Appendix A

United States Department of Agriculture Soil Descriptions

LOCATION AGAWAM MA+CT NH NY RI VT

Established Series
REV. WHT-CAW-SMF
01/2013

AGAWAM SERIES

The Agawam series consists of very deep, well drained soils formed in sandy, water deposited materials. They are level to steep soils on outwash plains and high stream terraces. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is moderately high or high in the upper solum and high or very high in the lower solum and substratum. Mean annual temperature is about 48 degrees F. and mean annual precipitation is about 47 inches.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Typic Dystrudepts

TYPICAL PEDON: Agawam fine sandy loam in a nearly level cultivated field at an elevation of about 124 feet. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; light brownish gray (10YR 6/2) dry; weak medium and coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary. (5 to 14 inches thick)

Bw1--11 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium and coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary.

Bw2--16 to 26 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary. (Combined thickness of the Bw horizons is 10 to 30 inches)

2C1--26 to 45 inches; olive(5Y 5/3) loamy fine sand; massive; very friable; few fine roots; strongly acid; clear smooth boundary.

2C2--45 to 55 inches; olive brown (2.5Y 4/4) loamy fine sand; massive; very friable; strongly acid; abrupt smooth boundary.

2C3--55 to 65 inches; olive (5Y 5/3) loamy sand; single grain; loose; strongly acid.

TYPE LOCATION: Hampshire County, Massachusetts; Town of Hatfield; 700 feet north of Elm Street at a point 1,600 feet west of its intersection with Prospect Street. USGS Mt. Holyoke quadrangle; Lat. 42 degrees 22 minutes 00 seconds N. and 72 degrees 36 minutes 42 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 15 to 35 inches. Coarse fragments range from 0 to 10 percent by volume in the surface, 0 to 30 percent in the B and C horizons above a depth of 40 inches and 0 to 60 percent below. The soil ranges from very strongly acid to slightly acid, unless limed.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. Dry value is 6 or more. It is fine sandy loam, very fine sandy loam, or loam. Undisturbed pedons have an A horizon that has hue of 7.5YR to 2.5Y, value of 2 to 3, and chroma of 1 to 3. It is 1 to 4 inches thick. Some pedons have a thin E horizon directly below the A.

The upper part of the Bw horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 3 to 8. The lower part has hue of 10YR to 5Y with value and chroma ranges the same as the upper part. Texture is fine sandy loam, very fine sandy loam, or loam in the upper part and fine sandy loam or very fine sandy loam in the lower part. Structure is very weak, weak or moderate granular or subangular blocky or the horizon is massive.

A BC horizon of sandy loam or loamy sand is present in some pedons. Color and texture ranges are the same as the lower part of the Bw. Structure is very weak, weak or moderate granular or the horizon is massive. It is up to 5 inches thick.

The C horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 to 4. It is stratified loamy fine sand, loamy sand, fine sand, sand, or their gravelly analogues and is very gravelly below a depth of 40 inches in some pedons. Consistence is very friable or loose.

COMPETING SERIES: These are the Barnstable, Branford, Haven, and Narragansett series. Barnstable soils formed in till over outwash and have rock fragments in the solum that are dominantly angular. Branford soils have hue of 5YR or redder throughout the B and C horizons. Narragansett soils lack stratified layers and have coarse fragments that are dominantly angular. Haven soils typically have more than 40 percent silt in the lower part of the Bw horizon.

GEOGRAPHIC SETTING: Agawam soils are level to steep soils on outwash plains and high stream terraces. Most areas are on slopes that are less than 15 percent. Steeper slopes are on terrace escarpments and steep sides of gullies in dissected outwash plains. The soils formed in sandy water deposited material derived principally from schist, granite, gneiss, and phyllite. Mean annual precipitation ranges from 28 to 55 inches and mean annual air temperature from 45 degrees to 50 degrees F. The mean growing season ranges from 120 to 200 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Enfield, Hadley, Hartland, Hinckley, Merrimac, Ninigret, Occum, Walpole, and Windsor soils on nearby landscapes. The excessively drained Hinckley and Windsor, somewhat excessively drained Merrimac, and well drained Enfield and Hartland soils are on associated outwash terraces and glacial lake plains. Well drained Hadley and Occum soils are on nearby floodplains. The moderately well drained Ninigret and poorly drained Walpole soils are associated in a drainage sequence with Agawam soils.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff and internal drainage are negligible to low. Saturated hydraulic conductivity is moderately high or high in the upper solum and high or very high in the lower solum and substratum.

USE AND VEGETATION: Most areas are used for growing cultivated hay, silage corn, tobacco, potatoes, and truck crops. Some areas are used for growing pasture. Native vegetation is forest composed mainly of white pine, gray birch, red maple, red, white, black, and scarlet oaks.

DISTRIBUTION AND EXTENT: Connecticut, Massachusetts, New Hampshire, eastern New York, and Rhode Island; MLRA's 101, 142, 144A, and 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Hampden and Hampshire Counties, Massachusetts, 1928.

REMARKS: It should be noted that as a competing series, Haven soils typically have soil temperatures that may be slightly warmer but a precise difference could not be quantified based on available data and historical use.

Diagnostic horizons and other features recognized in this pedon are:

1. Ochric epipedon - the zone from 0 to 11 inches (Ap horizon).
2. Cambic horizon - the zone from 11 to 26 inches (Bw horizons).
3. Contrasting particle-size - the coarse-loamy material contains less than 50 percent fine or coarser sand and the transition zone is less than 12.5 cm thick.

ADDITIONAL DATA: Reference samples from pedons S54MA023006, S58MA011002, S57NH013003, S70CT003001, S85VT027017, S85VT027018, S91MA011008, S93MA011003, S93MA011003, S93MA011004 from numerous counties and states, by NSSL, Lincoln, NE, various years. Pedon S70 CT-3-1 sampled in Hartford, Connecticut. Analysis by Beltsville soil survey laboratory.

National Cooperative Soil Survey
U.S.A.

LOCATION BELGRADE MA+CT NH NY VT
Established Series
Rev. WHT-CAW-MFF
06/2007

BELGRADE SERIES

The Belgrade series consists of very deep, moderately well drained soils formed in glaciolacustrine material. They are nearly level to moderately steep soils on terraces. Slope ranges from 0 to 25 percent. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum. Mean annual precipitation is about 44 inches, and the mean annual temperature is about 49 degrees F.

TAXONOMIC CLASS: Coarse-silty, mixed, active, mesic Aquic Dystric Eutrudepts

TYPICAL PEDON: Belgrade silt loam - on a 1 percent slope in a cultivated field at an elevation of about 8 meters. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 9 inches; very dark grayish brown (10YR 3/2) very fine sandy loam, light brownish gray (10YR 6/2) dry; very weak fine and medium granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary. (5 to 10 inches thick)

Bw1--9 to 20 inches; yellowish brown (10YR 5/6) very fine sandy loam; weak fine granular structure; very friable; common fine roots; slightly acid; clear wavy boundary. (6 to 32 inches thick)

BC--20 to 30 inches; light olive brown (2.5Y 5/4) very fine sandy loam; massive; very friable; few very fine roots; common prominent distinct strong brown (7.5YR 5/6) masses of iron accumulation and gray (5Y 5/1) iron depletions; slightly acid; clear wavy boundary. (0 to 12 inches thick)

C1--30 to 42 inches; light olive brown (2.5Y 5/4) very fine sandy loam; massive; very friable; many medium and coarse prominent yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) masses of iron accumulation, and gray (5Y 6/1) iron depletions; slightly acid; abrupt wavy boundary.

C2--42 to 65 inches; gray (5Y 6/1) loamy very fine sand; massive; very friable; common lenses of fine sand; many coarse prominent yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) masses of iron accumulation; neutral.

TYPE LOCATION: Essex County, Massachusetts; Town of Amesbury, 3.2 miles southwest of Amesbury Village, 550 feet north of Pleasant Valley Road and 700 feet east of Amesbury-Merrimac town line. Lat. 42 degrees 49 minutes 30 seconds N., and long. 70 degrees 58 minutes 04 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 20 to 44 inches. Reaction ranges from very strongly acid to neutral in the solum and from moderately acid to slightly alkaline in the C horizon; however, some subhorizon between depths of 10 and 30 inches is moderately acid to neutral. Redox depletions with a chroma of 2 or less are within a depth of 24 inches (60 cm). Gravel content ranges from 0 to 5 percent to a depth of 40 inches and 0 to 30 percent below 40 inches.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Dry value is 6 or more. It is silt loam or very fine sandy loam. Undisturbed areas have an A horizon with colors and textures similar to the Ap.

The Bw horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 3 to 6. Some pedons have lower Bw horizons with hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6, with common or many redoximorphic features. The Bw horizon is typically silt loam or very fine sandy loam but includes loamy very fine sand. Structure is weak coarse prismatic, weak fine subangular blocky or weak or moderate, fine or medium granular, or the horizon is massive. Consistence ranges from firm to very friable.

The BC horizon, where present, has characteristics similar to those of the lower Bw horizons.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It is silt loam, very fine sandy loam, or loamy very fine sand in the fine-earth fraction. Some pedons have thin strata of loamy fine sand, fine sand, or silt. Below a depth of 40 inches some pedons have unconforming strata of sand or sand and gravel, or very thin strata or varves of contrasting material. The C horizon has common to many redoximorphic features. It is usually massive, but some pedons have platy structure. Consistence ranges from firm to loose.

COMPETING SERIES: There are no other series in this family. The Bridgehampton, Boxford, Dartmouth, Enfield, Georgia, Hartland, Raynham, Scio, Suffield, Tisbury, Unadilla, and Wapping are similar soils in related families. Boxford soils are fine. Georgia soils are coarse-loamy. Suffield soils are coarse-silty over clayey. Bridgehampton, Dartmouth, Enfield, Scio, Tisbury, Unadilla, and Wapping soils have base saturation of less than 60 percent in the upper 30 inches. In addition, Enfield and Tisbury soils have sand and gravel within a depth of 40 inches. Hartland soils do not have redox depletions within a depth of 24 inches. Raynham soils have dominant chroma of 2 or less within a depth of 20 inches.

GEOGRAPHIC SETTING: Belgrade soils are nearly level to moderately steep soils on glaciolacustrine terraces. Slope ranges from 0 to 25 percent. The upper part of the soil formed in water or wind deposited material high in silt and very fine sand. The material below 40 inches is variable and ranges from gravelly sand to silt. Mean annual temperature ranges from 45 to 52 degrees F. and mean annual precipitation ranges from 40 to 47 inches. The frost free season ranges from 135 to 195 days.

GEOGRAPHICALLY ASSOCIATED SOILS: Belgrade soils are in a drainage sequence with the well drained Hartland, poorly drained Raynham, and very poorly drained Birdsall soils. Agawam, Deerfield, Enfield, Haven, Merrimac, Ninigret, Sudbury, Tisbury, and Windsor soils

are on nearby glacial outwash landforms. Hadley, Limerick, Occum, Pootatuck, Rippowam, and Winooski soils are on nearby flood plains.

DRAINAGE AND PERMEABILITY: Moderately well drained. Runoff is negligible to high. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum.

USE AND VEGETATION: Most areas are cleared and are used mainly for growing grasses, and legumes for hay or pasture, and for silage. Some areas are used for growing potatoes, sweet corn, vegetables, and other crops and some areas are used as urban land. Common trees in woodlots are white, red and black oak, hickory, sugar maple, red maple, ash, tulip, black birch, yellow birch, beech, white pine, and hemlock.

DISTRIBUTION AND EXTENT: Massachusetts, New Hampshire, New York, and Vermont (MLRAs 142, 144A, 144B, 145, and 149B). The soil is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Hartford County, Connecticut, 1959.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

1. Ochric epipedon - the zone from the soil surface to a depth of 9 inches (Ap horizon).
2. Cambic horizon - the zone from 9 to 30 inches (Bw and BC horizon).
3. Coarse-silty feature - the zone from 10 to 40 inches contains less than 15 percent sand that is coarser than very fine sand, including gravel, and about 5 to 10 percent clay (Bw, BC and Cl horizons).

National Cooperative Soil Survey
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Established Series
Rev. DAS-DCP-MCT-DHZ
05/2016

CANTON SERIES

The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy till. They are on nearly level to very steep moraines, hills, and ridges. Slope ranges from 0 to 45 percent. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum. The mean annual temperature is about 9 degrees C and the annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Canton fine sandy loam on a west-facing, convex, 8 percent slope in an extremely stony forested area at an elevation of about 210 meters. (Colors are for moist soil unless otherwise noted.)

Oi-- 0 to 5 cm; slightly decomposed plant material; (0 to 13 cm thick.)

A-- 5 to 13 cm; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; common fine roots; 5 percent gravel; very strongly acid (pH 4.6); abrupt smooth boundary. (3 to 10 cm thick.)

Bw1-- 13 to 30 cm; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 5 percent gravel; very strongly acid (pH 4.6); clear smooth boundary.

Bw2-- 30 to 41 cm; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 5 percent gravel; strongly acid (pH 5.1); clear smooth boundary.

Bw3-- 41 to 56 cm; yellowish brown (10YR 5/4) gravelly fine sandy loam; weak medium subangular blocky; friable; common fine and medium roots; 15 percent gravel; strongly acid (pH 5.1); abrupt smooth boundary. (Combined thickness of the Bw horizons is 43 to 84 cm.)

2C-- 56 to 170 cm; grayish brown (2.5Y 5/2) gravelly loamy sand; massive; friable; 25 percent gravel; moderately acid (pH 5.6).

TYPE LOCATION: Worcester County, Massachusetts; Town of Douglas; 150 feet south on Wallum Lake Road from the junction of Cedar and South West Main Streets, and 165 feet

southwest of Wallum Lake Road. USGS Oxford, MA quadrangle; Latitude 42 degrees, 2 minutes, 43.2 seconds N., and Longitude 71 degrees, 45 minutes, 44.8 seconds W., NAD 83.

RANGE IN CHARACTERISTICS: Solum thickness is commonly 46 to 91 cm, but ranges to 36 cm. It corresponds closely to the depth to the sandy till. Rock fragment content consists of 0 to 20 percent gravel and 0 to 5 percent cobbles in the solum. Stones and boulders are 0 to 15 percent of the surface and solum. Gravel content is 10 to 30 percent, cobbles 5 to 10 percent, and stones 0 to 10 percent in the substratum. Rock fragments are dominantly granite, gneiss, and quartzite. The soil ranges from extremely acid to moderately acid.

The O horizons, where present, consist of slightly, moderately, and/or highly decomposed organic material.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. Texture is sandy loam, fine sandy loam, loam, or very fine sandy loam in the fine-earth fraction. Some pedons have an Ap horizon with properties similar to the A horizon. It is up to 20 cm thick.

Some pedons have a thin E or AE horizon that has hue of 7.5YR or 10YR, value of 3 to 5 and chroma of 1 or 2 with similar textures to the A horizon. It is up to 8cm thick.

The upper Bw horizons commonly have hue of 10YR, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, value of 4 or 5, and chroma of 4 to 8. The lower Bw horizons have hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 4 to 8. Texture of the fine-earth fraction of the Bw horizons is commonly fine sandy loam and less commonly sandy loam, loam, and very fine sandy loam. Structure of the Bw horizons is granular or subangular blocky.

Some pedons have a Bs, Bh, or BC horizon with texture similar to the Bw horizons.

The 2C horizon typically has hue of 2.5Y or 5Y, value of 5 to 7, and chroma of 2 or 3. In some pedons hue is 10YR with chroma of 4 to 6. The texture of the fine-earth fraction is loamy fine sand or coarser. It is single grain or massive. Consistence is friable, very friable or loose. Thin lenses or small pockets of firm or very firm finer textured material are common below 91 cm.

COMPETING SERIES: There are no other soils currently in the same family.

The Agawam, Barnstable, Branford, Brookfield, Charlton, Haven, and Narragansett series are in closely related families. The Agawam, Branford, and Haven soils have stratified sand or sand and gravel in the series control section. In addition, the Branford soils have hues redder than 7.5YR throughout the B horizon. Barnstable soils formed in till over outwash and have less than 30 percent fine sand in the lower part of the Bw horizon. Brookfield soils formed in sulfur bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Charlton soils lack a lithologic discontinuity of abrupt change in sand distribution. Narragansett soils have more than 55 percent silt and very fine sand in the solum.

GEOGRAPHIC SETTING: Canton soils are on moraines and glaciated upland hills and ridges. Slope ranges from 0 to 45 percent. The soils formed in an acid coarse loamy supraglacial melt out till over loose sandy till of Wisconsin age derived from gneiss, granite and schist along with some fine-grained sandstone in some pedons. The loamy mantle in some pedons is influenced or derived from eolian sources. The climate is humid temperate. The mean annual air temperature is 7 to 11 degrees C, and the mean annual precipitation ranges from 1016 to 1295 mm.

GEOGRAPHICALLY ASSOCIATED SOILS: The Newfields series is the moderately well drained member of the same toposequence. The Agawam, Haven, Merrimac, and Warwick soils are on nearby glacial outwash kames and plains. The Barnstable, Brookfield, Charlton, Cheshire, Dutchess, Gloucester, Hollis, Montauk, Narragansett, and Paxton soils are on nearby glaciated uplands. Brookfield, Charlton, Cheshire, Dutchess, Gloucester, Hollis, Montauk, and Paxton soils do not have a contrasting particle size in the control section.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is negligible to medium. Internal drainage is medium. Saturated hydraulic conductivity is moderately high or high in the solum and high or very high in the substratum.

USE AND VEGETATION: Mostly forested. Some areas have been cleared of surface stones and are used for crops and pasture. Native vegetation is forest composed of eastern white pine, northern red, white, and black oaks, hickory, red maple, sugar maple, gray birch, yellow birch, beech, eastern hemlock, and white ash.

DISTRIBUTION AND EXTENT: Glaciated uplands in Connecticut, Massachusetts, New Hampshire, eastern New York, and Rhode Island, also in the Massachusetts Coastal Islands; MLRAs 144A, 145, and 149B. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Herkimer County, New York, 1969.

REMARKS:

Diagnostic horizons and features recognized in this pedon are:
1) Ochric epipedon - the zone from 0 to 13 cm (Oi and A horizons).
2) Cambic horizon - the zone from 13 to 56 cm (Bw1, Bw2, and Bw3 horizons).
3) Contrasting particle size - the coarse-loamy material contains less than 50 percent fine sand or coarser, and the transition zone between the two parts of the particle-size control section is less than 12 cm thick. (Coarse-loamy over sandy or sandy skeletal).
4) Lithologic discontinuity - abrupt change in sand distribution at 56 cm (2C horizon).
6) Particle-size control section - the zone from 30 to 105 cm (Bw1, Bw2, Bw3, and 2C horizons).

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for sample no. S1982CT007001, S1999CT013001, S1999CT013004, S2000CT007003, S2004CT011003, and pedons of similar soils is available through the National

Cooperative Soil Survey Soil Characterization Database:
http://ncsslabdatamart.sc.egov.usda.gov/

National Cooperative Soil Survey
U.S.A.

LOCATION CHARLTON CT+MA NH NY RI

Established Series
Rev. SJM-DCP-SMF
05/2016

CHARLTON SERIES

The Charlton series consists of very deep, well drained soils formed in loamy melt-out till. They are nearly level to very steep soils on moraines, hills, and ridges. Slope ranges from 0 to 60 percent. Saturated hydraulic conductivity is moderately high or high. Mean annual temperature is about 9 degrees C and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Charlton fine sandy loam - forested, very stony, at an elevation of about 170 meters. (Colors are for moist soil unless otherwise noted.)

Oe -- 0 to 4 cm; black (10YR 2/1) moderately decomposed forest plant material. (0 to 5 cm thick.)

A -- 4 to 10 cm; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; 5 percent gravel; very strongly acid; abrupt smooth boundary. (2 to 15 cm thick.)

Bw1 -- 10 to 18 cm; brown (7.5YR 4/4) fine sandy loam; weak coarse granular structure; very friable; many fine and medium roots; 5 percent gravel; very strongly acid; clear wavy boundary.

Bw2 -- 18 to 48 cm; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 10 percent gravel and cobbles; very strongly acid; clear wavy boundary.

Bw3 -- 48 to 69 cm; light olive brown (2.5Y 5/4) gravelly fine sandy loam; massive; very friable; few medium roots; 15 percent gravel and cobbles; very strongly acid; abrupt wavy boundary. (Combined thickness of the Bw horizons is 35 to 91 cm.)

C -- 69 to 165 cm; grayish brown (2.5Y 5/2) gravelly fine sandy loam with thin lenses of loamy sand; massive; friable, some lenses firm; few medium roots; 25 percent gravel and cobbles; strongly acid.

TYPE LOCATION: New Haven County, Connecticut; town of Middlebury, 3800 feet along Long Meadow Road from the intersection with South Street, 450 feet southeast along a gravel road and 50 feet west of the gravel road, 400 feet northeast of Long Meadow Pond, in a wooded area. USGS Naugatuck topographic quadrangle, Latitude 41 degrees 29 minutes 48.40 seconds

N., Longitude 73 degrees 7 minutes 04.59 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 31 to 109 cm. Depth to bedrock is commonly more than 180 cm. Rock fragments range from 5 to 35 percent by volume to a depth of 100 cm and up to 50 percent below 100 cm. Except where the surface layer is stony, the fragments are mostly subrounded gravel and typically make up 60 percent or more of the total rock fragments. Unless limed, reaction ranges from extremely acid to moderately acid.

The O horizon, where present, ranges from slightly decomposed to highly decomposed plant material.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. Disturbed pedons have an Ap horizon with value of 3 or 4 and chroma of 2 to 4. The A or Ap horizon is sandy loam, fine sandy loam, or loam in the fine-earth fraction. It has weak or moderate granular structure and is friable or very friable.

Some pedons have a thin AE or E horizon below the O horizon or a thin E horizon below the A horizon. It has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. Texture, structure, and consistence are like the A horizon.

The upper part of the Bw horizon has commonly hue of 7.5YR or 10YR, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, and value and chroma of 4 to 6. The lower part of the Bw horizon has hue of 10YR or 2.5Y and value and chroma of 4 to 6. Texture of the Bw horizon is loam, fine sandy loam, or sandy loam with less than 65 percent silt plus very fine sand in the fine earth fraction. It has weak granular or subangular blocky structure. Consistence is friable or very friable.

Some pedons have a BC horizon with value and chroma like the lower part of the Bw horizon, but includes hue of 5Y. The BC horizon commonly has texture, structure, and consistence like the Bw horizon but the range includes geologically derived structure appearing in the form of thin plates.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. Texture is loam, fine sandy loam, or sandy loam in the fine-earth fraction, with pockets or thin lenses of loamy sand. The horizon is massive or has plates of geogenic origin. Consistence commonly is very friable or friable but in some pedons includes firm.

COMPETING SERIES: These are Chadakoin, Chatfield, Maplecrest, Riverhead, Stinger and Valois. Chadakoin and Valois soils formed in till derived primary from sedimentary rock parent materials. Chatfield soils have a lithic contact at 50 to 100 cm below the mineral soil surface. Maplecrest soils formed in till derived from red sedimentary rock parent materials. Riverhead soils formed in glacial outwash deposits and have sandy textures in the substratum. Stinger soils are moderately deep to a paralithic contact and formed in colluvium on mountain side slopes in Oregon.

GEOGRAPHIC SETTING: Charlton soils are nearly level to very steep soils on moraines and glaciated upland hills and ridges. Slope ranges from 0 to 60 percent. The soils formed in acid melt-out till derived mainly from schist, gneiss, or granite. Mean annual temperature ranges from 7 to 11 degrees C and mean annual precipitation commonly ranges from 940 to 1245 cm, but the range includes as low as 660 cm in some places east of the Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 to 185 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Acton, Brookfield, Chatfield, Essex, Hollis, Leicester, Rainbow, Ridgebury, Sutton, Wapping, Whitman, and Woodbridge soils on nearby landscapes. The moderately well drained Sutton and the poorly drained Leicester soils are associated in a drainage sequence. Acton and Wapping soils are moderately well drained. Brookfield soils formed in iron sulfide bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Chatfield soils have bedrock within a depth of 50 to 100 cm. Essex soils have a sandy particle-size control section and a dense substratum. Hollis soils have bedrock within a depth of 25 to 50 cm. Rainbow and Woodbridge soils are moderately well drained with a dense substratum. Ridgebury soils are poorly drained and have a dense substratum. Whitman soils are very poorly drained with a dense substratum.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Areas cleared of stones are used for cultivated crops, specialty crops, hay, and pasture. Many scattered areas are used for community development. Stony areas are mostly wooded. Common trees are northern red, white, and black oak, hickory, sugar maple, red maple, black and gray birch, white ash, beech, white pine, and hemlock.

DISTRIBUTION AND EXTENT: Glaciated uplands in Connecticut, Massachusetts, New Hampshire, New York, and Rhode Island. MLRAs 142,144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Worcester County, Massachusetts, 1922.

REMARKS: Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 10 cm (Oe and A horizons).
2. Cambic horizon - the zone from 10 to 69 cm (Bw1, Bw2, and Bw3 horizons).
3. Particle-size class - coarse-loamy in the control section from 29 to 109 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006.

Full characterization data for sample numbers S1999NY005001 and S1999CT013003. Pedons analyzed by the KSSL, Lincoln, NE.

National Cooperative Soil Survey
U.S.A.

LOCATION CHATFIELD NH+CT MA NJ NY

Established Series
Rev. LWK-ERS-JTI
04/2017

CHATFIELD SERIES

The Chatfield series consists of well drained soils formed in loamy melt-out till. They are moderately deep to bedrock. They are nearly level to very steep soils on bedrock-controlled hills and ridges. Slope ranges from 0 to 70 percent. Crystalline bedrock is at depths of 50 to 100 cm. Saturated hydraulic conductivity is moderately high or high in the mineral soil. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Chatfield fine sandy loam, on a 13 percent slope in a wooded area. (Colors are for moist soil unless otherwise noted).

Oi -- 0 to 3 cm, slightly decomposed leaf, needle, and twig litter; extremely acid, pH 4.2. (0 to 15 cm thick.)

A -- 3 to 5 cm, very dark gray (10YR 3/1) fine sandy loam, gray (10YR 5/1), dry; weak fine subangular blocky structure; friable; many fine and medium roots throughout; 5 percent mixed gravel and cobbles; very strongly acid, pH 4.5; abrupt smooth boundary. (1 to 25 cm thick.)

Bw1-- 5 to 33 cm, strong brown (7.5YR 5/6) gravelly fine sandy loam; weak fine subangular blocky structure; friable; common fine roots throughout and common medium roots throughout; 15 percent mixed gravel and cobbles; very strongly acid, pH 4.5; abrupt wavy boundary.

Bw2 -- 33 to 76 cm, strong brown (7.5YR 5/6) gravelly fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots throughout; 20 percent mixed rock fragments; very strongly acid, pH 4.5; abrupt irregular boundary. (Combined thickness of the Bw horizons is 10 to 80 cm.)

2R -- 76 cm; fractured slightly-weathered schist bedrock.

TYPE LOCATION: Merrimack County, New Hampshire; Town of Epsom, 450 feet north-northwest from point 3,550 feet southwest along Old Mountain Road from intersection of Mountain Road and Tarlton Road. USGS Gossville, NH topographic quadrangle; Latitude 43 degrees, 11 minutes, 55.79 seconds N. and Longitude 71 degrees, 19 minutes, 22.31 seconds W., WGS 1984.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 40 to 97 cm. Depth to

bedrock ranges from 50 to 100 cm from the mineral soil surface. Rock fragments range from 5 to 50 percent by volume in the A horizon and from 5 to 35 percent in the B and C horizons. Rock fragments are typically gravel or channers, but include cobbles, stones, boulders and flagstones, particularly just above the bedrock.

The O horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 2. It is slightly, intermediately, and/or highly decomposed plant material. Reaction ranges from extremely acid to moderately acid.

The A, or Ap horizon where present, has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 4. Dry value is 6 or higher. Texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction. Structure is granular. Consistence is friable or very friable. Reaction ranges from extremely acid to moderately acid, unless limed.

The AB or BA horizon, where present, has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. Texture is similar to the A horizon.

The Bw horizon commonly has hue of 10YR or 2.5Y, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, value of 3 to 6, and chroma of 4 to 6. Texture is similar to the A horizon. The Bw horizon has subangular blocky or granular structure and is friable or very friable. Reaction ranges from very strongly acid to moderately acid.

Some pedons have a BC horizon with color and texture similar to the C horizon.

The C horizon, where present, has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4, and the 7.5YR hue is limited to horizons having a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (> 0.15). Texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction and may have lenses or pockets of loamy sand. It is massive and may have plate-like divisions. It is friable or firm. Reaction ranges from very strongly through moderately acid.

The 2R horizon is dominantly schist, granite, or gneiss bedrock. In places it is massive, but it dominantly has vertical and horizontal fractures in the upper 30 to 76 cm.

COMPETING SERIES: These are the Chadakoin, Charlton, Maplecrest, Riverhead, Stinger, and Valois series. Chadakoin, Maplecrest, and Valois soils formed in till derived primary from sedimentary rock parent materials and are greater than 100 cm to bedrock. Charlton soils formed in similar parent material to that of Chatfield but are greater than 150 cm to bedrock. Riverhead soils formed in glacial outwash deposits and are greater than 100 cm to bedrock. Stinger soils are not from Region R and have a paralithic contact.

GEOGRAPHIC SETTING: Chatfield soils are nearly level through very steep, and are on bedrock-controlled glaciated upland landscapes. The soils formed in a moderately thick mantle of melt-out till overlying granite, gneiss, or schist bedrock. Slope ranges from 0 to 70 percent. Mean annual precipitation ranges from 660 to 1270 mm, mean annual temperature ranges from 7

to 13 degrees C, and the frost free season ranges from 130 to 180 days. Elevation ranges from 0 to 305 meters above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brimfield, Brookfield, Cardigan, Charlton, Hollis, Narragansett, Nipmuck, and Paxton soils and their wetter associates on nearby landscapes where the soil mantle is deeper than 100 cm. Brimfield, Brookfield and Nipmuck soils formed in sulfur bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Brookfield, Charlton, Narragansett, and Paxton soils are very deep soils. Cardigan soils are moderately deep soils that formed in till derived from phyllite, slate, shale, and schist. Hollis soils are shallow to bedrock and are on nearby ridge crests and areas adjacent to rock outcrops.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Potential for surface runoff ranges from low to high. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Most areas of Chatfield soils are in woodland. Major tree species include white and northern red oaks, sugar maple, beech, eastern hemlock, eastern white pine, eastern red cedar, and shagbark hickory. Some small cleared areas are used for pasture, are idle, or are sites for residential and recreational development.

DISTRIBUTION AND EXTENT: Connecticut, eastern New York, Massachusetts, New Jersey, and New Hampshire. MLRAs 142, 143, 144A and 145. The soils are of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Orange County, New York, 1940.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon - the zone from 0 to 5 cm (Oi and A horizons).
Cambic horizon - the zone from 5 to 76 cm (Bw1 and Bw2 horizons).
Lithic contact - bedrock at 76 cm (2R horizon).
Particle-size control section - the zone from 28 to 76 cm (part of the Bw1 horizon and all of the Bw2 horizon).
Lithologic discontinuity - at a depth of 76 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for pedons with User Pedon IDs of S1955NH015003, S1982CT007005, S1982CT007005, S1982NY061001, S1995NH013003, S1995NJ037003, S1998NY005001, S1999NY005004, S2000NY005002, S2000NY005004, S2000NY005008, S2000NY119002, S2000NY119003, S2002CT005007, and S2002CT005008. Pedons analyzed by the NSSL, Lincoln, NE. The laboratory characterization data for these pedons and similar soils is available through the National Cooperative Soil Survey Soil Characterization Database: http://ncsslabdatamart.sc.egov.usda.gov/

National Cooperative Soil Survey
U.S.A.

LOCATION DEERFIELD MA+CT NH NY RI VT

Established Series
Rev. CAW-MFF
01/2017

DEERFIELD SERIES

The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial deposits. They are nearly level to strongly sloping soils on terraces, deltas, and outwash plains. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is high or very high. Mean annual temperature is about 49 degrees F. and mean annual precipitation is about 47 inches.

TAXONOMIC CLASS: Mixed, mesic Aquic Udipsamments

TYPICAL PEDON: Deerfield loamy sand in a cultivated field at an elevation of about 114 meters. (Colors are for moist soil.)

Ap --0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary. (6 to 12 inches thick)

Bw1 --9 to 15 inches; yellowish brown (10YR 5/6) loamy sand; very weak fine granular structure; very friable; common fine roots; moderately acid; clear wavy boundary.

Bw2 --15 to 19 inches; yellowish brown (10YR 5/4) loamy sand; very weak fine and medium granular structure; very friable; common fine roots; common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; moderately acid; clear smooth boundary. (Combined thickness of the Bw horizons is 5 to 27 inches thick)

BC --19 to 27 inches; olive brown (2.5Y 4/4) sand; single grain; loose; few fine roots; common fine and medium prominent strong brown (7.5YR 5/8) and reddish brown (5YR 4/4) masses of iron accumulation, and common fine and medium distinct grayish brown (10YR 5/2) iron depletions; moderately acid; abrupt smooth boundary. (0 to 20 inches thick)

C --27 to 65 inches; olive gray (5Y 4/2) sand grading with depth to dark gray (5Y 4/1) fine sand; single grain; loose; common fine and medium prominent strong brown (7.5YR 5/8) and reddish brown (5YR 4/4) masses of iron accumulation, and common fine and medium distinct grayish brown (10YR 5/2) iron depletions; moderately acid.

TYPE LOCATION: Franklin County, Massachusetts; Town of Montague, 800 feet west of a point on West Mineral Road that is 4,000 feet from the intersection of West Mineral Road and Millers Falls Road, in a cultivated field. Lat. 42 degrees 35 minutes 36.4 seconds N. and long. 72 degrees 30 minutes 48.2 seconds W., NAD 83.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 15 to 40 inches. Gravel, generally fine pebbles, ranges from 0 to 15 percent in the solum and 0 to 20 percent in the substratum. Reaction ranges from very strongly acid through slightly acid unless limed. Iron depletions with chroma of two or less are between depths of 15 and 40 inches from the mineral soil surface.

The Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is fine sandy loam, sandy loam, loamy fine sand, loamy sand, fine sand, or sand. Undisturbed pedons commonly have an O horizon, and a thin sequence of A, E, and Bs, Bhs or Bh horizons, or an AB horizon. The Ap or A horizon has weak or moderate very fine to medium granular structure.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. Texture of the upper part of the Bw horizon, within a depth of 10 inches from the soil surface, has the same range as the A horizon. Below 10 inches texture is loamy fine sand, loamy sand, fine sand, sand or coarse sand. Structure is weak, very fine to medium granular or subangular blocky, or is single grain.

The BC horizon, where present, has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 4. Texture range is the same as the lower part of the Bw horizon. Structure is weak, very fine to medium granular, or is single grain.

The C horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4. Texture is loamy fine sand, loamy sand, fine sand, sand or coarse sand. It is commonly single grain but may be very weak or weak granular.

COMPETING SERIES: These are the Algansee, Altmar, Brems, Brockatonorton, Elnora, Fortress, Livonia, Morocco, Ottokee, Partridge, Tedrow, and Zaborowsky series. The Algansee, Brems, Brockatonorton, Meckling, Morocco, Ottokee, Partridge, Tedrow, and Zaborowsky soils are from outside of region R. Algansee soils have an irregular decrease of organic matter with depth. Altmar soils have rock fragments dominated by sandstone. Birchwood soils formed in sandy sediments over glacial till. Brems and Ottokee soils have sola more than 40 inches thick, and Ottokee soils have lamellae. Elnora soils contain more fine sand in the lower part of the series control section. Fortress soils formed in anthropotransported soil material from eolian sand, outwash, ordredging activities. Livonia soils formed in glaciolacustrine parent material with neutral to moderately alkaline reaction and average less than 960 mm of annual precipitation. Meckling soils are calcareous throughout. Morocco soils have redox features within a depth of 15 inches. Partridge soils have bedrock at depths of 20 to 40 inches. Tedrow and Zaborosky soils have carbonates.

GEOGRAPHIC SETTING: Deerfield soils are level to strongly sloping soils on terraces, deltas, and outwash plains. Slope gradients are commonly 0 to 3 percent, but range to 15 percent. The soils formed in thick deposits of sand derived mainly from granite, gneiss and quartzite, but in places containing materials from schist and sandstone. The sand is poorly graded; medium sand is generally dominant and typically contains little or no gravel. Mean annual temperature ranges from 45 to 52 degrees F. and the mean annual precipitation typically ranges from 38 to 55

inches but the range includes as low as 26 inches in some places east of Adirondack Mountains in the Champlain Valley of New York. The mean growing season ranges from 120 to 200 days.

GEOGRAPHICALLY ASSOCIATED SOILS: Deerfield soils are in a drainage sequence that includes the excessively drained Carver and Windsor soils, the somewhat poorly drained Pipestone and Wareham soils, and the very poorly drained Scarboro soils. The well drained Agawam, somewhat excessively drained Merrimac, and the excessively drained Hinckley and Penwood soils are on nearby glacial outwash landforms and have sandy and gravelly substrata. The excessively drained Plymouth, somewhat excessively drained Gloucester, well drained Canton, Charlton, Cheshire, Essex and Paxton, and moderately well drained Woodbridge soils are on nearby glacial till uplands.

DRAINAGE AND PERMEABILITY: Moderately well drained. Runoff is negligible to low. Saturated hydraulic conductivity is high or very high.

USE AND VEGETATION: Mainly cleared and used for truck crops, tobacco, potatoes, hay, pasture and silage corn. Forested areas have pitch pine, white pine, gray birch, red maple, oaks, and sugar maple. Some areas are in urban uses.

DISTRIBUTION AND EXTENT: New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut and New York. (MLRA's 101, 142, 144A, 144B, 145, and 149B) The soils of this series are moderately extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Franklin County, Massachusetts, 1964.

REMARKS: The use of very weak structure in the A horizon is no longer an approved choice for grade of structure and has been removed from this description. Some pedons may exist where this grade of structure has been described.

Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 9 inches (Ap horizon).
2. Aquic feature - the zone from 19 to 40 inches has redox depletions with chroma of 2 or less. (BC and C horizons).

National Cooperative Soil Survey
U.S.A.

LOCATION HINCKLEY MA+CT ME NH NJ NY RI VT

Established Series
Rev. CAW-SMF-DCP
08/2017

HINCKLEY SERIES

The Hinckley series consists of very deep, excessively drained soils formed in glaciofluvial materials. They are nearly level through very steep soils on outwash terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers. Saturated hydraulic conductivity is high or very high. Slope ranges from 0 to 60 percent. Mean annual temperature is about 7 degrees C, and mean annual precipitation is about 1143 mm.

TAXONOMIC CLASS: Sandy-skeletal, mixed, mesic Typic Udorthents

TYPICAL PEDON: Hinckley loamy sand in woodland at an elevation of about 240 meters. (All colors are for moist soil.)

Oe -- 0 to 3 cm; moderately decomposed plant material derived from red pine needles and twigs. (0 to 5 cm thick.)

Ap -- 3 to 20 cm; very dark grayish brown (10YR 3/2) loamy sand; weak fine and medium granular structure; very friable; many fine and medium roots; 5 percent fine gravel; very strongly acid; abrupt smooth boundary. (3 to 25 cm thick.)

Bw1 -- 20 to 28 cm; strong brown (7.5YR 5/6) gravelly loamy sand; weak fine and medium granular structure; very friable; common fine and medium roots; 20 percent gravel; very strongly acid; clear smooth boundary.

Bw2 -- 28 to 41 cm; yellowish brown (10YR 5/4) gravelly loamy sand; weak fine and medium granular structure; very friable; common fine and medium roots; 25 percent gravel; very strongly acid; clear irregular boundary. (Combined thickness of the Bw horizon is 8 to 41 cm.)

BC -- 41 to 48 cm; yellowish brown (10YR 5/4) very gravelly sand; single grain; loose; common fine and medium roots; 40 percent gravel; strongly acid; clear smooth boundary. (0 to 13 cm thick)

C -- 48 to 165 cm; light olive brown (2.5Y 5/4) extremely gravelly sand consisting of stratified sand, gravel and cobbles; single grain; loose; common fine and medium roots in the upper 20 cm and very few below; 60 percent gravel and cobbles; moderately acid.

TYPE LOCATION: Worcester County, Massachusetts; Town of Petersham, Harvard Forest, 240 feet north of Tom Swamp Road at a point 1.15 miles east of the intersection of Athol Road

and Tom Swamp Road. USGS Athol, MA topographic quadrangle, Latitude 42 degrees, 30 minutes, 41.8 seconds N., and Longitude 72 degrees, 12 minutes, 28.9 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 30 to 87 cm. Rock fragment content of the solum ranges from 5 through 50 percent gravel, 0 through 30 percent cobbles, and 0 through 3 percent stones. Rock fragment content of individual horizons of the substratum ranges from 10 through 55 percent gravel, 5 through 25 percent cobbles, and 0 through 5 percent stones. In some places gravel content throughout the soil ranges up through 75 percent. The soil ranges from extremely acid through moderately acid, except where limed.

The O horizons, where present, consist of slightly, moderately, and/or highly decomposed plant material. They have hue N or 2.5YR through 7.5YR, value of 2 or 3, and chroma of 0 through 3.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 through 4. Texture of the fine-earth fraction is very fine sandy loam, fine sandy loam, sandy loam, coarse sandy loam, loamy fine sand, loamy sand, or loamy coarse sand. Structure is weak or moderate very fine through coarse granular or subangular blocky. Consistence is friable or very friable. Undisturbed areas have an A horizon that has hue of 10YR, value of 2 or 3, and chroma of 1 through 4.

Some pedons have thin E, Bhs, Bh, or Bs horizons below the A horizon.

The upper part of the Bw horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 3 through 8. The lower part has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 3 through 8. Texture, to a depth of 25 cm from the surface, is fine sandy loam, sandy loam, coarse sandy loam, loamy fine sand, loamy sand, or loamy coarse sand in the fine-earth fraction. Below 25 cm it is loamy fine sand, loamy sand, loamy coarse sand, fine sand, sand, or coarse sand in the fine-earth fraction. Structure commonly is weak fine and/or medium granular or the horizon is structureless, but ranges through weak subangular blocky in some places. It is very friable, friable, or loose.

Some pedons have a BC horizon with characteristics similar to both the B and 2C horizons.

The C horizon has hue of 7.5YR through 5Y, value of 3 through 7, and chroma of 2 through 8. Texture is loamy fine sand, loamy sand, loamy coarse sand, fine sand, sand or coarse sand in the fine-earth fraction, and is stratified.

COMPETING SERIES: These are the Bonaparte, Manchester, Mecosta, Multorpor, Otisville, Quonset, and Rikers series. Mecosta and Multorpor soils are from outside Land Resource Region R. Bonaparte soils have carbonates within a depth of 100 cm. Manchester soils have 5YR or redder hue in the Bw and C horizons. Mecosta soils are calcareous and Multorpor soils do not have Bw horizons. Otisville soils have rock fragments dominated by sandstone, shale, and slate. Quonset soils have rock fragments dominated by phyllite, slate, and shale. Rikers soils have carboliths in the soil.

GEOGRAPHIC SETTING: Hinckley soils are nearly level through very steep soils on outwash

terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers. Slope is generally 0 through 8 percent on tops of the terraces, outwash plains and deltas. Slope of 8 through 60 percent or more are on the kames, eskers and margins of the outwash plains, deltas, and terraces. The soils formed in glaciofluvial sand and gravel derived principally from granite, gneiss, and schist. Mean annual temperature ranges from 7 to 13 degrees C, and mean annual precipitation ranges from 1016 to 1270 mm. Length of the growing season ranges from 140 through 240 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Agawam, Canton, Charlton, Deerfield, Essex, Gloucester, Horseneck, Mashpee, Massasoit, Merrimac, Paxton, Pompton, Riverhead, Scarboro, Sudbury, Walpole, Wareham, and Windsor soils on nearby landscapes. Horseneck, Pompton, and Riverhead soils are commonly associates in the extreme southern portions of MLRA 144A. Agawam, Merrimac, and Riverhead soils are similar to Hinckley soils, but have cambic horizons. Canton, Charlton, Essex, Gloucester, and Paxton soils formed in till. Deerfield, Horseneck, and Sudbury soils are moderately well drained and Horseneck and Sudbury soils have Cambic horizons. Pompton soils have Cambic horizons and are moderately well and somewhat poorly drained. Scarboro soils are very poorly drained. Windsor soils have less than 15 percent rock fragments. Mashpee and Massasoit soils are poorly drained with spodic horizons. Walpole and Wareham soils are poorly drained.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained. Surface runoff is negligible through low. Saturated hydraulic conductivity is high or very high.

USE AND VEGETATION: Cleared areas are used for hay, pasture, and silage corn. In the southern Connecticut River Valley, Hinckley soils are used for growing tobacco and truck crops and in eastern Massachusetts, truck crops. Most areas are forested, brush land or used as urban land. Northern red, black, white, scarlet and scrub oak, eastern white and pitch pine, eastern hemlock, and gray birch are the common trees. Unimproved pasture and idle land support hardhack, little bluestem, bracken fern, sweet fern, and low bush blueberry.

DISTRIBUTION AND EXTENT: Connecticut, southern Maine, Massachusetts, New Hampshire, northern New Jersey, New York, Rhode Island, and Vermont. MLRA's 101, 141, 142, 144A, 145, and 149B. The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Oneida County, New York, 1913.

REMARKS: The use of the Hinckley series in frigid areas of Maine, and in MLRA 143 and 144B, is relict to before temperature classes. These have been removed from the SC file.

Diagnostic horizons and features recognized in this pedon are:
1. Ochric epipedon - the zone from 3 to 20 cm (Ap horizon).
2. Sandy-skeletal feature - the zone from 25 to 100 cm has a weighted average content of rock fragments of 51 percent and a particle size of the fine-earth fraction is sandy (Bw, BC, and C horizons).

ADDITIONAL DATA: Reference samples from pedons S55NH015002, S56MA011002, S56MA011003, S57MA023005, S58NH015002, S73MA009001, S73MA005002, S73MA009004, S73MA005005, S96NH013003 from Massachusetts and New Hampshire, samples by NSSL, Lincoln, NE, various dates.

National Cooperative Soil Survey
U.S.A.

LOCATION LIMERICK CT MA NH NY VT
Established Series
Rev. MHS-SHG-DCP
03/2010

LIMERICK SERIES

The Limerick series consists of very deep, poorly drained soils on flood plains. They formed in loamy alluvium. Saturated hydraulic conductivity is moderately high or high. Slope ranges from 0 through 3 percent. Mean annual precipitation is about 44 inches (1118 millimeters) and mean annual temperature is about 45 degrees F. (7 degrees C).

TAXONOMIC CLASS: Coarse-silty, mixed, superactive, nonacid, mesic Fluvaquentic Endoaquepts

TYPICAL PEDON: Limerick silt loam, on a nearly level slope in hay land at an elevation of about 10 feet. (Colors are for moist soil unless otherwise noted.)

Ap-- 0 to 8 inches (0 to 20 centimeters); dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; common very fine and fine and few medium roots; moderately acid; clear smooth boundary. (3 to 10 inches, 8 to 25 centimeters thick.)

BCg1-- 8 to 20 inches (20 to 50 centimeters); olive gray (5Y 4/2) silt loam; massive; friable; few very fine and fine roots; common medium prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4 and 10YR 5/6) soft masses of iron accumulation; moderately acid; clear smooth boundary.

BCg2-- 20 to 36 inches (50 to 91 centimeters); olive gray (5Y 4/2) silt loam; massive; common medium prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4 and 10YR 5/6) soft masses of iron accumulation; moderately acid; clear smooth boundary.

BCg3-- 36 to 54 inches; (91 to 137 centimeters) dark gray (5Y 4/1) silt loam; massive; common medium prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4 and 10YR 5/6) soft masses of iron accumulation; moderately acid; clear smooth boundary. (Combined thickness of the BCg horizons ranges from 6 to more than 60 inches (15 to 152 centimeters.)

Cg-- 54 to 65 inches (137 to 165 centimeters); dark greenish gray (5GY 4/1) silt loam; massive; few, fine prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4 and 10YR 5/6) soft masses of iron accumulation; neutral.

TYPE LOCATION: Hartford County, Connecticut; town of Wethersfield, 1200 feet east on Second Lane Road from Interstate 91 underpass, 50 feet south of Second Lane Road, on the Hartford South. USGS Hartford South topographic quadrangle, Latitude 41 degrees, 41 minutes,

52 seconds N., Longitude 72 degrees, 38 minutes, 22 seconds W., NAD 1983, on the floodplain of the Connecticut River.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 17 through more than 60 inches (43 through 152 centimeters). Depth to bedrock is more than 60 inches (152 centimeters). Reaction ranges from strongly acid through neutral. The weighted average of fine and coarser sands, in the particle-size control section, is less than 15 percent.

The A or Ap horizon has hue of 10YR through 5Y, value of 3 or 4, and chroma of 1 or 2. Texture is commonly silt loam but includes very fine sandy loam. Structure is typically weak or moderate, fine or medium granular. Some A horizons have weak or moderate medium subangular blocky structure. Consistence is friable or very friable. Redoximorphic features, where present, are few through many, fine through coarse and faint through prominent.

Some pedons have one or more Ab horizons with hue of 10YR through 5Y, value of 3 or 4 and chroma of 1 or 2. Texture is commonly silt loam but includes very fine sandy loam. The horizons are massive and friable.

Some pedons have a Bg horizon, 6 through 8 inches (15 through 20 centimeters) thick, with hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 or 2. Texture is commonly silt loam, but includes silt and very fine sandy loam. Structure is weak granular or subangular blocky, or the horizon is massive. Consistence is friable. Redoximorphic features are few through many, fine through coarse and distinct or prominent.

The BCg horizon, where present, has hue of 10YR through 5Y, value of 4 through 6 and chroma of 1 or 2. Texture is commonly silt loam, but includes silt and very fine sandy loam. Strata of loamy very fine sand, very fine sand, or fine sand .2 through .5 inches (.5 through 1.3 centimeters) thick are present in some horizons. The horizon is massive and friable or very friable. Redoximorphic features range from few through many, fine through coarse and faint through prominent.

The Cg horizon, where present, has hue of 10YR through 5GY, or is neutral, value of 4, and chroma of 0 through 2. Texture is commonly silt loam but includes silt and very fine sandy loam. Some pedons have thin strata (less than .2 inches) (.5 centimeters) that vary in color, texture, or reaction. Redoximorphic features, where present, are few through many and fine or medium prominent. The horizon is massive and friable.

Some pedons have a 2Cg horizon below a depth of 40 inches (100 centimeters). It has hue of 10YR through 5Y, value of 3 through 5, and chroma of 1 through 4. Texture is fine sandy loam through sand.

COMPETING SERIES: Oridia and Skokomish soils are currently the only other series in this family. Oridia and Skokomish series are from Land Reasource Region A in the Pacific Northwest.

The Lim, Rippowam, and Rumney series are in related families. They have a weighted average of fine sand or coarser in the particle-size control section of more than 15 percent. Rumney soils have a cooler mean annual soil temperature.

GEOGRAPHIC SETTING: Limerick soils are on the flood plains of major rivers and their larger tributaries. In some places they are on the flood plains of small streams. They may be on broad flat areas or in shallow depressions. The soils formed in recent alluvial deposits that are dominantly silt and very fine sand. Mean annual temperature ranges from about 45 through 52 degrees F. (7 through 11 degrees C.), and mean annual precipitation ranges from 30 through 50 inches (762 through 1270 millimeters). The frost-free season ranges from 105 through 180 days.

GEOGRAPHICALLY ASSOCIATED SOILS: Limerick soils are the poorly drained member of the drainage sequence that includes the well drained Hadley, the moderately well drained Winooski, and the very poorly drained Saco soils. Common associated soils on nearby terraces are the Agawam, Enfield, Hinckley, Merrimac, and Windsor series.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Poorly drained. Saturated hydraulic conductivity is moderately high or high. Most areas are flooded for periods of several days each year, usually in late winter or early spring.

USE AND VEGETATION: Most areas are used for long term hay and pasture. A few areas have been drained, and cultivated crops are grown. Common trees in wooded areas are red maple and eastern white pine. Additional woody species are alders, willows, black ash, green ash, swamp birch, river birch, silky willow, and pussy willow. Common herbaceous species include cinnamon fern, nettle, and skunk cabbage.

DISTRIBUTION AND EXTENT: Connecticut, Massachusetts, New Hampshire, New York, and Vermont; MLRAs 142, 144A, and 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Aroostook County, Maine, 1943.

REMARKS: 1. With this revision the classification is changed from Coarse-silty, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts to Coarse-silty, mixed, superactive, nonacid, mesic Fluvaquentic Endoaquepts. This reflects a review of current lab data available for this series, S70MA015004, S70MA015005 and S06CT003-001 were some of the selected lab pedons used to make the determination.

2. The use of the Limerick series in Maine, and in MLRA 143 and 144B, is relict to before temperature classes. These have been removed from the SC file.

3. Diagnostic horizons and features recognized in this pedon include:

a. Ochric epipedon - the zone from 0 to 8 inches (0 to 20 centimeters) (Ap horizon).
b. Cambic horizon - the zone from 8 to 54 inches (20 to 137 centimeters) (BCg horizons).
c. Aquept feature - Within 20 inches (50 centimeters) of the soil surface the matrix has chroma of 2 or less with redox concentrations.
d. Fluvaquentic feature: The organic-carbon content is presumed to decrease irregularly with depth between 10 through 50 inches (25 through 125 centimeters).
e. Nonacid reaction class - the pH is presumed to be 5.0 or more in 0.01m $CaCl_2$ in at least some part of the control section.
f. The material composing the Cg layer is presumed to change color upon exposure to air thereby not meeting the criteria for a Cambic horizon.

National Cooperative Soil Survey
U.S.A.

LOCATION MERRIMAC MA+CT NH NY RI VT

Established Series
Rev. DGG-WHT-MFF
01/2013

MERRIMAC SERIES

The Merrimac series consists of very deep, somewhat excessively drained soils formed in outwash. They are nearly level through very steep soils on outwash terraces and plains and other glaciofluvial landforms. Slope ranges from 0 through 35 percent. Saturated hydraulic conductivity is high or very high. Mean annual temperature is about 48 degrees F. (9 degrees C.) and mean annual precipitation is about 42 inches (1067 millimeters).

TAXONOMIC CLASS: Sandy, mixed, mesic Typic Dystrudepts

TYPICAL PEDON: Merrimac fine sandy loam cultivated, at an elevation of about 122 meters. (Colors are for moist soil.)

Ap -- 0 to 10 inches (0 to 25 centimeters); very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; very friable; many fine roots; 10 percent fine gravel; strongly acid; abrupt smooth boundary. (1 to 14 inches (3 to 36 centimeters) thick.)

Bwl -- 10 to 15 inches (25 to 38 centimeters); brown (7.5YR 4/4) fine sandy loam; weak fine and medium granular structure; very friable; common fine roots; 10 percent fine gravel; strongly acid; clear wavy boundary.

Bw2 -- 15 to 22 inches (38 to 56 centimeters); dark yellowish brown (10YR 4/4) gravelly sandy loam; weak fine and medium granular structure; very friable; few fine roots; 15 percent gravel; strongly acid; clear wavy boundary.

Bw3 -- 22 to 26 inches (56 to 66 centimeters); dark yellowish brown (10YR 4/4) gravelly loamy sand; very weak fine granular structure; very friable; few fine roots; 25 percent gravel; moderately acid; clear wavy boundary. (Combined thickness of the Bw horizons is 6 to 34 inches (15 to 86 centimeters).)

2C -- 26 to 65 inches (66 to 165 centimeters); 80 percent yellowish brown (10YR 5/4) and 20 percent dark grayish brown (10YR 4/2) very gravelly sand; single grain; loose; stratified; few fine roots in upper 4 inches; 40 percent gravel, 10 percent cobbles; moderately acid.

TYPE LOCATION: Franklin County, Massachusetts; Town of Leverett, 2.75 miles south-southeast of Montague Village, 0.13 miles southeast of Cranberry Pond, just west of Route 63. USGS Williamsburg, MA topographic quadrangle, Latitude 42 degrees, 29 minutes, 51 seconds

N. and Longitude 72 degrees, 31 minutes, 12 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 18 through 36 inches (46 through 91 centimeters). Rock fragments are commonly granite or gneiss or schist but up to 25 percent are flat, fine-grained slate, shale, or phyllite fragments. The upper part of the solum commonly has 2 through 20 percent gravel, but includes cobbles in some pedons, and the lower part 5 through 30 percent. The substratum contains 2 through 55 percent gravel and 5 through 15 percent cobbles. Total volume of rock fragments in the particle-size control section is less than 35 percent. Clay content is less than 18 percent. Reaction ranges from extremely acid through moderately acid, unless limed.

The O horizon, where present, ranges in thickness from 2 through 5 inches (4 through 13 centimeters). They have hue 2.5YR through 10YR, value 2 or 3, and chroma 1 through 3. They are fibric, hemic, or sapric material.

The Ap, A, or AE horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 through 4. Texture is fine sandy loam, sandy loam, or very fine sandy loam in the fine-earth fraction.

The E horizon, where present, ranges in thickness from 1 through 3 inches (3 through 8 centimeters). They have hue 5YR through 10YR, value 4 through 6, and chroma 1 through 4. Texture is sandy loam or coarse sandy loam in the fine-earth fraction. Some pedons have thin Spodic horizons less than 2 inches (5 centimeters) thick with hue 7.5YR or 10YR, value 4, and chroma 3 through 6.

The Bw horizon has hue of 7.5YR or 10YR in the upper part and 7.5YR through 2.5Y in the lower part. Value ranges from 3 through 6 and chroma from 3 through 8. Texture of the upper part of the Bw horizon is fine sandy loam, sandy loam, coarse sandy loam, or very fine sandy loam in the fine-earth fraction. It has granular or subangular blocky structure or the horizon is massive. The lower part of the B horizon is sandy loam, coarse sandy loam, loamy coarse sand, loamy fine sand, or loamy sand in the fine-earth fraction. Sandy loam textures do not extend below a depth of 27 inches (69 centimeters), but a minimum thickness of 5 inches (13 centimeters) of sandy loam overlies any lower B or 2C horizon that is loamy fine sand or coarser. The B subhorizon that lies above the 2C horizon in many pedons is single grain. Some pedons have a BC horizon that is similar to the lower part of the Bw.

The 2C horizon has hue of 10YR through 5Y and ranges widely in value and chroma. It consists of stratified coarse sand, sand, gravel, and cobbles and has a weighted texture of gravelly or very gravelly sand or coarse sand. Some pedons have thin lenses of loamy fine sand or fine sand.

COMPETING SERIES: These are the Hartford and Knickerbocker series. Hartford soils have hues of 5YR or redder in the Bw horizon. Knickerbocker soils generally have less rock fragments in the substratum and the fragments are commonly slate and dark shale.

GEOGRAPHIC SETTING: Merrimac soils are level to very steep soils on outwash plains and valley trains, and associated kames, eskers, stream terraces and water deposited parts of

moraines. The steeper slopes are on the margin escarpments of terraces and plains, and on eskers and kames. Slope ranges from 0 through 35 percent. The soils formed in water sorted gravelly and sandy material derived mainly from granitic, gneissic, and some schistose rocks. Mean annual precipitation ranges from 28 through 55 inches (711 through 1397 millimeters); mean annual air temperature ranges from 45 through 50 degrees F. (7 through 10 degrees C.), mean growing season ranges from 120 through 200 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Agawam, Hinckley, Mashpee (T), Massasoit (T), Sudbury, Scarboro, Walpole, and Windsor soils on nearby landscapes. The well drained Agawam soils are coarse-loamy over sandy or sandy-skeletal. The excessively drained Hinckley soils are sandy-skeletal. The very poorly drained Scarboro soils are in depressions. The moderately drained Sudbury soils are on adjacent, slightly lower landforms. The poorly drained Mashpee (T), Massasoit (T), and Walpole soils are in drainageways and on low landforms. The excessively drained Windsor soils have loamy fine sand to sand textures in the Bw horizon and lack rock fragments.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat excessively drained. Runoff is negligible through medium. Saturated hydraulic conductivity is high or very high.

USE AND VEGETATION: Most areas are cultivated and used for growing hay, pasture, silage, corn, or truck crops. Some areas are used to grow tobacco in the Connecticut River Valley in Massachusetts and Connecticut. Some areas are forested with mostly white pine, gray birch, hemlock, red maple, and red, black, white, and scarlet oaks.

DISTRIBUTION AND EXTENT: Massachusetts, Connecticut, New Hampshire, New York, Vermont, and Rhode Island. MLRA's 142, 144A, 145, and 149B. The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Merrimack County, New Hampshire, 1906.

REMARKS: The use of the Merrimac series in Maine, and in MLRA 143 and 144B, is relict to before temperature classes. These have been removed from the SC file.

Diagnostic horizons and other features recognized in this pedon are:

1. Ochric epipedon - the zone from 0 to 10 inches (0 to 25 centimeters) (Ap horizon).
2. Cambic horizon - the zone from 10 to 22 inches (25 to 56 centimeters) (Bw horizon).

National Cooperative Soil Survey
U.S.A.

LOCATION OCCUM CT +MA NH NY VT
Established Series
Rev. MFF-SMF
07/2006

OCCUM SERIES

The Occum series consists of very deep, well drained loamy soils formed in alluvial sediments. They are nearly level soils on flood plains, subject to common flooding. Slope ranges from 0 to 3 percent. Saturated hydraulic conductivity is moderately high or high in the loamy layers and high or very high in the sandy substratum. Mean annual temperature is about 50 degrees F., and mean annual precipitation is about 43 inches.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Fluventic Dystrudepts

TYPICAL PEDON: Occum fine sandy loam in a hayfield at an elevation of about 200 feet. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 10 inches; dark brown (10YR 3/3) fine sandy loam, pale brown (10YR 6/3) dry; weak fine and medium granular structure; very friable; many very fine and fine roots; moderately acid; clear smooth boundary. (5 to 12 inches thick)

Bw1--10 to 17 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine and fine roots; moderately acid; clear smooth boundary.

Bw2--17 to 28 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; very friable; few very fine and fine roots; moderately acid; clear smooth boundary. (Combined thickness of the Bw horizons is 14 to 35 inches.)

C1--28 to 32 inches; yellowish brown (10YR 5/4) loamy sand; single grain; loose; moderately acid; clear smooth boundary.

C2--32 to 42 inches; brown (10YR 5/3) and light olive brown (2.5Y 5/4) sand; single grain; loose; 10 percent gravel; moderately acid; clear smooth boundary.

C3--42 to 65 inches; brown (10YR 5/3) and light olive brown (2.5Y 5/4) very gravelly coarse sand; single grain; loose; 35 percent gravel; moderately acid.

TYPE LOCATION: Hartford County, Connecticut; town of Granby, 50 feet north of Mechanicsville Road at a point 2,300 feet west of Route 10 and 50 feet east of East Branch Salmon Brook. USGS Tariffville topographic quadrangle, latitude 41 degrees 58 minutes 15 seconds N., longitude 72 degrees 48 minutes 11 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the solum and depth to the coarse-textured substratum range from 20 to 40 inches. Gravel ranges from 0 to 15 percent by volume in the solum and from 0 to 60 percent in the substratum. Some pedons have up to 10 percent cobbles in the substratum. Unless limed, reaction ranges from very strongly acid to slightly acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. Texture is very fine sandy loam, fine sandy loam, or sandy loam. It has weak or moderate granular structure and is friable or very friable.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 3 to 6. It is commonly fine sandy loam or sandy loam, but the range includes very fine sandy loam or loam in the upper part. Some pedons have thin strata of loam, very fine sandy loam, or silt loam. The Bw horizon has granular or subangular blocky structure, or it is massive. Consistence is friable or very friable. Some pedons have thin Ab horizons.

The C horizon has hue of 7.5YR to 5Y, value of 3 to 7, and chroma of 2 to 6. Some pedons have redoximorphic features below a depth of 4 feet. Texture of individual layers ranges from loamy fine sand to coarse sand in the fine-earth fraction. Included in some pedons are thin loamy and/or extremely gravelly strata. Also, some pedons have a loamy C horizon layer just below the Bw horizon. The C horizon is single grain and loose in the sandy part. The loamy part is typically massive and friable. The thickness and number of subhorizons is variable and corresponds to the thickness and variability of
the alluvial deposits.

COMPETING SERIES: McNulty and Wenonah are other soils currently in the same family. McNulty soils are from outside of LRR R. McNulty soils average more than 60 inches of precipitation per year. Wenonah soils formed in alluvium containing sandstone, siltstone, and shale.

GEOGRAPHIC SETTING: Occum soils are nearly level soils on flood plains, along rivers and streams. Slope ranges from 0 to 3 percent. The soils formed in recent alluvium derived mostly from gneiss, granite, and schist. Mean annual temperature ranges from 45 to 54 degrees F., mean annual precipitation ranges from 35 to 50 inches but the range includes as low as 26 inches in some places east of Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 to 190 days.

GEOGRAPHICALLY ASSOCIATED SOILS: The Agawam, Enfield, Hadley, Haven, Hinckley, Lim, Limerick, Merrimac, Pootatuck, Rippowam, Saco, Suncook, Windsor, and Winooski series are on nearby landscapes. The moderately well drained Pootatuck and the poorly drained Rippowam soils are associated in a drainage sequence. Agawam, Enfield, Haven, and Merrimac soils have a regular decrease in organic carbon with depth. Hadley and Hamlin soils are coarse-silty. Pootatuck soils have low chroma mottles within a 24 inch depth. Hinckley and Windsor soils are on nearby terraces and outwash plains. Lim, Limerick, Saco, and Winooski soils are wetter silty floodplain associates. Suncook soils are sandy, excessively drained soils on floodplains.

DRAINAGE AND PERMEABILITY: Well drained. Surface runoff is negligible to low. Saturated hydraulic conductivity is moderately high or high in the loamy layers and high or very high in the sandy substratum. Many areas of these soils flood for short periods each year, but typically not during the growing season. The soils on higher positions flood occasionally.

USE AND VEGETATION: Cleared areas are used for cultivated crops, hay, and pasture. Common trees in wooded areas are sycamore, white pine, white, yellow, and gray birch, red maple, sugar maple, hemlock, and red and white oak.

DISTRIBUTION AND EXTENT: Holocene floodplains in Connecticut, Massachusetts, New Hampshire, New York, and Vermont; MLRAs 142, 144A and 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Windham County, Connecticut, 1980.

REMARKS: Cation exchange activity class placement determined from a review of limited lab data and similar or associated soils.

Diagnostic horizons and features recognized in this pedon are:

1. Ochric epipedon - the zone from 0 to 10 inches (Ap horizon).
2. Cambic horizon - the zone from 10 to 28 inches (Bw1, Bw2 horizons).
3. Fluventic feature - irregular decrease in organic carbon with depth and organic carbon is greater than 0.2 percent within 1.25 meters.
4. Particle-size class - averages coarse-loamy in the particle size control section from 10 to 40 inches (Bw1, Bw2, C1, C2 horizons).

National Cooperative Soil Survey
U.S.A.

LOCATION PIPESTONE MI+CT IN MA NH NY

Established Series
Rev. JDL-NWS-MLK
09/2012

PIPESTONE SERIES

The Pipestone series consists of very deep, somewhat poorly drained soils formed in sandy outwash on outwash plains, lake plains, beach ridges, and water-worked till plains. Slope ranges from 0 to 8 percent. Mean annual precipitation is about 889 mm (35 inches), and mean annual temperature is about 10.0 degrees C (50 degrees F).

TAXONOMIC CLASS: Sandy, mixed, mesic Typic Endoaquods

TYPICAL PEDON: Pipestone sand, on an east-facing, convex, 1 percent slope in an idle field. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 20 cm (8 inches); very dark brown (10YR 2/2) sand, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary. [0 to 25 cm (10 inches) thick]

E--20 to 28 cm (8 to 11 inches); grayish brown (10YR 5/2) sand; moderate medium granular structure; very friable; common fine roots; common medium distinct dark yellowish brown (10YR 3/4) masses of oxidized iron in the matrix; moderately acid; abrupt broken boundary. [0 to 25 cm (10 inches) thick]

Bhs--28 to 38 cm (11 to 15 inches); dark reddish brown (5YR 3/3) sand; weak medium subangular blocky structure; very friable; few fine roots; common fine distinct brown (7.5YR 4/4) masses of oxidized iron in the matrix; strongly acid; abrupt wavy boundary. [0 to 25 cm (10 inches) thick]

Bs--38 to 79 cm (15 to 31 inches); yellowish brown (10YR 5/6) sand; single grain; loose; moderately acid; abrupt wavy boundary. [10 to 58 cm (4 to 23 inches) thick]

C--79 to 152 cm (31 to 60 inches); light brownish gray (10YR 6/2) sand; single grain; loose; slightly acid.

TYPE LOCATION: Berrien County, Michigan; about 4 miles northeast of Benton Harbor; 1,172 feet south and 99 feet west of the northeast corner of sec. 28, T. 3 S., R. 18 W.; USGS Benton Heights topographic quadrangle; lat. 42 degrees 10 minutes 59.5 seconds N. and long. 86 degrees 23 minutes 54 seconds W., WGS 84.

RANGE IN CHARACTERISTICS:

Thickness of the solum: 51 to 127 cm (20 to 50 inches)
Rock fragment content: 0 to 10 percent gravel throughout

Ap horizon:
Hue: 7.5YR or 10YR
Value: 2 to 4
Chroma: 1 to 3
Texture: sand, fine sand, loamy sand, loamy fine sand, or loamy coarse sand
Reaction: extremely acid to neutral

A horizon, where present:
Hue: 7.5YR or 10YR, or is neutral
Value: 2 to 4
Chroma: 0 to 3
Texture: sand, fine sand, loamy sand, loamy fine sand, or loamy coarse sand
Reaction: extremely acid to neutral

Some forested pedons have partially or well decomposed O horizons of forest litter up to 13 cm (5 inches) thick.

E horizon:
Hue: 7.5YR or 10YR
Value: 5 to 7
Chroma: 1 to 3
Texture: sand, loamy sand, fine sand, loamy fine sand, coarse sand, or loamy coarse sand
Reaction: extremely acid to neutral

Bhs horizon:
Hue: 5YR to 10YR
Value: 2 or 3
Chroma: 2 or 3
Texture: sand, loamy sand, fine sand, coarse sand, or loamy coarse sand
Ortstein content: 0 to 30 percent of the surface area exposed in a vertical cut through the Bhs horizon and is present in less than 50 percent of the pedons
Reaction: extremely acid to moderately acid

Bs horizon in pedons without a Bhs horizon:
Hue: 5YR or 7.5YR
Value: 3 or 4
Chroma: 4
Texture: sand, loamy sand, loamy fine sand, fine sand, coarse sand, or loamy coarse sand
Reaction: extremely acid to moderately acid

Bs horizon in pedons with a Bhs horizon:
Hue: 5YR to 10YR
Value: 3 to 6

Chroma: 4 to 8
Iron and manganese concretions: present in some pedons
Texture: sand, loamy sand, loamy fine sand, fine sand, coarse sand, or loamy coarse sand
Reaction: extremely acid to moderately acid

BC horizon, where present:
Hue: 10YR
Value: 5 to 7
Chroma: 4 to 6
Texture: sand, loamy sand, loamy fine sand, fine sand, coarse sand, or loamy coarse sand
Reaction: very strongly acid to neutral

C horizon:
Hue: 7.5YR or 10YR
Value: 5 to 7
Chroma: 2 to 6
Texture: sand, fine sand, coarse sand, or loamy coarse sand
Reaction: very strongly acid to neutral

COMPETING SERIES: There are no other series in the same family.

GEOGRAPHIC SETTING: Pipestone soils are on outwash plains, lake plains, beach ridges, and till plains of Wisconsinan age. Slope ranges from 0 to 8 percent but are dominantly 0 to 4 percent. Pipestone soils formed in sandy outwash. Mean annual precipitation ranges from 711 to 914 mm (28 to 36 inches). Mean annual temperature ranges from 7.2 to 10.0 degrees C (45 to 50 degrees F).

GEOGRAPHICALLY ASSOCIATED SOILS: The excessively drained Oakville and Grattan soils and the poorly drained or very poorly drained Granby, Kingsville, and Newton soils are in a drainage sequences with Pipestone soils.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat poorly drained. The water table fluctuates from near the surface during prolonged wet periods to depths greater than 122 cm (4 feet) in dry seasons. Depth to the top of a seasonal high water table ranges from 15 to 46 cm (0.5 to 1.5 feet) between October and June in normal years. Potential for surface runoff is negligible or very low. Saturated hydraulic conductivity is high or very high. Permeability is rapid.

USE AND VEGETATION: A large part is or has been cultivated. Some areas are in permanent pasture. Special crops such as blueberries, cucumbers, and melons are important crops on this soil. Many areas are in various stages of reforestation. Natural forests are American basswood, eastern cottonwood, northern red oak, bitternut hickory, white ash, swamp white oak, and red maple.

DISTRIBUTION AND EXTENT: MLRAs 96, 97, 98, 99, 142, 144A, 149B in southern Michigan, northeastern Indiana, Connecticut, Massachusetts, New Hampshire and New York.

The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: AMHERST, MASSACHUSETTS

SERIES ESTABLISHED: Gratiot County, Michigan, 1975.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon: from the surface to a depth of 28 cm (11 inches) (Ap and E horizons).
Albic horizon: from a depth of 20 to 28 cm (8 to 11 inches) (E horizon).
Spodic horizon: from a depth of 28 to 38 cm (11 to 15 inches) (Bhs horizon).

ADDITIONAL DATA: Soil Interpretation Record: MI0257.

National Cooperative Soil Survey
U.S.A.

LOCATION POOTATUCK CT+MA NH NY RI VT

Established Series
Rev. MFF-SMF-GS
01/2013

POOTATUCK SERIES

The Pootatuck series consists of very deep, moderately well drained loamy soils formed in alluvial sediments. They are nearly level soils on floodplains subject to frequent to occasional flooding. Slope ranges from 0 to 3 percent. Saturated hydraulic conductivity is moderately high or high in the loamy upper layers and high or very high in the sandy substratum. Mean annual temperature is about 10 degrees Celsius, and mean annual precipitation is about 1190 millimeters.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts

TYPICAL PEDON: Pootatuck fine sandy loam - cutover woodland. (Colors are for moist soil.)

A-- 0 to 10 centimeters; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure; friable; common fine and medium roots; strongly acid; clear wavy boundary. (7 to 23 centimeters thick)

Bw1-- 10 to 41 centimeters; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.

Bw2-- 41 to 53 centimeters; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; moderately acid; few medium prominent strong brown (7.5YR 5/6) masses of iron concentration and few medium faint grayish brown (10YR 5/2) iron depletions; gradual wavy boundary.

Bw3-- 53 to 74 centimeters; dark brown (10YR 3/3) sandy loam; weak medium subangular blocky structure; friable; common medium faint grayish brown (10YR 5/2) iron depletions and common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; common fine roots; moderately acid; clear wavy boundary. (Combined thickness of the Bw horizons is 36 to 94 centimeters.)

C1-- 74 to 89 centimeters; brown (10YR 4/3) sand; single grain; loose; few fine roots; common medium faint grayish brown (10YR 5/2) iron depletions and common medium prominent strong brown (7.5YR 5/6) masses of iron concentration; moderately acid; clear wavy boundary.

C2-- 89 to 100 centimeters; grayish brown (2.5Y 5/2) sand; single grain; loose; 5 percent gravel; few fine faint pale brown (10YR 6/3) masses of iron concentrations; moderately acid; clear wavy

boundary.

C3-- 100 to 165 centimeters; grayish brown (10YR 5/2) gravelly sand; single grain; loose; 25 percent gravel; moderately acid.

TYPE LOCATION: Fairfield County, Connecticut; town of Easton, 800 feet northwest along Connecticut Route 58 from the intersection with Silver Hill Road, 200 feet east Route 58, and 80 feet west of the Aspetuck River; USGS Botsford topographic quadrangle, latitude 41 degrees 16 minutes 40 seconds N., longitude 73 degrees 19 minutes 32 seconds W, NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the solum and depth to the coarse-textured substratum range from 50 to 100 centimeters. Gravel ranges from 0 to 15 percent by volume in the solum and from 0 to 40 percent in the substratum. Some pedons have up to 15 percent cobbles in the substratum. Unless limed, reaction ranges very strongly acid to slightly acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. Texture is loam, very fine sandy loam, fine sandy loam, or sandy loam. It has weak or moderate granular structure and is friable or very friable.

The Bw horizon has hue of 10YR to 5Y and value and chroma of 3 to 6. Iron depletions occur above a depth of 60 centimeters. The Bw horizon is dominantly fine sandy loam or sandy loam, but includes thin strata of loam, very fine sandy loam, or silt loam. It has granular or subangular blocky structure, or the horizon is massive. Consistence is friable or very friable.

Some pedons have thin Ab horizon strata.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 6. It is typically has redoximorphic features in some subhorizon. Texture of individual layers ranges from loamy fine sand to coarse sand in the fine-earth fraction. Included in some pedons are thin loamy and/or extremely gravelly strata. Also, some pedons have a loamy C horizon layer just below the Bw horizon. The C horizon is single grain and loose in the sandy part. The loamy part is typically massive and friable or very friable. The thickness and number of subhorizons is variable and corresponds to the thickness and variability of the alluvial deposits.

COMPETING SERIES: The Basher, Iotla, Issue, and Philo series are currently in the same family. Iotla and Issue series are from outside LRRs L, R and S. Basher soils have hue of 7.5YR or redder in the B horizon. Philo soils formed in alluvium derived from sandstone and shale. Iotla soils have redoximorphic features in the upper part of the B horizon. Issue soils are somewhat poorly drained. Iotla and Issue soils also have mean summer temperatures more than 3 degrees Celsius warmer than Pootatuck soils.

GEOGRAPHIC SETTING: Pootatuck soils are nearly level soils on floodplains and along rivers and streams. Slope ranges from 0 to 3 percent. The soils formed in recent alluvium derived mostly from granite, gneiss, and schist. Mean annual temperature ranges from 7 to 13 degrees Celsius, mean annual precipitation ranges from 890 to 1270 millimeters, but the range includes as low as 660 millimeters in some places east of Adirondack Mountains in the Champlain Valley

of New York. The growing season ranges from 115 to 190 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Ellington, Ninigret, Occum, Rippowam, Tisbury, and Winooski soils and the Agawam, Enfield, Hadley, Haven, Hinckley, Lim, Limerick, Merrimac, Saco, Suncook, and Windsor soils on nearby landscapes. The well drained Occum and the poorly drained Rippowam soils are associated in a drainage sequence. Agawam, Enfield, Haven, Hinckley, Merrimac, and Windsor soils are better drained and are on nearby outwash terraces. Hadley, Lim, Limerick, and Saco soils are silty floodplain associates. Suncook soils are sandy, excessively drained soils on floodplains.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. Surface runoff is slow. Saturated hydraulic conductivity moderately is moderately high or high in the loamy upper layers and high or very high in the sandy substratum. Most areas of these soils flood for short periods each year. Soils on higher positions flood occasionally.

USE AND VEGETATION: Cleared areas are used for cultivated crops, hay, or pasture. Common trees in wooded areas are white pine, white, yellow, and gray birch, red maple, elm, alder, and hemlock.

DISTRIBUTION AND EXTENT: Floodplains in Connecticut, Massachusetts, New Hampshire, eastern New York, Rhode Island, and Vermont; MLRAs 142, 144A and 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Fairfield County, Connecticut, 1979.

REMARKS: Cation exchange activity class placement determined from a review of limited lab data and similar or associated soils.

Diagnostic horizons and features recognized in this pedon are:
1. Ochric epipedon - the zone from 0 to 10 centimeters (A horizon).
2. Cambic horizon - the zone from 10 to 74 centimeters (Bw horizons).
3. Fluvaquentic subgroup - irregular decrease in organic carbon with depth and organic carbon is greater than 0.2 percent within 1.25 meters; aquic conditions and low chroma redoximorphic depletions with chroma 2 or less are within a depth of 60 centimeters from the surface.
4. Particle-size class - averages coarse-loamy in the control section from 25 to 100 centimeters.

National Cooperative Soil Survey
U.S.A.

LOCATION RIPPOWAM CT +MA NH NY RI VT
Established Series
Rev. MFF-RAS-SMF
05/2005

RIPPOWAM SERIES

The Rippowam series consists of very deep, poorly drained loamy soils formed in alluvial sediments. They are nearly level soils on flood plains subject to frequent flooding. Slope ranges from 0 to 3 percent. Saturated hydraulic conductivity ranges from moderately high or high in the loamy upper part and high or very high in the underlying sandy materials. Mean annual temperature is about 50 degrees F., and mean annual precipitation is about 47 inches.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, nonacid, mesic Fluvaquentic Endoaquepts

TYPICAL PEDON: Rippowam fine sandy loam in woodland at an elevation of about 435 feet. (Colors are for moist soil.)

A--0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure; friable; common fine and medium roots; very strongly acid; clear wavy boundary. (3 to 9 inches thick)

Bg1--5 to 12 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; clear wavy boundary.

Bg2--12 to 19 inches; dark gray (10YR 4/1) fine sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; many medium prominent yellowish red (5YR 4/6) masses of iron accumulation; strongly acid; clear wavy boundary. (Combined thickness of the Bg horizons is 6 to 27 inches.)

BCg1--19 to 24 inches; grayish brown (10YR 5/2) sandy loam; massive; friable; few fine and medium roots; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.

BCg2--24 to 27 inches; very dark gray (10YR 3/1) sandy loam; massive; friable; few fine and medium roots; moderately acid; clear wavy boundary. (Combined thickness of the BCg horizons is 0 to 8 inches.)

Cg1--27 to 31 inches; dark gray (10YR 4/1) loamy sand; single grain; loose; moderately acid; clear wavy boundary.

Cg2--31 to 65 inches; grayish brown (10YR 5/2) very gravelly sand; single grain; loose; 35 percent gravel; moderately acid.

TYPE LOCATION: Fairfield County, Connecticut; town of Redding, 100 feet south of Cross Highway and 100 feet east of Little River. USGS Botsford Quadrangle; latitude 41 degrees 18 minutes 32 seconds N. and longitude 73 degrees 21 minutes 57 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 20 to 40 inches. The difference between mean summer soil temperature and mean winter soil temperature is at least 25 degrees F. or more. Depth to the coarse-textured substratum layers commonly is from 20 to 40 inches but can range to a depth of 45 inches. Gravel ranges from 0 to 15 percent by volume in the solum and from 0 to 40 percent in the sandy substratum. Some pedons have up to 10 percent cobbles in the coarse-textured substratum. Reaction ranges from very strongly acid to neutral with some subhorizon being moderately acid, slightly acid, or neutral within a depth of 40 inches.

Some pedons have an O horizon that is highly decomposed, moderately decomposed, or slightly decomposed plant material. It has hue of 5YR to 10YR and value and chroma of 3 or less.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. Texture is very fine sandy loam, fine sandy loam, or sandy loam. It typically has weak or moderate granular structure but some pedons have subangular blocky structure. Consistence is friable or very friable.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2 and typically has redoximorphic features. Texture of the Bg horizon is dominantly fine sandy loam or sandy loam. The Bg horizon is massive or has weak granular or subangular blocky structure. Consistence is friable or very friable.

The BCg horizon, where present, has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 or 4 and typically has redoximorphic features. Texture of the BCg horizon is dominantly fine sandy loam or sandy loam. The BCg horizon is massive or has weak granular or subangular blocky structure. Consistence is friable or very friable.

Included in some pedons are thin Ab horizons with characteristics similar to the A horizon.

The C horizon or layer has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. Texture ranges from loamy fine sand to coarse sand in the fine-earth fraction. The C horizon is typically single grain and loose. Some pedons have thin loamy strata and/or extremely gravelly strata in the lower part of the C horizon.

COMPETING SERIES: There are no soils currently in the same family. Briscot, Holderton, and Lim soils are in related families. Briscot soils are from outside LRR R.

Briscot soils are dominantly fine sandy loam or finer to a 60-inch depth and the difference between mean summer soil temperature and mean winter soil temperature is less than 25 degrees

F. Holderton soils have an active cation exchange activity class and have textures finer than loamy fine sand in the substratum. Lim soils have a texture to a depth of at least 18 inches that is commonly silt loam or very fine sandy loam but includes loam with more than 65 percent silt plus very fine sand.

GEOGRAPHIC SETTING: Rippowam soils are nearly level soils on flood plains along rivers and streams. They are in low areas. Slope ranges from 0 to 3 percent. The soils formed in recent alluvium derived mostly from granite, gneiss, and schist. Mean annual temperature ranges from 45 to 54 degrees F., mean annual precipitation ranges from 35 to 50 inches, and the growing season ranges from 115 to 190 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Agawam, Enfield, Hadley, Haven, Hinckley, Lim, Limerick, Merrimac, Ninigret, Occum, Pootatuck, Saco, Suncook, Tisbury, Windsor, and Winooski soils on nearby landscapes. The well drained Occum and the moderately well drained Pootatuck soils are associated in a drainage sequence. Agawam, Haven, Enfield, Hinckley, Merrimac, Ninigret, Tisbury, and Windsor soils are better drained soils on outwash terraces. Hadley soils are well drained silty floodplain associates. Suncook soils are excessively drained sandy soils on floodplains.

DRAINAGE AND PERMEABILITY: Poorly drained. Surface runoff is negligible to low. Saturated hydraulic conductivity ranges from moderately high or high in the loamy upper part and high or very high in the underlying sandy materials. These soils typically flood in the spring of each year. Rippowam soils have a water table at or near the surface much of this year.

USE AND VEGETATION: Most areas are in brushy woodland. Common trees are red maple, willow, and alder. A few areas are cleared and used for pasture or hay.

DISTRIBUTION AND EXTENT: Floodplains in Connecticut, Massachusetts, New Hampshire, eastern New York, Rhode Island, and Vermont; MLRAs 142, 144A, 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Fairfield County, Connecticut, 1979.

REMARKS: This revision reflects conformance to a change in soil taxonomy based on a revision to the definition of the cambic horizon made in 1999. Cation exchange activity class placement determined from a review of limited lab data and similar or associated soils.

Diagnostic horizons and features recognized in this pedon are:

1. Ochric epipedon - the zone from 0 to 5 inches (A horizon).
2. Cambic horizon - the zone from 5 to 27 inches (Bg1, Bg2, BCg1, and BCg2 horizons). Evidence of alteration is in the form of description of subangular blocky structure and inferred

absence of rock structure to a depth of 27 inches.
3. Particle-size class - averages coarse-loamy in the control section from 10 to 40 inches.

National Cooperative Soil Survey
U.S.A.

LOCATION SACO CT+MA NH NY VT
Established Series
Rev. MFF-SMF
05/1999

SACO SERIES

The Saco series consists of very deep, very poorly drained soils formed in silty alluvial deposits. They are nearly level soils on flood plains, subject to frequent flooding. Slope ranges from 0 to 2 percent. Permeability is moderate in the silty layers and rapid or very rapid in the underlying sandy materials. Mean annual temperature is about 50 degrees F. and mean annual precipitation is about 47 inches.

TAXONOMIC CLASS: Coarse-silty, mixed, active, nonacid, mesic Fluvaquentic Humaquepts

TYPICAL PEDON: Saco silt loam - grass field. (Colors are for moist soil unless otherwise noted.)

A--0 to 12 inches; very dark gray (10YR 3/1) silt loam; gray (10YR 5/1) dry; weak coarse granular structure; very friable; many fine roots; moderately acid; clear wavy boundary. (10 to 15 inches thick)

Cg1--12 to 32 inches; gray (10YR 5/1) silt loam; massive; friable; few fine roots; common medium faint light brownish gray (10YR 6/2) iron depletions and common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; moderately acid; clear wavy boundary.

Cg2--32 to 48 inches; gray (5Y 5/1) silt loam with thin strata of very dark gray (10YR 3/1) silt loam; massive; friable; moderately acid; clear wavy boundary. (Combined thickness of the silty C horizon layers is 30 to 50 inches)

2Cg3--48 to 60 inches; gray (10YR 6/1 and 5/1) stratified coarse sand and medium sand; single grain; loose; moderately acid.

TYPE LOCATION: Hartford County, Connecticut; town of South Windsor, 1200 feet west along Newbury Road from the intersection with Ter Street and 270 feet south of Newbury Road. USGS Manchester quadrangle; latitude 41 degrees 49 minutes 49 seconds N., Longitude 72 degrees 37 minutes 23 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Depth to the coarse-textured substratum layers is more than 40 inches. Gravel ranges from 0 to 5 percent to 40 inches and from 0 to 40 percent below. The soil is strongly acid to neutral to a depth of about 30 inches and moderately acid to neutral below.

Some pedons have O horizons up to 5 inches thick.

The A or Ap horizon has hue of 7.5YR through 2.5Y, value of 2 or 3 and chroma of 1 through 3. Texture is silt loam, mucky silt loam, very fine sandy loam or mucky very fine sandy loam. It has weak granular structure or the horizon is massive. Consistence is friable or very friable.

Individual layers of the C horizon are neutral or have hue of 10YR through 5Y, value of 3 through 6 and chroma of 0 through 2. Layers within a 30 inch depth commonly have value of 5 or 6 and chroma of 1 or 2 and have redoximorphic features. Included in some pedons are thin, Ab horizon strata. Texture of the C horizon to a depth of 40 inches or more is silt loam or very fine sandy loam. Below 40 inches texture ranges to include loamy fine sand through very gravelly coarse sand. Some pedons have subhorizons with texture of fine sandy loam. The upper silty layers are massive or have weak structure. Consistence is friable or very friable. The underlying sandy layers are single grain and loose. The thickness and number of horizons below the A horizon is variable and corresponds to the thickness and variability of the alluvial deposits.

COMPETING SERIES: There are no other series currently in the same family.

The Birdsall, Mansfield, Rippowam, Wayland and Whitman soils are similar soils in related families.

Birdsall, Mansfield and Whitman soils have a regular decrease in organic-carbon with depth. In addition, Mansfield and Whitman soils are coarse-loamy. Wayland soils have a dark A horizon less than 10 inches thick and are fine-silty. Rippowam soils are coarse-loamy and poorly drained.

GEOGRAPHIC SETTING: Saco soils are nearly level soils on flood plains, along rivers and streams. They are in depressed areas. Slope ranges from 0 to 2 percent. The soils formed in recent silty alluvium derived mostly from granite, gneiss, schist, shale and sandstone. Mean annual temperature is 45 to 54 degrees F., mean annual precipitation is 32 to 50 inches and the growing season is 120 to 195 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Agawam, Bash, Enfield, Hadley, Haven, Hinckley, Limerick, Merrimac, Ninigret, Occum, Pootatuck, Rippowam, Suncook, Tisbury, Windsor and Winooski soils on nearby landscapes. The well drained Hadley, moderately well drained Winooski and poorly drained Limerick soils are associated in a drainage sequence. Agawam, Enfield, Haven, Hinckley, Merrimac, Ninigret, Tisbury, and Windsor soils are better drained soils on nearby outwash terraces. Bash, Occum, Pootatuck and Suncook soils are coarser textured flood plain associates.

DRAINAGE AND PERMEABILITY: Very poorly drained. Surface runoff is slow or very slow. In places water is ponded on the surface from late fall through early spring. Permeability is moderate in the silty layers and rapid or very rapid in the underlying sandy materials. These soils flood in the spring and after periods of heavy rainfall.

USE AND VEGETATION: Most areas are in brushy woodland. Common trees are red maple, elm, willow, pin oak, and alder. Fir and spruce are common in the northern areas. A few areas are in low quality pasture.

DISTRIBUTION AND EXTENT: Floodplains in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and eastern New York; MLRAs 101, 142, 144A, and 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Cumberland County, Maine, 1915.

REMARKS: This revision reflects change in soil taxonomy and general updating. Cation exchange activity class placement determined from a review of limited lab data and similar or associated soils. Saco soils were previously used in Maine but soil temperature studies have resulted in the mesic soil temperature regime not being used currently.

Diagnostic horizons and features recognized in this pedon are:

1. Umbric epipedon - the zone from 0 to 12 inches (A);
2. Fluvaquentic subgroup - an irregular decrease in organic-carbon content between a depth of 25 cm. and 125 cm. and slope less than 25 percent;
3. Particle size class - averages coarse-silty in the control section 10 to 40 inches.

National Cooperative Soil Survey
U.S.A.

LOCATION SCARBORO MA CT NH NY RI VT
Established Series
Rev. WHT-SMF-MFF
03/2010

SCARBORO SERIES

The Scarboro series consists of very deep, very poorly drained soils in sandy glaciofluvial deposits on outwash plains, deltas, and terraces. They are nearly level soils in depressions. Slope ranges from 0 through 3 percent. Saturated hydraulic conductivity is high or very high. Mean annual temperature is about 49 degrees F. (9 degrees C.) and the mean annual precipitation is about 44 inches (1118 millimeters).

TAXONOMIC CLASS: Sandy, mixed, mesic Histic Humaquepts

TYPICAL PEDON: Scarboro mucky fine sandy loam woodland; in an area of Scarboro mucky fine sandy loam at an elevation of about 212 meters. (Colors are for moist soil.)

Oi-- 0 to 1 inch (0 to 3 centimeters); slightly decomposed maple leaves and other plant material

Oa-- 1 to 8 inches (3 to 20 centimeters); dark brown (10YR3/3) mucky peat; thin platy structure; friable; common fine roots; very strongly acid; abrupt wavy boundary. (Combined thickness of Oi, Oe, and Oa horizons is 8 to 13 inches (20 to 33 centimeters).)

A-- 8 to 14 inches (20 to 36 centimeters); black (N 2/0) mucky fine sandy loam; weak medium granular structure; friable; common fine roots; very strongly acid; abrupt smooth boundary. (0 to 14 inches (0 to 36 centimeters) thick.)

Cg1-- 14 to 19 inches (36 to 48 centimeters); grayish brown (2.5Y 5/2) loamy sand; massive; friable; many fine roots; very strongly acid; abrupt irregular boundary.

Cg2-- 19 to 22 inches (48 to 56 centimeters); grayish brown (2.5Y 5/2) sand; massive; friable; few fine roots; 10 percent rock fragments; common medium prominent dark brown (7.5YR 3/2) areas of iron depletion and common medium prominent yellowish red (5YR 4/6) masses of iron; very strongly acid; clear wavy boundary.

Cg3-- 22 to 65 inches (56 to 165 centimeters); grayish brown (2.5Y 5/2) gravelly sand; single grain; loose; 15 percent rock fragments; strongly acid.

TYPE LOCATION: 60 feet north of Electric Avenue near the south edge of Forest Hill Cemetery in the City of Fitchburg, Massachusetts. USGS Fitchburg, MA topographic quadrangle, Latitude 42 degrees, 34 minutes, 0.3 seconds N., and Longitude 71 degrees, 48 minutes, 33.3 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Stones range from 0 through 5 percent by volume in the A horizon and upper part of the C horizon and are absent in the lower part of the C horizon. Cobbles range from 0 through 10 percent in the A horizon, 0 through 5 percent in the upper part of the C horizon, and are absent in the lower part of the C horizon. Gravel ranges from 0 through 10 percent by volume in the A horizon, 0 through 20 percent in the upper part of the C horizon to a depth of 30 inches (76 centimeters), and 0 through 50 percent in the C horizon below a depth of 30 inches (76 centimeters). Reaction ranges from very strongly acid through moderately acid in the A horizon and upper part of the C horizon, and from very strongly acid through neutral in the lower part of the C horizon.

The O horizon is commonly mucky peat or muck, but the range includes thin layers of peat at the surface. The O horizon is neutral or has hue 5YR through 10YR, value of 2 or 3, and chroma of 0 through 3.

The A horizon where present is neutral or has hue of 5YR through 2.5Y, value of 2 through 3, and chroma of 0 through 2. It is fine sandy loam, sandy loam, loamy fine sand, loamy sand, fine sand, sand or their mucky analogues in the fine-earth fraction. This horizon commonly is 5 through 14 inches (13 through 36 centimeters) thick, but in some places may be less than 5 inches (13 centimeters) thick or absent.

The upper part of the Cg horizon is neutral or has hue of 10YR through 5Y, value of 3 through 7, and chroma of 0 through 3. Some pedons have few or common fine through coarse redoximorphic features. Texture is fine sandy loam, sandy loam, loamy fine sand, loamy coarse sand, loamy sand, fine sand, or sand in the fine-earth fraction.

The lower part of the C horizon is neutral or has hue of 10YR through 5Y or 5GY, value of 3 through 6, and chroma of 0 through 4. Redoximorphic features range from none through many and are fine through coarse. Texture is loamy fine sand, loamy sand, fine sand, sand, loamy coarse sand, or coarse sand in the fine-earth fraction. The C horizon is structureless and loose, very friable, or friable. It is often stratified.

COMPETING SERIES: These are the Ackerman and Antung series. These soils are from outside LRR R and S. Ackerman soils are more alkaline in the organic horizons and the upper part of the C horizon. They also contain coprogenous material. Antung soils are more alkaline and effervesce in the C horizon.

GEOGRAPHIC SETTING: Scarboro soils are in level or nearly level depressions on outwash plains, deltas, and terraces. Slope is less than 3 percent. The soils formed in sandy glaciofluvial deposits. Mean annual temperature ranges from 46 through 57 degrees F. (8 through 14 degrees C.) and mean annual precipitation ranges from 38 through 55 inches (965 through 1397 millimeters).

GEOGRAPHICALLY ASSOCIATED SOILS: The excessively drained Hinckley, Windsor and Penwood soils, somewhat excessively drained Merrimac soils, moderately well drained Sudbury and Deerfield soils, poorly drained Mashpee(T) and Massasoit(T) soils, somewhat poorly and poorly drained Walpole and Wareham soils are on higher positions on associated

glaciofluvial landforms. The poorly drained Rippowam soils and very poorly drained Saco soils are on nearby flood plains. The very poorly drained Rainberry soils lack a Histic epipedon and have Spodic horizons.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Very poorly drained. Saturated hydraulic conductivity is high or very high. Surface runoff is high or very high. The water table is at or near the surface for 6 to 12 months of the year, and many areas are ponded for short periods.

USE AND VEGETATION: Shrub and brush land or woodland. Common shrubs are speckled alder, smooth alder, rhoda azalea, steeplebush spirea, leatherleaf, labrador-tea, winterberry, highbush blueberry, large cranberry, black huckleberry, poison sumac, and sheep laurel. Common trees are red maple, slippery elm, Atlantic white cedar, tamarack, eastern white pine, willow, and gray birch.

DISTRIBUTION AND EXTENT: Glaciofluvial landforms in Connecticut, Massachusetts, New Hampshire, Rhode Island, eastern New York, and Vermont. MLRAs 142, 144A, 145, and 149B. Scarboro soils are extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Cumberland County, Maine; 1915.

REMARKS: 1. Geographical location (latitude and longitude) determined from the published soil survey.

2. The use of the Scarboro series in Maine, and in MLRA 144B, is relict to before temperature classes. These have been removed from the SC file.

Diagnostic horizons and features recognized in this pedon are:
1. Histic epipedon - the zone from the soil surface to a depth of 8 inches (20 centimeters), (Oi and Oa horizons).
2. Thickness of organic soil materials is 8 inches (20 centimeters).
3. Aquic conditions - Histic epipedon or the zone from 19 to 22 inches (48 to 56 centimeters) has 50 percent or more 2 chroma with redox concentrations (Cg2 horizon).

National Cooperative Soil Survey
U.S.A.

LOCATION SCIO NY+MA ME NH PA RI

Established Series
Rev. JDV-WEH-DAS
03/2013

SCIO SERIES

The Scio series consists of very deep, moderately well drained soils formed in eolian, lacustrine, or alluvial sediments dominated by silt and very fine sand. They are on terraces, old alluvial fans, lake plains, outwash plains and lakebeds. Saturated hydraulic conductivity is moderately high or high to a depth of 100 centimeters and ranges from moderately low through very high below 100 centimeters. Slope ranges from 0 through 25 percent. Mean annual temperature is 9 degrees C., and mean annual precipitation is 940 millimeters.

TAXONOMIC CLASS: Coarse-silty, mixed, active, mesic Aquic Dystrudepts

TYPICAL PEDON: Scio silt loam, on a 2 percent slope in a pasture. (Colors are for moist soil.)

Ap -- 0 to 23 centimeters; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many fine roots; moderately acid; limed; abrupt smooth boundary. (10 to 33 centimeters thick.)

Bw1 -- 23 to 48 centimeters; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; common medium and fine pores; strongly acid; clear wavy boundary.

Bw2 -- 48 to 79 centimeters; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; common medium and fine pores; common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation and light brownish gray (10YR 6/2) areas of iron depletion in the matrix; strongly acid; clear smooth boundary. (Combined thickness of the Bw horizon is 38 to 135 centimeters.)

C -- 79 to 102 centimeters; brown (10YR 5/3) silt loam; very weak thick plate like divisions; friable; common medium and fine pores; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation and distinct gray (10YR 6/1) areas of iron depletion in the matrix; 3 percent rock fragments; strongly acid; abrupt smooth boundary. (20 to 102 centimeters thick.)

2Cg -- 102 to 183 centimeters; grayish brown (2.5Y 5/2) very gravelly loamy sand; single grain; loose; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; 35 percent gravel; moderately acid.

TYPE LOCATION: Wyoming County, New York; town of Pike, 2 miles north of village of Pike on west side of Campbell Road, 0.7 mile north of junction of Campbell Road and Safford

Road. USGS Pike, NY topographic quadrangle; Latitude 42 degrees, 35 minutes, 17 seconds N. and Longitude 78 degrees, 09 minutes, 26 seconds W., NAD 1927.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 50 through 168 centimeters. Depth to material contrasting with solum texture is 100 centimeters or more. Depth to bedrock is greater than 1.5 meters. Depth to free carbonates is greater than 2 meters. Rock fragments, mainly gravel and cobbles, range from 0 through 5 percent above 100 centimeters and from 0 through 60 percent below 100 centimeters. Stones cover 0 through 10 percent of the surface in some areas.

Some pedons have an O horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 or 3. It is silt loam, very fine sandy loam, or fine sandy loam. Undisturbed pedons have an A horizon with colors similar to the Ap, but also include value of 2. They are 2 through 5 inches thick. Reaction ranges from extremely acid through strongly acid, unless limed.

The B horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 3 through 6. Redox depletions and accumulations are within a depth of 24 inches (61 centimeters). It is silt loam or very fine sandy loam. Reaction ranges from extremely acid through strongly acid to a depth of 76 centimeters and very strongly through moderately acid below 76 centimeters. Some pedons have a BC horizon.

The C horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 1 through 6. Texture is silt loam to fine sandy loam. It may contain strata of gravel and sand. It is massive or single grain, and may have plate-like divisions. Reaction ranges from very strongly acid through slightly alkaline.

The 2C horizon, if present, has hue of 7.5YR through 5Y, value of 3 through 6, and chroma of 1 through 4. It is silt loam, very fine sandy loam, or loamy very fine sand in the fine earth fraction. In addition, below a depth of 40 inches (100 centimeters) it can range from fine sandy loam through very gravelly sand. Reaction ranges from very strongly acid through slightly alkaline.

COMPETING SERIES: The Dartmouth series is the only other series in the same family. Dartmouth soils have a gravel content of 0 through 5 percent throughout, and have below a depth of 40 inches (100 centimeters) textures limited to silt, silt loam, very fine sandy loam, or loamy very fine sand and saturated hydraulic conductivity ranges from moderately low through moderately high.

GEOGRAPHIC SETTING: Scio soils are most commonly on terraces or old alluvial fans, but are also on lake plains, outwash plains, lakebeds, and lacustrine mantled uplands. The solum is formed entirely in eolian, lacustrine, or alluvial sediments which may extend to a depth of many centimeters or may be underlain by loamy, sandy, or gravelly material at depths greater than 40 inches (100 centimeters). Slope ranges from 0 through 25 percent. Mean annual temperature ranges from 8 through 10 degrees C., mean annual precipitation ranges from 710 through 1270 millimeters, and mean annual frost-free days ranges from 120 through 180 days. Elevation

ranges from 31 through 457 meters above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: The Scio series is in a drainage sequence with the well drained Unadilla soils, the well drained and moderately well drained Bridgehampton soils, the poorly drained Raynham soils, and the very poorly drained Birdsall soils. Pope, Tioga, and Hadley soils, and their wetter associated soils are on adjacent floodplains. Alton, Chenango, Copake, and Howard soils, and their wetter associated soils are on adjacent gravelly outwash terraces, kames, and outwash plains.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. The potential for surface runoff is very low to high. Saturated hydraulic conductivity is moderately high or high to a depth of 100 centimeters and ranges from moderately low through very high below 40 inches 100 centimeters.

USE AND VEGETATION: Most of the soil has been cleared and is used for growing hay, corn, vegetables, fruit, and small grain. Native vegetation is northern red oak, white ash, sugar maple, black cherry, eastern hemlock, and eastern white pine.

DISTRIBUTION AND EXTENT: Massachusetts, Maine, New Hampshire, New York, Pennsylvania, and Rhode Island. MLRAs 101, 139, 140, 143, 144A, 144B, 145, and 149B. The series is moderately extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Allegany County, New York, 1946.

REMARKS: This revision reflects changes to the range in characteristics as well as general updating to metric units. Scio soils have been mapped in frigid areas in the past, but have a Mesic temperature regime. The series will not be used in MLRAs 143 and 144B, or the state of Maine, when older soil surveys in these MLRAs are updated.

Diagnostic horizons and features recognized in this pedon are:
1) Ochric epipedon - the zone from 0 to 23 centimeters (Ap horizon).
2) Cambic horizon - the zone from 23 to 79 centimeters (Bw horizons).
3) Aquic subgroup - Redox depletions with chroma of 2 or less are within 60 centimeters of the mineral soil surface (Bw2 horizon).
4) Particle-size control section - the zone from 23 through 100 centimeters (Bw1, Bw2, C horizons).
5) Lithologic discontinuity - at a depth of 102 centimeters.

ADDITIONAL DATA: Full characterization data for sample no.91MA023009. Pedon analyzed by the NSSL, Lincoln, NE.

National Cooperative Soil Survey
U.S.A.

LOCATION SUNCOOK CT+MA NH NY PA

Established Series
Rev. MFF-SMF-DCP
01/2013

SUNCOOK SERIES

The Suncook series consists of very deep, excessively drained sandy soils formed in alluvial sediments. They are nearly level soils on flood plains, subject to frequent or occasional flooding. Slope ranges from 0 to 3 percent. Saturated hydraulic conductivity is high or very high in the surface layer and underlying strata. Mean annual temperature is about 10 degrees Celsius , and mean annual precipitation is about 1090 millimeters.

TAXONOMIC CLASS: Mixed, mesic Typic Udipsamments

TYPICAL PEDON: Suncook loamy fine sand in a woodland at an elevation of about 60 meters. (Colors are for moist soil.)

Ap-- 0 to 18 centimeters; very dark grayish brown (10YR 3/2) loamy fine sand; very weak coarse granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary. (15 to 25 centimeters thick)

C1-- 18 to 38 centimeters; dark grayish brown (10YR 4/2) and brown (10YR 5/3) coarse sand; single grain; loose; few fine roots; 2 percent fine gravel; strongly acid; abrupt smooth boundary.

C2-- 38 to 56 centimeters; dark brown (10YR 3/3) loamy fine sand with lenses of coarse sand; single grain; loose; few fine roots; strongly acid; abrupt smooth boundary.

C3-- 56 to 81 centimeters; pale brown (10YR 6/3) medium and coarse sand; single grain; loose; strongly acid; abrupt smooth boundary.

C4-- 81 to 107 centimeters; dark grayish brown (10YR 4/2) fine and medium sand; single grain; loose; strongly acid; abrupt smooth boundary.

C5-- 107 to 165 centimeters; dark grayish brown (10YR 4/2) stratified sand; single grain; loose; 10 percent gravel; strongly acid. (Combined thickness of the C horizons is 140 to 150 cm within a depth of 165 cm).

TYPE LOCATION: Hartford County, Connecticut; Town of Granby, 1000 feet east along Mechanicsville Road from the intersection with Connecticut Route 189, 1200 feet north of Mechanicsville Road, and 50 feet east of the East Branch Salmon Brook; USGS Tariffville topographic quadrangle, latitude 41 degrees 58 minutes 26 seconds N., longitude 72 degrees 48 minutes 12 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Most pedons are essentially gravel free, but the range includes as much as 10 percent gravel by volume to a 50 centimeter-depth, up to 20 percent gravel from 50 to 100 centimeters, and as much as 40 percent below a depth of 100 centimeters. Unless limed, reaction ranges from very strongly acid to slightly acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3. Texture is loamy sand, loamy fine sand, sandy loam, or fine sandy loam. The horizon commonly has weak or moderate granular structure or it is single grain. Some pedons have subangular blocky structure. Consistence is friable, very friable or loose. A horizons may be less than 15 centimeters thick in some places.

Individual layers of the C horizon have hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 1 to 6. Texture ranges from loamy fine sand to coarse sand in the fine-earth fraction.
Some pedons have thin buried sandy A horizons that are very dark grayish brown to black.

COMPETING SERIES: These are the Acquango, Aldo, Bigapple, Biltmore, Boplain, Breeze, Caesar, Chute, Dabney, Gardiner, Hodge, Oakville, Osolo, Pahuk, Penwood, Perks, Pinegrove, Plainfield, Poquonock, Ronda, Samoa, Sardak, Sarpy, Scotah, Spessard, Tyner, Wapanucket, and Windsor soils.
Acquango, Biltmore, Gardiner, Pahuk, Samoa, Sarduk, and Sarpy soils are from outside LRR R and S. Acquango soils are very slightly to moderately saline. Aldo soils have a water table and saturation within the series control section for as much as 1 month per year in 6 or more out of 10 years. Bigapple and Breeze soils formed in anthrotransported materials. Biltmore and Spessard soils are well drained. Boplain soils have a paralithic contact within the control section. Caesar, Oakville, Penwood, Plainfield, Tyner, and Windsor soils have B horizons. Chute, Hodge, and Sarpy soils are neutral to moderately alkaline throughout. Dabney and Westport soils receive more than 1500 centimeters of precipitation. Osolo soils have sola thicker than 150 centimeters. Pahuk soils formed in old alluvium and outwash and are not subject to flooding. Perks soils have high chroma mottles within a depth of 100 centimeters. Pinegrove soils formed in acid regolith from surface mine operations. Poquonuck soils have densic horizons within 100 centimeters. Samoa soils formed in eolian materials. Sardak soils are calcareous. Scotah soils have redoximorphic features at depths of 100 to 150 centimeters and saturation for 1 month or less per year in 6 out of 10 years. Ronda soils formed on floodplains of the mesic Piedmont region of North Carolina. Wapanucket soils formed in sandy glaciofluvial or eolian deposits underlain by loamy glaciolacustrine deposits.

GEOGRAPHIC SETTING: Suncook soils are nearly level soils on flood plains. Slope ranges from 0 to 3 percent. The soils formed in recent sandy alluvium derived mainly from granite, gneiss, schist, and quartzite. Mean annual temperature ranges from 7 to 12 degrees Celsius., mean annual precipitation ranges from 1000 to 1270 millimeters, and the growing season ranges from 120 to 180 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the the Agawam, Hadley, Haven, Hinckley, Lim, Limerick, Merrimac, Occum, Pootatuck, Rippowam, Saco, Windsor, and Winooski soils on nearby landscapes. The well drained Occum, moderately well drained

Pootatuck, and poorly drained Rippowam soils are associated in a drainage sequence. Other floodplain associates include the Hadley, Winooski, Lim, Limerick, and Saco soils, all of which have higher silt content. Agawam, Haven, Hinckley, and Merrimac soils are on nearby outwash terraces and are underlain by stratified sand and gravel.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained. Surface runoff is negligible. Saturated hydraulic conductivity is high or very high throughout. Flooding varies from once a year to once in ten years, but typically does not occur in the growing season.

USE AND VEGETATION: Most areas are wooded or in brushy unimproved pasture. Cleared areas are in hay or pasture, but a few scattered areas are in cultivated crops. Common trees are sycamore, aspen, cotton wood white and black oak, silver maple red maple, white pine, and ironwood. Understory plants include bayberry, ground cedar, lowbush blueberry, pipsissewa, and hairy moss.

DISTRIBUTION AND EXTENT: Flood plains in Connecticut, Massachusetts, New Hampshire, New York, and Rhode Island; MLRAs 140, 144A, 145, 149A, and 149B. The series is of small extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Hartford County, Connecticut, 1959.

REMARKS: This revision reflects general updating.
Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon the zone from 0 to 18 centimeters (Ap horizon)
2. Particle-size class - the control section from 25 to 100 centimeters averages sandy (C1, C2, C3, and C4 horizons).
3. Entisols - no diagnostic horizons present.
4. Udic moisture regime and the mean summer and mean winter soil temperatures at a depth of 50 centimeters differ by 5 degrees Celsius or more.

National Cooperative Soil Survey
U.S.A.

LOCATION SWANSEA MA+RI

Established Series
Rev. PCF-DGG-DAS
02/2014

SWANSEA SERIES

The Swansea series consists of very poorly drained organic soils. They formed in 40 to 130 centimeters of highly decomposed organic material over sandy mineral. These soils are in depressions or on flat level areas on uplands and outwash plains. Saturated hydraulic conductivity is moderately high or high in the organic material and very high in the substratum. The mean annual temperature is about 9 degrees Celsius and the mean annual precipitation is about 1143 millimeters.

TAXONOMIC CLASS: Sandy or sandy-skeletal, mixed, dysic, mesic Terric Haplosaprists

TYPICAL PEDON: Swansea muck - on a 0 percent slope in a wooded area. When described the soil was wet and the depth to the water table was 4 inches. (Colors are for moist soils.)

Oa1--0 to 5 cm.; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); 15 percent fiber, 2 percent rubbed; weak medium granular structure; very friable; many medium roots; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa2--5 to 23 cm.; black (5YR 2/1) broken face and rubbed sapric material; 10 percent fiber, 2 percent rubbed; weak medium granular structure; very friable; common medium roots; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa3--23 to 33 cm.; black (N 2/) broken face and rubbed sapric material; 10 percent fiber, 2 percent rubbed; massive; very friable; few fine roots; contains 5 percent brown (7.5YR 4/4) woody fragments 1 to 4 inches in diameter; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Oa4--33 to 66 cm.; black (N 2/) broken face and rubbed sapric material; 5 percent fiber, 0 percent rubbed; massive; very friable; few fine roots; less than 5 percent mineral; extremely acid; abrupt wavy boundary.

Cg1--66 to 81 cm.; light olive gray (5Y 6/2) loamy coarse sand; single grain; loose; very strongly acid; abrupt wavy boundary.

Cg2--81 to 165 cm.; light olive gray (5Y 6/2) gravelly loamy coarse sand; single grain; loose; 30 percent gravel; very strongly acid.

TYPE LOCATION: Bristol County, Massachusetts, Town of Swansea, 1,000 feet east of Old

Fall River Road, 1,000 feet south of Interstate 295, and 80 feet north of the telephone line. Latitude 41 degrees 45 minutes 57 seconds N. and longitude 71 degrees 14 minutes 49 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: The depth to the Cg horizon is 40 to 130 centimeters. Cumulative layers of hemic materials comprise less than 25 centimeters and fibric materials less than 12 centimeters of the subsurface and bottom tiers. Woody fragments are in some part of the organic material in most pedons and comprise up to 25 percent of some horizons. Fragments consist of twigs, branches, logs, or stumps and are 2 centimeters to more than 30 centimeters in diameter. Woody fragments are firm but break abruptly under pressure. Reaction is less than 4.5 in 0.01 molar calcium chloride throughout the organic material.

The surface tier has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 to 2. In some pedons the chroma ranges to 4. It is dominantly sapric material; however, in some pedons it has various proportions of both sapric and hemic materials or has fibric materials. It has weak or moderate, fine or medium, granular or subangular blocky structure or it is massive. Some pedons have a mineral surface layer of sand or coarse sand that is 10 to 25 centimeters thick.

The subsurface and bottom tiers, above the C horizon, have hue of 5YR through 10YR, value of 2 to 3, and chroma of 0 to 3. Chroma or value or both may change from 0.5 to 2 units upon rubbing. Broken faces become darker upon brief exposure to air. The subsurface tier is dominated by sapric material with a rubbed fiber content of less than 16 percent of the organic volume. The subsurface and bottom tiers have platy structure or are massive. They are very friable or friable. Unrubbed organic material resembles herbaceous and woody plant tissues.

The C or Cg horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. Redoximorphic features are present in some pedons. It ranges from coarse sand to loamy fine sand and their gravelly analogs but may include some finer-textured lenses or horizons in some pedons. Rock fragment content ranges from 0 to 45 percent and is commonly gravel but includes cobbles in some pedons. Reaction ranges from extremely acid to strongly acid.

COMPETING SERIES: This is the Makinen series which are from outside LRR R and S. The Makinen soils receive less than 813 millimeters of mean annual precipitation and have less gravel in the substratum.

Freetown and Paupack are similar soils in related families. Freetown soils have organic layers greater than 130 centimeters. Paupack soils are underlain by loamy skeletal or clayey skeletal mineral material.

GEOGRAPHIC SETTING: Swansea soils are in swamps and bogs that range from small enclosed depressions to areas of several hundred acres in size. They are on outwash plains, till plains and moraines. Slope ranges from 0 to 1 percent. Mean annual temperature is 7 to 10 degrees Celsius and mean annual precipitation is 1016 to 1270 millimeters. The frost-free period is 120 to 180 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Freetown, Hinckley, Windsor,

Ridgebury, Whitman, and Scarboro soils on nearby landscapes. Freetown soils are on similar landscapes and have more than 130 centimeters of organic material. The excessively drained Hinckley and Windsor soils are on nearby outwash landforms. The somewhat poorly and poorly drained Ridgebury soils and the very poorly drained Whitman and Scarboro soils formed in glacial till are adjacent to areas of Swansea soils.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Very poorly drained. Saturated Hydraulic Conductivity is moderately high or high in the organic material and very high in the substratum.

USE AND VEGETATION: Mostly forested. Native vegetation includes red maple, American elm, green ash, eastern hemlock, Atlantic white cedar, buttonbush, winterberry, swamp azalea, and leatherleaf. Some acreage has been cleared and is used for truck crops. The main crop is cranberries.

DISTRIBUTION AND EXTENT: Swamps and bogs in Massachusetts and Rhode Island; MLRAs 144A, 145, 149B. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Bristol County, Massachusetts, 1979

REMARKS: These soils were previously mapped in Massachusetts as Cranberry bog, Medisaprists, and Muck and in some areas as Adrian soils. The Type Location is pedon T1MA603018, also the typical pedon for the soil survey of Bristol County, MA, Southern Part.

Diagnostic horizons and features in this pedon include:

1. Terric feature - mineral soil from a depth of 66 to 165 centimeters (2Cg horizons).
2. Lithic discontinuity - there is a significant change in particle size at a depth of 66 centimeters (Cg1 horizon).
3. Sapric material from 0 to 66 centimeters (Oa horizons)
4. Histic epipedon from 0 to 33 centimeters
5. Aquic conditions 0 to 165 centimeters
6. Endosaturation 0 to 165 centimeters

National Cooperative Soil Survey
U.S.A.

LOCATION WINDSOR CT+MA NH NY RI VT

Established Series
Rev. MFF-SMF-DCP
03/2014

WINDSOR SERIES

The Windsor series consists of very deep, excessively drained soils formed in sandy outwash or eolian deposits. They are nearly level through very steep soils on glaciofluvial landforms. Slope ranges from 0 through 60 percent. Saturated hydraulic conductivity is high or very high. Mean annual temperature is about 10 degrees C and mean annual precipitation is about 1092 mm.

TAXONOMIC CLASS: Mixed, mesic Typic Udipsamments

TYPICAL PEDON: Windsor loamy sand - forested, 3 percent slope, at an elevation of about 24 meters. (Colors are for moist soil.)

Oe--0 to 3 cm; black (10YR 2/1) moderately decomposed forest plant material; many very fine and fine roots; very strongly acid; abrupt smooth boundary. (0 to 8 cm thick.)

A--3 to 8 cm; very dark grayish brown (10YR 3/2) loamy sand; weak medium granular structure; very friable; many very fine and fine roots; strongly acid; abrupt wavy boundary. (3 to 25 cm thick.)

Bw1--8 to 23 cm; strong brown (7.5YR 5/6) loamy sand; very weak fine granular structure; very friable; many fine and medium roots; strongly acid; gradual wavy boundary.

Bw2--23 to 53 cm; yellowish brown (10YR 5/6) loamy sand; very weak fine granular structure; very friable; common fine and medium roots; strongly acid; gradual wavy boundary.

Bw3--53 to 64 cm; light yellowish brown (10YR 6/4) sand; single grain; loose; few coarse roots; strongly acid; clear wavy boundary. (Combined thickness of the Bw horizons is 23 to 86 cm.)

C--64 to 165 cm; pale brown (10YR 6/3) and light brownish gray (10YR 6/2) sand; single grain; loose; few coarse roots; strongly acid.

TYPE LOCATION: Hartford County, Connecticut; town of South Windsor, 1100 feet northwest along Chapel Road from the intersection of Chapel Road and Ellington Road and 100 feet due south of Chapel Road. USGS Manchester, CT topographic quadrangle, Latitude 41 degrees, 48 minutes, 35 seconds N., Longitude 72 degrees, 36 minutes, 22 seconds W., NAD 1983

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 25 to 92 cm. Rock

fragments, dominantly fine gravel, range from 0 through 10 percent by volume in the solum and from 0 to 15 percent in the substratum. Thin strata of gravel or thin subhorizons of coarse sand or loamy coarse sand are present in some pedons. Unless limed, reaction in the solum commonly is extremely acid to moderately acid, but the range includes slightly acid. Unless limed, reaction in the substratum commonly is very strongly acid to slightly acid, but the range includes neutral.

O horizons are present in some pedons.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. Many pedons have an Ap horizon up to 12 inches thick with value of 3 or 4 and chroma of 2 to 4. The A or Ap horizon is loamy fine sand, loamy sand, fine sand, or sand. It has weak or moderate granular structure and is very friable, friable, or loose.

Some pedons have a thin E horizon with hue 7.5YR or 10YR, value of 4 to 6, and chroma of 1 or 2.

The upper part of the Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part of Bw horizon has hue of 7.5YR to 5Y, value of 4 to 7, and chroma of 3 to 6. The Bw horizon is loamy sand or loamy fine sand in the upper part and loamy fine sand, loamy sand, fine sand, or sand in the lower part. The Bw horizon has weak granular or weak subangular blocky structure, or it is massive or single grain. Consistence is very friable or loose.

Some pedons have a BC horizon similar to the lower part of the Bw horizon.

The C horizon has hue of 5YR to 5Y, value of 4 to 7, and chroma of 1 to 6. It is fine sand, sand, coarse sand, loamy fine sand, or loamy sand. The horizon is massive or single grain and consistence is very friable or loose.

COMPETING SERIES: These are the Acquango, Aldo, Bigapple, Biltmore, Boplain, Breeze, Caesar, Chute, Dabney, Hodge, Oakville, Osolo, Pahuk, Penwood, Perks, Pinegrove, Plainfield, Poquonock, Ronda, Samoa, Sardak, Sarpy, Scotah, Spessard, Suncook, Tyner, and Wapanucket series. Aquango, Aldo, Biltmore, Boplain, Chute, Dabney, Hodge, Osolo, Pahuk, Perks, Ronda, Samoa, Sardak, Spessard, and Tyner soils are from outside of LRRs L, R, and S. Acquango soils are very slightly to moderately saline within the soil profile. Aldo soils have a water table and saturation within the series control section for as much as one month per year in 6 out of 10 years. Bigapple soils formed in human transported soil material from dredging activities. Biltmore and Spessard soils are well drained. Breeze soils formed in human transported sandy soil materials intermingled with construction debris. Caesar soils contain more coarse sand. Chute, Hodge, and Sarpy soils contain free carbonates and do not have a B horizon. Dabney soils do not have a B horizon and receive more than 152 cm of precipitation annually. Oakville soils typically average 50 percent or more fine sand in the subsoil. Osolo soils have a solum thicker than 1.5 m. Penwood soils have hue of 5YR or redder in the B horizon. Pahuk, Perks, Samoa, and Suncook soils do not have a B horizon. Plainfield soils are less moist in all parts of the control section for the 120 days following the summer solstice. Poquonock soils have a densic contact with in 1 m. Ronda soils formed in alluvium from residuum sources. Sardak soils formed in alluvium and are calcareous. Tyner soils have a thicker solum. Wapanucket soils are underlain

by glaciolacustrine deposits with in the series control section.

GEOGRAPHIC SETTING: Windsor soils are nearly level through very steep soils typically on glaciofluvial landforms but include late-Wisconsin-aged dunes. The steeper slopes are typically on terrace escarpments. Slope ranges from 0 to 60 percent. The soils formed in outwash or eolian deposits of poorly graded sands and loamy sands derived mainly from crystalline rocks. Mean annual temperature ranges from 7 to 12 degrees C, and the mean annual precipitation typically ranges from 965 to 1270 mm, but the range includes as low as 660 mm in some places east of Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 120 to 190 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Deerfield, Hinckley, Merrimac, Quonset, Suncook, Agawam, Hadley, Haven, Occum, Pootatuck, Scarboro, Sudbury, Walpole, Wareham, and Winooski soils on nearby landscapes. The moderately well drained Deerfield and Sudbury, the somewhat poorly drained and poorly drained Walpole and Wareham, and the very poorly drained Scarboro soils are common drainage associates. Agawam and Haven soils are coarse-loamy over sandy or sandy-skeletal or coarse-loamy terrace associates, respectively. Hadley, Occum, Pootatuck, and Winooski soils are on nearby flood plains.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained. Surface runoff is negligible to medium. Saturated hydraulic conductivity is high or very high.

USE AND VEGETATION: Most areas are forested or in low growing brushy vegetation. Some areas are used for silage corn, hay, and pasture. Small areas, mostly irrigated, are used for shade tobacco, vegetables and nursery stock. Some areas are in community development. Common trees are white, black, and northern red oak, eastern white pine, pitch pine, gray birch, poplar, red maple, and sugar maple.

DISTRIBUTION AND EXTENT: Late Wisconsin glaciofluvial or eolian landforms in Connecticut, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont; MLRAs 101, 142, 144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Connecticut Valley Area, 1899.

REMARKS: The use of the Windsor series in Maine, and in MLRAs 141, 144B, and 143 is relict to before temperature classes in soil taxoonomy. These have been removed from the SC file.

Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 8 cm (Oe and A horizons).
2. Particle-size class - averages sandy in the control section from 25 to 100 cm.
3. No cambic horizon and development of color - the zone from 8 to 64 cm demonstrates development of color with no illuvial accumulation of material (Bw horizons).

ADDITIONAL DATA: Reference samples from pedons 54MA023005, 63VT011001, 63VT011002, 64NH017003, 64NH017004, 70CT003003, 70MA011003, 70VT017002, 73MA005003, 73MA005004, 91MA023006, 95NH013001, 96NH013004, 98NY045002, 98NY085002, S07VT011004.

National Cooperative Soil Survey
U.S.A.

LOCATION WINOOSKI MA+CT NH VT

Established Series
Rev. DGG-SMF-DCP
01/2013

WINOOSKI SERIES

The Winooski series consists of very deep, moderately well drained soils formed in alluvial material. These soils are on nearly level flood plains. Slope ranges from 0 through 3 percent. Saturated hydraulic conductivity is moderately low through high. Mean annual precipitation is about 45 inches (1143 millimeters) and the mean annual temperature is about 49 degrees F (7 degrees C).

TAXONOMIC CLASS: Coarse-silty, mixed, superactive, mesic Fluvaquentic Dystrudepts

TYPICAL PEDON: Winooski very fine sandy loam on a 1 percent slope in a cultivated field at an elevation of about 69 meters. (Colors are for moist soil unless otherwise stated.)

Ap -- 0 to 8 inches (0 to 20 centimeters); very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary. (4 to 18 inches (10 to 46 centimeters thick).

Bw1 -- 8 to 18 inches (20 to 46 centimeters); brown (10YR 4/3) very fine sandy loam; massive; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bw2 -- 18 to 26 inches (46 to 66 centimeters); olive brown (2.5Y 4/4) very fine sandy loam, common medium prominent pinkish gray (5YR 7/2) and faint brown (10YR 5/3) areas of iron depletion; massive; friable; few fine roots; strongly acid; abrupt smooth boundary. (Combined thickness of the Bw horizons is 6 to 30 inches (15 to 76 centimeters).

BC -- 26 to 43 inches (66 to 109 centimeters); olive gray (5Y 5/2) very fine sandy loam; massive; friable; common medium faint light gray (5Y 7/2) areas of iron depletion and faint brown (10YR 5/3) masses of iron accumulation; moderately acid; clear smooth boundary. (0 to 20 inches (0 to 51 centimeters thick).

C -- 43 to 65 inches (109 to 165 centimeters); olive (5Y 5/3) loamy very fine sand; massive; friable; common medium distinct light brownish gray (10YR 6/2) iron depletions and prominent strong brown (7.5YR 5/8) masses of iron accumulation; moderately acid.

TYPE LOCATION: Worcester County, Massachusetts, Town of Lancaster, 100 feet north of Massachusetts Route 117, 900 feet west of the Bolton town line. USGS Hudson, MA topographic quadrangle, Latitude 42 degrees, 27 minutes, 35 seconds N., Longitude 71 degrees, 39 minutes, 7 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 18 through 43 inches (46 through 110 centimeters). Gravel ranges from 0 through 5 percent by volume throughout the soil. Reaction ranges from extremely acid through neutral. Depth to iron depletions with chroma of 2 or less ranges from 14 through 20 inches (35 through 50 centimeters).

The O horizon where present ranges in thickness from 1 or 2 inches (3 through 6 centimeters). The O has hue 7.5YR, value 2.5 or 3, and chroma of 2 or 3. Decompositon of the plant material ranges from fibric through sapric.

The A or Ap horizon has hue of 7.5YR through 5Y, value of 2 through 4, and chroma of 1 through 3. Texture is silt loam, silt, very fine sandy loam, or loamy very fine sand. Structure is subangular blocky, platy, or granular. Consistence is very friable or friable.

Some pedons have Ab and/or AB horizons similar in characteristic to the A or Ap horizon.

The Bw horizon has hue of 7.5 YR through 5Y, value of 2 through 5, and chroma of 2 through 6. Matrix chroma of 2 is below a depth of 20 inches (50 centimeters). Texture is silt loam, silt or very fine sandy loam. Structure is granular or subangular blocky, or it is massive. Consistence is very friable or friable.

The BC horizon, where present, has hue of 10YR through 5Y, value of 2 through 5, and chroma of 2 through 4. Matrix chroma of 2 is below a depth of 20 inches (50 centimeters). Texture is silt loam, silt, very fine sandy loam, or loamy very fine sand. Structure is granular or subangular blocky, or it is massive. Consistence is very friable or friable.

The C horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma of 2 through 4. Matrix chroma of 2 is below a depth of 20 inches (50 centimeters). Texture is silt loam, silt, very fine sandy loam, or loamy very fine sand. Some pedons have thin strata of very fine sand, fine sand, sand, or coarse sand below a depth of 40 inches (100 centimeters). The C horizon is massive or has fine stratification. Consistence is firm through very friable.

The thickness and number of horizons below the A horizon is variable and corresponds to the thickness and variability of the alluvial deposits.

COMPETING SERIES: The Otego soil is the only other soil currently in the same family. Otego soils are formed in alluvium from sandstone, siltstone, and shale. Otego soils do not allow for loamy very fine sand textures in their A, BC, or C horizons.

GEOGRAPHIC SETTING: Winooski soils are nearly level soils on flood plains. They are typically in broad depressions. Slope ranges from 0 through 3 percent. The soils formed in recent alluvial deposits of very fine sand and silt. The source of the alluvium is from igneous and meta-igneous geology, with additions of limestone and dolomite for areas in the Lake Champlain valley, and their resultant glacial materials. Mean annual precipitation ranges from 40 through 50 inches (1016 through 1270 millimeters) and mean annual air temperature from 45 degrees through 52 degrees F. (7 through 11 degrees C.). Mean annual growing season ranges from 120

through 200 days.

GEOGRAPHICALLY ASSOCIATED SOILS: Winooski soils are the moderately well drained member of a drainage sequence which includes the well drained Hadley soils, the poorly drained Limerick soils and the very poorly drained Saco soils on nearby landscapes.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. Saturated hydraulic conductivity is moderately low through high. Flooding frequency varies from twice a year to once in 10 years. Stream overflow generally occurs during late winter or spring and during periods of high rainfall.

USE AND VEGETATION: Used mainly for growing hay, silage corn and pasture in support of dairying and to some extent for truck crops, potatoes, and tobacco. Native vegetation is forest composed mainly of red maple, silver maple, elm, willow, northern hardwoods, and eastern white pine. Balsam fir and spruce are in the northerly range of the series.

DISTRIBUTION AND EXTENT: New Hampshire, Massachusetts, Connecticut, and Vermont. MLRA's 142, 144A, and 145. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Chittenden County, Vermont, 1938.

REMARKS: The Winooski soils mapped in Maine, and in MLRA 144B and 143, are now considered to be in the frigid temperature regime and are relict.

Diagnostic horizons and features recognized in this pedon include:

1. Ochric epipedon - the zone from the surface to a depth of about 8 inches (20 centimeters) (Ap horizon).
2. Coarse-silty particle size - less than 10 percent of the material in the 10 through 40 inch (25 through 100 centimeter) zone is fine sand or coarser, including gravel, and clay averages about 7 percent.
3. Cambic horizon the zone from 8 to 43 inches (20 to 109 centimeters) (Bw1, Bw2, and BC horizons) has evidence of alteration in the form of absence of rock structure or some degree of soil structure.
4. Aquic feature - the zone from 18 to 26 inches has redox depletions and aquic conditions at some time during the year. (Bw2 horizon)

Additional NSSL data: numerous full characterization pedons sampled in CT, MA, NH and VT

National Cooperative Soil Survey
U.S.A.

Appendix B

Technical Study Reports

Technical Report for the Downstream American Eel Passage Assessment

Lowell Hydroelectric Project (FERC No. 2790)

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February 25, 2021

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1 Introduction

A radio-telemetry assessment of the downstream passage success for adult silver-phase American eels (*Anguilla rostrata*) was conducted in support of the relicensing for the Lowell Hydroelectric Project (Lowell or Project), Federal Energy Regulatory Commission (FERC) No. 2790, as identified in the Revised Study Plan (RSP) submitted by Boott Hydropower, LLC (Boott) on January 28, 2019. The approach and methodology described in the RSP for the downstream eel passage study was approved with modifications by the FERC in its Study Plan Determination (SPD) letter dated March 13, 2019. In their SPD, FERC staff commented on several points related to the original resource agency study requests and the eel passage study proposed by Boott as part of the PSP.

- Resource agency request for a HI-Z balloon tag turbine survival assessment.
    - *FERC recommended no HI-Z balloon tag assessment be conducted during 2019. Information from the radio-telemetry and desktop analyses should provide adequate estimates of passage route survival. In the event these findings are inconclusive FERC would consider additional study requests.*
- Resource agency request for eel releases to start in mid-September.
    - *FERC recommended that Boott should initiate eel releases as early in the fall season as the commercial collection and associated bacterial and viral screening process prior to import allows.*
- Resource agency request for release of 10 dead tagged eels in conjunction with each upstream release of live tagged eels.
    - *FERC recommended Boott release two dead tagged eels in conjunction with each upstream release of live tagged eels.*
- Resource agency request for two years of radio-telemetry data collection.
    - *FERC noted there was no indication at the time of issuance for the SPD that a second study year was warranted. If the first study year failed to meet study objectives and provide the necessary information for assessing project effects then stakeholders will have an opportunity to file a request to modify the study to collect additional information.*

In accordance with 18 C.F.R. § 5.15(c), Boott filed their Initial Study Report (ISR) with FERC on February 25, 2020. As described in the ISR, data analyses were in progress and scheduled for completion during 2020. On June 12, 2020 FERC issued a Revised Process Plan and Schedule and Determination on Requests for Study Modifications for the Lowell Hydroelectric Project (Revised PPS). In accordance with the Revised PPS, Boott filed their Revised ISR with FERC on September 30, 2020, which contained a full report for the Downstream American Eel Passage

Assessment. Boott held a revised ISR meeting on October 15, 2020 and representatives from FERC, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Massachusetts Division of Fisheries and Wildlife (MADFW), Massachusetts Division of Marine Fisheries (MDMF), and the New Hampshire Fish and Game Department (NHFGD) had the opportunity to provide comments. Subsequent to the September 30, 2020 ISR meeting, the MADFW (November 25, 2020), NMFS (November 30, 2020), and MDMF (November 30, 2020) submitted written comments on the ISR to FERC. A summary of comments received and the corresponding responses is provided in Appendix E of this report. Where noted, the body of the report has been updated to reflect the content of those comments.

This final technical report provides a description of the objectives, methodologies and results of the 2019 radio-telemetry assessment to evaluate the downstream passage of adult silver eels at the Lowell Project. In addition to the radio-tagged silver-phase eels marked as part of this evaluation, an additional eel passage study was conducted outside of the Licensing efforts for Lowell to assess downstream movement at the Merrimack River Project (FERC No. 1893). Adult eels tagged as part of the upstream project were also monitored as they moved through the Lowell Project area. Findings for those individuals have been included in this report.

2 Objectives

The goal of this study was to determine the Lowell Project's impact on the outmigration of adult silver-phase American eels.

Specific objectives included:

- Quantification of the movement rates and relative proportion of eels passing via various routes at the project (i.e., turbines, downstream bypass, and spill); and
- Evaluation of mortality of eels passed via each potential route.

3 Project Description and Study Area

The Lowell Project is located at River Mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of: (1) a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones; (2) a 720-acre impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29; (3) a 5.5-mile-long canal system which includes several small dams and gatehouses; (4) a powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW); (5) a 440-foot-long tailrace channel; (6) four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal System containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW; (7) a 4.5-mile long, 13.8-kilovolt transmission line

connecting the powerhouses to the regional distribution grid; (8) upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket dam; and (9) appurtenant facilities. At the normal pond elevation of 92.2 feet NGVD 1929 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control, and has no usable storage capacity.

The study area for the downstream eel passage assessment included the mainstem Merrimack River from the upper extent of the Project's impoundment located approximately 23 river miles upstream from the Pawtucket Dam in Litchfield, New Hampshire, to the Lawrence Hydroelectric Project (FERC No. 2800), located approximately 11 river miles downstream of the Pawtucket Dam (Figure 3-1). The Upper Pawtucket Canal and Guard Locks facility were also considered as part of the study area.

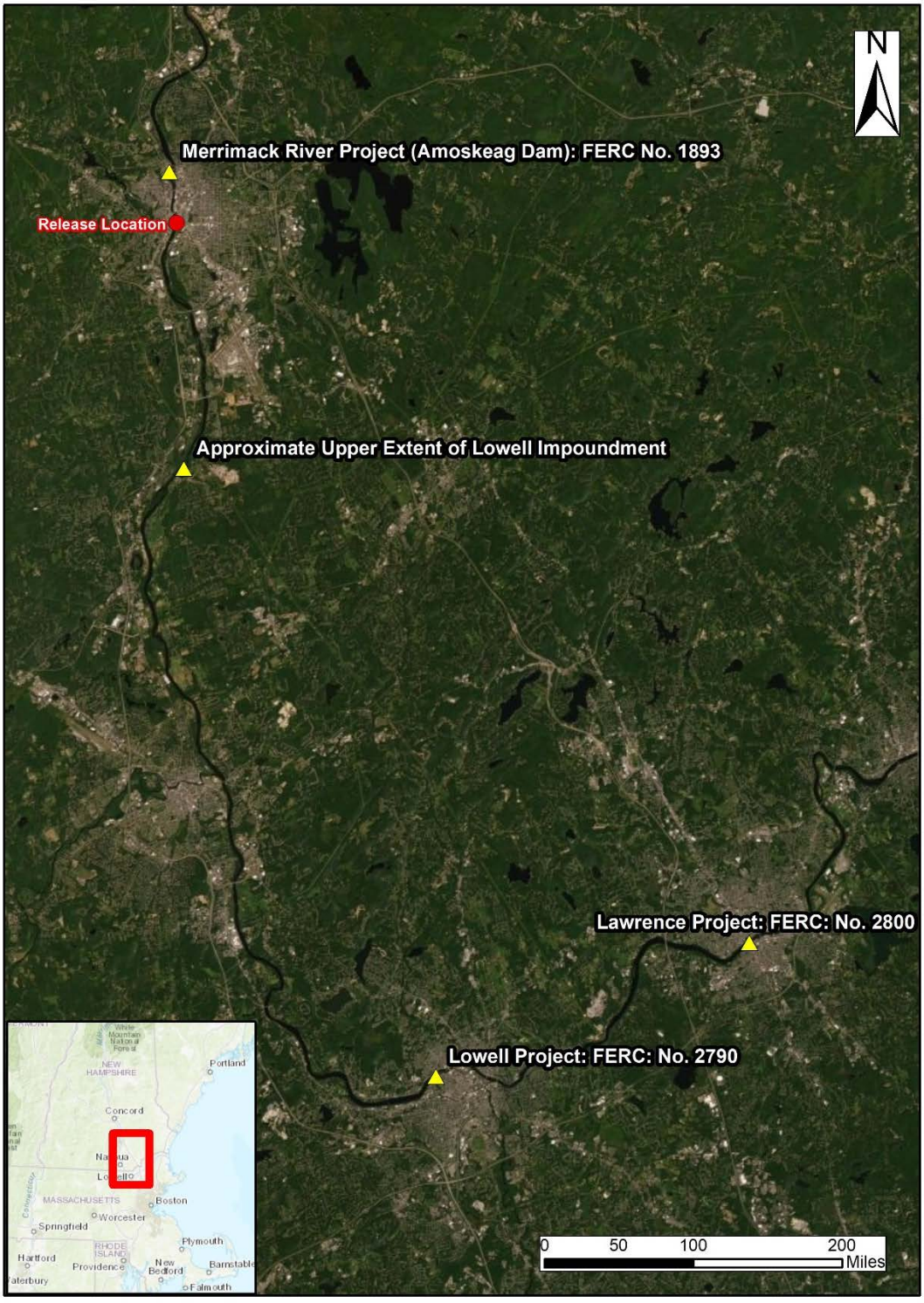

Figure 3–1. Merrimack River study reach considered during the fall 2019 adult silver-phase American eel downstream passage assessment.

4 Methods

Downstream passage of adult American eels through the Lowell Project reach was evaluated via radio-telemetry during the fall of 2019. Following the release of radio-tagged individuals into the Merrimack River upstream of the Lowell impoundment, their movements were monitored using a series of stationary radio-telemetry receivers in place at the Project as well as at several additional stationary monitoring stations installed at bank-side locations upstream and downstream of the Project to inform on general movements, distribution among available passage routes and Project passage success.

4.1 Radio Telemetry Equipment

Movements of radio-tagged individuals during the 2019 study were recorded via a series of stationary radio-telemetry receivers. Radio-telemetry equipment used during the evaluation of downstream passage at Lowell included Orion receivers, manufactured by Sigma Eight, as well as SRX receivers manufactured by Lotek Wireless. Each receiver was paired with either an aerial or underwater antenna (dropper antenna). Aerial antennas (four or six element Yagi) were utilized to detect radio-tagged individuals within the larger, more open sections of river, such as within the tailrace or at locations downriver of Lowell. Dropper antennas were fixed at downstream passage locations (e.g., downstream bypass). Dropper antennas were custom built by stripping the shielded ends of RG-58 coaxial cables.

All eels radio-tagged during 2019 were equipped with a Sigma Eight TX-PSC-I-450 radio transmitter (149.320, 149.340 or 149.360 MHz, pulse rate = 2.0 seconds). The TX-PSC-I-450 transmitters measured approximately 12 x 12 x 46 mm, weighed 8.5 g and had an estimated battery life of 357 days when set at a 2.0 second burst rate. Each transmitter was coded to emit a unique identifying signal so that individual eels could be identified by a receiver.

4.2 Monitoring Stations

The RSP identified a total of twelve monitoring stations to be set up at Lowell for the downstream eel passage assessment. Each of the twelve monitoring locations identified in the RSP were installed as described and each location consisted of a data-logging receiver, antenna, power source, and were configured to receive transmitter signals from a designated area continuously throughout the study period. During installation of each station, range testing was conducted to configure the antennas and receivers in a manner which maximized detection efficiencies at each location. The operation of the radio telemetry receivers was initially established during installation, then confirmed throughout the study period by using beacon tags. A number of beacon tags were stationed at strategic locations within the detection range of either multiple or single antennas, and they emitted signals at programmed time intervals. These signals were detected and logged by the receivers and used to record the functionality of the system throughout the study period.

The locations of monitoring stations installed for the 2019 Lowell eel passage study are outlined here and presented in Figures 4-1 through 4-3.

Monitoring Station 19: This station was installed at the upper end of the Project impoundment and detected eels following their initial movement downstream from the release location and upon entry into the project area. Station 19 consisted of a single Lotek SRX receiver and aerial antenna oriented perpendicular to the river channel.

Monitoring Station 21: This station consisted of a single Lotek SRX radio-receiver and an aerial antenna and was installed and calibrated in a manner to provide detection information for radio-tagged eels as they approached the upstream face of Pawtucket Dam. Detections at this location were used to inform on arrival of eels immediately upstream of the project.

Monitoring Station 25: Station 25 consisted of a single Orion radio-receiver and aerial antenna installed and calibrated to provide coverage of the upstream side of the Pawtucket Gatehouse. This station informed on radio-tagged eels which had approached the upstream side of the Pawtucket Gatehouse.

Monitoring Station 27: Station 27 consisted of a single Lotek radio-receiver and aerial antenna installed and calibrated to provide coverage of the downstream side of the Pawtucket Gatehouse. This station informed on radio-tagged eels which had successfully passed through the Pawtucket Gatehouse and entered the Northern Canal.

Monitoring Station 29: Station 29 consisted of a single Lotek SRX radio-receiver and aerial antenna installed and calibrated to provide detection information for radio-tagged eels that passed through the Pawtucket Gatehouse, entered the E.L. Field Powerhouse forebay (i.e., the Northern Canal) and were in the vicinity of the entrance to the downstream bypass and intake racks.

Monitoring Station 31: This station consisted of a single Orion radio-receiver and underwater drop antenna installed and calibrated to provide detection information for radio-tagged eels exiting the forebay via the downstream bypass.

Monitoring Station 33: Station 33 consisted of a single Lotek SRX radio-receiver and aerial antenna installed to monitor across the bypassed reach at a point downstream of where the surge gate enters from the power canal and upstream of the downstream bypass discharge. Detections at this location were used to confirm the downstream passage of individuals using the spillway or surge gate.

Monitoring Station 35: This station consisted of a single Lotek SRX radio-receiver and aerial antenna installed at a location overlooking the E.L. Field Powerhouse tailrace. Detections at this location were used to confirm downstream passage of individuals via the Project turbine units.

Monitoring Station 37: This station was installed at a point along the mainstem of the Merrimack River downstream of both the E.L. Field Powerhouse tailrace and the confluence with the Concord River. Station 37 consisted of a single Lotek SRX receiver and aerial antenna oriented perpendicular to the river channel. Station 37 was installed at the Lowell Waste Water Treatment Plant, approximately 2.1 miles downstream of the tailrace.

Monitoring Station 39: Station 39 was installed at a commercial business near the midpoint between the Lowell and Lawrence projects and consisted of a single Lotek SRX receiver and aerial antenna oriented perpendicular to the river channel. Station 39 was located approximately 6.0 miles downstream of the tailrace.

Monitoring Station 40: This station consisted of a single Lotek SRX radio-receiver and an aerial antenna and was installed and calibrated in a manner to provide detection information for radio-tagged eels as they approached the upstream face of Essex Dam (approximately 10.75 miles downstream of the Lowell tailrace).

Monitoring Station 23: This station was installed to detect eels which entered the downtown canal system via the Pawtucket Canal rather than pass the Project via one of the mainstem passage routes. The entrance to the Pawtucket Canal sits at a point upstream of the Pawtucket Dam and the Northern Canal. Station 23 was installed at the Guard Locks, approximately 1,700 feet downstream from the entrance to the canal. The monitoring zone for Station 23 was directed downstream to ensure detections recorded at that location were of individuals which had definitively entered the downtown canal system.

4.3 Tagging and Release Procedures

Silver-phase American eels were purchased from a commercial eel trapper operating on the St. Croix River in Maine. Eels were transported by truck from the St. Croix area to holding tanks installed at Garvins Falls Dam (Merrimack River Project, Bow, NH) on October 3, 2019. The total number of eels available for purchase from the St. Croix River was slightly less than the number required to achieve the study sample size described in the FERC-approved RSP. An additional twelve silver eels were provided by the New Hampshire Fish and Game Department (NHFGD) following their collection in a sampling weir being operated on the Soucook River. NHFGD staff maintained Soucook River eels at the Nashua Fish Hatchery until Normandeau staff transported them to the holding tanks at Garvins Falls on October 21.

All eels were held for a minimum of 24 hours prior to tagging. Individuals were visually examined and if they appeared healthy were anesthetized in a clove oil and ethanol solution (Figure 4-4). Eels were held and visually monitored in the anesthesia bath for approximately 10–15 min prior to tagging. Once sedated, eels were removed from the bath and placed on a clean, wet towel. The total length (TL) and eye diameter (horizontal and vertical; nearest 0.1 mm) were measured. Although the capture method virtually guarantees sample specimens are migratory, a previously described correlation between eye size, body length and gonad development was used to confirm whether individuals were mature and likely to be active outmigrants (Pankhurst 1982). This eye index relationship (I) was described using the formula:

$$I = [(A+B/4)2\pi/L]*100$$

where A = horizontal eye diameter, B = vertical eye diameter, and L = total body length. Silver-phase American eels typically have an eye index between 6.0 and 13.5, with a bronze coloration along the lateral line that separates the dark, silver back from the white belly. Eels meeting

these characteristics were selected for surgical tagging. In short, an incision was made off center on the ventral surface of the individual and of an adequate length to insert the transmitter into the body cavity. A hollow needle was inserted into the incision and was pushed through the body wall just off of the ventral mid-line and at a point posterior to the incision. The antenna was fed through the needle and gently pulled so that the transmitter entered the body cavity. The needle was then fully pulled through the body wall and removed from the antenna. The transmitter was positioned by pulling the antenna so that it lay directly under the incision. The incision was closed with two or three interrupted sutures (chromic gut with a 4-0 cutting needle) evenly spaced across the incision. A small amount of an antibacterial ointment was applied to the incision site to prevent infection.

Following tagging, each individual was transferred to an acclimation tank supplied with ambient river water for an additional 24-h observation period to allow eels to recover from surgery. Following the recovery period, eels were assessed for normal behavior prior to release and were then trucked to the car-top boat launch located adjacent to the Northeast Delta Dental Stadium in Manchester, NH and upstream of the Lowell Project impoundment[1]. Radio-tagged individuals were carefully netted from the truck tank and were released from the shoreline. A total of five separate release groups, each comprising 20 radio-tagged eels were released during the 2019 study. The date and time of each release was recorded.

4.4 Data Collection

4.4.1 Stationary Telemetry Data

Receiver downloads occurred three to four times weekly during the period from the initial tag and release event until the end of November, 2019. Backup copies of all telemetry data were made prior to receiver initialization. Field tests at the time of download to ensure data integrity and receiver performance included confirmation of file integrity, confirmation that the last record was consistent with the downloaded data (beacon tags were critical to this step), and lastly, confirmation that the receiver was operational upon restart and actively collecting data post download. Within a data file, transmitter detections were stored as a single event (i.e., single data line). Each event included the date and time of detection, frequency, ID code, and signal strength.

4.4.2 Manual Telemetry Data

To provide supplemental detection information to the stationary receiver data set, manual tracking was conducted on a number of occasions from the time of initial release through the end of November, 2019. Manual effort was exerted in the vicinity of the Lowell Project (i.e., tailrace and headpond immediately upstream of Pawtucket Dam) on most dates when stationary telemetry equipment was checked. In addition, a number of boat or truck-based

[1] Normandeau Associates simultaneously conducted an additional downstream adult eel passage study at the Merrimack River Project (FERC No. 1893) during fall 2019. A total of 60 eels were radio-tagged during that assessment and were also monitored for passage at Lowell. Results from that group of eels at Lowell and points downriver have been incorporated into this report.

efforts were conducted to look for radio-tagged eels within the Lowell impoundment and the reach of the Merrimack downstream to Lawrence.

4.4.3 Operational and Environmental Data

Merrimack River water temperature was recorded via a continuously operating logger installed within the Lowell intake canal. Hourly records for operations data were provided by Boott for the 2019 evaluation period and included:

- Headpond elevation (ft);
- Power canal elevation (ft);
- Headpond-power canal differential (ft);
- Tailrace elevation (ft);
- Head differential for E.L. Field turbines (ft);
- Total inflow (cfs);
- Unit 1 discharge (cfs) and output (KW);
- Unit 2 discharge (cfs) and output (KW);
- Downstream bypass discharge (cfs);
- Upstream fishway discharge (cfs);
- Downtown canal flow (cfs); and
- Spill flow through the bypassed reach.

4.4.4 Downstream Drift Assessment

A total of ten freshly dead adult silver-phase eels were radio-tagged and released downstream of Lowell during the 2019 study period. Two individuals were released on each date that a group of live test eels was released upstream of the Lowell impoundment. Dead, radio-tagged eels were released directly into the discharge of an active turbine unit at the E.L. Field powerhouse. The downstream progression of these known mortalities was recorded via both the stationary receivers as well as during manual tracking events.

4.5 Data Analysis

The tagging, telemetry and Project operations data sets collected as part of this effort were examined and used to evaluate a number of metrics related to downstream passage success and movement through the Project area.

4.5.1 Downstream Movement and Passage Route Selection

A complete record of all valid stationary receiver detections for each radio-tagged adult American eel was generated. The pattern and timing of detections in these individual records were reviewed, and a route of passage as well as project arrival and passage times were assigned to each radio-tagged individual. In the instance that a downstream route could not be clearly determined from the collected data, the passage event for that particular fish was classified as ‘unknown’.

Where data were available, impoundment duration and project residence times were calculated. Values for impoundment duration were calculated as the duration of time from detection at Station 19 until detection at Station 21. Upstream project residence time was defined as the duration of time from the initial detection at Station 21 until the determined time of downstream passage. Time spent immediately upstream of the dam was further evaluated using initial detection times for eels at Monitoring Stations 25 and 27 to provide an understanding of passage times associated with moving through the Pawtucket Gatehouse and entering into the Northern Canal approach to the E.L. Field powerhouse.

4.5.2 Parameter Estimates for Evaluation of Downstream Passage

Downstream passage success at the Project was estimated for adult American eels using a standard Cormack-Jolly-Seber (CJS) model run for the set of individual encounter histories (i.e., the series of detection/no detection through the linear sequence of receivers from upstream to downstream; Lebreton et al. 1992). This approach provided a series of reach-specific "survival" or passage success estimates for:

- Monitoring Station 19 to Monitoring Station 21 (i.e., impoundment duration);
- Monitoring Station 21 (i.e., upstream approach) to downstream passage;
- Downstream passage to Monitoring Station 37 (i.e., first downstream receiver); and
- Monitoring Station 37 (i.e., first downstream receiver) to Monitoring Station 39 (i.e., second downstream receiver)

Standard error and confidence bounds for each estimate were generated. The joint probability of three reach survival estimates (i.e., (Lowell to Station 37)*(Station 37 to Station 39)*(Station 39 to Lawrence)) was used as the estimate of total passage survival for the Project. This approach resulted in a mortality estimate that included both background mortality (i.e., natural mortality such as predation) and mortality due to Project effects in the reach extending from Lowell downstream to Lawrence. Thus, the results presented in this report reflect a minimum estimate of survival attributable to Project effects for adult silver eels.

To evaluate passage success using the CJS models, a suite of candidate models were developed in Program MARK (White and Burnham 1999) based on whether survival (i.e., passage success), recapture (i.e., detection), or both vary or are constant among stations. Models developed during this study included:

- *Phi(t)p(t)*: survival and recapture may vary between receiver stations;
- *Phi(t)p(.)*: survival may vary between stations; recapture is constant between stations;
- *Phi(.)p(t)*: survival is constant between stations; recapture may vary between stations;
- *Phi(.)p(.)*: survival and recapture are constant between stations;

Where;

- *Phi* = probability of survival
- *p* = probability of detection
- *(t)* = parameter varies
- *(.)* = parameter is constant

To evaluate the fit of the CJS model, goodness of fit testing was conducted for the "starting model" (i.e., the fully parameterized model) using the function RELEASE within Program MARK. Akaike's Information Criterion (AIC) was used to rank the models as to how well they fit the observed mark-recapture data (Lebreton et al. 1992). Lower AIC values denote a more explanatory yet parsimonious fit than higher AIC values. Assuming the assumptions of the model with the lowest AIC value were reasonable with regards to this study, that model was selected for the purposes of generating passage effectiveness estimates.

Models were prepared which evaluated downstream passage success of adult eels at Lowell as follows:

- All eels – based on detection at Station 37, Station 39 and Lawrence;
- Garvins Falls release group – based on detection at Station 37, Station 39, and Lawrence;
- Lowell Project release group – based on detection at Station 37, Station 39, and Lawrence;
- All eels – adjusted for median "travel time" for freshly dead eels released in Lowell tailrace to reach Lawrence (i.e., test eels with downstream travel times in excess of median drift duration manually adjusted to reflect a mortality at the Project); and
- All eels – by downstream passage route.

4.5.3 Time to Event Analysis

4.5.3.1 Cox Proportional Hazard Model

Utilizing available methodology for quantifying fish passage performance (Castro-Santos and Perry 2012), multi-variate Cox proportional hazard models were developed to assess the impact of various operational and environmental variables on the rate of passage success. Operational and environmental variables considered as part of this analysis included:

- Merrimack River water temperature (^{o}C);
- Head differential (ft) at the Pawtucket Gatehouse (i.e., headpond vs. Northern Canal);
- Bypassed reach spill flow (cfs);
- E.L. Field turbine discharge (cfs);
- Merrimack River inflow (cfs); and
- E.L. Field head differential (ft) (i.e., Northern Canal vs. tailwater).

This assessment on the rate of passage success focused on approach events at (1) the Pawtucket Gatehouse (i.e., Station 25), and (2) at the E.L. Field Powerhouse (i.e., Station 29).

Regression models for the time to event analyses were constructed using the *coxph*() function from the package "*survival*" in R (R Core Team 2020) and were used to evaluate the rate of passage success and identify operational hazards at sites which contained a physical barrier or a structure through which tagged individuals would have to navigate (i.e., the Pawtucket Gatehouse and E.L. Field Powerhouse).

The Cox proportional hazard regression can be described as a hazard function to evaluate the proportionate risk at time (t) such that

$$h(t) = h_0(t) \times exp(b_1x_1 + b_2x_2 + \ldots + b_ix_i)$$

where $h(t)$ represents that hazard at a given time point which is equal to the initial or baseline hazard at time 0:00 ($h_0(t)$) multiplied by e (the base of the natural logarithm) to the power of the additive relationship between each covariate (x_i) multiplied by its associated coefficient (b_i).

From the above equation, the relative impact of an operational parameter on the rate of passage success is represented by its associated coefficient. The hazard ratio of a given operational parameter is calculated by exponentiating the coefficient of a given parameter, which represents that multiplicative impact of that parameter. It is important to note that exponentiating these coefficients makes the value relative to a value of 1 (e^0), which represents a baseline of no hazard. For example, if the hazard ratio is greater than 1, e.g., 1.5, that will be interpreted as that covariate increasing the risk of passage failure by a factor of 1.5. Alternatively stated, a hazard ratio of 1.5 indicates that the associated covariate increases the risk by 50% as it is 0.5 greater than 1. In contrast, a hazard ratio below 1, e.g., 0.75, indicates that the associated covariate reduces the risk of passage failure by a factor of 0.75, or 25%. In short, a hazard ratio >1 indicates an increase in the risk of passage failure, a hazard ratio of 1 indicates no significant directional effect on passage, and a hazard ratio <1 indicates a reduction in the risk of passage failure.

4.5.3.2 Model Evaluation and Selection

As is the case with any statistical model, the type of model selected makes inherent assumptions about the nature of the data being modelled. The primary assumption of a Cox proportional hazard model is that the hazards are proportional. However, this assumption is not always appropriate for the data. As a result, the *cox.zph()* function was used during this assessment to assess the validity of the proportional hazard assumption. This function assessed scaled Schoenfield residuals to evaluate whether Cox regression residuals of each covariate in addition to the model as a whole are independent of time. In the event that the Schoenfield residuals are not independent of time, it can be said that the assumption of proportional hazards is violated and a Cox proportional hazards model may be misrepresentative of the true relationships between the selected covariates and passage success.

4.5.3.3 Event Definition

To evaluate the impact of operational parameters on passage success, instances of passage success and failure required definition and represent the 'events' (or passage attempts) in this analysis. Ostensibly, the transmitters deployed during this study should transmit a signal that when within range of a particular receiver will be detected every 2.0 seconds. However, various sources of outside noise or areas of poor coverage due to structures, etc. introduce variation into the frequency of detection for a unique transmitters signals. Given that different site locations and receiver types are subject to varying degrees of ambient noise, the duration between successive detections was calculated for each tagged individual at each receiver location. A threshold interval for determining continued presence of a transmitter within the detection zone of a specific receiver was identified as the 95th percentile of the observed set of interval durations. This value was calculated at 14.4 seconds for Station 25 and 32.4 seconds for Station 29. These two threshold values were then used to delineate when each event was started and completed for a tagged individual. The departure of a radio-tagged individual from the detection zone of a particular receiver was determined when the time interval between successive detections exceeded the specific threshold interval for that zone.

From this, a passage failure event (assigned a value of 0) was defined as any duration where all detections lay within the 95th percentile of durations for all individuals at that site. Passage failure represents events in which a tagged individual enters the field of detection at a given site without passing to the next site (i.e., moving downstream) in the system. A passage success event (assigned a status of 1) was defined using the final instance of detection for a tagged individual at a singular site where that tagged individual was next detected at a downstream receiver (i.e., successfully passed). Passage success/failure (1/0) was used as the status coinciding with time in the Cox proportional hazard models. After defining passage events for every individual, the time duration for the regression was defined as the duration from one event to the next.

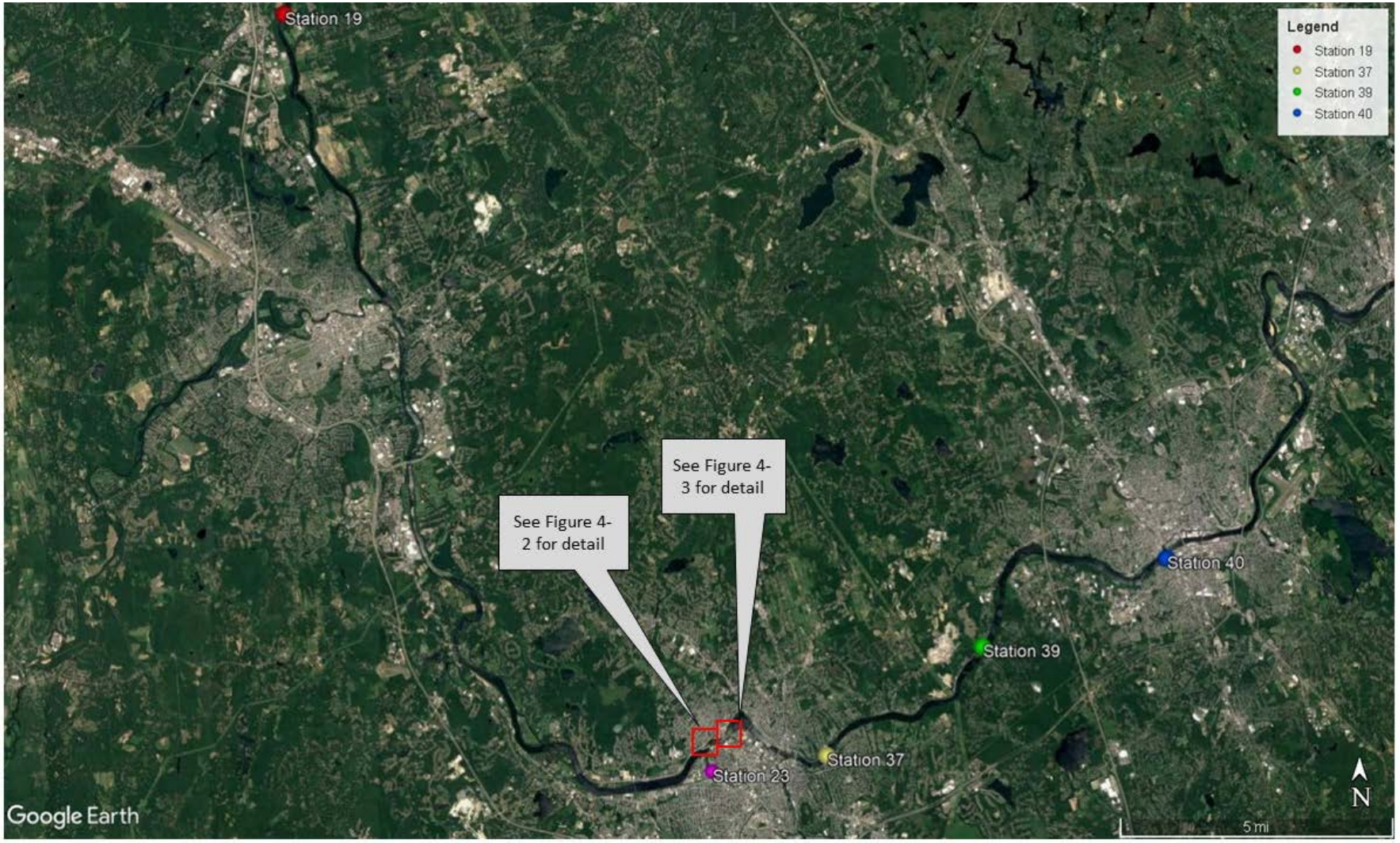

Figure 4–1. Locations of remote stationary radio-telemetry receivers installed during the 2019 adult American eel downstream passage assessment at Lowell.

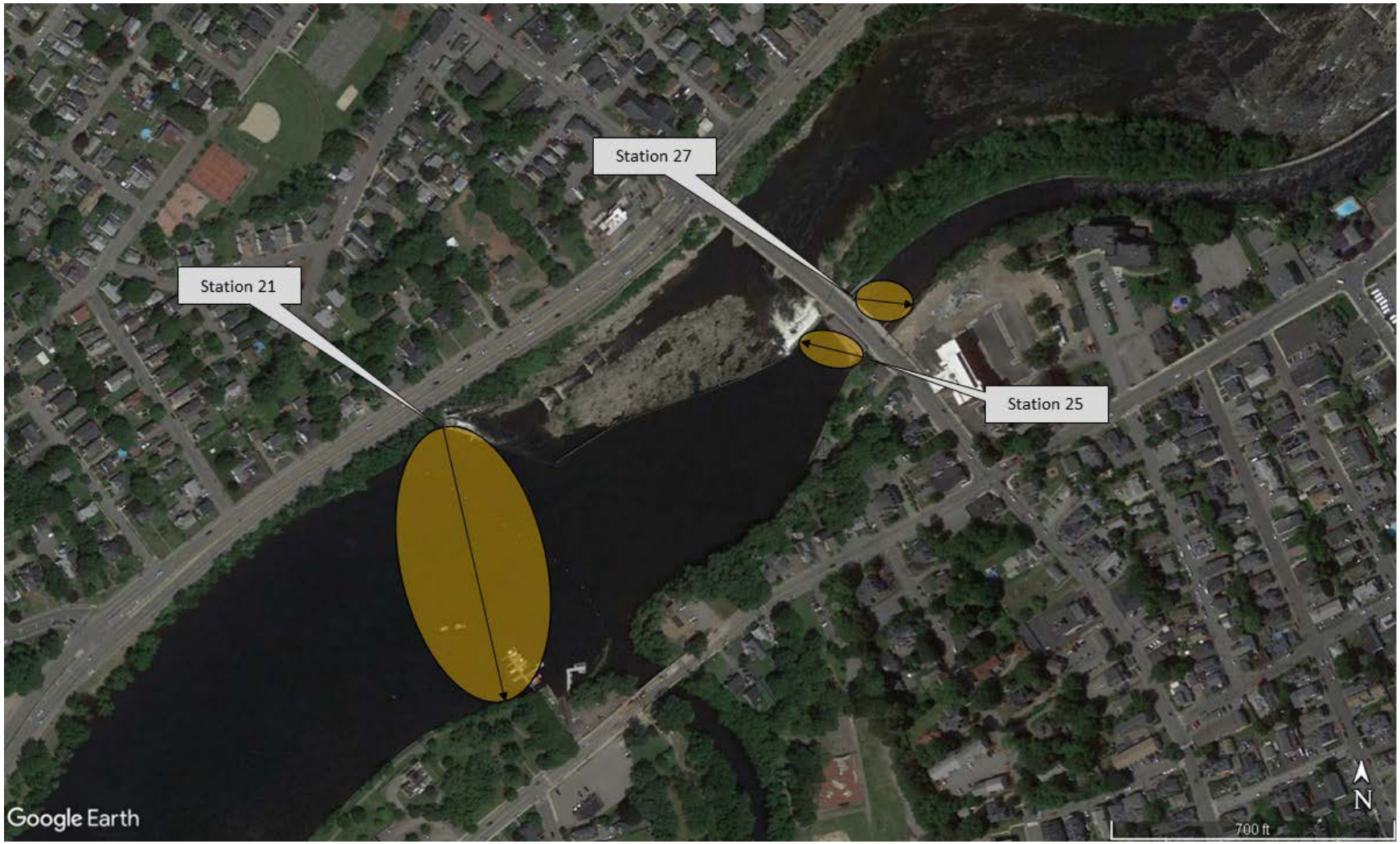

Figure 4–2. Locations and approximate detection areas for stationary radio-telemetry receivers installed upstream of Pawtucket Dam and at the Northern Gatehouse during the 2019 adult American eel downstream passage assessment at Lowell.

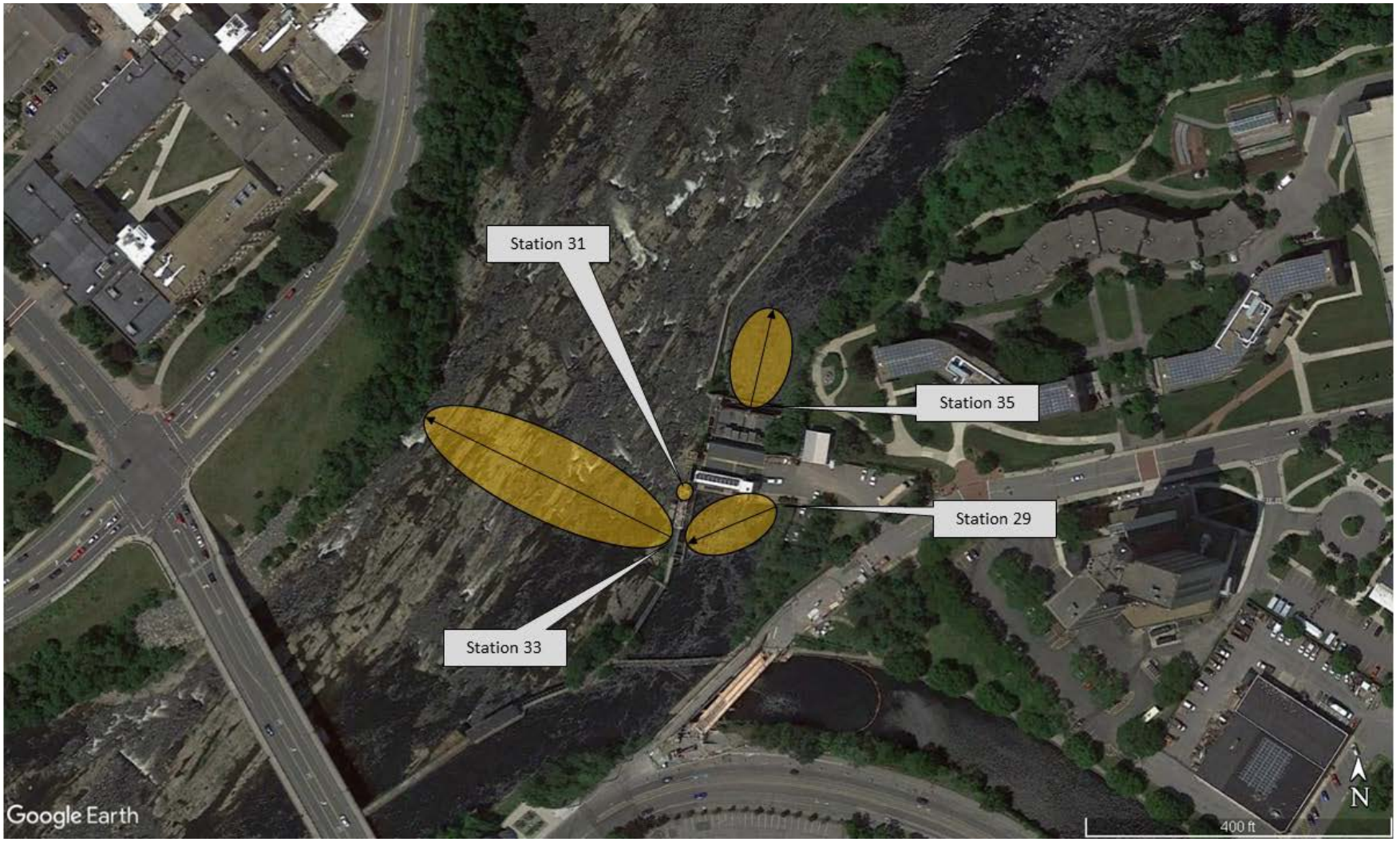

Figure 4–3. Locations and approximate detection areas for stationary radio-telemetry receivers installed in the vicinity of the E.L. Field Powerhouse during the 2019 adult American eel downstream passage assessment at Lowell.

Figure 4–4. Tagging process for silver-phase American eels.

5 Results

5.1 Merrimack River Conditions and Lowell Project Operations

Figure 5-1 presents the Merrimack River flow and water temperature for the period of time from the first eel release on October 9 until the end of the monitoring period on November 31, 2019. Water temperatures at Lowell ranged from 16°C at the onset of the study to 2°C on November 30. Total river flow values represent the reported inflow at the Lowell Project. Merrimack River flow at Lowell ranged between 1,089 and 12,995 cfs during the nearly two month fall study period. Figure 5-2 presents the monthly flow duration curves prepared for Lowell during the development of the Preliminary Application Document. The median flow condition at the Project is approximately 3,600 cfs during October and 6,500 cfs during November. Merrimack River conditions have a ~20% probability during October and a ~38% probability during November to exceed the ~8,000 cfs capacity of the E.L. Field powerhouse.

Table 5-1 summarizes the percentage of inflow records from the 2019 study period categorized by volume (to the nearest 1,000 cfs) as well as the percentage of time that each volume category is historically exceeded[2]. To help characterize the 2019 passage season, monthly exceedance probabilities less than 0.35 were classified as "high" flow conditions, 0.35 to 0.65 were classified as "normal" flow conditions, and greater than 0.65 were classified as "low" flow conditions. Inflows at the Project for the period October 9 through 31 were representative of high flow conditions (i.e., those with a probability of exceedance of less than 0.35) for 35% of the period, normal flow conditions (i.e., those with a probability of exceedance of 0.35-0.65) for 29% of the time and low flow conditions (i.e., those with a probability of exceedance of greater than 0.65) for 36% of the time. For the month of November, inflows were representative of high flow conditions 26% of the time, normal flow conditions 15% of the time and low flow conditions 59% of the time.

Flow duration information for the months of October and November (combined) is presented in Figure 5-3. The median flow condition during the two month period is near 5,000 cfs. When characterized using the flow condition criteria above, inflows at the Project for the period October 9 through November 30 were representative of high flow conditions (i.e., those with a probability of exceedance of less than 0.35) for 19% of the period, normal flow conditions (i.e., those with a probability of exceedance of 0.35-0.65) for 56% of the time and low flow conditions (i.e., those with a probability of exceedance of greater than 0.65) for 24% of the time (Table 5-1).

Figure 5-4 summarizes the allocation of water among the E.L. Field powerhouse, bypassed reach, downstream fishway, and downtown canal system at Lowell. Turbine units were in operation at the E.L. Field powerhouse for the duration of the study period with Unit 1 in operation throughout the study and Unit 2 coming online at 0900 on October 16. The

[2] Estimates of monthly exceedance estimated from monthly flow duration curves provided in Appendix H of the PAD.

downstream bypass was operated throughout the study period, passing approximately 132 cfs (i.e., 2% of the nameplate capacity of the E.L. Field turbine units; 6,600 cfs). Two major spill events, associated with increases in river flows, occurred during the monitoring period. The first major spill event occurred from approximately October 29 to November 5 and the second occurred towards the end of the passage season (~November 25). Flows to the downstream canal system represented between 15-20% of the 2,000 cfs capacity during October and between 20-57% of the 2,000 cfs capacity during November. Due to overriding safety concerns, Boott limited operation of the turbine units within the downtown canal system during the study period. To the extent possible, Boott's operations staff attempted to operate the canal system as if there were canal units available, by opening gates when river flows exceeded the hydraulic capacity of the E.L. Field turbines (7,000 to 8,000 cfs). As a result, flows through the downtown canal system were largely restricted to passage via open gates. The Licensee manually recorded gate and unit settings during the study period within the downtown canal system. A breakdown of those values and related discharge estimates are provided in Appendix A.

Table 5–1. Frequency of occurrence of river inflow at Lowell (to nearest 1,000 cfs) during 2019 adult American eel passage assessment and corresponding percentage of time flows are historically exceeded.

River Flow (nearest 1k)	October 9-30, 2019		November 1-30, 2019		Oct 9 - Nov 30, 2019	
	Percentage of Month	Percentage of Month Historically Exceeded	Percentage of Month	Percentage of Month Historically Exceeded	Percentage of Period	Percentage of Period Historically Exceeded
1000	16.1%	90	-	> 95	7.0%	>95
2000	19.4%	85	-	> 95	8.4%	90
3000	6.0%	60	10.7%	88	8.6%	76
4000	22.6%	45	25.1%	78	24.0%	63
5000	12.7%	34	23.6%	66	18.9%	50
6000	9.4%	27	5.5%	55	7.2%	42
7000	6.2%	23	6.5%	45	6.4%	35
8000	4.2%	19	2.8%	38	3.4%	29
9000	3.1%	16	2.8%	30	2.9%	24
10000	0.4%	14	5.4%	25	3.2%	21
11000	-	<5	9.8%	5	5.6%	5
12000	-	<5	5.4%	<5	3.1%	LT 5
13000	-	<5	2.4%	<5	1.3%	LT 5

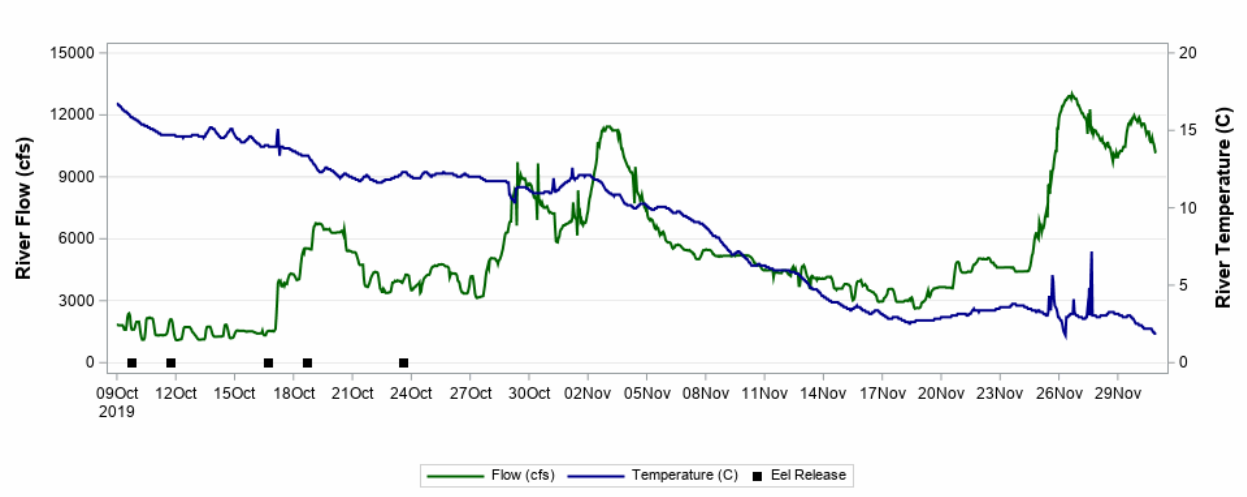

Figure 5–1. Merrimack River flow and water temperature at Lowell for the period October 9 to November 30, 2019.

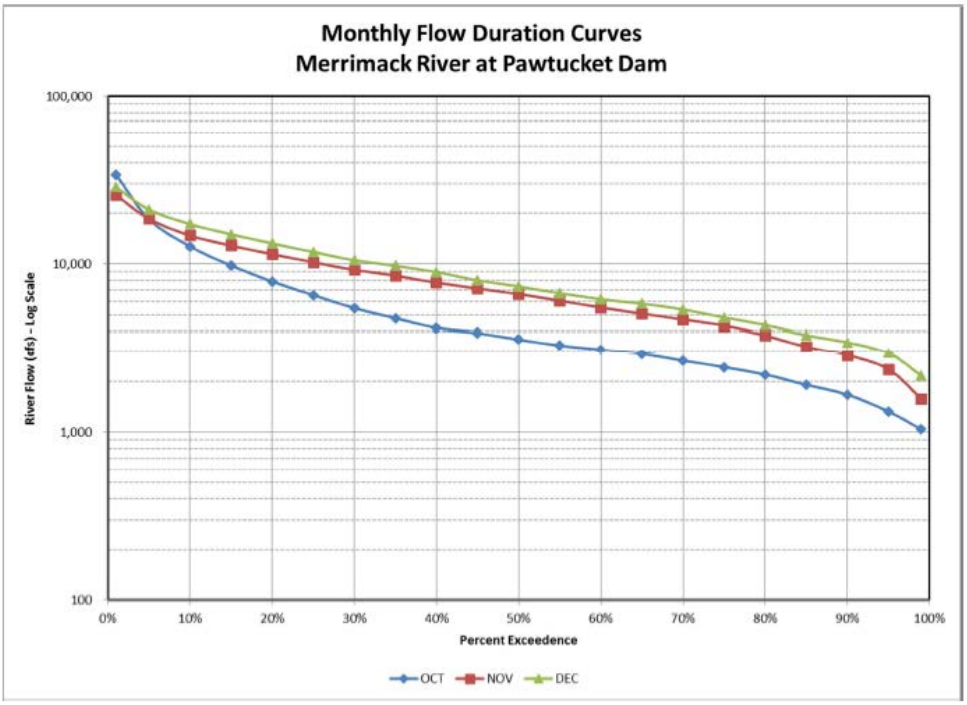

Figure 5–2. Flow duration curves for the months of October, November and December at the Lowell hydroelectric project.

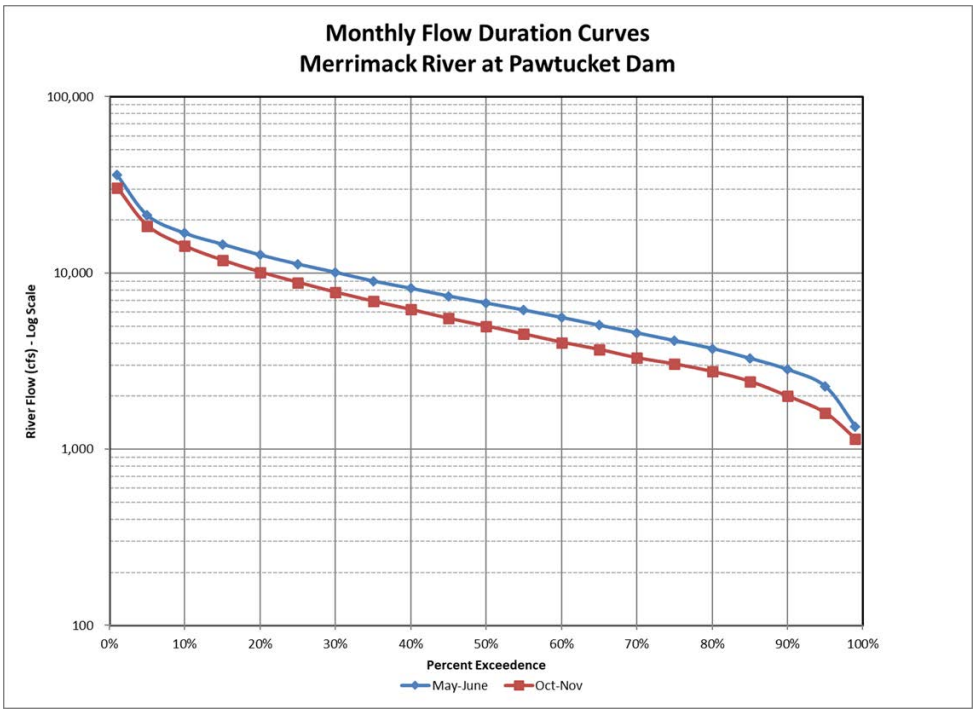

Figure 5–3. Flow duration curves for the two month period of October-November at the Lowell hydroelectric project.

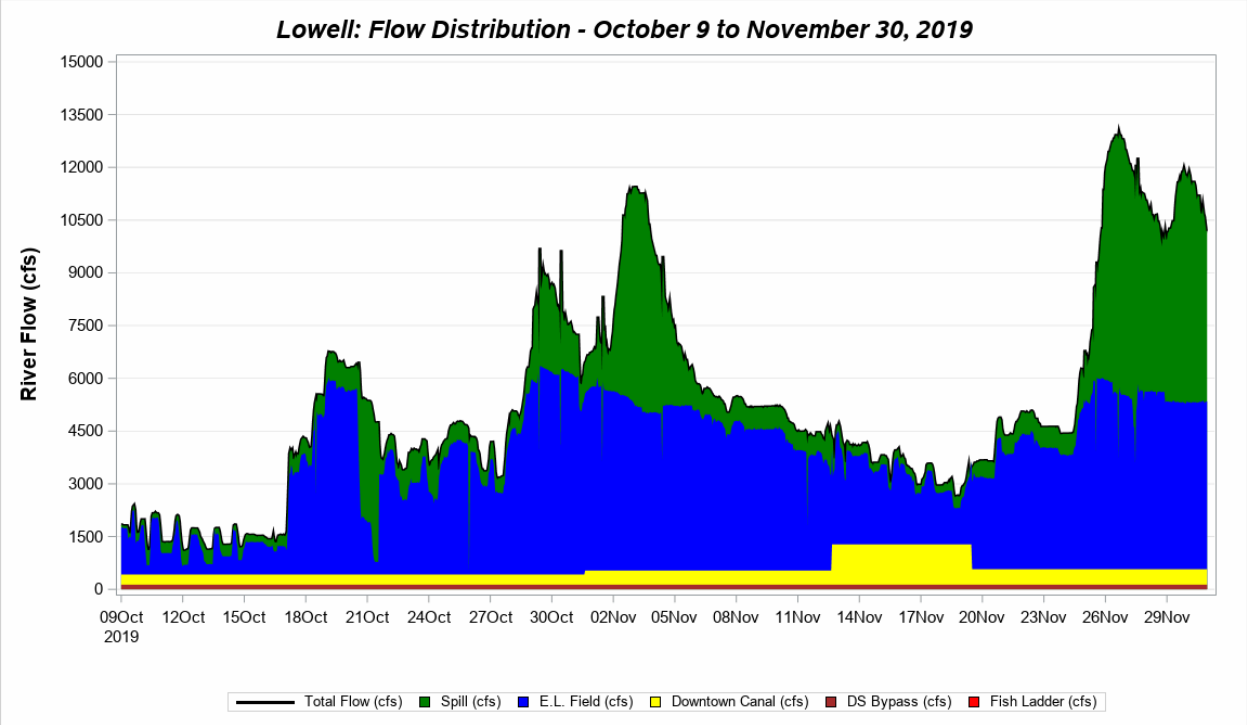

Figure 5–4. Total, spill, E.L. Field, downstream bypass and downstream canal system flow (cfs) for the period October 9 to November 30, 2019.

5.2 Monitoring Station Functionality

Radio-tagged adult American eels were released into the Merrimack River beginning in early October, 2019. The RSP called for continuous monitoring at each stationary receiver location through the end of November. Figure 5-5 provides an overview of the continuity of monitoring at each of the twelve stationary receiver locations during the fall period. The majority of the radio-telemetry monitoring stations installed to evaluate passage at Lowell during the fall study operated without issue for the full period.

Interruptions in continuous coverage were observed at three locations during the latter part of the study when lessened levels of daylight led to reduced efficiency of solar panel charge. These locations included Station 19 (upstream end of the Lowell impoundment) from 2000 on November 10 to 1400 on November 12, Station 27 (downstream side of the Pawtucket Gatehouse) from 0830 to 1030 on November 12, and Station 37 (first receiver downstream of Lowell) from 0200 to 1300 on November 5. Potential impacts to the study results from these three outages were likely limited. A single radio-tagged eel which approached the Pawtucket Dam after 2000 on November 10 lacked a detection at Station 19 and may have passed during the outage at that location preventing calculation of an impoundment residence duration for that individual. The outage at Station 27 was extremely short in duration and there were no radio-tagged eels detected upstream of the gatehouse that went undetected at that location prior to initial detection in the E.L. Field forebay. No radio-tagged eels passing downstream of Lowell on November 5 (or preceding two dates) went undetected at Station 37.

The aerial antenna at Station 25 (upstream side of the Pawtucket Gatehouse was removed by Boott operations staff to facilitate the installation of a crane to remove the in-river debris load from the upstream side of the gatehouse structure on November 21. A single radio-tagged eel did approach on November 22 and the outage at that station prevented a determination of the time to pass through the Pawtucket Gatehouse for that individual.

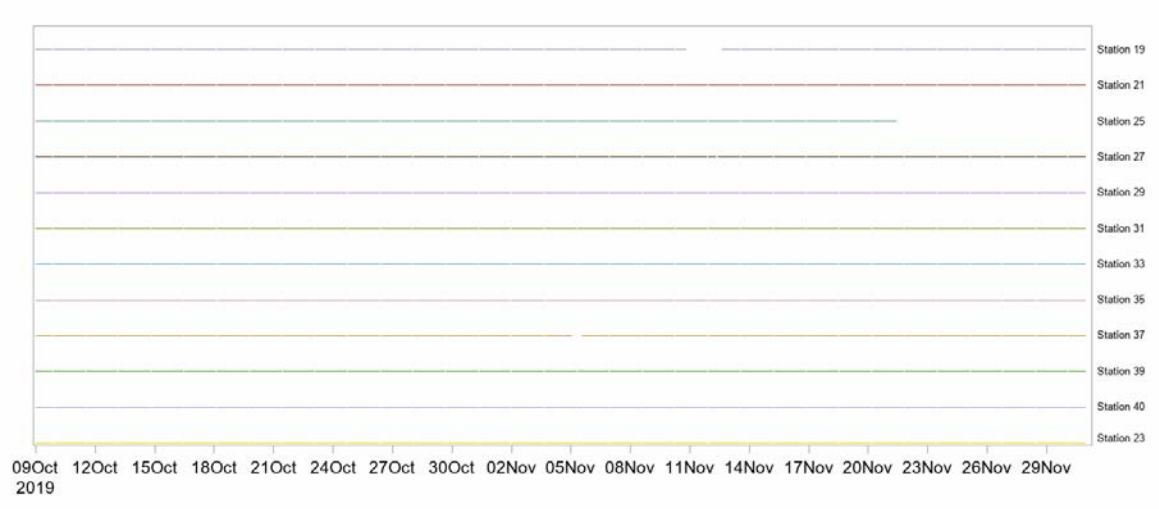

Figure 5–5. Operational coverage for telemetry receivers at Lowell during the adult silver eel downstream passage assessment, October 9 to November 30, 2019.

5.3 Downstream Drift Assessment

A total of ten freshly dead, radio-tagged American eels were released from the back deck of the E.L. Field powerhouse and directly into the upper portion of the discharge from an active turbine unit during the 2019 evaluation period. Freshly-dead eels were released intact and would be representative of an individual which did not suffer a physical strike which may result in partial or full severing of the body. Two individuals were released in the tailrace on each date where a group of radio-tagged eels were released upstream of the Project impoundment in Manchester, NH. Table 5-2 provides a summary of the release schedule and date-time of first detection for the drift eels to arrive at monitoring stations downstream of Lowell (Stations 37, 39, and 40).

Of the ten freshly dead, radio-tagged eels released at Lowell, seven were eventually detected at Station 40 (located at Lawrence, 10.75 miles downstream of the Lowell tailrace). The median duration to drift from the Lowell tailrace downstream to Lawrence was 216.4 hours (range = 59.4-538.9 hours). Three freshly dead eels did not drift the full distance from the tailrace to Station 40 at Lawrence. Of those individuals, two moved away from the Lowell tailrace but were not detected at Station 37 (2.1 miles downstream of Lowell). The third individual drifted from the Lowell tailrace to Station 37 over a period of 247.8 hours.

5.4 Eel Tagging and Releases

Eels were tagged and released upstream of the Project starting on October 9 and ending on October 23. Monitoring coverage at Lowell provided detection information on radio-tagged individuals released upstream of Lowell as part of this relicensing study (n = 102) as well as individuals released as part of a separate study conducted upstream at Garvins Falls Dam (Merrimack River Project, FERC No. 1893; n = 60) in Bow, NH. Table 5-3 provides a summary of the release dates and number of individuals for the 2019 passage assessment. A total of 162 live, radio-tagged adult eels were released over a span of two weeks and were potentially available for evaluation of downstream passage at Lowell. The majority of those individuals originated from the St. Croix River whereas the rest were captured locally (Soucook River; n = 10).[3] Eels tagged and released at locations upstream of Lowell as part of the 2019 passage evaluation ranged in length from 646 to 1,032 mm with the highest contribution of individuals to the 800-849 mm length class (Figure 5-6). The mean length of radio-tagged individuals released upstream of Garvins Falls (mean = 828 mm; range = 646-999 mm) was similar to that for eels released upstream of the Lowell impoundment (mean = 823 mm; range = 679-1,032 mm). The majority of eye index values recorded (98%) were within the literature reported range (6.0-13.5) for outmigrating eels. A full listing of tagging and biocharacteristics information for eels released during 2019 is provided in Appendix B.

[3] See Appendix D for a comparison of passage metrics for the October 23 release group comprised of eels originating from the Soucook River (n = 10) and St. Croix River (n = 12).

5.5 Impoundment Passage

Radio-tagged eels released upstream of the Lowell impoundment and upstream of Garvins Falls Dam were initially detected at Monitoring Station 19, located at the upstream extent of the Lowell impoundment (~ 23 miles from the Pawtucket Dam). The duration of time for radio-tagged individuals to move through the Lowell impoundment and arrive at the Pawtucket Dam (as indicated by detection at Station 21) ranged from 12.5 hours to 16.4 days (Table 5-4; Figure 5-7. The median duration of time spent in the Lowell impoundment was 2.1 days and did not appear to differ for eels originally released upstream of the Lowell impoundment or upstream of Garvins Falls.

5.6 Project Arrival and Upstream Residence Duration

Releases of radio-tagged eels were initiated on October 9 at locations upstream of the Project boundary and upstream of Garvins Falls Dam. Figure 5-8 presents the distribution of arrival dates for radio-tagged eels at the Pawtucket Dam as indicated by detection at Station 21. Initial detections for eels were recorded over a range of dates from October 13 through November 22 with just over fifty percent of individuals initially detected between the dates of October 24 and 30.

The duration of time radio-tagged individuals were present upstream of the Pawtucket Dam was determined for all individuals which approached and eventually passed downstream and was calculated as the duration of time from initial detection at Station 21 until confirmed downstream passage via one of the available routes. When all individuals are considered, upstream residence duration prior to downstream passage ranged between 0.2 hours to 16.5 days (Table 5-5; Figure 5-9). The median duration of time spent immediately upstream of the dam structure was 0.4 hours and did not appear to differ for eels originally released upstream of the Lowell impoundment or upstream of Garvins Falls. Of the radio-tagged eels which approached Pawtucket Dam, 94% passed in fewer than 24 hours after initial detection. Eight radio-tagged adult eels took greater than 24 hours to pass downstream following their initial detection at Station 21.

Outmigrating adult eels encountering the Pawtucket Dam can (1) pass through the Pawtucket Gatehouse and enter the power canal, (2) pass downstream over Pawtucket Dam via spill, or (3) enter the Pawtucket Canal and navigate downstream via the downtown canal system. During the 2019 evaluation there were no detections of radio-tagged eels at Monitoring Station 23 indicating individuals passed downstream of Lowell in the mainstem Merrimack rather than entering the downtown canal system. The majority of radio-tagged eels were determined to have passed through the Pawtucket Gatehouse and entered the Northern Canal to approach the E.L. Field powerhouse. The duration of time to pass through the Pawtucket Gatehouse was determined based on the initial detection for each individual eel at Stations 25 and 27 which independently monitored the upstream and downstream sides of that structure. The median duration of time for radio-tagged eels to approach and pass through the Pawtucket Gatehouse was 0.1 hours (range <0.1 hours to 3.9 days; Table 5-6). The vast majority (95%) of radio-tagged eels passing through the Pawtucket Gatehouse did so in 30 minutes or less.

Similar to observations at the Pawtucket Gatehouse, radio-tagged eels which entered the Northern Canal and passed downstream of E.L. Field powerhouse did so relatively quickly. Of those individuals, 94% were resident in the power canal upstream of E.L. Field for 3 hours or less. The median residence duration in the Northern Canal was 0.2 hours (range = 0.1 hours to 22.1 days; Table 5-7). Seven radio-tagged individuals were present in the Northern Canal for 36 hours or greater prior to downstream passage.

5.7 Downstream Passage

A total of 162 radio-tagged eels were released at points upstream of the Lowell Project during the fall of 2019. Of that total, 147 were determined to have approached the Pawtucket Dam and were available for the evaluation of downstream passage route (Table 5-8). The majority of radio-tagged individuals passed through the Pawtucket Gatehouse and approached the E.L. Field powerhouse. Most individuals (92.5%) passed downstream of Lowell via the E.L. Field turbine units. Use of the downstream bypass was limited to two individuals (1.4% of those approaching the Pawtucket Dam). Use of the bypassed reach was limited to four individuals, representing 2.8% of radio-tagged eels which approached the Pawtucket Dam.

Radio-tagged silver eels were observed passing downstream of Lowell between the dates of October 13 and November 22 (Figure 5-10). Downstream passage of radio-tagged eels at Lowell peaked during the last part of October with 81% of all downstream passage events at the Project occurring on or before October 31. Figure 5-11 presents the timing distribution of downstream passage events for silver eels at Lowell. The majority of individuals passed downstream at dusk (hours 1800 – 2200) with a peak in the number of downstream passage events during the hour of 2000 (20%).

For each of the 142 individuals which were confirmed to have passed downstream of Lowell via a known passage route (i.e., turbine, downstream bypass, or spill) the hourly record of Project operations (Section 5.1) at the time of passage was reviewed. The discharge at the selected route was identified and contrasted with the cumulative discharge for all non-selected routes at the time of downstream passage (Table 5-9). The majority of radio-tagged eels passing downstream at Lowell did so via the E.L. Field turbine units. The median discharge through the two E.L. Field turbine units at the time of passage for those individuals was 4,122 cfs. When examined by passage route, the median percentage of passage route flow at each known downstream passage route represented 78% of project flow for turbine passed eels, 2% of project flow for downstream bypass passed eels and 41% of project flow for spill passed eels. Passage via the downstream route with the greatest proportion of flow at the time of passage occurred 87% of the time. A listing of route discharge at the time of downstream passage for each eel is provided in Appendix F.

5.8 Downstream Transit

Three monitoring stations were installed downstream of Lowell for the purpose of detecting radio-tagged adult eels following passage at the Project. Those receivers were located approximately 2.1 (Monitoring Station 37), 6.0 (Monitoring Station 39), and 10.75 (Monitoring

Station 40) miles downstream of the project. The minimum, maximum, and quartile transit times through those three reaches are presented in Table 5-10. The median transit time durations for tagged adult eels moving downstream of Lowell were 2.1, 15.0, and 21.8 hours for the 2.1 mile, 3.9 mile and 4.75 mile-long downstream reaches, respectively.

Table 5-11 and Figure 5-12 present the minimum, maximum and quartile transit times for radio-tagged silver eels to cover the reach from immediately downstream of Lowell to the upstream face of the Essex Dam in Lawrence (i.e., Station 40). The median travel time for radio-tagged eels to approach Lawrence following downstream passage at Lowell was 2.3 days (range = 6.7 hours to 38.2 days). Figure 5-13 presents the distribution of observed downstream transit rates for radio-tagged eels moving from Lowell to Lawrence. Reference lines for the 25, 50, and 75% quartiles observed for the freshly-dead drift eels are included (5.7, 9.0, and 19.0 days, respectively; Table 5-2). Of the live-radio-tagged eels which passed downstream of Lowell and were subsequently detected at Lawrence, 85% did so in less time than the 25th percentile of occurrence for the dead drift eels, 91% did so in less time than the 50th percentile (median) of occurrence for the dead drift eels, and 99% did so in less time than the 75th percentile of occurrence for the dead drift eels.

5.9 Passage Survival

The CJS model *Phi(t)p(t)* provided the best fit for the observed mark-recapture data associated with downstream movements of radio-tagged silver-phase American eels approaching and passing at Lowell during 2019 (Table 5-12). The detection efficiency for telemetry receivers recording passage of adult eels at monitoring stations at Lowell and Lawrence as well as the remote riverside locations ranged from 1.000 to 0.839 (Table 5-13). The relatively poor detection efficiency rate (0.839) was estimated for Station 37 (first receiver downstream of Lowell). It is suspected that background interference in the vicinity of the Waste Water Treatment Plant property may have led to the lower than desired detection rate. However, detection was 100% for eels at Station 39 and Lawrence.

The reach-specific survival estimates for the Merrimack River from the upstream extent of the Lowell impoundment to detection immediately upstream of Lawrence are presented in Table 5-14. There was no mortality associated with passage for adult radio-tagged eels moving downstream through the Lowell impoundment. Passage success for downstream adult American eels at Lowell was calculated as the joint probability of the three reach-specific survival estimates which encompasses the full section of the Merrimack River from Lowell downstream to Lawrence (i.e., Lowell to Station 37, Station 37 to Station 39, and Station 39 to Lawrence). This resulted in an estimated downstream passage survival for silver-phase American eels at Lowell of 75.5% (75% CI = 71.4%-79.6%). Estimates of downstream passage for eels released upstream of Garvins Falls (75.6%; 75% CI = 68.8%-82.2%) and immediately upstream of the Lowell impoundment (75.5%; 75% CI = 70.5%-80.4%) did not differ.

Encounter histories for all radio-tagged eels which approached and passed downstream of Lowell were evaluated relative to the calculated downstream transit durations for freshly dead eels released into the Lowell tailrace. Individual test eels with a transit duration from Lowell to

Lawrence in excess of the median duration required to drift the 10.75 mile reach were manually adjusted to reflect mortality at the Lowell Project. When those individuals are adjusted, the estimate of overall project passage survival at Lowell is 68.7% (75% CI = 64.5%-72.9%).

Radio-tagged eels which approached and passed downstream at Lowell during the 2019 evaluation did so primarily via the E.L. Field turbine units (Table 5-8) and the number of individuals (n = 136) permitted the generation of a route-specific passage survival rate (75.0%; 75% CI = 70.6%-79.4%). The limited number of radio-tagged eels passing the Project via spill (n = 4) or via the downstream bypass system (n = 2) were all determined to have successfully approached the Lawrence Project following downstream passage at Lowell.

5.10 Time to Event Analysis

A total of 144 Pawtucket Gatehouse and 61 E.L. Field Powerhouse forebay events were defined based on recorded detections of adult American eels during the 2019 study to evaluate the impact of operational parameters on passage success. The median event duration recorded for a radio-tagged adult eel was 1.6 minutes for individuals in the detection field of Station 25 immediately upstream of the Pawtucket Gatehouse and 29 seconds for individuals in the detection field of Station 29 covering the area immediately upstream of the intakes to the downstream bypass and turbine units at the E.L. Field Powerhouse.

5.10.1 Pawtucket Gatehouse

Results of the Cox proportional hazard model for the Pawtucket Gatehouse can be found in Table 5-15 and illustrated in Figure 5-14. Model results suggest a statistically significant and negative relationship between water temperature and passage success at the Pawtucket Gatehouse wherein a decrease in temperature leads to a 22% increase in the probability of passage failure (i.e., the probability of successfully passing downstream through the Pawtucket Gatehouse decreases as the water temperature decreases (presumably later in the season)). For this model, inflow data was split into three bins based on volume: 1080-5060 cfs (i.e., low), 5060-9030 cfs (i.e., mid), and 9030-13,000 cfs (i.e., high). The low inflow condition was used as a reference for comparison with mid and high inflow conditions, as illustrated in Figure 5-14. Although the model suggests an insignificant, negative relationship between inflow values from 1080-5060 cfs and passage success, a statistically significant, positive relationship was found between passage success and high inflow values ranging from 9030-13,000 cfs. This indicates inflow values classified as “high” reduced the probability of passage failure by 33% (i.e., likelihood of successful passage at the Pawtucket Gatehouse increases with rising inflow). Similarly, spill data was split into three bins: 0-3040 cfs (i.e., low), 3040-6070 cfs (i.e., mid), and 6070-9120 cfs (i.e., high) and the low spill flow category was used as reference for comparison with mid and high spill conditions (Figure 5-14). Mid-levels of spill flow were found to be significantly correlated with passage success. The probability of passage failure for adult eels at the Pawtucket Gatehouse decreases by 79% when spill is between 2080 and 6070 cfs. Additionally, it should be noted that Table 5-16 demonstrates the Pawtucket Gatehouse model meets the criteria necessary to accept the assumption that hazards are proportional, as all covariates were found to be independent of time.

5.10.2 E.L. Field Powerhouse Forebay

Results of the Cox proportional hazards model for E.L. Field forebay events suggest a statistically significant, negative relationship between both water temperature and the forebay-tailrace head differential versus passage success, increasing the probability of passage failure by 26% and 58%, respectively (Table 5-17). In order to make sure the data met the assumption of proportional hazards and ensure the use of an appropriate modelling framework, spill was maintained as a continuous variable and inflow was split into three bins (1080-5060 cfs (i.e., low), 5060-9030 cfs (i.e., mid), and 9030-13,000 cfs (i.e., high; Table 5-17). However, neither spill nor inflow were found to be significant variables with neither exhibiting a measurable impact on passage success out of the E.L. Field Powerhouse forebay. Model results indicate the combined turbine discharge (cfs) exhibited a negative, statistically significant impact on passage success, which was also classified into three bins: 592-1980 cfs (i.e., low generation), 1980-3950 cfs (i.e., mid generation), and 3950-5930 cfs (i.e., high generation). As illustrated in Figure 5-15, the low generation category was used as a reference for comparison to the mid and high generation conditions. Results suggest a strong, statistically significant interaction for the rate of passage failure under the mid and high generation conditions with an increase in the observed rate of passage failure for those two conditions relative to the low generation condition. Table 5-18 demonstrates that the E.L. Field Powerhouse forebay model meets the criteria necessary to accept the assumption that hazards are proportional, as all covariates were found to be independent of time.

5.11 Manual Tracking

In addition to the continuous monitoring provided by the 12 stationary receivers installed throughout the Project area for the duration from early October through November 2019, a total of 116 manual detections representing 66 individuals were recorded between October 21 and November 25. Appendix C contains a listing of manual detections identified to the nearest 0.25 mile and classified as “Transit” for eels which were detected at stationary receivers downstream of their manually determined position or “Stationary” for eels which were not detected again at stationary receivers downstream of their manually determined position(s). A total of 39 individuals were located a single time within the Lowell impoundment with the majority (38 or 39) representing an individual which exhibited continued downstream movement following manual detection. A total of 10 individuals were manually detected within the Merrimack River downstream of Lowell and upstream of Station 37. The majority of those individuals (8 of 10) represented stationary individuals which were not detected at any of the downstream stationary receivers (i.e., Stations 37, 39, or 40). Similarly, a total of 18 individuals were manually detected within the Merrimack River between Stations 37 and 39. The majority of those individuals (11 of 18) represented stationary individuals which were not detected at additional downstream stationary receivers (i.e., Stations 39, or 40). Five radio-tagged eels were each detected on a single occasion in the reach between Station 39 and immediately upstream of Lawrence (Station 40).

Table 5–2. Summary of the downstream drift distance and duration for freshly dead, radio-tagged silver eels released in the Lowell tailrace during the downstream passage assessment, October 9 to November 30, 2019.

Release Date	River Condition (cfs)		Frequency (ID)	Total Length (mm)	Station 37 Arrival		Station 39 Arrival		Station 40 Arrival		Drift Duration	
	Inflow	ELF Discharge			Date	Time	Date	Time	Date	Time	Hours	Days
9-Oct	1830	1265	149.320 (80)	806	-	-	17-Oct	22:01	18-Oct	2:29	198.8	8.3
			149.320 (81)	761	-	-	-	-	-	-	-	-
11-Oct	1515	824	149.320 (82)	726	14-Oct	4:12	15-Oct	3:47	1-Nov	18:44	503.4	21.0
			149.320 (83)	775	22-Oct	3:08	-	-	-	-	-	-
16-Oct	1454	780	149.320 (84)	807	27-Oct	20:06	8-Nov	1:19	8-Nov	5:35	538.9	22.5
			149.320 (85)	802	-	-	23-Oct	23:20	25-Oct	19:06	216.4	9.0
18-Oct	4938	3932	149.320 (86)	806	-	-	-	-	-	-	-	-
			149.320 (87)	932	20-Oct	5:56	2-Nov	19:29	4-Nov	18:28	407.0	17.0
23-Oct	3981	2795	149.320 (88)	958	24-Oct	3:58	25-Oct	2:29	26-Oct	18:44	72.6	3.0
			149.320 (89)	751	25-Oct	3:46	25-Oct	23:18	26-Oct	5:33	59.4	2.5

Table 5–3. Release date and location for radio-tagged silver eels upstream of Lowell during the downstream passage assessment, October 9 to November 30, 2019.

Release Date	Release Location	No. of Individuals
9-Oct	Upstream of Garvins Falls	20
9-Oct	Upstream of Lowell Impoundment	20
11-Oct	Upstream of Garvins Falls	20
11-Oct	Upstream of Lowell Impoundment	20
15-Oct	Upstream of Garvins Falls	20
16-Oct	Upstream of Lowell Impoundment	20
18-Oct	Upstream of Lowell Impoundment	20
23-Oct	Upstream of Lowell Impoundment	22

Table 5–4. Minimum, maximum, and quartile values of impoundment duration (hours) for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Release Location	Release Date	Impoundment Duration (hours)				
		Minimum	Maximum	Q25	Q50 (Median)	Q75
Garvins Falls	9-Oct	21.2	393.9	28.2	49.2	82.4
Garvins Falls	11-Oct	24.6	242.6	28.9	51.2	72.5
Garvins Falls	15-Oct	19.7	266.9	24.6	50.4	126.3
Garvins Falls	All	19.7	393.9	28.6	50.7	74.9
Lowell	9-Oct	12.5	239.3	47.8	68.9	131.8
Lowell	11-Oct	13.7	335.6	27.4	63.7	101.1
Lowell	16-Oct	21.8	287.7	46.0	68.1	137.0
Lowell	18-Oct	23.3	240.9	29.4	51.8	94.0
Lowell	23-Oct	23.2	71.8	26.7	29.0	51.5
Lowell	All	12.5	335.6	29.0	51.7	107.5
All		12.5	393.9	28.8	51.3	95.3

Table 5–5. Minimum, maximum, and quartile values of upstream residence duration (hours) for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Release Location	Release Date	Upstream Residence Duration (hours)*				
		Minimum	Maximum	Q25	Q50 (Median)	Q75
Garvins Falls	9-Oct	0.3	24.1	0.3	0.4	1.7
Garvins Falls	11-Oct	0.2	17.1	0.3	0.3	0.5
Garvins Falls	15-Oct	0.2	17.5	0.3	0.5	1.4
Garvins Falls	All	0.2	24.1	0.3	0.4	1.3
Lowell	9-Oct	0.2	395.4	0.3	0.4	1.3
Lowell	11-Oct	0.2	47.7	0.3	0.4	1.3
Lowell	16-Oct	0.2	0.5	0.2	0.3	0.4
Lowell	18-Oct	0.3	113.9	0.3	0.4	0.5
Lowell	23-Oct	0.2	165.3	0.3	0.4	1.5
Lowell	All	0.2	395.4	0.3	0.4	0.6
All		0.2	395.4	0.3	0.4	0.7

*Upstream residence duration = duration from arrival at Pawtucket Dam until confirmed downstream passage

Table 5–6. Minimum, maximum, and quartile values of time to pass the Pawtucket Gatehouse and enter Northern Canal (hours) for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Release Location	Release Date	Pawtucket Gatehouse Passage (hours)				
		Minimum	Maximum	Q25	Q50 (Median)	Q75
Garvins Falls	9-Oct	<0.1	23.0	0.1	0.1	0.3
Garvins Falls	11-Oct	<0.1	36.8	0.1	0.1	0.1
Garvins Falls	15-Oct	<0.1	0.5	0.1	0.1	0.1
Garvins Falls	All	<0.1	36.8	0.1	0.1	0.1
Lowell	9-Oct	<0.1	10.2	0.1	0.1	0.1
Lowell	11-Oct	<0.1	0.2	0.1	0.1	0.1
Lowell	16-Oct	<0.1	0.2	<0.1	0.1	0.1
Lowell	18-Oct	<0.1	0.2	0.1	0.1	0.1
Lowell	23-Oct	<0.1	93.5	0.1	0.1	0.1
Lowell	All	<0.1	93.5	0.1	0.1	0.1
All		<0.1	93.5	0.1	0.1	0.1

Table 5–7. Minimum, maximum, and quartile values of Northern Canal residence duration (hours) for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Release Location	Release Date	Northern Canal Residence (hours)				
		Minimum	Maximum	Q25	Q50 (Median)	Q75
Garvins Falls	9-Oct	0.2	1.0	0.2	0.2	0.7
Garvins Falls	11-Oct	0.1	3.1	0.2	0.2	0.3
Garvins Falls	15-Oct	0.1	0.5	0.1	0.2	0.3
Garvins Falls	All	0.1	3.1	0.2	0.2	0.3
Lowell	9-Oct	0.1	530.5	0.1	0.2	0.3
Lowell	11-Oct	0.1	47.6	0.2	0.2	0.5
Lowell	16-Oct	0.1	0.3	0.1	0.2	0.3
Lowell	18-Oct	0.1	113.7	0.2	0.2	0.3
Lowell	23-Oct	0.1	165.1	0.2	0.2	0.3
Lowell	All	0.1	530.5	0.2	0.2	0.3
All		0.1	530.5	0.2	0.2	0.3

Table 5–8. Downstream passage route selection for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Release Location	Release Date	Lowell Downstream Passage Route					
		No Detect	No Pass	Unknown	Turbine	Spill	Bypass
Garvins Falls	9-Oct	7	0	1	11	1	0
Garvins Falls	11-Oct	2	1	0	15	1	1
Garvins Falls	15-Oct	6	0	0	13	1	0
Garvins Falls	All	15	1	1	39	3	1
Lowell	9-Oct	0	0	1	19	0	0
Lowell	11-Oct	0	0	0	19	0	1
Lowell	16-Oct	0	0	1	18	1	0
Lowell	18-Oct	0	0	0	20	0	0
Lowell	23-Oct	0	0	1	21	0	0
Lowell	All	0	0	3	97	1	1
All		15	1	4	136	4	2
Percent Utilization			0.7%	2.7%	92.5%	2.7%	1.4%

Table 5–9. Quartile conditions of project discharge at the time of downstream passage for radio-tagged eels at the known route of passage and the cumulative sum of discharge at non-passage routes.

Passage Route	No. Using Route	Quartile	Route Discharge		Non-Route Discharge	
			cfs	%	cfs	%
Turbines	136	Q25	3353	67%	922.8	19%
		Q50	4122	78%	1169	22%
		Q75	5356	81%	2616	33%
Downstream Bypass	2	Q25	132	2%	1386	91%
		Q50	132	2%	1386	91%
		Q75	132	2%	1386	91%
Spill	4	Q25	2092	28%	3257	47%
		Q50	3031	41%	4355	59%
		Q75	3794	53%	5079	72%

Table 5–10. Minimum, maximum, and quartile values of travel time (hours) through three separate downstream reaches for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Downstream Reach	Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Downstream of Lowell to Station 37 (2.1 miles)	Garvins Falls	9-Oct	0.8	425.8	2.0	13.5	164.8
	Garvins Falls	11-Oct	0.8	667.7	1.1	1.4	6.8
	Garvins Falls	15-Oct	0.7	517.8	1.3	3.5	88.2
	Garvins Falls	All	0.7	667.7	1.1	2.6	29.0
	Lowell	9-Oct	0.7	23.9	0.9	2.2	10.3
	Lowell	11-Oct	0.7	453.6	1.0	1.2	3.2
	Lowell	16-Oct	0.7	237.6	1.7	2.7	3.9
	Lowell	18-Oct	0.7	44.1	1.0	1.9	7.5
	Lowell	23-Oct	0.7	600.5	1.1	1.6	14.3
	Lowell	All	0.7	600.5	1.1	2.0	10.3
	All		0.7	667.7	1.1	2.1	14.3
Station 37 to Station 39 (3.9 miles)	Garvins Falls	9-Oct	2.2	12.6	2.5	2.8	5.1
	Garvins Falls	11-Oct	1.4	86.7	2.0	3.4	67.2
	Garvins Falls	15-Oct	2.4	499.5	14.8	16.4	51.9
	Garvins Falls	All	1.4	499.5	2.5	9.1	41.5
	Lowell	9-Oct	1.8	324.9	17.7	37.3	66.7
	Lowell	11-Oct	1.4	187.3	2.2	19.9	108.4
	Lowell	16-Oct	2.1	69.4	15.5	18.6	20.6
	Lowell	18-Oct	1.9	381.0	2.3	3.0	15.1
	Lowell	23-Oct	1.7	190.8	2.3	2.8	32.5
	Lowell	All	1.4	381.0	2.5	16.6	38.5
	All		1.4	499.5	2.5	15.0	39.8
Station 39 to Lawrence (Station 40; 4.75 miles)	Garvins Falls	9-Oct	3.7	91.3	5.2	21.8	39.3
	Garvins Falls	11-Oct	3.7	89.2	7.9	16.3	23.4
	Garvins Falls	15-Oct	2.8	270.3	21.4	52.8	70.9
	Garvins Falls	All	2.8	270.3	7.9	21.6	56.2
	Lowell	9-Oct	3.0	182.3	3.8	23.5	70.0
	Lowell	11-Oct	3.1	119.4	3.4	4.5	21.9
	Lowell	16-Oct	3.5	114.4	4.7	27.3	47.6
	Lowell	18-Oct	3.7	113.1	19.1	23.5	57.8
	Lowell	23-Oct	3.3	356.2	4.5	20.4	46.0
	Lowell	All	3.0	356.2	4.5	22.1	47.1
	All		2.8	356.2	4.7	21.8	48.1

Table 5–11. Minimum, maximum, and quartile values for downstream travel duration from Lowell to Lawrence (hours) for radio-tagged eels released upstream of the Lowell project boundary and upstream of Garvins Falls Dam during the fall 2019 downstream passage assessment.

Release Location	Release Date	Downstream Travel: Lowell to Lawrence (hours)				
		Minimum	Maximum	Q25	Q50 (Median)	Q75
Garvins Falls	9-Oct	19.4	431.7	38.5	55.6	97.6
Garvins Falls	11-Oct	7.7	169.8	20.7	27.7	80.7
Garvins Falls	15-Oct	19.9	917.2	52.4	78.9	176.9
Garvins Falls	All	7.7	917.2	27.7	63.0	97.6
Lowell	9-Oct	10.9	427.5	38.9	70.6	165.3
Lowell	11-Oct	7.1	415.5	32.3	45.9	125.2
Lowell	16-Oct	8.2	146.8	33.6	57.7	87.0
Lowell	18-Oct	6.7	399.2	25.2	42.2	80.0
Lowell	23-Oct	21.1	359.8	41.9	60.9	97.6
Lowell	All	6.7	427.5	33.6	50.2	96.7
All		6.7	917.2	28.0	56.3	97.1

Table 5–12. CJS model selection criteria for survival of adult American eels at Lowell during the fall 2019 downstream passage assessment.

Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Parameters	Deviance
Phi(t)p(t)	657.65	0.00	1.00	1.00	8	11.92
Phi(.)p(t)	714.22	56.57	0.00	0.00	5	74.59
Phi(t)p(.)	719.99	62.34	0.00	0.00	6	78.33
Phi(.)p(.)	800.54	142.89	0.00	0.00	2	166.96

Where *phi* = survival; *p* = detection probability; t = parameter is allowed to vary with time; and "." = parameter is fixed with time.
AIC = Akaike's Information Criterion – comparison value among set of evaluated survival models

Table 5–13. Detection efficiency estimates (p) for monitoring locations installed to detect radio-tagged adult American eels approaching and passing Lowell during the fall 2019 downstream passage assessment.

Location	S	SE	95% CI	
Station 19	0.952	0.018	0.903	0.977
Lowell	1.000	0.000	-	-
Station 37	0.839	0.035	0.759	0.896
Station 39	1.000	0.000	-	-
Lawrence	1.000	0.000	-	-

Table 5–14. Reach-specific survival probability estimates (*phi)*, standard errors, and likelihood 75% and 95% confidence intervals for radio-tagged adult American eels approaching and passing Lowell during the fall 2019 downstream passage assessment.

Reach	Reach Length (mile)	*Phi*	SE	95% CI		75% CI	
Lowell Impoundment	23.0	1.000	0.000	-	-	-	-
Lowell to Station 37	2.1	0.900	0.029	0.828	0.944	0.861	0.928
Station 37 to Station 39	3.9	0.847	0.034	0.767	0.903	0.803	0.882
Station 39 to Lawrence	4.8	0.991	0.009	0.939	0.999	0.972	0.997
Lawrence to Station 45	2.1	0.903	0.039	0.795	0.957	0.848	0.939

Table 5–15. Results of the Cox proportional hazards model for adult American eel passage through Pawtucket Gatehouse. Significance is determined by p < 0.05.

Pawtucket Gatehouse										
Model: Time to Event ~ Temperature + Inflow + Spill										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change
Temp	0.2	0.07	2.86	0	Significant	1.22	0.82	1.06	1.4	↑ 22%
Inflow 5060-9030 cfs	0.04	0.31	0.14	0.89	Insignificant	1.05	0.96	0.56	1.94	↑ 5%
Inflow 9030-13,000 cfs	-0.27	0.79	-0.34	0.74	Insignificant	0.77	1.31	0.16	3.62	↓ 33%
Spill 3040-6070 cfs	-1.56	0.41	-3.86	0	Significant	0.21	4.78	0.09	0.46	↓ 79%
Spill 6070-9120 cfs	1.22	0.91	1.33	0.18	Insignificant	3.37	0.3	0.56	20.16	↑ 237%
Canal Height Diff.	-0.09	0.12	-0.75	0.45	Insignificant	0.91	1.09	0.72	1.16	↓ 9%

Significance is determined by p < 0.05.

Table 5–16. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model of Pawtucket Gatehouse passage events.

Variable	Chi-squared	df	P-Value
Temperature (°C)	3.35	1	0.067
Inflow (cfs)	1.34	2	0.512
Spill (cfs)	1.3	2	0.521
Gatehouse Differential (ft)	2.35	1	0.125
Full Model	11.88	6	0.065

Note: p < 0.05 indicates a violation of the proportional hazard assumption.

Table 5–17. Results of the Cox proportional hazards model for adult American eel passage through E.L. Field Powerhouse forebay.

Forebay										
Model: Time to Event ~ Temperature + Combined Turbine cfs + Spill + Inflow + ELF Head										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change
Temp	0.23	0.08	2.96	0	Significant	1.26	0.79	1.08	1.47	↑ 26%
Inflow 5060-9030 cfs	0.76	0.89	0.85	0.39	Insignificant	2.14	0.47	0.37	12.25	↑ 114%
Inflow 9030-13,000 cfs	-1.3	1.56	-0.84	0.4	Insignificant	0.27	3.68	0.01	5.78	↓ 73%
Spill cfs	0	0	2.19	0.03	No Hazard	1	1	1	1	0
Turbine CFS 1980-3950 cfs	2.26	0.73	3.09	0	Significant	9.56	0.1	2.28	39.98	↑ 856%
Turbine CFS 3950-5930 cfs	4.69	0.97	4.82	0	Significant	109	0.01	16.15	735.5	↑ 10798%
E.L. Field Powerhouse Head	0.46	0.18	2.47	0.01	Significant	1.58	0.63	1.1	2.27	↑ 58%

Significance is determined by $p < 0.05$.

Table 5–18. Output of the Schoenfield Residual test for time independence of covariates in Cox proportional hazard model of E.L. Field Powerhouse forebay events.

Variable	Chi-squared	df	P-Value
Temperature (°C)	0.0689	1	0.79
Inflow (cfs)	2.7546	2	0.25
Spill (cfs)	1.6921	1	0.19
Turbine Discharge (cfs)	1.3068	2	0.52
ELF Head Differential (ft)	0.099	1	0.75
Full Model	9.2518	7	0.24

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

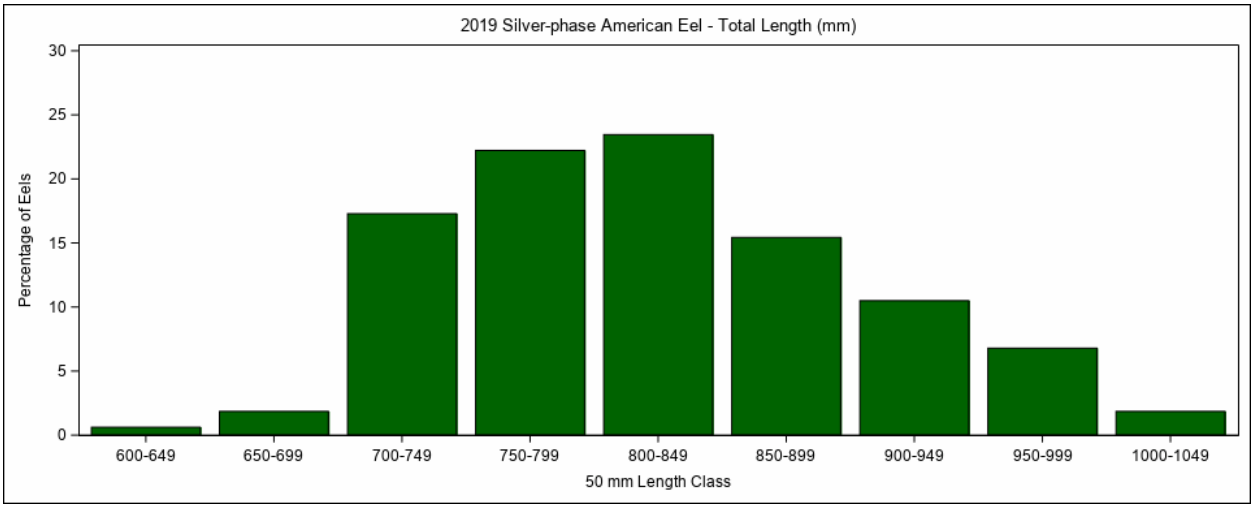

Figure 5–6. Length frequency distribution of adult American eels radio-tagged and released upstream of Lowell during 2019.

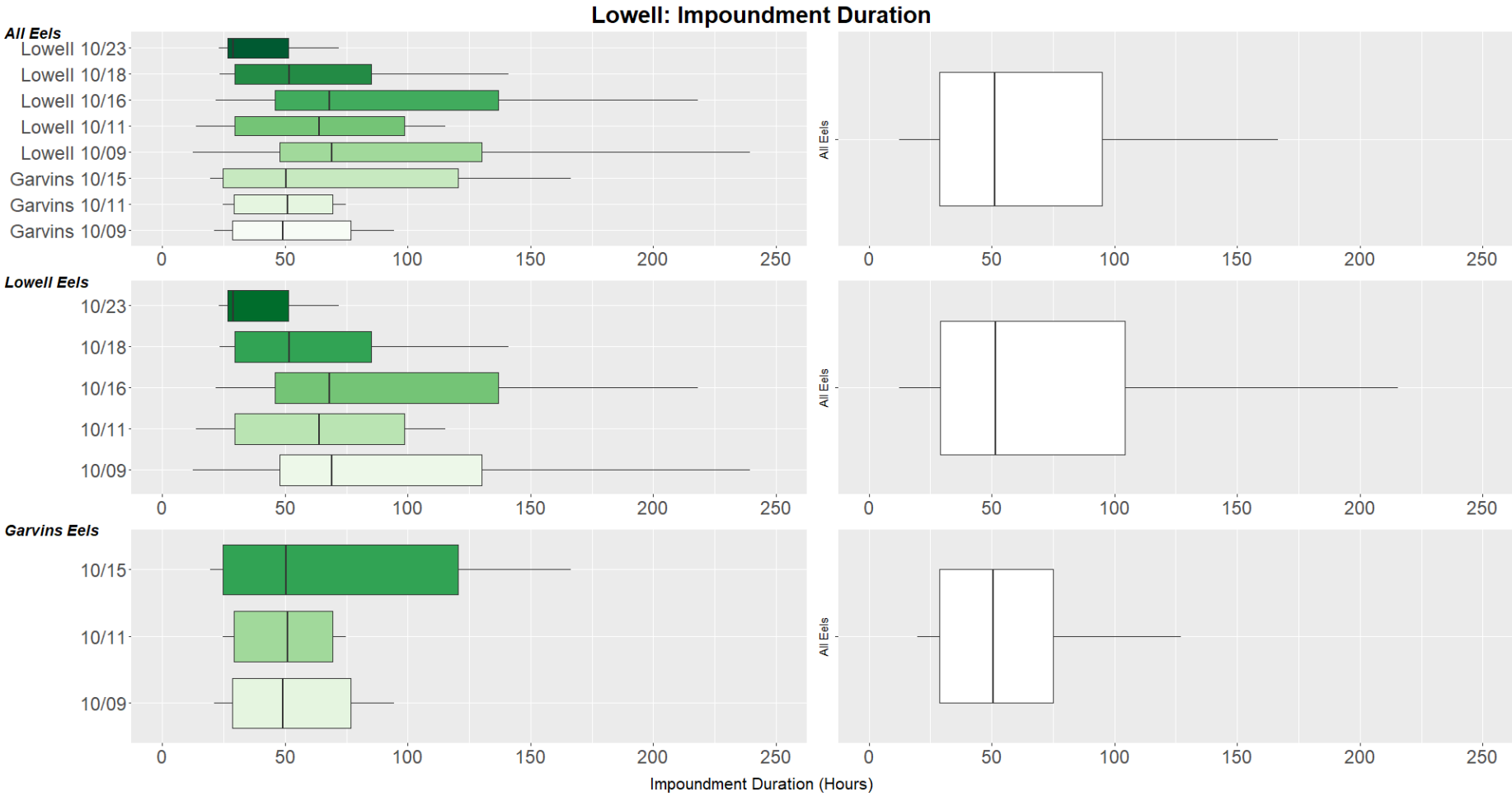

Figure 5–7. Boxplot of the Lowell impoundment duration for all radio-tagged eels (top panel), radio-tagged eels released upstream of Project boundary (middle panel) and upstream of Garvins Falls Dam (bottom panel).[4]

[4] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

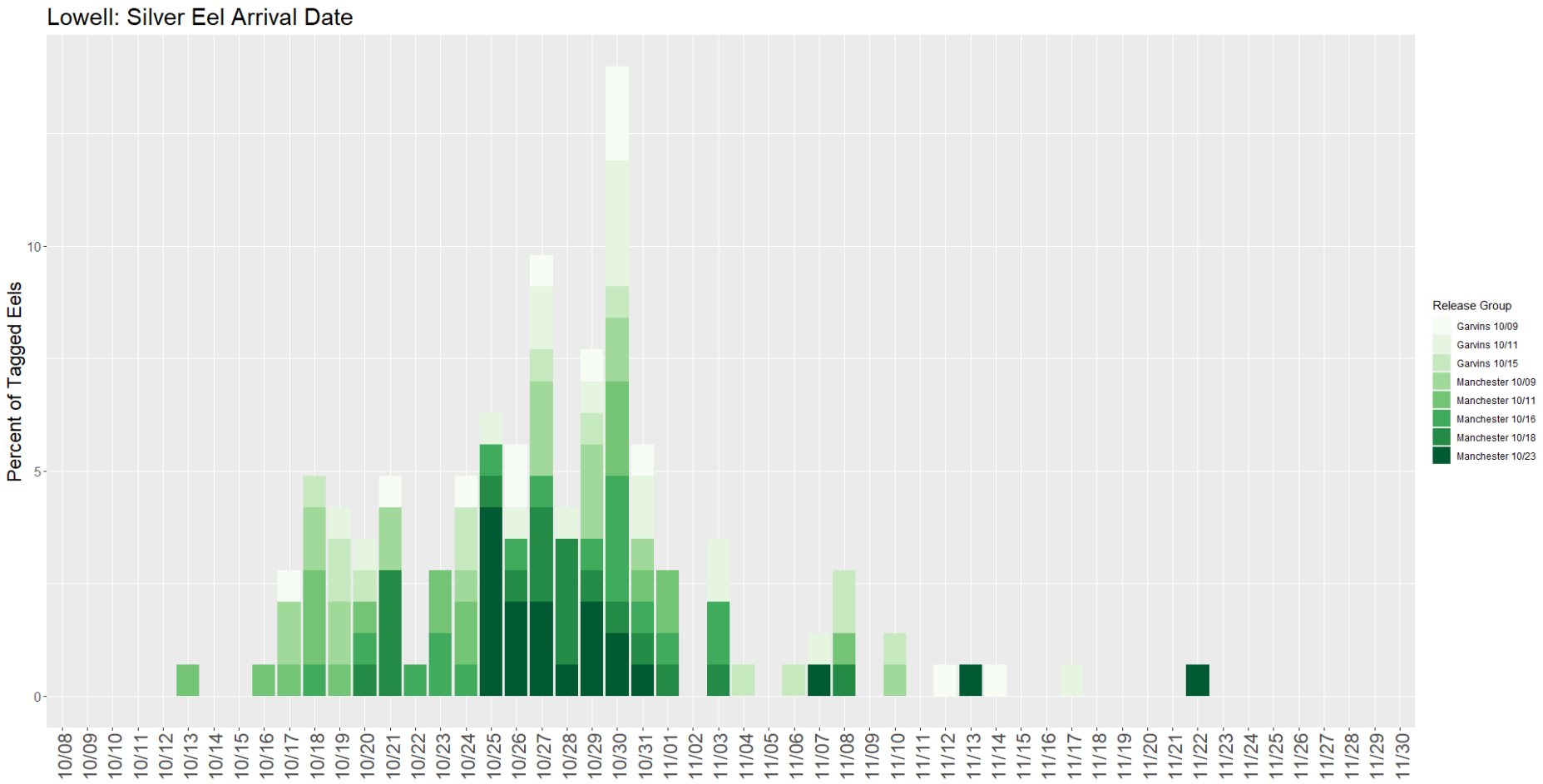

Figure 5–8. Distribution of Pawtucket Dam arrival dates for radio-tagged eels originally released upstream of the Project boundary (Manchester) and upstream of Garvins Falls Dam (Garvins Falls).

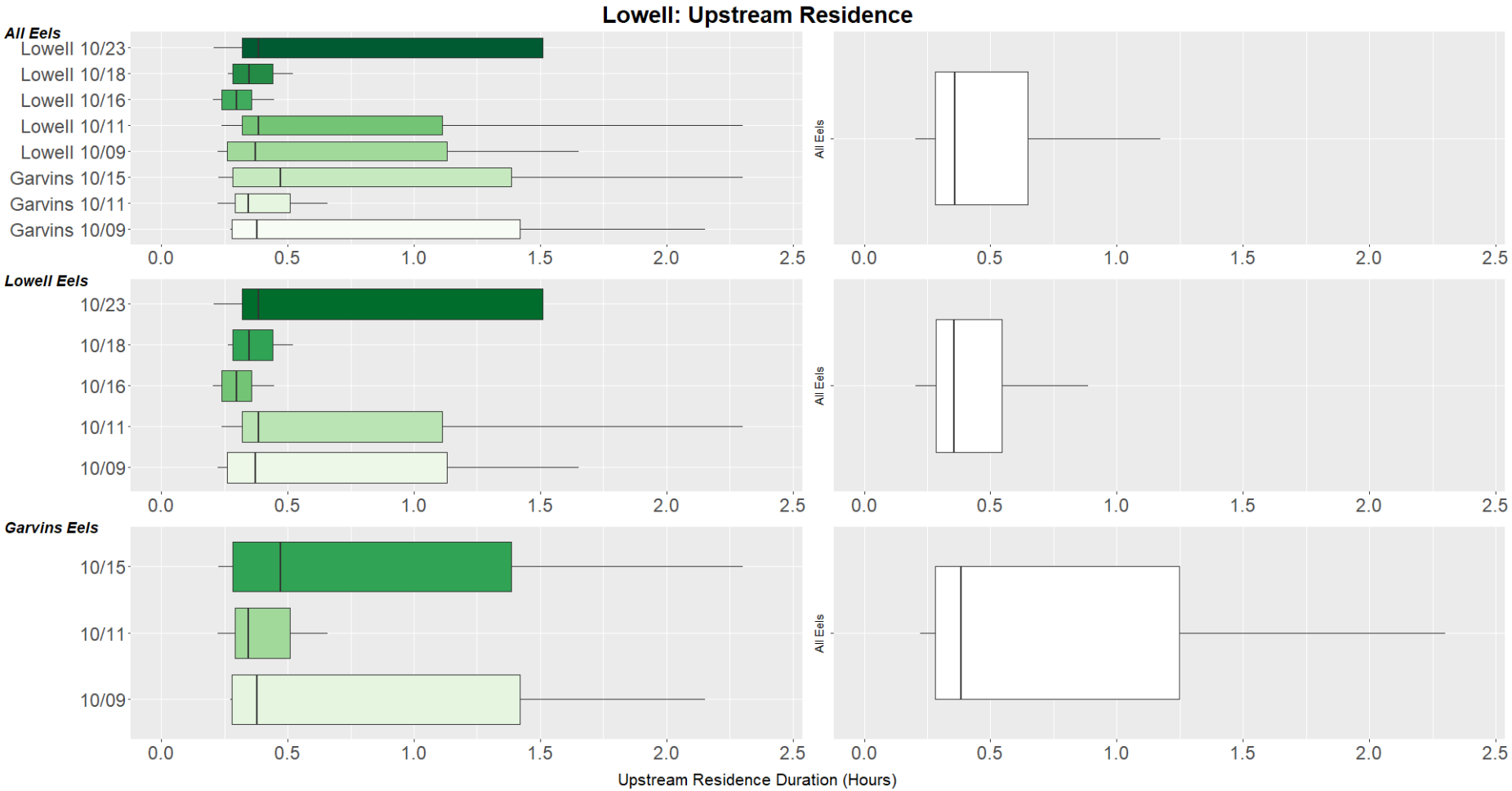

Figure 5–9. Boxplot of the residence duration upstream of Lowell for all radio-tagged eels (top panel), radio-tagged eels released upstream of Project boundary (middle panel) and upstream of Garvins Falls Dam (bottom panel).[5]

[5] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

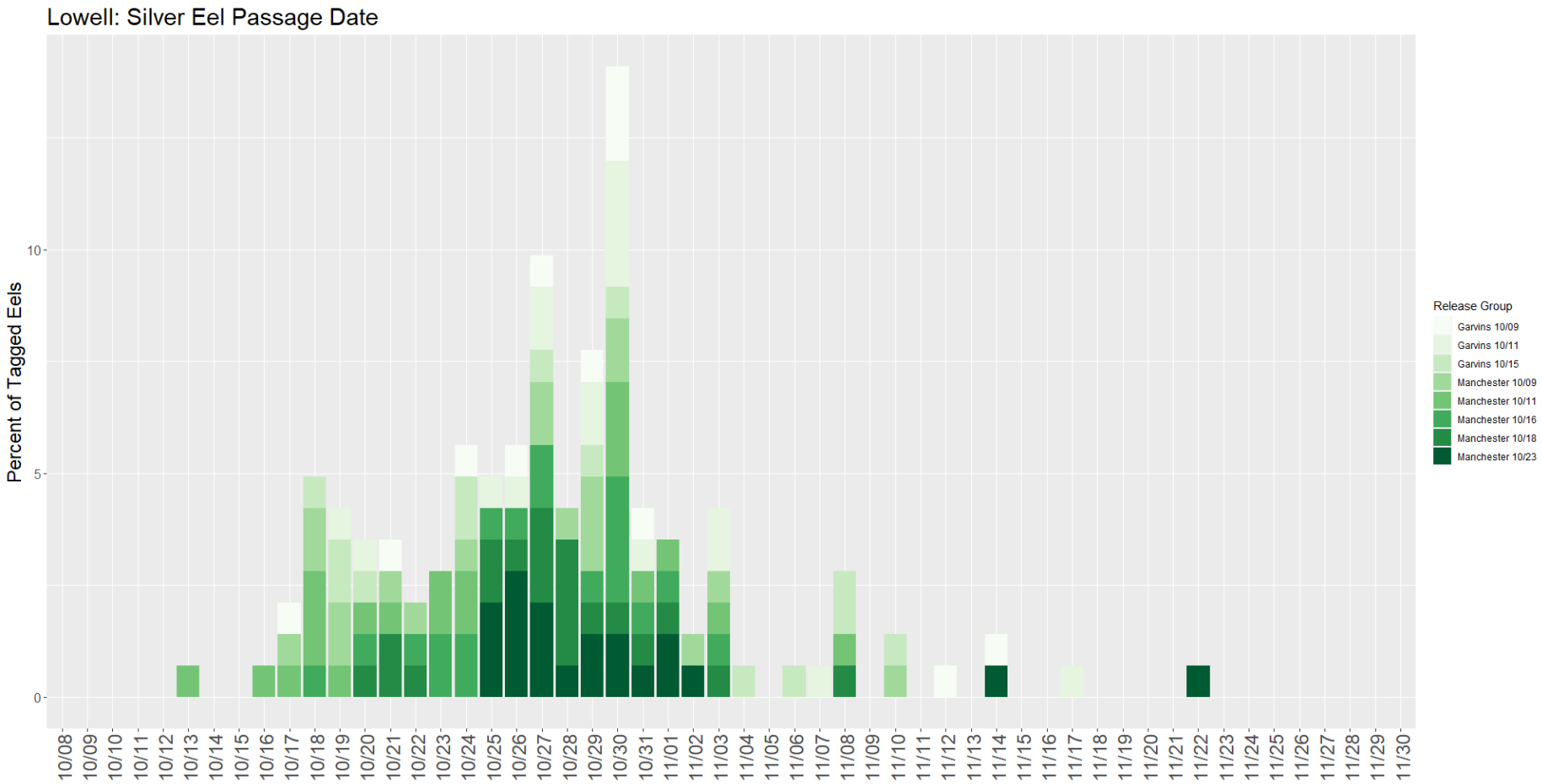

Figure 5–10. Distribution of Pawtucket Dam downstream passage dates for radio-tagged eels originally released upstream of the Project boundary (Manchester) and upstream of Garvins Falls Dam (Garvins Falls).

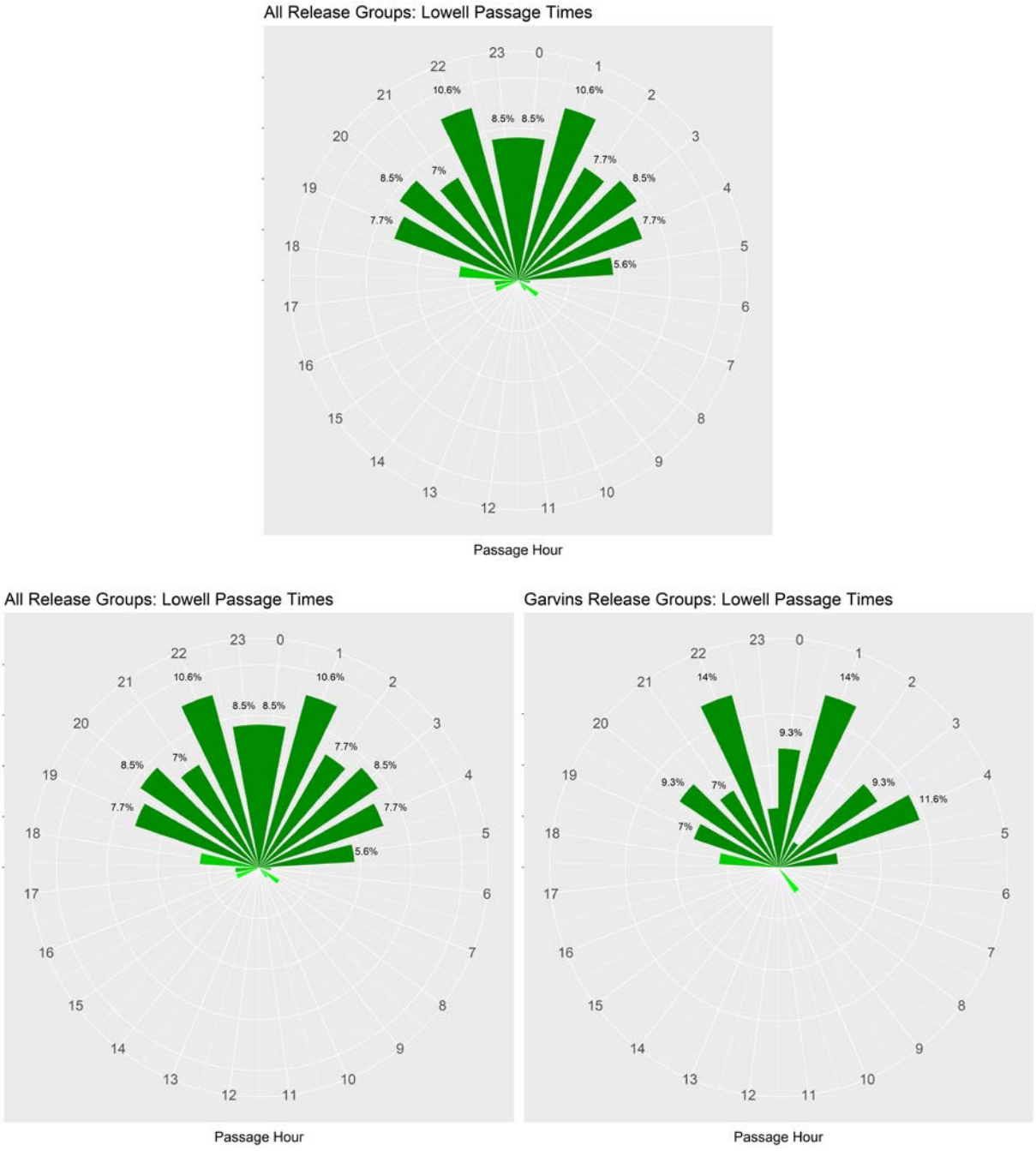

Figure 5–11. Distribution of downstream passage time for all radio-tagged silver eels (top), individuals released upstream of the Lowell Project boundary (bottom left) and upstream of Garvins Falls (bottom right)[6].

[6] Color shaded to represent light conditions: dark green corresponds to overnight hours, moderate green to crepuscular hours, and bright hours correspond to daylight hours.

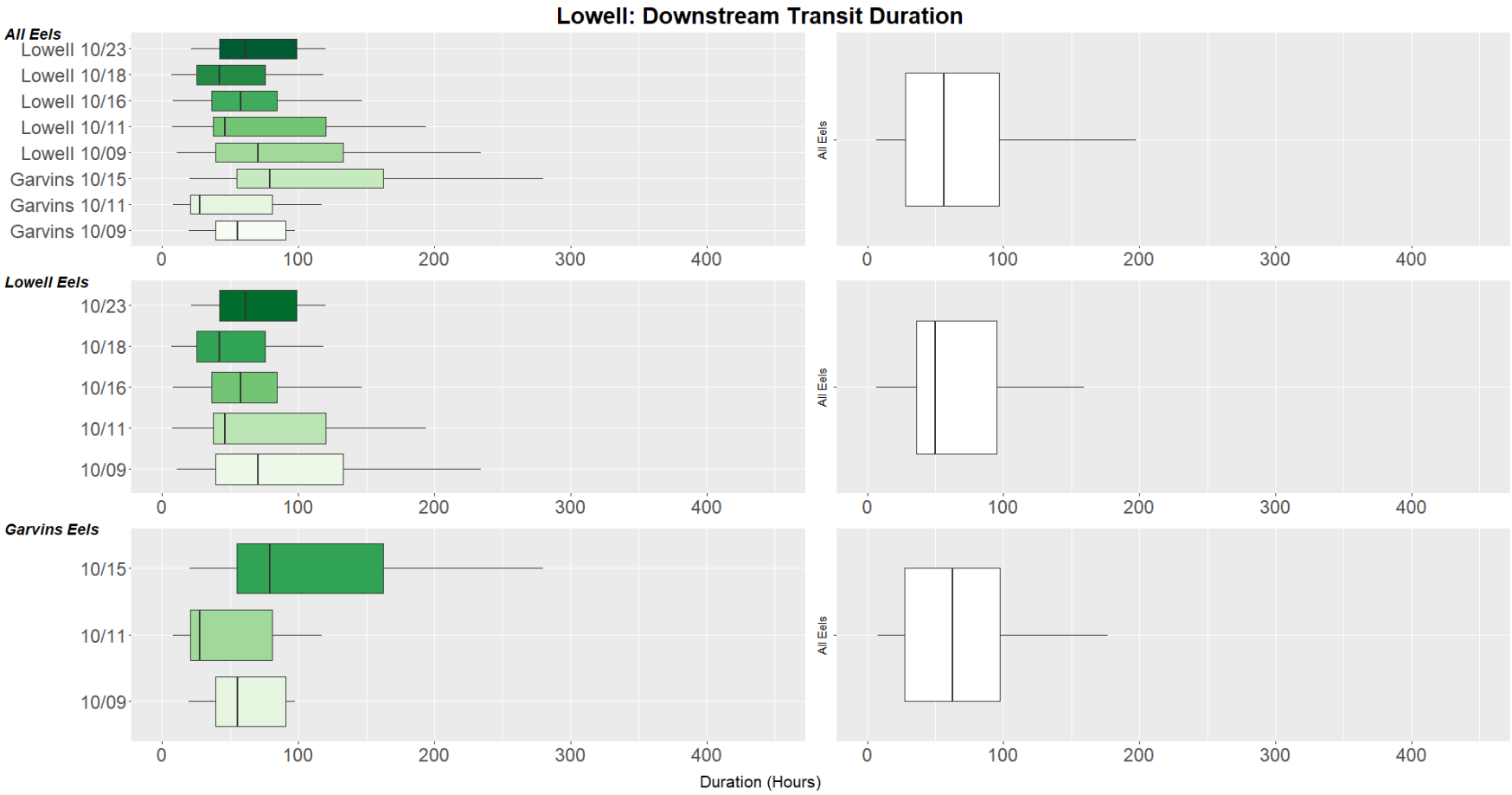

Figure 5–12. Boxplot of the downstream transit duration from Lowell to Lawrence for all radio-tagged eels (top panel), radio-tagged eels released upstream of Project boundary (middle panel) and upstream of Garvins Falls Dam (bottom panel).[7]

[7] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

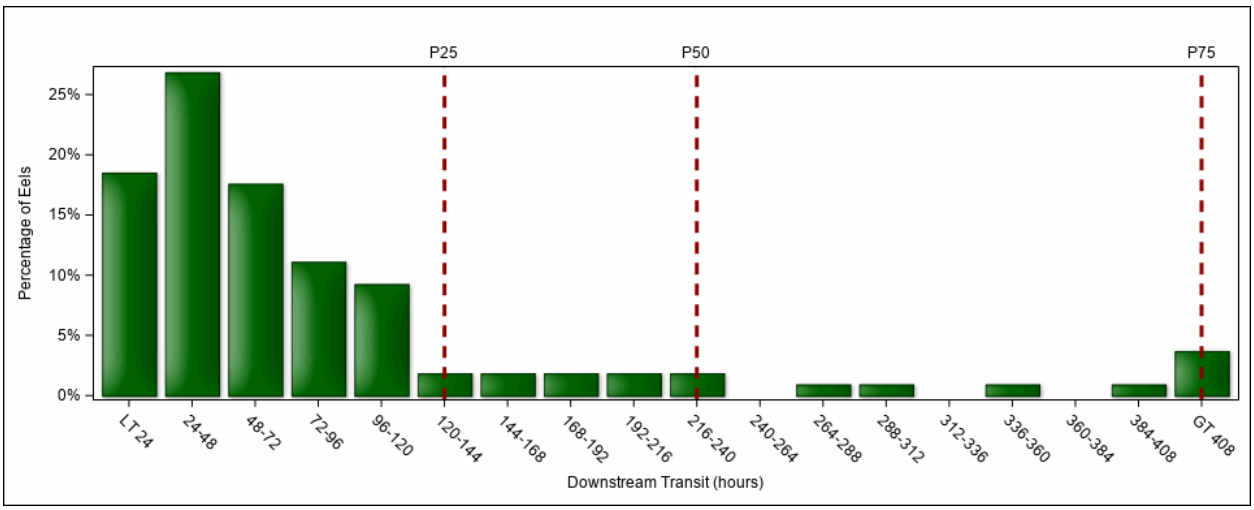

Figure 5–13. Distribution of downstream transit duration from Lowell to Lawrence for radio-tagged silver eels released upstream of the Lowell Project boundary and Garvins Falls. Vertical lines represent the 25th, 50th, and 75th percentiles for downstream transit durations from Lowell to Lawrence for freshly-dead drift eels.

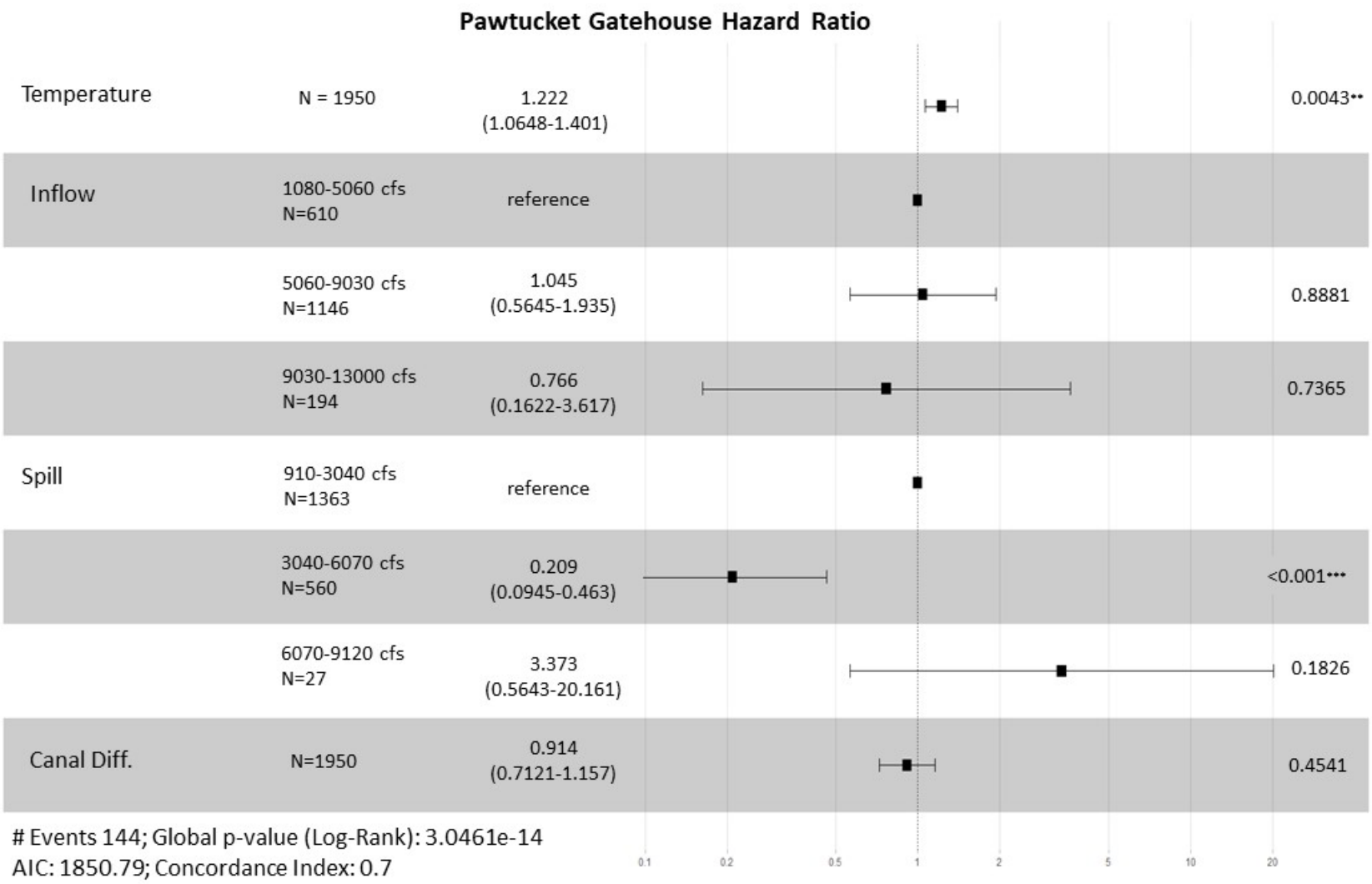

Figure 5–14. Cox proportional hazards model results for passage success of radio-tagged adult American eels at the Pawtucket Gatehouse.

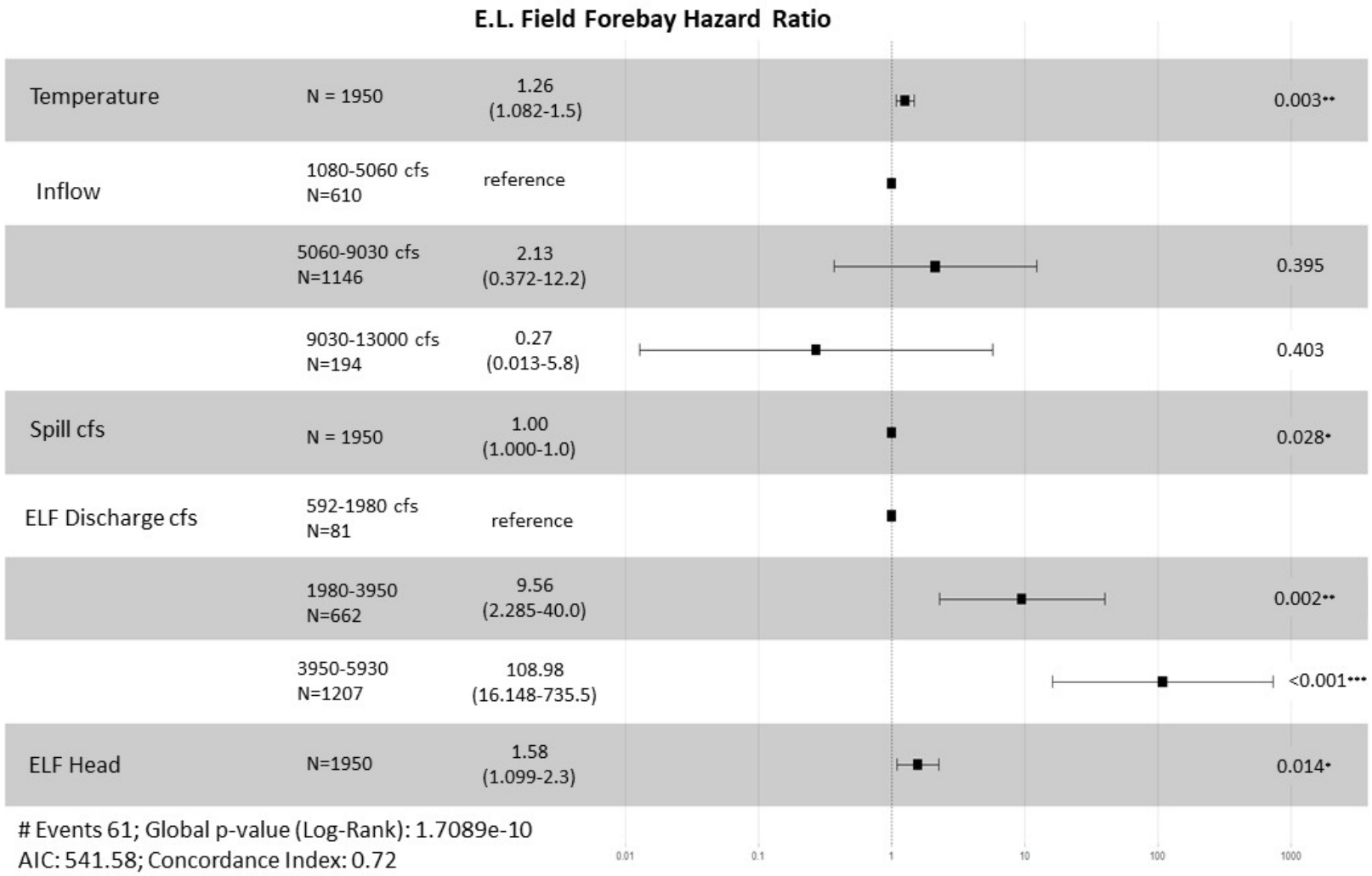

Figure 5–15. Cox proportional hazards model results for passage success of radio-tagged adult American eels at the E.L. Field Powerhouse forebay.

6 Summary

An evaluation of the potential impacts on the outmigration of adult silver-phase American eels was conducted in support of the FERC relicensing of the Lowell Project on the Merrimack River. Downstream passage effectiveness was evaluated using radio-telemetry during the 2019 fall migration season (October 9 to November 30, 2019). Monitoring of outmigrating adult American eels focused on the evaluation of movement through the Project impoundment, residence time immediately upstream of the Pawtucket Dam and prior to passage, passage route utilization and estimation of downstream passage survival at the Project.

A total of 102 adult silver eels were tagged and released at a shoreline location approximately 11 miles upstream of the upper end of the Lowell Project impoundment. Their subsequent downstream arrival and passage at the Project was monitored via a series of fixed-location telemetry receivers within the Lowell Project area. Arrival and downstream passage information was also monitored for 60 radio-tagged individuals released upstream of the Garvins Falls Dam as part of a separate study. The majority of individuals (152 of the 162) were obtained from a commercial vendor operating on the St. Croix River, Maine. The New Hampshire Fish and Game Department provided an additional 12 adult eels collected by a weir in the Soucook River, ten of which were also radio-tagged and released upstream of the Lowell impoundment. All 162 individuals were surgically radio-tagged and were released into the Merrimack over a range of release dates between October 9 and 23.

Radio-tagged eels moved through the 23 mile long Project impoundment in a median duration of 2.1 days. Upon initial detection at the Pawtucket Dam, the median duration of time spent immediately upstream of the dam structure was 0.4 hours with 94% passing downstream within the first 24 hours of their initial detection. Closer examination of the total residence time for radio-tagged eels indicated that the 95% of individuals passing through the Pawtucket Gatehouse did so in 30 minutes or less and upon entry into the Northern Canal the median residence duration prior to downstream passage was 0.2 hours.

Outmigrating adult eels encountering the Pawtucket Dam can (1) pass through the Pawtucket Gatehouse and enter the power canal, (2) pass downstream over Pawtucket Dam via spill, or (3) enter the Pawtucket Canal and navigate downstream via the downtown canal system. Individuals which enter the Northern Canal can pass downstream via one of the two turbine units at the E.L. Field Powerhouse, utilize the downstream bypass, or pass via the surge gate (operated only in the event of a station trip). During the 2019 evaluation there was no use of the downtown canal system. The majority of radio-tagged individuals passed through the Pawtucket Gatehouse and approached the E.L. Field powerhouse with 92.5% eventually passing downstream via the turbine units. Use of the existing downstream bypass system was limited to only two individuals. Downstream passage at the Project peaked during late October with all passage events completed by October 31. The majority of downstream passage events occurred during the evening and overnight hours.

Downstream passage survival was estimated for all radio-tagged eels from the point of initial detection upstream of the Pawtucket Dam downstream to Lawrence. This resulted in an

estimated downstream passage survival for silver-phase American eel at Lowell of 75.5% (75% CI = 71.4%-79.6%). This estimate of downstream passage survival for adult eels at the Project includes any background (i.e., natural) or tagging-related mortality for the species in the reach from approach to the Pawtucket Dam to Lawrence. As a result, this estimate should be viewed as a minimum estimate of total project survival (i.e., due solely to project effects) for adult eels at the Project. Due to the limited distribution of downstream passage route selection, route-specific estimates of passage were developed for only individuals using turbine units at the E.L. Field powerhouse (n = 136; 75.0% survival; 75% CI = 70.6%-79.4%). The limited number of radio-tagged eels passing the Project via spill or the downstream bypass system were all determined to have successfully approached the Lawrence Project following downstream passage at Lowell.

7 Variances from FERC-Approved Study Plan

The FERC-approved RSP indicated that a total of 100 radio-tagged silver-phase American eels would be released just upstream of upper boundary of the Project impoundment. The availability of two additional transmitters and test eels resulted in a total of 102 radio-tagged individuals released upstream of Lowell. To further enhance the sample size for evaluation of downstream passage, Boott also monitored the passage of radio-tagged silver-phase adult eels released further upstream in the Merrimack River. This resulted in an additional 45 individuals which approached Lowell and were available for analysis. There were no additional variances from the FERC-approved study plan.

8 References

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9 Appendices

Appendix A. Estimated weekly discharge values (cfs) for the Guard Locks, Swamp Locks, Hamilton Station, Section 8 Station, John Street Station, Boott Gate and Lower Locks.

BOOTT HYDROPOWER DOWNTOWN OPERATIONS: ESTIMATED FLOWS

Date	10/10/2019	10/17/2019	10/23/2019	10/31/2019	11/7/2019	11/12/2019	11/13/2019	11/19/2019
Time	900	1100	900	1445	1000	1530	1600	1200
Guard Locks								
Gate 1	197	197	197	246	246	529	529	246
Gate 2	128	128	128	0	0	0	0	0
Gate 3	0	0	0	0	0	0	0	0
Gate 4	0	0	0	0	0	176	176	0
Gate 5	0	0	0	197	197	441	441	246
Total	325	325	325	443	443	1145	1145	493
Swamp Locks								
Gate 1	0	0	0	0	0	0	0	0
Gate 2	252	252	252	252	252	492	492	252
Bayboards opened	0	0	0	0	0	0	0	0
Total	252	252	252	252	252	492	492	252
Hamilton								
Unit 1	26	13	13	13	13	100	109	0
Unit 2	13	13	13	13	13	158	127	0
Unit 3	20	20	20	20	20	0	0	0
Unit 4	10	10	10	10	10	127	127	0
Unit 5	17	17	17	17	17	14	14	0
Hamilton Wasteway	0	0	0	0	0	0	0	0
Total	86	73	73	73	73	399	377	0
Section 8								
Unit 1	0	0	0	0	0	0	0	0
Unit 2	0	0	0	0	0	133	133	0
Unit 3	75	75	75	75	75	0	0	0
Total	75	75	75	75	75	133	133	0
John St.								
Unit 3	0	0	0	0	0	0	0	0
Unit 4	0	0	0	0	0	0	0	0
Unit 5	0	0	0	0	0	0	0	0
Unit 6	0	0	0	0	0	236	0	0
Total	0	0	0	0	0	236	0	0
Boott Gate								
Gate	0	0	0	0	0	0	399	0
Bayboards opened	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	399	0
Lower Locks								
Gate	120	120	120	120	120	120	120	120
Bayboards opened	0	0	0	0	0	0	0	0
Total	120	120	120	120	120	120	120	120

Appendix B. Silver eel source, release, and biocharacteristics information for the 2019 downstream passage assessment at Lowell.

Frequency	ID	Source Location	Release		Total Length (mm)	Eye Measurements		
			Location	Date		Horizontal (mm)	Vertical (mm)	Index
149.340	10	St. Croix	Garvins	10/9/2019	815	10.2	10.2	10.0
149.340	11	St. Croix	Garvins	10/9/2019	842	10.2	10.1	9.5
149.340	12	St. Croix	Garvins	10/9/2019	764	9.5	9.2	9.0
149.340	13	St. Croix	Garvins	10/9/2019	744	9.9	10.0	10.5
149.340	14	St. Croix	Garvins	10/9/2019	723	8.8	9.0	8.6
149.340	15	St. Croix	Garvins	10/9/2019	720	9.5	9.3	9.6
149.340	16	St. Croix	Garvins	10/9/2019	821	9.9	9.7	9.1
149.340	17	St. Croix	Garvins	10/9/2019	874	11.2	10.9	11.0
149.340	18	St. Croix	Garvins	10/9/2019	892	10.0	10.0	8.8
149.340	19	St. Croix	Garvins	10/9/2019	824	9.7	9.8	9.1
149.360	20	St. Croix	Garvins	10/9/2019	807	9.5	9.1	8.4
149.360	21	St. Croix	Garvins	10/9/2019	838	10.4	10.2	9.9
149.360	22	St. Croix	Garvins	10/9/2019	817	9.2	9.0	7.9
149.360	23	St. Croix	Garvins	10/9/2019	912	10.0	9.9	8.5
149.360	24	St. Croix	Garvins	10/9/2019	919	10.1	10.1	8.7
149.360	25	St. Croix	Garvins	10/9/2019	975	10.2	10.2	8.4
149.360	26	St. Croix	Garvins	10/9/2019	917	10.0	10.0	8.6
149.360	27	St. Croix	Garvins	10/9/2019	806	9.2	9.3	8.4
149.360	28	St. Croix	Garvins	10/9/2019	883	9.9	9.9	8.7
149.360	29	St. Croix	Garvins	10/9/2019	946	10.5	10.1	8.8
149.340	90	St. Croix	Lowell	10/9/2019	727	.	.	.
149.340	91	St. Croix	Lowell	10/9/2019	734	11.0	8.0	9.7
149.340	92	St. Croix	Lowell	10/9/2019	883	10.5	9.0	8.5
149.340	93	St. Croix	Lowell	10/9/2019	896	12.0	10.0	10.6
149.340	94	St. Croix	Lowell	10/9/2019	709	9.0	7.0	7.1
149.340	95	St. Croix	Lowell	10/9/2019	901	12.2	9.8	10.5
149.340	96	St. Croix	Lowell	10/9/2019	811	9.5	8.1	7.5
149.340	97	St. Croix	Lowell	10/9/2019	814	9.8	8.7	8.3
149.340	98	St. Croix	Lowell	10/9/2019	742	7.5	6.8	5.4
149.340	99	St. Croix	Lowell	10/9/2019	901	11.6	10.9	11.0
149.360	100	St. Croix	Lowell	10/9/2019	853	11.2	9.5	9.9
149.360	101	St. Croix	Lowell	10/9/2019	956	10.2	9.8	8.2
149.360	102	St. Croix	Lowell	10/9/2019	995	10.0	9.5	7.5
149.360	103	St. Croix	Lowell	10/9/2019	988	10.0	9.2	7.3
149.360	104	St. Croix	Lowell	10/9/2019	803	10.0	9.1	8.9
149.360	105	St. Croix	Lowell	10/9/2019	1019	11.1	10.0	8.6
149.360	106	St. Croix	Lowell	10/9/2019	865	10.8	9.9	9.7
149.360	107	St. Croix	Lowell	10/9/2019	1032	11.6	10.0	8.9
149.360	108	St. Croix	Lowell	10/9/2019	796	7.9	7.5	5.9
149.360	109	St. Croix	Lowell	10/9/2019	815	9.8	8.9	8.4

Frequency	ID	Source Location	Release		Total Length (mm)	Eye Measurements		
			Location	Date		Horizontal (mm)	Vertical (mm)	Index
149.340	30	St. Croix	Garvins	10/11/2019	742	8.3	8.1	7.1
149.340	31	St. Croix	Garvins	10/11/2019	711	9.8	9.0	9.8
149.340	32	St. Croix	Garvins	10/11/2019	808	10.8	10.2	10.7
149.340	33	St. Croix	Garvins	10/11/2019	765	9.3	9.3	8.8
149.340	34	St. Croix	Garvins	10/11/2019	793	10.0	9.9	9.8
149.340	35	St. Croix	Garvins	10/11/2019	740	9.7	9.3	9.5
149.340	36	St. Croix	Garvins	10/11/2019	842	11.3	10.8	11.3
149.340	37	St. Croix	Garvins	10/11/2019	758	8.7	8.8	7.9
149.340	38	St. Croix	Garvins	10/11/2019	791	9.9	10.0	9.8
149.340	39	St. Croix	Garvins	10/11/2019	797	9.0	8.4	7.5
149.360	40	St. Croix	Garvins	10/11/2019	884	10.6	9.9	9.3
149.360	41	St. Croix	Garvins	10/11/2019	873	10.1	10.0	9.0
149.360	42	St. Croix	Garvins	10/11/2019	734	8.9	8.6	8.2
149.360	43	St. Croix	Garvins	10/11/2019	782	8.9	9.0	8.0
149.360	44	St. Croix	Garvins	10/11/2019	646	7.9	7.8	7.5
149.360	45	St. Croix	Garvins	10/11/2019	757	9.9	9.5	9.7
149.360	46	St. Croix	Garvins	10/11/2019	843	10.4	10.0	9.7
149.360	47	St. Croix	Garvins	10/11/2019	798	10.1	10.0	10.0
149.360	48	St. Croix	Garvins	10/11/2019	806	9.2	9.0	8.1
149.360	49	St. Croix	Garvins	10/11/2019	816	10.2	9.8	9.6
149.340	110	St. Croix	Lowell	10/11/2019	875	11.0	9.8	9.7
149.340	111	St. Croix	Lowell	10/11/2019	724	9.5	8.5	8.8
149.340	112	St. Croix	Lowell	10/11/2019	845	11.1	10.0	10.3
149.340	113	St. Croix	Lowell	10/11/2019	876	10.1	9.2	8.3
149.340	114	St. Croix	Lowell	10/11/2019	804	11.0	9.8	10.6
149.340	115	St. Croix	Lowell	10/11/2019	816	10.3	9.8	9.7
149.340	116	St. Croix	Lowell	10/11/2019	793	9.1	8.8	7.9
149.340	117	St. Croix	Lowell	10/11/2019	969	10.6	9.5	8.2
149.340	118	St. Croix	Lowell	10/11/2019	751	9.0	7.9	7.5
149.340	119	St. Croix	Lowell	10/11/2019	706	7.1	6.0	4.8
149.360	120	St. Croix	Lowell	10/11/2019	902	10.2	9.8	8.7
149.360	121	St. Croix	Lowell	10/11/2019	749	10.2	8.1	8.8
149.360	122	St. Croix	Lowell	10/11/2019	787	8.0	7.2	5.8
149.360	123	St. Croix	Lowell	10/11/2019	808	9.9	9.0	8.7
149.360	124	St. Croix	Lowell	10/11/2019	894	10.7	9.6	9.1
149.360	125	St. Croix	Lowell	10/11/2019	854	10.3	9.6	9.1
149.360	126	St. Croix	Lowell	10/11/2019	911	13.0	10.2	11.6
149.360	127	St. Croix	Lowell	10/11/2019	890	10.3	9.5	8.6
149.360	128	St. Croix	Lowell	10/11/2019	932	12.0	10.1	10.3
149.360	129	St. Croix	Lowell	10/11/2019	934	10.4	9.3	8.2
149.340	50	St. Croix	Garvins	10/15/2019	795	10.7	9.5	10.1
149.340	51	St. Croix	Garvins	10/15/2019	928	10.1	10.1	8.6
149.340	52	St. Croix	Garvins	10/15/2019	894	9.8	8.6	7.4
149.340	53	St. Croix	Garvins	10/15/2019	810	10.9	9.8	10.4

Frequency	ID	Source Location	Release		Total Length (mm)	Eye Measurements		
			Location	Date		Horizontal (mm)	Vertical (mm)	Index
149.340	54	St. Croix	Garvins	10/15/2019	884	10.2	9.6	8.7
149.340	55	St. Croix	Garvins	10/15/2019	775	10.0	8.8	9.0
149.340	56	St. Croix	Garvins	10/15/2019	941	10.2	9.7	8.3
149.340	57	St. Croix	Garvins	10/15/2019	995	13.4	12.2	12.9
149.340	58	St. Croix	Garvins	10/15/2019	741	9.2	8.7	8.5
149.340	59	St. Croix	Garvins	10/15/2019	829	10.3	8.9	8.7
149.360	60	St. Croix	Garvins	10/15/2019	834	10.5	9.1	9.0
149.360	61	St. Croix	Garvins	10/15/2019	802	9.4	8.8	8.1
149.360	62	St. Croix	Garvins	10/15/2019	728	8.6	7.9	7.3
149.360	63	St. Croix	Garvins	10/15/2019	999	12.8	11.0	11.1
149.360	64	St. Croix	Garvins	10/15/2019	972	11.0	10.1	9.0
149.360	65	St. Croix	Garvins	10/15/2019	766	8.0	7.4	6.1
149.360	66	St. Croix	Garvins	10/15/2019	798	9.2	8.3	7.5
149.360	67	St. Croix	Garvins	10/15/2019	996	12.3	11.3	11.0
149.360	68	St. Croix	Garvins	10/15/2019	845	11.0	9.9	10.1
149.360	69	St. Croix	Garvins	10/15/2019	824	9.3	8.0	7.1
149.340	130	St. Croix	Lowell	10/16/2019	1025	11.5	9.2	8.2
149.340	131	St. Croix	Lowell	10/16/2019	842	10.0	9.1	8.5
149.340	132	St. Croix	Lowell	10/16/2019	889	11.0	9.9	9.6
149.340	133	St. Croix	Lowell	10/16/2019	751	8.8	7.6	7.0
149.340	134	St. Croix	Lowell	10/16/2019	812	9.1	7.6	6.7
149.340	135	St. Croix	Lowell	10/16/2019	716	8.3	7.3	6.7
149.340	136	St. Croix	Lowell	10/16/2019	830	9.7	8.8	8.1
149.340	137	St. Croix	Lowell	10/16/2019	857	10.0	9.1	8.4
149.340	138	St. Croix	Lowell	10/16/2019	777	10.3	8.9	9.3
149.340	139	St. Croix	Lowell	10/16/2019	762	9.0	7.8	7.3
149.360	140	St. Croix	Lowell	10/16/2019	691	7.8	6.9	6.1
149.360	141	St. Croix	Lowell	10/16/2019	702	9.2	7.3	7.6
149.360	142	St. Croix	Lowell	10/16/2019	969	11.1	9.9	8.9
149.360	143	St. Croix	Lowell	10/16/2019	819	11.5	9.4	10.5
149.360	144	St. Croix	Lowell	10/16/2019	721	9.1	8.2	8.2
149.360	145	St. Croix	Lowell	10/16/2019	820	10.0	9.0	8.6
149.360	146	St. Croix	Lowell	10/16/2019	956	10.1	9.0	7.5
149.360	147	St. Croix	Lowell	10/16/2019	823	9.9	8.3	7.9
149.360	148	St. Croix	Lowell	10/16/2019	886	10.4	9.1	8.4
149.360	149	St. Croix	Lowell	10/16/2019	794	9.0	7.8	7.0
149.340	70	St. Croix	Lowell	10/18/2019	791	8.9	7.2	6.4
149.340	71	St. Croix	Lowell	10/18/2019	836	9.4	8.1	7.2
149.340	72	St. Croix	Lowell	10/18/2019	767	9.8	8.7	8.8
149.340	73	St. Croix	Lowell	10/18/2019	890	11.0	9.9	9.6
149.340	74	St. Croix	Lowell	10/18/2019	729	10.3	8.6	9.6
149.340	75	St. Croix	Lowell	10/18/2019	909	11.8	10.6	10.8
149.340	76	St. Croix	Lowell	10/18/2019	782	9.5	8.1	7.8
149.340	77	St. Croix	Lowell	10/18/2019	811	10.5	9.2	9.4

Frequency	ID	Source Location	Release		Total Length (mm)	Eye Measurements		
			Location	Date		Horizontal (mm)	Vertical (mm)	Index
149.340	78	St. Croix	Lowell	10/18/2019	879	10.6	9.2	8.8
149.340	79	St. Croix	Lowell	10/18/2019	705	9.1	7.3	7.5
149.360	80	St. Croix	Lowell	10/18/2019	891	10.6	9.2	8.6
149.360	81	St. Croix	Lowell	10/18/2019	730	8.9	7.8	7.5
149.360	82	St. Croix	Lowell	10/18/2019	815	9.2	8.3	7.4
149.360	83	St. Croix	Lowell	10/18/2019	732	9.0	8.1	7.8
149.360	84	St. Croix	Lowell	10/18/2019	796	9.1	8.0	7.2
149.360	85	St. Croix	Lowell	10/18/2019	938	11.1	9.1	8.5
149.360	86	St. Croix	Lowell	10/18/2019	679	8.7	7.6	7.7
149.360	87	St. Croix	Lowell	10/18/2019	939	10.6	9.0	8.0
149.360	88	St. Croix	Lowell	10/18/2019	790	10.7	8.9	9.5
149.360	89	St. Croix	Lowell	10/18/2019	853	9.9	8.2	7.5
149.340	150	St. Croix	Lowell	10/23/2019	933	11.5	10.3	10.0
149.340	151	St. Croix	Lowell	10/23/2019	756	9.8	8.5	8.7
149.340	152	St. Croix	Lowell	10/23/2019	757	10.0	8.5	8.9
149.340	153	St. Croix	Lowell	10/23/2019	708	10.8	10.0	12.0
149.340	154	St. Croix	Lowell	10/23/2019	898	10.2	9.8	8.7
149.340	155	St. Croix	Lowell	10/23/2019	709	10.0	9.5	10.5
149.340	156	St. Croix	Lowell	10/23/2019	813	11.0	10.6	11.3
149.340	157	St. Croix	Lowell	10/23/2019	752	9.8	8.5	8.7
149.340	158	St. Croix	Lowell	10/23/2019	942	10.5	10.5	9.2
149.340	159	St. Croix	Lowell	10/23/2019	719	9.3	8.0	8.2
149.360	160	Soucook	Lowell	10/23/2019	750	8.0	8.5	7.1
149.360	161	Soucook	Lowell	10/23/2019	693	9.1	9.0	9.3
149.360	162	Soucook	Lowell	10/23/2019	758	10.0	9.7	10.1
149.360	163	Soucook	Lowell	10/23/2019	862	8.9	9.1	7.4
149.360	164	Soucook	Lowell	10/23/2019	734	9.0	9.6	9.3
149.360	165	Soucook	Lowell	10/23/2019	760	9.1	9.6	9.0
149.360	166	Soucook	Lowell	10/23/2019	836	8.8	9.2	7.6
149.360	167	Soucook	Lowell	10/23/2019	792	8.8	9.0	7.9
149.360	168	Soucook	Lowell	10/23/2019	773	9.8	9.2	9.2
149.360	169	Soucook	Lowell	10/23/2019	774	9.1	9.0	8.3
149.360	170	St. Croix	Lowell	10/23/2019	750	8.3	9.0	7.8
149.340	171	St. Croix	Lowell	10/23/2019	747	9.0	9.0	8.5

Appendix C. Listing of manual tracking detections within the Lowell Project area.

River mile demarcations for reaches defined by stationary receivers:

Reach	River Mile	
	Upper End	Lower End
Station 19-Station 21	61.5	41.75
Station 35-Station 37	41.75	39.25
Station 37-Station 39	39.25	35.25
Station 39-Station 40	35.25	30.25

Date	Frequency	ID	RM	Location	Type
10/21/2019	149.340	74	42	Station 19-Station 21	Transit
10/28/2019	149.340	156	42	Station 19-Station 21	Transit
10/24/2019	149.360	21	42.5	Station 19-Station 21	Transit
10/24/2019	149.360	80	43.75	Station 19-Station 21	Transit
10/24/2019	149.340	139	44	Station 19-Station 21	Transit
11/6/2019	149.360	64	44.25	Station 19-Station 21	Transit
10/24/2019	149.340	58	44.5	Station 19-Station 21	Transit
10/24/2019	149.340	116	45.25	Station 19-Station 21	Transit
10/24/2019	149.360	101	47.75	Station 19-Station 21	Transit
11/6/2019	149.360	46	48	Station 19-Station 21	Transit
10/24/2019	149.340	53	49	Station 19-Station 21	Transit
10/24/2019	149.360	23	49.25	Station 19-Station 21	Transit
10/24/2019	149.360	142	49.25	Station 19-Station 21	Transit
10/24/2019	149.340	138	49.75	Station 19-Station 21	Transit
11/21/2019	149.340	159	49.75	Station 19-Station 21	Transit
10/24/2019	149.340	35	50.5	Station 19-Station 21	Transit
11/6/2019	149.360	89	50.5	Station 19-Station 21	Transit
10/24/2019	149.340	77	51.25	Station 19-Station 21	Transit
10/24/2019	149.340	95	51.25	Station 19-Station 21	Transit
11/6/2019	149.360	120	51.25	Station 19-Station 21	Transit
11/6/2019	149.340	17	51.5	Station 19-Station 21	Transit
11/6/2019	149.340	59	51.5	Station 19-Station 21	Transit
10/24/2019	149.360	41	52	Station 19-Station 21	Transit
11/6/2019	149.340	158	52.5	Station 19-Station 21	Transit
10/24/2019	149.360	83	52.75	Station 19-Station 21	Transit
11/6/2019	149.360	47	53	Station 19-Station 21	Transit
10/24/2019	149.360	147	53.25	Station 19-Station 21	Transit
10/24/2019	149.340	78	53.5	Station 19-Station 21	Transit
10/24/2019	149.360	166	53.5	Station 19-Station 21	Transit
10/24/2019	149.340	79	53.75	Station 19-Station 21	Transit
10/24/2019	149.360	105	54.25	Station 19-Station 21	Transit
10/24/2019	149.360	162	55.25	Station 19-Station 21	Transit
10/24/2019	149.360	20	55.5	Station 19-Station 21	Transit
10/24/2019	149.340	24	56.25	Station 19-Station 21	Stationary
10/24/2019	149.340	156	56.25	Station 19-Station 21	Transit

Date	Frequency	ID	RM	Location	Type
10/24/2019	149.340	171	56.25	Station 19-Station 21	Transit
10/24/2019	149.360	69	57.5	Station 19-Station 21	Transit
10/24/2019	149.360	165	59	Station 19-Station 21	Transit
10/24/2019	149.340	118	60.5	Station 19-Station 21	Transit
10/24/2019	149.340	10	61.25	Station 19-Station 21	Transit
11/11/2019	149.360	81	39.25	Station 35-Station 37	Stationary
11/18/2019	149.360	81	39.25	Station 35-Station 37	Stationary
11/25/2019	149.360	81	39.25	Station 35-Station 37	Stationary
11/25/2019	149.360	120	40.25	Station 35-Station 37	Transit
11/25/2019	149.340	171	40.25	Station 35-Station 37	Transit
11/11/2019	149.340	171	40.5	Station 35-Station 37	Transit
11/18/2019	149.360	120	40.75	Station 35-Station 37	Transit
11/18/2019	149.340	171	40.75	Station 35-Station 37	Transit
11/11/2019	149.340	55	41	Station 35-Station 37	Stationary
11/11/2019	149.360	102	41	Station 35-Station 37	Stationary
11/11/2019	149.340	131	41	Station 35-Station 37	Stationary
11/18/2019	149.340	55	41.25	Station 35-Station 37	Stationary
11/25/2019	149.340	55	41.25	Station 35-Station 37	Stationary
11/18/2019	149.360	80	41.25	Station 35-Station 37	Stationary
11/18/2019	149.360	102	41.25	Station 35-Station 37	Stationary
11/25/2019	149.360	102	41.25	Station 35-Station 37	Stationary
11/18/2019	149.360	108	41.25	Station 35-Station 37	Stationary
11/25/2019	149.360	108	41.25	Station 35-Station 37	Stationary
11/25/2019	149.340	131	41.25	Station 35-Station 37	Stationary
10/28/2019	149.340	35	41.5	Station 35-Station 37	Stationary
11/11/2019	149.340	35	41.5	Station 35-Station 37	Stationary
11/14/2019	149.360	132	41.5	Station 35-Station 37	Stationary
11/5/2019	149.360	103	35.25	Station 37-Station 39	Transit
11/5/2019	149.360	66	36.25	Station 37-Station 39	Transit
11/11/2019	149.340	154	36.25	Station 37-Station 39	Stationary
11/25/2019	149.360	164	36.25	Station 37-Station 39	Stationary
11/5/2019	149.340	154	36.5	Station 37-Station 39	Stationary
11/11/2019	149.360	164	36.5	Station 37-Station 39	Stationary
11/18/2019	149.360	164	36.5	Station 37-Station 39	Stationary
11/5/2019	149.360	65	36.75	Station 37-Station 39	Transit
11/5/2019	149.340	117	36.75	Station 37-Station 39	Stationary
11/11/2019	149.340	117	36.75	Station 37-Station 39	Stationary
11/18/2019	149.340	117	36.75	Station 37-Station 39	Stationary
11/25/2019	149.340	117	36.75	Station 37-Station 39	Stationary
11/5/2019	149.340	130	36.75	Station 37-Station 39	Stationary
11/5/2019	149.360	148	36.75	Station 37-Station 39	Stationary
11/11/2019	149.360	148	36.75	Station 37-Station 39	Stationary
11/25/2019	149.360	148	36.75	Station 37-Station 39	Stationary
11/5/2019	149.360	128	37	Station 37-Station 39	Transit
11/5/2019	149.360	164	37.5	Station 37-Station 39	Stationary
11/5/2019	149.340	155	37.75	Station 37-Station 39	Transit
11/5/2019	149.340	99	38	Station 37-Station 39	Stationary

Date	Frequency	ID	RM	Location	Type
11/5/2019	149.340	114	38	Station 37-Station 39	Transit
11/5/2019	149.360	22	38.25	Station 37-Station 39	Stationary
11/11/2019	149.360	22	38.25	Station 37-Station 39	Stationary
11/11/2019	149.340	93	38.25	Station 37-Station 39	Stationary
11/18/2019	149.340	93	38.25	Station 37-Station 39	Stationary
11/25/2019	149.340	93	38.25	Station 37-Station 39	Stationary
11/11/2019	149.340	99	38.25	Station 37-Station 39	Stationary
11/14/2019	149.340	99	38.25	Station 37-Station 39	Stationary
11/18/2019	149.340	99	38.25	Station 37-Station 39	Stationary
11/25/2019	149.340	99	38.25	Station 37-Station 39	Stationary
11/5/2019	149.340	33	38.5	Station 37-Station 39	Stationary
11/11/2019	149.340	33	38.5	Station 37-Station 39	Stationary
11/14/2019	149.360	33	38.5	Station 37-Station 39	Stationary
11/18/2019	149.340	33	38.5	Station 37-Station 39	Stationary
11/5/2019	149.360	145	38.5	Station 37-Station 39	Stationary
11/11/2019	149.360	145	38.5	Station 37-Station 39	Stationary
11/18/2019	149.360	145	38.5	Station 37-Station 39	Stationary
11/25/2019	149.360	145	38.5	Station 37-Station 39	Stationary
11/25/2019	149.340	33	39	Station 37-Station 39	Stationary
11/5/2019	149.360	41	39	Station 37-Station 39	Stationary
11/11/2019	149.360	41	39	Station 37-Station 39	Stationary
11/14/2019	149.360	41	39	Station 37-Station 39	Stationary
11/18/2019	149.360	41	39	Station 37-Station 39	Stationary
11/25/2019	149.360	41	39	Station 37-Station 39	Stationary
11/5/2019	149.360	144	39	Station 37-Station 39	Transit
11/11/2019	149.360	144	39	Station 37-Station 39	Stationary
11/14/2019	149.360	144	39	Station 37-Station 39	Stationary
11/18/2019	149.360	144	39	Station 37-Station 39	Stationary
11/25/2019	149.360	144	39	Station 37-Station 39	Stationary
11/5/2019	149.340	52	33.25	Station 39-Station 40	Stationary
11/5/2019	149.340	92	33.25	Station 39-Station 40	Transit
11/5/2019	149.360	85	34	Station 39-Station 40	Stationary
11/5/2019	149.340	90	34.5	Station 39-Station 40	Transit
11/18/2019	149.360	66	35	Station 39-Station 40	Transit

Appendix D. October 23, 2019 eel release: Soucook and St. Croix River eels.

The October 23, 2019 release of radio-tagged eels upstream of the Lowell impoundment was comprised of 10 individuals originating from the Soucook River in New Hampshire and 12 individuals originating from the St. Croix River, Maine. Table D-1 provides a comparison of the range of values for movement indices evaluated during this study and between the two groups. For most metrics the median duration did not appear to differ between the two groups. The median duration to pass downstream through the Lowell impoundment was nearly twice as long for eels originating in the St. Croix River. However, the minimum duration to do so was nearly the same for eels from both locations.

With regard to passage at Lowell there was no differentiation in passage route usage. All ten eels originating in the Soucook River and eleven of the twelve[8] eels originating in the St. Croix River passed downstream via the turbine units. Based on downriver detections, 83% of the eels originating in the St. Croix River and 80% of the eels originating in the Soucook River reached the Essex Dam in Lawrence.

Table D-1. Minimum, maximum, and quartile values for the suite of movement metrics assessed for radio-tagged eels originating from the Soucook and St. Croix Rivers and released upstream of the Lowell project boundary on October 23, 2019.

Movement Metric	Origin	Value				
		Min	Max	P25	Median	P75
Impoundment Duration (hrs)	Soucook	23.2	51.5	23.4	26.7	26.8
	St. Croix	25.4	71.8	29.0	49.9	66.0
Upstream Residence Duration (hrs)	Soucook	0.3	94.4	0.3	0.5	22.6
	St. Croix	0.2	165.3	0.3	0.4	1.5
Pawtucket Gatehouse Passage (hrs)	Soucook	<0.1	93.5	0.1	0.1	0.2
	St. Croix	<0.1	0.2	0.1	0.1	0.1
Northern Canal Residence (hrs)	Soucook	0.1	38.6	0.2	0.3	0.4
	St. Croix	0.1	165.1	0.2	0.2	0.3
Downstream Travel: Lowell to Lawrence (hrs)	Soucook	41.9	359.8	47.0	57.6	102.8
	St. Croix	21.1	196.7	26.1	60.9	97.6

[8] Passage route for one individual was left as unknown.

Appendix E. Responses to September 30, 2020 Revised ISR meeting comments.

Comment No.	Agency	Comment	Response
1	FERC	In Section 5.1 of the Revised ISR report it was stated that "Due to overriding safety concerns, Boott limited operation of the turbine units within the downtown canal system during the study period." Can Boott provide better definition of the referenced safety concerns? Is the operation of gates to provide flows through the downtown canal system a normal occurrence when units are offline?	Boott decided to cease operation of the downtown units due electrical hazard concerns for all of the units, in combination with mechanical and other issues with several of the units. The cost to return the units to safe, reliable service was deemed to be economically infeasible relative to the limited amount of generation historically gained from these units. When the downtown units are offline, Boott only operates the canal gates to the extent necessary to manage canal water levels.
2	FERC	In Section 5.1 of the Revised ISR report it was stated that "Flows to the downstream canal system represented between 15-20% of the 2,000 cfs capacity during October and between 20-57% of the 2,000 cfs capacity during November." Can Boott add language to the report to summarize historic canal flows?	Historically, the downtown units have only been operated when there is river flow in excess of the hydraulic capacity of the E.L. Field Powerhouse's two units, typically during spring runoff (March - May). Boott has never directly measured canal flows, and can only estimate flows using the generation records for the downtown units, which are metered separately from the E.L. Field units. For example, for the period 1998 – 2007, estimated average monthly canal flows used for generation were approximately 575 cfs, 800 cfs and 550 cfs for March, April and May respectively. Maximum generation flows for these months were

			approximately 1,500 to 1,600 cfs. Average and maximum generation flows during the eel outmigration period were approximately 90 cfs and 1,200 cfs respectively during October, and 115 and 900 cfs respectively during November.
3	FERC	Can Boott provide a Microsoft Excel file of station operations for the study period to allow for calculation of flow proportions by passage route?	Hourly operations records have been provided in Appendix G and include values for headpond elevation, forebay elevation, tailrace elevation, inflow, Unit 1 discharge, Unit 2 discharge, downstream bypass discharge, upstream fishway flow, downtown canal flow, and spill flow. The reported station operations at the time of downstream passage for each radio-tagged fish were identified. Section 5.7 of the final report has been modified to include a summary of the proportional volume of discharge through the selected passage route relative to non-selected routes (e.g., if a fish passed downstream via the turbines values reported for that individual would include the volume of water passing through the turbines vs. the volume of water passing downstream via alternative routes (i.e., downstream bypass or spill).
4	FERC	Can you provide a summary of the number of events defined for eels in the proportional hazards analysis?	Section 5.10 provides the requested number of events. A total of 144 Pawtucket Gatehouse and 61 E.L. Field Powerhouse forebay events were defined based on recorded detections of adult American eels during the 2019 study to evaluate the impact of operational parameters on passage success.

5	USFWS	In Section 5.1 of the Revised ISR report it was stated that "The downstream bypass was operated throughout the study period, passing approximately 130 cfs." Can you confirm the discharge through that facility when operated in the full open position?	The downstream bypass facility at E.L. Field was designed to pass up to 2% of the E.L. Field nameplate capacity of 6,600 cfs, or 132 cfs. That value has been corrected where referenced in the final report.
6	USFWS	Were approach velocities at the intake racks calculated for this evaluation?	Approach velocities were not calculated specific to observed passage conditions for radio-tagged silver eels. Discussion of the approach velocities expected at the E.L. Field Powerhouse is provided in the *Fish Passage Survival Study.*
7	NMFS	Is it possible to incorporate light incidence into the hourly passage plots (Revised ISR report Figure 5-10)?	Figure 5-10 of the final report has been updated to reflect diurnal, nocturnal or crepuscular passage events.
8	NMFS	Table 5-1 in Section 5-1 summarizes the percentage of inflow records from the 2019 study period categorized by volume as well as the percentage of time that each volume category is historically exceeded for the months of October and November. Is it possible to consider the study months of October and November as a whole to classify the full study period by flow condition?	Section 5-1 has been updated to include an examination of Merrimack River conditions during the full October 9 – November 30, 2019 study period relative to flow exceedance probabilities.
9	MDFW and NMFS	In their Revised ISR comment letters both MDFW and NMFS commented: *The goal of the juvenile alosine and American eel downstream passage assessments was to determine the Lowell Project's impact on the outmigration of juvenile alosine and adult American eel. The specific objectives included*	As stated in the DLA, Boott has elected to decommission the downtown canal units, and to remove the units and associated canal infrastructure from the new license.

		assessing rates and delay to migration for alosine and evaluation of route specific mortality for American eel. Operation of turbine units in the downtown canal system did not occur during the study for safety reasons. This lack of operation significantly affects the study results and our ability to assess project related impacts. However, it is our understanding that the canal units will be decommissioned, as stated by CRP during a conference call with us and the US Fish and Wildlife Service on November 16, 2020. Decommissioning of the canal units should be confirmed in the Draft License Application. If confirmed, then additional evaluation of project impacts related to the canals are not necessary. However, is there is a change in this decision and the downtown canal units are part of the proposed action within the Draft License Application, then the agencies intend to request a second year of study once the canal units are fully operational to determine post-spawned adult alosine and American eel downstream migration route selection, passage efficiency, and residence duration associated with the power canal under various operational conditions, including a range of spill conditions.	

Appendix F. Project inflow and discharge by potential passage route at the time of downstream passage for radio-tagged silver eels at Lowell.

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
149.340	113	10/13/2019	21:47:35	Turbine	1298	541	132	335	290
149.360	121	10/16/2019	23:22:18	Bypass	1518	792	132	304	290
149.340	96	10/17/2019	5:30:23	Turbine	3966	2886	132	658	290
149.360	25	10/17/2019	20:02:26	Turbine	4289	3416	132	451	290
149.360	122	10/17/2019	21:24:17	Turbine	4319	3414	132	483	290
149.340	119	10/18/2019	2:15:38	Turbine	4165	3248	132	495	290
149.360	129	10/18/2019	5:31:18	Turbine	4023	3073	132	527	290
149.360	100	10/18/2019	8:10:29	Turbine	4333	3640	132	271	290
149.340	93	10/18/2019	20:27:26	Turbine	5490	4457	132	611	290
149.360	124	10/18/2019	21:31:19	Turbine	5485	4554	132	509	290
149.360	66	10/18/2019	22:19:52	Turbine	5485	4554	132	509	290
149.360	140	10/18/2019	23:20:56	Turbine	5860	5091	132	348	290
149.340	52	10/19/2019	1:21:12	Turbine	6585	5448	132	715	290
149.340	56	10/19/2019	1:43:40	Turbine	6620	5493	132	705	290
149.340	39	10/19/2019	20:03:10	Turbine	6475	5326	132	728	290
149.360	102	10/19/2019	20:36:49	Turbine	6385	5294	132	669	290
149.360	123	10/19/2019	22:12:44	Turbine	6315	5209	132	683	290
149.360	107	10/19/2019	23:24:53	Turbine	6285	5203	132	660	290
149.340	51	10/20/2019	1:11:07	Turbine	6285	5226	132	637	290
149.360	85	10/20/2019	3:31:16	Turbine	6285	5210	132	653	290
149.360	149	10/20/2019	21:45:44	Spill	5405	1540	132	3443	290
149.360	45	10/20/2019	22:12:19	Turbine	5405	1540	132	3443	290
149.360	125	10/20/2019	23:51:04	Turbine	5345	1494	132	3430	290
149.340	75	10/21/2019	0:52:02	Turbine	5350	1472	132	3456	290
149.340	110	10/21/2019	2:02:10	Turbine	5350	1500	132	3429	290
149.360	26	10/21/2019	3:21:09	Turbine	5350	1485	132	3443	290
149.360	86	10/21/2019	21:00:51	Turbine	3860	3214	132	224	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
149.340	98	10/21/2019	21:15:58	Turbine	3860	3214	132	224	290
149.360	103	10/22/2019	0:19:40	Turbine	4225	3556	132	247	290
149.360	84	10/22/2019	0:25:22	Turbine	4225	3556	132	247	290
149.340	135	10/22/2019	0:36:31	Turbine	4285	3423	132	440	290
149.360	126	10/23/2019	1:44:58	Turbine	3870	2560	132	888	290
149.340	115	10/23/2019	2:42:26	Turbine	3900	2733	132	746	290
149.360	141	10/23/2019	19:19:33	Turbine	4255	3356	132	477	290
149.360	148	10/23/2019	23:35:43	Turbine	3510	2337	132	751	290
149.340	91	10/24/2019	2:27:30	Turbine	3540	2319	132	799	290
149.360	127	10/24/2019	2:31:29	Turbine	3630	2290	132	918	290
149.340	55	10/24/2019	4:54:09	Turbine	3660	2205	132	1033	290
149.360	21	10/24/2019	19:01:24	Turbine	4225	3330	132	473	290
149.340	139	10/24/2019	19:59:18	Turbine	4255	3322	132	512	290
149.340	58	10/24/2019	20:33:01	Turbine	4259	3342	132	495	290
149.360	142	10/24/2019	22:11:30	Turbine	4259	3336	132	500	290
149.340	116	10/24/2019	22:14:29	Turbine	4259	3336	132	500	290
149.360	164	10/25/2019	1:02:28	Turbine	4589	3659	132	508	290
149.340	138	10/25/2019	1:06:12	Turbine	4589	3659	132	508	290
149.340	35	10/25/2019	1:26:24	Turbine	4589	3659	132	508	290
149.360	166	10/25/2019	2:27:12	Turbine	4649	3736	132	491	290
149.340	78	10/25/2019	4:01:13	Turbine	4679	3733	132	524	290
149.340	74	10/25/2019	19:15:26	Turbine	4661	3721	132	518	290
149.360	168	10/25/2019	22:38:59	Turbine	4135	0	132	3713	290
149.360	167	10/26/2019	1:59:38	Turbine	4317	3485	132	409	290
149.360	23	10/26/2019	3:02:40	Turbine	4322	3496	132	404	290
149.360	80	10/26/2019	3:51:21	Turbine	4326	3468	132	436	290
149.360	165	10/26/2019	4:20:42	Turbine	4326	3468	132	436	290
149.360	169	10/26/2019	4:33:48	Turbine	4301	3479	132	400	290
149.360	162	10/26/2019	18:26:54	Turbine	3347	2526	132	399	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
149.340	136	10/26/2019	22:54:25	Turbine	3716	2935	132	359	290
149.360	44	10/26/2019	23:16:14	Turbine	3716	2935	132	359	290
149.340	73	10/27/2019	3:26:52	Turbine	4184	3260	132	501	290
149.360	147	10/27/2019	3:57:01	Turbine	3994	3121	132	451	290
149.340	152	10/27/2019	5:55:37	Turbine	3338	2302	132	615	290
149.360	105	10/27/2019	17:02:43	Turbine	3500	2557	132	521	290
149.340	153	10/27/2019	17:52:56	Turbine	3755	3039	132	294	290
149.360	20	10/27/2019	19:11:55	Turbine	4155	3414	132	320	290
149.340	79	10/27/2019	20:25:58	Turbine	4425	3570	132	433	290
149.340	33	10/27/2019	21:10:22	Turbine	4575	3686	132	466	290
149.360	101	10/27/2019	22:12:33	Turbine	4744	3794	132	528	290
149.360	146	10/27/2019	22:40:24	Turbine	4597	3901	132	274	290
149.340	53	10/27/2019	22:43:09	Turbine	4597	3901	132	274	290
149.360	41	10/27/2019	22:58:17	Turbine	4597	3901	132	274	290
149.340	157	10/27/2019	23:30:50	Turbine	4995	4058	132	515	290
149.360	83	10/27/2019	23:33:59	Turbine	4995	4058	132	515	290
149.340	95	10/28/2019	0:06:52	Turbine	4995	4058	132	515	290
149.340	77	10/28/2019	0:54:09	Turbine	5035	4092	132	521	290
149.360	88	10/28/2019	1:19:58	Turbine	5035	4092	132	521	290
149.340	76	10/28/2019	2:08:33	Turbine	5070	4152	132	495	290
149.360	163	10/28/2019	20:24:43	Turbine	6299	5150	132	728	290
149.340	72	10/28/2019	20:44:31	Turbine	6294	5141	132	731	290
149.340	30	10/29/2019	0:24:35	Bypass	6774	5536	132	816	290
149.340	70	10/29/2019	1:05:58	Turbine	6838	5542	132	874	290
149.340	90	10/29/2019	4:31:11	Turbine	8062	5446	132	2194	290
149.340	19	10/29/2019	4:47:24	Turbine	8062	5446	132	2194	290
149.340	97	10/29/2019	5:06:06	Turbine	8062	5446	132	2194	290
149.360	40	10/29/2019	5:31:28	Turbine	8266	5453	132	2391	290
149.360	145	10/29/2019	18:11:28	Turbine	8877	5838	132	2617	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
149.360	170	10/29/2019	19:50:25	Turbine	8802	5820	132	2561	290
149.360	60	10/29/2019	21:03:17	Turbine	8512	5787	132	2303	290
149.360	108	10/29/2019	23:13:53	Turbine	8646	5776	132	2448	290
149.340	154	10/29/2019	23:36:59	Turbine	8680	5759	132	2499	290
149.360	144	10/30/2019	0:20:53	Turbine	8680	5759	132	2499	290
149.360	22	10/30/2019	0:27:20	Turbine	8680	5759	132	2499	290
149.360	69	10/30/2019	0:29:51	Turbine	8680	5759	132	2499	290
149.340	36	10/30/2019	0:38:42	Turbine	8610	5728	132	2460	290
149.340	15	10/30/2019	1:28:12	Turbine	8610	5728	132	2460	290
149.360	43	10/30/2019	1:32:03	Turbine	8634	5694	132	2518	290
149.360	82	10/30/2019	1:38:07	Turbine	8634	5694	132	2518	290
149.340	133	10/30/2019	3:06:26	Turbine	8558	5693	132	2443	290
149.340	112	10/30/2019	3:34:50	Turbine	8368	5674	132	2272	290
149.360	48	10/30/2019	3:36:31	Turbine	8368	5674	132	2272	290
149.340	131	10/30/2019	3:42:42	Turbine	8368	5674	132	2272	290
149.360	160	10/30/2019	3:47:59	Turbine	8368	5674	132	2272	290
149.340	11	10/30/2019	3:55:05	Turbine	8368	5674	132	2272	290
149.340	94	10/30/2019	5:27:46	Turbine	8193	5679	132	2092	290
149.340	137	10/30/2019	16:29:17	Turbine	7749	5777	132	1550	290
149.340	150	10/30/2019	18:33:49	Turbine	7509	5770	132	1317	290
149.340	99	10/30/2019	20:11:40	Turbine	7503	5753	132	1329	290
149.340	117	10/30/2019	21:53:19	Turbine	7573	5707	132	1444	290
149.340	31	10/30/2019	22:14:58	Turbine	7573	5707	132	1444	290
149.340	114	10/30/2019	22:35:11	Turbine	7473	5715	132	1336	290
149.340	118	10/31/2019	2:25:17	Turbine	7297	5645	132	1230	290
149.340	71	10/31/2019	5:22:39	Turbine	7227	5600	132	1205	290
149.340	132	10/31/2019	16:55:20	Turbine	6580	5118	132	931	400
149.340	155	10/31/2019	19:51:20	Turbine	6650	5167	132	951	400
149.340	12	10/31/2019	20:08:19	Turbine	6650	5167	132	951	400

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
149.360	42	10/31/2019	21:51:40	Turbine	6714	5217	132	966	400
149.340	156	11/1/2019	2:46:31	Turbine	6807	5224	132	1051	400
149.340	171	11/1/2019	4:21:38	Turbine	6837	5241	132	1064	400
149.360	128	11/1/2019	8:36:03	Turbine	6984	5237	132	1215	400
149.360	143	11/1/2019	19:43:59	Turbine	6773	5087	132	1154	400
149.360	81	11/1/2019	20:19:48	Turbine	6773	5087	132	1154	400
149.360	161	11/2/2019	20:34:03	Turbine	11229	4855	132	5842	400
149.360	104	11/2/2019	23:53:46	Turbine	11429	4754	132	6143	400
149.360	109	11/3/2019	0:32:27	Turbine	11435	4712	132	6192	400
149.340	37	11/3/2019	2:28:04	Turbine	11435	4671	132	6232	400
149.340	134	11/3/2019	4:22:50	Turbine	11435	4706	132	6198	400
149.340	111	11/3/2019	6:15:36	Turbine	11341	4666	132	6143	400
149.340	38	11/3/2019	22:21:04	Spill	9866	4489	132	4845	400
149.360	87	11/3/2019	22:47:38	Turbine	9766	4491	132	4743	400
149.360	65	11/4/2019	19:49:23	Spill	7870	4719	132	2619	400
149.340	50	11/6/2019	4:22:12	Turbine	5823	4568	132	723	400
149.360	46	11/7/2019	18:32:50	Turbine	5152	4021	132	599	400
149.360	89	11/8/2019	1:51:29	Turbine	5483	4261	132	691	400
149.360	120	11/8/2019	2:58:43	Turbine	5453	4243	132	678	400
149.360	64	11/8/2019	4:43:08	Turbine	5458	4288	132	637	400
149.340	59	11/8/2019	4:59:43	Turbine	5458	4288	132	637	400
149.360	106	11/10/2019	19:00:04	Turbine	4704	3597	132	575	400
149.340	57	11/10/2019	23:17:20	Turbine	4499	3426	132	541	400
149.340	16	11/12/2019	9:08:30	Spill	4201	3157	132	512	400
149.340	151	11/14/2019	1:00:49	Turbine	4059	2524	132	259	1145
149.340	17	11/14/2019	18:19:03	Turbine	3590	2003	132	310	1145
149.360	47	11/17/2019	5:22:47	Turbine	3179	1665	132	237	1145
149.340	159	11/22/2019	19:12:08	Turbine	4725	3529	132	625	440

Appendix G. Reported hourly operations information for the Lowell Project for the duration of the 2019 fall telemetry studies

Report Appendix G available as Microsoft Excel data listing.

Technical Report for the Upstream and Downstream Adult Alosine Passage Assessment

Lowell Hydroelectric Project (FERC No. 2790)

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February 25, 2021

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1 Introduction

A radio-telemetry assessment of the upstream and downstream passage success for adult alewife (*Alosa pseudoharengus*) and American shad (*Alosa sapidissima*) was conducted in support of the relicensing for the Lowell Hydroelectric Project (Lowell or Project), Federal Energy Regulatory Commission (FERC) No. 2790, as identified in the Revised Study Plan (RSP) submitted by Boott Hydropower, LLC (Boott) on January 28, 2019. The approach and methodology described in the RSP for the adult alosine telemetry study was approved with modifications by the FERC in its Study Plan Determination (SPD) letter dated March 13, 2019. In their SPD, FERC staff commented on several points related to the original resource agency study requests and the adult alosine passage study proposed by Boott as part of the PSP.

- Resource agency request for a HI-Z balloon tag turbine survival assessment.
    - FERC recommended no HI-Z balloon tag assessment be conducted during 2019. Information from the radio-telemetry and desktop analyses should provide adequate estimates of project survival. In the event these findings are inconclusive FERC would consider additional study requests.
- Resource agency request to increase the number of dual-tagged (i.e., PIT and radio transmitters) from 150 alewives to 200 alewives and from 180 American shad to 200 American shad.
    - FERC indicated there was no evidence that the originally proposed sample sizes of 150 dual-tagged alewives and 180 dual tagged American shad would be insufficient to meet the goals of the study.
- Resource agency request to release tagged alewives and American shad intended to evaluate upstream passage at Lowell at the Lawrence Project rather than transport by truck to a point further upstream.
    - FERC recommended fish be released at a point further upstream to reduce the potential for fallback downstream of Lawrence immediately following tagging and release.
- Resource agency request for one group of herring to be released after May 20 due to likelihood of blueback herring present at that point in the season.
    - FERC recommended at least one release event occur after May 20.
- Resource agency request to add additional monitoring stations into the bypassed reach to help assess passage effectiveness through the existing concrete weirs.

  - FERC recommended that the spatial layout of the monitoring stations as described in the RSP should provide sufficient information to assess passage through that reach.

- Resource agency request to add an additional stationary receiver along the eastern wall of the E.L. Field tailrace to provide data redundancy.
  - FERC recommended placement of an additional stationary receiver along the eastern wall of the E.L. Field tailrace.

- Resource agency requested that Boott either (1) adjust the detection zone of RSP Station M7 further downstream or (2) add an additional station to ensure detection of fish as they approach the confluence of the bypassed reach and tailrace.
  - FERC recommended that the proposed location for Station M7 described in the RSP be installed in a manner which adequately covered the bypassed reach and tailrace confluence area.

On June 12, 2020 FERC issued a Revised Process Plan and Schedule and Determination on Requests for Study Modifications for the Lowell Hydroelectric Project (Revised PPS). In accordance with the Revised PPS, Boott filed their Revised ISR with FERC on September 30, 2020, which contained a mostly completed report for the Upstream and Downstream Adult Alosine Passage Assessment. Boott held a revised ISR meeting on October 15, 2020 and representatives from FERC, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Massachusetts Division of Fisheries and Wildlife (MADFW), Massachusetts Division of Marine Fisheries (MDMF), and the New Hampshire Fish and Game Department (NHFGD) had the opportunity to provide comments. A summary of comments received during the October 15 Revised ISR meeting and the corresponding responses are provided in Appendix B of this report. In addition, additional information gaps identified in Section 7.0 of the Revised ISR have been completed into this Updated Study Report. This final technical report describes the objectives, methodologies and results of the 2020 radio-telemetry assessment to evaluate the upstream and downstream passage of adult alosines at the Lowell Project.

It is important to note that the timing of this field study (April – June 2020) coincided with the rapid onset of the COVID-19 pandemic throughout the United States and that both the States of New Hampshire and Massachusetts were operating under a “stay-at-home” order during that time. Every effort was made to conduct this evaluation as described in the RSP and as approved by FERC in their SPD while still maintaining the health and safety of all Normandeau project staff and Boott operations staff.

2 Objectives

The goal of this study was to assess the behavior, approach routes, passage success, survival, and residence duration of adult American shad and alewives as they encounter the Lowell Project during their upstream and downstream migrations to determine if Project operations negatively impact their survival and production.

Specific objectives focused on upstream passage included:

- Determining route selection and behavior of upstream migrating shad and alewives at the Project under varied operational conditions, including a range of spill conditions;
- Assessing the nearfield attraction to, and entrance efficiency of, the fish lift with the river-side entrance open;
- Evaluating residence or fallback associated with the Pawtucket Gatehouse at the upstream end of the Northern Canal;
- Assessing the nearfield attraction to, and entrance efficiency of, the Pawtucket Dam ladder;
- Evaluating the internal efficiency of the Pawtucket Dam ladder;
- Collection of ladder and lift efficiency data, to include rates of approach to fishway entrances, entry into fishways, and passage under varied operational conditions, including a range of spill conditions; and
- To assess the effects of Project operations on the timing, orientation, routes and migration rates of shad and alewives.

Specific objectives focused on downstream passage included:

- Determining the proportion of post-spawned adults that select the downtown canal system or E.L. Field power canal as a downstream passage route;
- Determining post-spawned adult downstream migration route selection, passage efficiency, and residence duration associated with the power canal under various operational conditions, including a range of spill conditions;
- Comparing rates and measures of residence duration and movement among Project areas and routes utilized (e.g., spill at dam versus power canal); and
- Evaluating mortality of adult alosines passed via each potential route.

3 Project Description and Study Area

The Lowell Project is located at River Mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of: (1) a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones; (2) a 720-acre impoundment with a normal maximum water

surface elevation of 92.2 feet NGVD 29; (3) a 5.5-mile-long canal system which includes several small dams and gatehouses; (4) a powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW); (5) a 440-foot-long tailrace channel; (6) four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal System containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW; (7) a 4.5-mile long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid; (8) upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket dam; and (9) appurtenant facilities. At the normal pond elevation of 92.2 feet NGVD 1929 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control, and has no usable storage capacity.

The study area for the upstream and downstream adult alosine passage assessment included the mainstem Merrimack River from the upper extent of the Project's impoundment located approximately 23 river miles upstream from the Pawtucket Dam in Litchfield, New Hampshire, to the Lawrence Hydroelectric Project (FERC No. 2800), located approximately 11 river miles downstream of the Pawtucket Dam (Figure 3-1). The Project's downtown canal system and the Hamilton, Assets, Bridge Street and John Street Power Stations were also considered as part of the study area.

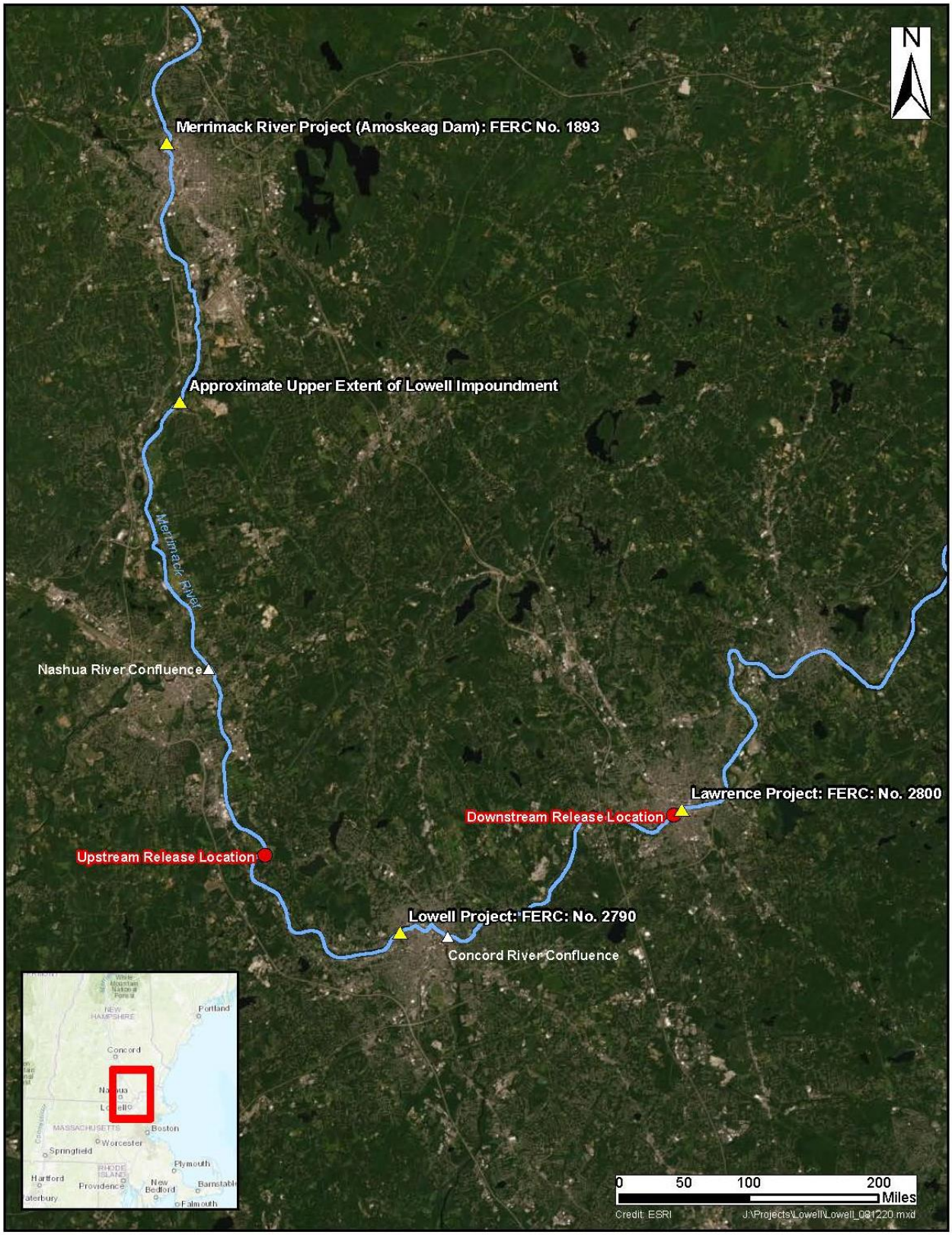

Figure 3–1. Merrimack River study reach considered during the spring 2020 adult alosine upstream and downstream passage assessment.

4 Methods

The upstream and downstream passage of adult alewives and American shad at the Lowell Project was evaluated using radio-telemetry during the spring of 2020. Following the release of radio-tagged individuals into the Merrimack River both upstream and downstream of the Lowell facility, their movements were monitored using a series of stationary radio-telemetry receivers in place at the Project as well as at several additional stationary monitoring receivers installed at bank-side locations upstream and downstream of the Project to inform on general movements, distribution among available passage routes and Project passage success.

4.1 Telemetry Equipment

Movements of radio-tagged individuals during the 2020 study were recorded via a series of stationary PIT[1] and radio-telemetry receivers. Telemetry equipment used during the evaluation of adult alosine passage at Lowell included Orion radio-telemetry receivers, manufactured by Sigma Eight, as well as SRX radio receivers manufactured by Lotek Wireless. Each radio-telemetry receiver was paired with either an aerial or underwater antenna (dropper antenna). Aerial antennas (four or six element Yagi) were utilized to detect radio-tagged individuals within the larger, more open sections of river, such as within the tailrace or at locations downriver of Lowell. Dropper antennas were fixed at downstream passage locations (e.g., downstream bypass). Dropper antennas were custom built by stripping the shielded ends of RG-58 coaxial cables.

Adult American shad and alewives were tagged using transmitters manufactured by Sigma-Eight (model TX-PSC-I-80 or TX-PSC-I-80D) and operating on one of five unique frequencies (149.440, 149.460, 149.480, 149.760, or 149.800 MHz). The TX-PSC-I-80 transmitters measured approximately 10 x 10 x 27 mm, weighed 4.2 g, and had an estimated battery life of 64 days when set at a 2.0 second burst rate. The TX-PSC-I-80D transmitters measured approximately 10 x 10 x 22 mm, weighed 3.3 g and had an estimated battery life of 64 days when set at a 2.0 second burst rate. Each transmitter was coded to emit a unique identifying signal so that individual shad and alewives could be identified by a receiver.

A series of PIT receivers were installed to complement the radio-telemetry array and were placed at locations intended to allow for precise tracking of shad and herring within the Project fishways. The PIT receivers and tags used during 2020 were half-duplex (HDX) and were manufactured by Oregon RFID. Each antenna loop was customized per monitoring site specifics, and equipped with a set of capacitors to properly tune the antenna loop inductance. The HDX PIT tags were encoded by the manufacturer and read only with a 64 bit unique ID. Each cylindrical PIT tag measured 3.65 mm in diameter, 32 mm long, and weighed 0.8g.

[1] Passive Integrated Transponder

4.2 Monitoring Stations

The RSP identified monitoring stations to be set up at Lowell for the spring 2020 adult alosine passage assessment. Each monitoring location identified in the RSP was installed and consisted of a data-logging receiver, antenna, and power source[2]. Receivers were configured to receive transmitter signals from a designated area continuously throughout the study period. During installation of each station, range testing was conducted to configure the antennas and receivers in a manner which maximized detection efficiencies at each location. The operation of receivers was initially established during installation, then confirmed throughout the study period by using beacon tags. A number of beacon tags were stationed at strategic locations within the detection range of either multiple or single antennas, and they emitted signals at programmed time intervals. These signals were detected and logged by the receivers and used to record the functionality of the system throughout the study period.

The locations of monitoring stations installed for the 2020 Lowell adult alosine passage study are outlined here and presented in Figures 4-1 through 4-4.

Monitoring Station 04: Station 04 was installed within the Lowell Project impoundment and was intended to detect radio-tagged adult alosines (1) originally released downstream of Lowell and following successful passage via the fish lift or ladder at the Project, or (2) during their initial movement downstream and away from the upstream release location. Station 04 consisted of a single Lotek SRX radio-receiver and aerial antenna oriented perpendicular to the river channel. It was located approximately 2.1 miles upstream of the Pawtucket Gatehouse and approximately 5.1 miles downstream of the upper release location.

Monitoring Station 05: This station consisted of a single Lotek SRX radio-receiver and an aerial antenna calibrated to provide detection information for radio-tagged alosines (1) originally released downstream of Lowell and following successful passage via the fish lift or ladder at the Project, or (2) originally released upstream as they approached the upstream face of Pawtucket Dam.

Monitoring Station 06: Station 06 consisted of a single Orion radio-receiver and aerial antenna. It was calibrated to provide coverage of the upstream side of the Pawtucket Gatehouse and to inform on (1) radio-tagged alosines originally released downstream of Lowell which had ascended the Project fish lift and successfully exited the Northern Canal via the Pawtucket Gatehouse, or (2) radio-tagged alosines which following a period of residence upstream of the Project had approached the upstream side of the Pawtucket Gatehouse.

Monitoring Station 07: Station 07 consisted of a single Orion radio-receiver and aerial antenna calibrated to provide coverage of the downstream side of the Pawtucket Gatehouse. Station 07 was installed to inform on (1) radio-tagged adult alosines originally released downstream which

[2] Note that three stations identified in the RSP were either modified or eliminated due to logistical issues identified during install, as discussed below. RSP Station M20 was eliminated and replaced with Station M21. RSP Stations C3 and C7 were changed from PIT to radio-telemetry receivers as noted during the ISR meeting in March, 2020.

had ascended the Project fish lift and approached the Pawtucket Gatehouse in an attempt to exit the Northern Canal, or (2) radio-tagged adult alosines which following a period of residence upstream of the Project had successfully passed through the Pawtucket Gatehouse and entered the Northern Canal.

Monitoring Station 08: Station 08 consisted of a single Lotek SRX radio-receiver and aerial antenna installed to provide detection information for radio-tagged adult alosines which were (1) successfully ascended via the fish lift following release downstream, or (2) following a period of residence upstream of the Project had successfully passed through the Pawtucket Gatehouse, entered the Northern Canal and forebay and were in the vicinity of the entrances to the downstream bypass and E.L. Field turbine intake racks.

Monitoring Station 09: Station 09 consisted of a single Orion radio-receiver and underwater drop antenna. It was installed and calibrated to provide detection information for radio-tagged adult alosines which following a period of residence upstream of the Project had successfully passed through the Pawtucket Gatehouse, entered the Northern Canal and forebay, and passed downstream via the downstream bypass.

Monitoring Station 10: This station consisted of a single Lotek SRX radio-receiver and aerial antenna and was installed at a location overlooking the Project tailrace. Detections at this location were used to identify radio-tagged adult alosines which were (1) originally released downstream and subsequently ascended into the Project tailrace and were within the nearfield area of the upstream fish lift, or (2) passed downstream through the turbine units at the E.L. Field Powerhouse following a period of residence upstream of the Pawtucket Dam and within the Northern Canal upstream of the intakes. As stated in the SPD, the installation of an additional stationary receiver along the eastern wall of the E.L. Field tailrace to provide data redundancy was recommended. During the spring installation period, the installation of an additional receiver along the eastern tailrace wall was not conducted due to a lack of safe access during spring flow conditions. Detections from the receiver installed on the backside of the E.L. Field Powerhouse were used for determining presence in the Lowell tailrace.

Monitoring Station 11: Station 11 consisted of a single Lotek SRX radio-receiver and aerial antenna and was installed to scan across the bypassed reach at a point downstream of where the surge gate enters from the power canal and upstream from the downstream bypass. Detections at this location were used to (1) confirm the downstream passage of radio-tagged adult alosines which following a period of residence upstream of the Project passed downstream using the spillway or surge gate, or (2) identify radio-tagged adult alosines released at Lawrence which had initiated an ascent upstream into the bypassed reach. The detection field for Station 11 was centered at a point in the bypassed reach approximately 15% of the distance upstream from the downstream confluence with the tailrace (when considering the full length of the bypassed reach from the entrance to the Pawtucket Dam fish ladder downstream to the confluence with the tailrace).

Monitoring Station 12: Station 12 consisted of a single Lotek SRX radio-receiver and aerial antenna installed to scan across the bypassed reach at a location near to the midpoint of that section. Detections at this location were used to identify radio-tagged adult alosines which had ascended upstream within the bypassed reach. The detection field for Station 12 was centered at a point in the bypassed reach approximately 53% of the distance upstream from the downstream confluence with the tailrace (when considering the full length of the bypassed reach from the entrance to the Pawtucket Dam fish ladder downstream to the confluence with the tailrace).

Monitoring Station 13: Station 13 consist of a single Lotek SRX radio-receiver and aerial antenna installed to scan the upper section of the bypassed reach in close proximity to the entrance to the upstream fishway. Detections at this location were used to identify radio-tagged adult alosines which have ascended the full length of the bypassed reach, were upstream of the concrete weirs and within the nearfield area of the upstream fishway.

Monitoring Stations 14/15: Stations 14 and 15 each consisted of a single half-duplex PIT reader and antenna installed at the first weir upstream from the entrance to the Project fish ladder. These two readers provided fine scale detection information for PIT-tagged adult alosines which had ascended the Project bypassed reach and entered the upstream fishway. The use of two independent PIT readers at this location permitted the install of a pair of smaller loop antennas to monitor each of the two slot openings rather than a single large antenna to try to monitor the full cross section of the fish ladder.

Monitoring Station 16**:** Station 16 was not described in the RSP but was added as a supplement to Stations 14 and 15 during the installation of stationary receivers prior to the spring 2020 study. Station 16 consisted of a single Orion radio-telemetry receiver coupled to an underwater drop antenna positioned inside of the entrance to the Pawtucket Dam fish ladder. This receiver was intended to provide redundant detection information for dual-tagged adult alosines in fish ladder entrance. The drop antenna was positioned upstream of the entrance weir and immediately downstream of the first concrete weir within the lower leg of the fishway.

Monitoring Stations 17/18: Stations 17 and 18 each consisted of a single half-duplex PIT reader and antenna installed at the first weir upstream from the turn pool within the Project fish ladder. These two readers provided fine scale detection information for PIT-tagged adult alosines which had ascended the lower leg of the fishway and were beginning their ascent through the upper leg. Similar to Stations 14/15, the use of two independent PIT readers at this location permitted the install of a pair of smaller loop antennas to monitor each of the two slot openings rather than a single large antenna to try to monitor the full cross section of the fish ladder.

Monitoring Station 19: Station 19 consisted of a single half-duplex PIT reader and antenna. The antenna was installed at the upstream side of the window crowder just downstream from the exit gate at the top of the Pawtucket Dam fish ladder. Installation of the antenna at this

position allowed for the usage of a smaller loop antenna than would be required to attempt to monitor the full cross section of the fish ladder. Station 19 was intended to provide fine scale detection information for PIT-tagged adult alosines which had ascended the Project bypassed reach, entered and successfully navigated the upstream fishway structure.

Monitoring Station 20: Station 20 consisted of a single half-duplex PIT reader and antenna installed to provide detection information for adult alosines which had entered the Lowell fish lift via the river-side entrance. Site conditions prior to the 2020 lift operational season were characterized by high tailwater elevations which prevented the dewatering of the lower entrance flume. As a result, options for installation of the single antenna in the lift entrance were limited. The antenna frame was sized to slide into an existing slot in the wall of the entrance flume just upstream of the riverside entrance weir and was of a size to span the full cross section of the fish lift entrance flume. The watered conditions in the exit flume eliminated the ability to move the antenna frame back and forth within the entrance flume to position at the "sweet spot" for detection range. Construction of two smaller antennas to cover the entrance was not considered due to concerns with a vertical pipe at the center of the entrance flume water column and the potential impact on upstream migrants.

Monitoring Station 21: Station 21 was not described in the RSP but was added during the installation of stationary receivers prior to the spring 2020 study, as a supplement for Monitoring Station 20. Station 21 consisted of a single Orion radio-telemetry receiver coupled to an underwater drop antenna positioned inside of the entrance to the E.L. Field fish lift. This receiver was intended to provide redundant detection information for dual-tagged adult alosines in the lift entrance. The drop antenna was positioned midway between the entrance weir the fish crowder when in its "fishing" position.

Monitoring Stations 22/23: Stations 22 and 23 each consisted of a single half-duplex PIT reader and antenna installed at the upstream end of E.L. Field fish lift exit flume. These two readers provided detection information for PIT-tagged adult alosines which had ascended upstream via the lift and were exiting into the Northern Canal. A pair of independent PIT readers were installed at this location rather than a single large antenna to monitor the full cross section of exit flume to maximize detection probability. Antennas were positioned side by side in the exit flume. During installation the exit flume was dewatered and project staff were able to move the antennas to multiple locations within the channel to identify the location where background interference was minimal.

Monitoring Station 24: Station 24 was installed at a point just downstream of the convergence of flow from the bypassed reach and E.L. Field powerhouse tailrace channel and consisted of a Lotek SRX receiver and aerial antenna. This station provided detection information for radio-tagged adult alosines (1) released at the Lawrence Project as they approach the Lowell Project, and (2) following downstream passage or a period of residence within the tailrace or bypassed reach at the Lowell Project.

Monitoring Station 25: This station was installed at a point along the mainstem of the Merrimack River downstream of both the E.L. Field Powerhouse tailrace and the confluence with the Concord River. Station 25 consisted of a single Lotek SRX receiver and aerial antenna oriented perpendicular to the river channel. This station provided detection information for radio-tagged adult alosines released (1) at the Lawrence Project as they approach the Lowell Project, and (2) following downstream passage or a period of residence within the tailrace or bypassed reach at the Lowell Project. Station 25 was installed at the Lowell Waste Water Treatment Plant, approximately 2.1 miles downstream of the tailrace.

Monitoring Station 26: Station 26 was installed at a commercial business near the midpoint between the Lowell and Lawrence projects and consisted of a single Lotek SRX receiver and aerial antenna oriented perpendicular to the river channel. This station provided detection information for radio-tagged adult alosines released (1) at the Lawrence Project as they approach the Lowell Project, and (2) following downstream passage or a period of residence within the tailrace or bypassed reach at the Lowell Project. Station 26 was located approximately 6.0 miles downstream of the tailrace.

Monitoring Station 27: This station consisted of a single Lotek SRX radio-receiver and an aerial antenna and was installed and calibrated in a manner to provide detection information for radio-tagged adult alosines as they approached the upstream face of Essex Dam (approximately 10.75 miles downstream of the Lowell tailrace).

Monitoring Stations 04 through 27 were installed and maintained throughout the duration of the spring 2020 adult alosine study to inform on the upstream and downstream passage of tagged alewives and American shad at Lowell and within the mainstem of the Merrimack River. An additional seven receivers were described in the RSP and were installed at locations within the Pawtucket Canal system (or “downtown canal” system) as part of this study. Outmigrating adult alosines can potentially enter the Pawtucket Canal system, the entrance of which sits at a point upstream of the Pawtucket Dam and the Northern Canal.

Outmigrating adult alosines entering the Pawtucket Canal first encounter the Guard Locks at a point approximately 1,700 ft downstream from the confluence with the mainstem Merrimack River. Following passage by the Guard Locks, radio-tagged adult alosines are free to move downstream through the Pawtucket Canal until flow diverges and continued passage is possible into either the Western, Merrimack, or Hamilton Canals or the individual can continue downstream in the Pawtucket Canal (via the Swamp Locks). The Western and Merrimack Canals are no longer in use and are essentially deadwater areas and the Assets Power Station (located on the Merrimack Canal) is non-functional and is planned to be eliminated from the new project license. Individuals passing into the Hamilton Canal subsequently enter the Lower Pawtucket Canal via the turbine intakes at the Hamilton Power Station or through the Hamilton Wasteway. From the lower Pawtucket Canal individuals enter into the Eastern Canal. From the Eastern Canal fish can pass into the Concord River via the Bridge Street Power Station or into the Merrimack River via the John Street Power Station or Boott Gate. The Lower Locks is rarely used to pass flow from the Eastern Canal other than for lockage. Monitoring Stations installed

and operated within the downtown canal system during the 2020 adult alosine study consisted of:

Monitoring Station 28: Station 28 was installed to detect outmigrating radio-tagged adult alosines which entered the Pawtucket Canal system rather than pass the Lowell Project via one of the mainstem passage routes. The entrance to the Pawtucket Canal sits at a point upstream of the Pawtucket Dam and the Northern Canal. Station 28 was located at the Guard Locks, approximately 1,700 ft downstream from the entrance to the canal. The monitoring zone for Station 28 was focused downstream of the Guard Locks facility to ensure any detections recorded at that location were of fish which had definitively entered the Pawtucket Canal system. Monitoring Station 28 consisted of a single Orion receiver and aerial antenna.

Monitoring Station 29: Station 29 was installed to detect radio-tagged adult alosines which have moved from the Pawtucket Canal to the Hamilton Canal and reached the Hamilton Power Station. It consisted of a single Orion receiver and antenna coverage at the Hamilton Power Station intake area upstream of the intake for Hamilton Unit 1.

Monitoring Station 30: As described in the RSP, Station 30 was to consist of a single half-duplex PIT reader and antenna and installed at the Hamilton Wasteway located at the downstream end of the Hamilton Canal. During the initial site reconnaissance it was determined that the installation of a PIT antenna was not feasible at this site due to the potential flow volume and the size of the opening and as a result coverage of this route was modified to a single Orion receiver and aerial antenna.

Monitoring Station 31: This station was installed to detect radio-tagged adult alosines which had entered the Eastern Canal and reached the Bridge Street Power Station (a.k.a. “Section 8”). It consisted of a single Lotek receiver and antenna coverage of the Bridge Street Power Station discharge area. Adult alosines successfully passing here had the potential to be subsequently detected downstream at Monitoring Stations 25, 26, and 27.

Monitoring Station 32: Station 32 was installed to detect radio-tagged adult alosines which had entered the Eastern Canal and reached the John Street Power Station. It consisted of a single Orion receiver and antenna coverage at the John Street Power Station intake area.

Monitoring Station 33: Station 33 consisted of a single Orion radio receiver and antenna coverage of the John Street Power Station discharge. Adult alosines successfully passing here had the potential to be subsequently detected downstream at Monitoring Stations 25, 26, and 27.

Monitoring Station 34: As described in the RSP, Station 34 was to consist of a single half-duplex PIT reader and antenna installed at the sluice gate located at Boott Dam. During the initial site reconnaissance it was determined that the installation of a PIT antenna was not feasible at this site due to the potential flow volume and the size of the opening and as a result coverage of this route was modified to a single Orion receiver and aerial antenna. This location provided

coverage to detect any fish departing the Eastern Canal for the Merrimack River during periods of gate operation to flush debris from the lower canal system.

4.3 Tagging and Release Procedures

The majority of adult American shad and alewives were collected for tagging at the Essex Dam fish lift at the Lawrence Hydroelectric Project[3]. Following collection methodology from a previous evaluation of shad movement in the lower Merrimack River (Sprankle, 2005), adult alosines were collected from a net pen placed in the exit flume of the lift which received fish directly from the hopper bucket. Following capture in the net pen, fish were dip-netted out and visually assessed to ascertain their suitability for tagging. Any individuals exhibiting excessive scale loss or other signs of significant stress were not considered for tagging and were released directly into the fish lift exit flume. Individuals deemed acceptable for tagging were quickly measured (total length, nearest mm), and gender was determined (when possible) by gently expressing eggs or milt from running-ripe fish. Radio transmitters were inserted gastrically. To facilitate gastric implantation, transmitters were affixed to a flexible tube with their trailing antenna running through the hollow center. The transmitter and leading edge of the flexible tube were pushed through the mouth and down to the stomach. Once in place, the tube was removed leaving the transmitter antenna trailing from the mouth. PIT tags were implanted into the peritoneal cavity through a small incision on the ventral side of the fish. Adult alosines during this study were either tagged with a radio transmitter (i.e., "radio-tagged"), a PIT tag (i.e., "PIT-tagged") or both a radio and PIT tag (i.e., "dual-tagged").

4.3.1 Upstream Release Procedures

Dual and PIT-tagged adult alosines intended to assess upstream passage effectiveness were released over six dates for alewives and five dates for American shad. All dual and PIT-tagged adult alosines were released directly into the exit flume of the upstream fishway at Lawrence following tagging.

4.3.2 Downstream Release Procedures

Radio-tagged adult alosines intended to assess downstream passage effectiveness were released over four dates for alewives and three dates for American shad. All radio-tagged adult alosines were trucked upstream and released into the Merrimack River at the Tyngsboro Riverfront Park, approximately 7.25 miles upstream of the dam. As described in the RSP, a total of 100 adult alewives and 100 adult American shad were to be radio-tagged and released upstream of the Pawtucket Dam for the purposes of evaluating downstream passage. The RSP had described an additional 50 adult alewives and 50 adult American shad which were to be radio-tagged and released directly into the downtown canal system downstream of the Guard Locks to assess passage through those facilities. Due to overriding safety concerns, Boott had ceased operation of the turbine units within the downtown canal system prior to the study

[3] Note that a subset of adult river herring required for the downstream passage evaluation were collected at Amoskeag fishways. Boott consulted with the resource agencies prior to tagging fish from Amoskeag. Additional details are provided in Section 5.6.

period. Following consultation with the resource agencies, Boott elected to reallocate the transmitters originally purchased for the downtown canal assessment to increase the number of individuals evaluated for downstream passage at the Pawtucket Dam and E.L. Field Powerhouse.

Concurrent with the upstream and downstream adult alosine passage assessment at Lowell, Normandeau Associates simultaneously conducted a separate adult alosine effectiveness study at the Mine Falls Project (FERC No. 3442) on the Nashua River, a tributary to the Merrimack River with a confluence 13.5 miles upstream of the Pawtucket Dam and within the Lowell Project impoundment. Mine Falls is the second dam on the Nashua River, sitting at river mile 5.2, approximately 4.0 miles upstream of the Jackson Mills Project. A total of 100 radio-tagged adult river herring were released upstream of Mine Falls (to be referenced as "Pepperell") and 100 radio-tagged adult river herring were released downstream of Mine Falls (to be referenced as "Mine Falls"). The portion of individuals from those two release groups which were determined to have approached the Pawtucket Dam (based on stationary receiver detections) have been included in this report as part of the assessment of downstream passage.

4.4 Data Collection

4.4.1 Stationary Telemetry Data

Receiver downloads occurred three to four times weekly during the period from the initial tag and release event until the end of June, 2020. Backup copies of all telemetry data were made prior to receiver initialization. Field tests at the time of download to ensure data integrity and receiver performance included confirmation of file integrity, confirmation that the last record was consistent with the downloaded data (beacon tags were critical to this step), and lastly, confirmation that the receiver was operational upon restart and actively collecting data post download. Within a data file, transmitter detections were stored as a single event (i.e., single data line). Each event included the date and time of detection, frequency, ID code, and signal strength.

4.4.2 Manual Telemetry Data

To provide supplemental detection information to the stationary receiver data set, manual tracking was conducted on a number of occasions from the time of initial release through the end of June, 2020. Manual effort was exerted in the vicinity of the Lowell Project (i.e., tailrace and headpond immediately upstream of Pawtucket Dam) on most dates when stationary telemetry equipment was checked. In addition, a number of boat or truck-based efforts were conducted to look for radio-tagged alosines within the Lowell impoundment and the reach of the Merrimack downstream to Lawrence.

4.4.3 Operational and Environmental Data

Hourly records for operations data were provided by Boott for the 2020 evaluation period and included:

- Headpond elevation (ft);

- Power canal elevation (ft);
- Headpond-power canal differential (ft);
- Tailrace elevation (ft);
- Head differential for E.L. Field turbines (ft);
- Total inflow (cfs);
- E.L. Field discharge (cfs);
- Downstream bypass facility discharge (cfs);
- Upstream fishway discharge (cfs);
- Downtown canal flow (cfs); and
- Spill flow through the bypassed reach.

4.4.4 Downstream Drift Assessment

Ten freshly dead adult alewives and ten American shad were radio-tagged and released downstream of Lowell during the 2020 study period. Two individuals were released on each date that a group of live test fish was released upstream of the Pawtucket Dam. Dead, radio-tagged adult alosines were released directly into the discharge of an active turbine unit at the E.L. Field powerhouse. The downstream progression of these known mortalities was recorded by the downstream stationary receivers.

4.5 Data Analysis – Upstream Passage

4.5.1 Fish Movement and Project Area Usage

The tagging, telemetry and Project operations data sets collected as part of this effort were examined and used to evaluate a number of metrics related to upstream passage success and movement through the Project area. These metrics included:

Approach Duration: This value was calculated as the duration of time from release into the Merrimack River at the Lawrence fish lift facility until the initial detection at Monitoring Station 24, the convergence area of the Pawtucket Dam bypassed reach and the E.L. Field tailrace discharge. The duration and rates of upstream ascent for tagged adult alosines from the Lawrence fish lift were further broken down to the discrete sections as bounded by Monitoring Stations 27 to 26, 26 to 25, and 25 to 24. This value was calculated for only dual-tagged individuals.

Time at Large: This value was calculated as the duration of time from the initial detection at Monitoring Station 24 until (1) upstream passage at the Project fish lift or fish ladder, or (2) movement downstream and permanently away from the project area. Final departure times were determined by the last detection at the lift or ladder structures for fish passing upstream or the last detection at Monitoring Station 24 for fish failing to pass and departing downstream. This value was calculated for only dual-tagged individuals.

Foray Events: Foray events were defined for dual-tagged individuals which moved from the convergence area (i.e., the detection zone of Station 24) upstream towards the fish lift or fish ladder as evidenced by detections on one or more receivers along those two routes leading

towards possible upstream passage into the headpond above the Pawtucket Dam. Each event was initiated by a detection at either Station 10 (i.e., E.L. Field tailrace and access to the fish lift) or Station 11 (i.e., the Pawtucket Dam bypassed reach and access to the fish ladder). The duration and magnitude (i.e., most upstream station) of each foray was determined. For individuals which initiated a foray in the direction of the fish lift, each unique event could potentially encompass a sequence of detections at:

- Station 10 – E.L. Field tailrace;
- Stations 20/21 – fish lift entrance;
- Stations 22/23 – fish lift exit flume;
- Station 08 – E.L. Field forebay;
- Station 07 – downstream side of the Pawtucket Gatehouse;
- Station 06 – upstream side of the Pawtucket Gatehouse;
- Station 05 – Merrimack River immediately upstream of the Pawtucket Dam; and
- Station 04 – Merrimack River approximately 2.0 miles upstream of the Pawtucket Dam.

For individuals which initiated a foray in the direction of the fish ladder, each unique event could potentially encompass a sequence of detections at:

- Station 11 – lower portion of the Pawtucket Dam bypassed reach;
- Stations 12 – mid-point of the Pawtucket Dam bypassed reach;
- Stations 13 – upstream end of the Pawtucket Dam bypassed reach;
- Station 14/15/16 – fish ladder entrance;
- Station 17/18 – fish ladder turn pool;
- Station 19 – fish ladder exit;
- Station 05 – Merrimack River immediately upstream of the Pawtucket Dam; and
- Station 04 – Merrimack River approximately 2.0 miles upstream of the Pawtucket Dam.

Entrance Events: The total number of unique entrance events within each defined foray event for a dual-tagged adult alosines approaching either the lift or fish ladder was determined. This process relied on the ability to identify the breaks in the detection time series for a particular individual to indicate when that fish was or was not present in the vicinity of an entrance receiver. Initial attempts to determine the appropriate threshold interval for coverage of the two entrances (i.e., lift or ladder), the intervals between all successive detections at those two locations were calculated by individual and foray event. A threshold interval for determining continued presence was identified as the 97th percentile of the observed set of interval durations. However, due to overlap in receiver coverage, tagged individuals had the opportunity to be detected by both the entrance receiver and the adjacent receiver above or below. This resulted in entrance detection intervals that were heavily inflated by rapid, alternating detections between sites skewing the 97th percentile threshold and overestimating the number of entrance events. To remove the impact of double coverage and alternating site detections and more accurately capture unique entrance events, an individual needed to exhibit at least three successive detections at either entrance before moving up or downstream in order to be considered an entry event. It should be noted that the receivers at the lift and

ladder entrances do not provide directional data. As a result, the reported number of "entrance events" calculated for an individual does not necessarily represent the precise number of individual entries at each structure. However, it does provide some insight into how often a tagged fish was in the vicinity of the entrance (either entering or exiting the structure).

4.5.2 Parameter Estimates for Evaluation of Upstream Passage Effectiveness

Upstream passage effectiveness for adult herring and shad at the Project fish lift and fish ladder was estimated using a standard Cormack-Jolly-Seber (CJS) model run for the set of individual encounter histories developed for each dual-tagged individual which was determined to have initiated a foray towards either passage facility. For dual-tagged individuals this approach provided a series of reach-specific "survival" or passage success estimates at the fish lift for:

- Station 10 to Stations 20/21 (tailrace to lift entrance);
- Stations 20/21 to Stations 22/23 (lift entrance to lift exit);
- Stations 22/23 to Station 08 (lift exit to E.L. Field forebay);
- Station 08 to Station 07 (E.L. Field forebay to downstream of Pawtucket Gatehouse); and
- Station 07 to Station 06 (downstream to upstream of Pawtucket Gatehouse).

This approach provided a series of reach-specific "survival" or passage success estimates at the fish ladder for:

- Station 11 to Station 12 (lower to middle of Pawtucket Dam bypassed reach);
- Station 12 to Station 13 (middle to upper Pawtucket Dam bypassed reach);
- Station 13 to Stations 14/15/16 (upper Pawtucket Dam bypassed reach to ladder entrance);
- Stations 14/15/16 to Stations 17/18 (ladder entrance to turn pool); and
- Stations 17/18 to Station 19 (ladder turn pool to exit).

Standard error and confidence bounds for each estimate were generated and those reach-specific estimates or the product of adjacent reach-specific estimates were used to evaluate upstream passage success. At the fish lift, nearfield effectiveness was estimated as the probability of a fish detected at Station 10 (E.L. Field tailrace) to move to Stations 20/21 (fish lift entrance). Internal effectiveness was estimated as the probability of a fish detected at the lift entrance to move to the lift exit (i.e., from Stations 20/21 to Stations 22/23). Total effectiveness for the Lowell fish lift was estimated as the joint probability to move from the E.L. Field tailrace to the lift exit (i.e., (Stn10 to Stn20/21)*(Stn20/21 to Stn22/23)). Additionally, the probability of successful departure from the Northern Canal (i.e., passage upstream and through the Pawtucket Gatehouse) was estimated as the probability to move from Station 07 to Station 06.

At the fish ladder, nearfield effectiveness was estimated as the probability of a fish detected at Station 13 (upper Pawtucket Dam bypassed reach) to move to Stations 14/15/16 (fish ladder entrance). Internal effectiveness was estimated as the joint probability of a fish detected at the ladder entrance to move to the ladder exit (i.e., (Stn14/15/16 to Stn17/18)*(Stn17/18 to Stn19)). Total effectiveness for the Lowell fish ladder was estimated as the joint probability to

move from the upper Pawtucket Dam bypassed reach to the ladder exit (i.e., (Stn13 to Stn14/15/16)*(Stn14/15/16 to Stn17/18)*(Stn17/18 to Stn19)).

To evaluate upstream passage effectiveness using the CJS models, a suite of candidate models were developed in Program MARK (White and Burnham 1999) based on whether survival (i.e., passage success), recapture (i.e., detection), or both vary or are constant among stations. Models developed during this study included:

- Phi(t)p(t): survival and recapture may vary between receiver stations;
- Phi(t)p(.): survival may vary between stations; recapture is constant between stations;
- Phi(.)p(t): survival is constant between stations; recapture may vary between stations;
- Phi(.)p(.): survival and recapture are constant between stations;

Where;

- Phi = probability of survival
- p = probability of detection
- (t) = parameter varies
- (.) = parameter is constant

To evaluate the fit of the CJS model, goodness of fit testing was conducted for the "starting model" (i.e., the fully parameterized model) using the function RELEASE within Program MARK. Akaike's Information Criterion (AIC) was used to rank the models as to how well they fit the observed mark-recapture data. Lower AIC values denote a more explanatory yet parsimonious fit than higher AIC values. The model with the lowest AIC value was selected for the purposes of generating passage effectiveness estimates.

4.5.3 Time to Event Analysis

4.5.3.1 Cox Proportional Hazard Model

Utilizing available methodology for quantifying fish passage performance (Castro-Santos and Perry 2012), multi-variate Cox proportional hazard models were developed to assess the impact of various operational and environmental variables on the rate of passage success. Operational variables considered as part of this analysis included:

- Bypassed reach spill flow (i.e., the sum of the Pawtucket Dam fish ladder and inflatable section overflow) (cfs);
- Spill flow (cfs);
- Merrimack River inflow (cfs); and
- Release date.

This assessment on the rate of passage success focused on upstream passage events directed towards the (1) E.L. Field fish lift, and (2) Pawtucket Dam fish ladder.

Regression models for the time to event analyses were constructed using the *coxph*() function from the package "*survival*" in R (R Core Team 2020) and were used to evaluate the rate of

passage success and identify operational hazards at sites which contained a physical barrier or a structure through which tagged individuals would have to navigate upstream of the dam through one of the two possible routes.

The Cox proportional hazard regression can be described as a hazard function to evaluate the proportionate risk at time (t) such that

$$h(t) = h_0(t) \times exp(b_1x_1 + b_2x_2 + \ldots + b_ix_i)$$

where $h(t)$ represents that hazard at a given time point which is equal to the initial or baseline hazard at time 0:00 ($h_0(t)$) multiplied by e (the base of the natural logarithm) to the power of the additive relationship between each covariate (x_i) multiplied by its associated coefficient (b_i).

From the above equation, the relative impact of an operational parameter on the rate of passage success is represented by its associated coefficient. The hazard ratio of a given operational parameter is calculated by exponentiating the coefficient of a given parameter, which represents that multiplicative impact of that parameter. It is important to note that exponentiating these coefficients makes the value relative to a value of 1 (e^0), which represents a baseline of no hazard. For example, if the hazard ratio is greater than 1, e.g., 1.5, that will be interpreted as that covariate increasing the risk of passage failure by a factor of 1.5. Alternatively stated, a hazard ratio of 1.5 indicates that the associated covariate increases the risk by 50% as it is 0.5 greater than 1. In contrast, a hazard ratio below 1, e.g., 0.75, indicates that the associated covariate reduces the risk of passage failure by a factor of 0.75, or 25%. In short, a hazard ratio >1 indicates an increase in the risk of passage failure, a hazard ratio of 1 indicates no significant directional effect on passage, and a hazard ratio <1 indicates a reduction in the risk of passage failure.

4.5.3.2 Model Evaluation and Selection

As is the case with any statistical model, the type of model selected makes inherent assumptions about the nature of the data being modelled. The primary assumption of a Cox proportional hazard model is that the hazards are proportional. However, this assumption is not always appropriate for the data. As a result, the *cox.zph()* function was used during this assessment to assess the validity of the proportional hazard assumption. This function assessed scaled Schoenfield residuals to evaluate whether Cox regression residuals of each covariate in addition to the model as a whole are independent of time. In the event that the Schoenfield residuals are not independent of time, it can be said that the assumption of proportional hazards is violated and a Cox proportional hazards model may be misrepresentative of the true relationships between the selected covariates and passage success.

4.5.3.3 Event Definition

The multi-variate Cox proportional hazard models constructed to assess the impact of various operational and environmental variables on the rate of upstream passage success for adult alewives and American shad incorporated the series of upstream foray events defined for each radio-tagged adult alosine using the methodology described above in Section 4.5.1.

4.6 Data Analysis – Downstream Passage

A complete record of all valid stationary receiver detections for each radio-tagged adult alosine was generated. The pattern and timing of detections in these individual records were reviewed, and a route of passage as well as project arrival and passage times were assigned to each radio-tagged individual. In the instance that a downstream route could not be clearly determined from the collected data, the passage event for that particular fish was classified as 'unknown'.

Where data were available, the approach duration and project residence times were calculated. Values for approach duration were calculated as the duration of time from release until detection at Station 05. Upstream project residence time was defined as the duration of time from the initial detection at Station 05 until the determined time of downstream passage. Time spent immediately upstream of the dam was further evaluated using initial detection times for adult alosines at Monitoring Stations 06 and 07 to provide an understanding of passage times associated with moving through the Pawtucket Gatehouse and entering into the Northern Canal approach to the E.L. Field powerhouse.

4.6.1 Parameter Estimates for Evaluation of Downstream Passage

Downstream passage success at the Project was estimated for adult alosines using a standard Cormack-Jolly-Seber (CJS) model run for the set of individual encounter histories (i.e., the series of detection/no detection through the linear sequence of receivers from upstream to downstream). This approach provided a series of reach-specific "survival" or passage success estimates for:

- Monitoring Station 04 to Monitoring Station 05 (i.e., lower impoundment);
- Monitoring Station 05 (i.e., upstream approach) to downstream passage;
- Downstream passage to Monitoring Station 25 (i.e., first downstream receiver);
- Monitoring Station 25 (i.e., first downstream receiver) to Monitoring Station 26 (i.e., second downstream receiver); and
- Station 26 to Lawrence.

Standard error and confidence bounds for each estimate were generated. The joint probability of three reach survival estimates (i.e., (Lowell to Station 25)*(Station 25 to Station 26)*(Station 26 to Lawrence)) was used as the estimate of total passage survival for the Project. This approach resulted in a mortality estimate that included both background mortality (i.e., natural mortality such as predation) and mortality due to Project effects in the reach extending from Lowell downstream to Lawrence. Thus, the results presented in this report reflect a minimum estimate of survival attributable to Project effects for adult alosines.

To evaluate passage success using the CJS models, a suite of candidate models were developed in Program MARK based on whether survival (i.e., passage success), recapture (i.e., detection), or both vary or are constant among stations. Models developed during this study included:

- *Phi(t)p(t)*: survival and recapture may vary between receiver stations;

- *Phi(t)p(.)*: survival may vary between stations; recapture is constant between stations;
- *Phi(.)p(t)*: survival is constant between stations; recapture may vary between stations;
- *Phi(.)p(.)*: survival and recapture are constant between stations;

Where;

- *Phi* = probability of survival
- *p* = probability of detection
- *(t)* = parameter varies
- *(.)* = parameter is constant

To evaluate the fit of the CJS model, goodness of fit testing was conducted for the "starting model" (i.e., the fully parameterized model) using the function RELEASE within Program MARK. Akaike's Information Criterion (AIC) was used to rank the models as to how well they fit the observed mark-recapture data. Lower AIC values denote a more explanatory yet parsimonious fit than higher AIC values. The model with the lowest AIC value was selected for the purposes of generating passage effectiveness estimates.

Models were prepared which evaluated downstream passage success of adult alosines at Lowell as follows:

- All adult alewives– based on detection at Station 37, Station 39 and Lawrence;
- Adult alewives originally released at Tyngsborough – based on detection at Station 25, Station 26 and Station 27 (i.e., Lawrence);
- Adult alewives originally released at Mine Falls or Pepperell – based on detection at Station 25, Station 26 and Station 27 (i.e., Lawrence);
- Route-specific adult alewives (turbine or downstream bypass) – based on detection at Station 25, Station 26 and Station 27 (i.e., Lawrence);
- All adult alewives– adjusted for median "travel time" for freshly dead adult alosines released in Lowell tailrace to reach Lawrence (i.e., test fish with downstream travel times in excess of median drift duration manually adjusted to reflect a mortality at the Project);
- All adult shad – based on detection at Station 25, Station 26 and Station 27 (i.e., Lawrence);
- Route-specific adult shad (turbine, downstream bypass, or spill) – based on detection at Station 25, Station 26 and Station 27 (i.e., Lawrence); and

- All adult shad– adjusted for median "travel time" for freshly dead adult alosines released in Lowell tailrace to reach Lawrence (i.e., test fish with downstream travel times in excess of median drift duration manually adjusted to reflect a mortality at the Project).

4.6.2 Time to Event Analysis – Downstream Passage

4.6.2.1 Cox Proportional Hazard Model

Utilizing available methodology for quantifying fish passage performance (Castro-Santos and Perry 2012), multi-variate Cox proportional hazard models were developed to assess the impact of various operational and environmental variables on the rate of downstream passage success for adult river herring and American shad. Operational variables considered as part of this analysis included:

- Merrimack River inflow (cfs);
- Spill flow (cfs);
- Downstream bypass facility flow (cfs);
- Release location (alewives only); and
- Release date.

This assessment on the rate of passage success focused on approach events at (1) the Pawtucket Gatehouse (i.e., Station 06), and (2) at the E.L. Field Powerhouse (i.e., Station 08).

Regression models for the time to event analyses were constructed using the *coxph*() function from the package "*survival*" in R (R Core Team 2020) and were used to evaluate the rate of passage success and identify operational hazards at sites which contained a physical barrier or a structure through which tagged individuals would have to navigate (i.e., the Pawtucket Gatehouse and E.L. Field Powerhouse).

The Cox proportional hazard regression can be described as a hazard function to evaluate the proportionate risk at time (t) such that

$$h(t) = h_0(t) \times exp(b_1x_1 + b_2x_2 + \ldots + b_ix_i)$$

where $h(t)$ represents that hazard at a given time point which is equal to the initial or baseline hazard at time 0:00 ($h_0(t)$) multiplied by e (the base of the natural logarithm) to the power of the additive relationship between each covariate (x_i) multiplied by its associated coefficient (b_i).

From the above equation, the relative impact of an operational parameter on the rate of passage success is represented by its associated coefficient. The hazard ratio of a given operational parameter is calculated by exponentiating the coefficient of a given parameter, which represents the multiplicative impact of that parameter. It is important to note that exponentiating these coefficients makes the value relative to a value of 1 (e^0), which represents a baseline of no hazard. For example, if the hazard ratio is greater than 1, e.g., 1.5, that will be interpreted as that covariate increasing the risk of passage failure by a factor of 1.5. Alternatively stated, a hazard ratio of 1.5 indicates that the associated covariate increases the

risk by 50% as it is 0.5 greater than 1. In contrast, a hazard ratio below 1, e.g., 0.75, indicates that the associated covariate reduces the risk of passage failure by a factor of 0.75, or 25%. In short, a hazard ratio >1 indicates an increase in the risk of passage failure, a hazard ratio of 1 indicates no significant directional effect on passage, and a hazard ratio <1 indicates a reduction in the risk of passage failure.

4.6.2.2 Model Evaluation and Selection

As is the case with any statistical model, the type of model selected makes inherent assumptions about the nature of the data being modelled. The primary assumption of a Cox proportional hazard model is that the hazards are proportional. However, this assumption is not always appropriate for the data. As a result, the *cox.zph()* function was used during this assessment to assess the validity of the proportional hazard assumption. This function assessed scaled Schoenfield residuals to evaluate whether Cox regression residuals of each covariate in addition to the model as a whole are independent of time. In the event that the Schoenfield residuals are not independent of time, it can be said that the assumption of proportional hazards is violated and a Cox proportional hazards model may be misrepresentative of the true relationships between the selected covariates and passage success.

4.6.2.3 Event Definition

To evaluate the impact of operational parameters on passage success, instances of passage success and failure required definition and represent the 'events' (or passage attempts) in this analysis. Ostensibly, the transmitters deployed during this study should transmit a signal that when within range of a particular receiver will be detected every 2.0 seconds. However, various sources of outside noise or areas of poor coverage due to structures, etc. introduce variation into the frequency of detection for a unique transmitters signals. Given that different site locations and receiver types are subject to varying degrees of ambient noise, the duration between successive detections was calculated for each tagged individual at each receiver location. A threshold interval for determining continued presence of a transmitter within the detection zone of a specific receiver was identified as the 95th percentile of the observed set of interval durations. This value was calculated at 3.42 minutes for Station 6 and 5.64 minutes for Station 29. These two threshold values were then used to delineate when each event was started and completed for a tagged individual. The departure of a radio-tagged individual from the detection zone of a particular receiver was determined when the time interval between successive detections exceeded the specific threshold interval for that zone. In addition, if an individual was observed having left the field of detection and was subsequently detected at another site before returning, this was considered as an event regardless of whether or not the fish returned to the field of detection within the limits of the 95th percentile threshold.

From this, a passage failure event (assigned a value of 0) was defined as any duration where all detections lay within the 95th percentile of durations for all individuals at that site. Passage failure represents events in which a tagged individual enters the field of detection at a given site without passing to the next site (i.e., moving downstream) in the system. A passage success event (assigned a status of 1) was defined using the final instance of detection for a tagged individual at a singular site where that tagged individual was next detected at a downstream

receiver (i.e., successfully passed). Passage success/failure (1/0) was used as the status coinciding with time in the Cox proportional hazard models. After defining passage events for every individual, the time duration for the regression was defined as the duration from one event to the next.

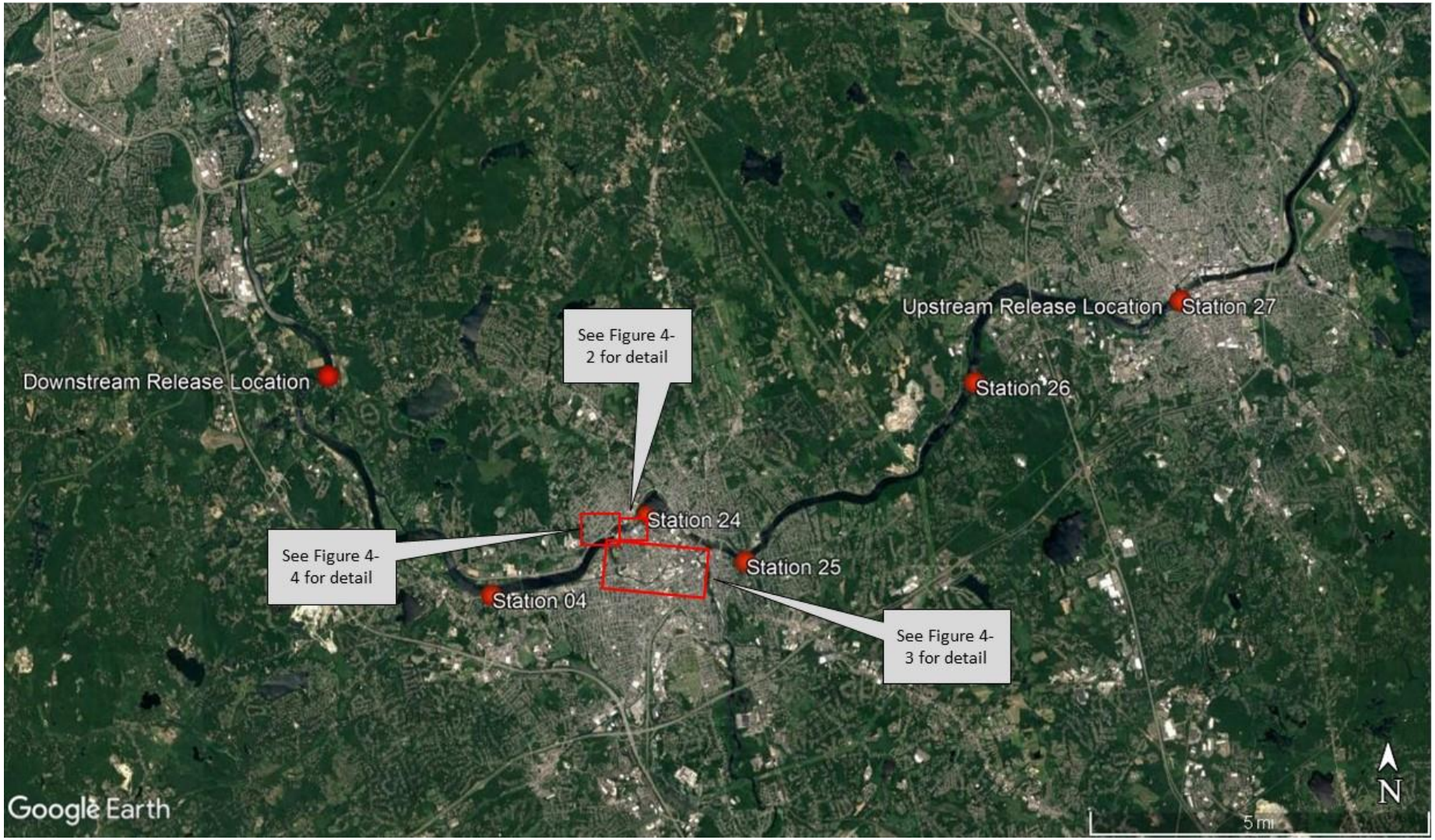

Figure 4–1. Locations of remote stationary radio-telemetry receivers installed during the 2020 adult alosine passage assessment at Lowell.

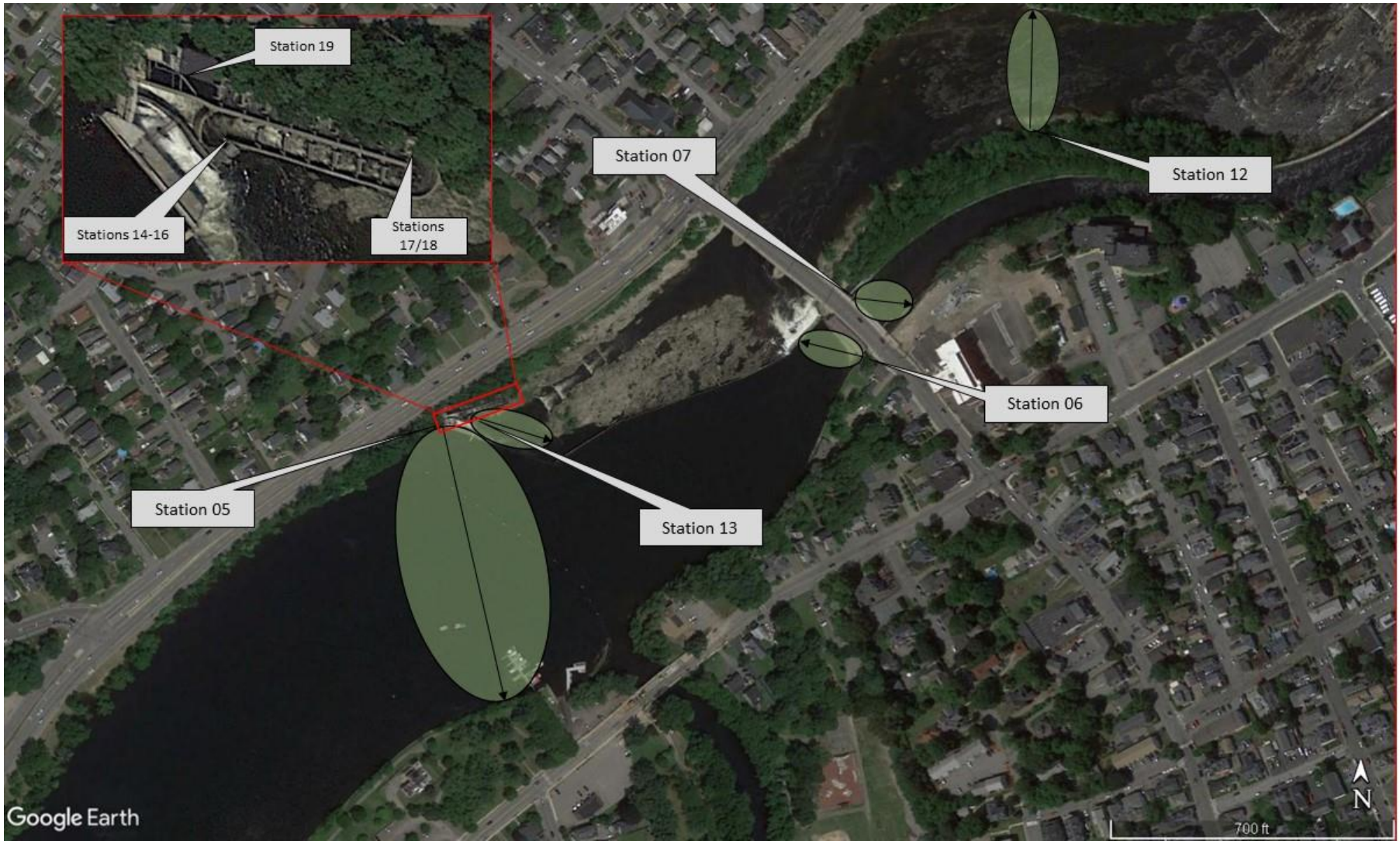

Figure 4–2. Locations and approximate detection areas for stationary radio-telemetry receivers installed upstream of Pawtucket Dam, fish ladder and Northern Gatehouse during the 2020 adult alosine passage assessment at Lowell.

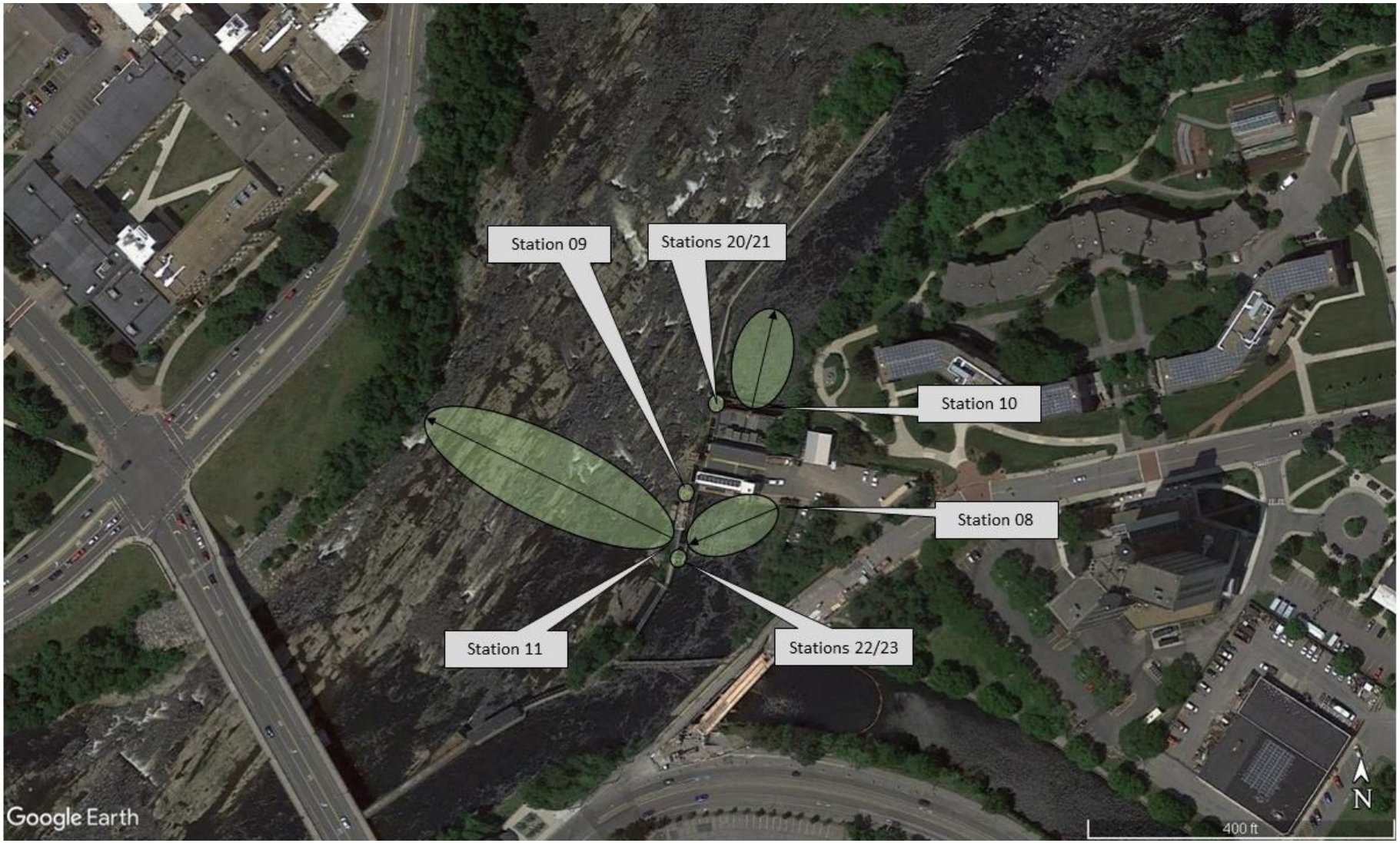

Figure 4–3. Locations and approximate detection areas for stationary radio-telemetry receivers installed in the vicinity of the E.L. Field Powerhouse during the 2020 adult alosine passage assessment at Lowell.

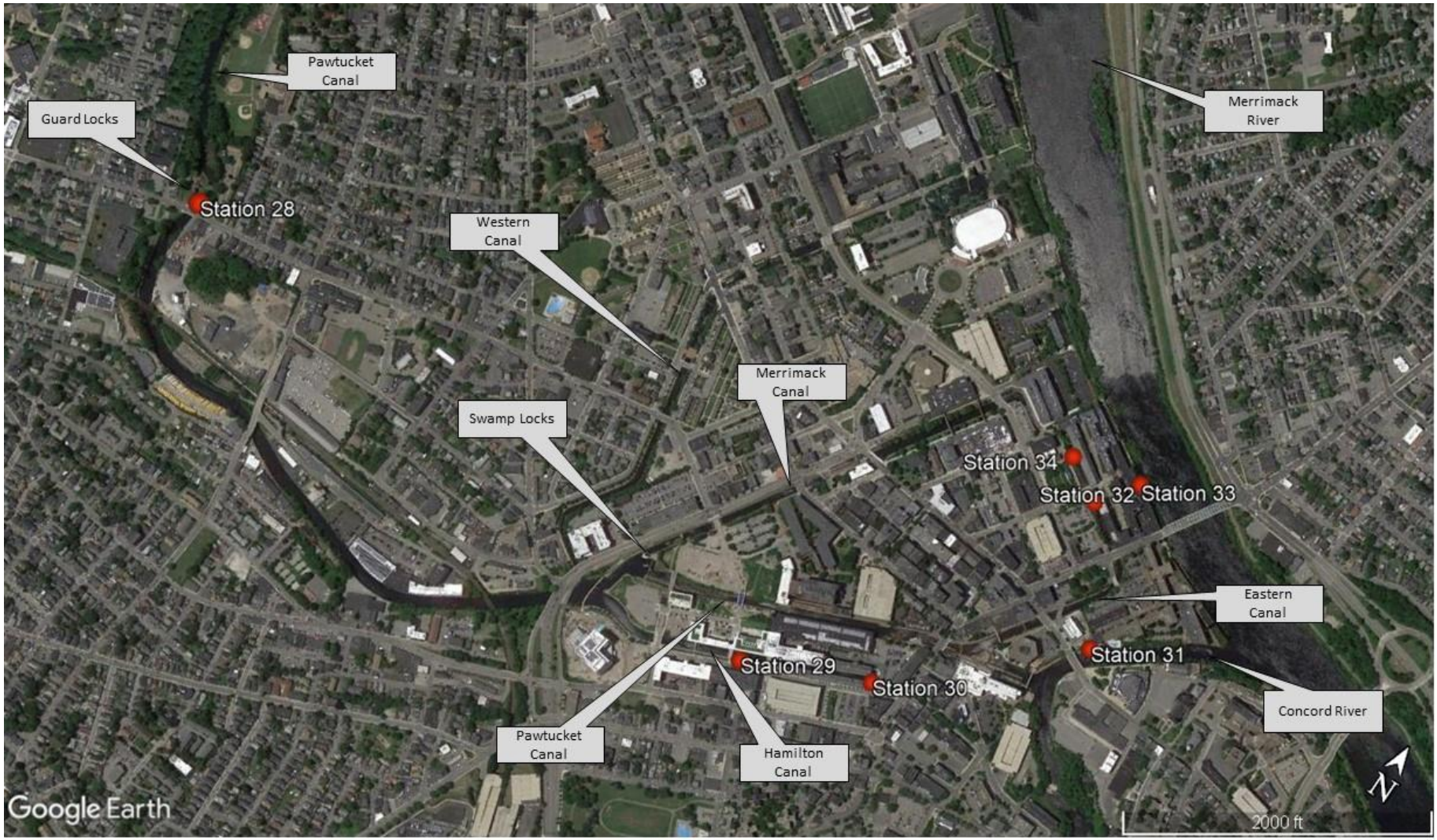

Figure 4–4. Locations and approximate detection areas for stationary radio-telemetry receivers installed within the downtown canal system during the 2020 adult alosine passage assessment at Lowell.

5 Results

5.1 Merrimack River Conditions and Lowell Project Operations

Daily water temperature at Lowell ranged from 8.0-21.1 °C over the course of the monitoring period. Figure 5-1 presents the Merrimack River inflow as recorded at the Lowell Project for the period of time from the first release of tagged adult alosines at Lawrence on May 7 until the end of the monitoring period on June 30, 2020. Merrimack River flow at Lowell ranged between 1,150 and 13,200 cfs during the nearly two month spring study period. Figure 5-2 presents the monthly flow duration curves prepared for the Lowell Project during the development of the Preliminary Application Document. The median flow condition at the Project is approximately 8,900 cfs during May and 4,900 cfs during June. Merrimack River conditions have a ~72% probability during May and a ~35% probability during June to exceed the ~6,600 cfs capacity of the E.L. Field powerhouse.

Table 5-1 summarizes the percentage of inflow records from the 2019 study period categorized by volume (to the nearest 1,000 cfs) as well as the percentage of time that each volume category is historically exceeded[4]. To help characterize the 2020 passage season, monthly exceedance probabilities less than 0.35 were classified as "high" flow conditions, 0.35 to 0.65 were classified as "normal" flow conditions, and greater than 0.65 were classified as "low" flow conditions. Inflows at the Project for the period May 7 through 31 were representative of high flow conditions (i.e., those with a probability of exceedance of less than 0.35) for 6% of the period, normal flow conditions (i.e., those with a probability of exceedance of 0.35-0.65) for 59% of the time and low flow conditions (i.e., those with a probability of exceedance of greater than 0.65) for 35% of the time. For the month of June, inflows were representative of normal flow conditions 7% of the time and low flow conditions 93% of the time.

Flow duration information for the months of May and June (combined) is presented in Figure 5-3. The median flow condition during the two month period is near 6,700 cfs. When characterized using the flow condition criteria above, inflows at the Project for the period May 7 through June 30, 2020 were representative of high flow conditions (i.e., those with a probability of exceedance of less than 0.35) for 7% of the period, normal flow conditions (i.e., those with a probability of exceedance of 0.35-0.65) for 36% of the time and low flow conditions (i.e., those with a probability of exceedance of greater than 0.65) for 57% of the time (Table 5-1).

Figure 5-4 summarizes the allocation of water among the E.L. Field powerhouse, bypassed reach, E.L. Field fish passage facility, Pawtucket Dam fish ladder and the downtown canal system at Lowell. Turbine units were in operation at the E.L. Field powerhouse for the duration of the study period with a brief exception on June 11. The E.L. Field fish passage facilities were

[4] Estimates of monthly exceedance estimated from monthly flow duration curves provided in Appendix H of the PAD.

operated throughout the study period, passing approximately 100 cfs between the hours of approximately 0600 to 1500 and 132 cfs from approximately 1500 to 0600. Two major spill events, associated with increases in river flows, occurred during the early portion of the monitoring period. Peaks for these two high flow events occurred on May 7 and May 18. Outside of those two periods of increased discharge, flows through the bypassed reach during the 2020 monitoring period were comprised of the ~500 cfs of water constituting the attraction and conveyance flow associated with the Pawtucket Dam fish ladder as well as incidental spill flow passing over the spillway. Incidental spill flows in excess of 500 cfs were present until May 21 after which incidental spill was reduced to near zero through the month of June (Figure 5-4).

Flows to the downstream canal system represented between 27-26% of the 2,000 cfs capacity during May and 27% of the 2,000 cfs capacity during June. Due to overriding safety concerns, Boott ceased operation of the turbine units within the downtown canal system prior to the study period. To the extent possible, Boott's operations staff attempted to operate the canal system as if there were canal units available, by opening gates when river flows exceeded the hydraulic capacity of the E.L. Field turbines (6,600 cfs). As a result, flows through the downtown canal system were limited to passage via open gates. Manual gate manipulations during the study period were limited to two dates. A summary of the downtown canal gate operations and discharge is provided in Table 5-2.

Hourly operations records are provided in Appendix C and include values for forebay elevation, tailrace elevation, inflow, E.L. Field turbine discharge, downstream bypass discharge, upstream fishway flow, downtown canal flow, and spill flow.

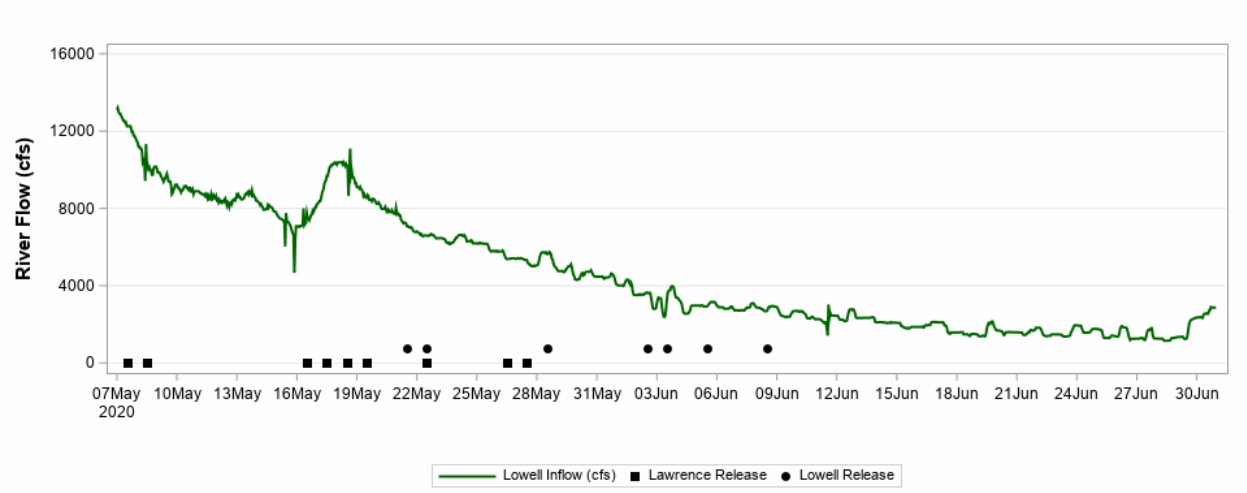

Figure 5–1. Merrimack River flow at Lowell for the period May 7 to June 30, 2020.

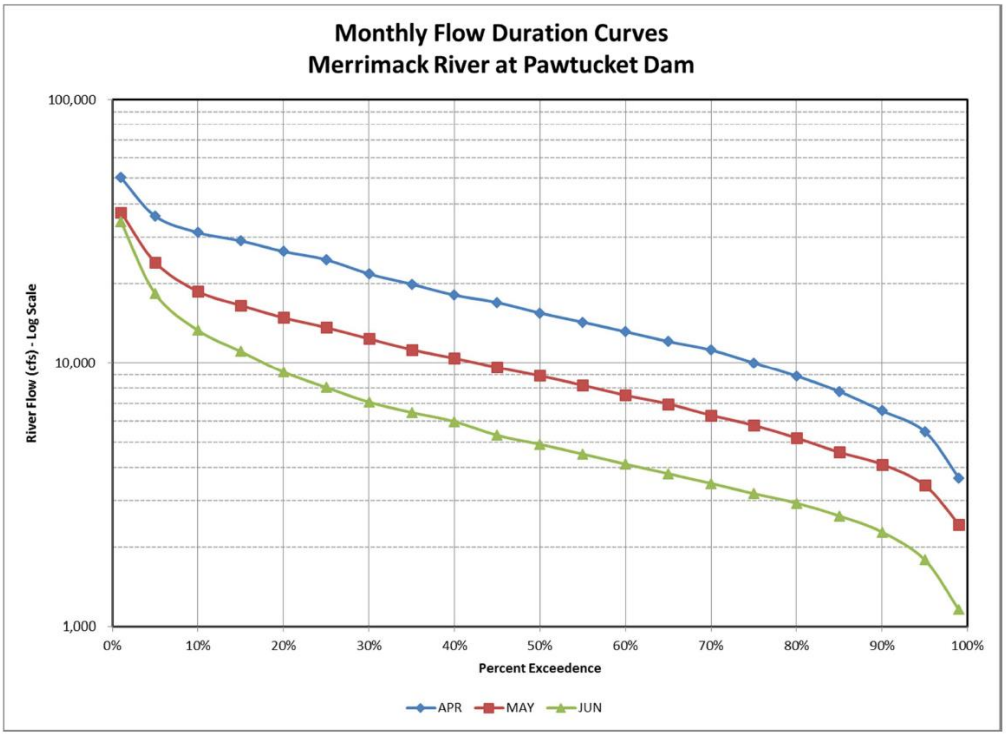

Figure 5–2. Flow duration curves for the months of April, May, and June at the Lowell hydroelectric project.

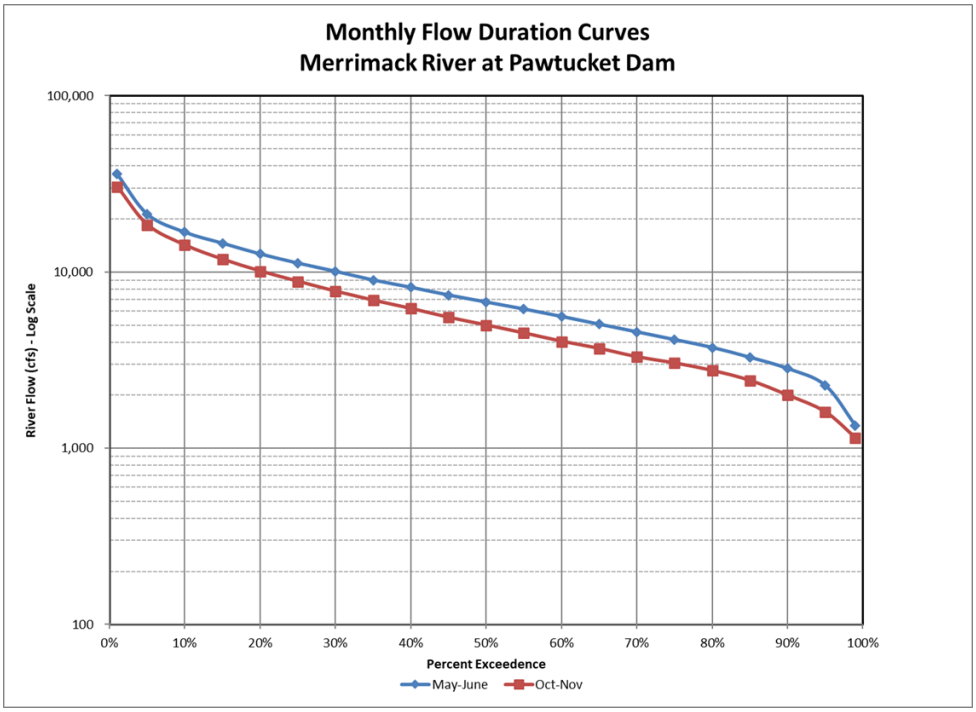

Figure 5–3. Flow duration curves for the two month period of October-November at the Lowell hydroelectric project.

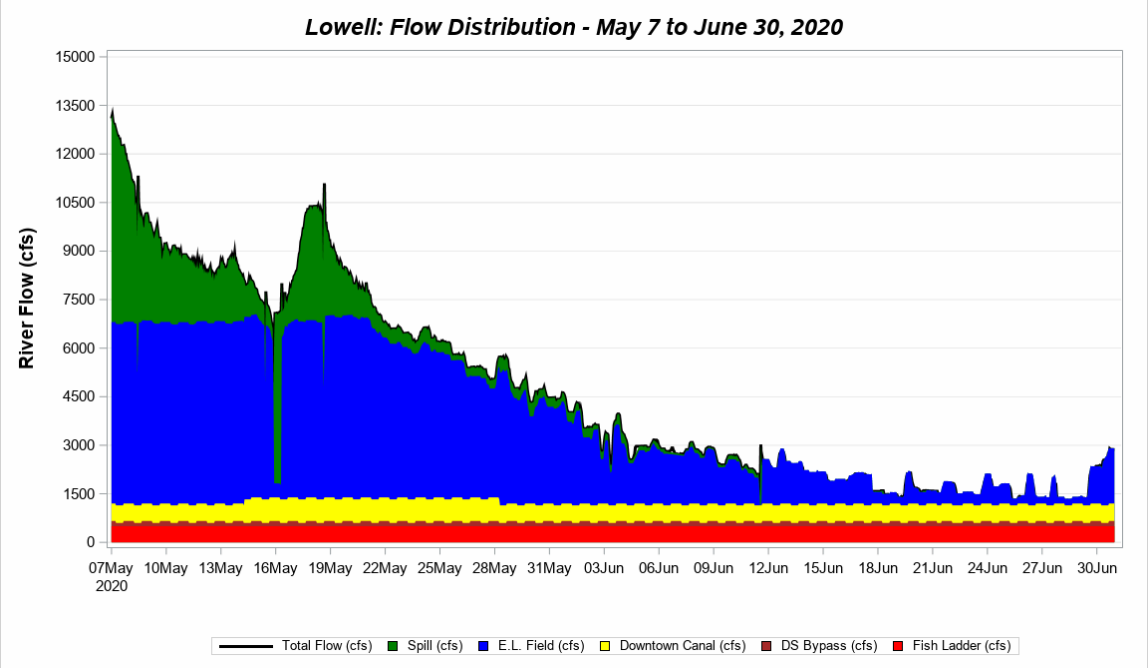

Figure 5–4. Total, spill, E.L. Field, fish ladder, downstream bypass and downtown canal system flow (cfs) for the period May 7 to June 30, 2020.

Table 5–1. Frequency of occurrence of river inflow at Lowell (to nearest 1,000 cfs) during 2020 adult alosine passage assessment and corresponding percentage of time flows are historically exceeded.

River Flow (nearest 1k)	May 7-31, 2020		June 1-30, 2020		May 7-June 30, 2020	
	Percentage of Month	Percentage of Month Historically Exceeded	Percentage of Month	Percentage of Month Historically Exceeded	Percentage of Period	Percentage of Period Historically Exceeded
1000	0.0%	100	20.6%	99	11.2%	99
2000	0.0%	100	46.4%	94	25.3%	96
3000	0.0%	96	26.0%	80	14.2%	88
4000	5.2%	90	7.1%	62	6.2%	76
5000	15.0%	82	-	-	6.8%	65
6000	14.8%	74	-	-	6.7%	56
7000	13.7%	65	-	-	6.2%	48
8000	18.5%	56	-	-	8.4%	41
9000	17.7%	48	-	-	8.0%	35
10000	9.5%	42	-	-	4.3%	30
11000	1.7%	9	-	-	0.8%	6
12000	2.3%	6	-	-	1.1%	LT5
13000	1.7%	LT 5	-	-	0.8%	LT5

Table 5–2. Summary of downtown canal gate settings and estimated discharge values during the spring 2020 adult alosine telemetry study at Lowell.

Date	Gate	Setting	Estimated Discharge (cfs)
7-May	Guard Locks	open	542
	Swamp Locks Deep Gate	open	542
	Hamilton Wasteway	closed	0
	Lower Locks Gates	open	542
	Boott Gate	closed	0
14-May	Guard Locks	open	729
	Swamp Locks Deep Gate	open	0
	Hamilton Wasteway	open	729
	Lower Locks Gates	open	542
	Boott Gate	open	190
28-May	Guard Locks	open	542
	Swamp Locks Deep Gate	open	542
	Hamilton Wasteway	closed	0
	Lower Locks Gates	open	542
	Boott Gate	closed	0

5.2 Monitoring Station Functionality

Radio-tagged adult alosines were released into the Merrimack River beginning in early May, and the RSP called for continuous monitoring at each stationary receiver location through the end of June, 2020. An overview of system continuity for stationary receivers along the mainstem of the Merrimack and at the E.L. Field Powerhouse is provided in Figure 5-5, for receivers associated with the fish lift and ladder is provided in Figure 5-6, and for receivers positioned at locations in the downtown power canal in Figure 5-7. The majority of the radio-telemetry monitoring stations installed to evaluate passage at Lowell during the spring study operated without issue for the full period.

Interruptions in continuous coverage were observed at two locations among the mainstem and E.L. Field receivers. Station 05 (approach area immediately upstream of Pawtucket Dam) was offline from 1000 on June 4 to 1000 on June 8 due to an internal error in the receiver. To adjust for this outage detection data recorded at Station 06 was reviewed and was used as an approximate for “first detection” of outmigrants approaching the Pawtucket Dam during this period. Station 24 (convergence area of the tailrace and bypassed reach) was offline for three periods during the latter part of May (1500 on May 19 – 1100 on May 20, 1200 on May 20 – 0900 on May 22, and 1300 on May 26 – 1000 on May 27). All components at Station 24 were evaluated after the second interruption (with no obvious cause). The receiver was replaced with a new unit on May 27 and operated without issue for the remainder of the study. To adjust for this outage, detection data from Stations 10 and 11 were used as a surrogate to represent “first detection” downstream of the Project for dual-tagged fish migrating upstream.

Neither outage had an impact on the ability to estimate effectiveness of the upstream fishway facilities or downstream passage survival for adult alosines.

All radio and PIT-readers installed in the E.L. Field fish lift and Pawtucket Dam fish ladder operated without issue for the duration of the study. Over the course of the study there were several minor outages at receiver stations related to the generating units within the downtown canal system. As there was no generation at any of the downtown canal turbine units over the course of the study the overall impact of these short duration outages had no impact on study results.

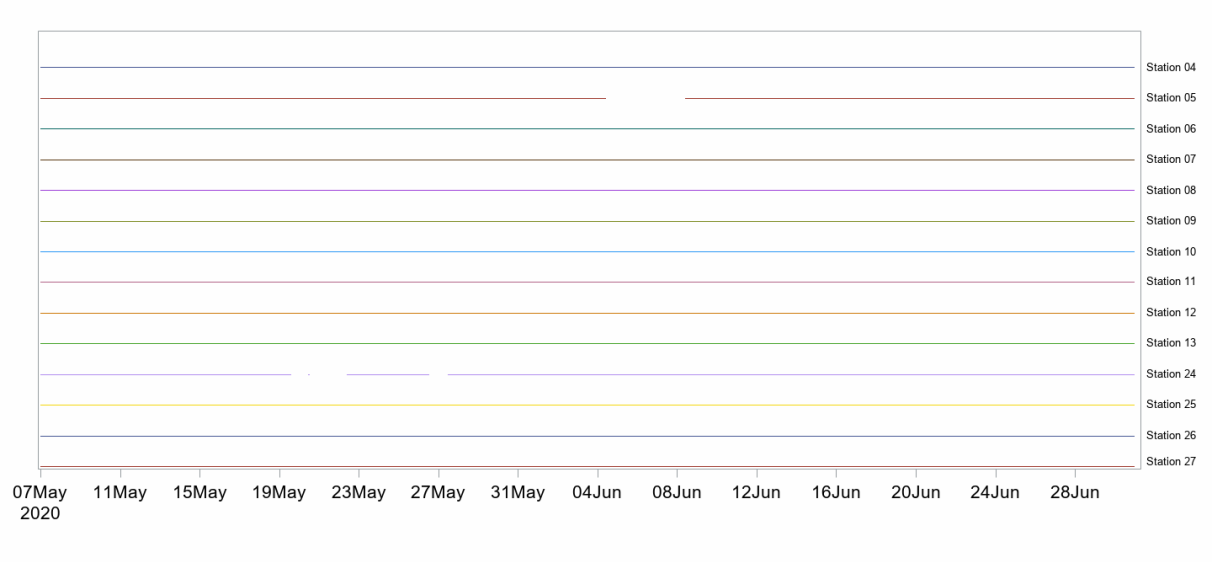

Figure 5–5. Operational coverage for telemetry receivers along the mainstem Merrimack River and vicinity of the E.L. Field Powerhouse during the adult alosine passage assessment, May 7 to June 30, 2020.

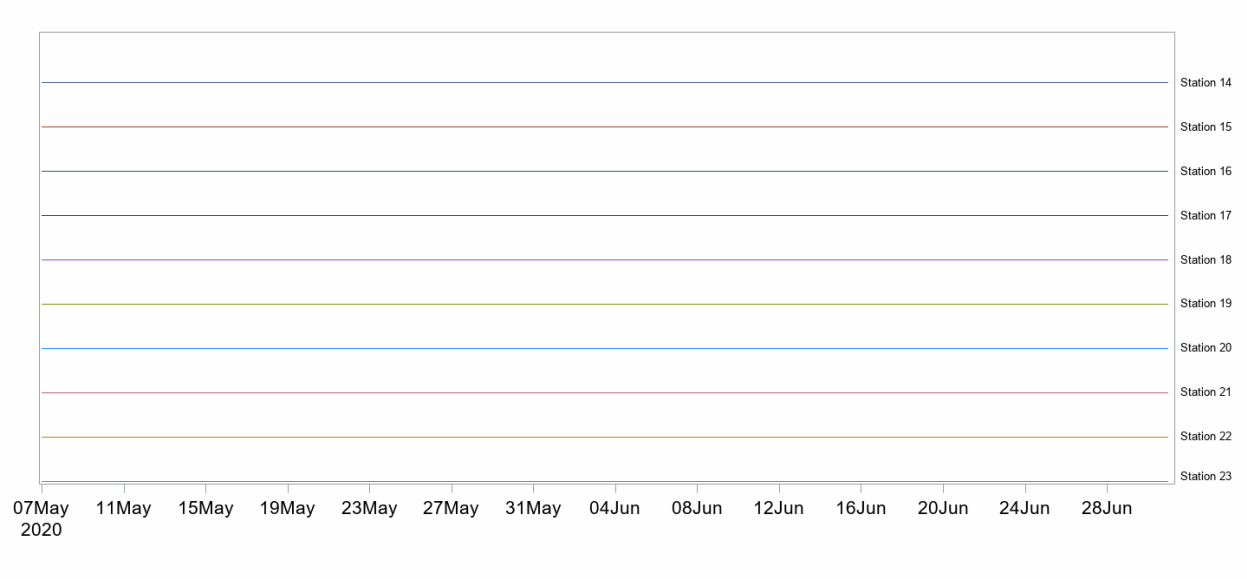

Figure 5–6. Operational coverage for telemetry receivers at the E.L. Field fish lift and Pawtucket Dam fish ladder during the adult alosine passage assessment, May 7 to June 30, 2020.

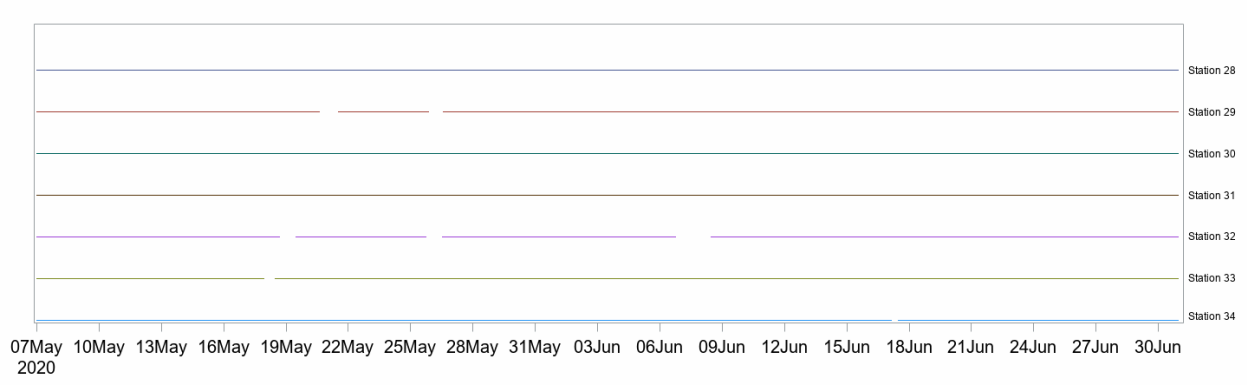

Figure 5–7. Operational coverage for telemetry receivers within the downtown canal system at the Lowell Project during the adult alosine passage assessment, May 7 to June 30, 2020.

5.3 Downstream Drift Assessment

Freshly dead, radio-tagged adult alewives (n = 10) and American shad (n =10) were released directly into the discharge of an active turbine unit at the Lowell Project during the 2020 downstream passage assessment. A total of two individuals were released in the tailrace on each date when 20 live radio-tagged adult alewives or American shad were released upstream of the Project. Table 5-3 provides a summary of the body size, tag information, release schedule and flow conditions at the time of release. These individuals were radio-tagged using

a unique frequency (149.360 MHz) and a set of independent receivers were positioned at Monitoring Stations 25, 26, and 27 to scan for the approach and passage of these fish. There were no detections for any of the 20 drift individuals at Stations 25 (2.1 miles), 26 (6.0 miles) or 27 (10.75 miles) downstream of the Lowell tailrace.

Table 5–3. Summary of tagging and release information for the downstream drift assessment of adult alewives and American shad released in the Lowell tailrace during the downstream passage assessment, May 7 to June 30, 2020.

Species	Release Date	River Condition (cfs)		Frequency (ID)	Total Length (mm)
		Inflow	ELF Discharge		
River Herring	21-May	7027	5127	149.360(10)	294
				149.360(11)	303
				149.360(12)	313
				149.360(13)	328
				149.360(14)	305
				149.360(15)	306
	22-May	6594	4808	149.360(16)	283
				149.360(17)	250
	28-May	5730	4188	149.360(18)	300
				149.360(19)	296
Shad	3-Jun	3278	2069	149.360(190)	452
				149.360(191)	475
				149.360(192)	438
				149.360(193)	472
				149.360(194)	438
	5-Jun	2927	1699	149.360(30)	464
				149.360(31)	499
				149.360(32)	451
				149.360(33)	487
				149.360(34)	506

5.4 Upstream Passage Effectiveness – Adult Alewives

A total of 354 adult alewives were tagged following collection at the Lawrence fish lift during May 2020 and were released for the purposes of evaluating upstream passage at Lowell (Table 5-4). Tagging was conducted over a total of six dates starting on May 7 and ending on May 19. Annual returns for river herring at Lawrence commenced on April 22 and ended on June 15 with significant daily peaks on May 17 and May 28 (Figure 5-8). Looking retrospectively, tagging dates carried out during the 2020 study were conducted during the 5th to 40th percentiles of the annual return. Of the fish tagged, 150 individuals carried both a PIT and radio-transmitter[5] and 204 carried only a PIT tag. Adult alewives tagged for evaluation of upstream passage at Lowell had a sex ratio of nearly 1:1 (51% male, 48% female; 1% undetermined). Total length of individuals tagged ranged from 260-335 mm (mean = 302 mm). A full listing of tagged individuals released at Lawrence during the spring of 2020 is provided in Appendix A.

5.4.1 Post-Release Movements

Adult alewives released downstream of Lowell were free to (1) move upstream and enter into the monitored section of the Merrimack River immediately downstream of the Project, (2) utilize the section of the Merrimack River between Lawrence and Lowell, or (3) fail to move upstream and depart the study reach to downstream of Lawrence. Each dual-tagged individual was classified into a unique post-release movement category based on their pattern of detections among the various monitoring stations. Individuals that were determined to have moved upstream to the project (based on detection at Monitoring Station 24) were classified as "Approached". Individuals that were limited to detections at the monitoring stations downstream of Lowell (i.e., Stations 25 and 26) were classified as "Lower River." Individuals that moved downstream immediately following release (as indicated by a lack of detections at any receivers upstream of Station 27 were classified as "Fallback").

As presented in Table 5-5, the majority of dual-tagged adult alewives were determined to have successfully moved upstream and into the area immediately downstream of the Lowell Project following their release. Of the 150 dual-tagged alewives released, 85% (128 of the 150) were determined to have approached Lowell. A total of 16 dual-tagged adult alewives (11% of all dual-tagged individuals) partially ascended the reach between Lowell and Lawrence but failed to approach the Project. Of those individuals, 50% ascended as far upstream as Station 26 and 50% ascended as far upstream as Station 25. Six dual-tagged individuals were undetected at any of the monitoring stations upstream of Lawrence following their release into the river.

5.4.2 Approach Duration and Time at Large

Adult alewives dual-tagged and released at Lawrence approached Lowell over a range of dates from May 7 (i.e., the first date of downstream releases) until May 23 (Figure 5-9). The median approach duration for dual-tagged adult alewives (i.e., the duration of time from release at Lawrence until initial detection at Station 24) was 19.6 hours (range = 7.7 hours to 11.9 days;

[5] All alewives that were tagged with a radio-tag and a PIT transmitter are referred to as "dual-tagged" in this report.

Table 5-6). When examined by release date, the median approach duration to Lowell was lowest for adult alewives released on May 16 and 17 and highest for those released on May 7 and 8 (Figure 5-10). The minimum, maximum, and quartile transit times through defined sections of the Merrimack River between the release location at Lawrence and the approach receiver (i.e., Station 24) at Lowell are provided in Table 5-7. Transit times calculated using the first detections for each dual-tagged fish at Stations 26, 25, and 24 resulted in median swim times of 5.9 hours from Lawrence to Station 26 (approximately 4.75 miles), 3.5 hours from Station 26 to Station 25 (approximately 3.9 miles) and 2.9 hours from Station 25 to Station 24 (approximately 2.0 miles). Table 5-8 provides the minimum, maximum, and quartile transit times through defined sections of the Merrimack River between the release location at Lawrence and Station 24 as a rate (i.e., miles per hour (mph)).

The duration of time at large following the initial detection at Station 24 for each dual-tagged individual ranged from 1.2 hours to 18.6 days (median = 1.9 days; Table 5-9). For an individual herring, the calculated value for time at large represented time from initial Station 24 detection until either (1) upstream passage out of the study area at the E.L. Field fish lift or the Pawtucket Dam fish ladder, or (2) the final movement downstream and away from the project area. When examined by eventual passage fate (i.e., passed or failed), the median duration of time at large for adult herring successfully passing upstream was less than one half that observed for adult herring which failed to pass upstream (1.7 days vs. 3.9 days, respectively).

5.4.3 Foray and Entrance Events

The full time series of recorded detections for each dual-tagged adult alewife was reviewed and each unique foray upstream towards either the E.L. Field fish lift or Pawtucket Dam fish ladder was identified based on the approach described in Section 4.5. Of the 128 dual-tagged alewives which were determined to have approached Lowell (based on detection at a minimum of Station 24) 95% (121 of the 128) made at least one upstream foray towards either the fish lift or ladder during their time at large in the Project area. Of those dual-tagged alewives, 82 individuals made one or more foray event towards the fish lift and 86 individuals made one or more foray towards the fish ladder. Fifty of the 128 dual-tagged adult alewives were determined to have made at least one foray in the direction of both the fish lift and fish ladder during their time at large in the project area.

5.4.3.1 E.L. Field Fish Lift

The 82 dual-tagged adult alewives determined to have approached the E.L. Field fish lift produced a combined total of 134 unique foray events. When considered on an individual basis, the number of unique lift forays ranged between one and five (mean = 1.6 events). Figure 5-11 summarizes the upstream magnitude for the full set of observed foray events at the fish lift for dual-tagged adult alewives. Approximately 66% of the set of upstream foray events towards the E.L. Field fish lift resulted in detection of the dual-tagged alewife at the lift entrance. Approximately 23% of upstream foray events resulted in dual-tagged adult alewives reaching the downstream side of the Pawtucket Gatehouse. Finally, 17% of the total number of 134 upstream forays in the direction of the E.L. Field fish lift resulting in dual-tagged alewives reached the upstream side of the Pawtucket Gatehouse.

Table 5-10 provides the minimum, maximum and quartile transit times for dual-tagged adult alewives moving upstream during fish lift forays. Upon entering the tailrace detection zone, the median duration of time to locate the fish lift entrance was 0.7 hours (range <0.1 hours to 13.4 hours). The median time to move from the entrance to the exit of the upstream fish lift was 10.4 hours and may be a function of a number of influences including timing of the lift schedule. Upon entering the E.L. Field Power Canal dual-tagged adult alewives proceed quickly upstream to the downstream face of the Pawtucket Gatehouse (median duration = 0.7 hours). The median duration of time for dual-tagged adult alewives to pass the Pawtucket Gatehouse was 25.7 hours (range 0.8 hours to 5.0 days).

Dual-tagged adult alewives were free to be detected at the E.L. Field fish lift entrance multiple times within a single foray event. As noted earlier, approximately 66% of upstream foray events resulted in detection at the fish lift entrance on at least one occasion. The total number of these entrance events were defined for each unique foray event and ranged from one to five (mean = 1.6; Table 5-11). Fish lift entrances were recorded over a range of dates from May 8 through May 30, 2020 (Figure 5-12). The percentage of entrance events peaked during mid-May (approximately May 17 through May 21). The diel distribution of entrance events at the E.L. Field fish lift is presented in Figure 5-13 and indicated dual-tagged alewives initially approached the lift entrance throughout the day with peaks during morning, midday, and late afternoon.

5.4.3.2 Pawtucket Dam Fish Ladder

The 86 dual-tagged adult alewives determined to have approached the Pawtucket Dam fish ladder produced a combined total of 105 unique foray events. When considered on an individual basis, the number of unique fish ladder forays ranged between one and three (mean = 1.2 events). Figure 5-14 summarizes the upstream magnitude for the full set of observed foray events at the fish ladder for dual-tagged adult alewives. The majority of upstream foray events terminated between the lower and upper bypassed reach detection locations (i.e., Stations 11 and 13) with approximately 55% of upstream foray events resulting in detection of the dual-tagged alewife at the upstream end of the bypassed reach. Upon reaching the upstream end of the bypassed reach, the rate of foray failure decreased. Finally, 41% of the total number of 105 upstream forays in the direction of the Pawtucket Dam fish ladder resulted in dual-tagged alewives reaching the ladder exit.

Table 5-12 provides the minimum, maximum and quartile transit times for dual-tagged adult alewives moving upstream during fish ladder forays. Following detection at the lower bypassed reach receiver, the median duration of time to ascend the bypassed reach was 23.6 hours (range = 2.7 hours to 11.7 days). Upon detection at the upper end of the bypassed reach the median duration of time to locate the fish lift entrance was 4.0 hours. Time from initial detection at the fish ladder entrance until exit at the top of the structure ranged from 0.8 hours to 2.0 days (median = 2.9 hours). The median time for dual-tagged adult alewives to transit the lower leg of the fish ladder was 2.1 hours and to transit the upper leg of the fish ladder was 1.1 hours.

Quartile ranges (i.e., P25 to P75) for the mean discharge through the bypass reach during each of the 105 adult alewife foray events were determined using hourly operations data provided by Boott. When examined by upstream magnitude, these ranges overlapped for conditions present for foray events reaching the lower bypassed reach receiver (1,944-3,372 cfs), the middle bypass receiver (954-2,563 cfs), and the upper bypass receiver (2,020-2,176 cfs). The quartile range of mean discharge through the bypass reach for adult herring which successfully passed upstream via the Pawtucket Dam fish ladder was 1,509-3-251 cfs (median = 2,478 cfs).

Dual-tagged adult alewives were free to be detected at the Pawtucket Dam fish ladder entrance multiple times within a single foray event. Approximately 51% of upstream foray events resulted in detection at the fish ladder entrance on at least one occasion. The total number of these entrance events were defined for each unique foray event and ranged from one to three (mean = 1.2; Table 5-13). The average number of entrance detections during a single foray was higher for the earlier release groups of dual-tagged adult alewives. Fish ladder entrances for dual-tagged adult alewives were recorded over a range of dates from May 7 through May 23, 2020 (Figure 5-15). Similar to the fish lift, the percentage of entrance events peaked during mid-May (approximately May 17 through May 21). The diel distribution of entrance events at the Pawtucket Dam fish ladder is presented in Figure 5-16 and indicated dual-tagged alewives initially approached the ladder entrance during the mid-morning, through afternoon hours.

5.4.4 PIT-Tagged Individuals

5.4.4.1 E.L. Field Fish Lift

Limitations detailed for the installation of Monitoring Station 20 in Section 4.2 precluded effective monitoring of PIT-tagged fish at that location. As a result, detection potential for the 204 PIT-tagged adult alewives at the E.L. Field fish lift was limited to the upper exit flume (Stations 22 and 23). PIT-tagged adult alewives were detected at the upper exit flume over a range of dates from May 10 through June 14, 2020 (Figure 5-17). The majority of PIT detections for tagged adult alewives at the lift entrance occurred between 0800 and 1800 with a pronounced peak at 1500 (Figure 5-18). Of the possible 204 PIT-tagged adult alewives, 88 (43%) were determined to have been present in the E.L. Field fish lift exit flume over the course of the study (Table 5-14).

5.4.4.2 Pawtucket Dam Fish Ladder

A total of 204 PIT-tagged adult alewives were released at Lawrence (Table 5-4) and 101 (49.5%) of those individuals were detected at the PIT reader stations installed within the Pawtucket Dam fish ladder (Table 5-15). PIT-tagged adult alewives were detected at the entrance to the Pawtucket Dam fish ladder over a range of dates from May 9 to May 27, 2020 (Figure 5-19). The majority of PIT detections for tagged adult alewives at the fish ladder entrance occurred between 0900 and 1800 (Figure 5-20). Of the 101 PIT-tagged adult alewives detected at the entrance reader, 94% (95 of the 101) were subsequently detected at the turn pool reader and 68% of those (65 of the 95) were subsequently detected at the exit reader. Table 5-16 provides the transit durations for PIT-tagged adult alewives based on initial detections at the entrance, turn pool and exit readers. The median duration to transit the lower leg of the fish ladder was 1.6 hours and to transit the upper leg of the fish ladder was 1.2 hours. The median duration for

a PIT-tagged alewife to move from the Pawtucket Dam fish ladder entrance to the exit was 3.8 hours.

5.4.5 Upstream Passage Effectiveness – Lowell Fish Lift

The CJS model *Phi*(t)*p*(t) provided the best fit for the observed mark-recapture data associated with upstream movements of dual-tagged adult alewives approaching the E.L. Field fish lift (Table 5-17). Specific passage success estimates at Lowell ranged between 0.527- 1.0 among discretely monitored river sections from the tailrace to the point upstream of the Pawtucket Gatehouse (Table 5-18). The detection efficiency for receivers associated with upstream passage of dual-tagged adult alewives at the fish lift ranged from 0.724-1.0 (Table 5-19). The lowest detection value was associated with the two PIT readers positioned in the exit flume of the upstream fishway.

As defined in Section 4.5.2, the specific passage success estimates obtained from the CJS model for dual-tagged adult alewives approaching the E.L. field fish lift were used to estimate (1) near field attraction, (2) fish lift internal efficiency, and (3) overall fish lift effectiveness. As stated earlier the nearfield attraction rate is the probability of an adult herring to move from the nearfield/tailrace region into the downstream entrance of the lift, the internal efficiency is the probability of an adult herring to move from the lift entrance to the lift exit and the overall efficiency is the probability of an adult herring to move from the tailrace/nearfield region to the upstream exit from the fish lift. Upstream passage effectiveness estimates for dual-tagged adult alewives at the Lowell fish lift during 2020 are as follows:

- Nearfield attraction effectiveness:
  - 83.3% (75% CI = 77.4-88.0%)
- Fish lift internal efficiency:
  - 52.7% (75% CI = 45.0-60.3%)
- Overall fish lift effectiveness:
  - 43.9% (75% CI = 39.3-51.4%)

5.4.6 Upstream Passage Effectiveness – Lowell Fish Ladder

The CJS model *Phi*(t)*p*(t) provided the best fit for the observed mark-recapture data associated with upstream movements of dual-tagged adult alewives approaching the Pawtucket Dam fish ladder (Table 5-20). Specific passage success estimates at Lowell ranged between 0.722-0.930 among discretely monitored river sections from Station 11 in the lower bypassed reach to the exit of the fish ladder upstream of the Pawtucket Dam (Table 5-21). The detection efficiency for receivers associated with upstream passage of dual-tagged adult alewives at the fish ladder ranged from 0.905-1.0 (Table 5-22).

As defined in Section 4.5.2, the specific passage success estimates obtained from the CJS model for dual-tagged adult alewives approaching the Pawtucket Dam fish ladder were used to estimate (1) near field attraction, (2) fish ladder internal efficiency, and (3) overall fish ladder effectiveness. As stated earlier the nearfield attraction rate is the probability of an adult herring to move from the nearfield/upper bypass region into the downstream entrance of the ladder,

the internal efficiency is the probability of an adult herring to move from the ladder entrance to the ladder exit and the overall efficiency is the probability of an adult herring to move from the nearfield/upper bypass region to the upstream exit from the fish ladder. Upstream passage effectiveness estimates for dual-tagged adult alewives at the Pawtucket Dam fish ladder during 2020 are as follows:

- Nearfield attraction effectiveness:
  - 93.0% (75% CI = 87.9-96.0%)
- Fish ladder internal efficiency:
  - 81.3% (75% CI = 75.1-87.5%)
- Overall fish ladder effectiveness:
  - 75.6% (75% CI = 69.2-82.2%)

The CJS model prepared for the assessment of upstream passage effectiveness of the Pawtucket Dam fish ladder also generated an effectiveness estimate for passage of adult alewife through the series of concrete weirs installed in the reach between the ladder entrance and the School Street Bridge. That reach was bracketed by Monitoring Stations 12 and 13 and passage effectiveness for adult alewives through that section was estimated at 91.8% (75% CI = 86.8-95.0%) (Table 5-21).

Table 5–4. Summary of tagging and release information for adult alewives released at Lawrence during the Lowell upstream passage assessment, May 7 to June 30, 2020.

Date	Type	Number
7-May	Dual	25
	PIT	34
8-May	Dual	25
	PIT	34
16-May	Dual	14
	PIT	-
17-May	Dual	36
	PIT	68
18-May	Dual	25
	PIT	34
19-May	Dual	25
	PIT	34
Total	Dual	150
	PIT	204

Table 5–5. Summary of post-release movement for adult alewives tagged and released downstream of Lowell during spring 2020.

Post-release Movement	Release Group						
	7-May	8-May	16-May	17-May	18-May	19-May	All
Approach	20	21	12	30	22	23	128
Downstream							0
Station 26	2	2	1	3	0	0	8
Station 25	2	2	0	2	1	1	8
Fallback	1	0	1	1	2	1	6
Total	25	25	14	36	25	25	150

Table 5–6. Minimum, maximum, and quartile values of approach duration (hours) for dual-tagged adult alewives released downstream of Lowell during the spring 2020 upstream passage assessment.

Alewife - Approach Duration (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
7-May	8.3	286.1	12.5	27.5	39.4
8-May	12.4	223.7	20.2	28.1	29.9
16-May	8.9	31.1	10.0	10.4	12.9
17-May	7.7	48.5	9.0	11.2	22.2
18-May	9.3	55.9	10.6	16.1	22.0
19-May	11.1	78.5	18.8	24.1	28.6
All	**7.7**	**286.1**	**11.0**	**19.6**	**28.6**

Table 5–7. Minimum, maximum, and quartile values of upstream transit durations (hours) for dual-tagged adult alewives released downstream of Lowell during the spring 2020 upstream passage assessment.

Alewife - Upstream Transit Times (hrs)						
Downstream Reach	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Lawrence to Station 26 (4.75 miles)	7-May	3.3	36.6	5.3	8.25	14.6
	8-May	3.9	8.6	5.6	6.6	7.1
	16-May	4.1	14	5.25	5.7	7.4
	17-May	3.1	74.9	4.4	5.4	6.1
	18-May	3.7	13.5	4.5	5.45	7.3
	19-May	5.5	25.5	5.8	5.9	6.4
	All	**3.1**	**74.9**	**4.7**	**5.9**	**7.1**
Station 26 to Station 25 (3.9 miles)	7-May	2.9	139.7	3.4	4.7	25.9
	8-May	3.8	27.3	7	19.5	21.1
	16-May	2.6	11.7	2.6	2.6	3.1
	17-May	2.4	40.7	2.7	3.2	12.4
	18-May	2.6	13.8	3.2	3.65	8.9
	19-May	2.1	6.1	2.2	2.6	3.4
	All	**2.1**	**139.7**	**2.7**	**3.5**	**11.7**
Station 25 to Station 24 (2.0 miles)	7-May	1.9	186.3	2.4	4	13.3
	8-May	2	12.4	2.65	2.95	7.3
	16-May	2.1	11.7	2.15	2.2	2.4
	17-May	1.4	13.3	1.6	2.1	3.8
	18-May	1.9	97	2.4	2.9	6.2
	19-May	14.5	70.4	15.4	16.2	47
	All	**1.4**	**186.3**	**2.2**	**2.9**	**8.4**

Table 5–8. Minimum, maximum, and quartile values of upstream transit rates (mph) for dual-tagged adult alewives released downstream of Lowell during the spring 2020 upstream passage assessment.

Alewife - Upstream Transit Rates (mph)						
Downstream Reach	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Lawrence to Station 26 (4.75 miles)	7-May	0.13	1.44	0.33	0.58	0.90
	8-May	0.55	1.22	0.67	0.72	0.85
	16-May	0.34	1.16	0.64	0.83	0.91
	17-May	0.06	1.53	0.78	0.88	1.08
	18-May	0.35	1.28	0.65	0.87	1.06
	19-May	0.19	0.86	0.74	0.81	0.82
	All	**0.06**	**1.53**	**0.67**	**0.81**	**1.01**
Station 26 to Station 25 (3.9 miles)	7-May	0.03	1.34	0.15	0.83	1.15
	8-May	0.14	1.03	0.18	0.20	0.56
	16-May	0.33	1.50	1.26	1.50	1.50
	17-May	0.10	1.63	0.31	1.22	1.44
	18-May	0.28	1.50	0.44	1.07	1.22
	19-May	0.64	1.86	1.15	1.50	1.77
	All	**0.03**	**1.86**	**0.33**	**1.11**	**1.44**
Station 25 to Station 24 (2.0 miles)	7-May	0.01	1.05	0.15	0.50	0.83
	8-May	0.16	1.00	0.27	0.68	0.76
	16-May	0.17	0.95	0.84	0.91	0.93
	17-May	0.15	1.43	0.53	0.95	1.25
	18-May	0.02	1.05	0.32	0.69	0.83
	19-May	0.03	0.14	0.04	0.12	0.13
	All	**0.01**	**1.43**	**0.24**	**0.69**	**0.91**

Table 5–9. Minimum, maximum, and quartile values of time at large (hours) for dual-tagged adult alewives released downstream of Lowell during the spring 2020 upstream passage assessment.

Alewife - Time at Large (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
7-May	16.0	333.6	91.6	171.3	234.9
8-May	3.1	411.4	43.7	161.9	206.6
16-May	20.2	97.9	38.8	46.6	67.5
17-May	1.2	192.5	22.4	41.6	54.7
18-May	12.1	445.6	28.8	58.4	83.3
19-May	2.0	148.5	6.0	26.2	39.5
All	**1.2**	**445.6**	**23.1**	**46.9**	**134.9**
Fate	**Minimum**	**Maximum**	**Q25**	**Q50 (Median)**	**Q75**
Failed	1.2	445.6	22.5	94.8	181.1
Passed	2.1	254.8	24.4	41.5	67.4

Table 5–10. Minimum, maximum, and quartile values of transit durations (hours) for dual-tagged adult alewives during fish lift forays recorded during the spring 2020 upstream passage assessment.

Alewife - Fish Lift Foray Durations (hrs)					
Lift Foray Segment	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tailrace to Entrance	<0.1	13.4	0.4	0.7	1.7
Entrance to Exit	0.2	46.9	1.5	10.4	19.1
Exit to Forebay	<0.1	<0.1	<0.1	<0.1	<0.1
Forebay to Pawtucket Gatehouse	0.2	1.5	0.5	0.7	0.8
Pawtucket Gatehouse to Upstream	0.8	120.2	4.9	25.7	47.4

Table 5–11. Minimum, maximum, and mean number of fish lift entrance events per upstream foray for dual-tagged adult alewives recorded during the spring 2020 upstream passage assessment.

Alewife - Number of Lift Entrance Detection Events			
Release Date	Minimum	Maximum	Mean
7-May	1	2	1.3
8-May	1	3	1.4
16-May	1	2	1.1
17-May	1	2	1.2
18-May	1	2	1.2
19-May	1	2	1.1
All	**1**	**3**	**1.2**

Table 5–12. Minimum, maximum, and quartile values of transit durations (hours) for radio-tagged adult alewives during fish ladder forays recorded during the spring 2020 upstream passage assessment.

Alewife - Fish Ladder Foray Durations (hrs)					
Ladder Foray Segment	Minimum	Maximum	Q25	Q50 (Median)	Q75
Lower Bypass to Mid Bypass	0.8	236.3	3.2	10.0	16.9
Mid Bypass to Upper Bypass	0.5	30.4	1.0	2.1	9.6
Lower Bypass to Upper Bypass	2.7	281.9	16.3	23.6	35.9
Upper Bypass to Entrance	0.3	258.7	1.0	4.0	19.0
Entrance to Turn Pool	0.3	102.4	1.3	2.1	4.1
Turn Pool to Exit	0.2	47.4	0.6	1.1	3.2
Entrance to Exit	0.8	49.1	2.2	2.9	14.7

Table 5–13. Minimum, maximum, and mean number of fish lift entrance events per upstream foray for dual-tagged adult alewives recorded during the spring 2020 upstream passage assessment.

Alewife - Number of Ladder Entrance Detection Events			
Release Date	Minimum	Maximum	Mean
7-May	1	5	2.6
8-May	1	5	2.1
16-May	1	3	1.6
17-May	1	3	1.6
18-May	1	4	1.4
19-May	1	2	1.1
All	**1**	**5**	**1.6**

Table 5–14. Number of PIT-tagged adult alewives released at Lawrence and recorded at in the exit channel of the E.L. Field Powerhouse fish lift during the spring 2020 upstream passage assessment.

Alewife - PIT Reader Counts	
Release Date	Fish Lift Exit
7-May	12
8-May	13
16-May	46
17-May	17
18-May	0
All	**88**

Table 5–15. Number of PIT-tagged adult alewives released at Lawrence and recorded at in the entrance, turn pool and exit of the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

Alewife - PIT Reader Counts			
Release Date	Entrance	Turn Pool	Exit
7-May	18	17	7
8-May	18	16	5
16-May	51	48	41
17-May	13	13	12
18-May	1	1	0
All	**101**	**95**	**65**

Table 5–16. Minimum, maximum, and quartile values for PIT-tagged adult alewives moving within the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

PIT-Tagged Alewife - Fish Ladder Durations (hours)					
Ladder Foray Segment	Minimum	Maximum	Q25	Q50 (Median)	Q75
Entrance to Turn Pool	0.2	196	0.8	1.6	4.9
Turn Pool to Exit	0.2	56	0.7	1.2	2.9
Entrance to Exit*	0.4	69.4	1.9	3.8	17.1

*Entrance to Exit duration calculated for individuals which ascended full length of ladder. Entrance to turn pool durations include individuals which may have ascended only as far upstream as the turn pool (i.e., did not pass full length of structure)

Table 5–17. CJS model selection criteria for upstream passage effectiveness of the E.L. Field fish lift for adult alewives at Lowell during spring 2020.

Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Parameters	Deviance
Phi(t)p(t)	375.79	0.00	1.00	1.00	10	37.83
Phi(t)p(.)	466.96	91.18	0.00	0.00	6	137.30
Phi(.)p(t)	478.19	102.40	0.00	0.00	8	144.40
Phi(.)p(.)	589.86	214.07	0.00	0.00	2	268.35

Table 5–18. Passage success probability estimates (*Phi)*, standard errors, and likelihood 75 and 95% confidence intervals for dual-tagged adult alewives approaching the E.L. Field fish lift during 2020.

Reach	*Phi*	SE	95% CI		75% CI	
Tailrace to Entrance	0.833	0.046	0.724	0.905	0.774	0.880
Entrance to Exit	0.527	0.067	0.396	0.654	0.450	0.603
Exit to Forebay	1.000	0.000	-	-	-	-
Forebay to Pawtucket Gatehouse	1.000	0.000	-	-	-	-
Pawtucket Gatehouse to Upstream	0.793	0.075	0.610	0.904	0.694	0.867

Table 5–19. Detection efficiency estimates (*p)*, for monitoring stations installed to detect dual-tagged adult alewives approaching the E.L. Field fish lift during 2020.

Location	S	SE	95% CI	
Station 21	1.000	0.000	-	-
Station 22/23	0.724	0.083	0.538	0.856
Station 08	0.828	0.070	0.647	0.926
Station 07	1.000	0.000	-	-
Station 06	1.000	0.000	-	-

Table 5–20. CJS model selection criteria for upstream passage effectiveness of the Pawtucket Dam fish ladder for adult alewives at Lowell during spring 2020.

Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Parameters	Deviance
Phi(t)p(t)	502.57	0.00	1.00	1.00	13	59.49
Phi(t)p(.)	520.06	17.49	0.00	0.00	7	89.34
Phi(.)p(t)	578.38	75.81	0.00	0.00	8	145.61
Phi(.)p(.)	648.23	145.66	0.00	0.00	2	227.65

Table 5–21. Passage success probability estimates (*Phi)*, standard errors, and likelihood 75 and 95% confidence intervals for dual-tagged adult alewives approaching the Pawtucket Dam fish ladder during 2020.

Reach	*Phi*	SE	95% CI		75% CI	
Lower Bypass to Mid Bypass	0.722	0.048	0.618	0.806	0.663	0.774
Mid Bypass to Upper Bypass	0.918	0.035	0.818	0.965	0.868	0.950
Upper Bypass to Entrance	0.930	0.034	0.827	0.973	0.879	0.960
Entrance to Turn Pool	0.913	0.041	0.793	0.966	0.853	0.950
Turn Pool to Exit	0.891	0.047	0.760	0.955	0.824	0.935

Table 5–22. Detection efficiency estimates (*p)*, for monitoring stations installed to detect dual-tagged adult alewives approaching the Pawtucket Dam fish ladder during 2020.

Location	S	SE	95% CI	
Station 11	1.000	0.000	1.000	1.000
Station 12	0.982	0.017	0.886	0.998
Station 13	1.000	0.000	1.000	1.000
Station 14/15/16	1.000	0.000	1.000	1.000
Station 17/18	0.930	0.039	0.805	0.977
Station 19	0.905	0.045	0.772	0.964

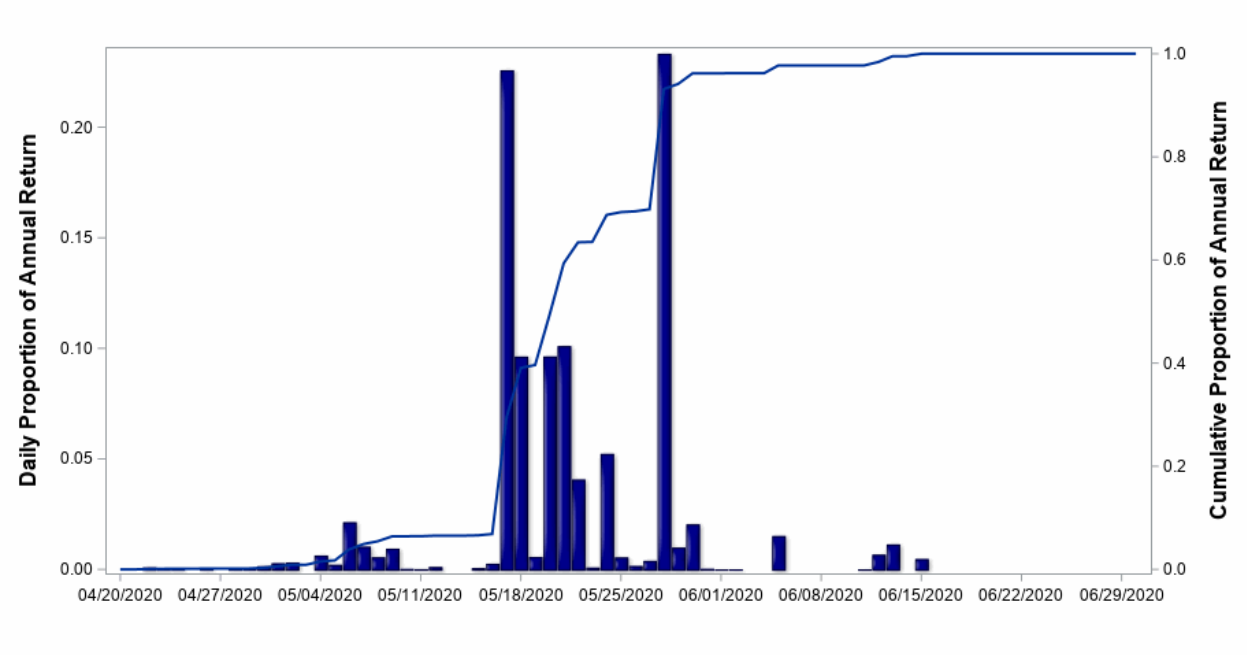

Figure 5–8. Daily (bars) and cumulative (line) percentage of adult river herring returns at the Lawrence fishway as enumerated by Salmonsoft recording for the 2020 passage season.

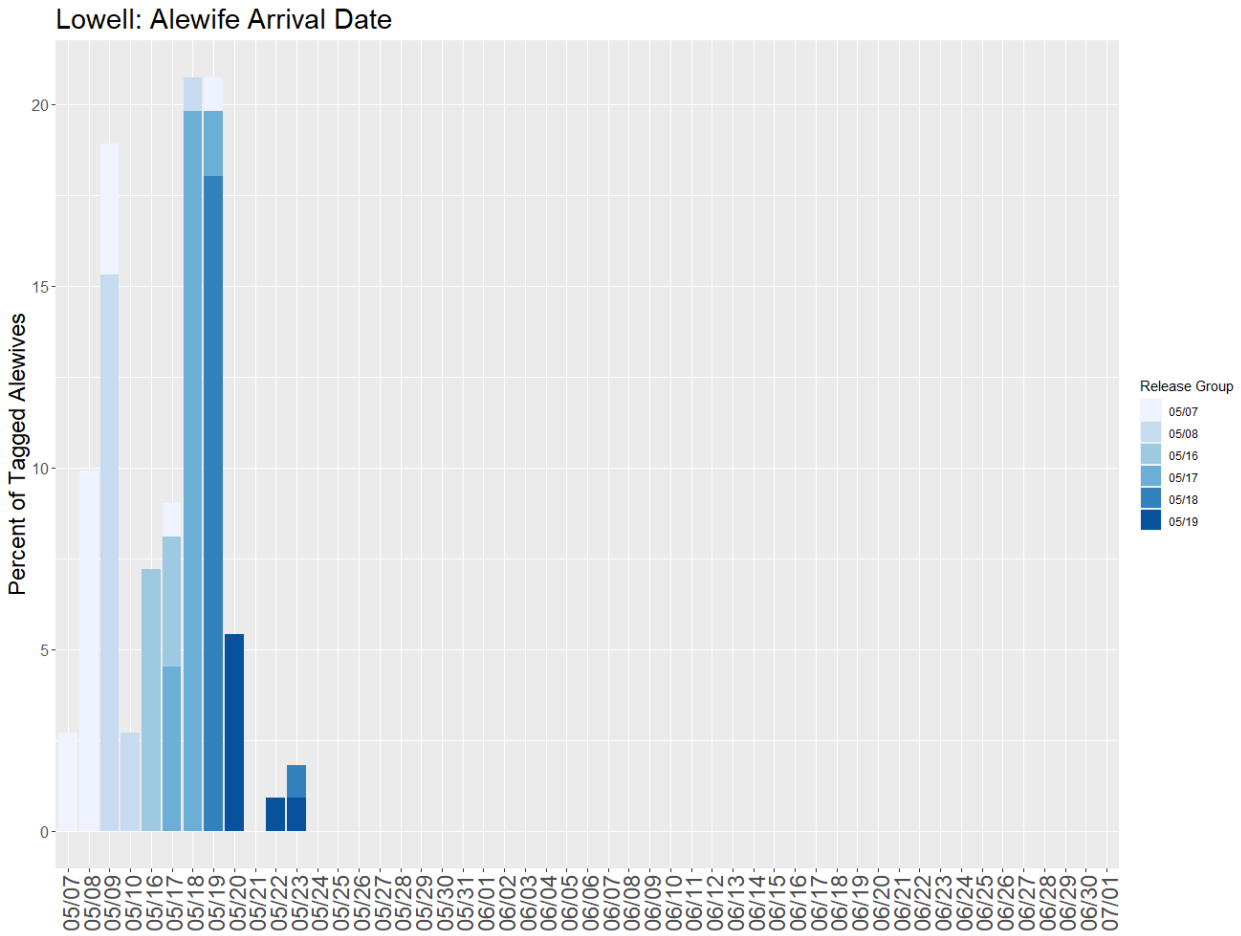

Figure 5–9. Distribution of arrival dates for dual-tagged adult alewives originally released downstream of Lowell at the Lawrence Project as part of the spring 2020 upstream passage assessment.

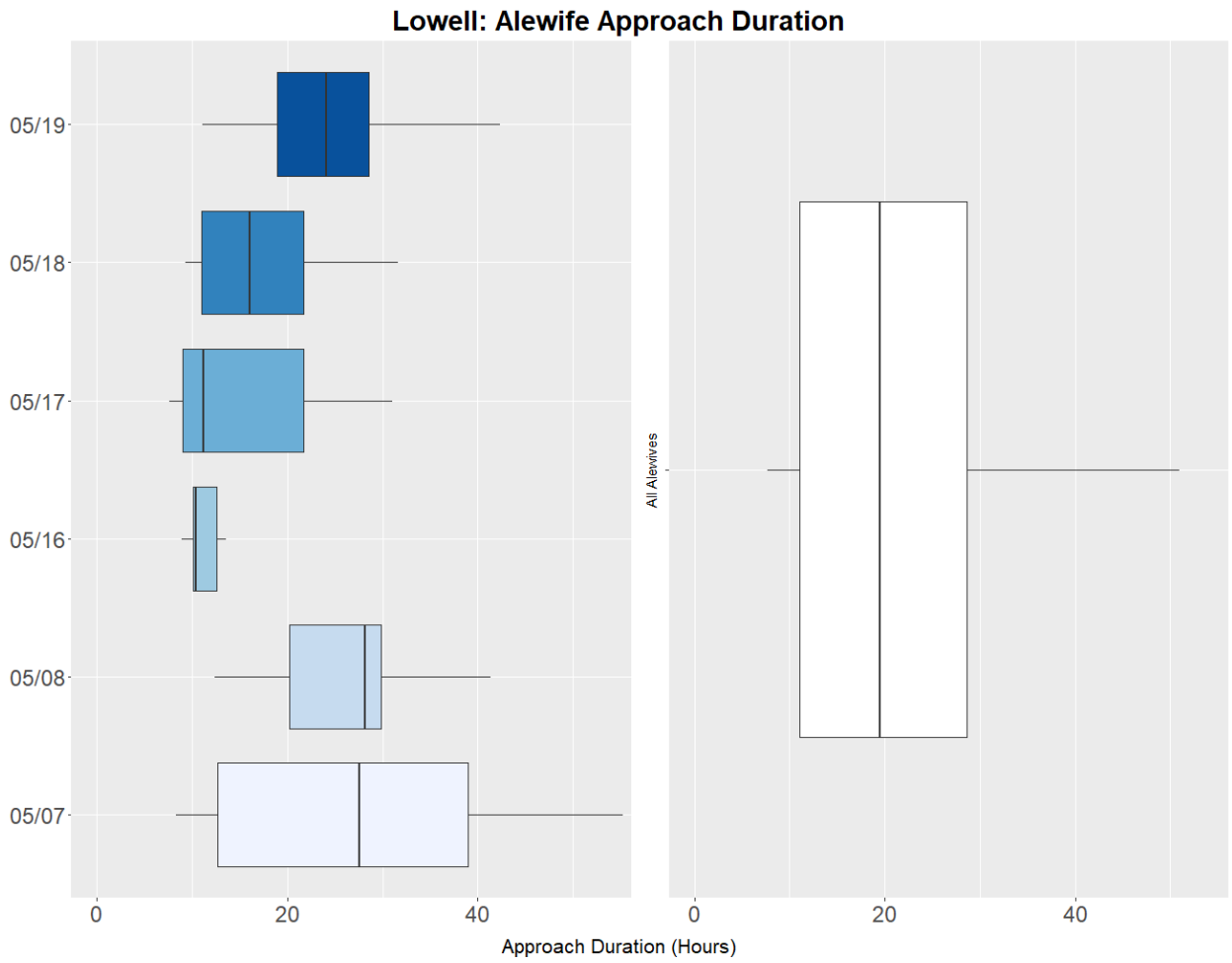

Figure 5–10. Boxplot of the approach duration for all dual-tagged adult alewives released downstream of Lowell during the spring 2020 upstream passage assessment. [6]

[6] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

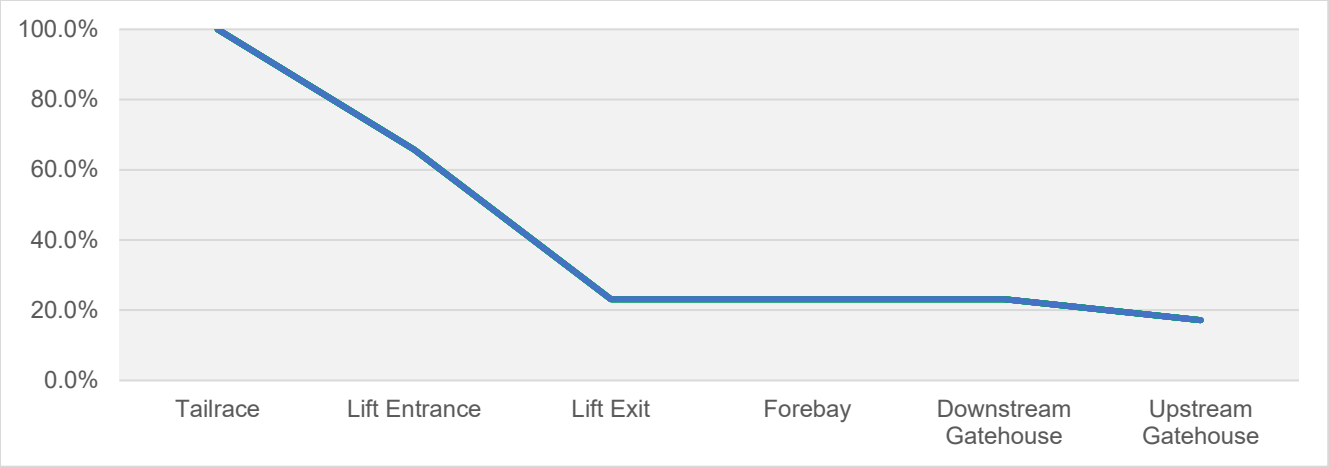

Figure 5–11. Magnitude of upstream progress for dual-tagged adult alewife forays at the E.L. Field fish lift during the spring 2020 upstream passage assessment.

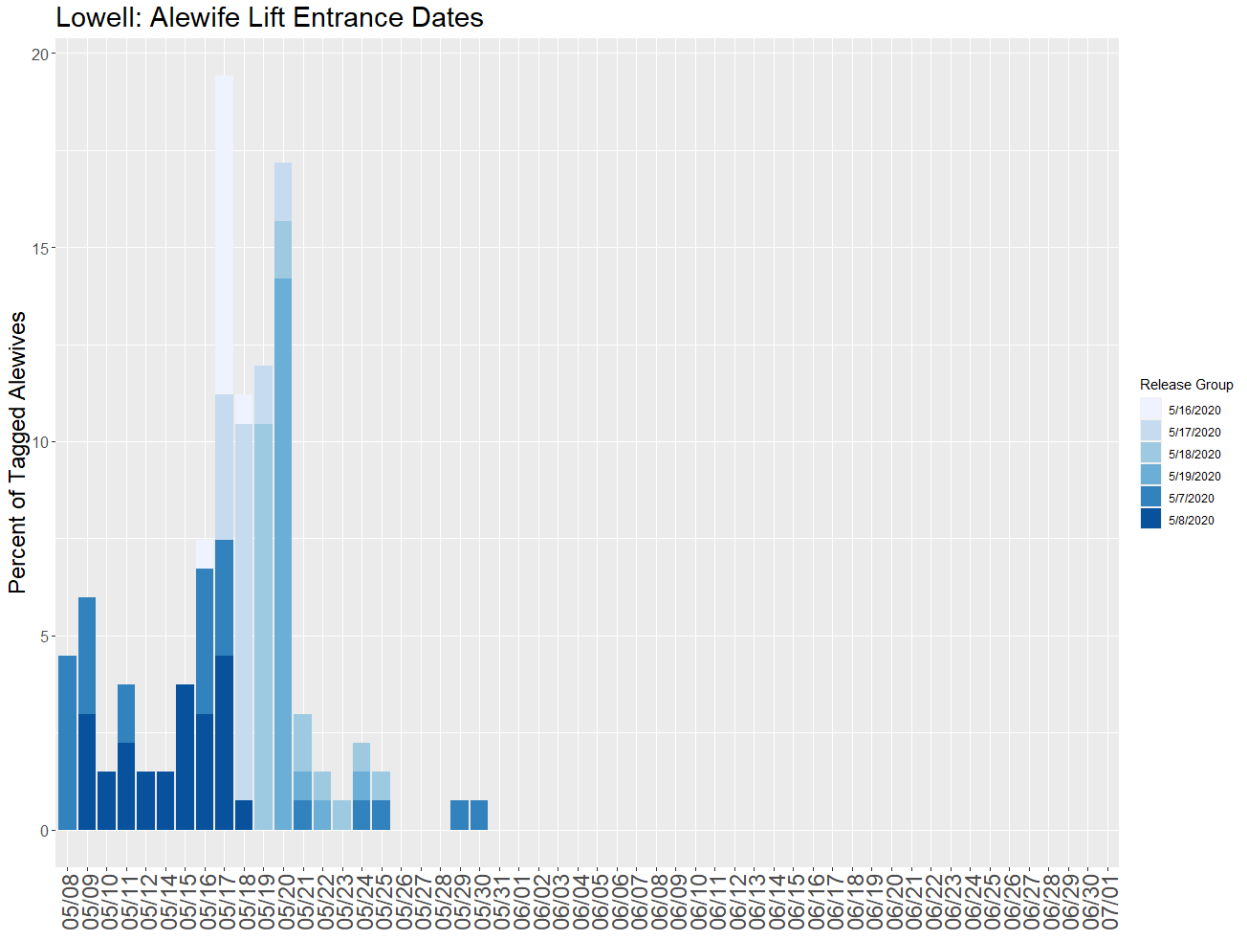

Figure 5–12. Distribution of entrance dates for dual-tagged adult alewives at the E.L. Field fish lift during the spring 2020 upstream passage assessment.

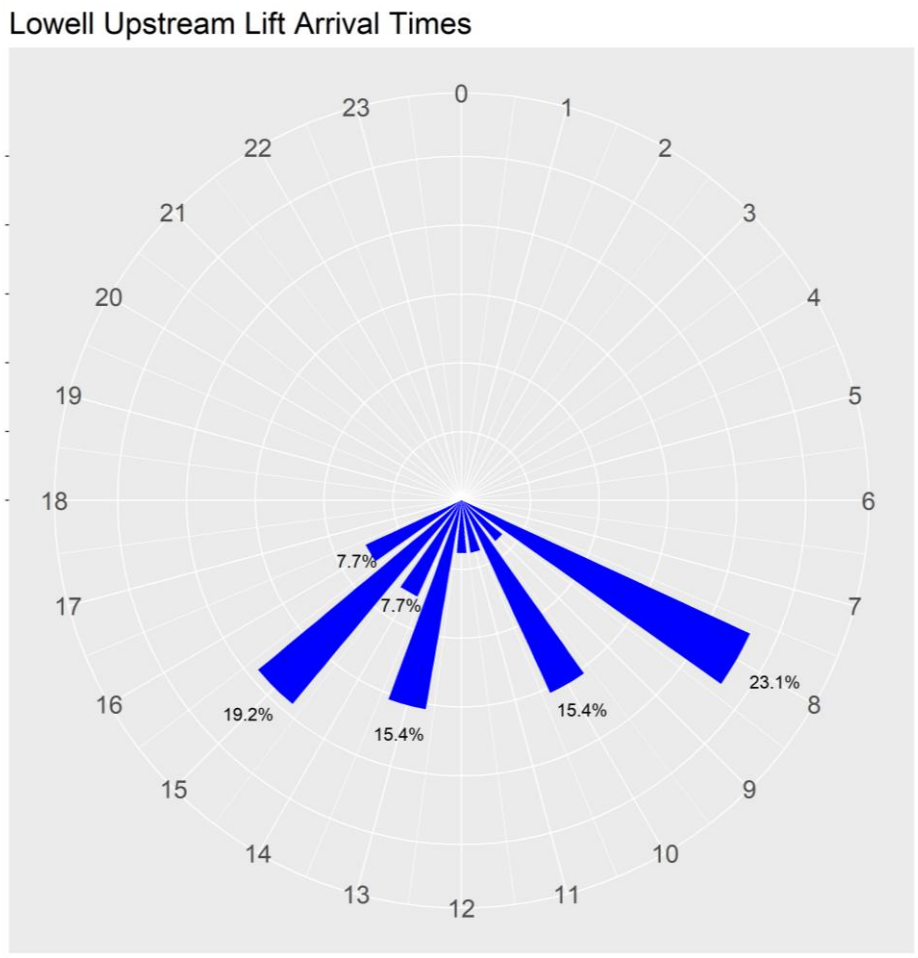

Figure 5–13. Distribution of entrance times for dual-tagged adult alewives at the E.L. Field fish lift during the spring 2020 upstream passage assessment.

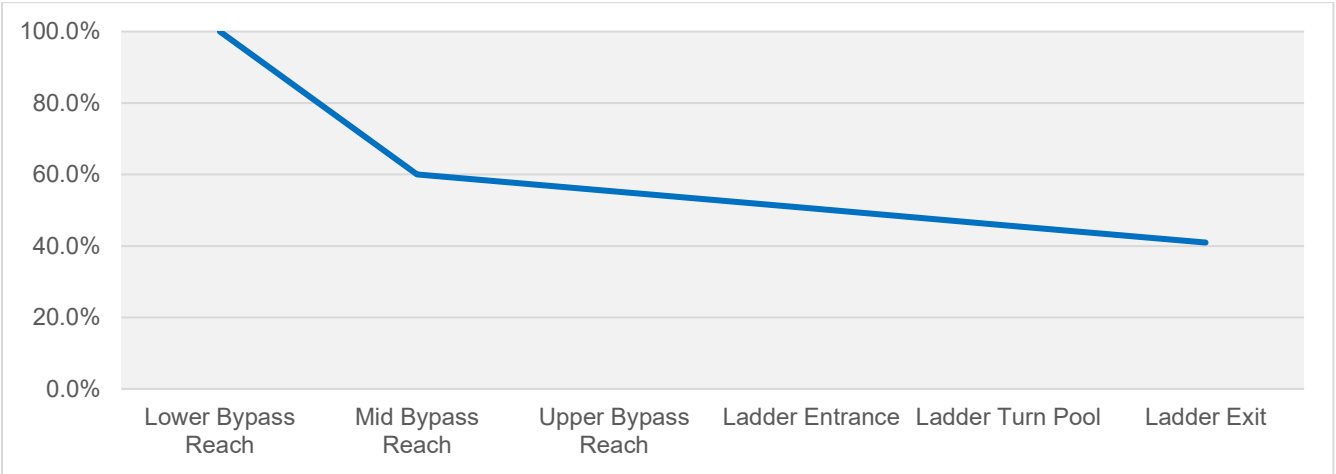

Figure 5–14. Magnitude of upstream progress for dual-tagged adult alewife forays at the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

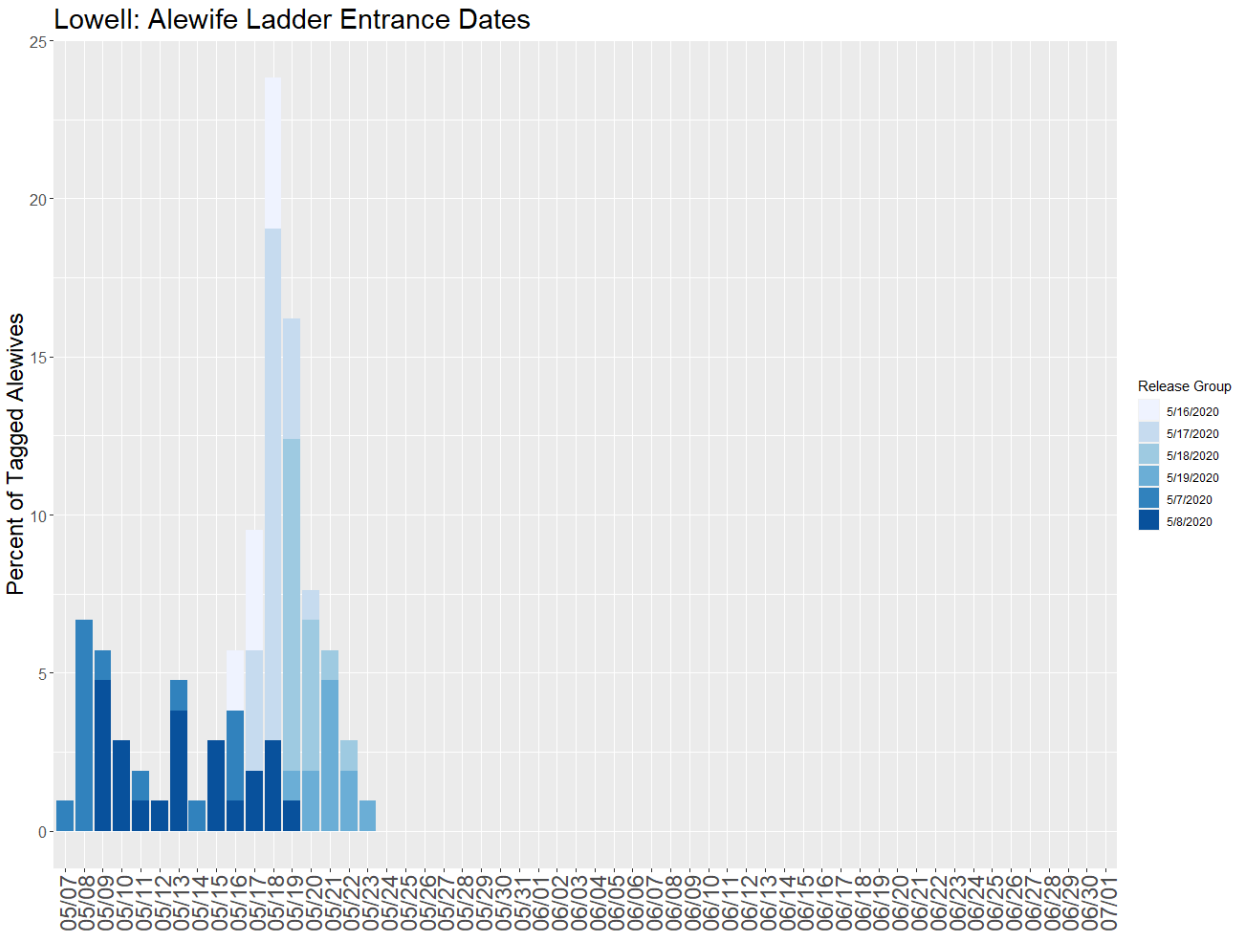

Figure 5–15. Distribution of entrance dates for dual-tagged adult alewives at the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

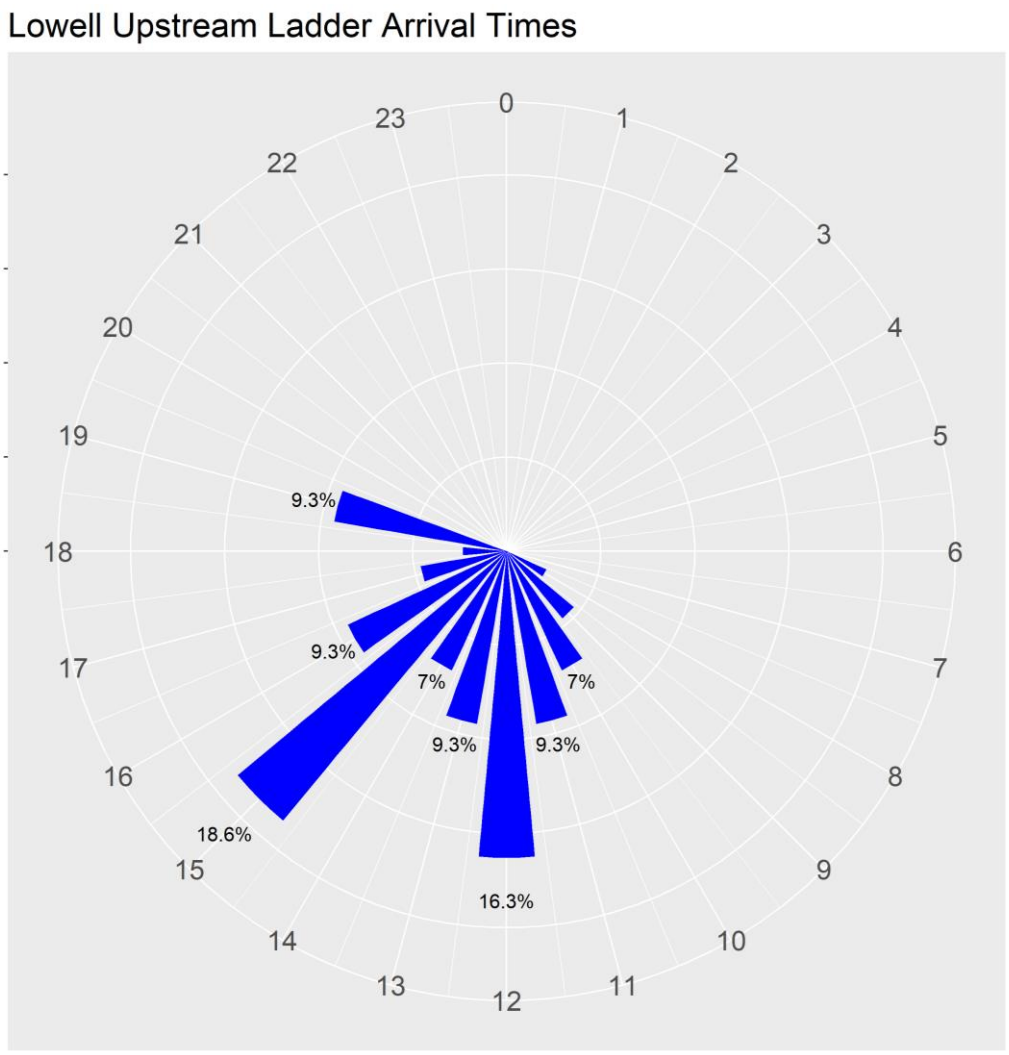

Figure 5–16. Distribution of entrance times for dual-tagged adult alewives at the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

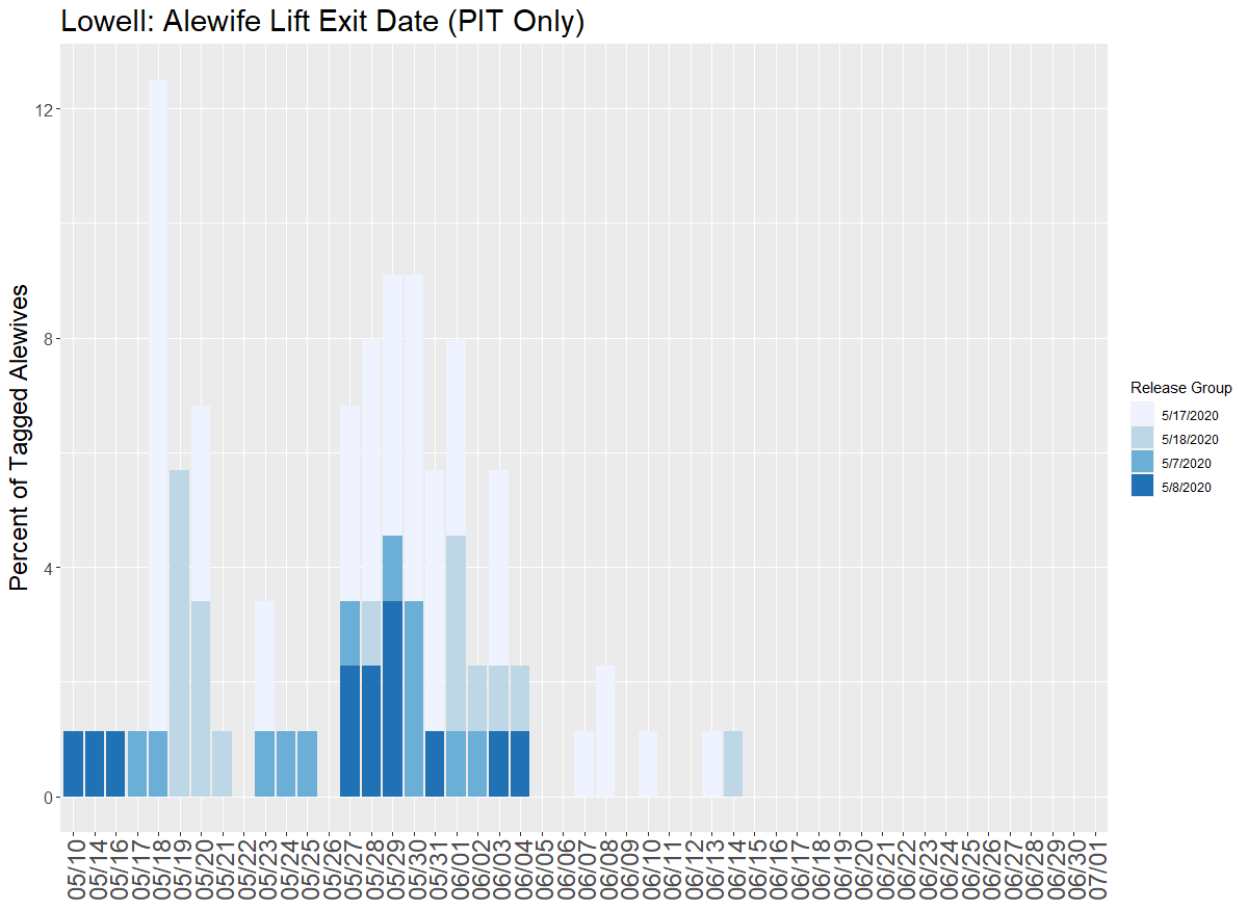

Figure 5–17. Distribution of exit flume dates for PIT-tagged adult alewives at the E.L Field Powerhouse fish lift during the spring 2020 upstream passage assessment.

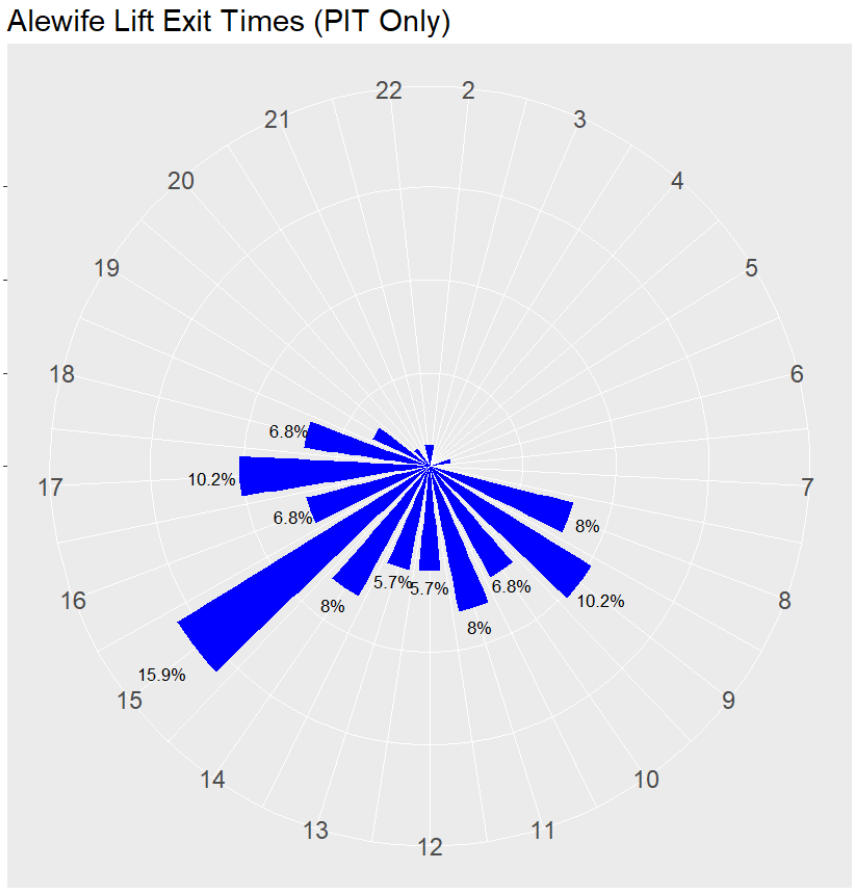

Figure 5–18. Distribution of entrance times for PIT-tagged adult alewives at the E.L Field Powerhouse fish lift during the spring 2020 upstream passage assessment.

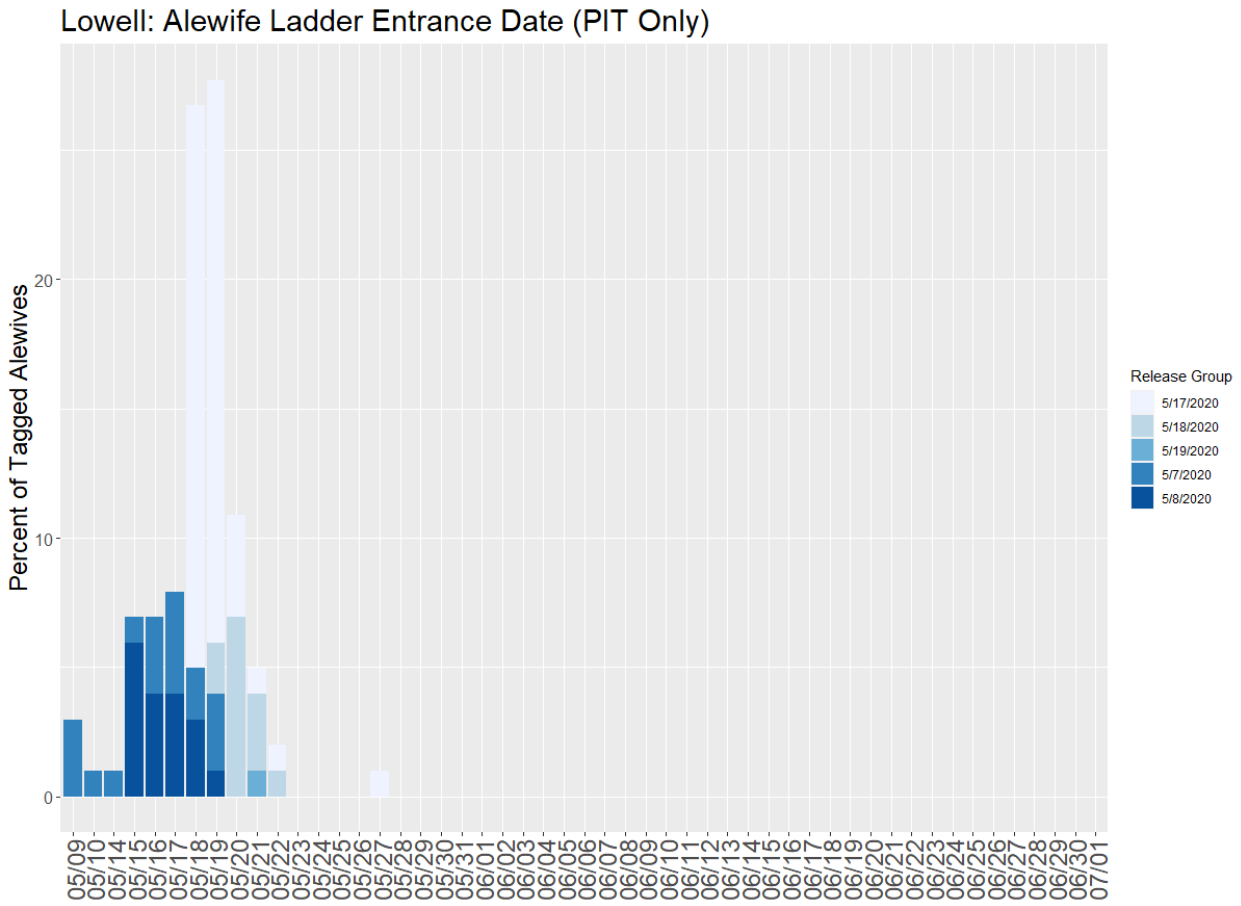

Figure 5–19. Distribution of entrance dates for PIT-tagged adult alewives at the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

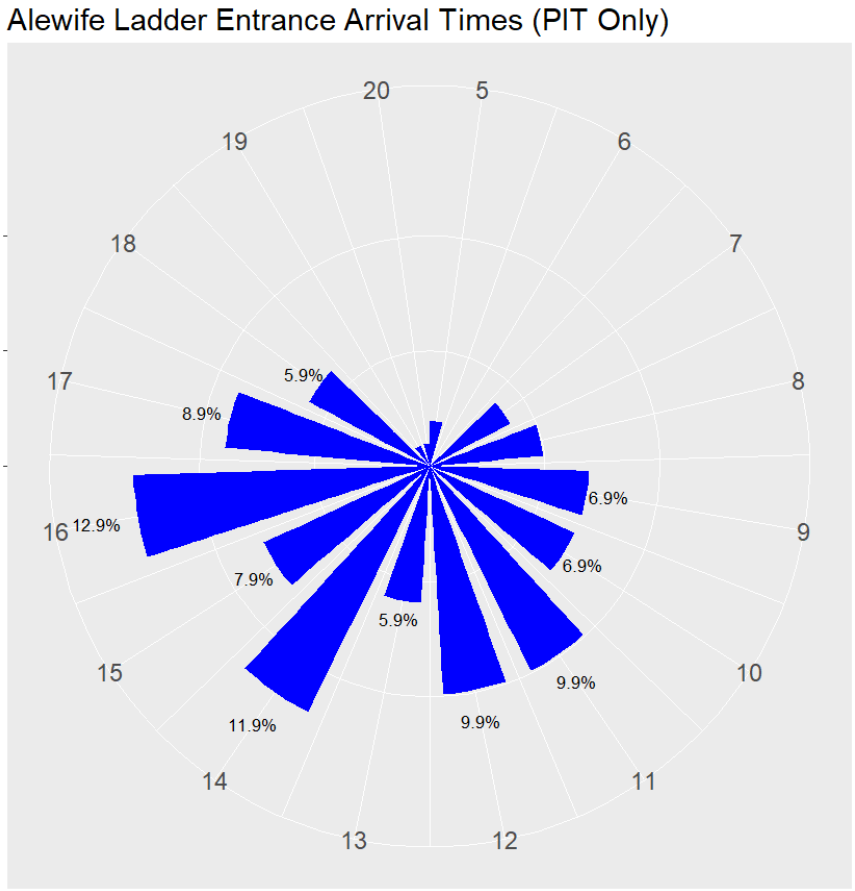

Figure 5–20. Distribution of entrance times for PIT-tagged adult alewives at the Pawtucket Dam fish ladder during the spring 2020 upstream passage assessment.

5.5 Upstream Passage Effectiveness – Adult American Shad

A total of 384 adult American shad were tagged following collection at the Lawrence fish lift during May 2020 and were released for the purposes of evaluating upstream passage at Lowell (Table 5-23). Tagging was conducted over a total of five dates starting on May 16 and ending on May 27. Annual returns for American shad at Lawrence commenced on May 5 and ended on June 25 with the peak daily returns occurring during the last week of May (Figure 5-21). Looking retrospectively, tagging dates carried out during the 2020 study were conducted during the 2nd to 32nd percentiles of the annual return. Of the adult shad tagged, 180 individuals carried both a PIT and radio-transmitter and 204 carried only a PIT tag[7]. Adult American shad tagged for evaluation of upstream passage at Lowell were 73% male, 21% female, and 6% undetermined. Total length of individuals tagged ranged from 400-573 mm (mean = 480 mm).

5.5.1 Post-Release Movements

Similar to adult alewives, the American shad tagged and released downstream of Lowell were free to (1) move upstream and enter into the monitored section of the Merrimack River immediately downstream of the Project, (2) utilize the section of the Merrimack River between Lawrence and Lowell, or (3) fail to move upstream and depart the study reach to downstream of Lawrence. Each dual-tagged individual was classified into a unique post-release movement category based on their pattern of detections among the various monitoring stations. Individuals which were determined to have moved upstream to the project (based on detection at Monitoring Station 24) were classified as “Approached”. Individuals which were limited to detections at the monitoring stations downstream of Lowell (i.e., Stations 25 and 26) were classified as “Lower River”. Individuals which moved downstream immediately following release (as indicated by a lack of detections at any receivers upstream of Station 27 were classified as “Fallback”).

As presented in Table 5-24, nearly 40% of dual-tagged adult shad (70 out of 180 individuals) were determined to have successfully moved upstream and into the area immediately downstream of the Lowell Project following their release. The percentage of dual-tagged shad to ascend upstream to the Project was consistent between the sexes (39% of dual-tagged males and 39% of dual-tagged females). The majority of individuals (47% of all dual-tagged individuals) partially ascended the reach between Lowell and Lawrence but failed to approach the Project. Of those individuals, 48% ascended as far upstream as Station 26 (4.75 miles upstream of Lawrence) and 52% ascended as far upstream as Station 25 (8.7 miles upstream of Lawrence). Twenty-five dual-tagged individuals (14% of the total) were undetected at any of the monitoring stations upstream of Lawrence following their release into the river. A portion of a tagged group of adult shad exhibiting fallback behavior immediately following handling and tagging is not unexpected.

[7] All shad that were tagged with a radio-tag and a PIT transmitter are referred to as “dual-tagged” in this report.

5.5.2 Approach Duration and Time at Large

Adult American shad dual-tagged and released at Lawrence approached Lowell over a range of dates from May 17 until June 6 (Figure 5-22). The median approach duration for dual-tagged adult shad (i.e., the duration of time from release at Lawrence until initial detection at Station 24) was 2.7 days (range = 8.4 hours to 29.3 days; Table 5-25). When examined by release date, the median approach duration to Lowell was lowest for adult shad released on May 22 and 26 and highest for those released on May 18 (Figure 5-23). The minimum, maximum, and quartile transit times through defined sections of the Merrimack River between the release location at Lawrence and the approach receiver (i.e., Station 24) at Lowell are provided in Table 5-26. Transit times calculated using the first detections for each dual-tagged fish at Stations 26, 25, and 24 resulted in median swim times of 14.0 hours from Lawrence to Station 26 (approximately 4.75 miles), 23.4 hours from Station 26 to Station 25 (approximately 3.9 miles) and 22.3 hours from Station 25 to Station 24 (approximately 2.0 miles). Table 5-27 provides the minimum, maximum, and quartile transit times through defined sections of the Merrimack River between the release location at Lawrence and Station 24 as a rate (i.e., miles per hour (mph)).

The duration of time at large following the initial detection at Station 24 for each dual-tagged American shad ranged from 0.3 hours to 24.1 days (median = 2.1 days; Table 5-28). For an individual adult shad, the calculated value for time at large represented time from initial Station 24 detection until either (1) upstream passage out of the study area at the E.L. Field fish lift or the Pawtucket Dam fish ladder, or (2) the final movement downstream and away from the project area. When examined by eventual passage fate (i.e., passed or failed), the median duration of time at large for adult American shad successfully passing upstream was nearly equal to that observed for adult shad which failed to pass upstream (2.3 days vs. 1.9 days, respectively).

5.5.3 Foray and Entrance Events

The full time series of recorded detections for each dual-tagged adult American shad was reviewed and each unique foray upstream towards either the E.L. Field fish lift or Pawtucket Dam fish ladder was identified based on the approach described in Section 4.5. Of the 70 dual-tagged shad which were determined to have approached Lowell (based on detection at a minimum of Station 24) 63% (44 of the 70) made at least one upstream foray towards either the fish lift or ladder during their time at large in the Project area. Of those dual-tagged shad, 43 individuals made one or more foray event towards the fish lift and only a single individual made a foray towards the fish ladder.

5.5.3.1 E.L. Field Fish Lift

The 43 dual-tagged adult shad determined to have approached the E.L. Field fish lift produced a combined total of 201 unique foray events. When considered on an individual basis, the number of unique lift forays ranged between one and 20 (mean = 4.7 events). Figure 5-24 summarizes the upstream magnitude for the full set of observed foray events at the fish lift for dual-tagged adult American shad. Approximately 37% of the set of upstream foray events towards the E.L. Field fish lift resulted in detection of the dual-tagged shad at the lift entrance.

Approximately 6% of upstream foray events resulted in dual-tagged adult American shad reaching the downstream side of the Pawtucket Gatehouse. Finally, 3% of the total number of 201 upstream forays in the direction of the E.L. Field fish lift resulted in dual-tagged shad reaching the upstream side of the Pawtucket Gatehouse.

Table 5-29 provides the minimum, maximum and quartile transit times for dual-tagged adult American shad moving upstream during fish lift forays. Upon entering the tailrace detection zone, the median duration of time to locate the fish lift entrance was 1.1 hours (range 0.1 hours to 1.8 days). Upon entering the E.L. Field Power Canal dual-tagged adult shad proceeded quickly upstream to the downstream face of the Pawtucket Gatehouse (median duration = 0.8 hours). The median duration of time for dual-tagged adult shad to pass the Pawtucket Gatehouse was 5.4 days (range 3.3 days to 9.0 days).

Dual-tagged adult shad were free to be detected at the E.L. Field fish lift entrance multiple times within a single foray event. As noted earlier, approximately 37% of upstream foray events resulted in detection at the fish lift entrance on at least one occasion. The total number of these entrance events were defined for each unique foray event and ranged from one to twenty (mean = 4.6; Table 5-30). Fish lift entrances were recorded over a range of dates from May 18 through June 15, 2020 (Figure 5-25). The percentage of entrance events peaked during late-May (approximately May 28 through May 30). The diel distribution of entrance events at the E.L. Field fish lift is presented in Figure 5-26 and indicated dual-tagged shad present at the lift entrance peaked during the mid-morning and early afternoon hours.

5.5.3.2 Pawtucket Dam Fish Ladder

Foray events for dual-tagged adult American shad up the Lowell bypassed reach and towards the Pawtucket Dam fish ladder were limited to a single event. A dual-tagged shad from the May 16 release group was detected at Station 11 in the lower bypassed reach on May 17th. It did not enter the fish ladder.

5.5.4 PIT-Tagged Individuals

5.5.4.1 E.L. Field Fish Lift

Limitations detailed for the installation of Monitoring Station 20 in Section 4.2 precluded effective monitoring of PIT-tagged fish at that location. As a result, detection potential for the 204 PIT-tagged adult American shad at the E.L. Field fish lift was limited to the upper exit flume (Stations 21 and 22). PIT-tagged adult shad were detected at the upper exit flume over a range of dates from May 19 through June 14, 2020 (Figure 5-27). Of the possible 204 PIT-tagged adult shad, 16 (8%) were determined to have been present in the E.L. Field fish lift exit flume over the course of the study.

5.5.4.2 Pawtucket Dam Fish Ladder

Detections at PIT readers within the Pawtucket Dam fish ladder for the 204 PIT-tagged adult shad released at Lawrence were limited to just two individuals. One PIT-tagged adult shad released at Lawrence on May 18 was detected at the fish ladder entrance on May 24 and ascended as far upstream as the turn pool (travel time = 0.8 hours). A second individual

(released at Lawrence on May 26) was detected at the fish ladder entrance reader on June 11 but was not subsequently detected at the turn pool or the ladder exit.

5.5.5 Upstream Passage Effectiveness – Lowell Fish Lift

The CJS model *Phi*(t)*p*(t) provided the best fit for the observed mark-recapture data associated with upstream movements of dual-tagged adult American shad approaching the E.L. Field fish lift (Table 5-31). Specific passage success estimates at Lowell ranged between 0.451- 1.0 among discretely monitored river sections from the tailrace to the point upstream of the Pawtucket Gatehouse (Table 5-32). The detection efficiency for receivers associated with upstream passage of dual-tagged adult American shad at the fish lift ranged from 0.612-1.0 (Table 5-33). Similar to that observed for dual-tagged adult alewives, the lowest detection value was associated with the two PIT readers positioned in the exit flume of the upstream fishway.

As defined in Section 4.5.2, the specific passage success estimates obtained from the CJS model for dual-tagged adult shad approaching the E.L. field fish lift were used to estimate (1) near field attraction, (2) fish lift internal efficiency, and (3) overall fish lift effectiveness. As stated earlier the nearfield attraction rate is the probability of an adult shad to move from the nearfield/tailrace region into the downstream entrance of the lift, the internal efficiency is the probability of an adult shad to move from the lift entrance to the lift exit and the overall efficiency is the probability of an adult shad to move from the tailrace/nearfield region to the upstream exit from the fish lift. Upstream passage effectiveness estimates for dual-tagged adult shad at the Lowell fish lift during 2020 are as follows:

- Nearfield attraction effectiveness:
  - 67.4% (75% CI = 58.8-75.1%)
- Fish lift internal efficiency:
  - 45.1% (75% CI = 34.8-55.8%)
- Overall fish lift effectiveness:
  - 30.4% (75% CI = 22.1-39.5%)

5.5.6 Upstream Passage Effectiveness – Lowell Fish Ladder

Limited number of returns for dual-tagged American shad (see Section 5.5.3.2) prevented the usage of a CJS model to evaluate upstream passage effectiveness of the Pawtucket Dam fish ladder for that species during spring, 2020.

Table 5–23. Summary of tagging and release information for adult American shad released at Lawrence during the Lowell upstream passage assessment, May 7 to June 30, 2020.

Date	Type	Number
16-May	Dual	30
	PIT	20
18-May	Dual	30
	PIT	48
22-May	Dual	30
	PIT	34
26-May	Dual	59
	PIT	68
27-May	Dual	31
	PIT	34
Total	Dual	180
	PIT	204

Table 5–24. Summary of post-release movement for adult American shad tagged and released downstream of Lowell during spring 2020.

Post-release Movement	Release Group					
	16-May	18-May	22-May	26-May	27-May	All
Approach	16	13	10	18	13	70
Downstream						0
Station 26	4	7	6	17	7	41
Station 25	5	8	11	14	6	44
Fallback	5	2	3	10	5	25
Total	30	30	30	59	31	180

Table 5–25. Minimum, maximum, and quartile values of approach duration (hours) for dual-tagged adult American shad released downstream of Lowell during the spring 2020 upstream passage assessment.

Shad - Approach Duration (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
16-May	31.0	703.2	46.7	64.5	163.3
18-May	8.4	223.8	76.1	111.9	123.8
22-May	10.5	85.4	27.1	40.0	67.7
26-May	28.4	288.3	31.1	41.7	70.1
27-May	18.6	186.4	43.0	70.5	82.7
All	**8.4**	**703.2**	**37.7**	**64.5**	**94.5**

Table 5–26. Minimum, maximum, and quartile values of upstream transit durations (hours) for dual-tagged adult American shad released downstream of Lowell during the spring 2020 upstream passage assessment.

Shad - Upstream Transit Times (hr)						
Downstream Reach	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Lawrence to Station 26 (4.75 miles)	16-May	3.8	141.0	5.5	8.5	17.9
	18-May	4.5	220.1	7.9	10.3	27.6
	22-May	3.8	239.7	4.5	9.4	67.8
	26-May	2.2	194.4	7.8	15.0	26.2
	27-May	5.8	225.4	9.7	16.3	27.7
	All	**2.2**	**239.7**	**7.4**	**14.0**	**27.6**
Station 26 to Station 25 (3.9 miles)	16-May	4.1	49.1	15.6	20.7	34.7
	18-May	2.1	37.6	2.5	23.1	27.2
	22-May	2.1	138.4	13.4	18.2	74.7
	26-May	11.3	480.2	18.2	27.2	50.2
	27-May	5.0	235.6	7.2	25.9	32.1
	All	**2.1**	**480.2**	**15.2**	**23.4**	**37.3**
Station 25 to Station 24 (2.0 miles)	16-May	2.3	166.6	14.6	36.4	61.0
	18-May	1.8	194.7	49.4	88.5	94.0
	22-May	2.7	54.9	4.0	7.9	24.9
	26-May	2.3	197.9	8.6	11.3	21.2
	27-May	2.0	99.2	3.2	13.2	75.4
	All	**1.8**	**197.9**	**5.9**	**22.3**	**75.4**

Table 5–27. Minimum, maximum, and quartile values of upstream transit rates (mph) for dual-tagged adult American shad released downstream of Lowell during the spring 2020 upstream passage assessment.

Shad - Upstream Transit Rates (mph)						
Downstream Reach	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Lawrence to Station 26 (4.75 miles)	16-May	0.03	1.25	0.27	0.56	0.86
	18-May	0.02	1.06	0.17	0.47	0.60
	22-May	0.02	1.25	0.07	0.51	1.06
	26-May	0.02	2.16	0.18	0.32	0.61
	27-May	0.02	0.82	0.17	0.30	0.50
	All	**0.02**	**2.16**	**0.17**	**0.34**	**0.64**
Station 26 to Station 25 (3.9 miles)	16-May	0.08	0.95	0.11	0.19	0.25
	18-May	0.10	1.86	0.14	0.17	1.56
	22-May	0.03	1.86	0.06	0.22	0.30
	26-May	0.01	0.35	0.08	0.14	0.21
	27-May	0.02	0.78	0.12	0.15	0.54
	All	**0.01**	**1.86**	**0.10**	**0.17**	**0.26**
Station 25 to Station 24 (2.0 miles)	16-May	0.01	0.87	0.03	0.05	0.14
	18-May	0.01	1.11	0.02	0.02	0.04
	22-May	0.04	0.74	0.08	0.25	0.50
	26-May	0.01	0.87	0.09	0.18	0.23
	27-May	0.02	1.00	0.03	0.15	0.63
	All	**0.01**	**1.11**	**0.03**	**0.09**	**0.34**

Table 5–28. Minimum, maximum, and quartile values of time at large (hours) for dual-tagged adult American shad released downstream of Lowell during the spring 2020 upstream passage assessment.

Shad - Time at Large (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
16-May	1.3	578.2	43.5	190.6	260.1
18-May	0.9	424.6	31.8	76.6	312.1
22-May	97.0	499.5	121.3	184.1	243.9
26-May	0.3	49.7	12.2	31.0	45.1
27-May	0.5	145.6	9.7	43.2	58.6
All	**0.3**	**578.2**	**24.0**	**49.7**	**165.5**
Fate	**Minimum**	**Maximum**	**Q25**	**Q50 (Median)**	**Q75**
Failed	0.3	578.2	11.8	46.8	215.3
Passed	28.5	424.6	43.9	54.5	136.4

Table 5–29. Minimum, maximum, and quartile values of transit durations (hours) for dual-tagged adult American shad during fish lift forays recorded during the spring 2020 upstream passage assessment.

Shad - Fish Lift Foray Durations (hr)					
Lift Foray Segment	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tailrace to Entrance	0.1	43.6	0.6	1.1	1.8
Entrance to Exit	1.0	23.5	1.2	2.4	11.5
Exit to Forebay	<0.1	0.4	<0.1	<0.1	0.1
Forebay to Pawtucket Gatehouse	0.3	1.5	0.5	0.8	1.1
Pawtucket Gatehouse to Upstream	79.7	216.2	80.6	129.5	197.6

Table 5–30. Minimum, maximum, and mean number of fish lift entrance events per upstream foray for dual-tagged adult American shad recorded during the spring 2020 upstream passage assessment.

Shad - Number of Lift Entrance Detection Events			
Release Date	Minimum	Maximum	Mean
16-May	1	20	5.6
18-May	1	10	4.8
22-May	1	10	3.9
26-May	1	9	3.4
27-May	1	18	5.2
All	**1**	**20**	**4.6**

Table 5–31. CJS model selection criteria for upstream passage effectiveness of the E.L. Field fish lift for adult American shad at Lowell during spring 2020.

Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Parameters	Deviance
Phi(t)p(t)	254.77	0.00	1.00	1.00	10	32.13
Phi(t)p(.)	315.05	60.28	0.00	0.00	5	103.05
Phi(.)p(t)	336.50	81.73	0.00	0.00	7	120.30
Phi(.)p(.)	410.43	155.66	0.00	0.00	2	204.63

Table 5–32. Passage success probability estimates (*Phi)*, standard errors, and likelihood 75 and 95% confidence intervals for dual-tagged adult American shad approaching the E.L. Field fish lift during 2020.

Reach	*Phi*	SE	95% CI		75% CI	
Tailrace to Entrance	0.674	0.071	0.523	0.797	0.588	0.751
Entrance to Exit	0.451	0.093	0.282	0.631	0.348	0.558
Exit to Forebay	1.000	0.000	-	-	-	-
Forebay to Pawtucket Gatehouse	0.918	0.078	0.594	0.989	0.773	0.974
Pawtucket Gatehouse to Upstream	0.500	0.144	0.244	0.756	0.340	0.660

Table 5–33. Detection efficiency estimates (*p*), for monitoring stations installed to detect dual-tagged adult American shad approaching the E.L. Field fish lift during 2020.

Location	S	SE	95% CI	
Station 21	1.000	0.000	1.000	1.000
Station 22/23	0.612	0.135	0.341	0.828
Station 08	0.842	0.102	0.541	0.960
Station 07	1.000	0.000	1.000	1.000
Station 06	0.833	0.152	0.369	0.977

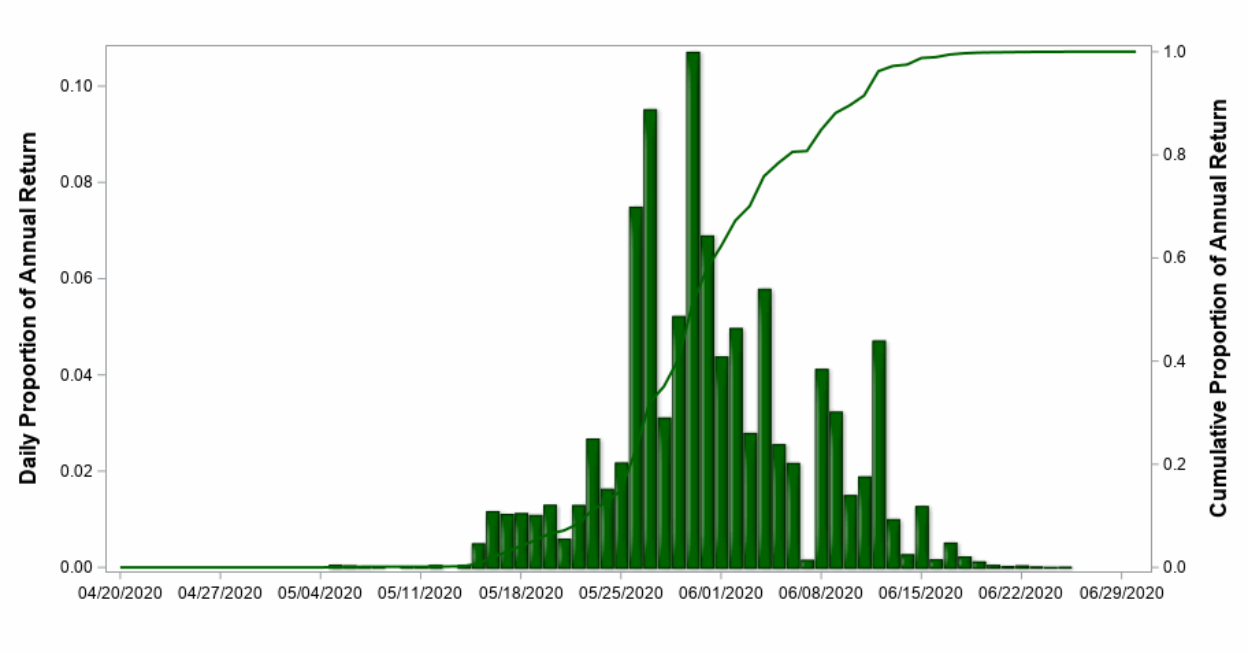

Figure 5–21. Daily (bars) and cumulative (line) proportion of annual adult American shad returns at the Lawrence fishway as enumerated by Salmonsoft recording for the 2020 passage season.

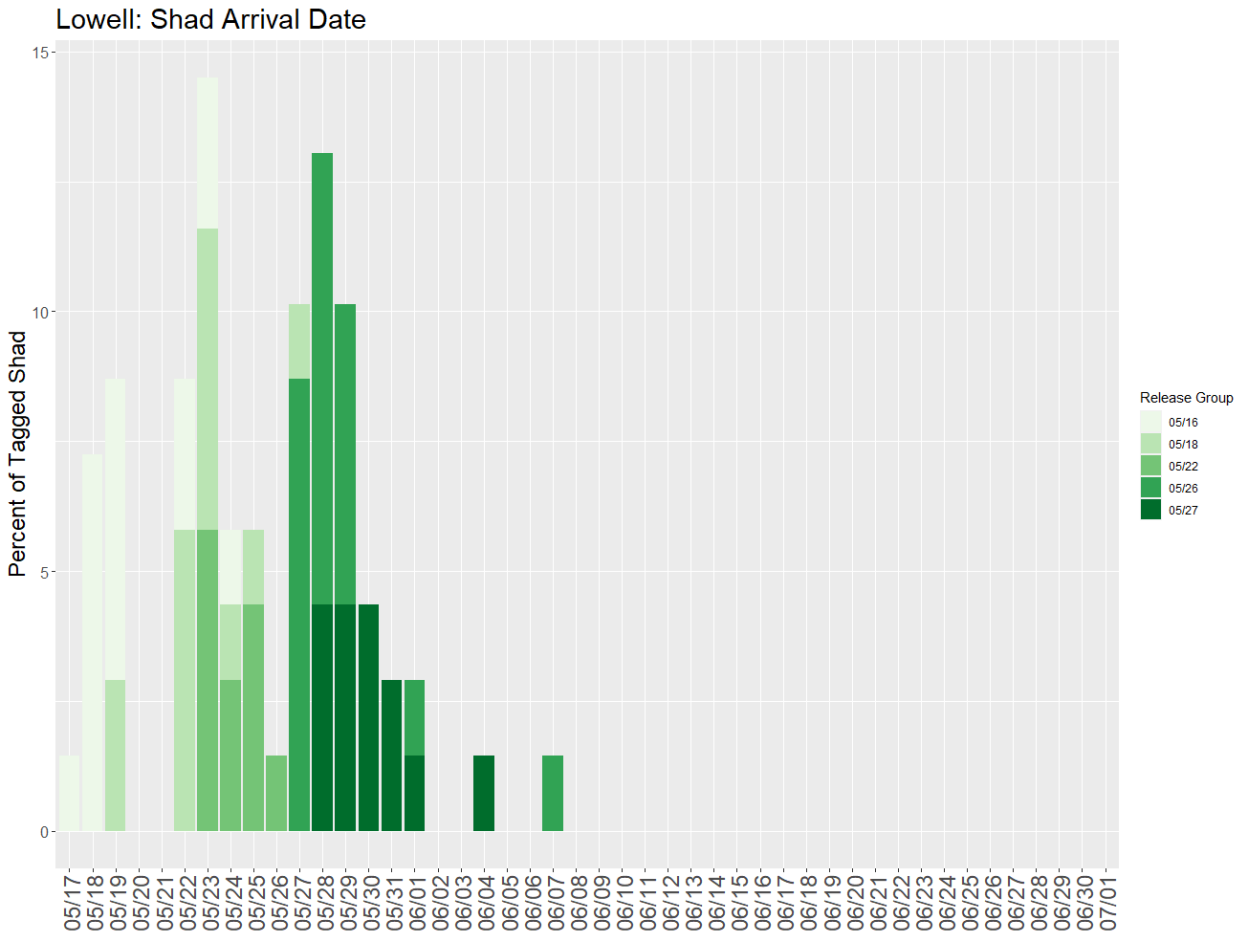

Figure 5–22. Distribution of arrival dates for dual-tagged adult American shad originally released downstream of Lowell at the Lawrence Project as part of the spring 2020 upstream passage assessment.

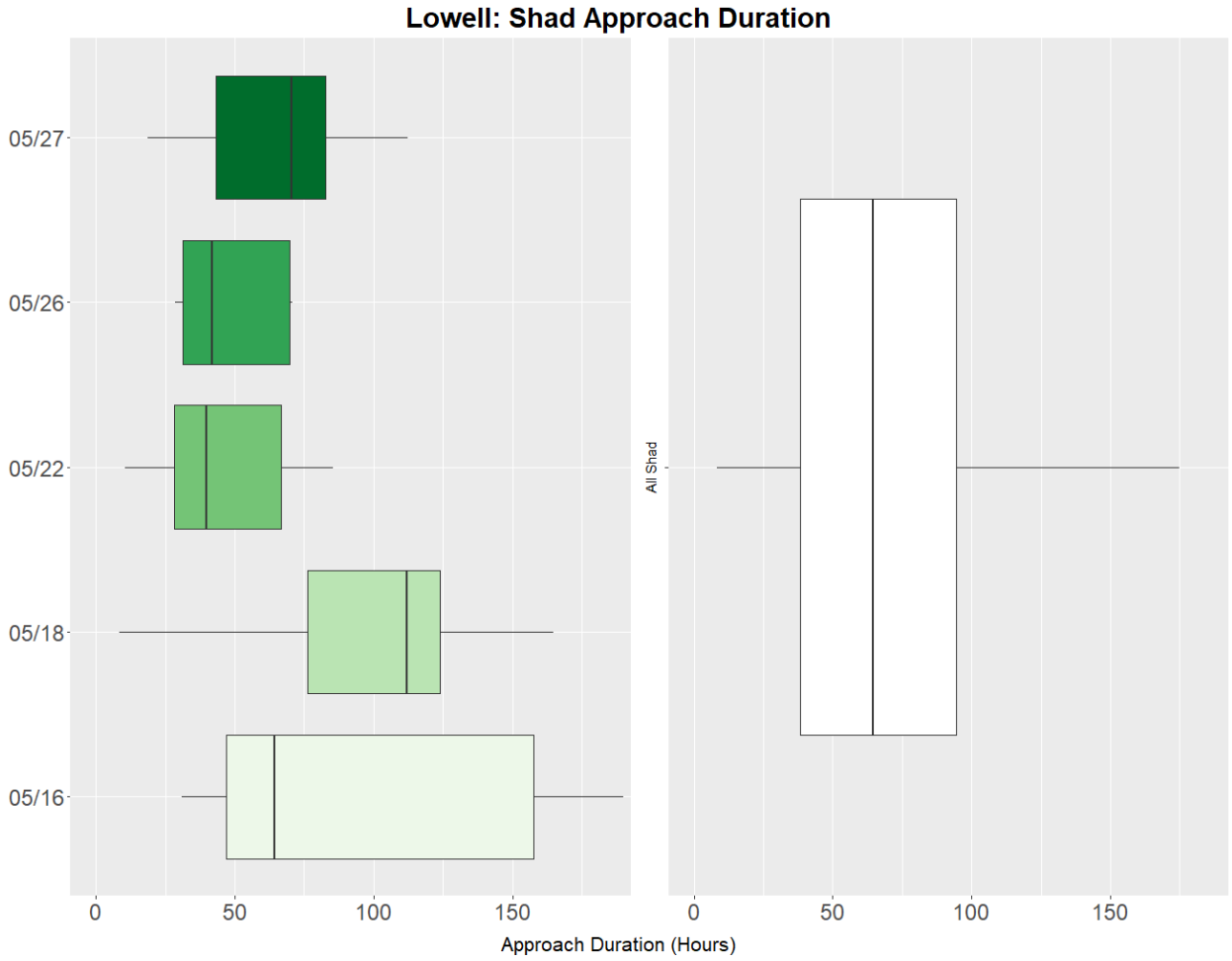

Figure 5–23. Boxplot of the approach duration for all dual-tagged adult American shad released downstream of Lowell during the spring 2020 upstream passage assessment. [8]

[8] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

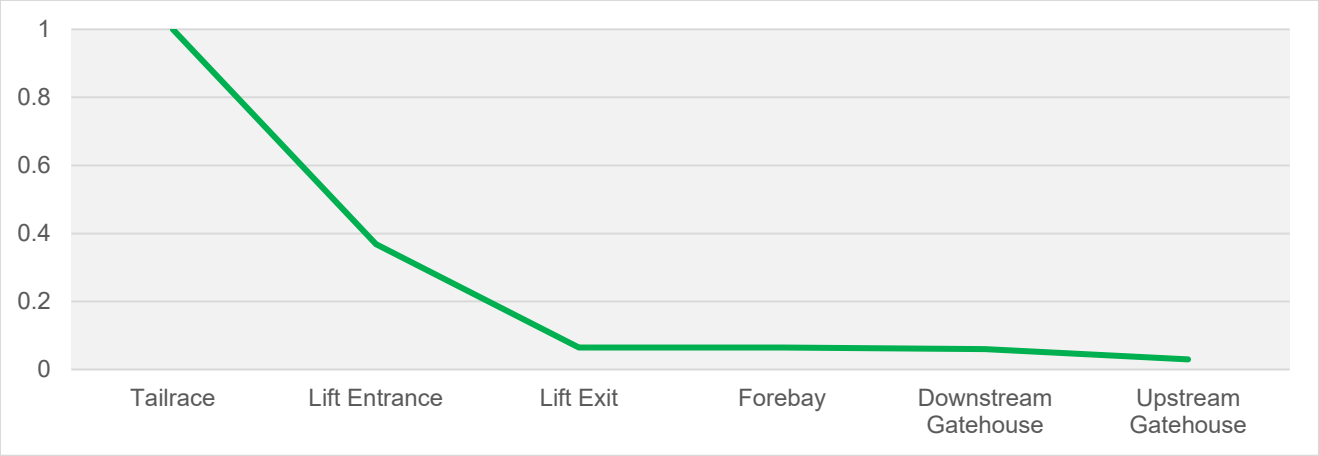

Figure 5–24. Magnitude of upstream progress for dual-tagged adult American shad forays at the E.L. Field fish lift during the spring 2020 upstream passage assessment.

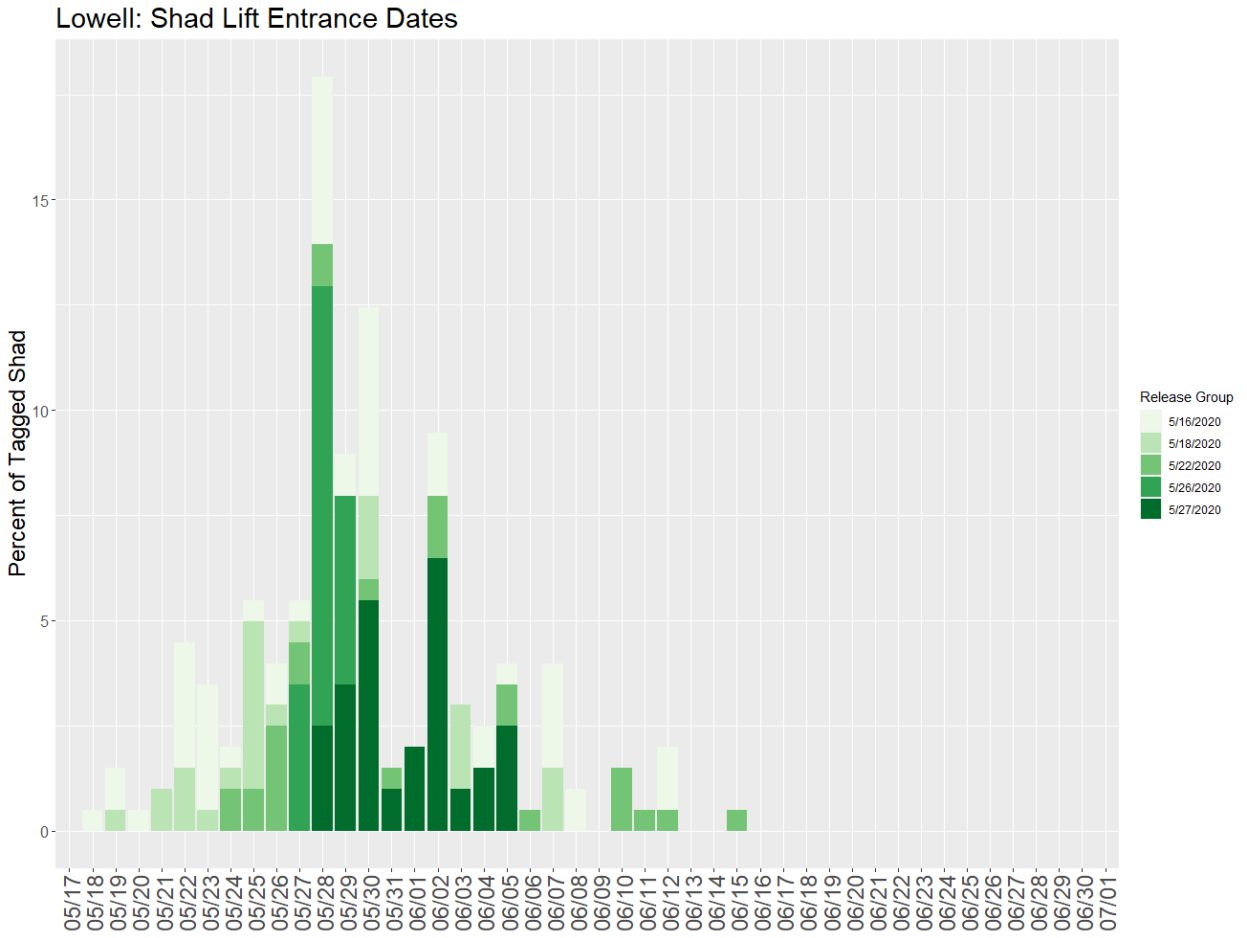

Figure 5–25. Distribution of entrance dates for dual-tagged adult American shad at the E.L. Field fish lift during the spring 2020 upstream passage assessment.

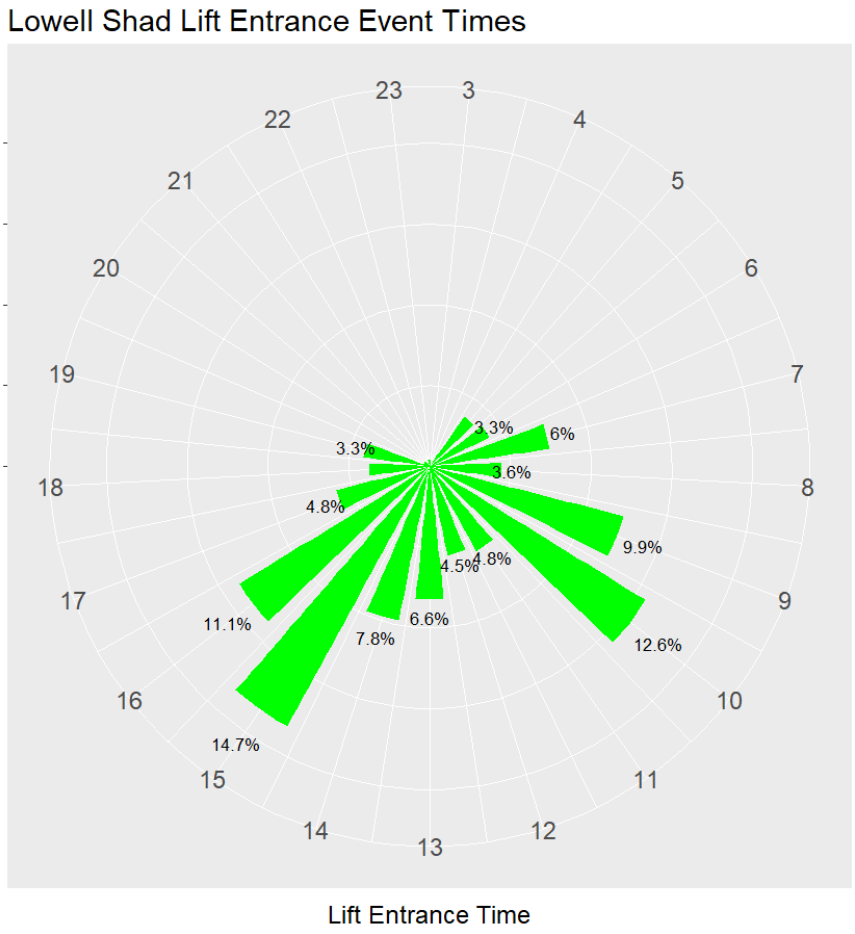

Figure 5–26. Distribution of entrance times for dual-tagged adult American shad at the E.L. Field fish lift during the spring 2020 upstream passage assessment.

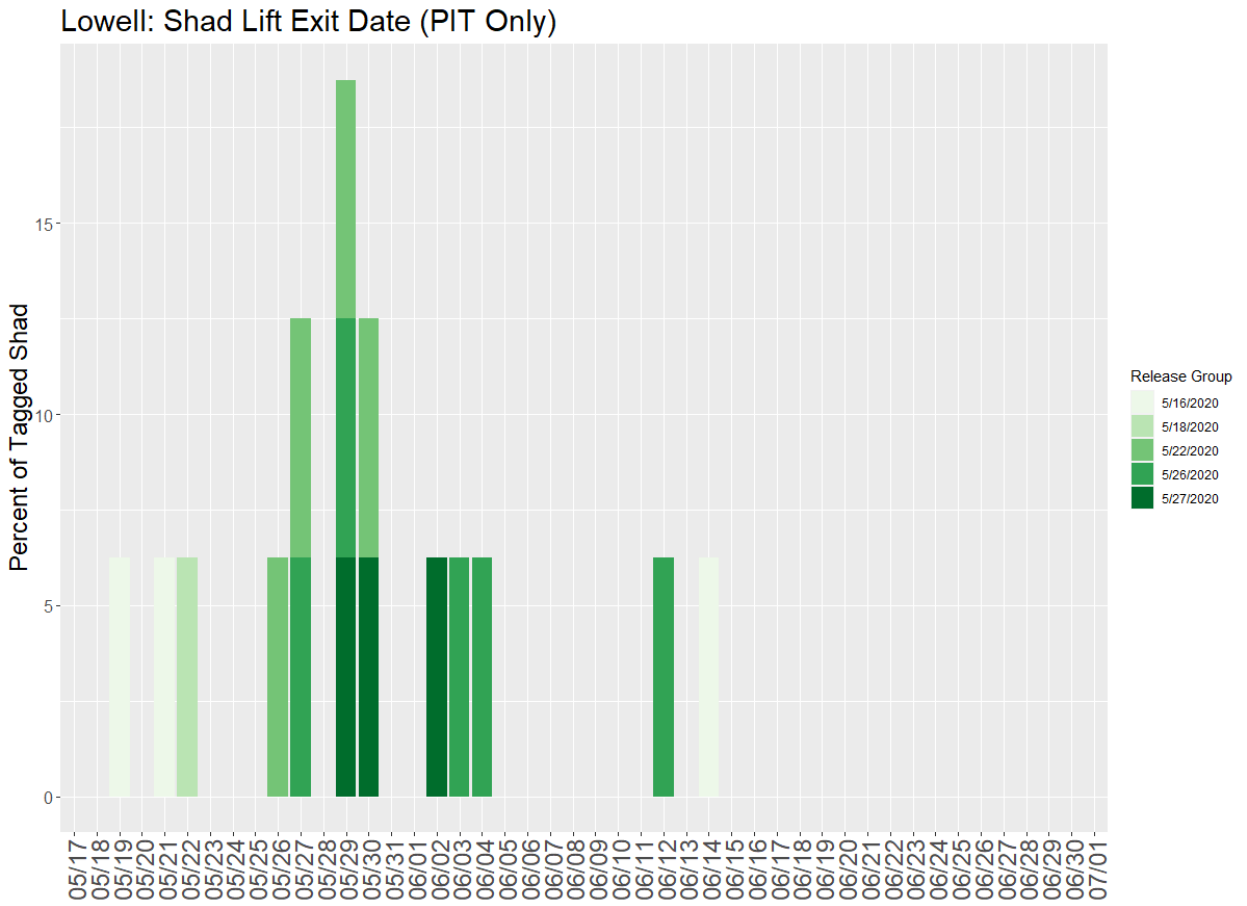

Figure 5–27. Distribution of exit flume dates for PIT-tagged adult American shad at the E.L Field Powerhouse fish lift during the spring 2020 upstream passage assessment.

5.6 Downstream Passage Effectiveness – Adult Alewives

A total of 150 adult alewives were radio-tagged and released during late-May and early-June 2020 for the purposes of evaluating downstream passage at Lowell (Table 5-34). Tagging was conducted on a total of four dates starting on May 21 and ending on June 2. Due to observations of reduced daily returns of river herring to the Lawrence Project over the days following the second release group (May 22) adult herring for the last two releases were obtained at the Amoskeag fishway located upstream of the Lowell Project in Manchester, NH[9]. Adult alewives tagged for evaluation of downstream passage at Lowell were comprised of 43% female, 56% male and 1% undetermined. Total length of individuals tagged ranged from 220-330 mm (mean = 294 mm). The mean body length for fish obtained at Lawrence and Amoskeag was similar (295 mm and 292 mm, respectively). A full listing of tagged individuals released upstream of Lowell during the spring of 2020 is provided in Appendix A.

As initially described in Section 4.3.2, a total of 200 radio-tagged adult alewives were released at two locations within the Nashua River, a tributary to the Merrimack River upstream of Lowell. The Pepperell release group consisted of 100 radio-tagged individuals released upstream of Mine Falls and subsequently moved downstream of both Mine Falls and Jackson Mills Dams. The Mine Falls release group consisted of 100 radio-tagged individuals released downstream of Mine Falls and subsequently moved downstream of Jackson Mills (and potentially Mine Falls, dependent on volitional upstream passage there) prior to arrival at Lowell. The subset of radio-tagged adult herring originating in the Nashua River and approaching Lowell (n = 93) has been incorporated into this overall review of downstream passage at the Project.

5.6.1 Project Arrival and Upstream Residence Duration

Releases of radio-tagged adult alewives were initiated upstream of Lowell at the Tyngsborough Riverfront Park on May 21 and concluded on June 2, 2020. Adult herring releases in the Nashua River occurred between the dates of May 17 to 19 for the Mine Falls group and between the dates of May 21 and 28 for the Pepperell release group. Figure 5-28 presents the distribution of arrival dates for those individual radio-tagged herring at the Pawtucket Dam as indicated by detection at Stations 05 and 06. When individuals from all upstream release locations are considered, initial detections for radio-tagged alewives were recorded over a range of dates from May 18 through June 10 with peaks in arrivals on May 30 and June 3, 2020. Radio-tagged individuals released at Mine Falls and Tyngsborough represented the majority of fish arriving through the second half of May and into early June. Later arriving outmigrants recorded approaching Lowell were originally released in the upper Nashua River at Pepperell. The duration of time from release until arrival at Lowell (i.e., the approach duration) ranged from 6.7 hours to 13.4 days (median = 2.4 days) for alewives released at Tyngsborough, from 12.3

[9] See Appendix F for a brief comparison of passage metrics for the adult river herring release groups at Tyngsborough which originated from tagging collections at the Lawrence (n = 80) and Amoskeag Dam (n = 70) fish passage facilities.

hours to 29.3 days (median = 10.3 days) for fish released at Pepperell, and from 3.0 days to 21.4 days (median = 11.4 days) for fish released at Mine Falls (Table 5-35).

The duration of time radio-tagged individuals were present upstream of the Pawtucket Dam was determined for all individuals which approached and eventually passed downstream and was calculated as the duration of time from initial detection immediately upstream of the dam until confirmed downstream passage via one of the available routes. When all individuals are considered, the upstream residence duration prior to downstream passage ranged between 0.4 hours to 8.9 days (Table 5-36; Figure 5-29). The median duration of time spent immediately upstream of the dam structure was 1.8 days and did not appear to differ greatly by release location for radio-tagged adult alewives released at any of the three locations upstream of Lowell (Tyngsborough = 2.0 days; Mine Falls = 1.6 days; and Pepperell = 1.5 days). Of the radio-tagged alewives which approached Pawtucket Dam, 26% passed in less than 24 hours and 78% passed in less than 96 hours after initial detection.

Outmigrating adult alosines encountering the Pawtucket Dam can (1) pass through the Pawtucket Gatehouse and enter the power canal, (2) pass downstream over Pawtucket Dam via spill, or (3) enter the Pawtucket Canal and navigate downstream via the downtown canal system. During the 2020 evaluation only four radio-tagged adult alewives were detected at Monitoring Station 28 indicating those individuals passed downstream through the downtown canal system rather than remaining in the mainstem Merrimack. The majority of radio-tagged alewives were determined to have passed through the Pawtucket Gatehouse and entered the Northern Canal to approach the E.L. Field powerhouse. The duration of time to pass through the Pawtucket Gatehouse was determined based on the initial detection for each individual adult at Stations 06 and 07 which independently monitored the upstream and downstream sides of that structure. The median duration of time for radio-tagged adult alewives to initially encounter and then pass through the Pawtucket Gatehouse was 1.7 hours (range <0.1 hours to 4.1 days; Table 5-37). The quartile ranges (25th to 75th percentiles) did not vary when examined among release groups (0.2-15.3 hours for herring originating at Tyngsborough; 0.1-10.1 hours for fish originating at Mine Falls; and 0.8-13.2 hours for fish originating at Pepperell). The majority (65%) of radio-tagged adult alewives passing through the Pawtucket Gatehouse did so in four hours or less following their initial detection at the structure.

Radio-tagged adult alewives released upstream of Lowell at Tyngsborough and which entered the Northern Canal and passed downstream of E.L. Field powerhouse did so relatively quickly. Of those individuals, 84% were resident in the power canal upstream of E.L. Field for 12 hours or less and the median residence duration in the Northern Canal was 0.5 hours (range = 0.2 hours to 1.8 days; Table 5-38). Adult river herring tagged and released at locations in the Nashua River demonstrated longer residence periods within the Northern Canal prior to downstream passage at Lowell. The quartile ranges (25th to 75th percentiles) for adult herring originally released at Pepperell ranged from 14.5-43.6 hours and for adult herring originally released at Mine Falls ranged from 4.7-69.6 hours (Table 5-38). When all individuals are considered, 20% of adult river herring were present in the Northern Canal for greater than 24 hours prior to downstream passage.

5.6.2 Downstream Passage

A total of 350 radio-tagged adult alewives were released at locations upstream of Lowell during the spring of 2020. Of that total, 124 of the 150 released upstream at Tyngsborough as part of this evaluation were determined to have approached the Pawtucket Dam and were available for the evaluation of downstream passage route (Table 5-39). An additional 93 radio-tagged adult river herring released upstream at Mine Falls (n = 50) and Pepperell (n=43) also approached Lowell and were included in the downstream analysis. The majority of radio-tagged individuals passed through the Pawtucket Gatehouse and approached the E.L. Field powerhouse (92% of approaching fish). Most individuals passed downstream of Lowell via the E.L. Field turbine units (47% of radio-tagged alewives) or utilized the downstream bypass (45% of radio-tagged alewives). Use of the bypassed reach (i.e., spill) was limited to a single individual.

Four radio-tagged adult alewives (2% of all fish approaching Pawtucket Dam) utilized the downtown canal system for downstream passage. The first of two individuals originally released at Tyngsborough and entering the downtown canal system moved through the Pawtucket Canal (i.e., Guard Locks and Swamp Locks) to the Eastern Canal. It was detected at Station 32 in the intake area of the John St. Station prior to passing downstream via the Boott Dam and subsequent detection downstream at Lawrence. Transit time from initial detection at the Guard Locks (Station 28) to passage at Boott Dam was 9.6 hours. The second individual moved through the Pawtucket Canal to Hamilton Canal and passed via the Hamilton Wasteway. It was detected at Station 32 in the intake area of the John St. Station prior to arrival at the receiver monitoring Boott Dam (i.e., Station 34). This individual exited the downtown canal system approximately 16.1 hours following initial detection at the Guard Locks. A single adult river herring originally released at Mine Falls entered the downtown canal system moved through the Pawtucket Canal to Hamilton Canal and passed via the Hamilton Wasteway. It was detected at Station 32 in the intake area of the John St. Station prior to arrival at the receiver monitoring Boott Dam (i.e., Station 34). Transit time from initial detection at the Guard Locks (Station 28) to passage at Boott Dam was 3.1 hours. This individual was subsequently detected downstream at Lawrence (Station 27). The fourth tagged adult river herring documented passing downstream via the downtown canal system was originally released at Pepperell. This individual moved through the Pawtucket Canal (i.e., Guard Locks and Swamp Locks) to the Eastern Canal. It was detected at Station 32 in the intake area of the John St. Station prior to initial detection at the Boott Dam sluice gate 51.9 hours after entering at the Guard Locks. This individual was likely a mortality as it remained stationary in the detection field of Station 34 for over two weeks following initial detection.

The single individual which passed Lowell via spill was initially detected at Station 06 (i.e., immediately upstream of the Pawtucket Gatehouse) but did not pass that structure and enter the Northern Canal.

Radio-tagged adult alewives were observed passing downstream of Lowell between the dates of May 18 through June 19 (Figure 5-30). Downstream passage of radio-tagged adult alosines at Lowell peaked during the early part of June with a peak of downstream passage events

occurring between June 3 and June 6, 2020. Figure 5-31 presents the timing distribution of downstream passage events for radio-tagged adult alewives at Lowell. The majority of individuals passed downstream during the mid-afternoon through early evening hours (i.e., 1400-1900).

For each of the 205 individuals which were confirmed to have passed downstream of Lowell via a known passage route (i.e., turbine, downstream bypass, spill or downtown canal) the hourly record of Project operations (Section 5.1) at the time of passage was reviewed. The discharge at the selected route was identified and contrasted with the cumulative discharge for all non-selected routes at the time of downstream passage (Table 5-40). A total of 47% of radio-tagged adult river herring passing downstream at Lowell did so via the E.L. Field turbine units. The median discharge through the two E.L. Field turbine units at the time of passage for those individuals was 1,853 cfs. When examined by passage route, the median percentage of passage route flow at each known downstream passage route represented 58% of project flow for turbine passed alewives, 4% of project flow for downstream bypass passed alewives, 23% of project flow for spill passed alewives, and 20% of project flow for individuals using the downtown canal system. A listing of route discharge at the time of downstream passage for each adult herring is provided in Appendix D.

5.6.3 Downstream Transit

Three monitoring stations were installed downstream of Lowell for the purpose of detecting radio-tagged adult alosines following passage at the Project during the spring of 2020. Those receivers were located approximately 2.1 (Monitoring Station 25), 6.0 (Monitoring Station 26), and 10.75 (Monitoring Station 27) miles downstream of the project. The minimum, maximum, and quartile transit times through those three reaches are presented in Table 5-41. The median transit time durations for all tagged adult alewives moving downstream of Lowell were 4.7, 2.7, and 17.9 hours for the 2.1 mile, 3.9 mile and 4.75 mile downstream reaches, respectively. When examined by release location the median downstream transit durations were comparable among groups for each reach, ranging from 4.0 to 5.0 hours for adult herring from Lowell to Station 25, 2.6 to 3.3 hours for adult herring from Station 25 to Station 26, and 15.4 to 19.0 hours for adult herring from Station 26 to Essex Dam in Lawrence. Table 5-42 provides the minimum, maximum, and quartile transit times through defined sections of the Merrimack River between Lowell and Lawrence as a rate (i.e., miles per hour (mph)).

Table 5-43 and Figure 5-32 present the minimum, maximum and quartile transit times for radio-tagged adult alewives to cover the full reach from immediately downstream of Lowell to the upstream face of the Essex Dam in Lawrence (i.e., Station 27). The median travel time for those individuals to approach Lawrence following downstream passage at Lowell was 1.1 days (range = 8.0 hours to 7.7 days).

5.6.4 Passage Survival

The CJS model *Phi(t)p(t)* provided the best fit for the observed mark-recapture data associated with downstream movements of all radio-tagged adult alewives approaching and passing at Lowell during 2020 (Table 5-44). The detection efficiency for telemetry receivers recording

passage of adult herring for monitoring stations at Lowell and downstream of Lowell ranged from 1.000 to 0.853 (Table 5-45). The reach-specific survival estimates for the Merrimack River from the Lowell impoundment receiver to detection immediately upstream of Lawrence for (1) all adult alewives, (2) adult alewives released at Tyngsborough, (3) adult alewives released in the Nashua River, (4) turbine-passed adult alewives, and (5) downstream bypass passed adult alewives are presented in Table 5-46. Passage success for downstream passage of adult alewives at Lowell was calculated as the joint probability of the three reach-specific survival estimates which encompasses the full section of the Merrimack River from Lowell downstream to Lawrence (i.e., Lowell to Station 25, Station 25 to Station 26, and Station 26 to Lawrence). This resulted in an estimated downstream passage survival for all adult alewives at Lowell of 80.1% (75% CI = 76.7%-83.6%). No adjustments were made to encounter histories for adult alewives passing Lowell to reflect the duration of time to detection at Lawrence following downstream passage since there were no documented events for radio-tagged "drift" alewives at the downstream receiver stations indicating that the magnitude of downstream travel for that species following dead release into the tailrace was negligible. When examined by release location, downstream passage survival was estimated for adult herring released at Tyngsborough at 76.1% (75% CI = 71.5%-80.5%) and for adult herring released in the Nashua River at 86.2% (75% CI = 81.3%-91.0%).

Radio-tagged adult alewives which approached and passed downstream at Lowell during the 2020 evaluation did so via a variety or passage routes (Table 5-39). Individual CJS models were run for the subset of individuals utilizing the E.L. Field turbine units and downstream bypass facility for downstream passage and produced estimates of 73.9% (75% CI = 68.8%-79.1%) and 87.8% (75% CI = 81.8%-91.5%), respectively. . The single adult alewife passing Lowell via spill and three of the four passing Lowell via the downtown canal system were also subsequently detected at Lawrence.

Table 5–34. Summary of tagging and release information for adult alewives released upstream of Lowell during the spring 2020 downstream passage assessment.

Date	Source	Type	Number
21-May	Lawrence	Radio	60
22-May	Lawrence	Radio	20
28-May	Amoskeag	Radio	20
2-Jun	Amoskeag	Radio	50
Total		Radio	150

Table 5–35. Minimum, maximum, and quartile values of approach duration (hours) for radio-tagged alewives released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Approach Duration (hrs)						
Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tyngsborough	21-May	6.7	323.6	154.4	181.0	233.1
	22-May	58.5	299.4	124.8	147.9	228.5
	28-May	11.8	155.1	28.1	37.8	52.5
	2-Jun	11.5	75.9	28.2	32.7	38.3
	All	**6.7**	**323.6**	**32.7**	**58.5**	**176.8**
Mine Falls	17-May	57.3	350.6	118.1	198.5	285.7
	18-May	12.3	702.6	204.3	239.4	292.4
	19-May	111.8	439.0	203.5	277.3	390.6
	All	**12.3**	**702.6**	**199.5**	**248.3**	**306.6**
Pepperell	21-May	197.2	481.5	379.5	397.4	440.5
	22-May	169.2	439.5	240.3	354.2	400.6
	28-May	72.6	513.7	130.2	173.9	235.1
	All	**72.6**	**513.7**	**174.7**	**274.7**	**397.4**
All		**6.7**	**702.6**	**46.7**	**175.0**	**261.4**

Table 5–36. Minimum, maximum, and quartile values of upstream residence duration (hours) for radio-tagged alewives released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Upstream Residence (hrs)						
Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tyngsborough	21-May	0.8	198.6	22.3	44.3	88.5
	22-May	16.0	210.1	37.7	51.5	78.7
	28-May	0.7	181.7	55.0	77.5	103.7
	2-Jun	2.1	134.4	22.7	42.6	71.8
	All	**0.7**	**210.1**	**25.3**	**48.2**	**88.6**
Mine Falls	17-May	0.9	114.9	4.7	10.1	39.3
	18-May	0.4	215.6	16.3	42.6	102.2
	19-May	0.8	164.6	25.5	39.7	90.3
	All	**0.4**	**215.6**	**15.7**	**38.3**	**100.2**
Pepperell	21-May	6.5	98.4	16.7	37.1	51.6
	22-May	6.0	69.0	28.6	36.1	37.9
	28-May	2.4	134.0	24.5	37.5	60.2
	All	**2.4**	**134.0**	**22.8**	**36.2**	**54.2**
All		**0.4**	**215.6**	**23.0**	**44.0**	**87.1**

Table 5–37. Minimum, maximum, and quartile values of time to pass the Pawtucket Gatehouse and enter Northern Canal (hours) for radio-tagged alewives released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Pawtucket Gatehouse Passage (hrs)						
Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tyngsborough	21-May	<0.1	99.3	0.2	0.5	7.3
	22-May	0.1	9.9	0.2	0.8	3.8
	28-May	<0.1	94.2	0.4	2.2	16.8
	2-Jun	<0.1	65.6	0.6	2.6	25.1
	All	**<0.1**	**99.3**	**0.2**	**1.8**	**15.3**
Mine Falls	17-May	<0.1	28.2	0.0	0.1	10.4
	18-May	<0.1	46.1	0.2	1.0	7.6
	19-May	<0.1	27.6	0.3	1.5	11.1
	All	**<0.1**	**46.1**	**0.1**	**0.8**	**10.1**
Pepperell	21-May	0.3	47.4	0.8	1.0	2.2
	22-May	0.1	21.7	0.3	0.8	6.9
	28-May	0.1	95.9	1.4	2.6	18.0
	All	**0.1**	**95.9**	**0.8**	**1.9**	**13.2**
All		**<0.1**	**99.3**	**0.2**	**1.7**	**14.6**

Table 5–38. Minimum, maximum, and quartile values of Northern Canal residence duration (hours) for radio-tagged alewives released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Northern Canal Residence (hrs)						
Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tyngsborough	21-May	0.2	38.2	0.3	0.4	6.1
	22-May	0.2	27.2	0.3	0.4	0.5
	28-May	0.2	33.3	0.3	0.5	3.7
	2-Jun	0.2	42.3	0.4	0.7	5.7
	All	**0.2**	**42.3**	**0.3**	**0.5**	**5.1**
Mine Falls	17-May	0.6	86.1	3.0	9.2	39.1
	18-May	0.2	213.4	13.3	28.8	86.6
	19-May	0.5	117.5	4.7	22.6	66.6
	All	**0.2**	**213.4**	**4.7**	**22.5**	**69.6**
Pepperell	21-May	1.0	95.5	2.2	19.1	46.0
	22-May	1.0	44.9	9.5	23.5	30.1
	28-May	1.6	133.1	18.9	21.7	42.1
	All	**1.0**	**133.1**	**14.5**	**22.3**	**43.6**
All		**0.2**	**213.4**	**0.4**	**2.8**	**21.4**

Table 5–39. Downstream passage route selection for radio-tagged alewives released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Lowell Downstream Passage Route							
Release Location	**Release Date**	**No Detect**	**No Pass**	**Downtown**	**Turbine**	**Spill**	**Bypass**
Tyngsborough	21-May	16	0	0	24	1	19
	22-May	7	0	0	7	0	6
	28-May	0	0	0	11	0	9
	2-Jun	3	1	2	22	0	22
	All	**26**	**1**	**2**	**64**	**1**	**56**
% of Total Detected			1%	2%	52%	1%	45%
Mine Falls	17-May	13	1	0	4	0	2
	18-May	18	3	0	9	0	10
	19-May	19	2	1	11	0	7
	All	**50**	**6**	**1**	**24**	**0**	**19**
% of Total Detected			12%	2%	48%	0%	38%
Pepperell	21-May	28	1	0	3	0	8
	22-May	9	3	0	2	0	5
	28-May	20	1	1	10	0	9
	All	**57**	**5**	**1**	**15**	**0**	**22**
% of Total Detected			12%	2%	35%	0%	51%
All		**133**	**12**	**4**	**103**	**1**	**97**
% of Total Detected			6%	2%	47%	0%	45%

Table 5–40. Quartile conditions of project discharge at the time of downstream passage for radio-tagged adult river herring at the known route of passage and the cumulative sum of discharge at non-passage routes.

Passage Route	No. Using Route	Quartile	Route Discharge		Non-Route Discharge	
			cfs	%	cfs	%
Turbines	103	Q25	1414	51%	1259	32%
		Q50	1853	58%	1352	42%
		Q75	3203	68%	1526	49%
Downstream Bypass	97	Q25	132	3%	2706	95%
		Q50	132	4%	2953	96%
		Q75	132	5%	3928	97%
Spill	1	-	683	23%	2283	77%
Downtown Canal	4	Q25	542	17%	2010	79%
		Q50	542	20%	2202	80%
		Q75	589	21%	2873	83%

Table 5–41. Minimum, maximum, and quartile values of travel time (hours) through three separate downstream reaches for radio-tagged alewives following downstream passage at Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Downstream Transit Duration (hrs)							
Downstream Reach	Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Downstream of Lowell to Station 25 (2.1 miles)	Tyngsborough	21-May	1.1	50.8	3.2	5.2	11.7
		22-May	2.6	17.0	4.5	6.2	10.0
		28-May	1.7	18.7	3.8	5.5	9.3
		2-Jun	1.5	28.5	2.6	4.6	6.9
		All	**1.1**	**50.8**	**3.0**	**5.0**	**8.8**
	Mine Falls	17-May	1.4	5.9	2.1	3.3	4.5
		18-May	1.1	16.5	3.7	4.9	6.2
		19-May	1.1	18.1	2.7	4.5	9.7
		All	**1.1**	**18.1**	**2.6**	**4.7**	**6.4**
	Pepperell	21-May	2.0	7.0	2.7	3.2	4.3
		22-May	0.5	7.6	2.3	3.9	4.3
		28-May	2.1	9.9	3.3	5.0	5.8
		All	**0.5**	**9.9**	**2.9**	**4.0**	**5.3**
	All		**0.5**	**50.8**	**2.9**	**4.7**	**7.1**
Station 25 to Station 26 (3.9 miles)	Tyngsborough	21-May	1.7	4.2	1.9	2.2	2.9
		22-May	1.8	4.5	2.0	2.1	2.4
		28-May	1.9	16.5	2.3	2.7	3.2
		2-Jun	2.2	13.7	2.6	3.0	3.9
		All	**1.7**	**16.5**	**2.1**	**2.6**	**3.1**
	Mine Falls	17-May	1.9	22.1	3.2	7.1	15.7
		18-May	1.8	18.1	2.1	2.6	3.1
		19-May	1.8	20.7	2.1	2.4	3.4
		All	**1.8**	**22.1**	**2.1**	**2.9**	**3.7**
	Pepperell	21-May	2.1	7.9	2.4	2.5	4.1
		22-May	2.5	4.6	2.8	3.3	4.0
		28-May	1.9	19.4	2.3	3.5	5.4
		All	**1.9**	**19.4**	**2.4**	**3.3**	**4.4**
	All		**1.7**	**22.1**	**2.1**	**2.7**	**3.5**
Station 26 to Lawrence (Station 27; 4.75 miles)	Tyngsborough	21-May	2.6	138.9	14.6	19.0	21.0
		22-May	4.5	8.5	5.2	5.8	7.2
		28-May	13.4	51.5	17.8	19.6	21.4
		2-Jun	4.1	68.2	17.0	18.7	20.4
		All	**2.6**	**138.9**	**16.3**	**19.0**	**21.0**
	Mine Falls	17-May	2.9	70.5	8.1	18.8	32.7
		18-May	13.5	20.7	16.2	17.0	19.2
		19-May	3.6	21.9	4.6	13.9	16.4
		All	**2.9**	**70.5**	**13.3**	**16.4**	**19.2**
	Pepperell	21-May	2.9	23.7	10.8	14.0	16.7
		22-May	3.4	17.6	5.9	13.0	16.2
		28-May	12.7	19.4	15.4	17.9	19.2
		All	**2.9**	**23.7**	**12.9**	**15.4**	**17.9**
	All		**2.6**	**138.9**	**13.7**	**17.9**	**19.9**

Table 5–42. Minimum, maximum, and quartile values of rate of travel (mph) through three separate downstream reaches for radio-tagged alewives following downstream passage at Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Downstream Transit Rate (mph)							
Downstream Reach	Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Downstream of Lowell to Station 25 (2.1 miles)	Tyngsborough	21-May	0.0	1.9	0.7	0.4	0.2
		22-May	0.1	0.8	0.5	0.3	0.2
		28-May	0.1	1.2	0.6	0.4	0.2
		2-Jun	0.1	1.4	0.8	0.5	0.3
		All	**0.0**	**1.9**	**0.7**	**0.4**	**0.2**
	Mine Falls	17-May	0.4	1.5	1.0	0.6	0.5
		18-May	0.1	1.8	0.6	0.4	0.3
		19-May	0.1	1.9	0.8	0.5	0.2
		All	**0.1**	**1.9**	**0.8**	**0.4**	**0.3**
	Pepperell	21-May	0.3	1.1	0.8	0.7	0.5
		22-May	0.3	4.2	0.9	0.5	0.5
		28-May	0.2	1.0	0.6	0.4	0.4
		All	**0.2**	**4.2**	**0.7**	**0.5**	**0.4**
	All		**0.0**	**4.2**	**0.7**	**0.4**	**0.3**
Station 25 to Station 26 (3.9 miles)	Tyngsborough	21-May	0.9	2.3	2.1	1.8	1.3
		22-May	0.9	2.2	2.0	1.9	1.6
		28-May	0.2	2.1	1.7	1.4	1.2
		2-Jun	0.3	1.8	1.5	1.3	1.0
		All	**0.2**	**2.3**	**1.9**	**1.5**	**1.3**
	Mine Falls	17-May	0.2	2.1	1.2	0.6	0.2
		18-May	0.2	2.2	1.8	1.5	1.3
		19-May	0.2	2.1	1.8	1.6	1.2
		All	**0.2**	**2.2**	**1.8**	**1.3**	**1.1**
	Pepperell	21-May	0.5	1.9	1.6	1.5	1.0
		22-May	0.9	1.6	1.4	1.2	1.0
		28-May	0.2	2.0	1.7	1.1	0.7
		All	**0.2**	**2.0**	**1.6**	**1.2**	**0.9**
	All		**0.2**	**2.3**	**1.9**	**1.4**	**1.1**
Station 26 to Lawrence (Station 27; 4.75 miles)	Tyngsborough	21-May	0.0	1.8	0.3	0.3	0.2
		22-May	0.6	1.1	0.9	0.8	0.7
		28-May	0.1	0.4	0.3	0.2	0.2
		2-Jun	0.1	1.2	0.3	0.3	0.2
		All	**0.0**	**1.8**	**0.3**	**0.3**	**0.2**
	Mine Falls	17-May	0.1	1.6	0.6	0.3	0.1
		18-May	0.2	0.4	0.3	0.3	0.2
		19-May	0.2	1.3	1.0	0.3	0.3
		All	**0.1**	**1.6**	**0.4**	**0.3**	**0.2**
	Pepperell	21-May	0.2	1.6	0.4	0.3	0.3
		22-May	0.3	1.4	0.8	0.4	0.3
		28-May	0.2	0.4	0.3	0.3	0.2
		All	**0.2**	**1.6**	**0.4**	**0.3**	**0.3**
	All		**0.0**	**1.8**	**0.3**	**0.3**	**0.2**

Table 5–43. Minimum, maximum, and quartile values for downstream travel duration from Lowell to Lawrence (hours) for radio-tagged alewives released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Alewife - Downstream Travel: Lowell to Lawrence (hrs)						
Release Location	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Tyngsborough	21-May	8.0	143.4	23.9	26.4	29.3
	22-May	15.0	23.4	15.2	15.3	19.4
	28-May	21.1	61.6	26.3	28.5	37.5
	2-Jun	10.6	184.6	23.9	26.2	34.0
	All	**8.0**	**184.6**	**23.8**	**26.6**	**32.4**
Mine Falls	17-May	10.6	94.6	23.8	26.7	44.6
	18-May	20.4	43.6	24.1	24.4	26.2
	19-May	16.0	37.3	21.9	24.0	27.0
	All	**10.6**	**94.6**	**23.0**	**24.4**	**27.3**
Pepperell	21-May	8.2	36.1	18.4	22.4	30.3
	22-May	9.7	28.7	12.2	20.9	23.1
	28-May	22.0	29.2	24.1	25.8	28.5
	All	**8.2**	**36.1**	**21.6**	**23.7**	**28.6**
All		**8.0**	**184.6**	**22.8**	**25.8**	**30.3**

Table 5–44. CJS model selection criteria for survival of alewives at Lowell during the spring 2020 adult alosine passage assessment.

Scenario	Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Parameters	Deviance
All Herring	*Phi(t)p(t)*	1496.93	0.00	1.00	1.00	11	31.11
	Phi(t)p(.)	1548.03	51.10	0.00	0.00	8	88.29
	Phi(.)p(t)	1687.72	190.79	0.00	0.00	7	230.01
	Phi(.)p(.)	1864.79	367.86	0.00	0.00	2	417.15
Tyngsborough Herring	*Phi(t)p(t)*	671.00	0.00	1.00	1.00	11	23.25
	Phi(t)p(.)	698.84	27.84	0.00	0.00	7	59.29
	Phi(.)p(t)	722.83	51.83	0.00	0.00	8	81.24
	Phi(.)p(.)	868.37	197.37	0.00	0.00	2	238.95
Nashua River Herring	*Phi(t)p(t)*	760.23	0.00	1.00	1.00	11	22.76
	Phi(t)p(.)	782.43	22.20	0.00	0.00	8	51.15
	Phi(.)p(t)	911.48	151.25	0.00	0.00	7	182.25
	Phi(.)p(.)	966.21	205.97	0.00	0.00	2	247.13
Turbine Passed	*Phi(t)p(t)*	492.78	0.00	1.00	1.00	9	27.38
	Phi(t)p(.)	526.12	33.34	0.00	0.00	5	68.92
	Phi(.)p(t)	557.04	64.26	0.00	0.00	7	95.75
	Phi(.)p(.)	670.78	178.00	0.00	0.00	2	219.66
Bypass Passed	*Phi(t)p(t)*	375.05	0.00	1.00	1.00	7	13.37
	Phi(.)p(t)	398.24	23.19	0.00	0.00	6	38.61
	Phi(t)p(.)	399.51	24.47	0.00	0.00	5	41.92
	Phi(.)p(.)	590.82	215.77	0.00	0.00	2	239.31

Where *phi* = survival; *p* = detection probability; t = parameter is allowed to vary with time; and "." = parameter is fixed with time.

Table 5–45. Detection efficiency estimates (p) for monitoring locations installed to detect radio-tagged alewives at Lowell during the spring 2020 adult alosine passage assessment.

Location	S	SE	95% CI	
Station 04	0.963	0.013	0.927	0.981
Lowell	0.961	0.014	0.924	0.980
Station 25	1.000	0.000	-	-
Station 26	0.975	0.012	0.936	0.991
Station 27	0.853	0.030	0.785	0.902

Table 5–46. Reach-specific survival probability estimates (*phi)*, standard errors, and likelihood 75% and 95% confidence intervals for radio-tagged alewives at Lowell during the spring 2020 adult alosine passage assessment.

Scenario	Reach	*Phi*	SE	95% CI		75% CI	
All Herring	*Station 04 to Project*	0.983	0.009	0.950	0.994	0.968	0.991
	Project to Passage	0.952	0.015	0.913	0.974	0.931	0.966
	Passage to Station 25	0.835	0.026	0.778	0.880	0.803	0.863
	Station 25 to Station 26	0.959	0.020	0.898	0.984	0.930	0.976
	Station 26 to Lawrence	1.000	0.000	-	-	-	-
Tyngsborough Herring	*Station 04 to Project*	0.976	0.014	0.929	0.992	0.955	0.988
	Project to Passage	0.992	0.008	0.944	0.999	0.974	0.997
	Passage to Station 25	0.782	0.037	0.700	0.846	0.736	0.822
	Station 25 to Station 26	0.973	0.022	0.872	0.995	0.931	0.990
	Station 26 to Lawrence	1.000	0.000	-	-	-	-
Nashua River Herring	*Station 04 to Project*	0.995	0.012	0.677	1.000	0.930	1.000
	Project to Passage	0.895	0.033	0.811	0.945	0.851	0.928
	Passage to Station 25	0.916	0.031	0.832	0.960	0.873	0.945
	Station 25 to Station 26	0.941	0.034	0.828	0.981	0.888	0.970
	Station 26 to Lawrence	1.000	0.000	-	-	-	-
Turbine Herring	*Station 04 to Project*	1.000	0.000	-	-	-	-
	Project to Passage	1.000	0.000	-	-	-	-
	Passage to Station 25	0.778	0.041	0.688	0.849	0.727	0.822
	Station 25 to Station 26	0.950	0.033	0.831	0.986	0.896	0.977
	Station 26 to Lawrence	1.000	0.000	-	-	-	-
Bypass Herring	*Station 04 to Project*	1.000	0.000	-	-	-	-
	Project to Passage	1.000	0.000	-	-	-	-
	Passage to Station 25	0.908	0.030	0.832	0.952	0.868	0.937
	Station 25 to Station 26	0.967	0.024	0.871	0.992	0.926	0.986
	Station 26 to Lawrence	1.000	0.000	1.000	1.000	1.000	1.000

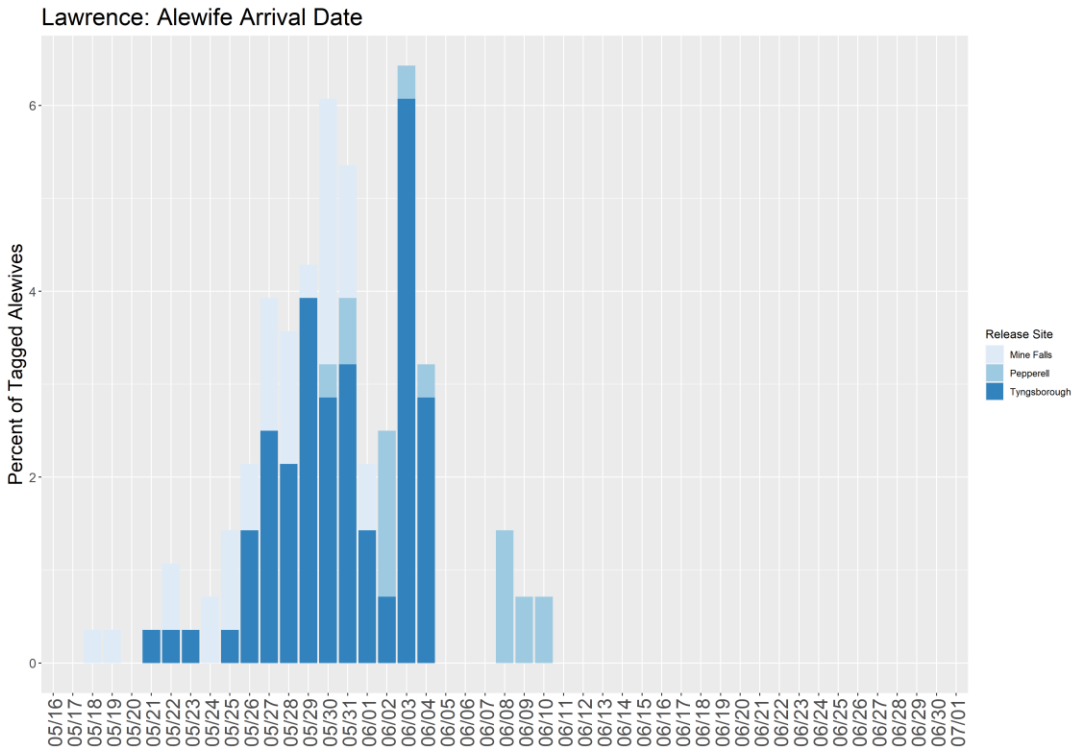

Figure 5–28. Distribution of Pawtucket Dam arrival dates for radio-tagged alewives at Lowell (by release location) during the spring 2020 adult alosine passage assessment.

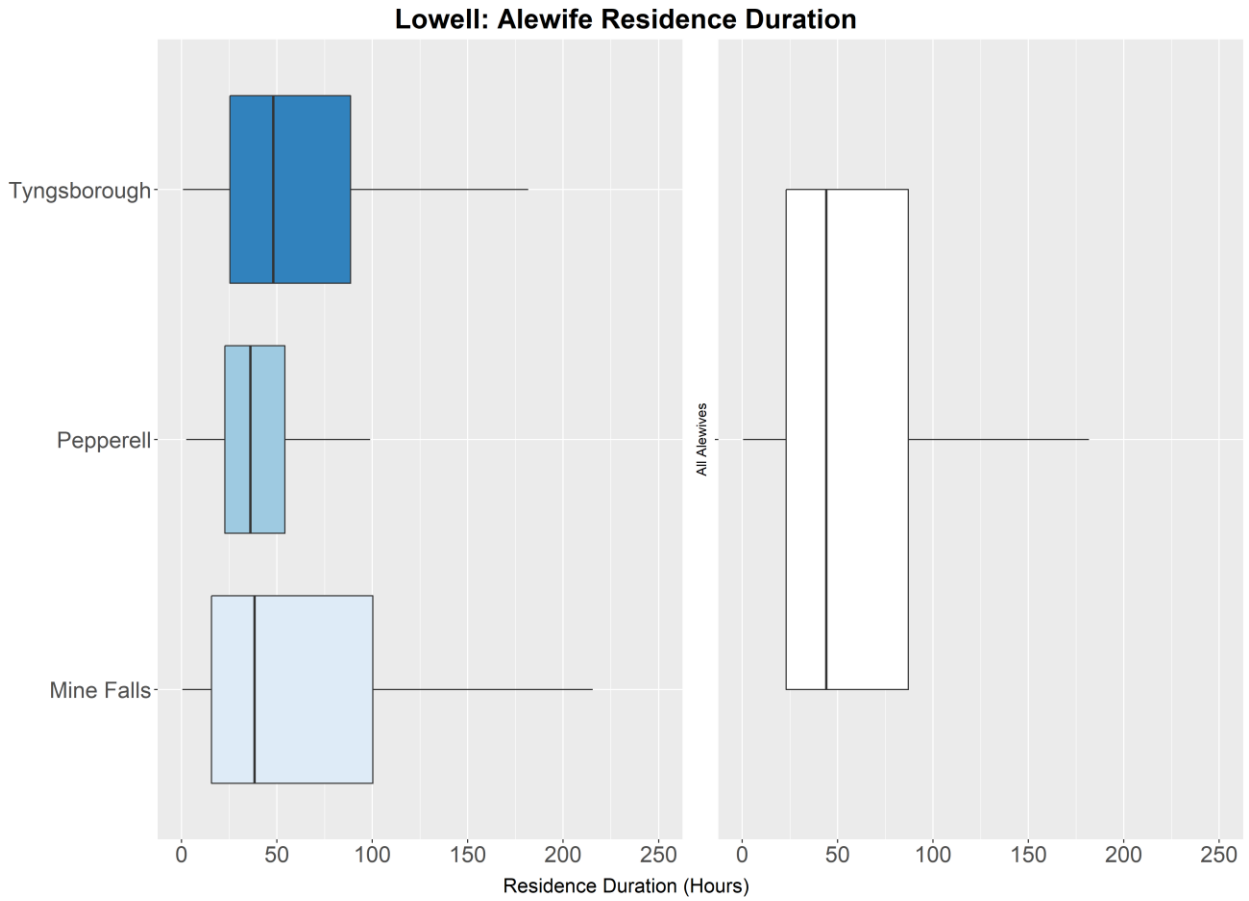

Figure 5–29. Boxplot of the Lowell upstream residence duration for radio-tagged alewives at Lowell (by release location) during the spring 2020 adult alosine passage assessment. [10]

[10] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

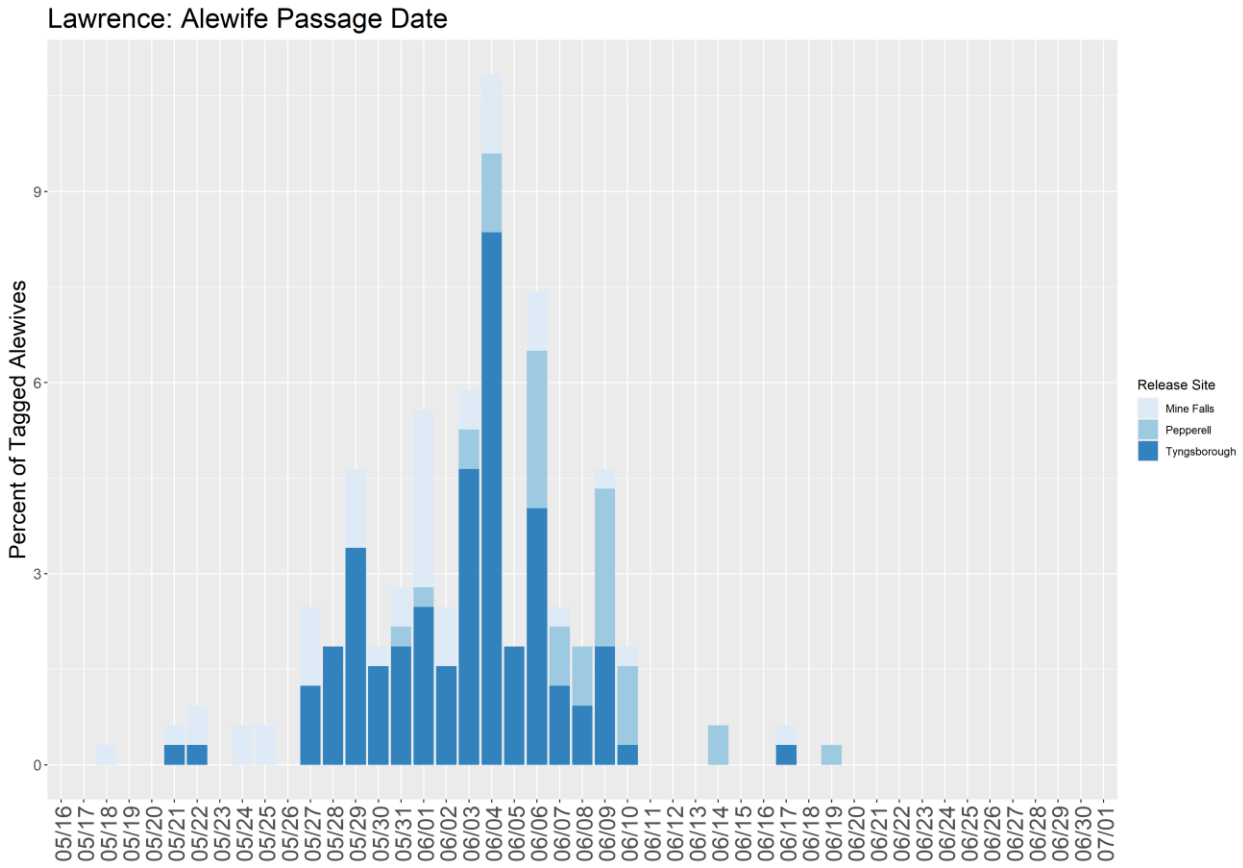

Figure 5–30. Distribution of Pawtucket Dam downstream passage dates for radio-tagged alewives at Lowell (by release location) during the spring 2020 adult alosine passage assessment.

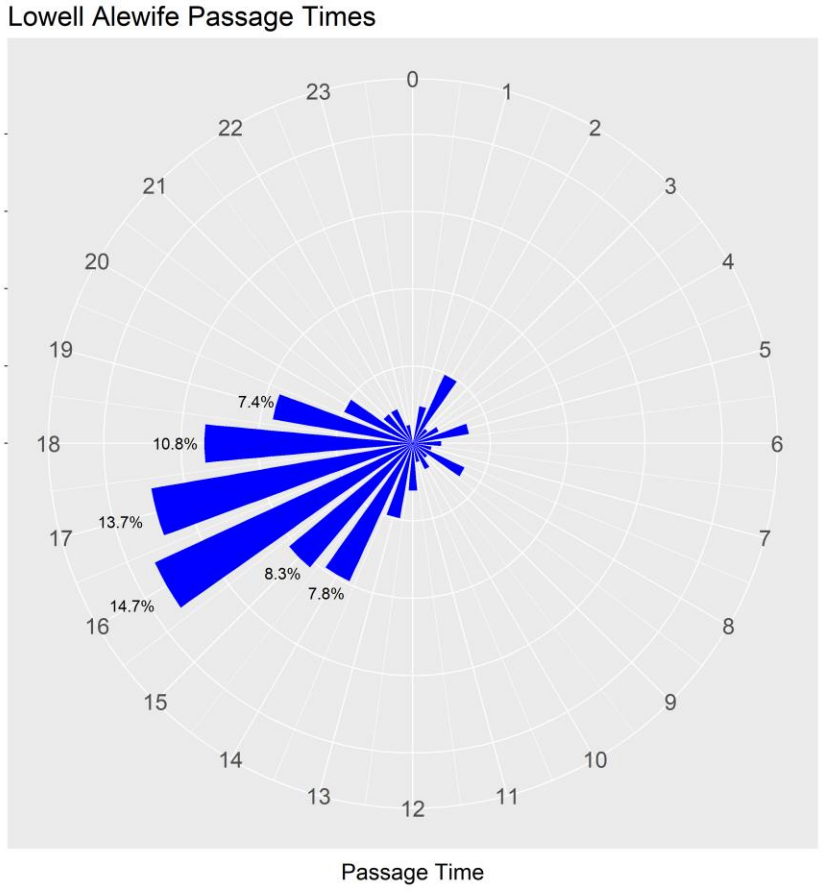

Figure 5–31. Distribution of downstream passage time for all radio-tagged alewives at Lowell during the spring 2020 adult alosine passage assessment.

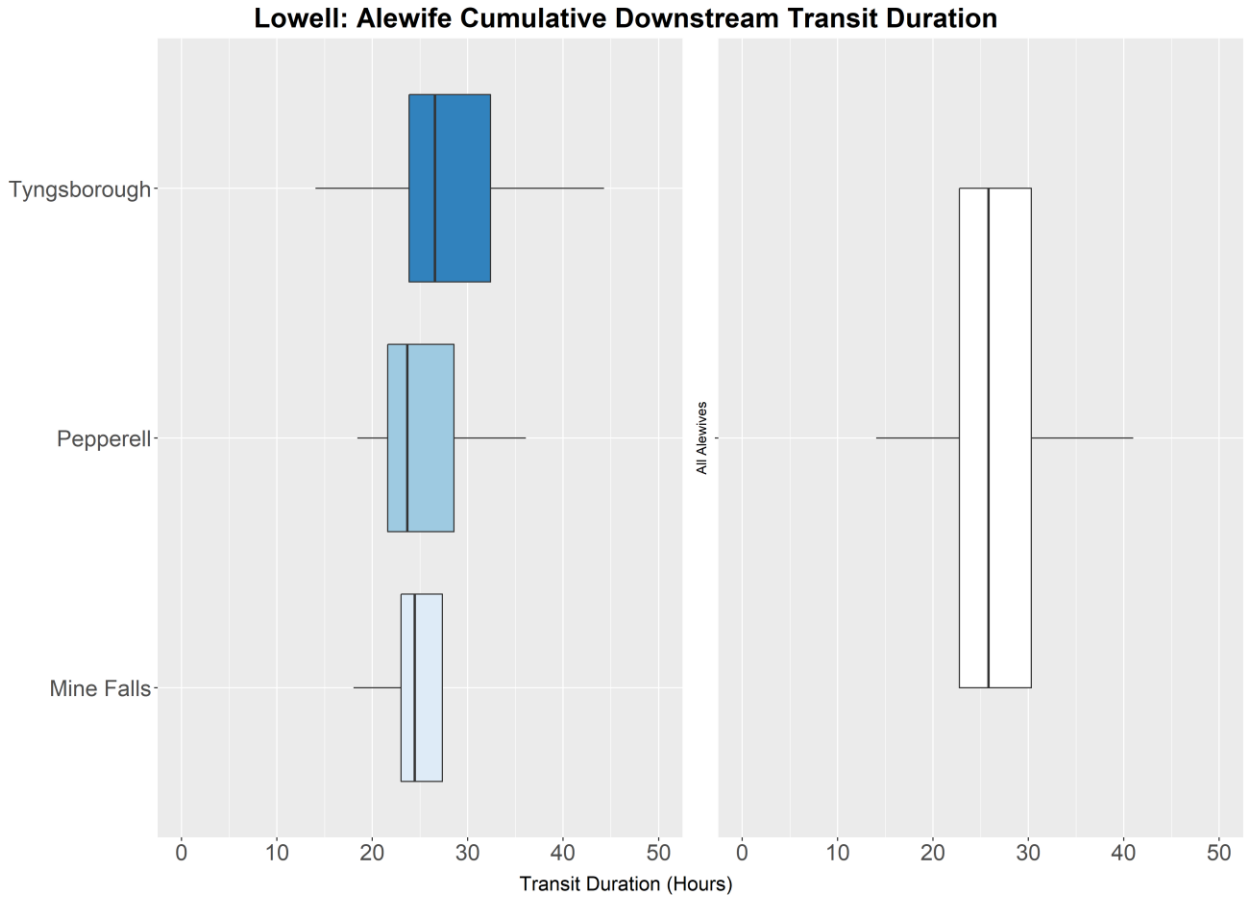

Figure 5–32. Boxplot of the downstream transit duration from Lowell to Lawrence for all radio-tagged alewives at Lowell (by release location) during the spring 2020 adult alosine passage assessment. [11]

[11] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

5.7 Downstream Passage Effectiveness – Adult American Shad

A total of 150 adult American shad were radio-tagged and released during early-June 2020 for the purposes of evaluating downstream passage at Lowell (Table 5-47). Tagging was conducted on a total of three dates (June 3, 5, and 8). The New Hampshire Fish and Game Department provided a tank truck to assist with moving radio-tagged shad from the Lawrence lift to the release location upstream of Lowell. Adult shad tagged for evaluation of downstream passage at Lowell were comprised of 37% female, 58% male and 5% undetermined. Total length of individuals tagged ranged from 385-556 mm (mean = 482 mm). A full listing of tagged individuals released upstream of Lowell during the spring of 2020 is provided in Appendix A.

5.7.1 Project Arrival and Upstream Residence Duration

Releases of radio-tagged adult American shad were initiated upstream of Lowell at the Tyngsborough Riverfront Park on June 3, 2020. Figure 5-33 presents the distribution of arrival dates for those individuals at the Pawtucket Dam as indicated by detection at Stations 05 and 06. Initial detections for radio-tagged shad were recorded over a range of dates from June 4 through June 27 with nearly 70% of those fish arriving on or before June 15, 2020. The duration of time from release until arrival at Lowell (i.e., the approach duration) ranged from 13.0 hours to 20.0 days (median = 6.8 days; Table 5-48).

The duration of time radio-tagged individuals were present upstream of the Pawtucket Dam was determined for all individuals which approached and eventually passed downstream and was calculated as the duration of time from their initial detection immediately upstream of the dam until confirmed downstream passage via one of the available routes. When all individuals are considered, the upstream residence duration prior to downstream passage ranged between 0.4 hours to 19.1 days (Table 5-49; Figure 5-34). The median duration of time spent immediately upstream of the dam structure for a radio-tagged adult shad was 3.9 days. Of the radio-tagged adult shad which approached Pawtucket Dam, 30% passed in fewer than 24 hours and 51% passed in fewer than 96 hours after initial detection.

Outmigrating adult alosines encountering the Pawtucket Dam can (1) pass through the Pawtucket Gatehouse and enter the power canal, (2) pass downstream over Pawtucket Dam via spill, or (3) enter the Pawtucket Canal and navigate downstream via the downtown canal system. During the 2020 evaluation there were no radio-tagged adult shad detected at the Guard Locks (Station 28) and determined to have utilized the downtown canal system. The majority of radio-tagged adult shad were determined to have passed through the Pawtucket Gatehouse and entered the Northern Canal to approach the E.L. Field powerhouse. The duration of time to pass through the Pawtucket Gatehouse was determined based on the initial detection for each individual adult at Stations 06 and 07 which independently monitored the upstream and downstream sides of that structure. The median duration of time for radio-tagged adult shad to initially encounter and then pass through the Pawtucket Gatehouse was 2.1 hours (range <0.1 hours to 5.9 days; Table 5-50). The majority (75%) of radio-tagged adult shad passing through the Pawtucket Gatehouse did so in 12 hours or less following their initial detection at the structure.

Radio-tagged adult shad which entered the Northern Canal and passed downstream of E.L. Field powerhouse did so relatively quickly. Of those individuals, 78% were resident in the power canal upstream of E.L. Field for 12 hours or less. The median residence duration in the Northern Canal was 4.4 hours (range = 0.5 hours to 3.0 days; Table 5-51). Five radio-tagged individuals were present in the Northern Canal for greater than 24 hours prior to downstream passage.

5.7.2 Downstream Passage

A total of 150 radio-tagged adult American shad were released upstream of Lowell during the spring of 2020. Of that total, 118 were determined to have approached the Pawtucket Dam and were available for the evaluation of downstream passage route (Table 5-52). Over half of the radio-tagged shad passed through the Pawtucket Gatehouse, approached the E.L. Field powerhouse, and passed downstream via the E.L. Field turbine units (26% of radio-tagged shad) or utilized the downstream bypass (28% of radio-tagged shad). Use of the bypassed reach (i.e., spill or usage of the attraction water gate associated with the upstream fish ladder) was observed for 38% of the radio-tagged adult shad which approached the Project. Of the 45 radio-tagged adult shad which were determined to have passed downstream via the bypassed reach, 89% were initially detected in the area immediately upstream of the Pawtucket Gatehouse prior to downstream passage. Of those same 45 individuals, 9% were determined to have entered and exited the Northern Canal via the Pawtucket Gatehouse prior to their eventual passage downstream via the bypassed reach.

Radio-tagged adult shad were observed passing downstream of Lowell between the dates of June 5 through June 27 (Figure 5-35). Downstream passage of radio-tagged adult shad at Lowell peaked during mid-June with over half of all passage events occurring between June 16 and June 20, 2020. Figure 5-36 presents the timing distribution of downstream passage events for radio-tagged adult shad at Lowell. The majority of individuals passed downstream during the late morning, afternoon and early evening hours (i.e., 1000-2000).

For each of the 109 individuals which were confirmed to have passed downstream of Lowell via a known passage route (i.e., turbine, downstream bypass, or spill) the hourly record of Project operations (Section 5.1) at the time of passage was reviewed. The discharge at the selected route was identified and contrasted with the cumulative discharge for all non-selected routes at the time of downstream passage (Table 5-53). A total of 28% of radio-tagged adult shad passing downstream at Lowell did so via the E.L. Field turbine units. The median discharge through the two E.L. Field turbine units at the time of passage for those individuals was 967 cfs. When examined by passage route, the median percentage of passage route flow at each known downstream passage route represented 46% of project flow for turbine passed shad, 6% of project flow for downstream bypass passed shad, and 33% of project flow for spill passed shad. A listing of route discharge at the time of downstream passage for each adult American shad is provided in Appendix D.

5.7.3 Downstream Transit

Three monitoring stations were installed downstream of Lowell for the purpose of detecting radio-tagged adult alosines following passage at the Project during the spring of 2020. Those receivers were located approximately 2.1 (Monitoring Station 25), 6.0 (Monitoring Station 26), and 10.75 (Monitoring Station 27) miles downstream of the project. The minimum, maximum, and quartile transit times through those three reaches are presented in Table 5-54. The median transit time durations for tagged adult shad moving downstream of Lowell were 6.4, 1.9, and 5.9 hours for the 2.1 mile, 3.9 mile and 4.75 mile downstream reaches, respectively. Table 5-55 provides the minimum, maximum, and quartile transit times through defined sections of the Merrimack River between Lowell and Lawrence as a rate (i.e., miles per hour (mph)).

Table 5-56 and Figure 5-37 present the minimum, maximum and quartile transit times for radio-tagged adult shad to cover the full reach from immediately downstream of Lowell to the upstream face of the Essex Dam in Lawrence (i.e., Station 27). The median travel time for those fish to approach Lawrence following downstream passage at Lowell was 18.5 hours (range = 6.9 hours to 5.6 days).

5.7.4 Passage Survival

The CJS model *Phi(t)p(t)* provided the best fit for the observed mark-recapture data associated with downstream movements of radio-tagged adult American shad approaching and passing at Lowell during 2020 (Table 5-57). The detection efficiency for telemetry receivers recording passage of adult shad for monitoring stations at and downstream of Lowell ranged from 0.987 to 0.859 (Table 5-58). The reach-specific survival estimates for the Merrimack River from the Lowell impoundment receiver to detection immediately upstream of Lawrence are presented in Table 5-59. Passage success for downstream passage of adult shad at Lowell was calculated as the joint probability of the three reach-specific survival estimates which encompasses the full section of the Merrimack River from Lowell downstream to Lawrence (i.e., Lowell to Station 25, Station 25 to Station 26, and Station 26 to Lawrence). This resulted in an estimated downstream passage survival for adult shad at Lowell of 70.0% (75% CI = 64.5%-74.6%). No adjustments were made to encounter histories for shad passing Lowell to reflect the duration of time to detection at Lawrence following downstream passage since there were no documented events for radio-tagged “drift” shad at the downstream receiver stations indicating that the magnitude of downstream travel for that species following dead release into the tailrace was negligible.

Radio-tagged adult shad which approached and passed downstream at Lowell during the 2020 evaluation did so via a variety or passage routes (Table 5-52). Sample sizes for adult shad passing downstream via the turbines, downstream bypass facility or spill through the bypassed reach were sufficient to generate an estimate of downstream passage survival via the CJS model approach. When examined by passage route downstream passage for adult American shad was estimated at:

- E.L. Field Turbines: adult American shad passage success = 35.5% (75% CI = 25.8%-45.2%);

- Downstream bypass facility: adult American shad passage success = 82.6% (75% CI = 75.7%-90.9%); and

- Spill: adult American shad passage success = 89.2% (75% CI = 82.6%-93.8%).

Table 5–47. Summary of tagging and release information for adult American shad released upstream of Lowell during the spring 2020 downstream passage assessment.

Date	Source	Type	Number
3-Jun	Lawrence	Radio	50
5-Jun	Lawrence	Radio	50
8-Jun	Amoskeag	Radio	50
Total		Radio	150

Table 5–48. Minimum, maximum, and quartile values of approach duration (hours) for radio-tagged American shad released upstream of Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Approach Duration (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
3-Jun	13.0	410.7	53.4	155.1	243.8
5-Jun	16.1	480.5	54.6	155.5	312.6
8-Jun	31.6	455.4	46.9	163.3	262.1
All	**13.0**	**480.5**	**53.4**	**163.3**	**266.6**

Table 5–49. Minimum, maximum, and quartile values of upstream residence duration (hours) for radio-tagged American shad released upstream of Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Upstream Residence (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
3-Jun	3.1	349.3	39.6	126.5	250.8
5-Jun	0.4	459.3	17.6	133.5	236.7
8-Jun	1.6	239.5	5.6	20.8	140.1
All	**0.4**	**459.3**	**14.6**	**92.8**	**213.2**

Table 5–50. Minimum, maximum, and quartile values of time to pass the Pawtucket Gatehouse and enter Northern Canal (hours) for radio-tagged American shad released upstream of Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Pawtucket Gatehouse Passage (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
3-Jun	<0.1	141.7	0.5	2.9	14.9
5-Jun	0.1	50.1	0.4	1.5	7.6
8-Jun	0.5	95.3	0.8	2.4	30.5
All	**<0.1**	**141.7**	**0.5**	**2.1**	**11.7**

Table 5–51. Minimum, maximum, and quartile values of Northern Canal residence duration (hours) for radio-tagged American shad released upstream of Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Northern Canal Residence (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
3-Jun	0.5	73.0	1.5	4.5	9.5
5-Jun	0.7	37.5	1.8	5.8	10.2
8-Jun	0.6	44.9	1.4	3.8	12.7
All	**0.5**	**73.0**	**1.7**	**4.4**	**10.6**

Table 5–52. Downstream passage route selection for radio-tagged American shad released upstream of Lowell during the spring 2020 adult alosine passage assessment.

Release Date	American Shad - Lowell Downstream Passage Route					
	No Detect	No Pass	Downtown	Turbine	Spill	Bypass
3-Jun	9	3	0	15	10	13
5-Jun	7	3	0	10	15	15
8-Jun	16	3	0	6	20	5
All	32	9	0	31	45	33
% of Total Detected		8%	0%	26%	38%	28%

Table 5–53. Quartile conditions of project discharge at the time of downstream passage for radio-tagged adult American shad at the known route of passage and the cumulative sum of discharge at non-passage routes.

Passage Route	No. Using Route	Quartile	Route Discharge		Non-Route Discharge	
			cfs	%	cfs	%
Turbines	31	Q25	418	27%	1104	49%
		Q50	967	46%	1154	54%
		Q75	1272	51%	1222	73%
Spill	45	Q25	500	29%	934	64%
		Q50	500	33%	1023	67%
		Q75	528	36%	1212	71%
Downstream Bypass	33	Q25	132	6%	1453	92%
		Q50	132	6%	1942	94%
		Q75	132	8%	1982	94%

Table 5–54. Minimum, maximum, and quartile values of travel time (hours) through three separate downstream reaches for radio-tagged American shad following downstream passage at Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Downstream Transit Duration (hrs)						
Downstream Reach	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Downstream of Lowell to Station 37 (2.1 miles)	21-May	2.0	267.5	3.8	5.6	14.2
	22-May	1.5	71.2	4.6	6.3	20.1
	28-May	2.1	54.8	3.6	6.9	27.0
	All	**1.5**	**267.5**	**3.7**	**6.4**	**19.3**
Station 37 to Station 39 (3.9 miles)	21-May	1.3	9.1	1.5	1.8	2.6
	22-May	1.4	11.2	1.8	2.4	4.1
	28-May	1.3	28.9	1.5	1.7	2.0
	All	**1.3**	**28.9**	**1.6**	**1.9**	**3.0**
Station 39 to Lawrence (Station 40; 4.75 miles)	21-May	1.7	119.3	3.2	5.7	11.5
	22-May	1.7	41.2	2.9	5.7	9.4
	28-May	2.8	24.5	3.4	8.4	14.4
	All	**1.7**	**119.3**	**3.3**	**5.9**	**11.5**

Table 5–55. Minimum, maximum, and quartile values of rate of travel (mph) through three separate downstream reaches for radio-tagged American shad following downstream passage at Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Downstream Transit Rate (mph)						
Downstream Reach	Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
Downstream of Lowell to Station 37 (2.1 miles)	21-May	0.20	1.38	0.69	1.00	1.20
	22-May	0.16	1.29	0.44	0.75	1.00
	28-May	0.06	1.38	0.90	1.06	1.20
	All	**0.06**	**1.38**	**0.60**	**0.95**	**1.13**
Station 37 to Station 39 (3.9 miles)	21-May	0.43	3.00	1.50	2.17	2.60
	22-May	0.35	2.79	0.95	1.63	2.17
	28-May	0.13	3.00	1.95	2.29	2.60
	All	**0.13**	**3.00**	**1.30**	**2.05**	**2.44**
Station 39 to Lawrence (Station 40; 4.75 miles)	21-May	0.04	2.79	0.41	0.83	1.49
	22-May	0.12	2.79	0.51	0.83	1.64
	28-May	0.19	1.70	0.33	0.57	1.40
	All	**0.04**	**2.79**	**0.41**	**0.81**	**1.46**

Table 5–56. Minimum, maximum, and quartile values for downstream travel duration from Lowell to Lawrence (hours) for radio-tagged American shad released upstream of Lowell during the spring 2020 adult alosine passage assessment.

American Shad - Downstream Travel: Lowell to Lawrence (hrs)					
Release Date	Minimum	Maximum	Q25	Q50 (Median)	Q75
3-Jun	7.5	135.1	11.9	16.8	27.4
5-Jun	9.1	55.6	11.1	18.9	33.7
8-Jun	6.9	53.8	10.5	19.4	37.7
All	**6.9**	**135.1**	**11.1**	**18.5**	**32.6**

Table 5–57. CJS model selection criteria for survival of American shad at Lowell during the spring 2020 adult alosine passage assessment.

Scenario	Model	AICc	Delta AICc	AICc Weight	Model Likelihood	No. Parameters	Deviance
All Shad	*Phi(t)p(t)*	700.94	0.00	0.99	1.00	13	36.10
	Phi(t)p(.)	710.68	9.74	0.01	0.01	8	56.15
	Phi(.)p(t)	733.58	32.64	0.00	0.00	8	79.06
	Phi(.)p(.)	740.85	39.91	0.00	0.00	2	98.51
Turbine Passed	*Phi(t)p(t)*	86.36	0.00	0.99	1.00	4	1.38
	Phi(t)p(.)	96.46	10.11	0.01	0.01	4	11.49
	Phi(.)p(t)	145.28	58.92	0.00	0.00	4	60.30
	Phi(.)p(.)	152.16	65.80	0.00	0.00	2	71.37
Bypass Passed	*Phi(t)p(t)*	95.27	0.00	0.96	1.00	6	0.42
	Phi(.)p(t)	102.54	7.27	0.03	0.03	4	11.90
	Phi(t)p(.)	104.57	9.30	0.01	0.01	5	11.84
	Phi(.)p(.)	109.90	14.63	0.00	0.00	2	23.40
Spill Passed	*Phi(t)p(t)*	202.02	0.00	0.97	1.00	8	13.90
	Phi(.)p(t)	210.16	8.14	0.02	0.02	7	24.16
	Phi(t)p(.)	210.16	8.14	0.02	0.02	4	30.42
	Phi(.)p(.)	218.28	16.26	0.00	0.00	2	42.64

Where *phi* = survival; *p* = detection probability; t = parameter is allowed to vary with time; and "." = parameter is fixed with time.

Table 5–58. Detection efficiency estimates (p) for monitoring locations installed to detect radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment.

Location	S	SE	95% CI	
Station 04	0.966	0.017	0.914	0.987
Lowell	0.965	0.020	0.896	0.989
Station 25	0.987	0.013	0.916	0.998
Station 26	0.859	0.039	0.763	0.920
Station 27	0.897	0.037	0.799	0.950

Table 5–59. Reach-specific survival probability estimates (*phi)*, standard errors, and likelihood 75% and 95% confidence intervals for radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment.

Scenario	Reach	*Phi*	SE	95% CI		75% CI	
All Shad	*Station 04 to Project*	0.951	0.02	0.894	0.978	0.923	0.97
	Project to Passage	0.948	0.023	0.881	0.979	0.915	0.969
	Passage to Station 25	0.753	0.041	0.663	0.825	0.702	0.797
	Station 25 to Station 26	0.931	0.028	0.851	0.969	0.89	0.957
	Station 26 to Lawrence	1.000	0.016	-	-	-	-
Turbine Shad	*Station 04 to Project*	1.000	0.000	-	-	-	-
	Project to Passage	1.000	0.000	-	-	-	-
	Passage to Station 25	0.452	0.089	0.289	0.626	0.352	0.555
	Station 25 to Station 26	0.786	0.110	0.506	0.929	0.634	0.886
	Station 26 to Lawrence	1.000	0.000	-	-	-	-
Bypass Shad	*Station 04 to Project*	1.000	0.000	-	-	-	-
	Project to Passage	1.000	0.000	-	-	-	-
	Passage to Station 25	0.879	0.057	0.718	0.954	0.797	0.930
	Station 25 to Station 26	0.967	0.034	0.785	0.996	0.896	0.990
	Station 26 to Lawrence	0.973	0.038	0.687	0.998	0.874	0.995
Spill Shad	*Station 04 to Project*	1.000	0.000	-	-	-	-
	Project to Passage	1.000	0.000	-	-	-	-
	Passage to Station 25	0.934	0.037	0.812	0.979	0.876	0.966
	Station 25 to Station 26	0.954	0.034	0.820	0.990	0.895	0.981
	Station 26 to Lawrence	1.000	0.000	-	-	-	-

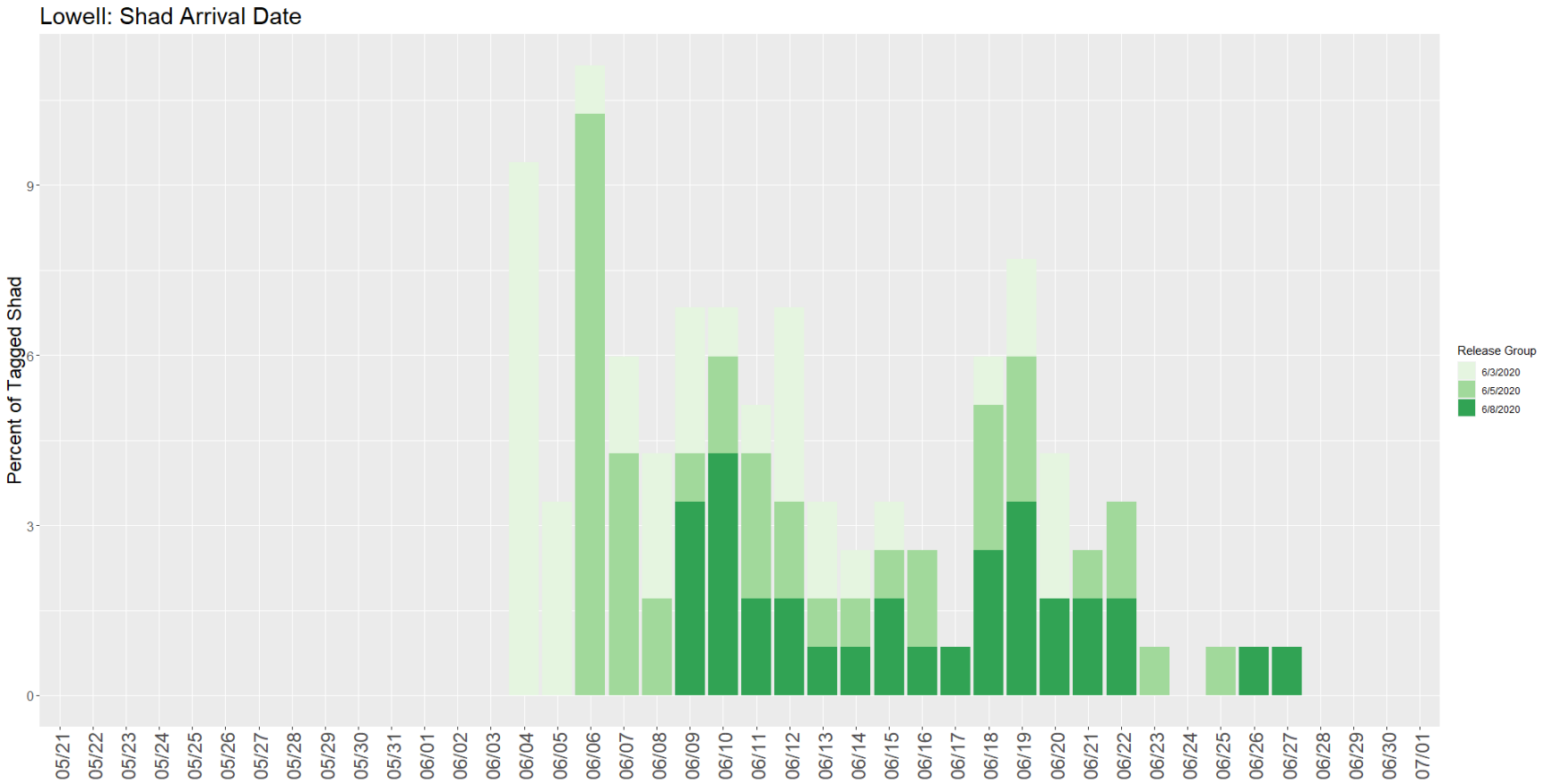

Figure 5–33. Distribution of Pawtucket Dam arrival dates for radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment.

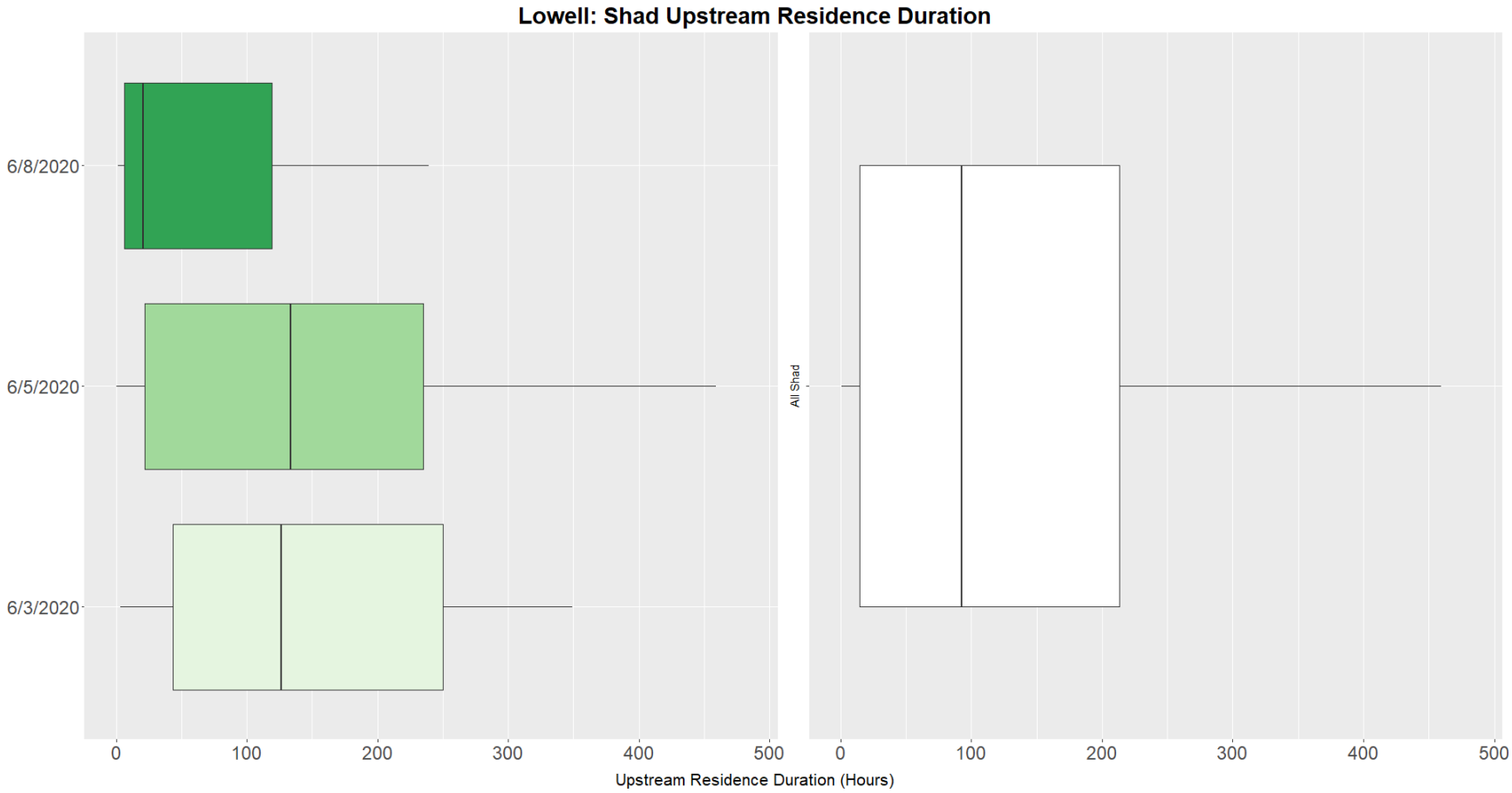

Figure 5–34. Boxplot of the Lowell upstream residence duration for radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment. [12]

[12] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

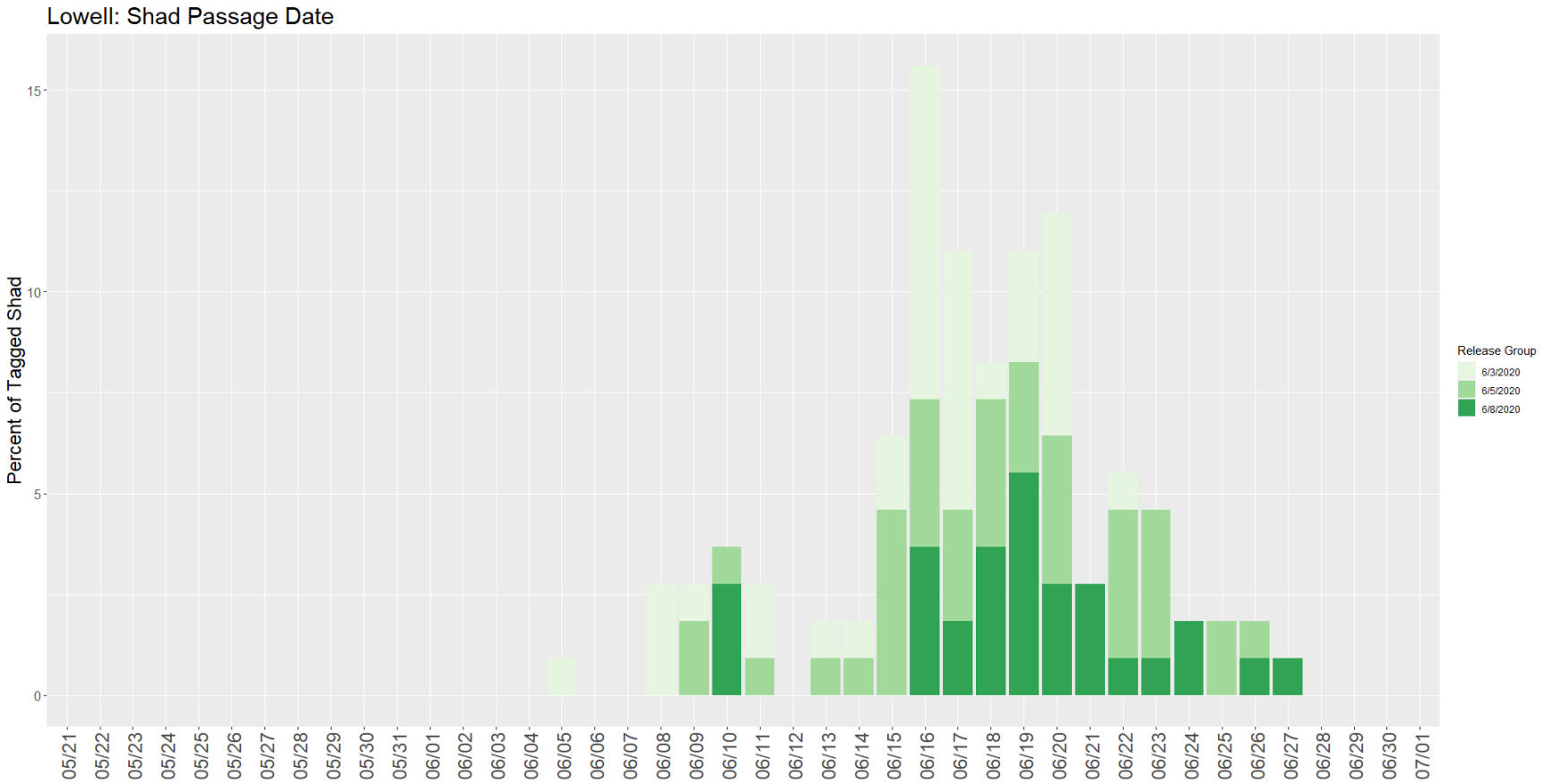

Figure 5–35. Distribution of Pawtucket Dam downstream passage dates for radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment.

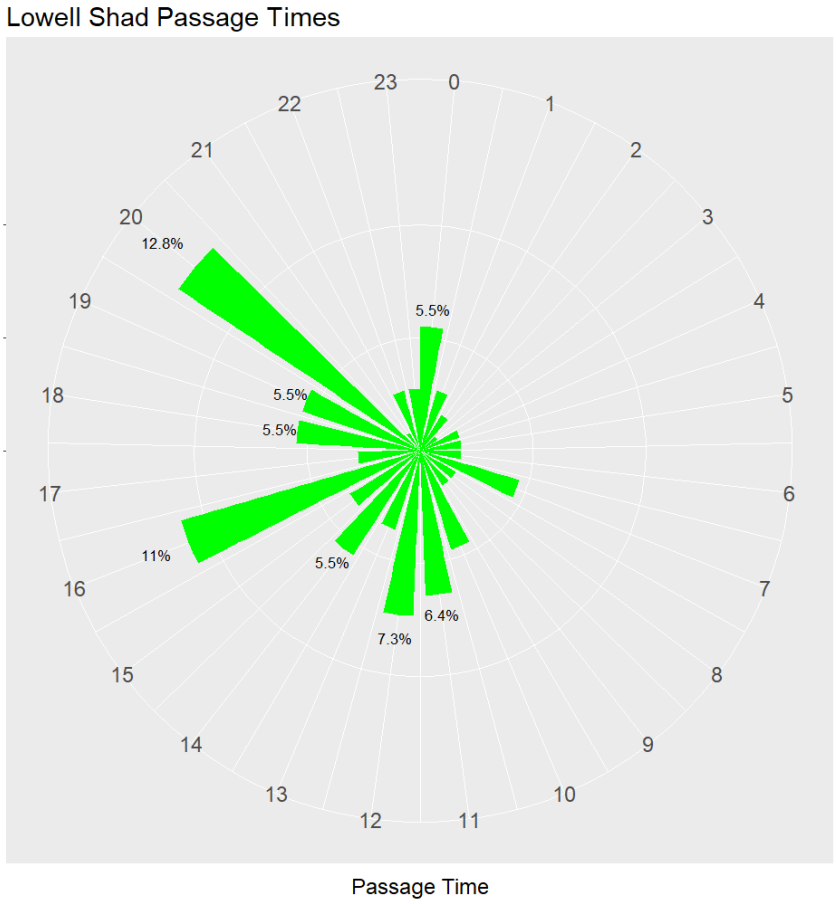

Figure 5–36. Distribution of downstream passage time for all radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment.

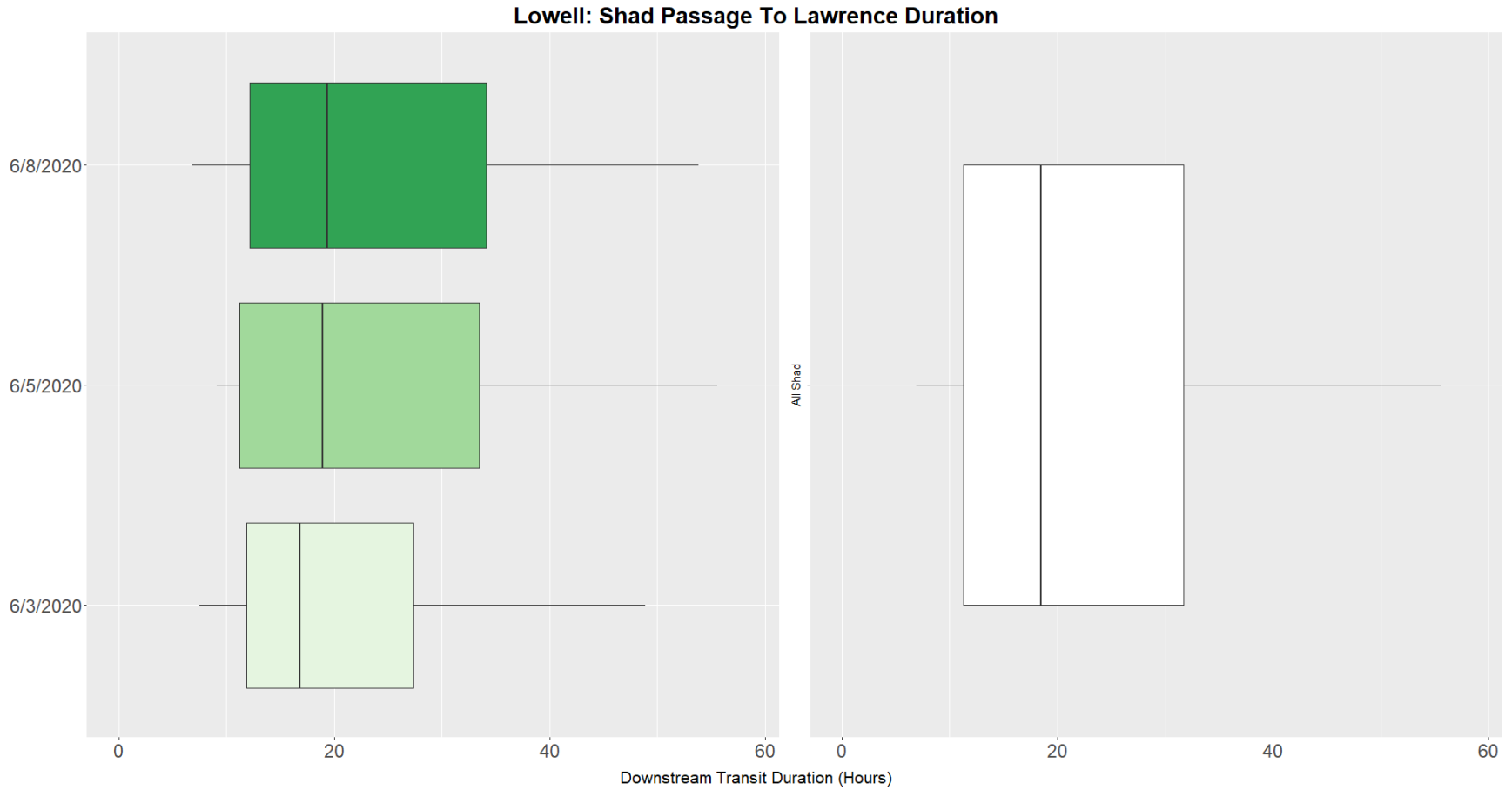

Figure 5–37. Boxplot of the downstream transit duration from Lowell to Lawrence for all radio-tagged American shad at Lowell during the spring 2020 adult alosine passage assessment.[13]

[13] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

5.8 Time to Event Analysis

5.8.1 Adult Alewives – Downstream

A total of 1,508 Pawtucket Gatehouse and 22,051 E.L. Field Powerhouse forebay events were defined based on recorded detections of radio-tagged adult alewives during the 2020 study to evaluate the impact of operational parameters on passage success. The median event duration recorded for a radio-tagged individual was 3.4 minutes for individuals in the detection field of Station 06 immediately upstream of the Pawtucket Gatehouse and 5.6 minutes for individuals in the detection field of Station 08 covering the area immediately upstream of the E.L. Field intake structure.

5.8.1.1 Pawtucket Gatehouse

Results of the adult alewife Cox proportional hazard model for the Pawtucket Gatehouse were found to be unreliable as all variables failed to obey the assumption that covariates are independent of time and that hazards are proportional (Table 5-60). In an effort to identify any existing correlations between passage success/failure or delay and the operational parameters available, a generalized additive model (GAM) with a Tweedie-distribution and generalized linear model (GLM) with a binomial distribution were built from the package '*mgcv'* in the Program R (R Core Team 2020). These model types permitted flexible parameterization of the error structure and offered an alternative method for exploring the relationships in question under a different suite of model assumptions.

GLMs were constructed as a means of understanding whether event success was correlated with inflow, spill, release location, or release date. The GLM model suggested a statistically significant positive correlation between downstream adult herring passage success and inflow with successful downstream passage events occurring most frequently when inflow is greater than 6000 cfs (Figure 5-38). Additionally, there was a statistically significant negative relationship between release location and downstream adult herring passage success indicating that individuals released in the Nashua River at the Mine Falls release site were less likely to pass downstream of Lowell successfully than either the Tyngsborough or Pepperell release groups (Figure 5-39).

GAMs were built in an attempt to understand which covariates exhibited a significant impact on the duration of each event (i.e. which covariates were responsible for causing delay in successful downstream passage for adult river herring at the Pawtucket Gatehouse). Release date, release location, inflow, bypass flow, and event type (i.e., pass or fail) were included in the GAM as a covariate to assess whether passage success or failure significantly impacted the duration of an event. Although results of this model agreed with that of the GLM, suggesting event duration was positively correlated with inflow and negatively correlated with passage success (i.e. successful passage reduced event duration) these results were considered weak as only 10.7% of the deviance in the data was explained by the model.

Table 5–60. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model for adult river herring Pawtucket Gatehouse downstream passage events.

Variable	Chi-squared	df	P-Value
Release Location	7.00	2	0.03
Release Date	36.32	2	0.07
Inflow (cfs)	47.98	5	<0.01
Spill (cfs)	2.41	1	<0.01
Full Model	85.47	10	<0.01

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

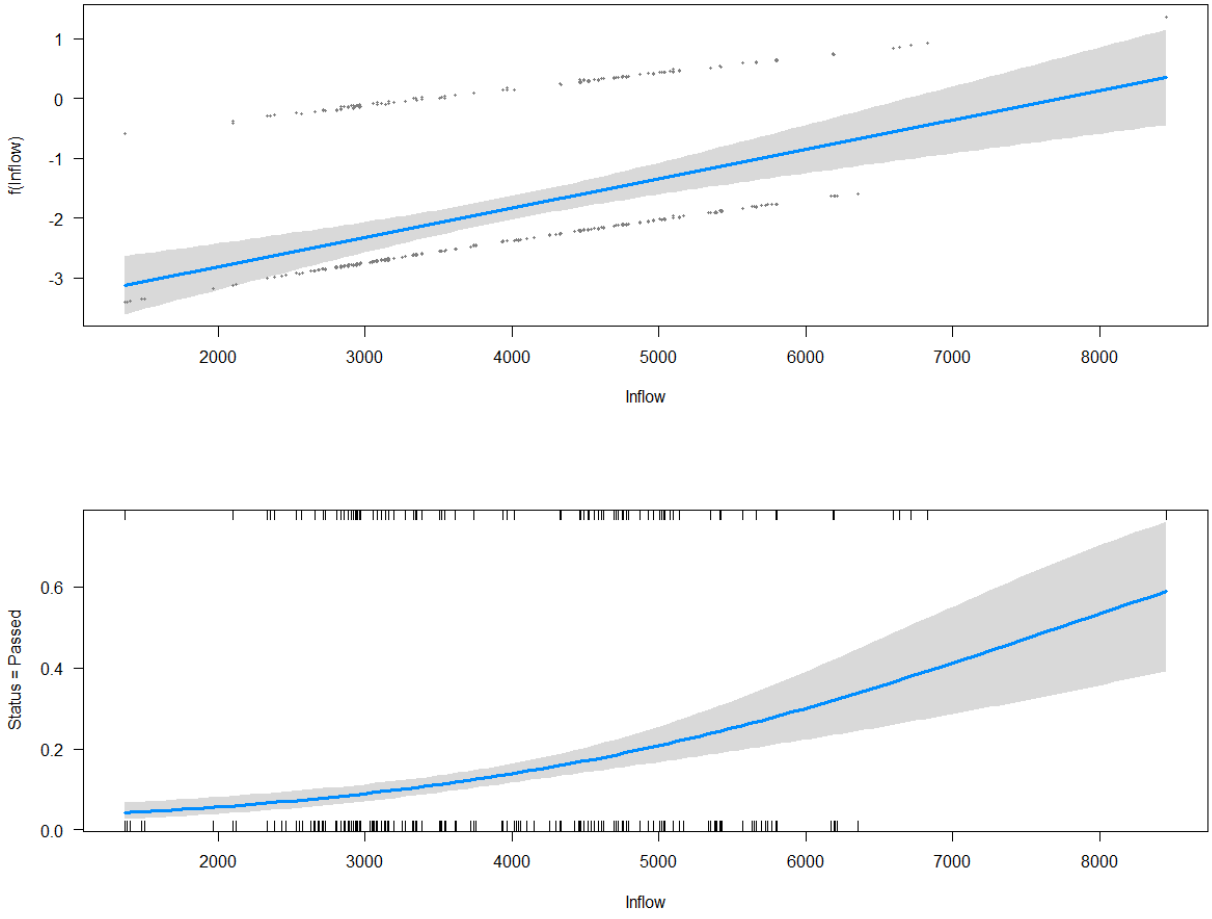

Figure 5–38. Results of the binomial GLM illustrating the relationship between inflow and the probability of passage success for adult river herring at the Pawtucket Gatehouse.

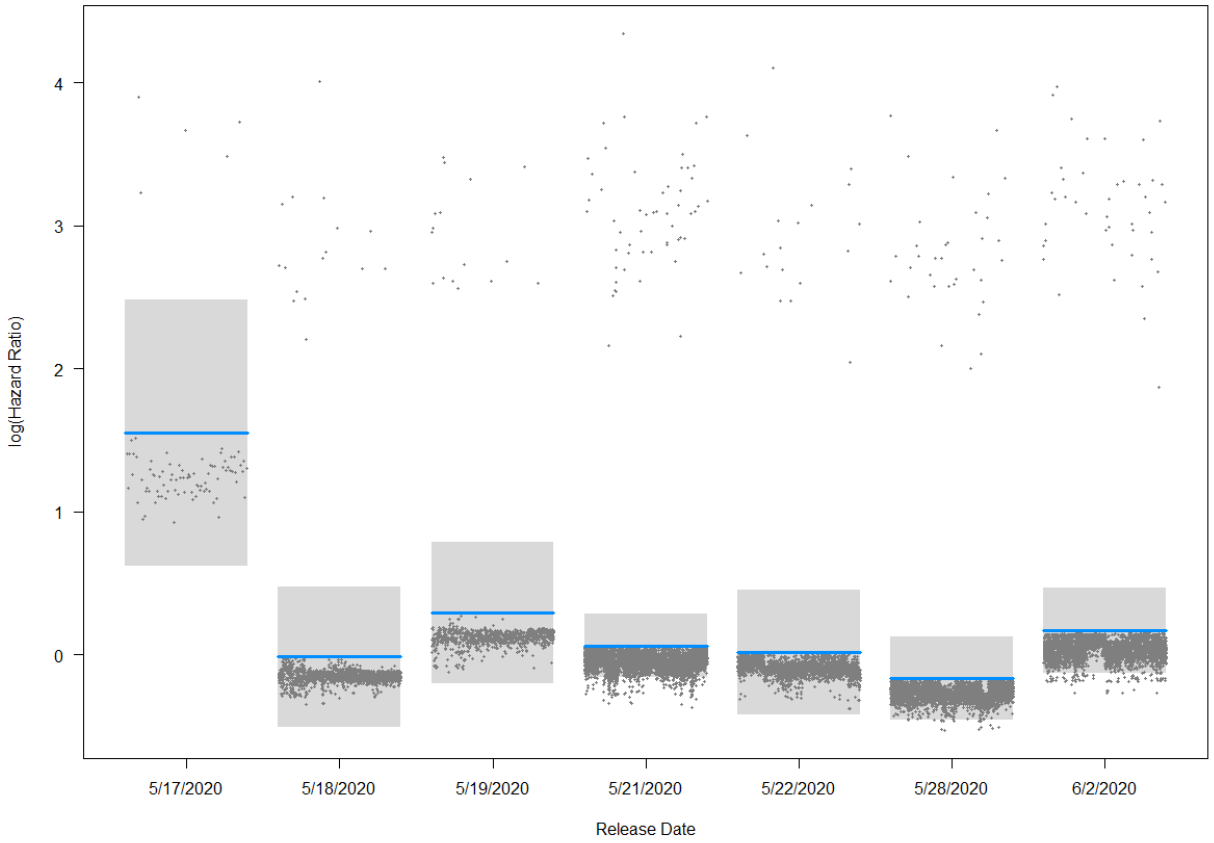

Figure 5–39. Results of the binomial GLM illustrating the relationship between release date and the probability of passage success for adult river herring at the Pawtucket Gatehouse.

5.8.1.2 E.L. Field Powerhouse Forebay

Similar to the results for the downstream adult river herring Pawtucket gatehouse model, release location and bypass flow failed to meet the assumptions of the Cox proportional hazard model for adult river herring downstream passage at the E.L. Field Powerhouse (Table 5-61). As a result, these covariates were excluded from consideration in the model. Inflow and release date were the only two covariates to pass the test of proportional hazards and were the only two covariates included in the model (Table 5-62). Results of the Cox proportional hazard model for downstream passage of adult river herring at the E.L. Field Powerhouse indicate a significant relationship between passage success and inflow, however this impact was marginal with inflow causing <1% decrease in the hazard ratio. Release date was significantly correlated with downstream adult river herring passage success at the E.L. Field Powerhouse, with an overall decrease in hazard ratio with later release dates (i.e., increased residence duration and lowered passage success during the latter part of the downstream migration window).

Table 5–61. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model for adult river herring E.L. Field Powerhouse downstream passage events.

Variable	Chi-squared	df	P-Value
Inflow (cfs)	0.87	1	0.35
Release Date	8.24	6	0.22
Full Model	8.27	7	0.31

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

Table 5–62. Results of the Cox proportional hazards model for adult alewife downstream passage at the E.L. Field Powerhouse.

E.L. Field Powerhouse										
Model: Time to Event ~ Inflow + Release Date										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change
Inflow	<-0.01	0.00	-2.32	0.02	Significant	1.00	1.00	1.00	1.00	No Change
Release – May 18	<-0.01	0.52	-3.00	<0.01	Significant	0.21	4.77	0.08	0.58	↓ 79%
Release – May 19	<-0.01	0.53	-2.37	0.17	Significant	0.28	3.51	0.10	0.80	↓ 72%
Release – May 21	<-0.01	0.48	-3.10	<0.01	Significant	0.23	4.43	0.09	0.58	↓ 77%
Release – May 22	<-0.01	0.52	-2.96	<0.01	Significant	0.22	4.64	0.08	0.60	↓78
Release – May 28	<-0.01	0.50	-3.45	<0.01	Significant	0.18	5.55	0.07	0.48	↓ 82%
Release – June 2	<-0.01	0.51	-2.69	<0.01	Significant	0.25	3.98	0.09	0.69	↓ 75%

Significance is determined by $p < 0.05$.

5.8.2 Adult American Shad – Downstream

A total of 8,219 Pawtucket Gatehouse and 30,028 E.L. Field Powerhouse forebay events were defined based on recorded detections of radio-tagged adult American shad during the 2020 study to evaluate the impact of operational parameters on passage success. The median event duration recorded for a radio-tagged shad was 54.8 seconds for individuals in the detection field of Station 06 immediately upstream of the Pawtucket Gatehouse and 2.1 minutes for individuals in the detection field of Station 08 covering the area immediately upstream of the E.L. Field intake structure.

5.8.2.1 Pawtucket Gatehouse

Results of the Cox proportional hazard model for the Pawtucket Gatehouse showed no significant relationships between event durations and operational parameters (Table 5-63; Table 5-64). Only release date exhibited a statistically significant correlation, with tagged adult American shad released on June 8 exhibiting significantly higher hazard ratios than tagged adult American shad released on June 6. Inflow was not included in this model as it was not independent of time and failed to meet the criteria of the model assumptions.

5.8.2.2 E.L. Field Powerhouse Forebay

Results of the Cox proportional hazards model for the E.L. Field Powerhouse indicated statistically significant relationships between passage success and inflow, release date, and

downstream bypass flow (Table 5-65). Inflow was determined to have a minor negative impact on downstream shad passage success at the E.L. Field Powerhouse, decreasing the likelihood of hazards occurring by approximately 1% as inflow increases (Table 5-66). On the contrary, release date and discharge through the downstream bypass exhibited positive correlations. The hazard probability for tagged adult American shad released on June 8 was higher than that for tagged adult American shad released on June 6. No variables were excluded from this model as they all met the time-independent assumptions of the Cox proportional hazards model.

Table 5–63. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model for adult American shad Pawtucket Gatehouse downstream passage events.

Variable	Chi-squared	df	P-Value
Release Date	2.06	2	0.36
Spill (cfs)	<0.01	1	0.97
Full Model	2.15	3	0.54

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

Table 5–64. Results of the Cox proportional hazards model for adult American shad downstream passage at the Pawtucket Gatehouse.

Pawtucket Gatehouse										
Model: Time to Event ~ Release Date + Spill										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change
Release – June 5	0.03	1.03	0.25	0.11	Insignificant	1.03	0.97	0.63	1.67	↑ 3%
Release – June 8	0.64	1.90	0.26	2.49	Significant	1.90	0.53	1.15	3.15	↑ 90%
Spill (cfs)	<0.01	1.00	<0.01	0.96	Insignificant	1.00	1.00	1.00	1.00	No Change

Significance is determined by $p < 0.05$.

Table 5–65. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model for adult American shad E.L. Field Powerhouse downstream passage events.

Variable	Chi-squared	df	P-Value
Inflow (cfs)	0.01	1	0.93
Release Date	0.87	2	0.65
Bypass (cfs)	0.26	1	0.61
Full Model	1.25	4	0.87

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

Table 5–66. Results of the Cox proportional hazards model for adult American shad downstream passage at the E.L. Field Powerhouse.

E.L. Field Powerhouse										
Model: Time to Event ~ Inflow + Release Date + Bypass Flow										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change
Inflow (cfs)	<0.01	1.00	<0.01	-3.78	Significant	1.00	1.00	1.00	1.00	No Change
Release – June 5	0.11	1.12	0.29	0.38	Insignificant	1.12	0.89	0.63	1.98	↑ 12%
Release – June 8	1.07	2.90	0.37	2.86	Significant	2.90	0.34	1.40	6.03	↑ 190%
Bypass (cfs)	0.03	1.03	0.01	5.08	Significant	1.03	0.97	1.02	1.04	↑ 3%

Significance is determined by $p < 0.05$.

5.8.3 Adult Alewives – Upstream

A total of 239 upstream foray events were defined based on recorded detections of adult alewives during the 2020 study to evaluate the impact of operational parameters on passage success. A description of the upstream magnitude and duration of those events is provided in Sections 5.4.3 for adult alewives.

Results of the Cox proportional hazard model were limited as the set of operations related parameters failed to meet the assumption they were independent of time and as a result were not included in the model (Table 5-67). The final adult alewife model assessed the hazards to passage success as a function of path selection (i.e., Pawtucket Dam fish ladder or the E.L. Field fish lift) and release date (Table 5-68). Results of the Cox proportional hazard model indicated a marginally significant relationship between path selection and hazard ratio in addition to a significant relationship between release date and hazard ratio. Based on these outputs, adult river herring utilizing the Pawtucket Dam fish ladder are less likely to experience passage failure than those using the E.L. Field fish lift. Foray attempts directed towards the E.L. Field fish lift increased the hazard (or probability of failure) by 62%. With regards to release date, adult alewives released during the beginning of the study were more likely to pass successfully than fish released during the latter part of the evaluation. No release date was found to negatively impact the hazard.

In an effort elucidate any existing correlations between passage success/failure or delay and the operational parameters available, a generalized additive model (GAM) with a Tweedie-distribution and generalized linear model (GLM) with a binomial distribution were built from the package '*mgcv*' in the Program R (R Core Team 2020). These model types allow for flexible parameterization of the error structure and offer an alternative method for exploring the relationships in question under a different suite of model assumptions.

GLMs were constructed as a means of understanding whether event success was correlated with turbine discharge, spill, release date, or path selection. Results of this model indicated a statistically significant negative correlation between passage successes and E.L. Field fish lift attempts with successful passage events occurring most frequently at the Pawtucket Dam fish ladder (Figure 5-40). This reaffirms the results of the Cox model, which suggests that adult alewives attempting to utilize the E.L. Field fish lift are more likely to incur a hazard (i.e., fail).

No statistically significant relationships were identified between upstream passage success and operational parameters (i.e., total bypass reach flow, spill flow, or inflow).

GAMs were built in an attempt to understand which covariates exhibited a significant impact on the duration of each event (i.e. which covariates are responsible for causing delay in upstream passage attempts for adult alewives). In addition to release date, turbine discharge, and route selection, event type (i.e., success/failure) was included in the GAM as a covariate to assess whether passage success or failure significantly impacted the duration of an event. Results of this model agreed with that of the GLM, suggesting event duration was negatively correlated with adult alewife attempts at the E.L. Field fish lift and positively correlated with passage success (i.e. adult alewives attempting to use the E.L. Field fish lift had longer event durations, but successful passage reduced event duration). In addition, results of the adult alewife GAM suggested that event durations are significantly and negatively correlated with increasing spill such that increasing spill decreases event durations. However, given that spill was not found to be a significant factor impacting passage success, it can be inferred that the shorter durations are the result of fish exiting the system during periods of high spill flow. This does not suggest that increasing spill will increase passage efficiency.

Table 5–67. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model for adult alewife upstream passage events.

Variable	Chi-squared	df	P-Value
Path	1.82	1	0.18
Release Date	2.53	5	0.77
Full Model	3.65	6	0.72

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

Table 5–68. Results of the Cox proportional hazards model for adult alewife upstream passage.

Upstream Passage										
Model: Time to Event ~ Path + Release Date										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change
Path	0.49	1.63	1.76	0.08	Insignificant	1.63	0.61	0.95	2.80	↑ 63%
Release – May 8	-1.71	0.18	-2.83	<0.01	Significant	0.18	5.54	0.06	0.59	↓ 81%
Release – May 7	-1.48	0.23	-2.78	0.01	Significant	0.23	4.39	0.08	0.65	↓ 77%
Release – May 17	-0.33	0.72	-0.81	0.42	Insignificant	0.72	1.39	0.33	1.59	↓ 28%
Release – May 18	-1.25	0.29	-2.81	<0.01	Significant	0.29	3.48	0.12	0.69	↓ 31%
Release – May 19	-0.59	0.55	-1.37	0.17	Insignificant	0.55	1.81	0.24	1.29	↓ 45%

Significance is determined by $p < 0.05$.

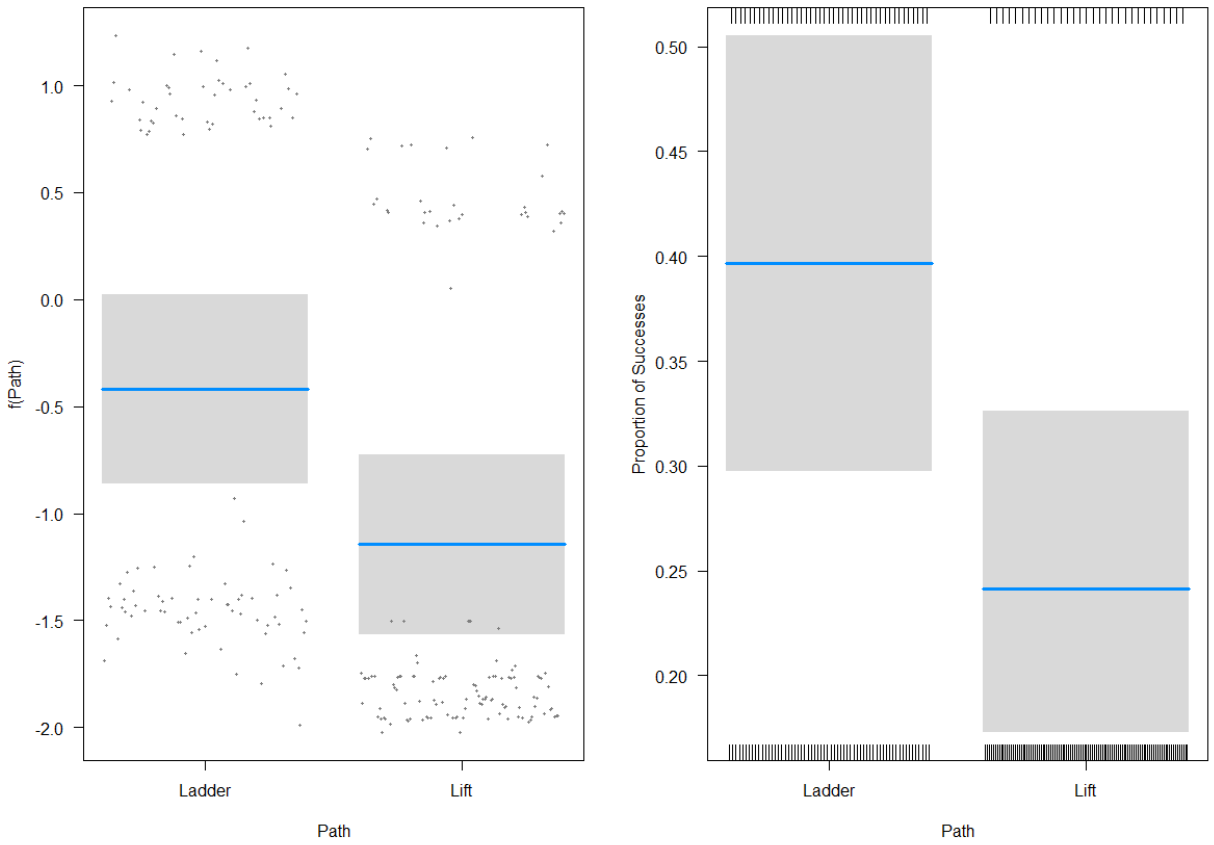

Figure 5–40. Results of the binomial GLM illustrating the relationship between passage route selection and the probability of passage success for adult river herring at the E.L. Field Powerhouse fish lift or Pawtucket Dam fish ladder.

5.8.4 Adult American Shad – Upstream

A total of 202 upstream foray events were defined based on recorded detections of American shad during the 2020 study to evaluate the impact of operational parameters on passage success. Of those 202 events, 201 were identified as forays directed towards the E.L. Field fish lift and 1 was identified as a foray directed towards the Pawtucket Dam fish ladder. A description of the upstream magnitude and duration of those events is provided in Sections 5.5.3 for adult American shad.

A meaningful Cox proportional hazard model was unable to be built to represent upstream passage for adult American shad at Lowell. The full set of variables failed to meet the assumption that they are independent of time (Table 5-69). In lieu of that, a GAM with a Tweedie-distribution and GLM with a binomial distribution were assembled to evaluate upstream passage for adult American shad at Lowell.

GLMs were constructed as a means of understanding whether turbine discharge, spill, or event duration had statistically significant impacts on the probability of passage success (i.e., event = 1). Results of this model indicate a statistically significant positive correlation between passage successes and event duration with most successful passage events occurring after 1 hour (4000 seconds; Figure 5-41). No statistically significant relationships were identified between passage success and operational parameters (i.e., i.e., total bypass reach flow, spill flow, or inflow). Due to the limited observations of dual-tagged adult shad ascending the bypassed reach in an attempt to reach the Pawtucket Dam fish ladder, path selection was not included in this model.

GAMs were built in an attempt to understand which covariates exhibited a significant impact on the duration of each event (i.e. which covariates are responsible for causing delay in upstream passage attempts). In addition to turbine discharge and spill flow, event type (i.e., success/failure) was included in the GAM as a covariate to assess whether passage success or failure significantly impacted the duration of an event. Results of this model suggested statistically significant correlations between several covariate and event duration. Covariates with the heaviest influence on event duration were passage success (event = 1) and turbine discharge. In both instances, event duration was positively correlated, suggesting that shad exhibiting a longer event duration are more likely to successfully pass and that event duration increases with turbine discharge. With regard to spill flow, results of this model suggest that event durations are significantly and negatively correlated with increasing spill such that increasing spill decreases event durations (Figure 5-42). However, given that spill was not found to be a significant factor impacting passage success, it can be inferred that the shorter durations are the result of fish exiting the system during periods of high spill flow. This does not suggest that increasing spill will increase passage efficiency.

Table 5–69. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model for adult American shad upstream passage events.

Variable	Chi-squared	df	P-Value
ELF (cfs)	4.75	1.00	0.03
Spill (cfs)	6.49	1.00	0.01
Full Model	6.49	2.00	0.04

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

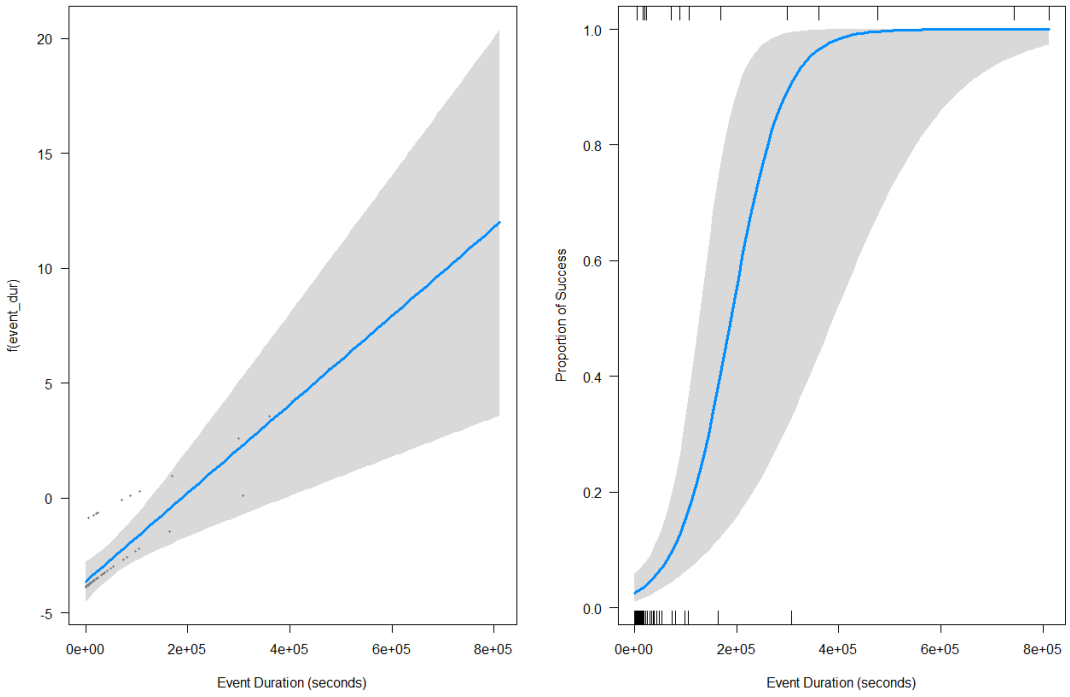

Figure 5–41. Results of the binomial GLM illustrating the relationship between event duration and the probability of passage success for adult American shad at the E.L. Field Powerhouse fish lift or Pawtucket Dam fish ladder.

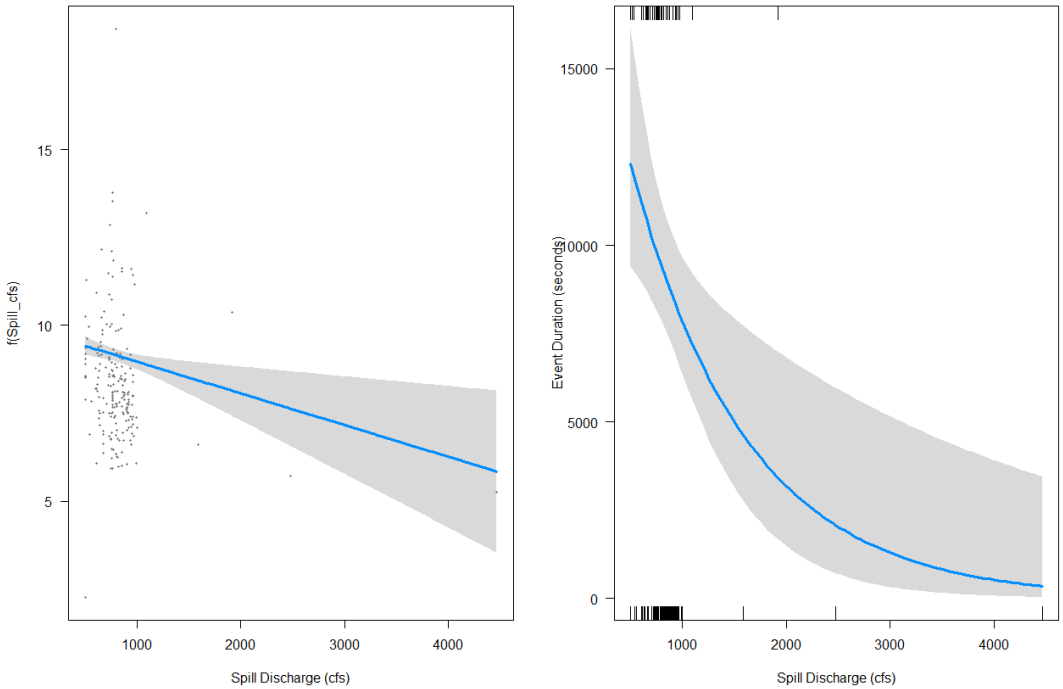

Figure 5–42. Results of the Tweedie GAM illustrating the relationship between event duration and spill discharge for adult American shad at Lowell.

5.9 Manual Tracking

In addition to the continuous monitoring provided by the set of stationary receivers installed throughout the Project area for the duration from early May through June 2020, a total of 99 manual detections representing 67 individuals (20 alewives and 47 American shad) were recorded between May 29 and July 2. Appendix E contains a listing of manual detections identified to the nearest 0.25 mile and classified as "Transit" for tagged fish which were subsequently detected at stationary receivers downstream of their manually determined position or "Final" for tagged alosines which were detected within the section of river bounded by the receiver station(s) at which their final stationary detection was recorded (e.g., manual detection of a fish immediately upstream of Essex Dam with stationary detections at Stations 26 and 27 would be classified as "Final" for that reach). Manual detections classified as "Transit" were predominantly recorded for individuals in the upper sections of the study area (i.e., upstream of Station 04 (17 observations) or between Stations 04 and 05 (9 observations)). Manual detections classified as "Final" were mostly recorded in the reach between Stations 26 and 27 which represented the bottom of the study reach at Essex Dam (44 observations). Manual detections were classified as "Final" for an additional 12 observations recorded upstream of Station 04 for individuals which failed to approach Pawtucket Dam.

6 Summary

An evaluation of the upstream and downstream passage effectiveness for adult alewives and American shad was conducted in support of the FERC relicensing of the Lowell Hydroelectric Project. Fish passage effectiveness was evaluated using telemetry during the 2020 spring passage season (May through June). Merrimack River conditions during the spring 2020 passage assessment were considered as normal or low for the majority of May and low for most of the month of June. The E.L. Field fish passage facilities (i.e., upstream fish lift and downstream fish bypass) were operated throughout the study period and those turbine units were in operation for the duration of the study period. Two major spill events, associated with increases in river flows, occurred during the early portion of the monitoring period (May 7 and May 18). Outside of those two periods of increased discharge, flows through the bypassed reach during the 2020 monitoring period were comprised of the ~500 cfs of water constituting the attraction and conveyance flow associated with the Pawtucket Dam fish ladder as well as incidental spill flow passing over the spillway. Incidental spill flows in excess of 500 cfs were present until May 21 after which incidental spill was reduced to near zero through the month of June. Flows to the downstream canal system were limited during both months as Boott suspended operation of the generating units in that system prior to the onset of the study due to overriding safety concerns.

6.1 Adult Alewife

A total of 504 adult alewives were radio and/or PIT-tagged over a range of dates from May 7 through June 2, 2020. Of that total, 354 (150 dual-tagged and 204 PIT-tagged) were tagged and released at the Lawrence Project (FERC No. 2800) fish lift facility and were evaluated for upstream passage at Lowell. The remaining 150 radio-tagged adult alewives were sourced from either the fish passage facility at Lawrence or the upstream fish ladder at Amoskeag Dam in

Manchester, NH (FERC No. 1893) and were released upstream of Lowell at the Tyngsborough Riverfront Park for the evaluation of downstream passage. An additional set of radio-tagged adult alewives released as part of a concurrent fish passage study on the Nashua River were also monitored for downstream passage at Lowell. Of the dual-tagged adult alewives released downstream of the Project, 85% were determined to have approached Lowell and were available to assess passage effectiveness of either E.L. Field powerhouse fish lift or the Pawtucket Dam fish ladder. Of the 150 radio-tagged adult alewives released upstream of Lowell, 83% approached the Pawtucket Dam and were available to evaluate downstream passage at the Project. The downstream passage analysis for adult alewives at Lowell was supplemented with information from an additional 93 individuals which approached Pawtucket Dam following release in the Nashua River.

Releases of dual-tagged alewives downstream of the Project occurred over six dates between May 7 and May 19, 2020 and individuals were observed approaching the Lowell Project as early as the initial date of release through May 23. The duration of time for fish to move upstream from the release location at Lawrence to Lowell was around one day for most dual-tagged adult alewives (median = 19.6 hours; 75th percentile = 28.6 hours). Following arrival downstream of the Project, 95% of dual-tagged adult alewives made at least one foray upstream towards either the fish lift or ladder. When examined by structure 64% of dual-tagged alewives made at least one foray in the direction of the fish lift, 67% in the direction of the fish ladder, and 39% in the direction of the fish lift and fish ladder.

The 82 dual-tagged adult alewives determined to have approached the E.L. Field fish lift produced a combined total of 134 unique foray events. Approximately 66% of the set of upstream foray events towards the E.L. Field fish lift resulted in detection of the dual-tagged alewife at the lift entrance and the median duration of time to locate the fish lift entrance was 0.7 hours. Fish lift entrances were recorded over a range of dates from May 8 through May 30 and peaked during mid-May. Upstream effectiveness of the E.L. Field fish lift was assessed using a CJS model and for an individual adult alewife which entered the tailrace channel estimated the probability of locating the entrance (i.e., the nearfield attraction) at 83.3%. The overall effectiveness of the E.L. Field fish lift for adult alewife passage during 2020 was estimated at 43.9% (75% CI = 39.3-51.4%). Following upstream passage at the lift, dual-tagged adult alewives proceed quickly upstream to the downstream face of the Pawtucket Gatehouse (median duration = 0.7 hours). The median duration of time for dual-tagged adult alewives to pass the Pawtucket Gatehouse was 25.7 hours.

A total of 86 adult alewives made at least one foray in the direction of the Pawtucket Dam fish ladder during their time at large in the Project area. Of the 105 total forays towards the fish ladder, 51% resulted in at least one detection at the ladder entrance and the median duration of time to locate the entrance once an individual had arrived at the upper end of the bypassed reach was 4.0 hours. Fish lift entrances were recorded for dual-tagged adult alewives over a range of dates from May 7 through May 23 and peaked during mid-May. Additional observations of PIT-tag only adult alewife entrances into the fish ladder occurred over a comparable range of dates (May 9 to May 27). Upstream effectiveness of the Pawtucket Dam

fish ladder was assessed using a CJS model and for an individual adult alewife which ascended to the upper end of the bypassed reach the probability of locating the entrance (i.e., the nearfield attraction) was 93.0%. The overall effectiveness of the Pawtucket Dam fish ladder for adult alewife passage during 2020 was estimated at 75.6% (75% CI = 69.2-82.2%). The median duration of time from initial detection at the fish ladder entrance until exit at the top of the structure for dual-tagged adult alewives was 2.9 hours (lower leg median duration = 2.1 hours; upper leg median duration = 1.1 hours). Supplemental data collected for the PIT-tag only adult alewives which entered the Pawtucket Dam fish ladder corresponded with observations for the dual-tagged fish (median ladder passage duration = 3.8 hours; lower leg passage = 1.6 hours; upper leg passage = 1.2 hours).

Outmigration of radio-tagged adult alewives was observed over a range of dates from May 21 to June 17 with a peak number of events occurring between June 3 and 6. The median upstream residence time prior to downstream passage was 1.8 days with 78% of those individuals passing downstream within 96 hours of arrival. The majority of individuals passed downstream of Lowell via the E.L. Field turbine units (47% of radio-tagged alewives) or utilized the downstream bypass (45% of radio-tagged alewives). Downstream passage survival was calculated as the joint probability of the three reach-specific survival estimates which encompasses the full section of the Merrimack River from Lowell downstream to Lawrence and resulted in an estimated downstream passage survival for adult alewives at Lowell of 80.1% (75% CI = 76.7%-83.6%). This estimate of downstream passage survival for adult alewives at Lowell includes background mortality (i.e., natural mortality) for the species in the downstream reach, along with any tagging-related mortalities or tag regurgitations. As a result, this estimate should be viewed as a minimum estimate of total project survival (i.e., due solely to project effects) for adult alewives at the Project. Downstream passage survival for adult alewives utilizing the E.L. Field turbine units and downstream bypass facility was 73.9% (75% CI = 68.8%-79.1%) and 87.8% (75% CI = 81.8%-91.5%), respectively.

6.2 Adult American Shad

A total of 534 adult American shad were radio and/or PIT-tagged over a range of dates from May 16 through June 8, 2020. Of that total, 384 (180 dual-tagged and 204 PIT-tagged) were tagged and released at the Lawrence fish lift facility and were evaluated for upstream passage at Lowell. The remaining 150 radio-tagged adult American shad were collected from the fish passage facility at Lawrence and were released upstream of Lowell at the Tyngsborough Riverfront Park for the evaluation of downstream passage. Of the dual-tagged adult American shad released downstream of the Project, 40% were determined to have approached Lowell and were available to assess passage effectiveness of either E.L. Field powerhouse fish lift or the Pawtucket Dam fish ladder. An additional 47% of the dual-tagged shad exhibited upstream movement following tagging and release at Lawrence but did not move the full length of the Merrimack River reach between the two Projects. Of the 150 radio-tagged adult shad released upstream of Lowell, 79% approached the Pawtucket Dam and were available to evaluate downstream passage at the Project.

Releases of dual-tagged American shad downstream of the Project occurred over five dates between May 16 and May 27, 2020 and individuals were observed approaching the Lowell Project between May 17 and June 6. The median duration of time for shad to move upstream from the release location at Lawrence to Lowell was 64.5 hours (2.7 days). Following arrival downstream of the Project, 63% of dual-tagged adult American shad made at least one foray upstream towards either the fish lift or ladder. The vast majority those shad made one or more forays in the direction of the fish lift. Only a single dual-tagged shad was determined to have initiated an upstream ascent into the bypassed reach and in the direction of the fish ladder.

The 43 dual-tagged adult American shad determined to have approached the E.L. Field fish lift produced a combined total of 201 unique foray events. Approximately 37% of the set of upstream foray events towards the E.L. Field fish lift resulted in detection of the dual-tagged shad at the lift entrance and the median duration of time to locate the fish lift entrance was 1.1 hours. Fish lift entrances were recorded over a range of dates from May 18 through June 15 and peaked during late-May. Upstream effectiveness of the E.L. Field fish lift was assessed using a CJS model and for an individual adult shad which entered the tailrace channel estimated the probability of locating the entrance (i.e., the nearfield attraction) at 67.4%. The overall effectiveness of the E.L. Field fish lift for adult American shad passage during 2020 was estimated at 30.4% (75% CI = 22.1-39.5%). Following upstream passage at the lift, dual-tagged adult shad proceed quickly upstream to the downstream face of the Pawtucket Gatehouse (median duration = 0.8 hours). The median duration of time for dual-tagged adult shad to pass the Pawtucket Gatehouse was 5.4 days.

Upstream movement of dual-tagged shad within the Lowell bypassed reach was limited to a single individual which was detected only at the lowermost receiver within that reach. There were no detections of any dual-tagged adult American shad at the Pawtucket Dam fish ladder during the 2020 study. Similarly, detections of PIT-tagged adult shad were also very limited during the 2020 study period. Of the 204 PIT-tagged adult shad released at Lawrence during the onset of the study only two individuals were determined to have entered the fish ladder.

Outmigration of radio-tagged adult American shad was observed over a range of dates from June 4 to June 27 with a peak number of events occurring on or before June 15. The median upstream residence time prior to downstream passage was 3.9 days with 51% of individuals passing downstream in less than 96 hours after their arrival. The majority of individuals passed downstream of Lowell via the E.L. Field turbine units (26%), the downstream bypass (28%) or utilized the bypassed reach (38% of radio-tagged shad). Downstream passage survival was calculated as the joint probability of the three reach-specific survival estimates which encompasses the full section of the Merrimack River from Lowell downstream to Lawrence and resulted in an estimated downstream passage survival for adult shad at Lowell of 70.0% (75% CI = 64.5%-74.6%). This estimate of downstream passage survival for adult shad at Lowell includes background mortality (i.e., natural mortality) for the species in the downstream reach, along with any tagging-related mortalities or tag regurgitations. As a result, this estimate should be viewed as a minimum estimate of total project survival (i.e., due solely to project effects) for adult American shad at the Project. Downstream passage survival for adult American shad

utilizing the E.L. Field turbine units, downstream bypass facility or spill was 35.5% (75% CI = 25.8%-45.2%), 82.6% (75% CI = 75.7%-90.9%), and 89.2% (75% CI = 82.6%-93.8%), respectively.

7 Variances from FERC-Approved Study Plan

The timing of this field study (April – June 2020) coincided with the rapid onset of the COVID-19 pandemic throughout the United States and during the course of this evaluation both the States of New Hampshire and Massachusetts were operating under a "stay-at-home" order. Every effort was made to conduct this evaluation as described in the FERC-approved RSP while still maintaining the health and safety of all Normandeau project staff and Boott operations staff.

Variances from the RSP included:

- Monitoring Station M20 was described in the RSP as a PIT-reader to be installed at the hopper discharge of the E.L. Field fish lift. Range testing conducted following installation of this antenna indicated significant background interference at that location reducing the read range of the antenna to near zero. As a result that unit was moved further upstream to allow for a pair of readers to provide coverage of the fish lift exit flume.

- Monitoring Stations C3 and C7 were described in the RSP as PIT-readers. Following initial site reconnaissance it was determined by Normandeau field staff that the intended detection area was not suitable for a PIT antenna. As a result those two locations were instead monitored using a Sigma-Eight Orion radio telemetry receiver. This change in equipment was noted during the March 2020 ISR meeting held in Lowell, MA.

- As Boott was not operating the downtown canal units due to safety concerns, the 100 radio-tagged adult alewife and shad (50 each) proposed in the RSP for release into the downtown canal system to assess outmigration through those facilities were instead placed in the river upstream of Lowell to increase the sample size for the downstream passage assessment. Boott consulted with both USFWS and NHFGD prior to making this modification.

- Due to uncertainty in returns of adult river herring at Lawrence towards the tail end of the monitoring period, Boott relied on the use of 70 adult alewives collected at the Amoskeag trap and truck facility in Manchester, NH. These individuals were radio-tagged and the released into the river upstream of Lowell to evaluate downstream passage of that species. Boott consulted with both USFWS and NHFGD prior to making this modification.

- In their SPD and based on resource agency comments, FERC recommended placement of an additional stationary receiver along the eastern wall of the E.L. Field tailrace. Boott and Normandeau staff evaluated the eastern tailrace wall during the site

installation process and access to that reach was deemed unsafe. The study proceeded with a single tailrace receiver which operated without issue for the duration of the study period.

- In their SPD, FERC recommended fish be released at a point further upstream to reduce the potential for fallback downstream of Lawrence immediately following tagging and release. Adult alosines collected for upstream passage from the Lawrence fish lift were released directly into the exit flume of that facility following tagging. This change was made due to the lack of early season tank truck assistance to move American shad upstream as well as the closure of the public boat access upstream of Lawrence by the City due to the ongoing COVID situation.

- The evaluation of the E.L. Field fish lift as part of the spring 2020 adult alosine passage evaluation was conducted under the same tailrace channel geometry as previous evaluations. As discussed during consultation with the resource agencies prior to the 2020 study, Boott could not guarantee that the planned tailrace ledge modifications could be completed in time to avoid interference with fish lift operations and this study.

8 References

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9 Appendices

Appendix A. Tagging and release information for adult alosines for the spring 2020 passage assessment at Lowell.

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	295	5/7/2020	Dual	149.440	10	900_230000237305	Lawrence	US
Alewife	M	310	5/7/2020	Dual	149.440	11	900_230000237304	Lawrence	US
Alewife	F	298	5/7/2020	Dual	149.440	12	900_230000237303	Lawrence	US
Alewife	F	319	5/7/2020	Dual	149.440	13	900_230000237302	Lawrence	US
Alewife	F	296	5/7/2020	Dual	149.440	14	900_230000237301	Lawrence	US
Alewife	F	315	5/7/2020	Dual	149.460	40	900_230000237310	Lawrence	US
Alewife	M	292	5/7/2020	Dual	149.460	41	900_230000237309	Lawrence	US
Alewife	M	298	5/7/2020	Dual	149.460	42	900_230000237308	Lawrence	US
Alewife	M	305	5/7/2020	Dual	149.460	43	900_230000237307	Lawrence	US
Alewife	F	314	5/7/2020	Dual	149.460	44	900_230000237306	Lawrence	US
Alewife	M	303	5/7/2020	Dual	149.480	70	900_230000237315	Lawrence	US
Alewife	M	280	5/7/2020	Dual	149.480	71	900_230000237314	Lawrence	US
Alewife	F	311	5/7/2020	Dual	149.480	72	900_230000237313	Lawrence	US
Alewife	M	297	5/7/2020	Dual	149.480	73	900_230000237312	Lawrence	US
Alewife	F	304	5/7/2020	Dual	149.480	74	900_230000237311	Lawrence	US
Alewife	F	319	5/7/2020	Dual	149.760	100	900_230000237320	Lawrence	US
Alewife	F	314	5/7/2020	Dual	149.760	101	900_230000237319	Lawrence	US
Alewife	F	315	5/7/2020	Dual	149.760	102	900_230000237318	Lawrence	US
Alewife	M	305	5/7/2020	Dual	149.760	103	900_230000237317	Lawrence	US
Alewife	F	305	5/7/2020	Dual	149.760	104	900_230000237316	Lawrence	US
Alewife	M	295	5/7/2020	Dual	149.800	130	900_230000237325	Lawrence	US
Alewife	F	330	5/7/2020	Dual	149.800	131	900_230000237324	Lawrence	US
Alewife	M	310	5/7/2020	Dual	149.800	132	900_230000237323	Lawrence	US
Alewife	F	294	5/7/2020	Dual	149.800	133	900_230000237322	Lawrence	US
Alewife	F	295	5/7/2020	Dual	149.800	134	900_230000237321	Lawrence	US
Alewife	F	285	5/7/2020	PIT	-	-	900_230000237328	Lawrence	US
Alewife	M	285	5/7/2020	PIT	-	-	900_230000237356	Lawrence	US
Alewife	M	288	5/7/2020	PIT	-	-	900_230000237348	Lawrence	US
Alewife	M	290	5/7/2020	PIT	-	-	900_230000237329	Lawrence	US
Alewife	F	290	5/7/2020	PIT	-	-	900_230000237330	Lawrence	US
Alewife	M	290	5/7/2020	PIT	-	-	900_230000237331	Lawrence	US
Alewife	M	292	5/7/2020	PIT	-	-	900_230000237341	Lawrence	US
Alewife	M	295	5/7/2020	PIT	-	-	900_230000237353	Lawrence	US
Alewife	M	295	5/7/2020	PIT	-	-	900_230000237359	Lawrence	US
Alewife	M	296	5/7/2020	PIT	-	-	900_230000237354	Lawrence	US
Alewife	F	297	5/7/2020	PIT	-	-	900_230000237334	Lawrence	US
Alewife	M	297	5/7/2020	PIT	-	-	900_230000237347	Lawrence	US
Alewife	M	299	5/7/2020	PIT	-	-	900_230000237333	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	299	5/7/2020	PIT	-	-	900_230000237339	Lawrence	US
Alewife	M	300	5/7/2020	PIT	-	-	900_230000237326	Lawrence	US
Alewife	F	300	5/7/2020	PIT	-	-	900_230000237332	Lawrence	US
Alewife	M	300	5/7/2020	PIT	-	-	900_230000237346	Lawrence	US
Alewife	M	300	5/7/2020	PIT	-	-	900_230000237352	Lawrence	US
Alewife	M	303	5/7/2020	PIT	-	-	900_230000237345	Lawrence	US
Alewife	M	303	5/7/2020	PIT	-	-	900_230000237351	Lawrence	US
Alewife	M	304	5/7/2020	PIT	-	-	900_230000237335	Lawrence	US
Alewife	M	304	5/7/2020	PIT	-	-	900_230000237343	Lawrence	US
Alewife	F	305	5/7/2020	PIT	-	-	900_230000237357	Lawrence	US
Alewife	F	308	5/7/2020	PIT	-	-	900_230000237355	Lawrence	US
Alewife	M	310	5/7/2020	PIT	-	-	900_230000237349	Lawrence	US
Alewife	M	312	5/7/2020	PIT	-	-	900_230000237336	Lawrence	US
Alewife	F	312	5/7/2020	PIT	-	-	900_230000237344	Lawrence	US
Alewife	F	313	5/7/2020	PIT	-	-	900_230000237340	Lawrence	US
Alewife	F	314	5/7/2020	PIT	-	-	900_230000237337	Lawrence	US
Alewife	F	314	5/7/2020	PIT	-	-	900_230000237338	Lawrence	US
Alewife	U	315	5/7/2020	PIT	-	-	900_230000237342	Lawrence	US
Alewife	U	316	5/7/2020	PIT	-	-	900_230000237358	Lawrence	US
Alewife	F	319	5/7/2020	PIT	-	-	900_230000237350	Lawrence	US
Alewife	F	330	5/7/2020	PIT	-	-	900_230000237327	Lawrence	US
Alewife	M	294	5/8/2020	Dual	149.440	16	900_230000237419	Lawrence	US
Alewife	M	303	5/8/2020	Dual	149.440	17	900_230000237418	Lawrence	US
Alewife	M	300	5/8/2020	Dual	149.440	18	900_230000237417	Lawrence	US
Alewife	F	335	5/8/2020	Dual	149.440	19	900_230000237416	Lawrence	US
Alewife	F	314	5/8/2020	Dual	149.440	20	900_230000237415	Lawrence	US
Alewife	M	290	5/8/2020	Dual	149.460	46	900_230000237424	Lawrence	US
Alewife	F	311	5/8/2020	Dual	149.460	47	900_230000237423	Lawrence	US
Alewife	M	301	5/8/2020	Dual	149.460	48	900_230000237422	Lawrence	US
Alewife	M	304	5/8/2020	Dual	149.460	49	900_230000237421	Lawrence	US
Alewife	M	289	5/8/2020	Dual	149.460	50	900_230000237420	Lawrence	US
Alewife	M	282	5/8/2020	Dual	149.480	76	900_230000237429	Lawrence	US
Alewife	M	301	5/8/2020	Dual	149.480	77	900_230000237428	Lawrence	US
Alewife	M	314	5/8/2020	Dual	149.480	78	900_230000237427	Lawrence	US
Alewife	M	285	5/8/2020	Dual	149.480	79	900_230000237426	Lawrence	US
Alewife	M	284	5/8/2020	Dual	149.480	80	900_230000237425	Lawrence	US
Alewife	U	320	5/8/2020	Dual	149.760	106	900_230000237434	Lawrence	US
Alewife	M	304	5/8/2020	Dual	149.760	107	900_230000237433	Lawrence	US
Alewife	M	293	5/8/2020	Dual	149.760	108	900_230000237432	Lawrence	US
Alewife	M	290	5/8/2020	Dual	149.760	109	900_230000237431	Lawrence	US
Alewife	F	289	5/8/2020	Dual	149.760	110	900_230000237430	Lawrence	US
Alewife	M	304	5/8/2020	Dual	149.800	136	900_230000237439	Lawrence	US
Alewife	F	315	5/8/2020	Dual	149.800	137	900_230000237438	Lawrence	US
Alewife	M	306	5/8/2020	Dual	149.800	138	900_230000237437	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	325	5/8/2020	Dual	149.800	139	900_230000237436	Lawrence	US
Alewife	M	294	5/8/2020	Dual	149.800	140	900_230000237435	Lawrence	US
Alewife	M	280	5/8/2020	PIT	-	-	900_230000237406	Lawrence	US
Alewife	M	285	5/8/2020	PIT	-	-	900_230000237403	Lawrence	US
Alewife	M	287	5/8/2020	PIT	-	-	900_230000237413	Lawrence	US
Alewife	M	290	5/8/2020	PIT	-	-	900_230000237404	Lawrence	US
Alewife	M	290	5/8/2020	PIT	-	-	900_230000237412	Lawrence	US
Alewife	M	291	5/8/2020	PIT	-	-	900_230000237440	Lawrence	US
Alewife	M	292	5/8/2020	PIT	-	-	900_230000237391	Lawrence	US
Alewife	M	292	5/8/2020	PIT	-	-	900_230000237407	Lawrence	US
Alewife	M	294	5/8/2020	PIT	-	-	900_230000237443	Lawrence	US
Alewife	M	295	5/8/2020	PIT	-	-	900_230000237393	Lawrence	US
Alewife	M	295	5/8/2020	PIT	-	-	900_230000237397	Lawrence	US
Alewife	M	295	5/8/2020	PIT	-	-	900_230000237398	Lawrence	US
Alewife	M	297	5/8/2020	PIT	-	-	900_230000237441	Lawrence	US
Alewife	U	298	5/8/2020	PIT	-	-	900_230000237445	Lawrence	US
Alewife	F	300	5/8/2020	PIT	-	-	900_230000237405	Lawrence	US
Alewife	M	300	5/8/2020	PIT	-	-	900_230000237410	Lawrence	US
Alewife	M	302	5/8/2020	PIT	-	-	900_230000237411	Lawrence	US
Alewife	M	302	5/8/2020	PIT	-	-	900_230000237448	Lawrence	US
Alewife	F	304	5/8/2020	PIT	-	-	900_230000237442	Lawrence	US
Alewife	F	305	5/8/2020	PIT	-	-	900_230000237402	Lawrence	US
Alewife	F	305	5/8/2020	PIT	-	-	900_230000237408	Lawrence	US
Alewife	U	305	5/8/2020	PIT	-	-	900_230000237447	Lawrence	US
Alewife	F	307	5/8/2020	PIT	-	-	900_230000237444	Lawrence	US
Alewife	M	308	5/8/2020	PIT	-	-	900_230000237399	Lawrence	US
Alewife	F	308	5/8/2020	PIT	-	-	900_230000237446	Lawrence	US
Alewife	M	310	5/8/2020	PIT	-	-	900_230000237390	Lawrence	US
Alewife	F	310	5/8/2020	PIT	-	-	900_230000237400	Lawrence	US
Alewife	M	310	5/8/2020	PIT	-	-	900_230000237409	Lawrence	US
Alewife	F	314	5/8/2020	PIT	-	-	900_230000237394	Lawrence	US
Alewife	F	314	5/8/2020	PIT	-	-	900_230000237396	Lawrence	US
Alewife	F	314	5/8/2020	PIT	-	-	900_230000237414	Lawrence	US
Alewife	F	315	5/8/2020	PIT	-	-	900_230000237401	Lawrence	US
Alewife	F	317	5/8/2020	PIT	-	-	900_230000237395	Lawrence	US
Alewife	M	318	5/8/2020	PIT	-	-	900_230000237392	Lawrence	US
Alewife	F	321	5/16/2020	Dual	149.440	22	900_230000237461	Lawrence	US
Alewife	M	313	5/16/2020	Dual	149.440	23	900_230000237463	Lawrence	US
Alewife	F	302	5/16/2020	Dual	149.440	24	900_230000237465	Lawrence	US
Alewife	M	304	5/16/2020	Dual	149.440	25	900_230000237467	Lawrence	US
Alewife	F	316	5/16/2020	Dual	149.440	26	900_230000237469	Lawrence	US
Alewife	F	325	5/16/2020	Dual	149.460	52	900_230000237478	Lawrence	US
Alewife	F	321	5/16/2020	Dual	149.460	53	900_230000237477	Lawrence	US
Alewife	F	312	5/16/2020	Dual	149.460	54	900_230000237475	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	M	295	5/16/2020	Dual	149.460	55	900_230000237471	Lawrence	US
Alewife	M	305	5/16/2020	Dual	149.800	142	900_230000237449	Lawrence	US
Alewife	M	315	5/16/2020	Dual	149.800	143	900_230000237456	Lawrence	US
Alewife	M	303	5/16/2020	Dual	149.800	144	900_230000237454	Lawrence	US
Alewife	F	309	5/16/2020	Dual	149.800	145	900_230000237452	Lawrence	US
Alewife	F	325	5/16/2020	Dual	149.800	146	900_230000237450	Lawrence	US
Alewife	F	304	5/17/2020	Dual	149.440	28	900_230000237677	Lawrence	US
Alewife	M	275	5/17/2020	Dual	149.440	29	900_230000237676	Lawrence	US
Alewife	M	290	5/17/2020	Dual	149.440	30	900_230000237675	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.440	31	900_230000237674	Lawrence	US
Alewife	F	295	5/17/2020	Dual	149.440	32	900_230000237673	Lawrence	US
Alewife	F	305	5/17/2020	Dual	149.460	56	900_230000237613	Lawrence	US
Alewife	F	300	5/17/2020	Dual	149.460	58	900_230000237683	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.460	59	900_230000237682	Lawrence	US
Alewife	F	292	5/17/2020	Dual	149.460	60	900_230000237681	Lawrence	US
Alewife	F	290	5/17/2020	Dual	149.460	61	900_230000237680	Lawrence	US
Alewife	M	310	5/17/2020	Dual	149.460	62	900_230000237678	Lawrence	US
Alewife	M	300	5/17/2020	Dual	149.480	82	900_230000237618	Lawrence	US
Alewife	F	304	5/17/2020	Dual	149.480	83	900_230000237617	Lawrence	US
Alewife	F	308	5/17/2020	Dual	149.480	84	900_230000237616	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.480	85	900_230000237615	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.480	86	900_230000237614	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.480	88	900_230000237688	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.480	89	900_230000237687	Lawrence	US
Alewife	F	297	5/17/2020	Dual	149.480	90	900_230000237686	Lawrence	US
Alewife	M	290	5/17/2020	Dual	149.480	91	900_230000237685	Lawrence	US
Alewife	M	300	5/17/2020	Dual	149.480	92	900_230000237684	Lawrence	US
Alewife	F	295	5/17/2020	Dual	149.760	112	900_230000237624	Lawrence	US
Alewife	F	315	5/17/2020	Dual	149.760	113	900_230000237623	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.760	114	900_230000237622	Lawrence	US
Alewife	F	293	5/17/2020	Dual	149.760	115	900_230000237620	Lawrence	US
Alewife	M	275	5/17/2020	Dual	149.760	116	900_230000237619	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.760	118	900_230000237693	Lawrence	US
Alewife	F	315	5/17/2020	Dual	149.760	119	900_230000237692	Lawrence	US
Alewife	F	318	5/17/2020	Dual	149.760	120	900_230000237691	Lawrence	US
Alewife	F	295	5/17/2020	Dual	149.760	121	900_230000237690	Lawrence	US
Alewife	F	315	5/17/2020	Dual	149.760	122	900_230000237689	Lawrence	US
Alewife	F	300	5/17/2020	Dual	149.800	148	900_230000237699	Lawrence	US
Alewife	M	295	5/17/2020	Dual	149.800	149	900_230000237698	Lawrence	US
Alewife	F	295	5/17/2020	Dual	149.800	150	900_230000237696	Lawrence	US
Alewife	F	310	5/17/2020	Dual	149.800	151	900_230000237695	Lawrence	US
Alewife	M	290	5/17/2020	Dual	149.800	152	900_230000237694	Lawrence	US
Alewife	M	260	5/17/2020	PIT	-	-	900_230000237743	Lawrence	US
Alewife	F	274	5/17/2020	PIT	-	-	900_230000237745	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	M	275	5/17/2020	PIT	-	-	900_230000237736	Lawrence	US
Alewife	M	280	5/17/2020	PIT	-	-	900_230000237775	Lawrence	US
Alewife	M	281	5/17/2020	PIT	-	-	900_230000237766	Lawrence	US
Alewife	M	281	5/17/2020	PIT	-	-	900_230000237752	Lawrence	US
Alewife	M	285	5/17/2020	PIT	-	-	900_230000237625	Lawrence	US
Alewife	F	285	5/17/2020	PIT	-	-	900_230000237636	Lawrence	US
Alewife	M	286	5/17/2020	PIT	-	-	900_230000237733	Lawrence	US
Alewife	F	288	5/17/2020	PIT	-	-	900_230000237774	Lawrence	US
Alewife	M	288	5/17/2020	PIT	-	-	900_230000237738	Lawrence	US
Alewife	M	290	5/17/2020	PIT	-	-	900_230000237627	Lawrence	US
Alewife	M	290	5/17/2020	PIT	-	-	900_230000237631	Lawrence	US
Alewife	M	290	5/17/2020	PIT	-	-	900_230000237634	Lawrence	US
Alewife	F	290	5/17/2020	PIT	-	-	900_230000237773	Lawrence	US
Alewife	M	291	5/17/2020	PIT	-	-	900_230000237754	Lawrence	US
Alewife	M	292	5/17/2020	PIT	-	-	900_230000237744	Lawrence	US
Alewife	M	292	5/17/2020	PIT	-	-	900_230000237759	Lawrence	US
Alewife	M	293	5/17/2020	PIT	-	-	900_230000237750	Lawrence	US
Alewife	M	293	5/17/2020	PIT	-	-	900_230000237751	Lawrence	US
Alewife	M	294	5/17/2020	PIT	-	-	900_230000237735	Lawrence	US
Alewife	M	295	5/17/2020	PIT	-	-	900_230000237621	Lawrence	US
Alewife	F	295	5/17/2020	PIT	-	-	900_230000237628	Lawrence	US
Alewife	F	295	5/17/2020	PIT	-	-	900_230000237635	Lawrence	US
Alewife	M	295	5/17/2020	PIT	-	-	900_230000237742	Lawrence	US
Alewife	F	295	5/17/2020	PIT	-	-	900_230000237753	Lawrence	US
Alewife	F	296	5/17/2020	PIT	-	-	900_230000237768	Lawrence	US
Alewife	M	296	5/17/2020	PIT	-	-	900_230000237758	Lawrence	US
Alewife	F	299	5/17/2020	PIT	-	-	900_230000237771	Lawrence	US
Alewife	M	300	5/17/2020	PIT	-	-	900_230000237633	Lawrence	US
Alewife	F	300	5/17/2020	PIT	-	-	900_230000237637	Lawrence	US
Alewife	M	300	5/17/2020	PIT	-	-	900_230000237641	Lawrence	US
Alewife	F	300	5/17/2020	PIT	-	-	900_230000237642	Lawrence	US
Alewife	F	300	5/17/2020	PIT	-	-	900_230000237769	Lawrence	US
Alewife	U	300	5/17/2020	PIT	-	-	900_230000237679	Lawrence	US
Alewife	F	301	5/17/2020	PIT	-	-	900_230000237764	Lawrence	US
Alewife	M	302	5/17/2020	PIT	-	-	900_230000237737	Lawrence	US
Alewife	M	302	5/17/2020	PIT	-	-	900_230000237747	Lawrence	US
Alewife	F	303	5/17/2020	PIT	-	-	900_230000237740	Lawrence	US
Alewife	F	304	5/17/2020	PIT	-	-	900_230000237772	Lawrence	US
Alewife	F	304	5/17/2020	PIT	-	-	900_230000237749	Lawrence	US
Alewife	F	305	5/17/2020	PIT	-	-	900_230000237629	Lawrence	US
Alewife	M	305	5/17/2020	PIT	-	-	900_230000237638	Lawrence	US
Alewife	M	305	5/17/2020	PIT	-	-	900_230000237730	Lawrence	US
Alewife	M	305	5/17/2020	PIT	-	-	900_230000237732	Lawrence	US
Alewife	F	305	5/17/2020	PIT	-	-	900_230000237741	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	M	305	5/17/2020	PIT	-	-	900_230000237746	Lawrence	US
Alewife	F	305	5/17/2020	PIT	-	-	900_230000237756	Lawrence	US
Alewife	M	305	5/17/2020	PIT	-	-	900_230000237757	Lawrence	US
Alewife	M	306	5/17/2020	PIT	-	-	900_230000237734	Lawrence	US
Alewife	F	307	5/17/2020	PIT	-	-	900_230000237762	Lawrence	US
Alewife	F	308	5/17/2020	PIT	-	-	900_230000237739	Lawrence	US
Alewife	M	309	5/17/2020	PIT	-	-	900_230000237767	Lawrence	US
Alewife	F	310	5/17/2020	PIT	-	-	900_230000237630	Lawrence	US
Alewife	F	310	5/17/2020	PIT	-	-	900_230000237765	Lawrence	US
Alewife	M	310	5/17/2020	PIT	-	-	900_230000237770	Lawrence	US
Alewife	M	310	5/17/2020	PIT	-	-	900_230000237697	Lawrence	US
Alewife	F	310	5/17/2020	PIT	-	-	900_230000237731	Lawrence	US
Alewife	F	312	5/17/2020	PIT	-	-	900_230000237640	Lawrence	US
Alewife	F	312	5/17/2020	PIT	-	-	900_230000237776	Lawrence	US
Alewife	M	314	5/17/2020	PIT	-	-	900_230000237763	Lawrence	US
Alewife	F	315	5/17/2020	PIT	-	-	900_230000237632	Lawrence	US
Alewife	F	315	5/17/2020	PIT	-	-	900_230000237755	Lawrence	US
Alewife	F	316	5/17/2020	PIT	-	-	900_230000237748	Lawrence	US
Alewife	F	319	5/17/2020	PIT	-	-	900_230000237760	Lawrence	US
Alewife	F	320	5/17/2020	PIT	-	-	900_230000237626	Lawrence	US
Alewife	F	324	5/17/2020	PIT	-	-	900_230000237761	Lawrence	US
Alewife	F	330	5/17/2020	PIT	-	-	900_230000237639	Lawrence	US
Alewife	F	282	5/18/2020	Dual	149.440	34	900_230000237815	Lawrence	US
Alewife	M	306	5/18/2020	Dual	149.440	35	900_230000237812	Lawrence	US
Alewife	M	290	5/18/2020	Dual	149.440	36	900_230000237811	Lawrence	US
Alewife	M	274	5/18/2020	Dual	149.440	37	900_230000237809	Lawrence	US
Alewife	F	306	5/18/2020	Dual	149.440	38	900_230000237807	Lawrence	US
Alewife	M	306	5/18/2020	Dual	149.460	64	900_230000237846	Lawrence	US
Alewife	F	295	5/18/2020	Dual	149.460	65	900_230000237821	Lawrence	US
Alewife	F	315	5/18/2020	Dual	149.460	66	900_230000237819	Lawrence	US
Alewife	M	305	5/18/2020	Dual	149.460	67	900_230000237818	Lawrence	US
Alewife	M	287	5/18/2020	Dual	149.460	68	900_230000237816	Lawrence	US
Alewife	F	307	5/18/2020	Dual	149.480	94	900_230000237858	Lawrence	US
Alewife	F	294	5/18/2020	Dual	149.480	95	900_230000237859	Lawrence	US
Alewife	F	323	5/18/2020	Dual	149.480	96	900_230000237860	Lawrence	US
Alewife	M	291	5/18/2020	Dual	149.480	97	900_230000237861	Lawrence	US
Alewife	F	280	5/18/2020	Dual	149.480	98	900_230000237862	Lawrence	US
Alewife	F	318	5/18/2020	Dual	149.760	124	900_230000237863	Lawrence	US
Alewife	M	281	5/18/2020	Dual	149.760	125	900_230000237864	Lawrence	US
Alewife	M	287	5/18/2020	Dual	149.760	126	900_230000237865	Lawrence	US
Alewife	M	269	5/18/2020	Dual	149.760	127	900_230000237866	Lawrence	US
Alewife	F	318	5/18/2020	Dual	149.760	128	900_230000237504	Lawrence	US
Alewife	M	286	5/18/2020	Dual	149.800	154	900_230000237505	Lawrence	US
Alewife	F	306	5/18/2020	Dual	149.800	155	900_230000237506	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	319	5/18/2020	Dual	149.800	156	900_230000237507	Lawrence	US
Alewife	F	286	5/18/2020	Dual	149.800	157	900_230000237508	Lawrence	US
Alewife	F	304	5/18/2020	Dual	149.800	158	900_230000237509	Lawrence	US
Alewife	F	262	5/18/2020	PIT	-	-	900_230000237534	Lawrence	US
Alewife	F	285	5/18/2020	PIT	-	-	900_230000237535	Lawrence	US
Alewife	M	286	5/18/2020	PIT	-	-	900_230000237517	Lawrence	US
Alewife	M	286	5/18/2020	PIT	-	-	900_230000237527	Lawrence	US
Alewife	M	287	5/18/2020	PIT	-	-	900_230000237538	Lawrence	US
Alewife	M	291	5/18/2020	PIT	-	-	900_230000237511	Lawrence	US
Alewife	M	291	5/18/2020	PIT	-	-	900_230000237536	Lawrence	US
Alewife	M	291	5/18/2020	PIT	-	-	900_230000237540	Lawrence	US
Alewife	F	292	5/18/2020	PIT	-	-	900_230000237514	Lawrence	US
Alewife	M	295	5/18/2020	PIT	-	-	900_230000237526	Lawrence	US
Alewife	M	296	5/18/2020	PIT	-	-	900_230000237524	Lawrence	US
Alewife	M	298	5/18/2020	PIT	-	-	900_230000237519	Lawrence	US
Alewife	M	299	5/18/2020	PIT	-	-	900_230000237541	Lawrence	US
Alewife	F	300	5/18/2020	PIT	-	-	900_230000237510	Lawrence	US
Alewife	F	303	5/18/2020	PIT	-	-	900_230000237539	Lawrence	US
Alewife	F	304	5/18/2020	PIT	-	-	900_230000237542	Lawrence	US
Alewife	F	305	5/18/2020	PIT	-	-	900_230000237521	Lawrence	US
Alewife	M	305	5/18/2020	PIT	-	-	900_230000237522	Lawrence	US
Alewife	M	305	5/18/2020	PIT	-	-	900_230000237531	Lawrence	US
Alewife	M	305	5/18/2020	PIT	-	-	900_230000237537	Lawrence	US
Alewife	F	307	5/18/2020	PIT	-	-	900_230000237530	Lawrence	US
Alewife	M	308	5/18/2020	PIT	-	-	900_230000237516	Lawrence	US
Alewife	M	308	5/18/2020	PIT	-	-	900_230000237543	Lawrence	US
Alewife	F	310	5/18/2020	PIT	-	-	900_230000237523	Lawrence	US
Alewife	F	310	5/18/2020	PIT	-	-	900_230000237525	Lawrence	US
Alewife	F	311	5/18/2020	PIT	-	-	900_230000237512	Lawrence	US
Alewife	F	312	5/18/2020	PIT	-	-	900_230000237515	Lawrence	US
Alewife	F	314	5/18/2020	PIT	-	-	900_230000237518	Lawrence	US
Alewife	F	315	5/18/2020	PIT	-	-	900_230000237532	Lawrence	US
Alewife	F	316	5/18/2020	PIT	-	-	900_230000237513	Lawrence	US
Alewife	F	316	5/18/2020	PIT	-	-	900_230000237529	Lawrence	US
Alewife	F	317	5/18/2020	PIT	-	-	900_230000237528	Lawrence	US
Alewife	F	319	5/18/2020	PIT	-	-	900_230000237520	Lawrence	US
Alewife	F	326	5/18/2020	PIT	-	-	900_230000237533	Lawrence	US
Alewife	M	295	5/19/2020	Dual	149.440	40	900_230000237955	Lawrence	US
Alewife	F	297	5/19/2020	Dual	149.440	41	900_230000237956	Lawrence	US
Alewife	F	312	5/19/2020	Dual	149.440	42	900_230000237957	Lawrence	US
Alewife	F	301	5/19/2020	Dual	149.440	43	900_230000237958	Lawrence	US
Alewife	F	314	5/19/2020	Dual	149.440	44	900_230000237959	Lawrence	US
Alewife	M	304	5/19/2020	Dual	149.460	70	900_230000237960	Lawrence	US
Alewife	F	310	5/19/2020	Dual	149.460	71	900_230000237961	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	316	5/19/2020	Dual	149.460	72	900_230000237962	Lawrence	US
Alewife	F	314	5/19/2020	Dual	149.460	73	900_230000237963	Lawrence	US
Alewife	M	312	5/19/2020	Dual	149.460	74	900_230000237964	Lawrence	US
Alewife	F	305	5/19/2020	Dual	149.480	100	900_230000237965	Lawrence	US
Alewife	M	299	5/19/2020	Dual	149.480	101	900_230000237966	Lawrence	US
Alewife	M	295	5/19/2020	Dual	149.480	102	900_230000237967	Lawrence	US
Alewife	M	308	5/19/2020	Dual	149.480	103	900_230000237968	Lawrence	US
Alewife	F	305	5/19/2020	Dual	149.480	104	900_230000237969	Lawrence	US
Alewife	M	307	5/19/2020	Dual	149.760	130	900_230000237970	Lawrence	US
Alewife	F	309	5/19/2020	Dual	149.760	131	900_230000237971	Lawrence	US
Alewife	F	320	5/19/2020	Dual	149.760	132	900_230000237972	Lawrence	US
Alewife	F	310	5/19/2020	Dual	149.760	133	900_230000237973	Lawrence	US
Alewife	F	324	5/19/2020	Dual	149.760	134	900_230000237974	Lawrence	US
Alewife	M	287	5/19/2020	Dual	149.800	160	900_230000237975	Lawrence	US
Alewife	M	305	5/19/2020	Dual	149.800	161	900_230000237976	Lawrence	US
Alewife	F	313	5/19/2020	Dual	149.800	162	900_230000237977	Lawrence	US
Alewife	F	302	5/19/2020	Dual	149.800	163	900_230000237978	Lawrence	US
Alewife	M	307	5/19/2020	Dual	149.800	164	900_230000237979	Lawrence	US
Alewife	M	285	5/19/2020	PIT	-	-	900_230000237921	Lawrence	US
Alewife	F	287	5/19/2020	PIT	-	-	900_23000023865	Lawrence	US
Alewife	M	288	5/19/2020	PIT	-	-	900_23000023855	Lawrence	US
Alewife	M	289	5/19/2020	PIT	-	-	900_23000023843	Lawrence	US
Alewife	M	289	5/19/2020	PIT	-	-	900_23000023849	Lawrence	US
Alewife	M	290	5/19/2020	PIT	-	-	900_23000023862	Lawrence	US
Alewife	F	291	5/19/2020	PIT	-	-	900_23000023848	Lawrence	US
Alewife	M	291	5/19/2020	PIT	-	-	900_23000023859	Lawrence	US
Alewife	M	292	5/19/2020	PIT	-	-	900_23000023844	Lawrence	US
Alewife	M	294	5/19/2020	PIT	-	-	900_23000023860	Lawrence	US
Alewife	F	295	5/19/2020	PIT	-	-	900_23000023866	Lawrence	US
Alewife	M	295	5/19/2020	PIT	-	-	900_23000023870	Lawrence	US
Alewife	F	296	5/19/2020	PIT	-	-	900_23000023840	Lawrence	US
Alewife	M	296	5/19/2020	PIT	-	-	900_23000023851	Lawrence	US
Alewife	F	296	5/19/2020	PIT	-	-	900_23000023854	Lawrence	US
Alewife	M	296	5/19/2020	PIT	-	-	900_23000023857	Lawrence	US
Alewife	F	298	5/19/2020	PIT	-	-	900_23000023856	Lawrence	US
Alewife	F	300	5/19/2020	PIT	-	-	900_23000023867	Lawrence	US
Alewife	M	302	5/19/2020	PIT	-	-	900_23000023864	Lawrence	US
Alewife	M	303	5/19/2020	PIT	-	-	900_23000023861	Lawrence	US
Alewife	F	304	5/19/2020	PIT	-	-	900_23000023852	Lawrence	US
Alewife	M	305	5/19/2020	PIT	-	-	900_23000023846	Lawrence	US
Alewife	M	306	5/19/2020	PIT	-	-	900_23000023847	Lawrence	US
Alewife	F	307	5/19/2020	PIT	-	-	900_23000023863	Lawrence	US
Alewife	M	311	5/19/2020	PIT	-	-	900_23000023842	Lawrence	US
Alewife	M	312	5/19/2020	PIT	-	-	900_23000023872	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	315	5/19/2020	PIT	-	-	900_23000023853	Lawrence	US
Alewife	F	316	5/19/2020	PIT	-	-	900_23000023850	Lawrence	US
Alewife	F	316	5/19/2020	PIT	-	-	900_23000023868	Lawrence	US
Alewife	F	320	5/19/2020	PIT	-	-	900_23000023869	Lawrence	US
Alewife	F	321	5/19/2020	PIT	-	-	900_23000023845	Lawrence	US
Alewife	F	321	5/19/2020	PIT	-	-	900_23000023858	Lawrence	US
Alewife	F	325	5/19/2020	PIT	-	-	900_23000023841	Lawrence	US
Alewife	F	330	5/19/2020	PIT	-	-	900_23000023871	Lawrence	US
Alewife	M	289	5/21/2020	Radio	149.440	158	-	Lawrence	DS
Alewife	M	287	5/21/2020	Radio	149.440	159	-	Lawrence	DS
Alewife	M	271	5/21/2020	Radio	149.440	160	-	Lawrence	DS
Alewife	M	299	5/21/2020	Radio	149.440	161	-	Lawrence	DS
Alewife	M	304	5/21/2020	Radio	149.440	162	-	Lawrence	DS
Alewife	M	295	5/21/2020	Radio	149.440	163	-	Lawrence	DS
Alewife	F	307	5/21/2020	Radio	149.440	164	-	Lawrence	DS
Alewife	M	273	5/21/2020	Radio	149.440	165	-	Lawrence	DS
Alewife	F	313	5/21/2020	Radio	149.440	166	-	Lawrence	DS
Alewife	F	220	5/21/2020	Radio	149.440	167	-	Lawrence	DS
Alewife	M	298	5/21/2020	Radio	149.440	168	-	Lawrence	DS
Alewife	M	298	5/21/2020	Radio	149.440	169	-	Lawrence	DS
Alewife	M	301	5/21/2020	Radio	149.460	76	-	Lawrence	DS
Alewife	M	295	5/21/2020	Radio	149.460	77	-	Lawrence	DS
Alewife	M	293	5/21/2020	Radio	149.460	78	-	Lawrence	DS
Alewife	M	267	5/21/2020	Radio	149.460	79	-	Lawrence	DS
Alewife	F	290	5/21/2020	Radio	149.460	80	-	Lawrence	DS
Alewife	F	294	5/21/2020	Radio	149.460	81	-	Lawrence	DS
Alewife	M	306	5/21/2020	Radio	149.460	82	-	Lawrence	DS
Alewife	M	285	5/21/2020	Radio	149.460	83	-	Lawrence	DS
Alewife	M	295	5/21/2020	Radio	149.460	84	-	Lawrence	DS
Alewife	F	261	5/21/2020	Radio	149.460	85	-	Lawrence	DS
Alewife	F	292	5/21/2020	Radio	149.460	86	-	Lawrence	DS
Alewife	M	270	5/21/2020	Radio	149.460	87	-	Lawrence	DS
Alewife	M	288	5/21/2020	Radio	149.480	106	-	Lawrence	DS
Alewife	M	298	5/21/2020	Radio	149.480	107	-	Lawrence	DS
Alewife	M	302	5/21/2020	Radio	149.480	108	-	Lawrence	DS
Alewife	F	314	5/21/2020	Radio	149.480	109	-	Lawrence	DS
Alewife	M	287	5/21/2020	Radio	149.480	110	-	Lawrence	DS
Alewife	M	293	5/21/2020	Radio	149.480	111	-	Lawrence	DS
Alewife	F	310	5/21/2020	Radio	149.480	112	-	Lawrence	DS
Alewife	M	294	5/21/2020	Radio	149.480	113	-	Lawrence	DS
Alewife	M	304	5/21/2020	Radio	149.480	114	-	Lawrence	DS
Alewife	M	315	5/21/2020	Radio	149.480	115	-	Lawrence	DS
Alewife	M	282	5/21/2020	Radio	149.480	116	-	Lawrence	DS
Alewife	F	321	5/21/2020	Radio	149.480	117	-	Lawrence	DS

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	M	309	5/21/2020	Radio	149.760	180	-	Lawrence	DS
Alewife	F	289	5/21/2020	Radio	149.760	181	-	Lawrence	DS
Alewife	M	308	5/21/2020	Radio	149.760	182	-	Lawrence	DS
Alewife	F	282	5/21/2020	Radio	149.760	183	-	Lawrence	DS
Alewife	F	298	5/21/2020	Radio	149.760	184	-	Lawrence	DS
Alewife	M	297	5/21/2020	Radio	149.760	185	-	Lawrence	DS
Alewife	M	295	5/21/2020	Radio	149.760	186	-	Lawrence	DS
Alewife	F	304	5/21/2020	Radio	149.760	187	-	Lawrence	DS
Alewife	M	260	5/21/2020	Radio	149.760	188	-	Lawrence	DS
Alewife	M	305	5/21/2020	Radio	149.760	189	-	Lawrence	DS
Alewife	F	330	5/21/2020	Radio	149.760	190	-	Lawrence	DS
Alewife	F	308	5/21/2020	Radio	149.760	191	-	Lawrence	DS
Alewife	F	305	5/21/2020	Radio	149.800	41	-	Lawrence	DS
Alewife	F	304	5/21/2020	Radio	149.800	42	-	Lawrence	DS
Alewife	M	297	5/21/2020	Radio	149.800	43	-	Lawrence	DS
Alewife	M	304	5/21/2020	Radio	149.800	44	-	Lawrence	DS
Alewife	F	296	5/21/2020	Radio	149.800	45	-	Lawrence	DS
Alewife	F	308	5/21/2020	Radio	149.800	46	-	Lawrence	DS
Alewife	M	286	5/21/2020	Radio	149.800	47	-	Lawrence	DS
Alewife	M	314	5/21/2020	Radio	149.800	48	-	Lawrence	DS
Alewife	F	320	5/21/2020	Radio	149.800	49	-	Lawrence	DS
Alewife	F	310	5/21/2020	Radio	149.800	50	-	Lawrence	DS
Alewife	F	309	5/21/2020	Radio	149.800	51	-	Lawrence	DS
Alewife	F	323	5/21/2020	Radio	149.800	52	-	Lawrence	DS
Alewife	M	277	5/22/2020	Radio	149.440	170	-	Lawrence	DS
Alewife	M	265	5/22/2020	Radio	149.440	171	-	Lawrence	DS
Alewife	M	290	5/22/2020	Radio	149.440	172	-	Lawrence	DS
Alewife	M	299	5/22/2020	Radio	149.440	173	-	Lawrence	DS
Alewife	M	278	5/22/2020	Radio	149.460	88	-	Lawrence	DS
Alewife	M	283	5/22/2020	Radio	149.460	89	-	Lawrence	DS
Alewife	M	284	5/22/2020	Radio	149.460	90	-	Lawrence	DS
Alewife	F	314	5/22/2020	Radio	149.460	91	-	Lawrence	DS
Alewife	F	295	5/22/2020	Radio	149.480	118	-	Lawrence	DS
Alewife	M	275	5/22/2020	Radio	149.480	119	-	Lawrence	DS
Alewife	M	291	5/22/2020	Radio	149.480	120	-	Lawrence	DS
Alewife	M	288	5/22/2020	Radio	149.480	121	-	Lawrence	DS
Alewife	M	282	5/22/2020	Radio	149.760	192	-	Lawrence	DS
Alewife	F	316	5/22/2020	Radio	149.760	194	-	Lawrence	DS
Alewife	F	294	5/22/2020	Radio	149.760	195	-	Lawrence	DS
Alewife	M	295	5/22/2020	Radio	149.760	193	-	Lawrence	DS
Alewife	F	318	5/22/2020	Radio	149.800	53	-	Lawrence	DS
Alewife	M	282	5/22/2020	Radio	149.800	54	-	Lawrence	DS
Alewife	M	296	5/22/2020	Radio	149.800	55	-	Lawrence	DS
Alewife	F	304	5/22/2020	Radio	149.800	56	-	Lawrence	DS

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	310	5/28/2020	Radio	149.440	174	-	Amoskeag	DS
Alewife	M	268	5/28/2020	Radio	149.440	175	-	Amoskeag	DS
Alewife	M	291	5/28/2020	Radio	149.440	176	-	Amoskeag	DS
Alewife	M	302	5/28/2020	Radio	149.440	177	-	Amoskeag	DS
Alewife	F	293	5/28/2020	Radio	149.460	92	-	Amoskeag	DS
Alewife	F	298	5/28/2020	Radio	149.460	93	-	Amoskeag	DS
Alewife	M	282	5/28/2020	Radio	149.460	94	-	Amoskeag	DS
Alewife	M	286	5/28/2020	Radio	149.460	95	-	Amoskeag	DS
Alewife	F	314	5/28/2020	Radio	149.480	122	-	Amoskeag	DS
Alewife	M	277	5/28/2020	Radio	149.480	123	-	Amoskeag	DS
Alewife	M	302	5/28/2020	Radio	149.480	124	-	Amoskeag	DS
Alewife	M	273	5/28/2020	Radio	149.480	125	-	Amoskeag	DS
Alewife	M	285	5/28/2020	Radio	149.760	196	-	Amoskeag	DS
Alewife	M	297	5/28/2020	Radio	149.760	197	-	Amoskeag	DS
Alewife	F	290	5/28/2020	Radio	149.760	198	-	Amoskeag	DS
Alewife	M	271	5/28/2020	Radio	149.760	199	-	Amoskeag	DS
Alewife	M	295	5/28/2020	Radio	149.800	57	-	Amoskeag	DS
Alewife	M	292	5/28/2020	Radio	149.800	58	-	Amoskeag	DS
Alewife	M	294	5/28/2020	Radio	149.800	59	-	Amoskeag	DS
Alewife	M	299	5/28/2020	Radio	149.800	60	-	Amoskeag	DS
Alewife	U	283	6/2/2020	Radio	149.440	55	-	Amoskeag	DS
Alewife	F	291	6/2/2020	Radio	149.440	56	-	Amoskeag	DS
Alewife	M	306	6/2/2020	Radio	149.440	57	-	Amoskeag	DS
Alewife	F	283	6/2/2020	Radio	149.440	58	-	Amoskeag	DS
Alewife	M	283	6/2/2020	Radio	149.440	59	-	Amoskeag	DS
Alewife	U	295	6/2/2020	Radio	149.440	60	-	Amoskeag	DS
Alewife	M	280	6/2/2020	Radio	149.440	61	-	Amoskeag	DS
Alewife	F	293	6/2/2020	Radio	149.440	62	-	Amoskeag	DS
Alewife	F	291	6/2/2020	Radio	149.440	63	-	Amoskeag	DS
Alewife	F	310	6/2/2020	Radio	149.440	64	-	Amoskeag	DS
Alewife	F	271	6/2/2020	Radio	149.460	141	-	Amoskeag	DS
Alewife	M	292	6/2/2020	Radio	149.460	142	-	Amoskeag	DS
Alewife	F	315	6/2/2020	Radio	149.460	143	-	Amoskeag	DS
Alewife	F	301	6/2/2020	Radio	149.460	144	-	Amoskeag	DS
Alewife	F	305	6/2/2020	Radio	149.460	145	-	Amoskeag	DS
Alewife	F	286	6/2/2020	Radio	149.460	146	-	Amoskeag	DS
Alewife	F	306	6/2/2020	Radio	149.460	147	-	Amoskeag	DS
Alewife	F	293	6/2/2020	Radio	149.460	148	-	Amoskeag	DS
Alewife	M	274	6/2/2020	Radio	149.460	149	-	Amoskeag	DS
Alewife	M	284	6/2/2020	Radio	149.460	150	-	Amoskeag	DS
Alewife	M	264	6/2/2020	Radio	149.480	127	-	Amoskeag	DS
Alewife	F	295	6/2/2020	Radio	149.480	128	-	Amoskeag	DS
Alewife	F	303	6/2/2020	Radio	149.480	129	-	Amoskeag	DS
Alewife	F	298	6/2/2020	Radio	149.480	130	-	Amoskeag	DS

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Alewife	F	310	6/2/2020	Radio	149.480	131	-	Amoskeag	DS
Alewife	M	282	6/2/2020	Radio	149.480	132	-	Amoskeag	DS
Alewife	F	296	6/2/2020	Radio	149.480	133	-	Amoskeag	DS
Alewife	M	275	6/2/2020	Radio	149.480	134	-	Amoskeag	DS
Alewife	F	293	6/2/2020	Radio	149.480	135	-	Amoskeag	DS
Alewife	F	317	6/2/2020	Radio	149.480	136	-	Amoskeag	DS
Alewife	F	302	6/2/2020	Radio	149.760	83	-	Amoskeag	DS
Alewife	F	316	6/2/2020	Radio	149.760	84	-	Amoskeag	DS
Alewife	F	293	6/2/2020	Radio	149.760	85	-	Amoskeag	DS
Alewife	M	294	6/2/2020	Radio	149.760	86	-	Amoskeag	DS
Alewife	F	320	6/2/2020	Radio	149.760	87	-	Amoskeag	DS
Alewife	F	293	6/2/2020	Radio	149.760	88	-	Amoskeag	DS
Alewife	M	274	6/2/2020	Radio	149.760	89	-	Amoskeag	DS
Alewife	M	286	6/2/2020	Radio	149.760	90	-	Amoskeag	DS
Alewife	F	323	6/2/2020	Radio	149.760	91	-	Amoskeag	DS
Alewife	M	279	6/2/2020	Radio	149.760	92	-	Amoskeag	DS
Alewife	M	264	6/2/2020	Radio	149.800	166	-	Amoskeag	DS
Alewife	F	289	6/2/2020	Radio	149.800	167	-	Amoskeag	DS
Alewife	M	286	6/2/2020	Radio	149.800	168	-	Amoskeag	DS
Alewife	M	287	6/2/2020	Radio	149.800	169	-	Amoskeag	DS
Alewife	M	255	6/2/2020	Radio	149.800	170	-	Amoskeag	DS
Alewife	F	298	6/2/2020	Radio	149.800	173	-	Amoskeag	DS
Alewife	M	276	6/2/2020	Radio	149.800	174	-	Amoskeag	DS
Alewife	M	292	6/2/2020	Radio	149.800	175	-	Amoskeag	DS
Alewife	F	310	6/2/2020	Radio	149.800	176	-	Amoskeag	DS
Alewife	F	306	6/2/2020	Radio	149.800	177	-	Amoskeag	DS
Shad	M	492	5/16/2020	Dual	149.440	121	900_230000237479	Lawrence	US
Shad	M	429	5/16/2020	Dual	149.440	122	900_230000237460	Lawrence	US
Shad	F	533	5/16/2020	Dual	149.440	123	900_230000237462	Lawrence	US
Shad	M	500	5/16/2020	Dual	149.440	124	900_230000237464	Lawrence	US
Shad	F	527	5/16/2020	Dual	149.440	125	900_230000237466	Lawrence	US
Shad	M	482	5/16/2020	Dual	149.440	126	900_230000237468	Lawrence	US
Shad	M	471	5/16/2020	Dual	149.460	156	900_230000237476	Lawrence	US
Shad	M	475	5/16/2020	Dual	149.460	157	900_230000237474	Lawrence	US
Shad	M	466	5/16/2020	Dual	149.460	158	900_230000237473	Lawrence	US
Shad	M	510	5/16/2020	Dual	149.460	159	900_230000237472	Lawrence	US
Shad	M	487	5/16/2020	Dual	149.460	160	900_230000237470	Lawrence	US
Shad	M	467	5/16/2020	Dual	149.460	161	900_230000237488	Lawrence	US
Shad	M	475	5/16/2020	Dual	149.480	10	900_230000237487	Lawrence	US
Shad	M	490	5/16/2020	Dual	149.480	11	900_230000237486	Lawrence	US
Shad	M	445	5/16/2020	Dual	149.480	12	900_230000237485	Lawrence	US
Shad	M	500	5/16/2020	Dual	149.480	13	900_230000237484	Lawrence	US
Shad	M	474	5/16/2020	Dual	149.480	14	900_230000237483	Lawrence	US
Shad	M	495	5/16/2020	Dual	149.480	15	900_230000237482	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	456	5/16/2020	Dual	149.760	46	900_230000237481	Lawrence	US
Shad	F	480	5/16/2020	Dual	149.760	47	900_230000237480	Lawrence	US
Shad	M	467	5/16/2020	Dual	149.760	48	900_230000237499	Lawrence	US
Shad	F	493	5/16/2020	Dual	149.760	49	900_230000237498	Lawrence	US
Shad	M	482	5/16/2020	Dual	149.760	50	900_230000237497	Lawrence	US
Shad	M	525	5/16/2020	Dual	149.760	51	900_230000237496	Lawrence	US
Shad	M	457	5/16/2020	Dual	149.800	83	900_230000237459	Lawrence	US
Shad	M	494	5/16/2020	Dual	149.800	84	900_230000237458	Lawrence	US
Shad	M	492	5/16/2020	Dual	149.800	85	900_230000237457	Lawrence	US
Shad	M	501	5/16/2020	Dual	149.800	86	900_230000237455	Lawrence	US
Shad	M	497	5/16/2020	Dual	149.800	87	900_230000237453	Lawrence	US
Shad	M	484	5/16/2020	Dual	149.800	88	900_230000237451	Lawrence	US
Shad	M	400	5/16/2020	PIT	-	-	900_230000237606	Lawrence	US
Shad	M	426	5/16/2020	PIT	-	-	900_230000237607	Lawrence	US
Shad	M	441	5/16/2020	PIT	-	-	900_230000237491	Lawrence	US
Shad	M	441	5/16/2020	PIT	-	-	900_230000237605	Lawrence	US
Shad	M	452	5/16/2020	PIT	-	-	900_230000237495	Lawrence	US
Shad	M	452	5/16/2020	PIT	-	-	900_230000237611	Lawrence	US
Shad	M	455	5/16/2020	PIT	-	-	900_230000237494	Lawrence	US
Shad	M	465	5/16/2020	PIT	-	-	900_230000237600	Lawrence	US
Shad	M	468	5/16/2020	PIT	-	-	900_230000237610	Lawrence	US
Shad	M	469	5/16/2020	PIT	-	-	900_230000237612	Lawrence	US
Shad	M	472	5/16/2020	PIT	-	-	900_230000237490	Lawrence	US
Shad	M	474	5/16/2020	PIT	-	-	900_230000237601	Lawrence	US
Shad	M	485	5/16/2020	PIT	-	-	900_230000237604	Lawrence	US
Shad	M	490	5/16/2020	PIT	-	-	900_230000237603	Lawrence	US
Shad	M	491	5/16/2020	PIT	-	-	900_230000237608	Lawrence	US
Shad	F	502	5/16/2020	PIT	-	-	900_230000237493	Lawrence	US
Shad	F	510	5/16/2020	PIT	-	-	900_230000237489	Lawrence	US
Shad	F	511	5/16/2020	PIT	-	-	900_230000237492	Lawrence	US
Shad	F	532	5/16/2020	PIT	-	-	900_230000237309	Lawrence	US
Shad	F	545	5/16/2020	PIT	-	-	900_230000237602	Lawrence	US
Shad	M	472	5/18/2020	Dual	149.440	127	900_230000237820	Lawrence	US
Shad	M	432	5/18/2020	Dual	149.440	128	900_230000237817	Lawrence	US
Shad	U	535	5/18/2020	Dual	149.440	129	900_230000237814	Lawrence	US
Shad	M	462	5/18/2020	Dual	149.440	130	900_230000237813	Lawrence	US
Shad	U	497	5/18/2020	Dual	149.440	131	900_230000237810	Lawrence	US
Shad	F	545	5/18/2020	Dual	149.440	132	900_230000237808	Lawrence	US
Shad	F	470	5/18/2020	Dual	149.460	162	900_230000237827	Lawrence	US
Shad	M	440	5/18/2020	Dual	149.460	163	900_230000237826	Lawrence	US
Shad	M	505	5/18/2020	Dual	149.460	164	900_230000237825	Lawrence	US
Shad	F	533	5/18/2020	Dual	149.460	165	900_230000237824	Lawrence	US
Shad	M	480	5/18/2020	Dual	149.460	166	900_230000237823	Lawrence	US
Shad	M	470	5/18/2020	Dual	149.460	167	900_230000237822	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	U	445	5/18/2020	Dual	149.480	16	900_230000237833	Lawrence	US
Shad	F	520	5/18/2020	Dual	149.480	17	900_230000237832	Lawrence	US
Shad	M	473	5/18/2020	Dual	149.480	18	900_230000237831	Lawrence	US
Shad	M	467	5/18/2020	Dual	149.480	19	900_230000237830	Lawrence	US
Shad	M	520	5/18/2020	Dual	149.480	20	900_230000237829	Lawrence	US
Shad	F	515	5/18/2020	Dual	149.480	21	900_230000237828	Lawrence	US
Shad	M	468	5/18/2020	Dual	149.760	52	900_230000237838	Lawrence	US
Shad	M	455	5/18/2020	Dual	149.760	53	900_230000237837	Lawrence	US
Shad	M	460	5/18/2020	Dual	149.760	54	900_230000237836	Lawrence	US
Shad	M	483	5/18/2020	Dual	149.760	55	900_230000237835	Lawrence	US
Shad	M	445	5/18/2020	Dual	149.760	56	900_230000237834	Lawrence	US
Shad	F	515	5/18/2020	Dual	149.760	57	900_230000237839	Lawrence	US
Shad	M	453	5/18/2020	Dual	149.800	89	900_230000237845	Lawrence	US
Shad	M	461	5/18/2020	Dual	149.800	90	900_230000237844	Lawrence	US
Shad	M	466	5/18/2020	Dual	149.800	91	900_230000237843	Lawrence	US
Shad	M	483	5/18/2020	Dual	149.800	92	900_230000237842	Lawrence	US
Shad	F	558	5/18/2020	Dual	149.800	93	900_230000237841	Lawrence	US
Shad	M	486	5/18/2020	Dual	149.800	94	900_230000237840	Lawrence	US
Shad	M	404	5/18/2020	PIT	-	-	900_230000237887	Lawrence	US
Shad	M	413	5/18/2020	PIT	-	-	900_230000237849	Lawrence	US
Shad	M	418	5/18/2020	PIT	-	-	900_230000237503	Lawrence	US
Shad	M	429	5/18/2020	PIT	-	-	900_230000237882	Lawrence	US
Shad	M	433	5/18/2020	PIT	-	-	900_230000237502	Lawrence	US
Shad	M	445	5/18/2020	PIT	-	-	900_230000237878	Lawrence	US
Shad	M	445	5/18/2020	PIT	-	-	900_230000237886	Lawrence	US
Shad	M	447	5/18/2020	PIT	-	-	900_230000237501	Lawrence	US
Shad	M	449	5/18/2020	PIT	-	-	900_230000237897	Lawrence	US
Shad	U	450	5/18/2020	PIT	-	-	900_230000237884	Lawrence	US
Shad	M	451	5/18/2020	PIT	-	-	900_230000237891	Lawrence	US
Shad	M	452	5/18/2020	PIT	-	-	900_230000237890	Lawrence	US
Shad	M	453	5/18/2020	PIT	-	-	900_230000237894	Lawrence	US
Shad	M	455	5/18/2020	PIT	-	-	900_230000237888	Lawrence	US
Shad	M	456	5/18/2020	PIT	-	-	900_230000237867	Lawrence	US
Shad	M	456	5/18/2020	PIT	-	-	900_230000237880	Lawrence	US
Shad	M	457	5/18/2020	PIT	-	-	900_230000237500	Lawrence	US
Shad	M	458	5/18/2020	PIT	-	-	900_230000237881	Lawrence	US
Shad	M	462	5/18/2020	PIT	-	-	900_230000237879	Lawrence	US
Shad	M	465	5/18/2020	PIT	-	-	900_230000237868	Lawrence	US
Shad	M	467	5/18/2020	PIT	-	-	900_230000237893	Lawrence	US
Shad	F	468	5/18/2020	PIT	-	-	900_230000237870	Lawrence	US
Shad	M	469	5/18/2020	PIT	-	-	900_230000237885	Lawrence	US
Shad	M	470	5/18/2020	PIT	-	-	900_230000237852	Lawrence	US
Shad	M	472	5/18/2020	PIT	-	-	900_230000237895	Lawrence	US
Shad	M	474	5/18/2020	PIT	-	-	900_230000237856	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	480	5/18/2020	PIT	-	-	900_230000237877	Lawrence	US
Shad	M	481	5/18/2020	PIT	-	-	900_230000237899	Lawrence	US
Shad	M	485	5/18/2020	PIT	-	-	900_230000237874	Lawrence	US
Shad	F	490	5/18/2020	PIT	-	-	900_230000237853	Lawrence	US
Shad	M	493	5/18/2020	PIT	-	-	900_230000237847	Lawrence	US
Shad	M	493	5/18/2020	PIT	-	-	900_230000237855	Lawrence	US
Shad	M	493	5/18/2020	PIT	-	-	900_230000237876	Lawrence	US
Shad	F	494	5/18/2020	PIT	-	-	900_230000237898	Lawrence	US
Shad	F	495	5/18/2020	PIT	-	-	900_230000237851	Lawrence	US
Shad	F	498	5/18/2020	PIT	-	-	900_230000237883	Lawrence	US
Shad	M	499	5/18/2020	PIT	-	-	900_230000237892	Lawrence	US
Shad	F	500	5/18/2020	PIT	-	-	900_230000237875	Lawrence	US
Shad	M	505	5/18/2020	PIT	-	-	900_230000237896	Lawrence	US
Shad	F	510	5/18/2020	PIT	-	-	900_230000237872	Lawrence	US
Shad	M	511	5/18/2020	PIT	-	-	900_230000237871	Lawrence	US
Shad	M	518	5/18/2020	PIT	-	-	900_230000237889	Lawrence	US
Shad	F	521	5/18/2020	PIT	-	-	900_230000237850	Lawrence	US
Shad	M	527	5/18/2020	PIT	-	-	900_230000237869	Lawrence	US
Shad	F	530	5/18/2020	PIT	-	-	900_230000237854	Lawrence	US
Shad	M	535	5/18/2020	PIT	-	-	900_230000237848	Lawrence	US
Shad	M	540	5/18/2020	PIT	-	-	900_230000237873	Lawrence	US
Shad	M	466	5/18/2020	PIT			900_230000237857	Lawrence	US
Shad	F	573	5/22/2020	Dual	149.440	133	900_23000023879	Lawrence	US
Shad	F	543	5/22/2020	Dual	149.440	134	900_23000023878	Lawrence	US
Shad	M	453	5/22/2020	Dual	149.440	135	900_23000023877	Lawrence	US
Shad	M	445	5/22/2020	Dual	149.440	136	900_23000023876	Lawrence	US
Shad	M	509	5/22/2020	Dual	149.440	137	900_23000023875	Lawrence	US
Shad	M	510	5/22/2020	Dual	149.440	138	900_23000023874	Lawrence	US
Shad	F	504	5/22/2020	Dual	149.460	168	900_23000023885	Lawrence	US
Shad	U	482	5/22/2020	Dual	149.460	169	900_23000023884	Lawrence	US
Shad	F	457	5/22/2020	Dual	149.460	170	900_23000023883	Lawrence	US
Shad	M	470	5/22/2020	Dual	149.460	171	900_23000023882	Lawrence	US
Shad	M	469	5/22/2020	Dual	149.460	172	900_23000023881	Lawrence	US
Shad	F	540	5/22/2020	Dual	149.460	173	900_23000023880	Lawrence	US
Shad	M	538	5/22/2020	Dual	149.480	22	900_23000023892	Lawrence	US
Shad	M	467	5/22/2020	Dual	149.480	23	900_23000023891	Lawrence	US
Shad	F	531	5/22/2020	Dual	149.480	24	900_23000023890	Lawrence	US
Shad	M	485	5/22/2020	Dual	149.480	25	900_23000023888	Lawrence	US
Shad	M	468	5/22/2020	Dual	149.480	26	900_23000023887	Lawrence	US
Shad	F	511	5/22/2020	Dual	149.480	27	900_23000023886	Lawrence	US
Shad	M	448	5/22/2020	Dual	149.760	58	900_23000023899	Lawrence	US
Shad	M	493	5/22/2020	Dual	149.760	59	900_23000023898	Lawrence	US
Shad	M	480	5/22/2020	Dual	149.760	60	900_23000023897	Lawrence	US
Shad	M	460	5/22/2020	Dual	149.760	61	900_23000023896	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	428	5/22/2020	Dual	149.760	62	900_23000023895	Lawrence	US
Shad	M	480	5/22/2020	Dual	149.760	63	900_23000023893	Lawrence	US
Shad	M	467	5/22/2020	Dual	149.800	95	900_230000238100	Lawrence	US
Shad	M	478	5/22/2020	Dual	149.800	96	900_230000238101	Lawrence	US
Shad	M	448	5/22/2020	Dual	149.800	97	900_230000238103	Lawrence	US
Shad	M	486	5/22/2020	Dual	149.800	98	900_230000238104	Lawrence	US
Shad	F	475	5/22/2020	Dual	149.800	99	900_230000238105	Lawrence	US
Shad	M	495	5/22/2020	Dual	149.800	100	900_230000238106	Lawrence	US
Shad	M	423	5/22/2020	PIT	-	-	900_230000238113	Lawrence	US
Shad	M	433	5/22/2020	PIT	-	-	900_230000238122	Lawrence	US
Shad	M	434	5/22/2020	PIT	-	-	900_230000238129	Lawrence	US
Shad	M	440	5/22/2020	PIT	-	-	900_230000238110	Lawrence	US
Shad	M	447	5/22/2020	PIT	-	-	900_230000238109	Lawrence	US
Shad	M	448	5/22/2020	PIT	-	-	900_23000023873	Lawrence	US
Shad	M	453	5/22/2020	PIT	-	-	900_230000238128	Lawrence	US
Shad	M	453	5/22/2020	PIT	-	-	900_230000238131	Lawrence	US
Shad	M	454	5/22/2020	PIT	-	-	900_230000238134	Lawrence	US
Shad	M	455	5/22/2020	PIT	-	-	900_23000023889	Lawrence	US
Shad	M	456	5/22/2020	PIT	-	-	900_230000238119	Lawrence	US
Shad	M	457	5/22/2020	PIT	-	-	900_230000238125	Lawrence	US
Shad	M	457	5/22/2020	PIT	-	-	900_230000238133	Lawrence	US
Shad	M	465	5/22/2020	PIT	-	-	900_230000238117	Lawrence	US
Shad	M	468	5/22/2020	PIT	-	-	900_230000238116	Lawrence	US
Shad	M	468	5/22/2020	PIT	-	-	900_230000238121	Lawrence	US
Shad	M	468	5/22/2020	PIT	-	-	900_230000238132	Lawrence	US
Shad	M	470	5/22/2020	PIT	-	-	900_230000238124	Lawrence	US
Shad	M	470	5/22/2020	PIT	-	-	900_230000238127	Lawrence	US
Shad	M	475	5/22/2020	PIT	-	-	900_230000238107	Lawrence	US
Shad	M	478	5/22/2020	PIT	-	-	900_230000238123	Lawrence	US
Shad	M	482	5/22/2020	PIT	-	-	900_230000238112	Lawrence	US
Shad	M	482	5/22/2020	PIT	-	-	900_230000238130	Lawrence	US
Shad	M	483	5/22/2020	PIT	-	-	900_230000238120	Lawrence	US
Shad	M	487	5/22/2020	PIT	-	-	900_230000238136	Lawrence	US
Shad	M	506	5/22/2020	PIT	-	-	900_230000238118	Lawrence	US
Shad	M	513	5/22/2020	PIT	-	-	900_230000238108	Lawrence	US
Shad	M	520	5/22/2020	PIT	-	-	900_230000238102	Lawrence	US
Shad	F	520	5/22/2020	PIT	-	-	900_230000238126	Lawrence	US
Shad	M	525	5/22/2020	PIT	-	-	900_230000238111	Lawrence	US
Shad	F	531	5/22/2020	PIT	-	-	900_23000023894	Lawrence	US
Shad	M	532	5/22/2020	PIT	-	-	900_230000238114	Lawrence	US
Shad	M	554	5/22/2020	PIT	-	-	900_230000238115	Lawrence	US
Shad	M	560	5/22/2020	PIT	-	-	900_230000238135	Lawrence	US
Shad	M	482	5/26/2020	Dual	149.440	145	900_230000238137	Lawrence	US
Shad	M	484	5/26/2020	Dual	149.440	146	900_230000238138	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	450	5/26/2020	Dual	149.440	147	900_230000238139	Lawrence	US
Shad	M	465	5/26/2020	Dual	149.440	148	900_230000238140	Lawrence	US
Shad	F	510	5/26/2020	Dual	149.440	149	900_230000238141	Lawrence	US
Shad	M	484	5/26/2020	Dual	149.440	150	900_230000238142	Lawrence	US
Shad	M	498	5/26/2020	Dual	149.440	151	900_230000238205	Lawrence	US
Shad	M	478	5/26/2020	Dual	149.440	152	900_230000238204	Lawrence	US
Shad	M	462	5/26/2020	Dual	149.440	153	900_230000238203	Lawrence	US
Shad	F	525	5/26/2020	Dual	149.440	154	900_230000238202	Lawrence	US
Shad	M	462	5/26/2020	Dual	149.440	155	900_230000238201	Lawrence	US
Shad	M	478	5/26/2020	Dual	149.440	156	900_230000238200	Lawrence	US
Shad	M	492	5/26/2020	Dual	149.460	180	900_230000238143	Lawrence	US
Shad	F	536	5/26/2020	Dual	149.460	181	900_230000238144	Lawrence	US
Shad	F	535	5/26/2020	Dual	149.460	182	900_230000238145	Lawrence	US
Shad	F	495	5/26/2020	Dual	149.460	183	900_230000238146	Lawrence	US
Shad	M	440	5/26/2020	Dual	149.460	184	900_230000238147	Lawrence	US
Shad	M	461	5/26/2020	Dual	149.460	185	900_230000238148	Lawrence	US
Shad	M	468	5/26/2020	Dual	149.460	186	900_230000238211	Lawrence	US
Shad	M	444	5/26/2020	Dual	149.460	187	900_230000238210	Lawrence	US
Shad	F	496	5/26/2020	Dual	149.460	188	900_230000238209	Lawrence	US
Shad	M	456	5/26/2020	Dual	149.460	189	900_230000238208	Lawrence	US
Shad	M	452	5/26/2020	Dual	149.460	190	900_230000238207	Lawrence	US
Shad	M	458	5/26/2020	Dual	149.460	191	900_230000238206	Lawrence	US
Shad	M	478	5/26/2020	Dual	149.480	34	900_230000238149	Lawrence	US
Shad	M	444	5/26/2020	Dual	149.480	35	900_230000238150	Lawrence	US
Shad	M	445	5/26/2020	Dual	149.480	36	900_230000238152	Lawrence	US
Shad	M	460	5/26/2020	Dual	149.480	37	900_230000238153	Lawrence	US
Shad	F	549	5/26/2020	Dual	149.480	38	900_230000238154	Lawrence	US
Shad	F	532	5/26/2020	Dual	149.480	39	900_230000238155	Lawrence	US
Shad	M	438	5/26/2020	Dual	149.480	40	900_230000238217	Lawrence	US
Shad	M	485	5/26/2020	Dual	149.480	41	900_230000238216	Lawrence	US
Shad	M	433	5/26/2020	Dual	149.480	42	900_230000238215	Lawrence	US
Shad	F	520	5/26/2020	Dual	149.480	43	900_230000238214	Lawrence	US
Shad	M	485	5/26/2020	Dual	149.480	44	900_230000238213	Lawrence	US
Shad	M	533	5/26/2020	Dual	149.480	45	900_230000238212	Lawrence	US
Shad	M	467	5/26/2020	Dual	149.760	70	900_230000238156	Lawrence	US
Shad	F	540	5/26/2020	Dual	149.760	71	900_230000238157	Lawrence	US
Shad	M	480	5/26/2020	Dual	149.760	72	900_230000238158	Lawrence	US
Shad	M	536	5/26/2020	Dual	149.760	74	900_230000238159	Lawrence	US
Shad	M	478	5/26/2020	Dual	149.760	75	900_230000238160	Lawrence	US
Shad	M	463	5/26/2020	Dual	149.760	76	900_230000238223	Lawrence	US
Shad	M	476	5/26/2020	Dual	149.760	77	900_230000238222	Lawrence	US
Shad	F	559	5/26/2020	Dual	149.760	78	900_230000238221	Lawrence	US
Shad	M	450	5/26/2020	Dual	149.760	79	900_230000238220	Lawrence	US
Shad	M	475	5/26/2020	Dual	149.760	80	900_230000238219	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	F	505	5/26/2020	Dual	149.760	81	900_230000238218	Lawrence	US
Shad	M	451	5/26/2020	Dual	149.800	107	900_230000238161	Lawrence	US
Shad	M	477	5/26/2020	Dual	149.800	110	900_230000238164	Lawrence	US
Shad	M	469	5/26/2020	Dual	149.800	111	900_230000238165	Lawrence	US
Shad	M	450	5/26/2020	Dual	149.800	112	900_230000238166	Lawrence	US
Shad	F	501	5/26/2020	Dual	149.800	113	900_230000238229	Lawrence	US
Shad	M	492	5/26/2020	Dual	149.800	114	900_230000238228	Lawrence	US
Shad	M	480	5/26/2020	Dual	149.800	115	900_230000238227	Lawrence	US
Shad	M	492	5/26/2020	Dual	149.800	116	900_230000238226	Lawrence	US
Shad	M	441	5/26/2020	Dual	149.800	117	900_230000238225	Lawrence	US
Shad	M	462	5/26/2020	Dual	149.800	118	900_230000238224	Lawrence	US
Shad	M	475	5/26/2020	Dual	149.800	708	900_230000238162	Lawrence	US
Shad	U	475	5/26/2020	Dual	149.800	709	900_230000238163	Lawrence	US
Shad	M	430	5/26/2020	PIT	-	-	900_230000238246	Lawrence	US
Shad	M	435	5/26/2020	PIT	-	-	900_230000238176	Lawrence	US
Shad	M	438	5/26/2020	PIT	-	-	900_230000238232	Lawrence	US
Shad	M	440	5/26/2020	PIT	-	-	900_230000238234	Lawrence	US
Shad	M	441	5/26/2020	PIT	-	-	900_230000238187	Lawrence	US
Shad	M	450	5/26/2020	PIT	-	-	900_230000238241	Lawrence	US
Shad	U	455	5/26/2020	PIT	-	-	900_230000238235	Lawrence	US
Shad	M	455	5/26/2020	PIT	-	-	900_230000238253	Lawrence	US
Shad	M	456	5/26/2020	PIT	-	-	900_230000238189	Lawrence	US
Shad	M	457	5/26/2020	PIT	-	-	900_230000238182	Lawrence	US
Shad	M	457	5/26/2020	PIT	-	-	900_230000238259	Lawrence	US
Shad	M	460	5/26/2020	PIT	-	-	900_230000238172	Lawrence	US
Shad	U	460	5/26/2020	PIT	-	-	900_230000238180	Lawrence	US
Shad	U	460	5/26/2020	PIT	-	-	900_230000238240	Lawrence	US
Shad	M	460	5/26/2020	PIT	-	-	900_230000238257	Lawrence	US
Shad	M	461	5/26/2020	PIT	-	-	900_230000238258	Lawrence	US
Shad	M	462	5/26/2020	PIT	-	-	900_230000238186	Lawrence	US
Shad	M	463	5/26/2020	PIT	-	-	900_230000238195	Lawrence	US
Shad	M	463	5/26/2020	PIT	-	-	900_230000238254	Lawrence	US
Shad	F	464	5/26/2020	PIT	-	-	900_230000238247	Lawrence	US
Shad	M	465	5/26/2020	PIT	-	-	900_230000238173	Lawrence	US
Shad	F	465	5/26/2020	PIT	-	-	900_230000238190	Lawrence	US
Shad	M	465	5/26/2020	PIT	-	-	900_230000238196	Lawrence	US
Shad	M	465	5/26/2020	PIT	-	-	900_230000238249	Lawrence	US
Shad	M	465	5/26/2020	PIT	-	-	900_230000238255	Lawrence	US
Shad	M	466	5/26/2020	PIT	-	-	900_230000238250	Lawrence	US
Shad	U	467	5/26/2020	PIT	-	-	900_230000238239	Lawrence	US
Shad	M	470	5/26/2020	PIT	-	-	900_230000238233	Lawrence	US
Shad	M	472	5/26/2020	PIT	-	-	900_230000238260	Lawrence	US
Shad	M	473	5/26/2020	PIT	-	-	900_230000238245	Lawrence	US
Shad	M	474	5/26/2020	PIT	-	-	900_230000238178	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	474	5/26/2020	PIT	-	-	900_230000238236	Lawrence	US
Shad	M	475	5/26/2020	PIT	-	-	900_230000238177	Lawrence	US
Shad	M	477	5/26/2020	PIT	-	-	900_230000238151	Lawrence	US
Shad	M	477	5/26/2020	PIT	-	-	900_230000238168	Lawrence	US
Shad	U	477	5/26/2020	PIT	-	-	900_230000238185	Lawrence	US
Shad	M	477	5/26/2020	PIT	-	-	900_230000238248	Lawrence	US
Shad	M	478	5/26/2020	PIT	-	-	900_230000238192	Lawrence	US
Shad	M	479	5/26/2020	PIT	-	-	900_230000238181	Lawrence	US
Shad	M	480	5/26/2020	PIT	-	-	900_230000238238	Lawrence	US
Shad	M	481	5/26/2020	PIT	-	-	900_230000238263	Lawrence	US
Shad	M	482	5/26/2020	PIT	-	-	900_230000238243	Lawrence	US
Shad	M	484	5/26/2020	PIT	-	-	900_230000238194	Lawrence	US
Shad	M	485	5/26/2020	PIT	-	-	900_230000238174	Lawrence	US
Shad	M	485	5/26/2020	PIT	-	-	900_230000238184	Lawrence	US
Shad	M	485	5/26/2020	PIT	-	-	900_230000238256	Lawrence	US
Shad	U	487	5/26/2020	PIT	-	-	900_230000238198	Lawrence	US
Shad	F	489	5/26/2020	PIT	-	-	900_230000238197	Lawrence	US
Shad	F	490	5/26/2020	PIT	-	-	900_230000238231	Lawrence	US
Shad	F	490	5/26/2020	PIT	-	-	900_230000238242	Lawrence	US
Shad	M	490	5/26/2020	PIT	-	-	900_230000238262	Lawrence	US
Shad	F	492	5/26/2020	PIT	-	-	900_230000238244	Lawrence	US
Shad	F	498	5/26/2020	PIT	-	-	900_230000238167	Lawrence	US
Shad	U	498	5/26/2020	PIT	-	-	900_230000238170	Lawrence	US
Shad	F	500	5/26/2020	PIT	-	-	900_230000238199	Lawrence	US
Shad	F	504	5/26/2020	PIT	-	-	900_230000238191	Lawrence	US
Shad	M	504	5/26/2020	PIT	-	-	900_230000238230	Lawrence	US
Shad	U	507	5/26/2020	PIT	-	-	900_230000238183	Lawrence	US
Shad	F	510	5/26/2020	PIT	-	-	900_230000238175	Lawrence	US
Shad	U	512	5/26/2020	PIT	-	-	900_230000238193	Lawrence	US
Shad	F	513	5/26/2020	PIT	-	-	900_230000238237	Lawrence	US
Shad	U	515	5/26/2020	PIT	-	-	900_230000238169	Lawrence	US
Shad	F	515	5/26/2020	PIT	-	-	900_230000238261	Lawrence	US
Shad	F	518	5/26/2020	PIT	-	-	900_230000238188	Lawrence	US
Shad	F	518	5/26/2020	PIT	-	-	900_230000238251	Lawrence	US
Shad	F	518	5/26/2020	PIT	-	-	900_230000238252	Lawrence	US
Shad	F	520	5/26/2020	PIT	-	-	900_230000238179	Lawrence	US
Shad	F	536	5/26/2020	PIT	-	-	900_230000238171	Lawrence	US
Shad	F	503	5/27/2020	Dual	149.440	139	900_230000238269	Lawrence	US
Shad	M	469	5/27/2020	Dual	149.440	140	900_230000238268	Lawrence	US
Shad	M	483	5/27/2020	Dual	149.440	141	900_230000238267	Lawrence	US
Shad	M	470	5/27/2020	Dual	149.440	142	900_230000238266	Lawrence	US
Shad	M	519	5/27/2020	Dual	149.440	143	900_230000238265	Lawrence	US
Shad	U	482	5/27/2020	Dual	149.440	144	900_230000238264	Lawrence	US
Shad	U	516	5/27/2020	Dual	149.460	174	900_230000238275	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	464	5/27/2020	Dual	149.460	175	900_230000238274	Lawrence	US
Shad	F	522	5/27/2020	Dual	149.460	176	900_230000238273	Lawrence	US
Shad	M	443	5/27/2020	Dual	149.460	177	900_230000238272	Lawrence	US
Shad	M	483	5/27/2020	Dual	149.460	178	900_230000238271	Lawrence	US
Shad	M	480	5/27/2020	Dual	149.460	179	900_230000238270	Lawrence	US
Shad	M	460	5/27/2020	Dual	149.480	28	900_230000238281	Lawrence	US
Shad	M	466	5/27/2020	Dual	149.480	29	900_230000238280	Lawrence	US
Shad	M	469	5/27/2020	Dual	149.480	30	900_230000238279	Lawrence	US
Shad	M	444	5/27/2020	Dual	149.480	31	900_230000238278	Lawrence	US
Shad	F	500	5/27/2020	Dual	149.480	32	900_230000238277	Lawrence	US
Shad	M	492	5/27/2020	Dual	149.480	33	900_230000238276	Lawrence	US
Shad	M	472	5/27/2020	Dual	149.760	64	900_230000238287	Lawrence	US
Shad	U	504	5/27/2020	Dual	149.760	65	900_230000238286	Lawrence	US
Shad	M	471	5/27/2020	Dual	149.760	66	900_230000238285	Lawrence	US
Shad	F	509	5/27/2020	Dual	149.760	67	900_230000238284	Lawrence	US
Shad	M	440	5/27/2020	Dual	149.760	68	900_230000238283	Lawrence	US
Shad	M	485	5/27/2020	Dual	149.760	69	900_230000238282	Lawrence	US
Shad	M	467	5/27/2020	Dual	149.760	73	900_230000238294	Lawrence	US
Shad	F	533	5/27/2020	Dual	149.800	101	900_230000238293	Lawrence	US
Shad	F	542	5/27/2020	Dual	149.800	102	900_230000238292	Lawrence	US
Shad	M	463	5/27/2020	Dual	149.800	103	900_230000238291	Lawrence	US
Shad	M	488	5/27/2020	Dual	149.800	104	900_230000238290	Lawrence	US
Shad	M	413	5/27/2020	Dual	149.800	105	900_230000238289	Lawrence	US
Shad	M	480	5/27/2020	Dual	149.800	106	900_230000238288	Lawrence	US
Shad	M	460	5/27/2020	PIT	-	-	900_230000238312	Lawrence	US
Shad	M	410	5/27/2020	PIT	-	-	900_230000238311	Lawrence	US
Shad	M	419	5/27/2020	PIT	-	-	900_230000238307	Lawrence	US
Shad	M	420	5/27/2020	PIT	-	-	900_230000238303	Lawrence	US
Shad	M	420	5/27/2020	PIT	-	-	900_230000238323	Lawrence	US
Shad	M	434	5/27/2020	PIT	-	-	900_230000238316	Lawrence	US
Shad	M	438	5/27/2020	PIT	-	-	900_230000238327	Lawrence	US
Shad	M	440	5/27/2020	PIT	-	-	900_230000238325	Lawrence	US
Shad	M	456	5/27/2020	PIT	-	-	900_230000238317	Lawrence	US
Shad	M	458	5/27/2020	PIT	-	-	900_230000238309	Lawrence	US
Shad	M	460	5/27/2020	PIT	-	-	900_230000238295	Lawrence	US
Shad	M	462	5/27/2020	PIT	-	-	900_230000238308	Lawrence	US
Shad	F	471	5/27/2020	PIT	-	-	900_230000238320	Lawrence	US
Shad	M	472	5/27/2020	PIT	-	-	900_230000238296	Lawrence	US
Shad	M	474	5/27/2020	PIT	-	-	900_230000238299	Lawrence	US
Shad	M	476	5/27/2020	PIT	-	-	900_230000238313	Lawrence	US
Shad	M	477	5/27/2020	PIT	-	-	900_230000238298	Lawrence	US
Shad	M	480	5/27/2020	PIT	-	-	900_230000238301	Lawrence	US
Shad	M	480	5/27/2020	PIT	-	-	900_230000238310	Lawrence	US
Shad	M	480	5/27/2020	PIT	-	-	900_230000238322	Lawrence	US

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	F	482	5/27/2020	PIT	-	-	900_230000238314	Lawrence	US
Shad	U	489	5/27/2020	PIT	-	-	900_230000238321	Lawrence	US
Shad	F	490	5/27/2020	PIT	-	-	900_230000238328	Lawrence	US
Shad	F	491	5/27/2020	PIT	-	-	900_230000238305	Lawrence	US
Shad	M	495	5/27/2020	PIT	-	-	900_230000238300	Lawrence	US
Shad	F	500	5/27/2020	PIT	-	-	900_230000238319	Lawrence	US
Shad	U	500	5/27/2020	PIT	-	-	900_230000238326	Lawrence	US
Shad	F	504	5/27/2020	PIT	-	-	900_230000238318	Lawrence	US
Shad	U	506	5/27/2020	PIT	-	-	900_230000238315	Lawrence	US
Shad	F	506	5/27/2020	PIT	-	-	900_230000238324	Lawrence	US
Shad	M	510	5/27/2020	PIT	-	-	900_230000238302	Lawrence	US
Shad	F	510	5/27/2020	PIT	-	-	900_230000238306	Lawrence	US
Shad	M	519	5/27/2020	PIT	-	-	900_230000238297	Lawrence	US
Shad	F	540	5/27/2020	PIT	-	-	900_230000238304	Lawrence	US
Shad	M	494	6/3/2020	Radio	149.440	77	-	Lawrence	DS
Shad	F	504	6/3/2020	Radio	149.440	78	-	Lawrence	DS
Shad	M	460	6/3/2020	Radio	149.440	79	-	Lawrence	DS
Shad	F	497	6/3/2020	Radio	149.440	80	-	Lawrence	DS
Shad	F	508	6/3/2020	Radio	149.440	81	-	Lawrence	DS
Shad	M	472	6/3/2020	Radio	149.440	82	-	Lawrence	DS
Shad	M	436	6/3/2020	Radio	149.440	83	-	Lawrence	DS
Shad	F	512	6/3/2020	Radio	149.440	84	-	Lawrence	DS
Shad	M	442	6/3/2020	Radio	149.440	87	-	Lawrence	DS
Shad	F	500	6/3/2020	Radio	149.440	88	-	Lawrence	DS
Shad	M	422	6/3/2020	Radio	149.460	97	-	Lawrence	DS
Shad	M	411	6/3/2020	Radio	149.460	98	-	Lawrence	DS
Shad	F	490	6/3/2020	Radio	149.460	99	-	Lawrence	DS
Shad	M	448	6/3/2020	Radio	149.460	100	-	Lawrence	DS
Shad	F	551	6/3/2020	Radio	149.460	101	-	Lawrence	DS
Shad	F	497	6/3/2020	Radio	149.460	102	-	Lawrence	DS
Shad	F	505	6/3/2020	Radio	149.460	103	-	Lawrence	DS
Shad	M	446	6/3/2020	Radio	149.460	104	-	Lawrence	DS
Shad	M	493	6/3/2020	Radio	149.460	107	-	Lawrence	DS
Shad	F	490	6/3/2020	Radio	149.460	108	-	Lawrence	DS
Shad	M	463	6/3/2020	Radio	149.480	161	-	Lawrence	DS
Shad	M	466	6/3/2020	Radio	149.480	162	-	Lawrence	DS
Shad	U	463	6/3/2020	Radio	149.480	163	-	Lawrence	DS
Shad	F	542	6/3/2020	Radio	149.480	164	-	Lawrence	DS
Shad	F	503	6/3/2020	Radio	149.480	165	-	Lawrence	DS
Shad	F	445	6/3/2020	Radio	149.480	166	-	Lawrence	DS
Shad	M	476	6/3/2020	Radio	149.480	167	-	Lawrence	DS
Shad	F	505	6/3/2020	Radio	149.480	168	-	Lawrence	DS
Shad	M	500	6/3/2020	Radio	149.480	171	-	Lawrence	DS
Shad	M	413	6/3/2020	Radio	149.480	172	-	Lawrence	DS

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	M	436	6/3/2020	Radio	149.760	25	-	Lawrence	DS
Shad	F	521	6/3/2020	Radio	149.760	26	-	Lawrence	DS
Shad	M	485	6/3/2020	Radio	149.760	27	-	Lawrence	DS
Shad	M	453	6/3/2020	Radio	149.760	28	-	Lawrence	DS
Shad	M	440	6/3/2020	Radio	149.760	29	-	Lawrence	DS
Shad	U	498	6/3/2020	Radio	149.760	30	-	Lawrence	DS
Shad	M	435	6/3/2020	Radio	149.760	31	-	Lawrence	DS
Shad	M	459	6/3/2020	Radio	149.760	35	-	Lawrence	DS
Shad	M	455	6/3/2020	Radio	149.760	36	-	Lawrence	DS
Shad	F	550	6/3/2020	Radio	149.760	132	-	Lawrence	DS
Shad	M	455	6/3/2020	Radio	149.800	20	-	Lawrence	DS
Shad	M	422	6/3/2020	Radio	149.800	21	-	Lawrence	DS
Shad	U	510	6/3/2020	Radio	149.800	22	-	Lawrence	DS
Shad	F	470	6/3/2020	Radio	149.800	23	-	Lawrence	DS
Shad	F	506	6/3/2020	Radio	149.800	24	-	Lawrence	DS
Shad	M	444	6/3/2020	Radio	149.800	25	-	Lawrence	DS
Shad	M	445	6/3/2020	Radio	149.800	26	-	Lawrence	DS
Shad	F	495	6/3/2020	Radio	149.800	27	-	Lawrence	DS
Shad	M	482	6/3/2020	Radio	149.800	30	-	Lawrence	DS
Shad	M	521	6/3/2020	Radio	149.800	31	-	Lawrence	DS
Shad	M	500	6/5/2020	Radio	149.440	85	-	Lawrence	DS
Shad	M	422	6/5/2020	Radio	149.440	86	-	Lawrence	DS
Shad	M	493	6/5/2020	Radio	149.440	89	-	Lawrence	DS
Shad	M	425	6/5/2020	Radio	149.440	90	-	Lawrence	DS
Shad	M	488	6/5/2020	Radio	149.440	91	-	Lawrence	DS
Shad	M	481	6/5/2020	Radio	149.440	92	-	Lawrence	DS
Shad	M	500	6/5/2020	Radio	149.440	93	-	Lawrence	DS
Shad	M	425	6/5/2020	Radio	149.440	94	-	Lawrence	DS
Shad	M	445	6/5/2020	Radio	149.440	95	-	Lawrence	DS
Shad	F	527	6/5/2020	Radio	149.440	96	-	Lawrence	DS
Shad	F	494	6/5/2020	Radio	149.460	105	-	Lawrence	DS
Shad	M	490	6/5/2020	Radio	149.460	106	-	Lawrence	DS
Shad	M	444	6/5/2020	Radio	149.460	109	-	Lawrence	DS
Shad	M	502	6/5/2020	Radio	149.460	110	-	Lawrence	DS
Shad	M	443	6/5/2020	Radio	149.460	111	-	Lawrence	DS
Shad	F	530	6/5/2020	Radio	149.460	112	-	Lawrence	DS
Shad	M	471	6/5/2020	Radio	149.460	113	-	Lawrence	DS
Shad	M	393	6/5/2020	Radio	149.460	114	-	Lawrence	DS
Shad	M	465	6/5/2020	Radio	149.460	115	-	Lawrence	DS
Shad	F	501	6/5/2020	Radio	149.460	116	-	Lawrence	DS
Shad	U	481	6/5/2020	Radio	149.480	169	-	Lawrence	DS
Shad	M	413	6/5/2020	Radio	149.480	170	-	Lawrence	DS
Shad	F	528	6/5/2020	Radio	149.480	173	-	Lawrence	DS
Shad	M	520	6/5/2020	Radio	149.480	174	-	Lawrence	DS

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	F	459	6/5/2020	Radio	149.480	175	-	Lawrence	DS
Shad	U	502	6/5/2020	Radio	149.480	176	-	Lawrence	DS
Shad	M	437	6/5/2020	Radio	149.480	177	-	Lawrence	DS
Shad	M	481	6/5/2020	Radio	149.480	178	-	Lawrence	DS
Shad	M	472	6/5/2020	Radio	149.480	179	-	Lawrence	DS
Shad	F	530	6/5/2020	Radio	149.480	180	-	Lawrence	DS
Shad	M	490	6/5/2020	Radio	149.760	33	-	Lawrence	DS
Shad	M	465	6/5/2020	Radio	149.760	34	-	Lawrence	DS
Shad	M	457	6/5/2020	Radio	149.760	37	-	Lawrence	DS
Shad	M	385	6/5/2020	Radio	149.760	38	-	Lawrence	DS
Shad	M	500	6/5/2020	Radio	149.760	40	-	Lawrence	DS
Shad	M	475	6/5/2020	Radio	149.760	41	-	Lawrence	DS
Shad	M	508	6/5/2020	Radio	149.760	42	-	Lawrence	DS
Shad	M	482	6/5/2020	Radio	149.760	43	-	Lawrence	DS
Shad	M	475	6/5/2020	Radio	149.760	44	-	Lawrence	DS
Shad	F	505	6/5/2020	Radio	149.760	59	-	Lawrence	DS
Shad	M	475	6/5/2020	Radio	149.800	28	-	Lawrence	DS
Shad	M	468	6/5/2020	Radio	149.800	29	-	Lawrence	DS
Shad	M	492	6/5/2020	Radio	149.800	32	-	Lawrence	DS
Shad	U	526	6/5/2020	Radio	149.800	33	-	Lawrence	DS
Shad	F	470	6/5/2020	Radio	149.800	34	-	Lawrence	DS
Shad	F	486	6/5/2020	Radio	149.800	35	-	Lawrence	DS
Shad	F	508	6/5/2020	Radio	149.800	36	-	Lawrence	DS
Shad	F	545	6/5/2020	Radio	149.800	37	-	Lawrence	DS
Shad	M	460	6/5/2020	Radio	149.800	38	-	Lawrence	DS
Shad	M	432	6/5/2020	Radio	149.800	39	-	Lawrence	DS
Shad	F	530	6/8/2020	Radio	149.440	65	-	Lawrence	DS
Shad	F	481	6/8/2020	Radio	149.440	66	-	Lawrence	DS
Shad	F	532	6/8/2020	Radio	149.440	67	-	Lawrence	DS
Shad	F	518	6/8/2020	Radio	149.440	68	-	Lawrence	DS
Shad	F	490	6/8/2020	Radio	149.440	69	-	Lawrence	DS
Shad	M	496	6/8/2020	Radio	149.440	70	-	Lawrence	DS
Shad	M	452	6/8/2020	Radio	149.440	71	-	Lawrence	DS
Shad	M	476	6/8/2020	Radio	149.440	72	-	Lawrence	DS
Shad	F	538	6/8/2020	Radio	149.440	73	-	Lawrence	DS
Shad	F	530	6/8/2020	Radio	149.440	74	-	Lawrence	DS
Shad	F	505	6/8/2020	Radio	149.440	75	-	Lawrence	DS
Shad	M	393	6/8/2020	Radio	149.440	76	-	Lawrence	DS
Shad	F	525	6/8/2020	Radio	149.460	30	-	Lawrence	DS
Shad	M	450	6/8/2020	Radio	149.460	31	-	Lawrence	DS
Shad	F	552	6/8/2020	Radio	149.460	32	-	Lawrence	DS
Shad	M	452	6/8/2020	Radio	149.460	33	-	Lawrence	DS
Shad	F	556	6/8/2020	Radio	149.460	34	-	Lawrence	DS
Shad	F	553	6/8/2020	Radio	149.460	35	-	Lawrence	DS

Species	Gender	Total Length (mm)	Release Date	Type	Frequency	ID	PIT ID	Collection Location	US_DS
Shad	F	519	6/8/2020	Radio	149.460	36	-	Lawrence	DS
Shad	M	505	6/8/2020	Radio	149.460	37	-	Lawrence	DS
Shad	M	460	6/8/2020	Radio	149.460	38	-	Lawrence	DS
Shad	M	450	6/8/2020	Radio	149.460	39	-	Lawrence	DS
Shad	F	497	6/8/2020	Radio	149.460	117	-	Lawrence	DS
Shad	F	506	6/8/2020	Radio	149.460	118	-	Lawrence	DS
Shad	M	440	6/8/2020	Radio	149.480	181	-	Lawrence	DS
Shad	F	522	6/8/2020	Radio	149.480	182	-	Lawrence	DS
Shad	F	495	6/8/2020	Radio	149.480	183	-	Lawrence	DS
Shad	F	545	6/8/2020	Radio	149.480	184	-	Lawrence	DS
Shad	F	550	6/8/2020	Radio	149.480	185	-	Lawrence	DS
Shad	U	525	6/8/2020	Radio	149.480	186	-	Lawrence	DS
Shad	M	470	6/8/2020	Radio	149.480	187	-	Lawrence	DS
Shad	F	535	6/8/2020	Radio	149.480	188	-	Lawrence	DS
Shad	M	442	6/8/2020	Radio	149.480	189	-	Lawrence	DS
Shad	F	505	6/8/2020	Radio	149.480	190	-	Lawrence	DS
Shad	M	450	6/8/2020	Radio	149.480	191	-	Lawrence	DS
Shad	F	545	6/8/2020	Radio	149.480	192	-	Lawrence	DS
Shad	F	516	6/8/2020	Radio	149.760	14	-	Lawrence	DS
Shad	M	475	6/8/2020	Radio	149.760	15	-	Lawrence	DS
Shad	M	473	6/8/2020	Radio	149.760	16	-	Lawrence	DS
Shad	M	463	6/8/2020	Radio	149.760	17	-	Lawrence	DS
Shad	M	432	6/8/2020	Radio	149.760	18	-	Lawrence	DS
Shad	F	502	6/8/2020	Radio	149.760	19	-	Lawrence	DS
Shad	M	462	6/8/2020	Radio	149.760	20	-	Lawrence	DS
Shad	M	482	6/8/2020	Radio	149.760	21	-	Lawrence	DS
Shad	F	540	6/8/2020	Radio	149.760	22	-	Lawrence	DS
Shad	M	440	6/8/2020	Radio	149.760	23	-	Lawrence	DS
Shad	M	470	6/8/2020	Radio	149.760	24	-	Lawrence	DS
Shad	M	438	6/8/2020	Radio	149.800	119	-	Lawrence	DS
Shad	M	468	6/8/2020	Radio	149.800	120	-	Lawrence	DS
Shad	M	470	6/8/2020	Radio	149.800	121	-	Lawrence	DS

Appendix B. Responses to September 30, 2020 Revised ISR meeting comments.

Comment No.	Agency	Comment	Response
1	USFWS	In Section 5.4.6 (Upstream Passage Effectiveness – Lowell Fish Ladder) please better identify the success rate corresponding with passage of adult river herring through the weir section of the bypass reach.	Clarifying language has been added to Section 5.4.6 of the final report.
2	MDMF	For circle plots showing the hourly distributions of arrival or passage times can you confirm that source data for those plots are based on individual events and are not the sum or all detections (which may skew results towards one or more hours based on continued detection of an individual(s)).	Circle plots in the final report have been reviewed and are based on individual events, not the sum of all detections.
3	FERC	Will the updated revised study report contain CJS model estimates of downstream passage survival by passage route?	Sections 5.6.4 and 5.7.4 contain route-specific downstream passage survival estimates for adult river herring and American shad.
4	MDFW	Can a section be added which provides a comparison of downstream passage metrics for adult river herring originating at Lawrence versus those originating at Amoskeag?	Appendix F has a summary of passage metrics for adult river herring released upstream of Lowell at Tyngsborough and originating at either Lawrence or Amoskeag.

Appendix C. Reported hourly operations information for the Lowell Project for the duration of the 2020 spring telemetry study.

Report Appendix C available as Microsoft Excel data listing.

Appendix D. Project inflow and discharge by potential passage route at the time of downstream passage for radio-tagged adult alosines at Lowell.

Adult Alewives:

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
104 149.44	Mine Falls	5/18/2020	22:31:40	Turbine	9311	5625	132	500	729	2325
121 149.46	Mine Falls	5/21/2020	19:58:43	Turbine	6824	4979	132	500	729	484
188 149.76	Tyngsborough	5/21/2020	21:01:31	Turbine	6801	4943	132	500	729	497
85 149.46	Tyngsborough	5/22/2020	3:29:07	Turbine	6714	4900	132	500	729	453
183 149.8	Mine Falls	5/22/2020	15:50:19	Bypass	6630	4808	132	500	729	461
141 149.48	Mine Falls	5/22/2020	23:02:10	Turbine	6450	4638	132	500	729	451
154 149.48	Mine Falls	5/24/2020	2:30:34	Turbine	6625	4804	132	500	729	460
144 149.48	Mine Falls	5/24/2020	19:44:54	Turbine	6194	4483	132	500	729	350
116 149.44	Mine Falls	5/25/2020	8:19:42	Turbine	6163	4484	100	500	729	350
162 149.76	Mine Falls	5/25/2020	22:14:29	Turbine	5800	4240	132	500	729	199
112 149.44	Mine Falls	5/27/2020	0:06:52	Turbine	5393	3747	132	500	729	285
182 149.76	Tyngsborough	5/27/2020	3:10:24	Turbine	5393	3747	132	500	729	285
158 149.44	Tyngsborough	5/27/2020	5:52:46	Turbine	5398	3752	100	500	729	317
164 149.76	Mine Falls	5/27/2020	5:53:25	Turbine	5398	3752	100	500	729	317
148 149.48	Mine Falls	5/27/2020	10:20:41	Turbine	5334	3747	100	500	729	258
119 149.48	Tyngsborough	5/27/2020	16:43:06	Bypass	5034	3388	132	500	729	285
111 149.48	Tyngsborough	5/27/2020	17:52:17	Turbine	5004	3356	132	500	729	287
195 149.8	Mine Falls	5/27/2020	22:44:12	Downtown	5039	3364	132	500	729	314
191 149.76	Tyngsborough	5/28/2020	0:32:54	Turbine	5074	3412	132	500	729	301
108 149.48	Tyngsborough	5/28/2020	4:46:38	Turbine	5660	4020	132	500	729	279
186 149.76	Tyngsborough	5/28/2020	5:19:41	Turbine	5660	4020	132	500	729	279
80 149.46	Tyngsborough	5/28/2020	6:22:48	Turbine	5725	4096	100	500	729	300
87 149.46	Tyngsborough	5/28/2020	6:38:05	Turbine	5725	4082	100	500	542	501
91 149.46	Tyngsborough	5/28/2020	8:01:20	Turbine	5730	4109	100	500	542	479
183 149.76	Tyngsborough	5/29/2020	2:17:00	Bypass	4750	3259	132	500	542	317
493 149.76	Tyngsborough	5/29/2020	2:17:00	Bypass	4750	3259	132	500	542	317
122 149.48	Tyngsborough	5/29/2020	2:41:07	Bypass	4750	3248	132	500	542	328
173 149.44	Tyngsborough	5/29/2020	5:27:02	Turbine	4755	3249	132	500	542	332
43 149.8	Tyngsborough	5/29/2020	14:18:13	Bypass	5005	3529	100	500	542	334
168 149.44	Tyngsborough	5/29/2020	15:52:43	Bypass	5010	3537	132	500	542	299
111 149.44	Mine Falls	5/29/2020	15:55:25	Bypass	5010	3537	132	500	542	299
170 149.76	Mine Falls	5/29/2020	15:58:29	Bypass	5010	3537	132	500	542	299
54 149.8	Tyngsborough	5/29/2020	17:16:43	Turbine	5095	3484	132	500	542	437
110 149.44	Mine Falls	5/29/2020	17:26:05	Bypass	5095	3484	132	500	542	437
107 149.48	Tyngsborough	5/29/2020	17:51:59	Turbine	4950	3282	132	500	542	494
47 149.8	Tyngsborough	5/29/2020	18:07:53	Bypass	4950	3282	132	500	542	494
46 149.8	Tyngsborough	5/29/2020	18:09:54	Turbine	4950	3282	132	500	542	494
175 149.76	Mine Falls	5/29/2020	18:52:42	Turbine	4710	3105	132	500	542	431
160 149.44	Tyngsborough	5/29/2020	19:12:42	Bypass	4710	3105	132	500	542	431
125 149.48	Tyngsborough	5/30/2020	15:45:37	Turbine	4724	3316	132	500	542	234
138 149.46	Mine Falls	5/30/2020	15:57:25	Bypass	4724	3316	132	500	542	234
169 149.44	Tyngsborough	5/30/2020	16:11:55	Bypass	4724	3316	132	500	542	234
171 149.44	Tyngsborough	5/30/2020	16:22:25	Bypass	4724	3316	132	500	542	234
172 149.44	Tyngsborough	5/30/2020	18:38:17	Turbine	4609	3157	132	500	542	278
94 149.46	Tyngsborough	5/30/2020	20:07:50	Turbine	4519	3073	132	500	542	272
159 149.44	Tyngsborough	5/31/2020	5:36:37	Turbine	4468	2991	100	500	542	335

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
157 149.48	Mine Falls	5/31/2020	8:26:08	Turbine	4383	2995	100	500	542	246
172 149.76	Mine Falls	5/31/2020	12:22:12	Turbine	4422	3032	100	500	542	248
161 149.44	Tyngsborough	5/31/2020	14:55:25	Turbine	4456	3104	100	500	542	210
113 149.48	Tyngsborough	5/31/2020	15:24:57	Turbine	4456	3104	100	500	542	210
180 149.44	Pepperell	5/31/2020	15:59:24	Bypass	4486	3142	132	500	542	170
116 149.48	Tyngsborough	5/31/2020	16:52:53	Bypass	4624	3152	132	500	542	298
123 149.48	Tyngsborough	5/31/2020	17:40:25	Turbine	4620	3152	132	500	542	294
109 149.48	Tyngsborough	5/31/2020	17:50:58	Turbine	4620	3152	132	500	542	294
175 149.44	Tyngsborough	6/1/2020	1:35:28	Bypass	4013	2524	132	500	542	315
160 149.76	Mine Falls	6/1/2020	2:40:36	Turbine	4013	2521	132	500	542	318
163 149.44	Tyngsborough	6/1/2020	7:56:37	Turbine	3987	2540	100	500	542	305
171 149.76	Mine Falls	6/1/2020	8:21:44	Turbine	3987	2540	100	500	542	305
146 149.76	Pepperell	6/1/2020	11:58:34	Bypass	4311	2930	100	500	542	239
83 149.46	Tyngsborough	6/1/2020	12:10:38	Turbine	4311	2930	100	500	542	239
198 149.76	Tyngsborough	6/1/2020	13:48:30	Bypass	4296	2924	100	500	542	230
197 149.8	Mine Falls	6/1/2020	14:25:13	Turbine	4296	2924	100	500	542	230
187 149.8	Mine Falls	6/1/2020	16:02:38	Turbine	4060	2905	132	500	542	28
150 149.48	Mine Falls	6/1/2020	16:07:08	Bypass	4060	2905	132	500	542	28
150 149.48	Mine Falls	6/1/2020	16:07:08	Bypass	4060	2905	132	500	542	28
187 149.76	Tyngsborough	6/1/2020	16:09:41	Bypass	4060	2905	132	500	542	28
143 149.48	Mine Falls	6/1/2020	16:23:07	Bypass	4060	2905	132	500	542	28
196 149.76	Tyngsborough	6/1/2020	16:23:26	Bypass	4060	2905	132	500	542	28
145 149.48	Mine Falls	6/1/2020	17:13:25	Turbine	4150	2689	132	500	542	287
42 149.8	Tyngsborough	6/1/2020	17:23:49	Bypass	4150	2689	132	500	542	287
189 149.76	Tyngsborough	6/1/2020	18:26:26	Bypass	4030	2501	132	500	542	355
128 149.46	Mine Falls	6/1/2020	21:34:18	Turbine	3514	2041	132	500	542	299
178 149.76	Mine Falls	6/2/2020	0:12:32	Bypass	3514	2043	132	500	542	297
95 149.46	Tyngsborough	6/2/2020	13:42:16	Turbine	3616	2340	100	500	542	134
167 149.76	Mine Falls	6/2/2020	17:08:55	Bypass	3410	2005	132	500	542	231
176 149.44	Tyngsborough	6/2/2020	17:35:20	Bypass	3160	1727	132	500	542	259
118 149.48	Tyngsborough	6/2/2020	17:39:07	Bypass	3160	1727	132	500	542	259
199 149.8	Mine Falls	6/2/2020	17:41:46	Bypass	3160	1727	132	500	542	259
197 149.76	Tyngsborough	6/2/2020	17:50:08	Bypass	3160	1727	132	500	542	259
77 149.46	Tyngsborough	6/2/2020	17:59:07	Bypass	3160	1727	132	500	542	259
57 149.8	Tyngsborough	6/3/2020	1:06:08	Turbine	3274	1865	132	500	542	235
58 149.8	Tyngsborough	6/3/2020	2:29:45	Bypass	3384	1960	132	500	542	250
190 149.76	Tyngsborough	6/3/2020	8:50:43	Bypass	2378	1023	100	500	542	213
177 149.44	Tyngsborough	6/3/2020	9:33:31	Turbine	2428	1084	100	500	542	202
184 149.76	Tyngsborough	6/3/2020	9:37:45	Turbine	2428	1084	100	500	542	202
199 149.76	Tyngsborough	6/3/2020	15:42:16	Turbine	3757	2449	132	500	542	134
64 149.44	Tyngsborough	6/3/2020	16:10:18	Turbine	3757	2449	132	500	542	134
25 149.46	Pepperell	6/3/2020	16:13:24	Bypass	3757	2449	132	500	542	134
50 149.8	Tyngsborough	6/3/2020	16:35:36	Bypass	3937	2438	132	500	542	325
189 149.8	Mine Falls	6/3/2020	16:36:00	Bypass	3937	2438	132	500	542	325
185 149.8	Mine Falls	6/3/2020	16:36:11	Bypass	3937	2438	132	500	542	325
82 149.46	Tyngsborough	6/3/2020	17:05:55	Bypass	3937	2438	132	500	542	325
181 149.76	Tyngsborough	6/3/2020	17:06:41	Bypass	3937	2438	132	500	542	325
106 149.48	Tyngsborough	6/3/2020	17:07:57	Bypass	3937	2438	132	500	542	325
165 149.44	Tyngsborough	6/3/2020	17:22:54	Bypass	3937	2438	132	500	542	325
59 149.8	Tyngsborough	6/3/2020	19:08:44	Turbine	3967	2439	132	500	542	354
112 149.48	Tyngsborough	6/3/2020	19:10:18	Bypass	3967	2439	132	500	542	354

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
134 149.48	Tyngsborough	6/3/2020	19:14:05	Bypass	3967	2439	132	500	542	354
76 149.8	Pepperell	6/3/2020	20:59:10	Turbine	3743	2219	132	500	542	350
173 149.76	Mine Falls	6/4/2020	2:50:07	Bypass	3252	1798	132	500	542	280
57 149.44	Tyngsborough	6/4/2020	2:50:40	Bypass	3252	1798	132	500	542	280
191 149.8	Mine Falls	6/4/2020	4:27:43	Turbine	3196	1731	132	500	542	291
136 149.48	Tyngsborough	6/4/2020	10:21:46	Turbine	2548	1300	100	500	542	106
192 149.76	Tyngsborough	6/4/2020	10:53:31	Turbine	2548	1304	100	500	542	102
53 149.8	Tyngsborough	6/4/2020	11:02:47	Turbine	2548	1304	100	500	542	102
62 149.44	Tyngsborough	6/4/2020	12:51:17	Bypass	2552	1304	100	500	542	106
129 149.48	Tyngsborough	6/4/2020	12:51:39	Bypass	2552	1304	100	500	542	106
166 149.44	Tyngsborough	6/4/2020	12:56:59	Turbine	2552	1304	100	500	542	106
77 149.8	Pepperell	6/4/2020	13:06:00	Turbine	2552	1304	100	500	542	106
148 149.46	Tyngsborough	6/4/2020	13:14:44	Downtown	2552	1304	100	500	542	106
148 149.76	Pepperell	6/4/2020	13:22:59	Downtown	2552	1304	100	500	542	106
195 149.76	Tyngsborough	6/4/2020	13:57:47	Bypass	2572	1302	100	500	542	128
56 149.8	Tyngsborough	6/4/2020	14:38:25	Turbine	2656	1365	100	500	542	149
150 149.76	Pepperell	6/4/2020	14:39:36	Turbine	2656	1365	100	500	542	149
63 149.44	Tyngsborough	6/4/2020	14:53:04	Turbine	2656	1365	100	500	542	149
185 149.76	Tyngsborough	6/4/2020	15:01:48	Turbine	2656	1365	100	500	542	149
130 149.48	Tyngsborough	6/4/2020	15:10:57	Turbine	2656	1365	100	500	542	149
196 149.44	Pepperell	6/4/2020	15:27:35	Turbine	2656	1365	100	500	542	149
85 149.76	Tyngsborough	6/4/2020	16:46:59	Downtown	2936	1462	132	500	542	300
114 149.48	Tyngsborough	6/4/2020	16:47:07	Turbine	2936	1462	132	500	542	300
60 149.8	Tyngsborough	6/4/2020	16:54:56	Turbine	2936	1462	132	500	542	300
124 149.48	Tyngsborough	6/4/2020	16:56:33	Bypass	2936	1462	132	500	542	300
149 149.46	Tyngsborough	6/4/2020	17:15:39	Bypass	2936	1462	132	500	542	300
65 149.48	Pepperell	6/4/2020	17:18:36	Bypass	2936	1462	132	500	542	300
194 149.8	Mine Falls	6/4/2020	17:25:03	Bypass	2936	1462	132	500	542	300
132 149.48	Tyngsborough	6/4/2020	17:55:15	Bypass	2966	1593	132	500	542	199
141 149.46	Tyngsborough	6/4/2020	18:08:33	Bypass	2966	1593	132	500	542	199
167 149.8	Tyngsborough	6/4/2020	18:36:53	Bypass	2966	1559	132	500	542	233
166 149.8	Tyngsborough	6/4/2020	19:16:26	Bypass	2966	1559	132	500	542	233
174 149.8	Tyngsborough	6/4/2020	19:28:56	Bypass	2966	1559	132	500	542	233
44 149.8	Tyngsborough	6/4/2020	19:44:30	Spill	2966	1609	132	500	542	183
150 149.46	Tyngsborough	6/4/2020	20:14:18	Turbine	2966	1609	132	500	542	183
192 149.8	Mine Falls	6/4/2020	21:11:52	Turbine	2966	1609	132	500	542	183
127 149.48	Tyngsborough	6/4/2020	21:20:50	Turbine	2966	1609	132	500	542	183
89 149.76	Tyngsborough	6/4/2020	22:19:13	Turbine	2966	1642	132	500	542	150
61 149.44	Tyngsborough	6/5/2020	0:49:28	Turbine	2969	1643	132	500	542	152
56 149.44	Tyngsborough	6/5/2020	1:46:00	Turbine	2969	1639	132	500	542	156
87 149.76	Tyngsborough	6/5/2020	15:48:40	Turbine	3112	1854	132	500	542	84
84 149.76	Tyngsborough	6/5/2020	17:54:19	Turbine	3162	1853	132	500	542	135
92 149.76	Tyngsborough	6/5/2020	20:07:30	Bypass	3138	1678	132	500	542	286
145 149.46	Tyngsborough	6/5/2020	20:48:31	Turbine	3155	1667	132	500	542	314
128 149.48	Tyngsborough	6/6/2020	6:26:03	Turbine	2885	1589	100	500	542	154
173 149.8	Tyngsborough	6/6/2020	14:08:20	Turbine	2808	1606	100	500	542	60
55 149.44	Tyngsborough	6/6/2020	14:12:46	Bypass	2808	1606	100	500	542	60
60 149.44	Tyngsborough	6/6/2020	14:17:40	Turbine	2808	1606	100	500	542	60
133 149.48	Tyngsborough	6/6/2020	14:36:09	Turbine	2838	1605	100	500	542	91
93 149.46	Tyngsborough	6/6/2020	14:48:12	Turbine	2838	1605	100	500	542	91
52 149.8	Tyngsborough	6/6/2020	14:52:19	Turbine	2838	1605	100	500	542	91

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
92 149.46	Tyngsborough	6/6/2020	15:50:28	Turbine	2858	1639	132	500	542	45
152 149.76	Pepperell	6/6/2020	16:20:51	Bypass	2858	1639	132	500	542	45
198 149.8	Mine Falls	6/6/2020	16:34:41	Bypass	2918	1638	132	500	542	106
90 149.76	Tyngsborough	6/6/2020	16:44:57	Bypass	2918	1638	132	500	542	106
21 149.46	Pepperell	6/6/2020	16:53:51	Turbine	2918	1638	132	500	542	106
179 149.76	Mine Falls	6/6/2020	17:31:35	Turbine	2918	1638	132	500	542	106
59 149.48	Pepperell	6/6/2020	18:22:50	Turbine	2918	1638	132	500	542	106
169 149.8	Tyngsborough	6/6/2020	18:40:04	Bypass	2838	1638	132	500	542	28
66 149.48	Pepperell	6/6/2020	18:59:04	Bypass	2838	1638	132	500	542	28
135 149.48	Tyngsborough	6/6/2020	18:59:19	Bypass	2838	1638	132	500	542	28
86 149.76	Tyngsborough	6/6/2020	18:59:49	Bypass	2838	1638	132	500	542	28
141 149.76	Pepperell	6/6/2020	19:08:40	Bypass	2838	1638	132	500	542	28
50 149.48	Pepperell	6/6/2020	19:09:22	Bypass	2838	1638	132	500	542	28
186 149.44	Pepperell	6/6/2020	19:09:34	Bypass	2838	1638	132	500	542	28
83 149.76	Tyngsborough	6/6/2020	19:10:49	Turbine	2838	1638	132	500	542	28
153 149.76	Pepperell	6/6/2020	19:28:57	Turbine	2838	1638	132	500	542	28
118 149.44	Mine Falls	6/6/2020	20:09:25	Bypass	2808	1634	132	500	542	28
174 149.44	Tyngsborough	6/7/2020	16:00:26	Bypass	2895	1714	132	500	542	28
81 149.8	Pepperell	6/7/2020	16:03:57	Bypass	2895	1714	132	500	542	28
164 149.44	Tyngsborough	6/7/2020	16:08:41	Bypass	2895	1714	132	500	542	28
168 149.76	Mine Falls	6/7/2020	17:48:31	Bypass	3085	1748	132	500	542	163
91 149.76	Tyngsborough	6/7/2020	17:49:33	Bypass	3085	1748	132	500	542	163
194 149.76	Tyngsborough	6/7/2020	18:09:30	Bypass	3085	1748	132	500	542	163
142 149.76	Pepperell	6/7/2020	18:15:05	Bypass	3085	1748	132	500	542	163
55 149.48	Pepperell	6/7/2020	18:54:59	Bypass	3085	1751	132	500	542	160
198 149.44	Pepperell	6/8/2020	1:14:45	Bypass	2862	1555	132	500	542	133
115 149.48	Tyngsborough	6/8/2020	5:33:39	Turbine	2778	1463	100	500	542	173
176 149.8	Tyngsborough	6/8/2020	7:40:22	Turbine	2728	1468	100	500	542	118
188 149.44	Pepperell	6/8/2020	18:22:13	Bypass	2938	1699	132	500	542	65
168 149.8	Tyngsborough	6/8/2020	18:41:51	Bypass	2938	1694	132	500	542	70
60 149.48	Pepperell	6/8/2020	23:28:47	Turbine	2912	1667	132	500	542	71
119 149.44	Mine Falls	6/9/2020	13:56:39	Turbine	2392	1179	100	500	542	71
79 149.8	Pepperell	6/9/2020	14:03:44	Turbine	2392	1179	100	500	542	71
143 149.46	Tyngsborough	6/9/2020	14:24:47	Turbine	2392	1179	100	500	542	71
64 149.48	Pepperell	6/9/2020	15:10:00	Turbine	2382	1180	100	500	542	60
175 149.8	Tyngsborough	6/9/2020	15:55:19	Bypass	2412	1203	132	500	542	35
58 149.44	Tyngsborough	6/9/2020	15:59:11	Turbine	2412	1203	132	500	542	35
56 149.48	Pepperell	6/9/2020	16:18:35	Bypass	2412	1203	132	500	542	35
131 149.48	Tyngsborough	6/9/2020	16:19:03	Bypass	2412	1203	132	500	542	35
143 149.76	Pepperell	6/9/2020	16:22:27	Bypass	2412	1203	132	500	542	35
149 149.76	Pepperell	6/9/2020	17:00:41	Turbine	2532	1213	132	500	542	145
197 149.44	Pepperell	6/9/2020	17:05:12	Bypass	2532	1213	132	500	542	145
137 149.76	Pepperell	6/9/2020	18:30:43	Bypass	2652	1336	132	500	542	142
170 149.8	Tyngsborough	6/9/2020	18:30:49	Turbine	2652	1336	132	500	542	142
147 149.46	Tyngsborough	6/9/2020	18:40:17	Bypass	2652	1336	132	500	542	142
53 149.48	Pepperell	6/9/2020	18:49:54	Turbine	2652	1336	132	500	542	142
176 149.76	Mine Falls	6/10/2020	13:13:32	Turbine	2299	1086	100	500	542	71
47 149.48	Pepperell	6/10/2020	13:50:16	Turbine	2299	1084	100	500	542	73
140 149.76	Pepperell	6/10/2020	14:07:03	Turbine	2299	1084	100	500	542	73
57 149.48	Pepperell	6/10/2020	14:48:27	Turbine	2302	1083	100	500	542	77
146 149.46	Tyngsborough	6/10/2020	16:11:38	Bypass	2302	1086	132	500	542	42

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
144 149.76	Pepperell	6/10/2020	18:47:50	Bypass	2385	1065	132	500	542	146
69 149.8	Pepperell	6/14/2020	19:51:14	Bypass	2082	984	132	500	542	28
154 149.76	Pepperell	6/14/2020	20:29:04	Bypass	2082	984	132	500	542	28
59 149.44	Tyngsborough	6/17/2020	8:01:09	Turbine	2083	966	100	500	542	0
165 149.76	Mine Falls	6/17/2020	20:13:17	Bypass	1576	353	132	500	542	49
195 149.44	Pepperell	6/19/2020	4:28:20	Bypass	1368	210	132	500	542	28

Adult American Shad:

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
87 149.44	Tyngsborough	6/5/2020	16:02:37	Turbine	3112	1854	132	500	542	84
81 149.44	Tyngsborough	6/8/2020	7:18:07	Turbine	2778	1468	100	500	542	168
82 149.44	Tyngsborough	6/8/2020	17:00:07	Turbine	2938	1696	132	500	542	68
21 149.8	Tyngsborough	6/8/2020	20:46:18	Turbine	2908	1672	132	500	542	62
27 149.8	Tyngsborough	6/9/2020	10:37:38	Turbine	2362	1168	100	500	542	52
38 149.76	Tyngsborough	6/9/2020	15:58:49	Turbine	2412	1203	132	500	542	35
32 149.8	Tyngsborough	6/9/2020	20:40:30	Bypass	2685	1362	132	500	542	149
30 149.46	Tyngsborough	6/10/2020	5:20:10	Turbine	2655	1361	132	500	542	120
74 149.44	Tyngsborough	6/10/2020	11:10:52	Turbine	2469	1234	100	500	542	93
119 149.8	Tyngsborough	6/10/2020	20:05:58	Turbine	2335	1023	132	500	542	138
113 149.46	Tyngsborough	6/10/2020	22:26:57	Bypass	2262	925	132	500	542	163
40 149.76	Tyngsborough	6/11/2020	13:14:48	Spill	1414	-22	100	500	542	294
107 149.46	Tyngsborough	6/11/2020	14:27:24	Spill	3022	-21	100	500	542	1901
29 149.76	Tyngsborough	6/11/2020	16:47:51	Turbine	2471	1373	132	500	542	28
171 149.48	Tyngsborough	6/13/2020	1:15:31	Turbine	2329	1311	132	500	542	28
176 149.48	Tyngsborough	6/13/2020	7:59:26	Turbine	2332	1309	100	500	542	0
97 149.46	Tyngsborough	6/14/2020	3:08:46	Turbine	2105	1032	132	500	542	28
38 149.8	Tyngsborough	6/14/2020	20:48:56	Bypass	2082	989	132	500	542	28
90 149.44	Tyngsborough	6/15/2020	0:01:17	Bypass	2082	988	132	500	542	28
94 149.44	Tyngsborough	6/15/2020	0:06:56	Bypass	2082	988	132	500	542	28
103 149.46	Tyngsborough	6/15/2020	1:12:32	Turbine	2062	989	132	500	542	28
33 149.8	Tyngsborough	6/15/2020	2:05:42	Turbine	2062	986	132	500	542	28
105 149.46	Tyngsborough	6/15/2020	4:04:08	Bypass	2062	951	132	500	542	28
92 149.44	Tyngsborough	6/15/2020	20:47:30	Bypass	1861	758	132	500	542	28
26 149.8	Tyngsborough	6/15/2020	23:59:51	Turbine	1861	758	132	500	542	28
22 149.8	Tyngsborough	6/16/2020	0:48:03	Bypass	1861	759	132	500	542	28
163 149.48	Tyngsborough	6/16/2020	1:30:30	Bypass	1861	758	132	500	542	28
179 149.48	Tyngsborough	6/16/2020	5:58:44	Turbine	1861	751	100	500	542	0
168 149.48	Tyngsborough	6/16/2020	7:23:00	Spill	1881	757	100	500	542	0
41 149.76	Tyngsborough	6/16/2020	10:03:40	Turbine	1941	925	100	500	542	0
186 149.48	Tyngsborough	6/16/2020	16:52:52	Bypass	2074	947	132	500	542	28
180 149.48	Tyngsborough	6/16/2020	16:53:03	Bypass	2074	947	132	500	542	28
192 149.48	Tyngsborough	6/16/2020	18:02:25	Turbine	2114	925	132	500	542	28
166 149.48	Tyngsborough	6/16/2020	18:28:00	Bypass	2114	925	132	500	542	28
116 149.46	Tyngsborough	6/16/2020	18:48:22	Bypass	2117	925	132	500	542	28
27 149.76	Tyngsborough	6/16/2020	19:55:28	Bypass	2120	963	132	500	542	28
38 149.46	Tyngsborough	6/16/2020	20:11:12	Bypass	2120	963	132	500	542	28
31 149.76	Tyngsborough	6/16/2020	20:30:14	Bypass	2120	963	132	500	542	28

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
20 149.76	Tyngsborough	6/16/2020	20:48:22	Bypass	2120	963	132	500	542	28
28 149.76	Tyngsborough	6/16/2020	20:48:52	Bypass	2120	963	132	500	542	28
84 149.44	Tyngsborough	6/16/2020	22:12:23	Bypass	2100	963	132	500	542	28
30 149.76	Tyngsborough	6/16/2020	23:57:49	Turbine	2100	964	132	500	542	28
111 149.46	Tyngsborough	6/17/2020	0:58:42	Bypass	2100	964	132	500	542	28
83 149.44	Tyngsborough	6/17/2020	2:30:36	Bypass	2100	965	132	500	542	28
15 149.76	Tyngsborough	6/17/2020	4:54:15	Turbine	2100	966	132	500	542	28
181 149.48	Tyngsborough	6/17/2020	6:56:28	Turbine	2103	967	100	500	542	0
164 149.48	Tyngsborough	6/17/2020	11:58:23	Spill	1823	965	100	500	542	0
108 149.46	Tyngsborough	6/17/2020	16:44:06	Turbine	1576	422	132	500	542	28
162 149.48	Tyngsborough	6/17/2020	16:56:37	Bypass	1576	422	132	500	542	28
30 149.8	Tyngsborough	6/17/2020	18:18:52	Bypass	1576	364	132	500	542	38
31 149.8	Tyngsborough	6/17/2020	19:11:55	Bypass	1576	355	132	500	542	47
78 149.44	Tyngsborough	6/17/2020	20:43:11	Bypass	1576	357	132	500	542	45
109 149.46	Tyngsborough	6/17/2020	21:53:18	Bypass	1576	353	132	500	542	49
96 149.44	Tyngsborough	6/17/2020	23:44:06	Bypass	1576	354	132	500	542	48
165 149.48	Tyngsborough	6/18/2020	6:47:19	Turbine	1594	352	100	500	542	100
110 149.46	Tyngsborough	6/18/2020	12:26:46	Spill	1484	357	100	500	542	0
33 149.76	Tyngsborough	6/18/2020	12:43:53	Spill	1484	359	100	500	542	0
32 149.46	Tyngsborough	6/18/2020	13:02:34	Spill	1484	359	100	500	542	0
187 149.48	Tyngsborough	6/18/2020	14:25:05	Spill	1434	355	100	500	542	0
34 149.46	Tyngsborough	6/18/2020	15:36:47	Spill	1401	353	132	500	542	28
112 149.46	Tyngsborough	6/18/2020	20:14:43	Spill	1501	345	132	500	542	28
65 149.44	Tyngsborough	6/18/2020	20:36:09	Spill	1498	347	132	500	542	28
173 149.48	Tyngsborough	6/18/2020	22:16:18	Turbine	1498	349	132	500	542	28
36 149.76	Tyngsborough	6/19/2020	7:27:17	Turbine	1418	254	100	500	542	22
167 149.48	Tyngsborough	6/19/2020	7:44:08	Spill	1401	256	100	500	542	3
121 149.8	Tyngsborough	6/19/2020	11:05:41	Spill	1501	469	100	500	542	0
190 149.48	Tyngsborough	6/19/2020	11:49:20	Spill	1761	817	100	500	542	0
93 149.44	Tyngsborough	6/19/2020	12:39:12	Spill	1941	986	100	500	542	0
37 149.76	Tyngsborough	6/19/2020	12:47:07	Spill	1941	986	100	500	542	0
25 149.8	Tyngsborough	6/19/2020	12:55:25	Spill	1941	986	100	500	542	0
23 149.76	Tyngsborough	6/19/2020	13:07:21	Spill	1941	986	100	500	542	0
43 149.76	Tyngsborough	6/19/2020	15:41:56	Spill	2014	1006	132	500	542	28
191 149.48	Tyngsborough	6/19/2020	16:32:54	Spill	2124	1001	132	500	542	28
37 149.46	Tyngsborough	6/19/2020	16:56:34	Spill	2124	1001	132	500	542	28
24 149.76	Tyngsborough	6/19/2020	19:13:38	Spill	2141	984	132	500	542	28
169 149.48	Tyngsborough	6/20/2020	0:22:53	Bypass	1675	484	132	500	542	28
19 149.76	Tyngsborough	6/20/2020	9:24:47	Spill	1445	417	100	500	542	0
35 149.76	Tyngsborough	6/20/2020	9:55:28	Spill	1525	411	100	500	542	0
29 149.8	Tyngsborough	6/20/2020	10:01:22	Turbine	1525	411	100	500	542	0
77 149.44	Tyngsborough	6/20/2020	11:04:43	Turbine	1585	413	100	500	542	30
42 149.76	Tyngsborough	6/20/2020	11:18:33	Turbine	1585	413	100	500	542	30
104 149.46	Tyngsborough	6/20/2020	11:29:22	Spill	1585	413	100	500	542	30
114 149.46	Tyngsborough	6/20/2020	14:49:20	Turbine	1598	411	100	500	542	45
76 149.44	Tyngsborough	6/20/2020	16:55:56	Bypass	1585	409	132	500	542	28
20 149.8	Tyngsborough	6/20/2020	17:35:30	Spill	1595	411	132	500	542	28
80 149.44	Tyngsborough	6/20/2020	18:09:00	Spill	1595	411	132	500	542	28
172 149.48	Tyngsborough	6/20/2020	18:44:21	Spill	1585	410	132	500	542	28
120 149.8	Tyngsborough	6/20/2020	20:13:24	Spill	1585	413	132	500	542	28
70 149.44	Tyngsborough	6/21/2020	8:51:38	Spill	1448	397	100	500	542	0

ID_Frequency	Release Location	Passage			Reported cfs					
		Date	Time	Route	Inflow	Turbine	Bypass	Ladder	Downtown	Spill
36 149.46	Tyngsborough	6/21/2020	12:46:38	Spill	1551	549	132	500	542	28
73 149.44	Tyngsborough	6/21/2020	16:16:48	Spill	1681	689	132	500	542	28
91 149.44	Tyngsborough	6/22/2020	12:57:46	Spill	1397	369	100	500	542	0
72 149.44	Tyngsborough	6/22/2020	14:20:45	Spill	1397	370	100	500	542	0
170 149.48	Tyngsborough	6/22/2020	14:29:07	Spill	1397	370	100	500	542	0
26 149.76	Tyngsborough	6/22/2020	16:49:58	Bypass	1457	367	132	500	542	28
177 149.48	Tyngsborough	6/22/2020	19:29:05	Bypass	1477	365	132	500	542	28
39 149.8	Tyngsborough	6/22/2020	20:18:59	Spill	1477	367	132	500	542	28
44 149.76	Tyngsborough	6/23/2020	0:32:21	Turbine	1472	367	132	500	542	28
28 149.8	Tyngsborough	6/23/2020	10:49:18	Spill	1367	343	100	500	542	0
31 149.46	Tyngsborough	6/23/2020	10:54:54	Spill	1367	343	100	500	542	0
34 149.76	Tyngsborough	6/23/2020	17:39:39	Spill	1660	596	132	500	542	28
86 149.44	Tyngsborough	6/23/2020	19:09:11	Bypass	1747	723	132	500	542	28
21 149.76	Tyngsborough	6/24/2020	8:04:48	Spill	1575	593	100	500	542	0
16 149.76	Tyngsborough	6/24/2020	16:15:28	Bypass	1590	586	132	500	542	28
89 149.44	Tyngsborough	6/25/2020	15:06:58	Spill	1286	209	100	500	542	0
115 149.46	Tyngsborough	6/25/2020	19:22:42	Spill	1419	206	132	500	542	39
35 149.46	Tyngsborough	6/26/2020	12:51:56	Spill	1639	778	100	500	542	0
95 149.44	Tyngsborough	6/26/2020	14:15:52	Spill	1439	517	100	500	542	0
71 149.44	Tyngsborough	6/27/2020	13:57:17	Spill	1712	879	100	500	542	0

Appendix E. Listing of manual tracking detections within the Lowell Project area.

River mile demarcations for reaches defined by stationary receivers:

Reach	River Mile	
	Upper End	Lower End
Top of Impoundment-Station 04	61.5	43.85
Station 04-Station 05	43.85	41.75
Station 10-Station 25	41.75	39.25
Station 25-Station 26	39.25	35.25
Station 26-Station 27	35.25	30.25

Date	Species	Release Location	Frequency	ID	RM	Location	Type	Note
5/29/2020	Alewife	Tyngsborough	149.480	108	30.75	Station 26-Station 27	Final	via boat
6/4/2020	Alewife	Tyngsborough	149.460	93	42.75	Station 04-Station 05	Transit	via truck
6/4/2020	Alewife	Mine Falls	149.760	162	30.25	Station 26-Station 27	Final	via truck
6/4/2020	Alewife	Mine Falls	149.760	164	30.25	Station 26-Station 27	Final	via truck
6/4/2020	Alewife	Tyngsborough	149.800	46	30.25	Station 26-Station 27	Final	via truck
6/4/2020	American Shad	Tyngsborough	149.440	82	44.25	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.440	84	47.75	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.440	87	44.25	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.460	100	49.25	US of Station 04	Final	via truck
6/4/2020	American Shad	Tyngsborough	149.480	166	44.25	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.760	30	47.75	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.760	36	44.25	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.800	21	47.75	US of Station 04	Transit	via truck
6/4/2020	American Shad	Tyngsborough	149.800	30	47.75	US of Station 04	Transit	via truck
6/9/2020	Alewife	Tyngsborough	149.460	92	30.25	Station 26-Station 27	Final	via truck
6/10/2020	Alewife	Tyngsborough	149.440	177	30.25	Station 26-Station 27	Final	via truck
6/11/2020	Alewife	Tyngsborough	149.480	150	30.25	Station 26-Station 27	Final	via truck
6/11/2020	American Shad	Tyngsborough	149.760	29	30.25	Station 26-Station 27	Final	via truck
6/12/2020	American Shad	Tyngsborough	149.440	66	48.5	US of Station 04	Final	via boat
6/12/2020	American Shad	Tyngsborough	149.440	77	49.25	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.440	94	48.5	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.460	100	49.25	US of Station 04	Final	via boat
6/12/2020	American Shad	Tyngsborough	149.460	117	48.5	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.480	181	44.25	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.480	183	49.25	US of Station 04	Final	via boat
6/12/2020	American Shad	Tyngsborough	149.760	20	44.25	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.760	21	44.75	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.800	121	49.5	US of Station 04	Transit	via boat
6/12/2020	American Shad	Tyngsborough	149.440	83	41.5	Station 10-Station 25	Transit	via truck
6/12/2020	American Shad	Tyngsborough	149.460	111	41.75	Station 04-Station 05	Transit	via truck
6/12/2020	American Shad	Tyngsborough	149.760	15	41.75	Station 04-Station 05	Transit	via truck
6/12/2020	American Shad	Tyngsborough	149.760	38	41.75	Station 04-Station 05	Transit	via truck

Date	Species	Release Location	Frequency	ID	RM	Location	Type	Note
6/12/2020	American Shad	Tyngsborough	149.760	41	41.75	Station 04-Station 05	Transit	via truck
6/12/2020	American Shad	Tyngsborough	149.800	22	41.75	Station 04-Station 05	Transit	via truck
6/12/2020	American Shad	Tyngsborough	149.800	31	41.75	Station 04-Station 05	Transit	via truck
6/15/2020	Alewife	Pepperell	149.440	196	30.25	Station 26-Station 27	Final	via truck
6/15/2020	American Shad	Tyngsborough	149.440	75	47.25	US of Station 04	Final	via truck
6/15/2020	American Shad	Tyngsborough	149.460	33	42	Station 04-Station 05	Final	via truck
6/16/2020	American Shad	Tyngsborough	149.480	162	41.5	Station 10-Station 25	Transit	via truck
6/17/2020	Alewife	Pepperell	149.440	196	30.25	Station 26-Station 27	Final	via truck
6/17/2020	Alewife	Mine Falls	149.760	164	30.25	Station 26-Station 27	Final	via truck
6/17/2020	American Shad	Tyngsborough	149.480	163	30.25	Station 26-Station 27	Final	via truck
6/17/2020	American Shad	Tyngsborough	149.760	31	30.25	Station 26-Station 27	Final	via truck
6/18/2020	Alewife	Mine Falls	149.440	111	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Pepperell	149.440	196	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Tyngsborough	149.460	150	32.5	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Tyngsborough	149.480	135	31	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Pepperell	149.760	141	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Pepperell	149.760	143	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Pepperell	149.760	148	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Mine Falls	149.760	160	39	Station 25-Station 26	Final	via boat
6/18/2020	Alewife	Mine Falls	149.760	164	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Mine Falls	149.760	179	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Tyngsborough	149.760	197	30.25	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Tyngsborough	149.800	53	32.5	Station 26-Station 27	Final	via boat
6/18/2020	Alewife	Tyngsborough	149.440	56	33.75	Station 26-Station 27	Final	via boat
6/18/2020	American Shad	Tyngsborough	149.440	78	30.25	Station 26-Station 27	Transit	via boat
6/18/2020	American Shad	Tyngsborough	149.460	103	39	Station 25-Station 26	Final	via boat
6/18/2020	American Shad	Tyngsborough	149.460	111	30.25	Station 26-Station 27	Transit	via boat
6/18/2020	American Shad	Tyngsborough	149.480	180	30.25	Station 26-Station 27	Final	via boat
6/18/2020	American Shad	Tyngsborough	149.760	29	34.5	Station 26-Station 27	Final	via boat
6/18/2020	American Shad	Tyngsborough	149.800	30	34	Station 26-Station 27	Final	via boat
6/19/2020	Alewife	Pepperell	149.440	196	30.25	Station 26-Station 27	Final	via truck
6/19/2020	Alewife	Pepperell	149.760	141	30.25	Station 26-Station 27	Final	via truck
6/19/2020	Alewife	Mine Falls	149.760	164	30.25	Station 26-Station 27	Final	via truck
6/19/2020	American Shad	Tyngsborough	149.440	70	45.5	US of Station 04	Transit	via truck
6/19/2020	American Shad	Tyngsborough	149.440	75	47.25	US of Station 04	Final	via truck
6/19/2020	American Shad	Tyngsborough	149.460	108	30.25	Station 26-Station 27	Transit	via truck
6/19/2020	American Shad	Tyngsborough	149.460	111	30.25	Station 26-Station 27	Transit	via truck
6/19/2020	American Shad	Tyngsborough	149.480	183	49	US of Station 04	Final	via truck
6/19/2020	American Shad	Tyngsborough	149.480	184	48.25	US of Station 04	Final	via truck
6/19/2020	American Shad	Tyngsborough	149.480	191	48.25	US of Station 04	Transit	via truck
6/22/2020	American Shad	Tyngsborough	149.440	86	41.75	Station 04-Station 05	Transit	via truck
6/22/2020	American Shad	Tyngsborough	149.480	174	41.75	Station 04-Station 05	Final	via truck
6/22/2020	American Shad	Tyngsborough	149.480	177	41.5	Station 10-Station 25	Transit	via truck
6/22/2020	American Shad	Tyngsborough	149.760	16	41.75	Station 04-Station 05	Transit	via truck
6/22/2020	American Shad	Tyngsborough	149.760	38	41.5	Station 10-Station 25	Final	via truck

Date	Species	Release Location	Frequency	ID	RM	Location	Type	Note
6/23/2020	Alewife	Pepperell	149.440	196	30.25	Station 26-Station 27	Final	via truck
6/24/2020	Alewife	Pepperell	149.760	147	42.25	Station 04-Station 05	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.440	75	47.25	US of Station 04	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.460	31	41.5	Station 10-Station 25	Transit	via truck
6/24/2020	American Shad	Tyngsborough	149.460	101	41.75	Station 04-Station 05	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.480	184	47.75	US of Station 04	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.760	26	30.5	Station 26-Station 27	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.760	38	41.25	Station 10-Station 25	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.760	44	41.25	Station 10-Station 25	Final	via truck
6/24/2020	American Shad	Tyngsborough	149.800	22	41.25	Station 10-Station 25	Final	via truck
6/26/2020	American Shad	Tyngsborough	149.440	75	47.25	US of Station 04	Final	via boat
6/26/2020	American Shad	Tyngsborough	149.480	184	48	US of Station 04	Final	via truck
7/2/2020	Alewife	Tyngsborough	149.440	56	33.75	Station 26-Station 27	Final	via boat
7/2/2020	Alewife	Mine Falls	149.440	111	30.25	Station 26-Station 27	Final	via boat
7/2/2020	Alewife	Tyngsborough	149.460	150	32.25	Station 26-Station 27	Final	via boat
7/2/2020	Alewife	Tyngsborough	149.480	135	31	Station 26-Station 27	Final	via boat
7/2/2020	Alewife	Mine Falls	149.760	160	39	Station 25-Station 26	Final	via boat
7/2/2020	Alewife	Mine Falls	149.760	164	30.25	Station 26-Station 27	Final	via boat
7/2/2020	Alewife	Tyngsborough	149.760	197	30.25	Station 26-Station 27	Final	via boat
7/2/2020	American Shad	Tyngsborough	149.460	103	39	Station 25-Station 26	Final	via boat
7/2/2020	American Shad	Tyngsborough	149.760	20	38.75	Station 25-Station 26	Final	via boat
7/2/2020	American Shad	Tyngsborough	149.800	30	34.5	Station 26-Station 27	Final	via boat

Appendix F. Tyngsborough adult river herring releases – comparison of individuals originating at Lawrence vs. Amoskeag Dam.

Adult river herring radio-tagged and released into the mainstem Merrimack River in Tyngsborough for the assessment of downstream passage at Lowell originated at Lawrence (May 21 and May 22 releases; n = 80 fish) and at Amoskeag Dam (May 28 and June 2 releases; n = 70 fish). Table F-1 provides a comparison of the range of values for movement indices evaluated during this study and between the two groups. Based on comparison of the quartile values, observations for most metrics did not appear to differ between the two groups. The approach duration (i.e., time to pass from Station 04 to approach at the dam (Station 05)) was longer for individuals collected at Lawrence. Fish collected at the fish lift at Lawrence were likely pre-spawn individuals and may have moved upstream following release versus the fish collected at Amoskeag which showed a more directed downstream approach following their release at Tyngsborough. Residence in the Lowell project area did not appear to vary for the release groups originating at Lawrence or Amoskeag Dams. Similarly, the period of time to move downstream from Lowell to Lawrence did not vary greatly among the defined downstream reaches based on the quartile ranges for passage from Lowell to Station 25, Station 25 to Station 26 and Station 26 to detection at Lawrence. With regards to passage at Lowell, the majority of radio-tagged adult river herring originating at Lawrence and Amoskeag passing downstream did so via the turbines or downstream bypass facility (Figure F-1).

Table F-1. Minimum, maximum, and quartile values for the suite of movement metrics assessed for radio-tagged adult river herring originating at Lawrence and Amoskeag and released upstream of Lowell in Tyngsborough.

Movement Metric	Origin	Value				
		Min	Max	P25	Median	P75
Approach Duration (hrs)	Lawrence	6.7	323.6	135.2	179.1	234.1
	Amoskeag	11.5	155.1	27.6	33.6	40.5
Upstream Residence Duration (hrs)	Lawrence	0.8	210.1	25	44.7	88.5
	Amoskeag	0.7	181.7	26.1	49.4	90.2
Pawtucket Gatehouse Passage (hrs)	Lawrence	0	99.3	0.2	0.5	6.1
	Amoskeag	0	94.2	0.6	2.6	20.8
Northern Canal Residence (hrs)	Lawrence	0.2	38.2	0.3	0.4	2.2
	Amoskeag	0.2	42.3	0.4	0.7	5.6
Downstream Travel: Lowell to Station 25 (hrs)	Lawrence	1.1	50.8	3.4	5.3	11.6
	Amoskeag	1.5	28.5	2.9	4.8	7.6
Downstream Travel: Station 25 to Station 26 (hrs)	Lawrence	1.7	4.5	1.9	2.2	2.9
	Amoskeag	1.9	16.5	2.4	2.8	3.7
Downstream Travel: Station 26 to Station 27 (hrs)	Lawrence	2.6	138.9	10.7	18.8	21.0
	Amoskeag	4.1	68.2	17.6	19.4	21.1

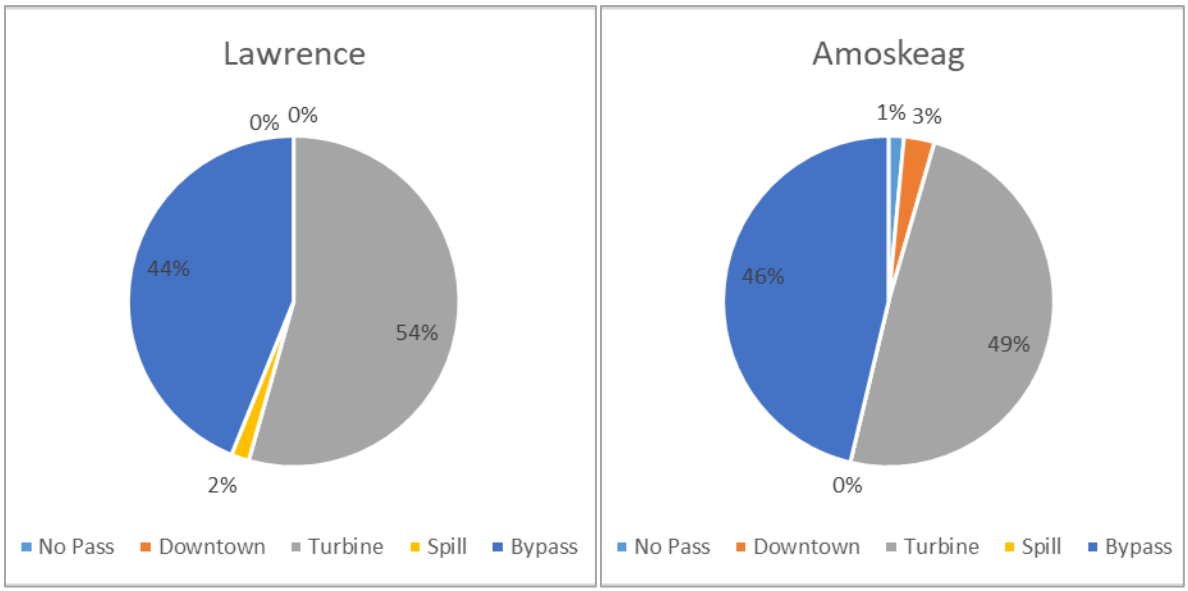

Figure F-1. Downstream passage route distribution observed at Lowell for radio-tagged adult river herring originating at Lawrence (left panel) and Amoskeag (right panel) and released upstream of Lowell in Tyngsborough.

Technical Report for the Fish Assemblage Study

Lowell Hydroelectric Project (FERC No. 2790)

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1 Introduction

A survey of the resident fish community was conducted in support of the relicensing for the Lowell Hydroelectric Project (Lowell or Project), Federal Energy Regulatory Commission (FERC) No. 2790, as identified in the Revised Study Plan (RSP) submitted by Boott Hydropower, LLC (Boott) on January 28, 2019. The approach and methodology described in the RSP for the fish community study was approved by FERC in its Study Plan Determination letter dated March 13, 2019.

In accordance with 18 C.F.R. § 5.15(c), Boott filed their Initial Study Report (ISR) with FERC on February 25, 2020. As described in the ISR, data analyses were in progress and scheduled for completion during 2020. On June 12, 2020 FERC issued a Revised Process Plan and Schedule and Determination on Requests for Study Modifications for the Lowell Hydroelectric Project (Revised PPS). In accordance with the Revised PPS, Boott filed their Revised ISR with FERC on September 30, 2020, which contained a full report for the Fish Assemblage Study. Boott held a revised ISR meeting on October 15, 2020 and a summary of the study results was presented to representatives from FERC, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Massachusetts Division of Fisheries and Wildlife (MADFW), Massachusetts Division of Marine Fisheries (MDMF), and the New Hampshire Fish and Game Department (NHFGD). No significant comments on the Fish Assemblage Study were received.

This final technical report provides a description of the objectives, methodologies and results of the 2019 field sampling intended to describe the fish community within the Lowell Project area.

2 Objectives

The goal of this study was to characterize the fish assemblage in areas affected by the Lowell Project, specifically the impoundment and bypassed reach.

Specific objectives included:

- Field sampling to describe the fish assemblage structure, distribution, and abundance within the Project affected area along spatial and temporal gradients; and
- A comparison of historical records of fish species occurrence in the Project area to results of this study.

3 Project Description and Study Area

The Lowell Project is located at River Mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of: (1) a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones; (2) a 720-acre impoundment with a normal maximum water

surface elevation of 92.2 feet NGVD 29; (3) a 5.5-mile-long canal system which includes several small dams and gatehouses; (4) a powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW); (5) a 440-foot-long tailrace channel; (6) four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal System containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW; (7) a 4.5-mile long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid; (8) upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket dam; and (9) appurtenant facilities. At the normal pond elevation of 92.2 feet NGVD 1929 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control, and has no usable storage capacity.

The study area for this fish community survey included the mainstem Merrimack River from the Pawtucket Dam to the upper extent of the Project's impoundment located approximately 23 river miles upstream, and the Project's 0.7-mile-long bypassed reach.

4 Methods

4.1 Lowell Impoundment

The 23-mile-long (37 kilometer) impoundment was stratified based on mesohabitat characteristics. Each stratum was delineated in 547-yard (500-meter) segments using Aeronautical Reconnaissance Coverage Geographic Information System (ArcGIS). Sampling locations were randomly selected and weighted proportional to mesohabitat type frequency (e.g., if 50 percent of a particular geographic reach was shallow, riffle habitat, then 50 percent of the total number of sampling locations for that geographic reach were randomly placed within that habitat type). As long as habitat was accessible, efforts were made to ensure that a minimum of three sampling locations were placed within each strata (i.e., habitat type). A total of twelve, 547-yard (500-meter) segments were randomly selected within the reach so that approximately 16% of the impoundment was sampled. The stratified-random site selection process was repeated for each of three seasonal surveys (spring, summer, and fall).

Following selection of the twelve, 500-meter sample units, boat electrofish sampling took place during the nighttime hours (as defined by daily sunset/sunrise times). A single bank (east or west) was randomly selected for each sample unit. Prior to the start of sampling, settings on the electrofishing unit were adjusted by a trained crew member to ensure that approximately 4.0 amps of pulsed DC current was being generated. After recording the start time, boat electrofish sampling consisted of a single shoreline pass starting at the upstream end of each 500m transect and proceeded downstream. Effort was made by the boat driver to follow the shoreline contour and probe the sampling anodes into habitat areas (i.e., overhanging vegetation, submerged aquatic vegetation, woody debris, etc.). The boat driver maintained the

boat in near-shore littoral habitat (< 10-feet deep) where the sampling field would be most effective. A pair of netters stood on the bow of the sampling vessel and placed all stunned fish into an onboard live well for processing. Once the sample transect was finished, the driver recorded the completion time and duration of the sampling effort.

An experimental gill net was set concurrent with boat electrofishing in each 500-m sample unit. Gill nets were fished within all sample units containing adequate water depths and flow conditions to allow for proper performance of the nets, specifically deep and mid-channel microhabitats. Experimental gillnets were eight feet deep and were constructed of four 25-ft panels of increasing mesh size (1.0, 2.0, 3.0, and 4.0-inch stretch mesh). Gillnets were set during nighttime hours (as defined by daily sunset/sunrise times) when fish species are most susceptible to the gear due to the reduced visual avoidance. Gillnets were deployed perpendicular to the shoreline in areas where water depths were greater than the net height and capture area was maximized. Nets were set and fished for an approximate four-hour period prior to retrieval to minimize netting mortality. Net set coordinates and the date and time of each set and pull were recorded.

To supplement experimental gill net sampling in deeper habitats (> 10 ft) where electrofishing is not effective and small fish and eels are not susceptible to gillnets, a pair of standard minnow traps were deployed. The traps were 2.5 feet long galvanized wire mesh (0.25 square inch) cylinders with two entry fykes. Traps were baited and anchored to remain on station for the duration of their soak time. For each sample unit, two traps were fished simultaneously with gillnets for an approximate four-hour period. Trap set coordinates and the date and time of each set and pull were recorded.

All fish collected from the impoundment were identified to the lowest possible taxonomic classification (preferably to species), enumerated, measured to total length (to the nearest mm), and weighed (to the nearest g). If large numbers of small fish (i.e., YOY or small cyprinid species) were captured, length and weight information was collected from the first 25 individuals within the sample and the remaining individuals were grouped, enumerated, and batch weighed.

For each 500-m sample unit, the sampling crews visually evaluated habitat within the reach. The dominant substrate (organics, sand/silt/clay, cobble/gravel, boulder, or ledge), proportion of transect with submerged aquatic vegetation (i.e., 0-25%, 5-50%, 50-75%, or 75-100%), and the proportion of transect with overhanging vegetative cover (i.e., 0-25%, 5-50%, 50-75%, or 75-100%) was recorded. To get a sense of relative water depth for the Merrimack River at each sampling transect, a series of nine measurements were collected. River depths were recorded at the quarter points (i.e., 25, 50, and 75%) of three cross sections placed at the upstream extent, downstream extent, and midpoint of each sample unit. A representative water velocity (ft/s) was recorded at the midpoint of the middle cross-section of each habitat unit. Following documentation of sample unit habitat and characteristics, a representative water quality measurement was collected at approximately one meter of depth. Water temperature (^{o}C), dissolved oxygen (mg/L) conductivity (µs/cm), pH, and turbidity (ntu) were recorded.

4.2 Lowell Bypassed Reach

Delineation of sample units was scaled for the shorter, less accessible bypassed reach. Each stratum was delineated in 55-yard (50-meter) segments using ArcGIS. Sampling locations were randomly selected and weighted proportional to mesohabitat type frequency. As long as habitat was available, effort was made to ensure that at least one sampling location was placed within each strata (i.e., habitat type) within the bypassed reach. A total of three segments were randomly selected within the bypassed reach during each of three seasonal surveys (spring, summer, fall). Due to safety and gear limitations, sampling was not conducted in (1) the reach from the Pawtucket Dam downstream to the School Street Bridge, and (2) the lowermost section of the bypass channel downstream of the Northern Canal surge gate. Sampling was limited to periods of minimum flow in the bypassed reach.

Backpack electrofish sampling was conducted within the Lowell bypassed reach. Halltech Aquatic Research Model HT2000B/MK5, battery-powered backpack electrofishers with ring probes and rattail cathodes were used to sample within the bypassed reach. Sampling was conducted by anchoring a fine mesh seine at the downstream end of a 50-m sample unit. A pair of backpack electrofishing units and four technicians moved in a downstream direction towards the seine while actively netting stunned individuals and kicking the substrate to drive additional stunned individuals towards the collection net. Backpack electrofish sampling was conducted during daylight hours. The backpack units were set at 550 volts at 100 Hertz (Hz). The start time, end time and duration of sampling were recorded for each sample unit. Specifics related to habitat and effort were the same as described above for impoundment sampling.

5 Results

5.1 Lowell Impoundment

5.1.1 Habitat Evaluation and Sample Unit Selection

A pair of biologists boated the stretch of the Merrimack River from the Pawtucket Dam upstream 23.0 miles to the uppermost extent of the Project area on May 18, 2019. Changes in mesohabitat type were visually identified and their locations recorded. Following importation of those habitat break points into ArcGIS, the 23.0 miles of the Merrimack River upstream of Lowell impoundment was subdivided into a total of 74 547-yard (500-meter) segments. The majority of those (78%) were classified as impoundment habitat. Lesser amounts of the overall reach were classified as run (7%) and pool (15%). The spatial distribution of mesohabitat types and 500-m segments for the 23.0 miles upstream of Lowell is provided in Appendix A.

Table 5-1 provides a listing of the habitat units upstream of the Pawtucket Dam that were randomly selected for sampling during the spring, summer, and fall periods of 2019. A total of twelve, 500-m segments were selected per season. During the spring season, a total of six impoundment, three run and three pool habitat units were sampled. River conditions (i.e., water depth) prevented effective sampling within some of the run habitat at the uppermost end of the Project area during the summer and fall sampling periods. As a result, seven impoundment, two run, and three pool habitat units were sampled during those seasons.

5.1.2 Sampling Effort

Fish community data were collected from a total of 36, 500-m sample units during the spring, summer, and fall of 2019 (12 sites per season). Effort expended at a sample unit during each of the three seasons consisted of (1) a 500-m shoreline boat electrofish sample, (2) a four hour experimental gill net set, and (3) a four hour baited minnow trap set. Fish community sampling in the Lowell impoundment occurred on June 24-26 (spring), August 19-21 (summer) and October 28-30 (fall). Tables 5-2 through 5-4 provide a summary of boat electrofish, gill net and minnow trap sampling in the Lowell impoundment. Impoundment sample units selected by season are presented visually in Appendix A.

5.1.3 Species Richness and Composition

A total of 1,847 individuals representing twenty-two fish species were collected from the Lowell impoundment during 2019 when all sampling seasons and sample units are considered (Table 5-5). The total impoundment catch represents all individuals collected and identified during boat electrofish and gill net sampling. There were no fish collected via minnow trap during the 2019 survey. Table 5-6 provides a summary of the impoundment community composition by season (electrofish and gill net). Spottail shiner (23.0%), redbreast sunfish (20.5%) and smallmouth bass (12.3%) were the three most numerically abundant species within the Lowell impoundment during the 2019 sampling. When examined by species, spottail shiner were most abundant during the spring (27.6% of seasonal catch) and fall (33.9% of seasonal catch) whereas redbreast sunfish were most abundant during the summer period (27.1% of seasonal catch).

Total catch and community composition from sampling units upstream of Pawtucket Dam and classified as impoundment, pool and run mesohabitat types are presented in Table 5-7. Centrarchid species were the most abundant within impoundment habitat with redbreast sunfish (24.2%), pumpkinseed (14.2%), and smallmouth bass (12.5%) representing the three most abundantly sampled species. Spottail shiner were the most abundantly sampled fish species in the pool (28.4%) and run (46.3%) habitat areas.

The majority of catch in the impoundment was observed during boat electrofishing efforts (Table 5-8). A total of 1,792 individuals representing 20 fish species were collected. Spottail shiner, redbreast sunfish, and smallmouth bass were the most frequently observed species within the impoundment electrofish catch. Total boat electrofish catch within the impoundment was fairly even across seasons (high of 677 individuals during the summer to a low of 543 individuals during the fall). A total of 55 individuals representing 15 species were recorded during gill net sampling in the Lowell impoundment. Yellow bullhead was the most frequently encountered species during gill net sampling and the majority of catch was recorded during the summer season.

5.1.4 Relative Abundance

Relative abundance, the number of fish captured with known sampling effort and indexed as catch per unit of effort (CPUE), was calculated on a species-specific basis. CPUE values were standardized to a fixed unit of time or distance using the following equations:

For time (i.e., fish per hour): CPUE for taxon j in sample i = (catch ji / duration i) * 60 min

Where: duration is expressed in minutes

For distance (i.e., fish per 100 m): CPUE for taxon j in sample i = (catch ji / length i) * 100m

Where: length is expressed in meters

Prior to the calculation of any CPUE values the data set was "zero filled" for each fish species, such that each species collected in the study was represented in every sample. CPUE values were calculated for each fish species by season and gear.

Catch rates were highest for spottail shiner, redbreast sunfish and smallmouth bass captured by boat electrofish sampling in the 23.0 mile reach upstream of Pawtucket Dam during the 2019 sampling (Table 5-9). Values for fish per unit of effort were highest for spottail shiner and smallmouth bass during the spring sampling event, redbreast sunfish and spottail shiner during the summer sampling event and fallfish and alewife during the fall sampling event. Table 5-10 provides CPUE rates for fish collected during gill net sampling in the upstream reach during 2019. The CPUE rate for yellow bullhead was the highest for fish collected in the experimental gill nets. A listing of CPUE rates for all species by season and mesohabitat type is provided in Appendix B.

5.1.5 Biocharacteristics

Length frequency distributions for fish species where 25 or more individuals were collected and measured during the impoundment sampling are presented in Appendix E. The observed range for fish sizes recorded for species observed in both the boat electrofish and gill net catch from the Lowell impoundment fall within the expected bounds for those species in the northeastern U.S. (Table 5-11). A full listing of catch data is provided in Appendix F.

5.1.6 Habitat and Water Quality Characteristics

Tables 5-12 and 5-13 provide summaries of habitat and water quality information recorded for each of the 36, 500-m sample units surveyed during the spring, summer and fall seasons. Dominant substrate, presence of submerged aquatic vegetation (SAV), and presence of general cover were consistent among all sample units regardless of mesohabitat classification (i.e., pool, run or impoundment). Sampled areas upstream of Pawtucket Dam were characterized by sand-silt-clay sediments, presence of SAV over 0-25% of the sample area and the presence of general cover over 0-25% of the sample area. Mean water depth (as sampled at quarter points of the river channel at the upper, middle, and lower points of each transect) trended towards shallower at the upper end of the reach upstream of Pawtucket Dam in areas classified as pool and run and deeper at the lower end in areas classified as impoundment.

Water temperature was relatively consistent among sample units with a ± 1-2°C range in values within each season. The average Merrimack River water temperature was 21.5^{o}C during the spring sampling, 25.6^{o}C during the summer sampling, and 10.8^{o}C during the fall sampling. Dissolved oxygen was measured at 8.1 mg/L or greater at all stations upstream of Pawtucket

Dam regardless of season. Conductivity averaged 114 µs/cm during the spring sampling, 181 µs/cm during the summer sampling, and 117 µs/cm during the fall sampling. In general, conductivity increased with proximity to the Pawtucket Dam. River pH was consistent across seasons ranging from 6.5-7.5. The average turbidity reading was higher during the spring sampling (2.6 NTU) than was observed during the summer or fall periods (1.8 and 1.6 NTUs, respectively).

Table 5–1. Sample unit habitat type and location for the spring, summer and fall Lowell impoundment fish community survey

Season	Sample Unit	Mesohabitat Type	Upstream		Downstream		Efish Bank
			Latitude	Longitude	Latitude	Longitude	
Spring	LIMP_002	Run	42.88173	-71.47036	42.87818	-71.47409	W
	LIMP_004	Run	42.87414	-71.47563	42.87073	-71.47963	E
	LIMP_005	Pool	42.87073	-71.47963	42.86747	-71.48384	W
	LIMP_012	Pool	42.84162	-71.48371	42.83729	-71.48473	E
	LIMP_015	Pool	42.82889	-71.48038	42.82455	-71.47880	E
	LIMP_016	Run	42.82455	-71.47880	42.82055	-71.47999	W
	LIMP_017	Impoundment	42.82055	-71.47999	42.81789	-71.47512	W
	LIMP_021	Impoundment	42.80479	-71.47225	42.80101	-71.46898	W
	LIMP_027	Impoundment	42.78203	-71.45706	42.77753	-71.45706	W
	LIMP_049	Impoundment	42.69368	-71.42215	42.69125	-71.41704	W
	LIMP_050	Impoundment	42.69125	-71.41704	42.68765	-71.41352	W
	LIMP_069	Impoundment	42.63767	-71.36403	42.63851	-71.35805	W
Summer	LIMP_001	Run	42.88500	-71.46616	42.88173	-71.47036	W
	LIMP_002	Run	42.88173	-71.47036	42.87818	-71.47409	W
	LIMP_006	Pool	42.86747	-71.48384	42.86341	-71.48632	E
	LIMP_011	Pool	42.84596	-71.48228	42.84162	-71.48371	E
	LIMP_014	Pool	42.83315	-71.48236	42.82889	-71.48038	W
	LIMP_020	Impoundment	42.80909	-71.47339	42.80479	-71.47225	E
	LIMP_021	Impoundment	42.80479	-71.47225	42.80101	-71.46898	E
	LIMP_042	Impoundment	42.72045	-71.43789	42.71597	-71.43723	W
	LIMP_045	Impoundment	42.70703	-71.43625	42.70288	-71.43394	W
	LIMP_056	Impoundment	42.67057	-71.41675	42.66851	-71.41135	E
	LIMP_065	Impoundment	42.64835	-71.37998	42.64423	-71.37771	E
	LIMP_068	Impoundment	42.63777	-71.37011	42.63767	-71.36403	E
Fall	LIMP_002	Run	42.88173	-71.47036	42.87818	-71.47409	E
	LIMP_003	Run	42.87818	-71.47409	42.87414	-71.47563	W
	LIMP_005	Pool	42.87073	-71.47963	42.86747	-71.48384	W
	LIMP_011	Pool	42.84596	-71.48228	42.84162	-71.48371	E
	LIMP_015	Pool	42.82889	-71.48038	42.82455	-71.47880	W
	LIMP_023	Impoundment	42.79761	-71.46500	42.79481	-71.46027	W
	LIMP_037	Impoundment	42.74124	-71.43966	42.73705	-71.43771	E
	LIMP_044	Impoundment	42.71149	-71.43696	42.70703	-71.43625	W
	LIMP_058	Impoundment	42.66630	-71.40605	42.66252	-71.40286	W
	LIMP_060	Impoundment	42.65840	-71.40047	42.65406	-71.39903	W
	LIMP_061	Impoundment	42.65406	-71.39903	42.64990	-71.39711	E
	LIMP_067	Impoundment	42.64024	-71.37510	42.63777	-71.37011	E

Table 5–2. Impoundment boat electrofish effort for the spring, summer and fall Lowell impoundment fish community survey

Season	Sample Unit	Sample			No. Amps	No. Netters	No. Runs
		Date	Time	Duration (Sec)			
Spring	LIMP_002	6/24/2019	21:01	753	4	2	1
	LIMP_004	6/24/2019	22:04	956	4	2	1
	LIMP_005	6/24/2019	23:29	741	4	2	1
	LIMP_012	6/25/2019	0:37	782	4	2	1
	LIMP_015	6/26/2019	22:31	907	4	2	1
	LIMP_016	6/26/2019	21:49	968	4	2	1
	LIMP_017	6/26/2019	21:01	1001	4	2	1
	LIMP_021	6/26/2019	23:30	833	4	2	1
	LIMP_027	6/26/2019	1:25	888	4	2	1
	LIMP_049	6/25/2019	23:56	909	4	2	1
	LIMP_050	6/25/2019	22:42	842	4	2	1
	LIMP_069	6/25/2019	21:26	837	4	2	1
Summer	LIMP_001	8/19/2019	20:38	851	4	2	1
	LIMP_002	8/19/2019	21:44	722	4	2	1
	LIMP_006	8/19/2019	22:54	775	4	2	1
	LIMP_011	8/20/2019	0:02	959	4	2	1
	LIMP_014	8/21/2019	22:02	837	4	2	1
	LIMP_020	8/21/2019	20:56	841	4	2	1
	LIMP_021	8/21/2019	20:20	729	4	2	1
	LIMP_042	8/21/2019	0:17	903	4	2	1
	LIMP_045	8/20/2019	23:32	852	4	2	1
	LIMP_056	8/20/2019	22:22	815	4	2	1
	LIMP_065	8/20/2019	21:35	881	4	2	1
	LIMP_068	8/20/2019	20:21	812	4	2	1
Fall	LIMP_002	10/29/2019	16:54	839	4	2	1
	LIMP_003	10/29/2019	18:02	834	4	2	1
	LIMP_005	10/29/2019	20:02	814	4	2	1
	LIMP_011	10/29/2019	21:11	939	4	2	1
	LIMP_015	10/29/2019	21:48	842	4	2	1
	LIMP_023	10/29/2019	22:45	946	4	2	1
	LIMP_037	10/30/2019	18:39	835	4	2	1
	LIMP_044	10/30/2019	17:45	942	4	2	1
	LIMP_058	10/28/2019	17:54	900	4	2	1
	LIMP_060	10/28/2019	18:24	1140	4	2	1
	LIMP_061	10/28/2019	19:00	1080	4	2	1
	LIMP_067	10/28/2019	20:00	1140	4	2	1

Table 5–3. Impoundment experimental gill net effort for the spring, summer and fall Lowell impoundment fish community survey

Season	Sample Unit	Sample			Set Location	
		Date	Time	Duration (hr)	Latitude	Longitude
Spring	LIMP_002	6/24/2019	20:49	4.3	42.87818	71.47409
	LIMP_004	6/24/2019	21:02	4.3	42.87054	71.47924
	LIMP_005	6/24/2019	21:09	4.6	42.86747	71.48384
	LIMP_012	6/24/2019	21:30	4.7	42.83729	71.48472
	LIMP_015	6/26/2019	21:02	4.1	42.82588	71.47865
	LIMP_016	6/26/2019	21:14	4.2	42.82069	71.47828
	LIMP_017	6/26/2019	21:24	4.3	42.81857	71.47600
	LIMP_021	6/26/2019	21:35	4.4	42.80157	71.46944
	LIMP_027	6/25/2019	22:22	4.2	42.77752	71.45763
	LIMP_049	6/25/2019	21:55	4.1	42.69118	71.41750
	LIMP_050	6/25/2019	21:47	4.0	42.68747	71.41373
	LIMP_069	6/25/2019	21:18	4.1	42.63792	71.35815
Summer	LIMP_001	8/19/2019	20:33	4.7	42.88173	71.47036
	LIMP_002	8/19/2019	21:04	4.5	42.87818	71.47409
	LIMP_006	8/19/2019	21:30	4.4	42.86341	71.48632
	LIMP_011	8/19/2019	21:54	4.5	42.84162	71.48371
	LIMP_014	8/21/2019	20:20	4.1	42.82890	71.48038
	LIMP_020	8/21/2019	19:52	5.2	42.80479	71.47225
	LIMP_021	8/21/2019	19:44	5.6	42.80101	71.46984
	LIMP_042	8/20/2019	21:58	5.7	42.71597	71.43723
	LIMP_045	8/20/2019	21:42	5.6	42.70288	71.43394
	LIMP_056	8/20/2019	21:10	5.6	42.66851	71.41135
	LIMP_065	8/20/2019	20:39	5.7	42.64423	71.37771
	LIMP_068	8/20/2019	20:18	5.4	42.63767	71.36403
Fall	LIMP_002	10/29/2019	17:50	4.2	42.87818	71.47409
	LIMP_003	10/29/2019	18:06	4.3	42.87414	71.47563
	LIMP_005	10/29/2019	18:15	4.7	42.86747	71.48384
	LIMP_011	10/29/2019	18:35	5.0	42.84162	71.48371
	LIMP_015	10/29/2019	18:50	5.3	42.82455	71.47880
	LIMP_023	10/30/2019	17:41	4.0	42.79481	71.46027
	LIMP_037	10/30/2019	18:01	4.2	42.73705	71.43771
	LIMP_044	10/30/2019	18:16	4.5	42.70703	71.43625
	LIMP_058	10/28/2019	17:48	4.0	42.66252	71.40286
	LIMP_060	10/28/2019	18:06	4.1	42.65406	71.39903
	LIMP_061	10/28/2019	18:13	4.2	42.64990	71.39711
	LIMP_067	10/28/2019	18:29	4.3	42.63777	71.37011

Table 5–4. Impoundment minnow trap effort for the spring, summer and fall Lowell impoundment fish community survey

Season	Sample Unit	Sample			Set Location	
		Date	Time	Duration (hr)	Latitude	Longitude
Spring	LIMP_002	6/24/2019	23:05	1.9	42.87818	71.47409
	LIMP_004	6/24/2019	22:29	3.1	42.87073	71.47963
	LIMP_005	6/24/2019	22:11	3.6	42.86747	71.48384
	LIMP_012	6/24/2019	21:30	4.8	42.83729	71.48472
	LIMP_015	6/25/2019	22:23	4.0	42.77731	71.45747
	LIMP_016	6/25/2019	21:56	4.1	42.69115	71.41727
	LIMP_017	6/25/2019	21:48	4.0	42.68721	71.41364
	LIMP_021	6/25/2019	21:22	4.0	42.63770	71.35809
	LIMP_027	6/26/2019	21:02	4.1	42.82511	71.47849
	LIMP_049	6/26/2019	21:15	4.2	42.82085	71.47791
	LIMP_050	6/26/2019	21:26	4.1	42.81836	71.47588
	LIMP_069	6/26/2019	21:36	4.2	42.80159	71.46933
Summer	LIMP_001	8/19/2019	22:42	2.8	42.88173	71.47036
	LIMP_002	8/19/2019	22:36	3.0	42.87818	71.47409
	LIMP_006	8/19/2019	22:20	3.7	42.86341	71.48632
	LIMP_011	8/19/2019	21:59	4.4	42.84162	71.48371
	LIMP_014	8/21/2019	20:22	4.0	42.82890	71.48038
	LIMP_020	8/21/2019	19:53	5.1	42.80479	71.47225
	LIMP_021	8/21/2019	19:46	5.5	42.80101	71.46984
	LIMP_042	8/20/2019	22:04	5.5	42.71597	71.43723
	LIMP_045	8/20/2019	21:45	5.5	42.70288	71.43394
	LIMP_056	8/20/2019	21:13	5.6	42.66851	71.41135
	LIMP_065	8/20/2019	22:48	3.5	42.64423	71.37771
	LIMP_068	8/20/2019	20:22	2.3	42.63767	71.36403
Fall	LIMP_002	10/29/2019	17:52	4.1	42.87818	71.47409
	LIMP_003	10/29/2019	18:07	4.2	42.87414	71.47563
	LIMP_005	10/29/2019	18:17	4.7	42.86747	71.48384
	LIMP_011	10/29/2019	18:37	5.0	42.84162	71.48371
	LIMP_015	10/29/2019	18:52	5.2	42.82455	71.47880
	LIMP_023	10/30/2019	17:42	4.0	42.79481	71.46027
	LIMP_037	10/30/2019	18:02	4.2	42.73705	71.43771
	LIMP_044	10/30/2019	18:18	4.4	42.70703	71.43625
	LIMP_058	10/28/2019	17:50	4.2	42.66252	71.40286
	LIMP_060	10/28/2019	18:04	4.2	42.65406	71.39903
	LIMP_061	10/28/2019	18:15	4.1	42.64990	71.39711
	LIMP_067	10/28/2019	18:31	4.2	42.63777	71.37011

Table 5–5. Number of fish captured upstream of Pawtucket Dam by boat electrofishing and experimental gill net during the spring, summer and fall sampling, 2019

Common Name	Spring	Summer	Fall	2019
	N	N	N	N
Alewife	0	21	92	113
American Eel	6	10	1	17
Black Crappie	2	2	1	5
Bluegill	24	77	21	122
Channel Catfish	0	1	0	1
Common Carp	1	3	1	5
Fallfish	34	34	75	143
Golden Shiner	1	5	7	13
Largemouth Bass	2	32	7	41
Lepomis spp.	1	3	0	4
Margined Madtom	3	5	1	9
Pumpkinseed	10	126	19	155
Redbreast Sunfish	137	196	45	378
Rock Bass	3	2	2	7
Sea Lamprey	7	6	8	21
Smallmouth Bass	127	50	50	227
Spottail Shiner	160	79	185	424
Tessellated Darter	14	14	3	31
Walleye	0	1	0	1
White Perch	0	1	0	1
White Sucker	24	9	22	55
Yellow Bullhead	7	42	5	54
Yellow Perch	16	3	1	20
Total	**579**	**722**	**546**	**1847**

Table 5–6. Percent composition of fish captured upstream of Pawtucket Dam by boat electrofishing and experimental gill net during the spring, summer and fall sampling, 2019

Common Name	Spring	Summer	Fall	2019
	Pct.	Pct.	Pct.	Pct.
Alewife	<0.1	2.9	16.8	6.1
American Eel	1.0	1.4	0.2	0.9
Black Crappie	0.3	0.3	0.2	0.3
Bluegill	4.1	10.7	3.8	6.6
Channel Catfish	<0.1	0.1	<0.1	0.1
Common Carp	0.2	0.4	0.2	0.3
Fallfish	5.9	4.7	13.7	7.7
Golden Shiner	0.2	0.7	1.3	0.7
Largemouth Bass	0.3	4.4	1.3	2.2
Lepomis spp.	0.2	0.4	<0.1	0.2
Margined Madtom	0.5	0.7	0.2	0.5
Pumpkinseed	1.7	17.5	3.5	8.4
Redbreast Sunfish	23.7	27.1	8.2	20.5
Rock Bass	0.5	0.3	0.4	0.4
Sea Lamprey	1.2	0.8	1.5	1.1
Smallmouth Bass	21.9	6.9	9.2	12.3
Spottail Shiner	27.6	10.9	33.9	23.0
Tessellated Darter	2.4	1.9	0.5	1.7
Walleye	<0.1	0.1	<0.1	0.1
White Perch	<0.1	0.1	<0.1	0.1
White Sucker	4.1	1.2	4.0	3.0
Yellow Bullhead	1.2	5.8	0.9	2.9
Yellow Perch	2.8	0.4	0.2	1.1

Table 5–7. Number and percent composition of fish captured upstream of Pawtucket Dam by boat electrofishing and experimental gill net within impoundment, pool and run mesohabitat areas, 2019

Common Name	Impoundment		Pool		Run	
	N	Pct.	N	Pct.	N	Pct.
Alewife	104	9.9	4	1.3	5	1.0
American Eel	11	1.0	1	0.3	5	1.0
Black Crappie	1	0.1	3	1.0	1	0.2
Bluegill	87	8.2	28	9.0	7	1.5
Channel Catfish	1	0.1	0	0.0	0	0.0
Common Carp	4	0.4	0	0.0	1	0.2
Fallfish	66	6.3	37	11.9	40	8.3
Golden Shiner	3	0.3	6	1.9	4	0.8
Largemouth Bass	22	2.1	15	4.8	4	0.8
Lepomis spp.	2	0.2	1	0.3	1	0.2
Margined Madtom	6	0.6	2	0.6	1	0.2
Pumpkinseed	150	14.2	3	1.0	2	0.4
Redbreast Sunfish	255	24.2	39	12.6	84	17.4
Rock Bass	3	0.3	2	0.6	2	0.4
Sea Lamprey	11	1.0	5	1.6	5	1.0
Smallmouth Bass	132	12.5	35	11.3	60	12.4
Spottail Shiner	113	10.7	88	28.4	223	46.3
Tessellated Darter	14	1.3	11	3.5	6	1.2
Walleye	1	0.1	0	0.0	0	0.0
White Perch	1	0.1	0	0.0	0	0.0
White Sucker	21	2.0	12	3.9	22	4.6
Yellow Bullhead	42	4.0	6	1.9	6	1.2
Yellow Perch	5	0.5	12	3.9	3	0.6
Total	**1055**	**100.0**	**310**	**100.0**	**482**	**100.0**

Table 5–8. Number of fish captured upstream of Pawtucket Dam by boat electrofishing or experimental gill net during spring, summer, and fall, 2019

Common Name	Boat Efish				Gill Net			
	Spring	Summer	Fall	Total	Spring	Summer	Fall	Total
Alewife	0	19	92	111	0	2	0	2
American Eel	6	10	1	17	0	0	0	0
Black Crappie	2	2	1	5	0	0	0	0
Bluegill	23	77	21	121	1	0	0	1
Channel Catfish	0	0	0	0	0	1	0	1
Common Carp	1	2	1	4	0	1	0	1
Fallfish	33	32	75	140	1	2	0	3
Golden Shiner	1	4	7	12	0	1	0	1
Largemouth Bass	2	32	7	41	0	0	0	0
Lepomis spp.	1	3	0	4	0	0	0	0
Margined Madtom	2	5	1	8	1	0	0	1
Pumpkinseed	10	125	19	154	0	1	0	1
Redbreast Sunfish	137	191	45	373	0	5	0	5
Rock Bass	3	2	2	7	0	0	0	0
Sea Lamprey	7	6	8	21	0	0	0	0
Smallmouth Bass	126	46	50	222	1	4	0	5
Spottail Shiner	159	79	184	422	1	0	1	2
Tessellated Darter	14	14	3	31	0	0	0	0
Walleye	0	0	0	0	0	1	0	1
White Perch	0	1	0	1	0	0	0	0
White Sucker	22	7	22	51	2	2	0	4
Yellow Bullhead	7	19	3	29	0	23	2	25
Yellow Perch	16	1	1	18	0	2	0	2
Total	**572**	**677**	**543**	**1792**	**7**	**45**	**3**	**55**

Table 5–9. Catch per unit of effort for fish captured upstream of Pawtucket Dam by boat electrofishing during spring, summer, and fall, 2019

Common Name	Spring		Summer		Fall		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
Alewife	0.00	0.00	1.39	0.06	10.15	0.61	3.85	0.23
American Eel	0.53	0.03	2.17	0.09	<0.01	<0.01	0.90	0.04
Black Crappie	0.53	0.02	0.23	0.01	0.31	0.01	0.36	0.02
Bluegill	3.04	0.14	9.13	0.43	3.15	0.15	5.11	0.24
Common Carp	0.07	<0.01	0.76	0.03	0.13	0.01	0.32	0.01
Fallfish	7.27	0.34	6.43	0.28	14.09	0.65	9.26	0.43
Golden Shiner	0.06	<0.01	0.75	0.03	1.66	0.07	0.82	0.04
Largemouth Bass	0.34	0.02	4.28	0.20	1.43	0.06	2.02	0.09
Lepomis spp.	0.07	<0.01	0.92	0.04	0.00	0.00	0.33	0.01
Margined Madtom	0.37	0.02	1.06	0.05	0.12	0.01	0.52	0.02
Pumpkinseed	0.80	0.04	9.60	0.44	2.13	0.13	4.18	0.20
Redbreast Sunfish	22.79	1.05	35.24	1.55	5.52	0.29	21.18	0.96
Rock Bass	1.19	0.05	0.24	0.01	0.10	0.01	0.51	0.02
Sea Lamprey	1.63	0.08	0.42	0.02	1.20	0.06	1.08	0.06
Smallmouth Bass	25.51	1.16	9.26	0.42	5.58	0.29	13.45	0.62
Spottail Shiner	35.29	1.55	25.94	1.12	8.30	0.37	23.17	1.01
Tessellated Darter	3.02	0.14	1.56	0.07	0.12	0.01	1.57	0.07
White Perch	0.00	0.00	0.08	0.00	0.00	0.00	0.03	0.00
White Sucker	4.19	0.21	1.27	0.06	2.46	0.12	2.64	0.13
Yellow Bullhead	0.90	0.05	2.00	0.09	0.52	0.03	1.14	0.05
Yellow Perch	4.66	0.20	0.21	0.01	<0.01	<0.01	1.62	0.07

Table 5–10. Catch per unit of effort for fish captured upstream of Pawtucket Dam by experimental gill net during spring, summer, and fall, 2019

Common Name	Spring	Summer	Fall	Total
	Fish/hr	Fish/hr	Fish/hr	Fish/hr
Alewife	<0.01	0.01	0.00	0.00
Bluegill	0.02	<0.01	<0.01	0.01
Channel Catfish	<0.01	0.00	<0.01	<0.01
Common Carp	<0.01	0.00	<0.01	<0.01
Fallfish	0.00	0.01	<0.01	0.01
Golden Shiner	<0.01	0.03	<0.01	0.01
Margined Madtom	0.00	<0.01	<0.01	<0.01
Pumpkinseed	<0.01	0.00	<0.01	<0.01
Redbreast Sunfish	<0.01	0.02	<0.01	0.01
Smallmouth Bass	0.00	0.01	<0.01	0.01
Spottail Shiner	0.03	<0.01	0.02	0.02
Walleye	<0.01	0.00	<0.01	<0.01
White Sucker	0.02	0.01	<0.01	0.01
Yellow Bullhead	<0.01	0.08	0.04	0.04
Yellow Perch	<0.01	0.01	<0.01	<0.01

Table 5–11. Minimum, mean, and maximum total length (mm) and weight (g) for fish captured upstream of Pawtucket Dam by boat electrofish and experimental gill net sampling during spring, summer, and fall, 2019

Sampling Gear	Common Name	No. Individuals	Total Length (mm)			Total Weight (g)		
			Min.	Mean	Max.	Min.	Mean	Max.
Boat Electrofish	Alewife	111	59	69	104	1	4	102
	American Eel	17	225	459	670	20	236	535
	Black Crappie	5	84	133	155	8	36	49
	Bluegill	121	47	110	220	1	38	255
	Common Carp	4	429	662	793	1350	4813	6500
	Fallfish	140	55	127	310	2	28	335
	Golden Shiner	12	80	120	208	6	23	73
	Largemouth Bass	41	57	141	382	2	108	900
	Margined Madtom	8	82	102	138	4	9	23
	Pumpkinseed	154	57	97	150	3	27	685
	Redbreast Sunfish	373	38	113	190	1	35	160
	Rock Bass	7	121	157	189	41	86	140
	Sea Lamprey	21	90	127	174	1	4	8
	Smallmouth Bass	222	64	158	494	3	93	1450
	Spottail Shiner	422	49	93	126	1	11	840
	Tessellated Darter	31	39	65	80	1	3	5
	White Perch	1	69	69	69	5	5	5
	White Sucker	51	84	310	520	7	600	1800
	Yellow Bullhead	29	104	183	297	15	95	310
	Yellow Perch	18	80	156	287	5	75	325
Gill Net	Alewife	2	101	101	101	11	12	12
	Bluegill	1	136	136	136	52	52	52
	Channel Catfish	1	296	296	296	290	290	290
	Common Carp	1	552	552	552	2400	2400	2400
	Fallfish	3	219	299	354	120	353	540
	Golden Shiner	1	95	95	95	9	9	9
	Margined Madtom	1	114	114	114	14	14	14
	Pumpkinseed	1	173	173	173	115	115	115
	Redbreast Sunfish	5	131	150	180	45	63	99
	Smallmouth Bass	5	178	217	270	80	132	240
	Spottail Shiner	2	110	118	125	15	18	20
	Walleye	1	630	630	630	2800	2800	2800
	White Sucker	4	358	398	430	550	788	950
	Yellow Bullhead	25	160	202	254	49	122	240
	Yellow Perch	2	178	223	268	70	175	280

Table 5–12. Physical habitat measurements recorded for sample units upstream of Pawtucket Dam during spring, summer, and fall, 2019

Season	Mesohabitat Type	Sample Unit	Habitat Parameter			
			Dominant Substrate	Pct. SAV	Pct. Cover	Mean Depth (ft)
Spring	Run	LIMP-002	Sand-Silt-Clay	0-25%	0-25%	16.3
	Run	LIMP-004	Sand-Silt-Clay	0-25%	0-25%	9.7
	Pool	LIMP-005	Sand-Silt-Clay	0-25%	0-25%	9.4
	Pool	LIMP-012	Sand-Silt-Clay	0-25%	0-25%	9.6
	Pool	LIMP-015	Sand-Silt-Clay	0-25%	0-25%	8.8
	Run	LIMP-016	Sand-Silt-Clay	0-25%	0-25%	6.4
	Impoundment	LIMP-017	Sand-Silt-Clay	0-25%	0-25%	8.4
	Impoundment	LIMP-021	Sand-Silt-Clay	0-25%	0-25%	11.6
	Impoundment	LIMP-027	Sand-Silt-Clay	0-25%	0-25%	6.8
	Impoundment	LIMP-049	Sand-Silt-Clay	0-25%	0-25%	14.6
	Impoundment	LIMP-050	Sand-Silt-Clay	0-25%	0-25%	12.6
	Impoundment	LIMP-069	Sand-Silt-Clay	0-25%	0-25%	16.1
Summer	Run	LIMP-001	Sand-Silt-Clay	0-25%	0-25%	11.0
	Run	LIMP-002	Sand-Silt-Clay	0-25%	0-25%	16.3
	Pool	LIMP-006	Sand-Silt-Clay	25-50%	0-25%	6.9
	Pool	LIMP-011	Sand-Silt-Clay	0-25%	0-25%	8.5
	Pool	LIMP-014	Sand-Silt-Clay	0-25%	0-25%	5.9
	Impoundment	LIMP-020	Sand-Silt-Clay	0-25%	0-25%	8.7
	Impoundment	LIMP-021	Sand-Silt-Clay	0-25%	0-25%	11.6
	Impoundment	LIMP-042	Sand-Silt-Clay	0-25%	0-25%	13.7
	Impoundment	LIMP-045	Sand-Silt-Clay	0-25%	0-25%	17.3
	Impoundment	LIMP-056	Sand-Silt-Clay	0-25%	0-25%	19.2
	Impoundment	LIMP-065	Sand-Silt-Clay	0-25%	0-25%	17.4
	Impoundment	LIMP-068	-	-	-	17.0
Fall	Run	LIMP-002	Sand-Silt-Clay	0-25%	0-25%	16.3
	Run	LIMP-003	Sand-Silt-Clay	0-25%	0-25%	6.4
	Pool	LIMP-005	Sand-Silt-Clay	0-25%	0-25%	9.4
	Pool	LIMP-011	Sand-Silt-Clay	0-25%	0-25%	8.5
	Pool	LIMP-015	Sand-Silt-Clay	0-25%	0-25%	8.8
	Impoundment	LIMP-023	Sand-Silt-Clay	0-25%	0-25%	9.7
	Impoundment	LIMP-037	Sand-Silt-Clay	0-25%	0-25%	14.8
	Impoundment	LIMP-044	Sand-Silt-Clay	0-25%	0-25%	19.8
	Impoundment	LIMP-058	Sand-Silt-Clay	0-25%	0-25%	13.4
	Impoundment	LIMP-060	Sand-Silt-Clay	0-25%	0-25%	14.7
	Impoundment	LIMP-061	Sand-Silt-Clay	0-25%	0-25%	17.4
	Impoundment	LIMP-067	Sand-Silt-Clay	0-25%	0-25%	14.3

Table 5–13. Water quality parameters recorded upstream of Pawtucket Dam during spring, summer, and fall, 2019

Season	Mesohabitat Type	Sample Unit	Water Quality Parameter				
			Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µs/cm)	pH	Turbidity (NTU)
Spring	Run	LIMP-002	21.6	8.8	98.0	7.4	1.6
	Run	LIMP-004	21.4	8.7	100.0	6.6	2.5
	Pool	LIMP-005	21.5	8.8	97.0	6.6	2.2
	Pool	LIMP-012	21.6	8.9	99.0	6.7	2.4
	Pool	LIMP-015	22.1	8.7	114.0	6.5	3.1
	Run	LIMP-016	22.0	9.0	112.0	6.5	3.7
	Impoundment	LIMP-017	22.0	8.8	114.0	6.6	2.2
	Impoundment	LIMP-021	21.9	8.7	120.0	6.6	3.2
	Impoundment	LIMP-027	20.8	8.6	115.0	6.7	2.5
	Impoundment	LIMP-049	20.6	8.5	133.0	6.6	2.7
	Impoundment	LIMP-050	20.7	8.5	131.0	6.6	3.5
	Impoundment	LIMP-069	21.2	8.4	139.0	6.6	2.0
Summer	Run	LIMP-001	26.0	8.3	169.0	7.5	1.9
	Run	LIMP-002	26.0	8.3	169.0	7.5	1.9
	Pool	LIMP-006	25.9	8.3	166.0	7.5	1.9
	Pool	LIMP-011	25.5	8.1	171.0	7.3	1.9
	Pool	LIMP-014	25.2	8.1	169.0	7.0	1.8
	Impoundment	LIMP-020	25.4	8.2	176.0	6.8	1.8
	Impoundment	LIMP-021	25.4	8.3	180.0	6.8	1.8
	Impoundment	LIMP-042	25.8	8.4	191.0	6.9	1.7
	Impoundment	LIMP-045	25.7	8.4	187.0	6.7	1.6
	Impoundment	LIMP-056	25.7	8.8	199.0	6.9	1.6
	Impoundment	LIMP-065	25.7	8.6	195.0	6.9	1.6
	Impoundment	LIMP-068	25.4	8.4	195.0	6.9	1.5
Fall	Run	LIMP-002	10.3	11.1	91.0	6.5	2.2
	Run	LIMP-003	10.4	11.1	91.0	6.6	2.1
	Pool	LIMP-005	10.4	11.1	92.0	6.7	2.0
	Pool	LIMP-011	10.5	11.1	95.0	6.9	2.0
	Pool	LIMP-015	10.5	11.0	96.0	7.4	1.9
	Impoundment	LIMP-023	10.8	10.9	96.0	6.9	2.2
	Impoundment	LIMP-037	11.0	10.8	125.0	7.0	1.8
	Impoundment	LIMP-044	10.9	10.6	123.0	7.1	1.9
	Impoundment	LIMP-058	11.2	10.1	145.0	7.2	0.9
	Impoundment	LIMP-060	11.2	10.1	146.0	7.2	1.0
	Impoundment	LIMP-061	11.3	10.0	152.0	7.2	0.9
	Impoundment	LIMP-067	11.5	9.8	151.0	7.3	0.8

5.2 Lowell Bypassed Reach

5.2.1 Habitat Evaluation and Sample Unit Selection

Changes in general habitat types within the Lowell bypassed reach were visually identified and marked in ArcGIS. The approximately 0.75 mile reach downstream of Pawtucket Dam was subdivided into a total of 23, 55-yard (50-meter) segments. The bypassed reach was subdivided into habitat classifications associated with the upper chute (i.e., the area between Pawtucket Dam and School Street Bridge), pooled section immediately downstream of the School Street Bridge, ledge channel area in the vicinity of the University Avenue Bridge, and the lower bypassed reach downstream of the power canal surge gate. Site conditions were considered inappropriate or unsafe for sampling in the upper chute reach and downstream of the spill gate. As a result back pack electrofish sampling in the bypassed reach occurred within the two middle reaches. Sampling locations were randomly selected on a seasonal basis. The spatial distribution of habitat classifications and 50-m segments within the 0.75 mile bypassed reach is provided in Appendix C.

Table 5-14 provides a listing of the habitat units downstream of the Pawtucket Dam and within the Lowell bypassed reach that were randomly selected for sampling during the spring, summer, and fall periods of 2019. A total of three, 50-m segments were selected per season.

5.2.2 Sampling Effort

Fish community data were collected from a total of 12, 50-m sample units during the spring, summer, and fall of 2019 (12 sites per season). Effort expended at a sample unit during each of the three seasons consisted of an approximately 50-m back pack electrofish sample. Fish community sampling in the Lowell bypassed reach occurred on June 28 (spring), August 27 (summer) and October 21 (fall). Table 5-15 provides a summary of the back pack electrofish sampling in the Lowell bypassed reach. Bypassed reach sample units selected by season are presented visually in Appendix C.

5.2.3 Species Richness and Composition

A total of 526 individuals representing fourteen fish species were collected during back pack electrofishing efforts within the Lowell bypassed reach during 2019 when all sampling seasons and sample units are considered (Table 5-16). Table 5-17 provides a summary of the bypassed reach community composition by season. Fallfish (39.9%), smallmouth bass (20.3%) and spottail shiner (16.7%) were the three most numerically abundant species within the Lowell bypassed reach during the 2019 sampling. When examined by species, spottail shiner were most abundant during the spring (48.8%), fallfish during the summer (55.0%) and fallfish during the fall (39.9%).

Total catch and community composition from sampling units within the pooled and ledge channel sections of the bypassed reach downstream of Pawtucket Dam are presented in Table 5-18. Fallfish were the most abundant fish species collected within the pooled habitat within the Lowell bypassed reach and downstream of Pawtucket Dam, representing 47% of the total catch. Fish catch from the ledge channel habitat located in the lower portion of the bypassed

reach was dominated by smallmouth bass which represented 60.6% of the total catch from that area. American eel represented 13.8% of the total electrofish catch from the ledge channel habitat within the Lowell bypassed reach.

5.2.4 Relative Abundance

CPUE values for back pack electrofish sampling within the Lowell bypassed reach downstream of Pawtucket Dam were standardized to a fixed unit of time or distance using the equations and methods provided in Section 5.1.4. Catch rates were highest for smallmouth bass, fallfish, and spottail shiner captured by back pack electrofish sampling in the 0.75 mile bypassed reach downstream of Pawtucket Dam during the 2019 sampling (Table 5-19). Values for fish per unit of effort were highest for spottail shiner and fallfish during the spring sampling event, fallfish and smallmouth bass during the summer sampling event and smallmouth bass and redbreast sunfish during the fall sampling event. A listing of CPUE rates for all species by season and habitat type is provided in Appendix D.

5.2.5 Biocharacteristics

Length frequency distributions for fish species where 25 or more individuals were collected and measured during the bypassed reach sampling are presented in Appendix E. The observed range for fish sizes recorded for species observed in the back pack electrofish catch from the reach downstream of the Pawtucket Dam fall within the expected bounds for those species in the northeastern U.S. (Table 5-11). A full listing of catch data is provided in Appendix F.

5.2.6 Habitat and Water Quality Characteristics

Tables 5-21 and 5-22 provide summaries of habitat and water quality information recorded for each of the 9, 50-m sample units surveyed within the Lowell bypassed reach during the spring, summer and fall seasons. A range of substrate types was sampled during each of the three seasons, ranging from areas of boulders to sand-silt-clay habitat. Sampled areas within the Lowell bypassed reach downstream of Pawtucket Dam were characterized by the presence of SAV over 0-25% of the sample area and the presence of general cover over 0-25% of the sample area. Mean water depth (as measured at quarter points of the electrofished area at the upper, middle, and lower points of each transect) was consistent among sample areas and season, ranging from 1.5-2.4 feet.

Water temperature was relatively consistent among sample units within each season[1] and averaged 22.9°C during the spring sampling, 23.8°C during the summer sampling, and 13.1°C during the fall sampling. Dissolved oxygen was measured at 8.9 mg/L or greater at all bypassed reach stations downstream of Pawtucket Dam regardless of season. Conductivity averaged 148 µs/cm during the spring sampling, 194 µs/cm during the summer sampling, and 100 µs/cm during the fall sampling. The average river pH in the bypassed reach was higher during the summer sampling event (7.8) than was observed during the spring (6.5) or fall (6.6).

[1] Water quality readings were available at only sample unit LBYP-011 during the spring event due to a malfunction with the meter handset during sampling.

Table 5–14. Sample unit habitat type and location for the spring, summer and fall Lowell bypassed reach fish community survey

Season	Sample Unit	Mesohabitat Type	Upstream		Downstream		Efish Bank
			Latitude	Longitude	Latitude	Longitude	
	LBYP-011	Ledge Channels	42.65102	-71.32619	42.65094	-71.32679	West
	LBYP-013	Pooled Section	42.65087	-71.32739	42.65080	-71.32800	West
Spring	LBYP-017	Pooled Section	42.65038	-71.32970	42.65007	-71.33015	West
	LBYP-011	Ledge Channels	42.65102	-71.32619	42.65094	-71.32679	West
	LBYP-014	Pooled Section	42.65080	-71.32800	42.65070	-71.32859	West
Summer	LBYP-018	Pooled Section	42.65007	-71.33015	42.64977	-71.33059	West
	LBYP-011	Ledge Channels	42.65102	-71.32619	42.65094	-71.32679	West
	LBYP-013	Pooled Section	42.65087	-71.32739	42.65080	-71.32800	West
Fall	LBYP-016	Pooled Section	42.65058	-71.32918	42.65038	-71.32970	West

Table 5–15. Back pack electrofish effort for the spring, summer and fall Lowell bypassed reach fish community survey

Season	Sample Unit	Sample			Settings (V/Hz)	No. Netters	No. Runs
		Date	Time	Duration (Sec)			
	LBYP-011	6/28/2019	11:11	1270	550/100	4	1
	LBYP-013	6/28/2019	9:50	978	550/100	4	1
Spring	LBYP-017	6/28/2019	12:47	1068	550/100	4	1
	LBYP-011	8/27/2019	9:55	1048	550/100	4	1
	LBYP-014	8/27/2019	11:23	887	550/100	4	1
Summer	LBYP-018	8/27/2019	13:25	917	550/100	4	1
	LBYP-011	10/21/2019	12:02	1089	550/100	4	1
	LBYP-013	10/21/2019	11:06	922	550/100	4	1
Fall	LBYP-016	10/21/2019	9:54	1033	550/100	4	1

Table 5–16. Number of fish captured within the bypassed reach downstream of Pawtucket Dam by back pack electrofishing during the spring, summer and fall sampling, 2019

Common Name	Spring	Summer	Fall	2019
	N	N	N	N
American Eel	10	18	5	33
Bluegill	2	1	0	3
Brown Trout	1	0	0	1
Fallfish	22	187	1	210
Largemouth Bass	0	2	0	2
Lepomis spp.	0	0	1	1
Longnose Dace	1	0	1	2
Margined Madtom	1	2	14	17
Redbreast Sunfish	1	5	7	13
Sea Lamprey	0	0	1	1
Smallmouth Bass	2	37	68	107
Spottail Shiner	39	49	0	88
Tessellated Darter	1	5	4	10
White Sucker	0	30	3	33
Yellow Bullhead	0	4	1	5
Total	**80**	**340**	**106**	**526**

Table 5–17. Percent composition of fish captured within the bypassed reach downstream of Pawtucket Dam by back pack electrofishing during the spring, summer and fall sampling, 2019

Common Name	Spring	Summer	Fall	2019
	Pct.	Pct.	Pct.	Pct.
American Eel	12.5	5.3	4.7	6.3
Bluegill	2.5	0.3	0.0	0.6
Brown Trout	1.3	0.0	0.0	0.2
Fallfish	27.5	55.0	0.9	39.9
Largemouth Bass	0.0	0.6	0.0	0.4
Lepomis spp.	0.0	0.0	0.9	0.2
Longnose Dace	1.3	0.0	0.9	0.4
Margined Madtom	1.3	0.6	13.2	3.2
Redbreast Sunfish	1.3	1.5	6.6	2.5
Sea Lamprey	0.0	0.0	0.9	0.2
Smallmouth Bass	2.5	10.9	64.2	20.3
Spottail Shiner	48.8	14.4	0.0	16.7
Tessellated Darter	1.3	1.5	3.8	1.9
White Sucker	0.0	8.8	2.8	6.3
Yellow Bullhead	0.0	1.2	0.9	1.0

Table 5–18. Number and percent composition of fish captured within the bypassed reach downstream of Pawtucket Dam by back pack electrofishing within pooled and ledge channel habitat areas, 2019

Common Name	Pooled Section		Ledge Channels	
	N	Pct.	N	Pct.
American Eel	20	4.6	13	13.8
Bluegill	3	0.7	0	0.0
Brown Trout	0	0.0	1	1.1
Fallfish	203	47.0	7	7.4
Largemouth Bass	2	0.5	0	0.0
Lepomis spp.	1	0.2	0	0.0
Longnose Dace	0	0.0	2	2.1
Margined Madtom	16	3.7	1	1.1
Redbreast Sunfish	4	0.9	9	9.6
Sea Lamprey	1	0.2	0	0.0
Smallmouth Bass	50	11.6	57	60.6
Spottail Shiner	88	20.4	0	0.0
Tessellated Darter	9	2.1	1	1.1
White Sucker	30	6.9	3	3.2
Yellow Bullhead	5	1.2	0	0.0

Table 5–19. Catch per unit of effort for fish captured within the bypassed reach downstream of Pawtucket Dam by back pack electrofishing during spring, summer, and fall, 2019

Backpack E-Fish								
Common Name	Spring		Summer		Fall		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
American Eel	12.40	7.83	12.00	8.00	1.81	0.83	8.74	5.56
Bluegill	0.76	0.33	0.28	0.17	0.00	0.00	0.35	0.17
Brown Trout	1.48	1.00	0.00	0.00	0.00	0.00	0.49	0.33
Fallfish	20.65	11.17	48.72	31.17	0.36	0.17	23.24	14.17
Largemouth Bass	0.00	0.00	0.56	0.33	0.00	0.00	0.19	0.11
Lepomis spp.	0.00	0.00	0.00	0.00	0.84	0.33	0.28	0.11
Longnose Dace	1.48	1.00	0.00	0.00	1.48	1.00	0.98	0.67
Margined Madtom	1.48	1.00	0.52	0.33	6.03	2.67	2.68	1.33
Redbreast Sunfish	1.48	1.00	2.55	1.67	10.33	7.00	4.79	3.22
Sea Lamprey	0.00	0.00	0.00	0.00	0.84	0.33	0.28	0.11
Smallmouth Bass	2.95	2.00	40.15	27.00	63.33	38.17	35.48	22.39
Spottail Shiner	32.83	13.00	12.78	8.17	0.00	0.00	15.20	7.06
Tessellated Darter	0.38	0.17	2.52	1.67	1.93	0.83	1.61	0.89
White Sucker	0.00	0.00	7.83	5.00	4.43	3.00	4.09	2.67
Yellow Bullhead	0.00	0.00	1.11	0.67	0.36	0.17	0.49	0.28

Table 5–20. Minimum, mean, and maximum total length (mm) and weight (g) for fish captured within the bypassed reach downstream of Pawtucket Dam by back pack electrofish sampling during spring, summer, and fall, 2019

Common Name	No. Individuals	Total Length (mm)			Total Weight (g)		
		Min.	Mean	Max.	Min.	Mean	Max.
American Eel	33	100	285	550	2	78	325
Bluegill	3	35	107	175	1	50	120
Brown Trout	1	225	225	225	110	110	110
Fallfish	210	22	46	86	1	10	415
Largemouth Bass	2	69	72	75	5	6	7
Lepomis spp.	1	31	31	31	1	1	1
Longnose Dace	2	80	90	99	6	8	10
Margined Madtom	17	50	85	133	1	7	21
Redbreast Sunfish	13	37	165	395	1	53	180
Sea Lamprey	1	160	160	160	7	7	7
Smallmouth Bass	107	79	118	215	6	24	110
Spottail Shiner	88	40	75	97	1	8	180
Tessellated Darter	10	56	66	86	1	3	6
White Sucker	33	55	87	279	2	14	240
Yellow Bullhead	5	59	70	87	4	6	9

Table 5–21. Physical habitat measurements recorded for sample units within the bypassed reach downstream of Pawtucket Dam during spring, summer, and fall, 2019

Season	Habitat Type	Sample Unit	Habitat Parameter			
			Dominant Substrate	Pct. SAV	Pct. Cover	Mean Depth (ft)
Spring	Ledge Channels	LBYP-011	Boulder/Rip-Rap	0-25%	0-25%	1.5
	Pooled Section	LBYP-013	Cobble-Gravel	0-25%	0-25%	1.8
	Pooled Section	LBYP-017	Sand-Silt-Clay	0-25%	0-25%	1.7
Summer	Ledge Channels	LBYP-011	Boulder/Rip-Rap	0-25%	0-25%	1.5
	Pooled Section	LBYP-014	Cobble-Gravel	0-25%	0-25%	1.8
	Pooled Section	LBYP-018	Sand-Silt-Clay	0-25%	0-25%	2.4
Fall	Ledge Channels	LBYP-011	Boulder/Rip-Rap	0-25%	0-25%	1.5
	Pooled Section	LBYP-013	Cobble-Gravel	0-25%	0-25%	1.8
	Pooled Section	LBYP-016	Sand-Silt-Clay	0-25%	0-25%	1.6

Table 5–22. Water quality parameters recorded within the bypassed reach downstream of Pawtucket Dam during spring, summer, and fall, 2019

Season	Habitat Type	Sample Unit	Water Quality Parameter			
			Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µs/cm)	pH
Spring	Ledge Channels	LBYP-011	22.9	9.5	148	6.5
	Pooled Section	LBYP-013	*	*	*	*
	Pooled Section	LBYP-017	*	*	*	*
Summer	Ledge Channels	LBYP-011	23.4	9.6	191	7.4
	Pooled Section	LBYP-014	23.9	9.1	195	7.8
	Pooled Section	LBYP-018	24.1	9.4	197	8.1
Fall	Ledge Channels	LBYP-011	13.2	9.8	104	6.3
	Pooled Section	LBYP-013	13.1	8.9	102	6.6
	Pooled Section	LBYP-016	13.0	10.6	95	6.8

* Water quality readings were available at only sample unit LBYP-011 during the spring event due to a malfunction with the meter handset during sampling

5.3 Historic Data

As described in the Lowell relicensing Pre-Application Document (PAD), the Merrimack River is home to a diverse assemblage of fishes, including cold water and warm water species. Stolte (1982; as cited in the Technical Committee for Anadromous Fishery Management of the Merrimack River Basin [Technical Committee] 1997) noted that during the last 150 years, over 15 non-indigenous species such as largemouth bass, smallmouth bass, walleye, common carp, rainbow trout, brown trout, various catfish species and goldfish have established through human introductions within the Merrimack River. At that time, the Merrimack River was identified as home to approximately 50 species of fish, nine of which were anadromous. The slower moving, ponded reaches of the Merrimack contain a higher predominance of warm water species whereas those areas with higher gradient contain the majority of cold water species. Hartel et al. (2002) identified a total of 57 reproducing fish species within the drainage; 21 primary species (i.e., those living full life cycle in freshwater), 8 secondary species (i.e., those with physiological capacity to move between fresh and salt water), 18 introduced species, and 10 diadromous species.

Fish assemblage sampling within the Lowell impoundment and bypassed reach during the spring, summer and fall of 2019 resulted in the identification of 24 fish species (Table 5-23). Of those species, 21 are considered freshwater and 3 are considered as diadromous. Based on information presented in Hartel et al. (2002) species observed during the 2019 fish sampling considered to be native to the Merrimack River watershed in Massachusetts represented 53% of the total catch across all seasons (12 species, 1,249 individuals). Conversely, species classified by Hartel et al. (2002) as introduced to the Merrimack River watershed represented 47% of the total catch across all seasons (12 species, 1,119 individuals).

Table 5–23. Classifications for fish species recorded within the Lowell impoundment and bypassed reach downstream of Pawtucket Dam during spring, summer, and fall, 2019

Common Name	Freshwater Resident	Diadromous	Native	Introduced
Alewife		X	X	
American Eel		X	X	
Black Crappie	X			X
Bluegill	X			X
Brown Trout	X			X
Channel Catfish	X			X
Common Carp	X			X
Fallfish	X		X	
Golden Shiner	X		X	
Largemouth Bass	X			X
Longnose Dace	X		X	
Margined Madtom	X			X
Pumpkinseed	X		X	
Redbreast Sunfish	X		X	
Rock Bass	X			X
Sea Lamprey		X	X	
Smallmouth Bass	X			X
Spottail Shiner	X			X
Tessellated Darter	X		X	
Walleye	X			X
White Perch	X		X	
White Sucker	X		X	
Yellow Bullhead	X			X
Yellow Perch	X		X	

6 Summary

The Lowell RSP identified two specific objectives for the fish assemblage study including (1) sampling to describe the fish assemblage structure, distribution, and abundance within the Project affected area along spatial and temporal gradients, and (2) a comparison of historical records of species occurrence with observations from this study.

Fish community sampling was conducted over spatial (impoundment versus bypassed reach) and temporal (spring, summer, and fall) gradients during 2019. Within the Lowell impoundment, fish were collected from standardized 500-m transects using a stratified random sampling design where mesohabitat type (i.e., impoundment, run, pool) was used to stratify. Once sites were identified, impoundment sampling was conducted via nighttime boat electrofishing, experimental gill netting, and minnow traps. Fish community data were collected from a total of 36, 500-m sample units during the spring, summer, and fall of 2019 (12 sites per season). A total of 1,847 individuals representing twenty-two fish species were collected from the Lowell impoundment during 2019 when all sampling seasons and sample units are considered. Spottail shiner (23.0%), redbreast sunfish (20.5%) and smallmouth bass (12.3%) were the three most numerically abundant species within the Lowell impoundment during the 2019 sampling. Centrarchid species were the most abundant within impoundment habitat with redbreast sunfish (24.2%), pumpkinseed (14.2%), and smallmouth bass (12.5%) representing the three most abundantly sampled species. Spottail shiner were the most abundantly sampled fish species in the pool (28.4%) and run (46.3%) habitat areas. The majority of catch in the impoundment was observed during boat electrofishing efforts.

Within the Lowell bypassed reach, fish were collected from standardized 50-m transects using a stratified random sampling design where habitat type was used to stratify. Site conditions were considered inappropriate or unsafe for sampling in two portions of the bypassed reach (i.e., the upper chute reach and downstream of the spill gate) and as a result back pack electrofish sampling in the bypassed reach occurred within the two middle reaches (i.e., the pooled section immediately downstream of the School Street Bridge and ledge channel area in the vicinity of the University Ave Bridge). A total of 526 individuals representing fourteen fish species were collected during back pack electrofishing efforts within the Lowell bypassed reach during 2019 when all sampling seasons and sample units are considered. Fallfish (39.9%), smallmouth bass (20.3%) and spottail shiner (16.7%) were the three most numerically abundant species within the Lowell bypassed reach during the 2019 sampling. Fallfish were the most abundant fish species collected within the pooled habitat within the Lowell bypassed reach and downstream of Pawtucket Dam, representing 47% of the total catch. Fish catch from the ledge channel habitat located in the lower portion of the bypassed reach was dominated by smallmouth bass which represented 60.6% of the total catch from that area.

Fish assemblage sampling within the Lowell impoundment and bypassed reach during the spring, summer and fall of 2019 resulted in the identification of 24 fish species. Approximately 53% of individuals collected during the 2019 sampling were classified as fish species native to the Merrimack River watershed in Massachusetts (12 species, 1,249 individuals). Conversely,

47% of the total catch across all seasons were classified as introduced to the Merrimack River watershed (12 species, 1,119 individuals).

7 Variances from FERC-Approved Study Plan

There was no variance from the methodologies and schedule as described in the FERC-approved study plan.

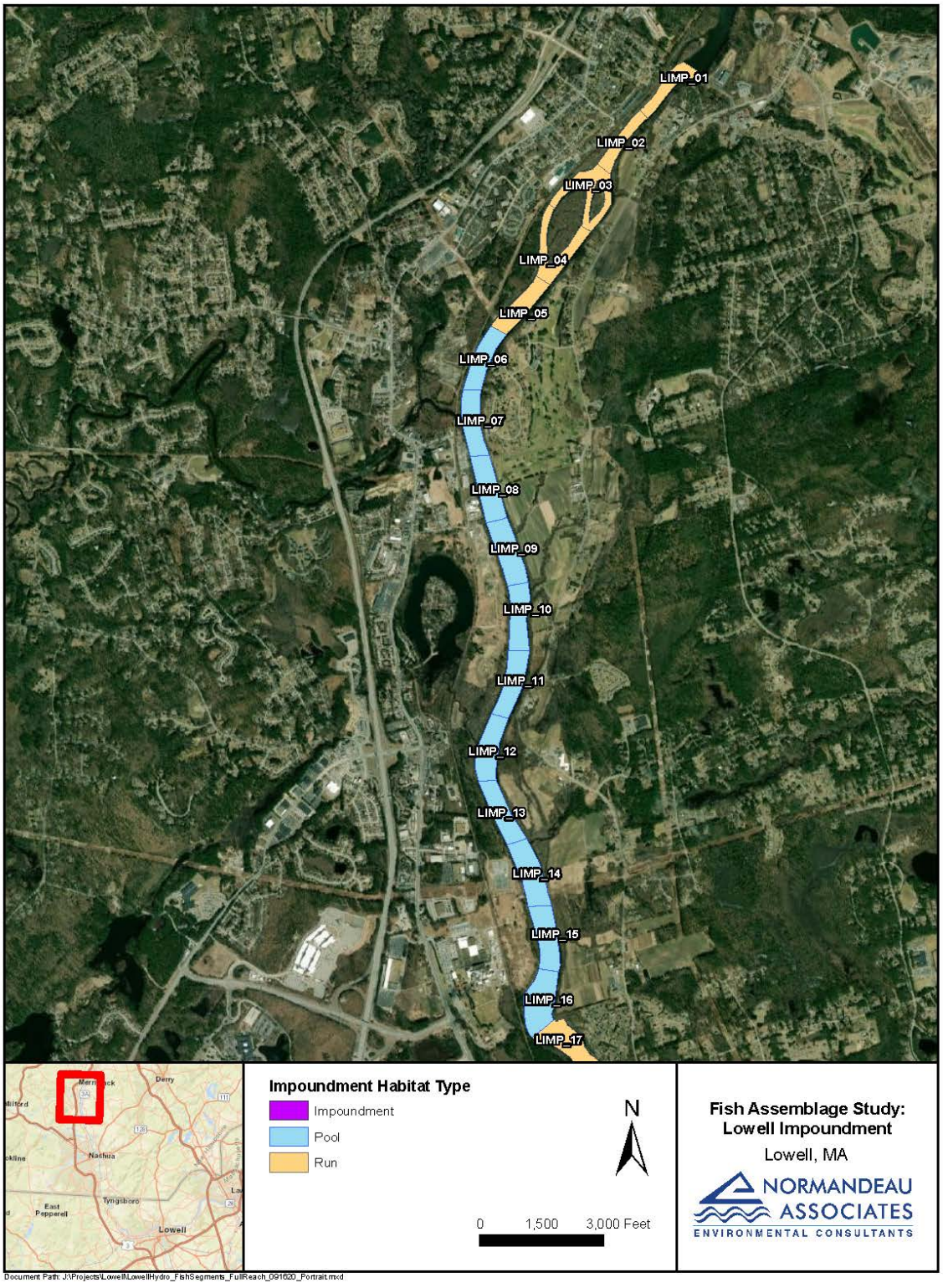
8 References

Hartel, K.E., D.B. Halliwell, and A.E. Launer. 2002. Inland Fishes of Massachusetts. Massachusetts Audubon Society.

Technical Committee for Anadromous Fishery Management of the Merrimack River Basin (Technical Committee). 1997. Strategic Plan and Status Review Anadromous Fish Restoration Program Merrimack River. Technical Committee for Anadromous Fishery Management of the Merrimack River Basin and Advisors to the Technical Committee.

9 Appendices

Appendix A. Spatial distribution of 500-m mesohabitat units for the 23.0 mile reach upstream of Pawtucket Dam.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LIMP_09
LIMP_10
LIMP_11
LIMP_12
LIMP_13
LIMP_14
LIMP_15
LIMP_16
LIMP_17
Impoundment Habitat Type
Impoundment
Pool
Run
N
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Fish Assemblage Study:
Lowell Impoundment
Lowell, MA
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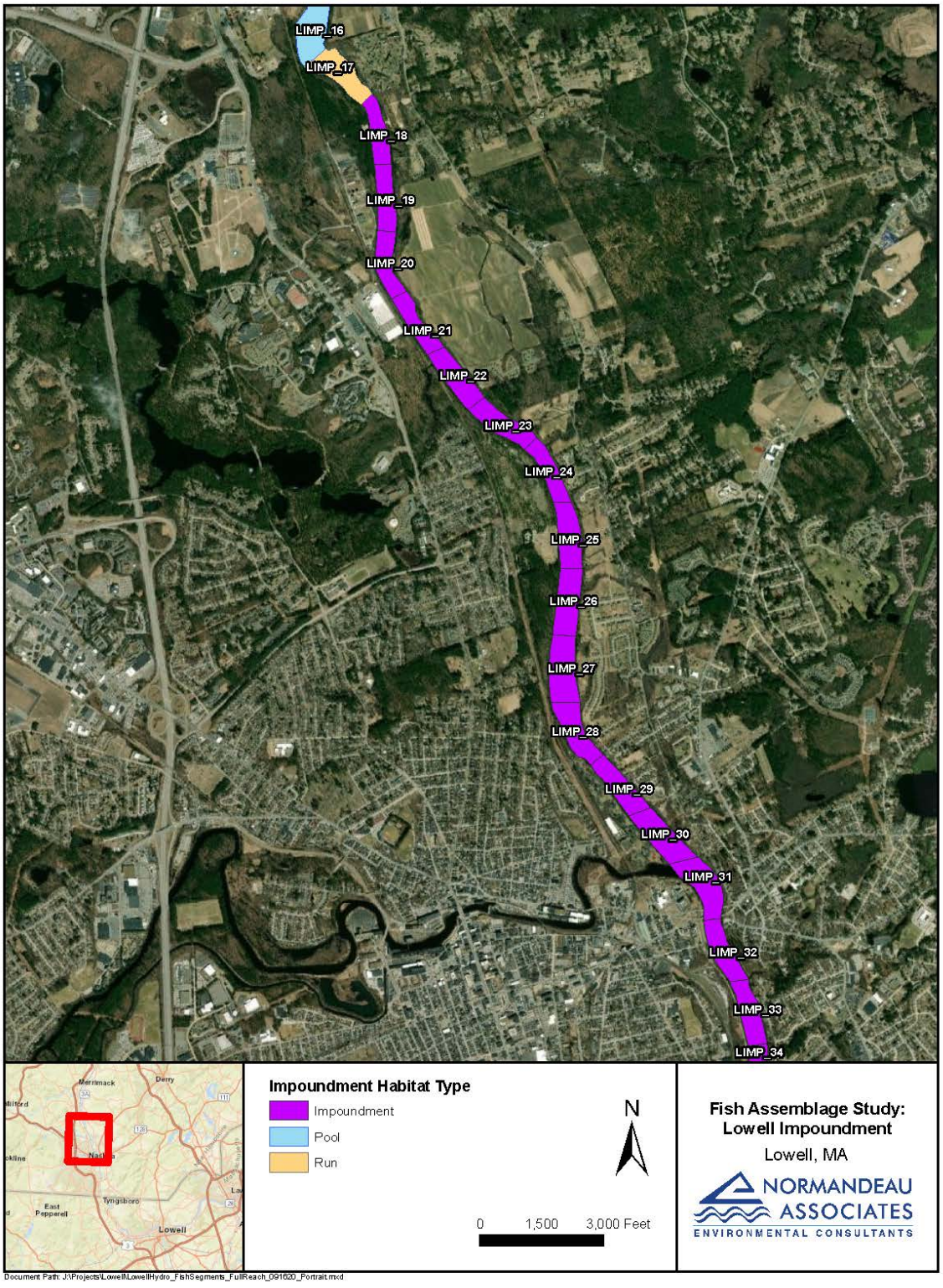
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LIMP_30
LIMP_31
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LIMP_33
LIMP_34
Impoundment Habitat Type
Impoundment
Pool
Run
N
0 1,500 3,000 Feet
Fish Assemblage Study:
Lowell Impoundment
Lowell, MA
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
Merrimack
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Tyngsboro
East Pepperell
Lowell
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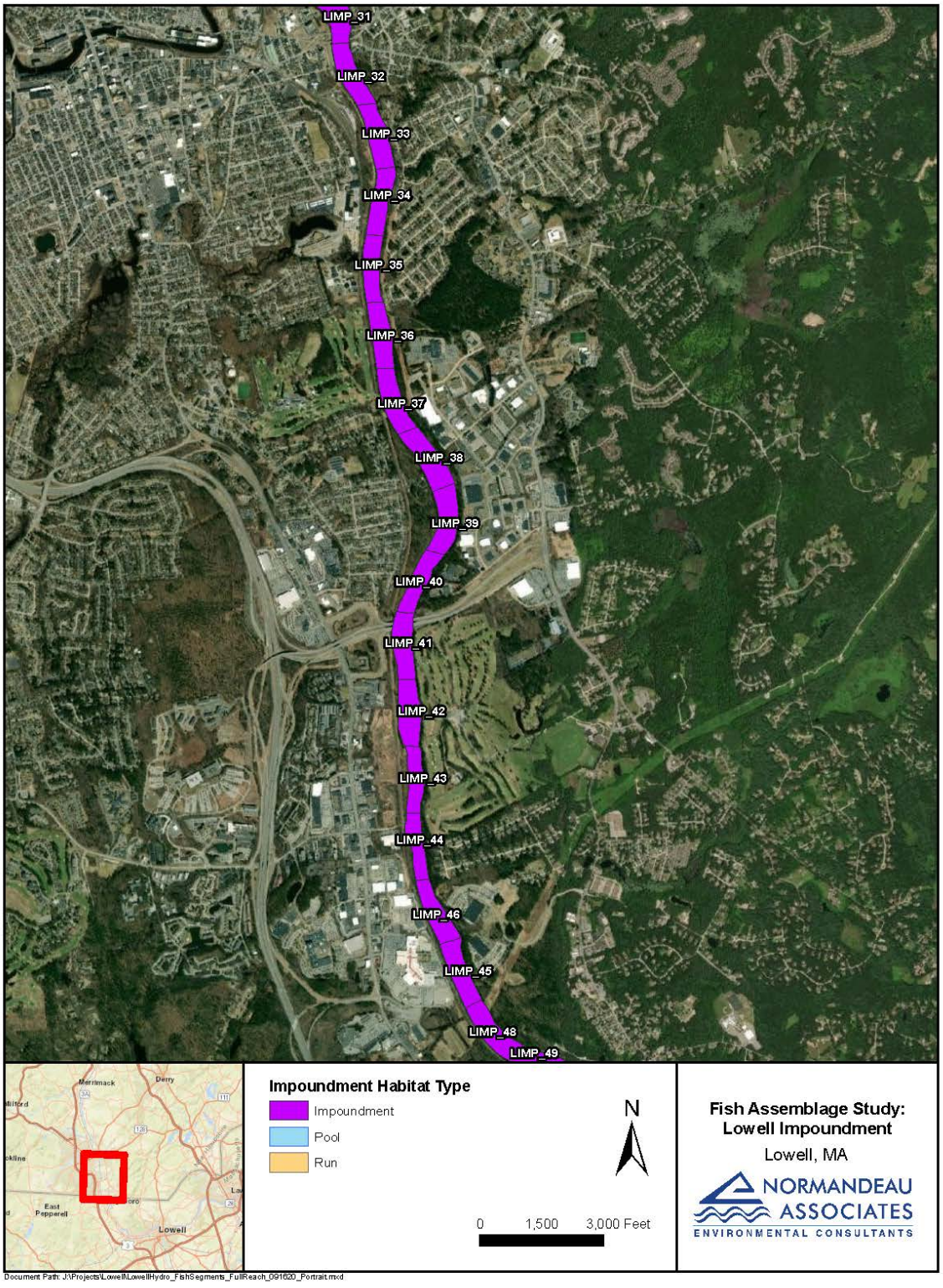
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Derry
East Pepperell
Lowell
Impoundment Habitat Type
Impoundment
Pool
Run
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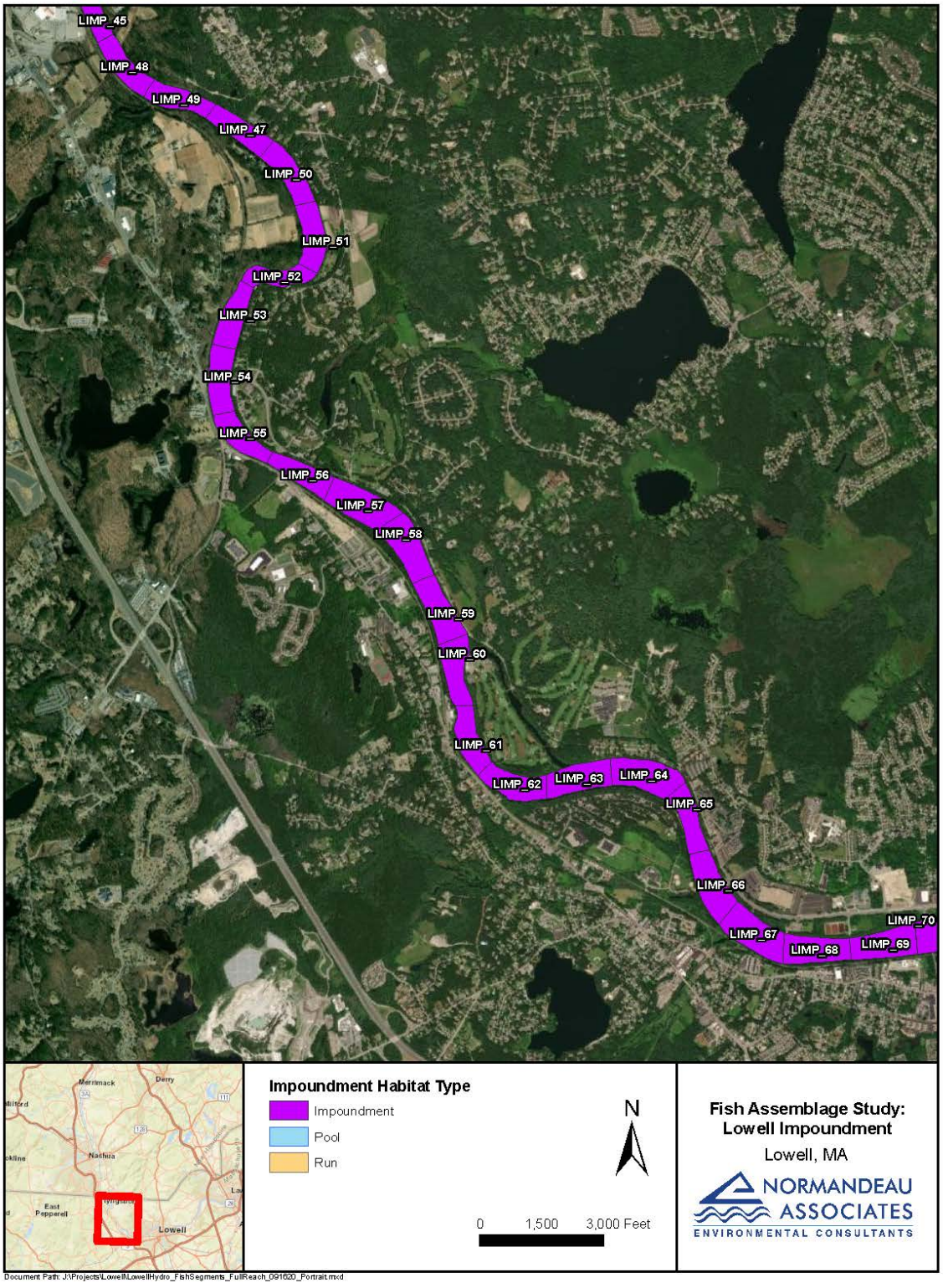
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LIMP_69
LIMP_70
Merrimack
Derry
Nashua
East Pepperell
Lowell
Impoundment Habitat Type
Impoundment
Pool
Run
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Fish Assemblage Study:
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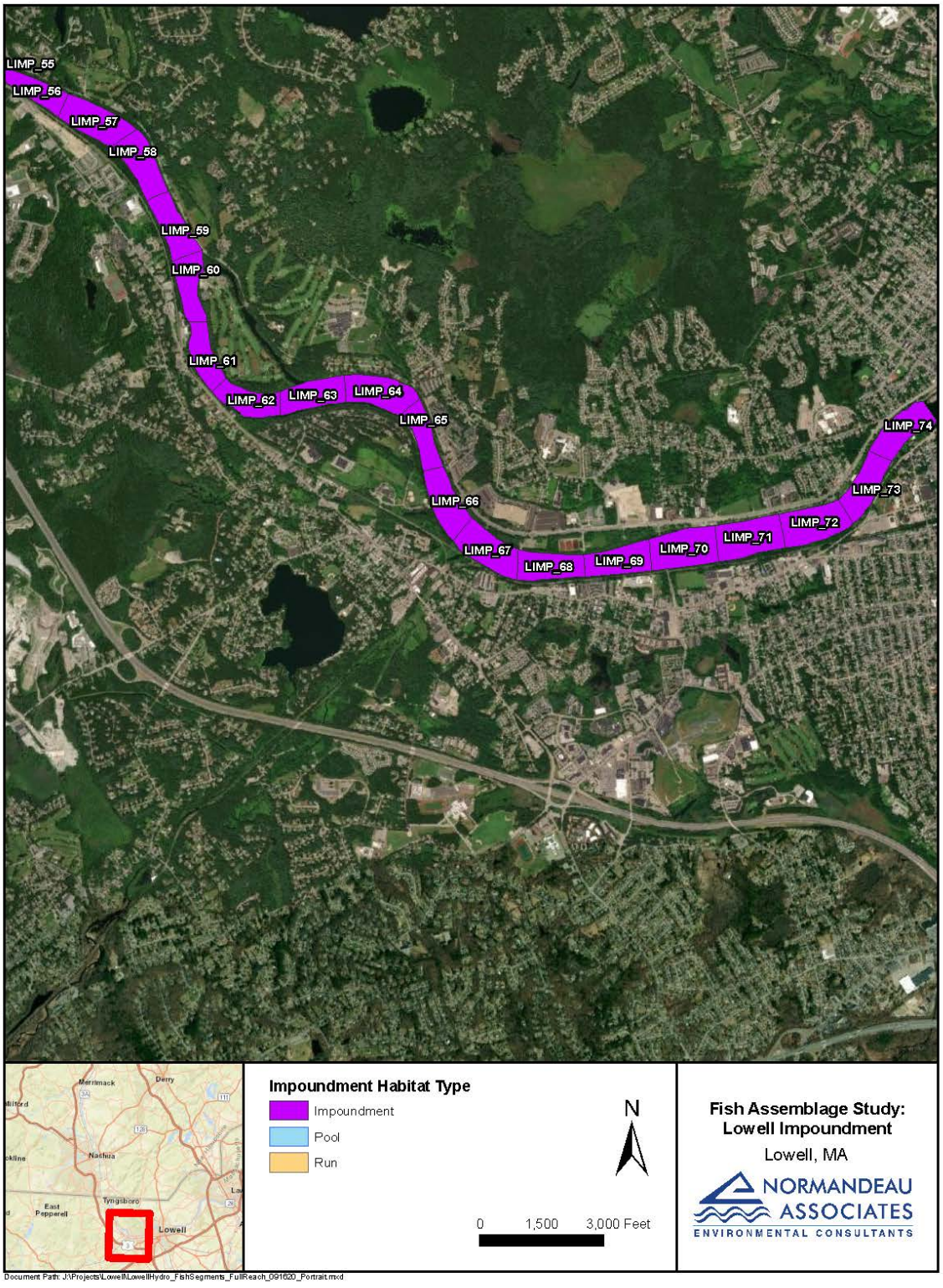
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LIMP_73
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Merrimack
Derry
Nashua
Tyngsboro
East Pepperell
Lowell
Impoundment Habitat Type
Impoundment
Pool
Run
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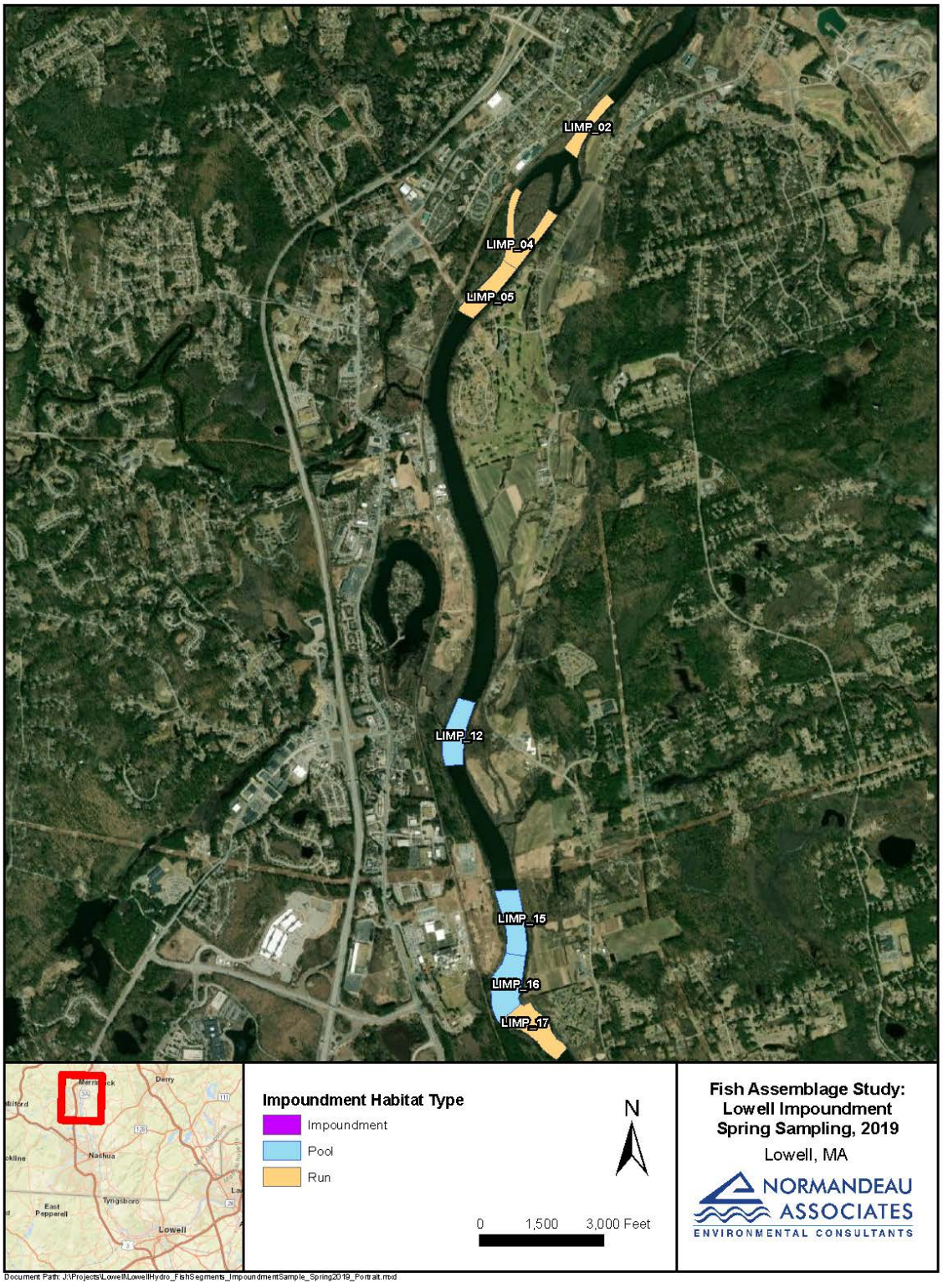
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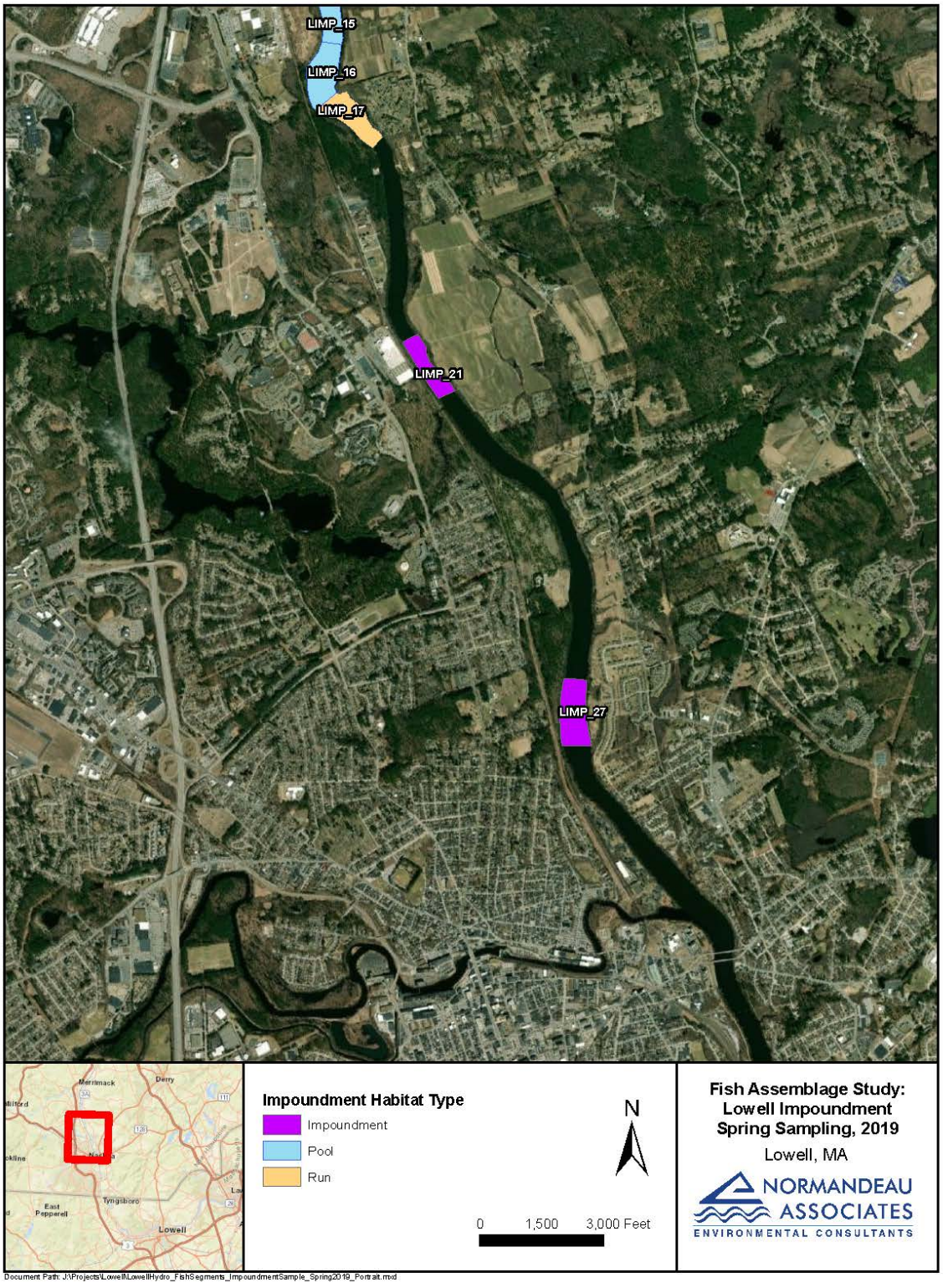
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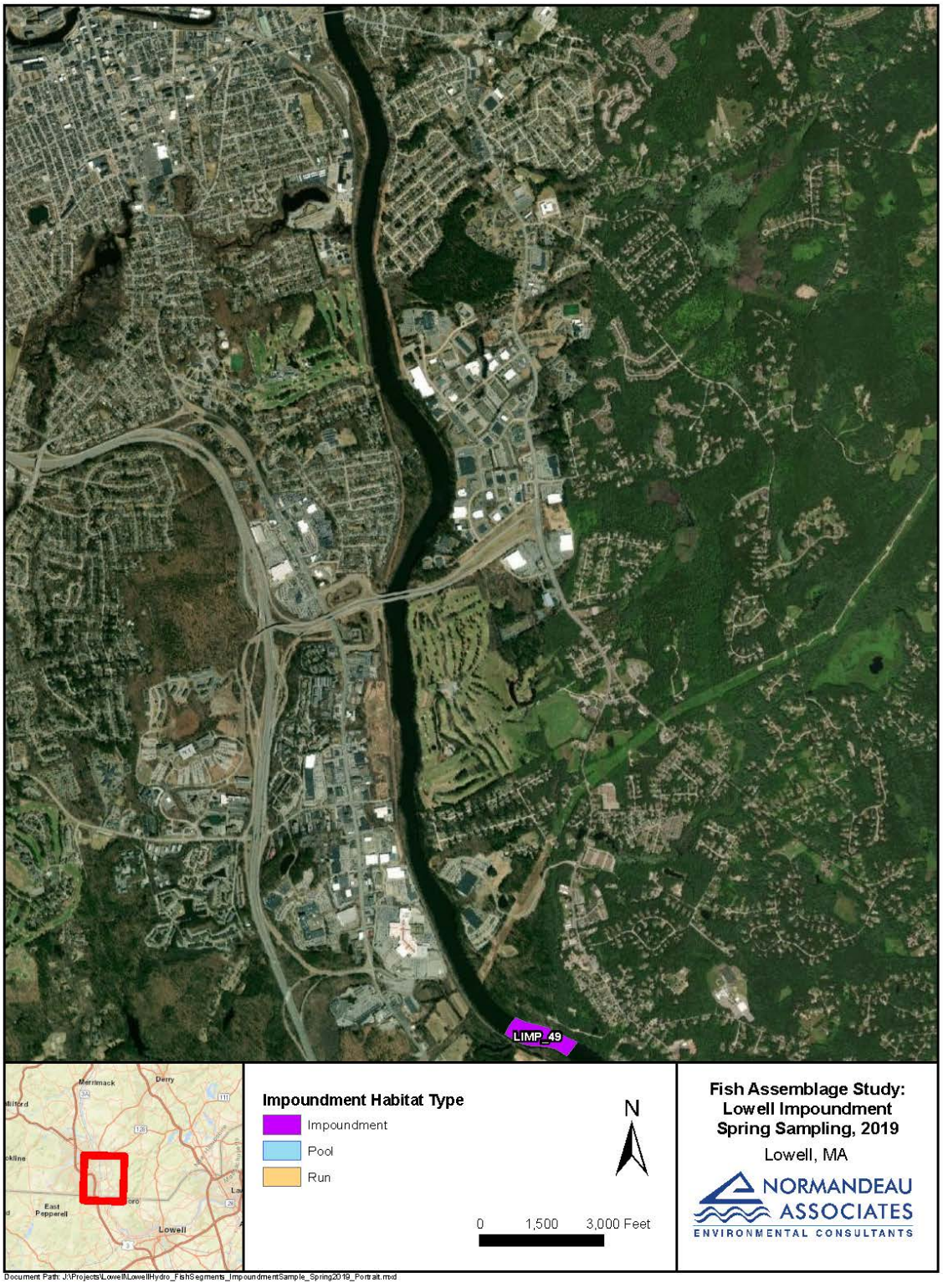
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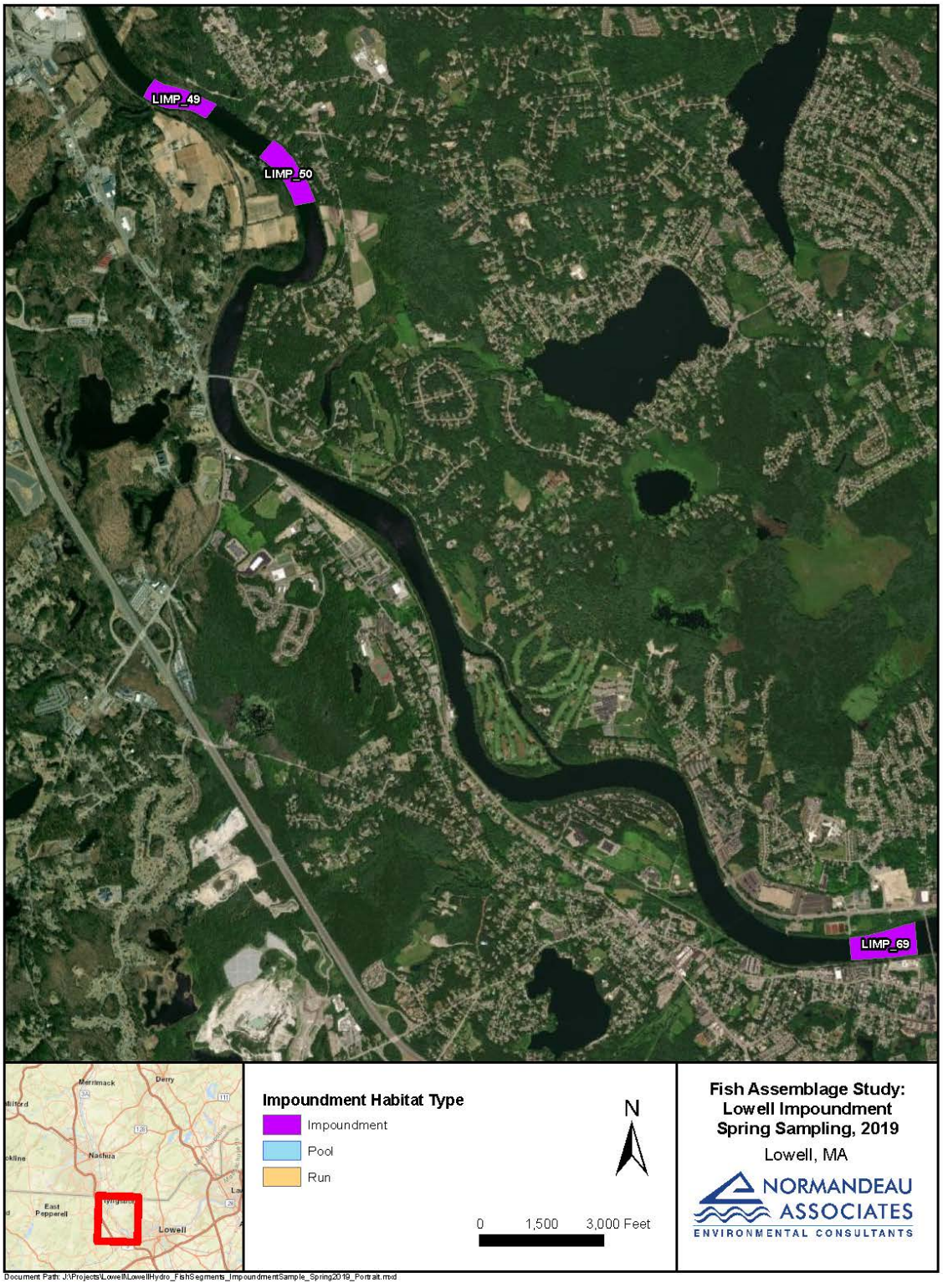
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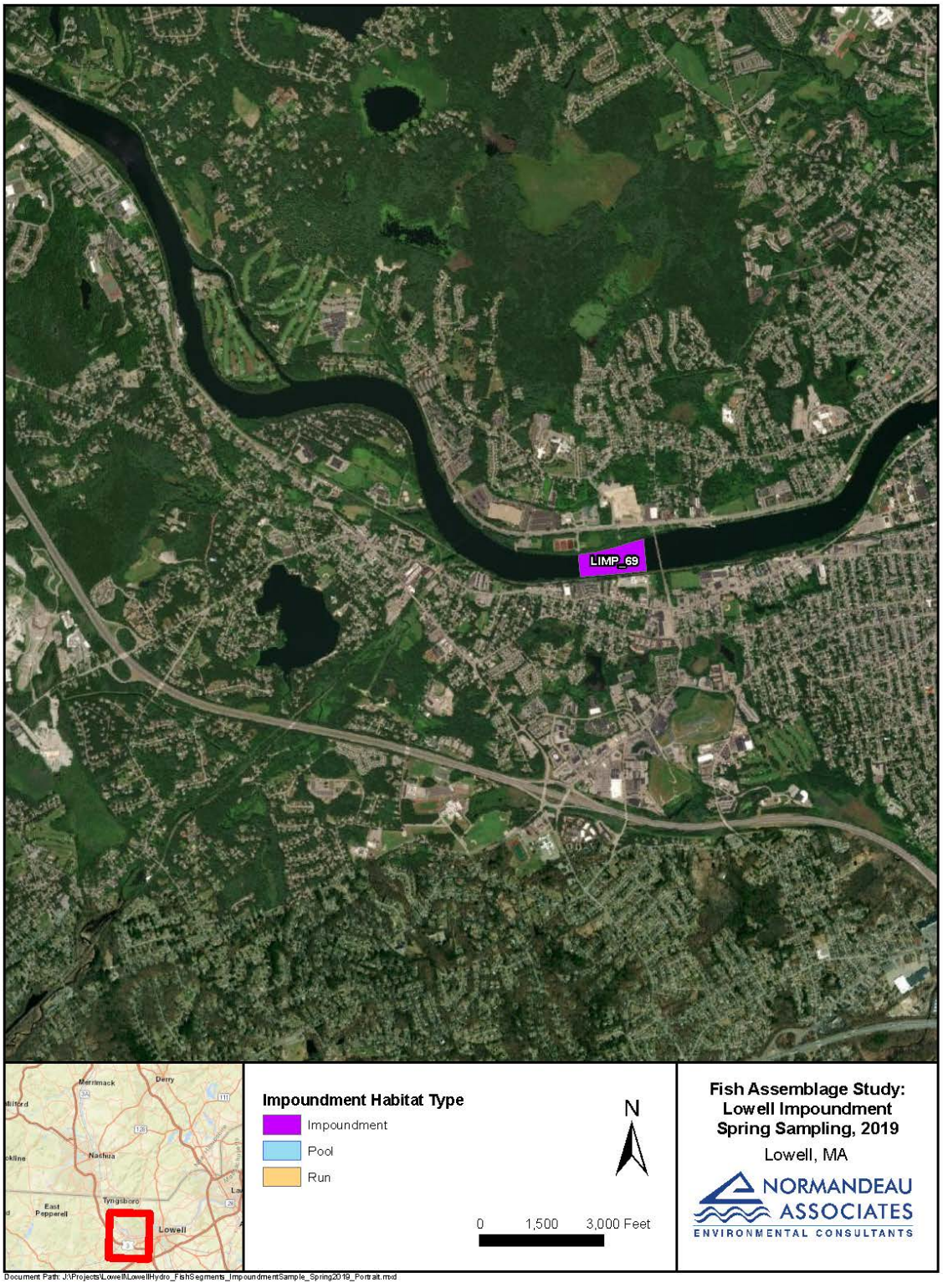
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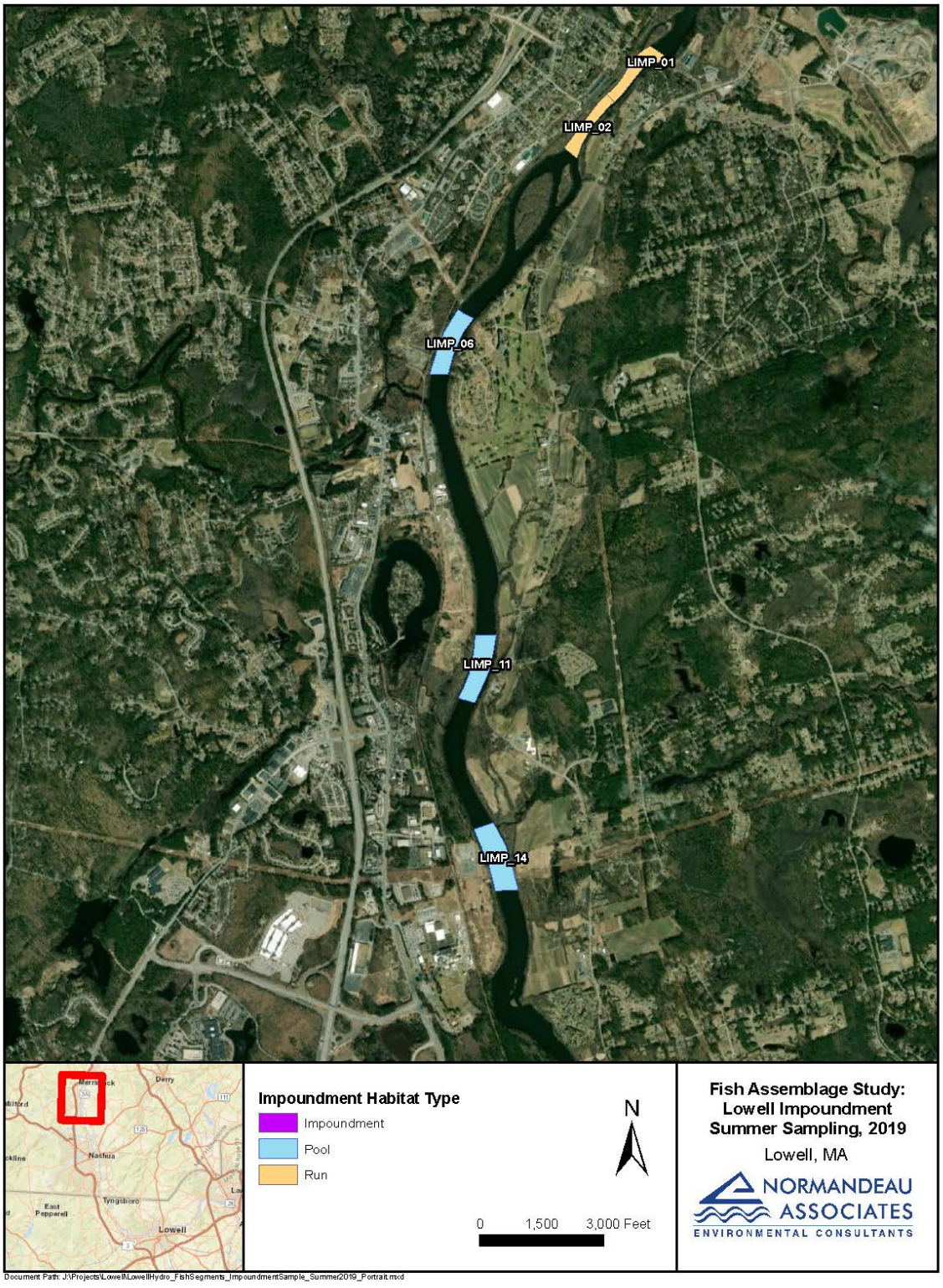
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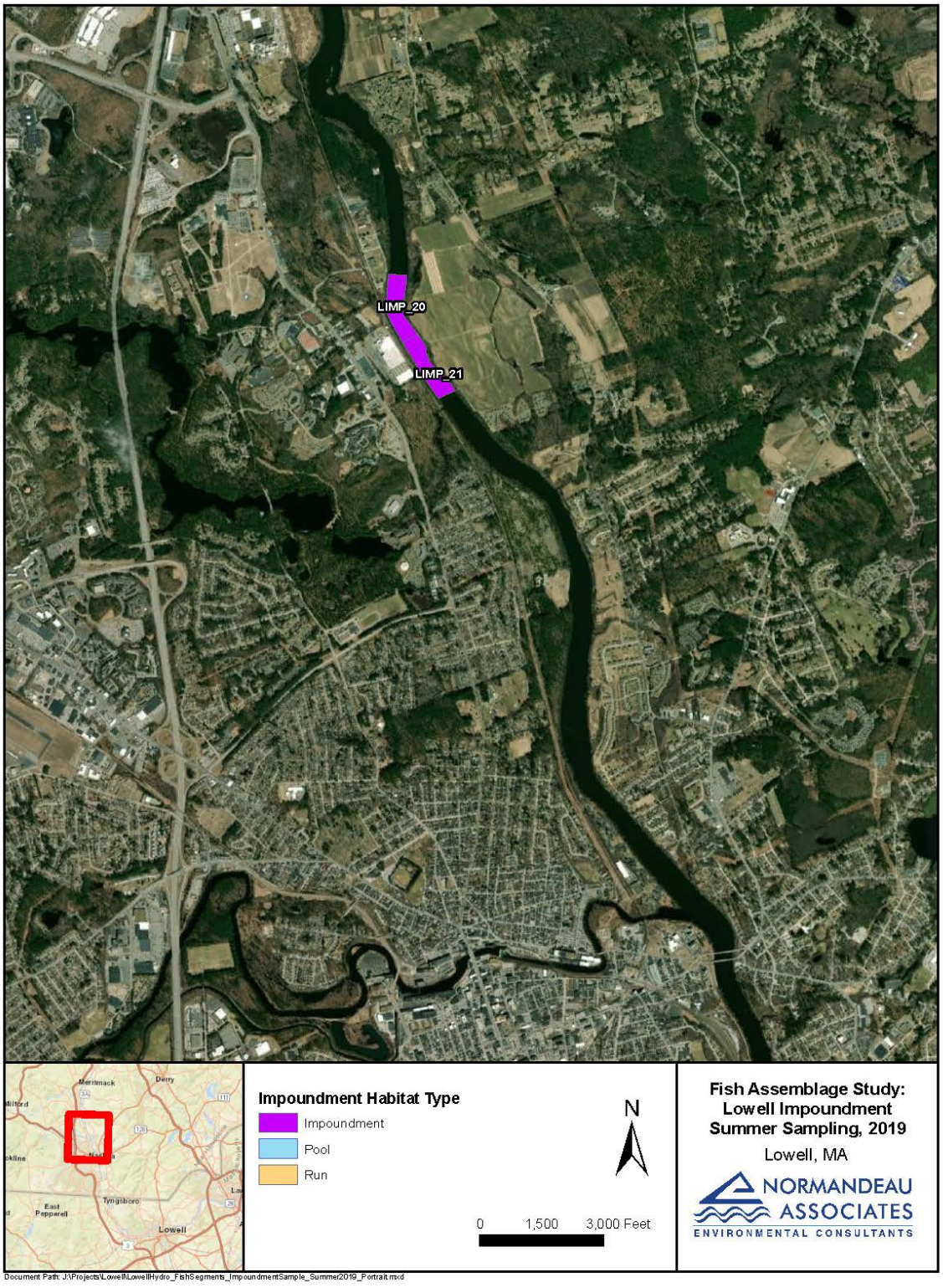
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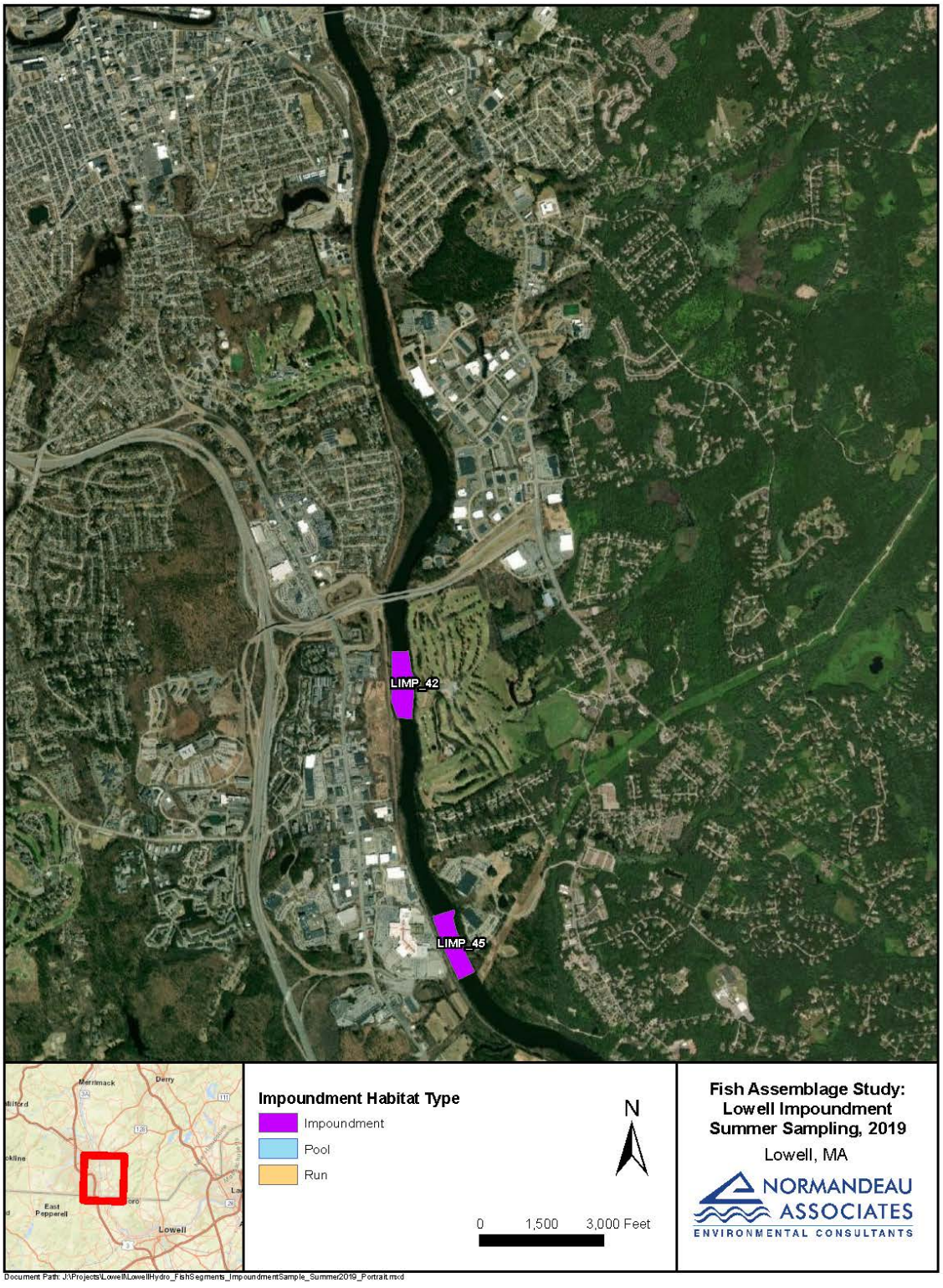
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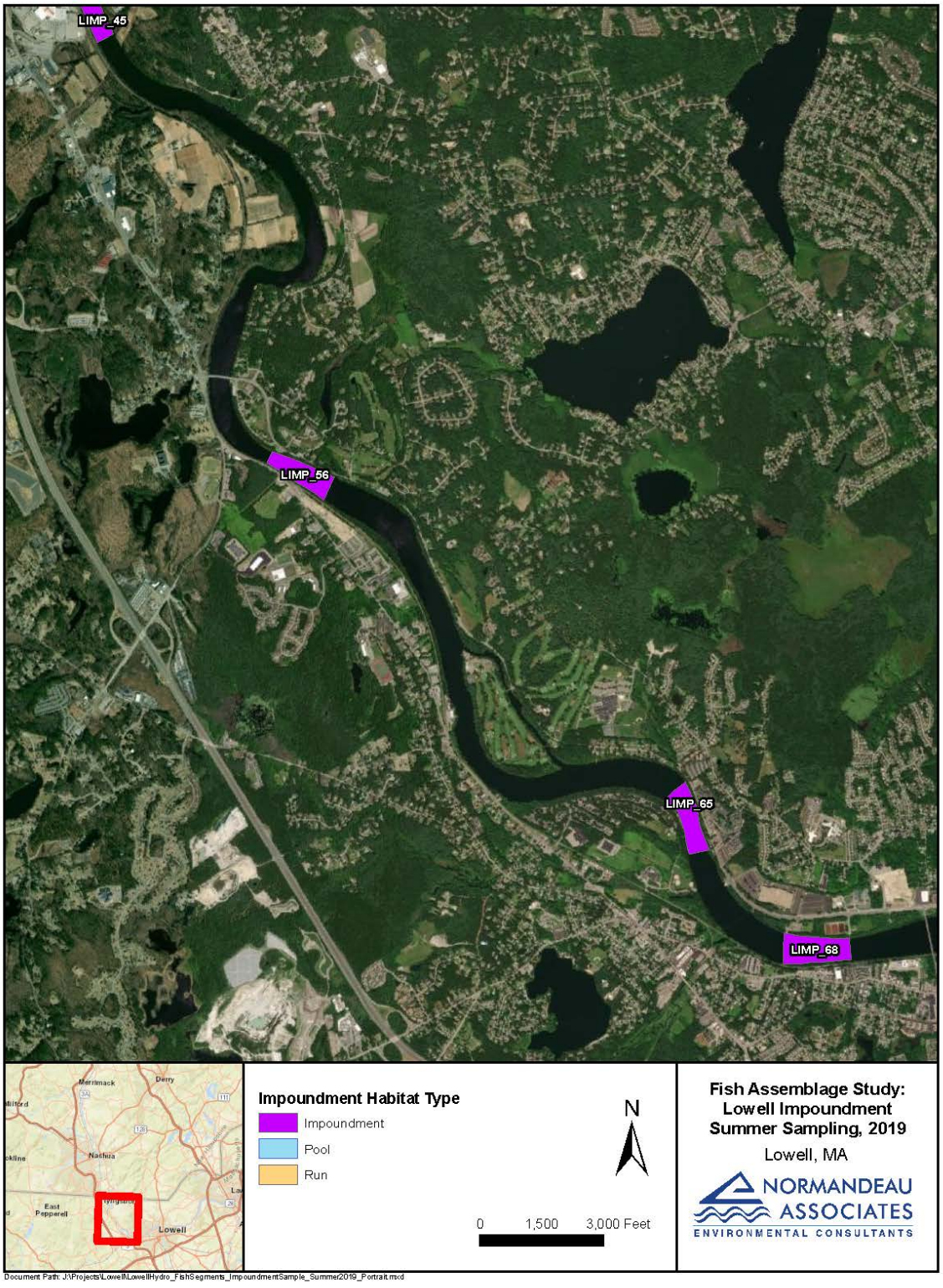
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Pool
Run
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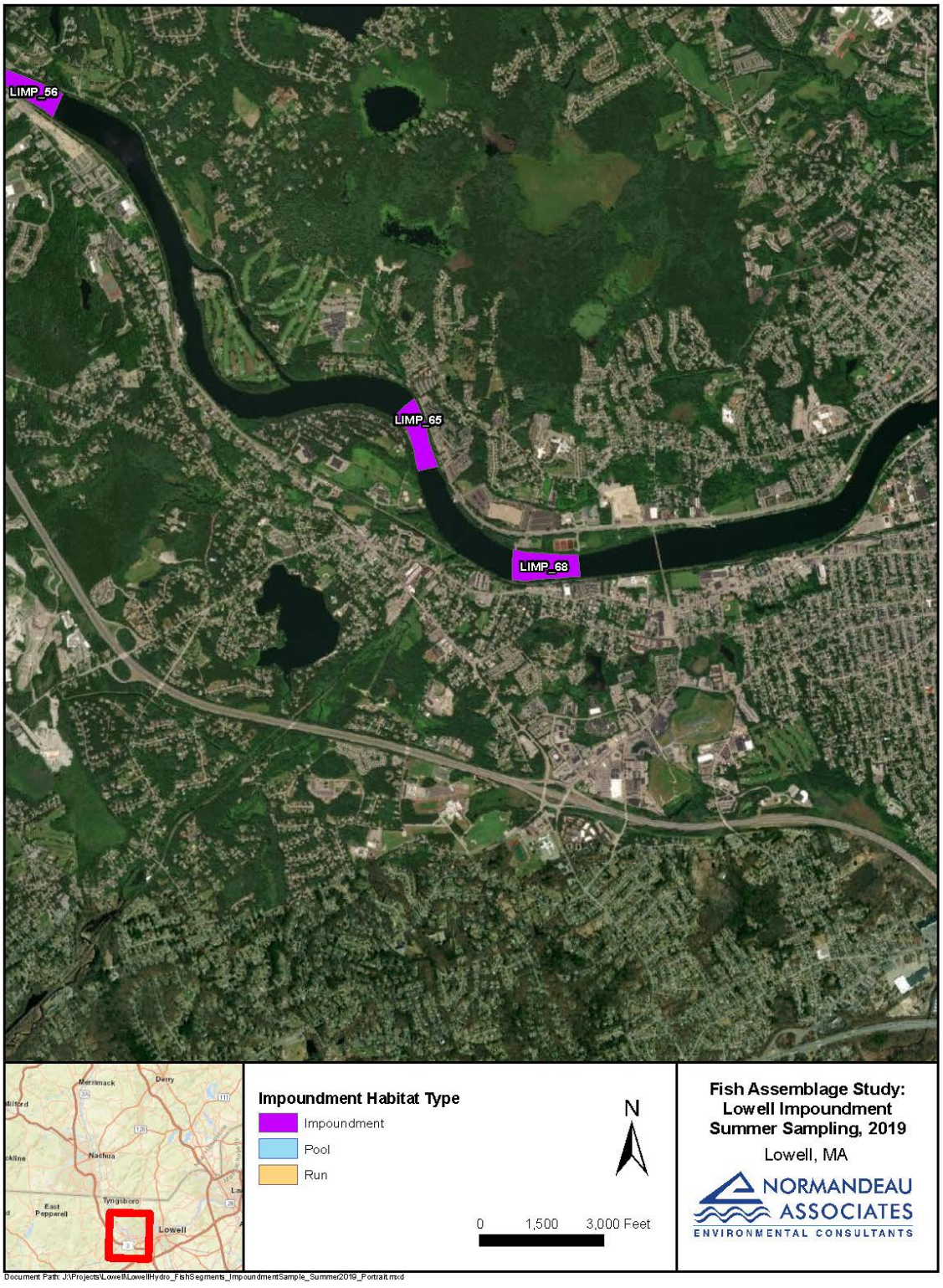
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Tyngsboro
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Impoundment
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Fish Assemblage Study:
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Summer Sampling, 2019
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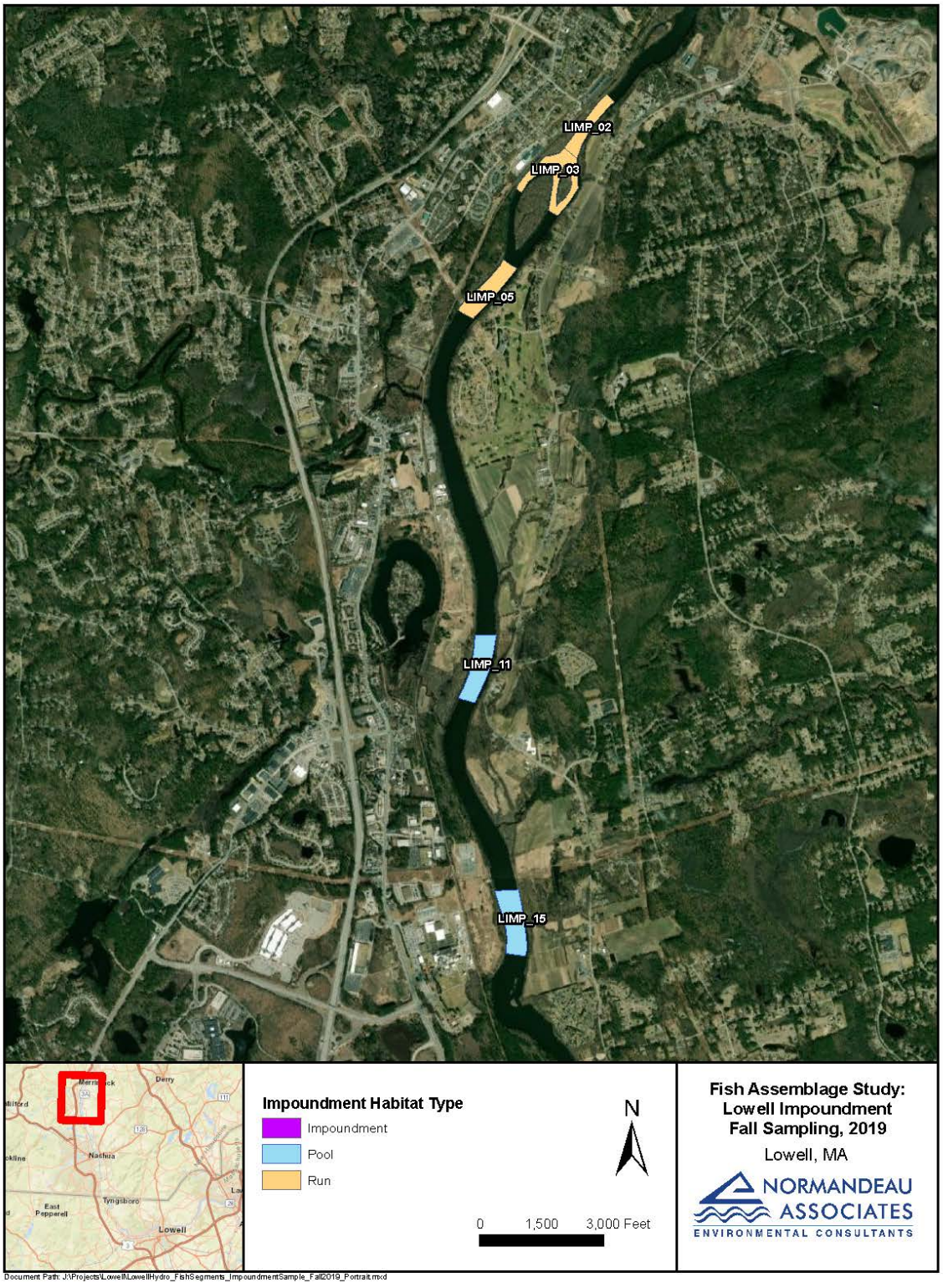
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Fall Sampling, 2019
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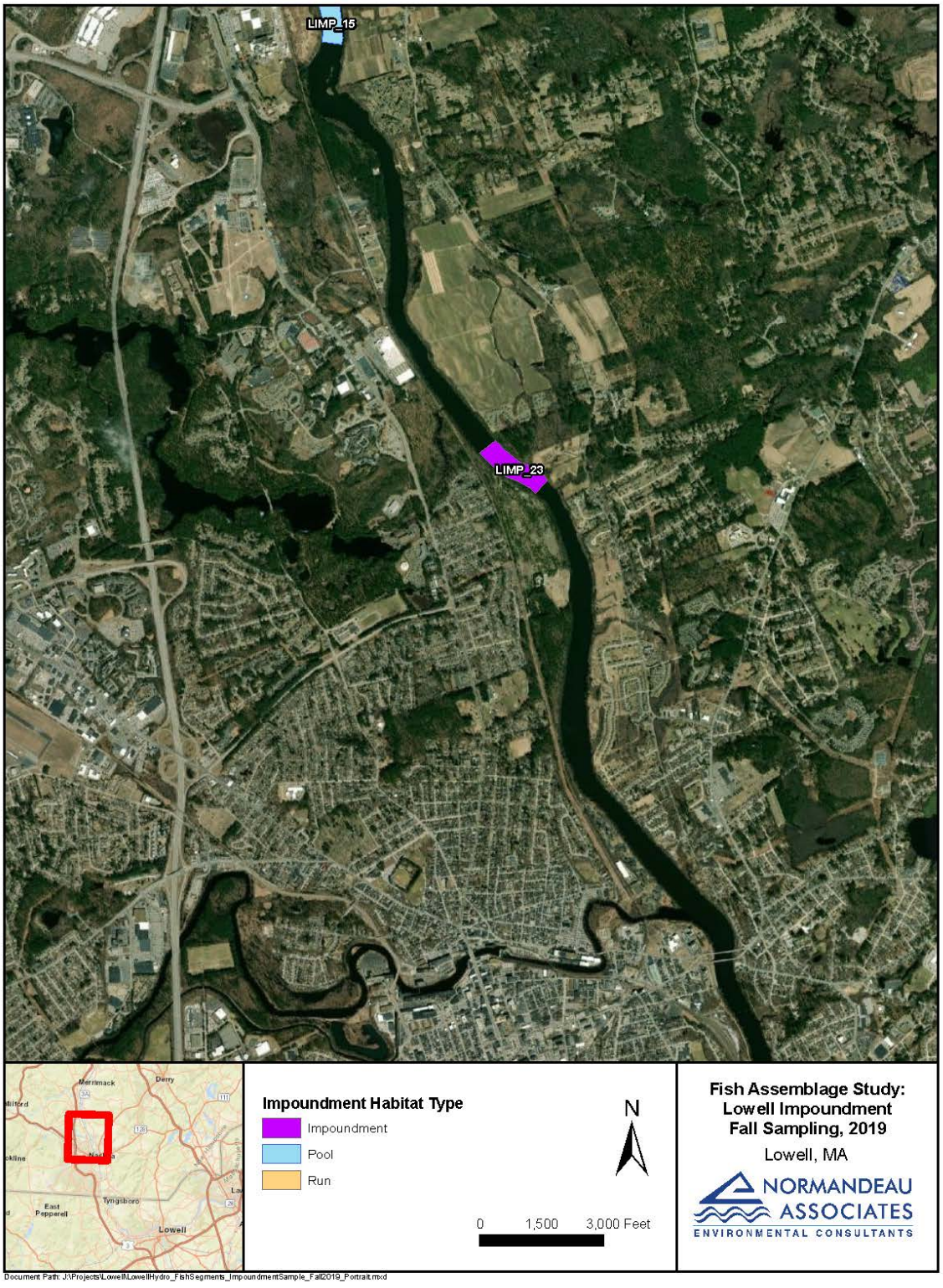
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Fall Sampling, 2019
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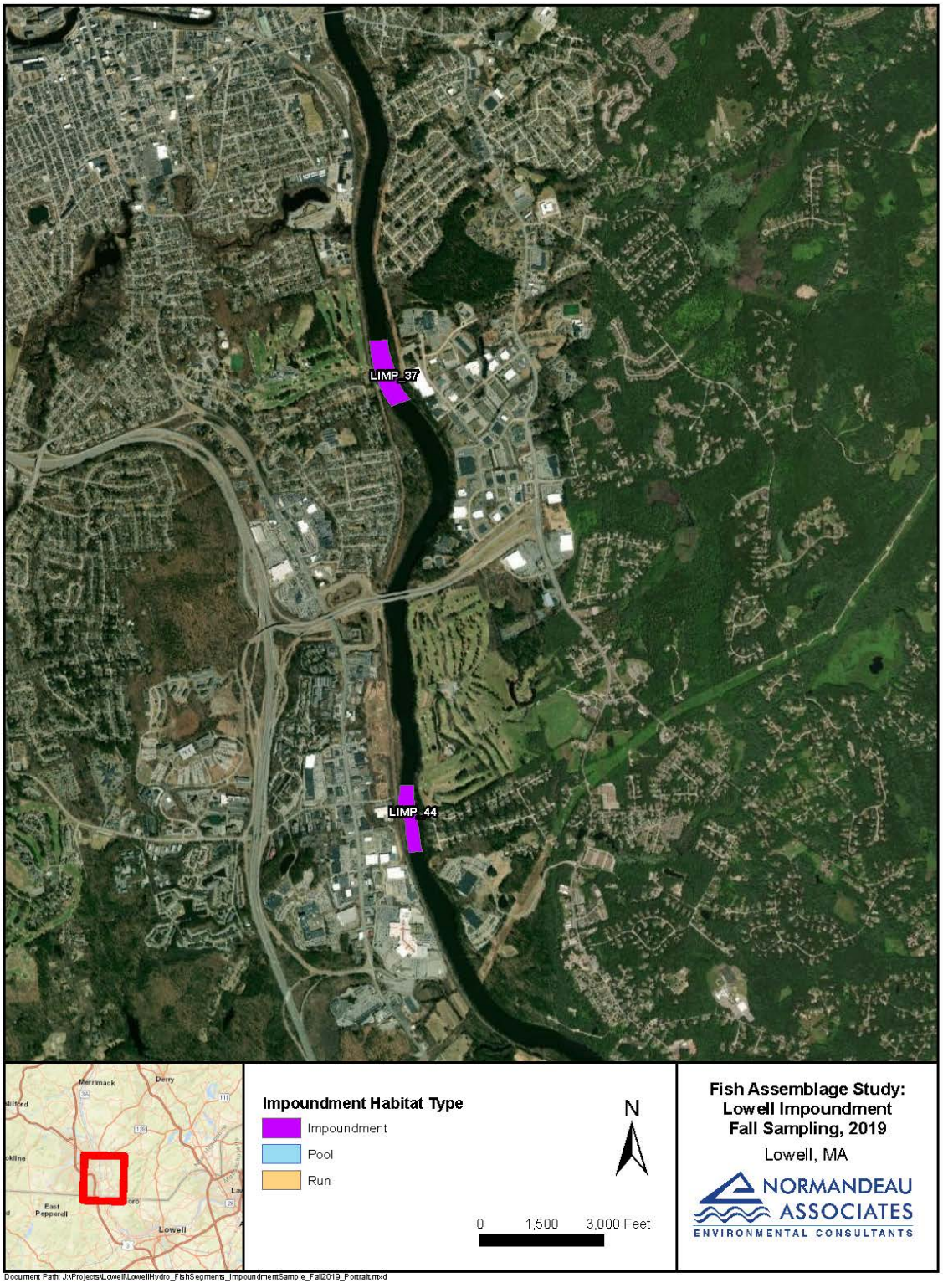
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NORMANDEAU ASSOCIATES
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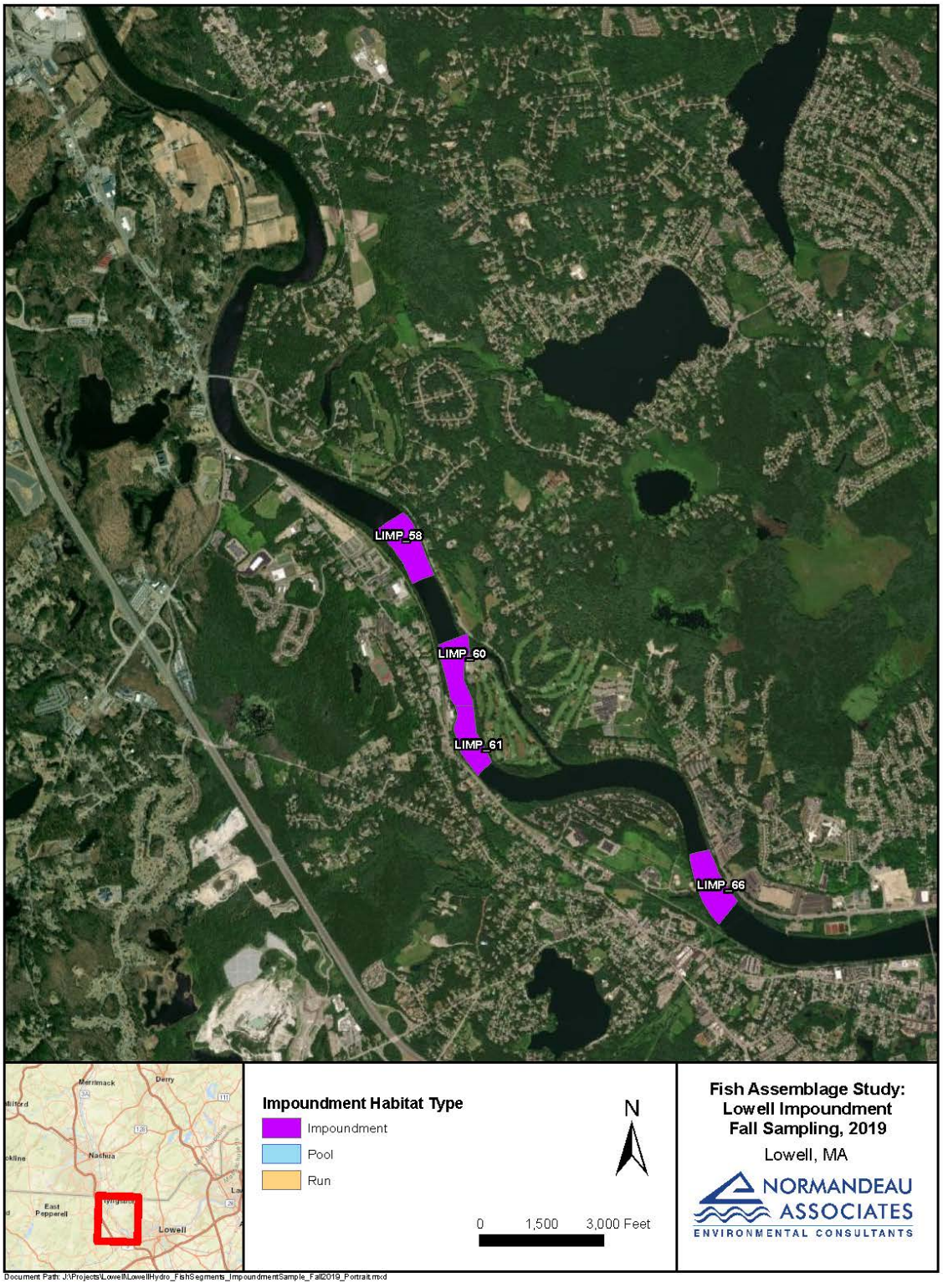
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Run
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Fish Assemblage Study:
Lowell Impoundment
Fall Sampling, 2019
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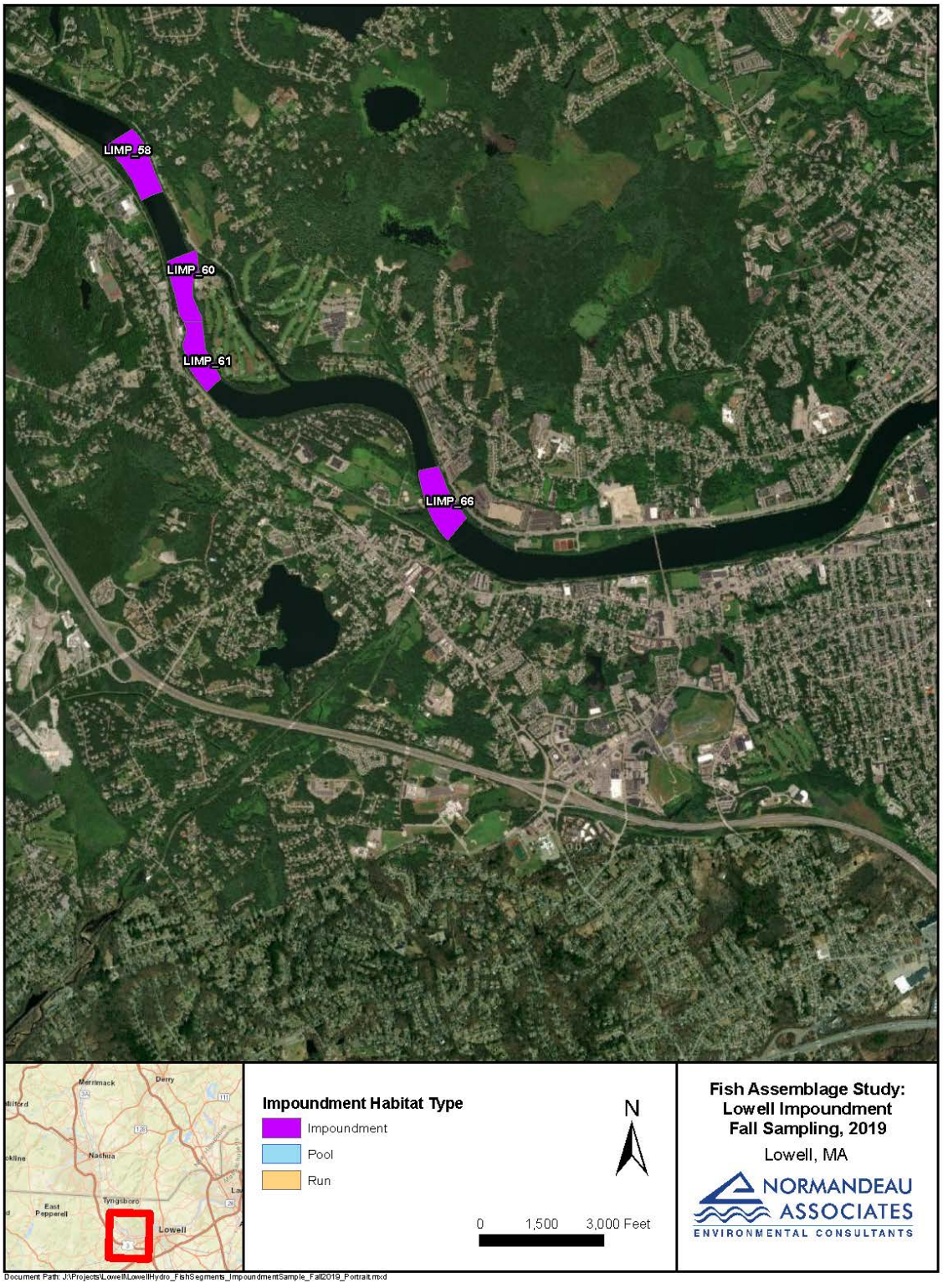
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Impoundment
Pool
Run
N
0 1,500 3,000 Feet
Fish Assemblage Study:
Lowell Impoundment
Fall Sampling, 2019
Lowell, MA
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
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Appendix B. Catch Per Unit of Effort (CPUE) information for boat electrofish and gill net sampling upstream of Pawtucket dam by season (spring, summer, and fall) and mesohabitat type (impoundment, pool, run).

Boat electrofish: Spring 2019

Common Name	Impoundment		Pool		Run		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
American Eel	1.07	0.05	0.00	0.00	0.53	0.03	0.53	0.03
Black Crappie	0.00	0.00	1.06	0.04	0.53	0.03	0.53	0.02
Bluegill	5.29	0.24	2.78	0.13	1.06	0.06	3.04	0.14
Common Carp	0.20	0.01	0.00	0.00	0.00	0.00	0.07	0.00
Fallfish	3.15	0.14	4.56	0.20	14.09	0.69	7.27	0.34
Golden Shiner	0.18	0.01	0.00	0.00	0.00	0.00	0.06	0.00
Largemouth Bass	0.00	0.00	0.51	0.02	0.53	0.03	0.34	0.02
Lepomis spp.	0.20	0.01	0.00	0.00	0.00	0.00	0.07	0.00
Margined Madtom	0.18	0.01	0.93	0.04	0.00	0.00	0.37	0.02
Pumpkinseed	1.87	0.09	0.00	0.00	0.53	0.03	0.80	0.04
Redbreast Sunfish	24.57	1.13	15.24	0.67	28.57	1.34	22.79	1.05
Rock Bass	0.47	0.02	1.06	0.04	2.05	0.09	1.19	0.05
Sea Lamprey	0.00	0.00	2.78	0.13	2.12	0.11	1.63	0.08
Smallmouth Bass	21.89	1.02	16.41	0.73	38.22	1.71	25.51	1.16
Spottail Shiner	38.11	1.64	23.84	1.04	43.91	1.97	35.29	1.55
Tessellated Darter	0.63	0.03	6.31	0.27	2.12	0.11	3.02	0.14
White Sucker	1.25	0.07	3.98	0.18	7.34	0.37	4.19	0.21
Yellow Bullhead	1.12	0.05	0.00	0.00	1.59	0.09	0.90	0.05
Yellow Perch	0.85	0.04	12.59	0.53	0.53	0.03	4.66	0.20

Boat electrofish: Summer 2019

Common Name	Impoundment		Pool		Run		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
Alewife	4.17	0.19	0.00	0.00	0.00	0.00	1.39	0.06
American Eel	1.30	0.06	0.48	0.02	4.72	0.20	2.17	0.09
Black Crappie	0.22	0.01	0.48	0.02	0.00	0.00	0.23	0.01
Bluegill	14.99	0.68	11.79	0.58	0.62	0.03	9.13	0.43
Common Carp	0.22	0.01	0.00	0.00	2.05	0.09	0.76	0.03
Fallfish	4.61	0.21	1.52	0.07	13.17	0.57	6.43	0.28
Golden Shiner	0.00	0.00	1.01	0.04	1.24	0.06	0.75	0.03
Largemouth Bass	4.04	0.19	6.13	0.29	2.67	0.11	4.28	0.20
Lepomis spp.	0.22	0.01	0.48	0.02	2.05	0.09	0.92	0.04
Margined Madtom	0.63	0.03	0.51	0.02	2.05	0.09	1.06	0.05
Pumpkinseed	26.72	1.21	1.45	0.07	0.62	0.03	9.60	0.44
Redbreast Sunfish	29.42	1.34	12.18	0.58	64.10	2.74	35.24	1.55
Rock Bass	0.22	0.01	0.51	0.02	0.00	0.00	0.24	0.01
Sea Lamprey	1.27	0.06	0.00	0.00	0.00	0.00	0.42	0.02
Smallmouth Bass	5.32	0.24	8.06	0.40	14.41	0.63	9.26	0.42
Spottail Shiner	0.45	0.02	18.23	0.82	59.13	2.51	25.94	1.12
Tessellated Darter	2.39	0.11	2.31	0.11	0.00	0.00	1.56	0.07
White Perch	0.23	0.01	0.00	0.00	0.00	0.00	0.08	0.00
White Sucker	0.00	0.00	1.95	0.09	1.86	0.09	1.27	0.06
Yellow Bullhead	2.92	0.13	2.46	0.11	0.62	0.03	2.00	0.09
Yellow Perch	0.00	0.00	0.00	0.00	0.62	0.03	0.21	0.01

Boat electrofish: Fall 2019

Common Name	Impoundment		Pool		Run		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
Alewife	13.23	0.83	3.98	0.18	13.23	0.83	10.15	0.61
American Eel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Black Crappie	0.00	0.00	0.93	0.04	0.00	0.00	0.31	0.01
Bluegill	2.21	0.12	5.04	0.22	2.21	0.12	3.15	0.15
Common Carp	0.20	0.01	0.00	0.00	0.20	0.01	0.13	0.01
Fallfish	7.81	0.38	26.66	1.20	7.81	0.38	14.09	0.65
Golden Shiner	0.37	0.02	4.24	0.18	0.37	0.02	1.66	0.07
Largemouth Bass	0.62	0.03	3.05	0.13	0.62	0.03	1.43	0.06
Margined Madtom	0.19	0.01	0.00	0.00	0.19	0.01	0.12	0.01
Pumpkinseed	3.20	0.19	0.00	0.00	3.20	0.19	2.13	0.13
Redbreast Sunfish	6.89	0.37	2.78	0.13	6.89	0.37	5.52	0.29
Rock Bass	0.16	0.01	0.00	0.00	0.16	0.01	0.10	0.01
Sea Lamprey	0.84	0.05	1.92	0.09	0.84	0.05	1.20	0.06
Smallmouth Bass	5.42	0.30	5.89	0.27	5.42	0.30	5.58	0.29
Spottail Shiner	5.62	0.26	13.65	0.58	5.62	0.26	8.30	0.37
Tessellated Darter	0.19	0.01	0.00	0.00	0.19	0.01	0.12	0.01
White Sucker	2.10	0.12	3.18	0.13	2.10	0.12	2.46	0.12
Yellow Bullhead	0.32	0.02	0.93	0.04	0.32	0.02	0.52	0.03
Yellow Perch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Experimental gill net: Spring 2019

Common Name	Impoundment	Pool	Run	Total
	Fish/hr	Fish/hr	Fish/hr	Fish/hr
Bluegill	0.00	0.05	0.00	0.02
Fallfish	0.01	0.00	0.00	0.00
Margined Madtom	0.01	0.00	0.00	0.00
Smallmouth Bass	0.01	0.00	0.00	0.00
Spottail Shiner	0.00	0.00	0.10	0.03
White Sucker	0.01	0.00	0.03	0.02

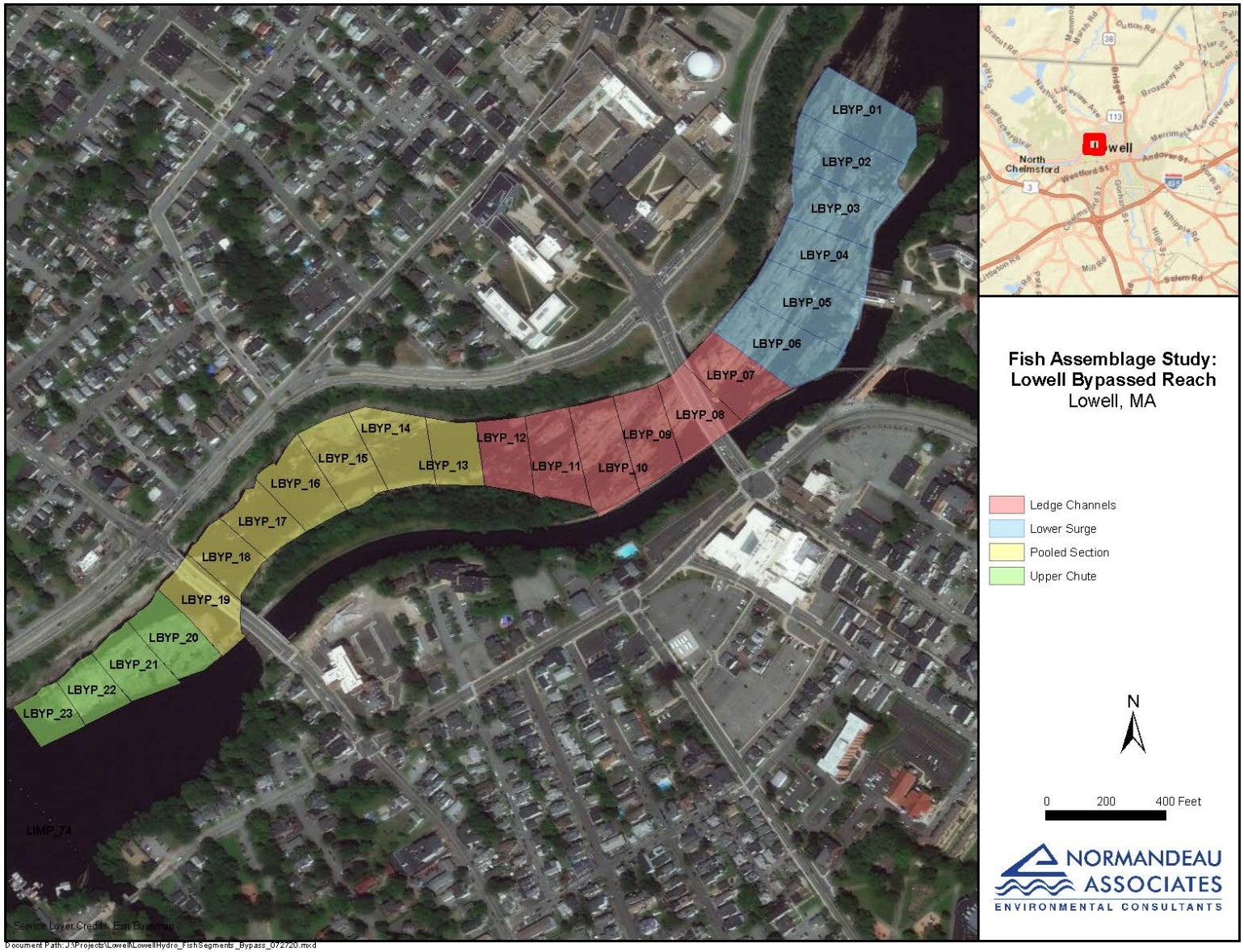
Experimental gill net: Summer 2019

Common Name	Impoundment	Pool	Run	Total
	Fish/hr	Fish/hr	Fish/hr	Fish/hr
Alewife	0.02	0.00	0.00	0.01
Channel Catfish	0.01	0.00	0.00	0.00
Common Carp	0.01	0.00	0.00	0.00
Fallfish	0.01	0.03	0.00	0.01
Golden Shiner	0.00	0.00	0.10	0.03
Pumpkinseed	0.01	0.00	0.00	0.00
Redbreast Sunfish	0.05	0.00	0.00	0.02
Smallmouth Bass	0.04	0.00	0.00	0.01
Walleye	0.01	0.00	0.00	0.00
White Sucker	0.01	0.03	0.00	0.01
Yellow Bullhead	0.20	0.00	0.03	0.08
Yellow Perch	0.02	0.00	0.00	0.01

Experimental gill net: Fall 2019

Common Name	Impoundment	Pool	Run	Total
	Fish/hr	Fish/hr	Fish/hr	Fish/hr
Spottail Shiner	0.00	0.05	0.00	0.02
Yellow Bullhead	0.01	0.00	0.10	0.04

Appendix C. Spatial distribution of 50-m habitat units for the 0.75 mile bypassed reach downstream of Pawtucket Dam.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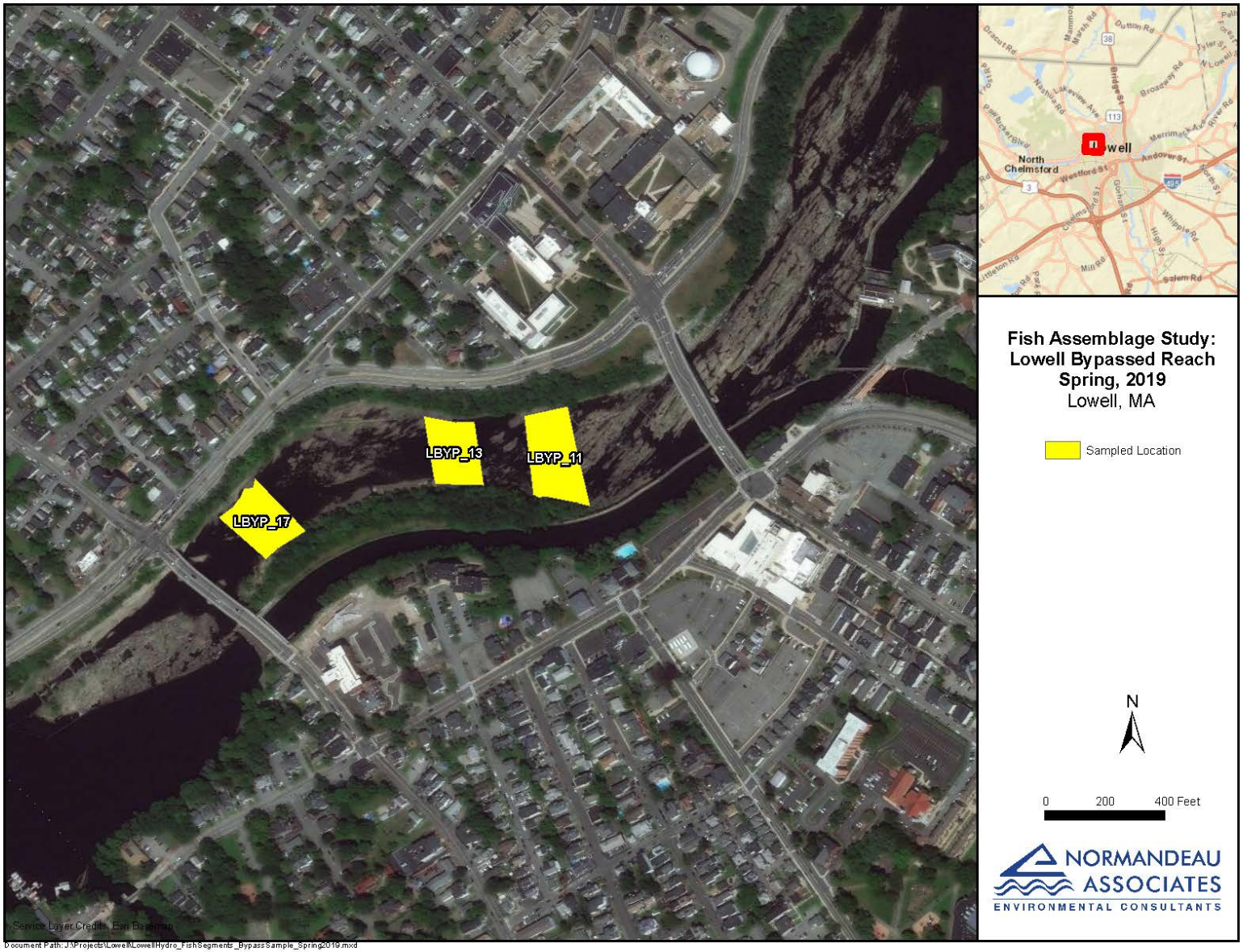
LBYP_02
LBYP_03
LBYP_04
LBYP_05
LBYP_06
LBYP_07
LBYP_08
LBYP_09
LBYP_10
LBYP_11
LBYP_12
LBYP_13
LBYP_14
LBYP_15
LBYP_16
LBYP_17
LBYP_18
LBYP_19
LBYP_20
LBYP_21
LBYP_22
LBYP_23
LIMP_74
Service Layer Credits: Esri Basemap
Document Path: J:\Projects\Lowell\Lowell\Hydro_FishSegments_Bypass_072720.mxd
Fish Assemblage Study:
Lowell Bypassed Reach
Lowell, MA
Ledge Channels
Lower Surge
Pooled Section
Upper Chute
N
0
200
400 Feet
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS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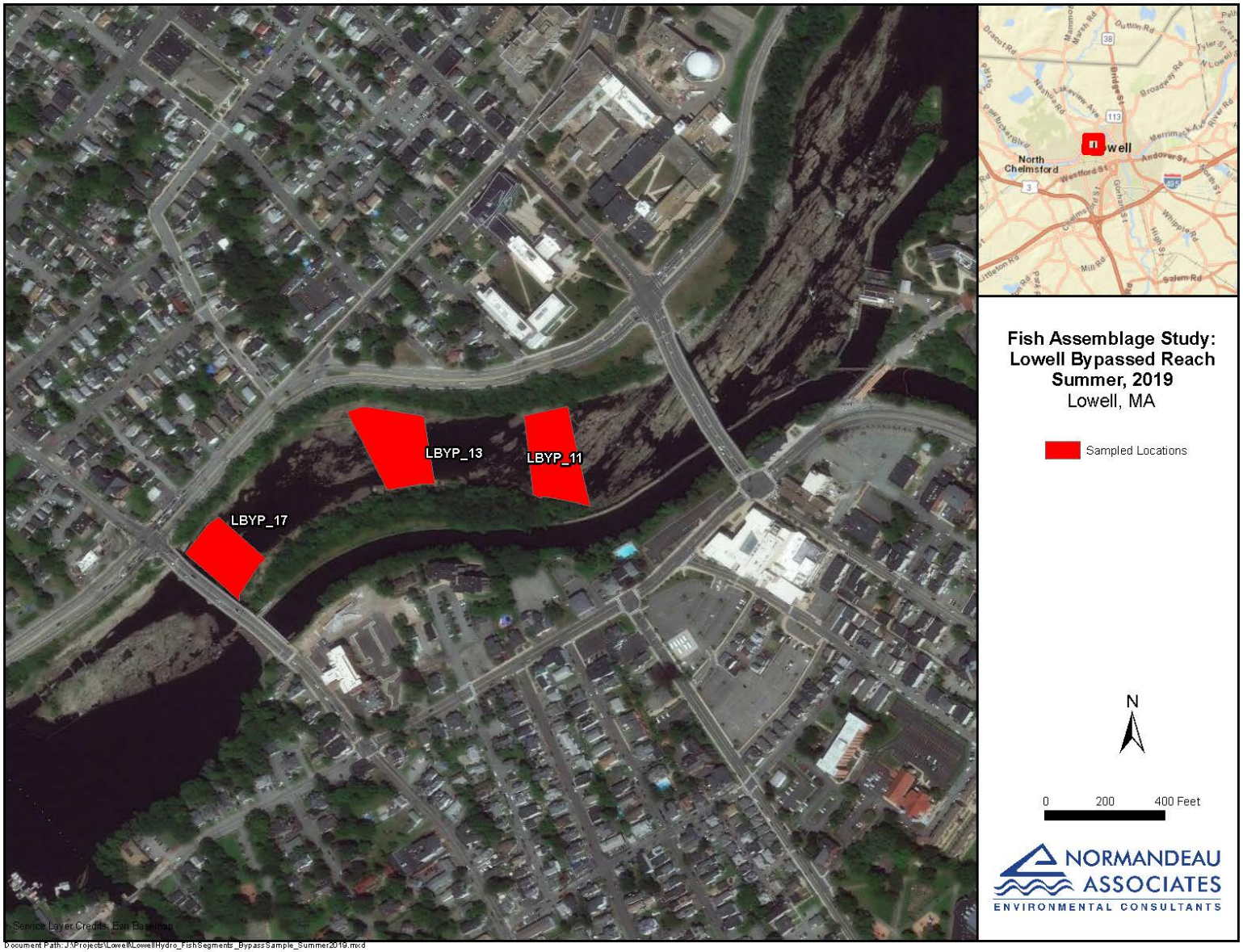
LBYP_11
LBYP_17
Service Layer Credits: Esri Basemap
Document Path: J:\Projects\Lowell\Lowell\Hydro_FishSegments_BypassSample_Spring2019.mxd
North Chelmsford
Fish Assemblage Study:
Lowell Bypassed Reach
Spring, 2019
Lowell, MA
Sampled Location
N
0 200 400 Feet
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS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Service Layer Credits: Esri Basemap
Document Path: J:\Projects\Lowell\Lowell\Hydro_FishSegments_BypassSample_Summer2019.mxd
Fish Assemblage Study:
Lowell Bypassed Reach
Summer, 2019
Lowell, MA
Sampled Locations
N
0 200 400 Feet
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

LBYP_16
LBYP_13
LBYP_11
North Chelmsford
Fish Assemblage Study:
Lowell Bypassed Reach
Fall, 2019
Lowell, MA
Sampled Locations
N
0 200 400 Feet
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
Service Layer Credits: Esri Basemap
Document Path: J:\Projects\Lowell\Lowell\Hydro_FishSegments_BypassSample_Fall2019.mxd

Appendix D. Catch Per Unit of Effort (CPUE) information for back pack electrofish sampling within the bypassed reach downstream of Pawtucket dam by season (spring, summer, and fall) and habitat type (pool and ledge channels).

Back pack electrofish: Spring 2019

Common Name	Ledge Channels		Pooled Section		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
American Eel	20.67	14.00	4.12	1.67	12.40	7.83
Bluegill	0.00	0.00	1.52	0.67	0.76	0.33
Brown Trout	2.95	2.00	0.00	0.00	1.48	1.00
Fallfish	20.67	14.00	20.62	8.33	20.65	11.17
Longnose Dace	2.95	2.00	0.00	0.00	1.48	1.00
Margined Madtom	2.95	2.00	0.00	0.00	1.48	1.00
Redbreast Sunfish	2.95	2.00	0.00	0.00	1.48	1.00
Smallmouth Bass	5.91	4.00	0.00	0.00	2.95	2.00
Spottail Shiner	0.00	0.00	65.66	26.00	32.83	13.00
Tessellated Darter	0.00	0.00	0.76	0.33	0.38	0.17

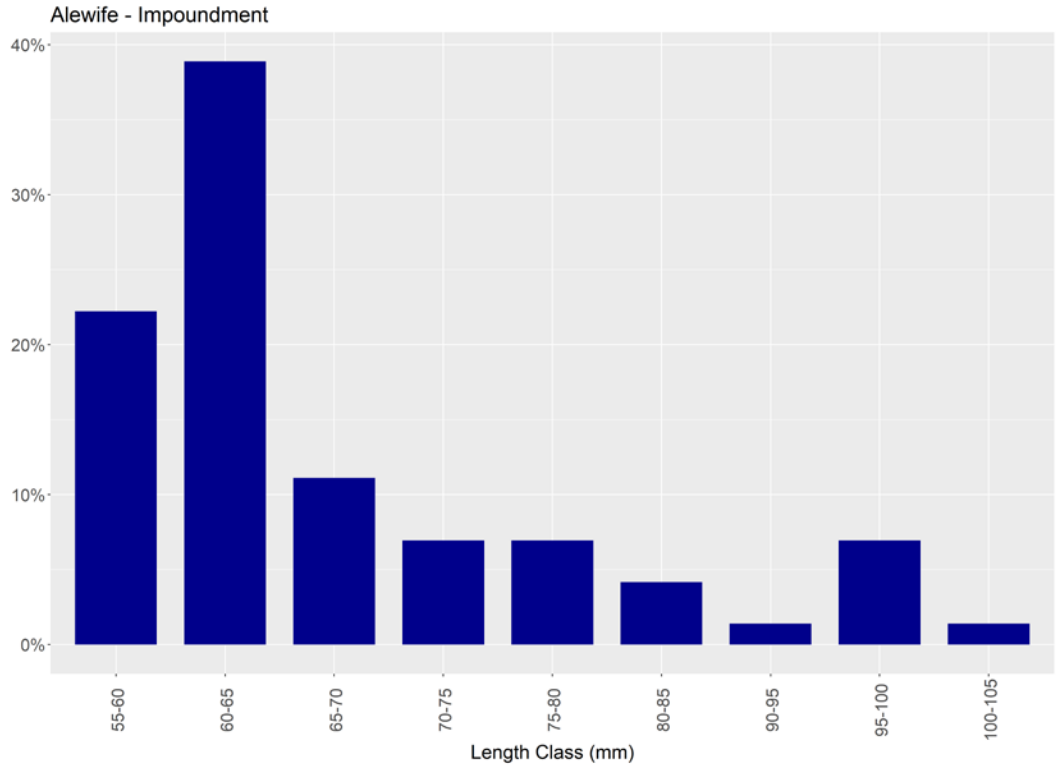
Back pack electrofish: Summer 2019

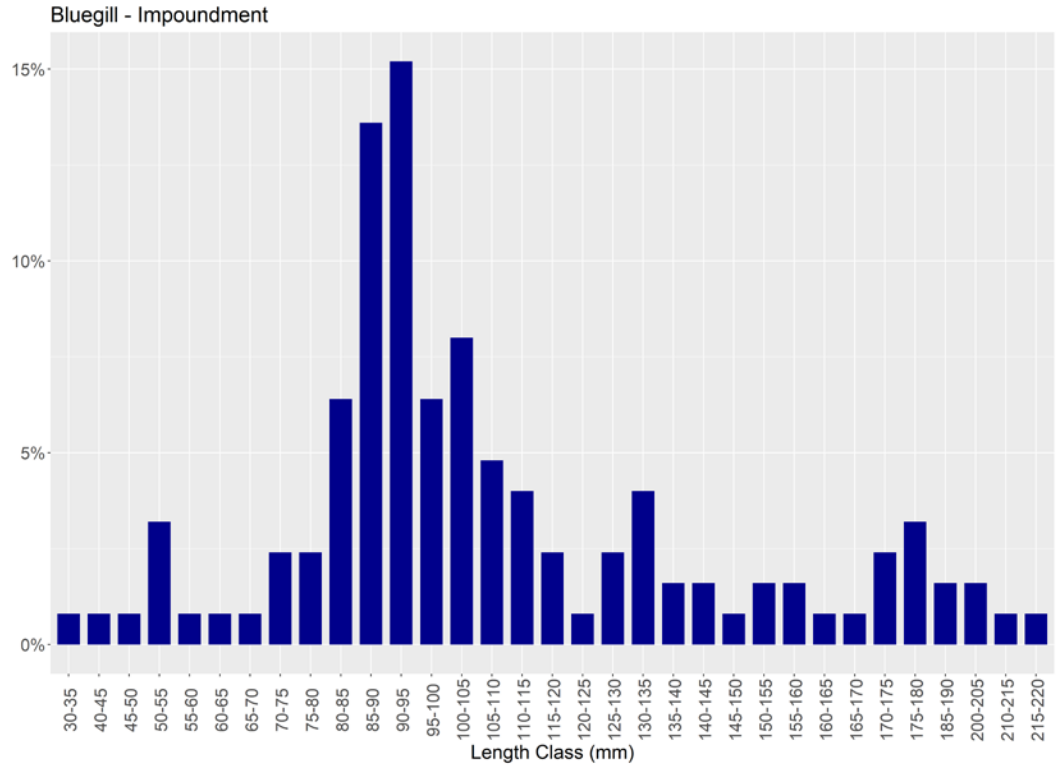
Common Name	Ledge Channels		Pooled Section		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
American Eel	17.72	12.00	6.28	4.00	12.00	8.00
Bluegill	0.00	0.00	0.56	0.33	0.28	0.17
Fallfish	0.00	0.00	97.43	62.33	48.72	31.17
Largemouth Bass	0.00	0.00	1.11	0.67	0.56	0.33
Margined Madtom	0.00	0.00	1.04	0.67	0.52	0.33
Redbreast Sunfish	2.95	2.00	2.15	1.33	2.55	1.67
Smallmouth Bass	73.82	50.00	6.49	4.00	40.15	27.00
Spottail Shiner	0.00	0.00	25.56	16.33	12.78	8.17
Tessellated Darter	2.95	2.00	2.08	1.33	2.52	1.67
White Sucker	0.00	0.00	15.66	10.00	7.83	5.00
Yellow Bullhead	0.00	0.00	2.22	1.33	1.11	0.67

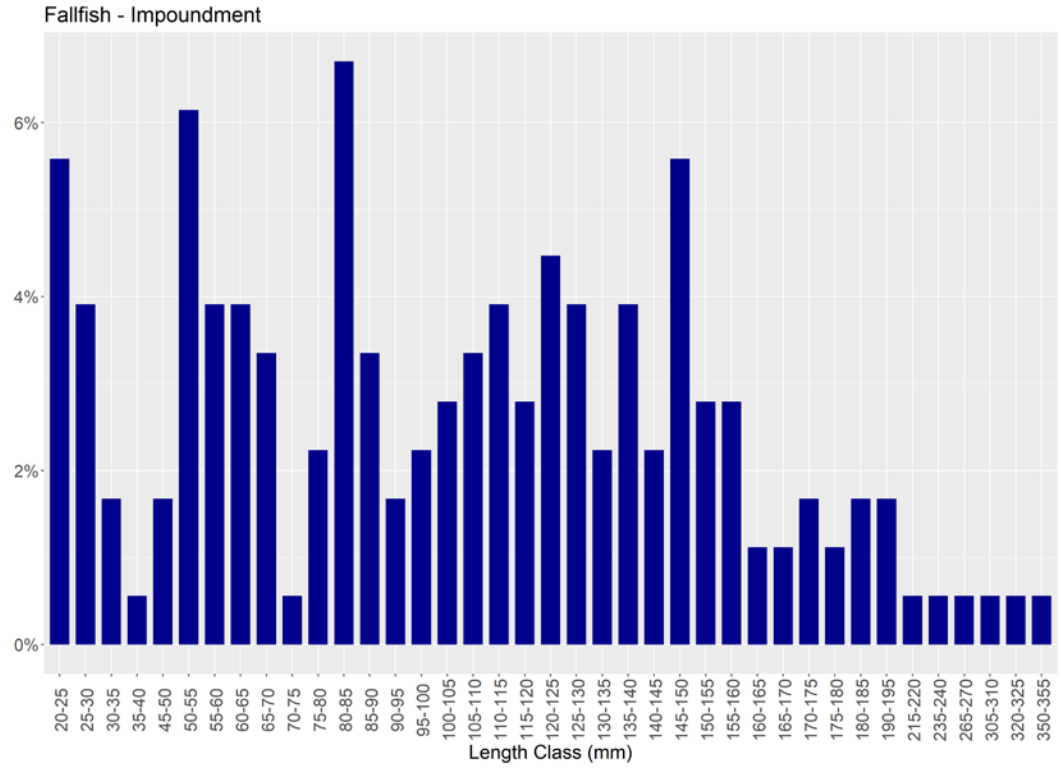
Back pack electrofish: Fall 2019

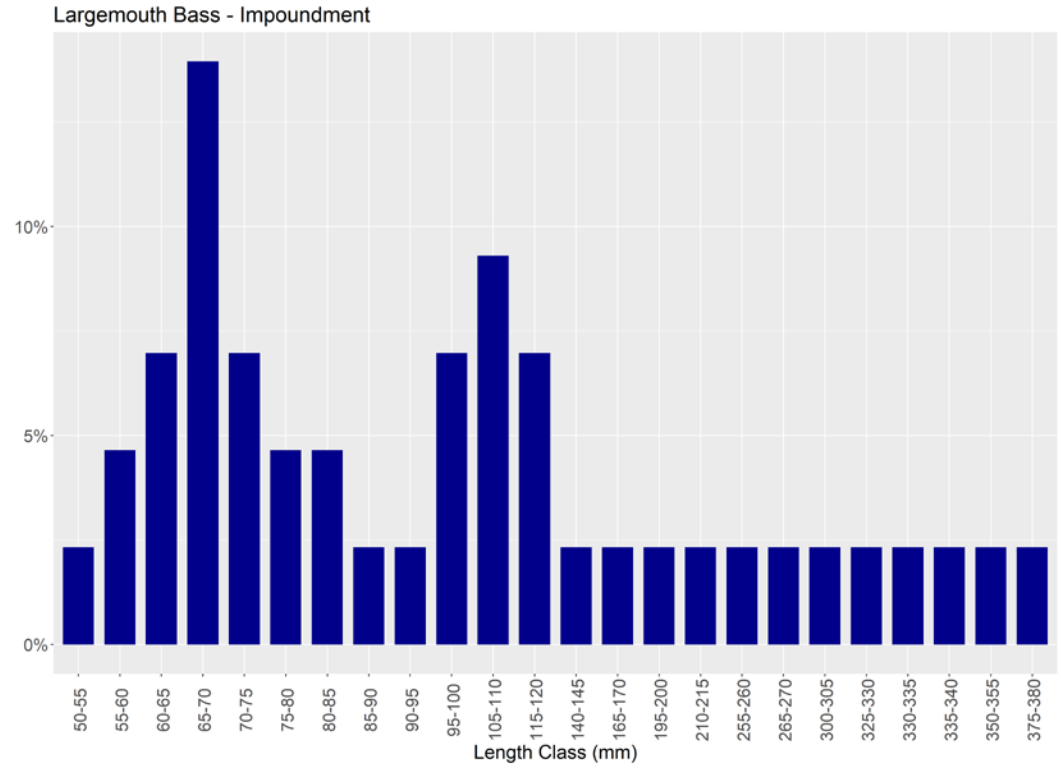
Common Name	Ledge Channels		Pooled Section		Total	
	Fish/hr	Fish/100m	Fish/hr	Fish/100m	Fish/hr	Fish/100m
American Eel	0.00	0.00	3.62	1.67	1.81	0.83
Fallfish	0.00	0.00	0.72	0.33	0.36	0.17
Lepomis spp.	0.00	0.00	1.68	0.67	0.84	0.33
Longnose Dace	2.95	2.00	0.00	0.00	1.48	1.00
Margined Madtom	0.00	0.00	12.06	5.33	6.03	2.67
Redbreast Sunfish	20.67	14.00	0.00	0.00	10.33	7.00
Sea Lamprey	0.00	0.00	1.68	0.67	0.84	0.33
Smallmouth Bass	88.58	60.00	38.08	16.33	63.33	38.17
Tessellated Darter	0.00	0.00	3.86	1.67	1.93	0.83
White Sucker	8.86	6.00	0.00	0.00	4.43	3.00
Yellow Bullhead	0.00	0.00	0.72	0.33	0.36	0.17

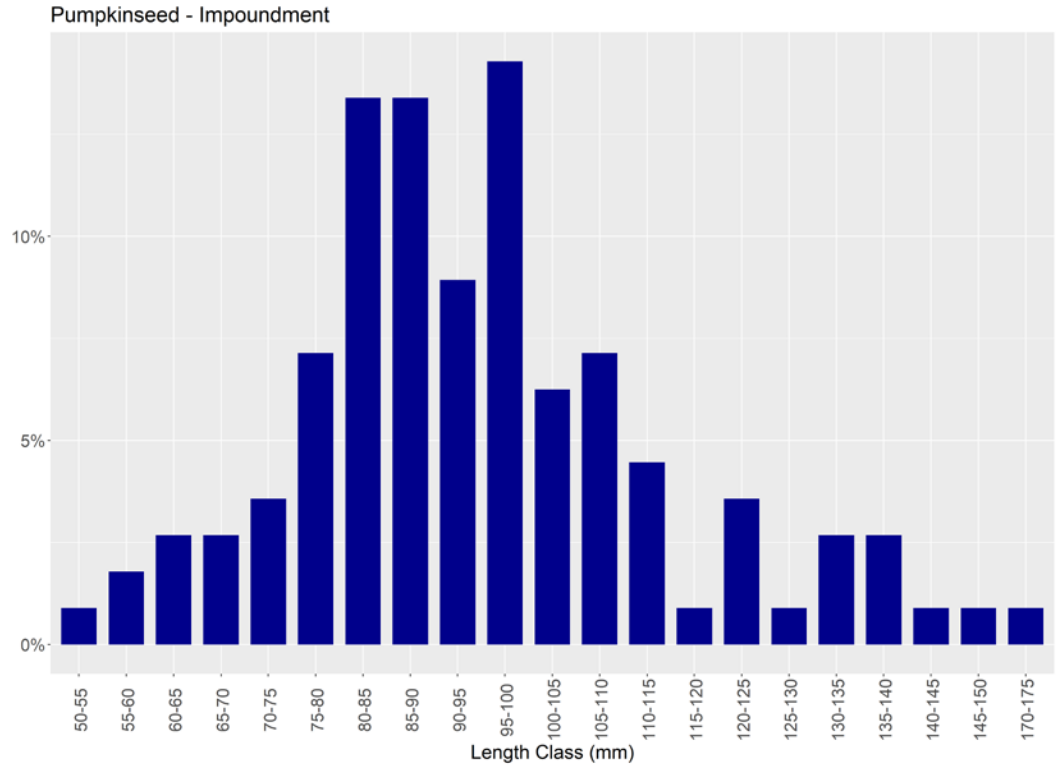
Appendix E. Length frequency distributions for common fish species collected by boat electrofish and experimental gill net sampling in the Lowell impoundment and back pack electrofish sampling within the bypassed reach downstream of Pawtucket dam.

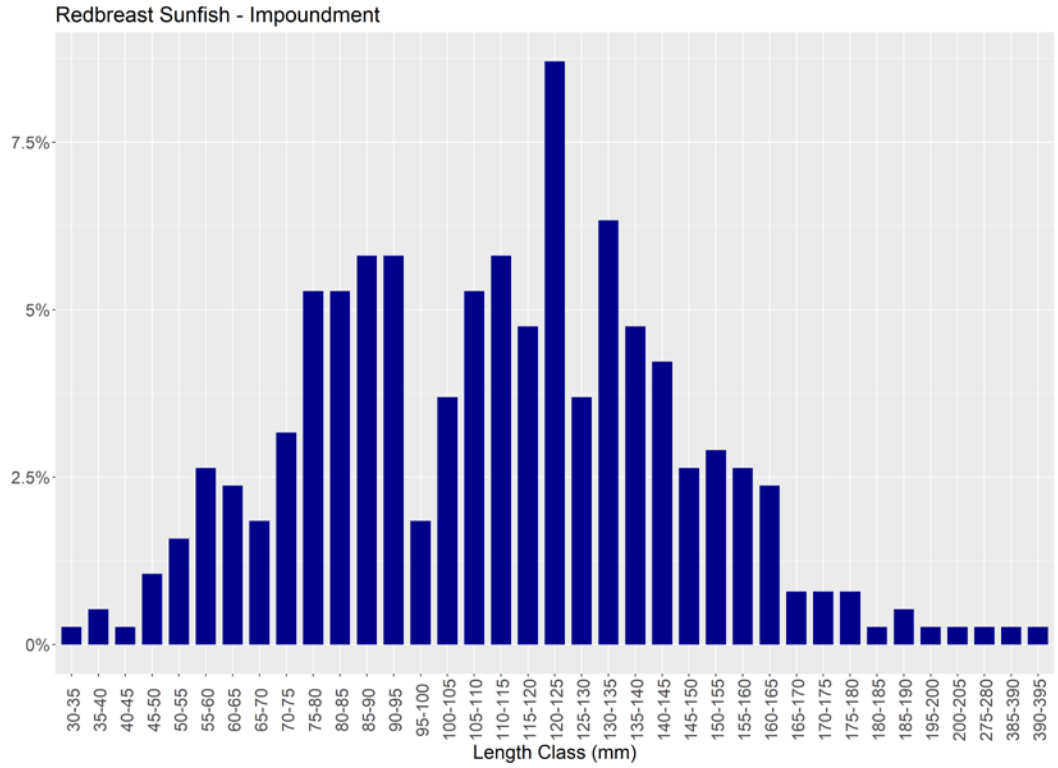

Alewife - Impoundment
40%
30%
20%
10%
0%
55-60
60-65
65-70
70-75
75-80
80-85
90-95
95-100
100-105
Length Class (mm)

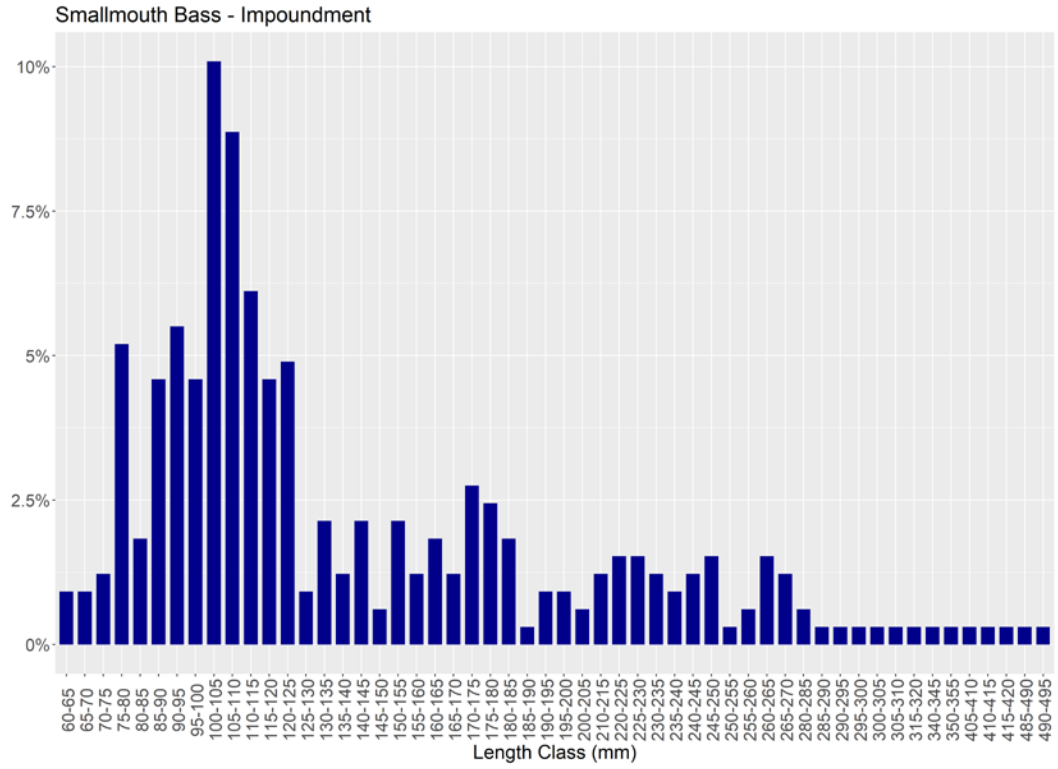

Bluegill - Impoundment
15%
10%
5%
0%
30-35
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-105
105-110
110-115
115-120
120-125
125-130
130-135
135-140
140-145
145-150
150-155
155-160
160-165
165-170
170-175
175-180
185-190
200-205
210-215
215-220
Length Class (mm)

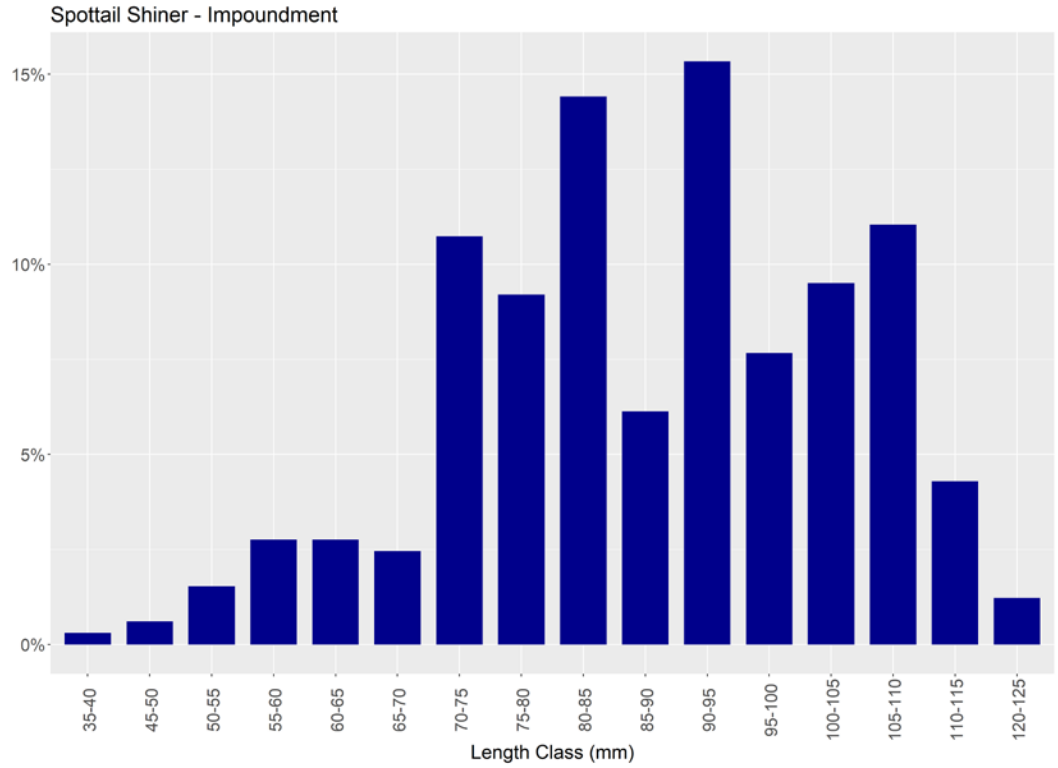

Fallfish - Impoundment
6%
4%
2%
0%
20-25
25-30
30-35
35-40
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-105
105-110
110-115
115-120
120-125
125-130
130-135
135-140
140-145
145-150
150-155
155-160
160-165
165-170
170-175
175-180
180-185
190-195
215-220
235-240
265-270
305-310
320-325
350-355
Length Class (mm)

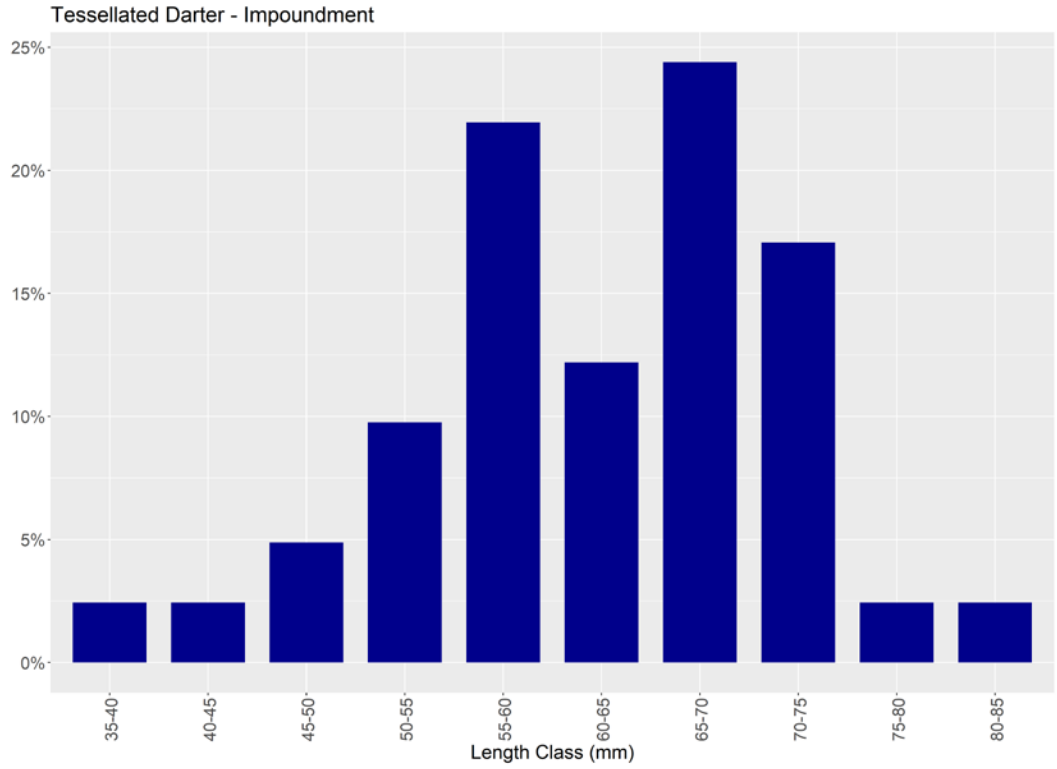

Largemouth Bass - Impoundment
10%
5%
0%
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
105-110
115-120
140-145
165-170
195-200
210-215
255-260
265-270
300-305
325-330
330-335
335-340
350-355
375-380
Length Class (mm)

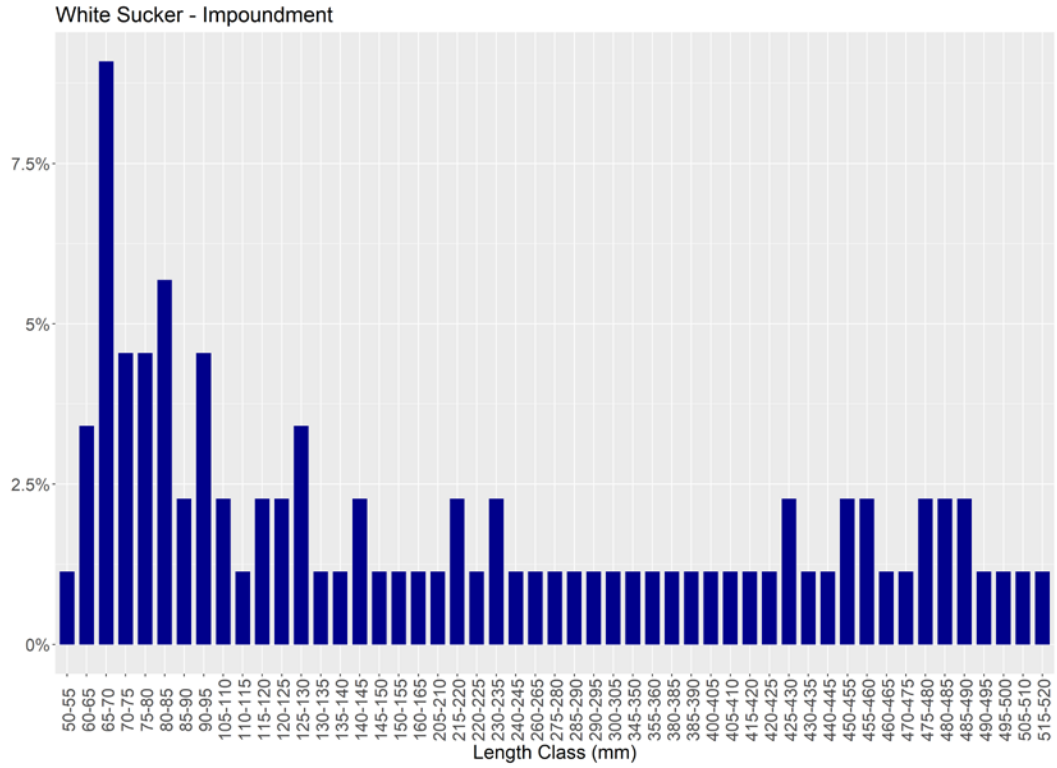

Pumpkinseed - Impoundment
10%
5%
0%
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-105
105-110
110-115
115-120
120-125
125-130
130-135
135-140
140-145
145-150
170-175
Length Class (mm)


Redbreast Sunfish - Impoundment
7.5%
5%
2.5%
0%
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-105
105-110
110-115
115-120
120-125
125-130
130-135
135-140
140-145
145-150
150-155
155-160
160-165
165-170
170-175
175-180
180-185
185-190
195-200
200-205
275-280
385-390
390-395
Length Class (mm)


Smallmouth Bass - Impoundment
10%
7.5%
5%
2.5%
0%
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-105
105-110
110-115
115-120
120-125
125-130
130-135
135-140
140-145
145-150
150-155
155-160
160-165
165-170
170-175
175-180
180-185
185-190
190-195
195-200
200-205
210-215
220-225
225-230
230-235
235-240
240-245
245-250
250-255
255-260
260-265
265-270
280-285
285-290
290-295
295-300
300-305
305-310
315-320
340-345
350-355
405-410
410-415
415-420
485-490
490-495
Length Class (mm)


Spottail Shiner - Impoundment
15%
10%
5%
0%
35-40
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85-90
90-95
95-100
100-105
105-110
110-115
120-125
Length Class (mm)


Tessellated Darter - Impoundment
25%
20%
15%
10%
5%
0%
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
Length Class (mm)


White Sucker - Impoundment
7.5%
5%
2.5%
0%
50-55
60-65
65-70
70-75
75-80
80-85
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135-140
140-145
145-150
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160-165
205-210
215-220
220-225
230-235
240-245
260-265
275-280
285-290
290-295
300-305
345-350
355-360
380-385
385-390
400-405
405-410
415-420
420-425
425-430
430-435
440-445
450-455
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475-480
480-485
485-490
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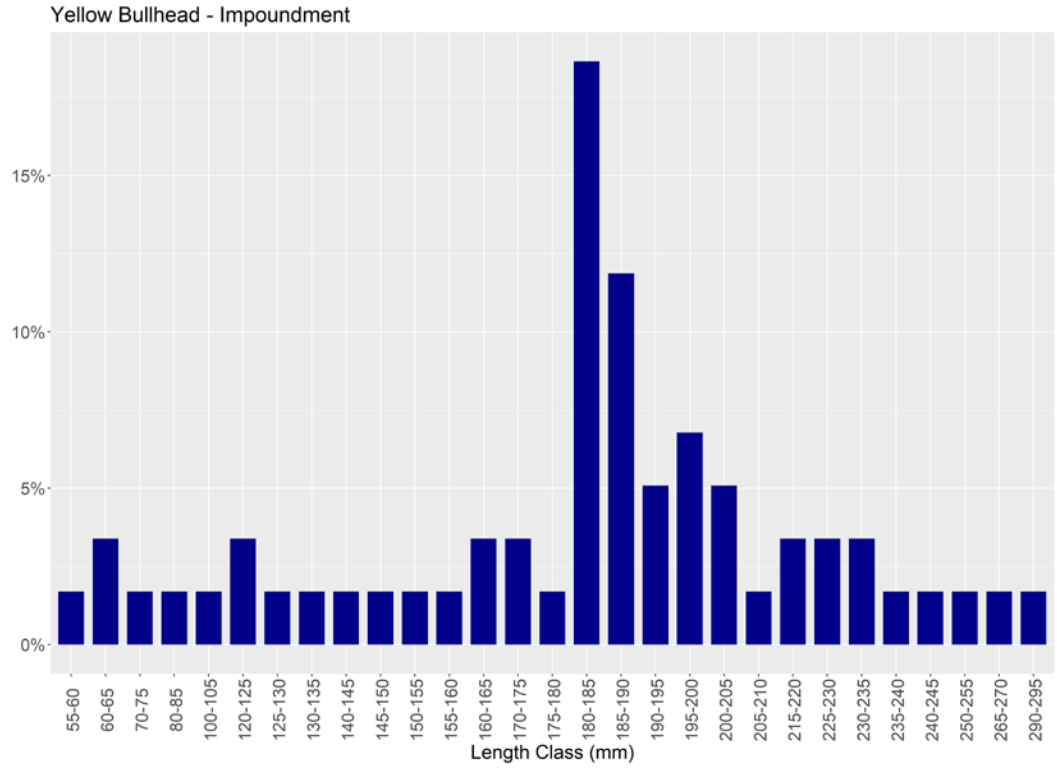
495-500
505-510
515-520
Length Class (mm)


Yellow Bullhead - Impoundment
15%
10%
5%
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55-60
60-65
70-75
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120-125
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130-135
140-145
145-150
150-155
155-160
160-165
170-175
175-180
180-185
185-190
190-195
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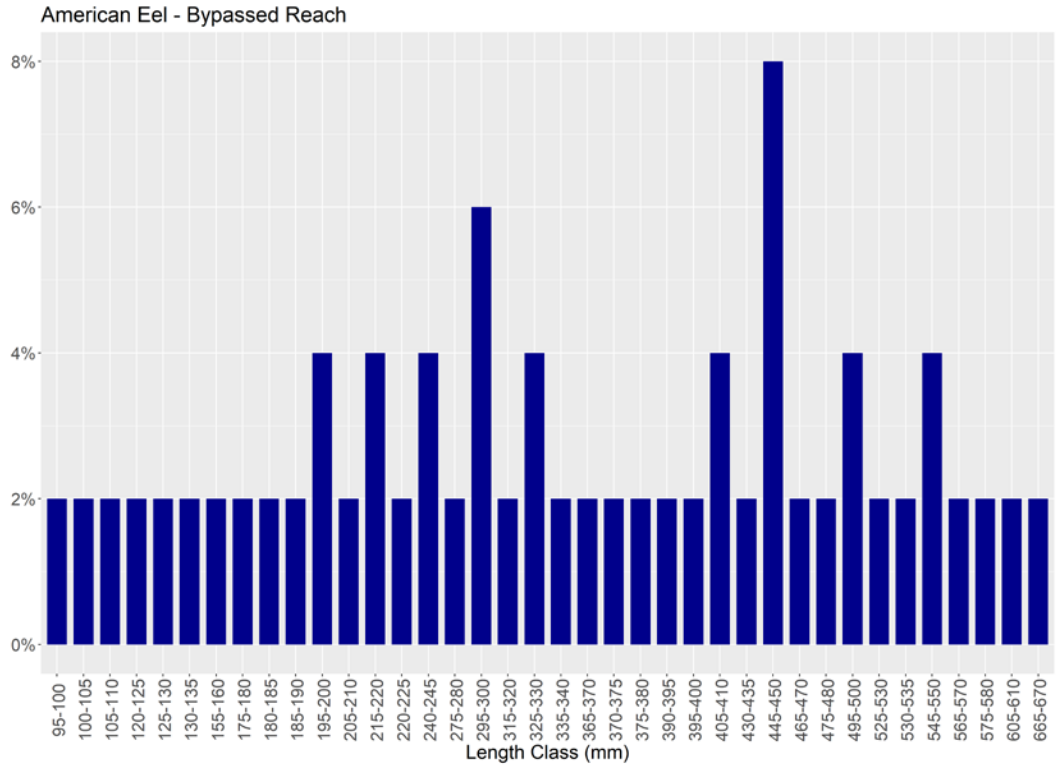
Length Class (mm)


American Eel - Bypassed Reach
8%
6%
4%
2%
0%
95-100
100-105
105-110
120-125
125-130
130-135
155-160
175-180
180-185
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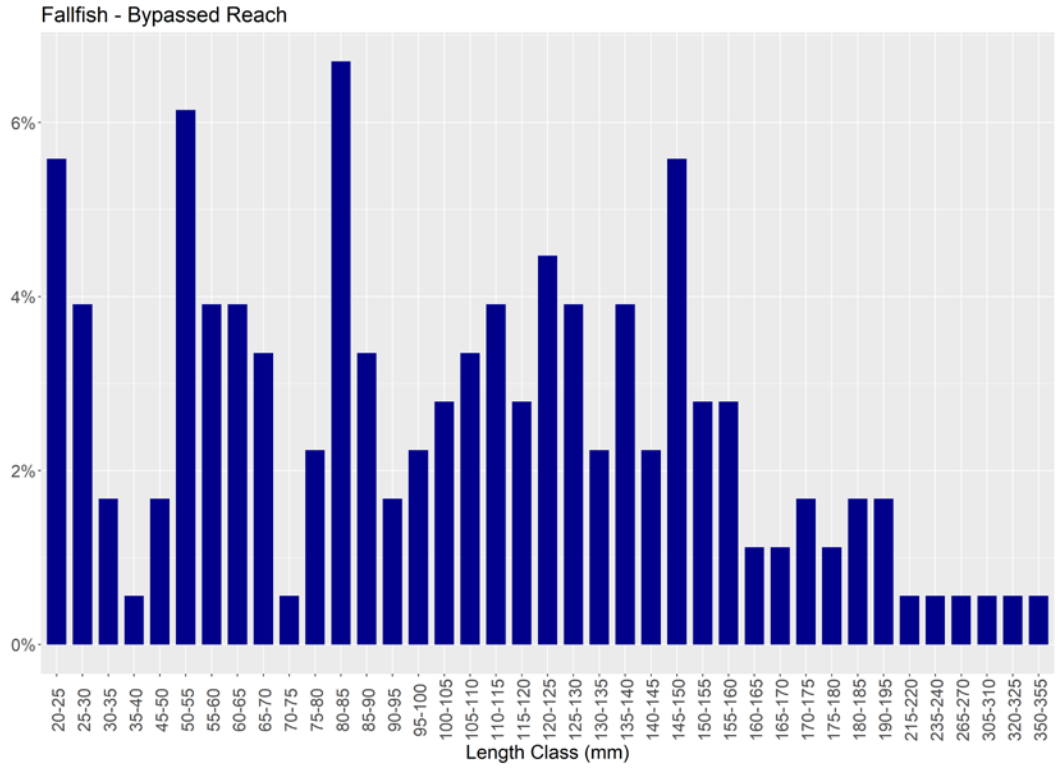
665-670
Length Class (mm)


Fallfish - Bypassed Reach
6%
4%
2%
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20-25
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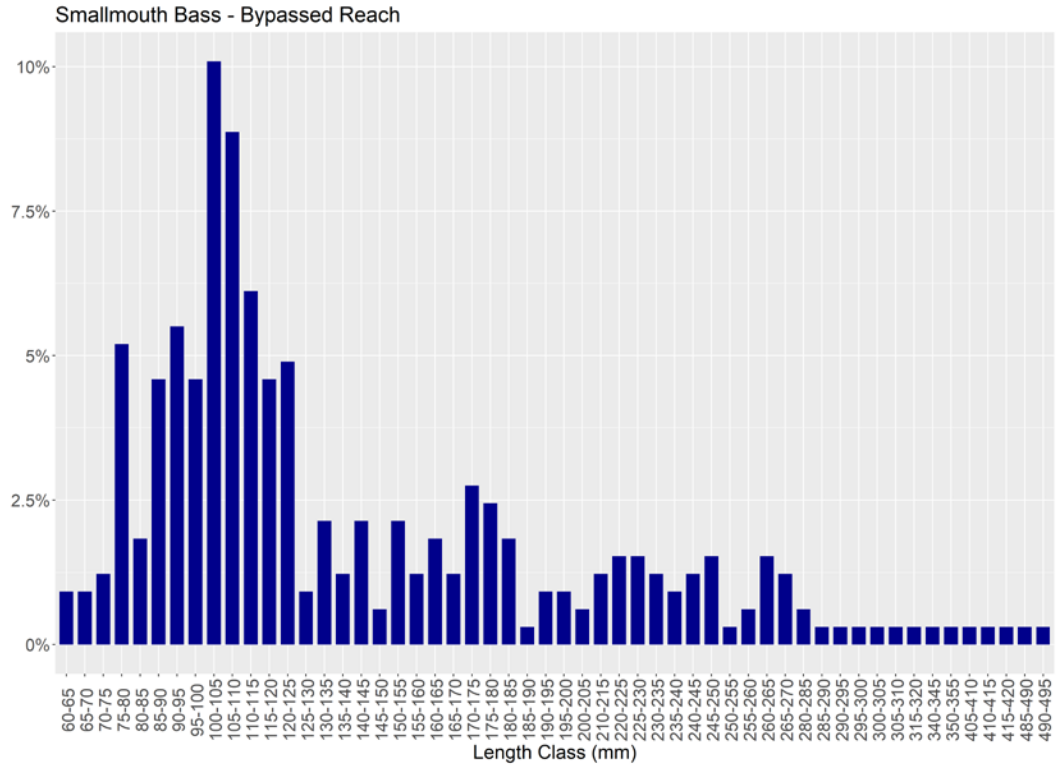
Smallmouth Bass - Bypassed Reach
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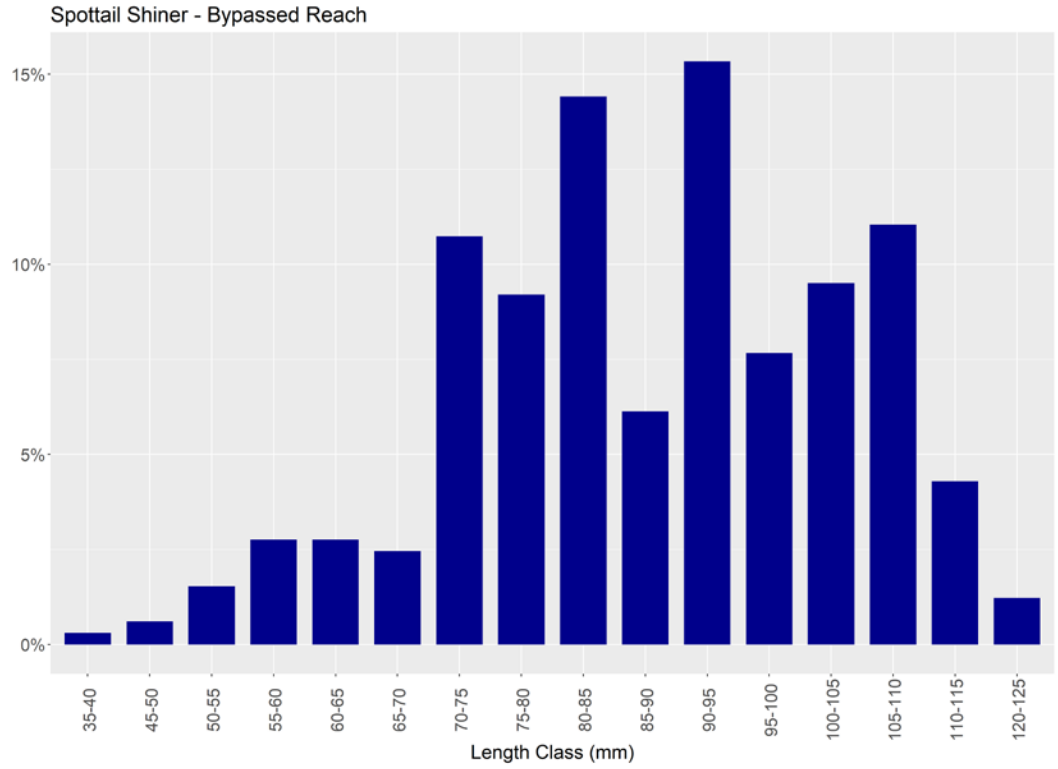
Length Class (mm)


Spottail Shiner - Bypassed Reach
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35-40
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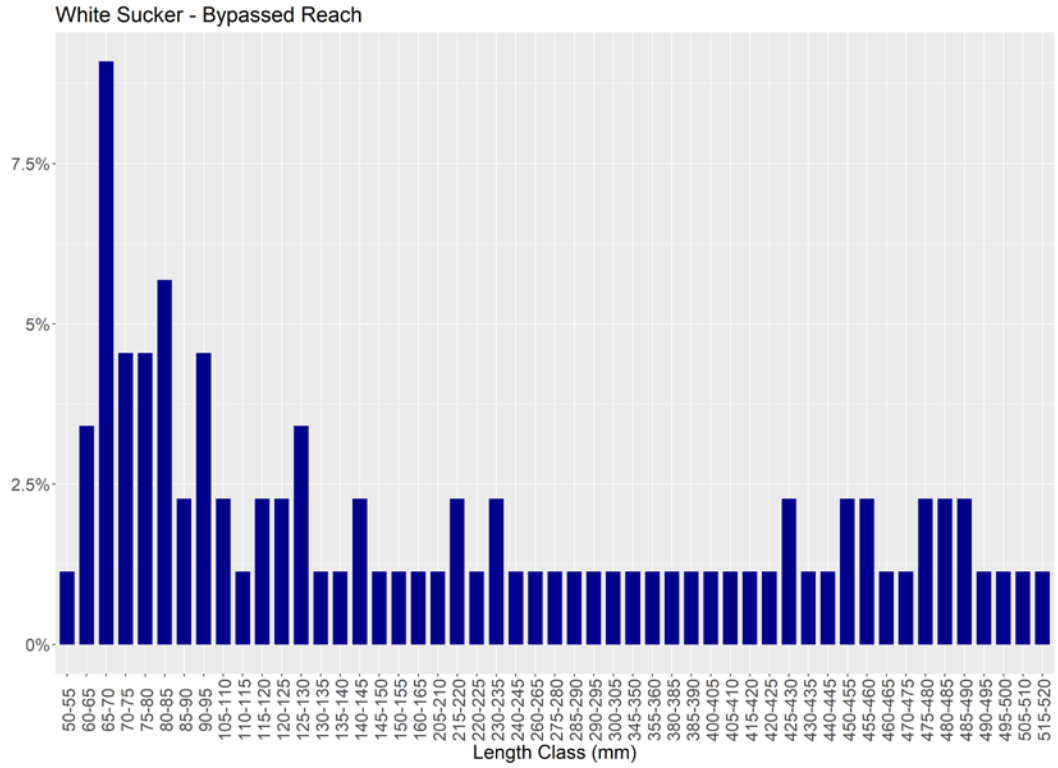
120-125
Length Class (mm)


White Sucker - Bypassed Reach
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455-460
460-465
470-475
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505-510
515-520
Length Class (mm)

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Report Appendix F available as Microsoft Excel data listing.

Technical Report for the Juvenile Alosine Downstream Passage Assessment

Lowell Hydroelectric Project (FERC No. 2790)

Prepared For

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February 25, 2021

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1 Introduction

A radio-telemetry assessment of the effects of project operation on downstream migrating juvenile alosines was conducted in support of the relicensing for the Lowell Hydroelectric Project (Lowell or Project), Federal Energy Regulatory Commission (FERC) No. 2790, as identified in the Revised Study Plan (RSP) submitted by Boott Hydropower, LLC (Boott) on January 28, 2019. The approach and methodology described in the RSP for the juvenile alosine study was approved without modifications by FERC in its Study Plan Determination (SPD) letter dated March 13, 2019.

In accordance with 18 C.F.R. § 5.15(c), Boott filed their Initial Study Report (ISR) with FERC on February 25, 2020. As described in the ISR, data analyses were in progress and scheduled for completion during 2020. On June 12, 2020 FERC issued a Revised Process Plan and Schedule and Determination on Requests for Study Modifications for the Lowell Hydroelectric Project (Revised PPS). In accordance with the Revised PPS, Boott filed their Revised ISR with FERC on September 30, 2020, which contained a full report for the Juvenile Alosine Downstream Passage Assessment. Boott held a revised ISR meeting on October 15, 2020 and representatives from FERC, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Massachusetts Division of Fisheries and Wildlife (MADFW), Massachusetts Division of Marine Fisheries (MDMF), and the New Hampshire Fish and Game Department (NHFGD) had the opportunity to provide comments. Subsequent to the September 30, 2020 ISR meeting, the MADFW (November 25, 2020), NMFS (November 30, 2020), and MDMF (November 30, 2020) submitted written comments on the ISR to FERC. A summary of comments received and the corresponding responses is provided in Appendix D of this report. Where noted, the body of the report has been updated to reflect the content of those comments.

This final technical report provides a description of the objectives, methodologies and results of the 2019 radio-telemetry assessment to evaluate the effect of operations on downstream migrating juvenile alosines at the Lowell Project.

2 Objectives

The goal of this study was to determine the Lowell Project's impact on the outmigration of juvenile alosines.

Specific objectives included:

- Assess the effects of the Project on the timing, orientation, passage routes, and migration rates of juvenile alosines.
- Determine the proportion of juvenile alosines that select the Pawtucket Canal versus the E.L. Field Powerhouse, downstream bypass facility, or dam spill as a downstream passage route, under varied operational conditions.

- Determine if there are any delays associated with downstream movement related to either dam spill or the E.L. Field Powerhouse due to operations.

3 Project Description and Study Area

The Lowell Project is located at River Mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of: (1) a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones; (2) a 720-acre impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29; (3) a 5.5-mile-long canal system which includes several small dams and gatehouses; (4) a powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW); (5) a 440-foot-long tailrace channel; (6) four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal System containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW; (7) a 4.5-mile long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid; (8) upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket dam; and (9) appurtenant facilities. At the normal pond elevation of 92.2 feet NGVD 1929 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control, and has no usable storage capacity.

The study area for the juvenile alosine passage assessment included the section of the Merrimack River from the point approximately 1.0 mile upstream of the Pawtucket Gatehouse to a point approximately 2.1 miles downstream from the E.L. Field Powerhouse tailrace (Figure 3-1). The Upper Pawtucket Canal and Guard Locks facility were also considered as part of the study area.

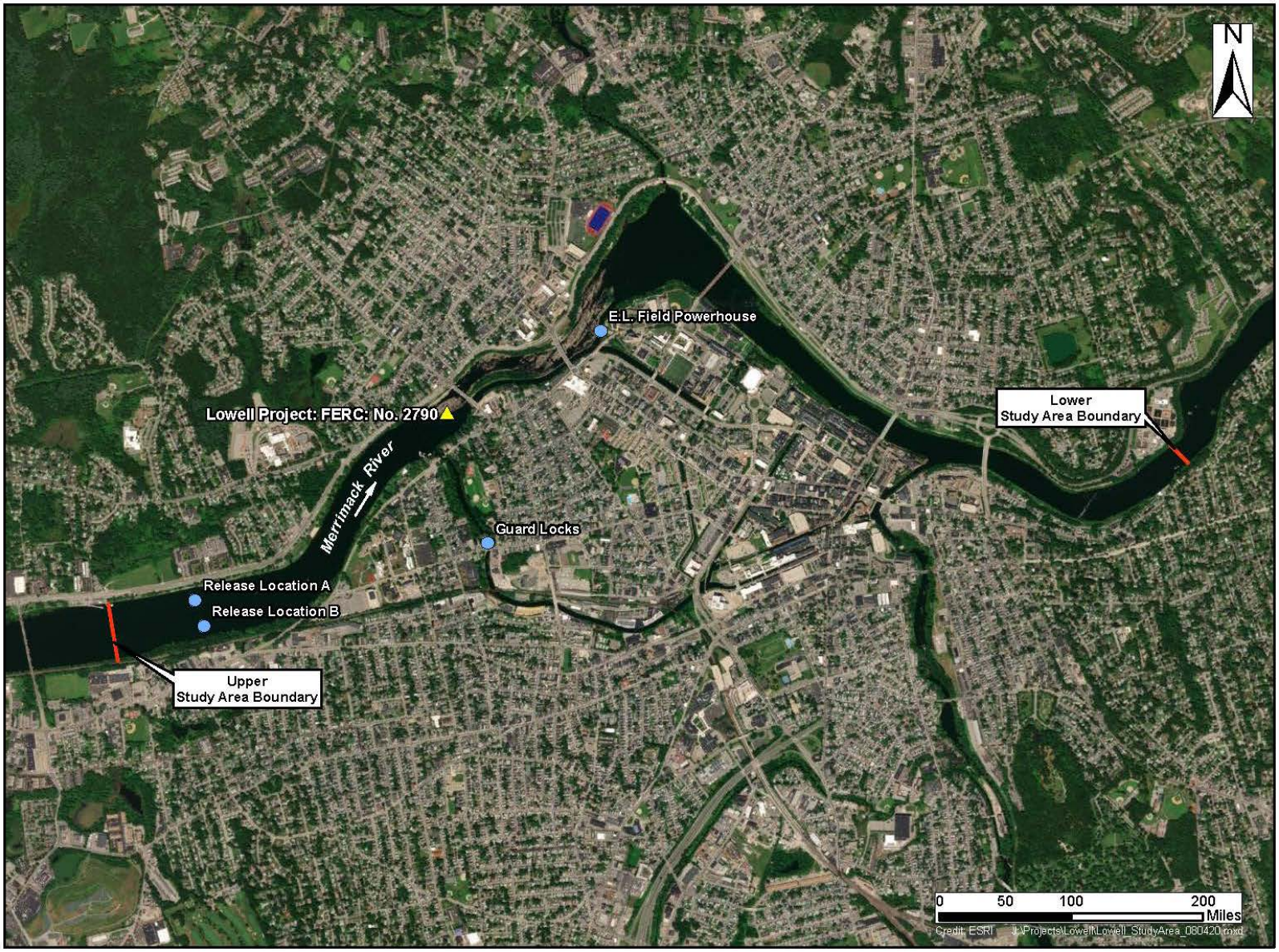

Figure 3–1. Merrimack River study reach considered during the fall 2019 juvenile alosine downstream passage assessment.

4 Methods

Downstream passage of juvenile alosines through the Lowell Project reach was evaluated using radio-telemetry during the fall of 2019. Following the release of radio-tagged individuals into the Lowell impoundment at a point approximately 1.0 miles upstream of the Pawtucket Gatehouse, downstream movements were monitored using a series of stationary radio-telemetry receivers in place at the Project as well as stationary monitoring stations installed at bank-side locations upstream and downstream of the Project to inform on general movements, distribution among available passage routes and continued downstream travel.

4.1 Radio Telemetry Equipment

Movements of radio-tagged individuals during the 2019 study were recorded via a series of stationary radio-telemetry receivers. Radio-telemetry equipment used during the evaluation of downstream passage at Lowell included Orion receivers, manufactured by Sigma Eight, as well as SRX receivers manufactured by Lotek Wireless. Each receiver was paired with either an aerial or underwater antenna (dropper antenna). Aerial antennas (four or six element Yagi) were utilized to detect radio-tagged individuals within the larger, more open sections of river, such as within the tailrace or at locations downriver of Lowell. Dropper antennas were fixed at downstream passage locations (e.g., downstream bypass).

Juvenile alosines radio-tagged during 2019 were equipped with a Lotek NTF-1-1 transmitter. The NTF-1-1 transmitters measured approximately 5 x 3 x 9.6 mm, weighed 0.24 grams and had an estimated battery life of 13 days when set at a 2.0 second burst rate. Each transmitter was coded to emit a unique identifying signal so that individual juvenile alosines could be identified by any given receiver.

4.2 Monitoring Stations

The RSP identified a total of ten monitoring stations to be set up at Lowell for the downstream juvenile alosine passage assessment. Each of the ten monitoring locations identified in the RSP were installed as described and each location consisted of a data-logging receiver, antenna, power source, and were configured to receive transmitter signals from a designated area continuously throughout the study period. During installation of each station, range testing was conducted to configure the antennas and receivers in a manner which maximized detection efficiencies at each location. The operation of the radio telemetry receivers was initially established during installation, then confirmed throughout the study period by using beacon tags. A number of beacon tags were stationed at strategic locations within the detection range of either multiple or single antennas, and they emitted signals at programmed time intervals. These signals were detected and logged by the receivers and used to record the functionality of the system throughout the study period.

The locations of monitoring stations installed for the 2019 juvenile alosine passage evaluation at Lowell are outlined here and presented in Figures 4-1 through 4-3.

Monitoring Station 20: This station was installed at a location downstream of the release location and upstream of Pawtucket Dam and was intended to detect radio-tagged juvenile alosines following their initial downstream movement away from the release location. Station 20 consisted of a single Lotek SRX receiver and an aerial antenna oriented perpendicular to the river channel and was located at a point approximately 0.6 miles upstream of the Pawtucket Gatehouse.

Monitoring Station 21: This station consisted of a single Lotek SRX radio-receiver and an aerial antenna located at the Project compressor building. Station 21 was installed and calibrated to provide information on radio-tagged juvenile alosines as they approached the upstream face of Pawtucket Dam. Detections at this location were used to inform on the arrival of radio-tagged juveniles at the Project.

Monitoring Station 24: Monitoring Station 24 consisted of a Lotek SRX radio-receiver and an aerial antenna installed to detect radio-tagged juvenile alosines which had entered the Pawtucket Canal system. The entrance to the Pawtucket Canal sits at a point upstream of the Pawtucket Dam and the Northern Canal. Station 24 was located at the Guard Locks, approximately 1,700 feet downstream from the entrance to the canal. The monitoring zone for Station 24 was focused downstream of the Guard Locks facility to ensure any detections recorded at that location were of fish which had definitively entered the downtown canal system.

Monitoring Station 26: Station 26 consisted of a single Orion radio-receiver and aerial antenna installed and calibrated to provide coverage of the upstream side of the Pawtucket Gatehouse. This station informed on radio-tagged juvenile alosines which had approached the upstream side of the Pawtucket Gatehouse.

Monitoring Station 28: Station 28 consisted of a single Lotek radio-receiver and aerial antenna installed and calibrated to provide coverage of the downstream side of the Pawtucket Gatehouse. This station informed on radio-tagged juvenile alosines which had successfully passed through the Pawtucket Gatehouse and entered the Northern Canal.

Monitoring Station 30: Station 30 consisted of a single Lotek SRX radio-receiver and aerial antenna installed and calibrated to provide detection information for radio-tagged juvenile alosines that passed through the Pawtucket Gatehouse, entered the E.L. Field Powerhouse forebay (i.e., the downstream potion of the Northern Canal) and were in the vicinity of the entrance to the downstream bypass and intake racks.

Monitoring Station 32: This station consisted of a single Orion radio-receiver and underwater drop antenna installed and calibrated to provide detection information for radio-tagged juvenile alosines exiting the forebay via the downstream bypass.

Monitoring Station 34: Station 34 consisted of a single Lotek SRX radio-receiver and aerial antenna installed and calibrated to scan across the bypassed reach at a point downstream of where the surge gate enters from the power canal and upstream from the downstream bypass.

Detections at this location confirmed downstream passage of juvenile alosines using the spillway or surge gate.

Monitoring Station 36: This station consisted of a single Lotek radio-receiver and aerial antenna installed at a location overlooking the project tailrace. Detections at this location were used to confirm the downstream passage of radio-tagged juvenile alosines via the E.L. Field powerhouse turbine units.

Monitoring Station 38: This station was installed at a point along the mainstem of the Merrimack River downstream of both the E.L. Field Powerhouse tailrace and the confluence with the Concord River. Station 38 consisted of a single Lotek SRX receiver and aerial antenna oriented perpendicular to the river channel and was installed at the Lowell Waste Water Treatment Plant, approximately 2.1 miles downstream of the tailrace.

4.3 Tagging and Release Procedures

Juvenile alosines were collected by boat electrofishing from Turtletown Pond in Concord, NH. Following collection, juvenile alosines were transported by tank truck to a temporary holding facility at the Garvins Falls Dam on the Merrimack River, Bow, NH. Once transferred to the holding tanks, collected juvenile alosines were allowed to acclimate for a minimum of 24 hours prior to tagging in order to observe for any latent post capture mortality.

NTF-1-1 transmitters were attached to a dry fly hook using bonding cement. The hook was inserted posterior to the dorsal fin with the majority of the tag and antenna trailing behind the insertion point (Figure 4-4). After tagging, fish were held in holding containers and maintained in ambient Merrimack River water until they were transported to the release site. As part of the 2019 passage route evaluation, a total of 10 separate release groups, each comprising up to 15 tagged and 15 untagged juvenile alosines, were released. Each release group was separated into two holding containers, each consisting of 7-8 tagged and 7-8 untagged juvenile alosines resulting in a total of 15 fish per container. Tagged juvenile alosines driven to the Rourke Brothers Boat Ramp in Lowell, MA and were then transported by boat to a location approximately 1.0 miles upstream of the Pawtucket Gatehouse. During each release event, the two holding containers were lowered over the side of the boat and the tagged and untagged juvenile alosines were allowed to volitionally exit the container. On each release date the total number of individuals placed in the river were split over two separate release points, one in the eastern third of the river and the other in the western third of the river. The date, time, and release location of each group of tagged alosines was recorded.

4.4 Data Collection

4.4.1 Stationary Telemetry Data

Receiver downloads occurred three to four times weekly during the period from the initial tag and release event until November 12, 2019 (i.e., six days beyond the anticipated battery life for radio-transmitters used for the final test fish release group (October 24, 2019)). Backup copies of all telemetry data were made prior to receiver initialization. Field tests at the time of

download to ensure data integrity and receiver performance included confirmation of file integrity, confirmation that the last record was consistent with the downloaded data (beacon tags were critical to this step), and lastly, confirmation that the receiver was operational upon restart and actively collecting data post download. Within a data file, transmitter detections were stored as a single event (i.e., single data line). Each event included the date and time of detection, frequency, ID code, and signal strength.

4.4.2 Manual Telemetry Data

To provide supplemental detection information to the stationary receiver data set, manual tracking was conducted on a number of occasions from the time of initial release through mid-November, 2019. Manual effort was exerted in the vicinity of the Lowell Project (i.e., tailrace and headpond immediately upstream of Pawtucket Dam) on most dates when stationary telemetry equipment was checked. In addition, a number of boat or truck-based efforts were conducted to look for radio-tagged individuals within the lower Lowell impoundment and the reach of the Merrimack downstream to Lawrence.

4.4.3 Operational and Environmental Data

Merrimack River water temperature was recorded via a continuously operating logger installed within the Lowell intake canal. Hourly records for operations data were provided by Boott for the 2019 evaluation period and included:

- Headpond elevation (ft);
- Power canal elevation (ft);
- Headpond-power canal differential (ft);
- Tailrace elevation (ft);
- Head differential for E.L. Field turbines (ft);
- Total inflow (cfs);
- Unit 1 discharge (cfs) and output (KW);
- Unit 2 discharge (cfs) and output (KW);
- Downstream bypass discharge (cfs);
- Upstream fishway discharge (cfs);
- Downtown canal flow (cfs); and
- Spill flow through the bypassed reach (cfs).

4.5 Data Analysis

The tagging, telemetry and Project operations data sets collected as part of this effort were examined and used to evaluate a number of metrics related to downstream passage success and movement through the Project area.

4.5.1 Downstream Movement and Passage Route Selection

A complete record of all valid stationary receiver detections for each radio-tagged juvenile alosines was generated. The pattern and timing of detections in these individual records were reviewed, and a route of passage as well as project arrival and passage times were assigned to

each radio-tagged individual. In the instance that a downstream route could not be clearly determined from the collected data, the passage event for that particular fish was classified as 'unknown'.

Where data were available, project residence times were calculated. Upstream residence duration was defined as the duration of time from the initial detection at Station 21 until the determined time of downstream passage. Time spent immediately upstream of the dam was further evaluated using initial detection times for radio-tagged juvenile alosines at Monitoring Stations 26 and 28 to provide an understanding of passage times associated with moving through the Pawtucket Gatehouse and entering into the Northern Canal approach to the E.L. Field powerhouse (i.e. "Pawtucket Gatehouse Passage"). Power canal residency was evaluated using the initial detection at Station 28 and the time of downstream passage to provide an understanding of the time spent within the Northern Canal prior to passage route selection (i.e. "Northern Canal Residence").

4.5.2 Time to Event Analysis

4.5.2.1 Cox Proportional Hazard Model

Utilizing available methodology for quantifying fish passage performance (Castro-Santos and Perry 2012), multi-variate Cox proportional hazard models were developed to assess the impact of various operational and environmental variables on the rate of passage success. Operational and environmental variables considered as part of this analysis included:

- Merrimack River water temperature (°C);
- Head differential (ft) at the Pawtucket Gatehouse (i.e., headpond vs. Northern Canal);
- Bypassed reach spill flow (cfs);
- E.L. Field turbine discharge (cfs);
- Merrimack River inflow (cfs); and
- E.L. Field head differential (ft) (i.e., Northern Canal vs. tailwater).

Although additional variables such as turbine operation at E.L. Field (i.e., Unit 1, Unit 2, both, or neither) and head pond elevation (ft) were available, there was not enough resolution in the data during the fall 2019 passage period to provide meaningful results. This assessment on the rate of passage success focused on approach events at (1) the Pawtucket Gatehouse (i.e., Station 25), and (2) at the E.L. Field Powerhouse (i.e., Station 29).

Regression models for the time to event analyses were constructed using the *coxph*() function from the package "*survival*" in R (R Core Team 2020) and were used to evaluate the rate of passage success and identify operational hazards at sites which contained a physical barrier or a structure through which tagged individuals would have to navigate (i.e., the Pawtucket Gatehouse and E.L. Field Powerhouse).

The Cox proportional hazard regression can be described as a hazard function to evaluate the proportionate risk at time (t) such that

$$h(t) = h_0(t) \times exp(b_1x_1 + b_2x_2 + \ldots + b_ix_i)$$

where $h(t)$ represents that hazard at a given time point which is equal to the initial or baseline hazard at time 0:00 ($h_0(t)$) multiplied by e (the base of the natural logarithm) to the power of the additive relationship between each covariate (x_i) multiplied by its associated coefficient (b_i).

From the above equation, the relative impact of an operational parameter on the rate of passage success is represented by its associated coefficient. The hazard ratio of a given operational parameter is calculated by exponentiating the coefficient of a given parameter, which represents that multiplicative impact of that parameter. It is important to note that exponentiating these coefficients makes the value relative to a value of 1 (e^0), which represents a baseline of no hazard. For example, if the hazard ratio is greater than 1, e.g., 1.5, that will be interpreted as that covariate increasing the risk of passage failure by a factor of 1.5. Alternatively stated, a hazard ratio of 1.5 indicates that the associated covariate increases the risk by 50% as it is 0.5 greater than 1. In contrast, a hazard ratio below 1, e.g., 0.75, indicates that the associated covariate reduces the risk of passage failure by a factor of 0.75, or 25%. In short, a hazard ratio >1 indicates an increase in the risk of passage failure, a hazard ratio of 1 indicates no significant directional effect on passage, and a hazard ratio <1 indicates a reduction in the risk of passage failure.

4.5.2.2 Model Evaluation and Selection

As is the case with any statistical model, the type of model selected makes inherent assumptions about the nature of the data being modelled. The primary assumption of a Cox proportional hazard model is that the hazards are proportional. However, this assumption is not always appropriate for the data. As a result, the *cox.zph()* function was used during this assessment to assess the validity of the proportional hazard assumption. This function assessed scaled Schoenfield residuals to evaluate whether Cox regression residuals of each covariate in addition to the model as a whole are independent of time. In the event that the Schoenfield residuals are not independent of time, it can be said that the assumption of proportional hazards is violated and a Cox proportional hazards model may be misrepresentative of the true relationships between the selected covariates and passage success.

4.5.2.3 Event Definition

To evaluate the impact of operational parameters on passage success, instances of passage success and failure required definition and represent the 'events' (or passage attempts) in this analysis. Ostensibly, the transmitters deployed during this study should transmit a signal that when within range of a particular receiver will be detected every 2.0 seconds. However, various sources of outside noise or areas of poor coverage due to structures, etc. introduce variation into the frequency of detection for a unique transmitter's signal. Given that different site locations and receiver types are subject to varying degrees of ambient noise, the duration between successive detections was calculated for each tagged individual at each receiver location. A threshold interval for determining continued presence of a transmitter within the detection zone of a specific receiver was identified as the 95th percentile of the observed set of interval durations. This value was calculated at 14.5 minutes for Station 26 and 25.2 seconds

for Station 30. These two threshold values were then used to delineate when each event was started and completed for a tagged individual. The lengthier threshold value at Station 26 was likely a function of multiple entrances and exits of radio-tagged juveniles from the relatively limited detection zone (receiver was adjusted to only provide coverage in area immediately upstream of the Pawtucket Gatehouse). The departure of a radio-tagged individual from the detection zone of a particular receiver was determined when the time interval between successive detections exceeded the specific threshold interval for that zone.

From this, a passage failure event (assigned a value of 0) was defined as any duration where all detections lay within the 95th percentile of durations for all individuals at that site. Passage failure represents events in which a tagged individual enters the field of detection at a given site without passing to the next site (i.e., moving downstream) in the system. A passage success event (assigned a status of 1) was defined using the final instance of detection for a tagged individual at a singular site where that tagged individual was next detected at a downstream receiver (i.e., successfully passed). Passage success/failure (1/0) was used as the status coinciding with time in the Cox proportional hazard models. After defining passage events for every individual, the time duration for the regression was defined as the duration from one event to the next.

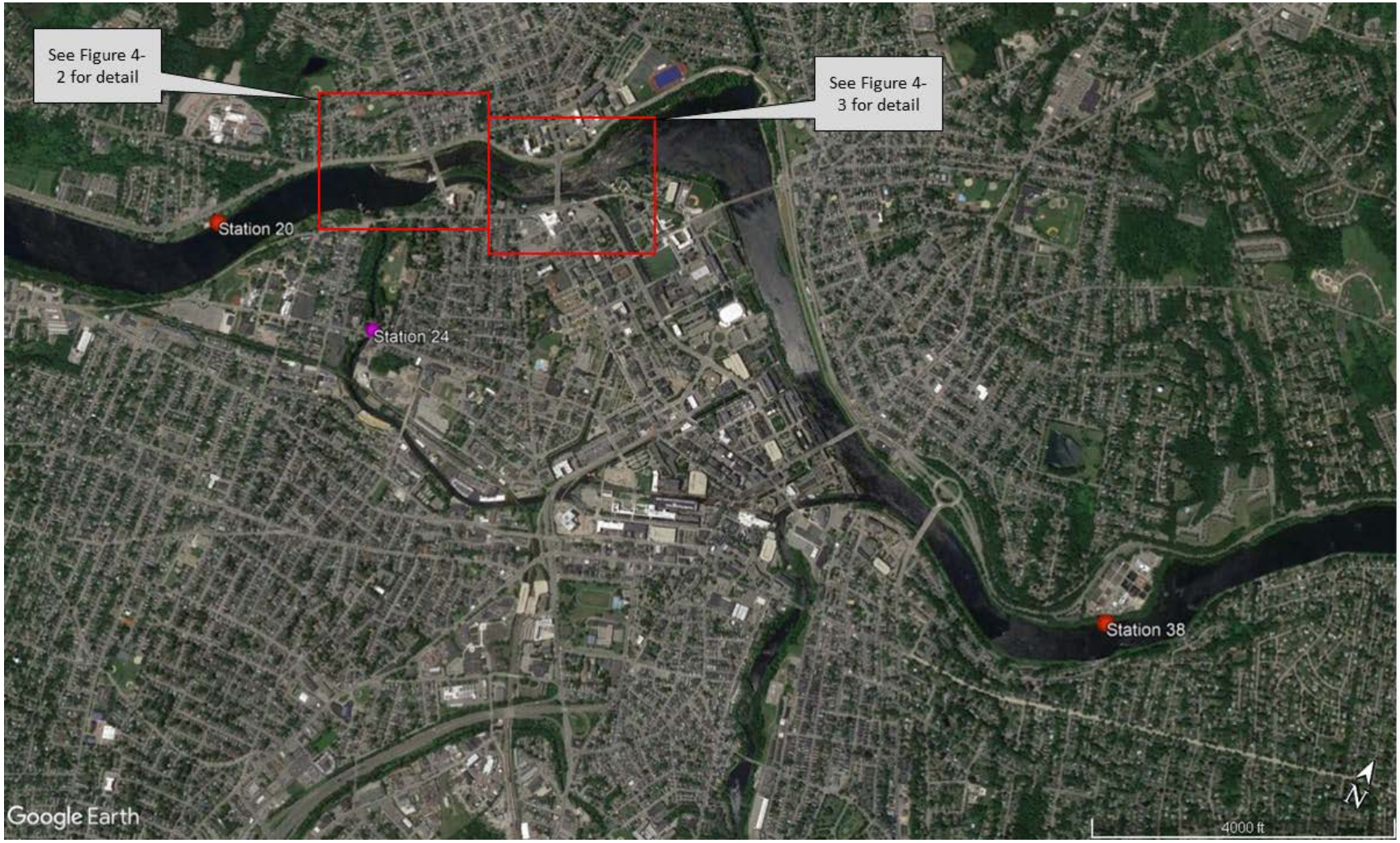

Figure 4–1. Locations and approximate detection areas for stationary radio-telemetry receivers installed during the 2019 juvenile alosine downstream passage assessment.

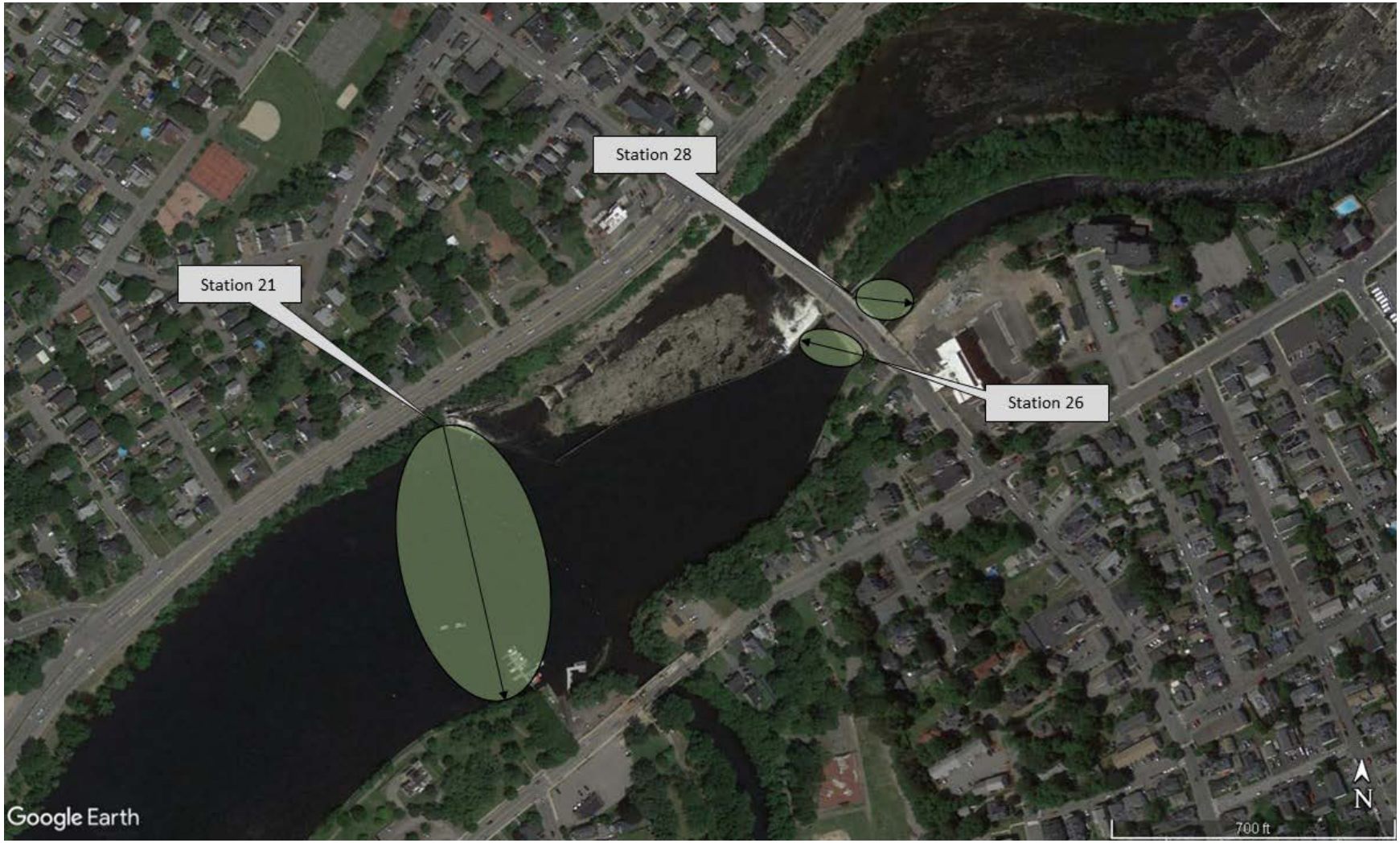

Figure 4–2. Locations and approximate detection areas for stationary radio-telemetry receivers installed upstream of Pawtucket Dam and at the Northern Gatehouse during the 2019 juvenile alosine downstream passage assessment at Lowell.

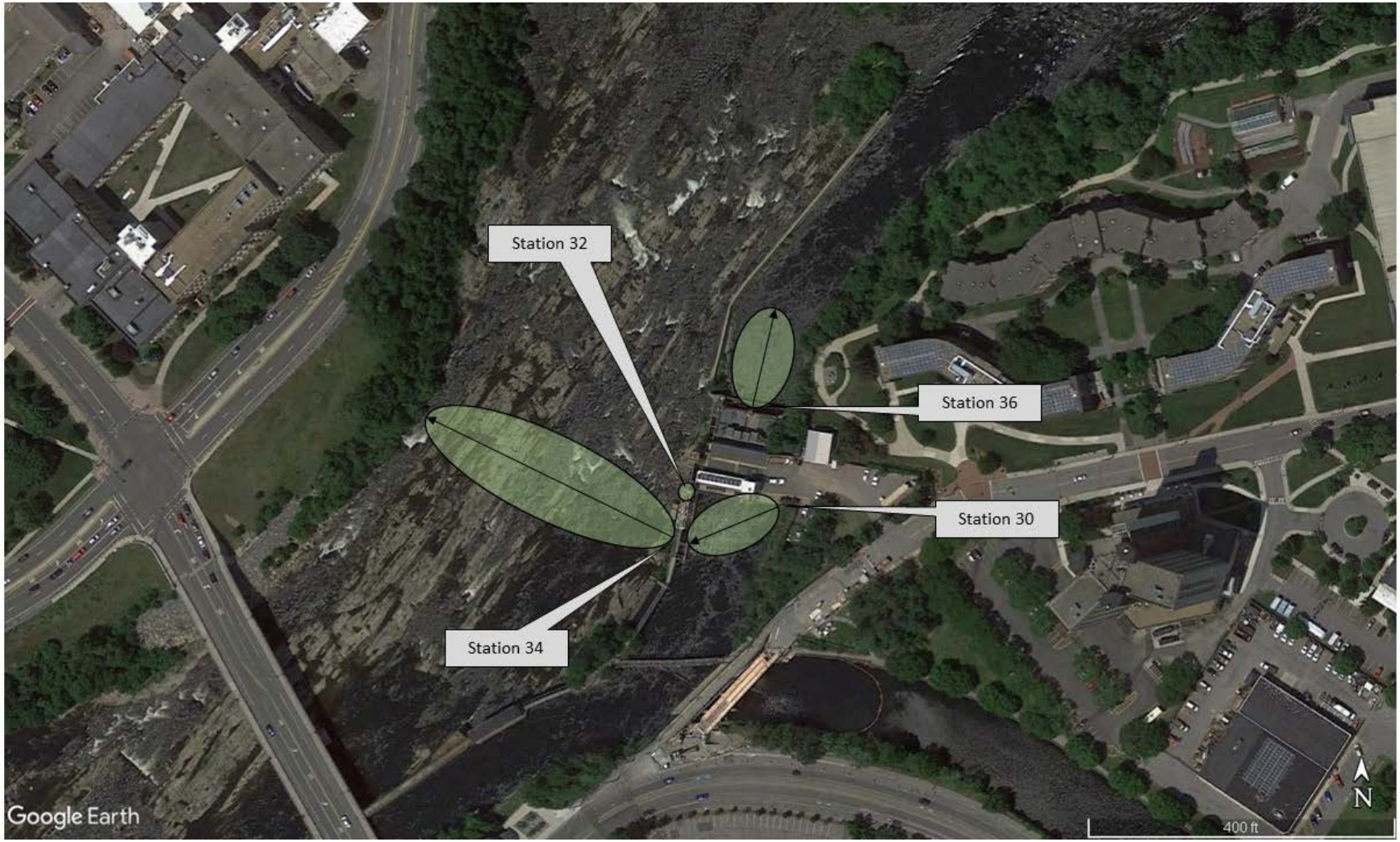

Figure 4–3. Locations and approximate detection areas for stationary radio-telemetry receivers installed in the vicinity of the E.L. Field Powerhouse during the 2019 juvenile alosine downstream passage assessment at Lowell.

Figure 4–4. Externally radio-tagged juvenile alosine showing relative position of transmitter attachment.

5 Results

5.1 Merrimack River Conditions and Lowell Project Operations

Figure 5-1 presents the Merrimack River flow and water temperature for the period of time from the first alosine release on October 9 until the end of the monitoring period on November 12, 2019. Merrimack River water temperature at the Project ranged from 16°C to 6°C during the monitoring period. Total river flow values represent the reported inflow at the Lowell Project and ranged between 1,089 and 11,435 cfs during the fall monitoring period. Figure 5-2 presents the monthly flow duration curves prepared for Lowell during the development of the Preliminary Application Document. The median flow condition at the Project is approximately 3,600 cfs during October and 6,500 cfs during November. Merrimack River conditions have a ~20% probability during October and a ~38% probability during November to exceed the ~8,000 cfs capacity of the E.L. Field powerhouse.

Table 5-1 summarizes the percentage of inflow records from the 2019 study period categorized by volume (to the nearest 1,000 cfs) as well as the percentage of time that each volume category is historically exceeded[1]. To help characterize the 2019 passage season, monthly exceedance probabilities less than 0.35 were classified as "high" flow conditions, 0.35 to 0.65 were classified as "normal" flow conditions, and greater than 0.65 were classified as "low" flow conditions. Inflows at the Project for the period October 9 through 31 were representative of high flow conditions (i.e., those with a probability of exceedance of less than 0.35) for 35% of the period, normal flow conditions (i.e., those with a probability of exceedance of 0.35-0.65) for 29% of the time and low flow conditions (i.e., those with a probability of exceedance of greater than 0.65) for 36% of the time. For the month of November, inflows were representative of high flow conditions 19% of the time, normal flow conditions 30% of the time and low flow conditions 51% of the time.

Flow duration information for the months of October and November (combined) is presented in Figure 5-3. The median flow condition during the two month period is near 5,000 cfs. When characterized using the flow condition criteria above, inflows at the Project for the period October 9 through November 12 were representative of high flow conditions (i.e., those with a probability of exceedance of less than 0.35) for 14% of the period, normal flow conditions (i.e., those with a probability of exceedance of 0.35-0.65) for 59% of the time and low flow conditions (i.e., those with a probability of exceedance of greater than 0.65) for 27% of the time (Table 5-1).

Figure 5-4 summarizes the allocation of water among the E.L. Field powerhouse, bypassed reach, downstream fishway, and downtown canal system at Lowell. Turbine units were in operation at the E.L. Field powerhouse for the duration of the study period with Unit 1 in operation throughout the study and Unit 2 coming online at 0900 on October 16. The

[1] Estimates of monthly exceedance estimated from monthly flow duration curves provided in Appendix H of the PAD.

downstream bypass was operated throughout the study period, passing approximately 132 cfs (i.e., 2% of the nameplate capacity of the E.L. Field turbine units; 6,600 cfs). A major spill event, associated with increases in river flows, occurred during the monitoring period. The event occurred from approximately October 29 to November 5, towards the end of the monitoring period. Flows to the downstream canal system represented between 15-20% of the 2,000 cfs canal capacity during October and 20% of the 2,000 cfs canal capacity for the majority of monitoring during early November. Due to overriding safety concerns, Boott limited operation of the turbine units within the downtown canal system during the study period. To the extent possible, Boott's operations staff attempted to operate the canal system as if there were canal units available, by opening gates when river flows exceeded the hydraulic capacity of the E.L. Field turbines (7,000 to 8,000 cfs). As a result, flows through the downtown canal system were largely restricted to passage via open gates. The Licensee manually recorded gate and unit settings once weekly during the study period within the downtown canal system. A breakdown of those values and related discharge estimates are provided in Appendix A.

Table 5–1. Frequency of occurrence of river inflow at Lowell (to nearest 1,000 cfs) during 2019 juvenile alosine downstream passage assessment and corresponding percentage of time flows are historically exceeded.

River Flow (Nearest 1k)	October 9-30, 2019		November 1-12, 2019		Oct 9 - Nov 30, 2019	
	Percentage of Month	Percentage of Month Historically Exceeded	Percentage of Month	Percentage of Month Historically Exceeded	Percentage of Period	Percentage of Period Historically Exceeded
1000	16.1%	90	-	> 95	10.6%	>95
2000	19.4%	85	-	> 95	12.7%	90
3000	6.0%	60	-	88	3.9%	76
4000	22.6%	45	14.5%	78	19.9%	63
5000	12.7%	34	36.6%	66	20.8%	50
6000	9.4%	27	11.1%	55	10.0%	42
7000	6.2%	23	12.8%	45	8.4%	35
8000	4.2%	19	6.6%	38	5.0%	29
9000	3.1%	16	4.8%	30	3.7%	24
10000	0.4%	14	3.5%	25	1.4%	21
11000	-	<5	10.4%	5	3.6%	5

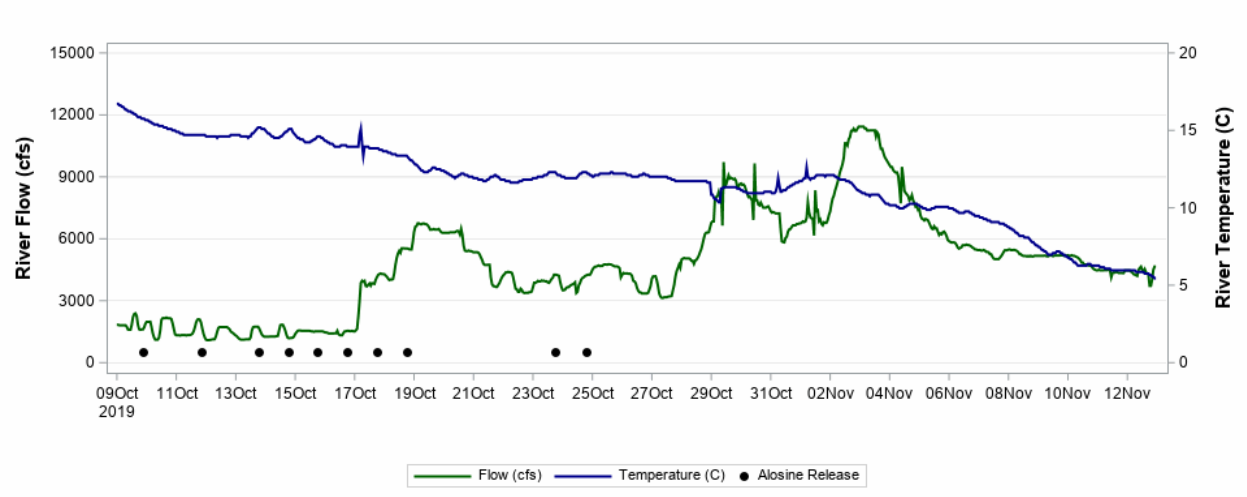

Figure 5–1. Merrimack River flow and water temperature at Lowell for the period October 9 to November 12, 2019.

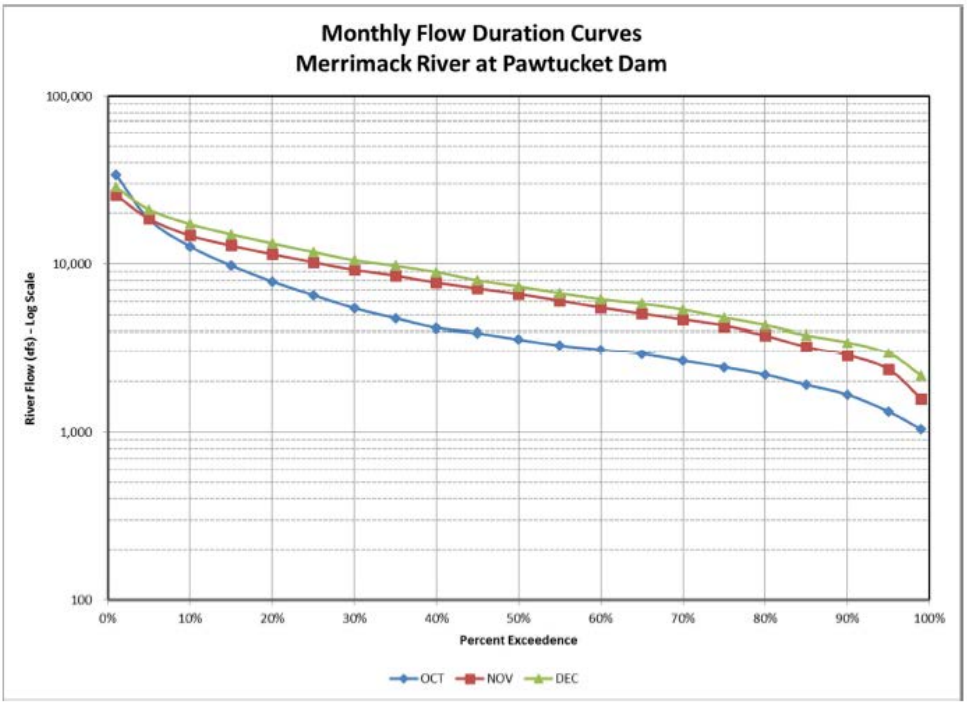

Figure 5–2. Flow duration curves for the months of October, November and December at the Lowell hydroelectric project.

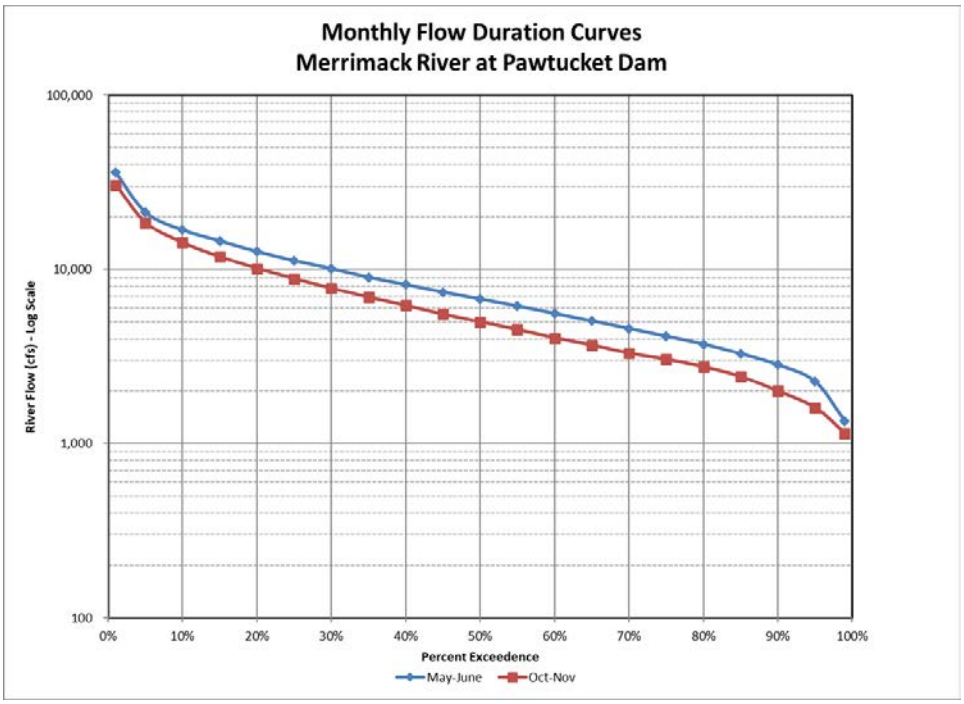

Figure 5–3. Flow duration curves for the two month period of October-November at the Lowell hydroelectric project.

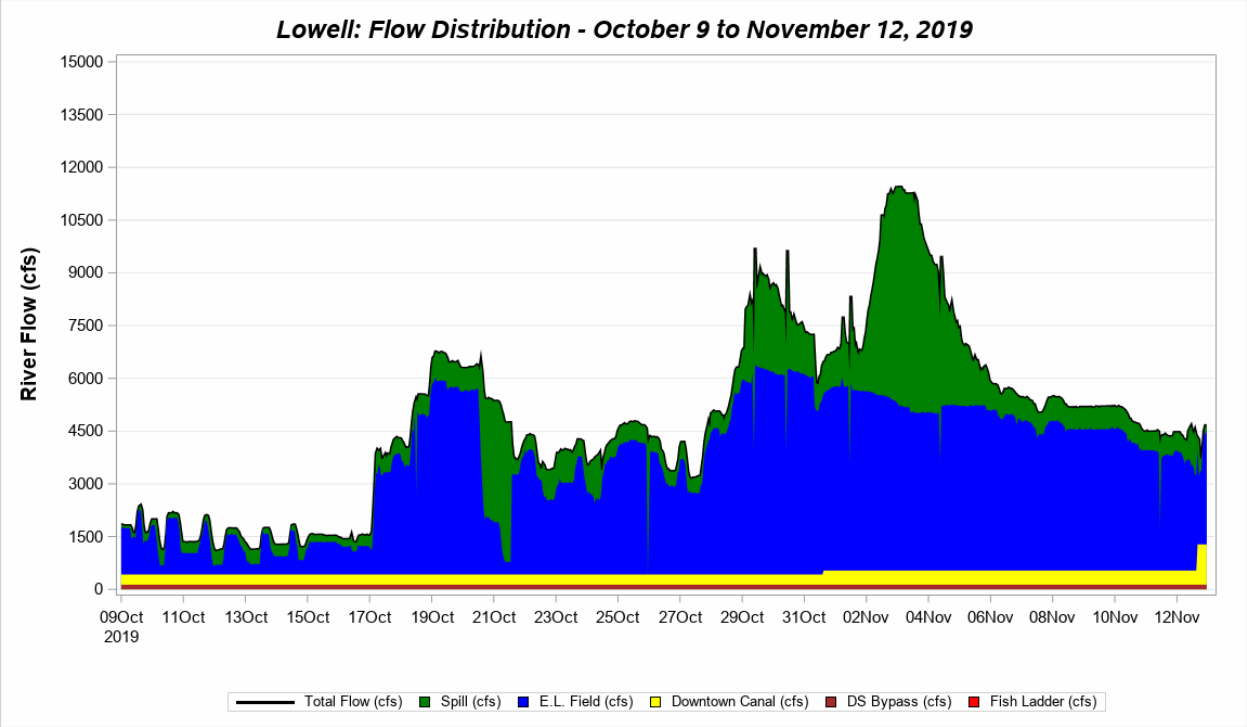

Figure 5–4. Total, spill, E.L. Field, downstream bypass and downstream canal system flow (cfs) for the period October 9 to November 12, 2019.

5.2 Monitoring Station Functionality

Radio-tagged juvenile alosines were released into the Merrimack River beginning in early October, 2019 and the RSP called for continuous monitoring at each stationary receiver location for 14 days after the final release of tagged fish. Figure 5-5 provides an overview of the continuity of monitoring at each of the ten stationary receiver locations during the fall period from the date of first release until November 12, 2019. The majority of the radio-telemetry monitoring stations installed to evaluate passage at Lowell during the fall study operated without issue for the full period.

Interruptions in continuous coverage were observed at two locations during the latter part of the 2019 monitoring period. These locations included Station 28 (downstream side of the Pawtucket Gatehouse) from 1900 on November 9 through the end of the monitoring period at Station 38 (receiver downstream of Lowell) from 0000 on November 5 to 1300 on November 7. There were no radio-tagged juvenile alosines which approached the Pawtucket Gatehouse after October 25 nor any downstream passage events for radio-tagged individuals after October 31. The late-season timing of these relatively short interruptions in coverage likely eliminated any potential impacts to the study results for monitoring juvenile alosine passage.

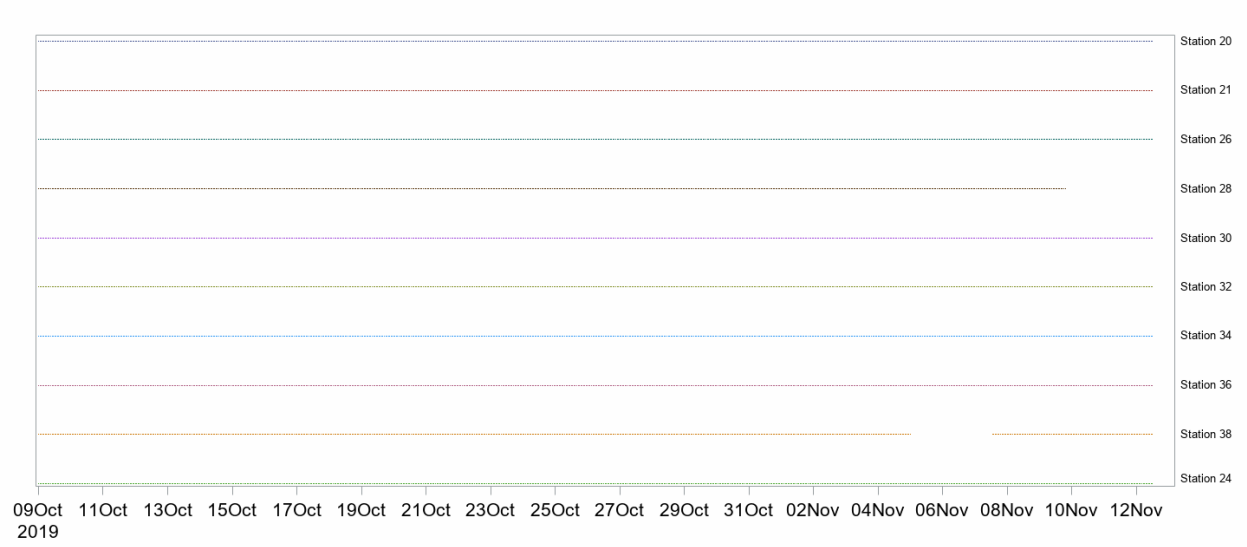

Figure 5–5. Operational coverage for telemetry receivers at Lowell during the juvenile alosine downstream passage assessment, October 9 to November 12, 2019.

5.3 Juvenile Alosine Tagging and Releases

Juvenile alosines were radio-tagged and released approximately 1.0 mile upstream of the Pawtucket Gatehouse starting on October 9 and ending on October 24. Table 5-2 provides a summary of the release dates and number of individuals released during the 2019 passage assessment. A total of 145 radio-tagged juvenile alosines were released over a span of 16 days and were potentially available for evaluation of downstream passage at Lowell. All test fish originated from Turtletown Pond in Concord, NH and were released with an equal number of untagged fish to promote schooling behavior. Fish tagged and released upstream of Lowell as part of the fall downstream passage evaluation ranged in length from 116 to 155 mm TL with a mean length of 134 mm. The majority of test fish (90%) measured between 125-144 mm. Mean length among release groups were similar across all ten release dates. A full listing of individuals radio-tagged and released as a part of this evaluation is included in Appendix B.

5.4 Project Arrival and Upstream Residence Duration

Releases of radio-tagged juvenile alosines were initiated on October 9, 2019. The distribution of arrival dates for radio-tagged alosines at the Pawtucket Dam as indicated by detection at Station 21 is provided in Figure 5-6. Initial detections for tagged alosines were recorded over a range of dates from October 9 through October 25 with all radio-tagged fish which successfully transited the approach reach doing so within a the first or second day after release.

Upstream residence (i.e., the duration of time radio-tagged individuals were present upstream of the Pawtucket Dam as determined for all individuals which approached and eventually passed downstream) was calculated as the duration of time from initial detection at Station 21 until confirmed downstream passage. When all individuals are considered, the upstream residence duration for radio-tagged juvenile alosines ranged between 0.4 hours to 4.8 days (Table 5-3; Figure 5-7). The median duration of time spent immediately upstream of the dam structure was 1.3 days, ranging from 0.8 hours to 3.6 days when examined among the ten separate release dates. Of the radio-tagged juvenile alosines which approached Pawtucket Dam, 42% passed in less than 24 hours and 68% in less than 48 hours after initial detection.

Outmigrating juvenile alosines encountering the Pawtucket Dam can (1) pass through the Pawtucket Gatehouse and enter the power canal (Northern Canal), (2) pass downstream over Pawtucket Dam via spill, or (3) enter the Pawtucket Canal and navigate downstream via the downtown canal system. The majority of radio-tagged juvenile alosines were determined to have passed through the Pawtucket Gatehouse and entered the Northern Canal to approach the E.L. Field powerhouse. The duration of time required to pass through the Pawtucket Gatehouse was evaluated as the difference in time of the initial detection for each individual radio-tagged juvenile at Stations 26 and 28 which independently monitored the upstream and downstream sides of that structure. The median duration of time for radio-tagged juvenile alosines to pass downstream of the Pawtucket Gatehouse following their approach at that structure was 0.1 hours (range <0.1 hours to 0.4 hours; Table 5-4), indicating rapid passage at that structure.

Whereas passage of radio-tagged juvenile alosines through the Pawtucket Gatehouse structure occurred relatively rapidly, the transit time for those tagged individuals to pass downstream of the Project after entering into the Northern Canal ranged from 0.2 hours up to 4.7 days (median = 22.0 hours; Table 5-5). Of those individuals, 56% were resident in the power canal upstream of E.L. Field for 24 hours or less. The overall percentage of radio-tagged juvenile alosines departing the power canal within 48 hours of entry increased to 68%.

5.5 Downstream Passage

A total of 145 radio-tagged juvenile alosines were released upstream of the Pawtucket Dam during the fall of 2019. The final disposition of all tagged juveniles is presented in Table 5-6. Three radio-tagged individuals (2% of total) did not approach the Pawtucket Dam following their initial release (as indicated by no detection at Station 21 or points further downstream). Three radio-tagged juvenile alosines (2.1% of the total approaching the dam) were determined to have entered the downtown canal system as evidenced by detection at the Guard Locks (Station 24). The majority of individual passed downstream of the Project via spill over the Pawtucket Dam (9.2%) or entered the power canal and approached the E.L. Field Powerhouse to pass downstream via the downstream bypass (12.0%) or turbine units (57.7%). A portion of individuals (18 fish; 12.7% of the total approaching the dam) failed to pass downstream. Reasons for this may include transmitter loss, predation, other mortality, or failure to locate a viable passage route. A definitive passage route could not be determined for nine individuals (6.3% of the total approaching the dam) and as a result those fish were classified as unknown.

Radio-tagged alosines were detected passing downstream between the dates of October 12 and October 31 (Figure 5-8) with a primary peak representing individuals associated with a number of release groups occurring on October 17-18. Passage events on the dates of October 17 and 18 represented 37.3% of the passage observed for radio-tagged juveniles during the study. Figure 5-9 presents the distribution of downstream passage events on an hourly basis. Passage occurred at almost all hours of the day with the highest passage rate occurring during the 1600 hour (10.7%). Overall passage was fairly uniform with 52% of detected events occurring between the hours of 1700 and 0500 and 48% between the hours of 0600 to 1600.

For each of the 115 individuals which were confirmed to have passed downstream of Lowell via a known passage route (i.e., turbine, downstream bypass, spill, or downtown canal system) the hourly record of Project operations (Section 5.1) at the time of passage was reviewed. The discharge at the selected route was identified and contrasted with the cumulative discharge for all non-selected routes at the time of downstream passage (Table 5-7). The majority of radio-tagged juvenile alosines passing downstream at Lowell did so via the E.L. Field turbine units (Table 5-6). The median discharge through the two E.L. Field turbine units at the time of passage for those individuals was 3,121 cfs. When examined by passage route, the median percentage of passage route flow at each known downstream passage route represented 79% of inflow for turbine passed juveniles, 8% of inflow for downstream bypass passed juveniles, 10% of inflow for spill passed juveniles, and 22% of inflow at the time of entry into the downtown canal system for three tagged juvenile alosines. Passage via the downstream route with the greatest proportion of flow at the time of passage occurred 65% of the time. A listing

of route discharge at the time of downstream passage for each juvenile alosine is provided in Appendix E.

5.6 Downstream Transit

A single monitoring station was installed downstream of Lowell for the purpose of detecting radio-tagged juvenile alosines following passage at the Project. That receiver (Station 38) was located approximately 2.1 miles downstream of the project. The minimum, maximum, and quartile transit times through that reach are presented in Table 5-8 and Figure 5-10. The median transit time durations for tagged juvenile alosines moving downstream of Lowell was 6.2 hours (range = 1.0 hours to 1.8 days) for the 2.1 mile downstream reach.

5.7 Proportional Hazard

A total of 145 Pawtucket Gatehouse and 126 E.L. Field Powerhouse forebay events were defined based on recorded detections of juvenile alosines during the 2019 study to evaluate the impact of operational parameters on passage success. The median event duration recorded for radio-tagged juvenile alosines was 4.6 minutes for individuals in the detection field of Station 26 immediately upstream of the Pawtucket Gatehouse and 47 seconds for individuals in the detection field of Station 30 covering the area immediately upstream of the intakes to the downstream bypass and turbine units at the E.L. Field Powerhouse.

5.7.1 Pawtucket Gatehouse

The Pawtucket Gatehouse model failed to meet the criteria necessary to accept the assumption that hazards are proportional (Table 5-10). The water temperature and inflow parameters are not independent of time in this scenario ($p < 0.05$), which means these values may misrepresent the true nature of the relationships with passage success/failure. In addition, the full model also has a p-value less than 0.05, which suggests it may be misrepresenting or masking the relationships between operational variables and rate of passage for juvenile alosines at the Pawtucket Gatehouse. Although results of the Cox proportional hazard model for the Pawtucket Gatehouse are provided in Table 5-9 and illustrated in Figure 5-11, they were not evaluated due to the lack of significance for the full model.

5.7.2 E.L. Field Powerhouse

Results of the Cox proportional hazards model for E.L. Field forebay events suggest a positive relationship between water temperature and the forebay-tailrace head differential versus passage success, decreasing the probability of passage failure by 8% and 7%, respectively (Table 5-11). Despite these marginal impacts, neither water temperature nor the forebay-tailrace head differential were found to be statistically significant in this model. In order to make sure the data met the assumption of proportional hazards and ensure the use of an appropriate modelling framework, inflow and spill were maintained as continuous variables (Table 5-11). Both spill and inflow were found to be insignificant variables with no measurable impact on passage success in the forebay. The only operational variable with a statistically significant impact on the probability of passage failure to depart the E.L Field forebay was combined turbine discharge, which was split into three bins: 592-1980 cfs (i.e., low), 1980-3950 cfs (i.e.,

mid), and 3950-5930 cfs (i.e., high). As illustrated in Figure 5-12, the low generation condition was used as a reference for the mid and high generation conditions. Results suggest a strong, statistically significant interaction between the mid and high generation conditions in relation to passage failure from the E.L. Field forebay. Mid-levels of turbine discharge (1980 and 3950 cfs) increased the probability of passage failure from the E.L. Field forebay by 605%, while high levels of turbine discharge (3950-5930 cfs) increased the probability of passage failure from the E.L. Field forebay by 2223%. The E.L. Field forebay model achieved the criteria necessary to accept the assumption that hazards are proportional (Table 5-12).

5.8 Manual Tracking

In addition to the continuous monitoring provided by the 10 stationary receivers installed throughout the Project area for duration from early October through mid-November 2019, a total of 21 manual detections representing 13 individuals were recorded between October 21 and November 7. Manual tracking for radio-tagged juvenile alosines was most effective via foot and in the vicinity of Project structures (i.e., bypassed reach, tailrace, Northern Canal/forebay). Appendix C contains a listing of manual detections identified to those relative locations and classified as “Transit” for individuals which were subsequently detected at stationary receivers downstream of their manually determined position or “Stationary” for individuals which were not detected again at stationary receivers downstream of their manually determined position(s). The majority of detections were classified as stationary as indicated by a lack of future downstream detections. Two individuals were detected within the Northern Canal downstream of the Pawtucket Gatehouse prior to their eventual downstream passage at the Project (as determined by the stationary receiver data).

Table 5–2. Release date and number of radio-tagged juvenile alosines released upstream of the Pawtucket Dam during the downstream passage assessment, October 9 through November 12, 2019.

	Release Date									
	Oct. 9	Oct. 11	Oct. 13	Oct. 14	Oct. 15	Oct. 16	Oct. 17	Oct. 18	Oct. 23	Oct. 24
Number Released	15	15	14	15	15	15	15	15	15	11
Release Time	20:27	20:04	19:33	18:52	18:15	18:12	17:53	17:58	18:18	18:45
Minimum Length (mm)	123	123	125	125	124	123	122	123	116	126
Maximum Length (mm)	138	144	145	142	147	144	143	146	143	155
Mean Length (mm)	133	131	134	135	134	134	132	137	134	137

Table 5–3. Minimum, maximum, and quartile values of upstream residence duration (hours) for radio-tagged juvenile alosines released upstream of the Pawtucket Dam during the fall 2019 downstream passage assessment.

Release Date	Upstream Residence Duration (Hours)				
	Minimum	Maximum	Q25	Q50 (Median)	Q75
9-Oct	50.6	113.4	74.5	86.7	111.0
11-Oct	37.5	67.9	39.9	45.4	62.3
13-Oct	18.5	114.7	19.1	19.6	71.8
14-Oct	52.2	63.5	52.8	54.2	60.0
15-Oct	29.7	68.2	30.4	33.0	60.6
16-Oct	7.5	45.8	26.1	38.9	40.9
17-Oct	0.9	23.0	7.5	12.7	21.5
18-Oct	0.4	8.2	0.4	0.8	4.4
23-Oct	0.7	23.2	0.8	0.9	12.4
24-Oct	0.9	25.3	0.9	5.1	17.2
All	0.4	114.7	7.9	30.5	54.1

Table 5–4. Minimum, maximum, and quartile values of time to pass the Pawtucket Gatehouse and enter Northern Canal (hours) for radio-tagged juvenile alosines released upstream of the Pawtucket Dam during the fall 2019 downstream passage assessment.

Release Date	Pawtucket Gatehouse Passage (Hours)				
	Minimum	Maximum	Q25	Q50 (Median)	Q75
9-Oct	< 0.1	0.3	0.1	0.1	0.2
11-Oct	< 0.1	0.2	0.1	0.1	0.2
13-Oct	< 0.1	0.2	0.1	0.1	0.1
14-Oct	< 0.1	0.1	< 0.1	< 0.1	0.1
15-Oct	< 0.1	0.2	0.1	0.1	0.2
16-Oct	0.1	0.2	0.1	0.1	0.1
17-Oct	0.1	0.2	0.1	0.1	0.2
18-Oct	< 0.1	0.6	0.1	0.1	0.3
23-Oct	0.1	0.3	0.1	0.1	0.2
24-Oct	0.1	0.4	0.2	0.2	0.3
All	< 0.1	0.4	0.1	0.1	0.2

Table 5–5. Minimum, maximum, and quartile values of residence time within Northern Canal (hours) for radio-tagged juvenile alosines released upstream of the Pawtucket Dam during the fall 2019 downstream passage assessment.

Release Date	Northern Canal Residence (Hours)				
	Minimum	Maximum	Q25	Q50 (Median)	Q75
9-Oct	31.8	151.0	50.0	77.0	100.7
11-Oct	19.3	66.9	25.2	36.4	51.9
13-Oct	12.7	105.4	17.3	18.8	71.3
14-Oct	39.5	62.5	51.5	53.5	62.5
15-Oct	23.9	24.0	23.9	24.0	24.0
16-Oct	17.9	22.4	20.0	22.0	22.2
17-Oct	0.2	21.9	0.9	10.6	12.3
18-Oct	0.2	8.0	0.2	0.8	5.0
23-Oct	0.3	0.5	0.4	0.4	0.5
24-Oct	0.3	25.1	0.4	6.0	25.1
All	0.2	112.1	4.6	22.0	52.8

Table 5–6. Downstream passage route selection and percent utilization of route options after detection at Station 21 for radio-tagged juvenile alosines released upstream of Pawtucket Dam during the fall 2019 downstream passage assessment.

Release Date	Lowell Downstream Passage Route						
	Did not Detect	Did Not Pass	Downtown Canal System	Spill	Bypass	Turbine	Unknown
9-Oct	0	2	1	1	5	6	0
11-Oct	0	2	1	0	4	8	0
13-Oct	1	3	0	1	4	4	1
14-Oct	1	1	1	0	1	10	1
15-Oct	0	2	0	2	2	8	1
16-Oct	0	0	0	6	0	7	2
17-Oct	0	2	0	2	0	9	3
18-Oct	0	2	0	0	0	13	0
23-Oct	1	3	0	0	1	11	1
24-Oct	0	4	0	1	0	6	0
All	3	18	3	13	17	82	9
Percent Utilization		12.7%	2.1%	9.2%	12.0%	57.7%	6.3%

Table 5–7. Quartile conditions of project discharge at the time of downstream passage for radio-tagged juvenile alosines at the known route of passage and the cumulative sum of discharge at non-passage routes.

Passage Route	No. Using Route	Quartile	Route Discharge		Non-Route Discharge	
			cfs	%	cfs	%
Turbines	82	Q25	2362	71%	801	18%
		Q50	3121	79%	932	21%
		Q75	4504	82%	1029	29%
Downstream Bypass	17	Q25	132	8%	1418	91%
		Q50	132	8%	1586	92%
		Q75	132	9%	1586	92%
Spill	13	Q25	553	10%	4081	89%
		Q50	553	10%	4974	90%
		Q75	561	11%	4977	90%
Downtown Canal	3	Q25	290	20%	920	76%
		Q50	290	22%	1040	78%
		Q75	290	24%	1147	80%

Table 5–8. Minimum, maximum, and quartile values of downstream transit time (hours) for radio-tagged juvenile alosines following passage at the Lowell project during the fall 2019 downstream passage assessment.

Release Date	Downstream Transit (Hours)				
	Minimum	Maximum	Q25	Q50 (Median)	Q75
9-Oct	3.0	18.0	4.9	7.2	8.3
11-Oct	3.7	42.2	4.8	6.1	9.7
13-Oct	2.6	24.6	5.5	7.4	17.7
14-Oct	1.5	14.8	5.5	9.5	13.9
15-Oct	1.6	15.0	7.5	12.2	13.9
16-Oct	2.6	14.6	3.6	4.4	12.0
17-Oct	1.6	10.6	1.9	3.0	10.0
18-Oct	1.0	17.3	1.3	2.0	3.6
23-Oct	1.7	9.9	2.7	3.0	7.4
24-Oct	3.0	13.5	3.0	12.3	13.5
All	1.0	42.2	2.9	6.2	11.4

Table 5–9. Results of the Cox proportional hazards model for juvenile alosine passage through Pawtucket Gatehouse. Significance is determined by p < 0.05.

Pawtucket Gatehouse										
Model: Time to Event ~ Temperature + Inflow + Spill										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change Failure
Temp	-0.93	0.08	-11.04	<0.001	Significant	0.4	2.53	0.34	0.47	↓ 60%
Inflow	0	0	-2.36	0.02	No Hazard	1	1	1	1	0
Spill 2080-4150 cfs	0.84	0.52	1.62	0.11	Insignificant	2.31	0.43	0.84	6.37	↑ 131%
Spill 4150-6240 cfs	2.57	1.14	2.26	0.02	Significant	13.05	0.08	1.4	121.28	↑ 1205%

Significance is determined by p < 0.05.

Table 5–10. Output of the Schoenfield residual test for time independence of covariates in Cox proportional hazard model of Pawtucket Gatehouse passage events.

Variable	Chi-squared	df	P-Value
Temperature (°C)	8.22	1	0
Inflow (cfs)	9.03	1	0
Spill (cfs)	4.23	2	0.12
Full Model	14.54	4	0.01

Note: p < 0.05 indicates a violation of the proportional hazard assumption.

Table 5–11. Results of the Cox proportional hazards model for juvenile alosine passage through E.L. Field Powerhouse forebay.

Forebay										
Model: Time to Event ~ Temperature + Combined Turbine cfs + Spill + Inflow + ELF Head										
Model Parameter	*b*	se	z	P-value	Significance	e^{b}	e^{-b}	Lower .95	Upper .95	Percent Change Failure
Temp	-0.08	0.16	-0.52	0.60	Insignificant	0.92	1.09	0.68	1.25	↓ 8%
Inflow	0	0	-1.62	0.11	No Hazard	1	1	1	1	0
Spill	0	0	1.16	0.25	No Hazard	1	1	1	1	0
Turbine CFS 1980-3950 cfs	1.8	0.53	3.40	<0.001	Significant	6.05	0.17	2.14	17.07	↑ 605%
Turbine CFS 3950-5930 cfs	3.15	0.88	3.58	<0.001	Significant	23.23	0.04	4.15	130.02	↑ 2223%
ELF Head	-0.08	0.07	-1.05	0.30	Insignificant	0.93	1.08	0.8	1.07	↓ 7%

Significance is determined by $p < 0.05$.

Table 5–12. Output of the Schoenfield Residual test for time independence of covariates in Cox proportional hazard model of E.L. Field Powerhouse forebay events.

Variable	Chi-squared	df	P-Value
Temperature (°C)	1.06	1	0.3
Inflow (cfs)	0	1	0.97
Spill (cfs)	0.21	1	0.64
Turbine Discharge (cfs)	0.41	2	0.81
ELF Head Differential (ft)	0.02	1	0.88
Full Model	5.85	6	0.44

Note: $p < 0.05$ indicates a violation of the proportional hazard assumption.

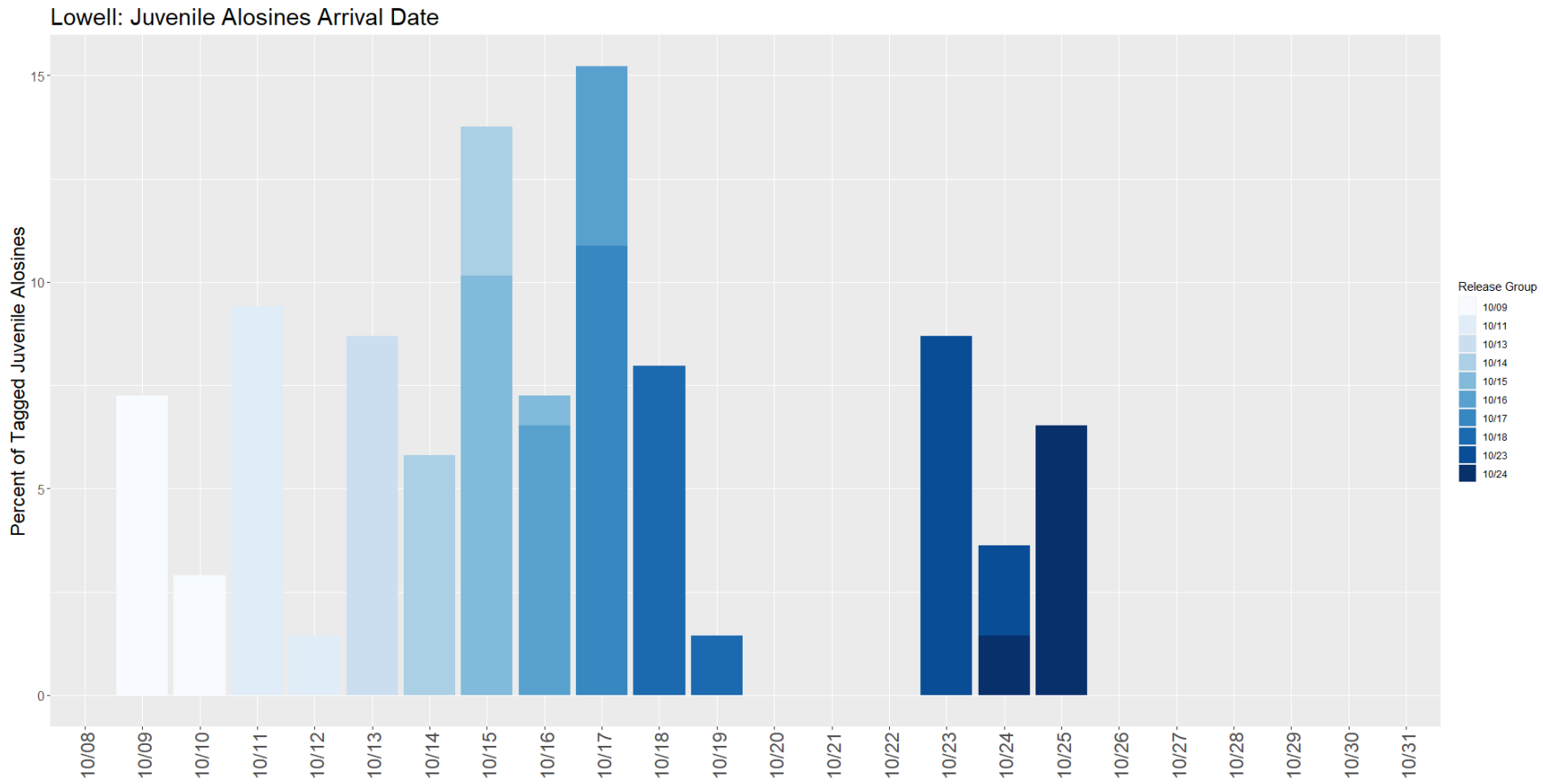

Figure 5–6. Distribution of Pawtucket Dam arrival dates for radio-tagged juvenile alosines released upstream of the Pawtucket Dam during the 2019 downstream passage assessment.

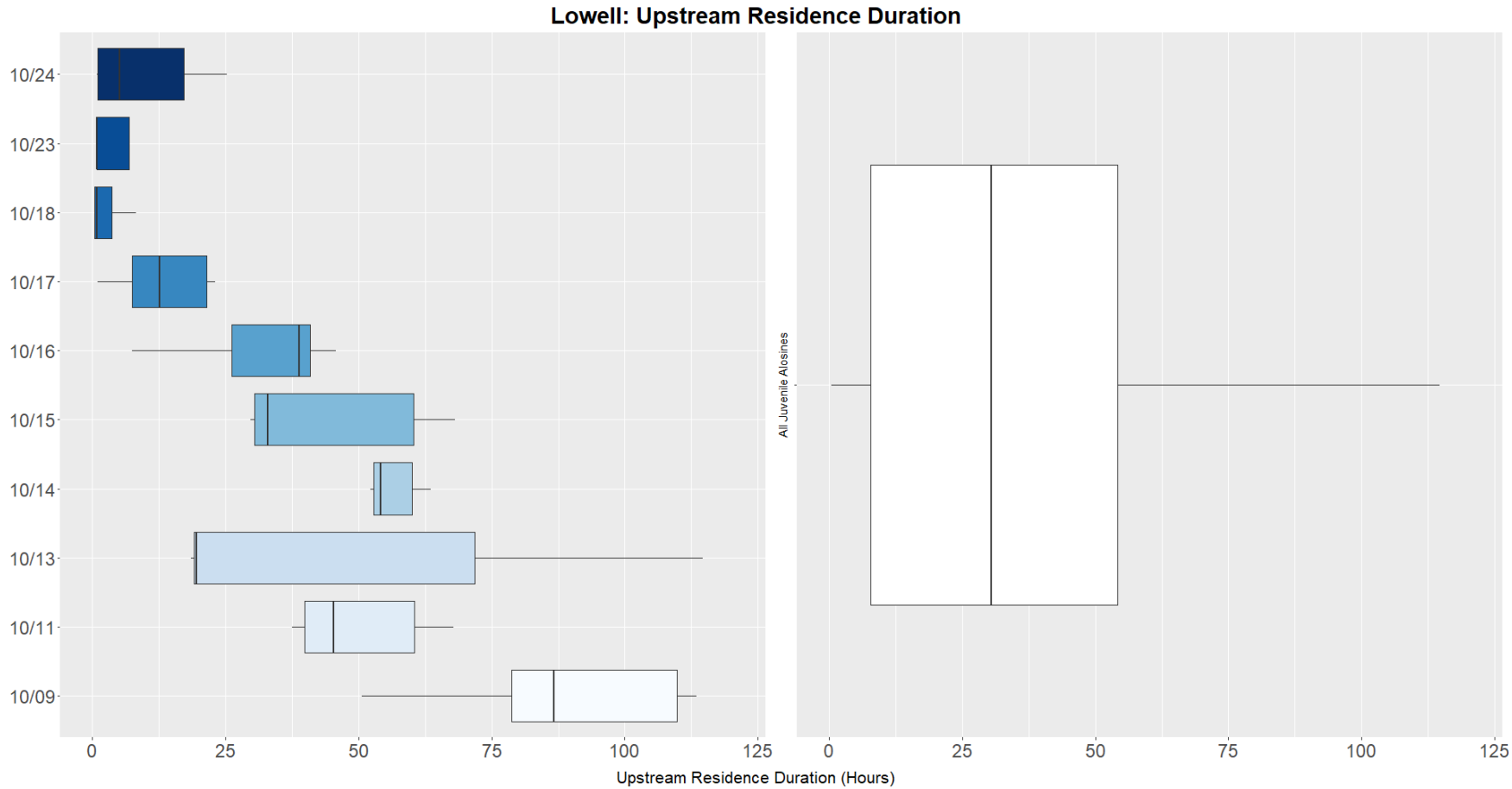

Figure 5–7. Box plot of upstream residence time for radio-tagged juvenile alosines passing downstream of Lowell during the 2019 downstream passage assessment. [2]

[2] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

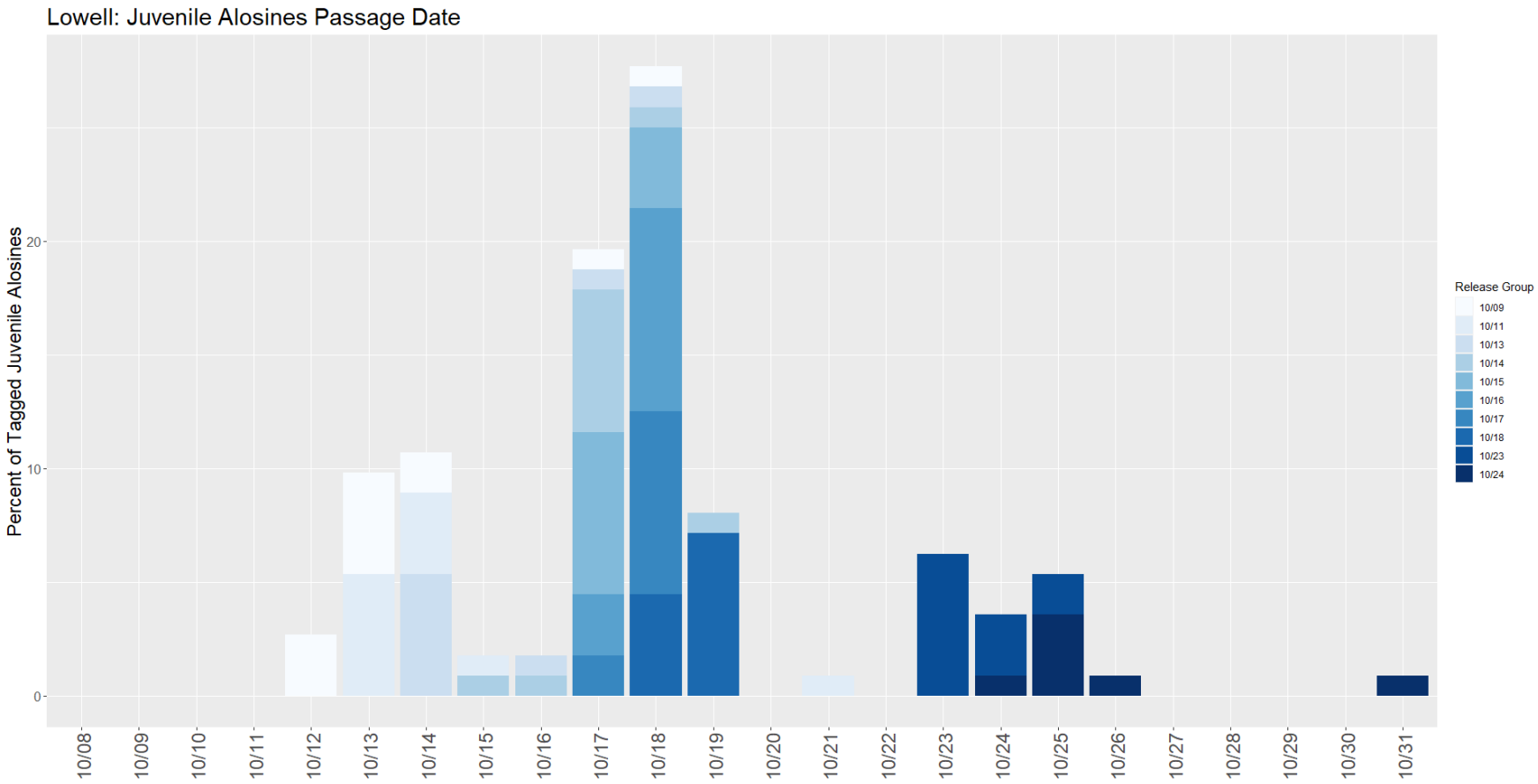

Figure 5–8. Distribution of Pawtucket Dam downstream passage dates for radio-tagged juvenile alosines during the 2019 downstream passage assessment.

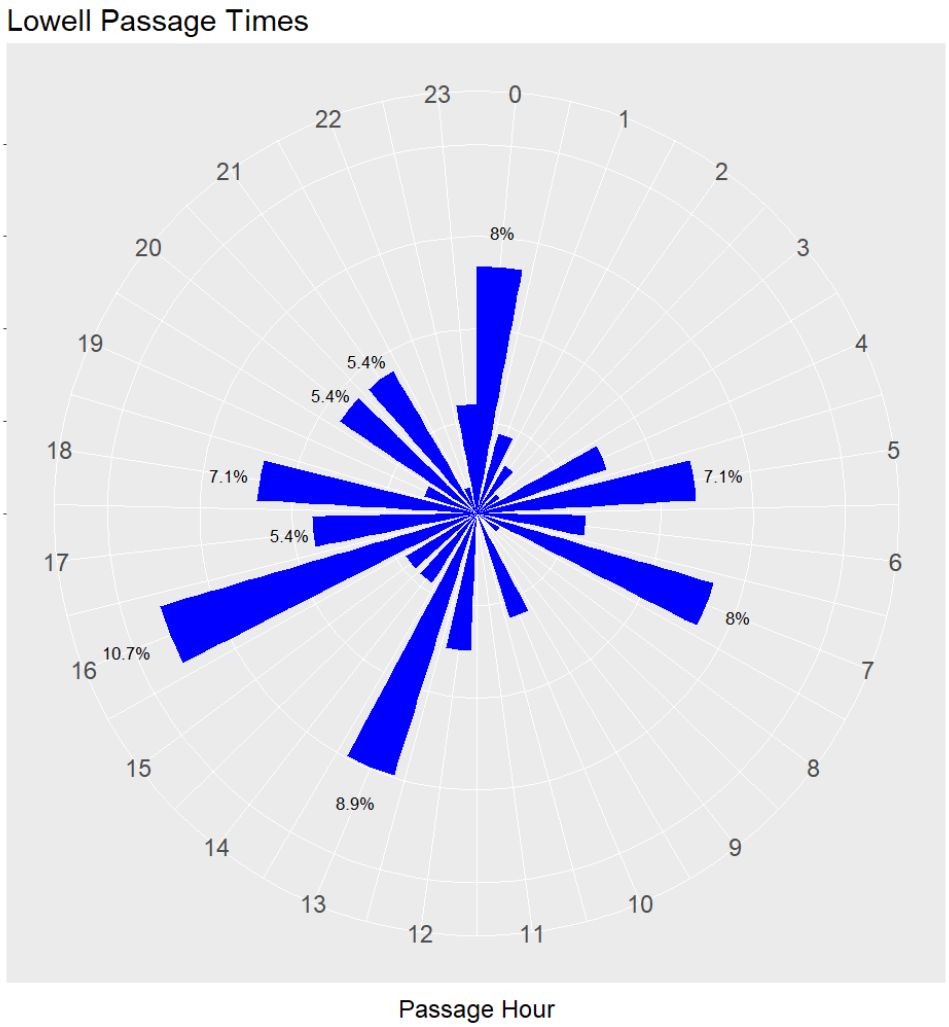

Figure 5–9. Distribution of downstream passage time for all radio-tagged juvenile alosine released upstream of Lowell during the 2019 downstream passage assessment.

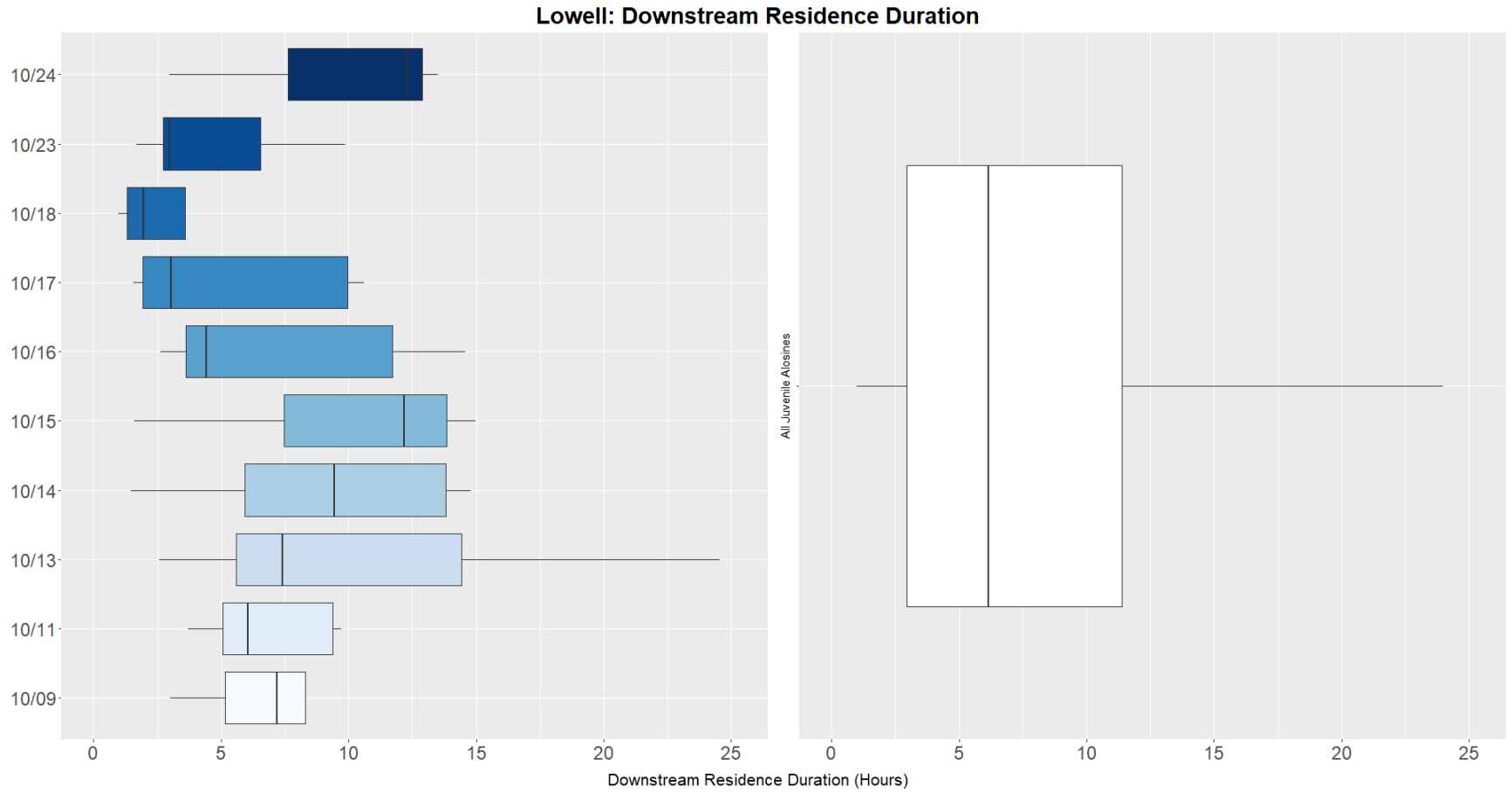

Figure 5–10. Box plot of downstream transit time for radio-tagged juvenile alosines following passage at Lowell during the 2019 downstream passage assessment. [3]

[3] The solid line represents the median while left and right portions of the box represent the first and third quartiles, respectively. Whiskers extend to the range of the data within the interquartile range (quartile*1.05) such that outliers outside of this range are not displayed.

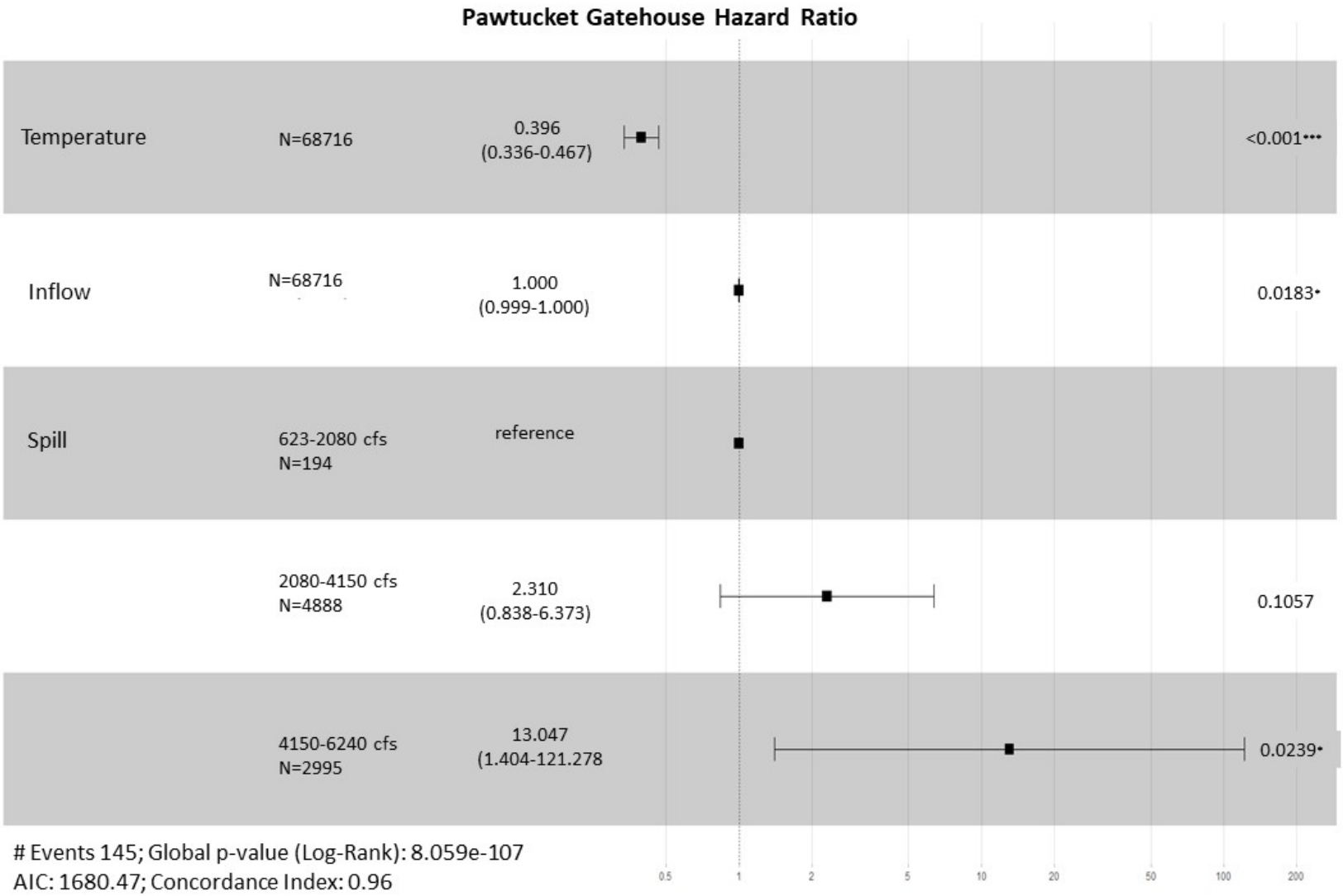

Figure 5–11. Cox proportional hazards model results for passage success of radio-tagged juvenile alosines at the Pawtucket Gatehouse.

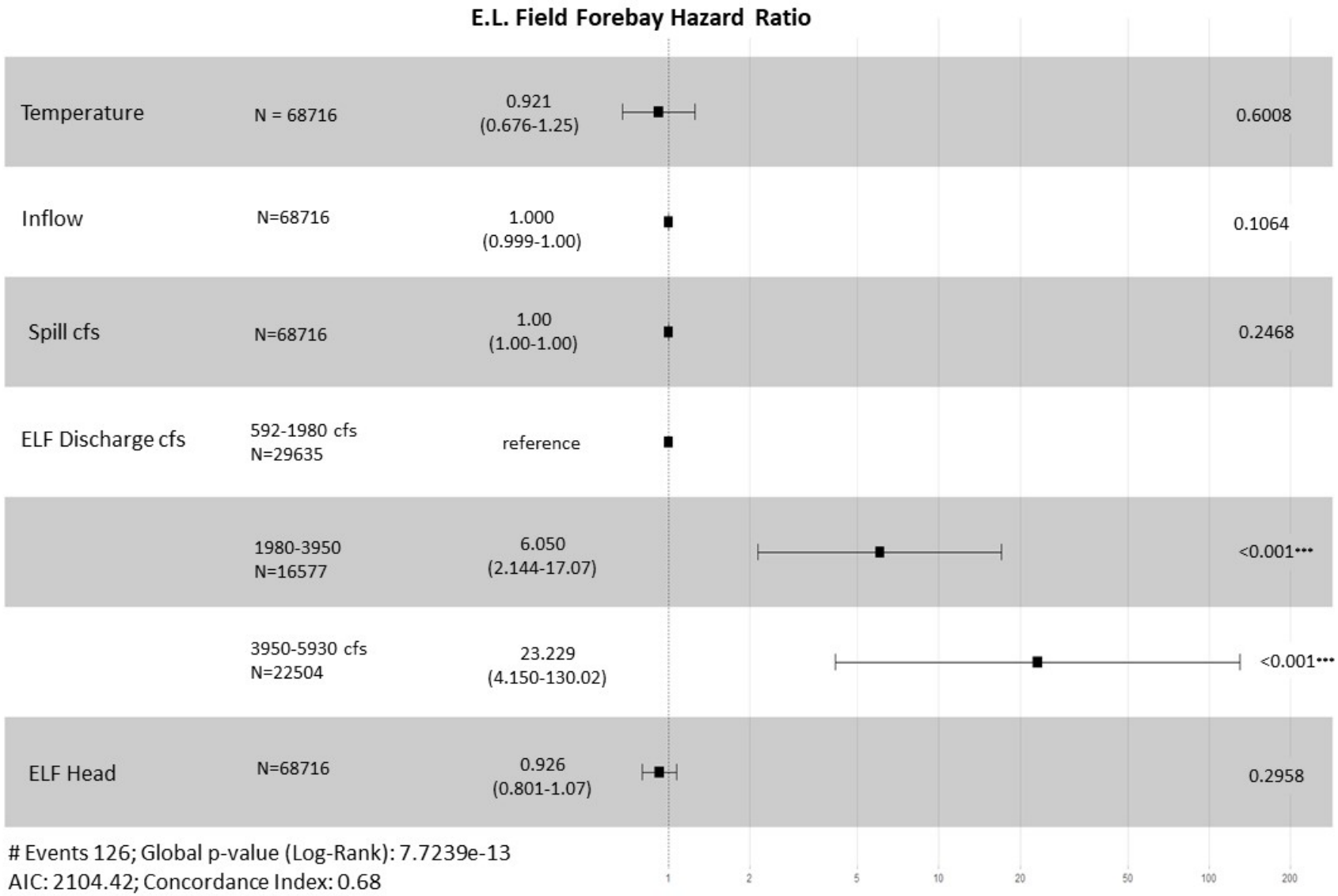

Figure 5–12. Cox proportional hazards model results for passage success of radio-tagged juvenile alosines at the E.L. Field Powerhouse forebay.

6 Summary

An evaluation of the potential impacts on the outmigration of juvenile alosines was conducted in support of the FERC relicensing of the Lowell Project on the Merrimack River. Downstream passage route utilization was evaluated using radio-telemetry during the 2019 fall migration season (October 9 to November 12, 2019). Monitoring of outmigrating juvenile alosines focused on the evaluation of the residence time immediately upstream of the Pawtucket Dam and prior to passage as well as passage route utilization at the Project.

A total of 145 juvenile alosines were tagged and released at mid-river locations approximately one mile upstream of the Pawtucket Gatehouse. Their subsequent downstream arrival and passage at the Project was monitored via a series of fixed-location telemetry receivers within the Lowell Project area. All of the juvenile alosines utilized for this study were collected from Turtletown Pond in Concord, New Hampshire and ranged in total length from 125-144 mm. Radio transmitters were bonded to small fish hooks and then externally affixed to each individual prior to their release. Releases of radio-tagged juveniles were spread over a 16 day period between October 9 and 24.

Upon initial detection at the Pawtucket Dam, the median duration of time spent immediately upstream of the dam structure was 1.3 days with 42% passing downstream within the first 24 hours of their initial detection. Closer examination of the total residence time for radio-tagged juvenile alosines indicated that all individuals determined to have entered the Northern Canal passed through the Pawtucket Gatehouse in less than 30 minutes. Upon entry into the Northern Canal, the median residence duration prior to downstream passage was longer (22.0 hours; range = 0.2 hours to 4.7 days). Nearly 70% of all downstream passage events for radio-tagged juvenile alosines occurred within 48 hours of initial detection in the E.L. Field forebay. The Cox proportional hazards model suggested a statistically significant interaction between the mid and high generation conditions in relation to passage failure from the E.L. Field forebay. The presence of higher generation flows increased the probability that a radio-tagged individual would approach downstream passage options in the power canal (i.e., turbines or downstream bypass) and reject the passage attempt relative to lower generation flows.

Outmigrating juvenile alosines encountering the Pawtucket Dam can (1) pass through the Pawtucket Gatehouse and enter the power canal, (2) pass downstream over Pawtucket Dam via spill, or (3) enter the Pawtucket Canal and navigate downstream via the downtown canal system. Individuals which enter the Northern Canal can subsequently pass downstream via one of the two turbine units at the E.L. Field Powerhouse, utilize the downstream bypass, or pass via the surge gate (operated only in the event of a station trip). During the 2019 evaluation the majority of radio-tagged individuals passed through the Pawtucket Gatehouse and approached the E.L. Field powerhouse. Of the individuals which approached the E.L. Field powerhouse and had a known downstream passage route, 83% eventually passed downstream via the turbine units[4]. Use of the existing downstream bypass system is estimated at 17%. The existing

[4] Note that downstream passage survival for juvenile alosines will be assessed as part of the desktop based *Fish Passage Survival Study*. Downstream passage survival was not estimated for radio-tagged juvenile alosines as part

downstream bypass at Lowell was last assessed for the effectiveness of passing juvenile alosines during 1994 and effectiveness was estimated at 37% during that study (Normandeau 1995). Only two percent of all radio-tagged juvenile alosines were determined to have entered the Pawtucket Canal and attempted downstream passage via the downtown canal system. Of the three individuals which entered the downtown canal system, one was determined to have exited the canal system and was detected downstream at Station 38.

7 Variances from FERC-Approved Study Plan

The FERC-approved RSP indicated that a total of 150 radio-tagged juvenile alosines. Five of the transmitters purchased for this study could not be activated. As a result, a total of 145 radio-tagged juvenile alosines were released and assessed for downstream passage at the Project. There were no additional variances from the FERC-approved study plan.

8 References

Castro-Santos, T. and R. Perry. 2012. Time-to-event analysis as a framework for quantifying fish passage performance. Pages 427-452 *in* N.S. Adams, J.W. Beeman, and J.H. Eiler, editors. Telemetry techniques: a user guide for fisheries research. American Fisheries Society, Bethesda, Maryland.

Normandeau Associates, Inc. (Normandeau). 1995. Use of the fish bypass by juvenile clupeids at the Lowell Hydroelectric Project during fall, 1994. Report Prepared for Consolidated Hydro, Inc.

R Core Team. (2020). R: A Language and Environment for Statistical Computing. Vienna, Austria.

of this assessment due to the uncertainty related to retention of externally mounted transmitters and the potential for negatively biasing a survival estimate due to loss of tags during the act of passage.

9 Appendices

Appendix A. Estimated weekly discharge values (cfs) for the Guard Locks, Swamp Locks, Hamilton Station, Section 8 Station, John Street Station, Boott Gate and Lower Locks.

BOOTT HYDROPOWER DOWNTOWN OPERATIONS: ESTIMATED FLOWS

Date	10/10/2019	10/17/2019	10/23/2019	10/31/2019	11/7/2019	11/12/2019
Time	900	1100	900	1445	1000	1530

Guard Locks						
Gate 1	197	197	197	246	246	529
Gate 2	128	128	128	0	0	0
Gate 3	0	0	0	0	0	0
Gate 4	0	0	0	0	0	176
Gate 5	0	0	0	197	197	441
Total	325	325	325	443	443	1145

Swamp Locks						
Gate 1	0	0	0	0	0	0
Gate 2	252	252	252	252	252	492
Bayboards opened	0	0	0	0	0	0
Total	252	252	252	252	252	492

Hamilton						
Unit 1	26	13	13	13	13	100
Unit 2	13	13	13	13	13	158
Unit 3	20	20	20	20	20	0
Unit 4	10	10	10	10	10	127
Unit 5	17	17	17	17	17	14
Hamilton Wasteway	0	0	0	0	0	0
Total	86	73	73	73	73	399

Section 8						
Unit 1	0	0	0	0	0	0
Unit 2	0	0	0	0	0	133
Unit 3	75	75	75	75	75	0
Total	75	75	75	75	75	133

John St.						
Unit 3	0	0	0	0	0	0
Unit 4	0	0	0	0	0	0
Unit 5	0	0	0	0	0	0
Unit 6	0	0	0	0	0	236
Total	0	0	0	0	0	236

Boott Gate						
Gate	0	0	0	0	0	0
Bayboards opened	0	0	0	0	0	0
Total	0	0	0	0	0	0

Lower Locks						
Gate	120	120	120	120	120	120
Bayboards opened	0	0	0	0	0	0
Total	120	120	120	120	120	120

Appendix B. Juvenile alosine tagging, release, and biocharacteristics information for the 2019 downstream passage assessment at Lowell.

Frequency	Tag ID	Total Length (mm)	Release	
			Date	Bank
150.360	27	134	10/9/2019	East
150.360	28	132	10/9/2019	East
150.360	30	136	10/9/2019	East
150.380	80	135	10/9/2019	East
150.380	87	134	10/9/2019	East
150.600	113	138	10/9/2019	East
150.600	140	126	10/9/2019	East
150.600	159	136	10/9/2019	East
150.360	26	134	10/9/2019	West
150.360	29	134	10/9/2019	West
150.380	68	129	10/9/2019	West
150.380	81	131	10/9/2019	West
150.380	83	137	10/9/2019	West
150.600	137	123	10/9/2019	West
150.600	143	128	10/9/2019	West
150.360	11	132	10/11/2019	East
150.360	12	137	10/11/2019	East
150.360	13	126	10/11/2019	East
150.380	67	133	10/11/2019	East
150.380	89	132	10/11/2019	East
150.380	91	138	10/11/2019	East
150.600	117	130	10/11/2019	East
150.600	136	123	10/11/2019	East
150.360	14	144	10/11/2019	West
150.360	15	126	10/11/2019	West
150.380	62	124	10/11/2019	West
150.380	75	129	10/11/2019	West
150.600	126	138	10/11/2019	West
150.600	144	128	10/11/2019	West
150.600	147	128	10/11/2019	West
150.360	32	138	10/13/2019	East
150.360	37	133	10/13/2019	East
150.360	40	127	10/13/2019	East
150.360	78	138	10/13/2019	East
150.380	79	140	10/13/2019	East
150.380	85	142	10/13/2019	East
150.380	107	132	10/13/2019	East
150.360	21	137	10/13/2019	West
150.360	34	128	10/13/2019	West
150.360	35	131	10/13/2019	West
150.360	45	134	10/13/2019	West
150.380	84	127	10/13/2019	West

Frequency	Tag ID	Total Length (mm)	Release	
			Date	Bank
150.380	96	129	10/13/2019	West
150.380	102	125	10/13/2019	West
150.360	17	141	10/14/2019	East
150.360	22	142	10/14/2019	East
150.360	25	139	10/14/2019	East
150.380	77	134	10/14/2019	East
150.380	95	137	10/14/2019	East
150.600	111	131	10/14/2019	East
150.600	133	137	10/14/2019	East
150.360	16	138	10/14/2019	West
150.360	20	134	10/14/2019	West
150.380	65	127	10/14/2019	West
150.380	70	135	10/14/2019	West
150.380	94	137	10/14/2019	West
150.600	112	133	10/14/2019	West
150.600	148	138	10/14/2019	West
150.600	149	125	10/14/2019	West
150.360	18	134	10/15/2019	East
150.360	19	124	10/15/2019	East
150.360	36	133	10/15/2019	East
150.380	82	129	10/15/2019	East
150.380	108	135	10/15/2019	East
150.600	122	133	10/15/2019	East
150.600	152	135	10/15/2019	East
150.360	23	127	10/15/2019	West
150.360	31	147	10/15/2019	West
150.380	69	141	10/15/2019	West
150.380	106	134	10/15/2019	West
150.380	110	127	10/15/2019	West
150.600	115	140	10/15/2019	West
150.600	119	132	10/15/2019	West
150.600	129	134	10/15/2019	West
150.360	42	136	10/16/2019	East
150.360	47	144	10/16/2019	East
150.360	60	133	10/16/2019	East
150.380	98	136	10/16/2019	East
150.380	100	128	10/16/2019	East
150.600	123	135	10/16/2019	East
150.600	153	133	10/16/2019	East
150.360	48	141	10/16/2019	West
150.360	56	132	10/16/2019	West
150.380	61	140	10/16/2019	West
150.380	97	128	10/16/2019	West
150.380	103	132	10/16/2019	West
150.600	127	138	10/16/2019	West
150.600	139	123	10/16/2019	West

Frequency	Tag ID	Total Length (mm)	Release	
			Date	Bank
150.600	154	137	10/16/2019	West
150.360	41	132	10/17/2019	East
150.360	43	133	10/17/2019	East
150.360	57	128	10/17/2019	East
150.380	88	143	10/17/2019	East
150.380	99	134	10/17/2019	East
150.600	120	139	10/17/2019	East
150.600	151	127	10/17/2019	East
150.360	44	140	10/17/2019	West
150.360	59	122	10/17/2019	West
150.380	64	124	10/17/2019	West
150.380	71	129	10/17/2019	West
150.380	92	127	10/17/2019	West
150.600	125	138	10/17/2019	West
150.600	134	122	10/17/2019	West
150.600	158	141	10/17/2019	West
150.360	49	142	10/18/2019	East
150.360	58	146	10/18/2019	East
150.360	82	123	10/18/2019	East
150.380	63	128	10/18/2019	East
150.380	93	138	10/18/2019	East
150.380	109	138	10/18/2019	East
150.600	130	135	10/18/2019	East
150.600	160	132	10/18/2019	East
150.360	46	129	10/18/2019	West
150.360	50	132	10/18/2019	West
150.380	90	131	10/18/2019	West
150.380	105	136	10/18/2019	West
150.600	114	133	10/18/2019	West
150.600	116	139	10/18/2019	West
150.600	155	123	10/18/2019	West
150.360	51	140	10/23/2019	East
150.360	55	139	10/23/2019	East
150.380	74	136	10/23/2019	East
150.380	76	124	10/23/2019	East
150.600	132	135	10/23/2019	East
150.600	142	116	10/23/2019	East
150.600	145	131	10/23/2019	East
150.600	156	138	10/23/2019	East
150.360	53	141	10/23/2019	West
150.360	54	132	10/23/2019	West
150.380	73	139	10/23/2019	West
150.380	101	143	10/23/2019	West
150.380	104	121	10/23/2019	West
150.600	118	141	10/23/2019	West
150.600	121	136	10/23/2019	West

Frequency	Tag ID	Total Length (mm)	Release	
			Date	Bank
150.380	72	131	10/24/2019	East
150.600	124	146	10/24/2019	East
150.600	141	155	10/24/2019	East
150.600	146	127	10/24/2019	East
150.600	150	141	10/24/2019	East
150.600	157	136	10/24/2019	East
150.380	86	132	10/24/2019	West
150.600	128	130	10/24/2019	West
150.600	131	139	10/24/2019	West
150.600	135	126	10/24/2019	West
150.600	138	140	10/24/2019	West

Appendix C. Listing of manual tracking detections within the Lowell Project area.

Date	Frequency	ID	Location	Type
10/21/2019	150.600	143	Bypassed Reach	Stationary
10/21/2019	150.600	136	Bypassed Reach	Stationary
10/21/2019	150.380	89	Northern Canal	Transit
10/21/2019	150.380	87	Tailrace	Stationary
10/21/2019	150.380	69	Northern Canal	Stationary
10/21/2019	150.380	62	Northern Canal	Stationary
10/21/2019	150.360	41	Northern Canal	Stationary
10/24/2019	150.600	136	Bypassed Reach	Stationary
10/24/2019	150.600	132	Northern Canal	Transit
10/24/2019	150.380	87	Tailrace	Stationary
10/24/2019	150.380	69	Northern Canal	Stationary
10/28/2019	150.600	157	Northern Canal	Stationary
10/28/2019	150.600	138	Northern Canal	Stationary
10/28/2019	150.600	124	Northern Canal	Stationary
10/28/2019	150.380	69	Northern Canal	Stationary
11/5/2019	150.600	146	Northern Canal	Stationary
11/5/2019	150.600	138	Northern Canal	Stationary
11/7/2019	150.600	157	Northern Canal	Stationary
11/7/2019	150.600	146	Northern Canal	Stationary
11/7/2019	150.600	138	Northern Canal	Stationary
11/7/2019	150.600	135	Tailrace	Stationary

Appendix D. Responses to September 30, 2020 Revised ISR meeting comments.

Comment No.	Agency	Comment	Response
1	FERC	Can Boott provide a Microsoft Excel file of station operations for the study period to allow for calculation of flow proportions by passage route?	Hourly operations records have been provided in Microsoft Excel format and include values for headpond elevation, forebay elevation, tailrace elevation, inflow, Unit 1 discharge, Unit 2 discharge, downstream bypass discharge, upstream fishway flow, downtown canal flow, and spill flow. The reported station operations at the time of downstream passage for each radio-tagged fish were identified. Section 5.5 of the final report has been modified to include a summary of the proportional volume of discharge through the selected passage route relative to non-selected routes (e.g., if a fish passed downstream via the turbines values reported for that individual would include the volume of water passing through the turbines vs. the volume of water passing downstream via alternative routes (i.e., downstream bypass or spill).
2	NMFS	Table 5-1 in Section 5-1 summarizes the percentage of inflow records from the 2019 study period categorized by volume as well as the percentage of time that each volume category is historically exceeded for the months of October and November. Is it possible to consider the study months of October and November as a	Section 5-1 has been updated to include an examination of Merrimack River conditions during the full October 9 – November 30, 2019 study period relative to flow exceedance probabilities.

		whole to classify the full study period by flow condition?	
3	MDFW	The Cox proportional hazards model for the Pawtucket Gatehouse failed to meet the criteria necessary to accept the assumption that hazards are proportional. Was a principal components analysis type approach considered to create new uncorrelated variables to increase interpretability of the data at that location?	The proportional hazards model for juvenile alosines at the Pawtucket Gatehouse was revisited and a variance inflation test (VIF-test) was conducted on all variables included in the original model. However, no two variables were found to be significantly correlated enough to consider removing or incorporating into an interaction term in the final model. As a result, no modifications were made to the model presented in the Revised ISR report.
4	MDFW and NMFS	In their Revised ISR comment letters both MDFW and NMFS commented: *The goal of the juvenile alosine and American eel downstream passage assessments was to determine the Lowell Project's impact on the outmigration of juvenile alosine and adult American eel. The specific objectives included assessing rates and delay to migration for alosine and evaluation of route specific mortality for American eel. Operation of turbine units in the downtown canal system did not occur during the study for safety reasons. This lack of operation significantly affects the study results and our ability to assess project related impacts. However, it is our understanding that the canal units will be decommissioned, as stated by CRP during a conference call with us and the US Fish and Wildlife Service on November 16, 2020.*	As stated in the DLA, Boott has elected to decommission the downtown canal units, and to remove the units and associated canal infrastructure from the new license.

		Decommissioning of the canal units should be confirmed in the Draft License Application. If confirmed, then additional evaluation of project impacts related to the canals are not necessary. However, is there is a change in this decision and the downtown canal units are part of the proposed action within the Draft License Application, then the agencies intend to request a second year of study once the canal units are fully operational to determine post-spawned adult alosine and American eel downstream migration route selection, passage efficiency, and residence duration associated with the power canal under various operational conditions, including a range of spill conditions.	

Appendix E. Project inflow and discharge by potential passage route at the time of downstream passage for radio-tagged juvenile alosines at Lowell.

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
150.380	68	10/11/2019	0:58:43	Downtown	1330	608	132	300	290
150.600	117	10/12/2019	1:03:28	Downtown	1089	272	132	395	290
150.380	87	10/12/2019	2:14:03	Turbine	1089	275	132	392	290
150.360	29	10/12/2019	3:54:47	Turbine	1107	282	132	403	290
150.600	159	10/12/2019	18:27:59	Turbine	1670	1038	132	210	290
150.360	27	10/13/2019	10:18:05	Turbine	1130	294	132	414	290
150.600	144	10/13/2019	13:35:10	Bypass	1718	1145	132	151	290
150.380	67	10/13/2019	13:38:28	Turbine	1718	1145	132	151	290
150.600	143	10/13/2019	13:41:22	Bypass	1718	1145	132	151	290
150.600	136	10/13/2019	13:42:34	Bypass	1718	1145	132	151	290
150.380	83	10/13/2019	13:43:25	Turbine	1718	1145	132	151	290
150.360	12	10/13/2019	13:43:41	Turbine	1718	1145	132	151	290
150.600	113	10/13/2019	13:45:51	Bypass	1718	1145	132	151	290
150.360	13	10/13/2019	13:54:11	Bypass	1718	1145	132	151	290
150.360	30	10/13/2019	13:57:48	Bypass	1718	1145	132	151	290
150.360	15	10/13/2019	14:09:02	Turbine	1718	1145	132	151	290
150.360	14	10/14/2019	0:05:48	Turbine	1258	516	132	320	290
150.380	91	10/14/2019	0:21:18	Bypass	1258	516	132	320	290
150.600	140	10/14/2019	10:56:36	Turbine	1565	1321	132	0	290
150.600	137	10/14/2019	15:05:40	Bypass	1712	936	132	354	290
150.600	126	10/14/2019	15:42:01	Turbine	1550	802	132	326	290
150.380	102	10/14/2019	16:17:23	Bypass	1550	802	132	326	290
150.360	37	10/14/2019	16:19:09	Bypass	1550	802	132	326	290
150.380	85	10/14/2019	16:53:41	Spill	1342	415	132	505	290
150.360	45	10/14/2019	17:29:46	Bypass	1342	415	132	505	290
150.380	75	10/14/2019	17:36:46	Turbine	1202	404	132	376	290
150.360	32	10/14/2019	18:32:42	Turbine	1182	414	132	346	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
150.360	34	10/14/2019	23:59:40	Turbine	1387	750	132	215	290
150.360	11	10/15/2019	1:00:43	Turbine	1467	861	132	184	290
150.360	25	10/15/2019	9:12:04	Downtown	1544	930	132	192	290
150.360	16	10/15/2019	16:02:50	Turbine	1514	931	132	161	290
150.600	149	10/16/2019	13:47:45	Turbine	1331	656	132	252	290
150.380	84	10/16/2019	20:21:18	Bypass	1523	802	132	299	290
150.380	81	10/17/2019	1:33:10	Bypass	1639	766	132	451	290
150.380	70	10/17/2019	4:13:10	Turbine	2990	2400	132	168	290
150.380	110	10/17/2019	4:16:57	Turbine	2990	2400	132	168	290
150.380	103	10/17/2019	4:46:22	Turbine	3858	2866	132	570	290
150.600	129	10/17/2019	4:47:56	Turbine	3858	2866	132	570	290
150.380	95	10/17/2019	4:50:24	Turbine	3858	2866	132	570	290
150.600	112	10/17/2019	5:01:24	Turbine	3858	2866	132	570	290
150.360	23	10/17/2019	5:02:19	Bypass	3858	2866	132	570	290
150.360	48	10/17/2019	5:08:50	Turbine	3858	2866	132	570	290
150.380	106	10/17/2019	5:08:53	Turbine	3858	2866	132	570	290
150.380	94	10/17/2019	5:13:05	Bypass	3858	2866	132	570	290
150.600	115	10/17/2019	5:14:24	Bypass	3858	2866	132	570	290
150.380	82	10/17/2019	5:47:32	Turbine	3966	2886	132	658	290
150.360	17	10/17/2019	6:06:50	Turbine	3966	2886	132	658	290
150.360	20	10/17/2019	6:52:11	Turbine	3920	3111	132	387	290
150.360	19	10/17/2019	7:01:11	Turbine	3920	3111	132	387	290
150.600	123	10/17/2019	7:15:30	Turbine	3920	3111	132	387	290
150.360	18	10/17/2019	7:26:13	Turbine	3920	3111	132	387	290
150.380	107	10/17/2019	17:23:22	Turbine	4015	3148	132	445	290
150.360	22	10/17/2019	17:36:23	Turbine	4140	3305	132	413	290
150.600	125	10/17/2019	19:53:59	Turbine	4289	3416	132	451	290
150.380	92	10/17/2019	20:17:37	Turbine	4289	3416	132	451	290
150.600	120	10/18/2019	1:05:56	Turbine	4220	3178	132	619	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
150.600	158	10/18/2019	7:11:57	Turbine	4048	3131	132	495	290
150.380	100	10/18/2019	7:19:50	Turbine	4048	3131	132	495	290
150.360	59	10/18/2019	7:42:33	Turbine	4333	3640	132	271	290
150.380	64	10/18/2019	8:48:12	Turbine	4749	4090	132	237	290
150.600	151	10/18/2019	10:15:06	Turbine	5075	4094	132	560	290
150.600	154	10/18/2019	12:01:18	Turbine	5410	2242	132	2746	290
150.600	127	10/18/2019	12:02:08	Spill	5410	2242	132	2746	290
150.600	122	10/18/2019	12:02:30	Turbine	5410	2242	132	2746	290
150.360	31	10/18/2019	12:03:59	Spill	5410	2242	132	2746	290
150.600	139	10/18/2019	15:20:09	Turbine	5535	4520	132	593	290
150.360	42	10/18/2019	16:19:50	Spill	5535	4552	132	561	290
150.360	60	10/18/2019	16:20:16	Spill	5535	4552	132	561	290
150.360	47	10/18/2019	16:20:16	Spill	5535	4552	132	561	290
150.380	79	10/18/2019	16:20:53	Turbine	5535	4552	132	561	290
150.380	77	10/18/2019	16:20:54	Turbine	5535	4552	132	561	290
150.360	43	10/18/2019	16:27:27	Turbine	5535	4552	132	561	290
150.380	88	10/18/2019	16:48:34	Spill	5530	4569	132	539	290
150.380	98	10/18/2019	16:49:06	Turbine	5530	4569	132	539	290
150.600	134	10/18/2019	17:10:13	Turbine	5530	4569	132	539	290
150.600	152	10/18/2019	18:07:11	Turbine	5530	4555	132	553	290
150.380	99	10/18/2019	18:13:03	Spill	5530	4555	132	553	290
150.360	36	10/18/2019	18:20:38	Spill	5530	4555	132	553	290
150.380	80	10/18/2019	18:22:47	Spill	5530	4555	132	553	290
150.380	97	10/18/2019	18:27:36	Spill	5530	4555	132	553	290
150.380	61	10/18/2019	18:53:15	Spill	5525	4542	132	561	290
150.360	50	10/18/2019	20:23:41	Turbine	5490	4457	132	611	290
150.380	90	10/18/2019	21:50:28	Turbine	5485	4554	132	509	290
150.600	114	10/18/2019	23:12:45	Turbine	5860	5091	132	348	290
150.360	49	10/18/2019	23:12:46	Turbine	5860	5091	132	348	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
150.600	116	10/18/2019	23:15:52	Turbine	5860	5091	132	348	290
150.380	63	10/19/2019	0:01:45	Turbine	6335	5372	132	541	290
150.360	58	10/19/2019	0:03:30	Turbine	6335	5372	132	541	290
150.360	46	10/19/2019	0:33:29	Turbine	6585	5448	132	715	290
150.600	160	10/19/2019	0:46:37	Turbine	6585	5448	132	715	290
150.600	130	10/19/2019	0:56:41	Turbine	6585	5448	132	715	290
150.380	93	10/19/2019	6:58:37	Turbine	6740	5512	132	806	290
150.380	109	10/19/2019	7:37:48	Turbine	6740	5522	132	796	290
150.600	155	10/19/2019	10:54:54	Turbine	6655	5512	132	721	290
150.380	65	10/19/2019	12:55:15	Turbine	6440	5285	132	733	290
150.380	89	10/21/2019	14:51:42	Turbine	3795	2855	132	518	290
150.380	101	10/23/2019	20:16:53	Turbine	4230	3373	132	436	290
150.600	142	10/23/2019	20:19:03	Turbine	4230	3373	132	436	290
150.600	145	10/23/2019	20:47:13	Turbine	4210	3073	132	715	290
150.360	53	10/23/2019	21:02:07	Turbine	4210	3073	132	715	290
150.380	104	10/23/2019	21:10:52	Turbine	4210	3073	132	715	290
150.360	51	10/23/2019	21:57:45	Turbine	3910	2755	132	732	290
150.380	74	10/23/2019	22:48:48	Turbine	3660	2595	132	643	290
150.380	73	10/24/2019	0:48:40	Turbine	3510	2349	132	739	290
150.380	76	10/24/2019	2:26:11	Turbine	3540	2319	132	799	290
150.600	121	10/24/2019	19:52:46	Turbine	4255	3322	132	512	290
150.600	131	10/24/2019	21:53:30	Turbine	4259	3336	132	500	290
150.380	86	10/25/2019	0:52:07	Spill	4589	3659	132	508	290
150.600	150	10/25/2019	5:23:18	Turbine	4709	3756	132	530	290
150.600	141	10/25/2019	6:58:53	Turbine	4684	3764	132	498	290
150.360	55	10/25/2019	7:29:32	Turbine	4684	3764	132	498	290
150.380	72	10/25/2019	14:35:58	Turbine	4755	3774	132	559	290
150.600	132	10/25/2019	21:00:26	Bypass	4631	3724	132	485	290
150.600	128	10/26/2019	7:04:55	Turbine	4285	3434	132	429	290

		Passage			Reported cfs				
Frequency	ID	Date	Time	Route	Inflow	Turbine	Bypass	Spill	Downtown
150.600	135	10/31/2019	17:07:14	Turbine	6580	5118	132	931	400

Lowell Hydroelectric Project (FERC No. 2790)

Fish Passage Survival Study

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1 Introduction

To support the relicensing of the Lowell Hydroelectric Project (Lowell or Project), a desktop review to assess the potential survival of fish passing downstream through turbine units associated with the Project was performed. This Fish Passage Survival Study was identified in the Revised Study Plan (RSP) submitted by Boott Hydropower, LLC (Boott) to the Federal Energy Regulatory Commission (FERC) on January 28, 2019. The approach and methodology described in the RSP for the Fish Passage Survival Study was approved without modifications by FERC in its Study Plan Determination (SPD) letter dated March 13, 2019. The January 28, 2019 RSP indicated that Project turbines in the E.L. Field, Bridge Street, Hamilton and John Street powerhouses would be evaluated as part of the Fish Passage Survival Study. Boott has indicated that Final License Application for the Project (due to FERC by April 30, 2021) will exclude the Bridge Street, Hamilton and John Street stations as part of the Project in the future license. As a result, this report was prepared on behalf of Boott to provide a description of the objectives, methodologies and results of the desktop based fish passage survival evaluation to characterize potential effects to outmigrating diadromous fish species associated with the two turbine units housed in the E.L. Field powerhouse on the mainstem of the Merrimack River.

2 Study Goals and Scope

2.1 Goals and Objectives

The goal of this study was to assess the potential survival of fish passing downstream through the E.L. Field turbines and to inform estimates of Project passage survival for emigrating diadromous fish species (adult and juvenile American shad, river herring, and American eel). Specific objectives for this study were to:

- Assess the potential for impingement for the target species and life stages;
- Assess the potential for entrainment for target species and life stages;
- Conduct a desktop survival analysis to estimate passage survival of target species and life stages for each active turbine type; and
- Assess total Project survival for the target species and life stages.

2.2 Scope

This Fish Passage Survival Study provides the following:

- A description of the Project reservoir, intake structure, turbine units, and operational regime;
- A summary of available fisheries information recently collected within the Project area as well as a summary of recent diadromous fish species returns to the Project;
- An overview of the life history and habitat requirements for three target fish species identified in the RSP (i.e., American shad, river herring, and American eel);

- An assessment of impingement and entrainment potential as a function of (1) the existing rack spacing, (2) calculated approach velocities, (3) the physical dimensions of target fish species, and (4) the swim capabilities (i.e., burst speed) of target fish species;

- A review of information contained in the 1997 Electric Power Research Institute (EPRI) database to provide a summary of (1) the size class composition of target fish species, (2) entrainment densities of target fish species, and (3) calculated survival rates of target species for the subset of hydroelectric projects comparable to the Project;

- The calculation of site-specific turbine passage survival rates for target fish species using the USFWS Turbine Blade Strike Analysis Tool (TBSA); and

- The use of recently collected, species-specific, proportional route selection data to calculate an estimate of total project survival.

3 Methods

This study addresses the qualitative classification of impingement, entrainment, and the probability of turbine passage survival at the Project using a review of relevant biological criteria and physical Project characteristics for three diadromous fish species. Factors that can influence the potential for impingement or entrainment at a hydropower project include structural characteristics such as the size and depth of the intake structure, the velocity of water as it enters the intake structure, the location of the intake structure relative to fish habitat, and the biological and behavioral characteristics (e.g., size, movement or migration patterns, and habitat preferences) of the specific life stages of fish species of interest. The likelihood of impingement is also highly dependent on the physical features and water velocities found at or near the trash racks along with species-specific physiological capabilities (i.e., swim speed). Turbine survival rates are primarily affected by engineering factors such as the amount of head differential of a turbine, its number of blades, rotational speed, hydraulic capacity, and the length of an entrained fish.

3.1 Project Impoundment, Intake, and Turbine Description

The first step in the evaluation of the potential for fish impingement and entrainment was to describe the physical features of the impoundment, E.L. Field intake structure, and turbine units that will affect entrainment, impingement and turbine passage survival. Project dimensions were obtained from available engineering drawings of the Project. Tables 3-1 and 3-2 summarize pertinent Project and turbine parameters and are further described in Section 4.1.

3.2 Life History and Habitat Requirements of Target Fish Species

A description of the life history, habitat requirements, and behavior of fish species was compiled to determine the likelihood of presence near the Project intakes and to evaluate entrainment potential. The “Traits Based Assessment” of Čada and Schweizer (2012) was used to qualitatively assess the potential entrainment risk for fish species, which considers each

species' primary location within the Project, preferred habitat, local movements and reproductive strategy. Species-specific behavioral requirements determine if and when a given life stage interacts with intake operation. The potential for each species to be susceptible to entrainment can be determined based on their life history characteristics in relation to the location of the Project's intake structure.

Categories of entrainment potential based on the likelihood that a fish species/life stage will be located near the intake structures are described as:

- None - species/life stage (e.g., adult, spawning, or juvenile) are not known to prefer the habitat near the intake structures
- Minimal - species may only occasionally be found occupying the habitat near the intake structures
- Moderate - species routinely or seasonally found occupying the habitat near the intake structures
- High - species likely to be found occupying the habitat near the intake structures

3.3 Entrainment Potential of Target Fish Species

The distance between bars on a trash rack (i.e., clear spacing) can affect the likelihood of an individual fish being excluded from moving through the trash rack and entering the turbine intakes. Fish species and life stages with a body width greater than the clear spacing are physically excluded from passing through a trash rack and becoming entrained. Proportional estimates of body width to total length (scaling factor) were compiled by Smith (1985) for a suite of fish species. These species-specific scaling factors were used to determine the minimum length of each species excluded from the turbines by the intake trash rack spacing. The clear spacing values were divided by the scaling factors to calculate the minimum length for each target species that would be excluded at the Project.

3.4 Electric Power Research Institute (EPRI) Entrainment Database Review

The Electric Power Research Institute (EPRI) 1997 entrainment database provides results from entrainment field studies conducted at 43 hydroelectric facilities east of the Mississippi River using full-flow tailrace netting. The database contains site characteristics of each of these facilities, as well as the total number of individuals of each species collected at each of the sites. The species counts are separated into variable size classes ranging from 2 to 30 inches.

A comparison of the EPRI entrainment database was made to provide a literature based assessment to compare with potential entrainment at the Project. To do so, the EPRI database was filtered for characteristics that match or are within a comparable range to those found at the Project which included the following:

1. Plants must be operated in run-of-river mode;
2. Total powerhouse hydraulic capacity must be within ±25% of the existing 6,600 cubic feet per second (cfs) capacity at Lowell (i.e. 4,950 to 8,250 cfs);

3. Trash rack clear spacing must be equal to or greater than the existing 7.25 inch rack spacing at Lowell; and
4. Entrainment data for fish species being considered at Lowell (i.e., American shad, river herring, and American eel) must be available.

Assuming one or more comparable projects were available from the EPRI database, collection totals of the Lowell target species from that set of locations were summarized by size class. In addition, the size class composition of the total number collected was summarized for each target species.

3.5 Impingement Potential of Target Fish Species

The ability for an individual fish to avoid being impinged or entrained at a powerhouse intake often depends on its swimming performance (Castro-Santos and Haro 2005). The swimming performance is directly related to the size of an individual fish; however, the swimming capability also varies among species based on morphological differences. Although there is no standard method that defines how swimming performance is measured, three commonly used definitions or types of swim speed are described in the scientific body of literature for fish (Katopodis and Gervais 2016). The three swim speed types, cruising, prolonged, and burst, are described as the following:

- Cruising or sustained swim speeds can be maintained indefinitely (Bain and Stevenson 1999);
- Prolonged swim speeds can be maintained between 5 and 8 minutes (Bain and Stevenson 1999); and
- Burst (also called startle, darting or sprint) swim speeds can be maintained for less than 20 seconds (Beamish 1978).

Burst swim speeds were used to assess if a fish can adequately escape involuntary impingement or entrainment. If a fish has a greater burst swim speed than the turbine intake approach velocity, it is capable of moving away from the intake flow field to avoid interaction. To assess swimming capabilities for the target fish species of interest, burst swim speeds were compiled from the available scientific literature.

To ascertain whether or not a certain size fish of a particular species is likely to be impinged or entrained, the burst swim speeds were compared to the calculated approach velocity of the intake trash racks at the maximum hydraulic capacity of the Project. The approach velocity at the Project intake was calculated using the velocity equation:

$$V = Q/A$$

Where:
Q = flow rate (cfs);
V = approach velocity (feet per second (fps)); and
A = area (square feet (ft^2)).

Fish species and sizes whose burst swim speeds are less than the approach velocity at the Project intake are susceptible to impingement at the trash racks if their body widths are greater than the trash rack spacing. If the body width of a fish is less than the trash rack spacing and its burst swim speed is less than the approach velocity, it is more susceptible to entrainment.

3.6 Turbine Survival Evaluation

To estimate survival of fish that entrain and pass through Project turbines, theoretical predictions were used to estimate a survival rate using a blade-strike model developed by the Department of Energy (Franke et al. 1997) that uses various turbine, fish and operations characteristics of a hydroelectric project to calculate a turbine blade strike and survival probability. This model was further modified by the United States Fish and Wildlife Service which produced the Turbine Blade Strike Analysis (TBSA) Tool that estimates the fraction of a population of fish that are killed by blade strike passing through a hydroelectric project (Towler and Pica 2018). TBSA creates a normally distributed population of fish described by its number, mean length, and standard deviation of length that are routed through hazards at a hydroelectric project, e. g., a turbine. Monte Carlo simulations are performed to determine the percentage of individuals subjected to turbine blade strike.

The TBSA is informed with turbine parameter values specific to the Project and calculated using methods outlined in Franke et al. (1997). The probability of blade strike in the model is based on several factors, including the number of runner blades, fish length, runner blade speed, turbine type, runner diameter, turbine efficiency, and total discharge. These factors are inputs into the model which predicts survival for a fish of a designated length, regardless of species. The TBSA model was used to predict turbine passage survival estimates expected for each target species in the Project area and up to the maximum lengths (rounded to whole inch) for each target fish species that could entrain through the existing trash rack spacing at the Project. The TBSA model simulations for American shad and river herring were run using a correlation factor (λ) of 0.2 which is the recommended conservative value (Towler and Pica 2018). An interim recommendation from the USFWS Fish Passage Engineering Group suggests the use of λ = 0.4 for American eels based on an analysis which evaluated the effect of varied TBSA correlation factors to adjust modeled estimates to match results from a series of empirical eel passage studies.

3.7 Electric Power Research Institute (EPRI) Turbine Survival Database Review

Similar to the comparison of the EPRI entrainment database review, the EPRI (1997) turbine survival database was reviewed to provide an equitable literature-based comparison of the turbine survival estimates calculated for the Project. To do so, the EPRI database was filtered for characteristics that match or are similar to those found at the Lowell Project. The following characteristics were selected to identify comparable projects:

1. Turbine type must be Kaplan;
2. Turbine hydraulic capacity must be within ±25% of the existing 3,300 cfs capacity at Lowell (i.e. 2,475-4,125 cfs);

3. Head rating must be within ±25% of the existing 39 feet of head at Lowell (i.e. 29 to 49 feet); and
4. Entrainment data for fish species being considered at Lowell (i.e., American shad, river herring, and American eel) must be available.

Assuming one or more comparable projects were identified within the EPRI survival database, the immediate, 24-hour, and 48-hour survival estimates were identified, if available, as they provided a range of time post-turbine passage for evaluating each species.

3.8 Qualitative Assessment of Entrainment and Turbine Survival Potential

Data collected during the literature review and site-specific evaluation process (i.e., habitat and life history, swim speeds, and turbine survival model estimates) were used to compile a qualitative assessment of the potential entrainment of target fishes. The qualitative assessment used a multi-step rank of:

- High (H)
- Moderate (M)
- Low (L)

Desktop impingement and entrainment assessments assigned an overall entrainment potential rank to each of the relevant life stages of target species considered based on consideration of habitat and life history, swim speed relative to intake velocity, and minimum exclusion lengths relative to trash rack spacing. In general, fish with life history attributes that include obligatory downstream migration are given a rating of 'High', while those with juvenile life history stages placing them in the vicinity of the intakes or as adults with swim speeds not necessarily greater than the approach velocity are labeled as 'Moderate' risk. Species with life history attributes that generally keep them away from the intakes or fish that had a burst swim speed greater than the intake velocity are listed as a 'Low' risk for entrainment. In relation to swim speed, regardless of life stage, fish are considered 'High' risk if the maximum burst speed does not exceed the intake velocity, 'Moderate' risk if the intake velocity falls within the range of burst swim speed, and 'Low' risk if the burst swim speed completely exceeded the intake velocity.

The entrainment potential classification for trash rack spacing depended on the minimum body length exclusion results. If the minimum exclusion length for the existing trash rack spacing was longer than the standard length for a juvenile or adult (i.e., many individuals of that species and life stage are likely to be shorter than the minimum exclusion length) it received a "High" entrainment risk potential. A "Moderate" entrainment risk potential was applied when the minimum exclusion length overlapped with a portion of the individuals that would be expected to achieve that length by the life stage indicated. A "Low" entrainment risk potential was applied when the minimum exclusion length of a trash rack was less than the standard length of the life stage being considered.

The risk categories for the turbine survival potential were based on the TBSA model estimates. TBSA results were converted to a qualitative ranking system similar to Winchell et al. (2000) for

standard lengths of the juvenile and adult life stages. “High” survival potential was applied to estimates greater than 95%, “Moderate” for estimates between 85-95%, and “Low” for estimates less than 85%.

Table 3-1: Lowell Project impoundment and intake characteristics

Site Characteristic	Lowell Project	
Normal Full Pond Elevation (feet (ft))	92.2	
Operating Mode	Run-of-River	
Surface Area at Normal Full Pond (acres)	720	
Total Storage Volume (acre-feet)	3,600	
Impoundment Length (miles)	23	
Total Hydraulic Capacity (cfs)	6,600	
	Unit 1	Unit 2
Upper Rack Elevation (ft)	72.5	72.5
Bottom Rack Elevation (ft)	40.5	40.5
Trash Rack Spacing (in)	7.25	7.25
Trash Rack Height (ft)	32	32
Trash Rack Width (ft)	32.35	32.35
Trash Rack Surface Area (sq. ft)	1,034.72	1,034.72
Maximum Turbine Discharge (cfs)	3,300	3,300
Intake velocity (fps)	3.2	3.2

Table 3-2: Lowell Project turbine characteristics

Turbine Parameter	E.L. Field Turbines	
	1	2
Turbine Type	Kaplan	Kaplan
Number of Blades	5	5
Runner Diameter (ft)	12.7	12.7
Head (ft)	39.0	39.0
Rotational Speed (rpm)	120.0	120.0
Discharge at Max Capacity (cfs)	3,300	3,300
Discharge at Optimum Capacity (cfs)	2,683	2,683
Turbine Efficiency (%)	92.8	92.8

4 Results

4.1 Lowell Project Description

4.1.1 Project Location and Facilities

The Lowell Hydroelectric Project (Project) is located at the Pawtucket Dam on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts. The Project is located approximately 11 miles upstream of the Lawrence Project (FERC No. 2800) and approximately 30 miles downstream of the Amoskeag Dam (a development of the Merrimack River Project, FERC No. 1893) in New Hampshire. The 116-mile-long Merrimack River begins at the confluence of the Winnipesaukee and Pemigewasset Rivers in Franklin, New Hampshire; flows southward into Massachusetts; and then travels northeast until it discharges into the Atlantic Ocean. The Project includes a single powerhouse, the 15.0-megawatt (MW) Eldred L. Field (E.L. Field) powerhouse constructed in 1985-1986 during Project redevelopment. The total installed capacity of the project is 15,012 kW.

The E.L. Field powerhouse utilizes the existing Pawtucket Dam and the first 2,200 feet of the Northern Canal. The powerhouse is located close to the canal, downstream of the University Avenue Bridge (also called the Moody Street Bridge), with an intake structure drawing water from the Northern Canal. A 440-foot tailrace channel, surge gate and fish passage facilities comprise other major E.L. Field powerhouse features.

The Project also includes the Guard Lock and Gates Facility ("Guard Locks") and the approximately 1,600-foot-long portion of the Pawtucket Canal leading from the Project impoundment to the Guard Locks.

4.1.2 Impoundment Characteristics

The Project operates in a run of river mode and has no usable storage capacity. The pond formed by the Pawtucket Dam extends approximately 23 miles upstream to Moore's Falls in Litchfield and Merrimack, New Hampshire. At the normal pond elevation of elevation of 92.2 feet NGVD 29 (crest of pneumatic crest gate), the surface area of the pond is reported to encompass an area of about 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet NGVD 29 and the minimum pond level of 87.2 feet NGVD 29 is approximately 3,960 acre-feet.

4.1.3 Powerhouse, Intake Structure, and Trash Racks

The E.L. Field powerhouse is a reinforced concrete structure. The powerhouse is approximately 109-feet-long by 96-feet-wide and houses two generating units with a total authorized generation of 15.0 MW. Each intake is equipped with trash racks with a clear spacing of 7.25 inches. Each unit intake rack covers an area of 1,034.72 ft^2. The powerhouse incorporates a separate conventional intake structure for each of the station's two identical units. Each intake is equipped with trashracks; intake and draft tube gate slots with permanent or bulkhead style gates for emergency shutdown and dewatering purposes are also provided. The powerhouse is equipped with a traversing trash rake to remove debris at the intake.

4.1.4 Downstream Bypass

The downstream fishway at the powerhouse consists of an adjustable-flow sluiceway and bypass adjacent to the intake headwall. Downstream migrants entering the bypass are quickly sluiced into an enlarged and deepened plunge pool located in the bypassed river reach next to the powerhouse. Natural channel braids in the riverbed allow emigrants to move downstream to the mainstem of the river, at the confluence of the river reach and tailrace.

4.1.5 Turbines

The Lowell Project includes two identical horizontal Kaplan turbines housed in the E.L. Field powerhouse with a total installed generating capacity of 15.0 MW. Each unit has a maximum hydraulic capacity of 3,300 cfs. See Table 3-2 for unit specifications.

4.1.6 Project Operations

The Project is operated in a ROR mode using the automatic pond level control capability of the E.L. Field Powerhouse. Boott normally operates the Project to maximize flow through the available units at the E.L. Field Powerhouse, then routes any additional flows through the Pawtucket Canal system. When river flows exceed the hydraulic capacity of the E.L. Field units (approximately 3,300 cfs per unit or 6,600 cfs for both units), excess flows up to approximately 2,000 cfs are routed through the downtown canal system. Any flows in excess of approximately 9,000 cfs are passed over the Pawtucket Dam spillway. The Project is required to maintain a minimum flow equal to 1,990 cfs or inflow, whichever is less, as measured immediately downstream from the Project.

4.2 Life History and Habitat Requirements of Target Fish Species

The Merrimack River watershed is home to a diverse assemblage of approximately 50 species of fishes, including cold water and warm water species, diadromous species, and introduced gamefish and non-gamefish species. The Fish Assemblage Study, conducted by Normandeau during the spring, summer and fall of 2019, consisted of boat electrofishing and gill net sampling to characterize the fish community in the Project impoundment. When all sample locations and gear types are considered, a total of 1,847 individuals representing twenty-two fish species were collected from the Lowell impoundment during 2019. The majority of fish collected were resident fish species with centrarchid and cyprinid species being most abundant. A summary of the fish captured in the 2019 study is provided in Table 4-1.

Diadromous species inherently have the highest likelihood of direct interaction with the Project as they are obligatory migrants which require passage upstream and downstream at the Project to complete their life cycles. Observations of diadromous species upstream of the Lowell Project during the Fish Assemblage Study were limited to observations of juvenile alewives during the summer and fall sampling events as well as a limited number of juvenile American eels during the three seasonal periods. Despite limited observations of diadromous fish species during the Fish Assemblage Study, American shad and river herring are documented annually utilizing the upstream passage facilities at the Project (i.e., the E.L. Field fish lift and Pawtucket Dam fish ladder). Camera-based counts of diadromous fish returns at Lowell conducted

annually since 2018 are summarized in Table 4-2. For the period 2018-2020, an annual average of 8,232 American shad and 179,239 adult river herring have volitionally passed upstream of the Project. In addition, Boott has quantified upstream passage of juvenile American eels since 2014. A total of 974 individuals were passed upstream during the 2020 passage season. Due to their migratory requirements and presence in the Project area, the target species for this analysis included American shad, river herring (i.e., alewife and blueback herring), and American eel.

4.2.1 American Shad

American shad are an anadromous, highly migratory, coastal pelagic, schooling species that range from northern Labrador to Florida. They are the largest member of the herring family (Clupeidae), and females are larger than males at all ages. Mature male shad range from 12 to 17.5 inches (30.5 - 44.7 cm) and mature females range from 15 to 19 inches (38.3 - 48.5 cm) (Stier and Crance 1985). Males mature at age 4, while females mature at ages 5-7. The maximum age is 11 years. Spending the majority of their life in the sea, mature adults migrate upriver to natal rivers to spawn from May to July. Although shad spawn in freshwater, there is no apparent required distance upstream of brackish water (Stier and Crance 1985). American shad return downstream to marine waters soon after spawning. American shad are known to be prolific spawners, with females producing up to 600,000 eggs. After broadcast-spawning, fertilized eggs sink to the bottom, where they become lodged in rubble and water-harden. Hatching typically occurs after 1-2 weeks, dependent on water temperature. Larvae may remain in freshwater, or drift into brackish water and grow rapidly, transforming into juveniles approximately 4 to 5 weeks after hatching (Stier and Crance 1985). During the first fall of their life, juvenile shad leave fresh water and migrate in schools downstream to the sea. Upon reaching the ocean, they become long-range coastal migrants. While at sea, American shad form large schools and migrate vertically to feed on zooplankton.

Period and life stages of greatest likelihood of exposure to intakes at the Lowell Project:

- June-July: Following spawning at upstream locations, adult American shad migrate downstream to return to marine habitat
- September-October: Following time spent in upstream rearing habitat, juveniles migrate downstream to enter marine habitat.

4.2.2 River Herring (Alewife and Blueback Herring)

Alewife and blueback herring are clupeid species very similar in appearance and behavior. Since it is difficult to distinguish between the two species, they are frequently considered together under the collective term “river herring”. They are anadromous, euryhaline, coastal, and pelagic fish (Bigelow and Schroeder 1953, Cooper 1961, Collette and Klein-MacPhee 2002). Alewife range from the St. Lawrence River, Canada to North Carolina (Neves 1981), and mature between ages 3-6, and are typically 10 to 11 inches (250-280 centimeters (cm)) in length (Bigelow and Schroeder 1953). They form large schools during their spring spawning migrations from the ocean to coastal rivers. Spawning migrations occur in a south-to-north progression as

water temperatures warm in the spring, typically taking place in late April to mid-May in the Gulf of Maine (Bigelow and Schroeder 1953). Blueback herring have a greater geographical range than alewife, ranging from Cape Breton, Nova Scotia to Florida. They also spawn in early June in the Gulf of Maine, roughly four weeks later in the season than alewife. Similar to alewife, blueback herring mature between the ages of 3-6 years. Adults require little or no current for spawning, utilizing ponds, lakes, or slow-flowing riverine areas at water temperatures of 13° to 20°C (55° to 68° F) (Otto et al. 1976, Wyllie et al. 1976, Kellogg 1982). There appears to be little preference for sediment type as spawning has been observed over hard sand, gravel, stone, detritus-covered bottoms and among sticks and vegetation (O'Dell 1934, Havey 1961). Eggs are about 1 millimeter (mm) in diameter, adhesive, and require 3 to 6 days to hatch over a temperature range of 16° to 22° C (61 to 72 °F). Larvae hatch at 0.1 to 0.2 inches (3 to 5 mm) in total length and become juveniles at approximately 0.8 inches (20 mm; Cianci 1969).

River herring have declined in recent years. The Atlantic States Marine Fisheries Commission reports that river herring stocks are depleted to near historic lows along the Atlantic coast (ASMFC 2012).

Period and life stages of greatest likelihood of exposure to intakes at the Lowell Project:

- May-June: Following spawning at upstream locations, adult river herring migrate downstream to return to marine habitat

- September-October: Following time spent in upstream rearing habitat, juveniles migrate downstream to enter marine habitat.

4.2.3 American Eel

The American eel is a catadromous species common in rivers, streams, lakes, tidal marshes and estuaries throughout the Northern Atlantic. It is native to Atlantic coastal waters from Newfoundland to South America. Males typically reach sizes up to 24 inches (61 cm) in length, while females reach larger sizes of 30 to 40 inches (76 to 102 cm). They are a long lived species, able to reach up to 30 years of age. Eels spend the majority of their lives in fresh water, but upon reaching maturity, they descend to the Atlantic Ocean in the fall. They migrate to the Sargasso Sea and spawn in February to April, dying shortly after. Females are prolific egg producers, with one female producing up to 20 million eggs. After spawning, leptocephalus larvae drift at sea for up to a year, and are gradually transported north by the Gulf Stream. As they approach the North American coast, the larvae metamorphose into unpigmented juveniles known as glass eels. During this metamorphosis, the body becomes cylindrical, the jaw and head are altered and the digestive tract becomes functional (Collette and Klein-MacPhee 2002). Glass eels appear in southern New England in March at 2 to 4 inches (~ 50-100 mm) in length. They migrate upstream at night into freshwater where they feed, and become pigmented; this is known as the "elver" life stage. They grow slowly until they sexually mature, which can take up to 20 years. However, eels are known to reach maturity as small as 11 inches (28 cm) for males and 18 inches (46 cm) for females. Once sexual maturity occurs in late summer to early

fall, the eel begins moving downstream, the eyes and pectoral fins enlarge, and feeding stops (Collette and Klein-MacPhee 2002). Specific spawning migration routes and egg life history information are currently unknown.

Period and life stages of greatest likelihood of exposure to intakes at the Lowell Project:

- September-November: Adult "silver" eels migrate downstream to begin spawning migration to the Sargasso Sea.

Table 4-1. Number of fish captured upstream of Pawtucket Dam by boat electrofishing and experimental gill net during spring, summer and fall sampling, 2019

Common Name	Spring	Summer	Fall	2019
	N	N	N	N
Alewife	0	21	92	113
American Eel	6	10	1	17
Black Crappie	2	2	1	5
Bluegill	24	77	21	122
Channel Catfish	0	1	0	1
Common Carp	1	3	1	5
Fallfish	34	34	75	143
Golden Shiner	1	5	7	13
Largemouth Bass	2	32	7	41
Lepomis spp.	1	3	0	4
Margined Madtom	3	5	1	9
Pumpkinseed	10	126	19	155
Redbreast Sunfish	137	196	45	378
Rock Bass	3	2	2	7
Sea Lamprey	7	6	8	21
Smallmouth Bass	127	50	50	227
Spottail Shiner	160	79	185	424
Tessellated Darter	14	14	3	31
Walleye	0	1	0	1
White Perch	0	1	0	1
White Sucker	24	9	22	55
Yellow Bullhead	7	42	5	54
Yellow Perch	16	3	1	20
Total	**579**	**722**	**546**	**1847**

Table 4-2. Diadromous fish returns as documented using SalmonSoft recording software at the E.L. Field fish lift and Pawtucket Dam fish ladder for the period 2018-2020.

Net Upstream Passage at Lowell Project			
Year	River Herring	American Shad	American Eel
2018	311,867	14,046	49
2019	43,871	2,201	2
2020	181,979	8,450	2

4.3 Entrainment Potential of Target Fish Species

Minimum exclusion lengths for juvenile and adult migrant life stages for the existing trash rack clear spacing at the Lowell Project are presented in Table 4-3. Proportional estimates of body width to total length (scaling factor) collected from Smith (1985) were used to determine the minimum length of each target species that would be excluded from entraining through the trash racks present at the Lowell Project (minimum exclusion size = rack clear spacing/scaling ratio).

All of the calculated estimates yielded lengths for target species that are unlikely to be present in the Project (i.e., a length outside of the range expected for the species in the vicinity of the Lowell Project). For example, the minimum size of American shad predicted to be excluded by a 7.25-inch intake rack is 54.1 inches—a length not attained by this species. In all cases where the maximum size of the species did not exceed the minimum exclusion size, a designation of 'none' was applied (Table 4-3). The existing 7.25 inch clear rack spacing will not physically exclude target fish species considered for this evaluation from entrainment at the E.L. Field powerhouse

Table 4-3. Minimum length for target fish to be excluded from entrainment based on existing 7.25 inch trash rack spacing

Common Name	Scaling Factor for Body Width[1]	Typical Length (inches) for target species juveniles and adults potentially encountered at the Project		Calculated Minimum Exclusion Length (inches)*
American shad	0.134	Juvenile	2-6[1]	none
		Adult	15-23[2]	
River herring	0.105	Juvenile	1.5-6[1]	none
		Adult	9-13[3]	
American eel	0.037	Adult	25-41[4]	none

* "None" indicates that the calculated exclusion length exceeds the maximum length expected for the species at Lowell

1 Upper end of range based on 145 juvenile alosines handled as part of the Juvenile Alosine Downstream Passage Assessment; Lower end of range adopted from species review

2 Based on 544 adult American shad handled as part of the Upstream and Downstream Adult Alosine Passage Assessment

3 Based on 914 adult river herring handled as part of the Upstream and Downstream Adult Alosine Passage Assessment

4 Based on 162 adult eels handled as part of the Downstream American Eel Passage Assessment (Note Soucook River origin eels ranged 27-34 inches; St. Croix River origin eels ranged 24-41 inches)

4.4 Electric Power Research Institute (EPRI) Entrainment Database Review

The EPRI 1997 database was reviewed for comparable hydroelectric projects using the criteria presented in Section 3.4. Following exclusion of project locations with differing operational styles (i.e., not run-of-river) or capacities differing from Lowell by ±25%, a single location was identified (Table 4-4). Although the operating mode and total powerhouse capacity were comparable, the rack spacing at the Wisconsin River Diversion (2.2 inches) was considerably less than the relatively wide rack spacing present at Lowell (i.e., 7.25 inch clear spacing). Lacking a set of comparable hydroelectric projects, a qualitative comparison of existing entrainment data was not conducted as part of this Lowell analysis.

Table 4-4. Hydroelectric facilities identified within the EPRI (1997) entrainment database considered for comparison to the Lowell Project

Facility Name	Total Plant Capacity (cfs)	Operating Mode	Trash Rack Spacing (in)
Wisconsin River Division	5,150	ROR	2.2
Lowell	6,600	ROR	7.25

ROR = Run-of-river

4.5 Impingement Potential of Target Fish Species

A summary of burst swim speeds determined for adult and juvenile American shad and river herring and adult American eel is presented in Table 4-5. These data were obtained using the Swim Speed & Swim Time Tool[1] (Katopodis and Gervais 2016; Di Rocco and Gervais 2020). The expected size range for each species/life stage was evaluated relative to the data available in the Swim Speed & Swim Time Tool and five representative lengths were chosen for burst speed estimation from the database. For each species/life stage, the five representative lengths included the upper and lower bounds of the anticipated size range for the Project area as well as the 25th, 50th, and 75th percentile lengths within that range. Each unique species-length combination was input into the Swim Speed & Swim Time Tool and produced a relationship for swim speed and swim time for a particular body length. For each body length selected to be assessed for each species, the following estimates were recorded:

1. Speed (ft/s) achieved by 97.5% of individuals of species X at body length Y for 3 seconds;
2. Speed (ft/s) achieved by 87.5% of individuals of species X at body length Y for 3 seconds;
3. Speed (ft/s) achieved by 50% of individuals of species X at body length Y for 3 seconds;

[1] Available online at: http://www.fishprotectiontools.ca/speedtime.html

4. Speed (ft/s) achieved by 12.5% of individuals of species X at body length Y for 3 seconds; and

5. Speed (ft/s) achieved by 2.5% of individuals of species X at body length Y for 3 seconds.

It is understood that burst swim speeds may vary greatly among different fish species as well as among sizes of the same species. However, variation exists within individuals of the same species and size class. Katopodis and Gervais (2016) demonstrate ascending physical capabilities as a smaller portion of the test fish are represented by each speed rating. For example, 97.5% of Adult American shad in the 15 inch size class are expected to be capable of achieving a speed of 17.3 fps for a period of 3 seconds, while only 2.5% of American shad of the same size are expected to be able to achieve a speed of 26.8 fps for 3 seconds. For the purposes of this desktop evaluation values representing the 50th percentile of swim speed over a three second period were selected as representative of a fishes burst swim capability. The 50th percentile speed rating for the minimum, median, and maximum size of each of the target fish species and life stages is provided in Table 4-5. The full range of swim speed estimates for target fish species generated using the Swim Speed & Swim Time Tool are provided in Appendix A.

Figure 4-1 presents the estimated burst speeds for the target species and life stages relative to the calculated intake velocity under full generation at the E.L. Field powerhouse intake structure (3.2 fps). In general, target species whose burst swim speeds are less than the approach velocity at an intake are likely to be involuntarily impinged or entrained depending on the size of an individual and the intake rack spacing. Burst speeds for each of target species/life stages considered in this assessment that are in excess of the calculated intake velocity at the E.L. Field powerhouse suggests the potential for involuntary impingement or entrainment is low. Individuals with burst speeds less than the approach velocities at E.L. Field are more likely to be entrained than impinged as most will fit through the existing rack spacing of 7.25 inches (Section 4.3).

Table 4-5. Burst swim speed information compiled from scientific literature for target fish species

Common Name	Size potentially encountered the region (in)	Size included in burst speed estimate based on data availability	Burst Speed (fps) at minimum size[5]	Burst Speed (fps) at median size[5]	Burst Speed (fps) at maximum size[5]
American shad (Juv)	2-6[1]	2-6	5.2	8.4	11.2
American shad (Adult)	15-23[2]	10-15	16.2	19.0	21.5
River herring (Juv)	1.25-6[1]	1.25-6	3.6	7.8	11.2
River herring (Adult)	9-13[3]	9-12	15.1	16.7	18.4
American Eel	25-41[4]	21-45	11.0	14.9	18.4

1 Upper end of range based on 145 juvenile alosines handled as part of the Juvenile Alosine Downstream Passage Assessment; Lower end of range adopted from species review
2 Based on 544 adult American shad handled as part of the Upstream and Downstream Adult Alosine Passage Assessment
3 Based on 914 adult river herring handled as part of the Upstream and Downstream Adult Alosine Passage Assessment
4 Based on 162 adult eels handled as part of the Downstream American Eel Passage Assessment (Note Soucook River origin eels ranged 27-34 inches; St. Croix River origin eels ranged 24-41 inches)
5 Katopodis, C, and R Gervais. 2016. Fish Swimming Performance Database and Analyses. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/002., 550.

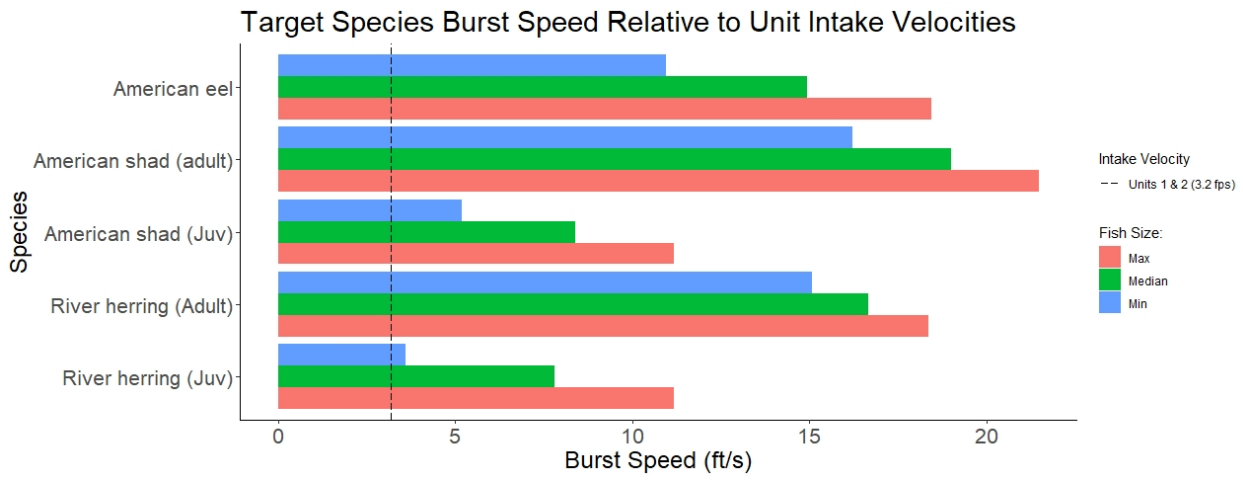

Figure 4-1. Burst swim speed of target fish species compared to calculated approach velocities at the Lowell intakes

4.6 Turbine Survival Evaluation

Table 4-6 provides a summary of the calculated TBSA turbine survival estimates for alosines (i.e., American shad and river herring) entrained through the E.L. Field Kaplan units. Survival values were estimated for the range of body lengths anticipated to be prone to entrainment based upon the minimum exclusion sizes presented in Table 4-3 as well as reasonable lengths expected to occur within the Project area. Estimates of turbine passage were inversely related to body length for each species/life stage considered with highest survival estimated for small juvenile shad or herring at 2 inches of length (~99%) and the lowest for adult American shad approaching 25 inches of length (~83%). A separate TBSA model was assembled for American eel which relied on recent USFWS guidance on the use of a varied correlation coefficient for that species (Table 4-7). The estimated range of survival for eels passing downstream through the E.L. Field turbines ranged from 71-39%. Similar to the trend observed for alosines, the rate of survival for adult eels was predicted to decrease as body size/length increased.

Table 4-6. TBSA predicted survival estimates for adult and juvenile American shad and river herring at the E.L. Field powerhouse.

Species/Life Stage	Size potentially encountered the region (in)	Body Length (Inches)							
		2 in	4 in	6 in	8 in	12 in	16	20	25
American shad (Juv)	2-6	98.6%	97.2%	95.9%					
American shad (Adult)	15-23						89.0%	86.4%	83.1%
River herring (Juv)	1.5-6	98.6%	97.2%	95.9%					
River herring (Adult)	9-13				94.8%	91.8%	89.0%		

Assumes full generation; λ = 0.2

Table 4-7. TBSA predicted survival estimates for adult American eels at the E.L. Field powerhouse.

Species/Life Stage	Size potentially encountered the region (in)	Body Length (Inches)						
		21	24	28	32	36	40	45
American eel (Adult)	25-41	71.2%	67.3%	61.8%	56.5%	51.7%	46.0%	39.1%

Assumes full generation; λ = 0.4

4.7 Electric Power Research Institute (EPRI) Turbine Survival Database Review

The EPRI 1997 survival database was reviewed for comparable hydroelectric projects using the criteria presented in Section 3.6. Following exclusion of project locations with differing turbine types (i.e., not Kaplan) or turbine unit capacities differing from Lowell by ±25%, a single location was identified (Table 4-8). Although the turbine style and capacity were comparable, the project head at Townsend Dam (16 feet) was considerably less than that at Lowell (i.e., 39 feet). In addition, entrainment survival data for the target species considered in this report were not available at Townsend Dam. Lacking a set of comparable hydroelectric projects, a qualitative comparison of existing entrainment survival data was not conducted as part of this Lowell analysis.

Winchell et al. (2000) provides a review of the EPRI (1997) database and a generalized summary of survival based on turbine type, runner speed, and fish size (Table 4-9). Winchell et al. (2000) reports mean survival rates (all fish species combined) for low speed axial flow (includes Kaplan) units to range from 95.4% for fish ≤ 4 inches to 87.2% for fish between 8 and 12 inches.

Table 4-8. Hydroelectric facilities identified within the EPRI (1997) turbine survival database considered for comparison to the Lowell Project

Facility Name	Turbine Type	Rated Head (ft)	Rated Flow (cfs) Per unit	Speed (rpm)	Runner Diameter (ft)	Runner Blades
Townsend Dam	Kaplan (Horizontal)	16	2,200	152	9.4	3
Lowell	Kaplan (Horizontal)	39	3,300	120	12.7	5

Table 4-9. Summary of fish survival rates by turbine type, speed, capacity and fish body size as compiled by Winchell et al. (2000)

Turbine Type	Runner Speed (rpm)	Hydraulic Capacity (cfs)	Fish Size (mm)	Average immediate survival (all species combined)		
				Minimum	Maximum	Mean
Axial Flow (Kaplan) Winchell (2000)	<300	636-1,203	<100	94.1%	98%	95.4%
		636-21,000	100-199	89.8%	98%	94.8%
		636-2,200	200-299	77.4%	97%	87.2%
		1203-2200	300+	86.8%	100%	93.4%

4.8 Qualitative Assessment of Entrainment and Turbine Survival Potential

Evaluating entrainment potential and subsequent survival for the target fish species required combining and synthesizing the species-specific behavioral traits, life stages, and swimming capabilities and comparing them to the Project's unique intake, water conveyance and infrastructure characteristics. The blending of these factors yielded a qualitative assessment of whether or not a target fish species will potentially entrain through the Project's intakes. In the event a fish becomes entrained, a secondary evaluation of the potential for that individual to survive passage through the Project's turbines depended primarily on its length and the physical parameters associated with the specific turbine. This final qualitative assessment took into consideration and summarized all of the factors that influenced entrainment and turbine passage and is presented in Table 4-10.

When the life history characteristics, behavior, and habitat use are considered, all species considered during this analysis (American eel, American shad, and river herring) are obligatory diadromous migrants. As such, they are required to pass the Project as part of their life cycle resulting in the classification of "high" entrainment potential for that category. All species/life stages considered in this assessment have the potential to become entrained through the existing 7.25 inch spaced racks because their body dimensions will permit them to fit through those openings. When the median burst swim speed rates are considered (Table 4-5), each species/life stage demonstrated potential to evade involuntary entrainment at Lowell. Only a portion of juvenile river herring in the low end of the expected size range for the species at Lowell would be expected to have a burst swim capability weak enough to be unable to avoid involuntary entrainment (Appendix A).

Outmigrating alosines are generally surface oriented as evidenced by their affinity for passing downstream of hydroelectric projects via overflow spillways or bypasses. That behavior may help to reduce the overall entrainment through the E.L. Field turbines at Lowell. Downstream bypass usage was quantified during the 2019 Juvenile Alosine Downstream Passage Assessment and 2020 Upstream and Downstream Adult Alosine Passage Assessment. Of the 99 radio-tagged juvenile alosines entering and passing downstream via the E.L. Field power canal, 17% utilized the existing downstream bypass facility and avoided turbine entrainment. Adult alosines which entered the Northern Canal upstream of the E.L Field intake structure exhibited higher rates of downstream bypass usage with 49% (97 of 200) of adult river herring and 52% (33 of 64) of adult American shad passing via the route.

Adult American eels are generally bottom oriented. Based on that generalized behavior during outmigration, their ability to fit through the existing rack spacing, and the presence of only a surface oriented downstream bypass it is expected that a high proportion of outmigrating eels which enter the Northern Canal upstream of the E.L. Field intake structure will entrain through the turbines. Entrainment of outmigrating silver eels was assessed during the 2019 Downstream American Eel Passage Assessment. During that study, 98.5% of tagged eels (134 of 136) which entered the Northern Canal were entrained at the E.L. Field turbine units.

The majority of individuals approaching the E.L. Field powerhouse are expected to be physically capable of avoiding involuntary entrainment due to their swimming capability relative to the intake velocity. However, it is still likely that individuals may voluntarily become entrained due to their need to migrate downstream to the marine environment. TBSA estimated survival rates for juvenile shad and river herring are expected to be high (>95%) whereas TBSA survival estimates for adults are classified as moderate (85-95%) for river herring to low (<85%) for larger bodied American shad. TBSA estimates of turbine survival for adult silver eels were low (<85%) over the full range of body lengths evaluated.

Table 4-10. Qualitative project passage survival potential for target fish species relative to factors influencing entrainment and turbine survival at Lowell

Species and Life Stage	Entrainment Potential			Survival
	Behavior, Habitat and Life History	Trash rack Clear Spacing	Swim Speed compared to Lowell Units	
		7.25 inches	(3.2 fps)	Kaplan
American Shad				
Juvenile	H	H	L	H
Adult	H	H	L	M-L
River Herring				
Juvenile	H	H	M-L	H
Adult	H	H	L	M
American Eel				
Adult (silver)	H	H	L	L

4.9 Total Project Survival

Empirical estimates of downstream passage survival were collected for adult American eels, river herring and American shad at Lowell during the 2019 Downstream American Eel Passage Assessment and 2020 Upstream and Downstream Adult Alosine Passage Assessment.

When all downstream passage routes are considered, the total project survival for adult American eels was estimated at 75.5% (75% CI = 71.4%-79.6%). An adequate sample size was available to produce a route-specific estimate of downstream passage survival for adult American eels at only the E.L. Field turbines (75.0%; 75% CI = 70.6%-79.4%). The limited number of radio-tagged eels passing the Project via spill (n = 4) or via the downstream bypass system (n = 2) were all determined to have successfully approached the Lawrence Project following downstream passage at Lowell. In the case of adult eels, the TBSA model (Table 4-7) tended to underestimate turbine survival.

When all downstream passage routes are considered for adult river herring, the total project survival at Lowell was estimated at 80.1% (75% CI = 76.7%-83.6%). When examined by passage route, survival was estimated for adult river herring passing through the downstream bypass at 87.8% (75% CI = 81.8%-91.5%) and for adult river herring passing downstream through the E.L. Field turbines at 73.9% (75% CI = 68.8%-79.1%). Similarly, total project survival at Lowell was estimated for adult American shad at 70.0% (75% CI = 64.5%-74.6%). When examined by passage route, survival was estimated for adult shad passing over the Pawtucket Dam via spill at 89.2% (75% CI = 82.6%-93.8%), through the downstream bypass at 82.6% (75% CI = 75.7%-90.9%) and through the E.L. Field turbines at 35.5% (75% CI = 25.8%-45.2%). In the case of adult alosines, the TBSA model (Table 4-6) tended to overestimate turbine survival.

An empirical estimate of juvenile alosine survival was not derived during the 2019 Juvenile Alosine Downstream Passage Assessment at Lowell. As a result, the TBSA desktop tool was used to estimate total project survival for juvenile alosines at the Project. The model required input of available downstream passage routes and an estimate of their proportional usage. Those rates were obtained from the 2019 study which estimated route usage for individuals passing the project via known mainstem routes as 11.6% via spill, 15.1% via the downstream bypass, and 73.2% via the E.L. Field turbine units. These observed route selection probabilities were imported into a multi-route TBSA model to evaluate the predicted whole-station survival for a normally-distributed population of 1,000 3.5 inch (S.D. ±1.0 inches) fish. For non-turbine routes (e.g., downstream bypass or spill), an estimate of passage mortality was required and was based on the empirical estimates obtained for adult alosines at the Project (12% at the downstream bypass and 11% via spill). Turbine-specific parameters were incorporated as previously described above in Table 3-2. Using this methodology, total project survival at Lowell for juvenile alosine-sized fish is estimated at 94.8%. Passage failures were attributed to fish passing downstream via the turbines (2.1% of total losses) and the downstream bypass facility/spill (3.1% of total losses).

These estimates of total project survival are all based on flow conditions during the study periods. As identified in the individual study reports the majority of the passage periods for these evaluations could be classified as normal to low flow. It is expected that changes in inflow will influence route selection and subsequently may affect the estimates of total project survival depending on the distribution of individuals among passage routes, each with their own specific passage survival rate.

5 Summary

Interactions with the Lowell Project for each of the species and life stages considered during this assessment are unavoidable based on their obligatory seasonal movements to complete portions of their life cycles. For all three target species (excluding American eel) individuals of both the adult and juvenile life stages are required to pass downstream of the Project in order to complete their life history. For this assessment, American eel was only considered as an entrainment/impingement risk during the adult life stage when they are actively out-migrating. Project interactions for alosines occur most frequently during the spring/early summer when post-spawn adults return downstream and during the fall/early winter when juveniles are migrating to the marine environment. Similar to juvenile alosines, the outmigration period for adult eels occurs during the fall time period.

As each of the target species/life stages are required to pass the Project as part of their life cycle, these species have a high probability of interacting with the E.L. Field turbine which resulted in a classification of "high" for the entrainment potential for that category. All species/life stages considered in this assessment have the potential to become entrained through the existing 7.25 inch spaced racks because their body dimensions will permit them to fit through those openings. When the median swim burst speed rates are considered, each species/life stage demonstrated potential to evade involuntary entrainment at Lowell. Only a portion of juvenile river herring in the low end of the expected size range for the species at Lowell would be expected to have a burst swim capability weak enough to be unable to avoid involuntary entrainment.

A TBSA assessment was conducted for fish lengths representative of (1) the size range of target species likely to be present at Lowell, and (2) body lengths less than the minimum exclusion length which would be subject to entrainment. The TBSA correlation value used in these analyses were based on a recent (December 8, 2020) USFWS memorandum that identified the use of a conservative value of $\lambda = 0.2$ for salmonids and alosine entrainment and $\lambda = 0.4$ for American eels. The TBSA analysis produced a range of survival estimates for turbine survival through the Project's E.L. Field powerhouse Kaplan units. Within that range of estimates, the probability of mortality due to blade strike increased as body size increased, a trend also identified in a review of the 1997 EPRI database by Winchell *et al.* (2000).

Estimates of total station survival for each target species/life stage were developed via empirical study (e.g., adult American eel, river herring, and American shad) or via a TBSA model informed with available empirical data and specific parameters associated with the E.L. Field turbine units. Estimates of total station survival were calculated at 75.5% for adult American eels, 80.1% for adult river herring, and 70.0% for adult American shad. A desktop based estimate of juvenile alosine total project survival was calculated at 94.8%. As with any estimate of total project survival, these values represent downstream passage success over the range of conditions during the evaluation. As noted in the revised Initial Study Reports which provided these estimates, river conditions during the passage periods were classified as normal to low flow. It is expected that as inflow conditions change the distribution of fish among available downstream passage routes will also change. These shifts in the proportional use among

passage routes has the potential to also shift the estimate of overall total project survival. The direction of that shift will be driven by the proportional use of passage routes with relatively higher or lower passage success rates for a particular species or life stage.

6 Variances from FERC-Approved Study Plan

The FERC-approved RSP indicated that Project turbines in the E.L. Field, Bridge Street, Hamilton and John Street powerhouses would be evaluated as part of the Fish Passage Survival Study. Since Boott has indicated that Final License Application for the Project (due to FERC by April 30, 2021) will exclude the Bridge Street, Hamilton and John Street stations as part of the Project in the future license, this effort focused on the two turbine units housed in the E.L. Field powerhouse on the mainstem Merrimack River.

The FERC-approved RSP proposed the use of a multiple-linear regression model for estimation of American eel turbine blade strike probabilities. This report substituted the newly available USFWS guidance for modification of the TBSA correlation factor (λ) from 0.2 to 0.4 to generate blade strike probabilities for American eels. In addition, turbine passage survival from the Downstream American Eel Passage Assessment was also included in this report and represents an empirical estimate of downstream passage survival for that species through the most frequently utilized passage route (i.e., the E.L. Field turbine units).

There were no additional variances from the FERC-approved study plan.

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8 Appendices

Appendix A. Supporting tables for burst speed analysis

American shad (Juvenile)					
% indicates portion of test fish able to achieve speed listed (fps) for 3 seconds					
Size (in)	97.50%	87.50%	50%	12.50%	2.50%
2	4.17	4.56	**5.18**	5.87	6.43
3	5.51	6.04	6.89	7.81	8.56
4	6.76	7.38	**8.40**	9.58	10.47
5	7.91	8.66	9.84	11.19	12.24
6	8.96	9.81	**11.19**	12.70	13.91

American shad (Adult)					
% indicates portion of test fish able to achieve speed listed (fps) for 3 seconds					
Size (in)	97.50%	87.50%	50%	12.50%	2.50%
10	13.03	14.24	**16.21**	18.44	20.21
11.25	14.08	15.42	17.52	19.95	21.82
12.5	15.26	16.70	**19.00**	21.62	23.69
13.75	16.24	17.78	20.24	23.03	25.20
15	17.26	18.90	**21.49**	24.44	26.77

River herring (Juvenile)					
% indicates portion of test fish able to achieve speed listed (fps) for 3 seconds					
Size (in)	97.50%	87.50%	50%	12.50%	2.50%
1.25	2.90	3.18	**3.61**	4.10	4.49
2.44	4.72	5.18	5.87	6.69	7.32
3.63	6.27	6.86	**7.81**	8.89	9.74
4.81	7.68	8.40	9.55	10.86	11.91
6	8.96	9.81	**11.19**	12.70	13.91

River herring (Adult)					
% indicates portion of test fish able to achieve speed listed (fps) for 3 seconds					
Size (in)	97.50%	87.50%	50%	12.50%	2.50%
9	12.11	13.26	**15.09**	17.16	18.80
9.75	12.83	14.04	15.98	18.18	19.92
10.5	13.35	14.63	**16.67**	18.93	20.74
11.25	14.08	15.42	17.52	19.95	21.82
12	14.76	16.14	**18.37**	20.90	22.90

American eel					
% indicates portion of test fish able to achieve speed listed (fps) for 3 seconds					
Size (in)	97.50%	87.50%	50%	12.50%	2.50%
21	6.50	8.04	**10.96**	14.93	18.54
27	7.68	9.55	12.99	17.65	21.95
33	8.83	10.96	**14.93**	20.31	25.23
39	9.88	12.27	16.70	22.74	28.25
45	10.89	13.55	**18.44**	25.10	31.17

Technical Report for the Instream Flow Habitat Assessment and Zone of Passage Study

Lowell Hydroelectric Project (FERC No. 2790)

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1 Introduction

Boott Hydropower, LLC (Boott) submitted their Revised Study Plan (RSP) to the Federal Energy Regulatory Commission (FERC) on January 28, 2019. Among the thirteen studies described in the RSP was the Instream Flow Habitat Assessment and Zone of Passage Study in the Bypassed Reach (the Study). FERC provided their Study Plan Determination (SPD) on March 13, 2019 and the Study was approved as filed. The purpose of this report is to describe study methodologies used to assess the flow:habitat relationship for target fish species and life stages in the Bypassed Reach (Bypass) and to evaluate the zone of passage assessment, and to detail the results of both Study components.

2 Objectives

As previously summarized in the RSP, there were two separate study elements requested to evaluate the bypassed reach, one pertaining to fish passage and one to aquatic habitat:

- Bypass Zone of Passage Assessment: determine flows which facilitate fish passage through the bypass reach through the use of detailed elevation and bathymetry data and two-dimensional (2D) modeling techniques;
- Instream Flow Habitat Assessment: determine impacts of a range of Project flows on wetted area and habitat for key aquatic species by conducting an instream flow study based on the Instream Flow Incremental Methodology (IFIM) process and one-dimensional (1D) modeling techniques.

These two study requests were subsequently combined into a single study. As detailed in the FERC-approved RSP, the Study was conducted via the application of a two-dimensional (2D) model of the bypassed reach to provide the results necessary to address both study elements and provide FERC with sufficient information to complete an environmental assessment.

3 Project Description and Study Area

The Lowell Project is located at River Mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of: (1) a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones; (2) a 720-acre impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29; (3) a 5.5-mile-long canal system which includes several small dams and gatehouses; (4) a powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW); (5) a 440-foot-long tailrace channel; (6) four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal System containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW; (7) a 4.5-mile long, 13.8-kilovolt transmission line

connecting the powerhouses to the regional distribution grid; (8) upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket dam; (9) appurtenant facilities; and (10) a 4,000 ft Bypassed Reach, which is the subject of this Study. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control, and has no usable storage capacity. As part of its relicensing proposal, Boott proposes to remove the four mill powerhouses and associated canal infrastructure from the Project's FERC license, retaining only the Pawtucket Dam, Northern Canal, E.L. Field Powerhouse and fish passage facilities. More detailed information is provided in Boott's application for new license.

The study areas for the zone of passage assessment and the aquatic habitat assessment were identical and both confined to the Bypass. The study area encompassed the length of the Bypass from just below the School Street Bridge (yellow line in Figure 3-1) downstream approximately 3,000 ft to the confluence of the Bypass and tailrace (green line in Figure 3-1). The 2D model for the zone of passage component was initially extended upstream from the bridge through the series of concrete passage weirs, however the model was not able to accurately describe velocity patterns associated with the artificial weir structures and consequently the passage assessment focused on the bedrock habitat below the bridge.

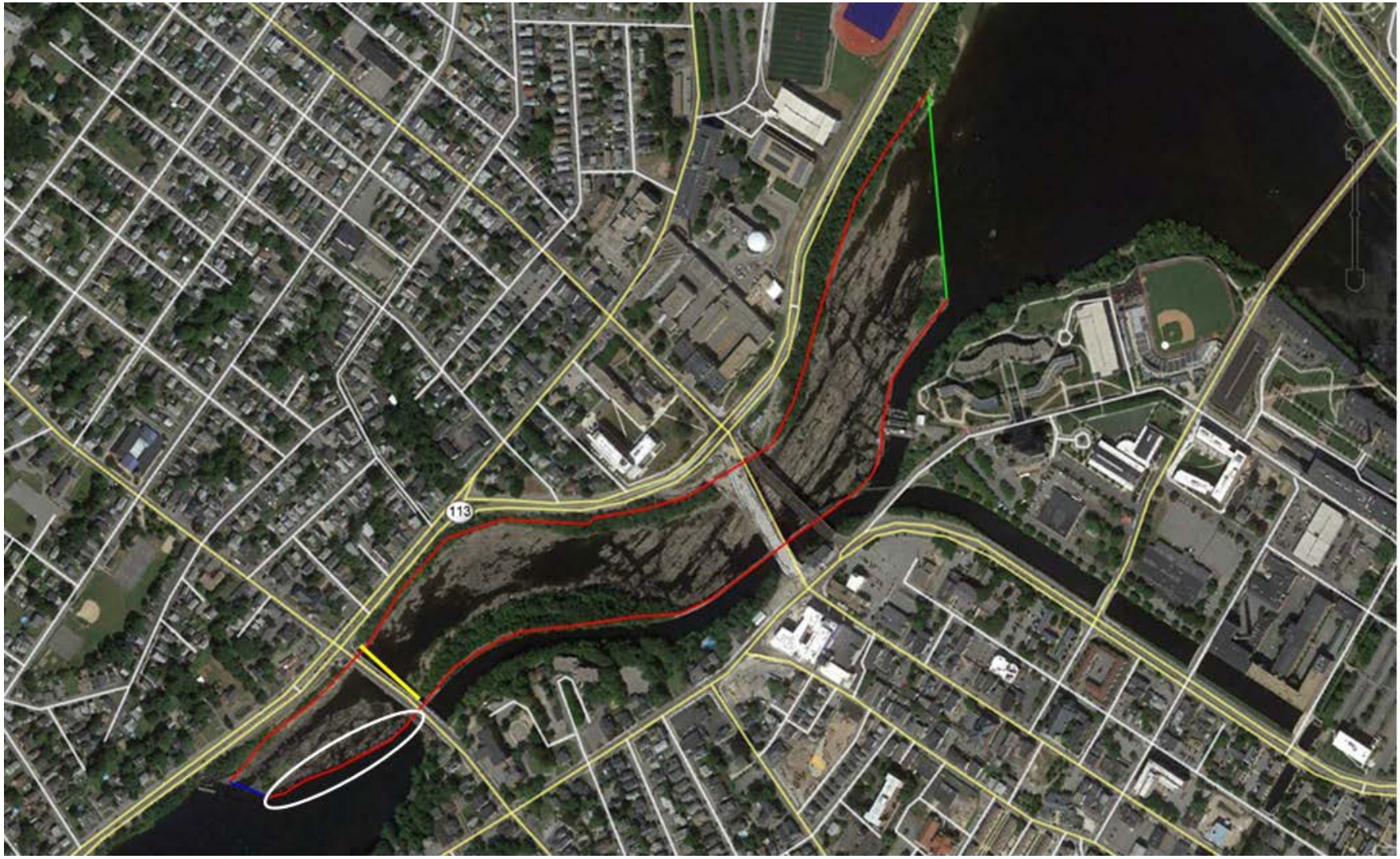


Figure 3–1. Spatial extent of the Bypassed Reach (red lines) showing the top boundary for both the zone of passage component and the aquatic habitat component (yellow line), the bottom boundary for both components (green line), and the parallel spillway (white oval) upstream of the modeled study reach.

4 Methods

4.1 2D Hydraulic Model

The 2D hydraulic model used to assess the zone of passage and aquatic habitat components of the instream flow study was River 2D (Steffler and Blackburn 2002), which is a depth-averaged model that incorporates Habitat Suitability Criteria (HSC) to evaluate the quantity and quality of aquatic habitat for selected species and life stages within the range of modeled flows. The River2D model uses a detailed topographic map of the study site to solve basic equations for conservation of mass and conservation of momentum in two horizontal directions to simulate water depths and velocities. Model inputs are bed topography, channel roughness, discharge at the upstream boundary, and water surface elevations at the downstream boundary. As noted in the River 2D manual "Obtaining an accurate representation of bed topography is likely the most critical, difficult, and time-consuming aspect of the 2D modeling exercise" (Steffler and Blackburn 2002). The topography for River 2D model is collected with higher density sampling in areas of more complex and/or rapidly varying habitat/bed features and lower densities in areas with more uniform topography (USFWS 2011). Some gaps in topography will occur in locations where depth, velocity, or other factors prevent safe data collection. The River 2D modules R2D_Bed and R2D_Mesh are used to generate bed topography and define the reach of interest using pointwise elevations and roughness.

Model calibration consists of adjusting the bed roughness values, if needed, in the model until a reasonable match is obtained between the simulated and measured water surface elevations. Water surface elevations predicted by the 2D model should be within 0.1 foot (0.031 m) of the water surface elevation measured at the upstream boundary (USFWS 2011). Once calibrated, the downstream water surface elevation and the inflow of the model are changed to simulate the flows of interest. Each flow change is run to a steady state solution. That is, for a constant inflow, the model is run until there is a constant outflow and the two flows are essentially equal. Typical convergence tolerance is within 1-5% of the inflow. Another measure of convergence is the solution change. Ideally, the solution change will become sufficiently small (0.00001) once converged. In some cases, the solution change will reach a relatively small value and not decrease any further, indicating a small, persistent oscillation at one or more points. This oscillation is often associated with a shallow node that alternates between wet and dry. This oscillation may be considered acceptable if the size of the variation is within the desired accuracy of the model (Steffler and Blackburn 2002). The ultimate goal is to define flow allocation through split channels and (in this case) accurately simulate fish migration pathways under low flow conditions.

The development of a 2D flow model requires the establishment of fixed boundaries at the upstream and downstream ends of the study reach. Those boundaries are required to be a single channel and be represented by a single water surface elevation (WSE) value for any given flow. The unique configuration of the spillway at the upstream end of the Bypass presents a challenge for establishment of the upstream boundary. The upstream fish ladder and associated attraction water system (AWS), as well as the 220 feet of pneumatic crest gate

closest to the northern bank (blue line in Figure 3-1) will discharge water in a linear fashion down through the full length of the Bypass. However, under conditions where flows are released from any of the pneumatic crest gate sections along the 765 feet of spillway oriented parallel to the Bypass channel (white oval in Figure 3-1), that discharge will not enter the uppermost section of the Bypass in a linear fashion. Spill-related inflows converging into the upper section of the Bypass would confound the 2D model if the upstream boundary is placed above that inflow.

As a result, the upstream boundary for the zone of passage and the aquatic habitat components of the Study was placed just below the School Street Bridge (yellow line in Figure 3-1). With the upstream boundary located at the Bridge, inflows provided from either the fish ladder and associated AWS system or any of the pneumatic crest gate sections are available at the model boundary in a more uniform (non-converging) flow pattern, and as a result permits modeling over a wide range of inflows to assess both passage and aquatic habitat.

4.1.1 Calibration Flows

A minimum of three calibration flows are required for collection of WSE and total flow (Q) at the upstream boundary, and WSE at the downstream boundary. The RSP recommended low flow calibration flow of 500 cfs, which represents the discharge from the fish ladder and associated AWS. The suggested high calibration flow target was ~7,800 cfs, which was the maximum combined discharge for the fish ladder, AWS system and 220 foot pneumatic crest gate, with a middle flow target of ~4,150 cfs (the midpoint between low and high flow targets). The general rule of thumb for instream flow evaluations is the ability to model downwards approximately 50% of the low flow, and upwards approximately 2 to 2½ times the highest calibration flow. Following that guidance, the calibration flows proposed as part of this study will theoretically support modeling from 250 cfs up to over 15,000 cfs. Actual measured calibration flows were similar to the proposed flows and ranged from 482 cfs for the low flow, 4,345 cfs for the middle flow, and 7,011 cfs for the high flow. As a result, modeled estimates could be generated over a range of flows from 250 cfs to 14,000 cfs.

4.2 Field Sampling

4.2.1 WSE and Flow Measurements

Collection of low, middle, and high calibration flow data occurred on 23 October 2019, 10 December 2020, and 4 December 2020, respectively. At each flow, WSE data were collected at several locations: just below the dam, at the fish ladder entrance, and just below the School Street Bridge (the upper boundary of the 2D model, Figure 3-1). WSE's were measured with a Real-time kinematic GPS (RTK) with a vertical accuracy of 0.1 ft. Total Bypass flow at low flow was measured at the downstream side of the School Street bridge using a Teledyne RDI Rio Grande 1200 KHz Acoustic Doppler Current Profiler (ADCP). The high flow and mid-flow discharge values were provided by the Licensee prior to each data collection event. Bypass flows were estimated by subtracting the flow reported at USGS gage no. 01099500 (Concord River below River Meadow Brook, at Lowell, MA) from USGS gage no. 01100000 (Merrimack River below Concord River at Lowell, MA), yielding inflow to the Pawtucket Dam, then

subtracting the calculated flow through the E.L. Field powerhouse turbines. Downtown canal flows were negligible during this period.

4.2.2 Bathymetry Measurements

As noted above, accurate bed elevation data is necessary to develop a 2D model that is representative of the actual study area. Stream bottom elevations within the Bypass were predominantly based on Light Detection and Ranging (LIDAR) data collected by Cornerstone Energy Services, Inc. on 24 October 2019 at a flow of 40 cfs. The estimated vertical and horizontal accuracy of the LIDAR output exceeded 0.1 ft. The LIDAR data was complemented by RTK measurements under riparian canopy and bridge structures where the LIDAR data was sparse or non-existent. RTK was also used to measure bathymetry in wadeable areas of the Bypass where LIDAR did not penetrate. This shallow water bathymetry data was collected during October 2019 under non-spill conditions within the Bypass. Bottom elevations in locations too deep to wade at low flow (i.e., depths >4 ft) were estimated using aerial photos, ADCP data, and RTK measurements. Substrate characterizations (see Section 4.2.3) were collected by two RTK crews at the same time.

4.2.3 Substrate Measurements

Bypass substrate was visually assessed on foot and via aerial photography in exposed bottom and shallow, wadeable areas using RTK to delineate polygons having specified substrate composition (Figure 4-1). Substrate was estimated in deeper, non-wadeable areas based on surrounding substrate characteristics and presence of eddy-forming features (e.g., bridge structures, point bars, etc.). Substrate composition was primarily used for assessing habitat suitability for each species and life-stage, according to their HSC (Section 4.4).

Polygons were defined by the percentage of dominant and subdominant substrate types in the following classes:

- Organics (ORG)
- Mud/Clay (MUD)
- Silt (SLT) (<0.003 inches)
- Sand (SND) (0.003-0.08 inches)
- Gravel (GRV) (0.08-2.5 inches)
- Cobble (COB) (2.5-10.1 inches)
- Boulder (BLD) (>10.1 inches)
- Bedrock (BED)

Where the substrate composition in a polygon was composed of two or more separate classes, the suitability of was calculated for each species and life-stage using the percentages of each type and the associated HSC values to calculate a weighted mean HSC value for that polygon. Crews noted that much of the gravel observed in the Bypass Reach was clean and laying on top of bedrock, suggesting it was very mobile and may not provide persistent habitat value.

4.3 2D Model Development

The RTK elevation data was combined with elevation data from the LIDAR to create the preliminary bed topography file. The resulting topography was edited in the River2D bed program by adding breaklines in order to refine the topography and interpolate between any gaps in coverage; resulting in the final digital elevation model used in the River2D program. In total, 692,252 survey points were used to create the topographic bed file (Figure 4-2), resulting in an overall point density of approximately 476 points/100 m^2. An artificial downstream extension was added to ensure a uniform outflow boundary and minimize any boundary effects in the model area of interest.

After finalizing the topographic bed file, a computational mesh was created for generating flow simulations. The final computational mesh had 18,223 nodes, 35,858 elements, and a mesh quality index of 0.38, which is within the River2D recommended quality index of 0.1 to 0.5 (Steffler and Blackburn 2002). Model calibration involved running the model at the three measured flows with a roughness value of 0.1. The modeled water surface elevations at the upstream end of the riffle were within 0.14 ft of the measured values (Table 4-1). After calibration, models were run to simulate flows from 250 cfs to 14,000 cfs. The downstream boundary conditions were set using a log-log rating curve created from the measured flows. A uniform Roughness (k_s) of 0.1 was used for all flow simulations

Model statistics for simulated flows are listed in Table 4-2. While solution change will ideally be below 0.00001 this is not always be achievable, especially at lower flows or in complex topography with many shallow depths. As noted in Steffler and Blackburn (2002):

> In some cases, the solution will reach a relatively small value of solution change (of the order of 0.03) and refuse to diminish further, regardless of the number of subsequent time steps. Usually, this indicates a small, persistent, oscillation at one (or sometimes more) points in the flow field. Often, the oscillation is associated with a shallow node that alternates between wet and dry. . . Finally, the oscillating solution may be considered acceptable, as the size of the variation may be within the desired accuracy of the simulation.

Given the high number of nodes in the model, the complexity of the topography, and the fact that the largest change was around our measurement accuracy, we found the results acceptable. In addition, the net Q was less than 1.1% in all of the model simulations, which is likely less than any error associated with flow measurements and the development of rating curves that were used to assign the upper and lower boundary conditions for the models, and the fact net Q was stable, we found the results to be acceptable. This rationale is consistent with findings in USFS (2011): "…we still considered these production cdg files for these sites to have a stable solution since the Net Q was not changing and the Net Q in all cases was less than 1.1%. In comparison, the accepted level of accuracy for USGS gages is generally 5%."

The bed elevations in wetted areas that were too dangerous or deep to collect topography with RTK were estimated using a combination of photos, aerial imagery, ADCP depth data and any nearby surveyed elevations.

4.4 Habitat Suitability Criteria (HSC)

HSC define the relative suitability of habitat variables for target species and life-stages, scaled from 0.0 (unsuitable habitat) to 1.0 (optimal habitat). HSC are the biological component of instream flow studies, and are directly incorporated into River2D for describing the flow:habitat relationship.

4.4.1 Target Species and Life-stages

Target fish species and life-stages were proposed for use in the RSP, then discussed and expanded upon during a May 21 2020 conference call with the relicensing participants. The species and associated life-stages used for the zone of passage component of this analysis are:

- American shad (adult passage)
- Blueback herring (adult passage)
- Alewife (adult passage)

HSC variables describing upstream passage criteria for each species were taken from USFWS (2019) and are presented in Table 4-3. The migratory species listed above (shad and river herring) are expected to require passage through the bypass reach to access upstream spawning habitat. Upstream passage criteria for American shad and river herring were generally taken from USFWS (2019) Fish Passage Engineering Design Criteria, which included maximum fish body depth, minimum weir opening depth, maximum weir opening velocity, and minimum weir opening width.

The species and associated life-stages used for the aquatic habitat component of this analysis are:

- American shad (juvenile, spawning)
- River herring (spawning)
- Smallmouth bass (fry, juvenile, adult, spawning)
- Fallfish (juvenile, adult)
- White sucker (fry, juvenile/adult, spawning)
- Longnose dace (juvenile, adult)
- Sea lamprey (spawning & incubation)
- Freshwater mussels (rearing)
- Benthic macroinvertebrates

The species and life stages listed above are those reasonably expected to utilize portions of the bypass for spawning and/or rearing. HSC variables describing aquatic habitat suitability for all species included mean column velocity, depth, and substrate are listed in Table 4-4, as well as the data sources associated with each HSC dataset. Graphical output of the HSC curves are presented in Appendix A.

Figure 4–1. Substrate polygon map of the Bypass Reach. See Section 4.2.3 for substrate code.

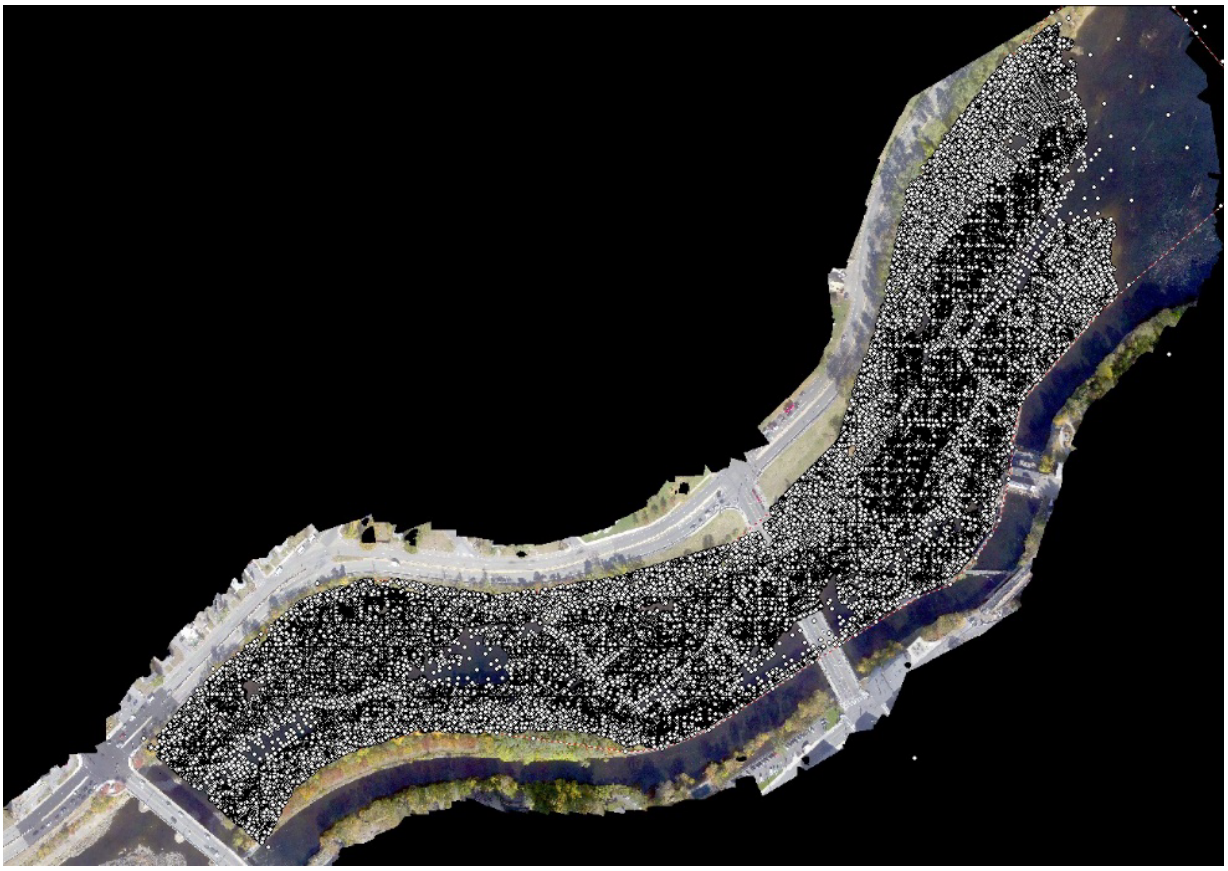


Figure 4–2. Topographic bed file for the 2D model (note-many nodes not visible in image).

Table 4–1. River2D calibration values.

Flow (cfs)	Measured stage (ft)	2D modeled stage (ft)	Difference (ft)
482	69.82	69.96	0.14
4,345	72.68	72.60	-0.08
7,011	73.74	73.62	-0.13

Table 4–2. River2D model simulation statistics.

Inflow (cfs)	Outflow (cfs)	Net Q	Solution Change
250.0	251.9	0.76%	6.94E-02
482.0	478.4	-0.74%	3.25E-02
1000.0	995.9	-0.41%	3.74E-02
2000.0	1977.9	-1.11%	4.87E-02
4345.0	4342.0	-0.07%	2.14E-02
6000.0	6000.2	0.00%	3.59E-02
8000.0	7999.6	-0.01%	3.41E-02
10000.0	9999.3	-0.01%	3.03E-02
12000.0	11993.6	-0.05%	2.82E-02
14000.0	14011.0	0.08%	4.25E-02

Table 4–3. Upstream passage criteria for river herring and American shad in the Bypass reach (criteria from USFWS 2019).

Species	Max Body Depth ft	Min Weir Depth ft	Max Weir Velocity fps	Min Weir Width ft
Blueback Herring	0.26	1.0	6.0	2.25
Alewife	0.29	1.0	6.0	2.5
American Shad	0.73	2.25	8.25	5.0

Table 4–4. HSC values according to species and life-stage. Data sources for mean column velocity (V), depth (D), and dominant substrate (S) HSC also shown.

Species	Life-stage	Velocity fps	HSC	Depth ft	HSC	Substrate	HSC	Source
American Shad	Juvenile	0.00	0.00	0.00	0.00	Organics	0.10	Stier & Crance 1985 (V), Greene et al. 2009 (D), Conowingo IFIM (S)
		0.20	1.00	0.66	0.50	Mud/clay	0.20	
		1.00	1.00	1.50	0.75	Silt	1.00	
		4.50	0.00	4.90	1.00	Sand	1.00	
				6.60	1.00	Gravel	1.00	
				13.20	0.75	Cobble	1.00	
				20.00	0.25	Boulder	0.60	
				50.00	0.00	Bedrock	0.40	
American Shad	Spawning	0.00	0.30	0.00	0.00	Organics	0.00	Hightower et al. 2012 (V), Hightower/Steir & Crance 1985 (D), Steir & Crance 1985 (S)
		0.70	0.75	1.60	0.40	Mud/clay	0.10	
		1.00	1.00	3.30	0.74	Silt	0.20	
		3.00	1.00	4.90	0.89	Sand	1.00	
		3.90	1.00	6.60	0.98	Gravel	1.00	
		5.60	0.00	8.20	1.00	Cobble	1.00	
				9.80	0.97	Boulder	0.60	
				11.50	0.92	Bedrock	0.40	
				13.10	0.85			
				14.80	0.77			
				16.40	0.68			
				18.00	0.60			
				19.70	0.53			
				21.30	0.46			
				50.00	0.00			
River Herring	Spawning	0.00	1.00	0.00	0.00	Organics	1.00	adapted from Pardue 1983 and Mather et al. 2012
		1.00	1.00	0.49	0.00	Mud/clay	1.00	
		1.01	0.00	0.50	1.00	Silt	1.00	
				9.80	1.00	Sand	0.10	
				9.90	0.00	Gravel	0.10	
						Cobble	0.10	
						Boulder	0.10	
						Bedrock	0.10	
Smallmouth Bass	Fry	0.00	0.60	0.00	0.00	Organics	0.10	Leonard et al. 1986
		0.19	1.00	0.28	0.06	Mud/clay	0.10	
		0.59	1.00	1.31	1.00	Silt	0.10	
		1.00	0.00	2.95	1.00	Sand	0.20	

Species	Life-stage	Velocity fps	HSC	Depth ft	HSC	Substrate	HSC	Source
				3.25	0.95	Gravel	0.30	
				4.59	0.40	Cobble	1.00	
				6.56	0.00	Boulder	1.00	
				10.00	0.00	Bedrock	0.50	
Smallmouth Bass	Juvenile	0.00	0.30	0.00	0.00	Organics	0.10	Groshens and Orth 1994 (V), Leonard et al. 1986 (D,S)
		0.17	0.66	0.52	0.00	Mud/clay	0.10	
		0.33	0.90	0.67	0.03	Silt	0.10	
		0.50	0.93	2.15	1.00	Sand	0.20	
		0.66	1.00	10.00	1.00	Gravel	0.30	
		0.83	1.00			Cobble	1.00	
		0.98	0.93			Boulder	1.00	
		1.15	0.87			Bedrock	0.50	
		1.31	0.84					
		1.47	0.77					
		1.64	0.70					
		1.81	0.62					
		1.98	0.47					
		2.30	0.27					
		2.62	0.17					
		2.95	0.09					
		3.94	0.03					
		4.59	0.00					
Smallmouth Bass	Adult	0.00	0.12	0.00	0.00	Organics	0.10	Groshens and Orth 1994 (V), Leonard et al. 1986 (D,S)
		0.17	0.66	0.92	0.00	Mud/clay	0.10	
		0.33	0.90	1.31	0.08	Silt	0.10	
		0.50	1.00	2.03	0.56	Sand	0.20	
		0.66	0.93	2.82	1.00	Gravel	0.30	
		0.83	0.82	6.00	1.00	Cobble	1.00	
		0.98	0.65	10.00	1.00	Boulder	1.00	
		1.15	0.53			Bedrock	0.50	
		1.31	0.46					
		1.47	0.42					
		1.64	0.36					
		1.81	0.32					
		1.98	0.25					
		2.30	0.15					
		2.62	0.08					
		2.95	0.06					
		3.94	0.04					
		4.59	0.04					
		5.00	0.00					
Smallmouth Bass	Spawning	0.00	1.00	0.22	0.00	Organics	0.00	Allen 1996 (V,S), Edwards et al. 1983 (D)

Species	Life-stage	Velocity fps	HSC	Depth ft	HSC	Substrate	HSC	Source
		0.45	1.00	0.50	0.02	Mud/clay	0.00	
		0.55	0.96	0.74	0.05	Silt	0.00	
		0.65	0.89	1.10	0.12	Sand	0.20	
		0.75	0.69	1.32	0.22	Gravel	1.00	
		0.85	0.34	1.53	0.34	Cobble	0.30	
		0.95	0.25	1.70	0.54	Boulder	0.00	
		1.05	0.20	1.90	0.90	Bedrock	0.00	
		1.15	0.16	2.05	0.97			
		1.25	0.14	2.18	0.99			
		1.65	0.11	2.40	1.00			
		1.85	0.09	4.75	1.00			
		2.35	0.04	4.95	0.97			
		2.55	0.02	5.10	0.91			
		2.75	0.00	5.40	0.62			
				5.80	0.40			
				6.10	0.27			
				6.50	0.17			
				6.95	0.09			
				7.30	0.04			
				7.75	0.02			
				8.00	0.00			
Fallfish	Juvenile	0.00	0.00	0.00	0.00	Organics	0.10	Gomez & Sullivan 2007
		0.10	0.60	0.40	0.00	Mud/clay	0.00	
		0.20	0.88	0.60	0.11	Silt	0.10	
		0.60	1.00	1.00	1.00	Sand	0.50	
		1.60	1.00	3.00	1.00	Gravel	1.00	
		2.00	0.40	4.00	0.27	Cobble	1.00	
		3.50	0.04	7.00	0.24	Boulder	0.20	
		4.30	0.00	8.00	0.07	Bedrock	0.00	
				100.00	0.07			
Fallfish	Adult	0.00	0.00	0.00	0.00	Organics	1.00	Gomez & Sullivan 2007
		0.10	1.00	0.50	0.00	Mud/clay	1.00	
		0.80	1.00	3.00	1.00	Silt	1.00	
		1.50	0.40	100.00	1.00	Sand	1.00	
		3.00	0.00			Gravel	1.00	
						Cobble	1.00	
						Boulder	1.00	
						Bedrock	1.00	
White Sucker	Fry	0.00	1.00	0.00	0.00	Organics	1.00	Twomey et al. 1984
		0.30	1.00	1.00	1.00	Mud/clay	1.00	
		1.00	0.00	100.00	1.00	Silt	1.00	
						Sand	1.00	
						Gravel	1.00	
						Cobble	1.00	
						Boulder	1.00	
						Bedrock	1.00	

Species	Life-stage	Velocity fps	HSC	Depth ft	HSC	Substrate	HSC	Source
White Sucker	Juvenile/ Adult	0.00	0.00	0.00	0.00	Organics	1.00	Twomey et al. 1984
		0.16	0.70	0.50	0.00	Mud/clay	1.00	
		0.33	1.00	2.30	1.00	Silt	1.00	
		0.49	1.00	3.30	1.00	Sand	1.00	
		0.66	0.70	9.80	0.50	Gravel	1.00	
		1.31	0.00	16.40	0.00	Cobble	1.00	
						Boulder	1.00	
						Bedrock	1.00	
White Sucker	Spawning	0.00	0.00	0.00	0.00	Organics	0.00	Twomey et al. 1984 (V,D), Gomez & Sullivan 2007 (S)
		0.50	0.40	0.50	1.00	Mud/clay	0.00	
		1.00	1.00	0.80	1.00	Silt	0.50	
		2.00	1.00	1.00	0.80	Sand	1.00	
		3.00	0.00	2.00	0.00	Gravel	0.90	
						Cobble	0.00	
						Boulder	0.00	
						Bedrock	0.00	
Longnose Dace	Juvenile	0.00	0.00	0.00	0.00	Organics	0.00	Gomez & Sullivan 2007
		0.75	1.00	0.75	1.00	Mud/clay	0.00	
		1.50	1.00	1.15	1.00	Silt	0.00	
		2.00	0.35	1.50	0.40	Sand	0.18	
		2.20	0.20	1.75	0.20	Gravel	1.00	
		2.50	0.13	2.00	0.14	Cobble	1.00	
		3.00	0.05	3.00	0.00	Boulder	0.50	
		4.00	0.00			Bedrock	0.00	
Longnose Dace	Adult	0.00	0.00	0.00	0.00	Organics	0.00	Gomez & Sullivan 2007
		0.75	1.00	0.10	0.00	Mud/clay	0.00	
		1.75	1.00	0.75	1.00	Silt	0.00	
		3.00	0.28	1.60	1.00	Sand	0.60	
		3.60	0.08	2.50	0.00	Gravel	1.00	
		4.50	0.00			Cobble	1.00	
						Boulder	0.80	
						Bedrock	0.00	
Sea Lamprey	Spawning	0.00	0.00	0.00	0.00	Organics	0.00	Kynard & Horgan (V,S), Kynard/GRH 2019 (D)
		0.30	0.00	0.13	0.00	Mud/clay	0.00	
		1.28	0.34	0.46	0.50	Silt	0.00	
		2.26	1.00	0.79	1.00	Sand	0.04	
		3.25	0.86	4.50	0.98	Gravel	1.00	
		4.23	0.30	5.50	0.78	Cobble	0.50	
		5.22	0.12	6.50	0.57	Boulder	0.02	
		6.20	0.08	7.50	0.43	Bedrock	0.00	
		6.23	0.00	8.50	0.28			
				9.50	0.15			

Species	Life-stage	Velocity fps	HSC	Depth ft	HSC	Substrate	HSC	Source
				10.50	0.07			
				11.50	0.04			
				12.50	0.01			
				13.50	0.00			
Freshwater Mussels	Rearing	0.00	0.50	0.00	0.00	Organics	0.00	Normandeau & Biodrawversity 2017
		0.10	1.00	1.50	1.00	Mud/clay	0.00	
		2.25	1.00	13.50	1.00	Silt	1.00	
		5.50	0.00	22.00	0.50	Sand	0.19	
				100.00	0.50	Gravel	0.72	
						Cobble	0.57	
						Boulder	0.29	
						Bedrock	0.17	
Benthic Macroinvertebrates	Rearing	0.00	0.00	0.00	0.00	Organics	0.50	Gomez & Sullivan 2000
		0.50	0.00	0.10	0.00	Mud/clay	0.50	
		1.50	1.00	0.40	1.00	Silt	0.20	
		3.50	1.00	3.00	1.00	Sand	0.10	
		4.60	0.50	5.00	0.50	Gravel	0.60	
		8.00	0.00	6.50	0.25	Cobble	1.00	
				8.00	0.15	Boulder	0.90	
				10.00	0.15	Bedrock	0.50	
				100.00	0.00			

5 Results

5.1 Zone of Passage Assessment

The zone of passage model was developed for three migratory species (Table 4-3) in the Bypass Reach from the School Street Bridge downstream 3,000 ft through the bedrock rapids to the tailrace confluence. The minimum flow that provided a continuous and unbroken pathway (or nearly unbroken pathway) meeting the passage criteria was estimated by modeling passage opportunities at flows ranging from 250 cfs to 14,000 cfs. The passage assessment utilized values for minimum passage depth and maximum passage velocity. The passage analysis did not account for channel widths, which are routinely used in assessing passage through weirs and ladders; however given the large scale of the Bypass Reach and the complexity of the bedrock habitat, it is unlikely that channel widths would be limiting.

Assessment of the zone of passage was problematic due to the highly complex bedrock habitat throughout most of the Bypass Reach. It should be noted that the 2D model utilized actual measurements for developing the elevation model, except in areas that remained too deep and fast at low flow to safely measure (Figure 5-1), and consequently is expected to be relatively accurate in most locations. In contrast, all velocities were estimated via the hydraulic model, and in a highly complex habitat such as the Bypass Reach, in particular the lower bedrock-dominated channel, the model resolution for velocities may not be sufficiently accurate or precise to confidently assess passability in some areas. Also, the estimated velocities represent mean column velocities and do not account for near bottom velocities, which would be expected to be lower than mean column. Likewise, the velocity assessment is not expected to accurately represent zones of slower velocities along the margins of bedrock channels. For these reasons, the passage assessment largely utilized the reliable depth bathymetry in association with species passage depth criteria to identify connectivity of passage channels for shad and herring, with focused comparisons of velocity characteristics at specific pinch-points, such as the steep, bedrock cross-over channels.

5.1.1 American Shad

Complete, uninterrupted connection from the lower boundary to the upper boundary and the series of passage weirs, when both depth and velocity was considered, was never achieved for American Shad (see Appendix B for passage conditions at all modeled flows and for depth-only and velocity-only passage maps). Looking at the 2.5 ft depth criteria alone showed that near full connectivity did not occur until flows exceeded 4,000 cfs. The lack of passage habitat at low flows was largely due to the deep passage criteria for shad (Table 4-3), which at 2.5 ft was more than double the average body depth of adult upstream migrants. As flows increased above 4,000 the depths became more suitable for passage, but estimated velocities began to exceed the 8.25 fps passage criteria in many of the bedrock channels, which resulted in additional gaps in passable habitat.

Because the deep depth criteria may not be realistic for shad swimming through natural channels (as opposed to jumping weirs or ascending ladders), this analysis was re-run using the same 1.0 ft depth criteria used for river herring. Decreasing the minimum depth criteria from

2.5 ft to 1.0 ft for shad resulted in almost continuous passage opportunities at just under 500 cfs when using depth alone (Figure 5-2), with multiple continuous pathways becoming available at flows of 1,000 cfs and above (Appendix B). Zooming in on one of the most critical passage locations at 482 cfs (yellow box in Figure 5-2) shows that the gaps in depth passage are relatively short (~5m) and are likely not an impediment to passage for adult shad (Figure 5-3, top map). Almost the entire area shown in Figure 5-3 possesses velocities less than the 8.25 fps criteria for American shad (Figure 5-3, bottom map). Depth suitability for passage continues to increase at higher flows (Figure 5-4), and velocities largely remain suitable for shad until flows exceed 6,000 cfs (Appendix B).

5.1.1 River Herring

Passage conditions for river herring, using a 1.0 ft minimum depth criteria are the same as for the reduced depth assessment for American shad (Figure 5-4), and show almost continuous passage opportunities at 482 cfs with multiple continuous pathways becoming available at flows over 1,000 cfs (Appendix B). Because the herring velocity criteria is somewhat slower at 6.0 fps than for American shad, the 2D model predicted more impassable area within the bedrock channels due to rapid currents, however it appears likely that herring could ascend the channels along the bottom or along the margins at 482 cfs (Figure 5-5). Velocities within the bedrock habitat increase with increasing flows, with excessive velocities through the bedrock at flows over 4,000 cfs (Appendix B).

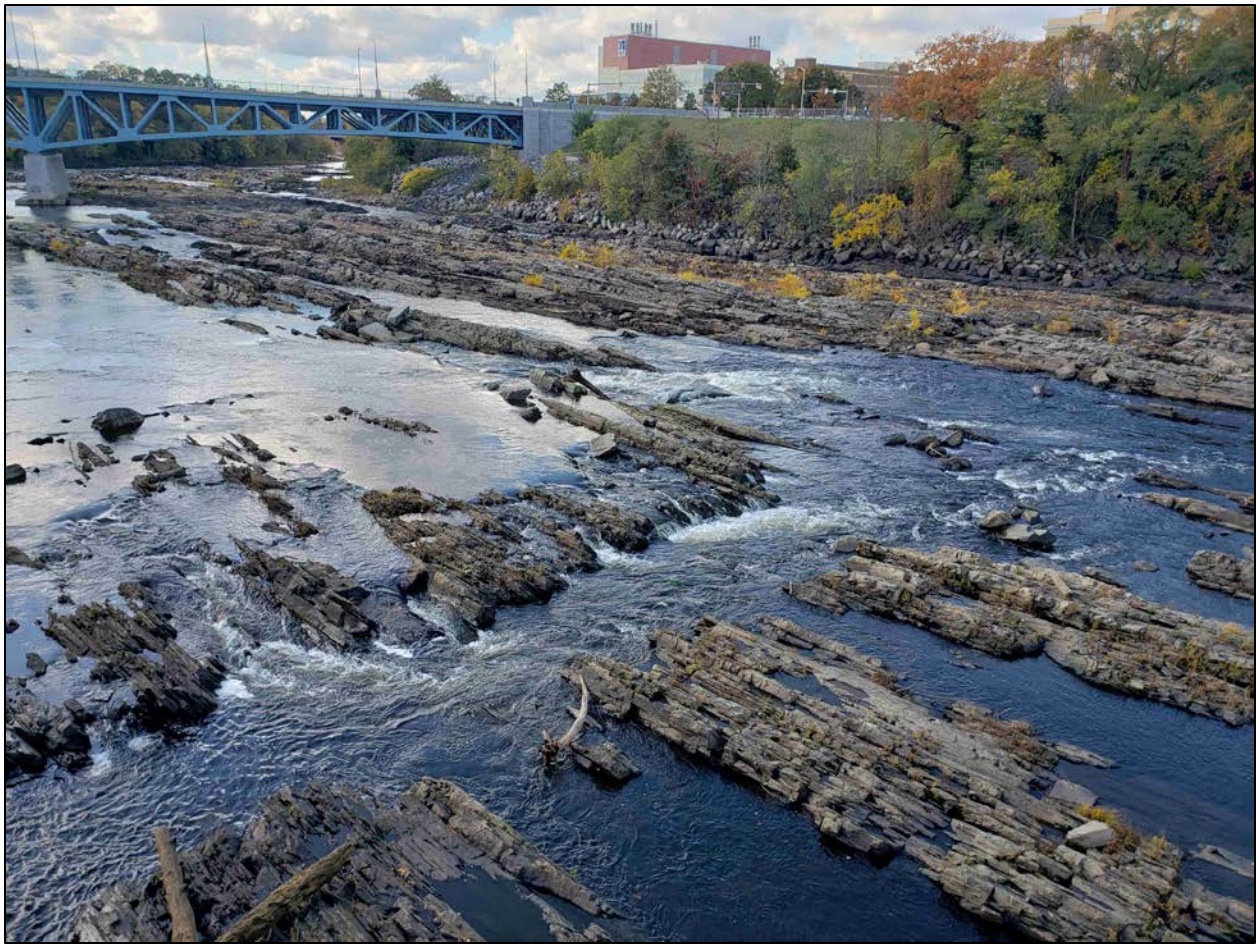


Figure 5-1. Complex deep and fast bedrock cross-over channels in the lower half of the Bypass Reach under low flow conditions. Image taken on Oct 23 2019 at a flow of approximately 480 cfs.

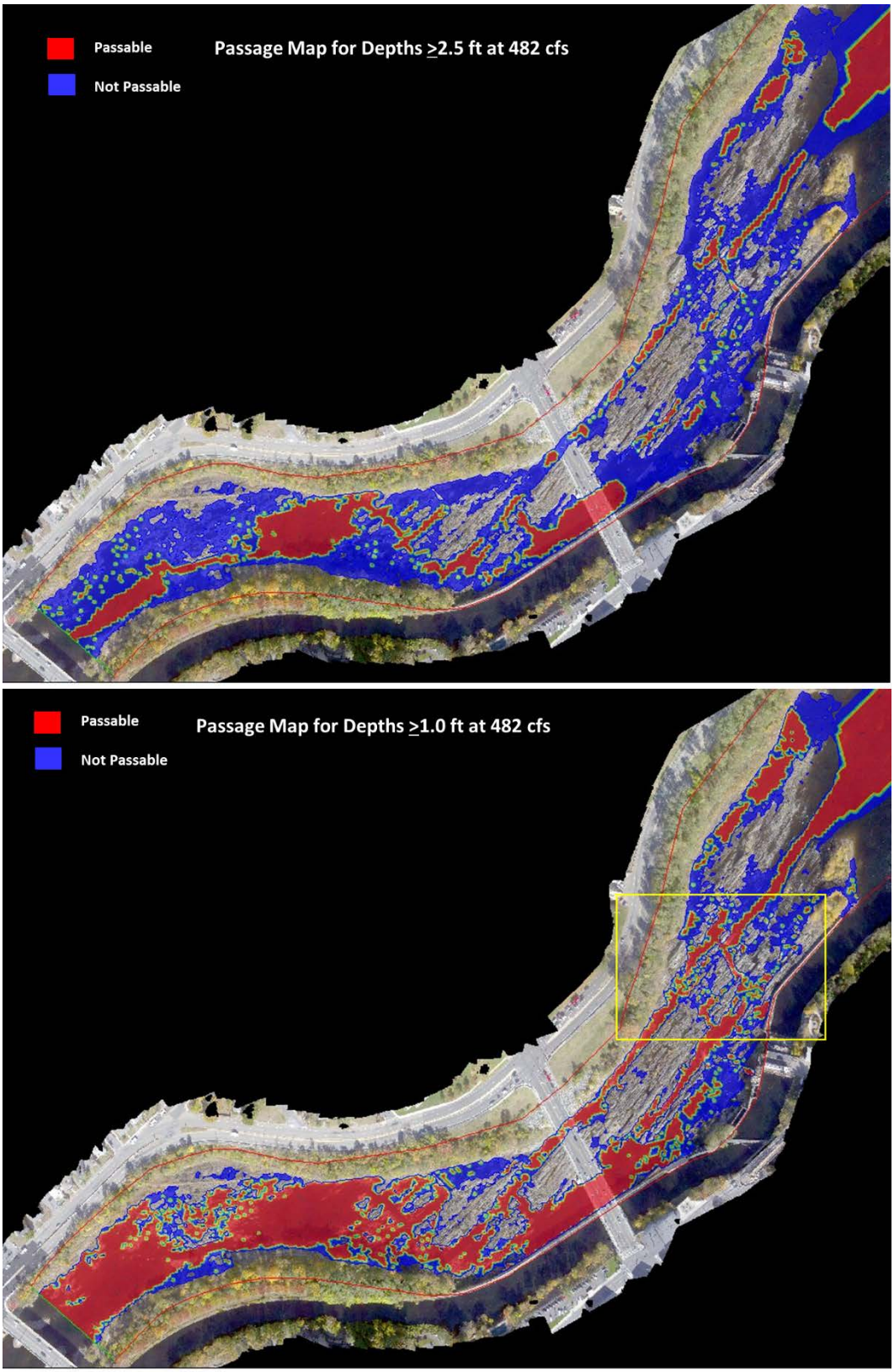


Figure 5-2. Comparative passage through Bypass Reach using minimum depth criteria of 2.5 ft (top map) and 1.0 ft (bottom map). Yellow box shows zoom area.

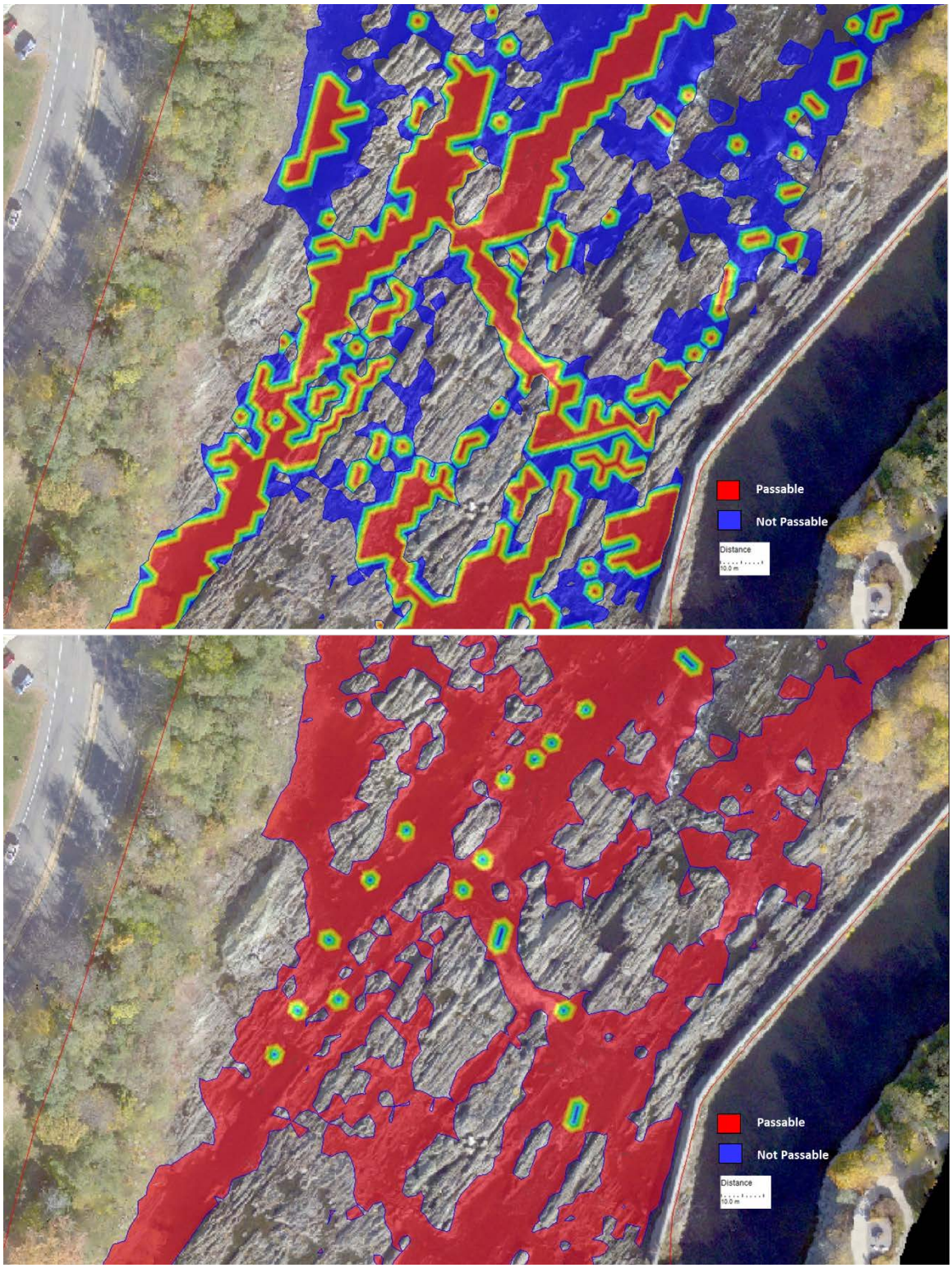


Figure 5-3. Close-up of bedrock cross-over channels in Bypass Reach showing 1 ft depth criteria (top map) and 8.25 fps velocity criteria (bottom map) for American shad at 483 cfs. (see Figure 5-1 for location of zoomed image).

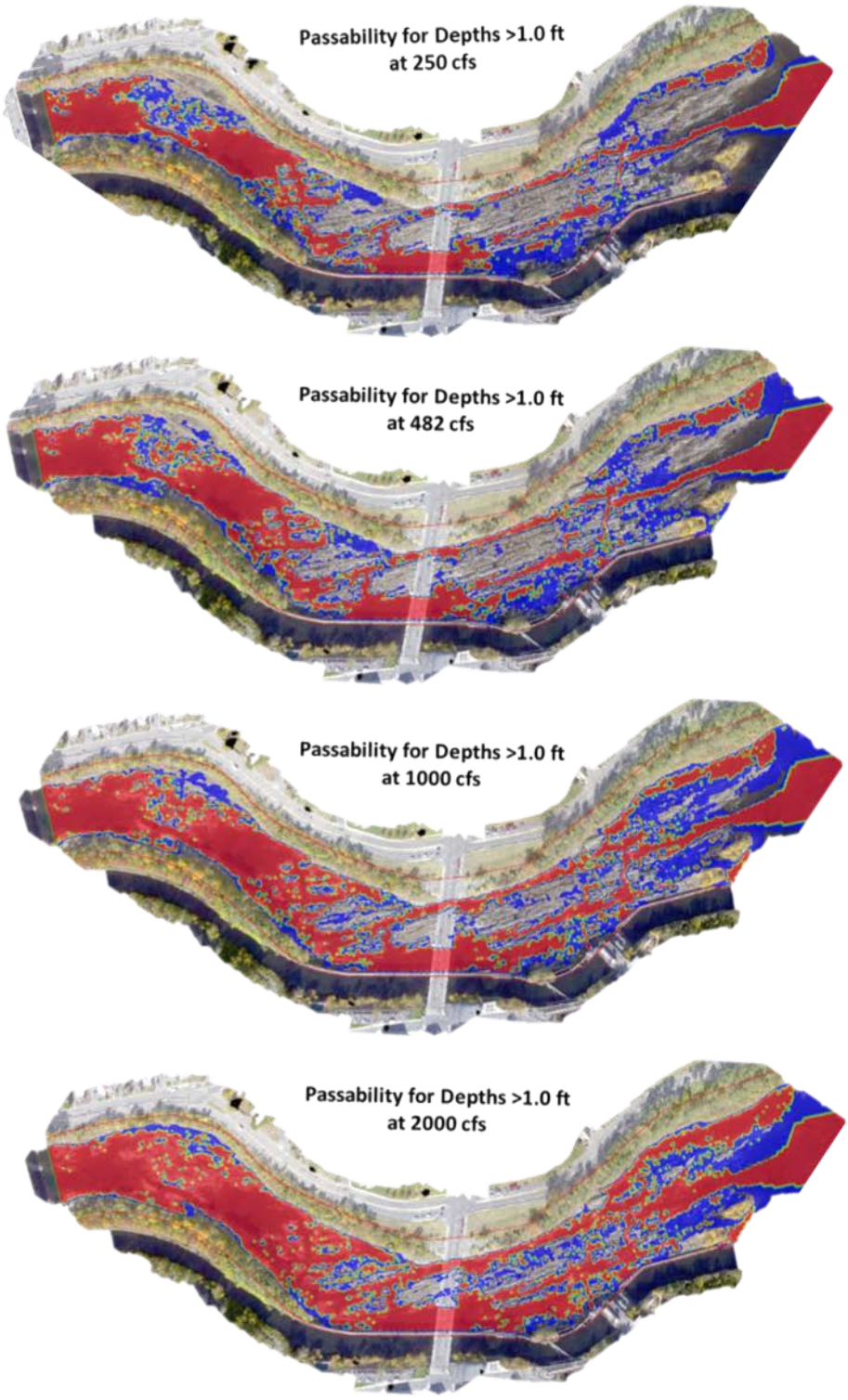


Figure 5-4. Comparative passage for American shad or river herring in the Bypass Reach for depths ≥1.0 ft at various flows. Red equal passable depth, blue non-passable.

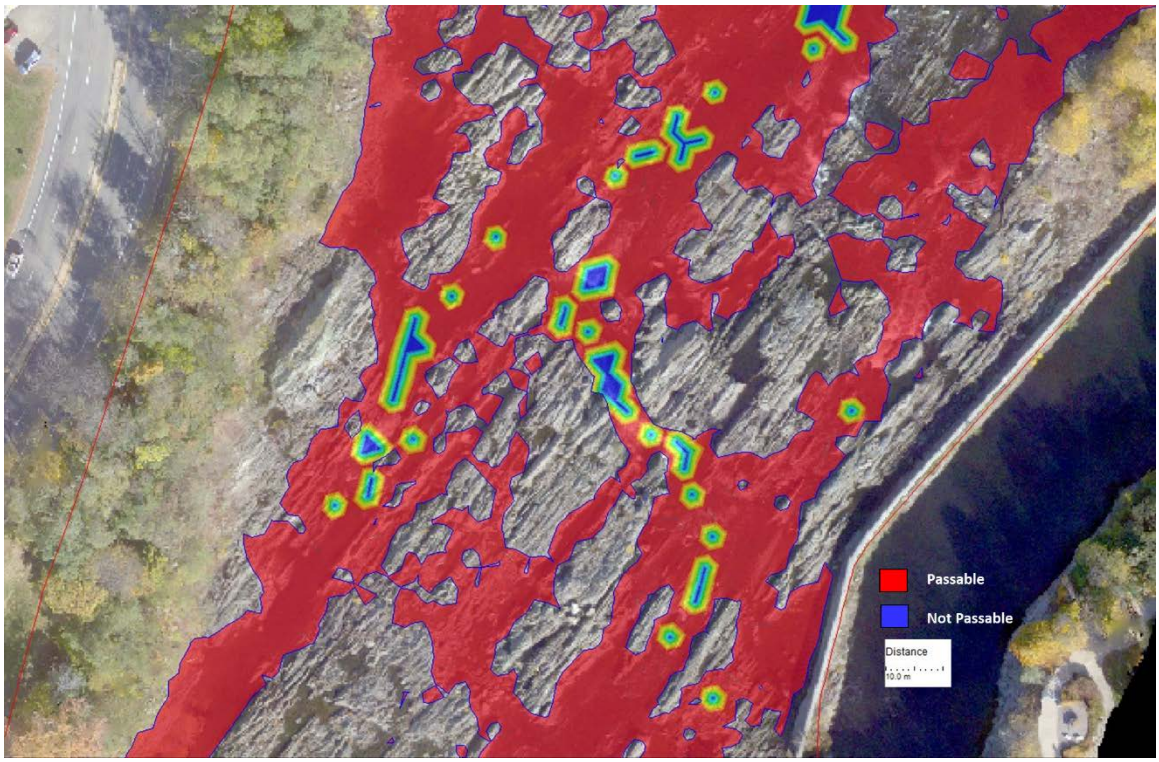


Figure 5-5. Close-up of bedrock cross-over channels in Bypass Reach showing 6.0 fps velocity criteria for river herring at 482 cfs. (see Figure 5-1 for location of zoomed image).

5.2 Aquatic Habitat Assessment

The aquatic habitat model was developed for 9 species and associated life stages in the Bypass Reach from the School Street Bridge downstream 3,000 ft through the bedrock rapids to the tailrace confluence at flows from 250 cfs to 14,000 cfs. An index of suitable habitat at each modeled flow, expressed as WUA in m^2, is presented in Table 5-1. Figure 5-6 illustrates the flow:habitat relationships for each species and life stage, and Figure 5-7 portrays the distribution and magnitude of WUA in the Bypass Reach for each species and life stage at the flow that provides maximum habitat.

5.2.1 American Shad

The index of suitable habitat (Table 5-1, Figure 5-6) for American shad juveniles remained relatively high (>10,000 m^2) at flows between 250 cfs and 2,000 cfs, with declining suitability to a minimum (3,641 m^2) at the maximum modeled flow of 14,000 cfs. The suitability index for shad spawning stayed high (>10,000 m^2) over a wider range of flows (1,000-8,000 cfs), with minima (~6,700 to ~5,700 m^2) at the lowest and the highest modeled flows, respectively. Most suitable habitat for both life stages occurred in the upper half of the modeled reach (Figure 5-7).

5.2.2 River Herring

The habitat index for spawning by river herring (Table 5-1, Figure 5-6) was highest at 3,110 m^2 at the lowest modeled flow (250 cfs), then progressively declined to 490 m^2 as flows increased to 14,000 cfs. Virtually all of the estimated habitat was of low suitability, due to the low suitability (0.1) for all rocky substrates (Table 4-4, Figure 5-7).

5.2.3 Sea Lamprey

Sea lamprey showed maximum habitat of 1,908 m^2 for spawning at 2,000 cfs flows (Table 5-1, Figure 5-6), with a declining habitat index to 355 m^2 at 14,000 cfs. Almost all of the suitable habitat occurred in the upper 1,000 ft of the modeled reach (Figure 5-7).

5.2.4 Fallfish

The habitat index for juvenile fallfish exceeded 1,000 m^2 at flows from 250 cfs to 2,000 cfs, with maximum habitat (3,134 m^2) at approximately 500 cfs (Table 5-1, Figure 5-6, Figure 5-7). Suitable habitat for adult fallfish was more available than for juveniles, with WUA estimates over 15,000 m^2 at flows from 250 cfs to 2,000 cfs, and a maximum of over 18,000 m^2 at 1,000 cfs. Juvenile habitat was largely restricted to the upper end of the modeled reach, whereas suitable habitat for adult fallfish was more widely distributed (Figure 5-7).

5.2.5 Longnose Dace

Suitable habitat for longnose dace juveniles was estimated at less than 1,000 m^2, except at about 500 cfs where WUA was 1,086 m^2 (Table 5-1, Figure 5-6). The habitat index for adult dace was somewhat higher, with WUA over 1,500 m^2 at flows from 250 cfs to 1,000 cfs, with a maximum of 2,414 m^2 at about 500 cfs. Most of the suitable habitat for both juvenile and adult

dace occurred in the upper end of the modeled reach above the area dominated by bedrock ledges (Figure 5-7).

5.2.6 Smallmouth Bass

The index of suitable habitat was highest for smallmouth bass fry (10,617 m^2) and spawning (879 m^2) at the lowest modeled flow of 250 cfs (Table 5-1, Figure 5-6), which is not unexpected due to the fry's weak swimming ability and the associated need for low velocities at bass nests. Suitable habitat for juvenile bass remained relatively high (>10,000 m2) at flows from 250 cfs to 2,000 cfs, with a maximum habitat index of 13,820 m^2 at 1,000 cfs. Adult smallmouth bass also showed maximum habitat (8,021 m^2) at 1,000 cfs, with a progressive decline to 2,016 m^2 at a flow of 14,000 cfs. Moderate to highly suitable habitat for fry, juvenile, and adult bass was distributed in both upper and lower ends of the modeled Bypass Reach, although spawning habitat was rare and confined to the upper region near the School Street Bridge (Figure 5-7).

5.2.7 White Sucker

The estimated WUA for white sucker fry, juvenile/adult, and spawning life stages all maximized at low flows (Table 5-1, Figure 5-6). The fry life stage showed high WUA at flows from 250 cfs to 2,000 cfs, with a maximum of 25,085 m^2 at the lowest modeled flow. Juvenile/adult WUA was 12,398 m^2 at about 500 cfs, whereas spawning WUA maximized at only 159 m^2 at 250 cfs. The low habitat index for sucker spawning was likely due to the HSC, which gave zero suitability for any substrate other than silt, sand, and gravel, each of which were rare in the Bypass Reach (Table 4-4, Figure 4-1). Both moderate and high quality habitat occurred for sucker fry and juvenile/adult life stages throughout most of the modeled reach, although habitat was spotty in the bedrock ledges (Figure 5-7). Suitable habitat for spawning was very rare and of low quality, due to the relative lack of suitable spawning substrate.

5.2.8 Freshwater Mussels

The 2D model estimated relatively high values of WUA for freshwater mussels, with indexes over 10,000 m^2 at 1,000 and 2,000 cfs, and a maximum of 11,066 m^2 at 2,000 cfs (Table 5-1, Figure 5-6). The abundance of suitable habitat is likely due to the broad preferences for coarse substrate types (Table 4-4), although most habitat was of low quality except in the area just downstream of the School Street Bridge and a small area adjacent to the powerhouse tailrace (Figure 5-7).

5.2.9 Benthic Macroinvertebrates

BMI showed the highest estimates of WUA of all species groups, with a maximum of 24,062 m^2 at 2,000 cfs, and maintained high habitat values (>10,000 m2) from 500 cfs to 10,000 cfs (Table 5-1, Figure 5-6). The high magnitude of WUA was largely due to the BMI's relatively high HSC value for bedrock at 0.5 (Table 4-4), which likely overestimates suitability of bedrock for EPT taxa (mayflies, stoneflies, and caddisflies), in comparison to Simulids and other midge species that have broader substrate preferences. The 2D model predicted suitable habitat for BMI throughout the Bypass Reach, although the highest quality habitat occurred in the upper end of the reach and near the bottom of the reach (Figure 5-7).

Table 5–1. Weighted Usable Area (WUA) in m^2 in the Bypass Reach according to flow, species, and life stage.

Flow	American Shad		River Herring	Sea Lamprey	Fallfish	
cfs	Juvenile	Spawning	Spawning	Spawning	Juvenile	Adult
250	11,923	6,738	3,110	576	2,764	15,133
482	14,468	9,368	2,951	1,012	3,134	17,586
1,000	15,864	12,859	2,421	1,599	2,873	18,363
2,000	14,946	15,664	1,711	1,908	1,726	14,308
4,345	9,948	15,755	1,011	1,282	893	8,219
6,000	7,558	13,396	820	858	895	6,782
7,011	6,517	11,852	723	724	894	6,201
8,000	5,710	10,313	675	611	819	5,724
10,000	4,644	7,864	568	489	688	4,979
12,000	4,025	6,418	523	415	511	4,573
14,000	3,641	5,718	490	355	371	4,277

Flow	Smallmouth Bass				Longnose Dace	
cfs	Fry	Juvenile	Adult	Spawning	Juvenile	Adult
250	10,617	10,141	5,834	879	838	1,970
482	10,491	12,772	7,155	727	1,086	2,414
1,000	7,768	13,820	8,021	508	735	1,657
2,000	5,507	11,407	6,350	324	385	848
4,345	3,340	6,793	4,014	215	283	537
6,000	2,817	5,412	3,366	201	296	580
7,011	2,454	4,882	3,087	173	265	599
8,000	2,270	4,394	2,818	161	212	508
10,000	1,899	3,665	2,402	143	116	303
12,000	1,660	3,249	2,153	104	69	160
14,000	1,526	2,983	2,016	98	44	109

Flow	White Sucker			Freshwater Mussels	Benthic Macro-invertebrates
cfs	Fry	Juvenile	Adult	Rearing	Rearing
250	25,085	10,724	159	8,217	7,213
482	22,449	12,398	95	9,686	12,031
1,000	16,881	10,462	61	10,937	18,958
2,000	11,986	6,989	21	11,066	24,062
4,345	7,219	4,352	69	8,528	21,698
6,000	6,041	3,758	123	6,679	17,847
7,011	5,233	3,361	95	5,802	15,777
8,000	4,787	3,165	66	5,039	13,819
10,000	4,065	2,706	34	3,913	10,948
12,000	3,657	2,481	12	3,244	8,867
14,000	3,488	2,354	9	2,866	7,250

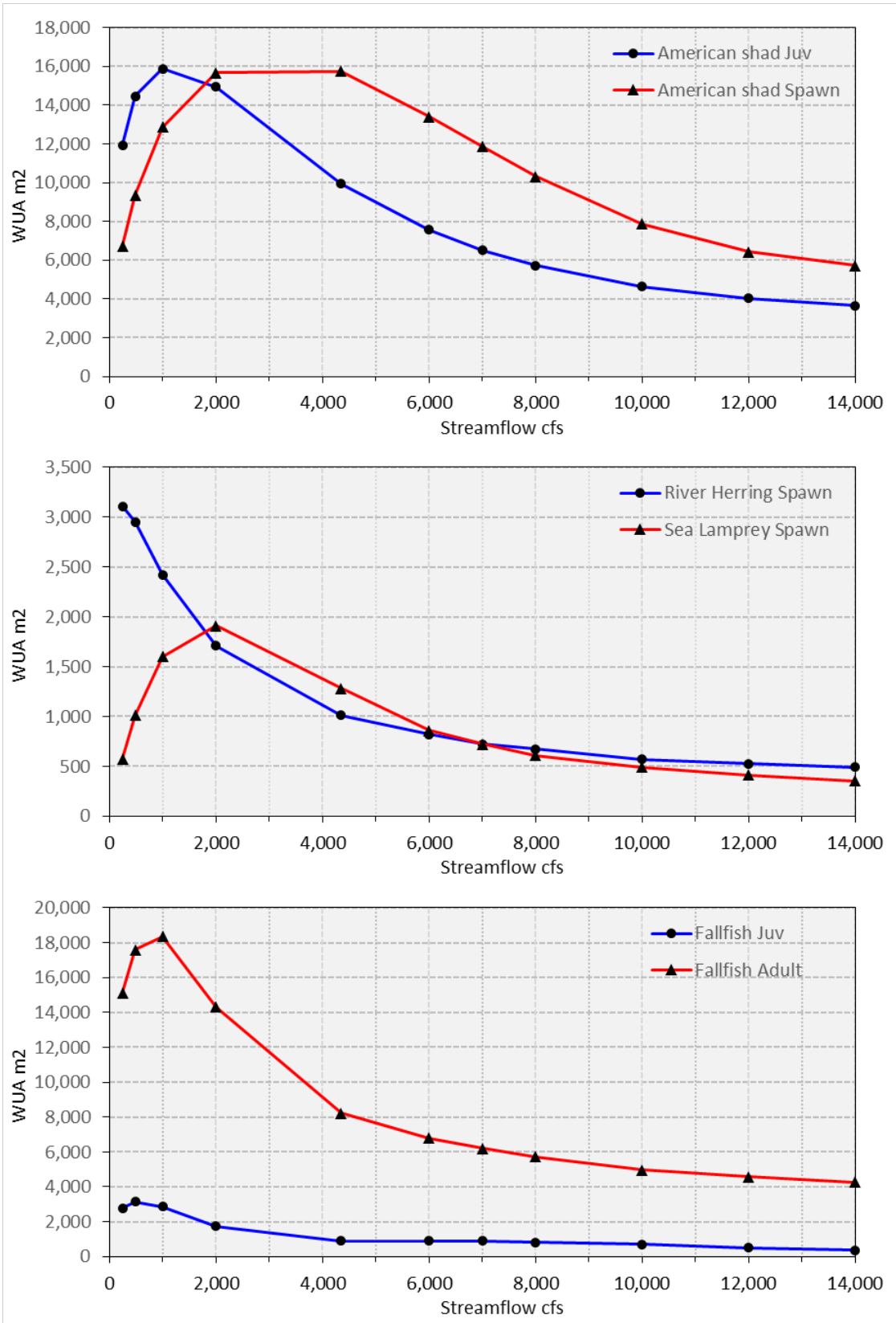


Figure 5-6. Relationship between WUA (m2) and flow (cfs) in Bypass Reach according to species and life stage.

Figure 5-6. (continued).

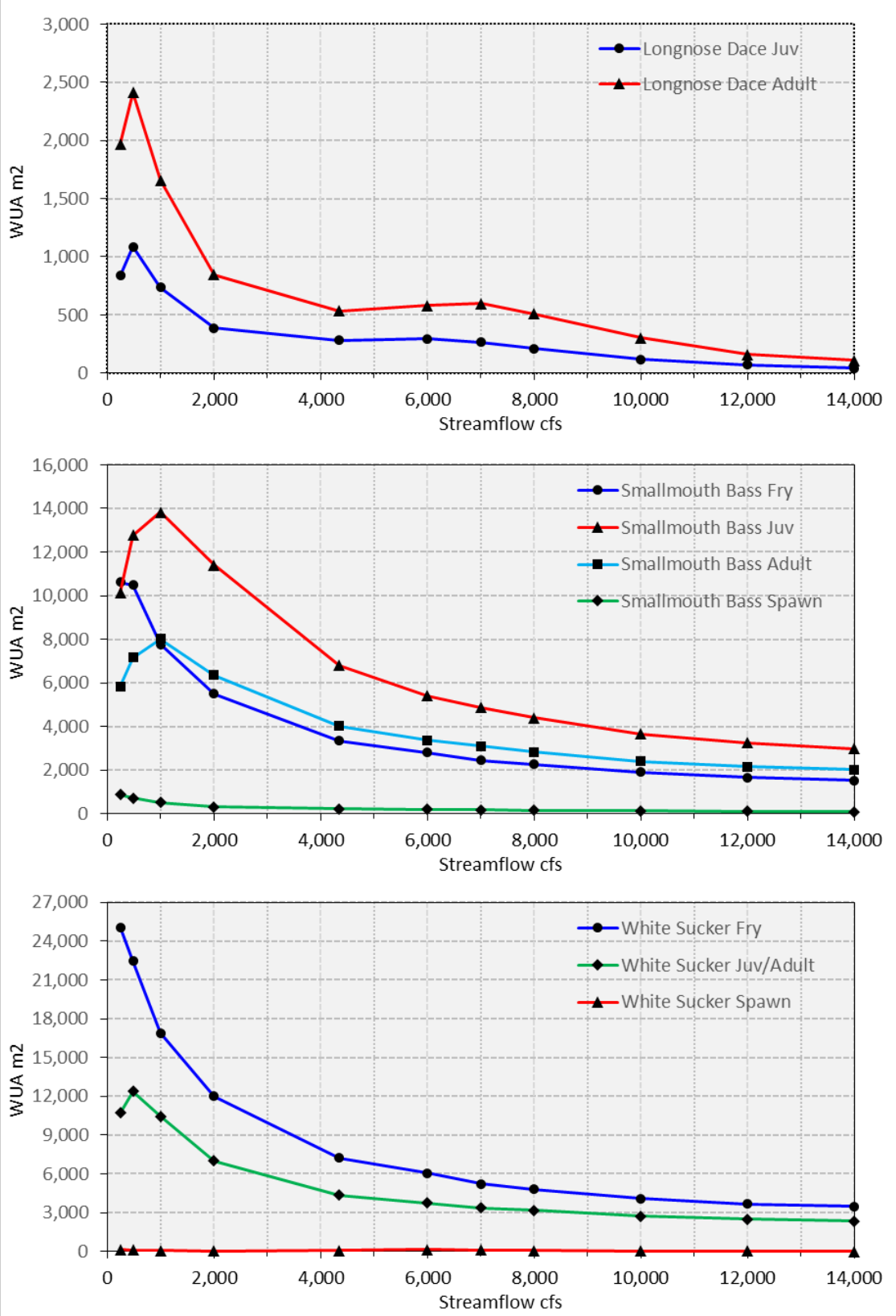
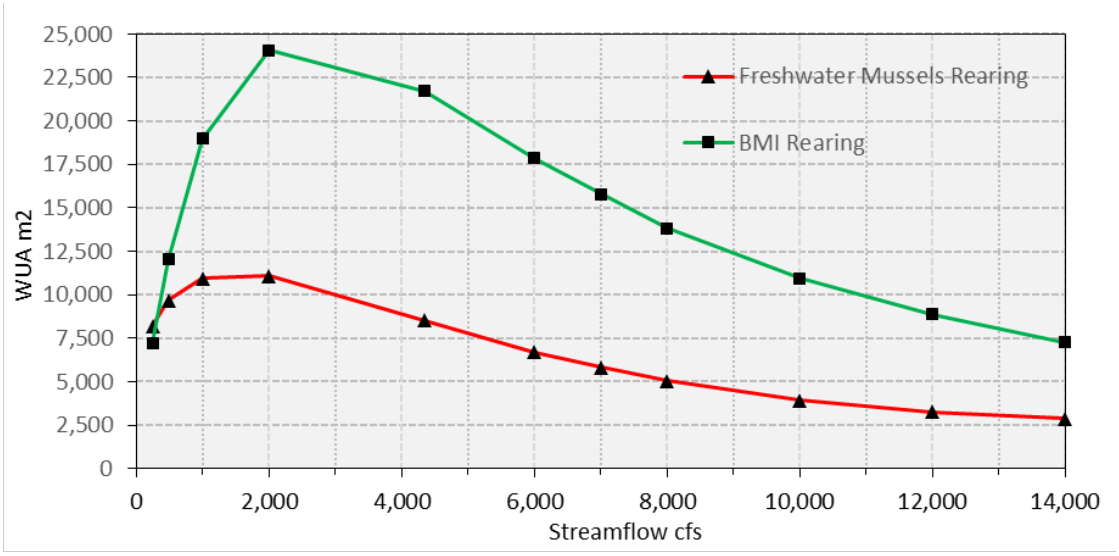


Figure 5-6. (continued).



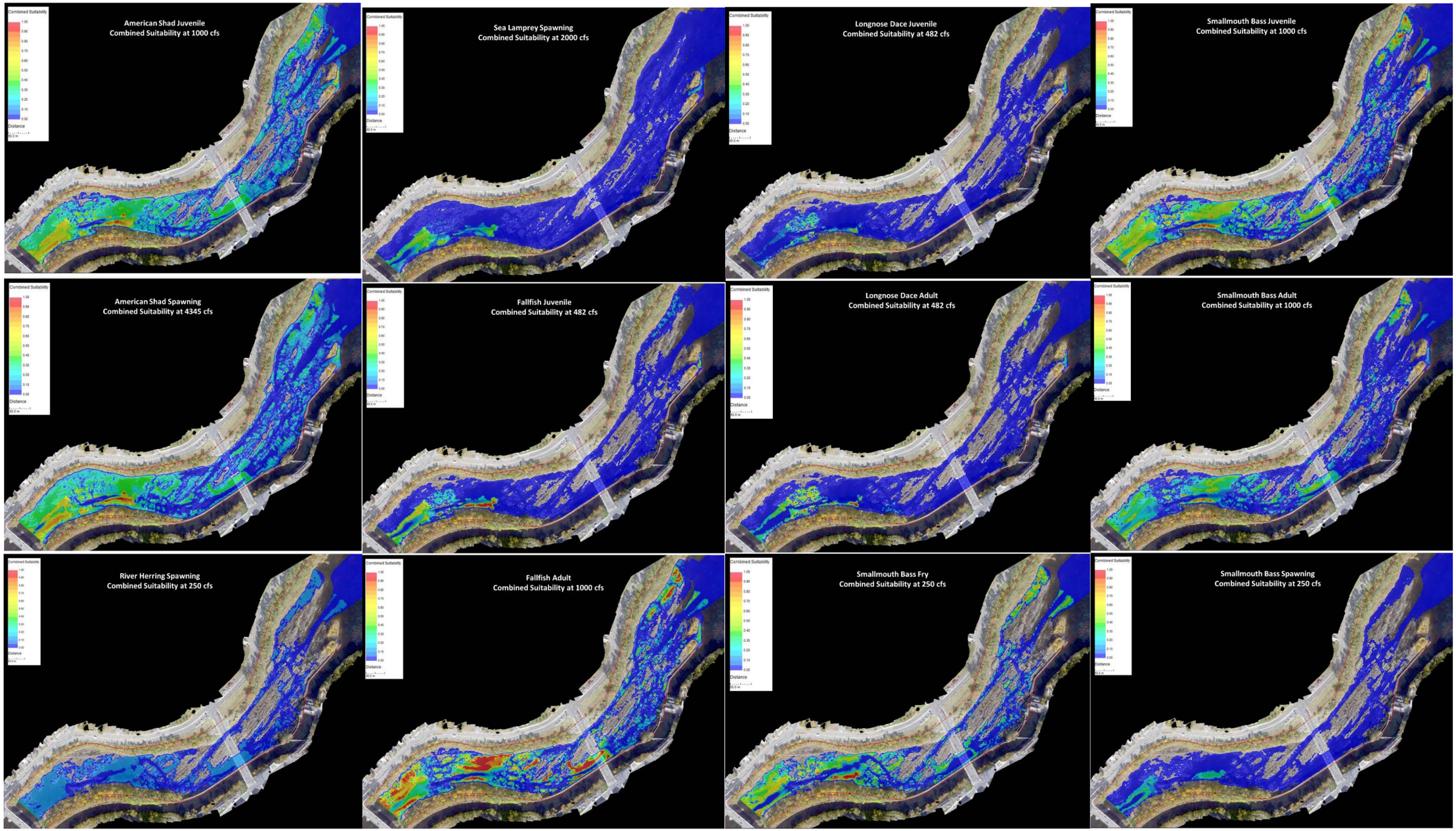


Figure 5-7. Bypass Reach showing combined suitability according to species and life stage.

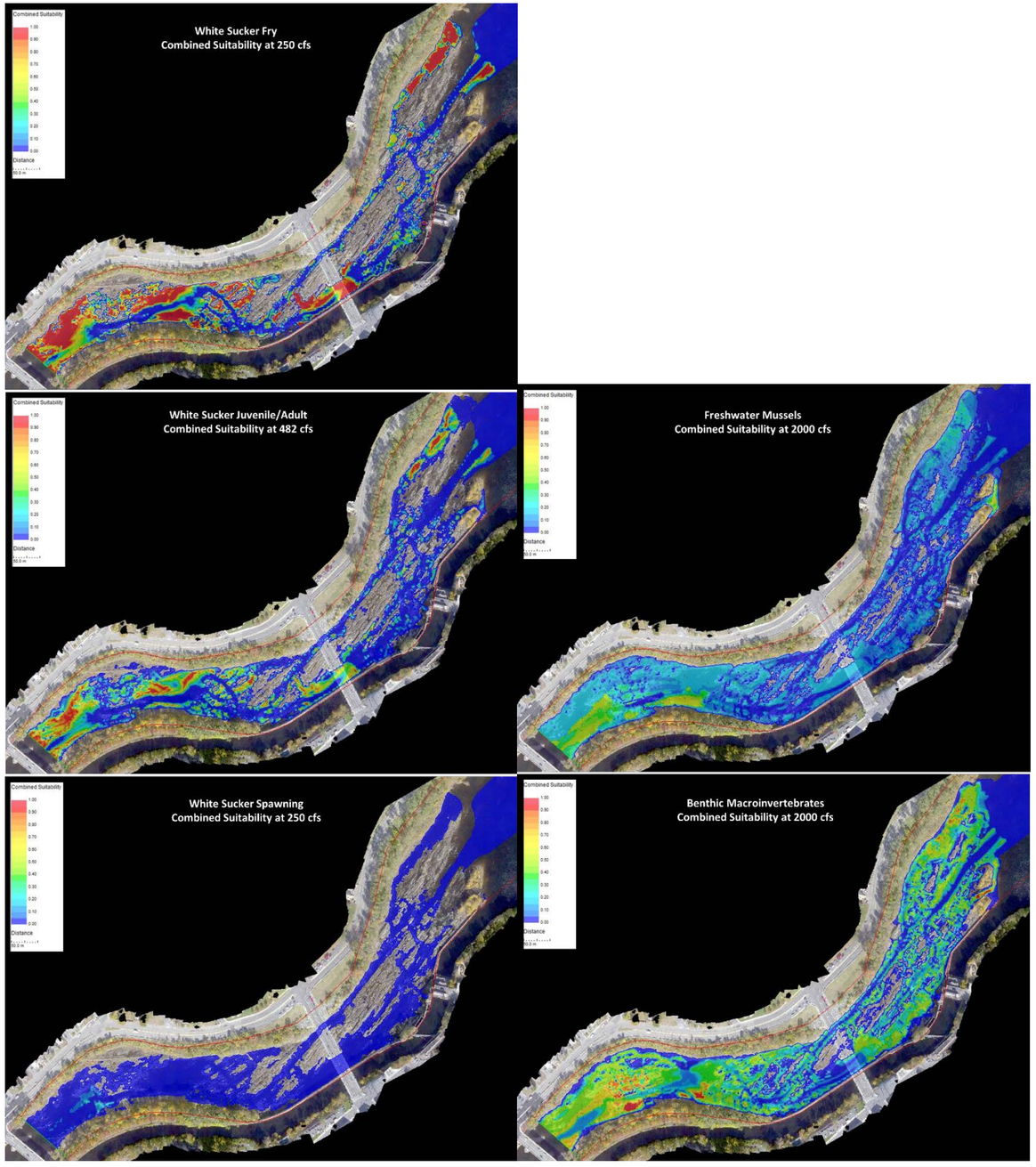


Figure 5-7. (continued)

6 Summary

A two-dimensional (2D) hydraulic model was developed in the Bypass Reach extending from the School Street Bridge downstream approximately 3,000 ft to the confluence with the powerhouse tailrace. The 2D model was calibrated at low (482 cfs), middle (4,345 cfs), and high (7,011 cfs) flows, with simulated flows ranging from 250 cfs to 14,000 cfs. Lidar and RTK measurements were utilized to develop a digital elevation model of the Bypass Reach. Visual surveys were also conducted on foot to delineate polygons consisting of specified substrate characteristics. The 2D model was utilized to assess the relationship between Bypass Flow and upstream passage through the bedrock dominated reach by adult migrant American shad and river herring (blueback herring, and alewife). The 2D model also assessed the relationship between Bypass flows and the quantity and quality of aquatic habitat, expressed as Weighted Usable Area (WUA), for 9 species groups and their associated life stages.

6.1 Summary of Zone of Passage Results

Assessment of the zone of passage was challenging due to the highly complex bedrock habitat throughout most of the Bypass Reach. Complete, uninterrupted connection from the lower boundary to the upper boundary at the School Street bridge, when utilizing passage criteria for both depth and velocity, was never achieved for either American shad or river herring. The 2D model identified numerous potential gaps in suitable passage habitat in the lower half of the Bypass Reach downstream of the University Avenue Bridge. From review of the zone of passage model imagery alone it is unclear if these gaps would be absolute barriers to upstream migration or if passage would be possible along the margins of the impassable gaps. Given the uncertainty in the modeled depth-averaged velocities through the lower, complex bedrock area, the passage analysis focused on flows meeting the depth criteria, with closer inspection of modeled velocities at identified pinch-points (e.g., narrow/fast bedrock channels).

In addition, the shad assessment was reanalyzed using a more realistic minimum depth of 1.0 ft (same as herring), which provided a near-continuous passage channel at flows of approximately 500 cfs, with multiple passage channels at higher flows (Figure 5-4). Passage opportunities based on depth alone increased with flows, but velocities became limiting at flows over 6,000 cfs (Appendix B). Likewise for river herring, depths became suitable for passage by 500 cfs, with excessive velocities through bedrock channels at flows of 4,000 cfs and greater. Note that these assessments do not account for channel widths, however given the large scale of the Bypass Reach and the complexity of the bedrock habitat, it is unlikely that channel widths would be limiting.

As part of the *Upstream and Downstream Adult Alosine Passage Assessment* study, movements of radio-tagged adult river herring and American shad were monitored within the Bypass Reach during spring 2020. As described in that technical report, flows through the Lowell Bypass Reach during the 2020 monitoring period were comprised of the ~500 cfs of water constituting the attraction and conveyance flow associated with the Pawtucket Dam fish ladder as well as incidental spill flow passing over the spillway. Incidental spill flows in excess of 500 cfs were present until May 21 after which incidental spill was reduced to near zero through the month of

June (Figure 6-1). A total of 105 unique foray events for radio-tagged adult river herring into the Bypass Reach were recorded during the 2020 study. These events were recorded over a range of dates from May 7 through May 23 with the majority of events occurring between May 17 and 19. When the average Bypass Reach discharge condition occurring during each upstream foray is considered, foray events resulting in successful passage at the Pawtucket Dam fish ladder occurred over a range of Bypass Reach flows from 883 to 4,432 cfs. Conversely, foray events which did not result in successful upstream passage and were determined to have ended at or near to the midpoint of the Bypass Reach occurred over a range of flows from 907-2,145 cfs and those that ended at the upstream end of the Bypass Reach occurred over a range of flows from 799 to 2,587 cfs. The probability of successful upstream passage for radio-tagged adult herring was evaluated using a Cormack Jolly-Seber model for the lower and upper portions of the Bypass Beach and was estimated at 72% and 92%, respectively. Although tagged adult herring were only detected through May 23 within the Lowell Bypass Reach, camera operations at the Pawtucket Dam fish ladder continued to document migrating river herring through the first week of June. Mean daily discharge values for flow through the Lowell Bypass Reach between May 24 and June 6 ranged from 900 to 546 cfs. A net total of 42,066 adult herring passed during that period (Figure 6-2)

Movements of radio-tagged adult American shad during the 2020 passage evaluation were limited to a single detection at the lowermost receiver station. When considered with findings from this zone of passage assessment it appears that shad have difficulty migrating upstream through the Bypass Reach. However, camera operations at the viewing window of the Pawtucket Dam fish ladder documented the upstream passage of 799 adult American shad over a range of dates from May 18 to June 26 with the majority of passage events documented during early and mid-June (Figure 6-3). Reported Merrimack River inflow during the period of peak shad detection in the Pawtucket Dam counting window during 2020 was below the E.L. Field Powerhouse capacity of 8,000 cfs; consequently no spill occurred over this period (Figure 6-1) and discharge through the Bypass Reach was limited to ~500 cfs from the Pawtucket Dam fish ladder (Figure 6-3).

Despite poor performance of tagged shad and the lack of passage connectivity through the Bypass Reach according to the 2D model (using the 2.5 ft minimum depth criteria), a proportion of adult shad were able to reach the Pawtucket Dam fish ladder under a Bypass flow of about 500 cfs. This is consistent with the revised 2D model using a 1.0 ft minimum depth criteria for shad, which suggested near continuous passage opportunities at a flow of approximately 500 cfs.

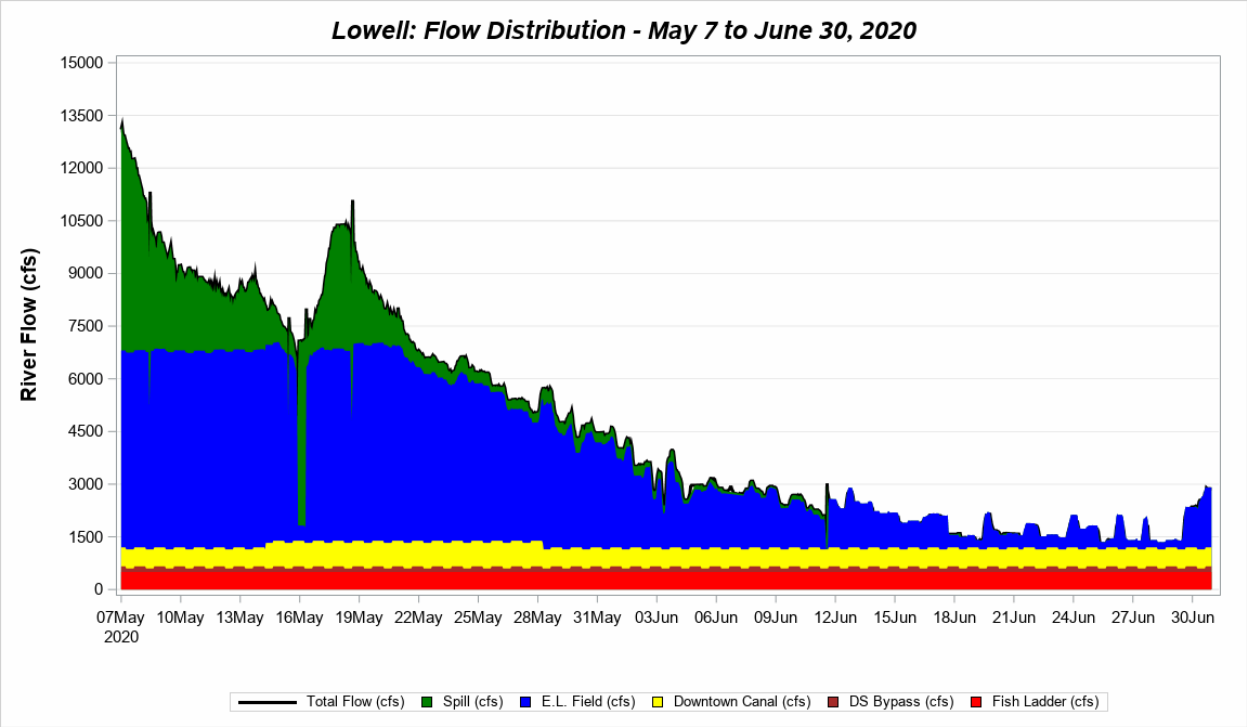


Figure 6-1. Total, spill, E.L. Field, fish ladder, downstream bypass and downtown canal system flow (cfs) for the period May 7 to June 30, 2020.

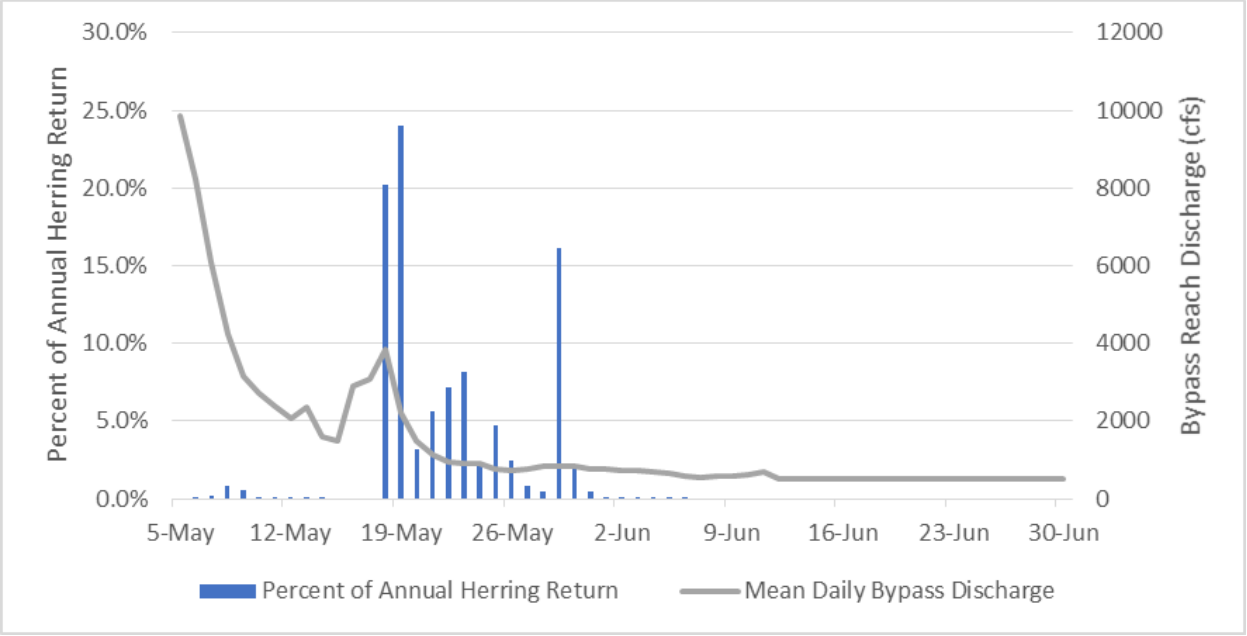


Figure 6-2. Pawtucket Dam fish ladder river herring counts and reported Lowell Bypass Reach discharge for the 2020 upstream passage season.

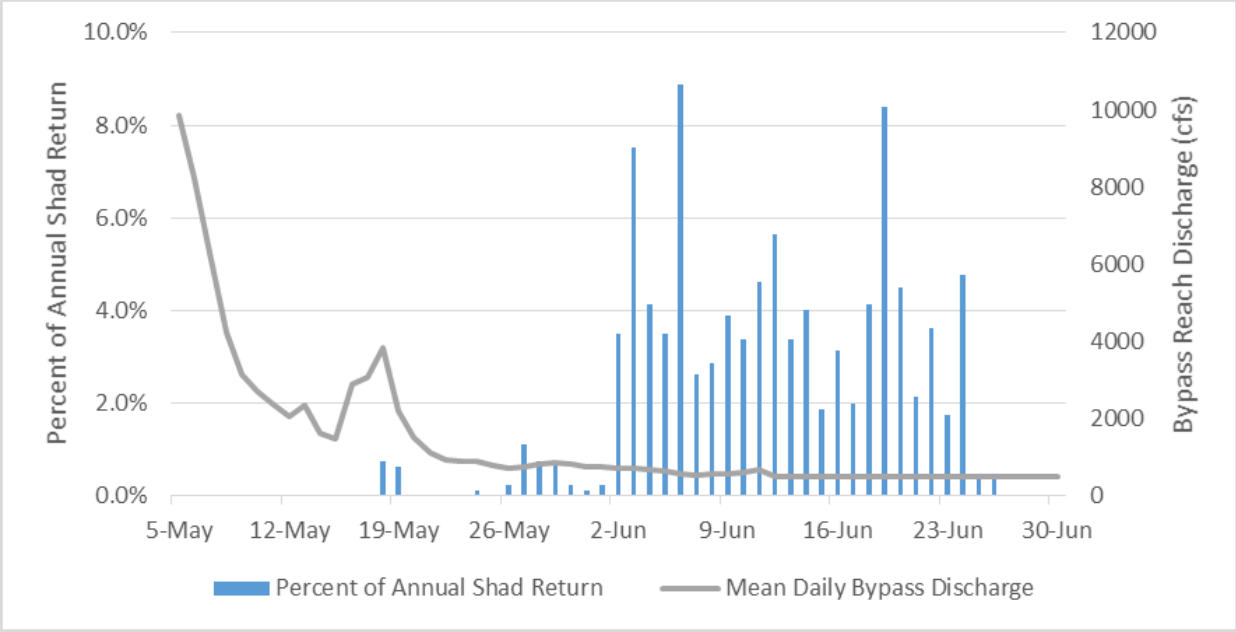


Figure 6-3. Pawtucket Dam fish ladder American shad counts and reported Lowell Bypass Reach discharge for the 2020 upstream passage season.

6.2 Summary of WUA Results

In most cases the habitat indexes for each species and life stage showed maximum suitable habitat at relatively low flows through the Bypass Reach (Table 5-1, Figure 5-6). Thirteen of the 17 assessments produced maximum WUA at flows of 1,000 cfs or less, with 3 other species/life stages (lamprey spawning, freshwater mussels, and BMI rearing) reaching maximum WUA at 2,000 cfs, and one species/life stage (shad spawning) showing maximum habitat at a higher flow (4,345 cfs). This result is primarily due to the steep, bedrock dominated habitat that characterizes the Bypass Reach. In terms of the magnitude of suitable habitat, the habitat index showed highest values for shad, adult fallfish, sucker fry, and BMI, each with maximum WUA estimates exceeding 15,000 m^2. In contrast, relatively little suitable habitat was predicted for lamprey spawning, bass spawning, sucker spawning, and juvenile longnose dace; all of which had maximum WUA values of less than 2,000 m^2. WUA distribution maps (Figure 5-7) revealed that most suitable habitat occurred in the upper 1,000 ft of the modeled reach, with limited suitable habitat in the lower, bedrock-dominated area.

7 Variances from FERC-Approved Study Plan

As previously noted, the 2D model for the zone of passage task was initially intended to encompass the series of weirs located in the upper end of the Bypass Reach upstream of the School Street Bridge. However the model was unable to run to a steady state solution due to unrealistically high velocities (greater than 2,000 fps) at nodes along the vertical edges of the weirs, which caused the time step to drop to infinitesimally small levels, and preventing the model from advancing beyond a few seconds. Consequently, the upstream boundary for both the zone of passage and the aquatic habitat elements of this study was placed just downstream of the School Street Bridge to avoid the transverse flow coming from the diagonal spillway.

The FERC-approved RSP notes that NMFS requested ADCP velocity data at randomly placed cross sections under the high calibration flow collection. Although not necessary for 2D model development, such data can be useful as validation data. However, we could not physically access locations for collecting validation data during the high flow event, and the current velocities in many areas was determined to be too fast and would exceed the capabilities of the ADCP trimaran. Consequently, transect validation data was not performed.

Due to the complexity of the bedrock-dominated habitat, both "minimum" and "optimal" passage flows were not identified. Instead, the minimum flow meeting passage depth criteria was identified for American shad and river herring, along with the range of potential passage flows based on both depth and velocity criteria.

There were no additional variances from the FERC-approved study plan in this task.

8 References

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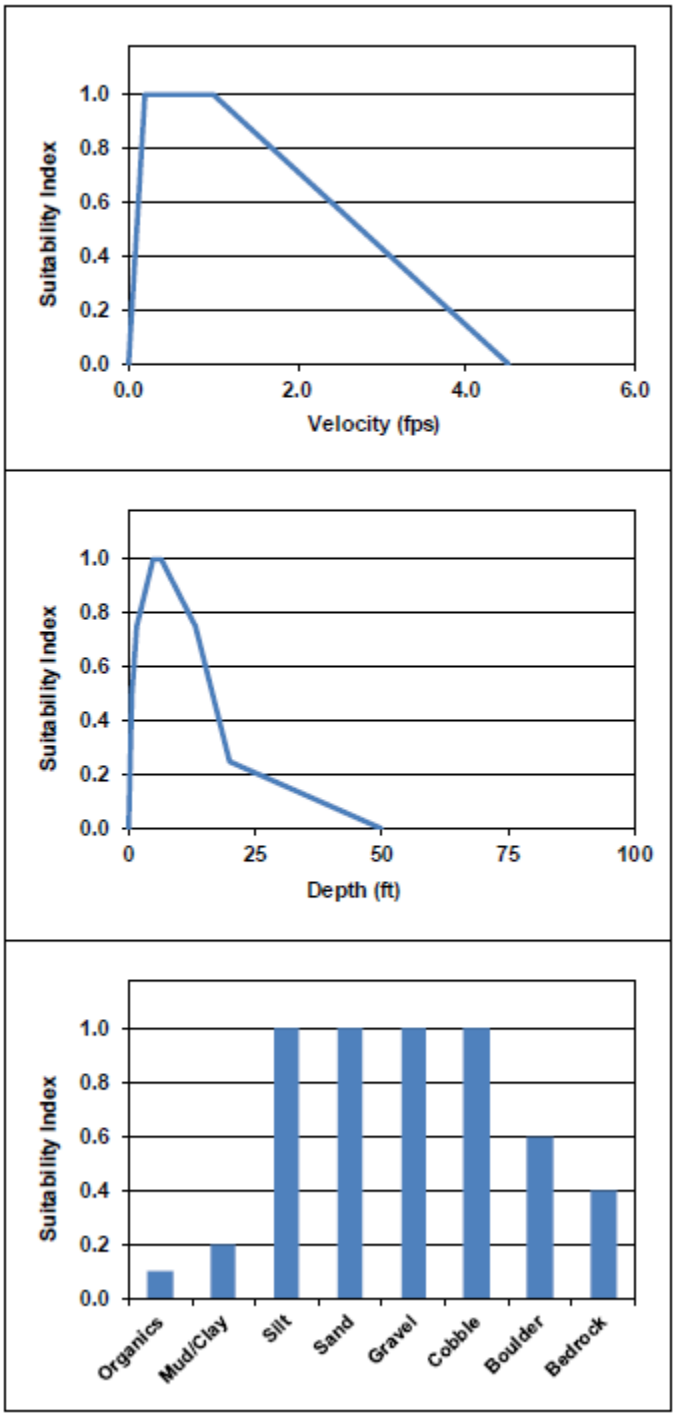
9 Appendices

Appendix A. Habitat suitability criteria for target species and life-stages.

American Shad Juvenile



Source:

Stier and Crance, 1985

Velocity (ft/s)	SI
0.00	0.00
0.20	1.00
1.00	1.00
4.50	0.00

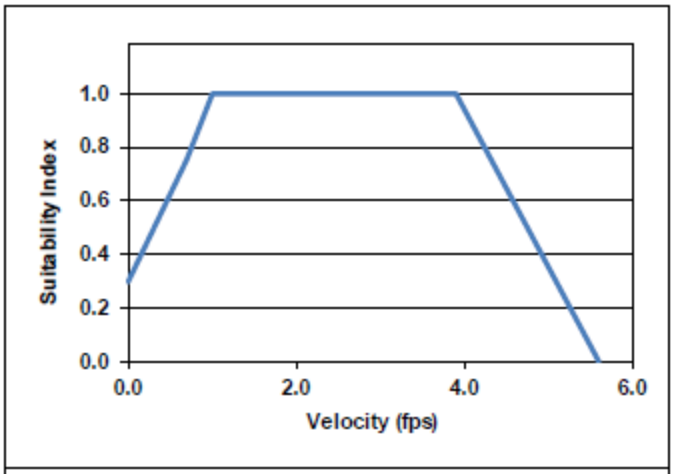
Greene et al., 2009

Depth (ft)	SI
0.00	0.00
0.66	0.50
1.50	0.75
4.90	1.00
6.60	1.00
13.20	0.75
20.00	0.25
50.00	0.00

Conowingo IFIM

Substrate	SI
Organics	0.10
Mud/Clay	0.20
Silt	1.00
Sand	1.00
Gravel	1.00
Cobble	1.00
Boulder	0.60
Bedrock	0.40

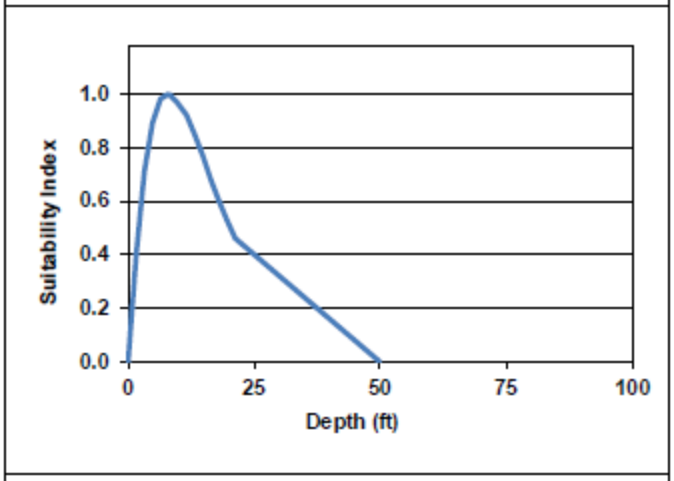
American Shad Spawning



Source:

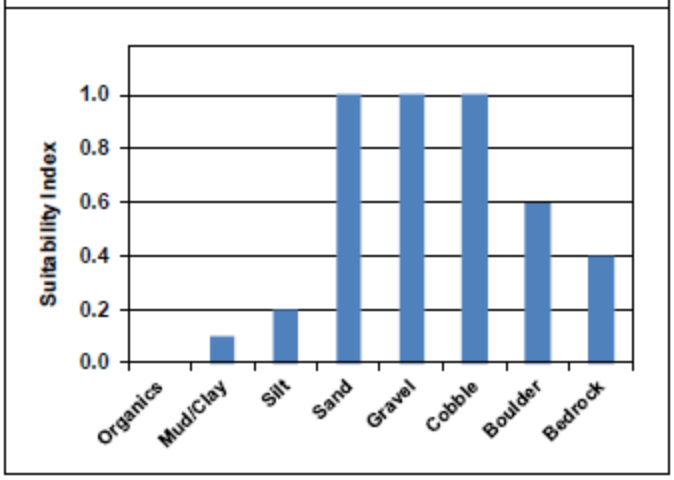
Velocity based on data from Hightower et al., 2012

Velocity (ft/s)	SI
0.00	0.30
0.70	0.75
1.00	1.00
3.00	1.00
3.90	1.00
5.60	0.00



Hightower et al., 2012 and Stier and Crance, 1985

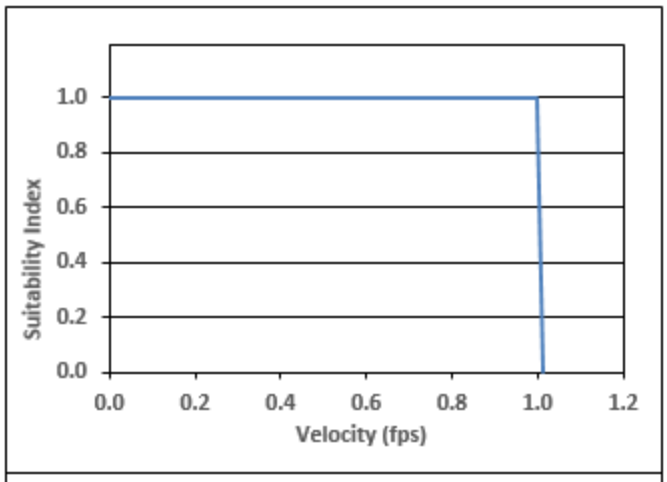
Depth (ft)	SI
0.00	0.00
1.60	0.40
3.30	0.71
4.90	0.89
6.60	0.98
8.20	1.00
9.80	0.97
11.50	0.92
13.10	0.85
14.80	0.77
16.40	0.68
18.00	0.60
19.70	0.53
21.30	0.46
50.00	0.00



Stier and Crance, 1985

Substrate	SI
Organics	0.00
Mud/Clay	0.10
Silt	0.20
Sand	1.00
Gravel	1.00
Cobble	1.00
Boulder	0.60
Bedrock	0.40

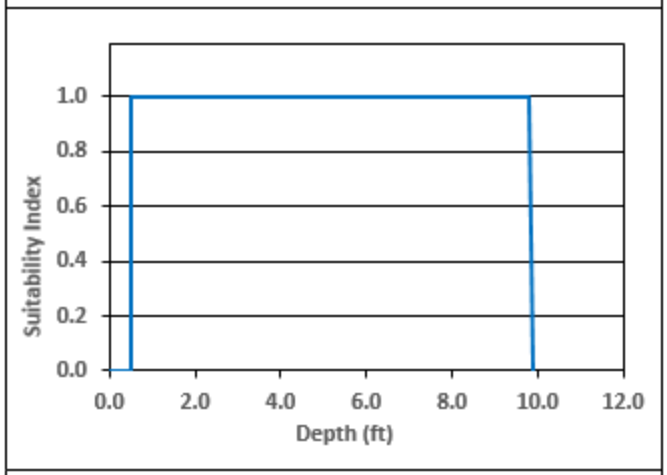
River Herring Spawning



Source:

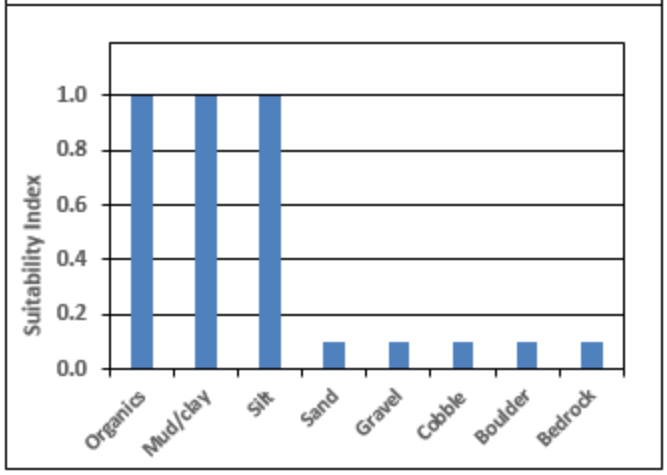
Adapted from Pardue 1983 and Mather et al. 2012

Velocity (ft/s)	SI
0.00	1.00
1.00	1.00
1.01	0.00



Adapted from Pardue 1983 and Mather et al. 2012

Depth (ft)	SI
0.00	0.00
0.49	0.00
0.50	1.00
9.80	1.00
9.90	0.00

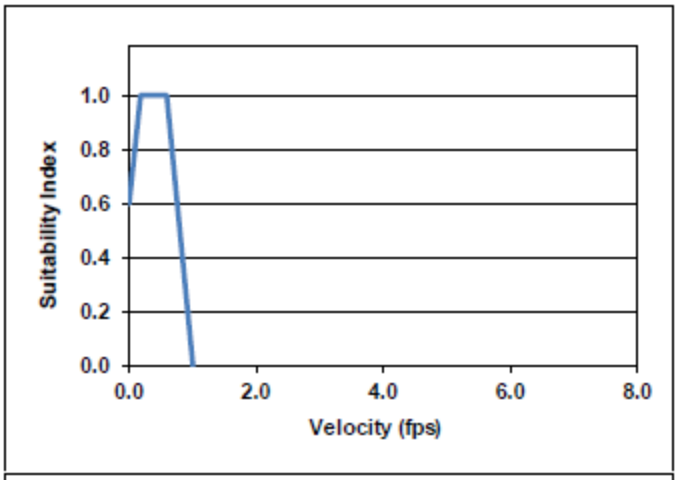


Adapted from Pardue 1983 and Mather et al. 2012

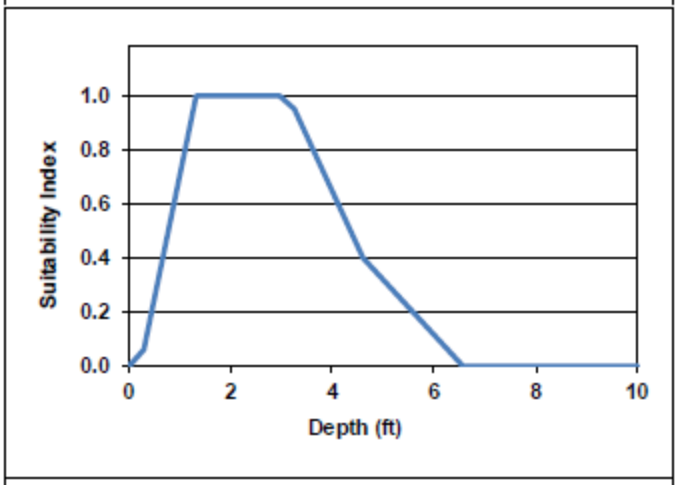
Substrate	SI
Organics	1.00
Mud/Clay	1.00
Silt	1.00
Sand	0.10
Gravel	0.10
Cobble	0.10
Boulder	0.10
Bedrock	0.10

Smallmouth Bass Fry

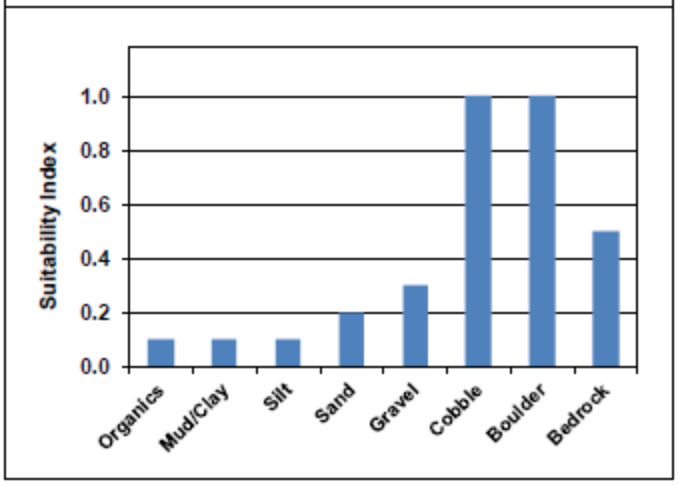
Source:
Leonard et al, 1986



Velocity (ft/s)	SI
0.00	0.60
0.19	1.00
0.59	1.00
1.00	0.00

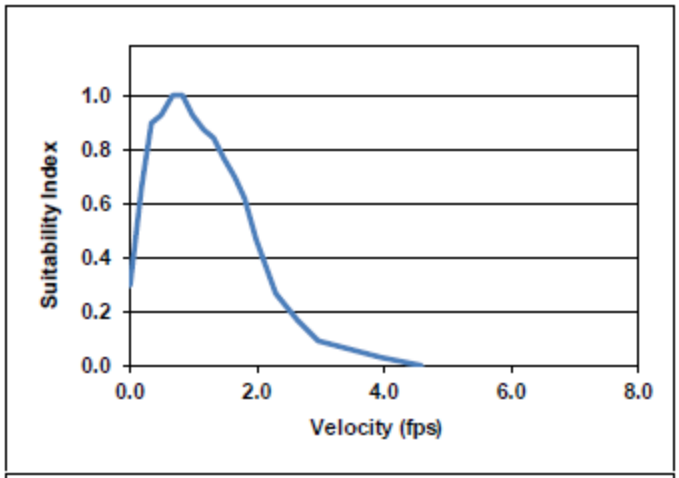


Depth (ft)	SI
0.00	0.00
0.28	0.06
1.31	1.00
2.95	1.00
3.25	0.95
4.59	0.40
6.56	0.00
10.00	0.00



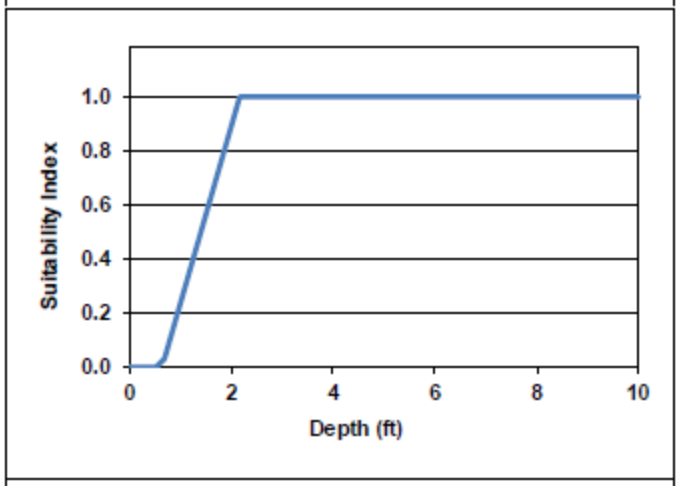
Substrate	SI
Organics	0.10
Mud/Clay	0.10
Silt	0.10
Sand	0.20
Gravel	0.30
Cobble	1.00
Boulder	1.00
Bedrock	0.50

Smallmouth Bass Juvenile



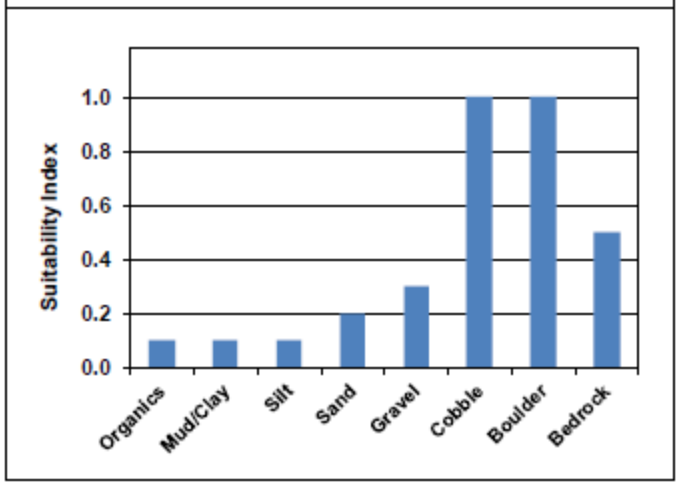
Source:
Groshens and Orth 1994

Velocity (ft/s)	SI
0.00	0.30
0.17	0.66
0.33	0.90
0.50	0.93
0.66	1.00
0.83	1.00
0.98	0.93
1.15	0.87
1.31	0.84
1.47	0.77
1.64	0.70
1.81	0.62
1.98	0.47
2.30	0.27
2.62	0.17
2.95	0.09
3.94	0.03
4.59	0.00



Leonard et al, 1986

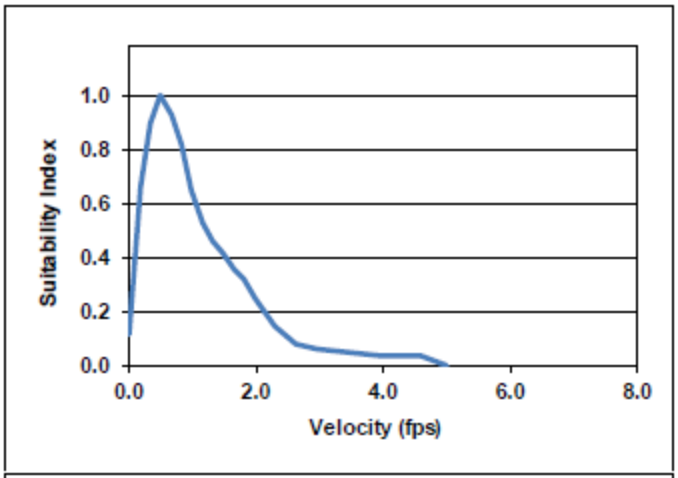
Depth (ft)	SI
0.00	0.00
0.52	0.00
0.67	0.03
2.15	1.00
10.00	1.00



Leonard et al, 1986

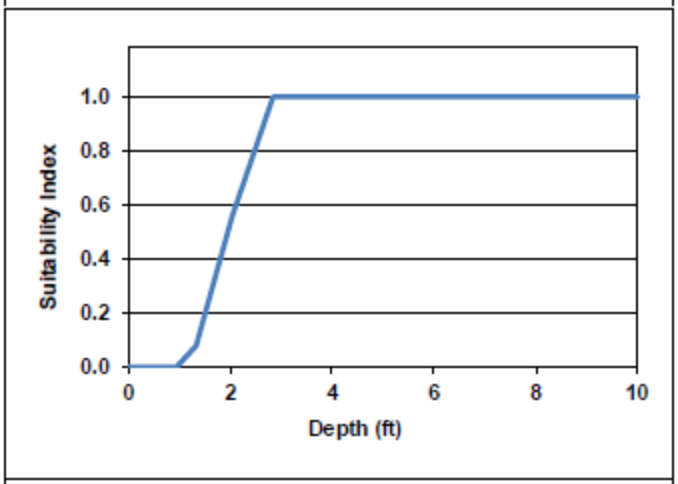
Substrate	SI
Organics	0.10
Mud/Clay	0.10
Silt	0.10
Sand	0.20
Gravel	0.30
Cobble	1.00
Boulder	1.00
Bedrock	0.50

Smallmouth Bass Adult



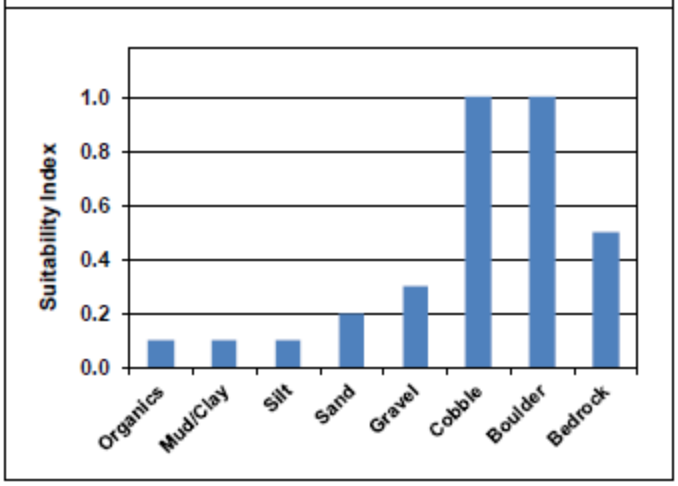
Source:
Groshens and Orth 1994

Velocity (ft/s)	SI
0.00	0.12
0.17	0.66
0.33	0.90
0.50	1.00
0.66	0.93
0.83	0.82
0.98	0.65
1.15	0.53
1.31	0.46
1.47	0.42
1.64	0.36
1.81	0.32
1.98	0.25
2.30	0.15
2.62	0.08
2.95	0.06
3.94	0.04
4.59	0.04
5.00	0.00



Leonard et al, 1986

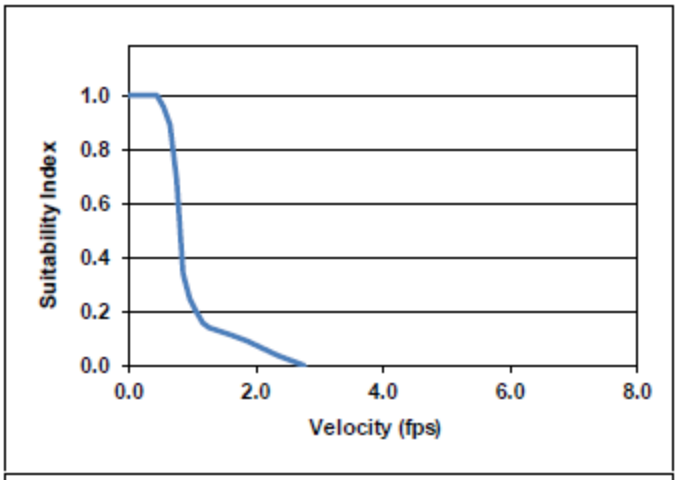
Depth (ft)	SI
0.00	0.00
0.92	0.00
1.31	0.08
2.03	0.56
2.82	1.00
6.00	1.00
10.00	1.00

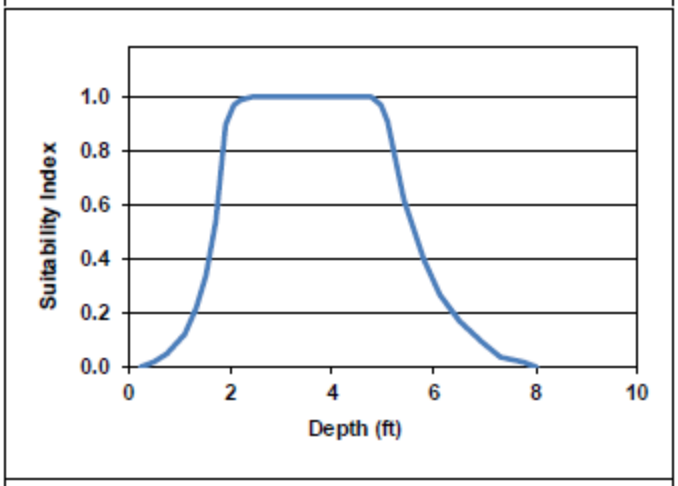


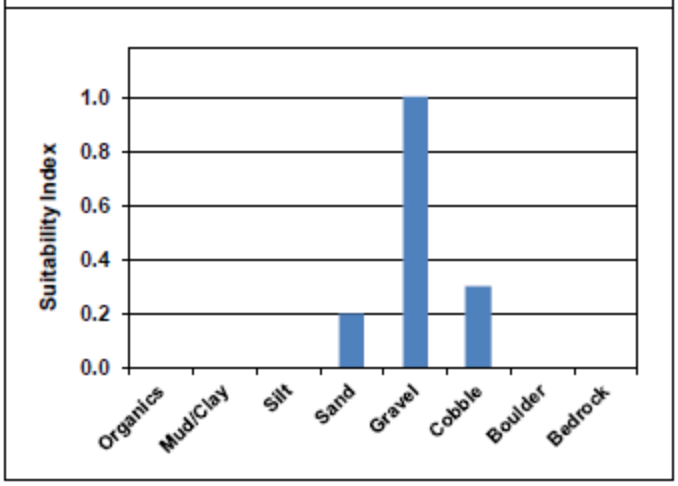
Leonard et al, 1986

Substrate	SI
Organics	0.10
Mud/Clay	0.10
Silt	0.10
Sand	0.20
Gravel	0.30
Cobble	1.00
Boulder	1.00
Bedrock	0.50

Smallmouth Bass Spawning







Source:

Allen, 1996

Velocity (ft/s)	SI
0.00	1.00
0.45	1.00
0.55	0.96
0.65	0.89
0.75	0.69
0.85	0.34
0.95	0.25
1.05	0.20
1.15	0.16
1.25	0.14
1.65	0.11
1.85	0.09
2.35	0.04
2.55	0.02
2.75	0.00

Edwards et al., 1983

Depth (ft)	SI
0.22	0.00
0.50	0.02
0.74	0.05
1.10	0.12
1.32	0.22
1.53	0.34
1.70	0.54
1.90	0.90
2.05	0.97
2.18	0.99
2.40	1.00
4.75	1.00
4.95	0.97
5.10	0.91
5.40	0.62
5.80	0.40
6.10	0.27
6.50	0.17
6.95	0.09
7.30	0.04
7.75	0.02
8.00	0.00

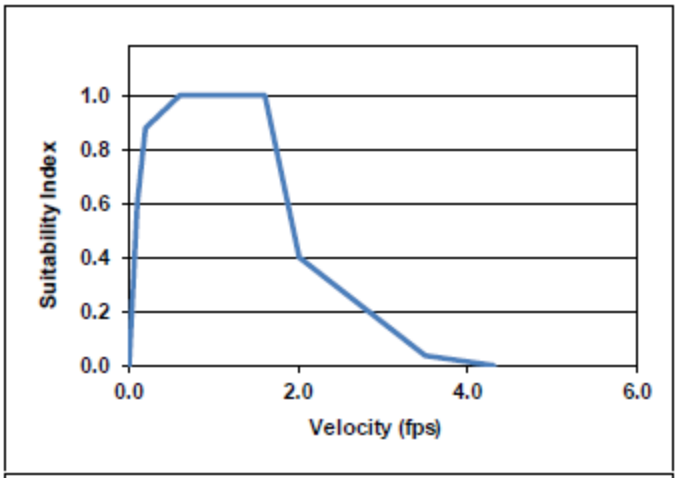
Allen, 1996

Substrate	SI
Organics	0.00
Mud/Clay	0.00
Silt	0.00
Sand	0.20
Gravel	1.00
Cobble	0.30
Boulder	0.00
Bedrock	0.00

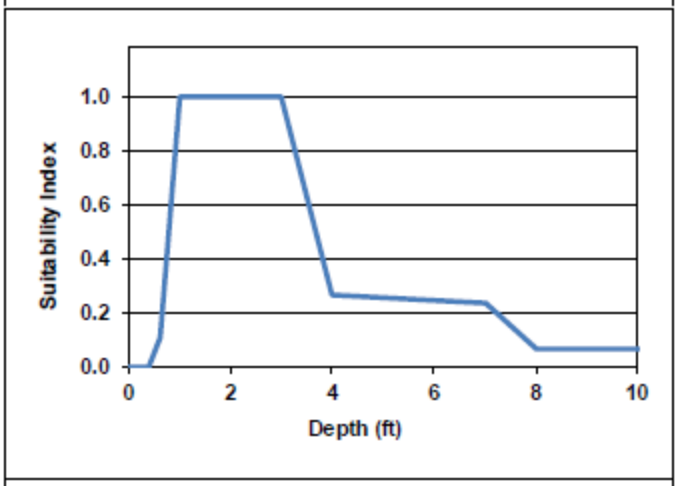
Fallfish Juvenile

Velocity and depth from brook trout fry curves (Deerfield River)
Substrate developed by Charles Ritzi

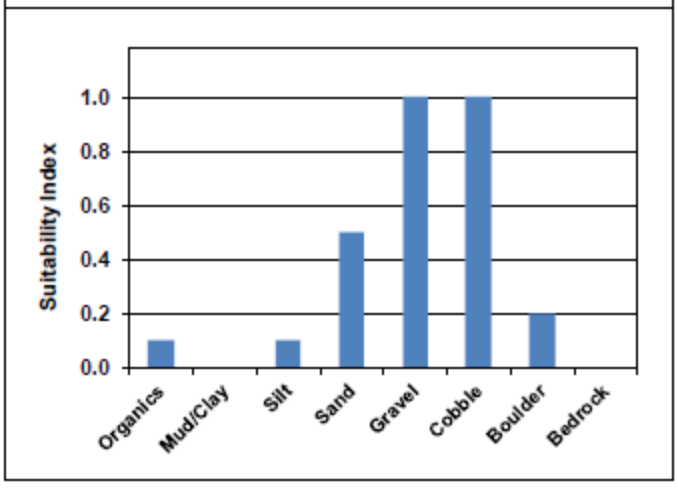
Source:
Gomez and Sullivan, 2007



Velocity (ft/s)	SI
0.00	0.00
0.10	0.60
0.20	0.88
0.60	1.00
1.60	1.00
2.00	0.40
3.50	0.04
4.30	0.00



Depth (ft)	SI
0.00	0.00
0.40	0.00
0.60	0.11
1.00	1.00
3.00	1.00
4.00	0.27
7.00	0.24
8.00	0.07
20.00	0.07
100.00	0.07

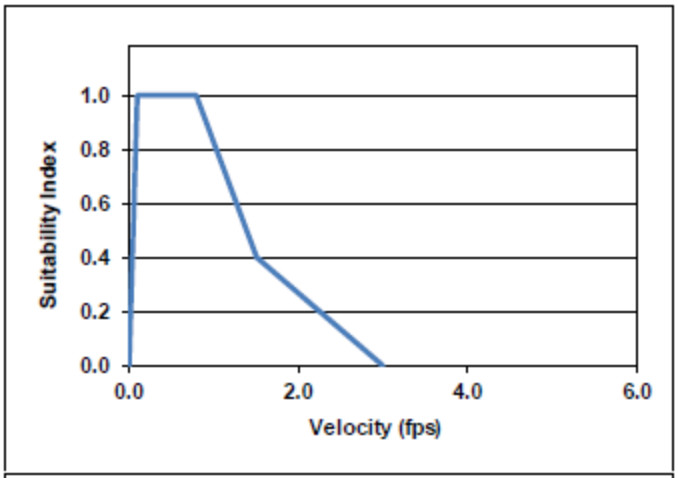


Substrate	SI
Organics	0.10
Mud/Clay	0.00
Silt	0.10
Sand	0.50
Gravel	1.00
Cobble	1.00
Boulder	0.20
Bedrock	0.00

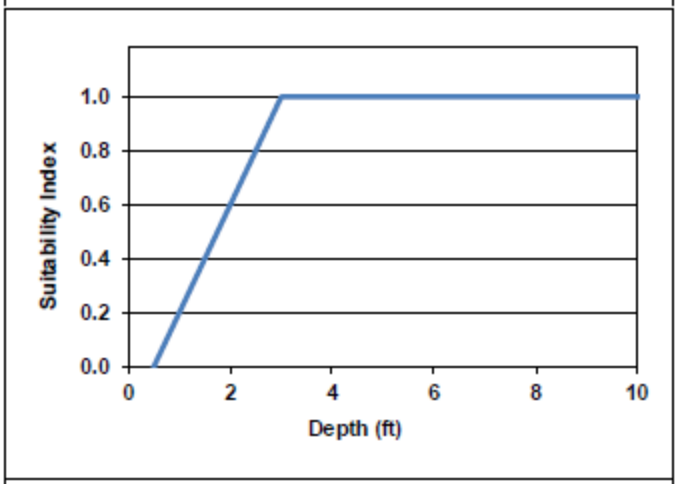
Fallfish Adult

Developed from consultation with NYSDEC
(New York Dept. of Environmental Conservation)

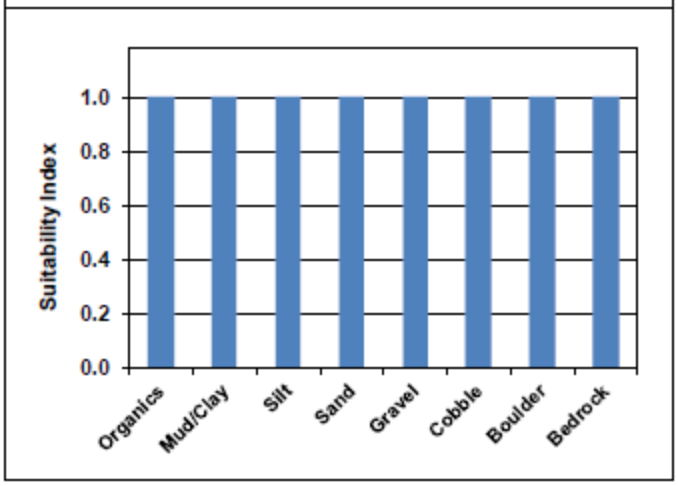
Source:
Gomez and Sullivan, 2007



Velocity (ft/s)	SI
0.00	0.00
0.10	1.00
0.80	1.00
1.50	0.40
3.00	0.00



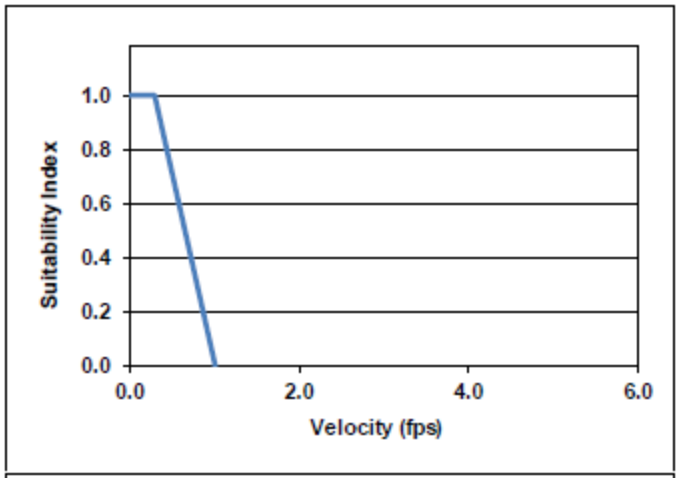
Depth (ft)	SI
0.00	0.00
0.50	0.00
3.00	1.00
100.00	1.00



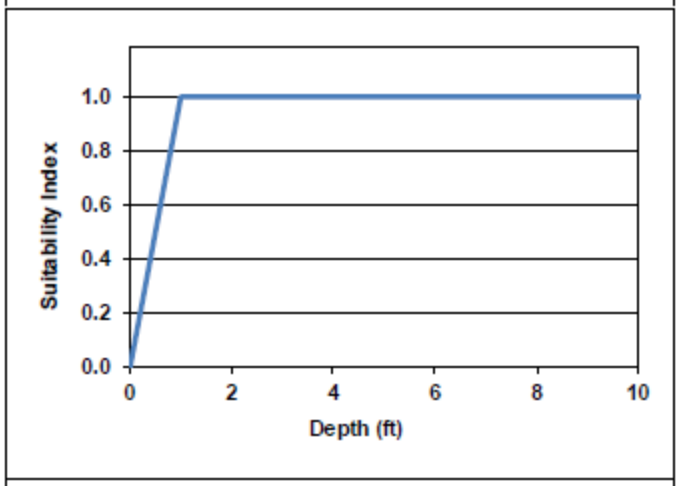
Substrate	SI
Organics	1.00
Mud/Clay	1.00
Silt	1.00
Sand	1.00
Gravel	1.00
Cobble	1.00
Boulder	1.00
Bedrock	1.00

White Sucker Fry

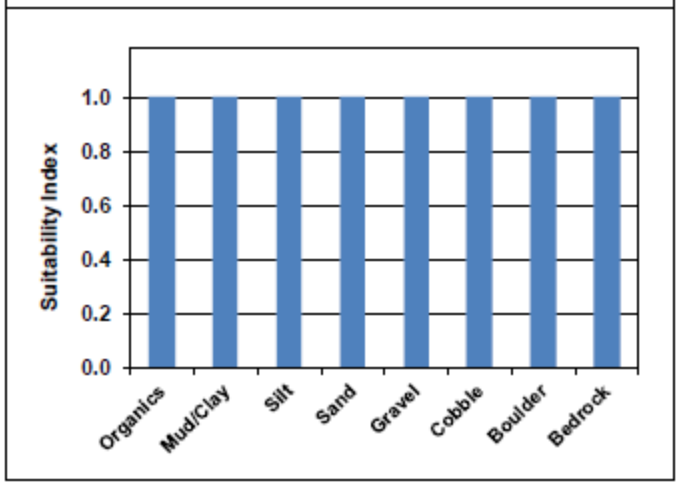
Source:
Twomey et al., 1984



Velocity (ft/s)	SI
0.00	1.00
0.30	1.00
1.00	0.00



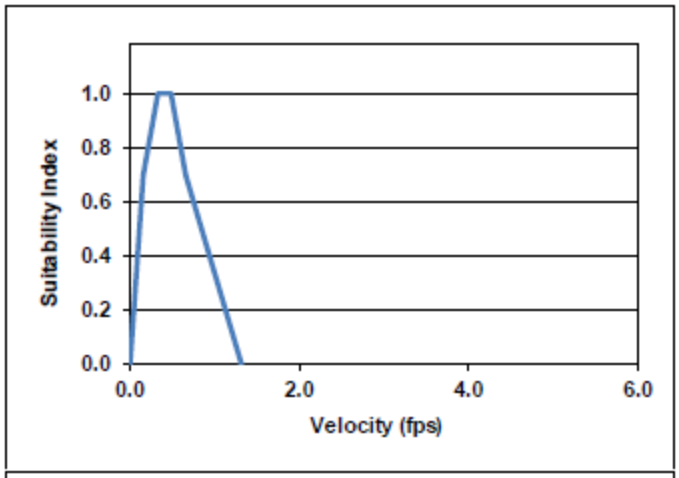
Depth (ft)	SI
0.00	0.00
1.00	1.00
100.00	1.00



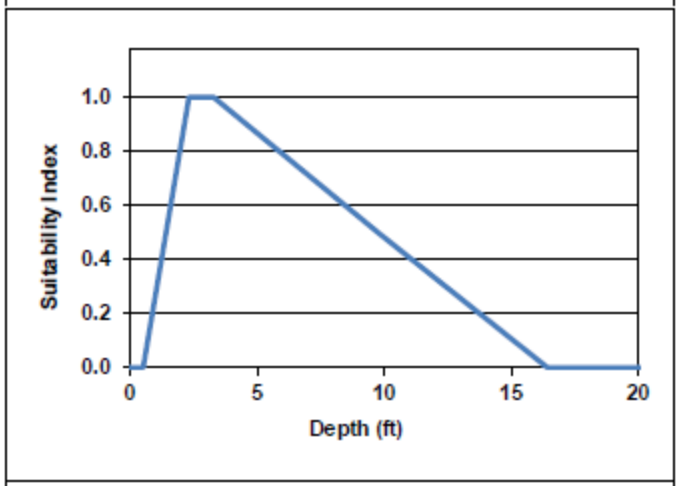
Substrate	SI
Organics	1.00
Mud/Clay	1.00
Silt	1.00
Sand	1.00
Gravel	1.00
Cobble	1.00
Boulder	1.00
Bedrock	1.00

White Sucker Adult/Juvenile

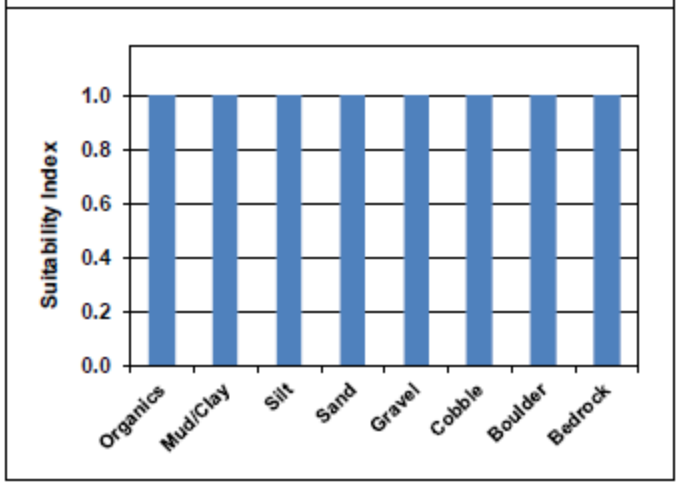
Source:
Twomey et al., 1984



Velocity (ft/s)	SI
0.00	0.00
0.16	0.70
0.33	1.00
0.49	1.00
0.66	0.70
1.31	0.00



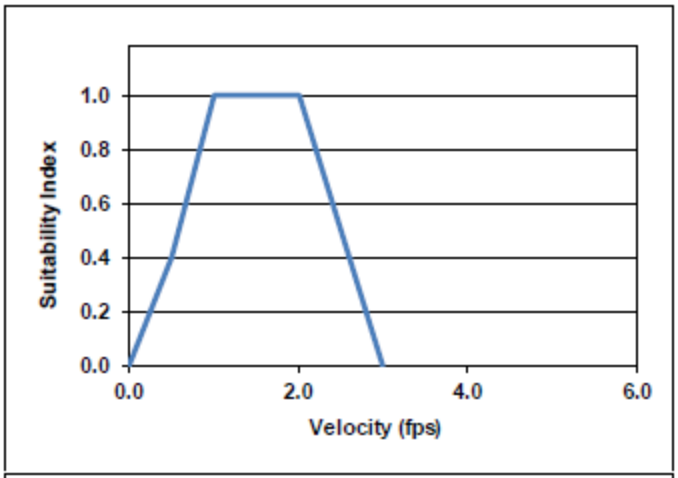
Depth (ft)	SI
0.00	0.00
0.50	0.00
2.30	1.00
3.30	1.00
9.80	0.50
16.40	0.00
100.00	0.00



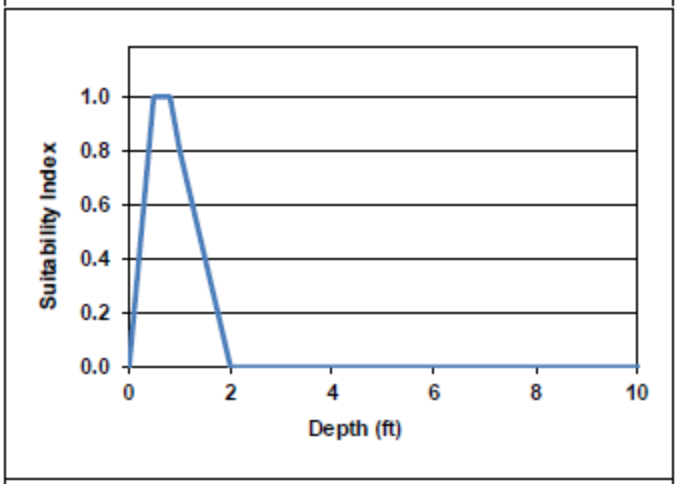
Substrate	SI
Organics	1.00
Mud/Clay	1.00
Silt	1.00
Sand	1.00
Gravel	1.00
Cobble	1.00
Boulder	1.00
Bedrock	1.00

White Sucker Spawning & Incubation

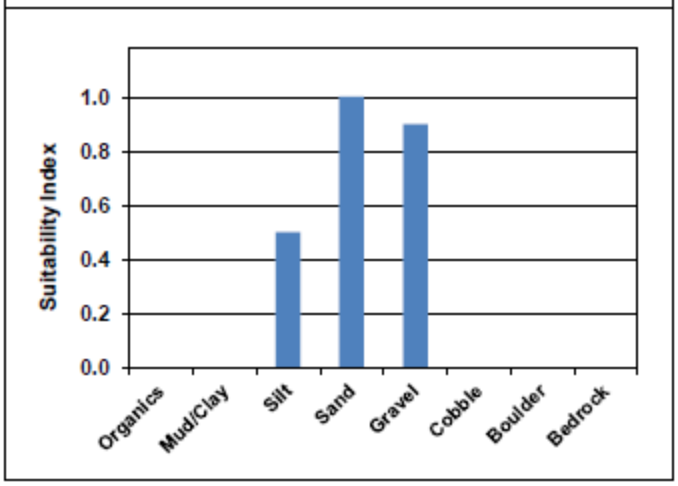
Source:
Twomey et al., 1984



Velocity (ft/s)	SI
0.00	0.00
0.50	0.40
1.00	1.00
2.00	1.00
3.00	0.00



Depth (ft)	SI
0.00	0.00
0.50	1.00
0.80	1.00
1.00	0.80
2.00	0.00
100.00	0.00



Substrate Source:
Gomez and Sullivan, 2007

Substrate	SI
Organics	0.00
Mud/Clay	0.00
Silt	0.50
Sand	1.00
Gravel	0.90
Cobble	0.00
Boulder	0.00
Bedrock	0.00

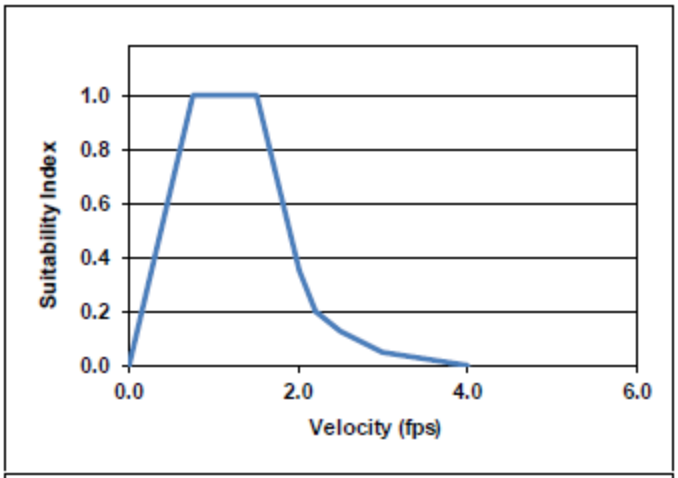
Longnose Dace Juvenile

Original curve identified as from USFWS HSC library

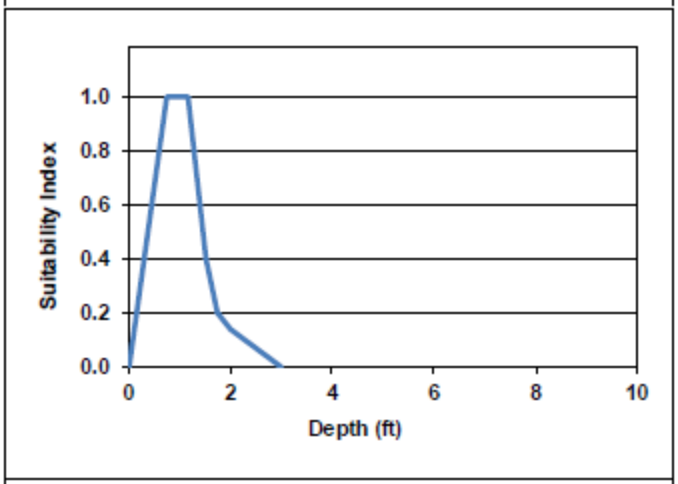
Modified by VDFW for the Lamoille River IFS (Gomez and Sullivan, 2000)

Source:

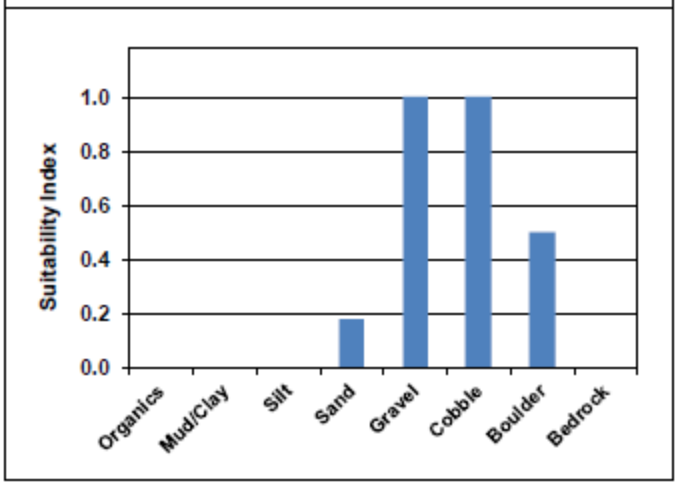
Gomez and Sullivan, 2000



Velocity (ft/s)	SI
0.00	0.00
0.75	1.00
1.50	1.00
2.00	0.35
2.20	0.20
2.50	0.13
3.00	0.05
4.00	0.00



Depth (ft)	SI
0.00	0.00
0.75	1.00
1.15	1.00
1.50	0.40
1.75	0.20
2.00	0.14
3.00	0.00



Substrate	SI
Organics	0.00
Mud/Clay	0.00
Silt	0.00
Sand	0.18
Gravel	1.00
Cobble	1.00
Boulder	0.50
Bedrock	0.00

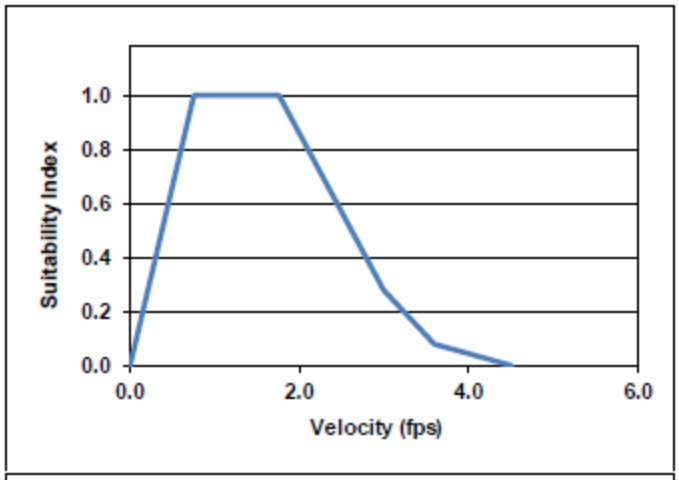
Longnose Dace Adult

Original curve identified as from USGS HSC library

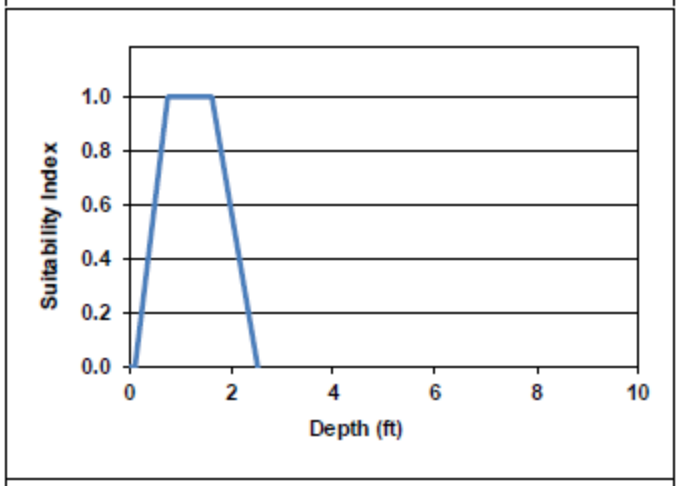
Modified by VDFW for the Lamoille River IFS (Gomez and Sullivan, 2000)

Source:

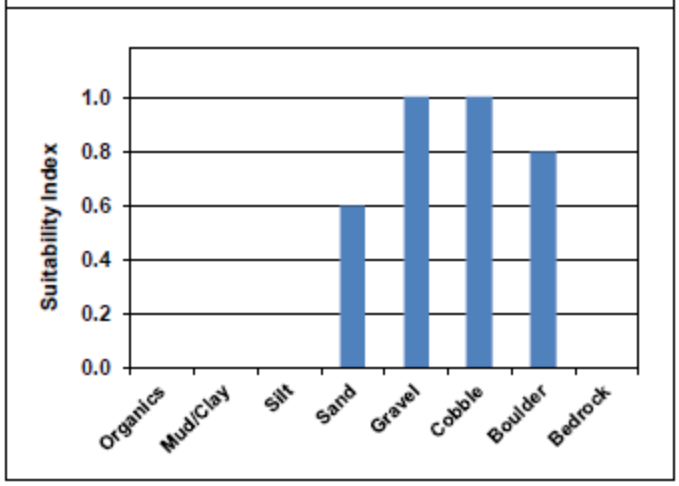
Gomez and Sullivan, 2000



Velocity (ft/s)	SI
0.00	0.00
0.75	1.00
1.75	1.00
3.00	0.28
3.60	0.08
4.50	0.00



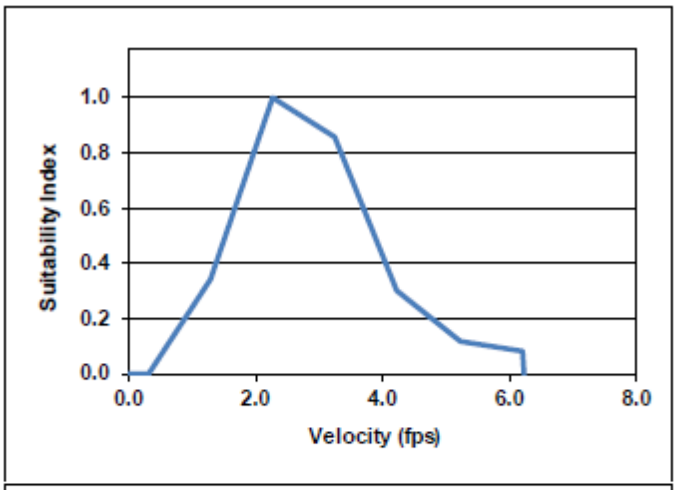
Depth (ft)	SI
0.00	0.00
0.10	0.00
0.75	1.00
1.60	1.00
2.50	0.00



Substrate	SI
Organics	0.00
Mud/Clay	0.00
Silt	0.00
Sand	0.60
Gravel	1.00
Cobble	1.00
Boulder	0.80
Bedrock	0.00

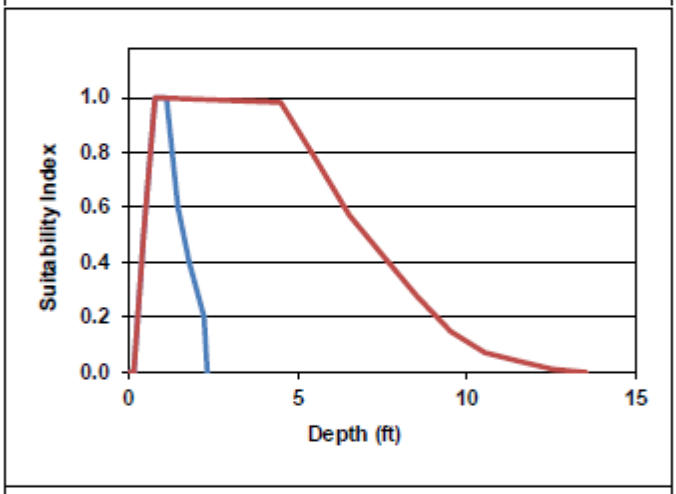
Sea Lamprey Spawning & Incubation

Modified by USFWS (2014) based on Yergeau 1983 (depth and substrate)



Source:
Kynard and Horgan, 2013
Yergeau, 1983

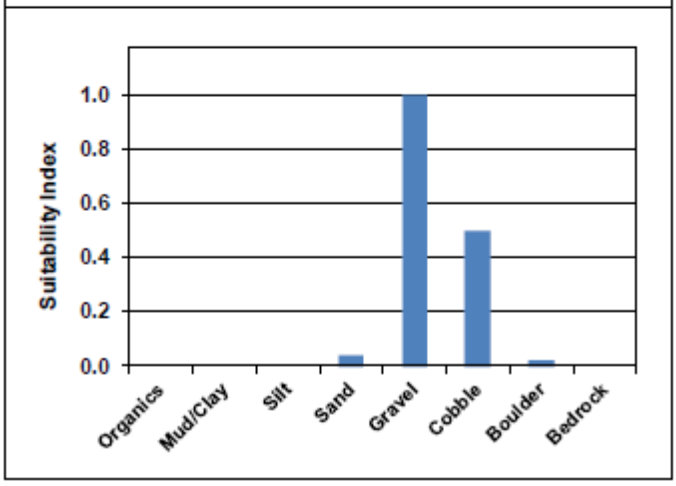
Velocity (ft/s)	SI
0.00	0.00
0.30	0.00
1.28	0.34
2.26	1.00
3.25	0.86
4.23	0.30
5.22	0.12
6.20	0.08
6.23	0.00



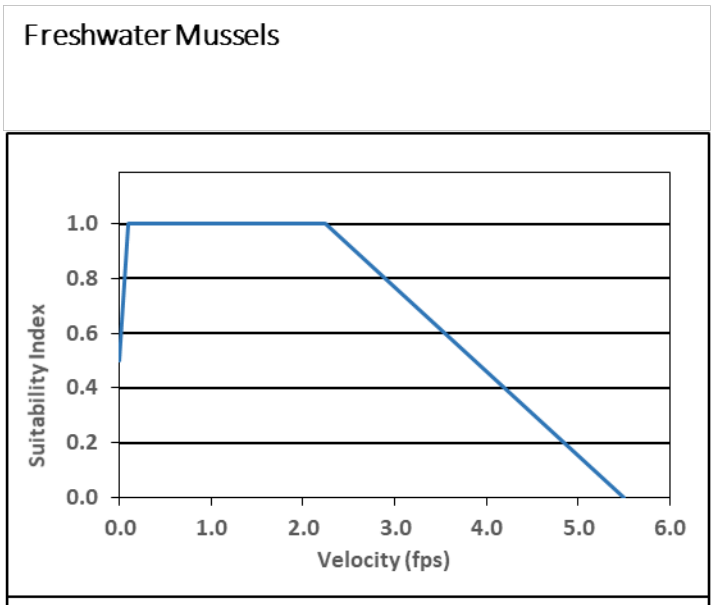
Depth (ft)	SI
0.00	0.00
0.13	0.00
0.46	0.50
0.79	1.00
1.12	1.00
1.44	0.60
1.77	0.40
2.20	0.20
2.30	0.00

Modified by NAI

Depth (ft)	SI
0.00	0.00
0.13	0.00
0.46	0.50
0.79	1.00
4.50	0.98
5.50	0.78
6.50	0.57
7.50	0.43
8.50	0.28
9.50	0.15
10.50	0.07
11.50	0.04
12.50	0.01
13.50	0.00



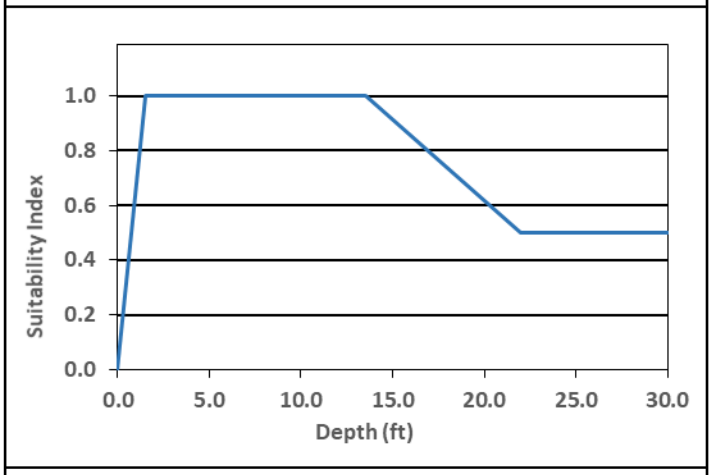
Substrate	SI
Organics	0.00
Mud/Clay	0.00
Silt	0.00
Sand	0.04
Gravel	1.00
Cobble	0.50
Boulder	0.02
Bedrock	0.00



Freshwater Mussels
Normandeau and Biodrawversity 2017

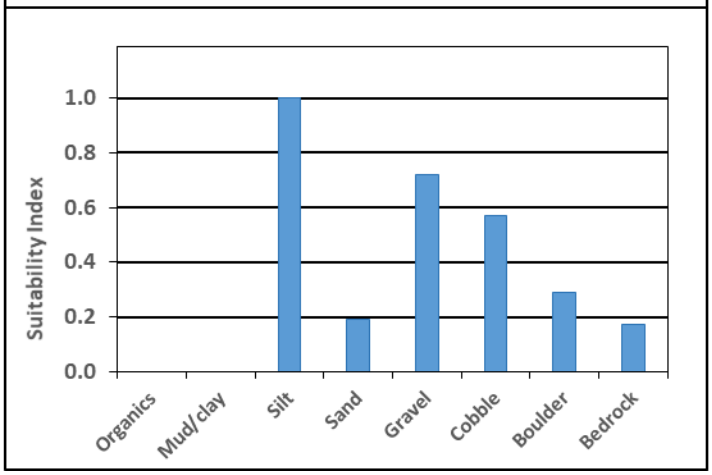
Freshwater Mussels

MCV (ft/s)	SI
0.00	0.50
0.10	1.00
2.25	1.00
5.50	0.00



Freshwater Mussels

Depth (ft)	SI
0.00	0.00
1.50	1.00
13.50	1.00
22.00	0.50
30.00	0.50
100	0.5

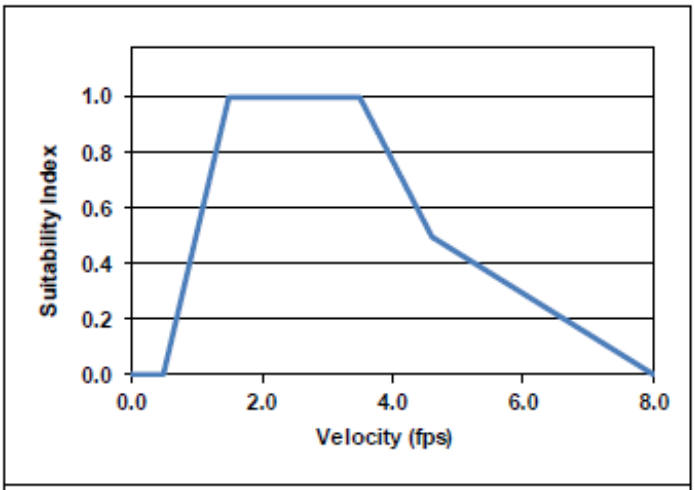


Freshwater Mussels

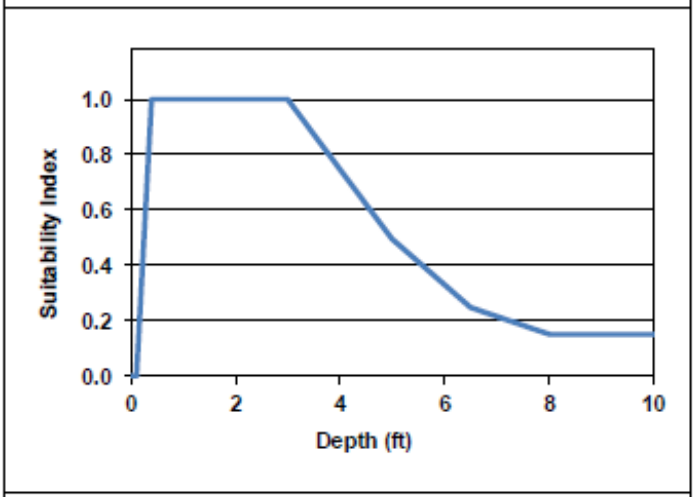
Substrate	SI
Organics	0.00
Mud/Clay	0.00
Silt	1.00
Sand	0.19
Gravel	0.72
Cobble	0.57
Boulder	0.29
Bedrock	0.17

Macroinvertebrates

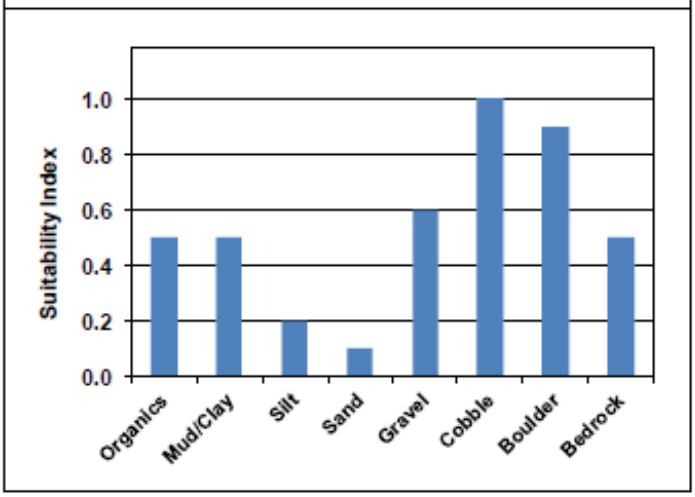
Source:
Gomez and Sullivan, 2000



Velocity (ft/s)	SI
0.00	0.00
0.50	0.00
1.50	1.00
3.50	1.00
4.60	0.50
8.00	0.00

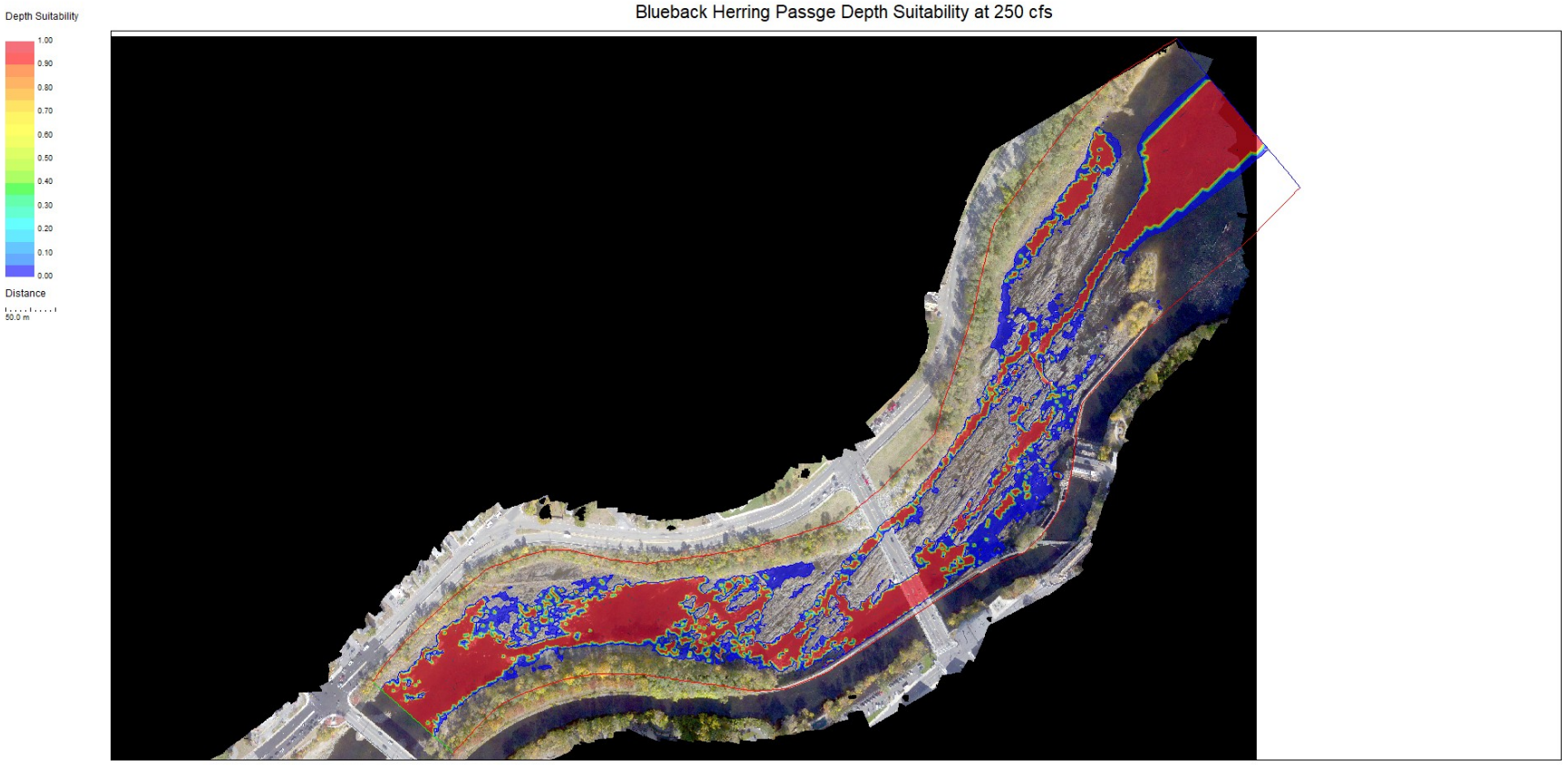


Depth (ft)	SI
0.00	0.00
0.10	0.00
0.40	1.00
3.00	1.00
5.00	0.50
6.50	0.25
8.00	0.15
10.00	0.15
100.00	0.00

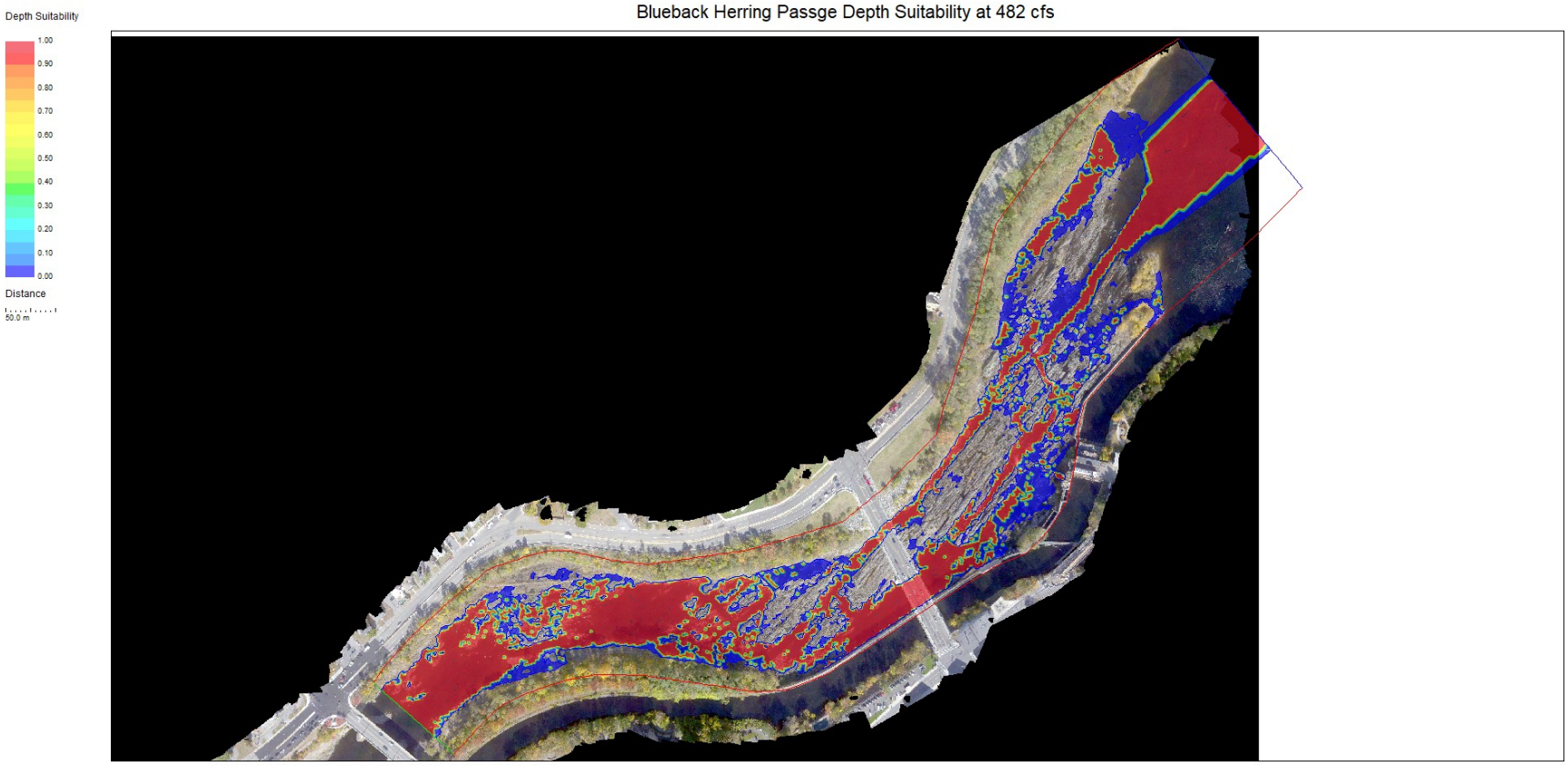


Substrate	SI
Organics	0.50
Mud/Clay	0.50
Silt	0.20
Sand	0.10
Gravel	0.60
Cobble	1.00
Boulder	0.90
Bedrock	0.50

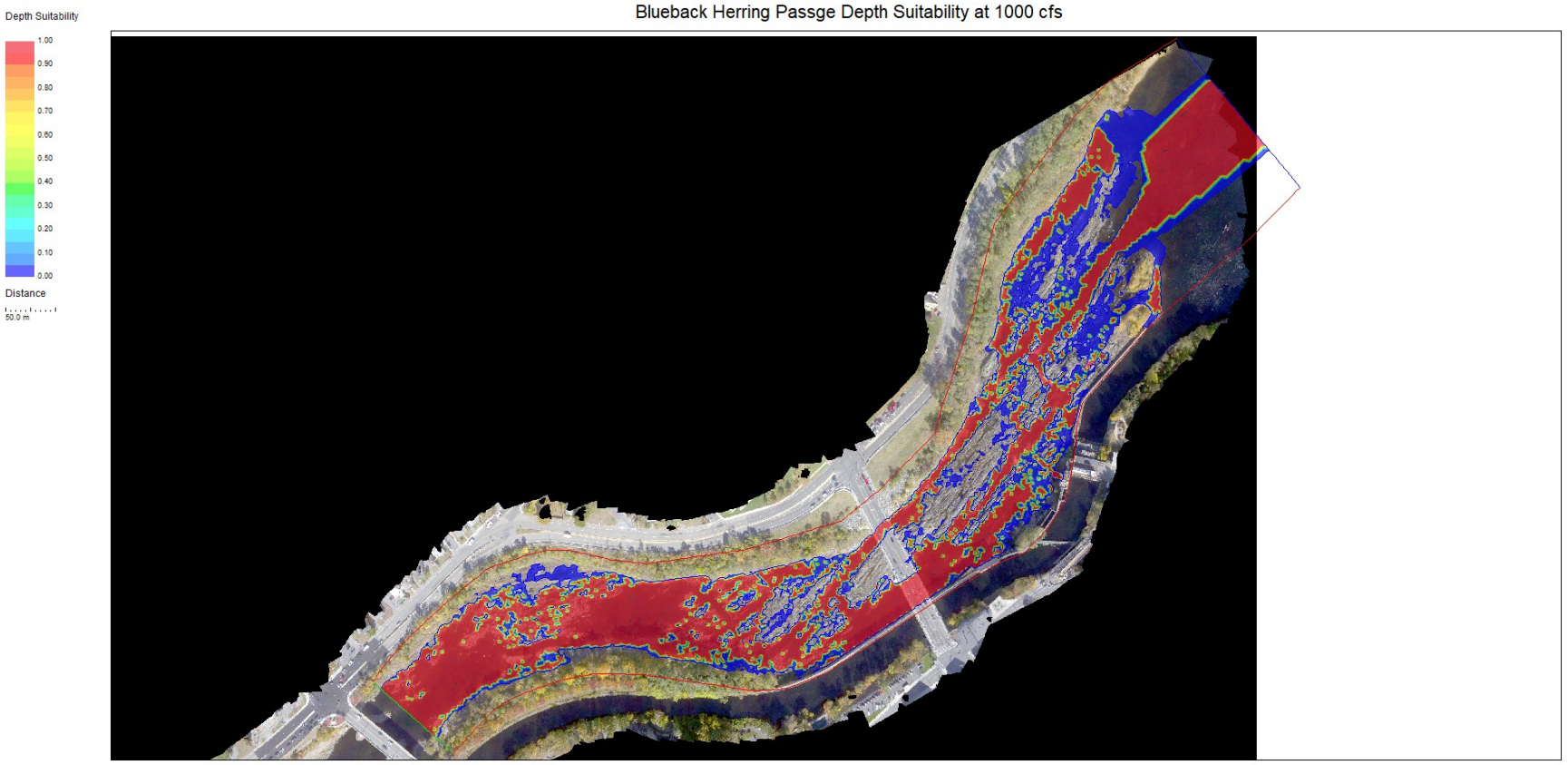
Appendix B. Zone of passage conditions for adult river herring and American shad – depth, velocity, and depth x velocity.



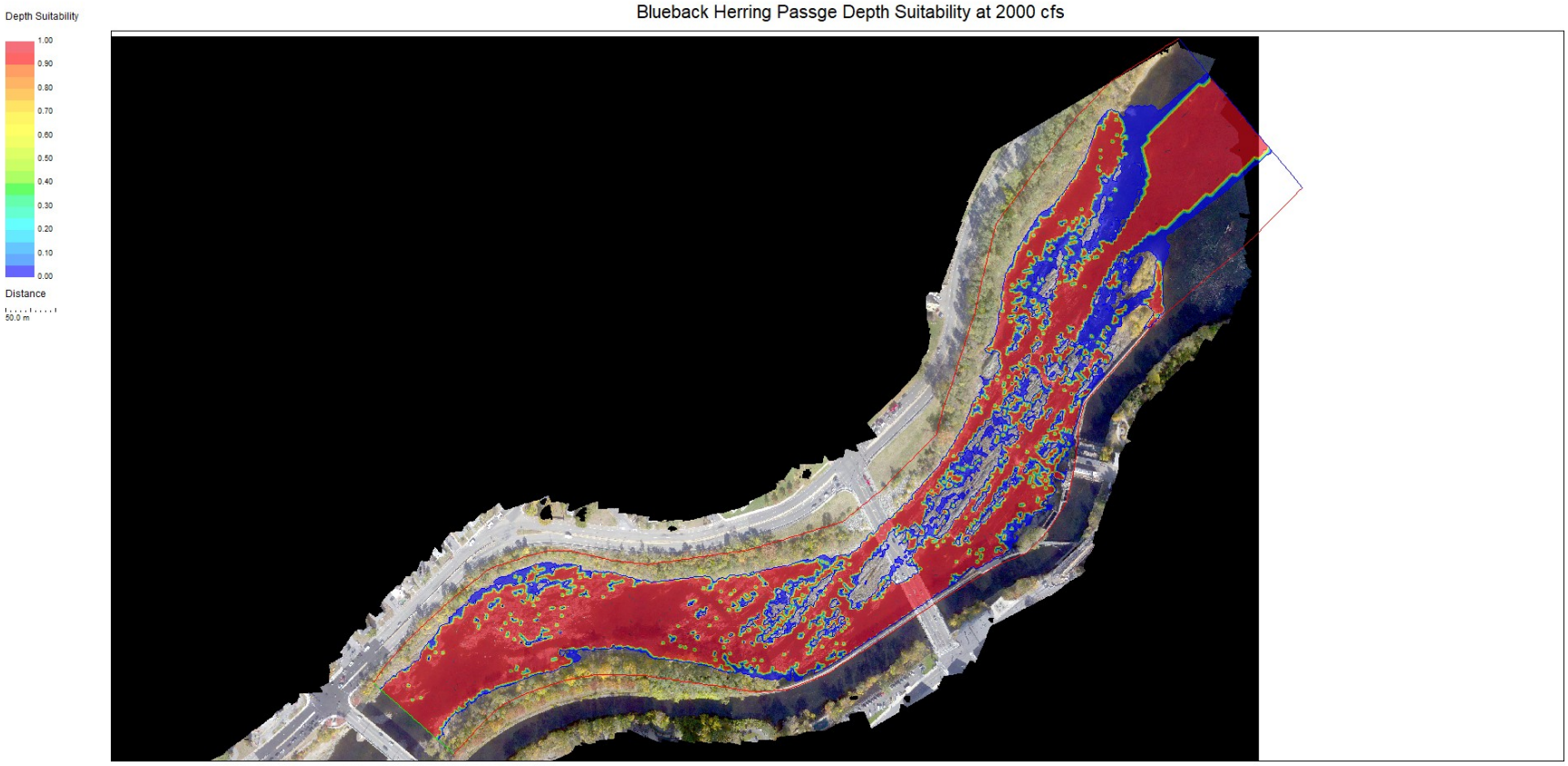
Note: Depth criteria = 1.0 ft. Same criteria for blueback herring and alewife. Map also represents passage for American shad using 1.0 ft depth criteria.



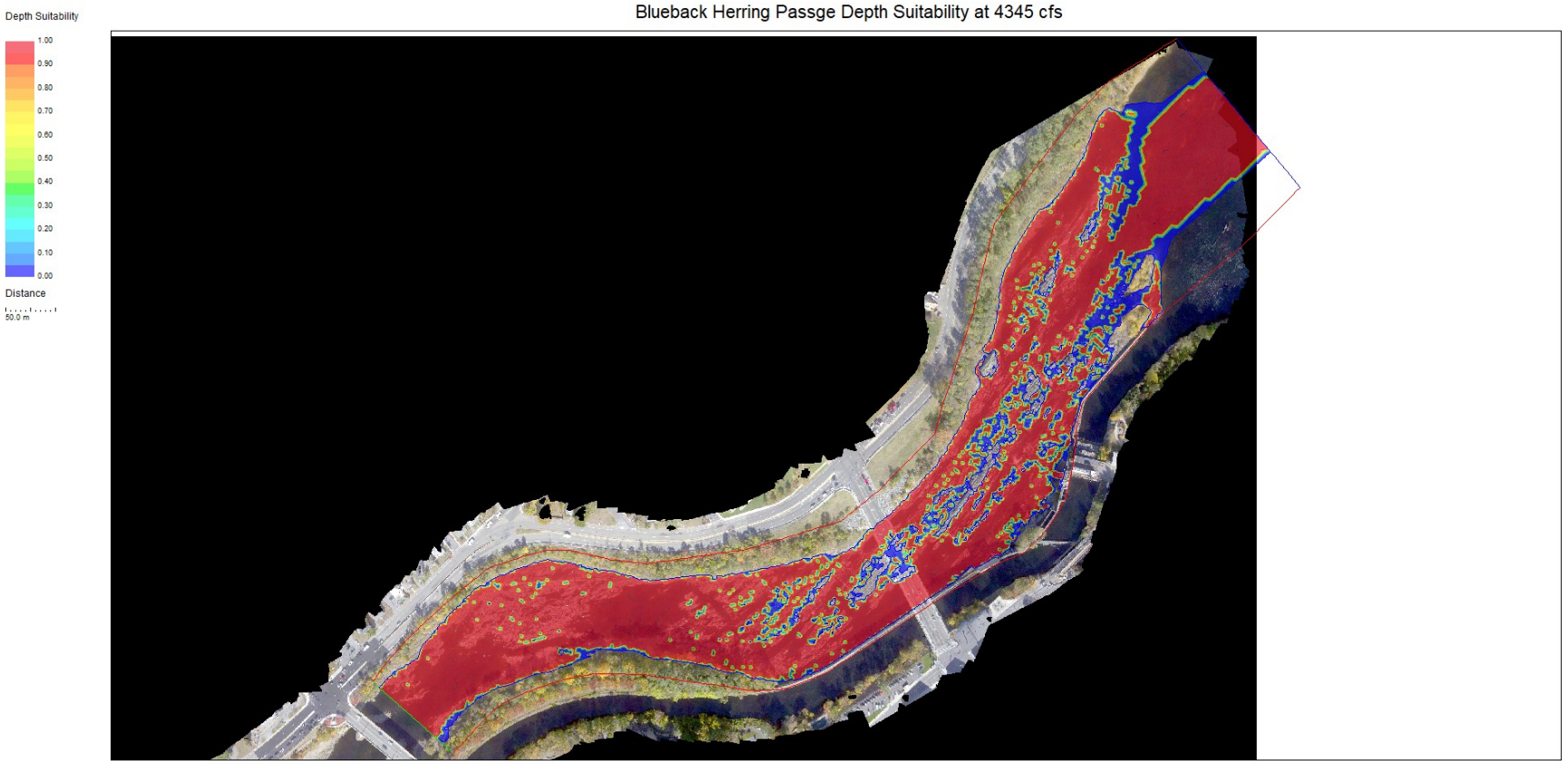
Note: Depth criteria = 1.0 ft. Same criteria for blueback herring and alewife. Map also represents passage for American shad using 1.0 ft depth criteria.



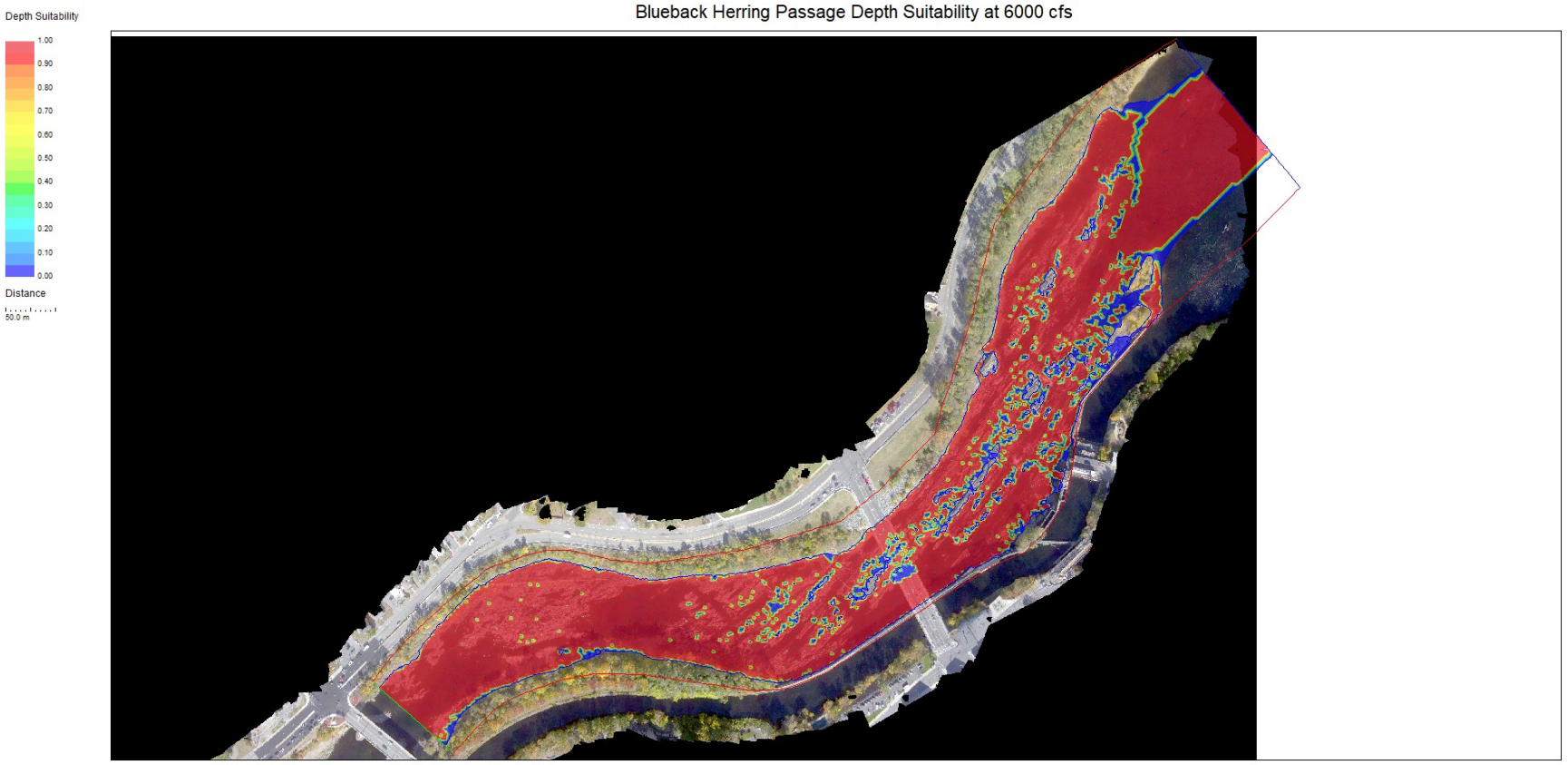
Note: Depth criteria = 1.0 ft. Same criteria for blueback herring and alewife. Map also represents passage for American shad using 1.0 ft depth criteria.



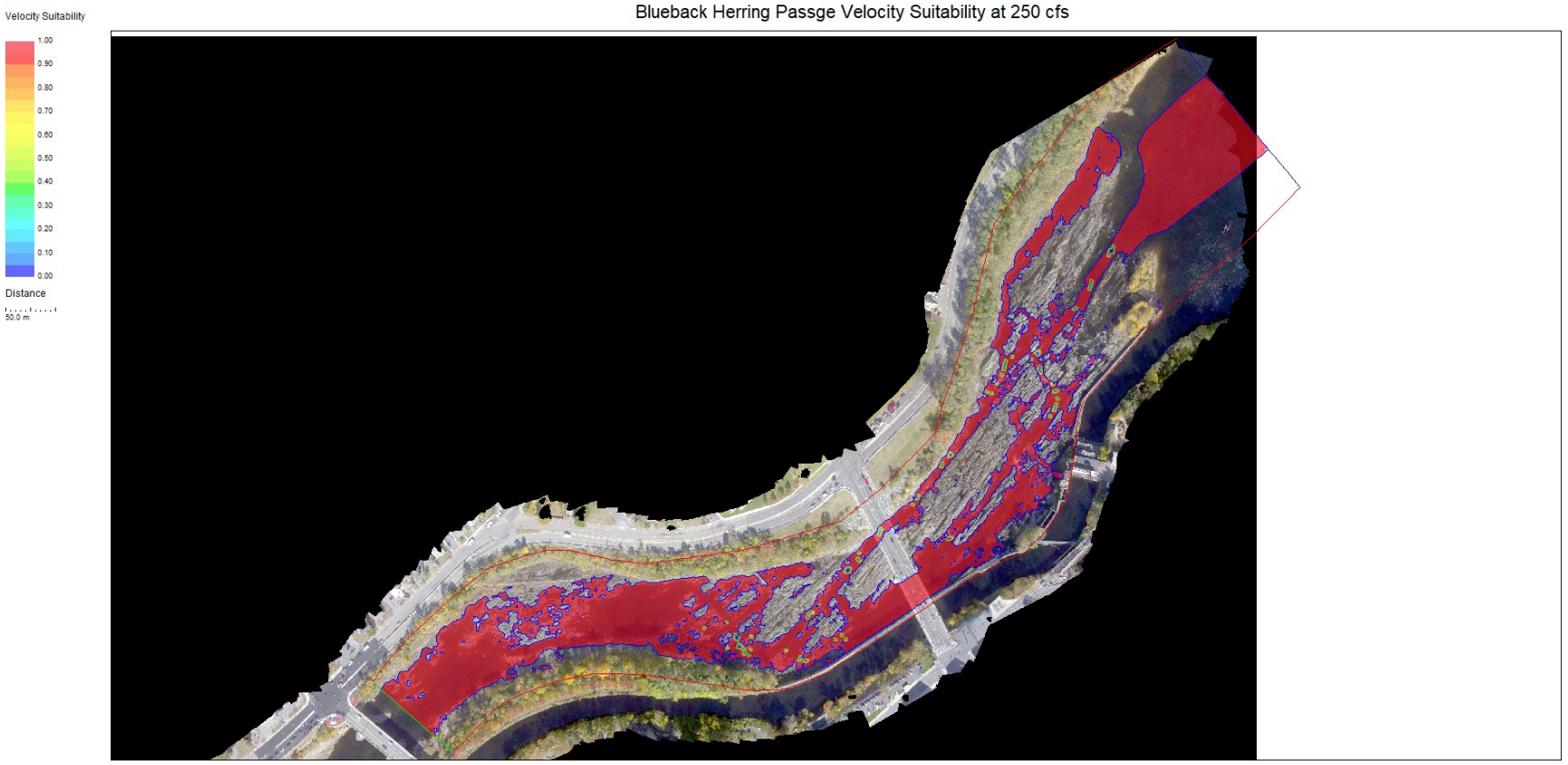
Note: Depth criteria = 1.0 ft. Same criteria for blueback herring and alewife. Map also represents passage for American shad using 1.0 ft depth criteria.



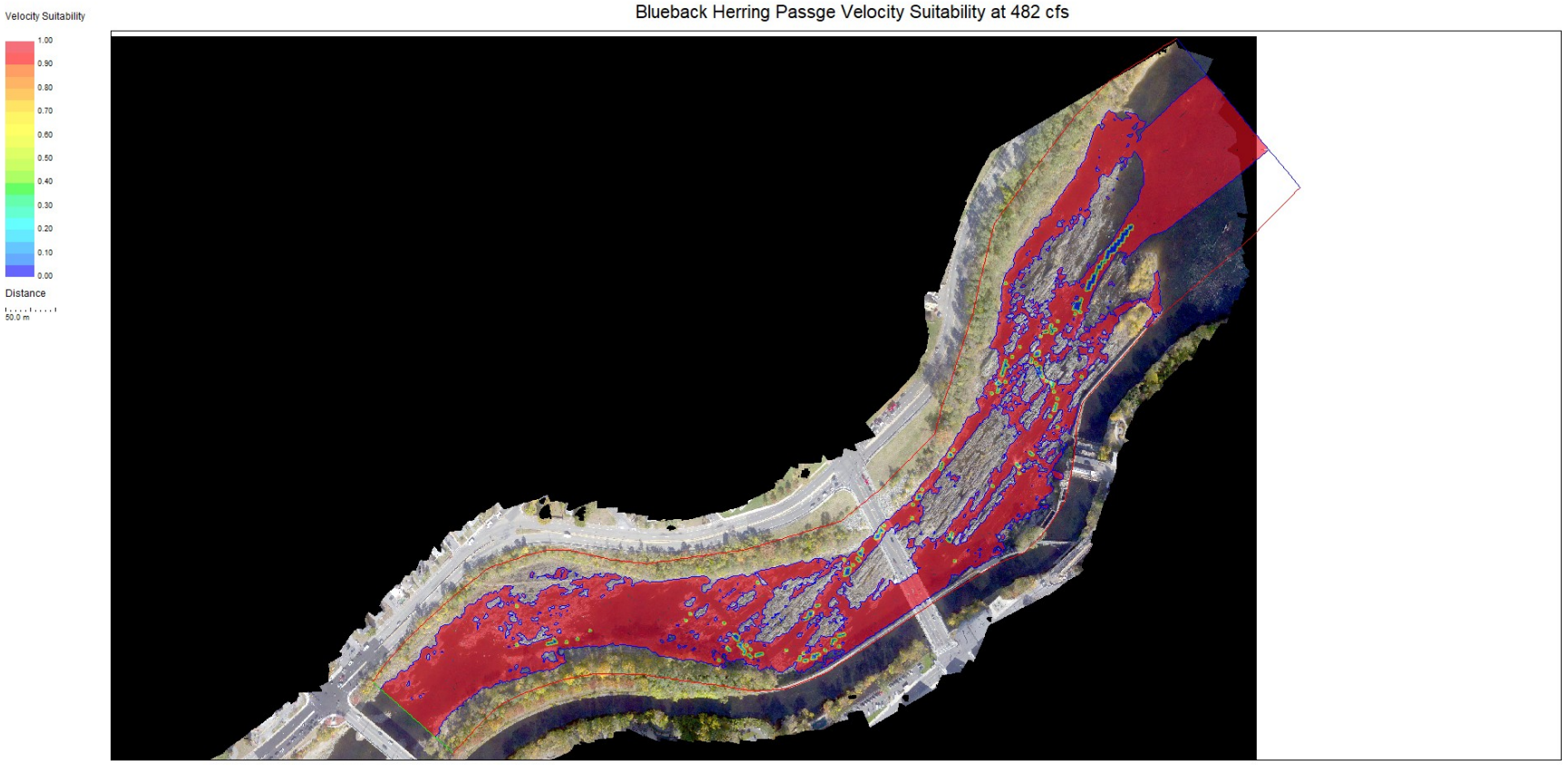
Note: Depth criteria = 1.0 ft. Same criteria for blueback herring and alewife. Map also represents passage for American shad using 1.0 ft depth criteria.



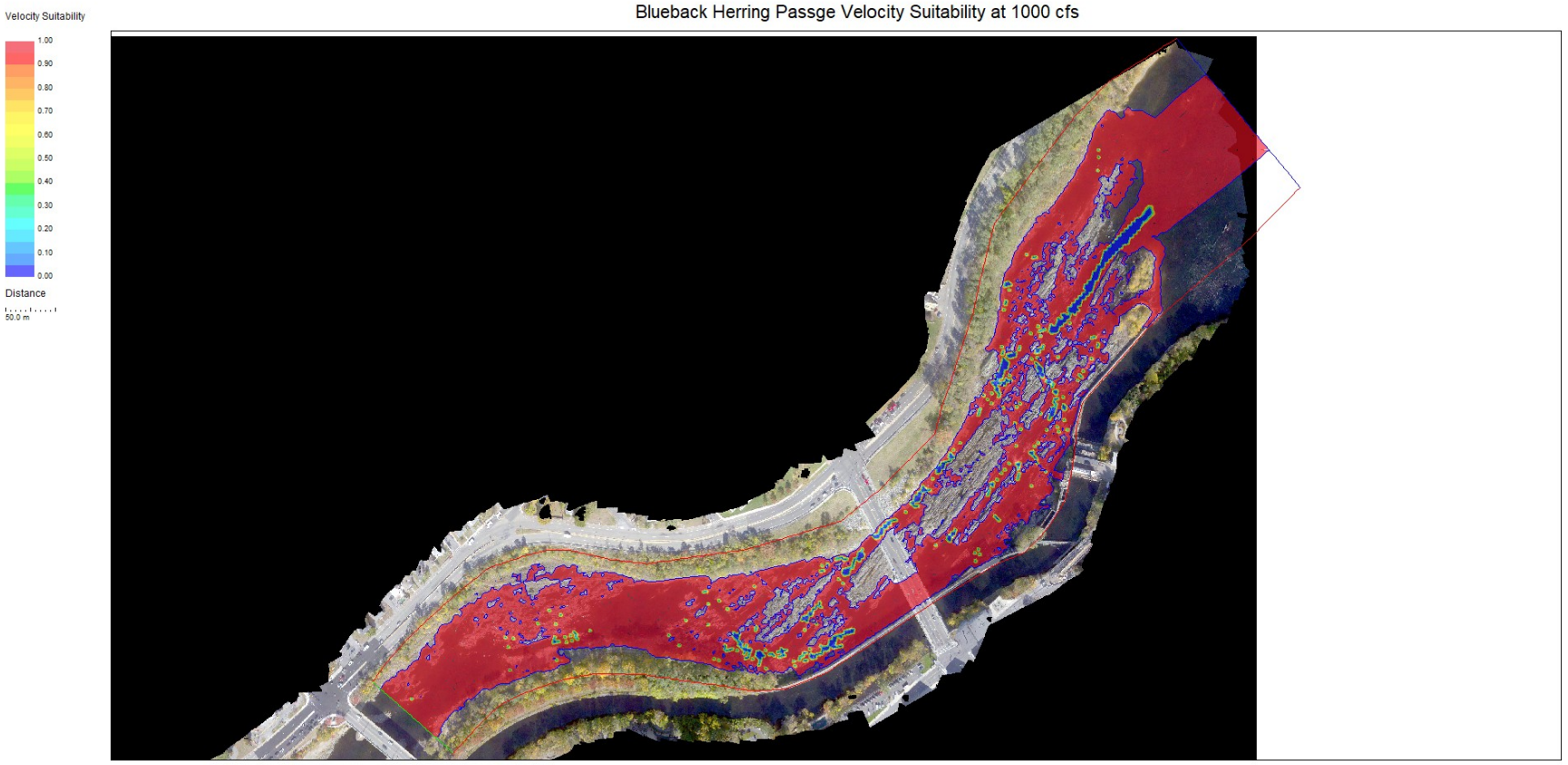
Note: Depth criteria = 1.0 ft. Same criteria for blueback herring and alewife. Map also represents passage for American shad using 1.0 ft depth criteria.



Note: Velocity criteria = 6.0 fps. Same criteria for blueback herring and alewife.



Note: Velocity criteria = 6.0 fps. Same criteria for blueback herring and alewife.



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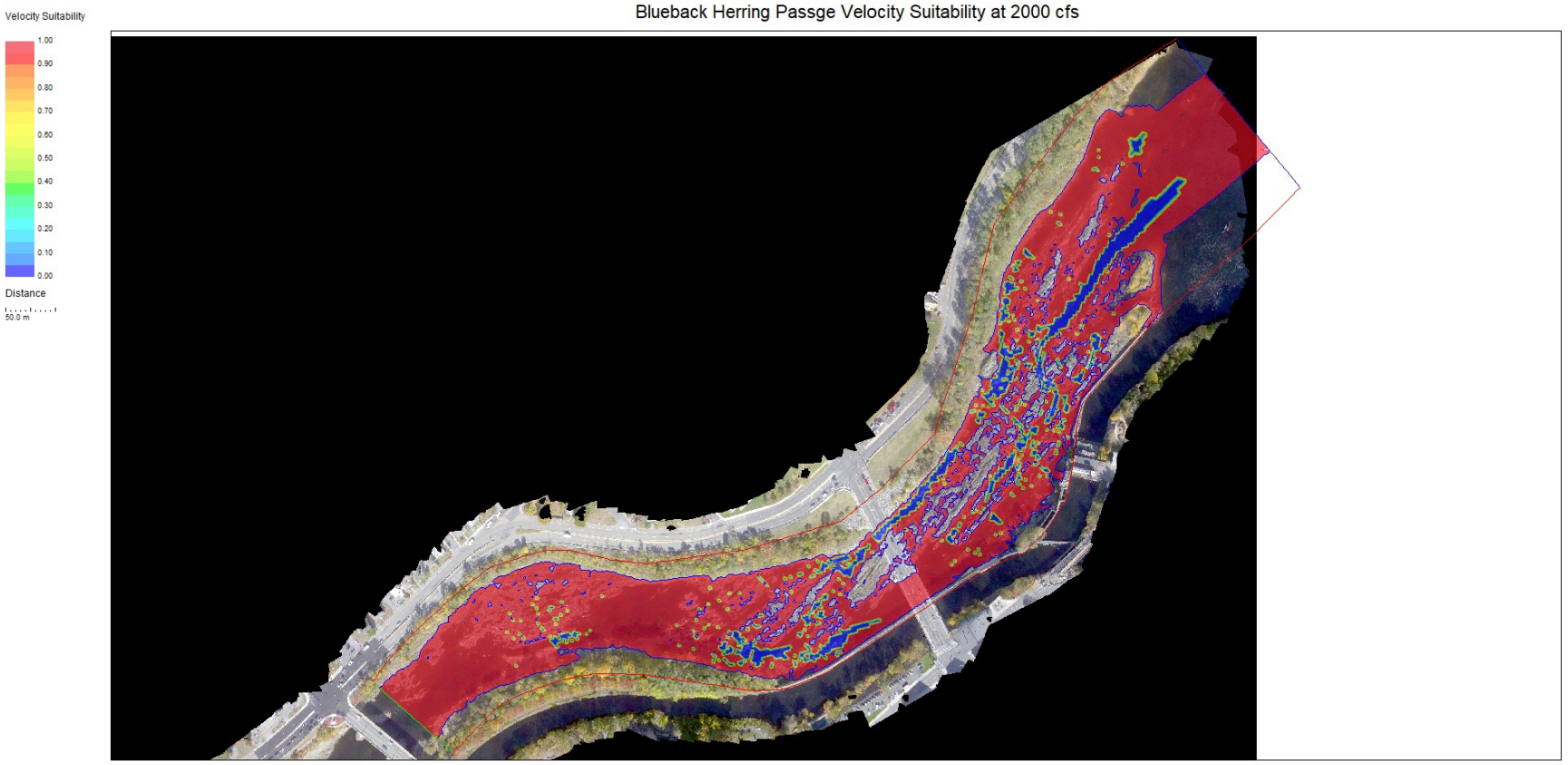

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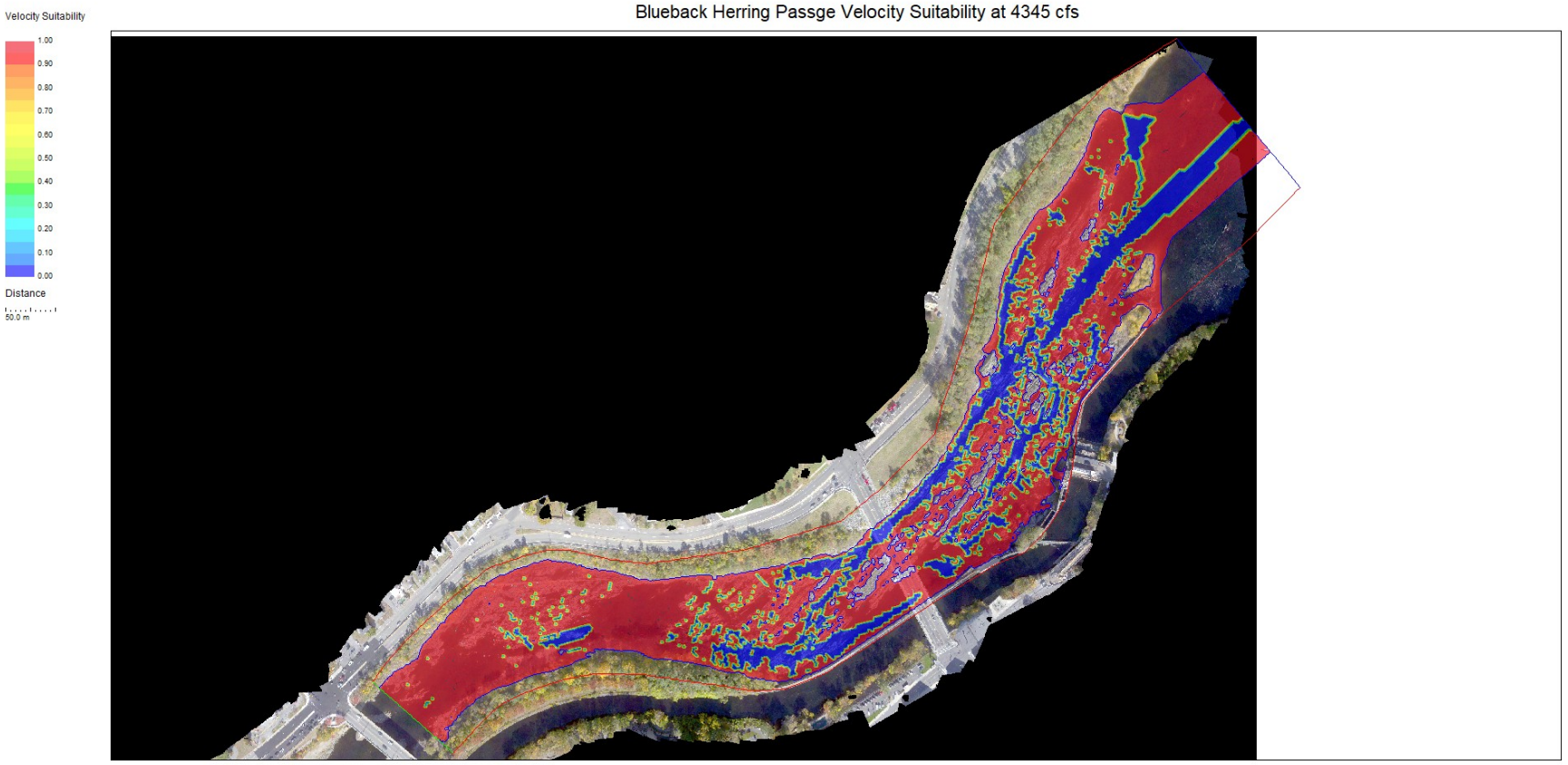

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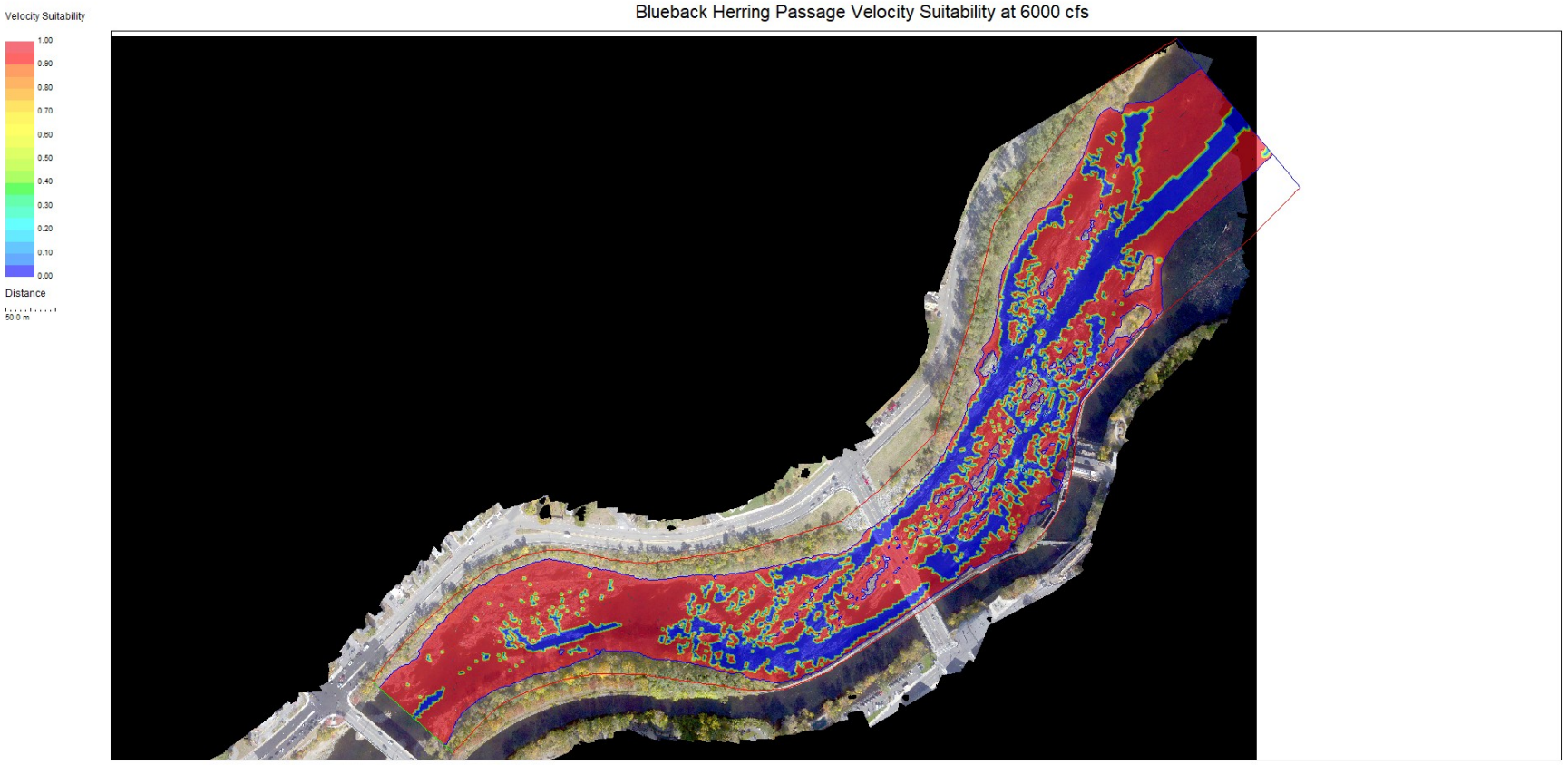

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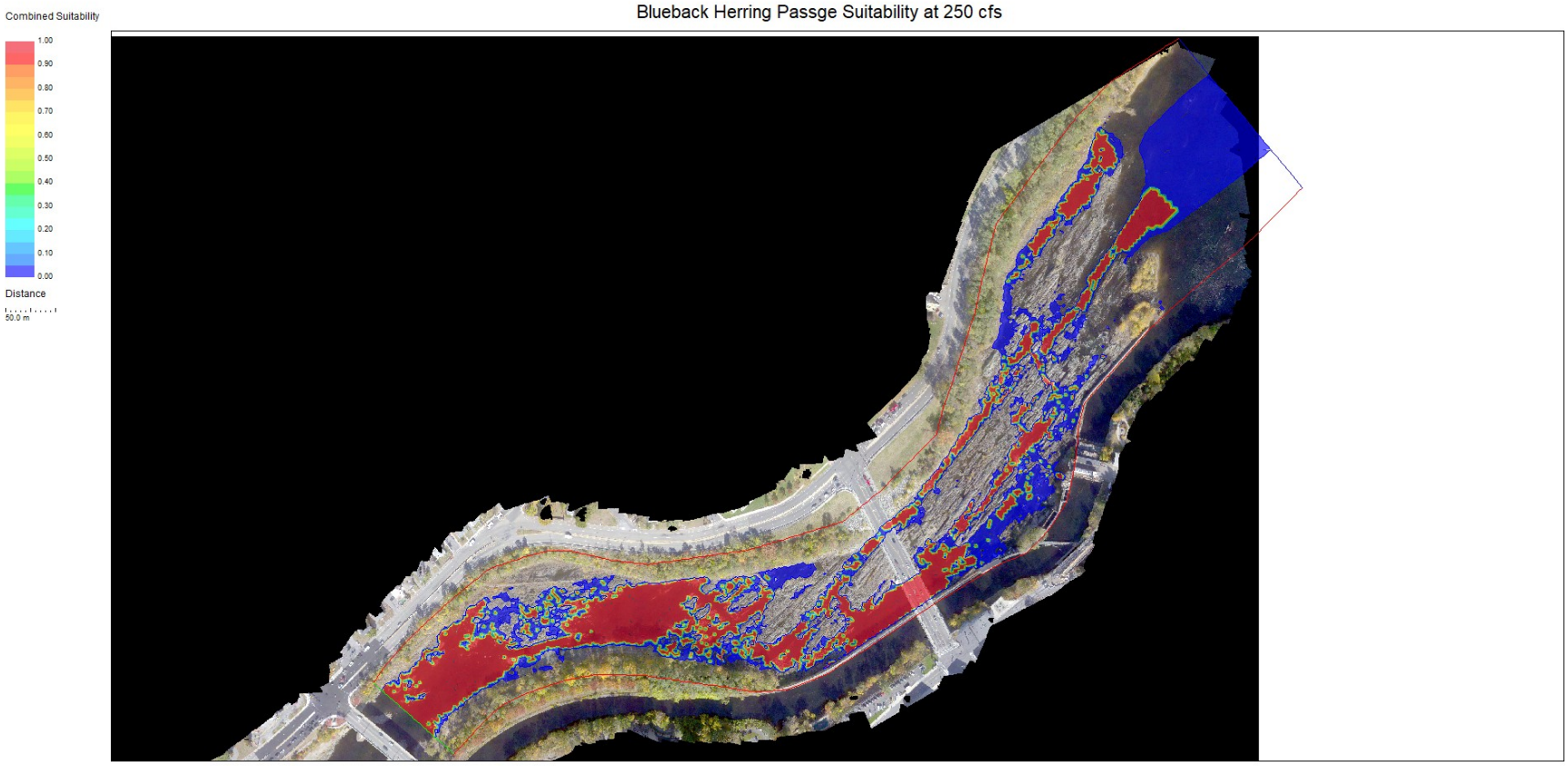

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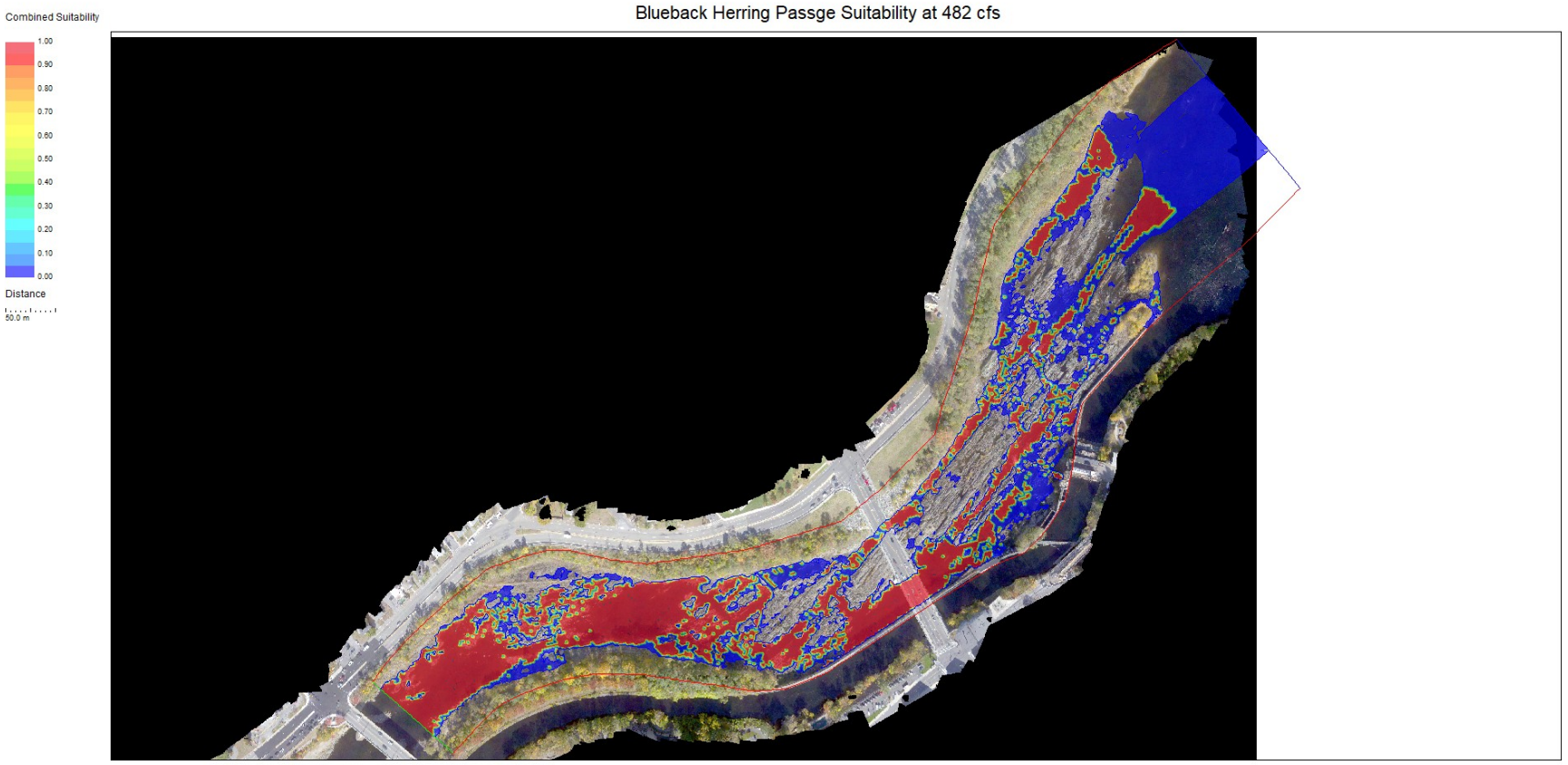

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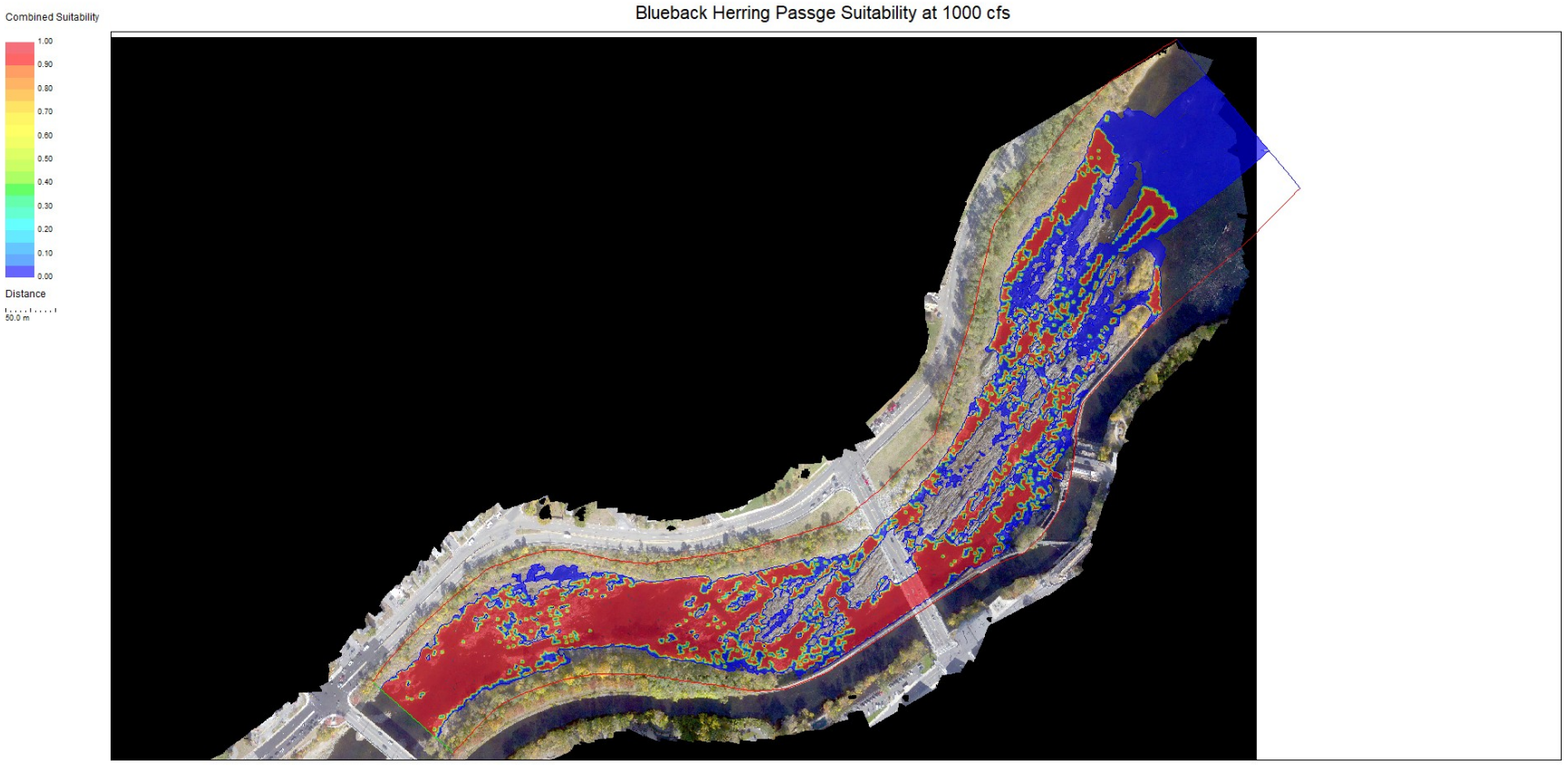

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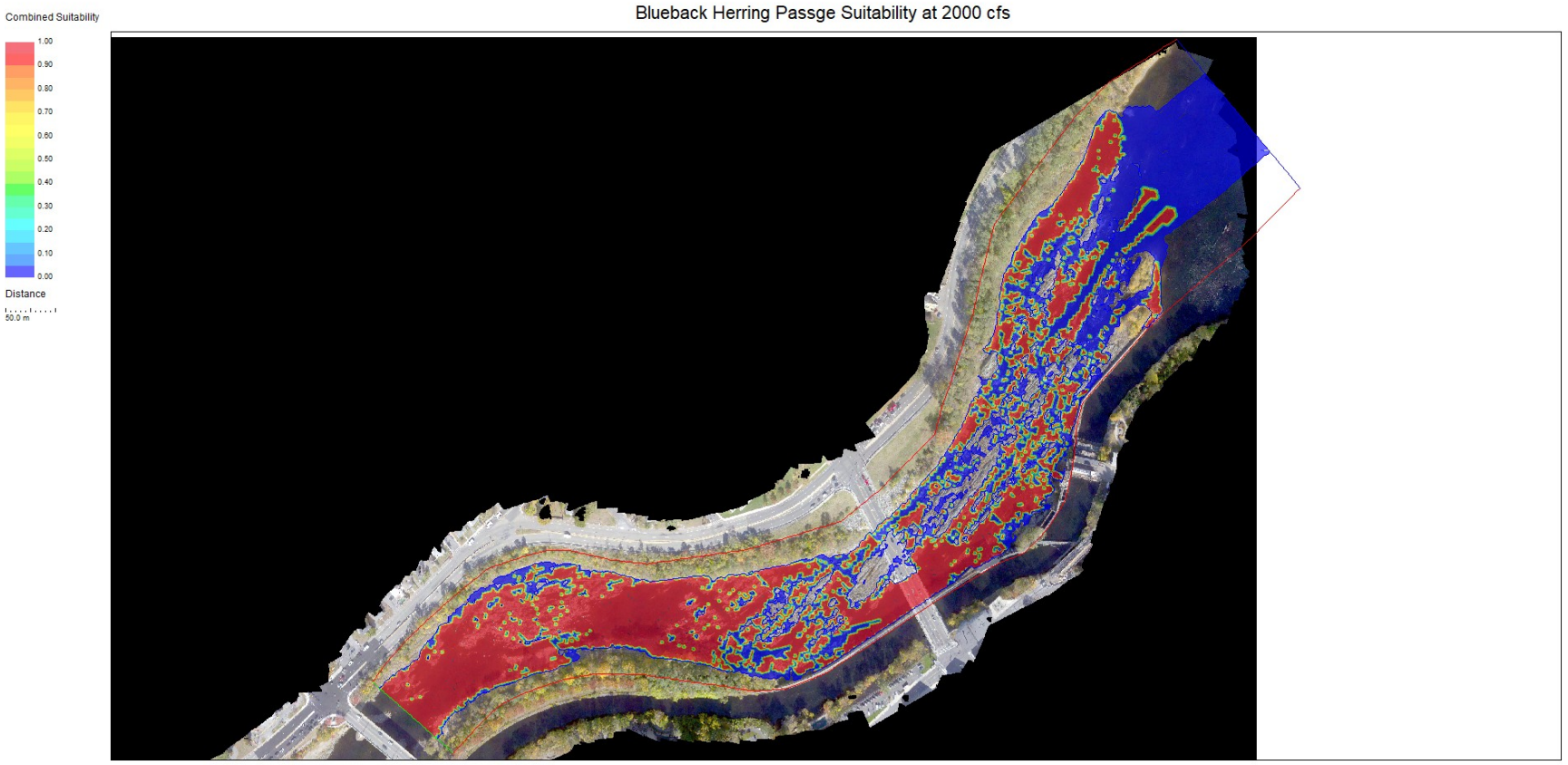

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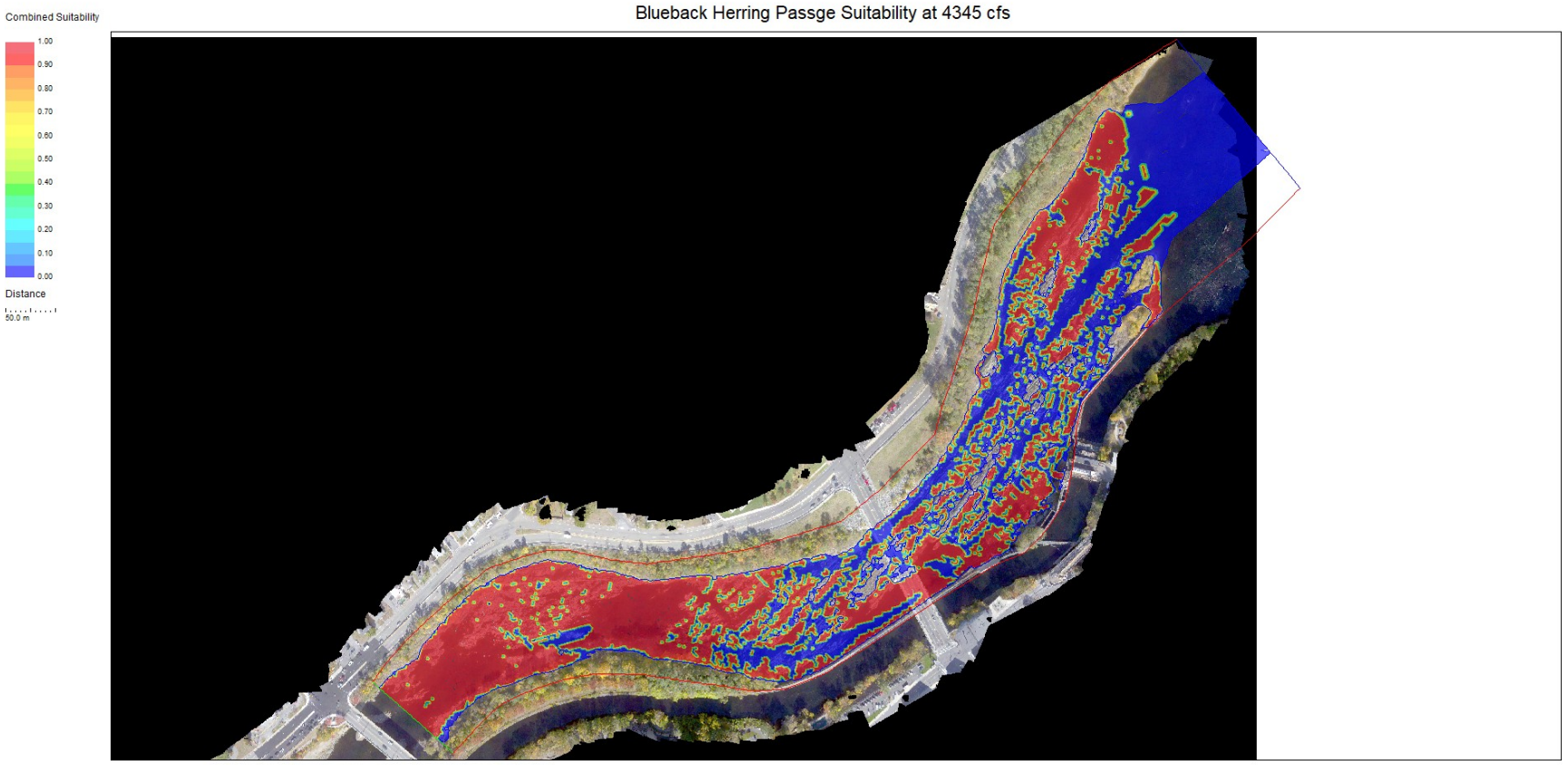

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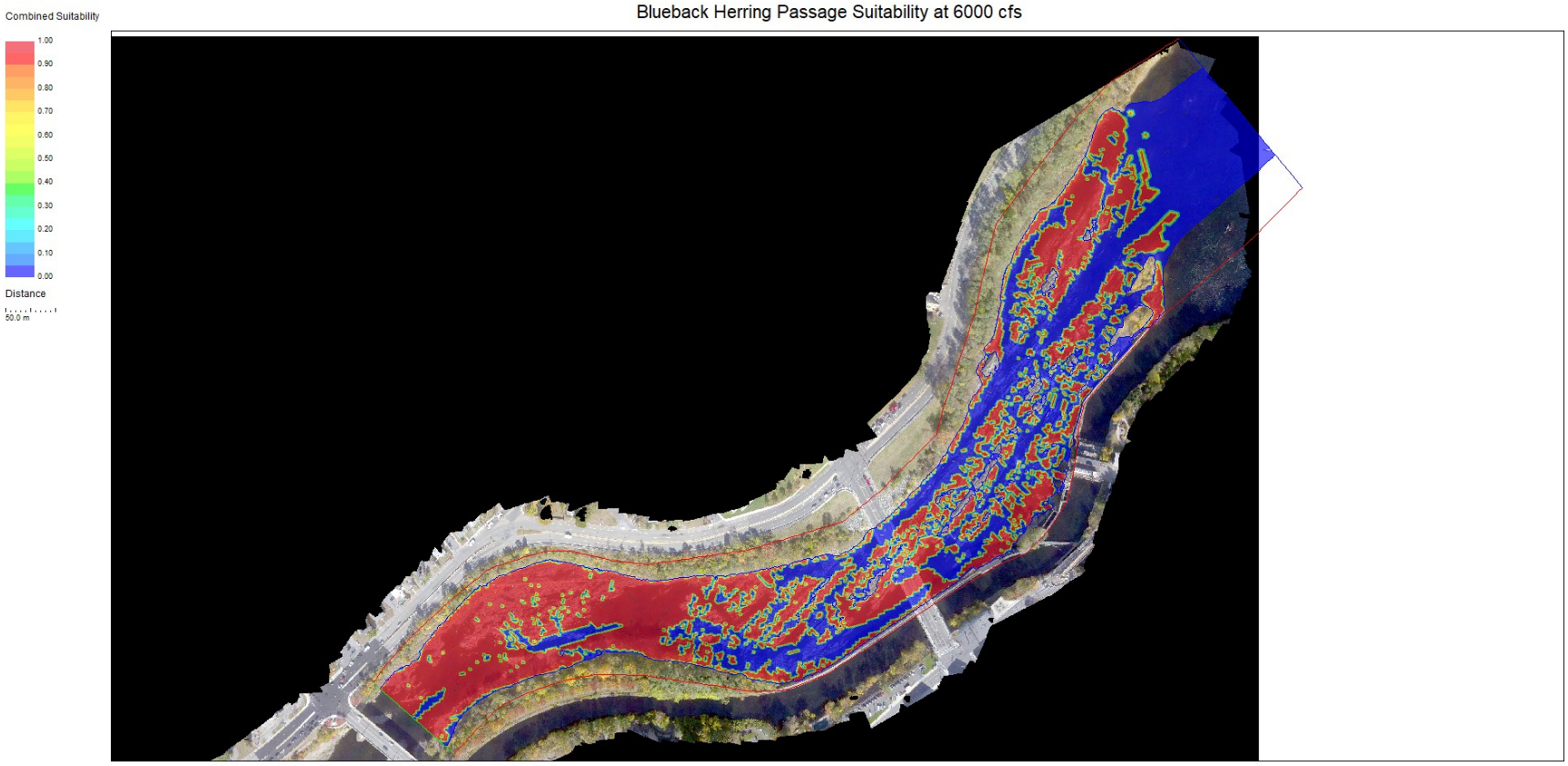

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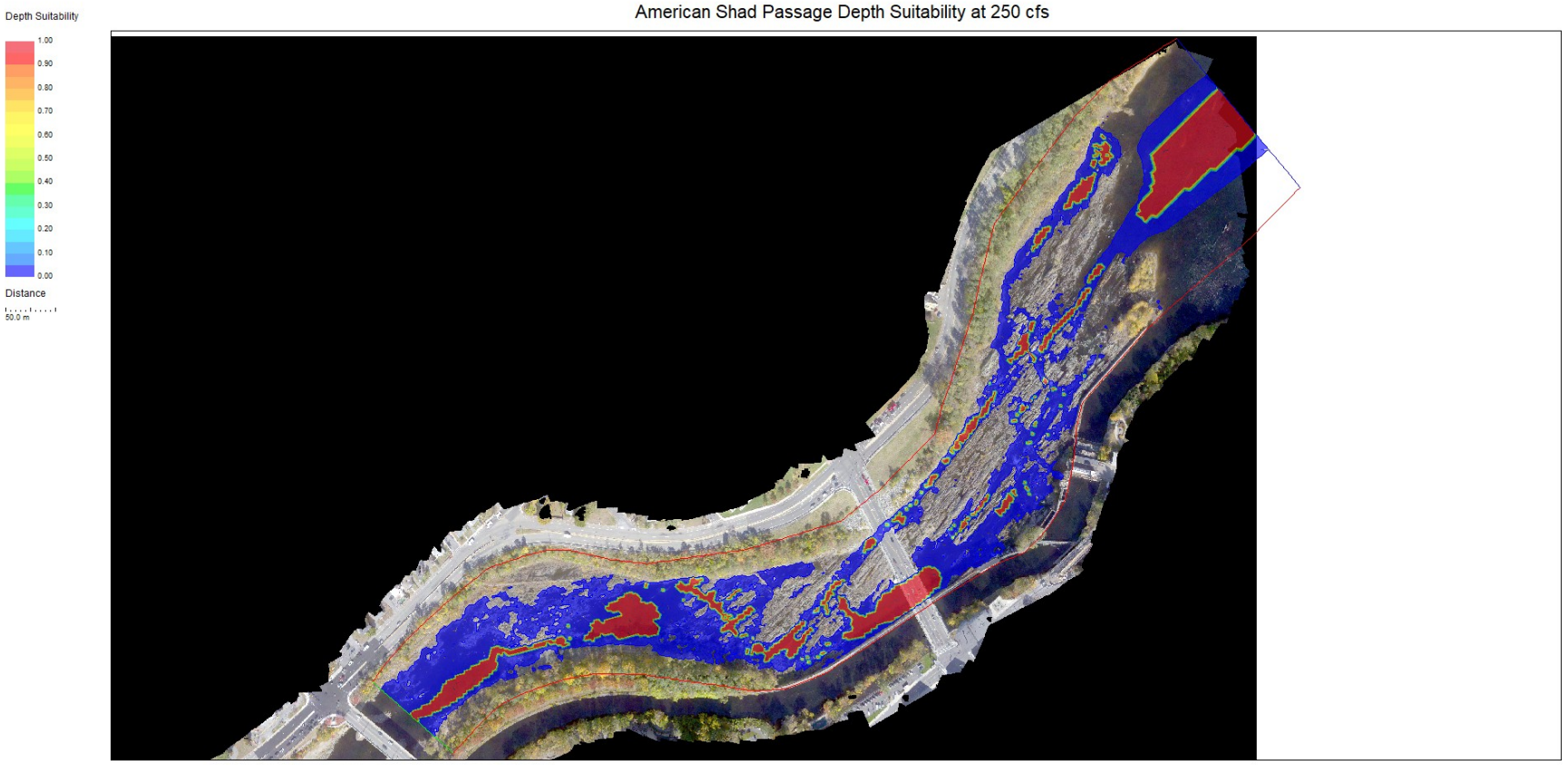

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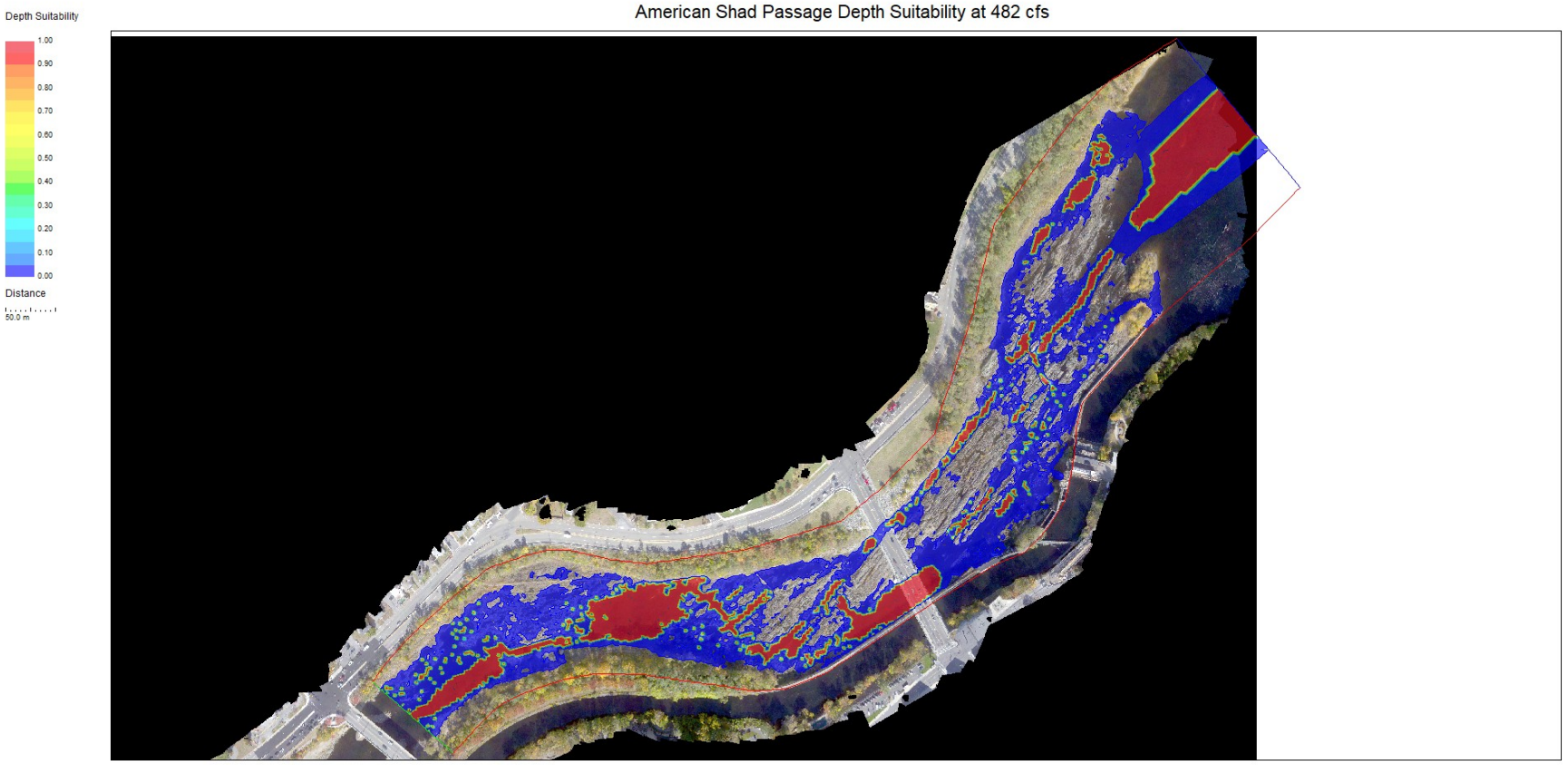

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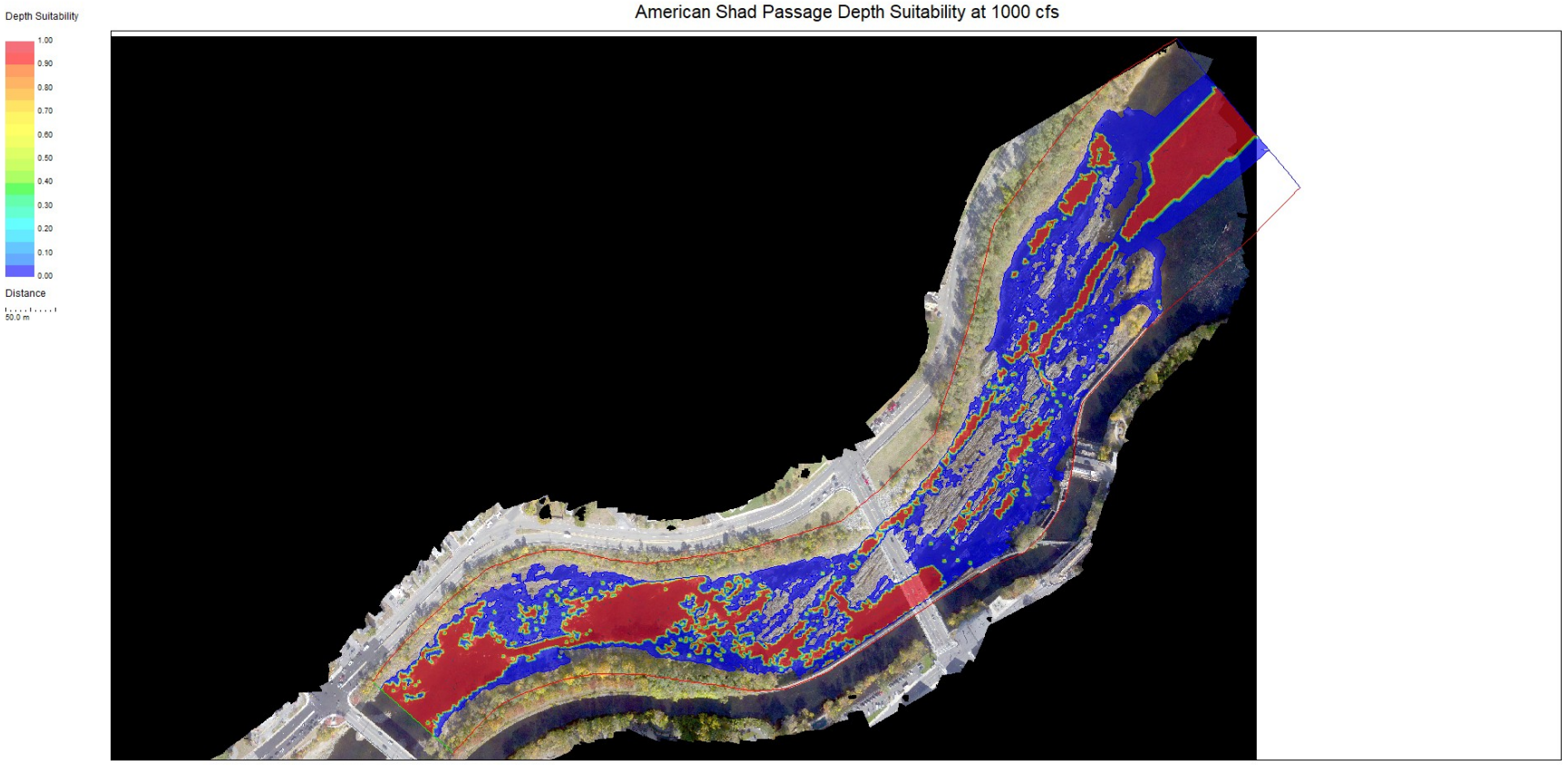

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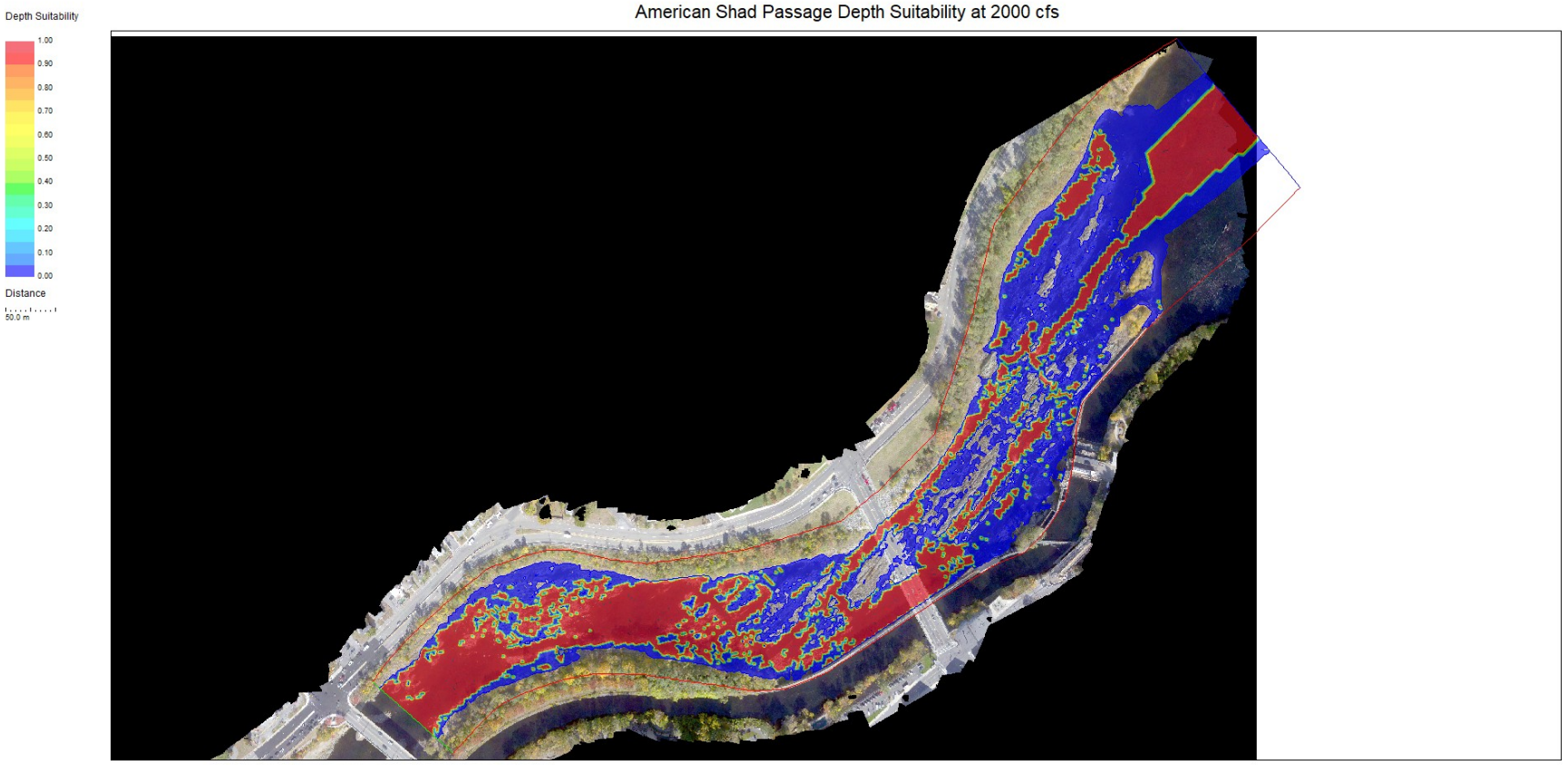

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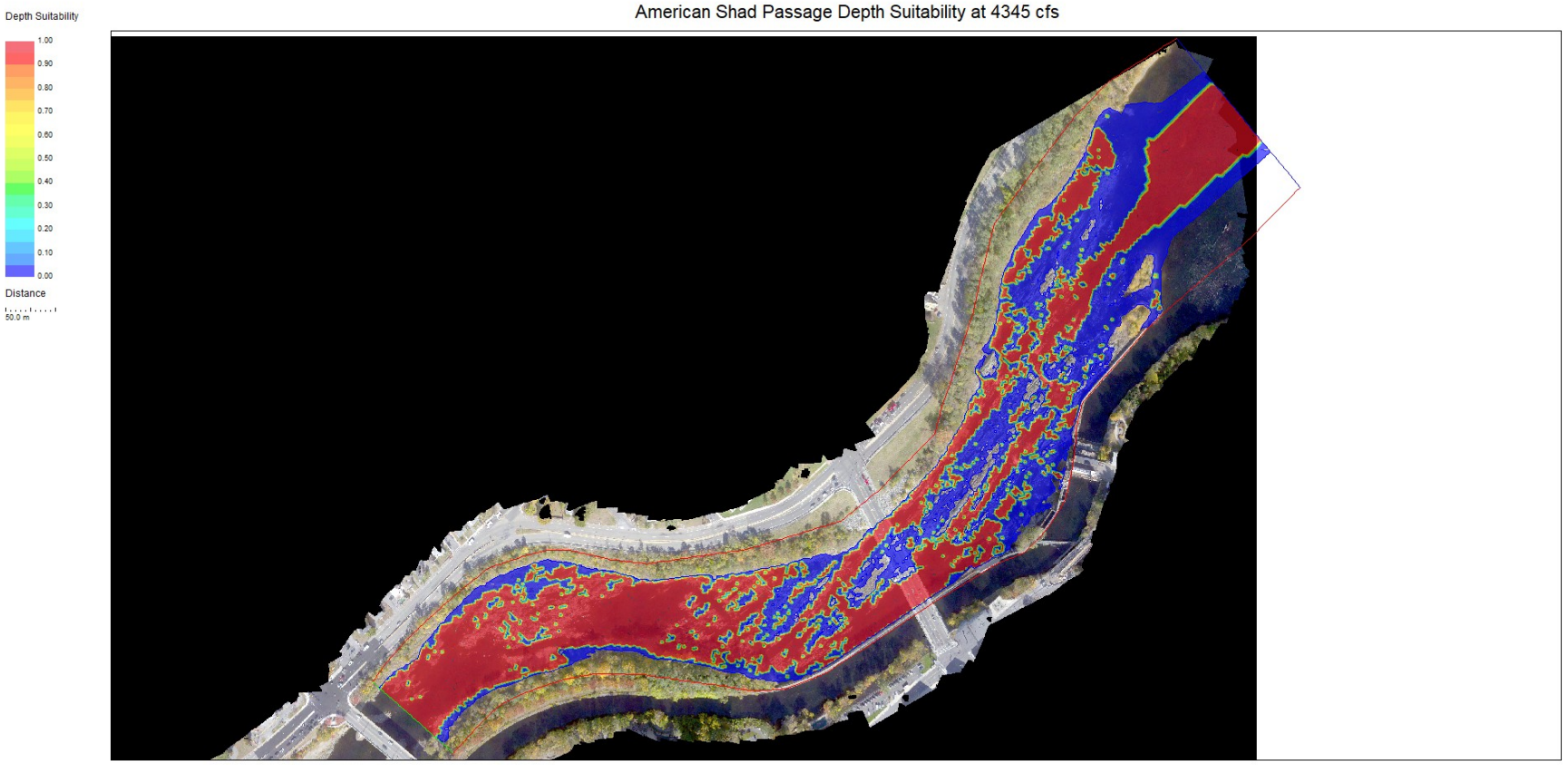

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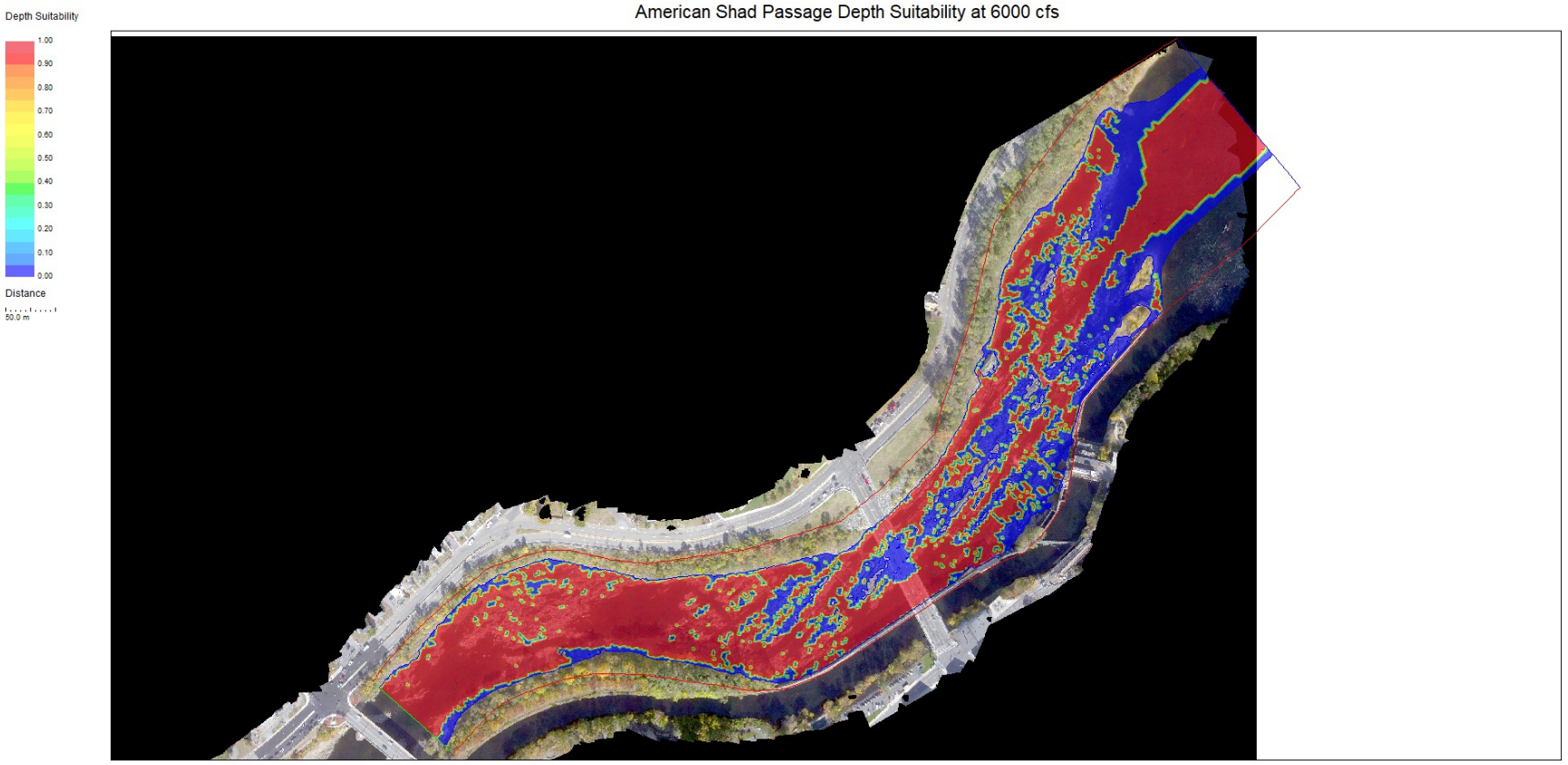

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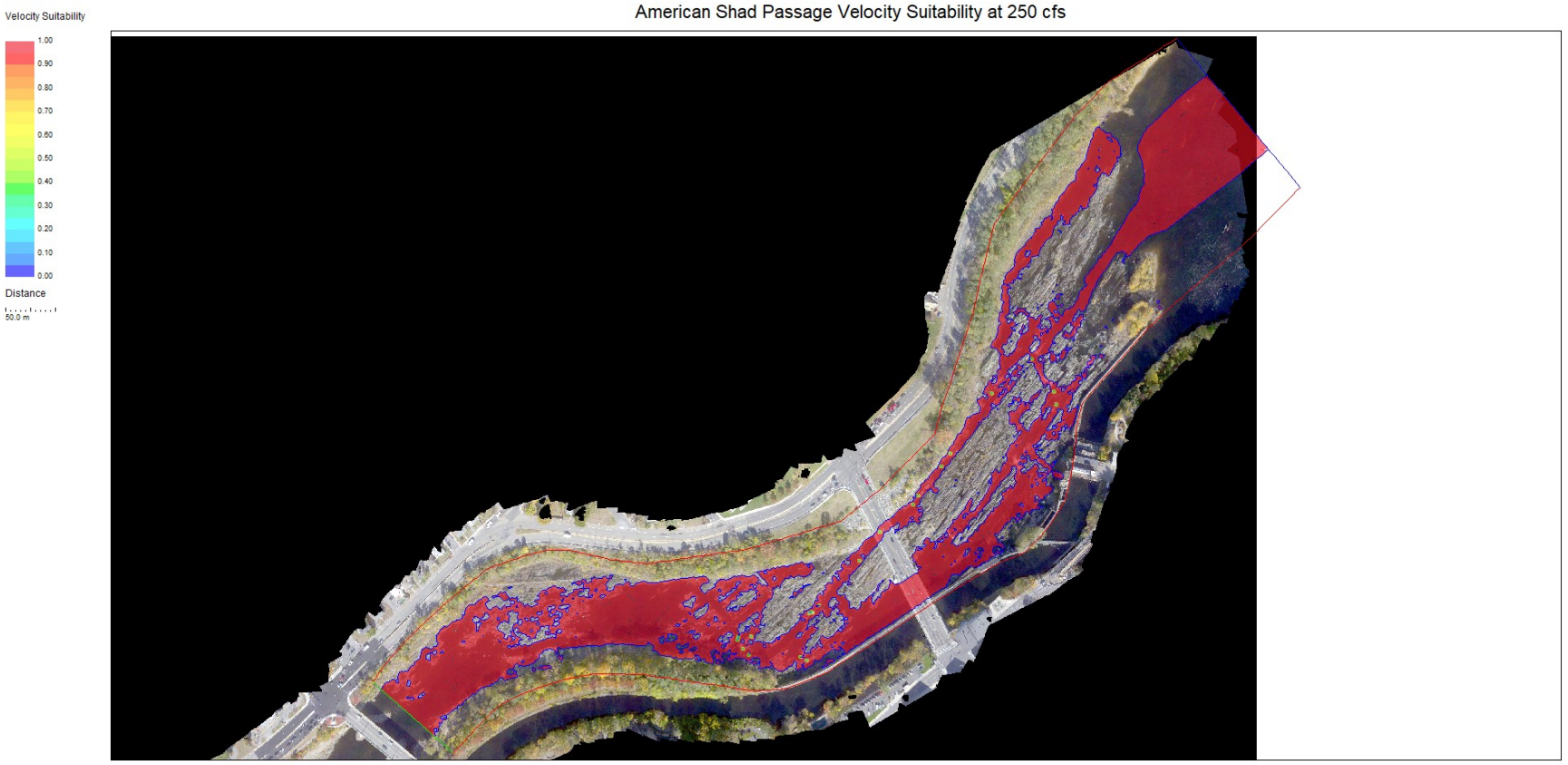

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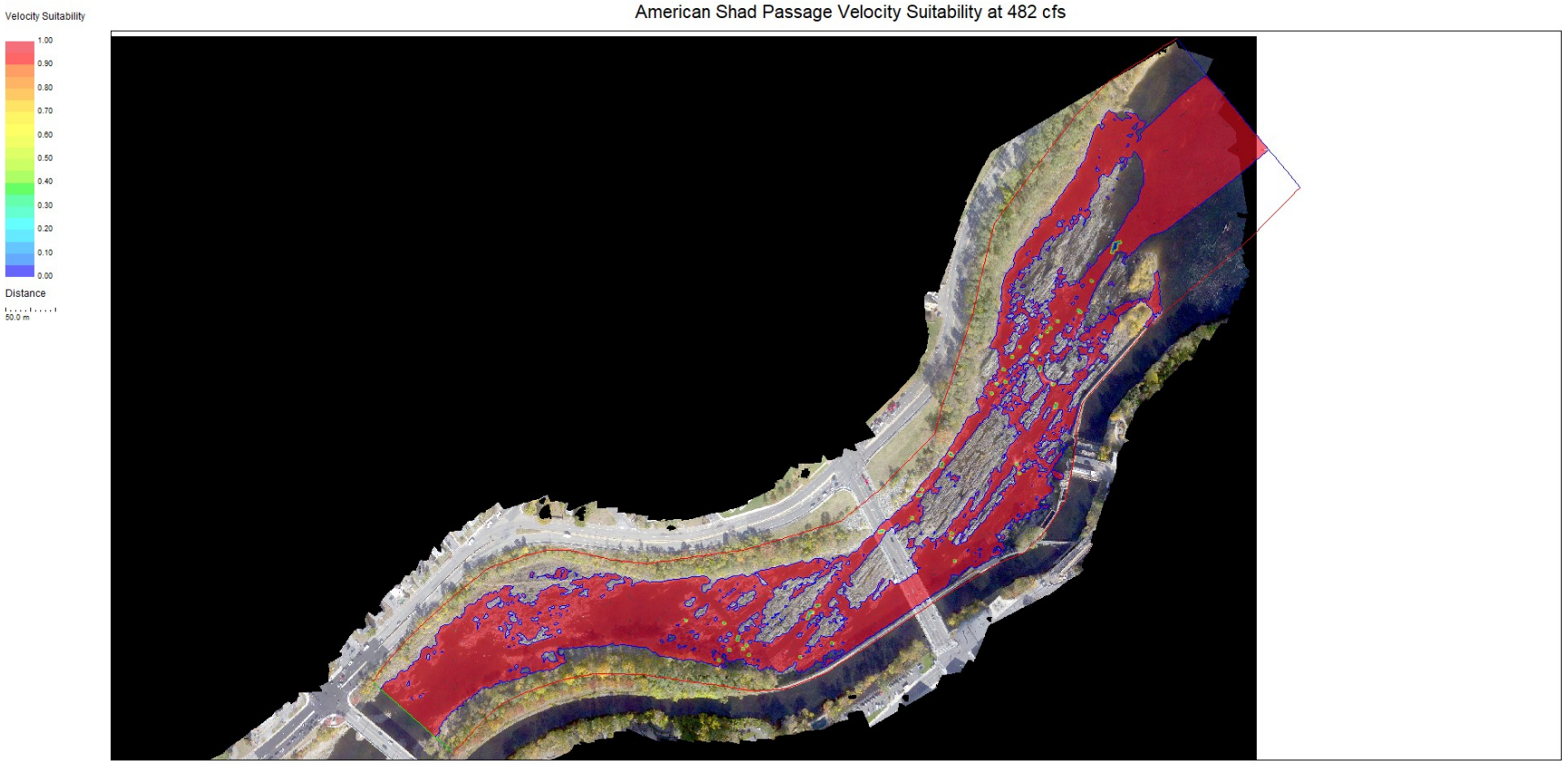

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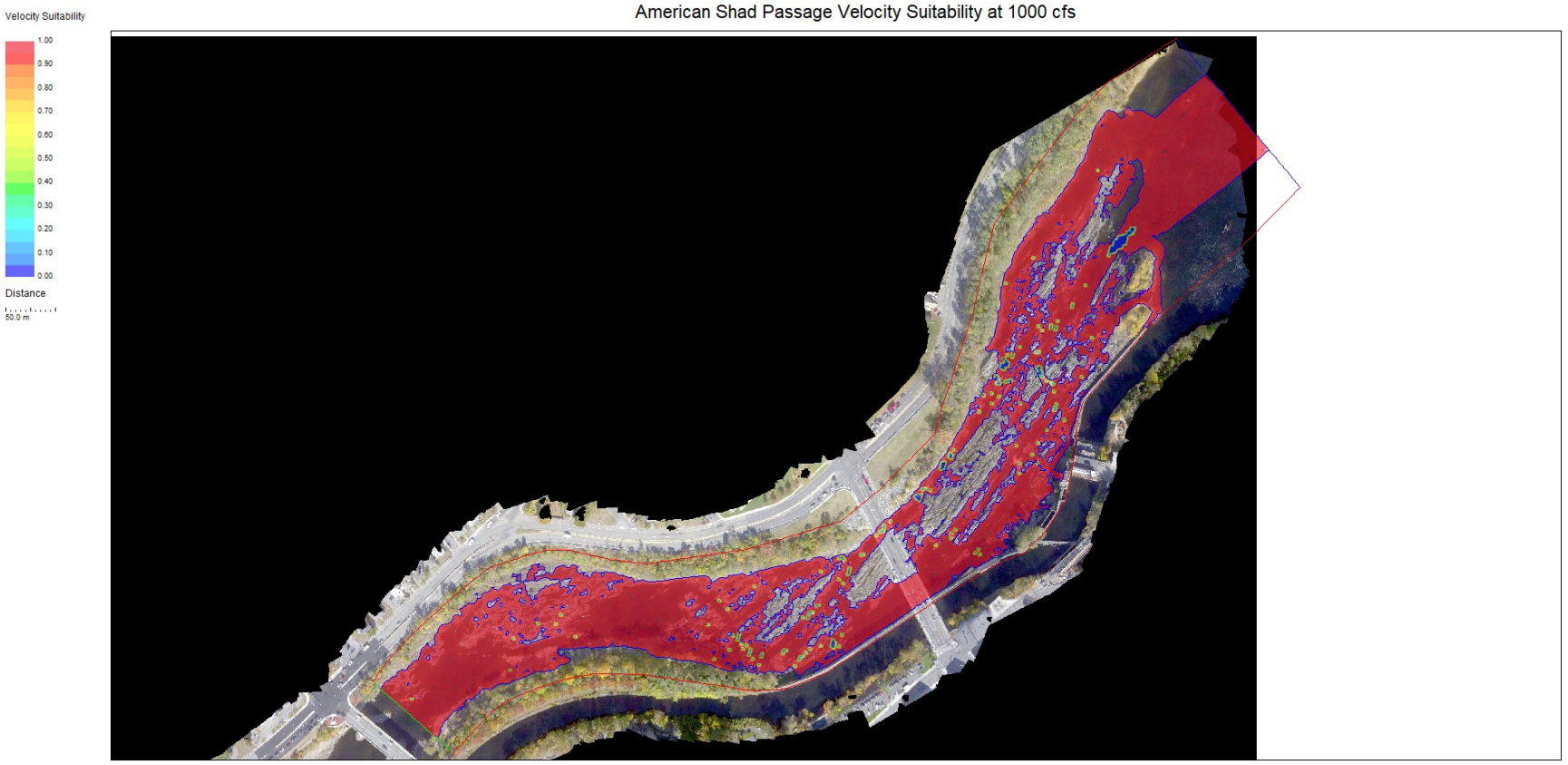

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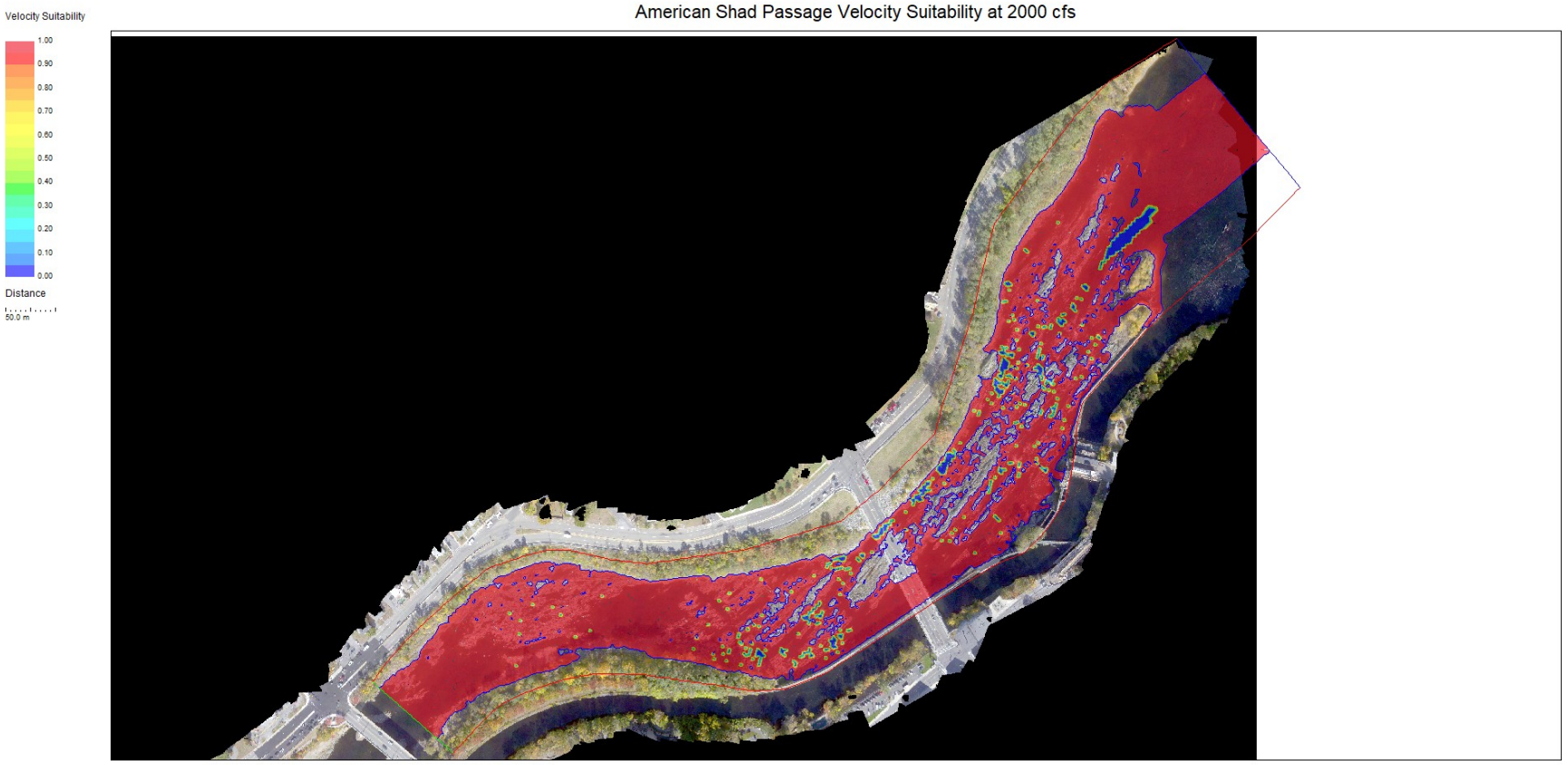

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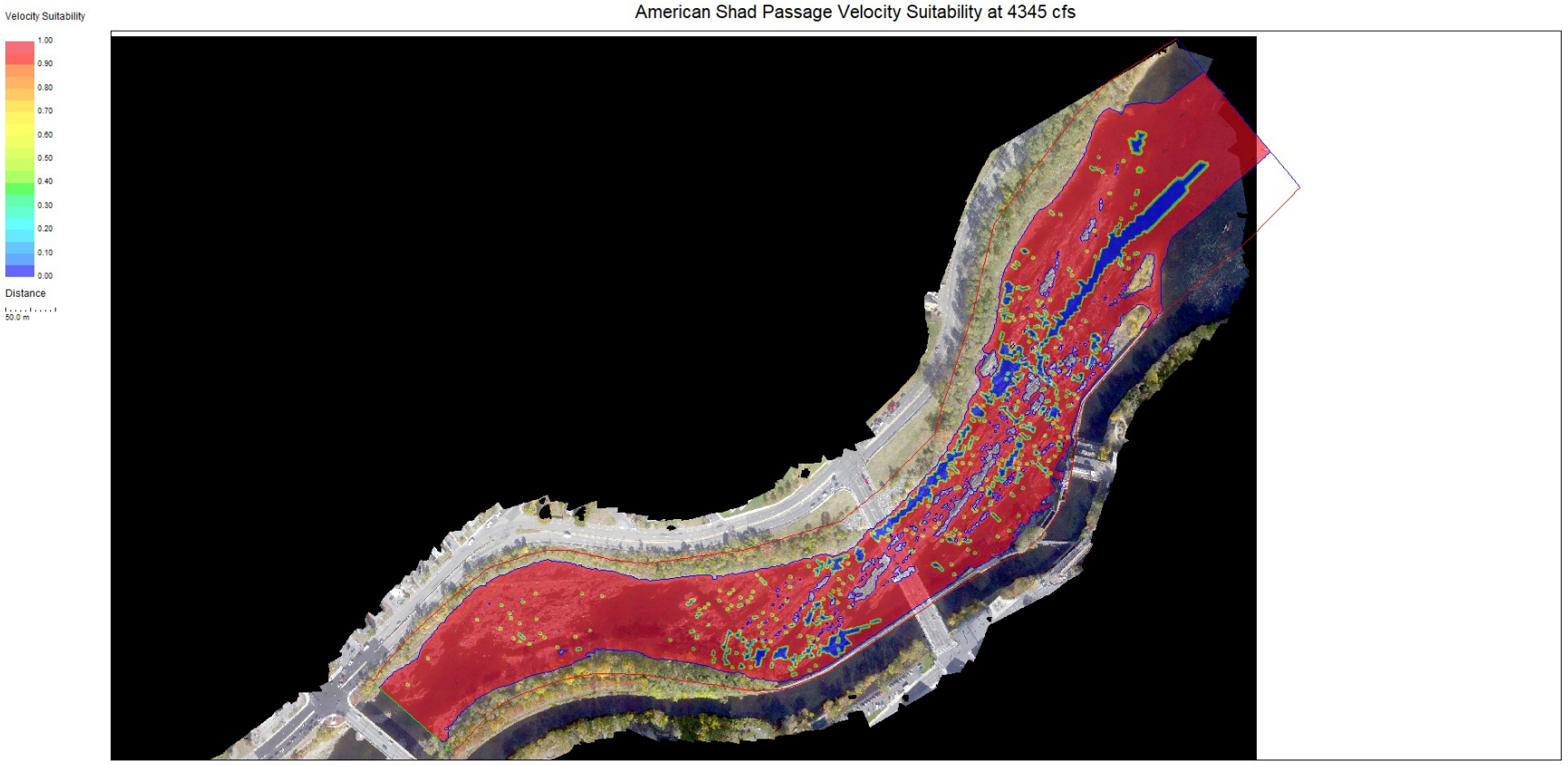

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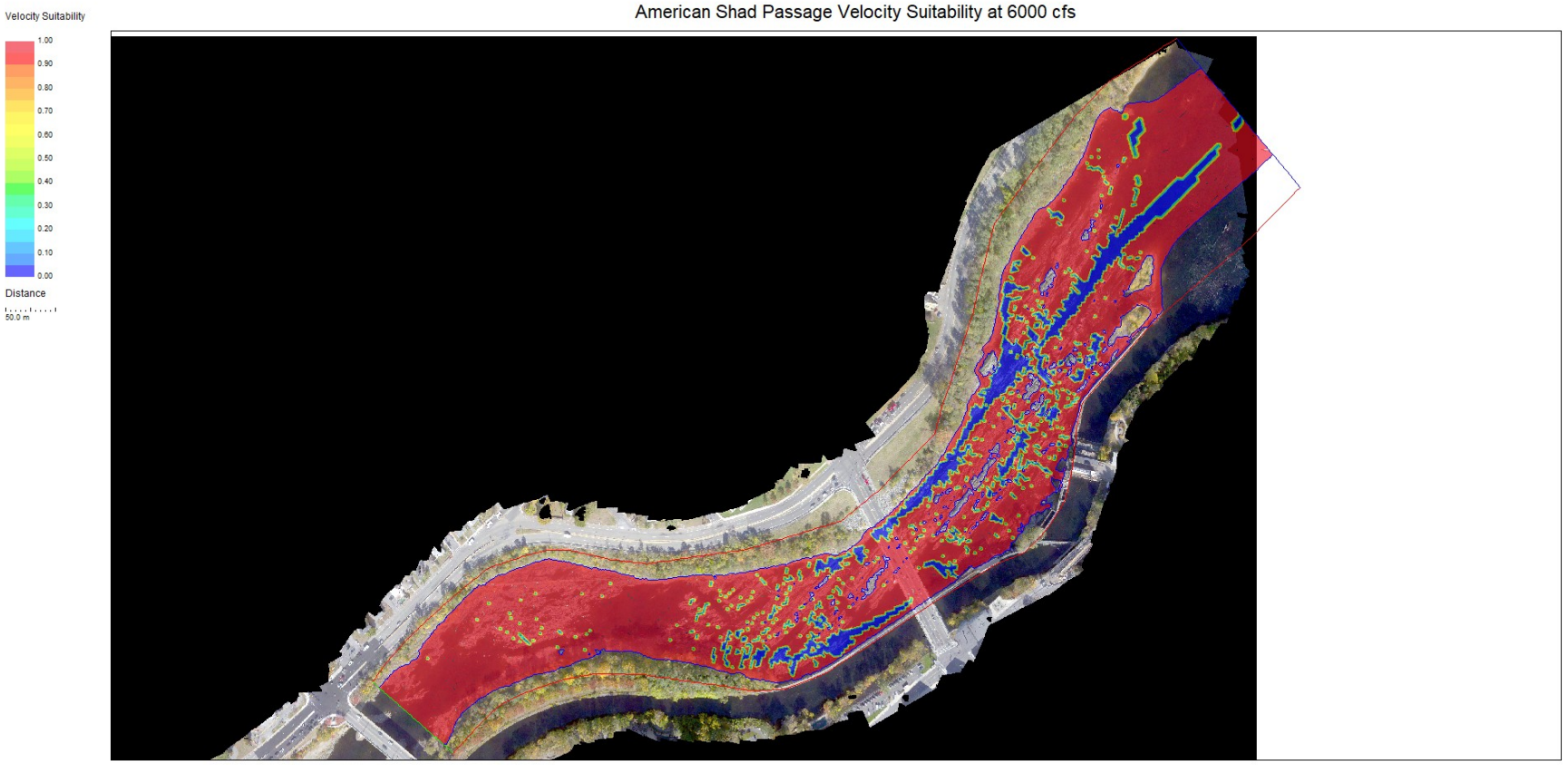

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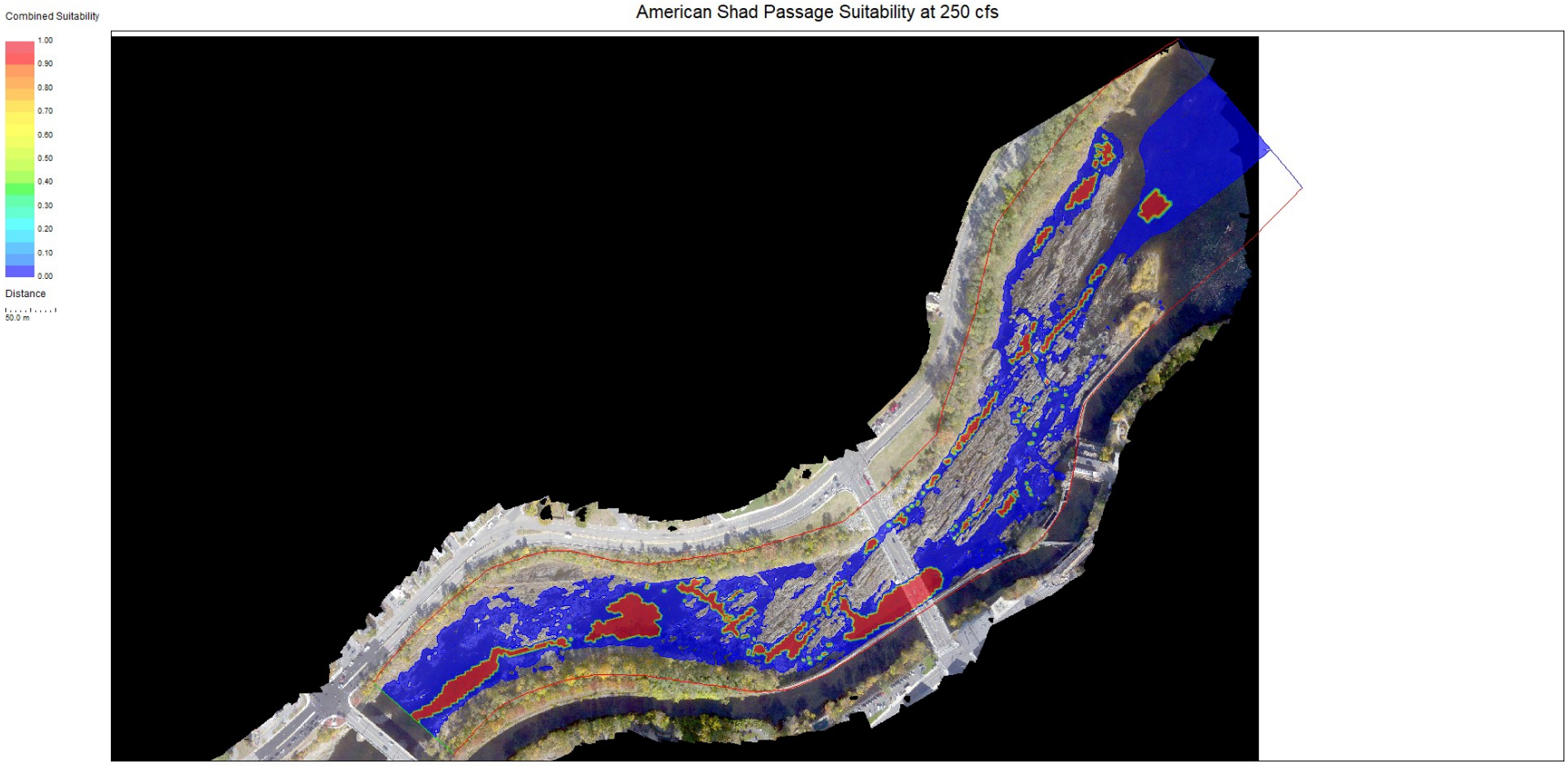

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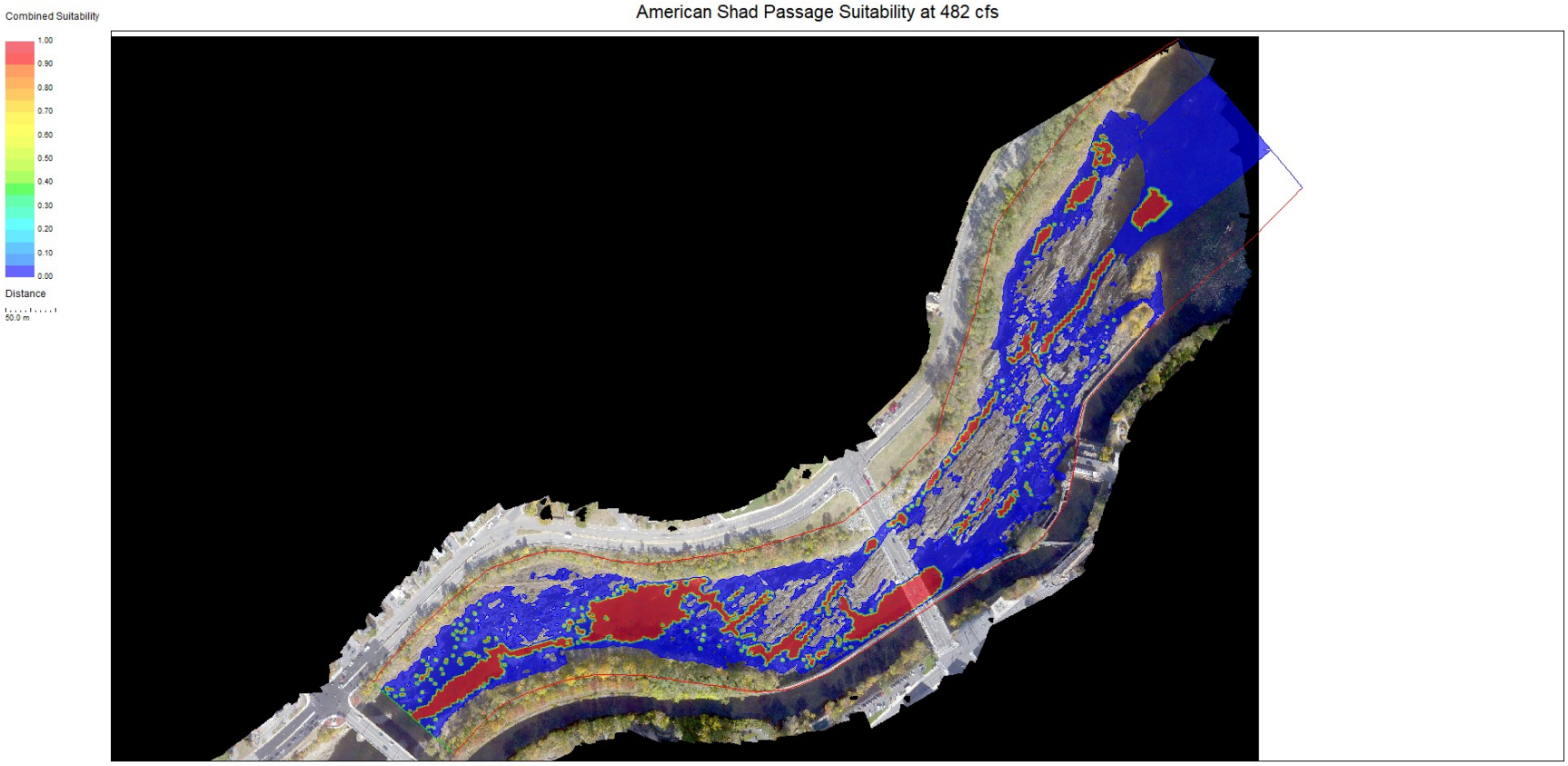

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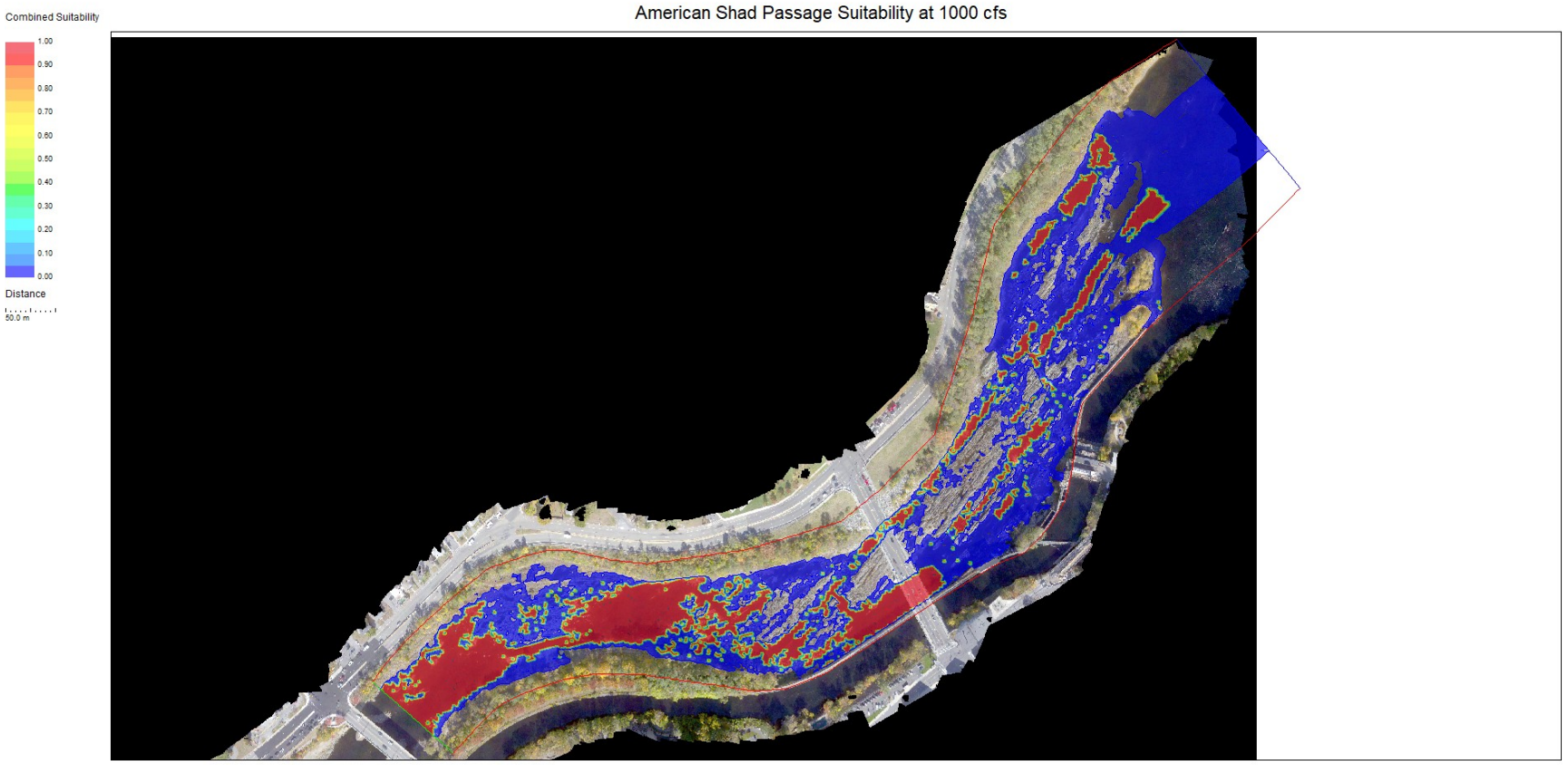

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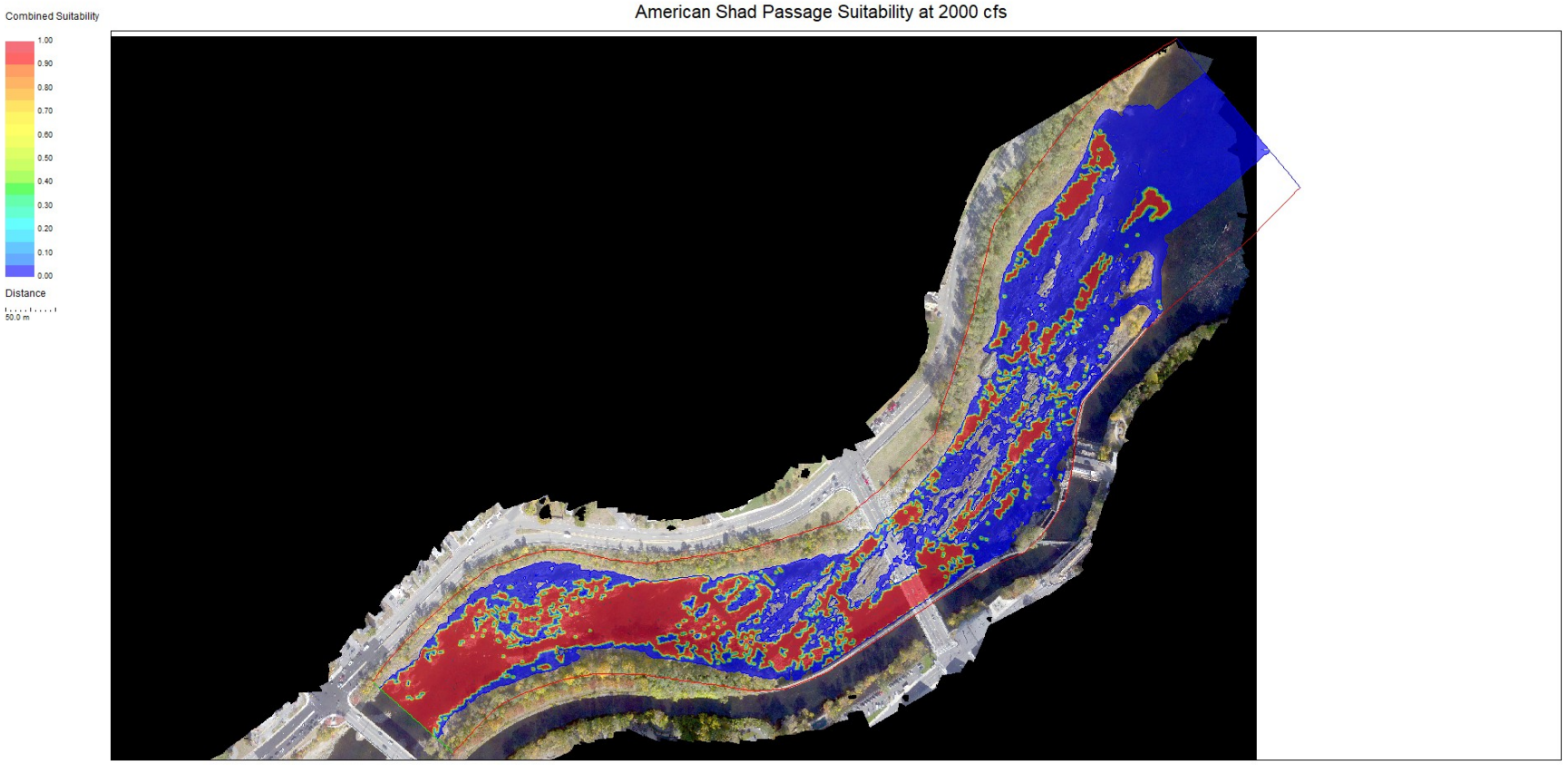

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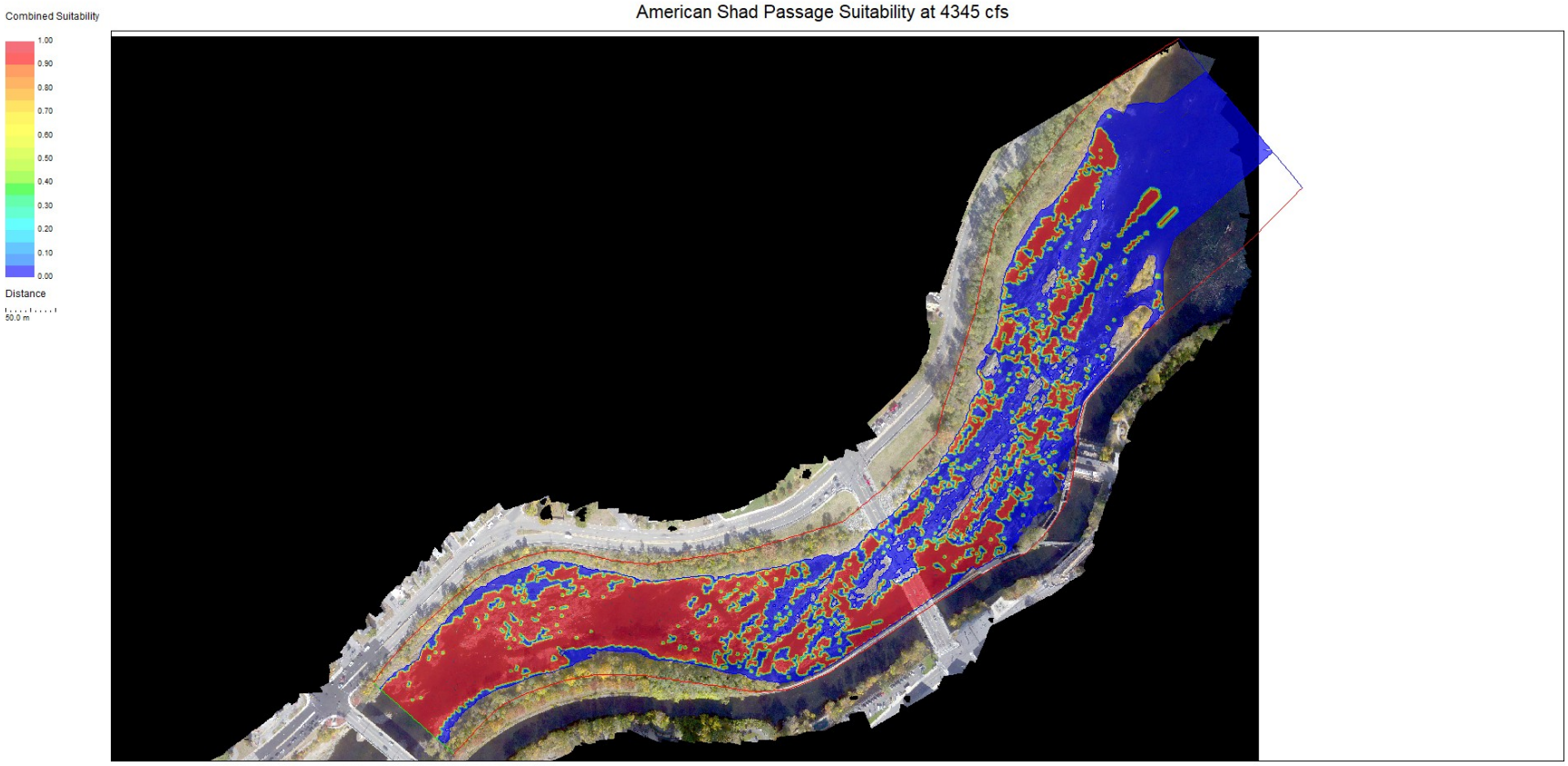

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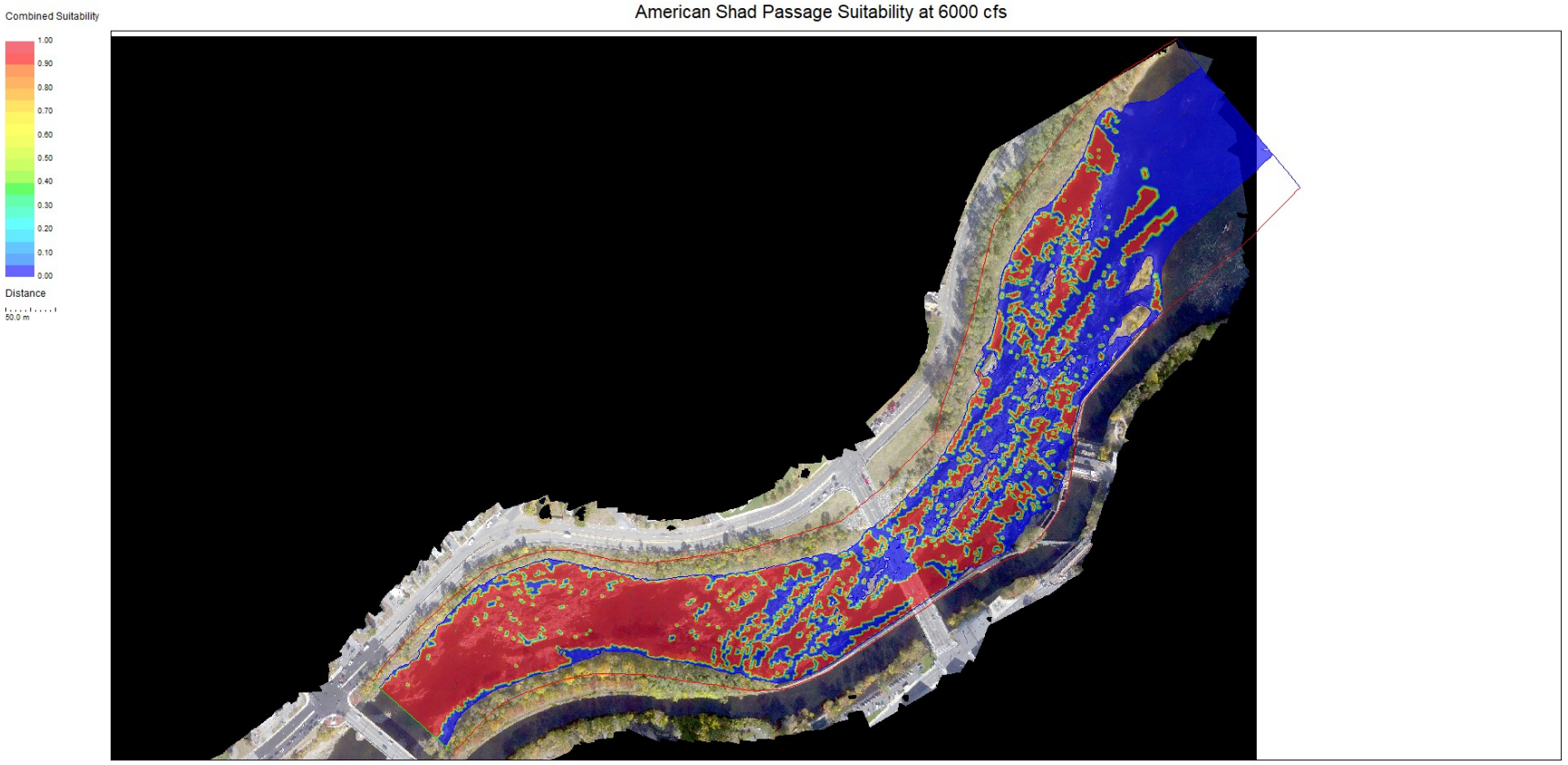

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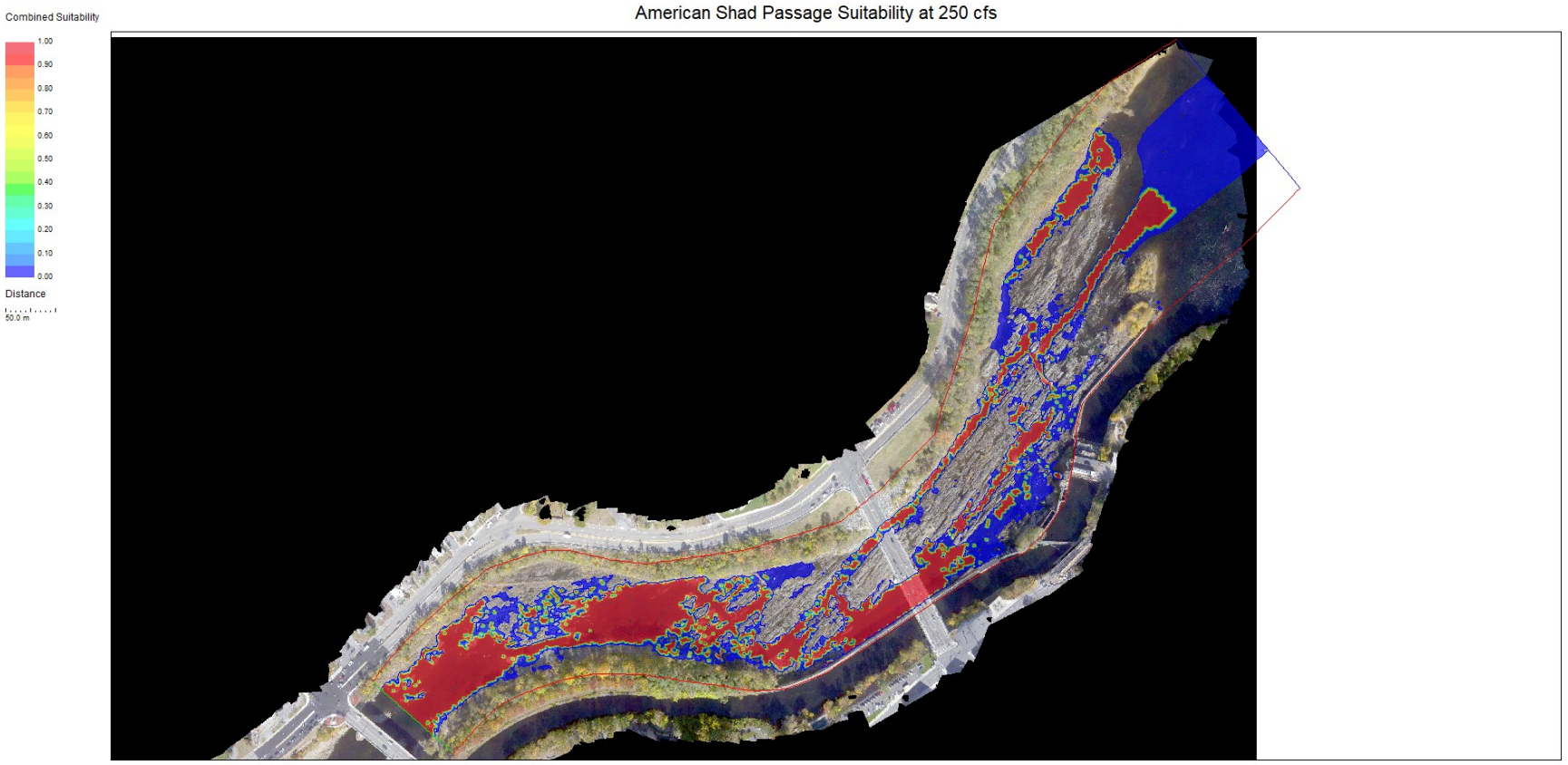

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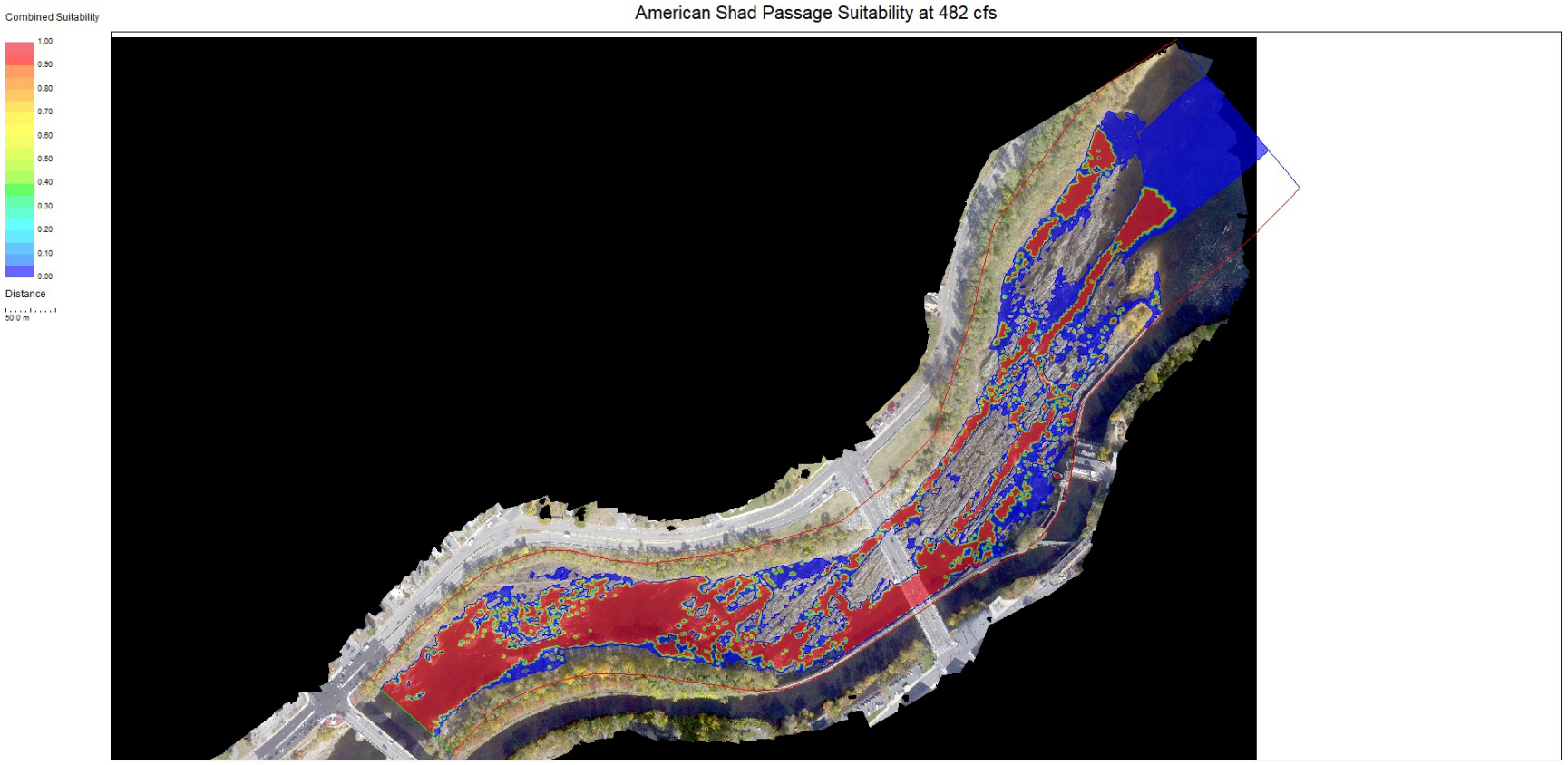

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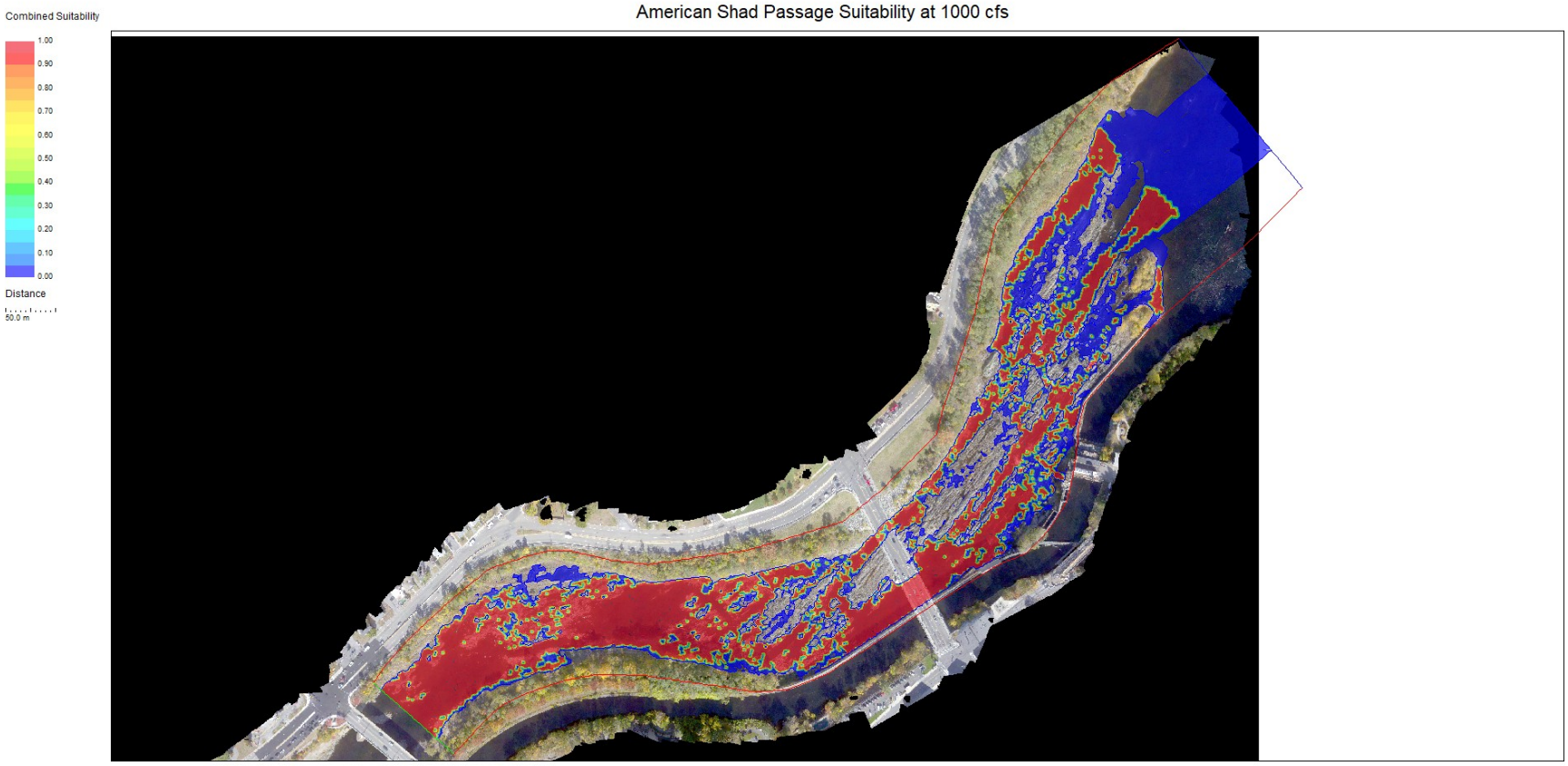

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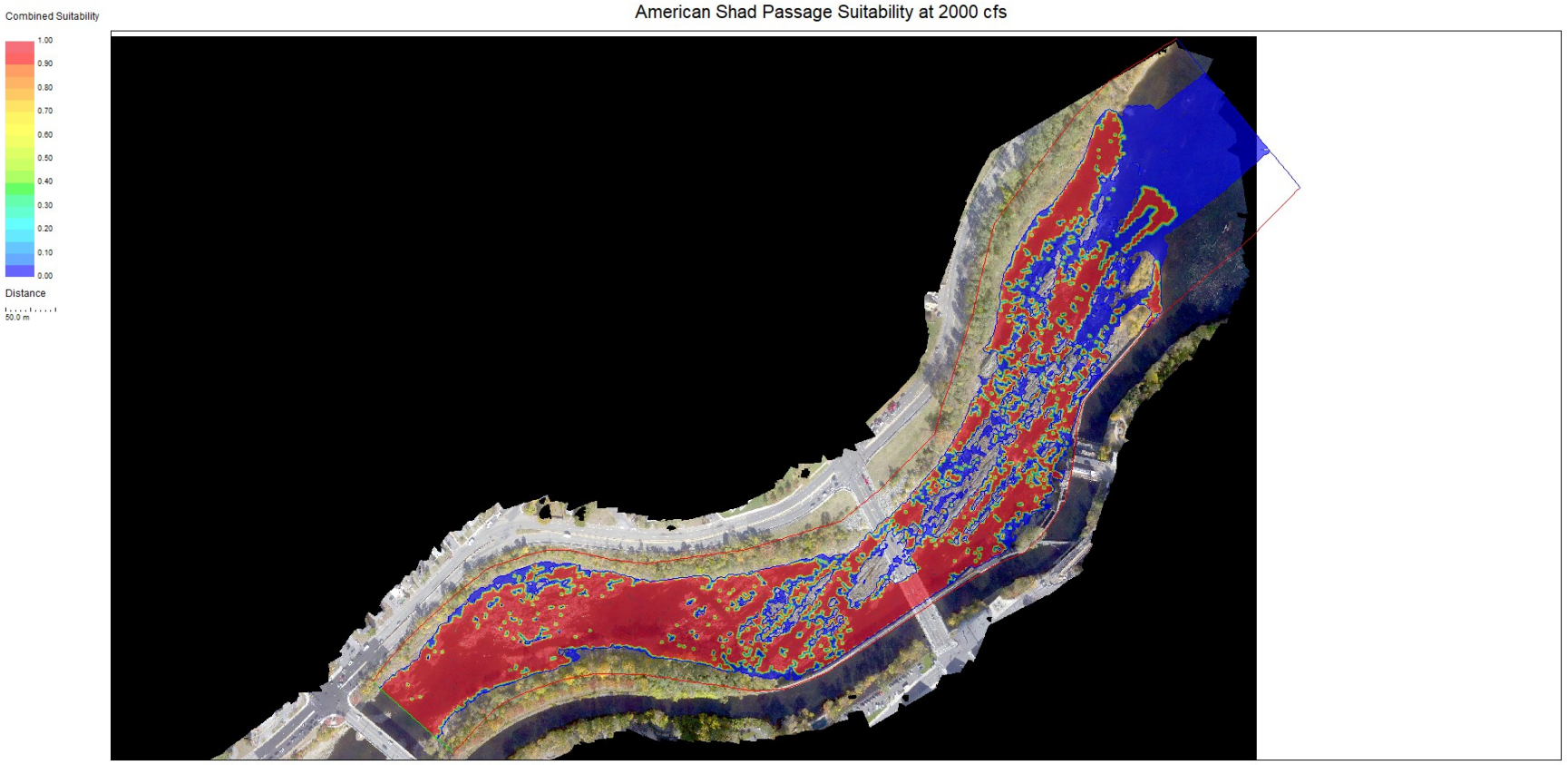

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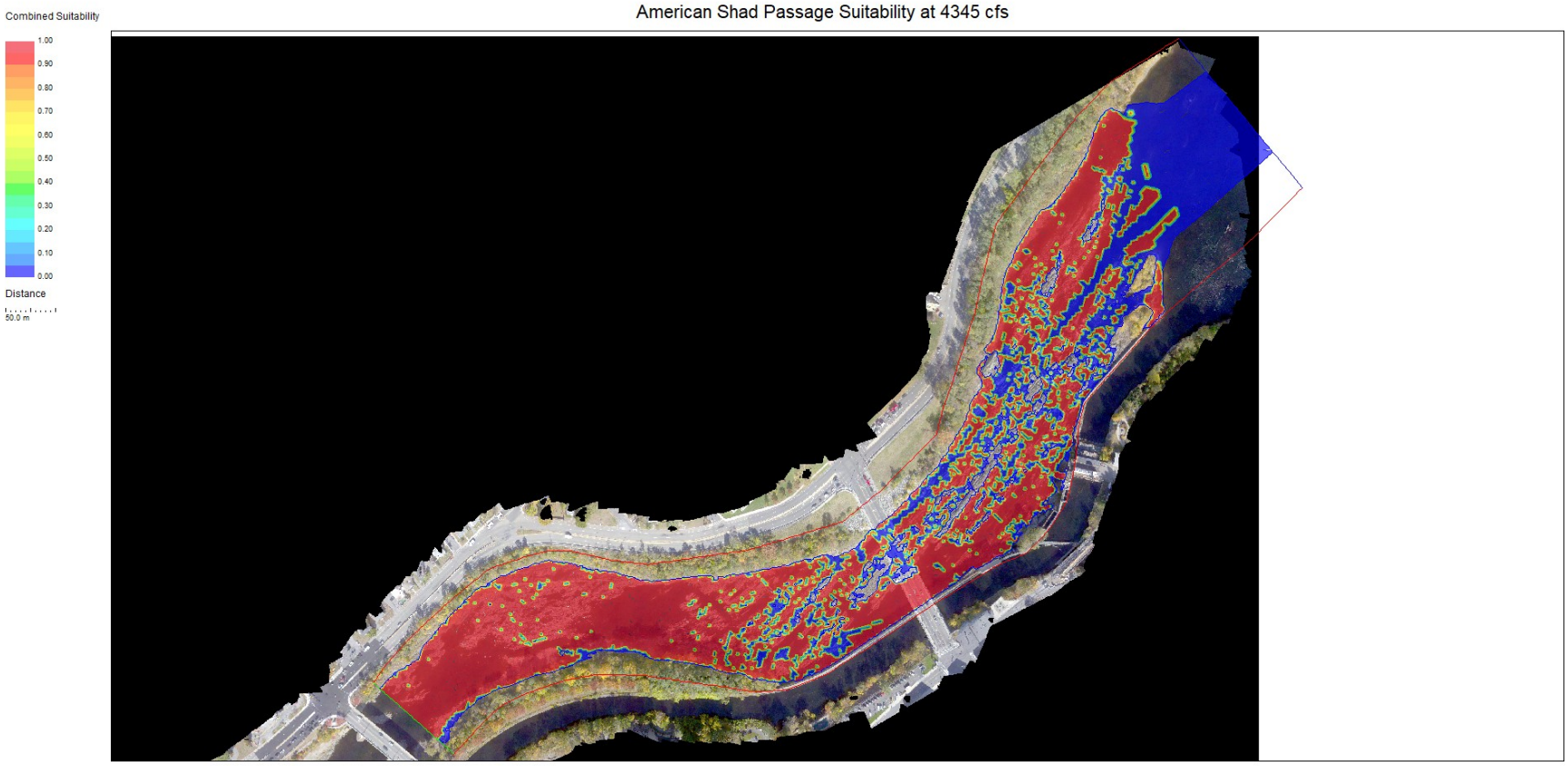

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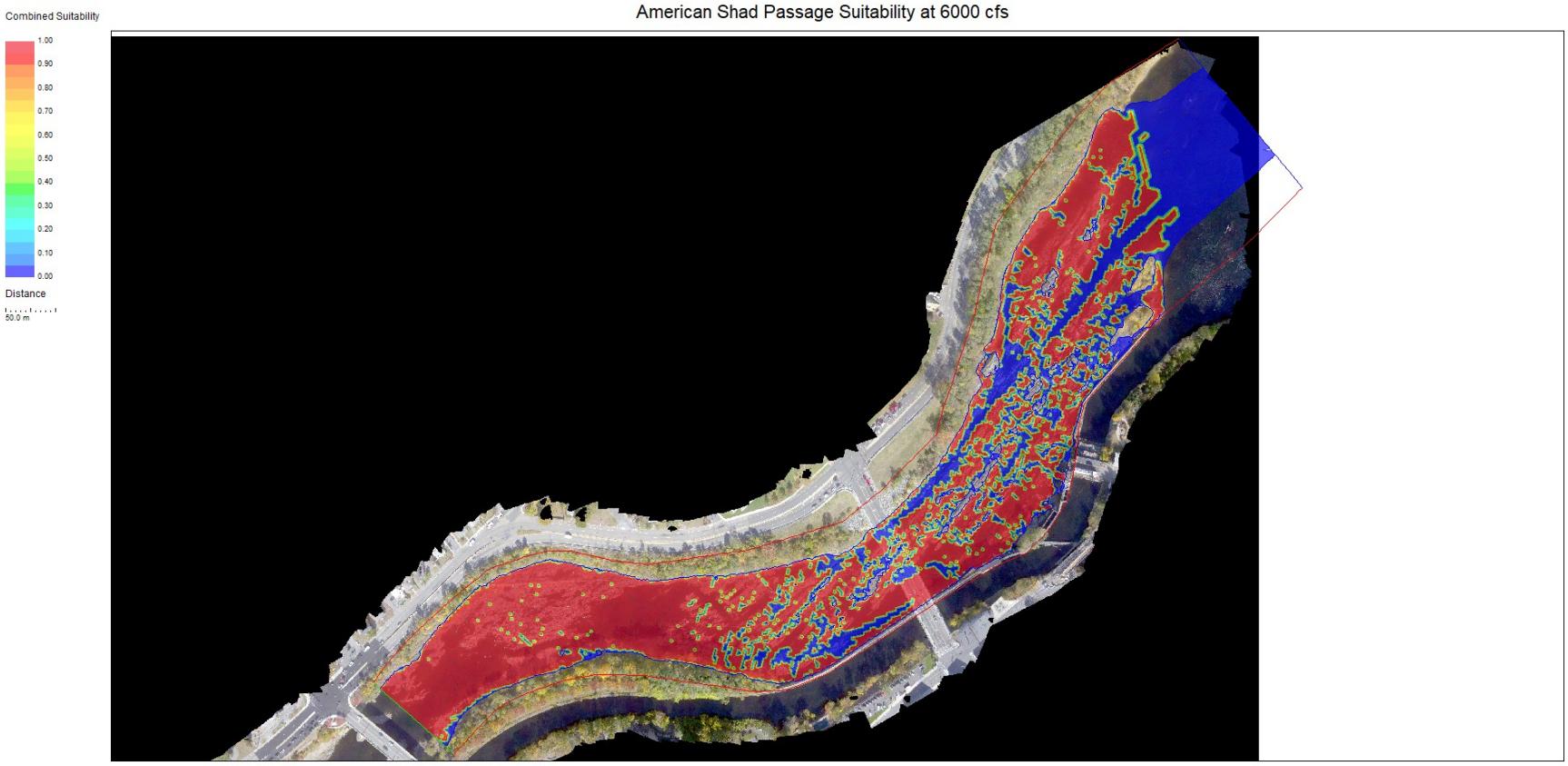

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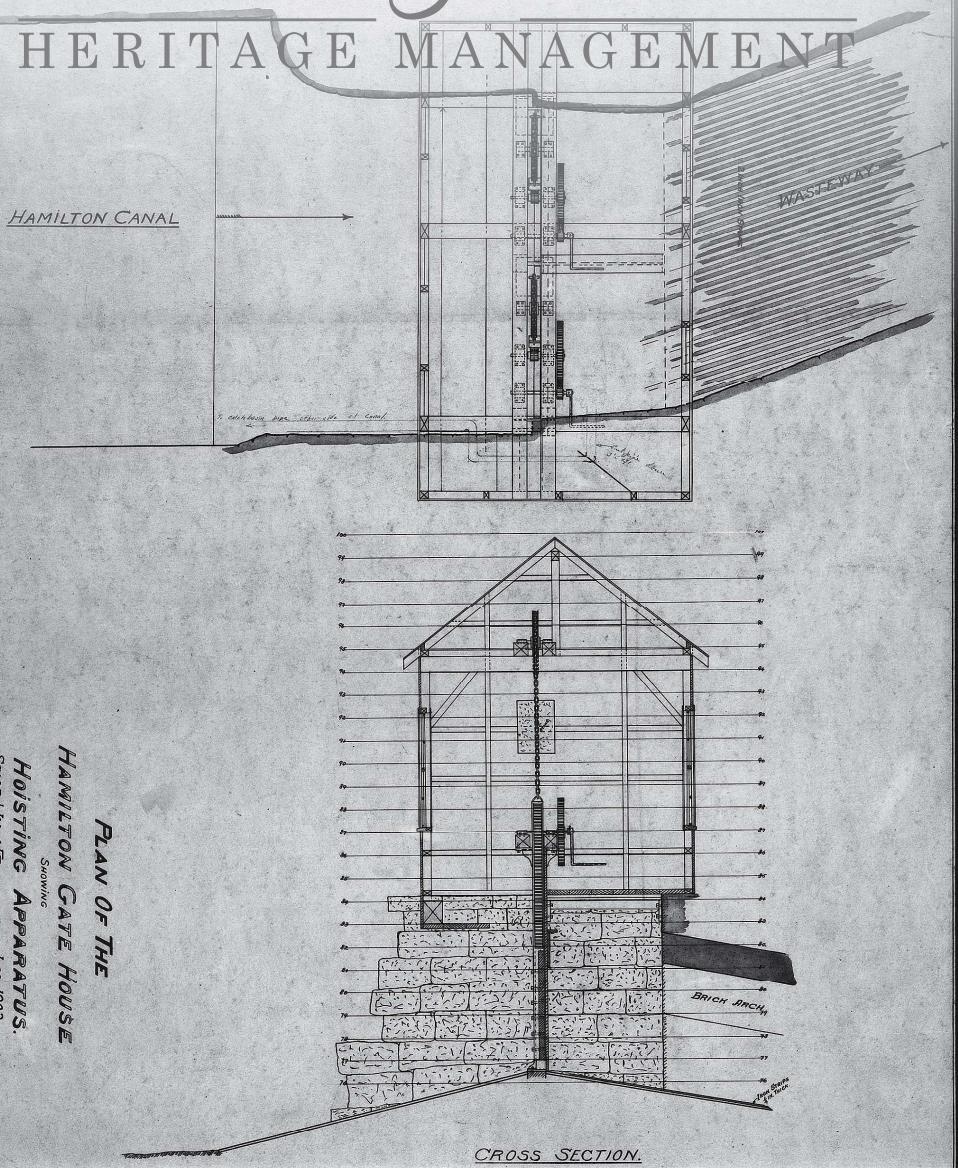
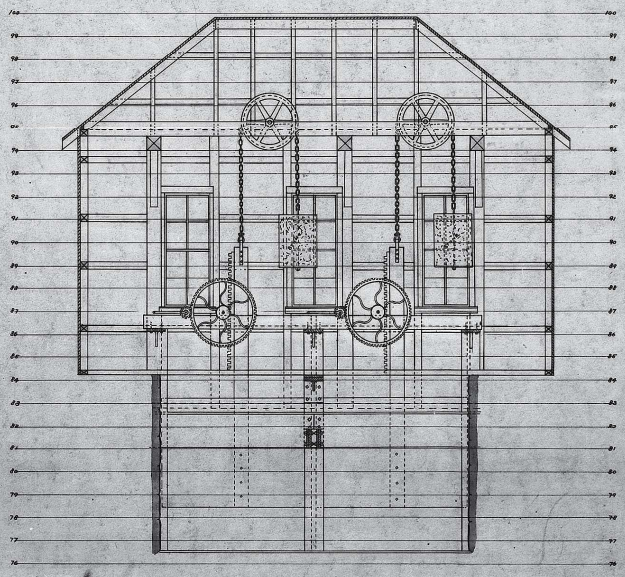
GRAY & PAPE

HERITAGE MANAGEMENT



CROSS SECTION.



LONGITUDINAL SECTION.

Historically Significant Waterpower Equipment Study, Boott Hydropower, LLC, Lowell, Massachusetts

LEAD FEDERAL AGENCY:
Federal Energy Regulatory Commission
FERC No. 2790

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Historically Significant Waterpower Equipment Study, Boott Hydropower, LLC, Lowell, Massachusetts

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1.0 INTRODUCTION

Boott Hydropower, LLC (Boott) is the licensee, owner, and operator of the 20.2-megawatt Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP), as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. In accordance with 18 C.F.R. § 5.15, Boott has initiated the Historically Significant Waterpower Equipment Study as provided in the study plan and schedule approved in the Commission's March 13, 2019, Study Plan Determination (SPD) for the Project. This report presents the results of the Historically Significant Waterpower Equipment Study.

The Study Report's stated goals were to:

- Consult with the National Park Service (NPS) and conduct a site visit to identify historically significant waterpower equipment of interest to the NPS for potential future interpretation, exhibition, or as scrap equipment to maintain and operate other historic machinery;
- Photodocument historically significant waterpower equipment identified in consultation with the NPS;
- Conduct background research on the history of identified waterpower equipment, including designer/engineer, dates of manufacture and use, and an explanation of how the equipment was or is used;
- Document current ownership of historically significant waterpower equipment; and
- Prepare a report summarizing the results of the Historically Significant Waterpower Equipment Study.

2.0 HISTORIC BACKGROUND

The City of Lowell is considered the birthplace of large-scale manufacturing in the United States. Lowell's success depended upon a variety of factors, but one of the most significant was the efficient use of the Merrimack River's waterpower. Begun as a transportation canal, the Lowell Canal System evolved during the nineteenth century into one of the nation's most important waterpower sites.

The Merrimack River originates south of Franklin, New Hampshire, where the Pemigewasset and the Winnepesaukee rivers join. From this point, the Merrimack flows 110 miles, and drops 269 vertical feet, to its mouth in Newburyport, Massachusetts. One of the principal vertical drops along this route occurs at Pawtucket Falls, just south of the New Hampshire state line in Lowell. Here the free-flowing Merrimack dropped more than thirty feet over a series of rapids. Below Pawtucket Falls, the Merrimack swings sharply to the southeast where, after a mile or so, the Concord River flows into the mainstream from the south. The river then swings back to the northeast and continues roughly thirty-seven miles to the sea.[1]

In 1792, a group of Newburyport merchants formed a company to build a canal around Pawtucket Falls. Circumventing the falls was expected to increase the flow of forest products from New Hampshire to Newburyport. The Proprietors of the Locks and Canals on Merrimack River (PLC), as the enterprise was styled, began construction in fall 1792. Work progressed in fits and starts, with the canal opening to traffic in fall 1796.[2]

The canal had to be deepened and its locks rebuilt or repaired several times during its first decade of operation. By 1821, the canal, then known as the Pawtucket Canal, included three single locks, the Guard Locks, Minx Locks, and Swamp or Upper Locks, and a flight of three locks in a row, known as the Lower Locks.

In 1821, the Boston Manufacturing Company (BMC), founded in 1813 by Francis Cabot Lowell, a Boston merchant, was seeking a location for new cotton mills. The BMC operated a fully integrated cotton mill in Waltham, Massachusetts, the first such mill in the world. Raw cotton entered the mill and, because of mechanical operations driven by waterpower, emerged as cloth. In 1821, the firm sought a new location for the production and printing of calicoes, a form of cloth not then produced in the United States. The firm sought land and adequate waterpower for factories, print works, and corporate housing, and began secretly purchasing the stock of the PLC, as well as land near the Pawtucket Canal. By 1822, the new venture had acquired control of the PLC, had formed itself as the Merrimack Manufacturing Company, and was ready to enlarge the Pawtucket Canal, erect its first mill, and construct a branch canal to the mill site.[3]

The purpose of every modification to the canal system was to provide a dependable and predictable flow of water to each mill site. Initially, this involved securing a reliable flow through Pawtucket Canal. The gates of the canal's locks opened and closed, admitting and releasing water into the system in accordance with the needs of traffic on the canal. This method of operation failed to provide the predictable flow of water required by the mills, so one of the first major building campaigns entailed construction of dams at each of the canal locks. Between 1822 and 1824, the Merrimack

[1] J.W. Meader, *The Merrimack River: Its Source and Its Tributaries* (Boston, MA: B.B. Russell, 1869).
[2] Patrick M. Malone. *Waterpower in Lowell: Engineering and Industry in Nineteenth-Century America* (Baltimore, MD: Johns Hopkins University Press, 2009), 12.
[3] Ibid., 22–24.

Manufacturing Company rebuilt the Pawtucket Canal to enable it to serve as both a power and transportation canal. The locks at the Guard Locks, Swamp Locks, and Lower Locks were rebuilt in stone, lined with wood. New dams, fitted with sluice gates, were constructed at each location. These dams created pools of water that could be used to provide water to the downstream mills, regardless of whether the canal locks were open or closed.[4]

Over a period of about twenty-five years, following the Merrimack Manufacturing Company's acquisition of control of the PLC in 1822, the transportation canal constructed around Pawtucket Falls was expanded and enlarged in a series of major building campaigns (Figure 2-1). By 1823, the newly constructed dam at Swamp Locks provided water for the Merrimack Canal. By 1826, the Lowell Canal branched off the Merrimack Canal and provided power for the Lowell Mills, while the Hamilton Canal branched off the Pawtucket Canal above Swamp Locks and provided power to the Appleton and Hamilton mills. In 1831, the Western Canal also branched off the Pawtucket Canal and served the Suffolk, Lawrence, and Tremont mills. In 1836, the Eastern Canal branched off the lower Pawtucket Canal and powered the Boott Mills. By 1836, the first stage of canal construction was complete. It constituted a two-level system, with the Western, Merrimack, Lowell, and Hamilton canals, all of which took their water from above Swamp Lock Dam, comprising the upper portion of the system, and the Lower Pawtucket and Eastern canals, fed from below Swamp Locks Dam, comprising the lower portions. The second great phase of construction was completed by 1848. Beginning in 1846, the construction of the Northern Canal and the Pawtucket Gatehouse brought water directly from the Merrimack River to the lower reaches of the Western Canal, reversed the flow of water in the upper reaches of the Western Canal, and, by means of the Moody Street Feeder, brought water to the lower stretch of the Merrimack Canal.[5]

This complex system of canals delivered the waterpower of the Merrimack River to the mills of ten textile corporations. Beside the lower Pawtucket Canal, stood the mills of the Hamilton, Appleton, Lowell, and Merrimack corporations, as well as the massive machine shop of the PLC. The Massachusetts and Boott mills stood between the Eastern Canal and the Merrimack River, while upstream were the Merrimack mills and the printworks and factories of the Lawrence Corporation. The Tremont and Suffolk mills flanked the Western Canal. This network of canals "formed a dynamic system which was only in equilibrium when proper water levels were maintained."[6] The engineering plan called for water to generate power on both levels of the system, to enter the lower canals only after passing through the wheel pit of an upper-level mill. This required upper-level water users to discharge at least as much water as the lower mills required.

Reduced discharge from upper-level mills could be offset by allowing supplemental water to flow directly from the upper to the lower levels. On the Western Canal, this could be done at the Hickey Hall Dam, while the flow in the Pawtucket Canal could be augmented by releasing water at Swamp Locks Dam. Managing the flow of water through this complex system required careful coordination. A system of dams and gatehouses helped control the flow of water and was intended to assure that all users were adequately supplied with power.

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[4] Anne Booth. "Historic Structure Report: Pawtucket Canal and Northern Canal Lock Structures: Historical Data Section." 3 vols., Harlan D. Unrau, ed. (Denver, CO: National Park Service Denver Service Center, 1981), 1:2.
[5] Louis C. Hunter. *A History of Industrial Power in the United States, 1780–1930; Volume One: Waterpower in the Century of the Steam Engine* (Charlottesville: University Press of Virginia, 1979), 255–261
[6] Patrick M. Malone. *Lowell Canal System* (Washington, D.C.: Historic American Engineering Record, 1975), 107.

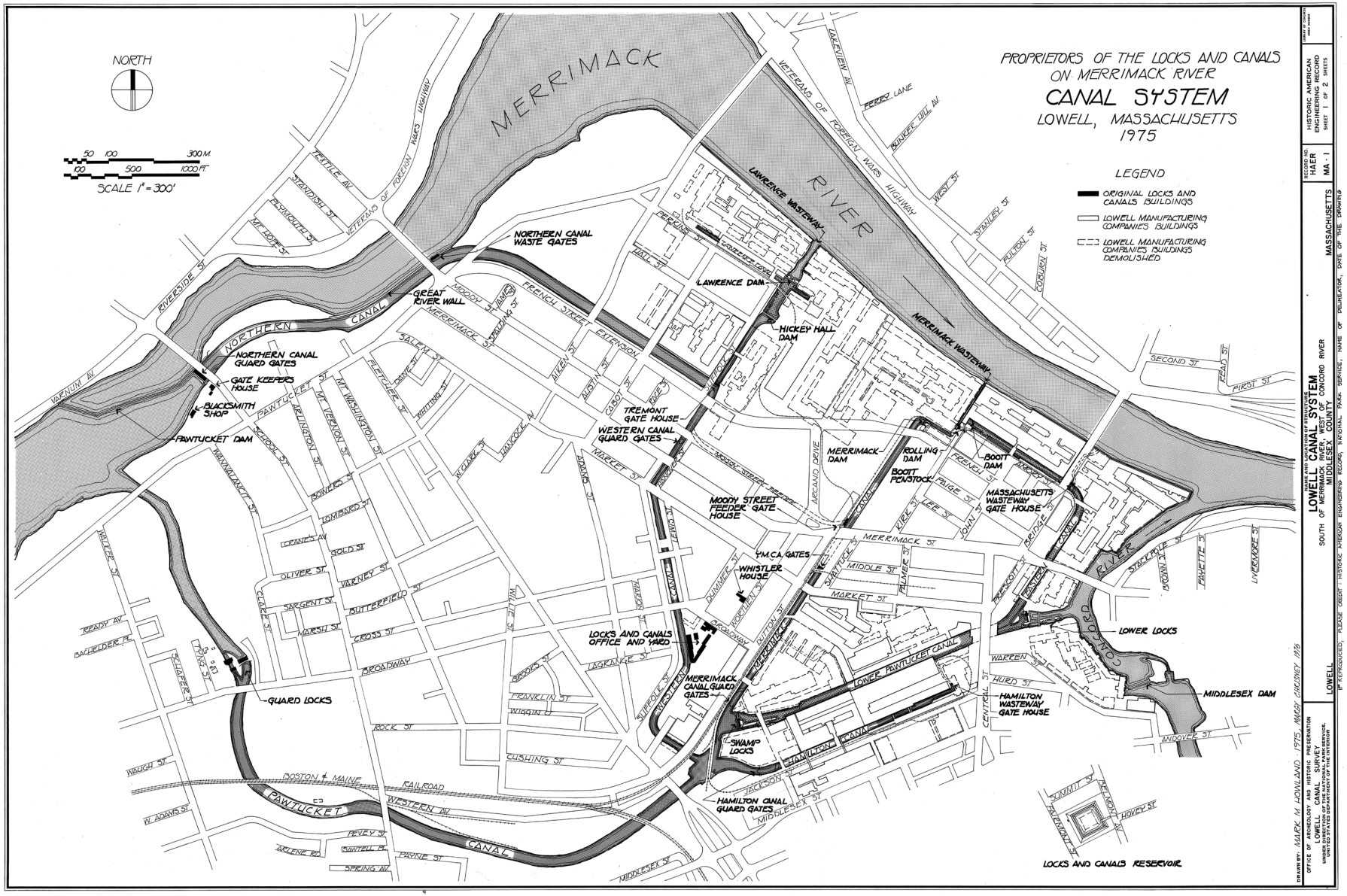

Figure 2-1. Historic American Engineering Record, Lowell Canal System, 1975.

3.0 STATUS AND SIGNIFICANCE

The Lowell Locks and Canals Historic District was listed in the National Register of Historic Places (NRHP) in 1976. The nomination's statement of significance reflects the standards of the time, and states that the district is significant "for its contributions to the development of Lowell as the first great industrial city in the United States." The statement of significance acknowledges the complex engineering involved in the construction of the canals and notes that "each new canal was built in an attempt to solve the problem of keeping all the mills supplied with a sufficient supply of power."[7] The established period of significance for the district is 1790–1870, though this periodization privileges the period when waterpower was used to directly drive mill machinery through the use of shafting and belting, and does not encompass the entire period of significance for the locks and canal system and its component resources.

The significance of the Lowell canal system is inherently bound up in the fact that it is a system whose successful operation is dependent upon all its individual component elements. No individual component element is more significant than any other since the successful functioning of the system relies upon all the components. Certainly, a particular canal, or a particular mill, could function without some elements of the system, but the system, as a whole, depended upon all its component elements. The resource is the system, not the system's individual elements.

After the initial design and construction of this system, lay a continuing series of engineering and management challenges to maintain and operate the system and, over time, to expand the system to meet growing demand. These challenges included meeting the at times conflicting requirements of power users, devising methods and equipment for measuring and monitoring the use of water, discouraging the waste of water, and, in periods of seasonal shortage or drought, rationing the use of the available water. Increasing the efficiency of the system by eliminating waste and improving the efficiency of every system component became imperative. This imperative applied to the penstocks, gates, and waterwheels of the mills, as well as to the dams and canals that supplied the water to the mills.[8]

The daily operation of this complex waterpower system, with multiple canals, dams, gate houses, and lesser elements, placed an enormous strain on the various system components. Floods, freshets, and other natural events compounded the wear and tear associated with daily operation. Many of the gates, sluices, and other elements that controlled the flow of water originally were constructed of wood and, therefore, subject to rot, and in need of regular maintenance, repair, and replacement. In addition to the daily wear and tear on system components, changes in the operations at individual mills could change demands for water, necessitating modifications to the system to meet this demand.[9]

These and other factors meant that since the initial construction of the Lowell Canal system nearly 200 years ago, the various component parts of the system have been subject to almost continuous repair, alteration, replacement, or improvement. In this environment of continual change, it follows that changes may be made to components of the system without adversely affecting the qualities and characteristics that make the system itself eligible for the NRHP.

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[7] Christine Boulding and Joe Orfant. "Lowell Locks and Canals Historic District," National Register of Historic Places Inventory-Nomination Form (Washington, D.C.: National Register of Historic Places, 1976).
[8] Hunter. *A History of Industrial Power*, 207.
[9] Ibid., 273–275.

4.0 CONSULTATION WITH NPS

In consultation with the NPS, Boott clarified the goals of this study during the December 18, 2019, Study Workshop held at the Lowell National Historical Park Visitor Center. The main goal of the study, as provided for in the approved study plan, was the identification of historically significant waterpower equipment "of interest to the NPS." However, Boott understands NPS's goals for this study include the determination of what original hydroelectric equipment is owned/operated by Boott within the Project Boundary is historically significant on a national level, not necessarily simply "of interest to the NPS." In other words, the selection of equipment to include in the analysis should not be limited to NPS' explicitly stated interest.

In July 2020, a site visit was held at Lowell to visit various locations associated with the control of water through the canal system. This tour included inspection of the Swamp Locks Gate House, the Hamilton Wasteway Gate House, the Lower Locks Gate House, the Boott Dam Gate House, the Moody Street Feeder Gate House, and the Northern Canal Gate House. Various types of gate operating mechanisms were observed. Discussions with NPS personnel indicated that they viewed the gate houses and their mechanisms as part of a larger system, as outlined above.

The majority of the gate operating equipment consisted of a rack-and-pinion system, originally operated by hand, but subsequently converted to electrical operation. The Boott Dam Gate House featured a hydraulic operating system, while the Northern Canal Gate House retained its original belt-driven line shafting, originally powered by the first Francis turbine installed in the United States.

5.0 HISTORICAL BACKGROUND OF OPERATING SYSTEM COMPONENTS

Gray & Pape conducted documentary research in the records held by the NPS at Lowell to identify the component elements of the larger canal system and the equipment used to operate water control devices throughout the system. The research effort also focused on developing a chronology of the alterations to individual components of the system. The results of the research effort are presented below (organized by canal) and progressing from upstream to downstream.

5.1 Pawtucket Canal - Guard Locks[10]

Between 1822 and 1823, Kirk Boott oversaw the reconstruction of the Guard Locks. Boott had a new channel cut around the existing locks and built a guard dam, with sluice gates, in this channel to regulate the flow of water downstream. In 1832, the dam was removed and rebuilt approximately 23 feet further downstream. At this date, the dam had five sluice gates sheltered in a wooden gate house. Subsequent modifications include:

- 1848 dam raised in height;
- 1856 sluice gates replaced;
- 1869 Francis-designed rack-and-pinon system for operating gates;
- 1870 Francis-designed hydraulic gate hoist system that employed five water-powered metal cylinders, each measuring 27 inches in diameter and 10 feet tall (cylinders, pistons, and rods manufactured by IP Morris & Company, rest of hoisting apparatus by Lowell Machine Shops[11]);
- 1870 existing brick gate house constructed;
- 1902 headgate sluices enlarged and extended;
- 1965 three middle hydraulic operating cylinders replaced, with oil hydraulic cylinders and pistons.

5.2 Pawtucket Canal - Swamp Locks[12]

Between 1822 and 1823, a 13-foot-tall stone dam, with sluice gates, was built adjacent to the Swamp Locks. The dam was rebuilt in a stepped configuration in 1841, at which time it is likely that the deep gate and sluiceway were added in the south portion of the dam. The dam underwent extensive repairs in 1850, and a gatehouse was constructed at about that time. Later alterations include:

- 1918 dam raised 1 foot in height;
- 1922 installed 2 additional 8-foot square waste gates and a small hydroelectric station to carry the Locks & Canal Yard light and power load; installation of waste gates required removal of 4 feet from top of dam for 20 feet[13];
- 1927–1928 sluice gate constructed between dam and locks, with gate house,

[10] Booth, "Historic Structure Report," 1:50–112.
[11] Proprietors of Locks and Canals Records, 1813–1962. Series II. General Files. Box 49, Folder 8 – Old Guard Locks, 1917–1949. On file at Lowell National Historic Park.
[12] Booth, "Historic Structure Report," 2:218–246.
[13] Proprietors of Locks and Canals Records, 1813–1962. Series II. General Files. Box 50, Folder 1 – Swamp Locks, 1897–1952. On file at Lowell National Historic Park.

- 1952 deep gate operation motorized with 3/4hp gear head motor, with sprockets and chain;
- 1953 gates converted to operate by remote control;
- 1971 north segment of gate house, covering 11 bays, removed.

5.3 Lower Pawtucket Canal - Lower Locks[14]

The Lower Locks were rebuilt in 1823, with a new dam constructed north of the locks. About 1841, a sluiceway was constructed at the north end of the dam. This was reconstructed and fitted with waste gates in 1887. Between 1946 and 1958, three concrete spillways were constructed over the dam.

5.4 Merrimack Canal[15]

In 1918, Locks and Canals proposed constructing a gate structure at Merrimack Dam. The Holyoke Machine Company of Worcester, Massachusetts, provided information for a hand-operated hoist system to be used for operation of a 3- by-8-foot gate. In October 1918, the work was delayed.

- Merrimack Canal Guard Gates
- YMCA Gates
- Moody Street Feeder Gate House
- Boott Penstock
- Merrimack Wasteway

5.5 Hamilton Canal - Wasteway Gate House

The two gates located in this building are operated by a rack-and-pinion system, with granite counterweights (Figure 5-1). The hoisting apparatus dates from 1903 and is similar in design and appearance to extant rack-and-pinion mechanisms in other locations, such as Swamp Locks and Lower Locks, within the system. This suggests that these rack-and-pinion mechanisms may all date from ca. 1900 (Figure 5-2).

5.6 Western Canal - Tremont Gates[16]

A 1911 blueprint shows a proposed arrangement for hoisting the gates by electric motor. In 1937, control of these gates was managed remotely from Lawrence Dam.

5.7 Western Canal - Lawrence Dam, Waterway & Canal[17]

In 1918, modifications were made to the existing hoist mechanism, which operated an 8.5-foot wide by 4.75-foot tall gate. The existing mechanism entailed three pairs of 12-inch iron wheels that rolled on an iron plate. The modifications were intended to permit operation by one man.

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[14] Booth, "Historic Structure Report," 2:323:343.
[15] Proprietors of Locks and Canals Records, 1813–1962. Series II. General Files. Box 50, Folder 5 - Merrimack Dam, 1915–1918. On file at Lowell National Historic Park.
[16] Proprietors of Locks and Canals Records, 1813–1962. Series II. General Files. Box 50, Folder 2 - Tremont Gates, 1911–1948. On file at Lowell National Historic Park.
[17] Proprietors of Locks and Canals Records, 1813–1962. Series II. General Files. Box 50, Folder 4 - Lawrence Dam, Wasteway, and Canal, 1913–1917. On file at Lowell National Historic Park.

Figure 5-1. Hamilton Wasteway Gate House, rack-and-pinion hoisting mechanism.

5.8 Northern Canal - Pawtucket Gate House[18]

The Northern Canal, which extended from the Merrimack River, just downstream from the Pawtucket Dam to the Western Canal, was designed and constructed between 1846 and 1848. The canal was intended to raise the total head of water by three feet. The Northern Canal Guard Gates, housed within the brick Guard House, control the flow of water into the canal. The ten guard, or sluice gates, were originally operated by a Francis turbine, the first turbine of this design ever constructed, that drove a system of belting and shafting (Figure 5-3, 5-4, 5-5, and 5-6). Alterations to the guard gates since 1848 include:

[18] Booth, "Historic Structure Report," 3:397–447.

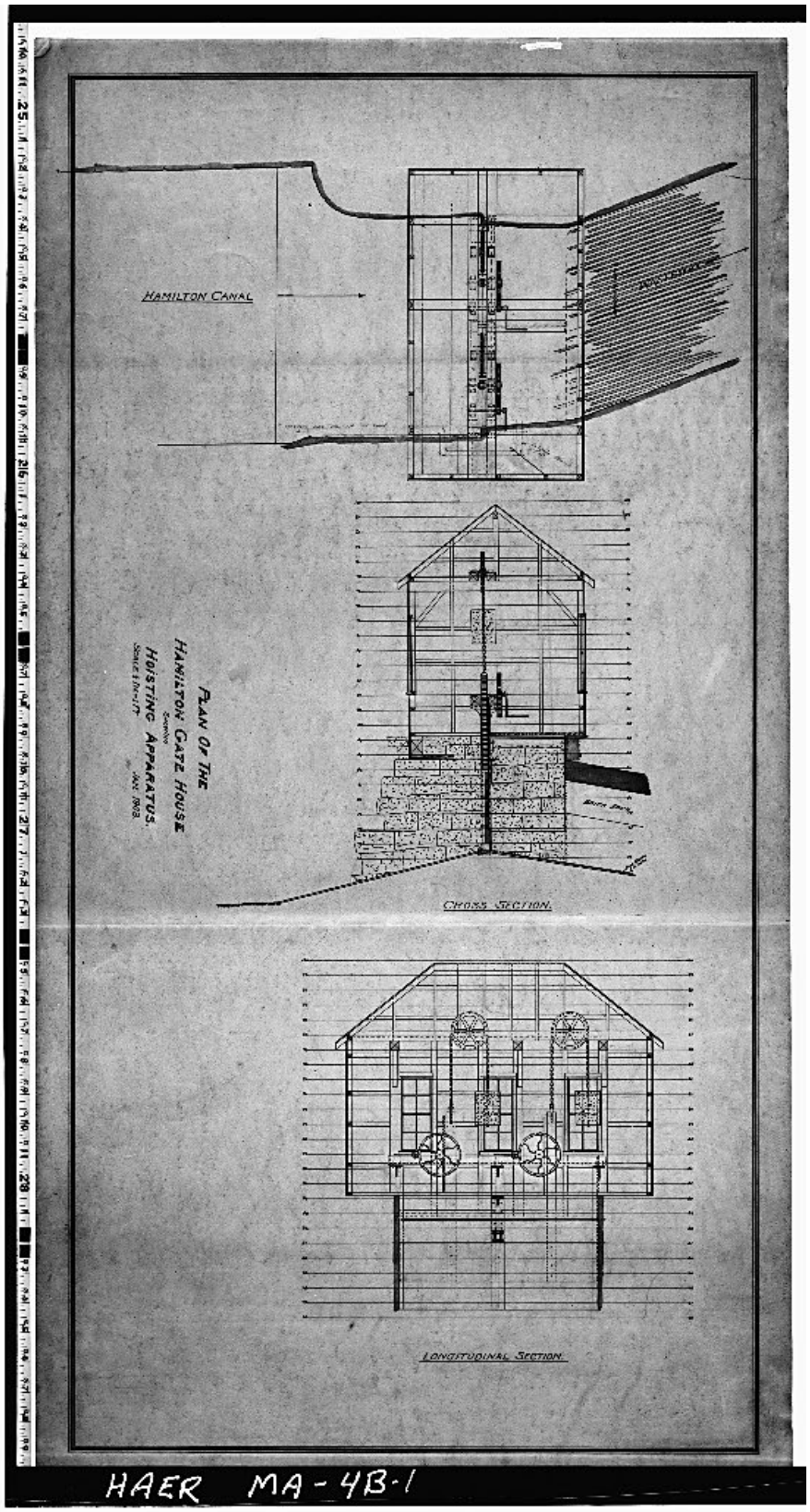

Figure 5-2. Hamilton Gate House hoisting apparatus, January 1903.

Figure 5-3. Belt drive sheave mounted atop Francis turbine.

Figure 5-4. Pawtucket Gate House, belt-and-line shaft system.

1878 main belt (96 feet long and 20 inches wide) replaced,
1881 main line shaft replaced,
1883 smaller belt pulleys replaced by friction pulleys and a clutch mechanism that permitted independent operation of each gate,
1891 turbine abandoned and hoist mechanism electrified,
1928 3 1891 electric motors replaced with a single 25-horsepower motor,
1950s 1928 electric motor replaced with a 10-horsepower motor for each gate.[19]

- Pawtucket Gate House
- Northern Canal Waste Gates
- Moody Street Feeder

[19] Thomas F. Mahlstedt. "Historic Structure Report: Northern Canal Guard Gatehouse Complex, Francis Gate Complex, Swamp Locks, Lower Locks: Archaeological Data Section." (Denver, CO: National Park Service Denver Service Center, 1983), 55.

Figure 5-5. Pawtucket Gate House, belt-and-line shaft system with electric motor drive in foreground.

Figure 5-6. Pawtucket Gate House, sluice gate casings, with belt drives above.

6.0 HISTORICALLY SIGNIFICANT WATERPOWER EQUIPMENT

As noted above, it is the totality of the system of waterpower and water-control machinery at Lowell that is historically significant. Removal and replacement of individual pieces of equipment was nearly continual, from the day the system first became operational. Removal or alteration of existing equipment would constitute an adverse effect upon the qualities that make the existing system historically significant if they prevented or precluded the system from operating. Several pieces of equipment appear to be historically significant, distinct from their role as a part of the larger system. These pieces of equipment include the surviving 1870 hydraulic gate hoist system at the Pawtucket Canal Guard Locks, and the Francis turbine powered belt-and-line shafting gate operating system at the Pawtucket Gate House. The extant gate operating system at the Moody Street Feeder Gate House (Figure 6-1 and 6-2) is likely also significant in its own right.

Figure 6-1. Moody Street Gate House, gate hoisting mechanisms.

Figure 6-2. Moody Street Gate House, detail of gate hoisting mechanism

7.0 CURRENT OWNERSHIP

Boott owns, or is responsible for, the equipment located within the canal systems gatehouses and other facilities, but is not responsible for most buildings, the canal prism, lock gates, or dams. In essence, Boott is only responsible for the equipment and devices that control the flow of water through the canal system. These elements, including flashboards, gates, and their operating equipment, have been upgraded and altered on many occasions.

The 1870 hydraulic gate hoist system at Pawtucket Canal Guard Locks is likely owned in part by PLC and the Commonwealth of Massachusetts, acting through the Massachusetts Department of Recreation and Conservation (MADCR). MADCR appears to own the Francis turbine-powered belt-and-line shafting gate operating system at the Pawtucket Gate House. The extant gate operating system at the Moody Street Feeder Gate House is also likely owned by PLC.

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Operation Analysis of the Lowell Canal Study

Lowell Hydroelectric Project (FERC No. 2790)

February 25, 2021

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Central Rivers Power

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List of Acronyms

Boott	Boott Hydropower, LLC (or Licensee)
CFR	Code of Federal Regulations
cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission (or Commission)
ILP	Integrated Licensing Process
kW	kilowatt
MW	megawatt
NGVD 29	National Geodetic Vertical Datum of 1929
Project	Lowell Hydroelectric Project (or Lowell Project)
Proprietors	Proprietors of the Locks and Canals
RM	river mile
ROR	run-of-river
SPD	Study Plan Determination

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1 Introduction and Background

Boott Hydropower, LLC (Boott or Licensee) is the Licensee, owner, and operator of the 20.2-megawatt (MW) Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (CFR) Part 5.

In accordance with 18 CFR §5.15, Boott has conducted studies as provided in the study plan and schedule approved in the Commission's March 13, 2019 Study Plan Determination (SPD) for the Project.[1] This report describes the methods and results of the approved Operation Analysis of the Lowell Canal Study.

1.1 Project Description and Background

The Lowell Project is located at river mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of:

1) A 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket Dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high, pneumatically-operated crest gates deployed in five independently-operable zones;
2) A 720-acre impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29;
3) A 5.5-mile-long canal system which includes several small dams and gatehouses;
4) A powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 MW;
5) A 440-foot-long tailrace channel;
6) Four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Pawtucket, Hamilton, and Eastern canal systems containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW;

[1] The Commission issued a Revised Process Plan and Schedule on June 12, 2020.

7) A 4.5-mile-long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid;

8) Upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse and a vertical-slot fish ladder at the Pawtucket Dam; and

9) Appurtenant facilities.

At the normal pond elevation of 92.2 feet NGVD 29 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet.

The Project operates in a run-of-river (ROR) mode using automatic pond level control capability of the E.L. Field Powerhouse and has no usable storage capacity. Boott normally operates the Project to maximize flow through the available units at the E.L. Field Powerhouse, then routes any additional flows through the Pawtucket Canal system. The E.L. Field turbine-generator units are more efficient and operate at a higher head than the older canal units and are, therefore, the priority first-on, last-off units in the Project operations scheme. When river flows exceed the hydraulic capacity of the E.L. Field units (approximately 3,300 cubic feet-per-second [cfs] per unit or 6,600 cfs for both units), excess flows up to approximately 2,000 cfs are routed through the downtown canal system and to the canal units. Any flows in excess of approximately 8,600 cfs (6,600 cfs at E.L. Field plus 2,000 cfs via canals) are passed over the Pawtucket Dam spillway. Pursuant to Article 37 of the existing FERC license, the Project maintains a minimum flow of 1,990 cfs or inflow, whichever is less, as measured immediately downstream from the Project.

On December 2, 2020, Boott filed a Draft License Application (DLA) with the Commission pursuant to 18 CFR §5.16(a). As described in the DLA, Boott is proposing to remove the four canal power stations (Assets, Bridge Street, Hamilton, and John Street) and associated canal infrastructure from the new FERC license. Operation of the canal units is no longer economically feasible, and Boott is not proposing to continue generation at these four developments. Boott will continue to manage the canal structures, water levels, and flows using best practices and consistent with current agreements with the National Park Service and other stakeholders.

2 Study Goals and Objectives

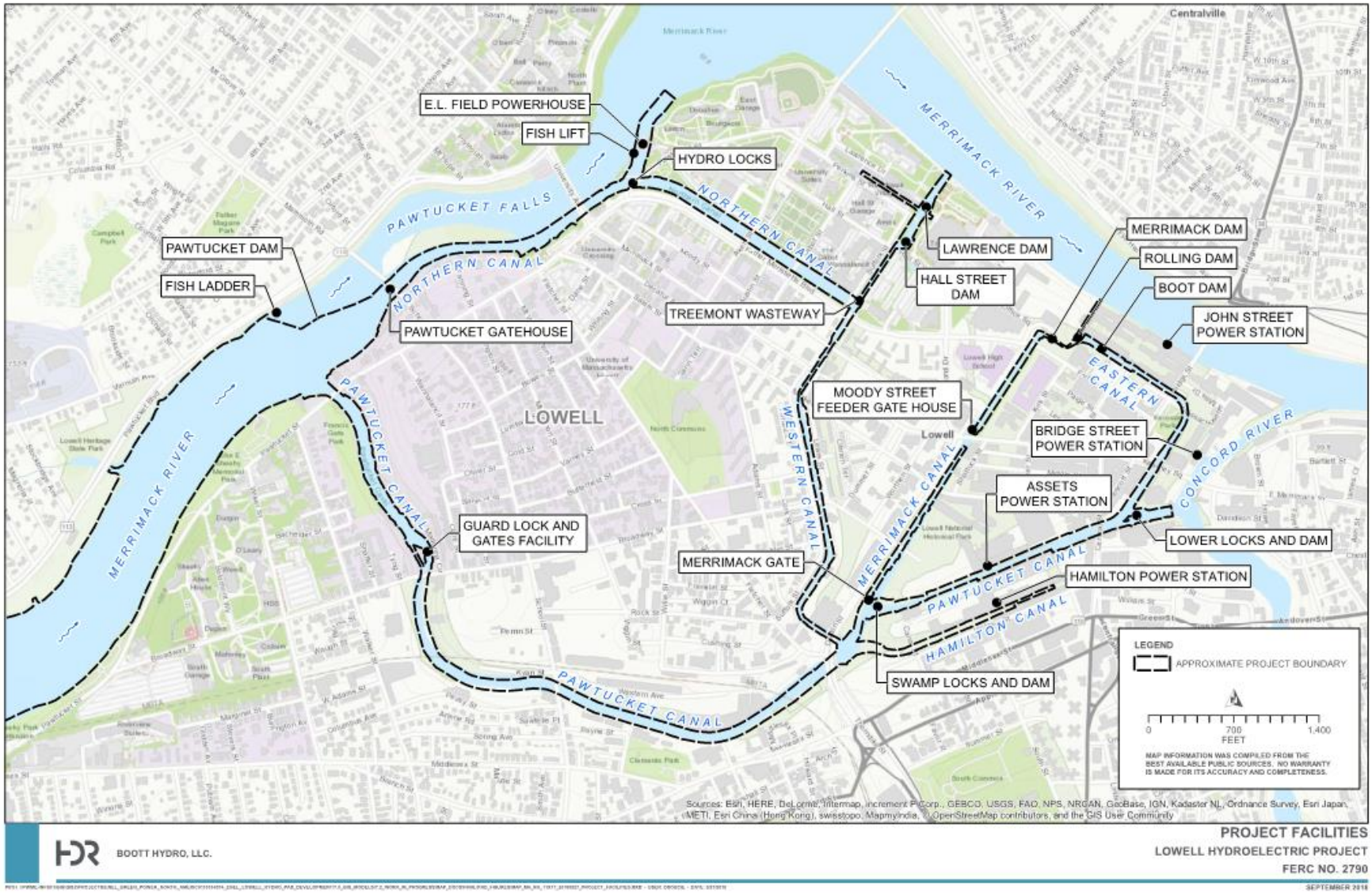
The goal of this study is to understand the operations of the Project's canal system. The specific objective of this study is to describe, to the extent possible, the operations of the canal system, which include, but are not limited to:

- How all of the canal units interact with the main units at the E.L. Field Powerhouse;
- How the canal units are sequenced;
- How often each of the canal units operate;
- The prioritization sequence of canal unit operations; and
- The amount of time the canal units are operated during the downstream passage season.

3 Study Area

The study area for the Operation Analysis of the Lowell Canal Study includes the Project's canal system and powerhouses located in the City of Lowell (Figure 3-1).

Figure 3-1. Existing Project Boundary and Facilities of the Lowell Canal System



4 Methodology

4.1 Literature Review

Boott conducted a desktop file review to examine current Project operational protocols and historical canal operations data. The canal units have experienced repeated maintenance issues, and generation is marginal, inefficient, and uneconomical under current conditions. Several of the canal system units have experienced prolonged outages in recent years, and the canal system as a whole has not been operated for purposes of generation in more than a year.

Historically, it has not been Boott's practice to log or otherwise record which of the individual canal units or powerhouses were in operation on a daily basis. As such, Boott does not have records of when individual canal powerhouses or units were operating. In general, operational data for the canal system is limited, and recent changes in both Project ownership and staffing have further compounded this issue.

To address the goals and objectives of this study, Boott reviewed data from a 10-year period of typical canal unit operations from 1998 – 2007. Data from this period was utilized in this analysis as it represented a relatively normal period of canal operations in which many (although not necessarily all) of the canal units were available for dispatch at Merrimack River flows in excess of 6,600 cfs capacity of the E.L. Field Powerhouse units. While the dataset does not indicate which specific units or powerhouses were operating, it does include aggregate records of generation (in kilowatts [kW]) for the downtown canal system recorded at 08:00 AM on a daily basis for the period of record. This data can be used to estimate how often canal units were operated on an annual basis and during downstream passage seasons. Because generation was reported in the aggregate, it is not possible to determine specifically which units or combination of units were in operation on a daily basis. Similarly, the dataset provides only a "snapshot" of daily generation at 08:00 AM; therefore, the data does not provide information on intra-daily changes in generation. However, Boott believes that this dataset provides a means of characterizing generation trends in the Project's canal system annually and for downstream passage seasons.

5 Study Results

5.1 Project Generating Units

At present, the Project includes a total of 17 generating units, including two units at the E.L. Field Powerhouse and 15 units at the downtown canal powerhouses. Generating unit characteristics are summarized in Table 5-1.

Table 5-1. Lowell Project Generating Unit Characteristics

Powerhouse	Unit #	Type	Size (Inches)	Speed (RPM)	Net Head (Feet)	Flow Rate (cfs)	Power (HP)	Power (kW)
E. L. Field	1	Fuji Horizontal Full Kaplan	152.4	120	39	3,300	11,540	7,506
E. L. Field	2	Fuji Horizontal Full Kaplan	152.4	120	39	3,300	11,540	7,506
Assets	1	Hercules Double Runner Styles C & D	33 and 31	150	13	376	444	265
Assets	2	Hercules Double Runner Styles C & D	33 and 31	150	13	376	444	265
Assets	3	Hercules Double Runner Styles C & D	33 and 31	150	13	376	444	265
Bridge Street	4	Hercules Type D Single Runner	42	138.5	22	333	655	360
Bridge Street	5	Hercules Type D Single Runner	42	138.5	22	333	655	360
Bridge Street	6	Hercules Type D Single Runner	42	138.5	22	333	655	360
Hamilton	1	Leffel Type Z Single Runner	45	120	13	374	459	280
Hamilton	2	Leffel Type Z Single Runner	39	133	13	279	341	190
Hamilton	3	Leffel Type Z Single Runner	36	150	13	237	287	160
Hamilton	4	Leffel Type Z Single Runner	45	120	13	374	459	280
Hamilton	5	Leffel Type Z Single Runner	45	120	13	374	459	280
John Street	3	Leffel Single Runner	33	200	21	250	482	300
John Street	4	Leffel Single Runner	33	200	21	250	482	300
John Street	5	Leffel Single Runner	33	200	21	250	482	300
John Street	6	Allis Chalmers Single Runner	72	100	21	1,000	1,925	1,200

5.2 Project Operations and Unit Dispatch Sequence

5.2.1 General Project Operations

As noted above, the Project operates in a ROR mode with no usable storage capacity. The two generating units at the E.L. Field Powerhouse are the most efficient units and are, therefore, the priority first-on, last-off units. It has been Boott's practice to dispatch the canal units when Merrimack River flows exceed the combined 6,600 cfs hydraulic capacity of the units at the E.L. Field Powerhouse. At flows higher than 6,600 cfs, Boott would typically divert up to 2,000 cfs to the canal units. Flows higher than 8,600 cfs (the combined capacity of the E.L. Field Powerhouse and the canal units) are spilled over the Pawtucket Dam spillway and into the Project's bypass reach.

5.2.2 Canal Unit Dispatch Sequence

In general, the canal unit dispatch sequence is intended to maximize the efficiency of units. Due to the imbalance of unit flow capacities between the units along the Hamilton Canal and the lower Pawtucket and Eastern canals, the Hamilton units would generally be the first units to be dispatched at Merrimack River flows in excess of 6,600 cfs. The Bridge Street units along the lower Pawtucket Canal and the John Street units along the Eastern Canal would then typically be sequenced to match the operating Hamilton canal units.

Notwithstanding this ideal unit dispatch sequence, Boott notes that the canal units have not been operated regularly in many years due to maintenance issues and other factors. In practice, the historical sequence for individual unit dispatch in each canal powerhouse has varied considerably depending on maintenance issues and unit operability. Historically, operators evaluated individual units based on flow conditions, operating efficiency, safety factors, and maintenance conditions prior to dispatching units for generation. As noted above, the canal units have not been operated in more than a year.

5.2.3 Historical Canal Unit Operations

As discussed in Section 4.1 of this study report, there is limited historical operations data available for the Project's existing downtown canal units. Boott analyzed aggregate canal unit generation data from a 10-year period of typical canal operations (1998 – 2007) to characterize operation of the Project's canal units. Boott also analyzed canal unit operations during the May – July fish passage season for spent alosines and the August – November fish passage season for adult eels and juvenile alosines. This analysis is indicative of the percent of time the canal units would be expected to operate each month under normal operating conditions.

Based on this analysis, the Project's canal units were operated on 34 percent of days during the total period of record (January 1, 1998 – December 31, 2007). The Project's canal units were operated on 40 percent of days during the May – July fish passage

season and on 15 percent of the days during the August – November fish passage season. Table 5-2 summarizes operation of the canal units by year.

Table 5-2. Percentage of Days Canal Units were Operated by Year (1998 – 2007)

Year	Total Annual Percentage of Days Canal Units were Operated	Percentage of Days Canal Units were Operated May – July	Percentage of Days Canal Units were Operated August – November
1998	37%	54%	1%
1999	30%	7%	19%
2000	30%	38%	2%
2001	17%	24%	0%
2002	27%	49%	3%
2003	40%	36%	37%
2004	45%	35%	30%
2005	64%	78%	48%
2006	29%	53%	7%
2007	18%	30%	8%

Boott also analyzed the operations of the Project's canal units on a monthly basis for the period of record, as shown in Table 5-3.

Table 5-3. Percentage of Days Canal Units were Operated by Month (1998 – 2007)

Month	Percentage of Days Canal Units were Operated
January	31%
February	23%
March	52%
April	81%
May	62%
June	43%
July	16%
August	6%
September	12%
October	15%
November	29%
December	35%

Finally, Boott conducted an analysis to determine the total number of days per month that the canal units were operated during the 10-year period of record, as shown in Table 5-4.

Table 5-4. Number of Days Canal Units were Operated by Month and Year

Month	Year									
	1998	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Jan	8	12	2	0	0	3	9	31	31	0
Feb	14	21	7	0	1	0	0	11	12	0
Mar	31	30	30	9	15	11	27	2	0	5
April	30	17	30	30	25	30	30	30	7	15
May	15	6	30	8	27	24	21	27	6	28
Jun	20	0	5	14	17	9	11	27	27	0
Jul	15	0	0	0	1	0	0	18	16	0
Aug	0	0	2	0	0	11	4	0	2	0
Sep	0	9	0	0	0	2	19	5	0	0
Oct	0	10	0	0	0	8	5	23	0	1
Nov	1	4	0	0	4	24	8	30	6	9
Dec	0	2	5	0	9	24	31	29	0	7

6 Summary and Discussion

The Lowell Project's canal generating units have experienced maintenance issues that have prevented normal operation of the units for the past several years. Limited operational data is available for the canal units, and it has not been Boott's practice to record individual canal unit or powerhouse start/stop times or daily generation. In order to address the goals and objectives of the Operation Analysis of the Lowell Canal Study, Boott reviewed available data from a period of relatively normal canal unit operations (1998 – 2007) to characterize how often the canal units were operated on an annual basis and during the May – July and August – November downstream fish passage seasons. Based on the available data, canal unit operations varied considerably from year-to-year. In general, this can be attributed to two primary factors:

- **Merrimack River Flows:** Boott prioritizes generation at the E.L. Field Powerhouse, and the downtown canal units are not dispatched until Merrimack River flows exceed the combined 6,600 cfs hydraulic capacity of the E.L. Field Powerhouse's two generation units;
- **Unit Maintenance and Operability:** The majority of the canal units were last upgraded in the 1940s and are now almost 80 years old. These units are routinely out-of-service for maintenance or because they are simply inoperable.

As discussed in Boott's December 2, 2020 DLA for the Project, operation of the canal units is no longer economically feasible, and Boott has proposed to remove the downtown developments (Assets, Bridge Street, Hamilton, and John Street) from the Project's FERC license. Boott is not proposing to restart or continue generation at these four developments.

7 Variances from FERC-Approved Study Plan

The Operation Analysis of the Lowell Canal Study was conducted in full accordance with the methods described in the FERC-approved study plan except for the following variances:

- The approved study plan directs Boott to describe how often each of the canal units operate and the amount of time canal units operate during the downstream passage season. As discussed in this study report, it has not been Boott's practice to record individual canal unit operations or document unit start/stop times. Accordingly, Boott reviewed and analyzed records from a period of relatively normal canal unit operations that reflect a daily "snapshot" of aggregate canal unit generation.

Three-Dimensional Computational Fluid Dynamics Model Study Report

Lowell Hydroelectric Project

(FERC No. 2790)

November 1, 2021

Prepared by:

HDR

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List of Acronyms

3D	three dimensional
ASCII	American Standard Code for Information Interchange.
AWS	auxiliary water supply
CFD	Computational Fluid Dynamics
cfs	cubic feet per second
DEM	digital elevation model
El.	elevation
FERC	Federal Energy Regulatory Commission (or Commission)
ft	feet
GIS	Geographic Information System
LAS	LASer file format
LiDAR	Light Detection and Ranging
NAD	North American datum
NAVD 88	North American vertical datum of 1988
NGVD 29	National Geodetic vertical datum 1929
Normandeau	Normandeau Associates, Inc.
Project	Lowell Hydroelectric Project (or Lowell Project)
RNG	Renormalized Group
STL	Standard Tessellation Language
Study	CFD Modeling Study
TIN	triangulated irregular network
URANS	Unsteady Reynolds Averaged-Navier Stokes
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
WSE	water surface elevation

1 Introduction

1.1 Purpose

The sections below detail the methods used to develop the Computational Fluid Dynamics (CFD) model and provide the requested data for the Lowell Hydro Fish Passage CFD study. This technical memo describes the numerical methods, model geometry, mesh development, boundary conditions, and results.

1.2 Background

The Federal Energy Regulatory Commission's (FERC) June 15, 2018 Scoping Document 1 identified the environmental resource issues at the Lowell Hydroelectric Project (Project) (FERC Project No. 2790) for analysis. The U.S. Fish and Wildlife Service, National Marine Fisheries Service, Massachusetts Division of Fisheries and Wildlife, and New Hampshire Fish and Game Department submitted formal requests for a CFD Modeling Study (Study) of the Project's fish passage facilities.

The goal of the Study is to determine the flow field conditions that exist in and around the Project's fish passage facilities, including around the fishway entrances, within fishway structures, and in the E.L. Field Powerhouse forebay. Information derived from this Study may be used in conjunction with telemetry and other studies performed for the Project relicensing (American Eel Passage Downstream Study, Juvenile Alosine Downstream Study, and Adult Alosine Passage Study Upstream and Downstream) to analyze fish behavior in response to hydraulics. This is anticipated to aid in the interpretation of preferable conditions for the guidance of migrating fish to and through the fish passage facilities.

The study area includes a portion of the Pawtucket Dam E.L. Field Powerhouse forebay, tailrace, and fish lift, the bypass reach in the vicinity of the Pawtucket Dam fish ladder entrance, and within the fish ladder.

2 CFD Model Development

2.1 Model Description

FLOW-3D is a commercially available software developed and supported by Flow Science, Inc. that is capable of solving the three-dimensional (3D) Unsteady Reynolds Averaged-Navier Stokes (URANS) equations. The software utilizes a Volume of Fluid method to calculate the free surface within the domain (Hirt & Nichols, 1981). The package contains the meshing module (pre-processor), solver, and post-processor. FlowSight was used to produce the results presented below and is provided with the FLOW-3D software package.

2.1.1 Modeling Approach

The governing equations used in Flow-3D are provided in the software user's guide (Flow Science, Inc, 2019). The software solves fully URANS equations on structured grids. Model fitted meshes were developed for the Pawtucket Dam fish ladder, E.L. Field Powerhouse forebay and E.L. Field Powerhouse tailrace. Known water surface elevations (WSE) and/or known flowrates were applied to the upstream boundaries of the CFD models. Applying the known WSE reduces the complexity of the URANS equations.

PRESSURE SOLVER OPTIONS

Two numerical schemes are available for the pressure solver with multiple options. Explicit and implicit solvers are available. Within the implicit solver, multiple options are available. Limited compressibility models can be toggled to relax the constraints of the pressure solver for cases where solution stability is an issue. The implicit pressure solver was applied to the model for the results presented below.

TURBULENCE MODELS

Various one (Prandtl Mixing Length and Turbulent Energy Model) and two equation (k-ε, k-ω, and RNG) turbulence models are available in FLOW-3D. A large eddy simulation model is also available for selection depending on the type of flow expected and desired flow feature resolution. The Renormalized Group (RNG) model was selected and is an applicable closure for the CFD Study based on anticipated flow patterns (Orszag & Yakhot, 1986).

MODEL LIMITATIONS

The CFD model is limited in the data it can accurately produce. Some hydrodynamic features are not accurately modeled with the selected solver and turbulence closure. For example, recirculation patterns and vortices are approximate in size and strength. Results within this memorandum are subject to the inputs at the time of the study.

2.2 Model Geometry

HDR developed a topographic Digital Elevation Model (DEM) using Geographical Information Systems (GIS). All geo-processing of the following data sources was achieved using the ArcMap (Esri) application's 3D analyst geo-processing tools.

A single DEM was created from the following data sources:

- Ortho imagery Light Detection and Ranging (LiDAR) based elevation data collected by Normandeau Associates, Inc. (Normandeau) provided in coordinate system Universal Transverse Mercator (UTM) Zone 19N, North American datum (NAD) 83 2011, units meters, North American vertical datum of 1988 (NAVD 88), units meters.
- Bathymetry depth points collected by Normandeau from three areas; 1) just upstream of the main dam fish ladder, 2) the power canal, and 3) the powerhouse tail race. Data provided in coordinate system UTM Zone 19N, NAD 83 2011, units meters, vertical datum NAVD 88, units feet.

- LiDAR acquired from United States Geological Survey (USGS) LASer file (LAS) format 2011. Data provided in coordinate system UTM Zone 19N, NAD 83, units meters, vertical datum NAVD 88, units meters.

The domain for each of these data sources is presented on Figure 2-1.

Most of the coverage area required for CFD modeling was comprised of data received by Normandeau as a randomly spaced point cloud xyz file. The xyz file was derived from remotely sensed survey in NAVD 88 vertical datum. These data were transformed as a discrete point feature class using "American Standard Code for Information Interchange (ASCII) 3D to Feature Class" geo-processing tool. Both the horizontal coordinate system (UTM 83 meters) and vertical units (NAVD 88 meters) were maintained. Figure 2-1 shows the Project reach and model terrain data sources.

The vertical units for the bathymetric survey data points were converted from feet (ft) to meters in order to match the vertical units of the larger areas of the overall CFD model area. A final step of converting the terrain to National Geodetic vertical datum (NGVD 29) was performed by adding 0.242 meters (0.793 ft) to the vertical units.

In several small overbank areas upstream of the fish ladder and along the east bank of the power canal and tailrace, additional terrain data were needed to provide additional detail; USGS LiDAR randomly spaced point cloud data was utilized. These USGS LiDAR derived files were converted from LAS to points using geo-processing tools "LAS Dataset to triangulated irregular network (TIN)" then "TIN Node".

In the areas of the fish ladder and fish elevator, polygon feature class were created to depict a flat area higher in elevation (El.) than the bottom of the Sterolithography file in Standard Tessallation Language (STL) file format in order to exclude water from ‘seeping’ between the final terrain DEM and the STL.

All components as described above were combined into a TIN using the "Create TIN" geo-processing tool. This resulting TIN was then converted to a final DEM raster using "GIS software within ArcMap (ESRI). The final step was to convert the .tiff raster to ASCII file "Raster to ASCII" for final import into the CFD model.

The fish ladder and E.L. Field Powerhouse structures were created in AutoCAD and exported to an STL in NGVD 29 vertical coordinates. The STLs and ground surface were rotated to align to an arbitrary vertical position. The rotation allows the structure location to align with the orthogonal mesh elements required for the solver. The rotated model reduces the number of mesh elements necessary to define the features within the model domain.

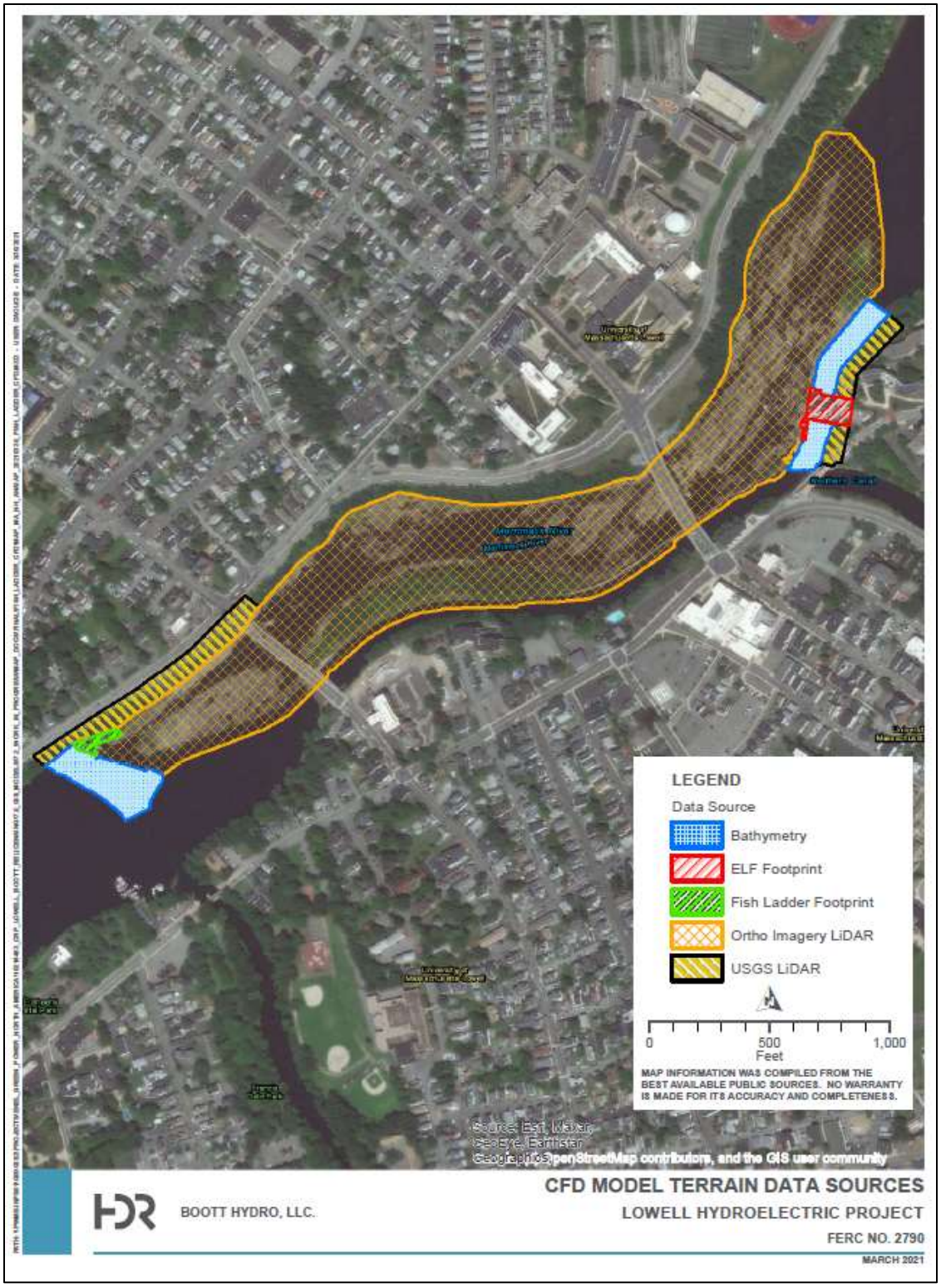

Figure 2-1: Data Sources Used in CFD Modeling Study Terrain Model Development

3 Mesh Development

The pre-processor for FLOW-3D works with orthogonal elements. The model topography and features were rotated to capture significant features with fewer elements. A balance between mesh density and computational time was desired. Several iterations of mesh density were performed, providing the basis for a mesh sensitivity analysis. A multi-block approach was utilized to build the model domain. The use of a multi-block domain allows multiple mesh sizes to be used throughout the domain. Each mesh block conformed to best practice guidelines provided by Flow Science (Flow Science, Inc, 2019).

3.1 Fish Ladder

3.1.1 Mesh Sensitivity Study

Multiple meshes of the fish ladder were analyzed to determine if the solution was grid independent. The first grid tested used 0.8-ft spacing in all three axial directions (coarse). After completion of the first simulation, the grid was refined to use a 0.4-ft spacing in all three axial directions (standard). The 0.4-ft mesh was further refined in a third test to limit the mesh spacing to 0.2-ft (refined). Figure 3-1 shows the meshed blocks with 0.4-ft spacing.

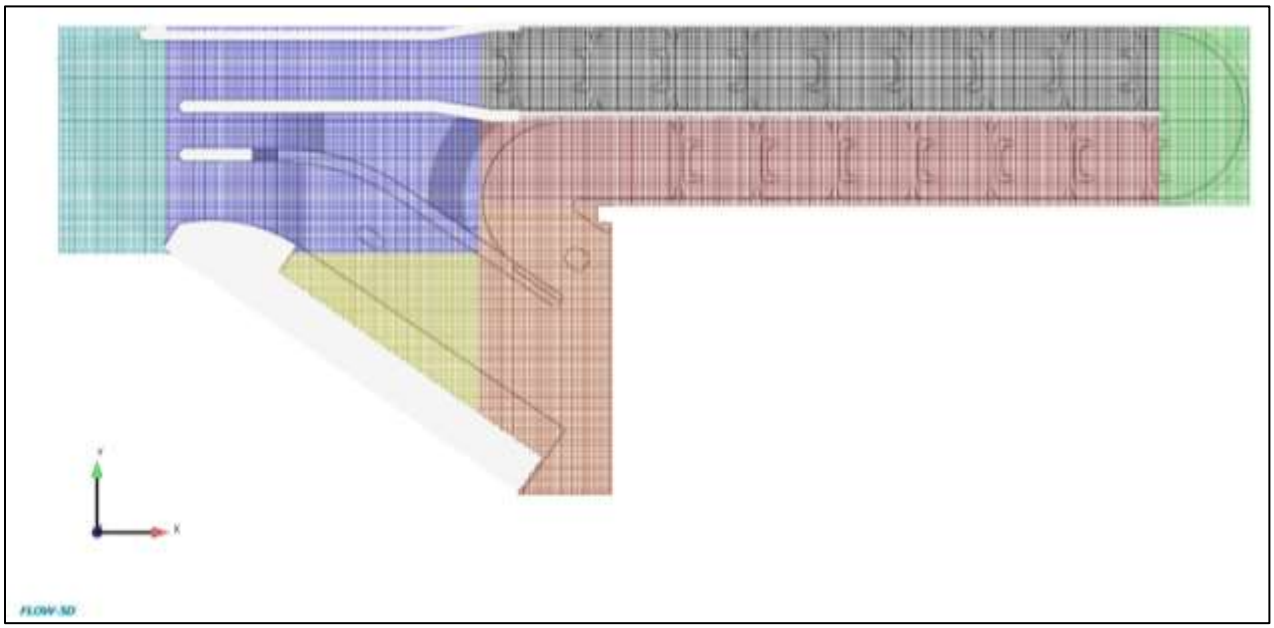

Figure 3-1: Fish Ladder Mesh Blocks (0.4-ft grid spacing)

During the mesh development stage of the CFD Study, multiple runs using identical boundary conditions were completed to determine the sensitivity to mesh parameters. Virtual probes measuring depth and velocity were placed throughout the fish ladder to measure the effects of the mesh refinement on model hydraulics.

The standard 0.4-ft grid spacing was used as a base for the final model. Further refinement to the vertical spacing resulted in a 0.2-ft vertical mesh size in the fish ladder. Additional refinements to the fish ladder mesh were assigned to the inflow area to improve model stability. WSE differences were minimal, and depth and velocity differences were minor between the refined and standard grid spacing.

3.1.2 Adding Terrain and Fish Ladder Features

Following the mesh sensitivity study, the Merrimack River bathymetry and Lowell Hydro Dam features were added upstream and downstream of the fish ladder. The combined bathymetry, dam, and fish ladder geometry is shown on Figure 3-2. It should be noted that the best available LiDAR data was used to capture the downstream bathymetry. Water levels in the Merrimack River at the time of LiDAR collection were such that only the five most up-stream weirs were captured in the terrain data. These weir geometries, and the face of the dam, were then refined within Flow-3D using existing as-built drawings as a guide. The bypass weirs were added to the model to provide a visual representation of potential flow features and not intended for detailed analysis.

A meeting between HDR and Boott Hydropower, LLC was held on March 2nd, 2021. Several updates to the fish ladder geometry were requested during the meeting and the following features were added:

- Baffles (2-ft and 4-ft) were installed along the inside and outside runs (facing downstream), respectively. These baffles sit approximately 6 inches above the floor of the fish ladder (shown on Figure 3-3).
- The inside section of the fish ladder exit has been sealed (shown on Figure 3-3).

The model extends from the upstream entrance of the fish ladder approximately 1000 ft downstream to the Mammoth Road Bridge.

As the fish ladder was the area of interest, the combined model mesh was refined to 0.4-ft grid spacing in the x- and y-axial directions and 0.2-ft grid spacing in the z-axial direction in the fish ladder vicinity. To facilitate reasonable computation run times, the mesh refinement was decreased from 0.4-ft, to 0.8-ft, and finally 1.6-ft grid spacing in the x- and y-axial directions moving away from the ladder. For the bypass reach blocks (non-fish ladder mesh blocks), the z-axial mesh spacing was a constant 0.4-ft. The three refinement levels are shown on Figure 3-4 as red (0.4-ft), green (0.8-ft) and blue (1.6-ft grid spacing) areas.

3.1.3 Bypass Weir Modifications

After discussions of preliminary results for the bypass area, a request to modify the bypass weirs to reflect the recommended configuration was made. The modifications to the bypass weirs were done to match the surveyed elevations of the recommended configuration. The surveyed elevation was originally provided on April 1st, 2021 (US Fish and Wildlife, 2014). The modified weir configuration was confirmed on a call with the Zone of Passage working group on June 21, 2021.

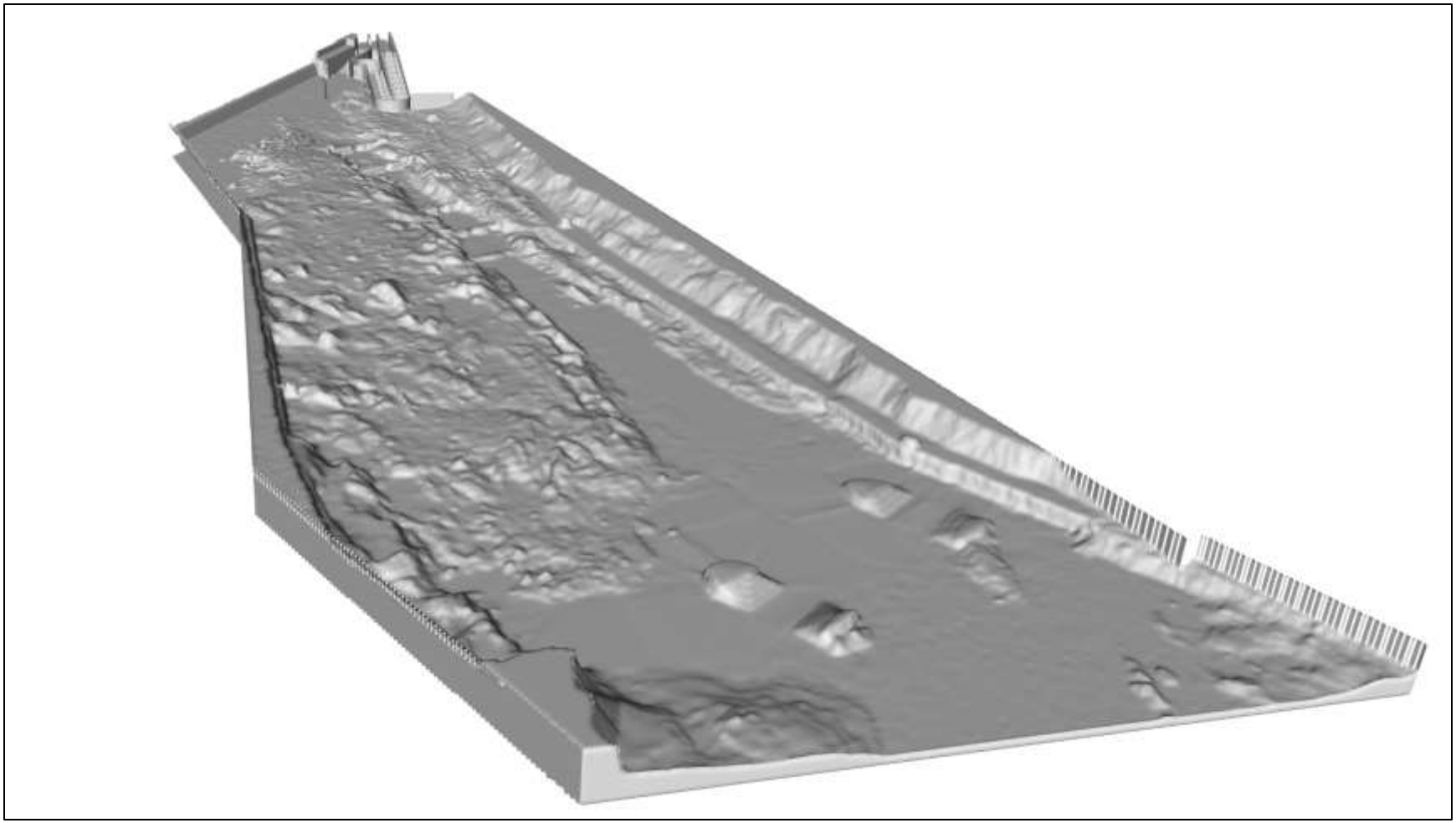

Figure 3-2: Combined Fish Ladder, Dam, and Bathymetry Geometry

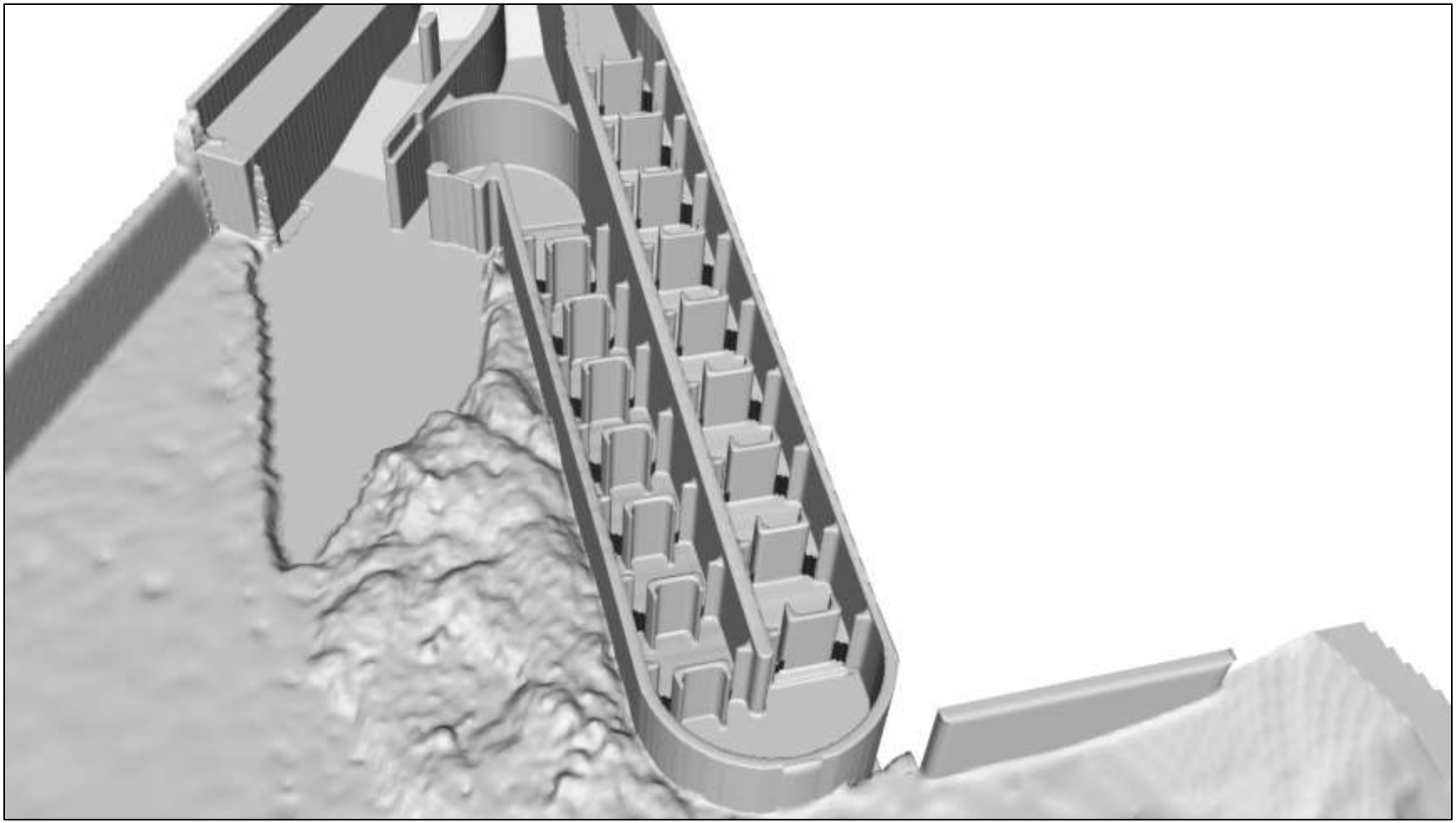

Figure 3-3: Fish Ladder Baffles (black) and Sealed Exit Section

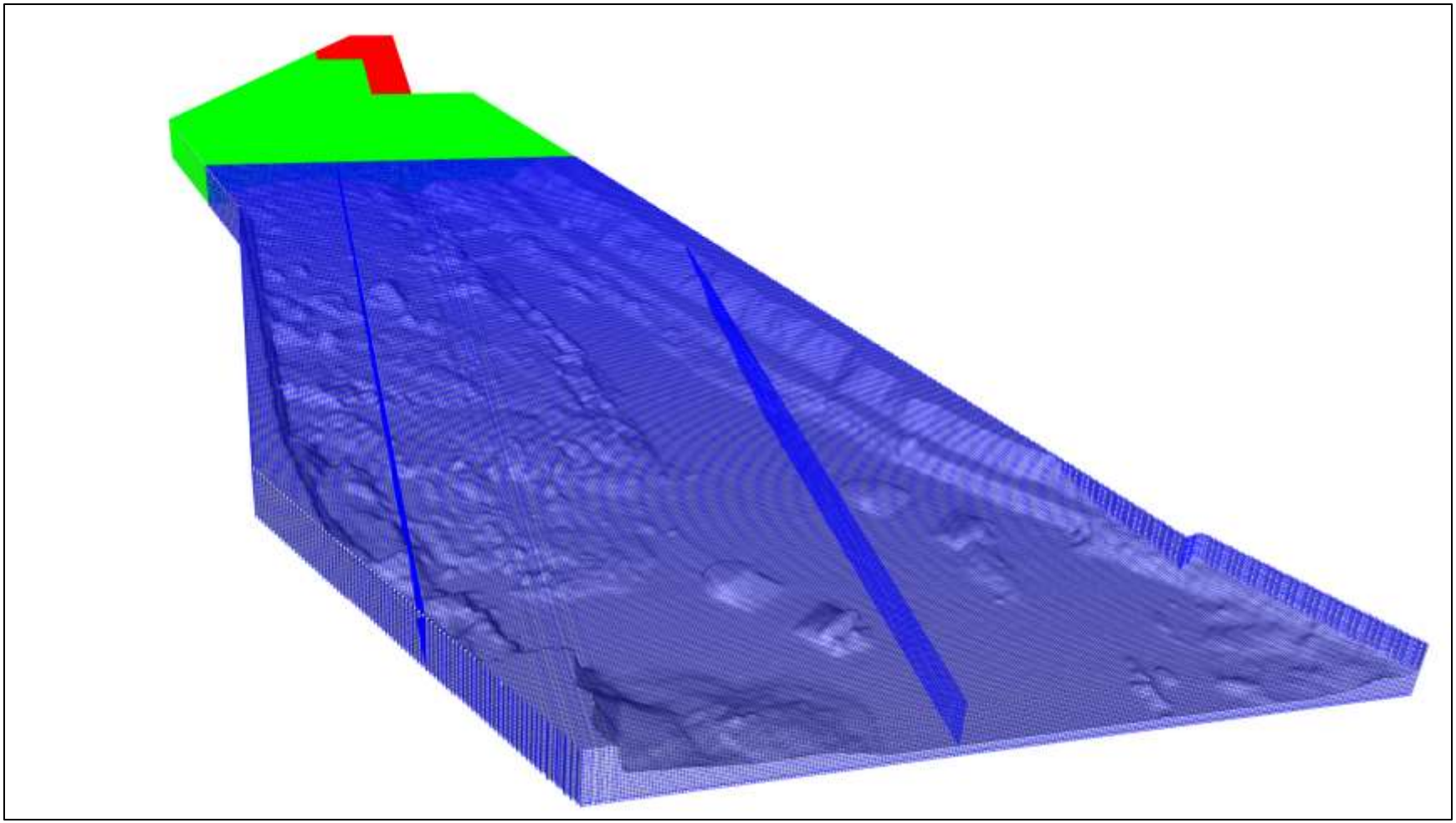

Figure 3-4: Combined Fish Ladder, Dam, and Bathymetry Mesh Refinement Zones

3.1.4 Model Scenarios

Table 3-1 lists the model analysis scenarios for the fish ladder model. The three simulations feature different inflow conditions to vary the hydraulics through the reach. It was assumed the fish ladder and diffuser flow was consistent between all three simulations. The flow (in cubic ft per second [cfs]) over the crest gate was assigned to a mass source using a unit flow rate calculation to evenly distribute flow over the crest.

Table 3-1: Model Analysis Scenarios for the Fish Ladder Model

Case	Fish Ladder (cfs)	Diffuser (cfs)	Crest Weir (cfs)	Sluice (cfs)	Notes:
1	30	60	300	0	Uses 40 ft section of crest weir adjacent to fish ladder
2	30	60	0	360	N/A
3	30	60	19,310	0	5% duration (26,000 cfs) minus E.L. Field Powerhouse operating at full capacity (6,600 cfs)
3	47	60	0	360	5% duration (26,000 cfs) minus E.L. Field Powerhouse operating at full capacity (6,600 cfs)

3.2 E.L. Field Powerhouse Forebay Model

A forebay model was developed to study the hydraulics of flow to the powerhouse. The full model geometry is shown on Figure 3-5.

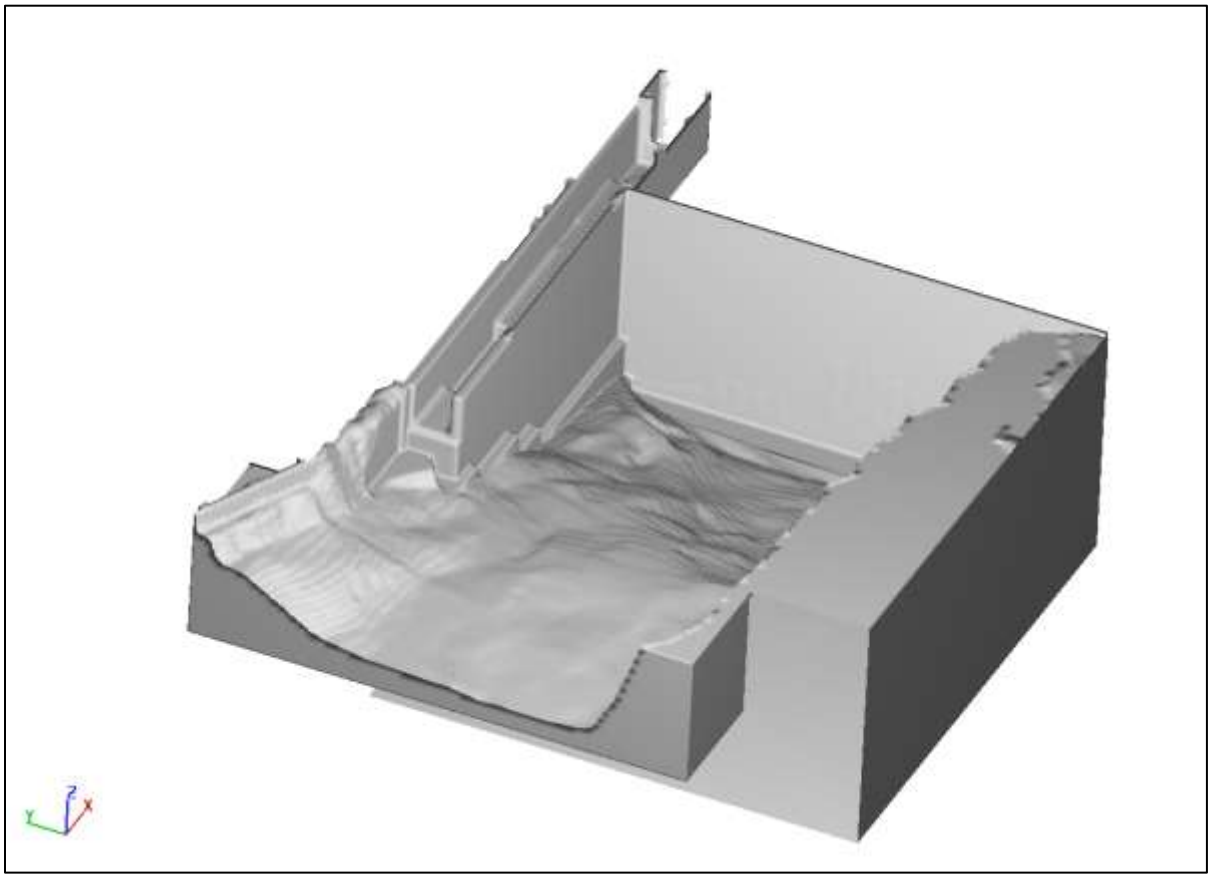

Figure 3-5: E.L. Field Powerhouse Forebay Model Geometry

3.2.1 Mesh Sensitivity Study

A mesh sensitivity study on the forebay model was completed with multiple mesh sizes. The first simulation used a 1.0-ft mesh in all three axial directions. Once the simulation was complete, the mesh was refined to use a 0.5-ft mesh.

The large recirculation patterns and low velocities resulted in similar results for the simulated meshes. The final mesh size was 0.5-ft in all axial directions.

3.2.2 Model Scenarios

Table 3-2 lists the boundary conditions for the forebay model. The forebay model used a constant WSE flow from the powerhouse channel as the upstream boundary condition. Mass sinks were used to allow flow to be removed from the powerhouse tunnels and the auxiliary water supply.

Table 3-2: CFD model scenarios for forebay model

Case	Unit 1 Discharge (cfs)	Unit 2 Discharge (cfs)	AWS Discharge (cfs)	Forebay WSE (ft, NGVD29 [NGVD88])	Notes:
1	3,300	3,300	130	91.0 [90.2]	5% exceedance flow tailwater El. (26,000 cfs)
2	1,310	1,310	130	91.0 [90.2]	75% exceedance flow tailwater El. (2,750 cfs)
3	600	600	130	91.0 [90.2]	Minimum unit operations

3.3 Tailrace Model

A tailrace model was developed to study the hydraulics of the flow leaving both the powerhouse and the auxiliary water supply (AWS). The full model geometry is shown on Figure 3-6. A detailed view of the powerhouse exits and flow directions with approximate powerhouse discharge and AWS boundaries is shown on Figure 3-7.

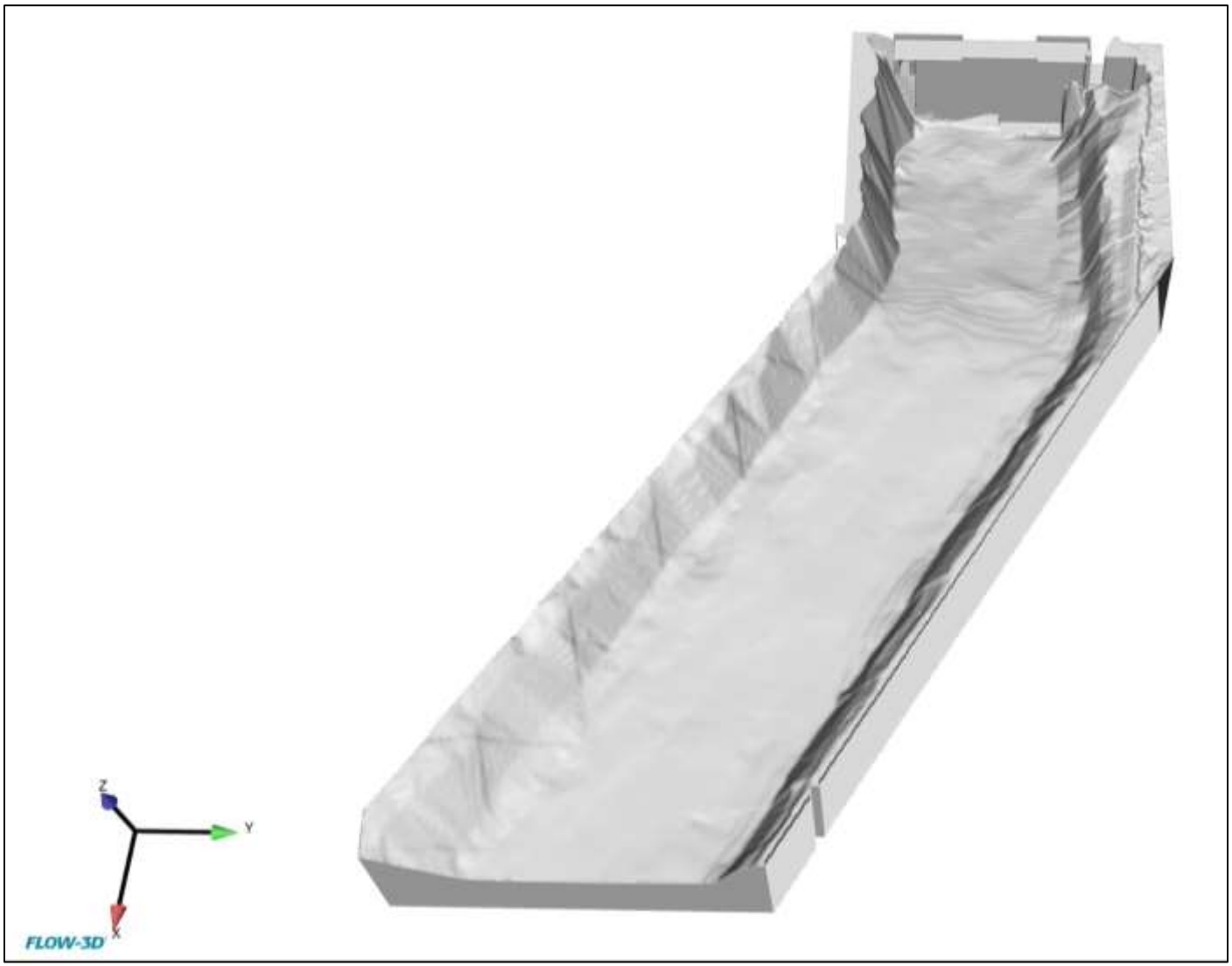

Figure 3-6:Tailrace Model Geometry

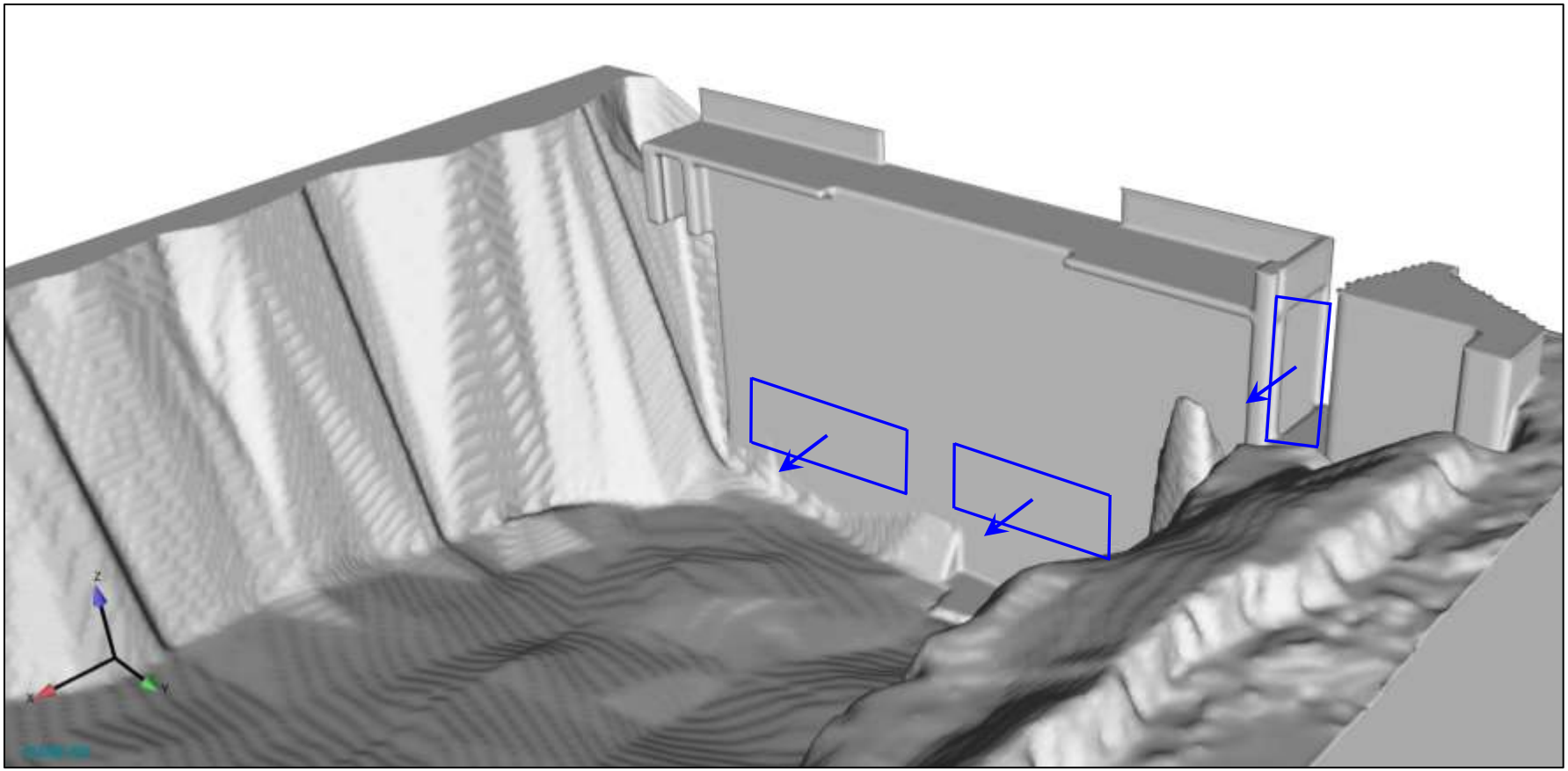

Figure 3-7:Tailrace Model Geometry, ELF Exit and Powerhouse Inflow Boundaries

3.3.1 Mesh Sensitivity Study

Multiple meshes were analyzed to determine if the solution was grid independent. The first grid tested used 1.6-ft spacing in all three axial directions. After completion of the first simulation, the grid was refined to use a 0.8-ft spacing in all three axial directions. Sensitivity to a second refinement was then analyzed. To ensure reasonable computation run times, the model mesh was then refined in the first 100 ft downstream of the powerhouse to 0.4-ft spacing in all three axial directions. The remainder of the domain was left at 0.8-ft spacing for the most refined. Figure 3-8 shows the mesh for the 0.8-ft spacing in the vicinity of the powerhouse.

A 0.8-ft mesh spacing in all directions for the entire tailrace model was chosen for the final analysis.

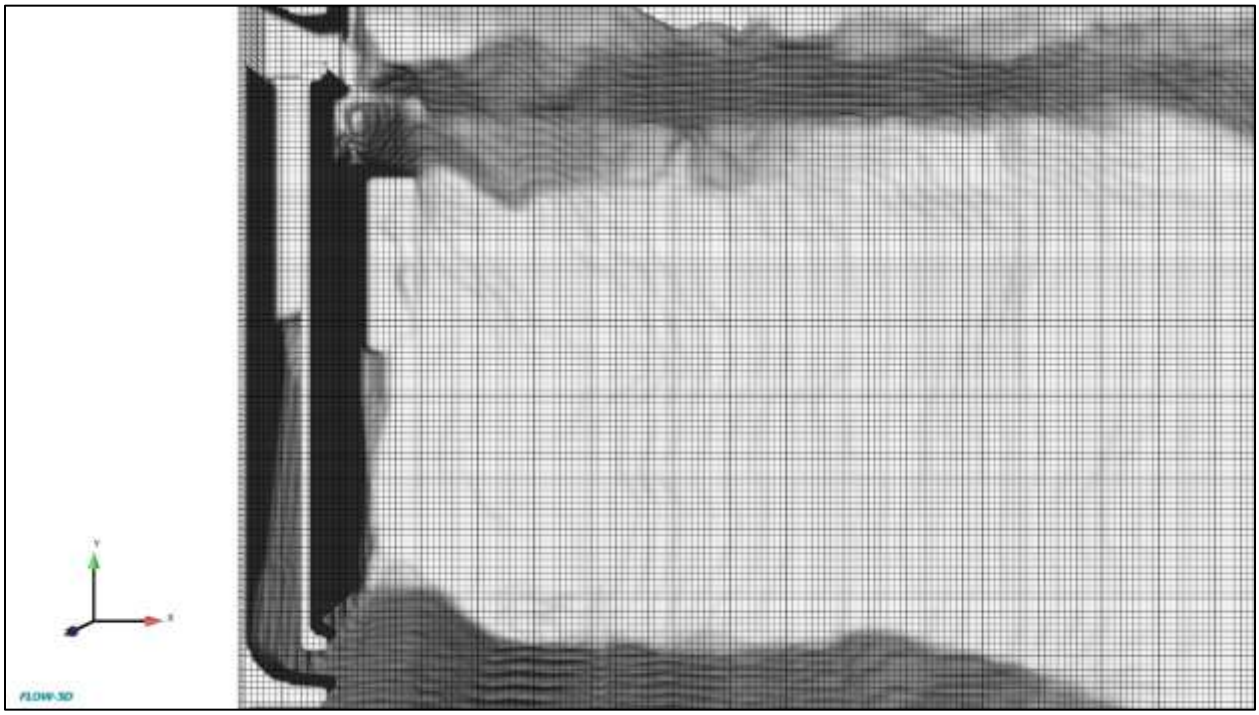

Figure 3-8: Typical Mesh Layout for Tailrace Model

3.3.2 Model Scenarios

Table 3-3 lists the boundary conditions for the tailrace model. The tailrace model used mass sources to add flow from the powerhouse units and the auxiliary water supply.

Table 3-3: CFD model scenarios for tailwater model

Case	Unit 1 Discharge (cfs)	Unit 2 Discharge (cfs)	AWS Discharge (cfs)	Tailwater WSE (ft, NGVD29 [NAVD88])	Notes:
1	3,300	3,300	100	58.36 [57.57]	5% exceedance flow tailwater El. (26,000 cfs)

Case	Unit 1 Discharge (cfs)	Unit 2 Discharge (cfs)	AWS Discharge (cfs)	Tailwater WSE (ft, NGVD29 [NAVD88])	Notes:
2	3,300	3,300	100	53.17 [52.38]	50% exceedance flow tailwater El. (6,800 cfs)

3.4 Model Approach

3.4.1 Boundary Conditions

Boundary conditions for the CFD model were applied through multiple boundary types, as listed below:

VOLUME FLOW INLET

The volume flow inlet allows a specified volume of flow to enter the model and was used at the upstream boundary of the model. A directional vector was applied to the inflow. The water surface was known and was specified for the inflow boundary condition.

PRESSURE INLET/OUTLET

The pressure boundary conditions specify a known pressure and/or WSE for the boundary.

MASS MOMENTUM SOURCE/SINK

The mass momentum source/sink allows a specified volume of flow to enter/exit the model at a specific location not associated with a mesh block boundary. This boundary type was used at the crest weir, auxiliary water supplies (AWS) and powerhouse inlet/outlet. A directional vector and uniform velocity distribution were applied to the inflow.

WALL

The boundary type wall applied the no-slip condition at the outer boundary of the mesh blocks as well as a zero-velocity condition normal to the boundary.

ROUGHNESS HEIGHT

The roughness height for the structures and topography was set to 0.003 ft, consistent with concrete.

3.5 Model Evaluation

Completed model runs were evaluated quantitatively and qualitatively using velocity magnitude and flow streamlines. The CFD model solves the URANS equations, and data presented at a single time step may contain a maximum or minimum value, which may or may not correspond to the anticipated hydraulic characteristics.

FLUX SURFACES

Flux surfaces were used to monitor the volumetric flow through portions of each CFD model. The surfaces were monitored for mass/volume balance of flow through the model.

MONITORING POINTS

Monitoring points were placed within the model to gather point data for the ladder, powerhouse channel, and tailrace. The monitoring points were selected based on their proximity to key model elements.

4 Results

4.1 Fish Ladder

Three fish ladder simulations were identified in the project scope. Plots showing velocity contours and vectors are presented in plan and profile views. Note the profile views are cut through the center of the inner and outer runs of the fish ladder. Streamlines through the fish ladder and in the immediate downstream region are presented in plan view. An isometric view of the water surface colored by velocity is also presented in the vicinity of the downstream weirs.

4.1.1 Case 1

Normal operation flow through the fish ladder was identified for each of the inlet features: diffuser, ladder, and crest gate. Case 1 assigns 300 cfs over the adjacent crest weir, 60 cfs through the diffuser, and 30 cfs through the fish ladder. The sluice gate is closed for Case 2.

Streamlines colored by velocity are shown on Figure 4-1. Figure 4-2 shows velocity vectors and contours. Figure 4-8 and Figure 4-4 show velocity vector and contour profiles for the inside and outside runs of the fish ladder upstream and downstream of the 180º bend in the fish ladder, respectively. Figure 4-5 shows the water surface colored by velocity in the vicinity of the weirs.

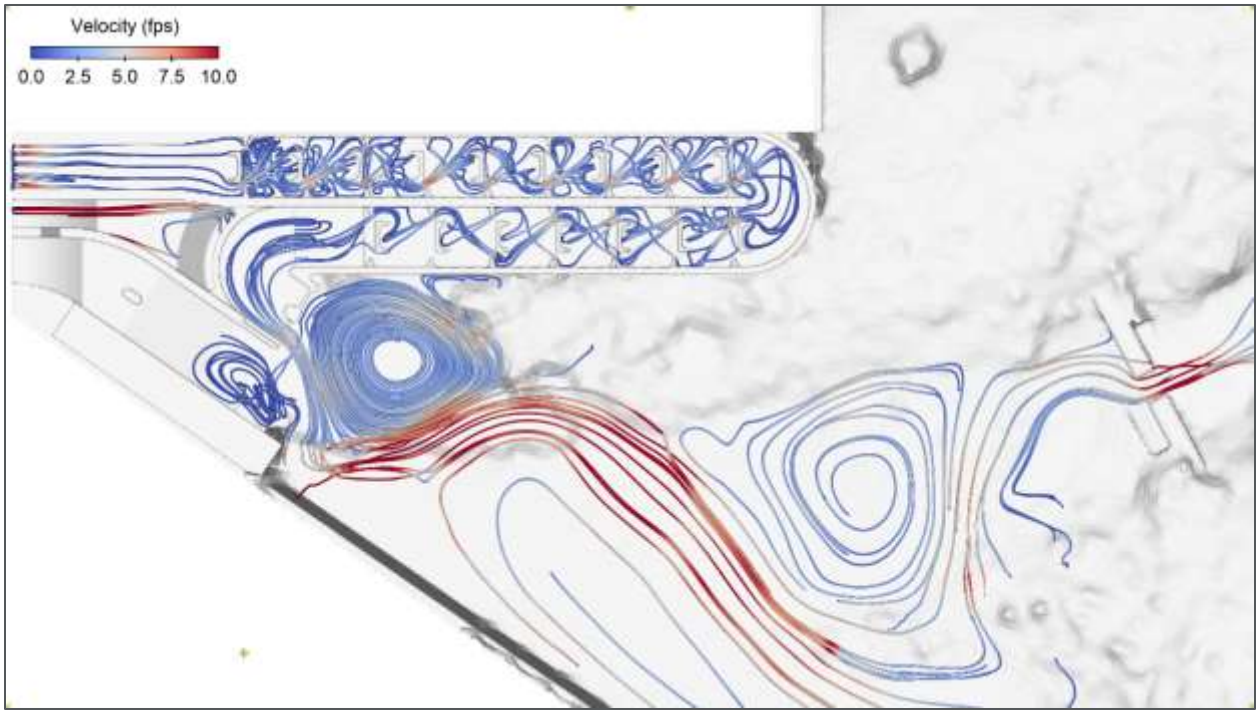

Figure 4-1: Streamlines Colored by Velocity Showing Flow Patterns for Case 1

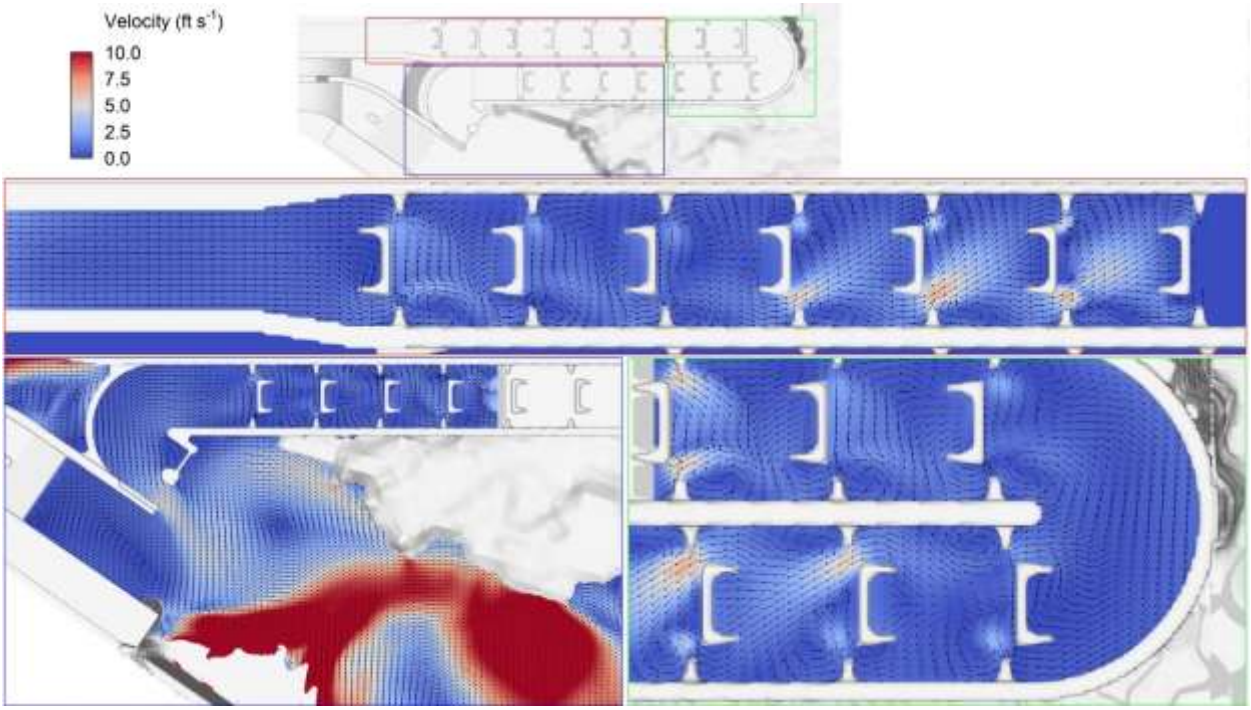

Figure 4-2: Velocity Contours and Vectors for Case 1

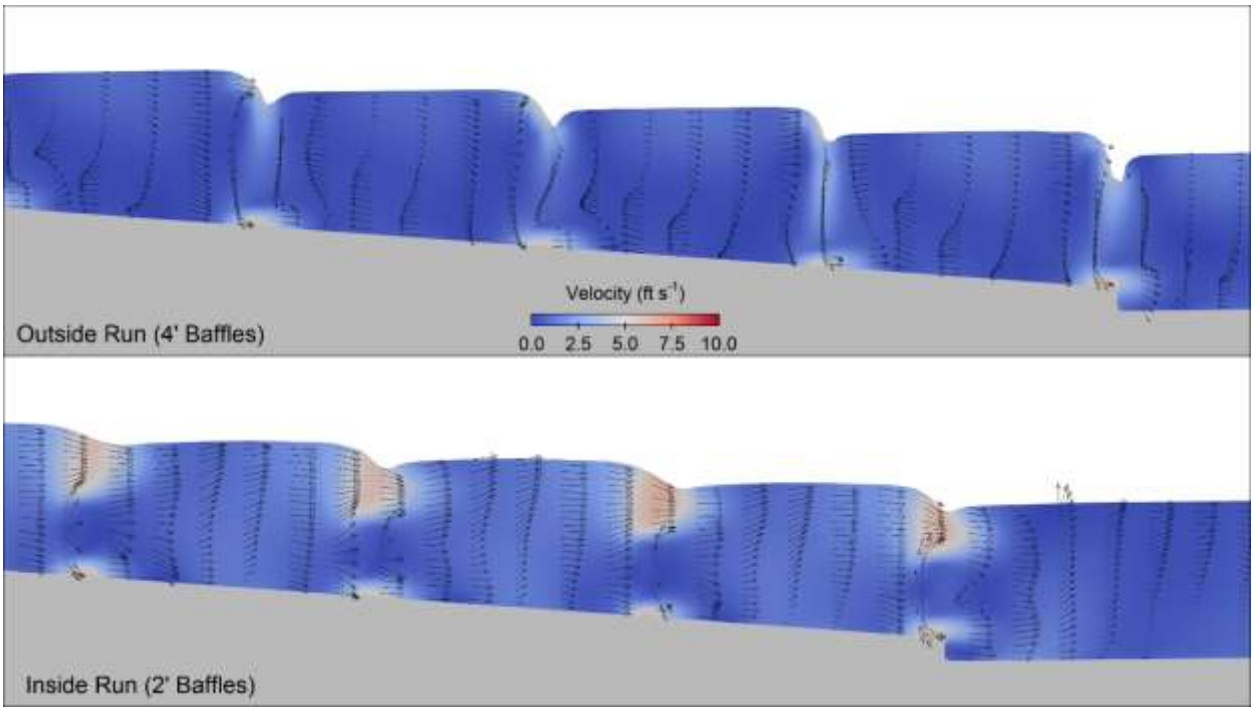

Figure 4-3: Velocity Contour and Vector Profiles Upstream of the 180º Bend

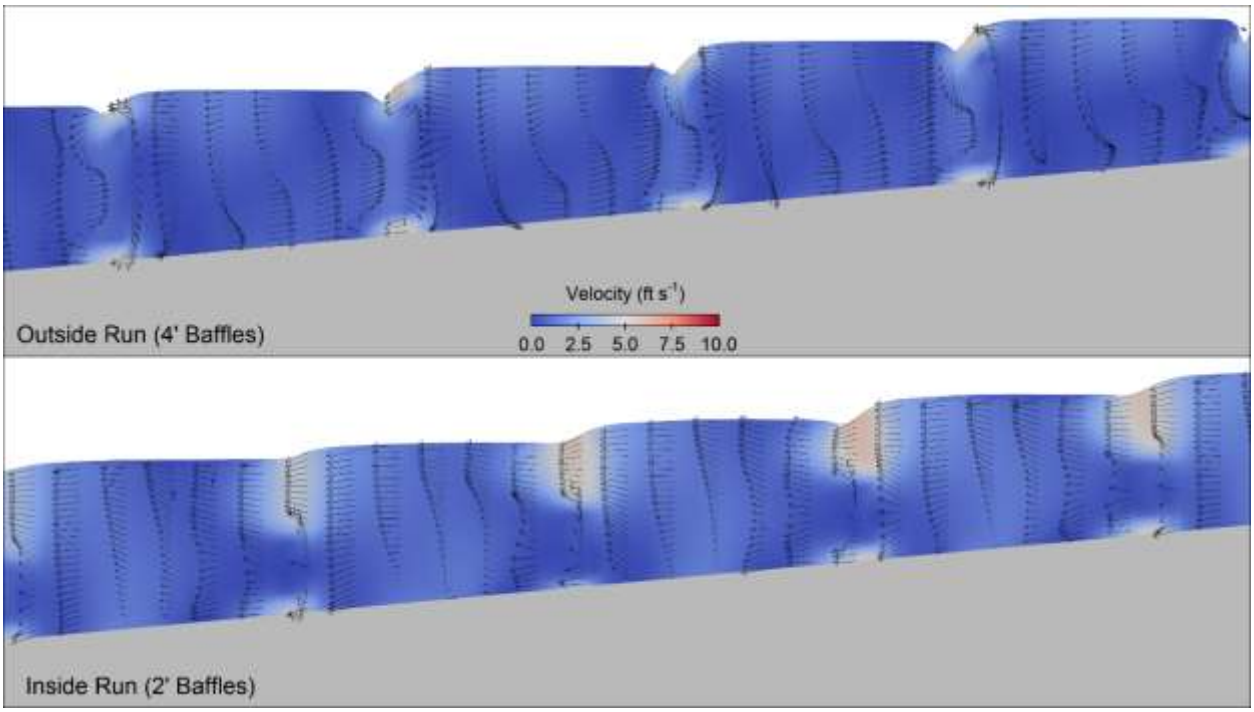

Figure 4-4: Velocity Contour and Vector Profiles Downstream of the 180o Bend

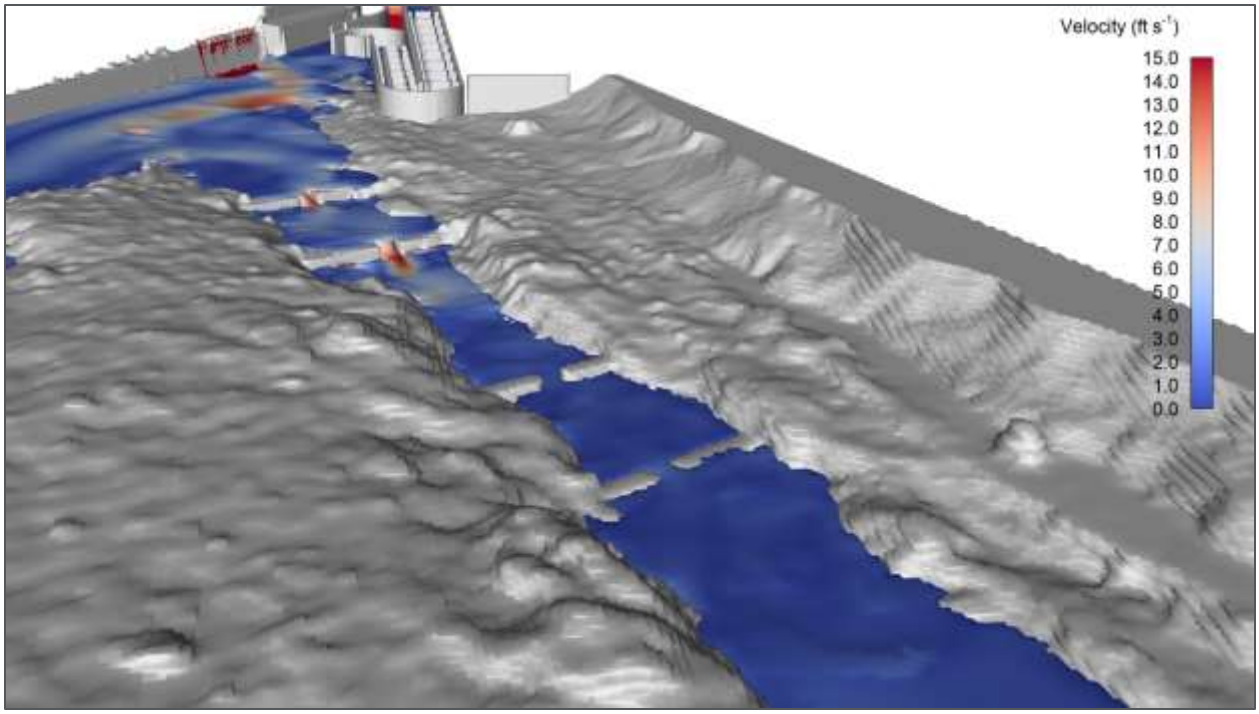

Figure 4-5: Water Surface Colored by Velocity

Flow through the fish ladder showed surface velocities of approximately 6.0 ft per second over the baffles. The vectors and streamlines indicate an area of recirculation on the inside portion of the 180° turn. The depth at the fish ladder entrance was approximately 5.0 to 5.5 ft. Multiple areas of recirculating flow were present downstream of the ladder entrance with a high velocity parallel to the fish ladder entrance. Flow over the bypass weirs does indicate potential surface velocities of about 10.0 ft per second.

4.1.2 Case 2

Normal operation flow through the fish ladder was identified for each of the inlet features: supplemental attraction through the sluice gate, diffuser, and ladder. Case 2 assigns 360 cfs through the sluice gate, 60 cfs through the diffuser, and 30 cfs through the ladder. The crest weir is closed for Case 2.

Streamlines colored by velocity are shown on Figure 4-6. Figure 4-7 shows velocity vectors and contours. Figure 4-8 and Figure 4-9 show velocity vector and contour profiles for the inside and outside runs of the fish ladder upstream and downstream of the 180º bend in the fish ladder, respectively. Figure 4-10 shows the water surface colored by velocity in the vicinity of the weirs.

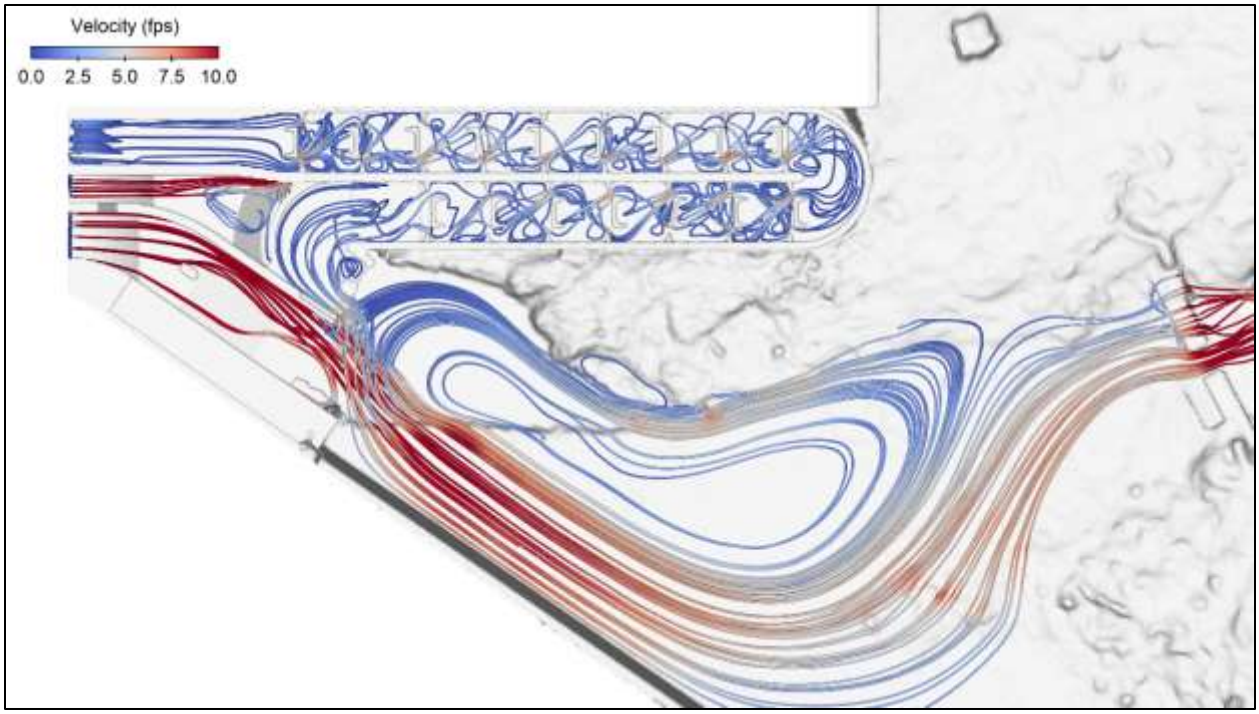

Figure 4-6: Streamlines Colored by Velocity Showing Flow Patterns for Case 2

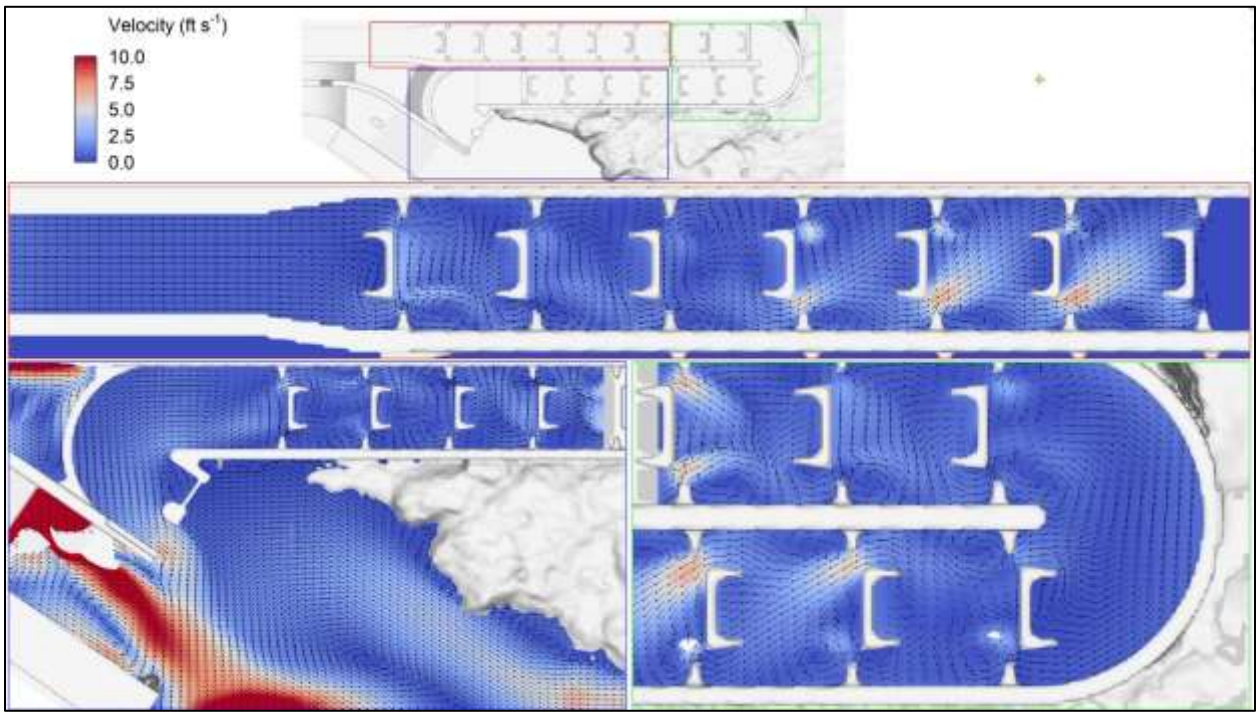

Figure 4-7: Velocity Contours and Vectors for Case 2

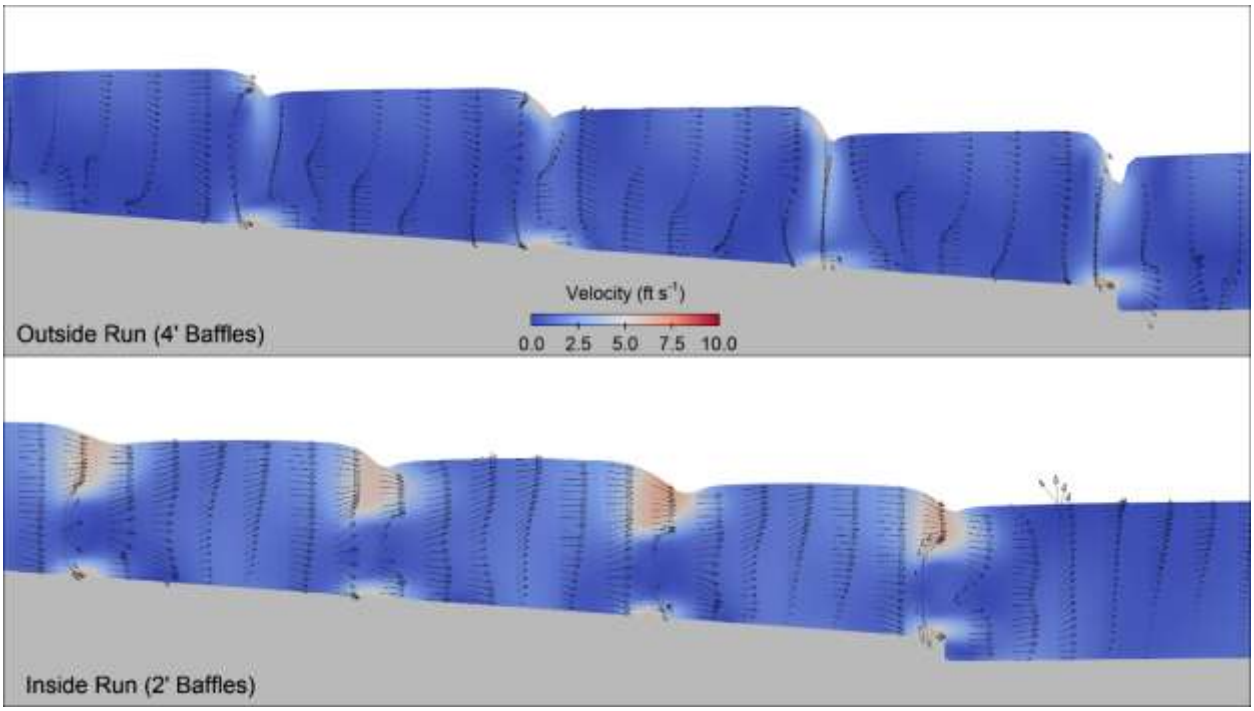

Figure 4-8: Velocity Contour and Vector Profiles Upstream of the 180º Bend

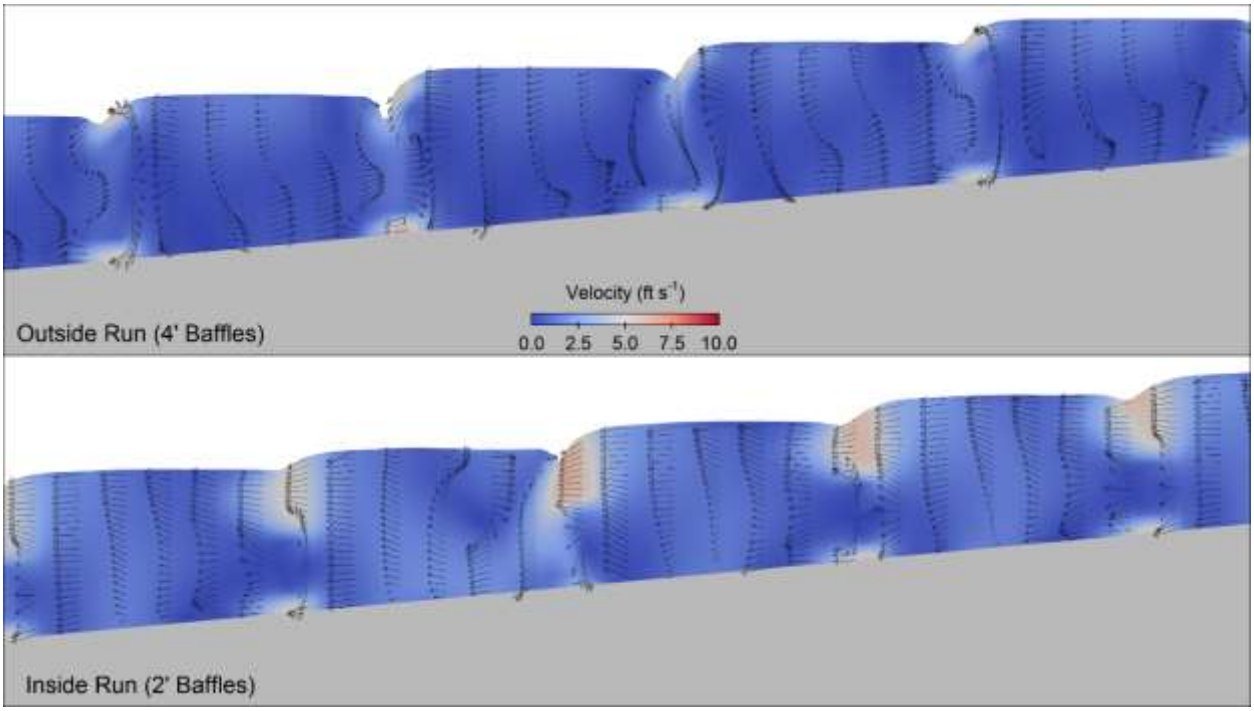

Figure 4-9: Velocity Contour and Vector Profiles Downstream of the 180º Bend

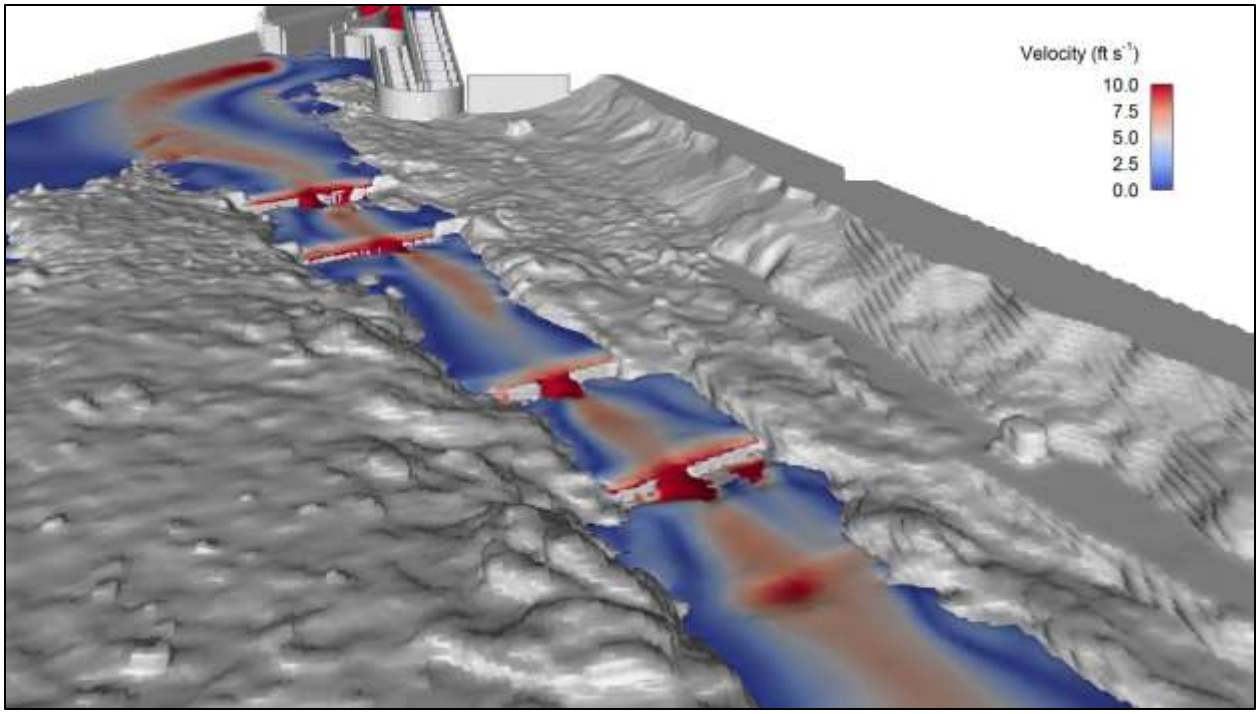

Figure 4-10: Water Surface Colored by Velocity

Flow through the fish ladder showed surface velocities of approximately 6.0 ft per second over the baffles. The vectors and streamlines indicate an area of recirculation on the inside portion of the 180° turn. The depth at the fish ladder entrance was approximately 6.5 ft. Multiple areas of recirculating flow were present downstream of the ladder entrance with a clearly defined flow path from the sluice flow to the first bypass weir. Flow over the bypass weirs does indicate potential surface velocities of about 10.0 ft per second.

4.1.3 Case 3

Case 3 assigns simulates the 5% exceedance flow in the Merrimack River of approximately 26,000 cfs. The powerhouse handles 6,600 cfs, leaving the remaining 19,400 cfs to be passed through the fish ladder and over the spillway crest. The normal operating flow of 30 cfs and 60 cfs were passed through the fish ladder and diffuser gates, respectively. 19,310 cfs is passed equally over the approximately 960 ft spillway crest.

Streamlines colored by velocity are shown on Figure 4-11. Figure 4-12 shows velocity vectors and contours. Figure 4-13 and Figure 4-14 show velocity vector and contour profiles for the inside and outside runs of the fish ladder upstream and downstream of the 180° bend in the fish ladder, respectively. Figure 4-15 shows the water surface colored by velocity in the vicinity of the weirs.

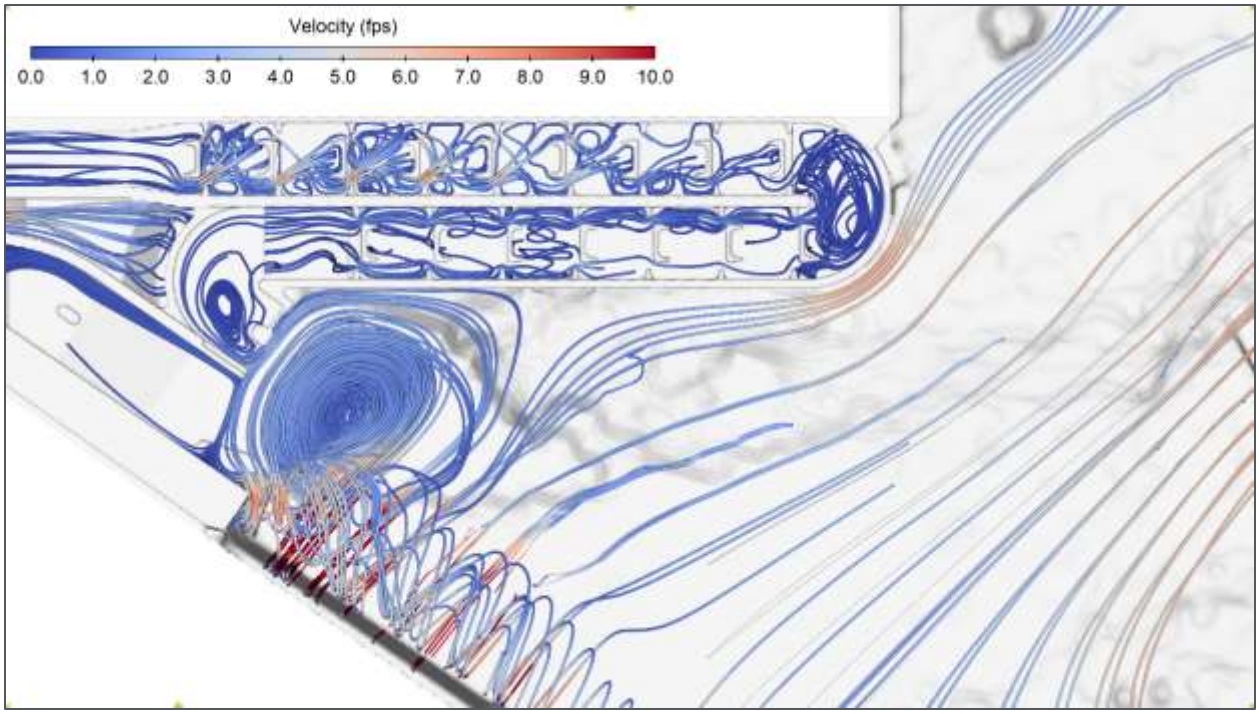

Figure 4-11: Streamlines Colored by Velocity Showing Flow Patterns for Case 3

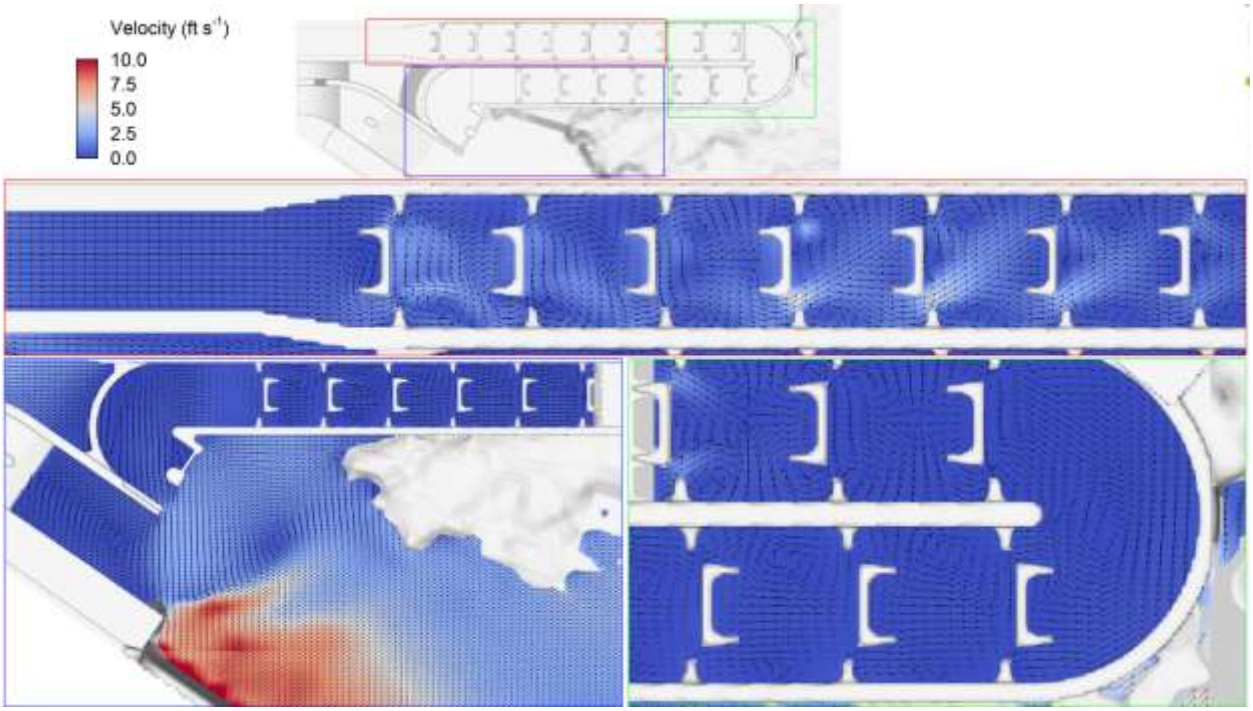

Figure 4-12: Velocity Contours and Vectors for Case 3

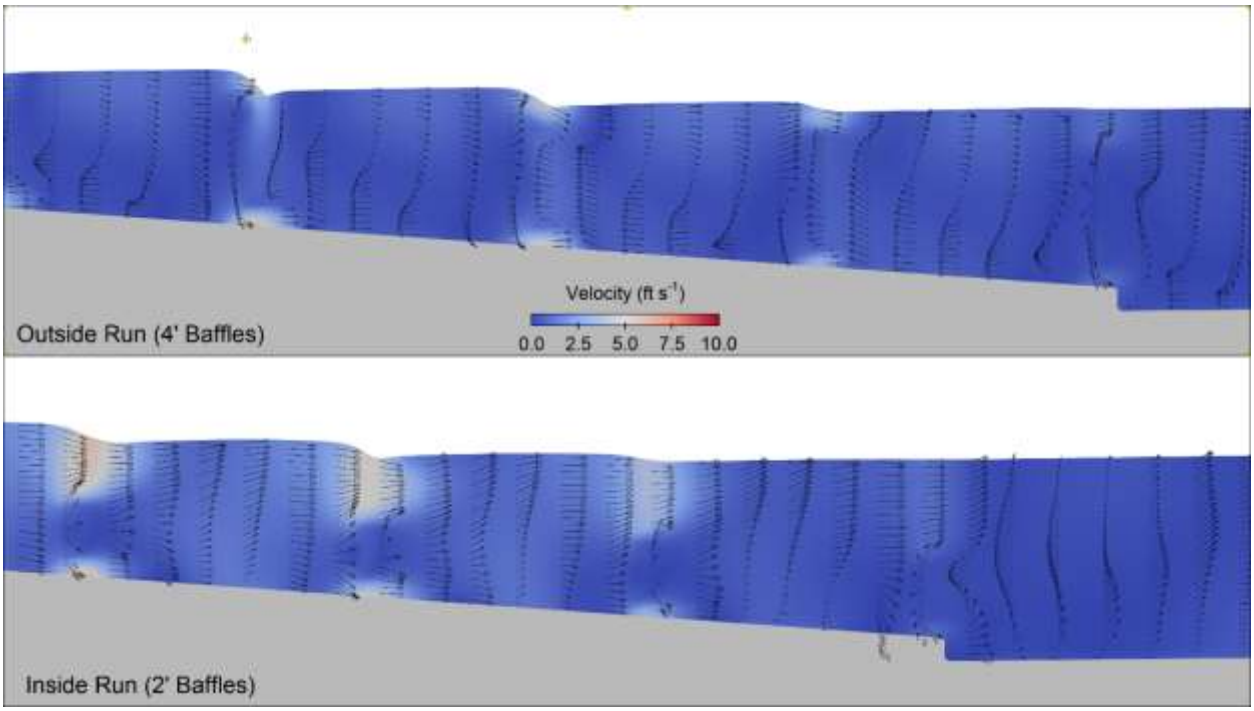

Figure 4-13: Velocity Contour and Vector Profiles Upstream of the 180° Bend

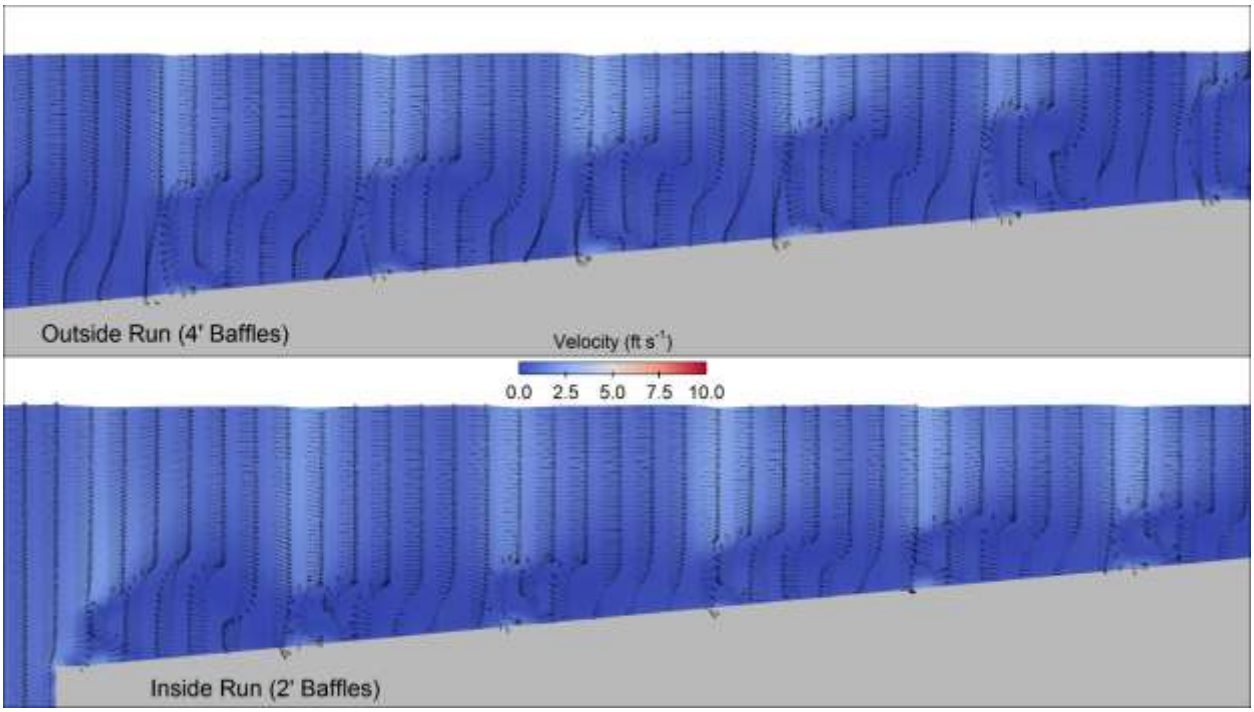

Figure 4-14: Velocity Contour and Vector Profiles Downstream of the 180° Bend

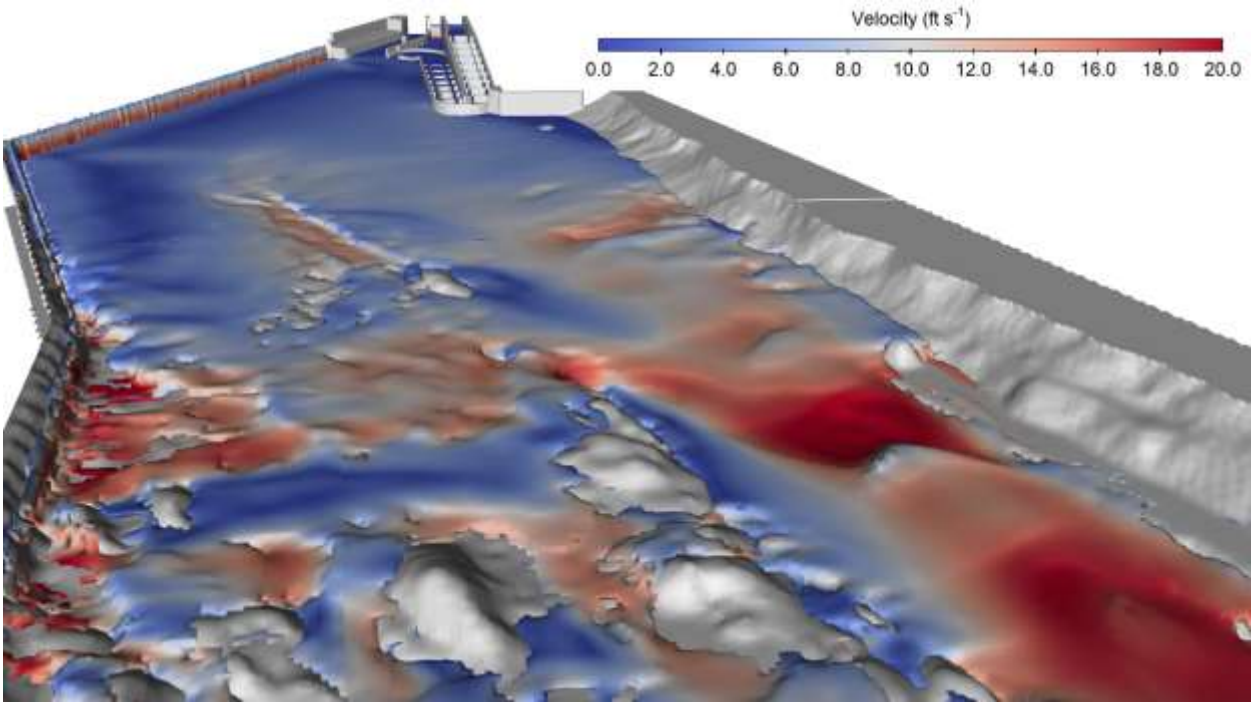

Figure 4-15: Water Surface Colored by Velocity

Flow through the fish ladder showed surface velocities of approximately 6.0 ft per second over the baffles. The vectors and streamlines indicate an area of recirculation on the inside portion of the 180° turn. The depth at the fish ladder entrance was approximately 12.5 ft. Multiple areas of recirculating flow were present downstream of the ladder entrance with a clearly defined flow path from the sluice flow to the first bypass weir. Flow over the bypass weirs does indicate potential surface velocities of about 10.0 ft per second.

4.1.4 Case 4

Case 4 is an update to Case 2 with the fish ladder flow being adjusted to 47 cfs. Case 4 assigns 360 cfs through the sluice gate, 60 cfs through the diffuser, and 47 cfs through the ladder. The crest weir is closed for Case 4.

Streamlines colored by velocity are shown in Figure 4-16 and stream lines colored by source are shown in Figure 4-17. Figure 4-18 shows velocity vectors and contours. Figure 4-19 and Figure 4-20 show velocity vector and contour profiles for the inside and outside runs of the fish ladder upstream and downstream of the 180º bend in the fish ladder, respectively. The water surface profile and depths in the fish ladder are shown in

Figure 4-21. Figure 4-22 shows the water surface colored by velocity in the vicinity of the weirs. The depth and 3ft of depth contour are shown in Figure 4-23. The depth and water surface profile through the bypass weirs is shown in Figure 4-24.

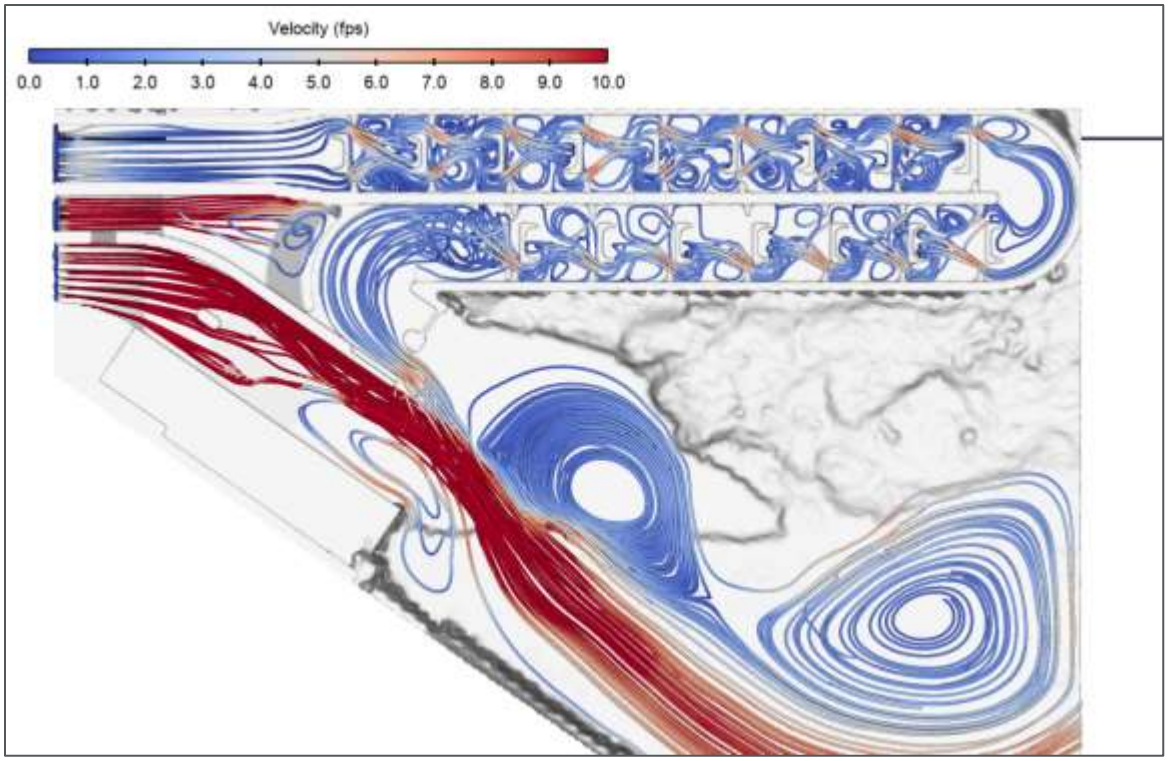

Figure 4-16: Streamlines Colored by Velocity Showing Flow Patterns for Case 4

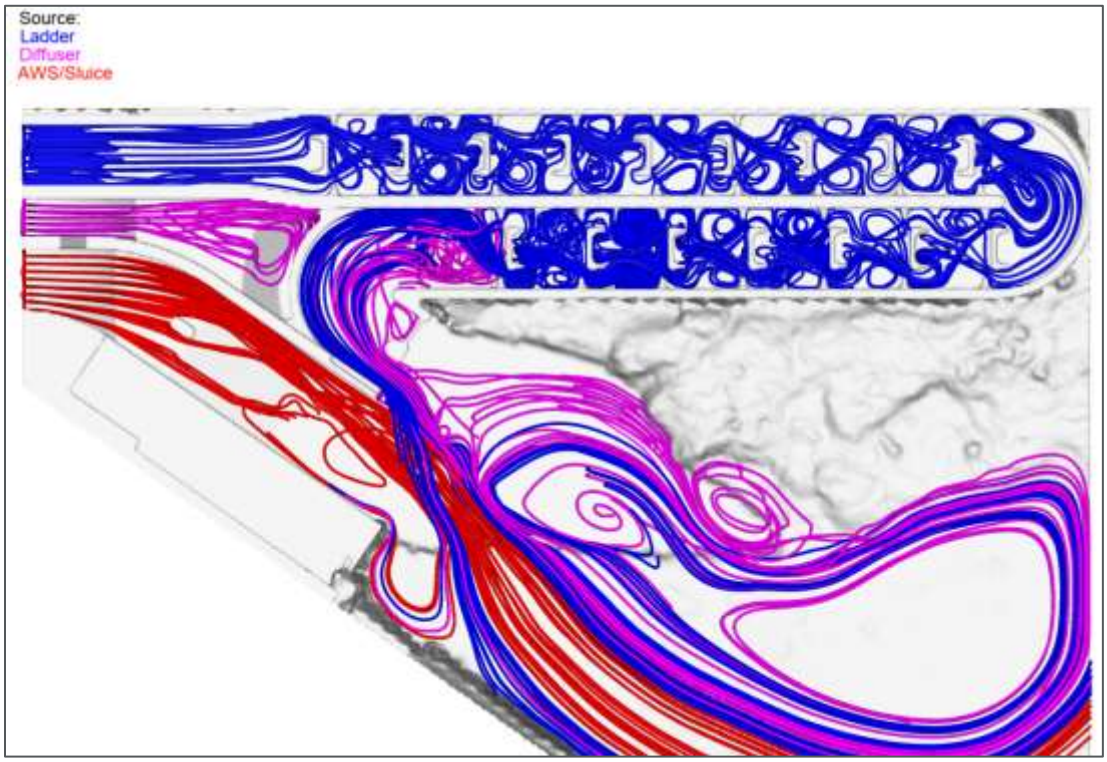

Figure 4-17: Streamlines Colored by Source Showing Flow Patterns for Case 4

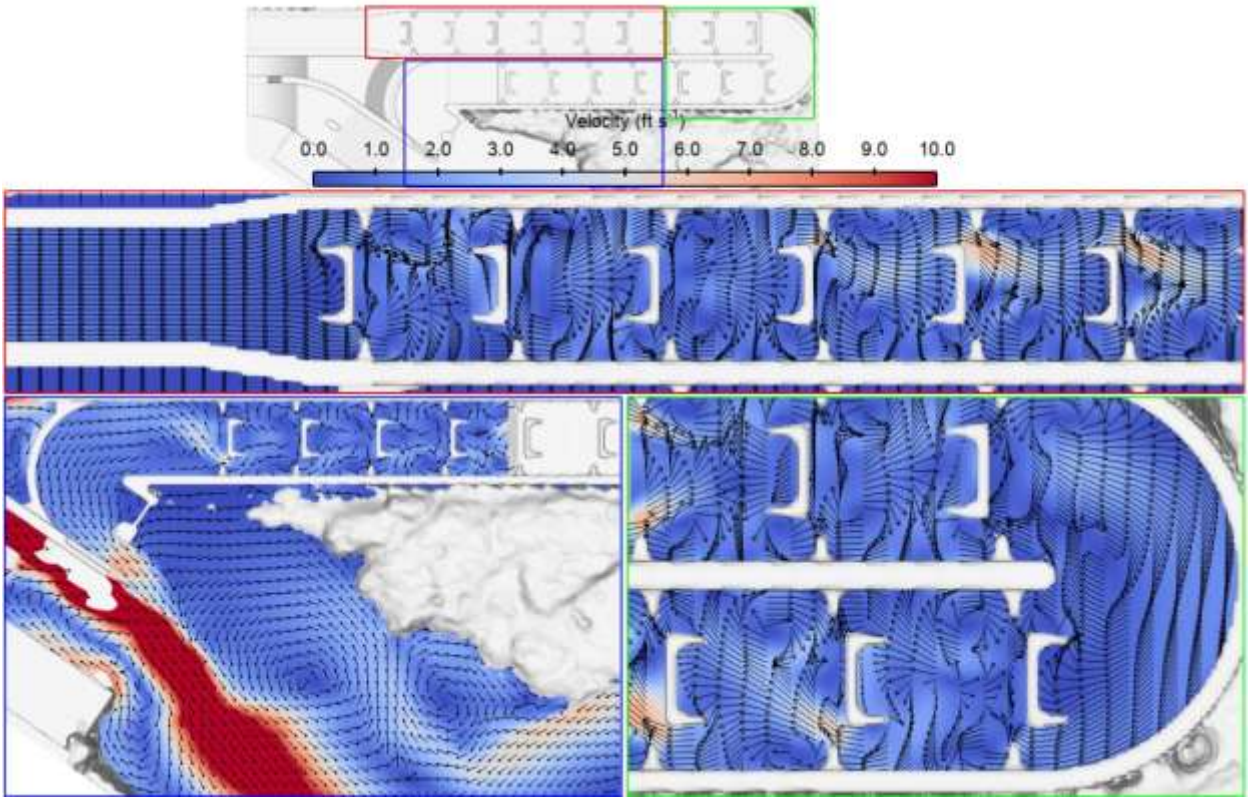

Figure 4-18: Velocity Contours and Vectors for Case 4

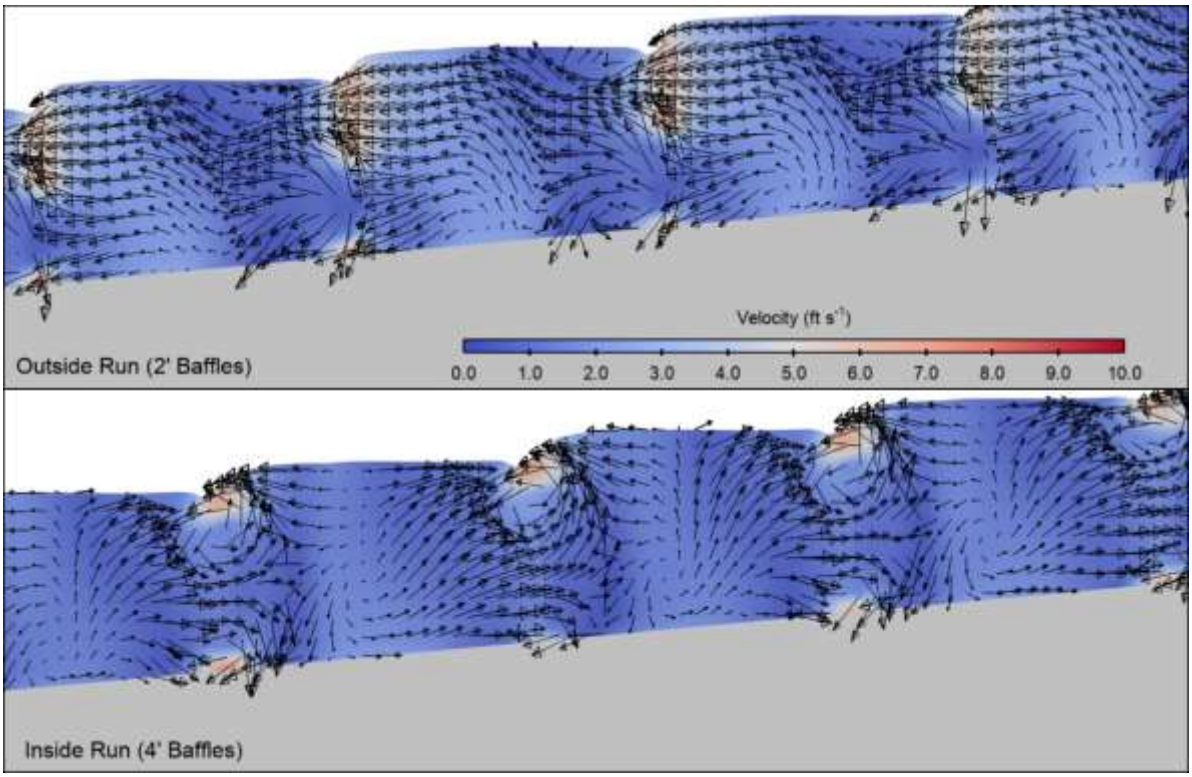

Figure 4-19: Velocity Contour and Vector Profiles Upstream of the 180º Bend

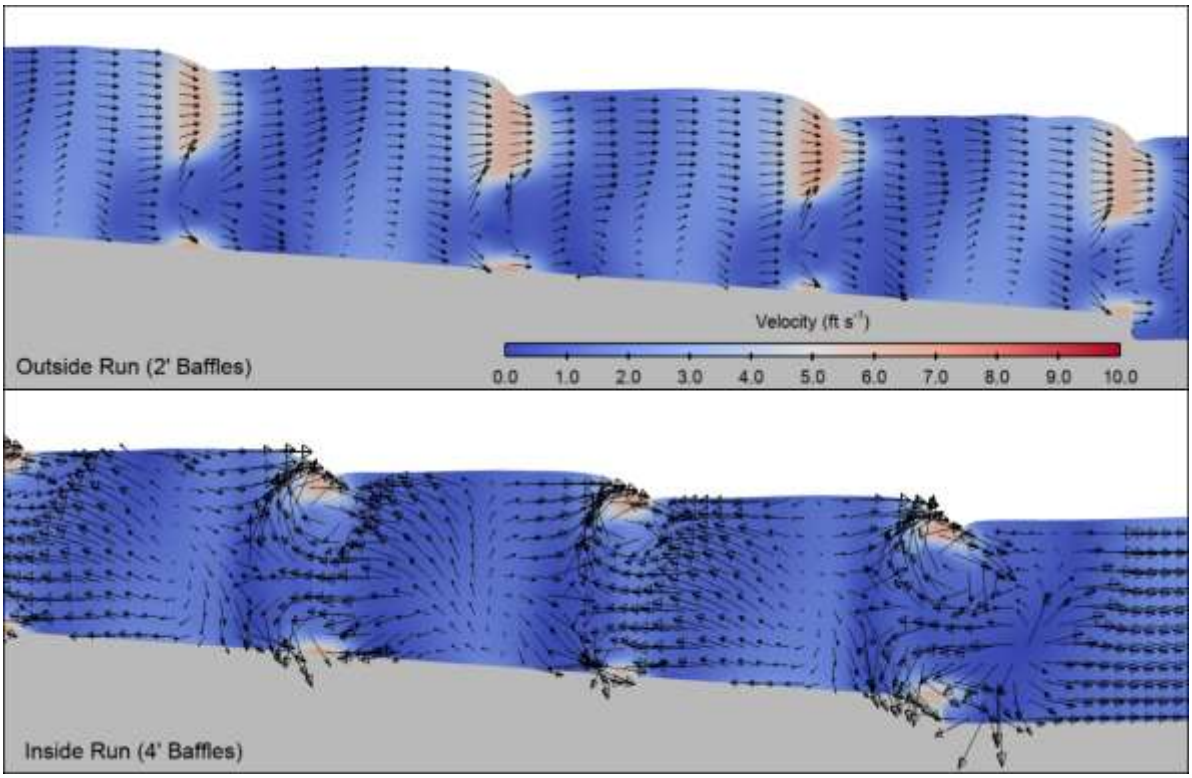

Figure 4-20: Velocity Contour and Vector Profiles Downstream of the 180º Bend

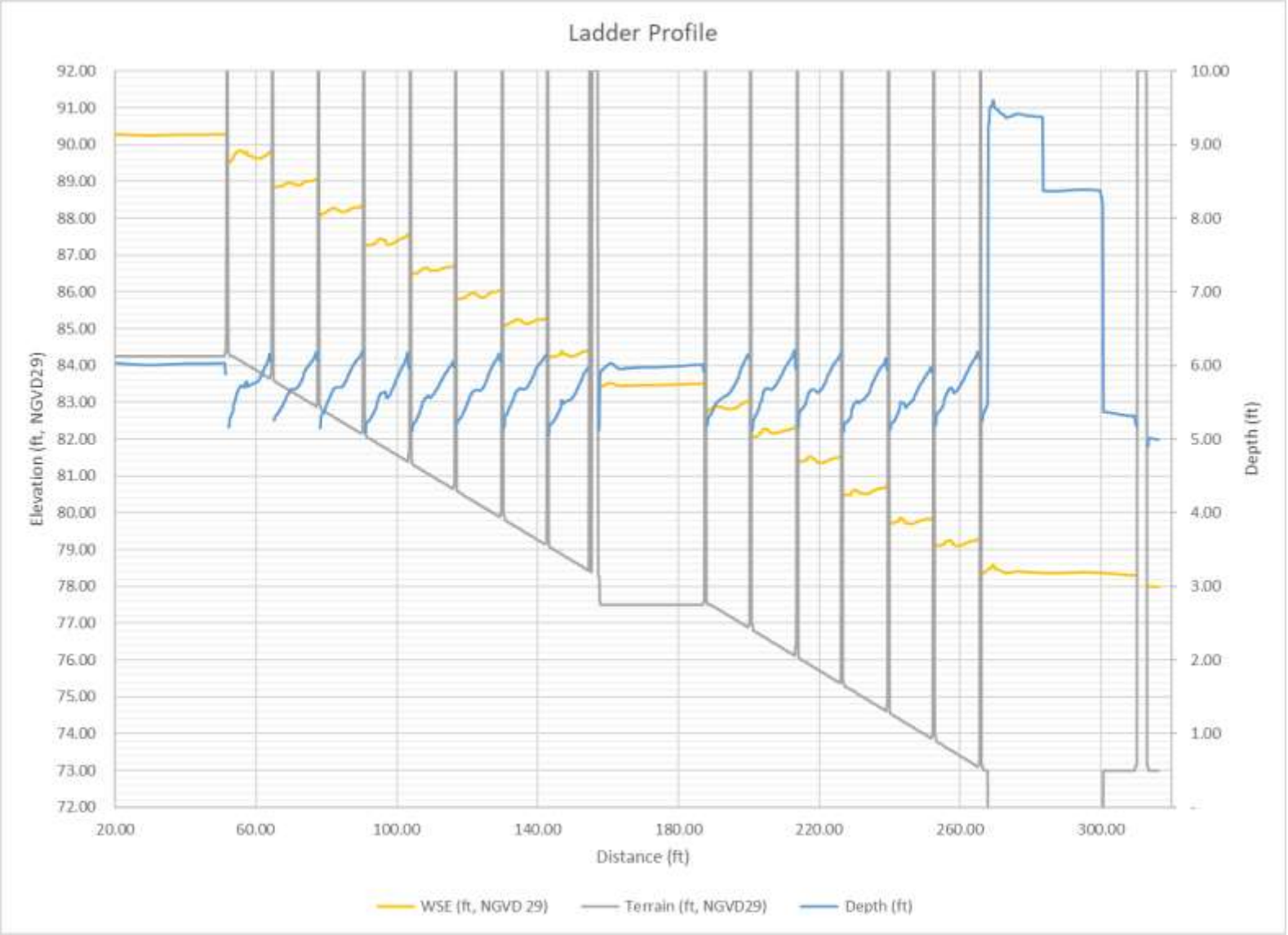

Figure 4-21: Water Surface Profiles and Depths through the Fish Ladder

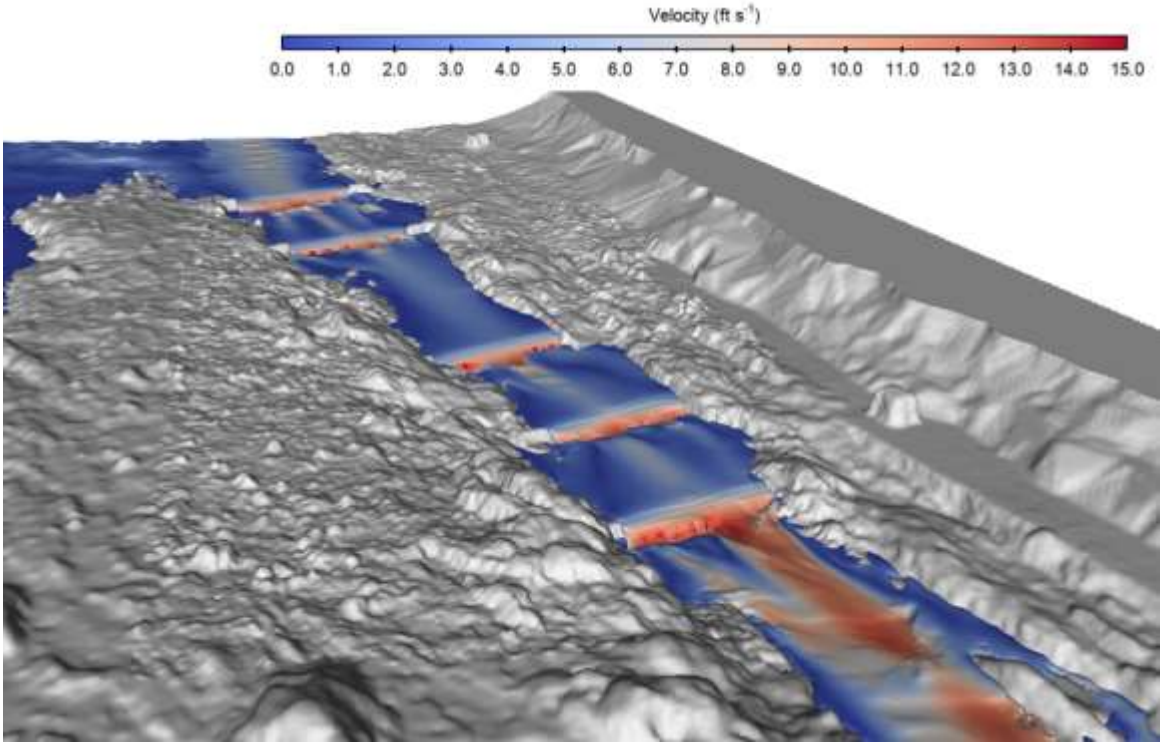

Figure 4-22: Water Surface Colored by Velocity

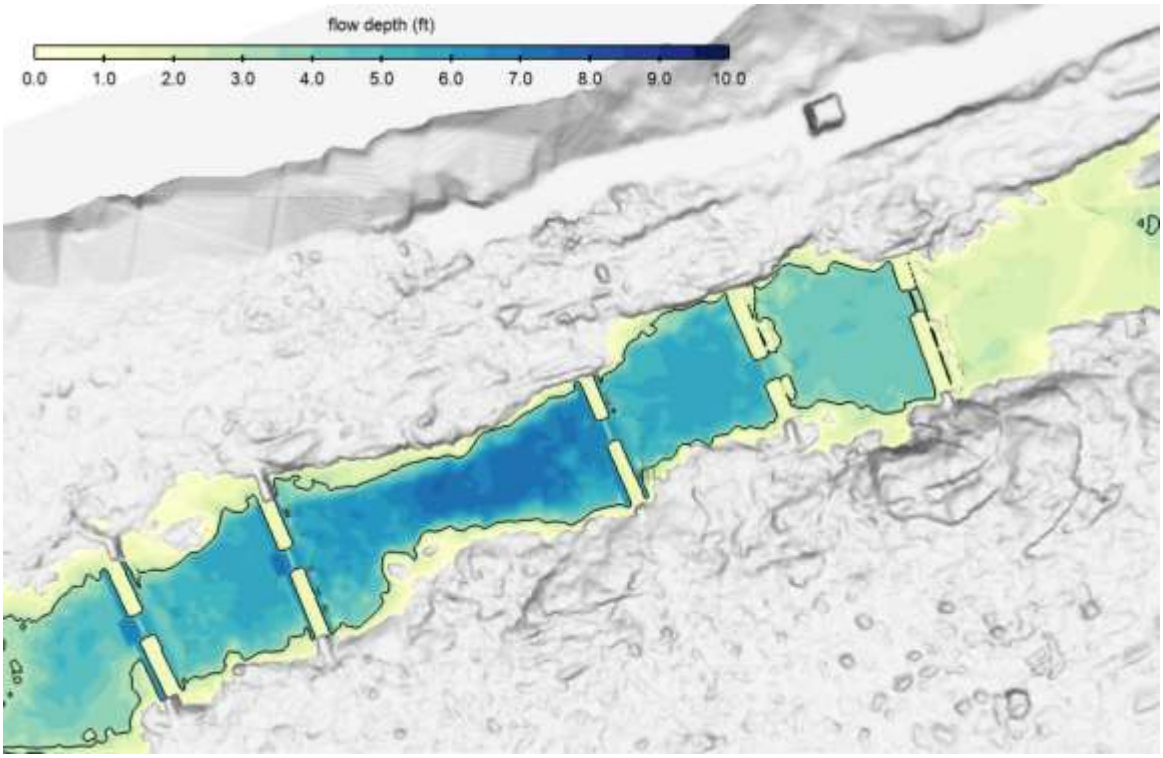

Figure 4-23: Water Depth and 3-foot contour through the Bypass Weirs

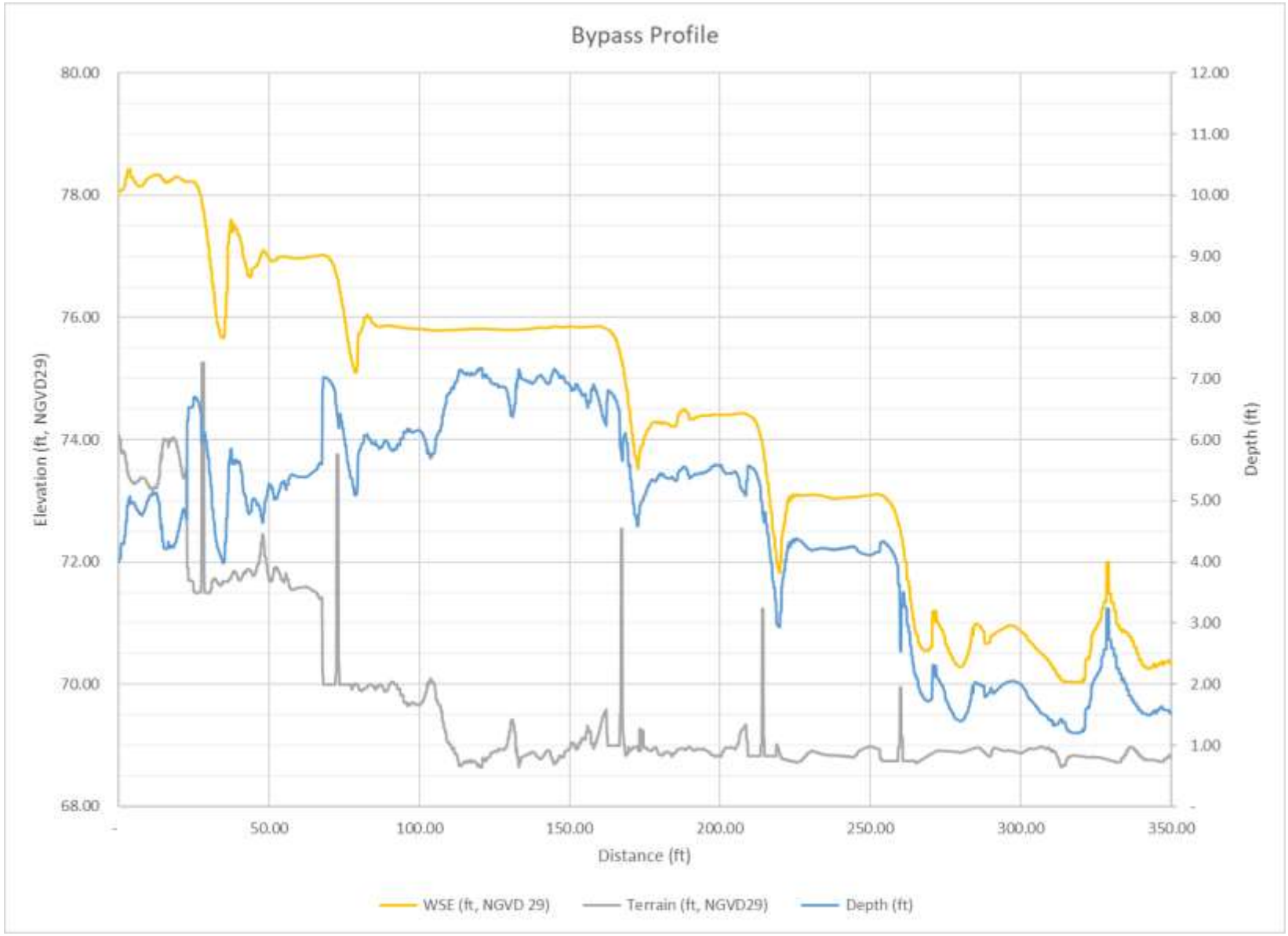

Figure 4-24: Water Surface Profiles and Depths through the Bypass Weirs

Flow through the fish ladder showed surface velocities of approximately 6.0 ft per second over the baffles. The vectors and streamlines indicate an area of recirculation on the inside portion of the 180° turn. The depth at the fish ladder entrance was approximately 5 ft. The water surface profile through the fish ladder showed pool to pool drops of approximately 1 ft with a depth of about 5.5 to 6 ft. Multiple areas of recirculating flow were present downstream of the ladder entrance with a clearly defined flow path from the sluice flow to the first bypass weir. Flow over the bypass weirs does indicate potential surface velocities of about 10.0 to 12.0 ft per second.

4.2 E.L. Field Powerhouse Forebay Model

The three simulations were analyzed and plots showing velocity contours and vectors at multiple depths were exported. The figures depicting streamlines are colored by velocity and model outlet. The red colored streamlines exit the model domain through the AWS and the cyan lines would discharge through the powerhouse.

4.2.1 Case 1 – Full Station Capacity

The 5 percent exceedance model assigns 3,300 cfs through each unit for a total powerhouse flow of 6,600 cfs. The AWS is operating at 130 cfs under this scenario. Figure 4-25 shows the velocity contours and vectors at the water surface (El. 91 ft, NGVD29) and depths of 1 ft (El. 90 ft, NGVD29), 6 ft (El. 85 ft, NGVD29), and 11 ft (El. 85 ft, NGVD29). The streamlines colored by velocity are shown on Figure 4-26. Figure 4-27 shows streamlines colored by model outlet. Figure 4-28 through Figure 4-33 show velocity contour or vectors on multiple sections in the forebay.

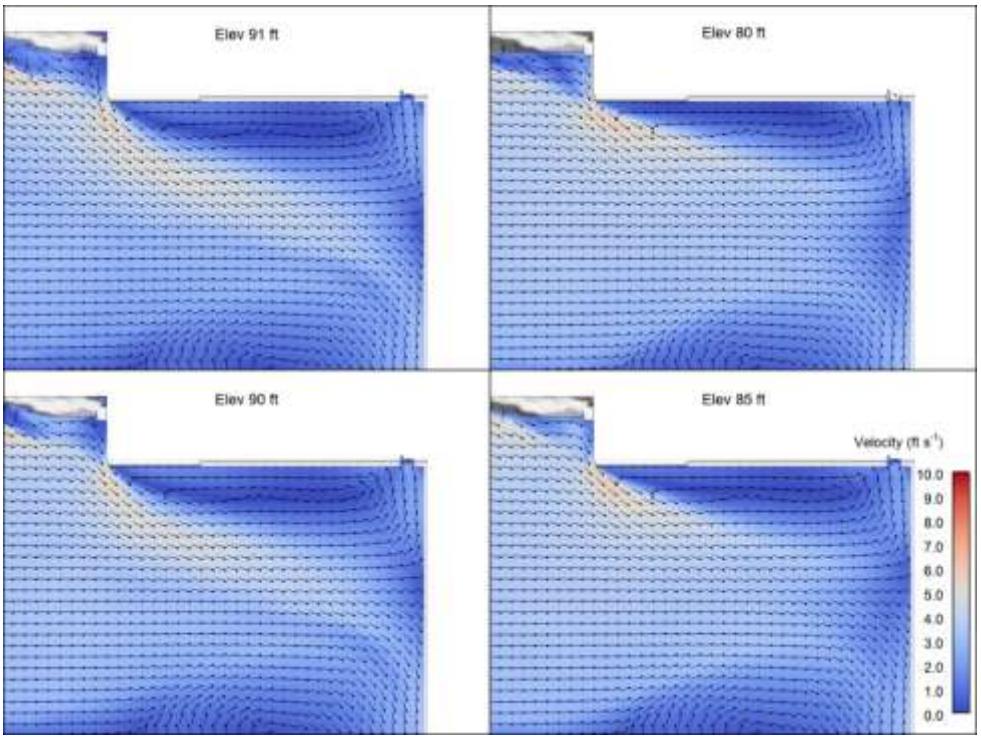

Figure 4-25: Velocity Contours and Vectors for Case 1

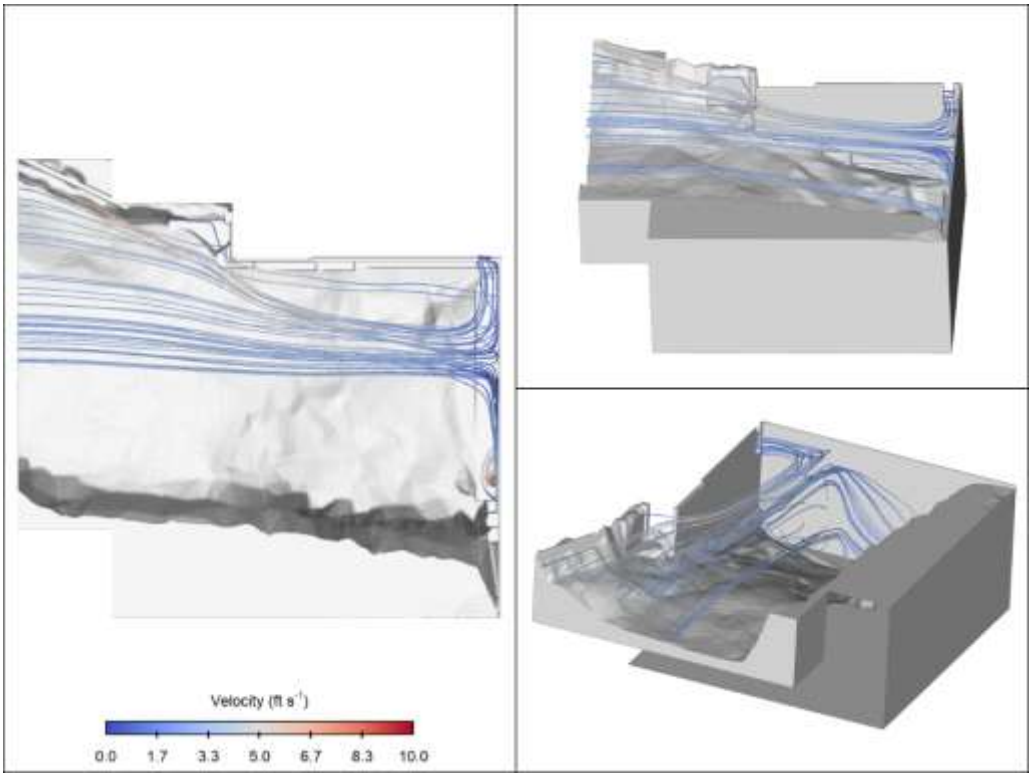

Figure 4-26: Streamlines Colored by Velocity Showing Flow Patterns

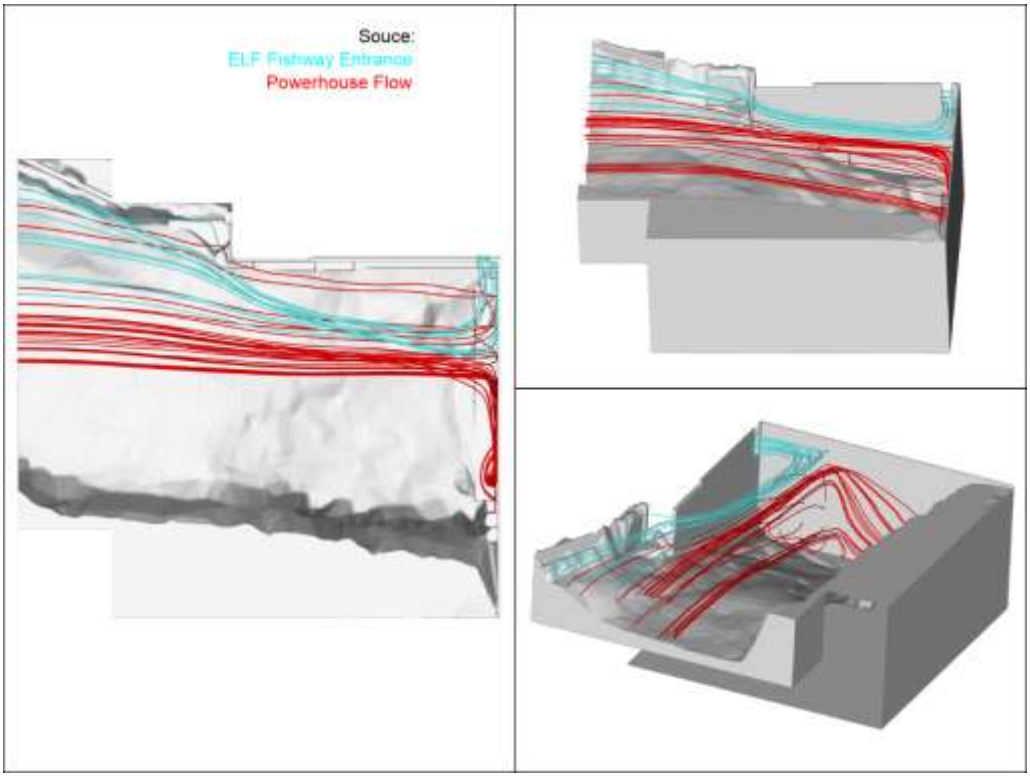

Figure 4-27: Streamlines Colored by Model Outlet Showing Flow Patterns for Case 1

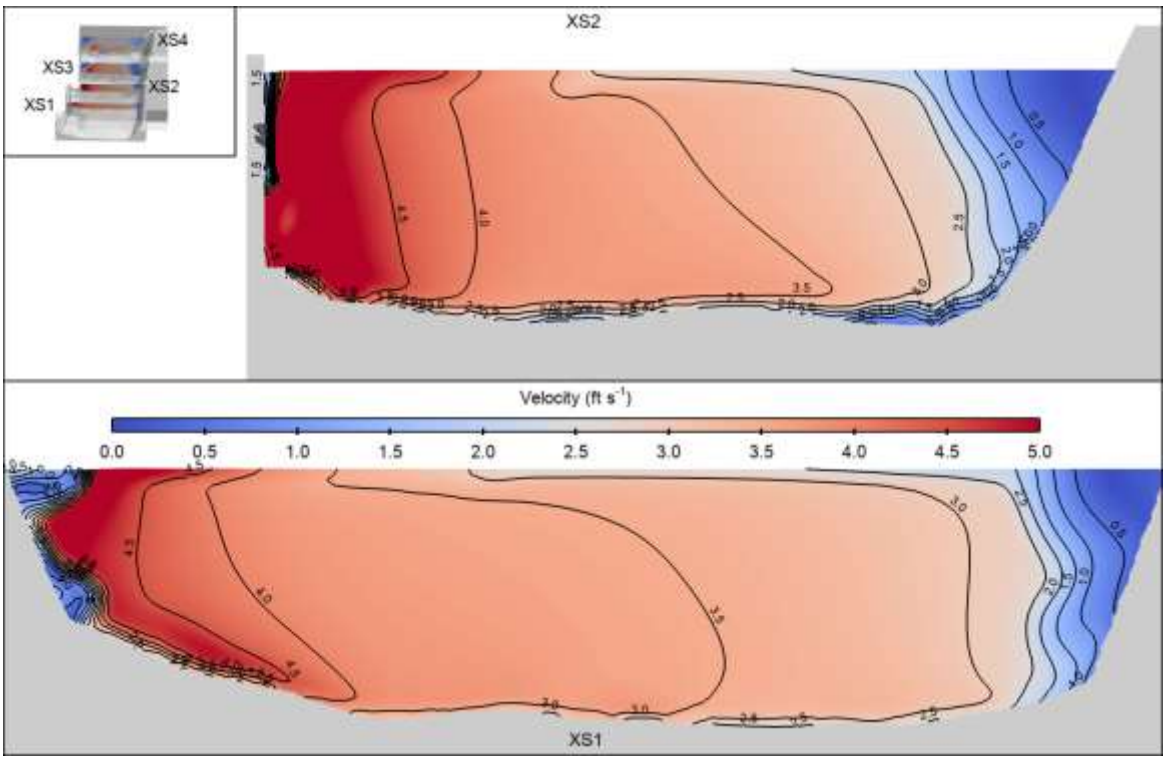

Figure 4-28: Velocity Contours on Cross-Sections for Case 1

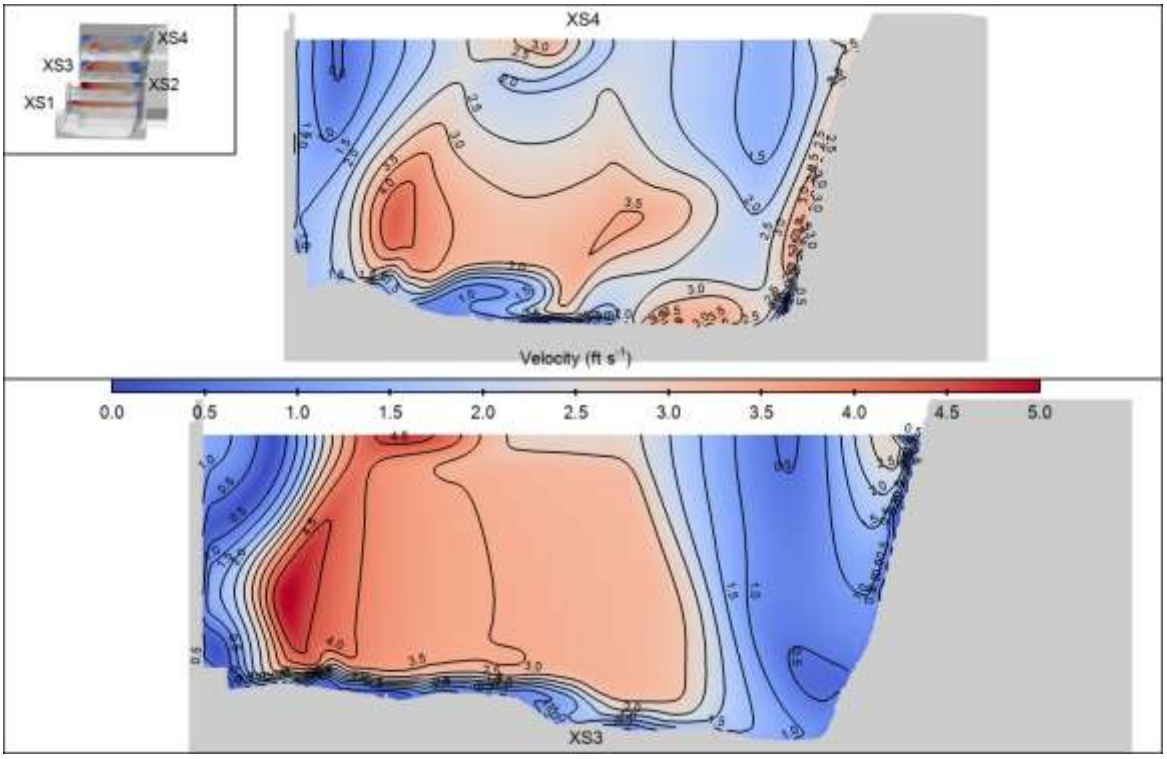

Figure 4-29: Velocity Contours on Cross-Sections for Case 1

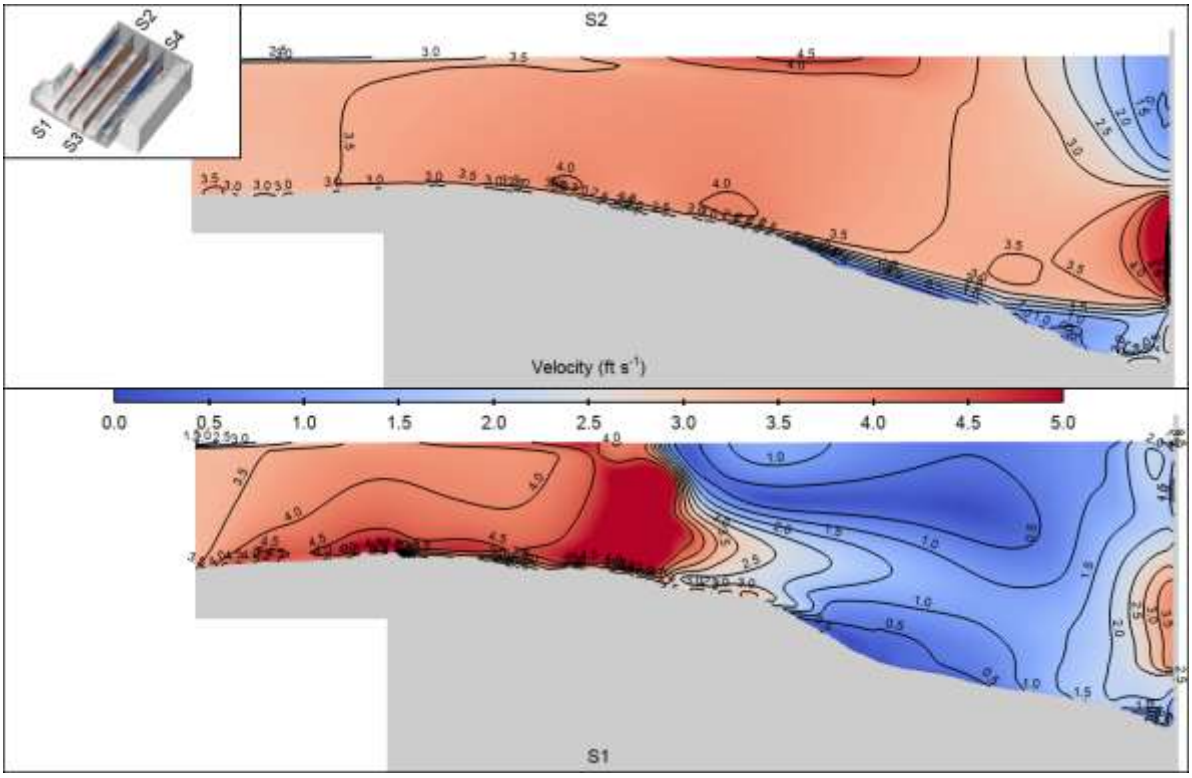

Figure 4-30: Velocity Contours on Sections for Case 1

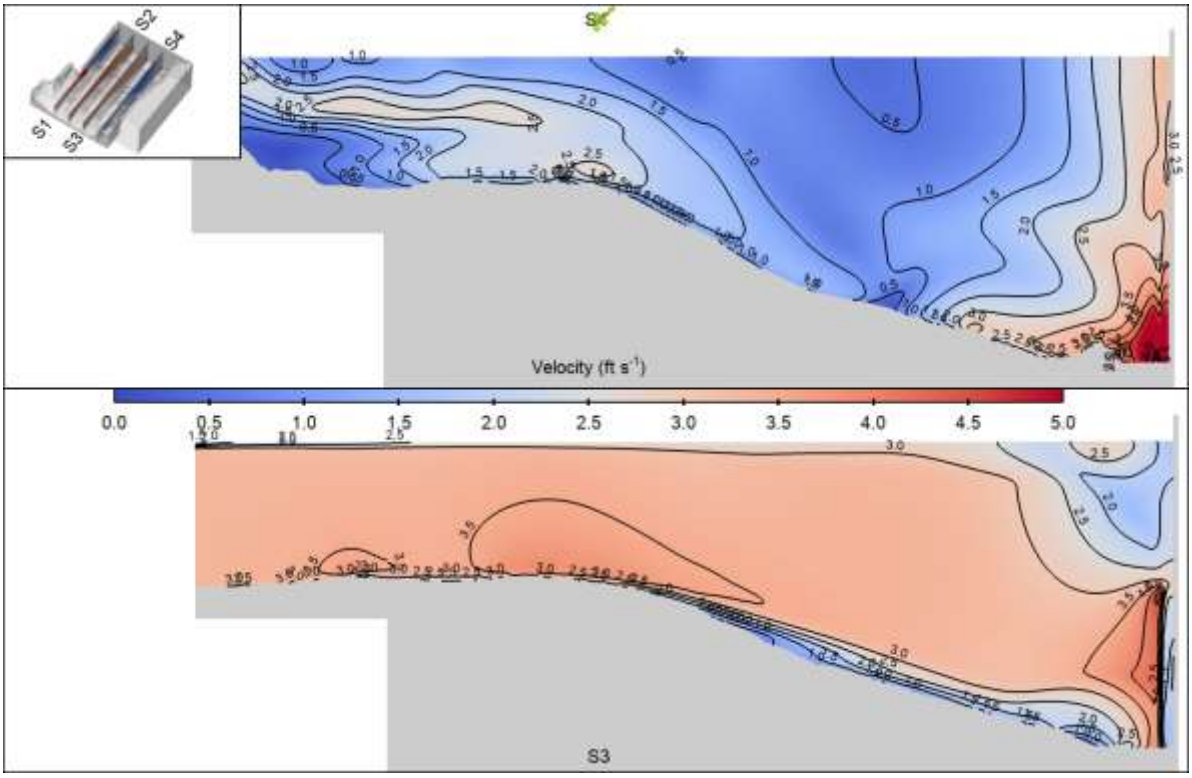

Figure 4-31: Velocity Contours on Sections for Case 1

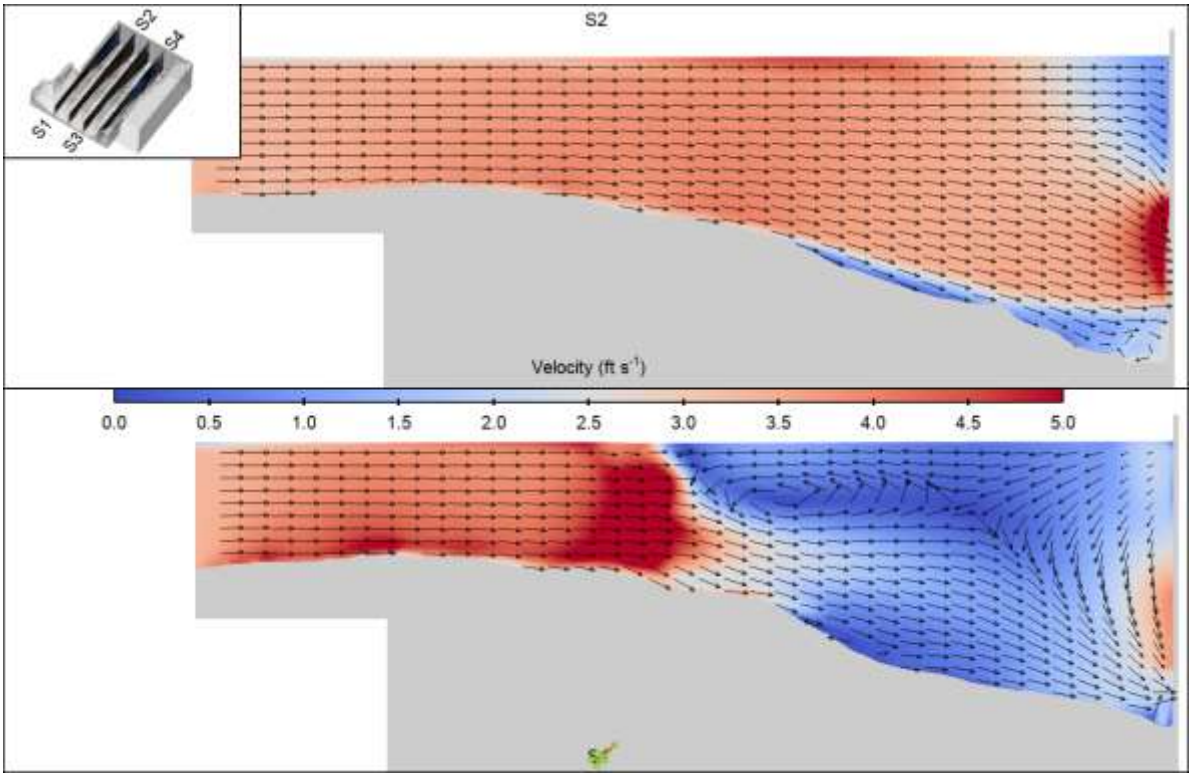

Figure 4-32: Velocity Vectors on Sections for Case 1

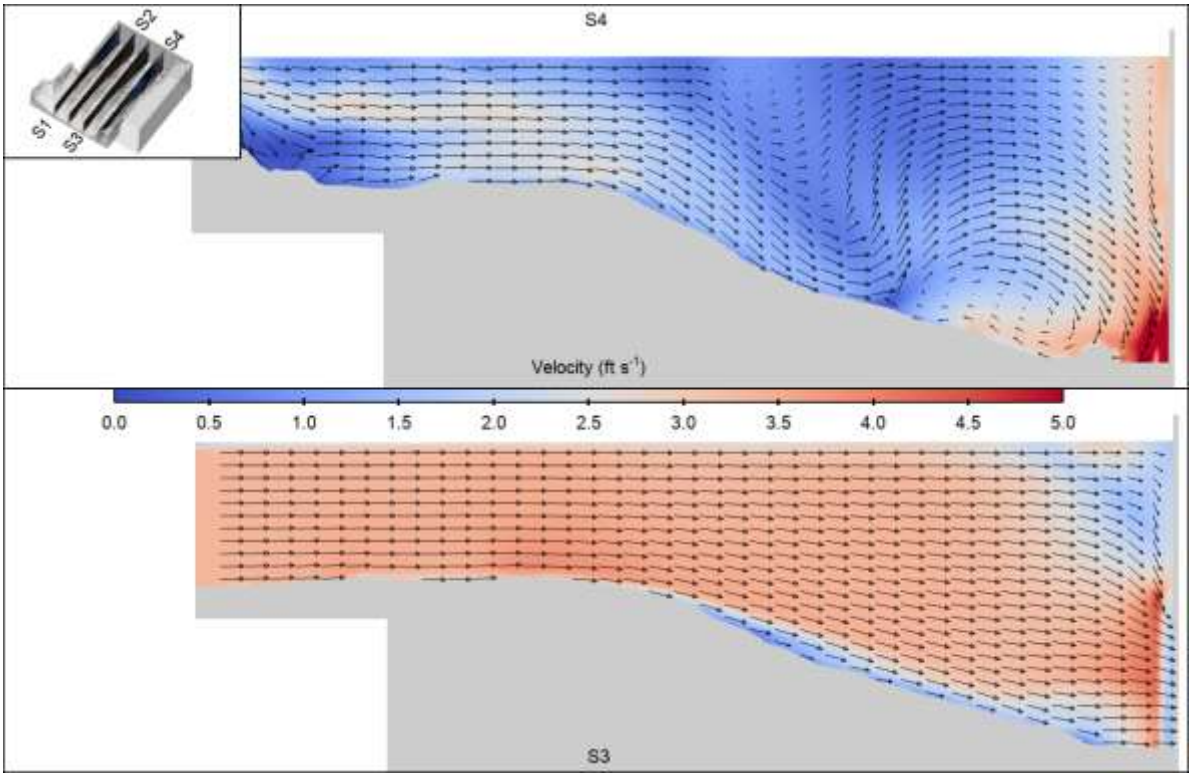

Figure 4-33: Velocity Vectors on Sections for Case 1

The velocity patterns show a large recirculation area along the fishway structure. Flow approaches the fishway entrance parallel to the powerhouse structure. The streamlines indicate flow entering the fishway originates from the left bank (viewing downstream) of the powerhouse channel.

4.2.2 Case 2 – 75% Exceedance

The 75 percent exceedance model assigns 1,310 cfs through each unit for a total powerhouse flow of 2,620 cfs. The AWS is operating at 130 cfs under this scenario. Figure 4-34 shows the velocity contours and vectors at the water surface (El. 91 ft, NGVD29) and depths of 1 ft (El. 90 ft, NGVD29), 6 ft (El. 85 ft, NGVD29), and 11 ft (El. 85 ft, NGVD29). The streamlines colored by velocity are shown on Figure 4-35. Figure 4-36 shows streamlines colored by model outlet. Figure 4-37 through Figure 4-42 show velocity contour or vectors on multiple sections in the forebay.

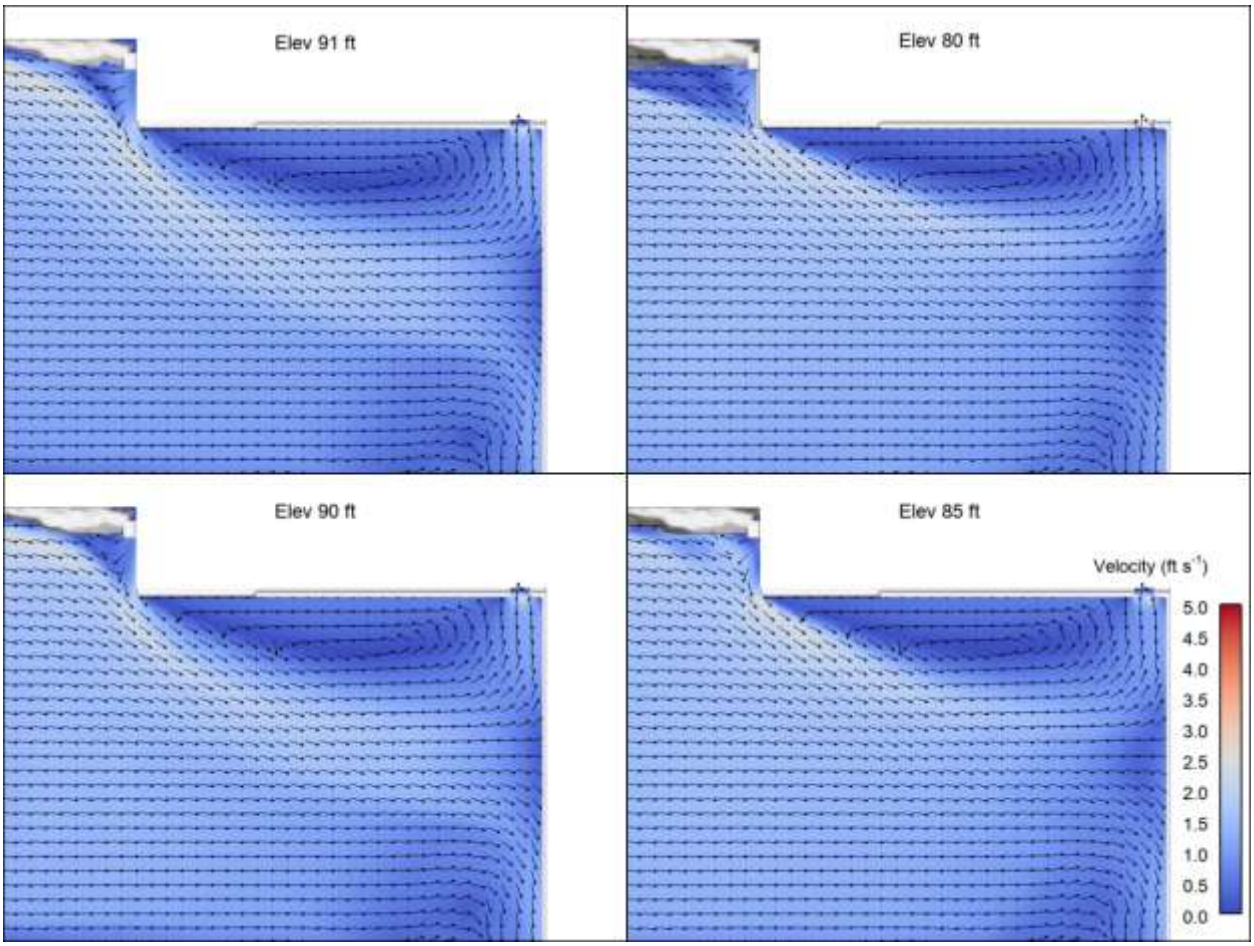

Figure 4-34: Velocity Contours and Vectors for Case 2

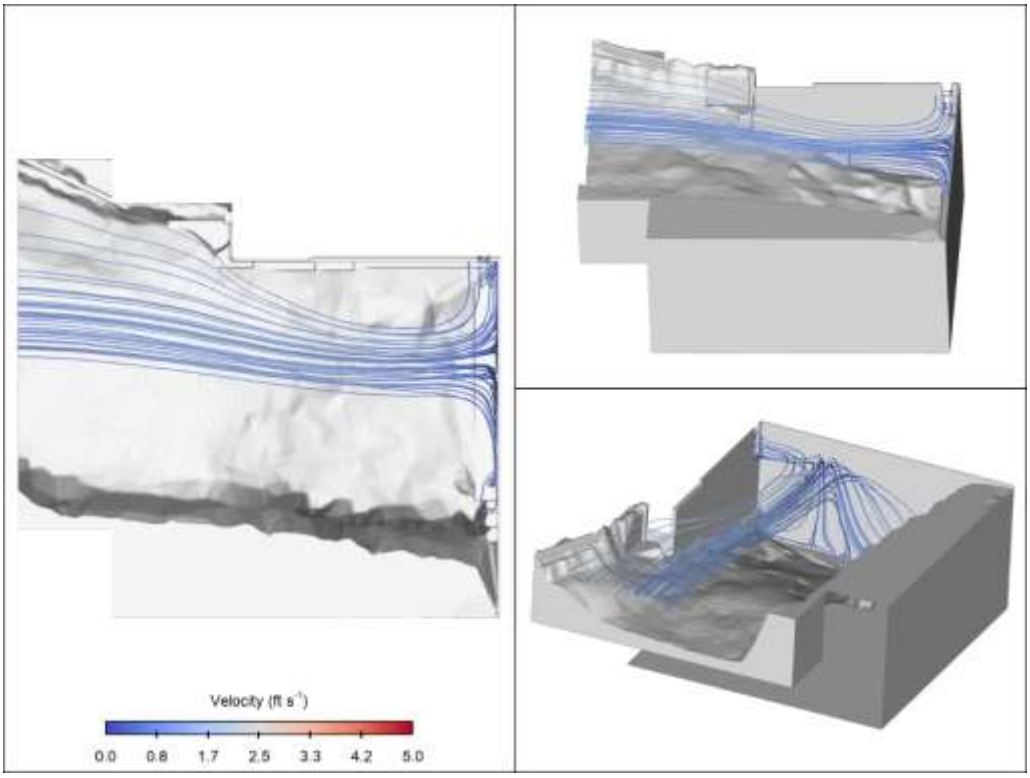

Figure 4-35: Streamlines Colored by Velocity Showing Flow Patterns for Case 2

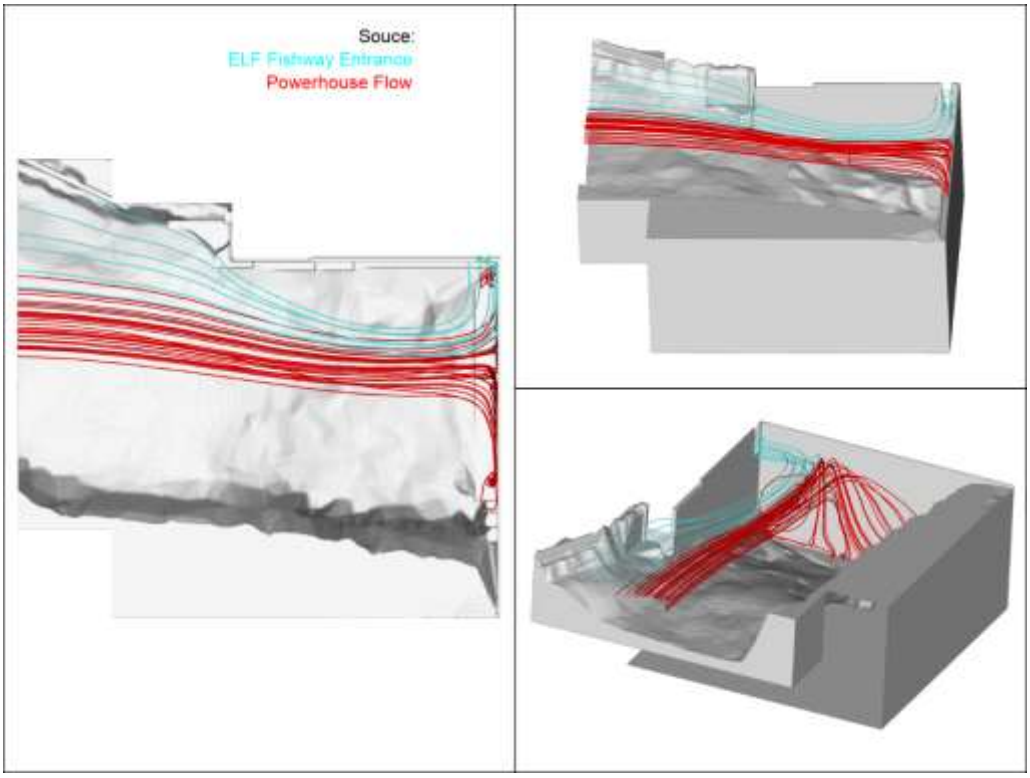

Figure 4-36: Streamlines Colored by Model Outlet Showing Flow Patterns for Case 2

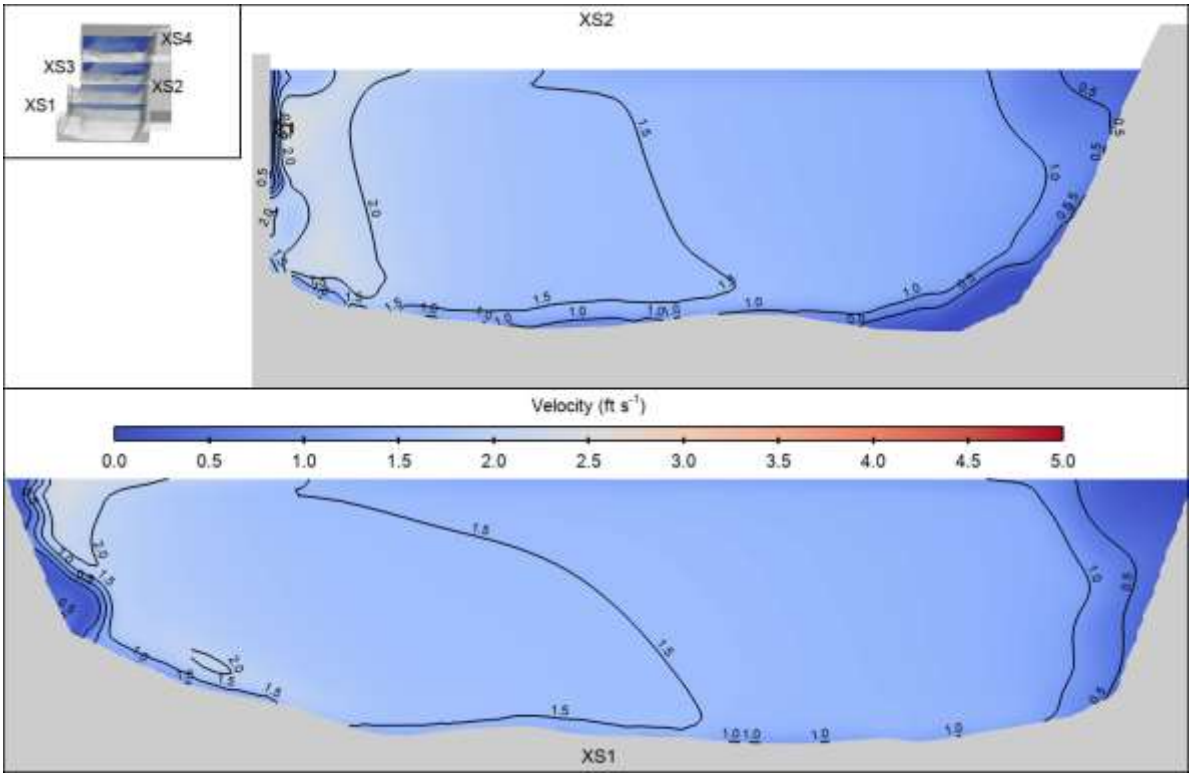

Figure 4-37: Velocity Contours on Cross-Sections for Case 2

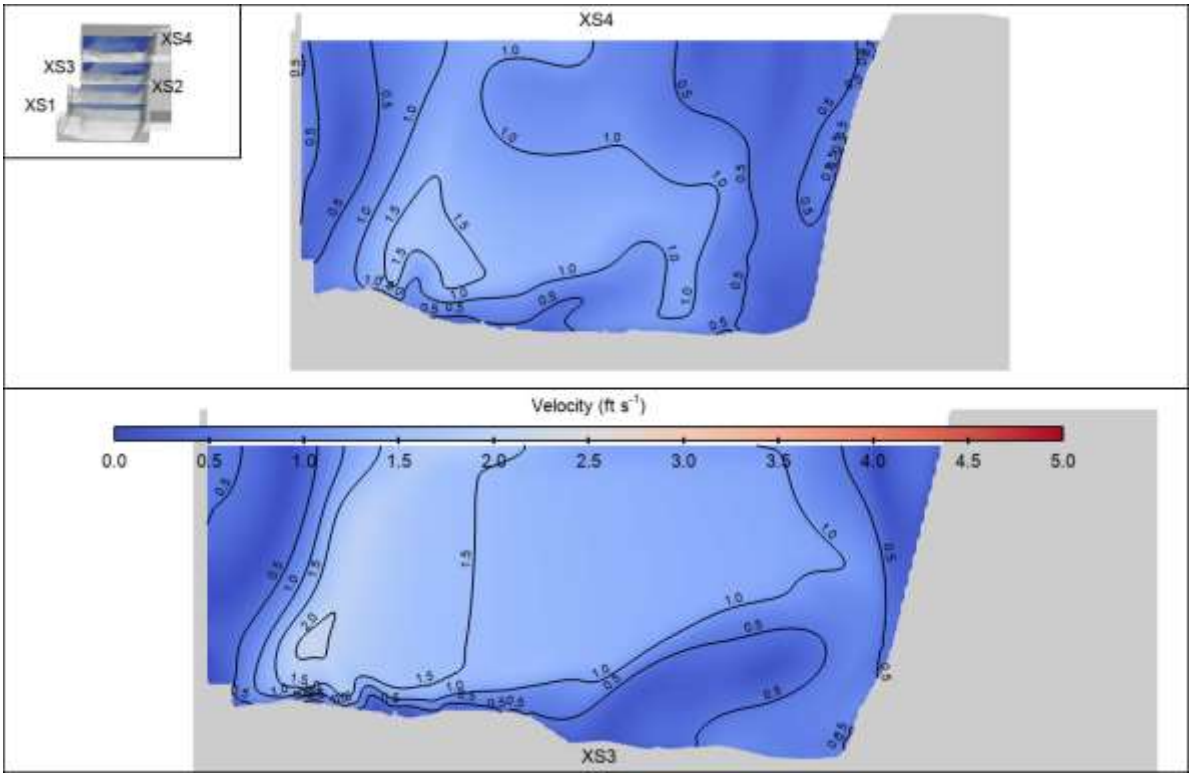

Figure 4-38: Velocity Contours on Cross-Sections for Case 2

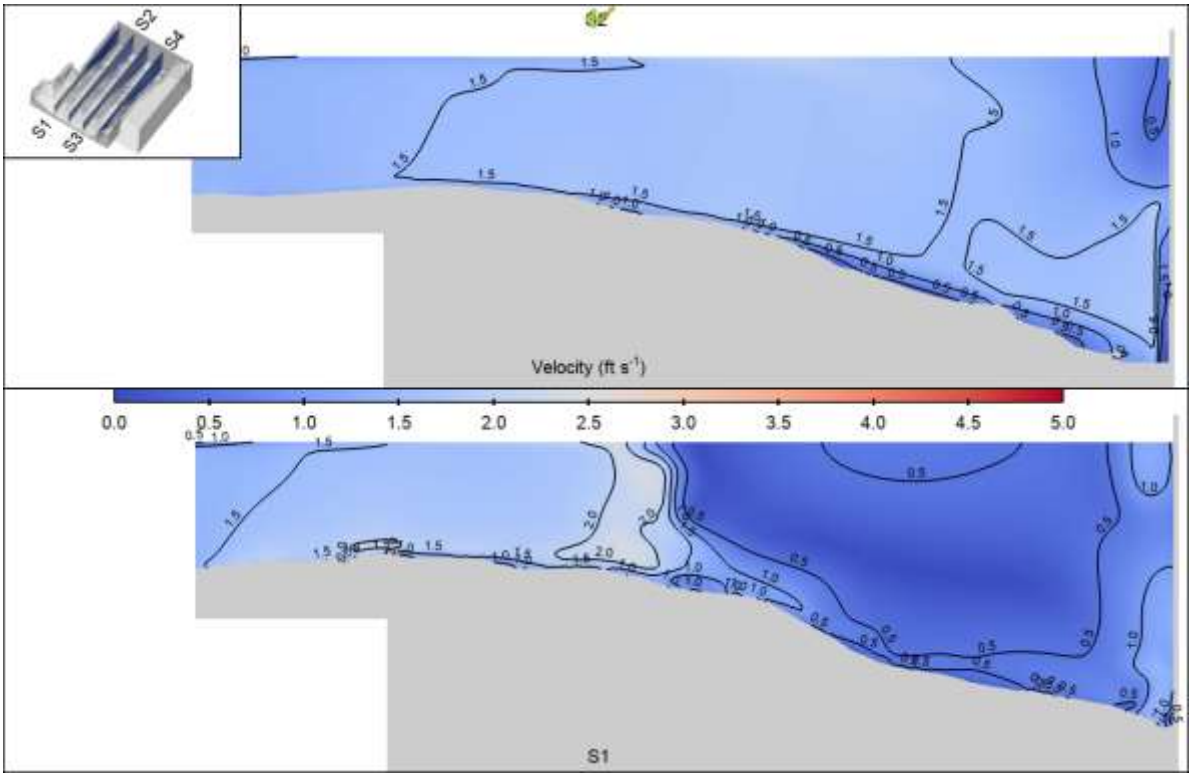

Figure 4-39: Velocity Contours on Sections for Case 2

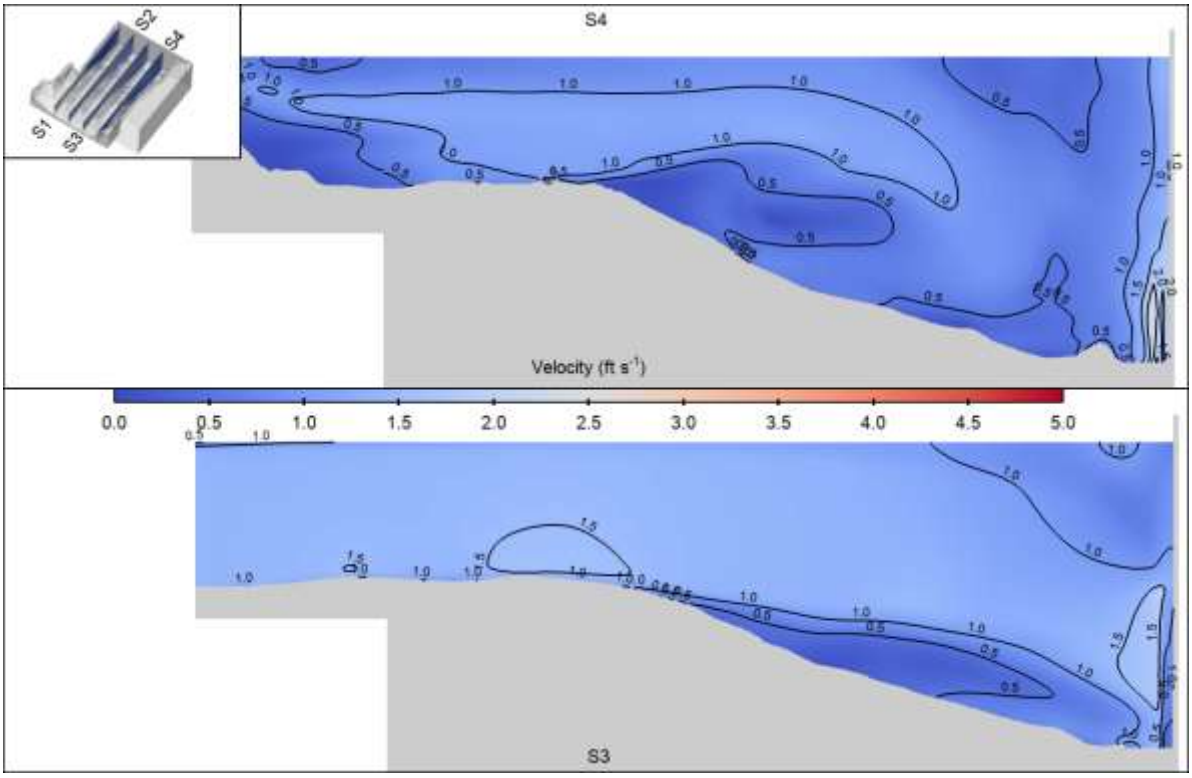

Figure 4-40: Velocity Contours on Sections for Case 2

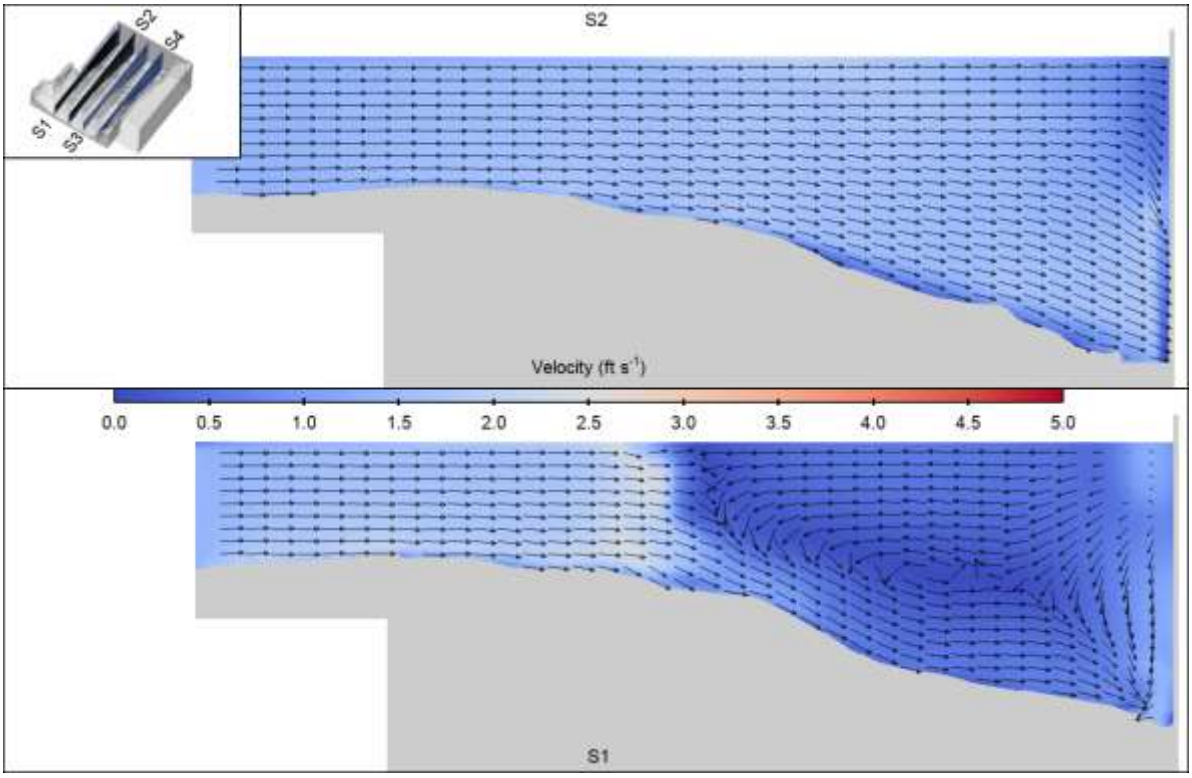

Figure 4-41: Velocity Vectors on Sections for Case 2

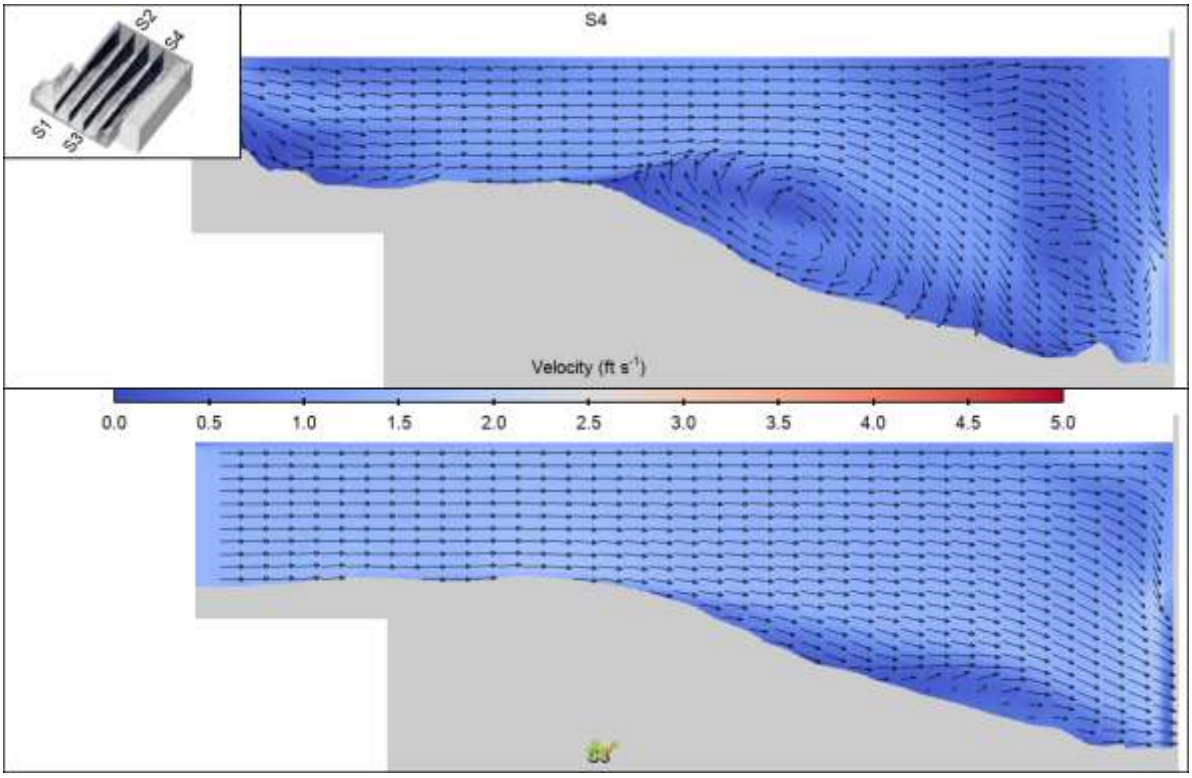

Figure 4-42: Velocity Vectors on Sections for Case 2

Similar to Case 1, The velocity patterns show a large recirculation area along the fishway structure. Flow approaches the fishway entrance parallel to the powerhouse structure. The streamlines indicate that flow entering the fishway originates from the left bank (viewing downstream) of the powerhouse channel.

4.2.3 Case 3 – Minimum Unit Flow

The 75 percent exceedance model assigns 600 cfs through each unit for a total powerhouse flow of 1,200 cfs. The AWS is operating at 130 cfs under this scenario. Figure 4-43 shows the velocity contours and vectors at the water surface (El. 91 ft, NGVD29) and depths of 1 ft (El. 90 ft, NGVD29), 6 ft (El. 85 ft, NGVD29), and 11 ft (El. 85 ft, NGVD29). The streamlines colored by velocity are shown on Figure 4-44. Figure 4-45 shows streamlines colored by model outlet. Figure 4-46 through Figure 4-51 show velocity contour or vectors on multiple sections in the forebay.

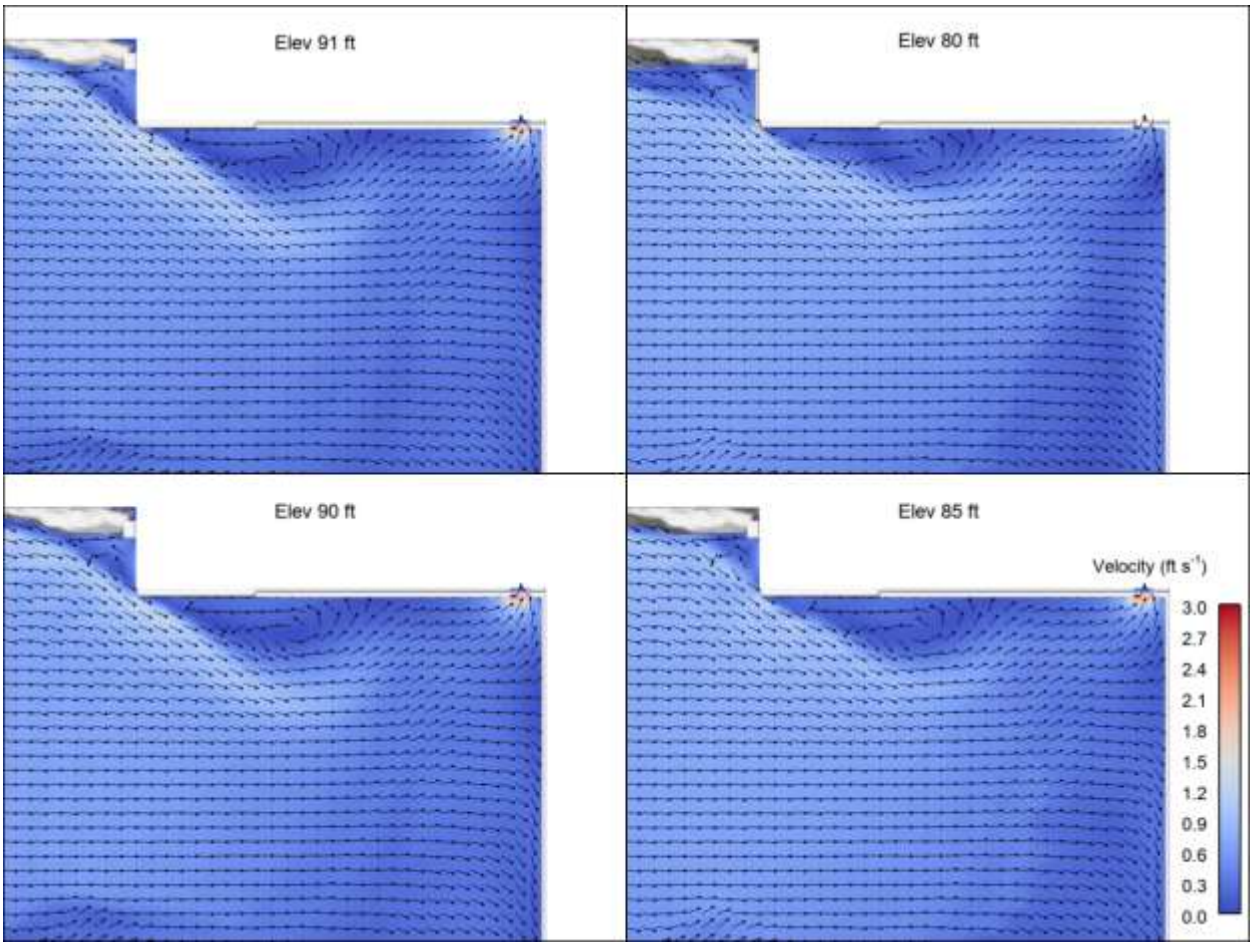

Figure 4-43: Velocity Contours and Vectors for Case 3

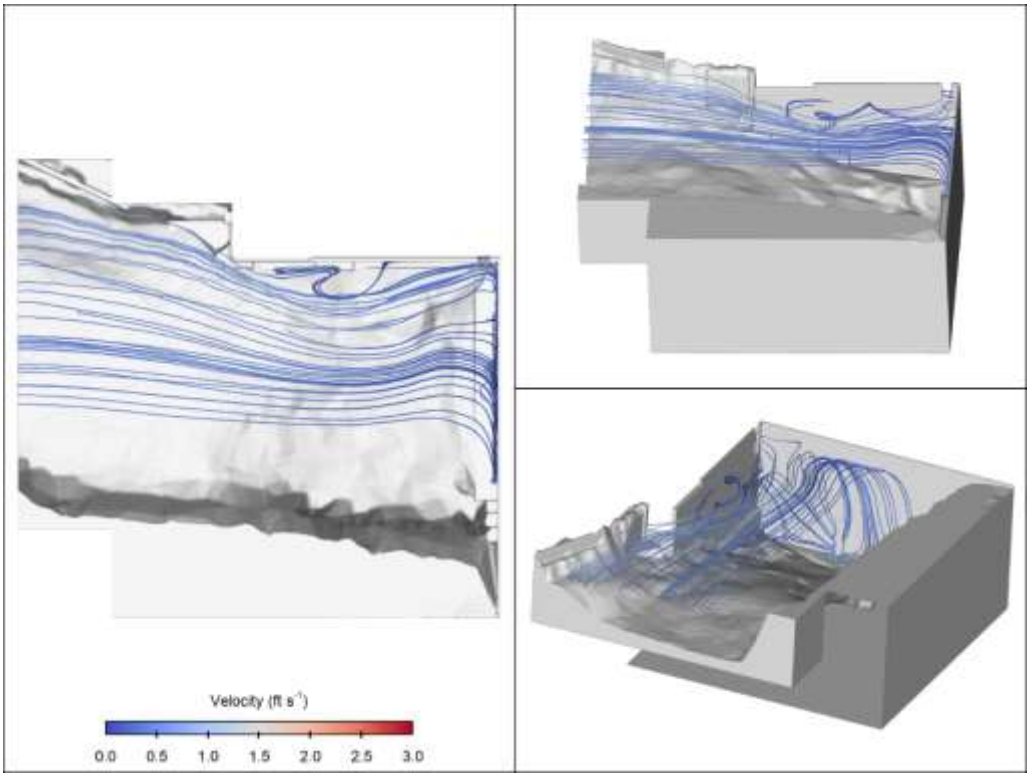

Figure 4-44: Streamlines Colored by Velocity Showing Flow Patterns for Case 3

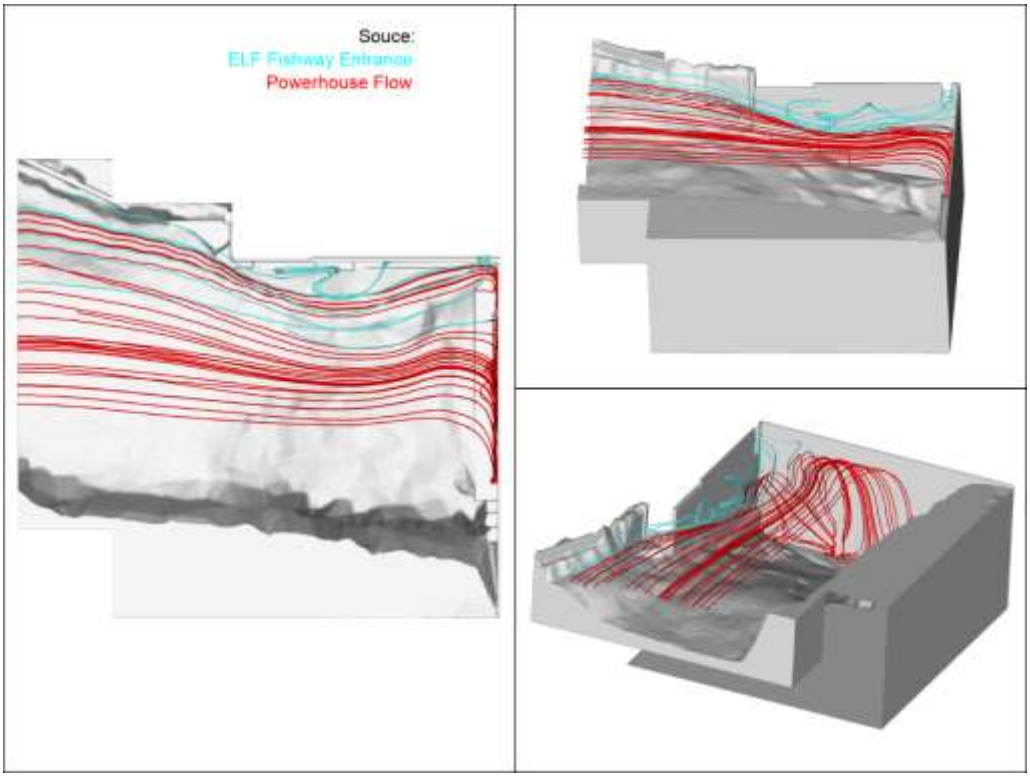

Figure 4-45: Streamlines Colored by Model Outlet Showing Flow Patterns for Case 3

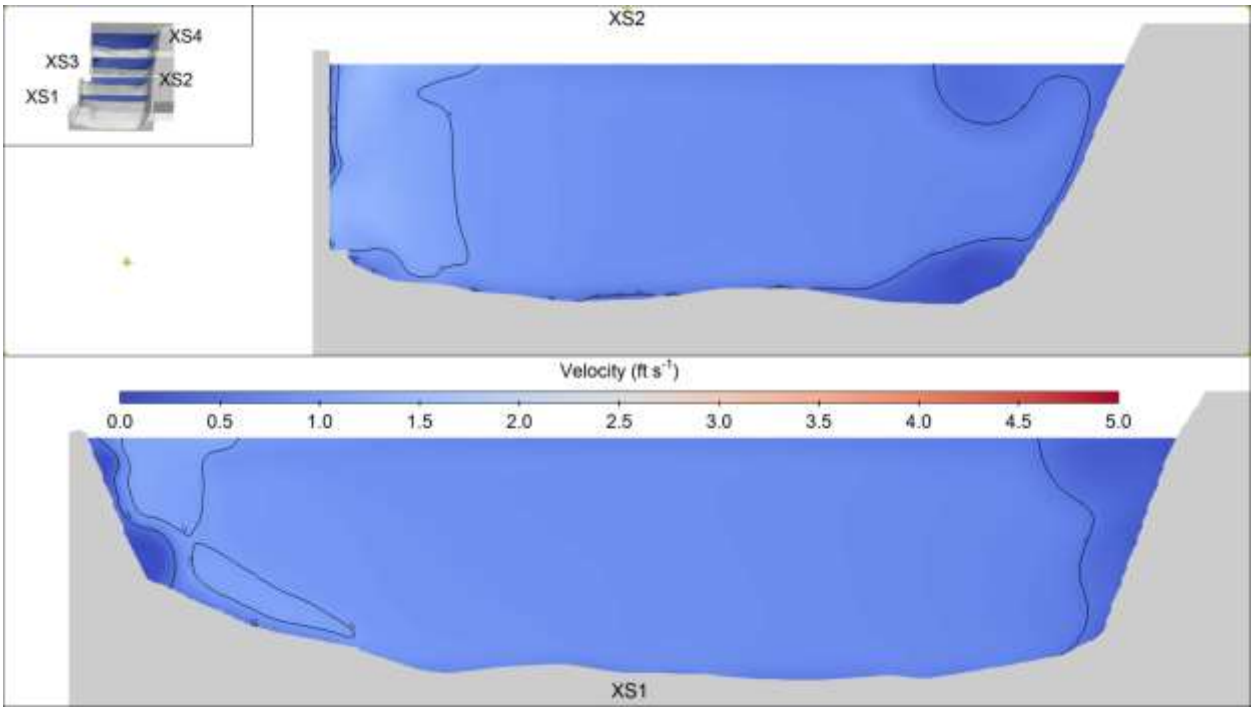

Figure 4-46: Velocity Contours on Cross-Sections for Case 3

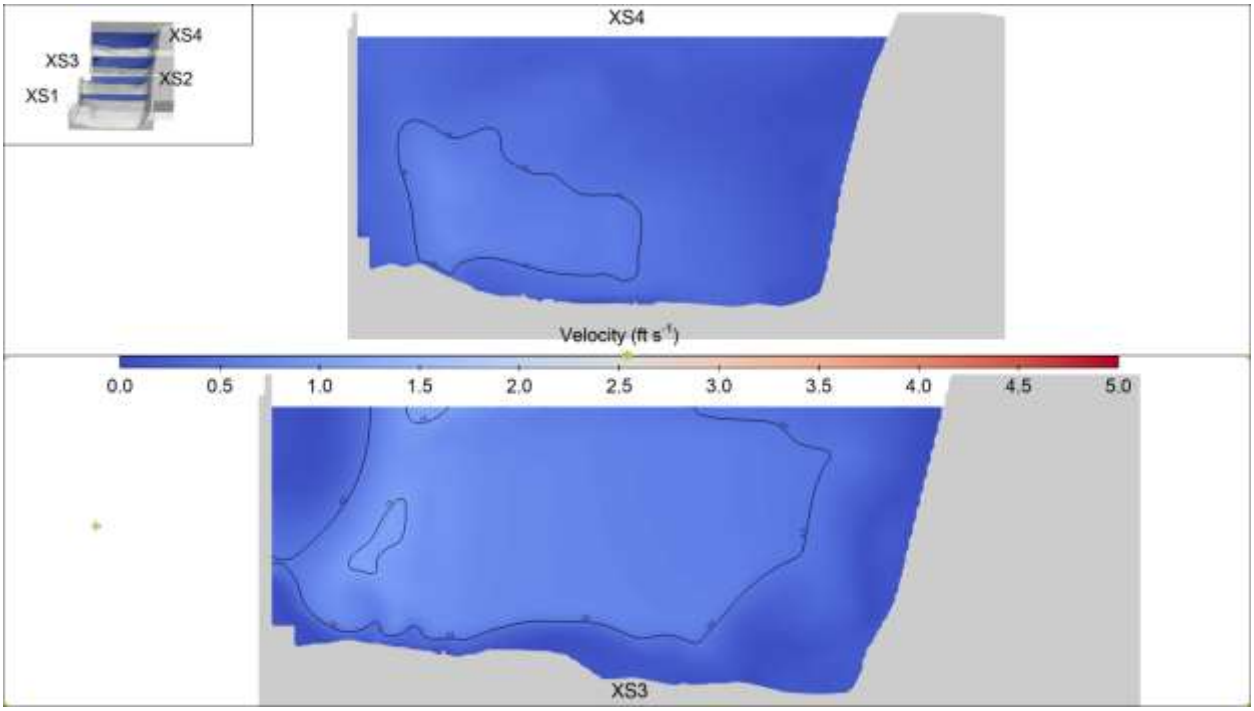

Figure 4-47: Velocity Contours on Cross-Sections for Case 3

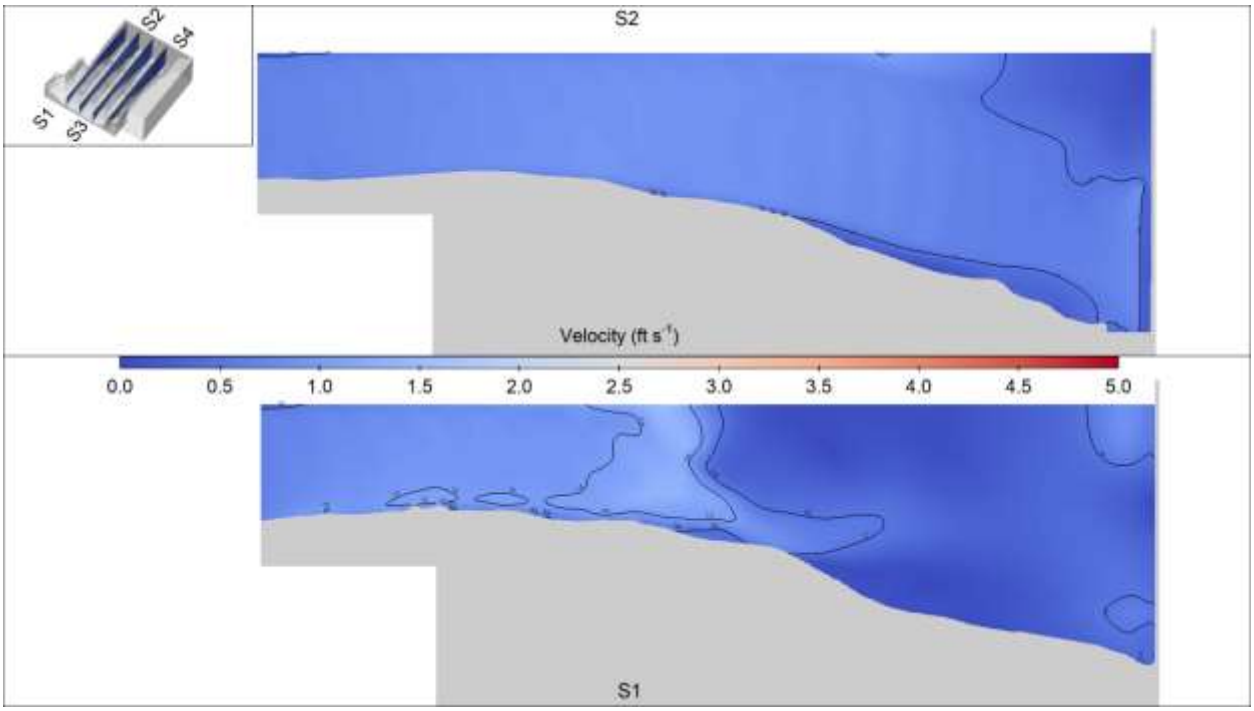

Figure 4-48: Velocity Contours on Sections for Case 3

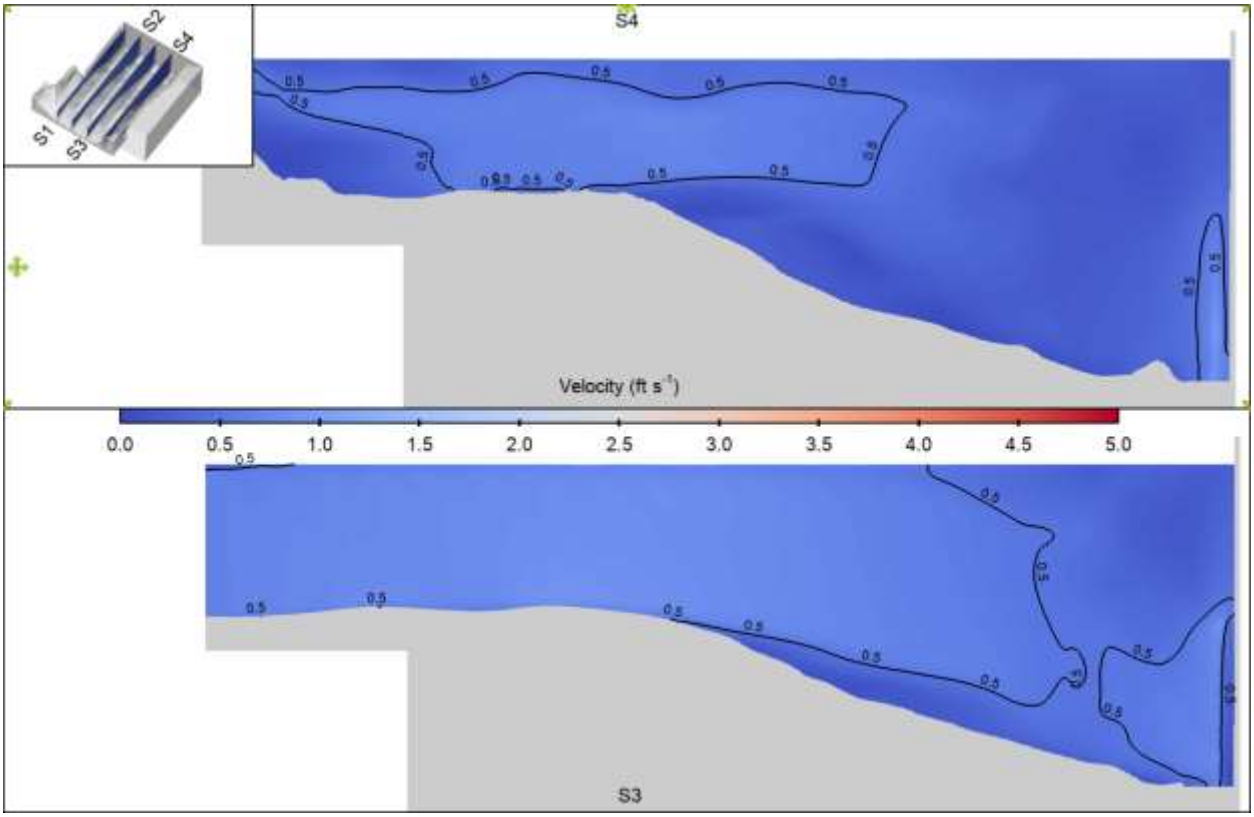

Figure 4-49: Velocity Contours on Sections for Case 3

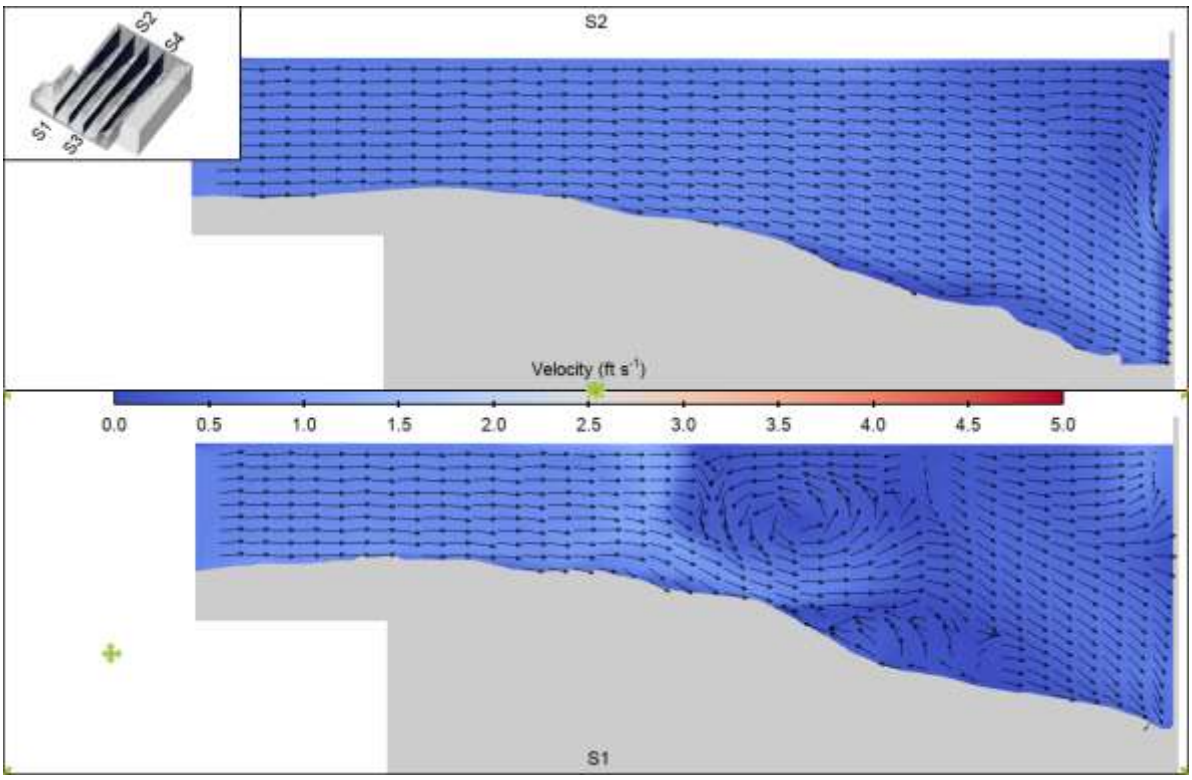

Figure 4-50: Velocity Vectors on Sections for Case 3

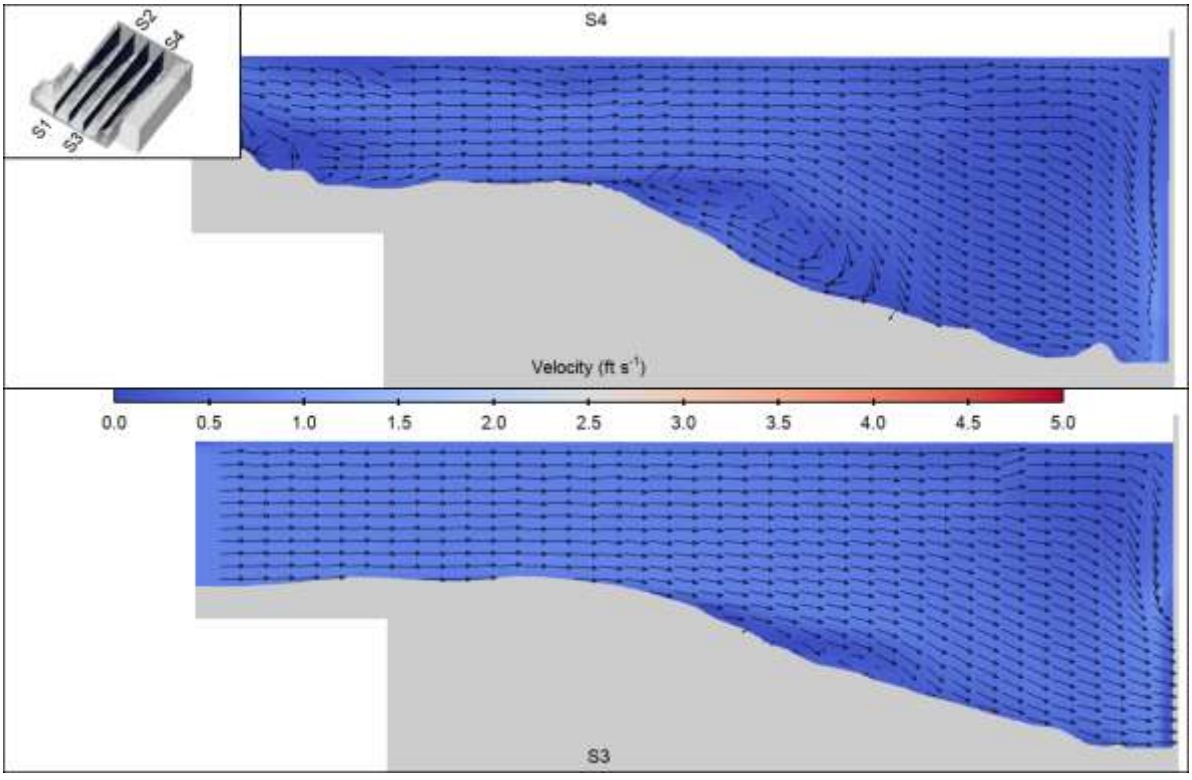

Figure 4-51: Velocity Vectors on Sections for Case 3

The velocity patterns show a recirculation area along the fish elevator structure. Flow approaches the fishway entrance parallel to the powerhouse structure. The streamlines indicate flow entering the fishway originates from the left bank (viewing downstream) of the powerhouse channel.

4.3 E.L. Field Powerhouse Tailrace Model

Two simulations for the tailrace model were analyzed and plots showing velocity contour and vectors at multiple depths were exported. The figures depicting streamlines are colored by velocity and model inlet. The red colored streamlines enter the model domain through the AWS and the cyan lines would discharge through the powerhouse.

4.3.1 Case 1 – 5% Exceedance Tailwater Level

The 5 percent exceedance model assigns 3,300 cfs through each unit for a total powerhouse flow of 6,600 cfs. The AWS is operating at 100 cfs under this scenario. The downstream tailwater condition was determined from the 1983 Tailwater Curve provided to HDR via Email on 2/12/2021. The river flow for the 5% exceedance is approximately 26,000 cfs. At this flow, the tailwater at the downstream end of the tailrace is approximately 58.36 ft. Figure 4-52 shows the velocity contours and vectors at the water surface and depths of 2 ft, 5 ft, and 10 ft. Multiple profiles showing velocity contours and vectors are shown on Figure 4-53. The streamlines colored by velocity are shown on Figure 4-54. Figure 4-55 shows streamlines colored by model outlet. The blue colored streamlines enter the model domain through the AWS and the red lines would discharge through the powerhouse.

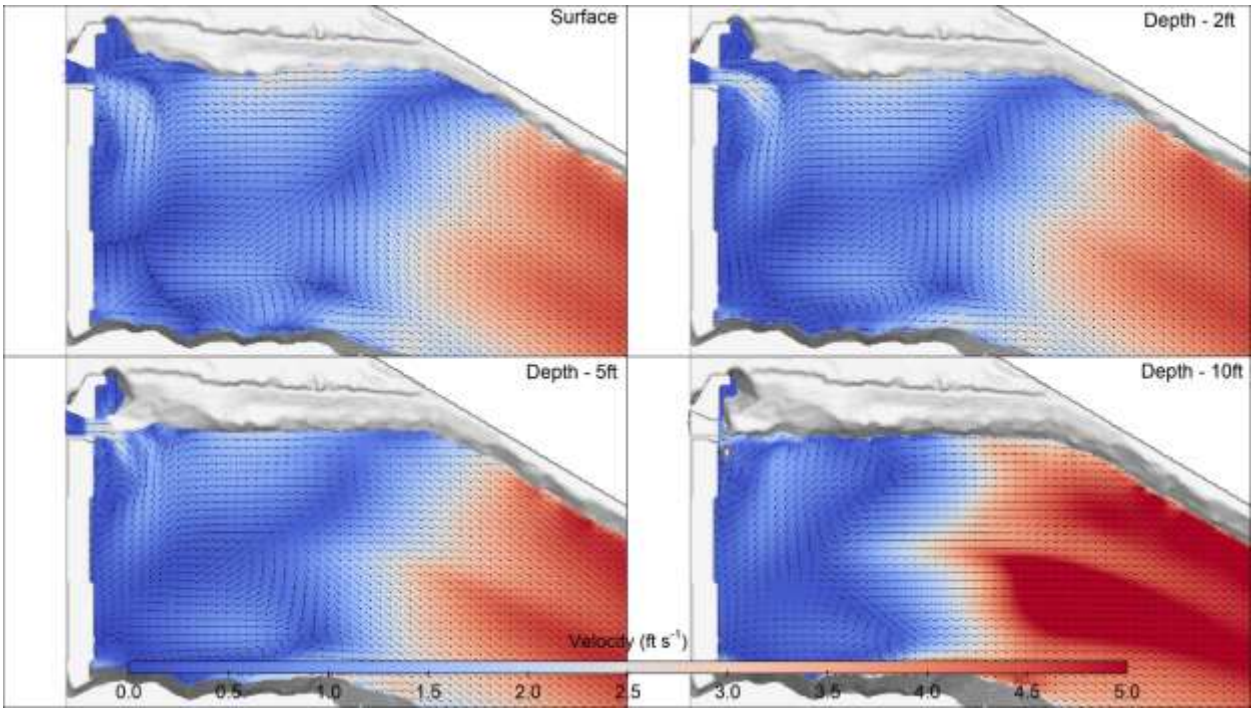

Figure 4-52: Velocity Contours and Vectors at Depth for Case 1

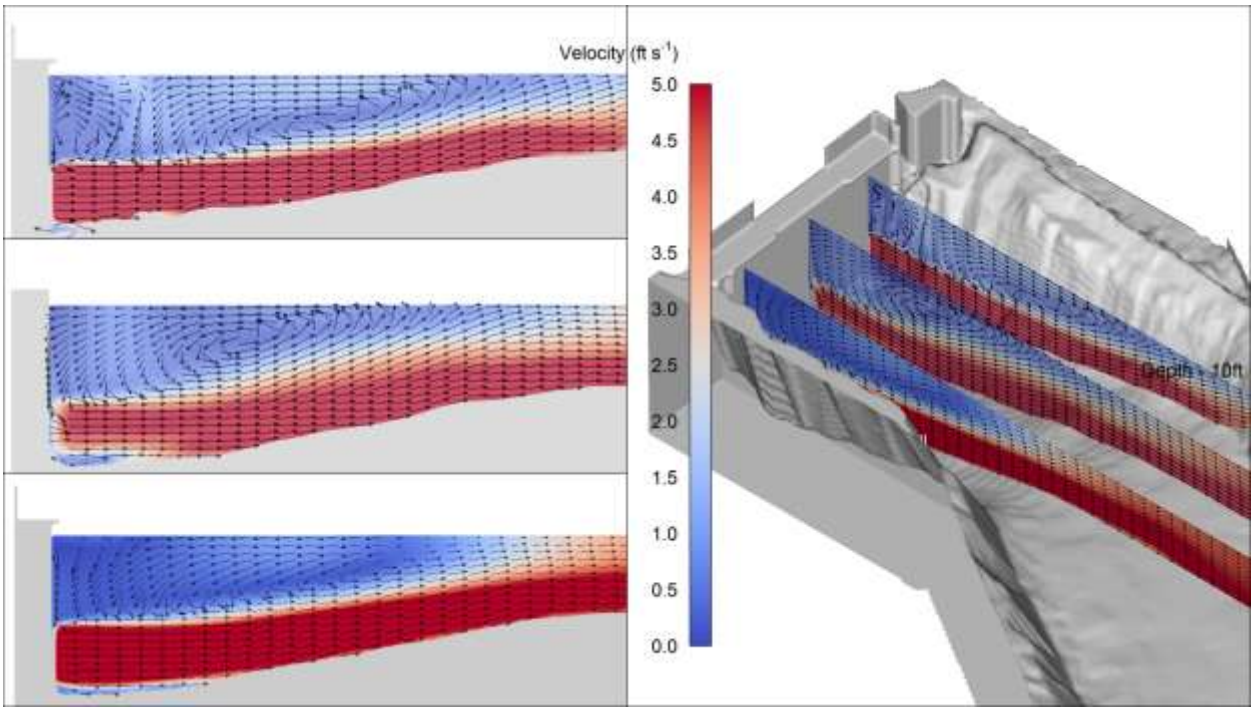

Figure 4-53: Velocity contours and Vector Profiles for Case 1

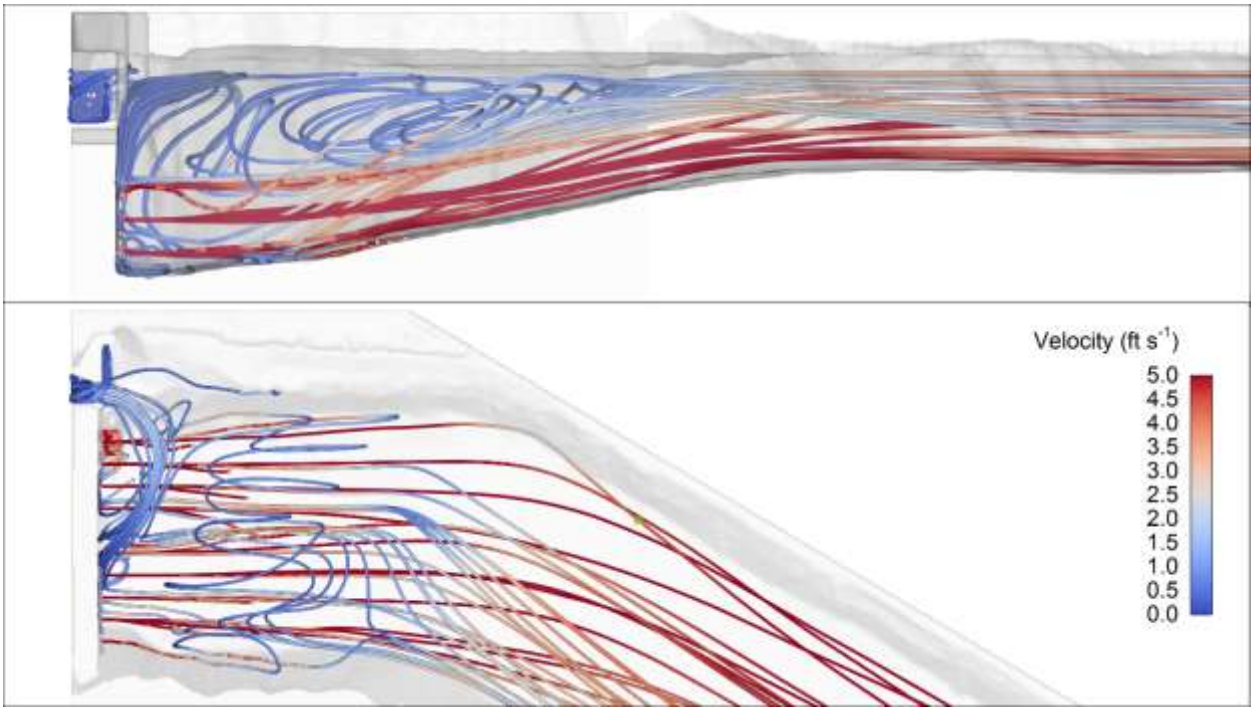

Figure 4-54: Streamlines Colored by Velocity Showing Flow Patterns for Case 1

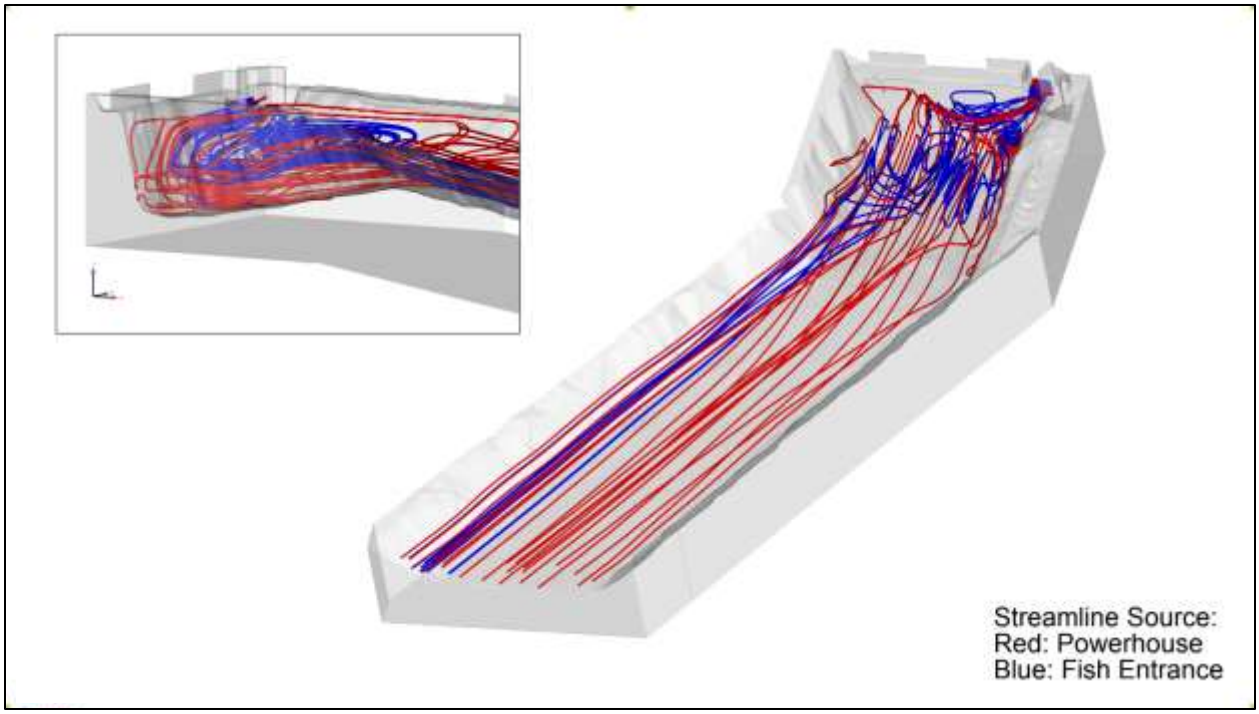

Figure 4-55: Streamlines Colored by Model Outlet Showing Flow Patterns for Case 1

The velocity patterns show a recirculation area above the powerhouse discharges. The recirculation creates two areas where flow is separated near the powerhouse discharge. The flow from the AWS mixes with the powerhouse discharge. The entrance to the AWS shows velocities below 4.0 ft per second. The rock outcrop downstream of the outlet directs flow to the center of the tailrace allowing the flow to mix with the powerhouse discharge.

4.3.2 Case 2 – 50% Exceedance Tailwater Level

The 50 percent exceedance model assigns 3,300 cfs through each unit for a total powerhouse flow of 6,600 cfs. The downstream tailwater condition was determined from the 1983 Tailwater Curve provided to HDR via Email on 2/12/2021. The river flow for the 50% exceedance is approximately 6,755 cfs. At this flow, the tailwater at the downstream end of the tailrace is approximately 53.2 ft. The AWS is operating at 100 cfs under this scenario. Figure 4-56 shows the velocity contours and vectors at the water surface and depths of 2 ft, 5 ft, and 10 ft. Multiple profiles showing velocity contours and vectors are shown in Figure 4-57. The streamlines colored by velocity are shown in Figure 4-58. Figure 4-59 shows streamlines colored by model outlet. The blue colored streamlines enter the model domain through the AWS and the red lines would discharge through the powerhouse.

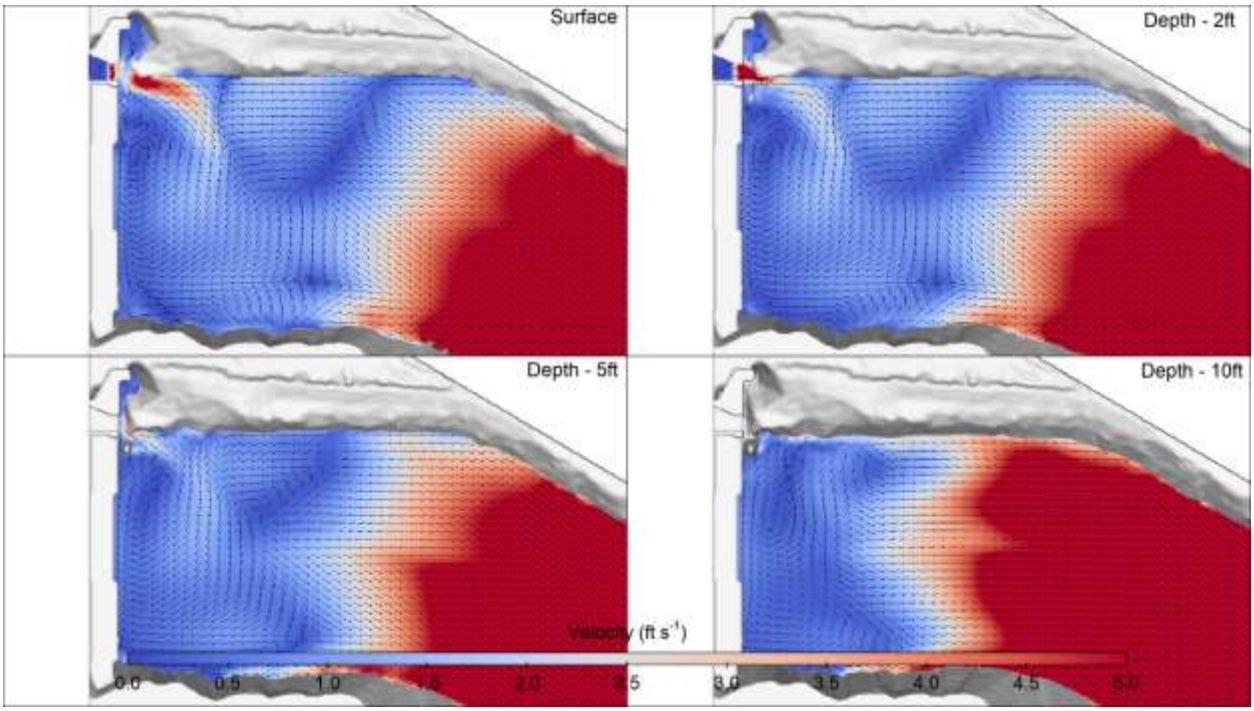

Figure 4-56: Velocity Contours and Vectors at Depth for Case 2

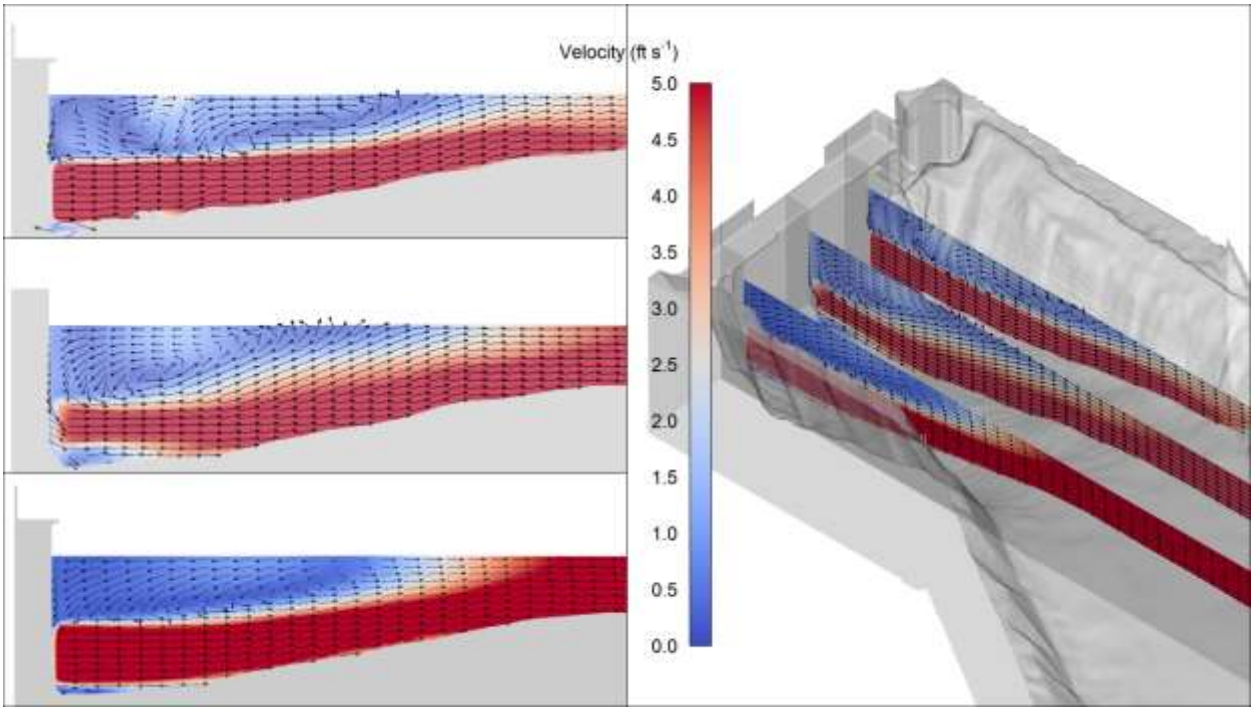

Figure 4-57: Velocity Contours and Vector Profiles for Case 2

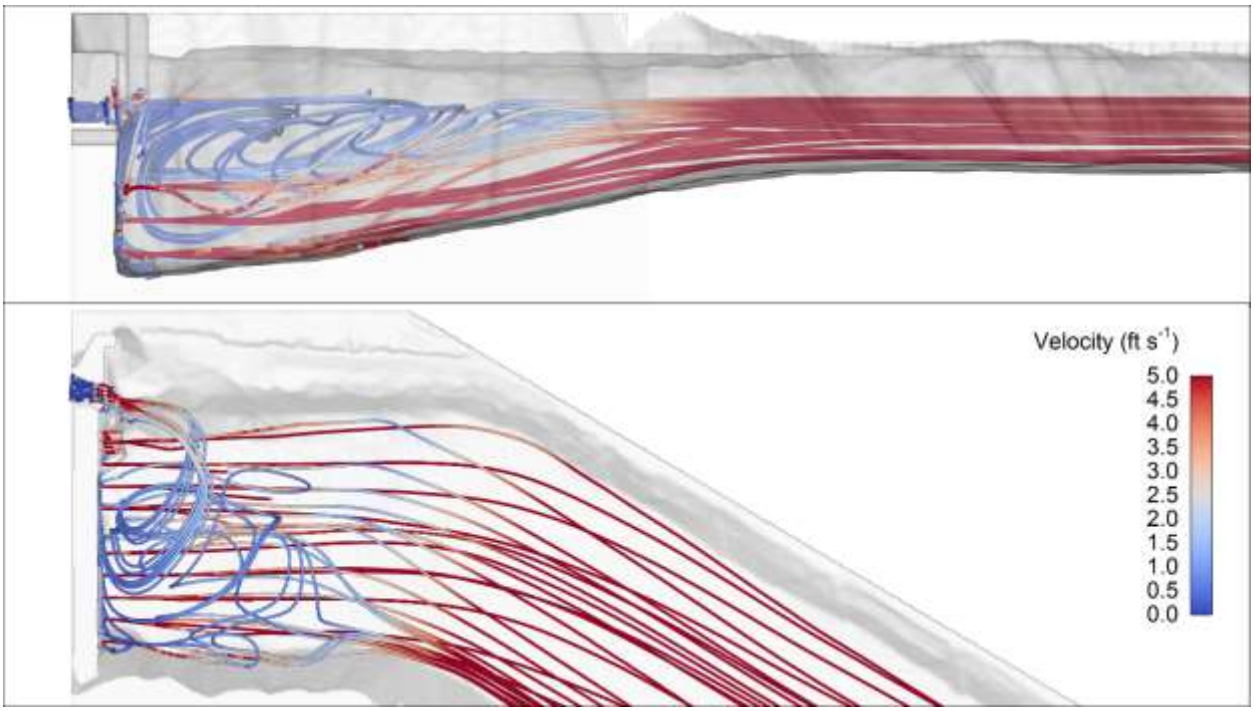

Figure 4-58: Streamlines Colored by Velocity Showing Flow Patterns for Case 2

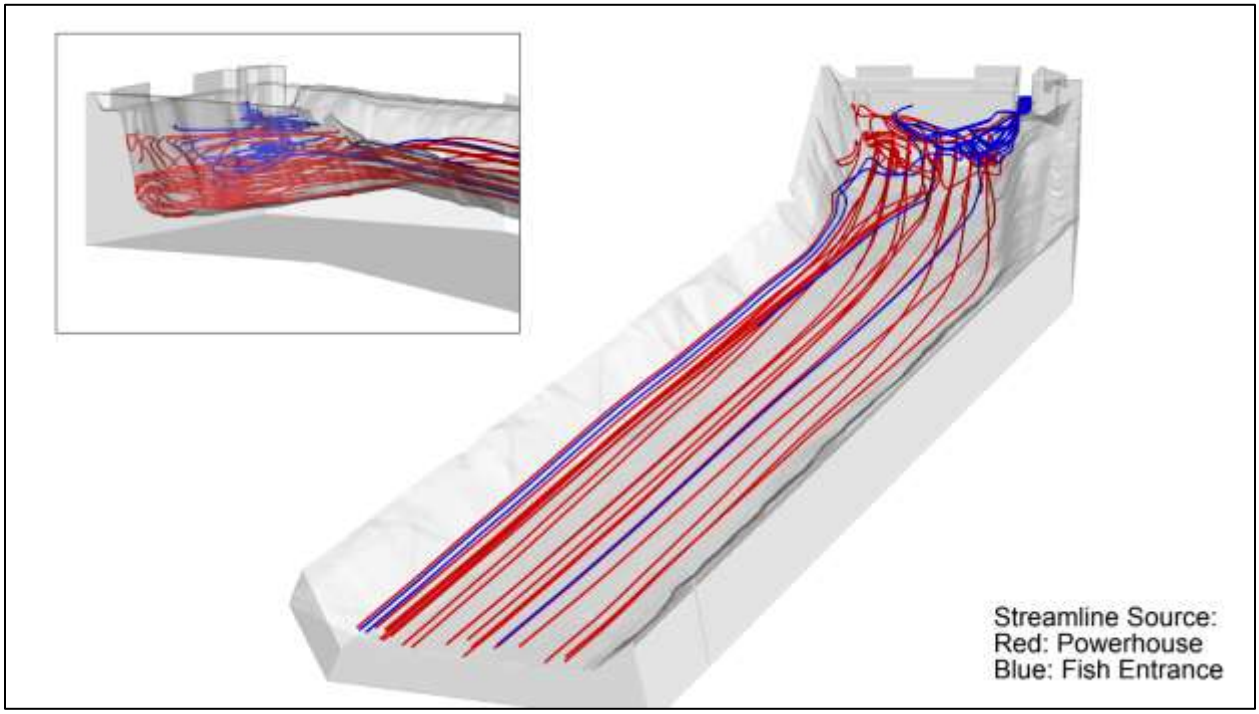

Figure 4-59: Streamlines Colored by Model Outlet Showing Flow Patterns for Case 2

The velocity patterns show a recirculation area above the powerhouse discharges. The recirculation creates two areas of flow separation near the powerhouse discharge. The flow from the AWS mixes with the powerhouse discharge. The velocity near the AWS

outlet is above 5.0 ft per second and the flow path was limited to the top 5 ft of the water column during modeling.

5 Conclusions

Three CFD models were developed to help assess the hydraulic conditions near the Pawtucket Dam fish ladder and the E.L. Field Powerhouse forebay and tailrace. Multiple simulations were run for each model and the results were graphically presented.

The Pawtucket Fish Ladder simulations showed increased velocities over the baffles placed in the fish ladder slots and a recirculation area was present in the 180° near the inside wall. The fish ladder entrance showed an area of flow recirculation or cross flow for the modeled events. The bypass weirs showed increased velocities at the gaps.

The E.L. Field Powerhouse forebay CFD model showed a large recirculation area upstream of the AWS. Flow entering the AWS was limited to the upper portion of the water column and originated along the left bank (viewing downstream) of the channel. The AWS flow would travel from the left bank to the upstream powerhouse face before turning parallel to the powerhouse face and entering the AWS.

The E.L. Field Powerhouse tailrace CFD model showed a mixed flow at the downstream boundary. Flow exiting the river side AWS was immediately mixed with the powerhouse discharge. Flow from the powerhouse would change direction and flow toward the powerhouse, mixing the AWS flow into the water column. The low tailrace elevation shows a limited flow path and velocities exceeding 5.0 ft per second at the AWS outlet.

6 References

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Hirt, C. W., & Nichols, D. B. (1981). Volume of Fluid (VOF) Method for the Dynamics of Free Boundaries. *Journal of Computational Physics*, 201-225.

Orszag, S. A., & Yakhot, V. (1986). Renormalization Group Analysis of Turbulence. *Internation Congress of Mathmaticians* (pp. 1395-1399). Berkley: Princeton University.

US Fish and Wildlife. (2014, November 20). Lowell Weir Survey_141120.xls.

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Memorandum

Monday, November 01, 2021

TO: Kevin Webb, Licensing Manager, Central Rivers Power

FROM: Drew Trested, Fisheries Scientist, Normandeau Associates, Inc.

SUBJECT: Response to June 23, 2021 FERC Staff Recommendations on Requested Modifications to Approved Studies – Fish Passage Survival

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Background

Boott Hydropower, LLC (Boott), a subsidiary of Central Rivers Power US, LLC, is the Licensee, owner, and operator of the 20-megawatt Lowell Hydroelectric Project (Project) (FERC No. 2790). Boott operates and maintains the Project under license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP). Pursuant to the ILP process, Boott submitted a Revised Initial Study Report (ISR) to FERC on February 25, 2021. Comments on the February 25, 2021 Revised ISR, including requests for study modifications, were filed by the Massachusetts Division of Fisheries and Wildlife (MDFW), the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (FWS). Boott filed responses to resource agency comments on May 28, 2021.

On June 23, 2021, the Commission issued a Determination on Requests for Study Modifications for the Lowell Hydroelectric Project. The letter contained the determination on requests for modifications to the approved study plan for the ongoing relicensing of the Lowell Project. Among the resource studies identified in the June 23 FERC determination letter was the Fish Passage Survival Study. Specific to the Fish Passage Survival Study, FERC indicated Boott should "*rerun the model for adult eels, adult alosines, and juvenile alosines for low, medium, and high flow conditions (i.e., 75, 50, and 25 percent exceedance flows), using the calibrated lambda values discussed above, with the assumption that fish routing will occur in proportion to flows*".

This technical memo provides a summary of the methodology and findings related to the FERC request for additional analysis for the Fish Passage Survival Study.

Methodology

To address the FERC request above, the following information was required:

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- Mean body length and associated standard deviation for anticipated outmigrating populations of adult river herring, adult American shad, juvenile alosines, and adult American eels;
- Lowell inflow for the downstream passage season for spring (i.e., May to June) and fall (i.e., October to November) migrants for the 75%, 50%, and 25% exceedance conditions;
- Set of physical parameter values and estimates for characterizing the two Kaplan turbine units housed in the E.L. Field powerhouse;
- Calibrated values of lambda for use in the new downstream passage models for adult alosines and adult eels (calibration to be informed using estimated turbine survival rates obtained during 2019-2020 field studies for adult eels and alosines);
- Proportional distribution among available downstream passage routes; and
- Non-turbine route-specific survival estimates.

All estimates of fish passage survival were calculated using the USFWS Turbine Blade Strike Analysis (TBSA) Tool. The TBSA estimates the fraction of a population of fish that are lost during downstream passage at a hydroelectric project. TBSA simulates passage of a normally distributed population of fish described by a user-defined mean length and associated standard deviation of length. The TBSA then routes the theoretical population through potential downstream passage routes at the project (e.g., turbine unit, downstream bypass or spill) using a user-defined set of proportions. The TBSA Tool provides an estimate of total passage survival for the subset of fish determined to pass the project via each user-input route. The TBSA uses turbine specific parameters to estimate blade strike for fish passing through the powerhouse units and incorporates user-defined survival rates for non-turbine routes.

Fish Size Information:
Body size information for the four target fish species used in this analysis is presented in Table 1. Species-specific length ranges are those originally presented in the Fish Passage Survival Study. For modeling purposes a normal distribution was assumed and the mid-point of the species-specific range was adopted as the mean value. An associated standard deviation was calculated as 1/3 the value between the mean and upper or lower bound of the range. This ensured that approximately 99% of the overall expected size range for each species would be considered.

Table 1. Size range (i.e., minimum – maximum), average, and associated standard deviation for target diadromous fish species.

Species	Minimum (inches)	Maximum (inches)	Average (inches)	Std. Dev.
River herring (Adult)	9	13	11	0. 7
American shad (Adult)	15	23	19	1.3
Juvenile Alosine	2	6	4	0.7
American Eel	25	41	33	2. 7

DRAFT

Lowell Inflow Conditions:

FERC requested modeled passage survival under low, medium and high flow conditions. Flow duration curves for the spring (i.e., May-June) and fall (i.e., October-November) were reviewed (Figure 1). Values for the 25%, 50%, and 75% exceedance conditions were considered as part of this analysis and are presented in Table 2.

Table 2. Merrimack River inflow at Lowell for the 25%, 50%, and 75% exceedance condition during the spring (May-June) and fall (September-October) seasons.

Percent Exceedance	Spring (cfs)	Fall (cfs)
25	11,239	8,835
50	6,755	4,989
75	4,129	3,038

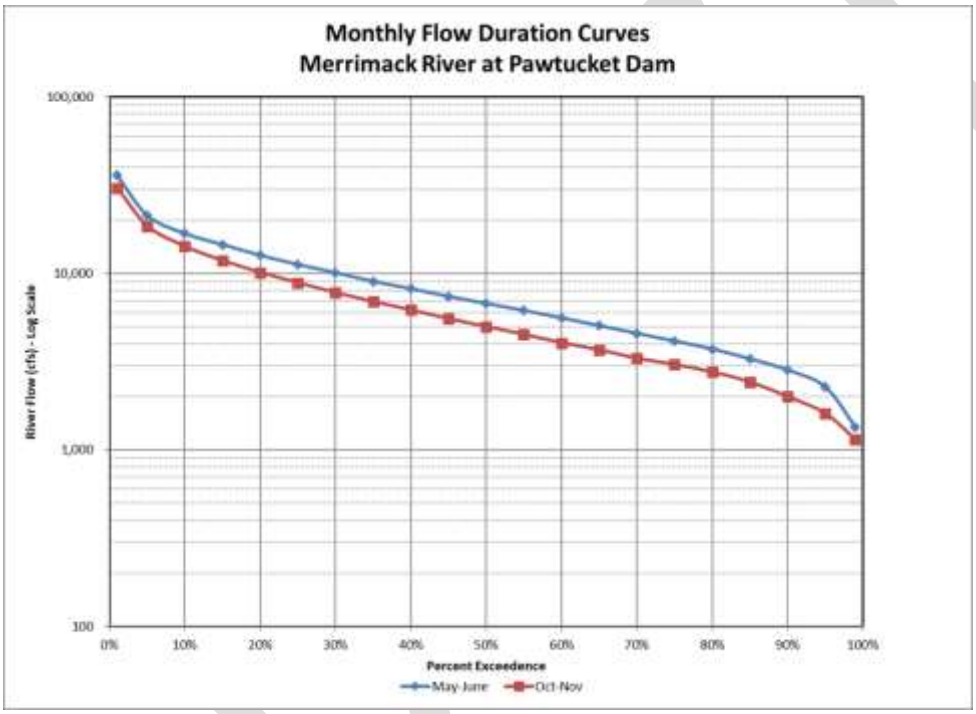

Figure 1. Flow duration curves for the two month periods of May-June and October-November at Lowell.

Lowell Turbine Parameters:

Table 3 provides a summary of the descriptive parameters for the two Kaplan turbines in operation at the E.L. Field powerhouse. These values were previously used during analyses presented in the Revised ISR.

Table 3. Characteristics of Kaplan turbines in operation at the Lowell Project E.L. Field Powerhouse.

Turbine Type	Kaplan
Runner Diameter (ft)	12.7
Number of Blades	5
Turbine Discharge (cfs)	3,300
Discharge at Optimum Efficiency (%)	81.3%
Net Head (ft)	39
Speed (rpm)	120
Turbine Efficiency (%)	92.8

Calibration of Lambda:

In addition to the turbine parameters described above, the strike mortality correlation factor, lambda (λ) is also required to run simulations of downstream fish passage survival using the USFWS TBSA Tool. The Fish Passage Survival Study provided by Boott as part of the Revised ISR, utilized recommended starting values of 0.2 for alosines and 0.4 for adult eels. As part of comments on the Revised ISR, the resource agencies requested the use of calibrated TBSA models to estimate total project survival. To accomplish this, multiple simulations were run which held the project-specific turbine parameters and fish population characteristics constant while allowing the correlation factor to vary. These simulations were run until a value of lambda was identified which produced a TBSA estimate of turbine passage survival equivalent to that observed during field studies conducted during 2019 and 2020. The resulting values for lambda used as part of this analysis are presented in Table 4.

Table 4. Correlation factor values (λ) used to calibrate turbine passage component of TBSA models to approximate field-derived turbine survival rates.

Fish Species (life stage)	Field-derived Turbine Survival Rate	Correlation Factor (λ)	Resulting TBSA Turbine Survival Rate
River herring (Adult)	73.9% (75% CI = 68.8%-79.1%)	0.7	73.9%
American shad (Adult)	35.5% (75% CI = 25.8%-45.2%)	1	34.6%
Juvenile Alosine	-	0.2*	-
American Eel	75.0% (75% CI = 70.6%-79.4%)	0.2	75.0%

*As no field-derived estimate of juvenile alosine survival was available, the standard USFWS value of λ =0.2 was used

Passage Route Distribution:

In their June 23, 2021 Determination on Requests for Study Modifications, FERC requested that additional downstream passage survival analyses assume that fish routing among available passage routes occur proportional to flow. Table 5 summarize the distribution of water at the Lowell Project under each of the seasonal inflow conditions presented in Table 2. In all cases it was assumed that the downstream bypass was in operation and passing 2% of station capacity. Inflow of up to 6,600 cfs was assumed to pass via the two turbine units. Any inflow in excess of

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the downstream bypass and powerhouse was assumed to pass downstream via spill into the bypassed reach.

Table 5. Distribution of inflow at the Lowell Project under the 25%, 50%, and 75% exceedance conditions during the spring and fall fish migration periods.

Condition	Inflow (cfs)	Discharge (cfs)			Distribution (%)		
		Turbine	Bypass	Spill	Turbine	Bypass	Spill
Spring - 25% Exceedance	11,239	6,600	132	4,507	59%	1%	40%
Spring - 50% Exceedance	6,755	6,600	132	23	98%	2%	0%
Spring - 75% Exceedance	4,129	4,046	83	0	98%	2%	0%
Fall - 25% Exceedance	8,835	6,600	132	2,103	75%	1%	24%
Fall - 50% Exceedance	4,989	4,889	100	0	98%	2%	0%
Fall - 75% Exceedance	3,038	2,977	61	0	98%	2%	0%

Non-Turbine Mortality Rates:
Determination of whole-station survival for a theoretical fish population using the TBSA requires user-defined input to characterize survival of individuals passing downstream via any non-turbine passage routes. In this case the field-derived passage rates for alosines and eels observed during the 2019 and 2020 studies were utilized. These values are summarized in Table 6.

Table 6. Field-derived or assumed non-turbine route mortality rates for species/life stages at Lowell.

Fish Species (life stage)	Bypass	Spill	Notes
River herring (Adult)	12.2%	10.8%	Spill was limited to 1 individual; used rate for adult shad as a surrogate
American shad (Adult)	17.4%	10.8%	
Juvenile Alosine	12.0%	11.0%	Used adult alosine rates as a surrogate
American Eel	0.0%	0.0%	Spill based on 4 individuals; bypass assumed to be equivalent

Results

Species-specific body size information, turbine parameters, assumed passage route distribution information, and available non-turbine survival rates were combined using the TBSA Tool to generate estimates of passage survival for adult river herring, adult American shad, juvenile alosines and adult American eels. Estimates were generated for a high flow condition (i.e., 25% exceedance condition), mid flow condition (i.e., 50% exceedance condition) and a low flow condition (i.e., 75% exceedance condition). Results are presented in Tables 7 (adult river herring, 8 (adult American shad), 9 (juvenile alosines), and 10 (adult American eels). In general, whole station survival was greatest under the high flow condition. The high flow condition resulted in 40% (spring) and 24% (fall), respectively, of flow (and fish) passing via spill into the downstream bypass. Downstream passage during the mid and low flow condition was limited

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to use of the downstream bypass or via the turbine units. As evidenced in Tables 7-9, blade strike at the turbine units was the primary cause of mortality under most species-inflow condition combinations.

Table 7. TBSA estimated rates for turbine strike, bypass failure, and passage survival for adult river herring under a high, mid, and low flow condition at Lowell.

Condition	Turbine Strikes	Bypass Failures	Survival
Spring - 25% Exceedance	14.7%	6.5%	78.8%
Spring - 50% Exceedance	24.2%	0.0%	75.8%
Spring - 75% Exceedance	35.8%	0.0%	64.2%

Table 8. Estimates of rates for turbine strike, bypass failure, and passage success for adult American shad under a high, mid, and low flow condition at Lowell.

Condition	Turbine Strikes	Bypass Failures	Survival
Spring - 25% Exceedance	42.2%	2.7%	55.1%
Spring - 50% Exceedance	64.5%	0.6%	34.9%
Spring - 75% Exceedance	79.4%	0.3%	20.3%

Table 9. Estimates of rates for turbine strike, bypass failure, and passage success for juvenile alosines under a high, mid, and low flow condition at Lowell.

Condition	Turbine Strikes	Bypass Failures	Survival
Fall - 25% Exceedance	1.1%	2.8%	96.1%
Fall - 50% Exceedance	3.2%	0.7%	96.1%
Fall - 75% Exceedance	3.9%	0.2%	95.9%

Table 10. Estimates of rates for turbine strike, bypass failure, and passage success for adult American eel under a high, mid, and low flow condition at Lowell.

Condition	Turbine Strikes	Bypass Failures	Survival
Fall - 25% Exceedance	16.7%	0.0%	83.3%
Fall - 50% Exceedance	27.2%	0.0%	72.8%
Fall - 75% Exceedance	33.9%	0.0%	66.1%

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Resources, Ownership, Boundaries, and Land Rights Study Report

Lowell Hydroelectric Project (FERC No. 2790)

November 1, 2021

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC
Manchester, New Hampshire

Central Rivers Power

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Appendix B - 1984 *Great Deed*
Appendix C - 1986 *Order of Taking*
Appendix D – 1995 *Grant of Easement*
Appendix E – GIS Database Exported Maps

List of Acronyms

Boott	Boott Hydropower, LLC (or Licensee)
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commonwealth	Commonwealth of Massachusetts
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission (or Commission)
FGMP	Final General Management Plan
GIS	Geographic Information System
GPS	Global Positioning System
ILP	Integrated Licensing Process
ISR	Initial Study Report
LHPC	Lowell Historic Preservation Commission
LNHP	Lowell National Historical Park
MADCR	Massachusetts Department of Conservation and Recreation
MADEM	Massachusetts Department of Environmental Management
MOU	memorandum of understanding
MW	megawatt
NHL	National Historic Landmark
NOI	Notice of Intent
NPS	National Park Service
PAD	Pre-Application Document
Project	Lowell Hydroelectric Project (or Lowell Project)
Proprietors	Proprietors of the Locks and Canals
PSP	Proposed Study Plan
RM	river mile
RMP	Resources Management Plan

ROR	run-of-river
RSP	Revised Study Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SPD	Study Plan Determination
Study Workshop	Lowell Hydroelectric Project Study Workshop

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1 Introduction and Background

Boott Hydropower, LLC (Boott or Licensee) is the Licensee, owner, and operator of the 20.2-megawatt Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (C.F.R.) Part 5.

In accordance with 18 C.F.R. § 5.15, Boott has conducted studies as provided in the study plan and schedule approved in the Commission's March 13, 2019 Study Plan Determination (SPD) for the Project.[1] This report describes the methods and results of the approved Resources, Ownership, Boundaries, and Land Rights Study conducted in support of a new license for the Project.

1.1 Project Description and Background

The Lowell Project is located at river mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of:

1) A 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket Dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones;
2) A 720-acre impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29;
3) A 5.5-mile-long canal system which includes several small dams and gatehouses;
4) A powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW);
5) A 440-foot-long tailrace channel;
6) Four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal systems containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW;

[1] The Commission issued a Revised Process Plan and Schedule on June 12, 2020.

7) A 4.5-mile-long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid;

8) Upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field Powerhouse, and a vertical-slot fish ladder at the Pawtucket Dam; and

9) Appurtenant facilities.

At the normal pond elevation of 92.2 feet NGVD 29 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet is approximately 3,600 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control and has no usable storage capacity.

The Project's primary features are located along the Merrimack River in the City of Lowell, Massachusetts. The City of Lowell was founded in the early 1820s by Boston merchant capitalists and became one of the most significant planned industrial cities in America. Lowell's factory system, which used the waterpower of the Merrimack River, incorporated new technologies to provide for the mass production of cotton cloth in mills throughout the city (National Park Service [NPS] 1981). Lowell established the pattern for large-scale waterpower development for the next 50 years.

Several Project facilities are located within overlapping locally, state, and nationally designated parks and historic properties/preservation districts. The Project's Pawtucket Dam and E.L. Field Powerhouse are located along the mainstem of the Merrimack River. The existing Project's two-tiered network of man-made canals extends throughout downtown Lowell. In addition to the Pawtucket Dam and hydroelectric developments, the existing Project also includes miscellaneous civil works in the City of Lowell, including the Guard Lock and Gates, Moody Street Feeder Gatehouse, Lawrence Dam, Hall Street Dam, Tremont Wasteway, Lower Locks and Dam, Swamp Locks and Dam, Merrimack Dam, Rolling Dam, and Boott Dam. As discussed in Boott's December 2, 2020 DLA for the Project, operation of the canal units is no longer economically feasible, and Boott has proposed to remove the downtown developments (Assets, Bridge Street, Hamilton, and John Street) and associated canal infrastructure from the Project's FERC license. Boott is not proposing to restart or continue generation at these four developments.

The canal system, the downtown mill sites, and many of the Project's civil works, are contributing resources to Lowell Locks and Canals National Historic Landmark (NHL) District. The canal system and many Project facilities are also located within the Lowell National Historical Park (LNHP) managed by the NPS and the larger Lowell Historic Preservation District. The LNHP was established by Congress in 1978 to "preserve and interpret the nationally significant historical and cultural sites, structures, and districts in Lowell, Massachusetts, for the benefit and inspiration of present and future generations." The park is by design a partnership park in which federal, state, and local governments as well as the private sector and local community carry out the legislative intent of the

park unit. The LNHP is also listed on the National Register of Historic Places (NRHP), and certain properties within the park overlap with properties in the NHL District.

The Lowell Heritage State Park, established in 1974 as a precursor to the LNHP, is also located within the City of Lowell and is comprised of linear greenways along the Merrimack River and canal system and a collection of historic buildings and structures related to the industrial development of the city. These buildings and structures include Project features and properties located within the NHL District. The Lowell Heritage State Park is operated by the Massachusetts Department of Conservation and Recreation (MADCR) and features exhibits created in partnership with the NPS (MADCR 2018). With the exception of the Rynne Bathhouse, all of the built resources within the Lowell Heritage State Park fall within the Lowell Historic District, designated by the City of Lowell to "…ensure that development activities within the district are consistent with the preservation of its 19th century setting" (MADCR 2014). Portions of the Lowell Heritage State Park also overlap with the Lowell Locks and Canals NHL District and the LNHP.

Ownership, boundaries, and land/access rights of the downtown canal system in Lowell are complex. The existing Project is situated within several different and overlapping parks, and preservation/conservation districts. The park is by design a partnership park in which federal, state, and local governments as well as the private sector and local community carry out the legislative intent of the park unit.

On April 30, 2018, Boott initiated the ILP by filing a Pre-Application Document (PAD) and Notice of Intent (NOI) with the Commission. Major ILP milestones to-date are presented below in Table 1-1.

Table 1-1. Major ILP Milestones Completed

Date	Milestone
April 30, 2018	PAD and NOI Filed
June 15, 2018	Scoping Document 1 (SD1) Issued by FERC
July 17, 2018	FERC Agency and Public Scoping Meetings Conducted
July 18, 2018	Project Site Visit Held
September 27, 2018	Scoping Document 2 (SD2) Issued by FERC
September 28, 2018	Proposed Study Plan (PSP) Filed
October 18 & 19, 2018	PSP Meeting Conducted
January 28, 2019	Revised Study Plan (RSP) Filed
March 13, 2019	FERC Issued SPD
February 25, 2020	Initial Study Report (ISR) Filed
March 11, 2020	ISR Meeting
June 12, 2020	FERC Issued Revised Process Plan and Schedule

September 30, 2020	Revised ISR Filed
December 2, 2020	Draft License Application (DLA) Filed
February 25, 2021	Revised ISR Filed
April 30, 2021	Final License Application (FLA) Filed

Boott has continued consultation with stakeholders regarding the approved studies as required by the Commission's SPD. In accordance with the approved study plan, Boott has also provided stakeholders with Quarterly ILP Study Progress Reports that include a description of study activities conducted during the previous quarter, activities expected to occur in the next quarter, and identified variances from the approved study plan.

2 Study Goals and Objectives

The goal of this study is to determine current ownership of resources within the canal system and existing Project Boundary, and document maintenance responsibilities, access rights, and FERC jurisdiction. The specific objectives of this study are as follows:

- Determine the current ownership of resources within the canal system in a comprehensive manner;
- Record maintenance responsibilities and obligations to resources within the canal system;
- Clarify FERC jurisdiction;
- Document recreational, educational, or other land access rights to resources within the canal system; and
  Work with the MADCR, NPS, City of Lowell, and other parties to develop a Geographic Information System (GIS) database of resources, ownership, boundaries, and land rights.

3 Study Area

In accordance with the Commission's SPD, the study area for the Resources, Ownership, Boundaries, and Land Rights Study includes the existing FERC Project Boundary and associated structures in the downtown area (Appendix A).

4 Methodology

4.1 Literature Review and Analysis

Boott conducted desktop research and a literature review to compile and review available ownership and rights documentation to obtain a better understanding of the rights and responsibilities related to resources within the Project Boundary. As appropriate and relevant, public guidance and conceptual planning and/or management documentation was reviewed by Boott including the following:

- The 1980 *Details of the Preservation Plan*[2] prepared by the Lowell Historic Preservation Commission (LHPC), containing technical materials including a description of agreed-upon agency roles at the City, State, and Federal level.
- The 1981 *Final General Management Plan* (FGMP)[2] developed by NPS to provide a basis for visitor use, resource management, and general development within the LNHP.
- The 1990 *Preservation Plan Amendment*[2] developed by the LHPC summarizes accomplishments of the LNHP and outlines its proposed activities.
- The 1991 *Memorandum of Understanding* (MOU) executed by MADCR, NPS, and Boott for the purpose of maintaining, managing, and operating the Lowell canal system (MOU 1991).

On December 18, 2019, Boott held a Lowell Hydroelectric Project Study Workshop (Study Workshop)[3] with stakeholders. During the Study Workshop it was suggested that three legal documents establish most of the ownership, responsibilities, and land rights to the Lowell canal system. The 1984 *Deed, Bill of Sale and Grant of Easements*, also known as the *"Great Deed"* (Appendix B) details the sale of portions of the Project from the Proprietors of the Locks and Canals on the Merrimack River (Proprietors)[4] to Boott, as well as associated access and repair easements. The 1986 *Order of Taking* (Appendix C) details the take of properties, rights, and responsibilities from Boott and Proprietors to the Commonwealth, operating through MADCR. The 1995 *Grant of Easement* (Appendix D) describes the easement rights provided to the NPS from MADCR for specific properties and parcels around the canal system.

[2] This plan was approved by FERC on March 20, 2019 as a Comprehensive Plan under section 10(a)(2)(A) of the Federal Power Act.

[3] The meeting minutes of the December 18, 2019 Study Workshop were appended to the ISR filed with FERC on February 25, 2020.

[4] Proprietors is an existing limited liability corporation founded on June 27, 1792 to construct the Pawtucket Canal. In the early 1960s, the company was acquired by a group of Lowell investors who restructured its assets. Boott acquired much of the Lowell Project, including the Pawtucket Dam, from the Proprietors in December 1984.

4.2 Geographic Information System Database

The GIS Database was developed using ESRI's ArcMap, ArcCatalog and ArcGIS Online. The GIS database has been published to create an existing service feature in ArcGIS Online. Incorporated into the GIS database is a point feature class with surveyed plans, .tiff and .jpg images. The Facility Location point feature class was created by spatially locating each parcel centroid listed on the existing exhibit maps relevant to any know easement or right of way along the power canals in Lowell, MA. The point features known as "Facility Location" were spatially located from several sources including existing exhibit maps, Google Earth and the LNHP website. Real Property GIS files were obtained from the City of Lowell Assessors office in January 2021 and are used to display background data as well as locating parcel ID and owner. Additionally, to enhance the user experience, each exhibit map was georeferenced to the parcel centroid in an effort to display the correct location within the canal system. Exhibit map images in the geodatabase appear as a pop-up in the known location.

This features in ArcGIS were converted into a publicly-accessible GIS database using ArcGIS Experience Builder and can be viewed here:
https://experience.arcgis.com/experience/f9e9b945e80c49daa767f50e218e0181/

5 Study Results

Pursuant to the approved study plan, Boott reviewed several sources to understand the ownership, rights, and responsibilities related to resources within the Project Boundary. The results of this analysis are divided into the following sections:

- **Section 5.1 Conceptual Planning of the Lowell Canal System:** identifies responsibilities and rights as presented in comprehensive plans and public planning documents issued for development and management of the Lowell canal system.
- **Section 5.2 Ownership of the Lowell Canal System:** presents the complex legal ownership of structures of the Lowell canal system based on a review of the 1984 *Great Deed* and 1986 *Order of Taking*.
- **Section 5.3 Easement Rights to the Lowell Canal System:** presents the legal easement rights to structures of the Lowell canal system based on a review of the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*.
- **Section 5.4 Resource Rights in the Lowell Canal System:** identifies specific resources and their ownership and/or easement rights based on a review of public planning documents and the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*.
- **Section 5.5 Historical Management Agreements:** discusses the two known historical management agreements which reflect the parties understanding of legal ownership, easement and resources, and management responsibilities.
- **Section 5.6 FERC Jurisdiction:** addresses one of the goals of the approved study plan by clarifying FERC jurisdiction.

The materials in this report comprise Boott's understanding of ownership, easement rights and resource rights to the Lowell canal system based on a review of planning documents, legal documents, and other available information. This report is limited to the documentation available to Boott during the course of the study. Further, this information is not intended to serve as legal or professional advice by Boott and should not be construed as such.

5.1 Conceptual Planning of the Lowell Canal System

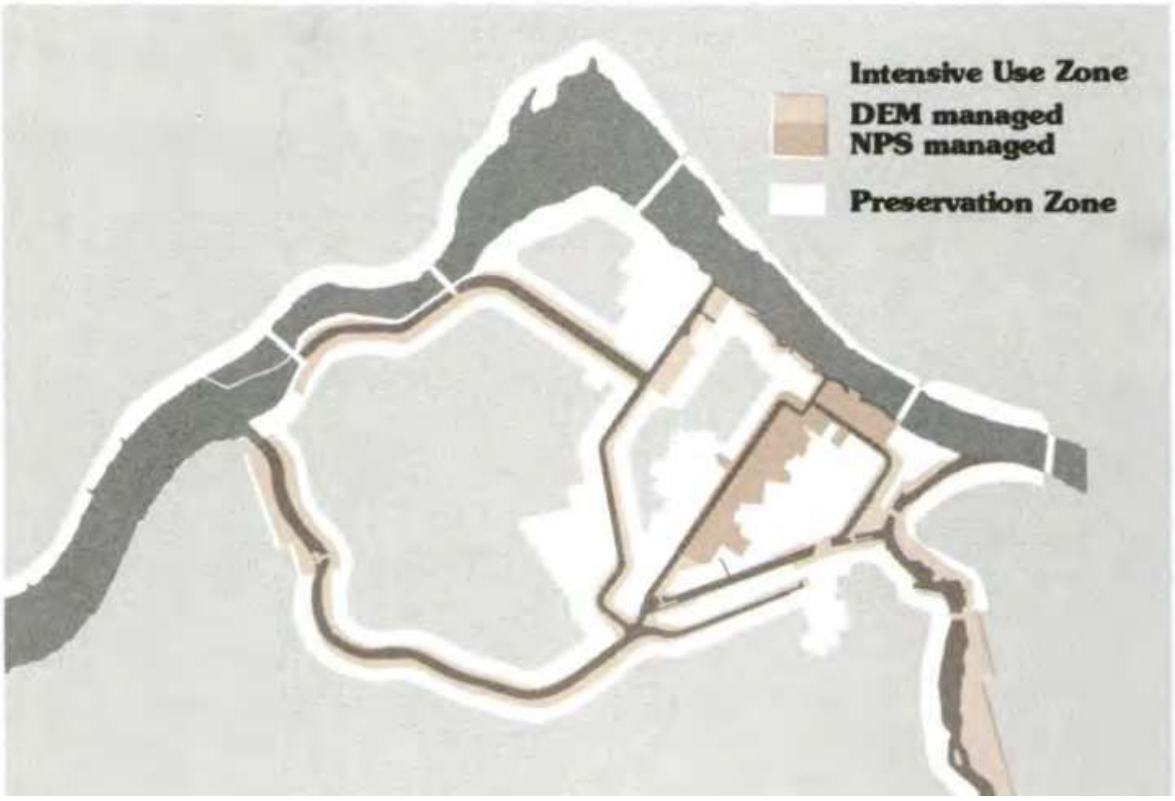
In 1975, the Lowell Historic Canal District Commission (LHCDC) was established by Congress to prepare a plan for the preservation and interpretation of Lowell's historic resources in and around the Lowell canal system. The *1977 Report of the LHCDC* (commonly referred to as the "Brown Book") produced the legislation that was passed by Congress in 1978 and signed into law by President Carter. This law established a two-tiered federal involvement: the LNHP acting as a unit of the NPS, and the Lowell Historic Preservation District (LHPD or the District)—administered by a commission under the Department of the Interior.

The *1977 Report of the LHCDC* proposed the creation of LNHP and presented the approach to developing the Lowell canal system and surrounding areas as a national park. The LHCDC stated that the key to development of the LNHP was a cooperative undertaking of the NPS and the Massachusetts Department of Environmental Management, the agency now known as MADCR. This partnership would "share state and federal resources, maximizing the effectiveness and abilities of each." Given the dense urban setting, it was understood that almost all the structures would remain in private ownership, but the structures would be developed and managed by NPS and MADCR (NHCDC 1977, p. 46). The authors further elaborated that "the NPS would develop an overall interpretive program and restore certain buildings and settings. The State would preserve the canal system and develop its recreational potentials." The specific responsibilities of each agency as identified in the *1977 Report of the LHCDC* are outlined below in Table 5-1 and Figure 5-1.

Table 5-1. Agency Responsibilities Identified in 1977 Report of the LHCDC

Agency	Responsibilities
NPS	interpretation, park wide downtown "cross-section" of 19th Century Lowell (including preservation, building and open space improvements, transportation and visitor services)
MADCR	canals, riverbanks, and related recreational areas gatehouses, locks and dams barge system

Figure 5-1. LNHP Management Responsibility Zones



Within the intensive use zone, both NPS and MADCR were tasked with acquiring and improving property, as well as developing and operating the major visitor attractions in the LNHP. The costs of park development, management, and maintenance would be shared on a *pro rata* basis between NPS and MADCR (LHCDC 1977). Additionally, the plan elaborated on the supportive involvement of local government, whose efforts in preservation in the downtown and elsewhere would dovetail in the LNHP.

In 1980, the *Preservation Plan* and *Details of the Preservation Plan* were published by the LHPC (LHPC 1980a; LHPC 1980b). *Details of the Preservation Plan* specified the roles of NPS, the Commonwealth of Massachusetts (acting through MADCR), and the City of Lowell. LNHP was to rehabilitate certain gatehouses and perform exterior façade improvements, among other tasks. MADCR's role was to acquire all or portions of the Lowell canal system, including the interpretive and recreational water access rights, and "also undertake the landscaping, repair and maintenance of all the basic canal structural components, canal related structures and canal related land for recreational use." The City of Lowell was to implement certain downtown street and pedestrian improvements, such as exposures of cobblestone streets, bricking, and paving of sidewalks.

In August 1981, NPS developed and issued the FGMP to provide a basis for visitor use, resource management, and general development within the LNHP. The FGMP states management of the Lowell canal system will be accomplished through cooperative agreements between private and public entities, but MADCR is the lead agency

responsible for maintaining, developing, and renovating the major elements of the canal system (NPS 1981). Proprietors, the owner of most of the Lowell canal system at the time, was responsible for the maintenance and operation of the hydromechanical components.

The Preservation Plan Amendment was released in 1990 (LHPC 1990). This plan presented NPS and MADCR as the lead parties responsible for preservation and maintenance of the Lowell canal system. The report stated that "Boott uses canal water to generate hydropower and performs all maintenance tasks directly related to that end. This includes keeping up machinery like control gates and turbines located at various points along the system." The *Preservation Plan Amendment* acknowledged that MADCR has the right to maintain and repair canal walls.

The conceptual framework for the rights and responsibilities for management of the Lowell canal system remain consistent within the *1977 Report of the LHCDC*, the 1980 *Details of the Preservation Plan*, the 1981 FGMP, and the 1990 *Preservation Plan Amendment*. MADCR and NPS are presented as the main parties responsible for developing, renovating, and maintaining the major elements of the canal system. As discussed in the following sections, this collaborative approach to management of the Lowell canal system was solidified with a succession of legal documents exchanging property, easement rights, and resource rights.

5.2 Ownership of the Lowell Canal System

On January 16, 1984, the *Great Deed* was executed between Proprietors, Boott Mills[5], and Boott, and through this deed a considerable portion of the Lowell canal system was conveyed to Boott. Notably, certain portions or resources that were not conveyed to Boott in the 1984 *Great Deed* were later obtained by MADCR through the December 1, 1986 *Order of Taking*, or remain under the legal ownership of Proprietors. Notably, these documents also issued ownership of lands and structures not located within the current FERC Project boundary and therefore outside the scope of this report. The following text describes the ownership of structures within the current FERC Project boundary. The structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.1 Pawtucket Dam

According to the 1984 *Great Deed*, the Pawtucket Dam is owned by Boott in its entirety and any and all equipment and mechanisms located in or on said dam or appurtenant thereto including fishways (Appendix B, p. 2).

5.2.2 Pawtucket Canal

According to the 1984 *Great Deed* and the 1986 *Order of Taking*, the length of the Pawtucket Canal and Lower Pawtucket Canal are currently owned by the Proprietors, including the canal walls (to the exterior planes), beds, and bottoms (Appendix B, p. 2, 4-5). As described below, structures and fixtures within the Pawtucket Canal have mixed ownership, with certain structures being jointly or independently owned by Proprietors and MADCR. Boott is not known to have legal ownership of any structures of or within the Pawtucket Canal. The boundaries of ownership of the Pawtucket Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.2.1 Francis Gatehouse

The Francis Gatehouse, also known as the Great Gate Gatehouse, is owned in part by MADCR and Proprietors. It is part of the Guard Lock and Gates facility and houses the Great Guard Gate. Proprietors owns all buildings, structures, and fixtures of the Francis Gatehouse below an elevation of 106.2 ft Mean Sea Level (MSL). MADCR owns all buildings, structures, and fixtures associated with the Francis Gatehouse above 106.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Francis

[5] Boott Mills was organized in the State of Massachusetts on May 29, 1964 and was the original co-Licensee of the Project with Proprietors. Boott Mills operated the downtown mill powerhouses before the Project was transferred to Boott in December 1984.

Gatehouse used in the ongoing maintenance and operation of hydroelectric power generation above 106.2 ft MSL are owned by Proprietors (Appendix C, p. 20; Appendix B, p. 2, 4-5).

5.2.2.2 Hydraulic Gatehouse

The Hydraulic Gatehouse, also known as the Guard Locks Gatehouse, is owned in part by MADCR and Proprietors. It is also part of the Guard Lock and Gates facility and houses the five headgates which control flow into the Pawtucket Canal. Proprietors owns all buildings, structures, and fixtures of the Hydraulic Gatehouse below an elevation of 88.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Hydraulic Gatehouse above 88.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Hydraulic Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 88.2 ft MSL are owned by Proprietors. (Appendix C, p. 20; Appendix B, p. 2, 4-5).

5.2.2.3 Guard Locks Locking Gatehouse

The Guard Locks Locking Gatehouse is owned in part by MADCR and Proprietors. It is also part of the Guard Lock and Gates facility. Proprietors owns all structures and fixtures of the Guard Locks Locking Gatehouse below an elevation of 99.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Pawtucket Gatehouse above 99.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Guard Locks Locking Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 99.2 ft MSL are owned by Proprietors. (Appendix C, p. 21; Appendix B, p. 2, 4-5).

5.2.2.4 Guard Locks Lock Chambers

The Guard Locks Lock Chambers, also known as the Lower Locking Gate, are owned by Proprietors (Appendix C, p. 21; Appendix B, p. 2, 4-5).

5.2.2.5 Swamp Locks Gatehouse

The Swamp Locks Gatehouse is owned in part by MADCR and Proprietors. Proprietors owns all structures and fixtures of the Swamp Locks Gatehouse below an elevation of 89.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Swamp Locks Gatehouse above 89.2 ft MSL, with the exception of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Swamp Locks Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 89.2 ft MSL are owned by Proprietors. (Appendix C, p. 16; Appendix B, p. 2, 4-5).

5.2.2.6 Swamp Locks Dam (North)

The Swamp Locks Dam (North) is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in the 1984 *Great Deed*. Similarly, MADCR did not acquire legal ownership of the Swamp Locks Dam (North) in the 1986 *Order of Taking* (Appendix C, p. 16-17).

5.2.2.7 Swamp Locks Dam (South)

The Swamp Locks Dam (South) is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in the 1984 *Great Deed*. Similarly, MADCR did not acquire legal ownership of the Swamp Locks Dam (South) in the 1986 *Order of Taking* (Appendix C, p. 17-18).

5.2.2.8 Lower Locks Gatehouse

The Lower Locks Gatehouse is owned in part by MADCR and Proprietors. Proprietors owns all structures and fixtures of the Lower Locks Gatehouse below an elevation of 74.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Lower Locks Gatehouse above 74.2 ft MSL, with the exception of structures and equipment used in the ongoing maintenance and operation of hydroelectric power generation. The fixtures and equipment of the Lower Locks Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 74.2 ft MSL are owned by Proprietors (Appendix C, p. 24; Appendix B, p. 2, 4-5).

5.2.2.9 Lower Locks Lock Chamber

The Lower Locks Lock Chamber is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in 1984. Similarly, MADCR did not acquire ownership of the Lower Locks Lock Chamber in the 1986 *Order of Taking* (Appendix C, p. 24-25).

5.2.2.10 Lower Locks Dam

The Lower Locks Dam is owned in its entirety by the Proprietors (Appendix B, p. 2, 5). The Pawtucket Canal, and thus structures within the Pawtucket Canal, were not conveyed to Boott from Proprietors in 1984. Similarly, MADCR did not acquire ownership of the Lower Locks Dam in the 1986 *Order of Taking* (Appendix C, p. 24-25).

5.2.2.11 Assets Power Station

Hydropower and generating equipment associated with Assets Power Station is owned by Boott, including all turbines, generators, governors, exciters, control panels, main

breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with Assets Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstock feeding the units of Assets Power Station is owned by Proprietors (Appendix B, p. 8).

The tailrace from Assets Power Station discharging into the Pawtucket Canal is owned by Proprietors (Appendix B, p. 8).

5.2.3 Northern Canal

The Northern Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Northern Canal was conveyed to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Northern Canal have mixed ownership, with certain structures being jointly or independently owned by Proprietors, Boott, and MADCR. The boundaries of ownership of the Northern Canal structures discussed below are depicted in Appendix A, Appendix E, and the associated GIS database.

5.2.3.1 Pawtucket Gatehouse

The Pawtucket Gatehouse (also known as the Northern Canal Gatehouse) is owned in part by MADCR and Boott. Boott owns all structures and fixtures of the Pawtucket Gatehouse below an elevation of 101.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Pawtucket Gatehouse above 101.2 ft MSL, with the exception of any structures needed for ongoing hydroelectric power generation. The fixtures and equipment of the Pawtucket Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 101.2 ft MSL are owned by Boott. (Appendix C, p. 11; Appendix B, p. 2-3).

5.2.3.2 Pawtucket Gatehouse Lock Chamber

The Pawtucket Gatehouse Lock Chamber above an elevation of 82.7 ft MSL was expressly reserved from conveyance to Boott in the 1984 *Great Deed* (Appendix B, p. 3), and remains under the legal ownership of Proprietors.

5.2.3.3 Northern Canal Waste Gatehouse

The Northern Canal Waste Gatehouse is owned in part by Proprietors and MADCR. The Northern Canal Waste Gatehouse was expressly reserved (without limitation) from conveyance to Boott in the 1984 *Great Deed* (Appendix B, p. 5). In the 1986 *Order of Taking*, MADCR obtained ownership of all buildings, structures, and fixtures associated with the Northern Canal Waste Gatehouse above 92.2 ft MSL, with the exception of any fixtures and equipment used in the ongoing maintenance and operation of hydroelectric

power generation (Appendix C, p. 15). The fixtures and equipment of the Northern Canal Waste Gatehouse used for ongoing maintenance and operation above 92.2 ft MSL are owned by Proprietors.

5.2.3.4 HydroLocks

The lock and control structure located at the bend of the Northern Canal was constructed by and is owned by Boott.

5.2.3.5 Great River Wall

The Great River Wall was expressly reserved from conveyance to Boott in the 1984 *Great Deed*, and remains under the legal ownership of Proprietors. The Great River Wall is the left retaining wall of the Northern Canal. It runs 2,485 feet from the Pawtucket Gatehouse to a natural rock outcrop upstream of the E.L. Field Powerhouse (Appendix B, p. 5; Appendix C, p. 13-15).

5.2.3.6 Northern Canal Walkway

The Northern Canal Walkway runs atop the Great River Wall for most of its length. The portion of the Northern Canal Walkway atop the Great River Wall is owned by Proprietors as a part of the Great River Wall. The westmost portion of the Northern Canal Walkway that diverts off the Great River Wall and extends into the Northern Canal Island (Parcel 29-B in Appendix A) is owned by MADCR.

5.2.4 Western Canal

The Western Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*, including the lower portion also known as the Lawrence Canal. The Western Canal was conveyed in its entirety to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Western Canal have mixed ownership, with certain structures being jointly or independently owned by Boott and MADCR. The boundaries of ownership of the Western Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.4.1 Tremont Gatehouse

The Tremont Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Tremont Gatehouse below an elevation of 90.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Tremont Gatehouse above 90.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Tremont Gatehouse used for ongoing maintenance and operation of

hydroelectric power generation above 90.2 ft MSL are owned by Boott. (Appendix C, p. 7; Appendix B, p. 2-3).

5.2.4.2 Lawrence Dam

The Lawrence Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks. Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks. (Appendix B, p. 2-3).

5.2.4.3 Hall Street Dam

The Hall Street Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks. Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks (Appendix B, p. 2-3).

5.2.5 Merrimack Canal

The Merrimack Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Merrimack Canal was conveyed in its entirety to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Merrimack Canal have mixed ownership, with certain structures being jointly or independently owned by Proprietors, Boott, and MADCR. The boundaries of ownership of the Merrimack Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.5.1 Merrimack Gates

The Merrimack Gates are owned by Boott and includes all appurtenant equipment or mechanisms. Said gates were transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks. (Appendix B, p. 2-3).

5.2.5.2 YMCA Gates

The YMCA Gates are owned by Boott, and includes all appurtenant equipment or mechanisms (Appendix B, p. 2-3).

5.2.5.3 Moody Street Feeder Gatehouse

The Moody Street Feeder Gatehouse is owned in part by NPS and Boott. Structures of the Moody Street Feeder Gatehouse above an elevation of 92.2 ft MSL were expressly reserved from conveyance in the 1984 *Great Deed* (Appendix B, p. 3). In July 2001, NPS purchased Moody Street Feeder Gatehouse (above an elevation of 92.2 ft MSL) from Proprietors. Boott owns all structures and fixtures of the Moody Street Feeder Gatehouse below an elevation of 92.2 ft MSL. The structures and equipment of the Moody Street Feeder Gatehouse used for ongoing maintenance and operation of hydroelectric power are owned by Boott (Appendix B, p. 2-3).

5.2.5.4 Moody Street Feeder

The Moody Street Feeder is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks (Appendix B, p. 2-3).

5.2.6 Eastern Canal

The Eastern Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Eastern Canal was conveyed in its entirety to the exterior plane of the canal walls, and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Eastern Canal have mixed ownership, with certain structures being jointly or independently owned by Boott and MADCR. The boundaries of ownership of the Eastern Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.6.1 Massachusetts Wasteway Gatehouse

The Massachusetts Wasteway Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Massachusetts Wasteway Gatehouse below an elevation of 80.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Massachusetts Wasteway Gatehouse above 80.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Massachusetts Wasteway Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 80.2 ft MSL are owned by Boott (Appendix C, p. 7; Appendix B, p. 2-3).

5.2.6.2 Boott Dam Gatehouse

The Boott Dam Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Boott Dam Gatehouse below an elevation of 74.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Boott Dam Gatehouse above 74.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures

and equipment of the Boott Dam Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 74.2 ft MSL are owned by Boott. (Appendix C, p. 7; Appendix B, p. 2-3).

5.2.6.3 Boott Dam

The Boott Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks. Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks (Appendix B, p. 2-3).

5.2.6.4 Rolling Dam Gatehouse (North)

The Rolling Dam Gatehouse (North) is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Rolling Dam Gatehouse (North) below an elevation of 83.7 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Rolling Dam Gatehouse (North) above 83.7 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Rolling Dam Gatehouse (North) used for ongoing maintenance and operation of hydroelectric power generation above 83.7 ft MSL are owned by Boott (Appendix C, p. 29; Appendix B, p. 2-3).

5.2.6.5 Rolling Dam Gatehouse (South)

The Rolling Dam Gatehouse (South) is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Rolling Dam Gatehouse (South) below an elevation of 83.7 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Rolling Dam Gatehouse (South) above 83.7 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Rolling Dam Gatehouse (South) used for ongoing maintenance and operation of hydroelectric power generation 83.7 ft MSL are owned by Boott (Appendix C, p. 29; Appendix B, p. 2-3).

5.2.6.6 Rolling Dam

The Rolling Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks (Appendix B, p. 2-3). Said dam was transferred to Boott by Proprietors with the fee to the underlying land, and all equipment and mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to wasteways, penstocks, tailraces, headgates, and racks.

5.2.6.7 Boott Penstock

The Boott Penstock from the Eastern Canal to the Merrimack Canal is owned by MADCR (Appendix C, p. 9).

5.2.6.8 Merrimack Dam

The Merrimack Dam is owned by Boott, and includes all appurtenant equipment or mechanisms, including the headrace, tailrace, and associated penstocks (Appendix B, p. 2-3).

5.2.6.9 John Street Power Station

Hydropower and generating equipment associated with John Street Power Station is owned by Boott, including all turbines, generators, governors, exciters, control panels, main breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with John Street Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstocks feeding the units of John Street Power Station are owned by Proprietors (Appendix B, p. 8).

The tailrace from John Street Power Station discharging into the Merrimack River is owned by Proprietors (Appendix B, p. 8).

5.2.6.10 Bridge Street Power Station

Hydropower and generating equipment associated with Bridge Street Power Station (Section 8) is owned by Boott, including all turbines, generators, governors, exciters, control panels, main breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with Bridge Street Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstocks feeding the units of Bridge Street Power Station are owned by Proprietors (Appendix B, p. 8).

The tailrace from Bridge Street Power Station discharging into the Concord River is owned by Proprietors (Appendix B, p. 8).

5.2.7 Hamilton Canal

The Hamilton Canal was conveyed from Proprietors to Boott in the 1984 *Great Deed*. The Hamilton Canal was conveyed in its entirety to the exterior plane of the canal walls,

and includes all sluiceways, dams, and gates, except those otherwise noted below (Appendix B, p. 2-3). Structures and fixtures within the Hamilton Canal have mixed ownership, with certain structures being jointly or independently owned by Boott and MADCR. The boundaries of ownership of the Hamilton Canal structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.2.7.1 Hamilton Gatehouse

The Hamilton Gatehouse is owned in part by Boott and MADCR. Boott owns all structures and fixtures of the Hamilton Gatehouse below an elevation of 90.2 ft MSL. MADCR owns buildings, structures, and fixtures associated with the Hamilton Gatehouse above 90.2 ft MSL, with the exception of fixtures and structures needed for ongoing maintenance and operation of hydroelectric power generation. The structures and equipment of the Hamilton Gatehouse used for ongoing maintenance and operation of hydroelectric power generation above 90.2 ft MSL are owned by Boott (Appendix C, p. 9; Appendix B, p. 2-3).

5.2.7.2 Hamilton Power Station

Hydropower and generating equipment associated with Hamilton Power Station is owned by Boott, including all turbines, generators, governors, exciters, control panels, main breakers, and transformers, transmission lines, and related mechanisms necessary for the production and transmission of electricity (Appendix B, p. 8). Turbine rooms and mill buildings or structures associated with Hamilton Power Station were excluded from this review as they are located outside of the FERC Project Boundary.

The penstocks feeding the units of Hamilton Power Station are owned by Proprietors (Appendix B, p. 8).

The tailrace from Bridge Street Power Station discharging into the Pawtucket Canal is owned by Proprietors (Appendix B, p. 8).

5.3 Easement Rights to the Lowell Canal System

On January 16, 1984, the *Great Deed* was executed between Proprietors, Boott Mills, and Boott, and through this deed various easement rights were conveyed to Boott. Additionally, MADCR later obtained easement rights to the canal system through the December 1, 1986 *Order of Taking*, and NPS obtained easement rights in the 1995 *Grant of Easement*. The following text describes the easement rights to the structures within the canal system based on an analysis of the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*. Notably, these three documents issued easements and rights that are not associated with lands and structures located within the current FERC Project boundary, therefore these are excluded from discussion in this report. The structures discussed below are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.1 Pawtucket Canal

The 1984 *Great Deed* conveyed to Boott an easement to the Pawtucket Canal and Lower Pawtucket Canal. This easement was granted in common with Proprietors for the right to install conduits, pipes, and wiring, and the right to maintain, repair and replace the canal walls (Appendix B, p. 4-5).

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all Pawtucket and Lower Pawtucket Canal walls, beds or bottoms, and to all dams and lock chambers located in the canals, for the following purposes (Appendix C, p. 33):

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construction and maintenance of improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Pawtucket Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Pawtucket Canal walls, beds or bottoms for purposes a-i listed

above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Pawtucket Canal precede the rights of all other parties. Boott and Proprietors have the right, in common with each other, to install conduits, pipes, and wiring, and to maintain, repair, and replace the Pawtucket Canal walls. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Pawtucket Canal.

As described below, structures and fixtures within the Pawtucket Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.1.1 Francis Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Francis Gatehouse. Said easement consists of the exclusive right of operation and controlling the Francis Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Francis Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Francis Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Francis Gatehouse, structures, and fixtures, as well as the right to access the Francis Gatehouse (Appendix C, p. 20).

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements such as walkway surfaces, lighting, railings, decking benches, and landscaping, and any other uses consistent with park uses (Appendix D, p. 2).

5.3.1.2 Hydraulic Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Hydraulic Gatehouse. Said easement consists of the exclusive right of operation and controlling the Hydraulic Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Hydraulic Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Hydraulic Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Hydraulic Gatehouse, structures, and fixtures, as well as the right to access the Hydraulic Gatehouse (Appendix C, p. 20).

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements such as walkway surfaces, lighting, railings, decking benches, and landscaping, and any other uses consistent with park uses (Appendix D, p. 2).

5.3.1.3 Guard Locks Locking Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Guard Locks Locking Gatehouse. Said easement consists of the exclusive right of operation and controlling the Guard Locks Locking Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Guard Locks Locking Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Guard Locks Locking Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements such as walkway surfaces, lighting, railings, decking benches, and landscaping, and any other uses consistent with park uses (Appendix D, p. 2).

5.3.1.4 Guard Locks Lock Chambers

MADCR has permanent and exclusive rights to the Guard Locks Lock Chambers for purposes a-i listed above in Section 5.3.1.

5.3.1.5 Swamp Locks Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Swamp Locks Gatehouse. Said easement consists of the exclusive right of operation and controlling the Swamp Locks Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Swamp Locks Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Swamp Locks Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Swamp Locks Gatehouse, structures, and fixtures, as well as the right to access the Swamp Locks Gatehouse (Appendix C, p. 16).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Swamp Lock Gatehouse (Appendix D, p. 3).

5.3.1.6 Swamp Locks Dam (North)

As understood based on a review of the described documents, Boott has the rights, in common with Proprietors, to install conduits, pipes, and wiring. Boott has the right to maintain and operate Swamp Locks Dam (North) (Appendix B, p. 4-5).

Additionally, MADCR has permanent and exclusive easement rights to Swamp Locks Dam (North) and all Pawtucket Canal walls, beds or bottoms for purposes a-i listed above in Section 5.3.1, provided those purposes do not interfere with Boott's use of the structure for hydroelectric power generation. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at Swamp Locks Dam (North) precede the rights of all other parties, including the land and/or property owner. All other property rights not mentioned reside with Proprietors, the present owner of the Pawtucket Canal and Swamp Locks Dam (North) (Appendix C, p. 16-17; Appendix B, p. 2, 4-5).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Swamp Locks Dam (North) (Appendix D, p. 3).

5.3.1.7 Swamp Locks Dam (South)

As understood based on a review of the described documents, Boott has the rights, in common with Proprietors, for the uninterrupted flowage of water past Swamp Locks Dam (South), as well as the rights to install conduits, pipes, and wiring. Boott has the right to maintain and operate Swamp Locks Dam (South) (Appendix B, p. 4-5).

Additionally, MADCR has permanent and exclusive easement rights to Swamp Locks Dam (South) and all Pawtucket Canal walls, beds or bottoms for purposes a-i listed above in Section 5.3.1, provided those purposes do not interfere with Boott's use of the structure for hydroelectric power generation. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at Swamp Locks Dam (South) precede the rights of all other parties, including the land and/or property owner. All other property rights not mentioned reside with Proprietors, the present owner of the Pawtucket Canal and Swamp Locks Dam (South) (Appendix C, p. 17-18; Appendix B, p. 2, 4-5).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Swamp Locks Dam (South) (Appendix D, p. 3).

5.3.1.8 Lower Locks Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Lower Locks Gatehouse. Said easement consists of the exclusive right of operation and controlling the Lower Locks Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Lower Locks Gatehouse. In common with Proprietors and others entitled, Boott has the right to access Lower Locks Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Pawtucket Canal walls, beds or bottoms for support of the Lower Locks Gatehouse, structures, and fixtures, as well as the right to access the Lower Locks Gatehouse (Appendix C, p. 16).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Lower Locks Gatehouse (Appendix D, p. 3).

5.3.1.9 Lower Locks Lock Chamber

MADCR has permanent and exclusive rights to the Lower Locks Lock Chamber for purposes a-i listed above in Section 5.3.1.

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Lower Locks Lock Chamber (Appendix D, p. 3).

5.3.1.10 Lower Locks Dam

As understood based on a review of the described documents, Boott has the rights, in common with Proprietors, to install conduits, pipes, and wiring. Boott has the right, in common with Proprietors, to maintain and operate Lower Locks Dam (Appendix B, p. 4-5).

Additionally, MADCR has permanent and exclusive easement rights to Lower Locks Dam and all Pawtucket Canal walls, beds or bottoms for purposes a-i listed above in Section 5.3.1, provided those purposes do not interfere with Boott's use of the structure for hydroelectric power generation. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at Lower Locks Dam precede the rights of all other parties, including the land and/or property owner. All other property rights not mentioned reside with Proprietors, the present owner of the Pawtucket Canal and Lower Locks Dam (Appendix C, p. 24-25; Appendix B, p. 2, 4-5).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Lower Locks Dam (Appendix D, p. 3).

5.3.1.11 Assets Power Station

In the 1984 *Great Deed,* Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of Assets Power Station from the Merrimack Canal, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott also obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Pawtucket Canal, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.3.2 Northern Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in the Northern Canal for the following purposes (Appendix C, p. 33):

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construct and maintain improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Northern Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Northern Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Northern Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Northern Canal.

As described below, structures and fixtures within the Northern Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.2.1 Pawtucket Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Pawtucket Gatehouse. Said easement consists of the exclusive right of operation and controlling the Pawtucket Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Pawtucket Gatehouse. Boott has the right to access Pawtucket Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Northern Canal walls, beds or bottoms for support of the Pawtucket Gatehouse, structures, and fixtures, as well as the right to access the Pawtucket Gatehouse (Appendix C, p. 16). MADCR also obtained an exclusive and permanent easement to the Pawtucket Gatehouse Wall and Lock Chamber for purposes a-i listed above in Section 5.3.2, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.2.2 Pawtucket Gatehouse Lock Chamber

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to the Pawtucket Gatehouse Lock Chamber for purposes a-i listed above in Section 5.3.2, provided that such activities do not interfere with Boott's hydroelectric power production.

The 1995 *Grant of Easement* granted NPS the right for construction and maintenance of improvements of the Pawtucket Gatehouse Lock Chamber (Appendix D, p. 2).

5.3.2.3 Northern Canal Waste Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Northern Canal Waste Gatehouse. Said easement consists of the exclusive right of operation and controlling the Northern Canal Waste Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Northern Canal Waste Gatehouse. Boott has the right to access Northern Canal Waste Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Northern Canal walls, beds or bottoms for support of the Northern Canal Waste Gatehouse, structures, and fixtures, as well as the right to access the Northern Canal Waste Gatehouse (Appendix C, p. 15).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Northern Canal Waste Gatehouse (Appendix D, p. 3).

5.3.2.4 Great River Wall

The 1984 *Great Deed* conveyed to Boott an easement for the right to maintain real and personal property of the Great River Wall. Said easement consists of the exclusive right of operation and controlling the Great River Wall, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms of the Great River Wall. Boott, in common with Proprietors, has the right to access Great River Wall for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent and exclusive easement in the Northern Canal walls, beds or bottoms, to implement any of the purposes a-i listed above in Section 5.3.2.

NPS has secured easements for improvements to the walkway and installation of railings and ramps, and rights acquired include a right to install, maintain or remove boat docking, railings, fencing, curbing, paving, lighting, landscaping, signs, walkway; and a right to access for above.

5.3.2.5 Northern Canal Walkway

The 1986 *Order of Taking* conveyed to MADCR a permanent and exclusive easement to the Northern Canal Walkway to implement any of the purposes a-i listed above in Section 5.3.2.

NPS has secured easements for improvements to the walkway and installation of railings and ramps, and rights acquired include a right to install, maintain or remove boat docking, railings, fencing, curbing, paving, lighting, landscaping, signs, walkway; and a right to access for above.

5.3.3 Western Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in the Western Canal for the following purposes (Appendix C, p. 33):

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construction and maintenance of improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Western Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Western Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Western Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Western Canal.

As described below, structures and fixtures within the Western Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.3.1 Tremont Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Tremont Gatehouse. Said easement consists of the exclusive right of operation and controlling the Tremont Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Tremont Gatehouse. Boott has the right to access Tremont Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Western Canal walls, beds or bottoms for support of the Tremont Gatehouse, structures, and fixtures, as well as the right to access the Tremont Gatehouse (Appendix C, p. 26).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Tremont Gatehouse (Appendix D, p. 3).

5.3.3.2 Lawrence Dam

MADCR obtained an exclusive and permanent easement to the Lawrence Dam for purposes a-i listed above in Section 5.3.3, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.3.3 Hall Street Dam

MADCR obtained an exclusive and permanent easement to the Hall Street Dam for purposes a-i listed above in Section 5.3.3, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4 Merrimack Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all Merrimack Canal walls, beds or bottoms, and to all dams and lock chambers located in the canals, for the following purposes (Appendix C, p. 33):

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

The 1995 *Grant of Easement* conveyed to NPS the right to construction and maintenance of improvements, including decking, lighting, benches, and landscaping at various structures and parcels of and around the Merrimack Canal.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Merrimack Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Merrimack Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Merrimack Canal.

As described below, structures and fixtures within the Pawtucket Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.4.1 Merrimack Gates

MADCR obtained an exclusive and permanent easement to the Merrimack Gates purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4.2 YMCA Gates

MADCR obtained an exclusive and permanent easement to the YMCA Gates purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4.3 Moody Street Feeder Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Moody Street Feeder Gatehouse. Said easement consists of the exclusive right of operation and controlling the Moody Street Feeder Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Moody Street Feeder Gatehouse. Boott has the right to access Moody Street Feeder Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

MADCR obtained an exclusive and permanent easement to the Moody Street Feeder Gatehouse for purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.4.4 Moody Street Feeder

MADCR obtained an exclusive and permanent easement to the Moody Street Feeder for purposes a-i listed above in Section 5.3.4, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5 Eastern Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in the Eastern Canal for the following purposes (Appendix C, p. 33):

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Eastern Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Eastern Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Eastern Canal.

As described below, structures and fixtures within the Eastern Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.5.1 Massachusetts Wasteway Gatehouse

Through the 1986 *Order of Taking*, MADCR obtained a permanent easement in the canal walls, beds, and bottoms for support of the Massachusetts Wasteway Gatehouse, as well as any structures or fixtures of the Massachusetts Wasteway Gatehouse.

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Massachusetts Wasteway Gatehouse (Appendix D, p. 3).

5.3.5.2 Boott Dam Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Boott Dam Gatehouse. Said easement consists of the exclusive right of operation and controlling the Boott Dam Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Boott Dam Gatehouse. Boott has the right to access Boott Dam Gatehouse for repair and

installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Eastern Canal walls, beds or bottoms for support of the Boott Dam Gatehouse, structures, and fixtures, as well as the right to access the Boott Dam Gatehouse (Appendix C, p. 26).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Boott Dam Gatehouse (Appendix D, p. 3).

5.3.5.3 Boott Dam

MADCR obtained an exclusive and permanent easement to the Boott Dam for purposes a-i listed above in Section 5.3.5, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5.4 Rolling Dam Gatehouse (North)

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Rolling Dam Gatehouse (North). Said easement consists of the exclusive right of operation and controlling the Rolling Dam Gatehouse (North), and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Rolling Dam Gatehouse (North). Boott has the right to access Rolling Dam Gatehouse (North) for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Eastern Canal walls, beds or bottoms for support of the Rolling Dam Gatehouse (North), structures, and fixtures, as well as the right to access the Rolling Dam Gatehouse (North) (Appendix C, p. 7).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Rolling Dam Gatehouse (North) (Appendix D, p. 3).

5.3.5.5 Rolling Dam Gatehouse (South)

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Rolling Dam Gatehouse (South). Said easement consists of the exclusive right of operation and controlling the Rolling Dam Gatehouse (South), and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Rolling Dam Gatehouse (South). Boott has the right to access

Rolling Dam Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Eastern Canal walls, beds or bottoms for support of the Rolling Dam Gatehouse (South), structures, and fixtures, as well as the right to access the Rolling Dam Gatehouse (South) (Appendix C, p. 7).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Rolling Dam Gatehouse (South) (Appendix D, p. 3).

5.3.5.6 Rolling Dam

MADCR obtained an exclusive and permanent easement to the Rolling Dam for purposes a-i listed above in Section 5.3.5, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5.7 Boott Penstock

Boott holds a permanent easement to the Boott Penstock to flow water together with the right to repair and replace said penstock and the right of access (Appendix C, p. 9).

5.3.5.8 Merrimack Dam

MADCR obtained an exclusive and permanent easement to the Merrimack Dam for purposes a-i listed above in Section 5.3.5, provided that such activities do not interfere with Boott's hydroelectric power production.

5.3.5.9 John Street Power Station

In the 1984 *Great Deed,* Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of John Street Assets Power Station from the Eastern Canal and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Merrimack River, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.3.5.10 Bridge Street Power Station

In the 1984 *Great Deed,* Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of Bridge Street Power Station

from the Eastern Canal, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott also obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Concord River, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.3.6 Hamilton Canal

In the 1986 *Order of Taking*, MADCR acquired a permanent and exclusive easement to all canal walls, beds or bottoms, and to all dams and lock chambers located in said canal and not otherwise noted for the following purposes (Appendix C, p. 33):

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

As understood based on a review of the described documents, MADCR has permanent and exclusive rights to all Hamilton Canal walls, beds or bottoms for purposes a-i listed above. The expressed exclusivity of this easement indicates that MADCR's rights to implement any of those purposes at or in the Hamilton Canal precede the rights of all other parties. Additionally, through the 1995 *Grant of Easement*, MADCR conveyed to NPS easement rights at various structures and parcels of the Hamilton Canal.

As described below, structures and fixtures within the Hamilton Canal have mixed easement rights, with certain structures sharing similar rights among different parties. The boundaries of easements to structures are assumed to follow the boundaries of ownership, which are depicted in the Appendix A, Appendix E, and the associated GIS database.

5.3.6.1 Hamilton Gatehouse

The 1984 *Great Deed* conveyed to Boott an easement for the right to enter and maintain real and personal property in the Hamilton Gatehouse. Said easement consists of the

exclusive right of operation and controlling the Hamilton Gatehouse, and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms inside Hamilton Gatehouse. Boott has the right to access Hamilton Gatehouse for repair and installation of the machinery and equipment, gauge equipment, and such other mechanisms located inside the gatehouse (Appendix B, p. 2, 5).

The 1986 *Order of Taking* conveyed to MADCR a permanent easement in the Hamilton Canal walls, beds or bottoms for support of the Hamilton Gatehouse, structures, and fixtures, as well as the right to access the Hamilton Gatehouse (Appendix C, p. 16).

The 1995 *Grant of Easement* granted NPS the right to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore the Hamilton Gatehouse (Appendix D, p. 3).

5.3.6.2 Hamilton Power Station

In the 1984 *Great Deed,* Boott obtained an easement to operate, maintain, repair and replace the existing penstocks leading to the turbines of Hamilton Power Station from the Hamilton Canal, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction (Appendix B, p. 8).

Boott also obtained an easement to operate, maintain, repair, and replace the existing tailraces leading from the turbines to the Concord River, and to remove any such tailrace in order to replace it with a tailrace of the same or a different size and construction (Appendix B, p. 8).

5.4 Resource Rights in the Lowell Canal System

Boott reviewed many sources to understand the resource rights to the Lowell canal system, including planning documents, the MOU, the 1984 *Great Deed* between Proprietors and Boott (Appendix B), the 1986 *Order of Taking* (Commonwealth of Massachusetts 1986), and the 1995 *Grant of Easement* (Appendix D).

For this study, resource rights are classified as such if they are owned by or issued to a party independently from any physical structure. The ownership and rights of physical resources, such as the canal system and gatehouses, are not discussed in this section because those rights are limited to specific structures and thus are addressed above in Sections 5.2 and 5.3.

5.4.1 Recreational Resource Rights of the Lowell Canal System

The 1977 *Report of the LHCDC* and the 1980 *Details of the Preservation Plan* indicated the Commonwealth agreed to preserve the canal system and develop its recreational potentials. The Commonwealth would also undertake the landscaping, repair and maintenance of all the basic canal structural components, canal related structures and canal related land for recreational use. By letter to dated May 14, 1980, MADCR stated that they were currently in the process of negotiating purchase rights to the Lowell canal system which would allow for recreational boating in the canals, stating further that use of the canals and implementation of the boating program were key elements of the Lowell Heritage State Park (Commonwealth 1980).

Through the 1986 *Order of Taking*, MADCR purchased "the exclusive right to use water in the entire canal system and the Merrimack River for recreational, educational, and navigational purposes" and the purposes shall be non-consumptive with respect to Boott's hydroelectric generation (Appendix C). Included in the 1986 *Order of Taking* is a permanent and exclusive easement to MADCR for all canal walls, beds, or bottoms throughout the canal system for purposes consistent with the use of the canal system as a recreational park. These purposes specifically include placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature (Appendix C). The 1995 *Grant of Easement* from MADCR to LNHP did not convey these exclusive recreation rights to LNHP, but does allow LNHP to hold boat tours through certain segments of the canal system (Appendix D).

The *1990 Preservation Plan Amendment* stated this about recreational resources of the canal system:

> "In general, water taxis, dinner boats, and other organized boating programs will be encouraged, subject to permission from the Heritage State Park [MADCR] which controls recreational boating rights on the canals."

In 1991, MADCR, the NPS, and Boott executed the MOU, which specifically identifies recreational resource rights as residing with MADCR, further stating MADCR was to "act

on all special use permit requests for the recreational use of the Lowell canal system and provide copies of approved permits to Boott Hydro and Proprietors and the NPS."

Conceptual planning documents, legal ownership and easement documents, as well as the MOU, are all consistent regarding recreational resource rights. MADCR owns exclusive rights to use the entire canal system for recreational, educational, and navigational purposes. MADCR holds an exclusive and permanent easement for placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature.

5.4.2 Air Resources of the Lowell Canal System

The 1986 *Order of Taking* transferred to MADCR "all air rights over the canals, including the canal walls and any dams thereon" (Appendix C).

5.4.3 Water and Flowage Resource Rights of the Lowell Canal System

Boott obtained water and flowage rights in the 1984 *Great Deed*. These rights include all riparian rights, water rights and mill rights of the canal system, for the uninterrupted flowage of water through the canals. Other uses of water in the Lowell canal system (e.g., surface water recreation) shall be non-consumptive with respect to hydroelectric generation except for reasonable amounts to operate locking gates. Proprietors retains the right to use up to 100 cfs of water from the canals for fire protection and process water (Appendix B; Appendix C).

5.4.4 Power Production

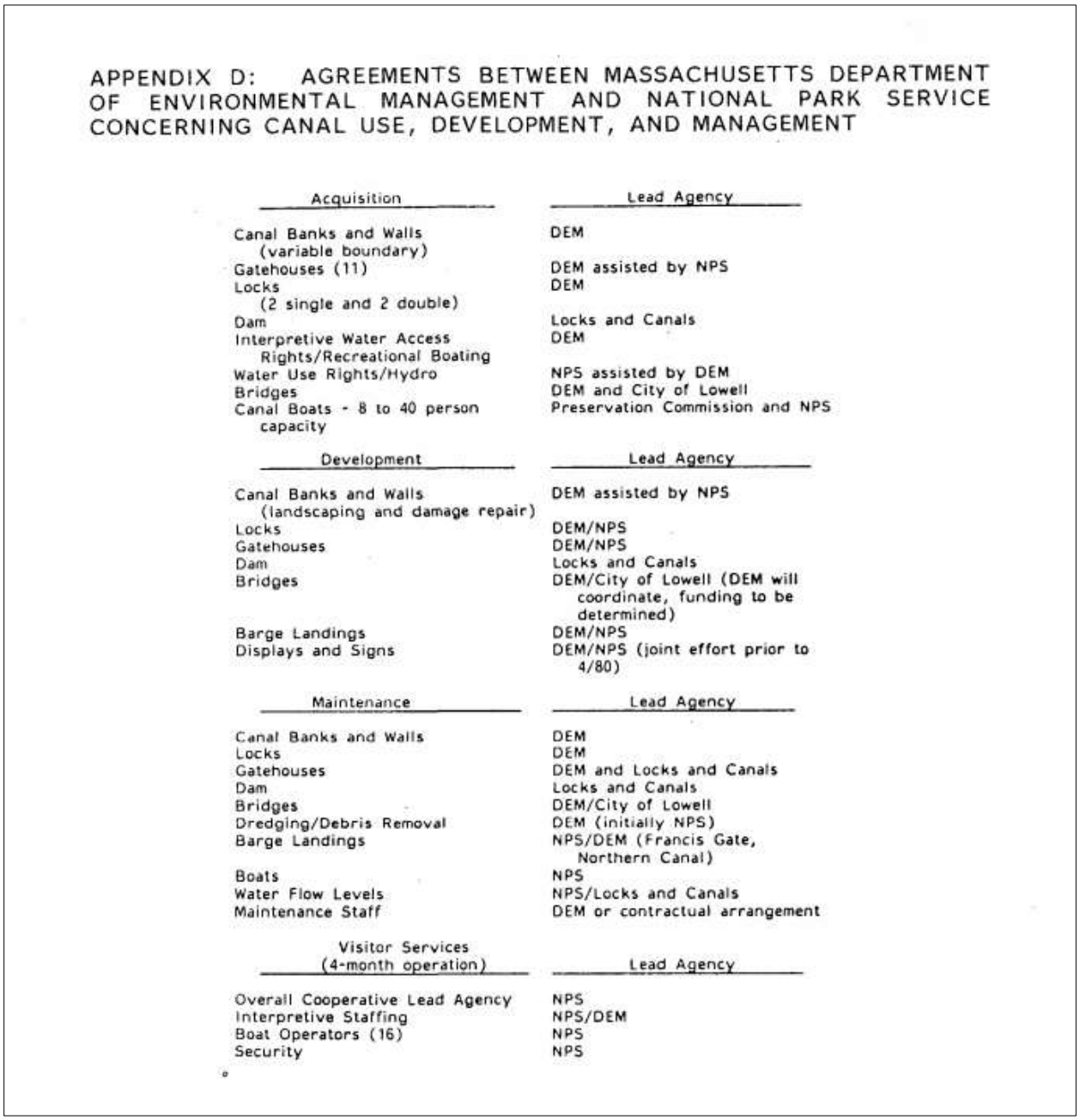
Included in the 1984 *Great Deed* is a conveyance from Proprietors to Boott stating that the land, easements, equipment, and rights are conveyed together with all necessary rights and easements for the purpose of utilizing the facilities, equipment, and fixtures for the purpose of producing and selling power. This includes the right to construct, reconstruct, modify, and rehabilitate such facilities, equipment, and fixtures and to install additional facilities, equipment, and fixtures of like purpose as are necessary, with the right to utilize the premises, structures, facilities, waterways, and equipment to their maximum potential for the purpose of power (Appendix B, p. 9). This is a resource right granted to Boott independently of its rights to specific structures.

5.5 Historical Management Agreements

There are two known historical management agreements between the parties with interests in the Lowell canal system. While these agreements have expired, they present an understanding between the parties of what their individual roles and responsibilities were regarding the Lowell canal system. Given the collaborative approach to ownership and easement rights to the Lowell canal system, the two agreements provide the best insight into delegation of regular management tasks such as ground maintenance, water levels, waterborne trash, and vegetation management.

Following establishment of the LNHP in 1978, MADCR, NPS, and Proprietors entered into an agreement in 1979 regarding management of the Lowell canal system. This agreement establishes MADCR as the lead party responsible for the maintenance of canal structural components, including canal banks and walls. As the lead party, MADCR was responsible for "landscaping and damage repair" to canal banks and walls, with assistance provided by NPS if needed. NPS was charged with the operation of the canal-related exhibits and services, and Locks and Canals (i.e., Proprietors and ultimately Boott) were responsible for the operation and maintenance of Pawtucket Dam and other hydromechanical parts of the Lowell canal system (NPS 1981). This agreement is presented below as Figure 5-2 and fully published in the 1981 FGMP.

Figure 5-2. 1979 Canal System Management Agreement



APPENDIX D: AGREEMENTS BETWEEN MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND NATIONAL PARK SERVICE CONCERNING CANAL USE, DEVELOPMENT, AND MANAGEMENT

Acquisition	Lead Agency
Canal Banks and Walls (variable boundary)	DEM
Gatehouses (11)	DEM assisted by NPS
Locks (2 single and 2 double)	DEM
Dam	Locks and Canals
Interpretive Water Access Rights/Recreational Boating	DEM
Water Use Rights/Hydro	NPS assisted by DEM
Bridges	DEM and City of Lowell
Canal Boats - 8 to 40 person capacity	Preservation Commission and NPS

Development	Lead Agency
Canal Banks and Walls (landscaping and damage repair)	DEM assisted by NPS
Locks	DEM/NPS
Gatehouses	DEM/NPS
Dam	Locks and Canals
Bridges	DEM/City of Lowell (DEM will coordinate, funding to be determined)
Barge Landings	DEM/NPS
Displays and Signs	DEM/NPS (joint effort prior to 4/80)

Maintenance	Lead Agency
Canal Banks and Walls	DEM
Locks	DEM
Gatehouses	DEM and Locks and Canals
Dam	Locks and Canals
Bridges	DEM/City of Lowell
Dredging/Debris Removal	DEM (initially NPS)
Barge Landings	NPS/DEM (Francis Gate, Northern Canal)
Boats	NPS
Water Flow Levels	NPS/Locks and Canals
Maintenance Staff	DEM or contractual arrangement

Visitor Services (4-month operation)	Lead Agency
Overall Cooperative Lead Agency	NPS
Interpretive Staffing	NPS/DEM
Boat Operators (16)	NPS
Security	NPS

In 1991, MADCR, the NPS, and Boott executed the MOU for the purpose of maintaining and operating the Lowell canal system.[6] The MOU was generated after the 1984 *Great Deed* and 1986 *Order of Taking*, and so it best represents an agreement between the parties of what their legal roles and responsibilities were. The MOU assigned specific responsibilities to each party and was filed with the Commission on April 25, 1991 (MOU 1991). The MOU included a provision expiring the agreement five years from the date of signing, with the option for renewal.

Article I of the MOU states that the agreement shall not diminish the rights and interests acquired by MADCR in the 1986 *Order of Taking*. The agreement shall not release or further bind Boott and Proprietors from their obligations under the FERC license or other obligations to maintain the Lowell canal system.

Article II of the MOU directs Proprietors to maintain the structural integrity of the walls, bottoms, and dam structures of the Pawtucket Canal to the extent they have the duty to do so as owner. Proprietors was to provide MADCR with any plans to alter the Pawtucket Canal and to obtain MADCR's written prior approval.

Article III of the MOU discusses the responsibilities of Boott, which includes maintaining canal walls, beds, bottoms, and dam structures to the extent they have a duty to do so as the owner. Article III(C) requires Boott to operate the canal system to provide the appropriate flows and water levels. Articles III(H-I) require Boott to obtain written approval from MADCR regarding any changes to the Gatehouses or canal walls which may affect the historic fabric of the system. Other article provisions require notification of drawdowns, access to the E.L. Field Powerhouse, and the payment of utility costs (heating and gas).

Article IV directed NPS to assist MADCR in the removal of litter and other waterborne trash from the Lowell canal system, and states NPS is responsible for maintaining and cleaning ("including removal of trash") all existing trash booms and safety lines/booms on the Lowell canal system. Article IV of the MOU directed NPS to assist MADCR in the removal and control of vegetation along the canal system, ("particularly that growing on and in the canal walls") and to assist MADCR in performing ground maintenance. NPS was tasked with assisting MADCR with the repair and maintenance of all historic gatehouses, such as the repair of architectural features, cleaning and repair of roof gutters, and the maintenance of locking gates and other mechanical devices.

Responsibilities assigned to MADCR under Article V of the MOU include routine maintenance of the gatehouses, serving as the lead agency for all grounds maintenance, keeping all grass, trees, and shrubs neatly trimmed and in a healthy condition, removing dead or diseased plants, fertilizing, pruning, and thinning of plants (as required), and approving ground maintenance or improvement plans as proposed by NPS. Article V directs MADCR to assist NPS in the removal and control of destructive vegetation along

[6] Proprietors of the Locks and Canals on the Merrimack River was included as a party in the MOU but did not execute the agreement.

the canal system, and to cooperate with the NPS on developing a litter removal program for waterborne litter and trash on the canals. (MOU 1991). MADCR was to implement an annual safety inspection of the locking gates and gate chambers. This article also specified MADCR to reimburse NPS for time and materials for work done on the canal system. Notably, MADCR was to "act on all special use permit requests for the recreational use of the Lowell canal system and provide copies of approved permits to Boott Hydro and Proprietors and the NPS."

Article VI of the MOU directed NPS and MADCR to hold a joint annual meeting to develop an annual building maintenance program, annual destructive vegetation clearing program and canal surface water cleanup program. The annual programs were to be developed in accordance with each agency's budget and seasonal staffing level. Under Article VI, MADCR was also directed to consult with NPS to develop a long-term capital improvement program for the canal system. The minutes of this annual meeting between MADCR and NPS were to be provided to Boott and the Proprietors each year (MOU 1991).

5.6 FERC Jurisdiction

One of the goals for this study was to clarify FERC jurisdiction. Section 23(b)(1) of the Federal Power Act (FPA) requires that each non-federal hydroelectric project, except those with pre-1920 federal permits that are still valid, falls under FERC jurisdiction if it: (1) is located on navigable waters of the United States; (2) occupies lands of the United States; (3) uses surplus water or water power from a government dam; or (4) is located on a body of water over which Congress has Commerce Clause jurisdiction, was constructed or modified after August 25, 1935, and affects interstate or foreign commerce.

All hydropower projects deemed jurisdictional must be licensed by FERC (or exempted from licensure), and the Project Boundary defines the geographical limits of FERC's jurisdiction. The Commission determines the limits of the Project Boundary based on lands and waters needed by the Licensee: (1) to construct and operate its Project and (2) to carry out other non-power project purposes such as fish passage and minimum flow requirements.

The Licensee is required to manage operations within the Project Boundary in accordance with the conditions set forth in the FERC license. Additionally, Section 10(c) of the FPA requires Licensees with to maintain the project works within the Project Boundary in a condition of repair adequate for the purposes of navigation and for the efficient operation of said works in the development and transmission of power, . . . to maintain and operate said works as not to impair navigation, and . . . conform to such rules and regulations as the Commission may from time to time prescribe for the protection of life, health, and property.

The FERC Project Boundary around the project impoundment, continuous project features, and noncontiguous Project works are presented in Exhibit G maps according to the methods required under 18 CFR §4.41(h)(2). The Exhibit G maps for the Lowell Hydroelectric Project were filed with the FLA on April 30, 2021.

As stated in the FLA, Boott proposes to remove the four mill power stations and associated canal infrastructure from the new FERC license. The Project Boundary will be modified to remove much of the downtown canal infrastructure. However, Boott will continue to manage the canal structures, water levels and flows using best practices and consistent with current agreements with the NPS and other stakeholders.

6 Discussion and Conclusion

6.1 Ownership and Easement Rights to the Lowell Canal System

Ownership, easement rights, and use of the canal system in Lowell are complex, with intersecting roles between public agencies and private entities at the local, State, and Federal level. In their request for this study, NPS noted that the eventual goal of this study would be to denote which entity is ultimately responsible for specific resources. Boott's review of the documentation indicated that it is not possible to specify ultimate responsibility for most physical resources of the Lowell canal system because the LNHP was planned, designed, and launched as a collaboration between parties, and legal documents were executed to solidify this approach. From the start of the park's conception in the 1977 *Report of the LHCDC*, the vision has always been "a creative partnership which would go beyond the reach of any single agency or level of government" (LHCDC 1977). Generally, the legal documentation issued in the form of the 1984 *Great Deed*, 1986 *Order of Taking*, and the 1995 *Grant of Easement* does not designate any party to be solely responsible for specific structures.

Ownership of the Lowell canal system is largely determined by the 1984 *Great Deed* and 1986 *Order of Taking*. Components of the canal system are owned by Proprietors, Boott, and MADCR. Proprietors owns much of the Pawtucket Canal and structures of the Pawtucket Canal. Boott owns the Northern Canal, Western Canal, Merrimack Canal, Eastern Canal, and Hamilton Canal. Boott owns specific dams, lock structures, and hydroelectric equipment within the canals they own, and this is largely determined based on elevation. MADCR owns most of the gatehouses and several other historical structures throughout the Lowell canal system.

Easement rights to structures of the Lowell canal system are held by Proprietors, Boott, MADCR, and NPS. In the 1984 *Great Deed*, Boott obtained easement rights, in common with Proprietors, to the Pawtucket Canal and structures of the Pawtucket Canal. These easement rights allow Boott to access, operate, maintain, repair, and replace the Pawtucket Canal and structures of the Pawtucket Canal. In the 1986 *Order of Taking*, MADCR obtained a permanent and exclusive easement to structures of the canal system, including canal walls, beds, and bottoms, for purposes including conservation, preservation, maintenance, and other uses consistent with the use of the system as a park. NPS obtained similar easement rights through the 1995 *Grant of Easement* from MADCR, including the right to maintain, repair, conduct grounds maintenance, and operate boat tours.

Most structures throughout the canal system have overlapping ownership and easement rights. A property owner (Proprietors, Boott, and/or MADCR) has a duty to achieve a reasonable standard of care[7] for the properties under their ownership. Each property

[7] The Standard of Reasonable Care is typically defined as the degree of caution and concern for the safety of self and others that a reasonable person would exhibit.

owner has a right to conduct routine maintenance of their facilities to achieve a standard of reasonable care, but they do not have an obligation to enhance or upgrade their properties. Similarly, a maintenance easement issued in common with others allows the holder to conduct routine maintenance of the property under easement, and allows others holding to also conduct routine maintenance, but the easement holder(s) is not required or permitted to upgrade or enhance the property.

An exclusive easement allows the easement owner to control and implement specific purposes as if they are the owner. MADCR has a permanent and exclusive easement over most of the canal system for the following purposes, which include enhancements and upgrades:

a) Support of all fixtures or structures of the Commonwealth now or hereafter attached;
b) Preservation and conservation;
c) Supplemental maintenance in addition to that performed by the Condemnees (the prior or current owner) and their successors and assigns;
d) Landscaping and erection of exhibits and structures;
e) Placement of barriers and fences;
f) Placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature;
g) Placement of lighting and other utilities;
h) Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
i) Any and all other uses consistent with the operation of the canal system as a park.

Given that MADCR's exclusive easement is throughout most of the canal system, it overlaps significantly with Boott and Proprietors' owned property. It is understood that Boott, Proprietors, and MADCR have a duty and right to maintain properties under their ownership to achieve a standard of reasonable care. Owners do not have an obligation or duty to upgrade or enhance their property. However, MADCR's exclusive easement throughout most of the Lowell canal system gives them the right to implement any of the purposes noted above, which include enhancements and upgrades, as if they were the owner. Accordingly, in cases of overlapping ownership and easement rights, it will almost entirely depend on the nature of the effort to determine obligations and responsibilities.

6.2 Resource Rights to the Lowell Canal System

For this study, resource rights were classified as such if they are owned by or issued to a party independently from any physical structure. Four resource rights were identified based on a review of the 1984 *Great Deed*, the 1986 *Order of Taking*, and the 1995 *Grant of Easement*.

Recreational resource rights are exclusively owned by MADCR. In early conceptual planning documents, MADCR was presented as the party that would own, implement, and manage any recreational resources. MADCR obtained such rights in the 1986 *Order of Taking*, including the exclusive right to use water for recreational, educational, or navigational purposes, and permanent and exclusive rights to build wharves, docks, and boat ramps. The 1990 *Preservation Plan Amendment* and the 1991 MOU, both issued after MADCR received all recreation rights, discuss MADCR's role as encouraging, managing, and approving different recreational activities throughout the Lowell canal system.

Air resource rights have been owned by MADCR since issuance of the 1986 *Great Deed*. Water and flowage rights are owned by Boott and Proprietors, as established in the 1984 *Great Deed*.

Additionally, as stated in the *1984 Great Deed*, Boott was granted the right to utilize structures of the canal system to their maximum potential for the purpose of power, a resource right granted to Boott independently of its rights to specific structures.

6.3 Historical Management Agreements

There are two known historical management agreements between the parties with interests in the Lowell canal system. The two agreements provide the best insight into delegation of regular management tasks such as grounds maintenance, water levels, waterborne trash, and vegetation management.

The 1979 agreement states that NPS and MADCR were responsible for development and maintenance of canal walls and banks, including landscaping and repair and dredging/debris removal, as well as developing locks, gatehouses, bridges, barge landings, and displays and signs. Proprietors (ultimately Boott) were responsible for development and maintenance of the Pawtucket Dam, water levels and flows, and gatehouses.

The 1991 MOU was executed between MADCR, the NPS, and Boott. As owners of the canal walls, the MOU directed Proprietors and Boott to maintain the structural integrity of the walls, bottoms, and dam structures to the extent they have the duty to do so as owner (maintain a standard of reasonable care). Proprietors and Boott were to provide MADCR with any plans that might alter the historic fabric of the canal system, and to obtain MADCR's written prior approval. Boott was directed to operate the canal system to provide the appropriate flows and water levels.

The MOU directed NPS and MADCR to collaborate on most daily, routine management tasks regarding the Lowell canal system. They were to remove litter and other waterborne trash from the Lowell canal system, and maintain and clean all existing trash booms and safety lines/booms on the Lowell canal system. NPS and MADCR were directed to hold a joint annual meeting to develop an annual building maintenance program, annual destructive vegetation clearing program ("particularly that growing on and in the canal walls") and canal surface water cleanup program. NPS was tasked with assisting MADCR with the repair and maintenance of all historic gatehouses, such as the repair of architectural features, cleaning and repair of roof gutters, and the maintenance of locking gates and other mechanical devices.

7 Variances from FERC-Approved Study Plan

The Resources, Ownership, Boundaries, and Land Rights Study was conducted in full accordance with the methods described in the FERC-approved study plan.

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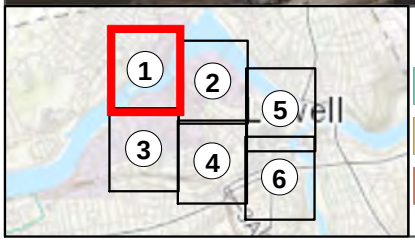
Proprietors of the Locks and Canals on the Merrimack River (Proprietors). 1984. Deed, Bill of Sale and *Grant of Easement*s.

Appendix A - Project Study Area, Facilities, and Structures



Facility

Eastern Canal

Hamilton Canal

Merrimack Canal

Northern Canal

Pawtucket Canal

Western Canal

EOTROADS_ARC

Lowell Resources Facilities Map

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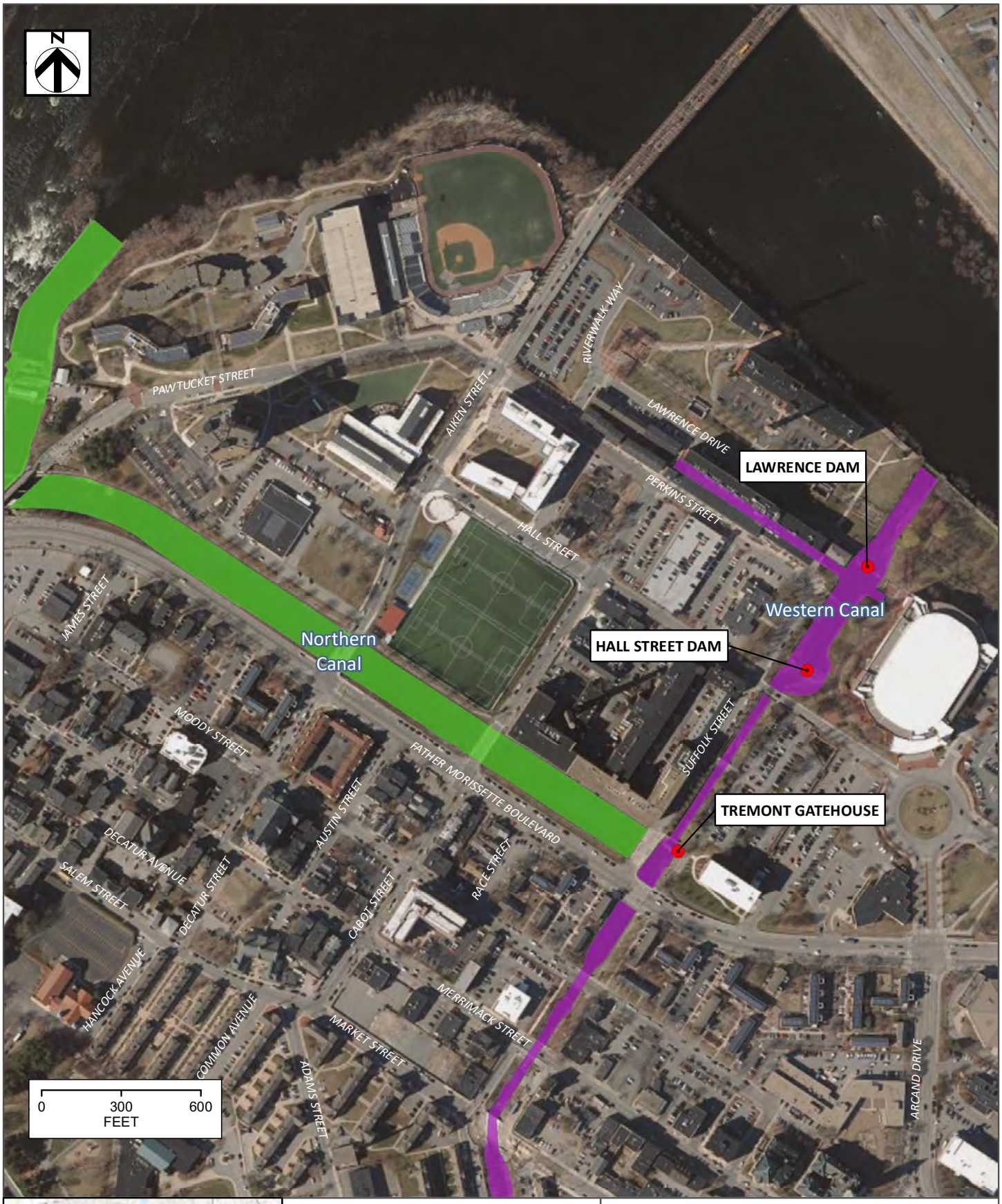
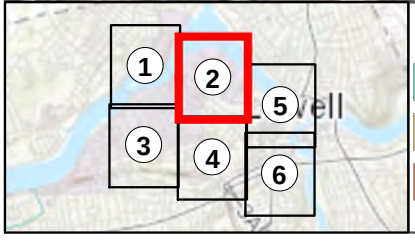
DATA SOURCES: Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community





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Hamilton Canal
Merrimack Canal
Northern Canal
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Lowell Resources Facilities Map

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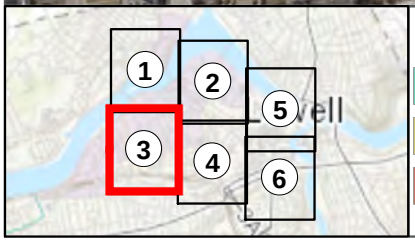

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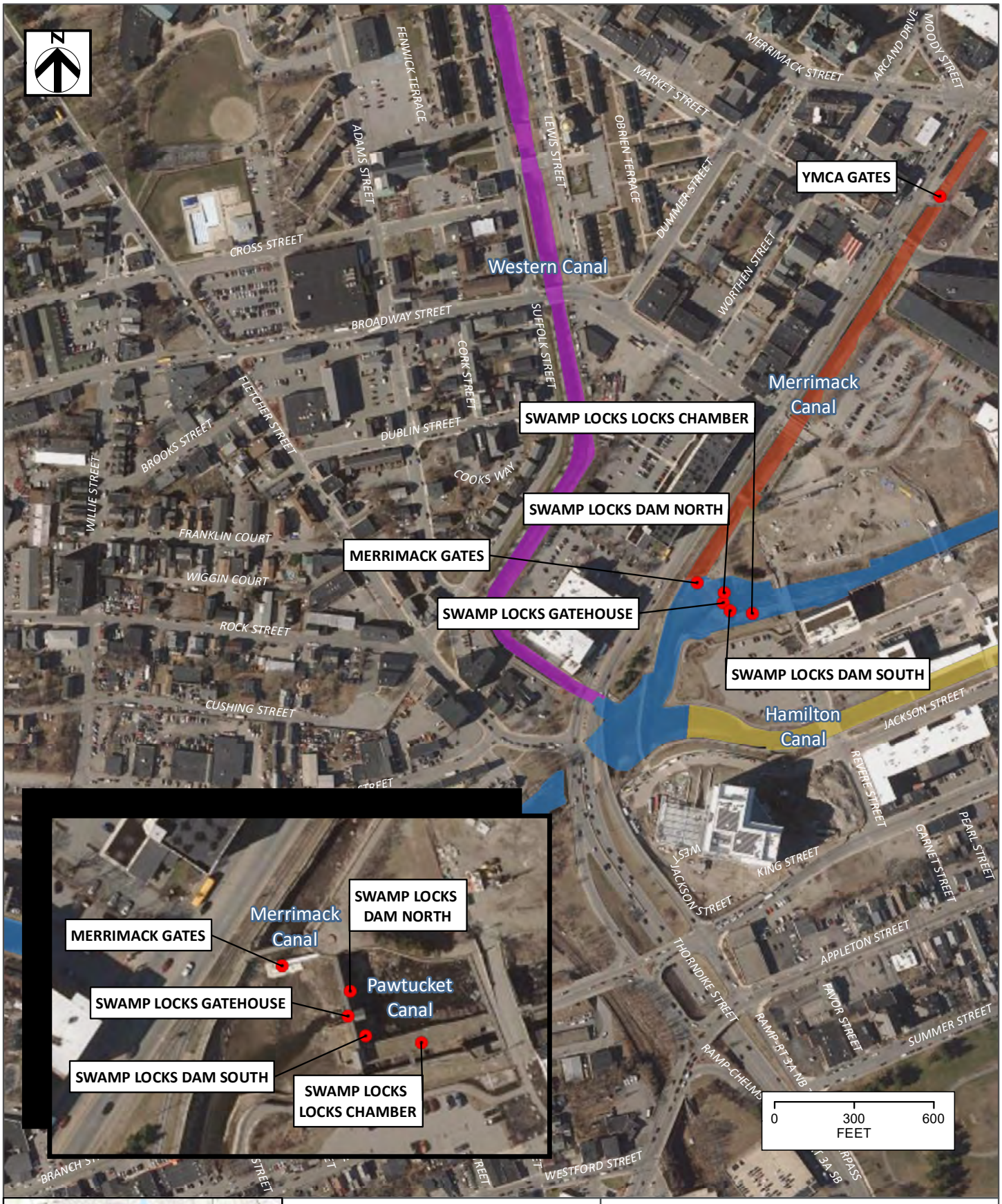

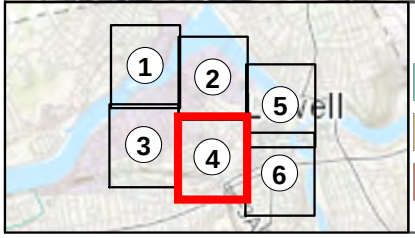

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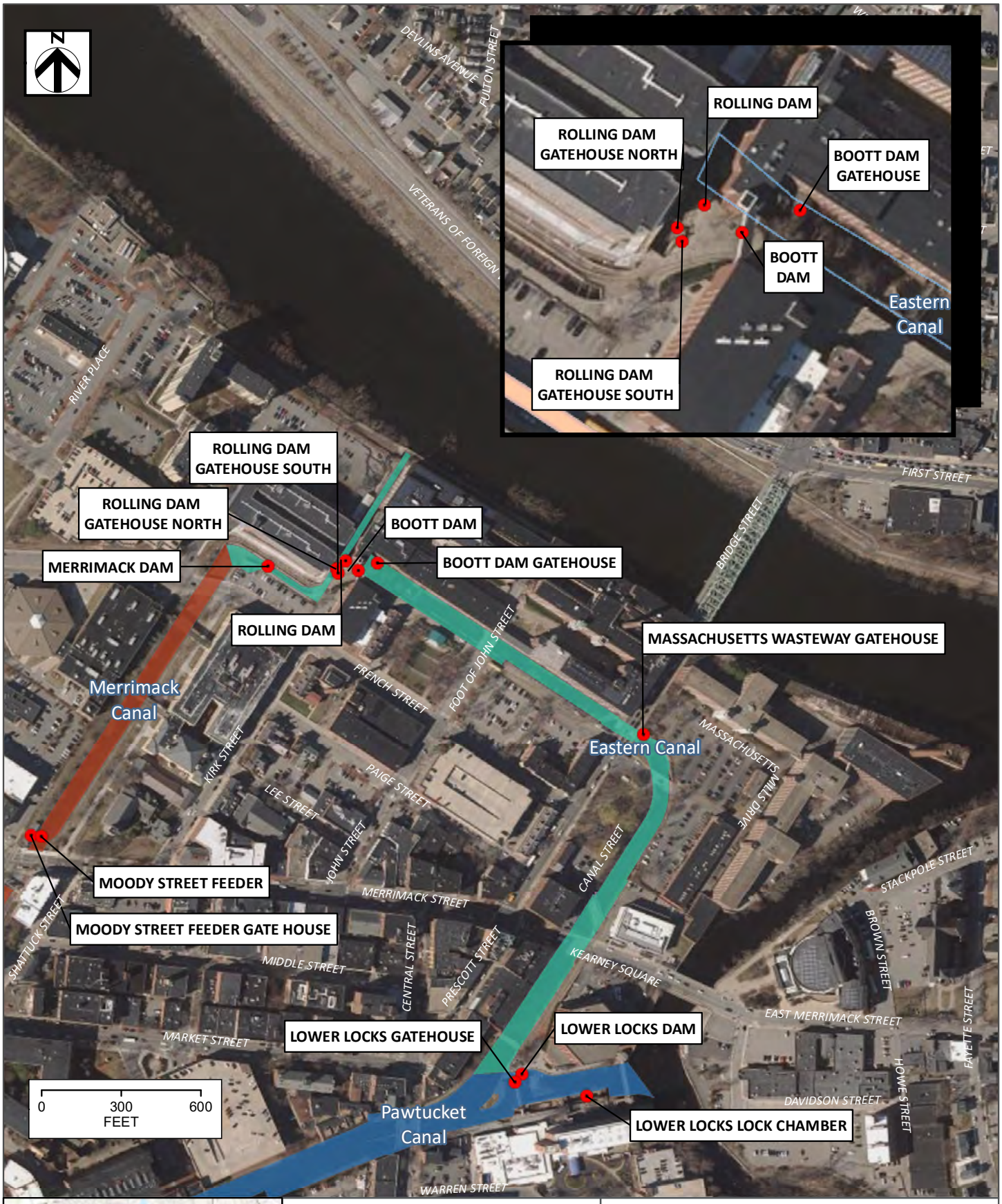

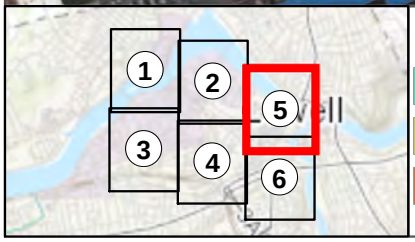

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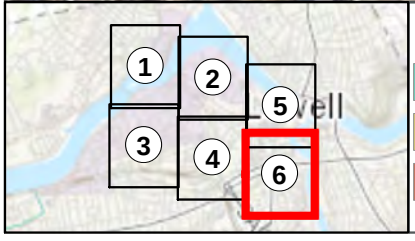
Page 5 of 6

DATA SOURCES: Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community



Facility

Eastern Canal

Hamilton Canal

Merrimack Canal

Northern Canal

Pawtucket Canal

Western Canal

EOTROADS_ARC

Lowell Resources Facilities Map

Page 6 of 6

DATA SOURCES: Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Appendix B - 1984 *Great Deed*

See Agmt B. 7444 P 302

DEED, BILL OF SALE AND GRANT OF EASEMENTS

PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER and BOOTT MILLS, both Massachusetts corporations with offices at Foot of John Street, Lowell, Middlesex County, Massachusetts (together with their successors and assigns, the "Grantors"), for TEN DOLLARS and other good and valuable consideration, hereby grant with warranty covenants to BOOTT HYDROPOWER, INC., a Massachusetts corporation with offices at Foot of John Street, Lowell, Middlesex County, Massachusetts (together with its successors and assigns, the "Grantee"), the following land, easements, property and interests and rights in property all located (except as expressly noted) in Lowell, Middlesex County, Massachusetts:

A. Land, Waterways, Improvements. The land, together with the buildings, improvements, fixtures and other property appurtenant thereto, consisting of those lands, canals, dams or portions thereof and other property set forth below (collectively, the "Parcels"):

1. Parcel I: That certain parcel of land, situated on the northerly side of Jackson Street, being shown as a right of way on a plan of land entitled "Compiled Plan in Lowell, Mass. owned by Courier-Citizen Company" dated March 10, 1978, recorded with Middlesex County North District Registry of Deeds (the "Registry"), Book of Plans 126, Plan 112.

2. Parcel II: That portion of the Merrimack River bounded as follows:

STARTING	from a point at the intersection of the easterly end of the upstream side of the Pawtucket Dam and the shoreline of the Merrimack River, thence
NORTHEASTERLY	along the shoreline of the Merrimack River to the intersection of the shoreline with land of The Commonwealth of Massachusetts, University of Lowell, described as Parcel 2 on a certain "Plan of Land in Lowell, Massachusetts prepared for Proprietors of Locks & Canals on Merrimack River and Massachusetts Wholesale Electric Co.; June 14, 1983" and recorded with the Registry in Plan Book 141, Plan 139, thence
NORTHWESTERLY	along said Parcel 2 to the centerline of the Merrimack River and continuing in the same direction to the opposing shoreline of the Merrimack River, thence
SOUTHWESTERLY	along the shoreline of the Merrimack River to the point of intersection with the westerly

end of the upstream side of the Pawtucket Dam, and thence

EASTERLY along the upstream side of the Pawtucket Dam to the point of beginning.

The Grantors also convey all their right, title and interest, if any, in and to the premises subject to the Lease dated September 28, 1983 between the University of Lowell and Boott Mills, notice of which Lease is recorded with the Registry in Book 2680, Page 281, said premises being shown as Parcels 1 and 2 on a certain Plan entitled "Plan of Land in Lowell, Massachusetts prepared for Proprietors of Locks and Canals on Merrimack River and Massachusetts Wholesale Electric Co.; June 14, 1983" and recorded with the Registry in Plan Book 141, Plan 139; provided, however, that the rights described in this paragraph shall not include any rights which Boott Mills has as lessee under said Lease.

Said Parcel II includes the Pawtucket Dam in its entirety and any and all equipment and mechanisms located in or on said dam or appurtenant thereto, including without limitation fishways and flashboards. Said Parcel II is subject to the rights of The Commonwealth of Massachusetts, the City of Lowell and others legally entitled to the use, maintenance and operation of the University Avenue Bridge and, pursuant to Chapter 132 of the Massachusetts Acts of 1835, the School Street Bridge crossing the same.

3. Parcel III: The land and waterways historically known and designated as follows:

A. The Northern Canal
B. The Western Canal
C. The Lower Western Canal
D. The Eastern Canal
E. The Merrimack Canal
F. The Lawrence Canal
G. The Hamilton Canal
H. The Moody Street Feeder

Said canals are conveyed in their entirety to the exterior plane of the existing canal walls, and including canal fences located thereon, the fee underlying the same, and all waterways and sluiceways forming a part of such canals, and including all dams and gates contained therein and including, but not limited to, the following dams and gates:

A. The Lawrence Dam
B. The Hall Street Dam
C. The Rolling Dam
D. The Merrimack Gates
E. The Boott Dam
F. The Northern Canal Headgates

Said dams and gates are conveyed together with the fee to the land underlying the same and all equipment and

mechanisms located in or on said dams and gates or appurtenant thereto, including, but not limited to, wasteways, penstocks, tailraces, headgates and racks.

Parcel III includes all Grantor's interest in the following bridges crossing the canals described above:

A.	Over Eastern Canal:	1. East Merrimack Street 2. Bridge Street
B.	Over Merrimack Canal:	1. Merrimack Street (only 25 feet either side of center line)
C.	Over Western Canal:	1. Merrimack Street (only 25 feet either side of center line)
D.	Over Northern Canal:	1. Suffolk Street 2. Pawtucket Street

Parcel III is subject to rights of The Commonwealth of Massachusetts, the City of Lowell and others legally entitled to the use, maintenance and operation of the above described bridges and other existing bridges crossing the canals described above.

Grantors hereby expressly reserve from the within grant, and Parcel III does not include, that portion of those structures, historically known and designated as set forth below, in or above the aforementioned canals, dams and gates which is above the following noted elevations above Mean Sea Level, National Geodetic Vertical Datum (hereinafter collectively referred to as the "Gatehouses"):

A. Northern Canal Gatehouse, above 101.2 feet M.S.L., including the Northern Canal Gatehouse Locks, above 82.7 feet M.S.L.
B. Tremont Gatehouse, above 90.2 feet M.S.L.
C. Hamilton Gatehouse, above 90.2 feet M.S.L.
D. Massachusetts Wasteway Gatehouse, above 80.2 feet M.S.L.
E. Rolling Dam Gatehouse, above 83.7 feet M.S.L.
F. Moody Street Feeder Gatehouse (also known as Merrimack Gatehouse), above 92.2 feet M.S.L.;
G. Boott Dam Gatehouse, above 74.2 feet M.S.L.;

however, Parcel III does include all mechanisms, controls and other machinery and equipment located above said

elevations which are necessary for the control and operation of the lands, dams and gates upon which the Gatehouses rest.

The Gatehouses are hereby intended to be severed from the lands, dams and gates upon which they rest, so that the Gatehouses will be considered real property of the Grantors separate from said land, dams and gates, and each may forever hereafter independently be conveyed, transferred, mortgaged and leased.

Grantors also hereby expressly reserve from the within grant, and Parcel III does not include, the so-called "Great River Wall," being the land and structures located thereon (including without limitation the Northern Canal Wastegate House, also called the High Bridge Gatehouse) dividing the Northern Canal and the Merrimack River which starts at the Northern Canal Gatehouse and extends northeasterly to the intersection of the Northern Canal with land of The Commonwealth of Massachusetts, University of Lowell, described as Parcel 1 on a certain "Plan of Land in Lowell, Massachusetts prepared for Proprietors of Locks & Canals on Merrimack River and Massachusetts Wholesale Electric Co.; June 14, 1983" and recorded with the Registry in Plan Book 141, Plan 139.

Said Parcel III also does not include those portions of canal walls previously conveyed as evidenced by instruments recorded with the Registry in Book 1428, Page 185, Book 1608, Page 357 and Book 1690, Page 429.

B. Easements. The following easements, newly created hereby, held or hereafter acquired by the Grantors, which are hereby made appurtenant to the Parcels:

1. Access and Repair. The Grantors grant an easement over the remaining lands of the Grantors, and grant the benefit of easements over lands of others, in each case which the Grantors may now or hereafter own, possess or have the right to use, for the purpose of obtaining access to the Parcels from public ways, for the providing of utilities necessary for the operation of the Parcels and entering on such portions of the property adjacent to the Parcels with personnel, equipment and materials for the purposes of maintaining, repairing, replacing, reconstructing and rebuilding the Parcels or any property located thereon.

2. Easement to Pawtucket Canal. The Grantors further grant an easement, in common with the Grantors and others entitled thereto, to the Pawtucket Canal, Lower Pawtucket

Canal, the Pawtucket Canal Guard Gate and Locks, the Swamp Locks Dam and the Lower Locks Dam for the uninterrupted flowage of water to the canals described in Parcel III above, together with the right to install conduits, pipes and wiring therein and the right to maintain, repair and replace the canal walls and fences on and bridges over said Pawtucket and Lower Pawtucket Canals and to maintain and operate the Pawtucket Canal Guard Gate and Locks, the Swamp Locks Dam and the Lower Locks Dam.

3. Easement for Access to Structures. The Grantors further grant easements to enter, and maintain real and personal property in, the Gatehouses and in addition those other structures in or adjacent to the above said canals and dams historically known and designated as follows:

A. Blacksmith Shop
B. Old Guard Locks Gatehouse
C. Swamp Locks Gatehouse
D. Lower Locks Gatehouse
E. Great River Wall (as described in Parcel III above), including without limitation the Northern Canal Wastegate House (also called the Highbridge Gatehouse)

Said easements consist of the exclusive right of operating and controlling the Gatehouses and the above said structures and locating, keeping in place, maintaining, replacing, operating, controlling and disposing of the control machinery and equipment, gauge equipment and other mechanisms located therein and, in common with the Grantors and others entitled thereto, for access to and for maintenance and repair of the Gatehouses and the above said structures and access to and maintenance, repair and installation of the control machinery and equipment, gauge equipment and such other mechanisms located therein as the same may from time to time be repaired, reconstructed or replaced. The Grantors further grant an easement over other lands of the Grantors, and grant the benefits of easements owned by Grantors over lands of others, in each case which the Grantors may now or hereafter own, possess or have the right to use, for powerlines, utilities and for access to and egress from the above said premises and public ways.

C. Water and Flowage Rights. The Grantors hereby grant to the Grantee any and all riparian rights, water rights and "Mill Powers" which the Grantors may have in the water flowing in the Merrimack River in Middlesex County,

Massachusetts, and Hillsborough County, New Hampshire. Such rights include any and all water rights which may exist regardless of how acquired, including, without limitation, any and all water rights which Grantors may have by virtue of riparian rights or any and all water rights which may have been specifically granted to Grantors, or acquired through the conveyance of interests in any dam or flowage rights or acquired by prescription, whether now owned or hereafter acquired. Without limiting the generality of the foregoing, said rights include:

(i) the right, without payment of compensation therefor, to utilize all the waters of the Merrimack River upstream of the Pawtucket Dam, and the right to extract and use such water, subject only to the rights of riparian owners along the Merrimack River and rights previously granted in (x) Agreement between Grantors and the City of Lowell et al. dated June 21, 1875 recorded with the Registry in Book 128, Page 113, (y) Agreement between Grantors and the City of Lowell et al. dated December 31, 1875 recorded with the Registry in Book 114, Page 121, and (z) Release among Grantors and The Commonwealth of Massachusetts dated April 17, 1896 recorded with the Registry in Book 274, Page 225.

(ii) the right, without payment of compensation therefor, to dam and divert all the water from the Merrimack River for the distance from the Pawtucket Dam to the intersection of the Merrimack River and the Concord River, through the Pawtucket or Northern Canals or othewise, and the right to extract and use such water, and

(iii) the right, without payment of compensation therefor, to overflow, flood, and cover to a height of 92.2 feet above Mean Sea Level (National Geodetic Vertical Datum) from July through February, and to a height of 91.2 feet above Mean Sea Level from March through June, real property in Middlesex County, Massachusetts, and Hillsborough County, New Hampshire, adjacent to the Merrimack River upstream from the current site of the Pawtucket Dam with flood water, slack space water or back water created by the operation of a dam or dams across the Merrimack River in the vicinity of the current site of the Pawtucket Dam together with the right to enter on such real property from time to time to maintain the dam or dams and the reservoir created by such dam or dams and to

clear the reservoir of any structures, growth or other obstruction below elevation 92.2 feet above Mean Sea Level which interfere with the operation of such dam or dams across the Merrimack River.

Said rights are subject to rights previously conveyed pursuant to the Agreement dated March 7, 1983 between the Grantors and James T. Lichoulas, as trustee for the Appleton Trust, as amended, recorded with the Registry in Book 2611, Page 630 and pursuant to the Agreement dated February 1, 1982 among the Grantors, Corporation Investments, Inc., Kenneth M. Scagel, Sr., Kenneth M. Scagel, Jr., Atlantic Associates and Massachusetts Hydro Associates recorded with the Registry in Book 2611, Page 624.

D. Reservations. The Grantors for themselves, their successors and assigns, reserve the right to use the surface water in the canals described in Parcel III above and the Pawtucket Canal for recreation and transportation purposes, provided that said use and operation in any and all events does not interfere with the use and operation of the Parcels for the generation of power. The Grantors also reserve for themselves, their successors and assigns, the right to use up to a combined total of 100 cubic feet per second of water in such canals, and the right to use such canals, to maintain and operate existing steam distribution and fire protection systems owned by the Grantors and to provide process water for customers of the Grantors, including improvements to or expansions of such systems within said limitations of flowage.

Subject to the easements herein granted and conveyed, the Grantors further reserve for themselves, their successors and assigns, any and all surface land and all air space above the premises described above as Parcel III, and further reserve the right to have access to and occupy, use and develop such surface land and air space; provided, however, that the occupation, use and development of such surface land and air space in any and all events shall neither interfere in any way with the use or operation of any of the Parcels, the facilities or rights described herein nor any other property of Grantees used for the purpose of generating hydroelectric power nor interfere in any way with access to the premises described above as Parcel III for purposes of maintaining, repairing, replacing, reconstructing and rebuilding the premises described as Parcel III as may from time to time become necessary in connection with the operation and upkeep of the same.

E. Fixtures and Equipment. The Grantor hereby grants to Grantees all hydro and generating equipment of the Grantors, including all turbines, generators, governors, exciters, control panels, main breakers and extra parts, tools, patterns, blueprints and performance data, transformers, substations, electrical transmission lines, and related mechanisms necessary for the production and transmission of electricity to the generator control panels. Without limiting the generality of the foregoing, said property includes the turbines and generators (the "Turbines") listed and described in Exhibit A and all appurtenant equipment and fixtures located in the rooms housing the same and the electrical transformers (the "Transformers") listed and described in Exhibit B.

F. Easements. The property described in Section E above is conveyed with the benefit of the following easements:

1. Turbine Rooms. An easement to enter, occupy, use, maintain and repair the rooms in which the Turbines are located for the purpose of keeping in place, maintaining, operating, repairing, replacing and otherwise dealing with the Turbines and all appurtenant equipment and fixtures located in the rooms housing the same. Included is the right at all times to enter and have unrestricted access to such rooms for such purposes, and to remove or alter the walls thereof (both interior and exterior) to the extent necessary or convenient to such purposes, provided that such walls shall be restored to their original condition (or to a condition having a similar functional utility and appearance) promptly upon completion of the activity leading to their removal or alteration.

2. Penstocks and Tailraces. An easement to operate, maintain, repair and replace the existing penstocks leading to the Turbines from the Merrimack Canal, Eastern Canal or Hamilton Canal, as the case may be, and to remove any such penstock in order to replace it with a penstock of the same or a different size and construction. Also an easement to operate, maintain, repair and replace the existing tailraces leading from the Turbines to the Pawtucket Canal, the Concord River or the Merrimack River, as the case may be, and to remove any such tailrace in order to replace it with a tailrace of the same or a difference size and construction.

3. Transformers. An easement to keep in place, locate, operate, maintain, repair, remove and replace the Transformers and an easement for unrestricted access thereto for such purposes.

4. Transmission Lines. Also the right to use, maintain and repair existing electrical transmission lines from the generator control panels, including all substations and transformers, of the Grantors for the purpose of operating the aforesaid equipment and facilities, until such time as the aforesaid equipment and facilities are permanently disconnected from such transmission lines. Also the right to construct, reconstruct, operate, keep in place, maintain, repair, remove and replace electrical transmission lines and lines for the transmission of intelligence by electricity, including connection to the generator control panels, substations, transformers, junction boxes, wires, cables, conduits and other necessary appurtenances thereto, upon, over, across and under the lands, buildings, structures and easements of the Grantors for the purpose of generating and selling power, whether generated by the facilities described herein, or by other power facilities owned by the Grantee in the City of Lowell.

G. General. The land, easements, equipment and rights described herein are conveyed together with all necessary rights and easements for the purpose of utilizing the aforesaid facilities, equipment and fixtures for the purpose of producing and selling power, including the right to construct, reconstruct, modify and rehabilitate such facilities, equipment and fixtures now existing and to install additional facilities, equipment and fixtures of like purpose, including without limitation an unrestricted right of access over other lands, easements and buildings of the Grantors from existing public ways as are necessary to fulfill the purposes of the within grant and conveyance and the right to utilize the within conveyed premises, structures, facilities, waterways and equipment to their maximum potential for such purposes.

For Grantors's title, see the following:

Deed of James Parkhurst dated September 20, 1792, recorded with Middlesex South District Registry of Deeds, Book 108, Page 461;

Deed of Benjamin Melvin dated November 10, 1795, recorded with Middlesex South District Registry of Deeds, Book 115, Page 518;

Deed of Joseph Tyler dated March 17, 1797, recorded with Middlesex South District Registry of Deeds, Book 125, Page 97;

Deed of Nathan Tyler dated February 17, 1798, recorded with Middlesex South District Registry of Deeds, Book 128, Page 223; and

Deed of Merrimack Manufacturing Co. dated January 2, 1826, recorded with Middlesex South District Registry of Deeds, Book 269, Page 1.

The extent and nature of the consideration herein is such that deed stamps are not required.

Reference is made to plans available for inspection at the offices of Chicago Title Insurance Co., which is currently located at 133 Federal Street, Boston, Massachusetts, for general identification and location of certain of the premises conveyed hereby.

IN WITNESS WHEREOF, Proprietors of the Locks and Canals on Merrimack River and Boott Mills have caused their corporate seals to be hereto affixed, and these presents signed in their name and behalf by Melvin G. Lezberg, their President, hereunto duly authorized, this 16th day of January, 1984.

PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER

by _____
Melvin G. Lezberg
President

BOOTT MILLS, INC.

by _____
Melvin G. Lezberg
President

COUNTY OF NEW YORK)
STATE OF NEW YORK)

On this 16th day of January, 1984, personally appeared before me Melvin G. Lezberg, who being by me duly sworn did say that he is President of Boott Mills and of Boott Hydropower, Inc., and that this instrument was duly signed and sealed on behalf of such corporations, and such person acknowledged the foregoing to be the free act and deed of such corporations.

_____
Notary Public
My Commission Expires:

[illegible] County
[illegible] March 30, 1984

Description of Turbines and Generators

Lowell Hydroelectric Project

Project Features p. A-2

Assets Power Station

Plan of Bigelow Yard p. A-3

Units 1, 2, 3 p. A-4

Bridge Street Power Station

Mill Yard Plan of Boott Mills Massachusetts Division p. A-5

Units 1, 2, 3 p. A-6

Units 4, 5, 6 p. A-7

Unit 12 p. A-8

Hamilton Power Station

Plan of the Hamilton Yard p. A-9

Units 1, 2 p. A-10

Unit 3 p. A-11

Units 4, 5 p. A-12

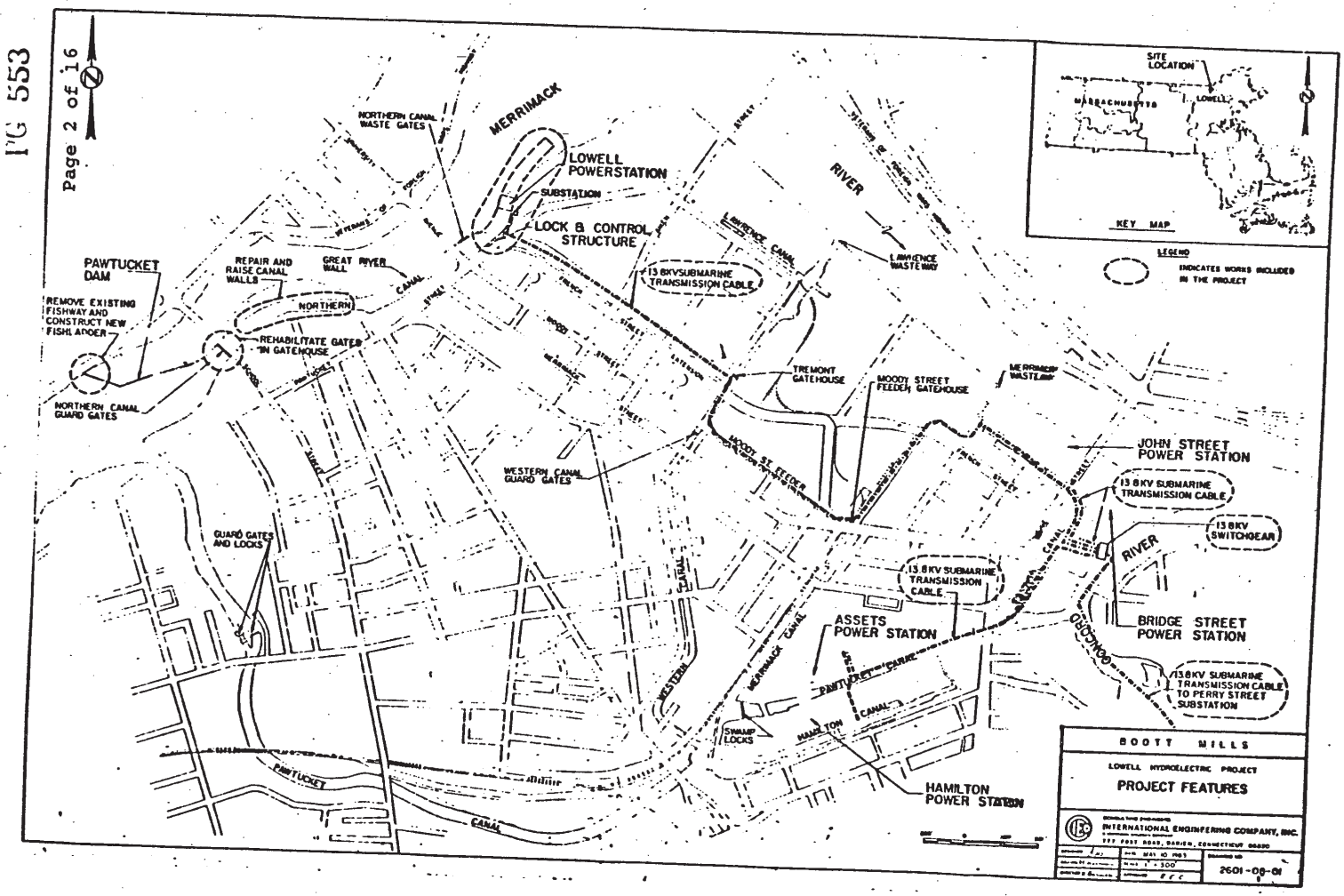
John Street Power Station

Plan of the Boott Yard p. A-13

Unit 1 p. A-14

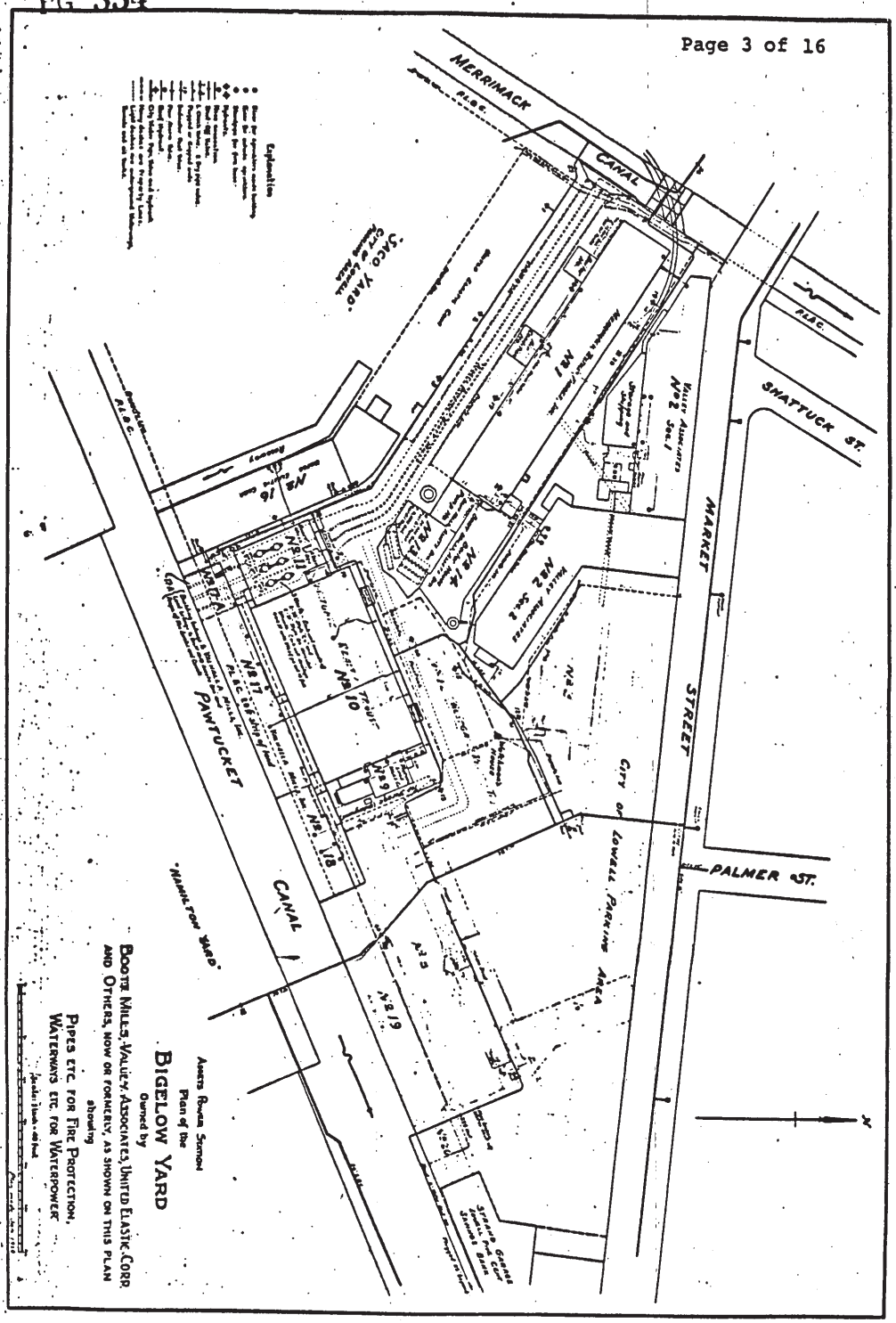
Units 3, 4, 5 p. A-15

Unit 6 p. A-16

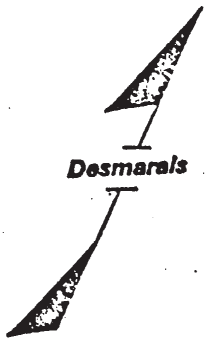


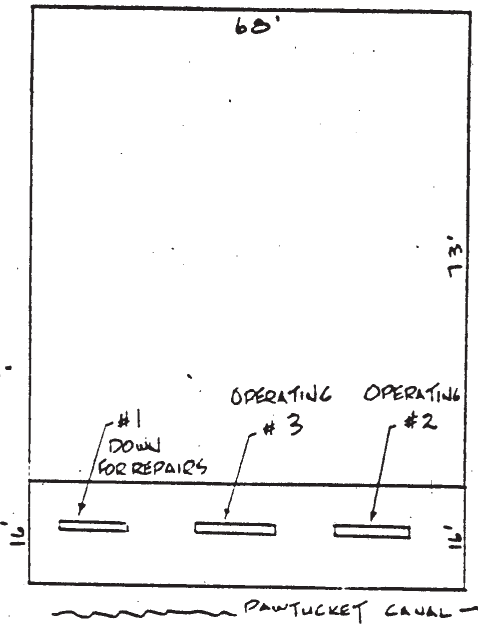
MERRIMACK
RIVER
NORTHERN CANAL WASTE GATES
LOWELL POWERSTATION
SUBSTATION
LOCK & CONTROL STRUCTURE
PAWTUCKET DAM
REMOVE EXISTING FISHWAY AND CONSTRUCT NEW FISHLADDER
REPAIR AND RAISE CANAL WALLS
GREAT RIVER WALL
NORTHERN
CANAL
REHABILITATE GATES IN GATEHOUSE
NORTHERN CANAL GUARD GATES
13.8KV SUBMARINE TRANSMISSION CABLE
LAWRENCE CANAL
LAWRENCE WASTEWAY
TREMONT GATEHOUSE
MOODY STREET FEEDER GATEHOUSE
MERRIMACK WASTEWAY
MOODY ST. FEEDER
WESTERN CANAL GUARD GATES
JOHN STREET POWER STATION
13.8KV SUBMARINE TRANSMISSION CABLE
13.8KV SWITCHGEAR
GUARD GATES AND LOCKS
13.8KV SUBMARINE TRANSMISSION CABLE
ASSETS POWER STATION
BRIDGE STREET POWER STATION
GONCORD
13.8KV SUBMARINE TRANSMISSION CABLE TO PERRY STREET SUBSTATION
WESTERN CANAL
MERRIMACK CANAL
PAWTUCKET CANAL
HAMILTON CANAL
SWAMP LOCKS
HAMILTON POWER STATION
PAWTUCKET CANAL
SITE LOCATION
MASSACHUSETTS
LOWELL
KEY MAP
LEGEND
INDICATES WORKS INCLUDED IN THE PROJECT
BOOTT MILLS
LOWELL HYDROELECTRIC PROJECT
PROJECT FEATURES
INTERNATIONAL ENGINEERING COMPANY, INC.
2601-08-01

PG 554


MERRIMACK
CANAL
SHATTUCK ST.
MARKET
STREET
PALMER ST.
PAWTUCKET
CANAL
"SACO YARD"
"HAMILTON YARD"
CITY OF LOWELL PARKING AREA
Explanation
Assets Power Station
Plan of the
BIGELOW YARD
Owned by
BOOTE MILLS, VALLEY ASSOCIATES, UNITED ELASTIC CORP.
AND OTHERS, NOW OR FORMERLY, AS SHOWN ON THIS PLAN
showing
PIPES ETC. FOR FIRE PROTECTION,
WATERWAYS ETC. FOR WATERPOWER

—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.
SCALE 1"= 20' —— DECEMBER 1983





TURBINE DATA
#1 - #2 - #3
HERCULES-DOUBLE RUNNER STYLES "C & D"
33 AND 31 INCHES.

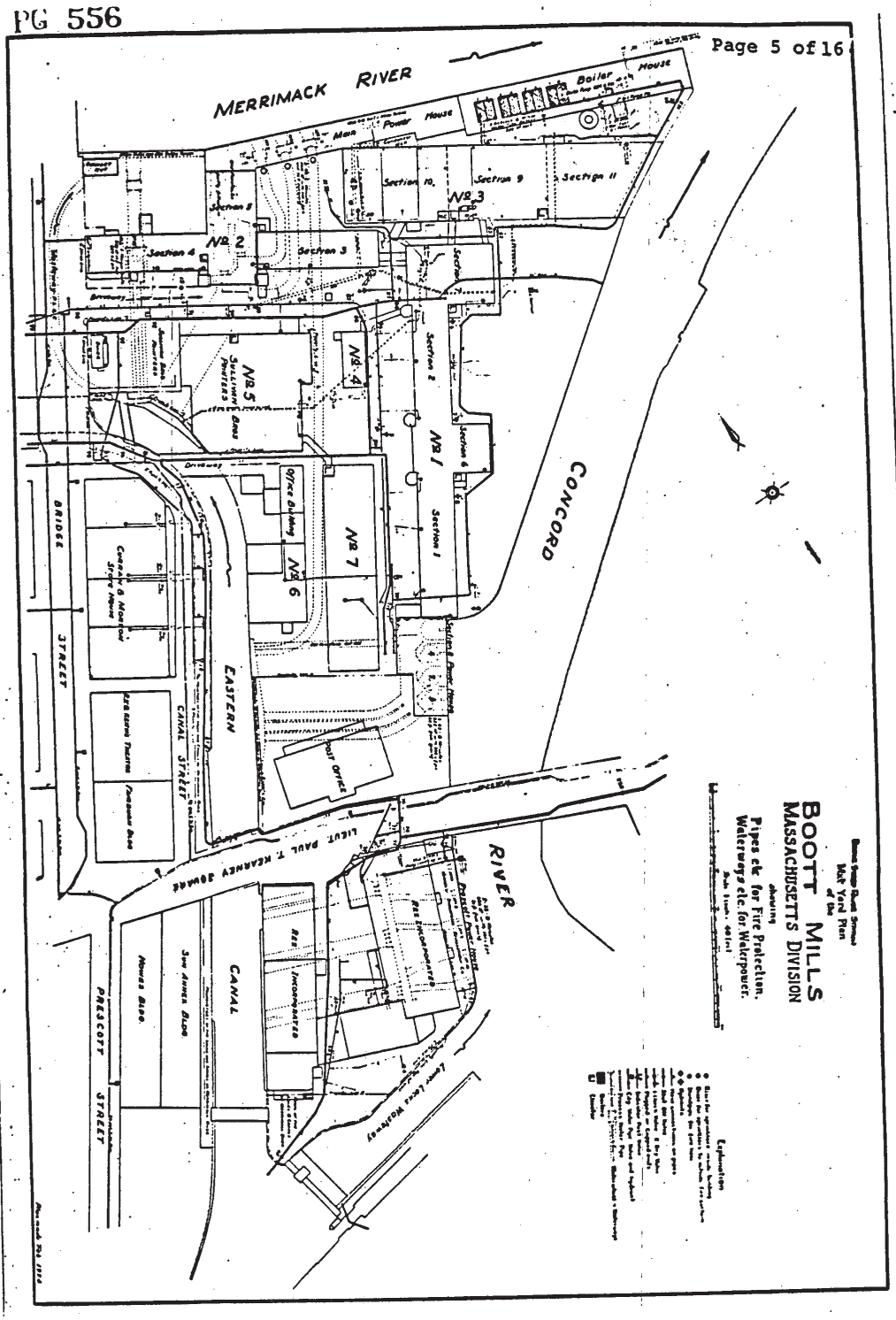
LOCATION: MARKET ST. ASSETS DIVISION
DESCRIPTION: 3 - GENERAL ELECTRIC ALTERNATING CURRENT HORIZONTAL TYPE GENERATORS
GENERATOR NUMBERS: #1 - 227596
#3 - 227897
#2 - UNACCESSIBLE

COMMONWEALTH OF MASSACHUSETTS
Raymond F. Desmarais #29996
REGISTERED LAND SURVEYOR

I CERTIFY THAT I HAVE EXAMINED THE PREMISES AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

Raymond F. Desmarais R.L.S.

PG 556


MERRIMACK RIVER
Main Power House
Boiler House
Section 10
Section 9
Section 11
Section 8
Section 4
Section 3
Section 2
Section 1
Section 6
No 1
No 2
No 3
No 4
No 5
No 6
No 7
Sullivan Bros
Office Building
Curran & Morrow Store House
Post Office
Eastern Canal Street
Bridge Street
Prescott Street
Lieut. Paul T. Kearney Square
Canal
Res Incorporated
Sun Annex Bldg
Howes Bldg
Concord River
Lower Lock Waterway
BOOTT MILLS
MASSACHUSETTS DIVISION
showing
Pipes etc for Fire Protection,
Waterways etc. for Waterpower.
Explanation

—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

SCALE 1" = 20' —— DECEMBER 1983

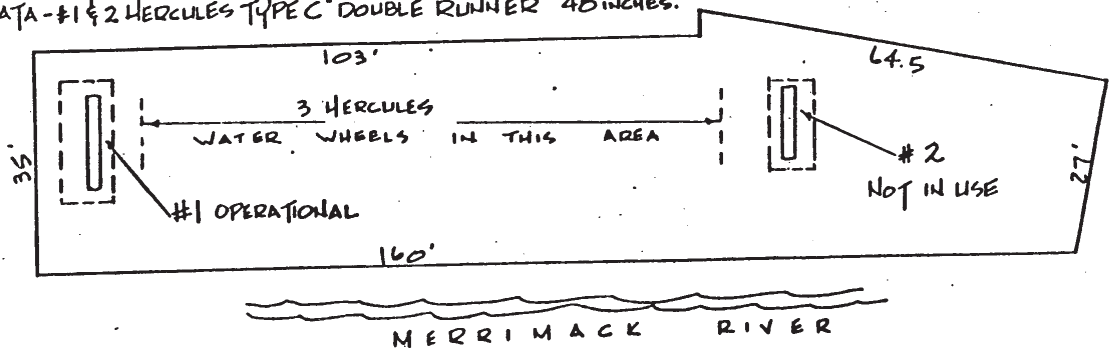
Desmarais

LOCATION - BRIDGE ST. - MAIN POWER.

DESCRIPTION: 2 - GENERAL ELECTRIC HORIZONTAL GENERATORS

GENERATOR NUMBERS #1 - 214156 - 600V - 1250 KW - 150 AMPS.
NUMBER #2 NOT ACCESSIBLE - 750 KW - 600V

TURBINE DATA - #1 & 2 HERCULES TYPE 'C' DOUBLE RUNNER 48 INCHES.



I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

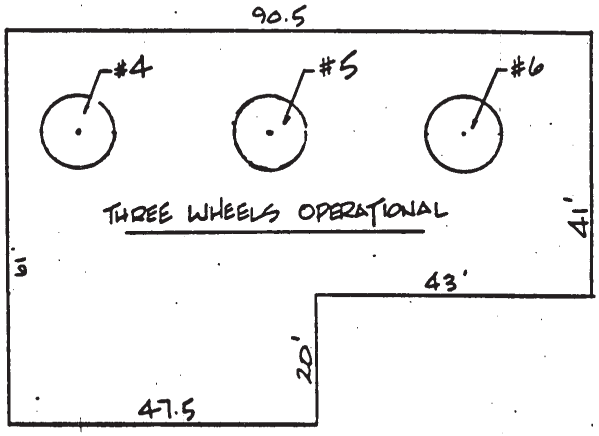
Raymond F. Desmarais R.L.S.

COMMONWEALTH OF MASSACHUSETTS
Raymond F. Desmarais #29996
REGISTERED LAND SURVEYOR

Desmarais

—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

SCALE 1" = 20' ——— DECEMBER 1983



LOCATION - SECTION 8 POWER HOUSE - BRIDGE ST.

DESCRIPTION - GENERAL ELECTRIC TURBINES #4-5-6

GENERATOR NUMBER - #4 - 1353168 #5 - 1353169 #6 - 1353170

(ALL 600V - 360 K.W.)

TURBINE DATA - #4-#5-#6 HERCULES TYPE "D" SINGLE RUNNER 42 INCHES

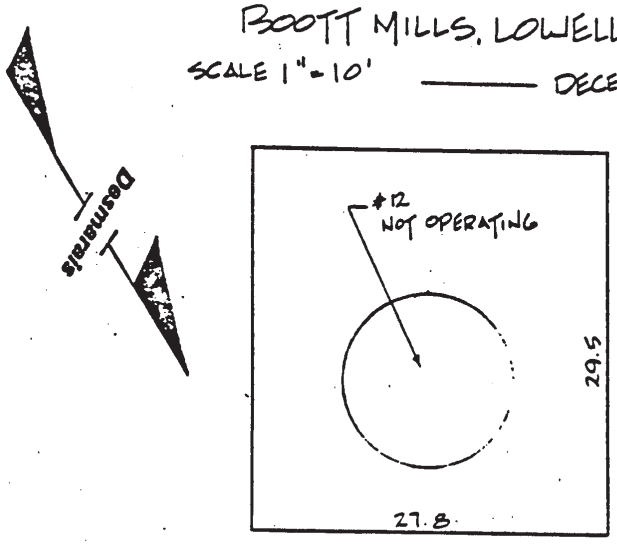
I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

COMMONWEALTH OF MASSACHUSETTS
Raymond F. Desmarais #29996
REGISTERED LAND SURVEYOR

Raymond F. Desmarais R.L.S.

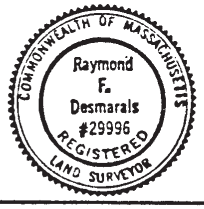
—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

SCALE 1"=10' —— DECEMBER 1983

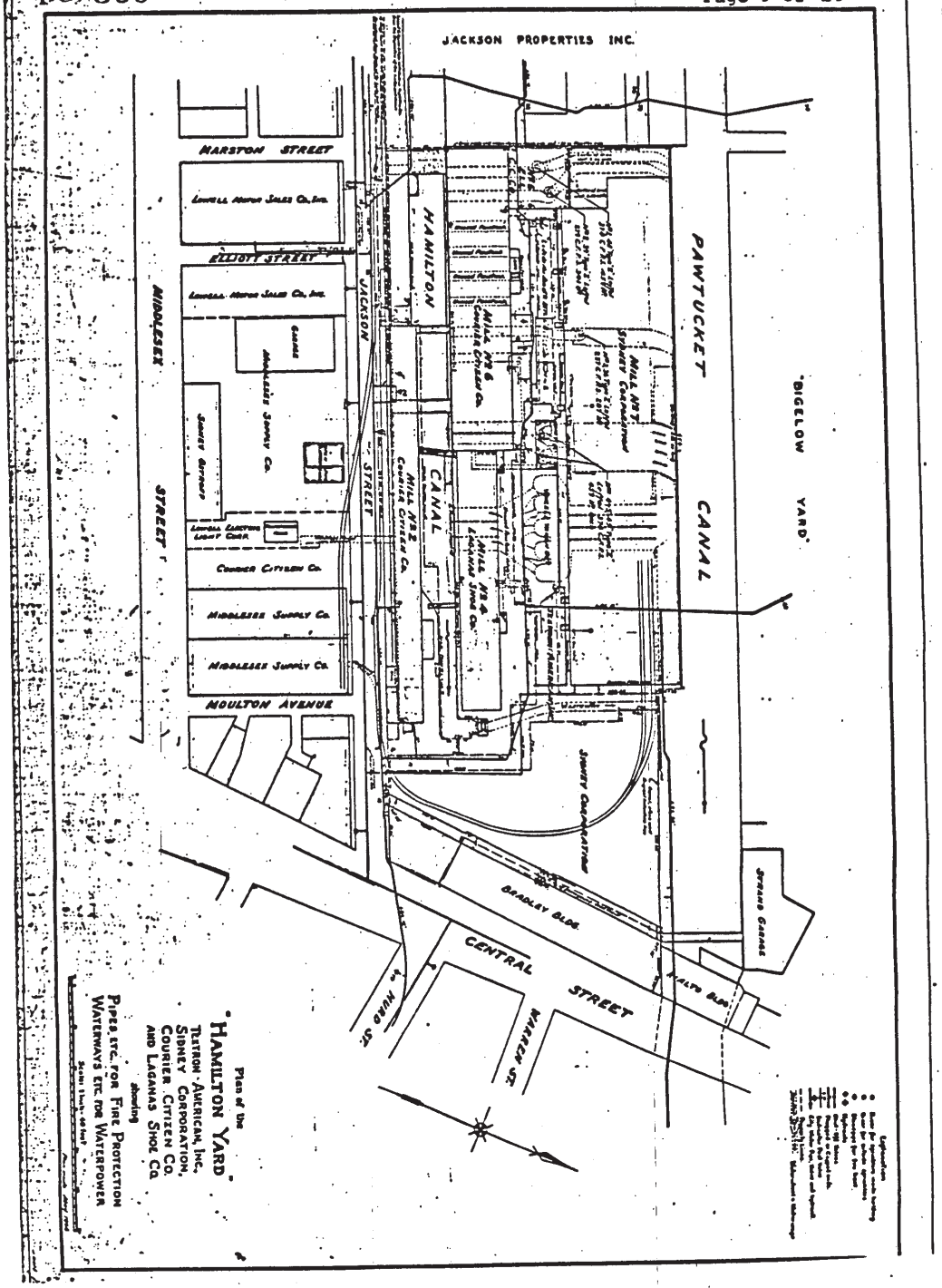


LOCATION - SECTION 4 - BRIDGE STREET
DESCRIPTION - GENERAL ELECTRIC - TURBINE #12
GENERATOR NUMBER - 2540290 - 600V
TURBINE DATA - MORGAN SMITH TYPE 'S' SINGLE RUNNER 46.5 IN.

I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

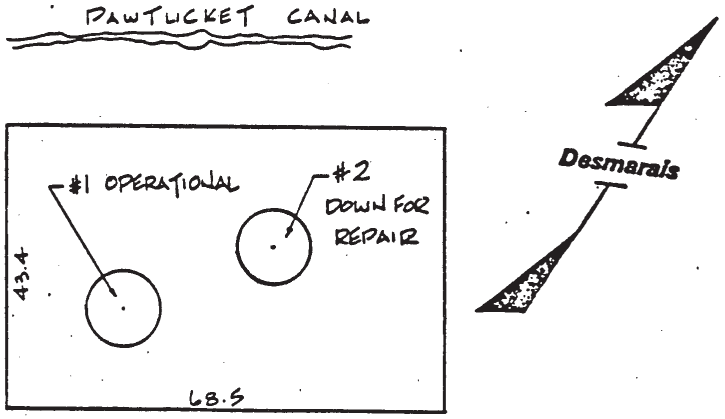


Raymond F. Desmarais R.L.S.


JACKSON PROPERTIES INC.
MARSTON STREET
ELLIOTT STREET
MIDDLESEX STREET
JACKSON STREET
HAMILTON CANAL
PAWTUCKET CANAL
"BIGELOW YARD"
MILL No 6 COURIER CITIZEN CO.
MILL No 7 SIDNEY CORPORATION
MILL No 2 COURIER CITIZEN CO.
MILL No 4 LAGANAS SHOE CO.
COURIER CITIZEN CO.
MIDDLESEX SUPPLY CO.
MIDDLESEX SUPPLY CO.
MOULTON AVENUE
SIDNEY CORPORATION
BRADLEY BLDG.
CENTRAL STREET
WARREN ST.
STRAND GARAGE
Plan of the
"HAMILTON YARD"
TEXTRON-AMERICAN, INC.
SIDNEY CORPORATION,
COURIER CITIZEN CO.
AND LAGANAS SHOE CO.
showing
PIPES, ETC. FOR FIRE PROTECTION
WATERWAYS ETC. FOR WATERPOWER

—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

SCALE 1"=20' ——— DECEMBER 1983



TURBINE DATA-#1&2 LEFFEL TYPE 2 SINGLE RUNNER #1-45IN #2-39IN.
LOCATION-HAMILTON STATION-JACKSON ST.
DESCRIPTION-#1 WESTINGHOUSE ELEC. MFG. CO!
ALTERNATING CURRENT GENERATOR.
DESCRIPTION-#2 ELECTRIC MACHINERY CO.
GENERATOR NUMBERS-#1-2603203 #2-503508

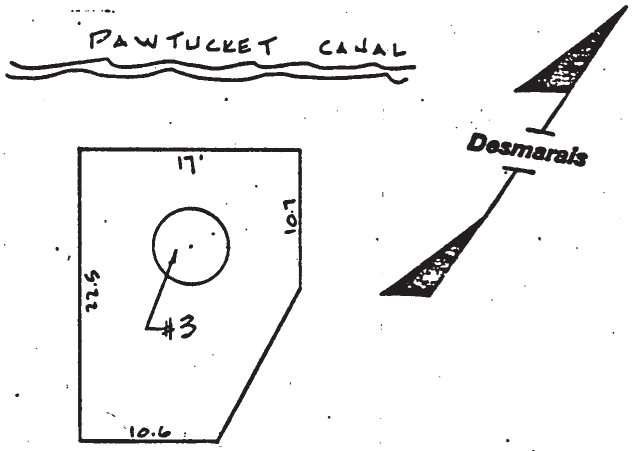
I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

COMMONWEALTH OF MASSACHUSETTS
Raymond F. Desmarais #29996
REGISTERED LAND SURVEYOR

Raymond F. Desmarais R.L.S.

—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

SCALE 1"=10' ——— DECEMBER 1983



LOCATION - HAMILTON STA. - JACKSON ST.
DESCRIPTION - ELECTRIC MACHINERY
GENERATOR NUMBER - 353484
TURBINE DATA - NO. 3 LEFFEL TYPE 2 SINGLE RUNNER 36 INCHES.

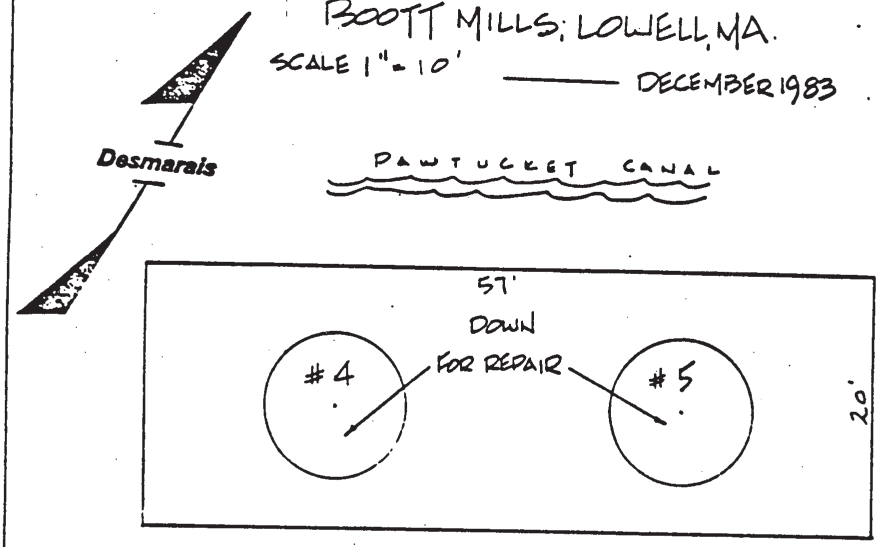
I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

COMMONWEALTH OF MASSACHUSETTS
Raymond F. Desmarais #29996
REGISTERED LAND SURVEYOR

Raymond F. Desmarais R.L.S.

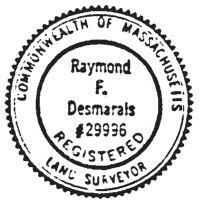
—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS; LOWELL, MA.

SCALE 1"=10' —— DECEMBER 1983



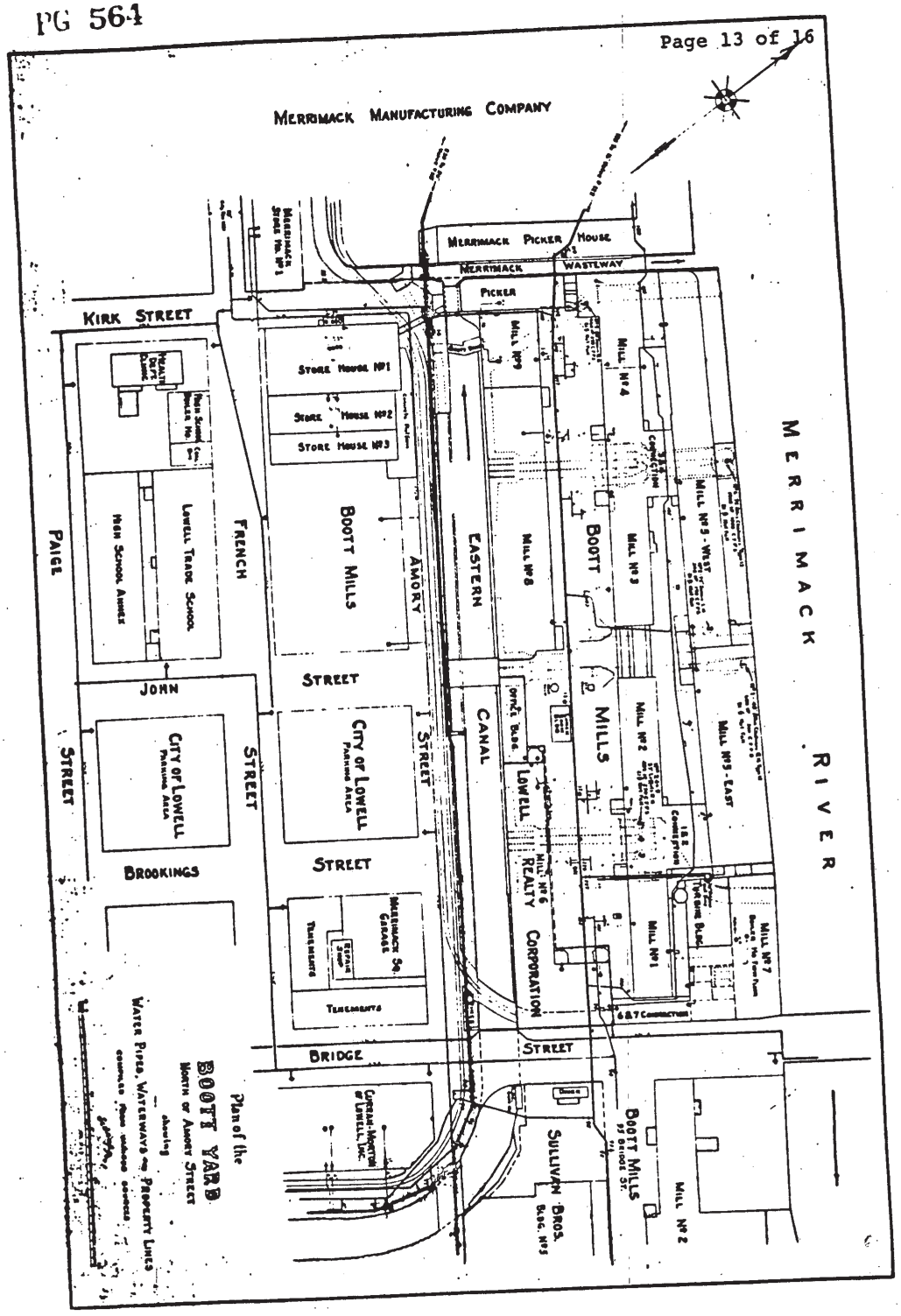
LOCATION - HAMILTON STATION: JACKSON ST.
DESCRIPTION - 2 - WESTINGHOUSE MFG. CO.
GENERATOR NUMBERS - #4 - 2603202 #5 - 2603201
TURBINE DATA - NO. 4 & 5 LEFFEL TYPE 2 SINGLE RUNNER 45 INCHES.

I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.



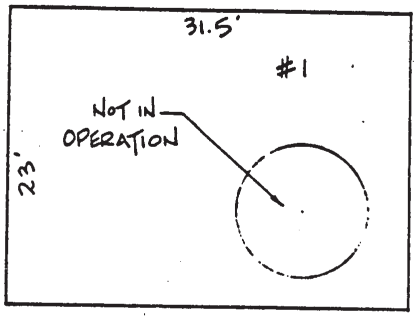
Raymond F. Desmarais R.L.S.

PG 564


MERRIMACK MANUFACTURING COMPANY
MERRIMACK PICKER HOUSE
MERRIMACK WASTEWAY
PICKER
KIRK STREET
STORE HOUSE No 1
STORE HOUSE No 2
STORE HOUSE No 3
MILL No 9
MILL No 4
MILL No 8
MILL No 3
MILL No 5 - WEST
MILL No 5 - EAST
MILL No 2
MILL No 1
MILL No 7
MILL No 6
BOOTT MILLS
BOOTT MILLS
EASTERN CANAL
AMORY STREET
FRENCH STREET
PAIGE STREET
JOHN STREET
BROOKINGS STREET
BRIDGE STREET
LOWELL REALTY CORPORATION
LOWELL TRADE SCHOOL
HIGH SCHOOL ANNEX
CITY OF LOWELL PARKING AREA
CITY OF LOWELL PARKING AREA
MERRIMACK SQ. GARAGE
TENEMENTS
TENEMENTS
CURRAN-MORTON OF LOWELL, INC.
SULLIVAN BROS. BLDG. No 5
BOOTT MILLS
MERRIMACK RIVER
Plan of the
BOOTT YARD
NORTH OF AMORY STREET
showing
WATER PIPES, WATERWAYS AND PROPERTY LINES

—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

SCALE 1" = 10' ——— DECEMBER 1983

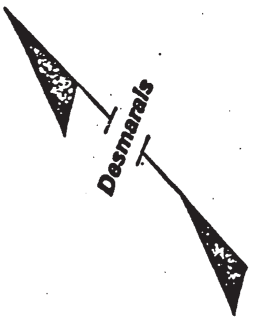


LOCATION — BUILDING 5- EAST — JOHN STREET.
DESCRIPTION — ALLIS-CHALMERS
WHITES HYDRALCONE REGAINER #1
GENERATOR NUMBER 108799 — 600V — 481 AMPS
TURBINE DATA - ALLIS CHALMERS SINGLE RUNNER 45 INCHES

I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

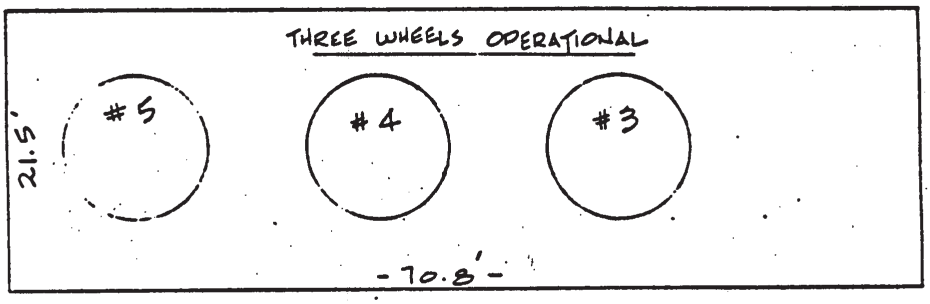
COMMONWEALTH OF MASSACHUSETTS
Raymond F. Desmarais #29996
REGISTERED LAND SURVEYOR

Raymond F. Desmarais R.L.S.



—DESCRIPTION—
—OF—
GENERATORS AND TURBINES
—LOCATED IN—
BOOTT MILLS, LOWELL, MA.

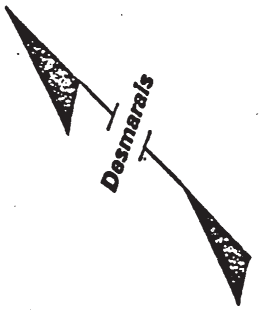
SCALE 1"=10' ——— DECEMBER 1983



LOCATION — MILL 1 & 2 CONNECTOR - JOHN STREET.
DESCRIPTION — G.E. - LEFFEL HYDRAULIC TURBINES
GENERATOR NUMBERS — #5 - 6637987 #4 - 6637986 #3 - 6637985
TURBINE DATA - LEFFEL SINGLE RUNNER 33 INCHES.

I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED APPROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

Raymond F. Desmarais R.L.S.



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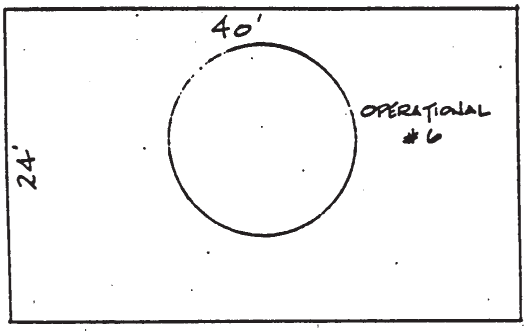
BOOTT MILLS, LOWELL, MA.

SCALE 1"=10' ——— DECEMBER 1983



LOCATION — BUILDING 5 - WEST END - JOHN STREET.

DESCRIPTION — ALLIS-CHALMERS HYDRAULIC TURBINE #6

GENERATOR NUMBER 113710 — 600V - 1445 AMPS.

TURBINE DATA - ALLIS CHALMERS SINGLE RUNNER 72 INCHES.

I CERTIFY THAT I HAVE EXAMINED THE PREMESIS AND THAT THE GENERATORS ARE LOCATED ADDROXIMATELY AS SHOWN WITHIN THE CONFINES OF THE ROOM AND BUILDING DESCRIBED ABOVE.

Raymond F. Desmarais R.L.S.

EXHIBIT B

Description of Transformers

Wagner Electric Company 2000 KVA, 13.8 KV Primary, 600 V Secondary, Three Phase, 60 Cycle Transformers:

(i) Serial No. YF 3229 located at Section 8 Power House, Bridge Street, and

(ii) Serial No. YF 3230 located at Market Street, Assets Division.

AFFIDAVIT

I, Richard G. Drury, on oath depose and say that while the premises described in the within instrument are not the same as described in or conveyed by prior recorded instruments identified sufficiently to locate the place of recording within the Registry, the within instrument does not create any new boundaries within the meaning of Mass. General Laws, Chapter 183, § 6A, since the premises being conveyed are bounded by known monuments consisting of canal walls, dams and river banks which have been established for over one hundred years.

Dated this 16th day of January 1984.

Richard G. Drury

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss. January 16, 1984

Then personally appeared the above-named Richard G. Drury and made oath that the foregoing statement subscribed by him is true, before me

James W. Flood Jr.

Notary Public James W. Flood Jr.

My commission expires: JAN. 3, 1986

Rec Jan 19 1984 10:17AM #1846

Appendix C -
1986 *Order of Taking*

77480

See Plan Book 157 Plan 69

Ins. B3830 P70 See B3888 P99 See B3888 P103

ORDER OF TAKING

The Commonwealth of Massachusetts (the "Commonwealth"), acting by and through its Commissioner of Environmental Management, of 100 Cambridge Street, Boston, Massachusetts 02202, by virtue of the authority conferred by Chapter 132A, Sections 3 and 3A of the General Laws, does hereby take in the varying interests described in the attached Schedule "I" for conservation and recreation purposes, in accordance with Chapter 132A, Sections 3 and 3A of the General Laws, the parcels of land located in Lowell, Middlesex County, Massachusetts, containing the areas and being described as set forth in the attached Schedule "II" and being commonly referred to as the land and water of Proprietors of the Locks and Canals on Merrimack River and other supposed owners hereinafter described ("Condemnees").

All of the aforesaid premises are shown and delineated on a plan entitled "Plan of Land of Lowell Canal System for the Department of Environmental Management of land located in Lowell, Massachusetts," surveyed by Atlantic Engineering and Survey Consultants of Lynn, Massachusetts variously dated from May 23, 1983 to August 13, 1983, Scale 1" = 40', and recorded herewith.

Together with the right, title and interest of Condemnees in and to those rights of way, access, wharves, docks,

1985 DEC 15 PM 2:36

shore and water rights, insofar as the same may be appurtenant to the canals and land hereby acquired, as stated on Schedule "I".

Said premises are acquired subject to the rights, privileges and easements as set forth in a deed of Boott Mills, et al to Boott Hydro dated January 16, 1984 and recorded with the Middlesex North Registry of Deeds at Book 2690, Page 542, except as expressly set forth herein.

Trees and structures, if any, upon the land are included in the taking.

Excepted from the rights herein taken by the Commonwealth are all easements for wires, pipes, conduits, poles and other appurtenances for the conveyance of water, sewage, gas, oil, electricity and telephone communication now lawfully in or upon the premises hereby taken.

For damages sustained by reasons of the aforesaid taking, and in accordance with the provisions of Chapter 79, Section 6 of the General Laws, as amended, awards have been made. The right is reserved to amend the award or to increase the amount of damages to be paid at any time prior to payment thereof for good cause shown.

SUPPOSED OWNERS

1. Proprietors of the Locks and Canals on Merrimack River.

2. Boott Hydropower, Inc.

3. Boott Mills

all with offices at Foot of John Street, Lowell, Middlesex County, Massachusetts, and

4. General Electric Credit Corporation

(all referred to herein as Condemnees), each as to their respective interests in any of the water, land or canals described in Schedule II.

All names of owners herein given, although supposed to be correct, are such only as to matters of opinion and belief.

IN WITNESS WHEREOF, the Commonwealth of Massachusetts has caused these presents to be executed in its name and behalf by James Gutensohn, its Commissioner of Environmental Management, hereunto duly authorized who does hereto set his hand this 1st of December, 1986.

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

By: _____
James Gutensohn, Commissioner

Commonwealth of Massachusetts
Suffolk County, ss: December 1, 1986

Then personally appeared before me the above James Gutensohn, Commissioner of the Department of Environmental Management, who acknowledged the foregoing as the free act and deed of the Department.

_____
John S. Lenkiewicz, Notary Public

My Commission Expires November 30, 1990

Approved:

John J. Bradshaw
ASSOCIATE DEPUTY COMMISSIONER

John I. Carlson, Deputy Commissioner
Division of Capital Planning &
Operations

Approved as to Form:

By: T. David Raftery
T. David Raftery, Chief
Eminent Domain Division
Assistant Attorney General

Approved:

Michael S. Dukakis
Governor of the Commonwealth

A

PG. 74

COMMONWEALTH OF MASSACHUSETTS

CITY OF LOWELL

In City Council:

VOTE

Authorizing the Department of Environmental Management to exercise the power of eminent domain to acquire certain parcels of Land in Lowell for addition to the Lowell Heritage State Park.

BE IT VOTED BY THE CITY COUNCIL OF THE CITY OF LOWELL, as follows:

In accordance with the provisions of Chapter 132A, Section 3A of the General Laws, the City of Lowell hereby approves exercise of the power of eminent domain by the Department of Environmental Management to acquire the parcels of land and varying interests in lands located in Lowell, Middlesex County, Massachusetts, containing the areas and being described as set forth in the attached Schedule I and being commonly referred to as the Land and Water of Proprietors of the Locks and Canals on Merrimack River and other supposed owners.

In City Council March 12, 1985 Read twice and adopted 9 yeas.

/s/ William F. Busby, City Clerk

Approved by B. Joseph Tully, City Manager on March 13, 1985.

A True Copy
Attest:

William F. Busby
City Clerk

CERTIFICATE OF VOTE PG 75

On a motion duly made and seconded, it was

VOTED: That the Board of Environmental Management, pursuant to Chapter 79 of the General Laws, approves the exercise of the power of eminent domain by the Department of Environmental Management for the below described property;

The parcels of land and varying interests in lands located in Lowell, Middlesex County, Massachusetts, containing the areas and being described as set forth in the attached Schedule I and being commonly referred to as the Land and Water of Proprietors of the Locks and Canals on Merrimack River and other supposed owners.

I, John Capone, Secretary of the Board of Environmental Management of the Commonwealth of Massachusetts, do hereby certify that the foregoing is a true copy of a vote adopted by the Board of Environmental Management at a meeting duly called and held on March 28, 1985, a quorum being present and voting; and that said vote has not been rescinded or amended.

Attest, a true copy

John Capone

John Capone, Secretary

Date: March 28, 1985

BK3880 PG 76

SCHEDULE I

PROPERTY IDENTIFICATION

Eastern Canal

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Massachusetts Wasteway Gatehouse	Near Bridge St.	199	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 80.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Boott Dam Gatehouse	Boott Mills	565	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 74.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in

Eastern Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Boott Dam Gatehouse (cont.)			perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Boott Dam	Boott Mills	830	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.

Eastern Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
CB-L/5721	Boott Penstock	2,511	Fee; reserving to Condemnees and their successors and assigns a permanent easement to flow water through the existing penstock located under said parcel together with the right to repair and replace said penstock and the right of access thereto.
Hamilton Canal			
Hamilton Gatehouse	Hamilton Wasteway	258	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 90.2 feet N.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
5345D	Near Jackson St.	8,637	Fee
5345C	Near Jackson St.	960	Fee
		3	

BK8830 PG 178

Hamilton Canal (cont.)

5345B	Near Jackson St.	368.5	Fee
5345A	Near Jackson St.	1,438	Fee

Merrimack River

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Blacksmith Shop	Off School St.	1,204	Fee, reserving, however, for the Condemnees, their successors and assigns the right and easement for access to and use of said Blacksmith Shop for the purpose of maintaining and operating the Pawtucket Dam for hydroelectric power production.
Pawtucket Gatehouse	School St.	2,400	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 101.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Pawtucket Gatehouse Wall & Lock Chamber	School St.	3,710	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures;

BK3830 PG 80

Merrimack River (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Pawtucket Gatehouse Wall & Lock Chamber (cont.)			(e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.
29; Lot 2	School St.	15,957	Fee

Merrimack River Properties

87	Front St.	57,587	Fee
92-B	Near VFW Hwy.	8,919	Fee
91-H	Aiken St. VFW Hwy.	53,971	Fee

Merrimack River Properties (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Front Street	VFW Hwy.	43,593	Fee
89	VFW Hwy.	5,334	Fee
88	VFW Hwy. Front St.	735	Fee
89-A	Aiken St. VFW Hwy.	75,939	Fee
96-B	Goodwill Industries	20,709	Fee
102	VFW Hwy.	32,800	Fee
103	VFW Hwy. Textile Ave.	91,476	Fee
107	VFW Hwy.	34,000	Fee
107-A	VFW Hwy.	5,550	Fee
99, 100 & 100A	School Street VFW Hwy.	1 acre	Fee
33-C-1	Aiken St.	38,369	Fee

BK3830 PG 82

Northern Canal

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Northern Canal Walkway	Near Moody St.	11,038	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.

Northern Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Northern Canal Waste Gatehouse	Northern Walkway	999	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 92.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
65-Y	Cabot St. Suffolk St.	5,528	Fee
29-B	School St.	95,832	Fee
30-A	Moody St. Pawtucket St.	4,950	Fee
CB-B	Moody St.	13,865	Fee
29-A	Falls St.	18,586	Fee

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Pawtucket Canal

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Swamp Locks Gatehouse		937	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 89.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Swamp Locks Dam (North)		875	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature;

Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Swamp Locks Dam (North) (cont.)			(g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.
Swamp Locks Dam (South)		840	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and

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Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Swamp Locks Dam (South) (cont.)			(i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.
Swamp Locks Chamber		11,685	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the

Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Swamp Locks Chamber (cont.)			use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.
CB-I	Junction of Hamilton & Pawtucket Canals	13,260	Fee, reserving, however, in the Condemnees, their successors and assigns the right and easement for access to such parcel for the purpose of maintaining a water supply system.
2B/2B-1/ 2D-1/2D-2	Thorndike St.	13,346	Fee, excepting those certain premises described in deed of Proprietors of Locks and Canals on Merrimack River to Joseph J. Flynn, Inc. dated February 8, 1961 and recorded at Book 1504, Page 447, Middlesex North Registry of Deeds.
CB-A/5	School St. Middlesex Pl.	39,000	Fee
CB-A/4	School St. Bridge	1,030	Fee
CB-A/3	School St.	22,500	Fee
CB-A/1	B&M Railroad	80	Fee
2B/2C-1/ 2C-2	Near Middlesex Pl.	4,011	Fee
17B	Kyan St.	3,728	Fee

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Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
7A	Broadway	16,319	Fee
Francis Gatehouse	Off Broadway	491	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 106.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Hydraulic Gatehouse	Off Broadway	1,377	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 88.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.

Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Locking Gatehouse	Off Broadway	1,100	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 99.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Guard Locks Lock Chambers		5,984	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature;

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Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Guard Locks Lock Chambers (cont.)			(g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.
8A, Lot 1	Broadway	19,848	Fee
8-B	Pawtucket St. Broadway	37,500	Fee
8-C	Off Broadway	5,660	Fee
13-B	Broadway Madonna Circle	26,200	Fee

Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Lower Locks Lock Chambers		9,127	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.

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Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Lower Locks Gate House		838	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 74.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
CB-H		11,100	Fee
9	Near Pawtucket St.	52	Fee
Lower Locks Dam		3,680	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences;

Pawtucket Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
			(f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.

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SCHEDULE I (cont'd)

Western Canal

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Tremont Gatehouse	Off Suffolk St.	382	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 90.2 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
5610 & 5362	Off Suffolk St.	894	Fee; reserving to Condemnees and their successors and assigns a permanent easement to flow water through the portions of the Western Canal located on said parcel together with the right to repair and replace such portions of the Western Canal and the right of access thereto.
CB-E, Lot C	Perkins St. Suffolk St.	5,844	Fee
CB-D, Lot J	Moody St.	282	Fee
CB-C, Lot I	Moody St. French St. Ext.	805	Fee
CB-D, Lot H	Moody St. Merrimack St.	1,167	Fee Fee

Western Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
CB-C, Lot G	Merrimack St. Moody St.	3,400	Fee Fee
CB-D, Lot F	Merrimack St. Hanover St. Market St.	2,310	Fee Fee Fee
CB-C, Lot E	Merrimack St. Market St. Suffolk St.	3,115	Fee Fee Fee
CB-D, Lot D	Market St. Lewis St. Jefferson St.	8,635	Fee Fee Fee
CB-D, Lot B	Jefferson St. Lewis St. Broadway	6,450	Fee Fee Fee
CB-C, Lot C	Suffolk St. Jefferson St. Market St.	10,905	Fee Fee Fee
CB-C, Lot A	Suffolk St. Broadway Jefferson St.	7,597	Fee Fee Fee
CB-E, Lot A	Suffolk St.	4,938	Fee
CB-D, Lot N	Off Worthen St.	3,000	Fee

BK3830 PG 96

BK3830 PG 97

Western Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
24	Hayden St.	2,839	Fee
	Worthern St.		Fee
	Dutton St.		Fee

Merrimack Canal

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Rolling Dam Gate House North	Merrimack Wasteway	269	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 83.7 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.
Rolling Dam Gate House South	Merrimack Wasteway	248	Buildings, structures and fixtures (exclusive of fixtures and equipment used in the ongoing maintenance and operation of hydroelectric power generation) above elevation 83.7 feet M.S.L. in fee and a permanent easement in the canal walls and beds or bottoms for support of said buildings, structures and fixtures and exclusive access to such buildings, structures and fixtures except as to the Condemnees and their successors and assigns who shall retain such right of access to such buildings, structures and fixtures as shall be necessary in perpetuity for the maintenance and operation of the gates and canals for hydroelectric power production.

BK3830 PG 98

Merrimack Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
YMCA Gates		300	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.

Merrimack Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
Rolling Dam		630	Permanent and exclusive easement for the following purposes: (a) support of all fixtures or structures of the Commonwealth now or hereafter attached; (b) preservation and conservation; (c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns; (d) landscaping and erection of exhibits and structures; (e) placement of barriers and fences; (f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature; (g) placement of lighting and other utilities; (h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and (i) any and all other uses consistent with the operation of the Canal system as a park; provided, however, that such easement shall not include any use that would interfere with the use, maintenance or operation by the Condemnees and their successors and assigns of said parcel and the canal for hydroelectric power production.

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Merrimack Canal (cont.)

Parcel Name/Number	Location	Land Area Sq. Ft.	Interest Acquired
CB-G	Merrimack & Lower Pawtucket Canals	25,209	Fee

IN ADDITION TO THE ABOVE PARCELS, the Commonwealth hereby acquires:

A. A permanent and exclusive easement in all canal walls and beds or bottoms and in all dams and boat lock chambers located in said canals and not otherwise referred to in this Schedule I, for the following purposes:

(a) support of all fixtures or structures of the Commonwealth now or hereafter attached;

(b) preservation and conservation;

(c) supplemental maintenance in addition to that performed by the Condemnees and their successors and assigns;

(d) landscaping and erection of exhibits and structures;

(e) placement of barriers and fences;

(f) placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature;

(g) placement of lighting and other utilities;

(h) operation and maintenance of boat locking chambers, if any, for any and all purposes; and

(i) any and all other uses consistent with the operation of the canal system as a park.

B. All air rights over the canals, including the canal walls and any dams thereon, to the extent not already lawfully obstructed or occupied, for so long as such lawful obstruction or occupation continues uninterrupted in its present form.

C. The exclusive right to use the water in the entire canal system and the Merrimack River for recreational, educational and navigational purposes, which use shall be nonconsumptive with respect to hydroelectric power generation except for reasonable amounts to operate locking gates.

ALL OF THE TITLE, RIGHTS AND INTEREST DESCRIBED IN SCHEDULES I AND II ARE TAKEN BY THE COMMONWEALTH SUBJECT TO THE FOLLOWING LIMITATIONS AND RESERVATIONS:

A. Such title, rights and interest will be used solely for public park purposes and shall not be used by the Commonwealth or its successors or assigns for any commercial or nonpublic purpose.

B. Condemnees and their successors and assigns retain the right of access to all parcels, buildings and structures to the extent necessary for the maintenance and operation of hydroelectric power production facilities.

C. There shall be reserved in the Condemnees, their successors and assigns an easement for wires, pipes, conduits, valves, pumps, poles and other equipment presently existing or hereafter to be installed for the operation, maintenance and extension of steam, fire protection, water supply systems, electricity, sewage, gas, oil, and telephone communication, provided that all such wires, pipes, conduits, valves, pumps, poles and other equipment to be installed in the future shall not be inconsistent with the Commonwealth's use and operation of the canal system as a public park, and provided further that all such wires, pipes, conduits, valves and pumps to be installed in the future relating to electricity, sewage, gas, oil, and telephone communication shall be installed below the surface of the land or water.

LEGAL DESCRIPTIONS FOR PARCELS SURVEYED

UNDER

D.E.M. CONTRACT NO. 97-82

LOWELL HERITAGE STATE PARK

1983

INDEX TO PLANS AND LEGAL DESCRIPTION

FOR

PARCELS SURVEYED UNDER D.E.M. CONTRACT 97-82

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ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 9

Beginning at a point on the northwesterly line of Pawtucket Street, said point being at the south edge of the southerly granite wall of the Pawtucket Canal; thence along the line of land now or formerly of Lowell Motor Boat Club Inc.

S 72° -24' -48" E, a distance of fifty-nine and 13/100 feet (59.13) to the Merrimack River; thence by said river

N 75° -39' -15" E, a distance of three and 34/100 feet (3.34) to a point at the northerly end of the southerly granite wall of the Pawtucket Canal, said point being on the south edge of said wall; thence along the back edge of said wall

N 70° -37' -02" W, a distance of fifty-six and 32/100 feet (56.32) to the point of beginning.

Containing fifty-two (52) square feet of land, more or less.

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66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 13B

Beginning at an iron pin set at the northwesterly corner of Broadway and Madonna Circle; thence along the northerly line of Broadway

S 82° -56' -05" W, a distance of about seventy feet (70) to a point at the back edge of the easterly granite wall of the Pawtucket Canal; thence along the back edge of said canal wall

NORTHERLY, more or less, a distance of about one hundred sixty-three feet (163) to an angle in said wall; thence along the back edge of a granite wall appurtenant to the Pawtucket Canal as follows:

SOUTHEASTERLY, more or less, a distance of about twenty-six feet (26),

NORTHEASTERLY, more or less, a distance of about three feet (3), and

NORTHWESTERLY, and WESTERLY, more or less, a distance of about ninety-four feet (94) to a point on said wall at Parcel 8-C; thence along the easterly line of Parcel 8-C

NORTHERLY, more or less, a distance of about thirteen feet (13) to the southerly face of the Hydraulic Gatehouse; thence by the face of said gatehouse

N 69° -11' -23" E, a distance of about sixty-seven feet (67) to the southeasterly corner thereof, and

N 20° -48' -37" W, a distance of nineteen and 39/100 feet (19.39) to the northeast corner of said gatehouse; thence along the edge of the easterly granite wall of the Pawtucket Canal as follows:
NORTHERLY, more or less, a distance of about ninety-six feet (96),
WESTERLY, more or less, a distance of about three feet (3), and

SOUTHERLY, more or less, a distance of about thirty-eight feet (38) to a point on the easterly shoreline of aforesaid Pawtucket Canal; thence along said easterly shoreline

NORTHWESTERLY, more or less, a distance of about one thousand four hundred and sixty-four feet (1,464) to a point at the back edge of the easterly granite wall of said Pawtucket Canal; thence along said canal wall

NORTHWESTERLY, more or less, a distance of about twenty-six feet (26) to a point on the southerly line of Pawtucket Street; thence along said line of Pawtucket Street

N 50° -30' -01" E, a distance of about twenty-four feet (24) to an iron pin set at land now or formerly of the City of Lowell; thence along the westerly line of land of said City of Lowell as follows:

S 42° -57' -18" E, a distance of eighteen and 50/100 feet (18.50) to an iron pin set,

S 52° -22' -18" E, a distance of forty-five and 33/100 feet (45.33) to a drill hole set,

S 51° -03' -18" E, a distance of twenty-six and 92/100 feet (26.92) to an iron pin set,

S 45° -57' -08" E, a distance of ninety-nine and 63/100 feet (99.63) to an iron pin set,

S 27° -45' -08" E, a distance of nine and 13/100 feet (9.13) to a point,

S 23° -43' -08" E, a distance of one hundred sixty-six and 68/100 feet (166.68) to a drill hole set,

S 20° -16' -08" E, a distance of eighteen and 32/100 feet (18.32) to a drill hole set,

S 06° -36' -38" E, a distance of one hundred eight and 50/100 feet (108.50 to an iron pin set,

S 11° -40' -38" E, a distance of two hundred thirty-six and 01/100 feet (236.01) to an iron pin set,

S 17° -29' -58" E, a distance of thirty-six and 11/100 feet (36.11) to an iron pin set,

S 22° -11' -38" E, a distance of thirty-six and 39/100 feet (36.39) to an iron pin set,

S 30° -12' -38" E, a distance of one hundred thirty-one and 48/100 feet (131.48) to a drill hole in a stone bound found,

S 30° -12' -38" E, a distance of one hundred and 00/100 feet (100.00) to a drill hole in a stone bound found,

S 30° -12' -37" E, a distance of fifty-three and 52/100 feet (53.52) to a drill hole in a stone bound found,

SOUTHEASTERLY, more or less, by a curve to the left having a radius of two hundred twelve and 80/100 feet (212.80), an arc length of thirty-nine and 25/100 feet (39.25) to a drill hole in a stone bound found, and

S 40° -46' -41" E, a distance of sixty and 26/100 feet (60.26) to a point at land now or formerly of Thomas Riley; thence along the southwesterly line of Riley as follows:

S 40° -46' -41" E, a distance of ninety-one and 60/100 feet (91.60) to a drill hole in a stone bound found,

S 51° -27' -21" E, a distance of ninety-three and 41/100 feet (93.41) to a point, and

S 55° -19' -01" E, a distance of one hundred eight and 23/100 feet (108.23) to a P.K. nail set at Madonna Circle; thence along the westerly line of Madonna Circle

S 11° -00' -40" E, a distance of two hundred fifty-three and 76/100 feet (253.76) to the point of beginning.

PG 112
Parcel: 13B (con't)

Containing twenty-six thousand and two hundred (26,200) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 8-B

Beginning at a point at the southwesterly corner of the parcel on the northerly line of Broadway, said point being N 82°-56'-05" E, a distance of fifty-two and 74/100 feet (52.74) of a stone bound found on the northerly line of Broadway; thence by land now or formerly of the Proprietors of Locks and Canals by five (5) courses as follows:

N 03°-54'-52" W, a distance of fifty-one and 47/100 feet (51.47) to a point,

N 27°-06'-12" W, a distance of eighty-eight and 85/100 feet (88.85) to a point,

N 28°-42'-32" W, a distance of one hundred eighty and 03/100 feet (180.03) to a point,

N 30°-21'-02" W, a distance of ninety-eight and 70/100 feet (98.70) to a point, and

N 40°-51'-32" W, a distance of sixty three and 10/100 feet (63.10) to a point; thence by land now or formerly of the Commonwealth of Massachusetts by four courses as follows:

N 39°-26'-01" W, a distance of eleven and 26/100 feet (11.26) to a point,

N 41°-26'-13" W, a distance of sixty-five and 21/100 feet (65.21) to a point,

N 40°-55'-22" W, a distance of twenty-eight and 28/100 feet (28.28) to a point, and

N 38°-57'-44" W, a distance of six and 35/100 feet (6.35) to a point; thence continuing by land now or formerly of the Commonwealth of Massachusetts by (19) courses as follows:

N 40°-51'-40" W, a distance of fifty-nine and 18/100 feet (59.18) to a point,

N 37°-55'-55" W, a distance of thirty-one and 65/100 feet (31.65) to a point,

N 29°-43'-39" W, a distance of forty-seven and 04/100 feet (47.04) to a point,

N 25°-59'-51" W, a distance of eighteen and 34/100 feet (18.34) to a point,

N 26°-07'-46" W, a distance of one hundred forty-seven and 13/100 feet (147.13) to a point,

PARCEL 8-B (cont'd)

N 57°-28'-20" W, a distance of zero and 73/100 feet (0.73) to a point,

N 22°-42'-54" W, a distance of forty-eight and 48/100 feet (48.48) to a point,

N 21°-32'-50" W, a distance of twenty and 27/100 feet (20.27) to a point,

N 14°-11'-07" W, a distance of one hundred forty-one and 00/100 feet (141.00) to a point,

N 04°-08'-34" E, a distance of sixty and 21/100 feet (60.21) to a point,

N 10°-37'-49" W, a distance of sixty-six and 11/100 feet (66.11) to a point,

N 10°-13'-54" W, a distance of forty-two and 29/100 feet (42.29) to a point,

N 19°-09'-50" W, a distance of seventeen and 85/100 feet (17.85) to a point,

N 19°-17'-12" W, a distance of fifty-nine and 17/100 feet (59.17) to a point,

N 24°-17'-55" W, a distance of forty-three and 27/100 feet (43.27) to a point,

N 29°-51'-29" W, a distance of forty-five and 82/100 feet (45.82) to a point,

N 33°-34'-42" W, a distance of thirty-six and 78/100 feet (36.78) to a point,

N 40°-05'-46" W, a distance of eighty and 63/100 feet (80.63) to a point, and

N 40°-40'-59" W, a distance of fifty-eight and 49/100 feet (58.49) to a drill hole with lead plug and brass pin found at the intersection with the southerly line of Pawtucket Street; thence

N 50°-30'-01" E, along the southerly line of Pawtucket Street, a distance of about six feet (6) to the westerly face of a granite wall on the westerly side of the Pawtucket Canal; thence

SOUTHERLY, more or less, along the westerly face of the aforementioned wall a distance of about fourty-five feet (45) to the end of the wall; thence continuing

SOUTHERLY, more or less, along the westerly bank of the Pawtucket Canal a distance of one thousand two hundred and eighty-one feet (1281) to a granite wall; thence continuing

SOUTHERLY, more or less, along the westerly face of said granite wall a distance of about eighty-one feet (81) to a drill hole set along the westerly face of the granite wall at the top of a set of concrete steps; thence

S 27°-16'-45" E, along the westerly face of the aforementioned granite wall, a distance of forty and 79/100 feet (40.79) to the northerly

face of a building known as the Locking Gate House; thence

S 62°-43'-24" W, along the northerly face of the aforementioned building a distance of seven and 80/100 feet (7.80) to a building corner; thence

S 27°-16'-45" E, along the westerly face of the aforementioned building a distance of sixteen and 06/100 feet (16.06) to a building corner; thence

N 62°-43'-24" E, along the southerly face of the aforementioned building a distance of about six feet (6) to the westerly face of a granite wall on the westerly side of the Pawtucket Canal; thence

SOUTHERLY, more or less, along the aforementioned wall a distance of about fifty-five-feet (55) to the northwesterly corner of a building known as the Francis Gate House; thence

S 27°-26'-58" E, along the westerly face of the Francis Gate House a distance of thirteen and 41/100 feet (13.41) to the southwesterly corner of the Francis Gate House; thence by the westerly face of a granite wall on the westerly side of the Pawtucket Canal by five (5) courses as follows:

SOUTHERLY, about twelve feet (12),

WESTERLY, about thirteen feet (13),

SOUTHERLY, about three feet (3),

EASTERLY, about sixteen feet (16), and

SOUTHERLY, about six and 4/10 feet (6.4) to an iron pin set at the westerly face of said wall; thence continuing

SOUTHERLY, more or less, along the westerly face of the aforementioned wall about fifty-one feet (51) to an angle point in the wall; thence continuing

SOUTHERLY, more or less, along said wall a distance of about twenty-five feet (25) to an iron pin set at the westerly face of said wall, said iron pin being seventy-five and 37/100 feet (75.37) on a bearing of S 21°-00'-01" E, from the last mentioned iron pin; thence

SOUTHWESTERLY, more or less, along the westerly face of the aforementioned granite wall a distance of about twenty-eight feet (28) to the northerly line of Broadway; thence

S 82°-56'-05" W, along Broadway a distance of about twenty-two feet (22) to the point of beginning.

Containing thirty-seven thousand five hundred square feet (37,500) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: Hydraulic Gatehouse - Guard Locks

Beginning at the southeasterly corner of the Hydraulic Gatehouse, said corner being twenty and 43/100 feet (20.43) distant from the westerly line of Madonna Circle; thence along the southerly wall of the gatehouse by Parcel 13-B and Parcel 8-C

S 69° -11' -23" W, a distance of seventy-one and 00/100 feet (71.00) to the southwest corner thereof; thence along the westerly wall of the gatehouse by Parcel 8-C

N 20° -48' -37" W, a distance of nineteen and 39/100 feet (19.39) to the northwest corner thereof; thence along the northerly wall of the gatehouse by Parcel 8-C and crossing the Pawtucket Canal

N 69° -11' -23" E, a distance of seventy-one and 00/100 feet (71.00) to the northeast corner thereof; thence along the easterly wall of the gatehouse

S 20° -48' -37" E, a distance of nineteen and 39/100 feet (19.39) to the point of beginning.

Containing one thousand three hundred and seventy-seven (1,377) square feet of land, more or less.

GEOTECHNICAL ENGINEERING AND SURVEY CONSULTANTS
56 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 8-C

Beginning at an iron pin set at the most northerly corner of the parcel, said pin being set at the back edge of the granite wall of the Pawtucket Canal; thence running along the exposed back edge of said granite wall

S 70°-45'-09" E, a distance of fifty-one and 24/100 feet (51.24) to an iron pin set; thence continuing along the exposed back edge of said wall by three (3) courses as follows:

SOUTHEASTERLY, more or less, a distance of about thirty-seven feet (37) to a chisel-cut set in the wall, said chisel-cut bearing S 45°-23'-13" E, and being thirty-four and 88/100 feet (34.88) distant from the last point described,

SOUTHWESTERLY, more or less, a distance of about three feet (3), and

SOUTHERLY, more or less, a distance of about four feet to the most westerly corner of the Hydraulic Gate House, said corner bearing S 07°-38'-47" W, and being five and 59/100 feet distant from the last mentioned chisel-cut; thence along the southwesterly face of the Hydraulic Gate House

S 20°-48'-37" E, a distance of nineteen and 39/100 feet (19.39) to the most southerly corner of said Gate House; thence running along the southerly face of the Hydraulic Gate House

N 69°-11'-23" E, a distance of four feet, more or less, to a point; thence running perpendicular to the last mentioned course

SOUTHERLY, more or less, a distance of about thirteen feet (13) to a point on the westerly edge of a stone wall; thence running along the edge of said wall as follows:

SOUTHWESTERLY, more or less, a distance of about twenty-two feet (22) to a point,

SOUTHEASTERLY, more or less, a distance of about three feet (3) to a point,

NORTHEASTERLY, more or less, a distance of about eighteen feet (18) to a point, and

SOUTHERLY, more or less, a distance of about forty-one feet to a drill hole set at the back of exposed edge of said wall, said drill hole bearing S 13°-10'- 24" E, and being fifty-eight and 36/100 feet (58.36) distant from the aforementioned southwesterly corner of the Hydraulic Gate House; thence continuing along the back edge of the exposed wall as follows:

S 19°-32'-24" W, a distance of twenty-three and 95/100 feet (23.95) to an iron pin set,

PG 118

S 88°-10'-35" W, a distance of eleven and 14/100 feet (11.14) to an iron pin set,

N 29°-55'-13" W, a distance of thirteen and 01/100 feet (13.01) to an iron pin set,

N 35°-19'-04" W, a distance of twelve and 82/100 feet (12.82) to an iron pin set, and

N 11°-33'-48" W, a distance of eighteen and 18/100 feet (18.18) to a drill hole set; thence continuing along the edge of exposed wall:

NORTHEASTERLY, more or less, a distance of about fourteen feet to a point,

NORTHWESTERLY, more or less, a distance of about three feet (3) to a point,

SOUTHWESTERLY, more or less, a distance of about fourteen feet (14) to a point,

NORTHWESTERLY, more or less, a distance of about twelve feet to the southeasterly corner of the Francis Gate House, said corner bearing N 36°-56'-54" W, and being fifteen and 26/100 feet (15.26) distant from the last mentioned drill hole; thence running along the northeasterly face of the Francis Gate House

N 27°-26'-58" W, a distance of thirteen and 41/100 feet (13.41) to the northeasterly corner thereof; thence running along the back of the exposed granite wall

N 17°-56'-25" W, a distance of nine and 09/100 feet (9.09) to a drill hole set in the bottom step of some granite steps; thence continuing along the back edge of the wall

NORTHWESTERLY, more or less, a distance of about thirty-two feet (32) to a point on the southerly wall of the Locking Gate House; thence running along the face of the north end of the Gate House as follows:

N 62°-43'-24" E, a distance of about seven feet (7) to the northeasterly corner of the Gate House,

N 27°-16'-45" W, a distance of sixteen and 06/100 feet (16.06) to the northerly corner of the Gate House,

S 62°-43'-24" W, a distance of about eight and 7/10 feet (8.7) to a point on the northerly face of the Locking Gate House, said point being at the back of the exposed granite wall as hereinbefore mentioned; thence running along the back of said wall

NORTHWESTERLY, more or less, a distance of about zero and 7/10 feet (0.7) to a drill hole set, said drill hole bearing S 66°-57'-39" W, and being eight and 71/100 feet (8.71) distant from the aforementioned northerly corner of the Locking Gate House; thence continuing along the back edge of said wall

N 22°-50'-38" W, a distance of thirty-two and 98/100 feet (32.98) to the point of beginning.

PARCEL B-C (cont'd)

Containing five thousand six hundred and sixty square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: FRANCIS GATE HOUSE

Beginning at the most northwesterly corner of the Francis Gate House, said corner being nineteen and 34/100 feet (19.34) distant from the northeasterly line of Parcel 8-A, Lot 1, and being on the easterly line of Parcel 8B; thence

N 62°-17'-23" E, along the northerly face of the Francis Gate House and across the lock chamber, a distance of thirty-six and 60/100 feet (36.60) to the most northerly corner thereof; thence running along the easterly building face

S 27°-26'-58" E, a distance of thirteen and 41/100 feet (13.41) to the southeasterly corner of said Francis Gate House; thence running along the southerly building face, and again crossing the lock chamber

S 62°-17'-23" W, a distance of thirty-six and 60/100 feet (36.60) to the southeast building corner; thence running along the westerly building face, being the easterly line of Parcel 8B,

N 27°-26'-58" W, a distance of thirteen and 41/100 feet (13.41) to the point of beginning.

Containing four hundred and ninety-one (491) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: LOCKING GATE HOUSE

Beginning at the most southwesterly corner of the Locking Gate House, said point being twelve and 64/100 feet (12.64) distant from the easterly line of Parcel 8A, Lot 1 and being on the easterly line of Parcel 8B; thence

N 27°-16'-45" W, along Parcel 8B, a distance of sixteen and 06/100 feet (16.06) to a building corner; thence

N 62°-43'-24" E, along the northerly face of the building, crossing over the lock chamber and by part of parcel 8-C to the most northeasterly building corner a distance of fifty-one and 29/100 feet (51.29); thence

S 27°-16'-45" E, along the most easterly face of said building a distance of sixteen and 06/100 feet (16.06) to a corner; thence

S 62°-43'-24" W, along the face of said building a distance of seven and 89/100 feet (7.89) to a corner; thence

S 27°-16'-45" E, along the face of said building a distance of eight and 00/100 feet (8.00) to the most southeasterly corner of said building; thence

S 62°-43'-24" W, along the most southerly face of said building a distance of thirty-five and 40/100 feet (35.40) to a corner; thence

N 27°-16'-45" W, along the face of said building a distance of eight and 00/100 feet (8.00) to a corner; thence

S 62°-43'-24" W, along the face of said building a distance of eight and 00/100 feet (8.00) to the point of beginning.

Containing one thousand one hundred (1,100) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 8-A ; LOT 1

Beginning at a stone bound found at the southwesterly corner of the parcel, said point being located at an angle on the northerly line of Broadway; thence

N 21°-35'-30" W, by land now or formerly of the Commonwealth of Massachusetts, one hundred ninety and 48/100 feet (190.48) to a concrete bound found; thence

N 21°-35'-30" W, by land now or formerly of Endevor Incorporated two hundred sixty-nine and 52/100 feet (269.52) to a point; thence by land now or formerly of the Proprietors of Locks and Canals by five (5) courses as follows:

S 40°- 51'- 32" E, a distance of sixty-three and 10/100 feet (63.10) to a point,

S 30°-21'-02" E, a distance of ninety-eight and 70/100 feet (98.70) to a point,

S 28°-42'-32" E, a distance of one hundred eighty and 03/100 feet (180.03) to a point,

S 27°-06'-12" E, a distance of eighty-eight and 85/100 feet (88.85) to a point, and

S 03°-54'-52" E, a distance of fifty-one and 47/100 feet (51.47) to a point on the northerly line of Broadway; thence

S 82°-56'-05" W, by said northerly line of Broadway, fifty-two and 74/100 feet (52.74) to the point of beginning.

Containing nineteen thousand eight hundred and forty-eight (19,848) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 7A

Beginning at an iron pin set at the northwesterly corner of the Parcel; said pin being a point on the southerly line of Broadway, said point bearing N 82° -56' -05" E and being sixteen and 85/100 feet (16.85) distant from an angle in said line; thence along said southerly line of Broadway

N 82° -56' -05" E, a distance of thirty-one and 29/100 feet (31.29) to a point at the back edge of the concrete wall of the Pawtucket Canal; thence running along the back edge of said wall as follows:

S 18° -33' -43" W, a distance of one hundred three and 20/100 feet (103.20 to an iron pin set at an angle in the wall,

S 08° -06' -33" W, a distance of sixty-five and 99/100 feet (65.99) to an iron pin set at an angle in the wall, and

S 05° -50' -20" E, a distance of one hundred ninety-two and 18/100 feet (192.18) to an iron pin set at an angle in the wall; thence continuing along the back edge of the concrete and then granite wall of the Pawtucket Canal as follows:

S 15° -12' -18" E, a distance of two hundred thirty-one and 72/100 feet (231.72) to an x-cut set at an angle in the wall, and

S 31° -44' -31" E, a distance of seventeen and 94/100 feet (17.94) to a point on the northerly line of location of the Boston and Maine Railroad; thence running along said railroad location line as follows:

N 84° -50' -16" W, a distance of fourteen and 34/100 feet (14.34) to a drill hole set at an angle in said location line, and

S 82° -00' -51" W, a distance of sixteen and 74/100 feet (16.74) to an iron pin set at the easterly line of land now or formerly of the City of Lowell; thence running along said land of the City of Lowell

N 15° -14' -25" W, a distance of two hundred sixty-four and 45/100 feet (264.45) to an iron pin found at the southerly corner of land now or formerly of the Commonwealth of Massachusetts; thence running along said land of the Commonwealth of Massachusetts by three (3) courses as follows:

N 05° -40' -50" W, a distance of one hundred seventy-eight and 07/100 feet (178.07) to an iron pin found,

N 08° -20' -10" E, a distance of seventy-two and 30/100 feet (72.30) to an iron pin set, and

N 18° -27' -01" E, a distance of ninety-one and 21/100 feet (91.21) to the point of beginning.

Containing sixteen thousand three hundred and nineteen square feet (16,319) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 124

PROPOSED DESCRIPTION OF LAND

PARCEL: 17B

Beginning at an iron pin set at the most northerly corner of the parcel, said iron pin being a point on the southerly line of location of the Boston and Maine Railroad and bearing S 86° -04' -09" W, and being one hundred ten and 51/100 feet (110.51) distant from a drill hole in a stone bound found at an angle in said railroad location line; thence running along the southerly line of land now or formerly of the Transit Construction Company of Lowell by two (2) courses as follows:

S 58° -42' -31" E, a distance of one hundred thirty-three and 95/100 feet (133.95) to a point of curvature,

SOUTHEASTERLY, more or less, by a curve to the left having a radius of three hundred twenty-eight and 45/100 feet (328.45), an arc length of sixty-seven and 42/100 feet (67.42) to an iron pin set on the most westerly end of Kyan Street; thence running along Kyan Street

S 06° -15' -39" W, a distance of seventeen and 54/100 feet (17.54) to a point at the back edge of the granite wall of the Pawtucket Canal; thence running along the back edge of said wall by three (3) courses as follows:

NORTHWESTERLY, more or less, by a curve to the right having a radius of three hundred forty-five and 57/100 feet (345.57) an arc length of sixty-six and 15/100 feet (66.15) to an x-cut set,

N 58° -41' -18" W, a distance of ninety-six and 27/100 feet (96.27) to an x-cut set, and

N 59° -37' -26" W, a distance of seventy-two and 08/100 feet (72.08) to a point on the southerly location line of the Boston and Maine Railroad; thence running along said railroad location line

N 86° -04' -09" E, a distance of thirty-one and 32/100 feet (31.32) to the point of beginning.

Containing three thousand seven hundred and twenty-eight (3,728) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 125

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-A/1

Beginning at a point on the southerly line of location of the Boston and Maine Railroad, said point being the northeasterly corner of land now or formerly of P. H. Macheras Oil Company; thence along said railroad location line

N 86° -50' -03" E, a distance of twenty and 20/100 feet (20.20) to a point at land now or formerly of the City of Lowell; thence along the westerly line of land of the City of Lowell

S 03° -30' -25" E, a distance of seven and 87/100 feet (7.87) to a point on the northerly line of land now or formerly of P. H. Macheras Oil Company; thence along said northerly line of P. H. Macheras Oil Company

N 71° -55' -57" W, a distance of twenty-one and 72/100 feet (21.72) to the point of beginning.

Containing eighty (80) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-A/3

Beginning at the northwesterly corner of the parcel, said corner being a point on the southerly line of location of the Boston and Maine Railroad, and being at the northeasterly corner of Parcel CB-A/2 as hereinbefore described; thence along the southerly location line of said railroad

N 86° -50' -03" E, a distance of seventy-one and 11/100 feet (71.11) to a point at the back edge of the southerly granite wall of the Pawtucket Canal; thence running along the back edge of said canal wall as follows:

S 43° -21' -58" E, a distance of sixty-four and 39/100 feet (64.39) to an iron pin set,

S 56° -00' -37" E, a distance of forty-five and 26/100 feet (45.26) to an x-cut set,

S 59° -03' -48" E, a distance of ninety-five and 68/100 feet (95.68) to a point,

S 58° -56' -41" E, a distance of eighty-six and 22/100 feet (86.22) to a drill hole set,

WESTERLY, more or less, by a curve to the left a distance of about two hundred and seven (207) feet to a drill hole set,

S 84° -07' -29" E, a distance of one hundred thirty-three and 92/100 feet (133.92) to a drill hole set,

S 88° -59' -18" E, a distance of twenty-nine and 40/100 feet (29.40) to a drill hole set,

S 89° -44' -14" E, a distance of forty-two and 79/100 feet (42.79) to a drill hole set,

N 87° -29' -24" E, a distance of thirty-nine and 60/100 feet (39.60) to a drill hole set,

N 83° -30' -57" E, a distance of one hundred three and 57/100 feet (103.57) to an x-cut set,

N 83° -29' -15" E, a distance of sixty-two and 46/100 feet (62.46) to an x-cut set,

S 85° -49' -54" E, a distance of one hundred eighteen and 37/100 feet (118.37) to an x-cut set, and

SOUTHEASTERLY, more or less, by a curve to the right a distance of about fifty-nine feet (59) to an x-cut set; thence

S 64° -34' -09" E, a distance of six and16/100 feet (6.16) to a point on the westerly line of School Street; thence along said westerly line of School Street

S 09° -18' -05" E, a distance of twenty-two and 36/100 feet (22.36) to a point at land now or formerly of Marinel Transportation Inc.; thence along the northerly line of land of Marinel Transportation Inc. and land of Nicholas C. Sarris et al as follows:

N 73° -27' -35" W, a distance of ninety-three and 55/100 feet (93.55) to a point,

N 85° -19' -55" W, a distance of sixty-eight and 00/100 feet (68.00) to a point of curvature,

WESTERLY, more or less, by a curve to the left having a radius of one hundred twenty-two and 00/100 feet (122.00), an arc length of twenty-five and 20/100 feet (25.20) to a point,

S 83° -30' -25" W, a distance of one hundred sixty and 00/100 feet (160.00) to a point of curvature,

WESTERLY, more or less, by a curve to the right having a radius of four hundred forty-seven and 00/100 feet (447.00), an arc length of fifty-two and 03/100 feet (52.03) to a point,

N 89° -48' -15" W, a distance of fifty and 00/100 feet (50.00) to a point of curvature,

WESTERLY, more or less, by a curve to the right having a radius of six hundred twenty-six and 00/100 feet (626.00), an arc length of seventy-six and 05/100 feet (76.05) to a point,

N 83° -13' -35" W, a distance of eighty and 00/100 feet (80.00) to a point of curvature, and

NORTHWESTERLY, more or less, by a curve to the right having a radius of five hundred fifty and 22/100 feet (550.22), an arc length of one hundred eighty-seven and 46/100 feet (187.46) to a point at the end of a twenty foot wide private way; thence crossing the end of said private way

N 64° -26' -11" W, a distance of twenty-eight and 22/100 feet (28.22) to the southeasterly corner of land now or formerly of P. H. Macheras Oil Company; thence along the northeasterly line of land of said P. H. Macheras Oil Company by two (2) courses as follows:

N 58° -56' -27" W, a distance of two hundred ninety-two and 59/100 feet (292.59) to a point, and

N 71° -55' 57" W, a distance of forty-five and 70/100 feet (45.70) to a point at the southeasterly corner of Parcel CB-A/2 as hereinbefore described; thence along the easterly line of land of said Parcel CB-A/2

N 03° -30' -25" W, a distance of twelve and 54/100 feet (12.54) to the point of beginning.

Containing twenty-two thousand and five hundred (22,500) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY ASSOCIATES
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

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PROPOSED DESCRIPTION OF LAND

PARCEL: CB-A/4

Beginning at the northwesterly corner of the Parcel, said corner being a point on the westerly line of School Street; thence crossing said School Street

S 64° -34' -09" E, a distance of fifty-eight and 41/100 feet (58.41) to a point on the easterly line of School Street; thence along said easterly line of School Street

S 09° -18' -05" E, a distance of twenty and 25/100 feet (20.25) to the corner of the concrete bridge abutment; thence crossing School Street by the face of said bridge abutment

N 66° -18' -20" W, a distance of fifty-seven and 23/100 feet (57.23) to a point on the westerly line of School Street, said point being at the northeasterly corner of land now or formerly of Marinel Transportation Inc.; thence along said westerly line of School Street

N 09° -18' -05" W, a distance of twenty-two and 36/100 feet (22.36) to the point of beginning.

Containing one thousand and thirty (1,030) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-A/5

Beginning at a point on the easterly line of School Street, said point being the northeasterly corner of Parcel CB-A/4 as hereinbefore described; thence

S 64° -34' -09" E, a distance of two and 24/100 feet (2.24) to an x-cut set at the back edge of the southerly granite wall of the Pawtucket Canal; thence running along the back edge of said canal wall as follows:

S 59° -30' -00" E, a distance of one hundred five and 94/100 feet (105.94) to an x-cut set,

S 63° -37' -19" E, a distance of one hundred ninety-three and 60/100 feet (193.60) to an x-cut set,

S 73° -36' -36" E, a distance of ninety-seven and 13/100 feet (97.13) to an x-cut set,

S 73° - 37' -46" E, a distance of seven hundred thirty-one and 97/100 feet (731.97) to an x-cut set,

EASTERLY, more or less, by a curve to the left a distance of about one hundred and seventy-seven feet (177) to a drill hole set,

EASTERLY, more or less, still by said curve, a distance of about two hundred and ninety-nine feet (299) to an iron pin set,

NORTHEASTERLY, more or less, by a curve to the left, a distance of about one hundred and forty-eight feet (148) to an x-cut set, and

N 57° -32' -42" E, a distance of two hundred forty-nine and 31/100 feet (249.31) to a point at the northwesterly corner of Parcel 2B/2C-1/2C-2 as hereinafter described; thence along the southeasterly line of Parcel 2B/2C-1/2C-2 and land now or formerly of Thomas M. Hughes

S 22° -45' -06" E, a distance of one hundred eight and 06/100 feet (108.06) to a point at an angle in the northerly line of Middlesex Place; thence along said northerly line of Middlesex Place

S 68° -00' -59" W, a distance of twenty-five and 00/100 feet (25.00) to a point at the southeasterly corner of land now or formerly of John A. and Sandra L. Crowe; thence along the easterly line of Crowe

N 22° -45' -06" W, a distance of eighty-five and 36/100 feet (85.36) to a point; thence along the northerly line of Crowe

S 57° -20' -02" W, a distance of two hundred seventy-seven and 58/100 feet (277.58) to a point at land now or formerly of Philip J. Stratos; thence along the northerly line of said Stratos

Parcel : CB-A/5 (cont'd)

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S 60° -04' -29" W, a distance of one hundred four and 53/100 feet (104.53) to a point of curvature; thence along the northerly line of land now or formerly of said Stratos, Peter D. Hallissy, and Lowell Boys Club Association

SOUTHWESTERLY, more or less, by a curve to the right having a radius of six hundred sixteen and 00/100 feet (616.00), an arc length of five hundred one and 72/100 feet (501.72) to a point at the northwesterly corner of land of said Lowell Boys Club Association; thence along the westerly line of the Lowell Boys Club Association

S 16° -16' -54" E, a distance of five and 00/100 feet (5.00) to a point at land now or formerly of Josephine M. Brady; thence along the northerly line of Brady as follows:

N 71° -50' -47" W, a distance of fifty-two and 05/100 feet (52.05) to a point,

N 71° -59' -55" W, a distance of one hundred sixty-eight and 82/100 feet (168.82) to a point, and

N 73° -44' -25" W, a distance of two hundred eighty-nine and 62/100 feet to a point at land now or formerly of Donald A. Delmore; thence by the northerly line of said Delmore and of land now or formerly of Ronald E. and Denise E. Belley as follows:

N 73° -44' -25" W, a distance of two hundred ninety-one and 65/100 feet (291.65) to a point,

N 63° -41' -05" W, a distance of one hundred ninety-eight and 65/100 feet (198.65) to a point, and

N 59° -37' -45" W, a distance of ninety-three and 37/100 feet (93.37) to a point on the easterly line of School Street; thence along said easterly line of School Street

N 09° -18' -05" W, a distance of twenty-three and 58/100 feet (23.58) to the point of beginning.

Containing thirty-nine thousand (39,000) square feet of land, more or less.

5 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND

PARCEL: 2B/2C-1/2C-2

Beginning at an iron pin set at the most westerly corner of the parcel, said pin being at the northeasterly corner of Parcel CB-A and being at the back edge of the southerly granite wall of the Pawtucket Canal; thence along the back edge of said canal wall

N 57° -32' -42" E, a distance of forty-two and 67/100 feet (42.67) to a point on the southwesterly location line of the Boston and Maine Railroad; thence along said railroad location line as follows:

SOUTHEASTERLY, more or less, by a curve to the right having a radius of nine hundred sixty-seven and 73/100 feet (967.73), an arc length of forty-one and 01/100 feet (41.01) to a point,

N 51° -44' -05" E, a distance of ten and 85/100 feet (10.85) to an iron pin set, and

SOUTHEASTERLY, more or less, by a curve to the right having a radius of nine hundred seventy-seven and 73/100 feet (977.73), an arc length of twenty-one and 57/100 feet (21.57) to an iron pin set at land now or formerly of Thomas M. Hughes; thence along the northwesterly line of land of said Hughes

S 51° -44' -05" W, a distance of ninety-five and 31/100 feet (95.31) to a point on the easterly line of Parcel CB-A; thence along said easterly line of Parcel CB-A

N 22° -45' -06" W, a distance of sixty-four and 06/100 feet (64.06) to the point of beginning.

Containing four thousand and eleven (4,011) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 132

PROPOSED DESCRIPTION OF LAND

PARCEL: 2B/2B-1/2D-1/2D-2

Beginning at the most northerly corner of the parcel, said corner being a point on the back edge of the southerly granite wall of the Pawtucket Canal and being on the northwesterly prolongation of the southwesterly line of Thorndike Street; thence by land now or formerly of the Proprietors of Locks and Canals and by said southwesterly line of Thorndike Street

S 30° -15' -09" E, a distance of seventy-one and 98/100 feet (71.98) to a point at land now or formerly of the City of Lowell; thence by the northwesterly line of land of said City of Lowell

S 51° -55' -38" W, a distance of one hundred eighty-one and 47/100 feet (181.47) to a point on the northeasterly location line of the Boston and Maine Railroad; thence along said railroad location line as follows:

NORTHWESTERLY, more or less, by a curve to the left having a radius of one thousand eighteen and 73/100 feet (1018.73), an arc length of fourteen and 66/100 feet (14.66) to a point,

S 48° -17' -17" W, a distance of six and 12/100 feet (6.12) to a point,

N 58° -18' -24" W, a distance of nineteen and 61/100 feet (19.61) to a point,

N 52° -12' -56" E, a distance of twenty-two and 05/100 feet (22.05) to a point, and

NORTHWESTERLY, more or less, by a curve to the left having a radius of one thousand thirty-three and 73/100 feet (1,033.73), an arc length of thirty-eight and 66/100 feet (38.66) to a point at the back edge of the southerly granite wall of the Pawtucket Canal; thence along the back edge of said canal wall

N 50° -48' -09" E, a distance of two hundred two and 09/100 feet (202.09) to the point of beginning.

Containing thirteen thousand three hundred and forty-six (13,346) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 133

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-I

Beginning at a drill hole set at the most westerly corner of the Parcel, said corner being at the juncture of the Pawtucket and Hamilton Canals; thence running along the back edge of the wall of the Pawtucket Canal by seven (7) courses as follows:

N 40° -41' -10" E, a distance of fifty-three and 20/100 feet (53.20) to a P.K. nail set,

N 22° -06' -49" E, a distance of one hundred one and 17/100 feet (101.17) to a P.K. nail set,

N 20° -16' -46" E, a distance of sixteen and 22/100 feet (16.22) to an x-cut set,

NORTHEASTERLY, more or less, by a curve to the right, a distance of about thirty-six feet (36) to a drill hole set,

S 72° -41' -05" E, a distance of twenty-seven and 06/100 feet (27.06) to an iron pin set,

N 85° -42' -05" E, a distance of thirty-three and 05/100 feet (33.05) to a point, and

N 04° -17' -55" W, a distance of nine and 85/100 feet (9.85) to an x-cut set at the back edge of the granite wall of the Swamp Locks, Upper Lock Chamber; thence running along the back edge of the wall of said Lock Chamber by three (3) courses as follows:

N 87° -04' -42" E, a distance of forty-nine and 47/100 feet (49.47) to an x-cut set,

N 85° -46' -53" E, a distance of one hundred thirty-nine and 78/100 feet (139.78) to an iron pin set, and

S 01° -48' -53" E, a distance of seven and 55/100 feet (7.55) to a drill hole set in the bevel of a concrete wall; thence running along said wall and crossing a Right-of-Way

N 81° -09' -40" E, a distance of fifty-two and 56/100 feet (52.56) to a point on the westerly line of Parcel CB-J/East as hereinafter described; thence running along the westerly line of Parcel CB-J/East

S 13° -10' -56" E, a distance of twenty-four and 42/100 feet (24.42) to a point; thence again crossing said Right-of-Way, and running by the northerly line of land now or formerly of the Pellon Corporation

S 85° -54' -08" W, a distance of three hundred twenty-eight and 90/100 feet (328.90) to a drill hole in a stone bound found; thence continuing along the line of land of said Pellon Corporation by ten (10) courses as follows:

S 21° -44' -28" W, a distance of one hundred forty-three and 34/100 feet (143.34) to a P.K. nail set,

S 87° -02' -19" E, a distance of five and 36/100 feet (5.36) to a P.K. nail set,

SOUTHEASTERLY, more or less, by a curve to the right having a radius of two hundred ninety and 18/100 feet (290.18), and an arc length of one hundred sevety-seven and 57/100 feet (177.57) to a P.K. nail set,

SOUTHEASTERLY, more or less, by a curve to the right having a radius of fifty and 42/100 feet (50.42), and an arc length of sixteen and 48/100 feet (16.48) to a point of reverse curvature,

SOUTHEASTERLY, more or less, by a curve to the left having a radius of fifty and 42/100 feet (50.42) and an arc length of thirteen and 19/100 feet (13.19) to a point of compound curvature,

SOUTHEASTERLY, more or less, by a curve to the left having a radius of one hundred thirty-one and 47/100 feet (131.47), and an arc length of sixty-eight and 79/100 feet (68.79) to a point,

S 78° -13' -08" E, a distance of seventeen and 83/100 feet (17.83) to a point,

EASTERLY, more or less, by a curve to the left having a radius of two hundred sixteen and 37/100 feet (216.37), and an arc length of ninety-two and 98/100 feet (92.98) to a point, and

N 77° -09' -34" E, a distance of thirty-six and 03/100 feet (36.03) to a point at land now or formerly of Jackson Properties Inc.; thence running along the westerly line of land of said Jackson Properties Inc.

S 12° -38' -26" E, a distance of eight and 27/100 feet (8.27) to a point at the back edge of the wall of the Hamilton Canal; thence running along the back edge of the wall of said Hamilton Canal as follows:

S 77° -19' -26" W, a distance of forty-eight and 14/100 feet (48.14) to an iron pin set,

WESTERLY, more or less, a distance of about seventy-three feet (73) to an x-cut set,

NORTHWESTERLY, more or less, a distance of about eighty-two feet (82) to a point,

NORTHWESTERLY, more or less, a distance of about seventy-three feet (73) to a drill hole set,

NORTHWESTERLY, more or less, a distance of about seventy-three feet (73) to a drill hole set,

WESTERLY, more or less, a distance of about eighty-two feet (82) to a P.K. nail set, and

N 86° -36' -20" W, a distance of thirty-eight and 12/100 feet (38.12) to the point of beginning.

Containing thirteen thousand two hundred and sixty square feet of land (13,260), more or less.

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PROPOSED DESCRIPTION OF LAND

PARCEL: Guard Locks Lock Chamber —

Begining at a drill hole set at the northwesterly corner of the parcel along the westerly face of the westerly granite lock chamber wall at the top of a set of granite steps, thence

S 27°-16'-45" E, along the westerly face of the aforementioned granite wall, a distance of forty and 79/100 feet (40.79) to the northerly face of a building known as the Locking Gate House; thence

S 62°-43'-24" W, along the northerly face of the aforementioned building a distance of seven and 80/100 feet (7.80) to a building corner; thence

S 27°-16'-45" E, along the westerly face of the aforementioned building a distance of sixteen and 06/100 feet (16.06) to a building corner; thence

N 62°-43'-24" E, along the southerly face of the aforementioned building a distance of about six feet (6) to the westerly face of a granite wall on the westerly side of the Pawtucket Canal; thence

SOUTHERLY, more or less, along the aforementioned wall a distance of about fifty-five-feet (55) to the northwesterly corner of a building known as the Francis Gate House; thence

S 27°-26'-58" E, along the westerly face of the Francis Gate House a distance of thirteen and 41/100 feet (13.41) to the southwesterly corner of the Francis Gate House; thence by the westerly face of a granite wall on the westerly side of the Pawtucket Canal by five (5) courses as follows:

SOUTHERLY, about twelve feet (12),

WESTERLY, about thirteen feet (13),

SOUTHERLY, about three feet (3),

EASTERLY, about sixteen feet (16), and

SOUTHERLY, about six and 4/10 feet (6.4) to an iron pin set at the westerly face of said wall; thence continuing

SOUTHERLY, more or less, along the westerly face of the aforementioned wall about fifty-one feet (51) to an angle point in the wall; thence continuing

SOUTHERLY, more or less, along said wall a distance of about twenty-five feet (25) to an iron pin set at the westerly face of said wall, said iron pin being seventy-five and 37/100 feet (75.37) on a bearing of S 21°-00'-01" E, from the last mentioned iron pin; thence

PARCEL: Guard Locks - Lock Chamber

Northeasterly, N 30° - 24'- 34"E, a distance of sixty two and 37/100 feet (62.37) to an iron pin set,

S 88°-10'-35" W, a distance of eleven and 14/100 feet (11.14) to an iron pin set,

N 29°-55'-13" W, a distance of thirteen and 01/100 feet (13.01) to an iron pin set,

N 35°-19'-04" W, a distance of twelve and 82/100 feet (12.82) to an iron pin set, and

N 11°-33'-48" W, a distance of eighteen and 18/100 feet (18.18) to a drill hole set; thence continuing along the edge of exposed wall:

NORTHEASTERLY, more or less, a distance of about fourteen feet to a point,

NORTHWESTERLY, more or less, a distance of about three feet (3) to a point,

SOUTHWESTERLY, more or less, a distance of about fourteen feet (14) to a point,

NORTHWESTERLY, more or less, a distance of about twelve feet to the southeasterly corner of the Francis Gate House, said corner bearing N 36°-56'-54" W, and being fifteen and 26/100 feet (15.26) distant from the last mentioned drill hole; thence running along the northeasterly face of the Francis Gate House

N 27°-26'-58" W, a distance of thirteen and 41/100 feet (13.41) to the northeasterly corner thereof; thence running along the back of the exposed granite wall

N 17°-56'-25" W, a distance of nine and 09/100 feet (9.09) to a drill hole set in the bottom step of some granite steps; thence continuing along the back edge of the wall

NORTHWESTERLY, more or less, a distance of about thirty-two feet (32) to a point on the southerly wall of the Locking Gate House; thence running along the face of the north end of the Gate House as follows:

N 62°-43'-24" E, a distance of about seven feet (7) to the northeasterly corner of the Gate House,

N 27°-16'-45" W, a distance of sixteen and 06/100 feet (16.06) to the northerly corner of the Gate House,

S 62°-43'-24" W, a distance of about eight and 7/10 feet (8.7) to a point on the northerly face of the Locking Gate House, said point being at the back of the exposed granite wall as hereinbefore mentioned; thence running along the back of said wall

PARCEL: Guard Locks - Lock Chamber

NORTHWESTERLY, more or less, a distance of about zero and 7/10 feet (0.7) to a drill hole set, said drill hole bearing S 66°-57'-39" W, and being eight and 71/100 feet (8.71) distant from the aforementioned northerly corner of the Locking Gate House; thence continuing along the back edge of said wall

N 22°-50'-38" W, a distance of thirty-two and 98/100 feet (32.98) to a point, thence

Westerly, S 73° - 44' - 18"W, a distance of thirty eight and 05/100 (38.05) to the point of begining.

Containing five thousand nine hundred and eighty four square feet (5,984) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: SWAMP LOCKS DAM/NORTH

Beginning at the southeasterly corner of the dam, said corner being the northeasterly corner of the northerly gatehouse as hereinbefore described; thence along the northerly wall of said northerly gatehouse

S 85° 34' -47" W, a distance of about fourteen feet (14) to the face of the dam, said face being about one foot (1) easterly from and parallel with the hereinbefore described westerly edge of the steel grate footbridge; thence running along the face of the dam

N 04° -25' -13" W, a distance of about sixty-one feet (61) to the face of a concrete wall; thence running along said concrete wall

EASTERLY, NORTHERLY, and EASTERLY, all of said directions being more or less, a distance of about fourteen feet (14) to a point along the wall at the toe of the dam; thence running along the toe of the dam

S 04° -25' -13" E, a distance of about sixty-four feet (64) to the point of beginning.

Containing eight hundred and seventy-five square feet (875) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: SWAMP LOCKS DAM/SOUTH

Beginning at the northwesterly corner of the dam, said corner being two and one-half feet (2.5) easterly from a westerly wall of the northerly gatehouse as hereinbefore described; thence running along the northerly line of the dam, said line being along a southerly wall in the aforesaid northerly gatehouse

N 85° -34' -47" E, a distance of about twenty-eight feet (28) to the northeast corner of the dam; thence running across the toe of the dam

S 04° -25' -13" E, more or less, a distance of about thirty feet (30) to the southeast corner of the dam; thence along the northerly face of a granite wall

S 85° -34' W, more or less, a distance of about twenty-eight feet (28) to the southwest corner of the dam, said corner being a point on the southerly wall of aforesaid northerly gatehouse; thence running along the face of the dam, said face being two and one-half feet (2.5) easterly from and parallel with a westerly wall of said gatehouse

N 04° -25' -13"W , a distance of about thirty feet (30) to the point of beginning.

Containing eight hundred and forty square feet (840) of land, more or less

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: SWAMP LOCKS GATEHOUSE

Beginning at the northwesterly corner of the parcel, said corner being a point along the southerly line of Parcel CB-G, bearing N 79° -49' -52" E, and being three and 15/100 feet (3.15) distant from a drill hole set at an angle in said southerly line of Parcel CB-G; thence along said line of Parcel CB-G
N 79° -49' -52" E, a distance of three and 52/100 feet (3.52) to a point; thence running along the edge of a steel grate footbridge

S 04° -25' -13" E, a distance of sixty-four and 47/100 feet (64.47) to the northerly wall of the northerly gatehouse; thence running along the wall of said gatehouse as follows:

N 85° -34' -47" E, a distance of eleven and 22/100 feet (11.22) to a corner,

S 04° -25' -13" E, a distance of ten and 50/100 feet (10.50) to a corner,

S 85° -34' -47" W, a distance of nine and 75/100 feet (9.75) to a corner, and

S 04° -25'-13" E, a distance of thirty and 06/100 feet (30.06) to a point zero and 30/100 feet (0.30) beyond the southeasterly corner of the northerly gatehouse; thence

S 85° -34' -20" W, a distance of two and 00/100 feet (2.00) to a point one and 78/100 feet (1.78) distant from the northeasterly corner of the southerly gatehouse and along the prolongation of the easterly wall thereof; thence running to and along the easterly wall of said southerly gatehouse as follows:

S 03° -45' -33" E, a distance of twenty and 14/100 feet (20.14) to a corner,

S 86° -14' -27" W, a distance of twelve and 42/100 feet (12.42) to a corner,

N 03° -45' -33" W, a distance of eighteen and 36/100 feet (18.36) to a corner, and

N 86° -14' -27" E, a distance of six and 32/100 feet (6.32) to a point on the northerly wall of said southerly gatehouse, said point being along the prolongation of the westerly wall of the northerly gatehouse, and two and 01/100 feet (2.01) distant therefrom; thence running to and along the wall of said northerly gatehouse as follows:

N 04° -25' -13" W, a distance of thirty-one and 77/100 feet (31.77) to a corner,

S 85° -34' -47" W, a distance of three and 93/100 feet (3.93) to a corner,

PARCEL: SWAMP LOCK GATEHOUSE
Page 2

N 04° -25' -13" W, a distance of ten and 50/100 feet (10.50) to a corner, and

N 85° -34' -47" E, a distance of seven and 08/100 feet (7.08) to a point on the northerly wall of the northerly gatehouse at the westerly edge of the steel grate footbridge ; thence running along the westerly edge of said footbridge

N 04° -25' -13" W, a distance of sixty-four and 11/100 feet (64.11) to the point of beginning.

Containing nine hundred and thirty-seven square feet (937) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: SWAMP LOCKS - LOCK CHAMBER

Beginning at a cross-cut set at the most westerly corner of the parcel, said cross-cut being at the back edge of the southerly granite wall of the Pawtucket Canal and being on the northerly line of land of Parcel CB-I as hereinbefore described; thence crossing the headwaters of the Swamp Locks and running

N 60°-11'-35" E, a distance of forty-five and 57/100 feet (45.57) to a cut set on the northerly face of a concrete buttress; thence along the northerly face of said buttress

N 86°-14'-27" E, a distance of seven and 43/100 feet (7.43) to the westerly face of the Swamp Locks Gatehouse; thence running along the walls of said gatehouse:

S 03°-45'-33" E, a distance of four and 26/100 feet (4.26) to a corner,

N 86°-14'-27" E, a distance of twelve and 42/100 feet (12.42) to a corner, and

N 03°-45'33" W, a distance of one and 17/100 feet (1.17) to a point on the easterly wall of said Swamp Locks Gatehouse; continuing,

N 03°-45'33" W, a distance of eighteen and 96/100 feet (18.96) to a point at the northerly face of the southerly granite wall of the Lower Pawtucket Canal; thence running along said granite wall as follows:

N 85°-34'-20" E, a distance of forty-six and 21/100 feet (46.21) to a cut set in the face of said wall,

N 84°-43'-16" E, a distance of forty-three and 12/100 feet (43.12) to a cut set in the face of said wall, and

N 89°-50'-16" E, a distance of twenty and 87/100 feet (20.87) to a cut set in the face of said wall; thence running along the northerly face of the southerly granite wall of the Lower Pawtucket Canal and thence crossing a twenty foot passageway

N 86°-13'-40" E, a distance of sixty-six and 78/100 feet (66.78) to a point on the easterly line of said twenty foot passageway; thence running along the easterly line of said passageway

N 09°-30'-31" W, a distance of three and 95/100 feet (3.95) to the southerly shoreline of the Lower Pawtucket Canal; thence running along said southerly shoreline as follows:

N 85°-27'-15" E, a distance of forty-one and 46/100 feet (41.46) to a point,

N 88°-55'-33" E, a distance of eighty and 01/100 feet (80.01) to a point, and

S 06°-40'-48" E, a distance of eleven and 18/100 feet (11.18) to a point at the bottom of the Swamp Locks Lower Lock Chamber; thence running along said Lower Lock Chamber

S 84°-08'-49" W, a distance of forty-eight and 05/100 feet (48.05) to a point; thence running, as follows:

S 00°-25'-22" E, a distance of twenty-seven and 89/100 feet (27.89) to a point on the northerly line of land now or formerly of the Pellon Corporation; thence alng the line of said Pellon Corporation

S 77°-16'-35" W, a distance of sixty-six and 89/100 feet (66.89) to a point on the easterly line of a twenty foot passageway leading to Jackson Street; thence along the easterly line of said passageway

N 13°-10'-56" W, a distance of eleven and 82/100 feet (11.82) to a point at the southerly wall of the Swamp Locks Lower Lock Chamber; thence along the southerly wall of the Swamp Locks Lower Lock Chamber as follows:

S 81°-09'-40" W, a distance of fifty-two and 56/100 feet (52.56) to a drill hole set in the face of a concrete wall, and

N 01°-48'-53" W, a distance of seven and 55/100 feet (7.55) to an iron pin set at the back edge of the southerly granite wall of the Swamp Locks Upper Chamber; thence running along the back edge of said granite wall as follows:

S 85°-46'-53" W, a distance of one hundred thirty-nine and 78/100 feet (139.78)

S 87°-04'-42" W, a distance of forty-nine and 47/100 feet (49.47) to the point of beginning.

Containing eleven thousand six hundred and eighty five square feet (11,685), of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
60 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-G

Beginning at a drill hole set at the most southeasterly corner of the parcel, said drill hole being at the back edge of the northerly granite wall of the Lower Pawtucket Canal and the westerly wall of a wasteway appurtenant thereto; thence along the back edge of said granite canal wall:

S 77° -29' -58" W, a distance of one hundred eighty-four and 15/100 feet (184.15) to an x-cut set, and

S 77° -30' -59" W, a distance of one hundred sixty-nine and 44/100 feet (169.44) to a point at the inlet of an abandoned penstock; thence continuing along the back edge of said canal wall, more or less, and running under a concrete slab deck erected over a portion of the canal

S 88° -10' -10" W, a distance of three hundred fifty-seven and 82/100 feet (357.82) to a drill hole set in the top of a concrete wall; thence

N 76° -48' -05" W, a distance of twenty-eight and 87/100 feet (28.87) to a P.K. nail set in the pavement of the margin roadway; thence

N 64° -01' -21" W, a distance of sixty-one and 75/100 feet (61.75) to a P.K. nail set; thence

S 79° -49' 52" W, a distance of forty-one and 03/100 feet (41.03) to a drill hole set at the back edge of the concrete wall of the Pawtucket Canal; thence along the back edge of said concrete wall as follows:

N 73° -14' -07" W, a distance of nine and 54/100 feet (9.54) to a point,

N 51° -46' -40" W, a distance of seventeen and 24/100 feet (17.24) to a point, and

NORTHWESTERLY, more or less, by a curve in said wall to an iron pin set, said pin bearing N 22° -38' -49" W, and being five and 64/100 feet (5.64) distant from the point last mentioned; thence

N 43° -25' -34" E, a distance of sixty-seven and 95/100 feet (67.95) to a point; thence

N 08° -17' -03" W, a distance of six and 00/100 feet (6.00) to a drill hole set at the back edge of the southerly granite wall of the Merrimack Canal; thence along said granite canal wall

N 42° -20' -18" E, a distance of one hundred two and 32/100 feet (102.32) to a P.K. nail set, and

N 36° -47' -04" E, a distance of thirty-one and 41/100 feet (31.41) to an iron pin set; thence running under a bridge over said Merrimack Canal

N 43° -41' -11" E, a distance of sixty-three and 21/100 feet (63.21) to a point; thence

Parcel: CB-3 (con()

S 46° -18' -49" E, a distance of eleven and 59/100 feet (11.59) to a point; thence in part by the back edge of the granite wall

N 43° -30' -36" E, a distance of one hundred four and 47/100 feet (104.47, to an iron pin set; thence crossing the inlet of an abandoned penstock

N 46° -43' -29" E, a distance of thirty-eight and 32/100 feet (38.32) to an iron pin set; thence along the back edge of a granite wall as follow

N 41° -47' -54" E, a distance of seventy-two and 39/100 feet (72.39) to a point, and

N 44° -05' -17" E, a distance of ninety-five and 94/100 feet (95.94) to an iron pin set; thence running along the shoreline of the Merrimack Canal more or less, as follows:

N 25° -13' -45" E, a distance of thirty and 15/100 feet (30.15) to an iron pin set,

N 34° -16' -58" E, a distance of twenty-two and 39/100 feet (22.39) to an x-cut set, and

S 48° -14' -10" E, a distance of twelve and 75/100 feet (12.75) to an iron pin set at the back edge of a granite wall; thence along the back edge of said wall

N 43° -46' -07" E, a distance of one hundred twenty-six and 24/100 feet (126.24) to an iron pin set, and still by the edge of said wall

N 43° -46' -07" E, a distance of twenty-four and 02/100 feet (24.02) to the end thereof; thence

N 22° -32' -24" E, a distance of twenty-three and 98/100 feet (23.98) to the back corner of a concrete wall; thence along the back edge of said wall as follows:

N 25° -42' -52" E, a distance of thirteen and 29/100 feet (13.29) to a point,

N 49° -58' -52" E, a distance of twenty-one and 23/100 feet (21.23) to a point, and

N 67° -34' -51" E, a distance of twenty-five and 07/100 feet (25.07) to a point on the edge of said wall at land now or formerly of C.W.S. Associates Trust; thence by land of C.W.S. Associates and land of the Commonwealth of Massachusetts as follows:

S 46° -38' -52" E, a distance of nine and 00/100 feet (9.00) to a point, and

S 43° -41' -11" W, a distance of six hundred eighteen and 92/100 feet (618.92) to a drill hole in a concrete bound found at land now or formerly of the Pellon Corporation; thence by land of said Pellon Corporation as follows:

S 43° -41' -03" W, a distance of twenty-two and 75/100 feet (22.75) to a point,

S 43° -07' -46" W, a distance of sixty-five and 21/100 feet (65.21) to

S 41° -58' -46" W, a distance of one hundred and 40/100 feet (100.40) to a point,

S 48° -01' -14" E, a distance of fourteen and 54/100 feet (14.54) to a point,

N 89° -49' -46" E, a distance of thirty-seven and 98/100 feet (37.98) to a point,

S 62° -42' -14" E, a distance of forty-eight and 00/100 feet (48.00) to a point,

S 74° -47' -14" E, a distance of twenty-seven and 00/100 feet (27.00) to a point,

N 88° -10' -46" E, a distance of three hundred fifty-six and 93/100 feet (356.93) to a P.K. nail set, and

N 77° -31' -26" E, a distance of three hundred fifty-three and 06/100 feet (353.06) to a drill hole set at the back edge of the westerly granite wall of a wasteway; thence along the back edge of said wall

S 12° -33' -54" E, a distance of eighteen and 50/100 feet (18.50) to the point of beginning.

Containing twenty-five thousand two hundred and nine (25,209) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: LOWER LOCKS DAM

Beginning at a point at the southwesterly corner of the parcel, said point being two feet (2) distant from and parallel with the westerly face of the Lower Locks Gate House as hereinbefore described; thence crossing the Pawtucket Canal and running along the face of the Lower Locks Dam

N 06° -25' -46" E, a distance of eighty-seven feet (87) more or less to a point at the northerly end of the dam; thence running along the northerly end of the Lower Locks Dam

EASTERLY, more or less, a distance of about forty-one feet (41) to the base of said Dam; thence crossing the Pawtucket Canal and running across the base of the dam

SOUTHERLY, more or less, a distance of about ninety-eight feet (98) to a point at the base of granite of the Lower Locks; thence running along the southerly line of the Lower Locks Dam, being at the base of granite of said Lower Locks

WESTERLY, more or less, a distance of about forty-six feet (46) to the point of beginning.

Containing three thousand six hundred and eighty square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: LOWER LOCKS GATE HOUSE

Beginning at the southwesterly corner of the Lower Locks Gate House, said corner being at an angle in the northerly line of Parcel CB-K as hereinbefore described; thence running along the westerly face of the Gate House, more or less, and across the Pawtucket Canal, by five (5) courses as follows:

N 06° -25' 46" E, a distance of sixty-four and 78/100 feet (64.78) to a point,

N 83° -34' 14" W, a distance of two and 50/100 feet (2.50) to a point,

N 06° -25' -46" E, a distance of twelve and 25/100 feet (12.25) to a point,

S 83° -34' 14" E, a distance of two and 50/100 feet (2.50) to a point, and

N 06° -25' -46" E, a distance of eighteen and 10/100 feet (18.10) to the northwesterly corner of the Gate House, being at land now or formerly of the City of Lowell and known as the Rex Lot; thence along the northerly face of the Lower Locks Gate House by land now or formerly of the City of Lowell

S 83° -34' -14" E, a distance of seven and 50/100 feet (7.50) to the northeasterly corner of the Gate House; thence running along the easterly face of said Gate House, and crossing the Lower Locks Dam, by five (5) courses as follows:

S 06° -25' -46" W, a distance of eighteen and 10/100 feet (18.10) to a point,

S 83° -34' -14" E, a distance of seven and 70/100 feet (7.70) to a point,

S 06° -25' -46" W, a distance of twelve and 25/100 feet (12.25) to a point,

N 83° -34' 14" W, a distance of seven and 70/100 feet (7.70) to a point, and

S 06° -25' -46" W, a distance of sixty-four and 78/100 feet (64.78) to the southeasterly corner of the Lower Locks Gate House, being at an angle in the northerly line of Parcel CB-K as hereinbefore described; thence along said northerly line of Parcel CB-K along the southerly face of the Gate House

N 83° -34' -14" W, a distance of seven and 50/100 feet (7.50) to the point of beginning.

Containing eight hundred and thirty-eight square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-H

Beginning at an iron pin set at the southwesterly corner of the parcel, said iron pin being at the base of a granite retaining wall and being at an angle in the line of land now or formerly of Lowell Revitalization Corporation; thence running along the easterly line of land of said Lowell Revitalization Corporation

N 06° -44' -32" E, a distance of twenty and 32/100 feet (20.32) to an iron pin set at the back edge of the granite wall of the Pawtucket Canal; thence along the edge of said granite canal wall

S 84° -53' -27" E, a distance of sixty-eight and 96/100 feet (68.96) to a drill hole set at the southwesterly corner of a concrete wall; thence along the back edge of said concrete wall, more or less, crossing an old penstock

S 85° -57' -30" E, a distance of sixty-nine and 79/100 feet (69.79) to an x-cut set near the back edge of the granite wall of the Lower Locks; thence

S 44° -46' -55" E, a distance of eight and 86/100 feet (8.86) to an iron pin set; thence along the back edge of the exposed granite wall of the Lower Locks

S 83° -28' -56" E, a distance of one hundred ten and 00/100 feet (110.00) to a drill hole set near the back edge of said wall of the Lower Locks; thence

S 83° -10' -03" E, a distance of one hundred thirty-six and 39/100 feet (136.39) to an iron pin set at the base of the last granite stone of the Lower Locks; thence along the granite base stones of the Lower Locks

N 06° -01' -39" E, a distance of eleven feet (11) more or less to the Pawtucket Canal; thence along the Pawtucket Canal and the Concord River

EASTERLY, more or less, a distance of about one hundred and thirty feet (130) to a point; thence running along the northerly line of land now or formerly of the City of Lowell and Lowell Revitalization Corporation

N 83° -15' -28" W, a distance of five hundred and fourteen feet (514), more or less, to the point of beginning.

Containing eleven thousand one hundred square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: LOWER LOCKS LOCK CHAMBERS

Beginning at the most westerly corner of the parcel, said corner being a point on the northerly line of Parcel CB-H as hereinbefore described and bearing S 85° -57' 30" E, and being forty-nine and 55/100 feet (49.55) distant from a drill hole set in the southwesterly end of a concrete wall; thence running to a point on the northerly side of the Lower Locks

N 12° -49' -10" E, a distance of twenty-three and 64/100 feet (23.64); thence running along the outer edge of the granite blocks

S 82° -56' -24" E, a distance of seventeen and 44/100 feet (17.44) to a point on the southerly prolongation of the westerly line of the Lower Locks Gate House; thence

N 06° -25' -46" E, a distance of one and 49/100 feet (1.49) to the southwesterly corner of the Lower Locks Gate House as hereinafter described; thence along the southerly face of said Gate House

S 83° -34' -14" E, a distance of seven and 50/100 feet (7.50) to the southeast corner of the Lower Locks Gate House; thence along the easterly wall of said Gate House

N 06° -25' -46" E, a distance of four and 76/100 feet (4.76) to a point; thence along the northerly edge of the concrete capped wall of the Lower Locks

S 83° -18' -52" E, a distance of one hundred twenty-six and 25/100 feet (126.25) to a point; thence along the northerly top edge of granite of the Lower Locks by three (3) courses as follows:

N 89° -40' -25" E, a distance of nine and 86/100 feet (9.86) to a point,

S 82° -53' -58" E, a distance of ninety-eight and 75/100 feet (98.75) to a point, and

N 80° - 11' -21" E, a distance of eleven and 35/100 feet to a point at the base of the granite blocks of the Lower Locks; thence running along the base of said blocks

S 06° -01' -39" W, a distance of thirty-eight and 00/100 feet (38.00) to an iron pin set at the base of the last granite stone on the southeasterly end of the Lower Locks, said iron pin being at an angle in the northerly line of Parcel CB-H as hereinbefore described; thence running along the southerly line of the Lower Locks, being the northerly line of Parcel CB-H, by four (4) courses as follows:

N 83° -10' -03" W, a distance of one hundred thirty-six and 39/100 feet (136.39) to a drill hole set in granite,

PARCEL: LOWER LOCKS LOCK CHAMBERS (CONT.)

N 83° -28' -56" W, a distance of one hundred ten and 00/100 feet (110.00) to an iron pin set,

N 44° -46' -55" W, a distance of eight and 86/100 feet (8.86) to an x-cut set in granite, and

N 85° -57' -30" W, a distance of twenty and 24/100 feet (20.24) to the point of beginning.

Containing nine thousand one hundred and twenty-seven square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 5345A

Beginning at the southwesterly corner of the parcel, said corner bearing N 12° -38' -52" W, and being twenty-three and 00/100 feet (23.00) distant from the northerly line of Jackson Street; thence running along the easterly line of land now or formerly of James T. Lichoulas, trustee of Appleton Trust

N 12° -38' -52" W, a distance of ten and 91/100 feet (10.91) to a cut set at the face of a concrete wall; thence running along the southerly line of land now or formerly of the Proprietors of Locks and Canals and along said wall

N 84° -56' -46" E, a distance of forty-eight and 75/100 feet (48.75) to a drill hole set at the corner of said wall; thence running along the easterly line of land now or formerly of the Proprietors of Locks and Canals

N 02° -30' -39" E, a distance of seventeen and 68/100 feet (17.68) to a point at the Hamilton Canal; thence running along the southerly side of the Hamilton Canal

N 86° -56' -46" E, a distance of sixty-four and 37/100 feet (64.37) to a point on the northwesterly line of Parcel 5345C as hereinafter described; thence running along said northwesterly line of Parcel 5345C by two (2) courses as follows:

SOUTHWESTERLY, more or less, by a curve to the right having a radius of one hundred forty-two and 00/100 feet (142.00), an arc length of eighteen and 55/100 feet (18.55) to a point of compound curvature, and

SOUTHWESTERLY, more or less, by a curve to the right having a radius of ninety-eight and 00/100 feet (98.00), an arc length of thirty-four and 00/100 feet (34.00) to a point at the southeasterly corner of Parcel 5345B as hereinafter described; thence running along the easterly line of Parcel 5345B

N 12° -38' -52" W, a distance of five and 50/100 feet (5.50) to a point; thence running along the northerly line of Parcel 5345B, said line being twenty-three and 00/100 feet (23.00) distant from and parallel with the northerly line of Jackson Street

S 77° -21' -08" W, a distance of sixty-seven and 00/100 feet (67.00) to the point of beginning.

Containing one thousand four hundred and thirty-eight square feet (1,438) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 5345B

Beginning at the northwesterly corner of the parcel, said corner being the southwesterly corner of Parcel 5345A as hereinbefore described; thence running along the southerly and easterly lines of Parcel 5345A by two (2) courses as follows:

N 77° -21' -08" E, a distance of sixty-seven and 00/100 feet (67.00) to a point, and

S 12° -38' -52" E, a distance of five and 50/100 feet (5.50) to a point at land now or formerly of James T. Lichoulas, Trustee of Appleton Trust; thence running by land now or formerly of said James T. Lichoulas, Trustee

S 77° -21' -08" W, a distance of sixty-seven and 00/100 feet (67.00) to a point on the easterly line of other land owned now or formerly by James T. Lichoulas, Trustee of Appleton Trust; thence along said easterly line of Lichoulas

N 12° -38' -52" W, a distance of five and 50/100 feet (5.50) to the point of beginning.

Containing three hundred and sixty eight and 50/100 (368.5) square feet of land more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 5345C

Beginning at the southwesterly corner of the parcel, said corner being the southeasterly corner of Parcel 5345B as hereinbefore desribed; thence along the southerly line of Parcel 5345A by two (2) courses as follows:

NORTHEASTERLY, more or less, by a curve to the left having a radius of ninety-eight and 00/100 feet (98.00), an arc length of thirty-four and 00/100 feet (34.00) to a point of compound curvature; and

NORTHEASTERLY, more or less, by a curve to the left having a radius of one hundred forty-two and 00/100 feet (142.00), an arc length of nineteen and 29/100 feet (19.29) to a point at the Hamilton Canal; thence along the southerly line of said Hamilton Canal

N 77° -21' -08" E, a distance of forty-five and 00/100 feet (45.00) to a point; thence by land now or formerly of the Proprietors of Locks and Canals

S 20° -51' -08" W, a distance of twenty and 00/100 feet (20.00) to a point on the northerly line of land now or formerly of James T. Lichoulas, Trustee of Appleton Trust; thence along said northerly line of Lichoulas

S 77° -21' -08" W, a distance of eighty-four and 00/100 feet (84.00) to the point of beginning.

Containing nine hundred and sixty (960) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 5345D

Beginning at the southwesterly corner of the parcel, said point being the southeasterly corner of Parcel 5345C as hereinbefore described; thence along the easterly line of Parcel 5345C

N 20° -51' -08" E, a distance of seventeen and 87/100 feet (17.87) to a point at the Hamilton Canal; thence running along the back edge of the southerly wall of said canal by five (5) courses as follows:

N 77° -47' -01" E, a distance of thirty-three and 52/100 feet (33.52) to a punch mark set at the edge of a steel bridge girder,

N 76° -53' -30" E, a distance of twenty-one and 79/100 feet (21.79) to another punch mark set at the edge of a steel bridge girder,

N 77° -18' -27" E, a distance of one hundred fifty-nine and 96/100 feet (159.96) to a cut set at the back edge of the wall,

N 77° -29' -54" E, a distance of two hundred fifty-six and 02/100 feet (256.02) to a drill hole set at the back edge of the wall, and

N 76° -33' -10" E, a distance of one hundred seven and 84/100 feet (107.84 to a point at land now or formerly of Courier Citizen Company; thence by the westerly line of land of said Courier Citizen Company

S 12° -38' -52" E, a distance of fifteen and 80/100 feet (15.80) to a point at land now or formerly of James T. Lichoulas, Trustee of Appleton Trust; thence running by the northerly line of land of said James T. Lichoulas, Trustee

S 77° -21' -08" W, a distance of five hundred eighty-eight and 99/100 feet (588.99) to the point of beginning.

Containing eight thousand six hundred and thirty-seven (8,637) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS PG 157

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: HAMILTON GATEHOUSE

Beginning at a point on the westerly line of the Hamilton Canal at the head of the Hamilton Wasteway, said point bearing northeasterly, more or less, and being twenty-one and 05/100 feet (21.05) distant from the southeasterly corner of a building foundation; thence running along the westerly face of the Hamilton Gatehouse by land now or formerly of John Adden Furniture, Inc.

N 12° -40' -17" W, a distance of twelve and 18/100 feet (12.18) to the northwesterly corner of the gatehouse, said corner bearing southeasterly, more or less, and being twenty and 40/100 feet (20.40) distant from the northeasterly corner of a building foundation; thence running along the northerly and easterly faces of the Hamilton Gatehouse, by land now or formerly of John Adden Furniture, Inc.; by two (2) courses as follows:

N 77° -19' -43" E, a distance of twenty-one and 18/100 feet (21.18) to the northeast corner of the gatehouse,

S 12° -40' -17" E, a distance of twelve and 18/100 feet (12.18) to the southeast corner of the gatehouse; thence running along the southerly face of the gatehouse, by land now or formerly of John Adden Furniture, Inc. and crossing the Hamilton Canal

S 77° -19' -43" W, a distance of twenty-one and 18/100 feet (21.18) to the point of beginning.

Containing two hundred and fifty-eight (258) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 158

PROPOSED DESCRIPTION OF LAND

PARCEL: Y.M.C.A. GATES

Beginning at a point at the southeasterly corner of lot B, said point being the line of the southeasterly wall of the Merrimack Canal; thence running along said southeasterly canal wall

S 43°-05'-08" W, a distance of about twelve feet (12) to a point at the most southerly end of the concrete gate structure; thence crossing the Merrimack Canal and running along the southwesterly edge of the concrete and wood gate structure as follows:

NORTHERLY, more or less, by a curve to the right, a distance of about seven feet (7) to an angle,

NORTHWESTERLY, more or less, a distance of about fifteen feet (15) to an angle,

SOUTHWESTERLY, more or less, a distance of about two feet (2) to an angle,

WESTERLY, more or less, a distance of about two feet (2) to an angle,

NORTHERLY, more or less, a distance of about two feet (2) to an angle,

NORTHEASTERLY, more or less, a distance of about two feet (2) to an angle,

NORTHWESTERLY, more or less, a distance of about fourteen feet (14) to an angle, and

SOUTHWESTERLY, more or less, by a curve to the right, a distance of about ten feet (10) to a point on the southeasterly face of the northwesterly canal wall; thence running along said canal wall

N 43°-42'-49" E , a distance of about sixteen feet (16) to a point on the southwesterly face of the granite wall crossing the canal; thence running along the southwesterly face of said granite wall

SOUTHEASTERLY, more or less, a distance of about four feet (4) to a corner in the concrete gate structure; thence running along the northeasterly edge of the concrete and wood gate structure as follows:

SOUTHWESTERLY, more or less, a distance of about one foot (1) to an angle,

SOUTHEASTERLY, more or less, a distance of about fifteen feet (15) to an angle,

NORTHEASTERLY, more or less, a distance of about five feet (5) to an angle,

EASTERLY, more or less, a distance of about two feet (2) to an angle,

SOUTHERLY, more or less, a distance of about two feet (2) to an angle,

PARCEL: Y.M.C.A. GALLS

SOUTHWESTERLY, more or less, a distance of about five feet (5) to an angle, and

SOUTHEASTERLY, more or less, a distance of about twenty feet (20) to the point of beginning.

Containing three hundred square feet (300) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: ROLLING DAM

Beginning at an iron pin set on the southeasterly line of the Merrimack Wasteway, said pin being at an angle in the northwesterly line of Parcel CB-L/5721 as hereinbefore described; thence running along said southeasterly line of the Merrimack Wasteway by the northwesterly line of Parcel CB-L/5721 and by land now or formerly of Boott Mills

S 48° -17' -38" W, a distance of about thirty-five feet (35) more or less, to the face of the Rolling Dam; thence running across the Merrimack Wasteway by the face of said Rolling Dam

NORTHWESTERLY, more or less, a distance of about eighteen feet (18) to a point on the northwesterly line of the Merrimack Wasteway, being at land now or formerly of Lowell Union Properties Inc.; thence along the southeasterly line of said Lowell Union Properties Inc., being the northwesterly line of the Merrimack Wasteway,

N 48° -15' -38" E, a distance of thirty-five feet (35), more or less, to a point at the base of the Rolling Dam; thence crossing the Merrimack Wasteway and running along the base of said Rolling Dam

SOUTHEASTERLY, more or less, a distance of about eighteen feet (18) to the point of beginning.

Containing six hundred and thirty square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
56 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 161

PROPOSED DESCRIPTION OF LAND

PARCEL: ROLLING DAM GATE HOUSE/NORTH SECTION

Beginning at the northwesterly corner of the Rolling Dam Gate House, said corner being a point on the southeasterly line of land, now or formerly of Lowell Union Properties Inc., said southeasterly line of land also being the northwesterly line of the Merrimack Canal Wasteway, the aforesaid point of beginning bearing N 48° -15' -38" E and being fifty-seven and 58/100 feet (57.58) distant from a drill hole found in an angle in the wall of the Merrimack Canal; thence along the southeasterly line of land now or formerly of Lowell Union Properties Inc.

N 48° -15' -38" E, by the northwesterly line of the Merrimack Canal Wasteway and the Rolling Dam along the northwesterly face of the Rolling Dam Gate House, a distance of eleven and 15/100 feet (11.15) to a point; thence crossing the Rolling Dam and running along the northeasterly face of the Rolling Dam Gate House S 42° -02' -28" E, a distance of seventeen and 90/100 feet (17.90) to a point on the northwesterly line of land now or formerly of Boott Mills, being the southeasterly line of the Merrimack Canal Wasteway; thence running through the Rolling Dam Gate House along said southeasterly line of the Merrimack Canal Wasteway

S 48° -17' -38" W, a distance of twenty-seven and 29/100 feet (27.29) to a point on the southwesterly building face of the Rolling Dam Gate House, said point bearing N 20° -06' -35" E and being zero and 45/100 feet (0.45) distant from the most southwesterly corner thereof; thence crossing the Merrimack Canal Wasteway and running along the westerly and southwest building lines of the Rolling Dam Gate House by two (2) courses as follows:

N 20° -06' -35" E, a distance of eighteen and 26/100 feet (18.26) to a point, and

N 42° -02' -28" W, a distance of nine and 26/100 feet (9.26) to the point of beginning.

Containing two hundred and sixty-nine square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: ROLLING DAM GATE HOUSE/SOUTH SECTION

Beginning at a point on the northeasterly face of the Rolling Dam Gate House, said point being on the southeasterly line of the Merrimack Canal Wasteway and bearing S 48° -17' -38" W, and being nineteen and 37/100 feet (19.37) distant from an iron pin set at the northwesterly corner of Parcel CB-L/5721 as hereinbefore described; thence running by land now or formerly of Boott Mills along the building face of the Rolling Dam Gate House by four (4) courses as follows:

S 42° -02' -28" E, a distance of four and 07/100 feet (4.07) to a point,

S 20° -06' -35" W, a distance of twenty-two and 94/100 feet (22.94) to a point, said point bearing N 42° -45' -53" W, and being thirty-four and 96/100 feet (34.96) distant from the most northerly corner of Store House No. 1,

N 68° -42' -56" W, a distance of sixteen and 49/100 feet (16.49) to a point, and

N 20° -06' -35" E, a distance of zero and 45/100 feet (0.45) to a point on the southeasterly line of the Merrimack Canal Wasteway; thence along said southeasterly line of the Merrimack Canal Wasteway

N 48° -17' -38" E, a distance of twenty-seven and 29/100 feet (27.29) to the point of beginning.

Containing two hundred and forty-eight (248) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PC 163

PROPOSED DESCRIPTION OF LAND

PARCEL: MASSACHUSETTS WASTEWAY GATE HOUSE

Beginning at the northwesterly corner of the Massachusetts Wasteway Gate House, said corner bearing S 41° -44' -51" E, and being three and 74/100 feet (3.74) distant from the southeasterly line of Bridge Street; thence running along the face of the Massachusetts Wasteway Gate House by land now or formerly of the Proprietors of Locks and Canals, by three (3) courses as follows:

N 48° -15' -09" E, a distance of seven and 67/100 feet (7.67) to a corner,

S 41° -44' -51" E, a distance of twenty-six and 00/100 feet (26.00) to a corner, and

S 48° -15' -09" W, a distance of seven and 67/100 feet (7.67) to the most southerly corner of said Gate House, being a point on the southeasterly side of the Eastern Canal; thence along the southwesterly face of the Massachusetts Wasteway Gate House

N 41° -44'-51" W, a distance of twenty-six and 00/100 feet (26.00) to the point of beginning.

Containing one hundred and ninety-nine square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: BOOTT DAM

Beginning at a point on the northeasterly line of Parcel CB-L/5721, said point bearing N 43° -08' -52" W, and being about ten feet (10) distant from the northwesterly corner of the Boott Dam Gate House as hereinbefore described; thence running along the base of the Boott Dam, being the southeasterly line of Parcel 5721A,

NORTHEASTERLY, more or less, a distance of about thirty-nine feet to a point at the outer corner of a concrete siphon of the Boott Dam, said point being at land now or formerly of Boott Mills; thence along the line of land of Boott Mills

SOUTHEASTERLY, more or less, a distance of about six feet (6) to a point at the most northerly corner of the Boott Dam Gate House; thence along the northeasterly wall of the Boott Dam Gate House, being the southwesterly wall of Mill No.9 of the Boott Mills

S 41° -17' -01" E, a distance of fourteen feet (14) more or less, to a point at the face of the Boott Dam; thence running across the Eastern Canal along the face of said Boott Dam

SOUTHWESTERLY, more or less, a distance of about forty-two feet (42) to a point on the southwesterly wall of Boott Dam Gate House, said point being on the northeasterly line of Parcel CB-L/5721 as hereinbefore described; thence running along said northeasterly line of Parcel CB-L/5721 and the southwesterly wall of said Boott Dam Gate House

N 38° -32' -55" W, a distance of eight feet (8.0), more or less, to the northwest corner of the Gate House; thence continuing along the northeasterly line of aforesaid Parcel CB-L/5721

N 43° -08' -52" W, a distance of ten feet (10) more or less, to the point of beginning.

Containing eight hundred and thirty square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 165

PROPOSED DESCRIPTION OF LAND

PARCEL: BOOTT DAM GATE HOUSE

Beginning at the most northerly corner of the Boott Dam Gate House, said corner being a point on the southwesterly wall of Mill No. 9 of the Boott Mills, bearing S 41°-17'-01" E and being twenty nine and 46/100 feet (29.46) distant from southeasterly wall of the Picker Building; thence

S 41°-17'-01" E, along the southwesterly wall of Mill No. 9 of the Boott Mills sixteen and 67/100 feet (16.67) to a point on the Eastern Canal; thence crossing said Eastern Canal and running along the southeasterly face of the Boott Dam Gate House by two (2) courses as follows:

S 39°-34'-16" W, a distance of eighteen and 98/100 feet (18.98) to a point, and

S 56°-14'-08" W, a distance of twenty-two and 05/100 feet (22.05) to a point on the northeasterly line of Parcel CB-L/5721 as herein-before described, said point being the most southerly corner of the Boott Dam Gate House; thence

N 38°-32'-55" W, along the southwesterly face of the Boott Dam Gate House a distance of eleven and 01/100 feet (11.01) to a point; thence crossing said Eastern Canal and running along the wall of the Boott Dam Gate House by three(3) courses as follows:

N 56°-14'-08" E, a distance of nineteen and 50/100 feet (19.50) to a point,

N 51°-14'-58" W, a distance of four and 90/100 feet (4.90) to a point, and

N 39°-34'-16" E, a distance of twenty-one and 87/100 feet (21.87), to the point of beginning.

Containing five hundred and sixty-five (565) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-L/5721

Beginning at a point at the southeasterly corner of the parcel, said point being on the northeasterly line of land now or formerly of Boott Mills, and bearing N 41°-34'-09" W, and being sixty and 23/100 feet (60.23) distant from the westerly termination of Amory Street; thence

N 41°-34'-09" W, along the northeasterly line of land now or formerly of Boott Mills, a distance of one hundred fifty-eight and 92/100 feet (158.92) to an iron pin set at the southeasterly face of the southeasterly wall of the Rolling Dam; thence

N 48°-17'-38" E, along said southeasterly face of the southeasterly wall of the Rolling Dam, a distance of eight and 81/100 feet (8.81) to an iron pin set at an angle in the southerly wall of the Merrimack Wasteway; thence

N 70°-36'-40" E, along the southerly face of a wall, a distance of Nine and 91/100 feet (9.91) to a cross-cut set at an angle in said wall; thence

S 40°-30'-36" E, along the southwesterly face of the southwesterly wall of the Eastern Canal, a distance of four and 65/100 feet (4.65) to a point on th northwesterly face of a brick building; thence running along the face of said brick building by five (5) courses as follows:

S 48°-17'-38" W, a distance of zero and 71/100 feet (0.71) to a point,

S 40°-24'-35" E, a distance of ten and 40/100 feet (10.40) to a point,

S 50°-12'-21" W, a distance of twelve and 73/100 feet (12.73) to a point,

S 40°-24'-35" E, a distance of twenty-one and 36/100 feet (21.36) to a point, and

N 48°-23'-37" E, a distance of thirteen and 50/100 feet (13.50) to a point at the southwesterly face of the southwesterly wall of the Eastern Canal; thence running along said southwesterly face of the southwesterly wall of the Eastern Canal

S 43°-08'-52" E, a distance of thirty-five and 00/100 feet (35.00) to a point at the most westerly corner of the Boott Dam Gate House as hereinafter described; thence

S 38°-32'-55" E, along the southwesterly face of the Boott Dam Gate House, a distance of eleven and 07/100 feet (11.07) to a point at the most southerly corner thereof; thence along the southwesterly face of the southwesterly wall of the Eastern Canal

S 42°-29'-19" E, a distance of seventy-two and 12/100 feet (72.12) to a point; thence

S 45°-11'-23" W, along the northwesterly edge of a concrete capstone, a distance of eighteen and 69/100 feet (18.69) to a PK nail set at the point of beginning.

PARCEL: CB-L/5721 (cont'd)

Containing two thousand five hundred and eleven (2,511) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

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PROPOSED DESCRIPTION OF LAND

PARCEL: Blacksmith Shop

Beginning at the most southerly corner of the Blacksmith Shop, said corner bearing N 49° -46' -36" W, and being twnety-six and 24/100 feet (26.24) distant from the northwesterly line of land now or formerly of Flago Realty Corporation; thence along the face of the Blacksmith Shop follows:

N 66° -55' -23" W, a distance of eight and 15/100 feet (8.15) to a corner,

N 23° -51' -49" E, a distance of seven and 18/100 feet (7.18) to a corner,

N 65° -45' -09" W, a distance of seventeen and 26/100 feet (17.26) to a corner,

N 24° -09' -04" E, a distance of forty-five and 47/100 feet (45.47) to a corner,

S 65° -45' -09" E, a distance of twenty-five and 19/100 feet (25.19) to a corner, and

S 23° -51' -49" W, a distance of fifty-two and 48/100 feet (52.48) to the point of beginning.

Containing one thousand two hundred and four (1,204) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND

PARCEL: PAWTUCKET GATE HOUSE

Beginning at the most southeasterly corner of the Pawtucket Gate House, said point being fifteen and 35/100 feet (15.35) northwesterly from the westerly line of Parcel 29; thence

N 46°-55'-36" W, along the most southerly face of the building a distance of one hundred eighteen and 70/100 feet (118.70) to a point; thence on a curve to the right

NORTHWESTERLY, more or less, along the face of said building a distance of five feet (5) to a point; thence

N 43°-12'-10" E, along the most westerly face of said building a distance of sixteen and 40/100 feet (16.40) to a building corner, said corner being set back from the southerly line of Pawtucket Street a distance of zero and 60/100 feet (0.60); thence

S 46°-55'-36" E, along the most northerly face of said building a distance of one hundred twenty-two and 04/100 feet (122.04) to the most northeasterly building corner, said corner being set back from the southerly line of Pawtucket Street a distance of zero and 46/100 feet (0.46); thence

S 43°-12'-10" W, along the most easterly face of said building a distance of nineteen and 75/100 feet (19.75) to the point of beginning.

Containing two thousand and four hundred (2,400) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: 29, Lot 2

Beginning at a drill hole set on the southwesterly line of School Street, said drill hole being at the northwesterly corner of land now or formerly of the Commonwealth of Massachusetts; thence along the westerly line of land of said Commonwealth of Massachusetts by two (2) courses as follows:

S 42° -50' -42" W, a distance of seventy-six and 30/100 feet (76.30) to an iron pin set, and

S 24° -14' -32" W, a distance of seventy-two and 91/100 feet (72.91) to an iron pin set; thence along the southwesterly line of land of the Commonwealth of Massachusetts

S 61° -39' -08" E, a distance of ninety-seven and 41/100 feet (97.41) to a point on the northwesterly line of land now or formerly of the American Red Cross; thence along the northwesterly lone of land of said American Red Cross and of Flago Realty Corporation

S 40° -13' -24" W, a distance of two hundred twenty and 81/100 feet (220.81) to an x-cut in a stone bound found at land of Irene Desmarias; thence along the northeasterly line of land now or formerly of said Desmarias as follows:

N 23° -03' -25" W, a distance of forty-two and 34/100 feet (42.34) to a point, and

N 19° -33' -29" E, a distance of twenty-two and 00/100 feet (22.00) to a drill hole set in the granite retaining wall of the Merrimack River; thence along the Merrimack River by said retaining wall:

N 48° -01' -43" W, a distance of ten and 00/100 feet (10.00) to a drill hole set,

N 23° -55' -13" E, a distance of one hundred sixty-five and 57/100 feet (165.57) to a point,

N 24° -14' -32" E, a distance of seventy-four and 06/100 feet (74.06) to a drill hole set, and

N 42° -50' -42" E, a distance of seventy-seven and 48/100 feet (77.48) to a drill hole set on the southwesterly line of School Street; thence along said line of School Street

S 46° -51' -34" E, a distance of seven and 00/100 feet (7.00) to the point of beginning.

Containing fifteen thousand nine hundred and fifty-seven (15,957) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND

PARCEL: PAWTUCKET GATE HOUSE WALL AND LOCK CHAMBER

Beginning at a point at the most southeasterly corner of a brick building called the Pawtucket Gate House, said point being fifteen and 35/100 feet (15.35) distant from the northwesterly line of Parcel 29; thence

N 46°-55'-36" W, along the most southerly face of the building, a distance of one hundred eighteen and 70/100 feet (118.70) to a point; thence along a curve to the right along the face of said building a distance of five feet (5) to a point; thence

N 43°-12'-10" E, along the most westerly face of said building a distance of sixteen feet (16), more or less, to the end of a granite wall at the face of a concrete and granite wall; thence

NORTHWESTERLY, along said concrete and granite wall a distance of sixteen (16) feet, more or less; thence

SOUTHERLY, more or less, by the face of a granite wall by the following distances: ten feet (10), more or less, thence thirteen feet (13), more or less, and eight feet (8), more or less, around a curved section of wall; thence

SOUTHEASTERLY, along the face of the aforementioned granite wall, said face of wall being approximately parallel with and two and 7/10 feet (2.7) south of the southerly face of the Pawtucket Gate House, a distance of one hundred and twelve feet (112), more or less, to an angle point; thence along the face of said wall a distance of ten feet (10), more or less; thence along the face of said wall around a curve a distance of seven feet (7), more or less; thence along the face of said wall a distance of ten feet (10), more or less; thence

SOUTHEASTERLY, along a concrete wall, said wall being approximately parallel with School Street a distance of fifteen feet (15), more or less, to a point; thence

N 42°-50'-42" E, along land now or formerly of the Proprietors of Locks and Canals, a distance of twenty-three feet (23), more or less, to a drill hole set at the southerly line of School Street; thence

N 46°-51'-34" W, along the southerly line of School Street and land now or formerly of the Proprietors of Locks and Canals a distance of three feet (3), more or less, to a point; thence

NORTHEASTERLY, approximately perpendicular to the southerly line of School Street and under the School Street Bridge along the easterly face of the easterly granite wall of the lock chamber, fifty-eight feet (58), more or less, to the northerly line of School Street; thence

SOUTHEASTERLY, along said granite wall and the northerly line of School Street a distance of six feet (6), more or less, to a point; thence

NORTHEASTERLY, along the westerly face of a granite wall by land now or formerly of the Proprietors of Locks and Canals one hundred and twenty feet (120), more or less, and seventeen feet (17), more or less, to the shoreline; thence

SOUTHWESTERLY, along the westerly face of the easterly granite wall of the Northern Canal a distance of ninety-three feet (93), more or less, to a point; thence

NORTHWESTERLY, crossing the Lock Chamber a distance of nineteen feet (19), more or less, to the westerly face of the westerly granite of the Lock Chamber; thence

SOUTHWESTERLY, along said face of wall a distance of thirty-six feet (36), more or less, to the northerly line of School Street; thence

S 46°-51'-34" E, along the northerly line of School Street a distance of three feet (3), more or less, to a point; thence

SOUTHWESTERLY, approximately perpendicular to the northerly line of School Street and under the School Street Bridge along the westerly face of the westerly granite wall of the lock chamber, fifty-eight feet (58), more or less, to the southerly line of School Street; thence along the easterly face of the Pawtucket Gate House

S 43°-12'-10" W, a distance of twenty feet (20), more or less, to the point of beginning.

Containing three thousand seven hundred and ten (3,710) square feet, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 29-B

Beginning at a point on the northeasterly line of School Street and on the northerly side of the Northern Canal; thence along the line of School Stre

N 46°-51'-34" W, a distance of about fifteen feet (15) to the face of a concre wall at the Merrimack River; thence by the Merrimack River along said wall

NORTHEASTERLY, more or less, a distance of about twenty-four feet (24) to the shoreline of the Merrimack River; thence along said shoreline

NORTHEASTERLY and EASTERLY, more or less, a distance of about one thousand two hundred and twenty-five feet (1,225) to a point on the northwesterly line of the Northern Canal Walkway; thence along the northwesterly line of said walkway

SOUTHWESTERLY, more or less, a distance of about three hundred and twenty-one feet (321) to the westerly end of the walkway; thence by the westerly end of the walkway

SOUTHERLY, more or less, a distance of seven and 5/10 feet (7.5) to a point at the back edge of the northerly granite wall of the Northern Canal; thence along said canal wall as follows:

S87°-35'-13" W, a distance of thirty-eight and 82/100 feet (38.82) to an iron pin set,

WESTERLY, more or less, a distance of about two hundred and one feet (201) to an iron pin set,

SOUTHWESTERLY, more or less, a distance of about two hundred and thirty-eight (238) feet to an iron pin set, and

SOUTHWESTERLY, more or less, a distance of about one hundred and ninety-nine feet (199) to a point at the base of some granite steps; thence by the base of said steps

SOUTHEASTERLY, more or less, a distance of about two feet (2) to the water fac of the northerly granite wall of the Northern Canal; thence along said canal wall

S 54°-34'-18" W, a distance of ten and 34/100 feet (10.34) to a point, and

S 42°-34'-31" W, a distance of eighty-eight and 02/100 feet (88.02) to the point of beginning.

Containing two and 2/10 acres (2.2), more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 29-A

Beginning at a point at the northerly end of Falls Street, said point being on the northeasterly line thereof and bearing N 34°-31'-55" W and being one hundred fifty-one and 93/100 feet (151.93) distant from the northwesterly line of Pawtucket Street; thence running across the end of Falls Street

S 58°-04'-50" W, a distance of about twenty-six feet (26) to a point on the northeasterly line of land now or formerly of Robert Richards; thence along said line of Richards as follows:

N 33°-25'-55" W, a distance of about nine feet (9) to a point of curvature,

NORTHWESTERLY, more or less, by a curve to the left having a radius of twenty-four and 77/100 feet (24.77), an arc length of twenty-five and 13/100 feet (25.13) to a point of tangency, and

S 88°-25'-35" W, a distance of sixty-two and 28/100 feet (62.28) to a point at land now or formerly of Mathias Laurin; thence along the northerly line of said Laurin

S 88°-08'-35" W, a distance of one hundred eighty and 86/100 feet (180.86) to the center face of a granite post at land now or formerly of Lord Associates; thence along the northeasterly and northerly lines of Lord Associates as follows:

N 26°-09'-54" W, a distance of forty-four and 03/100 feet (44.03) to a point,

S 88°-37'-06" W, a distance of ninety -four and 07/100 feet (94.07) to a point of tangency, and

WESTERLY, more or less, by a curve to the left having a radius of six hundred ninety feet (690.00), an arc length of one hundred twenty-nine and 61/100 feet (129.61) to a point at land now or formerly of the Proprietors of Locks and Canals; thence along the northeasterly line of land of said Proprietors of Locks and Canals

N 21°-40'16" W, a distance of nineteen and 23/100 feet (19.23) to a point at the southerly edge of the southerly granite wall of the Northern Canal; thence running along said canal wall as follows:

N 86°-13'-11" E, a distance of one hundred twenty and 86/100 feet (120.86) to an iron pin set,

N 88°-06'-10" E, a distance of one hundred thirty-seven and 58/100 feet (137.58) to an iron pin set,

N 88°-29'-09" E, a distance of one hundred fifty and 63/100 feet (150.63) to an iron pin set,

S 89°-25'-37" E, a distance of thirty-three and 70/100 feet (33.70) to a point,

PARCEL: 29-A (cont'd)

N 86°-35'-12" E, a distance of fifty-four and 77/100 feet (54.77) to an iron pin set,

S 87°-37'-19" E, a distance of thirteen and 46/100 feet (13.46) to a point,

S 64°-33'-48"E, a distance of fourteen and 65/100 feet (14.65) to a point,

S 46°-05'-09" E, a distance of ten and 58/100 feet (10.58) to an iron pin set

S 32°-44'-56" E, a distance of ten and 85/100 feet (10.85) to a point, and

S 35°-07'-44" E, a distance of twenty and 45/100 feet (20.45) to a drill hole set at the base of some steps; thence crossing said steps

S 35°-07'-44" E, a distance of about four feet (4) to the face of a granite wall; thence by said wall;

S 58°-04'-50" W, a distance of about sixteen feet (16) to a point, and

SOUTHERLY, more or less, a distance of about five feet (5) to the point of beginning.

Containing eighteen thousand five hundred and eighty-six square feet (18,586) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-B

Beginning at a point on the southwesterly line of University Ave. point bearing N 45°-19'-56" W and being six and 51/100 feet (6.51) distant from the point of curvature leading to Pawtucket Street; thence along a wall by land now or formerly of Faneros

S 53°-32'-58" W, a distance of twenty-eight and 57/100 feet (28.57) to a drill hole in a stone bound found; thence running by land now or formerly of Faneros, by land of the Members of the Catholic Association, and by land of Reppucci

S 53°-32'-58" W, a distance of four hundred ninety-five and 24/100 feet (495.24) to the face of a granite wall at land now or formerly of said Reppucci; thence along land of Reppucci by said wall:

N 37°-59-38" W, a distance of eleven and 75/100 feet (11.75) to a drill hole in a stone bound found, and

S 57°-39'-52" E, a distance of one hundred seven and 63/100 feet (107.63) to a point at the face of said granite wall; thence

NORTHWESTERLY, more or less, a distance of about seven feet (7) to the southeasterly shoreline of the Northern Canal; thence along said canal shoreline

NORTHEASTERLY, more or less, a distance of about six hundred and twenty-seven feet (627) to a point on the southwesterly line of University Ave. thence along said line of University Ave.

S 45°-19'-56" E, a distance of about twenty-eight feet (28) to the point of beginning.

Containing thirteen thousand eight hundred and sixty-five square feet (13,865 of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 PG 177

PROPOSED DESCRIPTION OF LAND
PARCEL: 30-A

Beginning at a drill hole found in the capstone of a granite wall on the northwesterly line of Pawtucket Street, said drill hole being at the point of curvature leading to University Avenue thence along University Avenue

WESTERLY, more or less, by a curve to the right having a radius of thirty-seven and 90/100 feet (37.90), an arc length of fifty-six and 65/100 feet (56.65) to a point of tangency on the northeasterly line of said University Avenue thence along said line of University Avenue

N 45°-19'-56" W, a distance of twenty-nine feet(29), more or less, to the southeasterly shoreline of the Northern Canal; thence along said shoreline

NORTHEASTERLY, more or less, a distance of about one hundred and seventy feet (170) to a point on the northwesterly line of Pawtucket Street; thence along the line of Pawtucket Street:

S 45°- 19'-34" W, a distance of about thirty feet (30) to a drill hole in a stone bound found, and

S 49°-01'-35" W, a distance of ninety and 35/100 feet (90.35) to the point of beginning.

Containing four thousand nine hundred and fifty square feet (4,950) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: NORTHERN CANAL WASTE GATEHOUSE

Beginning at a point on the southwesterly wall of the Northern Canal Waste Gatehouse, said point being the northeasterly corner of the Northern Canal Walkway as hereinafter described; thence running by the northerly end of said walkway and by the Merrimack River

N 29°-58'-11" W, a distance of thirteen and 58/100 feet (13.58) to the southwest corner of the gatehouse; thence along the wall of the gatehouse as follows:

N 60°-01'-49" E, by the Merrimack River, a distance of sixty-seven and 39/10 feet (67.39) to a corner,

S 29°-58'-11" E, a distance of fourteen and 82/100 feet (14.82) to a corner at the Northern Canal, and, along said canal

S 60°-01'49" W, a distance of sixty-seven and 39/100 feet (67.39) to the southeast corner of the gatehouse; thence along the southwesterly wall of the gatehouse

N 29°-58'-11" W, a distance of one and 24/100 feet (1.24) to the point of beginning.

Containing nine hundred and ninety-nine square feet (999) of land , more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 179

PROPOSED DESCRIPTION OF LAND
PARCEL: NORTHERN CANAL WALKWAY

Beginning at a point on the southwesterly wall of the Northern Canal Waste Gatehouse, said point being one and 24/100 feet (1.24) distant from the southeasterly corner thereof; thence running along the southeasterly edge of the granite walkway along the Northern Canal as follows:

S 55°-59'-38" W, a distance of thirty-five and 35/100 feet (35.35) to a point

S 54°-48'-52" W, a distance of four hundred ninety-one and 45/100 feet (491.45) to a point,

S 55°-30'-18" W, a distance of forty and 24/100 feet (40.24) to a point,

S 58°-18'-36" W, a distance of thirty-six and 51/100 feet (36.51) to a point,

S 60°-52'-05" W, a distance of twenty-five and 18/100 feet (25.18) to a point,

S 63°-25'-15" W, a distance of eighteen and 43/100 feet (18.43) to a point,

S 64°-23'-07" W, a distance of thirteen and 70/100 feet (13.70) to a point,

S 66°-21'-58" W, a distance of thirty-one and 35/100 feet (31.35) to a point,

S 68°-30'30" W, a distance of thirty-one and 77/100 feet (31.77) to a point,

S 72°-39-30" W, a distance of thirty and 91/100 feet (30.91) to a point,

S 75°-12'31" W, a distance of thirty-three and 70/100 feet (33.70) to a point,

S 78°-46'-51" W, a distance of thirty-nine and 43/100 feet (39.43) to a point,

S 82°-18'-38" W, a distance of thirty and 40/100 feet (30.40) to a point,

S 85°-23'-04" W, a distance of thirty-seven and 57/100 feet (37.57) to a point,

S 87°-43'-27" W, a distance of twenty-six and 22/100 feet (26.22) to a point, and

S 88°-33'-07" W, a distance of two hundred fifty-eight and 29/100 feet (258.29) to a point at the end of a granite wall of the Northern Canal; thence running by the westerly end of the walkway and along Parcel 29-B

N 01°-26'-54" W, a distance of nine and 5/10 feet (9.5) to a point on the northwesterly edge of the walkway; thence running along the edge of said walkway by Parcel 29-B and the Merrimack River

EASTERLY and NORTHEASTERLY, more or less, a distance of about one thousand one hundred and seventy-seven feet (1,177) to a point on the southwesterly 71

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PARCEL: NORTHERN CANAL WALKWAY (contd.)

the northwesterly edge of the walkway, said northwesterly edge being nine and 5/10 feet (9.5) distant from and running parallel with the southeasterly edge of the walkway as hereinbefore described; thence along the southwesterly wall of the Northern Canal Waste Gatehouse

S 29°-58'-11" E, a distance of ten and 06/100 feet (10.06) to the point of beginning.

Containing eleven thousand and thirty-eight square feet (11,038) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 65-Y

Beginning at a point on the southeasterly line of Cabot Street, said point being at the land edge of the easterly granite wall of the Northern Canal; thence along said line of Cabot Street

N 48°-17'-37" E, a distance of eleven and 56/100 feet (11.56) to a point at land now or formerly of Murray Printing Company; thence along the southwesterly line of Murray Printing Company

S 41°-39'-43" E, a distance of four hundred seventy-four and 89/100 feet (474.89) to a point on the northwesterly line of Suffolk Street; thence along said line of Suffolk Street

S 48°-19'-10" W, a distance of eleven and 73/100 feet (11.73) to a point at the land edge of the easterly granite wall of the Northern Canal; thence along said canal wall:

N 41°-38'-39" W, a distance of four hundred fifty-one and 42/100 feet (451.42 to a drill hole set, and

N 41°-38'-39" W, a distance of twenty-one and 27/100 feet (21.27) to the point of beginning.

Containing five thousand five hundred and twenty-eight square feet (5,528) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 182

PROPOSED DESCRIPTION OF LAND

PARCEL: TREMONT CATEHOUSE

Beginning at the southeasterly corner of the gatehouse, said corner being at the head of the Tremont Wasteway, and bearing N 41° -52' -13" W and being twelve and 55/100 feet (12.55) distant from the northwesterly line of land now or formerly of the Commonwealth of Massachusetts; thence across the head of said Tremont Wasteway

N 41° -52' -13" W, a distance of thirty-one and 30/100 feet (31.30) to the most westerly corner of the gatehouse; thence by a granite wall and by Part Parcels 5610 & 5362 as hereinafter described as follows:

N 48° -07' - 47" E, a distance of twelve and 20/100 feet (12.20) to a corner,

S 41° -52' - 13" E, a distance of thirty-one and 30/100 feet (31.30) to a corner, and

S 48° -07' - 47" W, a distance of twelve and 20/100 feet (12.20) to the point of beginning.

Containing three hundred and eighty-two (382) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
60 Rand Street, Lynn, MA 01904
(617) 593-3395 •PG 183

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-E LOT A

Beginning at a point on the southeasterly line of Suffolk Street, said point being at a thirty foot right-of-way; thence along said thirty foot right-of-way

S 41°-36'-20" E, a distance of ten and 40/100 feet (10.40) to a PK nail set in a wood deck; thence along the back edge of the northwesterly granite wall of the Tremont Wasteway

S 48°-19'-26" W, a distance of four hundred seventy-five and 86/100 feet (475.86) to a PK nail set in a wall; thence along said wall

N 40°-26'-22" W, a distance of ten and 36/100 feet (10.36) to a point on the southeasterly line of Suffolk Street; thence along said line of Suffolk Street

N 48°-19'-10" E, a distance of four hundred seventy-five and 65/100 feet (475.65) to the point of beginning.

Containing four thousand nine hundred and thirty-eight square feet (4,938) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 595-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-E LOT C

Beginning at an iron pin set at the northeast corner of Suffolk Street and Perkins Street; thence along the northeasterly line of Perkins Street

N 41°-40'-50" W, a distance of seventy- two and 52/100 feet (72.52) to a PK nail set at land now or formerly of George W. McQuade; thence along the southeasterly line of McQuade

N 48°-19'-10" E, a distance of twenty and 02/100 feet (20.02) to a PK nail set at the back edge of the southwesterly granite wall of the Lawrence Canal; thence along said canal wall:

S 43°-07'-56" E, a distance of twenty-one and 56/100 feet (21.56) to a chain link fence post,

S 43°-07'-56" E, a distance of thirteen and 81/100 feet (13.81) to a chain link fence post,

S 40°-33'-30" E, a distance of forty and 14/100 feet (40.14) to a chain link fence post, and

S 12°-24'-37" E, a distance of eight and 32/100 feet (8.32) to a chain link fence post at the Lower Level of the Western Canal; thence along the back edge of the northwesterly granite wall of said Lower Level of the Western Canal as follows:

S 25°-02'-30" W, a distance of eight and 53/100 feet (8.53) to a chain link fence post,

S 47°-47'-35" W, a distance of thirty-five and 25/100 feet (35.25) to a chain link fence post,

S 47°-19'-23" W, a distance of thirtytwo and 29/100 feet (32.29) to an iron pin set,

S 49°-49'-54" W, a distance of eighty-five and 90/100 feet (85.90) to an iron pin set,

S 47°-51'-11" W, a distance of one hundred twenty-four and 42/100 feet (124.42 to a point,

S 65°-28'-17" W, a distance of sixteen and 37/100 feet (16.37) to an iron pin set, and

S 49°-24'-19" W, a distance of forty-eight and 63/100 feet (48.63) to a drill hole set on the northeasterly line of a thirty foot right-of-way; thence along said right-of-way

N 41°-36'-20" W, a distance of seven and 47/100 feet (7.47) to a point on the southeasterly line of Suffolk Street; thence along said line of Suffolk Street

N 48°-19'-10" E, a distance of three hundred thirty-three and 85/100 feet (333.85) to the point of beginning. 76

PARCEL: CB-E LOT C (cont'd.)

Containing five thousand eight hundred and forty-four square feet (5,844) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: PART PARCELS 5610 & 5362

Beginning at a point on the southeasterly line of Suffolk Street, said point being at the southwesterly corner of Parcel CB-E Lot A; thence along said Parcel CB-E Lot A

S 40° -26' - 22" E, a distance of ten and 36/100 feet (10.36) to a PK nail set in a granite wall; thence along the wall and crossing the Tremont Wasteway

S 40° - 26' - 22" E, a distance of twenty-nine and 98/100 feet (29.98) to a chisel cut set in said wall at land now or formerly of the Commonwealth of Massachusetts; thence along the northwesterly line of land of the Commonwealth of Massachusetts as follows:

S 48° - 21' - 10" W, a distance of thirteen and 29/100 feet (13.29) to a point,

S 41° - 26' - 38" E, a distance of twelve and 63/100 feet (12.63) to a point, and

S 48° - 19' - 12" W, a distance of fourteen and 26/100 feet (14.26) to an x-cut set on the granite wall at the head of the Tremont Wasteway; thence by the head of said Tremont Wasteway

N 41° - 52' - 13" W, a distance of twelve and 55/100 feet (12.55) to the southeasterly corner of the Tremont Gatehouse; thence along the walls of said gatehouse as follows:

N 48° - 07' - 47" E, a distance of twelve and 20/100 feet (12.20) to a corner,

N 41° - 52' - 13" W, a distance of thirty-one and 30/100 feet (31.30) to a corner, and

S48° - 07' - 47" W, a distance of nine and 20/100 feet (9.20) to a point at the back edge of the granite wall at the head of the Tremont Wasteway; thence along said wall

N 21° - 11' - 46" W, a distance of ten and 44/100 feet (10.44) to a point on the southeasterly line of Suffolk Street; thence along said line of Suffolk Street:

N 53° - 13' - 55" E, a distance of eight and 00/100 feet (8.00) to an angle in said street, and

N 48° - 19' - 10" E, a distance of fourteen and 00/100 feet (14.00) to the point of beginning.

Containing eight hundred and ninety-four (894) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 187

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-C LOT I

Beginning at a point on the northeasterly line of Moody Street, said point being an iron pin set at the southeasterly corner of land now or formerl of the Lowell Apartments; thence along the southeasterly line of said Lowell Apartments

N 33°-10'-15" E, a distance of two hundred twelve and 43/100 feet (212.43) to a point on the southwesterly line of French Street Extension; thence along said line of French Street Extension

S 56°-01'-24" E, a distance of one and 63/100 feet (1.63) to a point at the back edge of the northwesterly granite wall of the Western Canal; thence along the back edge of said canal wall as follows:

S 33°-09'-14" W, a distance of four and 16/100 feet (4.16) to an iron pin set,

S 33°-09'14" W, a distance of one hundred fifty-one and 42/100 feet (151.42) to an iron pin set,

S 17°-32'-06" W, a distance of fifty-seven and 31/100 feet (57.31) to an iron pin set, and

S 28°-57-00" W, a distance of one and 65/100 feet (1.65) to a point on the northeasterly line of Moody Street; thence along said line of Moody Street

N 56°-50'-00" W, a distance of seventeen and 25/100 feet (17.25) to the point of beginning.

Containing eight hundred and five square feet.(805) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 188

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-C LOT G

Beginning at a point on the northeasterly line of Merrimack Street, said point being at the southerly corner of land now or formerly of the Lowell Development Authority; thence along the southeasterly line of said Lowell Development Authority, being the southeasterly line of a fifteen foot wide easement of the Proprietors of Locks and Canals

N 33°-10'-15" E, a distance of one hundred seventy-two and 90/100 feet (172.9(to a spike set on the southwesterly line of Moody Street; thence along said line of Moody Street

S 56°-50'-00" E, a distance of sixteen and 37/100 feet (16.37) to a point at the back edge of the northwesterly granite wall of the Western Canal; thence along the Western Canal, in part by the back edge of a granite wall and in part by the shoreline thereof

SOUTHERLY, more or less, along the shoreline and two sections of granite distances of forty feet (40), seventy-five feet (75), and fifty-nine feet (59) to a drill hole set on the northeasterly line of Merrimack Street; thence along said line of Merrimack Street

N 56°-50'-00" W, a distance of twenty and 90/100 feet (20.90) to the point of beginning.

Containing three thousand four hundred square feet (3,400) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 189

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-C, Lot E

Beginning at a spike set at the northeasterly corner of Suffolk Street and Market Street; thence running along the easterly line of Suffolk Street

N 33° -10' -15" E, a distance of one hundred seventy-one and 85/100 feet (171.85) to a drill hole set at the corner of Merrimack Street; thence running along the southerly line of said Merrimack Street

S 56° -50' -00" E, a distance of seventeen and 55/100 feet (17.55) to a point at the land edge of the granite wall of the Western Canal; thence running along said wall of the Western Canal

S 32° -46' -59" W, a distance of one hundred seventy and 98/100 feet (170.98) to a point on the northerly line of Market Street; thence along the line of Market Street

N 56° -46' -50" W, a distance of eighteen and 71/100 feet (18.71) to the point of beginning.

Containing three thousand one hundred fifteen (3,115) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-C Lot C

Beginning at a drill hole set at the northeasterly corner of Suffolk Street and Jefferson Street; thence running along the easterly line of Suffolk Street

N 11° -11' -30" W, a distance of four hundred eighty-two and 44/100 feet (482.44) to a spike set in the granite curb at the point of curvature leading to Market Street; thence

NORTHEASTERLY, more or less, by a curve to the right having a radius of eleven and 46/100 feet (11.46), an arc length of twenty-six and 87/100 feet (26.87) to an x-cut set in the concrete walk; thence running along the southerly line of Market Street

S 56° -46' -50" E, a distance of about eighteen feet (18) to the westerly shoreline of the Western Canal; thence along the westerly shoreline of said Western Canal

SOUTHERLY, more or less, a distance of about four hundred eighty feet (480) to a point on the northerly line of Jefferson Street; thence running along said northerly line of Jefferson Street

S 78° -52' -10" W, a distance of about twenty-five feet (25) to the point of beginning.

Containing ten thousand nine hundred and five square feet (10,905) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 191

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-C Lot A

Beginning at a drill hole set in the concrete sidewalk at the northeasterly corner of Suffolk Street and Broadway; thence running along the easterly line of Suffolk Street

N 11° -11'-30" W, a distance of three hundred twenty-one and 90/100 feet (321.90) to a drill hole set at the southeasterly corner of Suffolk Street and Jefferson Street; thence running along the southerly line of Jefferson Street

N 78°-52' -10" E, a distance of twenty-three and 58/100 feet (23.58) to a drill hole set on the westerly line of the Western Canal; thence running along the back edge of the concrete retaining wall of said Western Canal as follows:

S 11° -18' -00" E, a distance of one hundred sixty and 76/100 feet (160.7[illegible] to a spike set, and

S 11° -11' -27" E, a distance of one hundred sixty-one and 69/100 feet (161.69) to the northerly line of Broadway; thence running along said northerly line of Broadway

S 80° -04' -33" W, a distance of twenty-three and 88/100 feet (23.88) to the point of beginning.

Containing seven thousand five hundred and ninty-seven square feet (7,597) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 24

Beginning at the northwesterly corner of Dutton Street and Hayden Street, said corner being the southeasterly corner of the parcel described; thence along the northwesterly line of Hayden Street

S 80°-30'-30" W, a distance of one hundred fifty and 82/100 feet (150.82) to the easterly line of Worthen Street; thence along said Worthen Street

N 09°-34'-16" W, a distance of seventeen and 24/100 feet (17.24) to a point at the back edge of the southeasterly granite wall of the Western Canal; thence along said canal wall

N 80°-23'-13" E, a distance of one hundred fifty-four and 75/100 feet (154.75) to a point on the westerly line of Dutton Street; thence along said Dutton Street

SOUTHERLY, more or less, by a curve to the right having a radius of one thousand two hundred ten and 46/100 feet (1,210.46), an arc length of eighteen and 01/100 feet (18.01) to the point of beginning.

Containing two thousand eight hundred and thirty-nine square feet (2,839) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 193

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-D LOT J

Beginning at an iron pin set on the northeasterly line of Moody Street, said pin being at the southwesterly corner of land now or formerly of Lowell Apartments; thence along said northeasterly line of Moody Street

N 56°-50-00" W, a distance of ten and 28/100 feet (10.28) to a point at the back edge of the southeasterly granite wall of the Western Canal; thence alon; said canal wall:

N 33°-40'-12" E, a distance of four and 62/100 feet (4.62) to an iron pin set and

N 45°-45'-12" E, a distance of forty-seven and 00/100 feet (47.00) to a point at land now or formerly of Lowell Apartments; thence along the northwesterly line of said Lowell Apartments

S 33°-09'-51" W, a distance of fifty and 49/100 feet (50.49) to the point of beginning.

Containing two hundred and eighty-two square feet (282) of land, more or less

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-D LOT H

Beginning at a point on the northeasterly line of Merrimack Street, said point being at the southwesterly corner of land now or formerly of the Lowell Development Authority; thence along said northeasterly line of Merrimack Street

N 56°-50'-00" W, a distance of ten and 83/100 feet (10.83) to a drill hole set at the land edge of the granite wall of the Western Canal; thence running along the land edge of the southeasterly granite wall of the Western Canal as follows:

N 31°-14'-15" E, a distance of twenty-seven and 54/100 feet (27.54) to a dril hole set,

N 32°-55'07" E, a distance of sixty-five and 39/100 feet (65.39) to an iron pin set,

NORTHEASTERLY, more or less, a distance of about thirty-eight feet (38) to an iron pin set, said pin bearing N45°-02'-42" E, and being thirty-six and 79/100 feet (36.79) distant from the last point mentioned,

N 28°-16'-36" E, a distance of thirty-eight and 94/100 feet (38.94) to an iron pin set, and

N 28°-31'46" E, a distance of four and 92/100 feet (4.92) to a point on the southwesterly line of Moody Street; thence along said line of Moody Street

S 56°-50'-00" E, a distance of eight and 19/100 feet (8.19) to a drill hole set at land now or formerly of the Lowell Development Authority; thence along the northwesterly line of said Lowell Development Authority

S 33°-09'-51" W, a distance of one hundred seventy-two and 90/100 feet (172.90) to the point of beginning.

Containing one thousand one hundred and sixty-seven square feet (1,167) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 195

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-D, LOT F

Beginning at an iron pin set at the northwesterly corner of Market Street and Hanover Street; thence along the northerly line of Market Street

N 56° -46' -50" W, a distance of thirteen and 80/100 feet (13.80) to a point at the back edge of the granite wall of the Western Canal thence running along the back edge of said wall as follows:

N 33° -29' -15" E, a distance of seven and 86/100 feet (7.86) to an iron pin set,

N 33° -29' -15" E, a distance of sixty-three and 90/100 feet (63.90) to an iron pin set,

N 33° -43' -33" E, a distance of thirty-eight and 38/100 feet (38.38) to an iron pin set,

N 32° -27' -04" E, a distance of fifty-eight and 96/100 feet (58.96) to a drill hole set, and

N 32° -27' -04" E, a distance of two and 81/100 feet (2.81) to a point on the southerly line of Merrimack Street; thence along said southerly line of Merrimack Street

S 56° -50' -00" E, a distance of thirteen and 79/100 feet (13.79) to a drill hole set at the corner of Hanover Street; thence along the westerly line of Hanover Street

S 33° -09' -51" W, a distance of one hundred seventy-one and 91/100 feet (171.91) to the point of beginning.

Containing two thousand three hundred and ten (2,310) square feet of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-D, Lot D

Beginning at a spike set at the northwesterly corner of Jefferson Street and Lewis Street; thence running along the northerly line of Jefferson Street.

S 78° -52' -10" W, a distance of about twenty-three feet (23) to the easterly shoreline of the Western Canal; thence along said shoreline of the Western Canal

NORTHERLY, more or less, a distance of about four hundred and fifty-two feet (452). to a point on the southwesterly line of Market Street; thence along said southwesterly line of Market Street

S 56° -46' -50" E, a distance of about forty-five feet (45) to a drill hole set in the concrete sidewalk at the southwesterly corner of Market Street and Lewis Street; thence along the westerly line of Lewis Street

S 11° -11' -30" E, a distance of four hundred eleven and 18/100 feet (411.18) to the point of beginning.

Containing eight thousand six hundred and thirty-five (8,635) square feet of land, more or less.

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66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 197

PROPOSED DESCRIPTION OF LAND

PARCEL: CB-D, Lot B

Beginning at a drill hole set in the granite curb at the northwesterly corner of Broadway and Lewis Street; thence running along the northerly line of Broadway

S 80° -04' -33" W, a distance of about twenty-five feet (25) to the easterly shoreline of the Western Canal; thence running along said easterly shoreline of the Western Canal

NORTHERLY, more or less, a distance of about three hundred and twenty- eight feet (328) to a point on the southerly line of Jefferson Street; thence along said line of Jefferson Street

N 78° -52' -10" E, a distance of about twenty-four feet (24) to a spike set at the corner of Lewis Street; thence running along the westerly line of Lewis Street

S 11° -11' -30" E, a distance of three hundred twenty-four and 02/100 feet (324.02) to the point of beginning.

Containing six thousand four hundred and fifty (6,450) square feet of land, more or less.

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66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 198

PROPOSED DESCRIPTION OF LAND
PARCEL: CB-D LOT N

Beginning at a point on the westerly line of land now or formerly of Joan Fabrics Corp., said point bearing S 09°-30'-00" E, and being two hundred ninety-eight and 92/100 feet (298.92) distant from an iron pin found on the southerly line of Broadway; thence along said westerly line of Joan Fabrics Corp.

S 09°-29'-38" E, a distance of two hundred twenty-eight and 20/100 feet (228.20) to an old artillery shell found at the corner of land now or formerly of Dutton Street Associates; thence along the westerly line of land of Dutton Street Associates

S 09°-32'-27" E, a distance of two hundred five and 81/100 feet (205.81) to other land of said Dutton Street Associates; thence along the northerly line of said other land of Dutton Street Associates

S 80°-27'-33" W, a distance of seven and 47/100 feet (7.47) to a point at the back edge of the easterly granite wall of the Western Canal; thence along said canal wall as follows:

N 09°-14'-49" W, a distance of three hundred sixty-eight and 43/100 feet (368.43) to a point,

N 12°-53'-42" W, a distance of twenty-nine and 63/100 feet (29.63) to a point, and

N 38°-44'-15" W, a distance of twenty-one and 18/100 feet (21.18) to a point at land now or formerly of George and Demosthenes Macheras; thence along the southeasterly line of said Macheras

N 35°-57'-53" E, a distance of twenty-five and 00/100 feet (25.00) to the point of beginning.

Containing three thousand square feet (3,000) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 199

PROPOSED DESCRIPTION OF LAND
PARCEL: 99,100, 100A

Beginning at a point on the southerly side of the V.F.W. Highway, said point being the most northwesterly corner of the parcel described; thence along the southerly line of the V.F.W. Highway

NORTHEASTERLY, more or less, by a curve to the right having a radius of two thousand feet (2000.00) even, and an arc length of two hundred twelve and 18/100 feet (212.18) to a stone bound found; thence still along the V.F.W. Highway

N 56°-41'-14" E, a distance of eight hundred eleven and 23/100 feet (811.23) to a point; thence still along the V.F.W. Highway

NORTHEASTERLY, more or less, by a curve to the left having a radius of one thousand two hundred eighty three feet (1283.00) even, and an arc length of two hundred twenty five and 29/100 feet (225.29) to an iron pin set; thence by land of the City of Lowell

S 50°-00'-00" E, a distance of two and 52/100 feet (2.52) to an iron pin set; thence still by land of the City of Lowell

N 46°-52'-40"E, a distance of sixty seven and 21/100 feet (67.21) to an iron pin set; thence still by land of the City of Lowell

S 50°-00'-00" E, a distance of three and 91/100 feet (3.91) to an iron pin set; thence still by land of the City of Lowell

N 53°-44'-51" E, a distance of eighty eight and 49/100 feet (88.49) to a drill hole set at the westerly line of School Street; thence along the westerly line of School Street

SOUTHEASTERLY, more or less, by a curve to the right having a radius of forty two feet (42.00) even with an arc length of fourteen feet (14.00) even to an iron pin set; thence still along the westerly line of School Street

S 51°-42'-02" E, a distance of fourteen feet (14+) to the shore line of the Merrimack River; thence along the northerly bank of the Merrimack River

SOUTHWESTERLY, more or less, a distance of one thousand fifty five feet (1055 ±) more or less to a point; thence by land of the Commonwealth of Massachusetts

N 32°-31'-48" W, a distance of twenty nine feet (29 ±) more or less to the point of beginning.

Containing one (1) acre of land more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
Parcel 102

Beginning at a point on the southerly side of the V.F.W. Highway, said point being the most northeasterly corner of the parcel described ; thence running along the southerly line of the V.F.W. Hignway

EASTERLY, more or less,by a curve to the left having a radius of four hundred feet (400.00) even, and an arc length of one hundred seventy nine and 82/100 feet (179.82) to a pin in lead plug found; thence still along the V.F.W. Hignway

S 42°-58'-22" W, a distance of two hundred ninty two and 18/100 feet (292.18) to a drill hole found in a concrete wall, thence by land now or formerly of the City of Lowell by five (5) courses as follows

S 49°-20'-00" E, a distance of twelve and 86/100 feet (12.86), thence

S 22°-40'- 00"W, a distance of fifty seven and 05/100 feet (57.05), thence

S 39°-41'-58" W, a distance of one hundred fourteen and 44/100 feet (114.44), thence

S 43°-51'-22" E, a distance of nineteen and 90/100 feet (19.90), thence

S 43°-14'-31" W, a distance of seventy six and 80/100 feet (76.80),to the intersection of the easterly line of School Street, thence along the easterly line of School Street

S 51°-42'-02" E, a distance of fourteen feet (14 ±) to a point; thence by the northerly side of the Merrimack River

NORTHEASTERLY, more or less, seven hundred and seven feet (707±),more or less, to a point; thence by parcel 103 now or formerly belonging to the Proprieters of Locks and Canals

NORTHERLY, more or less, a distance of fifteen feet (15±), more or less, to the point of beginning.

Containing thirty two thousand eight hundred square feet of land (32,800) more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 201

PROPOSED DESCRIPTION OF LAND
PARCEL : 103

Beginning at a point on the southerly side of the V.F.W. Highway, said point being the most northwesterly corner of the parcel described; thence along the southerly line of the V.F.W. Highway

NORTHEASTERLY, more or less, by a curve to the right having a radius of four hundred feet (400.00) even and an arc length of one hundred eighty seven and 38/100 feet (187.38) to a pin in lead plug found; thence continuing by the V.F.W. Highway by seven (7) courses as follows:

S 84°-25'-46" E, a distance of one hundred fifty eight and 89/100 feet (158,89) to a pin in lead plug found; thence

EASTERLY, more or less, by a curve to the left having a radius of one thousand feet (1000.00) even and an arc length of one hundred twenty seven and 64/100 feet (127.64) to a pin in lead plug found; thence

N 88°-15'-26" E, a distance of seventy three and 64/100 feet (73.64) to a pin in lead plug found; thence

EASTERLY, more or less, by a curve to the left having a radius of four hundred eighty three feet (483.00) and an arc length of one hundred thirty eight and 56/100 feet (138.56) to a pin in lead plug found; thence

N 71°-49'-13" E, a distance of one hundred ninty one and 28/100 feet (191.28) to a stone bound found; thence

NORTHEASTERLY, more or less, by a curve to the left having a radius of four hundred eighty three feet (483.00) even and an arc length of two hundred twenty seven and 29/100 feet (227.29) to a stone bound found; thence

N 44°-51'-30" E, a distance of sixty and 84/100 feet (60.84) to a point; thence

SOUTHEASTERLY, more or less, by a curve to the right having a radius of sixty five feet (65.00) and an arc length of one hundred one and 83/100 feet (101.83) to a point at the easterly lind of Textile Avenue; thence along the easterly line of Textile Avenue

S 45°-23'-00" E, a distance of seventy six feet (76 ±), more or less, to the shore line of the Merrimack River; thence along the shoreline of the Merrimack River

WESTERLY , more or less, a distance of one thousand four hundred twenty five feet (1425 ±) to a point; thence by two (2) courses by lot 102 now or formerly of the Proprieters of Locks and Canals

NORTHEASTERLY, more or less, a distance of one hundred fifteen feet (115 ±) more or less to a point; thence

NORTHERLY, more or less, a distance of fifteen feet (15 ±) more or less to the point of beginning.

Containing two and 1/10 acres (2.1) of land more or less.

PG 202

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 33-C-1

Beginning at a point on the Northerly side of Aiken Street, said point being the most southeasterly corner of the parcel described; thence along the southerly side of the Merrimack River

N 48°-21'-35" W, a distance of three hundred thirty five and 92/100 feet (335.92) to a point; thence still along the southerly side of the Merrimack River

NORTHERLY, more or less, by a curve to the left having a radius of three hundred and two feet (302.00) and an arc length of one hundred seventy eight and 16/100 feet (178.16) to a point; thence by land of the Commonwealth of Massachusetts

S 33°-06'-10" W, a distance of eighty six and 26/100 feet (86.26) to a point; thence by two (2) courses by other land of the Commonwealth of Massachusetts as follows

SOUTHEASTERLY, more or less, by a curve to the right having a radius of two hundred twenty-seven feet (227.00) and an arc length of one hundred seventy and 88/100 feet (170.88) to a point; thence

S 48°-21'-35" E, a distance of three hundred forty one and 61/100 feet (341.61) to a land court disk found at the intersection of Aiken Street; thence by two (2) courses by Aiken Street as follows

N 33°-03'-40" E, a distance of thirty seven and 39/100 feet (37.39) to a spike found in a granite wall; thence

N 41°-28'-15" E, a distance of thirty eight and 03/100 feet (38.03) to the point of beginning.

Containing thirty eight thousand three hundred sixty nine (38,369) square feet of land more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND
PARCEL: 92-B

Beginning at a point at the northeasterly corner of the parcel, said point bearing S 48°-05'-10" W, and being two hundred fifty-four and 91/100 feet (254.91) distant from the southwesterly line of the Veterans of Foreign Wars Highway; thence along the northwesterly line of Parcel 91-H

S 48°-05'-10" W, a distance of fifty-two and 45/100 feet (52.45) to the line of the Merrimack River as established in 1882; thence along said established river line

NORTHWESTERLY, by a curve to the left having a radius of one thousand eight hundred and 00/100 feet (1800.00), an arc length of one hundred seventy-five and 62/100 feet (175.62) to a point at land now or formerly of the Proprietors of Locks and Canals; thence along the southwesterly line of said Proprietors

N 42°-27'-56" E, a distance of fifty-two and 44/100 feet (52.44) to a point on the southwesterly line of land now or formerly of the City of Lowell; thence along said line of the City of Lowell

SOUTHEASTERLY, more or less, by a curve to the right having a radius of one thousand eight hundred fifty and 00/100 feet (1850.00), an arc lenght of one hundred eighty and 53/100 feet (180.53) to the point of beginning.

Containing eight thousand nine hundred and nineteen square feet (8,919) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 107-A

Beginning at a point on the northeasterly line of the Veterans of Foreign Wars Highway, said point being on the southerly line of the City of Lowell Water Works right-of-way; thence along said right-of-way by the chord of a curve to the right

S 75°-35'-05" E, a distance of one hundred forty-one and 35/100 feet (141.35) to a point at land now or formerly of the City of Lowell; thence along the northwesterly line of the City of Lowell

S 42°-27'-56" W, a distance of eighty-eight and 64/100 feet (88.64) to a point on the northeasterly line of aforesaid Veterans of Foreign Wars Highway; thence along said northeasterly line of said highway

N 37°-27'-28" W, a distance of one hundred twenty-six and 70/100 feet (126.70) to the point of beginning.

Containing five thousand five hundred and fifty square feet (5,550) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND
PARCEL: 107

Beginning at a point on the southwesterly line of the Veterans of Foreign Wars Highway, said point being on the easterly line of the Merrimack River and Beaver Brook; thence along said southwesterly line of said highway

SOUTHEASTERLY, more or less, by a curve to the right, having a radius of six hundred and seventy-three feet (673.00), an arc length of three hundred and ninety feet (390), more or less, to a point at land now or formerly of the City of Lowell; thence along the northwesterly line of said City of Lowell

S 42°-27'-56" W, a distance of about two hundred and twenty-one feet (221) to the Merrimack River; thence along the Merrimack River

NORTHWESTERLY, more or less, a distance of about four hundred and seventeen feet (417) to the point of beginning.

Containing thirty-four thousand square feet (34,000) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 91-H

Beginning at a point at the northwesterly corner of the Veterans of Foreign Wars Highway and Aiken Street, said corner being the southeasterly corner of the parcel described; thence along the northwesterly line of Aiken Street

S 41°-28'-15" W, a distance of fifty and 43/100 feet (50.43) to a point on the line of the Merrimack River as established in 1882; thence along said river line:

N 41°-04'-05" W, a distance of four hundred ninety-six and 25/100 feet (496.25) to a point of curvature, and

NORTHWESTERLY, more or less, by a curve to the left having a radius of one thousand eight hundred and 00/100 feet (1800.00), an arc length of five hundred eighty-six and 33/100 feet (586.33) to a point on the southeasterly line of Parcel 92-B; thence along Parcel 92-B

N 48°-05'-10" E, a distance of fifty-two and 45/100 feet (52.45) to a point on the southwesterly line of land now or formerly of the City of Lowell; thence along land of said City of Lowell:

SOUTHEASTERLY, more or less, by a curve to the right having a radius of one thousand eight hundred fifty and 00/100 feet (1850.00), an arc length of five hundred eighty-six and 57/100 feet (586.57) to a point of tangency, and

S 41°-04'-05" E, a distance of four hundred nine and 07/100 feet (409.07) to a point on the southeasterly line of the Veterans of Foreign Wars Highway; thence along said line of said highway

S 41°-04'-05" E, a distance of eighty and 63/100 feet (80.63) to the point of beginning.

Containing fifty-three thousand nine hundred and seventy-one square feet (53,971) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS

66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 89-A

Beginning at the southwesterly intersection of Aiken Street and the Veterans of Foreign Wars Highway; thence along the southwesterly line of said Veterans of Foreign Wars Highway as follows:

S 41°-04'-05" E, a distance of one thousand forty-seven and 87/100 feet (1047.87) to a stone bound found,

S 48°-55'-55" W, a distance of ten and 00/100 feet (10.00) to a stone bound found,

S 41°-04'-05" E, a distance of three hundred eighty-six and 95/100 feet (386.95) to a stone bound found,

N 46°-00'-19" E, a distance of ten and 00/100 feet (10.00) to a stone bound found, and

S 41°-04'-05" E, a distance of one hundred sixty-two and 54/100 feet, (162.54) to a point at Parcel 89; thence along the northwesterly line of Parcel 89

S 43°-30'-57" W, a distance of fifty and 22/100 feet (50.22) to the line of the Merrimack River as established in 1882; thence along said established river line

N 41°-04'-05" W, a distance of one thousand five hundred ninety-five and 04/100 feet (1595.04) to a point on the southeasterly line of Aiken Street; thence along said line of Aiken Street

N 41°-28'-15" E, a distance of fifty and 43/100 feet (50.43) to the point of beginning.

Containing seventy-five thousand nine hundred and thirty-nine square feet (75,939) of land, more or less.

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66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 89

Beginning at a point on the southwesterly line of the Veterans of Foreign Wars Highway, said point being at the southeasterly corner of Parcel 89-A; thence along the southwesterly line of said highway

S 39°-15'-25" E, a distance of one hundred twenty-six and 36/100 feet (126.36) to a point at land of the City of Lowell; thence along the northwesterly line of said City of Lowell

S 40°-56'-33" W, a distance of thirty-one and 86/100 feet (31.86) to a point on the northeasterly line of Front Street; thence along said line of Front Street

N 49°-03'-27" W, a distance of one hundred three and 85/100 feet (103.85) to a point on the line of the Merrimack River as established in 1882; thence along said established river line

N 41°-04'-05" W, a distance of twenty-three and 14/100 feet (23.14) to a point at the southerly corner of Parcel 89-A; thence along the southeasterly line of Parcel 89-A

N 43°-30'-57" E, a distance of fifty and 22/100 feet (50.22) to the point of beginning.

Containing five thousand three hundred and thirty-four square feet (5,334) of land, more or less.

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66 Rand Street, Lynn, MA 01904
(617) 593-3395 • PG 209

PROPOSED DESCRIPTION OF LAND
PARCEL: 88

Beginning at a point on the southwesterly line of the Veterans of Foreign Wars Highway said point bearing S 39°-15'-25" E and being two hundred eighteen and 95/100 feet (218.95) distant from a stone bound found on the southwesterly line of said highway; thence along said southwesterly highway line

S 39°-15'-25" E, a distance of ninety-three and 59/100 feet (93.59) to an angle point in said highway at the northeasterly line of Front Street; thence along the northeasterly line of Front Street

N 49°-03'-27" W, a distance of ninety-two and 22/100 feet (92.22) to a point at land now or formerly of the City of Lowell; thence along the southeasterly line of said City of Lowell

N 40°-56'-33" E, a distance of fifteen and 93/100 feet (15.93) to the point of beginning.

Containing seven hundred and thirty-five square feet (735) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395

PROPOSED DESCRIPTION OF LAND
PARCEL: FRONT STREET

Beginning at an angle in the southwesterly line of the Veterans of Foreign Wars Highway, said angle bearing S 39°-15'-25" E and being three hundred thirteen and 54/100 feet (313.54) distant from a stone bound found on the southwesterly line of said highway; thence along said highway line as follows:

S 49°-03'-27" E, a distance of six hundred sixty-four and 13/100 feet (664.13) to a point,

S 45°-11'-13" E, a distance of one hundred thirty-four and 37/100 feet (134.37) to a point,

S 41°-11'-50" W, a distance of eight and 40/100 feet (8.40) to a point,

S 42°-13'-24" E, a distance of seventy-five and 11/100 feet (75.11) to a point,

S 47°-24'-48" E, a distance of one hundred forty-nine and 68/100 feet (149.68) to an EPLP found in the top of a concrete wall,

S 62°-18'-45" E, a distance of four hundred twenty-two and 90/100 feet (422.90) to a point, and

S 58°-36'-38" E, a distance of one hundred four and 74/100 feet (104.74) to a point; thence

S 41°-13'-00" W, a distance of nine and 80/100 feet (9.80) to a point at Parcel 87; thence along the northeasterly line of Parcel 87 as follows:

N 57°-06'-30" W, a distance of one hundred thirteen and 62/100 feet (113.62) to a point,

N 62°-18'-45" W, a distance of four hundred twenty-seven and 10/100 feet (427.10) to a point, and

N 49°-03'-27" W, a distance of one thousand twelve and 30/100 feet (1012.30) to a point on the river line of the Merrimack River as established in 1882; thence along said established river line

N 41°-04'-05" W, a distance of two hundred eighty-seven and 79/100 feet (287.79) to a point at Parcel 89; thence along the southwesterly lines of Parcel 89, land of the City of Lowell, and Parcel 88

S 49°-03'-27" E, a distance of two hundred eighty-eight and 29/100 feet (288.29) to the point of beginning.

Containing forty-three thousand five hundred and ninety-three square feet (43,593) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PROPOSED DESCRIPTION OF LAND
PARCEL: 87

Beginning at the most northerly corner of the parcel, said corner being a point on the southwesterly line of Front Street and on the line of the Merrimack River as established in 1882: thence along the southwesterly line of said Front Street as follows:

S 49°-03'-27" E, a distance of one thousand twelve and 30/100 feet (1012.30) to a point,

S 62°-18'-45" E, a distance of four hundred twenty-seven and 10/100 feet (427.10) to a point, and

S 57°-06'-30" E, a distance of one thirteen and 62/100 feet (113.62) to a point; thence

S 41°-13'-00" W, a distance of ten and 54/100 feet (10.54) to the line of the Merrimack River as established in 1882; thence along said established river line as follows:

N 62°-33'-00" W, a distance of five hundred twenty-eight and 07/100 feet (528.07) to a point of curvature,

NORTHWESTERLY, more or less, by a curve to the right having a radius of one thousand seven hundred seventy-one and 00/100 feet (1771.00), an arc length of six hundred sixty-four and 00/100 feet (664.00) to a point of tangency, and

N 41°-04'-05" W, a distance of three hundred seventy-one and 22/100 feet (371.22) to the point of beginning.

Containing fifty-seven thousand five hundred and eighty-seven square feet (57,587) of land, more or less.

ATLANTIC ENGINEERING AND SURVEY CONSULTANTS
66 Rand Street, Lynn, MA 01904
(617) 593-3395 •

PG 212

PROPOSED DESCRIPTION OF LAND
PARCEL: 96-B

Beginning at an iron pin set at the northwesterly corner of the parcel, said pin being a point on the southwesterly line of land now or formerly of Merrimack Valley Goodwill Industries; thence along said line of Merrimack Valley Goodwill Industries

S 87°-57'-49" E, a distance of two hundred thirteen and 26/100 feet (213.26) to a point at land now or formerly of the General Board of the Church of the Nazarene; thence along the line of land of said General Board of the Church of the Nazarene as follows:

S 20°-09'-52" W, a distance of fifty-five and 23/100 feet (55.23) to a point,

S 69°-55'-39" E, a distance of forty and 88/100 feet (40.88) to an iron pin set, and

S 05°-14'-17" W, a distance of eighty and 00/100 feet (80.00) to the Merrimack River; thence along the Merriamck River by the shoreline of March 1975

N 64°-43'-08" W, a distance of two hundred fifty-three and 62/100 feet (253.62) to an iron pin set at land now or formerly of the City of Lowell; thence along the easterly line of said City of Lowell

N 05°-17'-28" E, a distance of forty-five and 00/100 feet (45.00) to the point of behinning.

Containing twenty-thousand seven hundred and nine square feet (20,709) of land, more or less.

Appendix D – 1995 *Grant of Easement*

GRANT OF EASEMENT

The COMMONWEALTH OF MASSACHUSETTS, acting by and through its Division of Capital Planning and Operations ("Grantor"), notwithstanding the provisions of sections 40E through 40J, inclusive, of Chapter 7 of the General Laws, in accordance with Chapter 149 of the Acts of 1992, for nominal consideration paid, does hereby grant to the UNITED STATES OF AMERICA, acting by and through the United States Department of the Interior, having a usual place of business at 222 Merrimack Street, Lowell, Massachusetts, 01852, ("Grantee") a perpetual easement, in common with others and subject to the terms and conditions of this grant, over, on and in the property known as the Lowell Heritage State Park in Lowell, Massachusetts (the "Property") in the locations described on Exhibit A attached hereto for the purposes specified herein:

Easement Area I = Tracts 104-26, 107-07, 107-15, 107-22, 107-23, 107-24, 107-25, 107-26, 107-27, 107-28, 107-29, 110-02, 111-09, 111-22, 111-23, and 111-24

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act establishing the Lowell National Historical Park, Public Law 95-290, as amended, (16 U.S.C., Sections 410cc et seq.), hereinafter referred to as the Act, and consistent with Chapter 149 of the Acts of 1992, hereinafter referred to as the Special Act, which purposes shall include: facilitation and provision of a continuous public pedestrian walkway along the Western canal, construction and maintenance of improvements, which improvements include but shall not be limited to: walkway surface at the edge of the Western Canal, decking, lighting, railing, benches, landscaping, signs and public art.

Easement Area II = Tract 107-35

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act and consistent with the Special Act, which purposes shall include: facilitation and provision of a continuous public pedestrian walkway and linear park along the Western canal, construction and maintenance of improvements, which improvements include but shall not be limited to: walkway surface at the edge of the Western Canal, decking, lighting, aerial and/or buried telecommunications cable, benches, landscaping, signs and public art.

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Easement Are III = Tracts 110-03, 110-06, 110-07, 110-09, 110-14, 110-20, 111-26

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act and consistent with the Special Act, which purposes shall include: facilitation and provision of a continuous public pedestrian walkway and linear park along the Pawtucket canal, construction and maintenance of improvements, which improvements include but shall not be limited to: walkway surface at the edge of the Pawtucket Canal, decking, lighting, railing, benches, landscaping, signs and public art.

Easement Area IV = Tracts 105-09, Tract 105-10, Tract 105-14, Tract 105-15

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act and consistent with the Special Act, which purposes shall include: facilitation and provision of a continuous public pedestrian walkway and linear park along the junction of the Pawtucket Canal, Merrimack River and the Northern Canal, maintenance and operation of the Gatekeeper's House, so-called, and of the Blacksmith Shop, so-called, construction and maintenance of improvements, which improvements include but shall not be limited to: maintenance and renovation of the Gatekeeper's House and the Blacksmith Shop, walkway surface at the edge of the Pawtucket Canal, the Northern Canal and the Merrimack River, decking, lighting railing, benches, landscaping, signs and public art.

Easement Area V = Tract 111-17

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act and consistent with the Special Act, which purposes shall include: facilitation and provision of a continuous public pedestrian walkway and linear park along the Hamilton Canal, construction and maintenance of improvements, which improvements include but shall not be limited to: walkway surface at the edge of the Hamilton Canal, decking, lighting, railing, benches, landscaping, signs and public art.

Easement Area VI = Tract 107-21

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act and consistent with the Special Act, which purposes shall

include: facilitation and provision of a continuous public pedestrian walkway along the Eastern Canal and Merrimack Canal Wasteway, construction and maintenance of improvements, which improvements include but shall not be limited to: walkway surface at the edge of the Eastern Canal and Merrimack Canal Wasteway, decking, lighting, railing, benches, landscaping, signs and public art.

Easement Area VII = Tract 107-39

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for all purposes consistent with the Act and consistent with the Special Act, which purposes shall include: facilitation and provision of a continuous public pedestrian walkway along the Northern Canal, construction and maintenance of improvements, which improvements include but shall not be limited to: walkway surface at the edge of the canal, decking, lighting, railing, benches, landscaping, signs and public art.

Easement Area VIII = Tracts 103-11, 105-13, 107-13, 107-38, 107-40, 108-21, 111-32, 111-33, 111-34, 112-01, 112-04

GRANTEE, its successors and assigns, shall have the right, in conjunction with others, to use the premises described herein for any and all purposes consistent with the Act and consistent with the Special Act, which purposes shall include, but not be limited to: conducting land and canal tours, running interpretive programs and the maintenance, improvement and restoration of Gatehouses and support structures, Dams and Lock Chambers.

The rights conveyed hereunder are conveyed subject to all matters of record at the Middlesex County Registry of Deeds.

All work performed by Grantee, its successors and assigns, pursuant to this easement shall at all times be performed in accordance with all applicable federal laws, statutes, and regulations including, but not limited to, 40 U.S.C. Section 619.

By its acceptance of this easement, the Grantee agrees that its liability relating to this easement shall be governed by the Federal Tort Claims Act, 28 U.S.C. Sections 2671 et seq.

By its acceptance of this easement, the Grantee agrees that its exercise of the Grantee's rights hereunder shall not interfere with the Grantor's use and operation of the Property as a state park or with the use, maintenance, or

operation for hydroelectric power production by Boott Hydropower, Inc., their successors and assigns.

In the event that the easement granted herein ceases to be used in connection with the purposes described herein, then the Grantee's interest in such easement area shall revert to the Grantor.

IN WITNESS WHEREOF, the Commonwealth of Massachusetts has caused these presents to be signed, sealed, acknowledged and delivered in its name and on its behalf by the undersigned, as the duly appointed and authorized Commissioner of the Division of Capital Planning and Operations on this 1st day of June, 1995.

Lark Jurev Palermo
Lark Jurev Palermo,
Commissioner
Division of Capital Planning
and Operations

COMMONWEALTH OF MASSACHUSETTS

Suffolk, ss. June 1, 1995

Then personally appeared the above named Lark Jurev Palermo, Commissioner of the Division of Capital Planning and Operations, and acknowledged the foregoing instrument to be the free act and deed of the Commonwealth of Massachusetts before me.

Notary Public

STEPHEN J. HINES
Type or Hand-Print Name
My Commission Expires October 14, 1999

Approved as to form:

Assistant Attorney General

Exhibit A

to Grant of Easement from Commonwealth of Massachusetts to United States of America dated as of June 1, 1995

Exhibit A consists of the 42 Tracts of land listed below. A metes and bounds description for each Tract is attached and incorporated in this Exhibit A.

Tract 103-11
Tract 104-26
Tract 105-09
Tract 105-10
Tract 105-13
Tract 105-14
Tract 105-15
Tract 107-07
Tract 107-13
Tract 107-15
Tract 107-21
Tract 107-22
Tract 107-23
Tract 107-24
Tract 107-25
Tract 107-26
Tract 107-27
Tract 107-28
Tract 107-29
Tract 107-35
Tract 107-38
Tract 107-39
Tract 107-40
Tract 108-21
Tract 110-02
Tract 110-03
Tract 110-06
Tract 110-07
Tract 110-09
Tract 110-14
Tract 110-20
Tract 111-09
Tract 111-17
Tract 111-22
Tract 111-23
Tract 111-24
Tract 111-26
Tract 111-32
Tract 111-33
Tract 111-34
Tract 112-01
Tract 112-04

Z:\WP51\LHPC\ExhibitA

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 999 square feet, more or less

Interest: Easement

Date: February 3, 1994

TRACT 103-11

A certain parcel of land with buildings, structures and fixtures, thereon, commonly known as the Northern Canal Waste Gate House, located in Lowell, Middlesex County, Massachusetts along the Northern Canal, so called, and further bounded and described as follows:

Beginning at a point on the southwesterly wall of the Northern Canal Waste Gate House, said point being the northeasterly corner of the Northern Canal Walkway, as shown on the plan hereinafter described; thence running by the northerly end of said walkway and by the Merrimack River

N 29° 58' 11" W, a distance of 13.58 feet to the southwest corner of the gate house; thence along the wall of the gate house as follows:

N 60° 01' 49" E, by the Merrimack River, a distance of 67.39 feet to a corner,

S 29° 58' 11" E, a distance of 14.82 feet to a corner at the Northern Canal, and, along said canal

S 60° 01' 49" W, a distance of 67.39 feet to the southeast corner of the gate house; thence along the southwesterly wall of the gate house

N 29° 58' 11" W, a distance of 1.4 feet to the point of beginning.

Containing 999 square feet of land, more or less.

Being shown as the Northern Canal Waste Gate House on sheet 23 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 5,844 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 104-26

A certain parcel of land situated in Lowell, Middlesex County, Massachusetts, along the Western Canal, so called, and being further bounded and described as follows:

Beginning at an iron pin set at the northeast corner of Suffolk Street and Perkins Street; thence along the northeasterly line of Perkins Street

N 41° 40' 50" W, a distance of 72.52 feet to a PK nail set at land now or formerly of George W. McQuade; thence along the southeasterly line of McQuade

N 48° 19' 10" E, a distance of 20.02 feet to PK nail set at the back edge of the southwesterly granite wall of the Lawrence Canal; thence along said canal wall:

S 43° 07' 56" E, a distance of 21. 56 feet to a chain link fence post,

S 43° 07' 56" E, a distance of 13.81 feet to a chain link fence post,

S 40° 33' 30" E, a distance of 40.14 feet to a chain link fence post, and

S 12° 24' 37" E, a distance of 8.32 feet to a chain link fence post at the Lower Level of the Western Canal; thence along the back edge of the northwesterly granite wall of said Lower Level of the Western Canal as follows:

S 25° 02' 30" W, a distance of 8.53 feet to a chain link fence post,

S 47° 47' 35" W, a distance of 35.25 feet to a chain link fence post,

S 47° 19' 23" W, a distance of 32.29 feet to an iron pin set,

S 49° 49' 54" W, a distance of 85.90 feet to an iron pin set,

S 47° 51' 11" W, a distance of 124.42 feet to a point,

S 65° 28' 17" W, a distance of 16.37 feet to an iron pin set, and

S 49° 24' 19" W, a distance of 48.63 feet to a drill hole set on the northeasterly line of a thirty foot right-of-way; thence along said right of way

N 41° 36' 20" W, a distance of 7.47 feet to a point on the southeasterly line of Suffolk Street; thence along said line of Suffolk Street

N 48° 19' 10" E, a distance of 333.85 feet to the point of beginning

Containing 5,844 square feet of land, more or less.

Being shown as Parcel CB-E, Lot C on sheet 25 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 15,957 square feet, more or less

Interest: Easement

Date: February 1, 1994

TRACT 105-09

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Northern Canal and the Merrimack River, so called, and known and numbered as 23.1 School Street and further bounded and described as follows:

Beginning at a drill hole set on the southwesterly line of School Street, said drill hole being at the northwesterly corner of land now or formerly of the Commonwealth of Massachusetts by two courses as follows:

S 42° 50' 42" W, a distance of 76.30 feet to an iron pin set, and

S 24° 14' 32" W, a distance of 72.91 feet to an iron pin set; thence along the southwesterly line of land of the Commonwealth of Massachusetts

S 61° 39' 08" E, a distance of 97.41 feet to a point on the northwesterly line of land now or formerly of the American Red Cross; thence along the northwesterly line of land of said American Red Cross and now or formerly of Flago Realty Corporation

S 40° 13' 24" W, a distance of 220.81 feet to an x-cut in a stone bound found at land now or formerly of Irene Desmarais; thence along the northeasterly line of said land now or formerly of said Desmarais as follows:

N 23° 03' 25" W, a distance of 42.34 feet to a point, and

N 19° 33' 29" E, a distance of 22 feet to a drill hole set in the granite retaining wall of the Merrimack River; thence along the Merrimack River by said retaining wall:

N 48° 01' 43" W, a distance of 10 feet to a drill hole set,

N 23° 55' 13" E, a distance of 165.57 feet to a point,

N 24° 14' 32" E, a distance of 74.06 feet to a drill hole set, and

N 42° 50' 42" E, a distance of 77.48 feet to a drill hole set on the southwesterly line of School Street; thence along said line of School Street

S 46° 51' 34" E, a distance of 7 feet to the point of beginning.

Containing 15,957 square feet of land, more or less.

Being shown as Parcel 29, Lot 2 on sheet 20 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

EXHIBIT A

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 13,678 square feet, more or less

Interest: Easement

Date: February 1, 1994

TRACT 105-10

A certain parcel of land, with the buildings thereon, located in Lowell, Middlesex County, Massachusetts along the Northern Canal and the Merrimack River, so called, and known and numbered as 23 School Street and further bounded and described as follows:

Beginning at the Easterly corner of the premises at a point in the Southwesterly line of School Street in said Lowell, where the Southeasterly face of a retaining wall intersects said School Street, which point is distant 199.75 feet Northerly from a drill hole in a stone bound set in the line of said School Street;

Thence, S 45° 20' W by the said face of the said wall and by land now or formerly of Harold F. Harrington et. als. and land now or formerly of the American National Red Cross, 111 feet, to a point;

Thence, at an angle S 56° 3' W still by said last named land and said wall, 12.46 feet to a point;

Thence, N 46° 2' 30" W by other land now or formerly of Proprietors of the Locks and Canals on Merrimack River, 97.36 feet to a stake at still other land now or formerly of said Proprietors of Locks and Canals;

Thence, N 39° 51' 40" E 72.91 feet to a point;

Thence, at an angle of 58° 27' 50" E still by said Proprietors of Locks and Canals; land and in part by the Southeasterly face of another retaining wall 76.30 feet to said School Street;

Thence, S 31° 14' 30" E by said School Street 91.78 feet to the point of beginning.

Containing 13,678 square feet of land, more or less.

Being shown on a plan of land entitled "Plan of Land in Lowell, Mass. for Prop. of Locks and Canals, July 5, 1960, Dana F. Perkins & Sons, Inc., C.E.'s and Surveyors," which plan is recorded with the Middlesex Northern District Registry of Deeds, Plan Book 93, Plan 59A.

Also being shown as Parcel 29, Lot 1 on sheet 20 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with said Registry of Deeds at Plan Book 157, Plan 69.

Being the same premises conveyed to the Commonwealth of Massachusetts by deed of Paul J. Desmarais and Lorraine L. Desmarais recorded with said Registry of Deeds at Book 2279, Page 435.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 2,400 square feet, more or less

Interest: Easement

Date: February 3, 1994

TRACT 105-13

A certain parcel of land with buildings, structures and fixtures thereon, commonly known as the Pawtucket Gate House, located in Lowell, Middlesex County, Massachusetts over the Northern Canal, so called, and the Merrimack River and near School Street and further bounded and described as follows:

Beginning at the most southeasterly corner of the Pawtucket Gate House, said point being 15.35 feet northwesterly from the westerly line of Parcel 29 as shown on the plan hereinafter described; thence

N 46° 55' 36" W, along the most southerly face of the building a distance of 118.70 feet to a point; thence on a curve to the right

NORTHWESTERLY, more or less, along the face of said building a distance of 5 feet to a point; thence

N 43° 12' 10" E, along the most westerly face of said building a distance of 16.40 feet to a building corner, said corner being set back from the southerly line of School Street a distance of 0.60 feet; thence

S 46° 55' 36" E, along the most northerly face of said building a distance of 122.04 feet to the most northeasterly building corner, said corner being set back from the southerly line of School Street a distance of 0.46 feet; thence

S 43° 12' 10" W, along the most easterly face of said building a distance of 19.75 feet to the point of beginning.

Containing 2,400 square feet of land, more or less.

Being shown as a brick gate house on sheet 20 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 24 May 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Meaning and intending the description of the above-referenced parcel to be the same parcel described at Book 3830, Page 169 of the above referenced taking and which description in the taking incorrectly referred to School Street as Pawtucket Street.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 3710 square feet, more or less

Interest: Easement

Date: August 19, 1994

TRACT 105-14

The land and buildings commonly known as the Pawtucket Gatehouse Wall and Lock Chamber, located on the Northern Canal, in Lowell, Middlesex County, Massachusetts, and further bounded and described as follows:

Beginning at a point at the most southeasterly corner of a brick building called the Pawtucket Gatehouse, said point being 15.35 feet distant from the northwesterly line of Parcel 29 as shown on the Plan hereinafter described; thence

N 46° 55' 36" W, along the most southerly face of the building, a distance of 118.70 feet to a point; thence along a curve to the right along the face of said building a distance of 5 feet to a point; thence

N 43° 12' 10" E, along the most westerly face of said building a distance of 16 feet, more or less, to the end of a granite wall at the face of a concrete and granite wall; thence

NORTHWESTERLY, along said concrete and granite wall a distance of 16 feet, more or less; thence

SOUTHERLY, more or less, by the face of a granite wall by the following distances: 10 feet, more or less, thence 13 feet, more or less, and 8 feet, more or less, around a curved section of wall; thence

SOUTHEASTERLY, along the face of the aforementioned granite wall, said face of wall being approximately parallel with and 2.7 feet south of the southerly face of the Pawtucket Gatehouse a distance of 112 feet, more or less, to an angle point; thence along the face of said wall a distance of 10 feet, more or less; thence along the face of said wall a distance of 10 feet more or less; thence along the face of said wall around a curve a distance of 7 feet, more or less; thence along the face of said wall a distance of 10 feet more or less; thence

SOUTHEASTERLY, along a concrete wall, said wall being approximately parallel with School Street a distance of 15 feet, more or less, to a point; thence

N 42° 50' 42" E, along land now or formerly of the Proprietors of Locks and Canals, a distance of 23 feet, more or less, to a drill hole set at the southerly line of School Street; thence

N 46° 51' 34" W, along the southerly line of School Street and land now or formerly of the Proprietors of Locks and Canals a distance of 3 feet, more or less, to a point; thence

NORTHEASTERLY, approximately perpendicular to the southerly line of School Street and under the School Street Bridge along the easterly face of the easterly granite wall of the lock chamber, 58 feet, more or less, to the northerly line of School Street; thence

SOUTHEASTERLY, along said granite wall and the northerly line of School Street a distance of 6 feet, more or less, to a point; thence

NORTHEASTERLY, along the westerly face of a granite wall by land now or formerly of the Proprietors of Locks and canals 120 feet, more or less, and 17 feet, more or less, to the shoreline; thence

SOUTHWESTERLY, along the westerly face of the easterly granite wall of the Northern Canal a distance of 93 feet, more or less, to a point; thence

NORTHWESTERLY, crossing the Lock Chamber a distance of 19 feet, more or less, to the westerly face of the westerly granite of the Lock Chamber; thence

SOUTHWESTERLY, along said face of wall a distance of 36 feet, more or less, to the northerly line of School Street; thence

S 46° 51' 34" E, along the northerly line of School Street a distance of 3 feet, more or less, to a point; thence

SOUTHWESTERLY, approximately perpendicular to the northerly line of School Street and under the School Street Bridge along the westerly face of the westerly granite wall of the lock chamber, 58 feet, more or less, to the southerly line of School Street; thence along the easterly face of the Pawtucket Gatehouse

S 43° 12' 10" W, a distance of 20 feet, more or less, to the point of beginning.

Containing 3710 square feet, more or less.

Being shown on sheet 20 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 3710 square feet, more or less

Interest: Easement

Date: August 19, 1994

TRACT 105-15

The land and buildings commonly known as the Blacksmith Shop, located along the Northern Canal and Merrimack River, in Lowell, Middlesex County, Massachusetts, and further bounded and described as follows:

Beginning at the most southerly corner of the Blacksmith Shop, said corner bearing N 49° 46' 36" W, and being 26.24 feet distant from the northwesterly line of land now or formerly of Flago Realty Corporation; thence along the face of the Blacksmith Shop as follows:

N 66° 55' 23" W, a distance of 8.15 feet to a corner,

N 23° 51' 49" E, a distance of 7.18 feet to a corner,

N 65° 45' 09" W, a distance of 17.26 feet to a corner,

N 24° 09' 04" E, a distance of 45.47 feet to a corner,

S 65° 45' 09" E, a distance of 25.19 feet to a corner, and

S 23° 51' 49" W, a distance of 52.48 feet to the point of beginning.

Containing 1,204 square feet of land, more or less.

Being shown on sheet 20 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 282 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 107-07

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called and known and numbered as 251 Moody Street, and further bounded and described as follows:

Beginning at an iron pin set on the northeasterly line of Moody Street, said pin being at the southwesterly corner of land now or formerly of Lowell Apartments; thence along said northeasterly line of Moody Street

N 56° 50' 00" W, a distance of 10.28 feet to a point at the back edge of the southeasterly granite wall of the Western Canal; thence along said canal wall:

N 33° 40' 12" E, a distance of 4.62 feet to an iron pin set and

N 45° 45' 12" E, a distance of 47.00 feet to a point at land now or formerly of Lowell Apartments; thence along the northwesterly line of said Lowell Apartments

S 33 ° 09' 51" W, a distance of 50.49 feet to the point of beginning.

Containing 282 square feet of land, more or less.

Being shown as Parcel CB-D, Lot J on sheet 26 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 0.01 of an acre, more or less

Interest: Easement

Date: June 25, 1992
Revised: February 3, 1994

TRACT 107-13

Two certain parcels of land with buildings, structures and fixtures thereon, commonly known as the Rolling Dam Gate House, located in Lowell, Middlesex County, Massachusetts over the Merrimack Canal and Wasteway, so called, and near French Street and further bounded and described as follows:

PARCEL I:

Beginning at the northwesterly corner of the Rolling Dam Gate House, said corner being a point in the southeasterly line of land, now or formerly of Lowell Union Properties Inc., said southeasterly line of land also being the northwesterly line of the Merrimack Canal Wasteway, the aforesaid point of beginning bearing N 48° 15' 38" E, and being 57.58 feet distant from a drill hole found in an angle in the wall of the Merrimack Canal; thence along the southeasterly line of land now or formerly of Lowell Union Properties Inc.

N 48° 15' 38" E by the northwesterly line of the Merrimack Canal Wasteway and the Rolling Dam along the northwesterly face of the Rolling Dam along the northwesterly face of the rolling Dam Gate House, a distance of 11.15 feet the a point;

Thence, crossing the Rolling Dam and running along the northeasterly face of the Rolling Dam Gate house S 42° 02' 28" E, a distance of 17.90 feet to a point on the northwesterly line of land now or formerly of Boott Mills, being the southeasterly line of the Merrimack Canal Wasteway;

Thence, running through the Rolling Dam Gate House along said southeasterly line of the Merrimack Canal Wasteway

S 48° 17' 38" W, a distance of 27.29 feet to a point on the southwesterly building face of the Rolling Dam Gate House, said point bearing N 20° 06'35" E and being 0.45 feet distant from the most southwesterly corner thereof; thence crossing the Merrimack Canal Wasteway and running along the westerly and southwest building lines of the Rolling Dam Gate House by two courses as follows:

N 20° 06' 35" E, a distance of 18.26 feet to a point, and

N 42° 02' 28" W, a distance of 9.26 feet to the point of beginning.

Containing 269 square feet of land, which is 0.01 of an acre, more or less.

PARCEL II:

Beginning at a point on the northeasterly face of the Rolling Dam Gate House, said point being on the southeasterly line of the Merrimack Canal Wasteway and bearing S 48° 17' 38" W, and being 19.37 feet distant from an iron pin set at the northwesterly corner of Parcel CB-L/5721 as shown on the plan hereinafter described; thence running the following four courses by land now or formerly of Boott Mills along the building face of the Rolling Dam Gate House:

S 42° 02' 28" E, a distance of 4.07 feet to a point,

S 20° 06' 35" W, a distance of 22.94 feet to a point, said point bearing N 42° 45' 53" W, and being 34.96 feet distant from the most northerly corner of Store House No. 1,

N 68° 42' 56" W, a distance of 16.49 feet to a point and

N 20° 06' 35" E, a distance of 0.45 feet to a point on the southeasterly line of the Merrimack Canal Wasteway;

Thence, along said southeasterly line of the Merrimack Canal Wasteway N 48° 17' 38" E, a distance of 27.29 feet to the point of beginning.

Containing 248 square feet of land, more or less, which is 0.01 of an acre, more or less.

Both Parcels I and II being shown as the Rolling Dam Gate House North and South on sheet 19 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 24 May 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 805 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 107-15

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called and known and numbered as 271 Moody Street, and further bounded and described as follows:

Beginning at a point on the northeasterly line of Moody Street, said point being an iron pin set at the southeasterly corner of land now or formerly of the Lowell Apartments; thence along the southeasterly line of said Lowell Apartments

N 33 ° 10' 15" E, a distance of 212.43 feet to a point on the southwesterly line of French Street Extension; thence along said line of French Street Extension

S 56° 01' 24" E, a distance of 1.63 feet to a point at the back edge of the northwesterly granite wall of the Western Canal; thence along the back edge of said canal wall as follows:

S 33° 09' 14" W, a distance of 4.16 feet to an iron pin set,

S 33° 09' 14" W, a distance of 151.42 feet to an iron pin set,

S 17° 32' 06" W, a distance of 57.31 feet to an iron pin set and

S 28° 57' 00" W, a distance of 1.65 feet to a point on the northeasterly line of Moody Street; thence along said line of Moody Street

N 56° 50' 00" W, a distance of 17.25 feet to the point of beginning.

Containing 805 square feet of land, more or less.

Being shown as Parcel CB-C, Lot I on sheet 26 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 2,511 square feet, more or less

Interest: Easement

Date: February 1, 1994
Revised: March 27, 1995

TRACT 107-21

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Eastern Canal and Merrimack Wasteway, so called, and further bounded and described as follows:

Beginning at a point at the southeasterly corner of the parcel, said point being on the northeasterly line of land now or formerly of Boott Mills, and bearing N 41° 34' 09" W, and being 60.23 feet distant from the westerly termination of Amory Street; thence

N 41° 34' 09" W, along the northeasterly line of land now or formerly of Boott Mills, a distance of 158.92 feet to an iron pin set at the southeasterly face of the southeasterly wall of the Rolling Dam; thence

N 48° 17' 38" E, along said southeasterly face of the southeasterly wall of the Rolling Dam, a distance of 8.61 feet to an iron pin set at an angle in the southerly wall of the Merrimack Wasteway; thence

N 70° 36' 40" E, along the southerly face of a wall, a distance of 9.91 feet to a cross-cut set at an angle in said wall; thence

S 40° 30' 36" E, along the southwesterly face of the southwesterly wall of the Eastern Canal, a distance of 4.65 feet to a point on the northwesterly face of a brick building; thence running along the face of said brick building by five courses as follows:

S 48° 17' 38" W, a distance of 0.71 feet to a point,

S 40° 24' 35" E, a distance of 10.40 feet to a point,

S 50° 12' 21" W, a distance of 12.73 feet to a point,

S 40° 24' 35" E, a distance of 21.36 feet to a point, and

N 48° 23' 37" E, a distance of 13.50 feet to a point at the southwesterly face of the southwesterly wall of the Eastern Canal; thence running along said southwesterly face of the southwesterly wall of the Eastern Canal

S 43° 08' 52" E, a distance of 35.00 feet to a point at the most westerly corner of the Boott Dam Gate House as shown on the plan hereinafter described; thence

S 38° 32' 55" E, along the southwesterly face of the Boott Dam Gate House a distance of 11.07 feet to a point at the most southerly corner thereof; thence along the southwesterly face of the southwesterly wall of the Eastern Canal

S 42° 29' 19" E, a distance of 72.12 feet to a point; thence

S 45° 11' 23" W, along the northwesterly edge of a concrete capstone, a distance of 18.69 feet to a PK nail set at the point of beginning.

Containing 2,511 square feet of land, more or less.

Being shown as Parcel CB-L/5721 on sheet 19 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 4,938 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 107-22

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called and Suffolk Street, and between French Street Extension and Hall Street and further bounded and described as follows:

Beginning at a point on the southeasterly line of Suffolk Street, said point being at a thirty foot right-of-way; thence along said thirty foot right-of way

S 41° 36' 20" E, a distance of 10.40 feet to a PK nail set in a wood deck; thence along the back edge of the northwesterly granite wall of the Tremont Wasteway

S 48° 19' 26" W, a distance of 475.86 feet to a PK nail set in a wall; thence along said wall

N 40° 26' 22" W, a distance of 10.36 feet to a point on the southeasterly line of Suffolk Street; thence along said line of Suffolk Street

N 48° 19' 10" E, a distance of 475.65 feet to the point of beginning

Containing 4,938 square feet of land, more or less.

Being shown as Parcel CB-E, Lot A on sheet 25 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 10,905 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 107-23

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 540 Market Street and further bounded and described as follows:

Beginning at a drill hole set at the northeasterly corner of Suffolk Street and Jefferson Street; thence running along the easterly line of Suffolk Street

N 11° 11' 30" W, a distance of 482.44 feet to a spike set in the granite curb at the point of curvature leading to Market Street; thence

Northeasterly, more or less, by a curve to the right having a radius of 11.46 feet, an arc length of 26.87 feet to an x-cut set in the concrete walk; thence running along the southerly line of Market Street

S 56° 46' 50" E, a distance of about 18 feet to the westerly shoreline of the Western Canal; thence along the westerly shoreline of said Western Canal

Southerly, more or less, a distance of about 480 feet to a point on the northerly line of Jefferson Street; thence running along said northerly line of Jefferson Street

S 78 52' 10" W, a distance of about 25 feet to the point of beginning.

Containing 10,905 square feet of land, more or less.

Being shown as Parcel CB-C, Lot C on sheets 27 and 28 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 8,635 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 107-24

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 520 Market Street and further bounded and described as follows:

Beginning at a spike set at the northwesterly corner of Jefferson Street and Lewis Street; thence running along the northerly line of Jefferson Street,

S 78° 52' 10" W, a distance of about 23 feet to the easterly shoreline of the Western Canal; thence along said shoreline of the Western Canal

Northerly, more or less, a distance of about 452 feet to a point on the southwesterly line of Market Street; thence along said southwesterly line of Market Street

S 56° 46' 50" E, a distance of about 45 feet to a drill hole set in the concrete sidewalk at the southwesterly corner of Market Street and Lewis Street; thence along the westerly line of Lewis Street

S 11° 11' 30" E, a distance of 411.18 feet to the point of beginning

Containing 8,635 square feet of land, more or less.

Being shown as Parcel CB-D, Lot D on sheets 27 and 28 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: City of Lowell and Comm. of MA/DEM
Date of Description: March 16, 1994
Revised: Oct. 7, 1994
Interest: Easement

Tract 107-25(Ecumenical Plaza)

All of that certain brick and concrete platform, together with the air rights, lying over the Western Canal in the City of Lowell, County of Middlesex and Commonwealth of Massachusetts, excluding the canal walls, and known as Ecumenical Plaza; Said Plaza is shown on Sheet No. 28 of a plan entitled "Lowell Canal System, Commonwealth of Massachusetts, Department of Environmental Management, Division of Forests and Parks, Lowell Heritage State Park, Lowell Massachusetts," and prepared by Atlantic Engineering and Survey Consultants and recorded in the Middlesex North Registry of Deeds in Plan Book 157, Plan 69.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 3,115 square feet, more or less

Interest: Easement

Date: January 13, 1994

TRACT 107-26

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 570 Merrimack Street and further bounded and described as follows:

Beginning at a spike set at the northeasterly corner of Suffolk Street and Market Street; thence running along the easterly line of Suffolk Street

N 33° 10' 15" E, a distance of 171.85 feet to a drill hole set at the corner of Merrimack Street; thence running along the southerly line of said Merrimack Street

S 56° 50' 00" E, a distance of 17.55 feet to a point at the land edge of the granite wall of the Western Canal; thence running along said wall of the Western Canal

S 32° 46' 59" W, a distance of 170.98 feet to a point on the northerly line of Market Street; thence along the line of Market Street

N 56° 46' 50" W, a distance of 18.71 feet to the point of beginning.

Containing 3,115 square feet of land, more or less.

Being shown as Parcel CB-C, Lot E on sheet 27 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 2,310 square feet, more or less

Interest: Easement

Date: January 26, 1994

TRACT 107-2Z

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 550 Merrimack Street and further bounded and described as follows:

Beginning at an iron pin set at the northwesterly corner of Market Street and Hanover Street; thence along the northerly line of Market Street

N 56° 46' 50" W, a distance of 13.80 feet to a point at the back edge of the granite wall of the Western Canal thence running along the back edge of said wall as follows:

N 33° 29' 15" E, a distance of 7.86 feet to an iron pin set,

N 33° 29' 15" E, a distance of 63.90 feet to an iron pin set,

N 33° 43' 33" E a distance of 38.38 feet to an iron pin set,

N 32° 27' 04" E, a distance of 58.96 feet to a drill hole set, and

N 32° 27' 04" E, a distance of 2.81 feet to a point on the southerly line of Merrimack Street; thence along said southerly line of Merrimack Street

S 56° 50' 00" E, a distance of 13.79 feet to a drill hole set at the corner of Hanover Street, thence along the westerly line of Hanover Street

S 33° 09' 51" W, a distance of 171.91 feet to the point of beginning.

Containing 2,310 square feet of land, more or less.

Being shown as Parcel CB-D, Lot F on sheet 27 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 3,400 square feet, more or less

Interest: Easement

Date: January 26, 1994

TRACT 107-28

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 571 Merrimack Street and further bounded and described as follows:

Beginning at a point on the northeasterly line of Merrimack Street, said point being at the Southerly corner of land now or formerly of the Lowell Development Authority; thence along the southeasterly line of said Lowell Development Authority, being the southeasterly line of a fifteen foot wide easement now or formerly of the Proprietors of Locks and Canals

N 33° 10' 15" E, a distance of 172.90 feet to a spike set on the southwesterly line of Moody Street; thence along said line of Moody Street

S 56° 50' 00" E, a distance of 16.37 feet to a point at the back edge of the northwesterly granite wall of the Western Canal; thence along the Western Canal, in part by the back edge of a granite wall and in part by the shoreline thereof

SOUTHERLY, more or less, along the shoreline and two sections of granite distances of 40 feet, 75 feet and 59 feet to a drill hole set on the northeasterly line of Merrimack Street; thence along said line of Merrimack Street

N 56° 50' 00" W, a distance of 20.90 feet to the point of beginning.

Containing 3,400 square feet of land, more or less.

Being shown as Parcel CB-C, Lot G on sheet 26 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 1,167 square feet, more or less

Interest: Easement

Date: January 26, 1994

TRACT 107-29

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 551 Merrimack Street and further bounded and described as follows:

Beginning at a point on the northeasterly line of Merrimack Street, said point being at the southwesterly corner of land now or formerly of the Lowell Development Authority; thence along said northeasterly line of Merrimack Street

N 56° 50' 00" W, a distance of 10.83 feet to a drill hole set at the land edge of the granite wall of the Western Canal; thence running along the land edge of the southeasterly granite wall of the Western Canal as follows:

N 31° 14' 15" E, a distance of 27.54 feet to a drill hole set,

N 32° 55' 07" E, a distance of 65.39 feet to an iron pin set,

NORTHEASTERLY, more or less, a distance of 38 feet, more or less, to an iron pin set, said pin bearing N 45° 02' 42" E, and being 36.79 feet distant from the last point mentioned,

N 28° 16' 36" E, a distance of 38.94 feet to an iron pin set, and

N 28° 31' 46" E, a distance of 4.92 feet to a point on the southwesterly line of Moody Street; thence along said line of Moody Street

S 56° 50' 00" E, a distance of 8.19 feet to a drill hole set at land now or formerly of the Lowell Development Authority; thence along the northwesterly line of said Lowell Development Authority

S 33° 09' 51" W, a distance of 172.90 feet to the point of beginning.

Containing 1,167 square feet of land, more or less.

Being shown as Parcel CB-D, Lot H on sheet 26 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/ DEM

Lowell Historic Preservation Commission

Area: 0.258 acres, more or less

Interest: Easement

Date: April 21, 1994
Revised: Sept. 26, 1994
(LHPC)

TRACT 107-35

A certain parcel of land located along the Western Canal, so called, and being located on the North side of Father Morrissette Boulevard (formerly known as French Street Extension) and East of Suffolk Street in Lowell, Middlesex County, Massachusetts, and being further bounded and described as follows:

Beginning at a point on the North side of said Father Morrissette Boulevard and the Southeasterly face of the Southeasterly wall of said Western Canal, said point is located 0.78 feet, more or less, Southeasterly of a pin in lead in the concrete walk;

Thence, continuing along the Southeasterly face of the Southeasterly wall by the following five courses:

N 31° 46' 38" E, 65.67 feet, more or less, to a point,

N 78° 53' 20" E, 11.04 feet, more or less, to a point,

N 33° 03' 52" E, 38.74 feet, more or less, to a point,

N 27° 47' 30" W, 8.29 feet, more or less, to a point, and

S 33° 03' 25" W, 0.88 feet, more or less, to a point;

Thence, N 57° 28' 58" W, 12.37 feet, more or less, to a point on the Southerly corner of the Tremont Gatehouse;

Thence, N 57° 28' 58" W, 40.58 feet, more or less, along said Gatehouse, to a point;

Thence, N 33° 03' 23" E, 28.84 feet, more or less, to a point;

Thence, S 55° 42' 09" E, 40.34 feet, more or less, to a point;

Thence, S 33° 05' 23" W, 13.29 feet, more or less, to a point;

Thence, S 56° 42' 25" E, 2.19 feet, more or less, to a point;

Thence, N 31° 36' 15" E, 14.94 feet, more or less, to a point;

Thence, N 33° 00' 23" E, 17.25 feet, more or less, to a point;

Thence, S 56° 53' 59" E, 95.16 feet, more or less, along land now or formerly of the Trustees of Wannalancit Office and Technology Center Trust, to a point;

Thence, S 33° 05' 46" W, 134.61 feet, more or less, along land now or formerly of the Commonwealth of Massachusetts, to a capped iron rod set;

Thence, by a curve to the right with a radius of 676.06 feet, more or less and a length of 5.31 feet, more or less, to a point;

Thence, by a curve to the right with a radius of 39.00 feet, more or less and a length of 63.96 feet, more or less, to a point;

Thence, N 33° 49' 13" E, 60.46 feet, more or less, to a point;

Thence, N 56° 10' 47" W, 24.77 feet, more or less, to a point;

Thence, S 33° 49' 13" W, 60.46 feet, more or less, to a point;

Thence, S 13° 09' 26" E, 93.24 feet, more or less, by a curve to the Left with a radius of 63.77 feet, more or less, and an arc length of 104.57 feet, more or less, to a point;

Thence, N 58° 45' 20" W, 65.05 feet, more or less, along Father Morrissette Boulevard, by a curve to the Right with a radius of 720.00 feet, more or less, and an arc length of 65.07 feet, more or less, to a stone bound found;

Thence, N 56° 09' 59" W, 14.51 feet, more or less, to the point of beginning.

Containing 11,226 square feet of land, more or less, which is 0.258 acres, more or less.

Being shown as Proposed Easement Number 2 on a plan entitled "Canalway Easement Plan of Land in Lowell, MA, Middlesex County, prepared for Lowell Historic Preservation Commission" by Ainsworth Associates, Inc., dated September 16, 1994 and recorded herewith.

Being a portion of the premises conveyed to the Commonwealth of Massachusetts, Department of Environmental Management by deed of Frank E. Barrett and Claire N. Barrett dated May 27, 1977 and recorded with said Registry of Deeds at Book 2251, Page 234.

Purported Owner: Commonwealth of Massachusetts (DEM)

Lowell Historic Preservation Commission

Area: 565 square feet, more or less.

Interest to be Acquired: Easement

Date: June 30, 1994

TRACT 107-38

All that certain parcel of land with the improvements thereon commonly known as the Boott Dam Gatehouse, located on the Eastern Canal, so called, in Lowell, Middlesex County, Massachusetts, and further bounded and described as follows:

Beginning at the most northerly corner of the Boott Dam Gate House, said corner being a point on the southwesterly wall of Mill No. 9 of the Boott Mills, bearing S 41° 17' 01" E and being 29.46 feet distance from the southeasterly wall of the Picker Building; thence

S 41° 17' 01" E, along the southwesterly wall of Mill No. 9 of the Boott Mills 16.67 feet to a point on the Eastern Canal; thence crossing said Eastern Canal and running along the southeasterly face of the Boott Dam Gate House by two courses as follows:

S 39° 34' 16" W, a distance of 18.98 feet to a point, and

S 56° 14' 08" W, a distance of 22.05 feet to a point on the northeasterly line of Parcel CB-L/5721 as shown on the plan hereinafter described, said point being the most southerly corner of the Boott Dam Gate House; thence

N 38° 32' 55" W, along the southwesterly face of the Boott Dam Gate House a distance of 11.01 feet to a point; thence crossing said Eastern Canal and running along the wall of the Boott Dam Gate House by three courses as follows:

N 56° 14' 08" E, a distance of 19.50 feet to a point,

N 51° 14' 58" W, a distance of 4.90 feet to a point, and

N 39° 34' 16" E, a distance of 21.87 feet to the point of beginning.

Containing 565 square feet of land, more or less.

Being shown as the Boott Dam Gate House on sheet 19 of a set of plans entitled "Lowell Heritage State Park, The Lowell Canal System" by Atlantic Engineering and Survey Consultants, dated July 1 1983, recorded with the Middlesex Northern District Registry of Deeds in Plan Book 157 plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds in Book 3830, at Page 70.

Purported Owner: Commonwealth of Massachusetts (DEM)

Lowell Historic Preservation Commission

Area: 5,528 square feet, more or less.

Interest to be Acquired: Easement

Date: June 30, 1994

TRACT 107-39

All that certain parcel of land located along the Northern Canal, so called and also located near Cabot Street, in Lowell, Middlesex County, Massachusetts and further bounded and described as follows:

Beginning at a point on the southeasterly line of Cabot Street, said point being at the land edge of the easterly granite wall of the Northern Canal; thence along said line of Cabot Street

N 48° 17' 37" E, a distance of 11.56 feet to a point at land now or formerly of Murray Printing Company; thence along the southwesterly line of Murray Printing Company

S 41° 39' 43" E, a distance of 474.89 feet to a point on the northwesterly line of Suffolk Street; thence along said line of Suffolk Street

S 48° 19' 10" W, a distance of 11.73 feet to a point at the land edge of the easterly granite wall of the Northern Canal; thence along said canal wall:

N 41° 38' 39" W, a distance of 451.42 feet to a drill hole set, and

N 41° 38' 39" W, a distance of 21.27 feet to the point of beginning.

Containing 5,528 square feet of land, more or less.

Being shown as Parcel 65-Y on sheet 25 of a set of plans entitled "Lowell Heritage State Park, The Lowell Canal System" by Atlantic Engineering and Survey Consultants, dated July 1 1983, recorded with the Middlesex Northern District Registry of Deeds in Plan Book 157 plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds in Book 3830, at Page 70.

Purported Owner: Commonwealth of Massachusetts (DEM)

Lowell Historic Preservation Commission

Area: 382 square feet, more or less.

Interest to be Acquired: Easement

Date: June 30, 1994

TRACT 107-40

All that certain parcel of land together with the improvements thereon commonly known as the Tremont Gatehouse located near the Tremont Wasteway, so called, in Lowell, Middlesex County, Massachusetts, and further bounded and described as follows:

Beginning at the southeasterly corner of the gatehouse, said corner being at the head of the Tremont Wasteway, and bearing N 41° 52' 13" W and being 12.55 feet distant from the northwesterly line of land now or formerly of the Commonwealth of Massachusetts; thence across the head of said Tremont Wasteway

N 41° 52' 13" W, a distance of 31.30 feet to the most westerly corner of the gatehouse; thence by a granite wall and by Part Parcels 5610 and 5362 as shown on the plan hereinafter described, as follows:

N 48° 07' 47 " E, a distance of 12.20 feet to a corner,

S 41° 52' 13" E, a distance of 31.30 feet to a corner, and

S 48° 07' 47" W, a distance of 12.20 feet to the point of beginning.

Containing 382 square feet of land, more or less.

Being shown as the Tremont Gatehouse on sheet 25 of a set of plans entitled "Lowell Heritage State Park, The Lowell Canal System" by Atlantic Engineering and Survey Consultants, dated July 1 1983, recorded with the Middlesex Northern District Registry of Deeds in Plan Book 157 plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds in Book 3830, at Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 199 square feet, more or less

Interest: Easement

Date: February 3, 1994

TRACT 108-21

A certain parcel of land with buildings, structures and fixtures thereon, commonly known as the Massachusetts Wasteway Gate House, located in Lowell, Middlesex County, Massachusetts over the Eastern Canal, so called, and near Bridge Street and further bounded and described as follows:

Beginning at the northwesterly corner of the Massachusetts Wasteway Gate House, said corner bearing S 41° 44' 51" E, and being 3.74 feet distant from the southeasterly line of Bridge Street; thence running along the face of the Massachusetts Wasteway Gate House by land now or formerly of the Proprietors of Locks and Canals, by three courses as follows:

N 48° 15' 09" E, a distance of 7.67 feet to a corner,

S 41° 44' 51" E, a distance of 26 feet to a corner, and

S 48° 15' 09" W, a distance of 7.67 feet to the most southerly corner of said Gate House, being a point on the southeasterly side of the Eastern Canal; thence along the southwesterly face of the Massachusetts Wasteway Gate House

N 41° 44' 51" W, a distance of 26 feet to the point of beginning.

Containing 199 square feet of land, more or less.

Being shown as the Massachusetts Wasteway Gate House on sheet 18 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 24 May 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 16,319 square feet, more or less

Interest: Easement

Date: February 1, 1994

TRACT 110-02

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal so called, and known and numbered as 722 Broadway and further bounded and described as follows:

Beginning at an iron pin set at the northwesterly corner of the parcel; said pin being a point on the southerly line of Broadway; said point bearing N 82° 56' 05" E and being 16.85 feet distant from an angle in said line; thence along said southerly line of Broadway

N 82° 56' 05" E, a distance of 31.29 feet to a point at the back edge of the concrete wall of the Pawtucket Canal; thence running along the back edge of said wall as follows:

S 18° 33' 43" E, a distance of 103.20 feet to an iron pin set at an angle in the wall,

S 08° 06' 33" W, a distance of 65.99 feet to an iron pin set at an angle in the wall, and

S 05° 50' 20"E, a distance of 192.18 feet to an iron pin set at an angle in the wall; thence continuing along the back edge of the concrete and then granite wall of the Pawtucket canal as follows:

S 15° 12' 18" E, a distance of 231.72 feet to an x-cut set at an angle in the wall, and

S 31° 44' 31" E, a distance of 17.94 feet to a point on the northerly line of location of the Boston and Maine Railroad; thence running along said railroad location line as follows:

N 84° 50' 16" W, a distance of 14.34 feet to a drill hole set at an angle in said location line, and

S 82° 00' 51" W, a distance of 16.74 feet to an iron pin set at the easterly line of land now or formerly of the City of Lowell; thence running along said land of the City of Lowell

N 15° 14' 25" W, a distance of 264.45 feet to an iron pin found at the southerly corner of land now or formerly of the Commonwealth of Massachusetts; thence running along said land of the Commonwealth of Massachusetts by three courses as follows:

N 05° 40' 50" W, a distance of 178.07 feet to an iron pin found,

N 08° 20' 10" E, a distance of 72.30 feet to an iron pin set, and

N 18° 27' 01" E, a distance of 91.21 feet to the point of beginning.

Containing 16,319 square feet of land, more or less.

Being shown as Parcel 7A on sheet 5 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3630, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 57,348 square feet, more or less

Interest: Easement

Date: February 1, 1994

TRACT 110-03

Two certain parcels of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal so called, and known and numbered as 713 Broadway and further bounded and described as follows:

PARCEL I:

Beginning at a stone bound found at the southwesterly corner of the parcel, said point being located at an angle on the northerly line of Broadway; thence

N 21° 35' 30" W, by land now or formerly of the Commonwealth of Massachusetts, 190.48 feet to a concrete bound found; thence

N 21° 35' 30" W, by land now or formerly of Endevor Incorporated 269.52 feet to a point; thence by land now or formerly of the Proprietors of Locks and Canals by five courses as follows:

S 40° 51' 32" E, a distance of 63.10 feet to a point,

S 30° 21' 02" E, a distance of 98.70 feet to a point,

S 28° 42' 32" E, a distance of 180.03 feet to a point,

S 27° 06' 12" E, a distance of 88.85 feet to a point, and

S 03° 54' 52" E, a distance of 51.47 feet to a point on the northerly line of Broadway; thence

S 82° 56' 05" W, by said northerly line of Broadway 52.74 feet to the point of beginning.

Containing 19,848 square feet of land, more or less.

Being shown as Parcel 8A, Lot 1 on sheet 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 24 May 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

PARCEL II:

Beginning at a point at the southwesterly corner of the parcel on the northerly line of Broadway, said point being N 82° 56' 05" E, a distance of 52.74 feet of a stone bound found on the northerly line of Broadway; thence by land now or formerly of the Proprietors of Locks and Canals by five courses as follows:

N 03° 54' 52" W, a distance of 51.47 feet to a point,

N 27° 06' 12" W, a distance of 88.85 feet to a point,

N 28° 42' 32" W, a distance of180.03 feet to a point,

N 30° 21' 02" W, a distance of 98.70 feet to a point, and

N 40° 51' 32" W, a distance of 63.10 feet to a point, thence by land now or formerly of the Commonwealth of Massachusetts by four courses as follows:

N 39° 26' 01" W, a distance of 11.26 feet to a point,

N 41° 26' 13" W, a distance of 65.21 feet to a point,

N 40° 55' 22" W, a distance of 28.28 feet to a point, and

N 38° 57' 44" W, a distance of 6.35 feet to a point; thence continuing by land now or formerly of the Commonwealth of Massachusetts by 19 courses as follows:

N 40° 51' 40" W, a distance of 59.18 feet to a point,

N 37° 55' 55" W, a distance of 31.65 feet to a point,

N 29° 43' 39" W, a distance of 47.04 feet to a point,

N 25° 59' 51" W, a distance of 18.34 feet to a point,

N 26° 07' 46" W, a distance of 147.13 feet to a point,

N 57° 28' 20" W, a distance of 0.73 feet to a point,

N 22° 42' 54" W, a distance of 48.48 feet to a point,

N 21° 32' 50" W, a distance of 20.27 feet to a point,

N 14° 11' 07" W, a distance of 141 feet to a point,

N 04° 08' 34" E, a distance of 60.21 feet to a point,

N 10° 37' 49" W, a distance of 66.11 feet to a point,

N 10° 13' 54" W, a distance of 42.29 feet to a point,

N 19° 09' 50" W, a distance of 17.85 feet to a point,

N 19° 17' 12" W, a distance of 59.17 feet to a point,

N 24° 17' 55" W, a distance of 43.27 feet to a point,

N 29° 51' 29" W, a distance of 45.82 feet to a point,

N 33° 34' 42" W, a distance of 36.78 feet to a point,

N 40° 05' 46" W, a distance of 80.63 feet to a point, and

N 40° 40' 59" W, a distance of 58.49 feet to a drill hole with lead plug and brass pin found at the intersection with the southerly line of Pawtucket Street; thence

N 50° 30' 01" E, along the southerly line of Pawtucket Street, a distance of 6 feet, more or less, to the westerly face of a granite wall on the westerly side of the Pawtucket Canal; thence

SOUTHERLY, more or less, along the westerly face of the aforementioned wall, a distance of 45 feet, more or less, to the end of the wall; thence continuing

SOUTHERLY, more or less, along the westerly bank of the Pawtucket Canal a distance of 1,281 feet to a granite wall; thence continuing

SOUTHERLY, more or less, along the westerly face of said granite wall a distance of 81 feet, more or less, to a drill hole set along the westerly face of the granite wall at the top of a set of concrete steps; thence

S 27° 16' 45" E, along the westerly face of the aforementioned granite wall, a distance of 40.79 feet to the northerly face of a building known as the Locking Gate House; thence

S 62° 43' 24" W, along the northerly face of the aforementioned building a distance of 7.80 feet to a building corner; thence

S 27° 16' 45" E, along the westerly face of the aforementioned building a distance of 16.06 feet to a building corner; thence

N 62° 43' 24" E, along the southerly face of the aforementioned building a distance of 6 feet, more or less, to the westerly face of a granite wall on the westerly side of the Pawtucket Canal; thence

SOUTHERLY, more or less, along the aforementioned wall a distance of 55 feet more or less to the northwesterly corner of a building known as the Francis Gate House; thence

S 27° 26' 58" E, along the westerly face of the Francis Gate House a distance of 13.41 feet to the southwesterly corner of the Francis Gate House; thence by the westerly face of a granite wall on the westerly side of the Pawtucket Canal by five courses as follows:

SOUTHERLY, 12 feet, more or less,

WESTERLY, 13 feet, more or less,

SOUTHERLY, 3 feet, more or less,

EASTERLY, 16 feet, more or less, and

SOUTHERLY, 6.4 feet, more or less, to an iron pin set at the westerly face of said wall; thence continuing

SOUTHERLY, more or less, along the westerly face of the aforementioned wall 51 feet, more or less, to an angle point in the wall; thence continuing

SOUTHERLY, more or less, along said wall a distance of 25 feet, more or less, to an iron pin set at the westerly face of said wall, said iron pin being 75.37 feet on a bearing of S 21° 00' 01" E, from the last mentioned iron pin; thence

SOUTHWESTERLY, more or less, along the westerly face of the aforementioned granite wall a distance of 28 feet, more or less to the northerly line of Broadway; thence

S 82° 56' 05" W, along Broadway a distance of 22 feet, more or less, to the point of beginning.

Containing 37,500 square feet of land, more or less.

Being shown as Parcel 8B on sheets 2, 3 and 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 24 May 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 0.9 of an acre, more or less

Interest: Easement

Date: February 1, 1994

TRACT 110-06

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal so called, and known and numbered as 380 School Street and 577.2 Middlesex Place and further bounded and described as follows:

Beginning at a point on the easterly line of School Street, said point being the northeasterly corner of Parcel CB-A/4 as shown on sheet 8 of the plan hereinafter described; thence

S 64° 34' 09" E, a distance of 2.24 feet to an x-cut set at the back edge of the southerly granite wall of the Pawtucket Canal; thence running along the back edge of said canal wall as follows:

S 59° 30' 00" E, a distance of 105.94 feet to an x-cut set,

S 63° 37' 19" E, a distance of 193.60 feet to an x-cut set,

S 73° 36' 36" E, a distance of 97.13 feet to an x-cut set,

S 73° 37' 46" E, a distance 731.97 feet to an x-cut set,

EASTERLY, more or less, by a curve to the left of a distance of 177 feet, more or less, to a drill hole set,

EASTERLY, more or less, still by said curve, a distance of 299 feet, more or less to an iron pin set,

NORTHEASTERLY, more or less, by a curve to the left, a distance of 148 feet, more or less, to an x-cut set, and

N 57° 32' 42" E, a distance 249.31 feet to a point at the northwesterly corner of Parcel 2B/2C-1/2C-2 as shown on sheet 9 of said plan; thence along the southeasterly line of Parcel 2B/2C-1/2C-2 and land now or formerly of Thomas M. Hughes

S 22° 45' 06" E, a distance of 108.06 feet to a point at an angle in the northerly line of Middlesex Place

S 68° 00' 59" W, a distance of 25 feet to a point at the southeasterly corner of land now or formerly of John A. and Sandra L. Crowe; thence along the easterly line of Crowe

N 22° 45' 06" W, a distance of 85.36 feet to a point; thence along the northerly line of Crowe

S 57° 20' 02" W, a distance of 277.58 feet to a point at land now or formerly of Philip J. Stratos; thence along the northerly line of said Stratos

S 60° 05' 29" W, a distance of 104.53 feet to a point of curvature; thence along the northerly line of land now or formerly of said Stratos, Peter D. Hallissy and Lowell Boys Club Association

SOUTHWESTERLY, more or less, by a curve to the right having a radius of 616 feet, an arc length of 501.72 feet to a point at the northwesterly corner of land now or formerly of said Lowell Boys Club Association; thence along the westerly line of the Lowell Boys Club Association

S 16° 16' 54" E, a distance of 5 feet to a point at land now or formerly of Josephine M. Brady; thence along the northerly line of Brady as follows:

N 71° 50' 47" W, a distance of 52.05 feet to a point,

N 71° 59' 55" W, a distance of 168.82 feet to a point, and

N 73° 44' 25" W, a distance of 289.62 feet to a point at land now or formerly of Donald A. Delmore; thence by the northerly line of said Delmore and of land now or formerly of Ronald E. and Denise E. Belley, as follows:

N 73° 44' 25" W, a distance of 291.65 feet to a point,

N 63° 41' 05" W, a distance of 198.65 feet to a point, and

N 59° 37' 45" W, a distance of 93.37 feet to a point on the easterly line of School Street; thence along said easterly line of School Street

N 09° 18' 05" W, a distance of 23.58 feet to the point of beginning.

Containing 39,000 square feet of land, more or less, which is 0.9 of an acre, more or less.

Being shown as Parcel CB-A/5 on sheets 8 and 9 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 5 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 0.52 of an acre, more or less

Interest: Easement

Date: February 1, 1994

TRACT 110-07

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal so called, and known and numbered as 379 School Street and further bounded and described as follows:

Beginning at the northwesterly corner of the parcel, said corner being a point on the southerly line of location of the Boston and Maine Railroad, and being at the northeasterly corner of Parcel CB-A/2 as shown on the plan hereinafter described; thence along the southerly location line of said railroad

N 86° 50' 03" E, a distance of 71.11 feet to a point at the back edge of the southerly granite wall of the Pawtucket Canal; thence running along the back edge of said canal wall as follows:

S 43° 21' 58" E, a distance of 64.39 feet to an iron pin set,

S 56° 00' 37" E, a distance of 45.26 feet to an x-cut set,

S 59° 03' 48" E, a distance of 95.68 feet to a point,

S 58° 56' 41" E, a distance of 86.22 feet to a drill hole set,

WESTERLY, more or less, by a curve to the left a distance of 207 feet, more or less, to a drill hole set,

S 84° 07' 29" E, a distance of 133.92 feet to a drill hole set,

S 88° 59' 18" E, a distance of 29.40 feet to a drill hole set,

S 89° 44' 14" E, a distance of 42.79 feet to a drill hole set,

N 87° 29' 24" E, a distance of 39.60 feet to a drill hole set,

N 83° 30' 57" E, a distance of 103.57 feet to an x-cut set,

N 83° 29' 15" E, a distance of 62.46 feet to an x-cut set, and

S 85° 49' 54" E, a distance of 118.37 feet to an x-cut set, and

SOUTHEASTERLY, more or less, by a curve to the right a distance of 59 feet, more or less, to an x-cut set; thence

S 64° 34' 09" E, a distance of 6.16 feet to a point on the westerly line of School Street; thence along said westerly line of School Street

S 09° 18' 05" E, a distance of 22.36 feet to a point at land now or formerly of Marinel Transportation Inc.; thence along the northerly line of land of Marinel Transportation, Inc. and land of Nicholas C. Sarris et. al. as follows:

N 73° 27' 35" W, a distance of 93.55 feet to a point,

N 85° 19' 55" W, a distance of 68 feet to a point of curvature,

WESTERLY, more or less, by a curve to the right having a radius of 122 feet, an arc length of 25.20 feet to a point,

S 83° 30' 25" W, a distance of 160 feet to a point of curvature,

WESTERLY, more or less, by a curve to the right having a radius of 447 feet, an arc length of 52.03 feet to a point,

N 89° 48' 15" W, a distance of 50 feet to a point of curvature,

WESTERLY, more or less, by a curve to the right having a radius of 626 feet, an arc length of 76.05 feet to a point,

N 83° 13' 35" W, a distance of 80 feet to a point of curvature, and

NORTHWESTERLY, more or less, by a curve to the right having a radius of 550.22 feet, an arc length of 187.46 feet to a point at the end of a twenty foot wide private way; thence crossing the end of said private way

N 64° 26' 11" W, a distance of 28.22 feet to the southeasterly corner of land now or formerly of P.H. Macheras Oil Company; thence along the northeasterly line of land of said P.H. Macheras Oil Company by two courses as follows:

N 58° 56' 27" W, a distance of 292.59 feet to a point, and

N 71° 55' 57" W, a distance of 45.70 feet to a point at the southeasterly corner of Parcel CB-A/2 as shown on the plan herinafter described; thence along the easterly line of land of said Parcel CB-A/2

N 03° 30' 25" W, a distance of 12.54 feet to the point of beginning.

Containing 22,500 square feet of land, more or less, which is 0.52 of an acre, more or less.

Being shown as Parcel CB-A/3 on sheet 7 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 5 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 80 square feet, more or less

Interest: Easement

Date: April 12, 1994

TRACT 110-09

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal, so called, located near the railroad bridge commonly known as "Red Bridge" and further bounded and described as follows:

Beginning at a point on the southerly line of location of the Boston and Maine Railroad, said point being the northeasterly corner of land now or formerly of P.H. Macheras Oil company; thence along said railroad location line

N 86° 50' 03" E, a distance of 20.20 feet to a point at land now or formerly of the City of Lowell; thence along the westerly line of land of the City of Lowell

S 03° 30' 25" E, a distance of 7.87 feet to a point on the northerly line of land now or formerly of P.H. Macheras Oil Company; thence along said northerly line of P.H. Macheras Oil Company

N 71° 55' 57" W, a distance of 21.72 feet to the point of beginning.

Containing 80 square feet of land, more or less.

Being shown as Parcel CB-A/1 on sheet 7 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 5 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 1,030 square feet, more or less

Interest: Easement

Date: February 2, 1994

TRACT 110-14

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal, so called, and below the School Street bridge and further bounded and described as follows:

Beginning at the northwesterly corner of the parcel, said corner being a point on the westerly line of School Street; thence crossing said School Street

S 64° 34' 09" E, a distance of 58.41 feet to a point on the easterly line of School Street; thence along said easterly line of School Street

S 09° 18' 05" E, a distance of 20.25 feet to the corner of the concrete bridge abutment; thence crossing School Street by the face of said bridge abutment

N 66° 18' 20" W, a distance of 57.23 feet to a point on the westerly line of School Street, said point being at the northeasterly corner of land now or formerly of Marinel Transportation, Inc.; thence along said westerly line of School Street

N 09° 18' 05" W, a distance of 22.36 feet to the point of beginning.

Containing 1,030 square feet of land, more or less.

Being shown as Parcel CB-A/4 on sheet 7 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 5 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

EXHIBIT A

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 39,335 square feet, more or less

Interest: Easement

Date: August 22, 1994

TRACT 110-20

The following six parcels of land, together with the buildings thereon, located on the Pawtucket Canal, in Lowell, Middlesex County, Massachusetts between Pawtucket Street and Broadway Street and further bounded and described as follows:

PARCEL I:

Beginning at an iron pin set at the most northerly corner of the parcel, said pin being set at the back edge of the granite wall of the Pawtucket Canal, thence running along the exposed back edge of said wall

S 70° 45' 09" E, a distance of 51.24 feet to an iron pin set; thence continuing along the exposed back edge of said wall by three courses as follows:

SOUTHEASTERLY, more or less, a distance of about 37 feet to a chisel-cut set in the wall, said chisel-cut bearing S 45° 23' 13" E, and being 34.88 feet distant from the last point described,

SOUTHWESTERLY, more or less, a distance of about 3 feet, and

SOUTHERLY, more or less, a distance of about 4 feet to the most westerly corner of the Hydraulic Gatehouse, said corner bearing S 07° 38' 47" W, and being 5.59 feet distant from the last mentioned chisel-cut; thence along the southwesterly face of the Hydraulic Gatehouse

S 20° 48' 37" E, a distance of 19.39 feet to the most southerly corner of said Gatehouse; thence running along the southerly face of the Hydraulic Gatehouse

N 69° 11' 23" E, a distance of 4 feet, more or less, to a point; thence running perpendicular to the last mentioned course

SOUTHERLY, more or less, a distance of about 13 feet to a point on the westerly edge of a stone wall; thence running along the edge of said wall as follows:

SOUTHWESTERLY, more or less, a distance of about 22 feet to a point,

SOUTHEASTERLY, more or less, a distance of about 3 feet to a point,

NORTHEASTERLY, more or less, a distance of about 18 feet to a point, and

SOUTHERLY, more or less, a distance of about 41 feet to a drill hole set at the back of exposed edge of said wall, said drill hole bearing S 13° 10' 24" E, and being 58.36 feet distant from the aforementioned southwesterly corner of the Hydraulic Gatehouse; thence continuing along the back edge of the exposed wall as follows:

S 19° 32' 24" W, a distance of 23.95 feet to an iron pin set,

S 88° 10' 35" W, a distance of 11.14 feet to an iron pin set,

N 29° 55' 13" W, a distance of 13.01 feet to an iron pin set,

N 35° 19' 04" W, a distance of 12.82 feet to an iron pin set, and

N 11° 33' 48" W, a distance of 18.18 feet to a drill hole set; thence continuing along the edge of exposed wall:

NORTHEASTERLY, more or less, a distance of about 14 feet to a point,

NORTHWESTERLY, more or less, a distance of about 3 feet to a point,

SOUTHWESTERLY, more or less, a distance of about 14 feet to a point,

NORTHWESTERLY, more or less, a distance of about 12 feet to the southeasterly corner of the Francis Gatehouse, said corner bearing N 36° 56' 54" W, and being 15.26 feet distant from the last mentioned drill hole; thence running along the northeasterly face of the Francis Gatehouse

N 27° 26' 58" W, a distance of 13.41 feet to the northeasterly corner thereof; thence running along the back of the exposed granite wall

N 17° 56' 25" W, a distance of 9.09 feet to a drill hole set in the bottom step of some granite steps; thence continuing along the back edge of the wall

NORTHWESTERLY, more or less, a distance of about 32 feet to a point on the southerly wall of the Locking Gatehouse; thence running along the face of the north end of the Gatehouse as follows:

N 62° 43' 24" E, a distance of 7 feet to the northeasterly corner of the Gatehouse,

N 27° 16' 45" W, a distance of 16.06 feet to the northerly corner of the Gatehouse,

S 62° 43' 24" W, a distance of about 8.7 feet to a point on the northerly face of the Locking Gatehouse, said point being at the back of the exposed granite wall as hereinbefore mentioned; thence running along the back of said wall

NORTHWESTERLY, more or less, a distance of about 0.7 feet to a drill hole set, said drill hole bearing S 66° 57' 39" W, and being 8.71 feet distant from the aforementioned northerly corner of the Locking Gatehouse; thence continuing along the back edge of said wall

N 22° 50' 38" W, a distance of 32.98 feet to the point of beginning.

Containing 5,660 square feet of land, more or less.

Being shown as Parcel 8-C on sheet 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

PARCEL II:

Beginning at an iron pin set at the northwesterly corner of Broadway and Madonna Circle; thence along the northerly line of Broadway

S 82° 56' 05" W, a distance of about 70 feet to a point at the back edge of the easterly granite wall of the Pawtucket Canal; thence along the back edge of said canal wall

NORTHERLY, more or less, a distance of about 163 feet to an angle in said wall; thence along the back edge of a granite wall appurtenant to the Pawtucket Canal as follows:

SOUTHEASTERLY, more or less, a distance of about 26 feet,

NORTHEASTERLY, more or less, a distance of about 3 feet, and

NORTHWESTERLY, and WESTERLY, more or less, a distance of about 94 feet to a point on said wall at Parcel 8-C, as described above; thence along the easterly line of Parcel 8-C

NORTHERLY, more or less, a distance of about 13 feet to the southerly face of the Hydraulic Gatehouse; thence by the face of said gatehouse

N 69° 11' 23" E, a distance of about 67 feet to the southeasterly corner thereof, and

N 20° 48' 37" W, a distance of 19.39 feet to the northeast corner of said gatehouse; thence along the edge of the easterly granite wall of the Pawtucket Canal as follows:

NORTHERLY, more or less, a distance of about 96 feet,

WESTERLY, more or less, a distance of about 3 feet, and

SOUTHERLY, more or less, a distance of about 38 feet to a point on the easterly shoreline of aforesaid Pawtucket Canal; thence along said easterly shoreline

NORTHWESTERLY, more or less, a distance of about 1,464 feet to a point at the back edge of the easterly granite wall of said Pawtucket Canal; thence along said canal wall

NORTHWESTERLY, more or less a distance of about 26 feet to a point on the southerly line of Pawtucket Street; thence along said line of Pawtucket Street

N 50° 30' 01" E. a distance of about 24 feet to an iron pin set at land now or formerly of the City of Lowell; thence along the westerly line of land of said City of Lowell as follows:

S 42° 57' 18" E, a distance of 18.50 feet to an iron pin set,

S 52° 22' 18" E, a distance of 45.33 feet to a drill hole set,

S 51° 03' 18" E, a distance of 26.92 feet to an iron pin set,

S 45° 57' 08" E, a distance of 99.63 feet to an iron pin set,

S 27° 45' 08" E, a distance of 9.13 feet to a point,

S 23° 43' 08" E, a distance of 166.68 feet to a drill hole set,

S 20° 16' 08" E, a distance of 18.32 feet to a drill hole set,

S 06° 36' 38" E, a distance of 108.50 feet to an iron pin set,

S 11° 40' 38" E, a distance of 236.01 feet to an iron pin set,

S 17° 29' 58" E, a distance of 36.11 feet to an iron pin set,

S 22° 11' 38" E, a distance of 36.39 feet to an iron pin set,

S 30° 12' 38" E, a distance of 131.48 feet to a drill hole in a stone bound found,

S 30° 12' 38" E, a distance of 100.00 feet to a drill hole in a stone bound found,

S 30° 12' 37" E, a distance of 53.52 feet to a drill hole in a stone bound found,

SOUTHEASTERLY, more or less, by a curve to the left having a radius of 212.80 feet, an arc length of 39.25 feet to a drill hole in a stone bound found, and

S 40° 46' 41" E, a distance of 60.26 feet to a point at land now or formerly of Thomas Riley; thence along the southwesterly line of Riley as follows:

S 40° 46' 41: E, a distance of 91.60 feet to a drill hole in a stone bound found,

S 51° 27' 21" E, a distance of 93.41 feet to a point, and

S 55° 19' 01" E, a distance of 108.23 feet to a P.K. nail set at Madonna Circle; thence along the westerly line of Madonna circle

S 11° 00' 40" E, a distance of 253.76 feet to the point of beginning.

Meaning and intending to exclude the canal walls of the Pawtucket Canal.

Containing 26,200 square feet of land, more or less.

Being shown as Parcel 13B on sheets 2, 3, and 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

PARCEL III:

Beginning at the southeasterly corner of the Hydraulic Gatehouse, said corner being 20.43 feet distant from the westerly line of Madonna Circle; thence along the southerly wall of the gatehouse by Parcel 13B and Parcel 8-C

S 69° 11' 23" W, a distance of 71.00 feet to the southwest corner thereof; thence along the westerly wall of the gatehouse, by Parcel 8-C

N 20° 48' 37" W, a distance of 19.39 feet to the northwest corner thereof; thence along the northerly wall of the gatehouse by Parcel 8-C and crossing the Pawtucket Canal

N 69° 11' 23" E, a distance of 71.00 feet to the northeast corner thereof; thence along the easterly wall of the gatehouse

S 20° 48' 37" E, a distance of 19.39 feet to the point of beginning.

Containing 1,377 square feet of land, more or less.

Being shown as Hydraulic Gatehouse - Guard Locks, on sheet 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

PARCEL IV:

Beginning at the most northwesterly corner of the Francis Gatehouse, said corner being 19.34 feet distant from the northeasterly line of Parcel 8-A, Lot 1 and being on the easterly line of Parcel 8B as shown on the Plan hereinafter described; thence

N 62° 17' 23" E, along the northerly face of the Francis Gatehouse and across the lock chamber, a distance of 36.60 feet to the most northerly corner thereof; thence running along the easterly building face

S 27° 26' 58" E, a distance of 13.41 feet to the southeasterly corner of said Francis Gatehouse; thence running along the southerly building face, and again crossing the lock chamber

S 62° 17' 23" W, a distance of 36.60 feet to the southeast building corner; thence running along the westerly building face, being the easterly line of Parcel 8B,

N 27° 26' 58" W, a distance of 13.41 feet to the point of beginning.

Containing 491 square feet of land, more or less.

Being shown as Francis Gatehouse on sheet 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

PARCEL V:

Beginning at the most southwesterly corner of the Locking Gatehouse, said point being 12.64 feet distant from the easterly line of Parcel 8A, Lot 1, as shown on the Plan hereinafter described, and being on the easterly line of Parcel 8B; thence

N 27° 16' 45" W, along Parcel 8B, a distance of 16.06 feet to a building corner; thence

N 62° 43' 24" E, along the northerly face of the building, crossing over the lock chamber and by part of Parcel 8-C to the most northeasterly building corner a distance of 51.29 feet; thence

S 27° 16' 45" E, along the most easterly face of said building a distance of 16.06 feet to a corner; thence

S 62° 43' 24" W, along the face of said building a distance of 7.89 feet to a corner; thence

S 27° 16' 45" E, along the face of said building a distance of 8.00 feet to the most southeasterly corner of said building; thence

S 62° 43' 24" W, along the most southerly face of said building a distance of 35.40 feet to a corner; thence

N 27° 16' 45" W, along the face of said building a distance of 8.00 feet to a corner; thence

S 62° 43' 24" W, along the face of said building a distance of 8.00 feet to the point of beginning.

Containing 1,000 square feet of land, more or less.

Being shown as Locking Gatehouse on sheet 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

PARCEL VI:

Beginning at a drill hole set at the northwesterly corner of the parcel along the westerly face of the westerly granite lock chamber wall at the top of a set of granite steps; thence

S 27° 16' 45" E, along the westerly face of the aforementioned granite wall, a distance of 40.79 feet to the northerly face of a building known as the Locking Gatehouse; thence

S 62° 43' 24" W, along the northerly face of the aforementioned building a distance of 7.80 feet to a building corner; thence

S 27° 16' 45" E, along the westerly face of the aforementioned building a distance of 16.06 feet to a building corner; thence

N 62° 43' 24" E, along the southerly face of the aforementioned building a distance of about 6 feet to the westerly face of a granite wall on the westerly side of the Pawtucket Canal; thence

SOUTHERLY, more or less, along the aforementioned wall a distance of about 55 feet to the northwesterly corner of a building known as Francis Gatehouse; thence

S 27° 26' 58" E, along the westerly face of the Francis Gatehouse a distance of 13.41 feet to the southwesterly corner of the Francis Gatehouse; thence by the westerly face of a granite wall on the westerly side of the Pawtucket Canal by 5 courses as follows:

SOUTHERLY, about 12 feet,

WESTERLY, about 13 feet,

SOUTHERLY, about 3 feet,

EASTERLY, about 16 feet, and

SOUTHERLY, about 6.4 feet to an iron pin set at the westerly face of said wall; thence continuing

SOUTHERLY, more or less, along the westerly face of the aforementioned wall about 51 feet to an angle point in the wall; thence continuing

SOUTHERLY, more or less, along said wall a distance of about 25 feet to an iron pin set at the westerly face of said wall, said iron pin being 75.37 feet on a bearing of S 21° 00' 01" E, from the last mentioned iron pin; thence

NORTHEASTERLY, N 30° 24' 34" E, a distance of 62.37 feet to an iron pin set,

S 88° 10' 35" W, a distance of 11.14 feet to an iron pin set,

N 29 ° 55' 13" W, a distance of 13.01 feet to an iron pin set,

N 35° 19' 04" W, a distance of 12.82 feet to an iron pin set, and

N 11° 33' 48" W, a distance of 18.18 feet to a drill hole set; thence continuing along the edge of exposed wall;

NORTHEASTERLY, more or less, a distance of about 14 feet to a point,

NORTHWESTERLY, more or less, a distance of about 3 feet to a point,

SOUTHWESTERLY, more or less, a distance of about 14 feet to a point,

NORTHWESTERLY, more or less, a distance of about 12 feet to the southeasterly corner of the Francis Gatehouse, said corner bearing N 36° 56' 54" W, and being 15.26 feet distant from the last mentioned drill hole; thence running along the northeasterly face of the Francis Gatehouse

N 27° 26' 58" W, a distance of 13.41 feet to the northeasterly corner thereof; thence running along the back of the exposed granite wall

N 17° 56' 25" W, a distance of 9.09 feet to a drill hole set in the bottom step of some granite steps; thence continuing along the back edge of the wall

NORTHWESTERLY, more or less, a distance of about 32 feet to a point on the southerly wall of the Locking Gatehouse; thence running along the face of the north end of the Gatehouse as follows:

N 62° 43' 24" E, a distance of about 7 feet to the northeasterly corner of the Gatehouse,

N 27° 16' 45" W, a distance of 16.06 feet to the northerly corner of the Gatehouse,

S 62° 43' 24" W, a distance of about 8.7 feet to a point on the northerly face of the Locking Gatehouse, said point being at the back of the exposed granite wall as hereinbefore mentioned; thence running along the back of said wall

NORTHWESTERLY, more or less, a distance of about 0.7 feet to a drill hole set, said drill hole bearing S 66° 57' 39" W, and being 8.71 feet distant from the aforementioned northerly corner of the Locking Gatehouse; thence continuing along the back edge of said wall

N 22° 50' 38" W, a distance of 32.98 feet to a point, thence

WESTERLY, S 73° 44' 18" W, a distance of 38.05 feet to the point of beginning.

Containing 5,984 square feet of land, more or less.

Being shown as Guard Locks - Lock Chamber, on sheet 4 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

All six parcels are a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with the Middlesex Northern District Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 2,839 square feet, more or less

Interest: Easement

Date: January 27, 1994

TRACT 111-09

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 501 Dutton Street and further bounded and described as follows:

Beginning at the northwesterly corner of Dutton Street and Hayden Street, said corner being the southeasterly corner of the parcel described; thence along the northwesterly line of Hayden Street

S 80° 30' 30" W, a distance of 150.82 feet to the easterly line of Worthen Street; thence along said Worthen Street

N 09° 34' 16" W, a distance of 17.24 feet to a point at the back edge of the southeasterly granite wall of the Western canal; thence along said canal wall

N 80° 23' 13" E, a distance of 154.75 feet to a point on the westerly line of Dutton Street; thence along said Dutton Street

SOUTHERLY, more or less, by a curve to the right having a radius of 1,210.46 feet, an arc length of 18.01 feet, to the point of beginning.

Containing 2,839 square feet of land, more or less.

Being shown as Parcel 24 on sheet 29 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 0.23 of an acre, more or less

Interest: Easement

Date: February 2, 1994

TRACT 111-17

Four certain parcels of land located in Lowell, Middlesex County, Massachusetts along the Hamilton Canal, so called, and known and numbered as 171.1 Jackson Street and further bounded and described as follows:

PARCEL I:

Beginning at the southwesterly corner of the parcel, said corner bearing N 12° 38' 52" W, and being 23 feet distant from the northerly line of Jackson Street; thence running along the easterly line of land now or formerly of James T. Lichoulas, Trustee of Appleton Trust

N 12° 38' 52" W, a distance of 10.91 feet to a cut set at the face of a concrete wall; thence running along the southerly line of land now or formerly of the Proprietors of Locks and Canals and along said wall

N 84° 56' 46" E, a distance of 48.75 feet to a drill hole set at the corner of said wall; thence running along the easterly line of land now or formerly of the Proprietors of Locks and Canals

N 02° 30' 39" E, a distance of 17.68 feet to a point at the Hamilton Canal; thence running along the southerly side of the Hamilton Canal

N 86° 56' 46" E, a distance of 64.37 feet to a point on the northwesterly line of Parcel 5345C, as hereinafter described; thence running along said northwesterly line of Parcel 5345C by two courses as follows:

SOUTHWESTERLY, more or less, by a curve to the right having a radius of 142 feet, an arc length of 18.55 feet to a point of compound curvature, and

SOUTHWESTERLY, more or less, by a curve to the right having a radius of 98 feet, an arc length of 34 feet to a point at the southeasterly corner of Parcel 5345B as hereinafter described; thence running along the easterly line of Parcel 5345B

N 12° 38' 52" W, a distance of 5.50 feet to a point; thence running along the northerly line of Parcel 5345B, said line being 23 feet distant from and parallel with the northerly line of Jackson Street

S 77° 21' 08" W, a distance of 67 feet to the point of beginning.

Containing 1,438 square feet of land, more or less.

Being shown as Parcel 5345A on sheet 15 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 29 June 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

PARCEL II:

Beginning at the northwesterly corner of the parcel, said corner being the southwesterly corner of Parcel 5345A as hereinbefore described; thence running along the southerly and easterly line of Parcel 5345A by two courses as follows:

N 77° 21' 08" E, a distance of 67 feet to a point, and

S 12° 38' 52" E, a distance of 5.50 feet to a point at land now or formerly of James T. Lichoulas, Trustee of Appleton Trust; thence running by land now or formerly of said James T. Lichoulas

S 77° 21' 08" W, a distance of 67 feet to a point on the easterly line of other land owned now or formerly by James T. Lichoulas, Trustee of Appleton Trust; thence along said easterly line of Lichoulas

N 12° 38' 52" W, a distance of 5.50 feet to the point of beginning.

Containing 368.5 square feet of land, more or less.

Being shown as Parcel 5345B on sheet 15 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 29 June 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

PARCEL III:

Beginning at the southwesterly corner of the parcel, said corner being the southeasterly corner of parcel 5345B as hereinbefore described; thence along the southerly line of Parcel 5345A by two courses as follows:

NORTHEASTERLY, more or less, by a curve to the left having a radius of 98 feet, an arc length of 34 feet to a point of compound curvature; and

NORTHEASTERLY, more or less, by a curve to the left having a radius of 142 feet, an arc length of 19.29 feet to a point at the Hamilton Canal; thence along the southerly line of said Hamilton Canal

N 77° 21' 08" E, a distance of 45 feet to a point; thence by land now or formerly of the Proprietors of Locks and Canals

S 20° 51' 08" W, a distance of 20 feet to a point on the northerly line of land now or formerly of James T. Lichoulas, Trustee of Appleton Trust; thence along said northerly line of Lichoulas

S 77° 21' 08" W, a distance of 84 feet to the point of beginning.

Containing 960 square feet of land, more or less.

Being shown as Parcel 5345C on sheet 15 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 29 June 1993 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

PARCEL IV:

Beginning at the southwesterly corner of the parcel, said point being the southeasterly corner of Parcel 5345C as hereinbefore described; thence along the easterly line of Parcel 5345C

N 20° 51' 08" E, a distance of 17.87 feet to a point at the Hamilton Canal; thence running along the back edge of the southerly wall of said canal by five courses as follows:

N 77° 46' 01" E, a distance of 33.52 feet to a punch mark set at the edge of a steel bridge girder,

N 76° 53' 30" E, a distance of 21.79 feet to another punch mark set at the edge of a steel bridge girder,

N 77° 16' 27" E, a distance of 59.96 feet to a cut set at the back edge of the wall,

N 77° 29' 54" E, a distance of 256.02 feet to a drill hole set at the back edge of the wall,

N 76° 33' 10" E, a distance of 107.84 feet to a point at land now or formerly of Courier Citizen company; thence by the westerly line of land of said Courier Citizen Company

S 12° 38' 52" E, a distance of 15.80 feet to a point at land now or formerly of James T. Lichoulas, Trustee of Appleton Trust; thence running by the northerly line of land of said James T. Lichoulas, Trustee

S 77° 21' 08" W, a distance of 588.99 feet to the point of beginning.

Containing 8,637 square feet of land, more or less.

Being shown as Parcel 5345D on sheet 15 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic

Engineering and Survey Consultants, dated 29 June 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Interest: Easement

Date: April 14, 1994

TRACT 111-22

A certain parcel of land located southerly of the Western Canal, so called, and also located southerly of a certain parcel of land known and numbered 501 Dutton Street, being a portion of Hayden Street, in the City of Lowell, County of Middlesex and Commonwealth of Massachusetts, and further bounded and described as follows:

Beginning at a point at the intersection of the Northwesterly line of Hayden Street with the Northerly line of Worthen Street, said point being the Southerly corner of the parcel known as 501 Dutton Street, being owned by the Commonwealth of Massachusetts;

Thence, turning and running Northeasterly along said land of the Commonwealth of Massachusetts a distance of 150.82 feet, more or less to the Westerly line of Dutton Street;

Thence, turning and running along said line of Dutton Street 10 feet, more or less to a point in the middle of Hayden Street;

Thence, turning and running Southwesterly in a straight line to a point located at the intersection of Hayden Street with the Northerly line of Worthen Street;

Thence, turning and running along said Worthen Street a distance of 10 feet, more or less, to the point of beginning.

The above described land is shown on the following plans:

Sheet 29 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69; and

Sheet 4 of a set of plans entitled "The Commonwealth of Massachusetts Plan of Road in the City of Lowell, Middlesex County Laid Out as a City Highway by the Department of Public Works" and prepared by Howard, Needles, Tammen & Bergendoff, dated September 25, 1985 and recorded with said Registry of Deeds in Plan Book 150, Plan 53.

Said property being owned by the Commonwealth of Massachusetts by virtue of its Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 7,597 square feet, more or less

Interest: Easement

Date: January 27, 1994

TRACT 111-23

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 139 Broadway and further bounded and described as follows:

Beginning at a drill hole set in the concrete sidewalk at the northeasterly corner of Suffolk Street and Broadway; thence running along the easterly line of Suffolk Street

N 11° 11' 30" W, a distance of 321.90 feet to a drill hole set at the southeasterly corner of Suffolk Street and Jefferson Street; thence running along the southerly line of Jefferson Street

N 78° 52' 10" E, a distance of 23.58 feet to a drill hole set on the westerly line of the Western Canal; thence running along the back edge of the concrete retaining wall of said Western Canal as follows:

S 11° 18' 00" E, a distance of 160.76 feet to a spike set, and

S 11° 11' 27" E, a distance of 161.69 feet to the northerly line of Broadway; thence running along said northerly line of Broadway

S 80° 04' 33" W, a distance of 23.88 feet to the point of beginning.

Containing 7,597 square feet of land, more or less.

Being shown as Parcel CB-C, Lot A on sheet 28 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 6,450 square feet, more or less

Interest: Easement

Date: January 27, 1994

TRACT 111-24

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Western Canal, so called, known and numbered as 125 Broadway and further bounded and described as follows:

Beginning at a drill hole set in the granite curb at the northwesterly corner of Broadway and Lewis Street; thence running along the northerly line of Broadway

S 80° 04' 33" W, a distance of 25 feet, more or less, to the easterly shoreline of the Western Canal; thence running along said easterly shoreline of the Western Canal

NORTHERLY, more or less, a distance of 328 feet, more or less, to a point on the southerly line of Jefferson Street; thence along said line of Jefferson Street

N 78° 52' 10" E, a distance of 24 feet, more or less, to a spike set at the corner of Lewis Street; thence running along the westerly line of Lewis Street

S 11° 11' 30" E, a distance of 324.02 feet to the point of beginning.

Containing 6,450 square feet of land, more or less.

Being shown as Parcel CB-D, Lot B on sheet 28 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 6 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 0.09 of an acre, more or less

Interest: Easement

Date: February 2, 1994

TRACT 111-26

A certain parcel of land located in Lowell, Middlesex County, Massachusetts along the Pawtucket Canal, so called, and further bounded and described as follows:

Beginning at an iron pin set at the most westerly corner of the parcel, said pin being at the northeasterly corner of Parcel CB-A, as shown on the plan hereinafter described, and being at the back edge of the southerly granite wall of the Pawtucket Canal; thence along the back edge of said canal wall

N 57° 32' 42" E, a distance of 42.67 feet to a point on the southwesterly location line of the Boston and Maine Railroad; thence along said railroad location line as follows:

SOUTHEASTERLY, more or less, by a curve to the right having a radius of 967.73 feet, an arc length of 41.01 feet to a point,

N 51° 44' 05" E, a distance of 10.85 feet to an iron pin set, and

SOUTHEASTERLY, more or less, by a curve to the right having a radius of 977.73 feet, an arc length of 21.57 feet to an iron pin set at land now or formerly of Thomas M. Hughes; thence along the northwesterly line of land of said Hughes

S 51 44' 05" W, a distance of 95.31 feet to a point on the easterly line of Parcel CB-A; thence along said easterly line of Parcel CB-A

N 22° 45' 06" W, a distance of 64.06 feet to the point of beginning.

Containing 4,011 square feet of land, more or less.

Being shown as Parcel 2B/2C-1/2C-2 on sheet 10 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 2 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 937 square feet, more or less

Interest: Easement

Date: February 3, 1994

TRACT 111-32

A certain parcel of land with buildings, improvements, structures and fixtures thereon, commonly known as the Swamp Locks Gate House, located in Lowell, Middlesex County, Massachusetts over the Lower Pawtucket Canal, so called, and further bounded and described as follows:

Beginning at the northwesterly corner of the parcel, said corner being a point along the southerly line of Parcel CB-G, as shown on the plan hereinafter described, bearing N 79° 49' 52" E, and being 3.15 feet distant from a drill hole set at an angle in the said southerly line of Parcel CB-G; thence along said line of Parcel CB-G

N 79° 49' 52" E, a distance of 3.52 feet to a point; thence running along the edge of a steel grate footbridge as shown on said plan

S 04° 25' 13" E, a distance of 64.47 feet to the northerly wall of the northerly gate house; thence running along the wall of said gate house as follows:

N 85° 34' 47" E, a distance of 11.22 feet to a corner,

S 04° 25' 13" E, a distance of 10.50 feet to a corner,

S 85° 34' 47" W, a distance of 9.75 feet to a corner and

S 04° 25' 13"E, a distance of 30.06 feet to a point 0.30 feet beyond the southeasterly corner of the northerly gate house; thence

S 85° 34' 20" W, a distance of 2 feet to a point 1.78 feet distant from the northeasterly corner of the southerly gate house and along the prolongation of the easterly wall thereof; thence running to and along the easterly wall of said southerly gate house as follows:

S 03° 45' 33" E, a distance of 20.14 feet to a corner,

S 86° 14' 27" W, a distance of 12.42 feet to a corner, and

N 03° 45' 33" W, a distance of 18.36 feet to a corner, and

N 86° 14' 27" E, a distance of 6.32 feet to a point on the northerly wall of said southerly gate house, said point being along the prolongation of the westerly wall of the northerly gate house, and 2.01 feet distant therefrom; thence running to and along the wall of said northerly gate house as follows:

N 04° 25' 13" W, a distance of 31.77 feet to a corner,

S 85° 34' 47" W, a distance of 3.93 feet to a corner,

N 04° 25' 13" W, a distance of 10.50 feet to a corner, and

N 85° 34' 47" E, a distance of 7.08 feet to a point on the northerly wall of the northerly gate house at the westerly edge of the steel grate footbridge; thence running along the westerly edge of said footbridge

N 04° 25' 13" W, a distance of 64.11 feet to the point of beginning.

Containing 937 square feet of land, more or less.

Being shown as Swamp Locks Gate House on sheet 12 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 2 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 875 square feet, more or less

Interest: Easement

Date: February 3, 1994

TRACT 111-33

Two certain parcels of land with improvements, structures and fixtures thereon, commonly known as the Swamp Locks Dam North and South, located in Lowell, Middlesex County, Massachusetts over the Lower Pawtucket Canal, so called, and further bounded and described as follows:

PARCEL I:

Beginning at the southeasterly corner of the dam, said corner being the northeasterly corner of the northerly gate house as shown on the plan hereinafter described; thence along the northerly wall of said northerly gate house

S 85° 34' 47" W, a distance of 14 feet, more or less, to the face of the dam, said face being about one foot easterly from and parallel with the westerly edge of the steel grate footbridge as shown on said plan; thence running along the face of the dam

N 04° 25' 13" W, a distance of 61 feet, more or less, to the face of a concrete wall; thence running along said concrete wall

EASTERLY, NORTHERLY and EASTERLY, all of said directions being more or less, a distance of 14 feet more or less to a point along the wall at the toe of the dam; thence running along the toe of the dam

S 04° 25' 13" E, a distance of 64 feet, more or less, to the point of beginning.

Containing 875 square feet of land, more or less.

PARCEL II:

Beginning at the northwesterly corner of the dam, said corner being 2.5 feet easterly from a westerly wall of the northerly gate house as shown on the plan hereinafter described; thence running along the northerly line of the dam, said line being along a southerly wall in the aforesaid northerly gate house

N 85° 34' 47" E, a distance of 28 feet, more or less, to the northeast corner of the dam; thence running across the toe of the dam

S 04° 25' 13" E, more or less, a distance of 30 feet, more or less, to the southeast corner of the dam; thence along the northerly face a granite wall

S 85° 34' W, more or less, a distance of 28 feet, more or less, to the southwest corner of the dam, said corner being a point on the southerly wall of aforesaid northerly gate house; thence running along the face of the dam, said face being 2.5 feet easterly from and parallel with a westerly wall of said gate house

N 04° 25' 13" W, a distance of 30 feet, more or less, to the point of beginning.

Containing 840 square feet of land, more or less.

Both Parcels I and II being shown as Swamp Locks Dam/North and Swamp Locks Dam/South on sheet 12 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 2 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 11,685 square feet, more or less

Interest: Easement

Date: February 3, 1994

TRACT 111-34

All that improvement and/or air rights with any structures and fixtures thereon, commonly known as the Swamp Locks Lock Chambers, located in Lowell, Middlesex County, Massachusetts over the Lower Pawtucket Canal, so called, and further bounded and described as follows:

Beginning at a cross-cut set at the most westerly corner of the parcel, said cross-cut being at the back edge of the southerly granite wall of the Pawtucket Canal and being on the northerly line of land of Parcel CB-I as shown on the plan hereinafter described; thence crossing the headwaters of the Swamp Locks and running

N 60° 11' 35" E, a distance of 45.57 feet to a cut set on the northerly face of a concrete buttress; thence along the northerly face of said buttress

N 86° 14' 27" E, a distance of 7.43 feet to the westerly face of the Swamp Locks Gate House; thence running along the walls of said Gate House:

S 03° 45' 33" E, a distance of 4.26 feet to a corner,

N 86° 14' 27" E, a distance of 12.42 feet to a corner, and

N 03° 45' 33" W, a distance of 1.17 feet to a point on the easterly wall of said Swamp Locks Gate House; continuing,

N 03° 45' 33" W, a distance of 18.96 feet to a point at the northerly face of the southerly granite wall of the Lower Pawtucket Canal; thence running along said granite wall as follows:

N 85° 34' 20" E, a distance of 46.21 feet to a cut set in the face of said wall,

N 84° 43' 16" E, a distance of 43.12 feet to a cut set in the face of said wall, and

N 89° 50' 16" E, a distance of 20.87 feet to a cut set in the face of said wall; thence running along the northerly face of the southerly granite wall of the Lower Pawtucket Canal and thence crossing a twenty foot passageway

N 86° 13' 40" E, a distance of 66.78 feet to a point on the easterly line of said twenty foot passageway; thence running along the easterly line of said twenty foot passageway

N 09° 30' 31" W, a distance of 3.95 feet to the southerly shoreline of the Lower Pawtucket Canal; thence running along said southerly shoreline as follows:

N 85° 27' 15" E, a distance of 41.46 feet to a point,

N 88° 55' 33" E, a distance of 80.01 feet to a point, and

S 06° 40' 48" E, a distance of 11.18 feet to a point at the bottom of the Swamp Locks Lower Lock Chamber; thence running along said Lower Lock Chamber

S 84° 08' 49" W, a distance of 48.05 feet to a point; thence running as follows:

S 00° 25' 22" E, a distance of 27.89 feet to a point on the northerly line of land now or formerly of the Pellon Corporation; thence along the line of said Pellon Corporation

S 77° 16' 35" W, a distance of 66.89 feet to a point on the easterly line of a twenty foot passageway leading to Jackson Street; thence along the easterly line of said passageway

N 13° 10' 56" W, a distance of 11.82 feet to a point at the southerly wall of the Swamp Locks Chamber; thence along the southerly wall of the Swamp Locks Lower Locks Chamber as follows:

S 81° 09' 40" W, a distance of 52.56 feet to a drill hole set in the face of a concrete wall, and

N 01° 48' 53" W, a distance of 7.55 feet to an iron pin set at the back edge of the southerly granite wall of the Swamp Locks Upper Chamber; thence running along the back edge of said granite wall as follows:

S 85° 46' 53" W, a distance of 139.78 feet

S 87° 04' 42" W, a distance of 49.47 feet to the point of beginning.

Containing 11,685 square feet of land, more or less.

Being shown as Swamp Locks-Lock Chamber on sheet 11 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 28 June 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 0.01 of an acre, more or less

Interest: Easement

Date: June 29, 1992
Revised: February 3, 1994

TRACT 112-01

A certain parcel of land with buildings, structures and fixtures, thereon, commonly known as the Hamilton Gate House, located in Lowell, Middlesex County, Massachusetts over the Hamilton Canal, so called, and near Jackson Street and further bounded and described as follows:

Beginning at a point on the westerly line of the Hamilton Canal at the head of the Hamilton Wasteway, said point bearing northeasterly, more or less, and being 21.05 feet distant from the southeasterly corner of a building foundation, thence running along the westerly face of the Hamilton Gate House by land now or formerly of John Adden Furniture, Inc. N 12° 40' 17" W, a distance of 12.18 feet to the northwesterly corner of the gate house, said corner bearing southeasterly more or less and being 20.40 feet distant from the northeasterly corner of a building foundation; thence running the following two courses along the northerly and easterly faces of the Hamilton Gate House, by land now or formerly of John Adden Furniture, Inc.;

N 77° 19' 43" E, a distance of 21.18 feet to the northeast corner of said gate house,

S 12° 40' 17" E, a distance of 12.18 feet to the southeast corner of said gate house;

Thence, running across the canal along the southerly face of the gate house, by land now or formerly of John Adden Furniture, Inc., S 77° 19' 43" W, a distance of 21.18 feet to the point of beginning.

Containing 258 square feet of land, which is 0.01 of an acre, more or less.

Being shown as the Hamilton Gate House on sheet 16 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

Being a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

EXHIBIT A

Purported Owner: Commonwealth of MA/DEM

Lowell Historic Preservation Commission

Area: 13,645 square feet, more or less

Interest: Easement

Date: August 18, 1994

TRACT 112-04

The following three parcels of land, with the buildings thereon, located in Lowell, Middlesex County, Massachusetts and more particularly bounded and described as follows:

PARCEL I:

A certain parcel of land located on the Pawtucket Canal, so called, in Lowell, Middlesex County, Massachusetts and commonly known as the Lower Locks Dam, and further bounded and described as follows:

Beginning at a point at the southwesterly corner of the parcel, said point being two feet distant from and parallel with the westerly face of the Lower Locks Gatehouse, as hereinafter described; thence crossing the Pawtucket Canal and running along the face of the Lower Locks Dam

N 06° 25' 46" E, a distance of 87 feet, more or less, to a point at the northerly end of the dam; thence running along the northerly end of the Lower Locks Dam

EASTERLY, more or less, a distance of about 41 feet to the base of said Dam; thence crossing the Pawtucket Canal and running across the base of the dam

SOUTHERLY, more or less, a distance of about 98 feet to a point at the base of granite of the Lower Locks; thence running along the southerly line of the Lower Locks Dam, being at the base of granite of said Lower Locks

WESTERLY, more or less, a distance of about 46 feet to the point of beginning.

Containing 3,680 square feet of land, more less.

PARCEL II:

The land, with the buildings thereon, located on the Pawtucket Canal in Lowell, Middlesex County, Massachusetts and commonly known as the Lower Locks Gatehouse, and further bounded and described as follows:

Beginning at the southwesterly corner of the Lower Locks Gatehouse, as shown on the Plan hereinafter described; thence running along the westerly face of the Gatehouse, more or less, and across the Pawtucket Canal, by five courses as follows:

N 06° 25' 46" E, a distance of 64.78 feet to a point,

N 83° 34' 14" W, a distance of 2.50 feet to a point,

N 06° 25' 46" E, a distance of 12.25 feet to a point,

S 83° 34' 14" E, a distance of 2.50 feet to a point, and

N 06° 25' 46" E, a distance of 18.10 feet to the northwesterly corner of the Gatehouse, being at land now or formerly of the City of Lowell and known as the Rex lot; thence along the northerly face of the Lower Locks Gatehouse by land now or formerly of the City of Lowell

S 83° 34' 14" E, a distance of 7.50 feet to the northeasterly corner of the Gatehouse; thence running along the easterly face of said Gatehouse, and crossing the Lower Locks Dam, by five courses as follows:

S 06° 25' 46" W, a distance of 18.10 feet to a point,

S 83° 34' 14" E, a distance of 7.70 feet to a point,

S 06° 25' 46" W, a distance of 12.25 feet to a point,

N 83° 34' 14" W, a distance of 7.70 feet to a point, and

S 06° 25' 46" W, a distance of 64.78 feet to the southeasterly corner of the Lower Locks Gatehouse; thence along the southerly face of the gatehouse

N 83° 34' 14" W, a distance of 7.50 feet to the point of beginning.

Containing 838 square feet of land, more or less.

PARCEL III:

The land, with any buildings and fixtures thereon, located on the Pawtucket Canal in Lowell, Middlesex County, Massachusetts, commonly known as the Lower Locks Chambers, and more particularly bounded and described as follows:

Beginning at the most westerly corner of the parcel, said corner being a point on the northerly line of Parcel CB-H, as shown on the Plan hereinafter described, and bearing S 85° 57' 30" E, and being 49.55 feet distant from a drill hole set in the southwesterly end of a concrete wall; thence running to a point on the northerly side of the Lower Locks

N 12° 49' 10" E, a distance of 23.64 feet; thence running along the outer edge of the granite blocks

S 82° 56' 24" E, a distance of 17.44 feet to a point on the southerly prolongation of the westerly line of the Lower Locks Gatehouse; thence

N 06° 25' 46" E, a distance of 1.49 feet to the southwesterly corner of the Lower Locks Gatehouse; thence along the southerly face of said Gatehouse

S 83° 34' 14" E, a distance of 7.50 feet to the southeast corner of the Lower Locks Gatehouse; thence along the easterly wall of said Gatehouse

N 06° 25' 46" E, a distance of 4.76 feet to a point; thence along the northerly edge of the concrete capped wall of the Lower Locks

S 83° 18' 52" E, a distance of 126.25 feet to a point; thence along the northerly top edge of granite of the Lower Locks by three courses as follows:

N 89° 40' 25" E, a distance of 9.86 feet to a point,

S 82° 53' 58" E, a distance of 98.75 feet to a point, and

N 80° 11' 21" E, a distance of 11.35 feet to a point at the base of the granite blocks of the Lower Locks; thence running along the base of said blocks

S 06° 01' 39" W, a distance of 38.00 feet to an iron pin set at the base of the last granite stone on the southeasterly end of the Lower Locks, said iron pin being at an angle in the northerly line of Parcel C8-H as hereinbefore mentioned; thence running along the southerly line of the Lower Locks, being the northerly line of Parcel C8-H, by four courses as follows:

N 83° 10' 03" W, a distance of 136.39 feet to a drill hole set in granite,

N 83° 28' 56" W, a distance of 110.00 feet to an iron pin set,

N 44° 46' 55" W, a distance of 8.86 feet to an x-cut set in granite, and

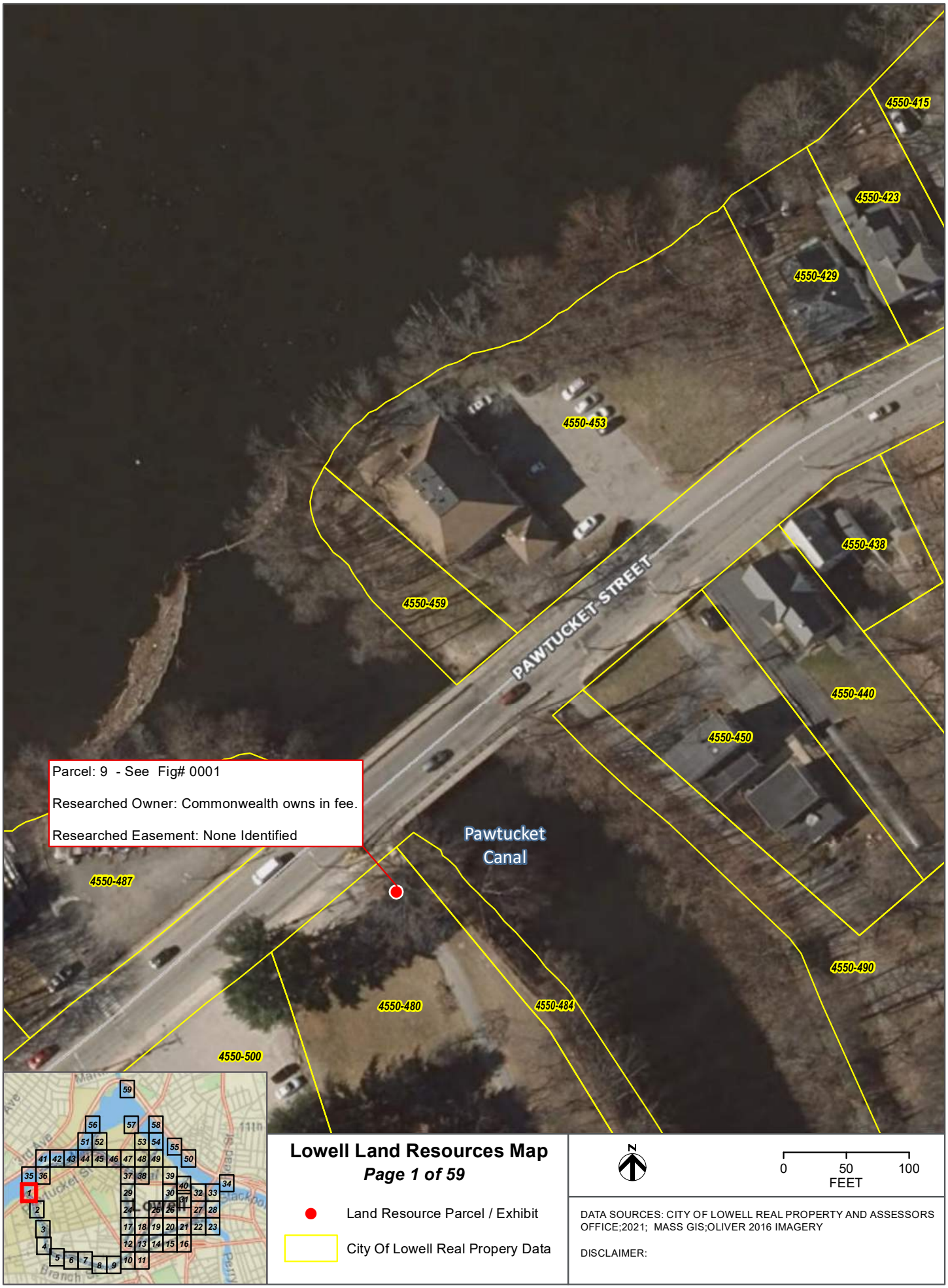
N 85° 57' 30" W, a distance of 20.24 feet to the point of beginning.

Containing 9,127 square feet of land, more or less.

All three parcels are shown on sheet 14 of a set of plans entitled "Lowell Canal System, Lowell Heritage State Park, Lowell, Massachusetts" prepared by Atlantic Engineering and Survey Consultants, dated 1 July 1983 and recorded with the Middlesex Northern District Registry of Deeds at Plan Book 157, Plan 69.

All three parcels are a portion of the premises taken by the Commonwealth of Massachusetts by Order of Taking dated December 1, 1986 and recorded with said Registry of Deeds at Book 3830, Page 70.

Appendix E – GIS Database Exported Maps



Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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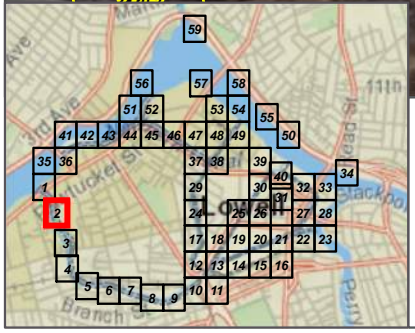
FEET

DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

DISCLAIMER:



Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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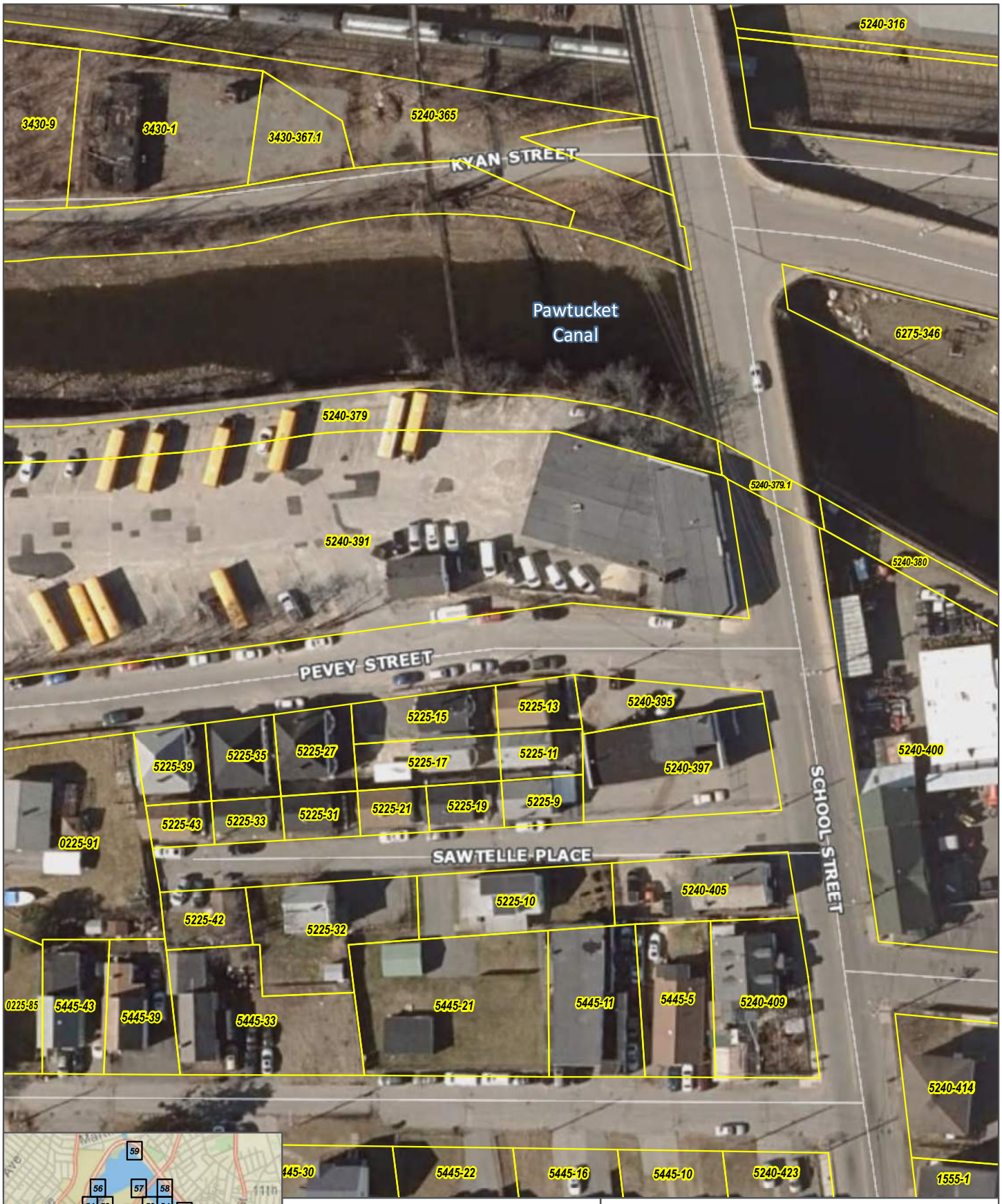

Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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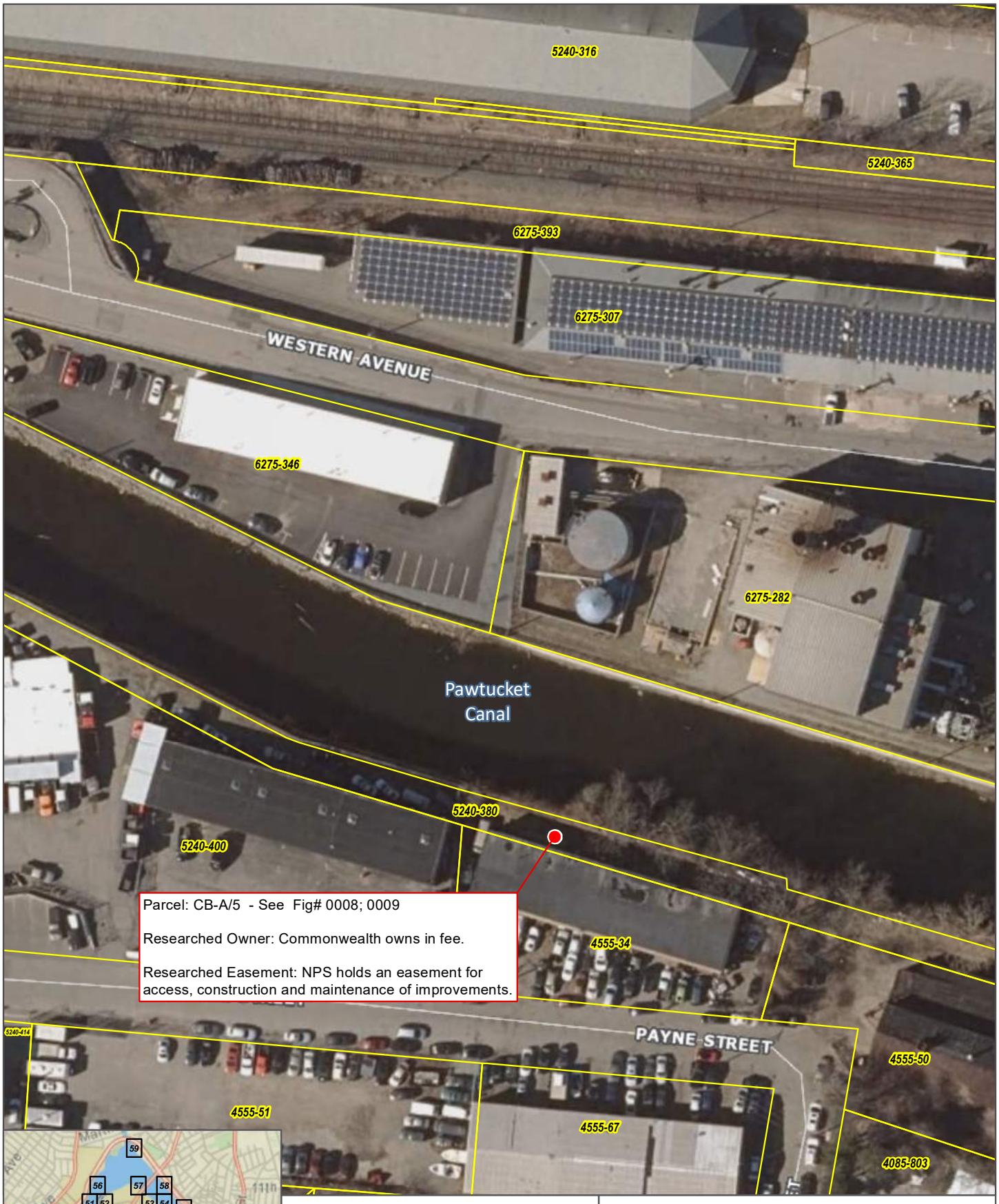

Parcel: CB-A/5 - See Fig# 0008; 0009

Researched Owner: Commonwealth owns in fee.

Researched Easement: NPS holds an easement for access, construction and maintenance of improvements.

Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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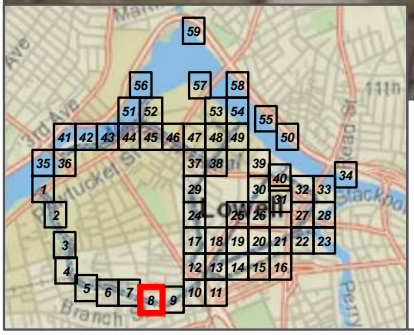

Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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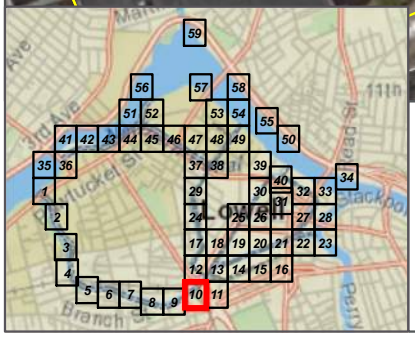

Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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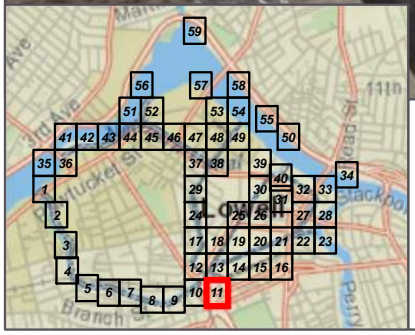

Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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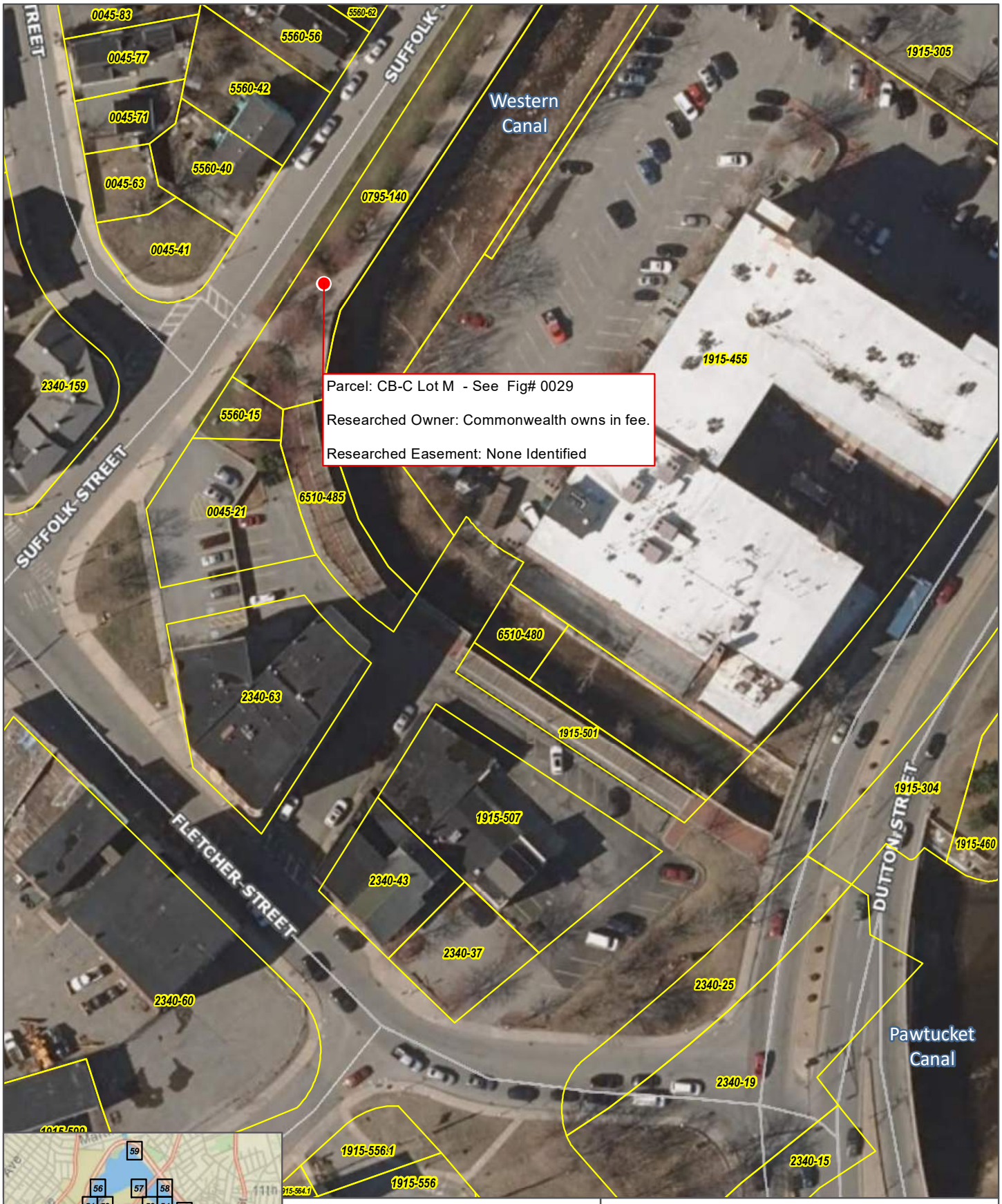

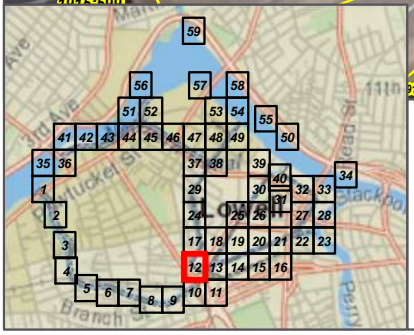

Lowell Land Resources Map

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Land Resource Parcel / Exhibit

City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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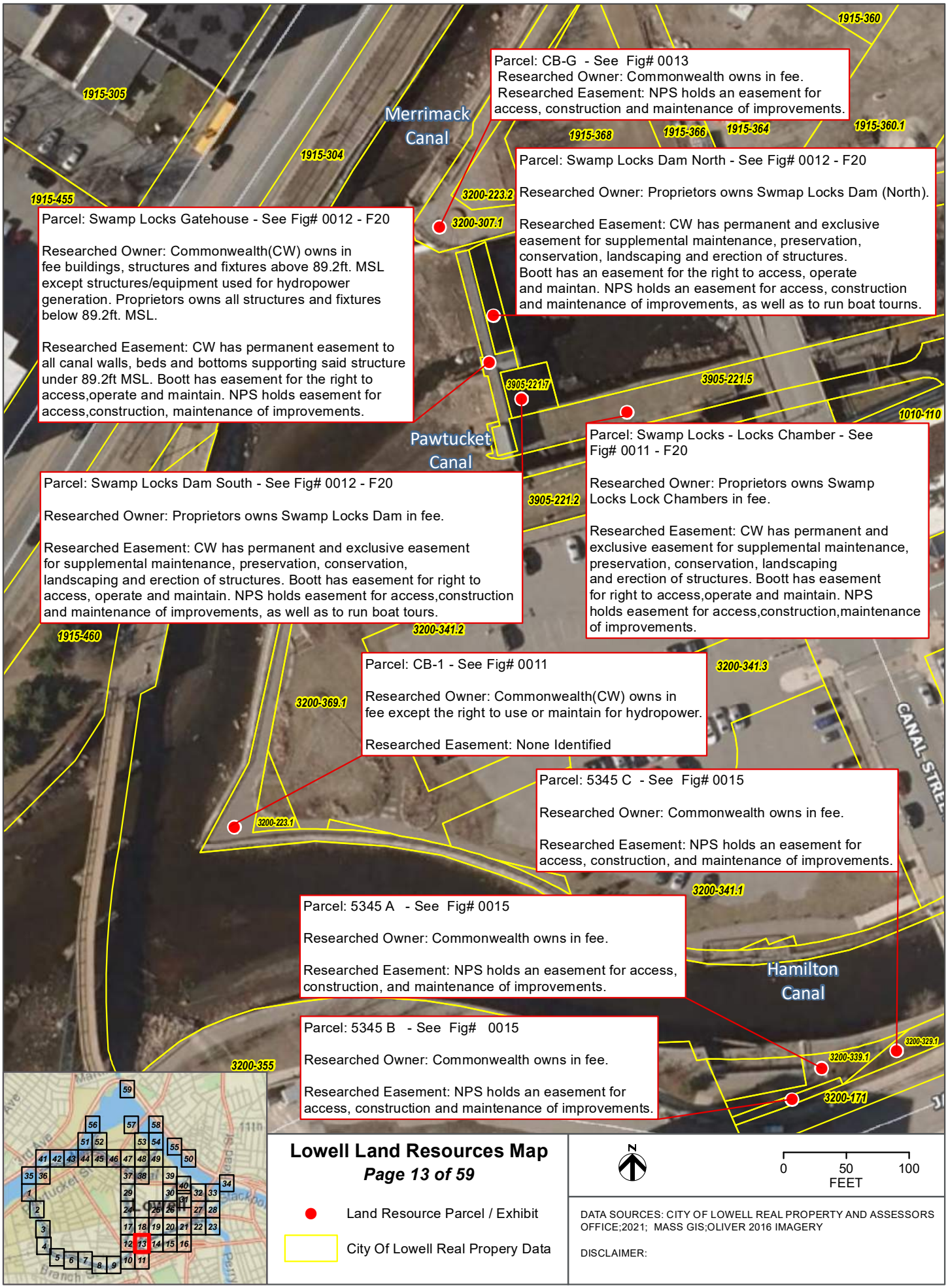
Parcel: CB-G - See Fig# 0013
Researched Owner: Commonwealth owns in fee.
Researched Easement: NPS holds an easement for access, construction and maintenance of improvements.
Parcel: Swamp Locks Dam North - See Fig# 0012 - F20
Researched Owner: Proprietors owns Swmap Locks Dam (North).
Researched Easement: CW has permanent and exclusive easement for supplemental maintenance, preservation, conservation, landscaping and erection of structures. Boott has an easement for the right to access, operate and maintan. NPS holds an easement for access, construction and maintenance of improvements, as well as to run boat tourns.
Parcel: Swamp Locks Gatehouse - See Fig# 0012 - F20
Researched Owner: Commonwealth(CW) owns in fee buildings, structures and fixtures above 89.2ft. MSL except structures/equipment used for hydropower generation. Proprietors owns all structures and fixtures below 89.2ft. MSL.
Researched Easement: CW has permanent easement to all canal walls, beds and bottoms supporting said structure under 89.2ft MSL. Boott has easement for the right to access,operate and maintain. NPS holds easement for access,construction, maintenance of improvements.
Parcel: Swamp Locks - Locks Chamber - See Fig# 0011 - F20
Researched Owner: Proprietors owns Swamp Locks Lock Chambers in fee.
Researched Easement: CW has permanent and exclusive easement for supplemental maintenance, preservation, conservation, landscaping and erection of structures. Boott has easement for right to access,operate and maintain. NPS holds easement for access,construction,maintenance of improvements.
Parcel: Swamp Locks Dam South - See Fig# 0012 - F20
Researched Owner: Proprietors owns Swamp Locks Dam in fee.
Researched Easement: CW has permanent and exclusive easement for supplemental maintenance, preservation, conservation, landscaping and erection of structures. Boott has easement for right to access, operate and maintain. NPS holds easement for access,construction and maintenance of improvements, as well as to run boat tours.
Parcel: CB-1 - See Fig# 0011
Researched Owner: Commonwealth(CW) owns in fee except the right to use or maintain for hydropower.
Researched Easement: None Identified
Parcel: 5345 C - See Fig# 0015
Researched Owner: Commonwealth owns in fee.
Researched Easement: NPS holds an easement for access, construction, and maintenance of improvements.
Parcel: 5345 A - See Fig# 0015
Researched Owner: Commonwealth owns in fee.
Researched Easement: NPS holds an easement for access, construction, and maintenance of improvements.
Parcel: 5345 B - See Fig# 0015
Researched Owner: Commonwealth owns in fee.
Researched Easement: NPS holds an easement for access, construction and maintenance of improvements.
Merrimack Canal
Pawtucket Canal
Hamilton Canal
CANAL STREET
1915-360
1915-305
1915-304
1915-455
1915-368
1915-366
1915-364
1915-360.1
3200-223.2
3200-307.1
3905-221.7
3905-221.5
1010-110
3905-221.2
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City Of Lowell Real Propery Data
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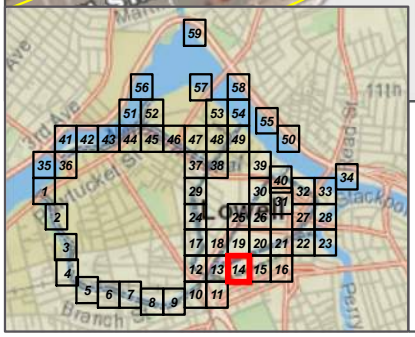

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City Of Lowell Real Propery Data

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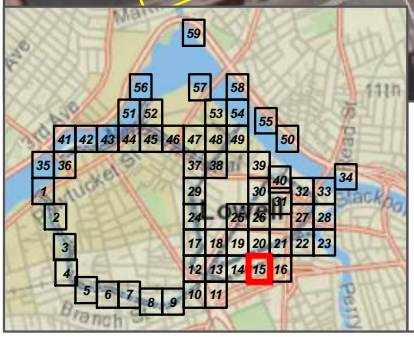

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City Of Lowell Real Propery Data

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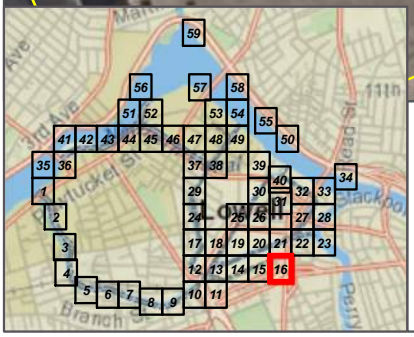

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City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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City Of Lowell Real Propery Data

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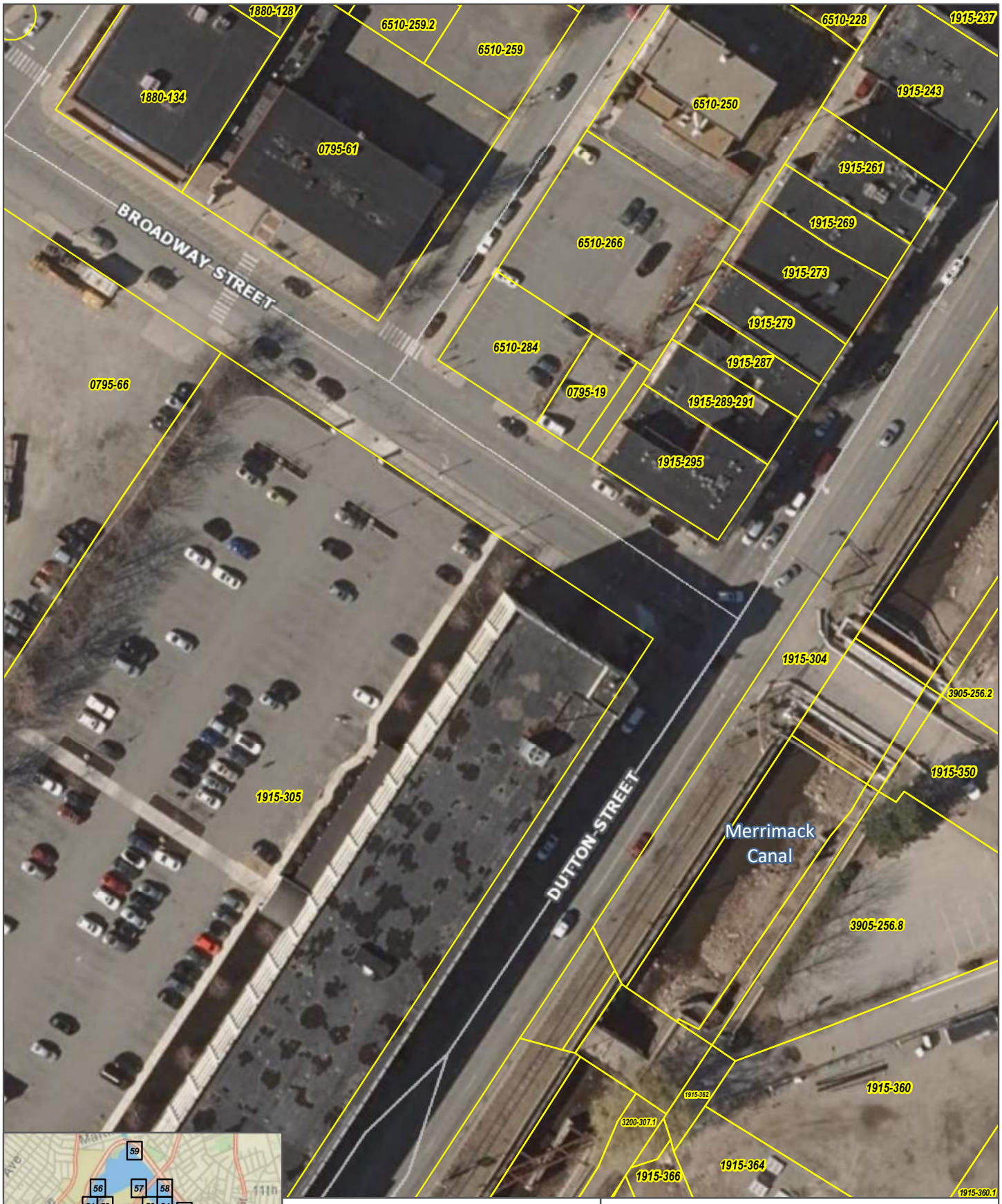

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City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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City Of Lowell Real Propery Data

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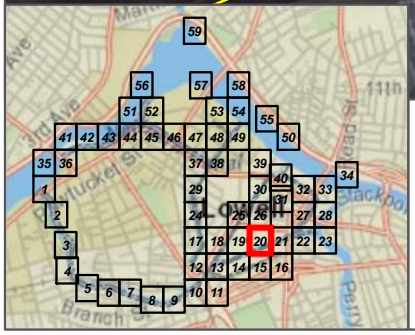

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City Of Lowell Real Propery Data

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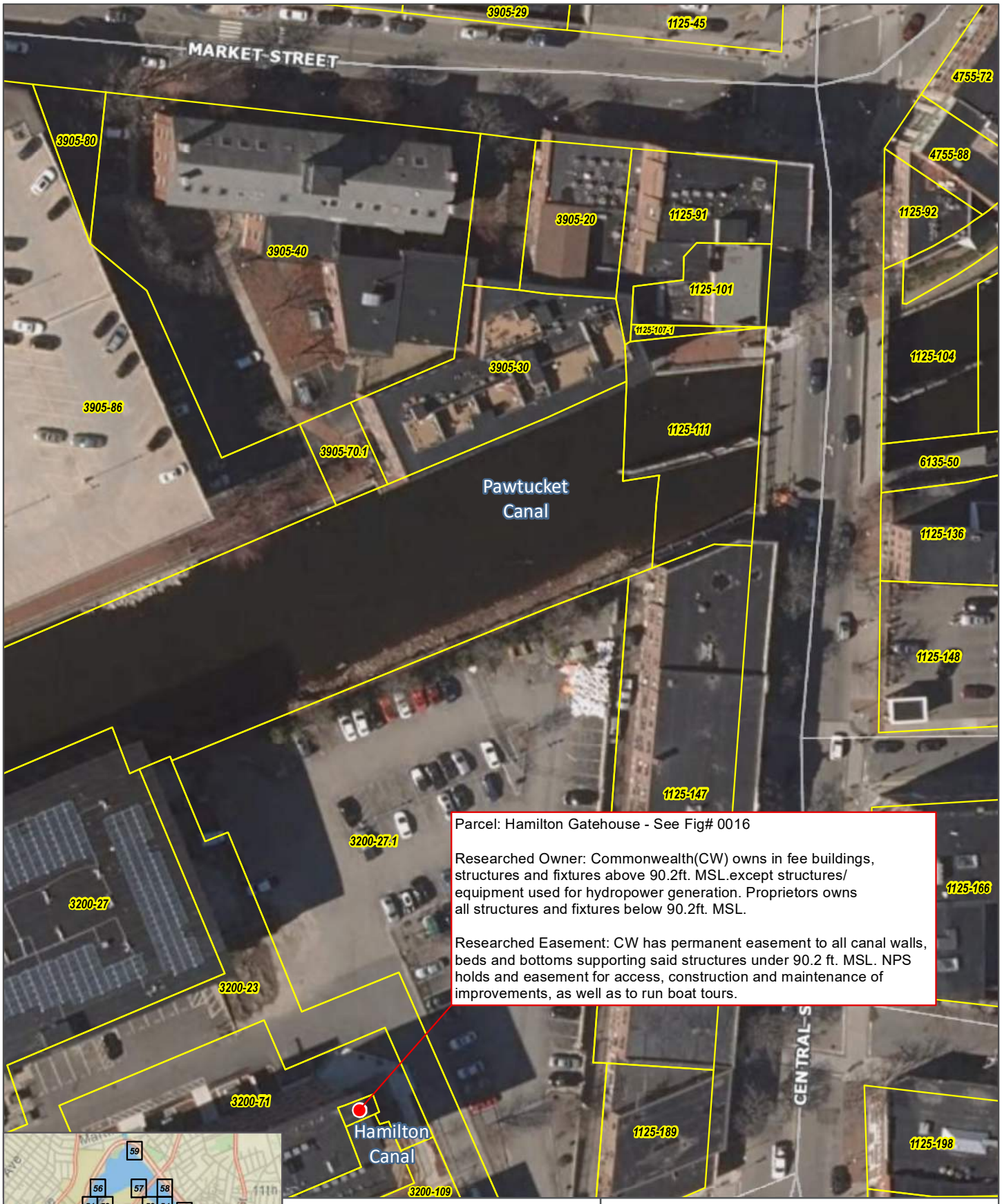
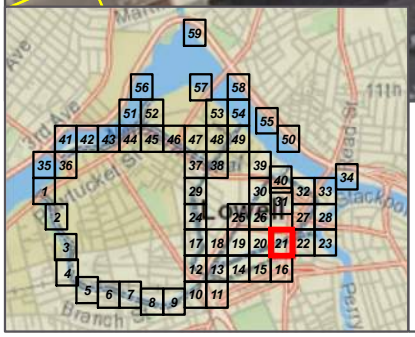


Parcel: Hamilton Gatehouse - See Fig# 0016

Researched Owner: Commonwealth(CW) owns in fee buildings, structures and fixtures above 90.2ft. MSL.except structures/ equipment used for hydropower generation. Proprietors owns all structures and fixtures below 90.2ft. MSL.

Researched Easement: CW has permanent easement to all canal walls, beds and bottoms supporting said structures under 90.2 ft. MSL. NPS holds and easement for access, construction and maintenance of improvements, as well as to run boat tours.



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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

DISCLAIMER:

Parcel: Lower Locks Dam - See Fig# 0014

Researched Owner: Commonwealth(CW) owns in fee buildings structures and fixtures above 74.2ft. MSL except structures/equipment used for hydropower generation. Proprietors owns all structures and fixtures below 47.2ft. MSL.

Researched Easement: CW has permanent easement to all canal walls, beds and bottoms supporting said structure under 74.2ft. MSL. Boott has an easement for the right to access, operate and maintain. NPS holds an easement for access, construction and maintenance of improvments.

Parcel: Lower Locks Gatehouse - See Fig# 0014

Researched Owner: Commonwealth(CW) owns in fee buildings structures and fixtures above 74.2ft. MSL except structures/equipment used for hydropower generation. Proprietors owns all structures and fixtures below 74.2ft. MSL

Researched Easement: CW has permanent easement to all canal walls, beds and bottoms supporting said structure under 74.2ft. MSL. Boott has easement for the right to access,operate and maintain. NPS holds easement for access, construction and maintenance of improvements, as well as run boat tours.

Parcel: Lower Locks Lock Chamber - See Fig# 0014 - F20

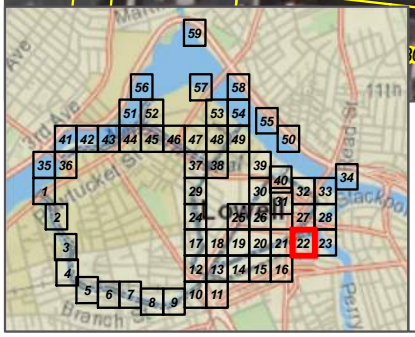
Researched Owner: Proprietors owns Lower Locks Lock Chamber.

Researched Easement: CW has permanent and exclusive easement for supplemental maintenance, preservation, conservation, landscaping and erection of structures. Boot has an easement for the right to access, operate and maintain. NPS holds an easement for access, construction and maintenance of improvements, as well as to run boat tours.

Parcel: CB-H - See Fig# 0014

Researched Owner: Commonwealth owns in fee.

Researched Easement: NPS holds an easement for access, construction and maintenance of improvements.



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City Of Lowell Real Propery Data

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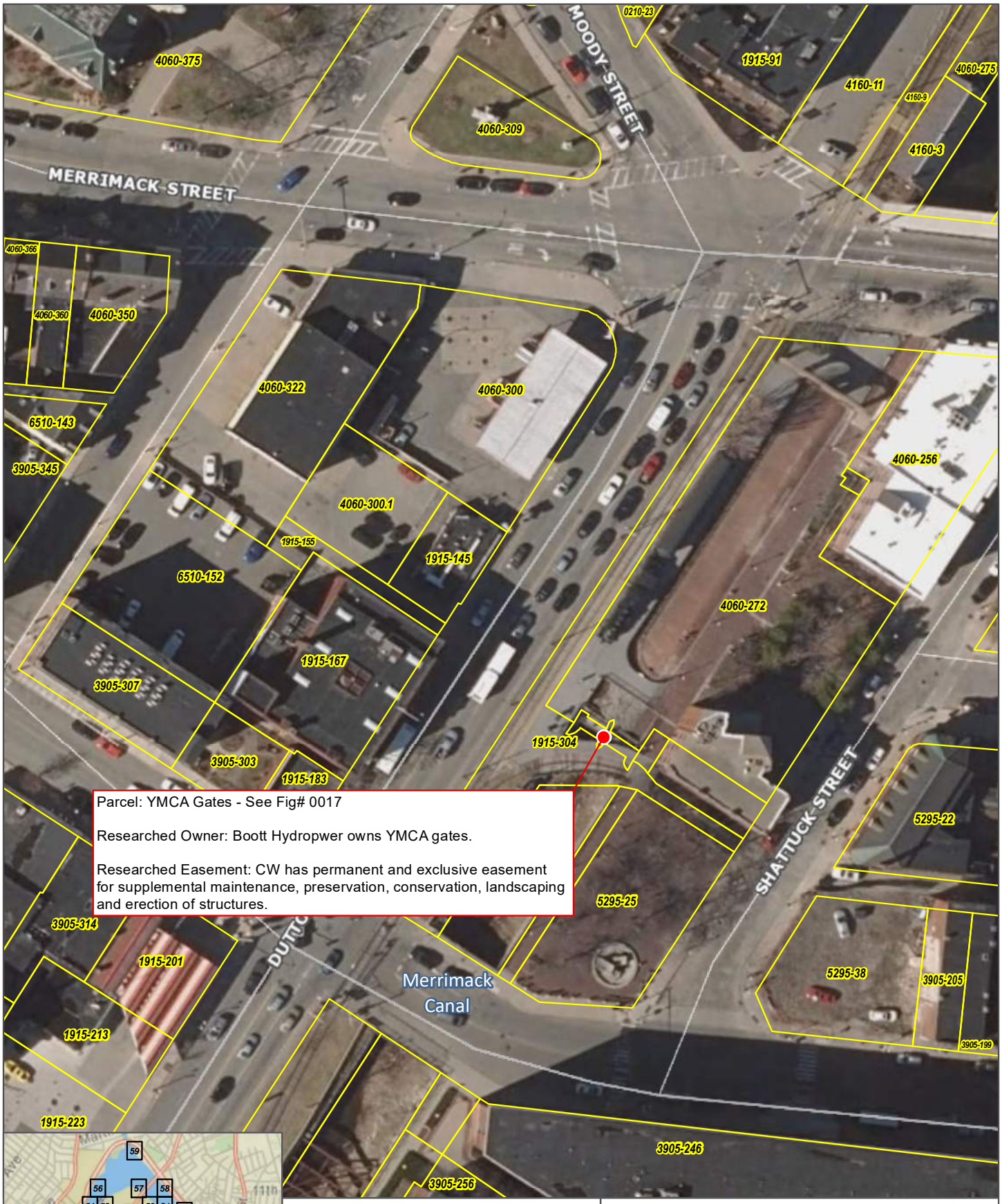

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City Of Lowell Real Propery Data

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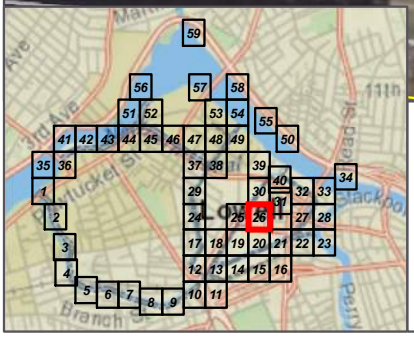

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City Of Lowell Real Propery Data

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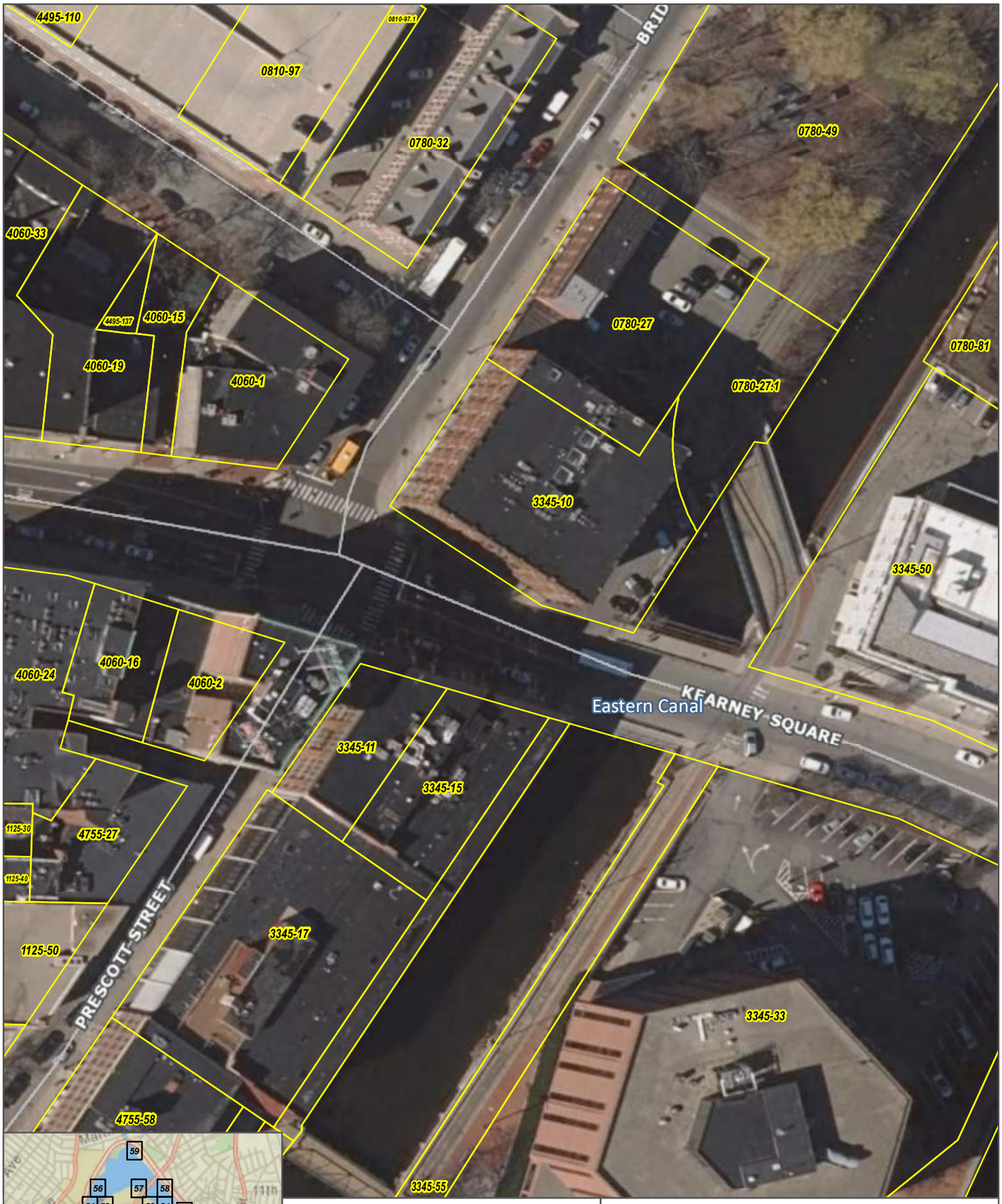

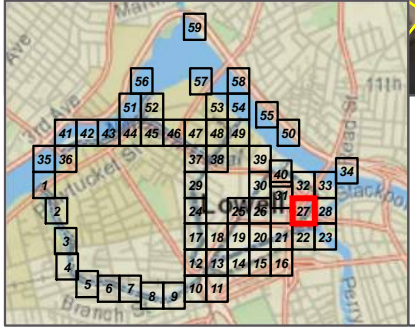

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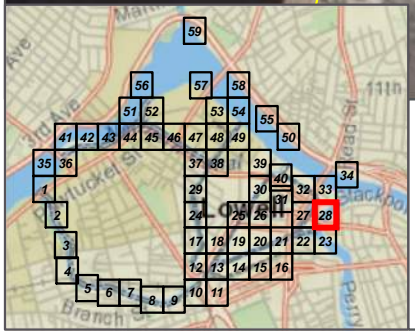

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City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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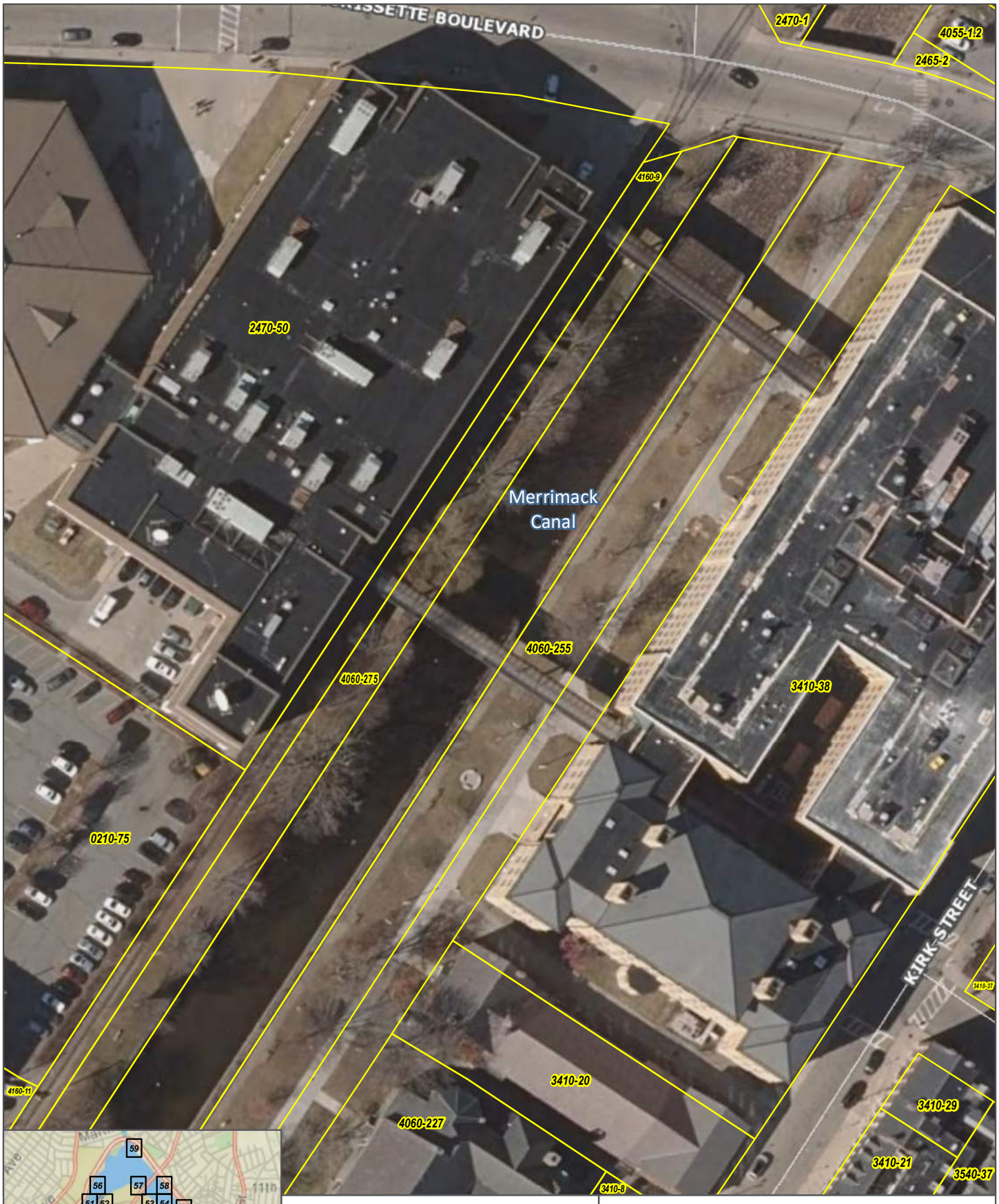

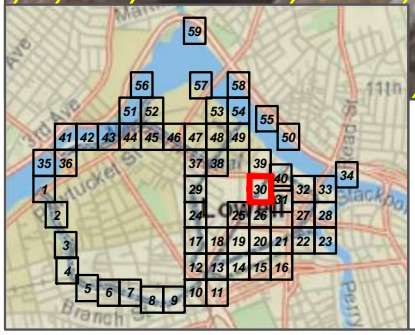

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City Of Lowell Real Propery Data

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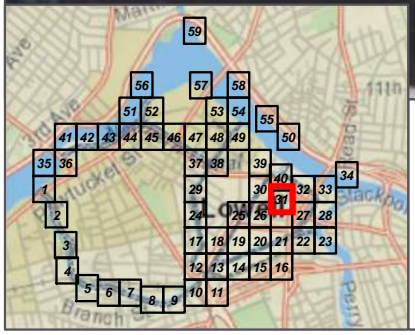

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City Of Lowell Real Propery Data

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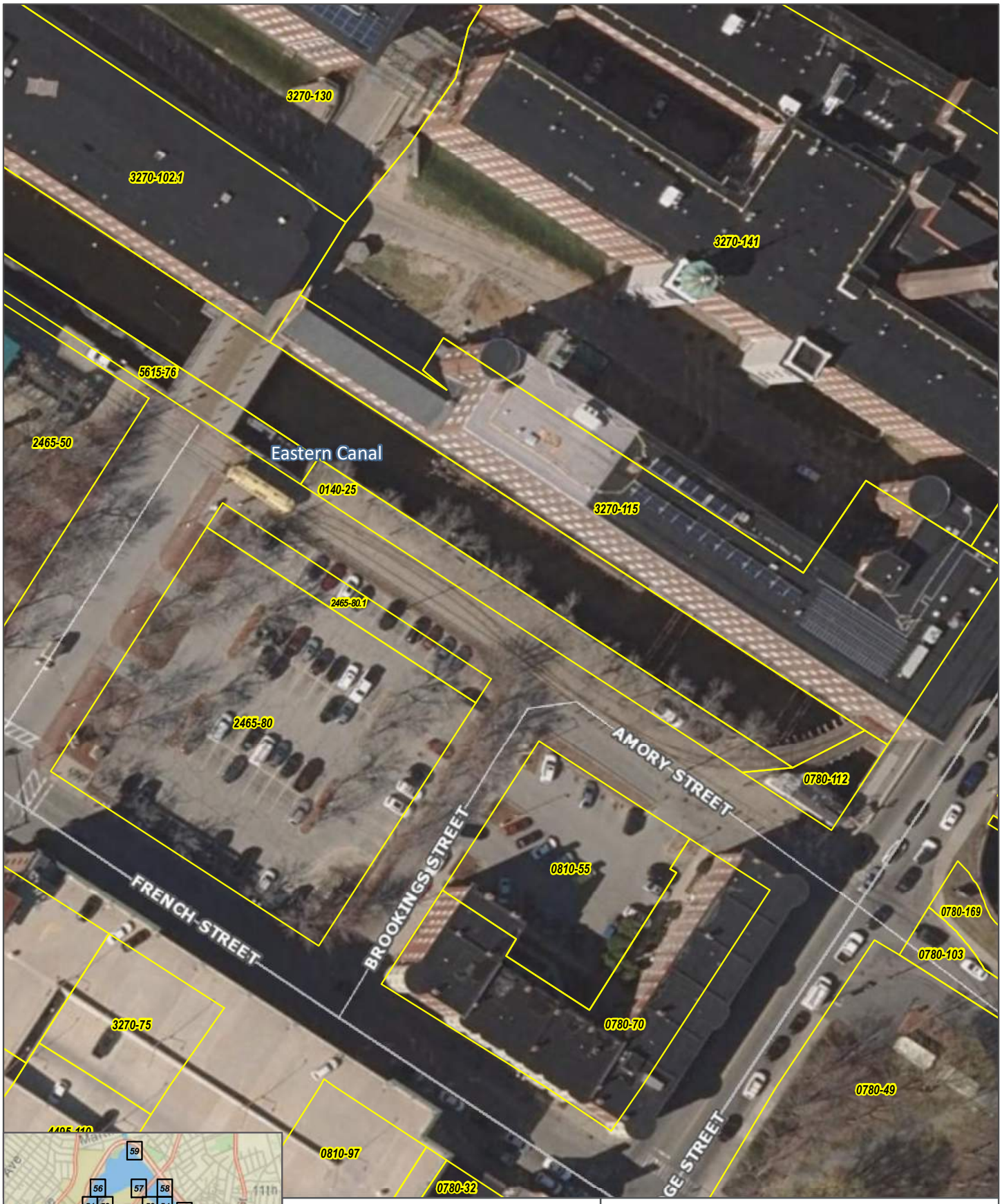

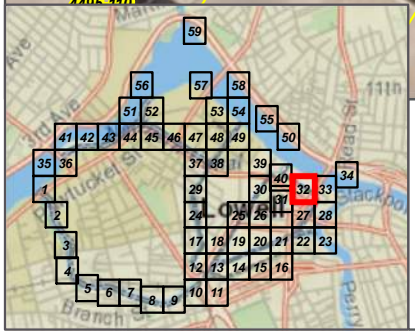

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City Of Lowell Real Propery Data

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City Of Lowell Real Propery Data

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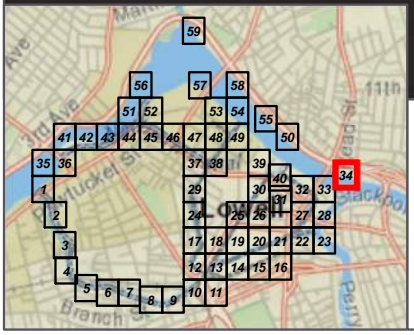

Lowell Land Resources Map

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City Of Lowell Real Propery Data

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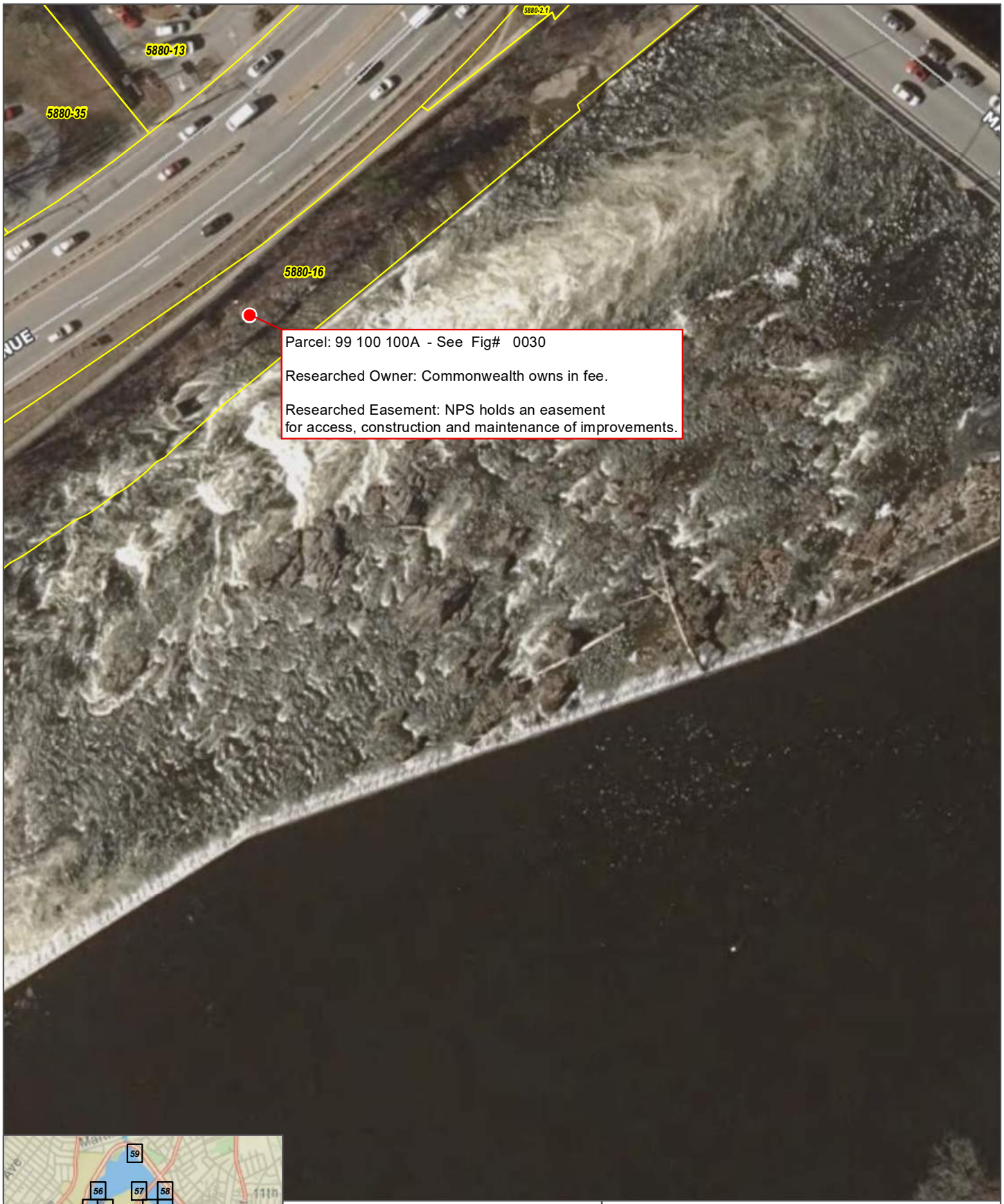

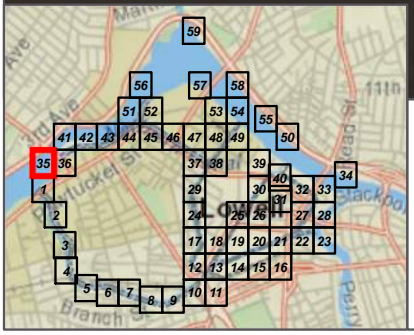

Lowell Land Resources Map

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City Of Lowell Real Propery Data

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DATA SOURCES: CITY OF LOWELL REAL PROPERTY AND ASSESSORS OFFICE;2021; MASS GIS;OLIVER 2016 IMAGERY

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City Of Lowell Real Propery Data

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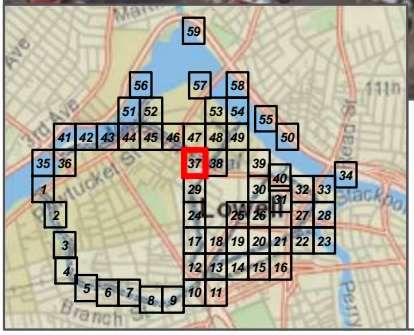

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City Of Lowell Real Propery Data

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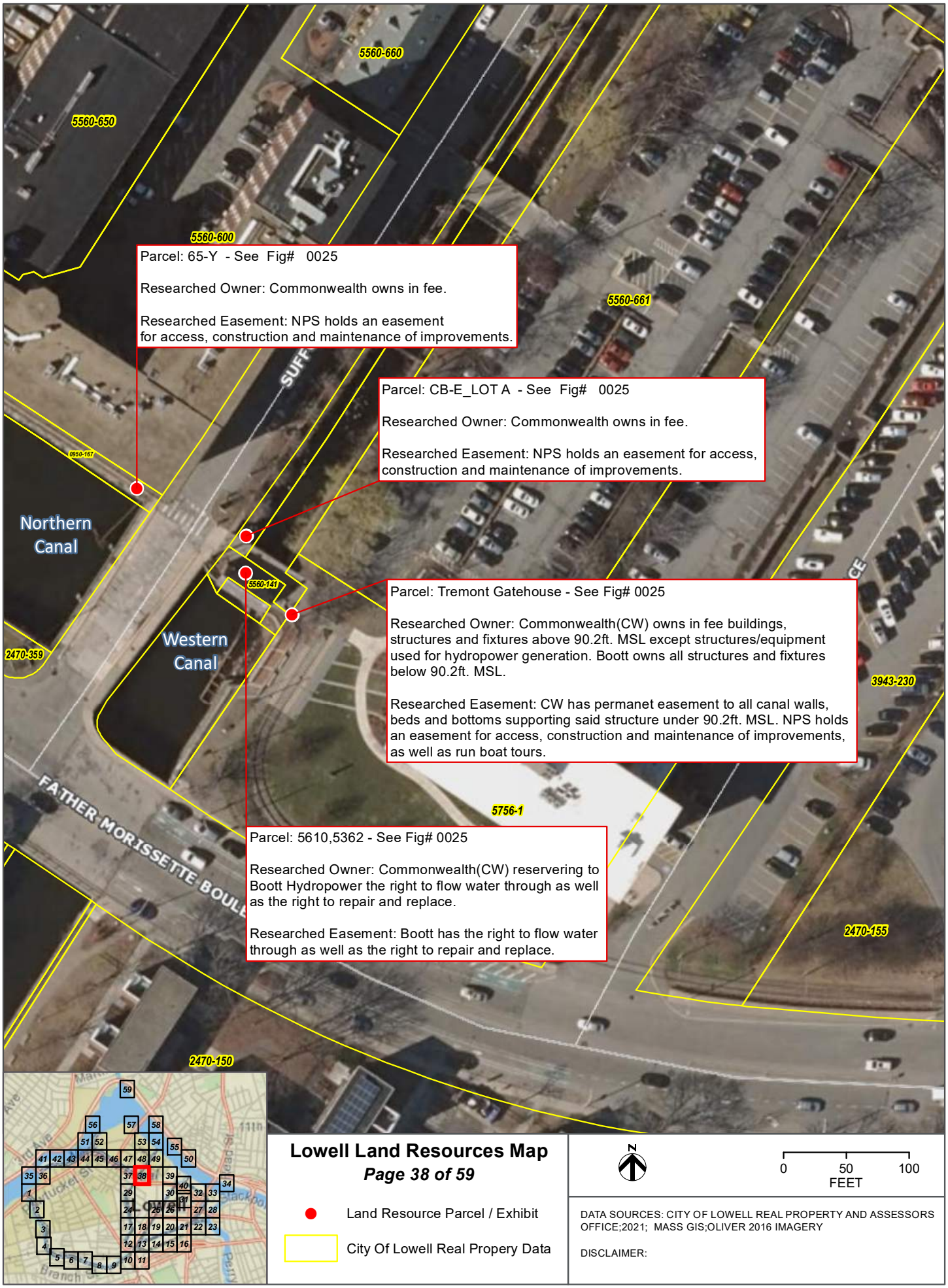

Lowell Land Resources Map

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City Of Lowell Real Propery Data

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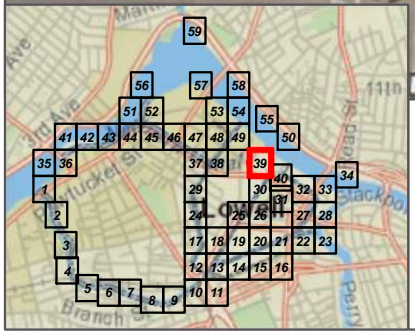

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City Of Lowell Real Propery Data

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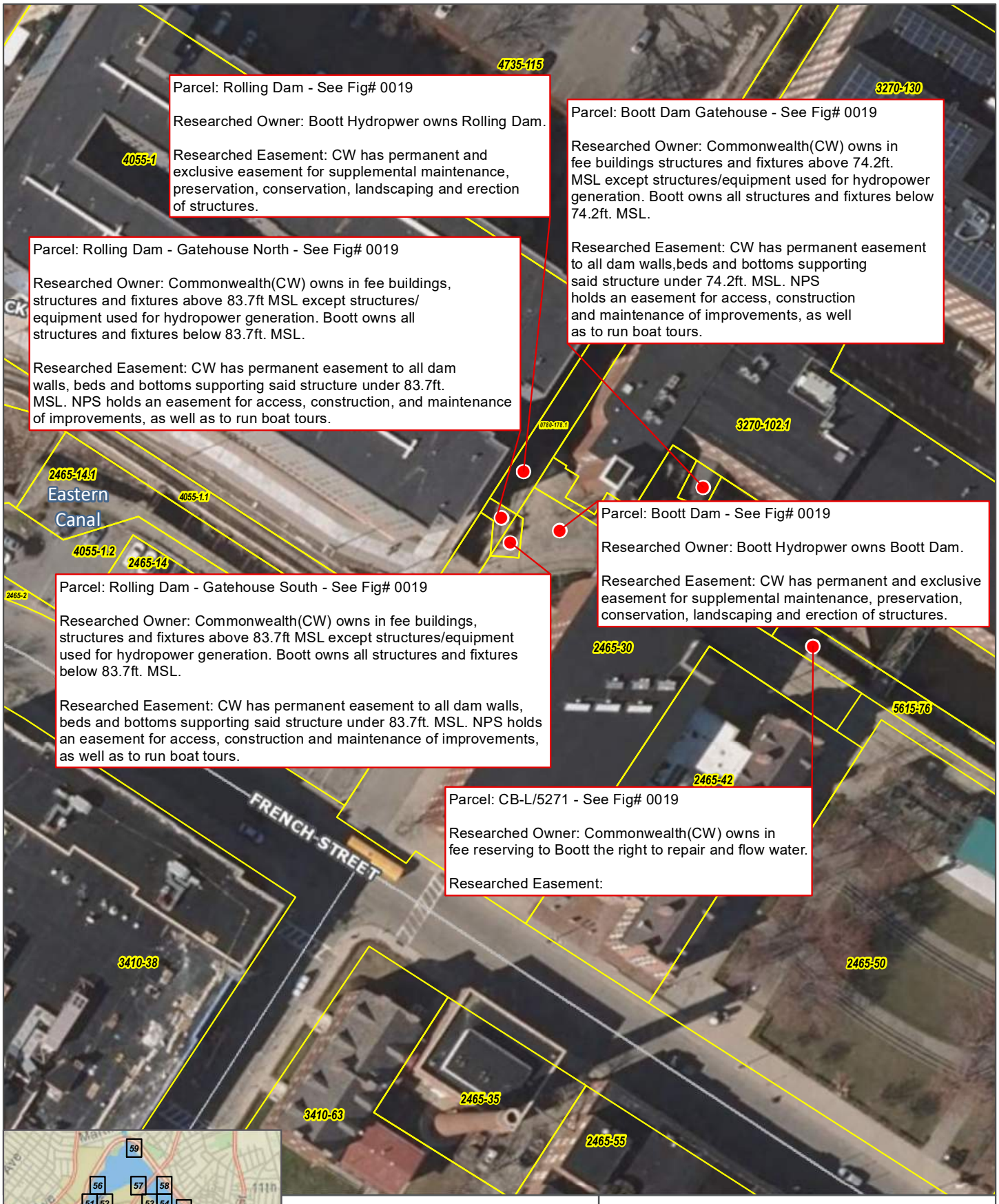

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City Of Lowell Real Propery Data

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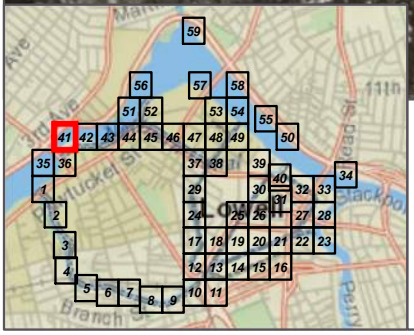

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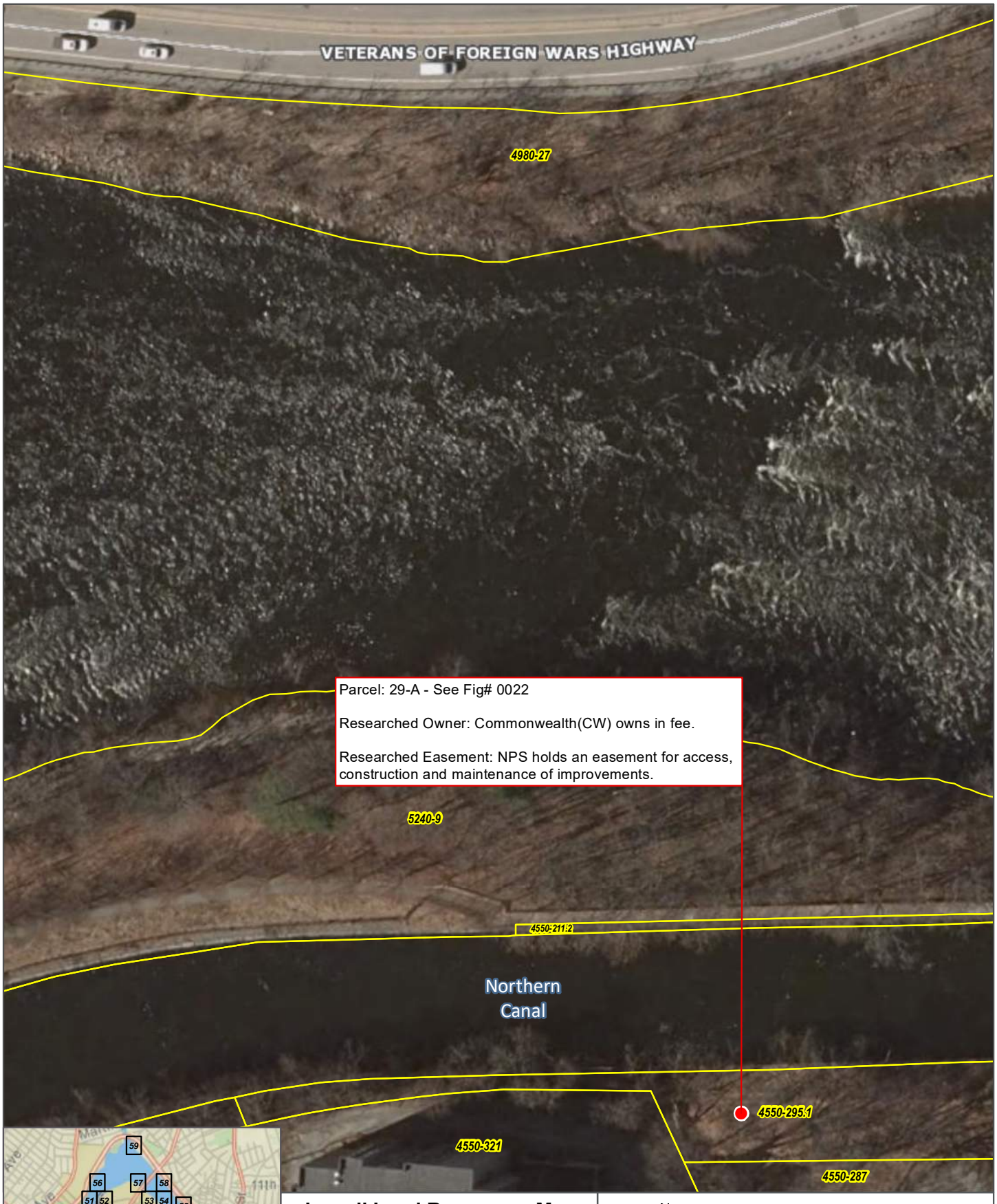

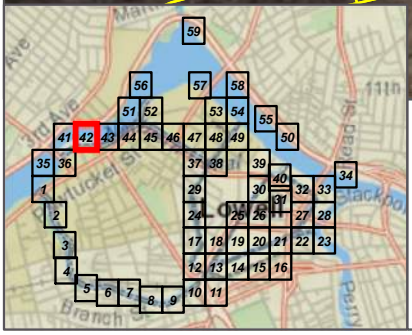

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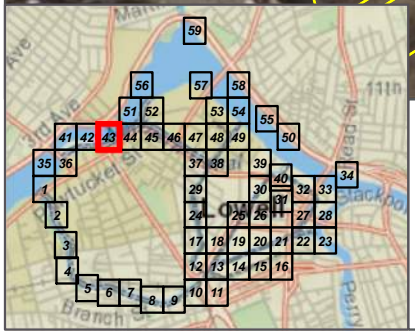

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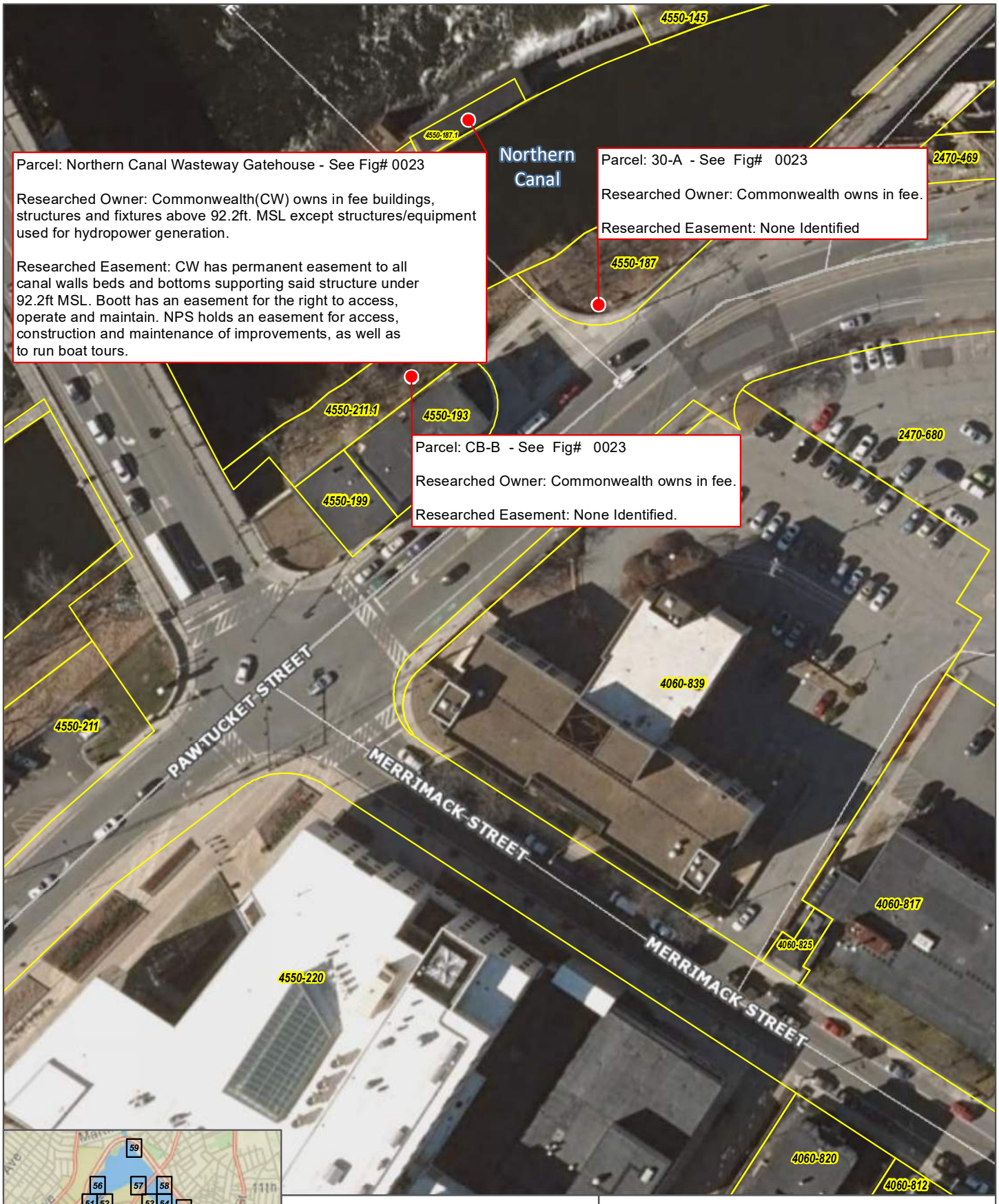

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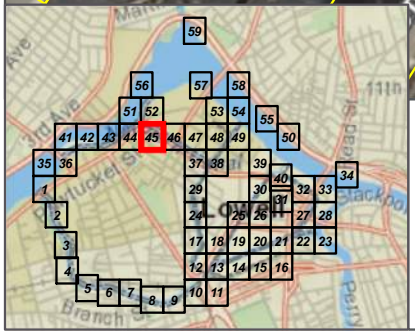

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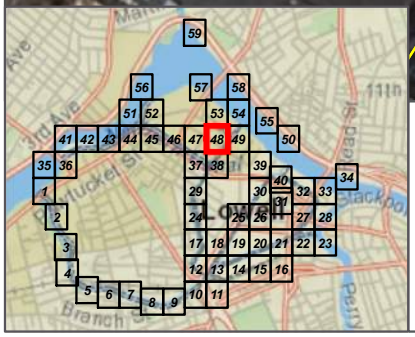

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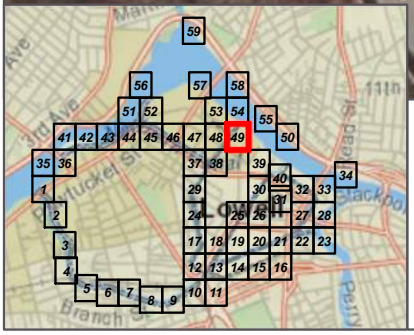

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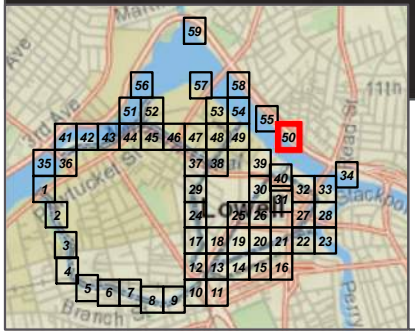

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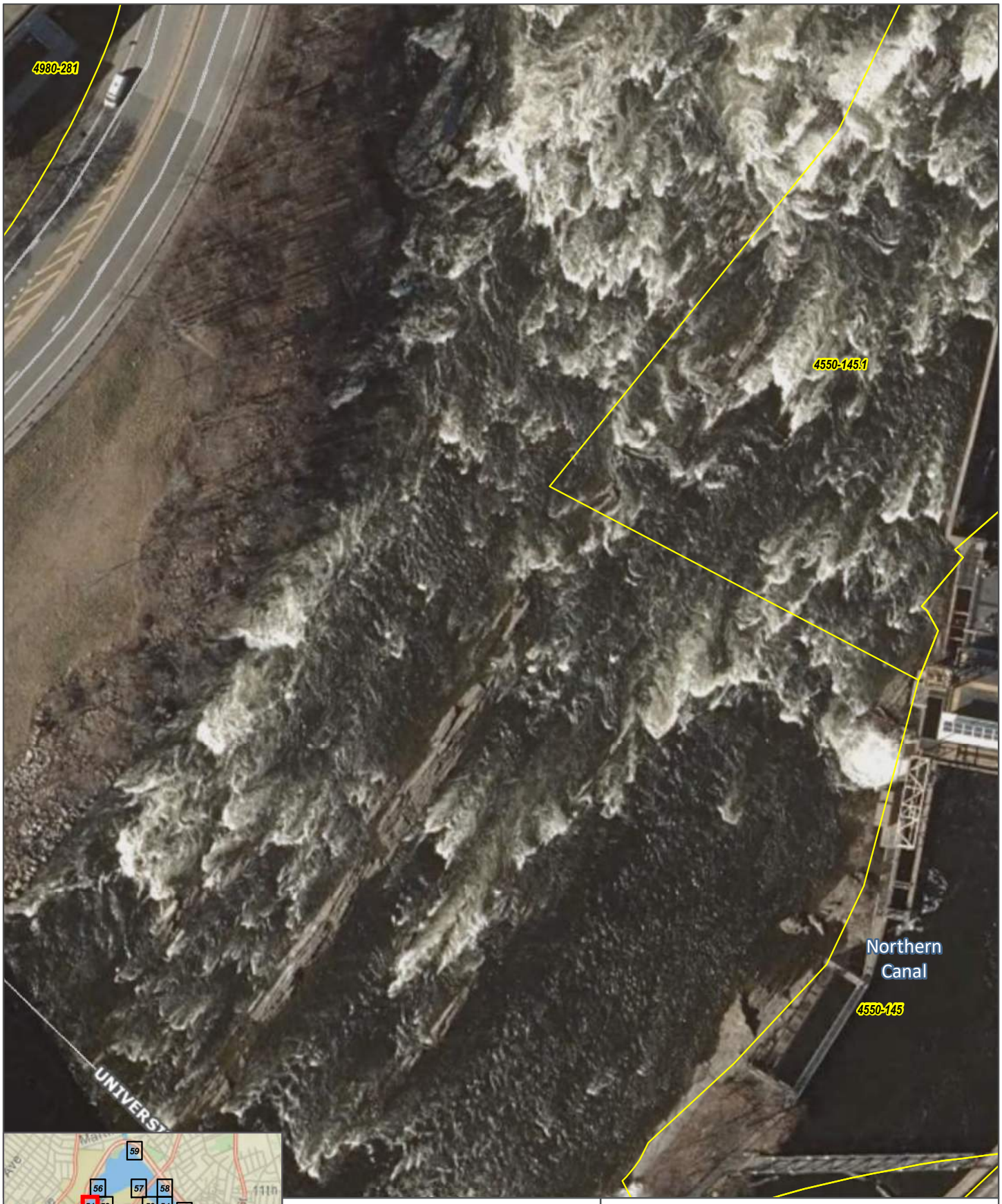

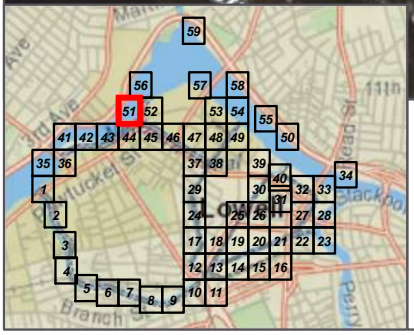

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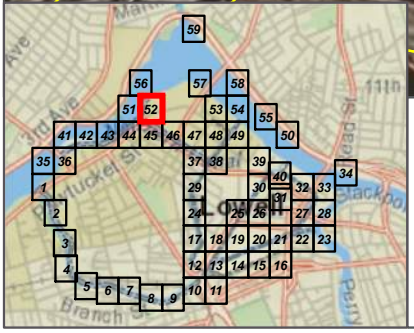

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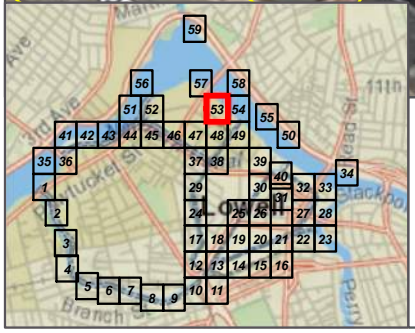

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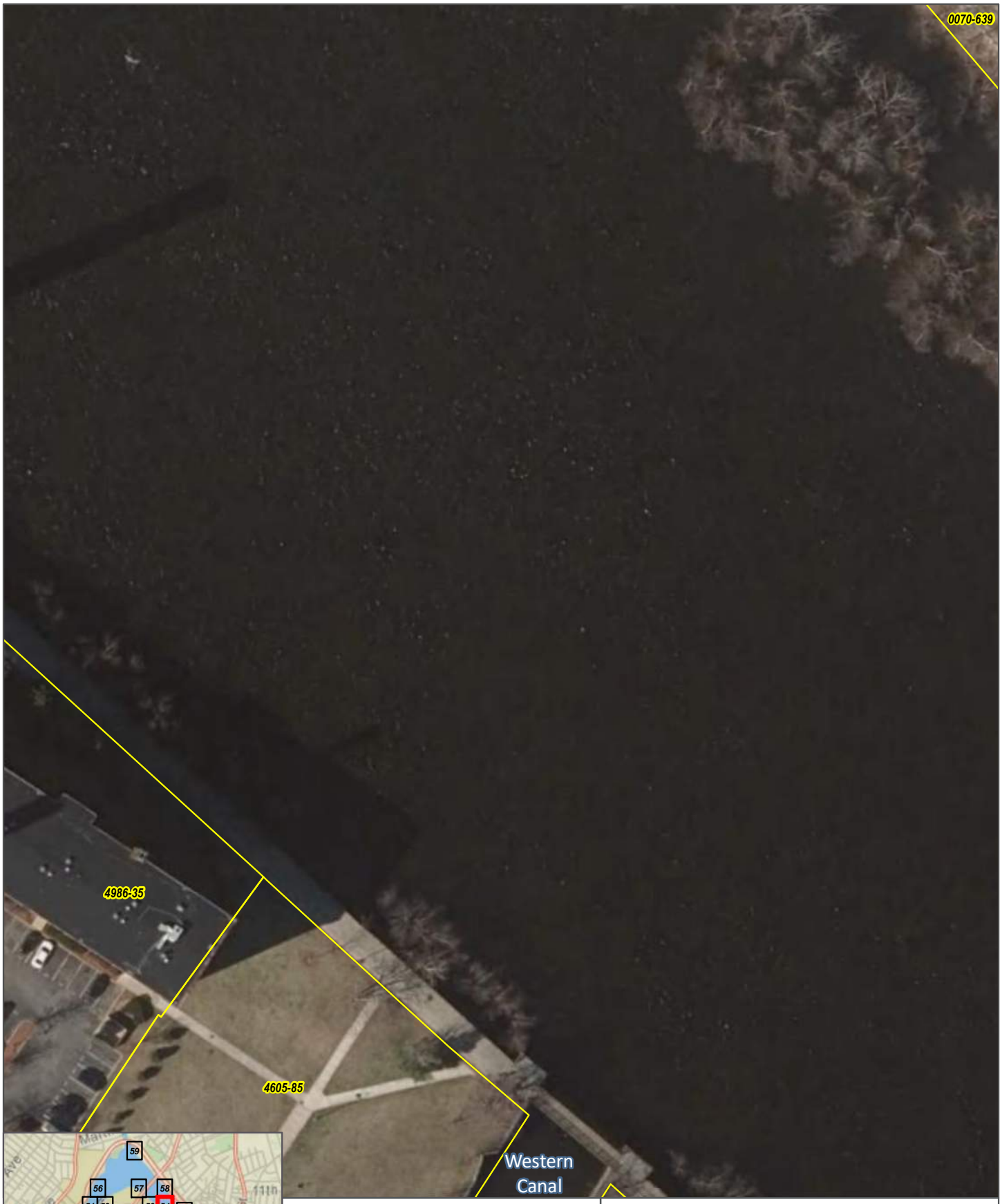

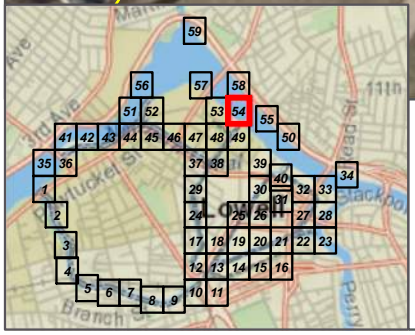

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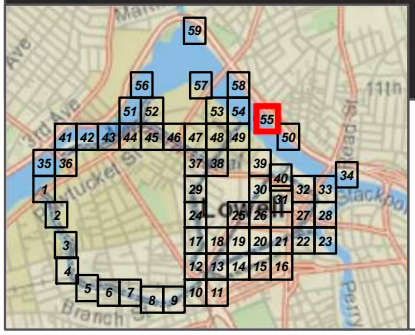

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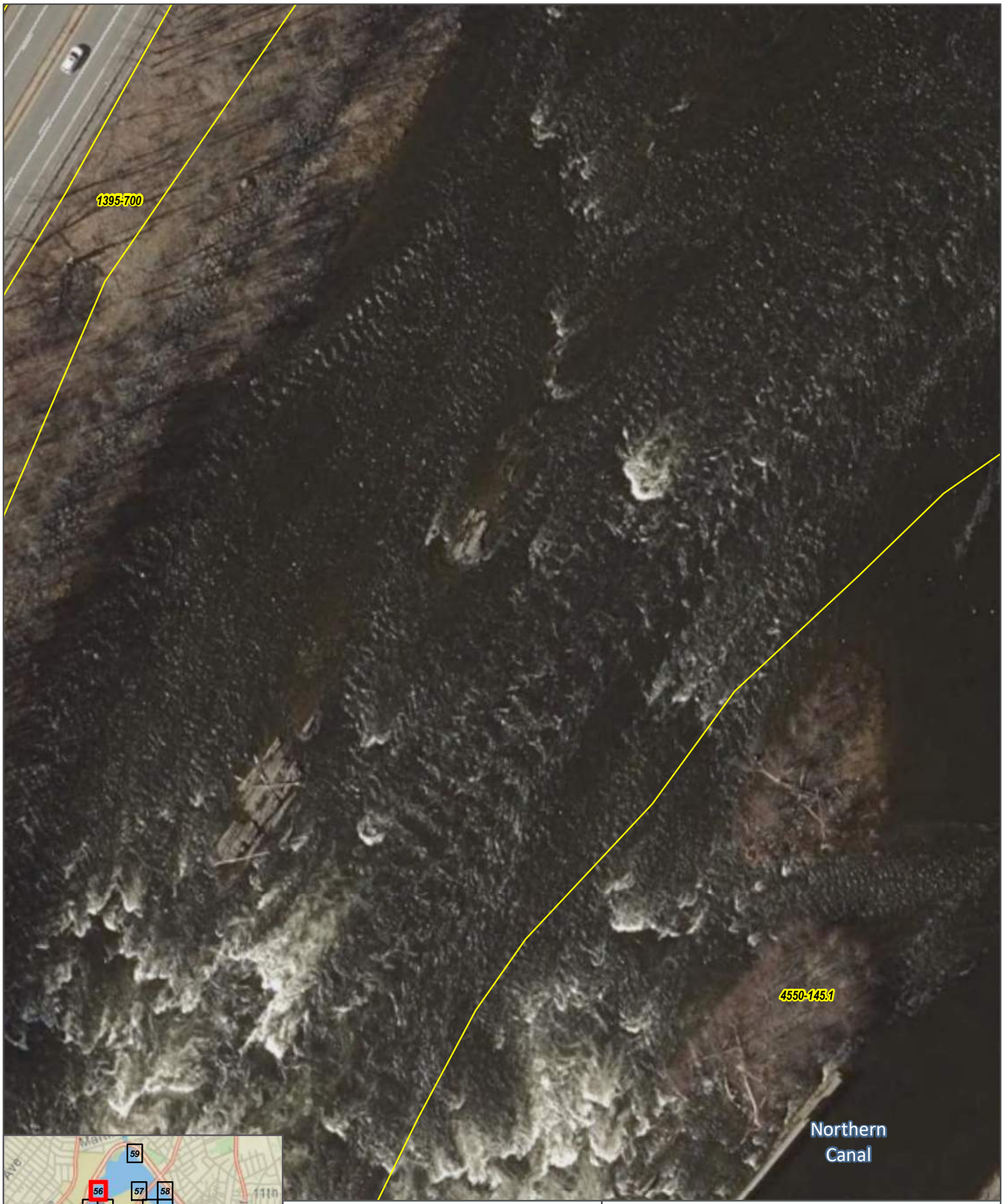

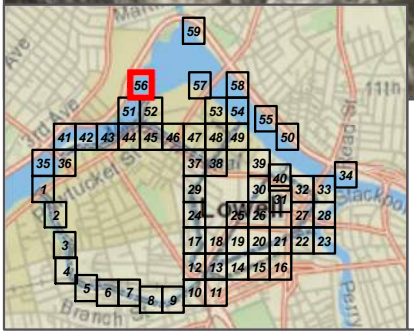

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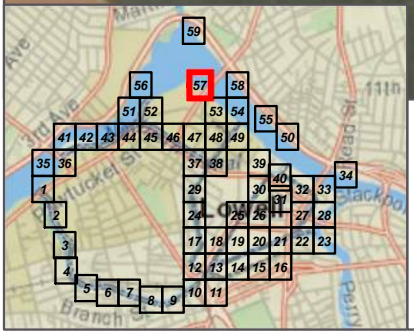

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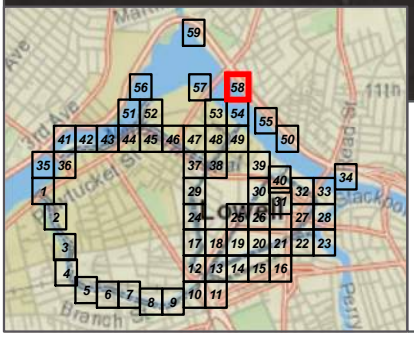

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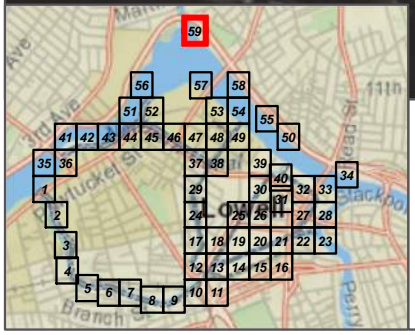

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Water Level and Flow Effects on Historic Resources Study Report

Lowell Hydroelectric Project (FERC No. 2790)

November 1, 2021

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC
Manchester, New Hampshire

Central Rivers Power

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Appendix D - Germaine Consultation and Correspondence

List of Acronyms

Boott	Boott Hydropower, LLC (or Licensee)
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission (or Commission)
ft	feet
ILP	Integrated Licensing Process
ISR	Initial Study Report
LNHP	Lowell National Historical Park
MADCR	Massachusetts Department of Conservation and Recreation
MW	megawatt
NGVD 29	National Geodetic Vertical Datum 1929
NHL	National Historic Landmark
NOI	Notice of Intent
NPS	National Park Service
PAD	Pre-Application Document
Project	Lowell Hydroelectric Project (or Lowell Project)
PSP	Proposed Study Plan
RL	river left
RM	river mile
ROR	run-of-river
RR	river right
RSP	Revised Study Plan
SD1	Scoping Document 1
SPD	Study Plan Determination
USDOI	U. S. Department of Interior

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1 Introduction and Background

Boott Hydropower, LLC (Boott or Licensee) is the Licensee, owner, and operator of the 20.2-megawatt (MW) Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (C.F.R.) Part 5.

In accordance with 18 C.F.R. § 5.15, Boott has conducted studies as provided in the study plan and schedule approved in the Commission's March 13, 2019 Study Plan Determination (SPD) for the Project.[1] This report describes the methods and results of the approved Water Level and Flow Effects on Historic Resources Study conducted in support of a new license for the Project.

1.1 Project Description and Background

The Lowell Project is located at river mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with a headpond extending approximately 23 miles upstream into Hillsborough County, New Hampshire. The existing Lowell Project consists of:

1) A 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket Dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet (ft) National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones;
2) A 720-acre headpond with a normal maximum water surface elevation of 92.2 ft NGVD 29;
3) A 5.5-mile-long canal system which includes several small dams and gatehouses;
4) A powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 MW;
5) A 440-foot-long tailrace channel;
6) Four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket Canal systems containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW;
7) A 4.5-mile-long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid;

[1] The Commission issued a Revised Process Plan and Schedule on June 12, 2020.

8) Upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket Dam; and

9) Appurtenant facilities.

At the normal pond elevation of 92.2 ft NGVD 29[2] (crest of the pneumatic flashboards), the surface area of the headpond encompasses an area of approximately 720 acres. The gross storage capacity between the normal surface elevation of 92.2 ft and the minimum pond level of 87.2 ft is approximately 3,600 acre-ft. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control and has no usable storage capacity.

The Project's primary features are located along the Merrimack River in the City of Lowell, Massachusetts. The City of Lowell was founded in the early 1820s by Boston merchant capitalists and became one of the most significant planned industrial cities in America (Hay 1991). Lowell's factory system, which used the waterpower of the Merrimack River, incorporated new technologies to provide for the mass production of cotton cloth in mills throughout the city (National Park Service [NPS] 1981). Lowell established the pattern for large-scale waterpower development for the next 50 years (Hay 1991).

Several Project facilities are located within overlapping locally, state, and nationally designated parks and historic properties and/or preservation districts. The Project's Pawtucket Dam and E.L. Field Powerhouse are located along the mainstem of the Merrimack River. The Project's two-tiered network of man-made canals extends throughout downtown Lowell. The 5.5-mile-long canal system provides flow to the Project's Hamilton, Assets, Bridge Street, and John Street developments. The Hamilton, Assets, Bridge Street, and John Street power stations and turbines are housed in large former mill buildings. The mill buildings are not included in the Project; the Project Boundary includes only the turbines and associated equipment at these downtown mill sites. In addition to the Pawtucket Dam and hydroelectric developments, the Project also includes miscellaneous civil works in the City of Lowell, including the Guard Lock and Gates, Moody Street Feeder Gatehouse, Lawrence Dam, Hall Street Dam, Tremont Wasteway, Lower Locks and Dam, Swamp Locks and Dam, Merrimack Dam and Merrimack Gate, Rolling Dam, and the Boott Dam.

The canal system, the downtown mill sites, and many of the Project's civil works, are contributing resources to Lowell Locks and Canals National Historic Landmark (NHL) District. The canal system and many Project facilities are also located within the Lowell National Historical Park (LNHP) managed by the NPS and the larger Lowell Historic Preservation District. The LNHP was established by Congress in 1978 to "preserve and interpret the nationally significant historical and cultural sites, structures, and districts in Lowell, Massachusetts, for the benefit and inspiration of present and future generations." The park is by design a partnership park in which federal, state, and local governments as

[2] Elevations throughout this study are reported or have been converted to the National Geodetic Vertical Datum 1929 (NGVD 29).

well as the private sector and local community carry out the legislative intent of the park unit. The Lowell National Historical Park is also listed on the National Register of Historic Places, and certain properties within the park overlap with properties in the NHL District.

The Lowell Heritage State Park, established in 1974 as a precursor to the LNHP, is also located within the City of Lowell and is comprised of linear greenways along the Merrimack River and canal system and a collection of historic buildings and structures related to the industrial development of the city. These buildings and structures include Project features and properties located within the NHL District. The Lowell Heritage State Park is operated by the Massachusetts Department of Conservation and Recreation (MADCR) and features exhibits created in partnership with the NPS (MADCR 2018). With the exception of the Rynne Bathhouse, all of the built resources within the Lowell Heritage State Park fall within the Lowell Historic District, designated by the City of Lowell to "…ensure that development activities within the district are consistent with the preservation of its 19th century setting" (MADCR 2014). Portions of the Lowell Heritage State Park also overlap with the Lowell Locks and Canals NHL District and the LNHP.

1.2 Study Development

On April 30, 2018, Boott initiated the ILP by filing a Pre-Application Document (PAD) and Notice of Intent (NOI) with the Commission. Major ILP milestones to-date are presented in Table 1-1.

Table 1-1. Major ILP Milestones Completed

Date	Milestone
April 30, 2018	PAD and NOI Filed
June 15, 2018	Scoping Document 1 (SD1) Issued by FERC
July 17, 2018	FERC Agency and Public Scoping Meetings Conducted
September 27, 2018	Scoping Document 2 (SD2) Issued by FERC
September 28, 2018	Proposed Study Plan (PSP) Filed
October 18 & 19, 2018	PSP Meeting Conducted
January 28, 2019	Revised Study Plan (RSP) Filed
March 13, 2019	FERC Issued SPD
February 25, 2020	Initial Study Report (ISR) Filed
March 11, 2020	ISR Meeting
June 12, 2020	FERC Issued Revised Process Plan and Schedule
December 2, 2020	Draft License Application Filed
February 25, 2021	Second ISR Filed
April 30, 2021	Final License Application Filed

Boott has continued consultation with stakeholders regarding the approved studies as required by the Commission's SPD. In accordance with the schedule presented in the Revised Study Plan (RSP), Boott has also provided stakeholders with Quarterly ILP Study Progress Reports that include a description of study activities conducted during the previous quarter, activities expected to occur in the next quarter, and identified variances from the approved study plan.

The NPS previously indicated that changing water levels and flows in the Project's canal system have the potential to adversely affect historic canal structures. To document water levels under a range of operating conditions, Boott deployed pressure transducers (level loggers) in the canal system to record water level fluctuations at 15-minute intervals. By letter dated May 5, 2019, Boott consulted with the NPS regarding the specific locations for level logger deployment. In June 2019, level loggers were deployed at 10 locations in the canal system. Data from the level loggers were downloaded on an approximate monthly basis.

On December 18, 2019, Boott held a Study Workshop to discuss the Water Level and Flow Effects Study; Recreation and Aesthetics Study; Historically Significant Waterpower Equipment Study; and the Resources, Ownership, Boundaries, and Land Rights Study. During the workshop, the NPS clarified that their interest was related to the effects of the Pawtucket Dam pneumatic crest gate system that became operational in 2018. The NPS was concerned that the new pneumatic crest gate could increase flows to the downtown canal system and that higher flows could have the potential to adversely affect historic structures. During the December 18, 2019 Study Workshop, Boott explained that water levels in the downtown canal system are not affected by the crest gate and that any effects would be limited to structures along the Northern Canal and the Upper Pawtucket Canal (extending upstream from the Guard Lock Gate Complex to the mainstem of the Merrimack River). Given that water levels in the downtown canal system are not affected by crest gate operations, the NPS agreed that the historic resources along the Northern Canal and Upper Pawtucket Canal should be the focus of the Water Level and Flow Effects Study. Therefore, the NPS and Boott agreed that Boott should relocate level loggers to the Upper Pawtucket Canal and Northern Canal and remove the remaining level loggers from the downtown canal system. Boott relocated the level loggers in March 2020 and recorded water level fluctuations in the Upper Pawtucket Canal and Northern Canal in 15-minute intervals through late September 2020. During the 2020 deployment period, Boott recorded a wide range of flows in the Upper Pawtucket Canal and Northern Canal, including high flow events during the spring freshet and low flow events during the summer and early fall of 2020. Boott believes that this range of flows is appropriate to analyze potential Project-related water level and flow effects on historic structures in the Upper Pawtucket and Northern canals. Boott utilized the level logger data from the 2020 deployment period, Project operation data, existing drawings, and field observations to assess potential effects.

2 Study Goals and Objectives

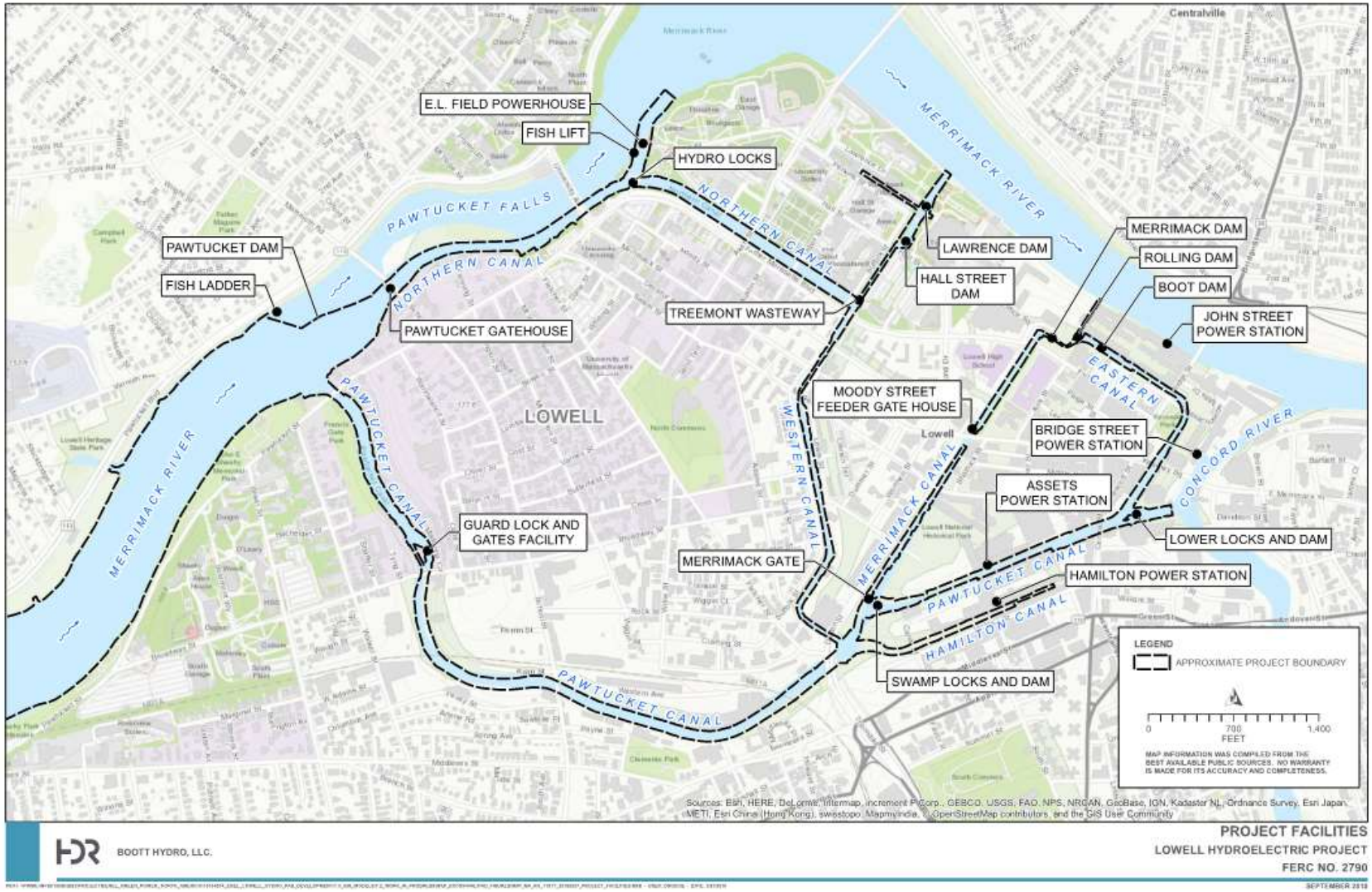
The goal of this study is to assess the potential effect of water level fluctuations within the headpond, Northern Canal, and the Pawtucket Canal (extending upstream from the Guard Lock Gate Complex to the mainstem of the Merrimack River) on the historic structures including the Pawtucket Gatehouse, the Waste Gate Building, the Guard Lock Gate Complex structures, and the Great Wall. The specific objectives of this study are as follows:

- Evaluate how Project operations, including manipulation of the new crest gate system, canal head gates, spillways, locks, fish passage structures, and generating units will change water levels in the Upper Pawtucket and Northern Canals;
- Determine the extent to which water flows or elevations are having an effect on historic resources;
- Conduct a structural assessment of the Great River Wall; and
- Identify potential impacts of current Project operations on nationally significant historic resources, including a structural assessment of the Great River Wall.

3 Study Area

In accordance with the Commission's SPD, the study area for the Water Level and Flow Effects on Historic Resources includes the Projects canal system and associated Project infrastructure within the FERC Project Boundary in the City of Lowell, limited to the Northern Canal from the canal headworks to the E.L. Field Powerhouse not including the portion of the Northern Canal downstream of the Hydro Locks. Also included in the study area is the Upper Pawtucket Canal from the confluence with the Merrimac River downstream to the Guard Lock Gate Complex (Figure 3-1) and the portion of the Project headpond in the proximity of the Pawtucket Dam.

Figure 3-1. Study Area for the Water Level and Flow Effects on Historic Resources Study Report



4 Methodology

4.1 Document Review of Existing Conditions

Boott reviewed available architectural and engineering evaluations of historic canal structures available from the NPS and other stakeholders, including documentation of previous maintenance and repairs to characterize existing conditions. Based on this document review, Boott identified properties that have previously been affected by water level or flow conditions. Copies of these documents are included in Appendix A of this study report.

4.2 Site Visit to Document Existing Conditions

The approved Water Level and Flow Effects Study Plan directed Boott to conduct a site visit with the NPS, to identify locations where fluctuating water levels or flows have previously caused adverse effects to historic structures along the canal system. As proposed by Boott, the intention of this field visit was to collect additional information from NPS staff who may have observed or documented potential adverse effects associated with Project-related flows or water levels, and to identify specific structures (or components of structures) that are of interest to the NPS. However, due to the ongoing COVID-19 pandemic, Boott sought alternatives to in-person meetings and field visits to protect the health and safety of all parties.

Accordingly, Boott consulted with the NPS via letter dated January 4, 2021 regarding previously documented issues related to Project-related flow effects or changing water levels along the canal system. Boott sought the NPS's assistance in identifying historic canal structures along the Upper Pawtucket and Northern Canals that have purportedly been affected by Project-related water levels or flows. Specifically, Boott sought any records of previous damage, maintenance, or repairs to structures along the Upper Pawtucket or Northern canals that have resulted from Project-related flows or water levels. Boott requested the NPS's assistance in identifying any other known issues related to water levels and flow effects on specific structures along these canals.

Boott conducted a site visit to historic canal structures with input from NPS to identify issues previously noted by the NPS related to the flow and water levels on historic structures. Due to COVID-19 guidance and restrictions, the site visit was conducted by Boott independently. The site visit was conducted on January 27, 2020 by Boott to visually assess the effects of water level fluctuations on the historic structures associated with the Northern and Upper Pawtucket Canals and to collect additional data in support of this study.

NPS provided written comments on February 3, 2021 in response to Boott's request for information. Following receipt of that information from NPS, Boott performed an additional

data collection site visit on February 15, 2021 to collect additional elevation information for the historic structures detailed by NPS.

4.3 Canal Water Level Monitoring

To assess water levels under a range of operating conditions, Boott installed pressure transducers (level loggers) at four locations within the canal system that were identified in consultation with the NPS, and an additional atmospheric logger deployed near the E.L. Field Powerhouse (for calibration and barometric pressure correction).

The level loggers were installed on March 10, 2020 and were placed at a depth where they would remain below the water level during all field conditions during the study period. Accordingly, each installation established a sound, initial reference depth to which relative change (increase/decrease in water depth) was then recorded.

Additionally, each level logger was placed in an inconspicuous location on the channel bottom or tethered with weights to a non-movable object (i.e. rock, handrail, or tree). Each level logger recorded Kilopascal (kPa) pressure and Fahrenheit (°F) water temperature at 15-minute intervals. Pressure was converted to a relative sensor depth using Hoboware Pro™ software by Onset®, and the loggers have a stated operational range of 0 to 30 ft and an accuracy of ±0.03 ft.

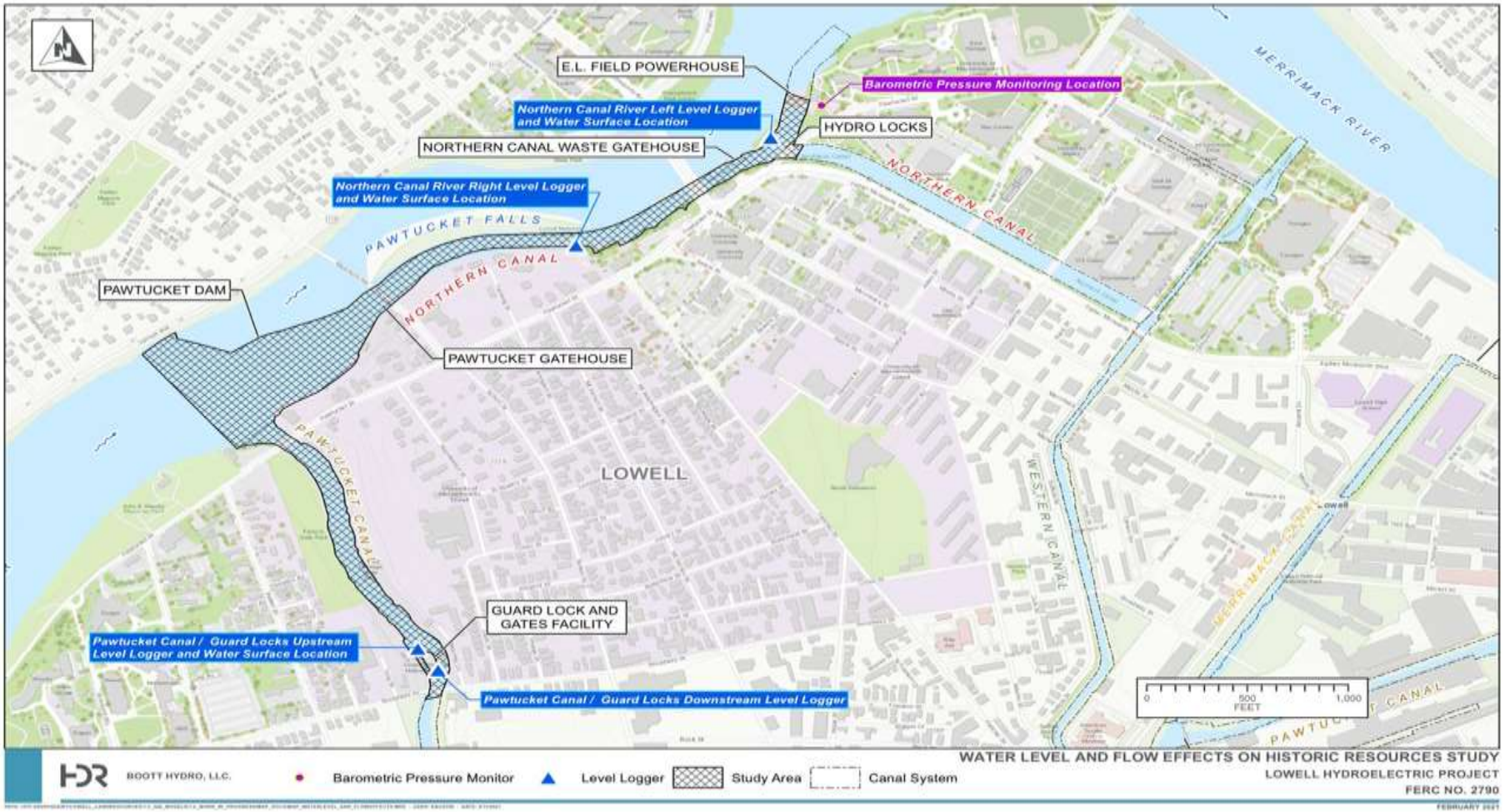
At the time of installation, and during each data download event, the vertical distance from the water surface (above each level logger) was measured to a temporary local fixed reference point ("local benchmark") which was used to correct any relative vertical change in level logger placement after data download events which occurred approximately monthly during the study period. Each local benchmark was then surveyed using an EOS Gold Global Positioning System with Real-Time Kinematic and sub-centimeter accuracy. Accordingly, the collected data was converted to an elevation which represents the elevation of the water surface at each location. This elevational data was then converted to the NGVD 29 using the National Oceanic and Atmospheric Administration's Vertical Datum Transformation tool (VDatum) to match the existing elevation data in Boott's Supervisory Control and Data Acquisition System (SCADA).

Level loggers were installed at 4 locations within the study area. Level logger locations are consistent with the areas of interest as identified by the NPS, with exact location within each area of interest determined by channel geometry, hydraulic conditions and field conditions.

A primary and backup level logger was installed at each location and recorded relative water depths at 15-minute intervals over the study period which extended from March 10 to September 23, 2020. Additionally, a single atmospheric logger was deployed within the study area at the E.L. Field Powerhouse to allow for calibration and barometric pressure correction. A total of nine instruments were deployed (eight in-water, and one atmospheric). The level logger locations include one location on the Northern Canal on river left (RL) adjacent to the Emergency Spillway Gate, a second location on the Northern Canal on river right (RR), near the intersection of Fletcher and Pawtucket Streets, and two

locations (one upstream and one downstream) on the Pawtucket Canal at the Guard Lock Gate Complex and are depicted in Figure 4-1 below.

Figure 4-1. Water Level and Flow Effects on Historic Resources Study Area



4.4 Project Operations Review

Boott reviewed Project operational data including headpond elevation, forebay elevation, Project operations, and Merrimack River flows. Boott then compared the results of these reviews to the water surface elevations recorded during the study periods, the elevations of historic structures and the existing conditions of those structures to determine the potential effect (if any) to the current conditions and expected conditions of such structures.

4.5 Visual Engineering Assessment of the Great River Wall

Boott conducted a review of prior structural engineering assessments of the Great River Wall, including review of available engineering and architectural drawings, maintenance records, photos and structural modifications. The results of this document review are summarized in Appendix B and filed with this report as Critical Energy Infrastructure Information (CEII).

On October 5-6, 2021, Boott visually assessed the existing conditions of the Great River Wall. The goal of this visit was to observe and photograph the existing condition of the Great River Wall that could be visually observed from the safety of available access points. The results of this document review are summarized in Appendix C and filed with this report as Critical Energy Infrastructure Information (CEII).

4.6 Analysis of Potential Project Related Effects

Boott analyzed the data collected in each of the five sections above to determine if and when Project operation flows into the canal system may have resulted in water levels reaching elevations to inundate wooden structural elements, or if periods of low flows may have caused damage to historic infrastructure.

5 Study Results

5.1 Documentation Review of Existing Conditions

Pursuant to the approved study plan, Boott reviewed several source documents to better understand the elevations of structures potentially effected by fluctuating water levels in the Northern and Upper Pawtucket Canals. The following list includes those documents reviewed[3].

- Proprietors Canal System Book of Facts.

[3] Some documents referenced in this study report and included in this list are considered Critical Energy Infrastructure Information (CEII) by the FERC and are not for public distribution and are also not included in Appendix A of this study report.

- Supporting Technical Information Document – Guard Locks and Gates Facility (NATDAM No. MA 00834) Lowell Hydroelectric Project FERC No. 2790-MA Lowell, Massachusetts. 2015.
- Dam Safety Inspection Report for the Lowell Hydroelectric Project FERC No. 02790-MA.
- U. S. Department of Interior (USDOI) comments on the PAD, comments on SD1, and study requests dated August 14, 2018 regarding Boott Hydropower, LLC, Lowell Hydropower Project (FERC No. 2790-072), Merrimack River, Middlesex County, MA, and Hillsborough County, NH.
- USDOI Request for Information Response February 3, 2021 regarding requested Information in response to Central Rivers Power letter dated 01/20/2021, Lowell Hydropower Project (FERC No. 2790-072), Water Level and Flow Effects on Historic Resources Study.
- Lowell Hydroelectric Project (FERC No. 2790) Exhibit E and F Drawings obtained from the circa 1980 Application for License for Major Project.
- Lowell Heritage State Park Drawings for the Lowell Canal System circa 1983. Department of Environmental Management division of Forests and Parks.
- E.L. Field Powerhouse operational data including but not limited to project generation, project flow, headpond elevations, project inflow, project outflow, fishway operations, etc.
- Historic American Engineering Record, National Park Service, Louis R. Scurci, 1974.
- Pawtucket Gatehouse Facility Ex Condition Photographs, 2020
- Northern Canal – New Lock Gates: Plans, Elevation Details, and Hardware. August 1984.
- Francis Guard Gate Sluice Gatehouse Ex Condition Photographs, 2020
- LNHP, Rehabilitate Northern Canal Waste Gatehouse. 100% Construction Documents June 28, 2018
- LNHP, Rehabilitate Northern Canal Waste Gatehouse. LOWE-225866 Project Specifications Construction Documents. NPS, Northeast Region 100% Submission June 28, 2018
- Project Scoping Report. Task Order #P17PD03094; Contract #P15PC00036; PMIS #225866 Northern Canal Waste Gatehouse. November 13, 2017.
- Rehabilitate Northern Canal Waste Gatehouse. LNHP, Lowell, MA Estimate Class A February 2, 2018.

Boott reviewed the above listed data to identify elevations, conditions, and other relevant information regarding historical structures that may be potentially affected by project operations related to water level fluctuations in the project headpond, Northern Canal and Upper Pawtucket Canal. While many of these documents contain relevant information

related to the conditions of relevant historic structures, there are few, if any details on the elevations of these structures in relation to water level fluctuation.

5.2 Canal Water Level Monitoring

As noted above, the objective of this study was to analyze the potential effects of water level fluctuations from project operations in the Northern Canal and the Upper Pawtucket Canal on historic structures with a focus on the Pawtucket Gatehouse, the Northern Canal Waste Gatehouse, the Guard Lock and Gatehouse Complex and the Great Wall.

The level loggers and associated elevation data captured a sufficient range of operational conditions (including spring freshet flows and summer low flows) over the course of the deployment period, to show a typical period of water surface elevation at each of the locations listed above. Additionally, the water surface elevations of the Project headpond and the Project forebay over the available period of record (1995 through 2010) allowed Boott to analyze the potential effects of water level fluctuations on historic structures in and along these canals.

5.2.1 E.L. Field Headpond/Northern Canal Lock

Water surface elevations within the Project headpond at the Northern Canal Lock during the study period (March 10 – September 29, 2020) range from a minimum of 91.76 ft to a maximum of 92.30 ft for a range of 0.54 ft (Figure 5-1).

Figure 5-2 shows the estimated elevations of the top and bottom sill of the Pawtucket Gatehouse Lock Gate relative to the water level of the Project headpond.

Figure 5-1. Project Headpond Water Surface Elevation During 2020 Monitoring Period

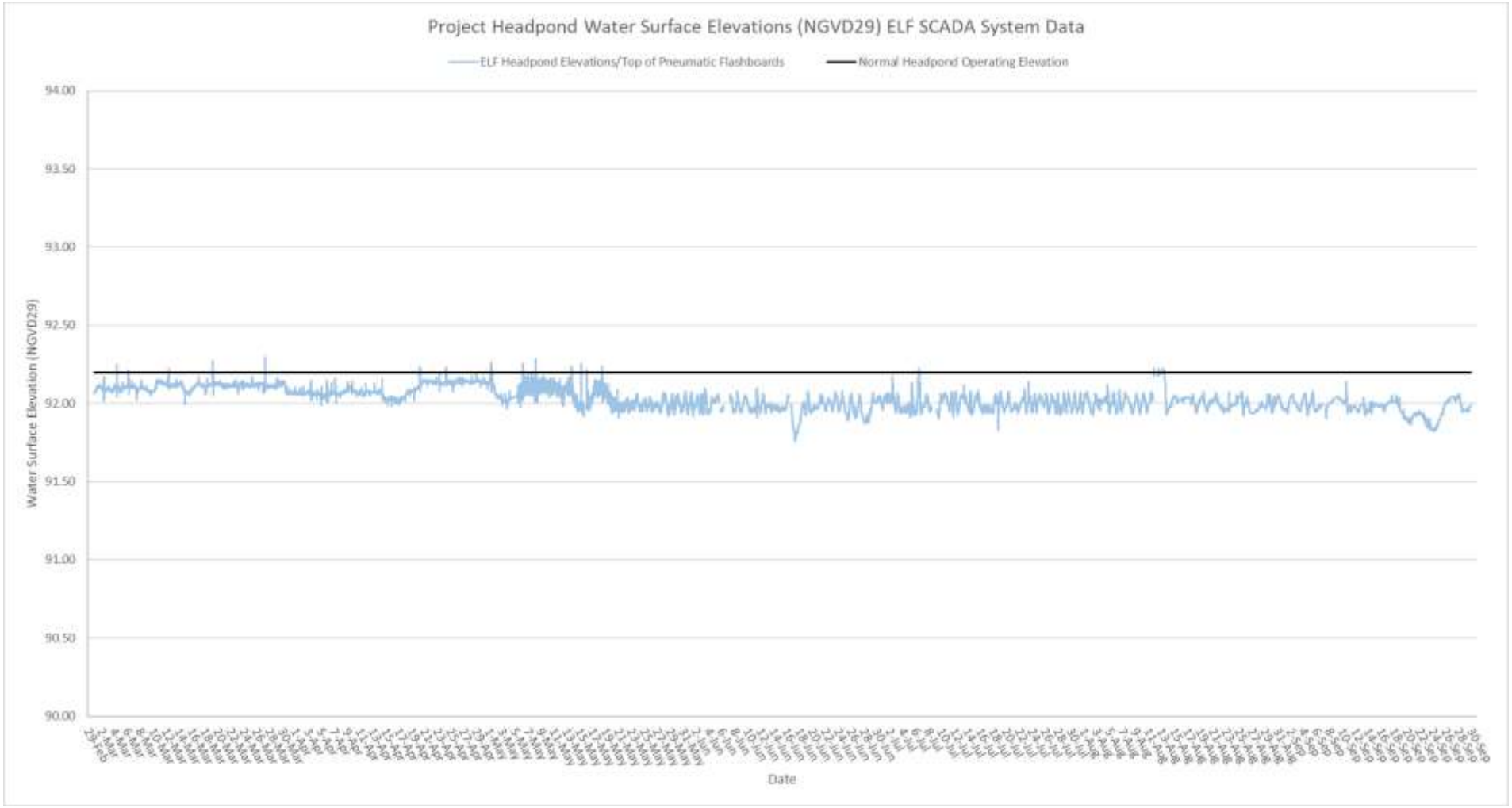
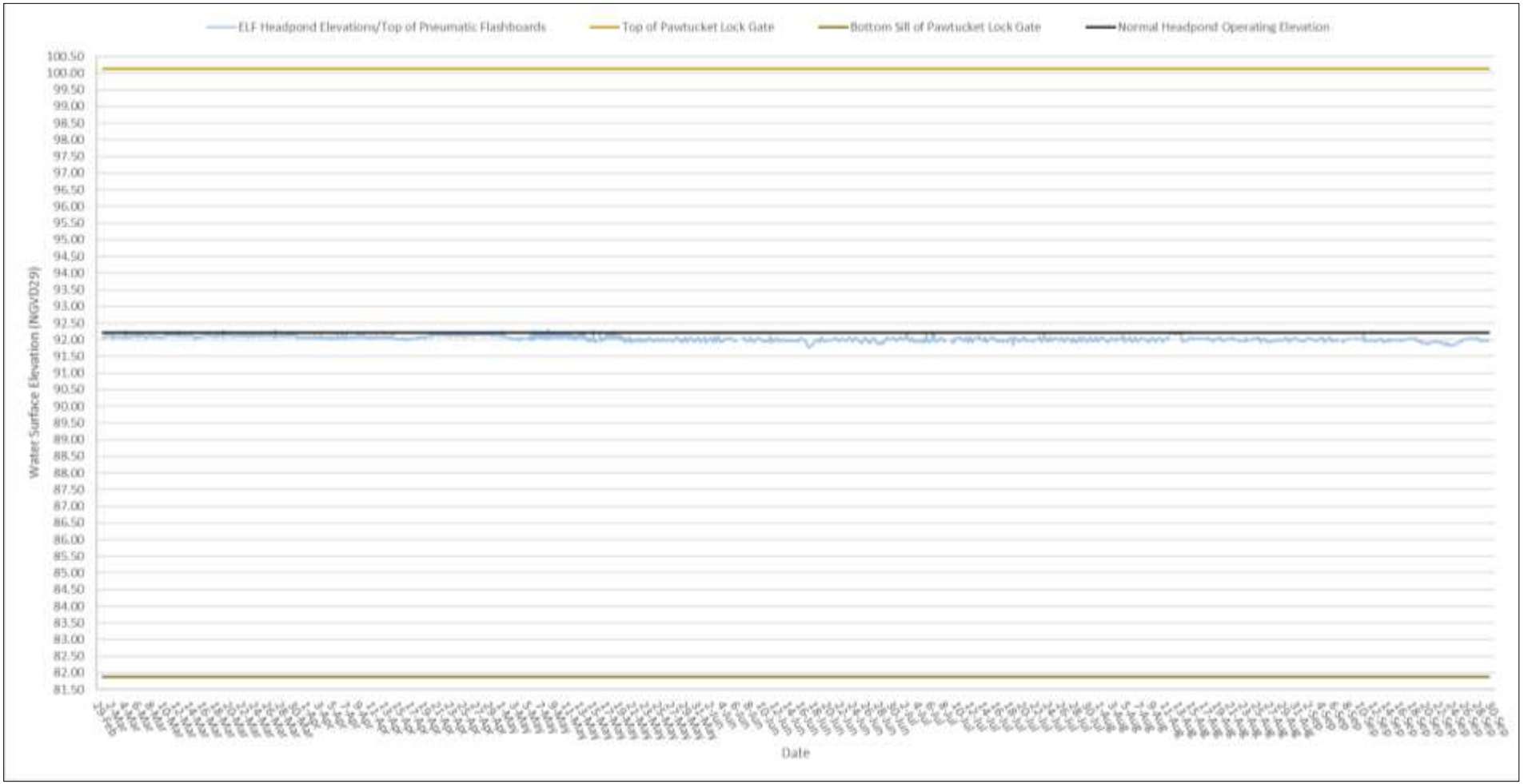


Figure 5-2. Project Headpond Water Surface Elevation During 2020 Monitoring Period Relative to Top and Bottom Sills of the Northern Canal Lock Gate



5.2.2 Northern Canal

Water surface elevations within the Northern Canal collected during the study period ranged from a minimum of 85.30 ft to a maximum of 91.64 ft (Figure 5-3) with a range of 6.34 ft at the Northern Canal River Left (RL) location near the Emergency Surge Gate and from a minimum of 85.71 ft to a maximum of 92.14 ft (Figure 5-4) for a range of 6.43 ft at the Northern Canal River Right (RR) location, near the canal's mid-point between the Pawtucket Gatehouse and the E.L. Field powerhouse.

Based on the level logger data collected in the Northern Canal at the RL location, water surface elevations within the Northern Canal reached elevations greater than 91.5 ft (the normal maximum operating elevation of the Northern Canal) on one occasion during the monitoring period. Beginning on August 11 at approximately 9:45 PM through August 13 at approximately 3:45 p.m. the water surface elevation in the Northern Canal was greater than 91.5 ft reaching a maximum elevation of 91.64 ft (Figure 5-3).

Based on the level logger data collected in the Northern Canal at the RR location, water surface elevations within the Northern Canal reached elevations greater than 91.5 ft (the normal maximum operating elevation of the Northern Canal) on three occasions. On March 19 at approximately 9:00 a.m. the water surface reached a maximum elevation of 91.52 ft for less than 15 minutes. On May 15 at the RR location, the water surface elevation within the Northern Canal rose above 91.5 ft for approximately 10 hours and reached a maximum elevation of 91.62 ft. Beginning on August 11 at approximately 9:45 p.m. through August 13 at approximately 3:45 p.m. the water surface elevation in the Northern Canal at the RR location was greater than 91.5 ft reaching a maximum elevation of 91.64 ft (Figure 5-4).

Figure 5-3. Northern Canal River Left Location - Water Surface Elevation During 2020 Monitoring Period

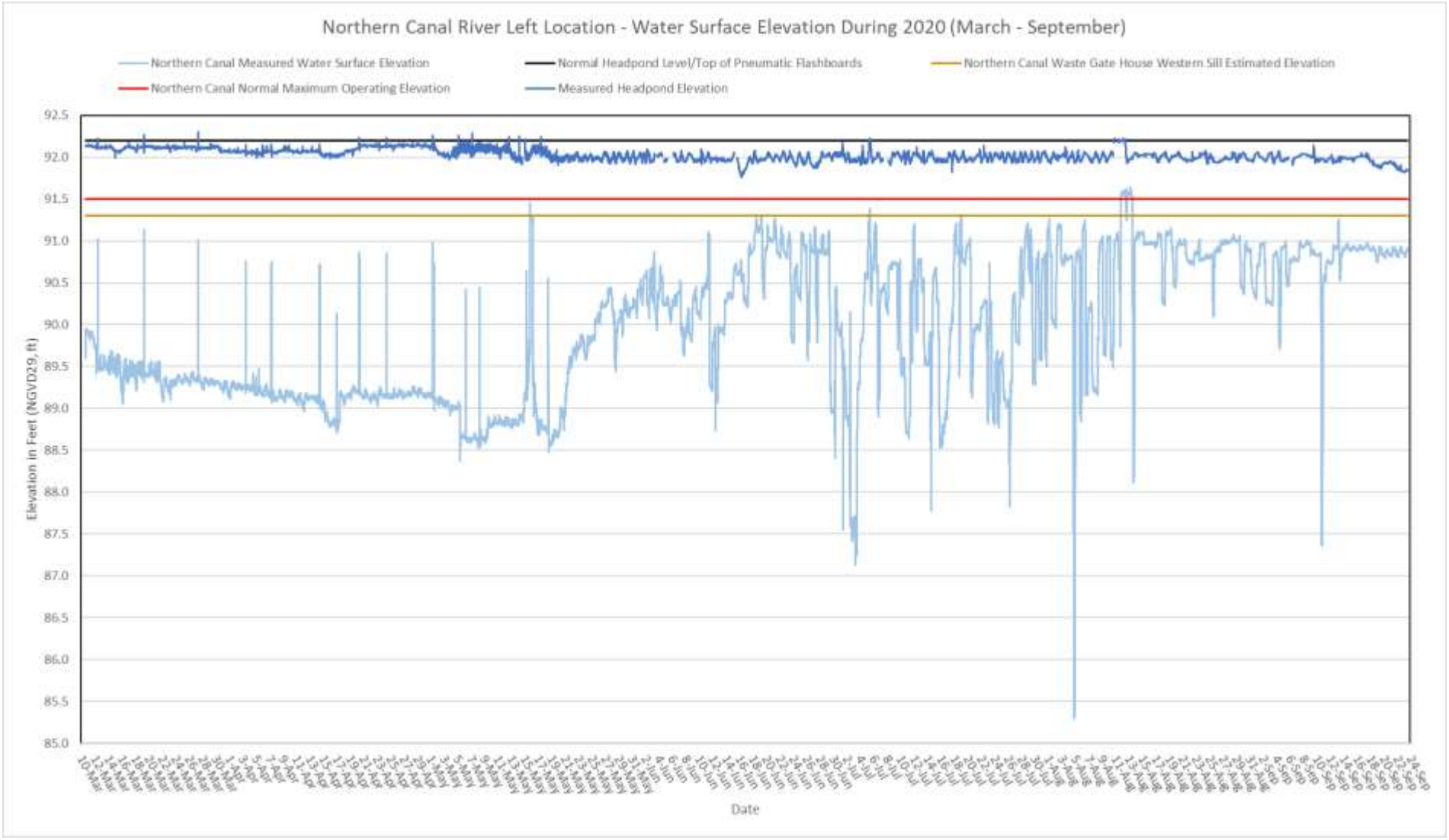
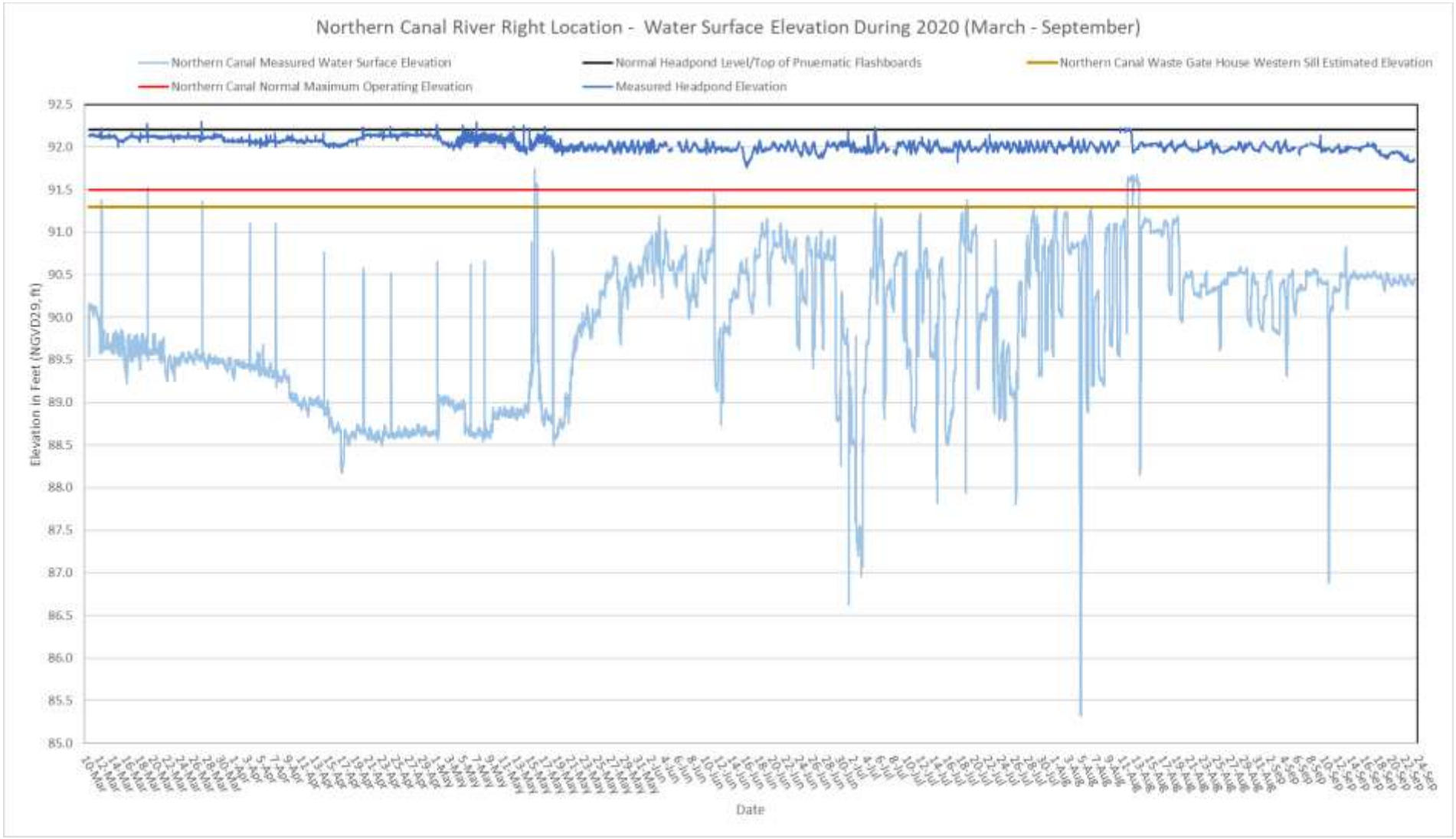


Figure 5-4. Northern Canal River Right Location - Water Surface Elevation During 2020 Monitoring Period. Pawtucket Canal



5.2.3 Upper Pawtucket Canal

Water surface elevations within the Upper Pawtucket Canal during the study period ranged from a minimum of 91.69 ft to a maximum of 92.35 ft (Figure 5-5) for a maximum range of 0.66 ft, and are consistent with the impoundment level data. Within the Lower Pawtucket Canal levels ranged from a minimum of 79.53 ft to a maximum of 86.21 ft (Figure 5-6) for a range of 6.68 ft. Water surface elevation data downstream of the Guard Lock Gate Complex were not collected following the June 12 download event due to loss of the downstream level loggers (Lower Pawtucket Canal). These loggers were not recovered nor replaced.

On one occasion during the study period, the water surface elevation within the Upper Pawtucket Canal reached an elevation greater than 92.2 ft (the normal operating elevation of the Project headpond). This event occurred from March 27 at approximately 11:30 a.m. and lasted for less than 15 minutes, reaching a maximum elevation of 92.29 ft.

The Lower Pawtucket Canal was drawn down approximately 6.5 ft from April 2 through April 7, 2020 to facilitate bridge reconstruction in downtown Lowell, but generally remained between elevations 88.25 ft and 89.47 ft, a range of 1.22 ft during the remaining study period.

Figure 5-5. 2020 Upper Pawtucket Canal Water Surface Elevation (March 10 - September 24)

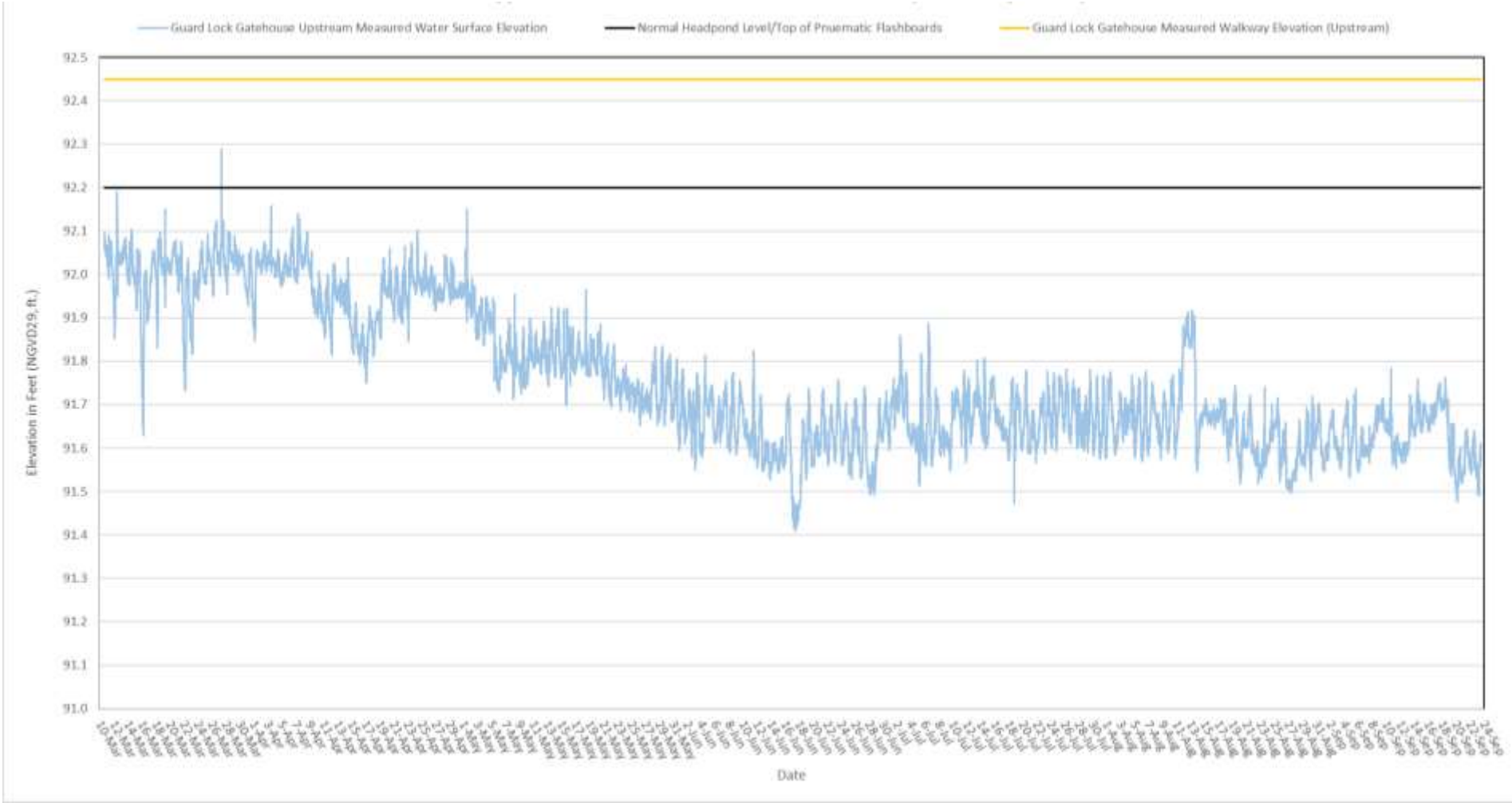
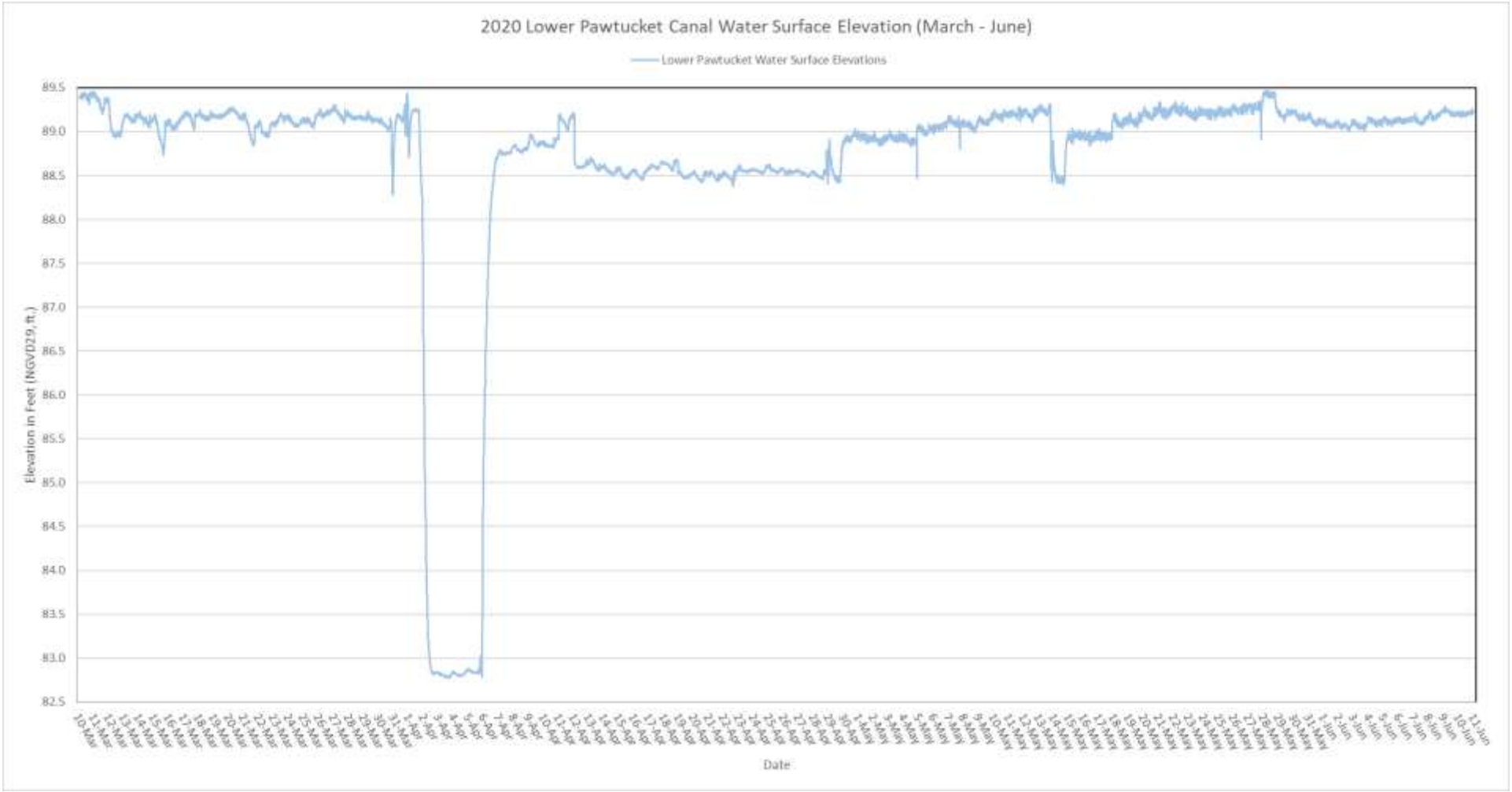


Figure 5-6. 2020 Lower Pawtucket Canal Water Surface Elevation (March 10 – June 11)

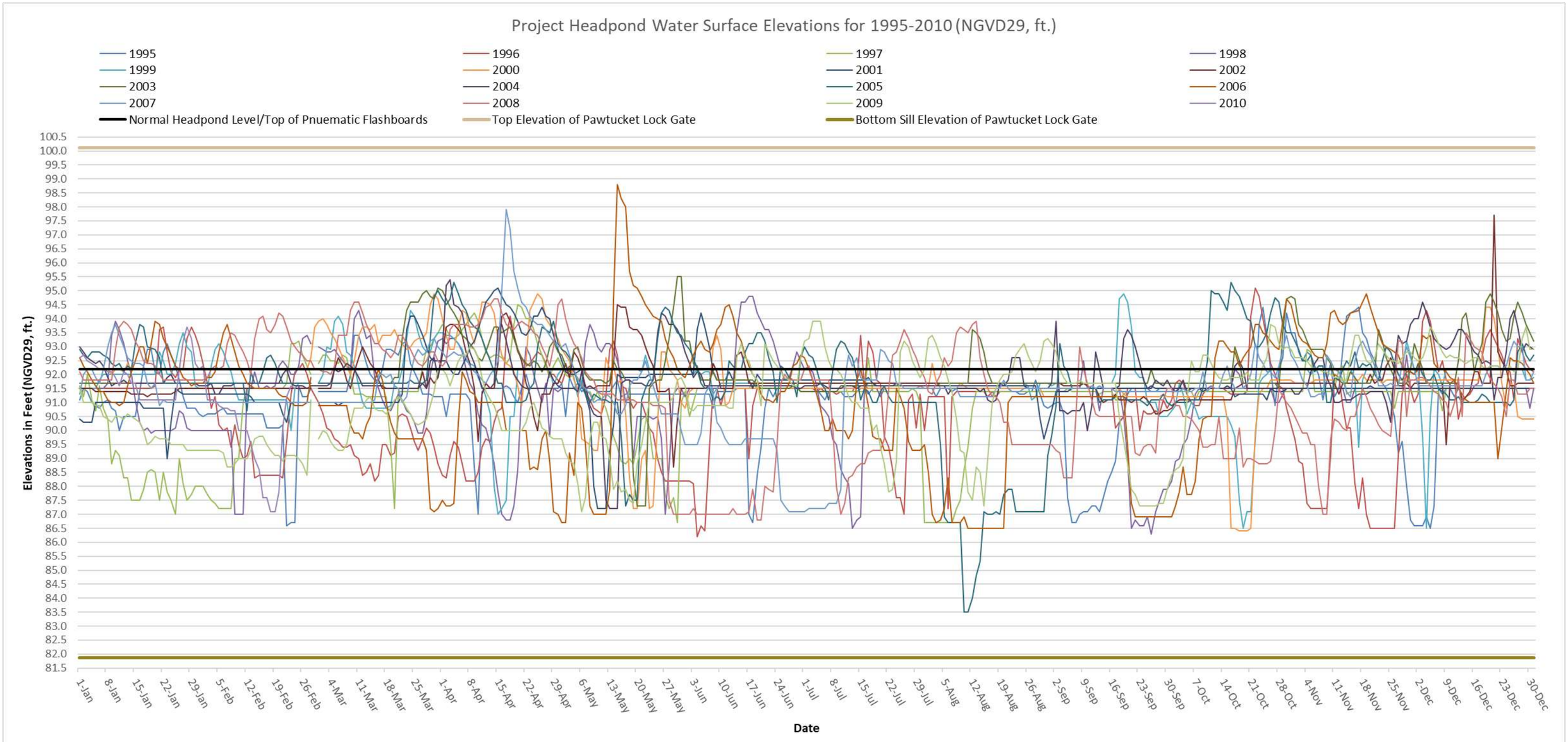


5.3 Project Operations Review

Boott has reviewed the operational data for the Pawtucket Dam headpond elevations and the E.L. Field Powerhouse forebay elevations for the available period of record (January 1995 through December 2010 (Figure 5-7 and Figure 5-8). These data are from the period when 5- foot- high wooden flashboards were deployed on the spillway crest, prior to the construction of the present pneumatic crest gate system. The data demonstrate that with the wooden flashboards, headpond levels were highly variable, due in large part to the Licensee's inability to maintain normal pond level when the flashboards were partially damaged or failed. Repair and replacement of the failed flashboards required a 5-foot drawdown of the project impoundment, typically for 2 days, to enable safe working conditions on the dam crest. In contrast, the pneumatic crest gate system maintains a steady impoundment level by automatically adjusting the height of the crest gate panels in response to increasing flows (Figure 5-1 and Figure 5-2). As flows recede the crest gates are automatically raised, thereby eliminating any need for impoundment drawdowns for flashboard repairs. With the original flashboards in place, headpond elevations were driven by the type of water year (wet, normal, dry) and were much more variable, although typical for a riverine environment. Figure 5-7 shows that during most normal years the headpond is maintained at or near crest elevation for a large portion of the year. Exceptions occur during seasonal spring freshet (mid-March to mid-April), during the fall rainy season (mid-October to early December) and during the occasional anomalous event.

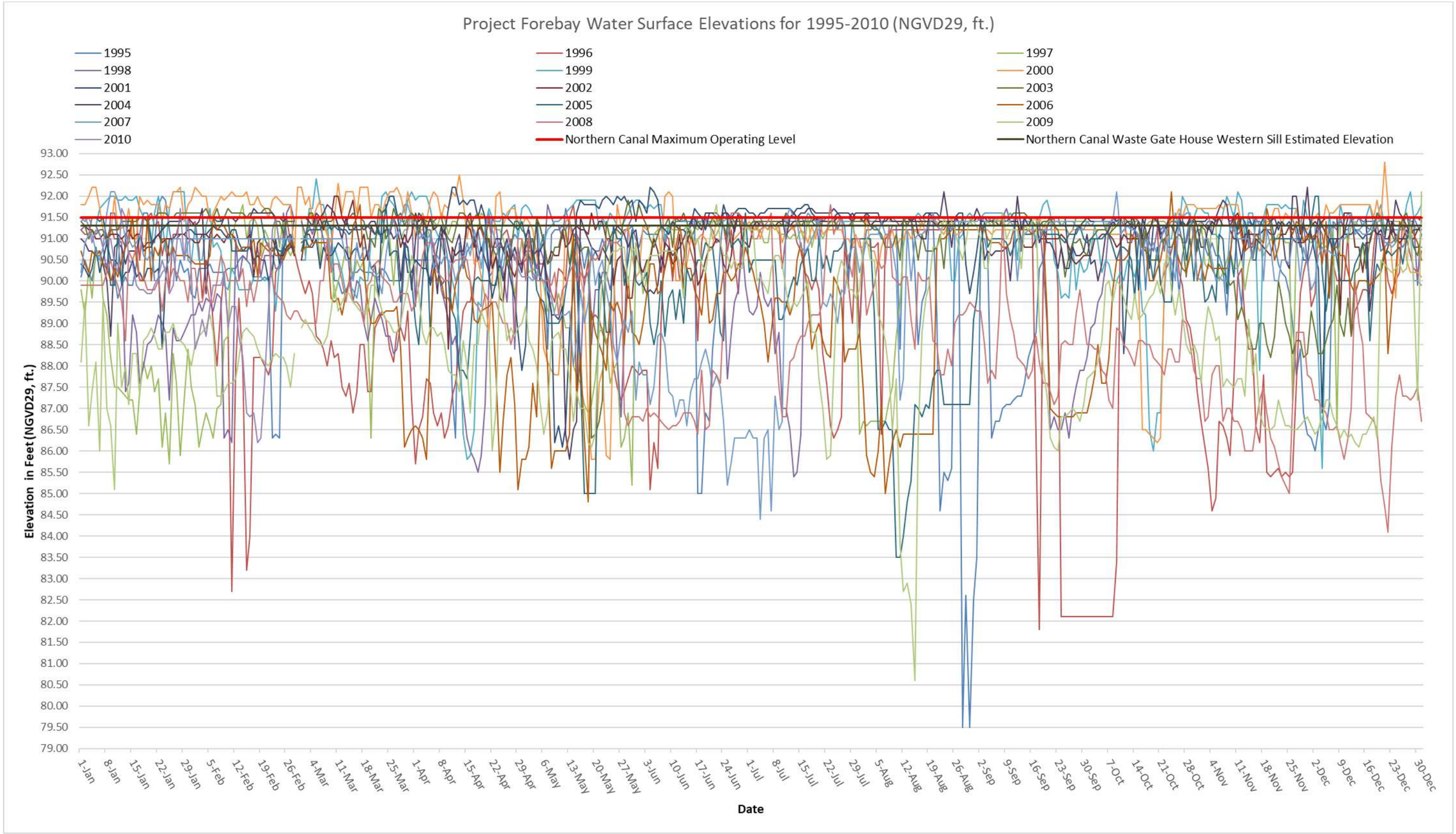
Notable in both the current data set with the crest gate (Figure 5-3 and Figure 5-4) and the historic data set with flashboards (Figure 5-3 and Figure 5-4) is that there is often a large water level differential across the Pawtucket Gatehouse, often reaching 3 or more feet. Normally, this differential would be only 0.7 ft, i.e., 92.2 ft normal pond elevation versus 91.5 ft maximum Northern Canal elevation. However larger differentials may occur, typically due to debris accumulation on the upstream side of the gatehouse, which restricts flow through the headgates (Photo 5-1). Large differentials are most common during the late winter and spring, when increased river flows bring large amounts of river debris down the river. This is a factor which has not been changed by the replacement of the original wooden flashboards with the pneumatic crest gates. Boott has not analyzed the data sufficiently to determine whether there is any difference in differentials between the pre- and post- crest gate data.

Figure 5-7. Merrimack River – Pawtucket Dam Headpond Elevations for Period of Record (1995-2010)[4]



[4] Period of Record Data 1995-2010 was recorded with 5-foot high wooden flash boards in operation and prior to the installation of the automated pneumatic flashboards along the crest of the Pawtucket Dam.

Figure 5-8. Northern Canal E.L. Field Powerhouse Forebay Elevations for Period of Record (1995-2010)



5.4 Visual Assessment of the Great River Wall

The review of prior structural engineering assessments of the Great River Wall and the visual observation are designated as CEII and as such are not available for public distribution.

5.5 Analysis of Potential Project Related Effects

Pursuant to the RSP, Boott analyzed the information obtained from sections 5.1 through 5.4 above, to assess the potential for project related effects to cause adverse impacts to the historical structures along the Northern and Upper Pawtucket Canals. Factors that may have the potential to effect historic resources can vary according to several factors including but not limited to Project operations, the magnitude and duration of natural high and low flow events, river debris and trash accumulation, natural decay, Project related maintenance, and non-Project related maintenance by other entities.

5.5.1 Northern Canal Lock and Pawtucket Gatehouse

The Northern Canal Lock and the Pawtucket Gatehouse (Photo 5-1) is located at the southern abutment of the Pawtucket Dam and controls flow into the Northern Canal. It is principally constructed of dressed masonry with concrete over lintels and contains ten 8-foot-wide by 15-foot-high, motor-operated, timber sliding gates which feed the Northern Canal. Another small intake opening feeds a presently unused wheel, which formerly powered the gate mechanisms through a line shaft. The structure's water passages are nearly 80 ft in length. A small navigation lock is located at the southerly end of the Pawtucket Gatehouse (Photo 5-2) (Boott 2017).

The Project is operated in a run of river mode (ROR) where outflow approximates inflow, generally maintaining the Project headpond at or near elevation 92.2 ft (see Figures 5-1 through 5-4). Under normal operations, Boott operates the Project to prioritize the E.L. Field Powerhouse generating units. When flows exceed the 6,600 cfs combined hydraulic capacity of the E.L. Field generating units, it has been Boott's practice to divert up to 2,000 cfs to the downtown canal units when they are operable. Flows higher than 8,600 cfs (the combined capacity of the E.L. Field Powerhouse and the canal units) are spilled over the Pawtucket Dam spillway and into the Project's bypass reach. The pneumatic crest gate system has a control system which maintains a constant upstream water level during increasing flows, by automatically lowering the crest gate panels as the spillway flow increases.

The concrete and masonry gatehouse show normal wear from exposure to the natural river conditions and Project water level fluctuation. Based on a review of existing documentation and consultation with the NPS, Boott did not identify potential Project-related effects on the gatehouse.

Photo 5-1. Northern Canal Lock and Pawtucket Gatehouse.

Photo 5-2. Pawtucket Gatehouse at Northern Canal Gate entrance (prior to 2018 gate damage).

Potential Project-related effects have been documented at the Northern Canal lock structure. The lock structure is controlled by a set of timber miter gates, with one set of gates at the upstream entrance/exit and a second set at the downstream entrance/exit. The gates are subject to routine water level fluctuations (see Figure 5-1 through Figure 5-4) that can deteriorate wooden and metal elements. While the magnitude of fluctuation in the Project's headpond has been significantly reduced by the implementation of the pneumatic crest gates, the gates are subject to routine seasonal high flow events. Portions of the gates are also continuously submerged, which contributes to natural deterioration of wooden and metal elements over time. Photo 5-3 shows the normal water level that is maintained approximately midway on the gate height, and Photo 5-4 shows the deterioration of wood and metal on the removed gate normally below the water surface.

On August 26, 2018, the right (facing downstream) timber gate controlling the upstream entrance/exit to the Northern Canal lock was damaged. The damage to the gate was caused by an unusual back surge of water moving upstream through the Northern Canal,

caused by a water level transducer malfunction. Under normal operations, the existing surge gate would be automatically activated upon full shutdown of the E.L. Field units to discharge the resulting back-surge of flow into the bypass reach. In this instance, the surge gate did not open because the malfunctioning transducer at the Pawtucket Gatehouse caused the E.L. Field units to back down rapidly but did not cause the them to trip off-line. As a result, the rapid unit backdown created a water-hammer effect that surged up the Northern Canal and into the miter gates. The gates had been previously chained together at their upper corner (See Photo 5-3), which prevented the gates from opening and releasing the surge as it moved upstream, and thus causing the right gate to break. Boott has recently removed the gate from service, and it is currently under repair.

Other factors which have likely contributed to the deterioration of the miter gates include, but are not limited to, high flows in the Merrimack River and natural deterioration of the submerged portions of the wooden gate structure, neither of which are attributable to Project operations.

Photo 5-3. Damage to the Northern Canal Lock Timber Gate.

Photo 5-4. Photo of wear of submerged portion of the Northern Canal Gate removed for repair.

5.5.2 Northern Canal Waste Gatehouse

The Northern Canal Waste Gatehouse is a single-story, heavy-timber-framed building, built circa 1872 atop the Great River Wall which houses gate operators for four canal release gates (Photo 5-5). Based on consultation with the NPS, Boott identified potential Project-related effects on certain wooden structural elements of the Northern Canal Waste Gatehouse. The wooden sills of the gatehouse have experienced deterioration. Boott reviewed Northern Canal water level data recorded in 2020 to determine if Northern Canal water levels could be a contributing factor to the deterioration of the sill.

Photo 5-5. Northern Canal Waste Gatehouse atop the Northern Canal.

As shown in Figure 5-3 and Figure 5-4, the Northern Canal Waste Gatehouse has wooden sill which overhangs the Northern Canal, with a bottom elevation of approximately 91.3 ft NGVD29. The normal maximum operating elevation of the Northern Canal is 91.5 ft. Figure 5-3 and Figure 5-4 show that the canal water surface elevations for the study period occasionally exceeded the bottom sill elevation, thereby inundating the heavy timber bottom sill on the south side of the structure (Photo 5-6). The Northern sill of the Waste Gatehouse has also deteriorated, due to natural exposure to the nearby river and atmospheric conditions, as well as its proximity to the spillway immediately to the east. It is possible that splashing water from the adjacent spillway may have contributed to the deterioration of the eastern third of the northern sill timber. Repeated inundation and drying of the timber sill can be a contributing factor to deterioration. Other factors, including the age of the wooden timbers, general maintenance, weathering, and atmospheric conditions are also likely to have contributed to the deterioration of the southern sill, and the eastern portion of the northern sill. The age of the sills is not known, i.e., it is not known if the existing sills are the original timbers from the 1872 construction of the gatehouse.

Photo 5-6. Northern Canal Waste Gatehouse underlying timber sill.

5.5.3 Guard Lock and Gates Facility

The Upper Pawtucket Canal branches off the Merrimack River a few hundred feet upstream of the Pawtucket Dam and feeds water into the downtown canal system via the Guard Lock and Gates Facility ("Guard Locks"). The facility consists of the following structures: 1) the Guard Gatehouse which houses 5 sluice gates to convey flow to the Lower Pawtucket Canal; 2) a 24 ft wide granite masonry Lock Canal with two pairs of wooden lock gates; 3) the timber and wood framed Lock House located above the upstream lock gate; 4) the Francis Gatehouse (or Great Gatehouse) timber and wood framed structure over the Lock Canal which houses the 25' high x 25' wide Francis (or Great) Gate. The Guard Gatehouse is separated from the Lock Canal and associated Lock House and Francis Gatehouse by an island with walls of granite, ledge, or concrete (Photo 5-7).

In its consultation comments, the NPS identified potential Project-related effects on the Guard Lock and Gates Facility. Specific issues identified by the NPS included damage to the upstream side of the gatehouse (including the upstream wooden walkway), erosion of the steps leading to the gatehouse, and damage to the entry door on the east side of the Gate House. Boott reviewed the available information regarding the condition of the Guard Locks Facility with respect to the potential impacts identified by the NPS.

Photo 5-7. 1976 - Guard Lock and Gates Facility viewed from upstream. The Guard Gatehouse is on the left and the Lock Canal and Lock House are on the right.

Photo 5-8. 2019 - Guard Lock and Gate Facility.

Water levels in the Pawtucket Canal upstream of the Guard Locks complex are essentially the same as the project impoundment and remained below the normal headpond level of 92.2 ft NGVD29 throughout the study period except for one occasion. On March 27, 2020 between 11:30 a.m. and 12:00 p.m. the water level in the Pawtucket Canal upstream of the Guard Locks reached 92.29 ft. Figure 5-5 shows the water surface elevation during the study period and the estimated elevation of the Guard Gatehouse walkway (**Error! Reference source not found.**).

Water levels in the Upper Pawtucket Canal remained below the walkway at the base of the Guard Lock Gatehouse for the entire study (Figure 5-5 and Photo 5-8). The elevation of the walkway (92.45 ft), the clapboard siding (92.45 ft), and the bottom of the mid-level windows (94.08 ft) are all above the normal water level of the Upper Pawtucket Canal (Figure 5-5). Under normal operating conditions, these features are rarely inundated. However, high flow events that are beyond Boott's control can cause water levels to exceed normal operating conditions and may inundate the walkway, clapboard siding, and mid-level windows. As described above, the pneumatic crest gate control system maintains a constant upstream impoundment elevation under elevated flow conditions by automatically adjusting the height of the crest gate panels. The crest gates would be fully lowered at river flows of approximately 35,000 cfs, above which the impoundment and Upper Pawtucket Canal level would rise uncontrolled. Thus, river flows in excess of 35,000 cfs could cause the Upper Pawtucket Canal to inundate the wooden structural elements of the gatehouse; however, these conditions are outside of the ability of the project to control the impoundment water level and therefore not attributable to Project operations.

While normal Project operating conditions do not appear to be having a significant effect on the wooden structural elements of the gatehouse, the presence of waterborne trash and debris may adversely affect the gatehouse. Trash and debris accumulate upstream from Guard Lock Gatehouse, including large logs and timbers. While the magnitude of fluctuation in the Project headpond has been significantly reduced by the implementation of the pneumatic crest gates (see Figure 5-1), the Pawtucket Canal is subject to routine seasonal high flow events, which are more likely to convey trash and debris from upriver areas. While trash and debris that accumulate upstream from the gatehouse have the potential to damage exterior wooden elements and windows under such high flow conditions, natural high flow events and waterborne trash are not related to Project operations. Boott retains a crane service to remove the trash and debris from in front of the Pawtucket Gatehouse once or twice each year.

Boott notes that the top of the steps (104.87 ft) leading to the lower level door of the Guard Gatehouse and the bottom sill of the lower level door itself (100.34 ft) are significantly above the maximum recorded Project headpond elevation for the recent period of record. According to the historic data for the period of record (1995 – 2010) the maximum elevation of the Project headpond was 98.8 ft in 2006. As such, apparent damage to these structural elements are not related to Project operations. The flood of March 20, 1936 was the only event high enough to inundate the gatehouse stairs, reaching a peak elevation of 107.3 ft at a flow of 173,000 cfs.

As is discussed in the Resources, Ownership, Boundaries, and Land Rights Study Report (Study 10), all of the structures within the Guard Lock and Gates Facility are owned by the Proprietors of Locks and Canals and the Commonwealth of Massachusetts, under the administration of the MADCR. In general, the Proprietors own the substructure of each building while the Commonwealth owns the buildings and fixtures above the foundations. Boott generally has easement rights to operate and maintain the water control equipment within each structure. NPS also retains rights to access and implement improvements such as walkway surfaces, lighting, railings, decking, benches, and landscaping. As owners, Proprietors and the Commonwealth have a right and a duty to maintain properties under their ownership, but they do not have an obligation to enhance or upgrade their properties. Similarly, an easement, such as that issued to Boott and/or NPS, allows the holder to conduct routine maintenance of the property under easement.

6 Conclusions

Wooden structural elements of the historic resources located along the Upper Pawtucket and Northern Canals appear most susceptible to damage from submergence, periodic inundation, and waterborne trash.

While the magnitude of fluctuation in the Project's headpond and the Pawtucket Canal has been significantly reduced by the implementation of the pneumatic crest gates, the Merrimack River is subject to routine seasonal high flow events that are beyond Boott's control.

High flow events can also mobilize waterborne trash and debris that have the potential to damage wooden structural elements; however, neither high flow events nor the presence of waterborne trash and debris in the Merrimack River are attributable to Project operations.

The operation of the Northern Canal has caused periodic inundation of the sill at the Northern Canal Waste Gatehouse. This inundation may be one factor in the continued deterioration of the gatehouse's southern sill. Spray from the canal spillway may also be contributing to deterioration along the eastern end of the northern sill.

While normal Project operations do not appear to be adversely affecting the Pawtucket Gatehouse Lock Structure beyond normal wear, at least one incident appears to have contributed to recorded damage to the upstream miter gate. The canal surge event that occurred in 2018 was caused by the malfunction of a water level transducer. The effect of the resulting surge was exacerbated by the practice of chaining the gates closed. This anomalous incident does not represent normal Project operations, and Boott is repairing the damage to the gate.

7 Variances from FERC-Approved Study Plan

The Water Level and Flow Effects on Historic Resources Study Report was conducted in full accordance with the methods described in the FERC-approved study plan except for the following variances:

- During meetings and consultation with the NPS after the issuance of the SPD, the stakeholders agreed to reduce the focus of this study limiting it to the Upper Pawtucket Canal from the Merrimack River downstream to the Guard Locks, and including a portion of the Project headpond in proximity to the Pawtucket Dam and the Northern Canal from the Pawtucket Dam to the E.L. Field Powerhouse.
- Because of the current COVID-19 pandemic, neither multiple-party site visits nor public meetings were conducted as part of this study. Boott consulted with the NPS to identify previous damage to historic resources within the study area and to collect additional information on the nature and extent of the damage.

8 Germane Consultation and Correspondence

A summary of germane correspondence and consultation related to the Water Level and Flow Effects on Historic Resources Study Report is presented in Table 8-1. Appendix D provides copies of relevant correspondence.

Table 8-1. Germane Consultation and Correspondence

Date	Type	From	To	Subject
May 5, 2019	Letter	Boott	NPS	Consultation on locations for level logger deployment
January 4, 2021	Letter	Boot	NPS	Request for Information for Water Level and Flow Effects on Historic Resources Study
February 3, 2021	Letter	NPS	Boott	Response to Requested Information

9 Literature Cited

Hay. (1991). A History of Hydroelectric Power in New York State. Albany, NY: New York State Museum.

Massachusetts Department of Conservation and Recreation (MADCR). 2014. Lowell/Greater Brook Planning Unit.

_____ 2018. Comments on the Pre-Application Document and Scoping Document. Filed with the Federal Energy Regulatory Commission. https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15002412

National Park Service. (NPS). 1981. Final General management Plan https://www.nps.gov/Lowell/learn/management/upload/1981-LOWE-GMP.pdf [Accessed August 1, 2020].

Appendix A - Documents Reviewed

Appendix B - Engineering Document Review of the Great River Wall (Critical Energy Infrastructure Information)

Appendix C - Visual Engineering Assessment of the Great River Wall (Critical Energy Infrastructure Information)

Appendix D - Germaine Consultation and Correspondence

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

May 31, 2022

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC
Manchester, New Hampshire

Central Rivers Power

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List of Acronyms

ADA	Americans with Disabilities Act
AW	American Whitewater
Boott	Boott Hydropower, LLC (or Licensee)
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commonwealth	Commonwealth of Massachusetts
DBH	diameter at breast height
DLA	Draft License Application
Enel	Enel Green Power North America
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission (or Commission)
FGMP	Final General Management Plan
FLA	Final License Application
GIS	Geographic Information System
GPS	Global Positioning System
ILP	Integrated Licensing Process
ISR	Initial Study Report
LNHP	Lowell National Historical Park
MADCR	Massachusetts Department of Conservation and Recreation
MADEM	Massachusetts Department of Emergency Management
MEOEEA	Massachusetts Executive Office of Energy and Environmental Affairs
MOU	memorandum of understanding
MW	megawatt
NGVD 29	National Geodetic Vertical Datum 1929
NHDES	New Hampshire Department of Environmental Services
NHDNCR	New Hampshire Department of Natural and Cultural Resources

NHFGD	New Hampshire Fish and Game Department
NHL	National Historic Landmark
NOI	Notice of Intent
NPS	National Park Service
NRPC	Nashua Regional Planning Commission
OSRP	Open Space and Recreation Plan
PAD	Pre-Application Document
Project	Lowell Hydroelectric Project (or Lowell Project)
Proprietors	Proprietors of the Locks and Canals
PSP	Proposed Study Plan
RM	river mile
RMP	Resources Management Plan
ROR	run-of-river
RSP	Revised Study Plan
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SPD	Study Plan Determination
Study Workshop	Lowell Hydroelectric Project Study Workshop
USFS	U.S. Forest Service
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
USR	Updated Study Report
Visitor Center	E.L. Field Powerhouse Visitor Center
VP	vegetation point

1 Introduction and Background

Boott Hydropower, LLC (Boott or Licensee) is the Licensee, owner, and operator of the 20.2-megawatt Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (C.F.R.) Part 5.

In accordance with 18 C.F.R. § 5.15, Boott has conducted studies as provided in the study plan and schedule approved in the Commission's March 13, 2019 Study Plan Determination (SPD) for the Project. This report describes the methods and results of the approved Recreation and Aesthetics Study conducted in support of a new license for the Project.

1.1 Project Description and Background

The Lowell Project is located at river mile (RM) 41 on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts, with an impoundment extending approximately 23 miles upstream into Hillsborough County, New Hampshire. As licensed, the existing Lowell Project consists of:

1) A 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket Dam) that includes a 982.5-foot-long spillway with a crest elevation of 87.2 feet National Geodetic Vertical Datum 1929 (NGVD 29) topped by 5-foot-high pneumatically-operated crest gates deployed in five independently-operable zones;
2) A 720-acre[1] impoundment with a normal maximum water surface elevation of 92.2 feet NGVD 29;
3) A 5.5-mile-long canal system which includes several small dams and gatehouses;
4) A powerhouse (E.L. Field) which uses water from the Northern Canal and contains two turbine-generator units with a total installed capacity of 15.0 megawatts (MW);
5) A 440-foot-long tailrace channel;
6) Four powerhouses (Assets, Bridge Street, Hamilton, and John Street) housed in nineteenth century mill buildings along the Northern and Pawtucket

[1] As licensed by the Commission, the impoundment surface area is 720 acres. The actual impoundment surface area is estimated at 1,236 acres.

Canal systems containing 15 turbine-generator units with a total installed capacity of approximately 5.1 MW;

7) A 4.5-mile-long, 13.8-kilovolt transmission line connecting the powerhouses to the regional distribution grid;

8) Upstream and downstream fish passage facilities including a fish elevator and downstream fish bypass at the E.L. Field powerhouse, and a vertical-slot fish ladder at the Pawtucket Dam; and

9) Appurtenant facilities.

At the normal pond elevation of 92.2 feet NGVD 29 (crest of the pneumatic flashboards), the surface area of the impoundment encompasses an area of approximately 1,236 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet (at spillway crest) is approximately 6,180 acre-feet. The Project operates essentially in a run-of-river (ROR) mode using automatic pond level control and has no usable storage capacity.

The Project's primary features are located along the Merrimack River in the City of Lowell, Massachusetts. The City of Lowell was founded in the early 1820s by Boston merchant capitalists and became one of the most significant planned industrial cities in America (Hay 1991). Lowell's factory system, which used the waterpower of the Merrimack River, incorporated new technologies to provide for the mass production of cotton cloth in mills throughout the city (National Park Service [NPS] 1981). Lowell established the pattern for large-scale waterpower development for the next 50 years (Hay 1991).

Several Project facilities are located within overlapping locally, state, and nationally designated parks and historic properties/preservation districts. The Project's Pawtucket Dam and E.L. Field Powerhouse are located along the mainstem of the Merrimack River. The Project's two-tiered network of man-made canals extends throughout downtown Lowell. The 5.5-mile-long canal system provides flow to the Project's Hamilton, Assets, Bridge Street, and John Street developments. The Hamilton, Assets, Bridge Street, and John Street power stations and turbines are housed in large former mill buildings. The mill buildings are not included in the Project; the Project Boundary includes only the turbines and associated waterways and equipment at these downtown mill sites. In addition to the Pawtucket Dam and hydroelectric developments, the Project also includes miscellaneous civil works in the City of Lowell, including the Guard Lock and Gates, Moody Street Feeder Gatehouse, Lawrence Dam, Hall Street Dam, Tremont Wasteway, Lower Locks and Dam, Swamp Locks and Dam, Merrimack Dam and Merrimack Gate, Rolling Dam, and the Boott Dam.

The canal system, the downtown mill sites, and many of the Project's civil works, are contributing resources to Lowell Locks and Canals National Historic Landmark (NHL) District. The canal system and many Project facilities are also located within the Lowell National Historical Park (LNHP) managed by the NPS and the larger Lowell Historic Preservation District. The LNHP was established by Congress in 1978 to "preserve and interpret the nationally significant historical and cultural sites, structures, and districts in

Lowell, Massachusetts, for the benefit and inspiration of present and future generations." The park is by design a partnership park in which federal, state, and local governments as well as the private sector and local community carry out the legislative intent of the park unit. The Lowell National Historical Park is also listed on the National Register of Historic Places (NRHP), and certain properties within the park overlap with properties in the NHL District.

The Lowell Heritage State Park, established in 1974 as a precursor to the LNHP, is also located within the City of Lowell and is comprised of linear greenways along the Merrimack River and canal system and a collection of historic buildings and structures related to the industrial development of the city. These buildings and structures include Project features and properties located within the NHL District. The Lowell Heritage State Park is operated by the Massachusetts Department of Conservation and Recreation (MADCR) and features exhibits created in partnership with the NPS (MADCR 2018). With the exception of the Rynne Bathhouse, all of the built resources within the Lowell Heritage State Park fall within the Lowell Historic District, designated by the City of Lowell to "…ensure that development activities within the district are consistent with the preservation of its 19th century setting" (MADCR 2014). Portions of the Lowell Heritage State Park also overlap with the Lowell Locks and Canals NHL District and the LNHP.

On April 30, 2018, Boott initiated the ILP by filing a Pre-Application Document (PAD) and Notice of Intent (NOI) with the Commission. Major ILP milestones to-date are presented in Table 1-1.

Table 1-1. Major ILP Milestones Completed

Date	Milestone
April 30, 2018	PAD and NOI Filed
June 15, 2018	Scoping Document 1 (SD1) Issued by FERC
July 17, 2018	FERC Agency and Public Scoping Meetings Conducted
July 18, 2018	Project Site Visit Held
September 27, 2018	Scoping Document 2 (SD2) Issued by FERC
September 28, 2018	Proposed Study Plan (PSP) Filed
October 18 & 19, 2018	PSP Meeting Conducted
January 28, 2019	Revised Study Plan (RSP) Filed
March 13, 2019	FERC Issued SPD
February 25, 2020	Initial Study Report (ISR) Filed
March 11, 2020	ISR Meeting
June 12, 2020	FERC Issued Revised Process Plan and Schedule
September 30, 2020	Revised ISR Filed

Date	Milestone
December 2, 2020	Draft License Application (DLA) Filed
February 2, 2021	FERC Issued Determination on Requests
February 25, 2021	Revised ISR Filed
April 30, 2021	Final License Application (FLA) Filed
June 23, 2021	FERC Issued Determination on Requests
November 1, 2021	Updated Study Report (USR) Filed
March 1, 2022	FERC Issued Determination on Requests

Boott has continued consultation with stakeholders regarding the approved studies as required by the Commission's SPD. In accordance with the schedule presented in the RSP, Boott has also provided stakeholders with Quarterly ILP Study Progress Reports that include a description of study activities conducted during the previous quarter, activities expected to occur in the next quarter, and identified variances from the approved study plan.

The Commission's March 1, 2022 Determination on Requests requested the Recreation and Aesthetics Study Report be updated with new information to identify Project effects on recreation. Table 1-2 below provides a roadmap to where FERC and stakeholders can find the study updates included in this report.

Table 1-2. Roadmap to Study Report Updates Based on FERC's March 1, 2022 Determination on Requests

FERC Study Report Update	Boott's Response
(1) a description of boat tour routes used by NPS (past or present) within the Northern and Pawtucket Canal system, including a description of locks or other navigational features that the tours pass through;	See Boott's response in Section 5.5.1.
(2) an evaluation of the effects of Project operation on NPS boat tours in the Northern Canal;	See Boott's response in Section 5.5.1.1.
(3) an evaluation of the effects of Project operation on NPS boat tours, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary;	See Boott's response as it relates to NPS boat tours on the Northern Canal in Section 5.5.1.1. See Boott's response as it relates to NPS boat tours on the Pawtucket Canal in Section 5.5.1.2.

FERC Study Report Update	Boott's Response
(4) an evaluation of the potential for expanding access to the canals for recreation (including NPS boat tours) in light of the results of the Operation Analysis of the Lowell Canal Study and in consideration of Project operation under normal and high flow conditions (including an assessment of surge gate and shut down options);	See Boott's response as it relates to NPS boat tours on the Northern Canal in Section 5.5.1.1. See Boott's response as it relates to public recreational access (including NPS boat tours) to the downtown canal system (i.e. excluding the Northern Canal) in Section 5.4.3.
(5) an analysis of the effects of Project operation on NPS boat tours and recreational rights, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary.	See Boott's response in Section 5.4.1.
Northern Canal Walkway: Identify the number of days that the Northern Canal Walkway would need to be closed seasonally due to flows resulting from Project operation.	See Boott's response in Section 5.5.2.

1.2 Project Recreation Facilities

Pursuant to existing License Article 38 and the FERC-approved Recreation Plan, Boott maintains the E. L Field Powerhouse Visitor Center (Visitor Center). The Visitor Center is the Project's only FERC-approved recreation facility. The Visitor Center offers a secured view of the interior of the turbine gallery and an interpretive display which provides information regarding the development, history, and operation of the Project and nearby historic, natural, cultural, and recreational resources.

Non-Project related recreational facilities and opportunities in the Project's vicinity include the Depot Street Boat Ramp, Greely Boat Ramp, LNHP, Lowell Heritage State Park, Merrill Park, Moore's Falls Conservation Area, and the Rourke Brothers Boat Ramp. The Merrimack River provides extensive recreational opportunities, including boating, canoeing, kayaking, rowing, fishing, and swimming. The surrounding vicinity is used for hiking, picnicking, bird watching, nature study, and overall enjoyment of scenic views.

2 Study Goals and Objectives

The goals of this study are to (a) document recreation resources and recreational activities that occur in the Project area; (b) determine the adequacy and capacity of existing recreational facilities to accommodate proposed enhancements and/or additional recreational activities; (c) assess potential effects of water levels and flow rates on existing recreational facilities; (d) assess the potential for expanded access to the canal system for recreation; and (e) identify areas within the canal system where vegetation growth on historic canal walls and waterborne trash are a concern.

The specific objectives of the study are to:

- Identify existing recreation facilities in the Project area;
- Quantify current recreational use based on recent and new surveys and interviews, and consultation with stakeholders, regional and statewide plans, and other available data (including NPS and MADCR planning documents);
- Identify proposed recreational uses based on surveys and interviews in consultation with stakeholders;
- Evaluate the potential effects of continued operation of the Project (including water levels and flow rates) on recreation resources and activities in the Project area;
- Assess the potential for expanded recreational access to the canal system in consultation with the NPS, MADCR, the City of Lowell, Lowell Parks and Conservation Trust, the Lowell Heritage Partnership, and other partners in recreation;
- Identify areas of concern related to waterborne trash and vegetation growth on historic canal walls and other structures or historic properties owned or under the control of Boott; and,
- Gather information on the condition of Boott's recreation facilities and identify any need for improvement.

3 Study Area

In accordance with the Commission's SPD, the study area for the Recreation and Aesthetics Study is a general area that includes the existing FERC Project Boundary and adjacent recreation facilities (Figure 3-1, Figure 3-2).

Figure 3-1. Existing Project Location and Boundary

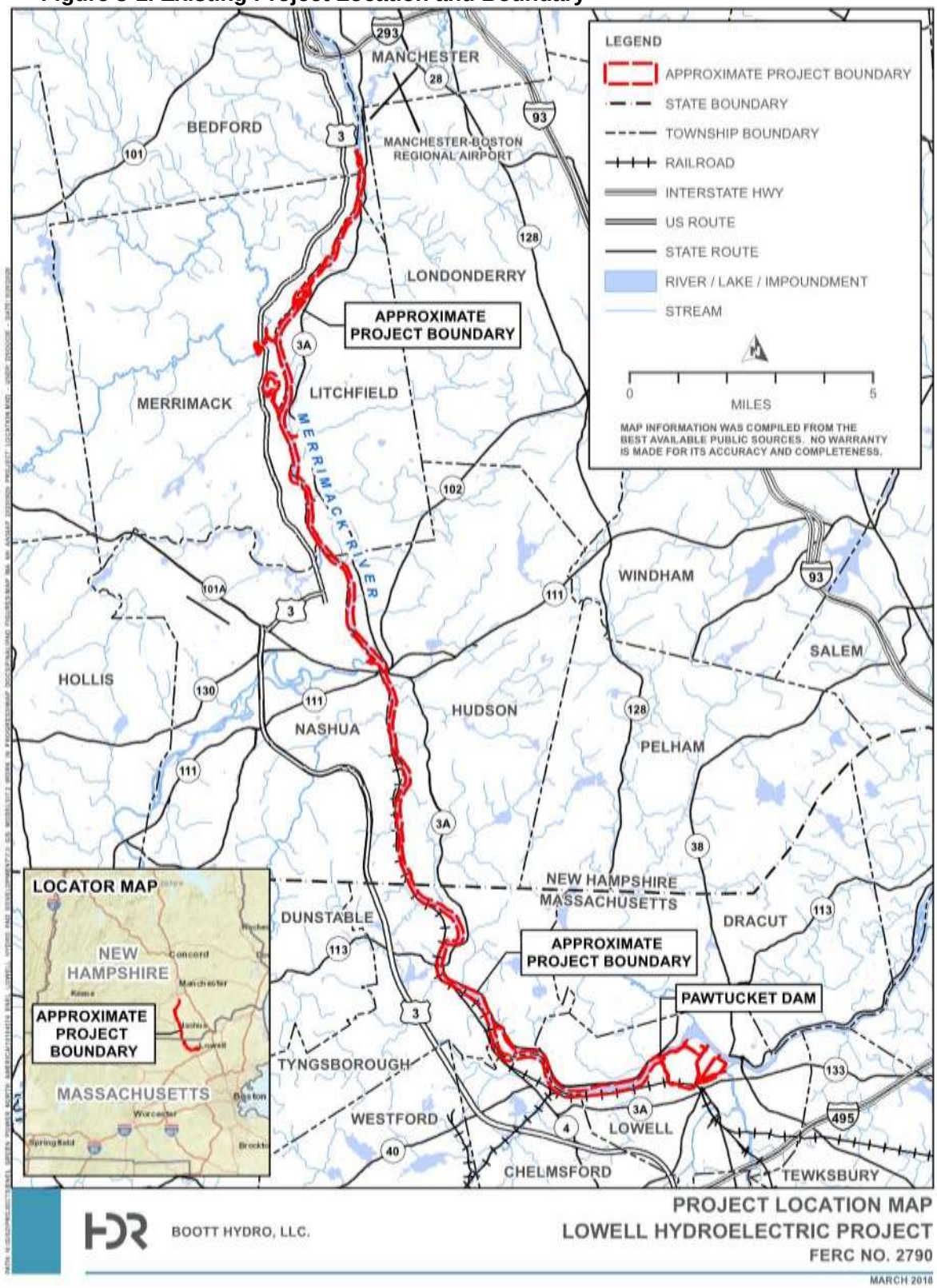
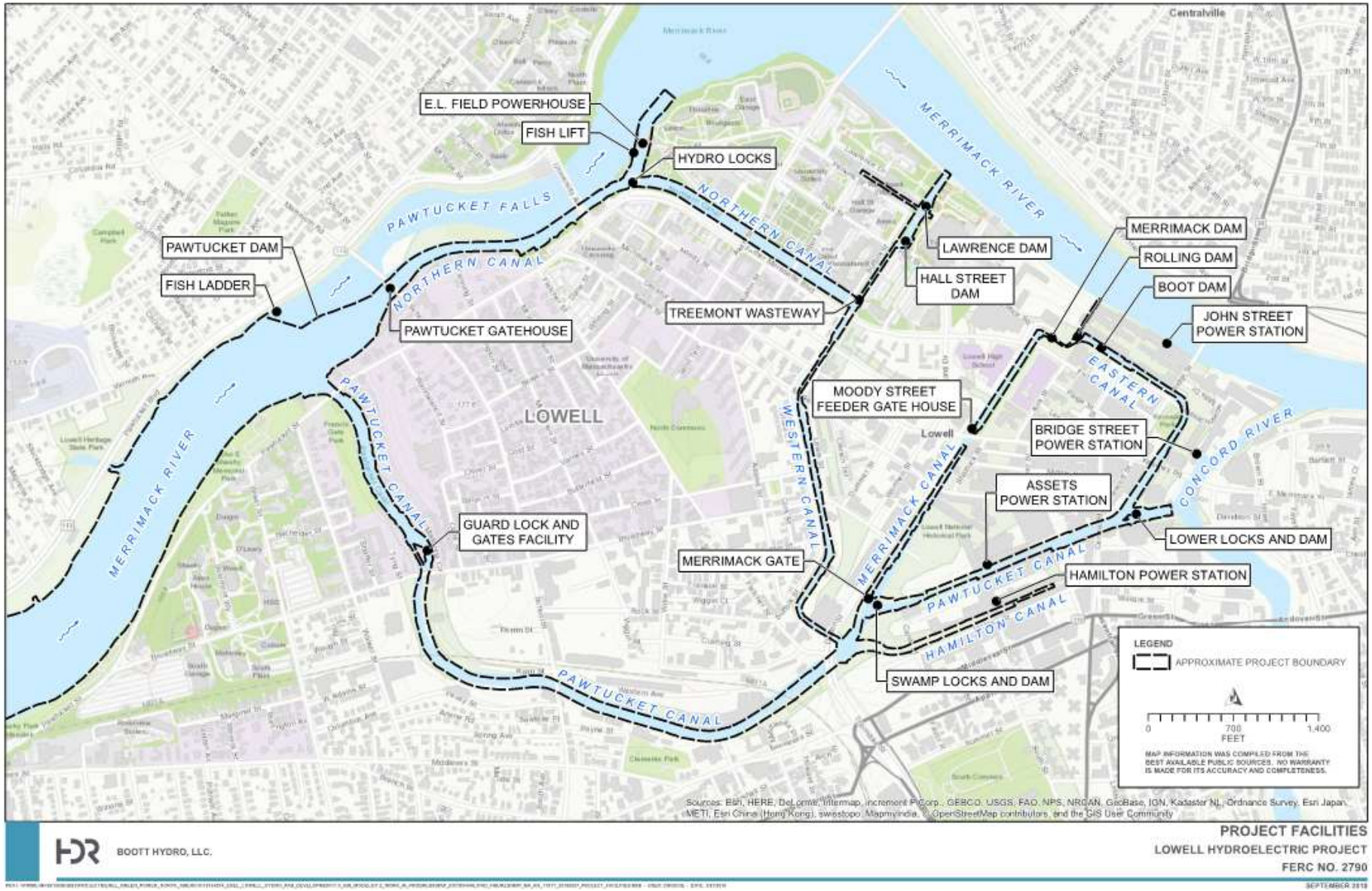


Figure 3-2. Existing Project Boundary and Facilities in Downtown Lowell



4 Methodology

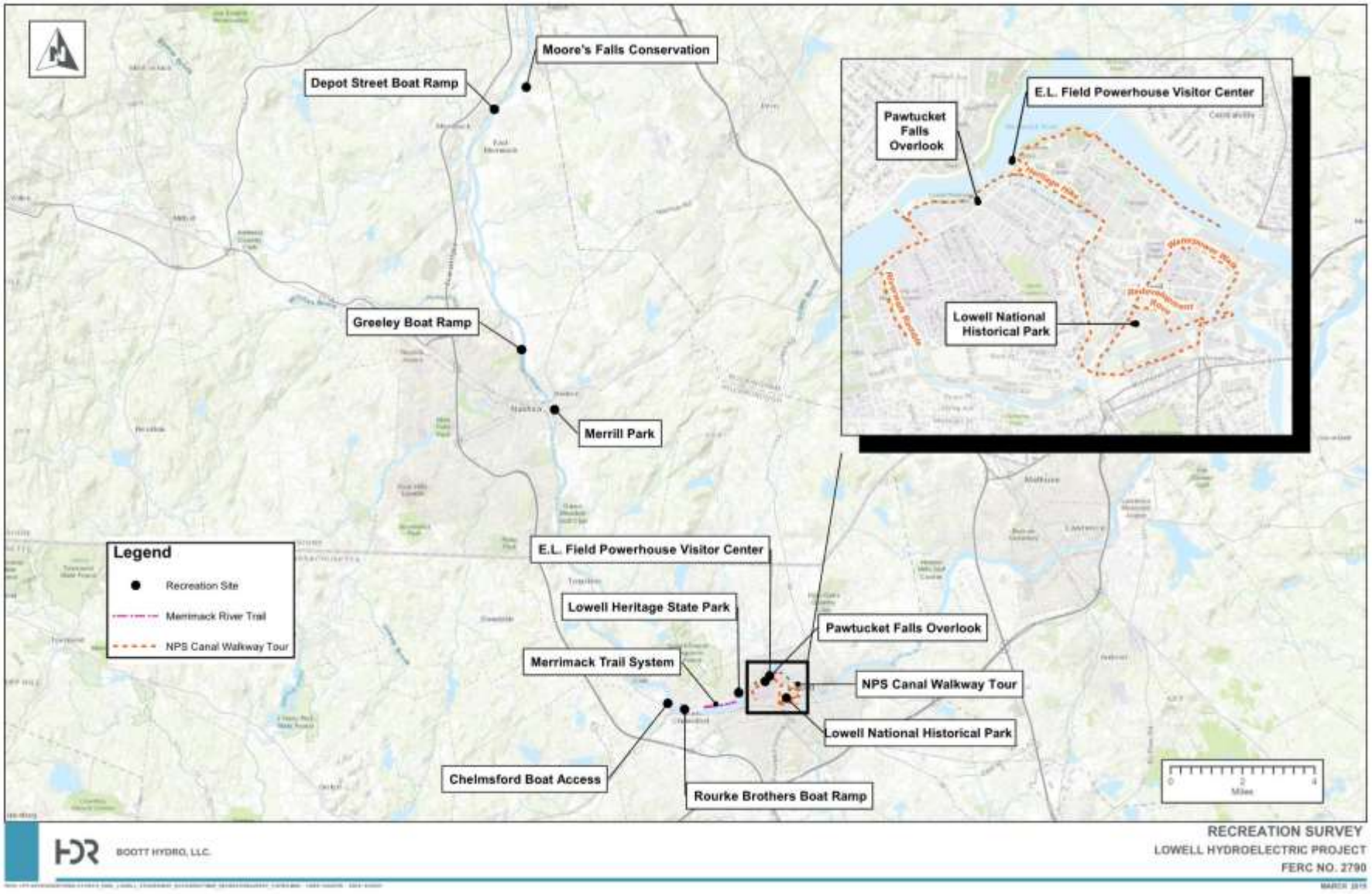
4.1 Literature Review

Boott conducted desktop research and a literature review to identify and describe recreational uses in the Project area, including (but not limited to) whitewater boating, canoeing, kayaking, fishing, swimming, walking, and architectural/historical tours. As a component of this research, Boott reviewed existing recreational uses, facilities management plans (as applicable), and limitations and regulations applicable to the Project area. Additionally, Boott conducted a records search and literature review on the historical and current practices regarding vegetation and waterborne trash management and control on historic canal walls and other structures or historic properties owned or under the control of Boott.

4.2 Field Inventory

Boott conducted a field inventory to document existing non-Project recreation facilities within the Project's vicinity in the fall of 2019. Recreation sites inventoried included the Moore's Falls Conservation Area, Depot Street Boat Ramp, Chelmsford Boat Access, Greeley Boat Ramp, the Rourke Brothers Boat Ramp, Lowell Heritage State Park, Merrimack Trail System, LNHP, Merrill Park, NPS Canal Walkways, and Pawtucket Falls Overlook (Figure 4-1). The Visitor Center, the only Project-related recreation facility, was also inventoried. Pursuant to the RSP, Boott collected information regarding each facility including the type and location of existing recreation facilities, the type of recreation provided (e.g., boat access, angler access, picnicking, etc.), existing amenities and sanitation, the type of vehicular access and parking (if any), the suitability of facilities to provide recreational opportunities and access for persons with disabilities (i.e., compliance with current Americans with Disabilities Act [ADA] standards for accessible design), Global Positioning System (GPS) location data, and representative photographic documentation of recreation facilities.

Figure 4-1. Recreation Field Inventory Locations



4.3 Collection of Visitor Use Data and Field Reconnaissance

4.3.1 Personal Interviews and Field Reconnaissance

As provided in the approved study plan, Boott conducted personal interviews (visitor-intercept surveys) and field reconnaissance activities at recreation facilities in the Project's vicinity between May and October 2019. Boott conducted field reconnaissance and personal interview surveys on random weekdays and weekend days throughout the months of May, June, July, August, September, and October of 2019. Personal interviews and field reconnaissance were conducted on four days of each month on both weekdays, weekend days, and holidays. The actual dates that personal interviews and field reconnaissance took place in 2019 are presented in Table 4-1.

Table 4-1. Personal Interviews and Field Reconnaissance Schedule

Month	Specific Dates
May	• Saturday May 25, 2019 • Sunday May 26, 2019 • Monday May 27, 2019 • Tuesday May 28, 2019
June	• Friday June 7, 2019 • Monday June 10, 2019 • Saturday June 15, 2019 • Sunday June 16, 2019
July	• Wednesday July 10, 2019 • Friday July 19, 2019 • Saturday July 27, 2019 • Sunday July 28, 2019
August	• Tuesday August 6, 2019 • Sunday August 18, 2019 • Wednesday August 21, 2019 • Saturday August 24, 2019
September	• Saturday September 14, 2019 • Thursday September 19, 2019 • Sunday September 22, 2019 • Wednesday September 25, 2019
October	• Wednesday October 9, 2019 • Tuesday October 15, 2019 • Saturday October 19, 2019 • Sunday October 27, 2019

Boott developed survey questions based on general concepts and guidance from the U.S. Forest Service's (USFS) National Visitor Use Monitoring Handbook (USFS 2007) and questions that were asked during recreation studies for other relevant hydropower relicensings. The survey questions that were asked during the personal interviews are included in Appendix A of this study report. Boott consulted with the NPS, MADCR, and

American Whitewater (AW) to identify specific recreation survey locations. The selected locations for the personal interviews and field reconnaissance (Figure 4-1) were:

- Lowell Heritage State Park
- Merrimack Trail System
- Pawtucket Falls Overlook
- NPS Canal Walkways
- LNHP Visitor Center
- Chelmsford Boat Access
- Rourke Brothers Boat Ramp
- Merrill Park, and
- Whitewater takeout location[2]

A team of two technicians traveled between each of the selected recreation sites and spent approximately one hour at each site conducting the personal interviews and collecting field reconnaissance data including (a) the various types of recreation activities, (b) an estimation of the number of vehicles, and (c) the approximate numbers of recreationists observed at each site. Before rotating to the next site, technicians also recorded the date, time, and weather conditions observed. For the personal interviews, individual recreationists and groups were interviewed, including visitors using boat launches and LNHP-managed facilities. Respondents answered questions verbally while a technician recorded their responses using the Qualtrics® offline survey platform to record and submit answers.[3] The personal interview questions included topics such as: general user information; age group, resident/visitor; purpose and duration of visit; distance traveled; history of visiting the site or area; types of recreational activities respondents participated in or planned to participate in during their visit; other recreational sites that respondents visited or intended to visit during their trip; general satisfaction with recreational opportunities, flow conditions, facilities, and the respondents overall visit and/or areas that need improvement; accessibility of facilities or areas; economic aspects, including dollars spent during their trip; and day use/overnight lodging during their visit.

4.3.2 Online Visitor Use Surveys

In addition to the personal interviews, Boott developed a version of the interview questions to allow respondents to provide survey responses online. In accordance with the approved study plan, the survey was made available for one year, from June 2019 to June 2020, on the Project's relicensing website (www.lowellprojectrelicensing.com). The

[2] The Whitewater takeout location is not identified on Figure 4-1. This informal non-Project recreation area is located along the riverfront behind Edward A. Lelacheur Park.

[3] While the survey questions in the approved study plan were utilized for these interviews, the numbering and specific wording was adapted during the interview to better facilitate the interview and to accommodate the Qualtrics® survey platform.

online survey was developed using the Qualtrics® survey platform. Boott posted a brief description of the purpose and intent of the survey and the website address at popular recreation access areas at the Project (Photo 4-1). During personal interviews and field reconnaissance, Boott provided handouts to recreationists with the relevant information on how to access the online survey. Boott notified the Commission and stakeholders of the availability of the online survey in the Second Quarterly Study Progress Report filed with the Commission on October 1, 2019. The survey questions developed for the online survey are also included in Appendix A of this study report.

Photo 4-1. Example of Signage for Participating in Online Visitor Use Surveys

4.4 Evaluation of Expanded Recreational Access in Project Canals

NPS and NPS partners have expressed interest in new, different, and expanded recreational access to and within the Project canals. Boott consulted with the NPS to discuss various recreational opportunities based on the NPS's plans for developing recreational access within the LNHP and the visitor use data collected pursuant to Section 4.3 of this report.

Boott conducted an evaluation of prospective recreation access. This evaluation considered:

- Public safety concerns associated with canal access;

- Infrastructure enhancement that may be required to provide safe public access to the canal system and how such improvements may affect aesthetic and historic resources; and,
- Potential options for improving canal system access, such as operational changes or other measures.

4.5 Documentation of Current Water Levels and Flows

In accordance with the SPD, Boott initiated the data collection associated with the Water Level and Flow Effects on Historic Resources Study and the Operation Analysis of the Lowell Canal Study, both filed with FERC on November 1, 2021. Pressure transducers (level loggers) were installed in the Project's canal system in 2019. On December 18, 2019, Boott held a Lowell Hydroelectric Project Study Workshop (Study Workshop)[4] with stakeholders and refined the data needs for this study based on consultation with the NPS and NPS partners. This included moving the level loggers to locations in the Upper Pawtucket Canal and Northern Canal on March 10, 2020 to better understand and collect data regarding the effects of the crest gate on NPS boat tours and access to the Northern Canal Walkway. These level loggers were removed on September 23, 2020.

4.6 Visual Survey for Vegetation Growth

The visual survey for vegetation growth was conducted between September 25 and 27, 2019. The visual survey was conducted to identify vegetation growth along the canal walls within the study area. Technicians identified the relative quantity and spatial distribution of each vegetation type using aerial photography and observations of habitat and specific plant species occurrences. The methods for this study followed those that were described in the study plan approved by the Commission.

4.6.1 Review of Existing Information

Terrestrial vegetation types occurring in the study area were described based on a review of existing information, an inspection of aerial photography, a review of the U.S. Geological Survey (USGS) 7.5-minute quadrangles, and observations of habitat and specific vegetation type occurrences during the field surveys. Sources of existing information included but were not limited to the following:

- Massachusetts Natural Heritage and Endangered Species Program Classification of the Natural Communities of Massachusetts (Swain 2020): provides a basis for the discussion and conserving the diversity of the types of natural communities and the species they support within the Commonwealth of Massachusetts (Commonwealth). The primary aim of the classification is to describe the natural communities that are

[4] The meeting minutes of the December 18, 2019 Study Workshop were appended to the ISR filed with FERC on February 25, 2020.

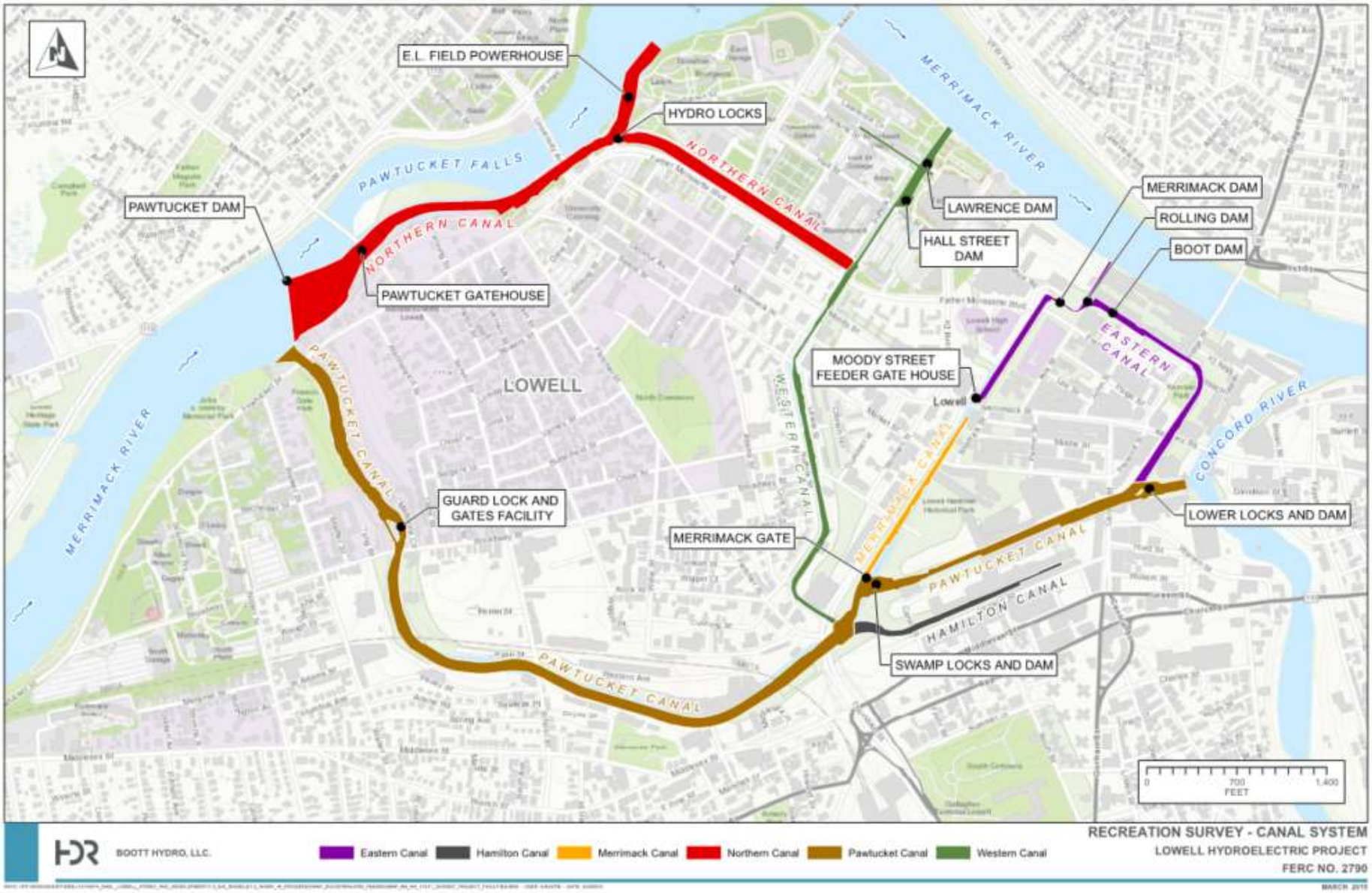
of conservation interest, while also including all types of natural communities in the state.

- Flora of the Northeast – A Manual of the Vascular Flora of New England and Adjacent New York (Magee and Ahles 1999): a reference work and year-round field manual that contains more than 2,400 range maps and over 900 line drawings for identifying the vascular flora of New England and New York.
- Invasive Plants (Kaufman and Kaufman 2007): a guide to the identification and the impacts and control of common North American invasive plant species.

4.6.2 Mapping of Vegetation Growth on Canal Walls

For the purposes of examining vegetation type distribution, the study area was divided into the six canals associated with the Lowell Project canal system including: 1) Pawtucket Canal; 2) Northern Canal; 3) Western Canal; 4) Merrimack Canal; 5) Eastern Canal; and 6) Hamilton Canal (Figure 4-2).

Figure 4-2. Visual Survey for Vegetation Growth Study Area



Visual qualitative surveys were conducted in the study area by foot along the shorelines of the canals, or via an NPS boat for the surveys conducted in the Pawtucket Canal from the Swamp Locks and Dam to the Merrimack River. Vegetation was characterized by dominant type (i.e., Herbaceous, Scrub-Shrub, Trees, Forested, or Mixed) (Table 4-2). The vegetation type assessments were based on overall dominant vegetation characteristics at the time of the survey that may have variations within small areas. In addition, the shoreline/canal was characterized by dominant features (i.e., Block Wall, Concrete, Earthen/Terrestrial Cultural, Stone Wall, Block Wall/Concrete/Stone Wall Mix) (Table 4-3). The shoreline/canal type assessments were based on overall dominant features at the time of the survey that may have variations within small areas.

Table 4-2. Dominant vegetation types used during field surveys

Vegetation Type	Description
Herbaceous	Characterized by primarily herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants less than 3 feet tall.
Scrub-Shrub	Consists of woody plants less than 3 inches diameter at breast height (DBH) and greater than or equal to 3 feet tall.
Trees	Consists of woody plants 3 inches or more in DBH, regardless of height. This vegetation type description was generally used to describe areas along canal walls where only a few trees were growing in a clump.
Forested	Characterized as a relatively large area that consists of primarily trees and underbrush.
Mixed	Characterized by a mosaic of herbaceous, scrub-shrub, and/or trees.

Table 4-3. Dominant shoreline/canal types used during field surveys

Shoreline/Canal Type	Description
Block Wall	Canal walls primarily dominated by placed, generally uniform sized blocks with concrete caps or block alone.
Concrete	Canal walls primarily dominated by concrete, with various types of cement and aggregate.
Earthen/Terrestrial Cultural	Canal walls generally dominated by earthen embankments (forested and unforested) and areas of exposed bedrock. Some of these areas (e.g., riprapped areas) have been created and/or maintained by human activities.
Stone Wall	Canal walls primarily dominated by placed, generally non-uniformly sized blocks with concrete caps or block alone.
Block Wall/ Concrete/Stone Wall Mix	Areas of canal walls predominantly composed of a conglomeration of block wall, concrete, or stone wall at varying quantities.

Mapped Vegetation Polygons and Vegetation Points (VPs)[5] were located using an EOS Positioning Systems Arrow 100™ GNSS receiver linked to an iPad™ Air 2 or Android device operating Collector for ArcGIS™ hand-held GPS unit (equipped with a data dictionary aiding in feature attribution). The presence and extent of cover of the vegetation on/along the canal walls observed at the time of the field survey was evaluated based on photographs and field observations. Geospatial vegetation data were transferred to a Geographic Information System (GIS) format and used to develop both visual maps depicting vegetation presence boundaries and VPs along the canal walls as well as tabular information quantifying the abundance and distribution of dominant vegetation types in the study area. Vegetation polygons were then analyzed to calculate the percentage represented by each vegetation category within each canal; VPs were not included in vegetation category percentage calculations because they represent a single point on the canal wall.

Each representative vegetation type was photographed. Each vegetation polygon and VPs, including any canal descriptive features (e.g., riprap, concrete walls, earthen embankments, etc.) within a polygon or near a VP, was photo documented when possible.

4.6.3 Data Analysis and Processing

During the field effort, mapped vegetation type polygons were collected to represent current conditions. Vegetation type boundaries were mapped to reflect field observations of vegetation composition.

Upon completion of the field data collection effort, all data were checked for errors and omissions. The percentages of each vegetation type were calculated. Minor adjustments were made to a small number of vegetation polygon boundaries and subsequent percentages based on examination of the location of the GPS polygon data relative to banks and bends along the canals, or from recorded field data during mapping.

4.7 Visual Survey for Waterborne Trash

The visual survey for waterborne trash was formally conducted on April 9, 2020. The survey was conducted to identify locations within the study area where waterborne trash accumulates within the Project Boundary. Waterborne trash occurring along the canals was described based on observations of accumulated waterborne trash during the field reconnaissance survey. The methods for this study followed those that were described in the study plan approved by the Commission.

[5] Vegetation points were used to identify areas along canal walls where a single vegetation type point was recorded. Vegetation points generally identify where a single species (e.g., shrub, tree) was located.

4.7.1 Review of Existing Information

Areas of waterborne trash occurring in the study area were described based on a review of existing information, an inspection of aerial photography, the observation of accumulated waterborne trash during other Project relicensing studies, a review of information provided to Boott by the NPS that identifies areas of trash accumulation (both on the canal bottom and waterborne) within the study area, as well as the specific waterborne trash occurrences during the field survey.

4.7.2 Waterborne Trash Mapping

For the purposes of examining waterborne trash accumulation areas, the study area was divided into the six canals associated with the Lowell Project canal system including: 1) Pawtucket Canal; 2) Northern Canal; 3) Western Canal; 4) Merrimack Canal; 5) Eastern Canal; and 6) Hamilton Canal, and associated NPS gatehouses and locks (Figure 4-2).

Visual qualitative surveys were conducted in the study area by vehicle as well as on foot along the shorelines of the canals. Waterborne trash was characterized by dominant type (i.e., Plastics/Household, Woody Debris, or Assorted) (Table 4-4). The canal level (low, medium, high) at the time of the site investigation was also recorded. The waterborne trash assessments were based on the overall dominant trash type observed at the time of the survey.

Table 4-4. Dominant Waterborne Trash Types Used During Field Surveys

Waterborne Trash Type	Description
Plastics/Household	Characterized by plastic cups, plastic bags, wrapping materials, plastic water bottles, plastic containers, rubber balls, fast-food wrappers, shoes, construction barrels, etc.
Woody Debris	Characterized by trees, logs, branches, stumps, boards, sections of plywood, etc.
Assorted	Characterized by a conglomeration at varying densities of plastics/household and woody debris.

Mapped areas of waterborne trash were located using an EOS Positioning Systems Arrow 100™ GNSS receiver linked to an iPad™ Air 2 or Android device operating Collector for ArcGIS™ hand-held GPS unit (equipped with a data dictionary aiding in feature attribution). The presence and extent of waterborne trash within the canals observed at the time of the field survey was evaluated based on field observations and photographs. Geospatial waterborne trash data were transferred to a GIS format and used to develop both visual maps depicting mapped areas of accumulated waterborne trash within the canals as well as tabular information describing the abundance and distribution of waterborne trash in the study area. The mapped polygons were then analyzed to calculate the area represented by each dominant trash type within each canal.

Each representative trash type was photographed. Each waterborne trash polygon, including any canal descriptive features (e.g., active construction adjacent to canal, primarily residential, commercial, etc.) in the vicinity of a polygon, was photo documented when possible.

4.7.3 Data Analysis and Processing

During the field effort, mapped waterborne trash polygons were collected to represent current conditions. Waterborne trash polygon boundaries were mapped to reflect field observations at the time of the investigations.

Upon completion of the field data collection effort, all data were checked for errors and omissions. The areas of each mapped waterborne trash polygon were calculated. Minor adjustments were made to a small number of mapped waterborne trash polygon boundaries and subsequent areas based on examination of the location of the GPS polygon data relative to banks and bends along the canals, or from recorded field data during mapping.

5 Study Results

5.1 Literature Review

Pursuant to the approved study plan, Boott reviewed several sources to summarize recreation in the Project area, including the Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP) (Massachusetts Executive Office of Energy and Environmental Affairs [MEOEEA] 2017); the New Hampshire Department of Natural and Cultural Resources (NHDNCR) SCORP 2018; the Massachusetts Recreational Trails Program Guide (MassTrails) 2020; the LNHP Foundation Document (LNHP 2017); The City of Lowell Open Space and Recreation Plan (City of Lowell 2018); and the City of Lowell's Comprehensive Master Plan, known as Sustainable Lowell 2025 (City of Lowell 2013). Additionally, Boott conducted a records and literature review on the historical and current practices regarding management of vegetation growth and waterborne trash. This section summarizes the results of the literature review to characterize these aspects in the Project area.

5.1.1 Recreation in the Project Area

The Merrimack River provides widespread recreational opportunities. The 116-mile-long Merrimack River begins at the confluence of the Winnipesaukee and Pemigewasset Rivers in the City of Franklin, New Hampshire, flows southward into Massachusetts, and then travels northeast until it discharges into the Atlantic Ocean (New Hampshire Department of Environmental Services [NHDES 2019]). Although the Merrimack River watershed is heavily forested (75% of the land area is covered with forest), it also supports all or parts of approximately 200 communities with a total population of 2.6

million people (Environmental Protection Agency [EPA] 2020; U.S. Army Corps of Engineers [USACE] 2006). The Merrimack River provides numerous recreational opportunities to the residents of the communities along its banks but is also utilized by residents of major cities in the region, particularly residents from Boston (Nashua Regional Planning Commission [NRPC] 2008; NHDES 2019; USACE 2006).

The Project dam is located at river mile 41 on the Merrimack River, and the impoundment extends upstream approximately 23 miles almost to the City of Manchester in New Hampshire. The Project impoundment is characterized by the urban/industrialized cities of Nashua, New Hampshire and Lowell, Massachusetts. Recreational opportunities differ closer to these larger, more populated cities along the river. The State of New Hampshire reports many recreational uses of the Project impoundment, including fishing, canoeing, kayaking, rowing, and motor boating. Lands adjacent to the Project impoundment are used for hiking, picnicking, birdwatching, nature study, and overall enjoyment of the scenic views (NHDES 2019; NHDNCR 2018; New Hampshire Fish and Game Department [NHFGD] 2020; NHFGD 2016).

The state of Massachusetts reports that recreation along the Project impoundment changes as open space generally decreases further downstream and riverfront communities are more industrialized (MEOEEA 2001). Water-based recreation (boating, fishing, canoeing, and swimming), is provided on the downstream portion of the Project impoundment by multiple boat ramps and waterfront parks. The City of Lowell, NPS, and MADCR report many additional recreational opportunities in and surrounding Lowell, including networks of trails, thousands of acres of nearby state forest, and urban passive parks for walking, jogging, dog-walking, and picnicking (City of Lowell 2018; MADCR 2014; LNHP 2017). As part of the LNHP or Lowell Heritage State Park, different sites in and around the city of Lowell are related to the historical era of textile manufacturing and offer museum exhibits, walking tours, and interpretive/interactive displays (LNHP 2017; MADCR 2014).

Although portions of the LNHP are within the Project boundary, it is not a FERC-approved recreation facility. As noted above in Section 1.2, the Visitor Center is the Project's only FERC-approved recreation facility. The Visitor Center offers a secured view of the interior of the turbine gallery and an interpretive display which provides information regarding the development, history, and operation of the Project and nearby historic, natural, cultural, and recreational resources.

Recreational opportunities available along the 23-mile impoundment are summarized in Table 5-1 and described in more detail below.

Table 5-1. Recreational Opportunities Available on the Project Impoundment

Recreational Facility	Canoe/Kayak Access	Boat Ramp	Picnic Area	Fishing Access	Trail System	Light Trails	Designated Swimming Area	Visitor Center	Historical/Heritage Exhibits
Moore's Falls Conservation Area	✓		✓	✓	✓	✓			
Depot Street Boat Ramp	✓		✓	✓					
John Bryant River Access	✓		✓	✓					
Thornton's Ferry Boat Launch	✓			✓					
Greeley Park & Boat Ramp	✓	✓	✓	✓	✓	✓			
Merrill Park	✓		✓	✓		✓			
Chelmsford Boat Access	✓	✓	✓	✓	✓				
Rourke Brothers Boat Ramp	✓	✓		✓					
Lowell Heritage State Park			✓	✓	✓	✓	✓		✓
Pawtucket Falls Overlook									✓
Lowell National Historical Park					✓	✓		✓	✓
E.L. Field Powerhouse Visitor Center								✓	✓

Much of the Project impoundment is in Hillsborough County in New Hampshire. The New Hampshire SCORP estimated that the county has approximately 54,480 acres of recreation lands and 116 public access sites to the water. Public lands maintained by state, federal, or local municipalities comprise the majority of identified recreational acreage in the county, followed by private non-profit organizations/land trusts. With an estimated 197 natural/passive recreation areas and 111 parks, picnics, and playground areas, Hillsborough County has the most of all counties in New Hampshire. Given the national trend of individuals choosing to recreate closer to home, the New Hampshire

SCORP states it is important that larger population bases, such as that of Hillsborough County, have higher proportions of recreation sites (NHDNCR 2018).

Most of the shore lands along the Merrimack River in New Hampshire are privately owned. Activities such as boating, canoeing, kayaking, rowing, and fishing take place immediately on the Merrimack River (NRPC 2008). There are six known boat access facilities in New Hampshire with direct access to the Project impoundment. These facilities range in design from concrete ramps to shoreline access and are described below:

Moore's Falls Conservation Area: Moore's Falls Conservation Area offers shoreline fishing and car-top boating access to Moore's Falls in the Project impoundment. Moore's Falls are a length of rapids on the Merrimack River which drop 6 feet in elevation over 650 feet in distance. There are also walking trails through the woods, an old trolly track trail, multiple access points to the Merrimack River for fishing, educational information regarding environmental conservation, and birdhouses. NHDES recommends this conservation area for angler fishing, as small and large mouth bass are often caught, as well as rainbow and brook trout, both of which are stocked by the NHFGD in the Lower Merrimack River (Middlesex Canal Association 2009; NHDES 2019).

Depot Street Boat Ramp: The Depot Street Boat Ramp offers a carry-in boat ramp and fishing access to the Merrimack River and is managed by the Town of Merrimack. The trail to the river runs under railroad tracks. This access is suitable for motorboats, as the river slows from the rocky rapids upstream (NHDES 2019; Merrimack Parks and Recreation 2020). There is also a scenic picnic area.

John Bryant River Access: The John Bryant River Access is a canoe/kayak car top facility managed by the Litchfield Recreation Commission. It provides fishing access, scenic views of the river, and birdwatching. It is available only to Town of Litchfield, New Hampshire residents (Litchfield Recreation Commission 2020).

Thornton's Ferry Boat Launch: Thornton's Ferry Boat Launch is owned by the Town of Merrimack and offers cartop carry-in boating and fishing access to the Merrimack River (NHFGD undated).

Greeley Park & Boat Ramp: Greeley Park is a 125-acre city park located in Nashua, New Hampshire. Greely Park offers many recreation amenities/facilities including baseball/softball fields, historical sites, picnic areas, playgrounds, restrooms, tennis courts, trails, and wading pools (NHFGD undated; City of Nashua 2020). In 2019, the City of Nashua issued an invitation to bid for reconstruction of the Greeley Park Boat Ramp, as well as construction of a gravel parking lot, placement of new signs, and three biological retention ponds. The work was scheduled for completion in July 2020 (NHFGD undated; City of Nashua 2019). A paved ramp at the north end of Greeley Park in Nashua also allows access to the river for boaters. NHDES recommends this conservation area for angler fishing (NHDES 2019).

Merrill Park: Merrill Park is a 9.3-acre city park located in Hudson, New Hampshire. It is adjacent to the east riverbank and Project boundary. The park is mostly forested with a few walking paths and picnic benches. It has a path which leads down to the Merrimack River, allowing hand-carry access for canoes or kayaks, or fishing (Town of Hudson undated).

The Merrimack River provides quickwater and flatwater experiences for canoeists and kayakers and is one of the largest surface water bodies in the region for motor boating. Local watershed organizations sponsor a variety of paddling trips on the Merrimack River and its tributaries throughout the spring, summer, and fall for beginner and intermediate paddlers (NHDES 2017). Upstream of the northern extent of the Project impoundment is a whitewater kayak course located in Manchester, New Hampshire. There are also class I-II+ rapids located between Amoskeag Falls to Goffs Falls (City of Manchester 2018).

The most popular outdoor activities for New Hampshire residents include wildlife observation, driving for pleasure, sightseeing, and jogging/running/walking. Day hiking tends to be more popular in New Hampshire than the national average (NHDNCR 2018). Natural areas in the vicinity of the Project in New Hampshire are also used for cross country skiing, picnicking, bird watching, nature study, and overall enjoyment of scenic views (NRPC 2008). In addition to the facilities mentioned above, the following facilities are within a 30-minute drive from the Project impoundment and are provided for these types of activities:

Litchfield State Forest: The Litchfield State Forest is a 450-acre forest in Litchfield managed by the State of New Hampshire. It is located about 1.5 miles east of the Project boundary. The 1.3-mile Litchfield State Forest Trail provides comfortable walking and biking trails. Off trails provide an additional four miles of hiking, wildlife observation, and scenic opportunities. The trails are often used for cross country skiing in the winter (Litchfield Recreation Commission 2020; ExploreYourSpaces 2020).

Flints Pond Access: Flints pond is a 50-acre, warm water pond located in the Town of Hollis in New Hampshire. The pond is open to the public for fishing, kayaking, and canoeing in the summer. In the winter, ice fishing, snowshoeing, and snowmobiling are also popular. A boat ramp is available at the north end of the pond (Flints Pond Improvement Association 2015). Flints Pond Access is approximately 0.2 miles west of the Project boundary.

Horse Hill Nature Preserve: Horse Hill Nature Preserve is a 560-acre property owned by the town of Merrimack, located about three miles west of the Project Boundary. It is primarily a mixed hardwood forest, with a series of streams, ponds, swamps, and numerous wetlands. Old logging roads form the basis of what is today a trail network used by hikers, bikers, cross country skiing, snowshoeing, hunters, snowmobilers, and horseback riders. This trail network covers most of the property, however, there are still large areas without defined access.

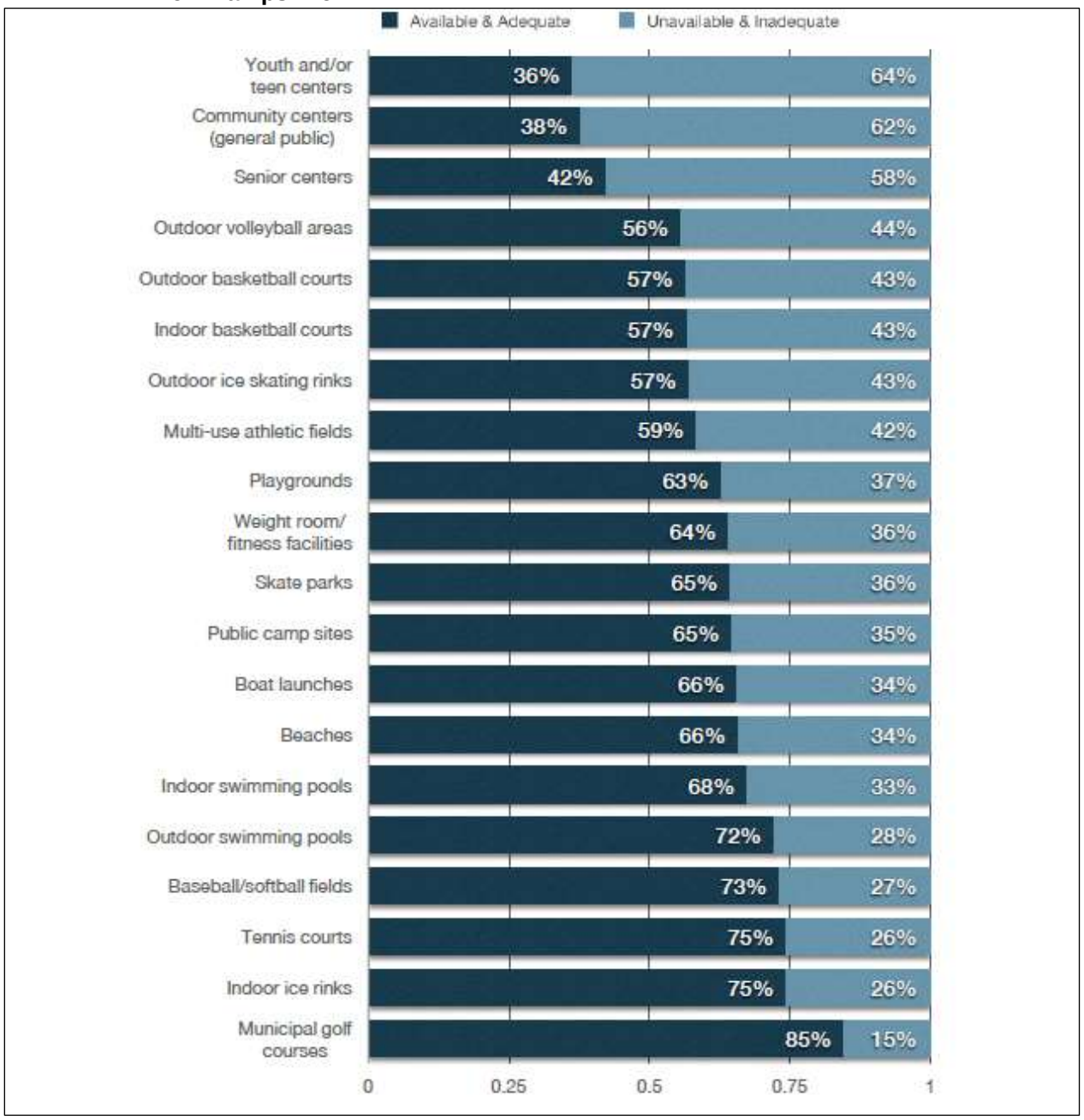
Leslie Bockes Memorial Forest: Forest Society owns and manages this approximately 226-acre forest located in Londonderry, New Hampshire (five miles east of the Project boundary). Nearly four miles of old logging roads provide hiking, skiing, and snowshoeing with numerous access points. The trails are on well-maintained woods roads that enable easy walking and generally good footing. The tract is a known spot for bird and nature-watching (Forest Society 2020).

Twin Bridge Park: Twin Bridge Park is in Merrimack, New Hampshire, and features a baseball field, playground, picnic area, and extensive hiking trails through 27 acres of woods along Baboosic Brook (Town of Merrimack undated). Twin Bridge Park is approximately 0.2 miles west of the Project boundary.

New Hampshire Heritage Trail: The completed trail system will connect trail segments along the Lower Merrimack River and ultimately extend south into Massachusetts, and north along the Merrimack, Pemigewasset, and Connecticut Rivers to the Canadian border. Several trail sections have been completed along this part of the river and northward, with existing segments in Nashua, Hooksett and Manchester, New Hampshire (NHDES 2019).

The most recent New Hampshire SCORP was developed in 2018 for the 2019-2023 program years (NHDNCR 2018). The primary goals of the New Hampshire SCORP are to identify outdoor recreation trends, needs, and issues for New Hampshire, as well as to provide a strategic plan to address changing recreation needs, conservation of natural resources, and the economic vitality of communities. Municipal officials in New Hampshire reported the availability and adequacy of developed recreation facilities and amenities to meet needs within their communities. Figure 5-1 below shows the facilities in order of greatest need in New Hampshire. Municipal officials reported youth and/or teen centers as least available and adequate to meet growing needs, while reporting indoor ice rinks and municipal golf courses as most available and adequate to meet needs. The most relevant to the Project of these rated recreation facilities and amenities in New Hampshire are state/municipal parks, beaches, boat launches, and public camping sites, all of which were identified as being at least moderately available and adequate to meet recreation needs (>50%).

Figure 5-1. Availability and Adequacy of Developed Recreation Facilities/Amenities in New Hampshire



Source: NHDNCR 2018

The Massachusetts SCORP (MEOEEA 2017) is a planning document that discusses the available recreational resources in a state, as well as its changing recreation needs. In drafting of the SCORP, the Massachusetts Executive Office of Energy and Environmental Affairs hosted a series of public meetings across the state in the fall of 2017. Online surveys were also utilized to gather input from both residents and recreation providers. Around 780 citizens responded to the resident survey and 58

municipalities and 38 land trusts responded to the recreation provider survey. The Massachusetts SCORP categorized the most common recreational activities as either water-based recreation (e.g. boating, fishing, swimming at beach/lake/river) or trail-based recreation (e.g., hiking, biking, cross-country). The nearness of an outdoor recreation facility to home was the top reason that it was visited most frequently. Accordingly, when asked to identify the most-needed improvements, recreationists identified trail and water-based recreation enhancements. Massachusetts municipalities reported the highest funding priorities for the next five years are playgrounds, ballfields (soccer, lacrosse, baseball, etc.), community or regional trail systems, and improved pedestrian access to parks (sidewalks, safe road crossings, etc.).

The downstream portion of the Project impoundment is accessible for water-based recreation by the following recreational facilities in Massachusetts:

Lowell Heritage State Park: The 83-acre Lowell Heritage State Park occupies a 2-mile long stretch along the north bank of the Project impoundment, upstream of the Pawtucket Dam. The park features historical exhibits that were created in partnership with the NPS to educate the public regarding the network of canals and mills constructed in the 19th century to power Lowell's then bustling textile industry. Activities available include biking, boating (non-motorized and motorized), canoeing and kayaking, swimming, fishing, hiking, and educational programs. Facilities include a paved bike path and walking esplanade, picnic area, a beach, restrooms, scenic viewing area, an outdoor concert stage, and visitors center (Commonwealth of Massachusetts 2018a). Also located within the park boundary is the University of Massachusetts Lowell Bellegarde Boathouse, which also houses the Merrimack River Rowing Association, a non-profit rowing club.

Rourke Brothers Boat Ramp (part of the Lowell Heritage State Park): The park provides a trailered boat launch, located on the north bank of the impoundment about 2 miles upstream of the Pawtucket Dam. Adjacent to the boat launch is an access dock for boating and fishing.

Chelmsford Boat Access: The park provides a trailered boat launch, shoreline fishing access, picnic areas, athletic fields, and trails.

The Resource Management Plan (RMP) for the MADCR Lowell/Great Brook Planning Unit (MADCR 2014) reports the following recreational facilities within the planning unit, located within a 30-minute drive from the Project boundary:

Lowell-Dracut Tyngsborough State Forest: The Lowell-Dracut Tyngsborough State Forest is approximately one mile north of the Project boundary. The Lowell-Dracut Tyngsborough State Forest spreads across three towns and features over 1,140 acres of protected land, including 180 acres of open water or wetlands and 457 acres of land in the city of Lowell. Popular activities include hiking, fishing, hunting, cycling, birding, picnicking, nature walking, mountain biking, and playing various field sports. In the

winter, people sled, ice skate, and cross-country ski (Commonwealth of Massachusetts 2018b).

Great Brook Farm State Park: Located seven miles south of the Project, this park is a working dairy farm connected to miles of trails that can be used for a variety of recreational activities. The park also includes historic buildings and resources, interpretive programming, and a cross-country ski concession.

Warren H. Manning State Forest: Located five miles south of the Project, this state forest is a largely wooded property with a small recreation area, complete with a spray deck, picnic area, water playground, and fitness trail.

Billerica State Forest: Located six miles south of the Project, this state forest offers rustic, multi-use trails and wooded areas for walking and wildlife viewing.

Carlisle State Forest: Located ten miles south of the Project, this state forest provides over a mile of trails through wooded property protected from forestry activities at the turn of the 20th century. The forest includes an older stand of exceptionally large eastern white pines.

Governor Thomas Dudley State Park: Located ten miles south of the Project, this 11-acre park is a small wooded parcel that provides access to the Concord River and links to other protected open spaces.

At the state level, the focus of outdoor recreation tends to be on recreation lands and facilities outside of urban areas. This is evidenced in the Massachusetts SCORP and MADCR's RMP for the area, which primarily discuss and address recreation in open undeveloped areas like state lands and forests.

Sustainable Lowell 2025 and the 2018 Lowell Open Space and Recreation Plan (OSRP) prepared by City of Lowell, estimates there are 463 acres of open space/recreational land owned or maintained by the city. The City of Lowell reports a variety of recreational amenities including sports facilities (basketball, tennis, softball, swimming, and skateboarding), passive parks for walking, jogging, dog-walking, and picnicking, community gardens, playgrounds, multiuse trails, and greenspaces. City-funded cemeteries provide an additional 222 acres of open space to Lowell residents and visitors (City of Lowell 2018). The City of Lowell has also collaborated with the LNHP to secure funding for and manage the development and redevelopment of 6,662 linear feet of canal walkways throughout Lowell, with work on an additional 11,360 linear feet underway (City of Lowell 2018).

The Concord River Greenway is still in development, but to date has 2,700 linear feet of trail and 1.3 acres of open space cutting through the City of Lowell. Public art and interpretive signs line the multi-modal path. Once complete, the Concord River Greenway will link to a network of trails in the area, including the Bay Circuit Trail, a 200-mile trail from coastal Boston to Kingston, as well as the Bruce Freeman Rail Trail from

Lowell to Framingham. It will also connect Rogers Fort Hill Park and Shedd Park with Lowell Cemetery and the city's cemeteries (City of Lowell 2018).

The attractions in Lowell that are open to the public as part of the LNHP are largely managed by NPS. The LNHP was established in 1978 and is operated by the NPS. It is a primary recreation attraction for the city of Lowell. According to the NPS Visitor Use Statistics website, the LNHP received around 481,536 visitors for the 2019 calendar year (NPS 2020). Opportunities available include museum exhibits, walking tours of the waterways, historic trolly rides, guided tours, music concerts, and boat tours on the Project canals.

The museum exhibits and activities are hands-on, interpretive, and educational opportunities. Key park experiences include the following:

Boott Cotton Mill Museum: Located in the Boott Cotton Mills Museum are interactive exhibits, a weave room, and video programs about the Industrial Revolution, labor, and the rise, fall, and rebirth of Lowell. This complex contains an adapted mill yard and is the most intact surviving example of the first phase of Lowell's mill construction. All four of the original 1835 mills in the Boott mill yard remain as part of an interconnected series of mill buildings.

Mill Girls and Immigrants Exhibit: The Mill Girls and Immigrants Exhibit is a self-guided tour through renovated boardinghouses displaying the kitchen, dining room, and bedrooms furnished in the style of the 1850s. Traditional museum exhibits are located on the second floor, including old photographs, newspaper articles, excerpts from letters, and highlights the lives of specific mill girls and immigrant workers.

Suffolk Mill Turbine Exhibit: This exhibit shows how water from the Western Canal flowed through an opening in the wall of a mill and fell on a large waterwheel in the basement to create kinetic energy. A guided tour also shows one restored turbine using a 13-foot drop of water to rotate shafts, gears, belts, and pulleys to a power loom.

Lowell National Historic Park Canal Walkways Tours: Self or professionally guided recreationists can follow walkways along the network of canals originating at the Pawtucket Dam and ending at the confluence of the Concord and Merrimack Rivers (NPS undated). Most of the walkways that follow the canals are also integrated into the common thoroughfares of the City of Lowell.

The Northern Canal Walkway: The Northern Canal Walkway provides interactive recreation with the historic structures of the Lowell Project, as well as a greenway along a scenic reach of the Merrimack River (NPS undated).

Boat tours led by NPS-guides also provide access to the Project impoundment. The canal boat tours highlight some of the Lowell Project facilities by travelling through the historic navigation locks (NPS undated). Additional recreational opportunities provided by NPS at the LNHP include trolley rides available for touring the city.

5.1.2 Vegetation and Waterborne Trash Management

Pursuant to the approved study plan, Boott reviewed several sources to summarize historical and current practices for vegetation and waterborne trash management in the Project Area.

Following establishment of the LNHP in 1978, MADCR[6], NPS, and Proprietors of the Locks and Canals (Proprietors), entered into an agreement in 1979 regarding management of the Lowell canal system. This agreement establishes MADCR as the lead party responsible for the maintenance of canal structural components, including canal banks and walls. As the lead party, MADCR was responsible for "landscaping and damage repair" to canal banks and walls, with assistance provided by NPS if needed. NPS was charged with the operation of the canal-related exhibits and services, and Proprietors were responsible for the operation and maintenance of the hydroelectric and hydromechanical parts of the Lowell canal system (NPS 1981). NPS developed and issued a Final General Management Plan (FGMP) in August 1981 to provide a basis for visitor use, resource management, and general development within the LNHP. The FGMP states management of the Lowell canal system will be accomplished through cooperative agreements between private and public entities, but MADCR is the lead agency responsible for maintaining, developing, and renovating the major elements of the canal system (NPS 1981).

In 1991, MADCR, the NPS, and Boott executed a Memorandum of Understanding (MOU) for the purpose of maintaining and operating the Lowell Canal System.[7] The MOU assigned specific responsibilities to each party and was filed with the Commission[8] on April 25, 1991 (MOU 1991). Article IV of the MOU directed NPS to assist MADCR in the removal and control of vegetation along the canal system, ("particularly that growing on and in the canal walls") and to assist MADCR in performing ground maintenance. Article IV also directed NPS to assist MADCR in the removal of litter and other waterborne trash from the Lowell Canal System, and states NPS is solely responsible for maintaining and cleaning, ("including removal of trash") all existing trash booms and safety lines/booms on the Lowell Canal System (MOU 1991).

Responsibilities assigned to MADCR under Article V of the MOU include serving as the lead agency for all grounds maintenance, keeping all grass, trees, and shrubs neatly trimmed and in a healthy condition, removing dead or diseased plants, fertilizing, pruning, and thinning of plants (as required), and approving ground maintenance or improvement plans as proposed by NPS. Article V also directs MADCR to assist NPS in

[6] The signatory of the 1979 agreement was the Massachusetts Department of Environmental Management (MADEM), the predecessor agency to MADCR.

[7] Proprietors of the Locks and Canals on the Merrimack River was included as a party in the MOU but did not execute the agreement.

[8] The 1991 Memorandum of Understanding is available on FERC's eLibrary (https://elibrary.ferc.gov/eLibrary/search) under docket number p-2790.

the removal and control of destructive vegetation along the canal system, and to cooperate with the NPS on developing a litter removal program for waterborne litter and trash on the canals. (MOU 1991). This article also directed MADCR to reimburse NPS for time and materials for work done on the canal system.

Article VI of the MOU directed NPS and MADCR to hold a joint annual meeting to develop an annual destructive vegetation clearing program and canal surface water cleanup program. The annual programs were to be developed in accordance with each agency's budget and seasonal staffing level. Under Article VI, MADCR was also directed to consult with NPS to develop a long-term capital improvement program for the canal system. The minutes of this annual meeting between MADCR and NPS were to be provided to Boott and the Proprietors each year (MOU 1991).

Article IX stated that the MOU would expire five years from the date of signing, with an option for renewal. Efforts to renew the MOU stalled in 1996, as MADCR issued a Grant of Easement[9] to the NPS in late 1995. This Grant of Easement provided NPS rights to implement construction and maintenance improvements at forty-two MADCR-owned parcels around the canal system. Such rights include landscaping, decking, and lighting. The Grant of Easement did not exclusively limit NPS's rights, only stating that construction and maintenance improvements must be consistent with the use of the area as a park. The Grant of Easement did not relinquish MADCR's waterborne trash and vegetation management responsibilities provided by the FGMP or MOU, as described above.

In the RMP for the Lowell/Great Brook Planning Unit, MADCR elaborates the agency was directed by the Commonwealth in 1993 to "concentrate on maximizing the riverfront component and minimizing, but not eliminating, [its] position in the downtown." Under a lower annual budget, MADCR states it has since focused its resources on the riverfront portion of the Lowell Heritage State Park system and less on the downtown canal system (MADCR 2014).

Through the current license term, FERC and Boott have corresponded on vegetation growth and waterborne trash accumulation at facilities within the Project boundary. The FERC Regional Office has regularly inspected the Project pursuant to its dam safety authority under Part 12 of the Commission's regulations. The most recent inspection of the Lowell Project performed on May 14, 2019 found that the facilities were in satisfactory condition, and there were no safety issues observed which required immediate attention. Following the inspection, FERC directed Boott to remove the vegetation and small tree growth observed at the crest of the Great River Wall and on the Hall Street Dam (FERC 2020; FERC 2019). A review of previous inspection reports indicate FERC found the Project facilities to be in overall good condition, and if necessary, directed Boott to remove vegetation growth or waterborne trash observed at Project structures. Boott typically identifies canal structures in need of vegetation removal and control in its Dam Safety Surveillance and Monitoring Reports annually

[9] The 1995 Grant of Easement is also generally referred to as LNHP Deed No. 40.

submitted to the FERC's New York Regional Office, and documents progress made during the preceding year.

Boott annually removes accumulated river-borne debris from the upstream side of the Northern Canal Gatehouse under an MADCR permit. This effort is performed as necessary, typically two to three times annually. Boott also removes debris that accumulates from the upstream side of the Guard Locks and Gatehouse in the Pawtucket Canal on an as necessary basis, both for aesthetics and to ensure that debris does not interfere with the proper functioning of the Guard Gates. Recently, Boott has agreed with the City of Lowell to conduct canal debris removal at recognized accumulation points, many of which are noted in this study.

According to documents and reports filed with the Commission, additional efforts to remove vegetation and waterborne trash from the Lowell canal system of have largely been independent or coordinated efforts between NPS, the City of Lowell, and Boott. In accordance with the MOU, NPS implemented frequent maintenance measures to limit trash accumulation and vegetation growth. On June 18, 2003, NPS filed their 2003 Lock Chamber Operations Manual with FERC. The manual states NPS employees should remove upstream trash in the vicinity of the lock chambers daily, and the lock chambers were to be flushed daily and cleaned of debris (NPS 2003). Operators were instructed to remove trash from in front of the following lock structures: Northern Lock at Pawtucket Gatehouse, Hydro Lock, Swamp Locks, and Francis Gate Lock (NPS 2003).

On October 26-27, 2006, Boott, the NPS, and the City of Lowell collaborated in a major effort to clean-up the canals and walkways The canals were drained for three days before workers from Boott, the City of Lowell, and LNHP could use heavy equipment to remove debris from within the canals. Volunteers also trimmed vegetation and picked up trash along the canal walkways (FERC 2007; Lowell Sun 2006).

After the Study Workshop, NPS provided a copy of their Exotic Species Treatment Calendar (dated September 11, 2018) prepared for the 2019 calendar year. The document presents the reported locations of target exotic vegetation species, methods for management, and an implementation calendar. The target exotic species were primarily reported at upland LNHP-structures outside of the Project boundary (Blacksmith Shop, Kerouac Park, Visitor Center Courtyard, Tremont Street Tracks, Kirk Street Headquarters, and Western Canal Walkway). At Project structures, NPS reported incidents of common invasive species including Garlic mustard (*Alliaria petiolata),* Asiatic bittersweet (*Celastrus orbiculatus*), Tree of Heaven (*Ailanthus altissima),* and Japanese knotweed (*Fallopia japonica*). Treatment methods employed by NPS include mechanical methods of hand-pulling, digging, cutting, seed-heading, mowing, and stump grinding, and chemical methods of foliar spray, herbicidal application to a cut stem/stump, basal bark, stem injection, and hand wicking (LNHP 2018).

There are also community efforts to manage the waterborne trash and vegetation growth. Local nonprofit groups including youth groups, Lowell Canalwaters Cleaners,

Coalition for a Better Acre, and Do-It-Yourself Lowell regularly host cleanup efforts during the warmer seasons.

Boott conducted visual surveys for vegetation growth and waterborne trash locations, and the results are provided below in Sections 5.5 and 5.6.

5.2 Field Inventory

As previously described, Boott conducted a field inventory to document existing non-Project recreation facilities within the Project's vicinity in the fall of 2019. Recreation sites inventoried included the Chelmsford Boat Access, Depot Street Boat Ramp, Greeley Boat Ramp, Lowell Heritage State Park, LNHP, Merrill Park, Merrimack Trail System, Moore's Falls Conservation Area, NPS Canal Walkway, Pawtucket Falls Overlook, and Rourke Brothers Boat Ramp. The Visitor Center (the only-FERC approved recreation facility), was closed on the days of inventory, but the external features (e.g. parking lot) were also inventoried.

Field inventory documentation, including a map of non-Project recreation facilities, representative photographs, and a description of amenities available at each facility is presented as Appendix B to this study report. The field inventory indicates there are considerable opportunities for recreation in the Project area. Most sites inventoried were reported in good condition, with parking lots, ample signage, and educational exhibits.

5.3 Visitor Use Data and Field Reconnaissance

In total, Boott conducted 53 personal interviews/visitor-intercept surveys between May 2019 and October 2019. In accordance with the approved study plan, Boott also collected field reconnaissance data during the personal interviews including estimating the number of vehicles, recreationists, and observed recreational activities. Results from the personal interviews are compiled in Appendix C and field reconnaissance data is summarized in Appendix D to this study report.

The online visitor use survey was made available to the public from June 2019 until June 2020. A total of 96 respondents completed the online survey. Results from the online surveys are compiled in Appendix E to this study report, and respondent zip codes with a representative map are compiled in Appendix F (for both the personal interviews and online surveys).

Of the personal interviews and online recreation surveys completed, the respondents thus far are typically regular visitors who visit three or more times per year (72 percent of personal interviewees and 76 percent of online respondents) and the remaining respondents identified themselves as first-time visitors or infrequent visitors. Personal interviewees travelled an average of 7.3 miles to the recreation area, with a range of 0.1 miles to 3,000 miles. Online respondents stated they travelled on average around 11 miles to the Project area. Most respondents stated they do not stay overnight in the

Project area in accommodations other than their primary residence (96 percent of personal interviewees and 90 percent of online respondents).

The most common recreational activities survey respondents participated in were trail-related activities (walking, dog-walking, hiking, running, or jogging), bank and/or boat fishing, and kayaking. Walking was the most common primary recreation activity. The majority (77 percent) of personal interview respondents rated their overall experience of recreational activities at the Project as “totally acceptable” or “acceptable.” The majority (92 percent) of personal interview respondents rated their overall experience of recreational activities at the Project as “totally acceptable” or “acceptable.”

According to respondents, the most frequently visited recreational facilities in the Project area were the Lowell Heritage State Park, the Rourke Brothers Boat Ramp, Chelmsford Boat Access, Merrimack Trail System, and LNHP-facilities. Participants were asked several questions regarding their general opinions of recreation in the vicinity of the Project, potential issues with the recreation facilities (i.e., crowding, safety), and recommendations for improvements to existing facilities. In general, the participants did not experience much crowding at the recreational facilities, parking issues, or lack of accessibility to the specific recreational facilities. Respondents both in-person and online tended to rate their overall experience at specific recreation facilities as “totally acceptable.” The most common recommendations for recreational enhancements were: (1) bathrooms/porta potty (2) improving/maintaining the existing structures such as the boat ramps, and (3) the addition of trash cans/trash control measures.

Field reconnaissance data obtained during personal interviews indicates the recreation facilities are well-utilized for many different activities. Walking (and dog-walking) and jogging/running were by far the most common activities observed by technicians. Additional common activities included bicycling, boating, picnicking, and fishing. The Merrimack Trail System and the Lowell Heritage State Park were highly utilized for many different recreational opportunities; these are connecting facilities, so it was common for recreationists to visit both. The Rourke Brothers Boat Ramp and the Chelmsford Boat Access were predictably mostly used for boating, but also commonly utilized for walking, dog-walking, fishing, and picnicking. The Chelmsford Boat Access adjoins a series of softball fields, and technicians reported softball tournaments with hundreds of attendees during the summer weekends. At all facilities, technicians generally reported less activity during the early daylight hours, and during rainy, cool times of the day.

5.4 Evaluation of Expanded Recreational Access in Project Canals

NPS and other stakeholders have expressed interest in new, different, and expanded recreational access to and within the Project canals. In accordance with the SPD, Boott consulted with the NPS, the City of Lowell, and other interested stakeholders to discuss various recreational opportunities associated with the Project canals. During the Study Workshop, stakeholders clarified they were looking for specific practical opportunities for

community on-water recreation. Boott and stakeholders' primary concerns were the recreational rights to the canal system and understanding public safety issues associated with providing recreational access in the Project's canal system.

In their FLA filed on April 30, 2021, Boott proposed to remove the four mill power stations (John Street Power Station, Bridge Street Power Station, Assets Power Station, and Hamilton Power Station) and associated canal infrastructure from the new FERC license. In the Commission's March 1, 2022 Determination on Requests, staff requested an analysis of the effects of Project operation on NPS boat tours and recreational rights, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary. Boott provides that evaluation below in Section 5.4.1.

FERC also requested an evaluation of the potential for expanding public access to the canals for recreation (including NPS boat tours) in light of the results of the Operation Analysis of the Lowell Canal Study and in consideration of Project operation under normal and high flow conditions. Boott provides that evaluation below in Section 5.4.3 as it pertains to the downtown canal system (i.e. excluding the Northern Canal, which is addressed separately in Section 5.5.1.1).

5.4.1 Rights to Recreational Access to Project Canals

Boott reviewed many sources to understand the recreational rights to the Lowell canal system, including the MOU, the 1984 Great Deed between Proprietors and Boott (Proprietors 1984), the 1986 Order of Taking (Commonwealth of Massachusetts 1986), and the 1995 Grant of Easement from the Commonwealth of Massachusetts to the LNHP (Commonwealth 1995). These documents form the basis of the Resources, Ownership, Boundaries, and Land Rights Study filed with the Commission on November 1, 2021. The 1984 Great Deed details the sale of portions of the Project from the Proprietors to the current owner (Boott), and provides the metes, bounds, and elevations of all the structures conveyed, as well as associated easements, access and repair rights (Proprietors 1984). The 1986 Order of Taking details the take of properties, rights, and responsibilities from Boott to the Commonwealth, operating through MADCR (Commonwealth 1986). The 1995 Grant of Easement describes the properties and parcels that were leased from the Commonwealth to the NPS and the rights and responsibilities of both parties with respect to those properties and parcels (Commonwealth 1995).

The review of these documents indicates that the 1984 Great Deed conveyed all canals throughout the canal system to Boott, except for the Pawtucket Canal and the Lower Pawtucket Canal. Proprietors instead retained ownership of the Pawtucket Canal and Lower Pawtucket Canal, and granted Boott an easement for the right to operate the structures of these canals, to "install conduits, pipes, and wiring" and the right to maintain, repair, or replace the existing structures (Proprietors 1984).

By letter dated May 14, 1980, MADCR stated that they were currently in the process of negotiating purchase rights to the Lowell canal system which would allow for recreational boating in the canals, stating further that use of the canals and implementation of the boating program were key elements of the Lowell Heritage State Park (Massachusetts Department of Emergency Management [MADEM] 1980). Through the 1986 Order of Taking, MADCR purchased all air rights over the canals, including over the canal walls and dams, and the exclusive right to use water in the entire canal system for recreational, educational, and navigational purposes, unless said purposes interfere with Boott's hydroelectric generation (Commonwealth 1986). Included in the 1986 Order of Taking is a permanent and exclusive easement to MADCR for all canal walls, beds, or bottoms throughout the canal system for purposes consistent with the use of the canal system as a recreational park. These purposes specifically include placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature (Commonwealth 1986). The 1995 Grant of Easement from MADCR to LNHP did not convey these exclusive recreation rights to LNHP (Commonwealth 1995).

Based on the review of the MOU, the 1984 Great Deed between Proprietors and Boott, the 1986 Order of Taking, and the 1995 Grant of Easement from the Commonwealth of Massachusetts to the LNHP, Boott currently does not have any right to expand recreational opportunities throughout the Lowell canal system. MADCR purchased all recreational rights over all the canals and canal walls (even canals owned by Boott), including exclusive navigational rights such as boating or canoeing. MADCR maintains an exclusive and permanent easement throughout the entire canal system to install access points such as boat ramps, wharves, and docks. Boott and other stakeholders are not permitted to use the canals as recreational resources, as those rights are exclusively held by MADCR. Boott describes recreational rights and responsibilities in more detail in the Resources, Ownership, Boundaries, and Land Rights Study Report filed with FERC on November 1, 2021.

In the RMP for the Lowell/Great Brook Planning Unit, MADCR does reference its recreational rights over the Lowell canal system, but further elaborates the agency was directed in 1993 to minimize its position in the downtown area (MADCR 2014). On August 14, 2018, MADCR filed comments with FERC on the PAD and Scoping Document 1 for the Project. The comments discuss the various MADCR-owned properties, but do not reference their recreational rights to the Lowell canal system (MADCR 2018).

In their FLA filed on April 30, 2021, Boott proposed to remove the four mill power stations and associated canal infrastructure from the new FERC license. Boott also proposed to continue to manage the canal structures and water levels and flows, consistent with current agreements with the NPS and other stakeholders. Additionally, as reported in their November 15, 2021 Response to Additional Information Request filed with the Commission, Boott is proposing to maintain specific water levels throughout the downtown canal system as determined in consultation with NPS and other stakeholders.

As reported in detail in the Resources, Ownership, Boundaries, and Land Rights Study Report filed with the Commission on November 1, 2021, the 1995 Grant of Easement from MADCR to LNHP provides for specific recreational rights to structures of the downtown canal system including: Swamp Locks Gatehouse, Swamp Locks Dam (North), Swamp Locks Dam (South), Lower Locks Gatehouse, Lower Locks Lock Chamber, Lower Locks Dam, the Tremont Gatehouse, the Massachusetts Wasteway Gatehouse, the Rolling Dam Gatehouse (North), Rolling Dam Gatehouse (South), and the Hamilton Gatehouse. Although the rights to each structure vary, almost universally NPS was granted the rights at each structure to conduct land and canal tours, run interpretive programs, and the right to maintain, improve, and restore said structures. Additionally, through the 1995 Grant of Easement, MADCR conveyed to NPS easement rights at various structures and parcels adjacent to all the canals. These recreation and access rights at these structures and parcels exist independently of the owner of the structure, although it is worth noting that Boott is not known to have legal ownership of any structures of or within the Pawtucket Canal (where NPS boat tours currently operate). NPS does not currently run boat tours on the Western Canal, Eastern Canal, or Hamilton Canal, and Boott is not aware of any current interest to run boat tours on those canals. The primary structures of interest as it relates to current NPS boat tours in the downtown canal system (proposed to be removed from the Project boundary) are located on the Pawtucket Canal. NPS holds the rights to recreational access to these structures, as provided by the 1995 Grant of Easement, and these structures are jointly owned by MADCR and Proprietors.

Boott's proposal to remove the downtown canal system from the Project boundary will not affect NPS' recreational rights to conduct their boat tours. By way of the 1995 Grant of Easement with MADCR, NPS holds recreational rights to structures of the canals to operate their boat tours, run interpretive programs, and the right to maintain, improve, and restore said structures. This agreement exists independently of the Project license and the Commission's oversight. Boott does not hold recreational rights to the downtown canal system, and does not own structures of the Pawtucket Canal where NPS boat tours currently operate. As discussed in the in the November 1, 2021 Resources, Ownership, Boundaries, and Land Rights Study Report filed with the Commission, Boott does hold rights to flow water through the Pawtucket Canal. Boott is proposing to continue to manage the canal structures, water levels and flows using best practices, consistent with current agreements with the NPS and other stakeholders.

5.4.2 Public Safety of Recreational Access to Project Canals

Boott reviewed relevant safety and security requirements, guidance documents, and study reports, including the Project's approved Public Safety Plan (Boott 2020), FERC's Guidelines for Public Safety at Hydropower Projects (FERC 2011), Recreation Development at Licensed Hydropower Projects (FERC 1996a), and the Security Program for Hydropower Projects (FERC 2016). Boott also reviewed pertinent guidance, design, and planning documents relating to recreational access throughout the canal system.

In accordance with the Commission's approved Public Safety Plan for the Project, Boott maintains fences and gates, lights, sirens, and warning signs to protect the public from the hazards of Project operations (Boott 2020). Boott has historically worked with FERC to strengthen the Public Safety Plan and allow access only where appropriate and safe. As described above, Boott does not have recreational or navigational rights to the canal system. Further, because of the steep canal walls, dams, historic locks and gate structures, and intake/outlet structures associated with the Project, Boott maintains that such access presents an unacceptable risk to public safety and Project security. In the 1990s, incidents of accidental drownings/body recoveries throughout the canal system triggered Boott and FERC to update the Public Safety Plan, install additional warning signs, and fencing to enhance public safety (Boott 1991; FERC 1996b; Boott 1998; Boott 2000).

While Boott does not have recreational or navigational rights to the canal system, Boott believes that providing access would present a number of significant safety concerns. As an example, FERC's Guidelines for Public Safety at Hydropower Projects states that canals create hazardous conditions due to the steep sides and hard surfaces. The safety guidelines indicate water, algae, and mud make conditions too slick and dangerous for recreationists to escape or be rescued. The multiple dams located throughout the canal system (Swamp Locks Dam, Lower Locks and Dam, Lawrence Dam, Hall Street Dam, Merrimack Dam, Rolling Dam, and Boott Dam) as well as the many gates and lock structures, are all also considered potentially hazardous (Figure 3-2). Such structures can create unexpected dangers as surface waters appear calm, but undercurrents are unpredictable. Powerhouse intake areas throughout the canal system also pose hazards to recreationists as currents can change unexpectedly. Boaters will often want to go over lower dams or explore restricted areas, but this must be discouraged by warning signs and barrier systems. As stated in FERC's guidelines, allowing recreationists access to or near to Project facilities poses significant safety and security risks.

In accordance with the SPD, Boott researched infrastructure enhancement that may be required to provide safe public access to the canal system and how such improvements may affect aesthetic and historic resources. FERC recommends that access points, such as canoe/kayak or boat ramps, should be at least 300 feet away from any structure that may pose a hazard (such as dams, intakes, and gate structures). A system of warning devices such as signs, boat restraining barriers, sirens, and buoys also may need installation at least 300 feet from any hazardous structure. At a minimum, escape devices such as life preservers and safety ropes are recommended to be installed near dams, canals, and any other hazardous structures, although FERC acknowledges theft and vandalism can be an issue with such installations. Permanent escape ladders may be considered (especially for canals) and should be installed every 250 feet on either side, but these devices are "attractive nuisances" and can often exacerbate unsafe conditions. Boaters will need escape ladders or other similar emergency escape points as situations can turn dangerous, such as unexpected lightning storms. Any provision of public access to the canals would necessarily create additional responsibilities for city, state and NPS public safety and law enforcement authorities. Additionally, information on dangerous areas, restrictions on speed, direction, or access (especially in canals),

alcohol use restrictions, enforcement and penalties, and other information relevant to safe recreational practice should be provided to recreationists at access points (FERC 2011).

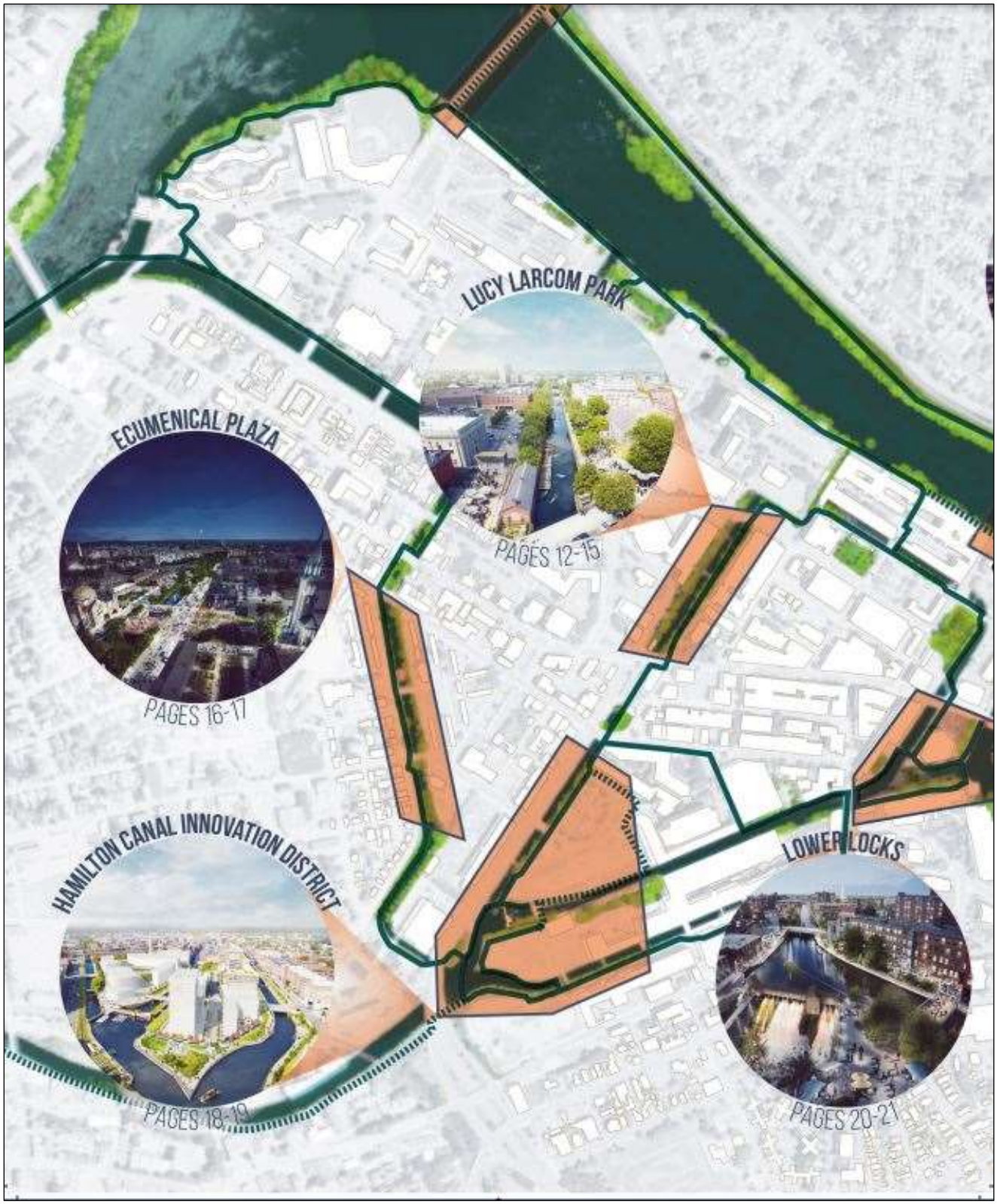
5.4.3 Expansion of Recreational Access to Project Canals

Given the information presented in Section 5.4.1 and 5.4.2, the opportunities for expansion of recreational opportunities in the Project canals are limited. MADCR exclusively owns all rights to allow recreation on or in the Project canals and holds easement rights to install recreational access points. As such, Boott does not have the rights to provide expanded recreational opportunities within the canal system. Surface water recreation in the canals was evaluated by the Lowell Historic Preservation Commission and the LNHP in public planning documents such as the 1977 Brown Book, the 1981 FGMP, and the 2017 Lowell Waterways Vitality Initiative Action Plan (Action Plan). The LNHP 1990 Preservation Plan Amendment stated:

> "The canals offer few boating opportunities beyond the Park's well-organized tour boat program. Because of swift water, lack of depth and width, low clearances, and other physical restrictions, water recreation is limited. If pleasure boating by individuals is to be considered, it should be kept to the Pawtucket Canal, and allowed mainly as a link to the Merrimack River. Paddle boating is possible if access, safety, and permitting are addressed. The Merrimack Canal at Lucy Larcom Park has been identified as the best place for still water activities such as this. In general, water taxis, dinner boats, and other organized boating program's will be encouraged, subject to permission from the Heritage State Park [MADCR] which controls recreational boating rights on the canals. The Pawtucket and Northern Canals offer possible routes, and could become a feature of the Canalway through private concessions."

The 2017 Action Plan was published as a collaborative report from the City of Lowell, the Lowell Heritage Partnership, and ex-officio members from the LNHP. The report presented consensus from the group on certain water-related areas that offer the best potential. The Action Plan identified the following canal areas: Lucy Larcom Park (Merrimack Canal); Ecumenical Plaza (Western Canal); Lower Locks, and the Hamilton Canal Innovation District (Hamilton, Pawtucket, and Merrimack Canals). The areas identified are shown in Figure 5-2.

Figure 5-2. Water-Based Areas Identified in the 2017 Action Plan



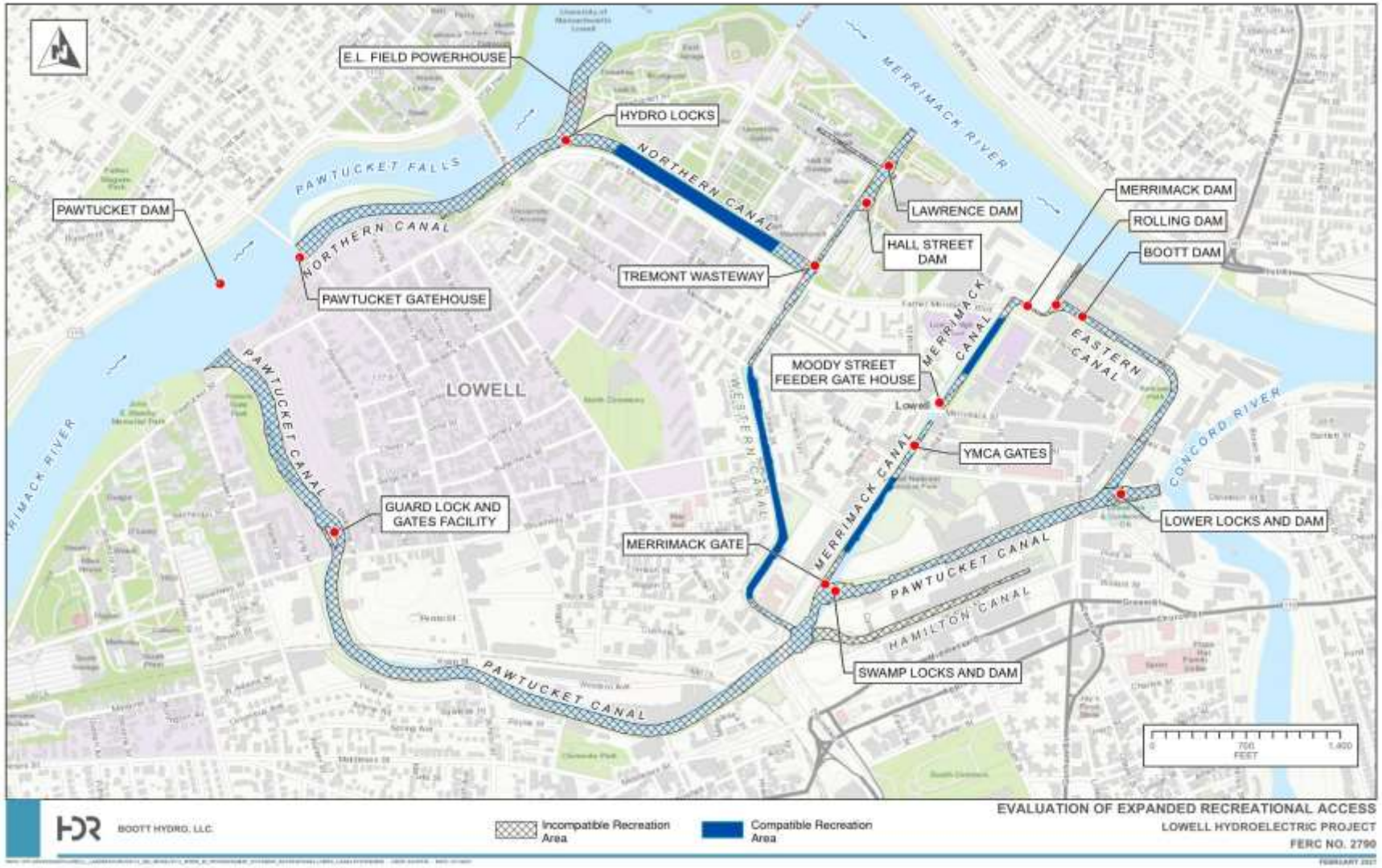
In their March 1, 2022 Determination on Requests, FERC recommended an evaluation of the potential for expanding access to the canals for recreation (including NPS boat tours) in light of the results of the Operation Analysis of the Lowell Canal Study and in consideration of Project operation under normal and high flow conditions. Boott provides that evaluation here as it pertains to the downtown canal system (i.e. excluding the Northern Canal, which is addressed separately in Section 5.5.1.1).

On February 25, 2021, Boott filed with the Commission their Operation Analysis of the Lowell Canal Study. This report determined that the four downtown power stations were only operated 34 percent of days during the total period of record studied (January 1, 1998 – December 31, 2007). This is primarily due to the fact that Boott operates the Project to maximize flow through the available units at the E.L. Field Powerhouse, then routes any additional flows through the Pawtucket Canal system. The E.L. Field turbine-generator units are more efficient and operate at a higher head than the older canal units and are, therefore, the priority first-on, last-off units in the Project operations scheme. When river flows exceed the hydraulic capacity of the E.L. Field units (approximately 3,300 cubic feet-per-second [cfs] per unit or 6,600 cfs for both units), excess flows up to approximately 2,000 cfs are routed through the Guard Locks Complex into the downtown canal system and to the canal units. Any flows in excess of approximately 8,600 cfs (6,600 cfs at E.L. Field plus 2,000 cfs via canals) are passed over the Pawtucket Dam spillway.

The study found that during normal flow conditions, including the peak recreation season (May through October), Boott historically only operated the downtown units approximately 25 percent of the time. During higher flow conditions above 6,600 cfs, Boott would typically divert up to 2,000 cfs past the Guard Locks Complex to the canal units. Overall during the period of record, the four downtown power stations were only operated 34 percent of the time.

With recreational rights, Project operations and public safety, and prior scoping by stakeholders in mind, Boott has identified specific segments of the canal system as potentially compatible with public access for recreation, and those areas are shown below in Figure 5-3. This evaluation does not include the already-established NPS tour boat program. The Merrimack Canal along Lucy Larcom Park is a recreation area potentially compatible with public access for recreation. Surface water recreation should be restricted to the area in between the Moody Street Feeder Gatehouse and the Merrimack Dam, at least 300 feet from either structure. This area is acceptable for stillwater activities like paddle boating, as identified in the 1990 Preservation Plan Amendment. The portion of the Merrimack Canal downstream from Merrimack Gate is potentially compatible for similar surface water recreation, and this area was identified in the 2017 Action Plan as a part of the Hamilton Canal Innovation District. The segment of Western Canal along the Ecumenical Plaza area has also been identified as potentially compatible with stillwater recreation. The segment of the Northern Canal between Hydro Locks and Tremont Gatehouse could also be compatible with stillwater recreation.

Figure 5-3. Potentially Compatible and Incompatible Recreation Areas



The remaining portions of canal system, including the remaining portion of the Hamilton Canal Innovation District (Pawtucket Canal, Hamilton Canal, and Swamp Locks) and the Lower Locks area, are not considered compatible due to public safety concerns, water levels and flows, and property rights. This is consistent with prior evaluations of on water recreation in the canals, with the 1977 Brown Book stating “the canals offer few boating opportunities beyond the Park's well-organized tour boat program. Because of swift water, lack of depth and width, low clearances, and other physical restrictions, water recreation is limited.” These areas identified by Boott may have swift currents and hazardous structures through the canals, including intakes, dams, locks, gate structures, and low-clearance bridges. Boott intends to retain current public safety signage throughout the canal system in accordance with the existing Public Safety Plan, such as the signage at Swamp Locks and Lower Locks stating, “Beware Water Rises Rapidly.” In addition to being unsafe, Hamilton Canal and the Lower Pawtucket Canal below Swamp Locks are both flanked with tall, renovated mill buildings on either side which severely limit emergency access and the ability to construct safety devices. Notably, Boott does not own the Pawtucket Canal, Swamp Locks, or Lower Locks; these structures remain under the ownership of Proprietors.

The Operation Analysis of the Lowell Canal Study indicates that Boott historically did not typically operate the downtown units during peak recreation season due to lack of high flows during the summer months. Therefore, it is Boott’s understanding that their proposal to remove the majority of the downtown canal system from the Project boundary does not change the limited recreation expansion options available in the downtown canal system, as presented above. As proposed in the FLA, Boott will continue to manage the canal structures, water levels and flows using best practices and consistent with current agreements with the NPS and other stakeholders. Boott does not have any right to expand recreational access in the Project canals regardless of the removal of the four downtown mill power stations from the Project boundary; MADCR holds those recreational rights, and public safety hazards will remain due to the fact that Boott will maintain current flows and water levels as agreed upon with NPS and other stakeholders.

As noted, FERC also requested an evaluation of the potential for expanding access to the canals for NPS boat tours in the downtown canal system light of the results of Operation Analysis of the Lowell Canal Study. The Operation Analysis of the Lowell Canal Study does not provide any new information to inform expansion of NPS boat tours in the downtown canal system. Recent conversations with NPS indicate their boat tours on the Pawtucket Canal are not notably affected by canal flows or Project operations as long as water levels are maintained within specified limits. As discussed below in Section 5.5.1, NPS historically operated boat tours on the Pawtucket Canal and the Northern Canal, and NPS currently operates boat tours on the Pawtucket Canal. Based on recent consultation with NPS, there is limited to no interest currently in expanding the boat tours to the Western and Eastern Canals due to low-lying bridges and other obstructions. To NPS’ knowledge, the Western Canal has never been successfully navigated, and to date Boott is not aware of any desire to navigate the

Western Canal as part of the NPS boat tour program. The Eastern Canal and the connecting Merrimack Canal in particular were never deemed suitable by the NPS for boat tours according to early public planning documents. Although Boott does not consider navigation of the Hamilton Canal safe due to reasons mentioned above, that decision is left to the discretion of NPS and MADCR, as they hold the recreational rights. Boott and/or Project operations do not currently prevent NPS from conducting boat tours on the Western Canal, Eastern Canal, or Merrimack Canal, and Boott's future management of the canal system will also not prevent such expansion of NPS boat tours. Based on recent consultation with NPS, NPS' main goal with the expansion of boat tours is to regain use of the Northern Canal as part of their regular boat tours (this is addressed separately below in Section 5.5.1.1).

Boott notes that the information presented above is developed at a conceptual/screening level only for purposes of this report. The feasibility of any potential safety, security, and recreation development activities is subject to additional design, permitting, and other federal, state, and local municipal requirements as may be appropriate. Further, this information is not intended to serve as a proposal by Boott for any recreation enhancements and should not be construed as such.

5.5 Evaluation of Water Levels and Flows on Recreational Access

In accordance with the SPD, Boott initiated data collection to better understand effects of the crest gate and water levels and flows on (1) NPS boat tours and (2) access to the Northern Canal Walkway.

In their letter dated March 1, 2022, the Commission requested a description of boat tour routes used by NPS (past or present) within the Northern and Pawtucket Canal system, including a description of locks or other navigational features that the tours pass through. Boott provides that information below in Section 5.5.1. FERC also requested an evaluation of the effects of Project operation on NPS boat tours in the Northern Canal. Boott provides that analysis below in Section 5.5.1.1.

FERC requested an evaluation of the effects of Project operation on current NPS boat tours, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary. Boott provides this evaluation as it relates to the Northern Canal in Section 5.5.1.1, and as it relates to the Pawtucket Canal in Section 5.5.1.2.

FERC also requested an evaluation of the potential for expanding NPS boat tours in light of the results of the Operation Analysis of the Lowell Canal Study and "in consideration of Project operation under normal and high flow conditions (including an assessment of surge gate and shut down options)." Given that use of the surge gate/shut down options only pertain to NPS boat tours on the Northern Canal, this is addressed below in Section 5.5.1.1.

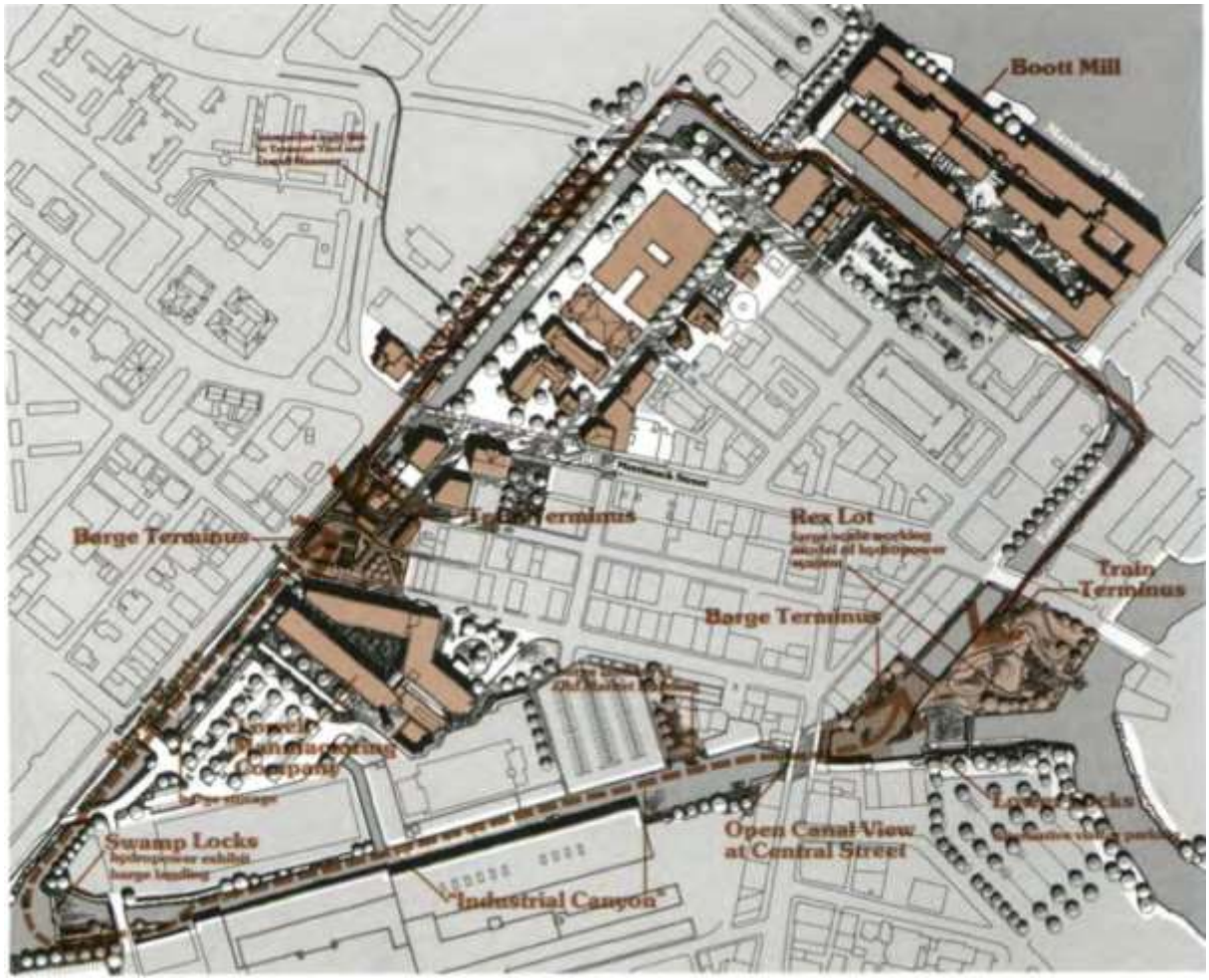
Lastly, FERC also recommended the Recreation and Aesthetics Study Report identify the number of days that the Northern Canal Walkway would need to be closed

seasonally due to flows resulting from Project operation, and this is provided in Section 5.5.2.

5.5.1 Historical and Current NPS Boat Tours

The 1977 Brown Book introduced the concept of combined train and boat tours throughout and around the canal system as a major attraction of the LNHP. The Downtown Canal Loop was designed as two segments: a boat tour to the south and a train to the north (Figure 5-4). Starting at the LNHP Visitor Center on the Merrimack Canal, the visitors could travel by boat through the Merrimack Canal to Swamp Locks on the Lower Pawtucket Canal, and descend down through the Swamp Locks Lock Chamber into the area known as the Industrial Canyon. The terminus to this boat tour was located on the Eastern Canal past the confluence with Lower Locks. Along this route, visitors would be allowed to disembark for a closer look at the Swamp Locks and Lower Lock Complexes, or walk among scale models of the mills and operate control devices on the canals. The visitor could then continue the Downtown Canal Loop by train around the Eastern Canal bends, Boott Mill, and the Merrimack Canal, ending back at the LNHP Visitor's Center.

Figure 5-4. 1977 Brown Book Downtown Canal Loop



As presented in the 1977 Brown Book, the Outlying Canal Loop was also designed to take off from the LNHP Visitor Center on the Merrimack Canal and proceed north up the Pawtucket Canal (Figure 5-5). The tour would utilize the Guard Locks Lock Chamber to complete the tour north through the Pawtucket Canal and enter the Merrimack River. The tour would continue through the Pawtucket Gatehouse utilizing the lock structure into the Northern Canal. Proceeding down the Northern Canal, the visitor would pass by the Northern Canal Wastegate House and the Northern Canal Walkway. The designed route continues along the Northern Canal and Western Canal (where there are no lock structures), before returning to the LNHP Visitor Center.

Figure 5-5. 1977 Brown Book Outlying Canal Loop

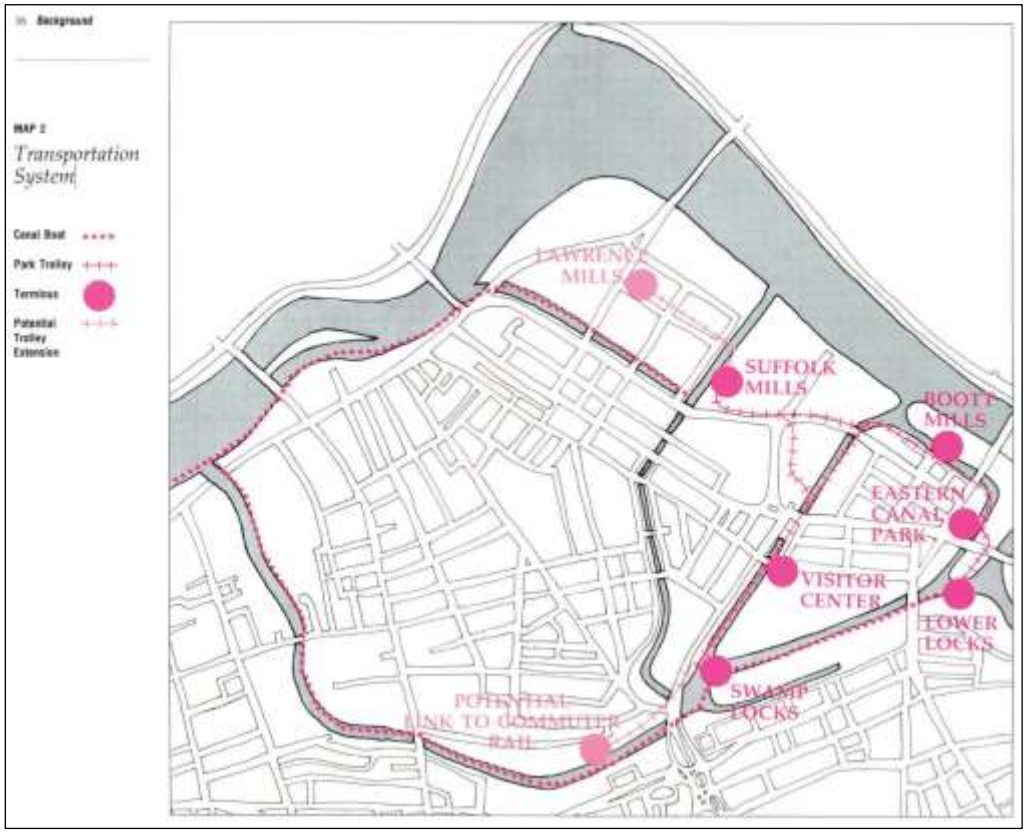
During the licensing of the Project, the Licensee reported that the lock at the Pawtucket Gatehouse had not been used since 1871 and was blocked by a concrete wall built in 1939. Additionally, the Licensee was in consultation with historic preservation and recreation officials regarding the Project's balance with NPS boat tours and other recreational boating. At the time, the plans for boat tours and recreational boating on the canals were hindered by low bridges on the Western Canal and the inland section of the Northern Canal. Long-range planning for boat traffic through the entire length of the Pawtucket Canal, from the Merrimack River to the Concord River, was also hindered by a bridge problem. However, the installation of Hydro Locks during the construction of the Lowell Hydroelectric Project meant the flows of the Northern Canal could be hydraulicly separated from remainder of the canal system, allowing for the maintenance of lower water levels in the downtown canal system during the boating season, thus allowing for clearance under low-lying bridges (Boott 1980).

As noted above in Section 5.4, by letter dated May 14, 1980, MADCR stated that they were in the process of negotiating purchase rights to the Lowell canal system which

would allow for recreational boating in the canals (MADEM 1980). Through the 1986 Order of Taking, MADCR purchased all air rights over the canals, including over the canal walls and dams, and the exclusive right to use water in the entire canal system for recreational, educational, and navigational purposes (Commonwealth 1986). Included in the 1986 Order of Taking is a permanent and exclusive easement to MADCR for all canal walls, beds, or bottoms throughout the canal system for purposes consistent with the use of the canal system as a recreational park. These purposes specifically include placement and attachment of docks, wharves, walls, and boat ramps of a temporary or permanent nature (Commonwealth 1986).

As reported in the 1990 Preservation Plan Amendment, the acquisition of these rights to MADCR allowed for the significant restorations of lock structures at Lower Locks, Guard Locks, and the Pawtucket Canal. Between the advent of the LNHP and the 1986 Order of Taking, boat tour operations were very limited due to the recreational rights issue as well as the infrastructure improvements and physical obstructions noted above. The 1990 Preservation Plan Amendment provided an updated layout of the combined canal boat tours and train system, showing the tour boats proceeding through the Pawtucket Canal and Lower Pawtucket Canal and the Northern Canal. The plans for full passage through the Western and Merrimack Canals were deemed infeasible due to overhead obstructions (e.g. bridges) that blocked passage, and it was noted that Swamp Locks Lock Chamber was inoperable but under repair by MADCR (Figure 5-6).

Figure 5-6. 1990 Preservation Plan Amendment Canal Boat Route



On April 14, 2022, Boott held a conference call with NPS to obtain information on their historical and current canal boat tour operations. The information discovered through this literature review is consistent with NPS operations staff's understanding of historical boat operations during this time frame. NPS states they do not ever recall successful navigation on the Western Canal (as originally conceived), and infrequent use, if any, of the Merrimack Canal for boat tours. As reported by NPS, between the late 1980s through 1994, NPS boat tours would run in either direction from Swamp Locks up through Guard Locks Locking Gatehouse (Guard Locks Complex), continuing north onto the Merrimack River and through the Pawtucket Gatehouse, using the Pawtucket Gatehouse Lock Chamber to enter onto the Northern Canal. Navigation on the Northern Canal continued through Hydro Locks to the Aiken Street dock before turning around to loop back to Swamp Locks. NPS staff would usually end the tour at Swamp Locks, or lock down Swamp Locks to the Lower Locks Complex. NPS staff report they usually did not lock down Lower Locks to access the Concord River.

NPS staff report the full loop of this tour was 1-2 hours and could be performed up to six times a day. There was usually interpretation at the Guard Locks Complex and the Pawtucket Gatehouse, and visitors could disembark to explore these features. In all, these tours spent about a full hour on the canals, and another hour at interpretations and other stops. NPS staff noted that there were no stops on the Northern Canal from the

Pawtucket Gatehouse to the Aiken Street dock; approximately ten minutes were spent navigating from Hydro Locks to the Aiken Street dock and back, and another fifteen minutes from Hydro Locks to the Pawtucket Gatehouse. About up to half an hour was spent navigating on the Northern Canal in total per tour.

Following the partial failure of the bayboard section of the Great River Wall in 1994 (Enel Green Power North America [Enel] 2008), NPS ceased boat tour operations on the Northern Canal, as discussed more below in Section 5.5.1.1. With the installation of the surge gate in 1999, and the safety threshold of 3,500 cfs established, NPS could resume canal boat tour operations on the Northern Canal. However, complications with Hydro Locks between 1996-1997 made the locking mechanisms inoperable, and NPS has not resumed regular boat tour operations on the Northern Canal, but will navigate the Northern Canal on specific occasions.

Currently, the NPS boat tour season lasts from May 15 through October 15. NPS reports that for the last 10-12 years they have offered up to four boat tours a day, during the boating season, touring up and down the Pawtucket and Lower Pawtucket Canal. Essentially, they launch at Swamp Locks, locking down using the Swamp Locks Lock Chamber, navigating to the Lower Locks Complex, turning around and locking back up through the Swamp Locks Lock Chamber and the Guard Locks Locking Gatehouse, and turning around at the confluence of the canal with the Merrimack River. The tour continues back down the Pawtucket Canal, locking down at the Guard Locks Locking Gatehouse and ending at the Swamp Locks Complex. Depending on whether they are locking up or down, NPS will allow boaters to disembark to view the complexes. NPS does not currently dock at or lock up/down at Lower Locks due to safety concerns.

5.5.1.1 Evaluation of Effects of Project Operations on NPS Boat Tours on the Northern Canal

In their letter dated March 1, 2022, the Commission recommended (1) an evaluation of the effects of Project operation on NPS boat tours in the Northern Canal; (2) an evaluation of the effects of Project operation on NPS boat tours, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary; and (3) an evaluation of the potential for expanding access to the canals for recreation (including NPS boat tours) in light of the results of the Operation Analysis of the Lowell Canal Study and in consideration of Project operation under normal and high flow conditions (including an assessment of surge gate and shut down options). Boott provides those evaluations here as they pertain to the NPS boat tours on the Northern Canal.

As noted above, NPS operated boat tours on the Northern Canal from the late 1980s to 1994, spending up to a half hour per tour navigating the Northern Canal from the Pawtucket Gatehouse, turning around at the Aiken Street dock, and navigating back through Hydro Locks to the Pawtucket Gatehouse. In 1994 NPS ceased boat tours on the Northern Canal after overtopping and failure of the bayboard section of the Great River Wall. The FERC New York Regional Office expressed their concerns by letter to the NPS on March 31, 1994, recommending that NPS discontinue both the Northern

Canal boat tours and walking along the Northern Canal Walkway until further studies were conducted (FERC 1994; Enel 2008). In their September 1994 Environmental Inspection Report, FERC stated "*the existence of a boat tour in a power canal is a practice that normally would be discouraged. Aside from the obvious hazards associated with power production it can also present unforeseen dangers. The Project, however, was designed with the idea that tour boats would operate in the canal. Recent events seem to indicate that this practice be revisited in terms of public safety*" (FERC 1994).

In 1999, Boott completed construction and testing of the surge gate. The surge gate is designed to automatically open when the E.L. Field station is tripped off-line, which prevents overtopping of the Great River Wall and prevents flooding of the historic Pawtucket Gatehouse and Northern Canal Waste Gatehouse. Testing of the surge gate indicated the gate successfully attenuated the resulting transient wave that can occur in the Northern Canal during sudden plant shutdown. However, testing posed the safety concern that should the station trip off-line while the NPS is operating tour boats on the Northern Canal, the boat and passengers could be drawn through the open surge gate (Enel 2008; FERC 2000). Testing demonstrated that the transient wave produced on unit trip was not large enough to overtop the Great River Wall when Northern Canal flows are less than 3,500 cfs (e.g., operating the E.L Field at half-capacity) and so the surge gate may be temporarily deactivated under such conditions. Thus, NPS and Boott agreed that boat tour operations can occur on the Northern Canal only if the Merrimack River flow is less than 3,500 cfs and if the surge gate is locked out/tagged out to prevent automatic opening (Enel 2008; FERC 2000). At Merrimack River flows as low as 3,500 cfs, flows in the Merrimack River are effectively equal to flows in the Northern Canal.

In a letter addressed to NPS and dated June 1, 1999,[10] FERC stated "*while this office conceptually disagrees with allowing recreational vessels in a power canal, the license stipulates the use of the canal for this purpose*." FERC indicated in this letter the agreed-upon protocol between NPS and Boott for tour boat operation on the Northern Canal was satisfactory. This letter from FERC also indicates a May 6, 1999 conference call in which NPS and Boott outlined the agreement to FERC.

The 1999 testing of the surge gate indicated it may only be deactivated (i.e. locked-out/tagged-out) if Merrimack River flows are less than 3,500 cfs. This lock-out/tag-out procedure is jointly undertaken by Boott and NPS personnel (Enel 2008; FERC 2000). When flows in the Merrimack River (and consequently the Northern Canal) are above 3,500 cfs and the surge gate is deactivated to prevent automatic opening, there is risk of overtopping of the Great River Wall, flooding of the Pawtucket Gatehouse and Northern Canal Waste Gatehouse, and undermining and/or weakening of the gatehouse and portions of the Northern Canal. If persons are boating on the Northern Canal, there is risk to human life in that passengers could be drawn through the open surge gate.

[10] Ascension Number 19990614-0512

Accordingly, the 3,500 cfs threshold for boating on the Northern Canal was agreed upon between Boott and NPS, and approved by FERC in 1999.

As discussed above, in recent years NPS holds boat tours on the Northern Canal only on special occasions mostly due to the locking issues at Hydro Locks that arose around 1996. NPS staff recently report that Hydro Locks is inoperable as pins were bent as they were frozen in at one point. Based on drawings these pins may be the hinge pins or the pins that lock the gates together in the closed position. The pins can no longer be moved or removed. Since they were frozen, they do not lock tight enough and there is leakage. Additionally, NPS reports that Hydro Locks is mired in mud (NPS 2018). As reported to FERC in their March 31, 2022 Response to Additional Information Request, Boott intends to install a downstream fish exclusion system including a new trashrack structure in the E.L. Field powerhouse forebay. During the installation of the downstream fish exclusion system, the Northern Canal will be dewatered, providing Boott the opportunity to inspect and repair as needed Hydro Locks and its locking mechanisms, as well as to determine whether the Hydro Locks gates are mired in mud.

In their March 1, 2022 Determination on Requests, FERC requested an evaluation of the effects of Project operation on current NPS boat tours, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary. The majority of the Northern Canal, i.e., the section between the Northern Canal Gatehouse and Hydro Locks, will remain within the Project boundary. However, the section of the Northern Canal between Hydro Locks and the Western Canal is proposed to be removed from the Project boundary. Boott does not anticipate the removal of this section of the Northern Canal from the Project boundary will affect NPS boat tours. In their FLA filed on April 30, 2021, Boott proposed to continue to manage the canal structures and water levels and flows using best practices, consistent with current agreements with the NPS and other stakeholders. Given Boott's canal elevation agreement with NPS, Boott regularly coordinates on water elevations with the NPS and other stakeholders. As reported in their November 1, 2021 Response to Additional Information Request, Boott is proposing to maintain specific water levels throughout the canal system as determined in consultation with NPS. The target water level for this portion of the Northern Canal is 86.7 ft NGVD 29.

Lastly, in their March 1, 2022 Determination on Requests, FERC requested an evaluation of the potential for expanding NPS boat tours in light of the results of the Operation Analysis of the Lowell Canal Study and in consideration of Project operation under normal and high flow conditions (including an assessment of surge gate and shut down options). The Operation Analysis of the Lowell Canal Study did not incorporate Northern Canal operations so that report is not discussed here.

As noted above, the surge gate can only be disabled when Merrimack River flows are less than 3,500 cfs, because testing of the surge gate indicated that a transient wave of less than 3,500 cfs is not enough to overtop the Great River Wall. At flows above 3,500 cfs, the surge gate is programmed to open automatically during a unit trip to prevent overtopping of the Great River Wall. The safety threshold of 3,500 cfs was agreed upon

between NPS and Boott, and FERC indicated their concurrence in the letter dated June 1, 1999. Boott acknowledges that NPS has expressed interest in raising this threshold, previously requesting a threshold of 4,000 cfs (NPS 2003), but deactivating the surge gate when flows are above 3,500 cfs defeats the purpose of its installation and presents the unacceptable risk to human life and Project safety. There are also circumstances under which Boott cannot deactivate the surge gate in order to protect worker safety and/or to ensure compliance with the Project's minimum flow requirement. For example, during any work on the crest of the Pawtucket Dam, the surge gate must remain active to prevent spillage from occurring in the event of a unit trip. Likewise, while the impoundment is being refilled following work on the spillway crest the gate must remain active to ensure minimum flow compliance should the E.L. Field Station trip off-line. In such situations Boott historically notified NPS and advised against any boat access to the Northern Canal until normal operations resume (Enel 2008).

For reasons mentioned, at this time Boott does not support broadly changing the safety threshold of 3,500 cfs in the Merrimack River to allow boat tours on the Northern Canal without a more thorough review of the 1998/1999 surge gate test data. At this time Boott has not been able to locate the 1998/1999 surge gate testing report in its records, and does not feel that it would be prudent to commit to modifying the established safety procedures until the report can be thoroughly reviewed.[11] Any modification to the established protocol will need to be carefully re-evaluated on a case-by-case basis in consultation and coordination among Boott, NPS and FERC's Division of Dam Safety and Inspections. Boott does not consider it practical or safe however to match the historical level of daily tours or six tours per day on the Northern Canal, prior to the bayboard washout incident and installation of the surge gate system. The inherent dangers of allowing tour boats to navigate a power canal during higher flows were not well understood when NPS was operating six tours a day on the Northern Canal from the late 1980s to 1994.

There may be a limited opportunity to expand the Northern Canal navigation flow threshold during the fish passage season. As proposed in the FLA, during the upstream fish passage season (which generally runs from late April through mid-July), Boott proposes to release a minimum flow of up to 500 cfs into the bypassed reach via the existing fish ladder at the Pawtucket Dam. At the time that the canal navigation protocol was developed, the fish ladder was only operated during higher flow conditions when there was spillage at the dam, thus this flow was not considered. Thus, under the proposed operating regime, flows in the Merrimack River will not be equal to Northern Canal flows, and Northern Canal flows may be equal to or below the 3,500 cfs safety threshold. Boott and NPS would need a defined protocol to evaluate this on a case-by-case basis, and in light of the results of the 1998/1999 surge test once that report is located.

[11] The report does not appear to be available via eLibrary, however there are two letters from Boott to FERC which indicate that the tests were planned to take place during the summer or fall of 1998.

FERC requested Boott consider shutdown options in their evaluation of expansion of NPS boat tours on the Northern Canal. As noted above, NPS boat tours historically only navigated the high flow portion of the Northern Canal (from Pawtucket Gatehouse to Hydro Locks) for approximately fifteen minutes but up to a half hour per tour, at around six tours a day. It is not practical for Boott to shut down or curtail operations regularly for NPS to run their boat tours for a limited amount of time on the Northern Canal. Boott currently sells all the electricity generated at the Project into the regional grid under a Power Purchase Agreement, but will likely sell energy under Independent Systems Operator – New England market conditions starting in 2023. Boott has a duty to provide clean renewable electric energy when possible to meet the demands of the electricity grid and cannot shut down or curtail operations on a regular basis.

As noted, Boott does not consider it practical or feasible to match historical levels of boat tours on the Northern Canal. The risks associated with allowing tour boats in a power canal have been evaluated since and are better understood. Additionally, NPS is not precluded from operating boat tours on the Pawtucket Canal during higher flow days when it is not appropriate to be on the Northern Canal. However, Boott believes there may be an opportunity to work with NPS to allow tour boats on occasion on the Northern Canal when Merrimack River flows are higher than 3,500 cfs but below 4,000 cfs.

Boott would be required to deviate from ROR operations in order to provide lower flow rates in the Northern Canal, as inflow to the Project would not match outflow. However, in the FLA, Boott proposed to operate the Project in a ROR mode using automatic pond level control of the E.L. Field powerhouse units, but with the stipulation that ROR operations may be temporarily modified for short periods to allow flow management for other Project and non-Project needs, e.g., for recreational purposes.

5.5.1.2 Evaluation of Effects of Project Operations on NPS Boat Tours on the Pawtucket Canal

In their March 1, 2022 Determination on Requests, FERC recommended an evaluation of the effects of Project operation on NPS boat tours, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary. As discussed above in Section 5.5.1, NPS currently operates their boat tours on the Pawtucket Canal.

In their FLA filed on April 30, 2021, Boott proposed to continue to manage the canal structures, water levels and flows using best practices, consistent with current agreements with the NPS and other stakeholders. Given Boott's canal elevation agreement with NPS, Boott regularly coordinates on water elevations with the NPS and other stakeholders. Additionally, as reported in their November 1, 2021 Response to Additional Information Request, Boott is proposing to maintain specific water levels throughout the canal system as determined in consultation with NPS. The target water levels for the canals are :

- Upper canal system (including Upper Pawtucket Canal between Guard Locks and Swamp Locks): staff gage reading = 86.7 ft NGVD29;

- Lower canal system (including Lower Pawtucket Canal): staff gage reading = 71.8 ft NGVD29.

Boott's proposal to remove the downtown canal system from the Project boundary is not expected to have any effect on NPS boat tours in the Pawtucket Canal. By way of the 1995 Grant of Easement with MADCR, NPS holds recreational rights to structures of the canals to operate their boat tours. This agreement exists independently of the Project license. Boott does not hold recreational rights to the downtown canal system, and does not own structures of the Pawtucket Canal where NPS' boat tours currently operate. Additionally, Boott is proposing to continue to manage the canal structures, water levels and flows using best practices, consistent with current agreements with the NPS and other stakeholders.

5.5.1.3 Evaluation of Effects of Crest Gate on NPS Boat Tours

This section of the Recreation and Aesthetics Study report is retained from the February 25, 2021 version of this report filed with the Commission. On April 26, 2021, NPS reported that recent work by the City of Lowell to renovate the Pawtucket Street Bridge has eliminated overhead clearance issues for NPS tour boats. Therefore, this concern is resolved, but for SPD completion purposes, Boott retains this evaluation.

In their original request for this evaluation, NPS stated that their tour boats barely pass under the Pawtucket Street Bridge over Pawtucket Canal.[12] With even a 1-foot elevation rise of the Project impoundment, NPS states their boats would be unable to pass under the Pawtucket Street Bridge.

On April 18, 2013, FERC authorized Boott to replace the existing wooden flashboard system on the Project's Pawtucket Dam with a pneumatic crest gate system. FERC approved the amended Crest Gate System Operations Plan on March 30, 2015. The plan describes the operation of the pneumatic crest gate system under normal and high-water operations. Under the amended Crest Gate System Operations Plan, when there is no flow over the spillway and flows in the river are below 8,600 cfs [the combined hydraulic capacity of the E.L. Field Powerhouse (6,600 cfs) and downtown canal system (2,000 cfs)], the elevation of the reservoir would be at the normal pond elevation of 92.2 ft NGVD 29. When Merrimack River flows exceed 8,600 cfs, the Crest Gate System Operations Plan allows for a gradual rise in elevation to ± 93.2 ft NGVD 29 until flows reach approximately 11,850 cfs.[13] Under high flows exceeding 11,850 cfs and reaching 31,600 cfs, the crest gate maintains an elevation of ± 93.2 ft.

[12] NPS also stated in their letter they are barely able to pass under Central Street Bridge over the Lower Pawtucket Canal. The crest gate does not affect the elevation of waters of the Lower Pawtucket Canal and thus is not included in this analysis.

[13] 11,850 cfs was determined by adding the hydraulic capacity of the E.L. Field Powerhouse (6,600 cfs), the downtown canal system (2,000 cfs) and the extra spillway flow (3,250 cfs) allowed by the Crest Gate System Operations Plan.

On November 20, 2019, NPS filed a consultation letter with FERC and Boott. In the letter, NPS stated that Merrimack River flows must be below 12,500 cfs in order for them to operate boat tours in the Pawtucket Canal, and the operating season for boat tours runs from May 15 to October 15.

Flows from United States Geological Survey (USGS) Gage No. 01099500 *Concord R Below R Meadow Brook*, at Lowell, MA were subtracted from flows at USGS Gage No. 01100000 *Merrimack River BL Concord River at Lowell, MA* to calculate the hydrologic data tabulated in Table 5-2, presenting data at the Project from the past 30 years (water years 1987- 2016).

Table 5-2. Lowell Hydroelectric Project Hydrologic Data (1987-2016)

Month	Minimum (cfs)	90% Exceedance (cfs)	Average (cfs)	10% Exceedance (cfs)	Maximum (cfs)
January	916	3,462	7,651	12,834	39,710
February	1,478	3,272	6,813	11,415	39,180
March	1,914	4,508	11,484	21,355	50,220
April	2,765	6,558	17,901	31,178	78,890
May	2,034	4,112	10,749	18,657	88,410
June	874	2,279	6,768	13,286	44,660
July	670	1,325	4,207	9,270	29,820
August	569	1,121	3,526	6,852	30,030
September	460	1,008	3,162	6,025	32,264
October	787	1,676	5,938	12,706	50,150
November	1,345	2,888	7,978	14,747	30,990
December	1,839	3,472	9,141	17,243	34,810
Annual	460	1,723	7,941	17,059	88,410

The Project maintains a normal pond elevation of 92.2 ft NGVD 29 when flows in the Merrimack River are up to 8,600 cfs. According to USGS gage data presented in Table 5-2, average flows during the operating season (May 15 through October 15) for NPS boat tours generally do not exceed 8,600 cfs. May is the only month with an average Merrimack River flow above 8,600 cfs.

As described above, when Merrimack River flows exceed 8,600 cfs, the crest elevation gradually rises to 93.2 ft NGVD 29 until flows reach 11,850 cfs. Ultimately, only between Merrimack River flows of 11,850 cfs and 12,500 cfs (NPS' self-reported limit), are NPS boats supposedly unable to pass under Pawtucket Street Bridge. This is a relatively narrow window, especially since the average flow for the entire operating season never reaches 11,850 cfs, and a 10% chance of exceedance of 11,850 cfs only occurs in May, June, and October. The majority of flows through the Lowell Project are a direct result of the annual hydrologic cycle, much of which is unpredictable and inconsistent. Merrimack

River flows high enough to raise the pond elevation 1-foot are seemingly just as likely to rise above NPS' self-reported threshold.

5.5.2 Northern Canal Walkway

The Northern Canal Walkway opens seasonally (May 15 through October 15) when flow rates in the Merrimack River and Northern Canal are lower than 3,500 cfs. This threshold was determined because a study demonstrated that a surge wave above 3,500 cfs in the Northern Canal poses a risk of overtopping the Great River Wall. In 1999, the Licensee completed construction of the surge gate, designed to attenuate the surge wave in the canal that occurs during sudden plant shutdown. A test of the surge gate revealed that the gate did attenuate the resulting transient wave. However, as reported to FERC, the test indicated when fully opened, the significant volume of discharge through the surge gate is hazardous to any persons in the riverbed below or near the gate. FERC directed Boott to design a Public Safety Plan to warn the public of this hazard, which included warning signs, sirens and beacons installed at various locations along and in the Merrimack River (FERC 2000). Accordingly, to be conservative and assure public safety, the 3,500 cfs threshold to open the Northern Canal Walkway remained despite the installation of the surge gate.

Boott acknowledges that the 3,500 cfs threshold is strict. However, the surge gate must open during a unit trip when Merrimack River flows are over 3,500 cfs, otherwise there is a threat of overtopping the Great River Wall and the Northern Canal Walkway. Conversely, the significant amount of flow that is released through the surge gate when opened poses an extreme risk to anyone below on the rocky shore or in the riverbed. NPS, City of Lowell, or MADCR staffing/guarding of the area may mitigate this risk below the surge gate, but due to the lack of any emergency access to that area it is not recommended by Boott.

Boott analyzed USGS data to determine how many days during the recreation season (May 15 through October 15) the Northern Canal Walkway is closed due to Project operations. Project hydrology can be determined by subtracting flows from USGS Gage No. 01099500 (*Concord R Below R Meadow Brook, at Lowell, MA*) from USGS Gage No. 01100000 (*Merrimack River BL Concord River at Lowell, MA*). Using the daily mean average means for both gages for the period of record of January 1, 2000 through January 1, 2022, Boott has determined on average, the NPS closes the Northern Canal Walkway 125 days during the recreation season. According to the LNHP website (NPS 2022), they make this determination each morning during the season by reviewing the most recent instantaneous value recorded at USGS Gage No. 01100000.

5.6 Visual Survey for Vegetation Growth

In total, 96 Vegetation Polygons (representing 80% of the total survey data collected in the study area) and 24 VPs (representing 20% of the total survey data collected in the study area) were mapped between September 25 and September 27, 2019 (Appendix G;

Appendix H). As shown in Table 5-3, the total study area encompassed approximately 44 acres and mapped vegetation on/along canal walls accounted for approximately 5 acres (11%) of the study area[14]. The Pawtucket Canal (19.63 acres; 44% of the total study area), Northern Canal (11.67 acres; 26% of the total study area), and Western Canal (5.51 acres; 13% of the total study area) represent more than 80 percent of the total study area (Table 5-3, Appendix G).

Maps showing the results of the vegetation assessment and mapping within the study area are illustrated in a 21-sheet, 11 by 17-inch vegetation type map set with numbered polygons (e.g., 1, 2) and VPs (e.g., VP1, VP2) for each vegetation polygon and/or VP, respectively in Appendix G. Results from the canal wall vegetation mapping are compiled in Appendix H and field reconnaissance data is summarized in Appendix I to this study report.

Table 5-3. Percent total acreage and mapped vegetation acreage of the six major canals associated with the Lowell Project canal system

Canal	Area (acres)	Percentage (%) of Total Study Area	Mapped Vegetation Area (acres)	Percentage (%) of Total Study Area with Mapped Vegetation
Eastern Canal	4.03	9%	0.93	2%
Hamilton Canal	2.01	5%	0.35	1%
Merrimack Canal	1.40	3%	0.38	1%
Northern Canal	11.67	26%	0.89	2%
Pawtucket Canal	19.63	44%	1.33	3%
Western Canal	5.51	13%	0.90	2%
Total	**44.25**	**100%**	**4.78**	**11%**

Pursuant to the approved study plan, vegetation type assessments were completed in the Pawtucket Canal, Northern Canal, Western Canal, Merrimack Canal, Eastern Canal, and Hamilton Canal. In addition, the shoreline/canal type was characterized by dominant features found in each of the mapped polygons and VPs. Field inventory documentation, including a map identifying each polygon or VP, representative photographs, and a description of the vegetation type observed at each polygon or VP is presented in Appendices G-J to this study report.

5.6.1 Eastern Canal

The vegetation mapping and characterization effort was conducted in the Eastern Canal on September 25, 2019. Sheets 8, 11, 12, and 16 present mapped vegetation types

[14] VPs are not included in mapped vegetation acreage calculations because they represent a single point(s) on a canal wall.

within the Eastern Canal (Appendix G). Additional canal-specific information describing vegetation and shoreline/canal features is provided in Appendix H.

The Eastern Canal study area represents 4.03 acres (approximately 9%) of the total study area (Table 5-3, Appendix G). Three (3) VPs were mapped in the Eastern Canal, representing approximately 13 percent of total mapped VPs in the total study area. At the time of the study, mapped VPs in the Eastern Canal had a dominant vegetation type of Scrub-Shrub (100% of the total). The dominant shoreline type of mapped VPs within the Eastern Canal is either Block Wall (approximately 33.3% of the total) or Block Wall/Concrete/Stone Wall Mix (approximately 66.7% of the total) (Appendix G, Appendix H, and Appendix I).

Fifteen (15) Vegetation Polygons were mapped in the Eastern Canal, representing approximately 16 percent of total mapped Vegetation Polygons in the total study area (Appendix G, Appendix H, and Appendix I). Vegetation was mapped on 0.93 acres of the Eastern Canal walls, representing approximately 19 percent of the total mapped vegetation area within the total study area and approximately 23 percent of the Eastern Canal study area. At the time of the study, the majority of mapped Vegetation Polygons in the Eastern Canal had a dominant vegetation type of Mixed (approximately 62% of the total). The dominant shoreline type of mapped Vegetation Polygons within the Eastern Canal is either Block Wall (approximately 80% of the total) or Block Wall/Concrete/Stone Wall Mix (approximately 20%) (Appendix G, Appendix H, and Appendix I).

Mapped Vegetation Polygons within the Eastern Canal with a dominant shoreline type of Block Wall had a dominant vegetation type of Mixed (0.43 acres; approximately 58% of the total) at the time of the study. Scrub-Shrub (0.17 acres; approximately 23% of the total) and Herbaceous (0.12 acres; approximately 16% of the total) were present in lesser amounts, with Trees (0.02 acres; approximately 3% of the total) being minimal at the time of the study. Mapped Vegetation Polygons within the Eastern Canal with a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix had a dominant vegetation type of Mixed (0.15 acres; approximately 79% of the total) or Trees (0.04 acres; approximately 21% of the total) at the time of the study (Appendix G, Appendix H, and Appendix I).

At the time of the study, no mapped VPs or Vegetation Polygons within the Eastern Canal had a dominant vegetation type of Forested. No mapped VPs or Vegetation Polygons within the Eastern Canal have dominant shoreline types of Concrete, Earthen/Terrestrial Cultural, or Stone Wall (Appendix G, Appendix H, and Appendix I).

5.6.2 Hamilton Canal

The vegetation mapping and characterization effort was conducted in the Hamilton Canal on September 25, 2019. Sheets 19 and 20 present mapped vegetation types within the Hamilton Canal (Appendix G). Additional canal specific information describing vegetation and shoreline/canal features is provided in Appendices H and I.

The Hamilton Canal study area represents 2.01 acres (approximately 5%) of the total study area (Table 5-3). One (1) VP was mapped in the Hamilton Canal, representing approximately 4 percent of total mapped VPs in the total study area. At the time of the study, the mapped VP in the Hamilton Canal had a dominant vegetation type of Herbaceous (100% of the total). The dominant shoreline type of the mapped VP within the Hamilton Canal is Block Wall/Concrete/Stone Wall Mix (100% of the total) (Appendix G, Appendix H, and Appendix I).

Seven (7) Vegetation Polygons were mapped in the Hamilton Canal, representing approximately 7 percent of total mapped Vegetation Polygons in the total study area. Vegetation was mapped on 0.35 acres of the Hamilton Canal walls, representing approximately 7 percent of the total mapped vegetation area within the total study area and approximately 17 percent of the Hamilton Canal study area. At the time of the study, the majority of mapped Vegetation Polygons in the Hamilton Canal had a dominant vegetation type of Mixed (approximately 74% of the total). The majority of mapped Vegetation Polygons in the Hamilton Canal have a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix (approximately 83% of the total) (Appendix G, Appendix H, and Appendix I).

Mapped Vegetation Polygons within the Hamilton Canal with a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix had a dominant vegetation type of Mixed (0.26 acres; approximately 90% of the total), Herbaceous (0.02 acres; approximately 7% of the total), or Trees (0.01 acres; approximately 3% of the total) at the time of the study. Mapped Vegetation Polygons within the Hamilton Canal that had a dominant shoreline type of Block Wall had a dominant vegetation type of Trees (0.03 acres; 50% of the total) or Scrub-Shrub (0.03 acres; 50% of the total) at the time of the study. (Appendix G, Appendix H, and Appendix I)

At the time of the study, no mapped VPs or Vegetation Polygons within the Hamilton Canal had a dominant vegetation type of Forested. No mapped VPs or Vegetation Polygons within the Hamilton Canal have a dominant shoreline type of Concrete, Earthen/Terrestrial Cultural, or Stone Wall (Appendix G, Appendix H, and Appendix I).

5.6.3 Merrimack Canal

The vegetation mapping and characterization effort was conducted in the Merrimack Canal on September 25, 2019. Sheets 11 and 15 present mapped vegetation types within the Merrimack Canal (Appendix G).

The Merrimack Canal study area represents 1.4 acres (approximately 3%) of the total study area (Table 5-3). No VPs were mapped in the Merrimack Canal at the time of the study (Appendix G, Appendix H, and Appendix I).

Nine (9) Vegetation Polygons were mapped in the Merrimack Canal, representing approximately 9 percent of total mapped Vegetation Polygons in the total study area. Vegetation was mapped on 0.38 acres of the Merrimack Canal walls, representing

approximately 8 percent of the total mapped vegetation area within the total study area and approximately 27 percent of the Hamilton Canal study area. At the time of the study, the majority of mapped Vegetation Polygons in the Merrimack Canal had a dominant vegetation type of Herbaceous (approximately 53% of the total). The majority of mapped Vegetation Polygons in the Merrimack Canal have a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix (approximately 54% of the total), followed closely by Block Wall (approximately 46% of the total) (Appendix G, Appendix H, and Appendix I).

Mapped Vegetation Polygons within the Merrimack Canal with a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix had a dominant vegetation type of Herbaceous (0.15 acres; approximately 75% of the total) or Scrub-Shrub (0.05 acres, approximately 25% of the total) at the time of the study. Mapped Vegetation Polygons within the Merrimack Canal with a dominant shoreline type of Block Wall had a dominant vegetation type of Mixed (0.12 acres; 71% of the total) or Herbaceous (0.05 acres; 29% of the total), at the time of the study. Trees represented less than 1 percent (0.003 acres) of the total mapped vegetation area within the Merrimack Canal study area and were the dominant vegetation type of mapped Vegetation Polygons that have a dominant shoreline type of Concrete. (Appendix G, Appendix H, and Appendix I)

At the time of the study, no mapped Vegetation Polygons within the Merrimack Canal had a dominant vegetation type of Forested. No mapped Vegetation Polygons within the Merrimack Canal have a dominant shoreline type of Earthen/Terrestrial Cultural or Stone Wall (Appendix G, Appendix H, and Appendix I).

5.6.4 Northern Canal

The vegetation mapping and characterization effort was conducted in the Northern Canal on September 26 and 27, 2019. Sheets 2, 3, 5, and 6 present mapped vegetation types within the Northern Canal (Appendix G).

As previously described, the Northern Canal study area represents 11.67 acres (approximately 26%) of the total study (Table 5-3). Eight (8) VPs were mapped in the Northern Canal, representing approximately 33 percent of total mapped VPs in the total study area. At the time of the study, the dominant vegetation type of mapped VPs in the Northern Canal was either Trees (50% of the total) or Scrub-Shrub (50% of the total). The dominant shoreline type of all mapped VPs within the Northern Canal is Block Wall (100% of the total) (Appendix G, Appendix H, and Appendix I)

Thirteen (13) Vegetation Polygons were mapped in the Northern Canal, representing approximately 14 percent of total mapped Vegetation Polygons in the total study area. Vegetation was mapped on 0.89 acres of the Northern Canal walls, representing approximately 19 percent of the total mapped vegetation area within the total study area and approximately 8 percent of the Northern Canal study area. At the time of the study, the majority of mapped Vegetation Polygons in the Northern Canal had a dominant vegetation type of Mixed (approximately 32% of the total), followed closely by Forested

and Herbaceous (each representing 28% of the total). The majority of mapped Vegetation Polygons in the Northern Canal have a dominant shoreline type of Block Wall (approximately 53% of the total) (Appendix G, Appendix H, and Appendix I).

Mapped Vegetation Polygons within the Northern Canal with a dominant shoreline type of Block Wall had a dominant vegetation type of Forested (0.19 acres; approximately 40% of the total), Mixed (0.16 acres; approximately 34% of the total); Scrub-Shrub (0.08 acres; approximately 17% of the total), Trees (0.03 acres; approximately 6% of the total); or Herbaceous (0.01 acres; approximately 2% of the total) at the time of the study. Mapped Vegetation Polygons within the Northern Canal with a dominant shoreline type of Bock Wall/Concrete/Stone Wall Mix had a dominant vegetation type of Forested (0.05 acres; 17% of the total) or Herbaceous (0.24 acres; 83% of the total) at the time of the study. Mapped Vegetation Polygons within the Northern Canal with a dominant shoreline type of Earthen/Terrestrial Cultural had a dominant vegetation type of Mixed (0.13 acres; 100% of the total) at the time of the study. (Appendix G, Appendix H, and Appendix I)

At the time of the study, the Northern Canal is the only canal with Forested vegetation observed on the dominant shoreline type of Block Wall. No mapped VPs or Vegetation Polygons within the Northern Canal had a dominant shoreline type of Concrete or Stone Wall (Appendix G).

5.6.5 Pawtucket Canal

The vegetation mapping and characterization effort was conducted on the Pawtucket Canal on September 25 and 26, 2019. An NPS boat was used to collect data in the Pawtucket Canal from the Swamp Locks and Dam to the Merrimack River on September 26, 2019. Additional data was collected for the remainder of the Pawtucket Canal on foot from the shoreline on September 25 and 26, 2019. Sheets 13 and 15 through 21 present mapped vegetation types within the Pawtucket Canal (Appendix G). Additional canal specific information describing vegetation and shoreline/canal features is provided in Appendix H and Appendix I.

As previously described, the Pawtucket Canal study area represents 19.63 acres (approximately 44%) of the total study area (Table 5-3, Appendix G). Eight (8) VPs were mapped in the Pawtucket Canal, representing approximately 33 percent of total mapped VPs in the total study area (Appendix G). At the time of the study, the majority of mapped VPs within the Pawtucket Canal had a dominant vegetation type of Trees (approximately 63% of the total). The majority of mapped VPs within the Pawtucket Canal have a dominant shoreline type of Block Wall (38% of the total), followed closely by Block Wall/Concrete/Stone Wall Mix and Stone Wall (each representing 25% of the total) (Appendix G, Appendix H, and Appendix I).

Thirty-two (32) Vegetation Polygons were mapped in the Pawtucket Canal, representing approximately 33 percent of total mapped Vegetation Polygons in the total study area. Vegetation was mapped on 1.33 acres of the Pawtucket Canal walls, representing approximately 28 percent of the total mapped vegetation area within the total study area

and approximately 7 percent of the Pawtucket Canal study area. At the time of the study, the majority of mapped Vegetation Polygons in the Pawtucket Canal had a dominant vegetation type of Trees (53% of the total). The majority of mapped Vegetation Polygons in the Pawtucket Canal have a dominant shoreline type of Block Wall (approximately 85% of the total) (Appendix G, Appendix H, and Appendix I).

Mapped Vegetation Polygons within the Pawtucket Canal with a dominant shoreline type of Block Wall had a dominant vegetation type of Trees (0.61 acres; approximately 54% of the total), Mixed (0.42 acres; 37% of the total), Scrub-Shrub (0.08 acres; 8% of the total), or Herbaceous (0.01 acres; 1% of the total) at the time of the study. The majority of mapped Vegetation Polygons within the Pawtucket Canal with a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix had a dominant vegetation type of Scrub-Shrub (0.03 acres; 34% of the total) at the time of the study. Mapped Vegetation Polygons within the Pawtucket Canal with a dominant shoreline type of Concrete had a dominant vegetation type of either Mixed (0.04 acres; 50% of the total) or Trees (0.04 acres; 50% of the total) at the time of the study and mapped Vegetation Polygons within the Pawtucket Canal with a dominant shoreline type of Stone Wall had a dominant vegetation type of Trees (0.03 acres; 100% of the total) at the time of the study. (Appendix G, Appendix H, and Appendix I).

At the time of the study, no mapped VPs or Vegetation Polygons within the Pawtucket Canal had a dominant vegetation type of Forested. No mapped VPs or Vegetation Polygons within the Pawtucket Canal have a dominant shoreline type of Earthen/Terrestrial Cultural. The Pawtucket Canal is the only canal in the total study area that had vegetation mapped on the dominant shoreline type of Stone Wall (Appendix G, Appendix H, and Appendix I).

It should be noted, based on the elevation of the water within the Pawtucket Canal at the time of the investigation, that the majority of the upstream extent of the Pawtucket Canal, upstream of the NPS Guard Lock and Gates Facility, is dominated by typical forested/riparian vegetation on earthen stream embankments and the canal in this area is assumed to not be bordered by one of the shoreline/canal types described in Table 4-2, therefore, no mapping of dominant vegetation types occurred in this area.

5.6.6 Western Canal

The vegetation mapping and characterization effort was conducted in the Western Canal on September 25 and 26, 2019. Mapbook sheets 6, 7, 10, 14, and 19 present mapped vegetation types within the Western Canal (Appendix G). Additional canal specific information describing vegetation and shoreline/canal features is provided in Appendix H and Appendix I.

As previously described, the Western Canal study area represents 5.51 acres (13%) of the total study area (Table 5-3, Appendix G). Four (4) VPs were mapped in the Western Canal, representing approximately 17 percent of total mapped VPs in the total study

area. At the time of the study, the majority of mapped VPs in the Western Canal had a dominant vegetation type of Scrub-Shrub (approximately 50% of the total). Mapped VPs in the Western Canal have a dominant shoreline type of either Block Wall (75% of the total) or Block Wall/Concrete/Stone Wall Mix (Appendix G, Appendix H, and Appendix I).

Twenty (20) Vegetation Polygons were mapped in the Western Canal, representing approximately 21 percent of total mapped Vegetation Polygons in the total study area. Vegetation was mapped on 0.9 acres of the Western Canal walls, representing approximately 19 percent of the total mapped vegetation area within the total study area and approximately 16 percent of the Western Canal study area. At the time of the study, the majority of mapped Vegetation Polygons in the Western Canal had a dominant vegetation type of Forested (approximately 53% of the total). The majority of mapped Vegetation Polygons in the Western Canal have a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix (approximately 77% of the total) (Appendix G, Appendix H, and Appendix I).

Mapped Vegetation Polygons within the Western Canal with a dominant shoreline type of Block Wall/Concrete/Stone Wall Mix had a dominant vegetation type of Forested (0.48 acres; 62% of the total), Mixed (0.16 acres; approximately 21% of the total), or Herbaceous (0.05 acres; 6% of the total) at the time of the study. Mapped Vegetation Polygons within the Western Canal with a dominant shoreline type of Block Wall had a dominant vegetation type of Mixed (0.01 acres; 8% of the total); Herbaceous (0.09 acres; 75% of the total); or Scrub-Shrub (0.02 acres; 17% of the total) at the time of the study. No mapped Vegetation Polygons within the Western Canal had dominant shoreline type of Concrete, Earthen/Terrestrial Cultural, or Stone Wall (Appendix G, Appendix H, and Appendix I).

5.7 Visual Survey for Waterborne Trash

Pursuant to the RSP, on April 9, 2020, Boott mapped areas within the canal system owned or under the control of Boott where waterborne trash may be a potential concern. The amount and type of waterborne trash that accumulates within the Project Boundary can vary according to several factors including the season, Project operations, the magnitude and duration of the flow events. During the visual survey for waterborne trash, the USGS Gage 01100000 Merrimack River BL Concord River at Lowell, MA, reported a discharge of over approximately 16,000 cfs (USGS 2020), and Boott's operations data reported an inflow of 14,500 cfs.[15]

Accumulated waterborne trash includes material floating on the impoundment surface and/or found on the surface of the canal system. Most of the waterborne trash accumulation within the Lowell Canal system appears to be derived from upstream

[15] Inflow to the project is typically estimated as flow reported at USGS Gage 01100000 Merrimack River BL Concord River at Lowell, MA minus the flow reported at USGS 01099500 Concord R Below R Meadow Brook, at Lowell, MA.

inputs (the Merrimack River) as well as direct canal inputs (accidental and intentional littering) and from runoff events (also likely from accidental and intentional littering).

In total, eight (8) areas of waterborne trash totaling 0.21 acres (representing 0.48% of the total study area) were mapped on April 9, 2020 (Appendix K) as well as three additional areas of accumulated trash on the canal bed and a single area with a waterborne sheen. The total study area encompassed approximately 44 acres and as shown in Table 5-4 all mapped areas within the canal were 3.531 acres or approximately 154,000 square feet.

Maps showing the results of the waterborne trash assessment and mapping within the study area are illustrated by a map set with numbered polygons (e.g., WBT-1, WBT-2) for each mapped waterborne trash polygon (Appendix K). Results from the waterborne trash mapping are compiled in Appendix K and field reconnaissance data is summarized in Table 5-4 and Photo 5-2 through Photo 5-11.

Table 5-4. Percent total acreage of waterborne trash mapped within the Lowell canal system.

Mapped Polygon Identifier	Location	Mapped Area (acres)	Mapped Area (sq. ft.)	Canal Water Level	Potential Local Cause
WBT-1	Merrimack River at Fishway Exit	0.007	286.0	High	Eddy Area at head of fishway
WBT-2	Merrimack River Upstream of Pawtucket Gatehouse	0.063	2,765.0	High	Gatehouse
WBT-3	Western Canal at Merrimack Street	0.011	488.0	Normal	Iron support beams for bridge
WBT-4	Western Canal at Moody Street	0.038	1,674.0	Normal	Gate
WBT-5	Northern Canal and Western Canal Junction	0.013	545.0	Normal	Fremont Gatehouse, structure creating eddy
WBT-6	Merrimack Canal at Market Street	0.024	1,045.0	Normal	Gates
WBT-7	Pawtucket Canal at Guard Locks	0.049	2,120.0	Normal	Gatehouse
WBT-8	Hamilton Canal adjacent to Hamilton Mills	0.004	182.0	Normal	End of Canal (Intake)
CBT-1	Pawtucket Canal from Industrial Canyon to Kerouac Park	1.833	79,832.0	Low	Canal dewatered
CBT-2	Pawtucket Canal adjacent to Appleton Mills	0.537	23,411.0	Low	Canal dewatered

Mapped Polygon Identifier	Location	Mapped Area (acres)	Mapped Area (sq. ft.)	Canal Water Level	Potential Local Cause
CBT-3	Eastern Canal adjacent to Tsongas and Boarding House Park	0.468	20,395.0	Low	Canal dewatered
WBS-1	Merrimack Canal adjacent to Visitor Center	0.484	21,066.0	Normal	Unknown sheen
	Total	**3.531**	**153,809.0**	**-**	**-**

Pursuant to the approved study plan, waterborne trash assessments were completed in the Pawtucket Canal, Northern Canal, Western Canal, Merrimack Canal, Eastern Canal, Hamilton Canal, and in the Merrimack River upstream of the dam and Northern Canal intake. Field inventory documentation, including a map identifying each polygon and a description of the type of waterborne trash observed at each polygon is presented in Appendix K to this study report.

Boott surveyed the Lowell canal system on foot and by vehicle to visually inspect and document waterborne trash within the study area. Observations were recorded regarding evidence and location of waterborne trash. Data collected during this portion of the survey included field notes, digitized locations of waterborne trash, and photographic documentation.

In addition to mapping waterborne trash, during incidental observations for other field efforts, Boott observed aged substrate trash accumulation in the bottom of the Eastern Canal and portions of the Pawtucket Canal during dewatered for various construction and maintenance activities not associated with hydroelectric operations. This aged substrate trash is further described in Section 5.6.9 below and is also depicted on the map of the study area in Appendix K.

Boott also observed a surface sheen on the Merrimack Canal on April 9, 2020. This sheen is further described in Section 5.6.10 below and is also depicted on the map of the study area in Appendix K.

5.7.1 Merrimack River at the Fishway Exit

Waterborne trash observed on the Merrimack River fishway exit (WBT-1) encompassed a water surface area of approximately 0.007 acres (Table 5-4). This trash appears to accumulate in an eddy type feature and above the intake water for the fishway. Waterborne trash consisted of buoys, plastics, shoes, rubber mats, foam, and bait containers (No photo available).

5.7.2 Merrimack River Upstream of the Pawtucket Gatehouse

Waterborne trash observed on the Merrimack River upstream of the Pawtucket Gatehouse (WBT-2) encompassed a water surface area of approximately 0.063 acres (Table 5-4). This trash appears to accumulate in an eddy type feature and above the gatehouse intakes. Waterborne trash consisted of logs, boards, organic debris, plastic cups, plates, shoes, water bottles, buoys, plastics, foam, and bait containers (Photo 5-1).

Photo 5-1. Waterborne trash on the Merrimack River upstream of the Northern Canal Gate entrance.

5.7.3 Western Canal at Merrimack Street

Waterborne trash observed on the Western Canal at Merrimack Street (WBT-3) encompassed a water surface area of approximately 0.011 acres (Table 5-4). This trash appears to be behind steel beams across the canal, potentially for structural support of the road bridge for Merrimack Street. Waterborne trash consisted of foam plates, plastic cups, rubber balls plastic jugs, plastic wrappers and bags (Photo 5-2).

Photo 5-2. Waterborne trash on the Western Canal at Merrimack Street.

5.7.4 Western Canal at Moody Street

Waterborne trash observed on the Western Canal at Moody Street (WBT-4) encompassed a water surface area of approximately 0.038 acres (Table 5-4). This trash appears to accumulate behind an operable gate structure. Waterborne trash consisted of tires, umbrellas, foam plates, plastic cups, plastic bottles, rubber balls, plastic jugs, plastic wrappers, foam boards and bags (Photo 5-3).

Photo 5-3. Waterborne trash on the Western Canal at Moody Street.

5.7.5 Northern Canal and Western Canal Junction at the Tremont Gatehouse and Powerhouse

Waterborne trash observed on the Northern Canal and Western Canal junction at the Tremont Gatehouse and Powerhouse (WBT-5) encompassed a water surface area of approximately 0.013 acres (Table 5-4). This trash appears to accumulate in an eddy within a large indent within the canal wall structure located just upstream of the Fremont Gatehouse. Waterborne trash consisted of foam board pieces, plastic cups, foam plates, foam bait containers, shoes, plastic bottles, and organic debris (Photo 5-4).

Photo 5-4. Waterborne trash on the Western Canal at the Northern Canal Junction.

5.7.6 Merrimack Canal at Market Street

Waterborne trash observed on the Merrimack Canal at Market Street (WBT-6) encompassed a water surface area of approximately 0.024 acres (Table 5-4). This trash appears to accumulate behind the operational gates at this location. Waterborne trash consisted of plastic bottles, foam containers, foam cups, plastic bags, rubber balls, diapers, glass bottles, wood, plastic wrappers, soft drink cans, and organic debris (Photo 5-5).

Photo 5-5. Waterborne trash on the Merrimack Canal at Market Street.

5.7.7 Pawtucket Canal at the Guard Lock and Gate Facility

Waterborne trash observed on the Pawtucket Canal at the Guard Lock and Gate Facility (WBT-7) encompassed a water surface area of approximately 0.049 acres (Table 5-4). This trash appears to accumulate upstream of the Guard Lock water release structure on river left. Waterborne trash consisted of paper, foam boards, all types of balls (rubber, plastic, baseball, soccer, etc.), organic matter, logs, tires, construction barrels, plastic bottles, cans, foam containers (Photo 5-6).

5.7.8 Hamilton Canal Adjacent to Hamilton Mills

Waterborne trash observed at the end of Hamilton Canal at the intake (WBT-8) encompassed a water surface area of approximately 0.004 acres (Table 5-4). This trash appears to accumulate at the intake (No photo available).

Photo 5-6. Waterborne trash on the Pawtucket Canal at Guard Lock and Gate Facility.

5.7.9 Observations of Aged Substrate Trash Accumulation on the bottom of the Eastern Canal and Portions of the Bottom of the Pawtucket Canal

Observations of substrate trash accumulation on the bottom of the Eastern Canal and portions of the Pawtucket Canal occurred during a dewatering event associated with non-Project construction and maintenance activities. This substrate accumulation encompassed an area of approximately 0.468 acres (Table 5-4) in the Eastern Canal, approximately 1.833 acres in the Pawtucket Canal near “Industrial Canyon”, and 0.537 acres in the Pawtucket Canal immediately downstream of the Swamp Locks. The substrate trash in the Eastern Canal consist largely of iron, traffic cones, cans, and woody debris. In the Pawtucket Canal near Industrial Canyon, the substrate trash consists mostly of wood, iron, and plastic trash. The Pawtucket Canal downstream of Swamp Locks consists mostly of metal and some minimal floating plastic bottles (Photo 5-7 through Photo 5-10).

Photo 5-7. Substrate trash on bottom of Eastern Canal across from Boarding House Park.

Photo 5-8. Substrate trash on bottom of Eastern Canal across from Boott Cotton Mills Museum and Tsongas Industrial History Center.

Photo 5-9. Substrate debris at the bottom of Pawtucket Canal adjacent to Appleton Mills and downstream of Swamp Locks.

Photo 5-10. Waterborne trash immediately downstream of Swamp Locks.

5.7.10 Observations of Surface Sheen

Boott also observed a surface sheen on the Merrimack Canal on April 9, 2020. The location of the source of this sheen was undetermined but appear to begin at or upstream of the Swamp Locks (Photo 5-11).

Photo 5-11. Surface sheen observed on April 9, 2020 on Merrimack Canal adjacent to the Visitor Center and downstream of the Swamp Locks.

6 Summary and Discussion

6.1 Field Inventory and Visitor Use Data

The results from the field inventory and the visitor use data (personal interviews, field reconnaissance, and online surveys) are consistent with the literature review. The field inventory identified extensive recreational facilities in the Project area, with the available amenities reported in good condition. Of the fifty-three (53) personal interviews and ninety-six (96) online recreation surveys completed, the respondents are typically regular visitors who visit three or more times per year. Respondents travelled an average of 7.3 miles (personal interviews) and 11 miles (online survey respondents) to the Project area. The most reported recreational activities are light activities such as walking, dog walking, and jogging, with most respondents rating their overall experience of recreational activities at the Project as “acceptable” or “totally acceptable.” The most frequently visited recreational facilities in the Project area were the Lowell Heritage State Park, the Rourke Brothers Boat Ramp, Chelmsford Boat Access, Merrimack Trail System, and LNHP-related facilities. Respondents both in-person and online tended to rate their

overall experience at these specific recreation facilities as “acceptable” or “totally acceptable.”

6.2 Evaluation of Recreational Access

The opportunities for expansion of recreational opportunities in the Project canals are limited. MADCR exclusively owns all rights to allow recreation on or in the Project canals and holds easement rights to install recreational access points. Boott’s proposal to remove the majority of the downtown canal system from the Project boundary does not affect the recreational rights held by MADCR, and granted to NPS. Boott identified segments of the Merrimack Canal, Western Canal, and Northern Canal as surface water recreation areas potentially compatible with public safety and recreational and property rights. Boott’s proposal to remove the majority of the downtown canal system from the Project boundary is not expected to affect recreational access (including NPS boat tours) in the downtown canal system. During the recreation season, which generally corresponds with lower flows in the Merrimack River, Boott infrequently operated the downtown mill power stations. Therefore, the removal of the downtown system from the new FERC license is not going to noticeably impact recreation opportunities in the canal system.

Boott also evaluated the effects of water levels and flows and crest gate operations on NPS-boat tours and the Northern Canal Walkway access. Between flows of 11,850 cfs and 12,500 cfs (NPS’ self-reported limit), NPS boats are reportedly unable to pass under Pawtucket Street Bridge. This is a relatively narrow difference, and such high flows are not common during the operating season (May 15 to October 15).

Boott also researched the 3,500 cfs threshold to open the Northern Canal Walkway. While the surge gate was installed to mitigate the risk of overtopping of the Great River Wall, the volume of water released from the surge gate is considered dangerous to any persons below on the riverbed or bank.

6.3 Visual Survey for Vegetation Growth

A wide variety of vegetation types, occurrences, and distribution, ranging from herbaceous, non-woody plants to forested areas of trees and underbrush, and shoreline/canal types, ranging from earthen embankments to placed, uniformly sized blocks, were observed during the canal wall vegetation surveys. The following summary statements are based on an analysis of survey results (Appendix G-Appendix I):

- Mapped vegetation[16] was greatest in the Pawtucket Canal (1.33 acres; approximately 28% of the total study area), followed by the Eastern Canal (0.93 acres), Western Canal (0.90 acres), and Northern Canal (0.89 acres) (each representing approximately 19% of the total study area).

[16] VPs are not included in mapped vegetation acreage calculations because they represent a single point(s) on a canal wall.

- At the time of the study, most mapped VPs within the total study area had a dominant vegetation type of Scrub-Shrub (46% of the total VP count), followed closely by Trees (38% of the total VP count). The majority of mapped Vegetation Polygons within the total study area had a dominant vegetation type of Mixed (41% of the total mapped vegetation area) at the time of the study.
- Within the total study area, most mapped VPs had a dominant shoreline type of Block Wall (63% of the total VP count). The majority of mapped Vegetation Polygons within the total study area also had a dominant shoreline type of Block Wall (58% of the total mapped vegetation area).
- Mapped Vegetation Polygons with a dominant vegetation type of Forested were only recorded within the Western Canal (53% of the Western Canal study area), and the Northern Canal (28% of the Northern Canal study area) at the time of the study. Forested vegetation was recorded on Block Wall (0.19 acres; approximately 4% of total mapped vegetation area) and Block/Wall/Concrete Stone Wall Mix (0.53 acres; approximately 11% of the total mapped vegetation area) at the time of the study.

6.4 Visual Survey for Waterborne Trash

The surveys for waterborne trash have shown that waterborne trash accumulates within the Project's canal system, and these accumulations are somewhat dependent on the level of the water within the canals as well as the required operation of some of the NPS gates within the study area. For example, NPS gates that are operated on a routine basis had minimal signs of waterborne trash associated with them, while others that are largely in the closed position tended to have accumulations of waterborne trash behind them at varying densities.

The combination of past and present land use activities in and around the Project area have contributed and will likely continue to contribute to the accumulation of waterborne trash within the Project's canal system that occur in the study area today (e.g., industrialization, commercial development, residential areas in close proximity to canals, etc.). However, the complexity and diversity of historical and current land use activities in the study area create a problem for tracing and identifying the sources of waterborne trash and its movement and distribution within the study area. Waterborne trash consisted of common materials such as foam board pieces, plastic cups, foam plates, foam bait containers, shoes, plastic bottles, and organic debris.

It is well known that many types of land uses contribute to the accumulations of waterborne trash including stormwater drainage systems, upstream sources, inappropriately discarded trash, natural events (woody debris), densely populated areas, etc. Roads, construction, recreation, residential developments, and commercial and industrial developments all can contribute to the problem. Ongoing Project operation and maintenance has very little potential to cause and/or significantly contribute to the waterborne trash accumulation areas observed during the study.

7 Variances from FERC-Approved Study Plan

The Recreation and Aesthetics Study was conducted in full accordance with the methods described in the FERC-approved study plan except for the following variances:

- When conducting personal interviews at the recreation facilities identified in consultation with stakeholders, field technicians generally attempted to visit each of the selected recreation facilities during every survey event. In some instances, field technicians encountered conditions at recreation facilities that presented safety risks. In such instances, field technicians avoided those facilities during the survey event and documented the unsafe conditions encountered that prevented personal interviews from occurring.
- When conducting canal wall vegetation surveys within/along the six canals identified, field technicians generally attempted to survey the entirety of the canal study area. In some instances, field technicians encountered conditions within/along the canals that restricted access for surveying. In such instances, field technicians advanced within/along the canal wall to the extent practicable and assessed vegetation from a distance collecting photo documentation.
- During the evaluation of expanded recreational access to the canal system, Boott did not generate cost estimates to develop recreational access to the Lowell canal system, as proposed in the RSP. Boott did not develop these cost estimates because Boott does not have any rights to develop recreational access to the Lowell canal system.

8 Germane Consultation and Correspondence

A summary of germane correspondence and consultation related to the Recreation and Aesthetics Study is presented in Table 8-1. Appendix L provides copies of relevant correspondence.

Table 8-1. Germane Consultation and Correspondence

Date	Type	From	To	Subject
May 7, 2019	Email/Letter	HDR and Boott	NPS, American Whitewater, and MADCR	Consultation on locations for visitor-intercept/personal interview locations
May 17, 2019	Letter	American Whitewater	HDR and Boott	Consultation on locations for visitor-intercept/personal interview locations
June 3, 2019	Email	HDR	NPS	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 4, 2019	Email	NPS	HDR	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 12, 2019	Email	NPS	HDR	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 12, 2019	Email	HDR	NPS	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 14, 2019	Email	HDR	NPS	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
July 2, 2020	Email	HDR	NPS	Lowell Recreation and Aesthetics Study
July 3, 2020	Email	NPS	HDR	Lowell Recreation and Aesthetics Study
October 1, 2019 (Accession Number 20191001-5038)	Letter	NPS	FERC, Boott, HDR	Comments on Study Process and the Recreation and Aesthetics Study
November 1, 2019	Email	HDR and Boott	NPS, MADCR, City of Lowell, Lowell Parks and Conservation Trust	Study Workshop Planning
November 1, 2019	Email	NPS	HDR	Study Workshop Planning
November 4, 2019	Email	City of Lowell	HDR	Study Workshop Planning
November 8, 2019	Email	HDR and Boott	NPS, MADCR, City of Lowell, Lowell Parks and Conservation Trust	Study Workshop Planning

Date	Type	From	To	Subject
December 9, 2019	Email	HDR and Boott	NPS, MADCR, City of Lowell, Lowell Parks and Conservation Trust	Study Workshop Planning
December 19, 2019	Email	NPS	HDR	Vegetation Mapping Consultation
December 20, 2019	Email	MADCR	HDR	Lowell Recreation and Aesthetics Study
December 20, 2019	Email	HDR	MADCR	Lowell Recreation and Aesthetics Study
March 13, 2020	Email	HDR	NPS	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
March 13, 2020	Email	NPS	HDR	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
April 10, 2020 (Accession Number 20200410-5033)	Email	NPS	HDR	Comments on the Recreation and Aesthetics Study
April 22, 2020 (Accession Number 20200422-5027)	Letter	American Whitewater	FERC, Boott, HDR	Comments on the Recreation and Aesthetics Study
April 26, 2021 (Accession Number 20210426-5218)	Letter	NPS	FERC, Boott, HDR	Comments on the Recreation and Aesthetics Study
April 5, 2022	Letter	HDR, Boott	NPS	Consultation regarding the Recreation and Aesthetics Study
May 10, 2022	Letter	HDR, Boott	NPS	Consultation regarding the Recreation and Aesthetics Study

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Appendix A - Recreation Interview and Survey Forms

Personal Interview Survey Form

ON-SITE/IN-PERSON RECREATION INTERVIEW
Lowell Project (FERC No. 2790)
Recreation Survey

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., owns and operates the Lowell Project, which is licensed by the Federal Energy Regulatory Commission (FERC). The current operating license for the Project was issued on May 1, 1973 and expires on April 30, 2023. Boott will file its application with FERC for a new license for continued project operation no later than April 30, 2021. As part of this relicensing process, Boott is conducting a series of resource studies to enable FERC to prepare its environmental review document and develop a new operating license. The purpose of this survey is to gather information regarding participation in outdoor recreation activities at the Lowell Project.

Interview Location:			
Home Zip Code:	_____	**Date:**	_____
Age:	_____	**Time:**	_____
River Conditions:			_____
Are you:	**Male** ☐	**Female** ☐	**Prefer not to answer** ☐
Interviewer:			

Q-1. Regarding the Lowell Project area, do you consider yourself: (**Please circle one)**

1. A regular visitor to this area (*3 or more times per year*)
2. An occasional visitor (*1-2 times per year*)
3. An infrequent visitor (*Less than 1 time per year*)
4. This is my first visit

Q-2. On this trip to the Lowell Project area, when did you arrive?

Arrival Date **Arrival Time**

_____/_____/_____ _____AM/PM

When did you or do you expect to leave the Lowell Project area?

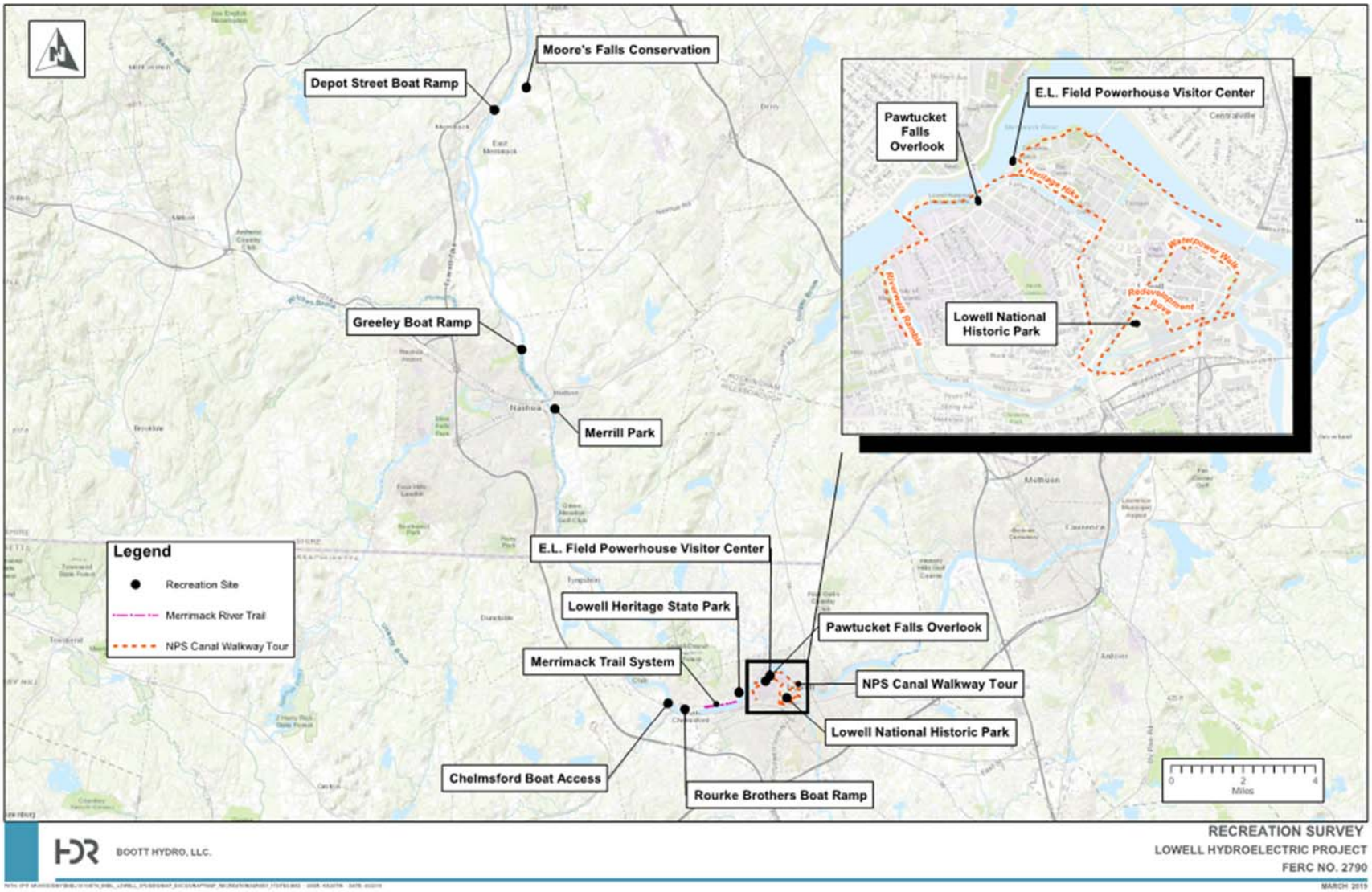
Departure Date **Departure Time**

_____/_____/_____ _____AM/PM

Q-3. During the last 12 months (including this trip), which month(s) did you visit the Lowell Project area?

A. _____

Project Area Recreation Map



Q-4. Which of the following recreation areas at or near the Lowell Project did you utilize for recreation during the past 12 months? **(Please circle all that apply)**

1. Lowell Heritage State Park
2. Merrimack River Trail
3. E.L. Field Powerhouse Visitor Center
4. NPS Walkway Tours
5. Riverwalk Ramble
6. Waterpower Walk
7. Heritage Hike
8. Northern Canal Walkway
9. Redevelopment Rove
10. Boat access facilities on the Project impoundment
11. Lowell Heritage State Park – Rourke Brothers Boat Ramp
12. Pawtucket Falls Overlook (Lowell, MA)
13. Chelmsford Boat Access (Chelmsford, MA)
14. Merrill Park (Hudson, NH)
15. Greeley Boat Ramp (Nashua, NH)
16. Depot St. Boat Ramp (Merrimack, NH)
17. Moore's Falls Conservation Area (Litchfield, NH)
18. Informal Shoreline Parking/Access Areas
19. None of the above
20. Other (Please list)

_____
_____
_____

Q-5. On your last trip, about how many miles did you travel to get to the Lowell Project?

A. _____miles

Q-6. Are you staying overnight in the Lowell Project area (not including at your own home) on this trip?

1. Yes 2. No

Q-7. If you answered yes to **Q-6**, at what type of accommodations will you be staying? (**Please circle one)**

1. RV/Auto/Tent Campground
2. Motel/hotel
3. Bed and Breakfast
4. Vacation or rental home
5. Other (Please specify: _____)

Q-8. How many people (including you) are in your group?

A. _____people

Q-9. Which of the following best describes your group during this trip?

1. Individual
2. Adult group (over 21)
3. Youth group (under 21)
4. Family (with children)
5. Mixed group (groups with children, adults, and/or teens)

Q-10. On this trip to the Lowell Project area, in which of the following activities have you or do you expect to participate? (**Please circle all that apply**)

1. Bank fishing	12. Canoeing	24. RV camping
2. Boat fishing	13. Kayaking	25. Tent camping
3. Guided fishing experience	14. Commercial whitewater boating	26. Photography
4. Walking tour	15. Museum-going	27. Sightseeing
5. Hiking	16. Shopping and/or dining	28. Relaxing
6. Backpacking	17. Swimming	29. Sunbathing
7. Guided canal tours	18. Off-highway vehicle (dirt bike/ATV)	30. Dog walking
8. Historical/heritage site visiting	19. Horseback riding	31. Painting/drawing
9. Running, jogging, and fitness	20. Off-road mountain biking	32. Other (please describe):
10. Rock climbing/bouldering	21. Road cycling	
11. Picnicking	22. Adventure sports	
	23. Geo-caching	

Q-11. Of the activities you circled in **Q-10** above, what is the primary activity that you participated in, or expect to participate in, on this visit? (**Please write in the corresponding number from above**)

A. Primary activity # _____

Q-12. Please rate the following for the primary activity you chose above:

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Challenge	1	2	3	4	5

Safety	1	2	3	4	5
Enjoyment	1	2	3	4	5
River/Canal Flow	1	2	3	4	5
Crowding	1	2	3	4	5
Overall Experience	1	2	3	4	5

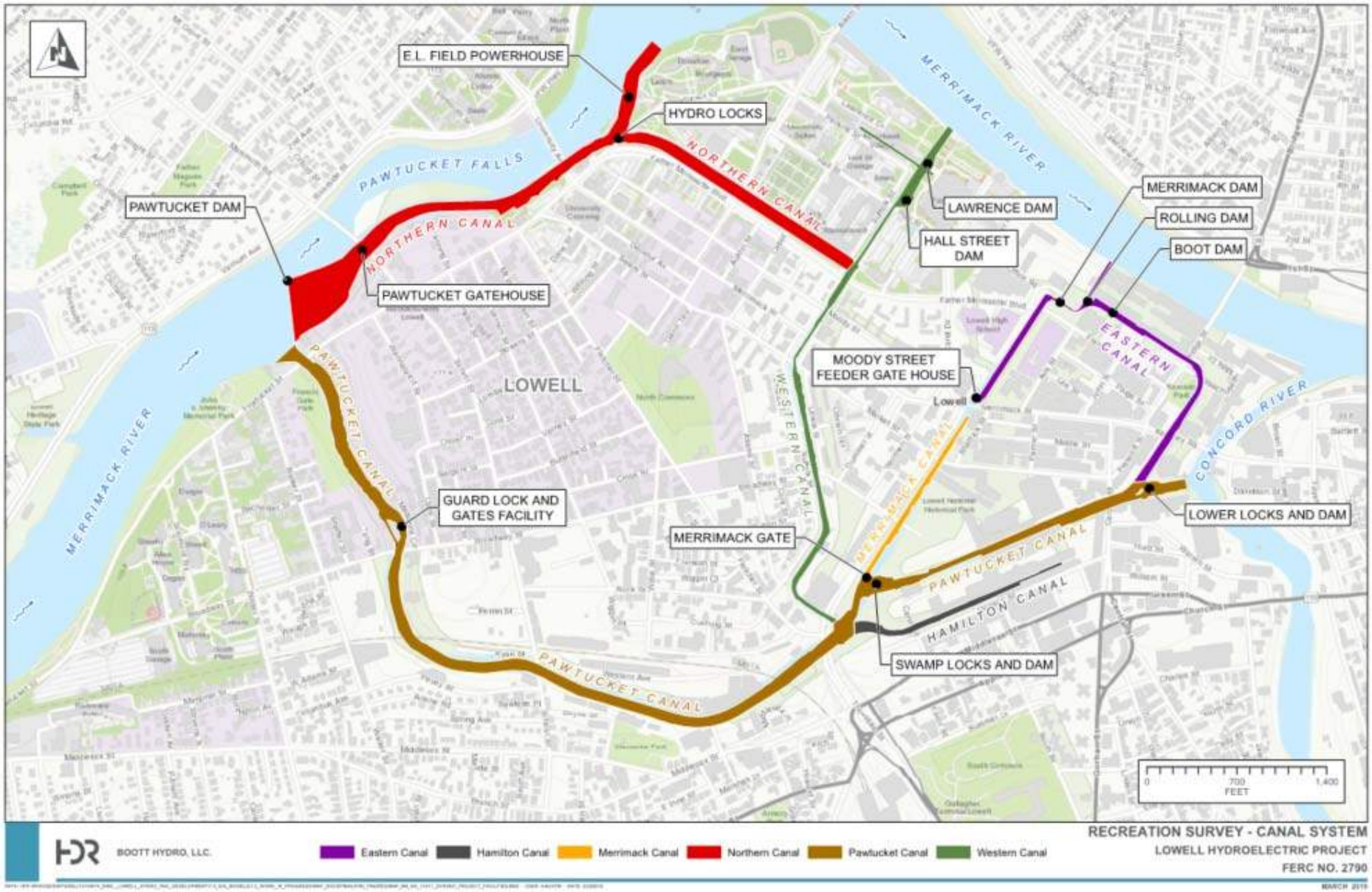
Q-13. Approximately how much money did you or do you intend to spend in preparation for or in association with your recreational trip to the Lowell Project (meals, gas, lodging, equipment, etc.)

A. $_____

Q-14. On previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in any of the canals shown in the figure below?

	Totally Unacceptable	**Unacceptable**	**Neutral**	**Acceptable**	**Totally Acceptable**
Eastern Canal	1	2	3	4	5
Hamilton Canal	1	2	3	4	5
Merrimack Canal	1	2	3	4	5
Northern Canal	1	2	3	4	5
Pawtucket Canal	1	2	3	4	5
Western Canal	1	2	3	4	5

Lowell Canal System



Q-15. On previous trips to the Project, please rate the following:

	Accessibility	Parking	Crowding	Condition of Recreation Facilities	Available Amenities	River/Canal Flow	Overall Experience
Lowell Heritage State Park							
Merrimack River Trail							
E.L. Field Powerhouse Visitor Center							
NPS Walkway Tours							
Riverwalk Ramble							
Waterpower Walk							
Heritage Hike							
Northern Canal Walkway							
Redevelopment Rove							
Boat access facilities							
Rourke Brothers Boat Ramp							
Pawtucket Falls Overlook							
Chelmsford Boat Access							
Merrill Park							
Greeley Boat Ramp							
Moore's Falls Conservation Area							
Informal Shoreline Parking/Access Areas							
Please use the following numerical scale to rate the formal recreation areas at the Lowell Project: 1) Totally Unacceptable; 2) Unacceptable; 3) Neutral; 4) Acceptable; 5) Totally Acceptable							

Q-16. Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project.

1. Type of recreation enhancement:_____

   Location(s):_____
   _____

2. Type of recreation enhancement:_____

   Location(s):_____
   _____

3. Type of recreation enhancement:_____

   Location(s):_____
   _____

Q-17. Please share any other comments that you have regarding recreation at the Lowell Project:_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you for completing the Recreation Survey!

Online Recreation Survey Form

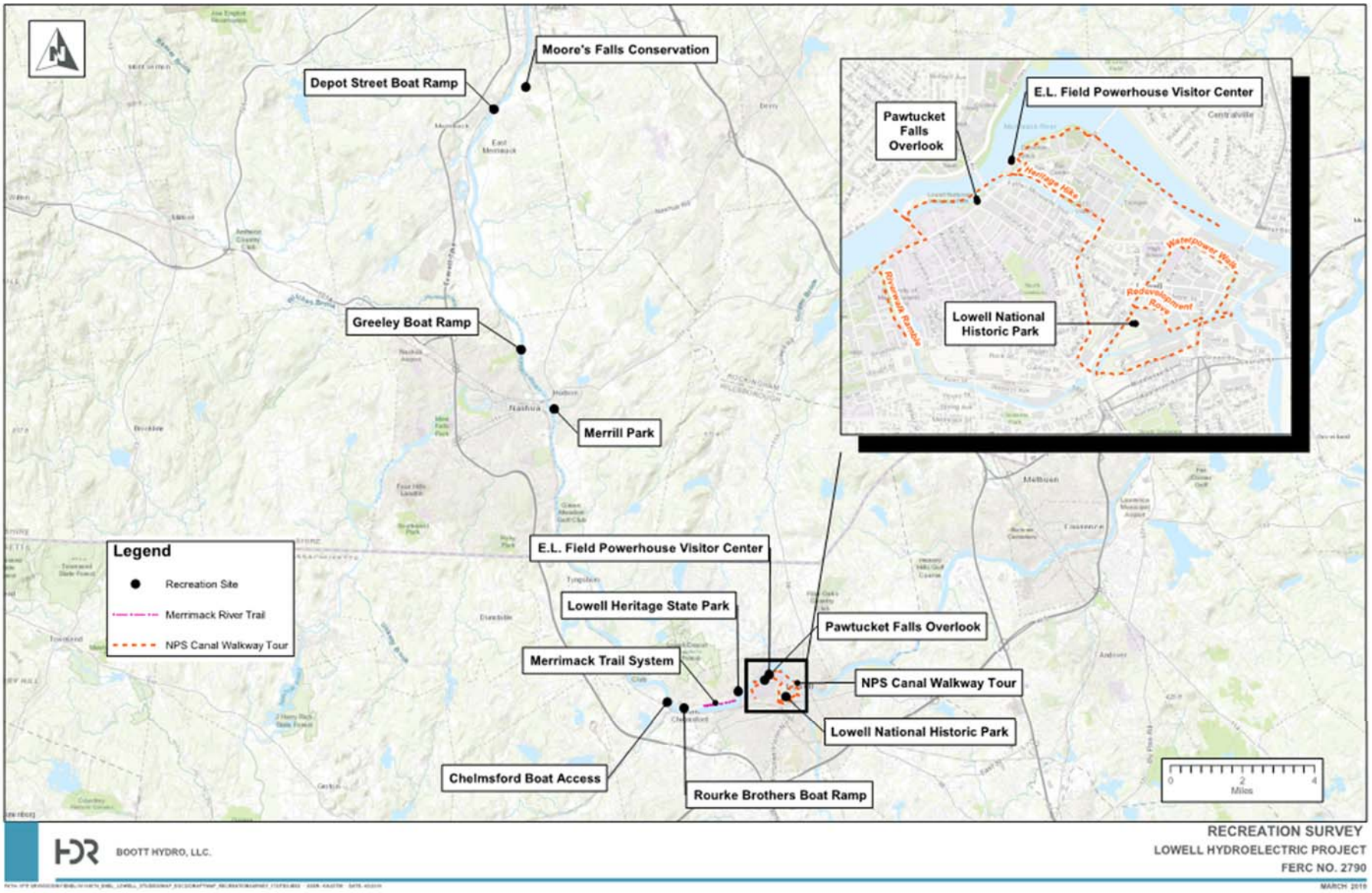
Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., owns and operates the Lowell Project, which is licensed by the Federal Energy Regulatory Commission (FERC). The current operating license for the Lowell Project was issued on May 1, 1973 and expires on April 30, 2023. Boott will file its application with FERC for a new license for continued project operation no later than April 30, 2021. As part of this relicensing process, Boott is conducting a series of resource studies to enable FERC to prepare its environmental review document and develop a new operating license.

The purpose of this survey is to gather information regarding participation in outdoor recreation activities at the Lowell Project.

The E.L. Field Powerhouse Visitor Center is the Lowell Project's only formal recreation area. Other, non-Project recreation facilities are also located near the Lowell Project, including the Lowell National Historical Park, Merrimack River Trail, Pawtucket Falls Overlook, boat access facilities on the Lowell Project impoundment, and the Rourke Brothers Boat Ramp. These and other non-Project facilities are not owned or operated by Boott, but are popular Merrimack River recreational areas. In addition, there are numerous informal access areas on Lowell Project lands that are used by the public to access the Merrimack River.

The Lowell Project area relevant to this survey is defined on the map. The information provided in this survey will inform the development of appropriate management measures for recreational resources at the Lowell Project.

Lowell Project Area Recreation Map



Q-1. What is the zip code of your primary residence? _____

Q-2. What is your age? _____

Q-3. Are you: Male ☐ Female ☐ Prefer not to answer ☐

Q-4. Regarding the Lowell Project area, do you consider yourself:

5. A regular visitor to this area (*3 or more times per year*)
6. An occasional visitor (*1-2 times per year*)
7. An infrequent visitor (*Less than 1 time per year*)

Q-5. During the last 12 months, which month(s) did you visit the Lowell Project area? *(select all that apply)*?

Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐

I have not visited in the last 12 months ☐

Q-6. Which of the following recreation areas at or near the Lowell Project did you utilize for recreation during the past 12 months? **(Please select all that apply)**

21. Lowell Heritage State Park
22. Merrimack River Trail
23. E.L. Field Powerhouse Visitor Center
24. NPS Walkway Tours
25. Riverwalk Ramble
26. Waterpower Walk
27. Heritage Hike
28. Northern Canal Walkway
29. Redevelopment Rove
30. Boat access facilities on the Lowell Project impoundment
31. Lowell Heritage State Park – Rourke Brothers Boat Ramp
32. Pawtucket Falls Overlook (Lowell, MA)
33. Chelmsford Boat Access (Chelmsford, MA)
34. Merrill Park (Hudson, NH)
35. Greeley Boat Ramp (Nashua, NH)
36. Depot St. Boat Ramp (Merrimack, NH)
37. Moore's Falls Conservation Area (Litchfield, NH)
38. Informal Shoreline Parking/Access Areas
39. None of the above
40. Other (Please list)

_____
_____
_____

Q-7. On your last trip, about how many miles did you travel to get to the Lowell Project?

A. _____miles

Q-8. During the past 12 months, when did you visit the Lowell Project? **(Please select one)**

1. Only on weekdays (Monday – Friday)
2. Only on weekends (Saturday or Sunday) and/or holidays
3. Both weekdays AND weekends and/or holidays

Q-9. On previous visits to the Lowell Project have you stayed overnight (not including your own home)?

2. Yes 2. No

Q-10. At what type of accommodations do you usually stay? (**Please select one)**

6. RV/Auto/Tent Campground
7. Motel/hotel
8. Bed and Breakfast
9. Vacation or Rental Home
10. Other (Please specify: _____)

Q-11. What was the approximate size of your group during your last trip to the Lowell Project area?

A. _____people

Q-12. Which of the following best describes your group during previous trips to the Lowell Project Area?

6. Individual
7. Adult group (over 21)
8. Youth group (under 21)
9. Family (with children)
10. Mixed group (groups with children, adults, and/or teens)

Q-13. On previous trips to the Lowell Project area, in which of the following activities have you or do you expect to participate? (**Please select all that apply**)

1. Bank fishing	12. Canoeing	24. RV camping
2. Boat fishing	13. Kayaking	25. Tent camping
3. Guided fishing experience	14. Commercial whitewater boating	26. Photography
4. Walking tour	15. Museum-going	27. Sightseeing
5. Hiking	16. Shopping and/or dining	28. Relaxing
6. Backpacking	17. Swimming	29. Sunbathing
7. Guided canal tours	18. Off-highway vehicle (dirt bike/ATV)	30. Dog walking
8. Historical/heritage site visits	19. Horseback riding	31. Painting/drawing
9. Running, jogging, and fitness	20. Off-road mountain biking	32. Other (please describe):

10. Rock climbing/bouldering	21. Road cycling
11. Picnicking	22. Adventure sports
	23. Geo-caching

Q-14. Of the activities you circled in **Q-13** above, what is the primary activity that you participated in during previous visits? (**Please write in the corresponding number from above**)

A. Primary activity # _____

Q-15. You selected (Primary Activity Number) as the Primary activity in Question 14. Please rate the following:

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Enjoyment	1	2	3	4	5
River/Canal Flow	1	2	3	4	5
Crowding	1	2	3	4	5
Overall Experience	1	2	3	4	5

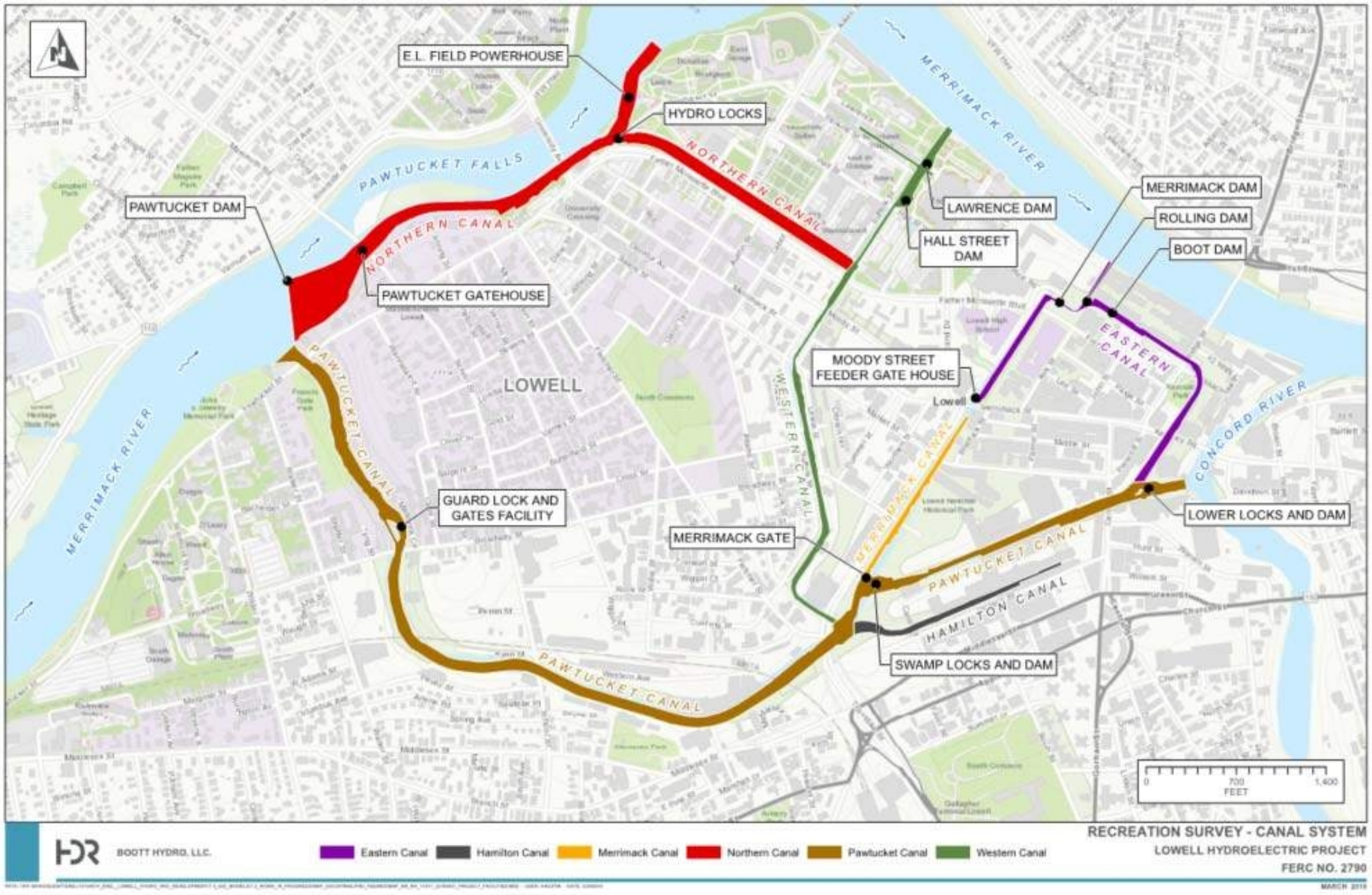
Q-16. Approximately how much money did you spend in preparation for or in association with your last recreational trip to the Lowell Project (meals, gas, lodging, equipment, etc.)?

A. $_____

Q-17. On previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in any of the canals shown in the below figure?

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Eastern Canal	1	2	3	4	5
Hamilton Canal	1	2	3	4	5
Merrimack Canal	1	2	3	4	5
Northern Canal	1	2	3	4	5
Pawtucket Canal	1	2	3	4	5
Western Canal	1	2	3	4	5

Lowell Canal System



Q-19. Thinking about your visit to the Lowell Heritage State Park…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-20. Thinking about your visit to the Merrimack River Trail….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-21. Thinking about your visit to the E.L. Field Powerhouse Visitor Center…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-22. Thinking about your visit on the NPS Walkway Tours….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-23. Thinking about your visit to the Riverwalk Ramble….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-24. Thinking about your visit to the Waterpower Walk….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-25. Thinking about your visit to the Heritage Hike….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-26. Thinking about your visit to the Northern Canal Walkway….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-27. Thinking about your visit to the Redevelopment Rove….

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-28. Thinking about your visit to boat access facilities on the Lowell Project impoundment…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-29. Thinking about your visit to the Rourke Brothers Boat Ramp…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-30. Thinking about your visit to the Pawtucket Falls Overlook…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-31. Thinking about your visit to the Chelmsford Boat Access…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	

Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-32. Thinking about your visit to the Merrill Park…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-33. Thinking about your visit to the Greeley Boat Ramp…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-34. Thinking about your visit to the Depot St. Boat Ramp…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-35. Thinking about your visit to the Moore's Falls Conservation Area…

(please use the following numerical scale to rate the recreation area)

1.) Totally Unacceptable
2.) Unacceptable
3.) Neutral
4.) Acceptable
5.) Totally Acceptable

Accessibility	
Parking	
Crowding	
Safety	
Condition of Recreation Facilities	
Available Amenities	
River/Canal Flow	
Overall Experience	

Q-36. Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project.

4. Type of recreation enhancement:_____

   Location(s):_____
   _____

5. Type of recreation enhancement:_____

   Location(s):_____
   _____

6. Type of recreation enhancement:_____

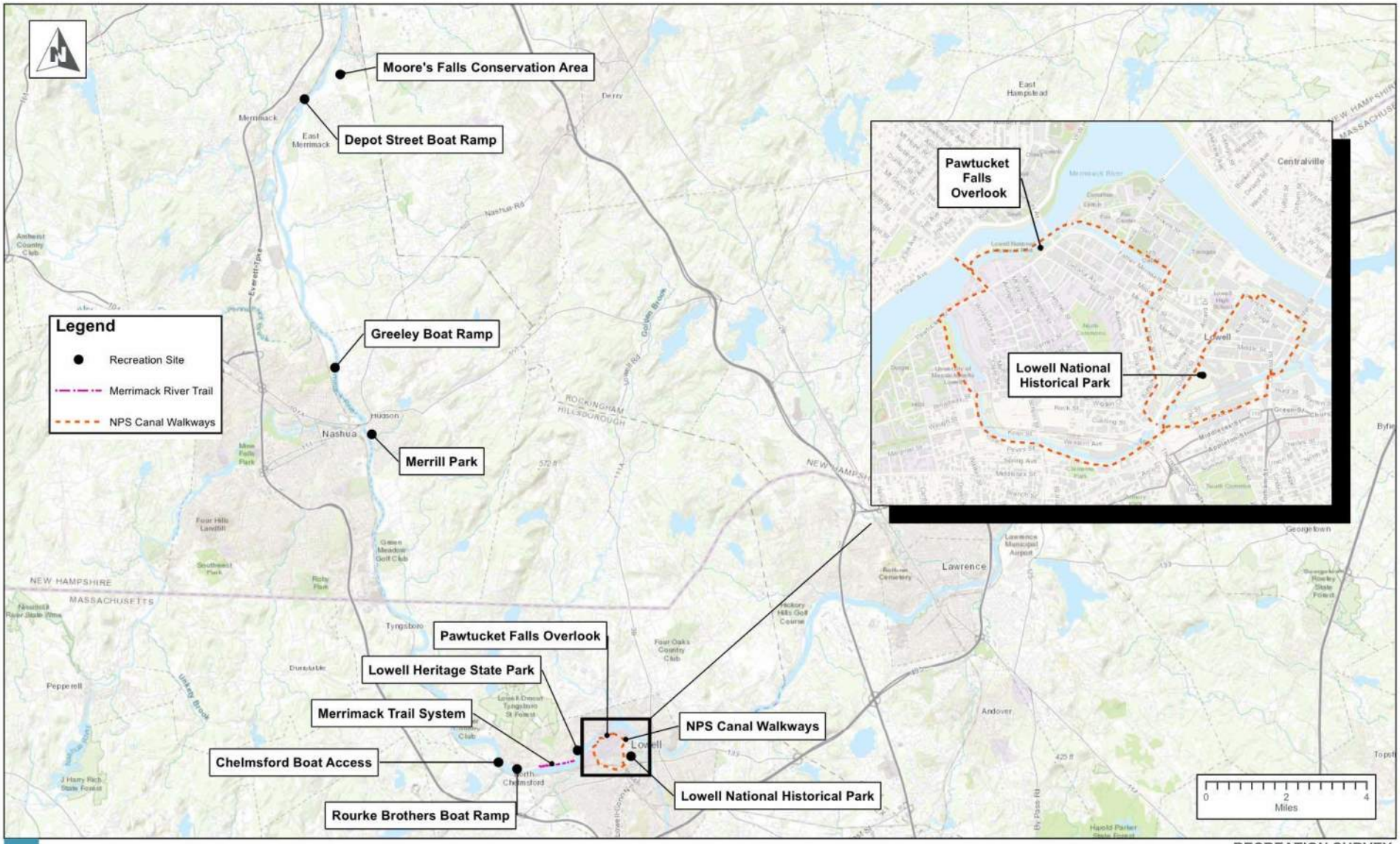
   Location(s):_____

Q-37. Please share any other comments that you have regarding recreation at the Lowell Project:
_____
_____
_____

Thank you for completing the Online Recreation Survey!

Appendix B - Recreation Inventory Map and Notes

Map of Recreation Inventory Areas



BOOTT HYDRO, LLC.

RECREATION SURVEY

LOWELL HYDROELECTRIC PROJECT

FERC NO. 2790

APRIL 2020

Recreation Inventory Notes

Chelmsford Boat Access
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Parking lot for approximately 50 cars - Parking circle - Boat trailer only parking	- Signage with public launch information - Kiosk with boat access rules and regulations - Blank kiosk	- Boat ramp - River trail - Picnicking tables - Waste receptacles	- Structural damage to boat ramp - Picnic tables noted to need ongoing maintenance - Trash receptables in good condition	- Baseball/softball fields

Photo 1 – Chelmsford Boat Access Kiosk

Photo 2 – Chelmsford Boat Access Ramp

Depot Street Boat Ramp
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- 6-8 car capacity parking lot - Emergency parking - Offstreet overflow parking	- Signage with public boat ramp information - Kiosk with boat access rules and regulations - Kiosk with information on the Landing Site of Reeds Ferry	- Boat ramp - Short trail to boat ramp with tunnel - Trash receptacles	- Boat ramp in good condition - Trail in good condition - Trash receptacles noted in good condition	- Grassy area for picnicking -

Photo 3 – Depot Street Boat Ramp Sign

Photo 4 – Depot Street Boat Ramp

Greeley Boat Ramp
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Parking for 2 near boat ramp - Parking for 4 just above boat ramp	- Entry signage with park hours and rules - Poor, unreadable signage near boat ramp	- Boat ramp - Off-road trail	- Boat ramp reported in good condition - Trail noted in good condition	- Access road

Photo 5 – Access road to Greeley Boat Ramp

Photo 6 – Greeley Boat Ramp

Lowell Heritage State Park
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- 20-30 car parking lot - Street parking	- Signage with rules, directions, and park hours	- Outdoor stage with grassy lawn - Sand beach - Benches - Pavilion - Emergency boat ramp	- All recreation amenities reported in good condition	- Restrooms inside building - Waste receptacles

Photo 7 – Parking lot at Lowell Heritage State Park

Photo 8 – Outdoor stage at Lowell Heritage State Park

Photo 9 – Beach at Lowell Heritage State Park

Lowell National Historical Park (Visitor Center)
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Ample free car parking lot (~100 spots) -	- "Bus, RV and Trailer Parking Only" - Lowell National Historical Park Visitor Center Sign - Visitor Center Sign with hours - Map of Lowell National Historical Park Features	- Standing exhibits with historical and hydropower information - Interactive equipment for education - Restrooms and water-fountain	- All recreation amenities reported in good condition	- Information front desk - Wheel chair ramp - Gift shop - Restrooms

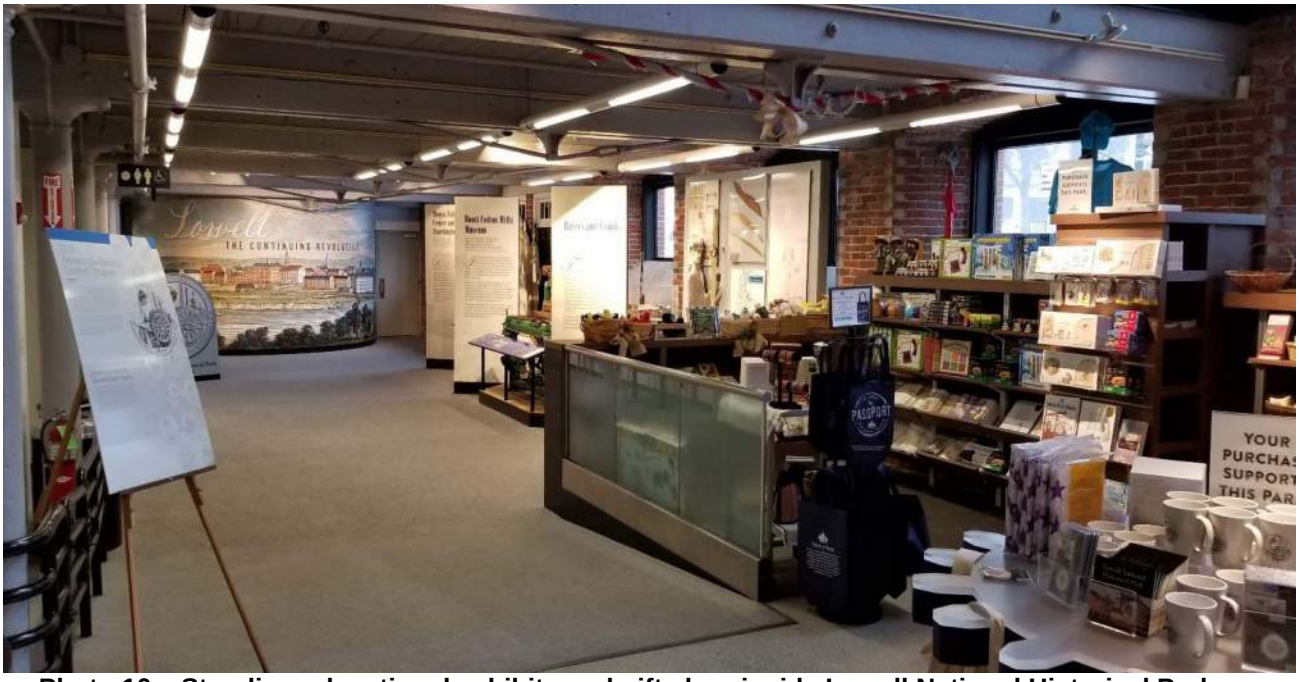


Photo 10 – Standing educational exhibits and gift shop inside Lowell National Historical Park Visitor Center

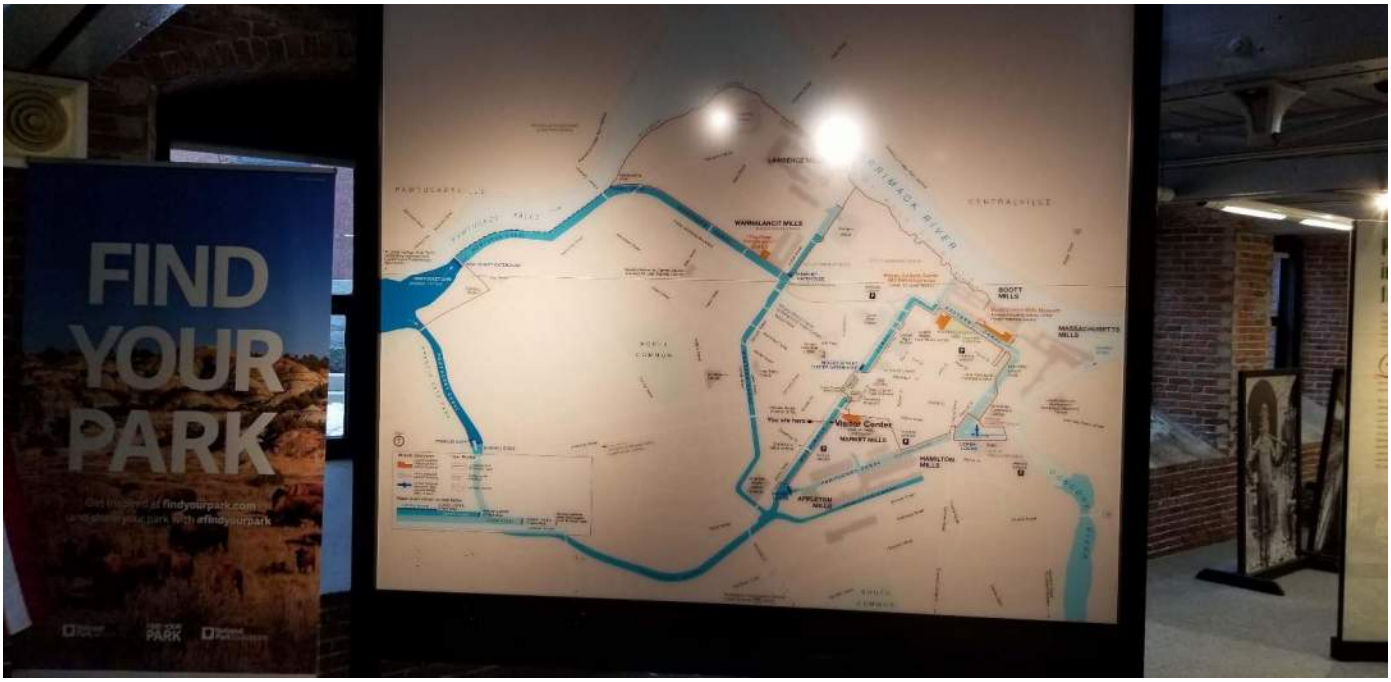


Photo 11 – Map of canal layout and Lowell National Historical Park Features (located inside Visitor Center)

Merrill Park
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- No formal park lot Dirt parking area for approximately 5 cars	- Entry sign to park	- Walking trail - Hand-carry launch area	- Parking area is minimal, could be graded, many deep ruts - Hand-carry launch and walking trail acceptable	- Bicycle motocross jump - Adjacent to graveyard (common area for dog walking)

Photo 12 – Entry sign to Merrill Park

Photo 13 –Access road to Merrill Park

Merrimack Trail System
Recreation Inventory
December 17, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Parking for approximately 20 cars - Street parking	- Welcome sign with rules and hours	- Trail to water - Walking trails - Benches - Trash receptacles - Bathrooms	- All recreation amenities reported in good condition	- Not applicable

Photo 14 – Walking Path

Moore's Falls Conservation Area
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Parking lot for 7-11 cars	- Welcome kiosk with rules and information on young forest and shrubland - Welcome sign with rules - Caution signs regarding hunting and other uses of the area - Educational exhibits with environmental information	- Trails - Educational exhibits	- All recreation amenities reported in good condition	- Birdhouses

Photo 15 – Welcome Kiosk to Moore's Falls Conservation Area

Photo 16 – Birdhouses at Moore's Falls Conservation Area

National Park Service Canal Walkways
Recreation Inventory
December 17, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Parking available at NPS Visitor Center	- Information and direction signs - Educational exhibits and signs	- Canalways - Benches - Education signs - Lighting	- All recreation amenities reported in good condition	- Not applicable

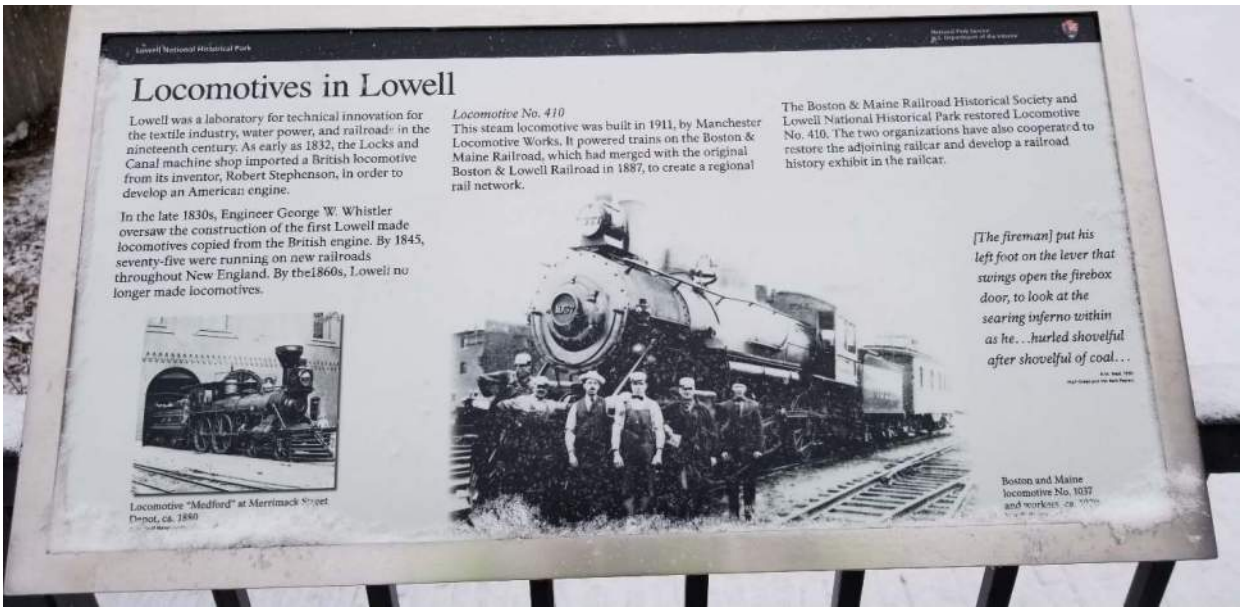


Photo 17 – Example photograph of educational signs

Photo 18 – Canalways and benches along Merrimack Canal Walk

Pawtucket Falls Overlook
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Not applicable	- Educational signage	- Overlook area	- Good condition	- Not applicable

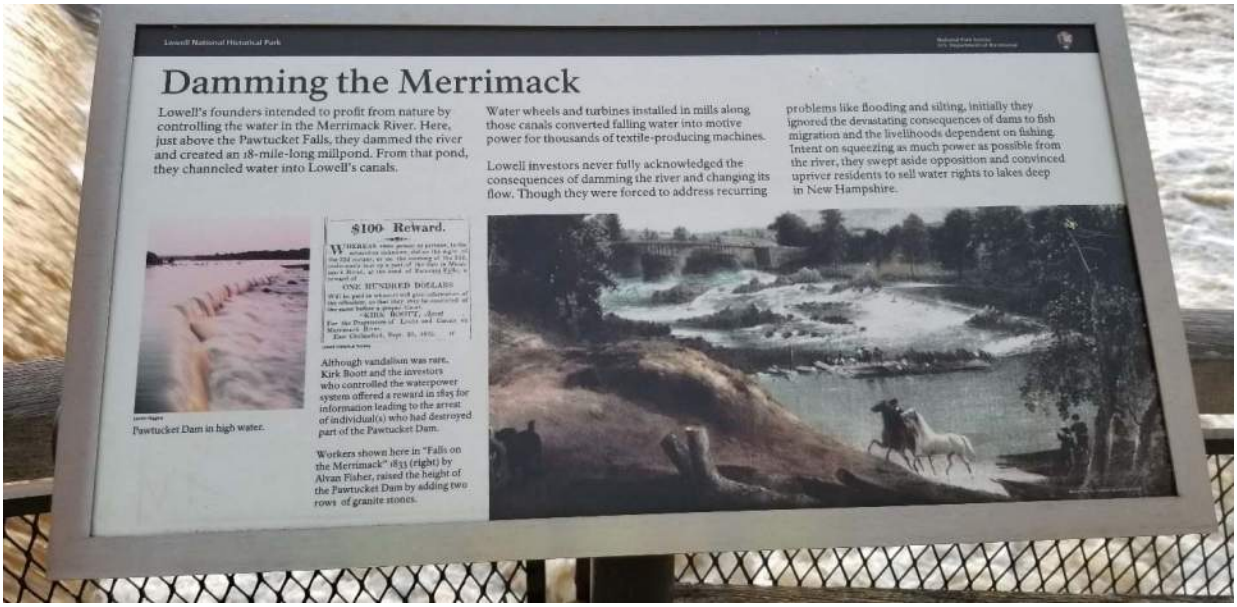


Photo 19 – Educational sign at the Pawtucket Falls Overlook

Photo 20 – View of dam and Pawtucket Falls from Pawtucket Falls Overlook

Rourke Brothers Boat Ramp
Recreation Inventory
December 16, 2019

Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- Parking for approximately 60 cars - Handicap parking/ADA-compliant	- Welcome sign - Kiosk with rules and regulations - Rourke Brothers Memorial Sign	- Boat ramp - Dock - Tables	- All recreation amenities reported in good condition	- Grassy picnic areas

Photo 21 – Kiosk with rules and regulations

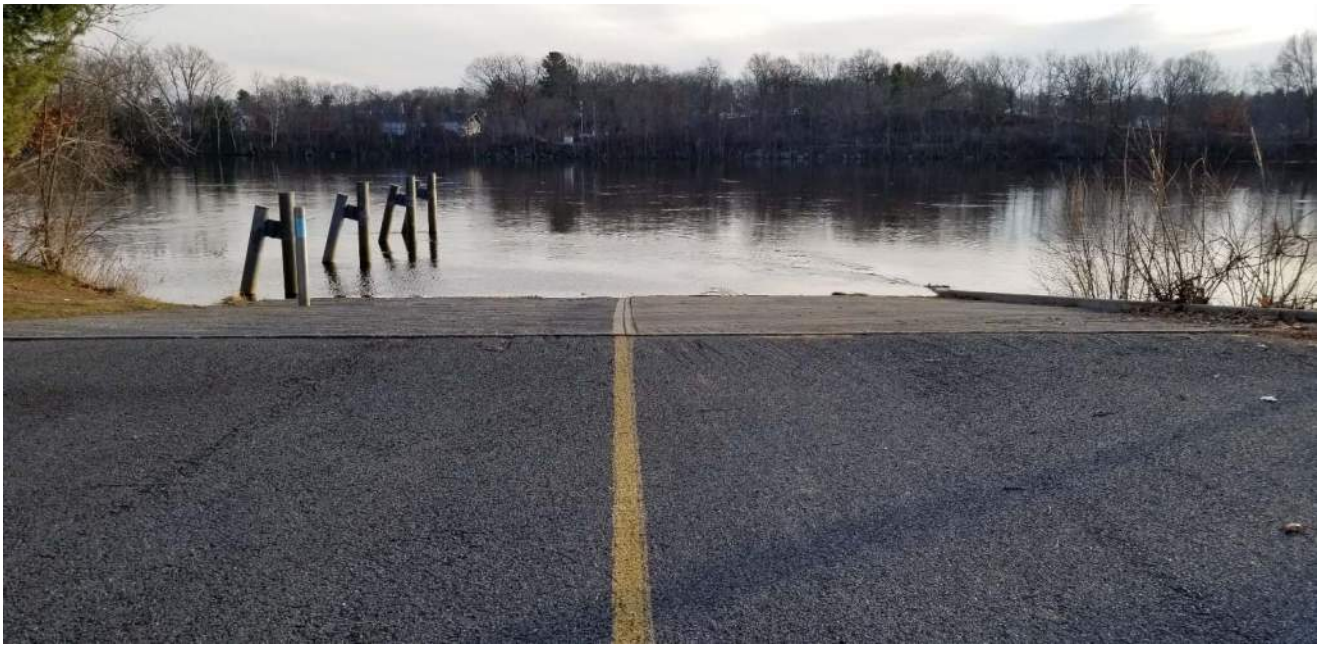


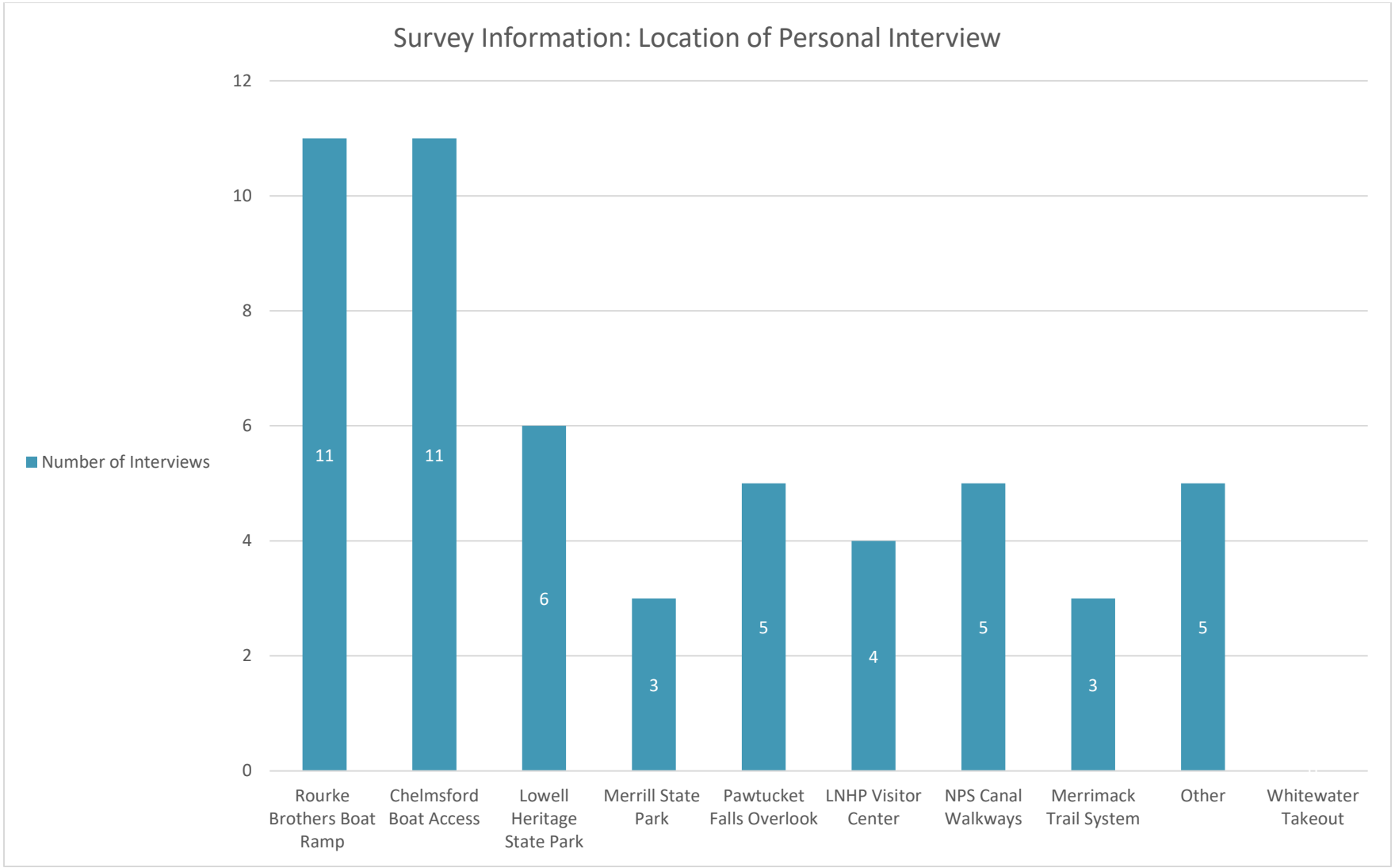
Photo 22 – Paved Rourke Brothers Boat Ramp

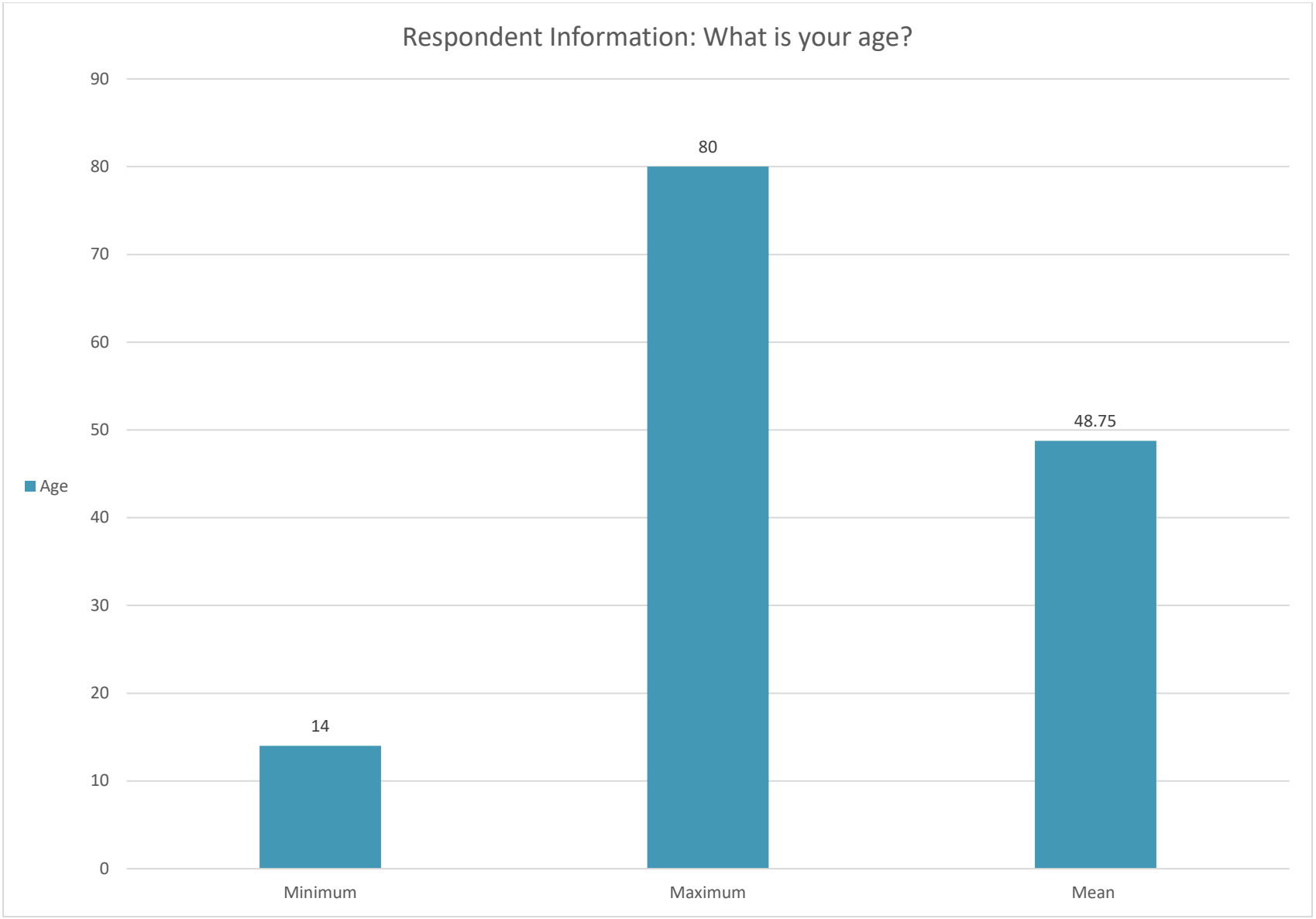
E.L. Field Powerhouse Visitor Center
Recreation Inventory
December 16, 2019

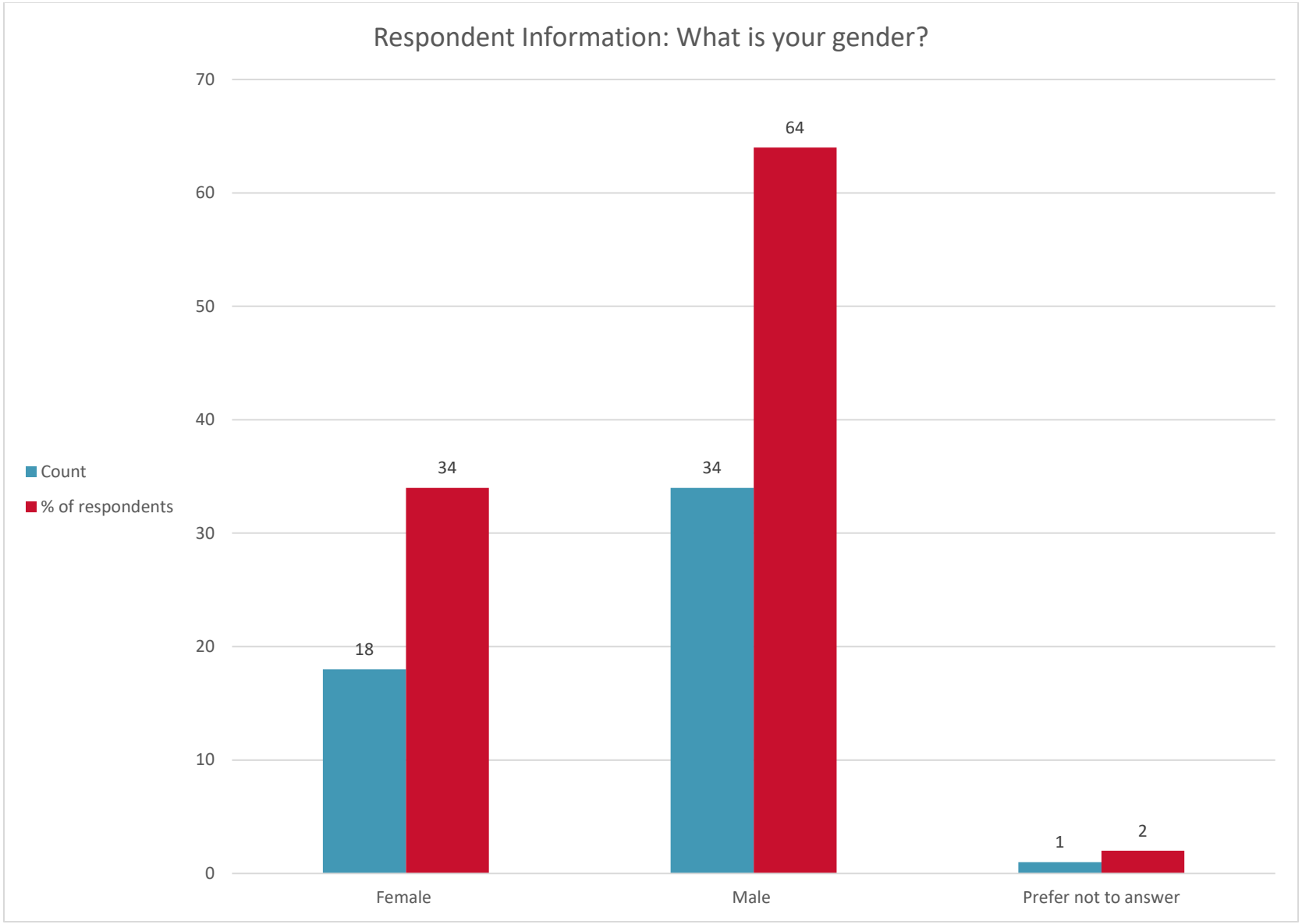
Parking	Signage	Recreation Amenities	Condition of Recreation Amenities	Additional Features
- **Large locked gated area available for parking** - **Asphalt/gravel parking area**	- Welcome sign	- Standing exhibits with historical and hydropower information - Interactive and interpretive equipment for education	- Reported in good condition	- ADA-compliant elevator

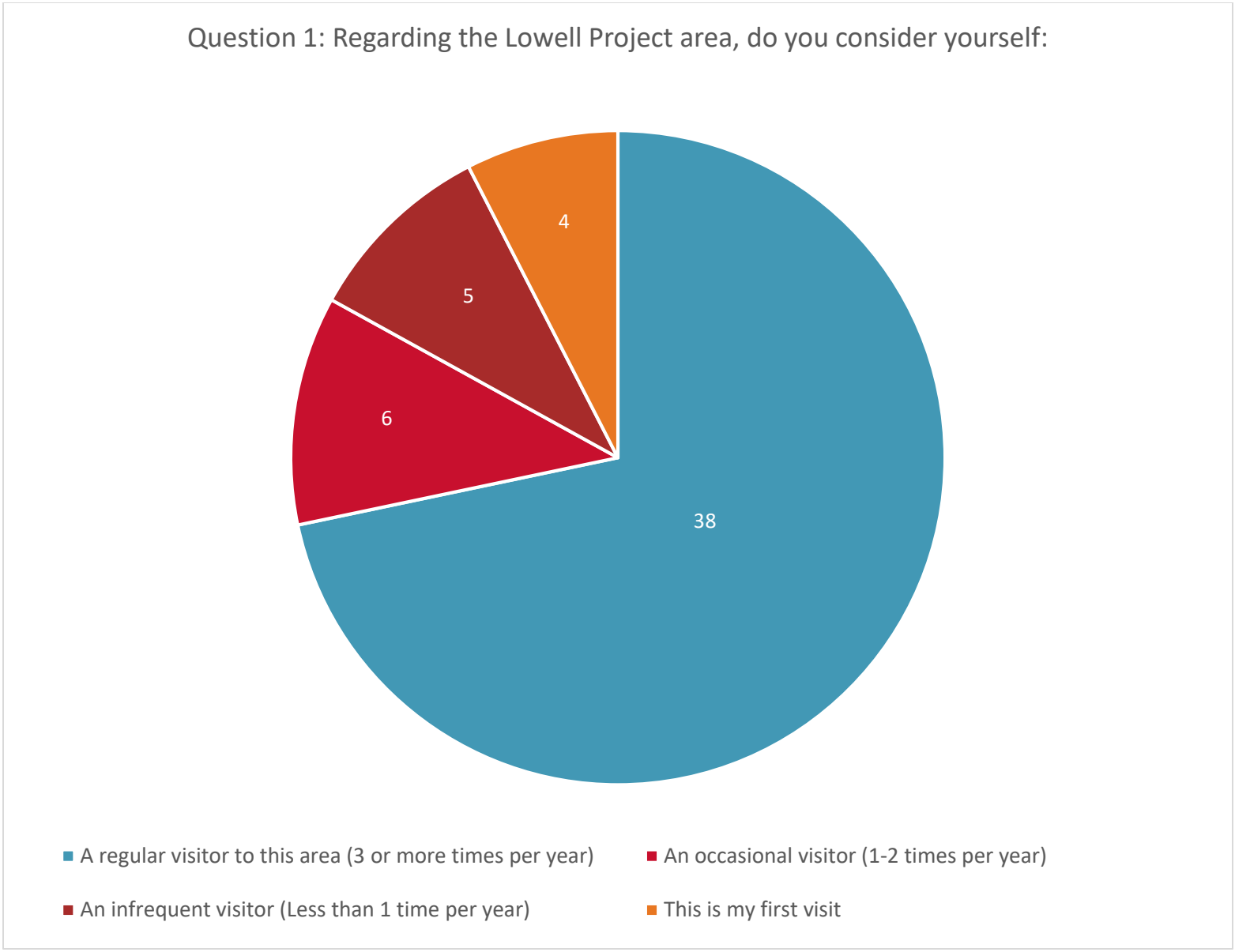
*****The E.L. Field Powerhouse Visitor Center was closed the days of inventory. Only the outside portions were included in this inventory.

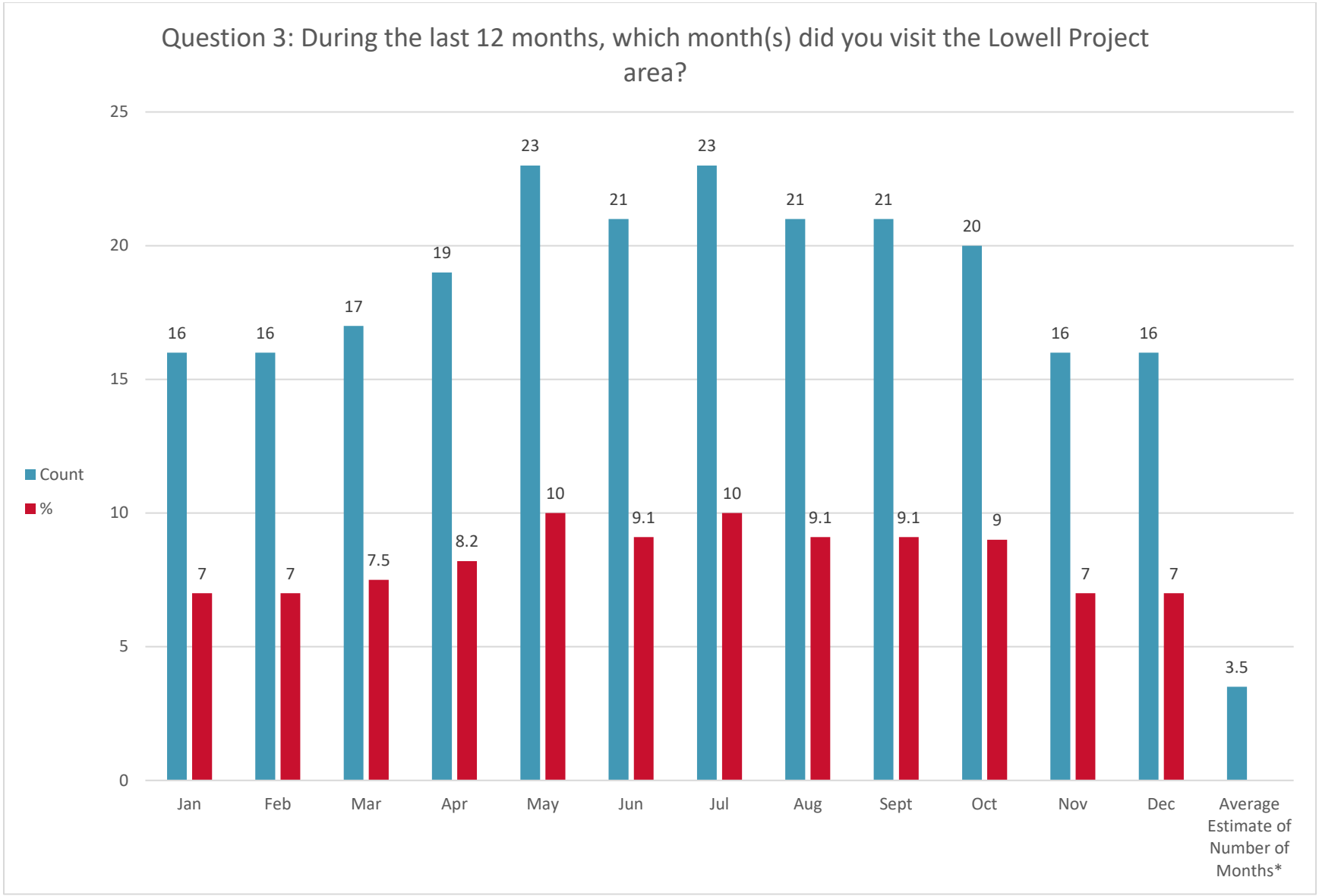
Appendix C - Personal Interview/Visitor-Intercept Survey Data


Survey Information: Location of Personal Interview
Number of Interviews
12
10
8
6
4
2
0
11
11
6
3
5
4
5
3
5
Rourke Brothers Boat Ramp
Chelmsford Boat Access
Lowell Heritage State Park
Merrill State Park
Pawtucket Falls Overlook
LNHP Visitor Center
NPS Canal Walkways
Merrimack Trail System
Other
Whitewater Takeout

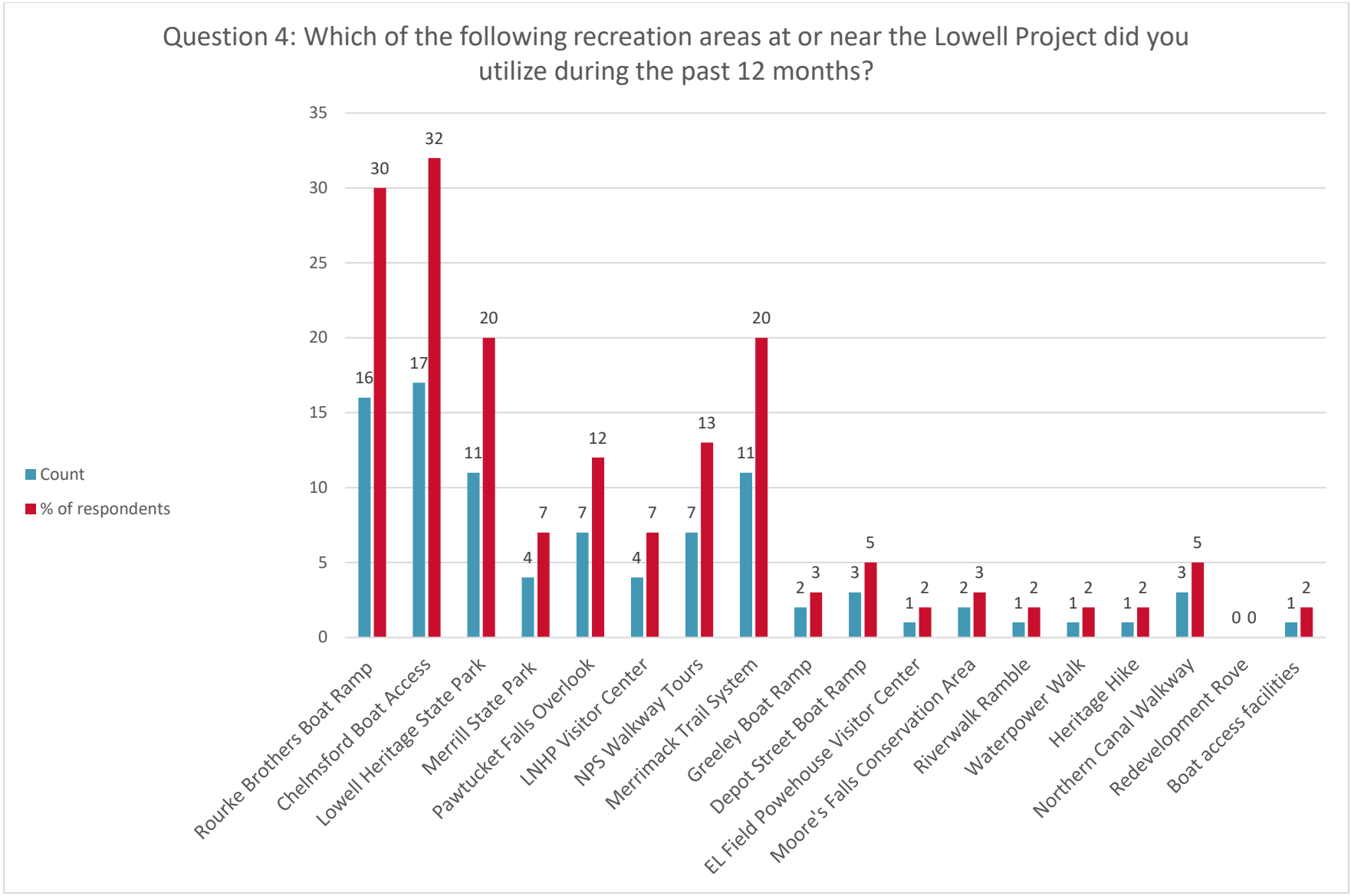

Respondent Information: What is your age?
90
80
70
60
50
40
30
20
10
0
Age
80
48.75
14
Minimum
Maximum
Mean

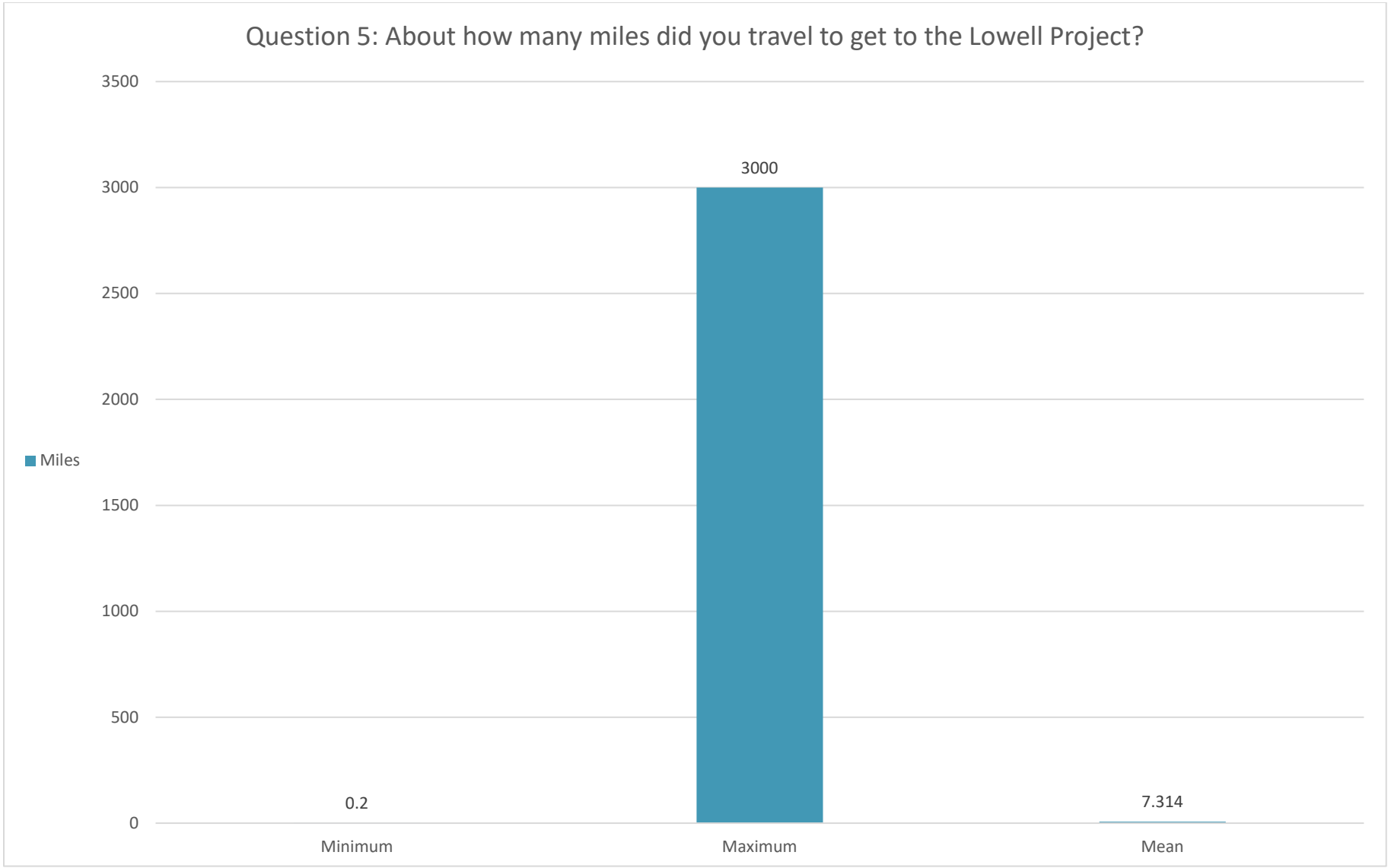

Respondent Information: What is your gender?
70
60
50
40
30
20
10
0
Count
% of respondents
18
34
34
64
1
2
Female
Male
Prefer not to answer


Question 1: Regarding the Lowell Project area, do you consider yourself:
38
6
5
4
A regular visitor to this area (3 or more times per year)
An occasional visitor (1-2 times per year)
An infrequent visitor (Less than 1 time per year)
This is my first visit

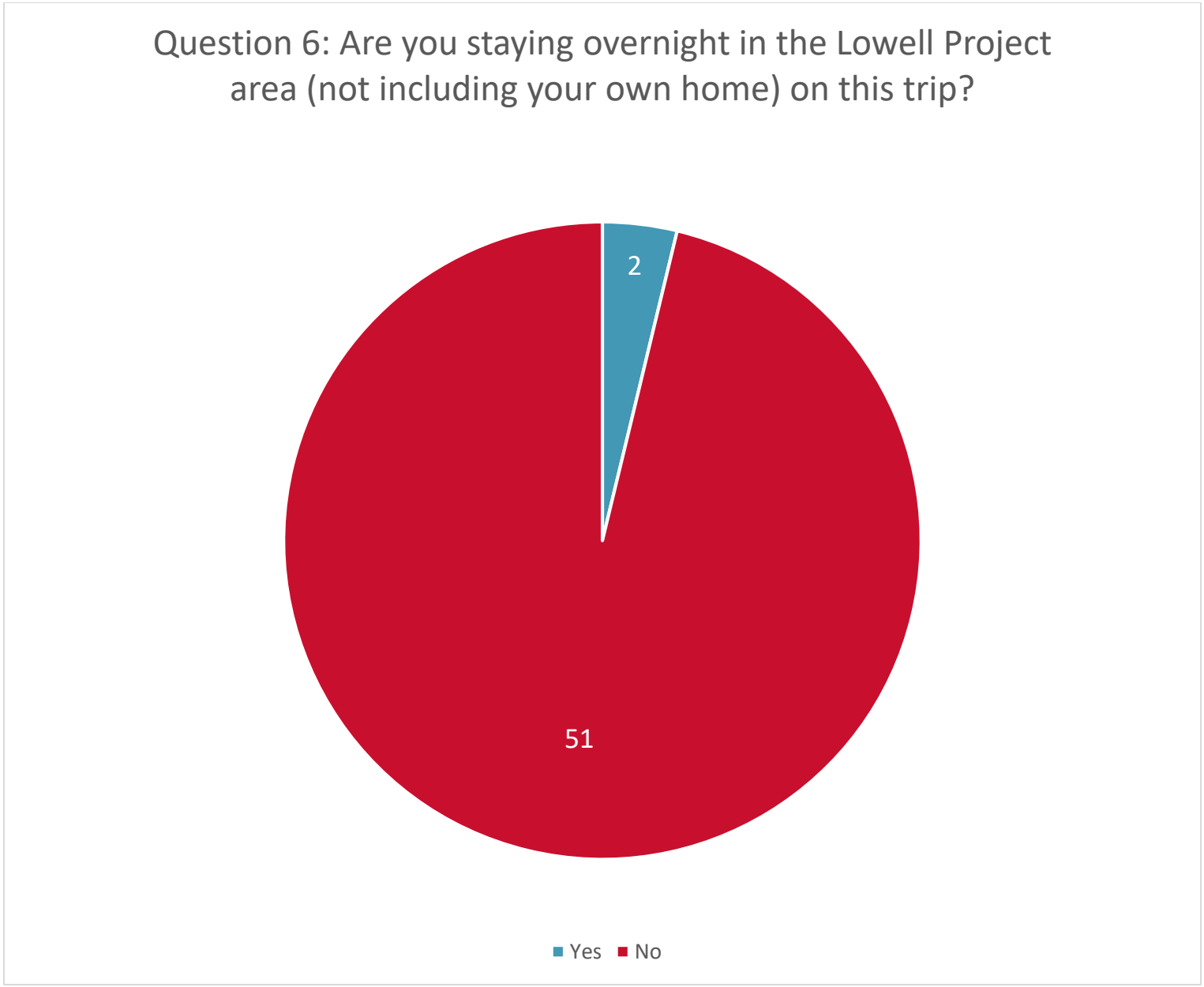


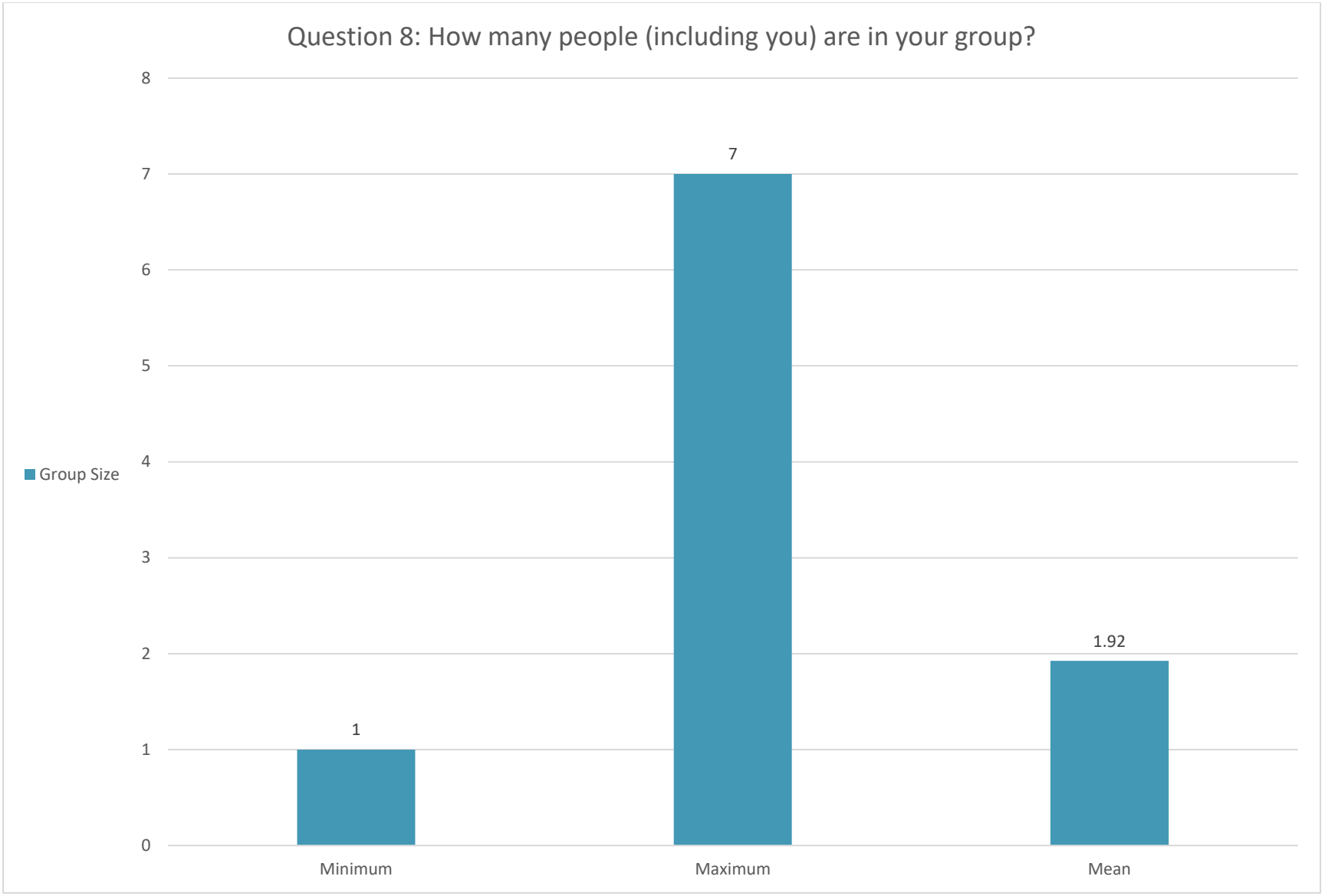
*A small number of respondents interpreted Question 3 as asking how many months during the last 12 months they visited the Project. This is the average of those responses.


Question 4: Which of the following recreation areas at or near the Lowell Project did you utilize during the past 12 months?
Count
% of respondents
35
30
25
20
15
10
5
0
16
30
17
32
11
20
4
7
7
12
4
7
7
13
11
20
2
3
3
5
1
2
2
3
1
2
1
2
1
2
3
5
0 0
1
2
Rourke Brothers Boat Ramp
Chelmsford Boat Access
Lowell Heritage State Park
Merrill State Park
Pawtucket Falls Overlook
LNHP Visitor Center
NPS Walkway Tours
Merrimack Trail System
Greeley Boat Ramp
Depot Street Boat Ramp
EL Field Powehouse Visitor Center
Moore's Falls Conservation Area
Riverwalk Ramble
Waterpower Walk
Heritage Hike
Northern Canal Walkway
Redevelopment Rove
Boat access facilities

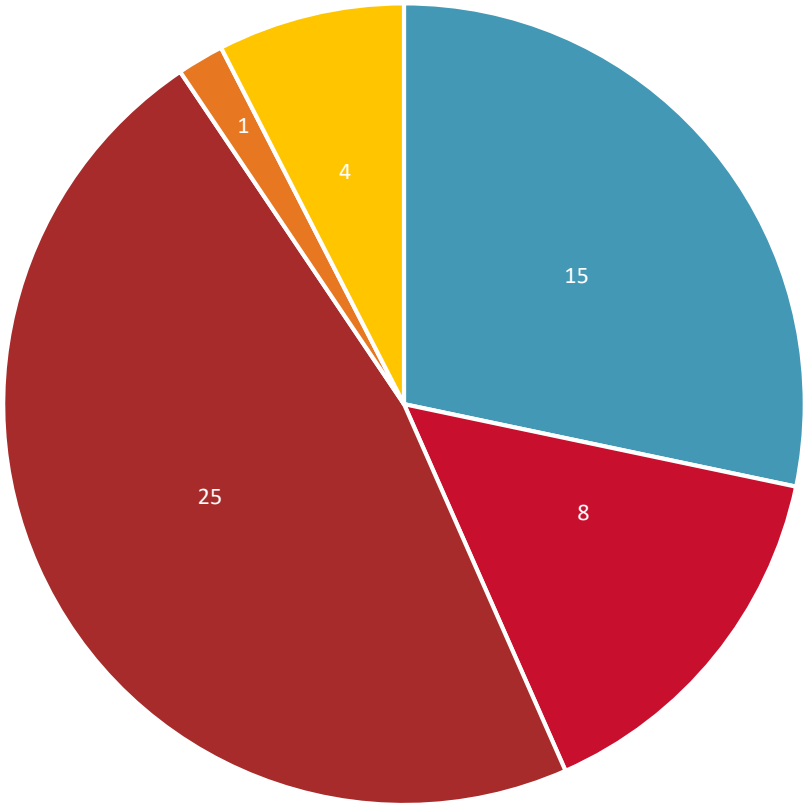


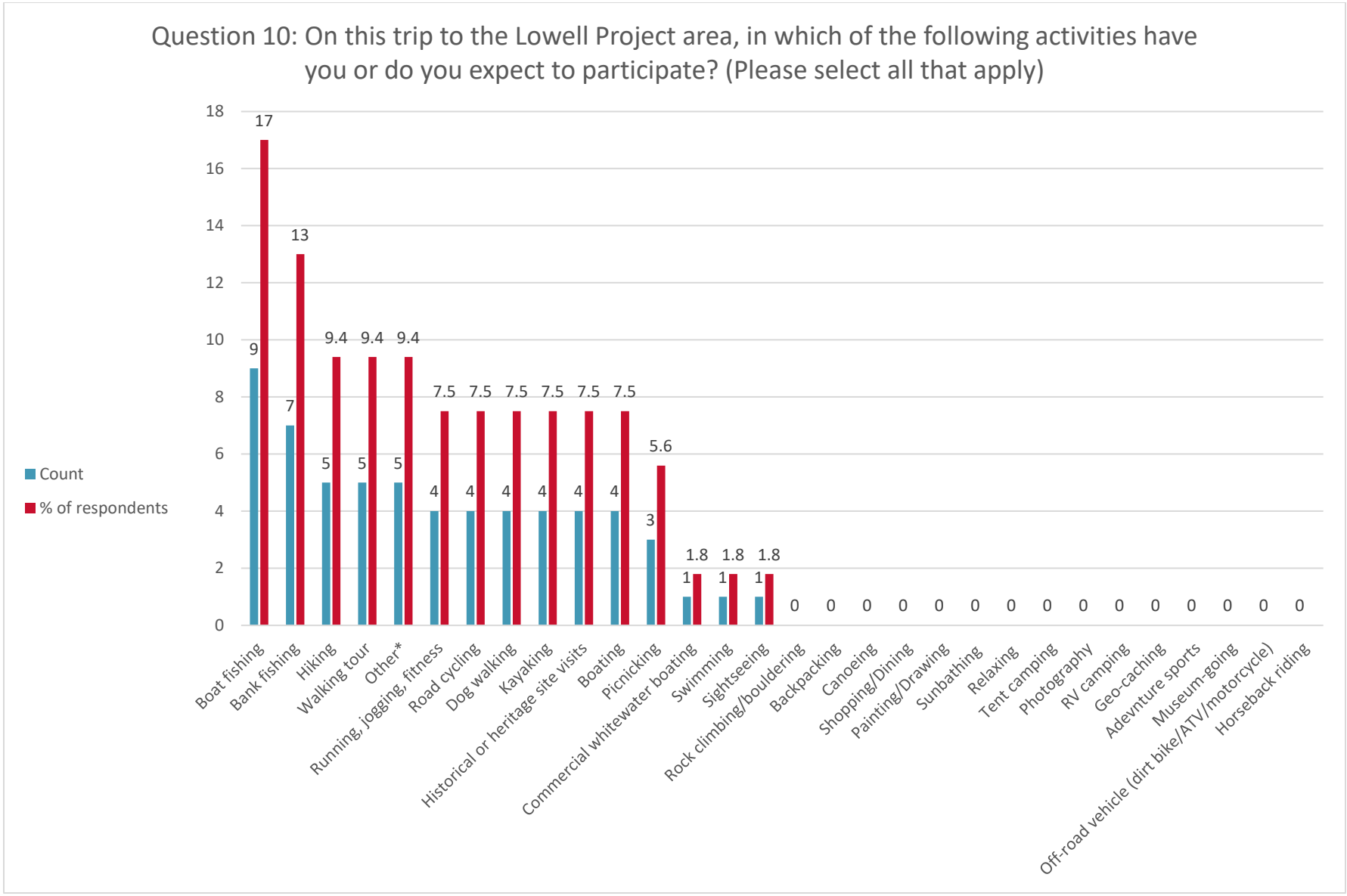
*The mean does not include the 3,000 miles as it would significantly skew the results. To see the full list of respondent residential zip codes and a representative map, see Appendix F.


Question 6: Are you staying overnight in the Lowell Project area (not including your own home) on this trip?
2
51
Yes
No

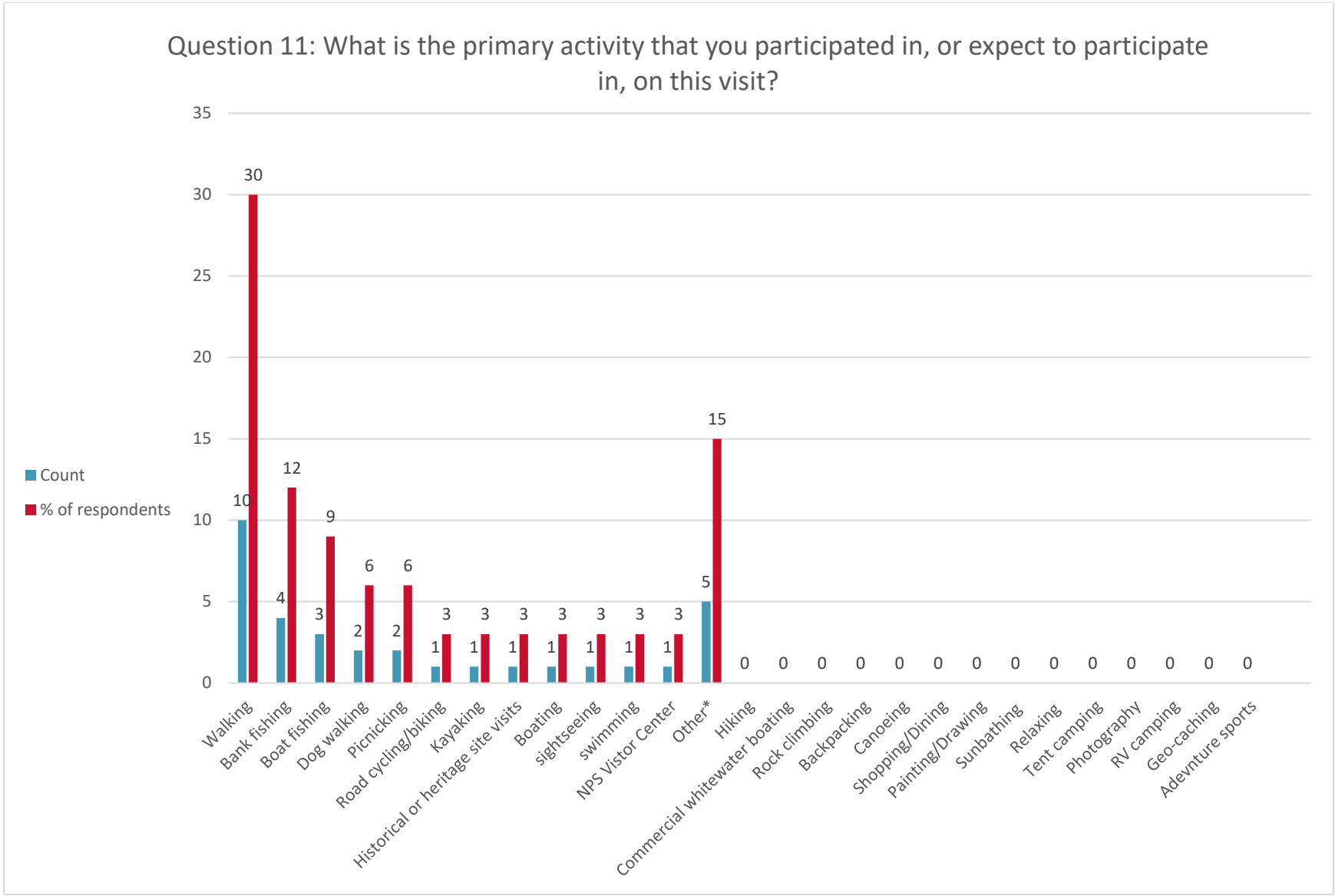

Question 8: How many people (including you) are in your group?
8
7
6
5
4
3
2
1
0
Group Size
1
7
1.92
Minimum
Maximum
Mean

Question 9: Which of the following best describes your group during this trip?

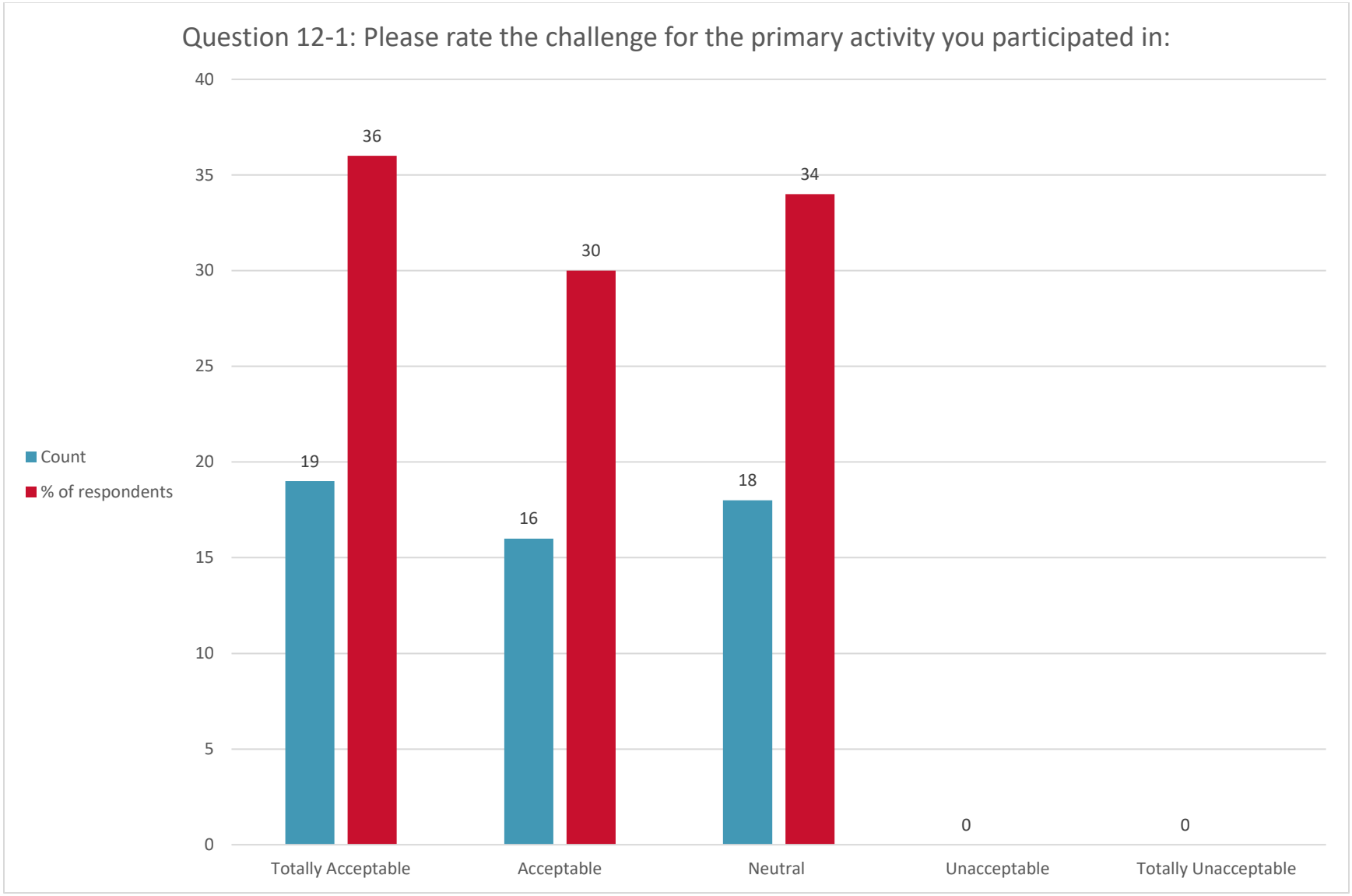


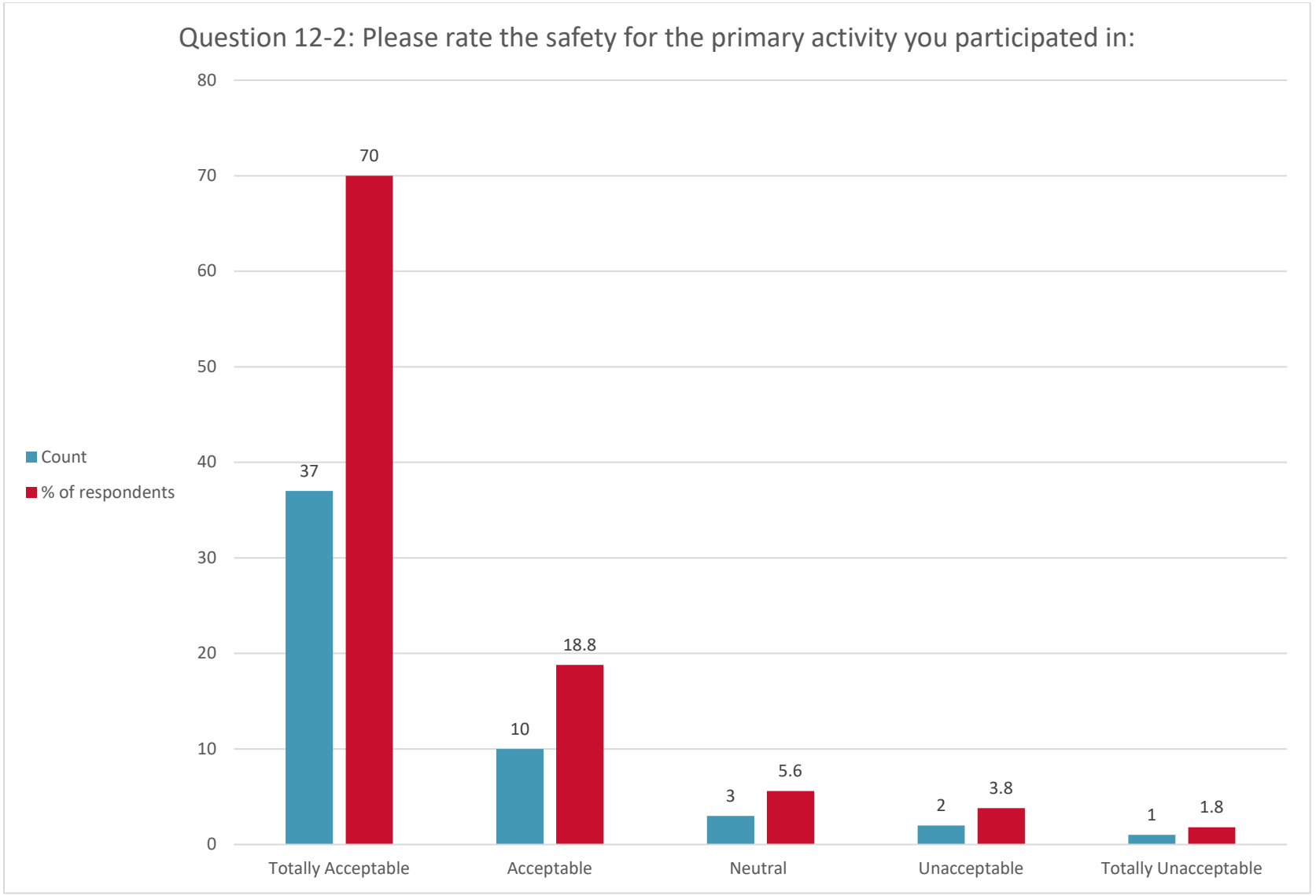


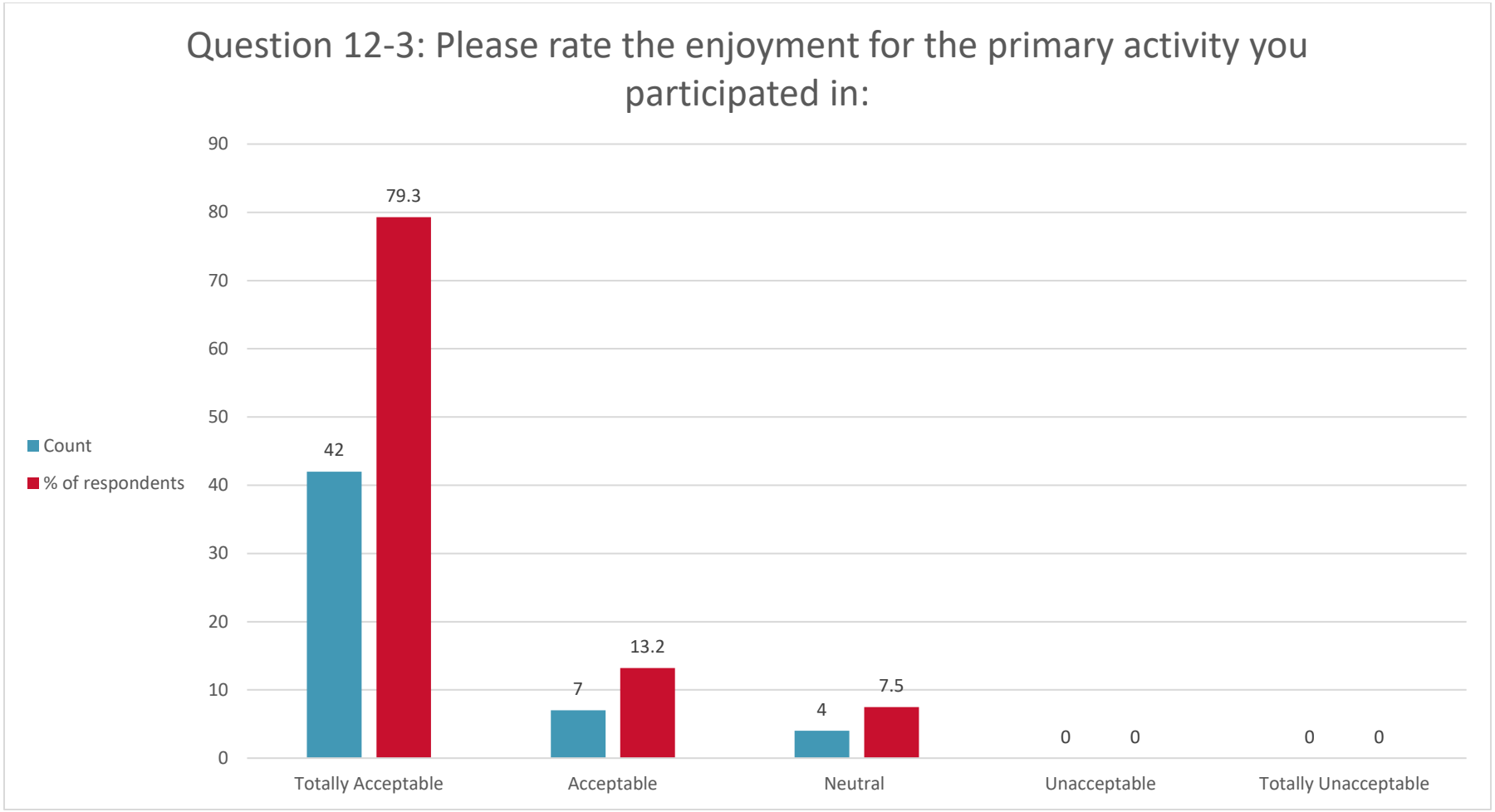
*Other activities included duck feeding, playground, jet skiing, rowing, and wake boarding.

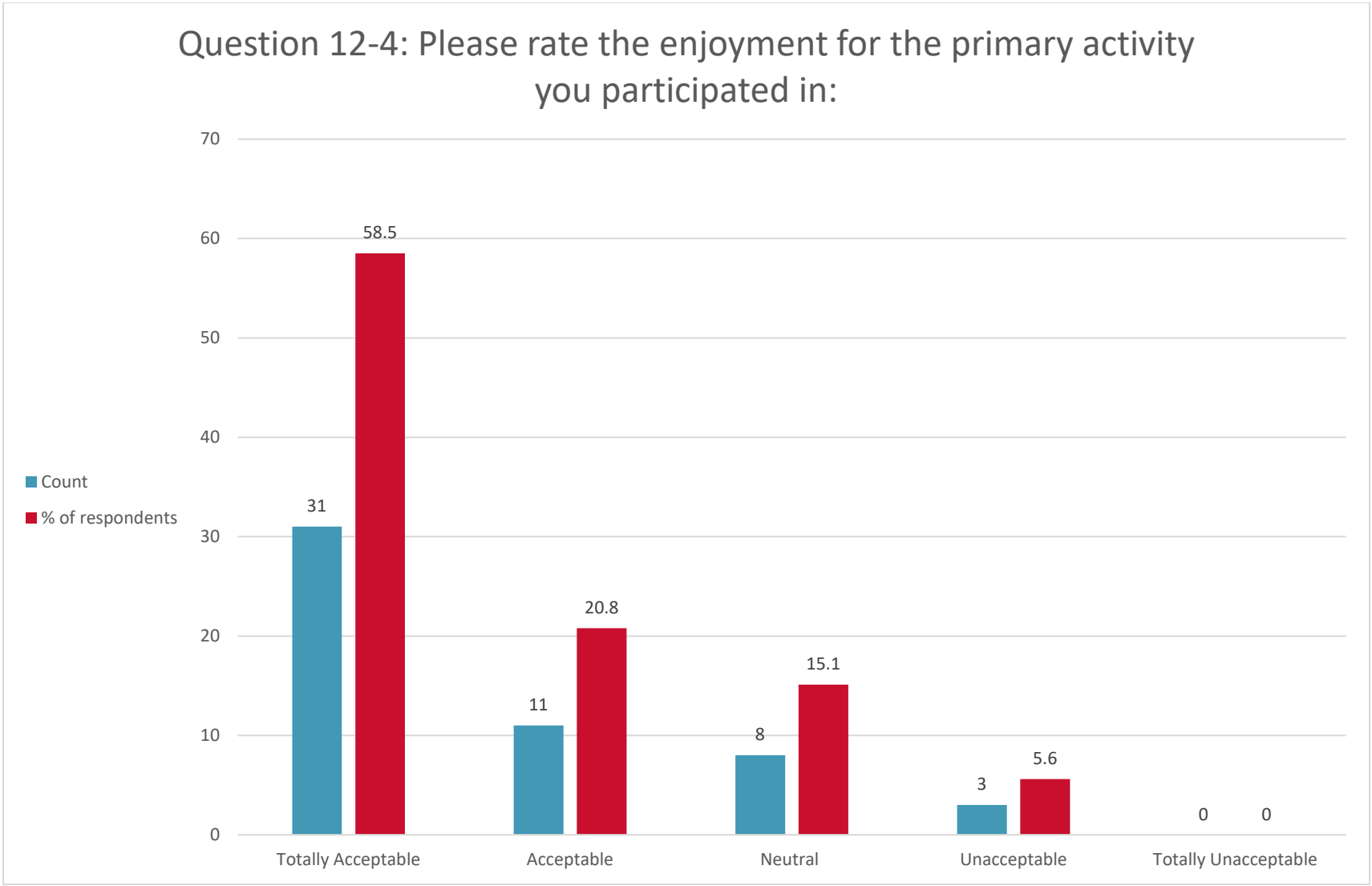


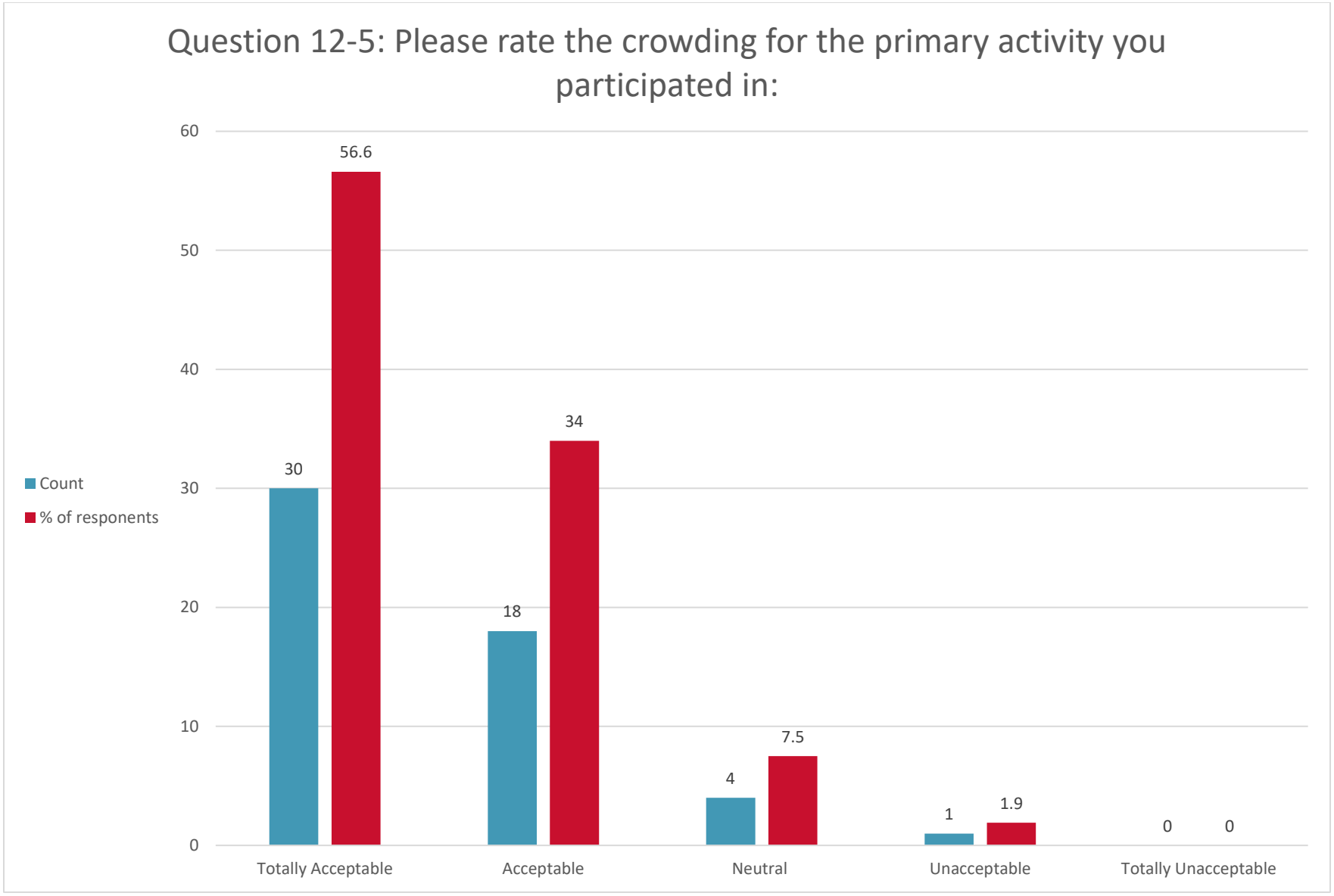
*Other activities included duck feeding, playground, jet skiing, rowing, and wake boarding.

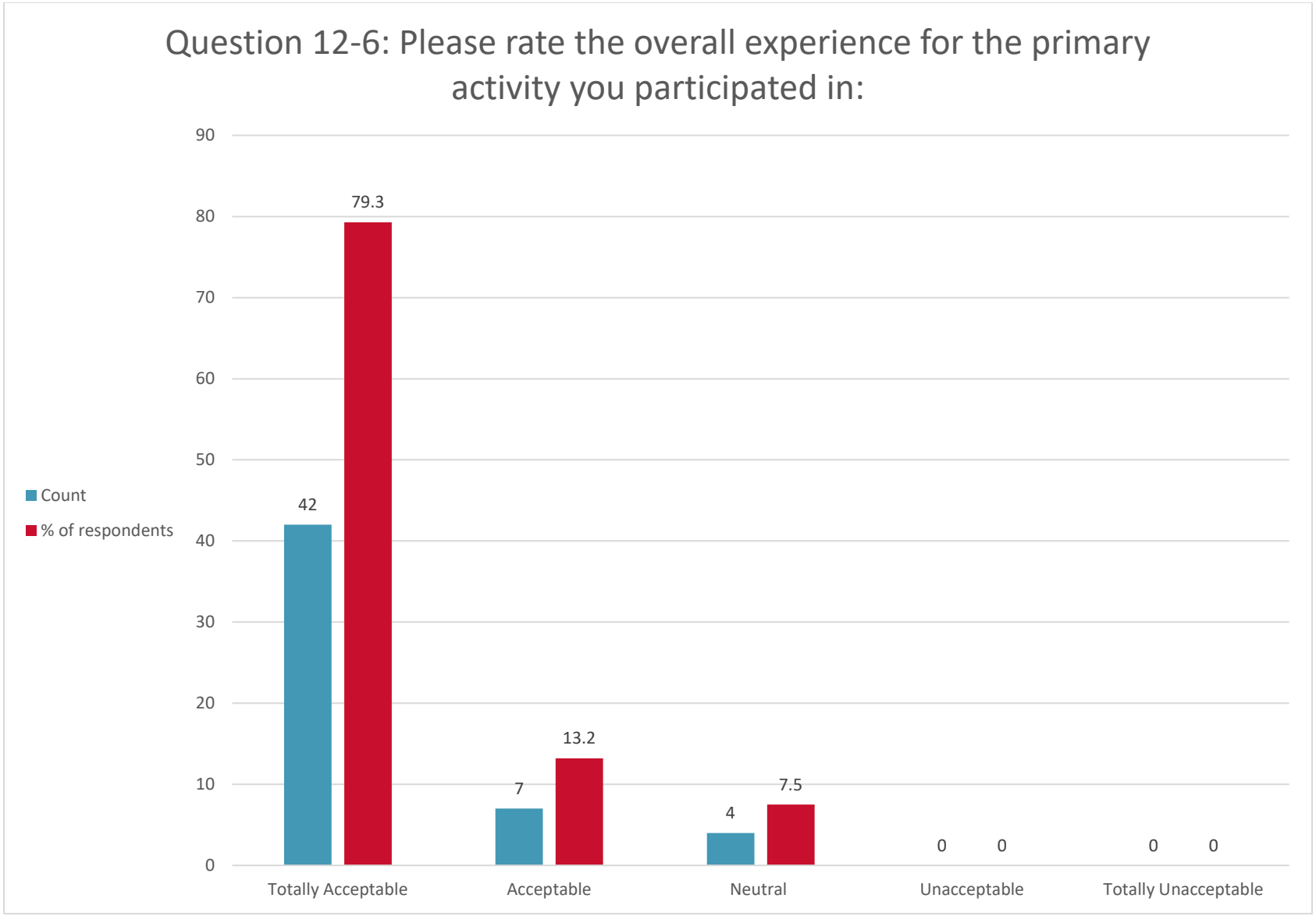

Question 12-1: Please rate the challenge for the primary activity you participated in:
40
35
30
25
20
15
10
5
0
Count
% of respondents
19
36
16
30
18
34
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

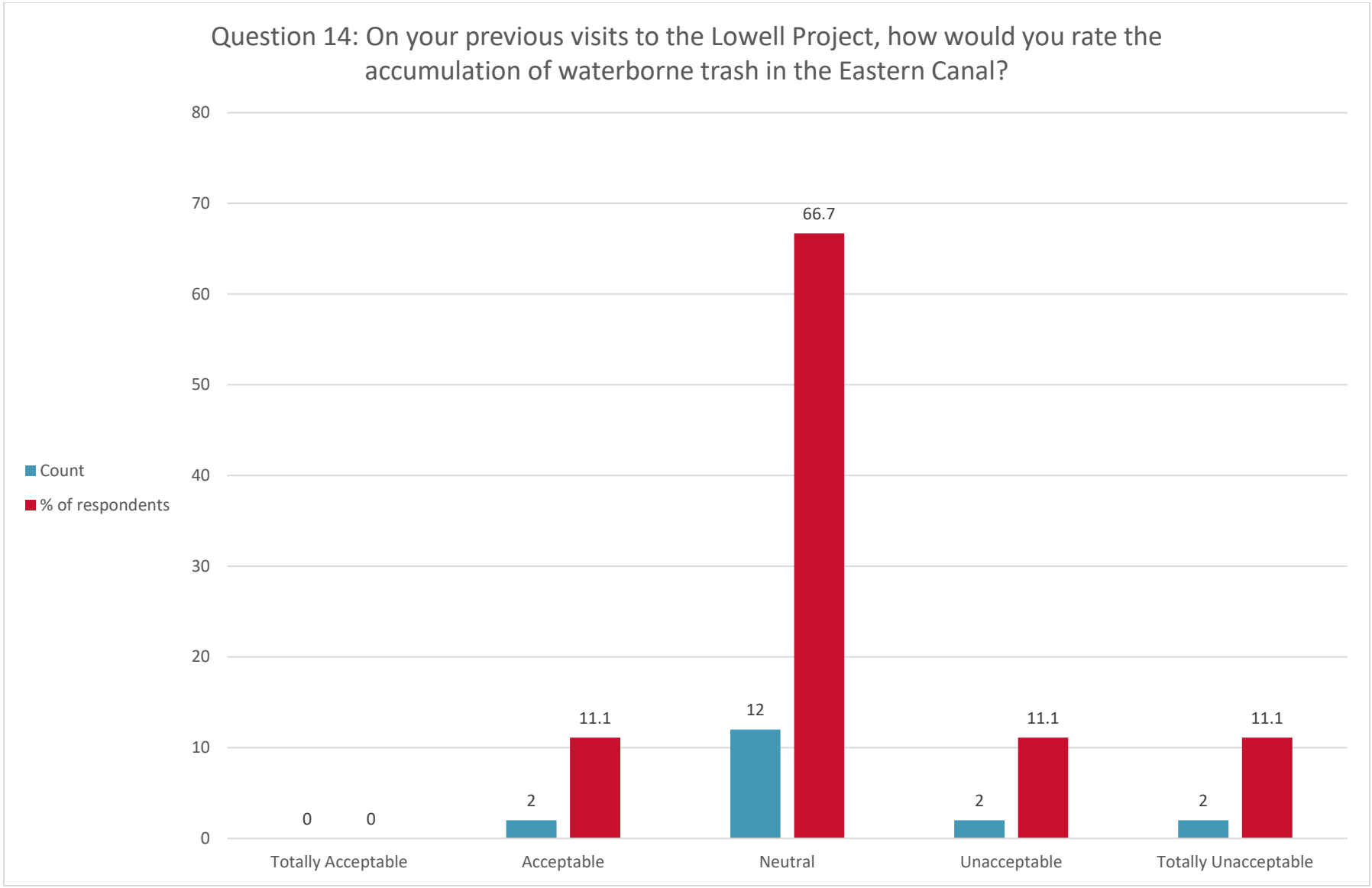

Question 12-2: Please rate the safety for the primary activity you participated in:
80
70
60
50
40
30
20
10
0
Count
% of respondents
37
70
10
18.8
3
5.6
2
3.8
1
1.8
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

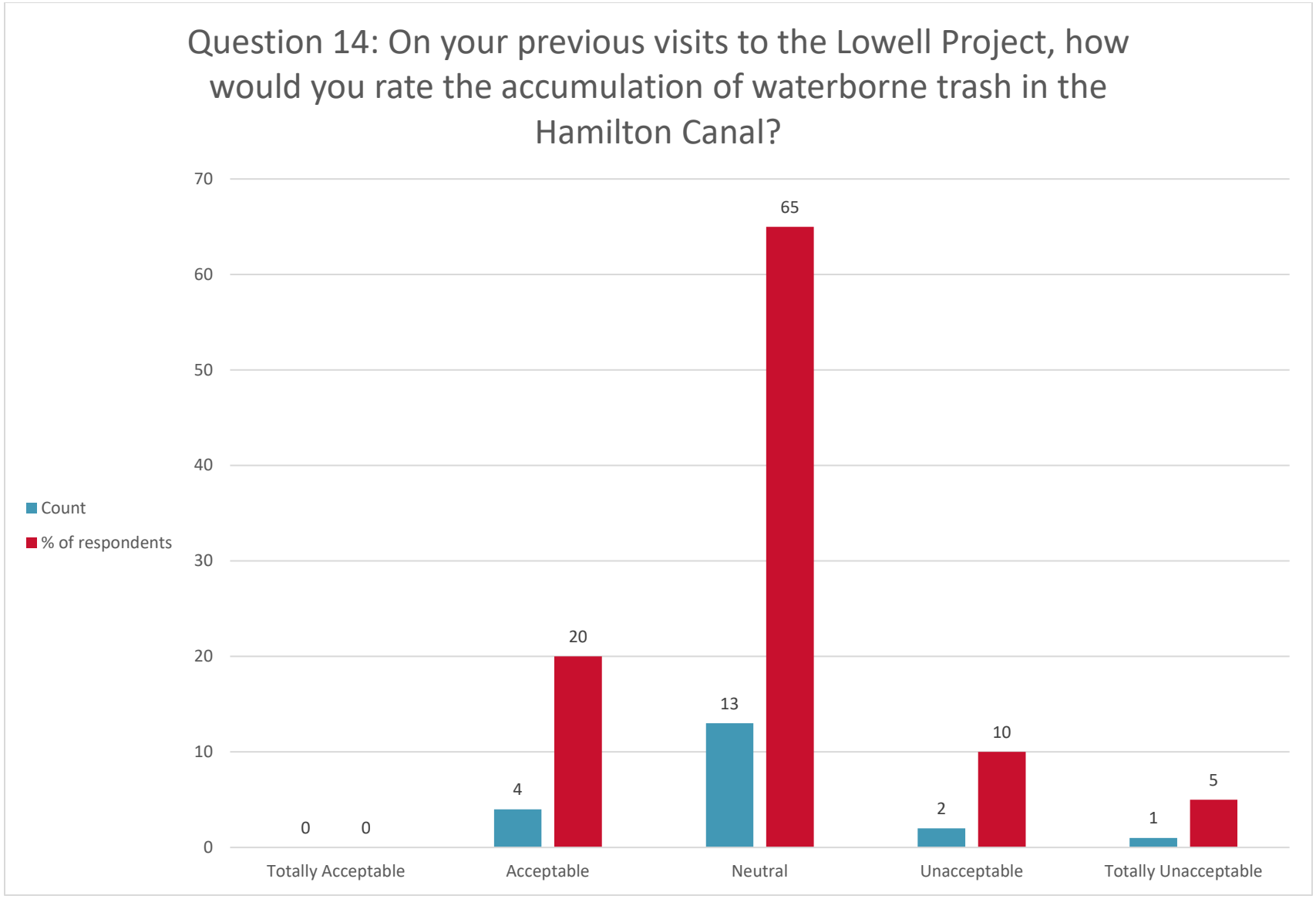

Question 12-3: Please rate the enjoyment for the primary activity you participated in:
Count
% of respondents
90
80
70
60
50
40
30
20
10
0
42
79.3
7
13.2
4
7.5
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

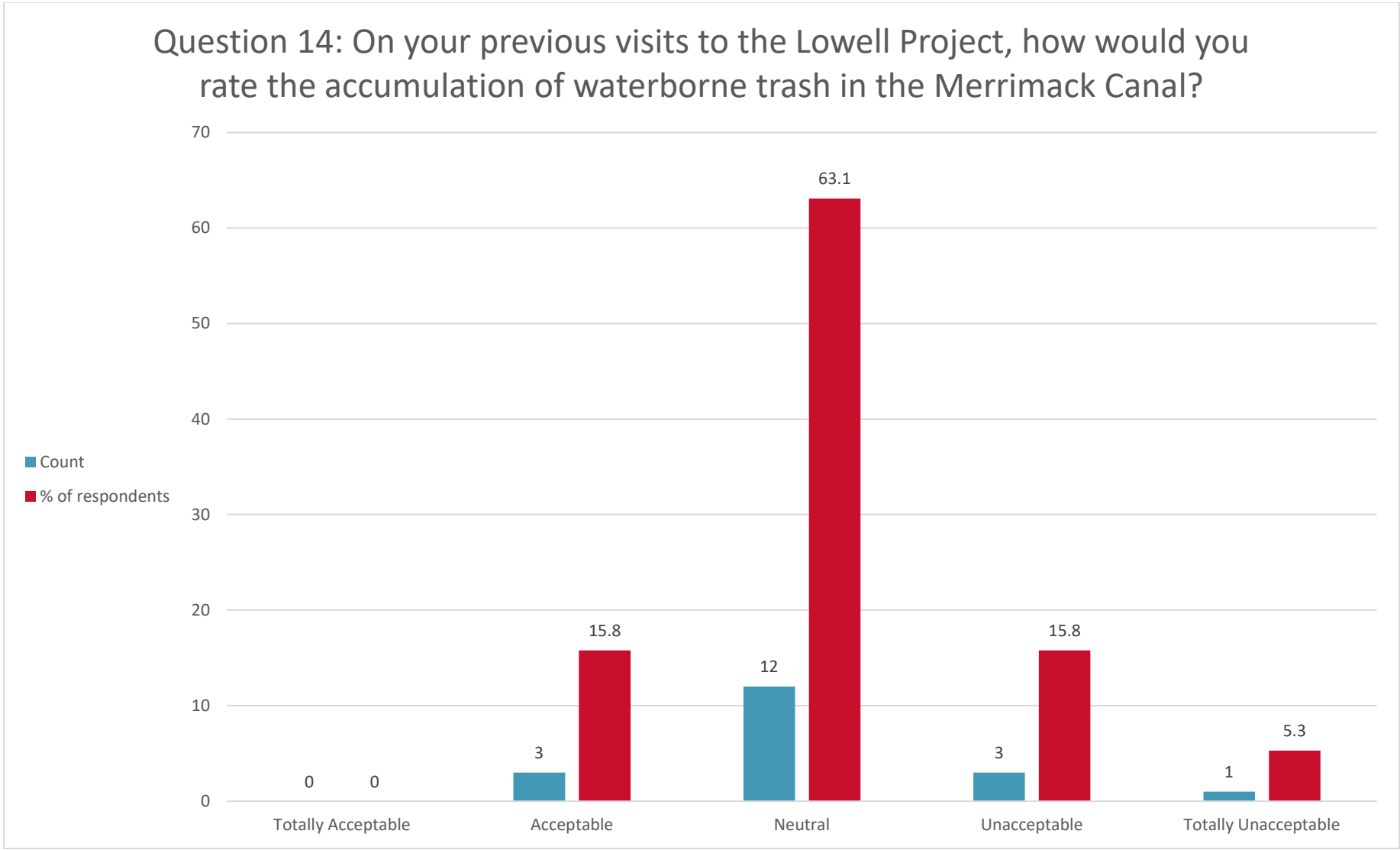

Question 12-4: Please rate the enjoyment for the primary activity you participated in:
70
60
50
40
30
20
10
0
Count
% of respondents
58.5
31
20.8
11
15.1
8
5.6
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

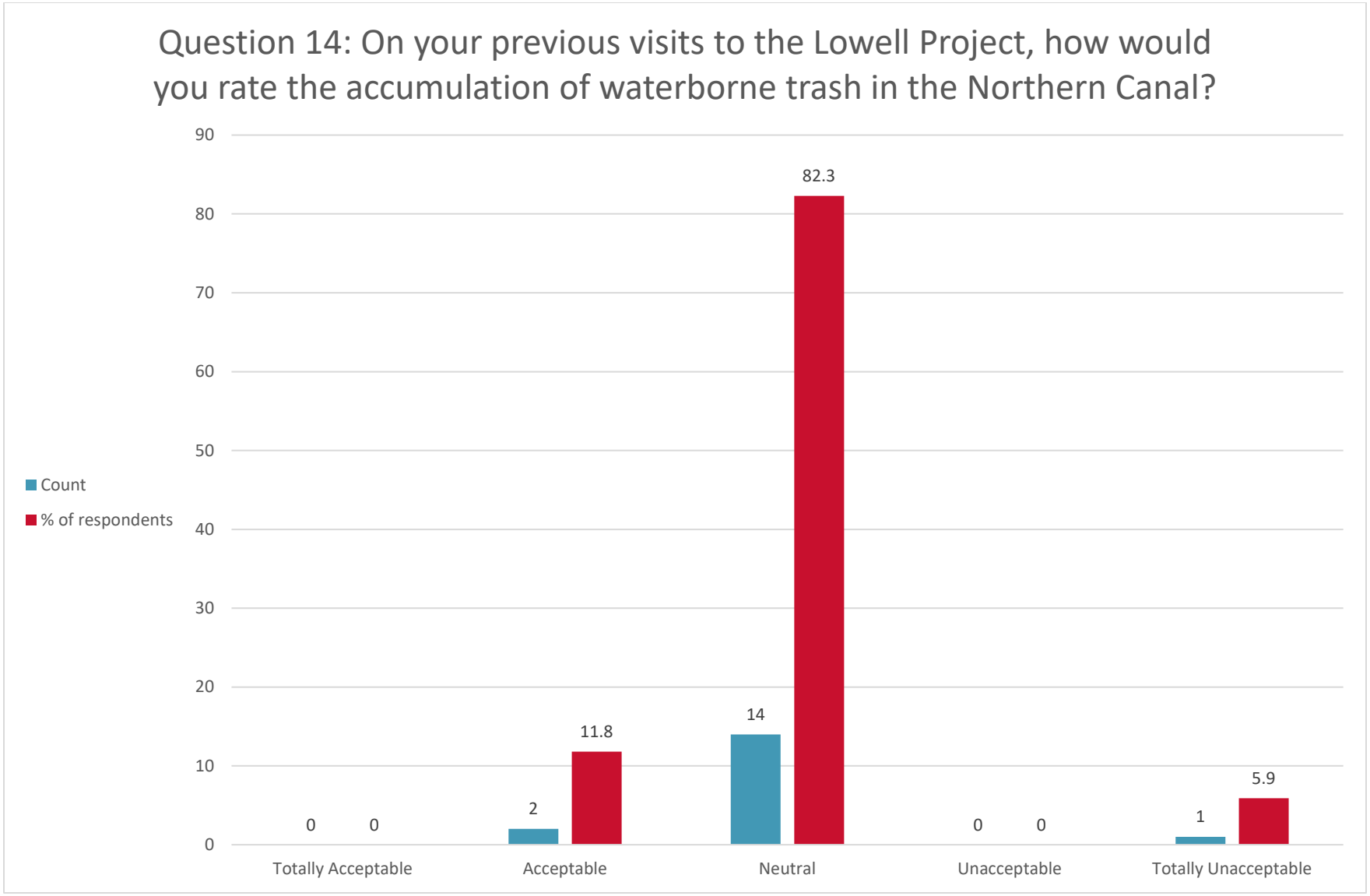

Question 12-5: Please rate the crowding for the primary activity you participated in:
60
50
40
30
20
10
0
56.6
30
34
18
7.5
4
1.9
1
0
0
Count
% of responents
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

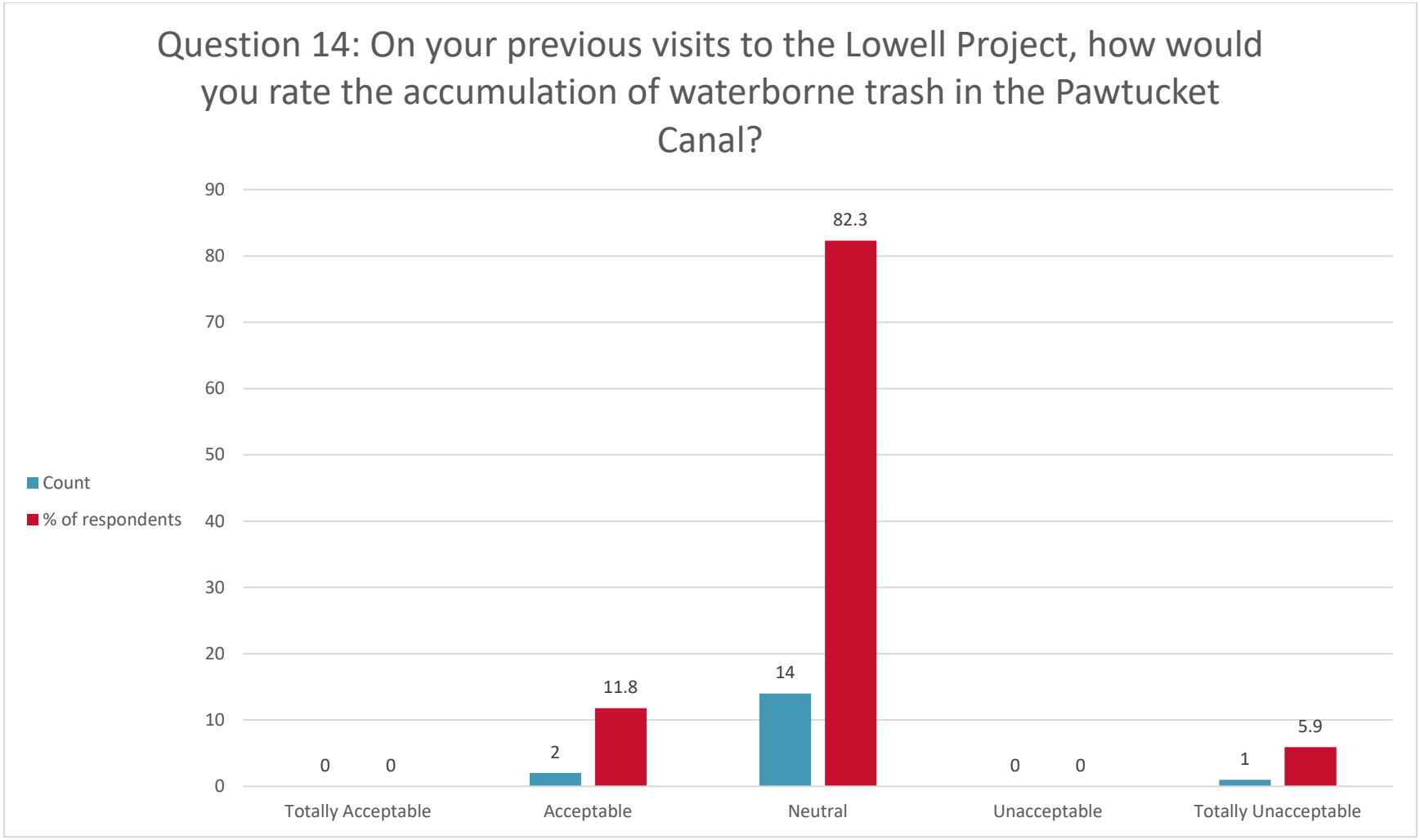

Question 12-6: Please rate the overall experience for the primary activity you participated in:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
42
79.3
7
13.2
4
7.5
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

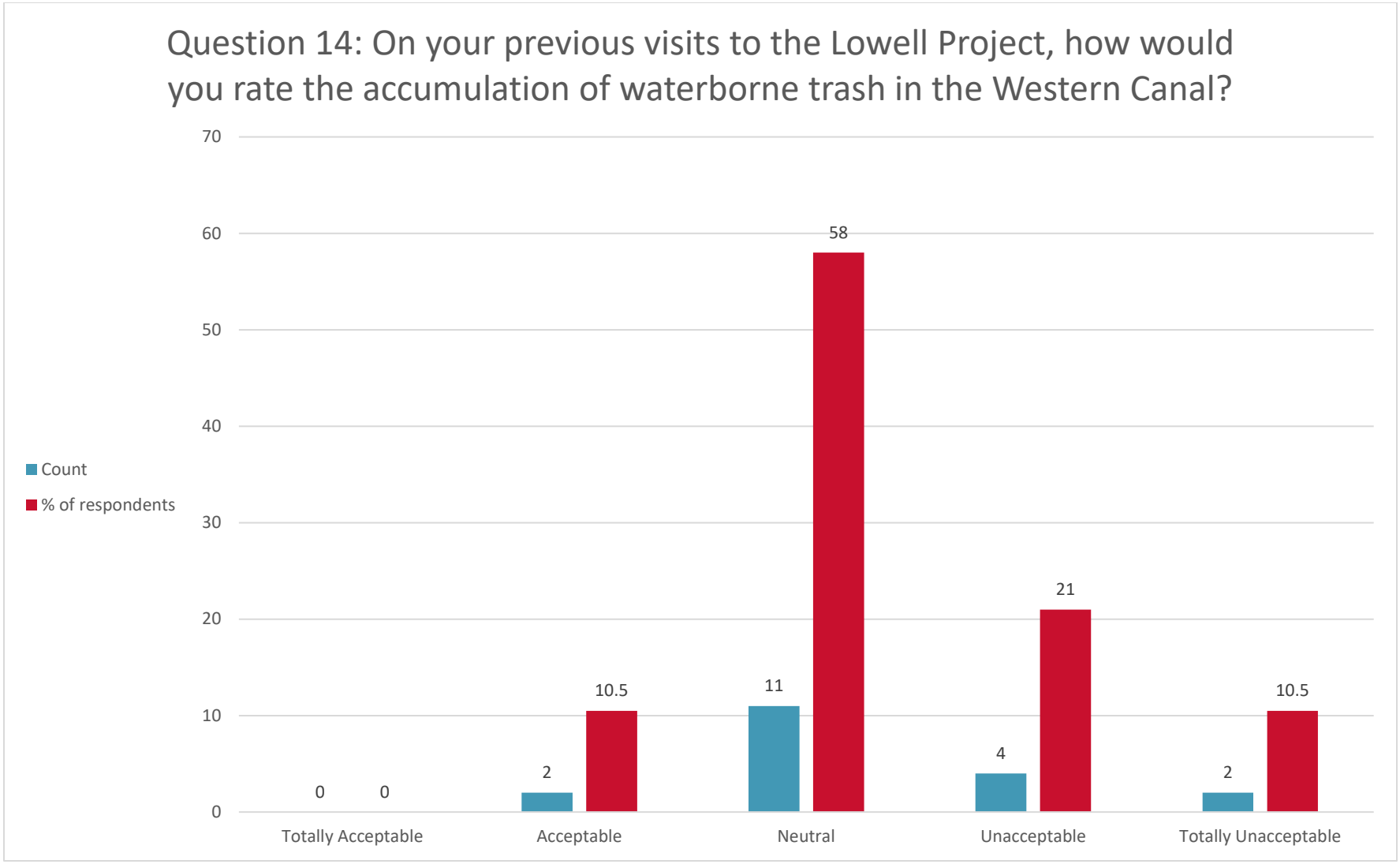

Question 14: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Eastern Canal?
80
70
60
50
40
30
20
10
0
Count
% of respondents
0
0
2
11.1
12
66.7
2
11.1
2
11.1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

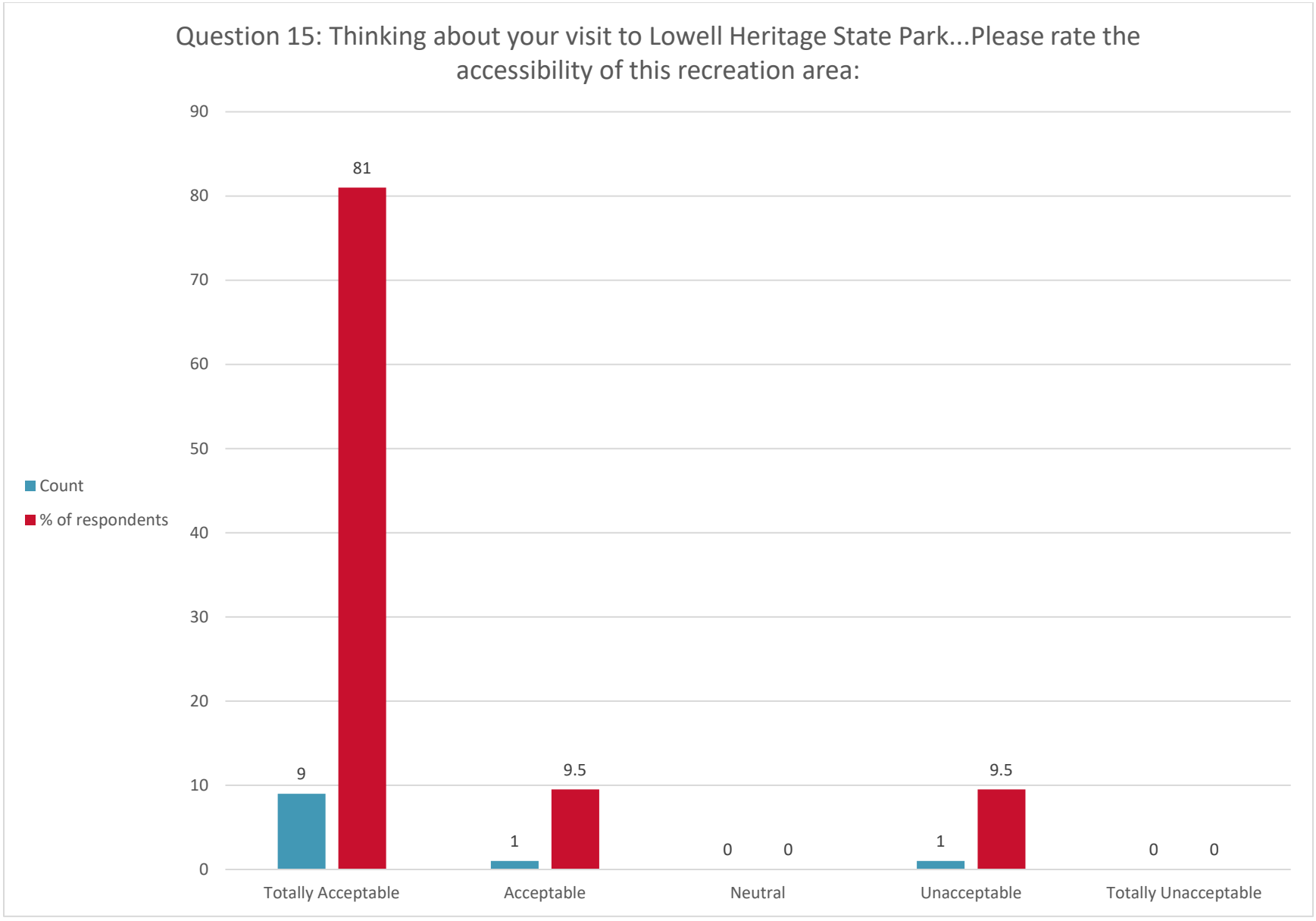

Question 14: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Hamilton Canal?
70
60
50
40
30
20
10
0
Count
% of respondents
0
0
4
20
13
65
2
10
1
5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

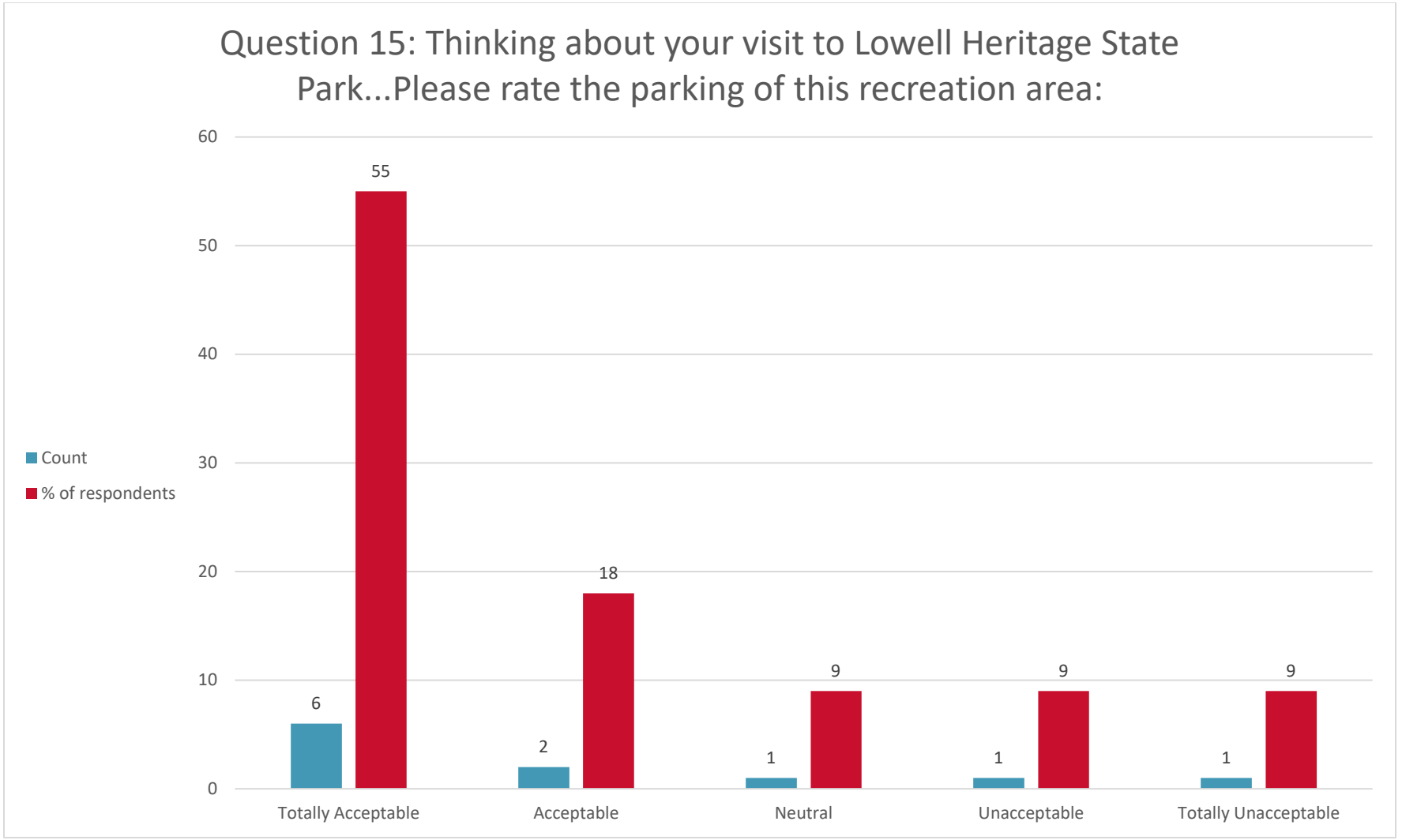

Question 14: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Merrimack Canal?
70
60
50
40
30
20
10
0
Count
% of respondents
0
0
3
15.8
12
63.1
3
15.8
1
5.3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

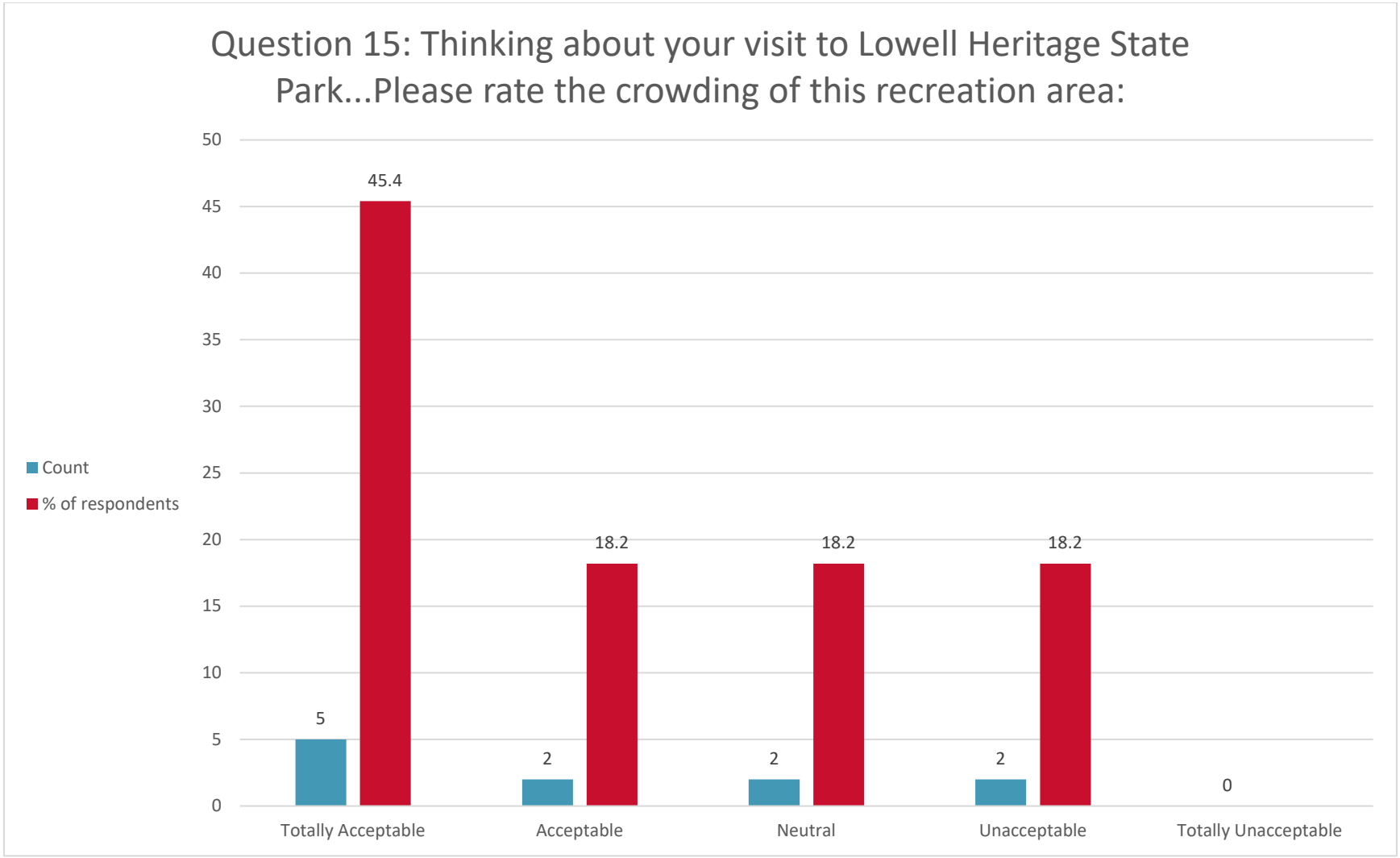

Question 14: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Northern Canal?
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
0
0
2
11.8
14
82.3
0
0
1
5.9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

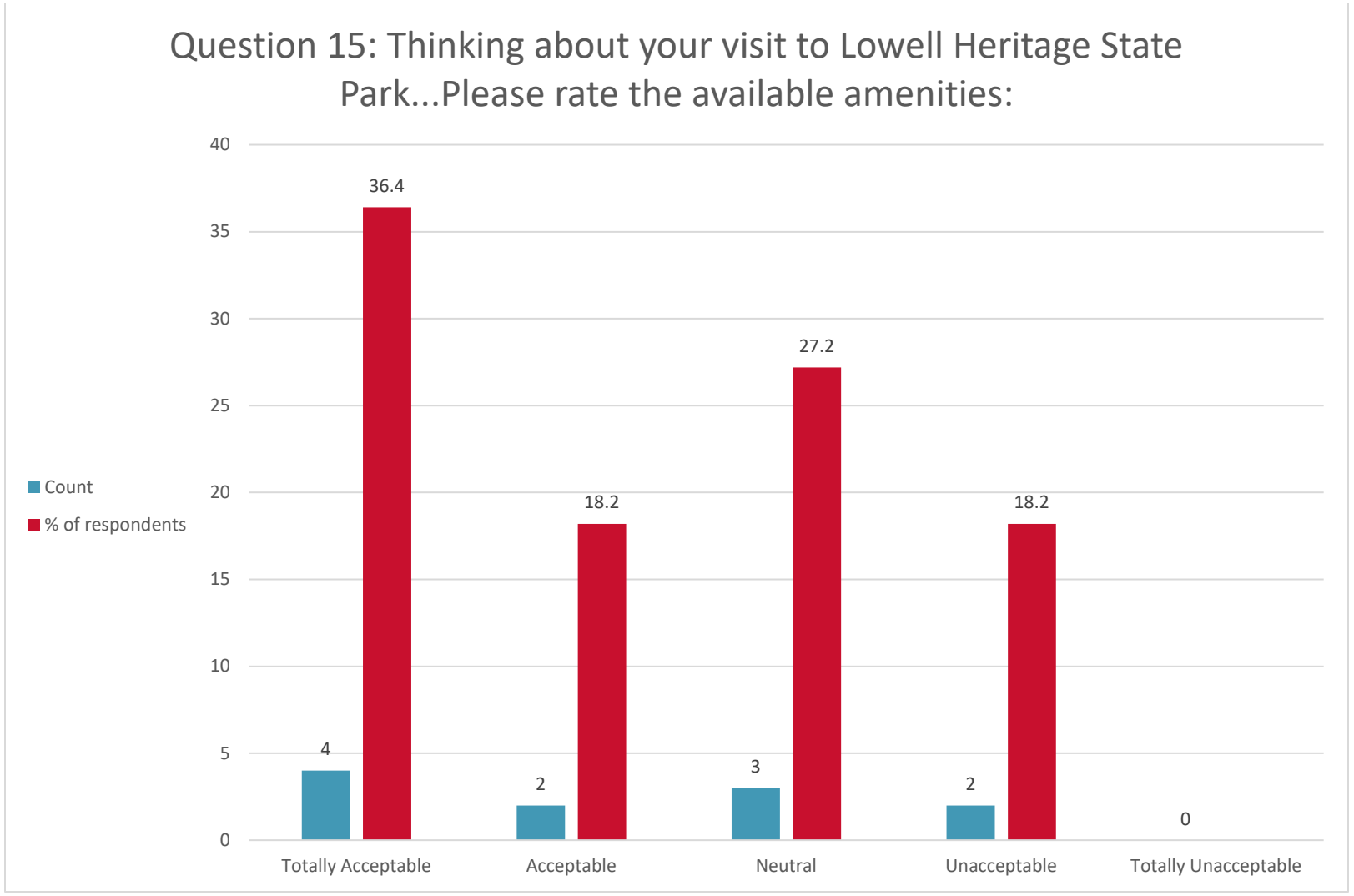

Question 14: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Pawtucket Canal?
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
0
0
2
11.8
14
82.3
0
0
1
5.9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

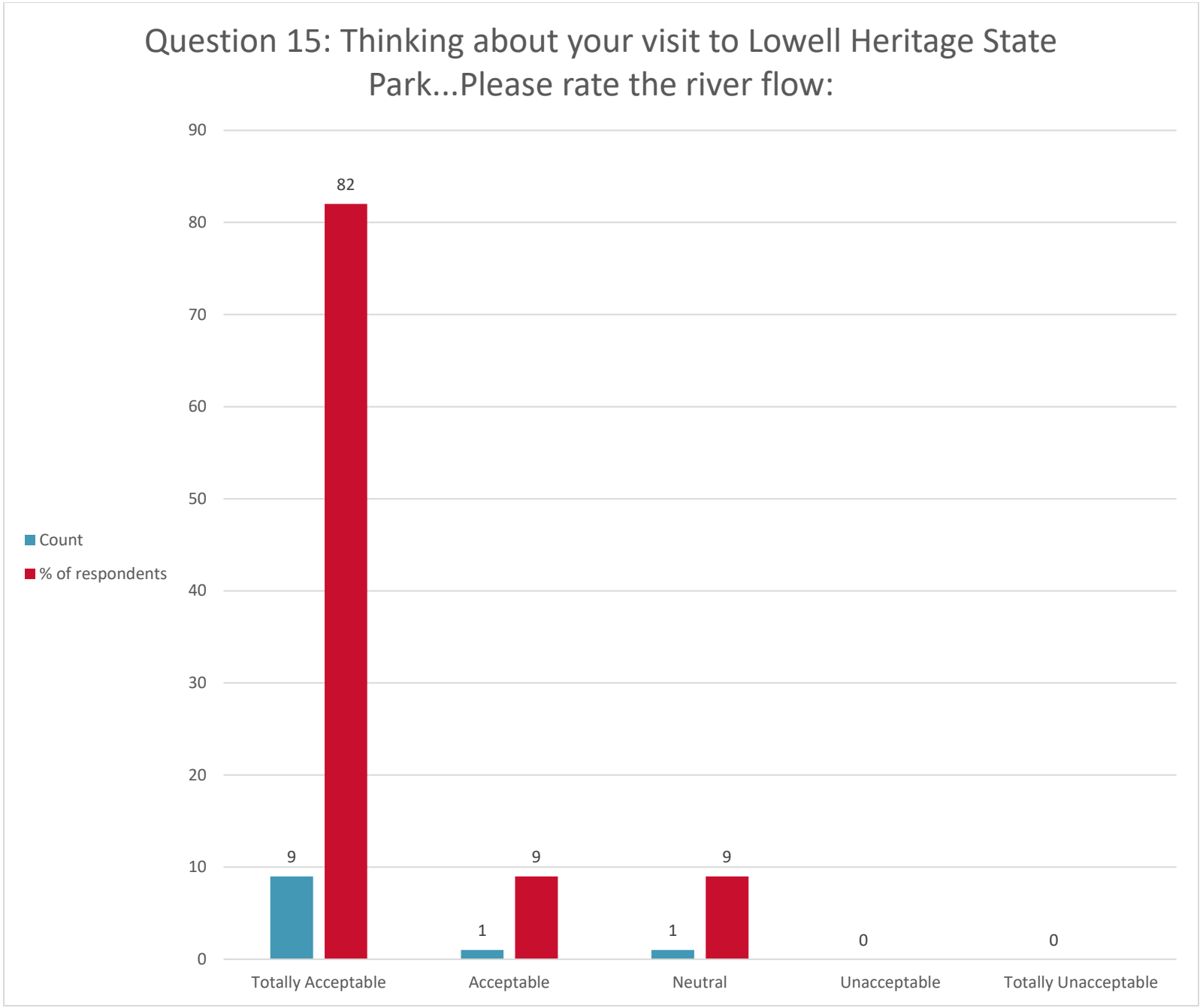

Question 14: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Western Canal?
70
60
50
40
30
20
10
0
Count
% of respondents
0
0
2
10.5
11
58
4
21
2
10.5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

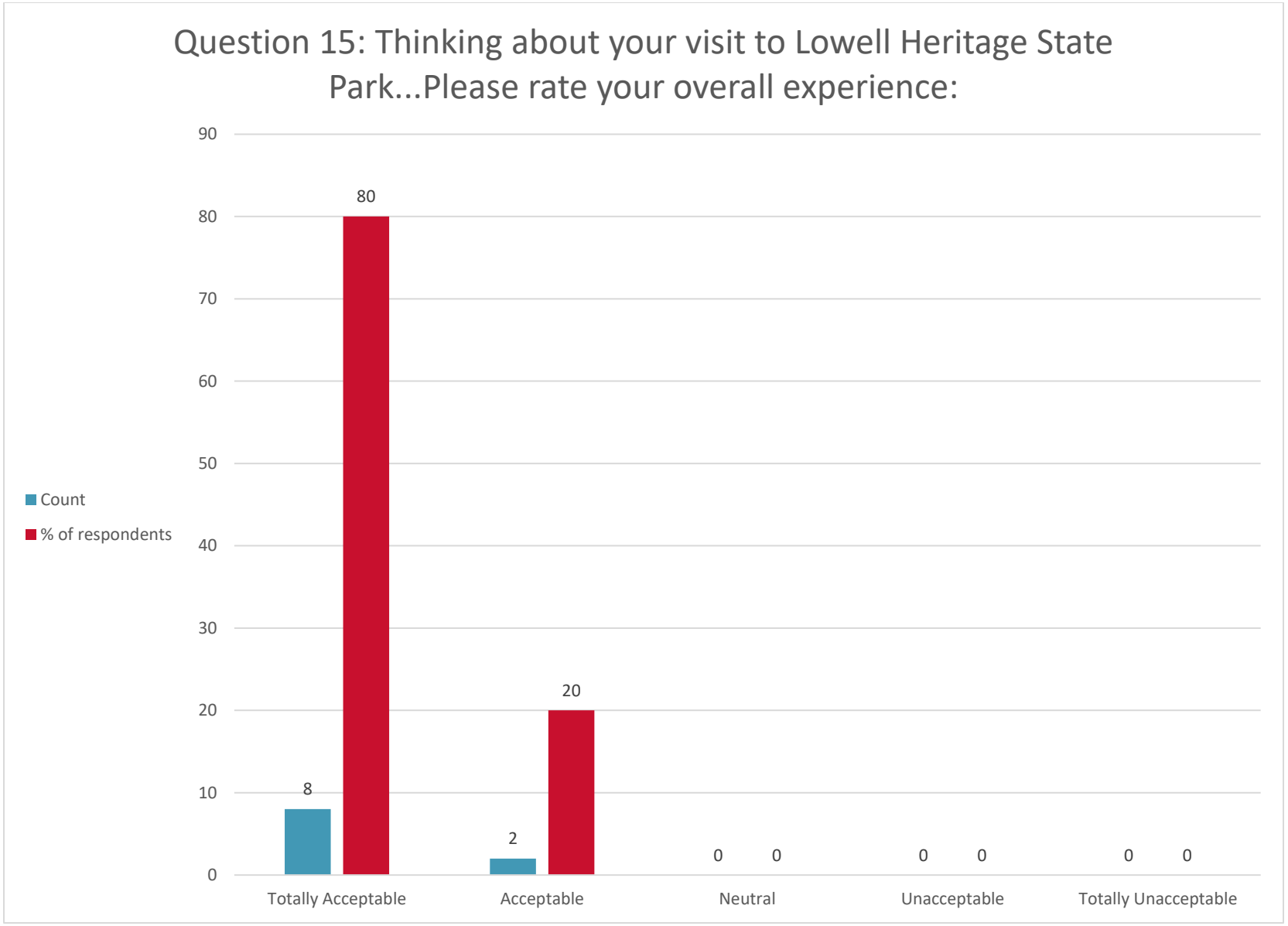

Question 15: Thinking about your visit to Lowell Heritage State Park...Please rate the accessibility of this recreation area:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
81
9
9.5
1
0
0
9.5
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

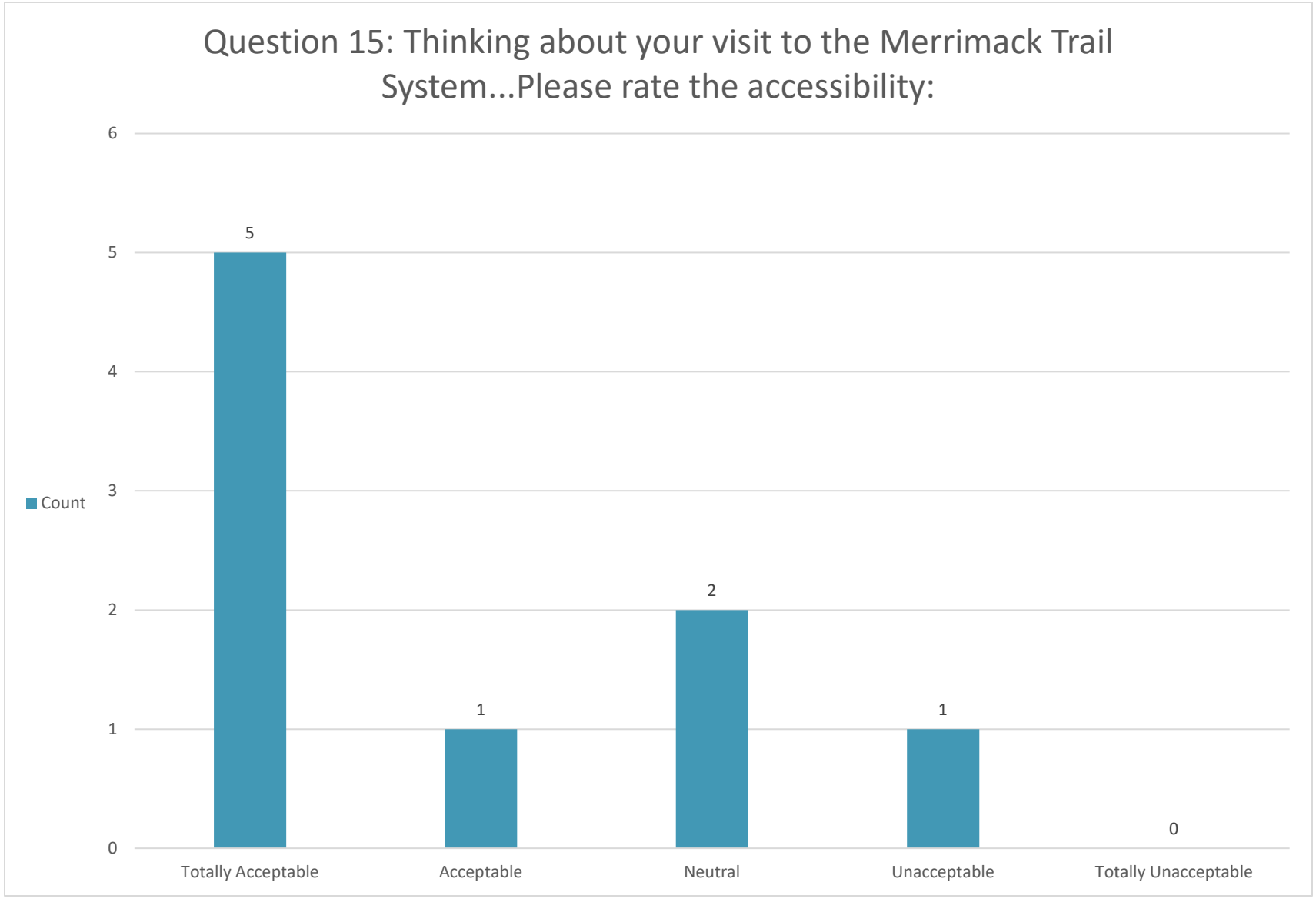

Question 15: Thinking about your visit to Lowell Heritage State Park...Please rate the parking of this recreation area:
60
50
40
30
20
10
0
Count
% of respondents
55
18
9
9
9
6
2
1
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to Lowell Heritage State Park...Please rate the crowding of this recreation area:
50
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
45.4
18.2
18.2
18.2
5
2
2
2
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

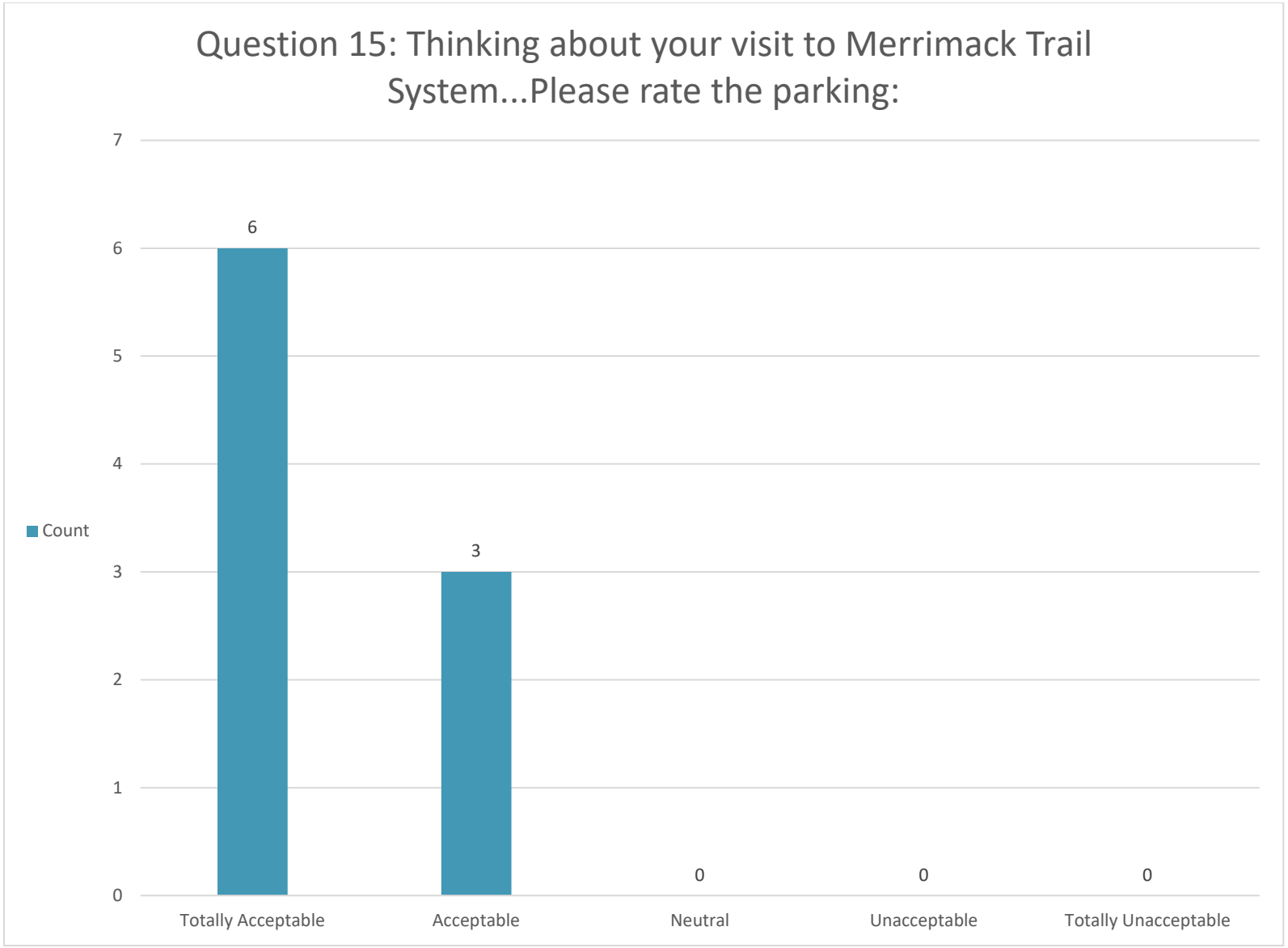

Question 15: Thinking about your visit to Lowell Heritage State Park...Please rate the available amenities:
40
35
30
25
20
15
10
5
0
Count
% of respondents
36.4
18.2
27.2
18.2
4
2
3
2
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to Lowell Heritage State Park...Please rate the river flow:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
82
9
9
1
9
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

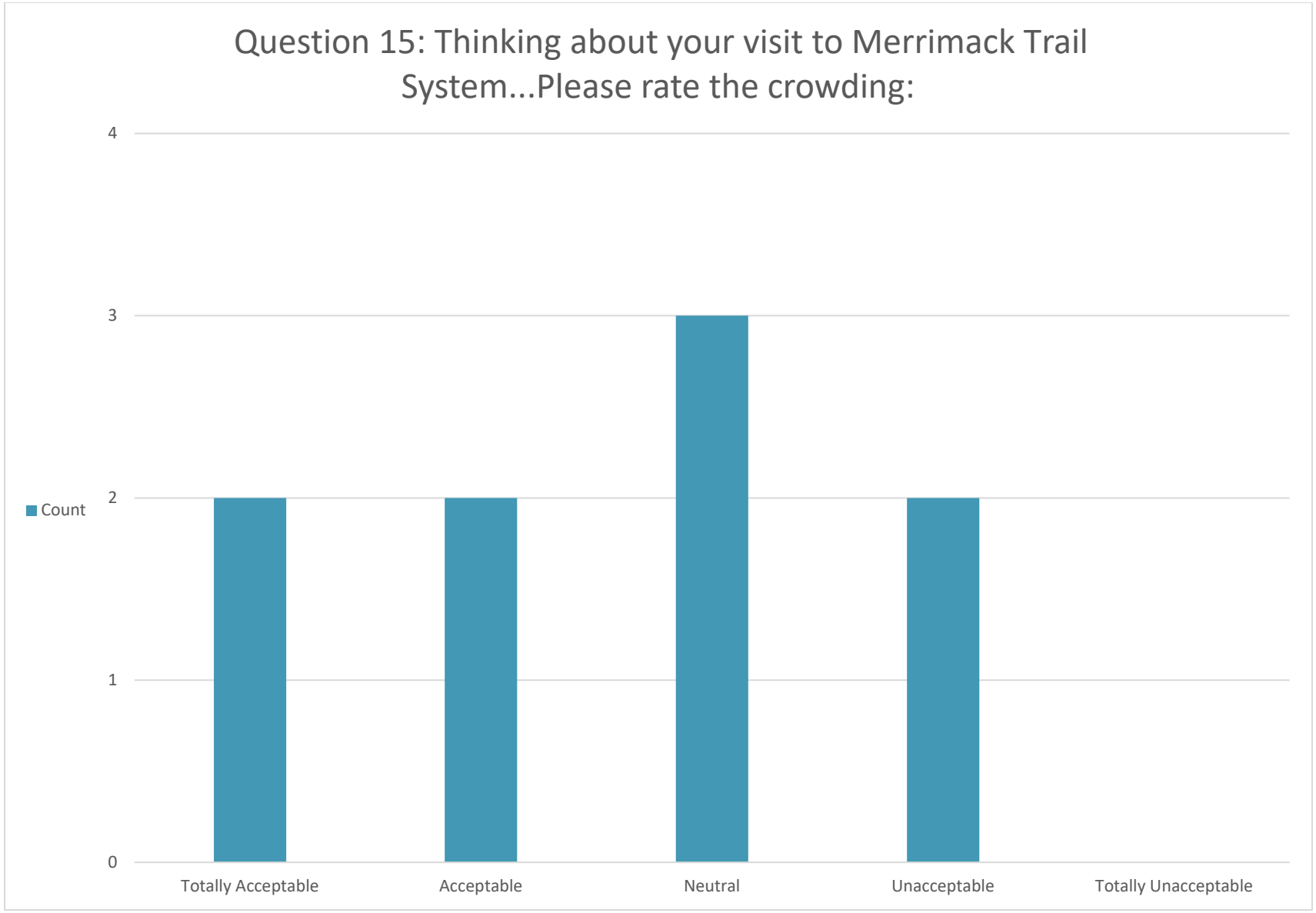

Question 15: Thinking about your visit to Lowell Heritage State Park...Please rate your overall experience:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
80
20
8
2
0
0
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable



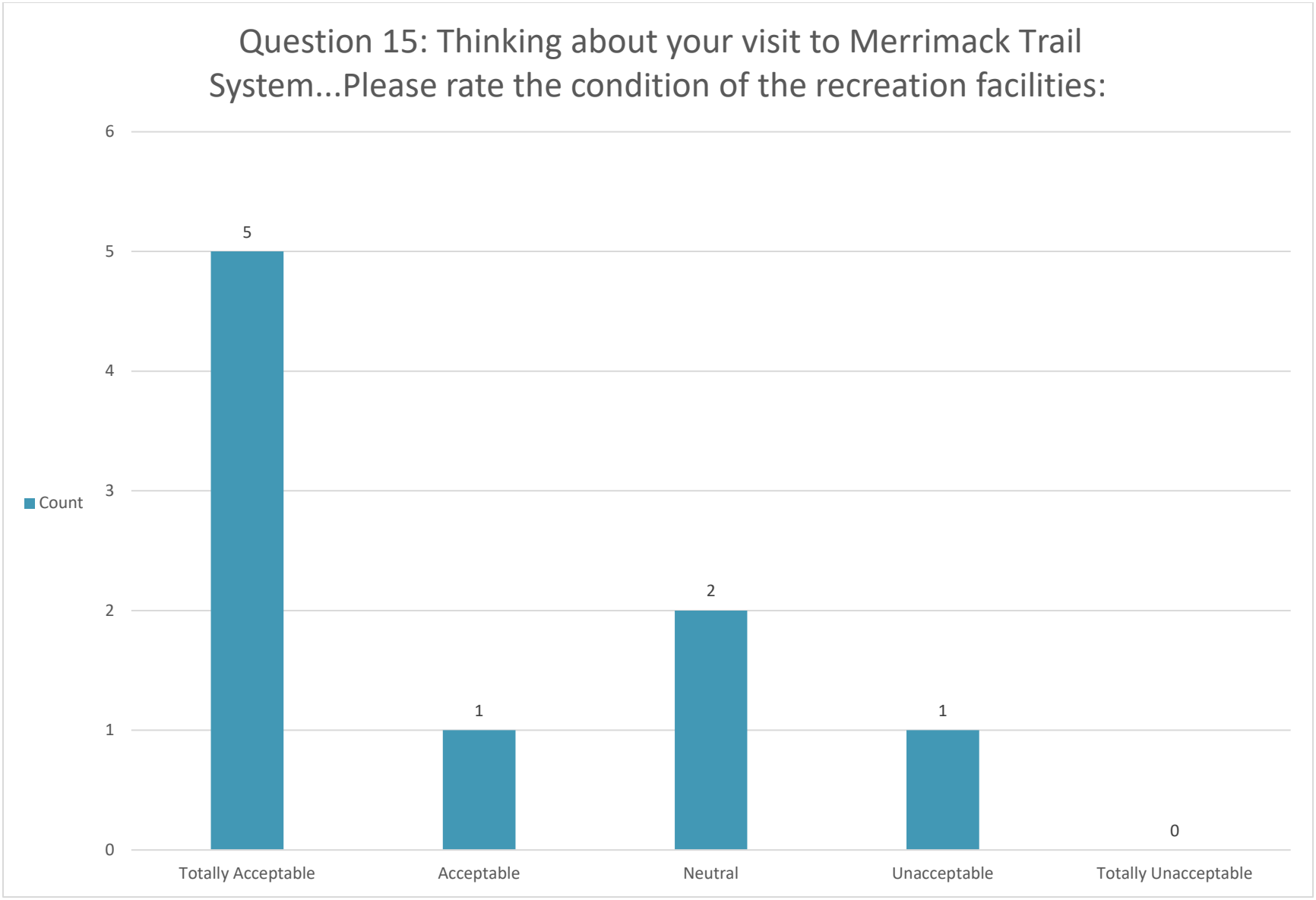
*Percentages not shown for respondent counts under ten.



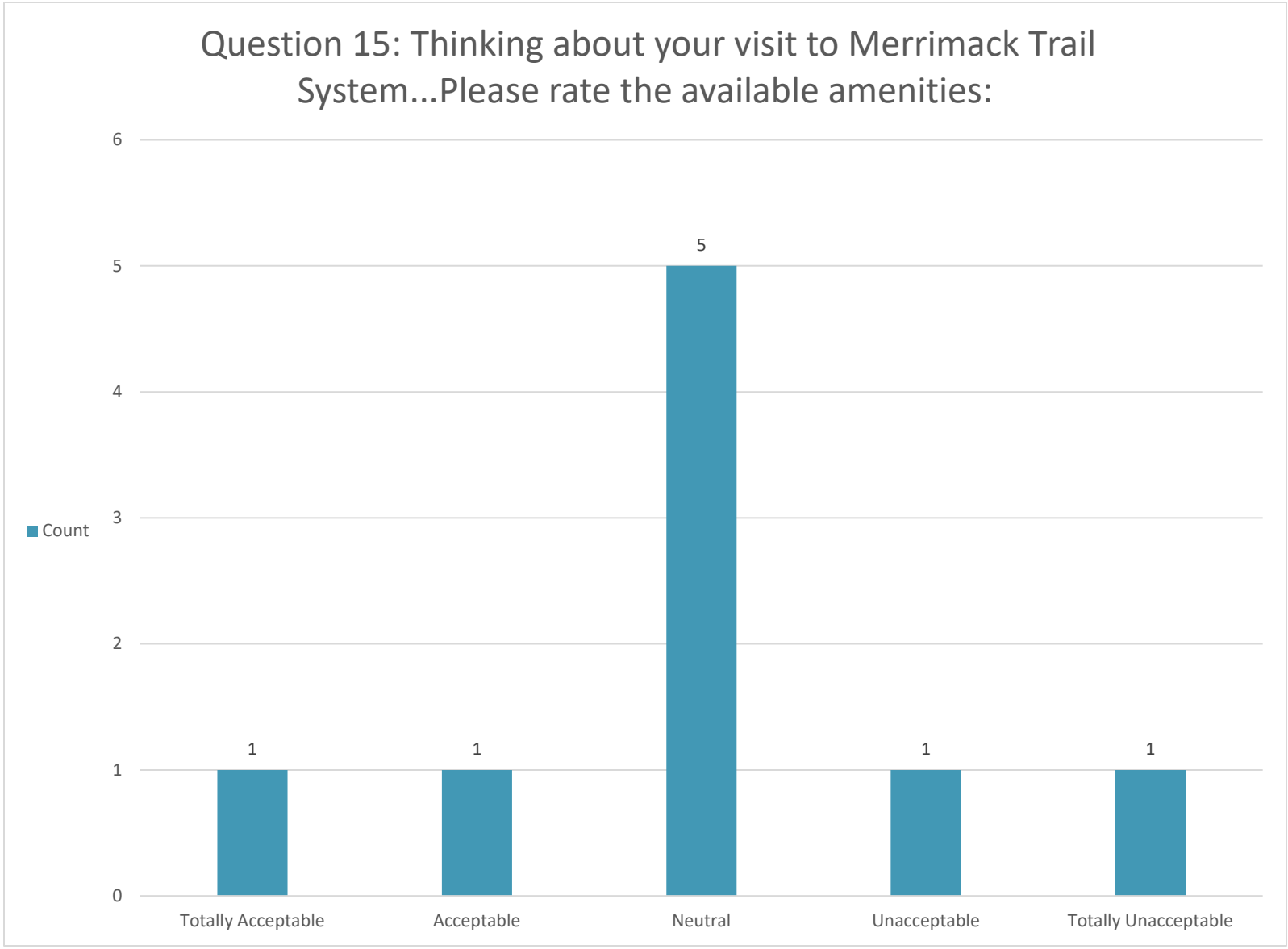
*Percentages not shown for respondent counts under ten.



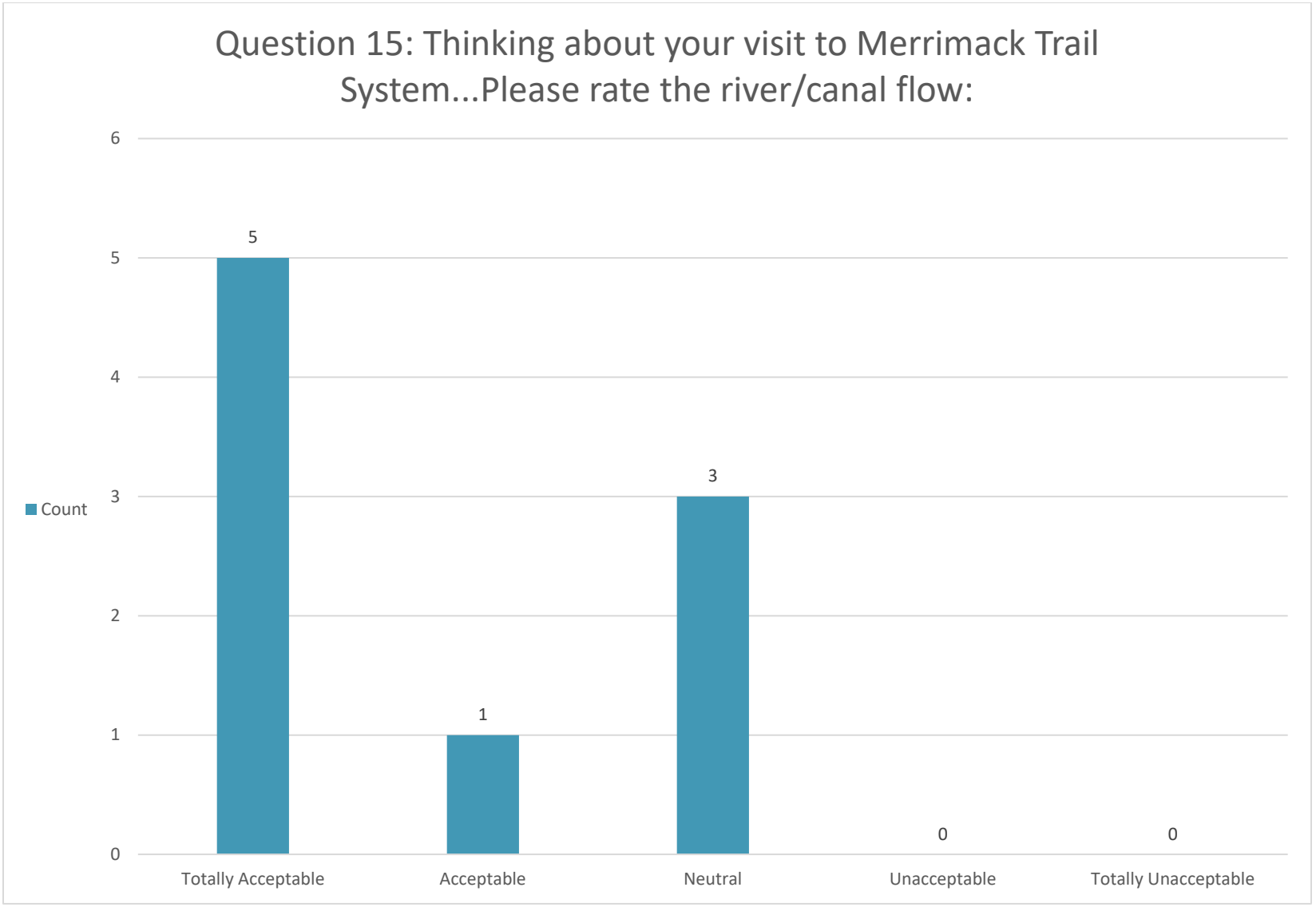
*Percentages not shown for respondent counts under ten.



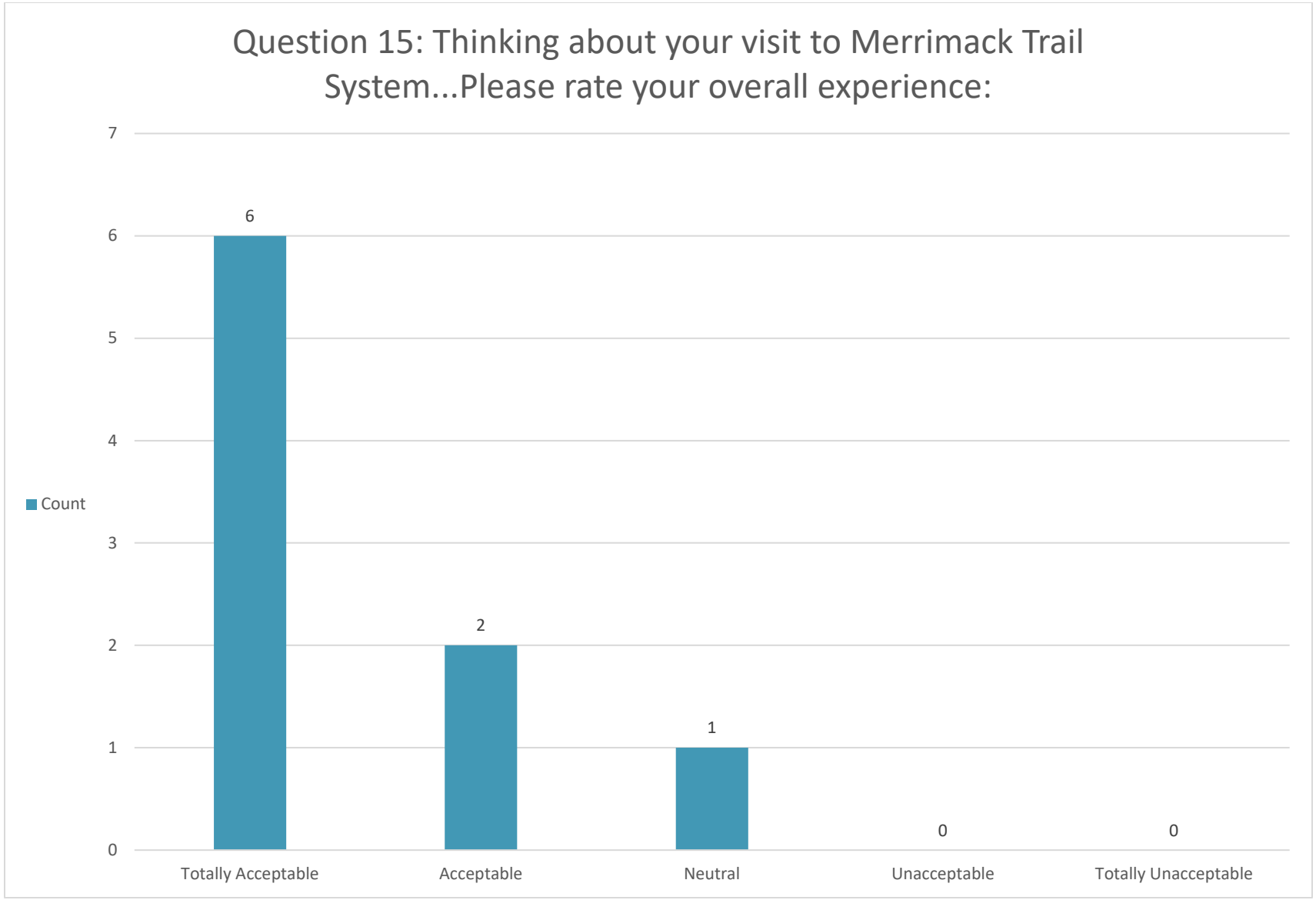
*Percentages not shown for respondent counts under ten.



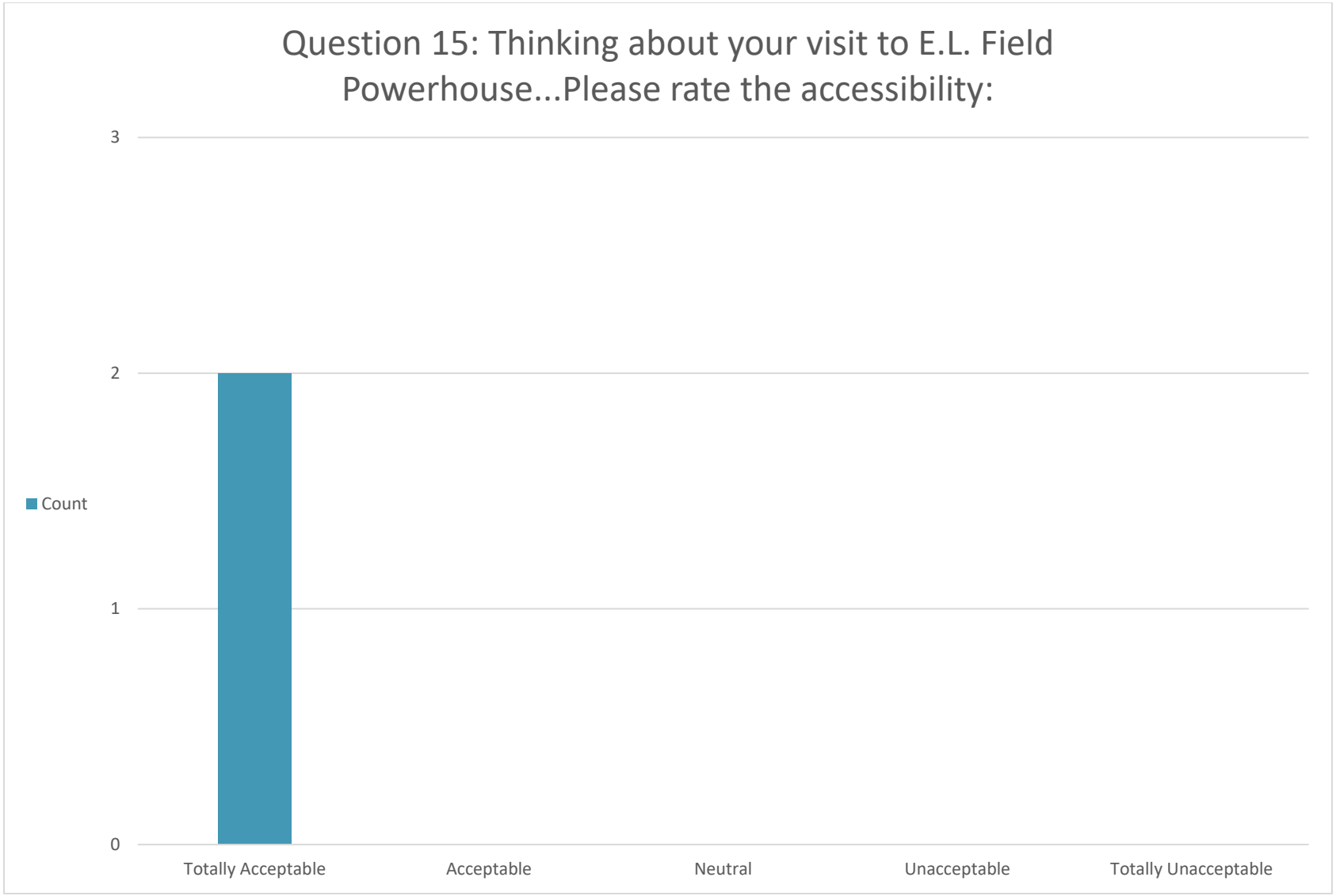
*Percentages not shown for respondent counts under ten.



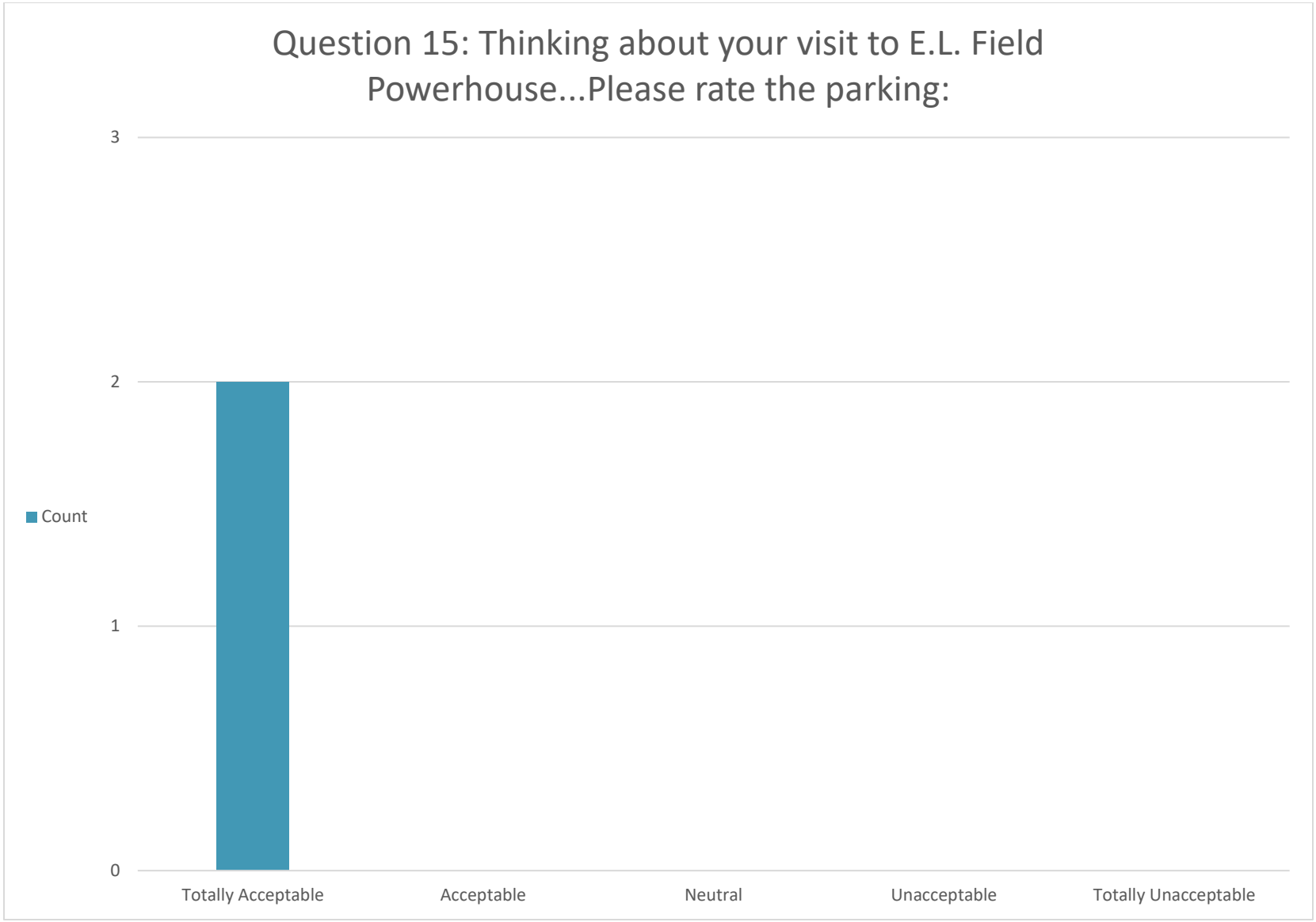
*Percentages not shown for respondent counts under ten.



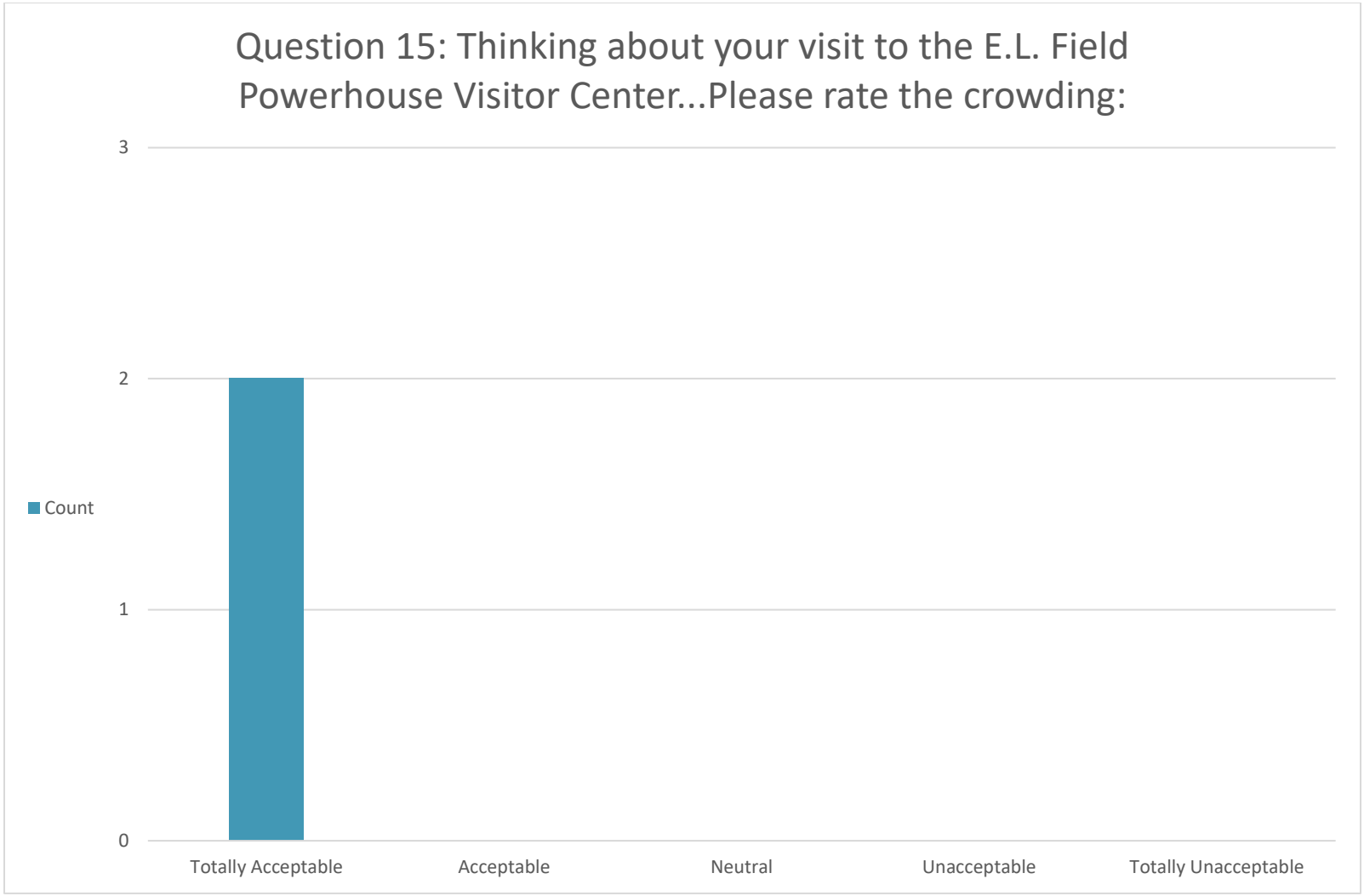
*Percentages not shown for respondent counts under ten.



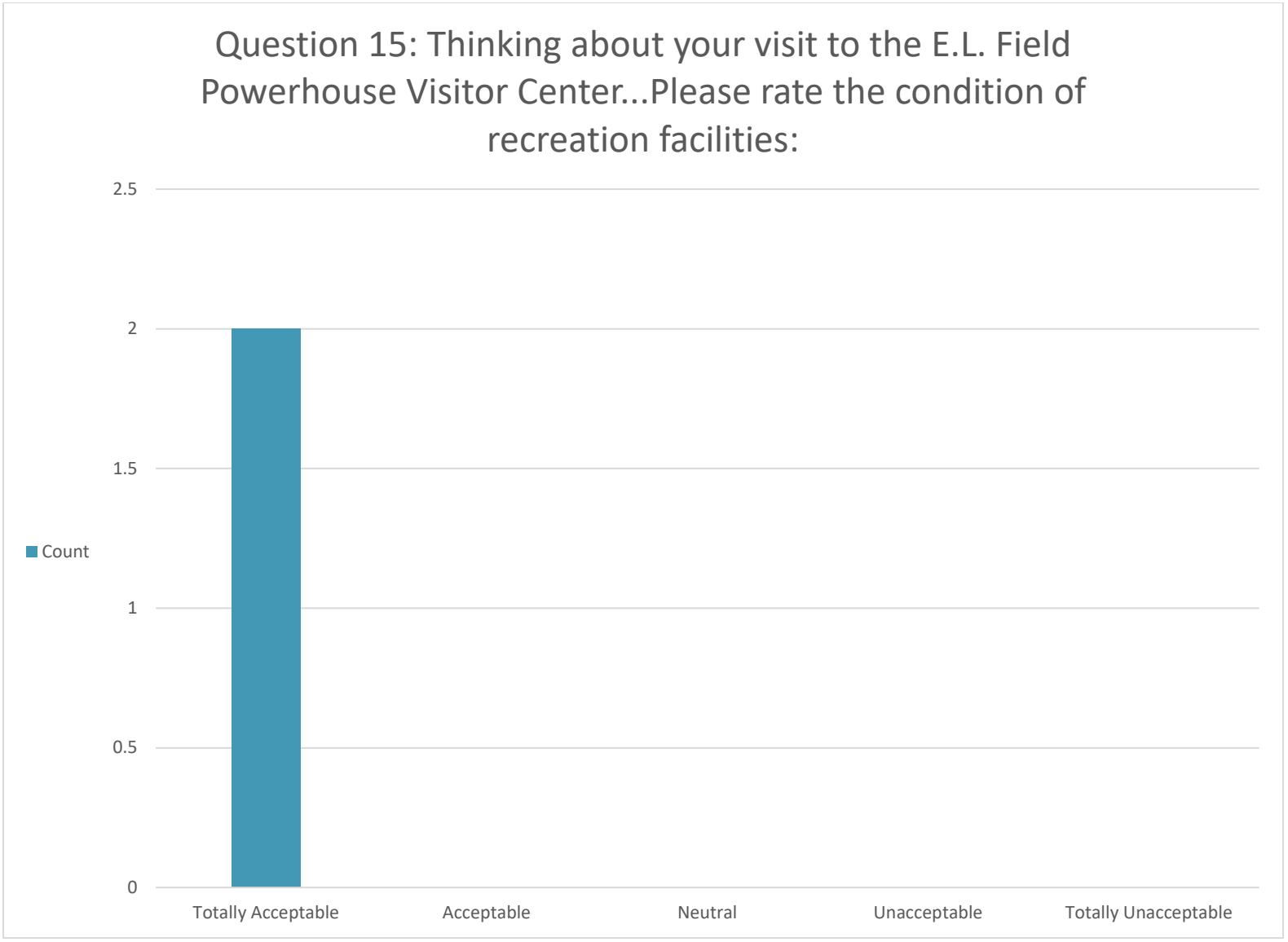
*Percentages not shown for respondent counts under ten.



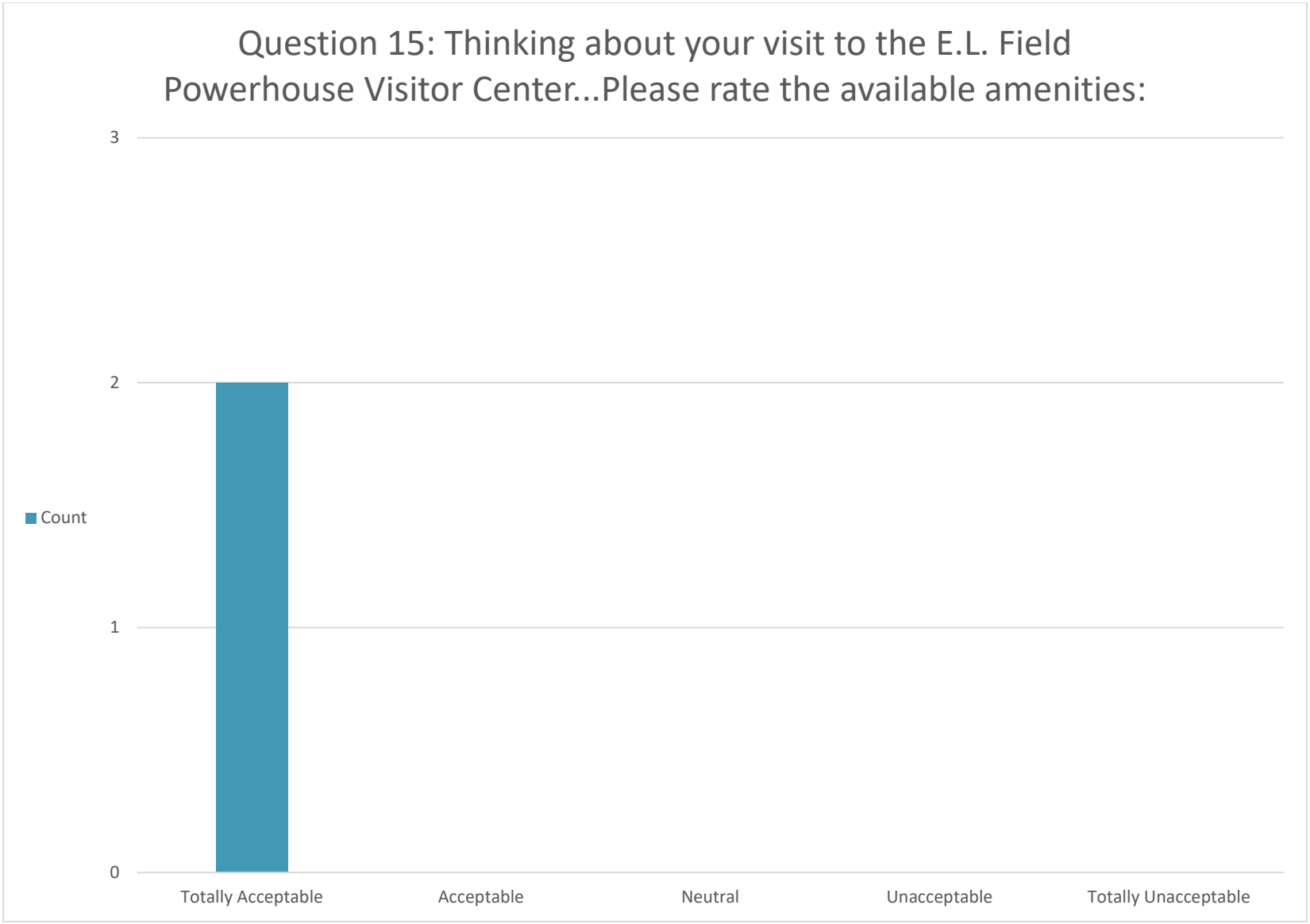
*Percentages not shown for respondent counts under ten.



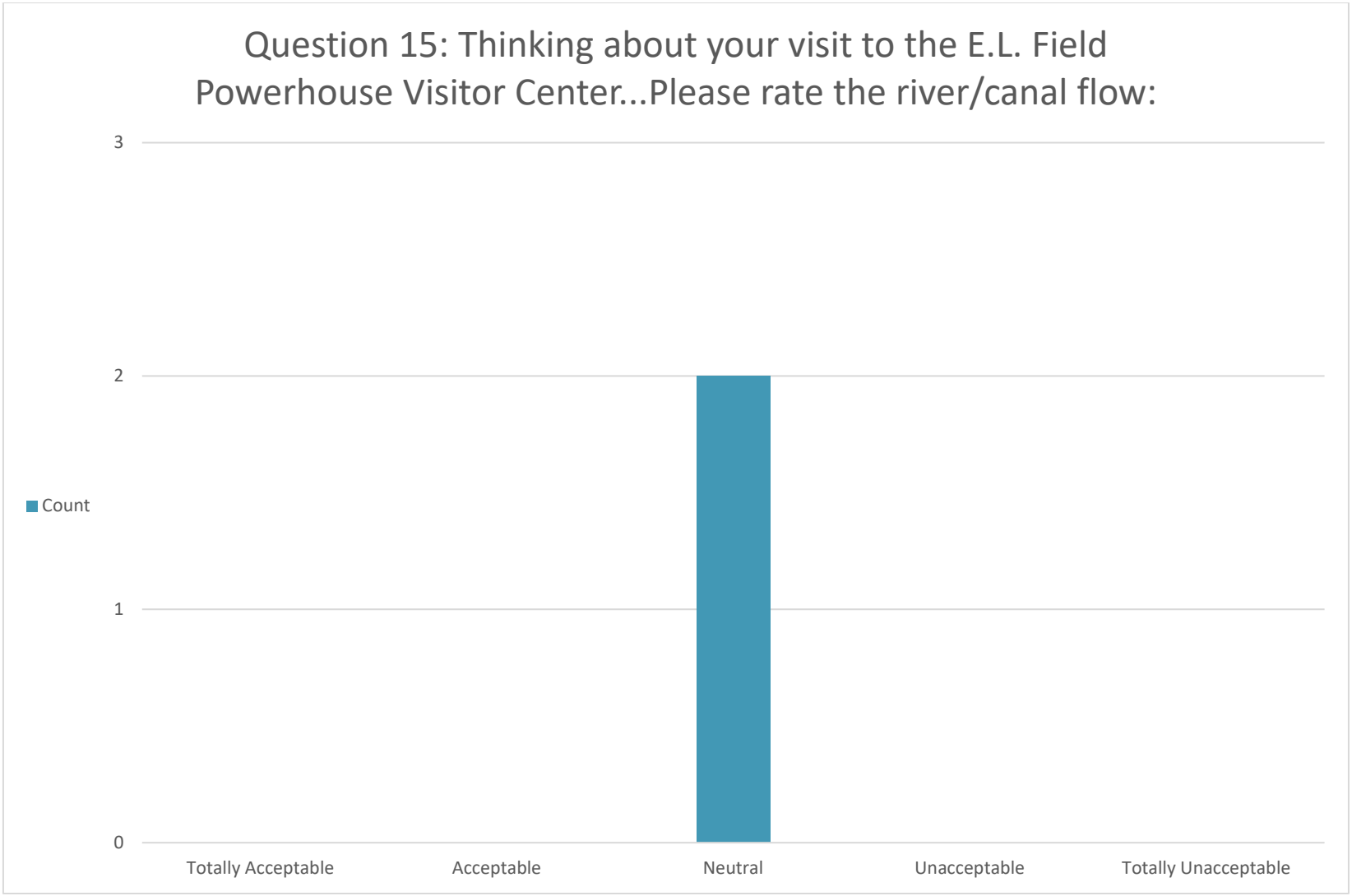
*Percentages not shown for respondent counts under ten.



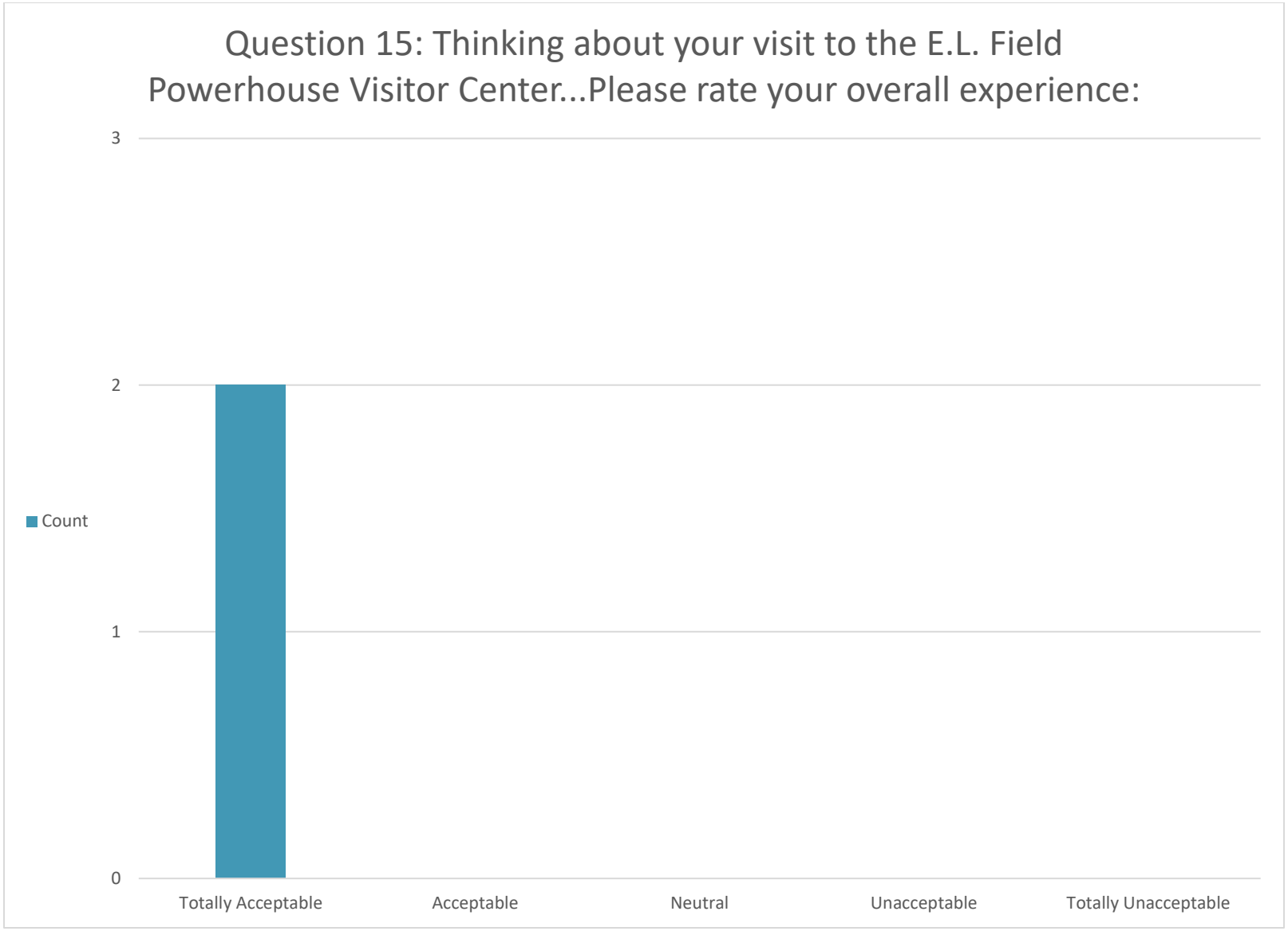
*Percentages not shown for respondent counts under ten.



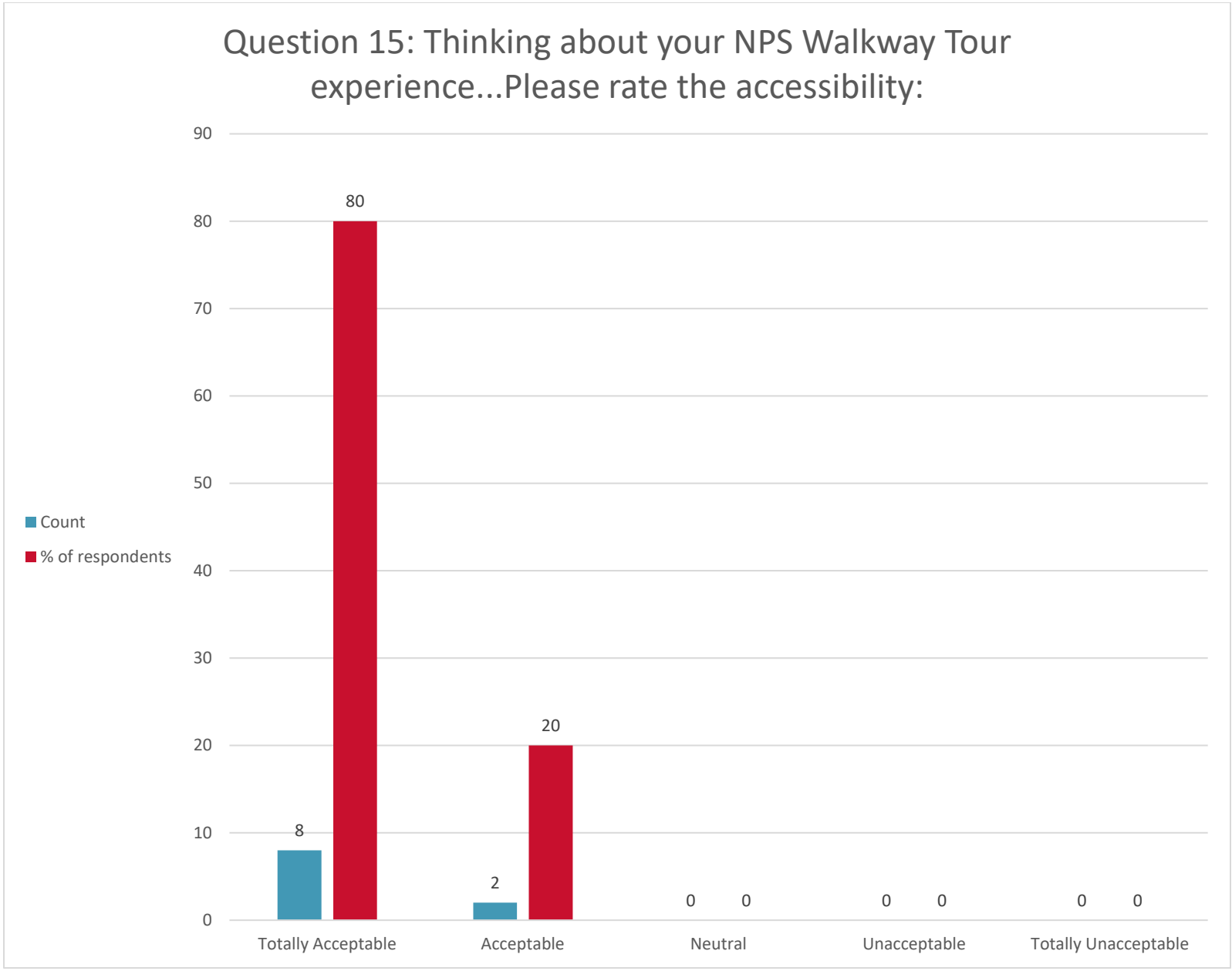
*Percentages not shown for respondent counts under ten.

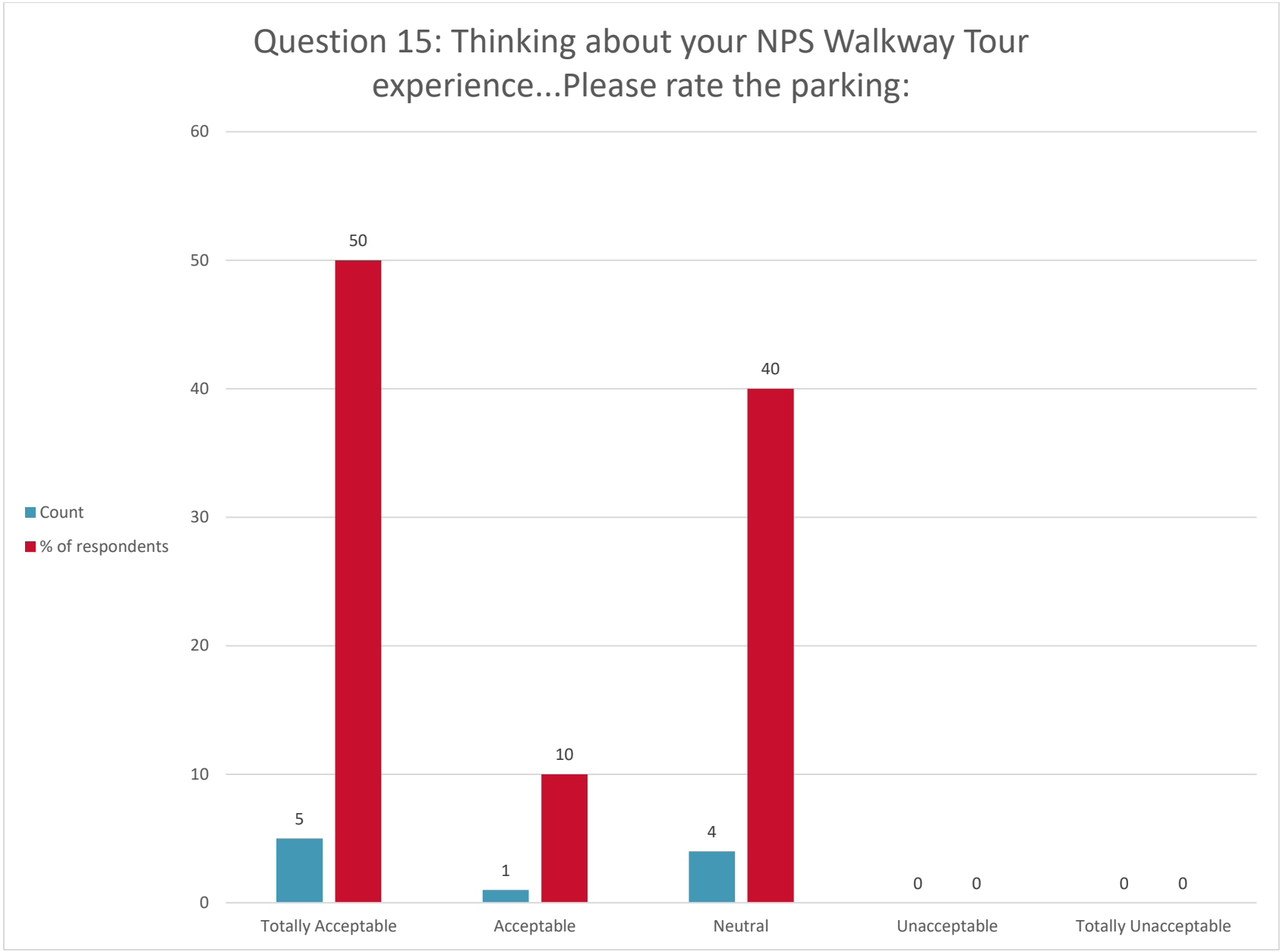


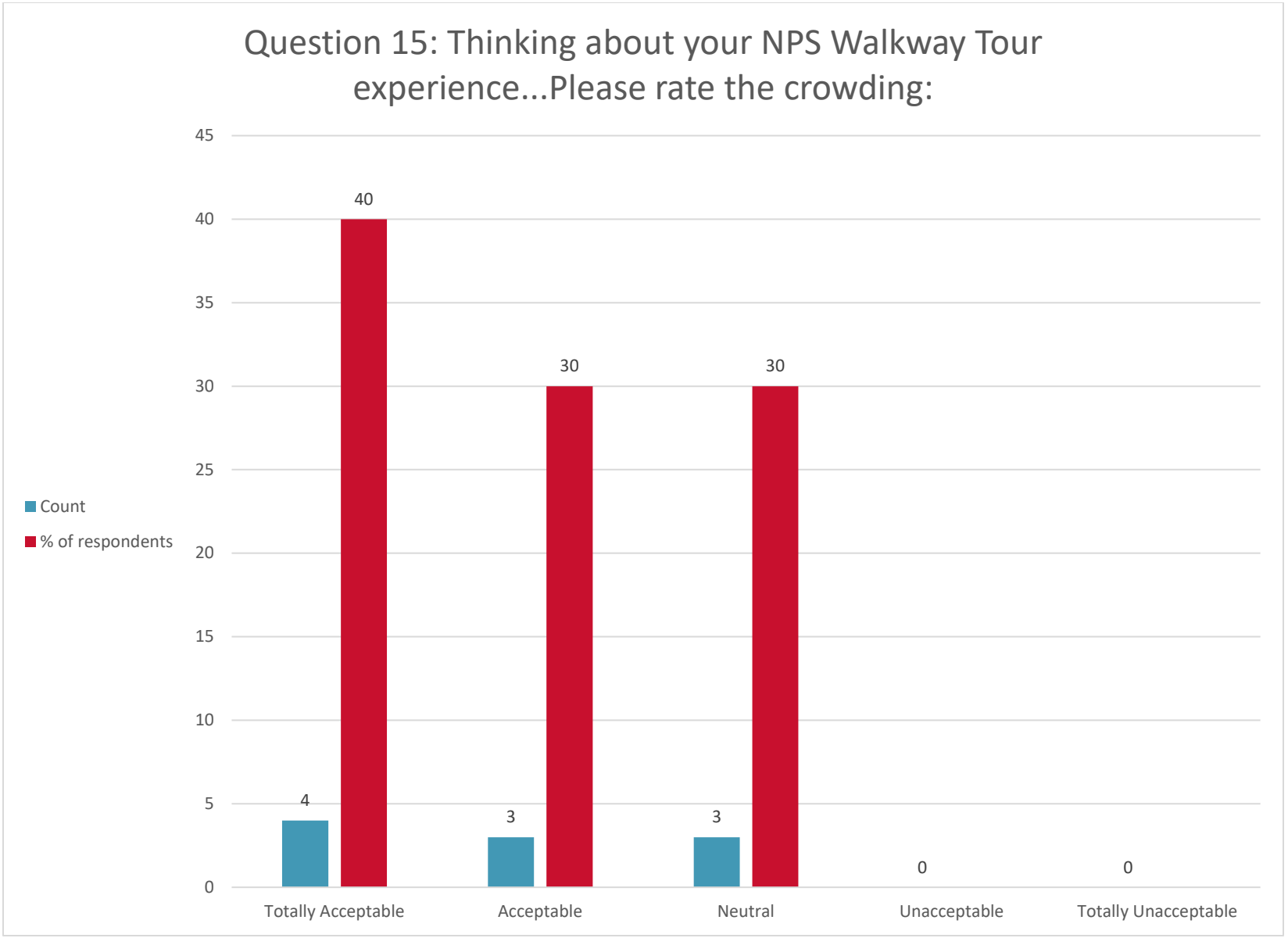
*Percentages not shown for respondent counts under ten.

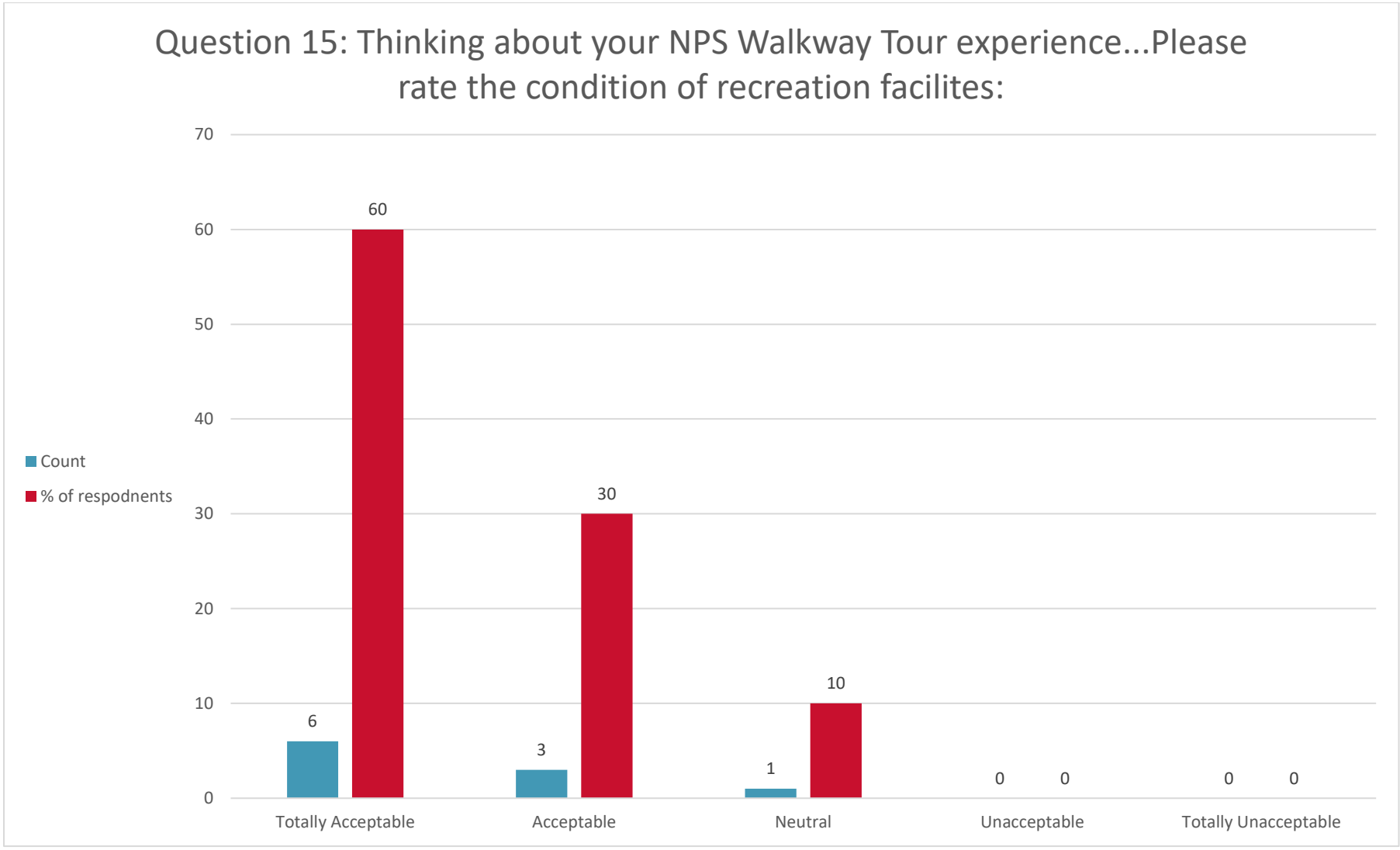


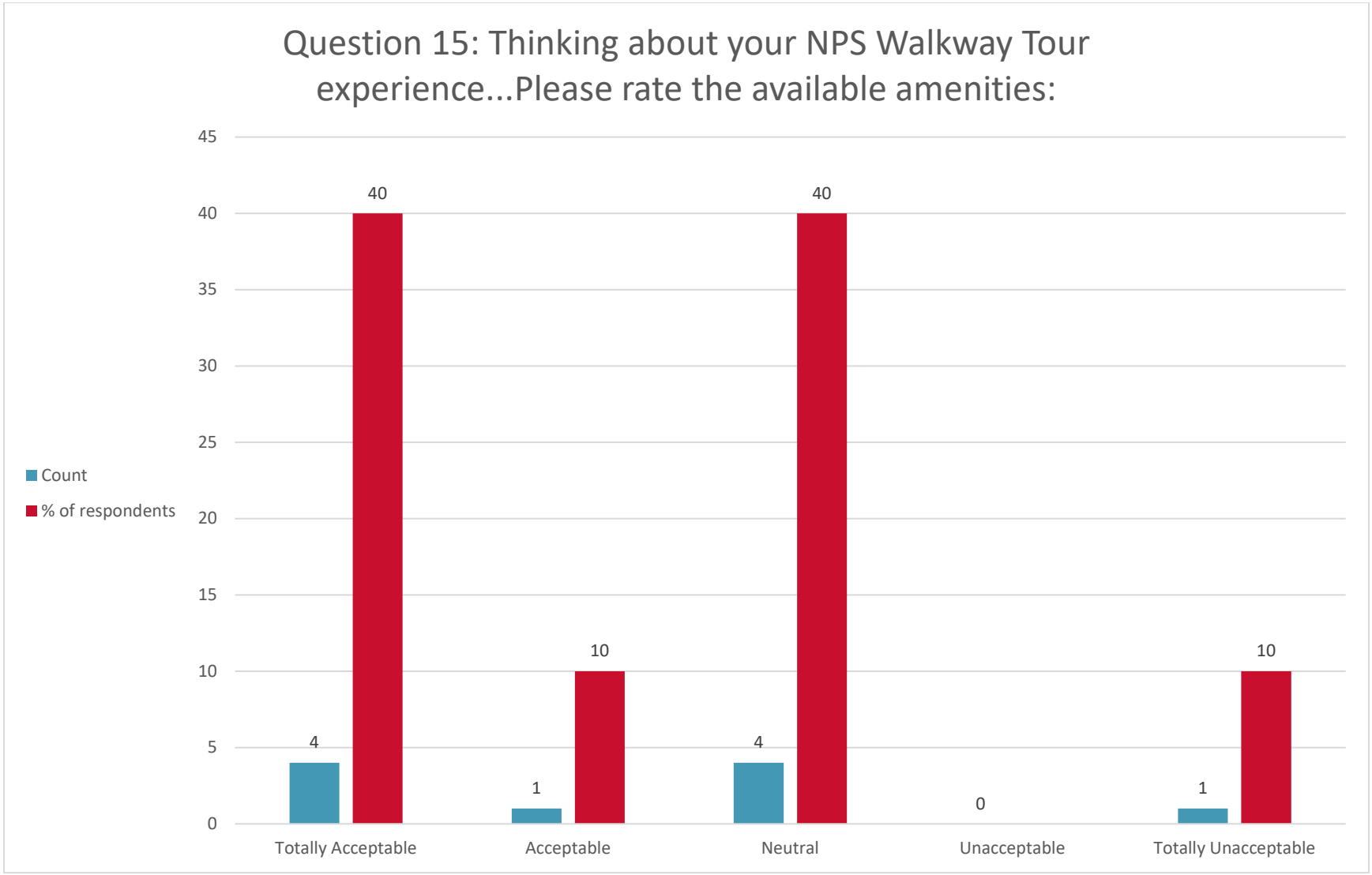
*Percentages not shown for respondent counts under ten.

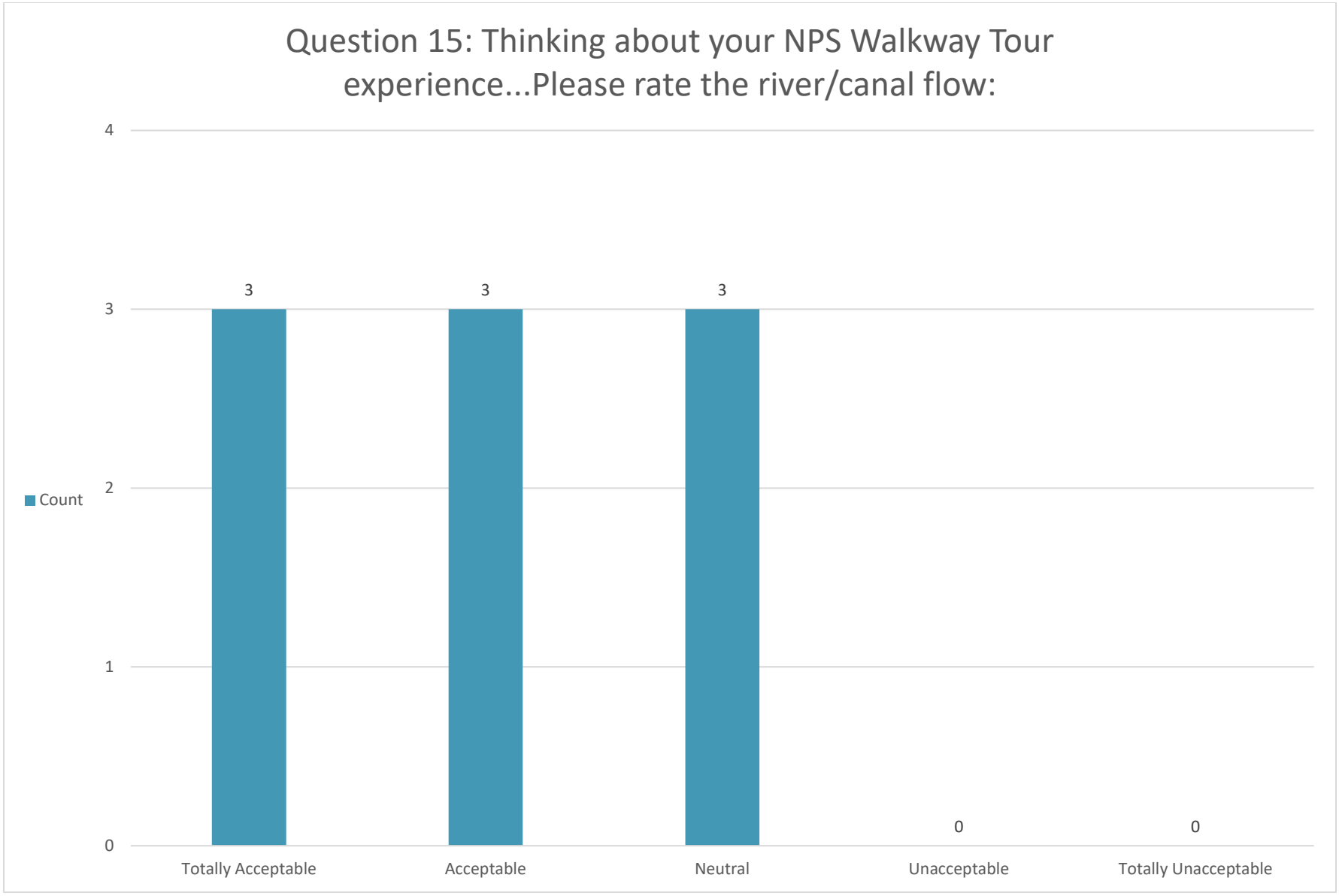

Question 15: Thinking about your NPS Walkway Tour experience...Please rate the accessibility:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
80
8
20
2
0
0
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your NPS Walkway Tour experience...Please rate the parking:
60
50
40
30
20
10
0
Count
% of respondents
50
40
10
5
4
1
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

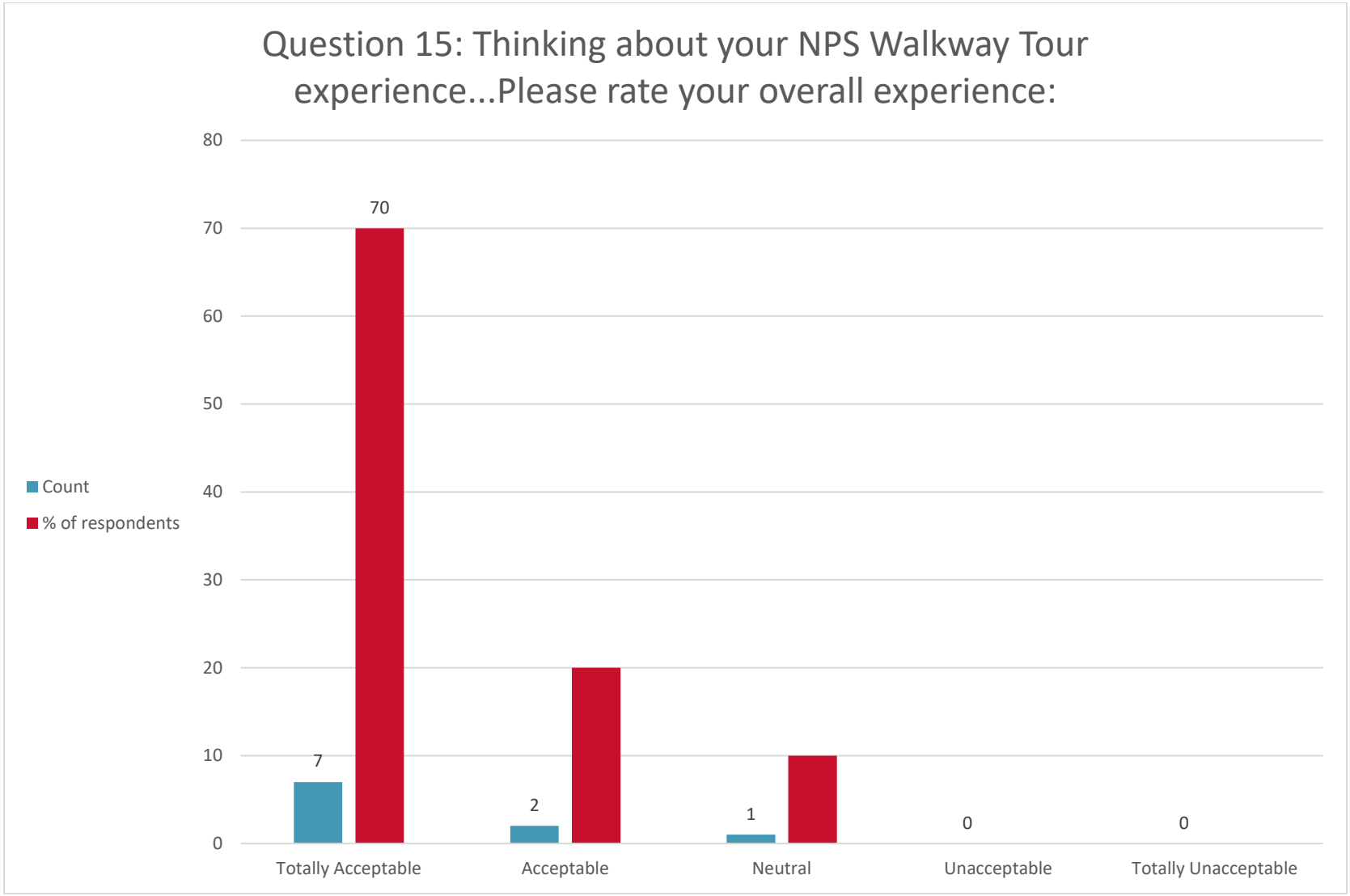

Question 15: Thinking about your NPS Walkway Tour experience...Please rate the crowding:
45
40
35
30
25
20
15
10
5
0
40
30
30
4
3
3
0
0
Count
% of respondents
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

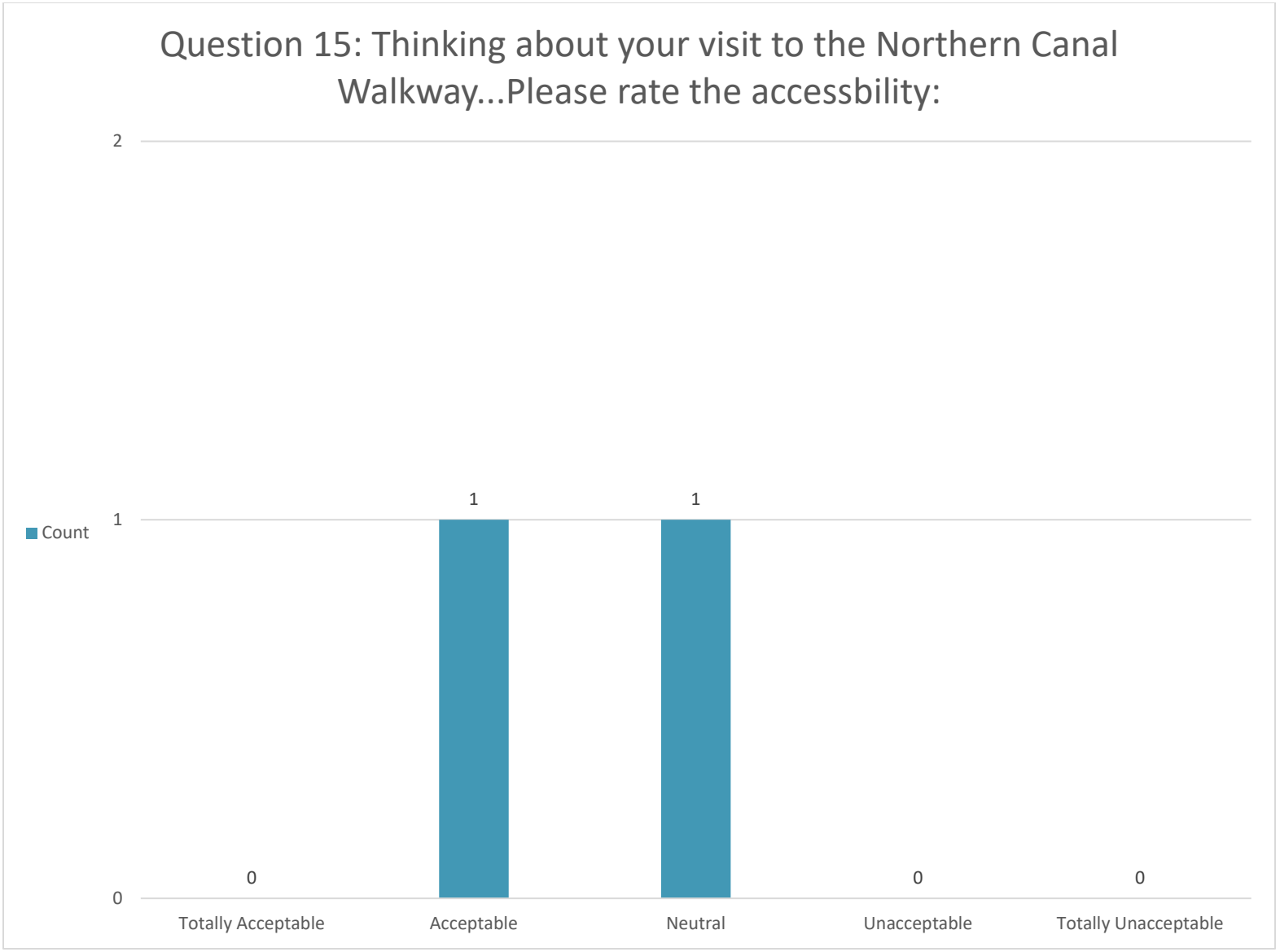

Question 15: Thinking about your NPS Walkway Tour experience...Please rate the condition of recreation facilites:
70
60
50
40
30
20
10
0
Count
% of respodnents
60
30
6
3
10
1
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your NPS Walkway Tour experience...Please rate the available amenities:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
40
40
10
10
4
1
4
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

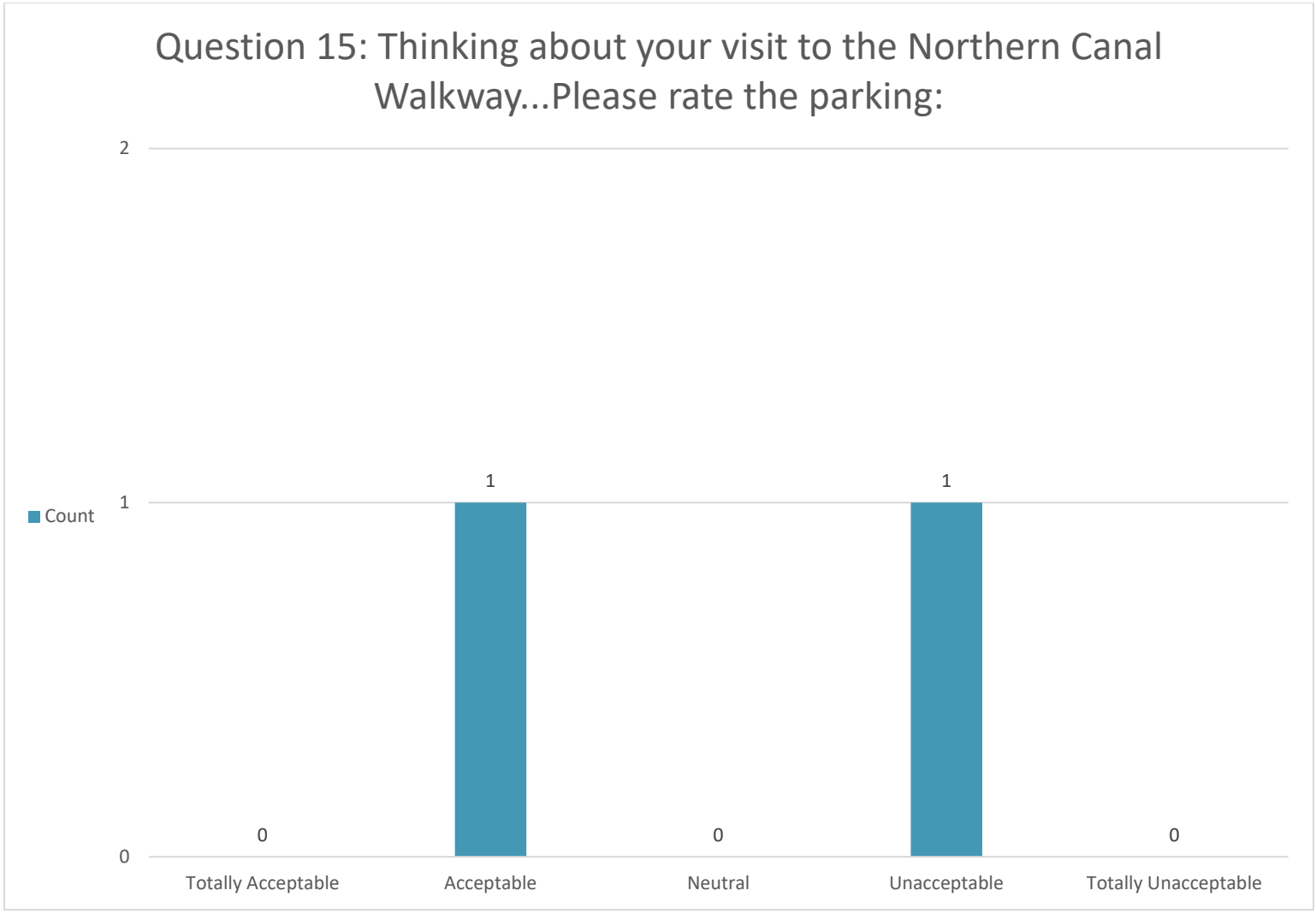


*Percentages not shown for respondent counts under ten.

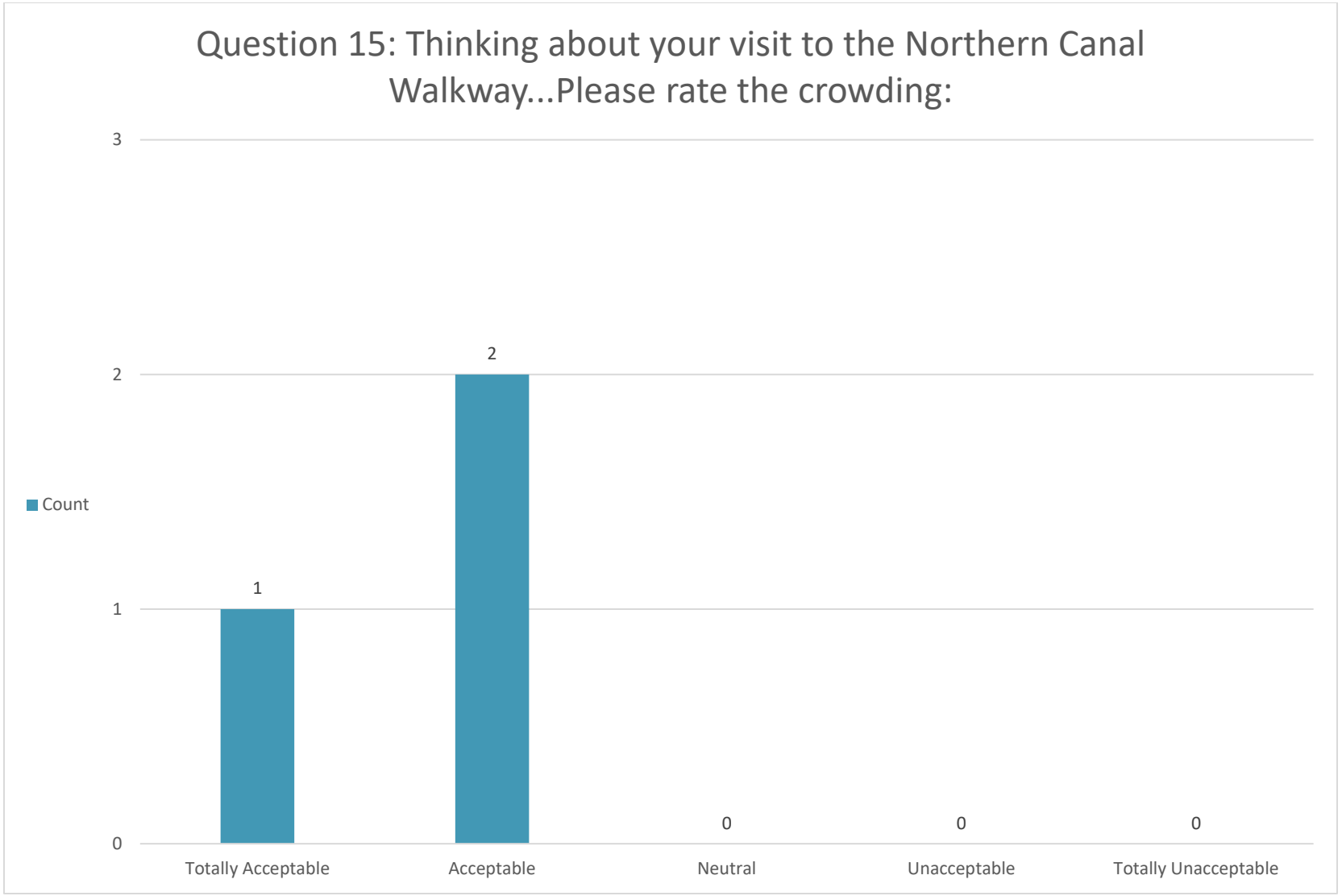

Question 15: Thinking about your NPS Walkway Tour experience...Please rate your overall experience:
80
70
60
50
40
30
20
10
0
Count
% of respondents
70
7
2
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable



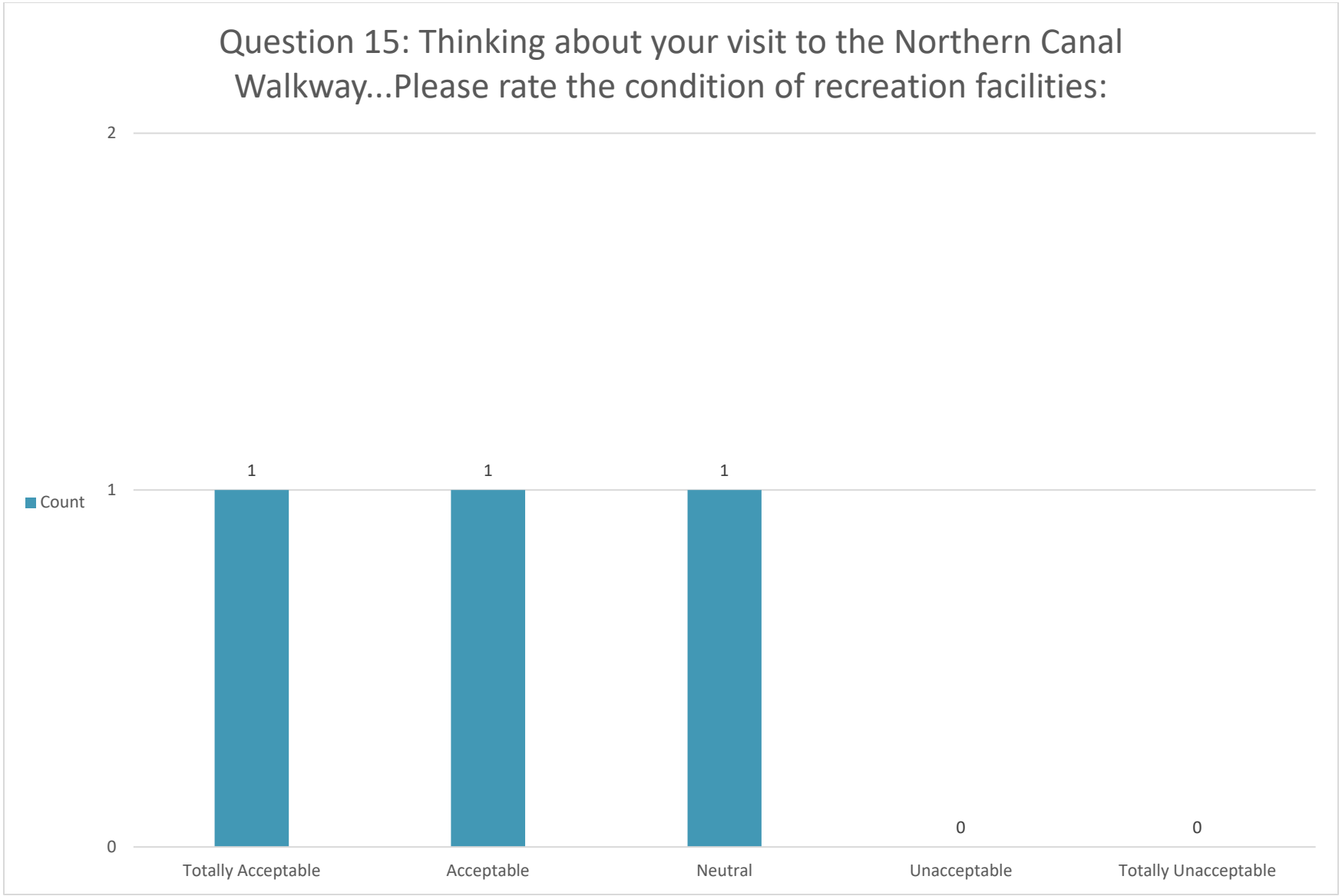
*Percentages not shown for respondent counts under ten.



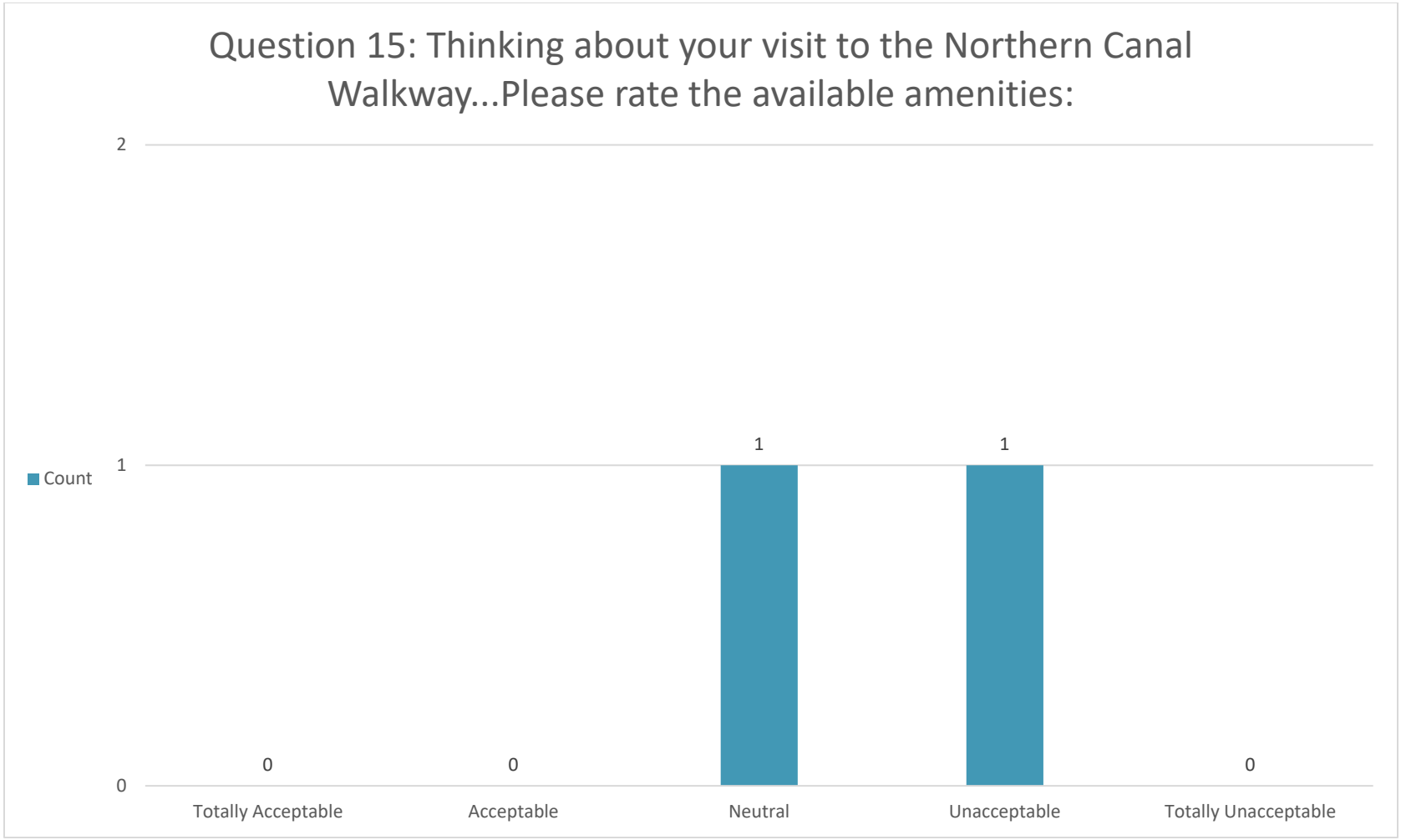
*Percentages not shown for respondent counts under ten.



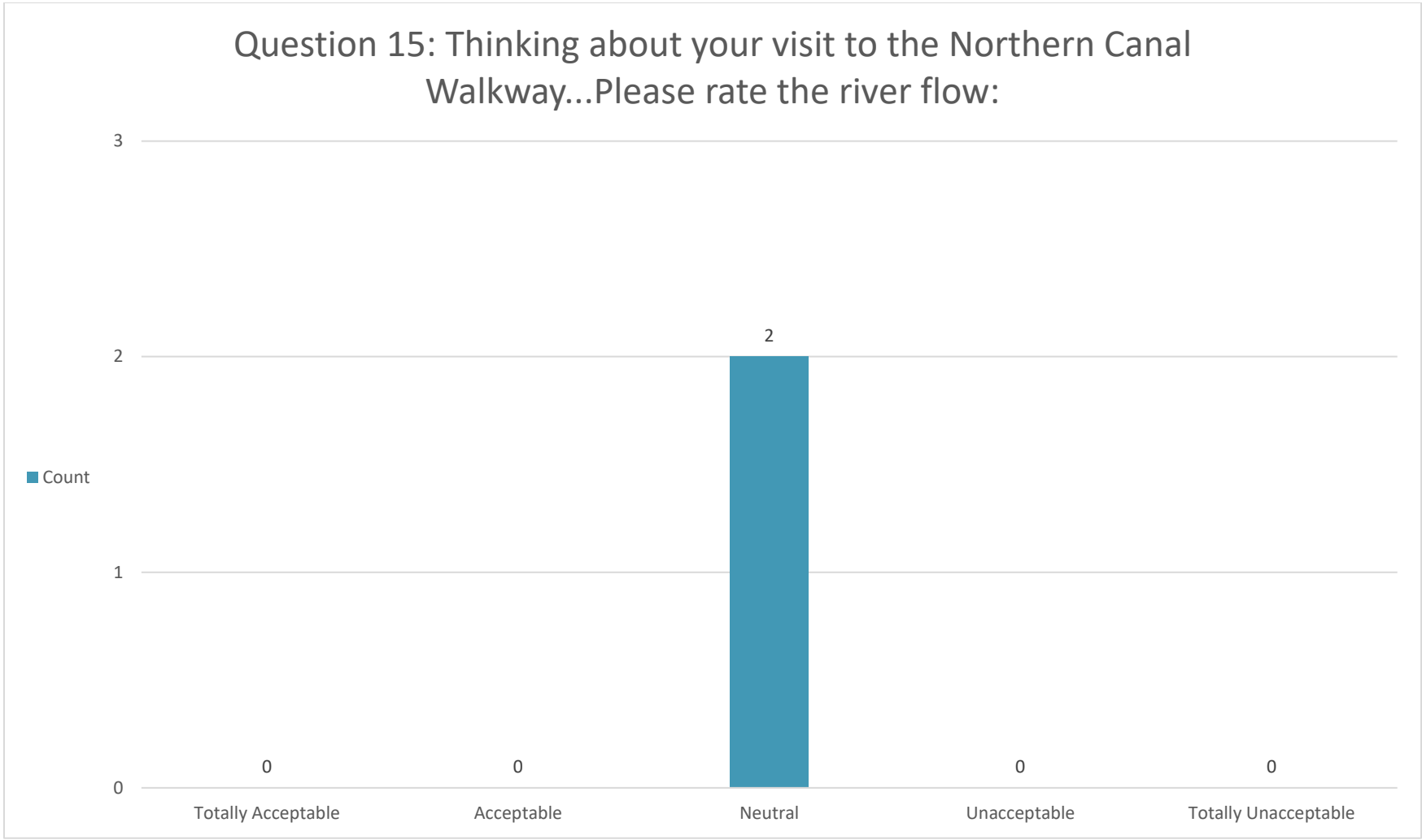
*Percentages not shown for respondent counts under ten.



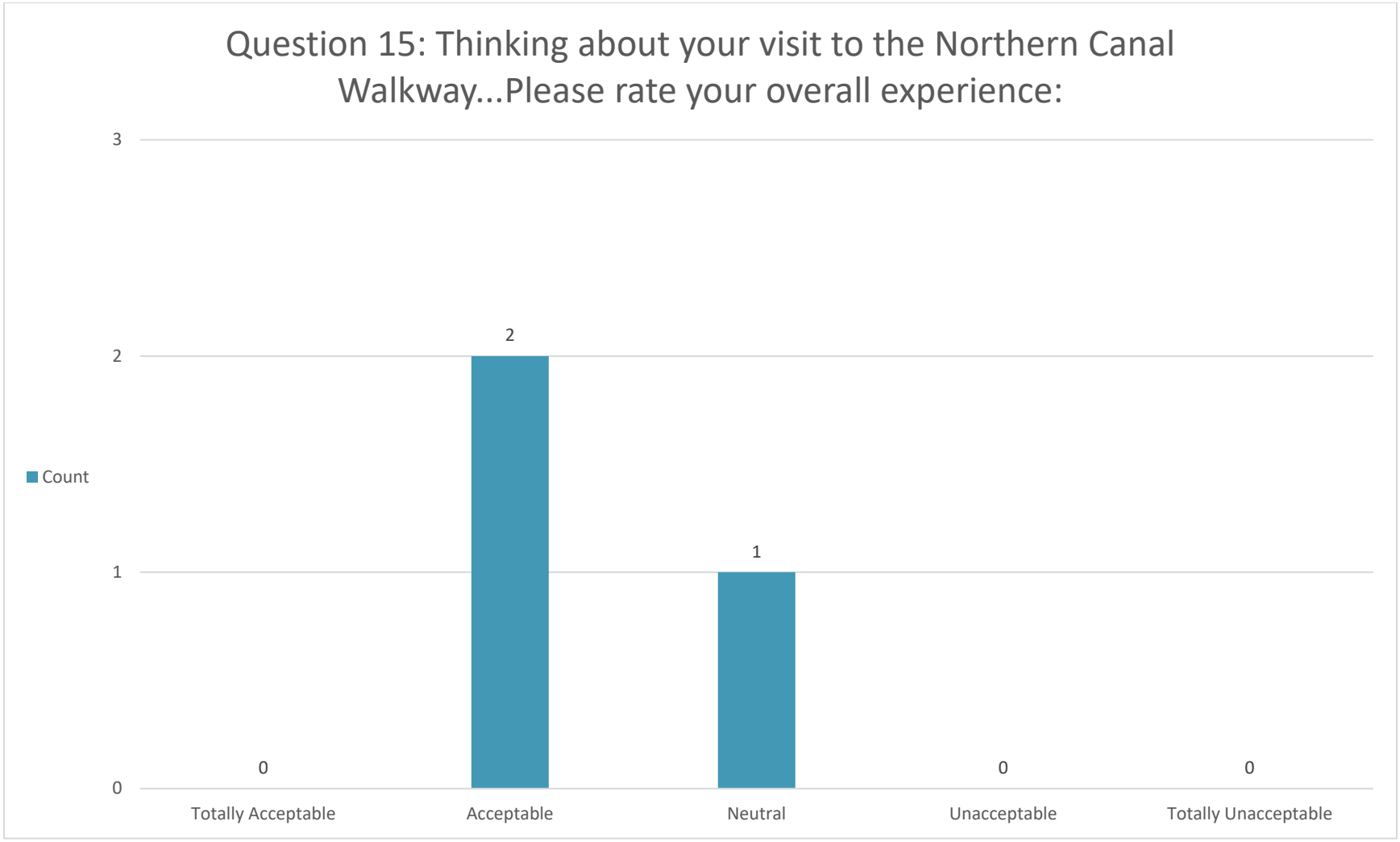
*Percentages not shown for respondent counts under ten.



*Percentages not shown for respondent counts under ten.



*Percentages not shown for respondent counts under ten.



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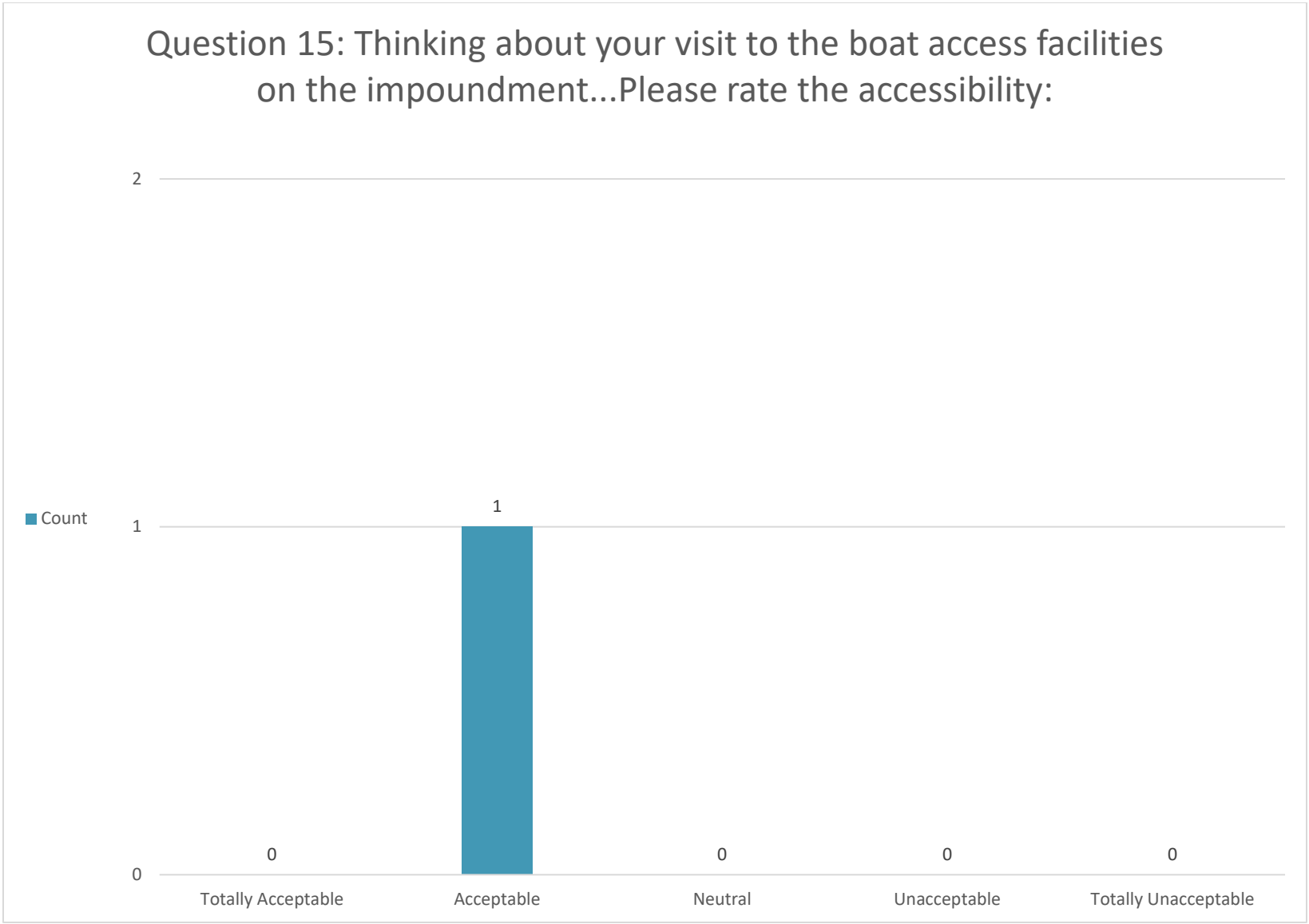
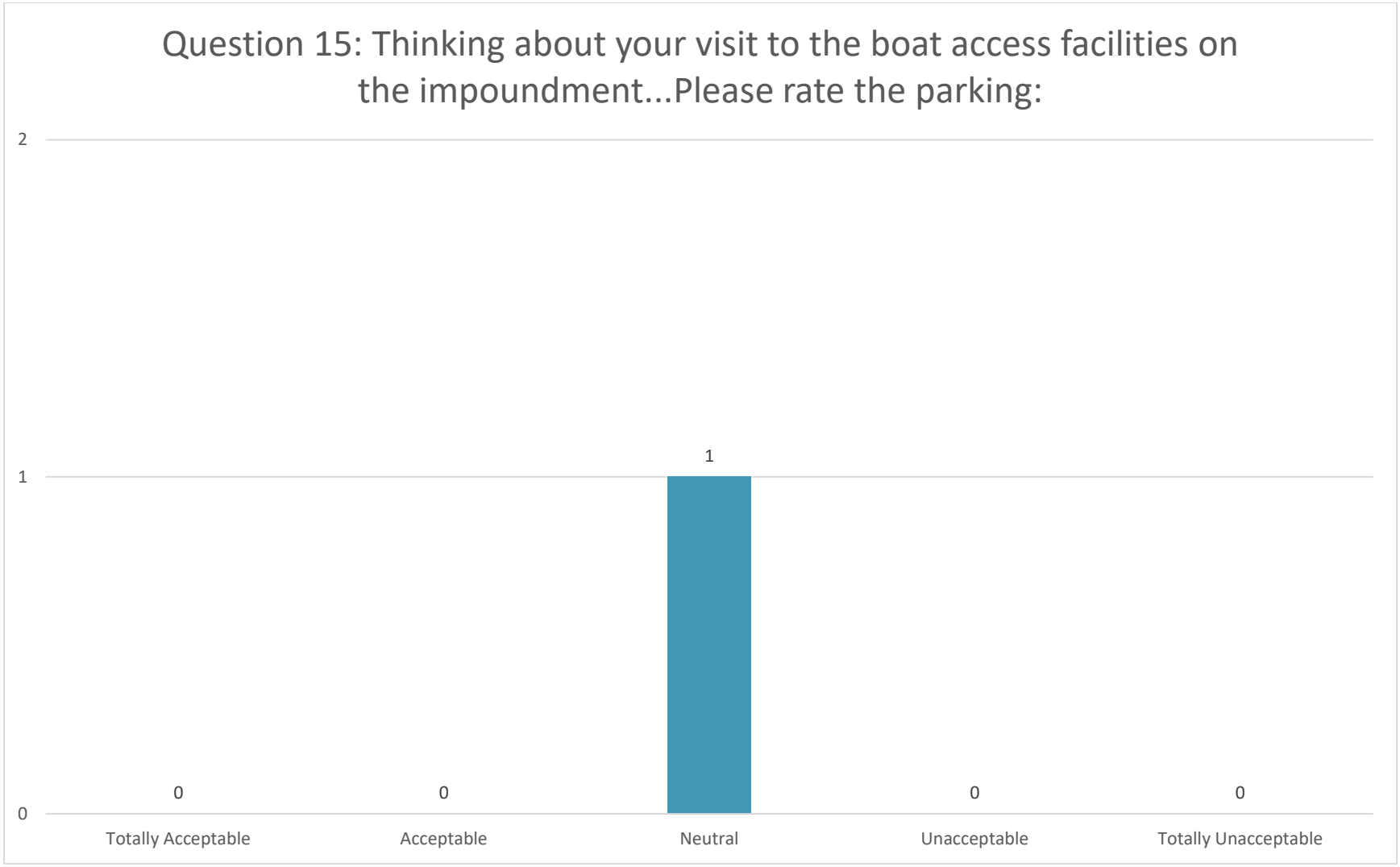
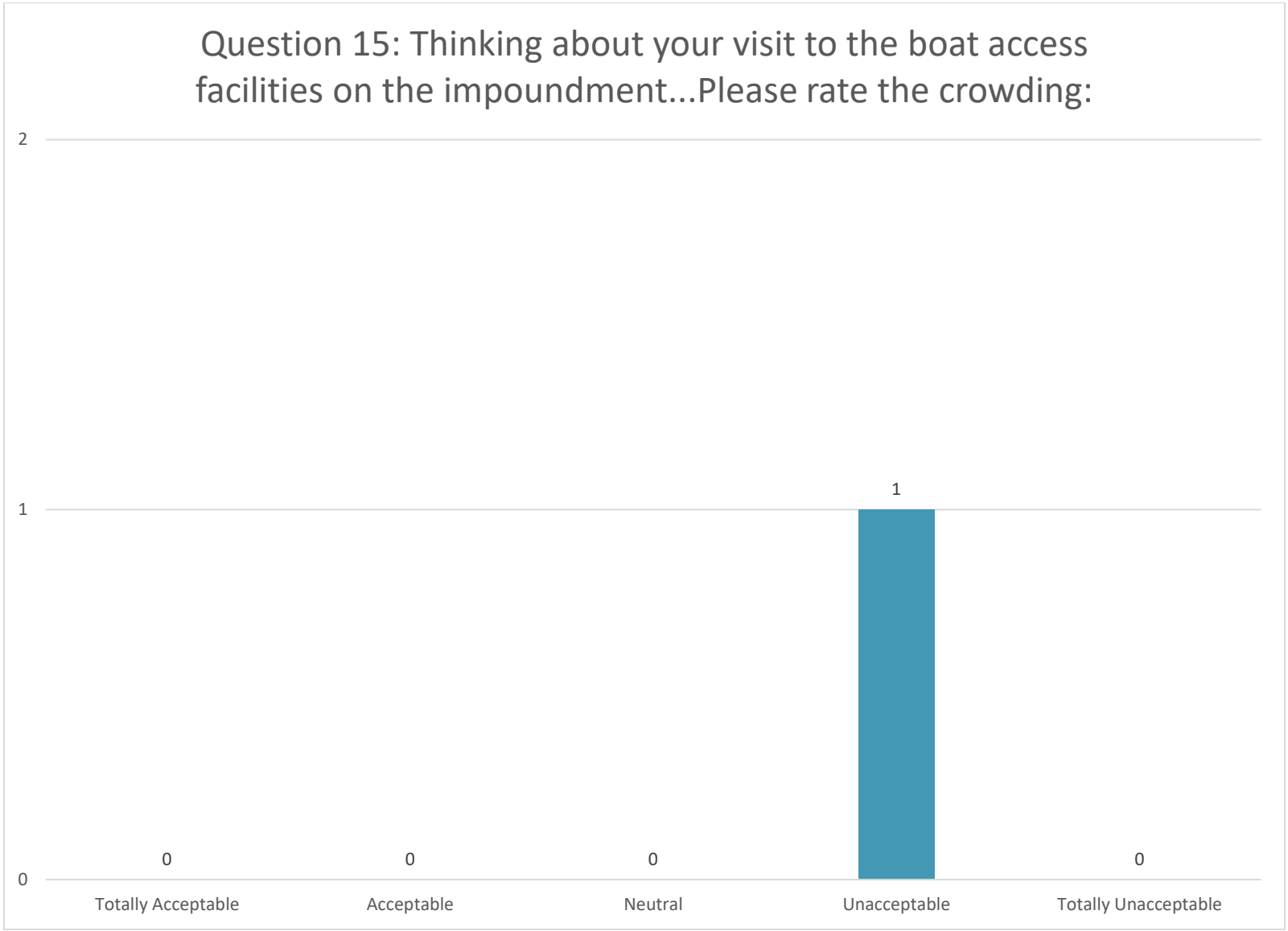


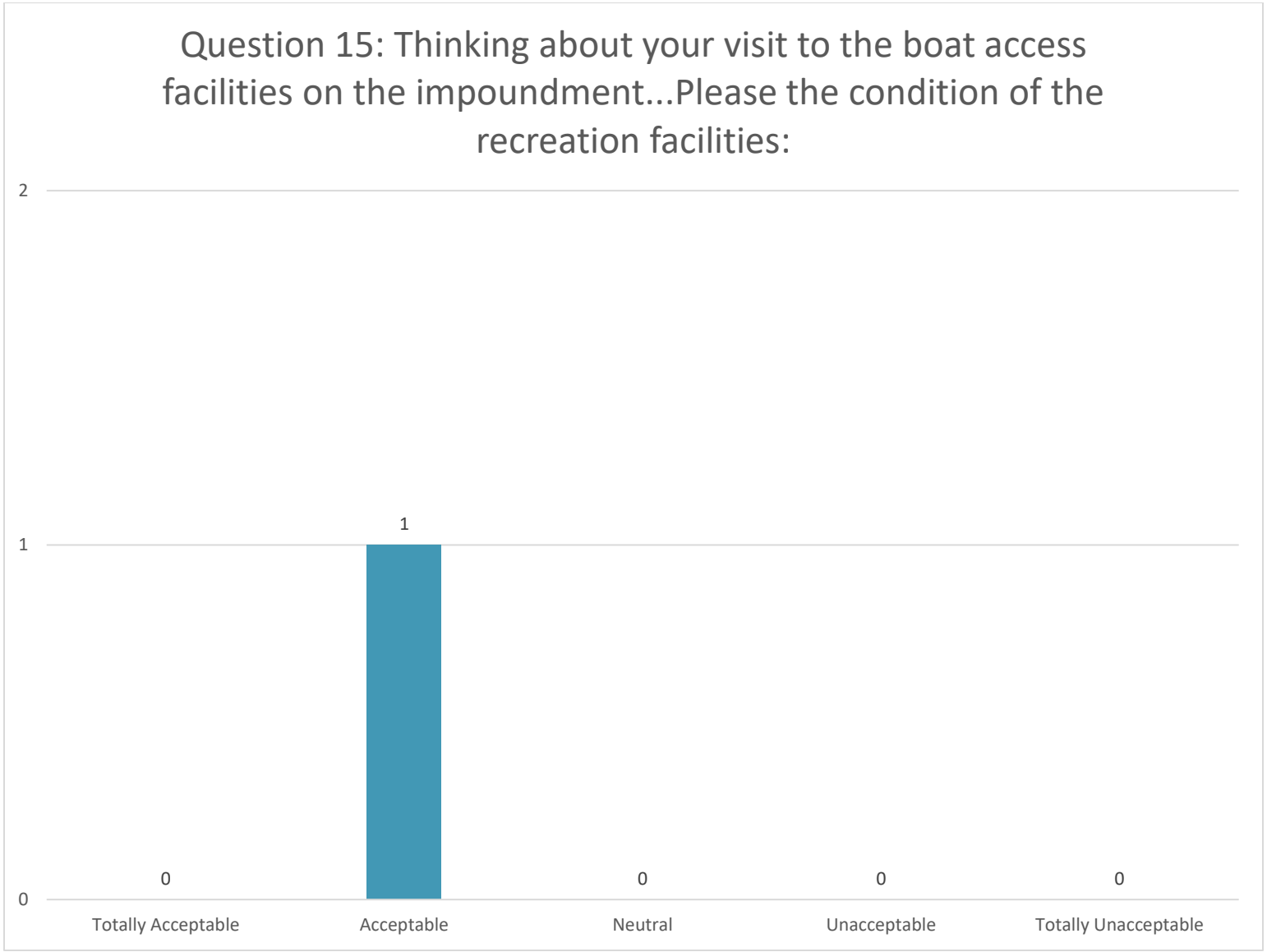
*Percentages not shown for respondent counts under ten.



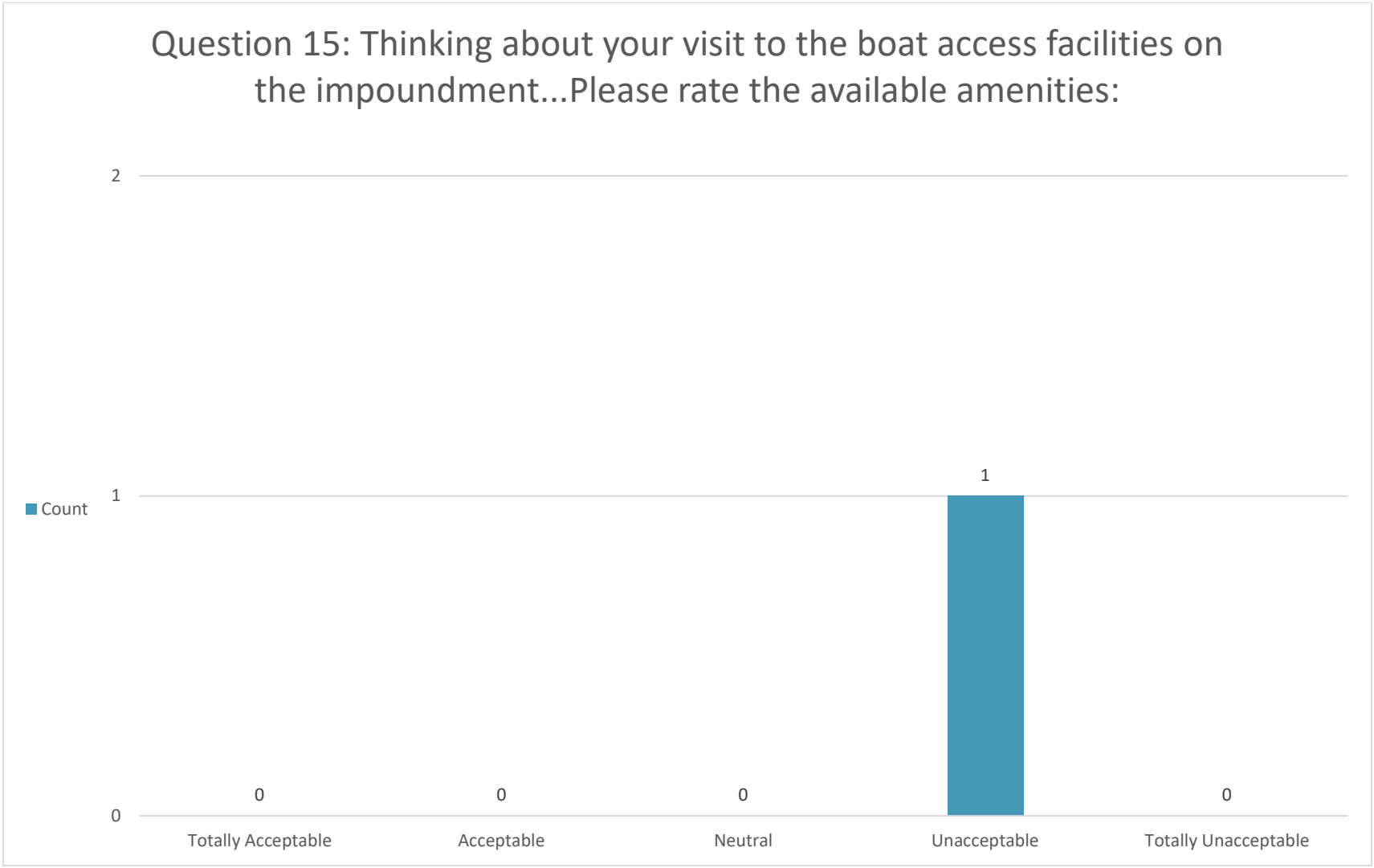
*Percentages not shown for respondent counts under ten.



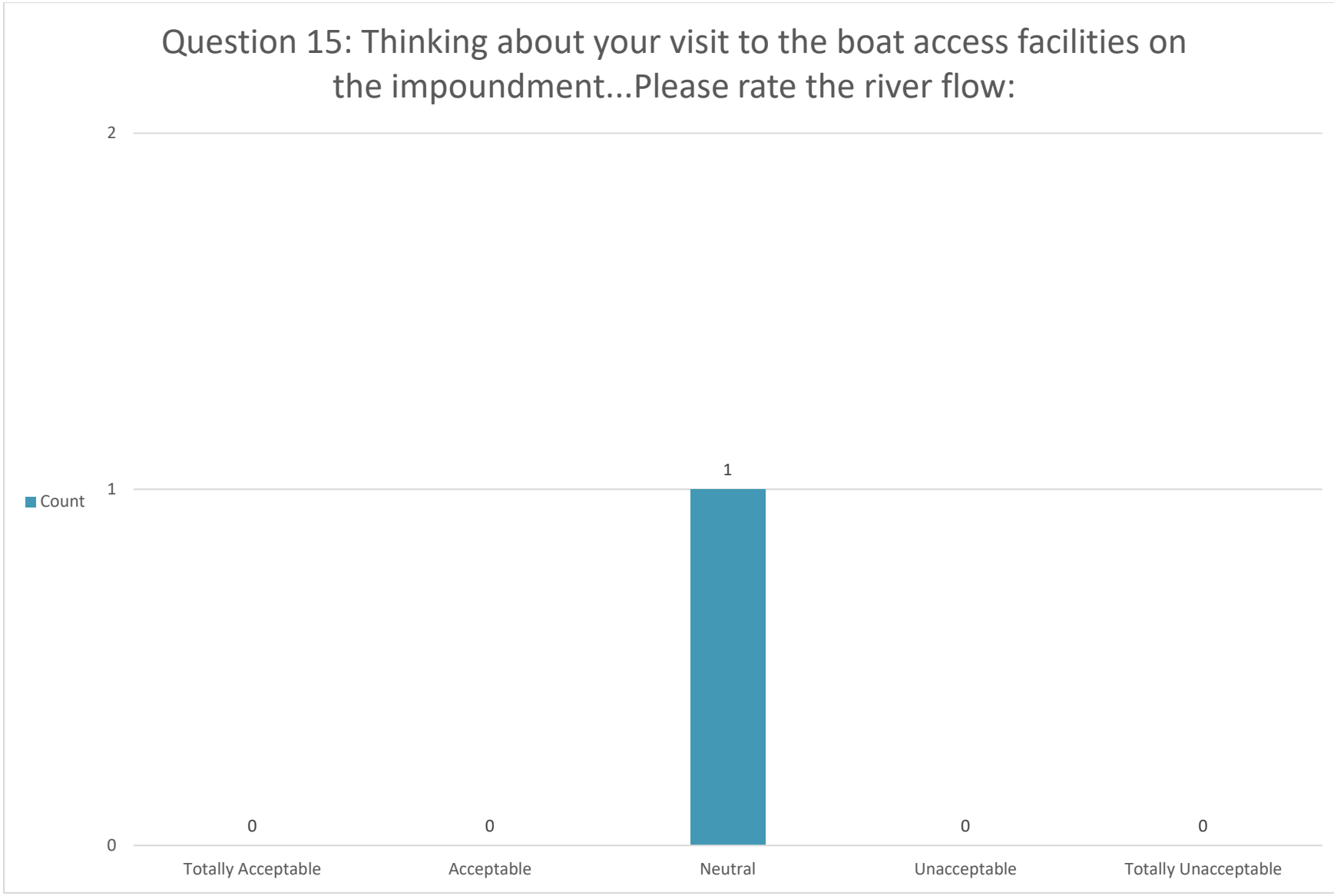
*Percentages not shown for respondent counts under ten.



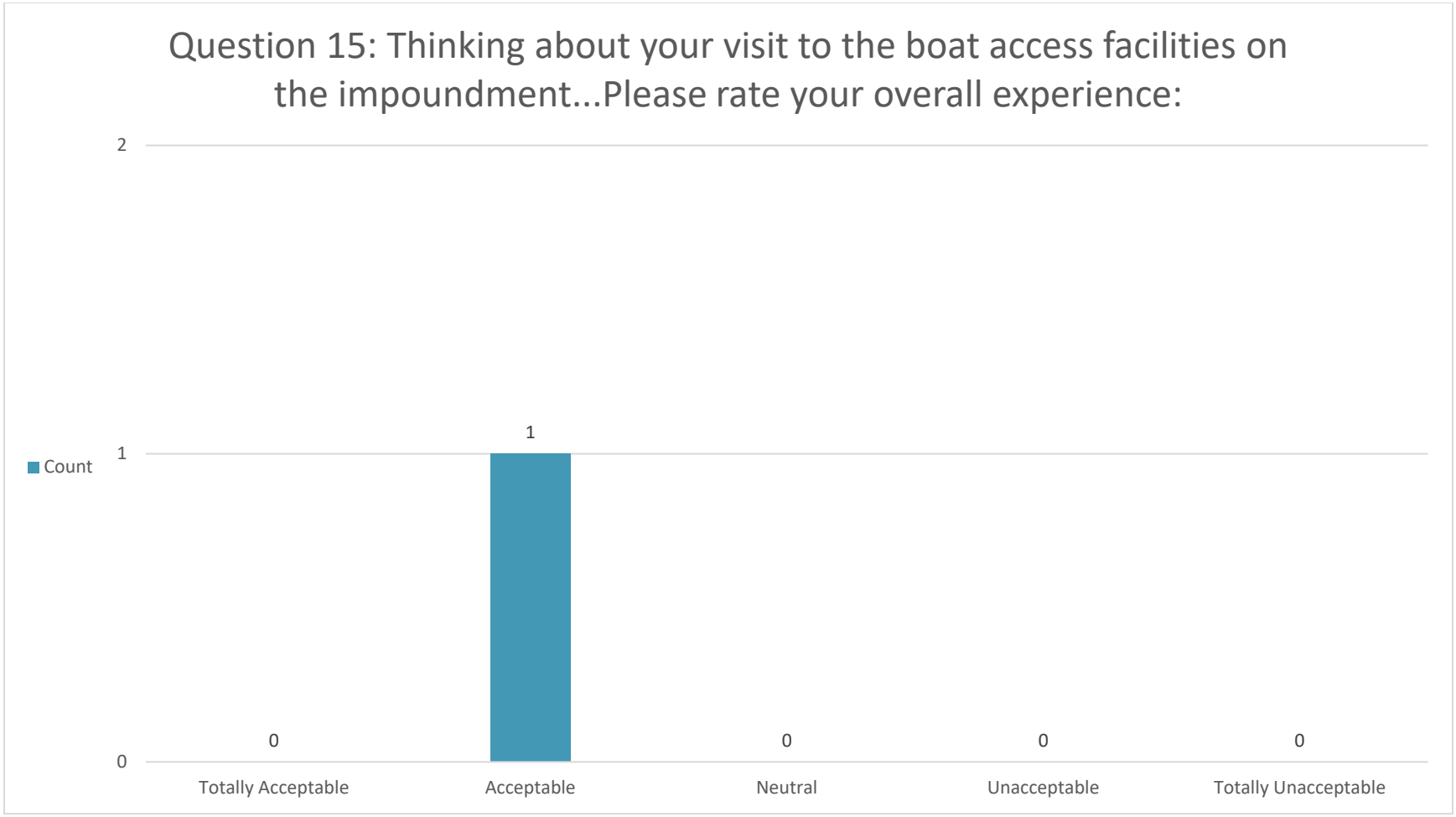
*Percentages not shown for respondent counts under ten.



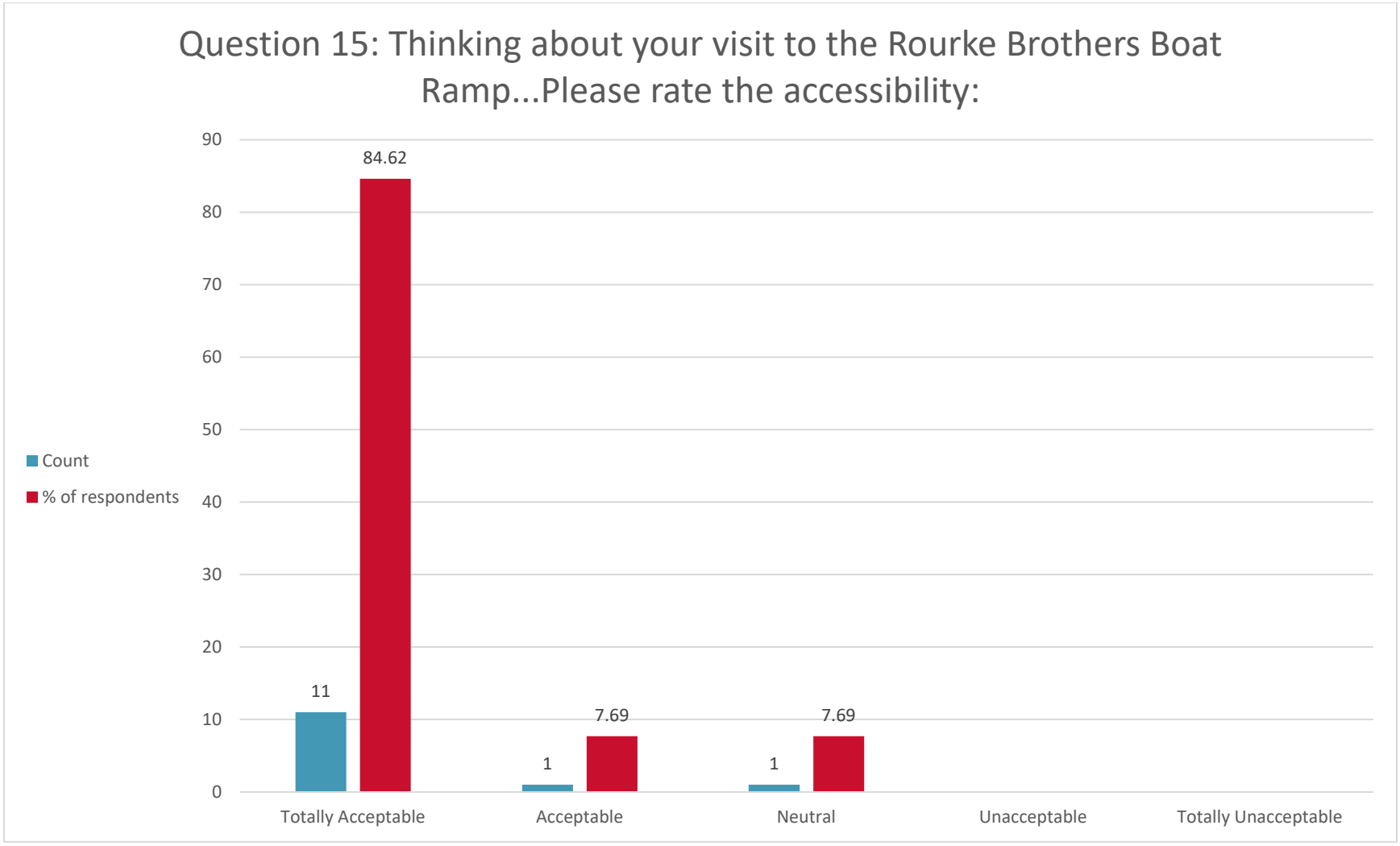
*Percentages not shown for respondent counts under ten.

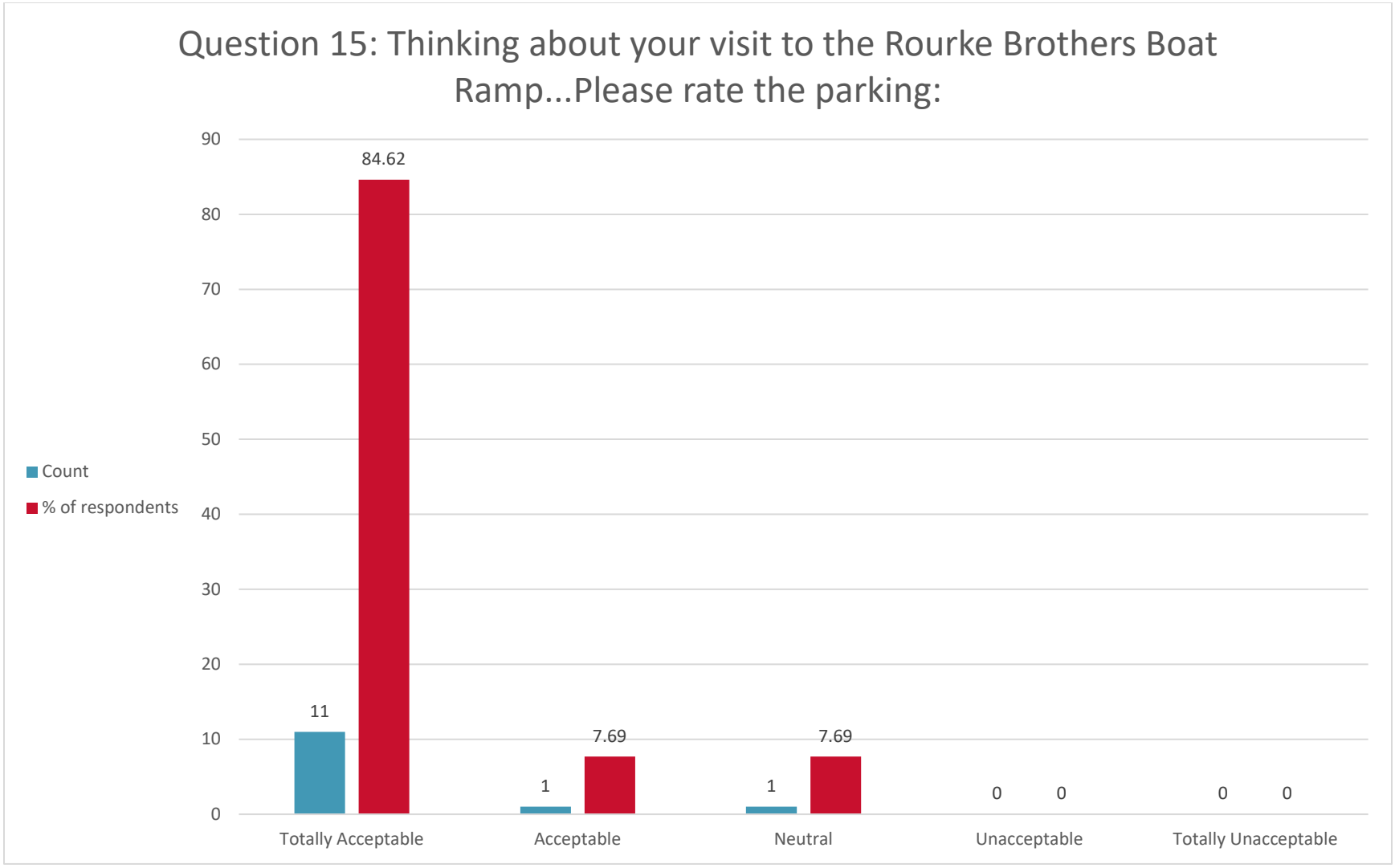


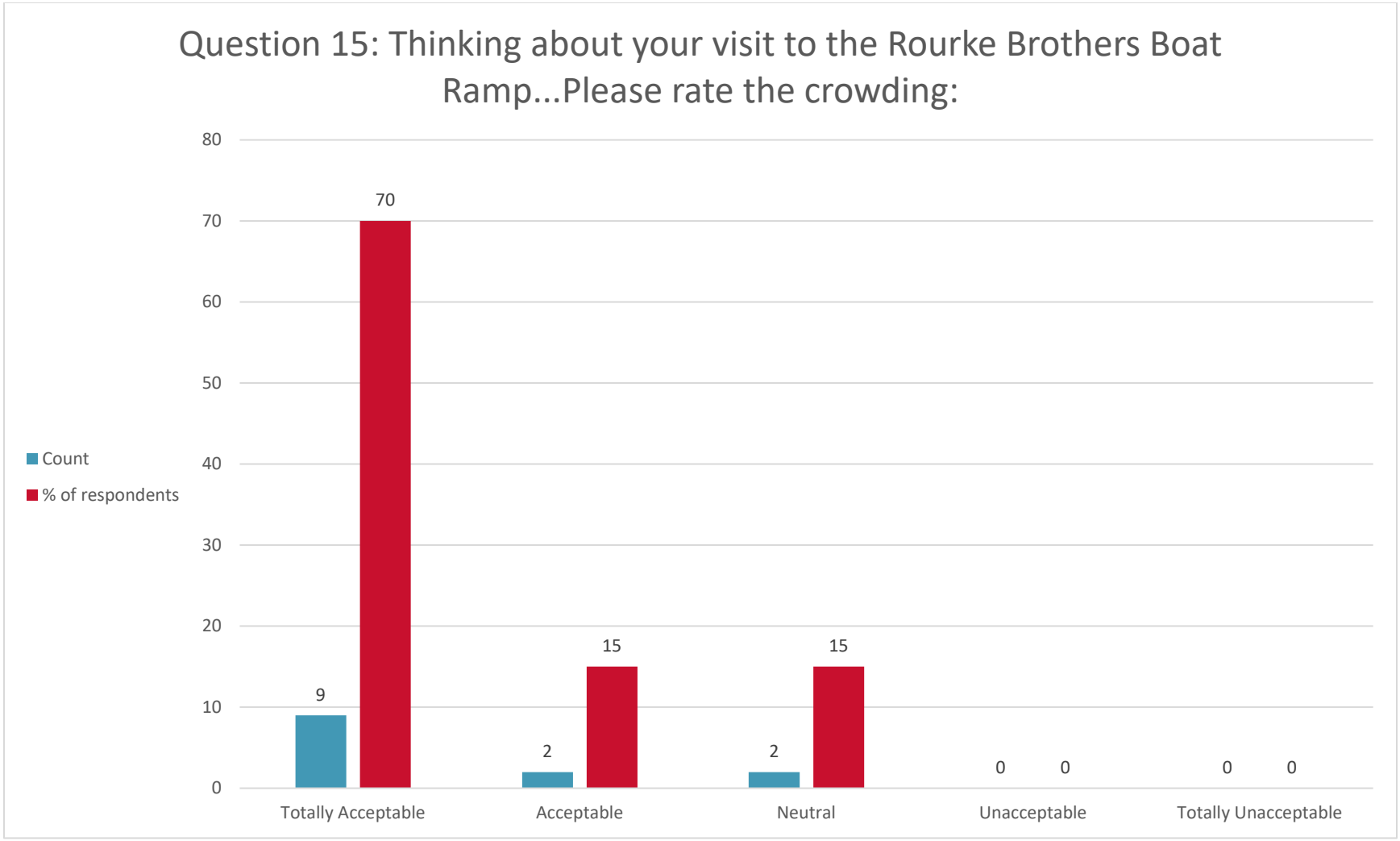
*Percentages not shown for respondent counts under ten.

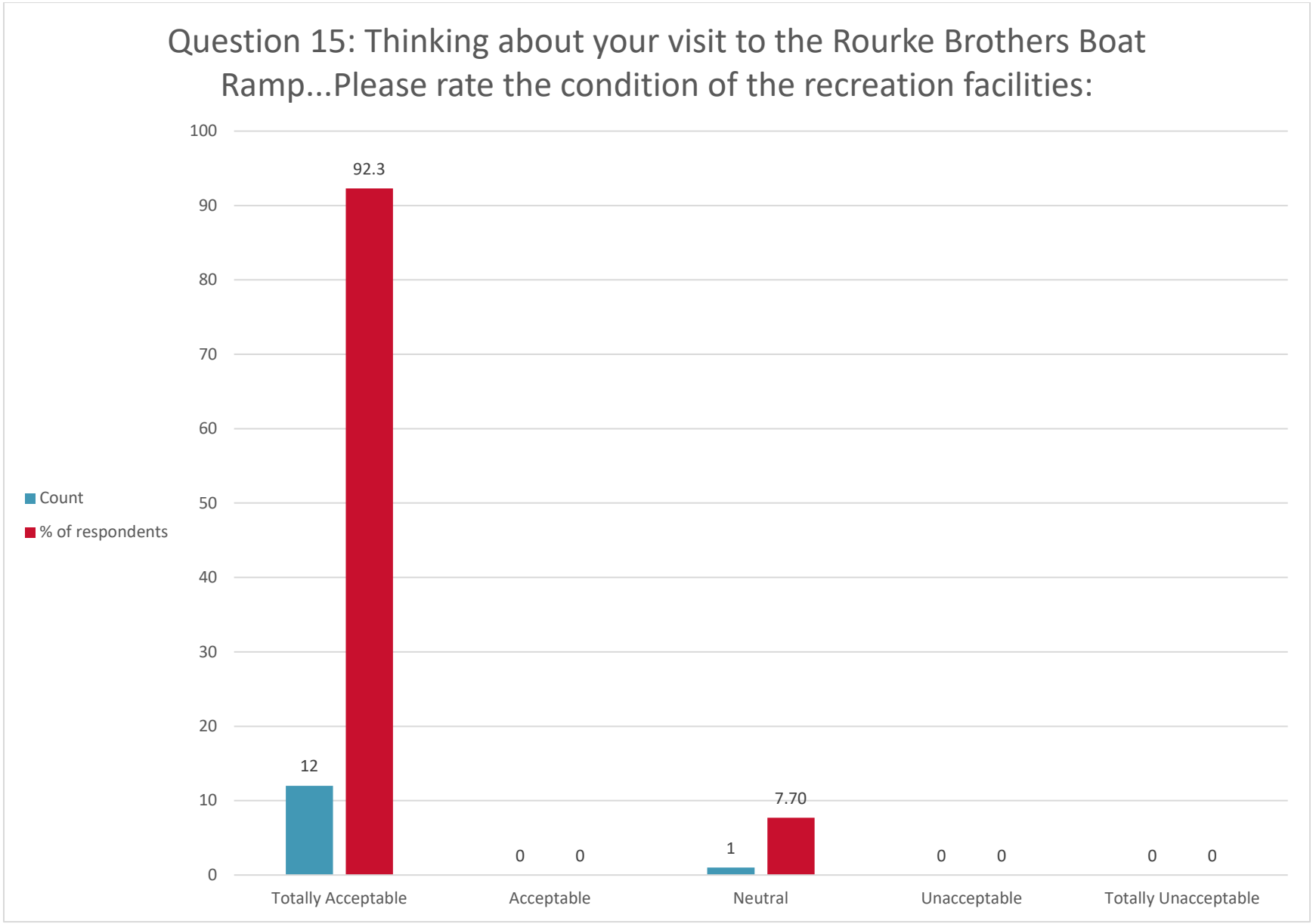


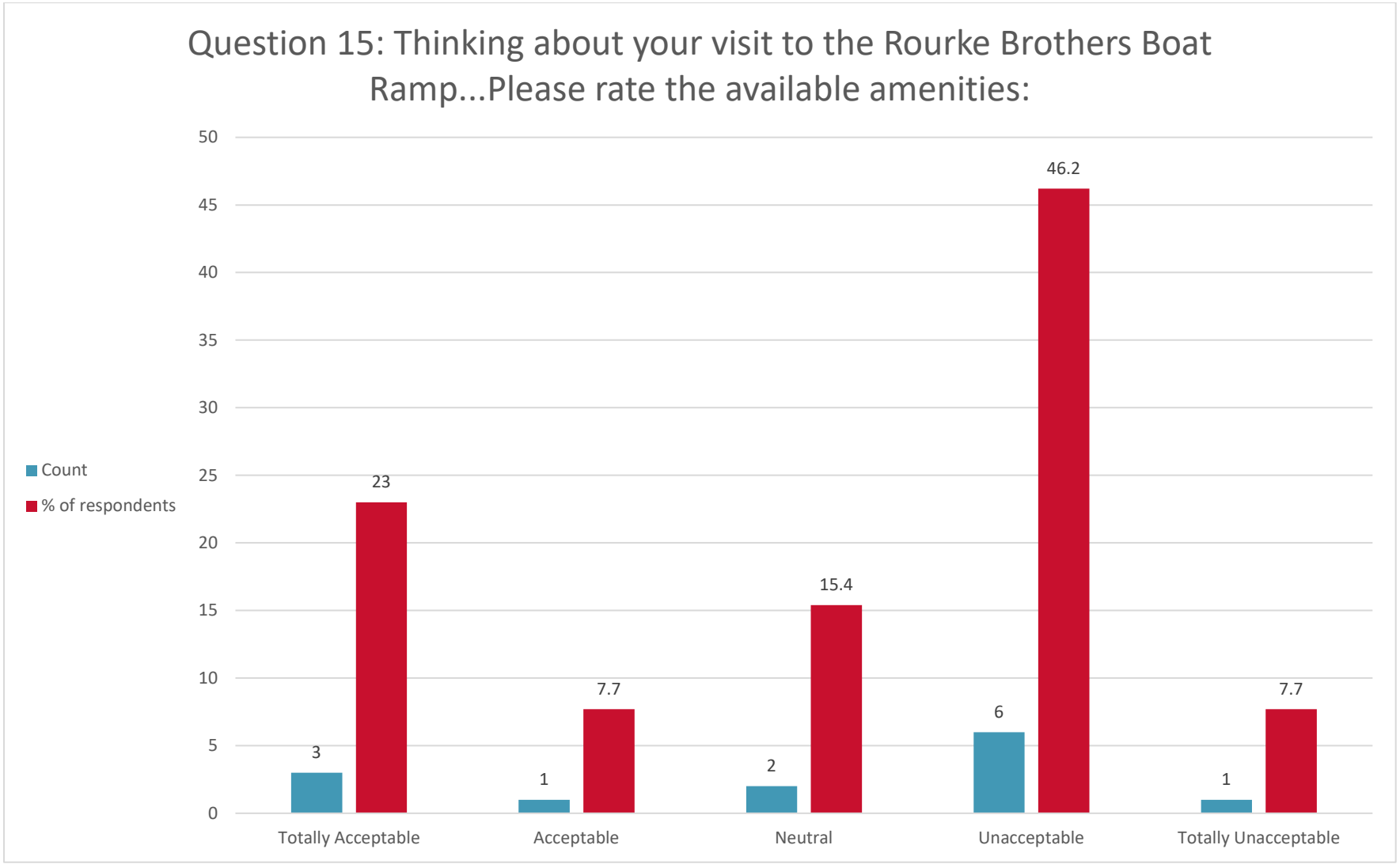
*Percentages not shown for respondent counts under ten.

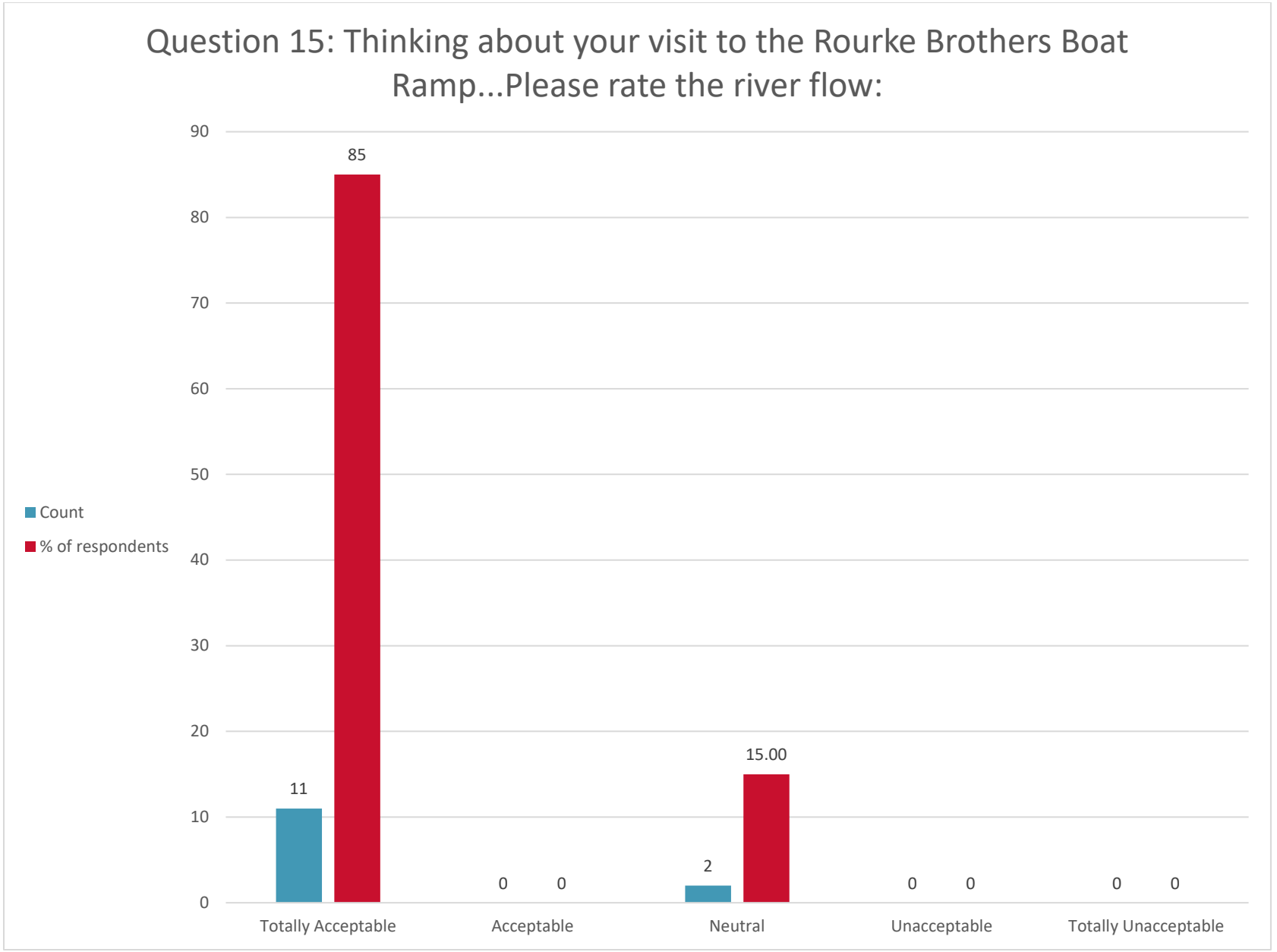

Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the accessibility:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
84.62
11
7.69
1
7.69
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

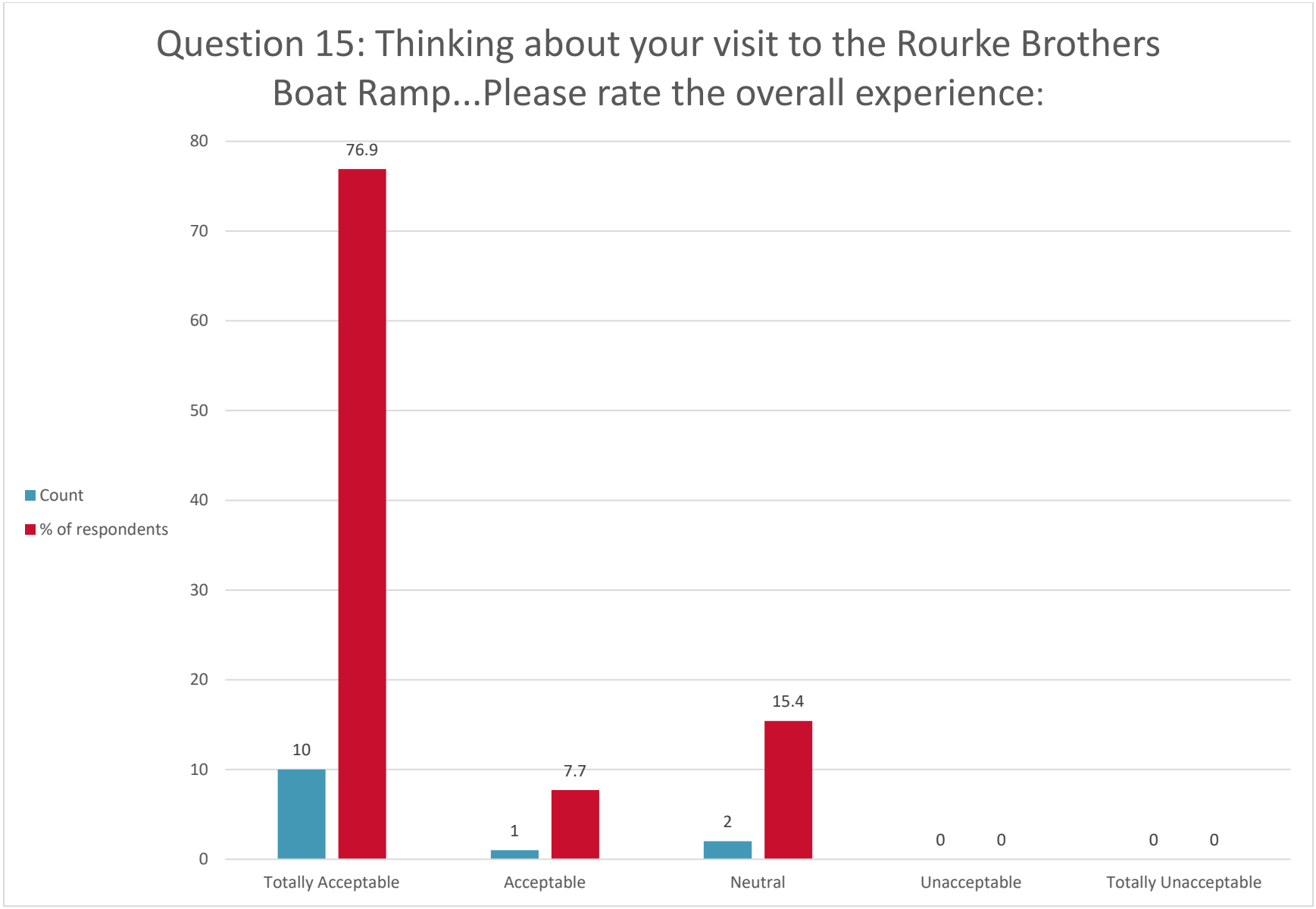

Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the parking:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
84.62
11
7.69
1
7.69
1
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

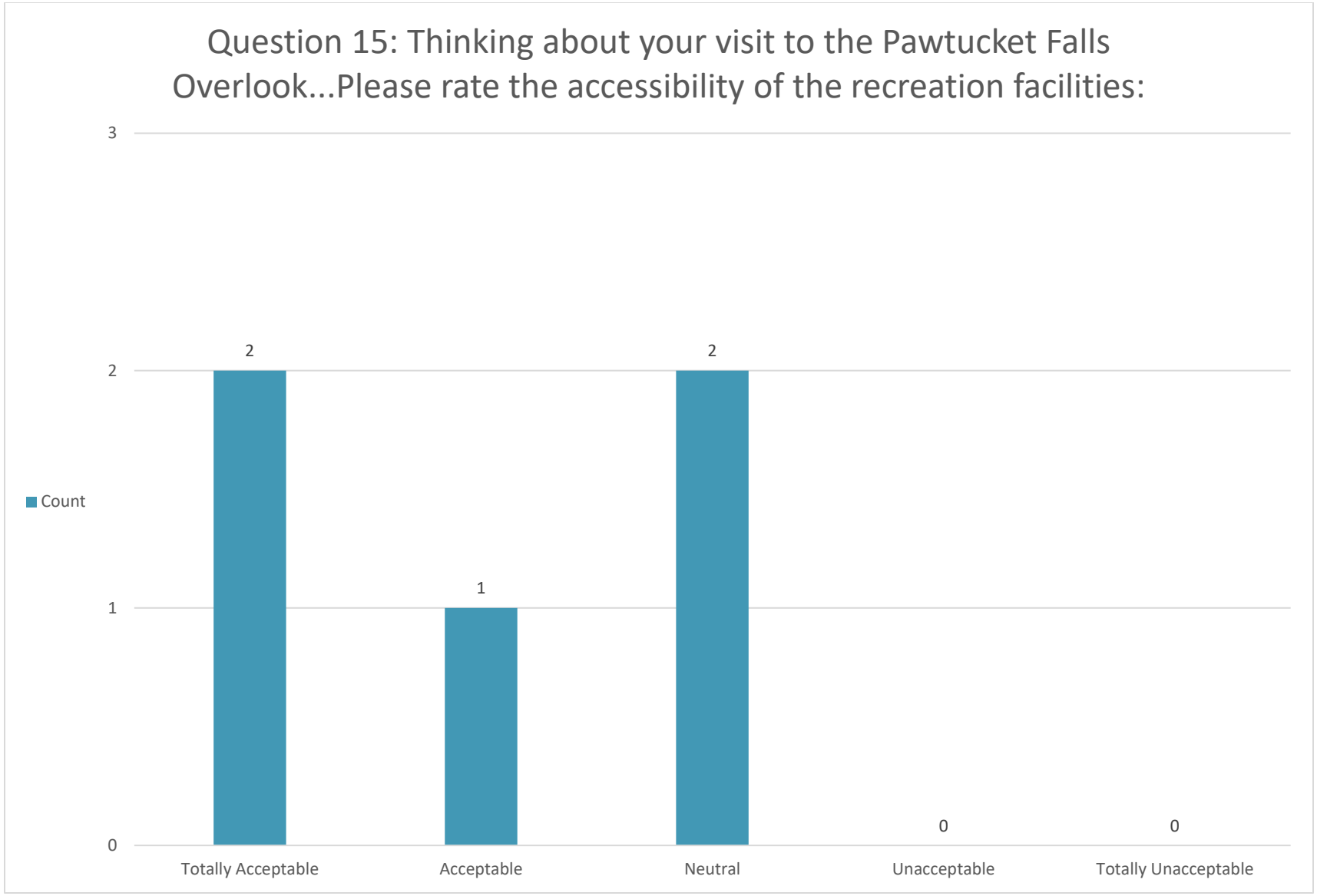

Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the crowding:
80
70
60
50
40
30
20
10
0
Count
% of respondents
9
70
2
15
2
15
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the condition of the recreation facilities:
100
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
92.3
12
0
0
1
7.70
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

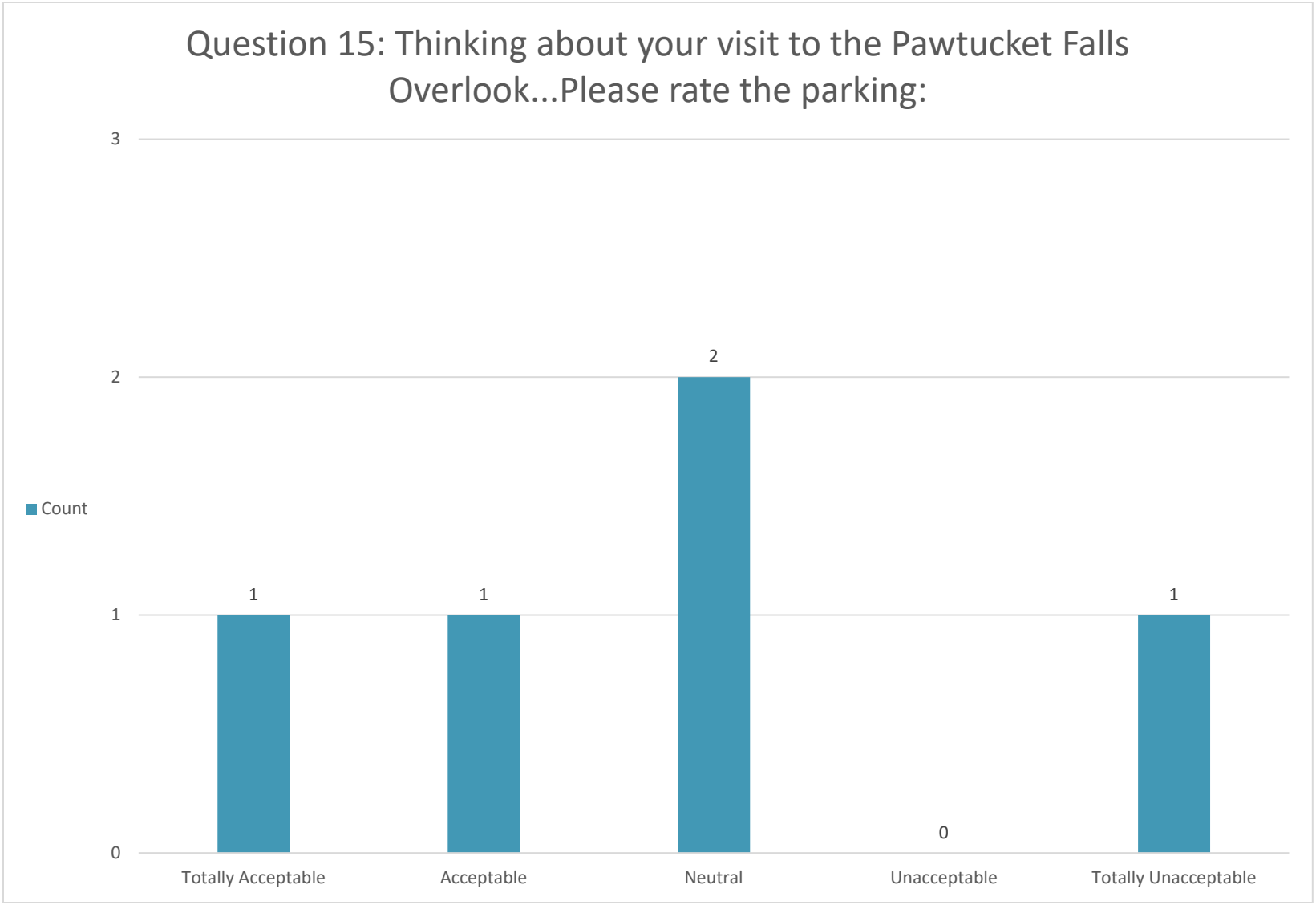

Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the available amenities:
50
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
3
23
1
7.7
2
15.4
6
46.2
1
7.7
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the river flow:
90
80
70
60
50
40
30
20
10
0
Count
% of respondents
85
11
0
0
2
15.00
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

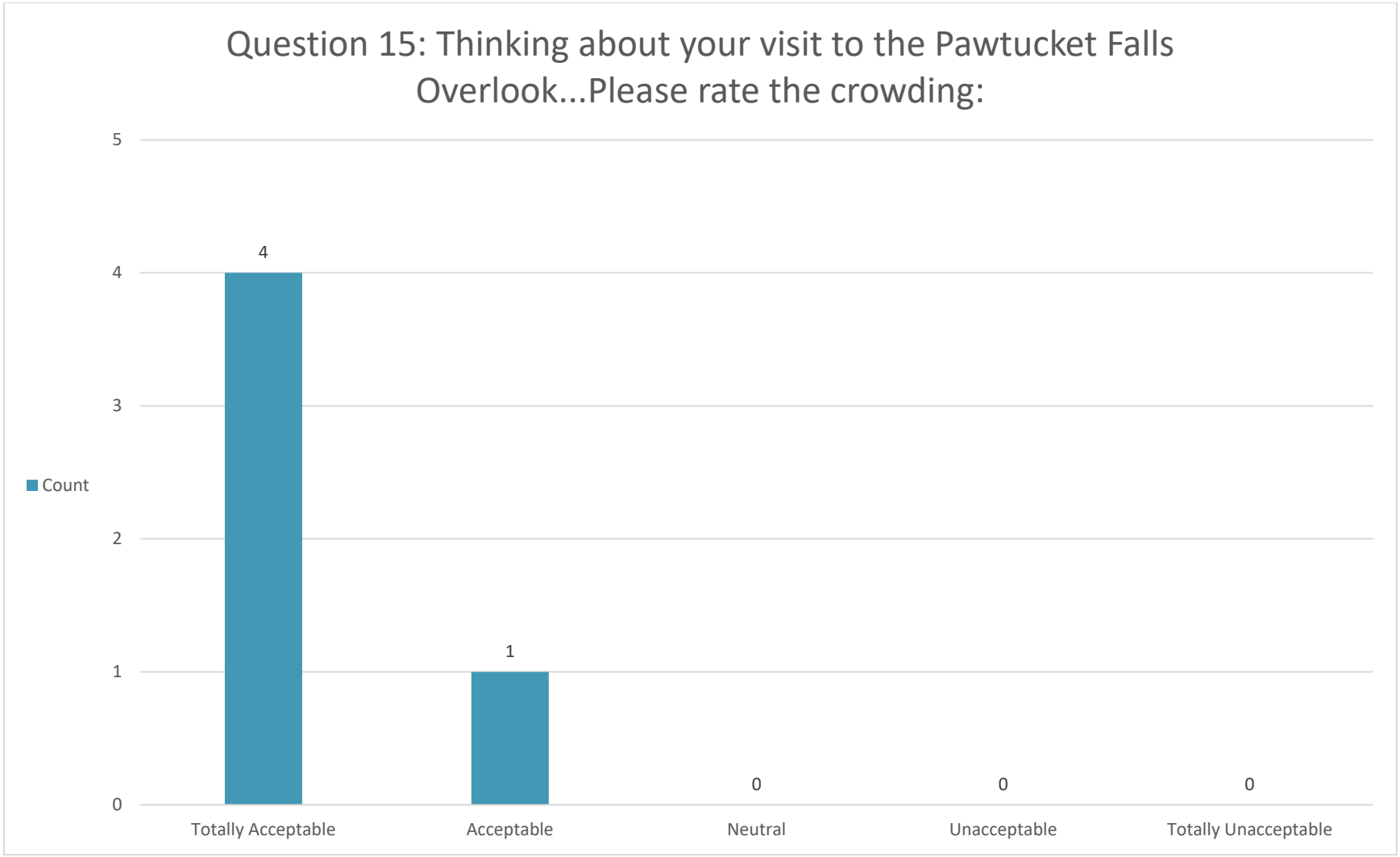

Question 15: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the overall experience:
80
70
60
50
40
30
20
10
0
Count
% of respondents
76.9
10
7.7
1
15.4
2
0
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable



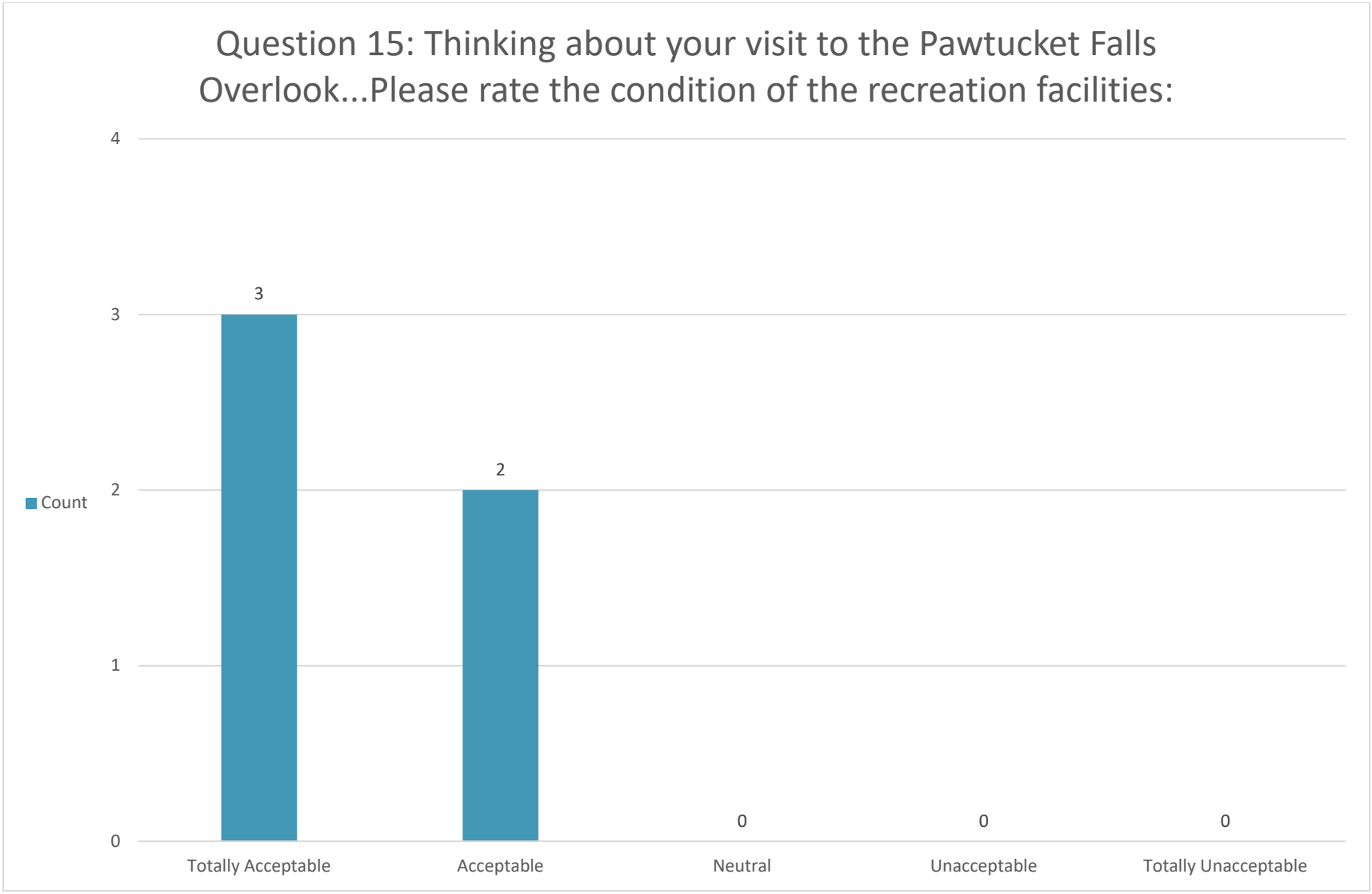
*Percentages not shown for respondent counts under ten.



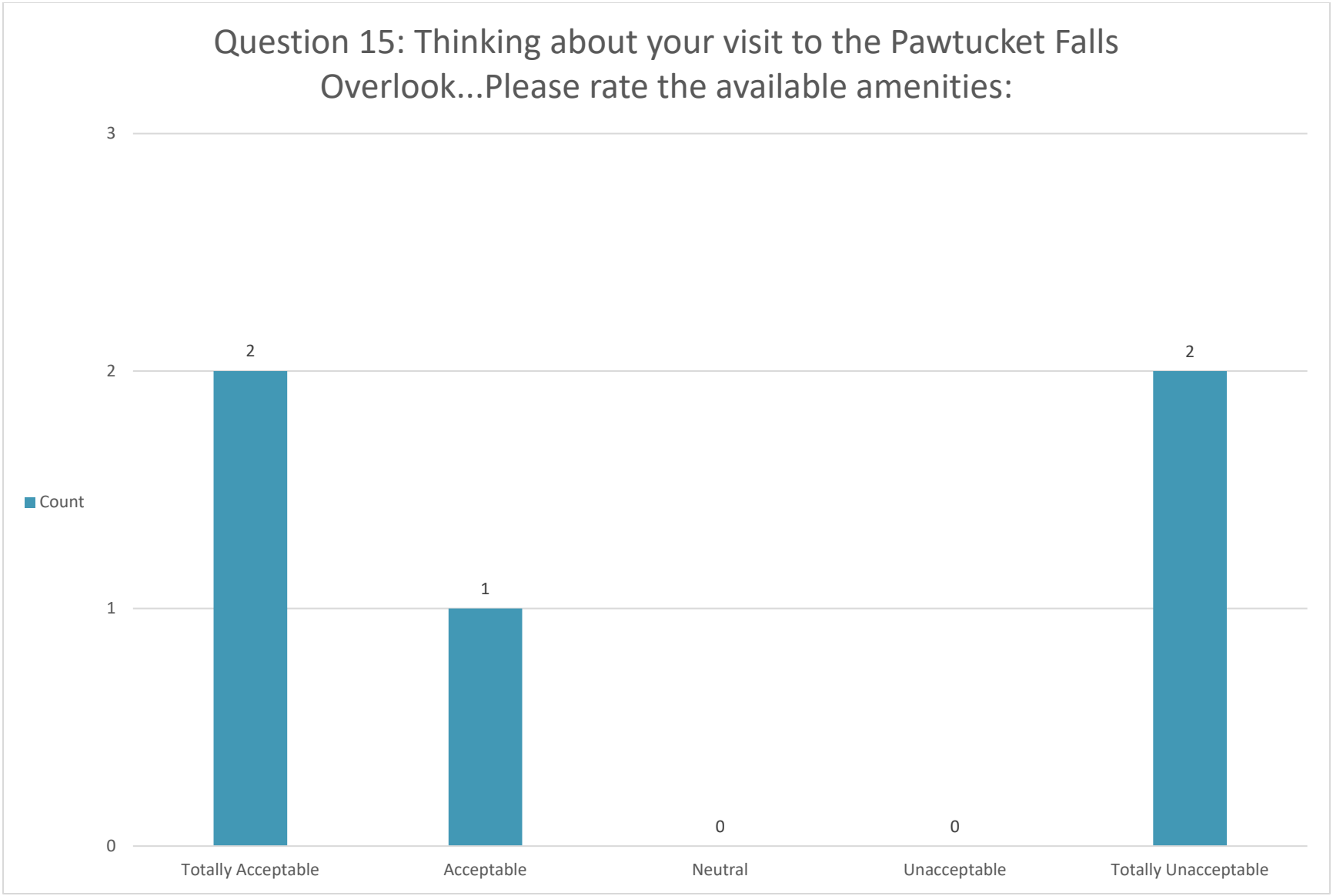
*Percentages not shown for respondent counts under ten.



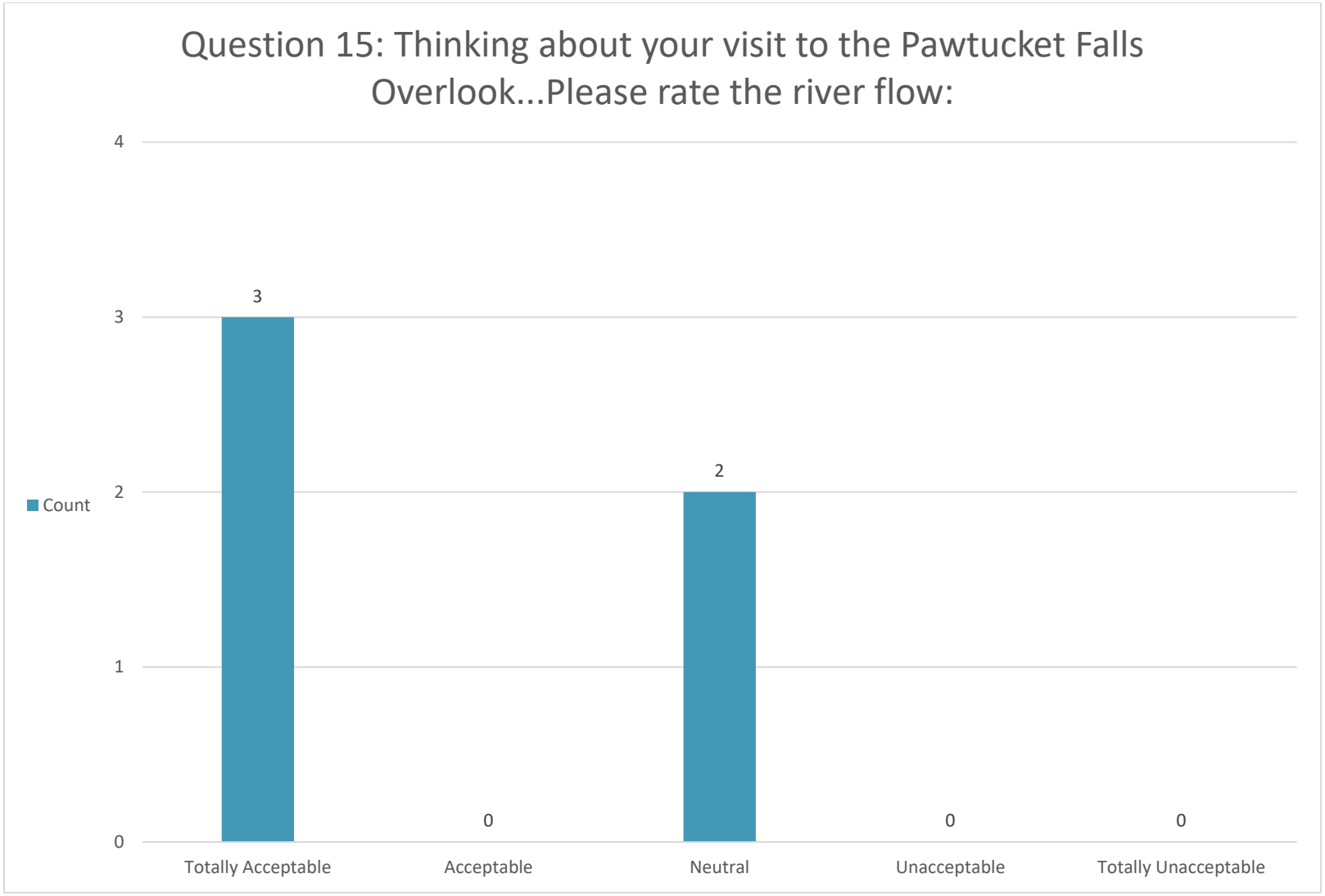
*Percentages not shown for respondent counts under ten.



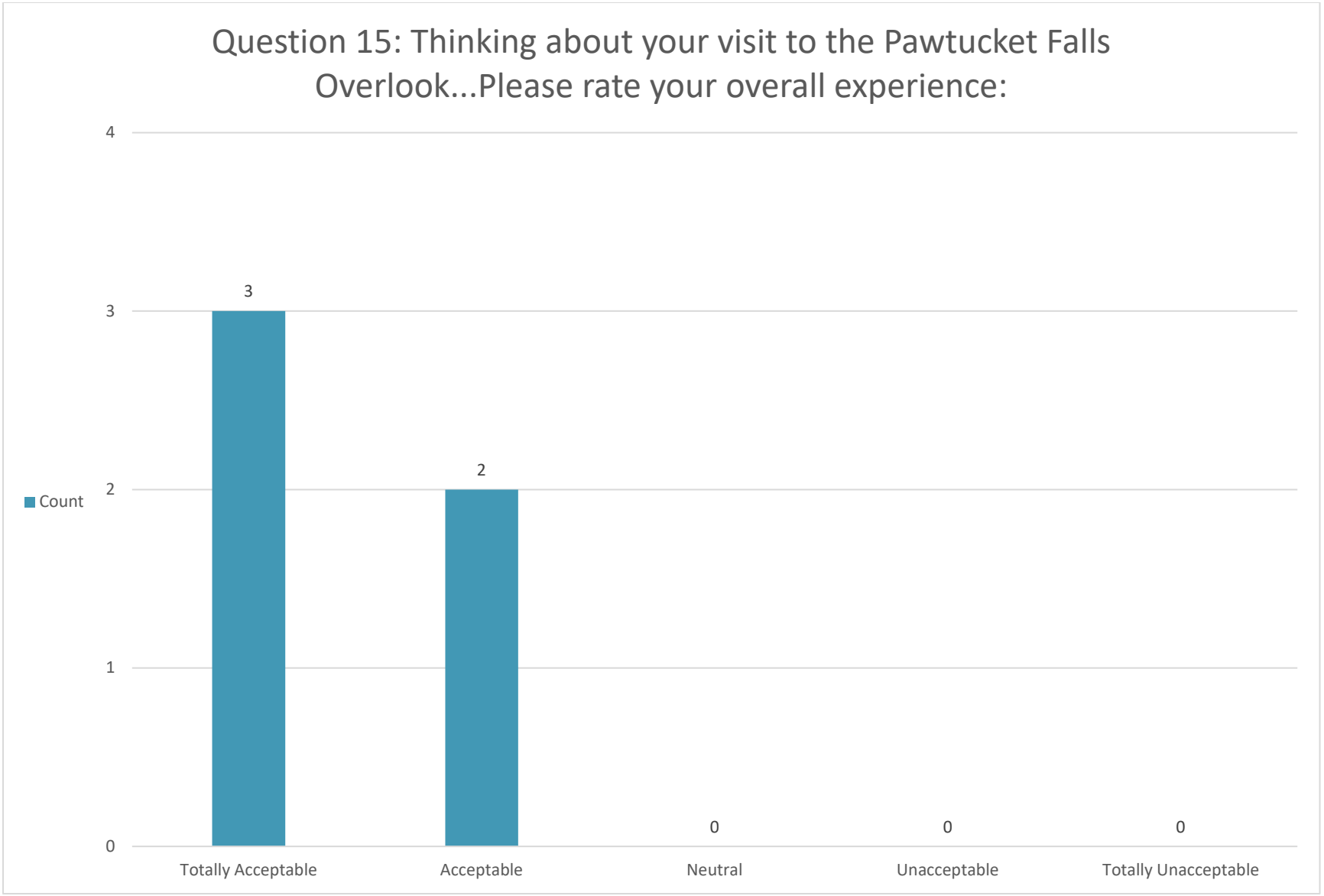
*Percentages not shown for respondent counts under ten.



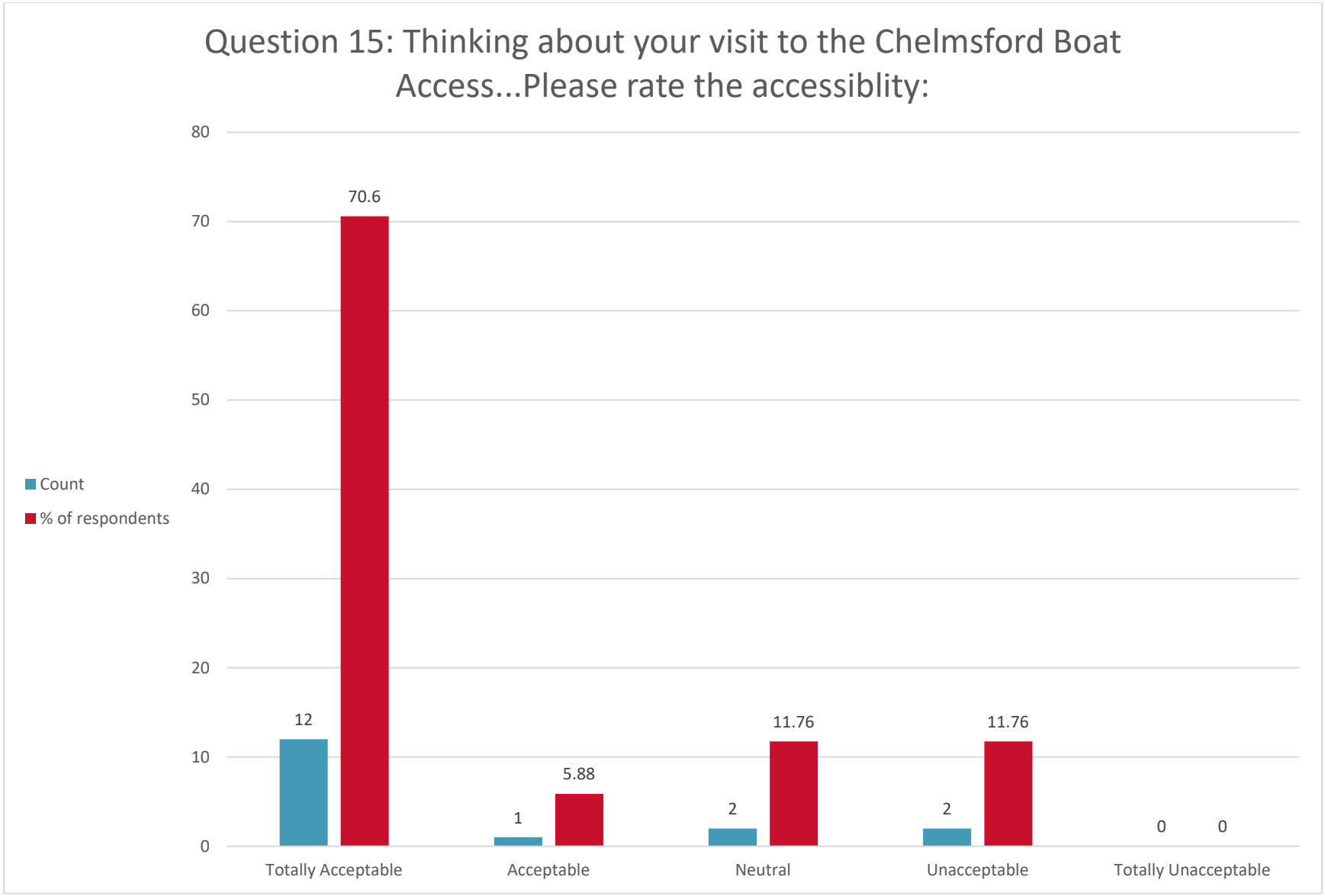
*Percentages not shown for respondent counts under ten.

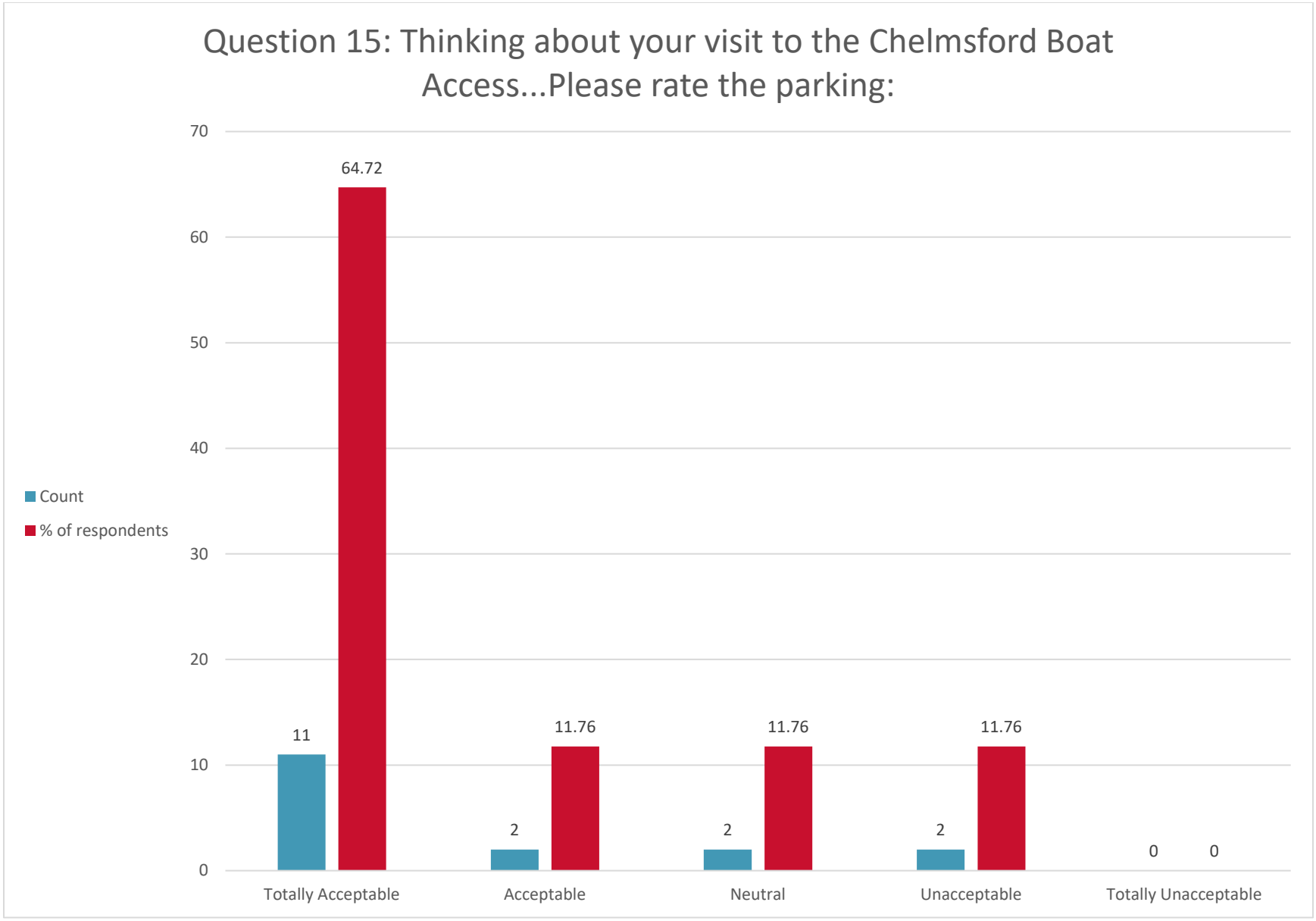


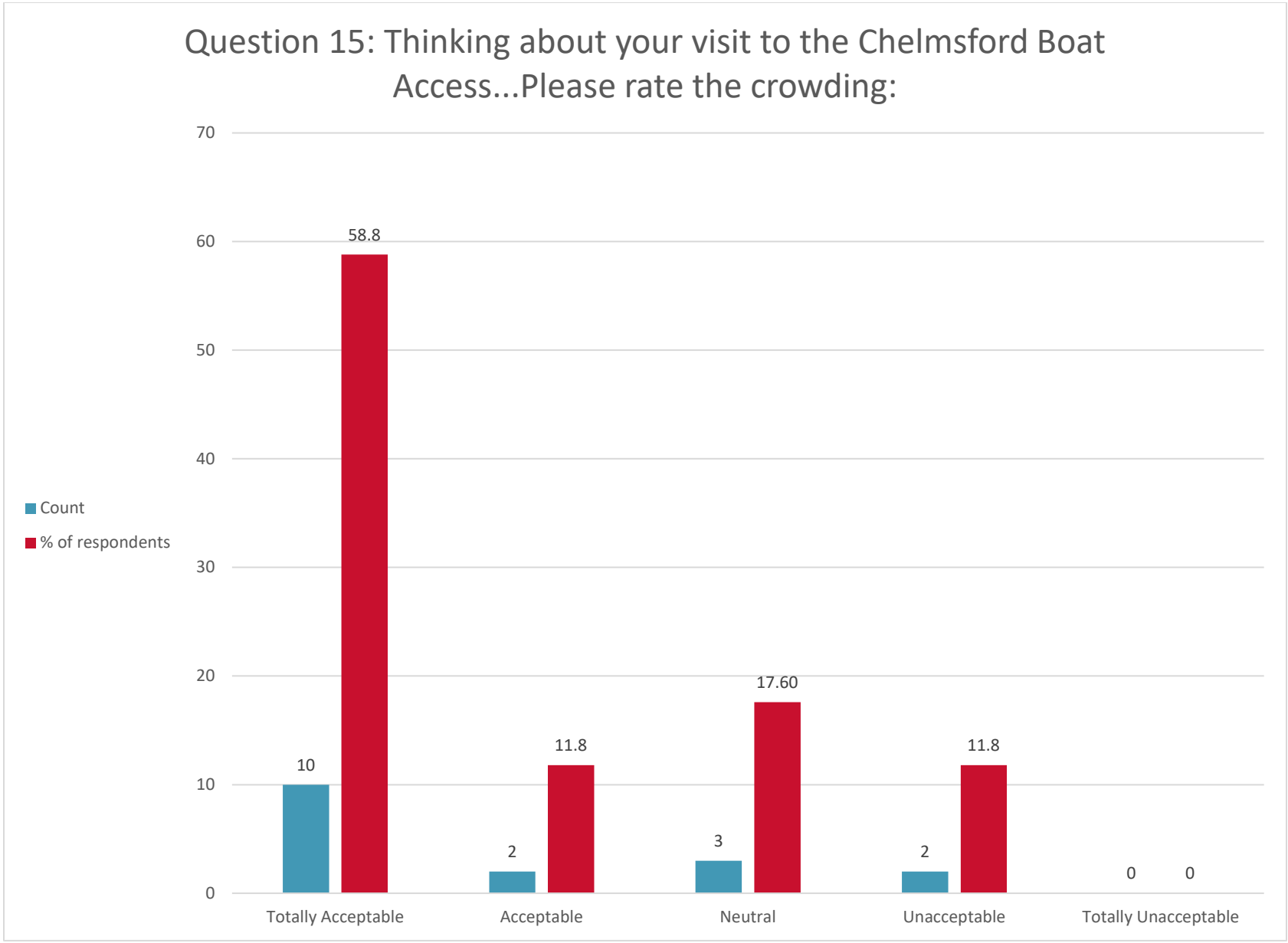
*Percentages not shown for respondent counts under ten.

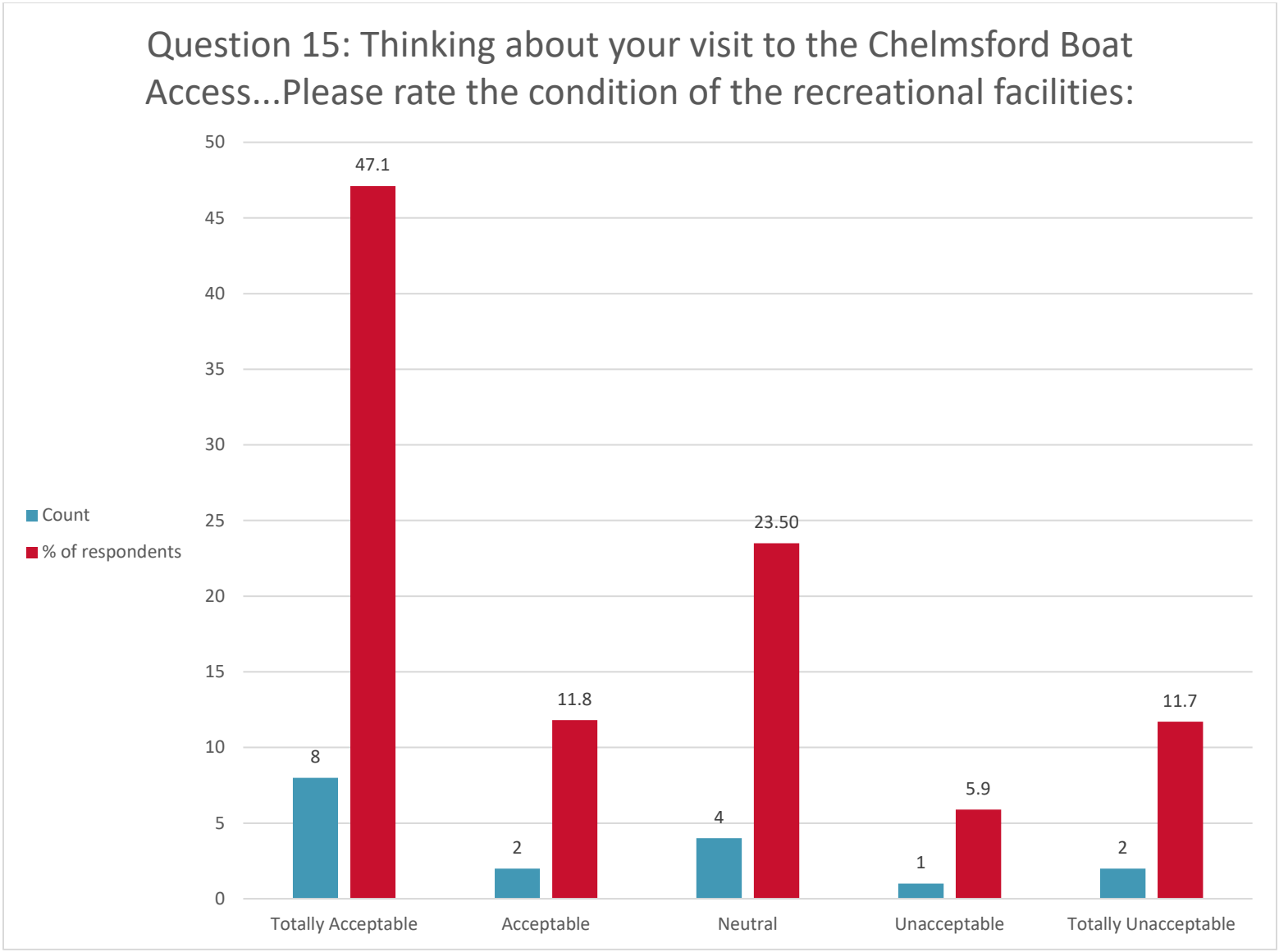


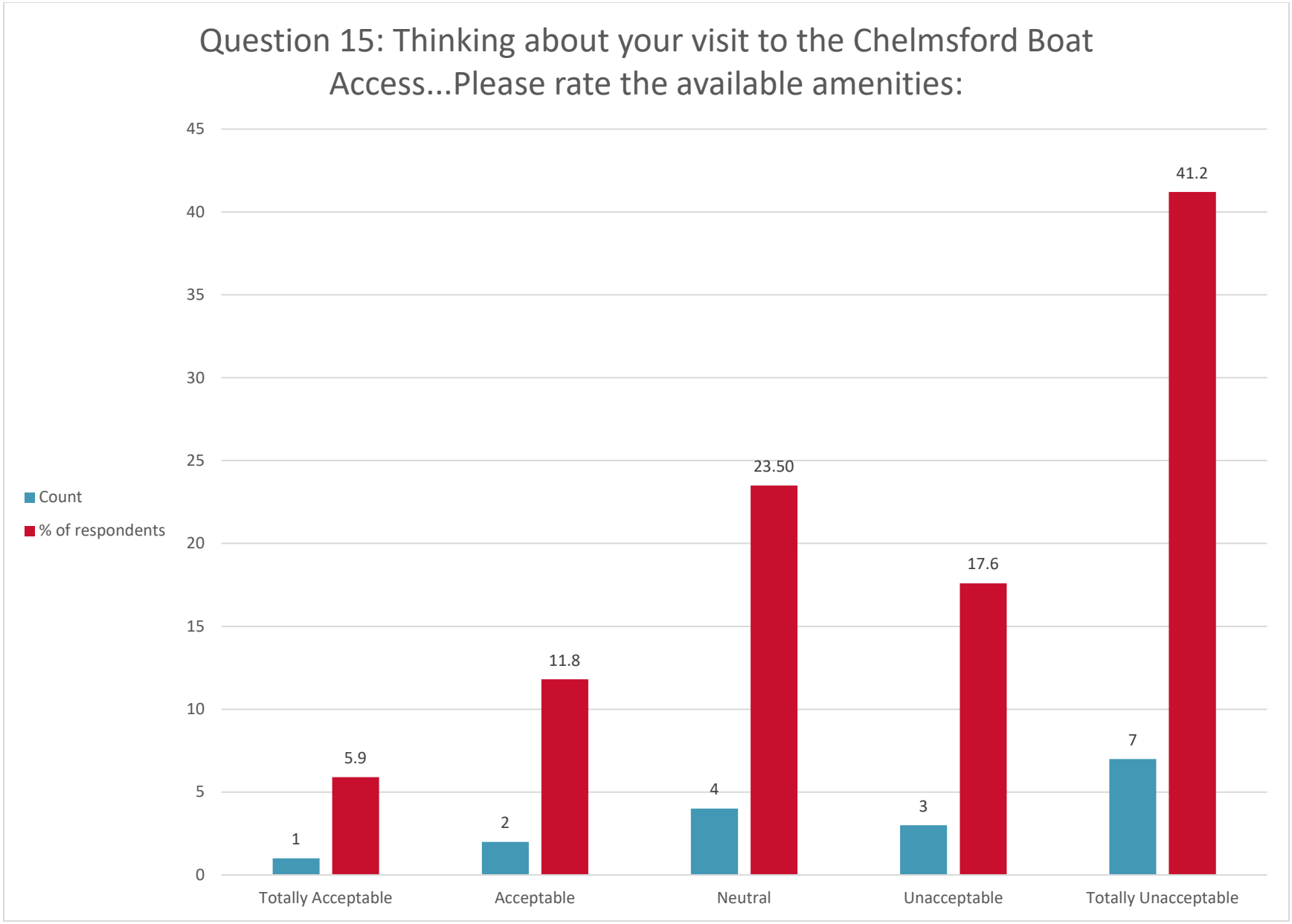
*Percentages not shown for respondent counts under ten.

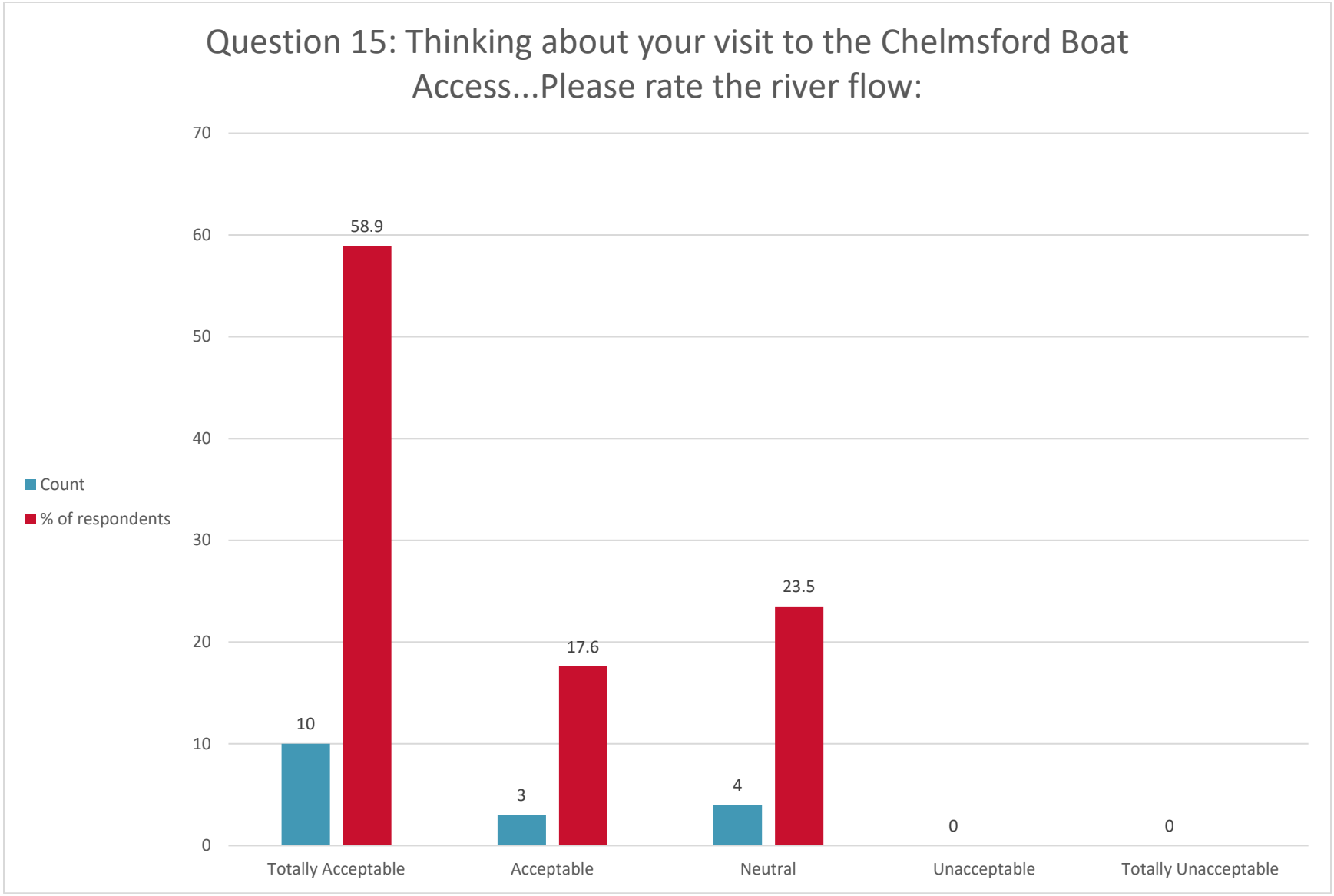

Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate the accessiblity:
80
70
60
50
40
30
20
10
0
Count
% of respondents
70.6
12
5.88
1
11.76
2
11.76
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

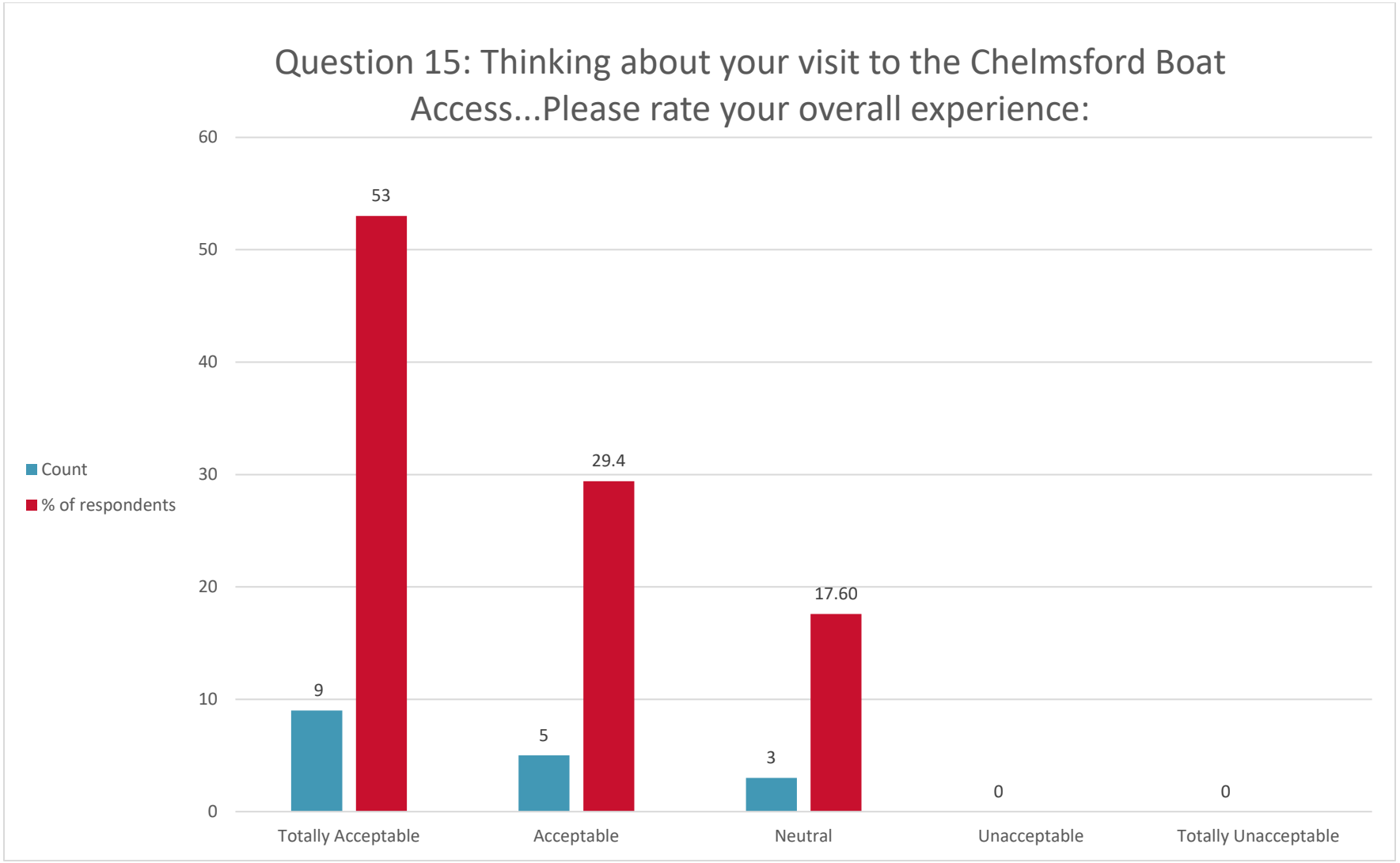

Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate the parking:
70
60
50
40
30
20
10
0
Count
% of respondents
64.72
11
11.76
2
11.76
2
11.76
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

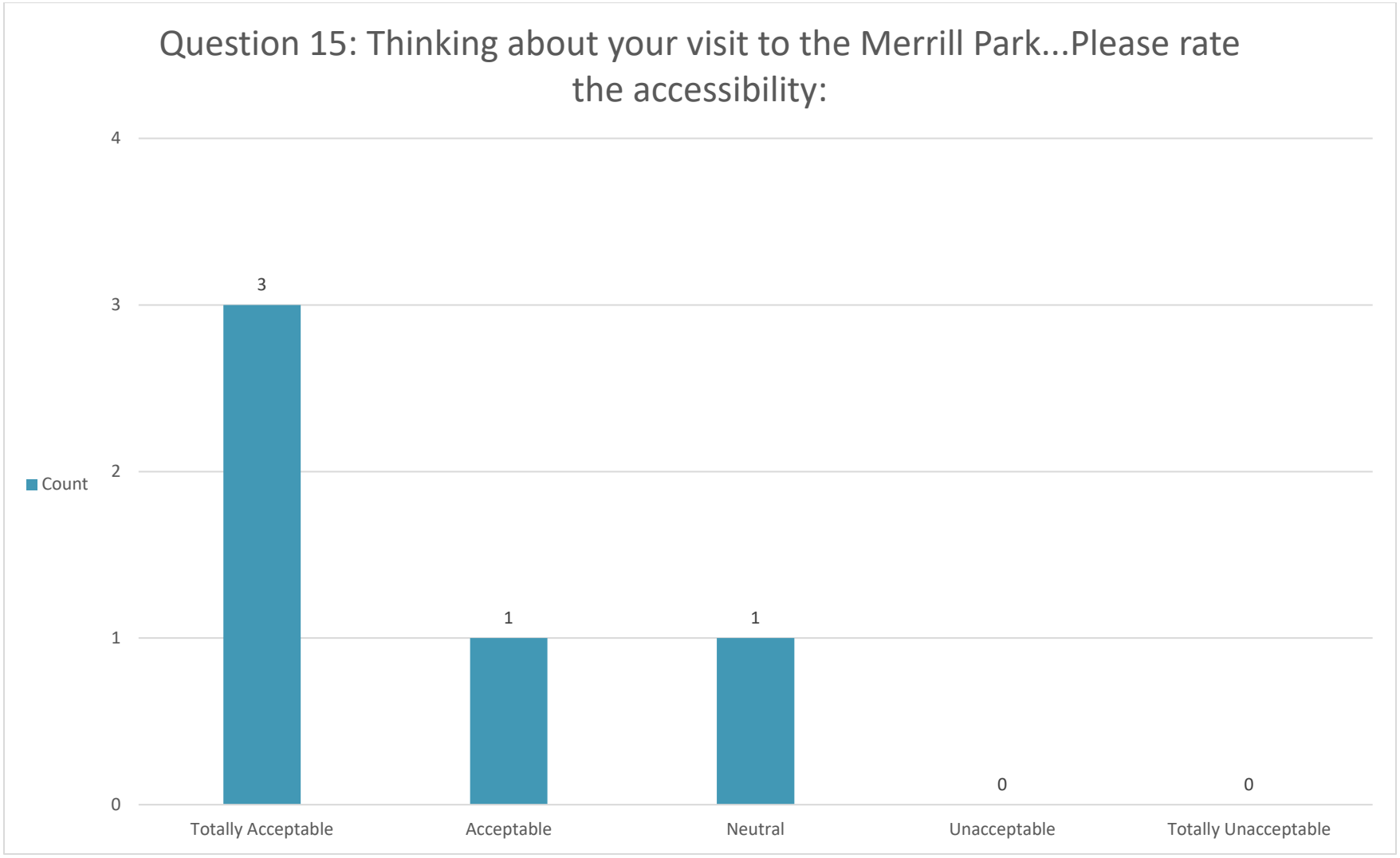

Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate the crowding:
70
60
50
40
30
20
10
0
Count
% of respondents
58.8
10
11.8
2
17.60
3
11.8
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate the condition of the recreational facilities:
50
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
47.1
8
11.8
2
23.50
4
5.9
1
11.7
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

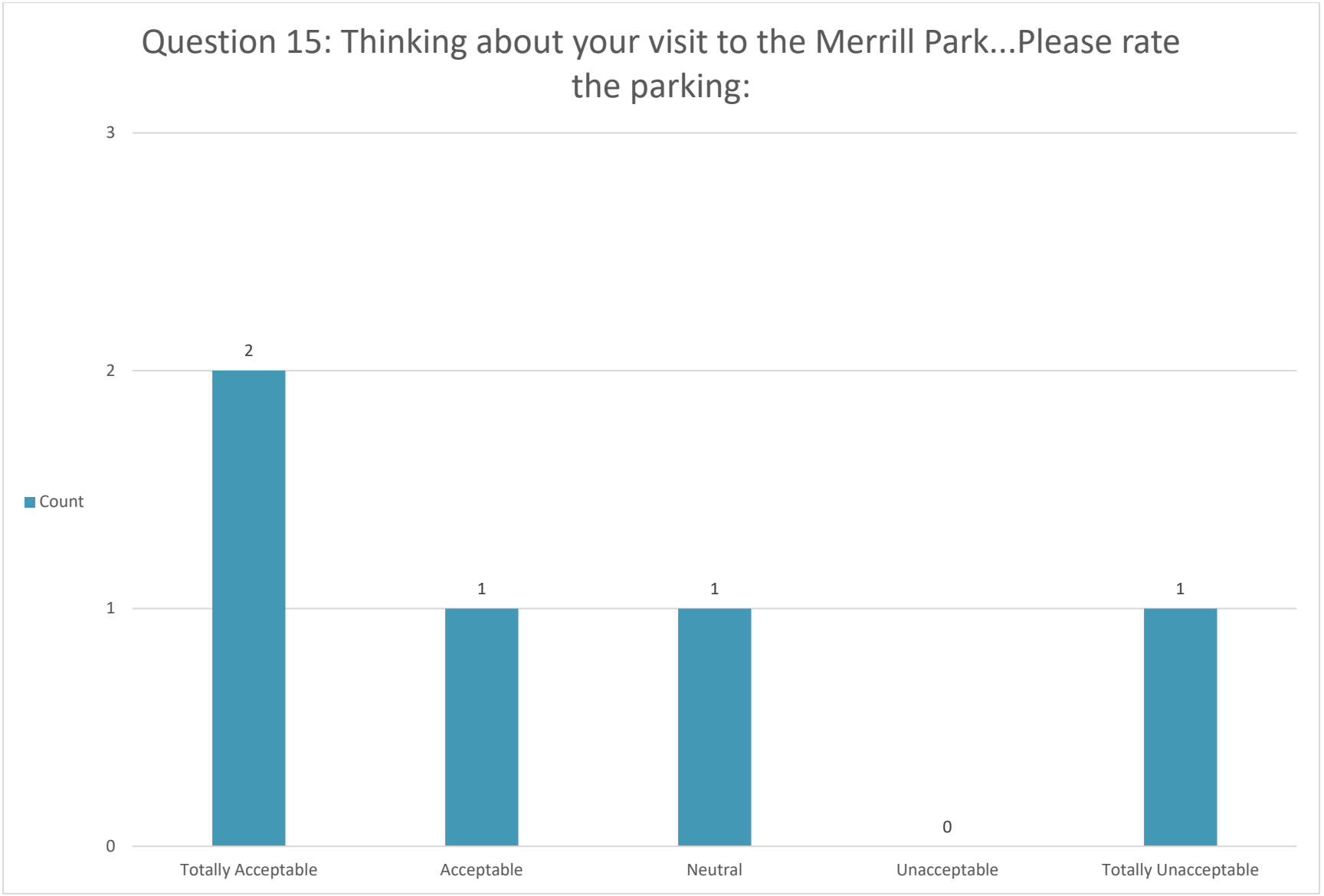

Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate the available amenities:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
1
5.9
2
11.8
4
23.50
3
17.6
7
41.2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate the river flow:
70
60
50
40
30
20
10
0
Count
% of respondents
58.9
17.6
23.5
10
3
4
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 15: Thinking about your visit to the Chelmsford Boat Access...Please rate your overall experience:
60
50
40
30
20
10
0
Count
% of respondents
53
29.4
17.60
9
5
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable



*Percentages not shown for respondent counts under ten.



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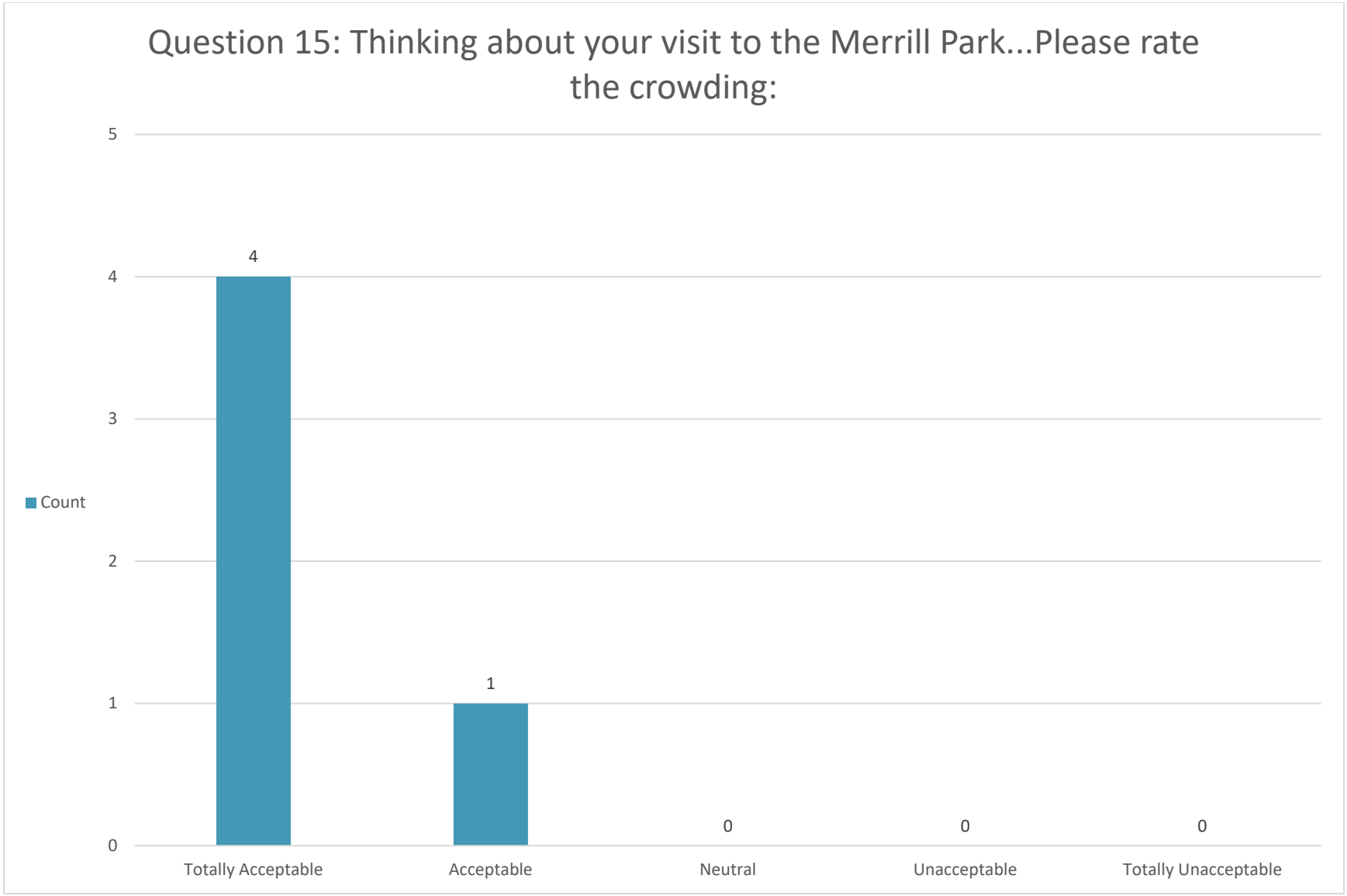

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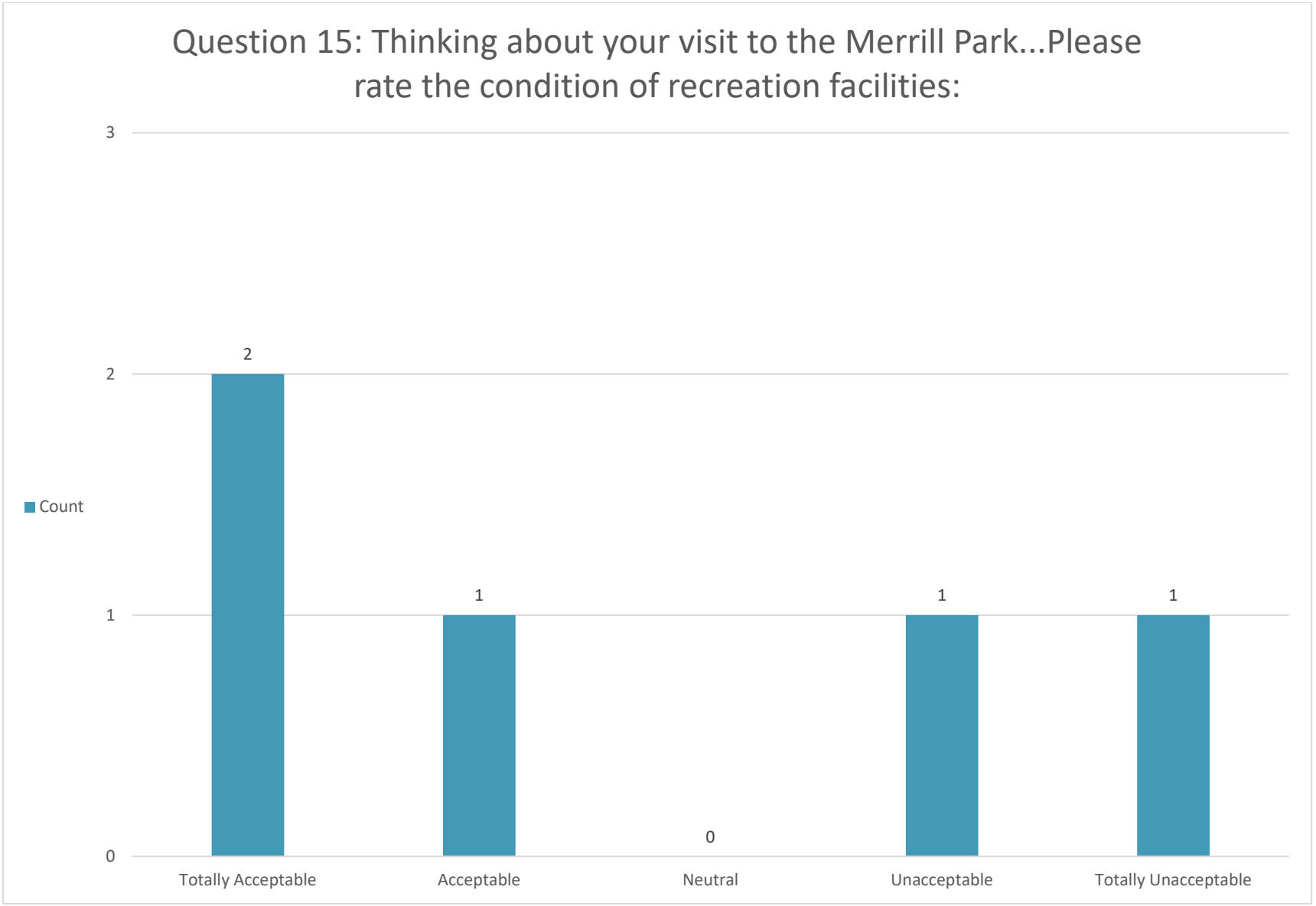
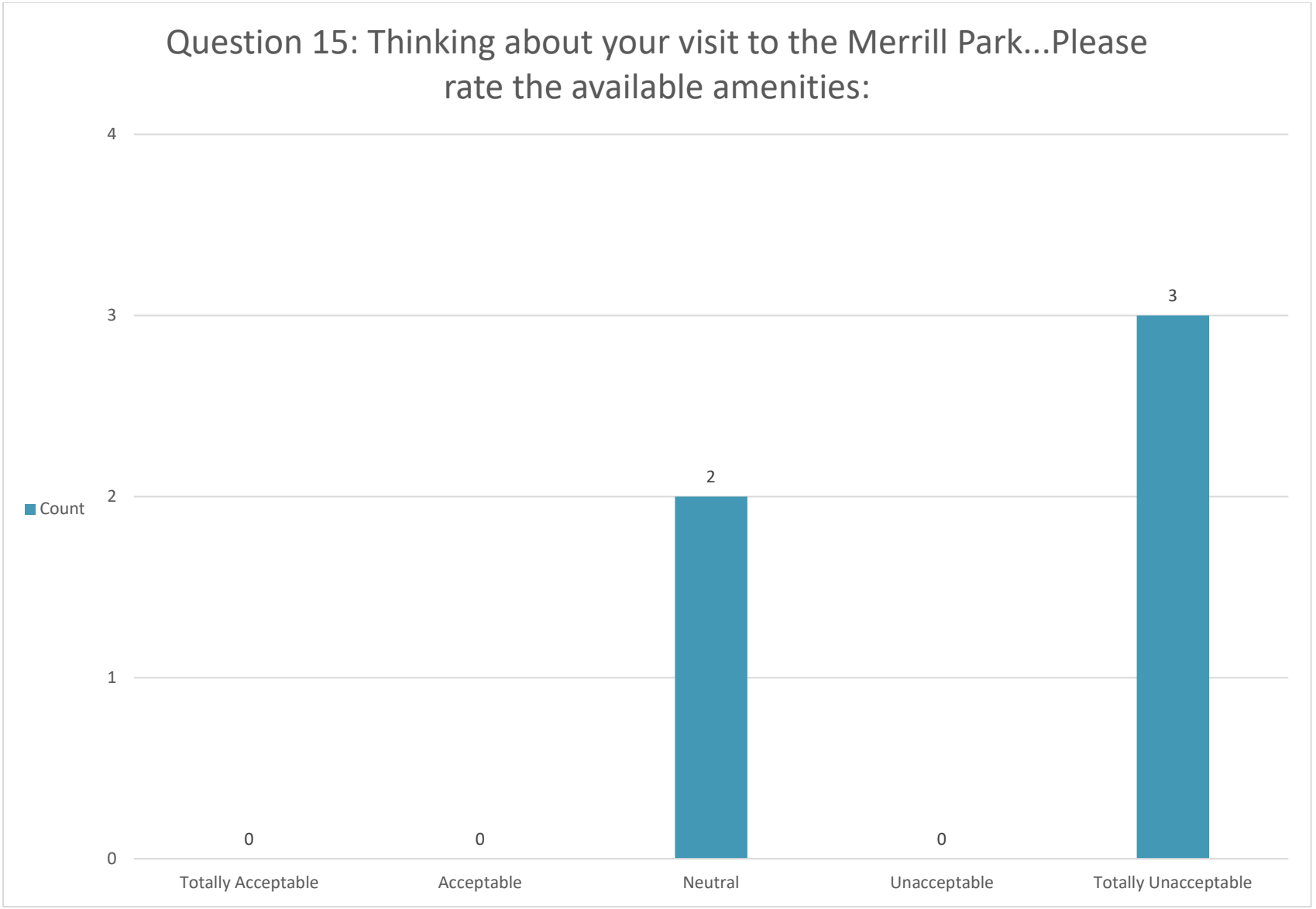
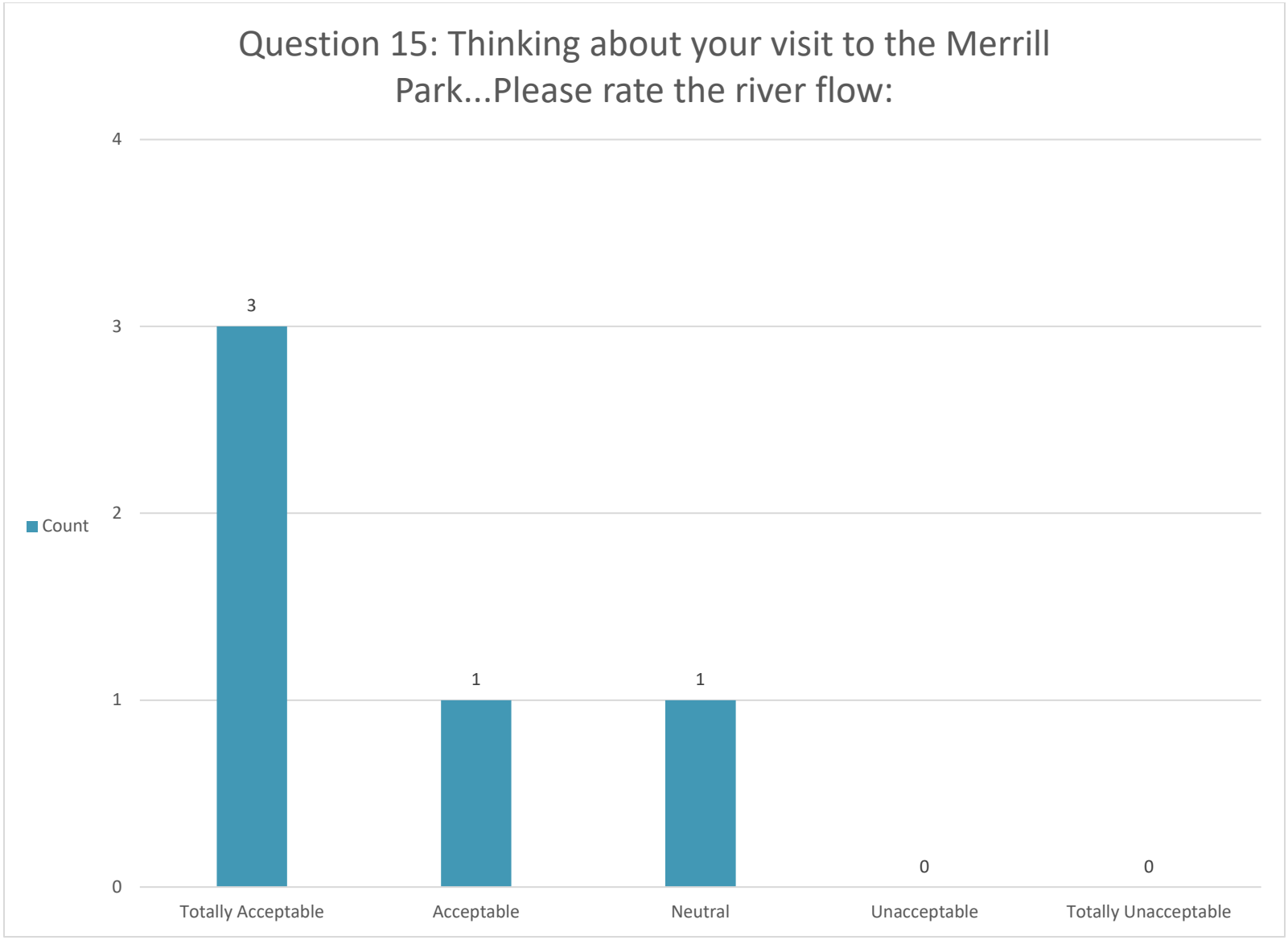


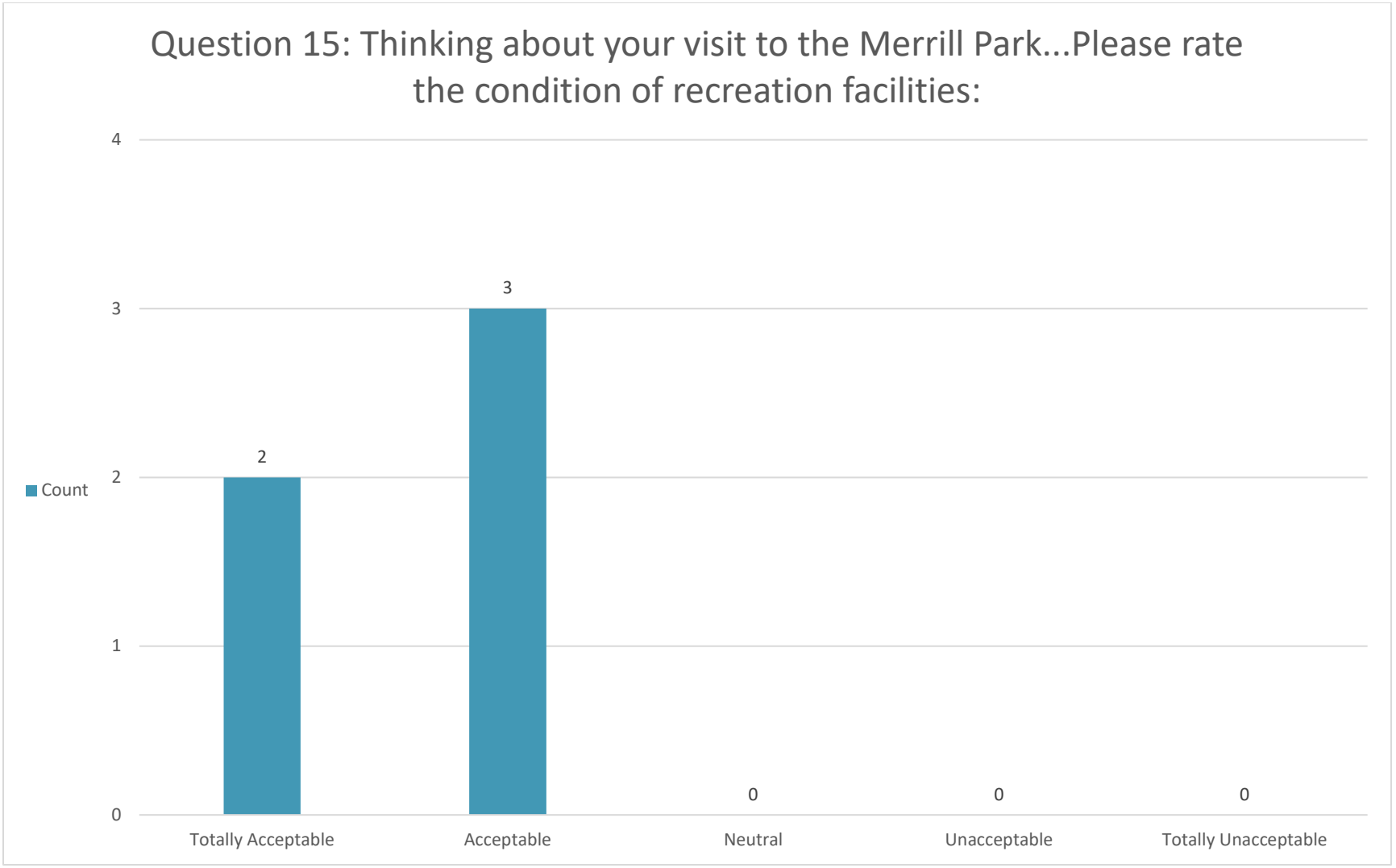
*Percentages not shown for respondent counts under ten.



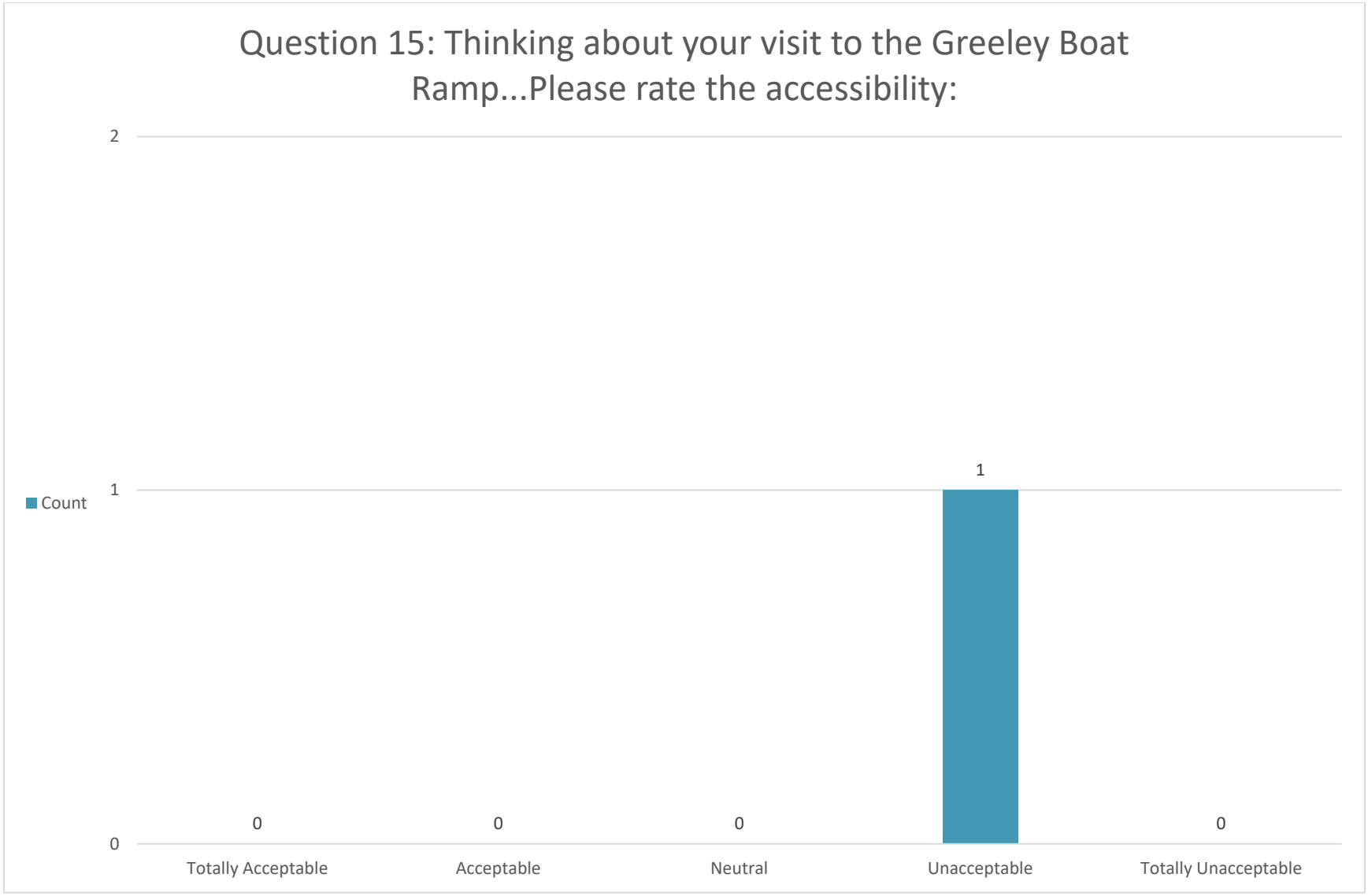
*Percentages not shown for respondent counts under ten.



*Percentages not shown for respondent counts under ten.



*Percentages not shown for respondent counts under ten.



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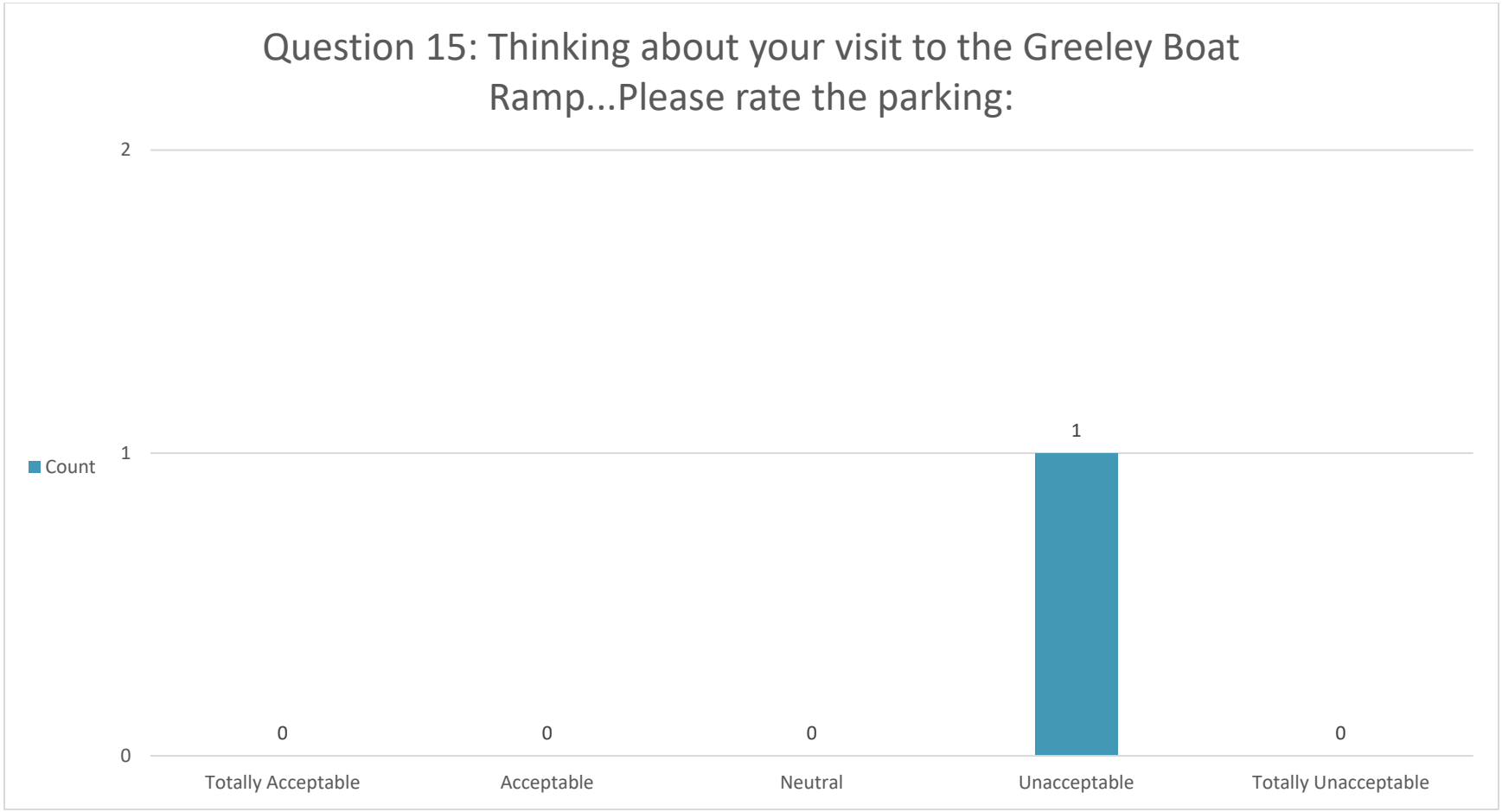

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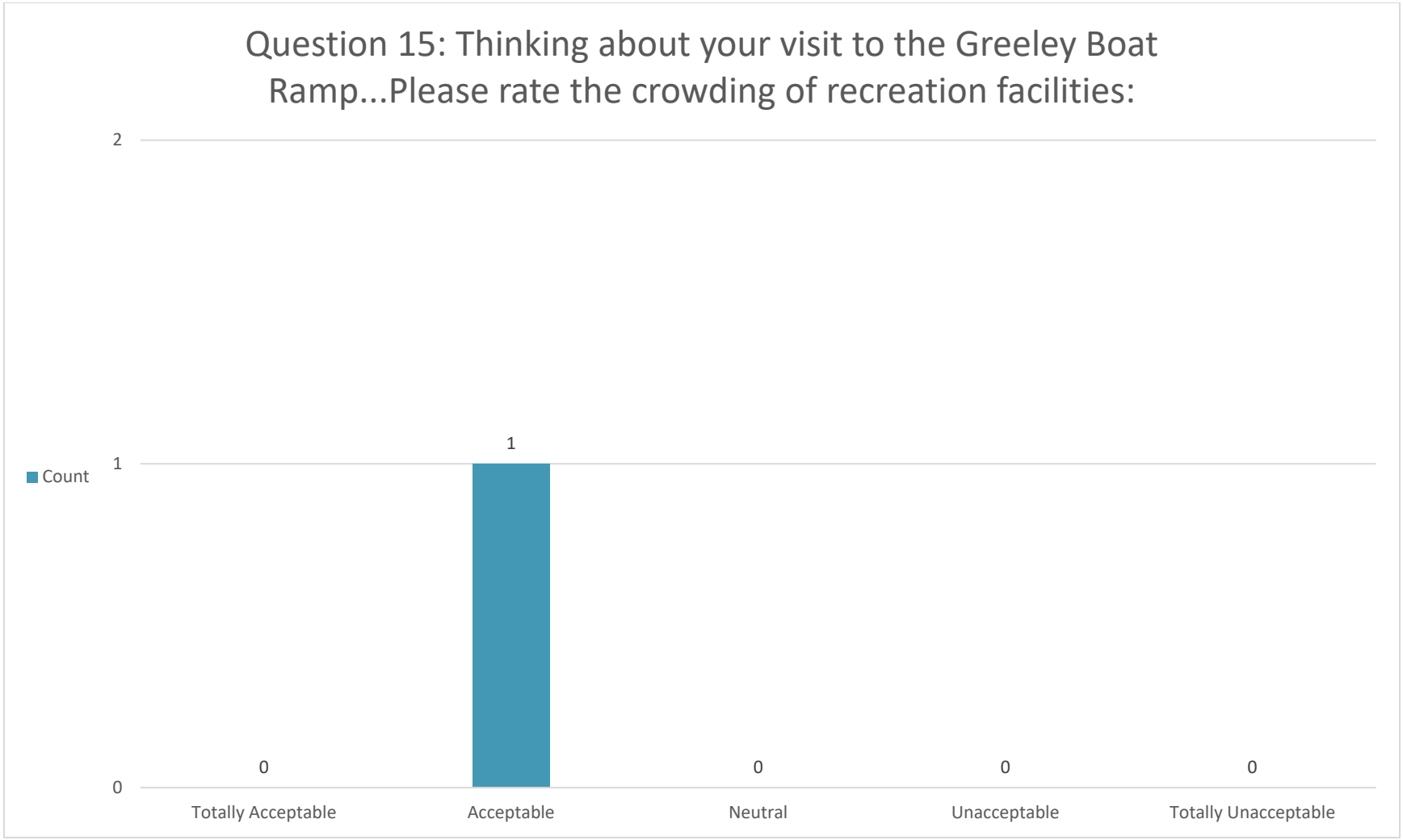

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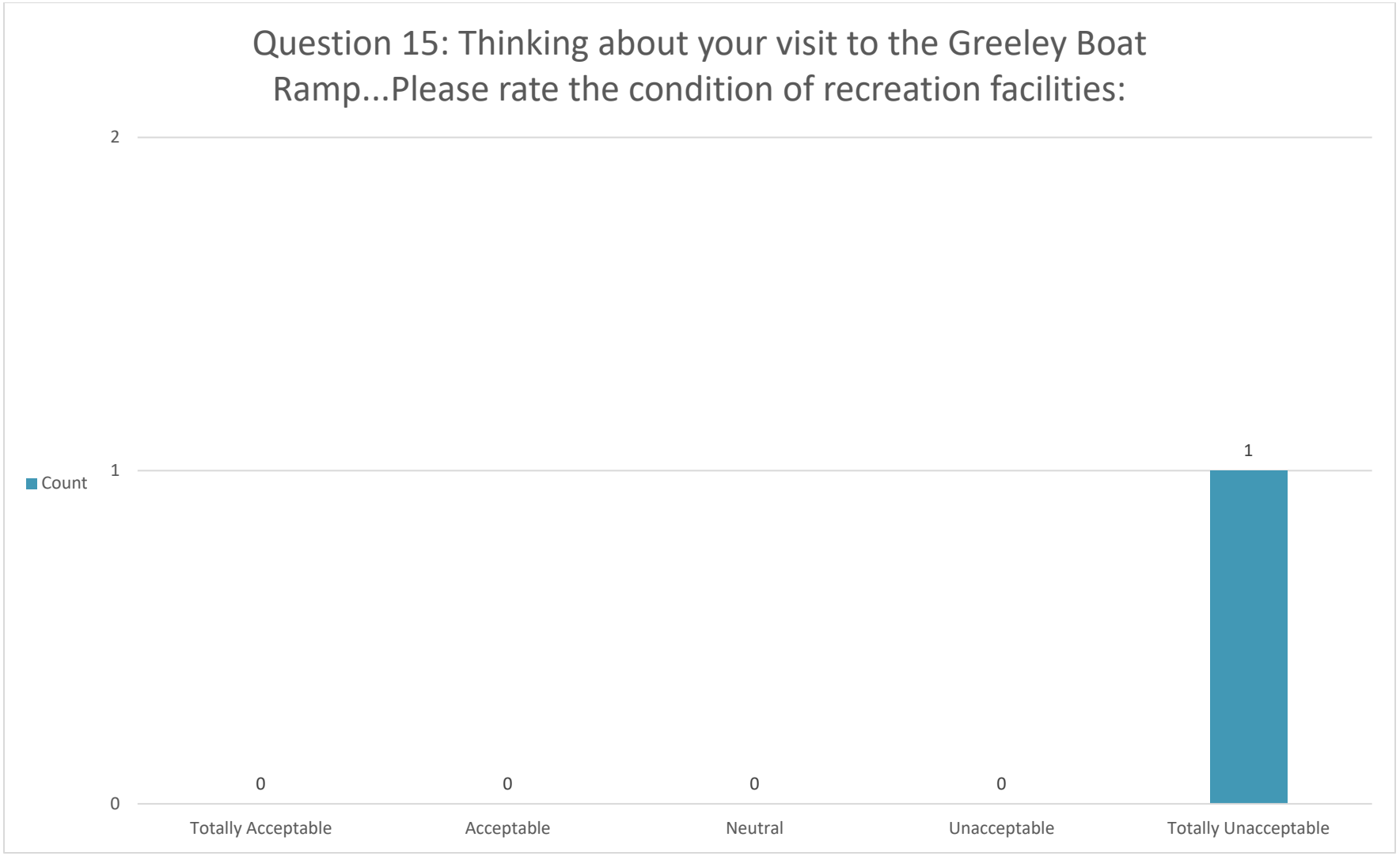

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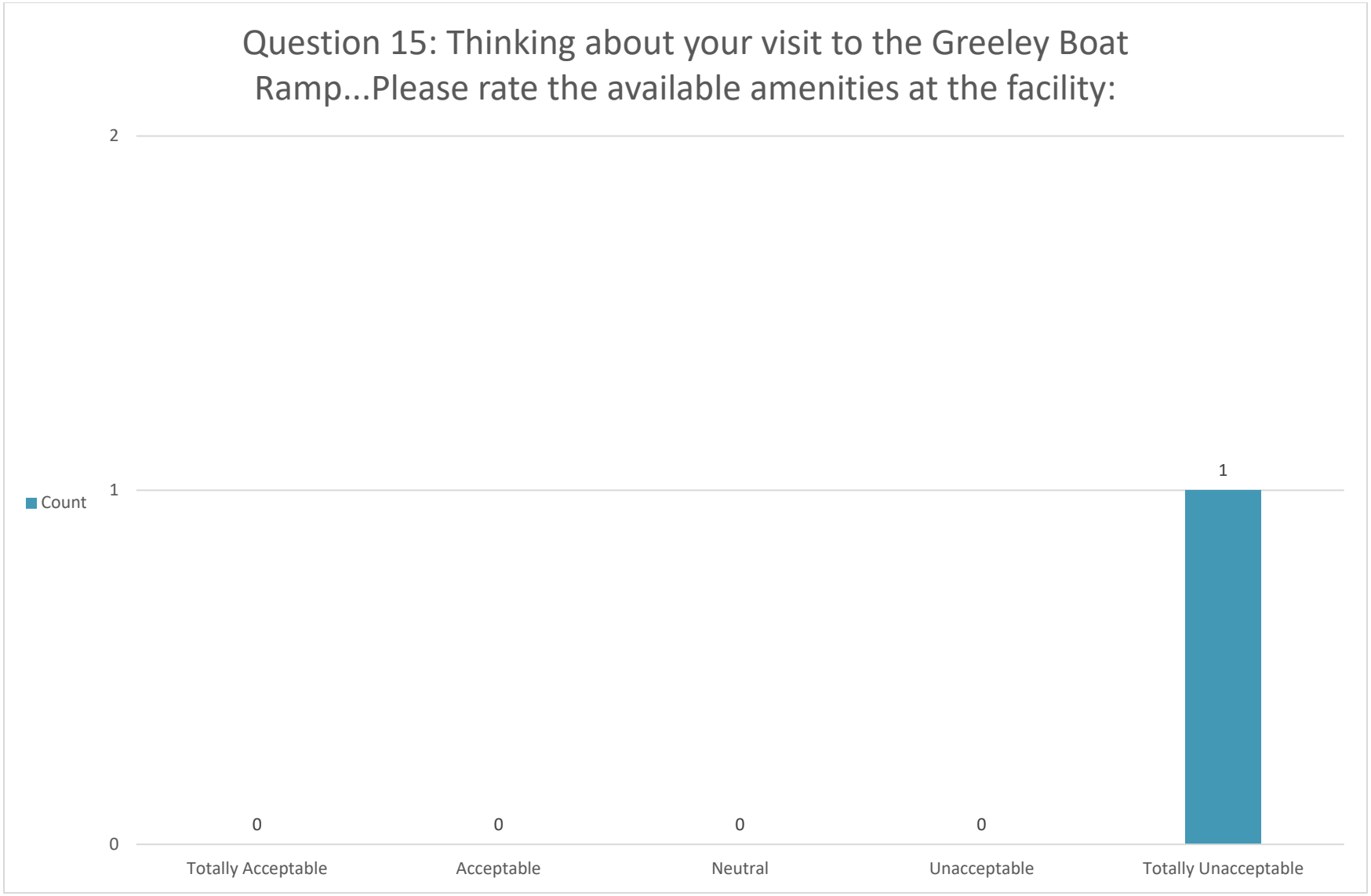

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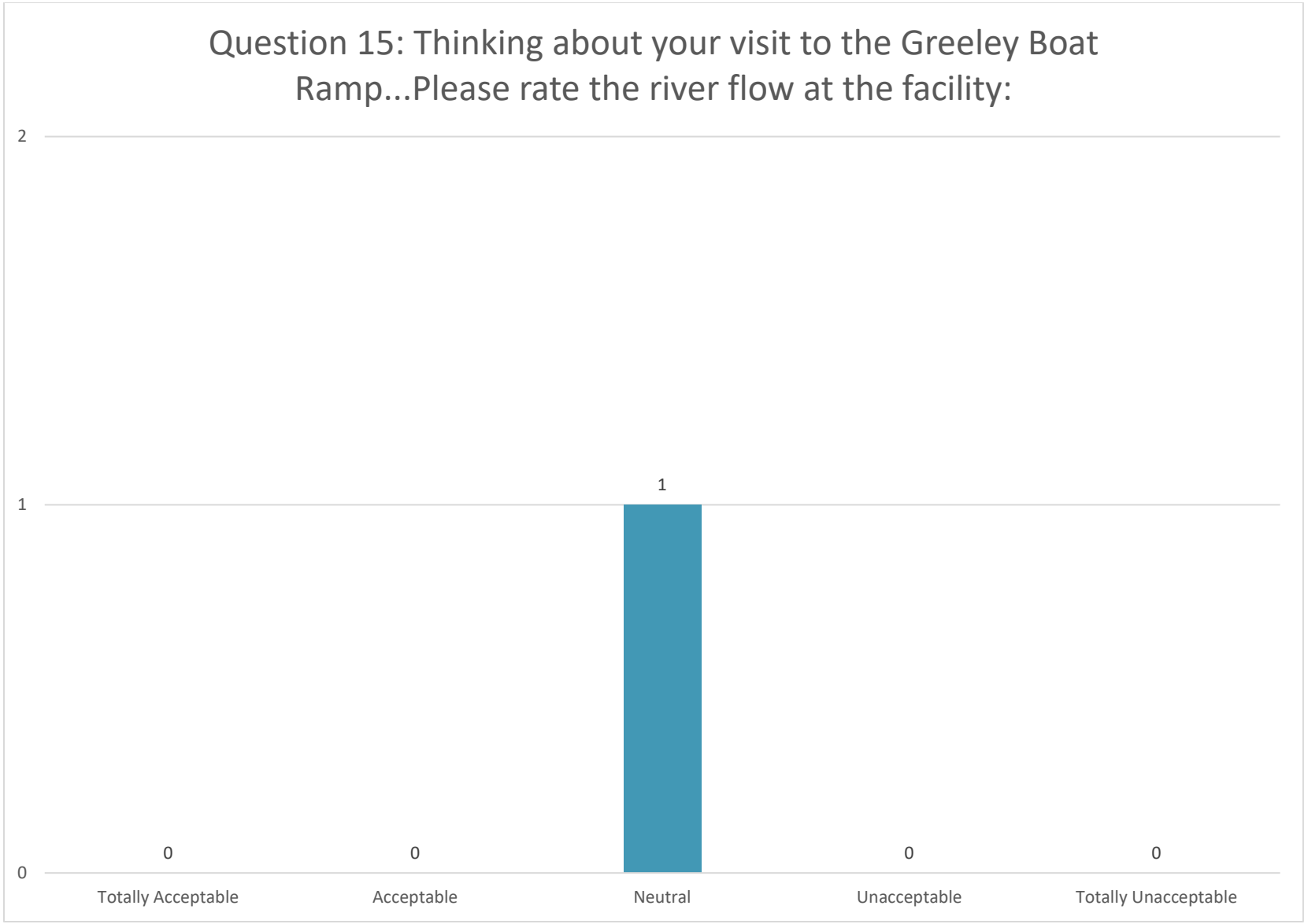

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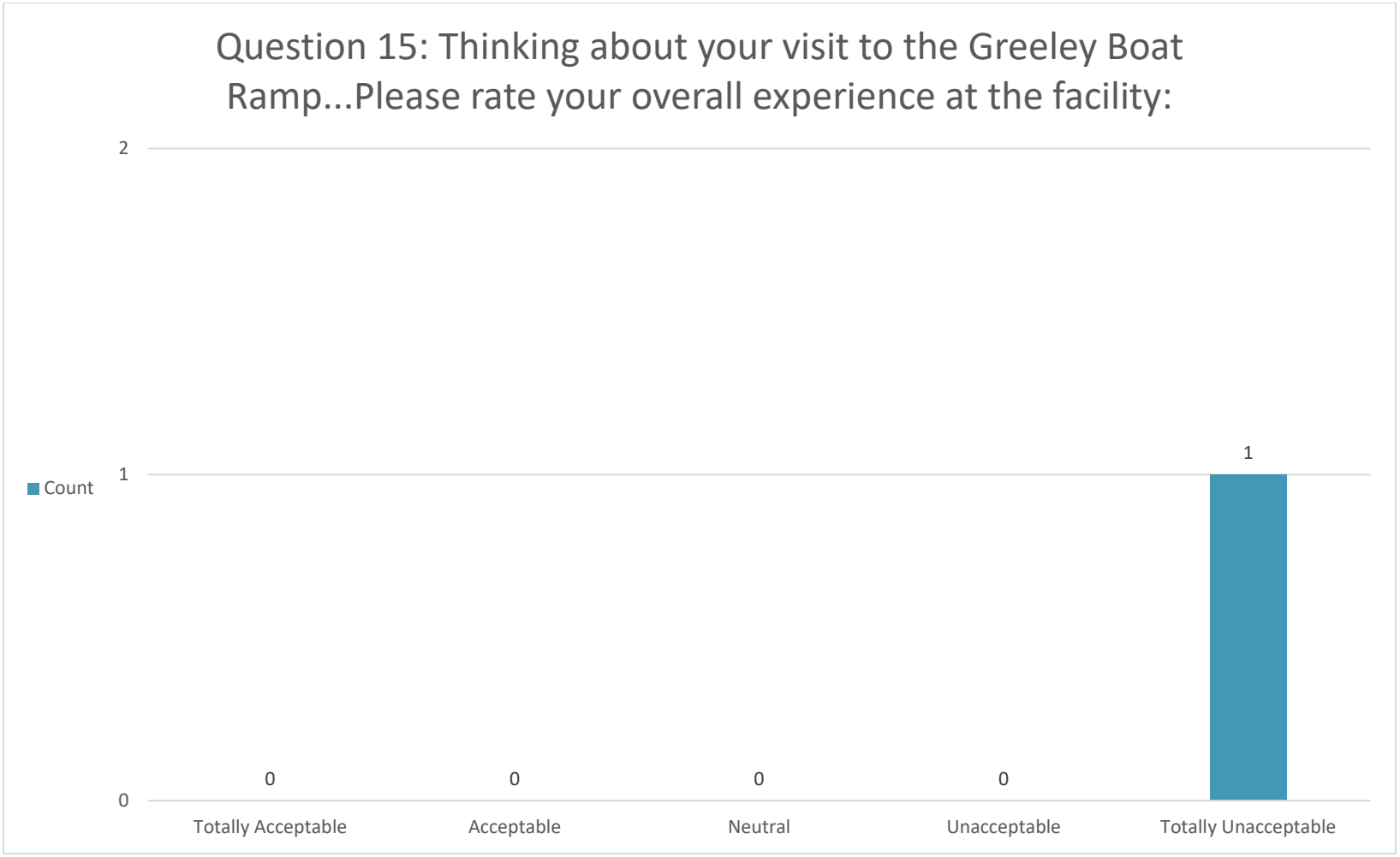

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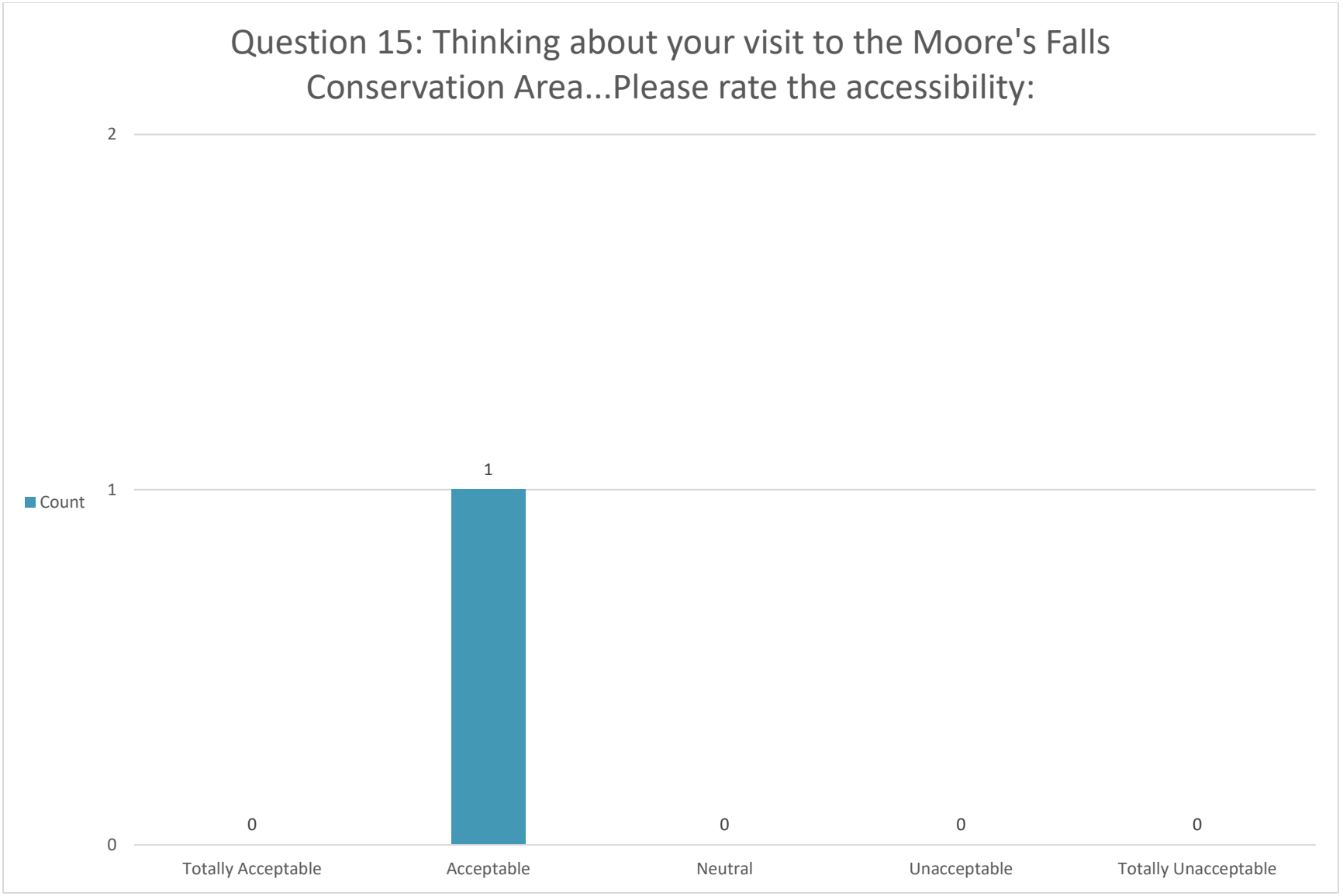

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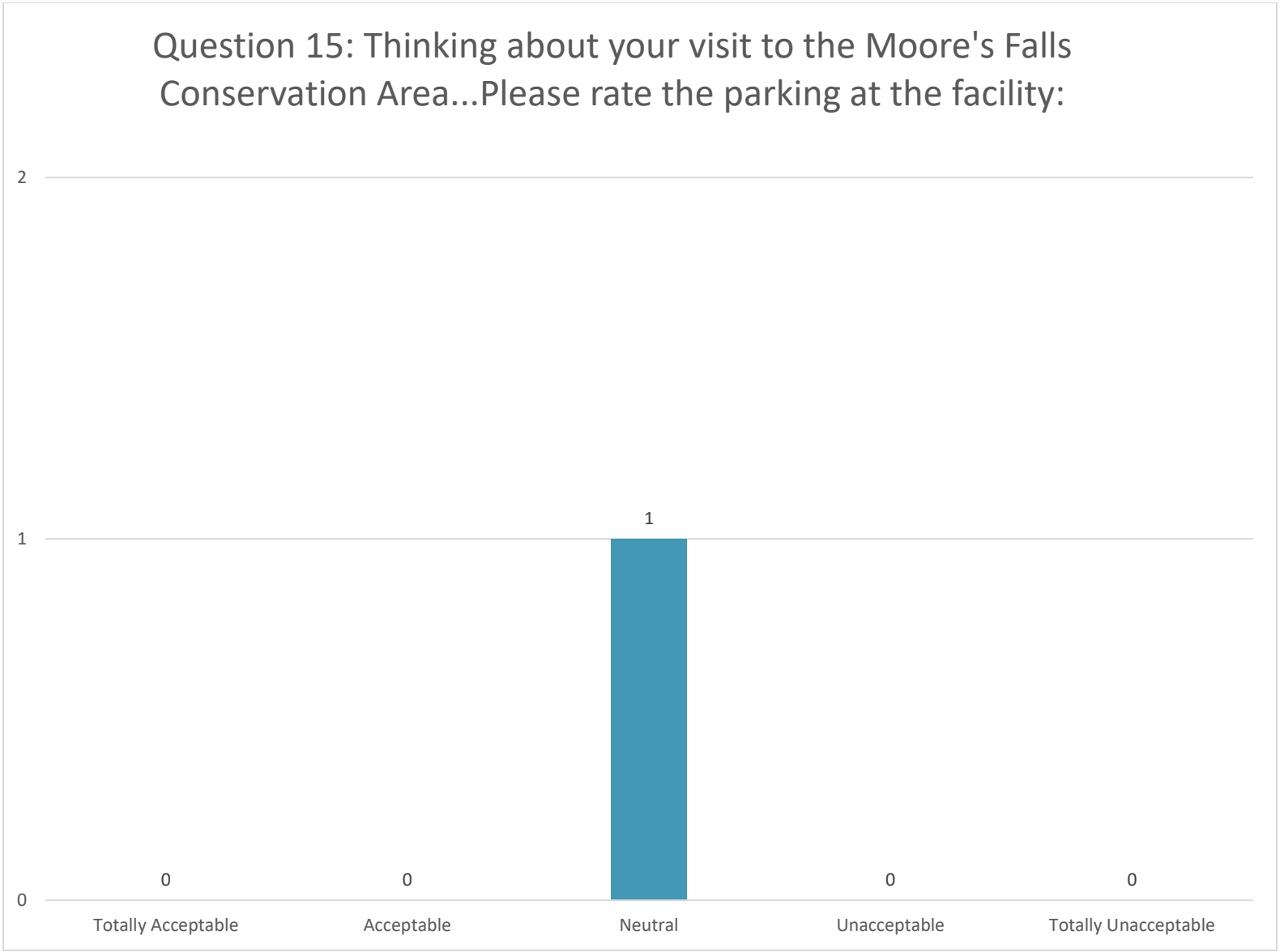

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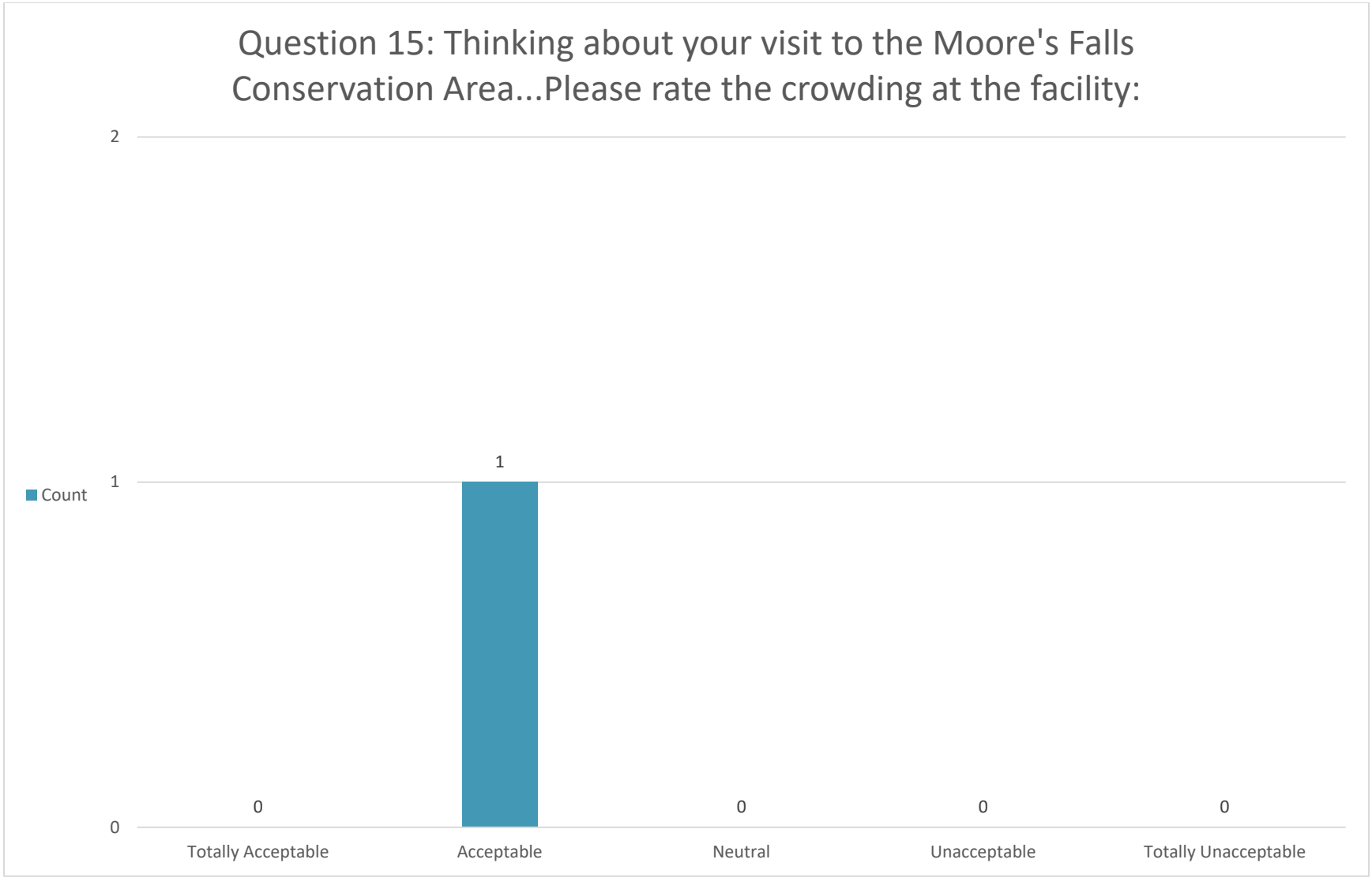

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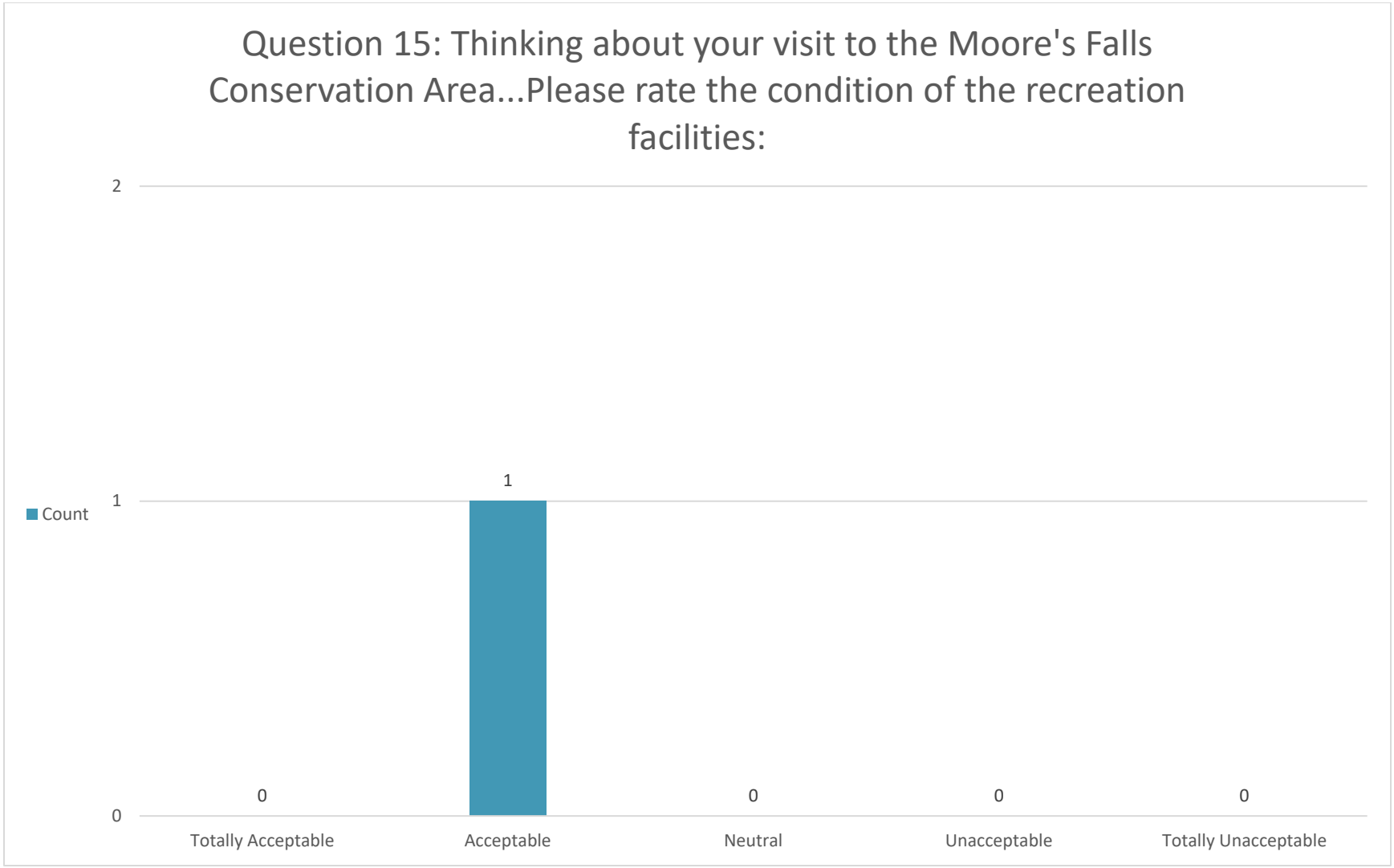

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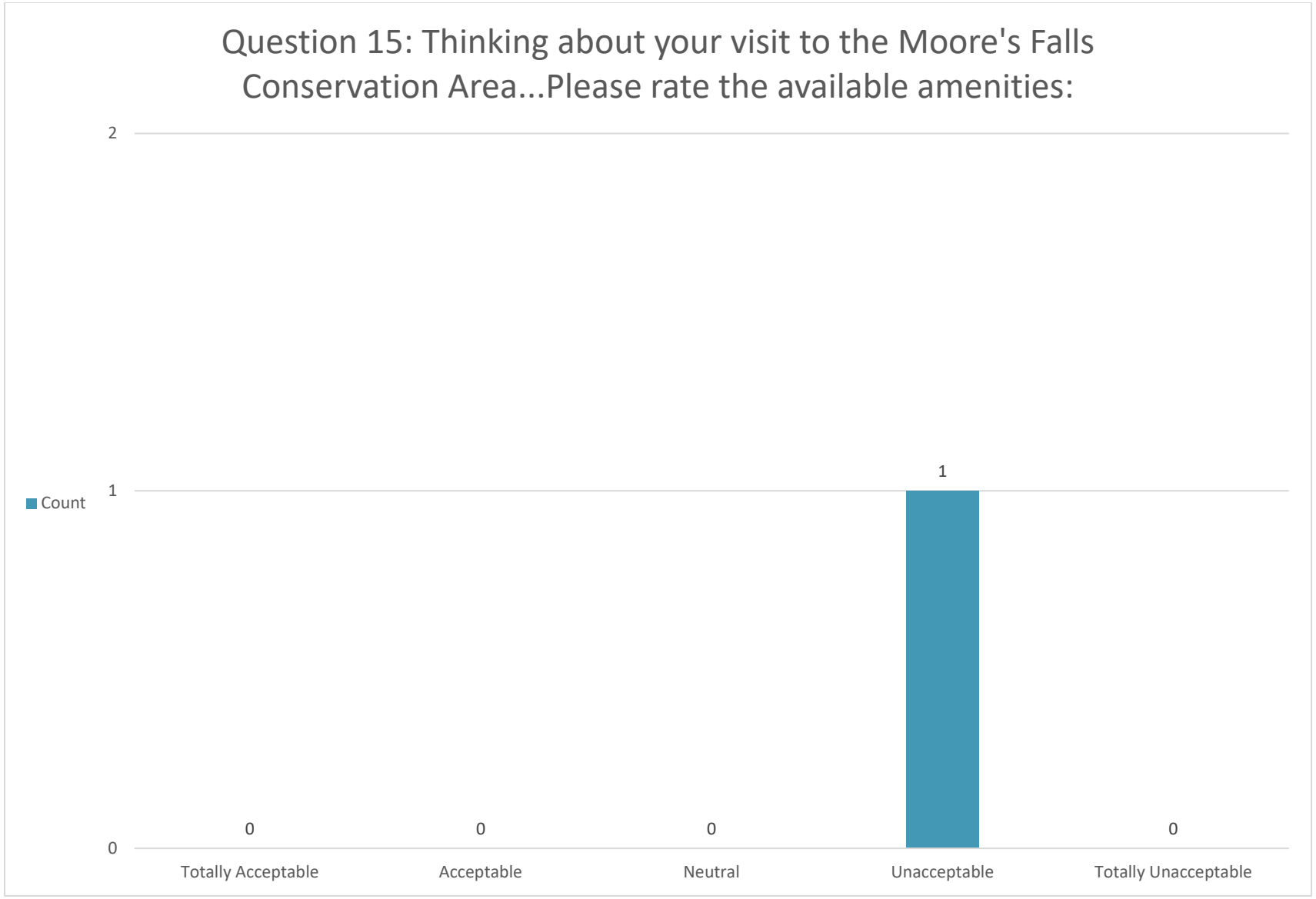

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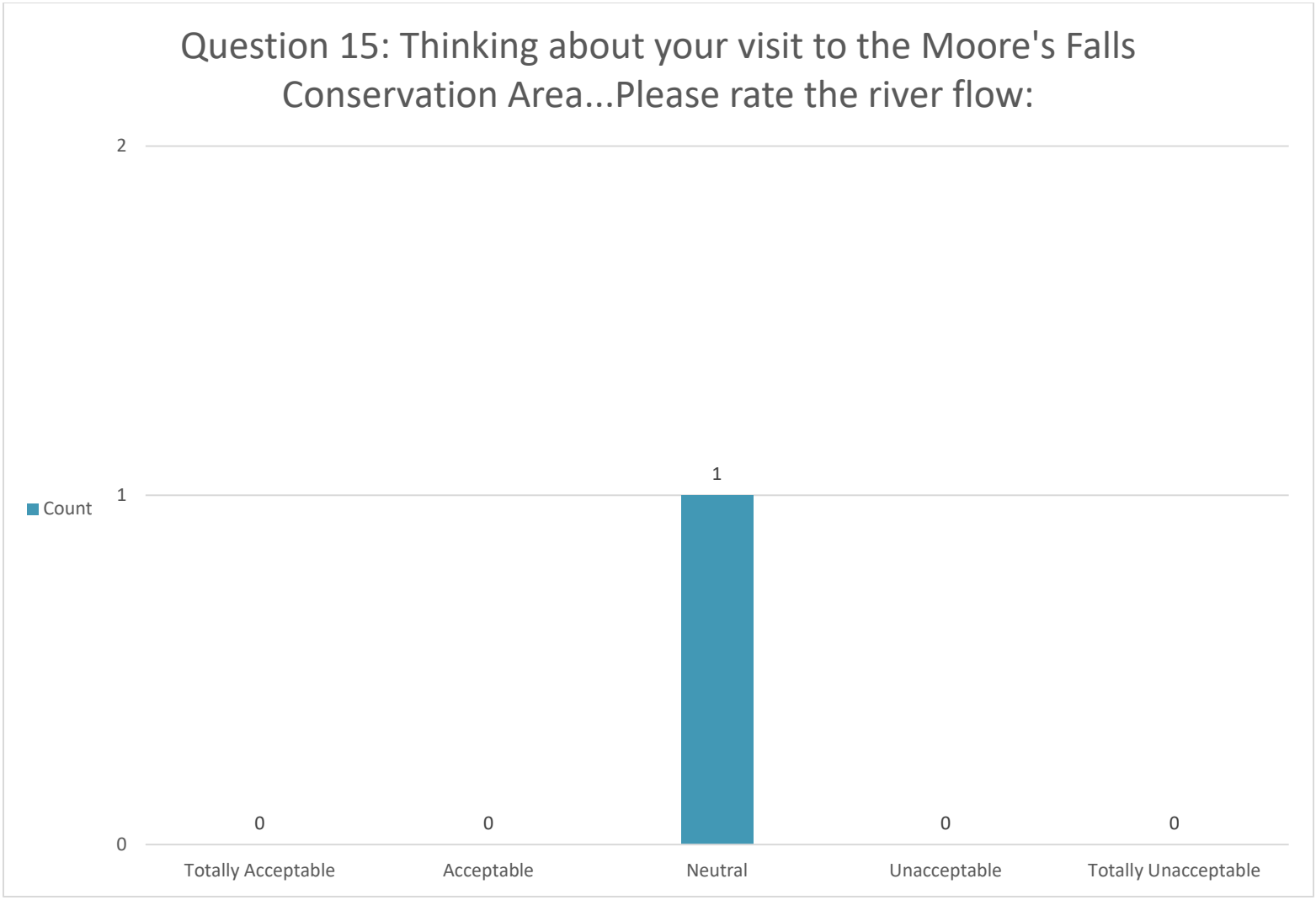
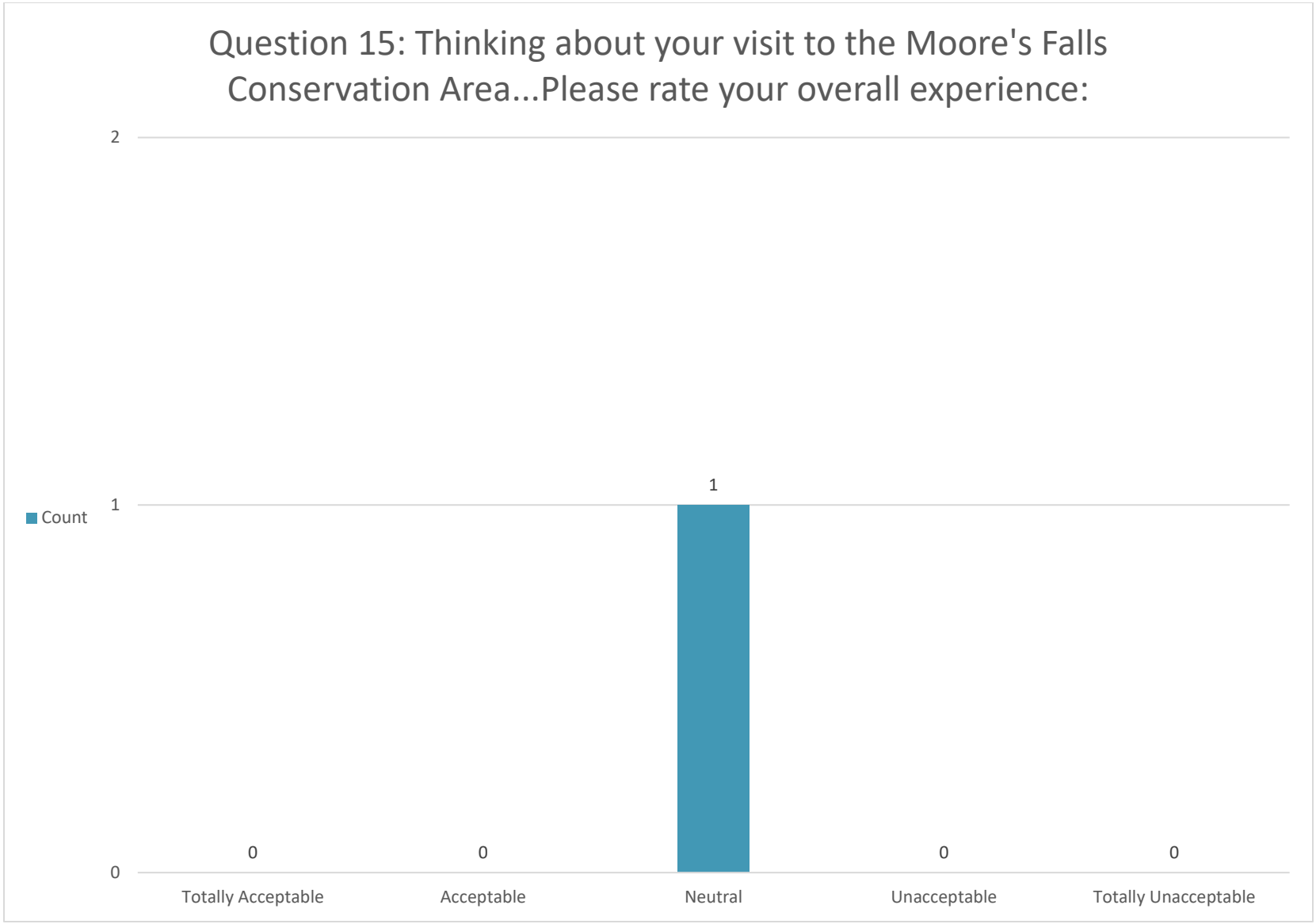


*Percentages not shown for respondent counts under ten.



*Percentages not shown for respondent counts under ten.

	Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 17: Please share any other comments that you have regarding recreation at the Lowell Project:
Recorded Date	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q17. General comments**
5/26/2019 19:18	Bathroom, fix boat ramp	Chelmsford Boat Ramp			
5/26/2019 19:18	Better parking more; more cleanliness	Lowell Heritage State Park	Needs a bathroom	Rourke Brothers Boat Ramp	
5/26/2019 19:18	Bathroom would be nice	Rourke Brothers Boat Ramp			Very clean, Every year is cleaner!
5/26/2019 19:18	Better ramp	Chelmsford Boat Ramp			
5/26/2019 19:18	Fix sidewalks, add grills, add picnic tables	Lowell Heritage State Park			Need professionally experienced oversight of programs that are held here. Hold events on holidays. More park staff for events.
5/26/2019 19:18	Bike and walk lanes	Merrimack River trail	Signage for opening of gates	Northern canal walkway	Nice dam; aesthetically pleasing
5/26/2019 19:18	Dock sanding, longer ramp	Rourke Brothers Boat Ramp	Repave of ramp, dock, trash barrel	Chelmsford	More access on opposite side of river of rourke bros ramp
5/26/2019 19:18	More fishing piers	Rourke Brothers Boat Ramp			
5/26/2019 19:18	New boat launch- deteriorating, public bathroom	Chelmsford Boat Ramp	Bathroom	Rourke ramp; Canal walkways	Flooding upstream with obermeyer; safety with powered crafts- post safety regs
5/27/2019 21:51	When students row rowing they should park on the side of the side of the road				Need bathrooms; trash cans. Two more American Disabilities Act parking at the parking spot. Rowers take all the parking spots.
5/27/2019 21:51	Access to the water	Merrill Park			

	Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 17: Please share any other comments that you have regarding recreation at the Lowell Project:
Recorded Date	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q17. General comments**
5/27/2019 21:51	Porta potty; trail should be widened; some type of advertisement;				
5/27/2019 21:51	Access to the beach and walkway	Chelmsford Boat Ramp			
5/27/2019 21:51	Improve the boat ramp	Chelmsford Boat Ramp			
5/27/2019 21:51	Porta Potty/ bathrooms on site of the boat launch	Chelmsford Boat Ramp			
5/27/2019 21:51					
5/27/2019 21:51	Some access points to the river esp folks want to launch a kayak or canoe	NPS walkway tours			
5/27/2019 21:51	Forest ranger presence	All			Great upkeep of rec facilities
5/27/2019 21:51	Bathroom hours extended until 9pm	Merrimack Trail System			Sometimes the music is too loud.
6/12/2019 7:41					
6/12/2019 7:41					Docks
6/12/2019 7:41					Bathrooms
6/12/2019 7:41					Rope swing to swim.
6/12/2019 7:41					

	Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 17: Please share any other comments that you have regarding recreation at the Lowell Project:
Recorded Date	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q17. General comments**
6/12/2019 7:41	More bathrooms; litter looks bad	Merrimack Trail System			
6/12/2019 7:42					
6/12/2019 7:42					
6/12/2019 7:42					
6/12/2019 7:42	Improve boat ramp and bathroom facilities	Chelmsford Boat Ramp			
6/12/2019 7:42	Trash can	Rourke Brothers Boat Ramp			
6/12/2019 7:42	Rent paddleboards	Chelmsford Boat Ramp			
7/26/2019 19:47	Turning lane into facility	Rourke Brothers Boat Ramp			Considers rourke bros third in the state; really nice
7/26/2019 19:47	Porta potty	Rourke Brothers Boat Ramp			
7/26/2019 19:47	Trash can	Pawtucket Overlook and Canal Walkways			
7/26/2019 19:47	Porta potty and trash can	Chelmsford Boat Ramp			
7/26/2019 19:48					
8/26/2019 10:55					

	Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 17: Please share any other comments that you have regarding recreation at the Lowell Project:
Recorded Date	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q17. General comments**
8/26/2019 10:55					"Informational panels great
8/26/2019 10:55	Paving, add flowering trees, higher barrier	Merrimack Trail System			
8/26/2019 10:55	Clean up trash in canal	Pawtucket Falls Overlook			
8/26/2019 10:55	Lifeguards during summer	Lowell Heritage State Park			
8/26/2019 10:55	Porta potty	Rourke Brothers Boat Ramp			
8/26/2019 10:55	Tray barrel and porta potty	Rourke Brothers Boat Ramp			
10/13/2019 19:46	Update bathrooms				
10/13/2019 19:46	Roads in and out need work and parking	Chelmsford Boat Launch			
10/31/2019 15:17	Blacktop the path occasionally	Merrimack Trail System			Walkway tours = visitor center
10/31/2019 15:17	Maintenance of benches, signs, add signage of existing facilities	Canal Walkway			
10/31/2019 15:17	More tables	Lowell Heritage State Park			
10/31/2019 15:17	Permanent bathroom or porta potty	Rourke Brothers Boat Ramp	Trashcan	Rourke brothers	

	Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 16: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 17: Please share any other comments that you have regarding recreation at the Lowell Project:
Recorded Date	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q16. Type of Recreation Enhancement:**	**Q. 16 Location(s)**	**Q17. General comments**
10/31/2019 15:17	Benches, trash can	Pawtucket Falls Overlook			
10/31/2019 15:17	Numbering of trees for emergency reasons	Lowell Heritage State Park	Volunteer ranger Dogs on leash	Lowell Heritage State Park	Policing good on weekends
10/31/2019 15:17					Trash at dam
10/31/2019 15:17	More benches in some areas; better signage at intersections				Set up volunteer rangers

Appendix D - Field Reconnaissance Data

Field Reconnaissance Data

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
May 25, 2019	Chelmsford Boat Access	Cloudy/partially sunny	8:04 – 9:06	• 3 cars	2	• Hiking • Boating
May 25, 2019	Merrill Park	Cloudy/partially sunny	9:30 – 10:30	• 0	1	• Walking
May 25, 2019	Rourke Brothers Boat Ramp	Cloudy/partially sunny	11:03 – 11:57	• 10 cars • 8 cars with trailers	16	• Boating • Kayaking • Paddle board
May 25, 2019	Merrimack Trail System	Cloudy/partially sunny	12:10 – 1:07	• 0	100	• Boating • Running, jogging, hiking
May 25, 2019	Pawtucket Falls Overlook	Cloudy/partially sunny	1:58 – 2:57	• 0	8	• Boating • Hiking
May 25, 2019	Lowell Heritage State Park	Cloudy/partially sunny	3:14 – 4:11	• Not recorded	150	• Hiking • Running, jogging, and fitness • Dog walking • Boating
May 25, 2019	NPS Canal Walkways	Cloudy/partially sunny	4:50 – 5:50	• N/A	30	• Picnicking
May 26, 2019	Lowell Heritage State Park	Sunny, 70s	8:30 – 9:30	• 30 cars	90	• Boating • Hiking • Bicycling • Picnicking • Running, jogging, and fitness • Dogwalking
May 26, 2019	Pawtucket Falls Overlook	Sunny, 70s	9:41 – 9:45	• 0	4	• Hiking/walking
May 26, 2019	Lowell National Historical Park Visitor Center	Sunny, 70s	10:57 – 12:02	• 20 cars	35	• Park attendance
May 26, 2019	NPS Canal Walkways	Sunny, 70s	12:10 – 13:18	• N/A	40	• Walking

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
May 26, 2019	Chelmsford Boat Access	Sunny, 70s	14:10 – 15:10	• 7 cars • 5 cars with boat trailers		• Boating
May 26, 2019	Merrimack Trail System	Sunny, 70s	17:09 – 18:10	• 60 cars (not including overflow parking)	175	• Hiking/Walking
May 27, 2019	Lowell National Historical Park Visitor Center	Sunny, 70s	8:30 – 9:30	• 0	2	• Park attendance
May 27, 2019	Merrimack Trail System	Sunny, 70s	9:55 – 11:00	• 20 rowing boats	250	• A regatta for the Massachusetts Public Schools Rowing Association • Hiking, walking, bicycling
May 27, 2019	Rourke Brothers Boat Ramp	Sunny, 70s	11:56 – 12:59	• 25 cars • 3 boats • 1 Moped • 1 car trailer	10	• Boating • Dog walking
May 27, 2019	Chelmsford Boat Access	Sunny, 70s	15:38 – 16:42	• 5 jet skis • 7 boat trailers	26	• Boating • Hiking, walking • Dog walking
May 27, 2019	Pawtucket Falls Overlook	Sunny, 70s	16:59 – 18:00	• 0	1	• Hiking/Walking
May 28, 2019	Rourke Brothers Boat Ramp	Overcast, 50s	8:05 – 9:08	• 2 cars	2	• Hiking/walking
May 28, 2019	NPS Canal Walkways	Overcast, 50s	9:20 – 10:30	• 0	14	• Park attendance • Fishing
May 28, 2019	Merrimack Trail System	Overcast, 50s	10:45 – 11:45	• 15 cars	29	• Hiking/walking • Fishing • Running/jogging
May 28, 2019	Lowell Heritage State Park	Overcast, 50s	11:48 – 12:45	• 3	2	• Dog walking • Hiking/walking • Running/Jogging

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
May 28, 2019	Pawtucket Falls Overlook	Overcast, 50s	12:53 – 13:56	• 1 car	1	• Walking
May 28, 2019	Chelmsford Boat Access	Overcast, 50s	14:27 – 15:24	• 1 car	0	• N/A
May 28, 2019	Lowell National Historical Park Visitor Center	Overcast, 50s	17:50 – 18:00	• 0	0	• Park was closed
June, 07, 2019	Rourke Brothers Boat Ramp	Sunny, 80s	8:00 – 9:01	• 2 cars	2	• Bicycling
June, 07, 2019	Merrill Park	Sunny, 80s	9:24 – 10:24	• 0	0	• N/A
June, 07, 2019	Chelmsford Boat Access	Sunny, 80s	10:54 – 12:00	• 4 cars	4	• Boating • Fishing
June, 07, 2019	Lowell National Historical Park Visitor Center	Sunny, 80s	12:15 – 13:18	• 0	36	• Park attendance
June, 07, 2019	NPS Canal Walkways	Sunny, 80s	13:18 – 14:20	• 0	40	• Walking • Bicycling
June, 07, 2019	Pawtucket Falls Overlook	Sunny, 80s	14:20 – 15:20	• 1 cars	2	• Walking
June, 07, 2019	Lowell Heritage State Park	Sunny, 80s	15:29 – 16:30	• 5 cars	40	• Hiking/walking • Picnicking • Bicycling • Boating
June, 07, 2019	Merrimack Trail System	Sunny, 80s	16:30 – 17:30	• 35 cars	60	• Hiking/walking • Picnicking • Boating • Fishing • Skateboarding • Paddle boarding
June, 07, 2019	Rourke Brothers Boat Ramp	Sunny, 80s	17:40 – 18:00	• 9 cars	10	• Boating • Walking

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
June 10, 2019	Merrimack Trail System	Sunny, 80s	8:08 – 9:08	• 30 cars	40	• Fishing • Running/jogging • Hiking/walking
June 10, 2019	Lowell Heritage State Park	Sunny, 80s	9:08 – 10:06	• 40 cars	60	• Running/jogging • Hiking/walking • Bicycling
June 10, 2019	Pawtucket Falls Overlook	Sunny, 80s	10:19 – 11:17	• 4 cars	2	• Walking
June 10, 2019	Rourke Brothers Boat Ramp	Sunny, 80s	11:28 – 12:26	• 13 cars	12	• Boating
June 10, 2019	Merrill Park	Sunny, 80s	13:15 – 14:13	• 0 cars	2	• Boating • Bicycling
June 10, 2019	Chelmsford Boat Access	Sunny, 80s	14:45 – 15:53	• 5 cars	8	• Boating • Fishing
June 10, 2019	Lowell National Historical Park Visitor Center	Sunny, 80s	16:10 – 17:09	• 0 cars	8	• Park attendance
June 10, 2019	NPS Canal Walkways	Sunny, 80s	17:09 – 18:09	• 0 cars	20	• Hiking/walking • Fishing
June 15, 2019	Rourke Brothers Boat Ramp	Sunny, 70s	8:00 – 9:00	• 3 cars	3	• Boating
June 15, 2019	Merrill Park	Sunny, 70s	9:25 – 10:25	• 0	2	• Bicycling
June 15, 2019	Chelmsford Boat Access	Sunny, 70s	11:10 – 12:13	• 1 boat trailer	5	• Boating • Fishing • Softball tournament
June 15, 2019	NPS Canal Walkways	Sunny, 70s	13:10 – 14:10	• 0	15	• Hiking/walking • Picnicking
June 15, 2019	Pawtucket Falls Overlook	Sunny, 70s	14:32 – 15:35	• 0	3	• Hiking/walking
June 15, 2019	Merrimack Trail System	Sunny, 70s	15:47 – 16:48	• 100	100	• Hiking/walking • Bicycling • Picnicking • Fishing • Boating • Running

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
June 15, 2019	Rourke Brothers Boat Ramp	Sunny, 70s	17:00 – 18:00	• 14 cars	30	• Boating • Jet skiing • Dog walking
June 16, 2019	Rourke Brothers Boat Ramp	Rainy, 60s	8:00 – 9:03	• 1 boat trailer • 1 car	1	• Dog walker
June 16, 2019	Lowell Heritage State Park	Rainy, 60s	9:23 – 10:23	• 8 cars	55	• Running/jogging • Hiking/walking • Bicycling • Picnicking
June 16, 2019	Lowell National Historical Park Visitor Center	Rainy, 60s	10:30 – 11:30	• 0	7	• Hiking/walking
June 16, 2019	NPS Canal Walking	Rainy, 60s	11:37 – 12:37	• 0	4	• Walking
June 16, 2019	Merrill Park	Rainy, 60s	13:21 – 14:28	• 1 car	2	• Dog walking
June 16, 2019	Chelmsford Boat Access	Rainy, 60s	15:10 – 16:10	• N/A	N/A	• N/A
June 16, 2019	Pawtucket Falls Overlook	Rainy, 60s	16:21 – 17:21	• 0	2	• Walking • Dog walking
June 16, 2019	Merrimack Trail System	Rainy, 60s	17:25 – 18:00	• 8	10	• Sitting in cars (raining) • Walking
July 10, 2019	Merrimack Trail System	Cloudy and Sunny, 60s	8:15 – 9:15	• 7 cars	8	• Hiking/walking
July 10, 2019	Merrill Park	Cloudy and Sunny, 60s	9:55 – 10:55	• 0	0	• N/A
July 10, 2019	Chelmsford Boat Access	Cloudy and Sunny, 60s	11:25 – 12:25	• 3 cars	5	• N/A
July 10, 2019	Pawtucket Falls Overlook	Cloudy and Sunny, 60s	13:15 – 14:15	• 0	0	• N/A
July 10, 2019	NPS Canal Walkways	Cloudy and Sunny, 60s	14:40 – 15:40	• 5	50	• Hiking/Walking • Bicycling • Swimming
July 10, 2019	Whitewater takeout	Cloudy and Sunny, 60s	15:52 – 16:50	• 0	0	• N/A
July 10, 2019	Rourke Brothers Boat Ramp	Cloudy and Sunny, 60s	16:50 – 18:00	• 8 cars	7	• Boating

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
July 19, 2019	Rourke Brothers Boat Ramp	Overcast, 70s	8:00 – 9:00	• 5 cars	2	• Dog walking • Bicycling • Fishing
July 19, 2019	Pawtucket Falls Overlook	Overcast, 70s	9:35 – 10:44	• 0	0	• N/A
July 19, 2019	Lowell National Historical Park Visitor Center	Overcast, 70s	10:58 – 11:58	• 0	9	• N/A
July 19, 2019	NPS Canal Walkways	Overcast, 70s	12:24 – 13:20	• 0	10	• N/A
July 19, 2019	Merrimack Trail System	Overcast, 70s	13:38 – 14:42	• 20 cars	50	• Boating • Running/jogging • Hiking/walking • Bicycling • Dog walking
July 19, 2019	Merrill Park	Overcast, 70s	15:25 – 16:25	• 1 car	8	• Bicycling
July 19, 2019	Whitewater Takeout	Overcast, 70s	17:00 – 18:00	• 0	0	• N/A
July 27, 2019	Merrimack Trail System	Sunny, 80s	8:07 – 9:06	• 40 cars	80	• Dog walker • Picnicking • Bicycling • Hiking/walking • Running/jogging
July 27, 2019	Merrill Park	Sunny, 80s	9:45 – 10:45	• 1	2	• Dog walker • Jet ski
July 27, 2019	Chelmsford Boat Access	Sunny, 80s	11:06 –12:07	• 2 cars • 4 boat trailers	10	• Picnicking • Boating • Softball tournaments
July 27, 2019	Rourke Brothers Boat Ramp	Sunny, 80s	12:19 – 13:20	• 20 cars	15	• Boating • Fishing • Bicycling • Picnicking
July 27, 2019	Pawtucket Falls Overlook	Sunny, 80s	14:02 – 15:02	• 0	0	• N/A
July 27, 2019	Whitewater Takeout	Sunny, 80s	15:10 – 16:10	• 0	0	• N/A
July 27, 2019	Lowell Heritage State Park	Sunny, 80s	16:20 – 17:20	• 30 cars	70	• Boating

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
						• Picnicking • Hiking/walking • Dog walking • Swimming
July 27, 2019	Rourke Brothers Boat Ramp	Sunny, 80s	18:00 – 19:00	• 14 cars • 6 trailers • 3 boaters	3	• Boating • Walking
July 28, 2019	Lowell National Historical Park Visitor Center	Sunny, 70s	8:30 – 9:30	• 0	7	• Park attendance
July 28, 2019	NPS Canal Walkways	Sunny, 70s	9:35 – 10:35	• 0	10	• Walking
July 28, 2019	Pawtucket Falls Overlook	Sunny, 70s	10:52 – 11:52	• 0	0	• N/A
July 28, 2019	Chelmsford Boat Access	Sunny, 70s	12:10 – 13:10	• 5 boat trailers	10	• Running/hiking • Boating • Bicycling
July 28, 2019	Merrill Park	Sunny, 70s	13:45 – 14:45	• 0	3	• Boating (not at Merrill Park, but observed from Merrill Park) • Fishing
July 28, 2019	Rourke Brothers Boat Ramp	Sunny, 70s	15:05 – 16:05	• 15 boat trailers	23	• Boating • Bicycling • Sailboating • Jet skiing
July 28, 2019	Lowell Heritage State Park	Sunny, 70s	16:25 – 17:25	• 35 cars	100	• Swimming • Running/jogging • Hiking/walking • Picnicking • Bicycling • Skateboarding • Dog walking
August 6, 2019	Merrimack Trail System	Sunny, 80s	8:10 – 9:10	• 50 cars	70	• Boating • Fishing • Running/jogging • Hiking/walking • Bicycling • Picnicking

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
						• Dog walking
August 6, 2019	Merrill Park	Sunny, 80s	09:45 – 10:45	• 0	0	• N/A
August 6, 2019	Chelmsford Boat Access	Sunny, 80s	11:20 – 12:20	• 3 cars	3	• Picnicking
August 6, 2019	Pawtucket Falls Overlook	Sunny, 80s	13:15 – 14:15	• 0	4	• Hiking/walking
August 6, 2019	Rourke Brothers Boat Ramp	Sunny, 80s	14:31 – 15:32	• 7 cars • 2 boat trailers	5	• Jet ski • Boating • Bicycling
August 6, 2019	Lowell Heritage State Park	Sunny, 80s	16:00 – 17:00	• 20 cars	60	• Picnicking • Swimming
August 6, 2019	Lowell National Historical Park Visitor Center	Sunny, 80s	17:21 – 18:00	• 0	11	• Park attendance
August 18, 2019	Lowell Heritage State Park	Cloudy, 80s	8:07 – 9:07	• 20 cars	90	• Running/jogging • Hiking/walking • Picnicking • Boating • Dog walkers
August 18, 2019	Chelmsford Boat Access	Cloudy, 80s	9:20 – 10:30	• 1 car • 1 trailer	4	• Softball tournament • Boating
August 18, 2019	Merrill Park	Cloudy, 80s	11:10 – 12:10	• 1 car	2	• Picnicking
August 18, 2019	Merrimack Trail System	Cloudy, 80s	12:45 – 13:45	• 50 cars	125	• Running/jogging • Hiking/walking • Bicycling
August 18, 2019	Lowell National Historical Park Visitor Center	Cloudy, 80s	14:35 – 15:35	• 0	21	• Park attendance
August 18, 2019	Pawtucket Falls Overlook	Cloudy, 80s	15:56 – 16:56	• 0	2	• Hiking/walking
August 18, 2019	Rourke Brothers Boat Ramp	Cloudy, 80s	17:09 – 18:00	• 11 cars • 8 boat trailers	14	• Boating • Fishing
August 21, 2019	Lowell Heritage State Park	Overcast, Rainy, 70s	8:00 – 9:00	• 15 cars	55	• Running/jogging • Hiking/walking • Dog walking
August 21, 2019	NPS Canal Walkways	Overcast, Rainy, 70s	9:15 – 10:15	• 0	30	• Walking • Dog walking

Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
						• Picnicking
August 21, 2019	Merrill Park	Overcast, Rainy, 70s	10:55 – 11:55	• 0	0	• N/A
August 21, 2019	Pawtucket Falls Overlook	Overcast, Rainy, 70s	12:30 – 13:30	• 0	2	• Dog walking
August 21, 2019	Rourke Brothers Boat Ramp	Overcast, Rainy, 70s	14:20 – 15:20	• 6 cars • 2 boat trailers	0	• Boating
August 21, 2019	Chelmsford Boat Access	Overcast, Rainy, 70s	15:30 – 16:30	• 0	0	• N/A
August 21, 2019	Merrimack Trail System	Overcast, Rainy, 70s	16:50 – 17:50	• 15 cars	40	• Running/jogging • Hiking/walking • Bicycling • Dog walking
August 24, 2019	Pawtucket Falls Overlook	Sunny, 70s	9:30 – 10:30	• 0	0	• N/A
August 24, 2019	Merrill Park	Sunny, 70s	11:20 – 12:20	• 0	0	• N/A
August 24, 2019	Chelmsford Boat Access	Sunny, 70s	12:45 – 13:45	• 10 cars • 6 trailers	18	• Boating • Bicycling
August 24, 2019	Lowell National Historical Park Visitor Center	Sunny, 70s	14:45 – 15:45	• 0	49	• Park attendance
August 24, 2019	NPS Canal Walkways	Sunny, 70s	16:00 – 17:00	• 0	12	• Walking • Picnicking
August 24, 2019	Rourke Brothers Boat Ramp	Sunny, 70s	17:15 – 18:00	• 4 cars • 5 trailers	8	• Boating • Fishing • Bicycling
September 14, 2019	Rourke Brothers Boat Ramp	Cloudy, rainy, 60s	8:15 – 9:15	• 2 cars	2	• Walking
September 14, 2019	Pawtucket Falls Overlook	Cloudy, rainy, 60s	9:25 –10:25	• 0	0	• N/A
September 14, 2019	Merrill Park	Cloudy, rainy, 60s	11:02–12:05	• 3 cars	3	• Picnicking
September 14, 2019	Chelmsford Boat Access	Cloudy, rainy, 60s	12:35 –13:35	• 0	2	• Fishing • Softball tournament
September 14, 2019	NPS Canal Walkways	Cloudy, rainy, 60s	14:45 – 15:45	• 0	1	• Running/jogging
September 14, 2019	Lowell Heritage State Park	Cloudy, rainy, 60s	16:08 – 17:08	• 2 cars	23	• Hiking/walking
September 14, 2019	Merrimack Trail System	Cloudy, rainy, 60s	17:18 – 18:00	• 10 cars	7	• Hiking/walking

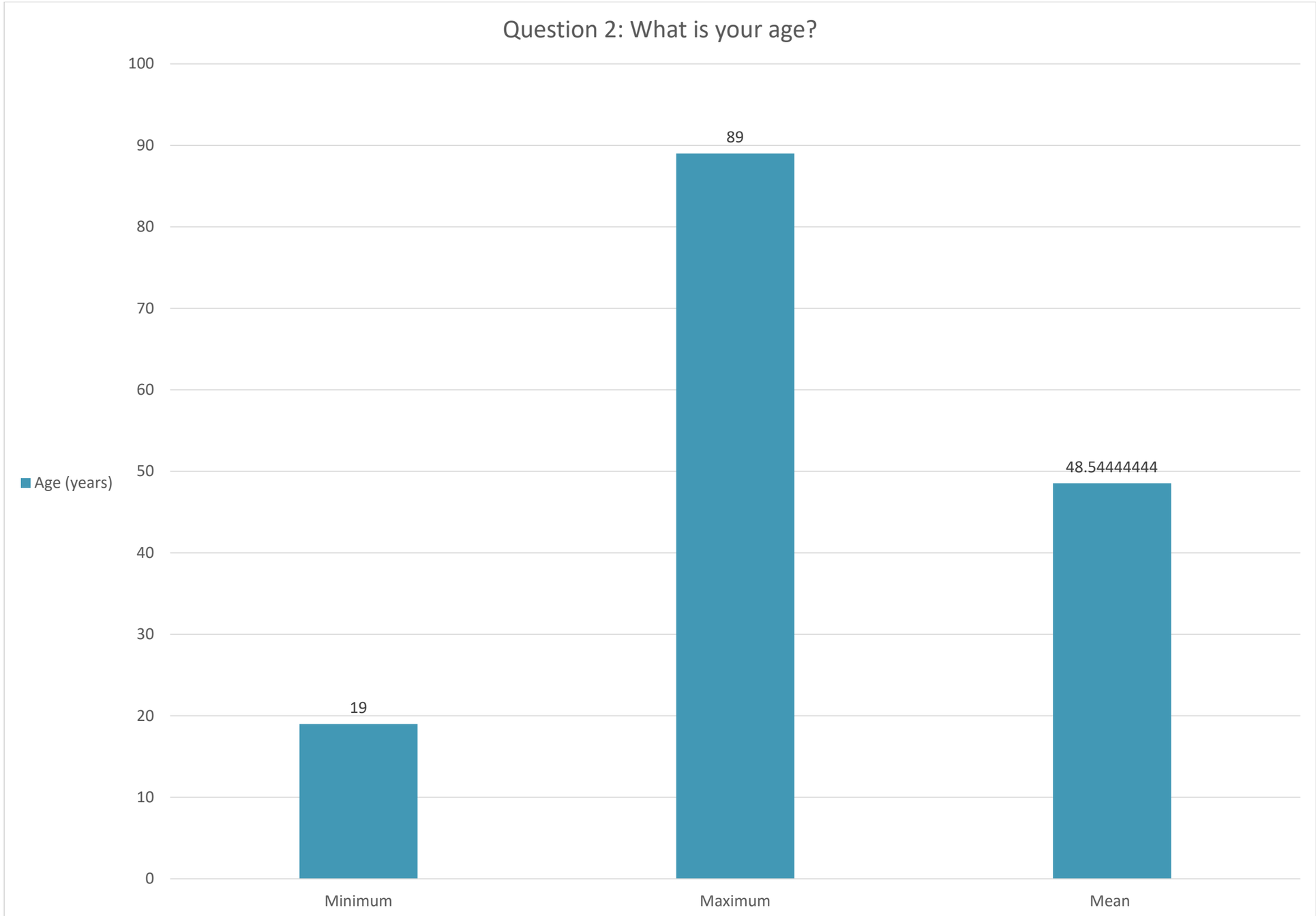
Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
September 19, 2019	Merrimack Trail System	Sunny, cool, 60s	8:00 – 9:00	• 0	54	• Fishing • Running/jogging • Hiking/walking
September 19, 2019	Rourke Brothers Boat Ramp	Sunny, cool, 60s	9:00 – 10:00	• 5 cars • 2 boat trailers	6	• Boating • Fishing
September 19, 2019	Merrill Park	Sunny, cool, 60s	10:30 – 11:30	• 1	2	• Hiking/walking
September 19, 2019	Chelmsford Boat Access	Sunny, cool, 60s	12:00 – 13:00	• 5 cars	1	• Picnicking • Fishing
September 19, 2019	Lowell National Historical Park Visitor Center	Sunny, cool, 60s	13:20 – 14:20	• 0	17	• Park attendance
September 19, 2019	Pawtucket Falls Overlook	Sunny, cool, 60s	15:05 – 16:05	• 0	0	• N/A
September 19, 2019	Lowell Heritage State Park	Sunny, cool, 60s	16:24 – 17:24	• Not Recorded	50	• Hiking/walking • Running/jogging • Bicycling
September 19, 2019	Rourke Brothers Boat Ramp	Sunny, cool, 60s	17:30 – 18:00	• 4 cars • 2 boat trailers	3	• Fishing • Boating
September 22, 2019	Rourke Brothers Boat Ramp	Sunny, 70s – 80s	8:00 – 9:00	• 3 cars • 4 boat trailers	5	• Boating • Fishing
September 22, 2019	Pawtucket Falls Overlook	Sunny, 70s – 80s	9:30 – 10:30	• 0	0	• N/A
September 22, 2019	Merrill Park	Sunny, 70s – 80s	11:00 – 12:00	• 2 trucks	4	• Hiking/walking
September 22, 2019	Chelmsford Boat Access	Sunny, 70s – 80s	12:25 – 13:25	• 6 cars • 5 boat trailers	8	• Boating
September 22, 2019	Lowell National Historical Park Visitor Center	Sunny, 70s – 80s	13:40 – 14:40	• 0	20	• Park attendance • Power outage occurred
September 22, 2019	NPS Canal Walkways	Sunny, 70s – 80s	15:00 – 16:00	• 0	13	• Hiking/walking • Running/jogging • Bicycling
September 22, 2019	Lowell Heritage State Park	Sunny, 70s – 80s	16:10 – 17:10	• 15 cars • 1 boat docked	70	• Swimming • Running/jogging • Hiking/walking • Bicycling • Dog walking
September 22, 2019	Merrimack Trail System	Sunny, 70s – 80s	17:17 – 18:00	• Not recorded	30	• Fishing • Running/jogging

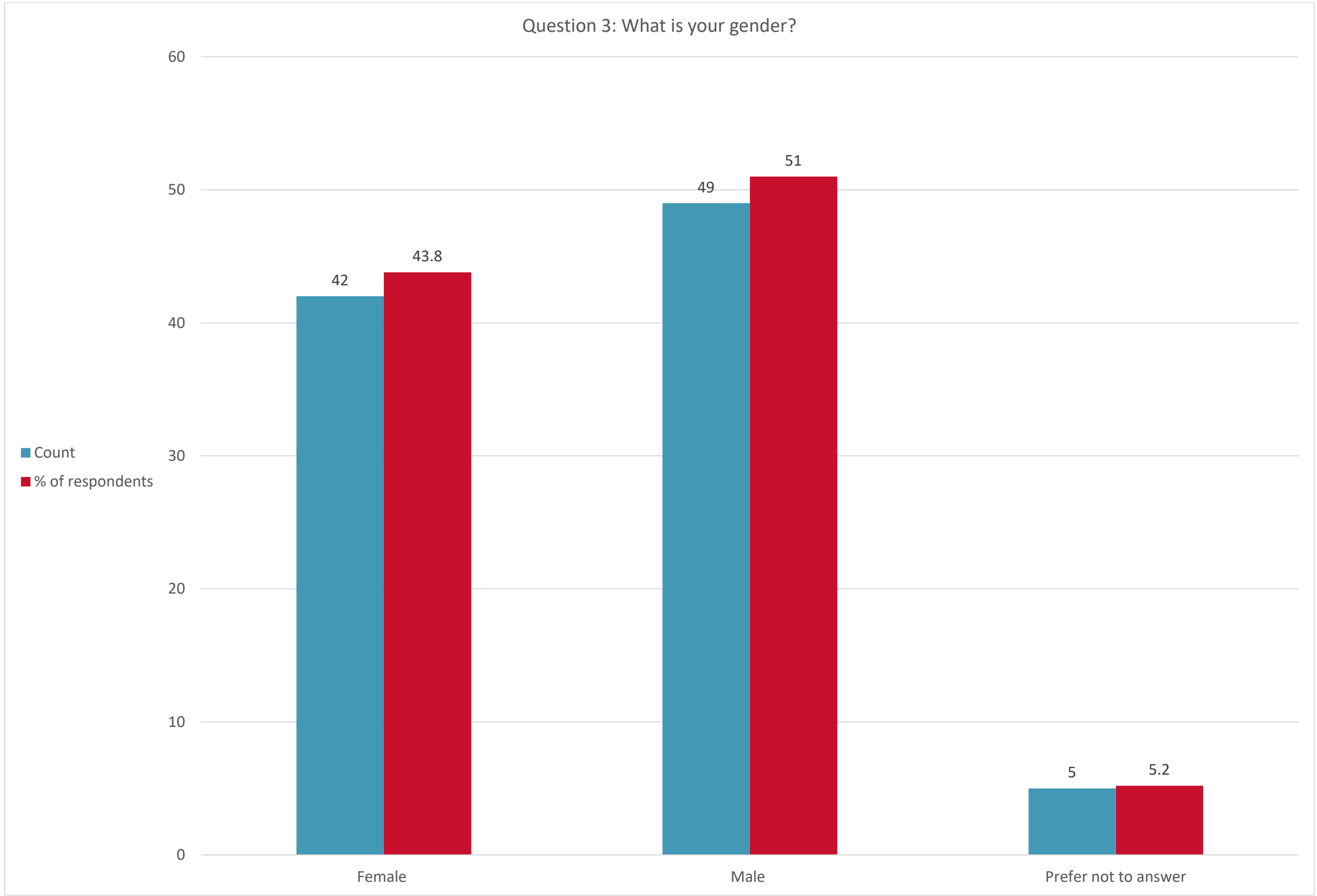
Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
						• Hiking/walking • Bicycling
September 25, 2019	Merrill Park	Sunny, 70s	8:40 – 9:40	• 1 car	1	• Hiking/walking
September 25, 2019	Lowell Heritage State Park	Sunny, 70s	10:20 – 11:20	• Not recorded	60	• Running/jogging • Hiking/walking • Bicycling
September 25, 2019	Pawtucket Falls Overlook	Sunny, 70s	11:25 – 12:25	• 3 cars	0	• N/A
September 25, 2019	Lowell National Historical Park Visitor Center	Sunny, 70s	13:10 – 14:10	• 0	10	• Park attendance
September 25, 2019	NPS Canal Walkways	Sunny, 70s	14:30 – 15:45	• 0	60	• Hiking/walking
September 25, 2019	Rourke Brothers Boat Ramp	Sunny, 70s	16:20 – 17:20	• 4 cars	4	• N/A
September 25, 2019	Merrimack Trail System	Sunny, 70s	17:23 – 18:00	• 45 cars	50	• Fishing • Running/jogging • Hiking/walking
October 9, 2019	Lowell Heritage State Park	Cloudy, windy, 50s	8:20 – 9:20	• 15 cars	19	• Hiking/walking • Running/jogging • Dog walking
October 9, 2019	Rourke Brothers Boat Ramp	Cloudy, windy, 50s	9:30 – 10:30	• 3 cars	1	• Dog walking
October 9, 2019	Merrill Park	Cloudy, windy, 50s	11:09 – 12:09	• 0	0	• N/A
October 9, 2019	NPS Canal Walkways	Cloudy, windy, 50s	12:59 – 13:59	• 0	13	• Hiking/walking
October 9, 2019	Chelmsford Boat Access	Cloudy, windy, 50s	14:46 – 15: 46	• 2 cars	1	• Hiking/walking
October 9, 2019	Pawtucket Falls Overlook	Cloudy, windy, 50s	16:03 – 17:00	• 0	0	• N/A
October 9, 2019	Merrimack Trail System	Cloudy, windy, 50s	17: 11 – 18:00	• 20 cars • 3 boats	32	• Hiking/walking • Running/Jogging • Boating
October 15, 2019	Merrill Park	Sunny, cool, 40-50s	8:10 – 9:10	• 0	0	• N/A
October 15, 2019	Lowell Heritage State Park	Sunny, cool, 40-50s	9:35 – 10:35	• 2 cars	40	• Running/jogging • Hiking/walking • Bicycling
October 15, 2019	Pawtucket Falls Overlook	Sunny, cool, 40-50s	10:40 –11:40	• 0	0	• N/A

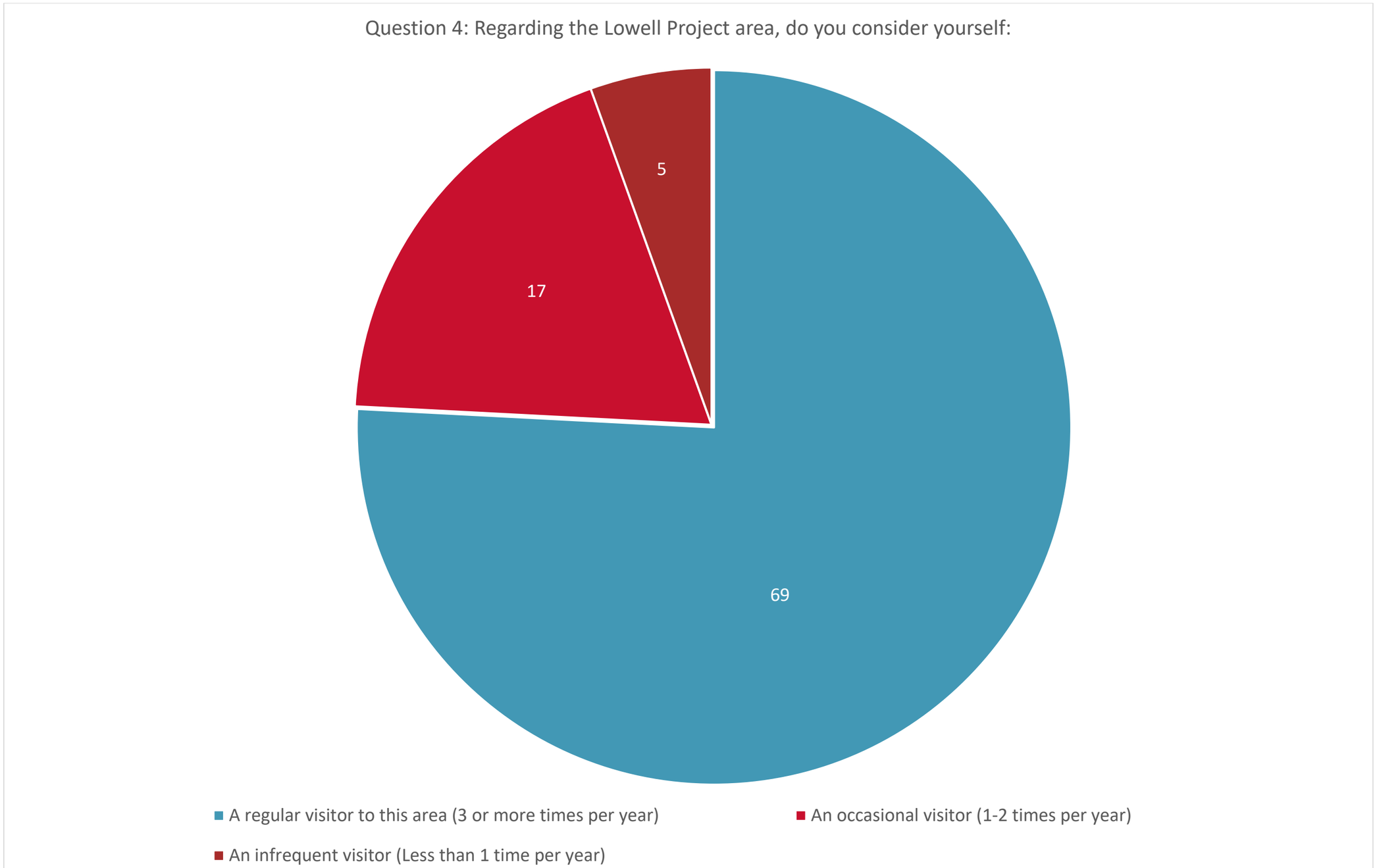
Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
October 15, 2019	Lowell National Historical Park Visitor Center	Sunny, cool, 40-50s	11:49 – 12:49	• 0	32	• Park attendance
October 15, 2019	NPS Canal Walkways	Sunny, cool, 40-50s	12:49 – 13:49	• 0	35	• Hiking/walking
October 15, 2019	Chelmsford Boat Access	Sunny, cool, 40-50s	14:39 – 15:39	• 3 cars	3	• Boating
October 15, 2019	Rourke Brothers Boat Ramp	Sunny, cool, 40-50s	15:50 – 16:50	• 6 cars	6	• Walking/hiking • Boating
October 15, 2019	Merrimack Trail System	Sunny, cool, 40-50s	16:53 – 17:53	• 0	65	• Running/jogging • Hiking/walking • Bicycling • Fishing • Picnicking
October 19, 2019	Rourke Brothers Boat Ramp	Sunny, 40-50s	8:00 – 9:00	• 8 cars	8	• Not recorded
October 19, 2019	Chelmsford Boat Access	Sunny, 40-50s	9:07 – 10:07	• 2 cars	4	• Hiking/walking
October 19, 2019	Merrill Park	Sunny, 40-50s	10:26 – 11:26	• 1 car	3	• Hiking/walking • Fishing
October 19, 2019	Merrimack Trail System	Sunny, 40-50s	11:49 – 12:49	• 0	64	• Running/jogging • Hiking/walking
October 19, 2019	Lowell National Historical Park Visitor Center	Sunny, 40-50s	13:23 – 14:23	• 0	47	• Park attendance
October 19, 2019	Pawtucket Falls Overlook	Sunny, 40-50s	14:32 – 15:32	• 0	2	• Fishing
October 19, 2019	NPS Canal Walkways	Sunny, 40-50s	15:35 –16:35	• 0	58	• Bicycling • Hiking/walking
October 19, 2019	Lowell Heritage State Park	Sunny, 40-50s	16:48 – 17:58	• 0	75	• Running/jogging • Hiking/walking • Bicycling • Picnicking • Boating
October 27, 2019	Pawtucket Falls Overlook	Rainy, cloudy, 50s	8:21 – 9:21	• 0		• Hiking/walking
October 27, 2019	Merrill Park	Rainy, cloudy, 50s	9:49 – 10:49	• 1 car		• Hiking/walking
October 27, 2019	Chelmsford Boat Access	Rainy, cloudy, 50s	11:27 – 12:17	• 1 car		• Boating

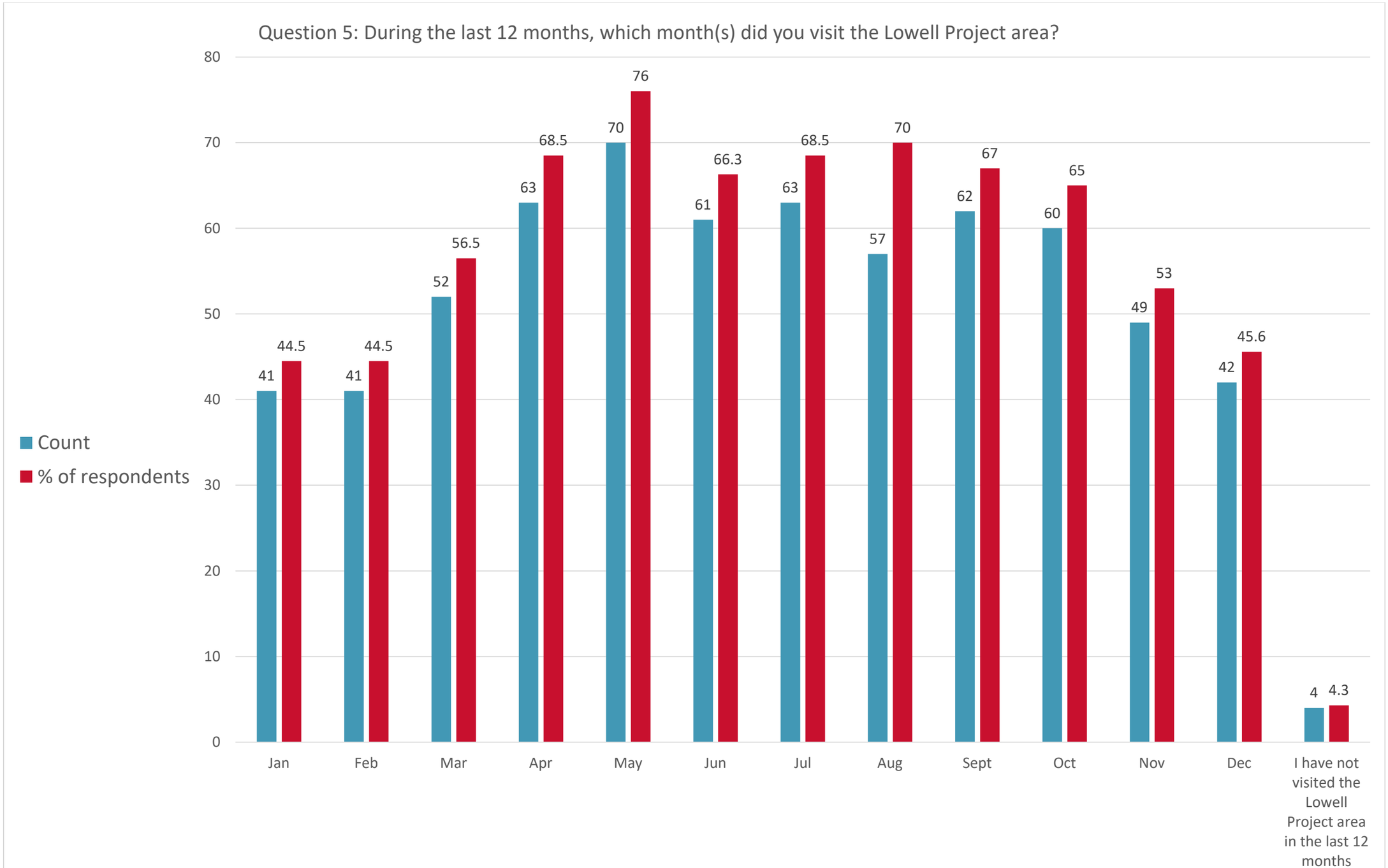
Personal Interviews and Field Reconnaissance Date	Location	Weather Conditions	Time (Military)	Approximate Vehicles Observed	Estimated Number of Recreationists Observed	Observed Recreational Activities
October 27, 2019	Lowell National Historical Park Visitor Center	Rainy, cloudy, 50s	12:31 – 13:31	• 0	13	• Park attendance
October 27, 2019	NPS Canal Walkways	Rainy, cloudy, 50s	14:03 – 15:03	• 0		• Hiking/walking
October 27, 2019	Rourke Brothers Boat Ramp	Rainy, cloudy, 50s	15:20 – 16:20	• 0	0	• N/A
October 27, 2019	Merrimack Trail System	Rainy, cloudy, 50s	16:30 – 17:30	• 4 cars	2	• Hiking/walking
October 27, 2019	Lowell Heritage State Park	Rainy, cloudy, 50s	17:32 – 18:00	• 0	0	• N/A

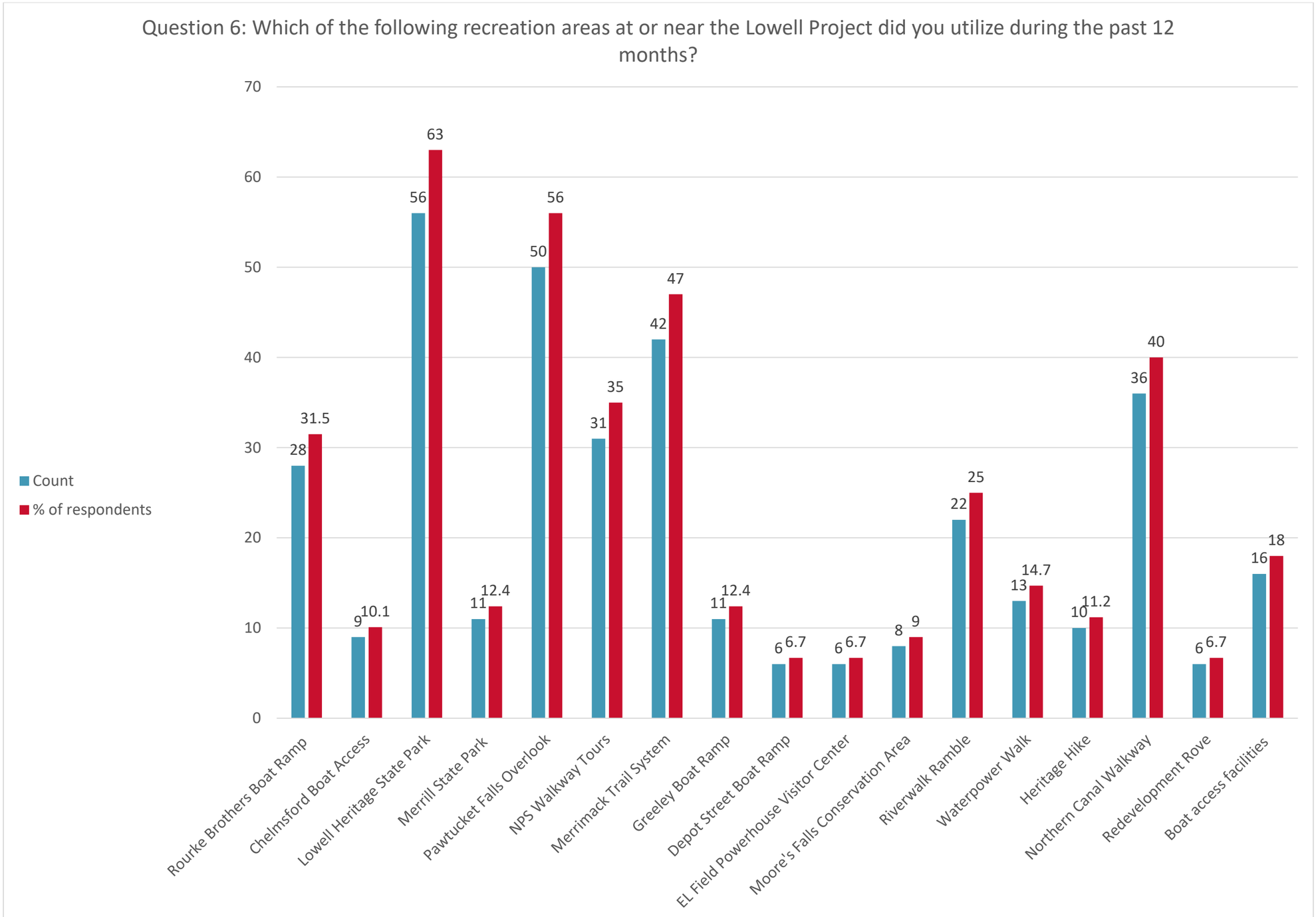
Appendix E - Online Recreation Survey Data

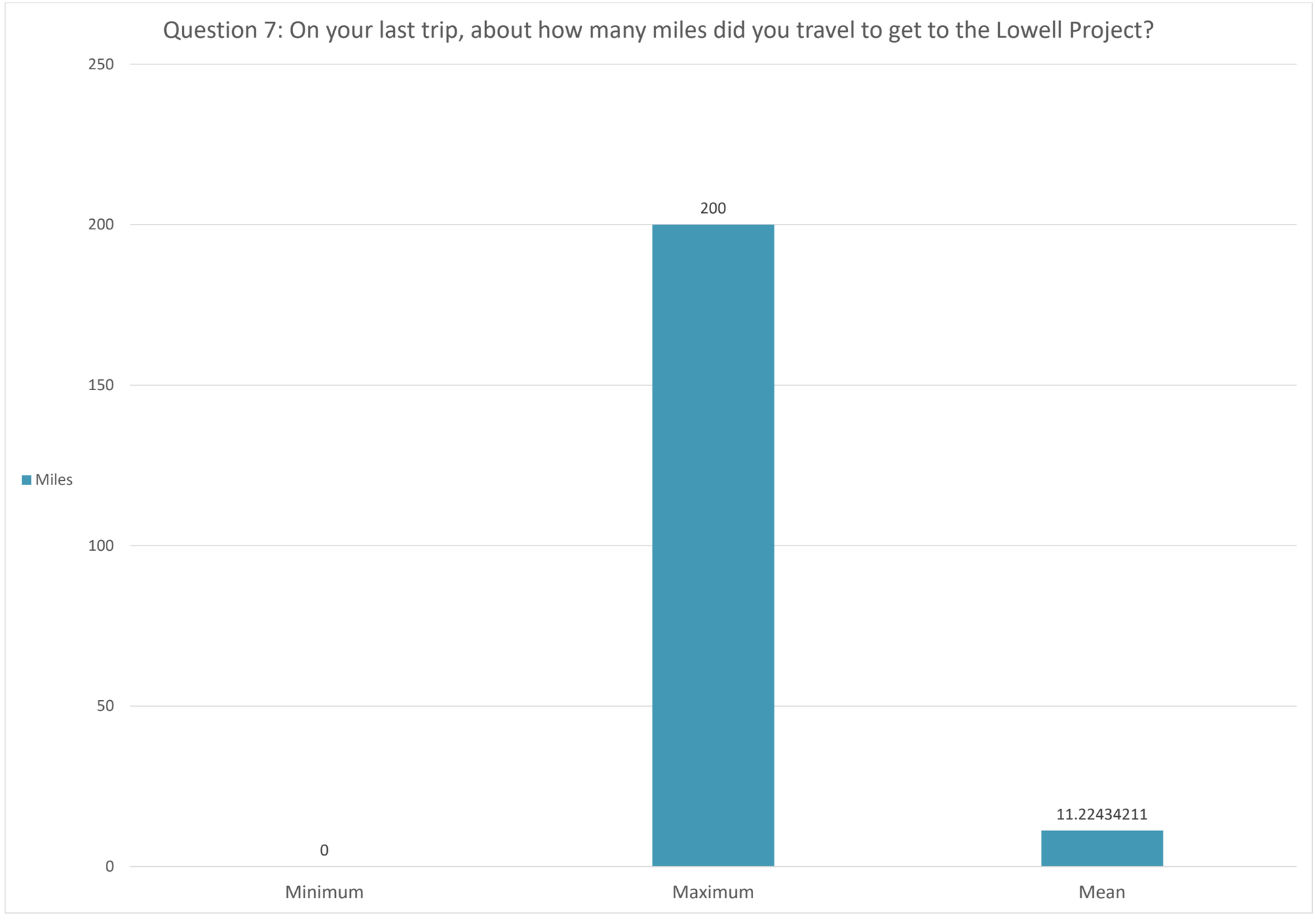

Question 2: What is your age?
100
90
80
70
60
50
40
30
20
10
0
Age (years)
19
89
48.54444444
Minimum
Maximum
Mean

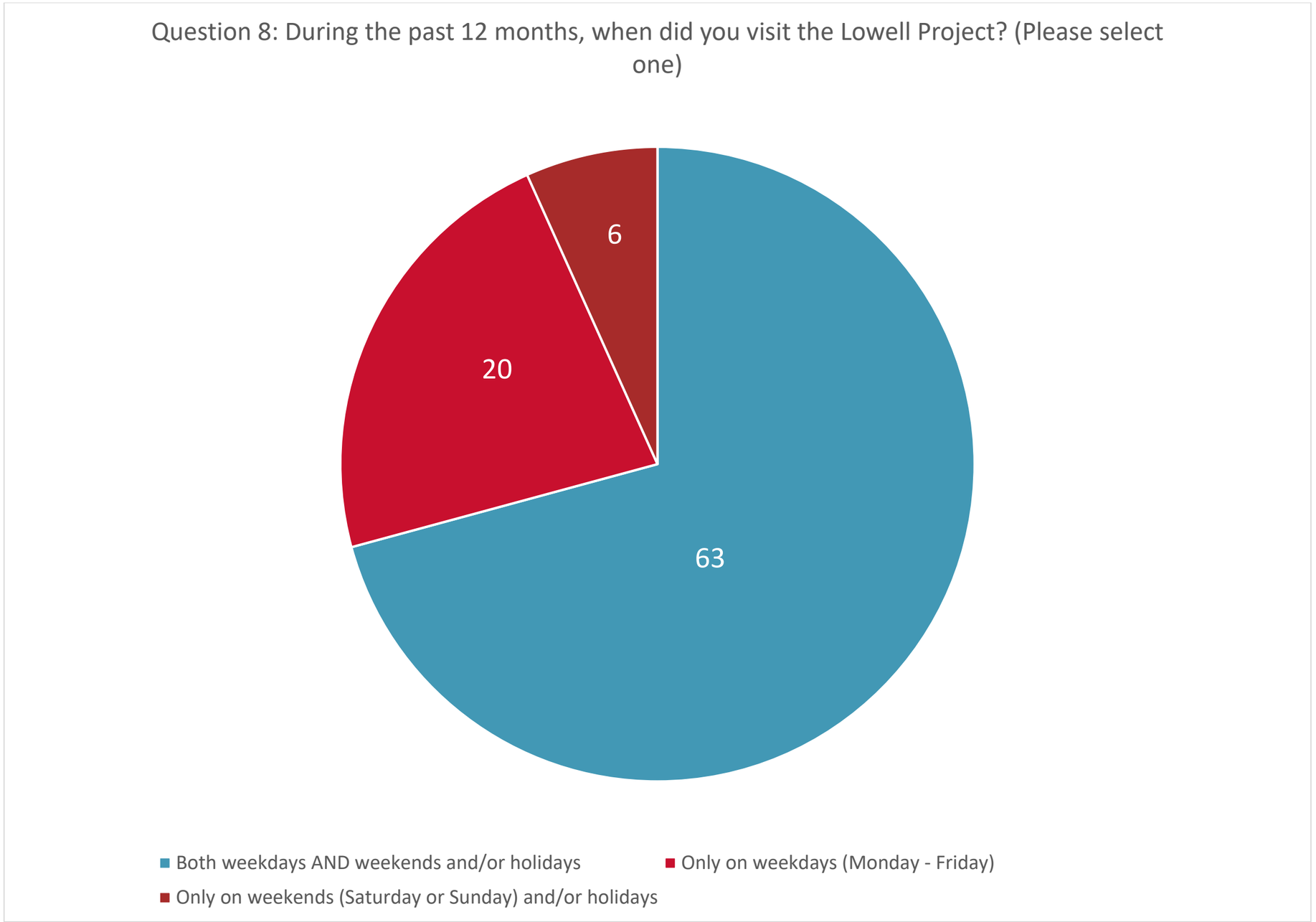

Question 3: What is your gender?
60
50
40
30
20
10
0
42
43.8
49
51
5
5.2
Female
Male
Prefer not to answer
Count
% of respondents

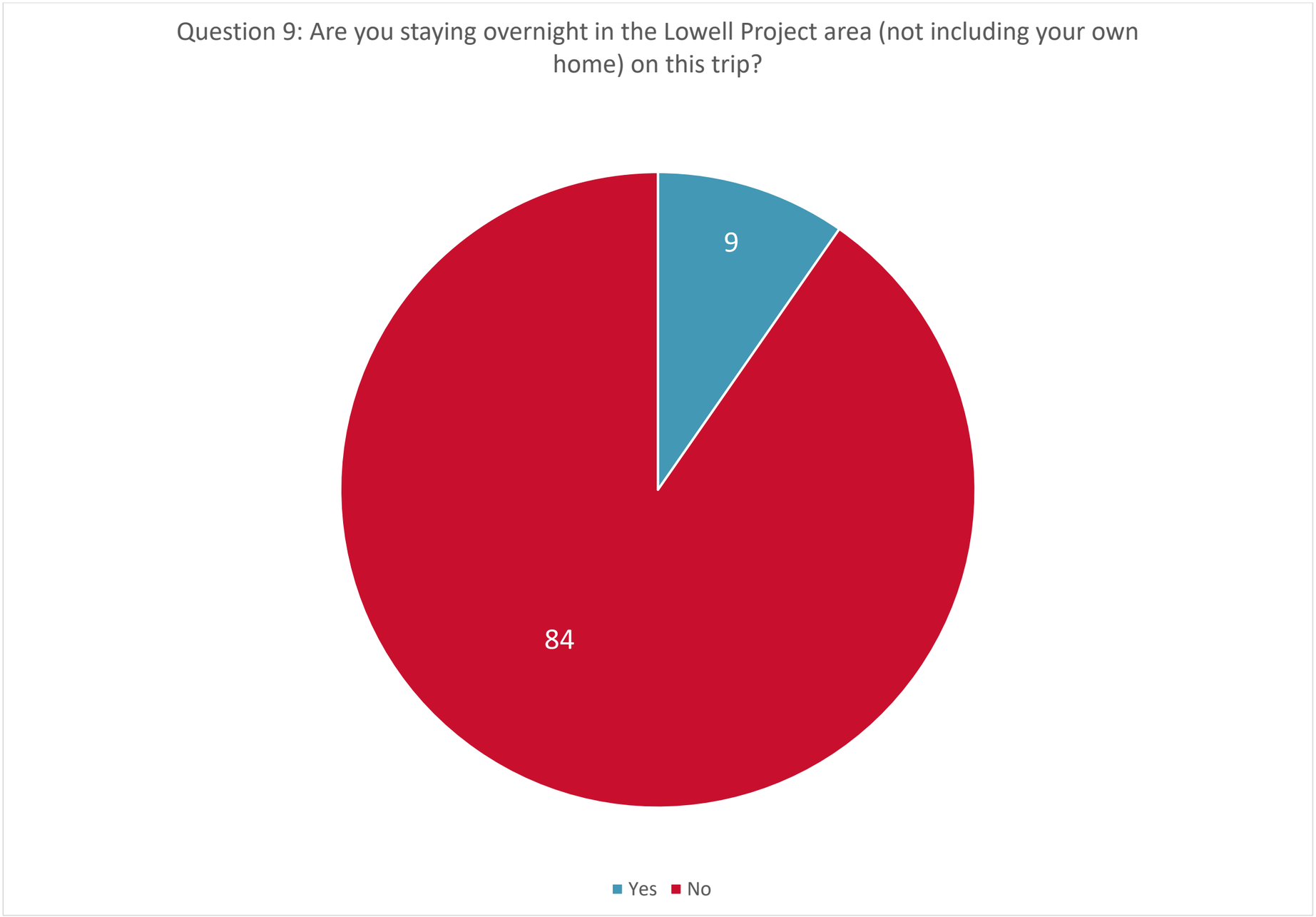

Question 4: Regarding the Lowell Project area, do you consider yourself:
5
17
69
A regular visitor to this area (3 or more times per year)
An occasional visitor (1-2 times per year)
An infrequent visitor (Less than 1 time per year)

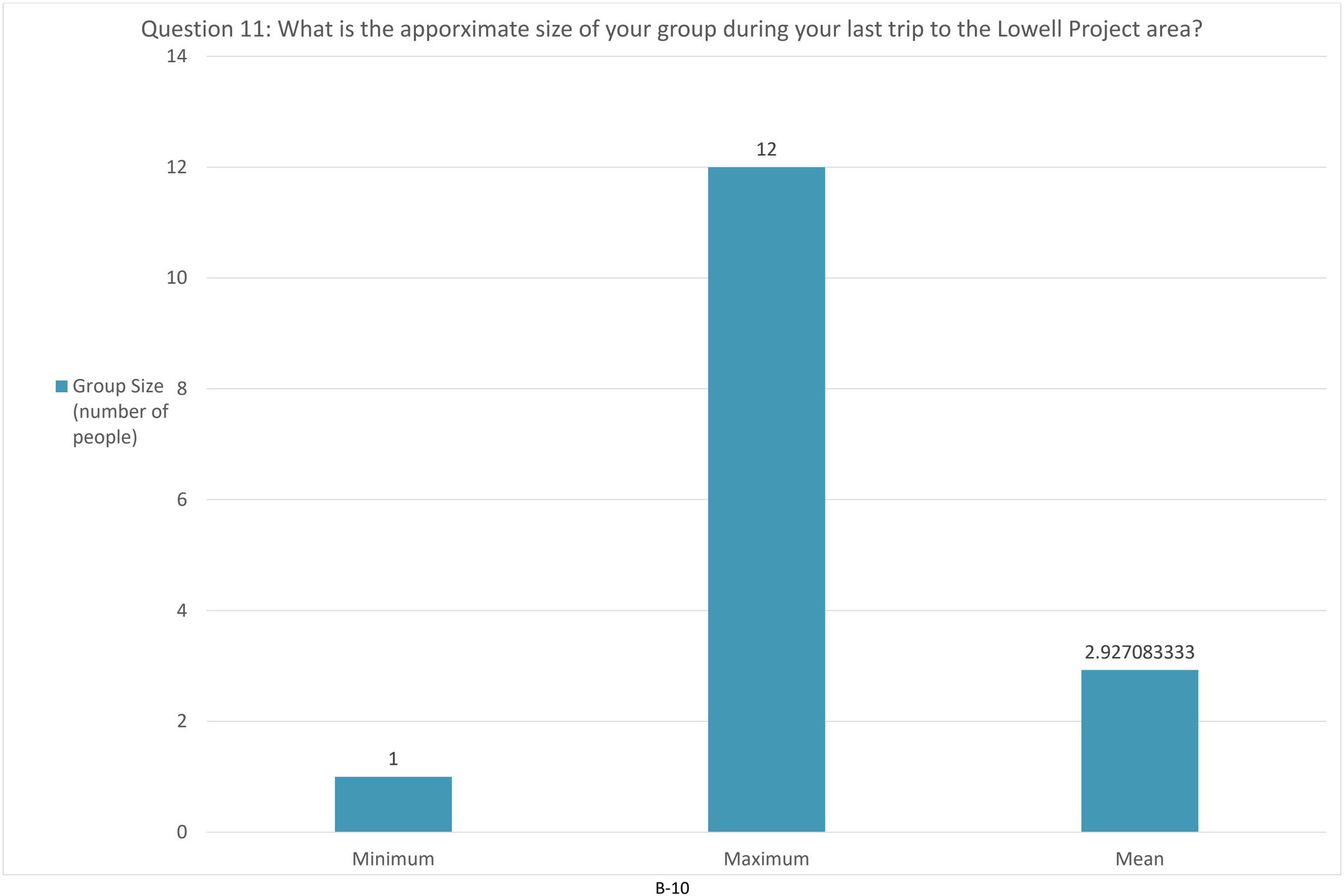

Question 5: During the last 12 months, which month(s) did you visit the Lowell Project area?
Count
% of respondents
80
70
60
50
40
30
20
10
0
41
44.5
41
44.5
52
56.5
63
68.5
70
76
61
66.3
63
68.5
57
70
62
67
60
65
49
53
42
45.6
4
4.3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
I have not visited the Lowell Project area in the last 12 months

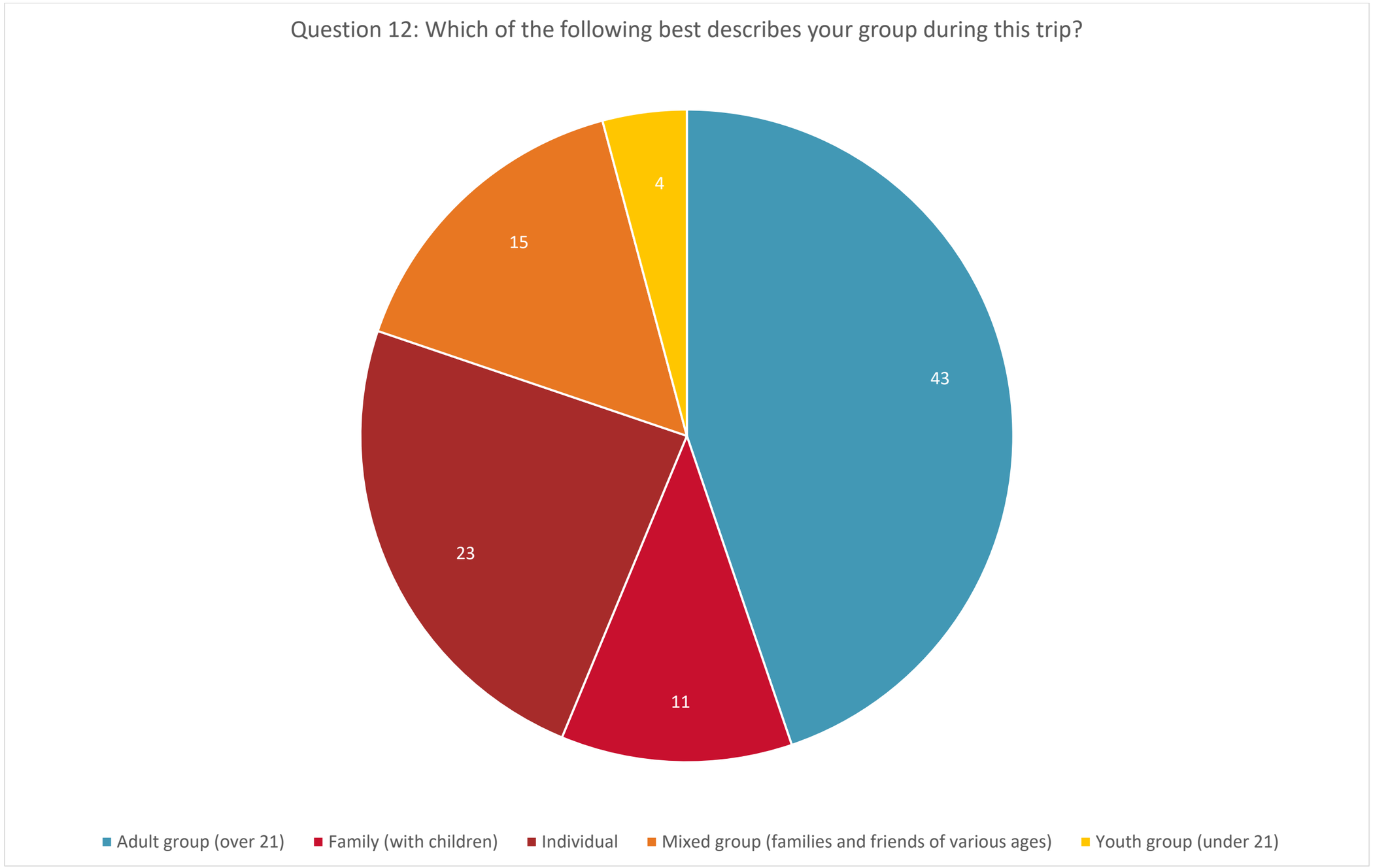

Question 6: Which of the following recreation areas at or near the Lowell Project did you utilize during the past 12 months?
Count
% of respondents
70
60
50
40
30
20
10
0
28
31.5
9
10.1
56
63
11
12.4
50
56
31
35
42
47
11
12.4
6
6.7
6
6.7
8
9
22
25
13
14.7
10
11.2
36
40
6
6.7
16
18
Rourke Brothers Boat Ramp
Chelmsford Boat Access
Lowell Heritage State Park
Merrill State Park
Pawtucket Falls Overlook
NPS Walkway Tours
Merrimack Trail System
Greeley Boat Ramp
Depot Street Boat Ramp
EL Field Powerhouse Visitor Center
Moore's Falls Conservation Area
Riverwalk Ramble
Waterpower Walk
Heritage Hike
Northern Canal Walkway
Redevelopment Rove
Boat access facilities

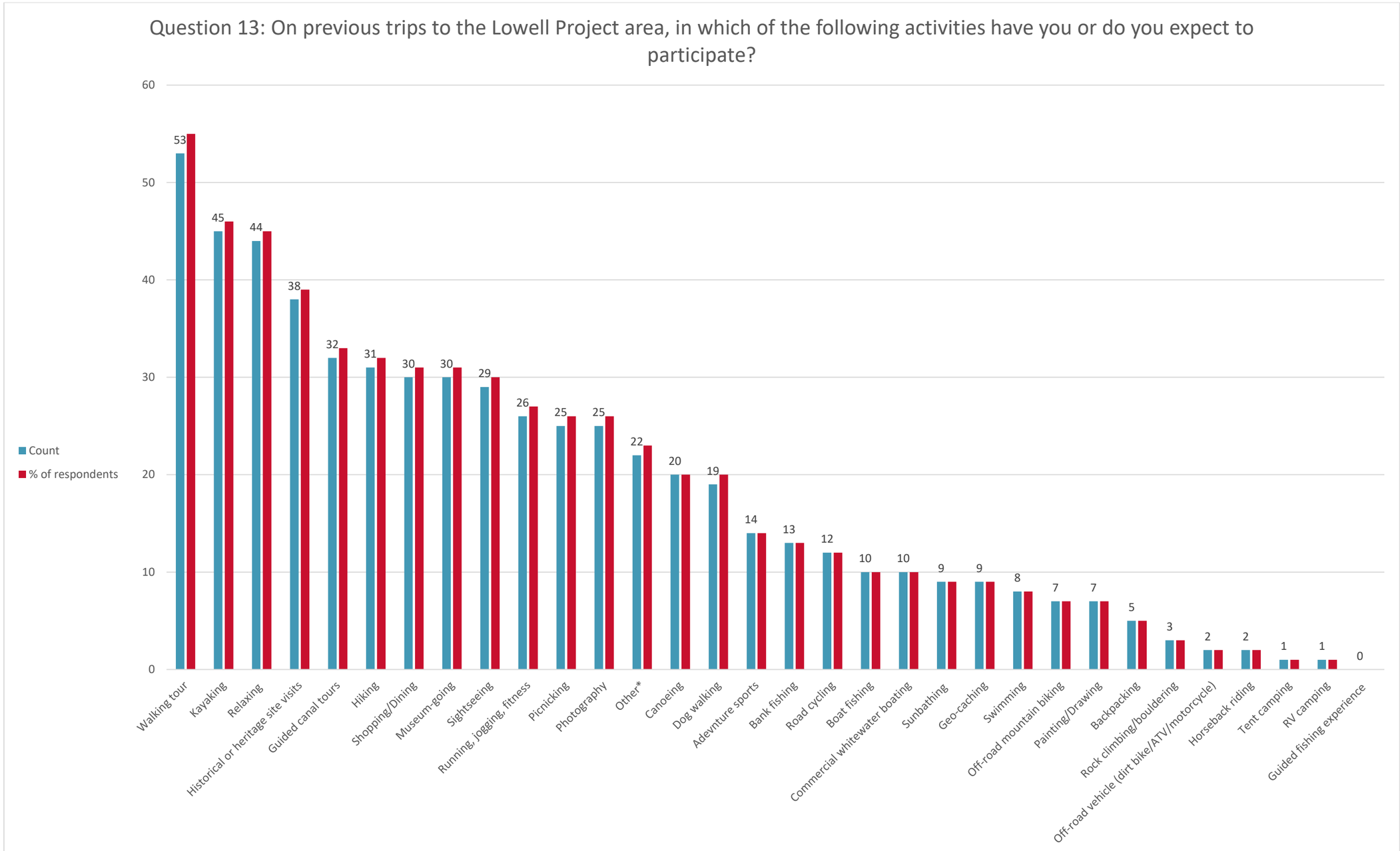

Question 7: On your last trip, about how many miles did you travel to get to the Lowell Project?
250
200
150
100
50
0
Miles
200
0
11.22434211
Minimum
Maximum
Mean


Question 8: During the past 12 months, when did you visit the Lowell Project? (Please select one)
6
20
63
Both weekdays AND weekends and/or holidays
Only on weekdays (Monday - Friday)
Only on weekends (Saturday or Sunday) and/or holidays

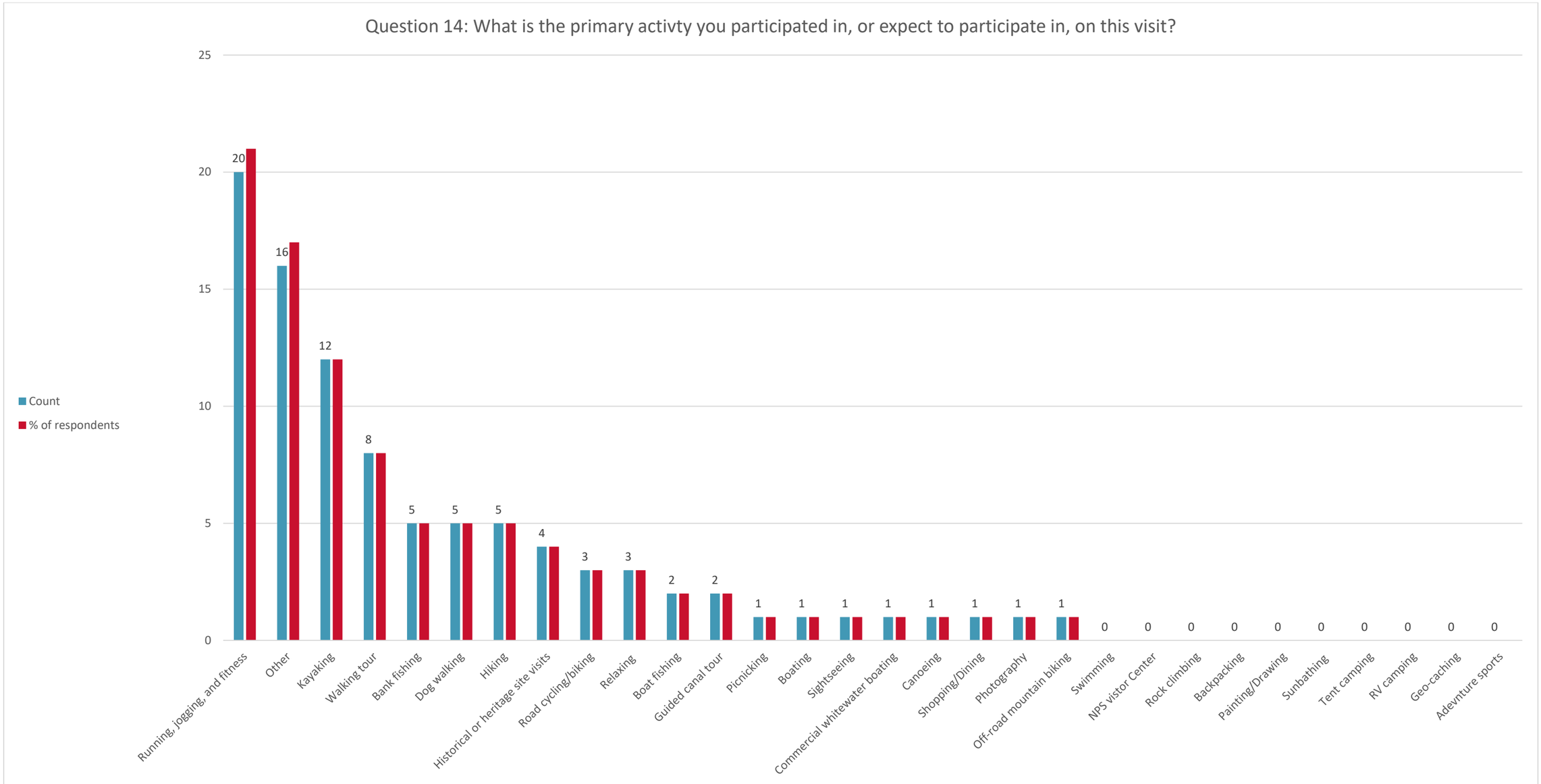

Question 9: Are you staying overnight in the Lowell Project area (not including your own home) on this trip?
9
84
Yes
No

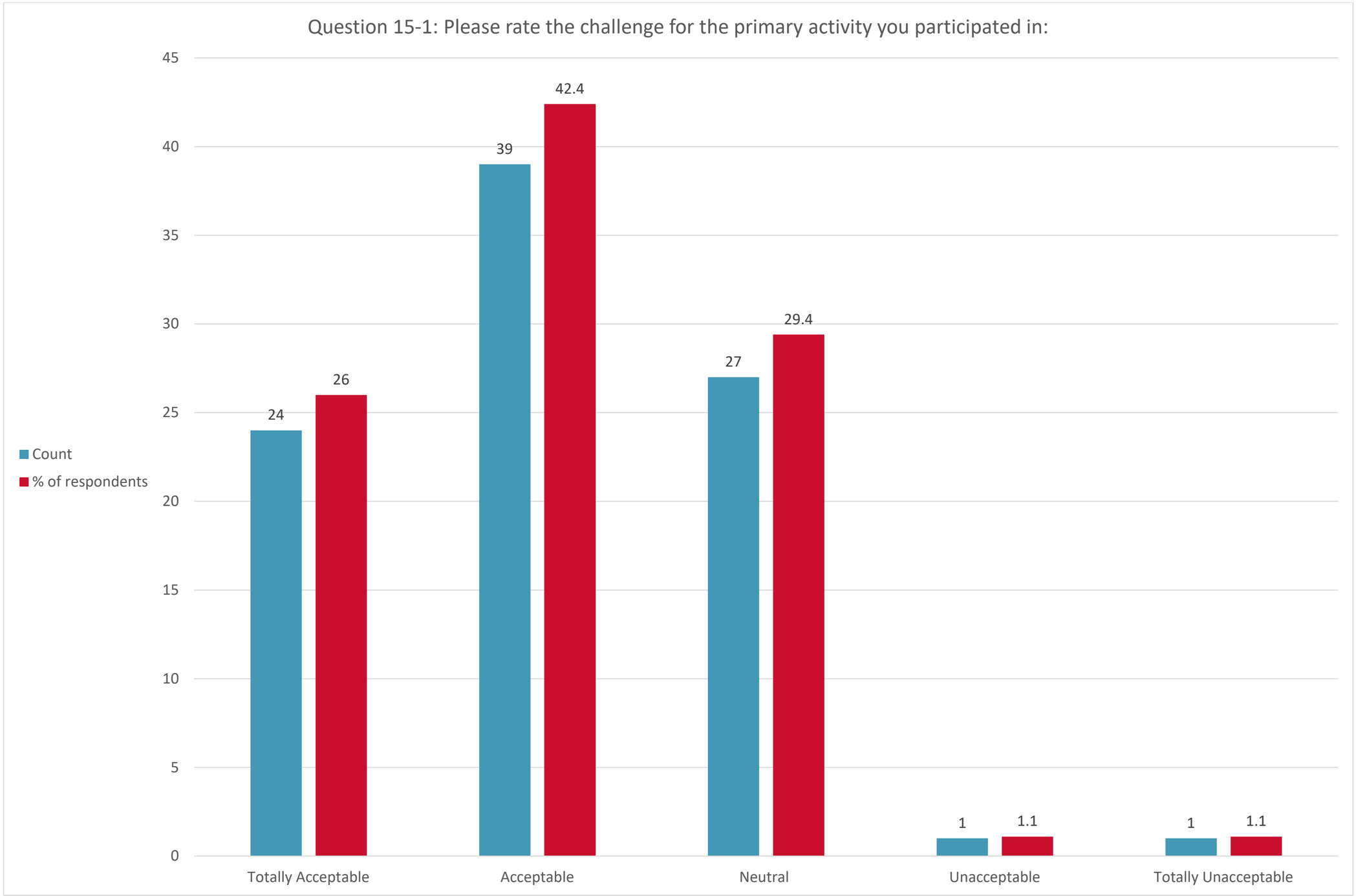

Question 11: What is the apporximate size of your group during your last trip to the Lowell Project area?
14
12
10
8
6
4
2
0
Group Size (number of people)
12
1
2.927083333
Minimum
Maximum
Mean

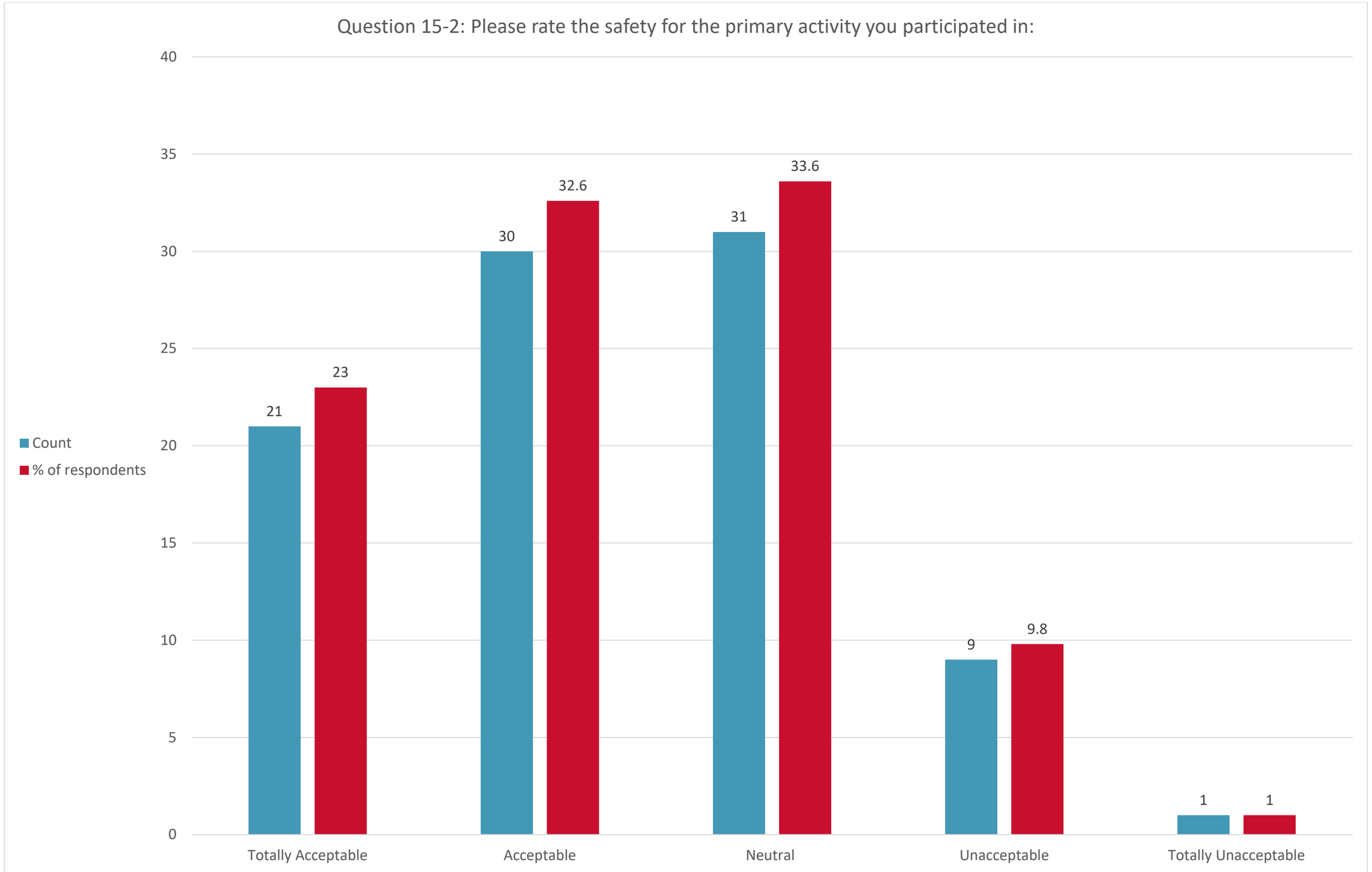

Question 12: Which of the following best describes your group during this trip?
43
11
23
15
4
Adult group (over 21)
Family (with children)
Individual
Mixed group (families and friends of various ages)
Youth group (under 21)

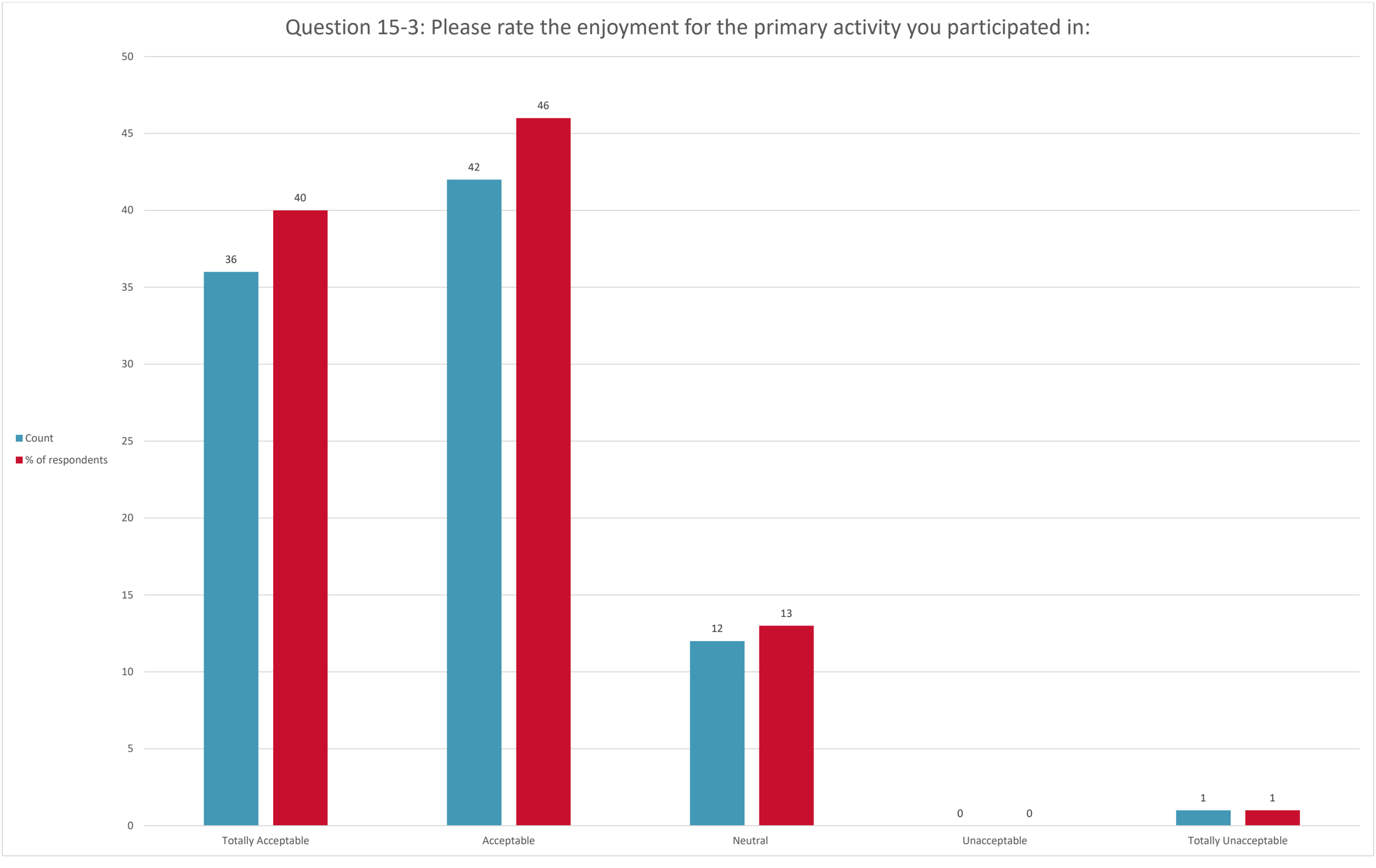


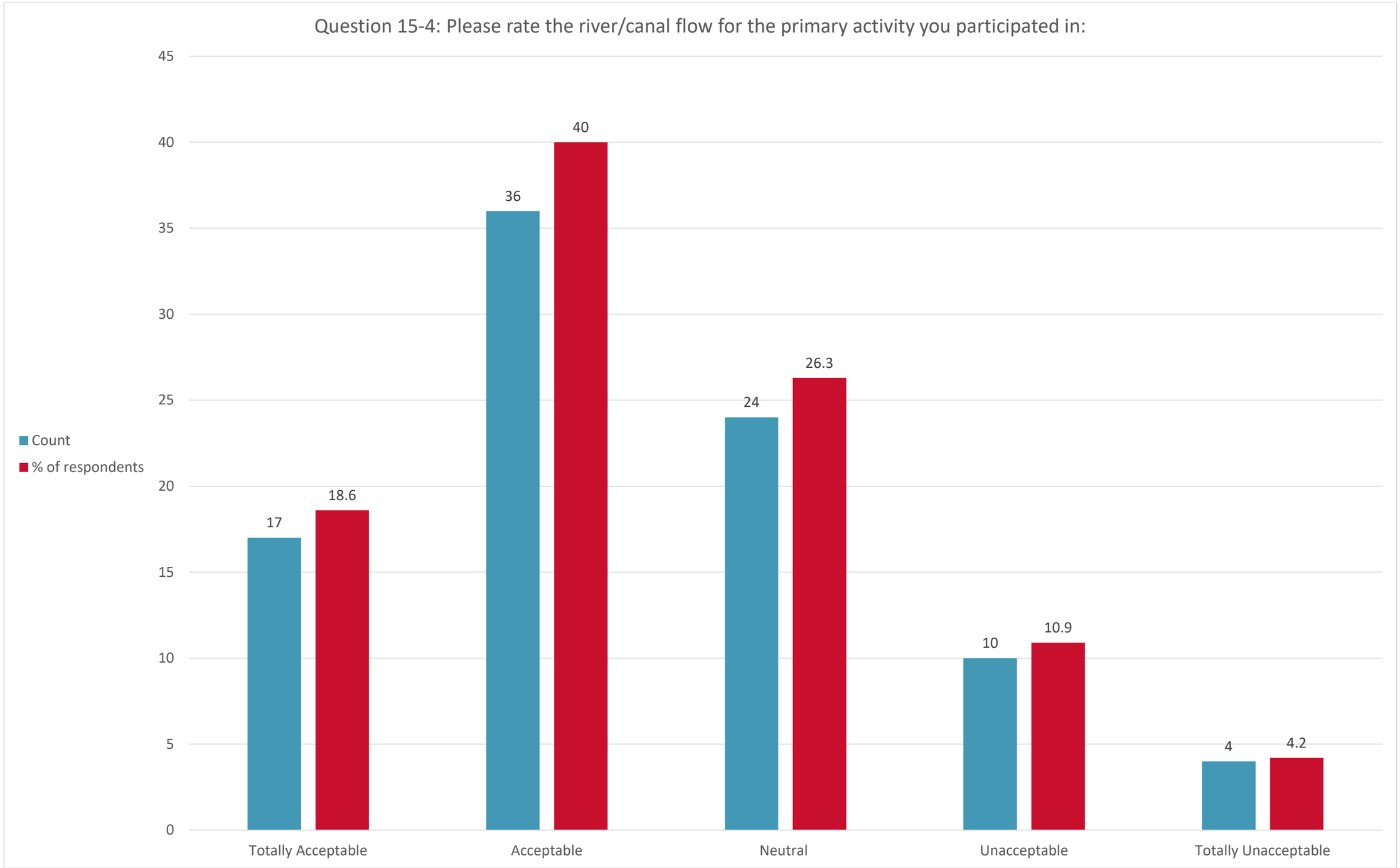
*Other responses included personal whitewater rafting or canoeing, hammocking, birding, attending festivals, and sport boating.

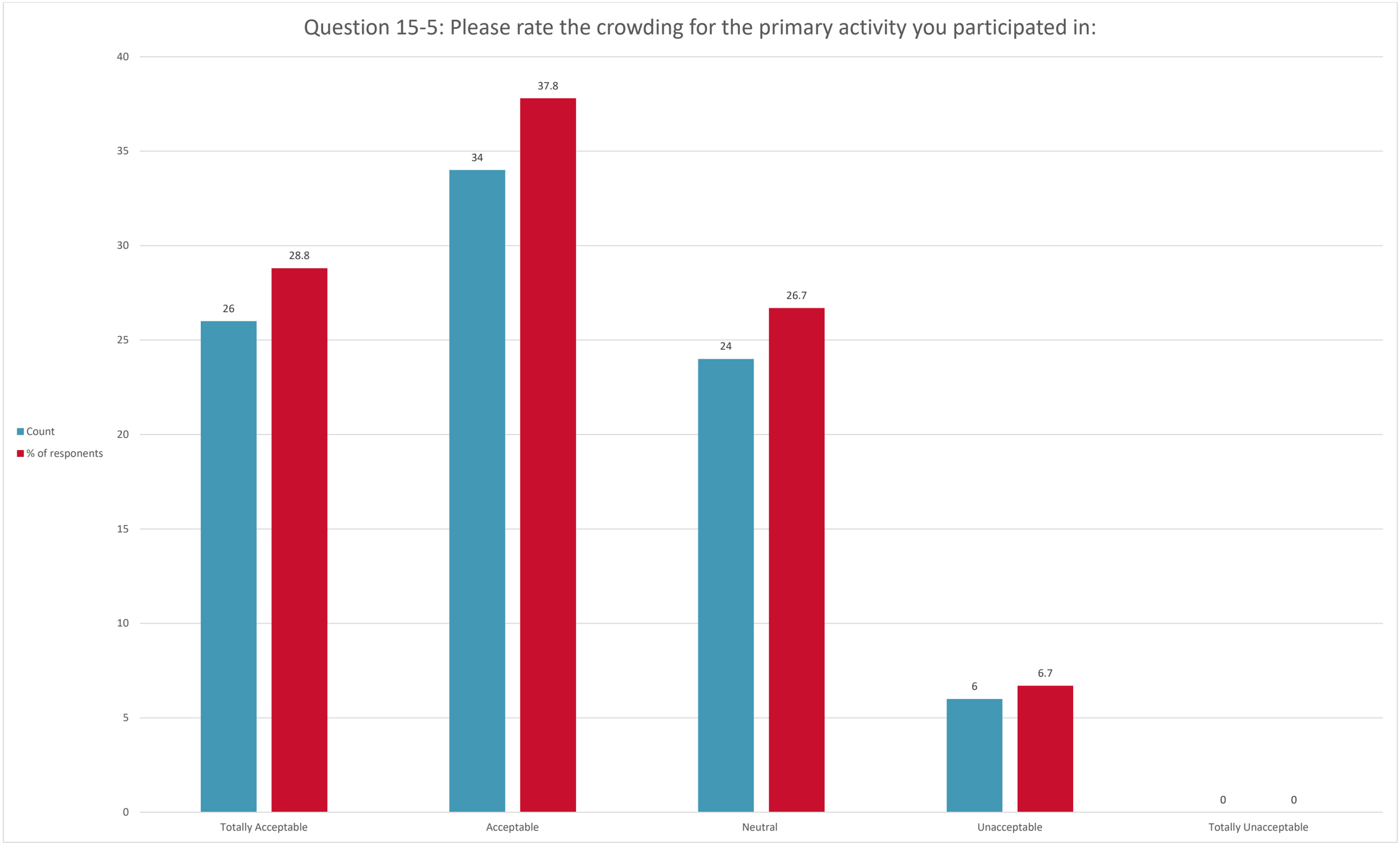

Question 14: What is the primary activty you participated in, or expect to participate in, on this visit?
Count
% of respondents
25
20
15
10
5
0
20
16
12
8
5
5
5
4
3
3
2
2
1
1
1
1
1
1
1
1
0
0
0
0
0
0
0
0
0
0
Running, jogging, and fitness
Other
Kayaking
Walking tour
Bank fishing
Dog walking
Hiking
Historical or heritage site visits
Road cycling/biking
Relaxing
Boat fishing
Guided canal tour
Picnicking
Boating
Sightseeing
Commercial whitewater boating
Canoeing
Shopping/Dining
Photography
Off-road mountain biking
Swimming
NPS vistor Center
Rock climbing
Backpacking
Painting/Drawing
Sunbathing
Tent camping
RV camping
Geo-caching
Adevnture sports

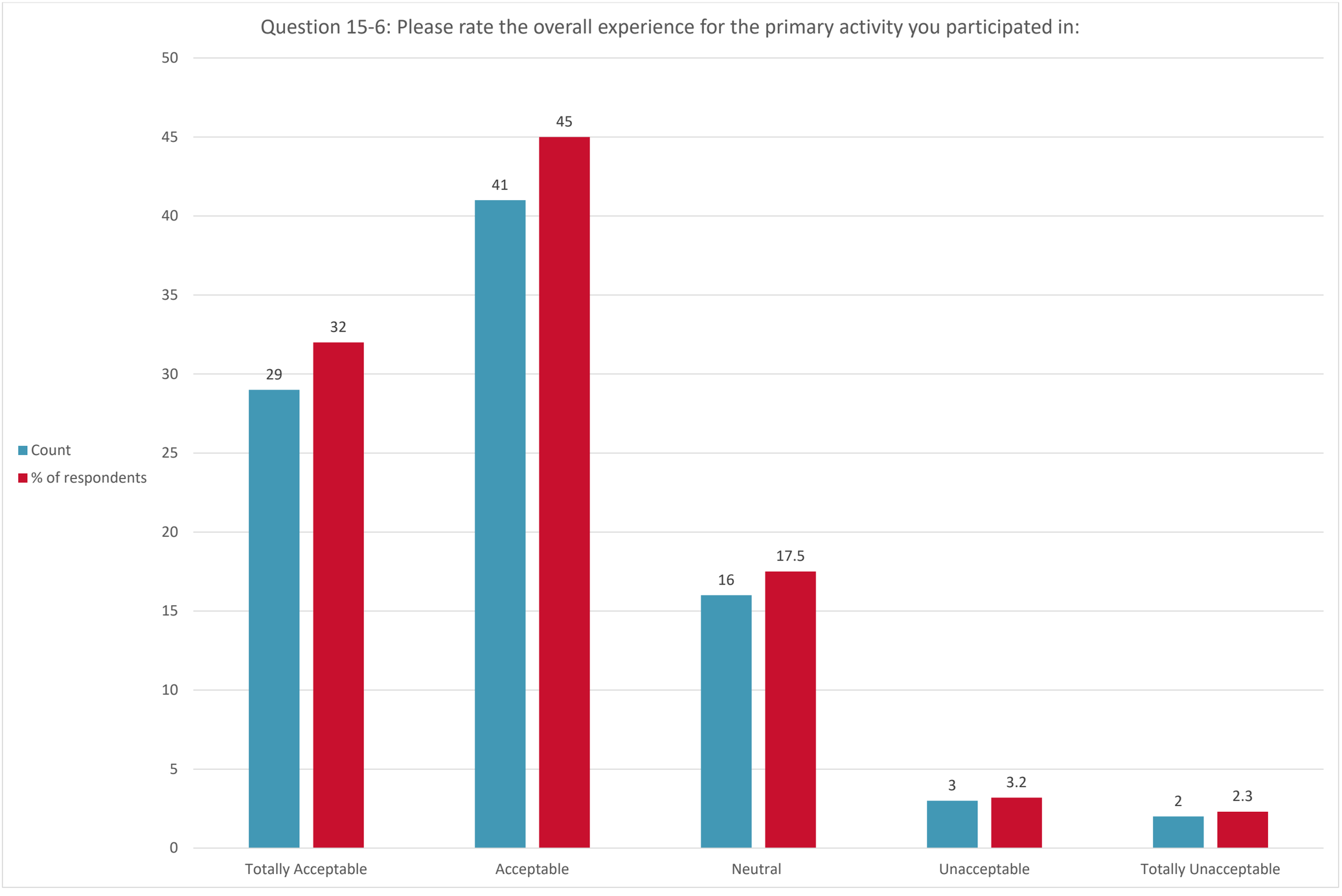

Question 15-1: Please rate the challenge for the primary activity you participated in:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
24
26
39
42.4
27
29.4
1
1.1
1
1.1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

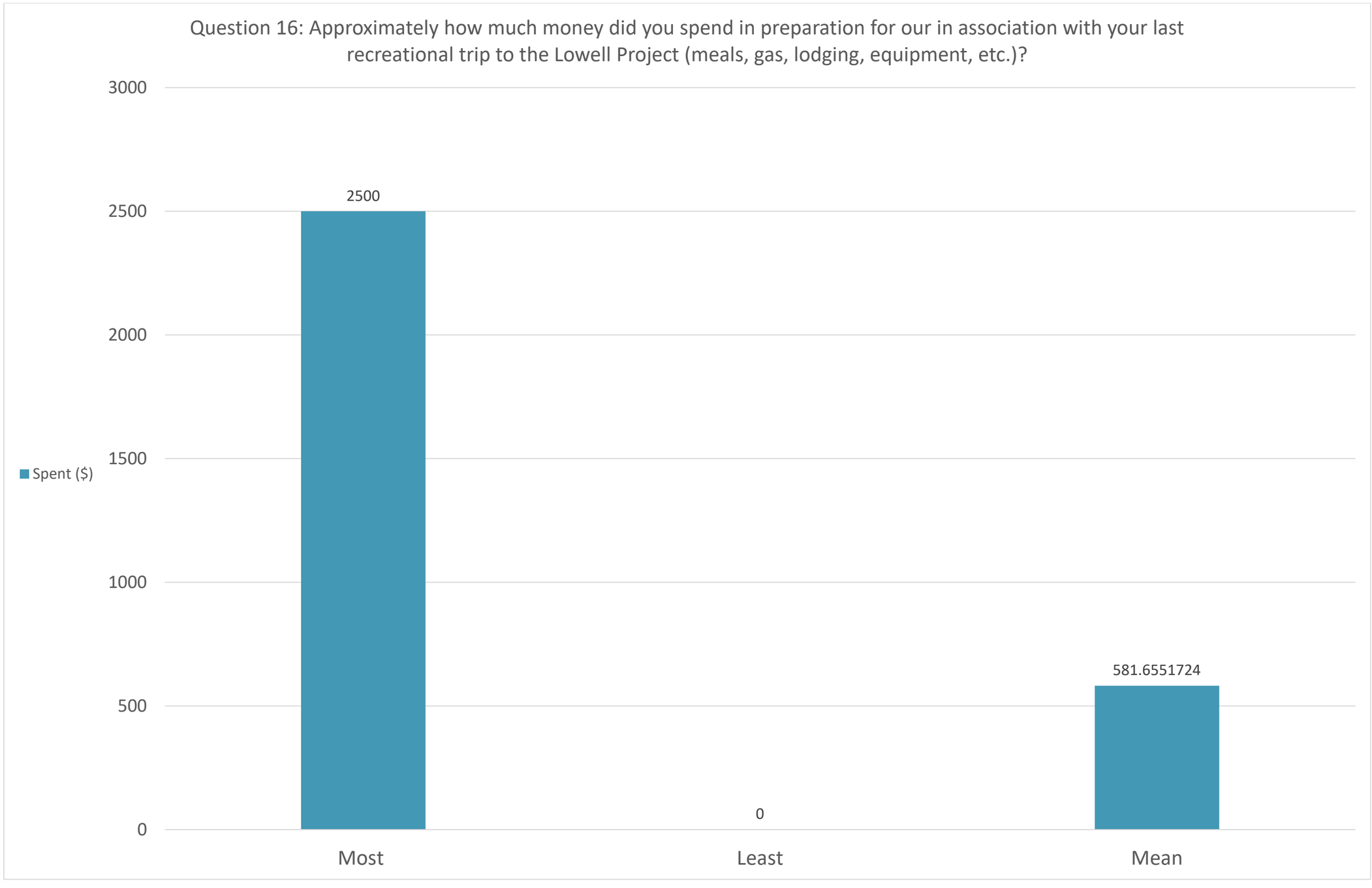

Question 15-2: Please rate the safety for the primary activity you participated in:
Count
% of respondents
40
35
30
25
20
15
10
5
0
21
23
30
32.6
31
33.6
9
9.8
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

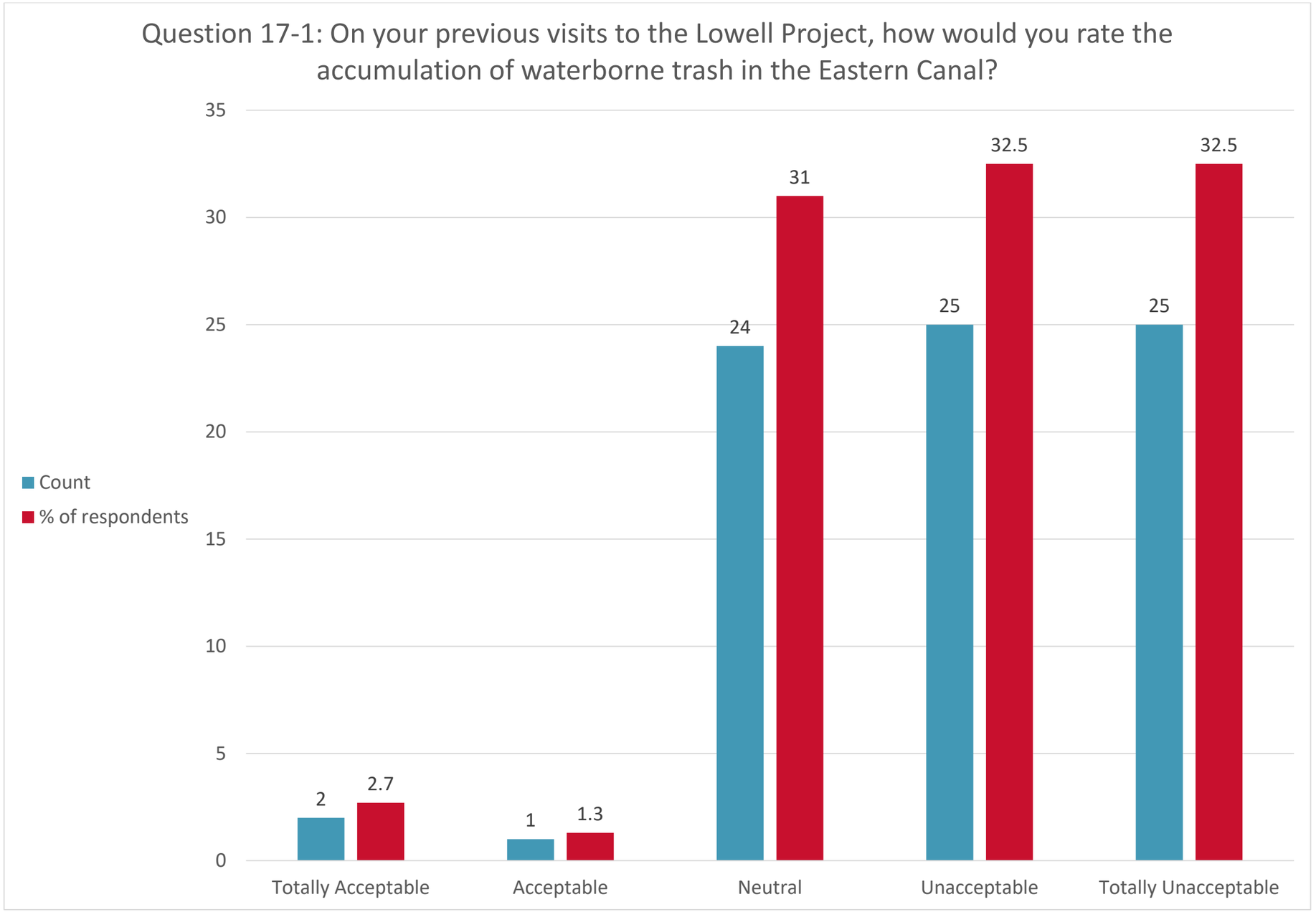

Question 15-3: Please rate the enjoyment for the primary activity you participated in:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
36
40
42
46
12
13
0
0
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

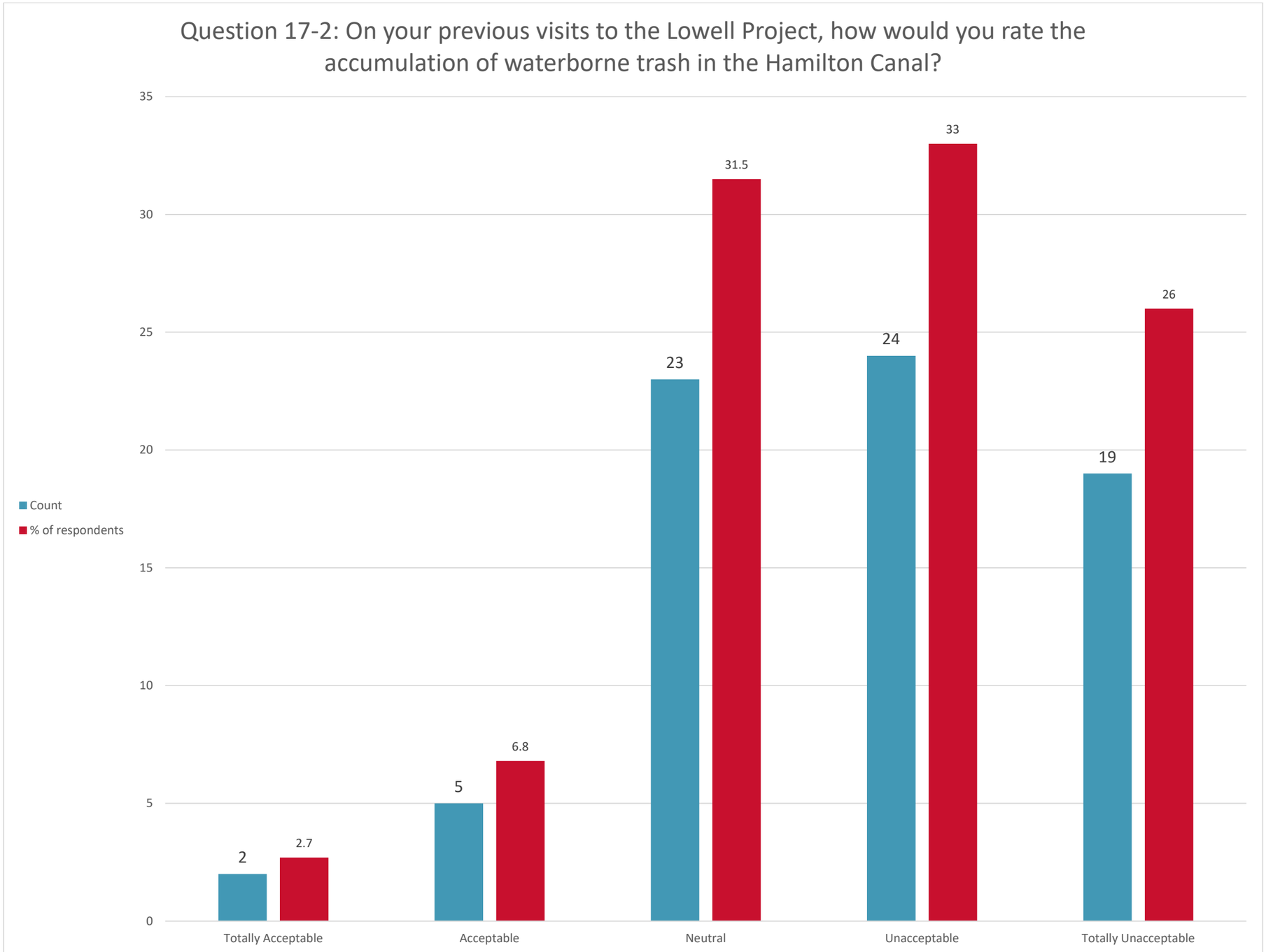

Question 15-4: Please rate the river/canal flow for the primary activity you participated in:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
17
18.6
36
40
24
26.3
10
10.9
4
4.2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

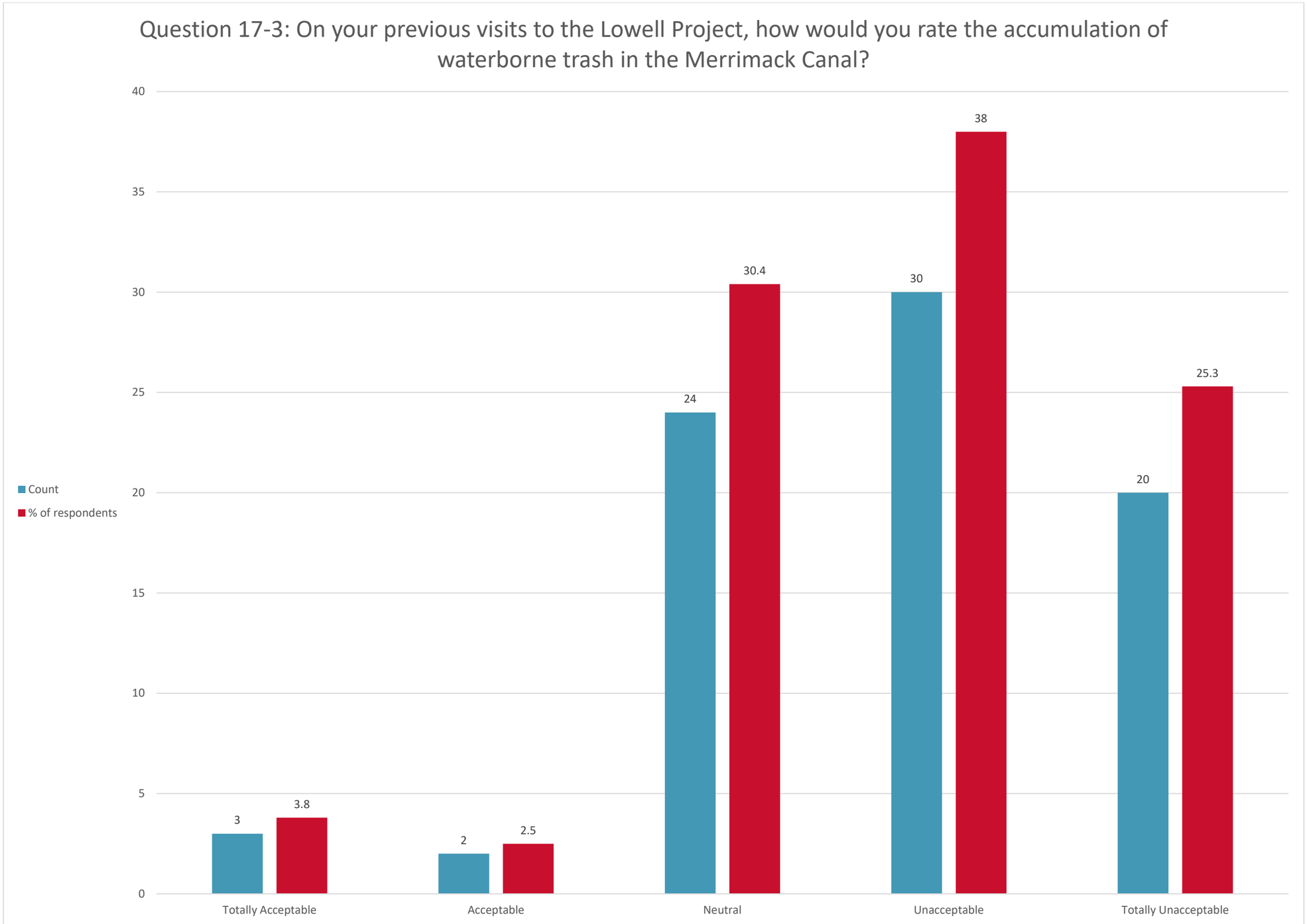

Question 15-5: Please rate the crowding for the primary activity you participated in:
40
35
30
25
20
15
10
5
0
Count
% of responents
26
28.8
34
37.8
24
26.7
6
6.7
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

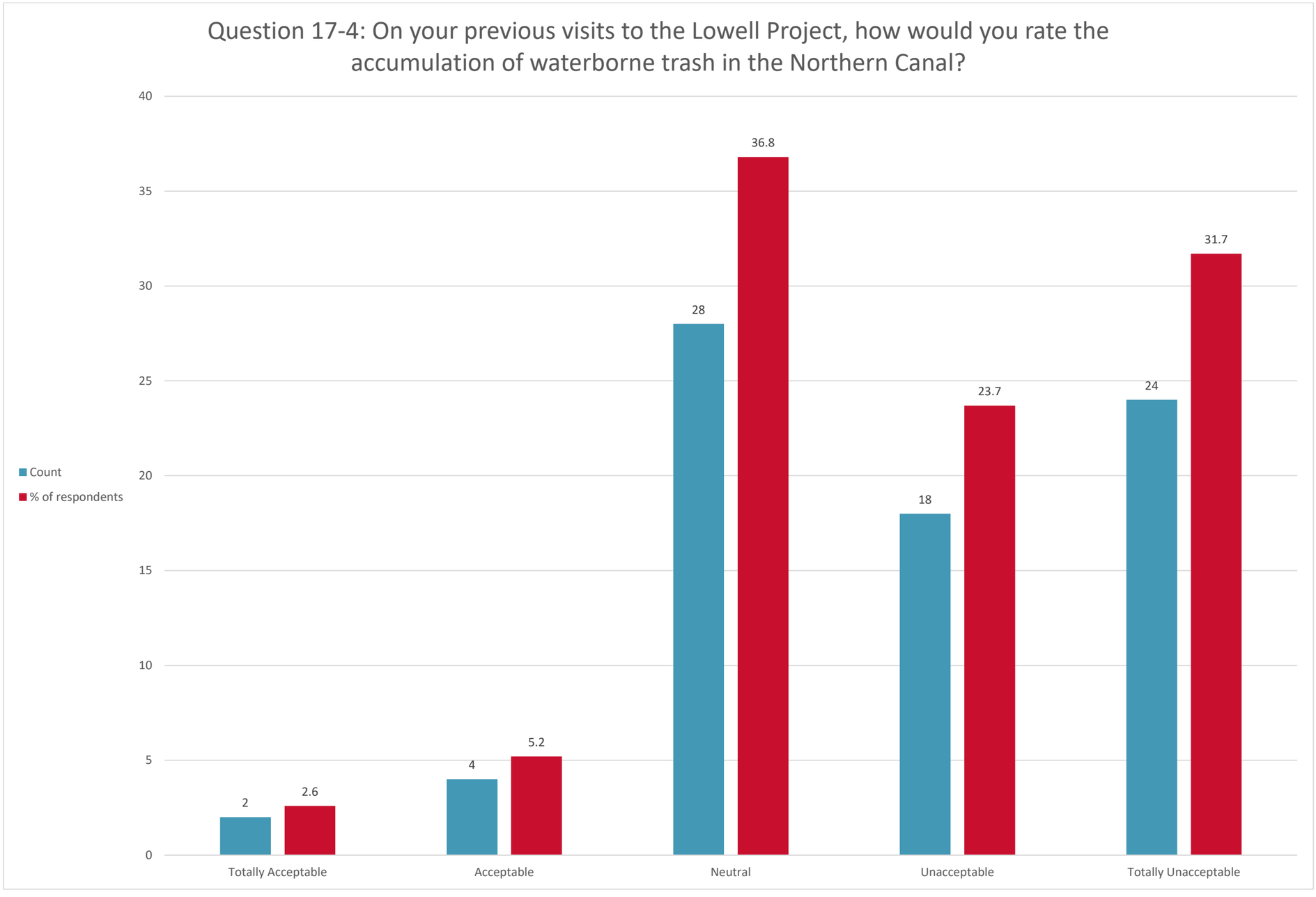

Question 15-6: Please rate the overall experience for the primary activity you participated in:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
29
32
41
45
16
17.5
3
3.2
2
2.3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

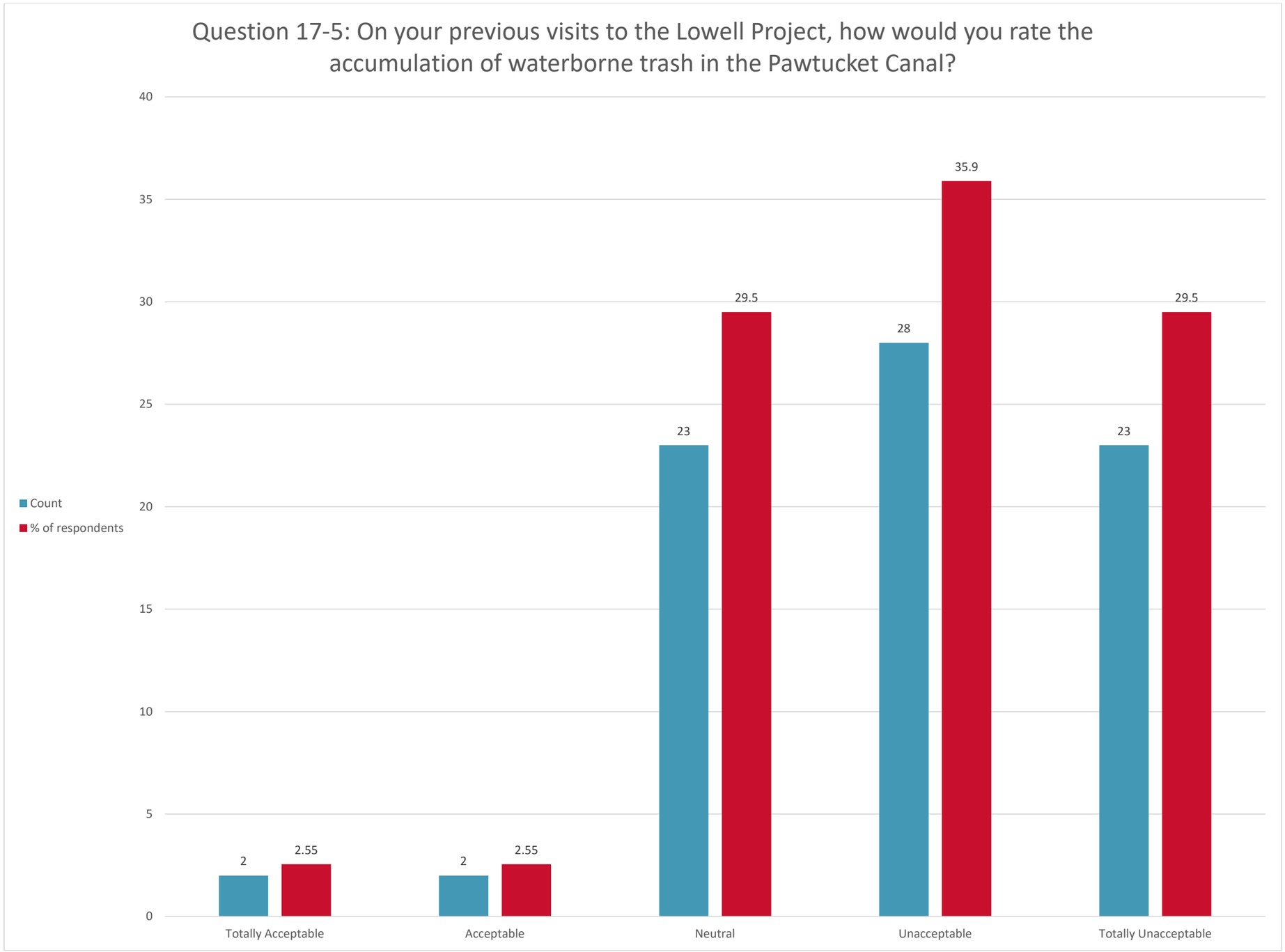

Question 16: Approximately how much money did you spend in preparation for our in association with your last recreational trip to the Lowell Project (meals, gas, lodging, equipment, etc.)?
3000
2500
2000
1500
1000
500
0
Spent ($)
2500
0
581.6551724
Most
Least
Mean

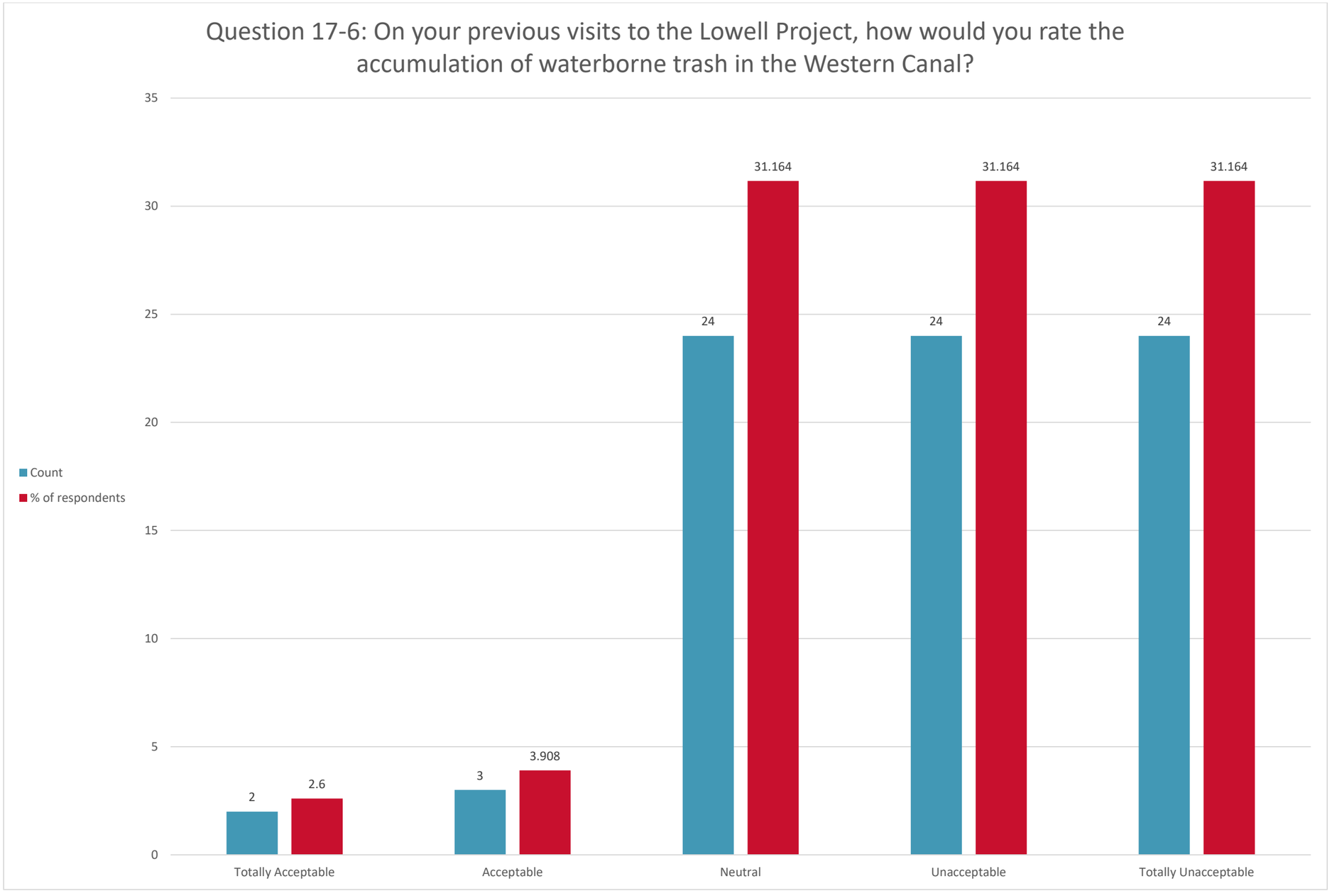

Question 17-1: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Eastern Canal?
35
30
25
20
15
10
5
0
Count
% of respondents
2
2.7
1
1.3
24
31
25
32.5
25
32.5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

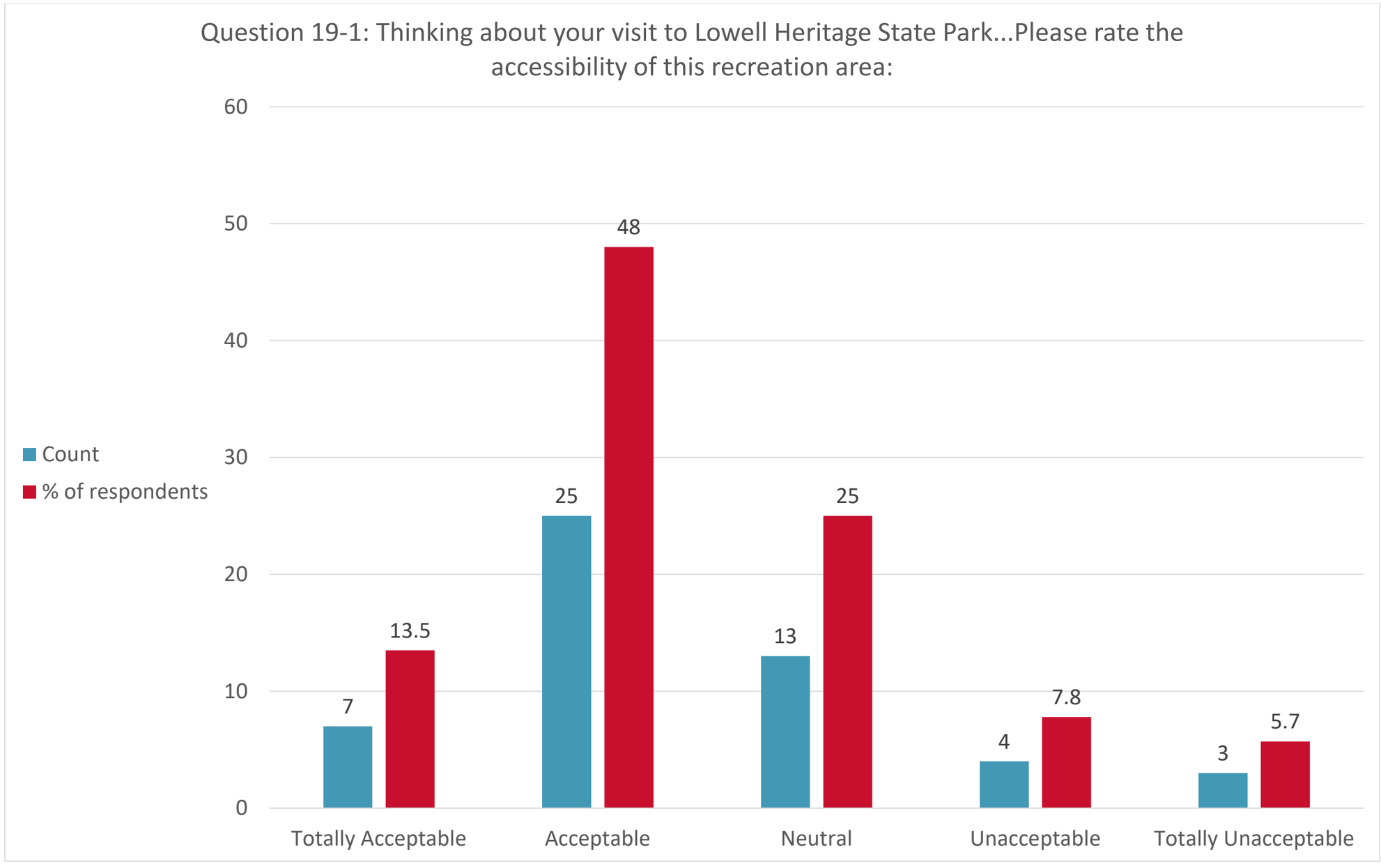

Question 17-2: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Hamilton Canal?
35
30
25
20
15
10
5
0
Count
% of respondents
2
2.7
5
6.8
23
31.5
24
33
19
26
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

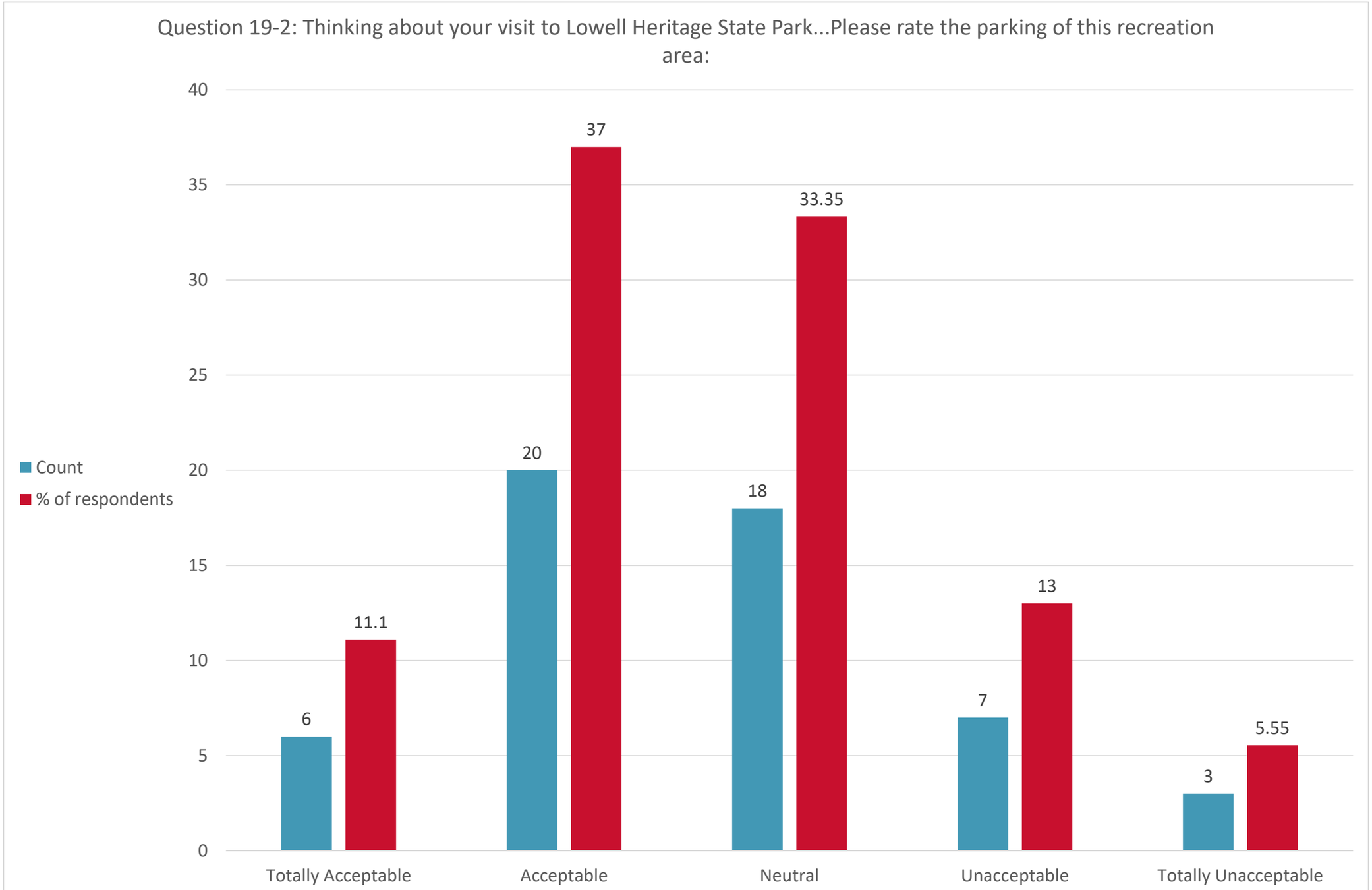

Question 17-3: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Merrimack Canal?
Count
% of respondents
40
35
30
25
20
15
10
5
0
3
3.8
2
2.5
24
30.4
30
38
20
25.3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

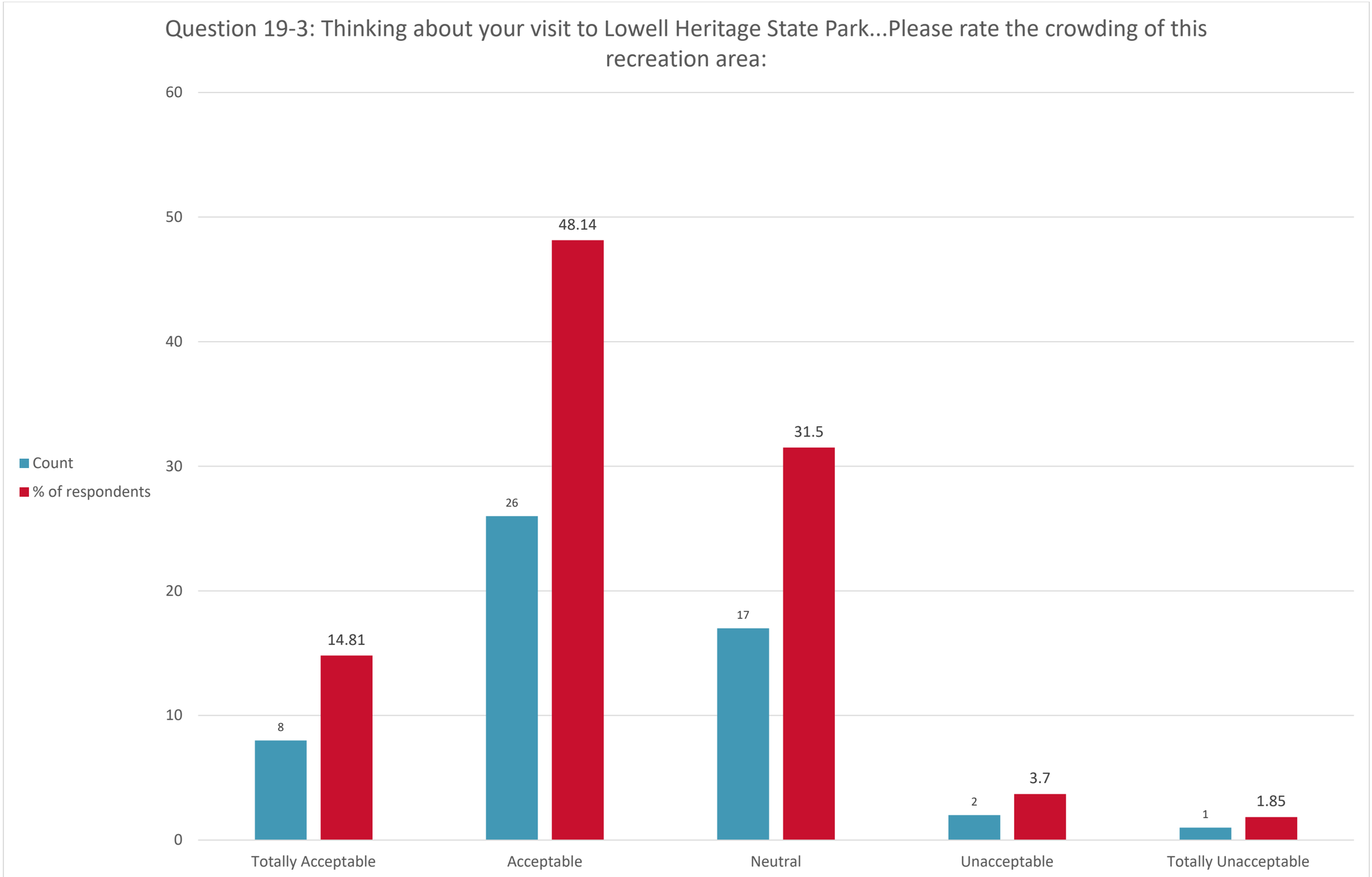

Question 17-4: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Northern Canal?
Count
% of respondents
40
35
30
25
20
15
10
5
0
2
2.6
4
5.2
28
36.8
18
23.7
24
31.7
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

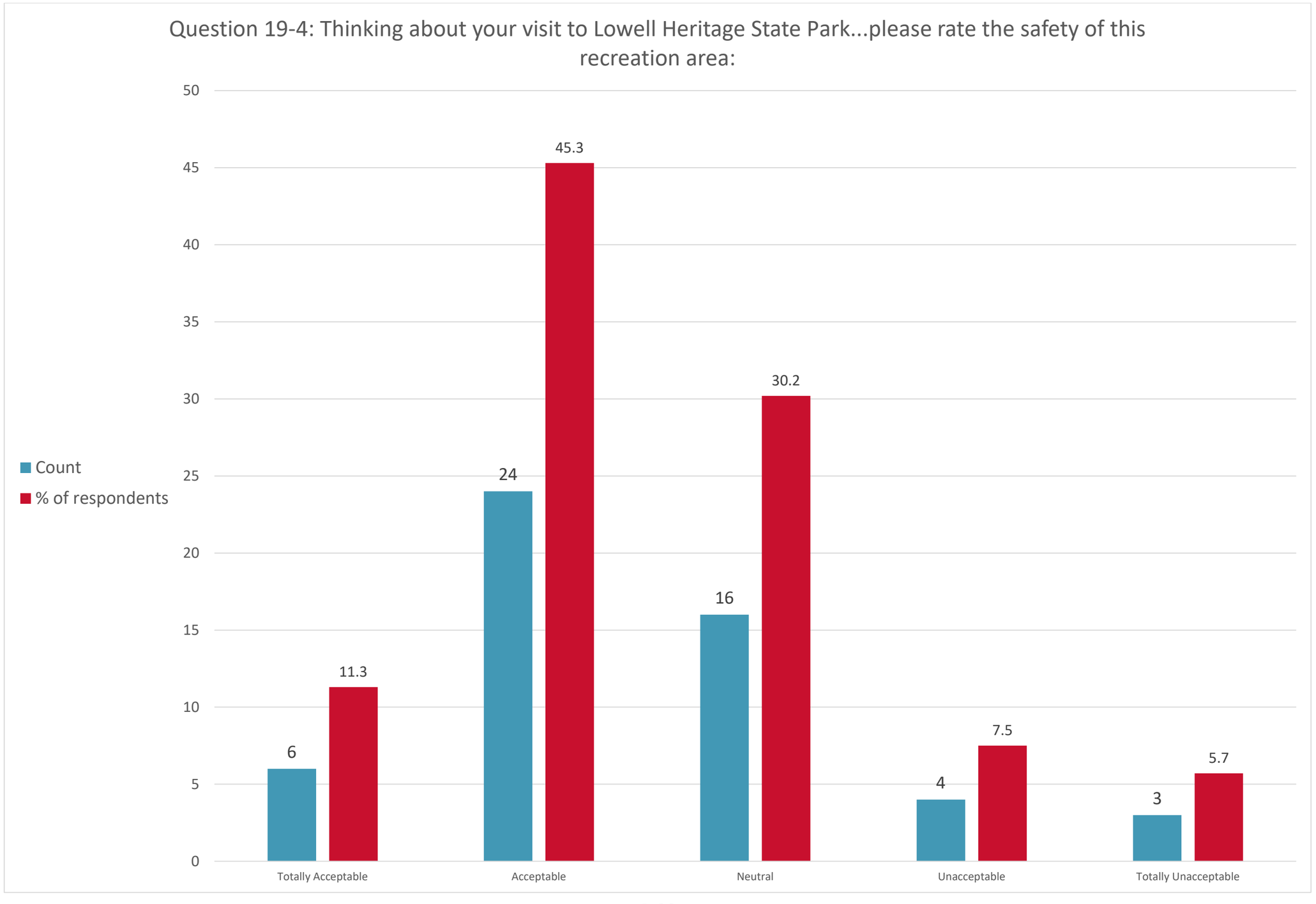

Question 17-5: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Pawtucket Canal?
Count
% of respondents
40
35
30
25
20
15
10
5
0
2
2.55
2
2.55
23
29.5
28
35.9
23
29.5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

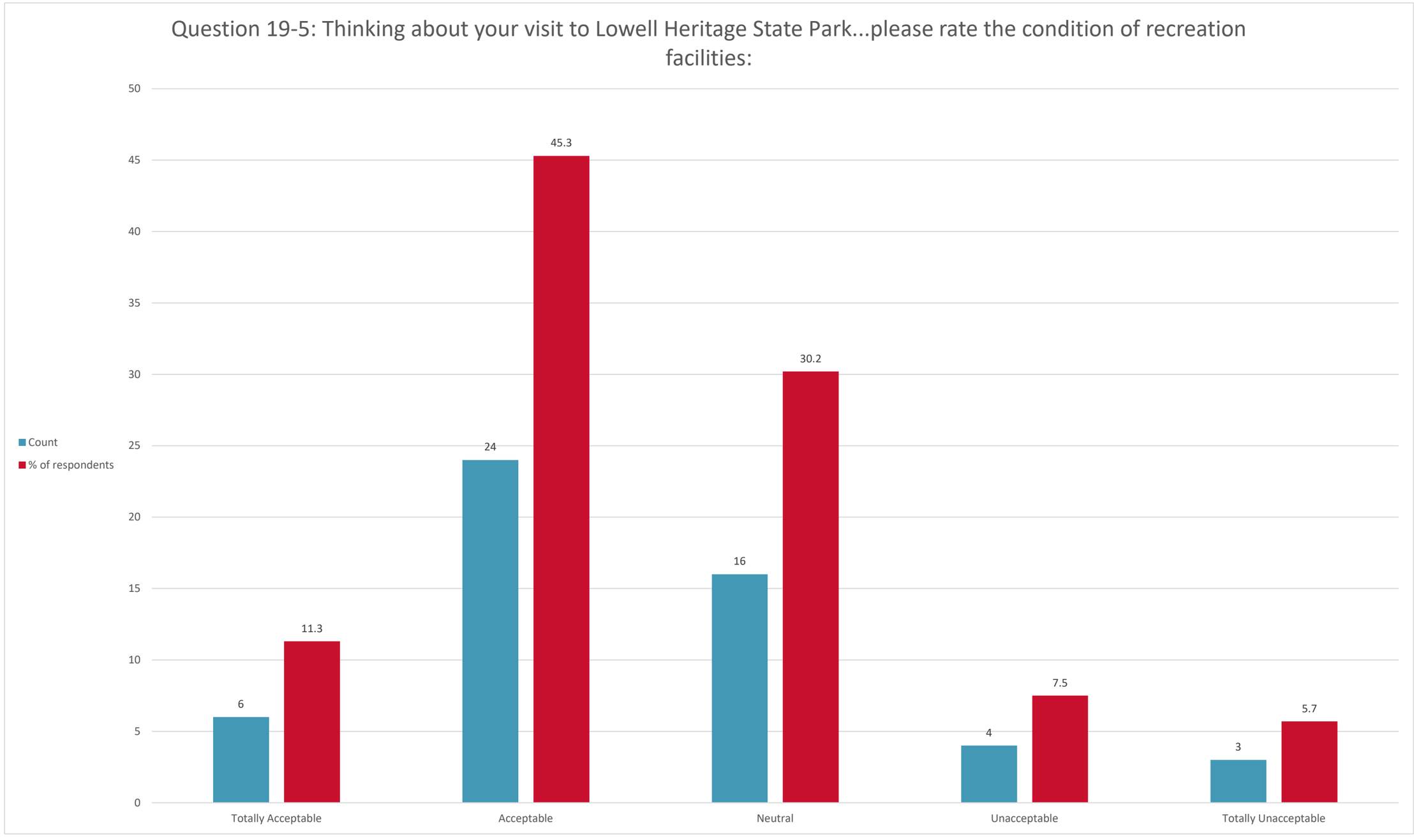

Question 17-6: On your previous visits to the Lowell Project, how would you rate the accumulation of waterborne trash in the Western Canal?
35
30
25
20
15
10
5
0
Count
% of respondents
2
2.6
3
3.908
24
31.164
24
31.164
24
31.164
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

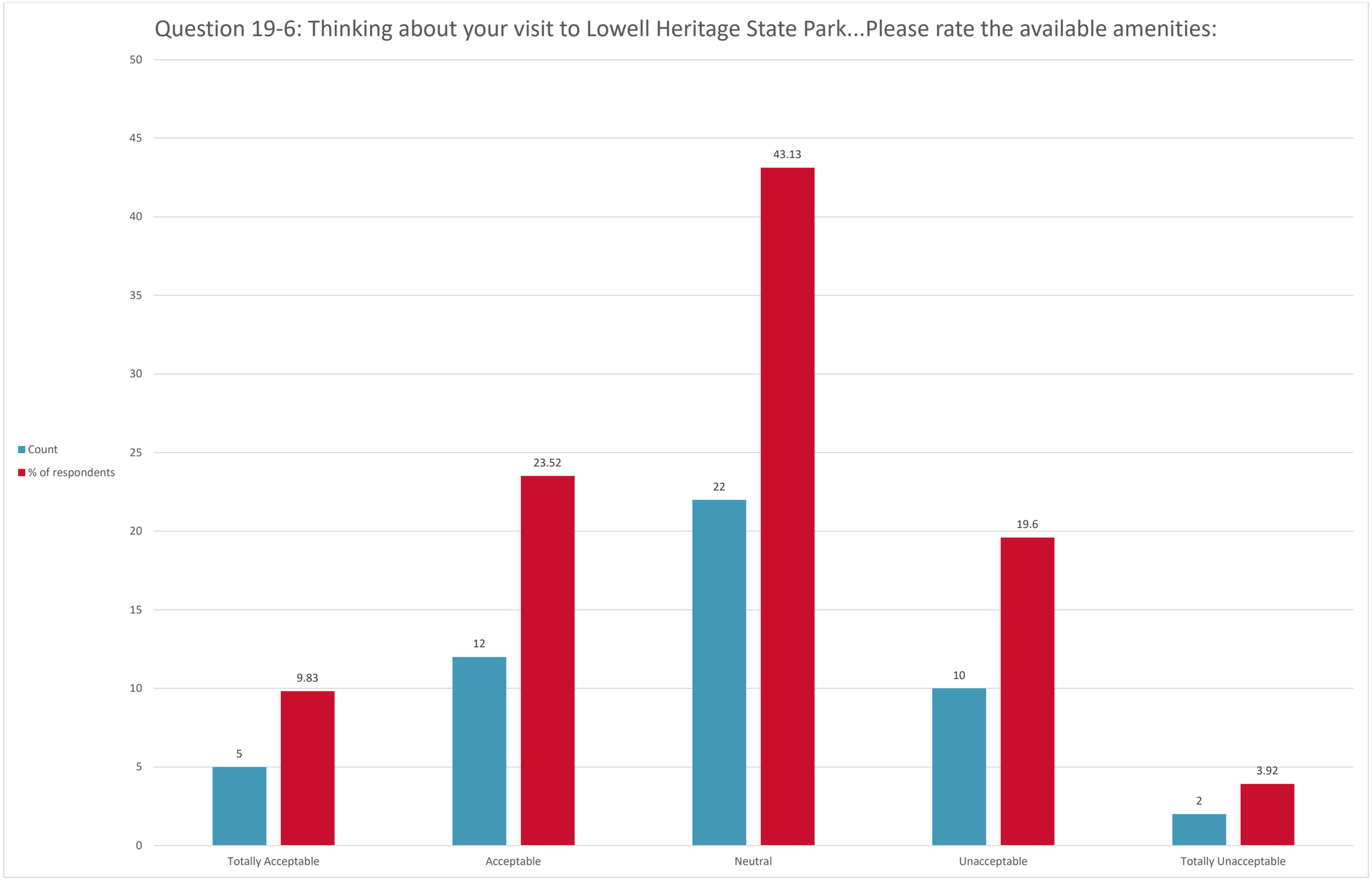

Question 19-1: Thinking about your visit to Lowell Heritage State Park...Please rate the accessibility of this recreation area:
60
50
40
30
20
10
0
Count
% of respondents
7
13.5
25
48
13
25
4
7.8
3
5.7
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

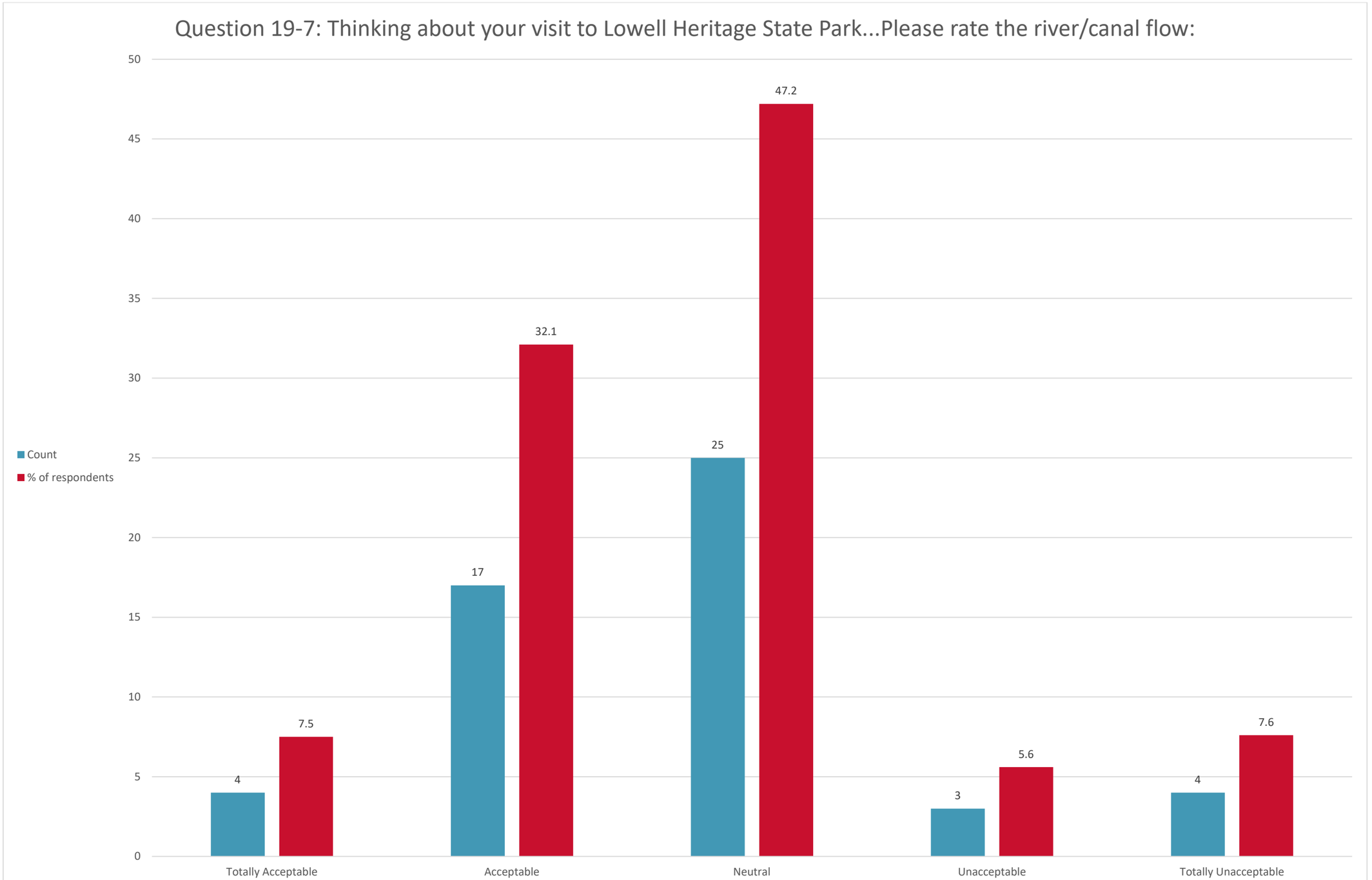

Question 19-2: Thinking about your visit to Lowell Heritage State Park...Please rate the parking of this recreation area:
Count
% of respondents
40
35
30
25
20
15
10
5
0
6
11.1
20
37
18
33.35
7
13
3
5.55
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

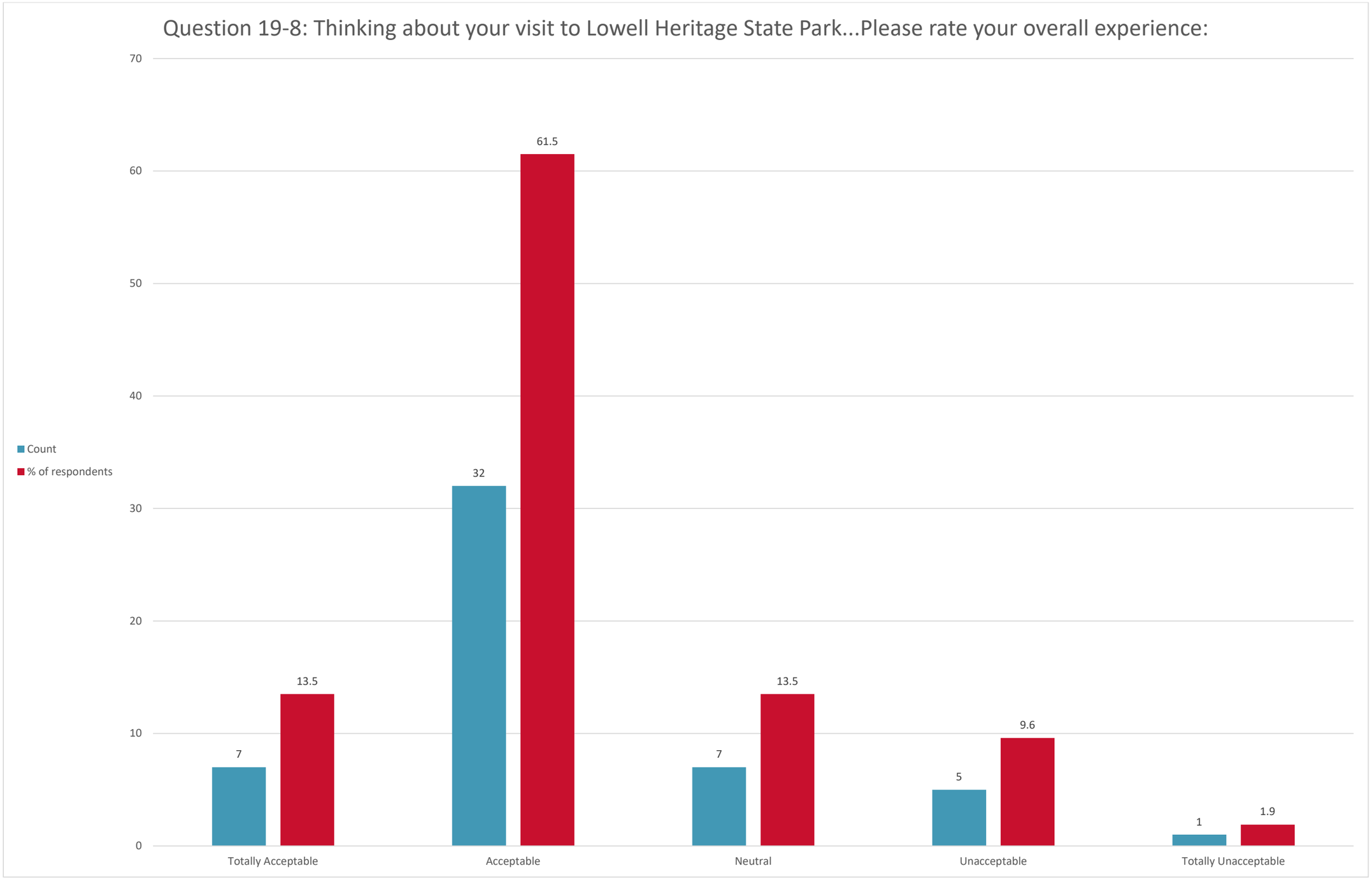

Question 19-3: Thinking about your visit to Lowell Heritage State Park...Please rate the crowding of this recreation area:
Count
% of respondents
60
50
40
30
20
10
0
8
14.81
26
48.14
17
31.5
2
3.7
1
1.85
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

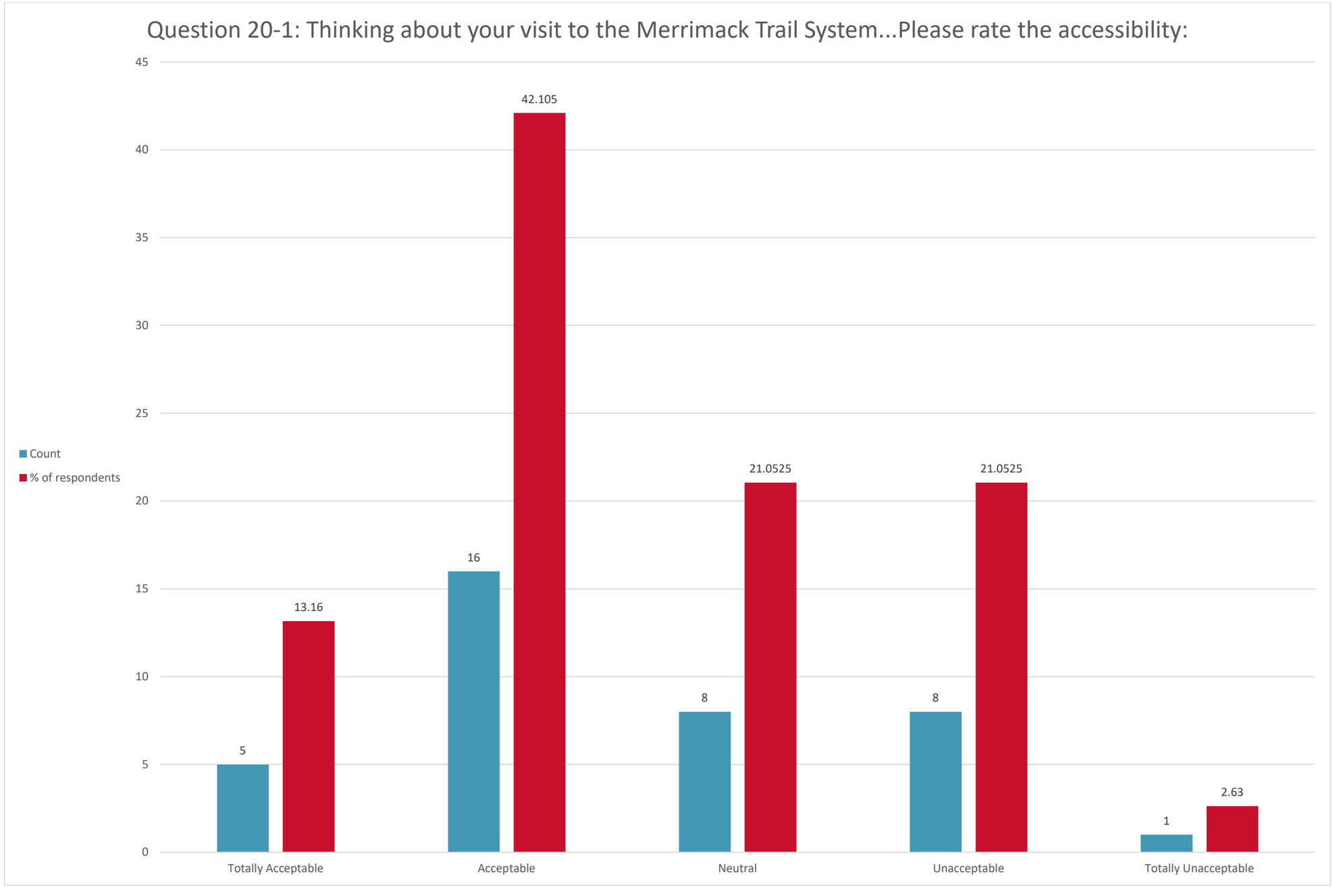

Question 19-4: Thinking about your visit to Lowell Heritage State Park...please rate the safety of this recreation area:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
45.3
30.2
24
16
11.3
6
7.5
4
5.7
3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

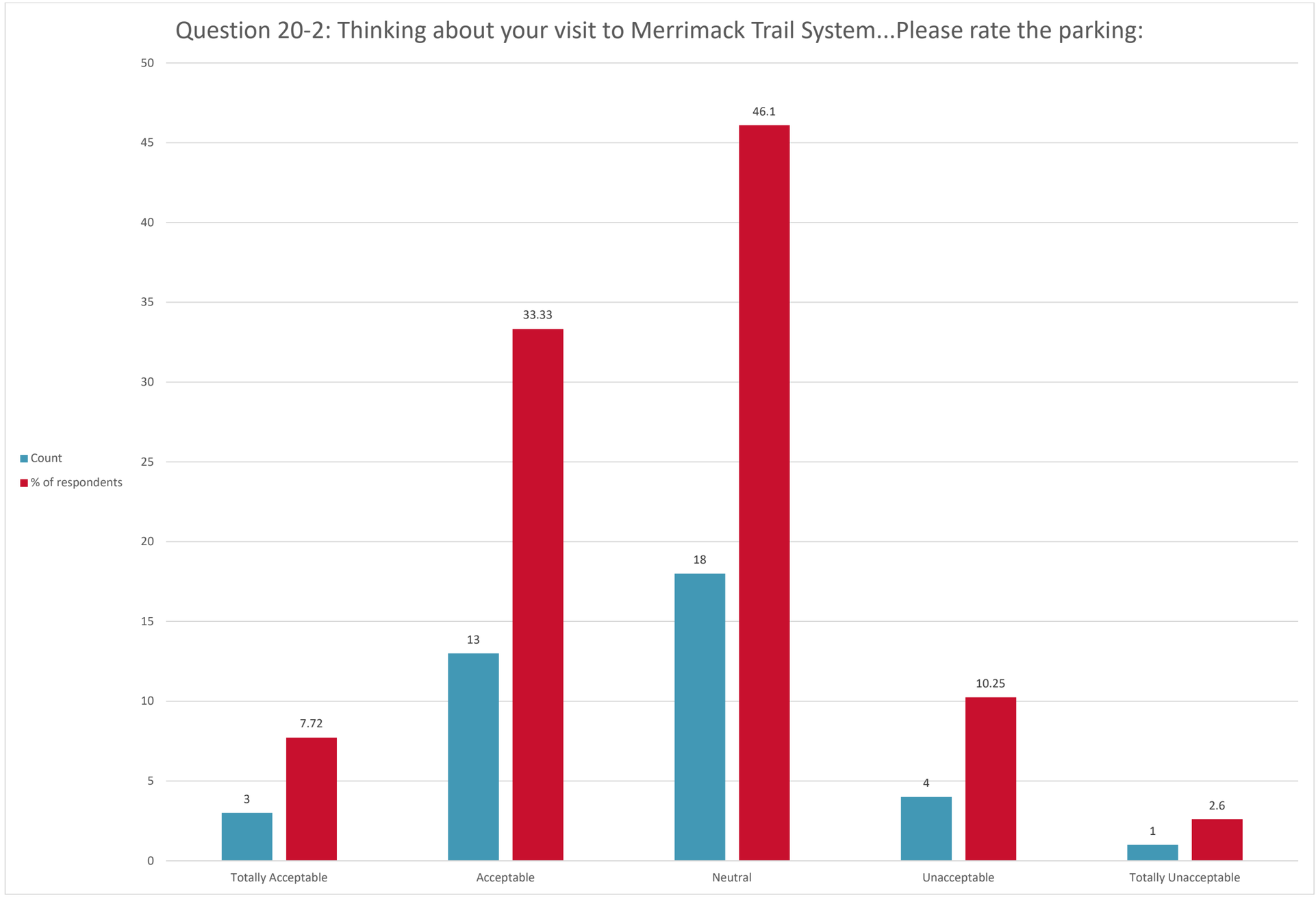

Question 19-5: Thinking about your visit to Lowell Heritage State Park...please rate the condition of recreation facilities:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
6
11.3
24
45.3
16
30.2
4
7.5
3
5.7
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

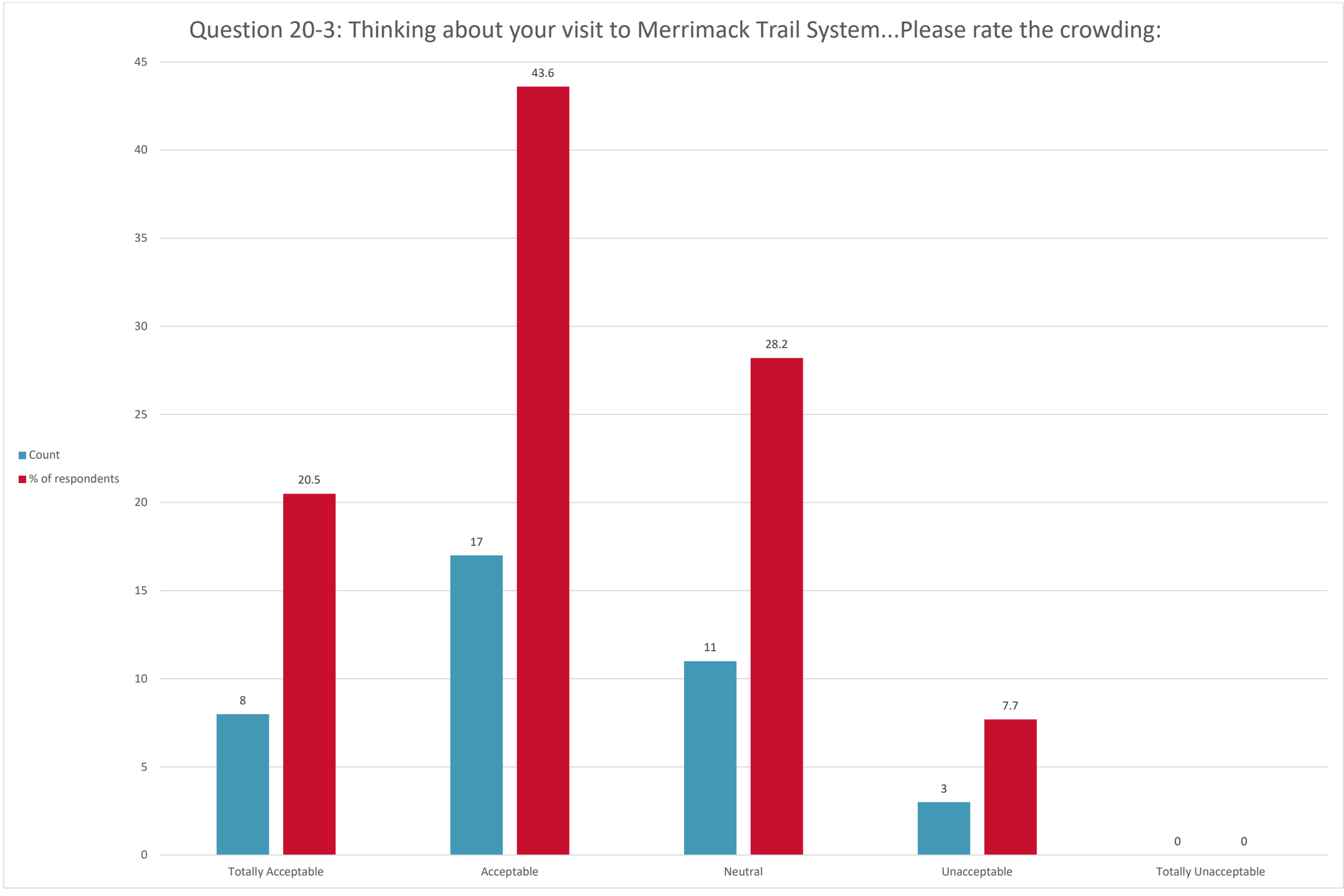

Question 19-6: Thinking about your visit to Lowell Heritage State Park...Please rate the available amenities:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
5
9.83
12
23.52
22
43.13
10
19.6
2
3.92
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

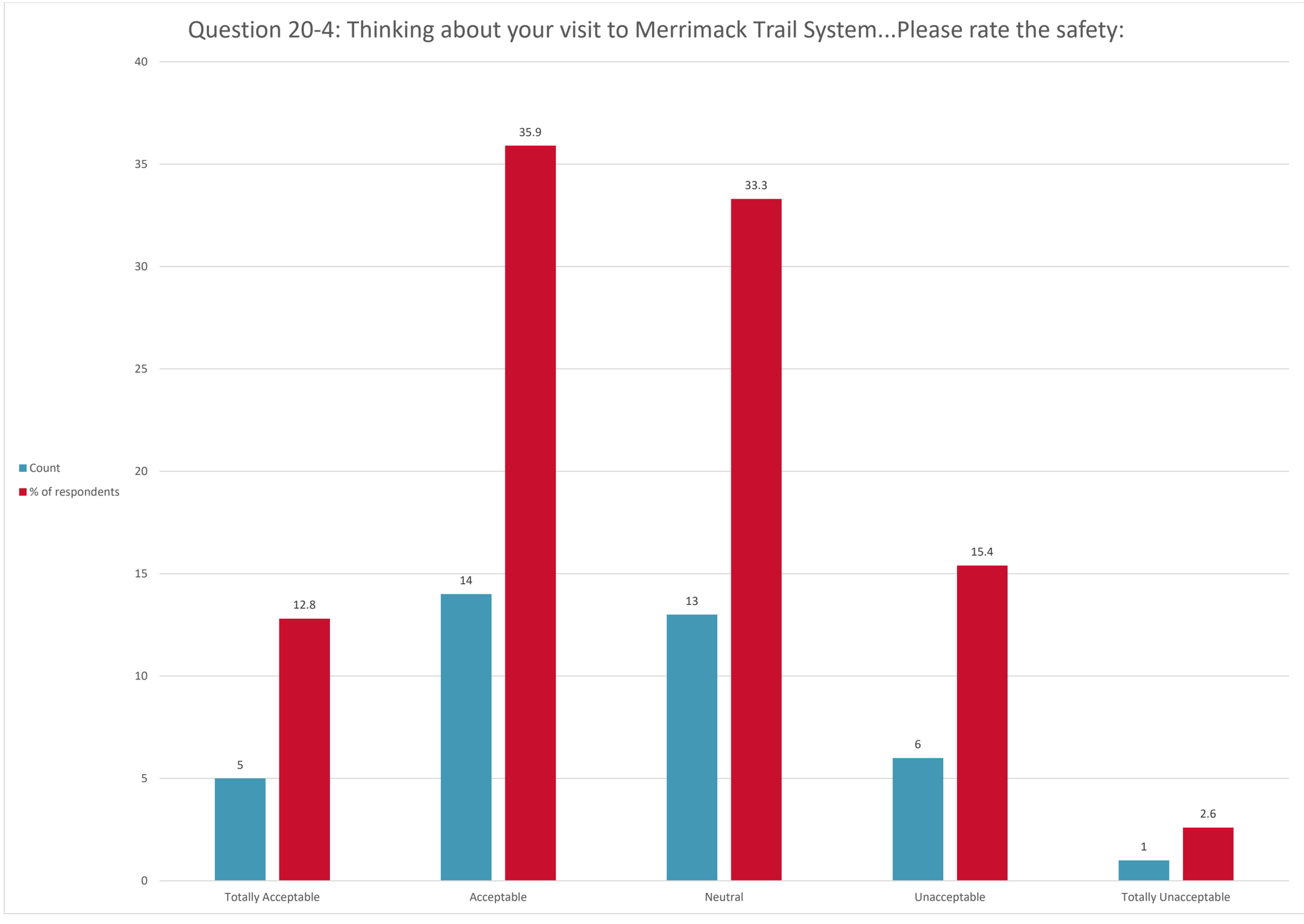

Question 19-7: Thinking about your visit to Lowell Heritage State Park...Please rate the river/canal flow:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
4
7.5
17
32.1
25
47.2
3
5.6
4
7.6
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

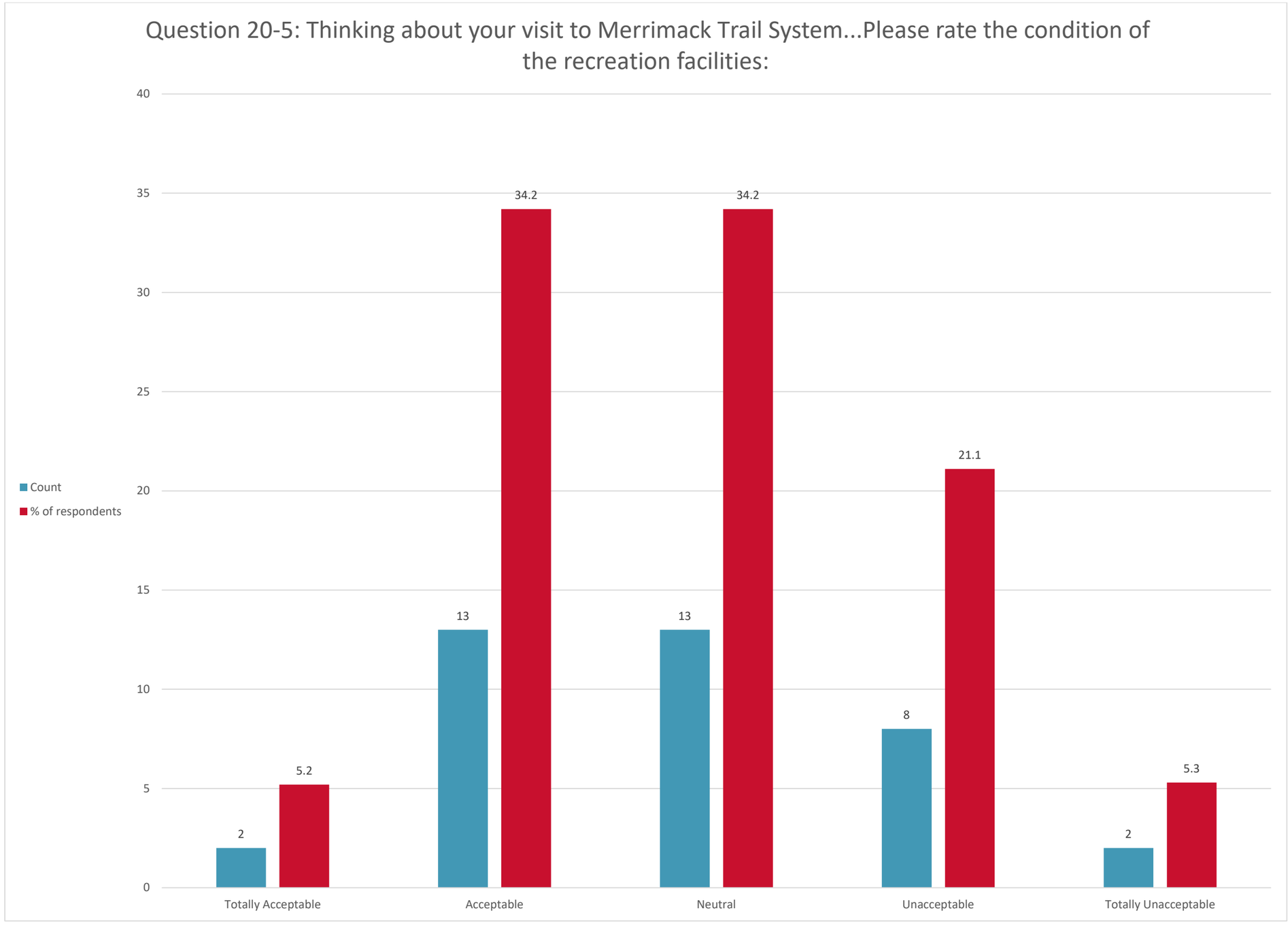

Question 19-8: Thinking about your visit to Lowell Heritage State Park...Please rate your overall experience:
70
60
50
40
30
20
10
0
Count
% of respondents
7
13.5
32
61.5
7
13.5
5
9.6
1
1.9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

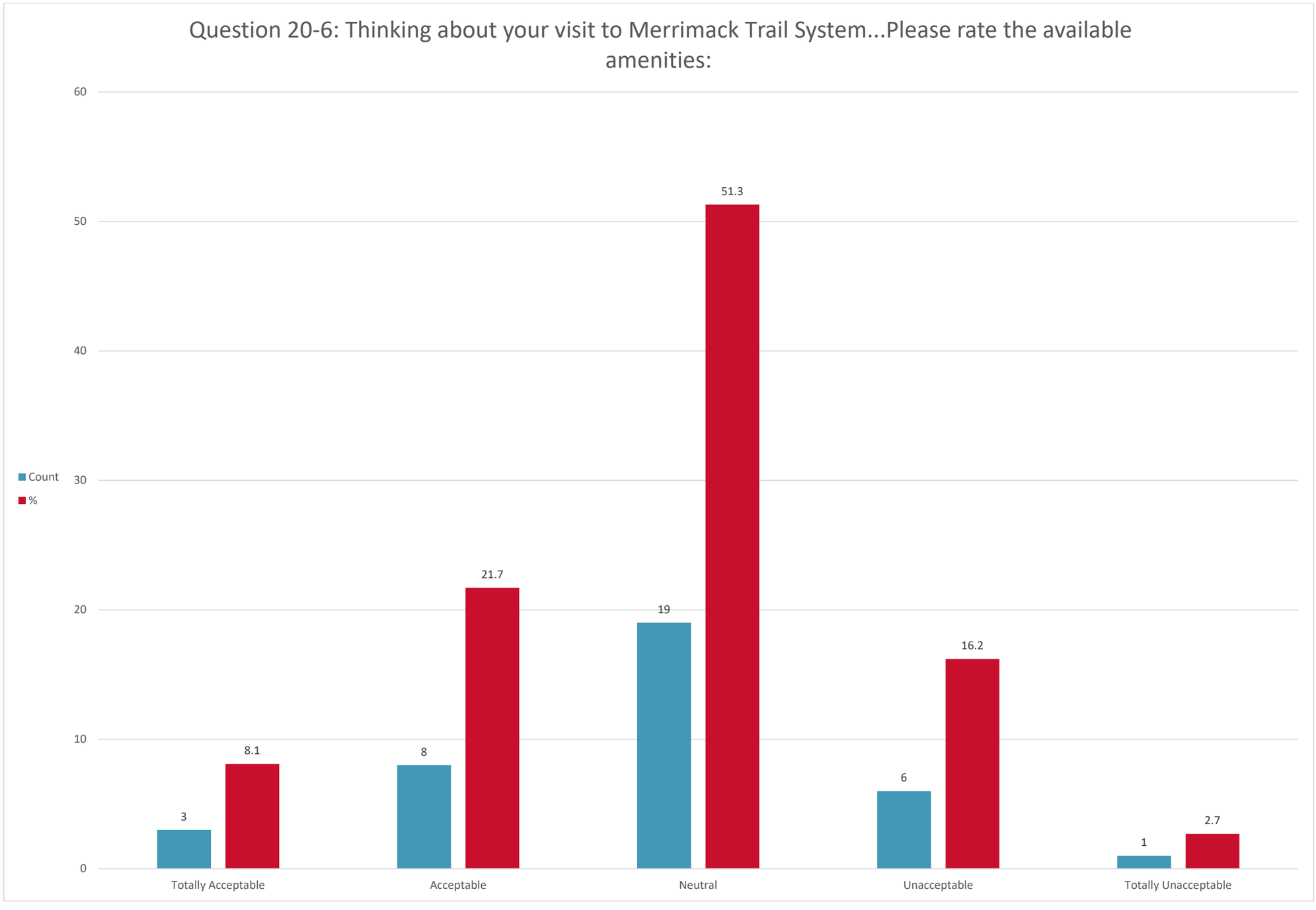

Question 20-1: Thinking about your visit to the Merrimack Trail System...Please rate the accessibility:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
42.105
21.0525
21.0525
13.16
16
8
8
5
1
2.63
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

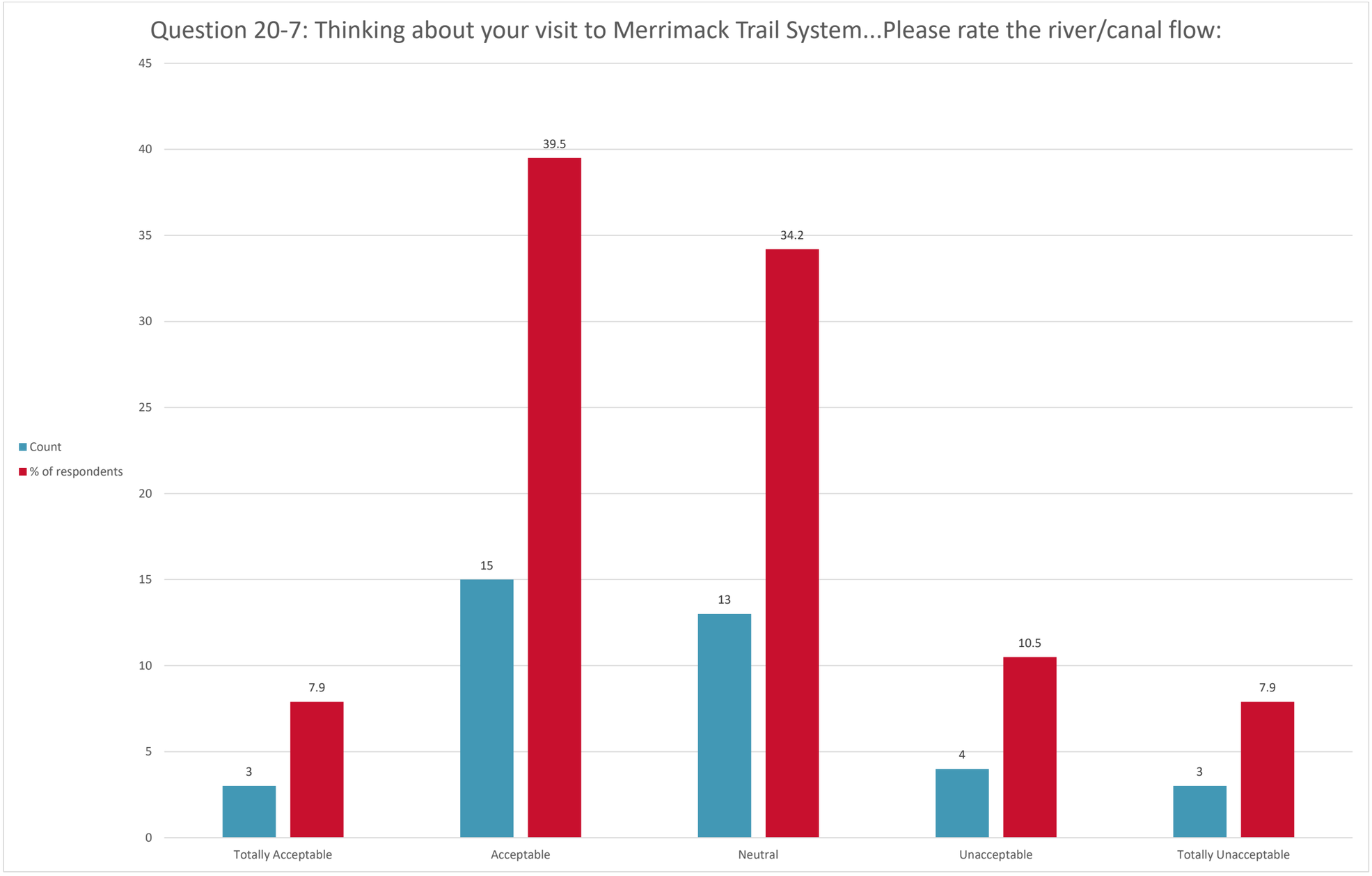

Question 20-2: Thinking about your visit to Merrimack Trail System...Please rate the parking:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
3
7.72
13
33.33
18
46.1
4
10.25
1
2.6
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

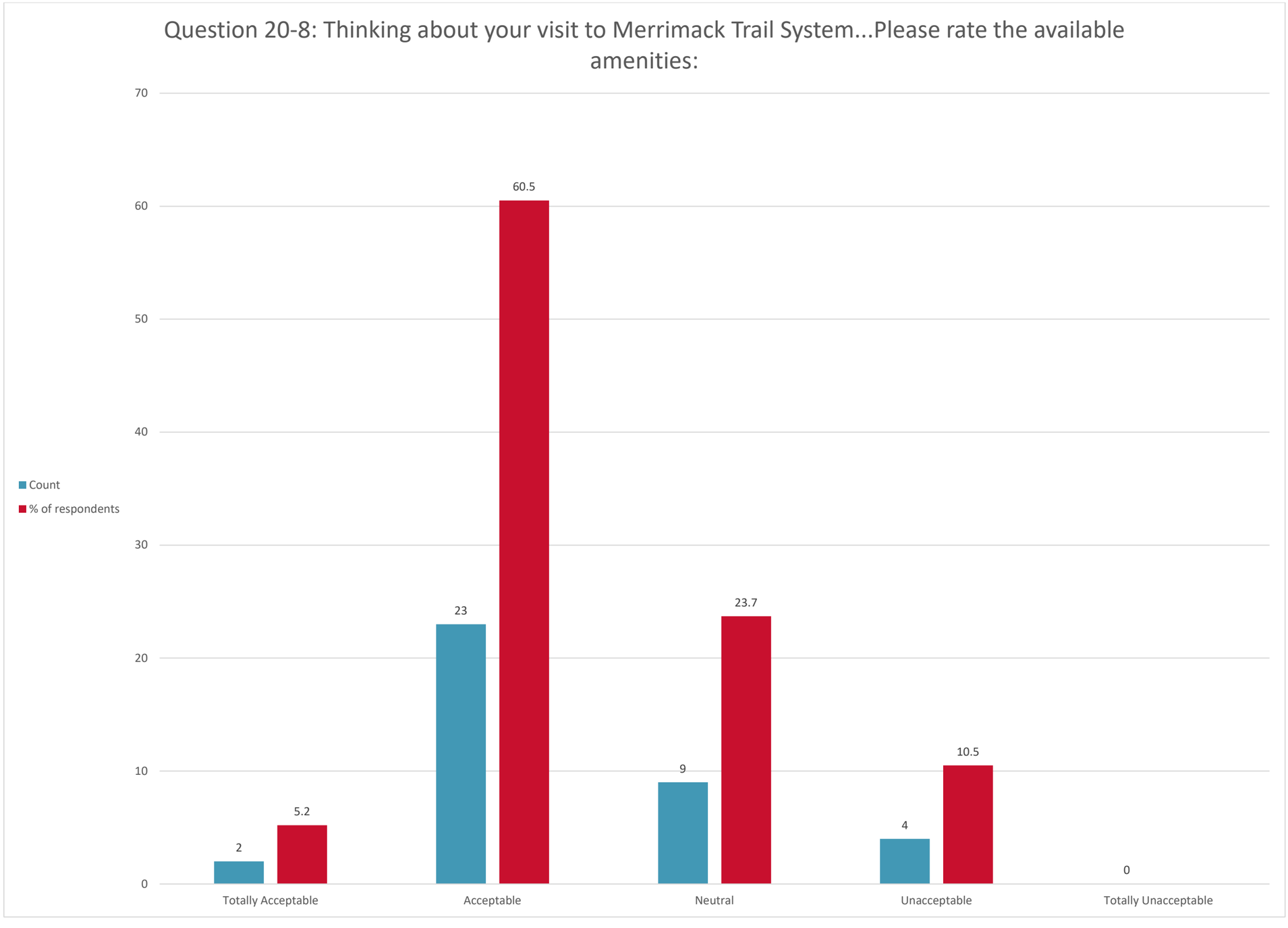

Question 20-3: Thinking about your visit to Merrimack Trail System...Please rate the crowding:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
8
20.5
17
43.6
11
28.2
3
7.7
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

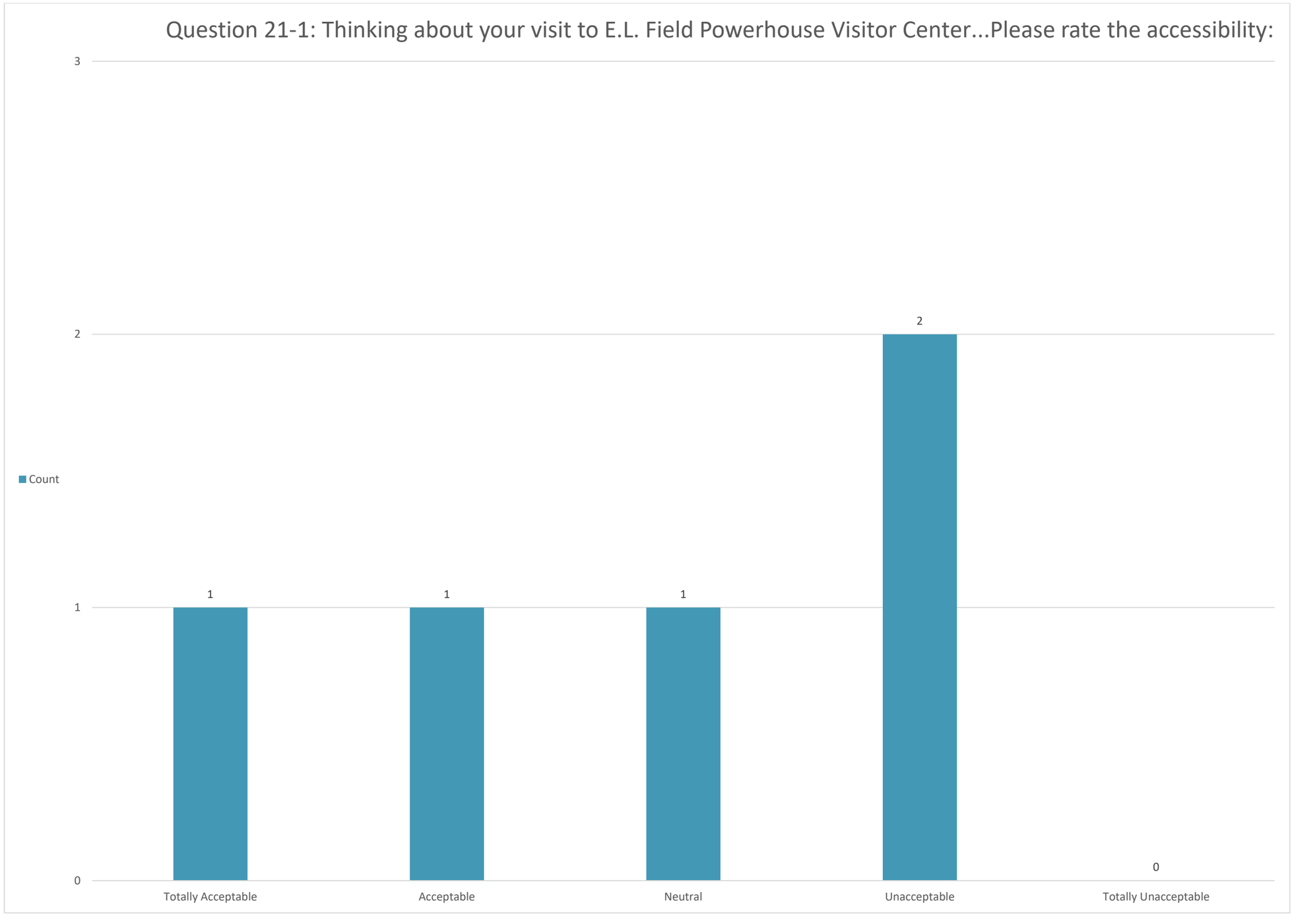

Question 20-4: Thinking about your visit to Merrimack Trail System...Please rate the safety:
Count
% of respondents
40
35
30
25
20
15
10
5
0
35.9
33.3
15.4
14
13
12.8
6
5
2.6
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

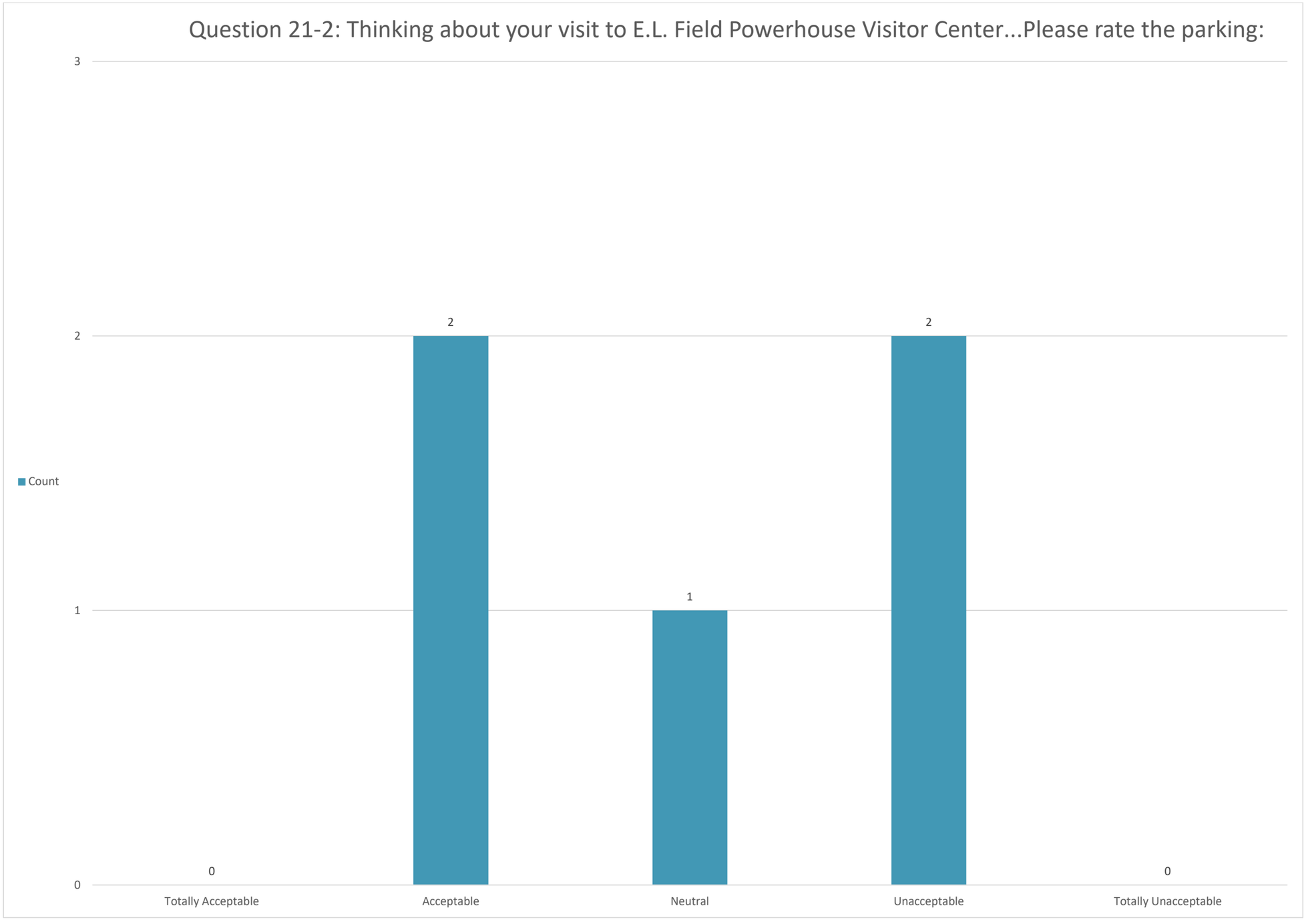

Question 20-5: Thinking about your visit to Merrimack Trail System...Please rate the condition of the recreation facilities:
Count
% of respondents
40
35
30
25
20
15
10
5
0
34.2
34.2
21.1
13
13
8
5.2
5.3
2
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

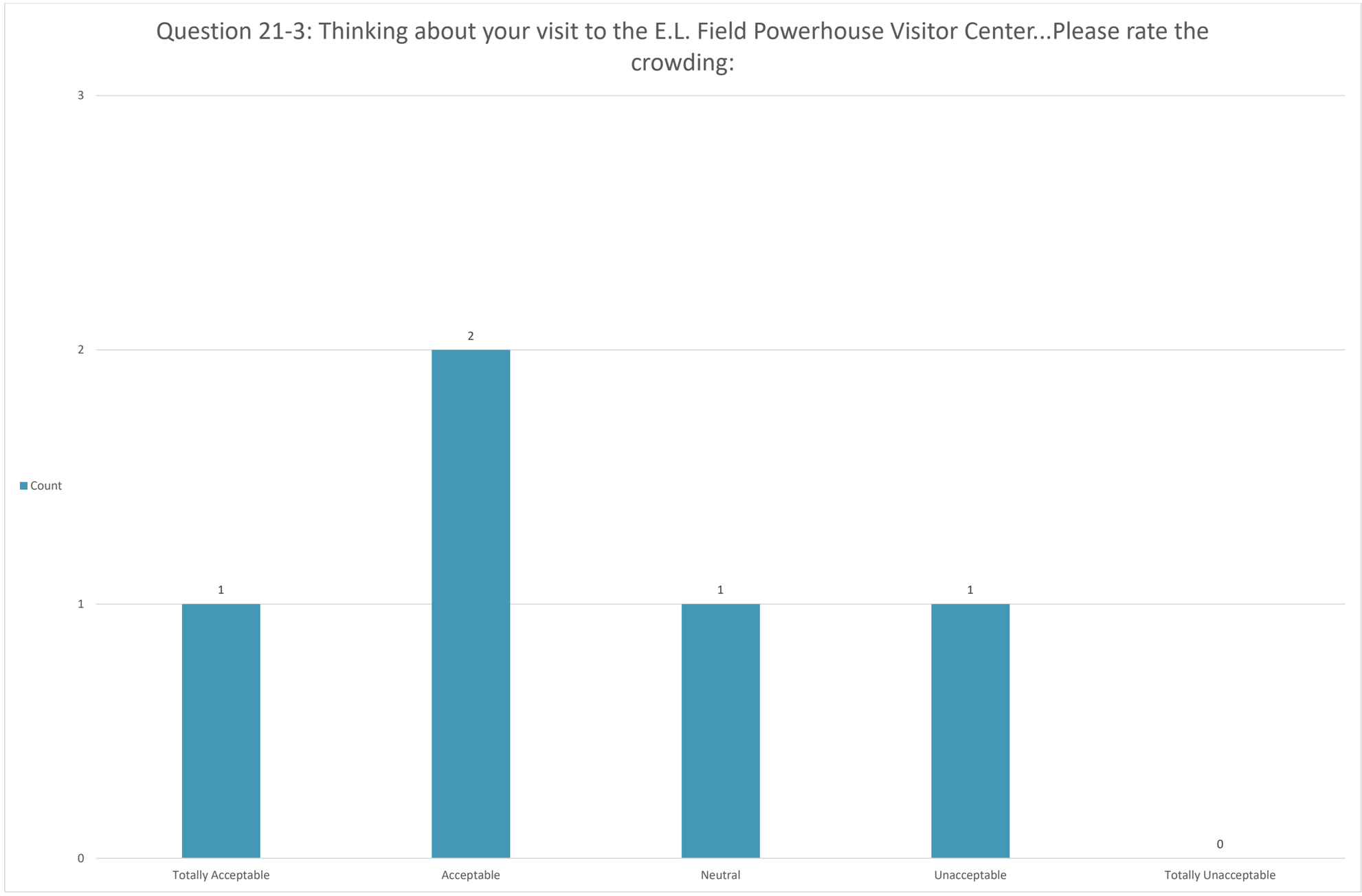

Question 20-6: Thinking about your visit to Merrimack Trail System...Please rate the available amenities:
60
50
40
30
20
10
0
Count
%
3
8.1
8
21.7
19
51.3
6
16.2
1
2.7
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

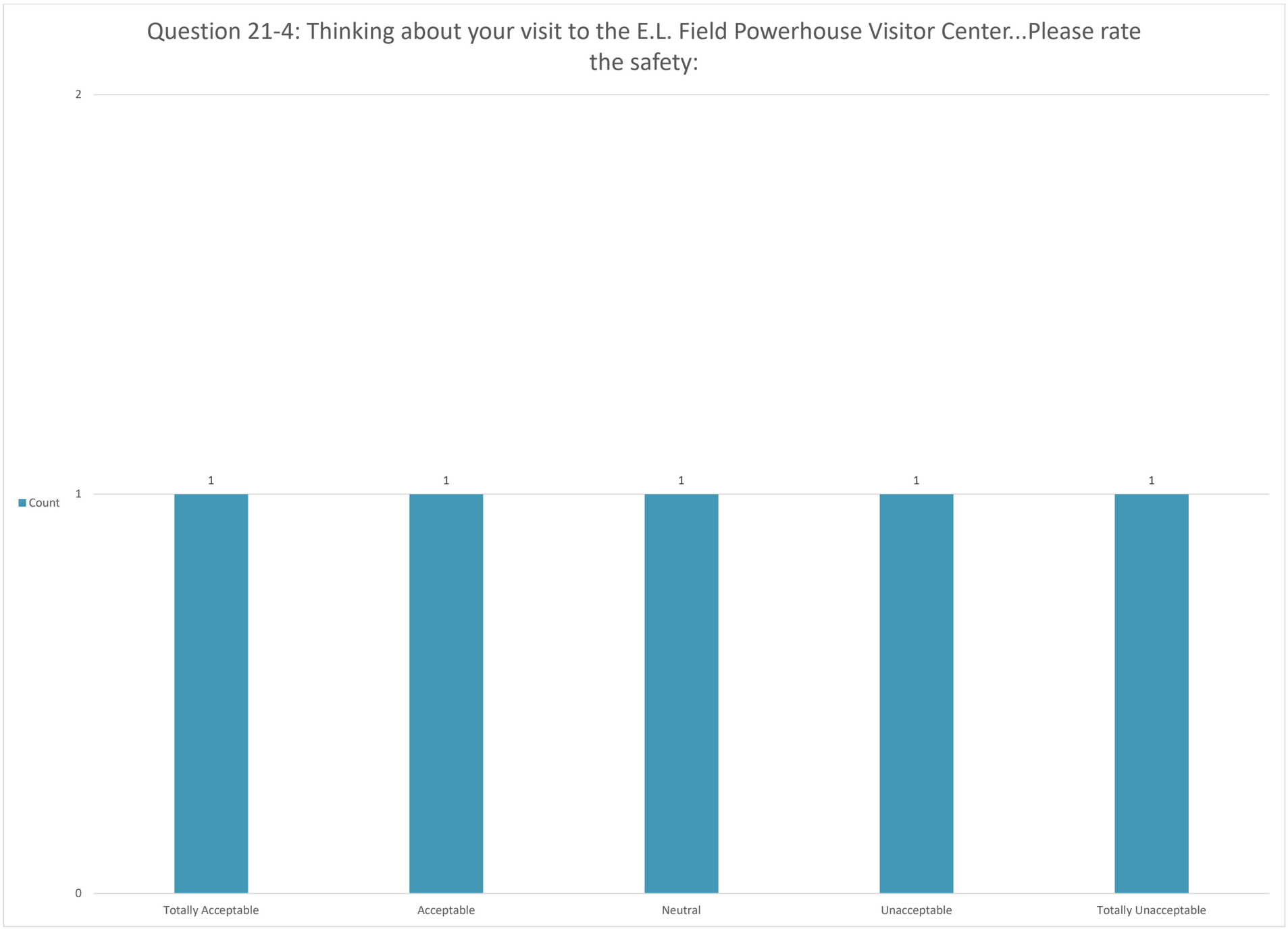

Question 20-7: Thinking about your visit to Merrimack Trail System...Please rate the river/canal flow:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
39.5
34.2
15
13
7.9
3
10.5
4
7.9
3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

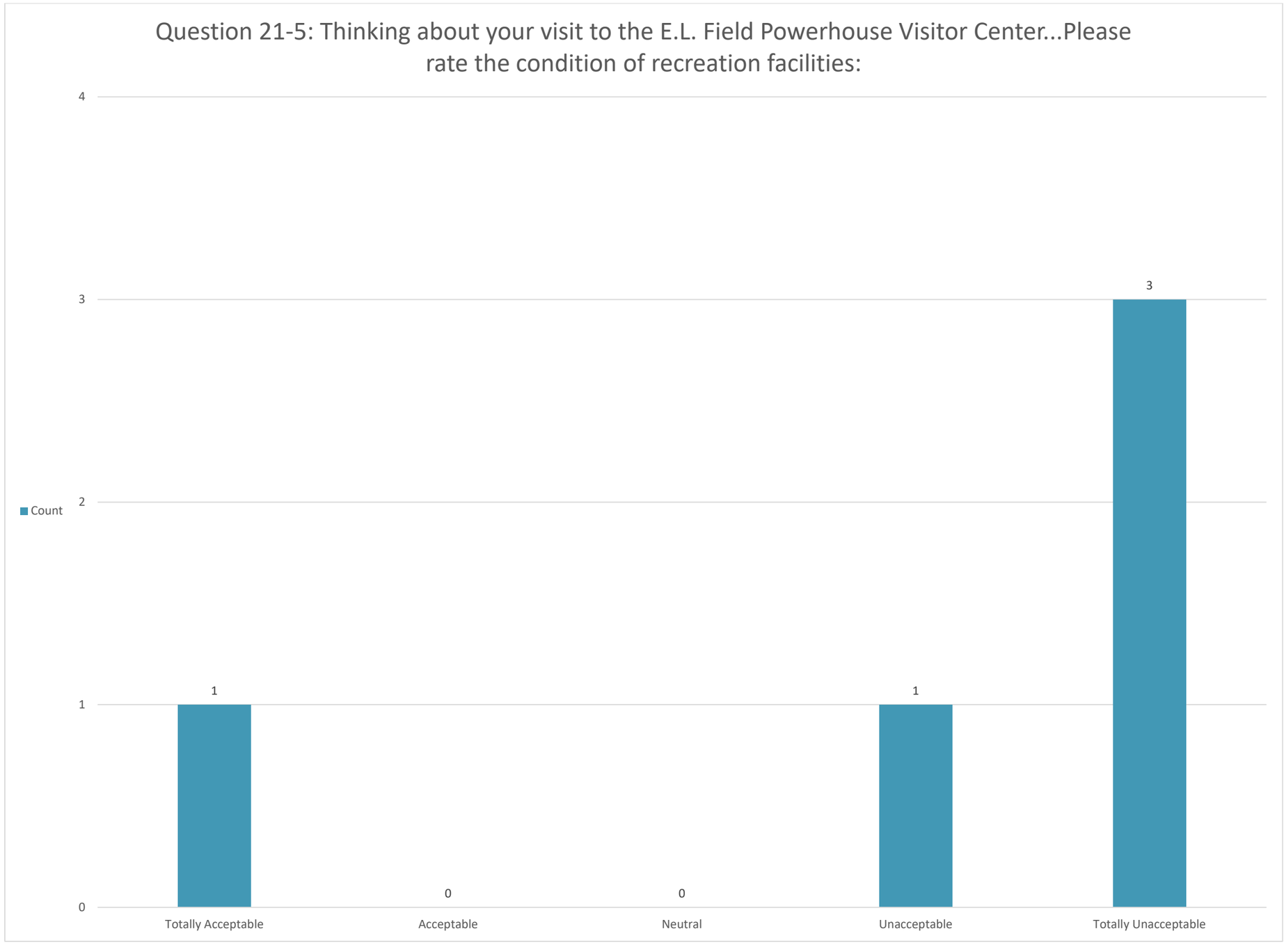

Question 20-8: Thinking about your visit to Merrimack Trail System...Please rate the available amenities:
70
60
50
40
30
20
10
0
Count
% of respondents
60.5
23
23.7
9
10.5
4
2
5.2
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

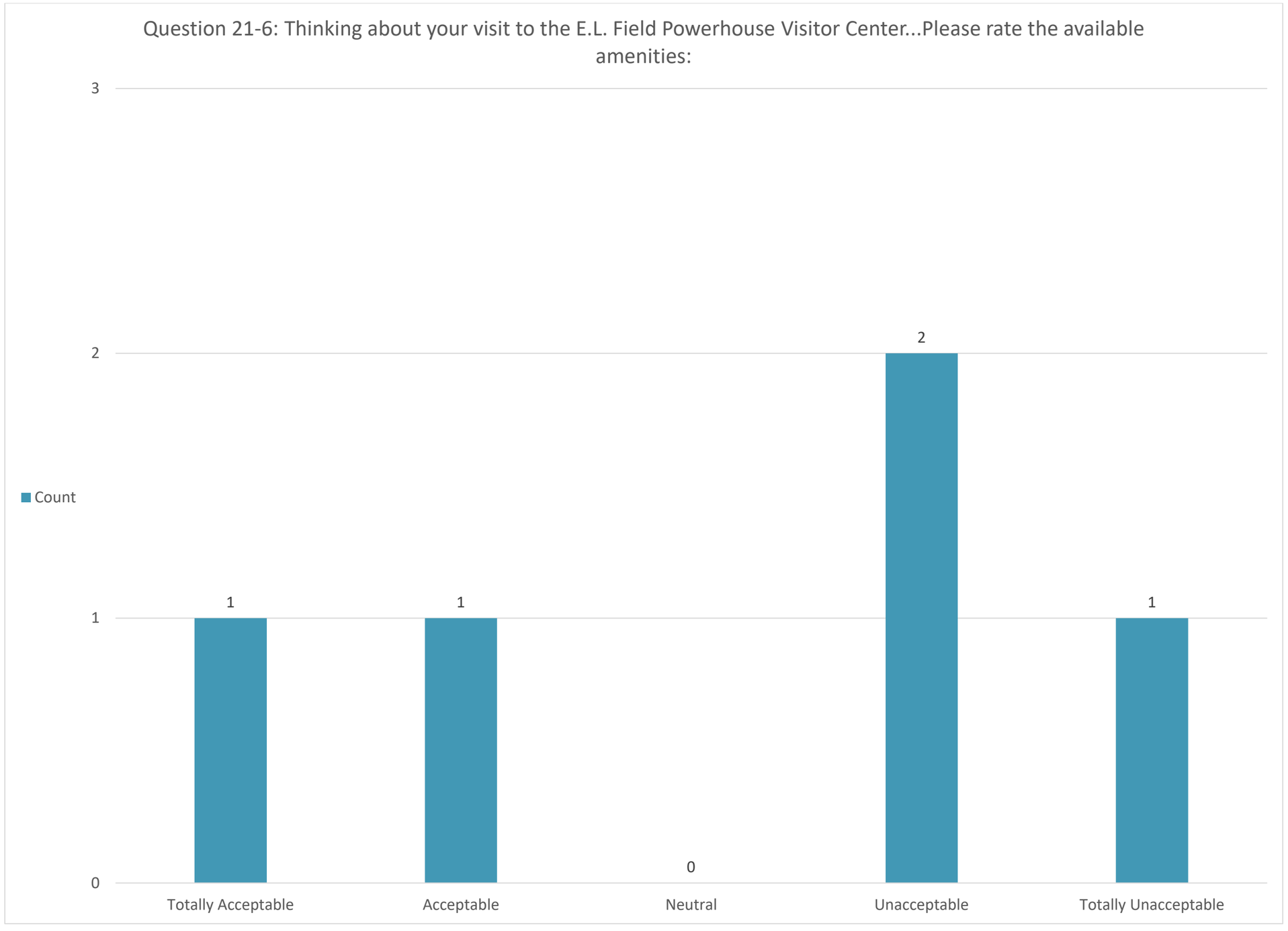

Question 21-1: Thinking about your visit to E.L. Field Powerhouse Visitor Center...Please rate the accessibility:
3
2
1
0
Count
1
1
1
2
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

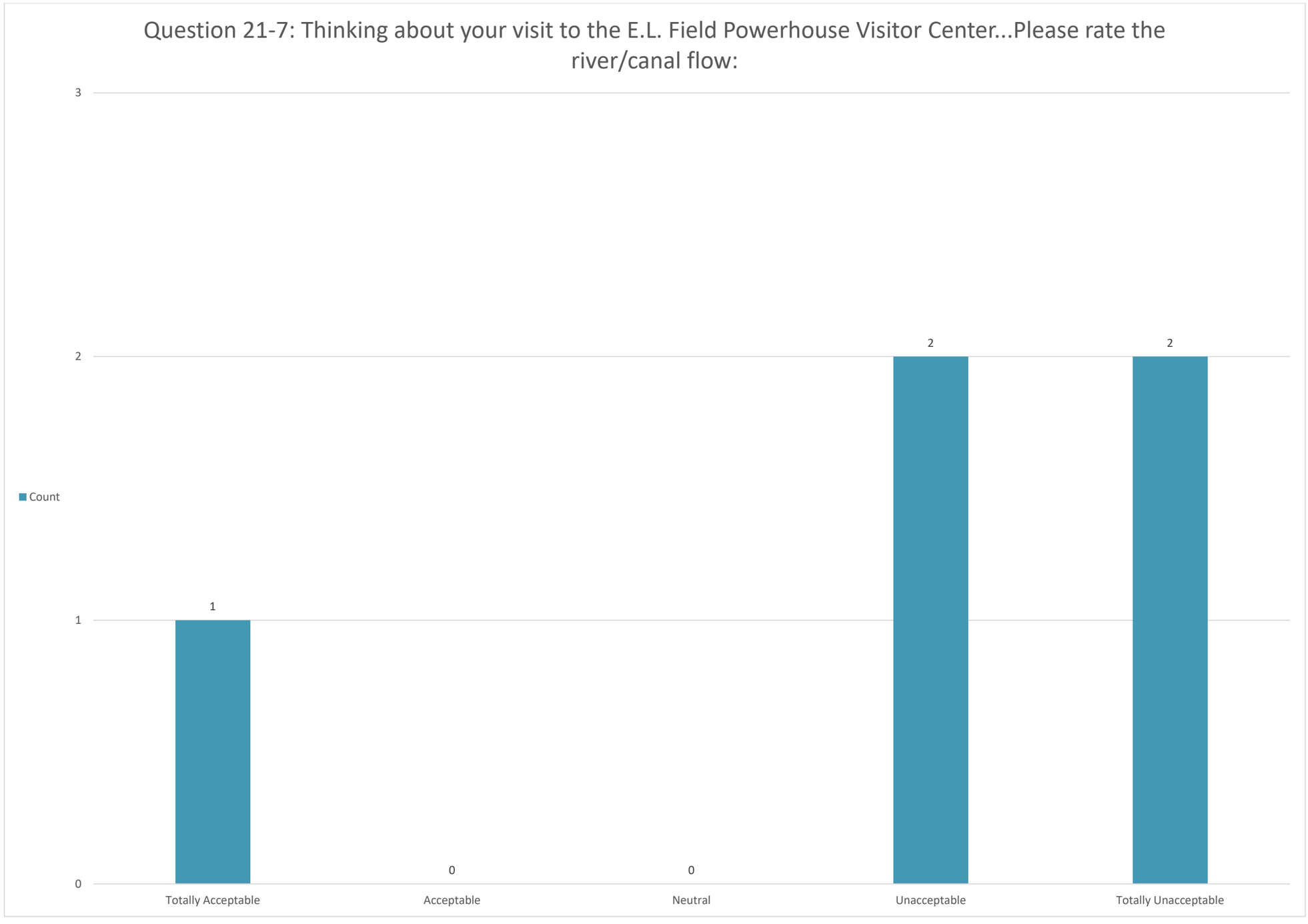

Question 21-2: Thinking about your visit to E.L. Field Powerhouse Visitor Center...Please rate the parking:
3
2
1
0
Count
2
2
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

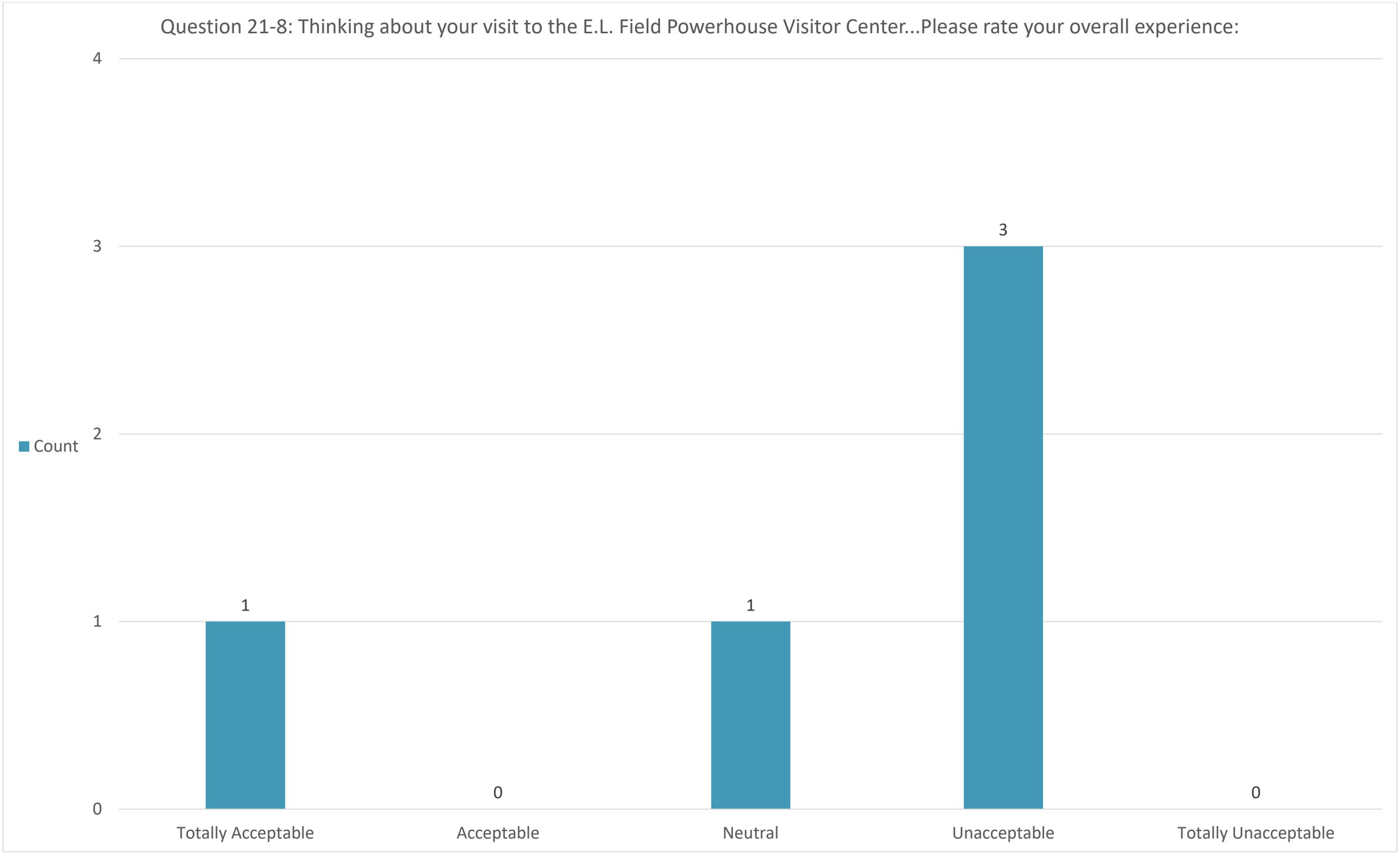

Question 21-3: Thinking about your visit to the E.L. Field Powerhouse Visitor Center...Please rate the crowding:
3
2
1
0
Count
1
2
1
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

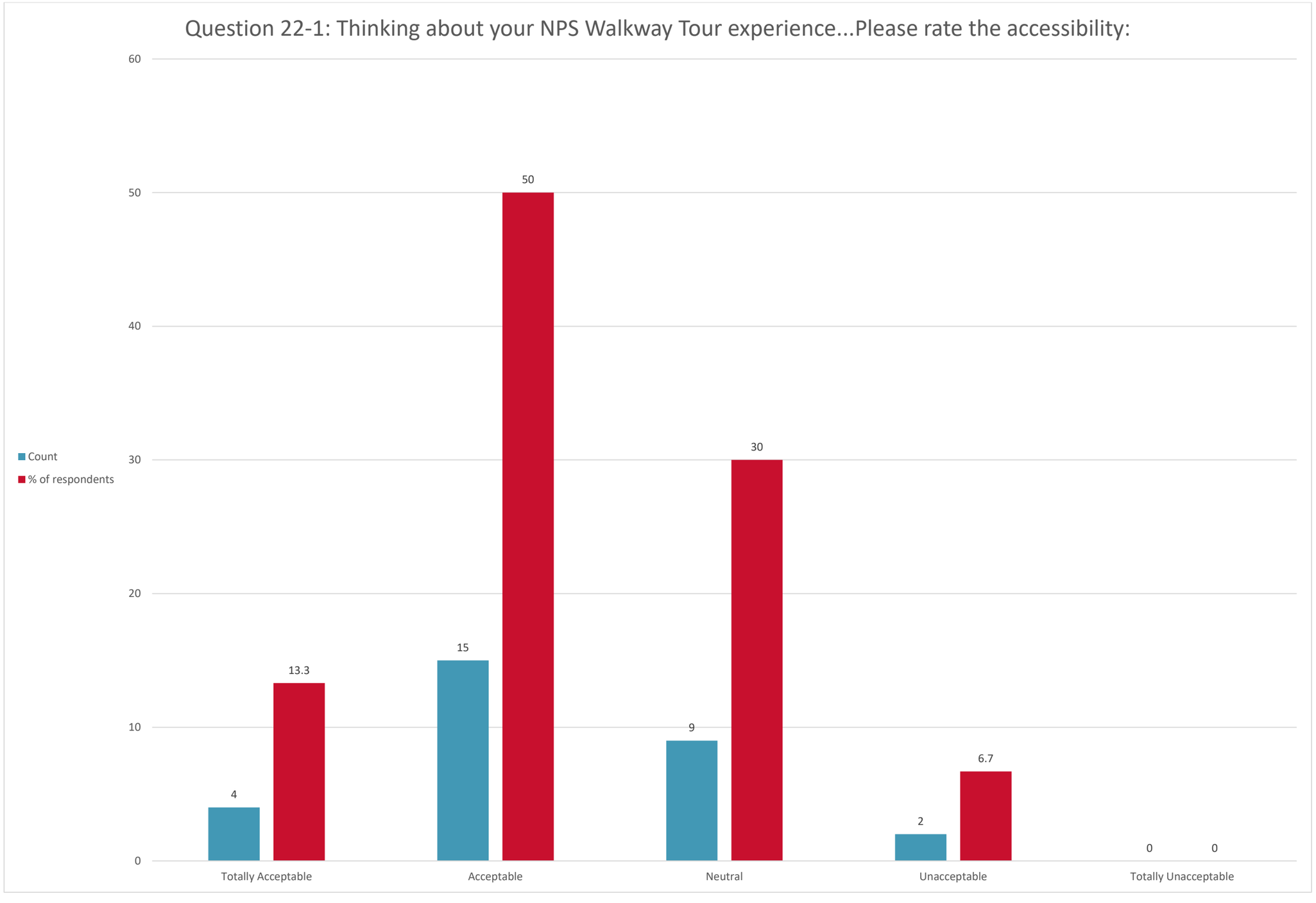

Question 21-4: Thinking about your visit to the E.L. Field Powerhouse Visitor Center...Please rate the safety:
2
1
0
Count
1
1
1
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

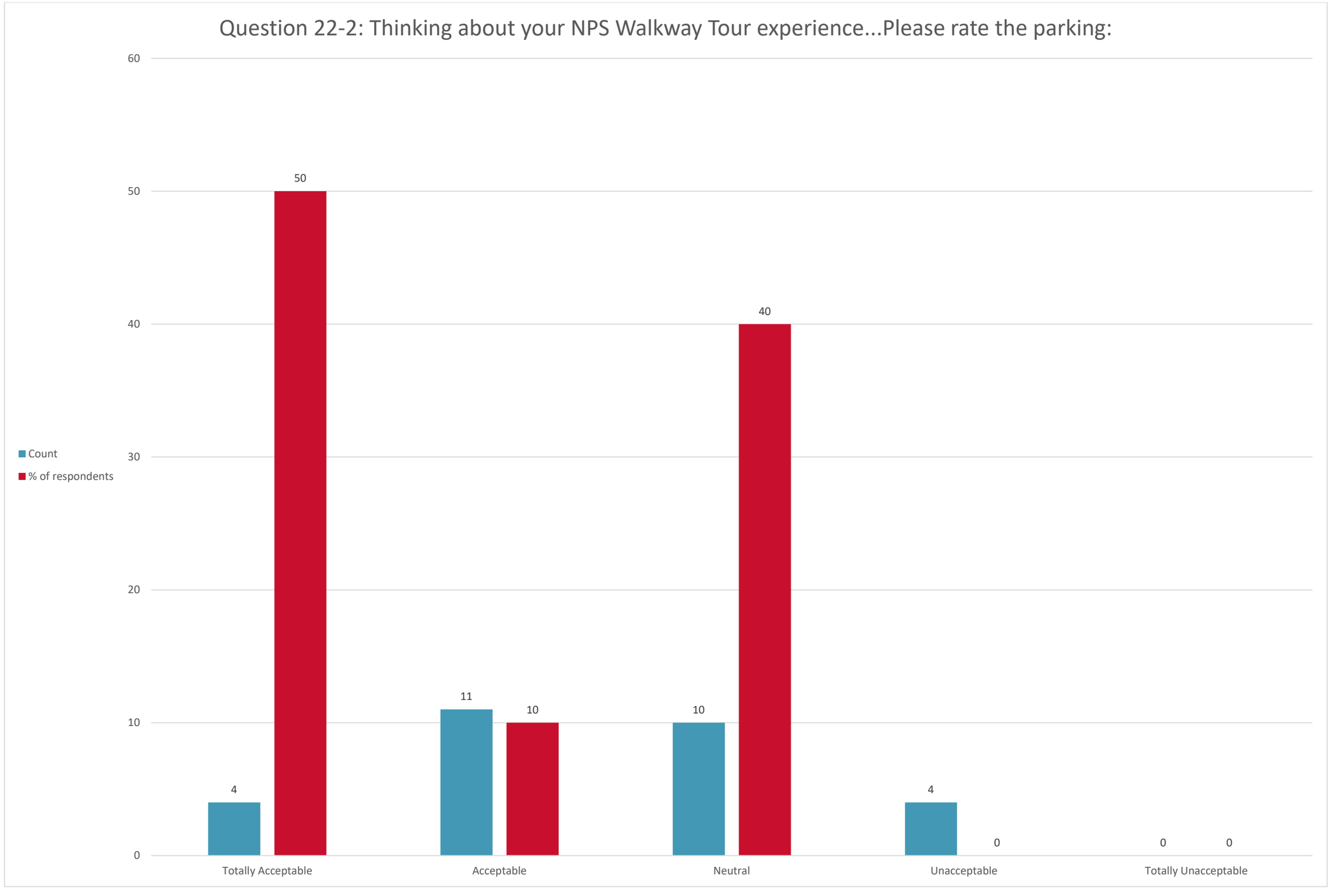

Question 21-5: Thinking about your visit to the E.L. Field Powerhouse Visitor Center...Please rate the condition of recreation facilities:
Count
4
3
2
1
0
1
0
0
1
3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

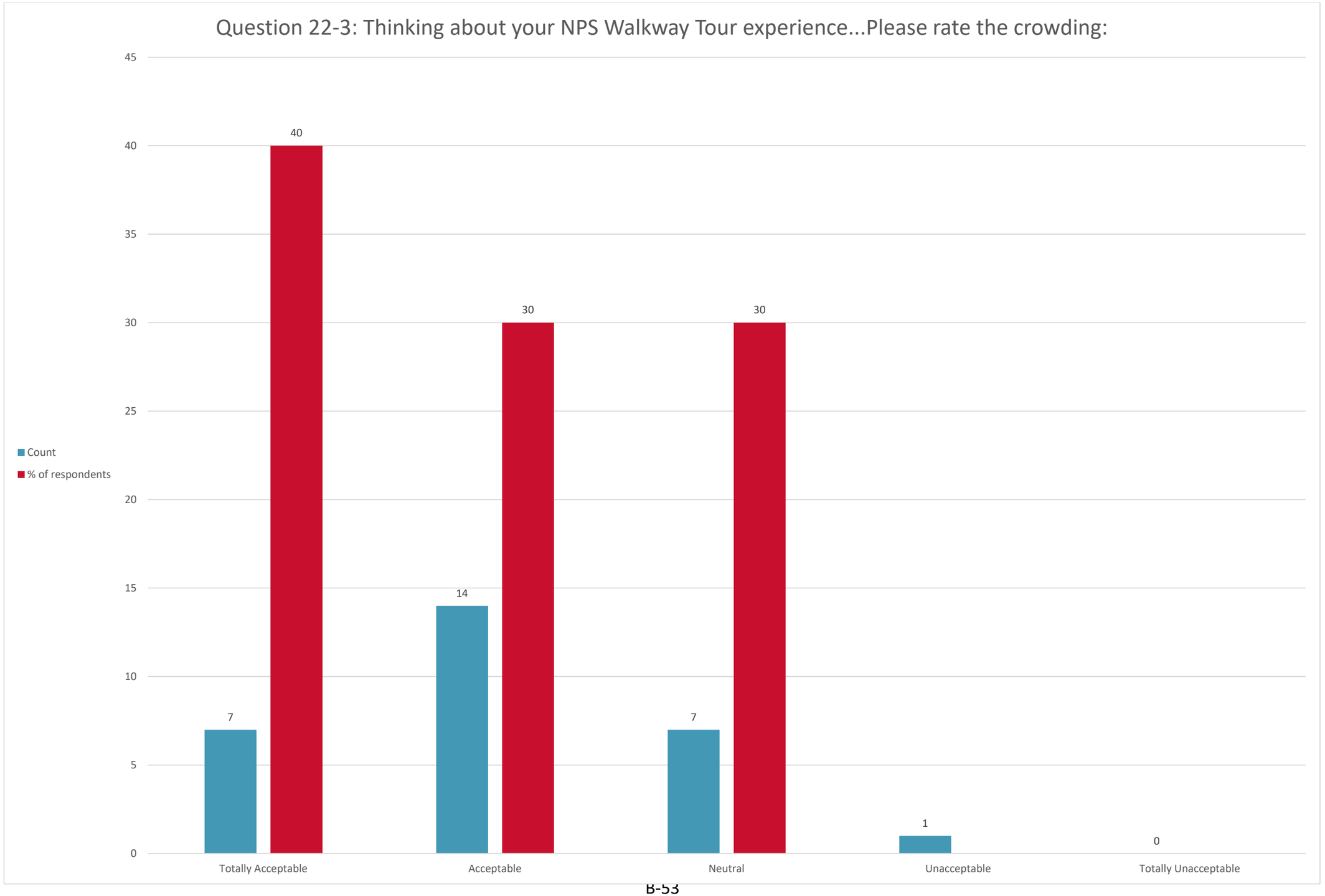

Question 21-6: Thinking about your visit to the E.L. Field Powerhouse Visitor Center...Please rate the available amenities:
3
2
1
0
Count
1
1
0
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

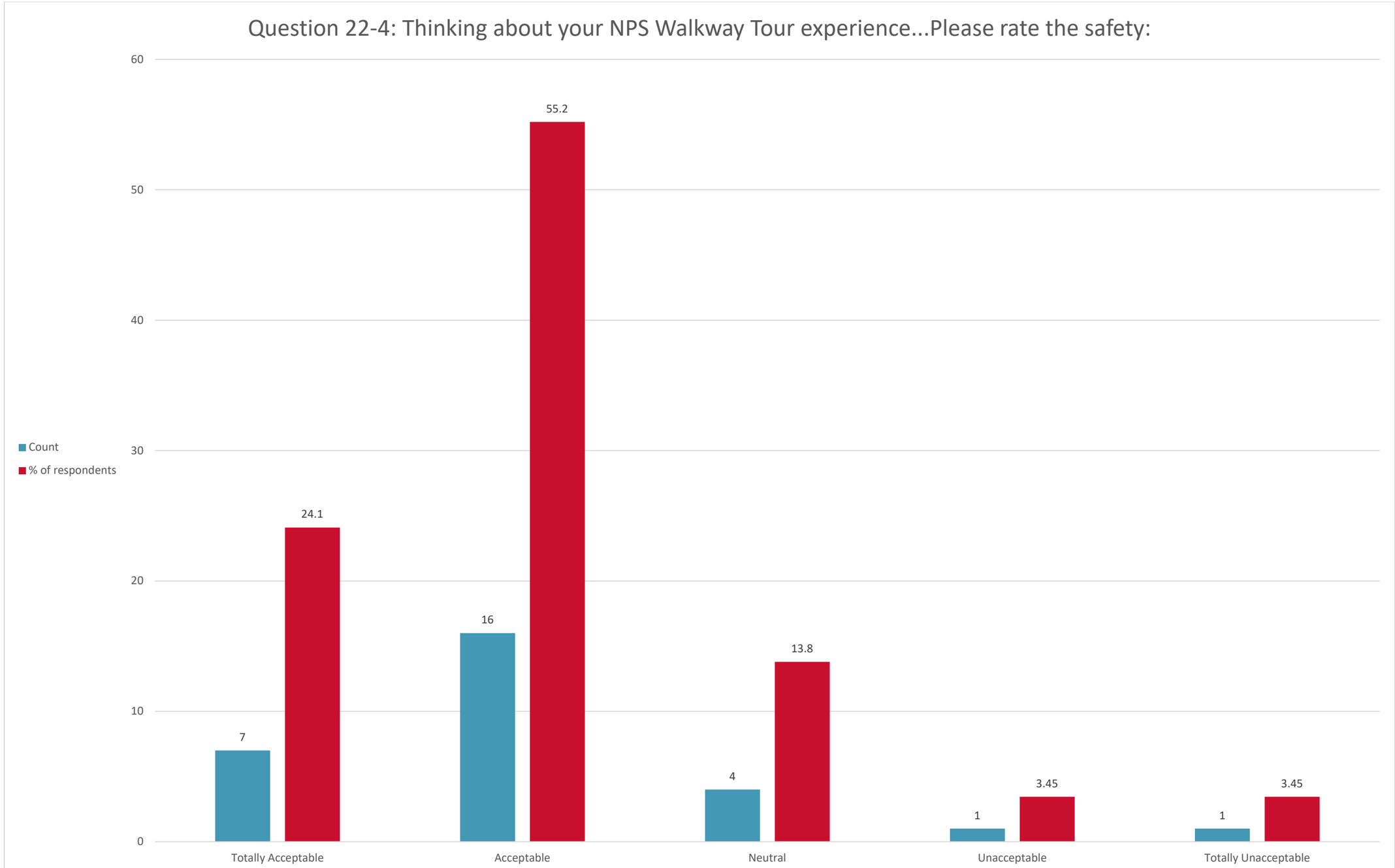

Question 21-7: Thinking about your visit to the E.L. Field Powerhouse Visitor Center...Please rate the river/canal flow:
3
2
1
0
Count
1
0
0
2
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

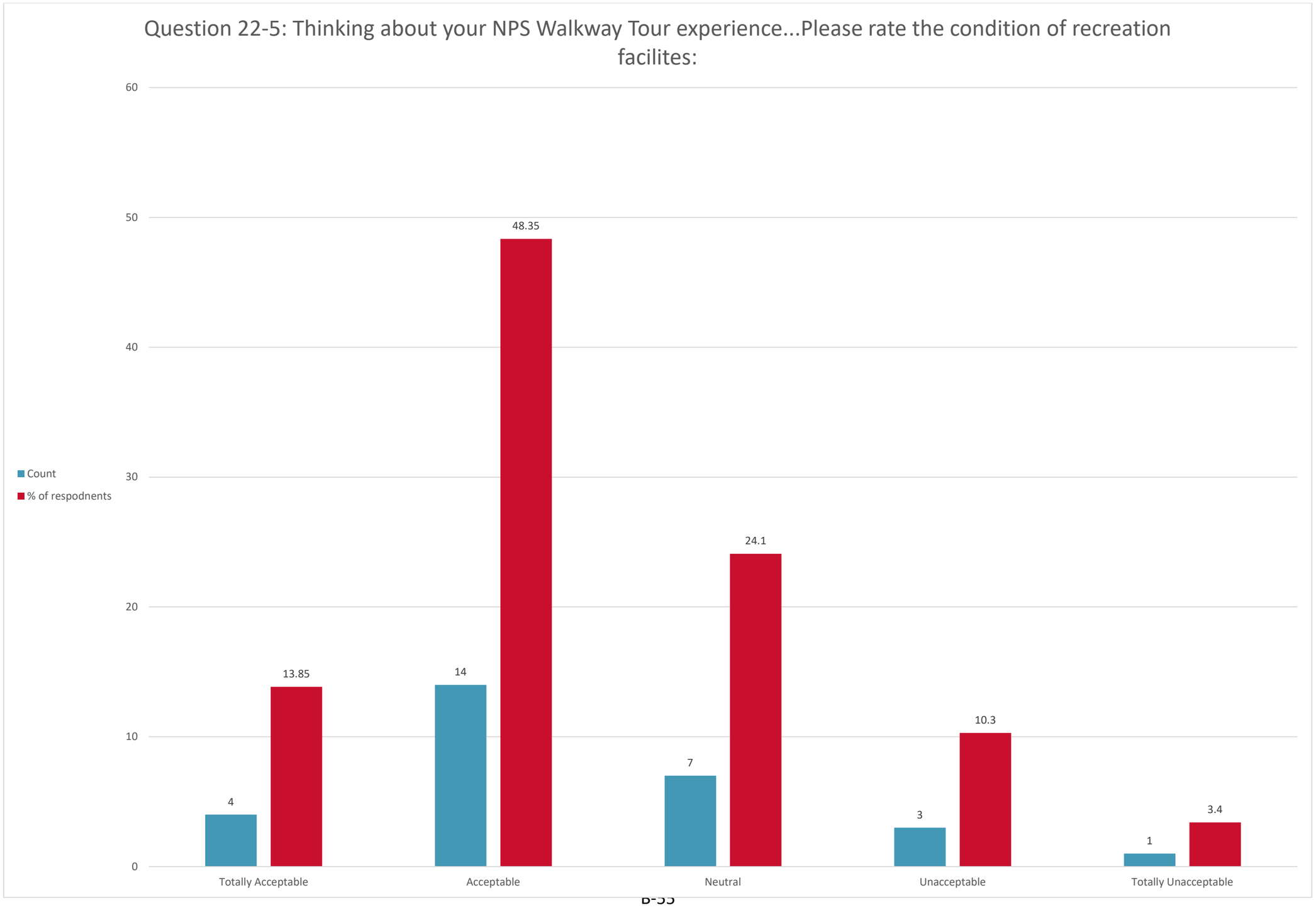

Question 21-8: Thinking about your visit to the E.L. Field Powerhouse Visitor Center...Please rate your overall experience:
Count
4
3
2
1
0
1
0
1
3
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

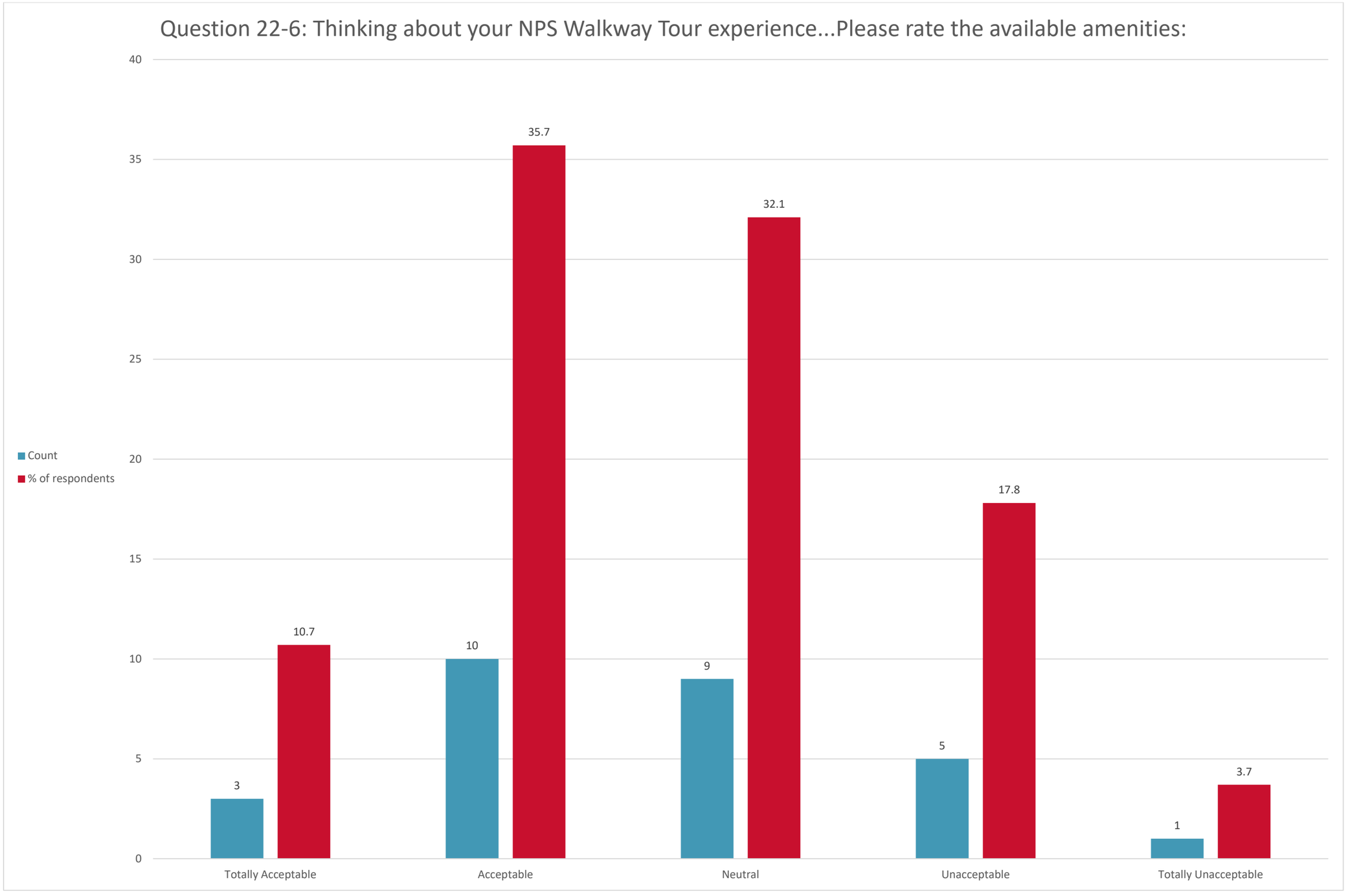

Question 22-1: Thinking about your NPS Walkway Tour experience...Please rate the accessibility:
60
50
40
30
20
10
0
Count
% of respondents
4
13.3
15
50
9
30
2
6.7
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

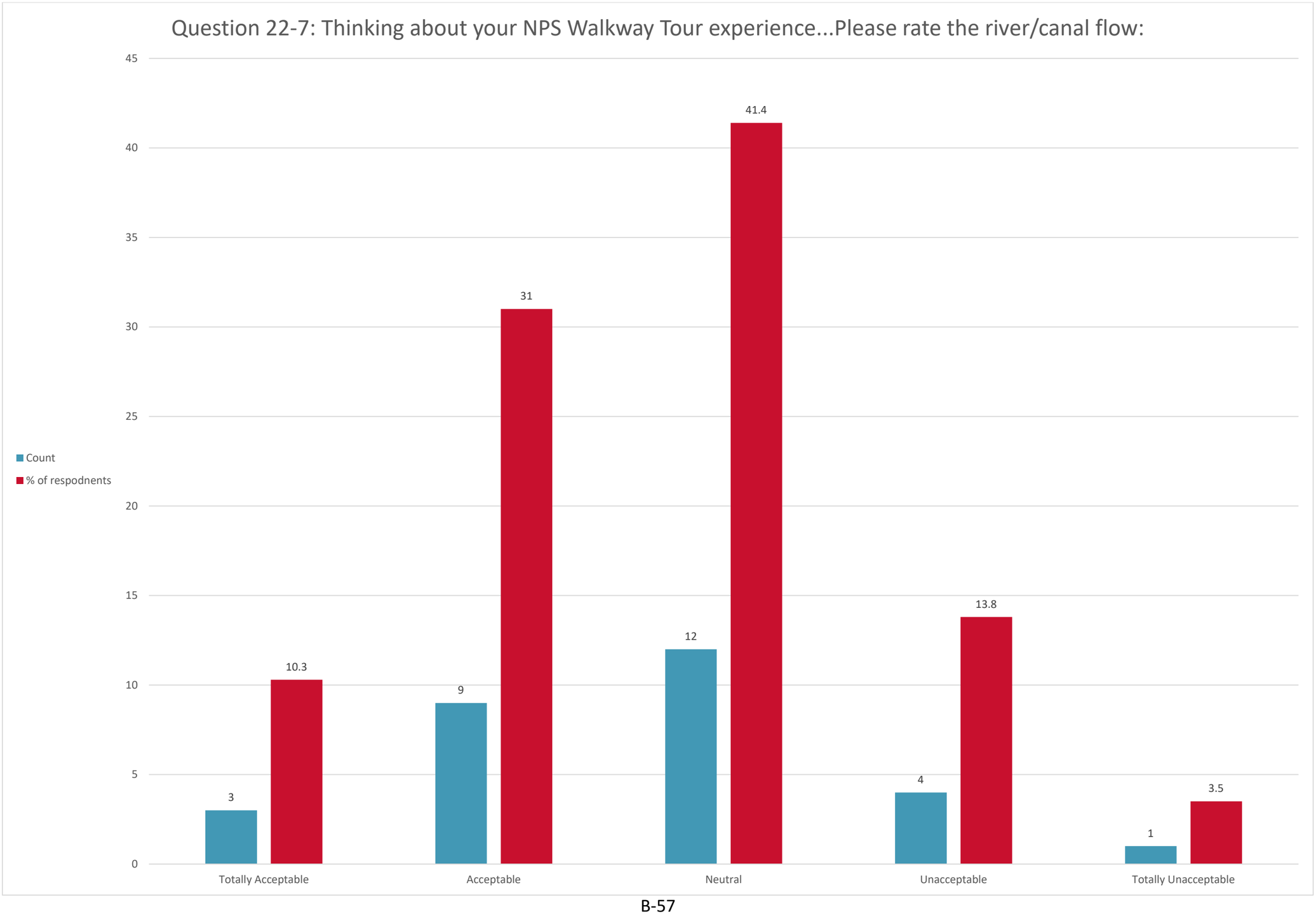

Question 22-2: Thinking about your NPS Walkway Tour experience...Please rate the parking:
60
50
40
30
20
10
0
Count
% of respondents
50
40
11
10
10
4
4
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

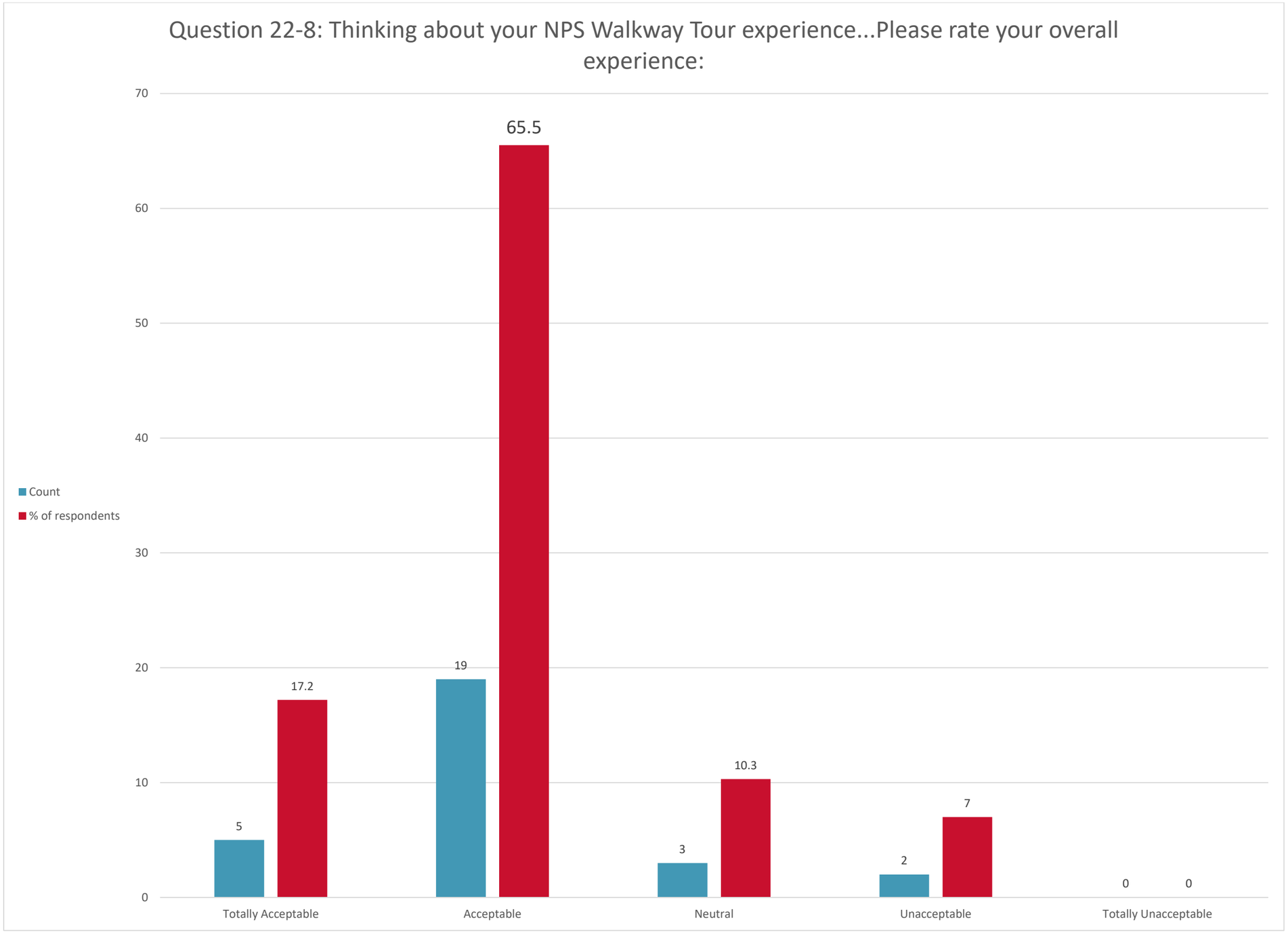

Question 22-3: Thinking about your NPS Walkway Tour experience...Please rate the crowding:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
40
30
30
14
7
7
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

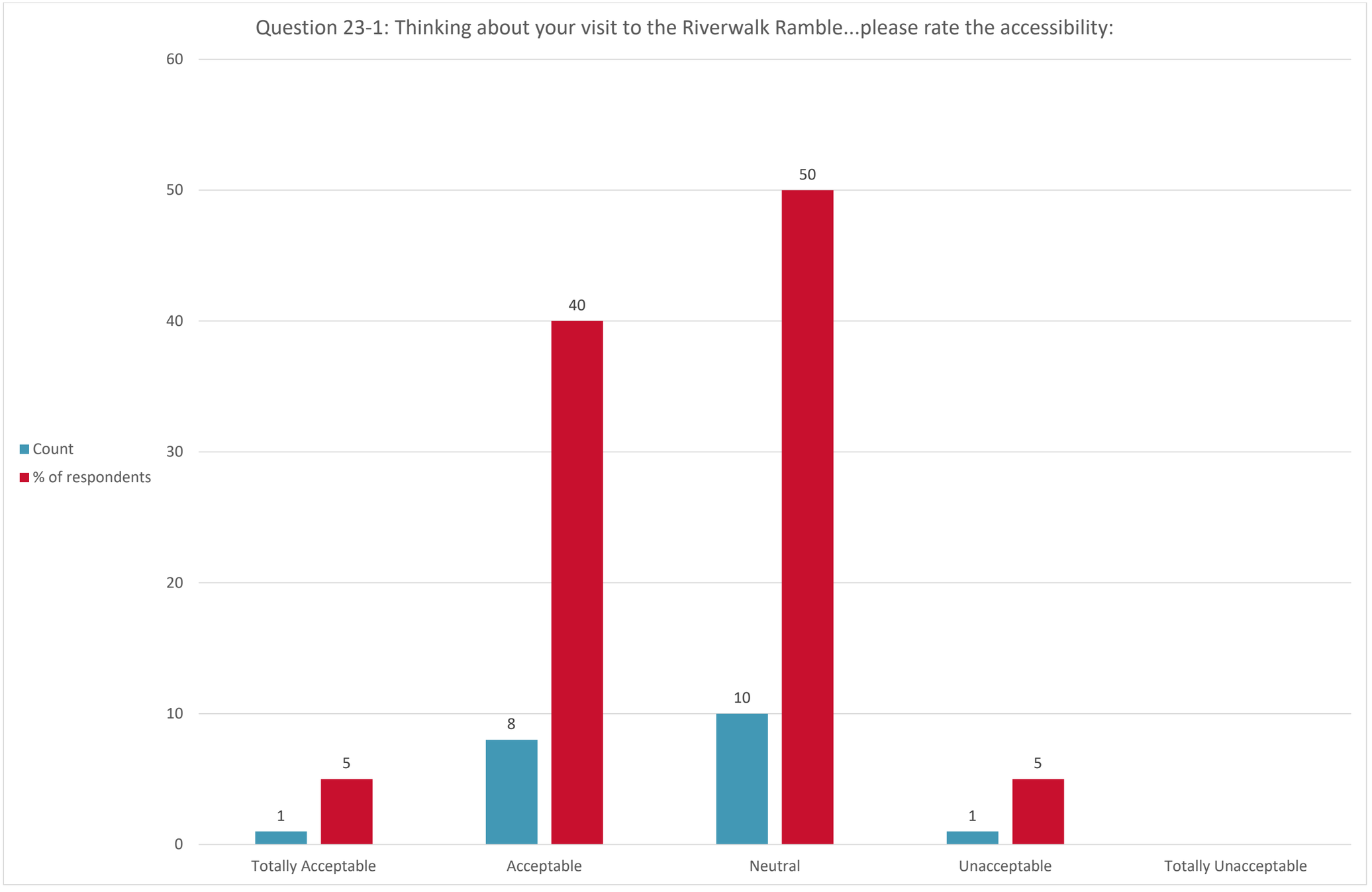

Question 22-4: Thinking about your NPS Walkway Tour experience...Please rate the safety:
Count
% of respondents
60
50
40
30
20
10
0
55.2
24.1
16
13.8
7
4
3.45
1
3.45
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

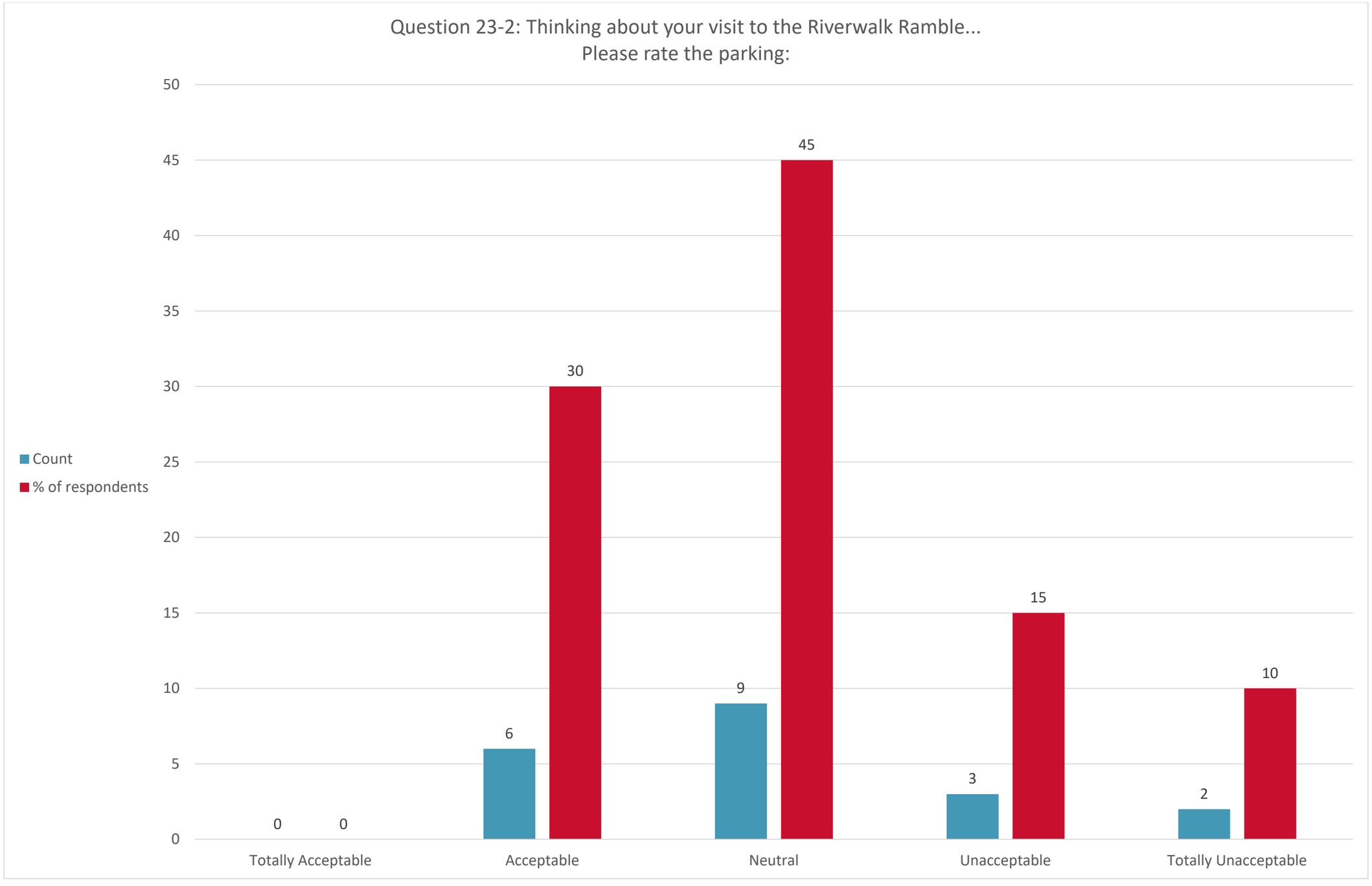

Question 22-5: Thinking about your NPS Walkway Tour experience...Please rate the condition of recreation facilites:
Count
% of respodnents
60
50
40
30
20
10
0
48.35
13.85
14
24.1
10.3
4
7
3
3.4
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

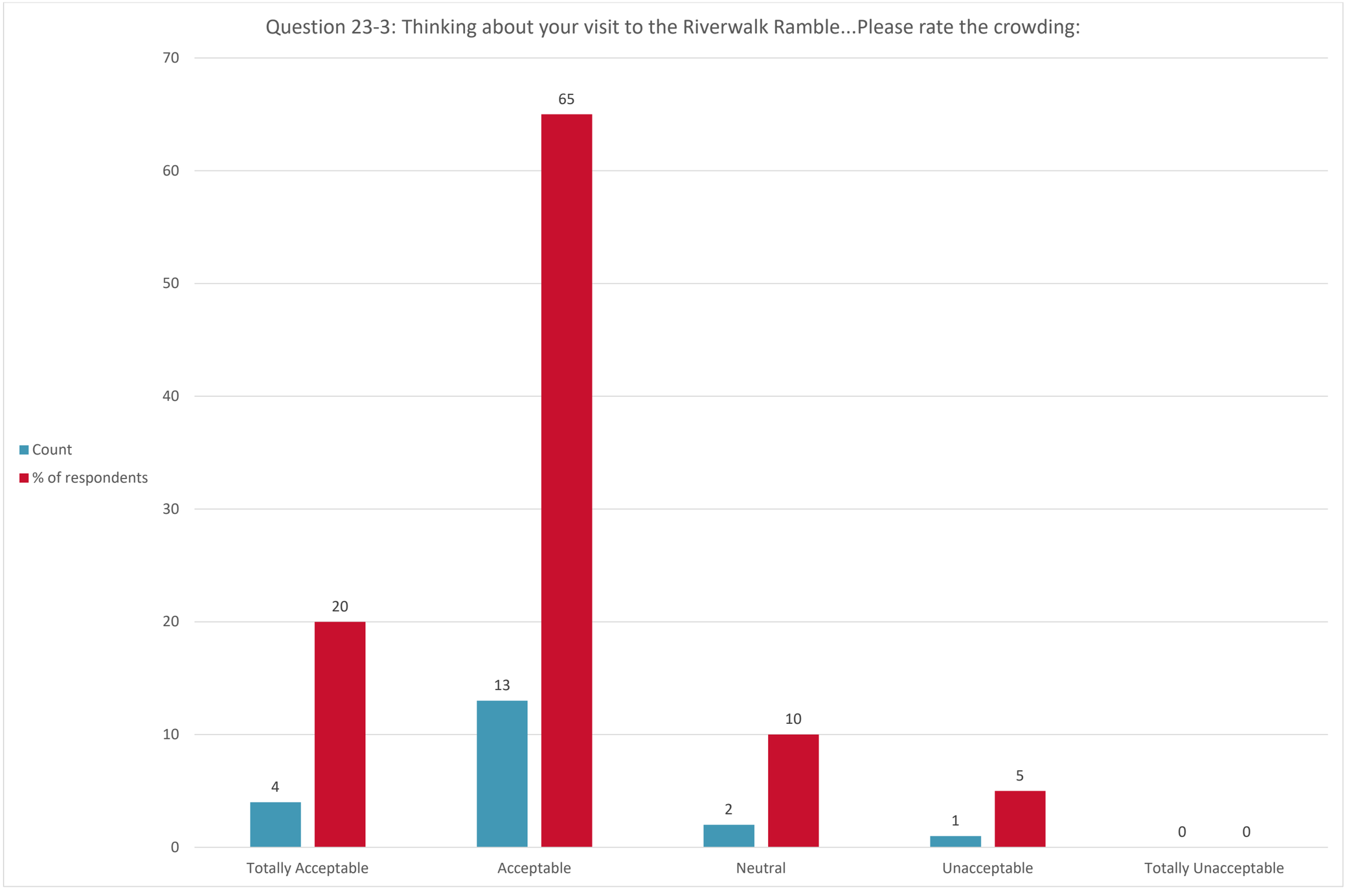

Question 22-6: Thinking about your NPS Walkway Tour experience...Please rate the available amenities:
Count
% of respondents
40
35
30
25
20
15
10
5
0
3
10.7
10
35.7
9
32.1
5
17.8
1
3.7
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

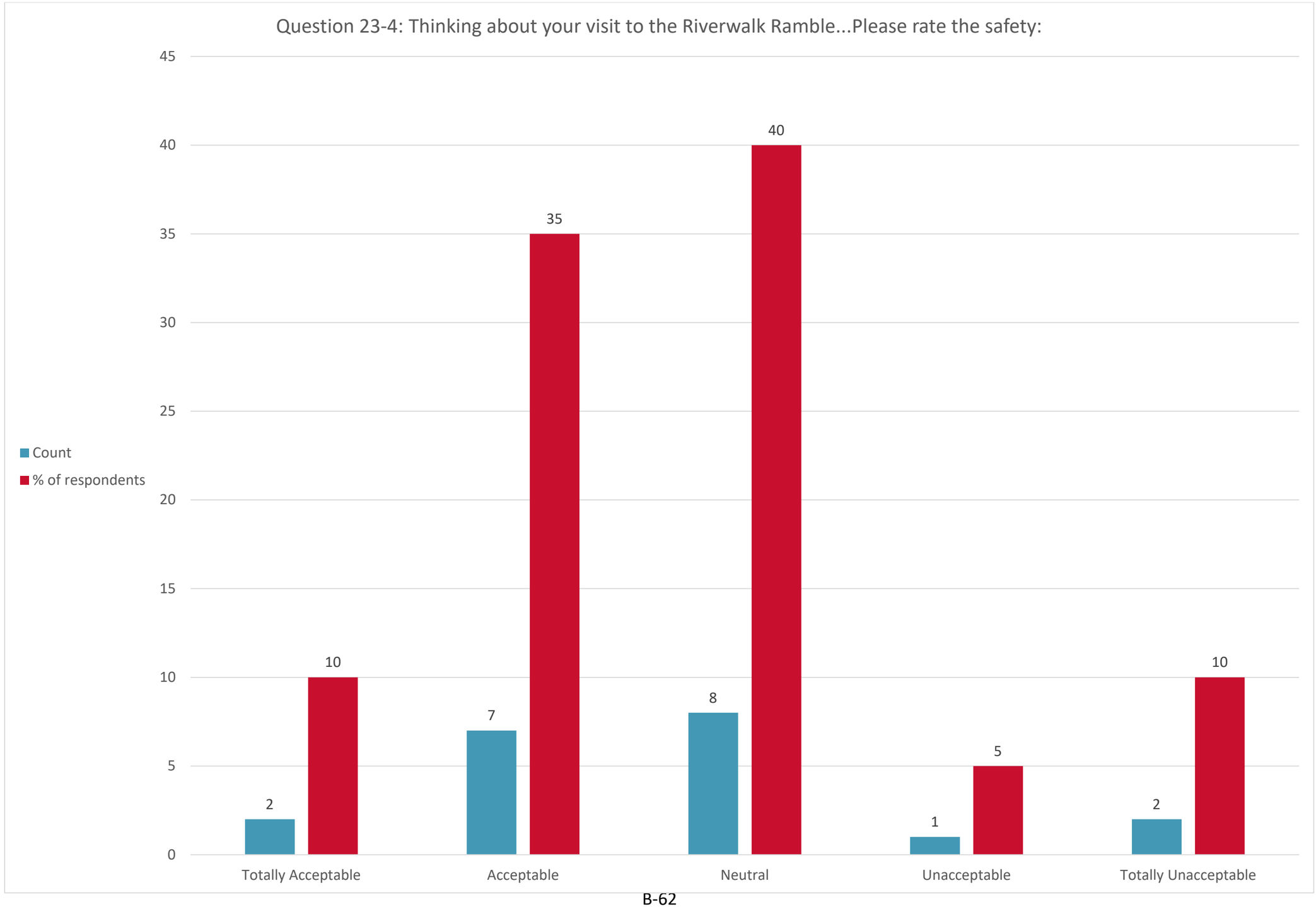

Question 22-7: Thinking about your NPS Walkway Tour experience...Please rate the river/canal flow:
45
40
35
30
25
20
15
10
5
0
Count
% of respodnents
3
10.3
9
31
12
41.4
4
13.8
1
3.5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

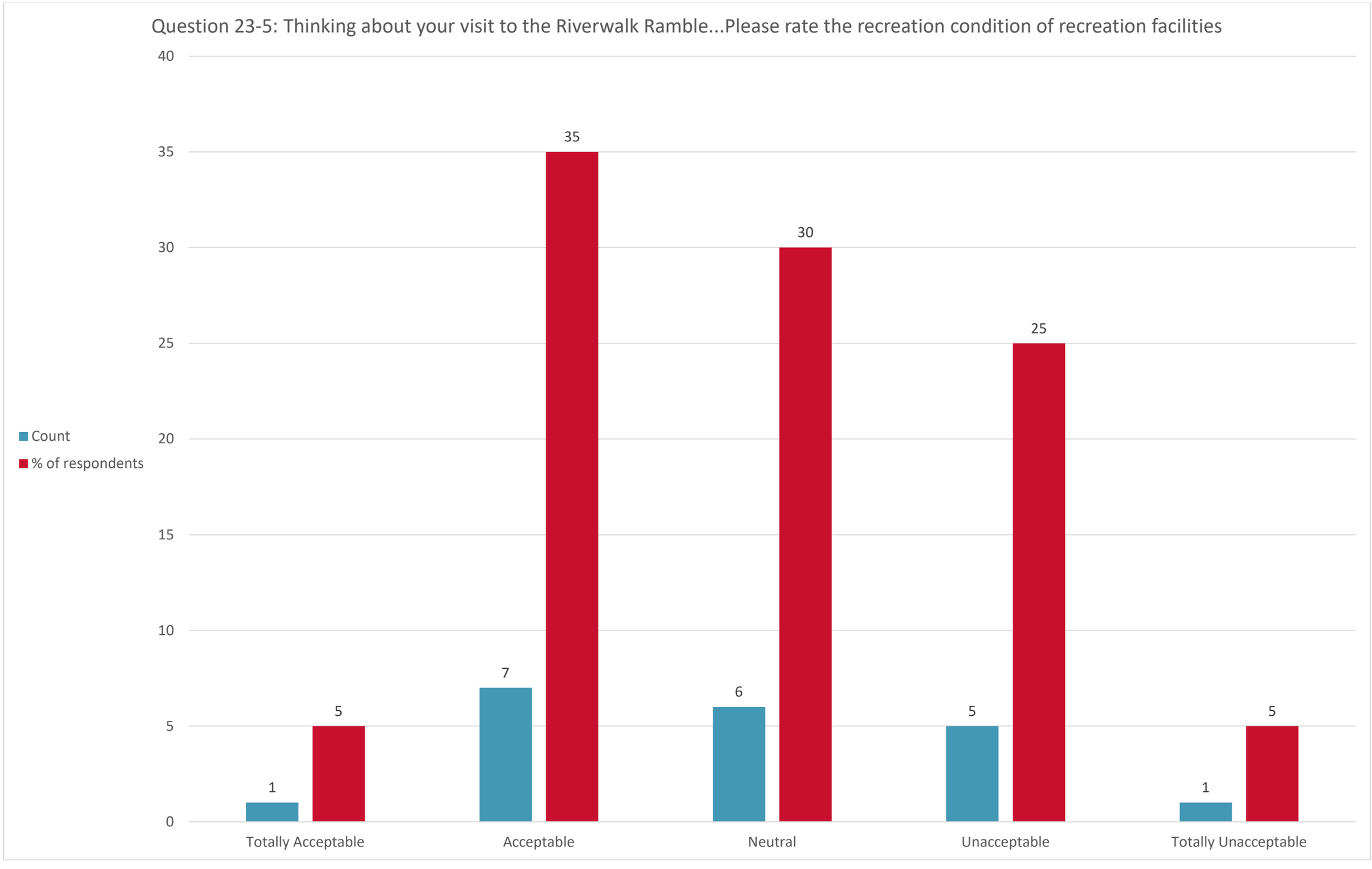

Question 22-8: Thinking about your NPS Walkway Tour experience...Please rate your overall experience:
70
60
50
40
30
20
10
0
Count
% of respondents
65.5
17.2
19
10.3
7
5
3
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

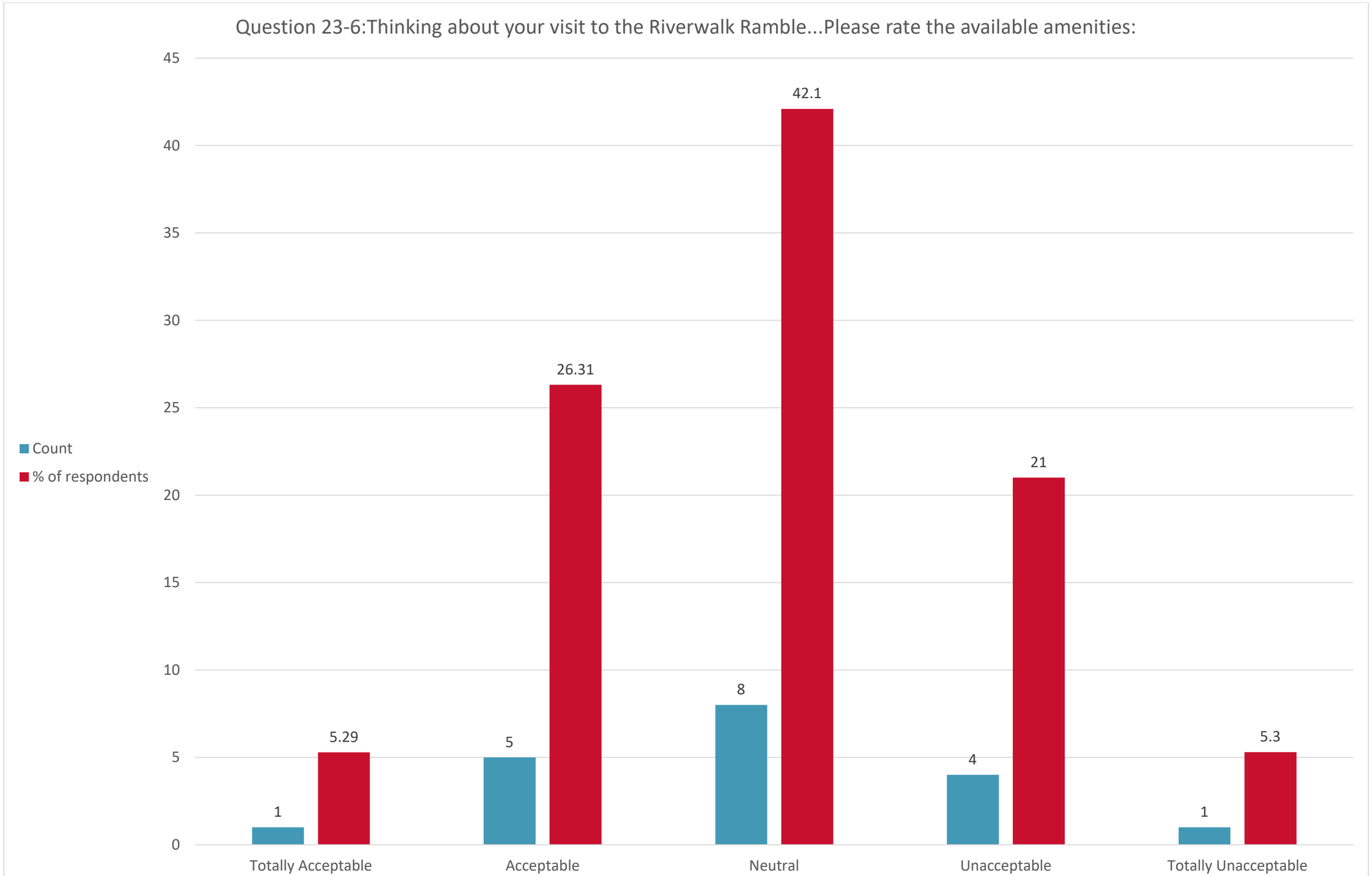

Question 23-1: Thinking about your visit to the Riverwalk Ramble...please rate the accessibility:
60
50
40
30
20
10
0
Count
% of respondents
1
5
8
40
10
50
1
5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

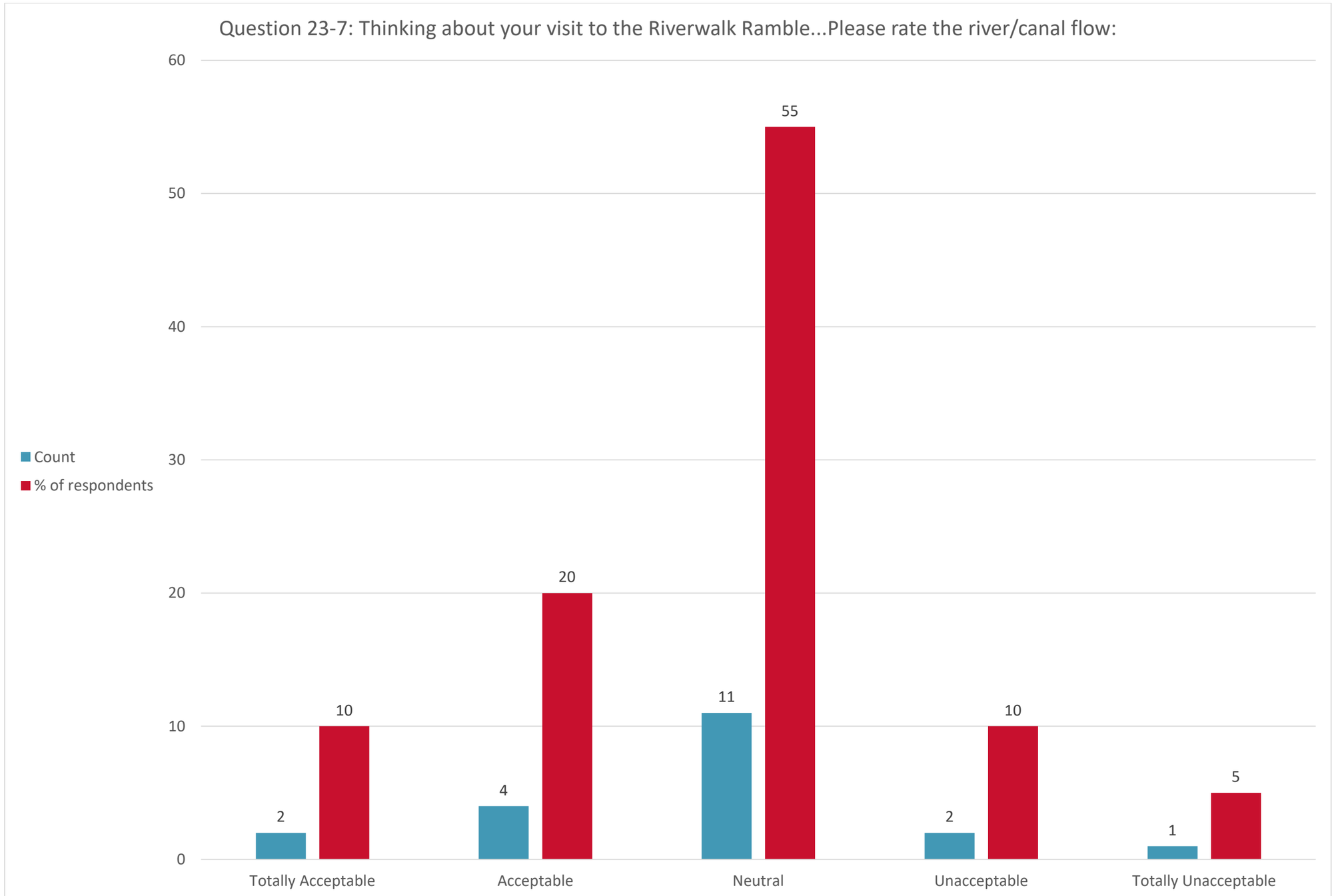

Question 23-2: Thinking about your visit to the Riverwalk Ramble...
Please rate the parking:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
0
0
6
30
9
45
3
15
2
10
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

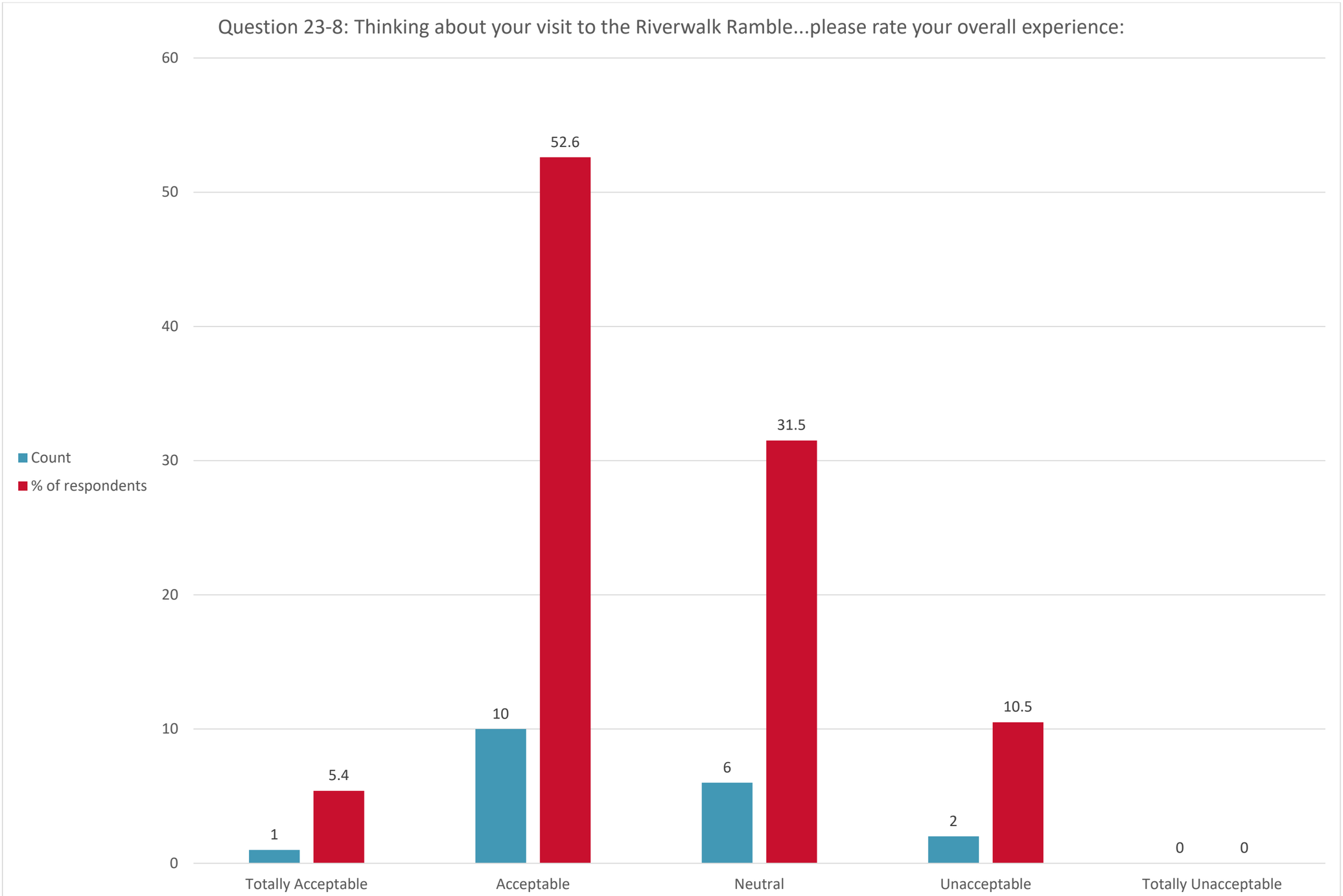

Question 23-3: Thinking about your visit to the Riverwalk Ramble...Please rate the crowding:
70
60
50
40
30
20
10
0
Count
% of respondents
65
20
4
13
2
10
1
5
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

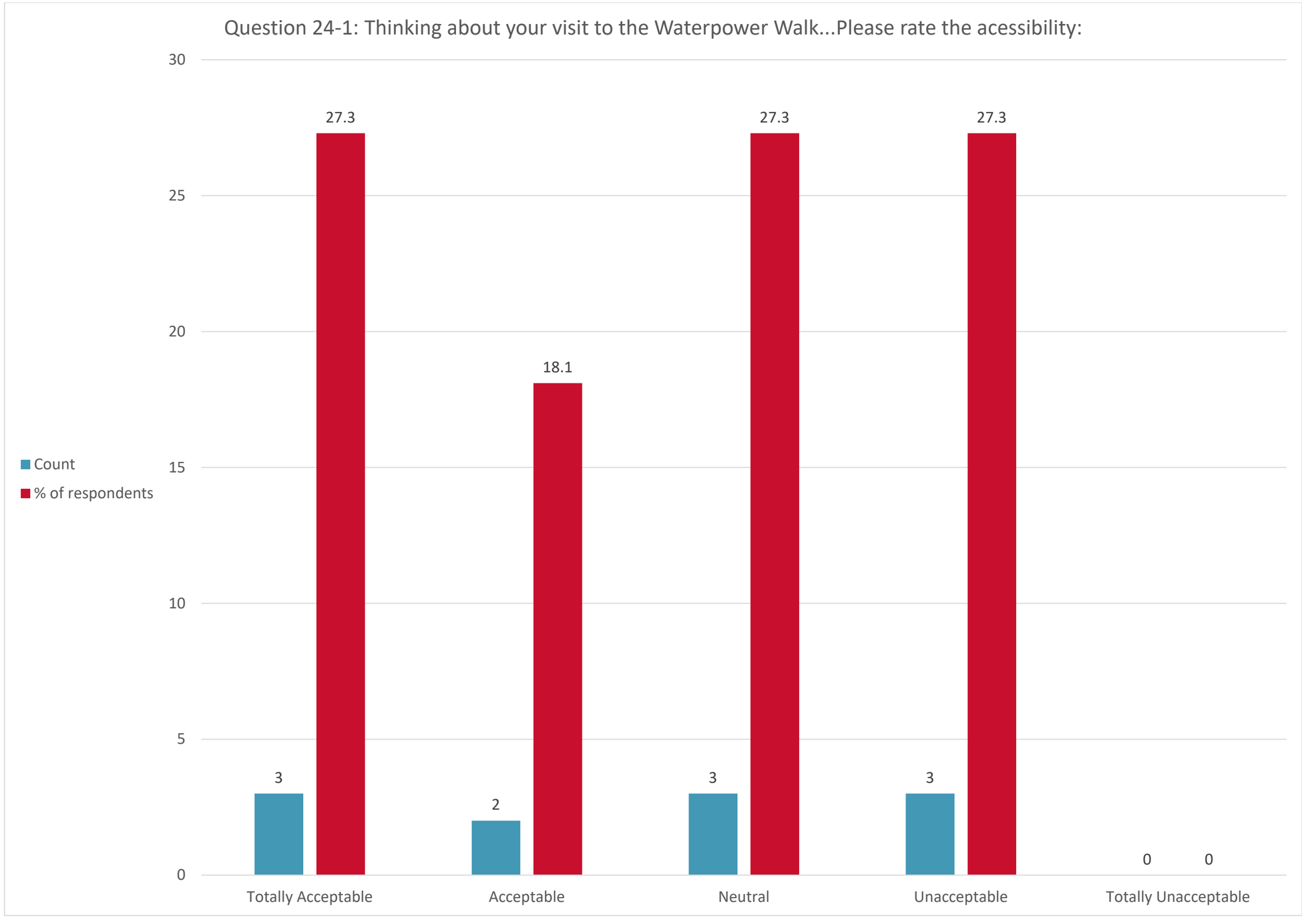

Question 23-4: Thinking about your visit to the Riverwalk Ramble...Please rate the safety:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
2
10
7
35
8
40
1
5
2
10
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

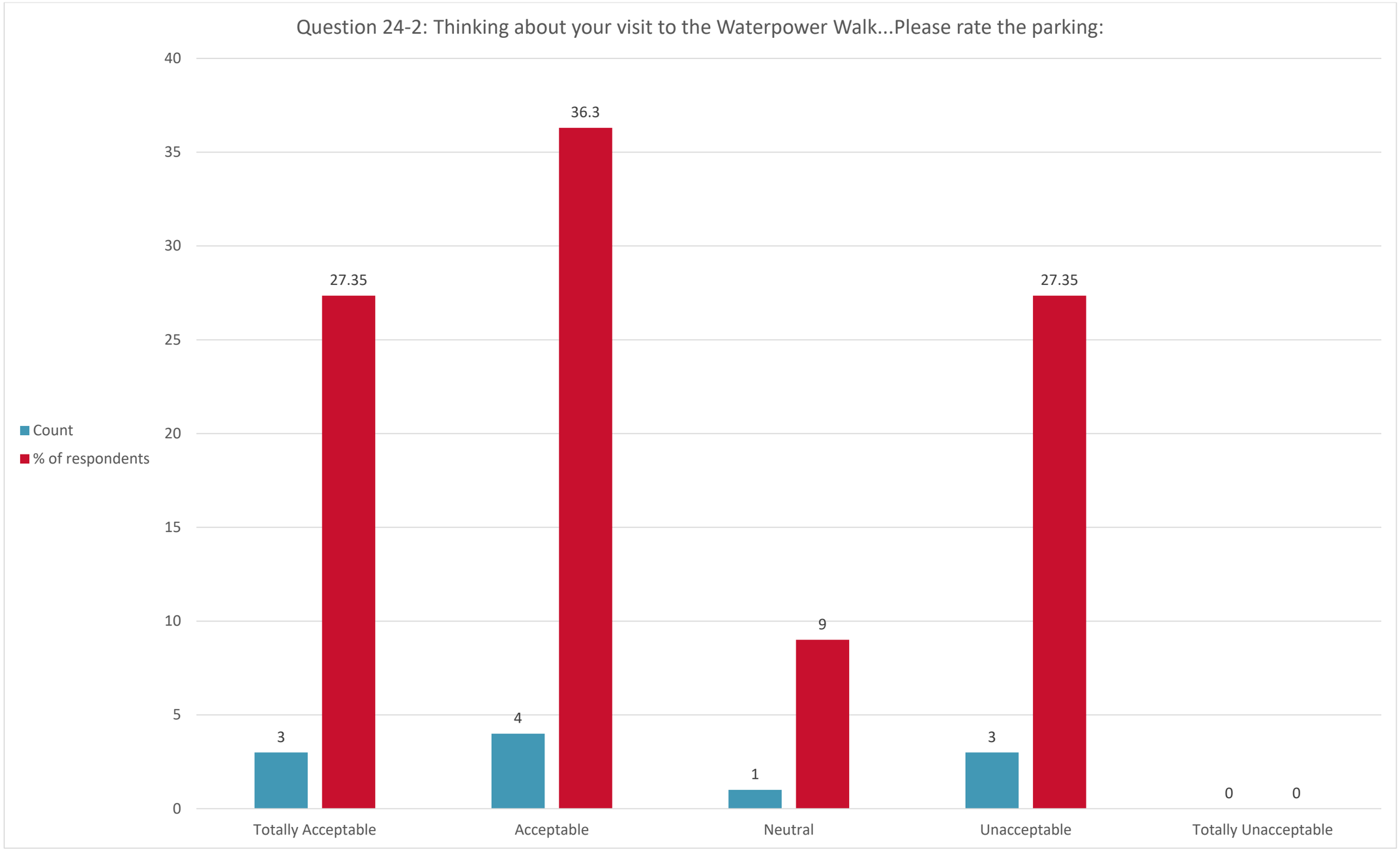

Question 23-5: Thinking about your visit to the Riverwalk Ramble...Please rate the recreation condition of recreation facilities
Count
% of respondents
40
35
30
25
20
15
10
5
0
35
30
25
7
6
5
5
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

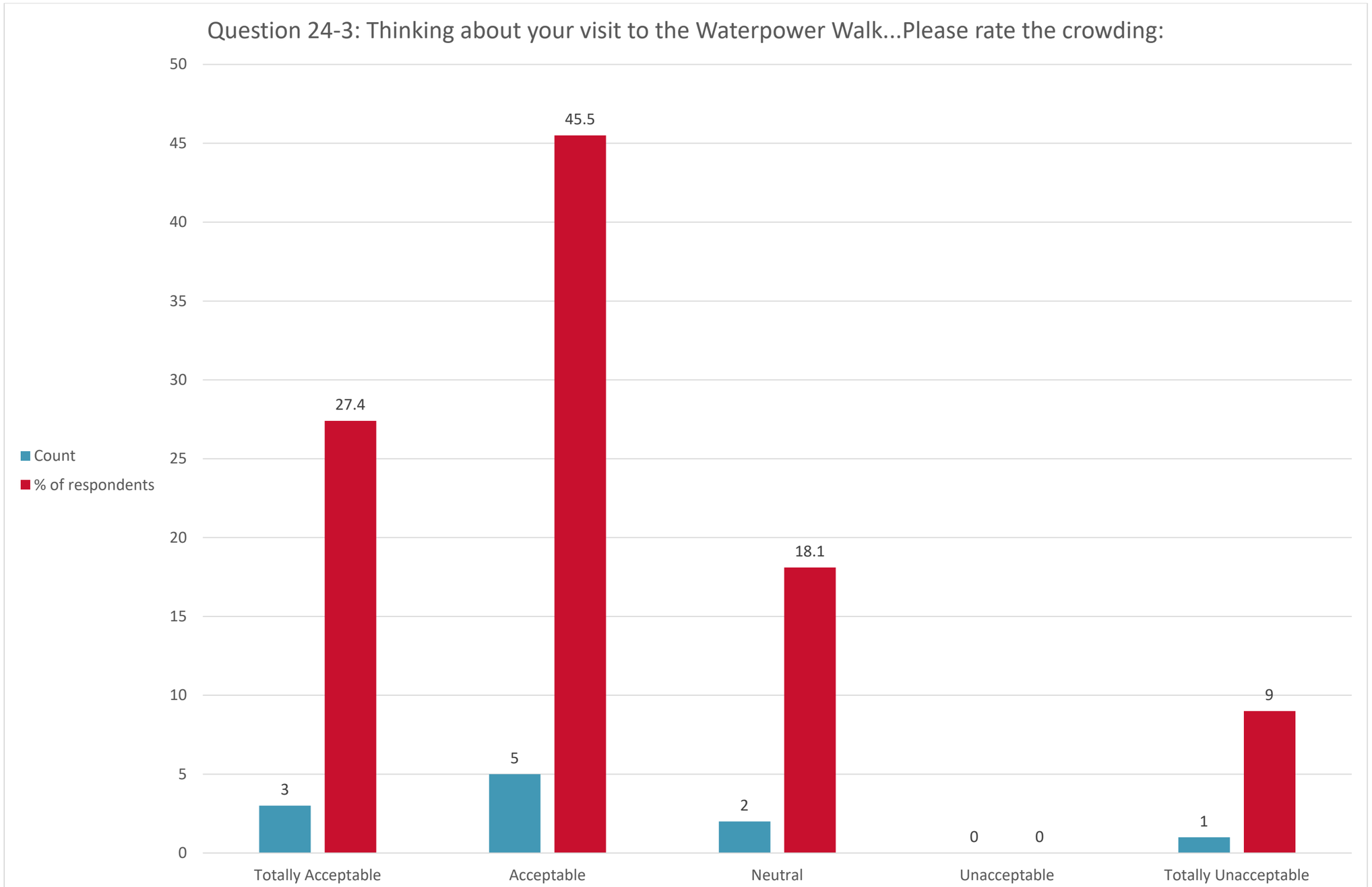

Question 23-6:Thinking about your visit to the Riverwalk Ramble...Please rate the available amenities:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
1
5.29
5
26.31
8
42.1
4
21
1
5.3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

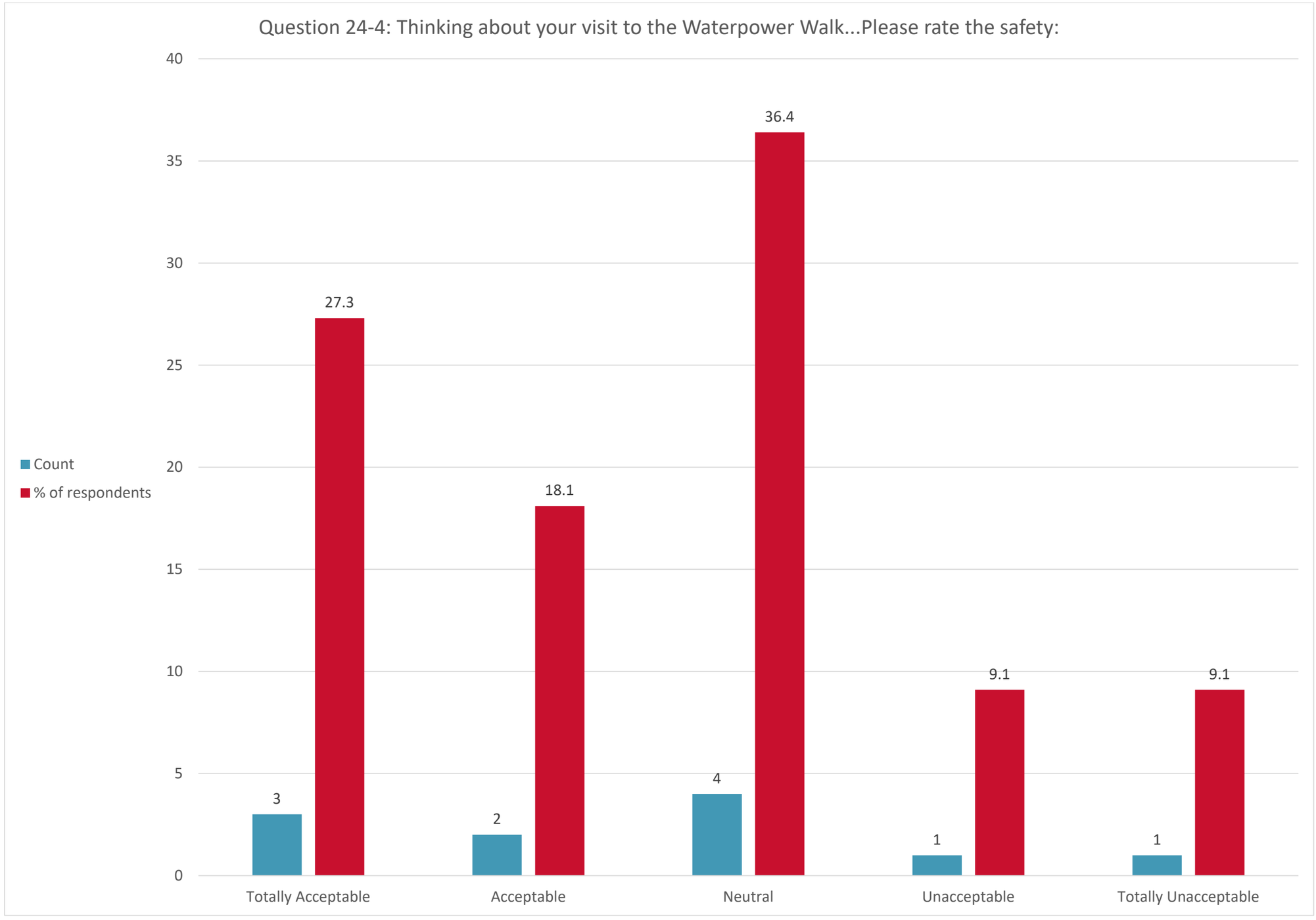

Question 23-7: Thinking about your visit to the Riverwalk Ramble...Please rate the river/canal flow:
Count
% of respondents
60
50
40
30
20
10
0
55
20
10
11
10
5
4
2
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

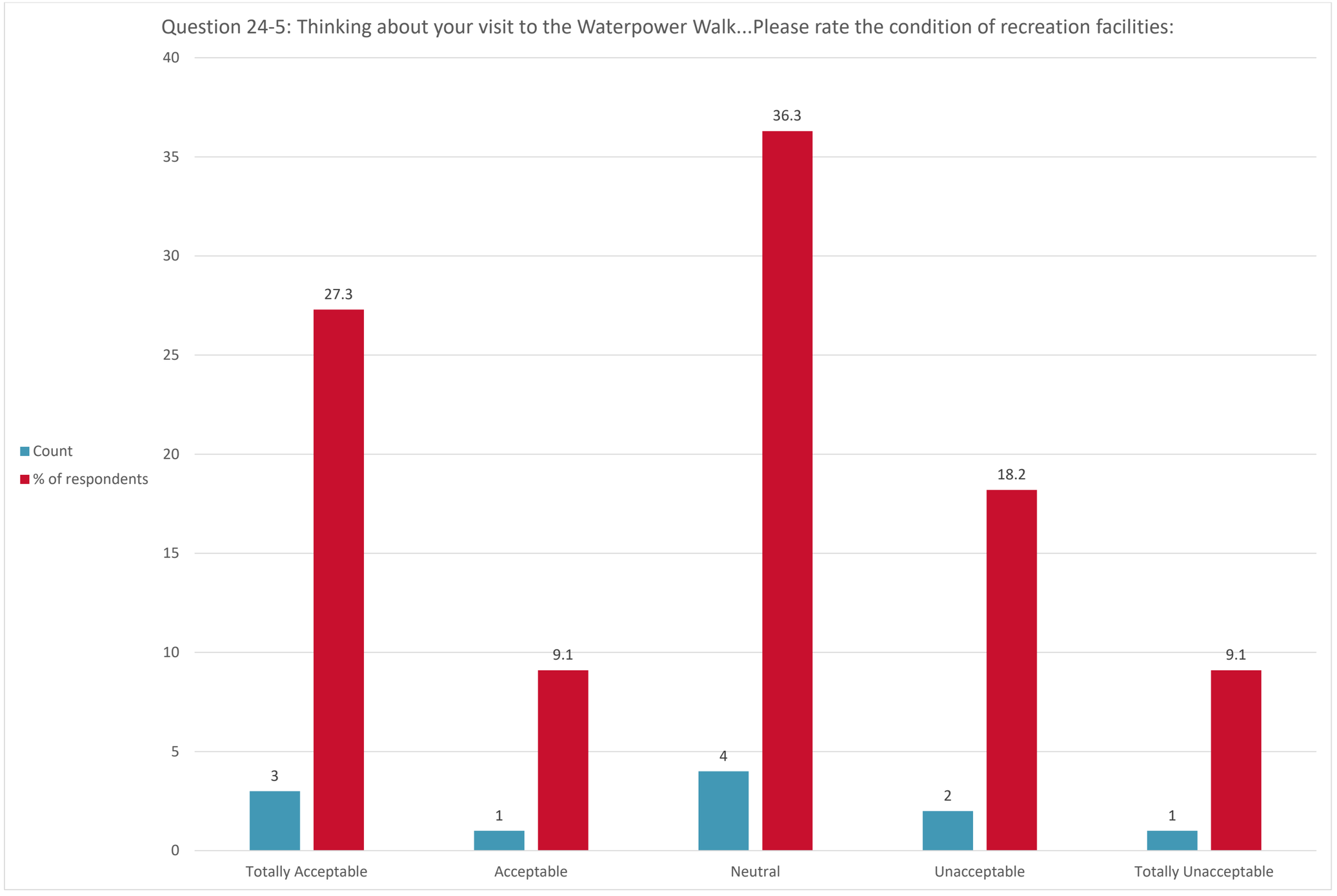

Question 23-8: Thinking about your visit to the Riverwalk Ramble...please rate your overall experience:
Count
% of respondents
60
50
40
30
20
10
0
52.6
31.5
10
5.4
6
1
2
10.5
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

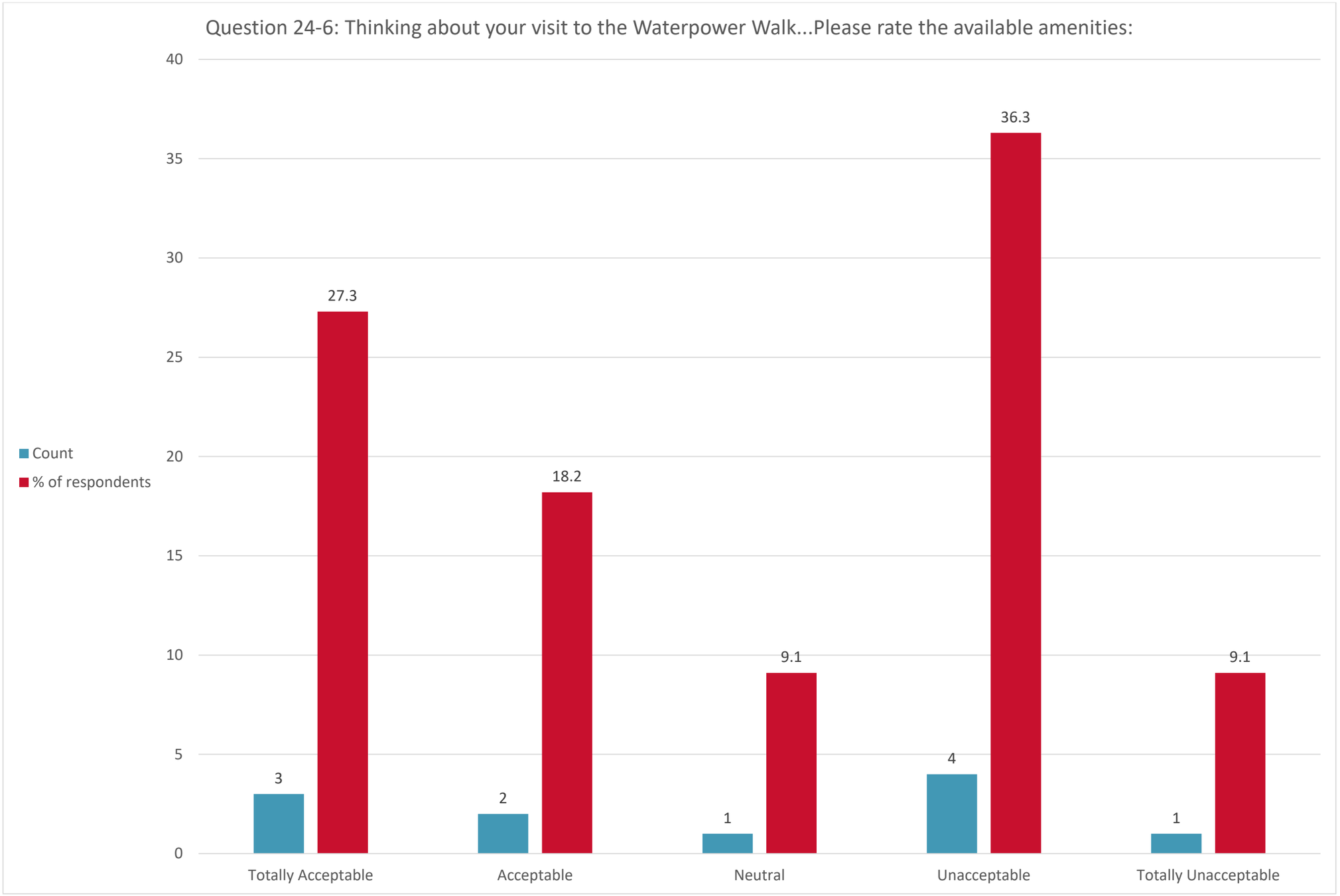

Question 24-1: Thinking about your visit to the Waterpower Walk...Please rate the acessibility:
Count
% of respondents
30
25
20
15
10
5
0
27.3
18.1
27.3
27.3
3
2
3
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

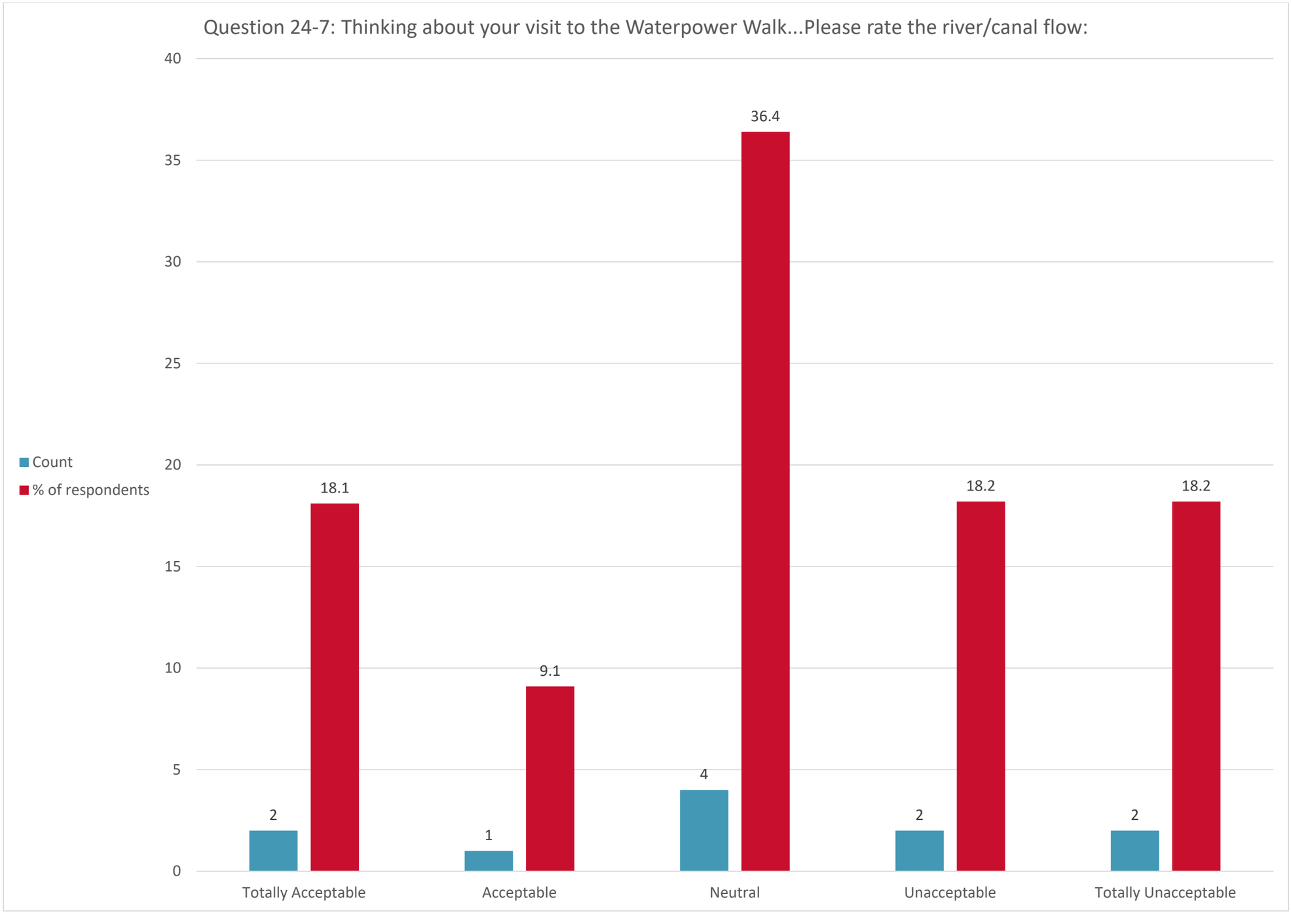

Question 24-2: Thinking about your visit to the Waterpower Walk...Please rate the parking:
Count
% of respondents
40
35
30
25
20
15
10
5
0
27.35
36.3
27.35
3
4
1
9
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

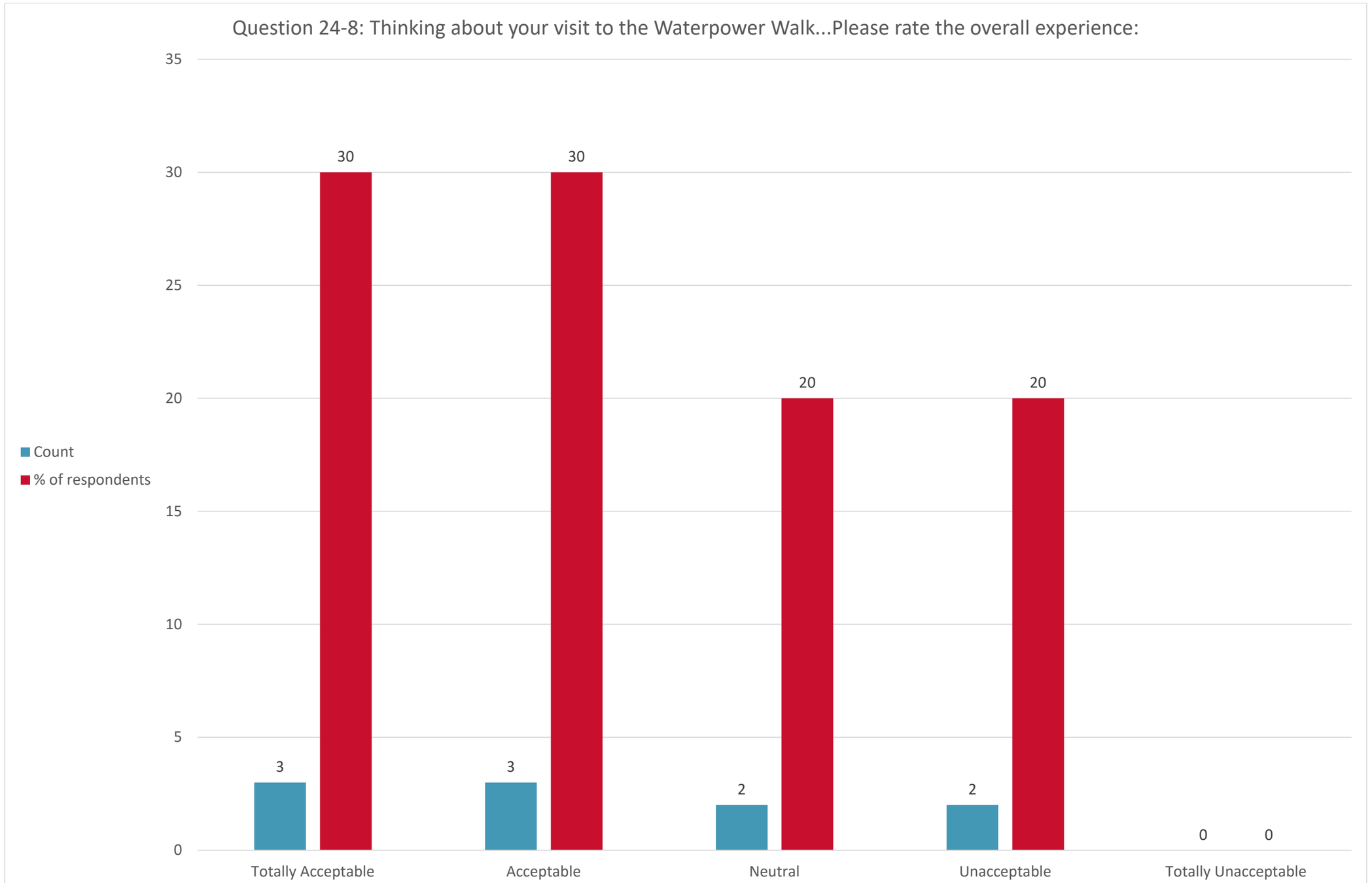

Question 24-3: Thinking about your visit to the Waterpower Walk...Please rate the crowding:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
27.4
45.5
18.1
3
5
2
0
0
1
9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

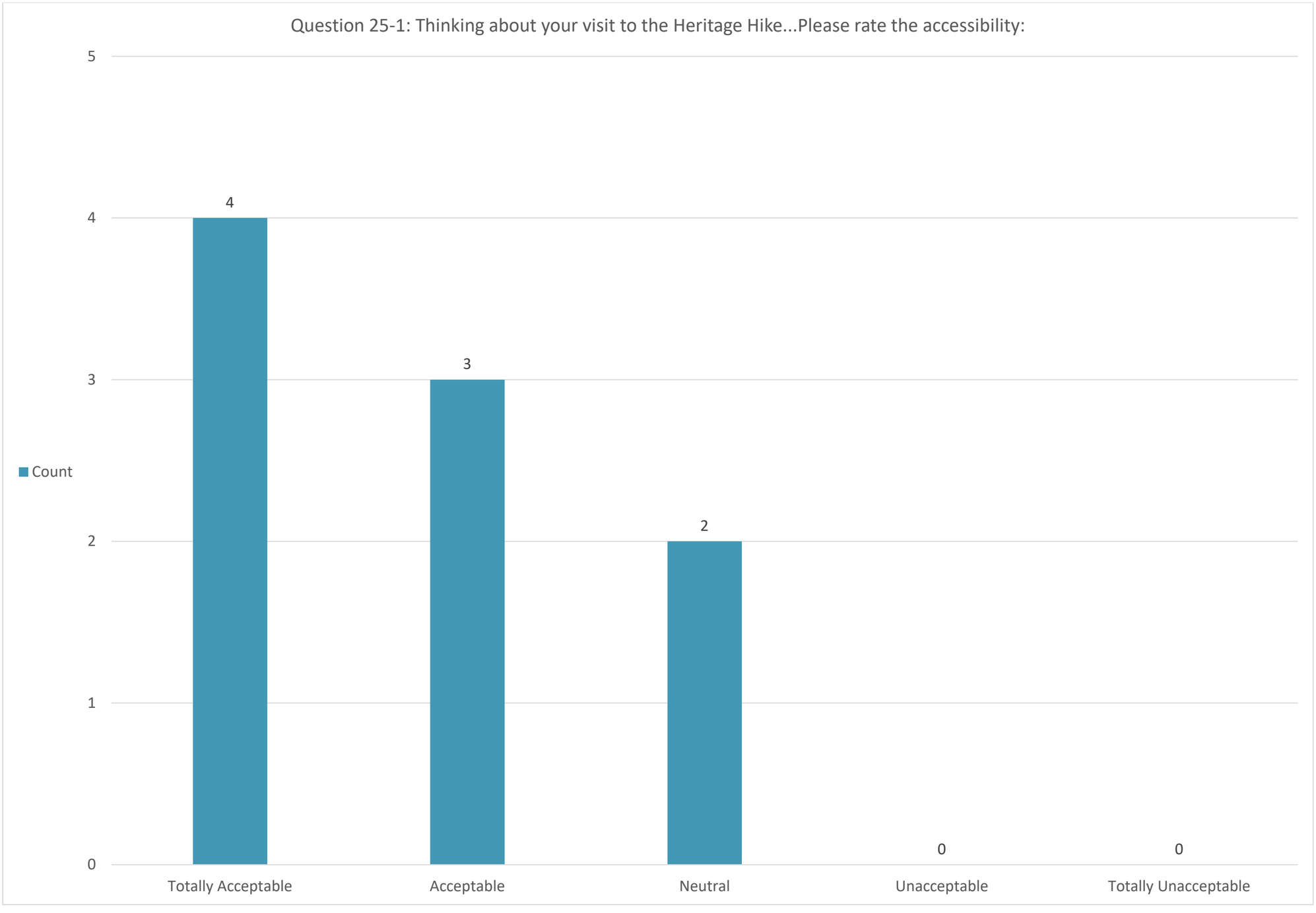

Question 24-4: Thinking about your visit to the Waterpower Walk...Please rate the safety:
Count
% of respondents
40
35
30
25
20
15
10
5
0
27.3
36.4
18.1
9.1
9.1
3
2
4
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

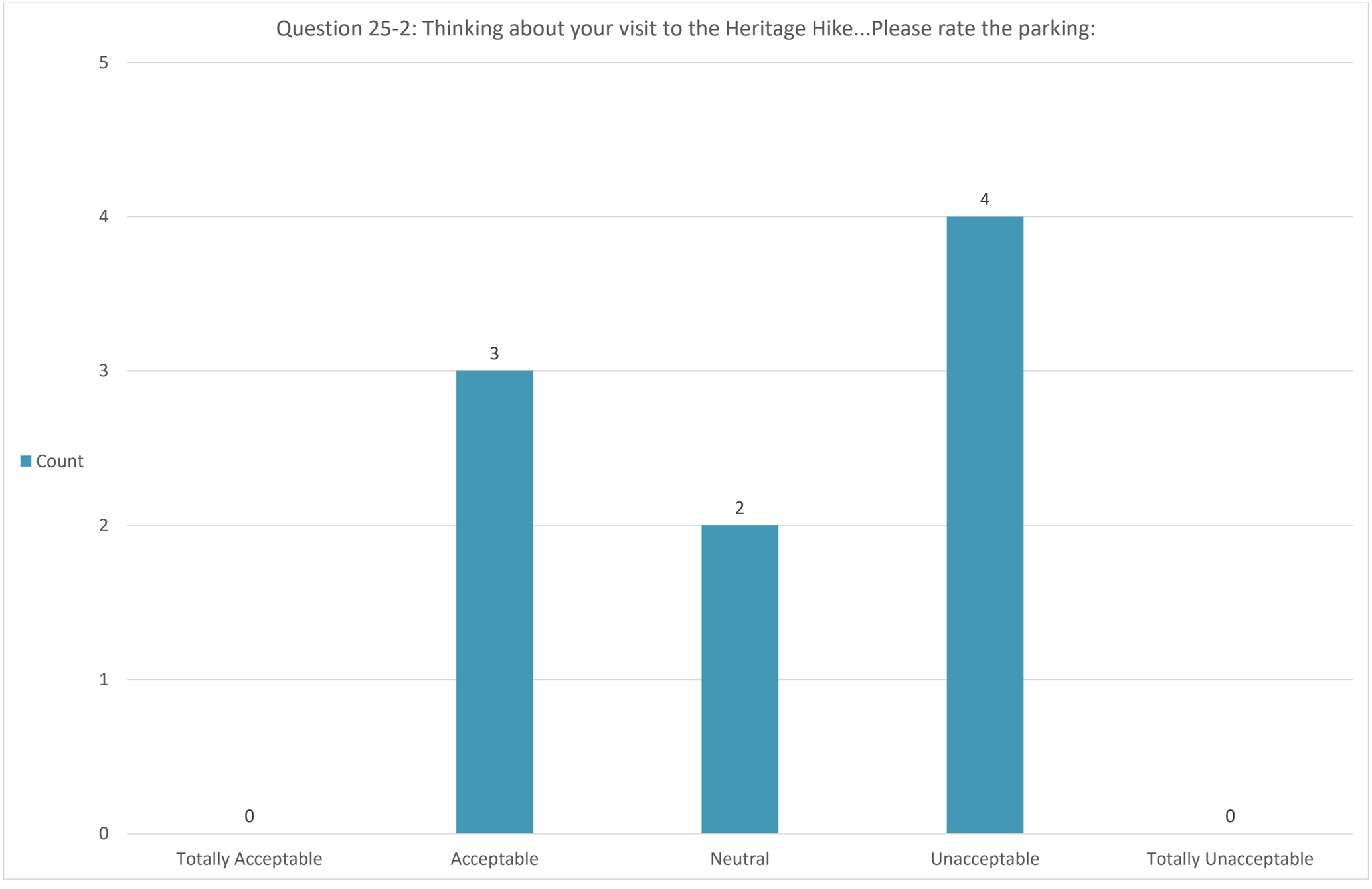

Question 24-5: Thinking about your visit to the Waterpower Walk...Please rate the condition of recreation facilities:
Count
% of respondents
40
35
30
25
20
15
10
5
0
27.3
36.3
18.2
9.1
9.1
3
1
4
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

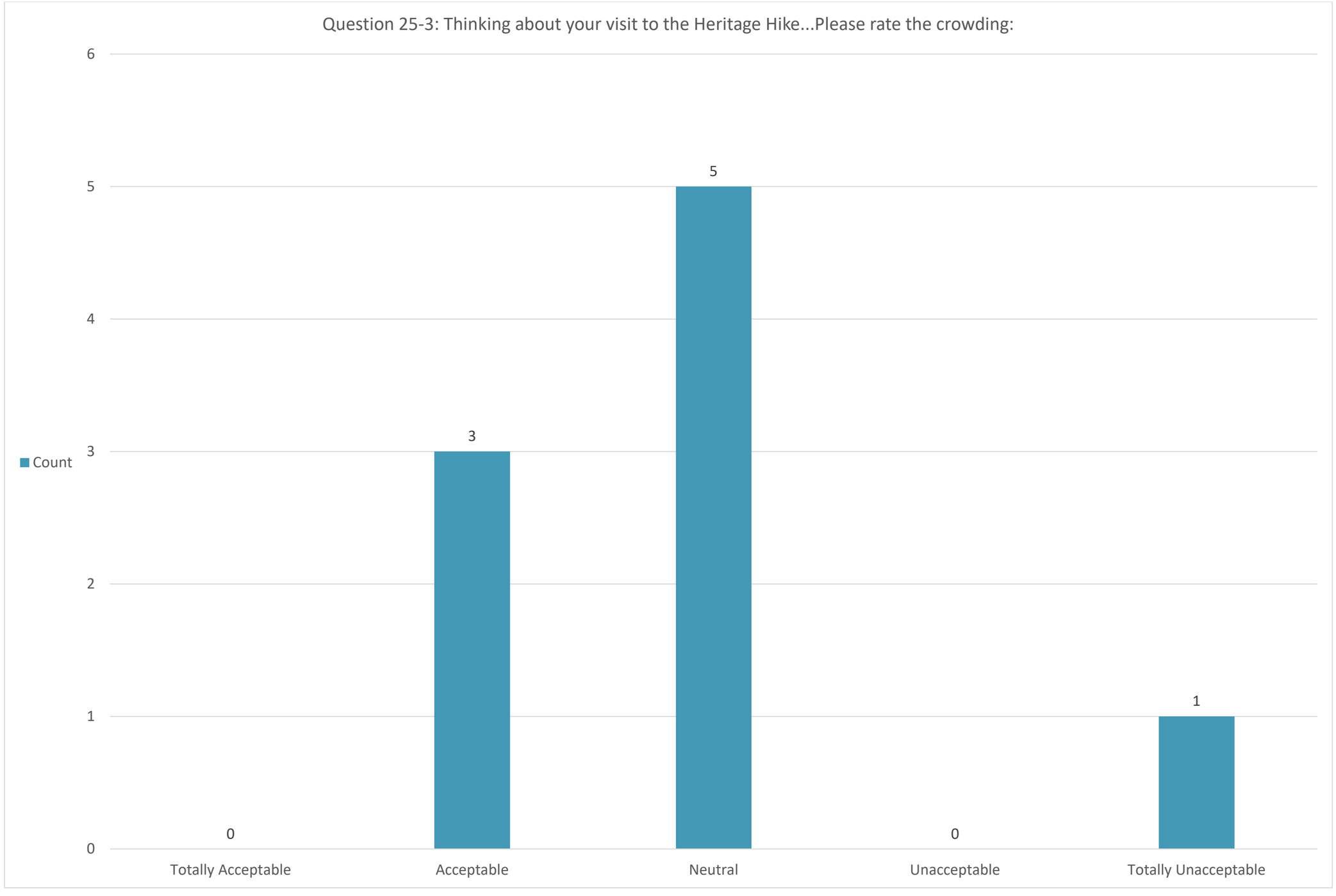

Question 24-6: Thinking about your visit to the Waterpower Walk...Please rate the available amenities:
Count
% of respondents
40
35
30
25
20
15
10
5
0
27.3
18.2
9.1
36.3
9.1
3
2
1
4
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

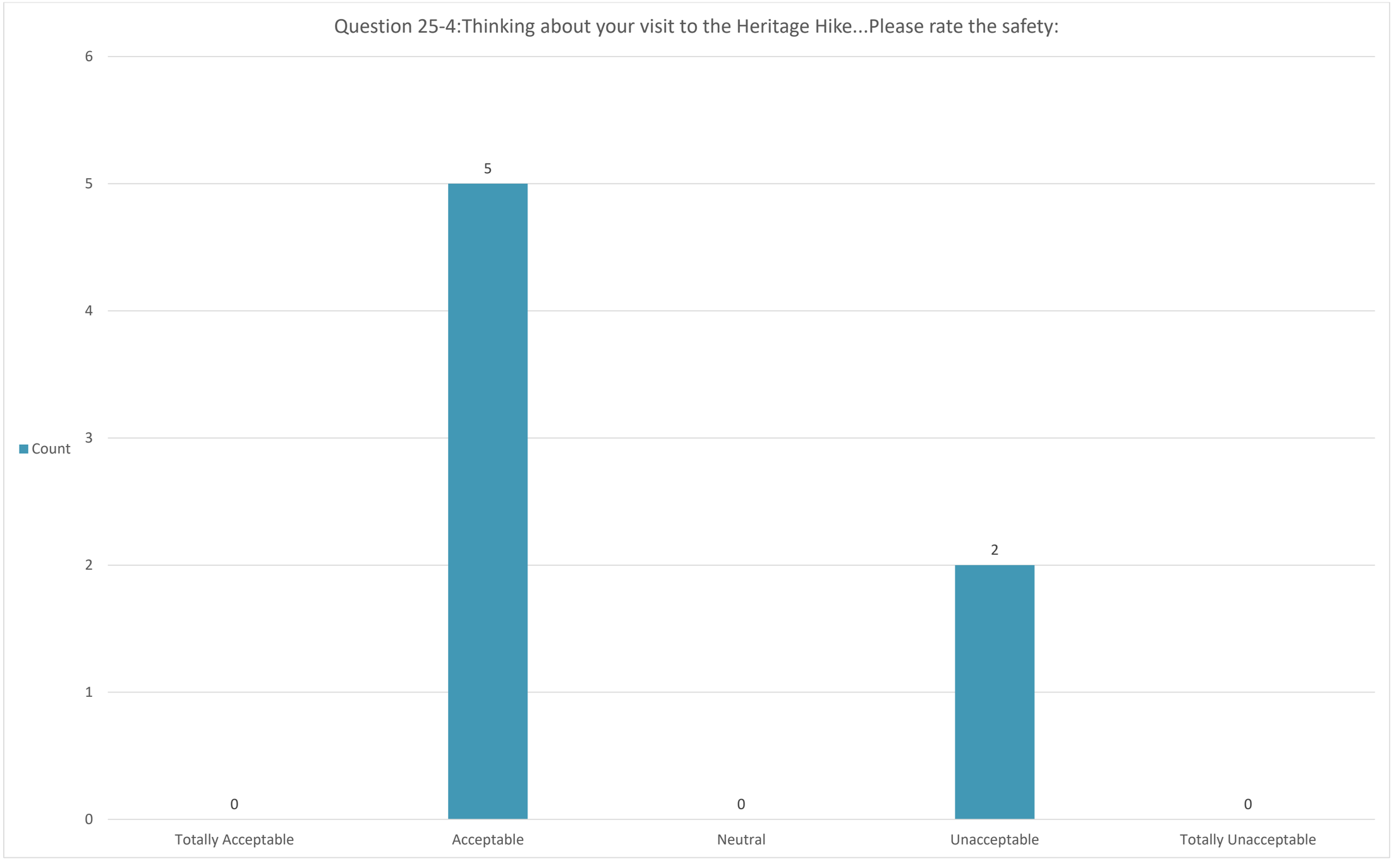

Question 24-7: Thinking about your visit to the Waterpower Walk...Please rate the river/canal flow:
Count
% of respondents
40
35
30
25
20
15
10
5
0
36.4
18.1
9.1
4
18.2
18.2
2
1
2
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

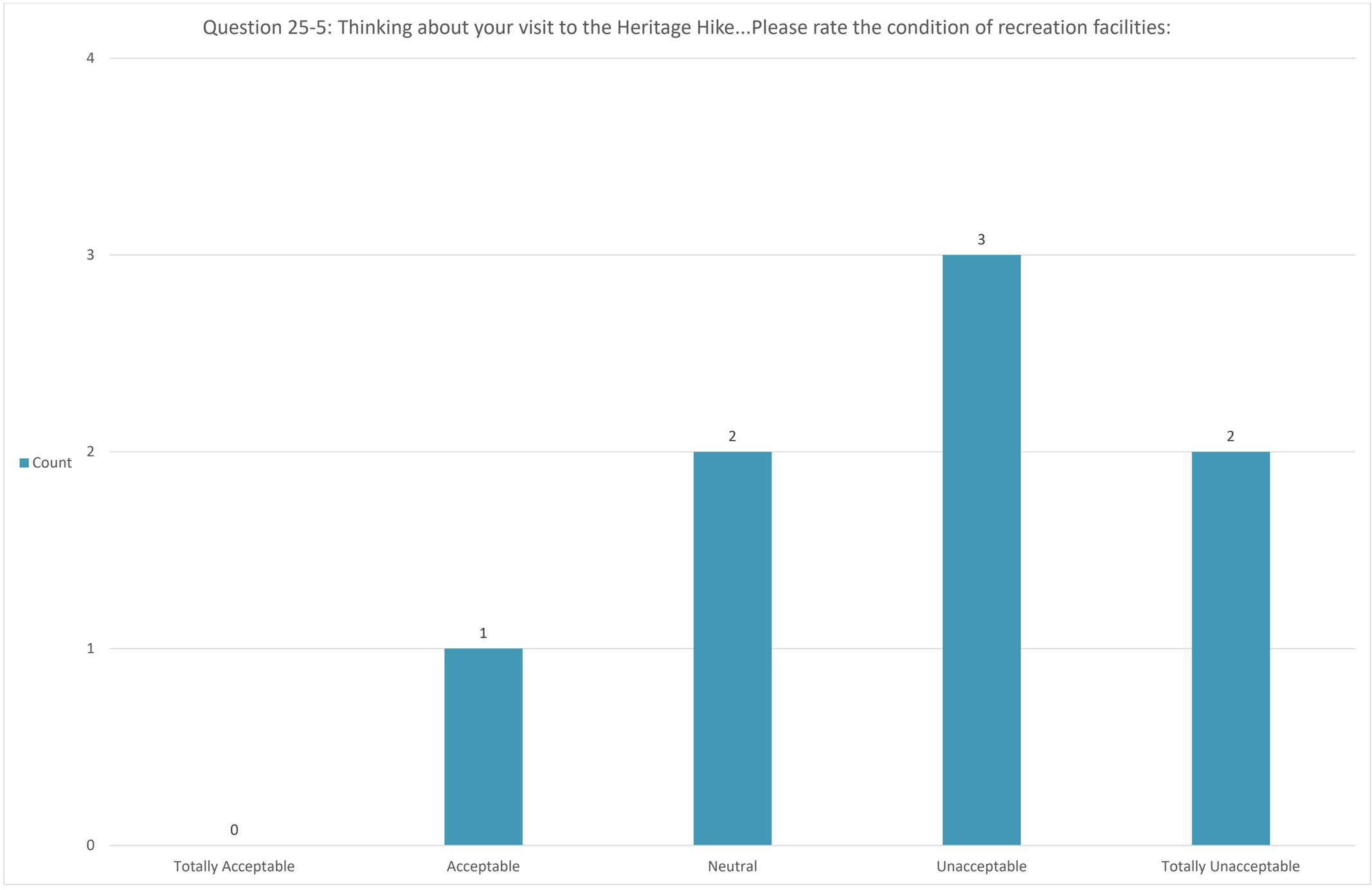

Question 24-8: Thinking about your visit to the Waterpower Walk...Please rate the overall experience:
35
30
25
20
15
10
5
0
Count
% of respondents
30
30
20
20
3
3
2
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

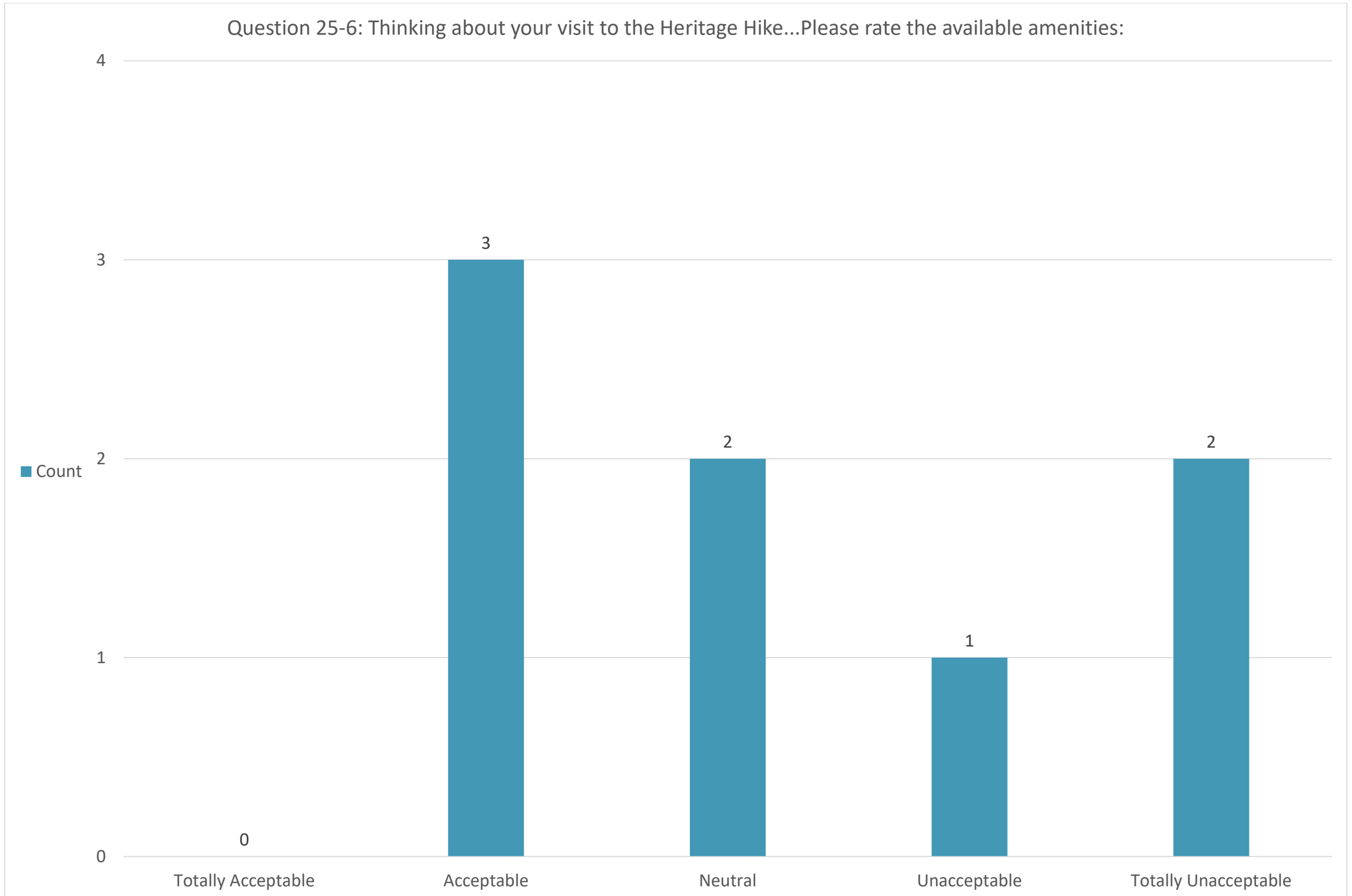

Question 25-1: Thinking about your visit to the Heritage Hike...Please rate the accessibility:
5
4
3
2
1
0
Count
4
3
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

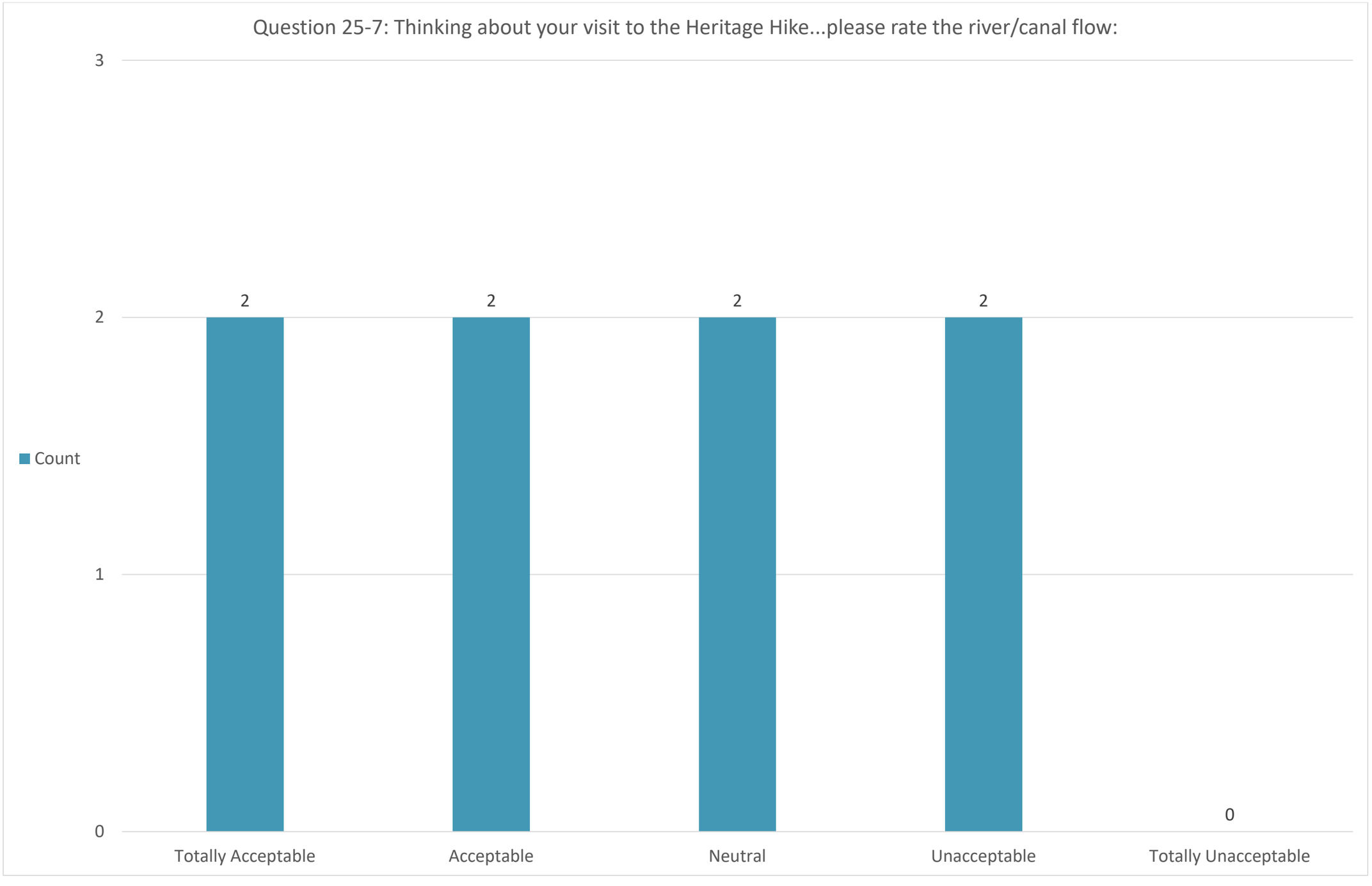

Question 25-2: Thinking about your visit to the Heritage Hike...Please rate the parking:
5
4
3
2
1
0
Count
0
3
2
4
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

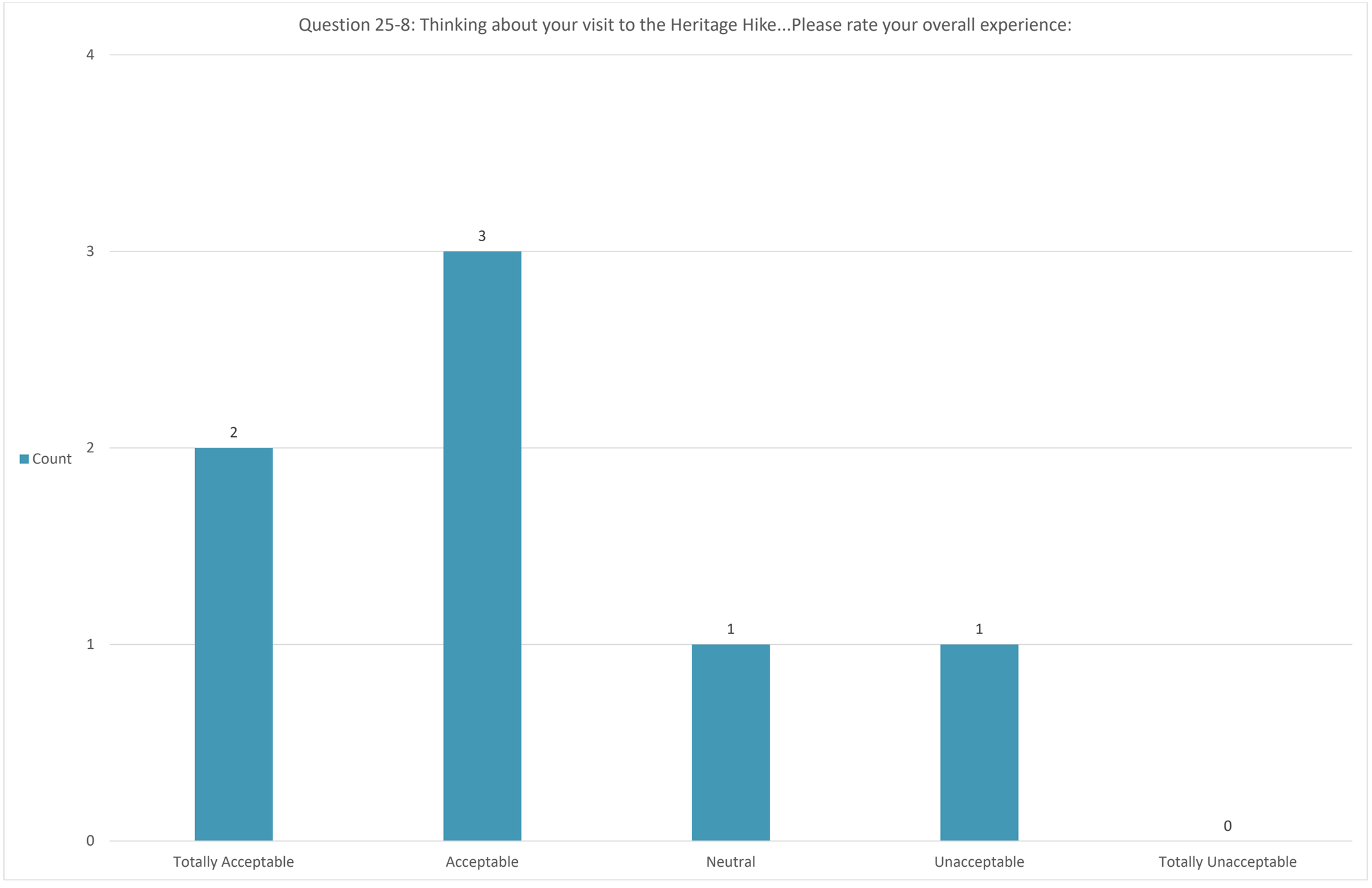

Question 25-3: Thinking about your visit to the Heritage Hike...Please rate the crowding:
6
5
4
3
2
1
0
Count
0
3
5
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

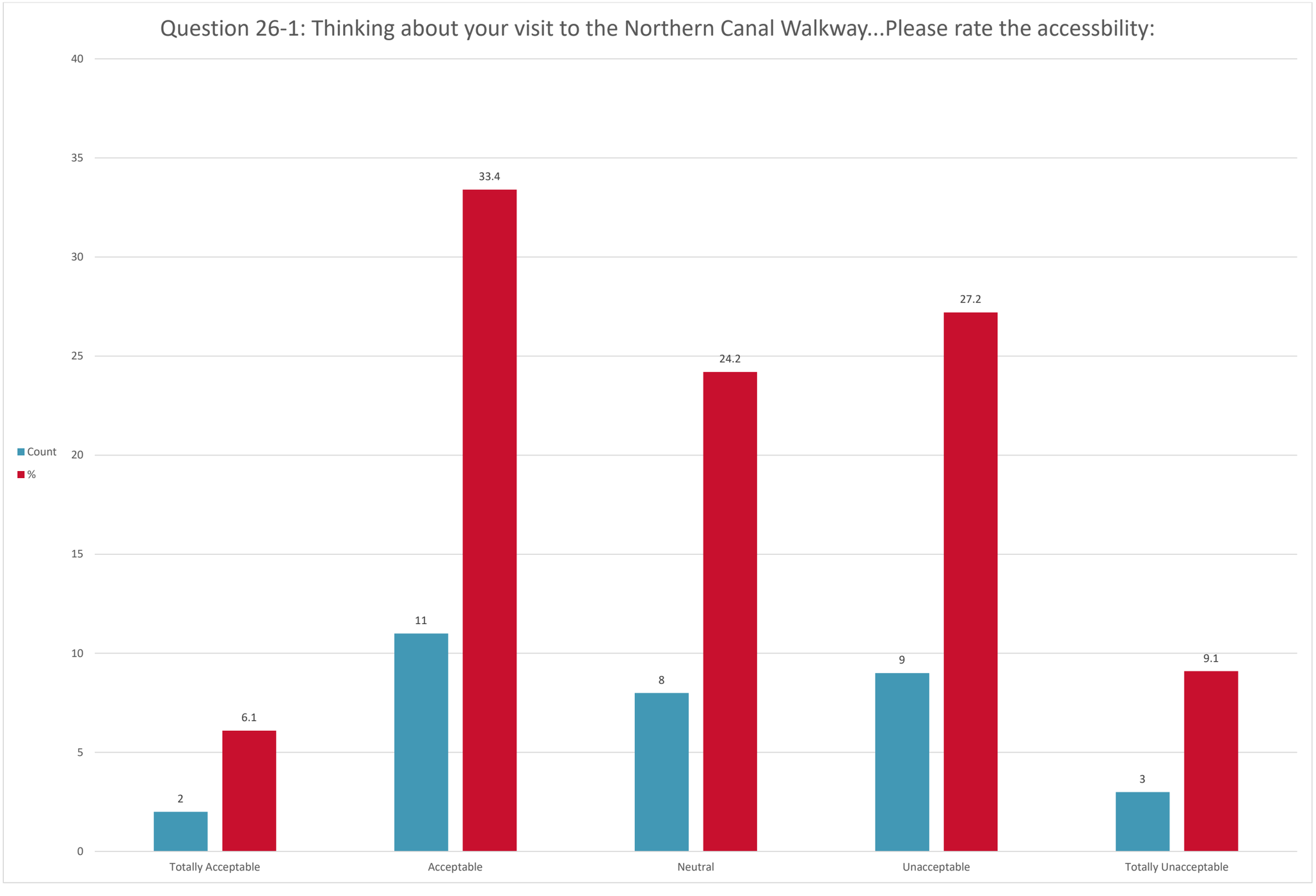

Question 25-4:Thinking about your visit to the Heritage Hike...Please rate the safety:
6
5
4
3
2
1
0
Count
5
2
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

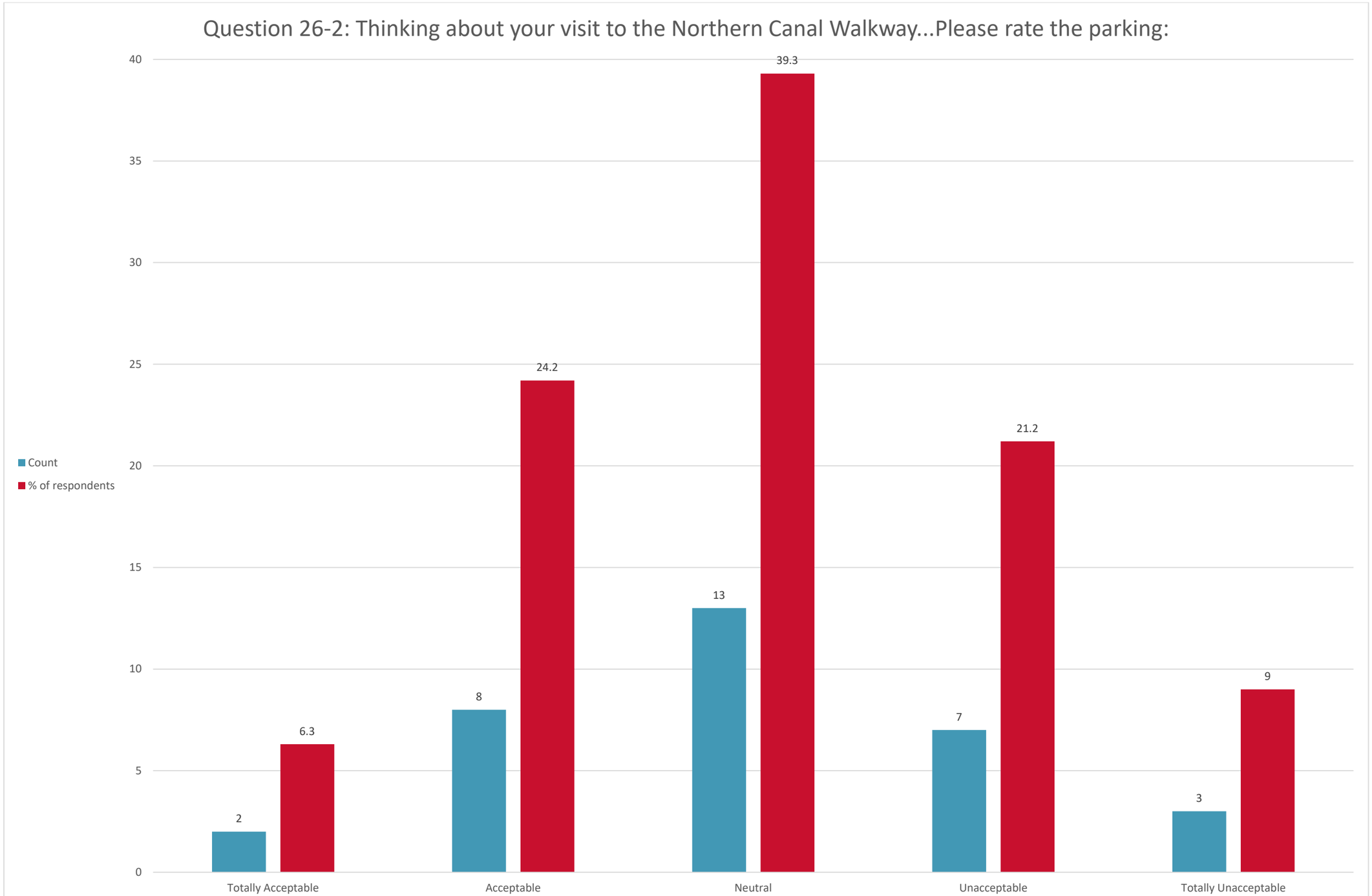

Question 25-5: Thinking about your visit to the Heritage Hike...Please rate the condition of recreation facilities:
Count
4
3
2
1
0
0
1
2
3
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

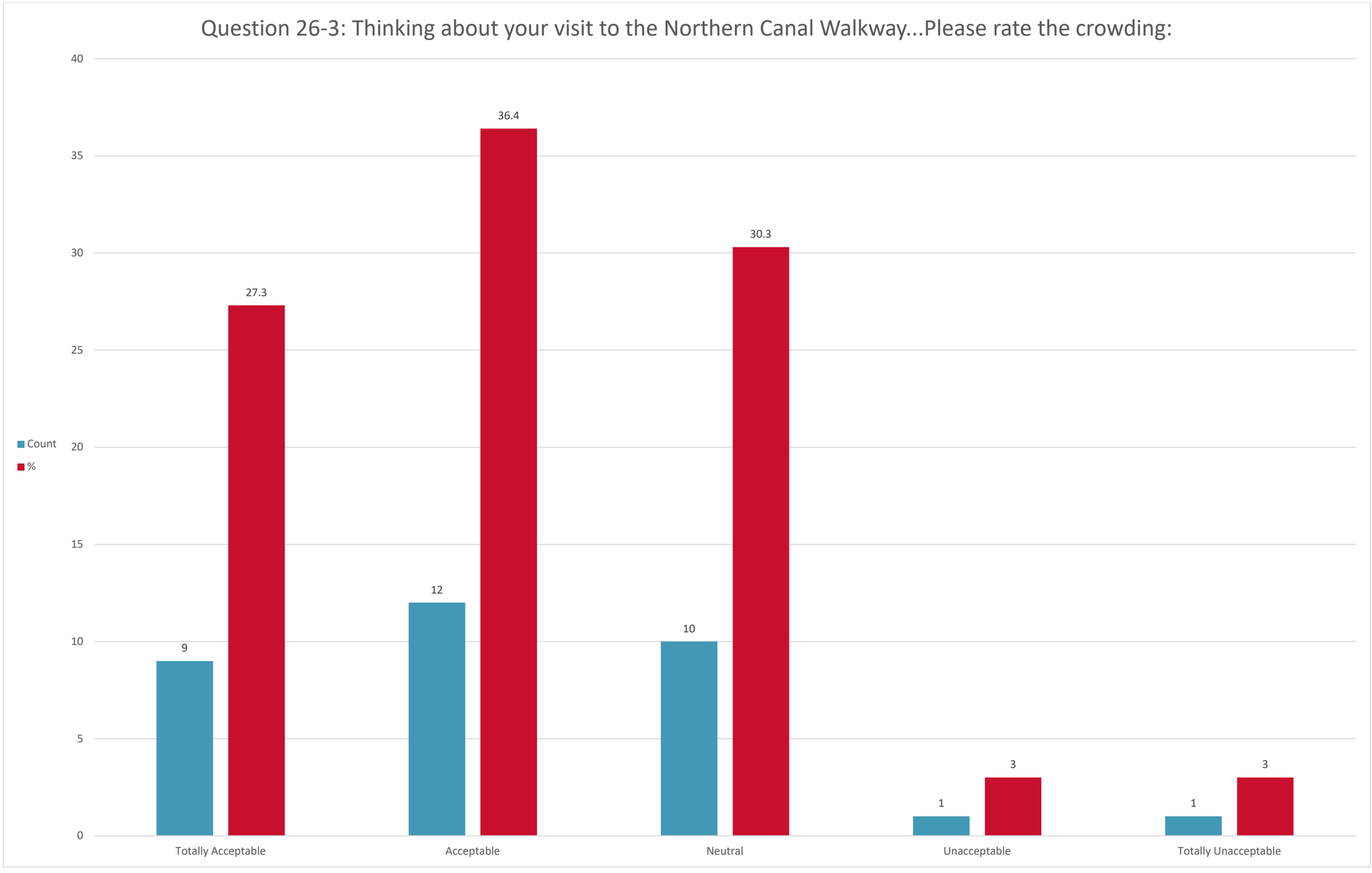

Question 25-6: Thinking about your visit to the Heritage Hike...Please rate the available amenities:
Count
4
3
2
1
0
0
3
2
1
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

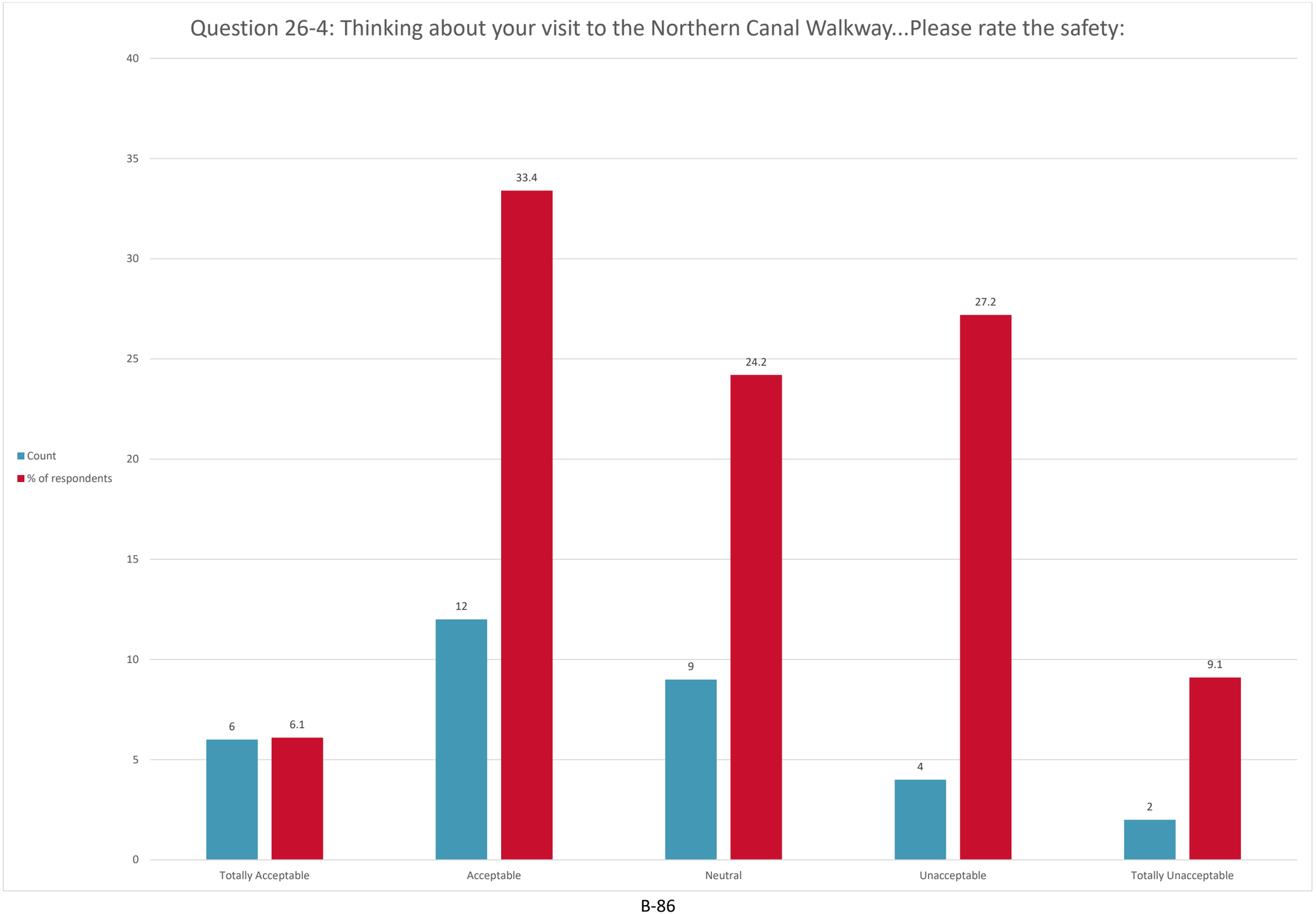

Question 25-7: Thinking about your visit to the Heritage Hike...please rate the river/canal flow:
3
2
1
0
Count
2
2
2
2
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

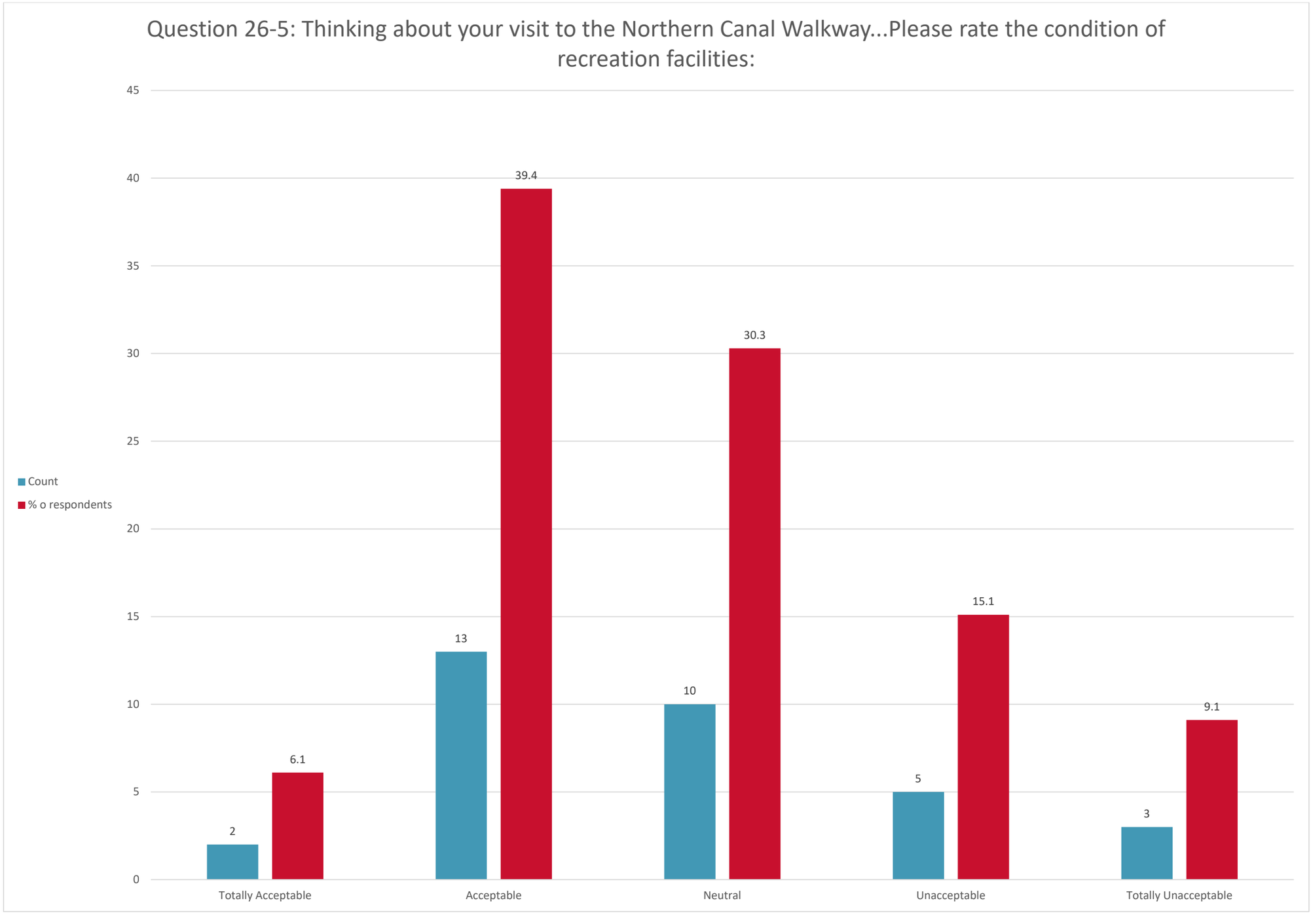

Question 25-8: Thinking about your visit to the Heritage Hike...Please rate your overall experience:
Count
4
3
2
1
0
2
3
1
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

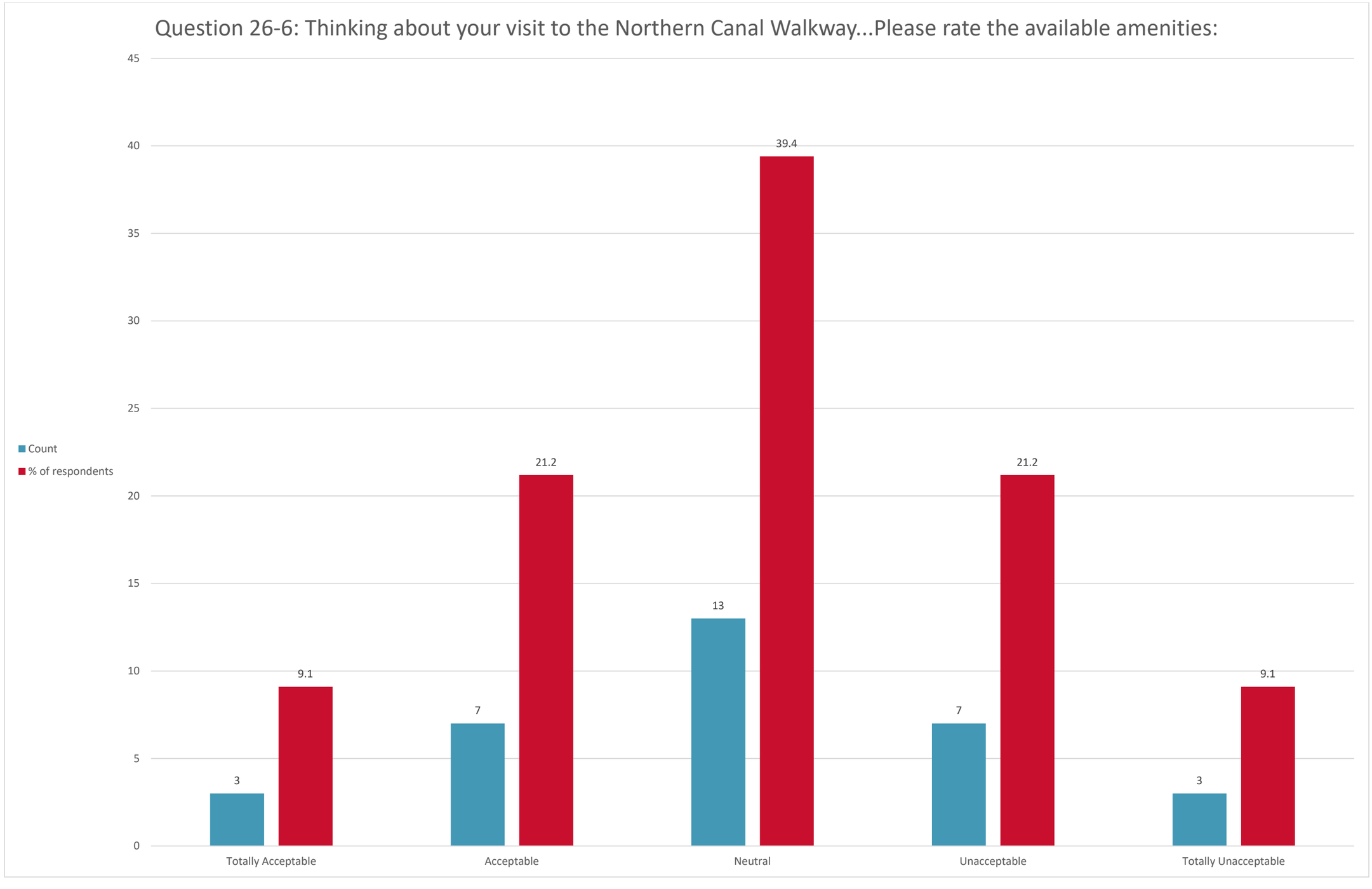

Question 26-1: Thinking about your visit to the Northern Canal Walkway...Please rate the accessbility:
Count
%
40
35
30
25
20
15
10
5
0
33.4
24.2
27.2
11
8
9
9.1
6.1
2
3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

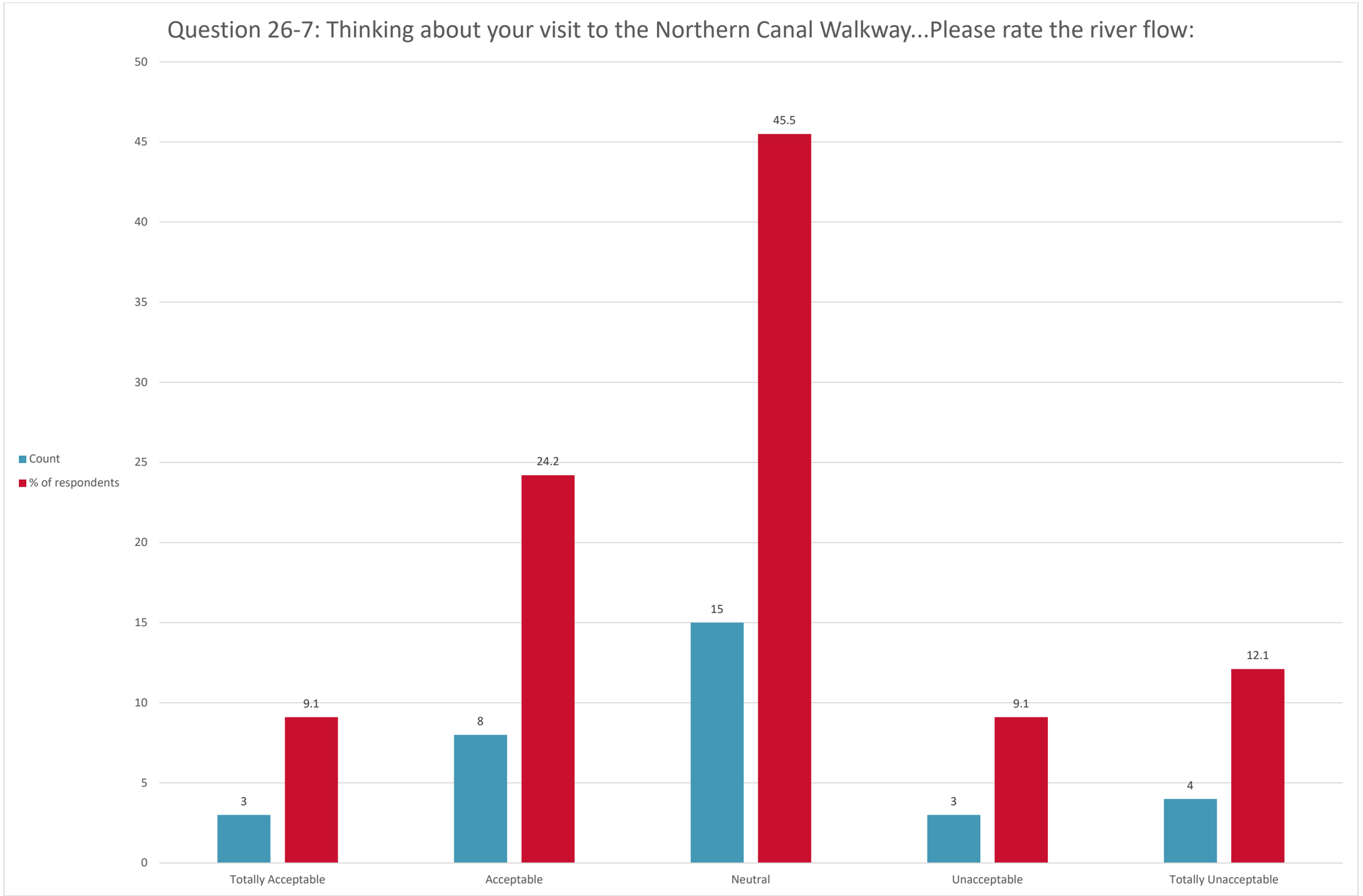

Question 26-2: Thinking about your visit to the Northern Canal Walkway...Please rate the parking:
Count
% of respondents
40
35
30
25
20
15
10
5
0
2
6.3
8
24.2
13
39.3
7
21.2
3
9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

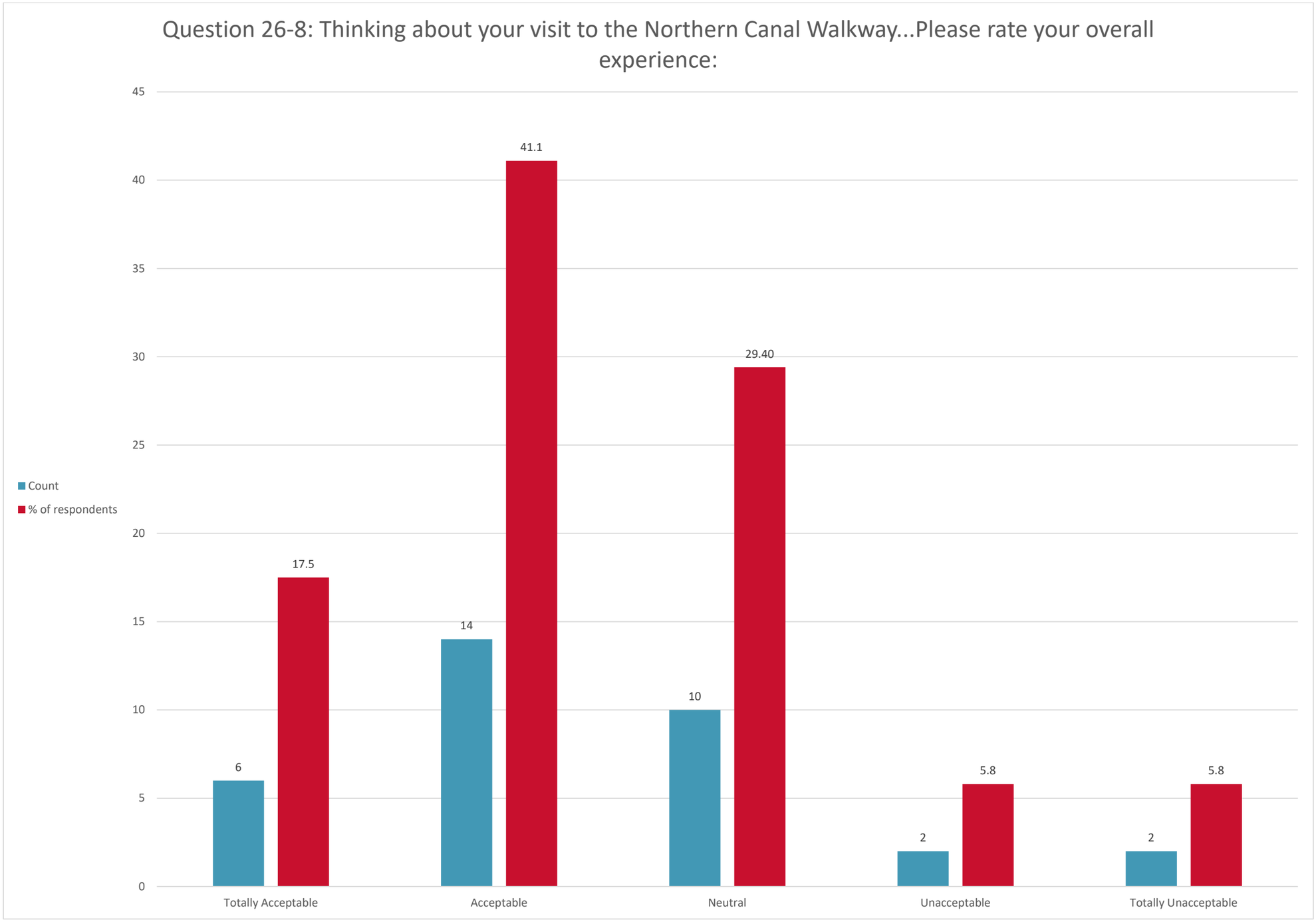

Question 26-3: Thinking about your visit to the Northern Canal Walkway...Please rate the crowding:
Count
%
40
35
30
25
20
15
10
5
0
27.3
36.4
30.3
9
12
10
1
3
1
3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

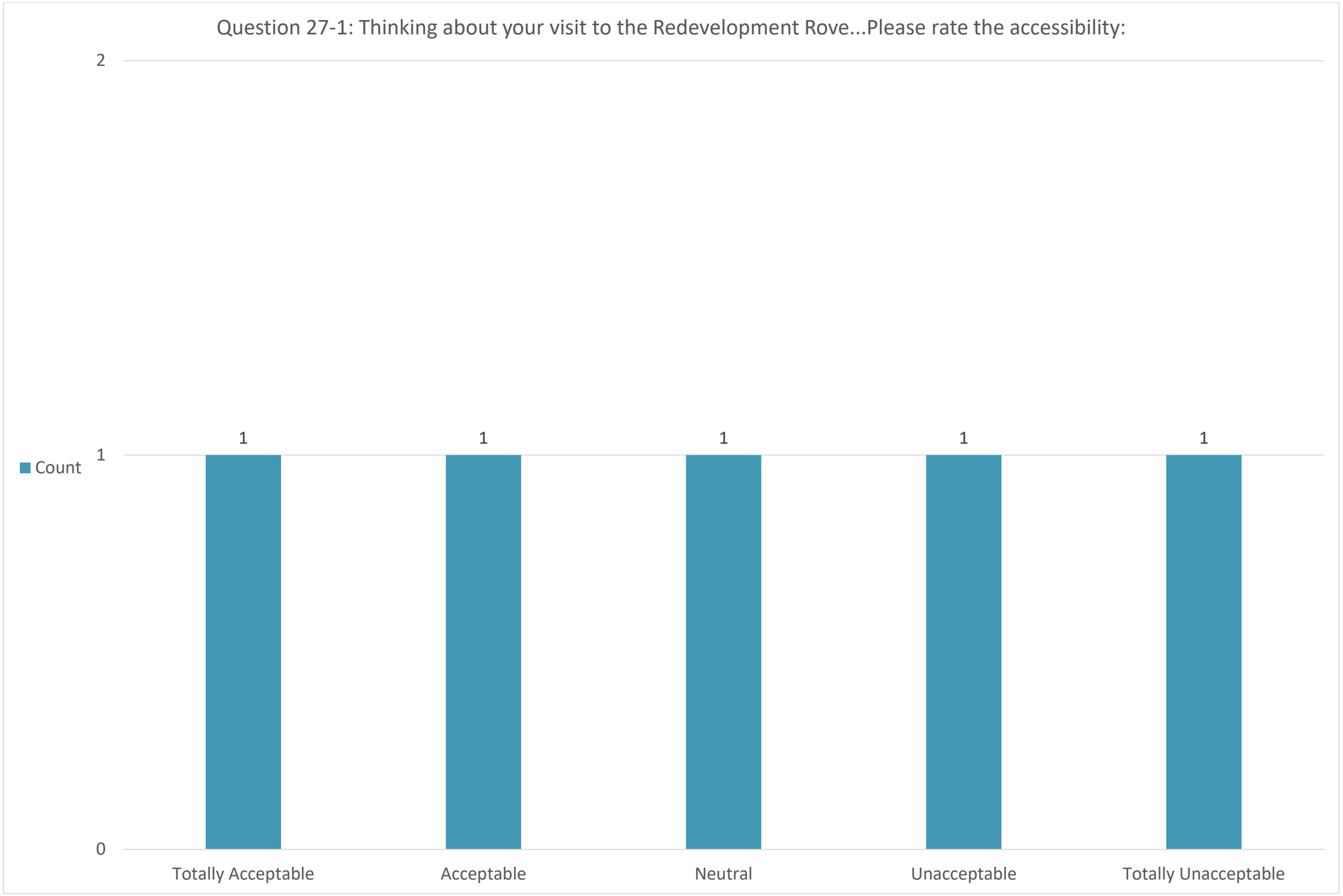

Question 26-4: Thinking about your visit to the Northern Canal Walkway...Please rate the safety:
Count
% of respondents
40
35
30
25
20
15
10
5
0
6
6.1
12
33.4
9
24.2
4
27.2
2
9.1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

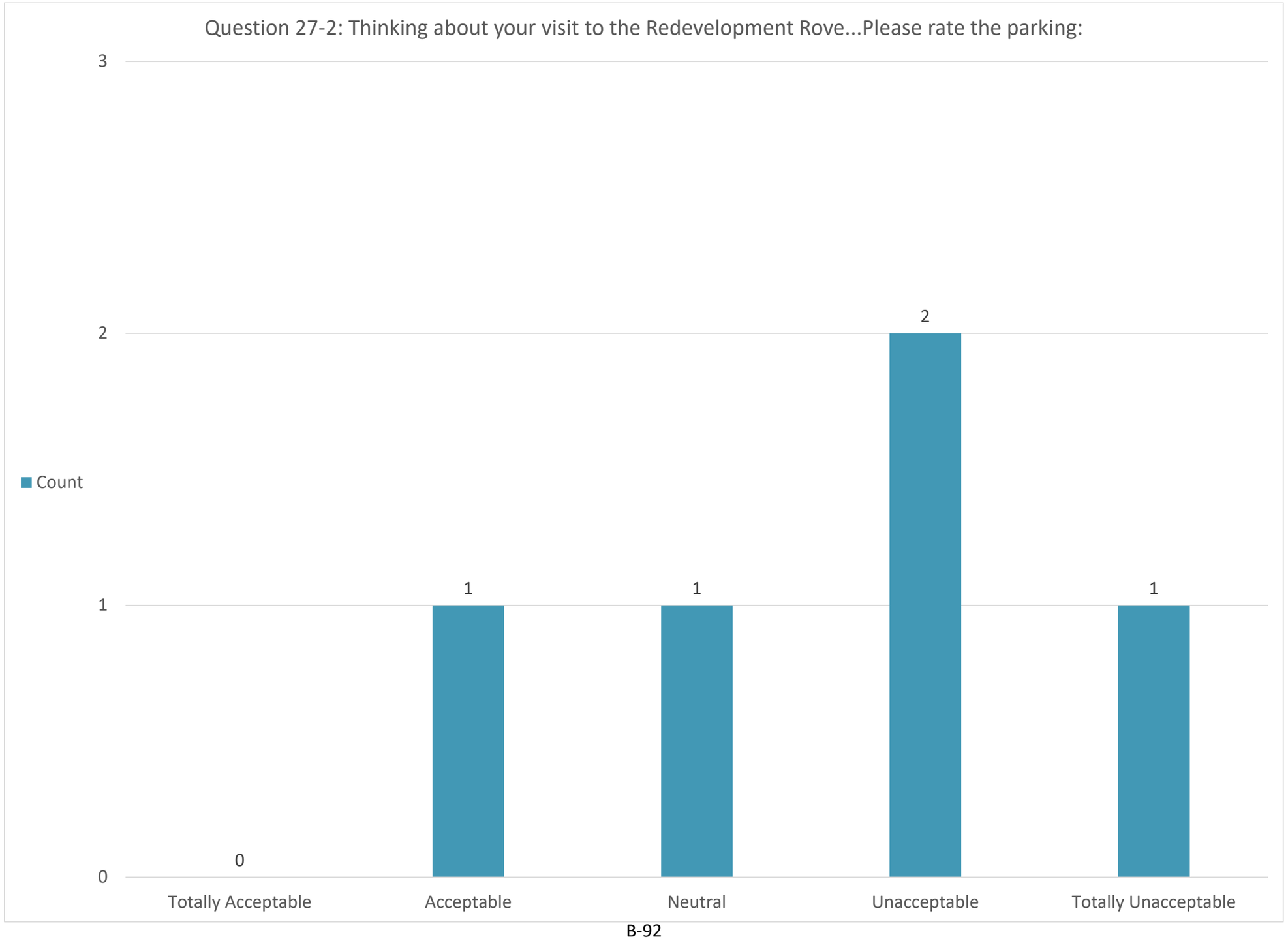

Question 26-5: Thinking about your visit to the Northern Canal Walkway...Please rate the condition of recreation facilities:
45
40
35
30
25
20
15
10
5
0
Count
% o respondents
39.4
30.3
15.1
13
10
9.1
6.1
5
3
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

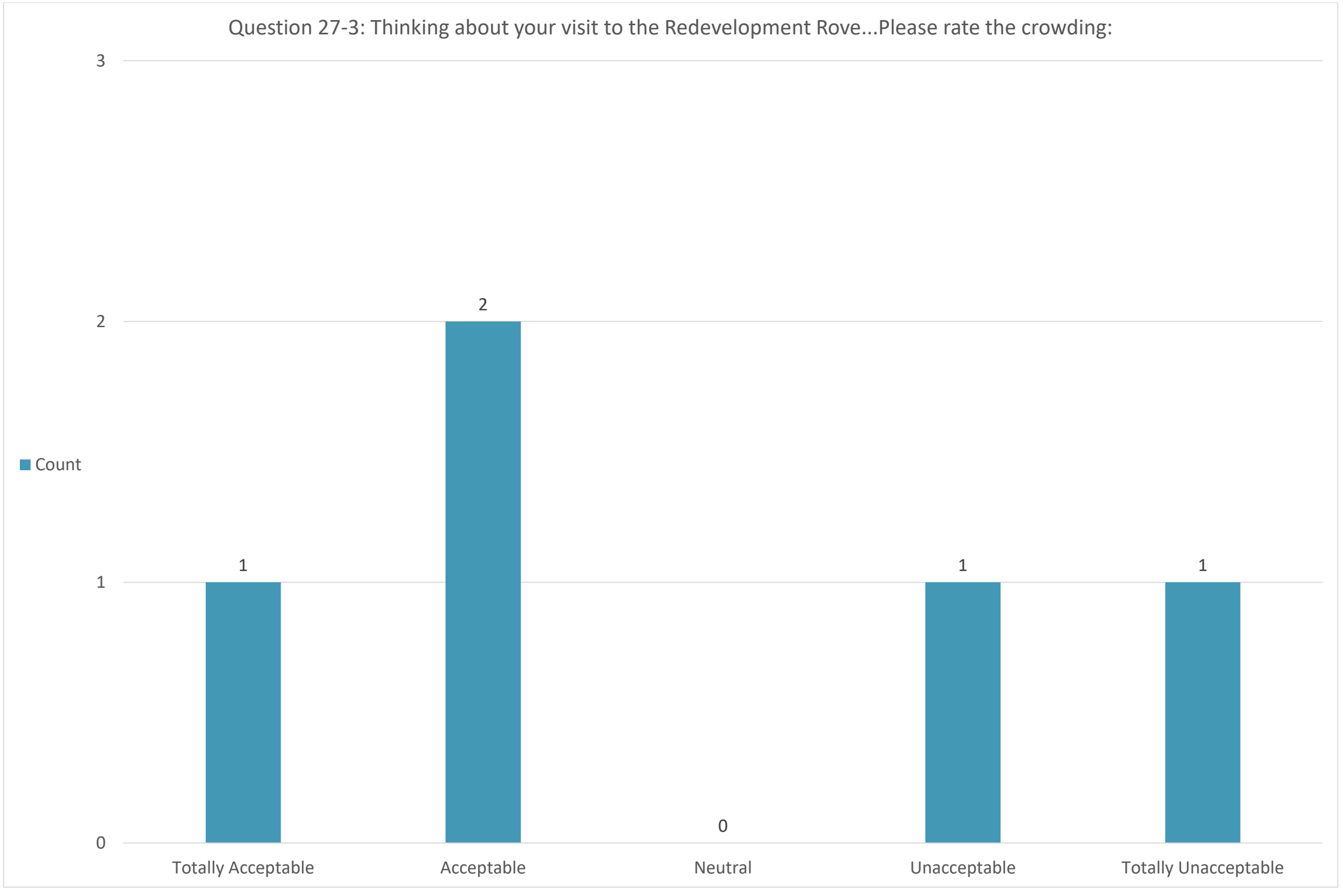

Question 26-6: Thinking about your visit to the Northern Canal Walkway...Please rate the available amenities:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
39.4
21.2
21.2
13
9.1
9.1
7
7
3
3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

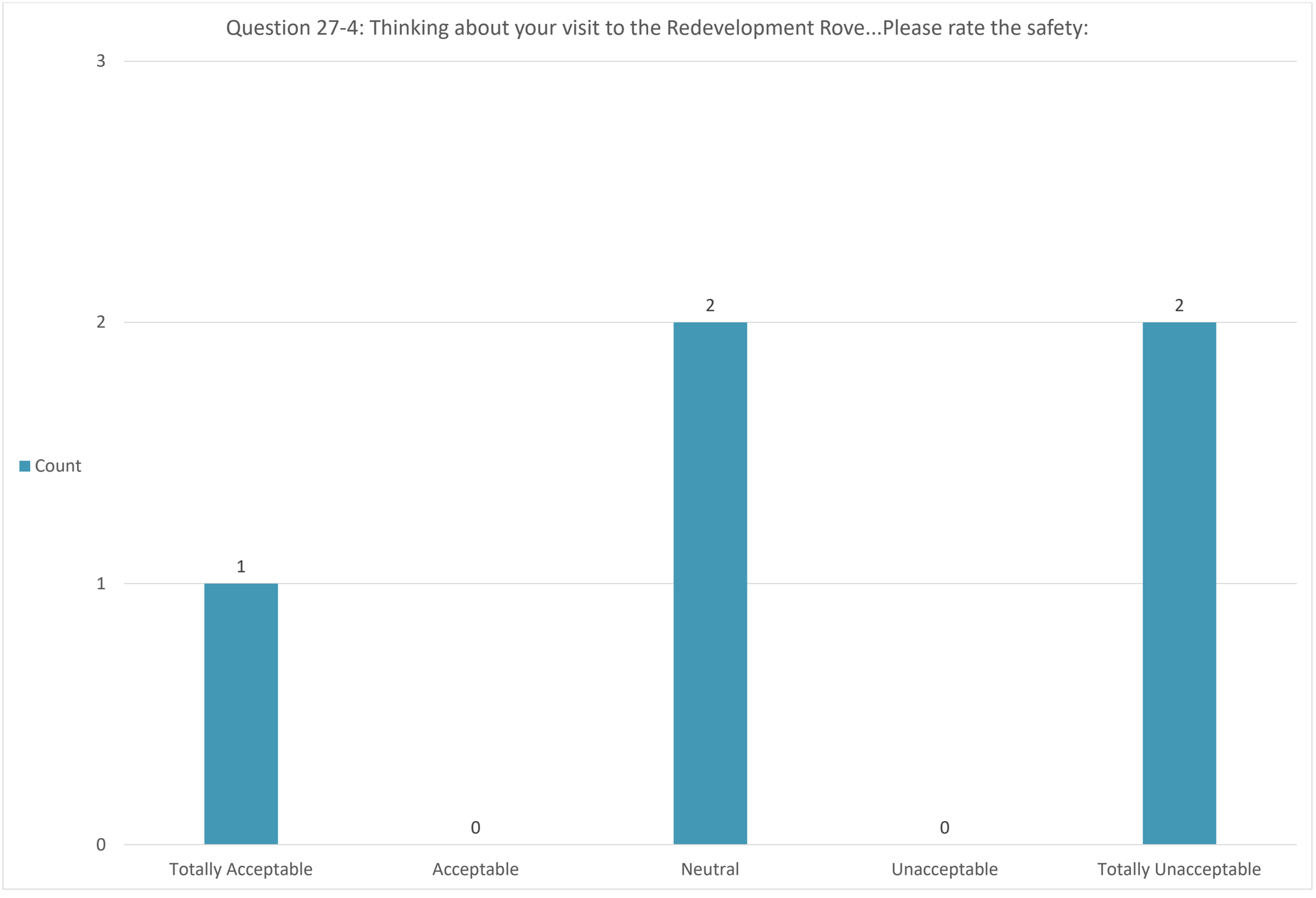

Question 26-7: Thinking about your visit to the Northern Canal Walkway...Please rate the river flow:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
3
9.1
8
24.2
15
45.5
3
9.1
4
12.1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

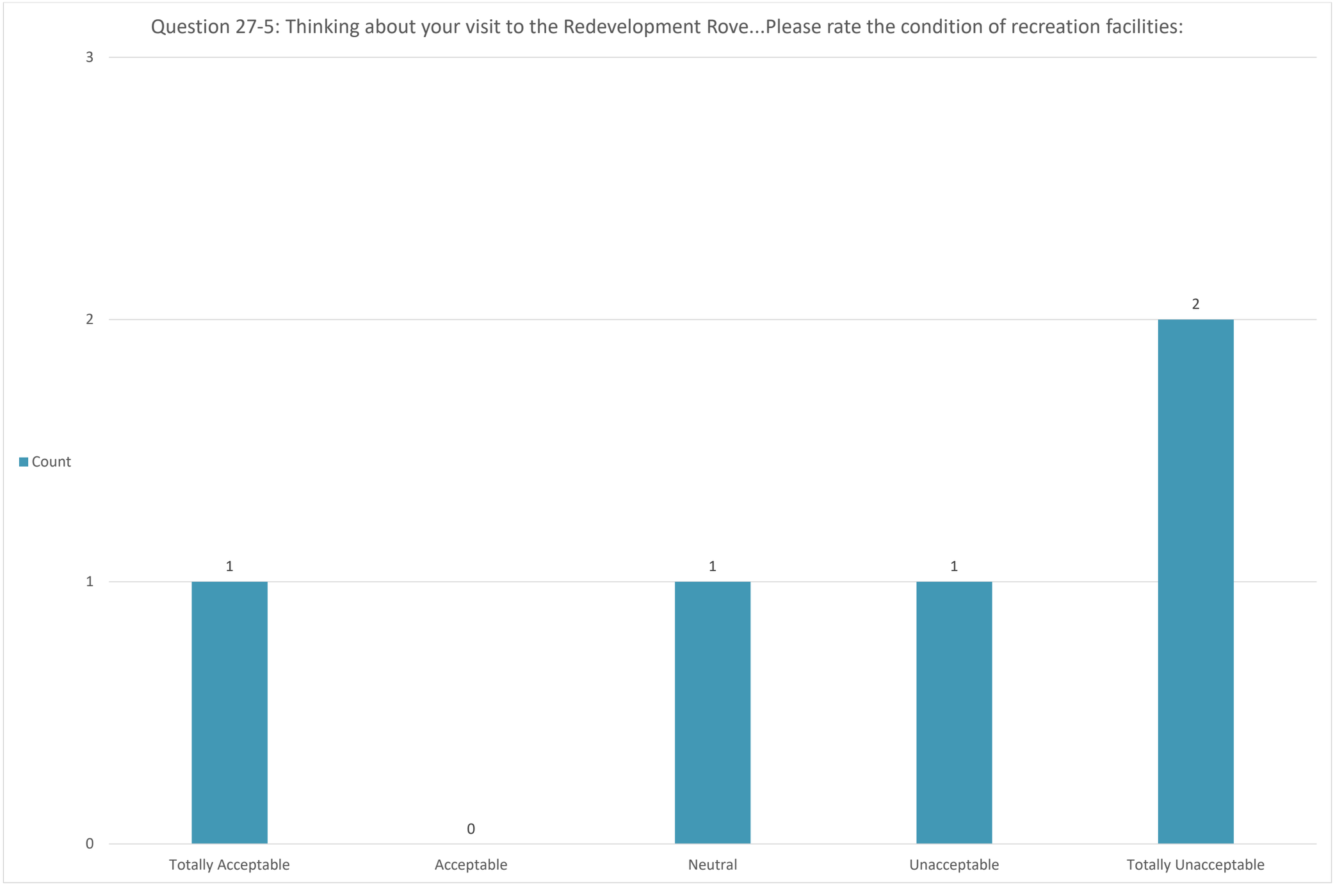

Question 26-8: Thinking about your visit to the Northern Canal Walkway...Please rate your overall experience:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
41.1
29.40
17.5
14
10
6
5.8
2
5.8
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

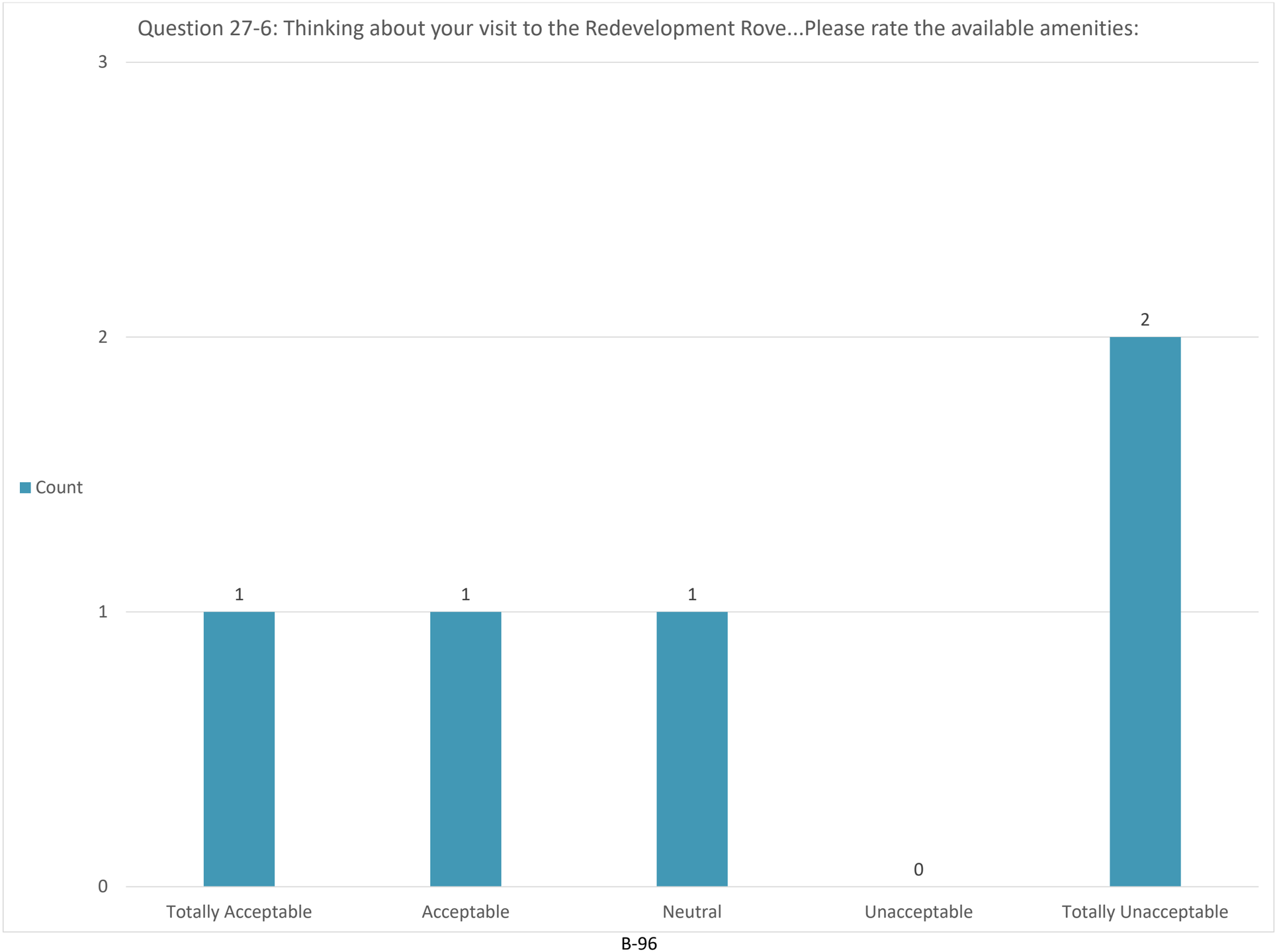

Question 27-1: Thinking about your visit to the Redevelopment Rove...Please rate the accessibility:
2
1
0
Count
1
1
1
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

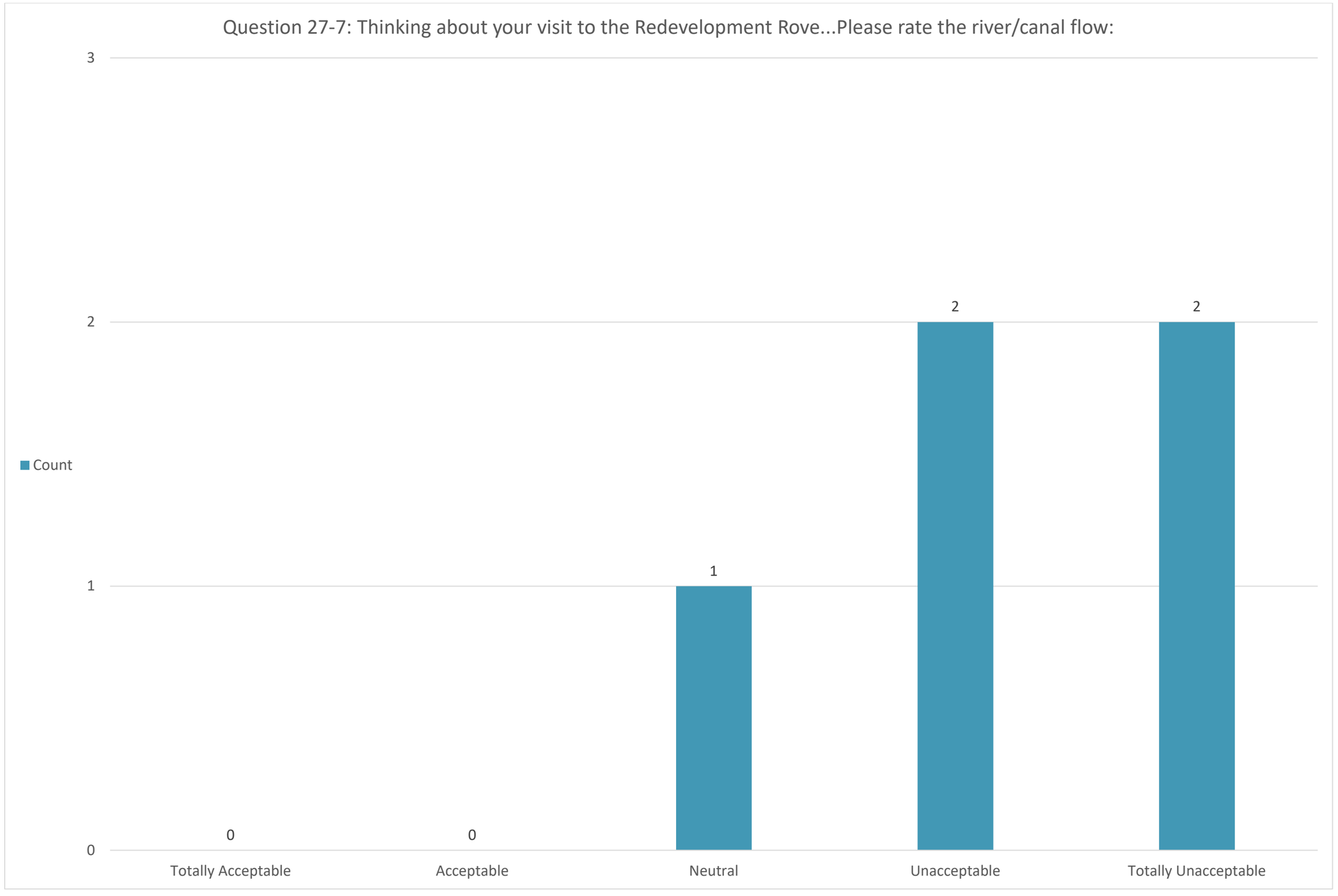

Question 27-2: Thinking about your visit to the Redevelopment Rove...Please rate the parking:
3
2
1
0
Count
0
1
1
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

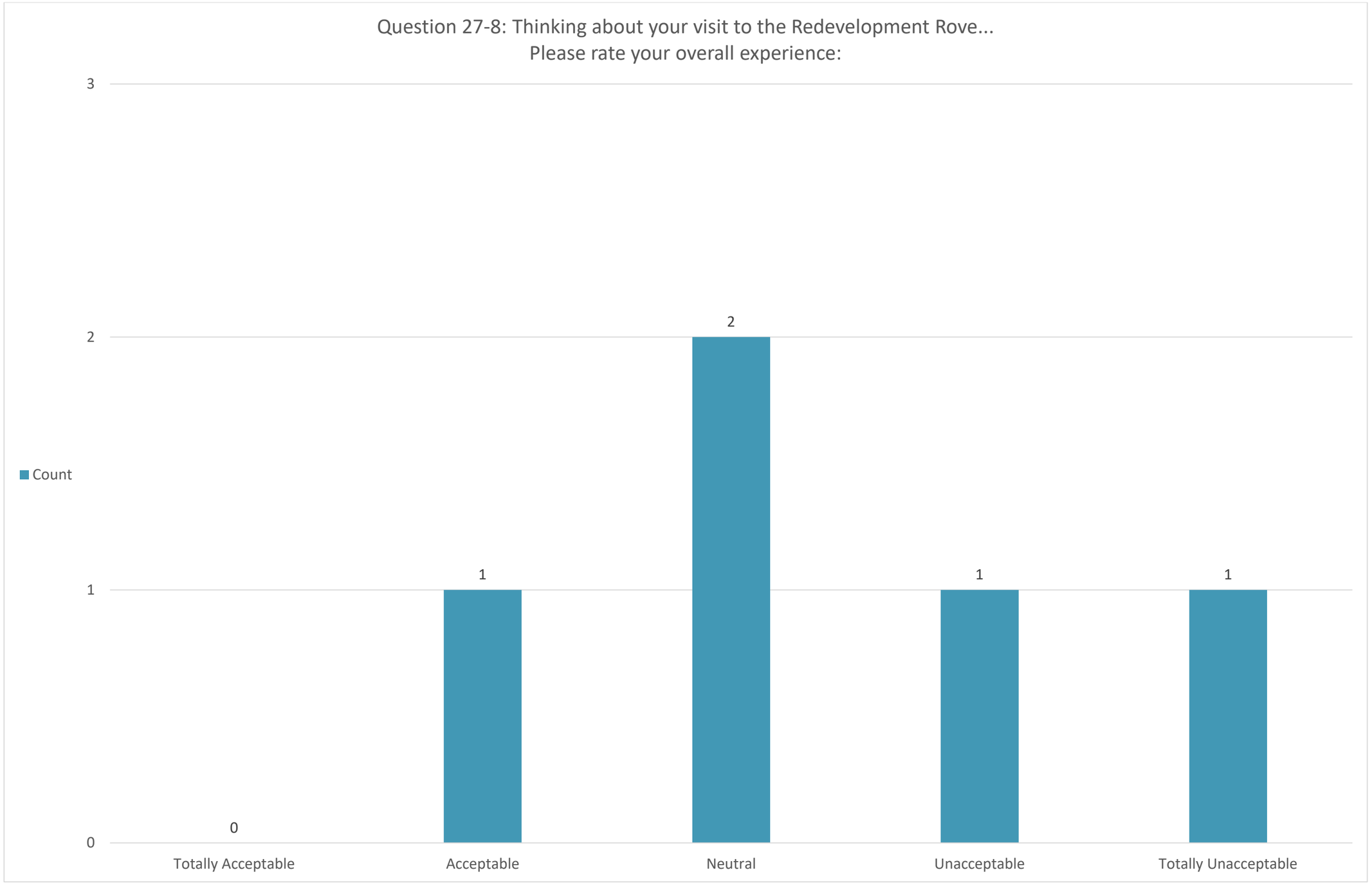

Question 27-3: Thinking about your visit to the Redevelopment Rove...Please rate the crowding:
3
2
1
0
Count
1
2
0
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

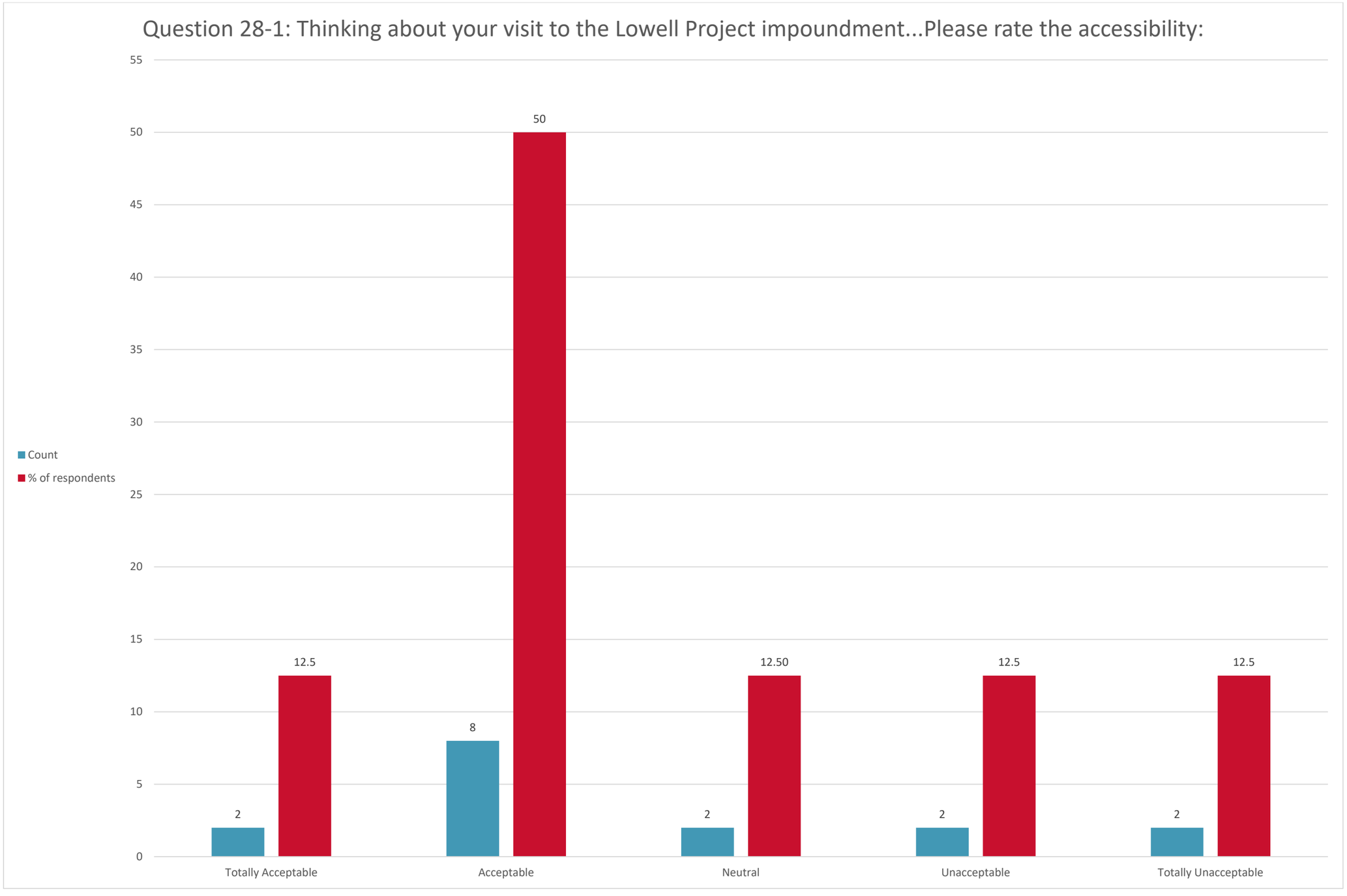

Question 27-4: Thinking about your visit to the Redevelopment Rove...Please rate the safety:
3
2
1
0
Count
1
0
2
0
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

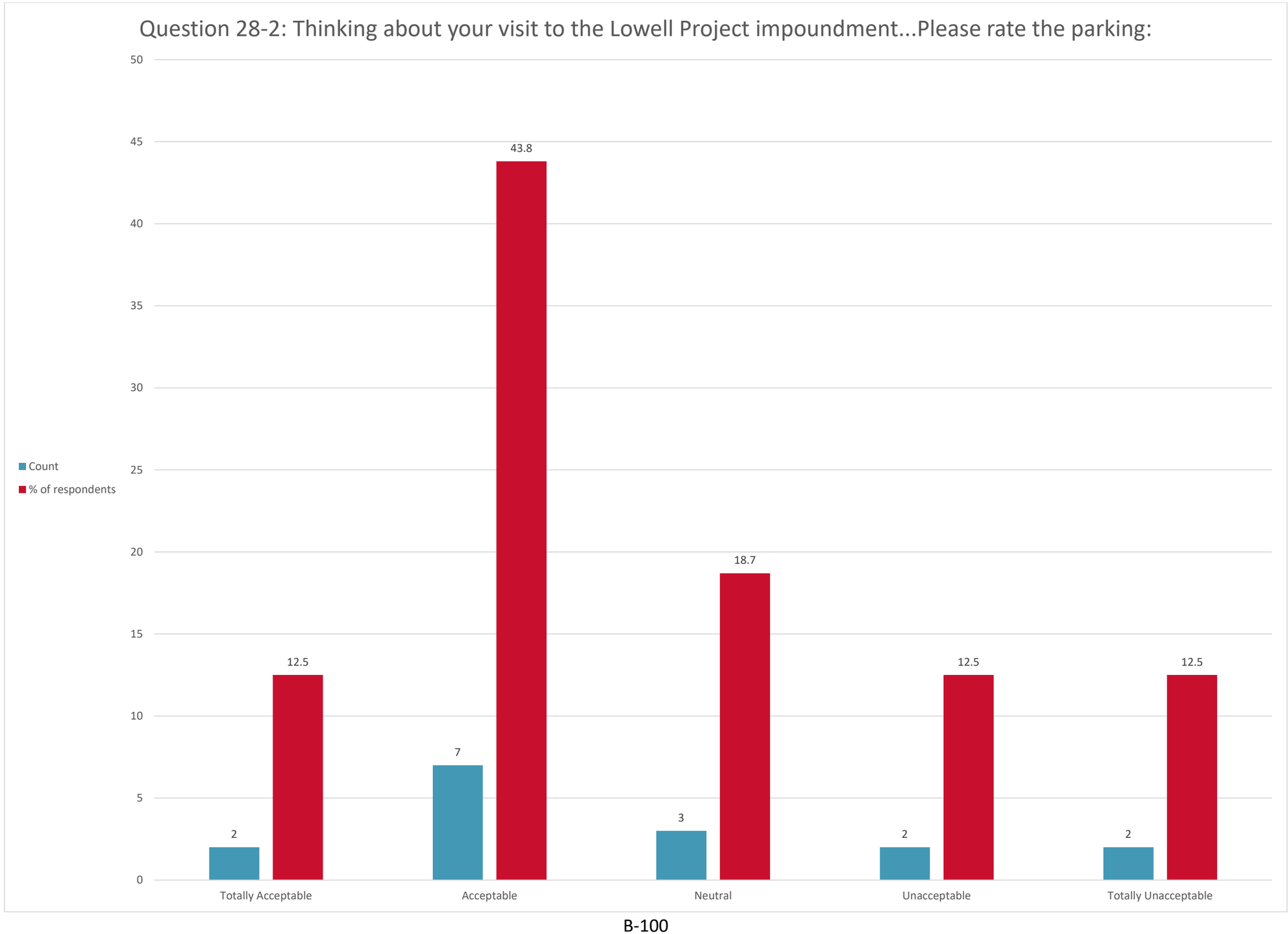

Question 27-5: Thinking about your visit to the Redevelopment Rove...Please rate the condition of recreation facilities:
3
2
1
0
Count
1
0
1
1
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

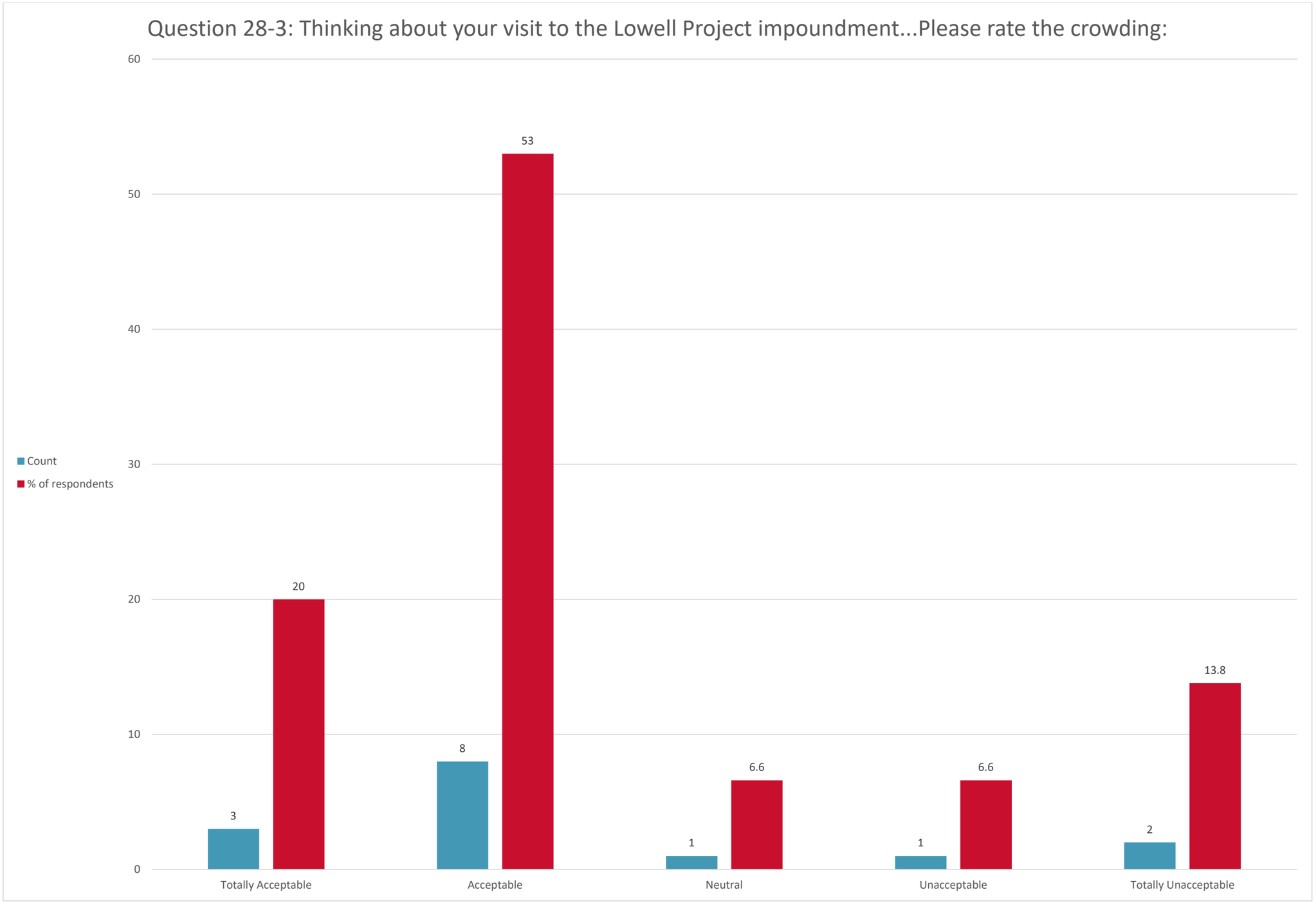

Question 27-6: Thinking about your visit to the Redevelopment Rove...Please rate the available amenities:
3
2
1
0
Count
1
1
1
0
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

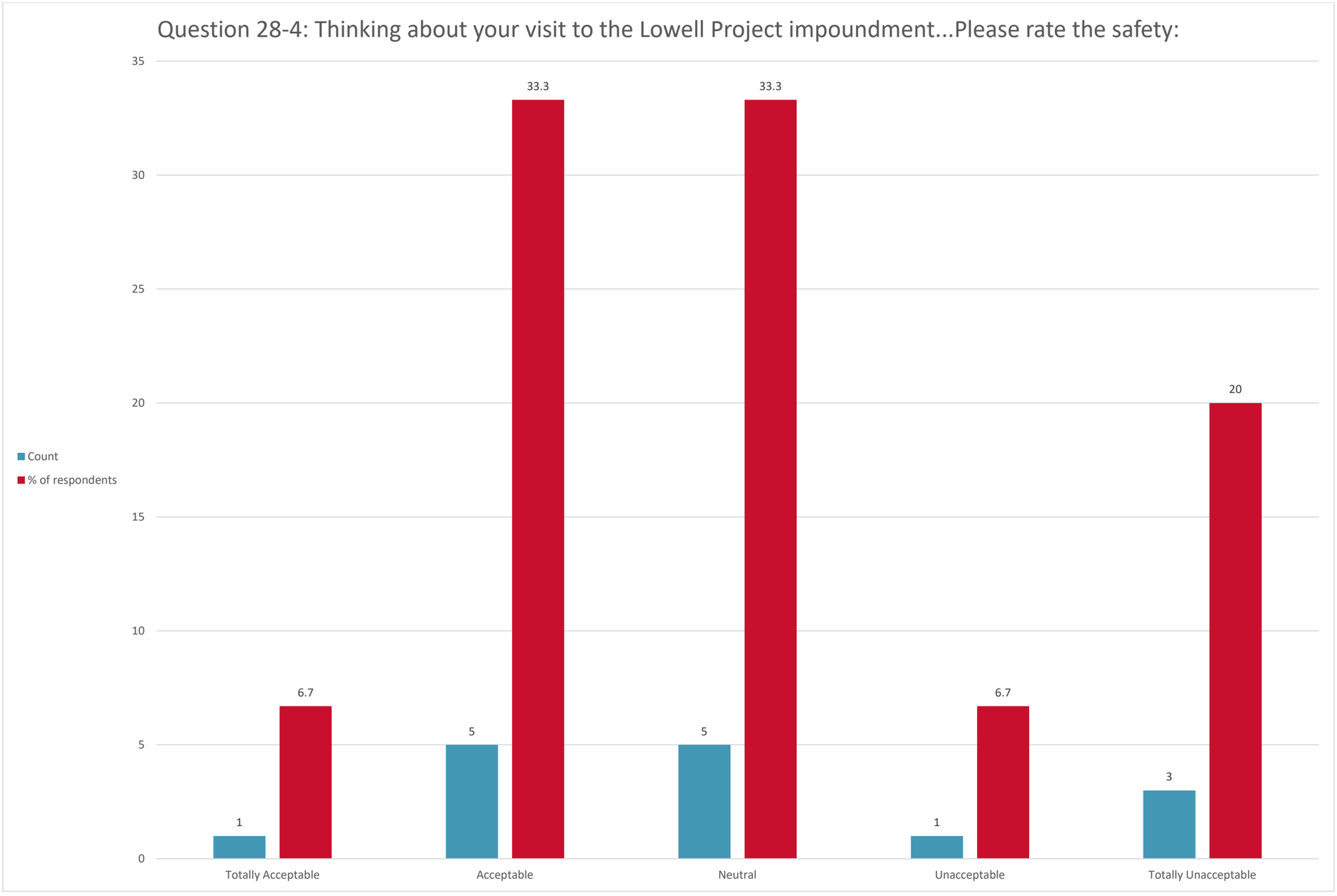

Question 27-7: Thinking about your visit to the Redevelopment Rove...Please rate the river/canal flow:
3
2
1
0
Count
0
0
1
2
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

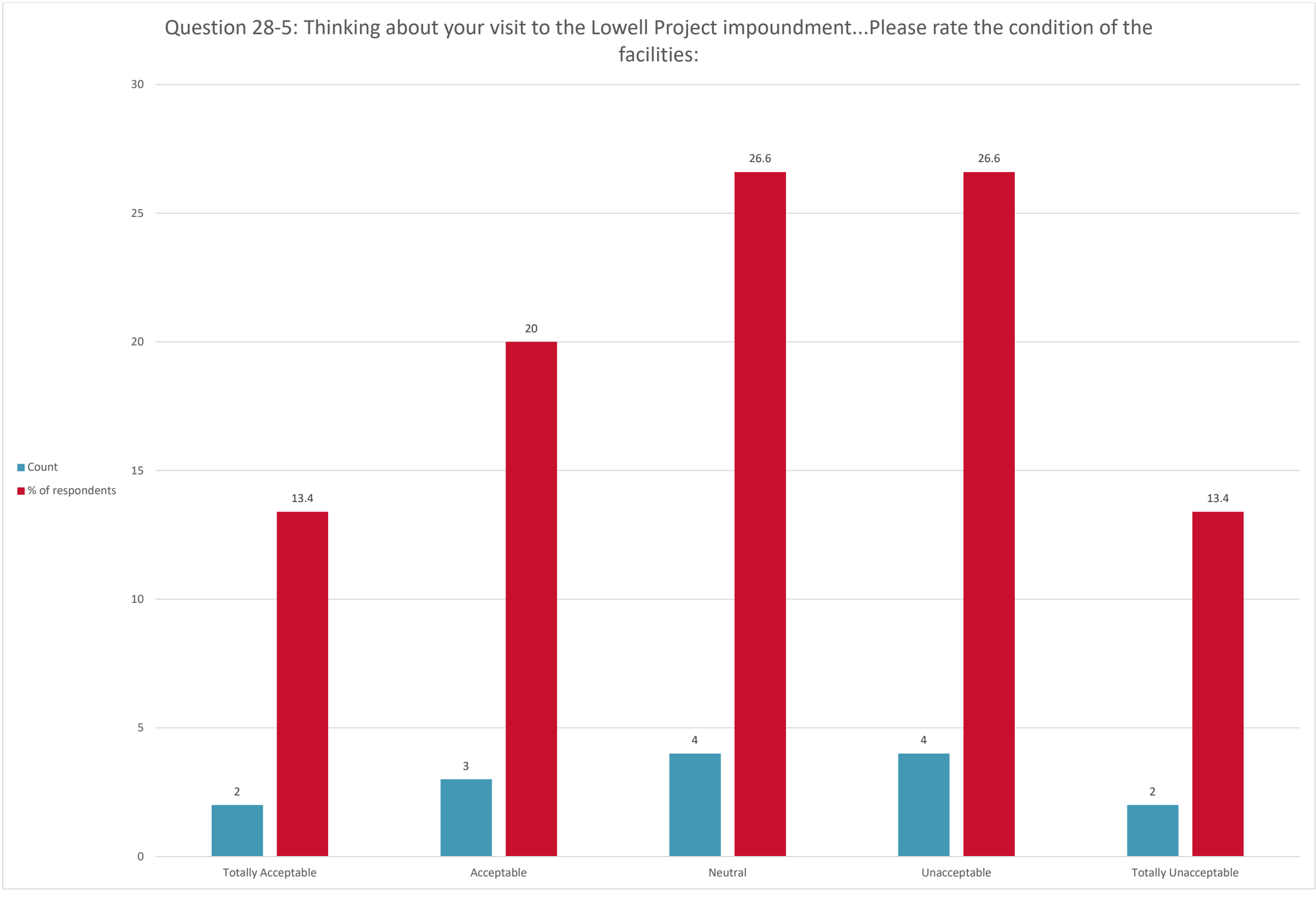

Question 27-8: Thinking about your visit to the Redevelopment Rove...
Please rate your overall experience:
3
2
1
0
Count
0
1
2
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

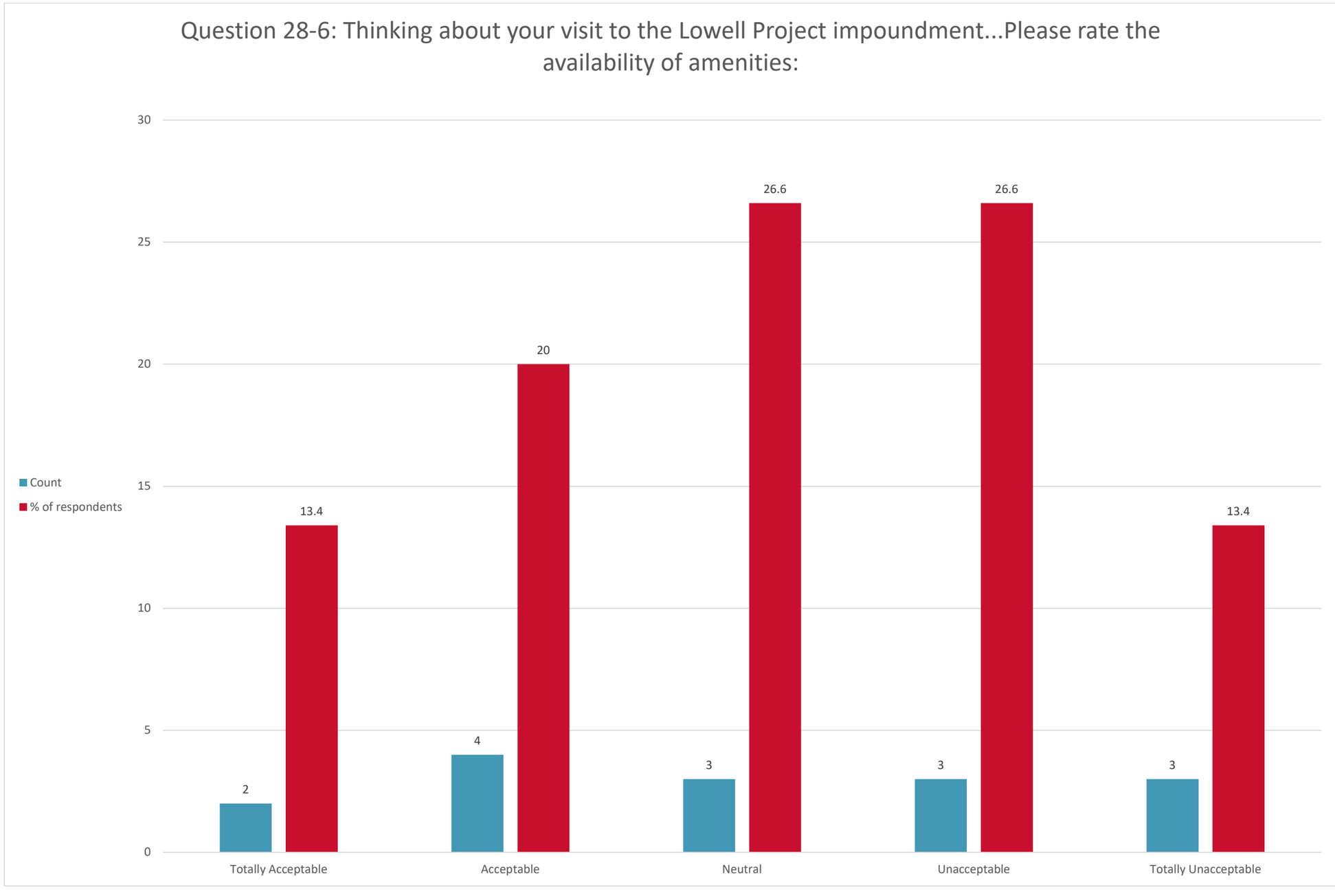

Question 28-1: Thinking about your visit to the Lowell Project impoundment...Please rate the accessibility:
55
50
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
50
12.5
8
12.50
2
2
2
12.5
12.5
12.5
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

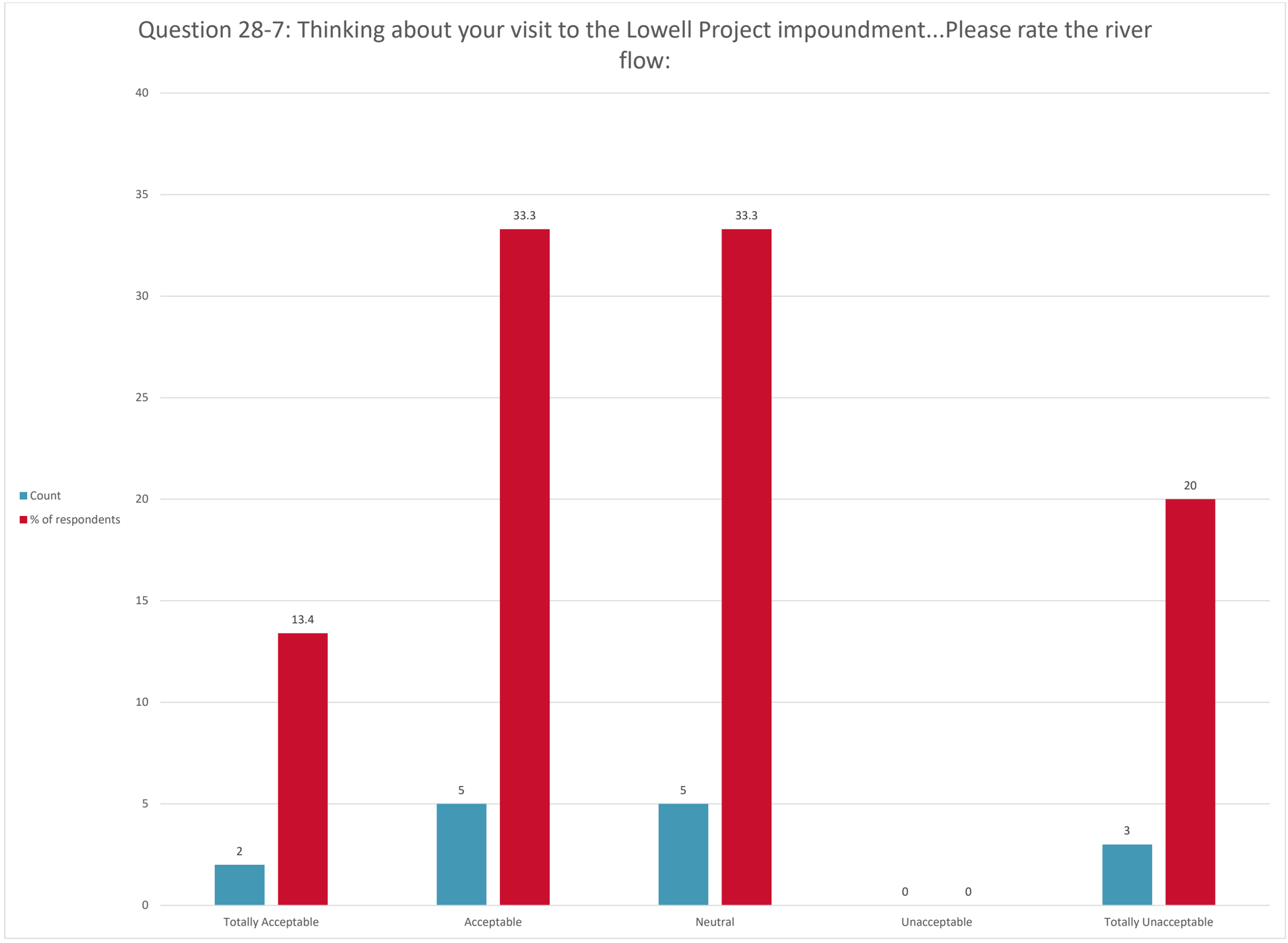

Question 28-2: Thinking about your visit to the Lowell Project impoundment...Please rate the parking:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
43.8
18.7
12.5
12.5
12.5
2
7
3
2
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

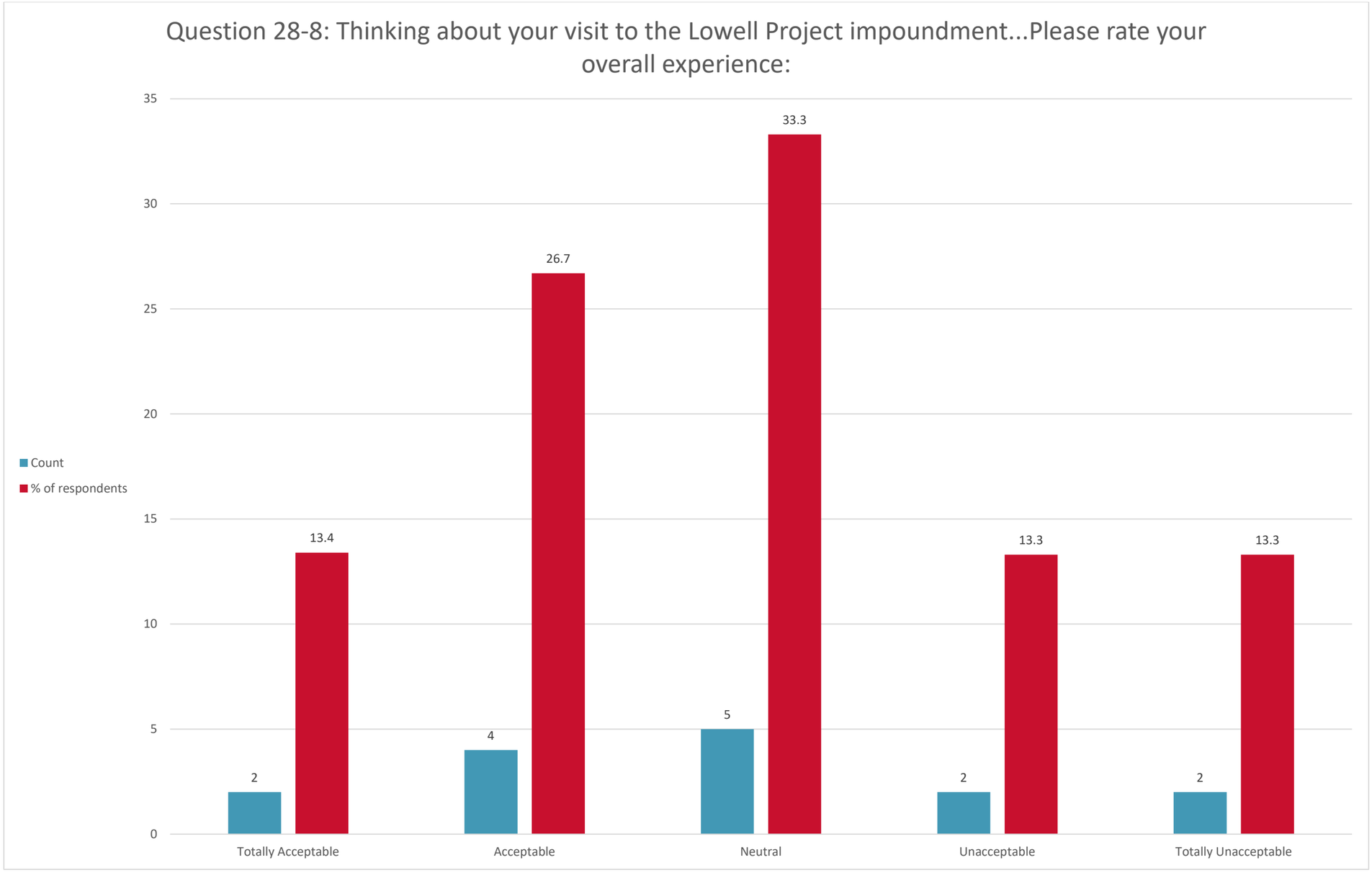

Question 28-3: Thinking about your visit to the Lowell Project impoundment...Please rate the crowding:
Count
% of respondents
60
50
40
30
20
10
0
53
20
3
8
1
6.6
1
6.6
2
13.8
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

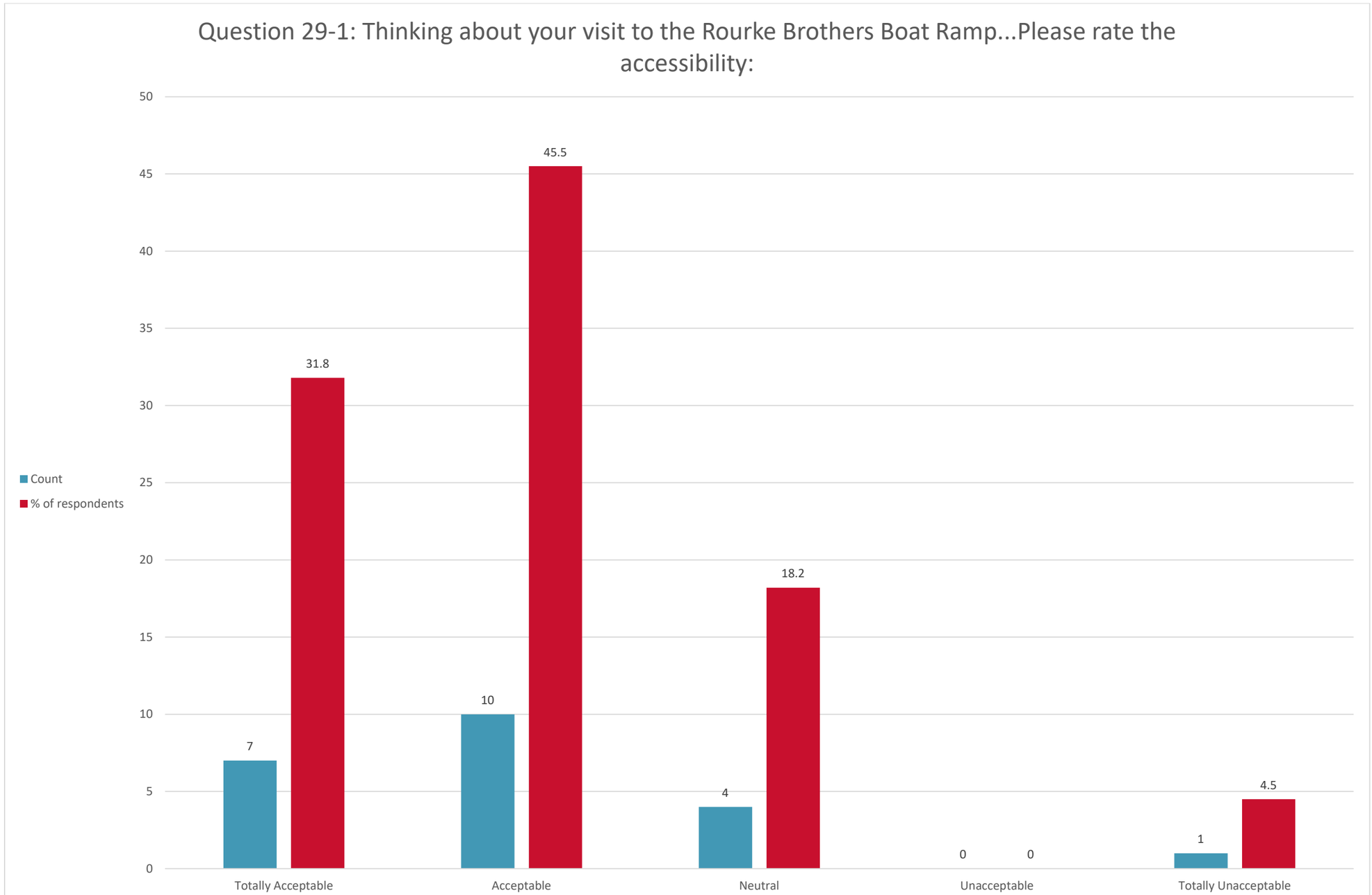

Question 28-4: Thinking about your visit to the Lowell Project impoundment...Please rate the safety:
Count
% of respondents
35
30
25
20
15
10
5
0
33.3
33.3
20
6.7
5
5
6.7
3
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

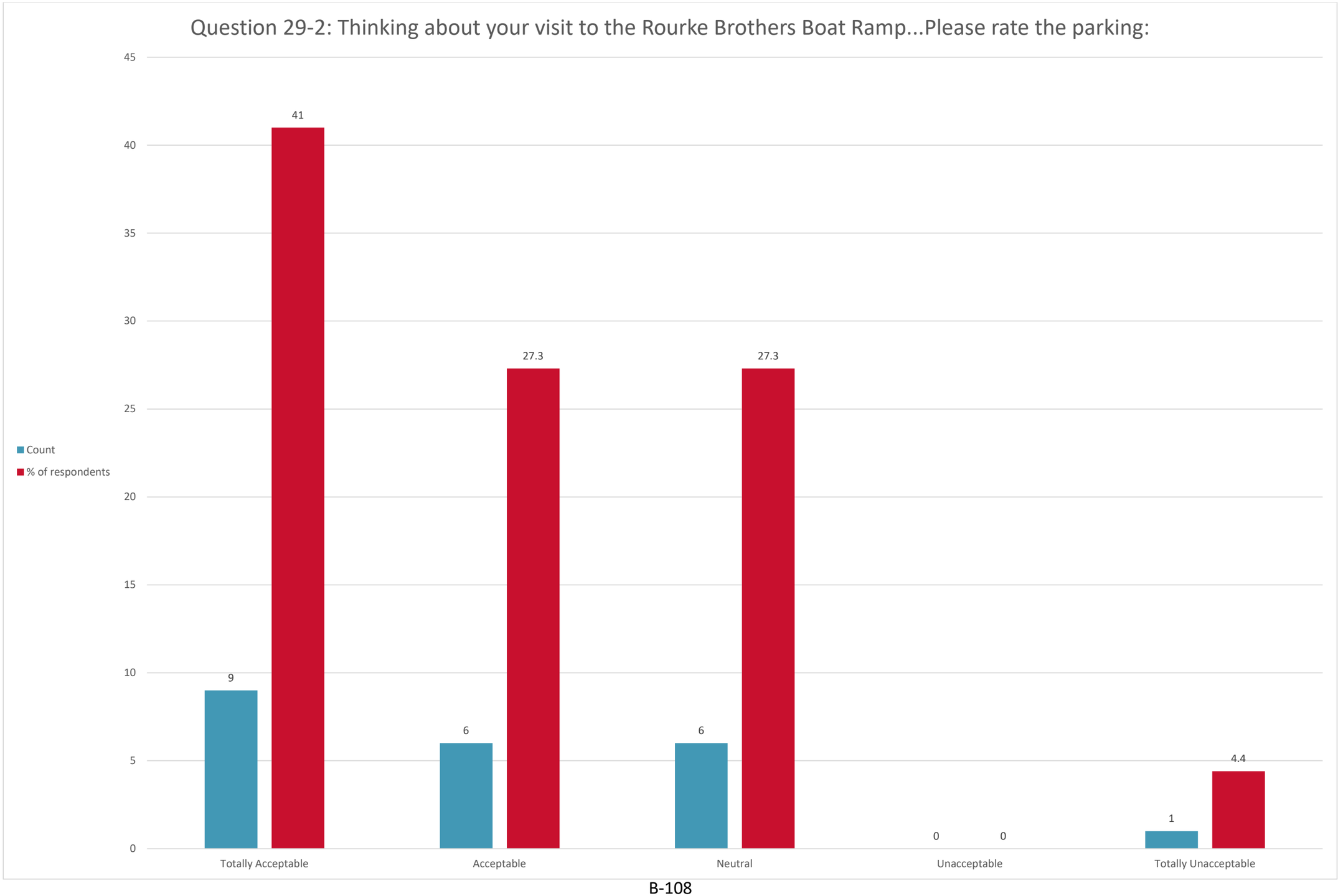

Question 28-5: Thinking about your visit to the Lowell Project impoundment...Please rate the condition of the facilities:
Count
% of respondents
30
25
20
15
10
5
0
2
13.4
3
20
4
26.6
4
26.6
2
13.4
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

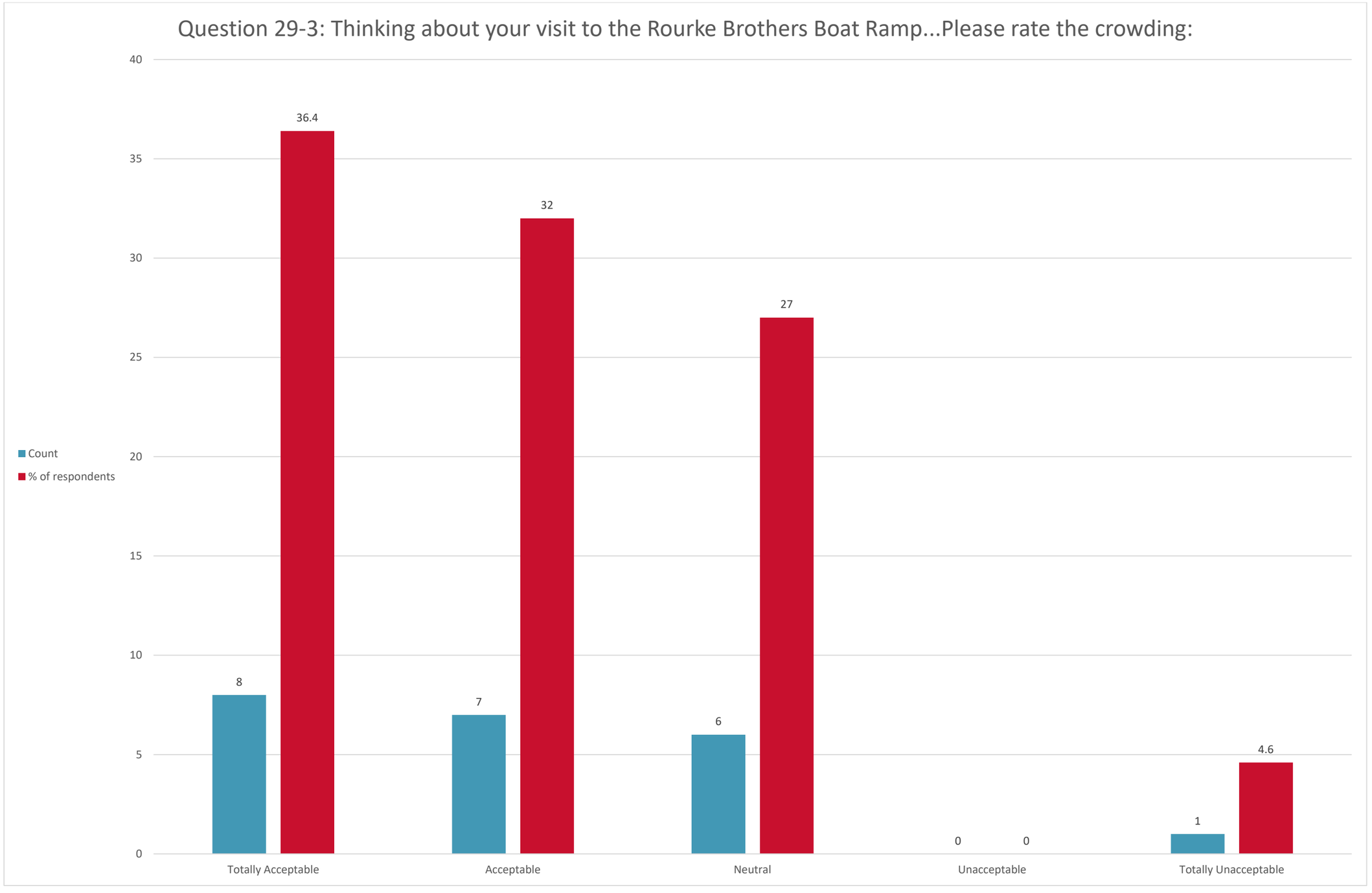

Question 28-6: Thinking about your visit to the Lowell Project impoundment...Please rate the availability of amenities:
30
25
20
15
10
5
0
Count
% of respondents
2
13.4
4
20
3
26.6
3
26.6
3
13.4
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

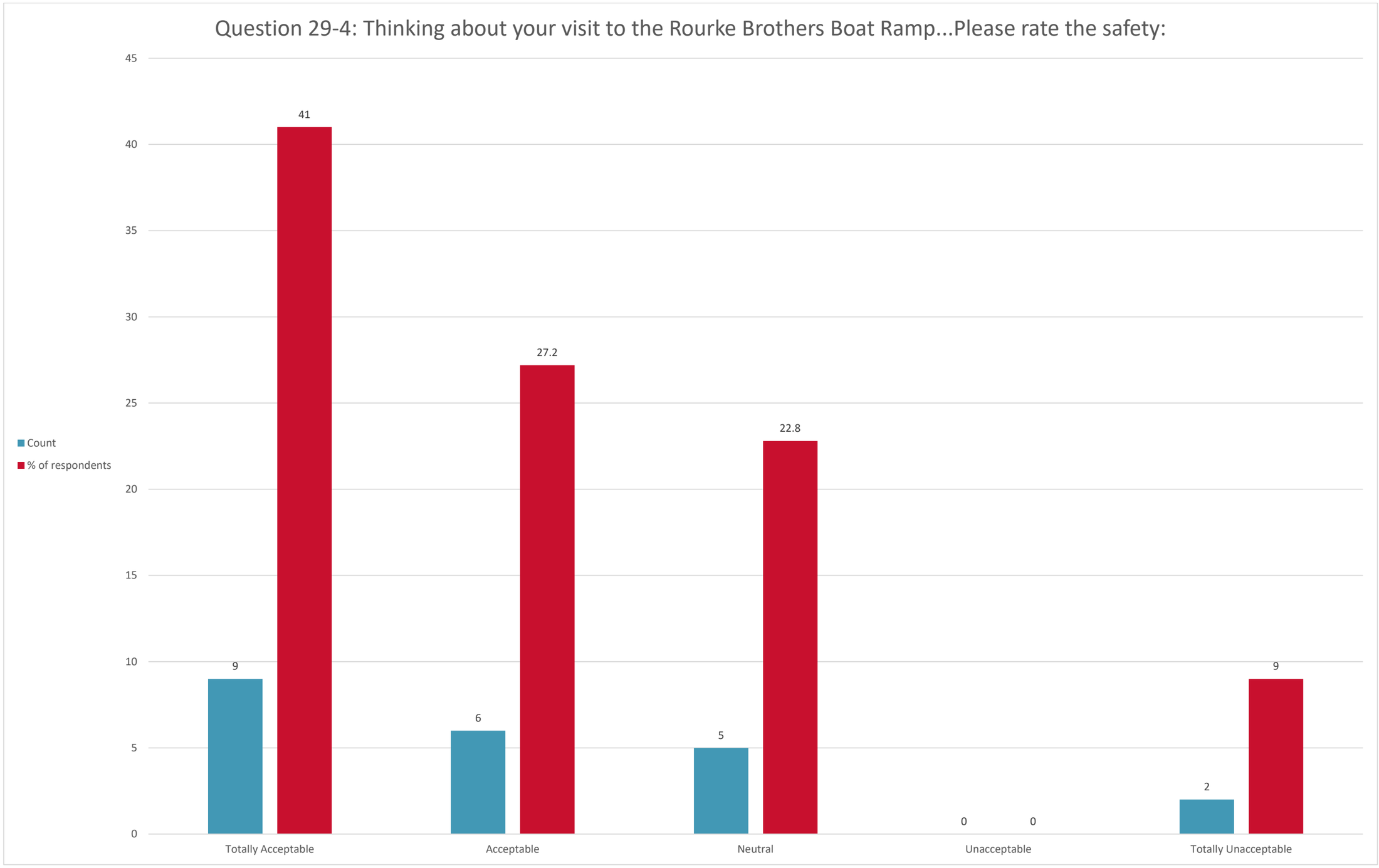

Question 28-7: Thinking about your visit to the Lowell Project impoundment...Please rate the river flow:
Count
% of respondents
40
35
30
25
20
15
10
5
0
33.3
33.3
20
13.4
5
5
2
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

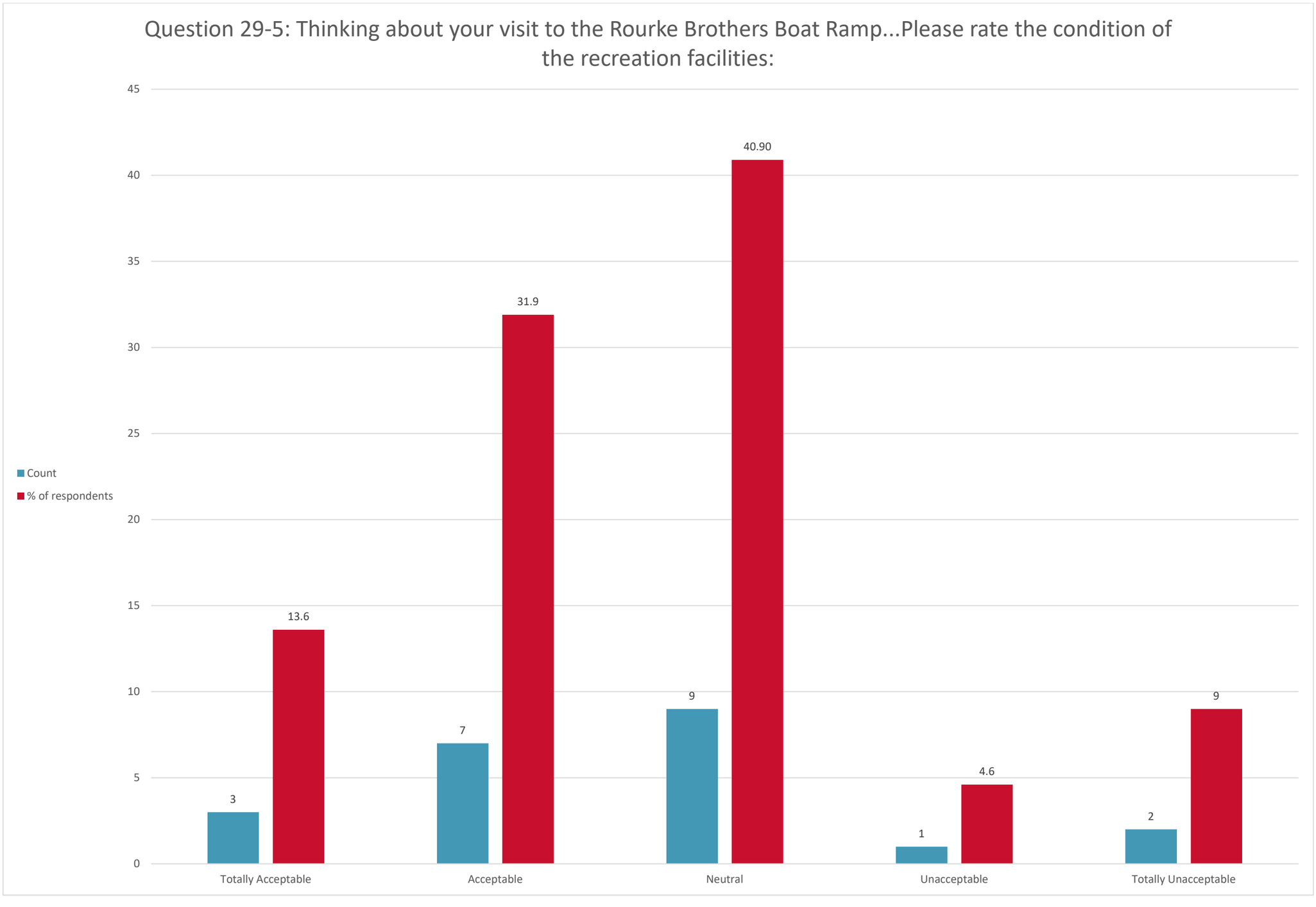

Question 28-8: Thinking about your visit to the Lowell Project impoundment...Please rate your overall experience:
Count
% of respondents
35
30
25
20
15
10
5
0
2
13.4
4
26.7
5
33.3
2
13.3
2
13.3
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

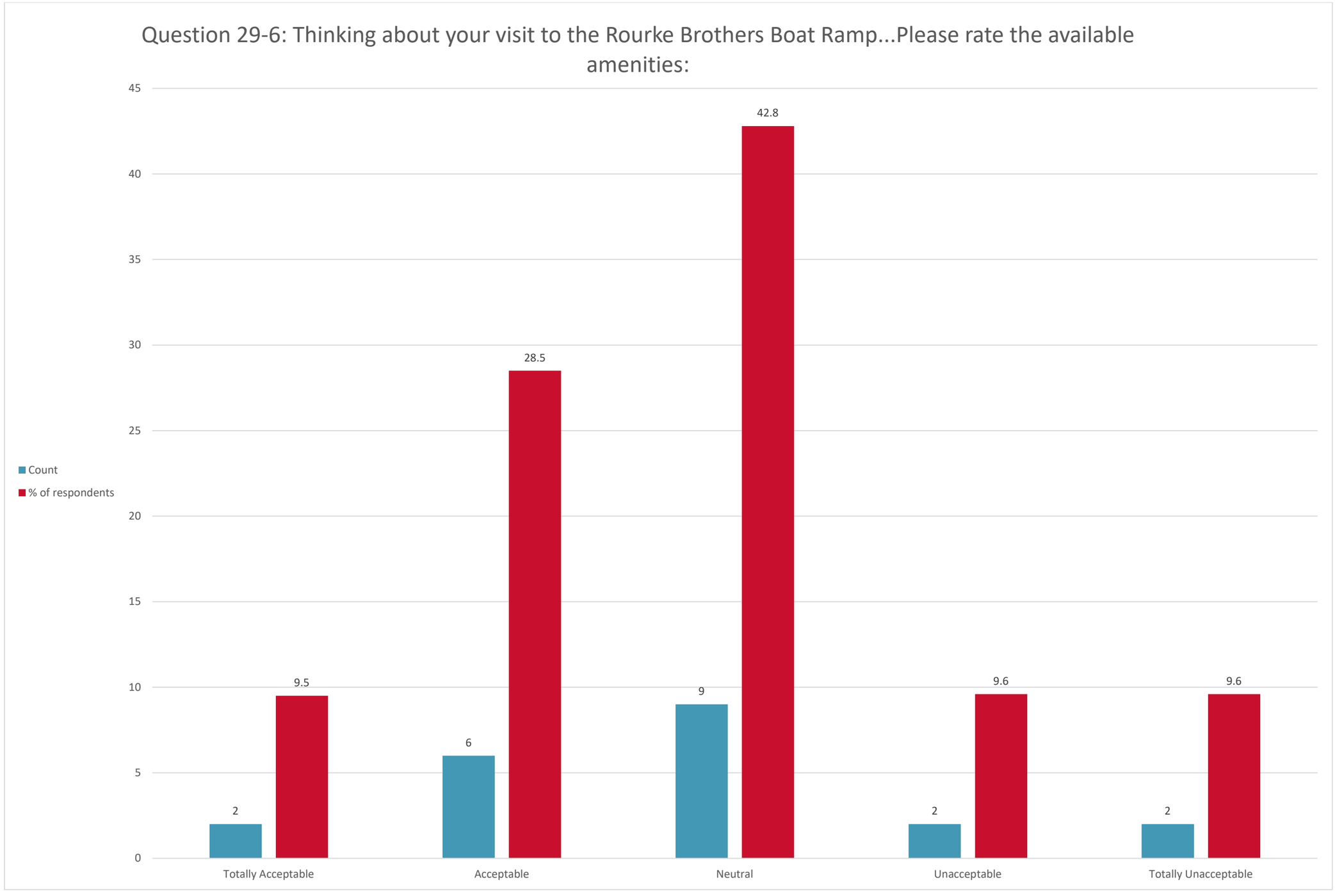

Question 29-1: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the accessibility:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
31.8
45.5
18.2
7
10
4
0
0
1
4.5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

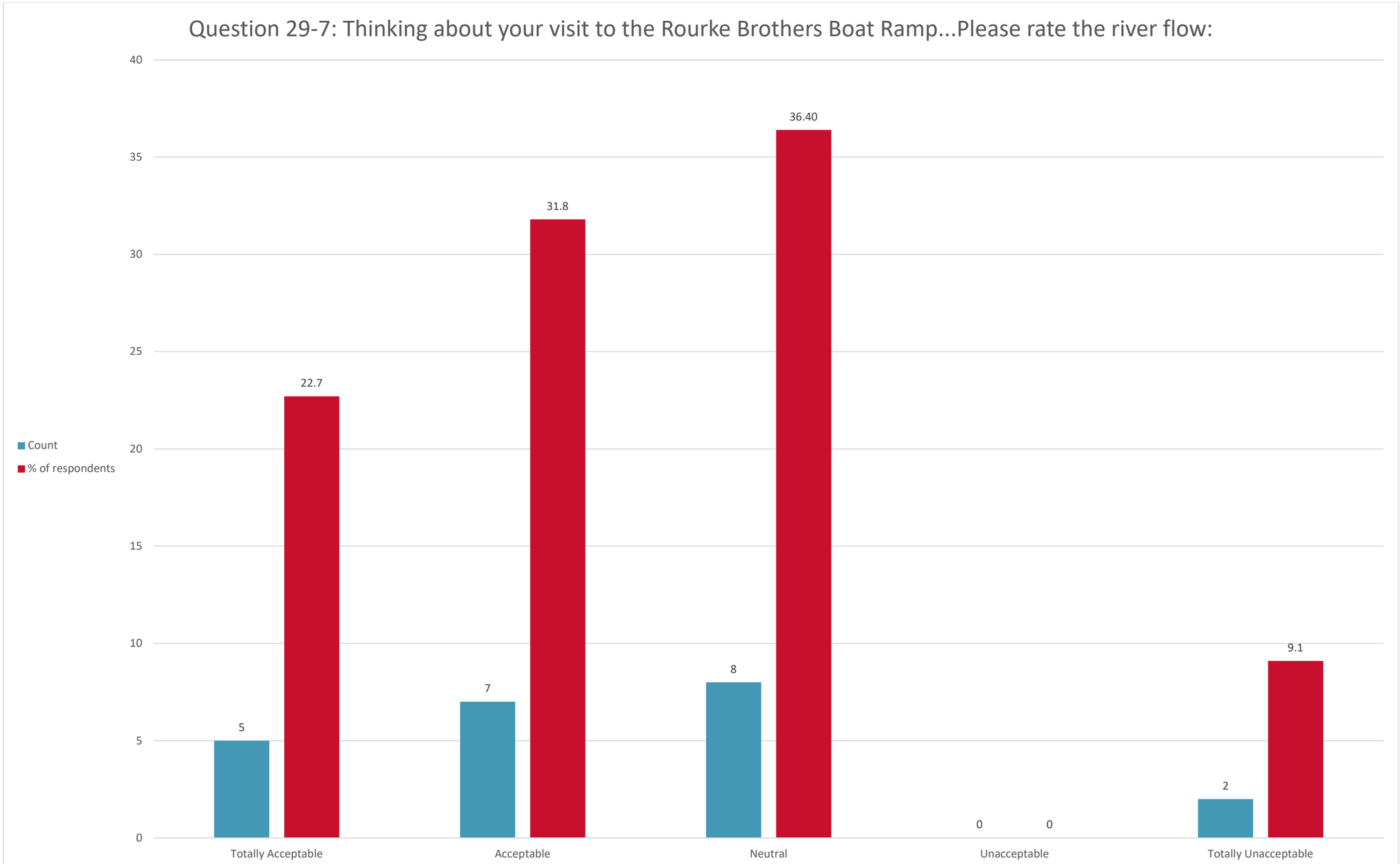

Question 29-2: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the parking:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
41
27.3
27.3
9
6
6
0
0
1
4.4
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

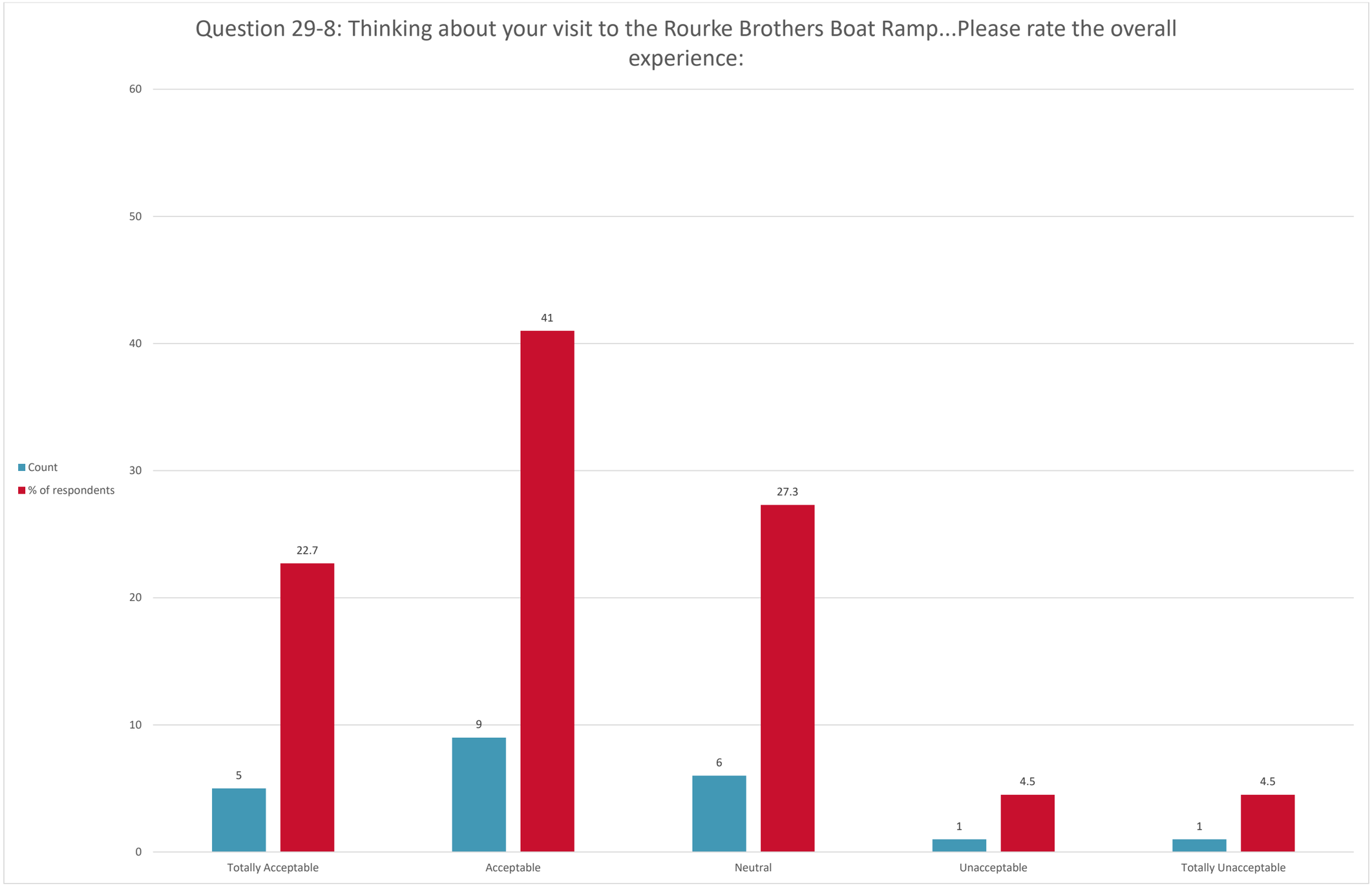

Question 29-3: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the crowding:
Count
% of respondents
40
35
30
25
20
15
10
5
0
36.4
32
27
8
7
6
0
0
1
4.6
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

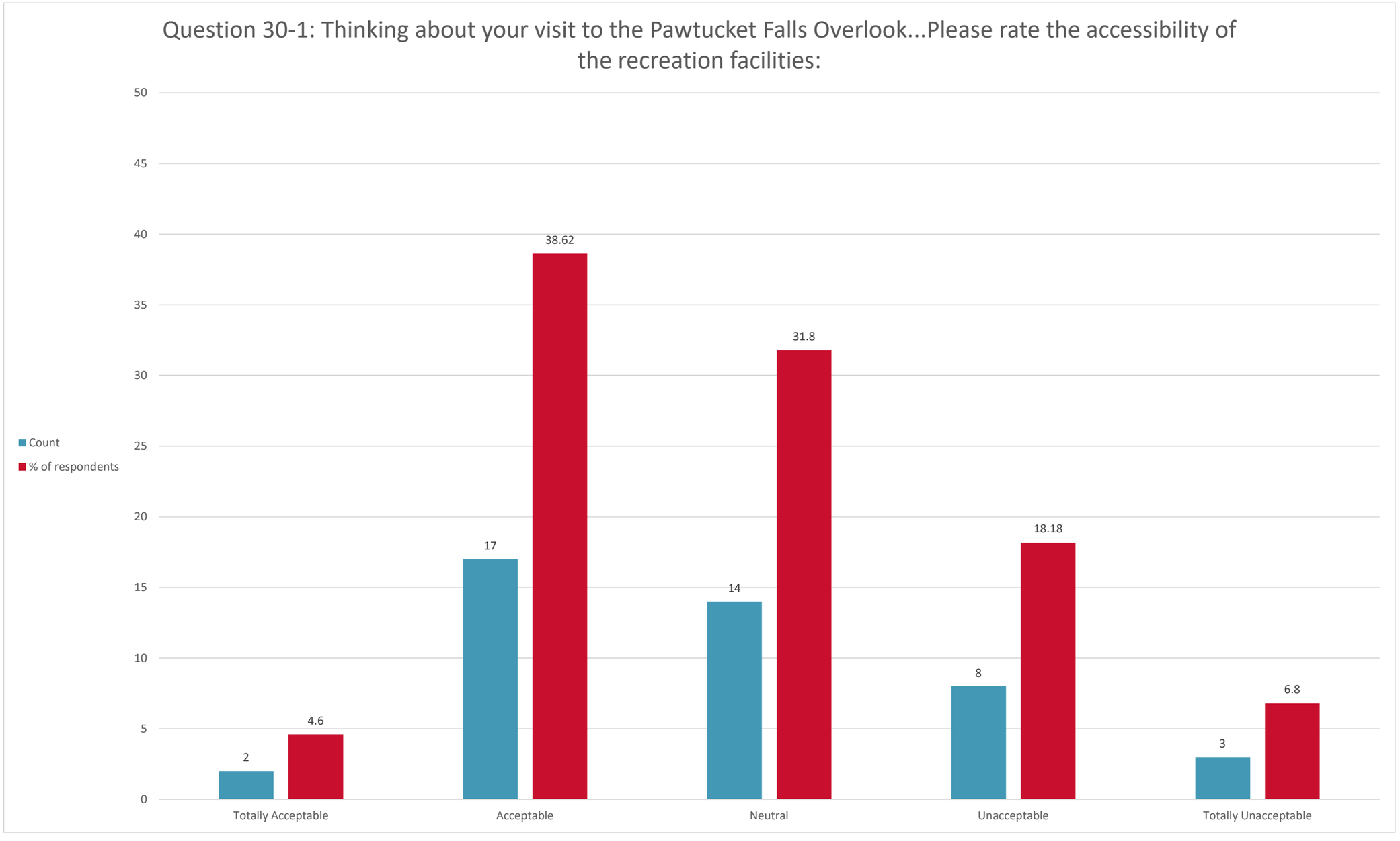

Question 29-4: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the safety:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
41
27.2
22.8
9
6
5
0
0
2
9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

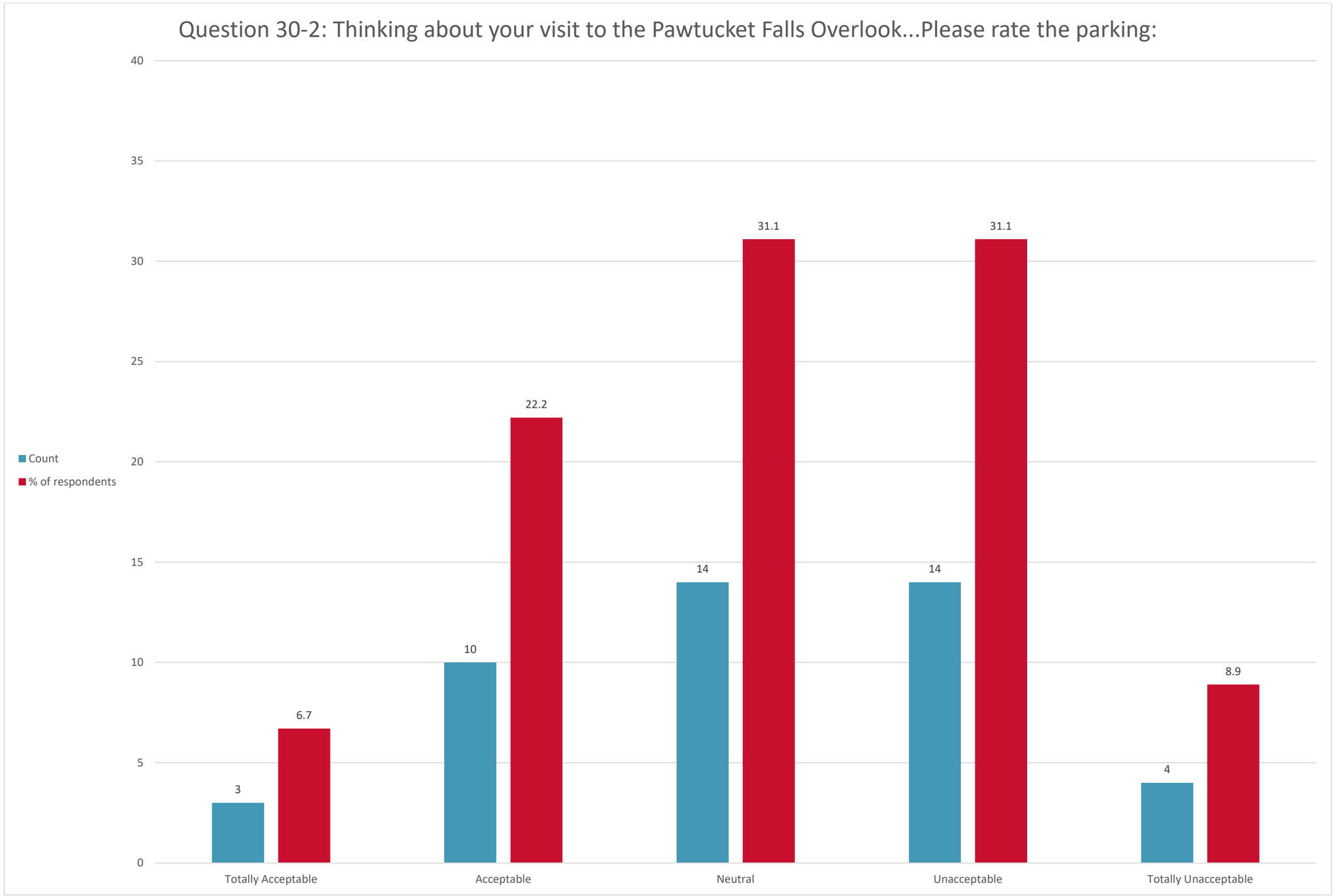

Question 29-5: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the condition of the recreation facilities:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
3
13.6
7
31.9
9
40.90
1
4.6
2
9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

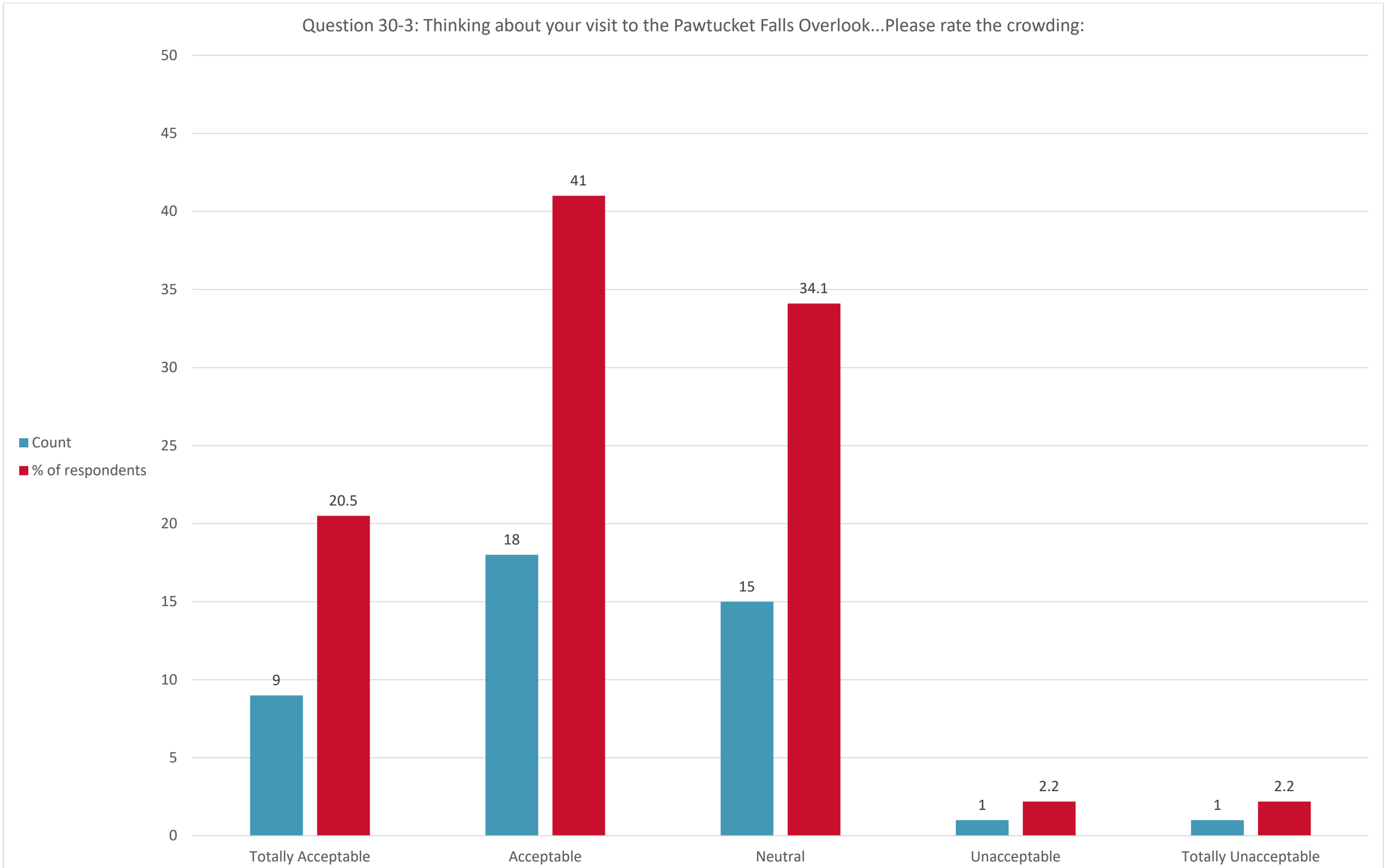

Question 29-6: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the available amenities:
45
40
35
30
25
20
15
10
5
0
Count
% of respondents
2
9.5
6
28.5
9
42.8
2
9.6
2
9.6
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

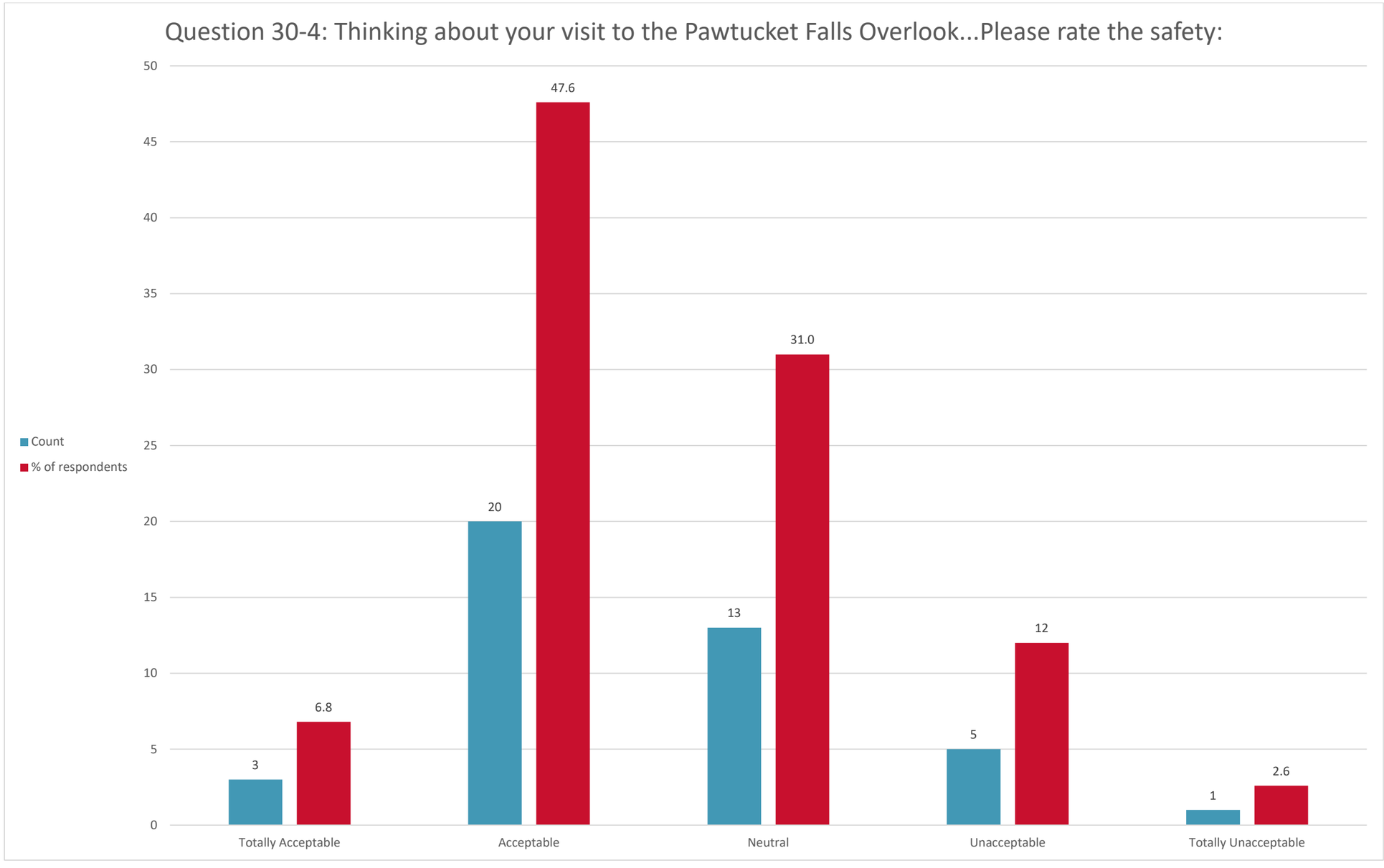

Question 29-7: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the river flow:
Count
% of respondents
40
35
30
25
20
15
10
5
0
22.7
31.8
36.40
5
7
8
0
0
2
9.1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

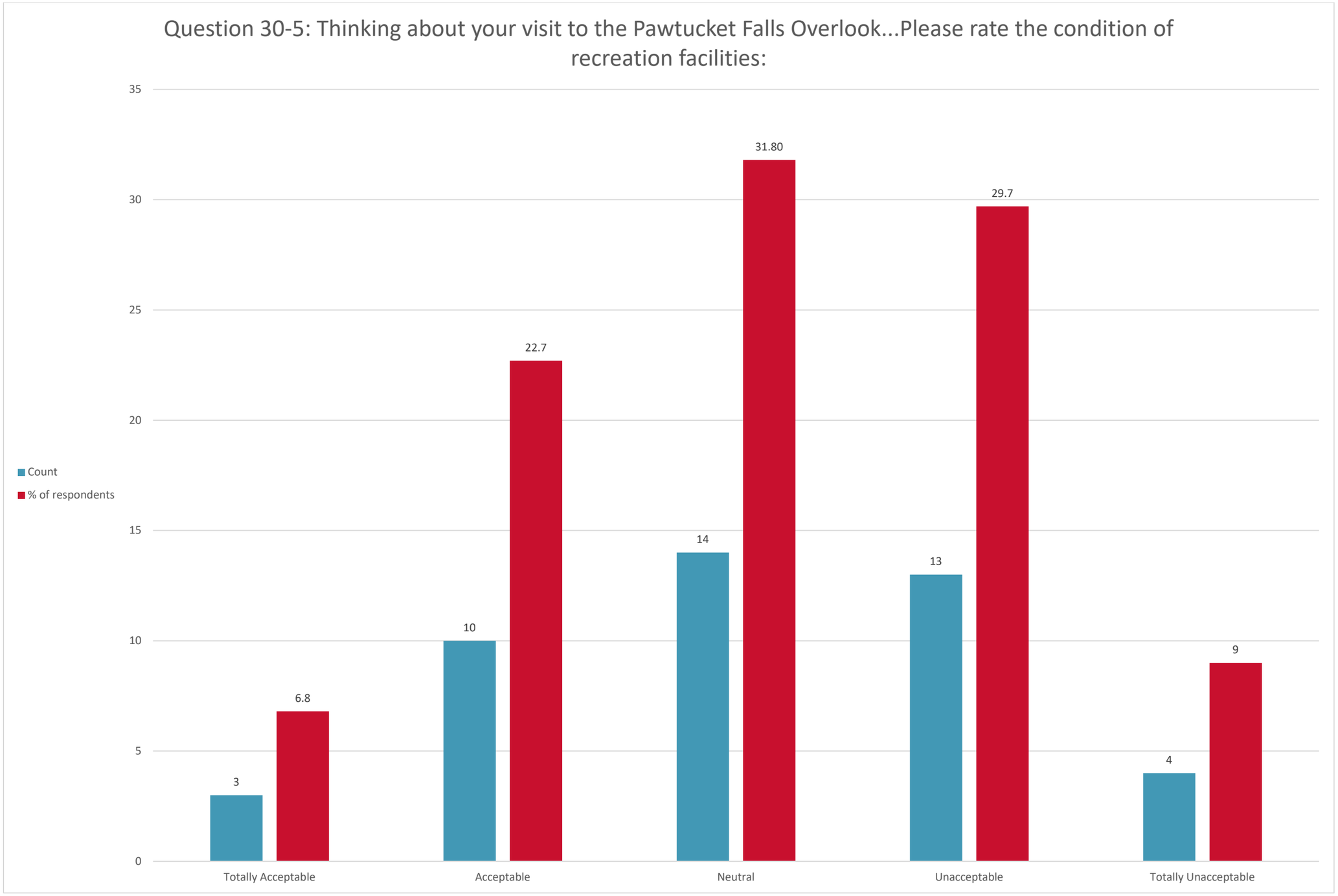

Question 29-8: Thinking about your visit to the Rourke Brothers Boat Ramp...Please rate the overall experience:
Count
% of respondents
60
50
40
30
20
10
0
5
22.7
9
41
6
27.3
1
4.5
1
4.5
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

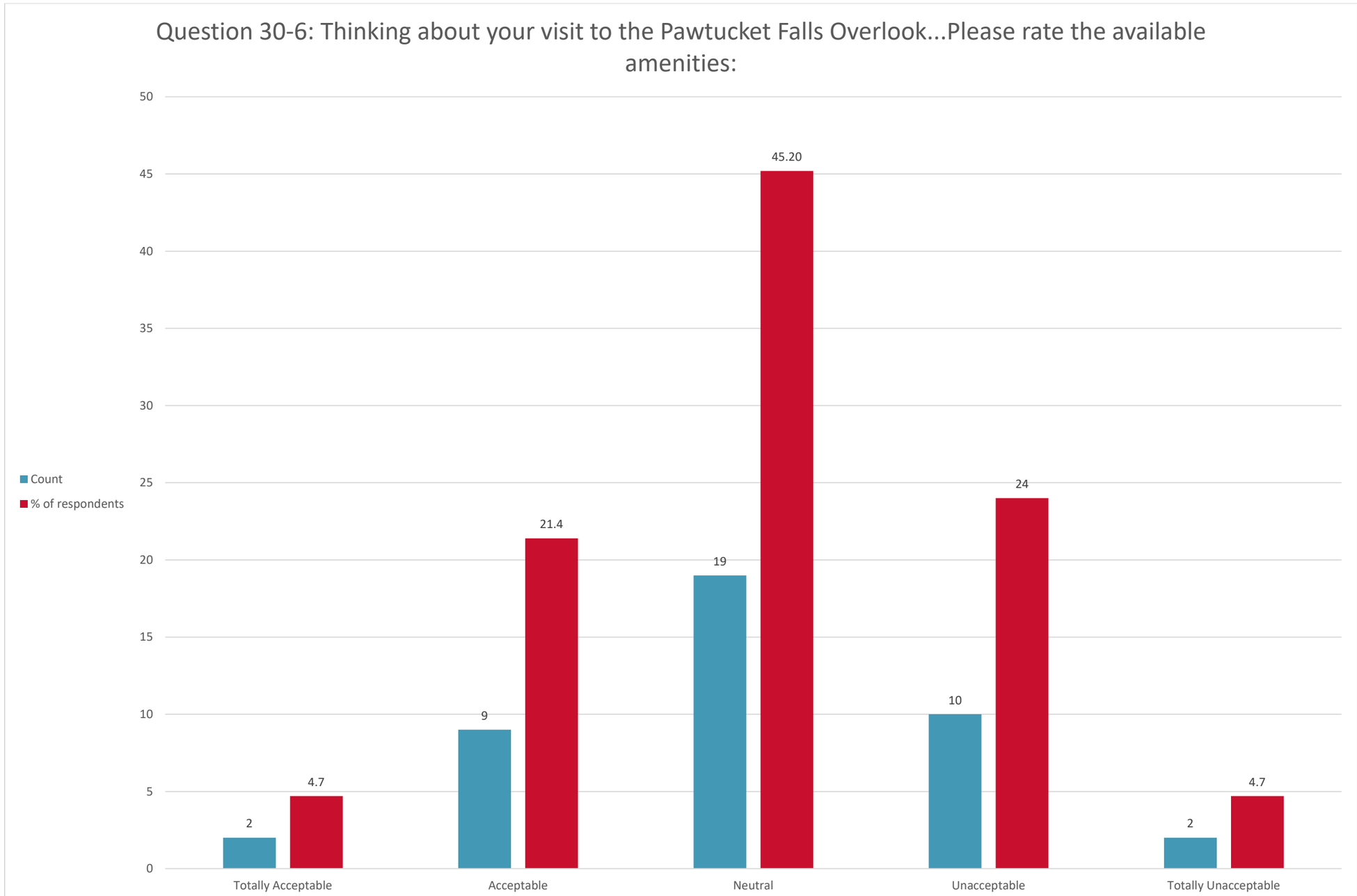

Question 30-1: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the accessibility of the recreation facilities:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
38.62
31.8
18.18
17
14
8
6.8
4.6
3
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

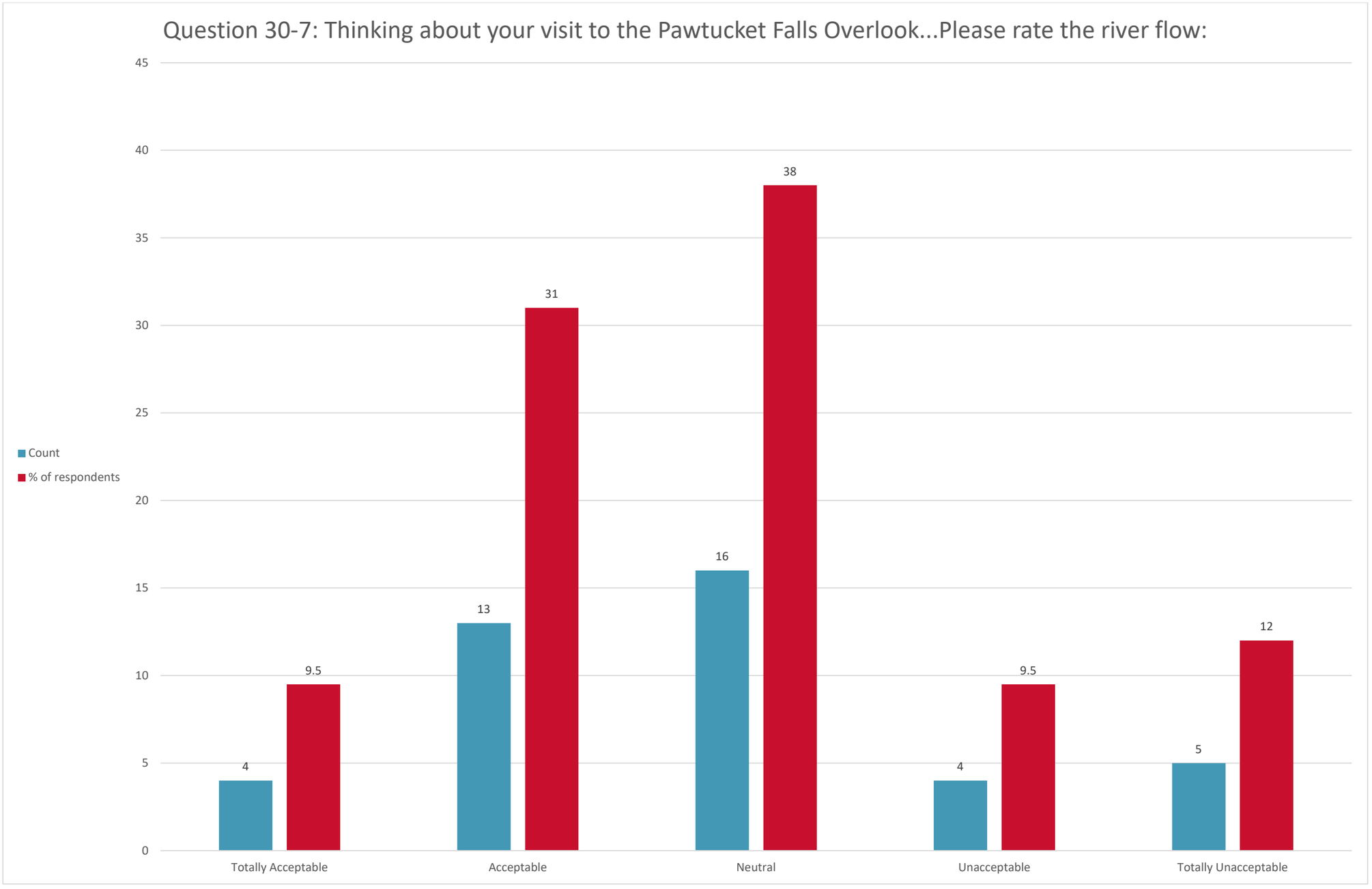

Question 30-2: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the parking:
Count
% of respondents
40
35
30
25
20
15
10
5
0
3
6.7
10
22.2
14
31.1
14
31.1
4
8.9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

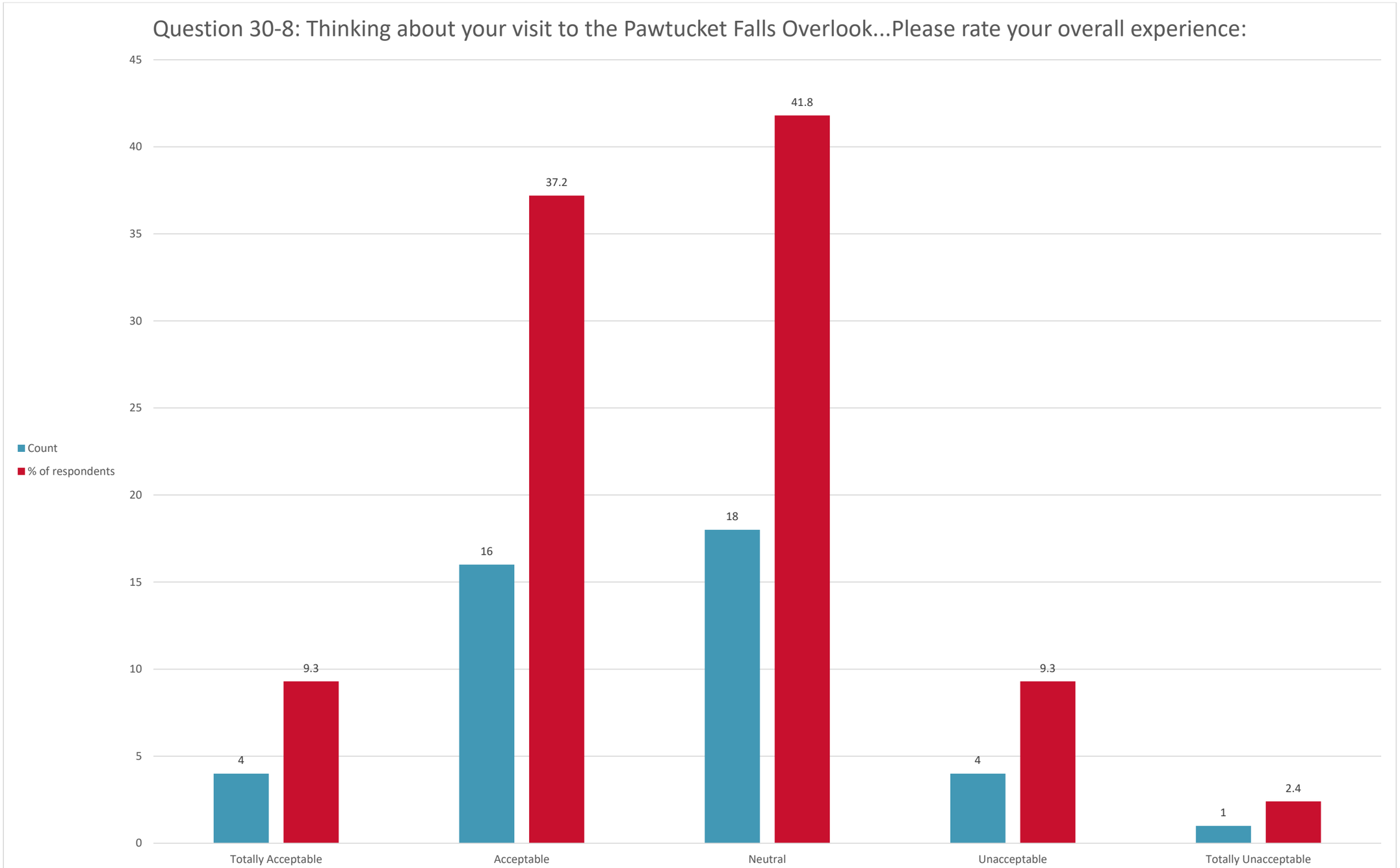

Question 30-3: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the crowding:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
9
20.5
18
41
15
34.1
1
2.2
1
2.2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

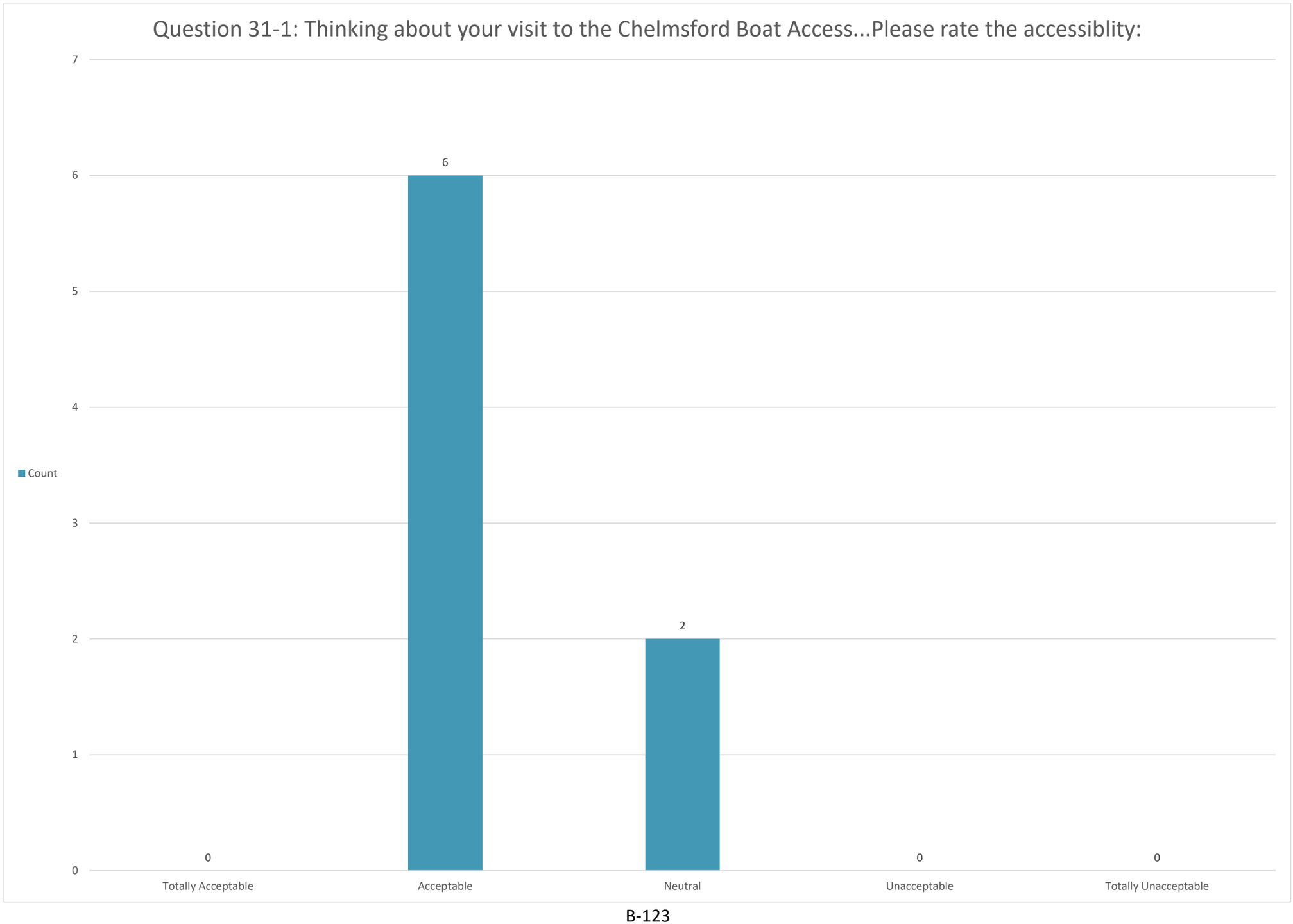

Question 30-4: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the safety:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
3
6.8
20
47.6
13
31.0
5
12
1
2.6
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

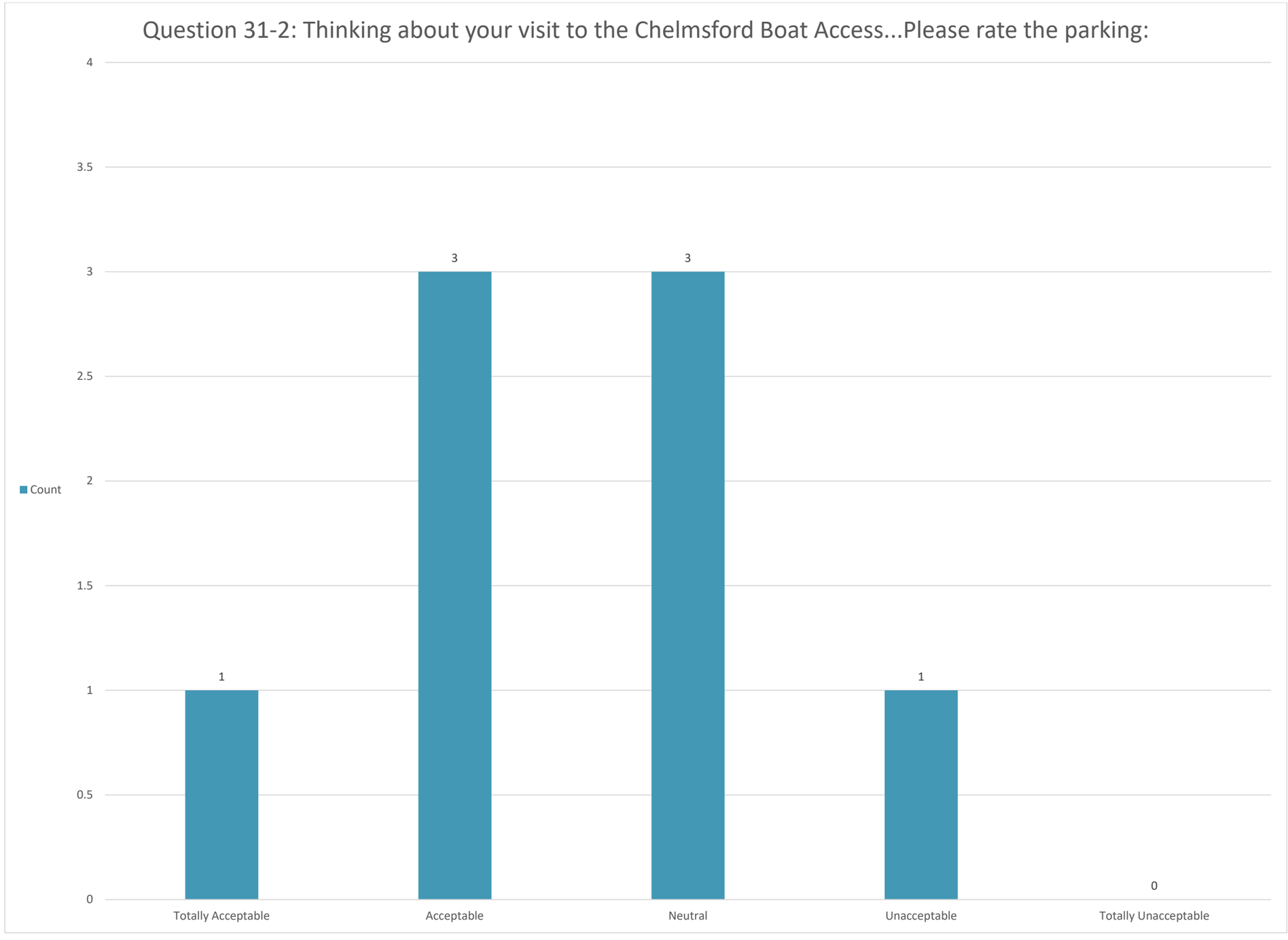

Question 30-5: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the condition of recreation facilities:
35
30
25
20
15
10
5
0
Count
% of respondents
3
6.8
10
22.7
14
31.80
13
29.7
4
9
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

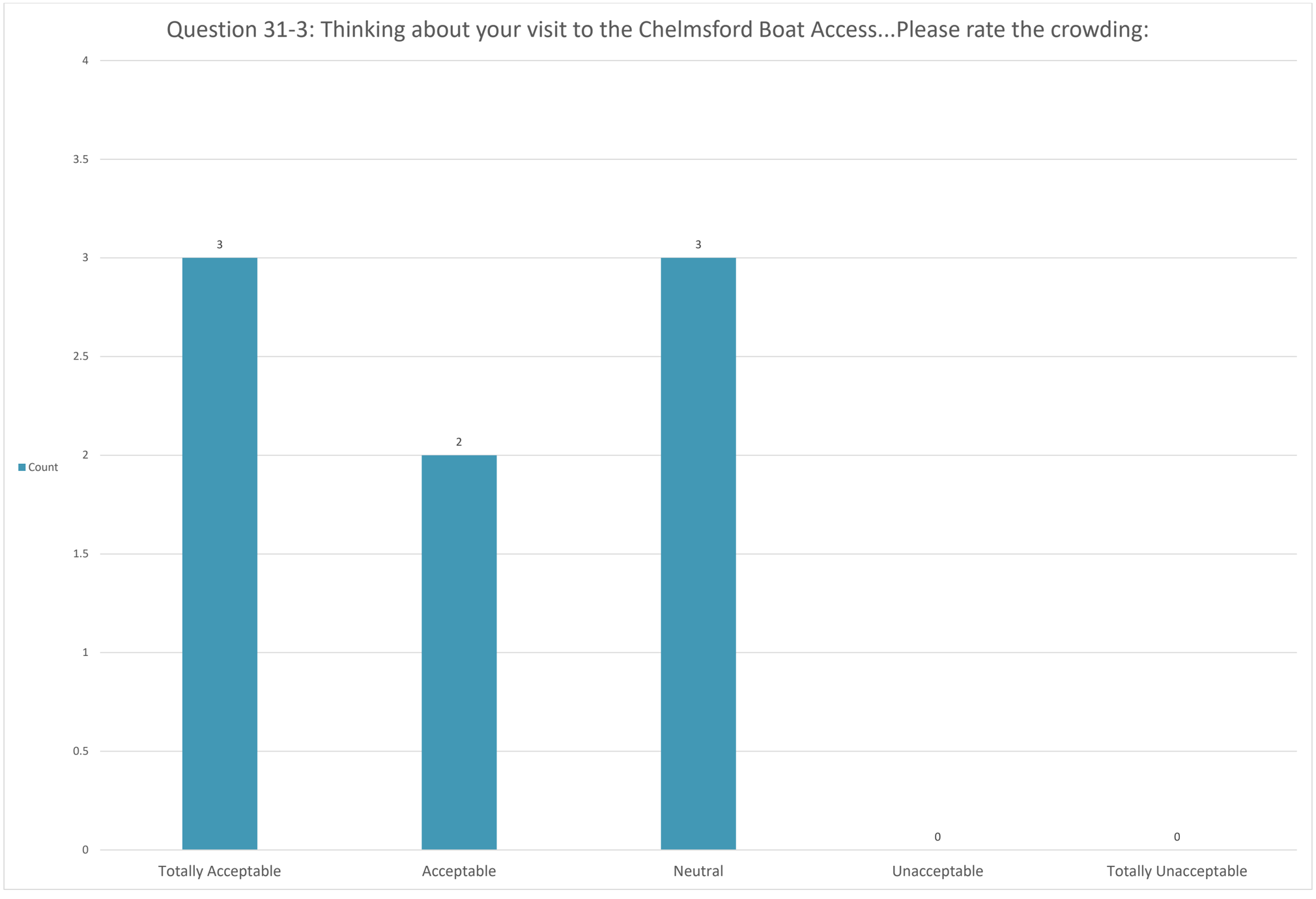

Question 30-6: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the available amenities:
Count
% of respondents
50
45
40
35
30
25
20
15
10
5
0
45.20
24
21.4
19
9
10
4.7
2
4.7
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

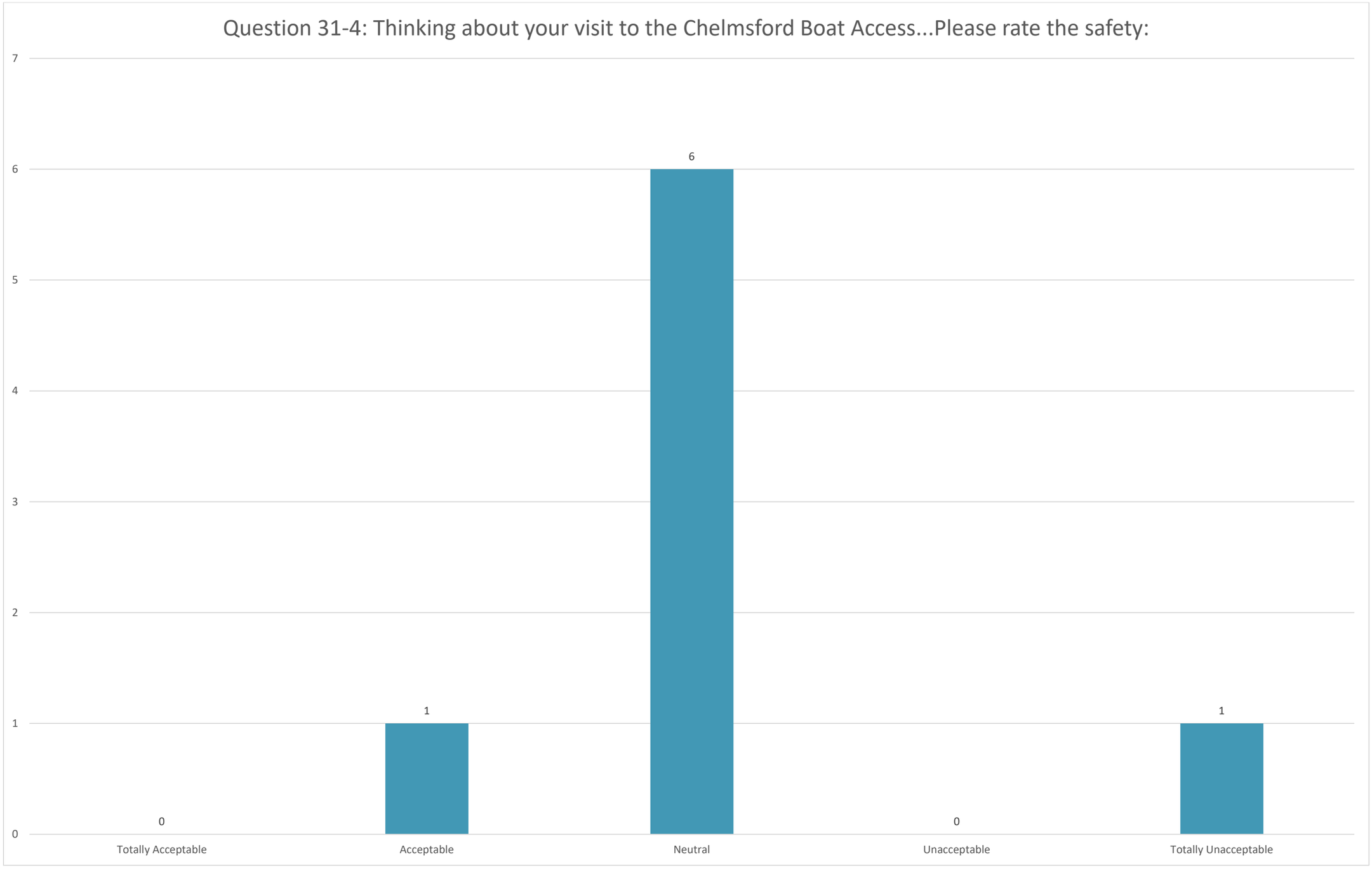

Question 30-7: Thinking about your visit to the Pawtucket Falls Overlook...Please rate the river flow:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
4
9.5
13
31
16
38
4
9.5
5
12
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

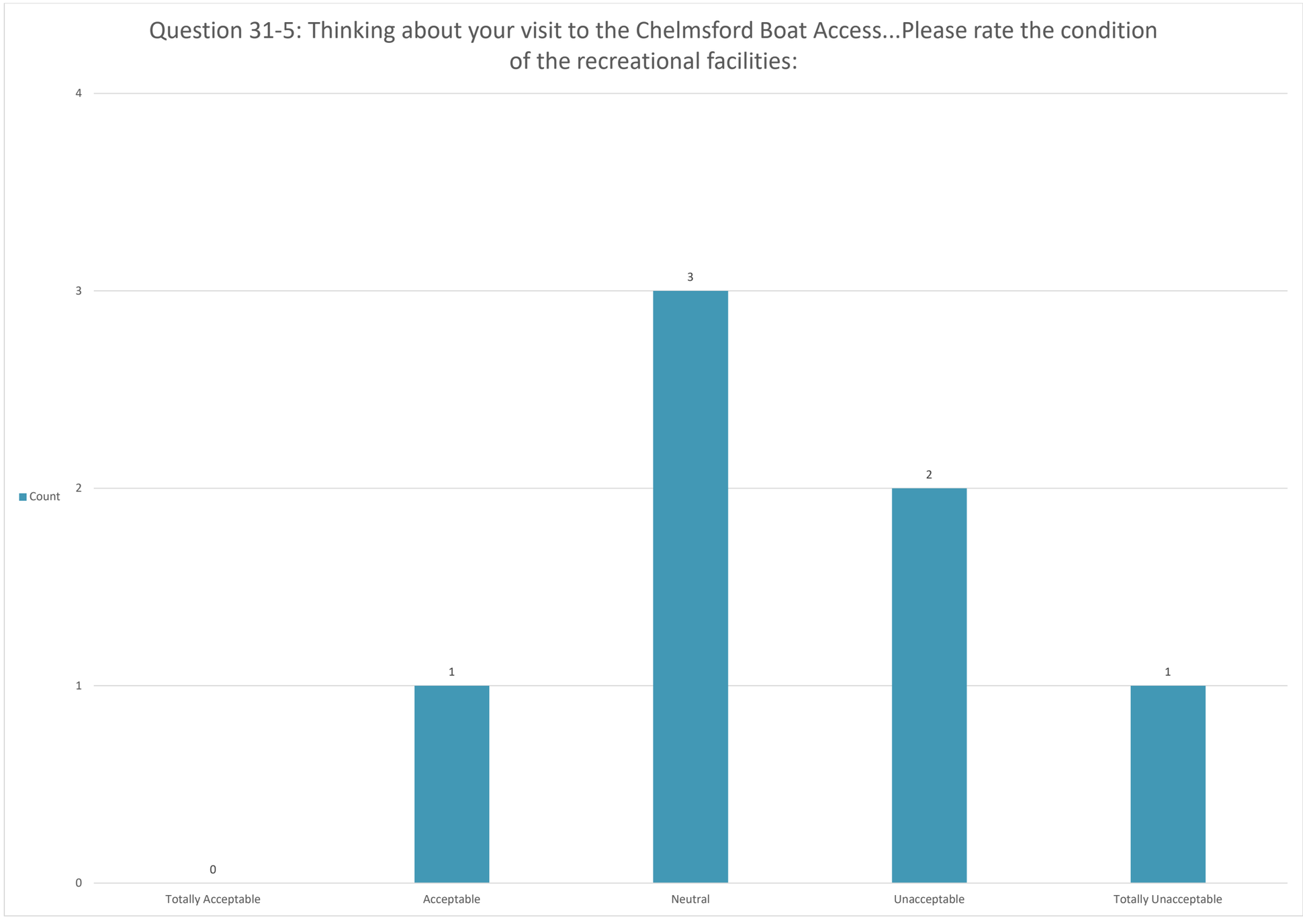

Question 30-8: Thinking about your visit to the Pawtucket Falls Overlook...Please rate your overall experience:
Count
% of respondents
45
40
35
30
25
20
15
10
5
0
4
9.3
16
37.2
18
41.8
4
9.3
1
2.4
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 31-1: Thinking about your visit to the Chelmsford Boat Access...Please rate the accessiblity:
7
6
5
4
3
2
1
0
Count
6
2
0
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

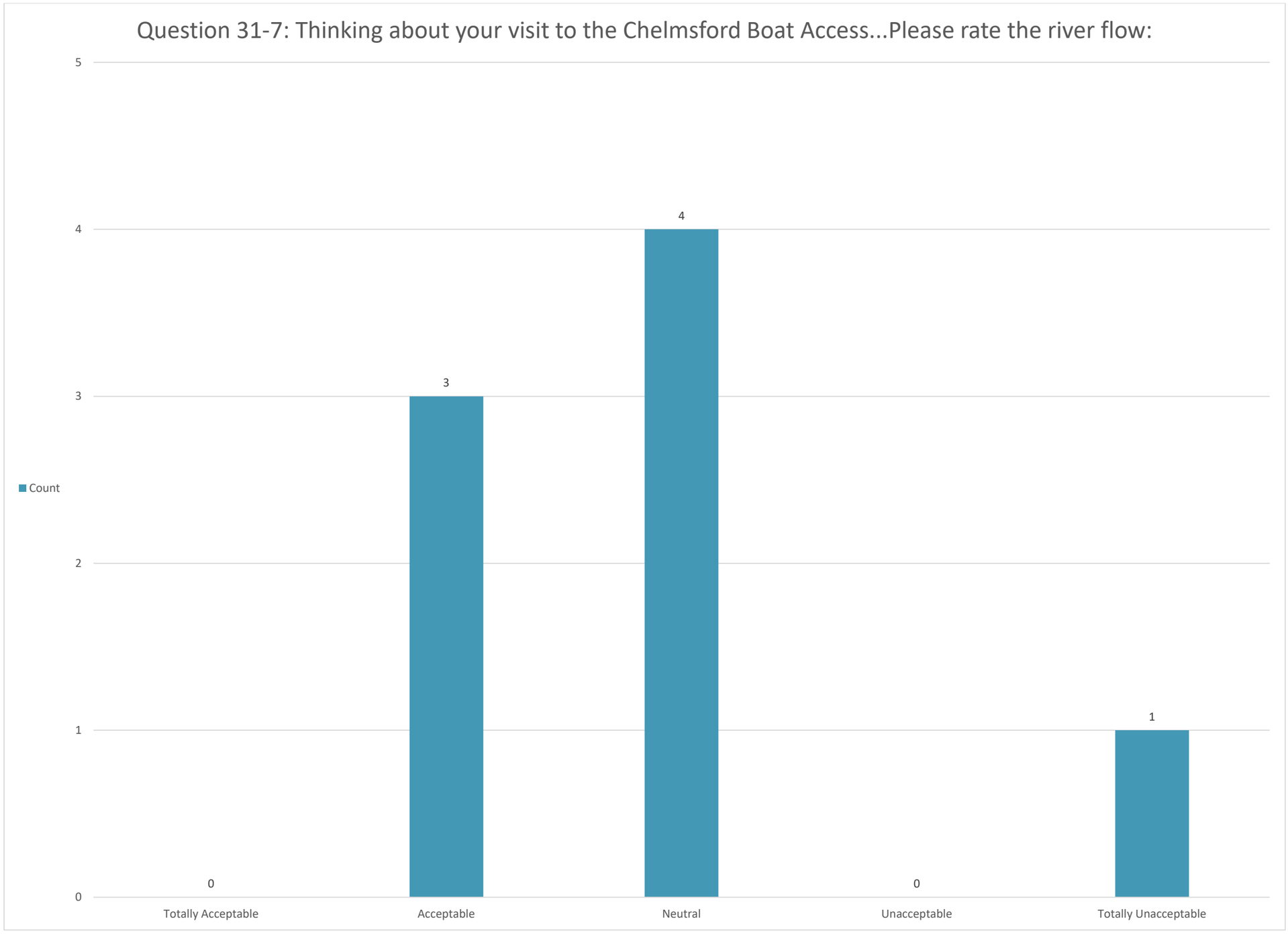

Question 31-2: Thinking about your visit to the Chelmsford Boat Access...Please rate the parking:
Count
4
3.5
3
2.5
2
1.5
1
0.5
0
1
3
3
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

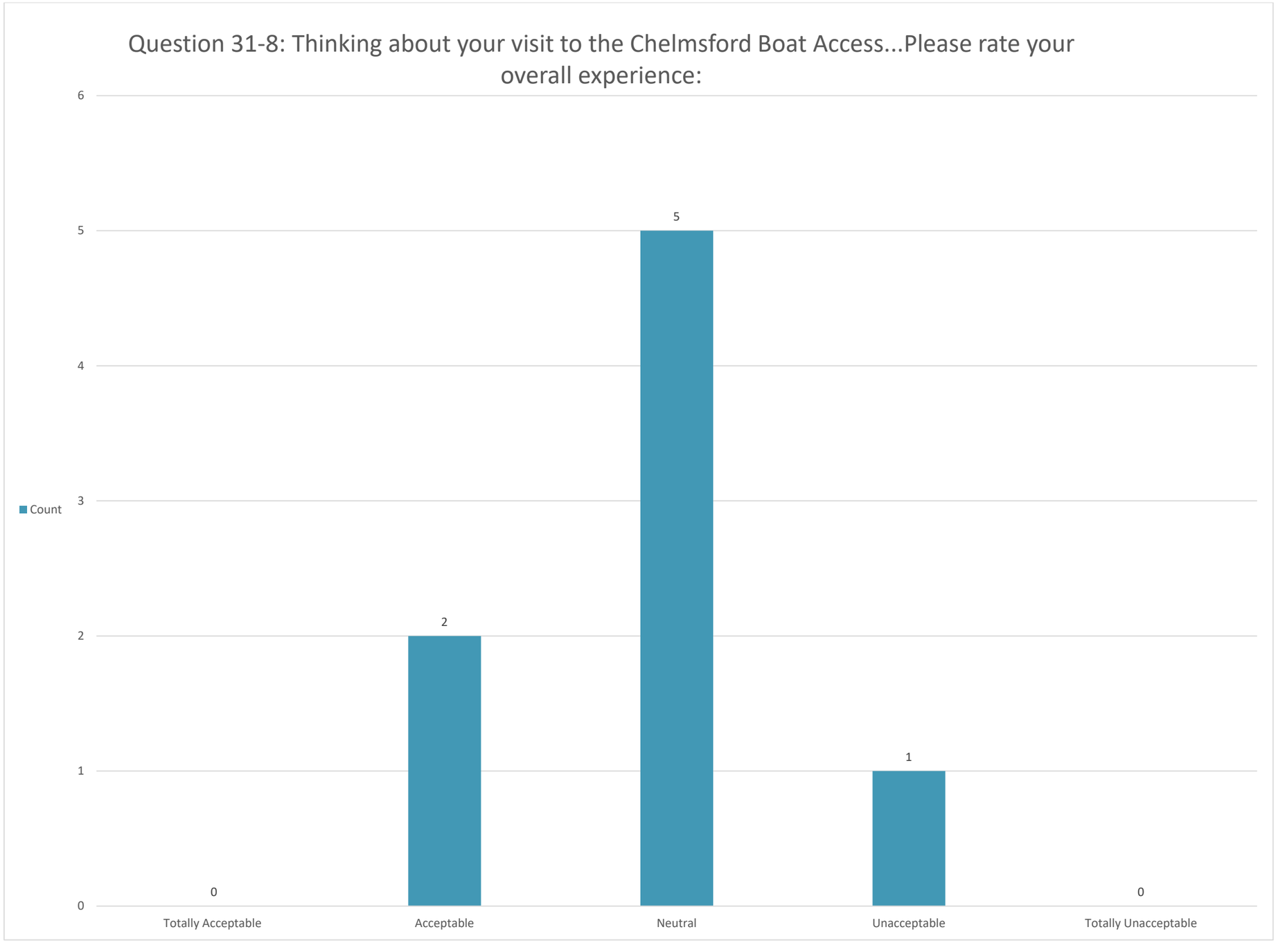

Question 31-3: Thinking about your visit to the Chelmsford Boat Access...Please rate the crowding:
Count
4
3.5
3
2.5
2
1.5
1
0.5
0
3
2
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

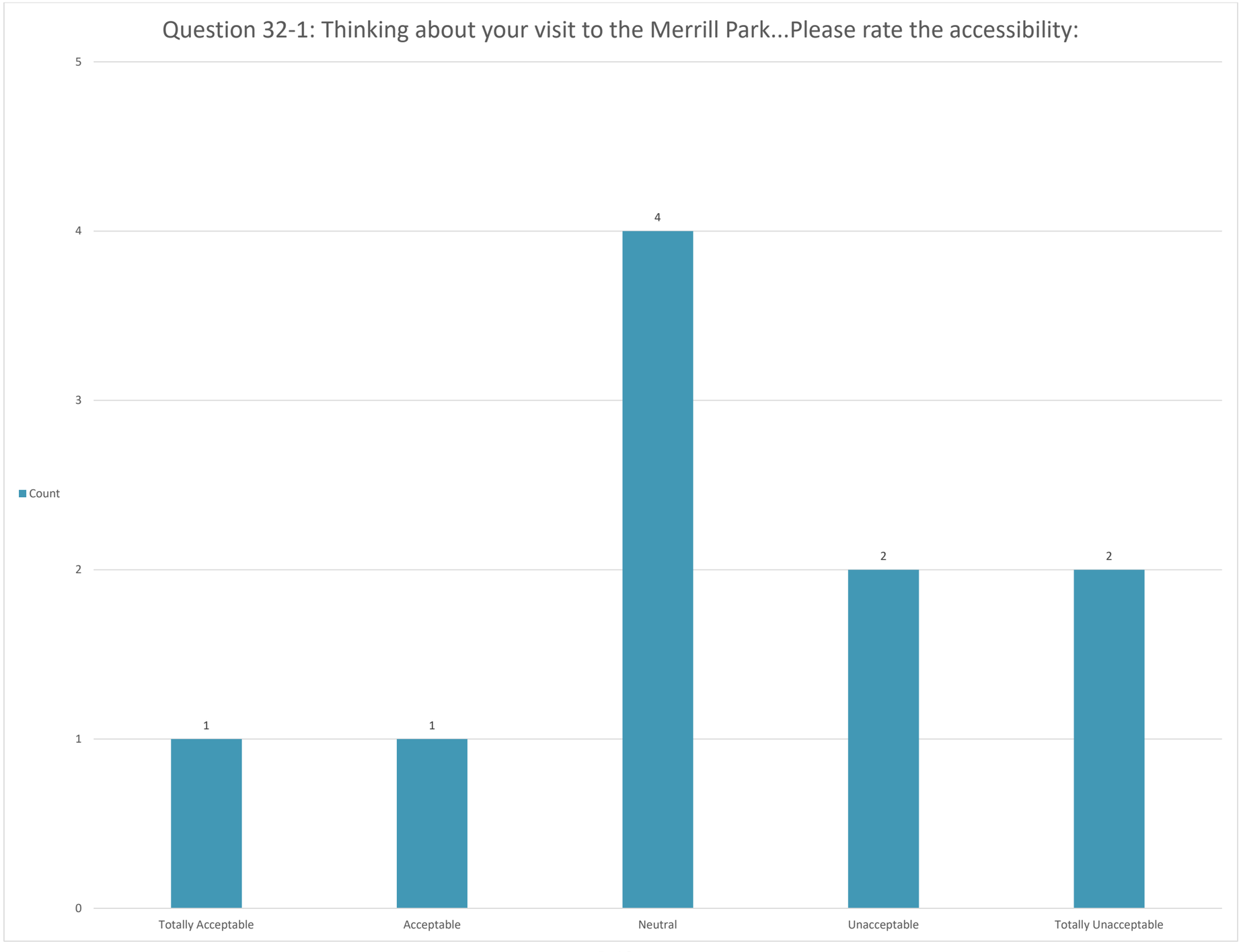

Question 31-4: Thinking about your visit to the Chelmsford Boat Access...Please rate the safety:
7
6
5
4
3
2
1
0
0
1
6
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

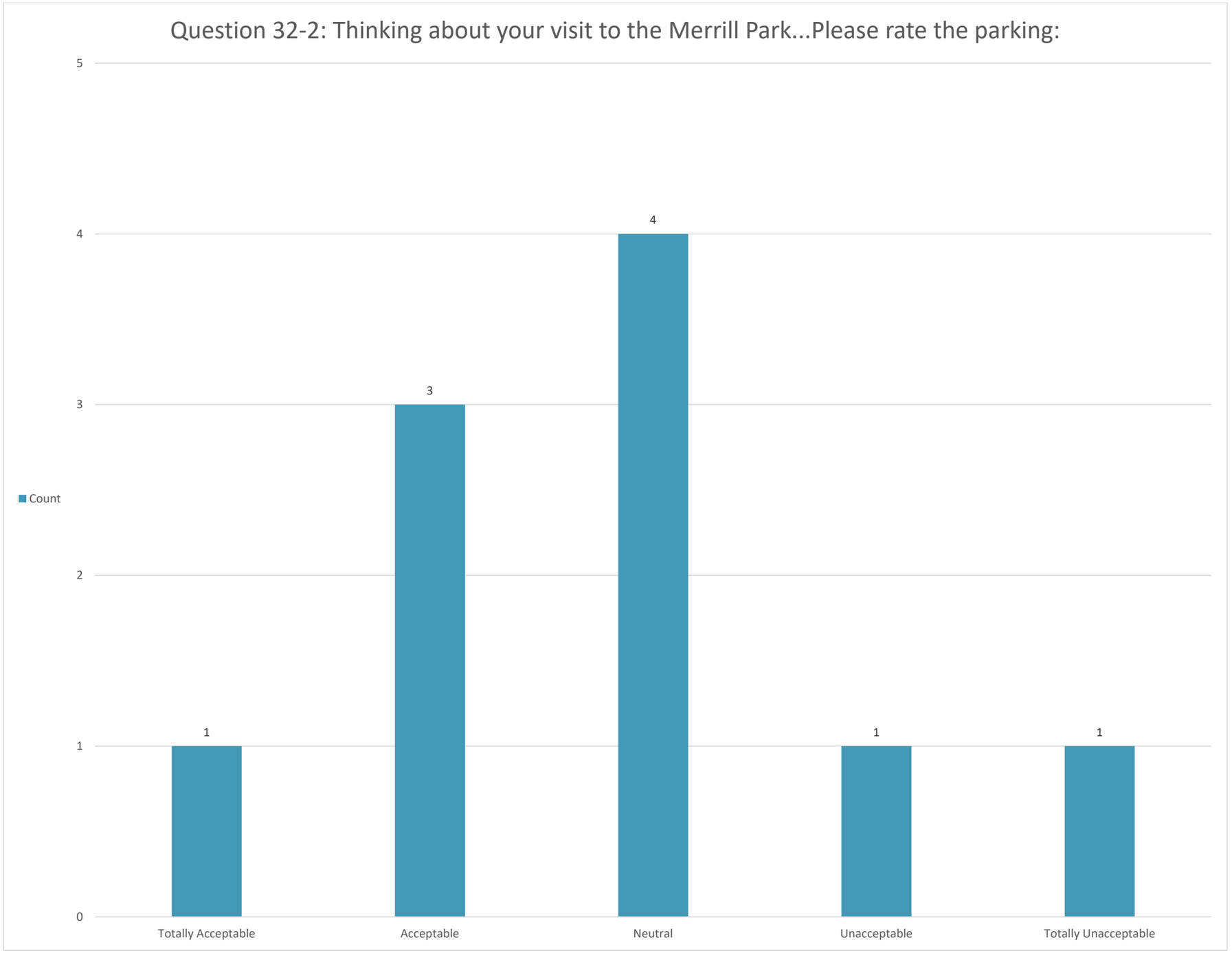

Question 31-5: Thinking about your visit to the Chelmsford Boat Access...Please rate the condition of the recreational facilities:
Count
4
3
2
1
0
0
1
3
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

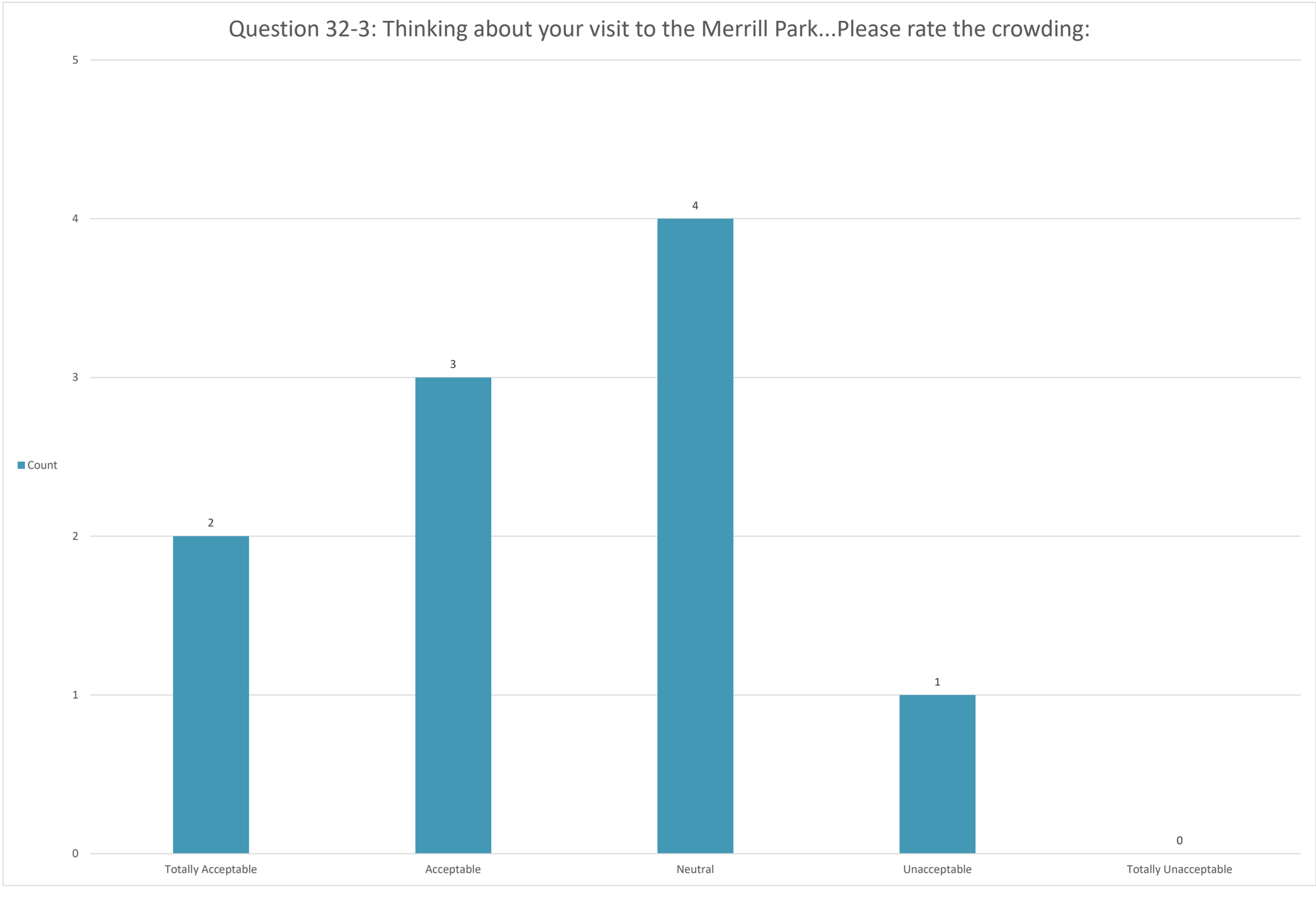
Question 31-6: Thinking about your visit to the Chelmsford Boat Access...Please rate the available amenities:
Count
4
3
2
1
0
0
0
3
3
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

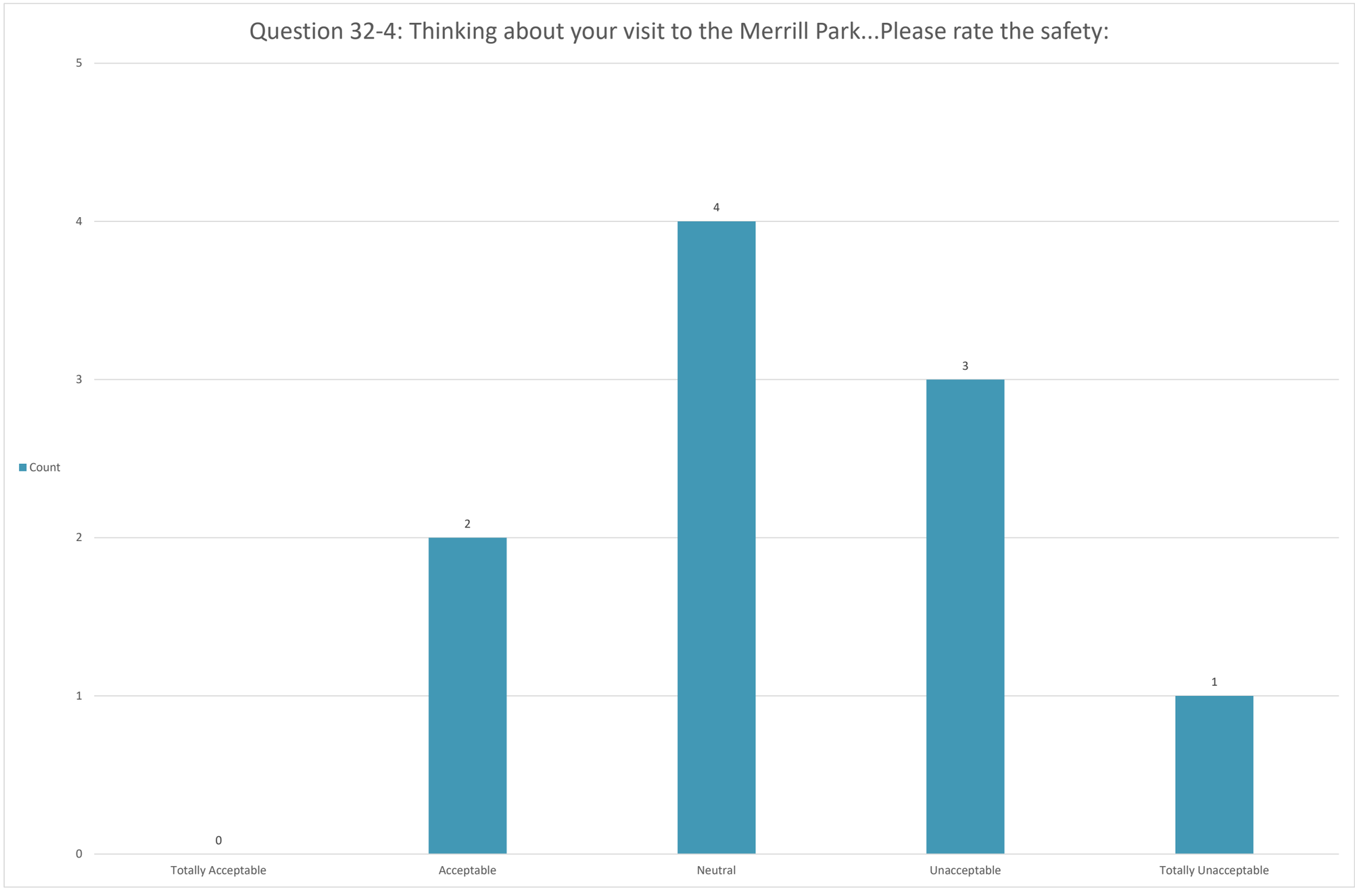

Question 31-7: Thinking about your visit to the Chelmsford Boat Access...Please rate the river flow:
5
4
3
2
1
0
Count
0
3
4
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

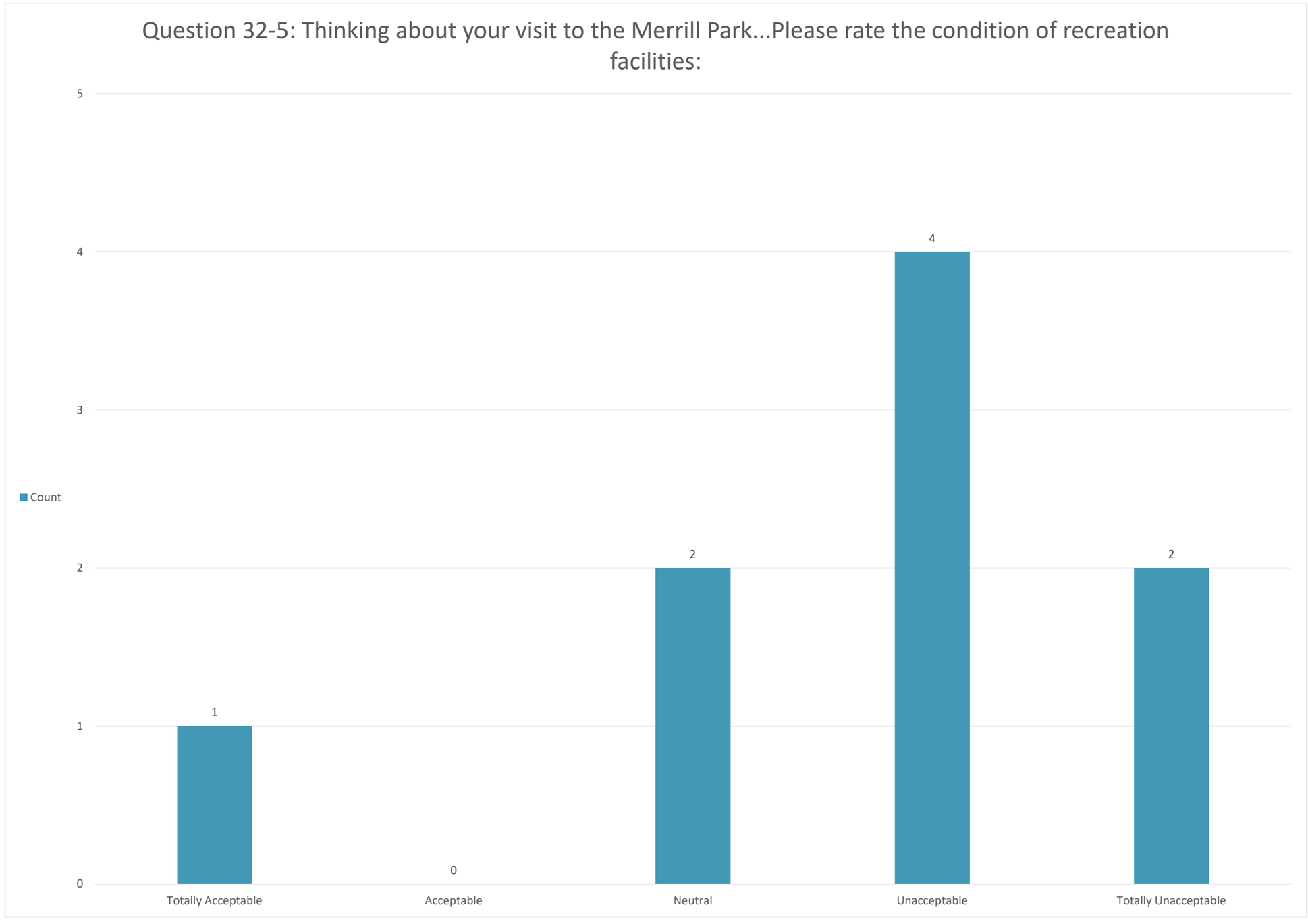

Question 31-8: Thinking about your visit to the Chelmsford Boat Access...Please rate your overall experience:
Count
6
5
4
3
2
1
0
0
2
5
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

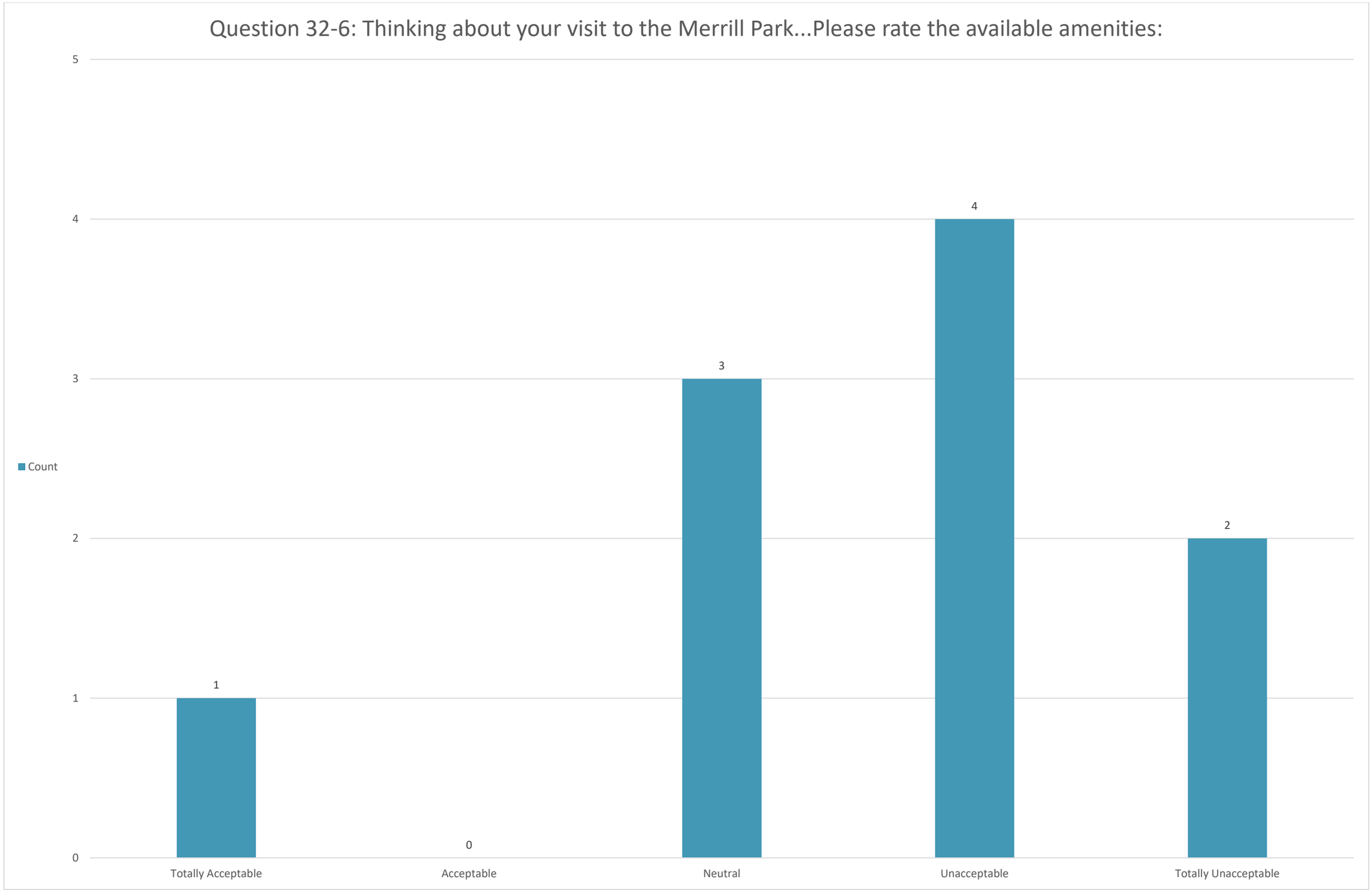

Question 32-1: Thinking about your visit to the Merrill Park...Please rate the accessibility:
5
4
3
2
1
0
Count
4
1
1
2
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

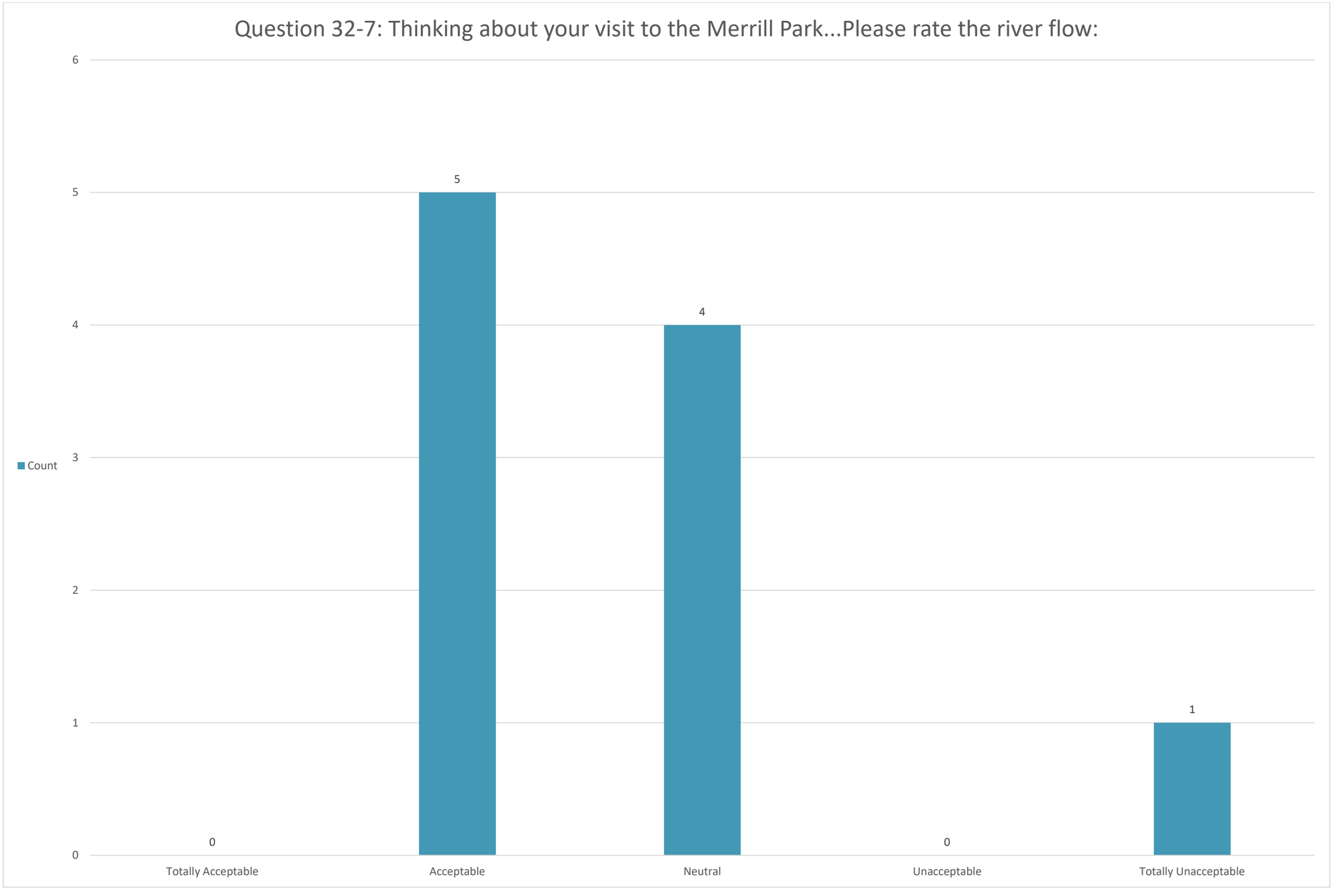

Question 32-2: Thinking about your visit to the Merrill Park...Please rate the parking:
5
4
3
2
1
0
Count
1
3
4
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

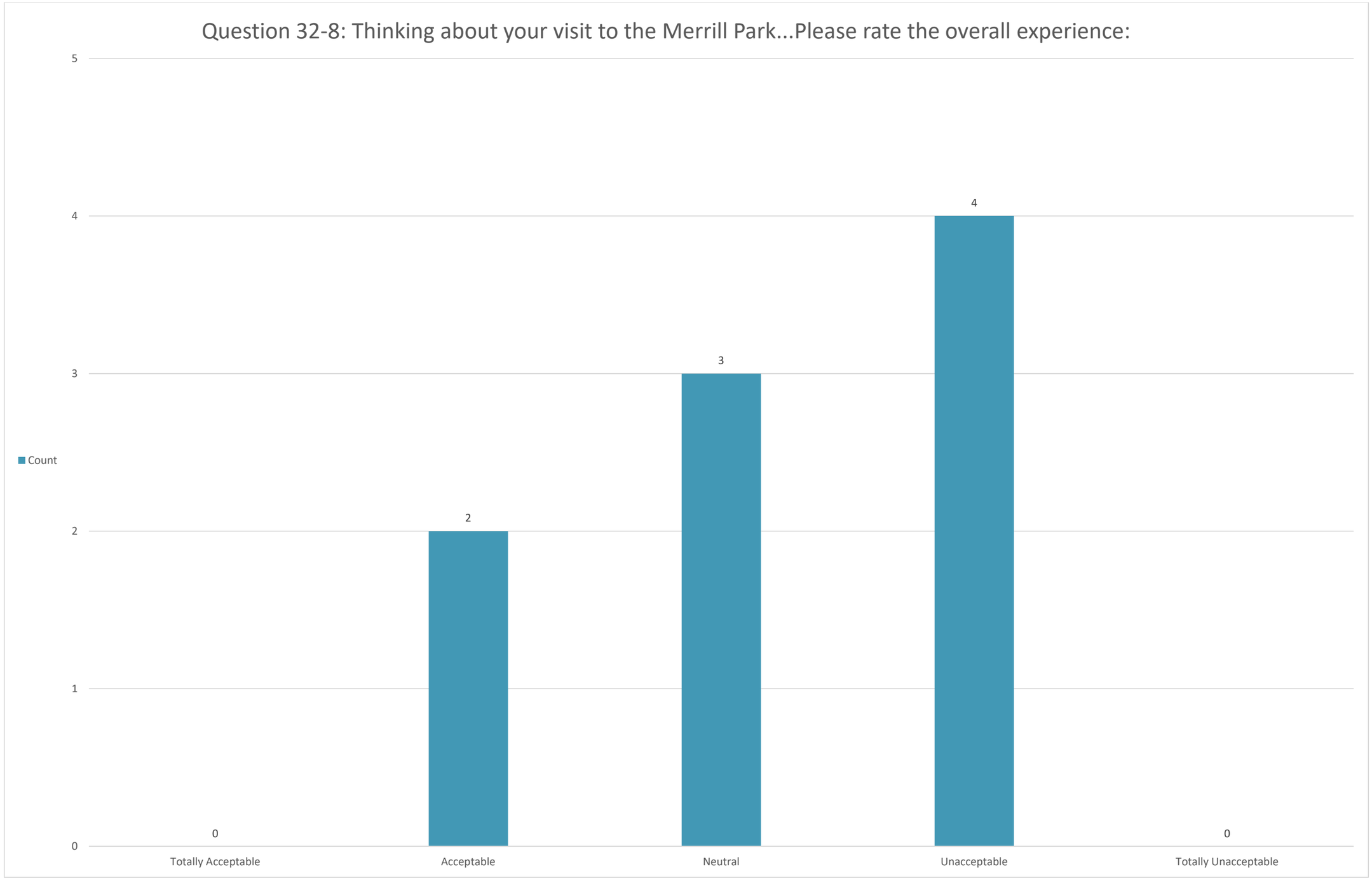

Question 32-3: Thinking about your visit to the Merrill Park...Please rate the crowding:
5
4
3
2
1
0
Count
2
3
4
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

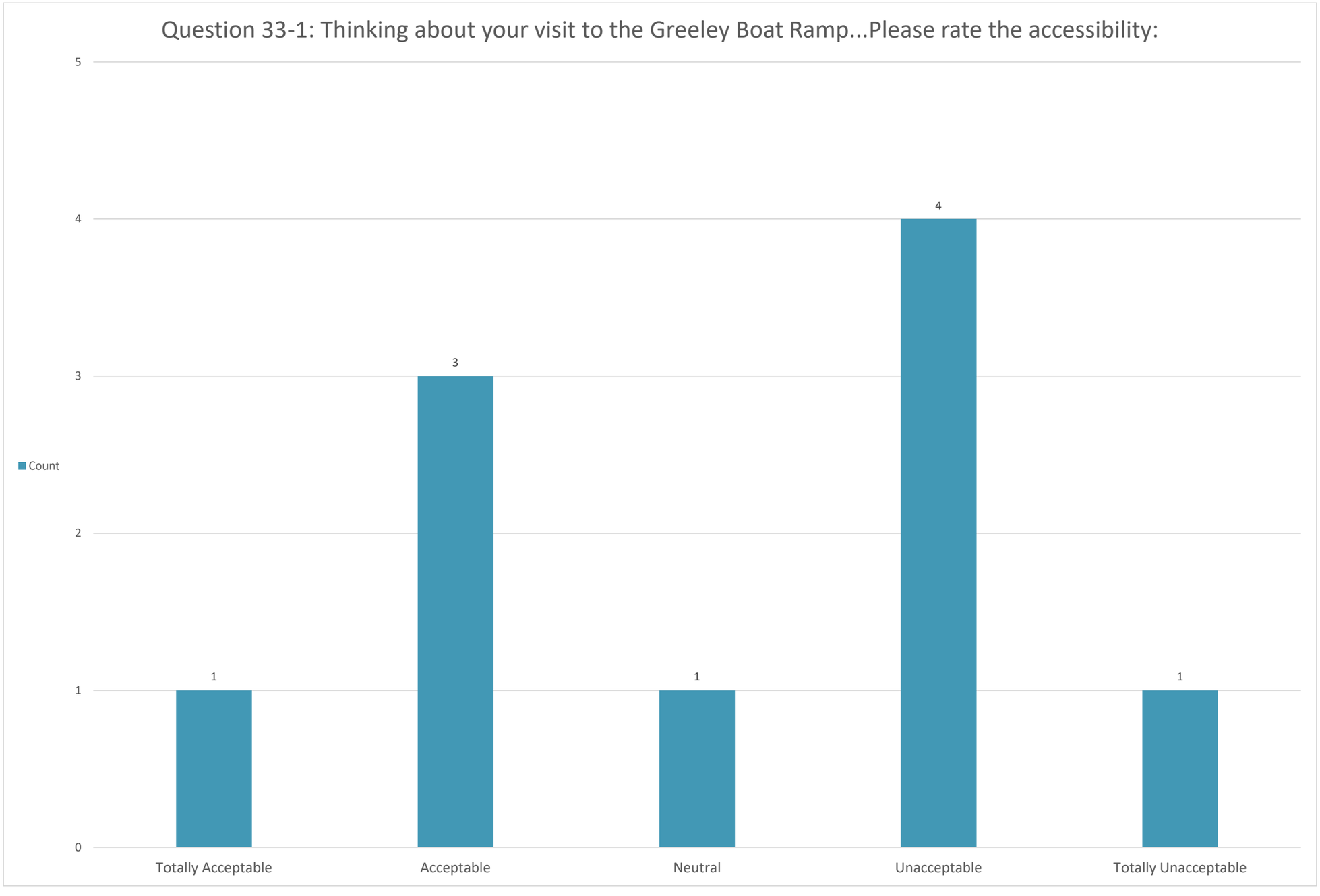

Question 32-4: Thinking about your visit to the Merrill Park...Please rate the safety:
5
4
3
2
1
0
Count
0
2
4
3
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

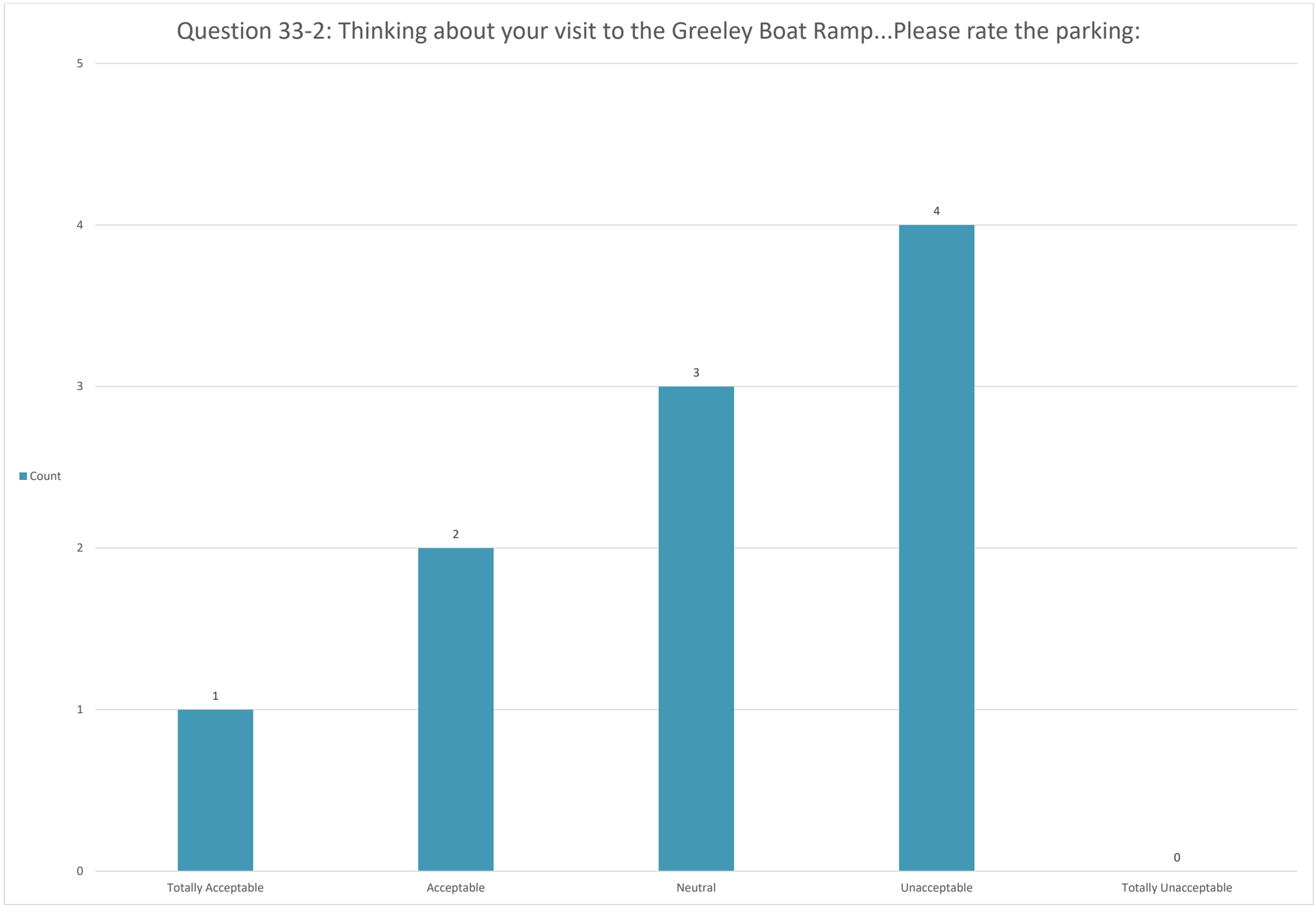

Question 32-5: Thinking about your visit to the Merrill Park...Please rate the condition of recreation facilities:
5
4
3
2
1
0
Count
1
0
2
4
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

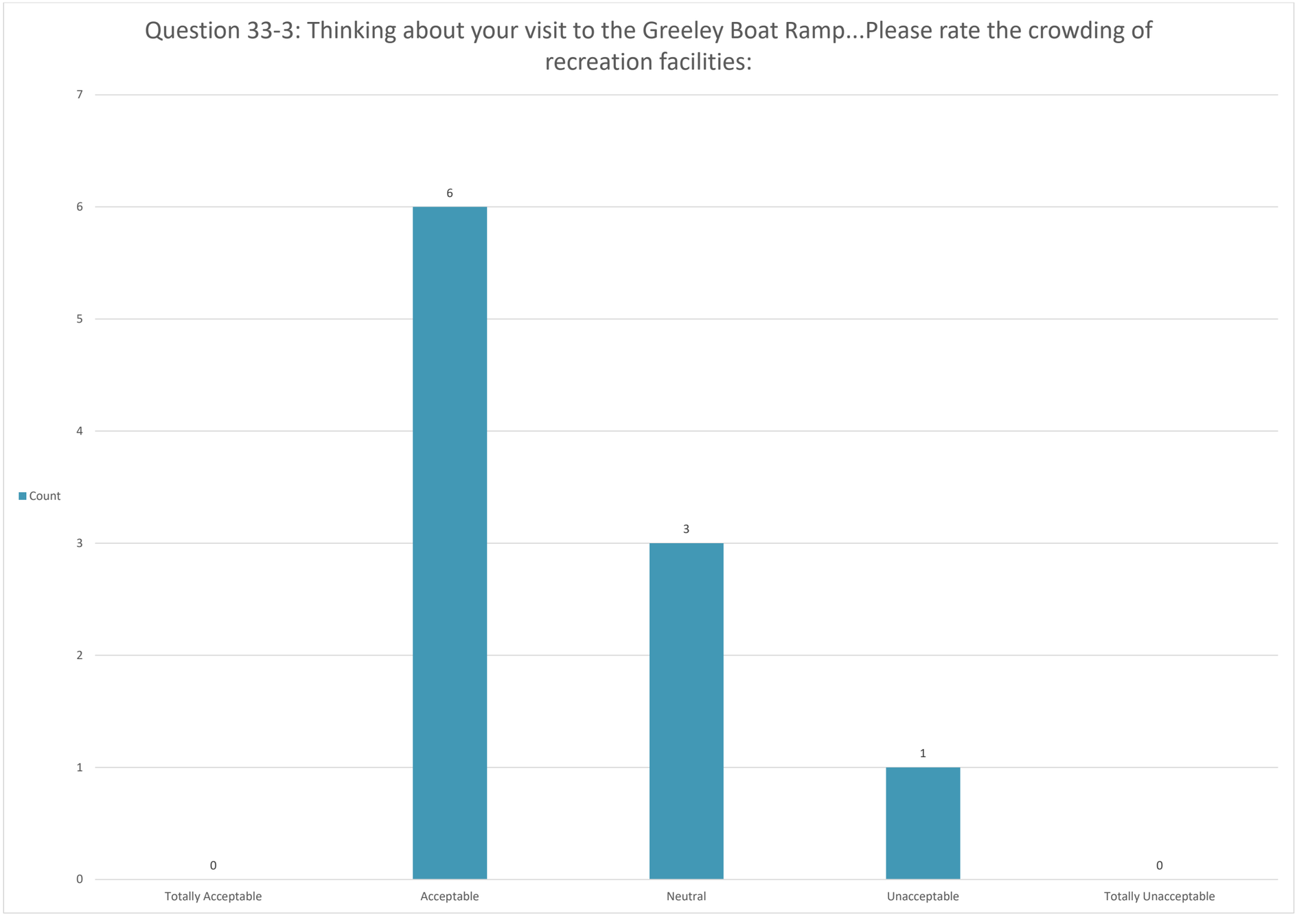

Question 32-6: Thinking about your visit to the Merrill Park...Please rate the available amenities:
5
4
3
2
1
0
Count
1
0
3
4
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

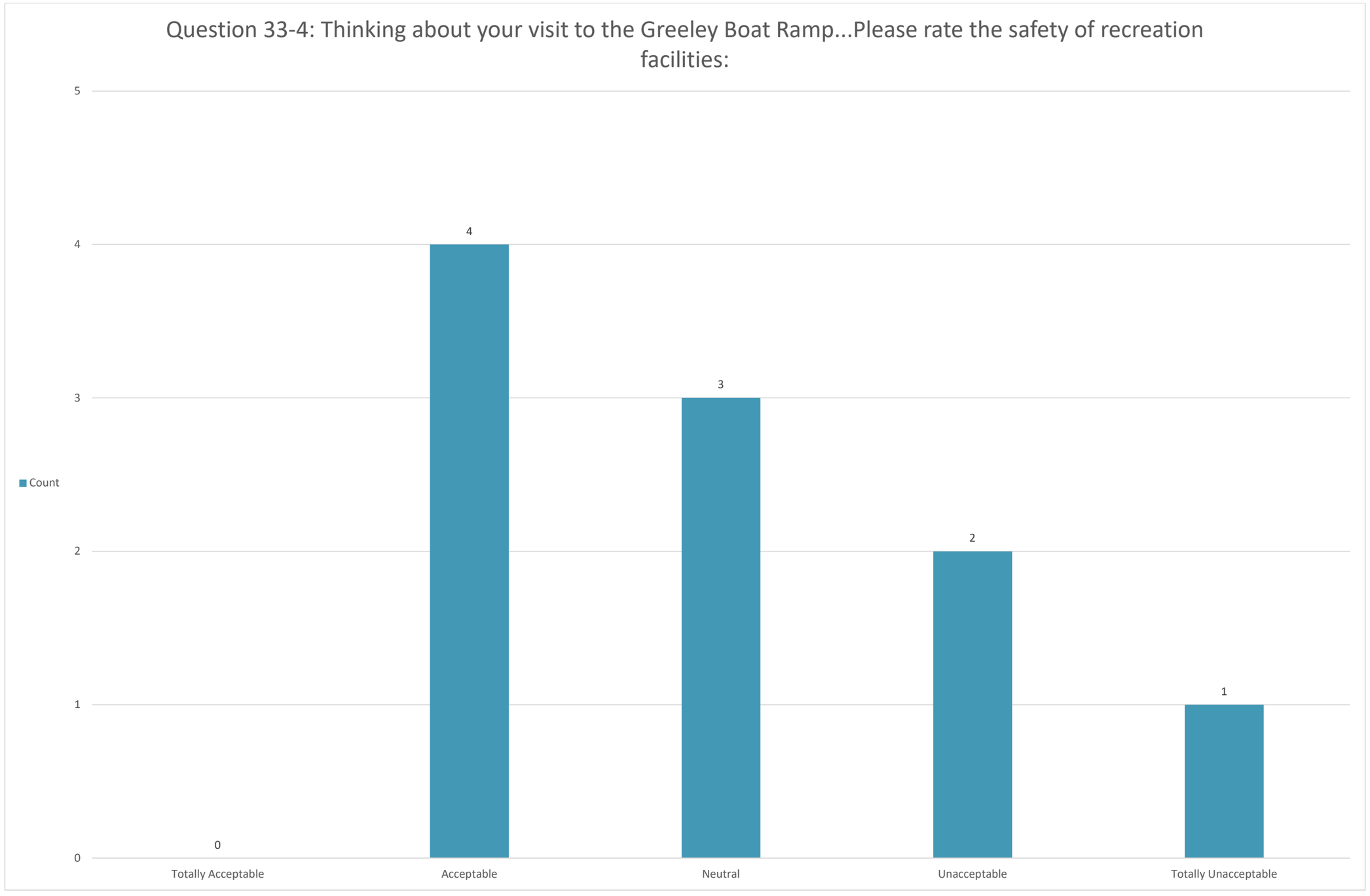

Question 32-7: Thinking about your visit to the Merrill Park...Please rate the river flow:
Count
6
5
4
3
2
1
0
5
4
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

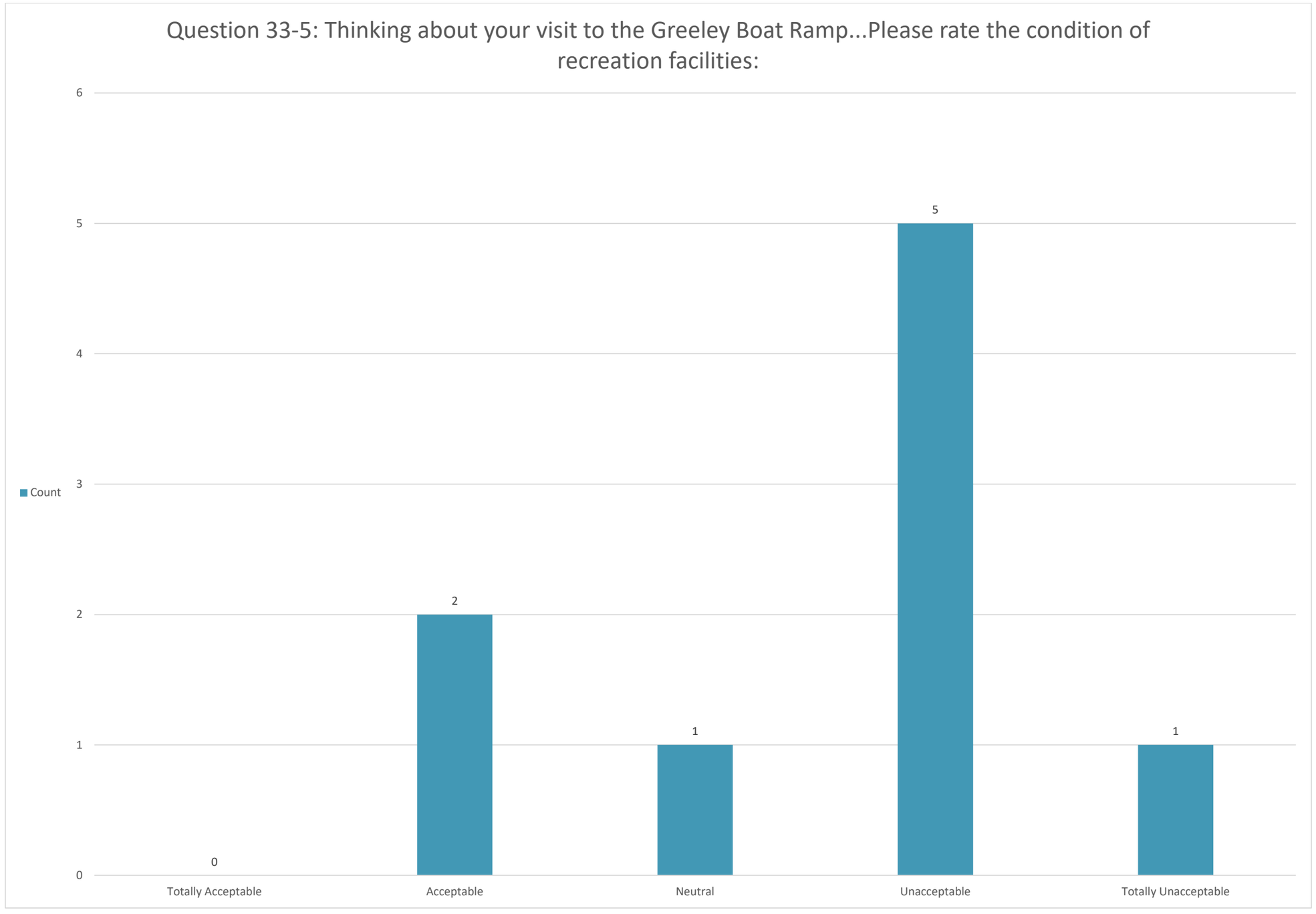

Question 32-8: Thinking about your visit to the Merrill Park...Please rate the overall experience:
5
4
3
2
1
0
Count
0
2
3
4
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

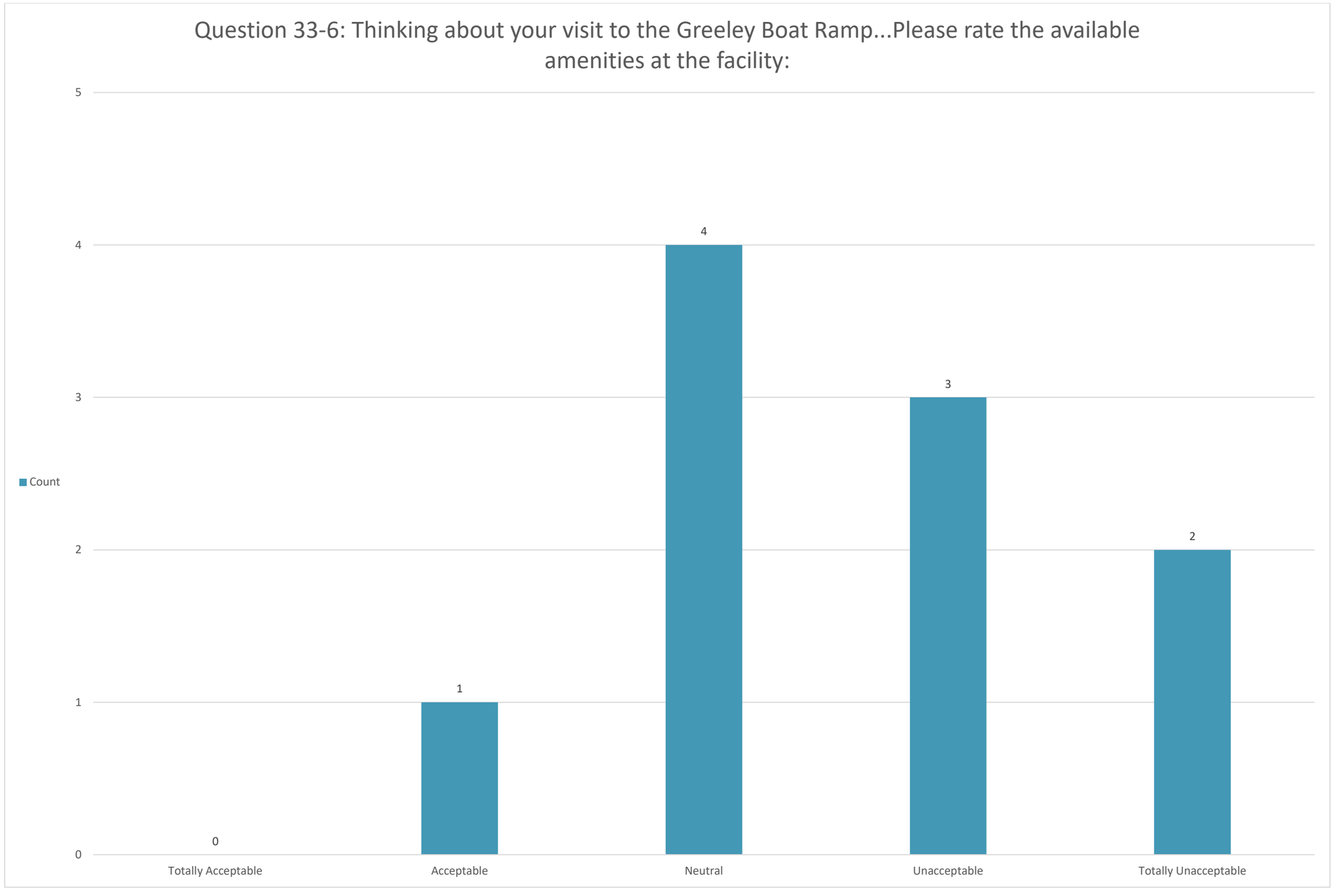

Question 33-1: Thinking about your visit to the Greeley Boat Ramp...Please rate the accessibility:
5
4
3
2
1
0
Count
1
3
1
4
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

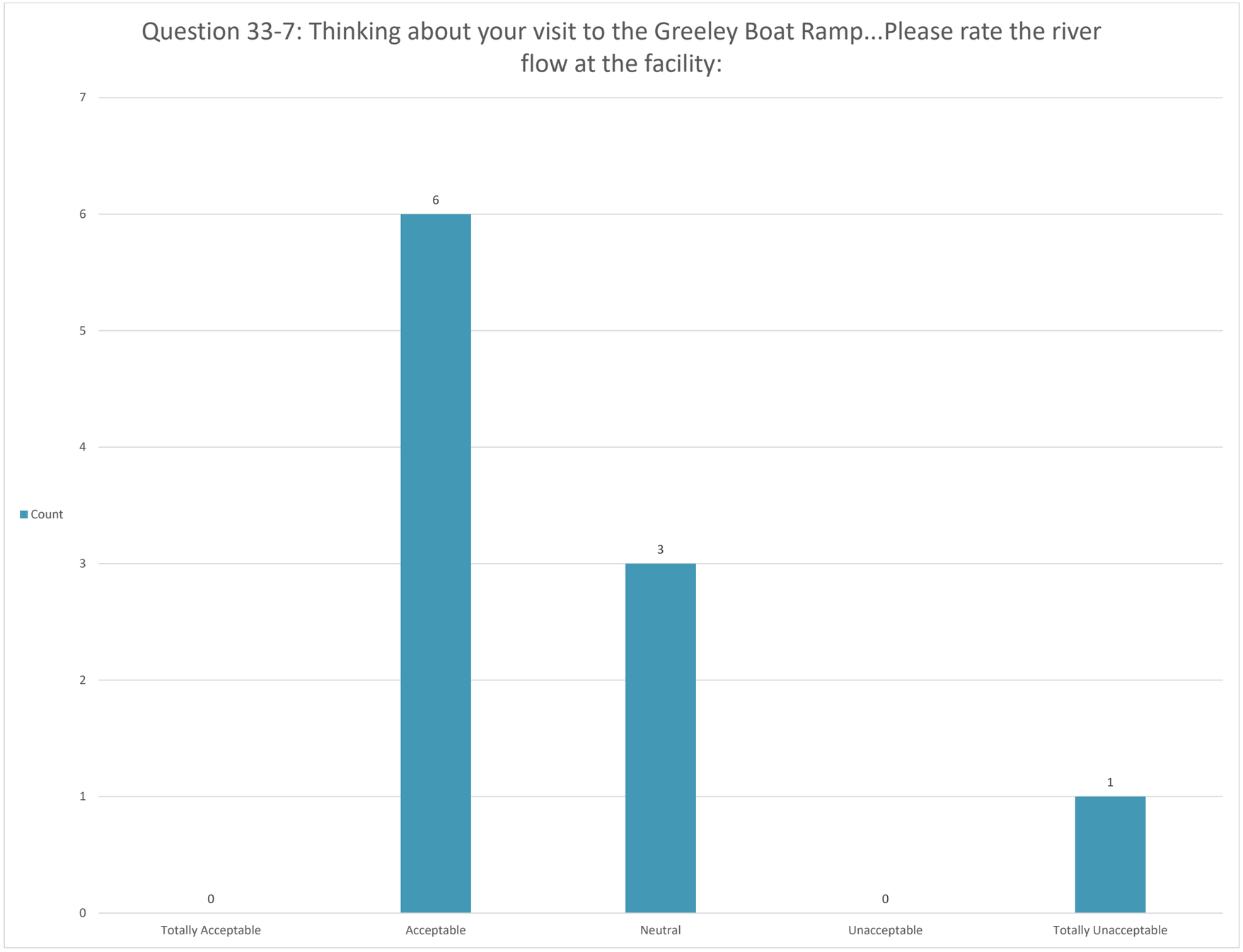

Question 33-2: Thinking about your visit to the Greeley Boat Ramp...Please rate the parking:
Count
5
4
3
2
1
0
1
2
3
4
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

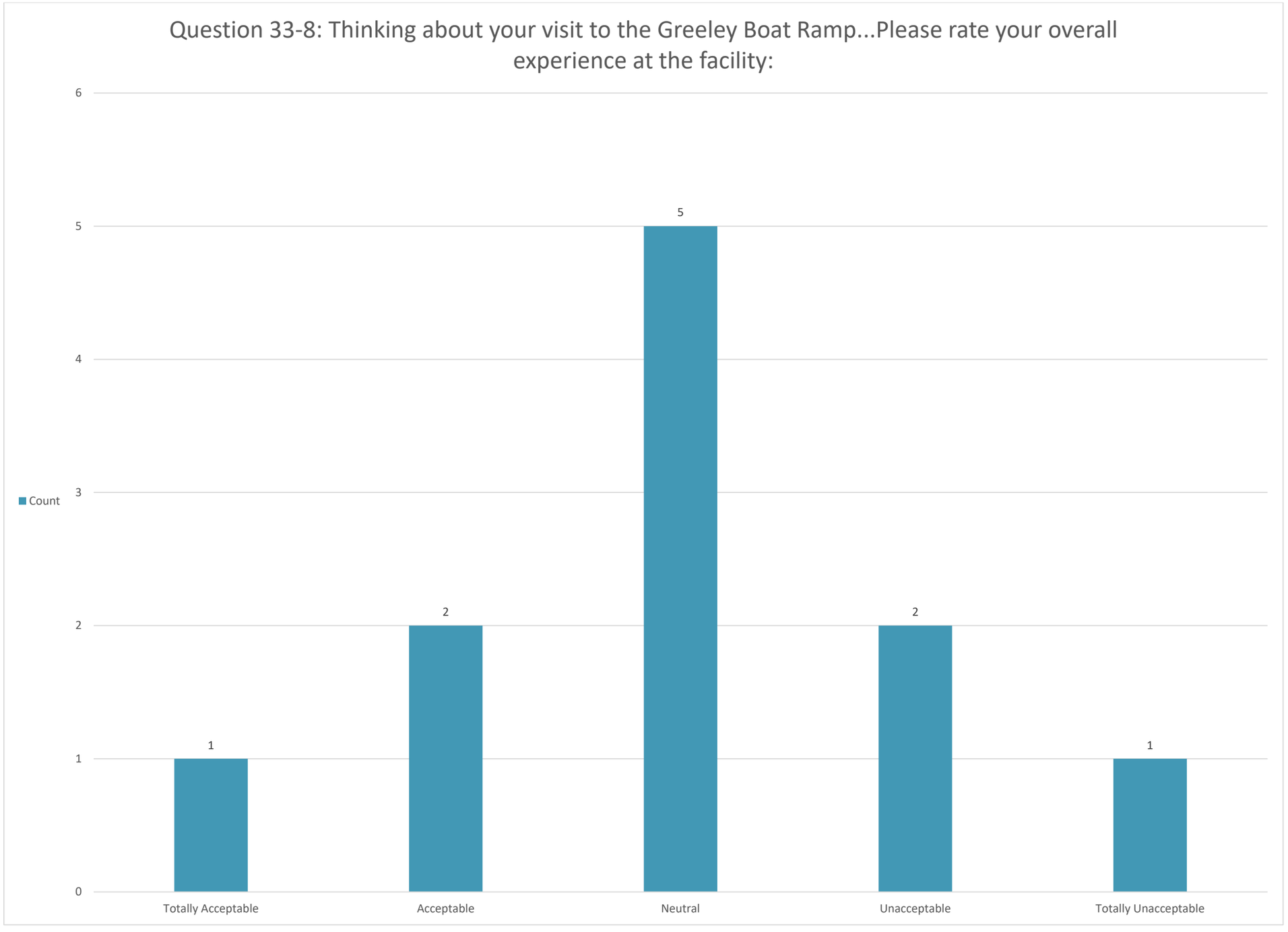

Question 33-3: Thinking about your visit to the Greeley Boat Ramp...Please rate the crowding of recreation facilities:
Count
7
6
5
4
3
2
1
0
0
6
3
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

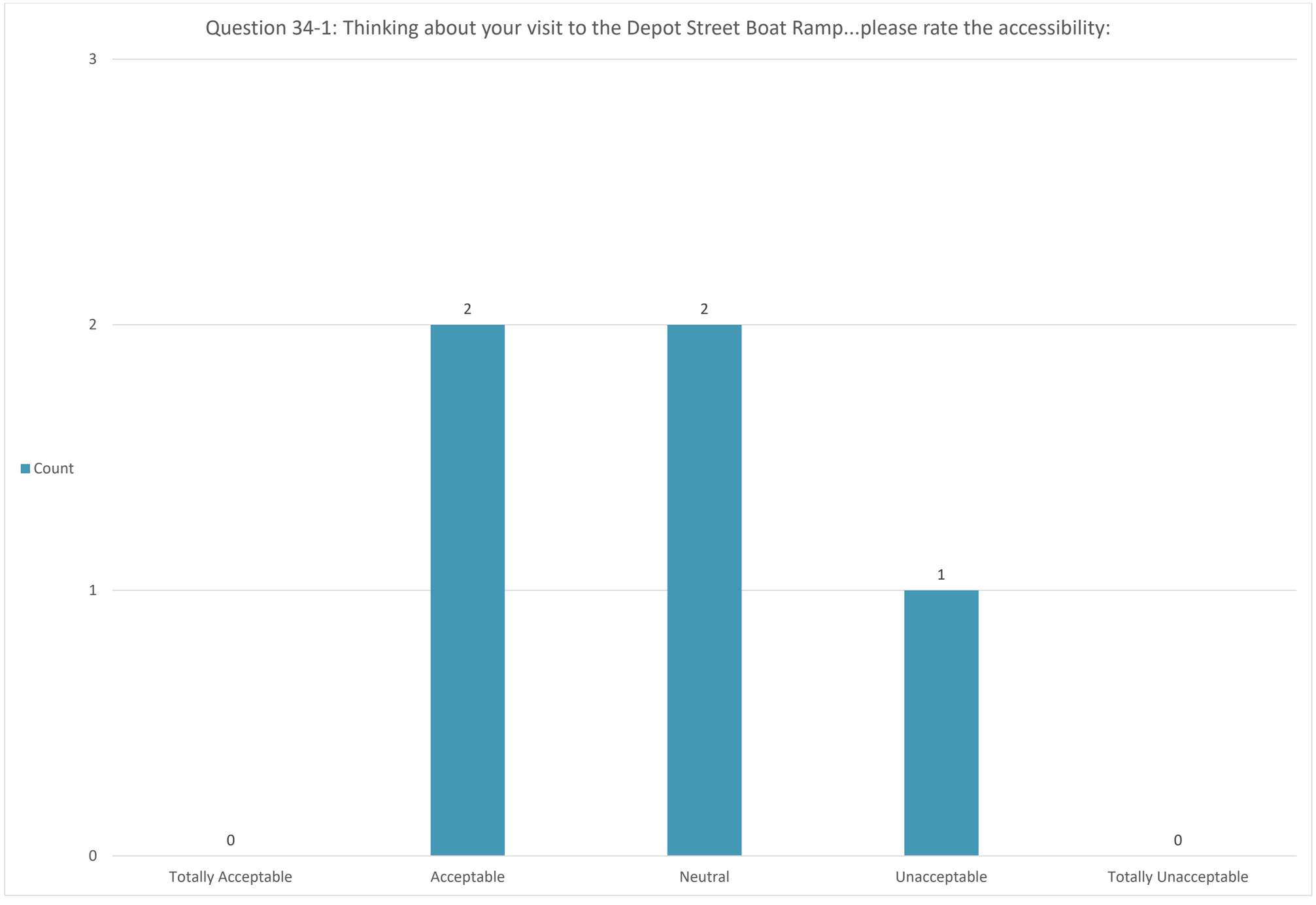

Question 33-4: Thinking about your visit to the Greeley Boat Ramp...Please rate the safety of recreation facilities:
5
4
3
2
1
0
Count
0
4
3
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

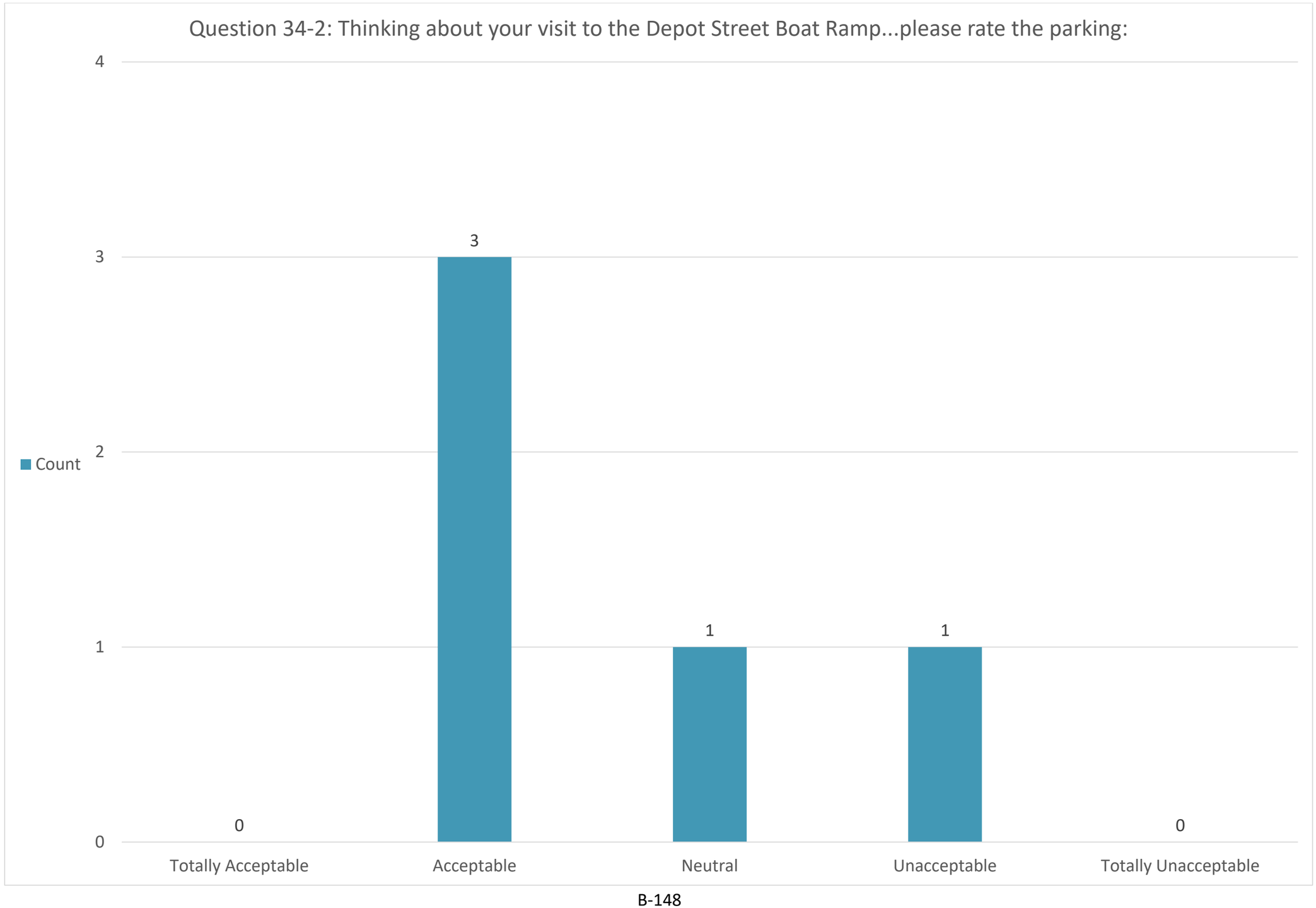

Question 33-5: Thinking about your visit to the Greeley Boat Ramp...Please rate the condition of recreation facilities:
Count
6
5
4
3
2
1
0
0
2
1
5
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

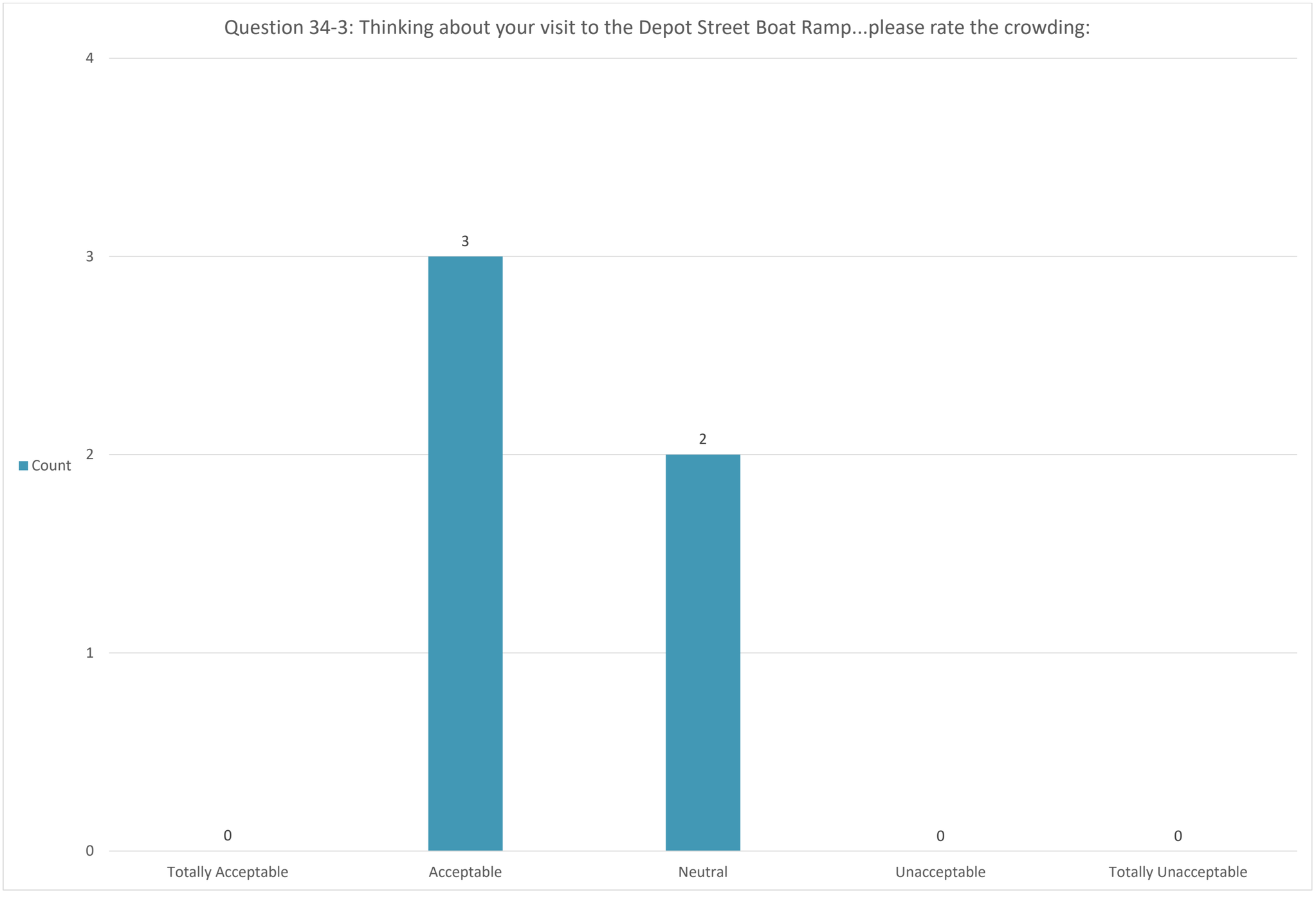

Question 33-6: Thinking about your visit to the Greeley Boat Ramp...Please rate the available amenities at the facility:
5
4
3
2
1
0
Count
0
1
4
3
2
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

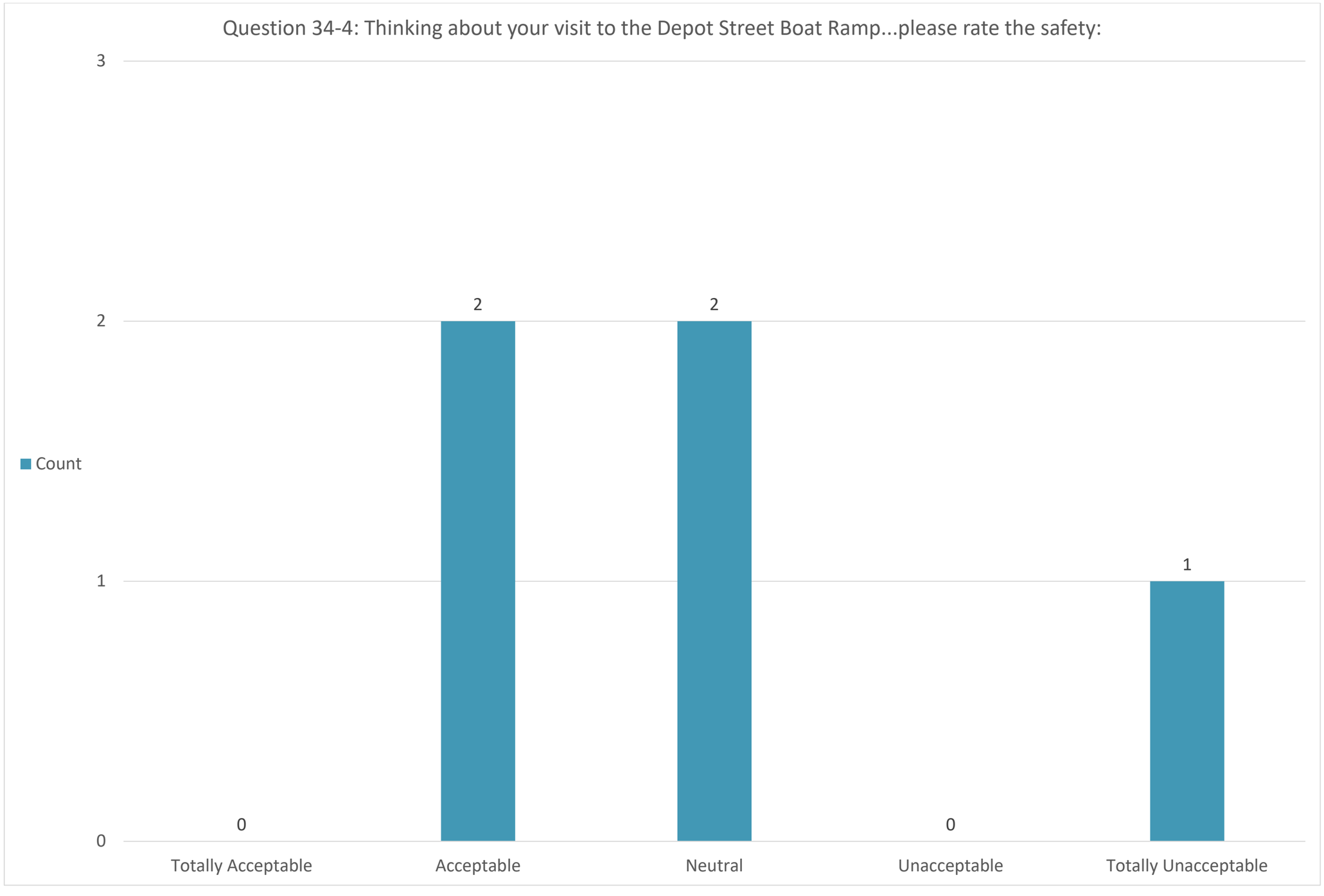

Question 33-7: Thinking about your visit to the Greeley Boat Ramp...Please rate the river flow at the facility:
7
6
5
4
3
2
1
0
Count
6
3
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

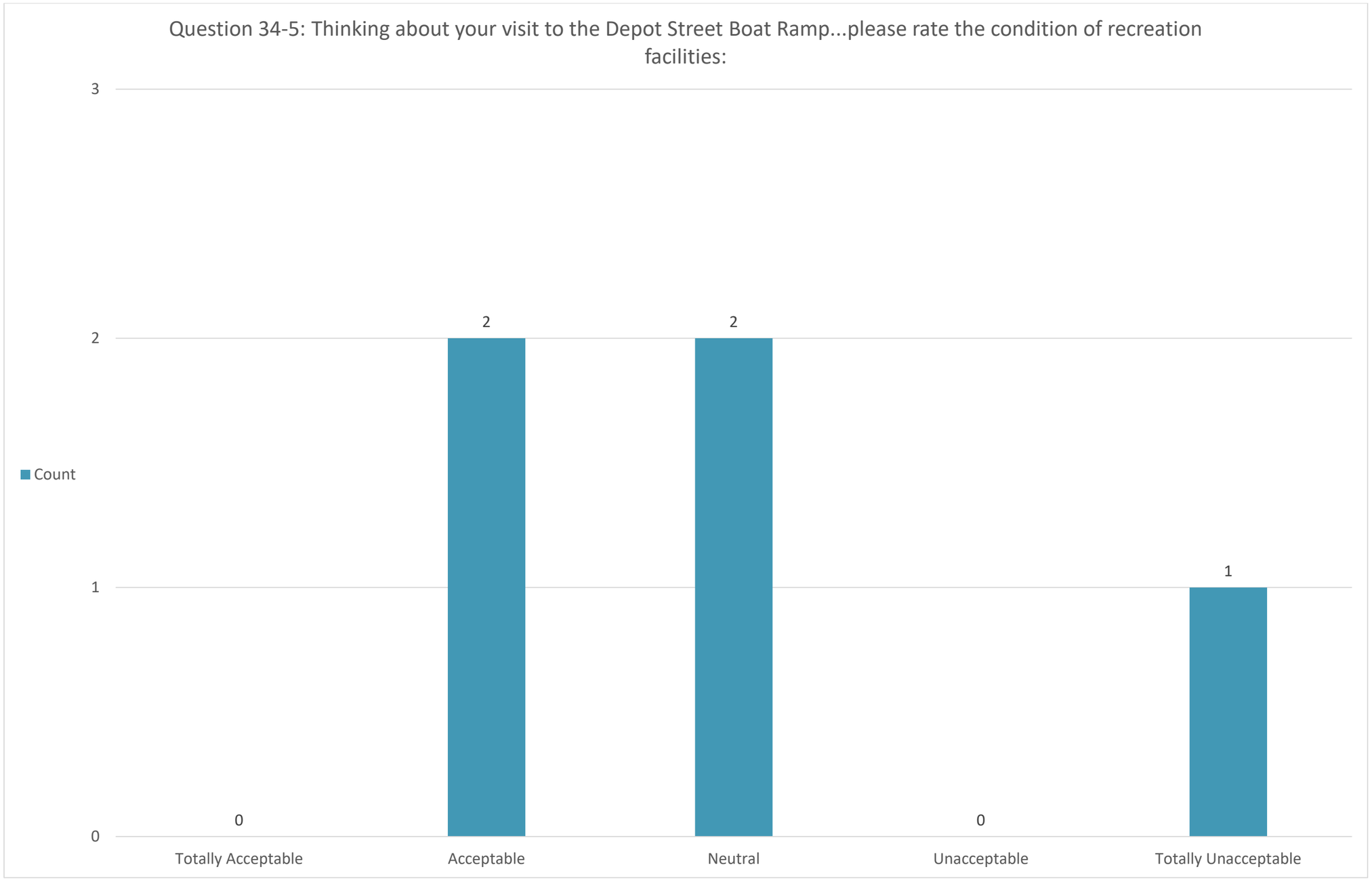

Question 33-8: Thinking about your visit to the Greeley Boat Ramp...Please rate your overall experience at the facility:
Count
6
5
4
3
2
1
0
1
2
5
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

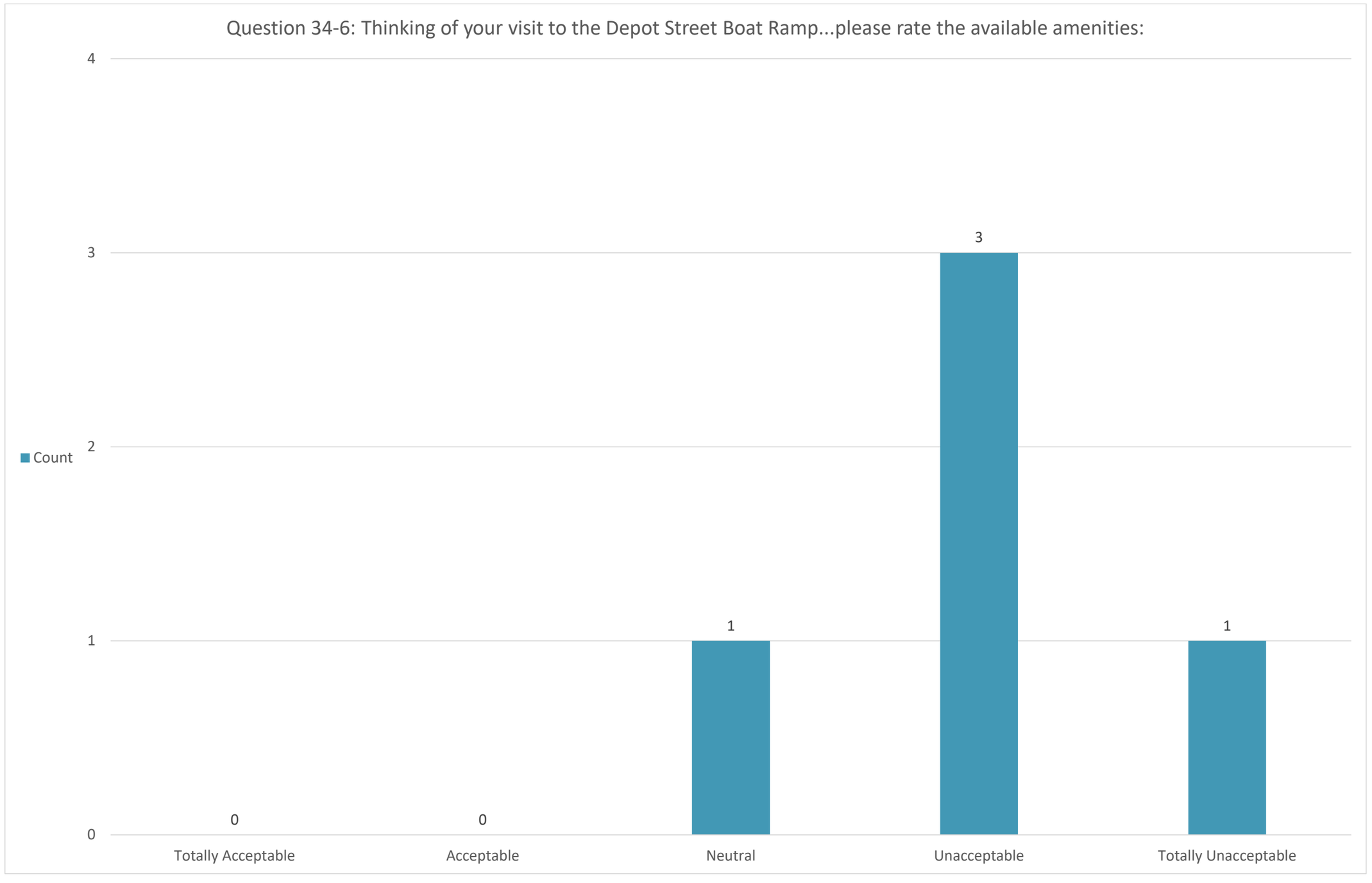

Question 34-1: Thinking about your visit to the Depot Street Boat Ramp...please rate the accessibility:
3
2
1
0
Count
0
2
2
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

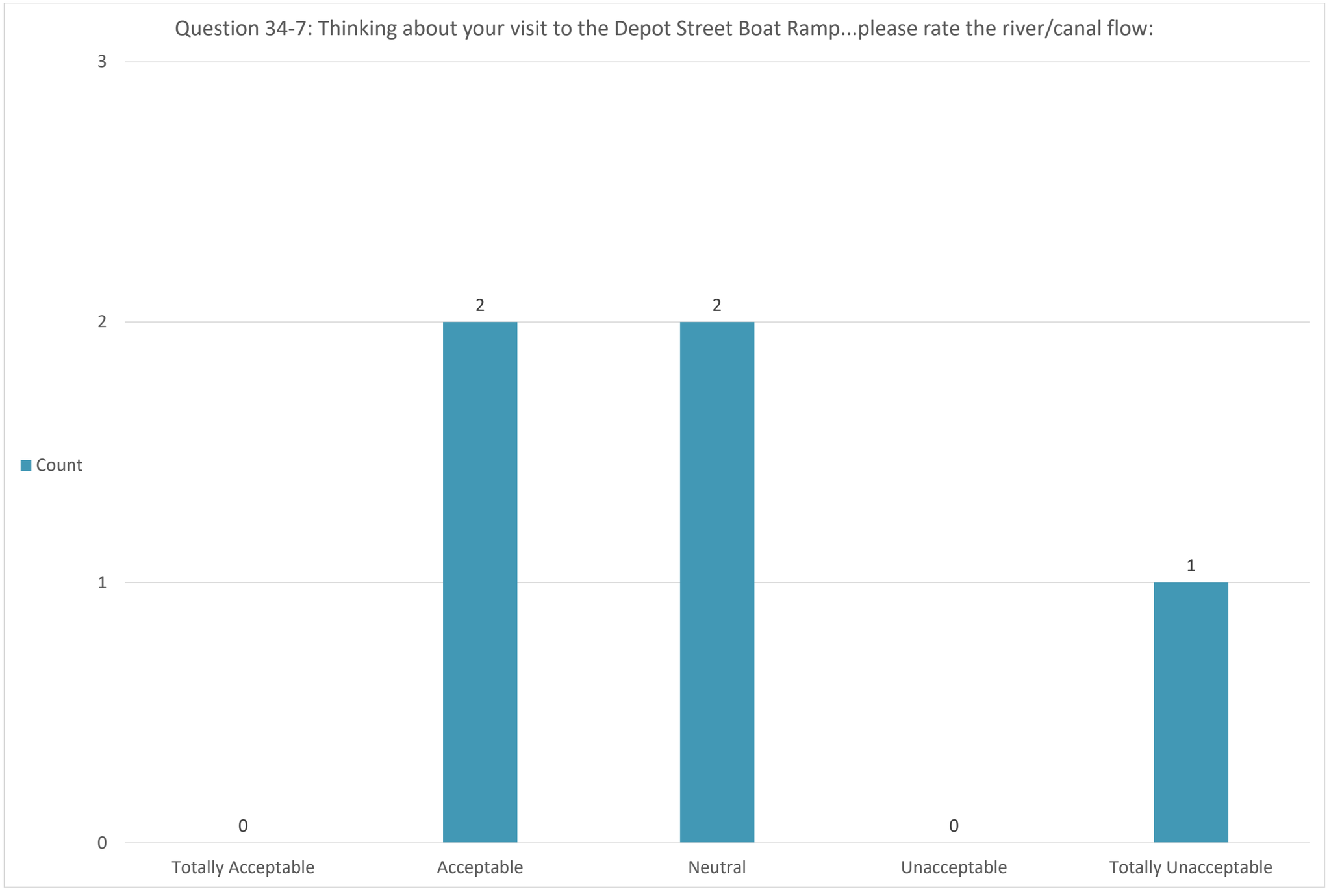

Question 34-2: Thinking about your visit to the Depot Street Boat Ramp...please rate the parking:
4
3
2
1
0
Count
3
1
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

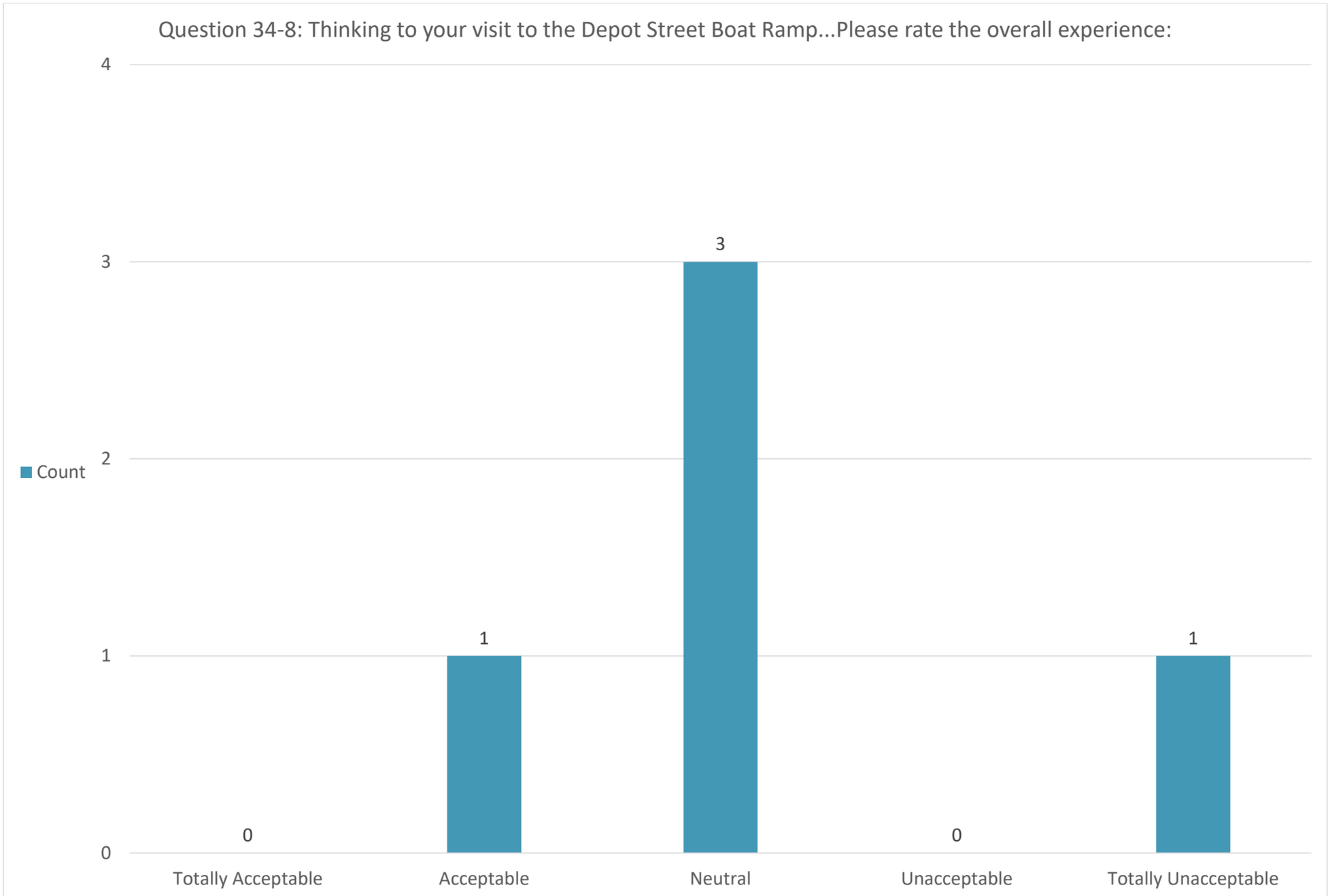

Question 34-3: Thinking about your visit to the Depot Street Boat Ramp...please rate the crowding:
Count
4
3
2
1
0
0
3
2
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

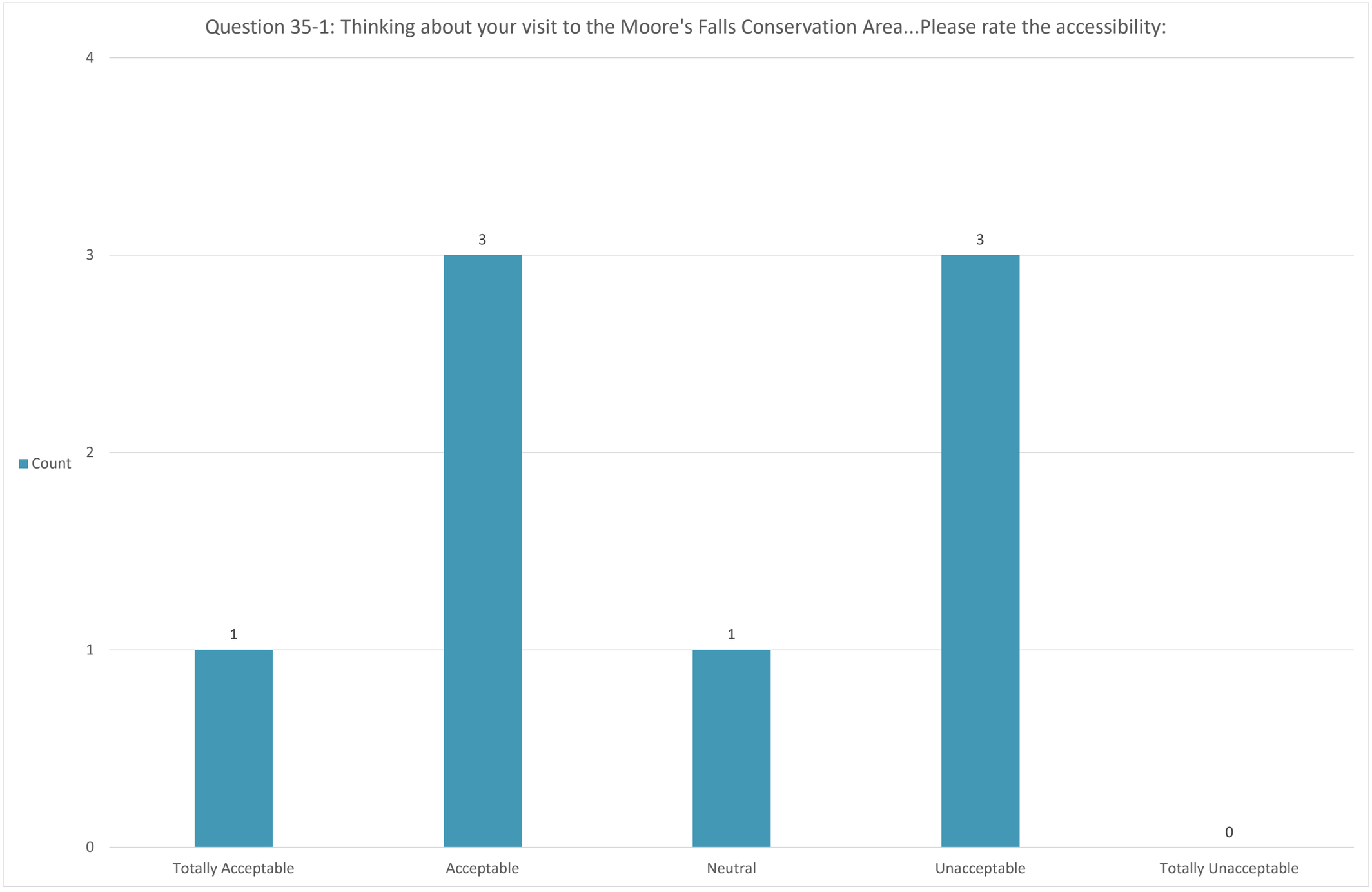

Question 34-4: Thinking about your visit to the Depot Street Boat Ramp...please rate the safety:
3
2
1
0
Count
2
2
1
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

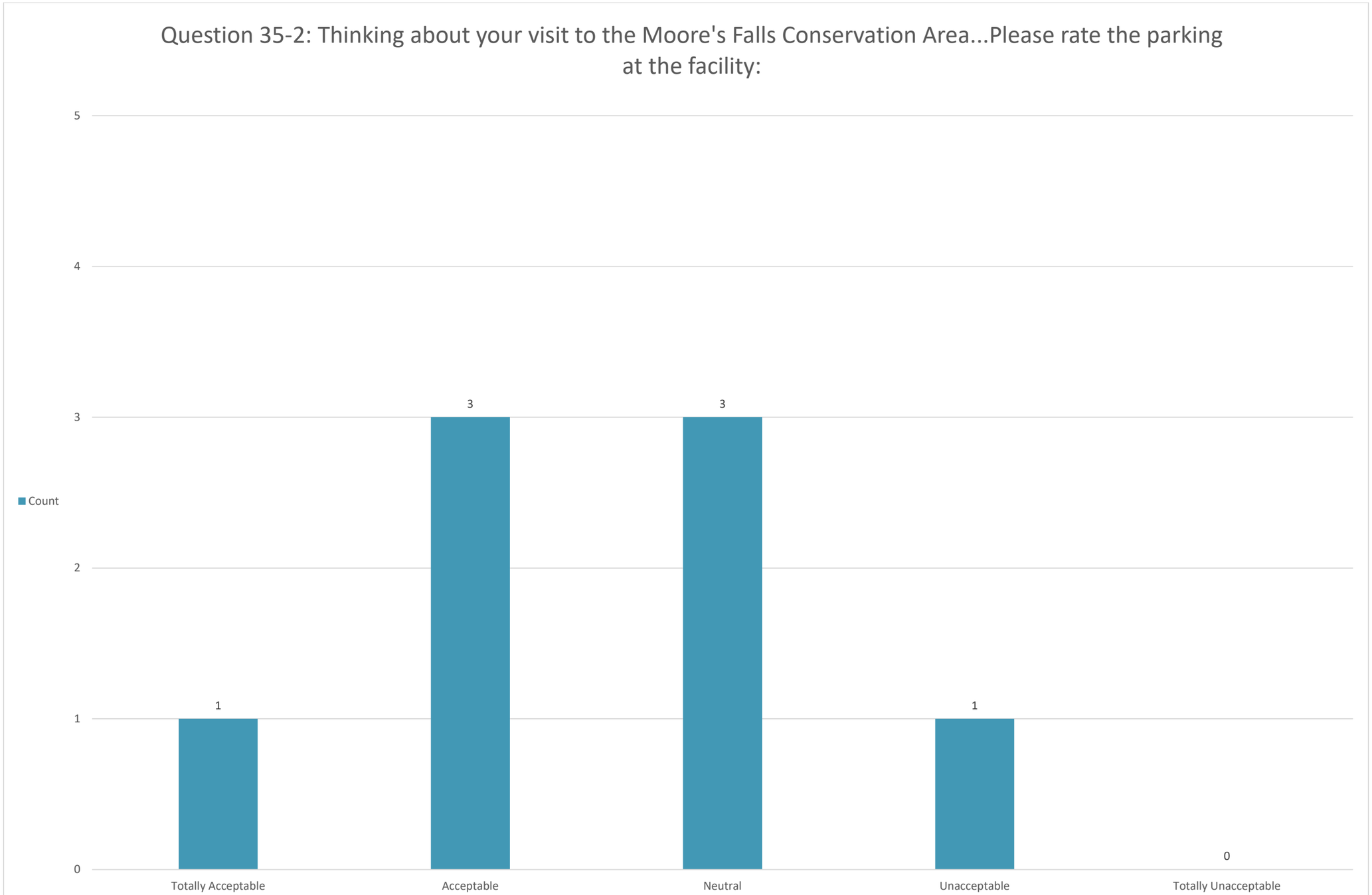

Question 34-5: Thinking about your visit to the Depot Street Boat Ramp...please rate the condition of recreation facilities:
3
2
1
0
Count
0
2
2
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

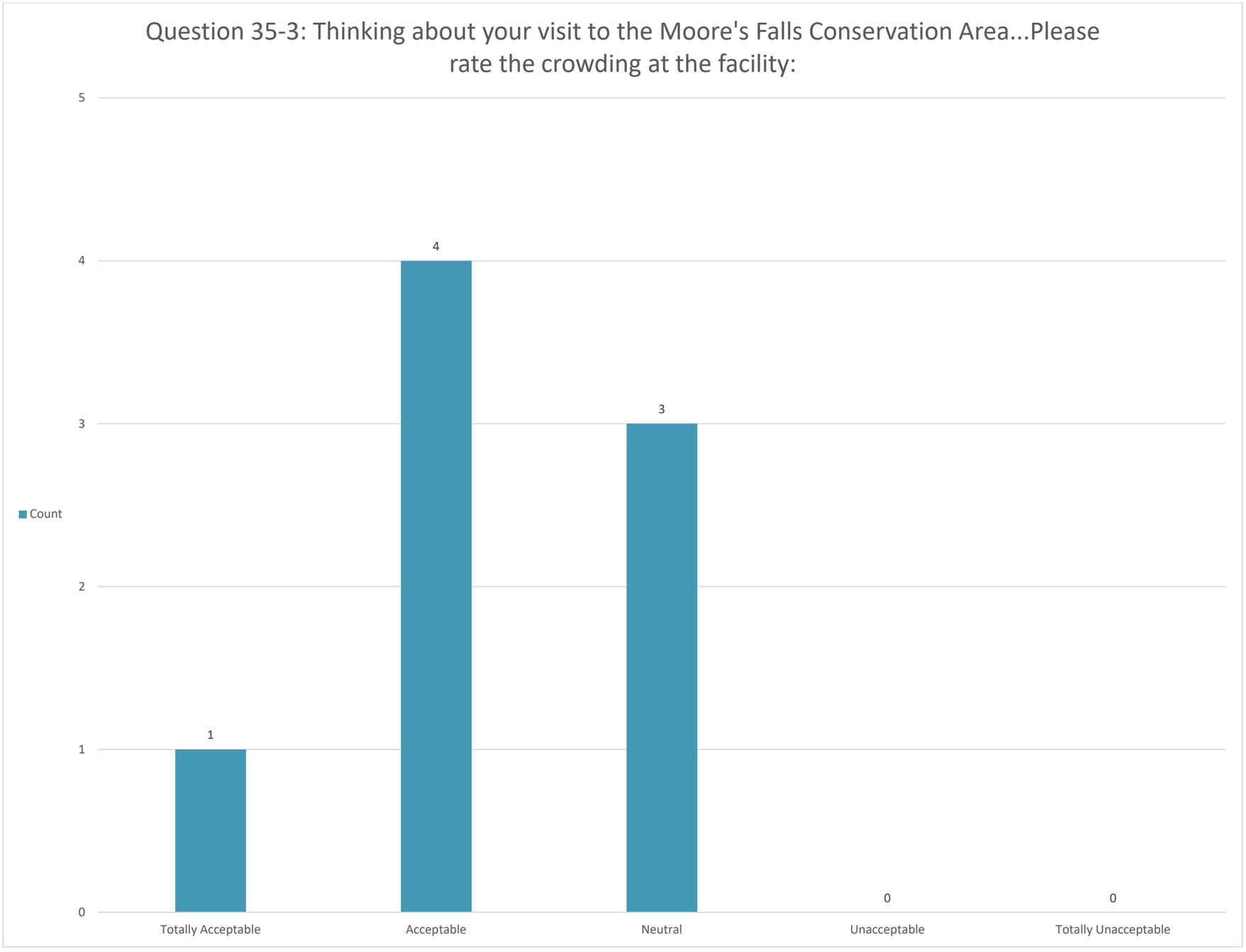

Question 34-6: Thinking of your visit to the Depot Street Boat Ramp...please rate the available amenities:
Count
4
3
2
1
0
0
0
1
3
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

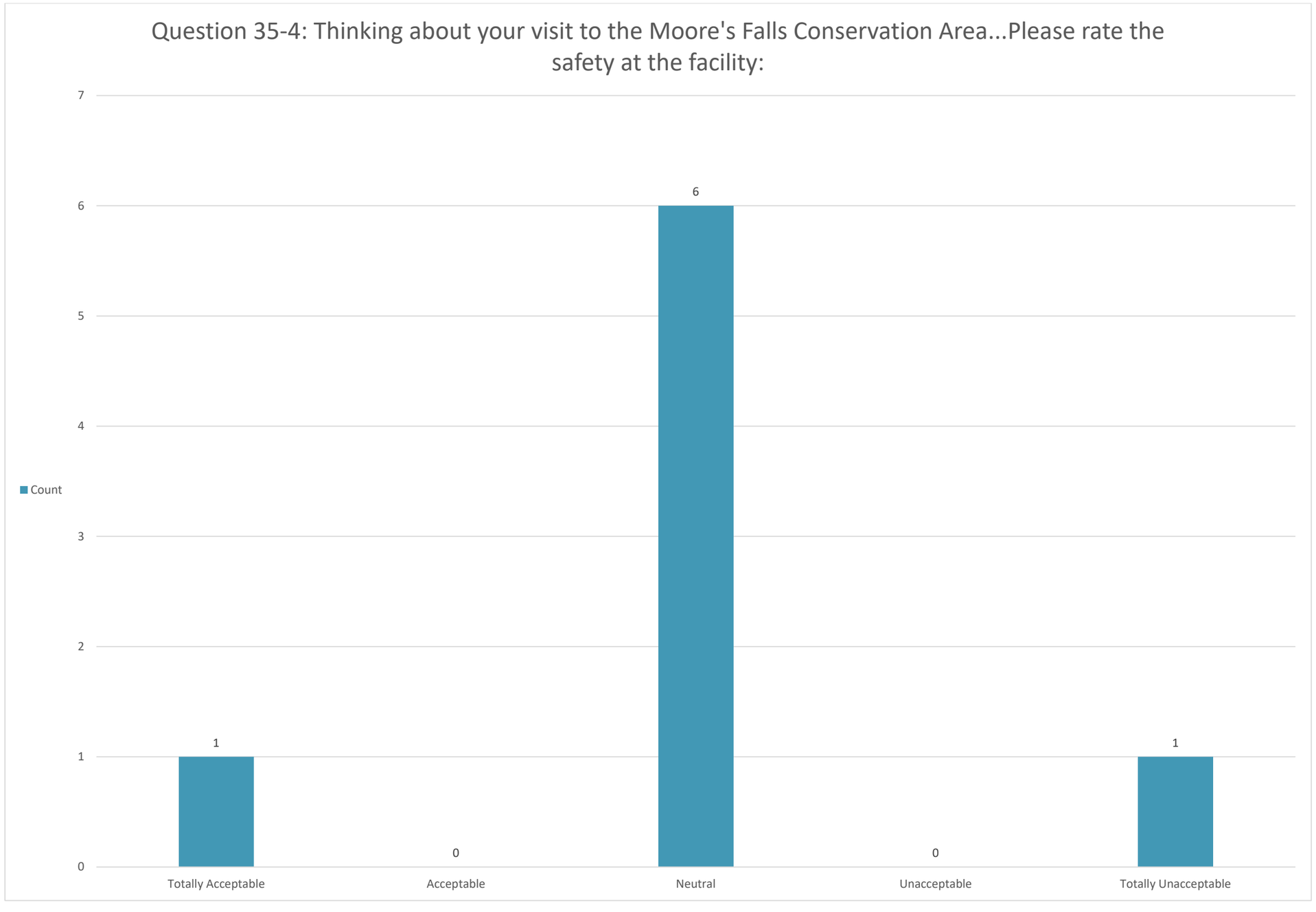

Question 34-7: Thinking about your visit to the Depot Street Boat Ramp...please rate the river/canal flow:
3
2
1
0
Count
0
2
2
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

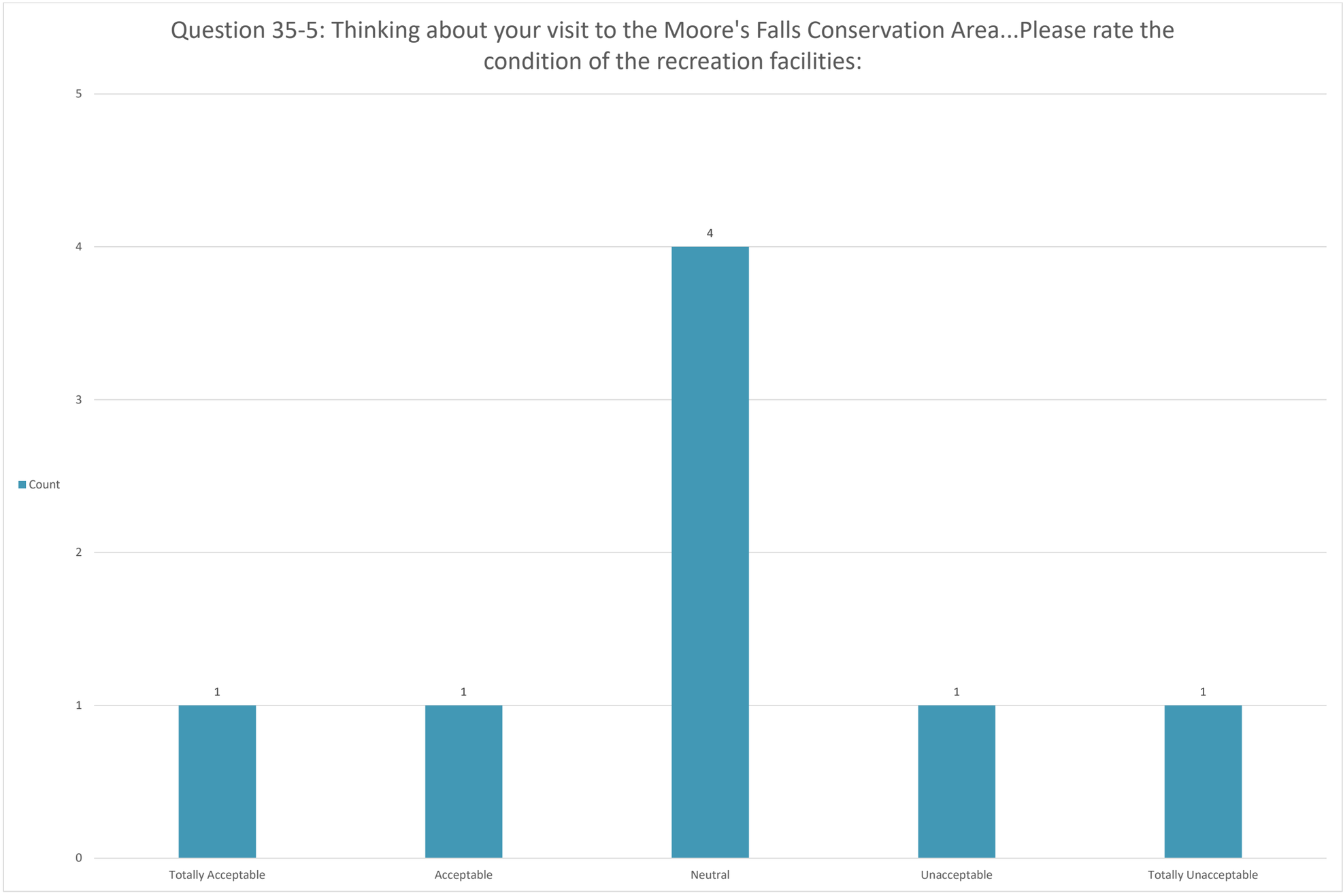

Question 34-8: Thinking to your visit to the Depot Street Boat Ramp...Please rate the overall experience:
Count
4
3
2
1
0
0
1
3
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

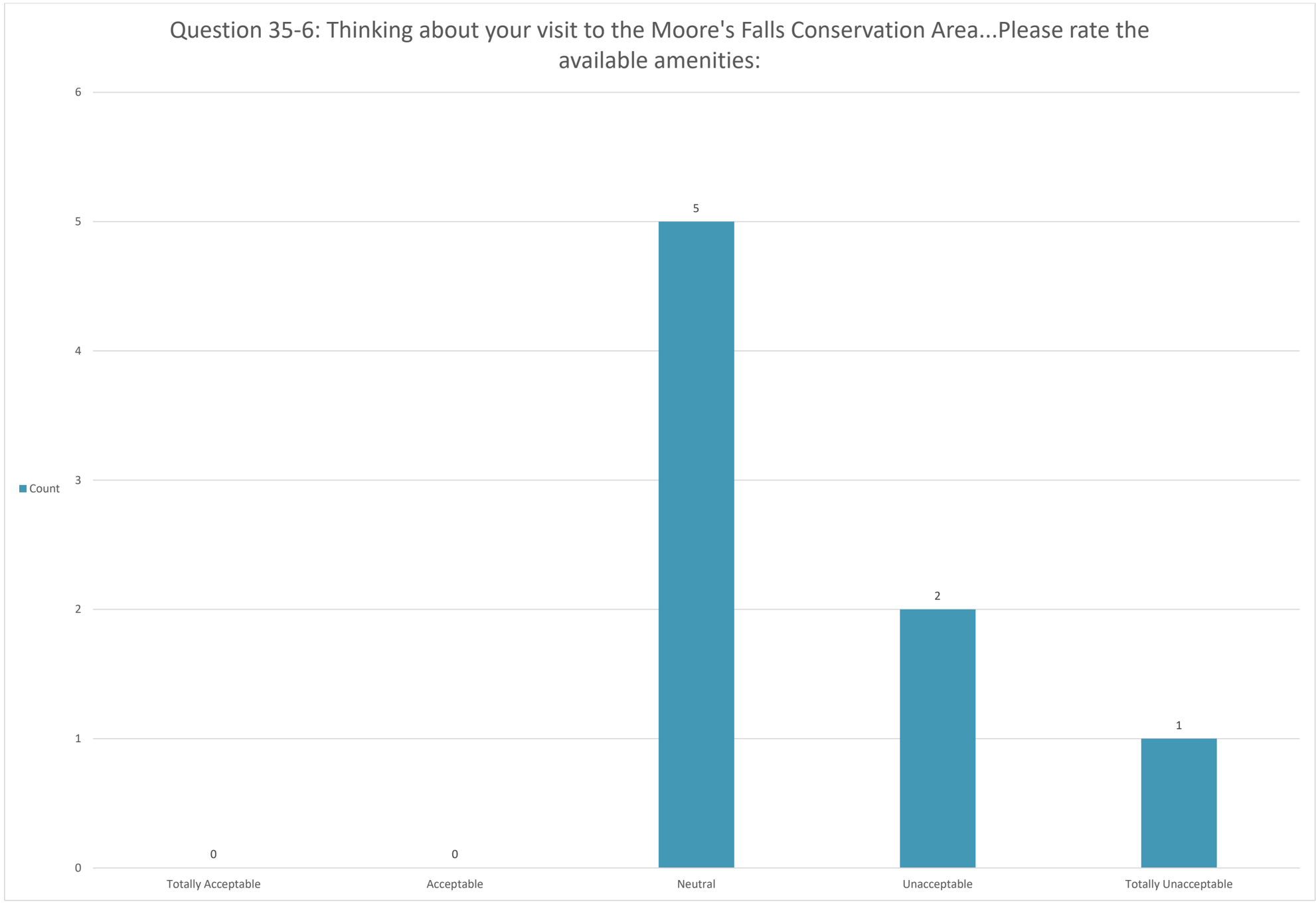

Question 35-1: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the accessibility:
Count
4
3
2
1
0
1
3
1
3
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

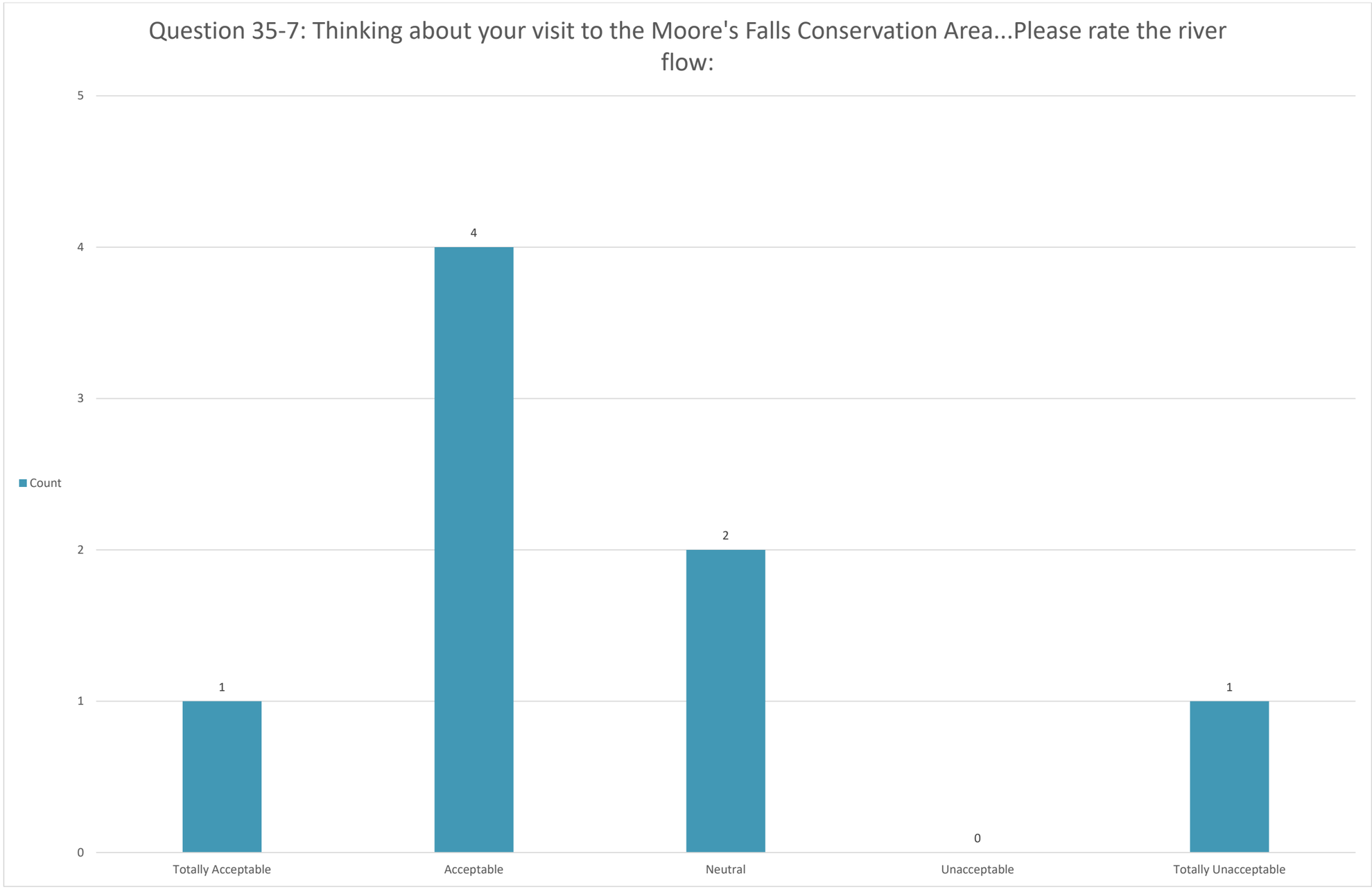

Question 35-2: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the parking at the facility:
5
4
3
2
1
0
Count
1
3
3
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

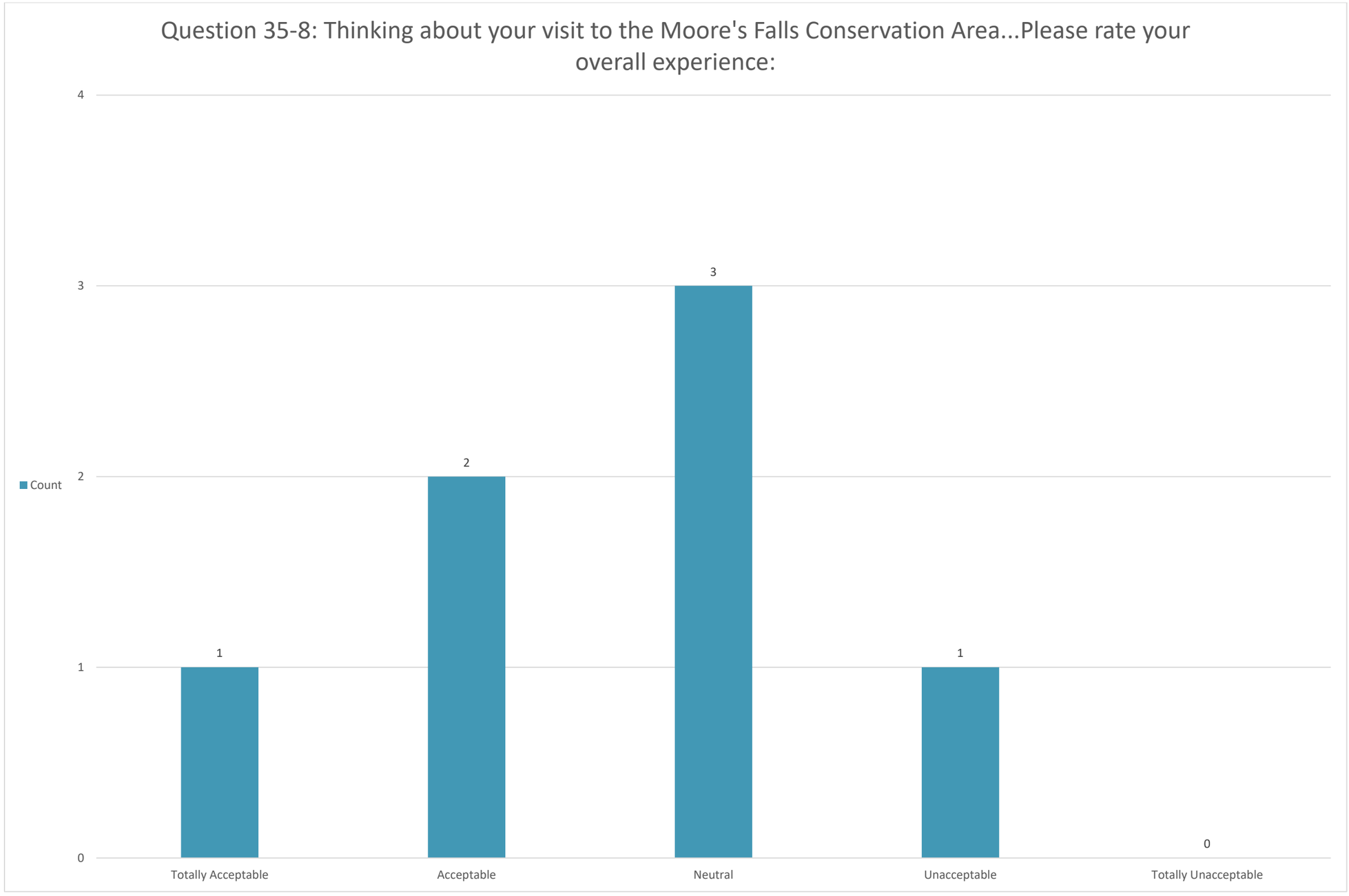

Question 35-3: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the crowding at the facility:
5
4
3
2
1
0
Count
1
4
3
0
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 35-4: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the safety at the facility:
Count
7
6
5
4
3
2
1
0
1
0
6
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 35-5: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the condition of the recreation facilities:
Count
5
4
3
2
1
0
1
1
4
1
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 35-6: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the available amenities:
Count
6
5
4
3
2
1
0
0
0
5
2
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 35-7: Thinking about your visit to the Moore's Falls Conservation Area...Please rate the river flow:
5
4
3
2
1
0
Count
1
4
2
0
1
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable


Question 35-8: Thinking about your visit to the Moore's Falls Conservation Area...Please rate your overall experience:
Count
4
3
2
1
0
1
2
3
1
0
Totally Acceptable
Acceptable
Neutral
Unacceptable
Totally Unacceptable

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
Recorded Date	**Q36-1. Type of Recreation Enhancement:**	**Q. 36-1. Location(s)**	**Q36-2. Type of Recreation Enhancement:**	**Q. 36-2. Location(s)**	**Q36-3. Type of Recreation Enhancement:**	**Q. 36-3. Location(s)**	
5/8/2019 7:25	fishing access	Pawtucket falls area	whitewater recreational releases with improved access and adequate flow information	Pawtucket falls	Improved access and trails	Pawtucket falls area	Lowell's world class whitewater and long season, is a resource that is greatly overlooked and underutilized due to the current condition. Whitewater boating is a popular sport in New England with tens of thousands of participants. Many live in the greater Boston area, myself just a few miles. Many Boaters enjoy the rapids on neighboring Concord River. Lowell has potential here to create another unique thriving attraction. Not only to the private boaters but to commercial companies as well. Commercial rafting proceeds on the Concord, currently help fund much of the greenway project. A longer greater season for them means more financial assistance from their proceeds. Lowell should be and has all the potential to be, a Richmond VA of the North.
5/8/2019 8:08	improvements for whitewater paddlers						
5/8/2019 8:53	River access to whitewater sections	Anywhere there is whitewater, in particular just below the dam.					
5/8/2019 9:03	Improved public access to the canals	all canals	better public access for unguided canoeing / kayaking	all canals	public access ramps, parking areas	near canals	It would be fantastic for economic development, waterfront pubs, non-motorized boat rental, to allow public access to Lowell canals - at least from dawn till dusk.
5/8/2019 9:10	Whitewater Access	Pawtucket Falls	Recreational releases	Pawtucket Falls	Proper Flow Gauge for Pawtucket Falls	Pawtucket Falls	I have traveled the country paddling challenging whitewater. Lowell has some of the highest quality whitewater given the correct conditions. However its inaccessibility, lack of flow, and debris problem. Has allowed it

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
Recorded Date	**Q36-1. Type of Recreation Enhancement:**	**Q. 36-1. Location(s)**	**Q36-2. Type of Recreation Enhancement:**	**Q. 36-2. Location(s)**	**Q36-3. Type of Recreation Enhancement:**	**Q. 36-3. Location(s)**	
							to be severely compromised, seldom visited and avoided commercially. Limited shoreline access has also created conditions of underutilized wooded areas, that largely harbor many homeless camps, dumping sites. Further adding to river and shoreline debris. Addressing these recreational potentials will greatly benefit the health of the river and the city as well as help developing Lowells growing recreational attractions.
5/8/2019 9:17							
5/8/2019 9:48							
5/8/2019 9:59	Keep rivers clear of debris and trash including trees	Concord					Good improvements to river putin and takeout locations.
5/8/2019 10:06	Boat ramps	Canals	Kayak and canoe access	Canals			
5/8/2019 10:12	Canoeing	Canals	Kayaking	Canals	Boat kayak access	Canals	
5/8/2019 10:12	Clean up trash	Everywhere					I stopped going because of the garbage, needles, etc
5/8/2019 10:22							
5/8/2019 10:57							

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
Recorded Date	**Q36-1. Type of Recreation Enhancement:**	**Q. 36-1. Location(s)**	**Q36-2. Type of Recreation Enhancement:**	**Q. 36-2. Location(s)**	**Q36-3. Type of Recreation Enhancement:**	**Q. 36-3. Location(s)**	
5/8/2019 11:07	River side boating put in	Wamesit Falls Overlook area	River side boating take out	Eastern Canal Park			
5/8/2019 11:27							
5/8/2019 12:55	artificial whitewater park	Pawtucket Canal and/or Northern Canal	whitewater rafting and whitewater kayaking				If one hasn't occurred, a city sponsored business study on the economic cost/benefits of constructing an artificial whitewater park would identify the feasibility of such a project. The proximity to such a large population would drastically promote tourism and should be considered within the city's development and economic plan.
5/8/2019 16:01							Entire project needs to be promoted and spruced up. If more activities were offered on a regular basis, more people would enjoy them. Compare attendance and usage with LOWELL WALKS!
5/8/2019 16:20	Shoreline access	Concord River					It's a valuable whitewater resource for kayaking, canoeing and rafting in Eastern Mass
5/8/2019 19:19							
5/8/2019 20:25	better parking	near greenway					
5/9/2019 4:22							
5/9/2019 6:37	Better kayak access		More releases of water		Less trash, especially needles		Yes please improve access flows and cleanliness for whitewater boaters like myself. Many boaters in the Boston area have to drive all the way to mid New Hampshire tonget decent paddling.

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
Recorded Date	**Q36-1. Type of Recreation Enhancement:**	**Q. 36-1. Location(s)**	**Q36-2. Type of Recreation Enhancement:**	**Q. 36-2. Location(s)**	**Q36-3. Type of Recreation Enhancement:**	**Q. 36-3. Location(s)**	
5/9/2019 23:53	Clean up the hypodermic needles	All locations					clean up the hypodermic needles at all locations
5/10/2019 3:58							Used Hypodermic needles are the immediate safety concern that needs to be addressed
5/11/2019 9:55							
5/13/2019 11:14	River clean-up efforts	Concord River	Old dam clean-up/removal	Concord River			Broad boating access around the city of Lowell would result in my using the area for whitewater recreation significantly more frequently. Currently, there's no reasonable access for rafts to the Merrimack River sections with whitewater that I'm generally aware of.
5/16/2019 8:43	Improving flows to the dewatered section of river	Pawtucket falls.	Access trails along river	Along dewatered section of pawtucket falls	Canoe and kayak access point.	Below Pawtucket falls.	Lowell has been over looked and underutilized when it comes to its recreational resource potentials. This facility has lacked any real recreational efforts in its past license. Its current condition, has limited the window of world class whitewater conditions, to a very few days a year. This has limited the amount of participation from the community of enthusiasts of this region. Improving flows, access, pollution from canals and homeless camps along the facility, would greatly improve these conditions. This license is 47 years in that time Lowell could grow into a Richmond VA like city in that timeframe. If the right choices are made for the residents of Lowell and surrounding communities.
5/16/2019 16:15	Improved flow	Pawtucket falls	Gauge to measure flow	Pawtucket falls	Improved access	Pawtucket falls	Large homeless population needs to be addressed. Not saying they need to be evicted but it is need that should be addressed
5/16/2019 20:28	boat trips						

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
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6/27/2019 12:30	Kayaking	Somewhere safe on canal system	canoeing	Somewhere safe on canal system			More people would like to use the canal system as a form of recreation. Where can this happen? You are the experts to tell us.
6/27/2019 15:24	More trash cans that are emptied frequently	River walk/canal walk	Beautification of the river walk/ canal walk	All			There's sooo much trash in the canals and around the canal walks /river walk. It's really gross.
6/28/2019 19:57	Damage repair/restoration post operations	North canal gate house/gatekeepers house					My comments are not about recreation. They constantly fail to repair damage that is cause from their crane operations at the northern gate house. I have continously tried to establish a working relationship with them, but to no avail. I live in a house via Massachusetts DCR, historic curatorship program, and i promise they continue to fail on the rules of their permit. I deal with these operations on a yearly basis, for almost 5 years. Not once have they followed their permit and repaired damages.
7/4/2019 7:58	Accessibility	Merrill park	Trail maintenance	Merrill Park	Trash removal	Merrill Park	I go to Merrill Park daily. The park does not seem to be maintained at all. There are no amenities. I collect a bag of trash every day on my visit. This park could be a jewel with a little help.
7/4/2019 8:18	Boat launch	Tyngsboro					Boat ramps are crowded on weekends with jet skiers
7/4/2019 8:31	clearing brush and fixing the walking path down to the river bank	toilets					

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7/4/2019 8:50	Trail maintenace	Merrill park	Signage and mapping	Merrill park	Additional ameneties	Merrill park	Riverfront Park needs to be included in the survey area as this is a highly used access point for fishing and paddling and swimming and great for picnics
7/4/2019 9:09	Leave park as is. Donâ€™t encourage use.	Merrill Park					
7/4/2019 9:19	More access to the Northern Canal	Northern Canal					
7/4/2019 9:21							
7/4/2019 9:23	increase access conditions and accessibility to Northern Canal Walkway	Northern Canal Walkway					
7/4/2019 9:28							
7/4/2019 10:37							
7/4/2019 10:38	Protected bicycle lane (or multi-use path parallel to road)	Pawtucket Boulevard - especially, the sidewalk by the Pawtucket Falls Bridge has	Pedestrian signal controls	Crossing by Rourke Bros. Boat Ramp - in the MIDDLE	Protected Bicycle Lane	All bridges across Merrimack River. Yes,	The biggest impediment to cycling in or near the described recreational areas, is safe access by bicycle. The river, itself, is one of the biggest obstacles for cyclists. Within the City of Lowell, only one bridge - at University Ave - is even remotely "bike-friendly", and the intersections at either foot of ALL the bridges are abysmal to cycle through.

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		STAIRS, and is neither bike-friendly, nor even ADA compliant!		section, for access by road cyclists on Pawtucket Boulevard seeking to turn left (to Rourke Bros/ Boat Ramp) or right (to Heritage Ice Cream)		ALL of them!	
7/4/2019 11:20	More accessible walkways / pathways, eliminate stairs	Northern canal walkway					
7/4/2019 11:26							I live in the Boott Mills. The canals have been dry and are dirty and unsightly with litter and trash. Do better
7/4/2019 11:34							
7/4/2019 11:42	bike racks	various					Not every place needs a restroom and a parking lot, it's an urban park and walking should be expected. I'd like to see the Lowell riverwalk connected and extended.

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
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7/4/2019 12:24	Consider opening some of the canals to recreational boating						So far the river has been consistent in depth since the Crest gate system was installed on the dam.
7/4/2019 12:49							
7/4/2019 12:57							Enel needs to do more to clean up the canals.
7/4/2019 13:10	More Lighting	Riverwalk	More trash removal	All canals	Homeless	All Lowell parks	Let’s tidy up. Let’s raise taxes! Let’s get the community involved!
7/4/2019 13:24	More paths along M river	Hudson	More paths along Nashua River	Nashua, Greeley Park	Safe Road cycling	All, connecting locations	General access to outdoor bike paths & areas to sit in the shade & sun. Connecting bike paths between locations would be good. Availability of coffee and sandwich shops for refreshment would be nice.
7/4/2019 13:53	Improvements	All	Cycling, hiking, fishing, running, walking, swimming	All			
7/4/2019 14:20	More public restrooms	Generally	Signage	Generally			
7/4/2019 15:33	Walkways leveled for better accessibility in certain areas	Canal walks	Canal trash clean up	Merrimack and Eastern canals			Can we have more easily available information about canal draw downs? connect the project area to the rail trails.

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7/4/2019 15:59	Canoe/kayak on the canal	Pawtucket Hamilton canals	Ice skating on canals	Pawtucket	Canal side dining	Pawtucket canal	Need to make the Lowell canals a destination for people to visit. Lighting and activities would be a great start.
7/4/2019 18:01							
7/4/2019 18:36	better and longer parking	Sheehy Memorial	Adult fixed exercise equipment	Merrimack Trail	Dog park	some place other than wher it is	Trash out of the canal. Less flooding in Lowell, due to high river levels. Better water quality in Merrimack.
7/4/2019 22:23							More parks, bocce, bike infrastructure, signage
7/5/2019 7:43	Casual canal boating	Merrimack, Western Canals	Cycling, walking	Merrimack River, Northern Bank	Water Taxi/Drinking/Shopping	Pawtucket Canal	The Canals are difficult for Lowell, as they limit road crossings. But they are also such an amenity unique in Massachusetts. Let's reclaim our title of Venice of America. We could also put up interpretive signage about how the canals still create renewable energy for the area and about how they contribute to the ecology, e.g., fish.
7/5/2019 12:15							
7/5/2019 13:30	Water fountain	All	Public bathroom		Bike and walking trails		The canals always has trash in them
7/5/2019 19:34							
7/7/2019 5:47							
7/7/2019 15:53	Off leash dog park	Anywhere shady by the river					

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7/7/2019 19:13							
7/7/2019 20:43	Boat ramp	Greeley park ramp	Widen access road, more parking fix ramp	Nashua			
7/16/2019 10:45	Better parking (current parking lots aren't enough, VFW highway semi-legal)	Heritage Park	Safety and beautification improvements between Sampas and the School St Bridge, by falls overlook				
7/16/2019 14:05							
7/16/2019 14:30	Seating	Along canal walkways	Parking	Near access points			
7/16/2019 15:09	more lighting						
7/16/2019 16:10	More trees, shade, greenery less pavement	all locations		all locations			

	Question 36-1: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-2: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Question 36-3: Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Lowell Project:		Q37. Please share any other comments that you have regarding recreation near the Lowell Project:
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7/16/2019 18:13	More public restroom access	throughout the area	More native plants to attract birds and mammals	throughout the area			I believe developing this aspect of our city can only make the area more attractive to visitors and better for residents who need access to nature
7/16/2019 18:19	Always concerned with access for non-motorized watercraft.	Through-paddlers					
7/16/2019 18:30							
7/17/2019 8:05	Pedestrian walkway improvement	All	Connecting trails	All	Clear, concise signage for areas and trails	All	Deteriorating sidewalks, excessive weedy brush along all trails. Unacceptable trash accumulation in all waterways detracts from top-notch opportunities for active and passive recreation. Desire paths connecting sites along Merrimack River are not suitable for anyone but the very sure-footed. Trash removal should be regular event not occasional event. More cooperation between private industry and local National Park/City and Conservation partners. The fish ladder is both an eyesore and poor function. Brush and weeds obscure walking vistas. Poison ivy. Chain link fences are not inviting or welcoming. Many walks are not in compliance with ADA regs
7/17/2019 18:53							
7/18/2019 12:07	Bathrooms available year-round	Lowell Heriatge State Park	More parking, less trash in waterWhole	Pawtucket Falls overlook			Whole area is an urban jewel which needs to be preserved and appreciated.

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			area is an urban jewel				
7/18/2019 14:32							
7/19/2019 10:00	better connected walking facilities	from the overlook to the heritage park					collection of trash in the canals and behind the dam.
7/27/2019 21:23	extra dock for boats						at the Rourke Brothers Boat Ramp the dock is only on the left side so most times you have to wait to load or unload. An extra dock on the right side would be very helpful.
7/29/2019 8:15	trash barrels	Rourke Brothers boat ramp					
8/4/2019 9:43	More boat docks	Rourke boat ramp	River hazard removal and or marking	Merrimack river to NH state line			
8/4/2019 14:35	Clean the canals, can't do anything with them being clean	Canals					You can't improve anything if the canals are full of trash.
8/29/2019 20:47	Whitewater boating	Pawtucket Falls	Fishing	Pawtucket Falls	River Surfing	Pawtucket Falls	Improved flow, access and gauging in the dewatered section of Pawtucket Falls, could greatly enhance recreational opportunity, through both whitewater boating and fishing. Creating better shoreline access, will also rid of the unsightly homeless camps, that are in these fenced off areas. Creating much of the water born trash in the dewatered section.

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8/29/2019 21:06	More fishing access	Canals near tsongas center	Free parking	Suffolk st	Cleaner water	Everywhere	There is a thriving aquatic ecosystem in those canals please help keep it clean for future generations to enjoy.
8/29/2019 21:26	river/bank cleanup and improved access from university ave bridge to beaver brook		trash cleanup at pawtucket falls, parking area, open throughout the year				overall reduction in the amount of trash buildup at dams/canals. Improved access for fishing/sightseeing along the river, especially in the area of umass lowell (university avenue bridge to beaver brook and at pawtucket falls.
8/30/2019 6:03	More shore fishing access from the boat rental ramp past the Rourke Bridge	Rourke Brothers Boat Ramp	Clean up the vegetation as you get closer to the bridge	Rourke Brothers Boat Ramp			
9/3/2019 17:04	None						
9/9/2019 7:24							
9/24/2019 16:02	Boat dock	Greely					The the boat ramp at Greeley is in serious Decline and is a tremendous safety hazard
10/9/2019 13:29							
11/14/2019 18:31	restrooms		interpretive panels		map panels to guide you to other features nearby		opening up the area for walking along the river with lights and benches and trash cans will really make the area, around the college and along the

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							canal, closer to what other cities have successfully done in developing their waterfront areas. great to see this project underway- Lowell is a real gem!
11/15/2019 14:50	Mapiing of navigation hazards	impoundment from Chelmsford to Cromwells Falls					Access in NH is way below contemporary standards
11/26/2019 19:08							
1/20/2020 8:29	Public notification of CSO events	Nashua, Manchester	whitewater recreational releases with improved access and adequate flow information	Pawtucket falls			Public has a right to receive automatic notification of upstream CSO events that would interfere with the use of the Impoundment

Appendix F - Respondents Zip Codes and Representative Map

Personal Interview Respondent Zip Codes

Zip code/location	Miles from Project
01440/Gardner, Massachusetts	42.1
01701/Framingham, Massachusetts	34.3
01810/Andover, Massachusetts	11.6
01821/Billerica, Massachusetts	8.7
01821/Billerica, Massachusetts	8.7
01824/Chelmsford, Massachusetts	6.0
01824/Chelmsford, Massachusetts	6.0
01824/Chelmsford, Massachusetts	6.0
01824/Chelmsford, Massachusetts	6.0
01826/Dracut, Massachusetts	2.4
01826/Dracut, Massachusetts	2.4
01826/Dracut, Massachusetts	2.4
01845/North Andover, Massachusetts	11.9
01850/Lowell, Massachusetts	1.5
01850/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01853/Lowell, Massachusetts	0.5
01853/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5

Zip code/location	Miles from Project
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01863/North Chelmsford, Massachusetts	7.5
01863/North Chelmsford, Massachusetts	7.5
01863/North Chelmsford, Massachusetts	7.5
01863/North Chelmsford, Massachusetts	7.5
01876/Tewksbury, Massachusetts	5.8
01876/Tewksbury, Massachusetts	5.8
01879/Tyngsboro, Massachusetts	11.2
01879/Tyngsboro, Massachusetts	11.2
01886/Graniteville, Massachusetts	12.8
01970/Salem, Massachusetts	33.1
02067/Sharon, Massachusetts	44.4
02461/Newton, Massachusetts	28.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03110/Bedford, New Hampshire	31.3
21009/Abingdon, Maryland	383.0
98040/Mercer Island, Washington	3045.0

Online Survey Zip Codes

Zip Code	Miles from project
01340/Colrain, Massachusetts	88.9
01450/Groton, Massachusetts	19.1
01453/Leominster, Massachusetts	27.9
01463/Pepperell Massachusetts	20.2
01503/Berlin, Massachusetts	26.8
01516/Douglas, Massachusetts	58.9
01604/Worcester, Massachusetts	41.6
01719/Boxborough, Massachusetts	19.5
01748/Hopkinton, Massachusetts	40.0
01757/Milford, Massachusetts	44.5
01760/Natick, Massachusetts	31.8
01821/Billerica, Massachusetts	8.7
01821/Billerica, Massachusetts	8.7
01824/Chelmsford, Massachusetts	6.0
01824/Chelmsford, Massachusetts	6.0
01824/Chelmsford, Massachusetts	6.0
01826/Dracut, Massachusetts	2.4
01826/Dracut, Massachusetts	2.4
01844/Methuen, Massachusetts	9.8
01844/Methuen, Massachusetts	9.8
01850/Lowell, Massachusetts	1.5
01850/Lowell, Massachusetts	1.5
01850/Lowell, Massachusetts	1.5
01850/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5

Zip Code	Miles from project
01851/Lowell, Massachusetts	1.5
01851/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
01852/Lowell, Massachusetts	1.5
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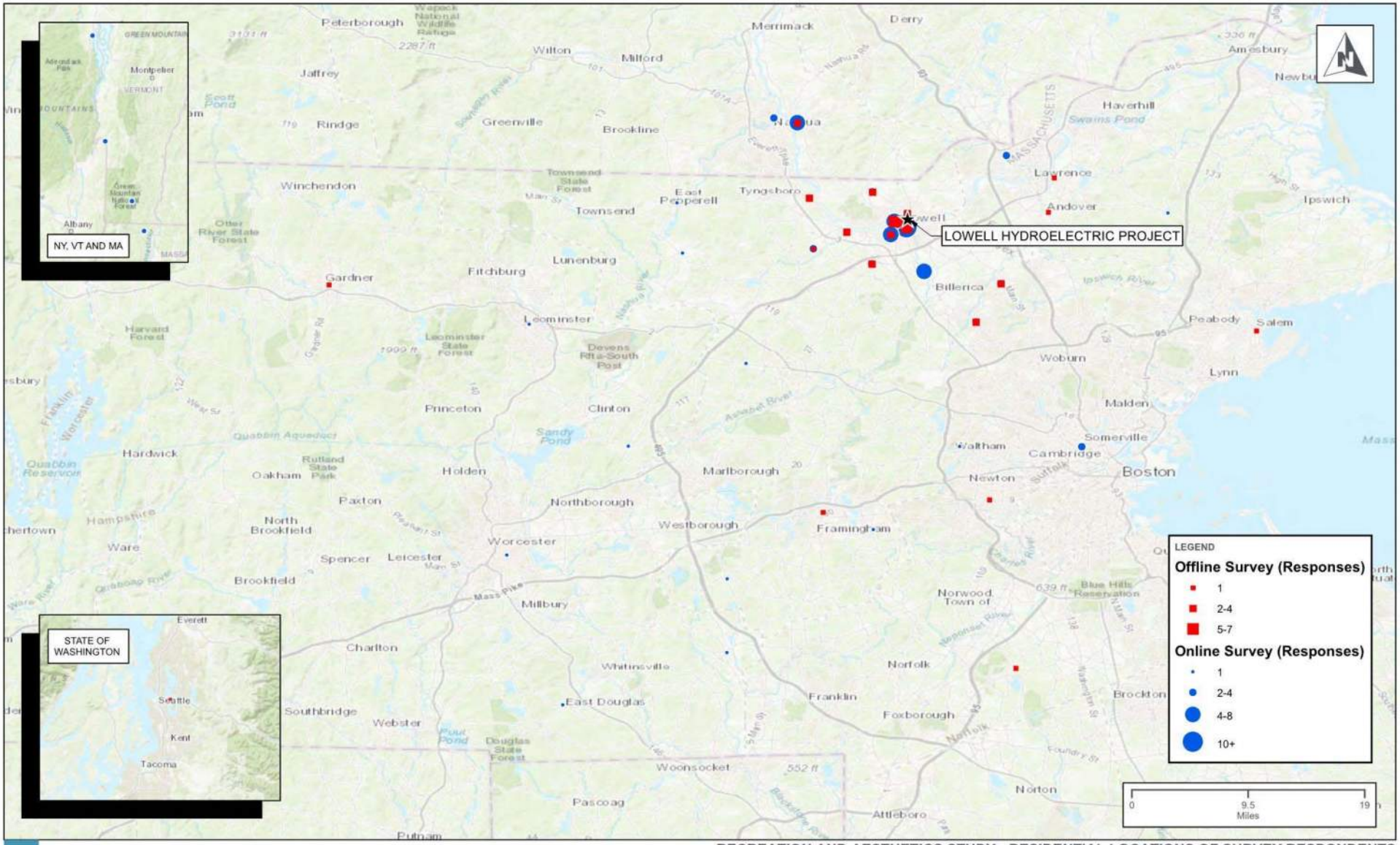
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5

Zip Code	Miles from project
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01854/Lowell, Massachusetts	0.5
01862/North Billerica, Massachusetts	5.1
01862/North Billerica, Massachusetts	5.1
01862/North Billerica, Massachusetts	5.1
01862/North Billerica, Massachusetts	5.1
01862/North Billerica, Massachusetts	5.1
01862/North Billerica, Massachusetts	5.1
01863/North Chelmsford, Massachusetts	7.5
01876/Tewksbury, Massachusetts	5.8
01876/Tewksbury, Massachusetts	5.8
01876/Tewksbury, Massachusetts	5.8
01879/Tyngsboro, Massachusetts	11.2
01886/Westford, Massachusetts	11.2
01886/Westford, Massachusetts	11.2
01921/Boxford, Massachusetts	19.6
02143/Somerville, Massachusetts	26.4
02143/Somerville, Massachusetts	26.4
02451/Waltham, Massachusetts	22.7
3051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5
03051/Hudson, New Hampshire	11.5

Zip Code	Miles from project
03051/Hudson, New Hampshire	11.5
03064/Nashua, New Hampshire	13.0
03064/Nashua, New Hampshire	13.0
03064/Nashua, New Hampshire	13.0
05356/West Dover, Vermont	115.0
05743/Fair Haven, Vermont	175.0
10003/New York City, New York	218.0
12901/Plattsburgh, New York	231.0

*Not all respondents to the online survey provided a home zip code.

Representative Map



BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY - RESIDENTIAL LOCATIONS OF SURVEY RESPONDENTS

LOWELL HYDROELECTRIC PROJECT

FERC NO. 2790

AUGUST 2020

Appendix G - Visual Survey for Vegetation Growth Mapbook

MATCH TO SHEET 02

Legend

- Canal System
- Project Facilities
- Photo Location*

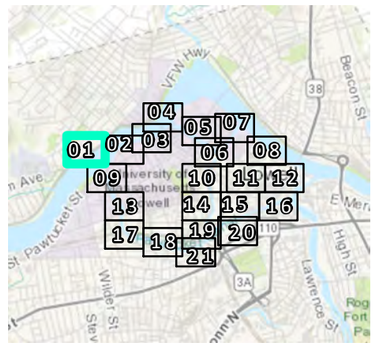
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



0 100 200
Feet

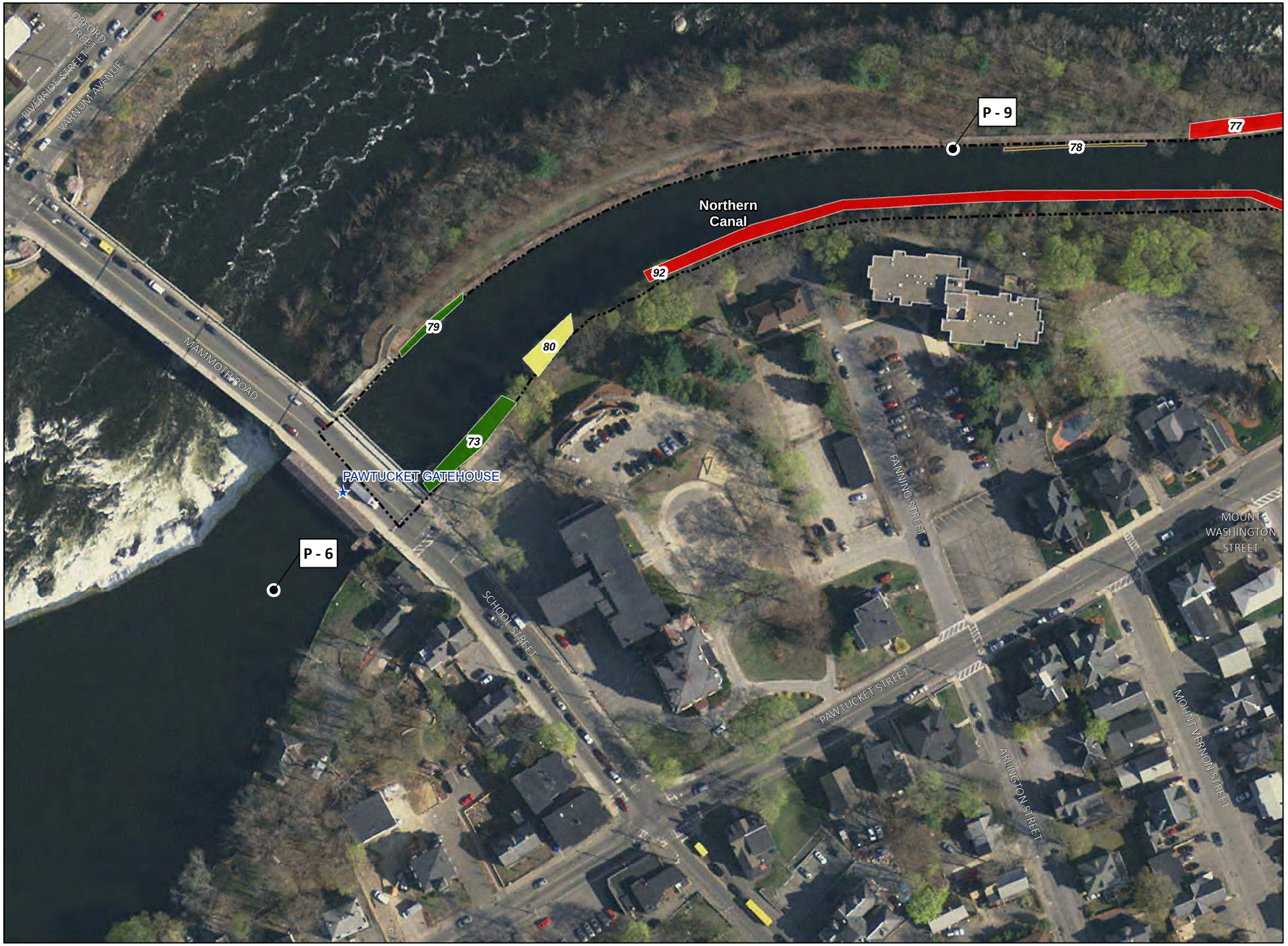
BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 01



MATCH TO SHEET 03

Legend

- Canal System
- Project Facilities
- Photo Location*

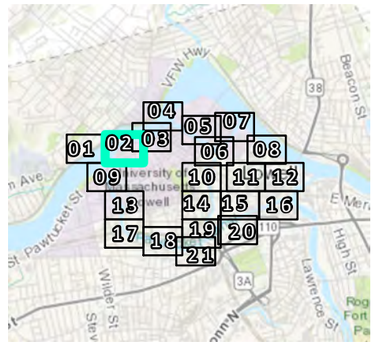
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



N

0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFTIMAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 02

PLYMOUTH STREET
VETERANS OF FOREIGN WARS HIGHWAY
UNIVERSITY AVENUE
FATHER MORISSETTE BOULEVARD
MERRIMACK STREET
MOODY STREET
PAWTUCKET STREET
SALEM STREET
FLETCHER STREET
DANE AVENUE
DANE STREET
GAGE STREET
WHITING STREET
FANNING STREET
MOUNT WASHINGTON STREET

Northern Canal

NORTHERN CANAL GATE HOUSE

P - 8
P - 10
P - 9

74
93
75
77
78
92
76

Legend

- Canal System
- Project Facilities
- Photo Location*

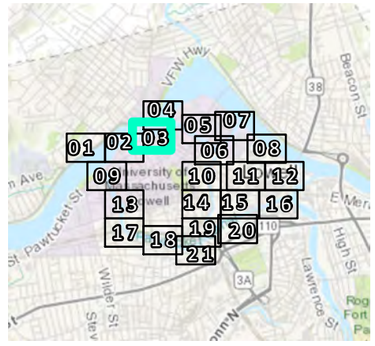
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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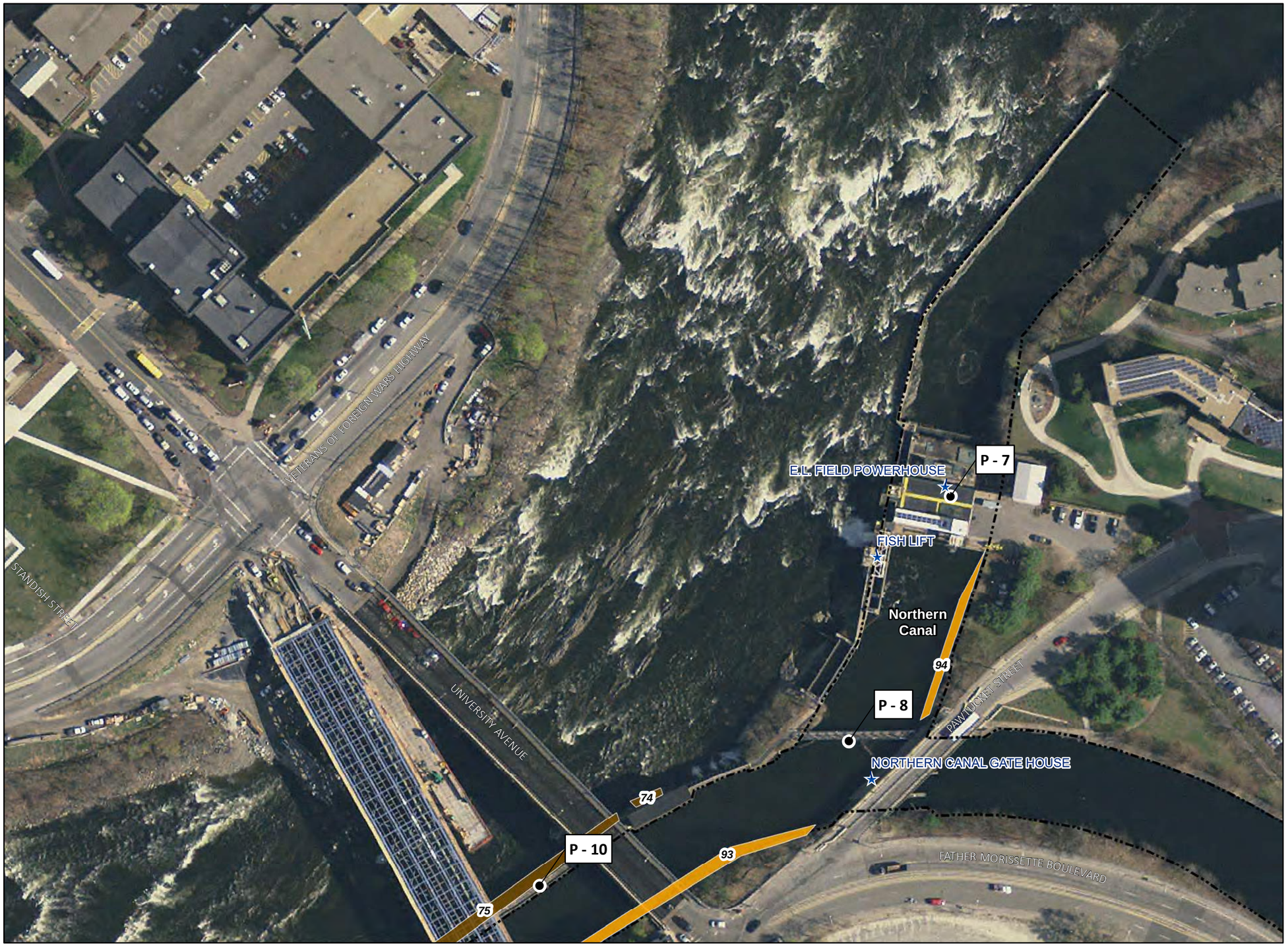
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020



MATCH TO SHEET 05

Legend

- Canal System
- Project Facilities
- Photo Location*

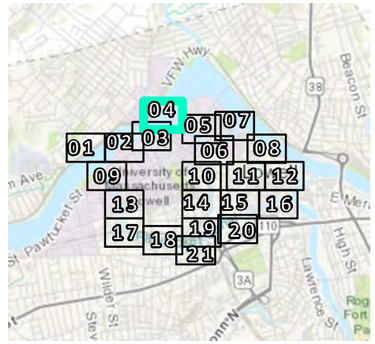
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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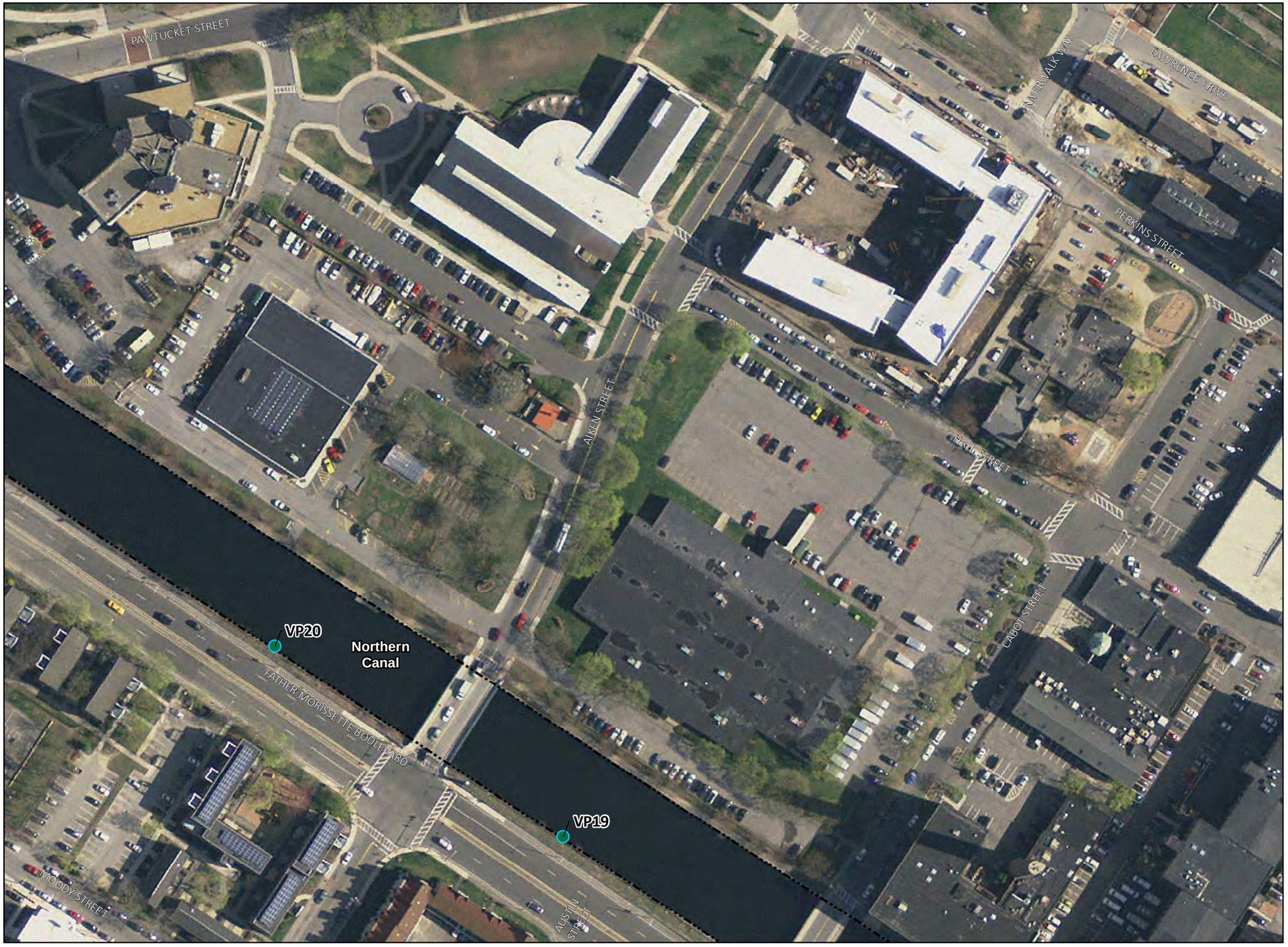
BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 04



MATCH TO SHEET 04

MATCH TO SHEET 07

Legend

- Canal System
- Project Facilities
- Photo Location*

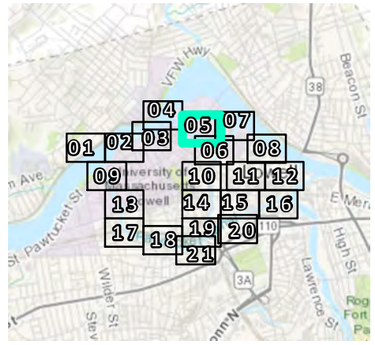
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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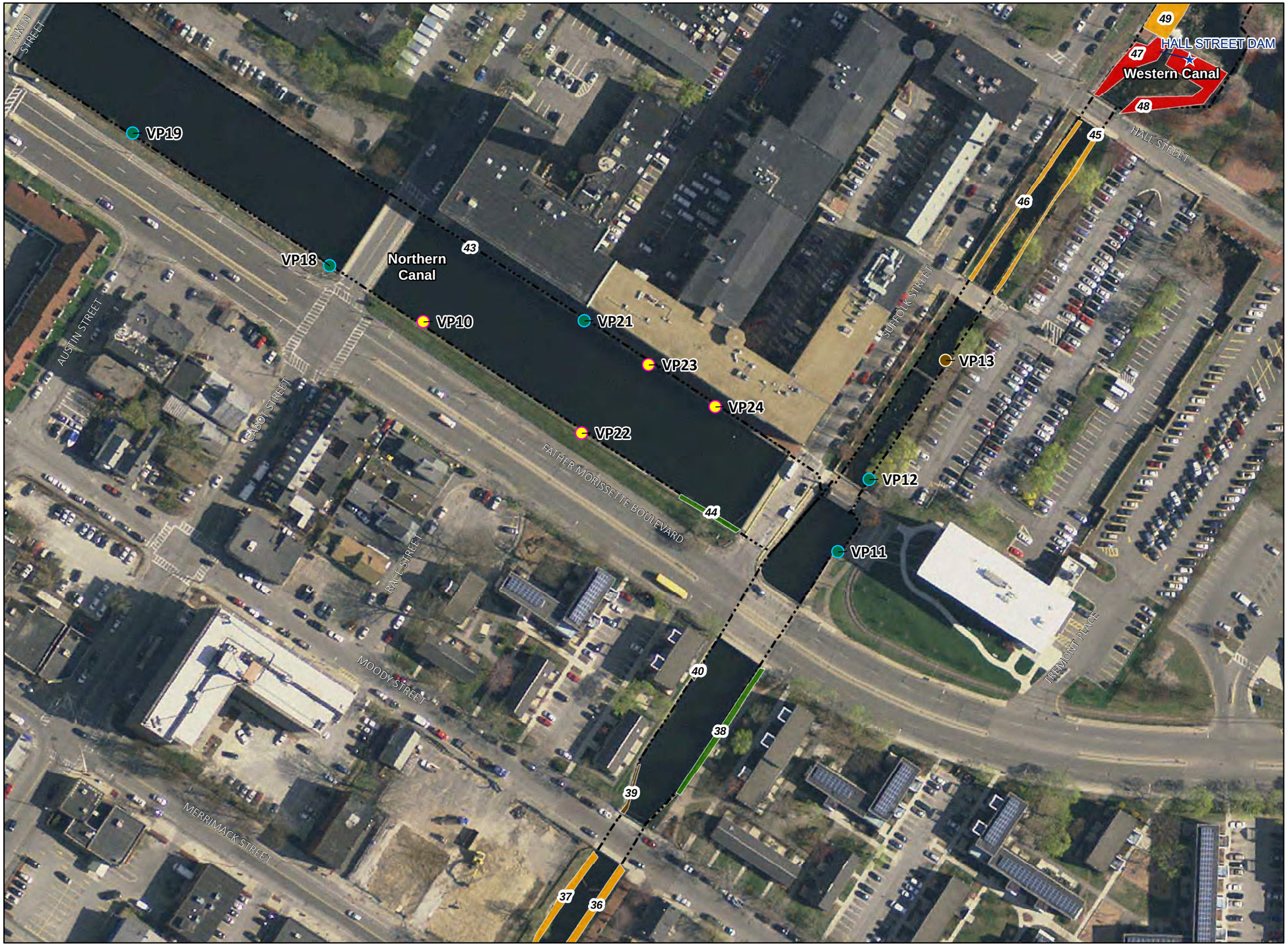
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020



Legend

- Canal System
- Project Facilities
- Photo Location*

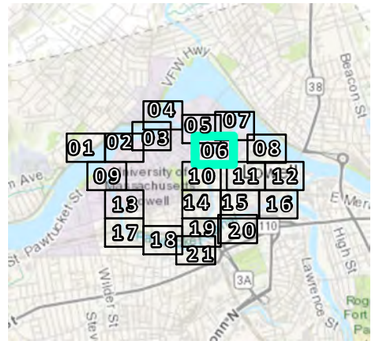
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



0 100 200
Feet

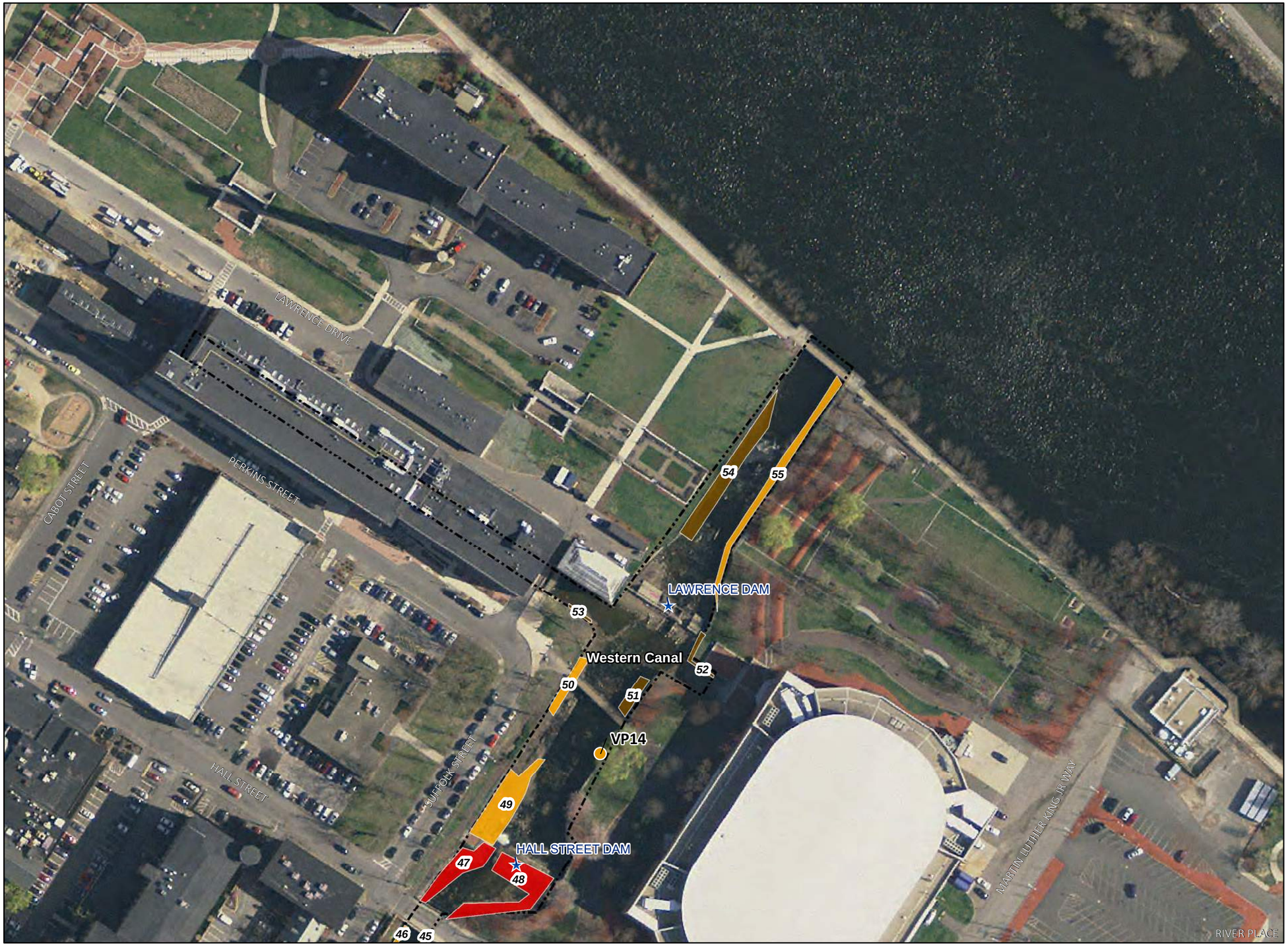
BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 05



MATCH TO SHEET 05

Legend

- Canal System
- Project Facilities
- Photo Location*

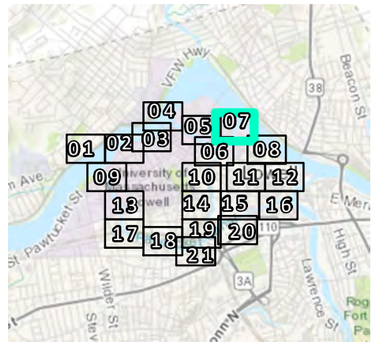
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



N

0 100 200
Feet

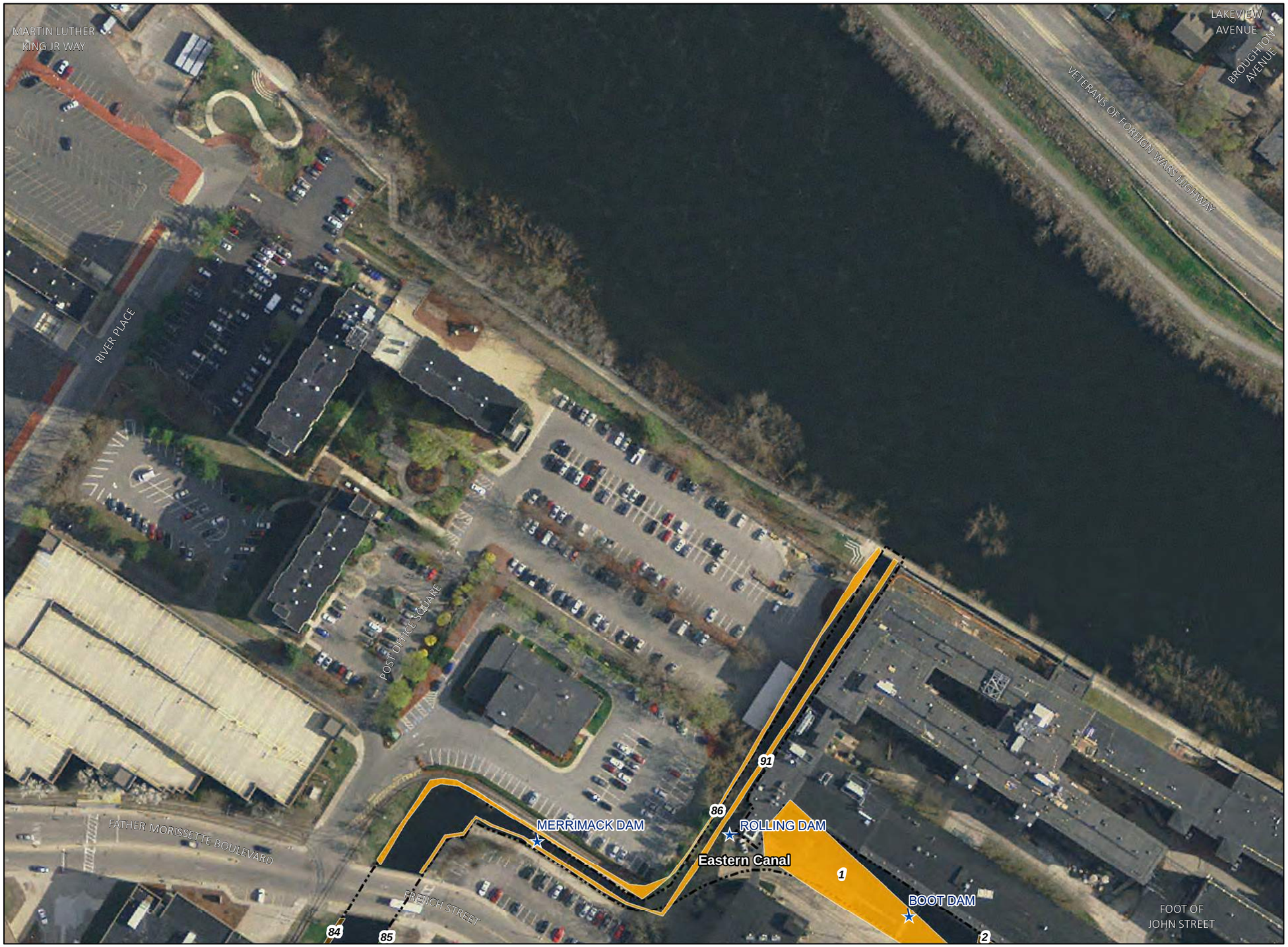
BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 07



Legend

- Canal System
- Project Facilities
- Photo Location*

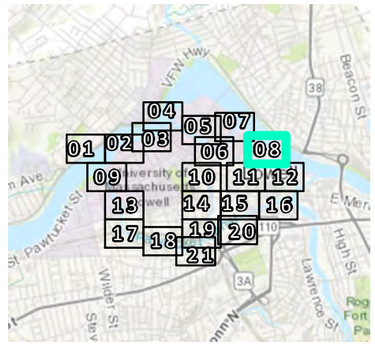
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

Legend

- Canal System
- Project Facilities
- Photo Location*

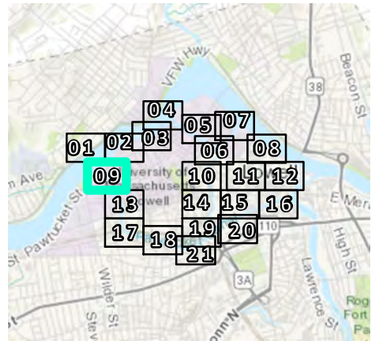
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

Legend

- Canal System
- Project Facilities
- Photo Location*

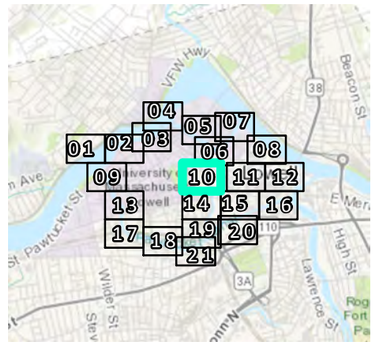
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



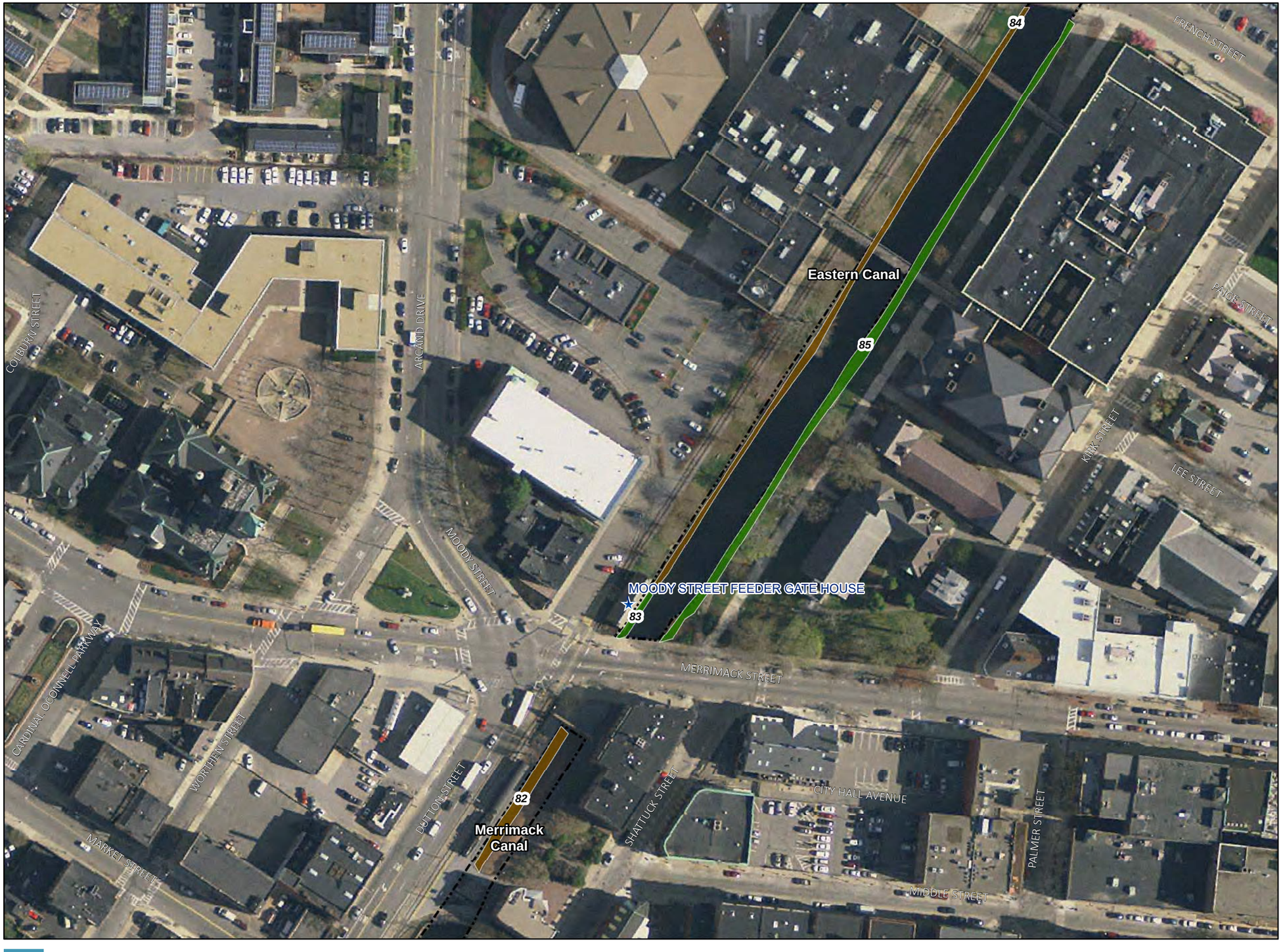
0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020



MATCH TO SHEET 12

Legend

- Canal System
- Project Facilities
- Photo Location*

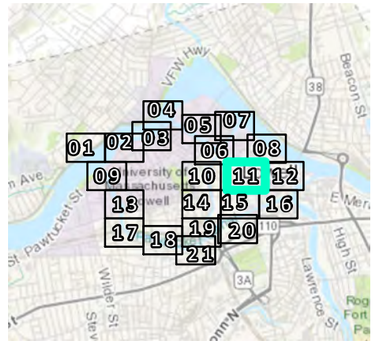
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



N

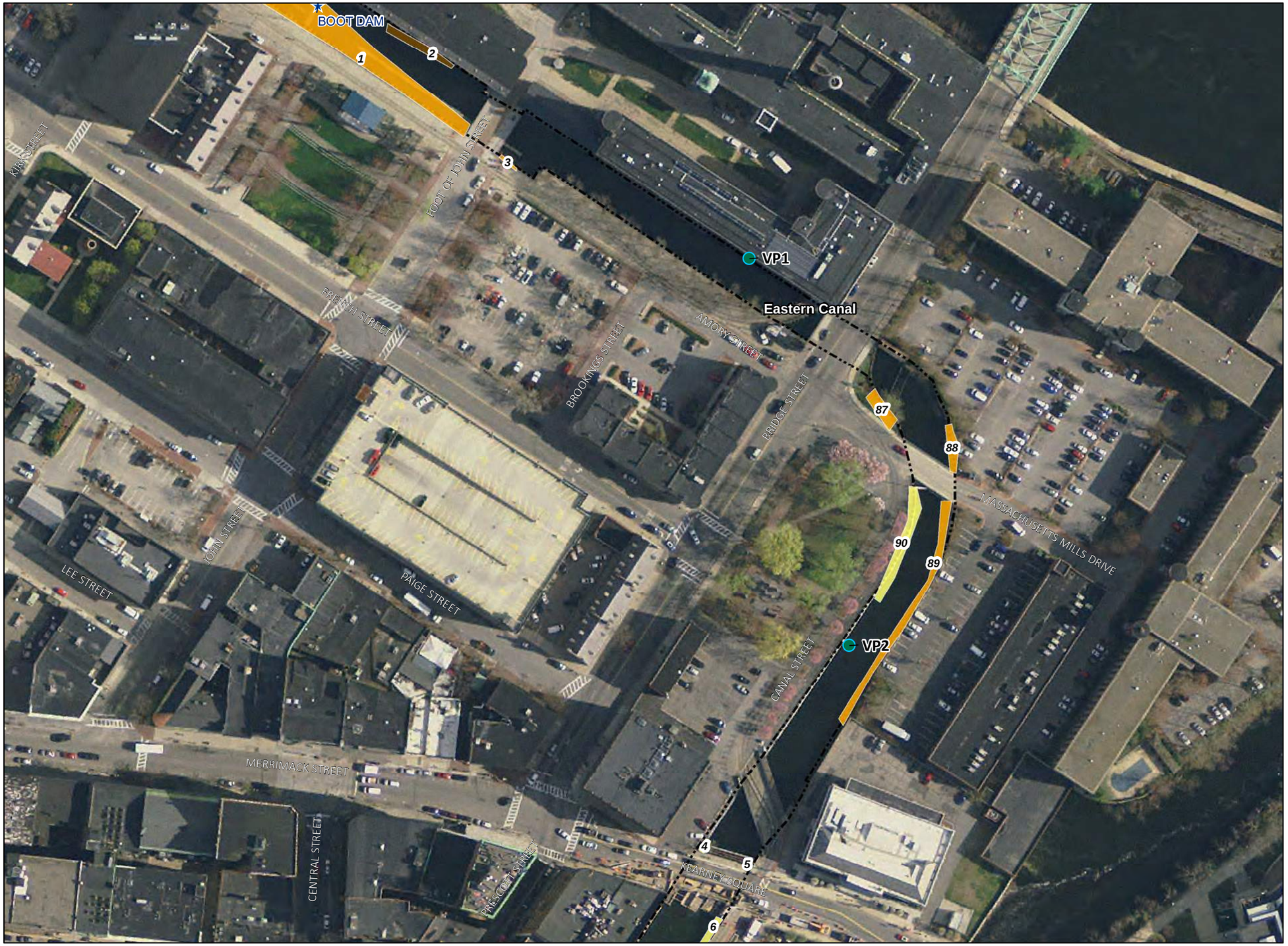
0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020



Legend

- Canal System
- Project Facilities
- Photo Location*

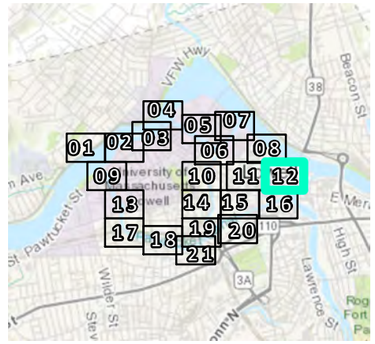
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



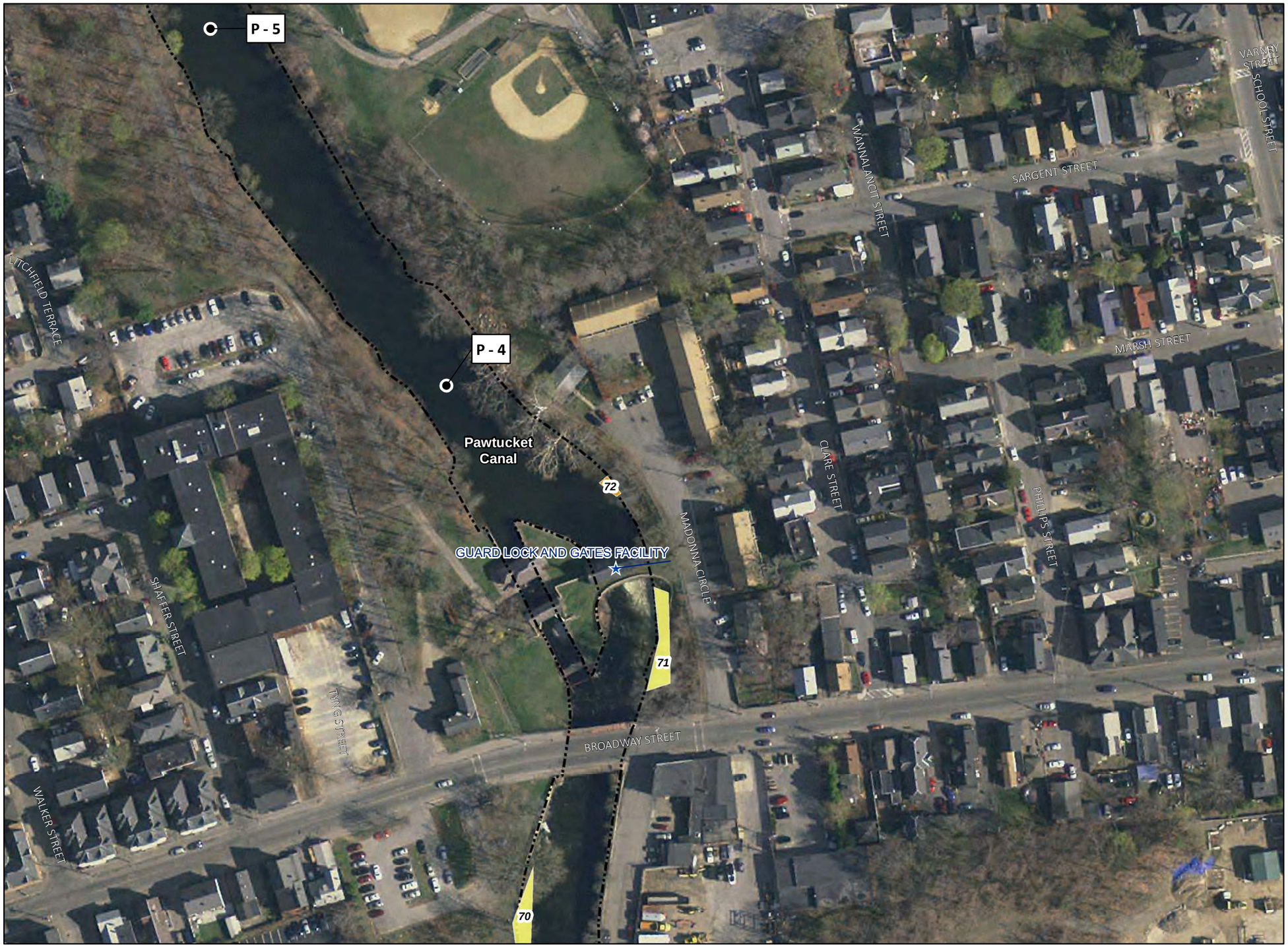
0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFTIMAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020



Legend

- Canal System
- Project Facilities
- Photo Location*

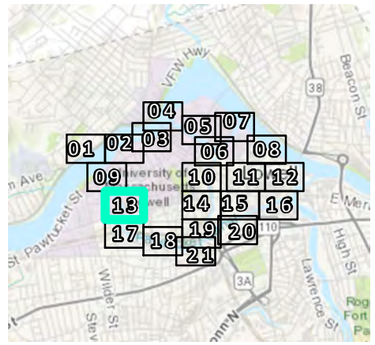
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



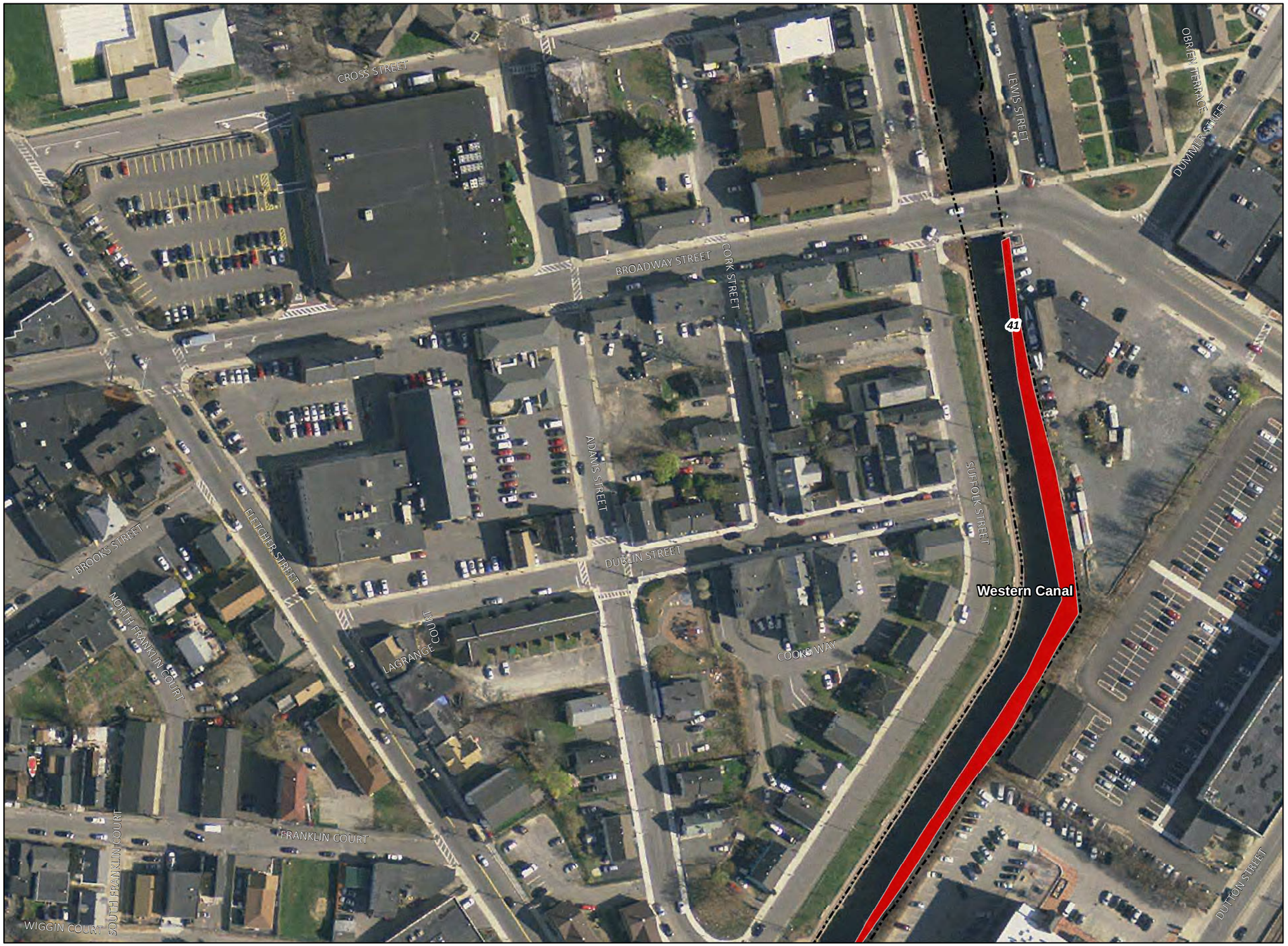
0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020



MATCH TO SHEET 15

Legend

- Canal System
- Project Facilities
- Photo Location*

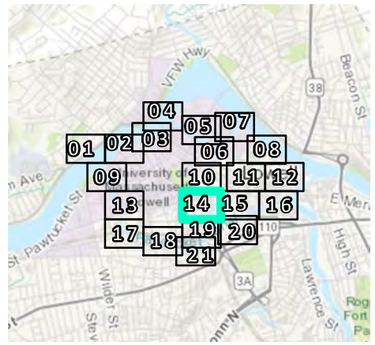
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



N

0 100 200
Feet

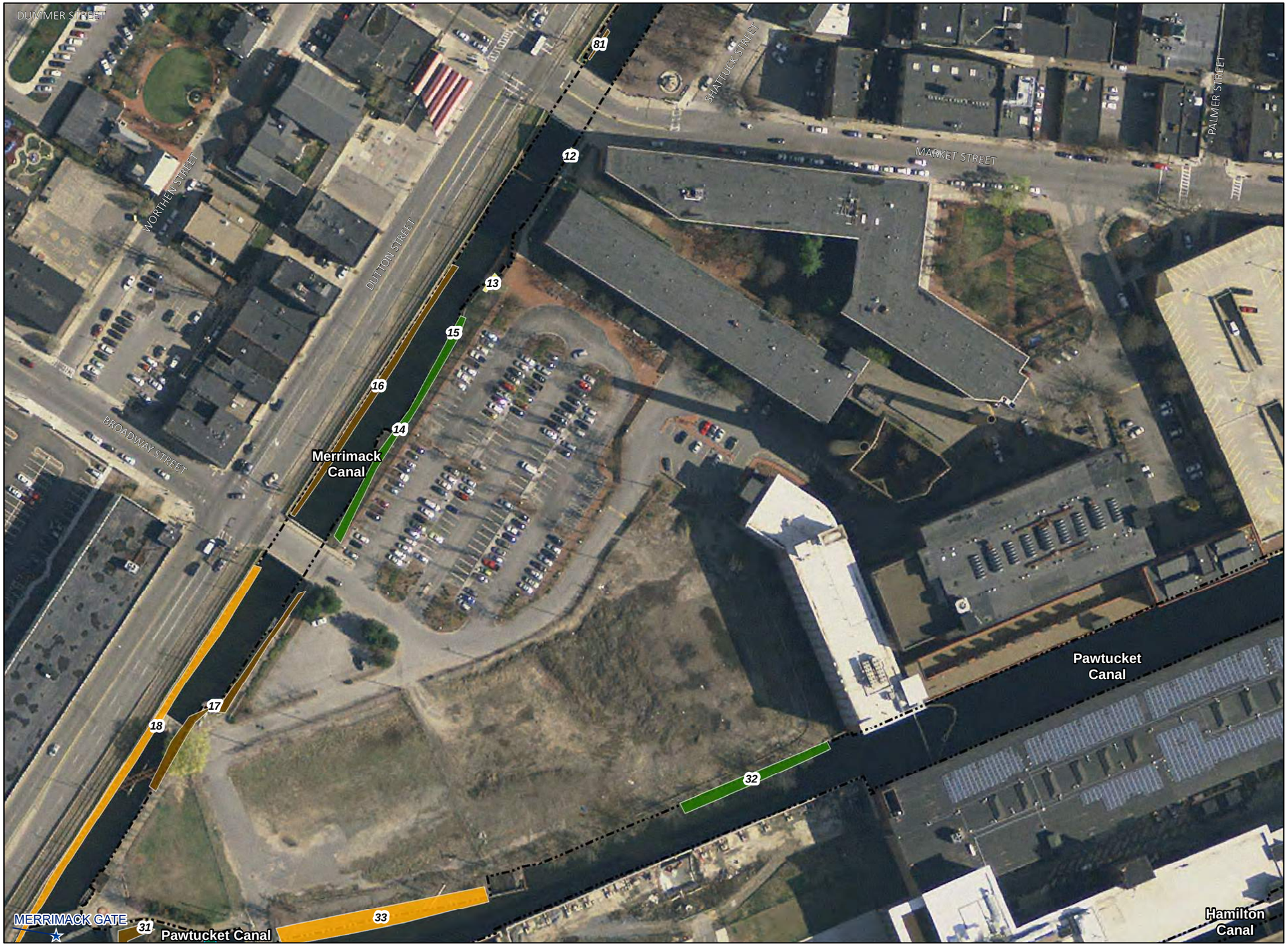
BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 14



MATCH TO SHEET 16

Legend

- Canal System
- Project Facilities
- Photo Location*

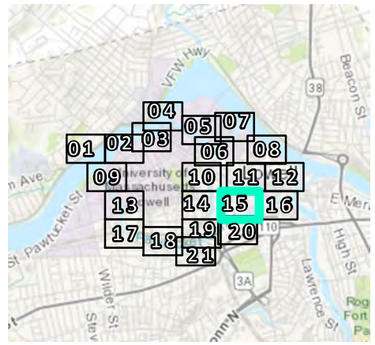
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



N

0 100 200
Feet

BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_VEGETATION_COVERTYPESTUDY11X17_0304.MXD - USER: KAUSTIN - DATE: 8/18/2020

AUGUST 2020

MATCH TO SHEET 15

MIDDLE STREET
PRESCOTT STREET
KEARNEY SQUARE
EAST MERRIMACK STREET
MARKET STREET
CENTRAL STREET
WARREN STREET
HURD STREET
GEORGE STREET
JACKSON STREET
WILLIAMS STREET

Eastern Canal
Pawtucket Canal
Hamilton Canal

VP3
VP4
VP5
VP6
VP7
LOWER LOCKS AND DAM
P - 1

6
7
8
9
10
11

Legend

- Canal System
- Project Facilities
- Photo Location*

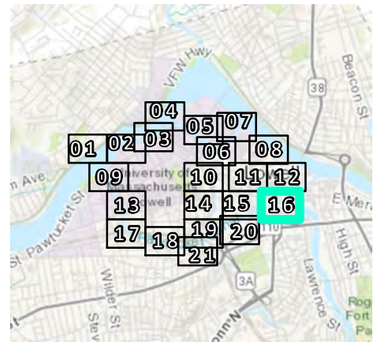
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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BOOTT HYDRO, LLC.

RECREATION AND AESTHETICS STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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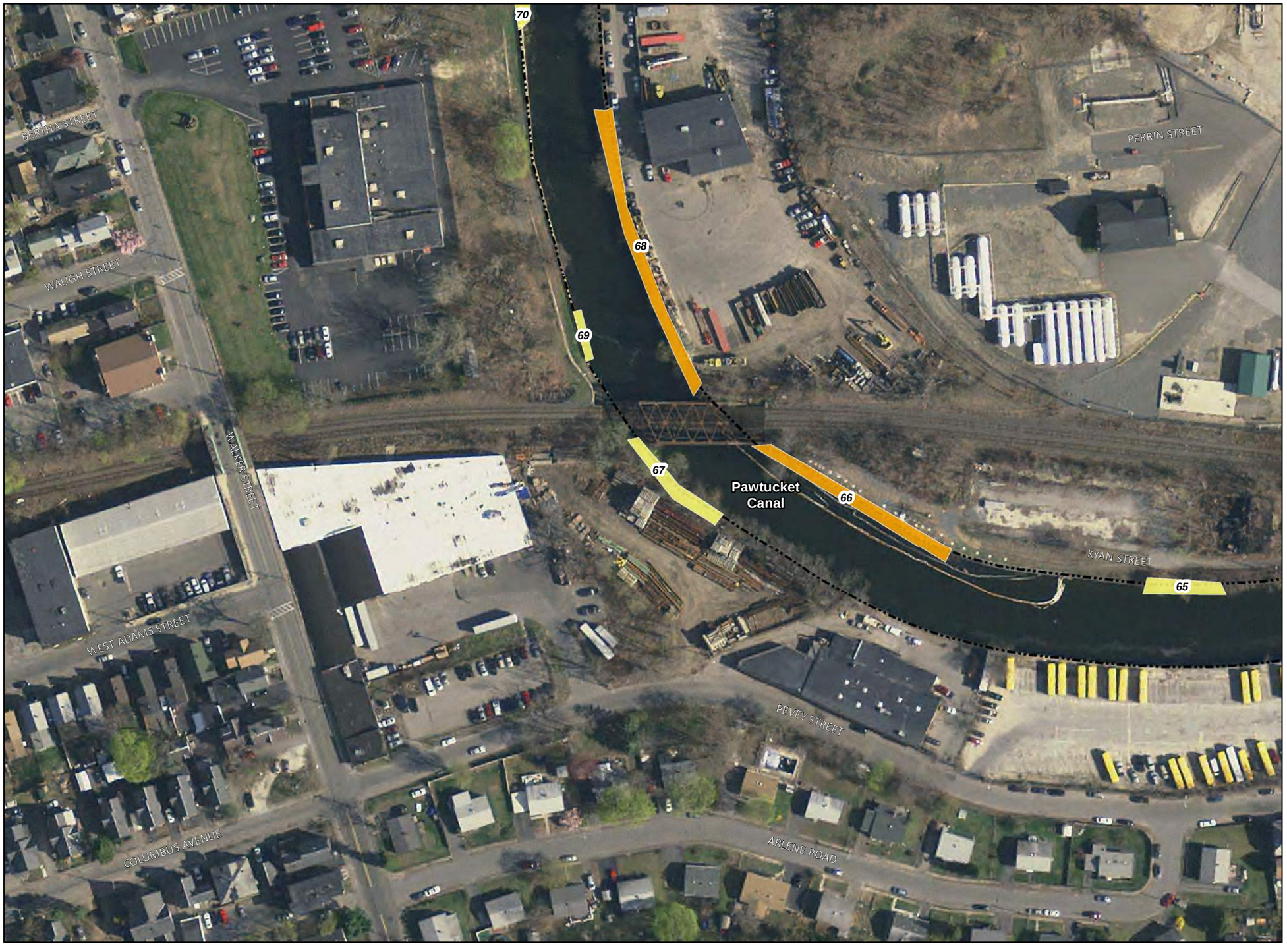


MATCH TO SHEET 18

Legend

- Canal System
- Project Facilities
- Photo Location*

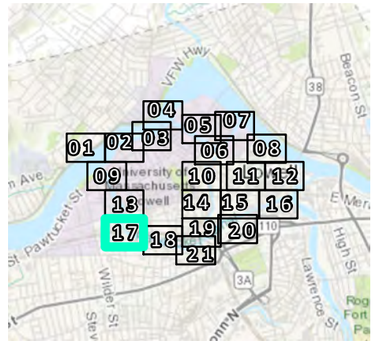
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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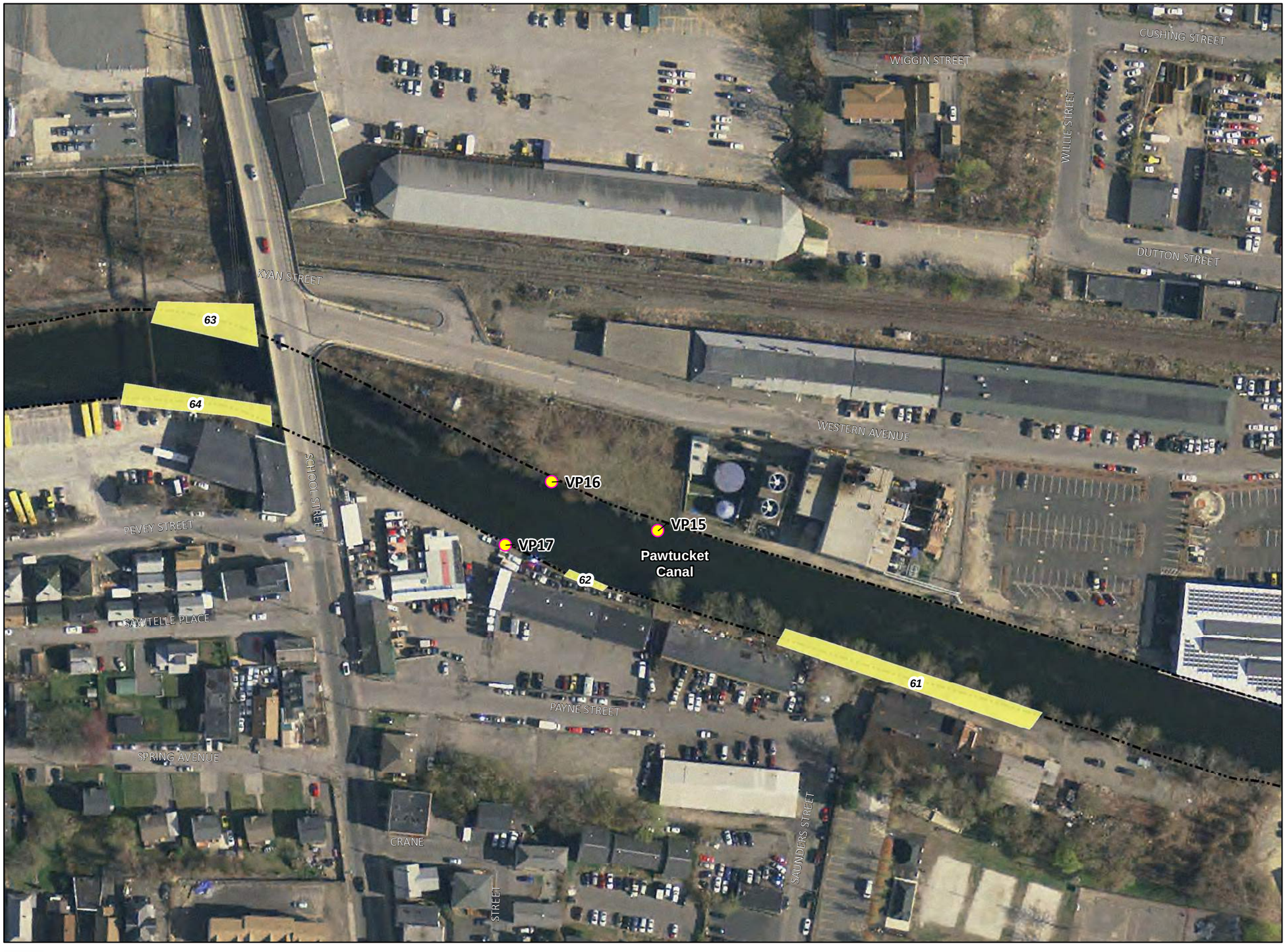
MATCH TO SHEET 17



MATCH TO SHEET 21

Legend

- Canal System
- Project Facilities
- Photo Location*

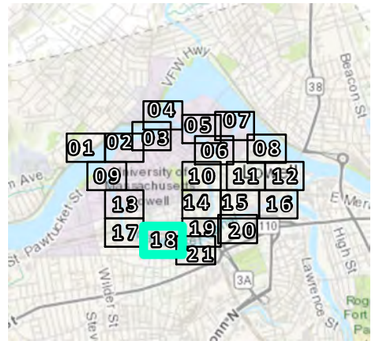
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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AUGUST 2020

MATCH TO SHEET 18

MATCH TO SHEET 20

SOUTH FRANKLIN COURT
WIGGIN COURT
ROCK STREET
ADAMS STREET
SUFFOLK STREET
FLETCHER STREET
NORTHEAST STREET
CUSHING STREET
WAMESIT COURT
DUTTON STREET
DUTTON AVENUE
WESTERN AVENUE
THORNDIKE STREET
MIDDLESEX STREET
RAMP-MIDDLESEX ST/LORD OVERPASS TO DUTTON ST NB

Western Canal
Hamilton Canal
Pawtucket Canal

41
42
18
19
20
20a
23
22
22a
21
56
57

Legend

- Canal System
- Project Facilities
- Photo Location*

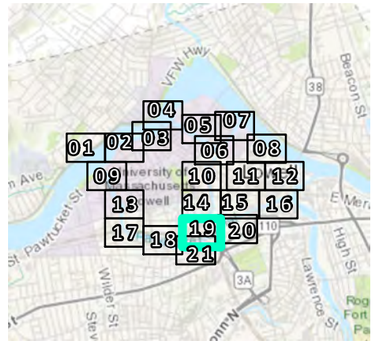
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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AUGUST 2020

MATCH TO SHEET 19

Merrimack Canal

DUTTON STREET

MERRIMACK GATE

VP9

33

31

Pawtucket Canal

SWAMP LOCKS AND DAM

30

29

18

19

27

26

23

JACKSON STREET

MARSTON STREET

ELLIOTT STREET

25

Hamilton Canal

22

22a

VP8

24

ROBESON STREET

REVERE STREET

MIDDLESEX STREET

SPRING STREET

SOUTH STREET

PEARL STREET

GARNET STREET

APPLETON STREET

WEST JACKSON STREET

KING STREET

APPLETON PLACE

WINTER STREET

RAMP-MIDDLESEX ST/LORD OVERPASS TO DUTTON ST NB

GOWARD PLACE

MATCH TO SHEET 19

Legend

- Canal System
- Project Facilities
- Photo Location*

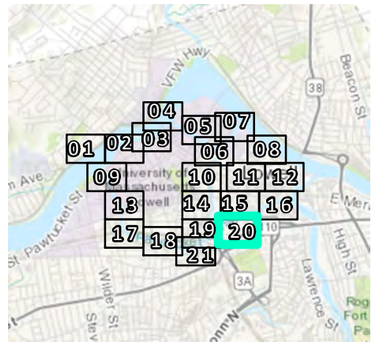
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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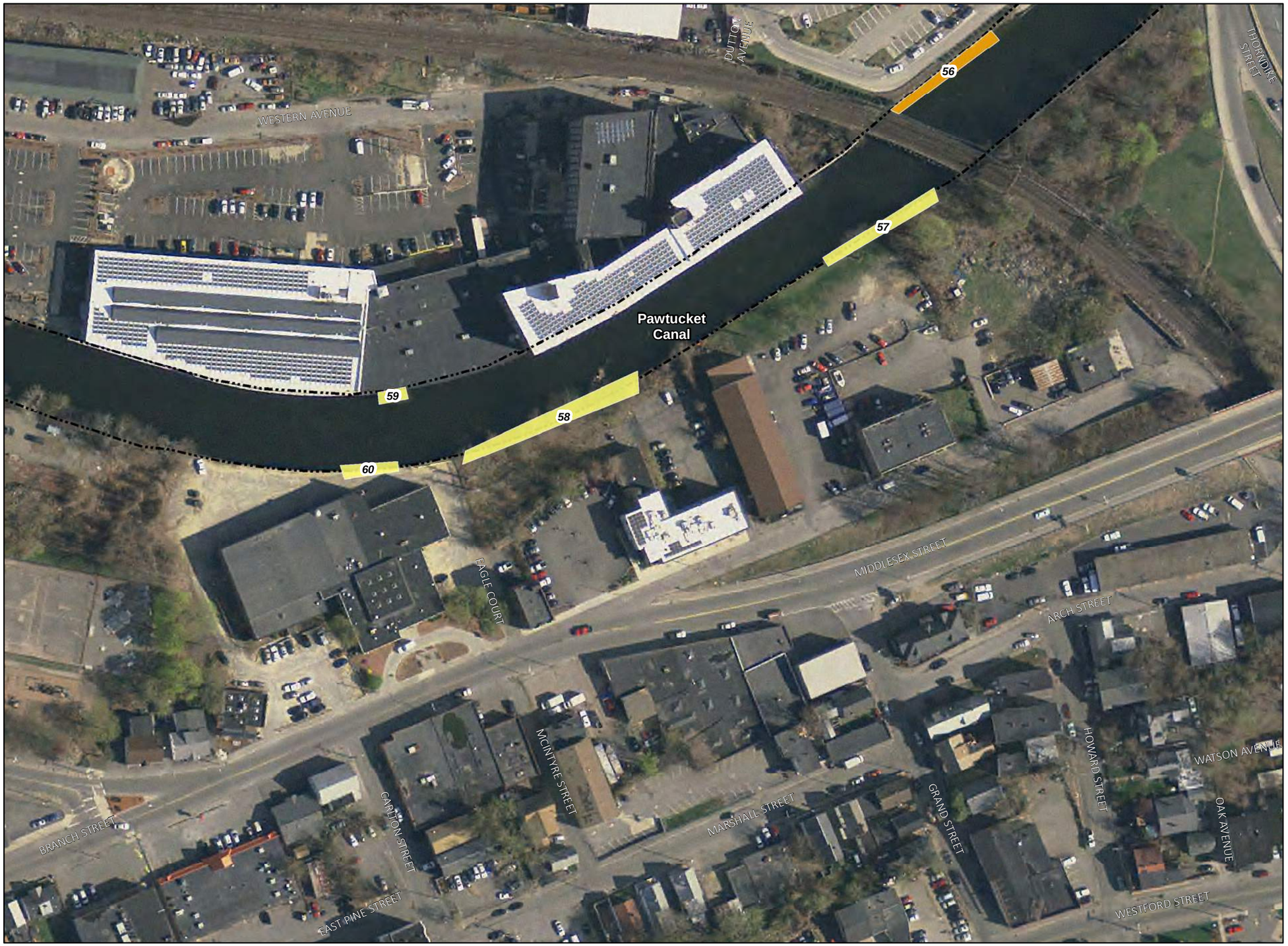
AUGUST 2020

MATCH TO SHEET 18



Legend

- Canal System
- Project Facilities
- Photo Location*

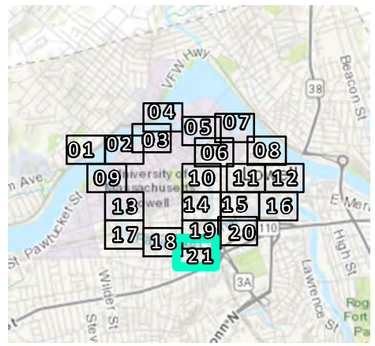
Dominant Vegetation Point

- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

Dominant Vegetation Polygon

- Forested
- Herbaceous
- Mixed
- Scrub-Shrub
- Trees

*NOTE: PHOTO LOCATION IS IDENTIFIED IF IT IS NOT ASSOCIATED WITH A DOMINANT VEGETATION POINT OR DOMINANT VEGETATION POLYGON



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RECREATION AND AESTHETICS STUDY
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FERC NO. 2790

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AUGUST 2020

Appendix H - Visual Survey for Vegetation Growth Data

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
1[4]	Mixed	Block Wall	Eastern	12	0.337	4.026	8.371	Several large woody trees are located at the northwestern end of the canal, while herbaceous plants dominate the western side of the canal
2	Herbaceous	Block Wall	Eastern	12	0.015	4.026	0.373	Small black locust scattered among purple loosestrife and other herbaceous weeds at base of building
3[4]	Mixed	Block Wall	Eastern	12	0.002	4.026	0.050	One elm tree, Boston ivy, ragweed; bottom of canal contains scattered aquatic vegetation
4[4]	Trees	Block Wall/Concrete/Stone Wall Mix	Eastern	12	0.002	4.026	0.050	One multi-trunked tree of heaven, 4 to 6 inches DBH
5	Trees	Block Wall/Concrete/Stone Wall Mix	Eastern	12	0.001	4.026	0.025	One multi-trunked birch, 1 inch DBH
6	Trees	Block Wall	Eastern	12, 16	0.024	4.026	0.596	Multiple tree of heaven and elm trees rooted and growing between stones of canal wall
7	Trees	Stone Wall	Pawtucket	16	0.034	19.630	0.173	Several large woody trees including river birch, tree of heaven, and silver maple, all 2 to 5 inches DBH
8	Herbaceous	Block Wall	Pawtucket	16	0.013	19.630	0.066	Canal contains what appears to be sediment deposited against the canal wall, sediment is topped with a layer of herbaceous plants
9	Trees	Concrete	Pawtucket	16	0.003	19.630	0.015	One tree of heaven and one unidentified hardwood growing on top of canal wall
10	Scrub-Shrub	Block Wall/Concrete/Stone Wall Mix	Pawtucket	16	0.010	19.630	0.051	Four tree of heaven, all 1 inch DBH growing on/out of canal wall
11	Scrub-Shrub	Block Wall	Pawtucket	16	0.003	19.630	0.015	Multiple tree of heaven growing out of canal wall
12	Trees	Block Wall/Concrete/Stone Wall Mix	Merrimack	15	0.002	1.402	0.143	Three multi-trunked elm trees, all with 1 inch DBH growing out of canal wall
13	Trees	Concrete	Merrimack	15	0.003	1.402	0.214	One elm tree and one mulberry growing out of concrete portion of canal wall
14	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Merrimack	15	0.054	1.402	3.852	Approximately 20% of the canal wall has woody trees (i.e. elms, locust, and mulberry) or herbaceous plants growing on it

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
15	Scrub-Shrub	Block Wall/Concrete/Stone Wall Mix	Merrimack	15	0.054	1.402	3.852	Approximately 20% of the canal wall has woody trees or herbaceous plants growing on it; woody trees include elms, locust, and mulberry
16	Herbaceous	Block Wall	Merrimack	15	0.053	1.402	3.780	Approximately 20% of the canal wall has woody trees (i.e. elms, locust, and mulberry) or herbaceous plants growing on it
17	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Merrimack	15	0.049	1.402	3.495	Approximately 20% of the canal wall has woody trees (i.e. mulberry and tree of heaven) or herbaceous plants growing on it
18	Mixed	Block Wall	Pawtucket	15, 19, 20	0.121	19.630	0.616	Tree of heaven, ragweed, maple, common mullein, Japanese knotweed, estimated at 20 % cover; Japanese knotweed density increased at NPS boat dock
18a*	Mixed	Block Wall	Merrimack	15, 19, 20	0.121	1.402	8.631	Approximately 20% of the canal wall has woody trees, shrubs, and/or herbaceous plants growing on it; vegetation includes tree of heaven, maple, common mullein, Japanese knot weed and ragweed. Japanese knot weed coverage increases with closer proximity to the NPS boat dock
19	Scrub-Shrub	Block Wall	Pawtucket	19, 20	0.037	19.630	0.188	Vegetation on canal wall includes elms, birches, and scattered ferns
20	Trees	Block Wall	Pawtucket	19	0.023	19.630	0.117	Catalpa tree is growing out of the top of the canal wall and several tree of heaven and birch, some with 5 to 10 inches DBH
20a*	Trees	Block Wall	Pawtucket	19	0.005	19.630	0.025	Catalpa growing out of wall, several trees of heaven, and birch, some with DBH of 5 to 10 inches
21	Scrub-Shrub	Block Wall/Concrete/Stone Wall Mix	Pawtucket	19	0.020	19.630	0.102	Vegetation on canal wall includes glossy buckthorn, boxelder, and tree of heaven, some with 3 to 5 inches DBH
22	Mixed	Block Wall/Concrete/Stone Wall Mix	Hamilton	19, 20	0.076	2.005	3.791	Vegetation on canal wall includes woody trees such as tree of heaven and elms, scattered herbaceous plants such as ragweed and mullein, and Virginia creeper vine
22a*	Mixed	Block Wall/Concrete/Stone Wall Mix	Pawtucket	19, 20	0.010	19.630	0.051	Tree of heaven, elms, ragweed, mullein, and Virginia creeper

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
23[4]	Scrub-Shrub	Block Wall	Hamilton	19, 20	0.027	2.005	1.347	Vegetation on canal wall is primarily tree of heaven and ragweed, with lesser density of mullein
24	Trees	Block Wall/Concrete/Stone Wall Mix	Hamilton	20	0.010	2.005	0.499	Vegetation on canal wall is primarily box elder and ragweed, with sporadic coverage of elm trees
25[4]	Trees	Block Wall	Hamilton	20	0.032	2.005	1.596	Vegetation growing out of canal wall includes one sycamore, several tree of heaven, glossy buckhorn, and ragweed
26[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Hamilton	20	0.105	2.005	5.237	The canal wall, west of walking bridge, consists of portions of concrete and is primarily covered in ragweed. The canal wall, east of walking bridge, contains trees, such as tree of heaven and elm
27[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Hamilton	20	0.076	2.005	3.791	Vegetation on canal wall consists primarily of trees with approximately 10 percent cover. Trees are smaller and less dense on canal wall east of the walking bridge. The canal wall west of the walking bridge consists of portions of concrete
29[5]	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Hamilton	20	0.024	2.005	1.197	Vegetation growing out of canal wall at the eastern end is hard to distinguish because of lack of access; however, vegetation coverage was approximately 15-20 percent and likely consists of ragweed, ivy, and elms
30	Mixed	Block Wall/Concrete/Stone Wall Mix	Pawtucket	20	0.013	19.630	0.066	Vegetation is located at the toe of the canal wall and includes elm, tree of heaven, ragweed, and jewelweed
31	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Pawtucket	15, 20	0.019	19.630	0.097	Vegetation growing out of canal wall is primarily herbaceous species, including purple loosestrife, Japanese knotweed, jewelweed, and buckthorn shrubs
32	Scrub-Shrub	Block Wall	Pawtucket	15	0.046	19.630	0.234	Shrubs are growing along the top of the canal wall, but cannot distinguish species because of lack of access; cannot tell if shrubs are growing out of the canal wall
33	Mixed	Block Wall	Pawtucket	15, 20	0.111	19.630	0.565	Vegetation growing on top of canal wall include several tree species and herbaceous species

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
34[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Western	10	0.014	5.510	0.254	Vegetation growing on the canal wall is sparse and consists primarily of vines. Vegetation growing on top of and approximately 3 feet back from canal wall is primarily herbaceous
35[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Western	10	0.014	5.510	0.254	Vegetation growing out of the canal wall is sparse and there are a few trees growing on top of and approximately 3 feet back from the canal wall
36[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Western	6, 10	0.036	5.510	0.653	Vegetation growing out of canal wall consists of mostly vines with a few tree of heaven are growing on top of and approximately 5 feet back from canal wall
37	Mixed	Block Wall/Concrete/Stone Wall Mix	Western	6, 10	0.034	5.510	0.617	Vegetation growing out of canal wall consists of mostly vines and a few tree of heaven are growing on top of and approximately 3 feet back from canal wall
38[4]	Scrub-Shrub	Block Wall	Western	6	0.025	5.510	0.454	Vegetation growing out of the canal wall, near the top, consists of shrubs,
39[4]	Herbaceous	Block Wall	Western	6	0.004	5.510	0.073	A few, small tree of heaven trees are growing out of the canal wall, near the top of wall
40	Herbaceous	Block Wall	Western	6	0.002	5.510	0.036	Small clump of shrubs growing out of the canal wall
41[4]	Forested	Block Wall/Concrete/Stone Wall Mix	Western	14, 19	0.377	5.510	6.842	Portions of the canal wall at bridge crossings on each side of the canal are concrete and brick; the highest density of vegetation in the polygon consists of locust, tree of heaven, box elder, maples and scattered shrubs, some with 6 to 14 inches DBH
42	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Western	19	0.051	5.510	0.926	Vegetation on canal wall consists of scattered herbaceous species that include Japanese knotweed, and scattered shrubs
43	Scrub-Shrub	Block Wall	Northern	6	0.001	11.670	0.009	Small clump of maple and elms growing on the canal wall
44	Scrub-Shrub	Block Wall	Northern	6	0.009	11.670	0.077	A clump of five small trees, including ash and elm with 1 to 2 inches DBH, growing on the canal wall

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
45[4]	Mixed	Block Wall	Western	6, 7	0.019	5.510	0.345	Vegetation growing on the eastern side of the canal wall includes several trees (i.e. mulberry, buckthorn, tree of heaven) and dense vines, including Boston and poison ivy
46[4]	Mixed	Block Wall	Western	6, 7	0.020	5.510	0.363	Vegetation growing on western side of the canal wall includes less trees than the eastern side of the canal wall (see Polygon 46) and similar vine species, such as Boston ivy and poison ivy
47[4]	Forested	Block Wall/Concrete/Stone Wall Mix	Western	6, 7	0.037	5.510	0.672	Vegetation growing on the canal wall includes large locust trees and ragweed
48	Forested	Block Wall/Concrete/Stone Wall Mix	Western	6, 7	0.065	5.510	1.180	Vegetation growing on the canal wall includes dense clumps of large buckhorn, elm, and birch
49	Mixed	Block Wall/Concrete/Stone Wall Mix	Western	6, 7	0.060	5.510	1.089	Tree of heaven, elms, vines and dense herbaceous species growing on canal wall
50	Mixed	Block Wall	Western	7	0.015	5.510	0.272	Tree of heaven, elms, and ragweed growing on canal wall
51[4]	Herbaceous	Block Wall	Western	7	0.012	5.510	0.218	Vegetation growing on canal wall include trees, such as mulberry and elms, and herbaceous ragweed
52	Herbaceous	Block Wall	Western	7	0.006	5.510	0.109	Vegetation growing on canal wall include trees, such as sycamore, and herbaceous species, such as purple loosestrife and Japanese knotweed
53	Herbaceous	Block Wall	Western	7	0.002	5.510	0.036	Small shrubs are growing out of canal wall
54[4]	Herbaceous	Block Wall	Western	7	0.060	5.510	1.089	Vegetation growing on canal wall consists primarily of vines; a few tree of heaven trees are growing at the toe of the canal wall, likely on deposited sediment
55[4]	Mixed	Block Wall	Western	7	0.045	5.510	0.817	Vegetation growing on canal wall consists primarily of herbaceous vegetation, such as ragweed, and vines; a few tree of heaven also growing on canal wall, but mostly at the toe of the canal wall

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
56[4]	Mixed	Concrete	Pawtucket	19, 21	0.037	19.630	0.188	Most of the canal wall is made of concrete with riprap placed at the toe of the wall; vegetation growing on wall consists of tree of heaven, box elder, and vines, such as Boston ivy
57	Trees	Block Wall	Pawtucket	19, 21	0.043	19.630	0.219	Vegetation growing out of the canal wall includes ash trees with 6 to 8 inches DBH
58[4]	Trees	Block Wall	Pawtucket	21	0.086	19.630	0.438	Vegetation growing out of the canal wall includes locust trees, tree of heaven, wild grape, and oriental bittersweet
59	Trees	Block Wall/Concrete/Stone Wall Mix	Pawtucket	21	0.010	19.630	0.051	Clump of trees currently growing out of the canal wall was being removed at time of survey
60	Trees	Block Wall	Pawtucket	21	0.019	19.630	0.097	Vegetation growing out of canal wall includes five small shrubs and ash and elm trees
61	Trees	Block Wall	Pawtucket	18	0.144	19.630	0.734	Vegetation growing out of canal wall consists primarily of oriental bittersweet; trees, such as birch and box elder, are growing primarily on top of the canal wall at the edge
62	Trees	Block Wall	Pawtucket	18	0.008	19.630	0.041	4 small birches are growing out of the canal wall
63	Trees	Block Wall	Pawtucket	18	0.091	19.630	0.464	Several tree species are growing out of the canal wall
64	Trees	Block Wall	Pawtucket	18	0.078	19.630	0.397	Black locust and box elder with 2 to 4 inches DBH are growing out of canal wall
65	Trees	Block Wall	Pawtucket	17	0.033	19.630	0.168	Tree species growing out of canal wall include tree of heaven, locust, and birch
66[4]	Mixed	Block Wall	Pawtucket	17	0.078	19.630	0.397	Vegetation growing out of canal wall at top of the wall include trees such as tree of heaven and birch, and vines, such as Boston ivy
67[4]	Trees	Block Wall	Pawtucket	17	0.044	19.630	0.224	Large locust and birch trees growing on top of canal wall
68	Mixed	Block Wall	Pawtucket	17	0.103	19.630	0.525	Sporadic trees, including elms and birch, and ragweed are growing on top edge of canal wall; vines, such as Boston ivy growing down canal wall

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
69[4]	Trees	Block Wall/Concrete/Stone Wall Mix	Pawtucket	17	0.012	19.630	0.061	Trees growing out of canal wall include tree of heaven and elms, approximately 10 feet tall
70[4]	Trees	Concrete	Pawtucket	13, 17	0.033	19.630	0.168	Canal wall is primarily concrete with trees, such as locust and elm, growing at the toe of the wall
71	Trees	Block Wall	Pawtucket	13	0.039	19.630	0.199	Tree of heaven and elm trees are primarily growing on top of the canal wall
72	Mixed	Block Wall	Pawtucket	13	0.005	19.630	0.025	Vegetation growing out of canal wall includes tree of heaven and vines
73	Scrub-Shrub	Block Wall	Northern	2	0.056	11.670	0.480	Tree of heaven, catalpa, and ash trees are growing on top of the canal wall
74[4]	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Northern	3,4	0.007	11.670	0.060	Ragweed is growing out of the canal wall located beneath the building
75[4]	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Northern	3,4	0.236	11.670	2.022	Vegetation is growing from small sill under the first block down on the canal wall and is dominated by herbaceous plants, such as ragweed, purple loosestrife, aster, scattered ferns, golden rod spp., scattered mulberry, elms, and buckthorn.
76	Mixed	Block Wall	Northern	3	0.157	11.670	1.345	Scattered trees and shrubs are growing out of the canal wall and along the toe of the wall
77[4]	Forested	Block Wall/Concrete/Stone Wall Mix	Northern	2, 3	0.048	11.670	0.411	At the western edge of polygon, the canal broadens and is forested with riparian species; topography extends to bypass reach; species include elms, mulberry, and honeysuckle; some stumps have been cut along the wall on the same side as the bypass reach
78[4]	Herbaceous	Block Wall	Northern	2, 3	0.011	11.670	0.094	Vegetation growing out of the canal walls include tree of heaven and mulberry and herbaceous species such as purple loosestrife and mullein
79[4]	Scrub-Shrub	Block Wall	Northern	2	0.017	11.670	0.146	Tree of heaven trees and vines are growing on top of the canal wall and within approximately 3 feet of the canal wall
80	Trees	Block Wall	Northern	2	0.033	11.670	0.283	Vegetation consists of few, large trees growing at the toe of the canal wall

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
81	Herbaceous	Stone Wall	Merrimack	15	0.003	1.402	0.214	Scattered ferns and 1 small, 4 ft. maple with .5 inch DBH growing out of canal wall
82[4]	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Merrimack	11	0.045	1.402	3.210	90% vegetative cover in this area; vegetation is mostly herbaceous, including ragweed, clover, *Aster* spp., and weeds; two small tree of heaven also present on canal wall
83	Scrub-Shrub	Block Wall	Eastern	11	0.010	4.026	0.248	Vegetation on the canal wall includes a dense clump of climbing vines, one small maple, and one small honeysuckle
84[4]	Herbaceous	Block Wall	Eastern	8, 11	0.109	4.026	2.707	Approximately 20% vegetative cover on the western side of the canal wall located primarily one block down from the top of the wall; vegetation includes a few maples, honeysuckle, and scattered herbaceous species.
85[4]	Scrub-Shrub	Block Wall	Eastern	8, 11	0.160	4.026	3.974	Approximately 40% vegetative cover on the east side of the canal wall; vegetation includes several 5 ft. elms, several birches, and a few red maples
86[4]	Mixed	Block Wall	Eastern	8	0.088	4.026	2.186	Mixed vegetation includes tree of heaven and some emergent wetland vegetation and cattail spp.; other herbaceous species are growing at the bottom of the canal
87	Mixed	Block Wall/Concrete/Stone Wall Mix	Eastern	12	0.014	4.026	0.348	Vegetation growing out of the canal wall includes and 8-trunked box elder at 5-10 inches DBH, glossy buckthorn, and two mulberry shrubs
88	Mixed	Block Wall/Concrete/Stone Wall Mix	Eastern	12	0.012	4.026	0.298	Vegetation growing out of the canal wall includes five tree of heaven at 1-2 inches DBH, one quaking aspen, and several multi-stemmed birches
89[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Eastern	12	0.046	4.026	1.143	Vegetation growing out of the canal wall includes an approximately 10-trunked tree of heaven tree at 6 inches DBH and poison ivy
90[4]	Trees	Block Wall/Concrete/Stone Wall Mix	Eastern	12	0.034	4.026	0.845	Vegetation growing out of canal wall is a 3-trunked tree of heaven tree at 4 inches DBH; also observed a recently cut birch tree tied with rope

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
91[4]	Mixed	Block Wall/Concrete/Stone Wall Mix	Eastern	8	0.078	4.026	1.937	Vegetation growing on the canal wall is primarily herbaceous, however, one maple at approximately 5-10 inches DBH is within polygon
92[4]	Forested	Block Wall	Northern	2, 3	0.191	11.670	1.637	View toward south side of canal showing vegetation growing on top of single stone/block
93[4]	Mixed	Earthen/ Terrestrial Cultural	Northern	3,4	0.093	11.670	0.797	View looking toward E.L Field Powerhouse, vegetation growing on bedrock along the south side of the canal
94	Mixed	Earthen/ Terrestrial Cultural	Northern	4	0.034	11.670	0.291	View looking west toward the E.L. Field Powerhouse from the NPS walking trail; vegetation is growing on bedrock along the south side of the canal
VP-1[4]	Scrub-Shrub	Block Wall	Eastern	12	N/A	4.026	N/A	Vegetation includes a single shrub growing out of the canal wall below the brick building and sparse herbaceous species
VP-2	Scrub-Shrub	Block Wall/Concrete/Stone Wall Mix	Eastern	12	N/A	4.026	N/A	Two tree of heaven at 1 inch DBH are growing out of the canal wall
VP-3	Scrub-Shrub	Block Wall/Concrete/Stone Wall Mix	Eastern	16	N/A	4.026	N/A	A single maple tree and a single elm tree are growing out of the canal wall
VP-4[4]	Scrub-Shrub	Stone Wall	Pawtucket	16	N/A	19.630	N/A	A multi-trunked clump of trees, approximately 6 to 8 feet tall, are growing out of canal wall
VP-5	Trees	Stone Wall	Pawtucket	16	N/A	19.630	N/A	A single small hardwood tree, approximately 6 feet tall, is growing out of the canal wall at toe of wall
VP-6	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Pawtucket	16	N/A	19.630	N/A	A single, small elm, approximately 4 feet tall, is growing out of canal wall/piping along wall
VP-7	Trees	Block Wall/Concrete/Stone Wall Mix	Pawtucket	16	N/A	19.630	N/A	One birch at 3 inches DBH is growing out of the canal wall
VP-8	Herbaceous	Block Wall/Concrete/Stone Wall Mix	Hamilton	20	N/A	2.005	N/A	One tree of heaven, approximately 4 feet tall, is growing at the edge of the lock platform

Vegetation Polygon/ Point Identifier	Dominant Vegetation Type[1]	Dominant Shoreline Type[2]	Canal[3]	Mapbook Sheet(s)	Polygon Acreage	Canal Acreage	% of Polygon	Field Notes Summary/Comments
VP-9	Scrub-Shrub	Concrete	Pawtucket	20	N/A	19.630	N/A	One tree of heaven growing out of a concrete portion of the canal wall, at top of the wall along sidewalk
VP-10[4]	Trees	Block Wall	Northern	6	N/A	11.670	N/A	Small maple growing out of the canal wall, near top of wall
VP-11[4]	Scrub-Shrub	Block Wall	Western	6	N/A	5.510	N/A	A small clump of silver maples are growing out of canal wall
VP-12	Scrub-Shrub	Concrete	Western	6	N/A	5.510	N/A	A small clump of mulberry growing out of canal wall
VP-13[4]	Herbaceous	Block Wall	Western	6	N/A	5.510	N/A	One tree of heaven growing out of canal wall
VP-14[4]	Mixed	Block Wall	Western	7	N/A	5.510	N/A	A small clump of shrubs growing out of canal wall
VP-15	Trees	Block Wall	Pawtucket	18	N/A	19.630	N/A	A single ash tree growing out of the canal wall
VP-16[4]	Trees	Block Wall	Pawtucket	18	N/A	19.630	N/A	Large tree growing out of canal wall
VP-17	Trees	Block Wall	Pawtucket	18	N/A	19.630	N/A	Small tree growing out of canal wall near outfall
VP-18	Scrub-Shrub	Block Wall	Northern	6	N/A	11.670	N/A	Two small shrubs growing on top of the canal wall
VP-19	Scrub-Shrub	Block Wall	Northern	5,6	N/A	11.670	N/A	One tree, likely dead, growing out of canal wall
VP-20	Scrub-Shrub	Block Wall	Northern	5	N/A	11.670	N/A	A single shrub (next to smaller shrubs) growing out of the canal wall
VP-21	Scrub-Shrub	Block Wall	Northern	6	N/A	11.670	N/A	Tree of heaven and oriental bittersweet growing out canal wall
VP-22	Trees	Block Wall	Northern	6	N/A	11.670	N/A	One small maple growing out of the canal wall
VP-23	Trees	Block Wall	Northern	6	N/A	11.670	N/A	Small clump of birch trees growing out of canal wall
VP-24	Trees	Block Wall	Northern	6	N/A	11.670	N/A	One small birch tree growing out of canal wall

Notes:

***** In instances where a polygon was recorded in more than one canal, for reporting purposes, it was separated into two distinct polygons that were each given a unique polygon identifier (e.g., 18 and 18a).

N/A = Not Applicable. Vegetation Points (VPs) were used to identify areas along canal walls where a single vegetation type point was recorded. VPs were not included in vegetation category percentage calculations because they represent a single point on the canal wall and were not assigned area estimates**.**

[1] Dominant Vegetation Types:
Herbaceous - Characterized by primarily herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants less than 3 feet tall.
Scrub-Shrub - Consists of woody plants less than 3 inches diameter at breast height (DBH) and greater than or equal to 3 feet tall.
Trees - Consists of woody plants 3 inches or more in DBH, regardless of height. This vegetation type description was generally used to describe areas along canal walls where only a few trees were growing in a clump.
Forested - Characterized as a relatively large area that consists of primarily trees and underbrush.
Mixed - Characterized by a mosaic of herbaceous, scrub-shrub, and/or trees.

[2] Dominant Shoreline Types:
Block Wall - Canal walls primarily dominated by placed, generally uniformly-sized blocks with concrete caps or block alone.
Concrete - Canal walls primarily dominated by concrete, with various types of cements and aggregate.
Earthen/Terrestrial Cultural - Canal walls generally dominated by earthen embankments (forested and unforested) and areas of exposed bedrock. Some of these areas (e.g., riprapped areas) have been created and/or maintained by human activities.
Stone Wall - Canal walls primarily dominated by placed, generally non-uniformly-sized blocks with concrete caps or blocks alone.
Block Wall/Concrete/Stone Wall Mix - Areas of canal walls predominantly composed of a conglomeration of block wall, concrete, or stone wall at varying quantities.

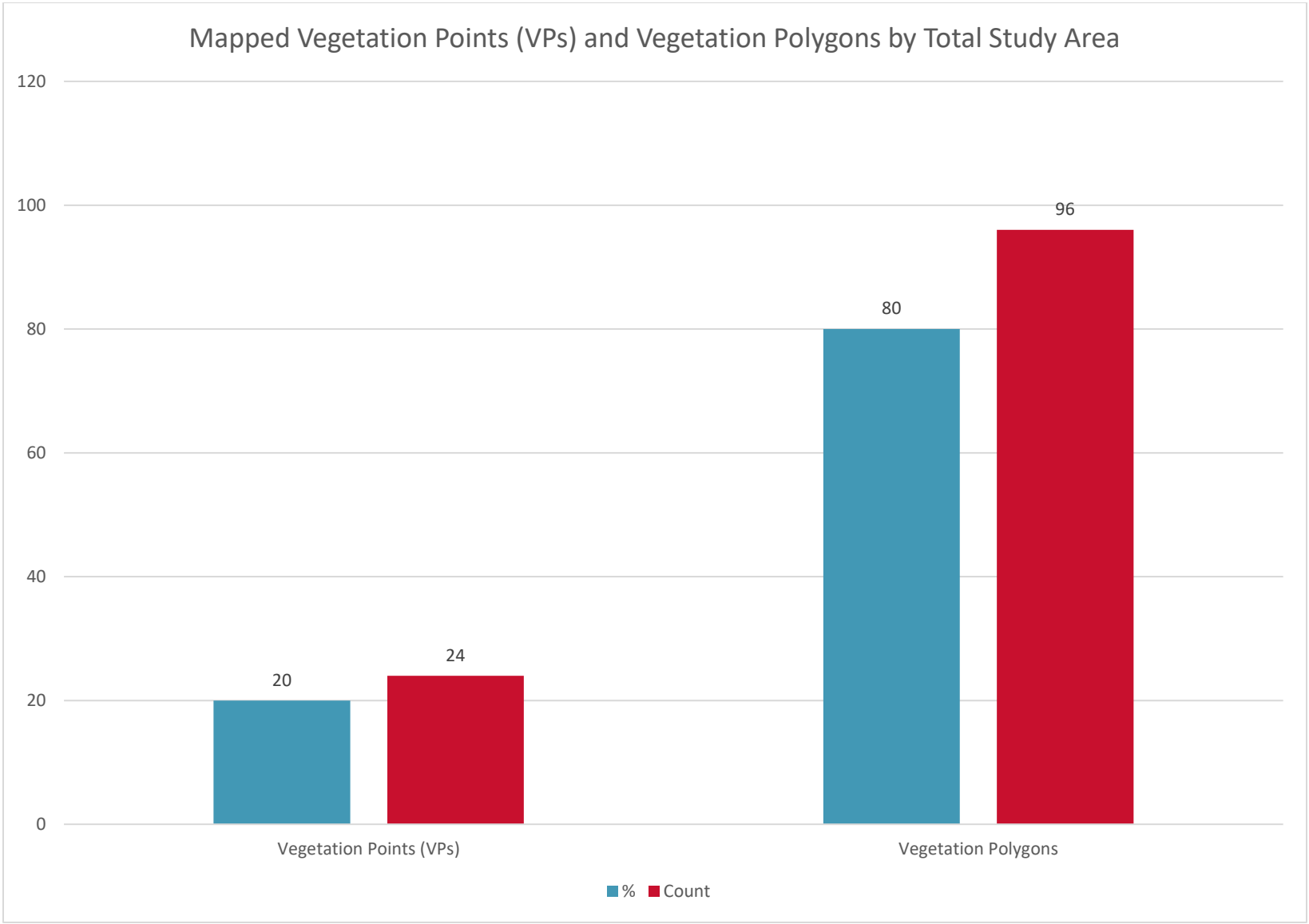
[3] The vegetation survey was conducted between September 25 and 27, 2019. For the purposes of examining vegetation type distribution, the study area was divided into the six canals associated with the Lowell Project canal system including: 1) Pawtucket Canal; 2) Northern Canal; 3) Western Canal; 4) Merrimack Canal; 5) Eastern Canal; and 6) Hamilton Canal.

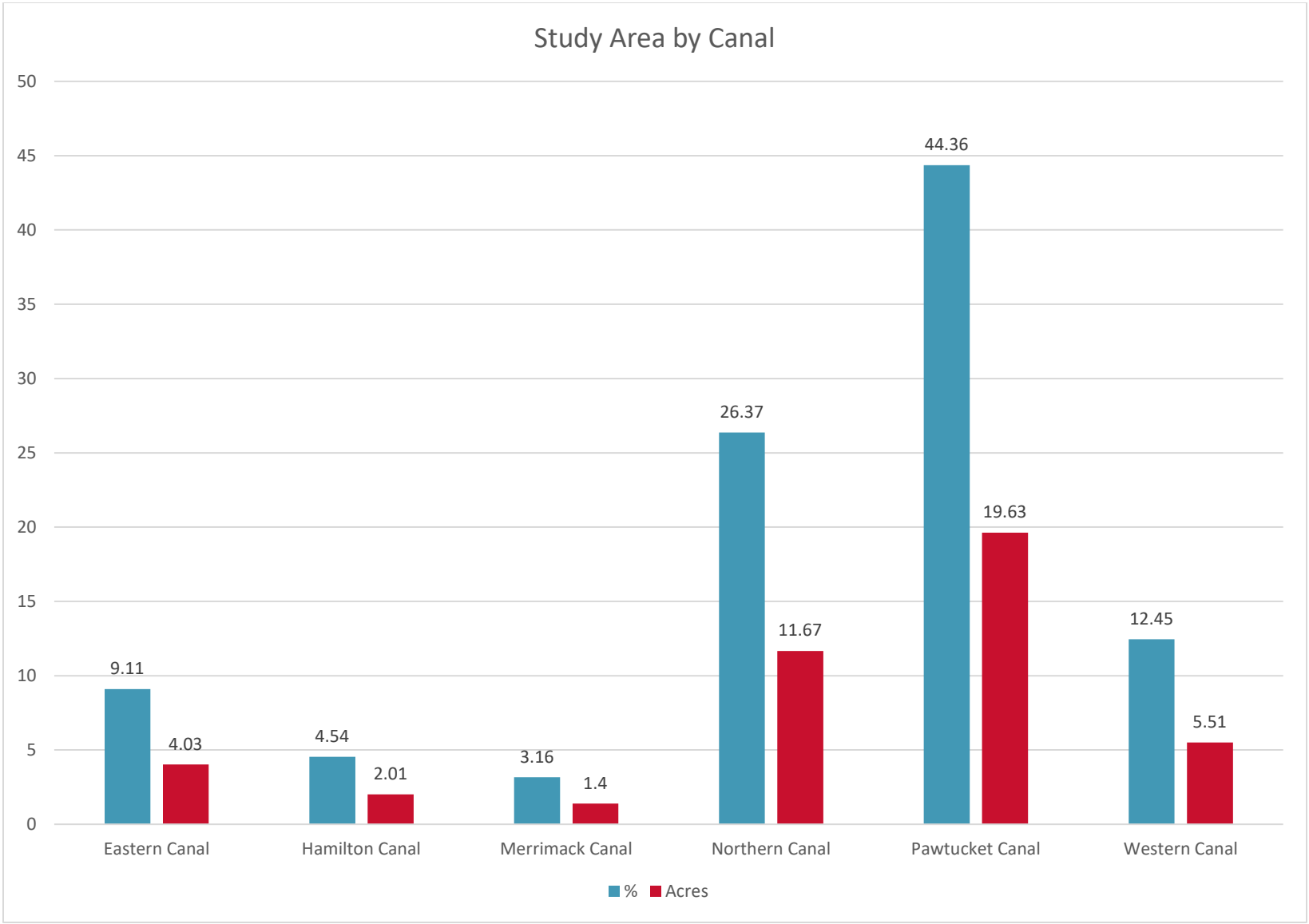
[4]This Vegetation Polygon/Point Identifier has a photograph(s) included in Appendix J.

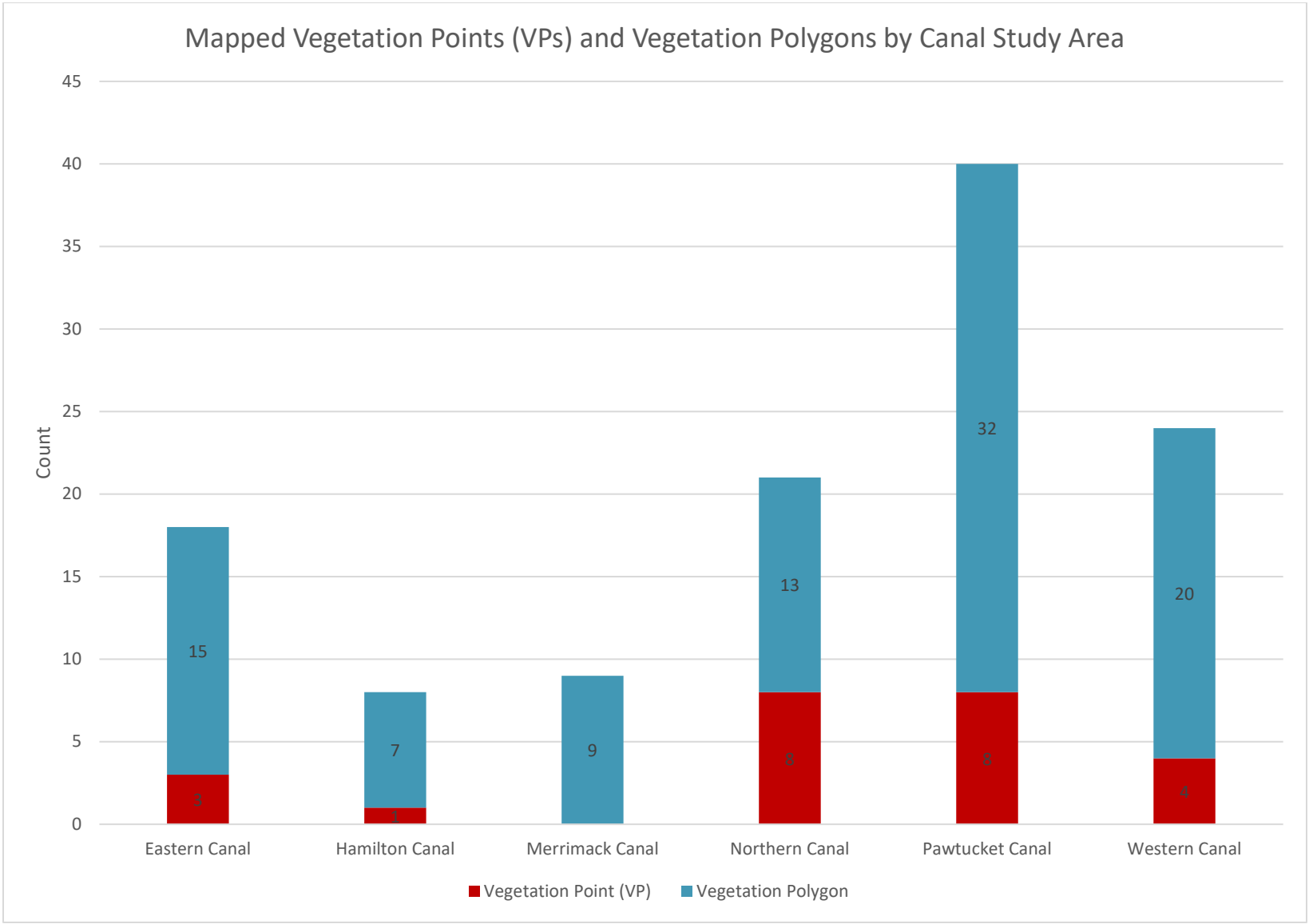
[5] Vegetation Polygon/Point Identifier 28 was not included in final results.

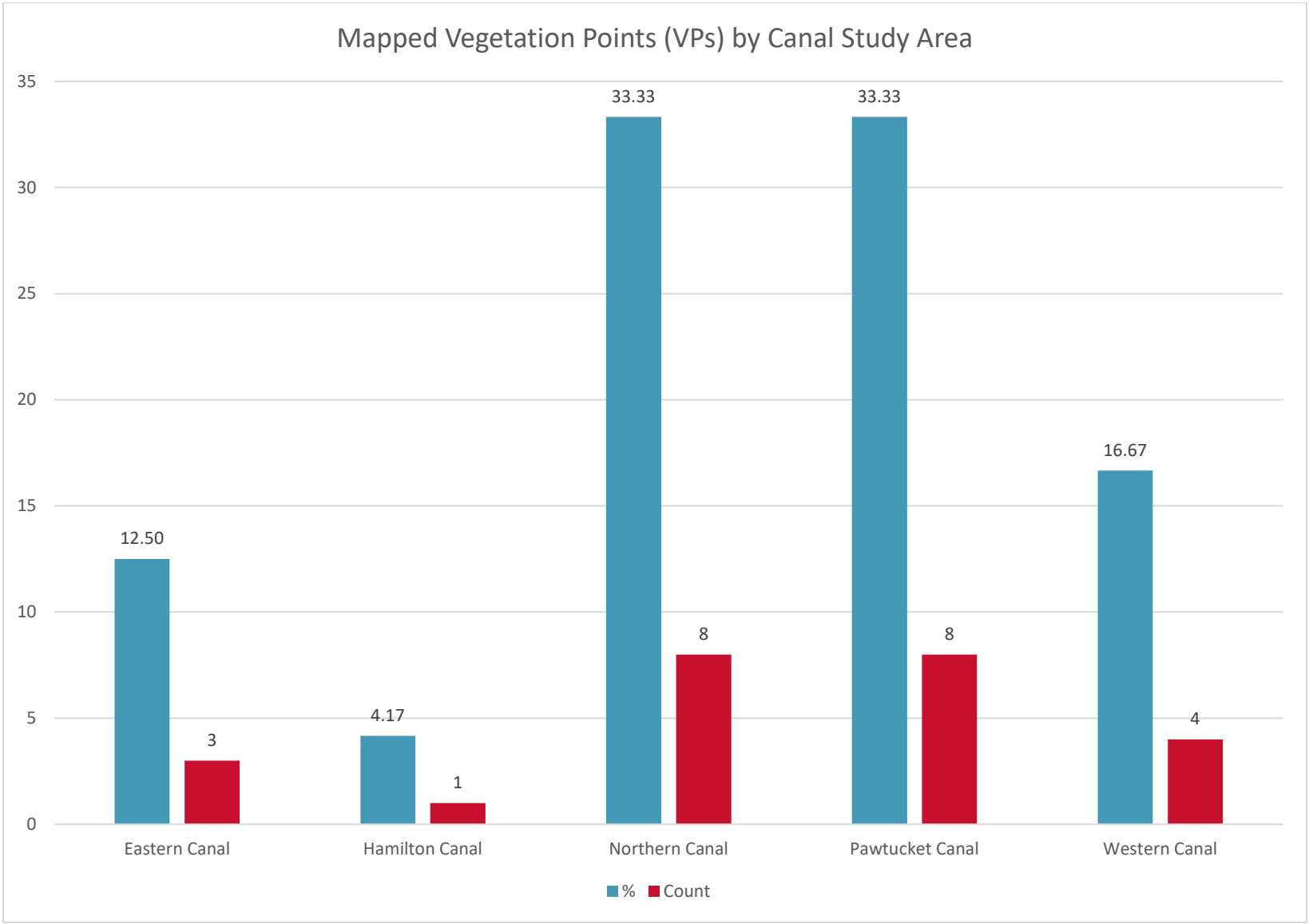
Appendix I - Visual Survey for Vegetation Growth Data Summary

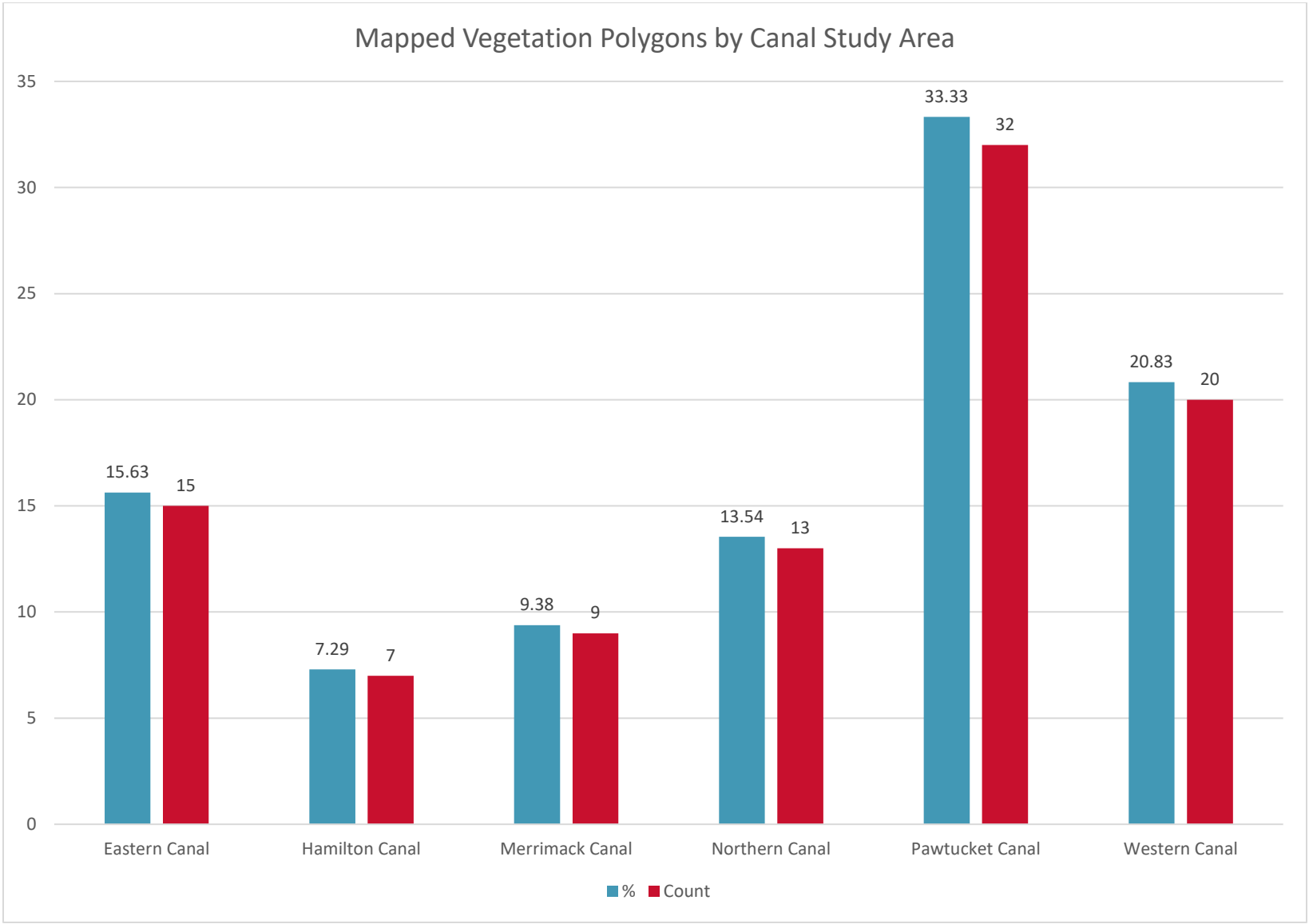
Summary of Visual Survey for Vegetation Growth Data

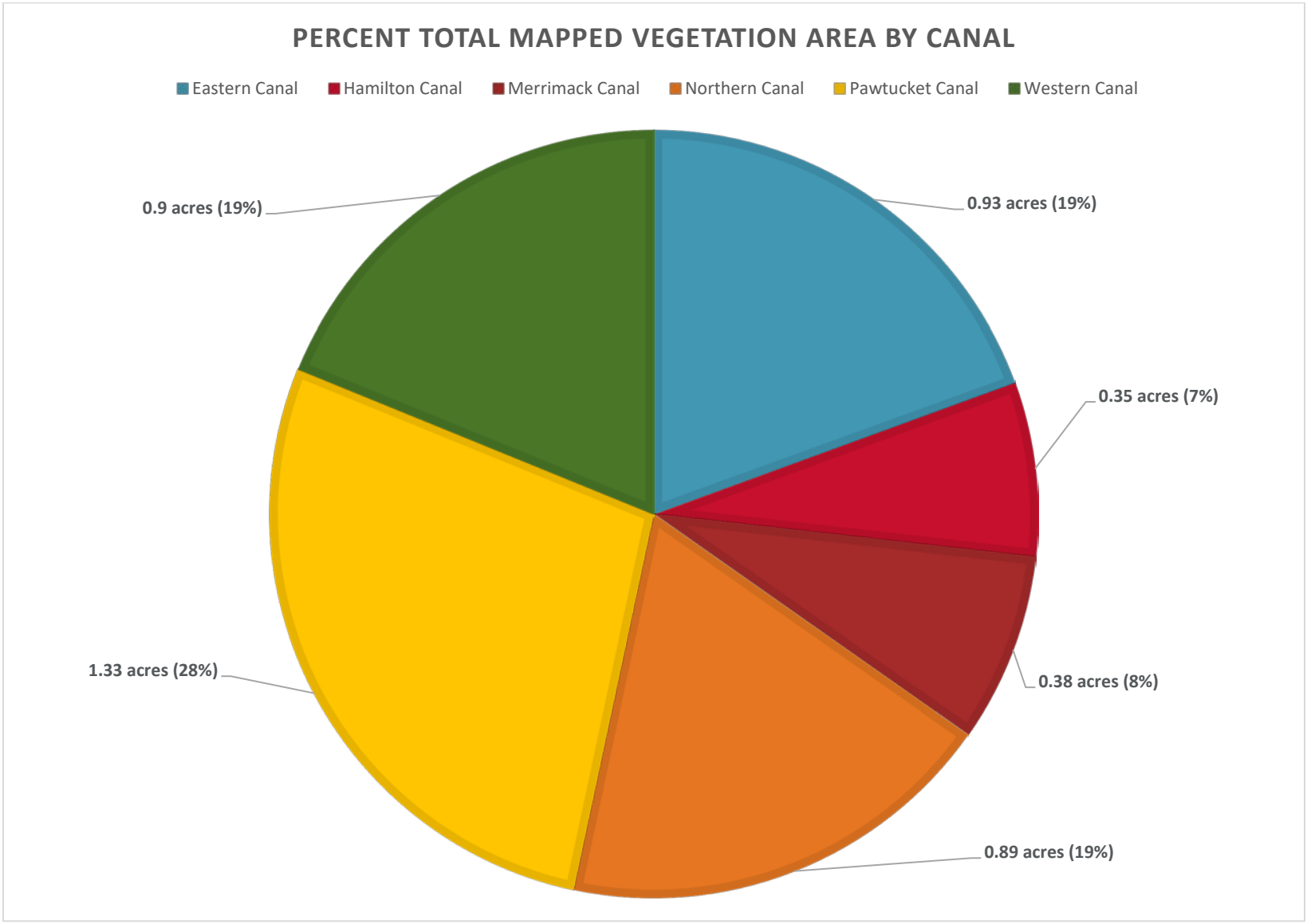

Mapped Vegetation Points (VPs) and Vegetation Polygons by Total Study Area
120
100
80
60
40
20
0
20
24
80
96
Vegetation Points (VPs)
Vegetation Polygons
% Count


Study Area by Canal
50
45
40
35
30
25
20
15
10
5
0
9.11
4.03
4.54
2.01
3.16
1.4
26.37
11.67
44.36
19.63
12.45
5.51
Eastern Canal
Hamilton Canal
Merrimack Canal
Northern Canal
Pawtucket Canal
Western Canal
% Acres

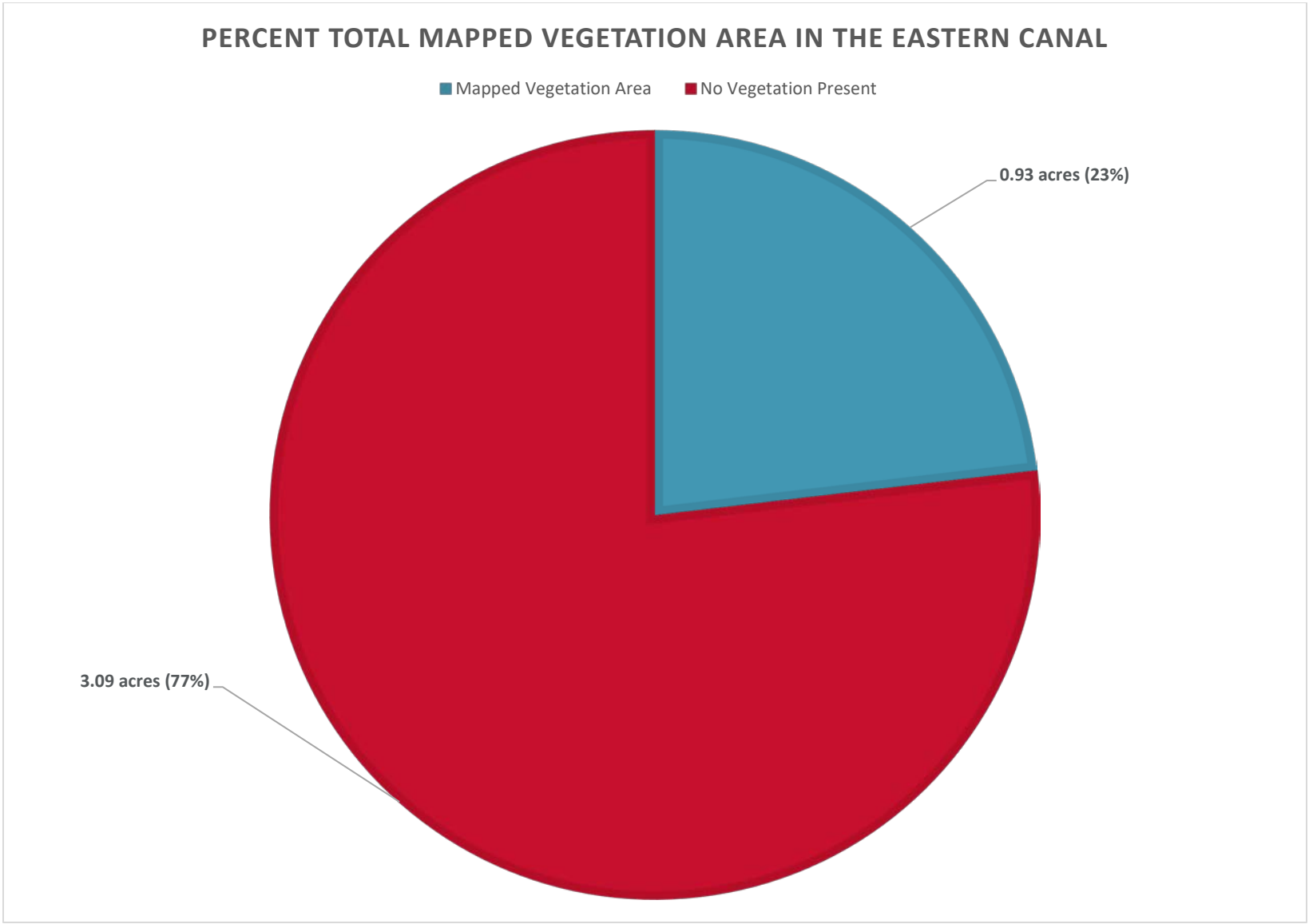

Mapped Vegetation Points (VPs) and Vegetation Polygons by Canal Study Area
Count
45
40
35
30
25
20
15
10
5
0
15
3
7
1
9
13
8
32
8
20
4
Eastern Canal
Hamilton Canal
Merrimack Canal
Northern Canal
Pawtucket Canal
Western Canal
Vegetation Point (VP)
Vegetation Polygon


Mapped Vegetation Points (VPs) by Canal Study Area
35
30
25
20
15
10
5
0
12.50
3
4.17
1
33.33
8
33.33
8
16.67
4
Eastern Canal
Hamilton Canal
Northern Canal
Pawtucket Canal
Western Canal
% Count

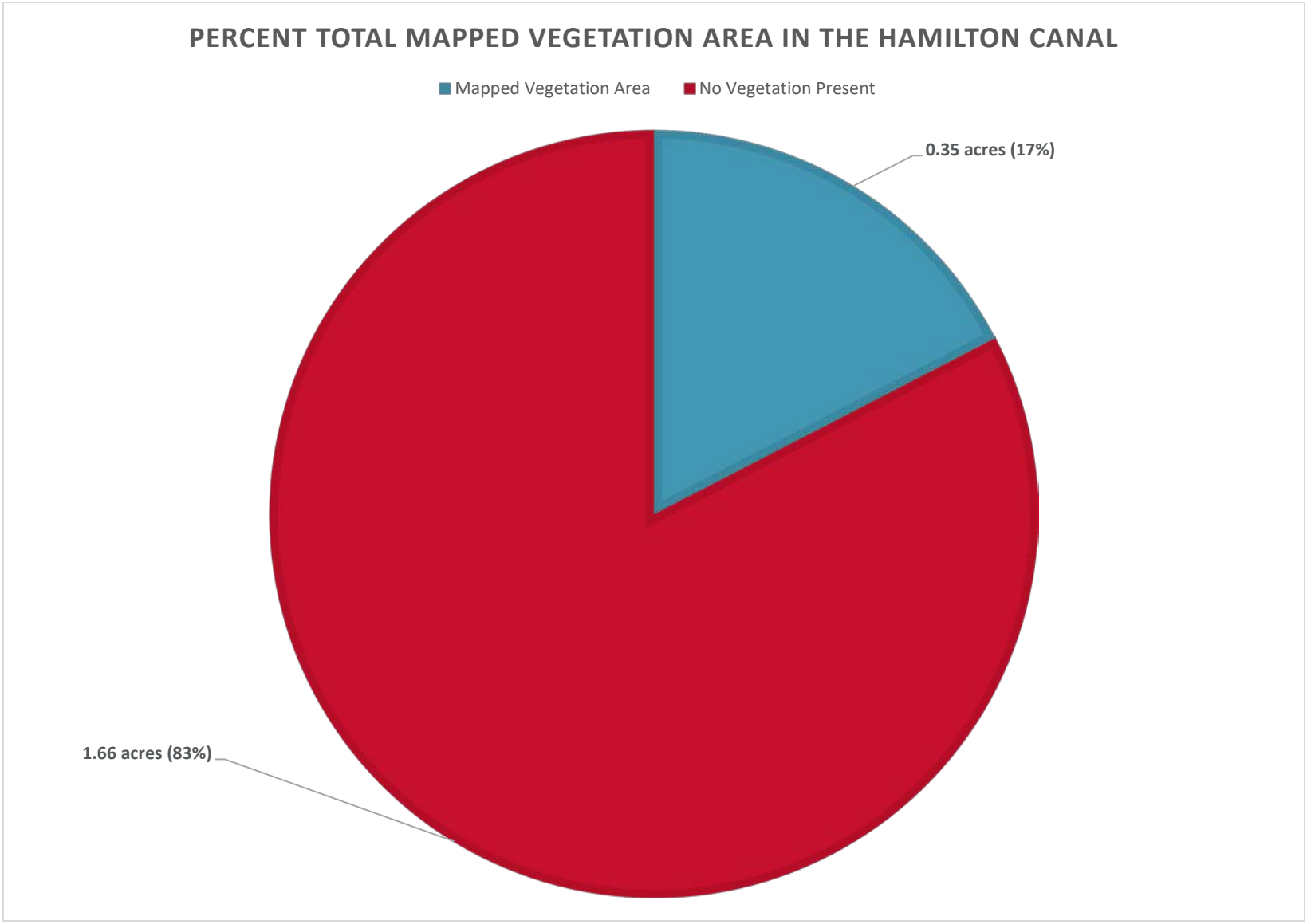

Mapped Vegetation Polygons by Canal Study Area
35
30
25
20
15
10
5
0
15.63
15
7.29
7
9.38
9
13.54
13
33.33
32
20.83
20
Eastern Canal
Hamilton Canal
Merrimack Canal
Northern Canal
Pawtucket Canal
Western Canal
% Count



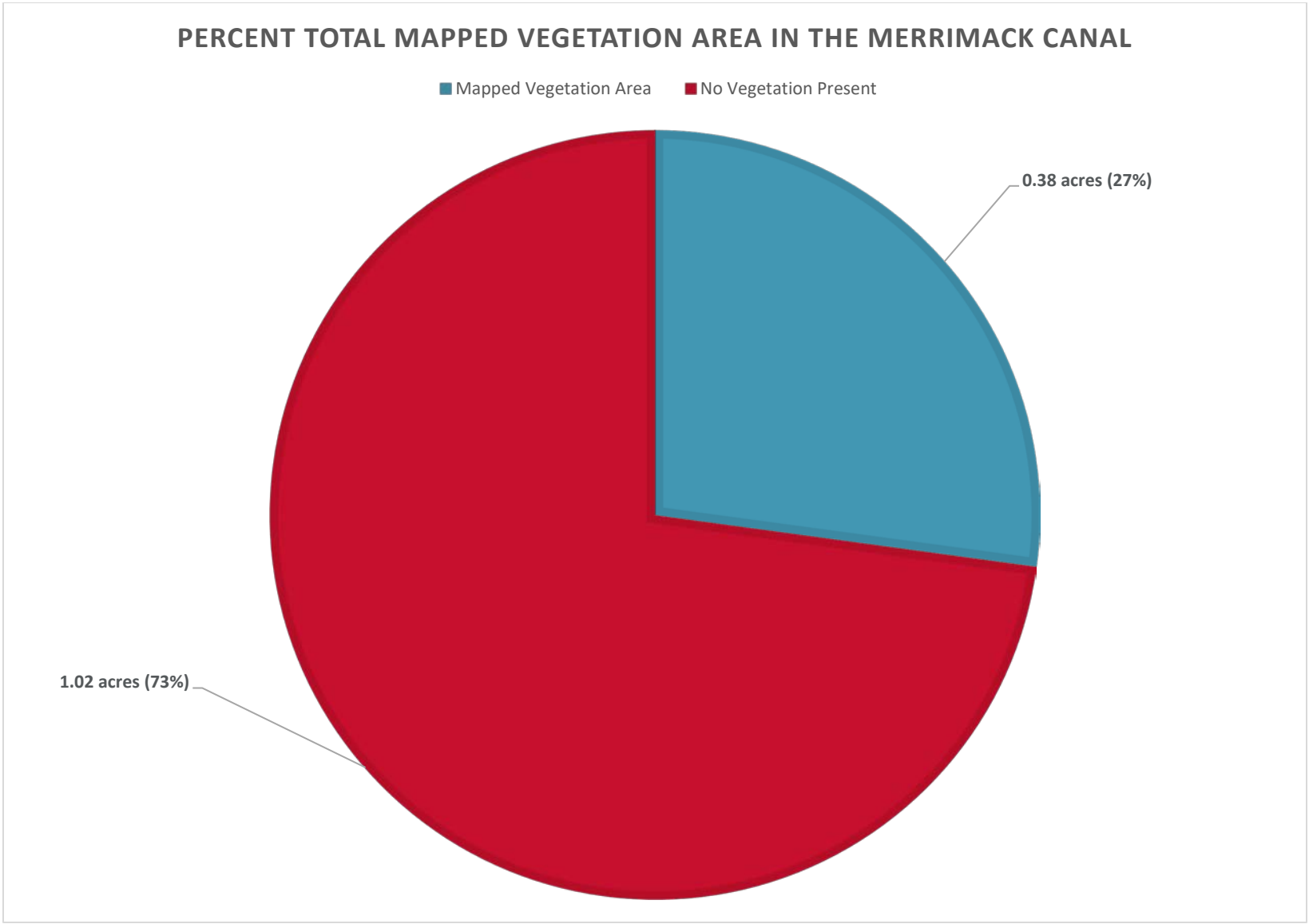
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



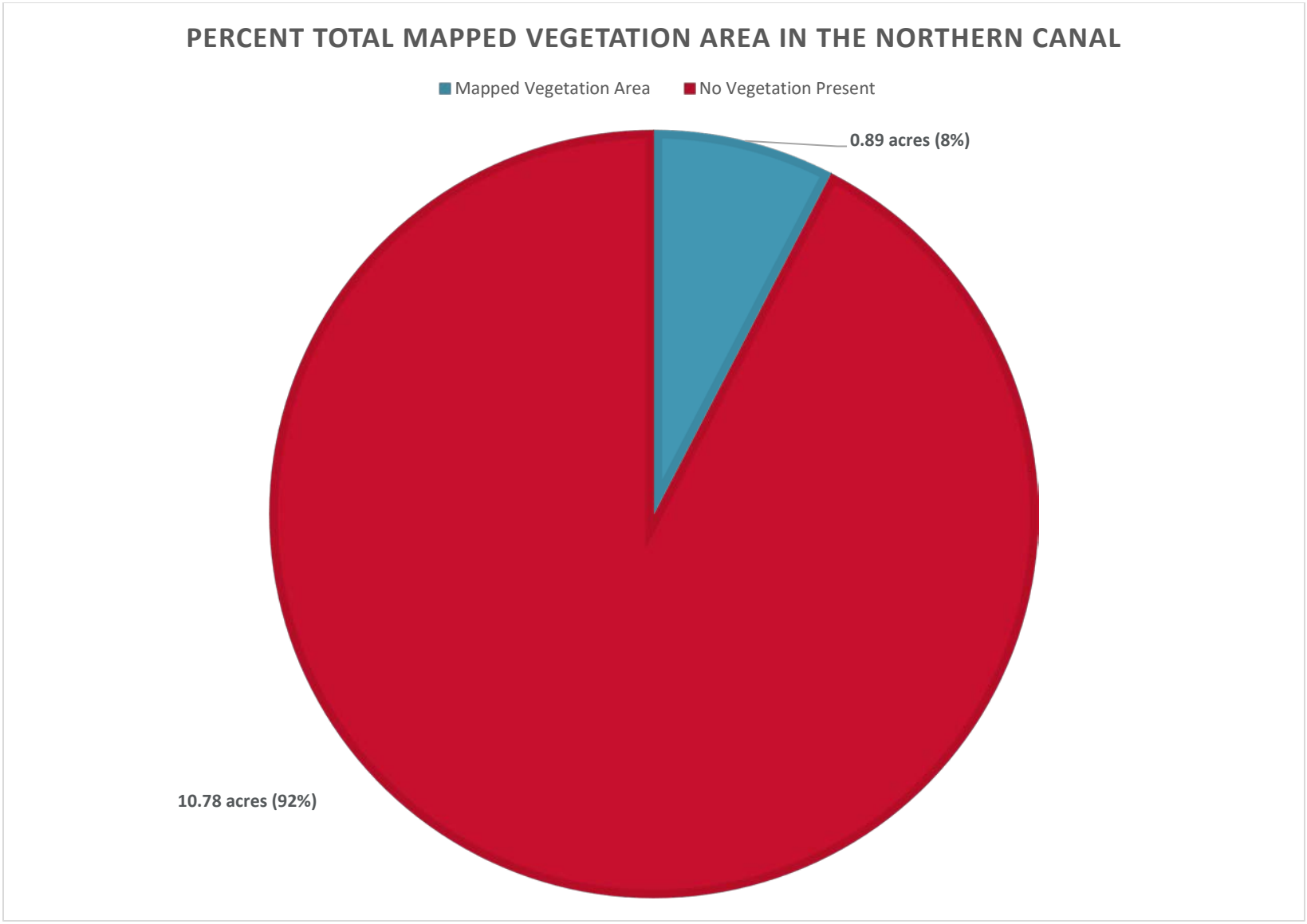
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



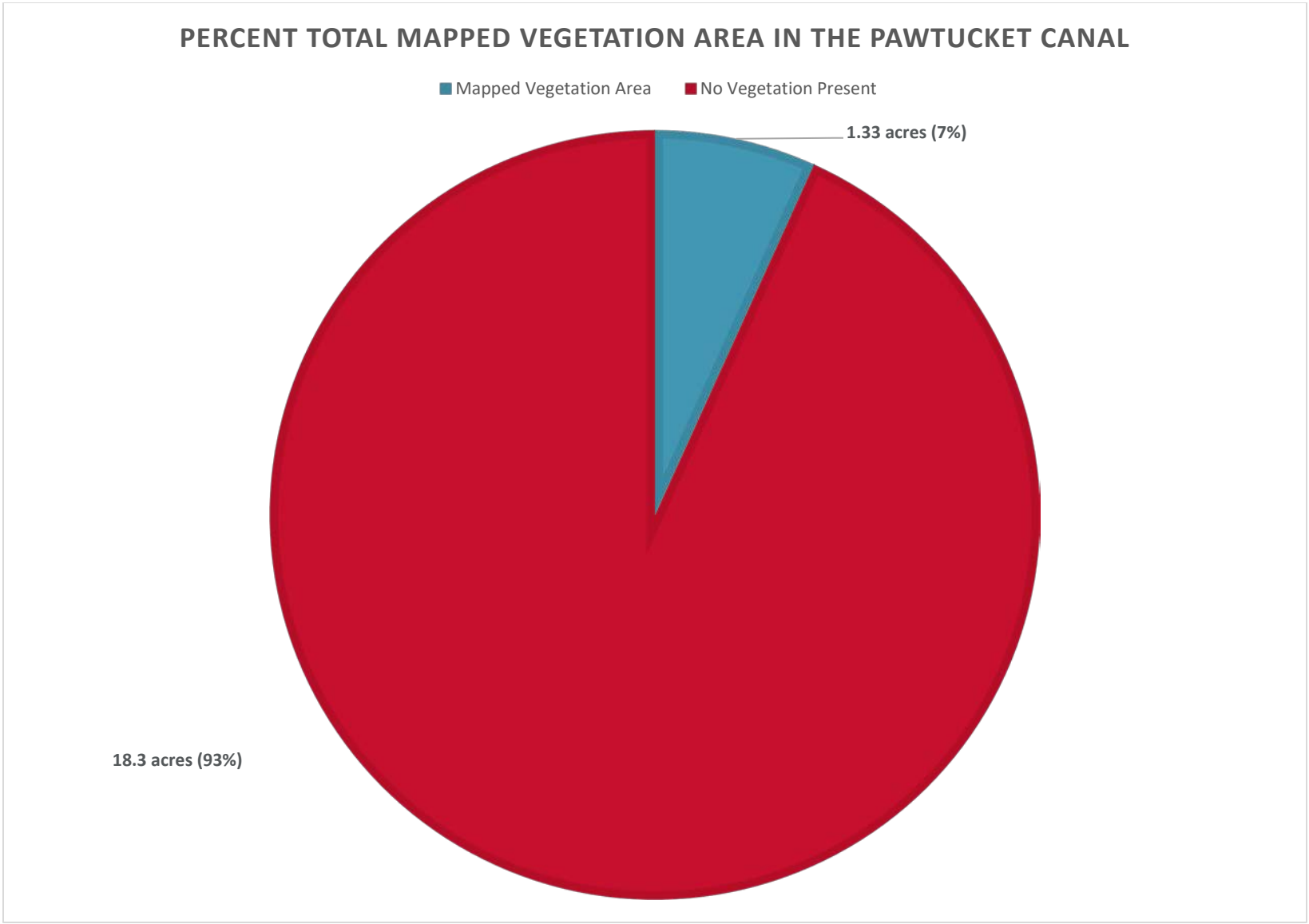
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



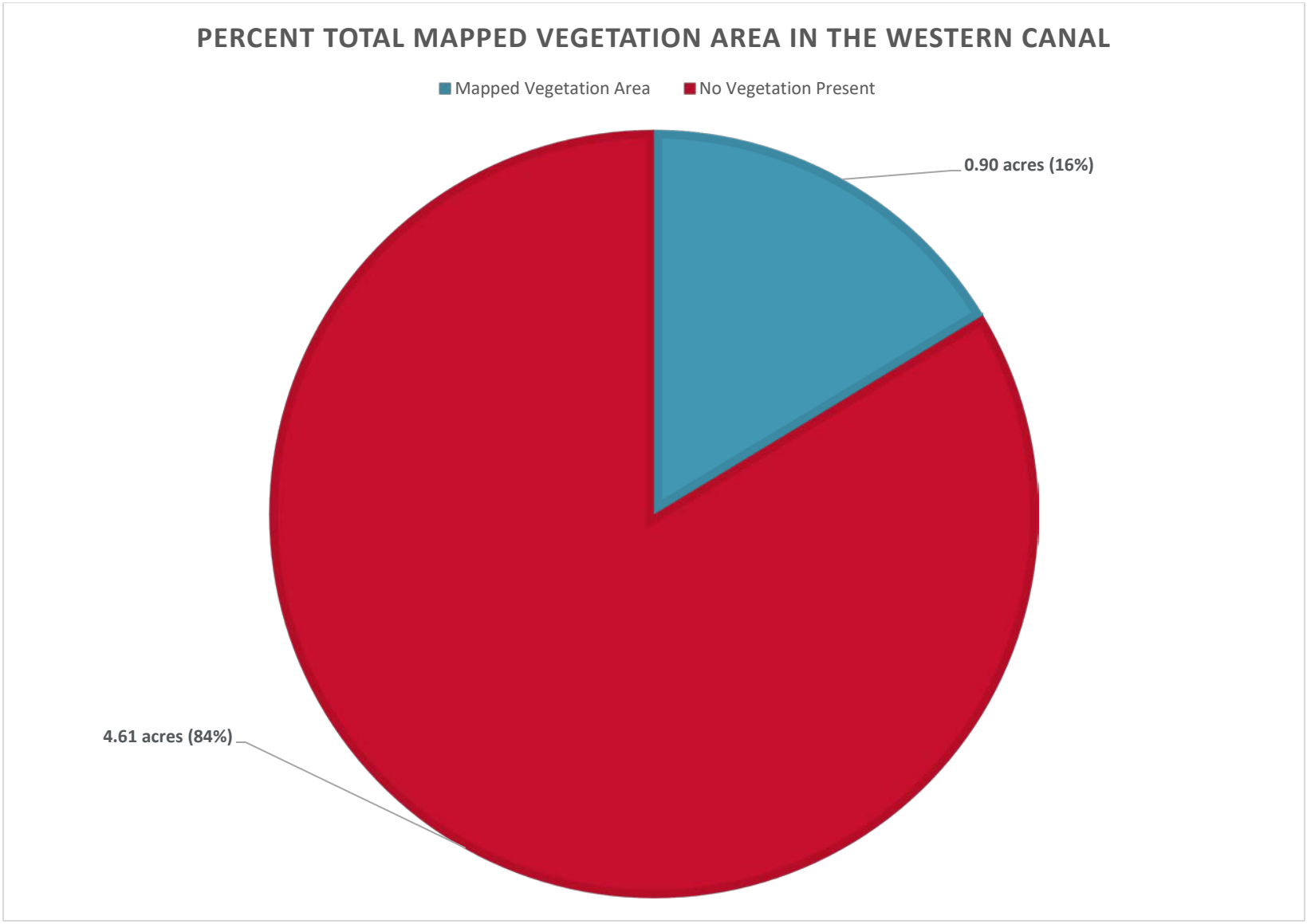
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



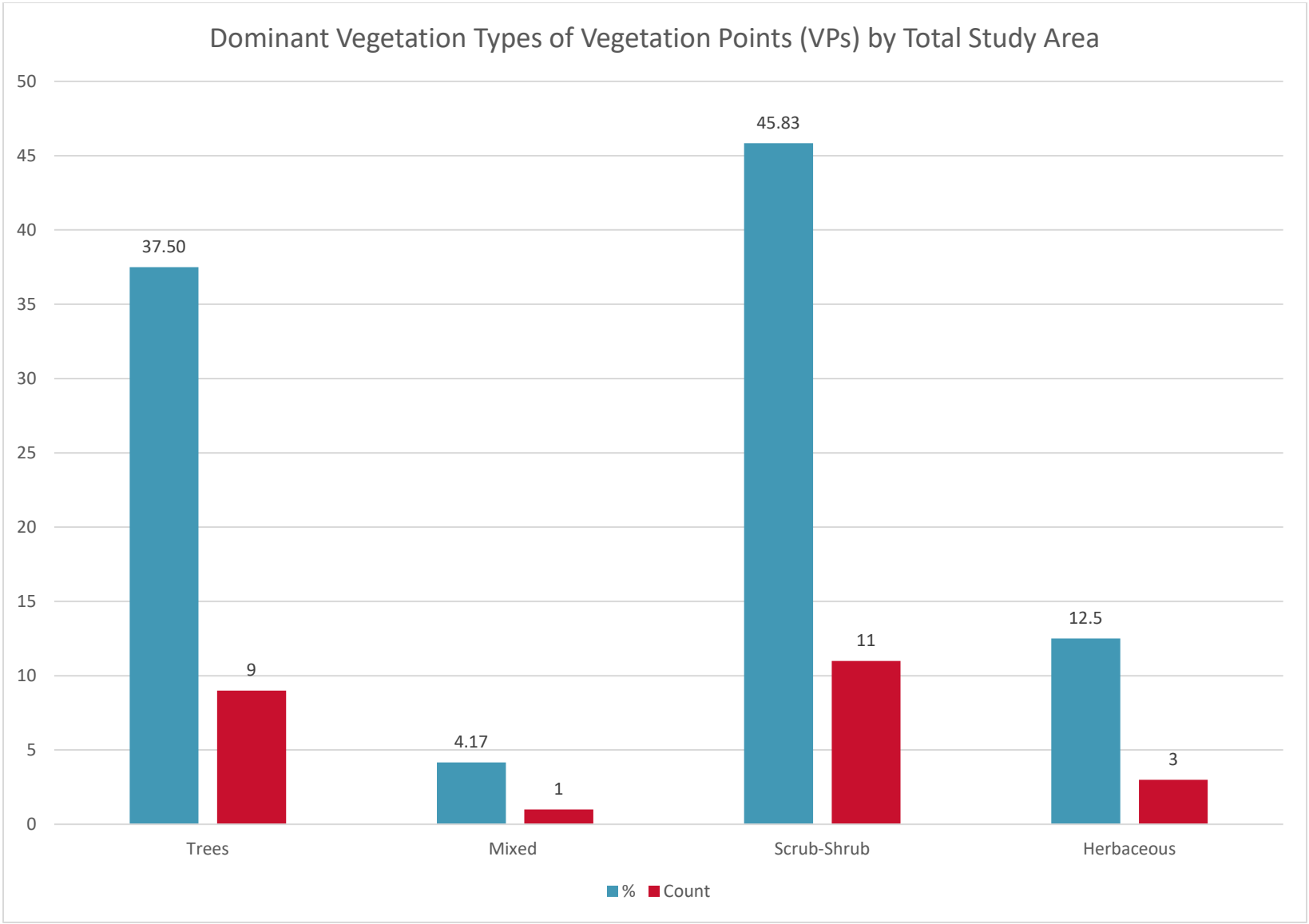
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations

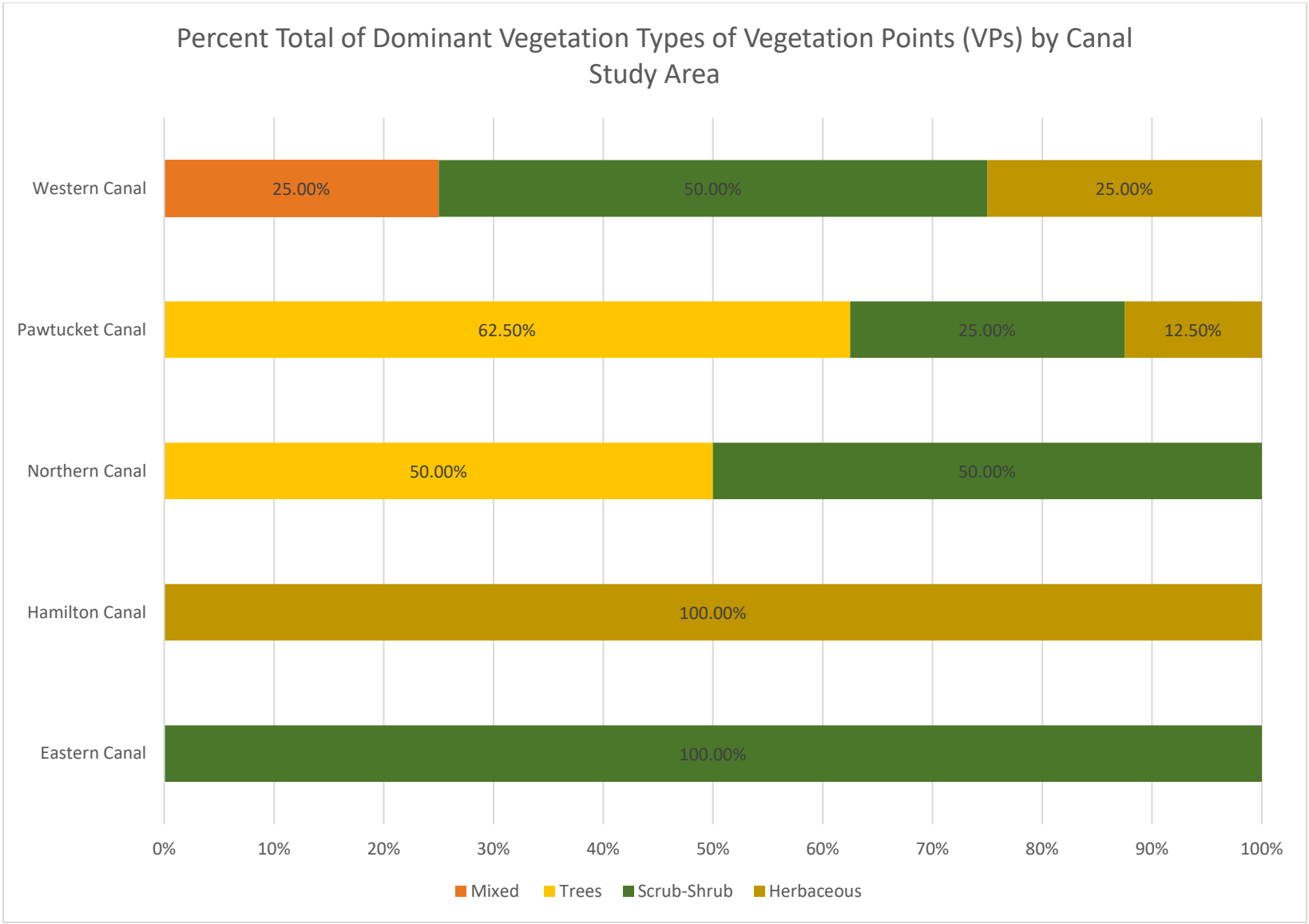


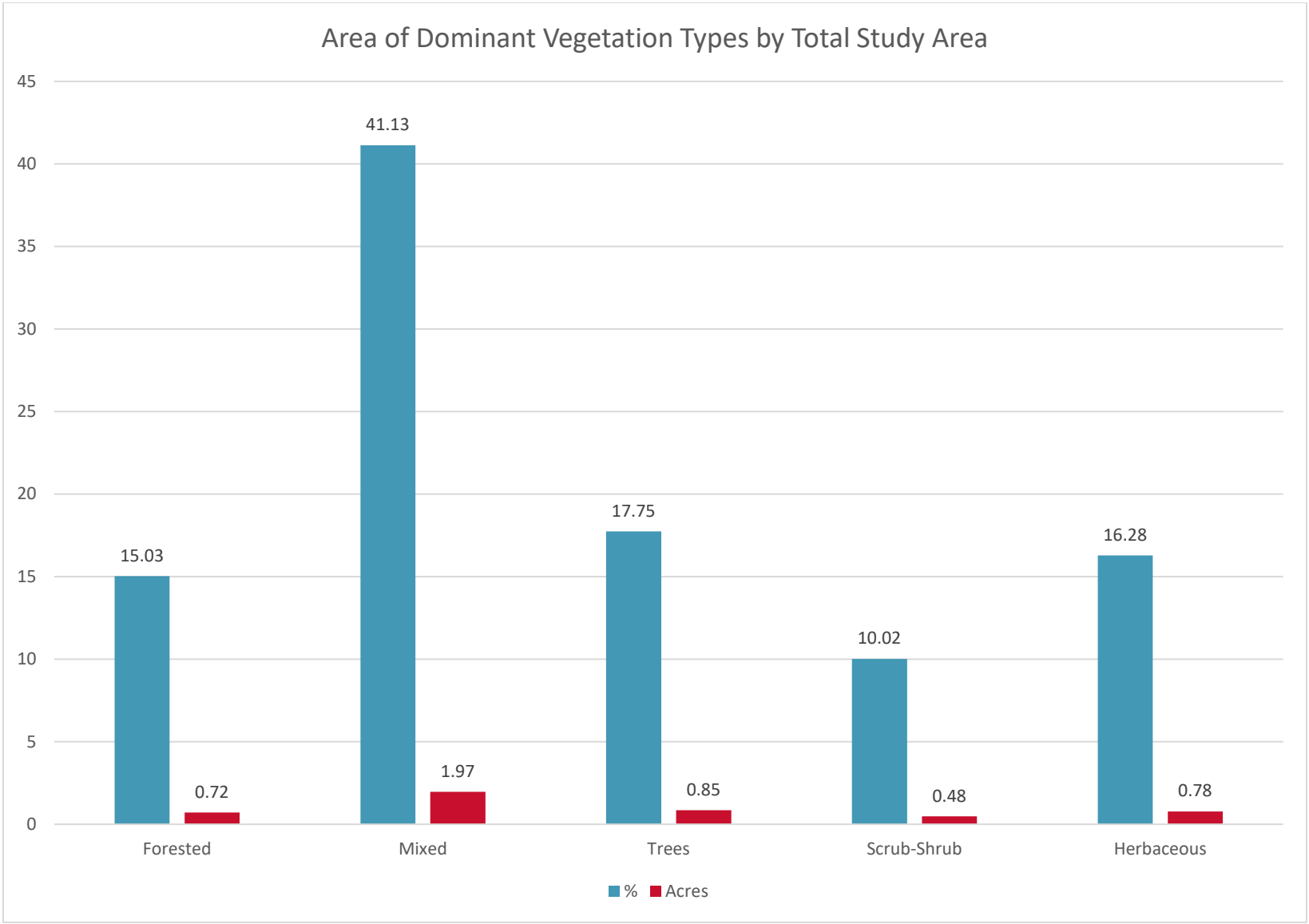
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



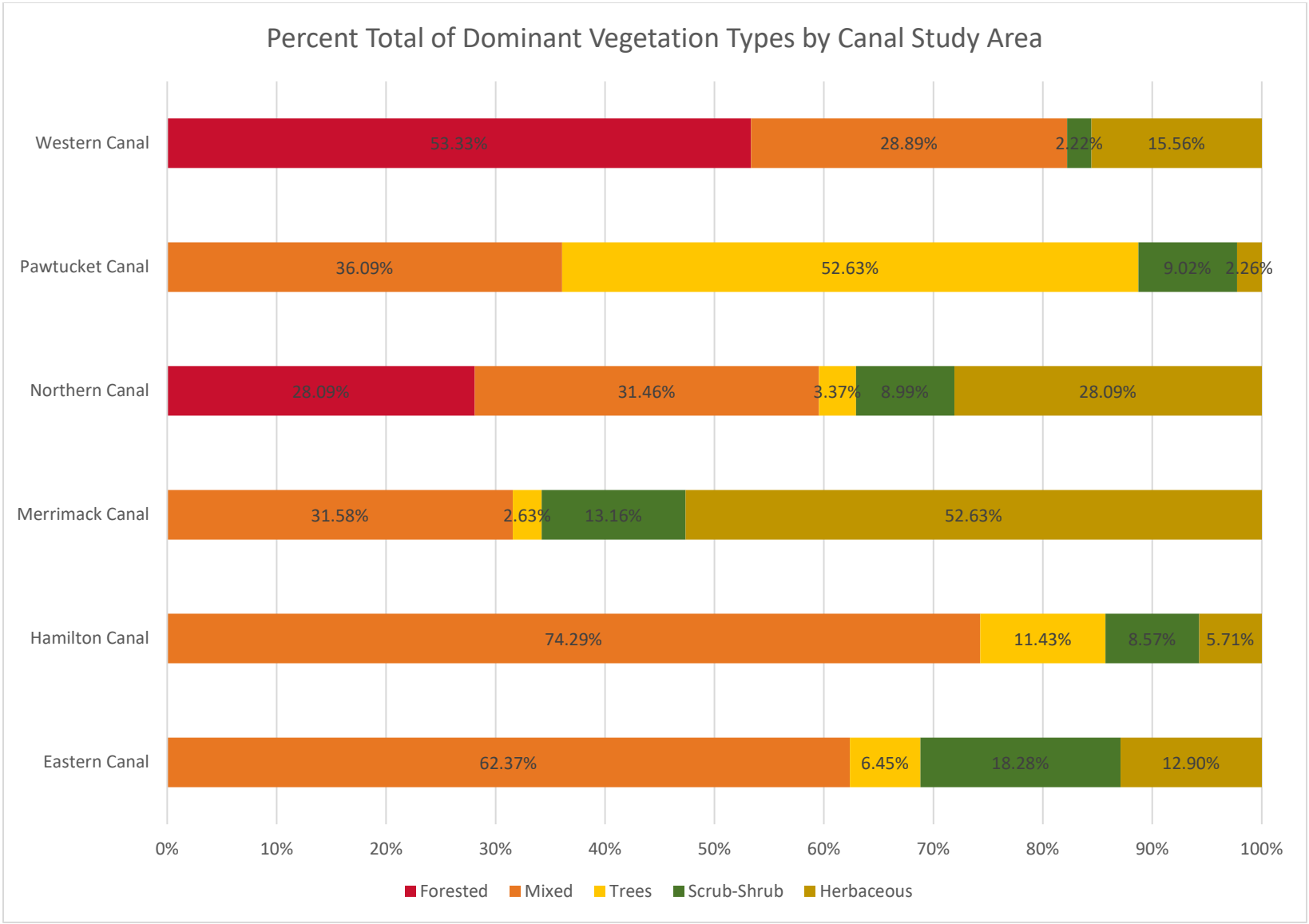
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations


Dominant Vegetation Types of Vegetation Points (VPs) by Total Study Area
50
45
40
35
30
25
20
15
10
5
0
37.50
9
4.17
1
45.83
11
12.5
3
Trees
Mixed
Scrub-Shrub
Herbaceous
% Count

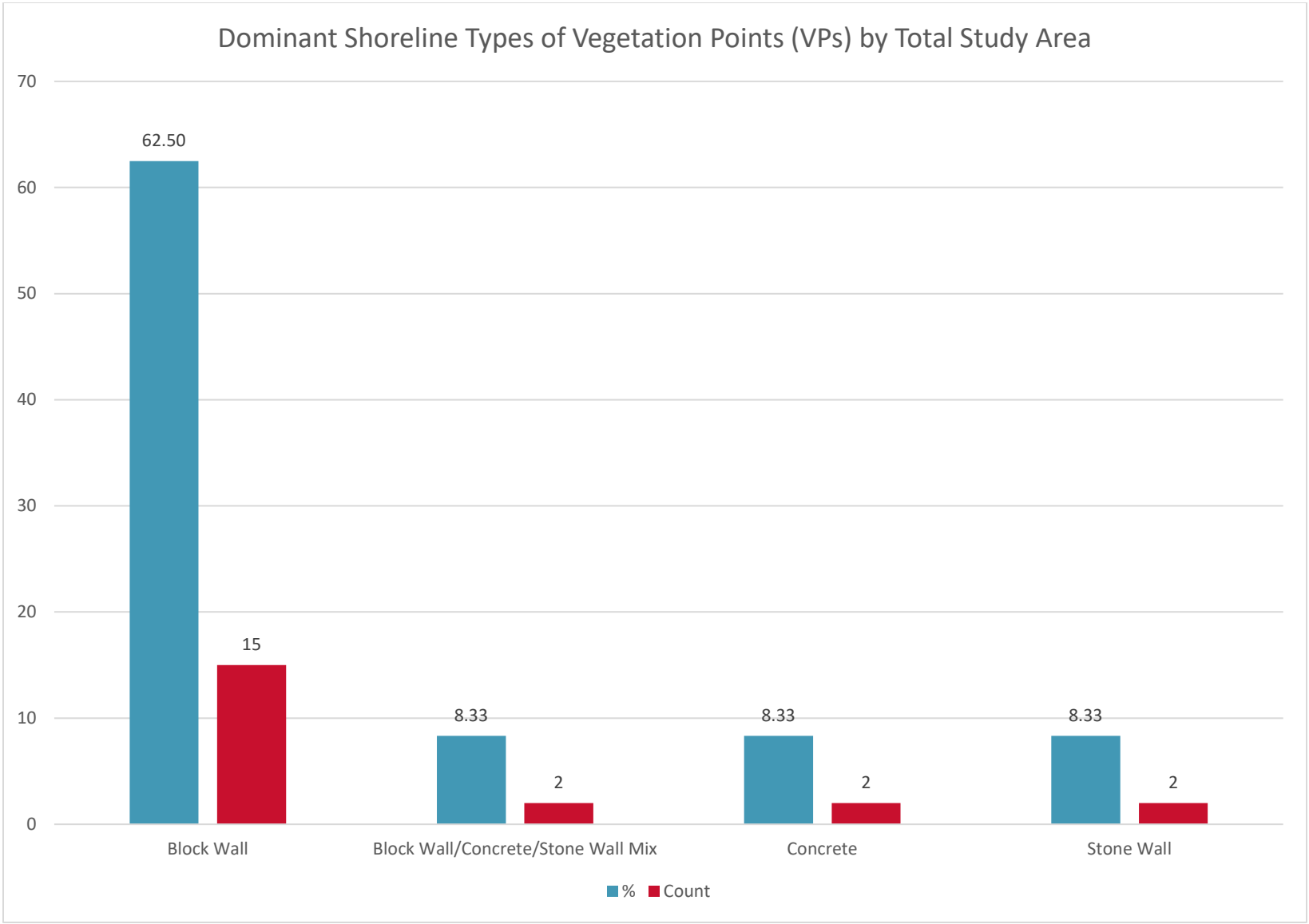

Percent Total of Dominant Vegetation Types of Vegetation Points (VPs) by Canal Study Area
Western Canal
Pawtucket Canal
Northern Canal
Hamilton Canal
Eastern Canal
25.00%
50.00%
25.00%
62.50%
25.00%
12.50%
50.00%
50.00%
100.00%
100.00%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Mixed
Trees
Scrub-Shrub
Herbaceous

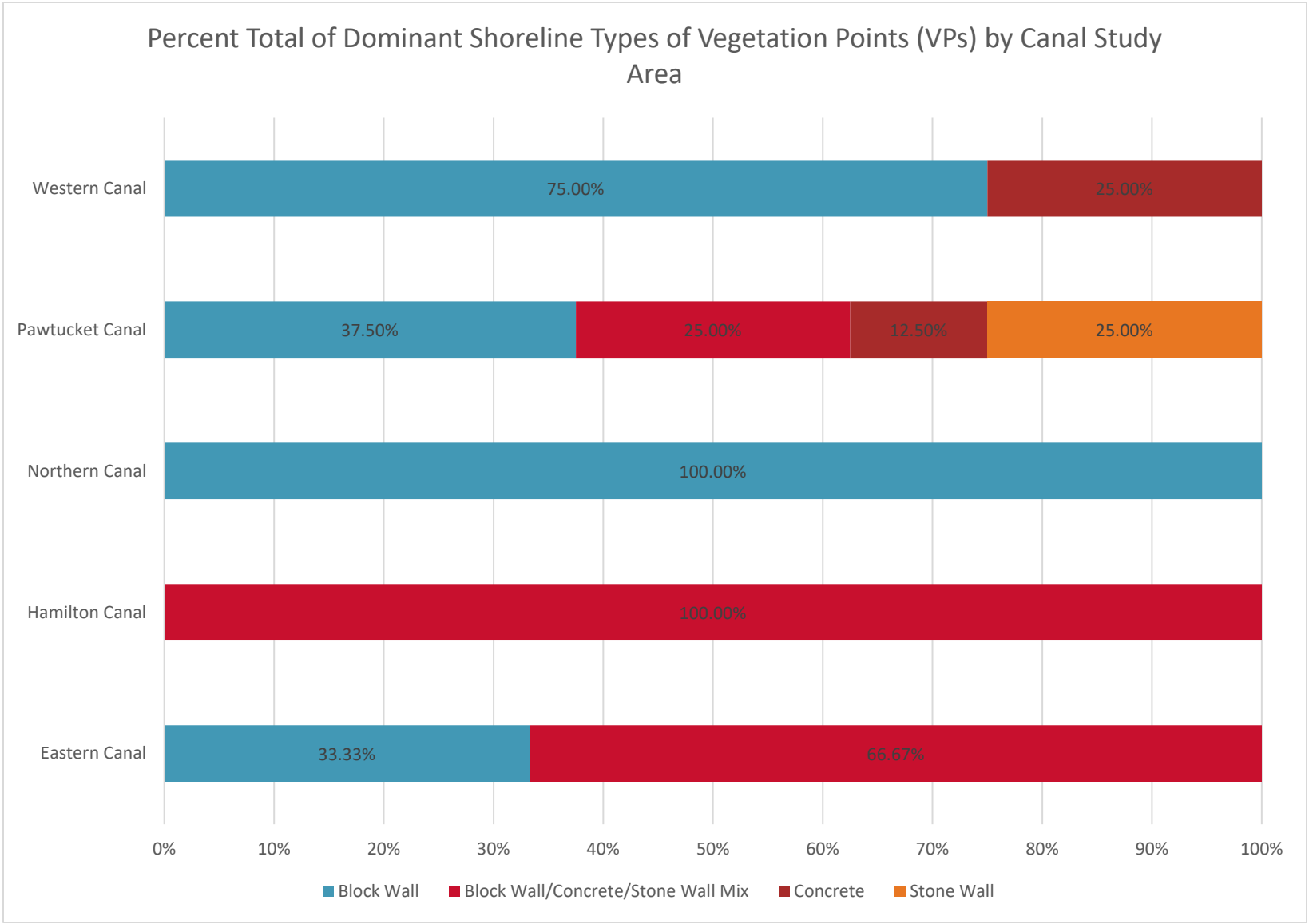


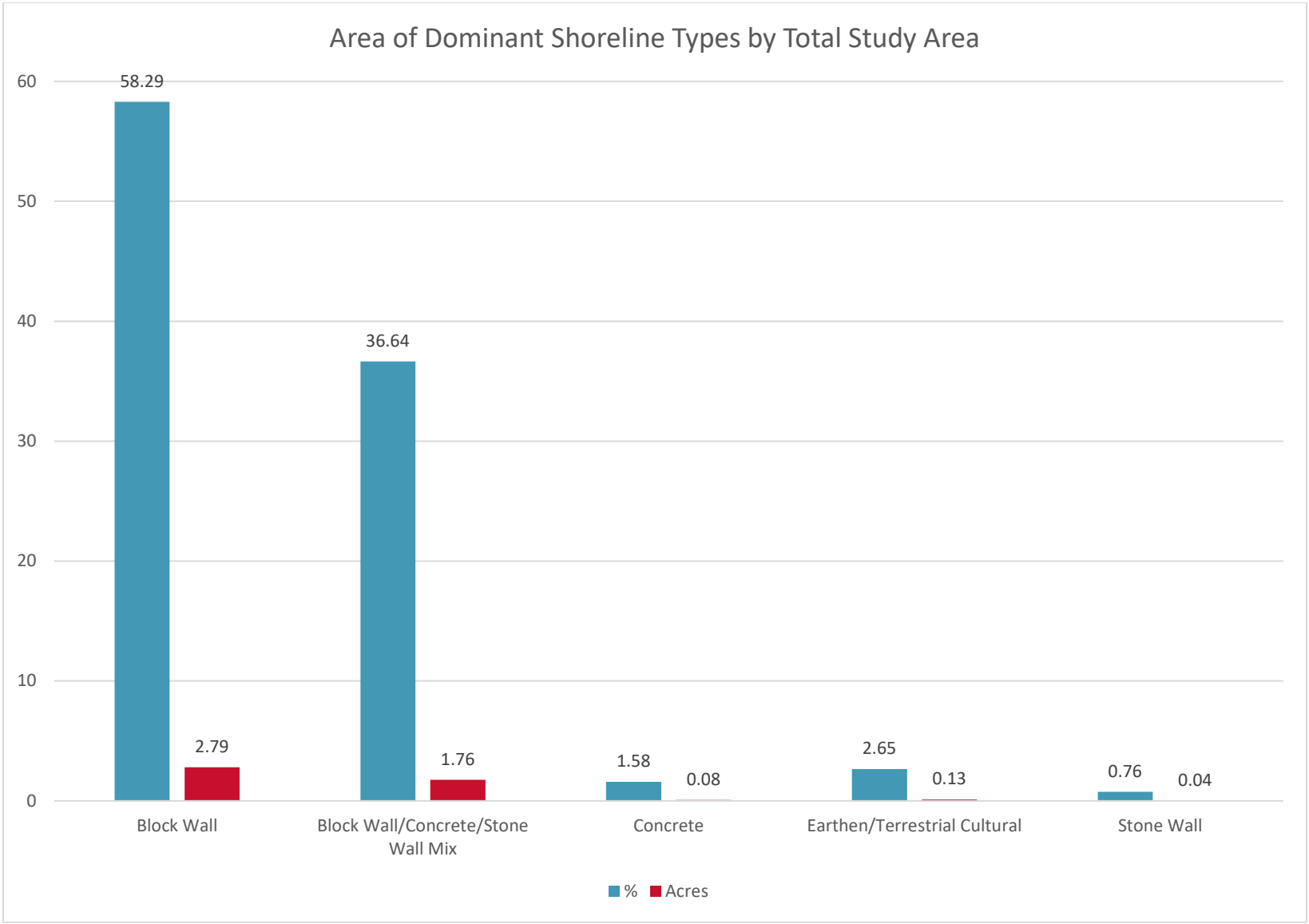
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



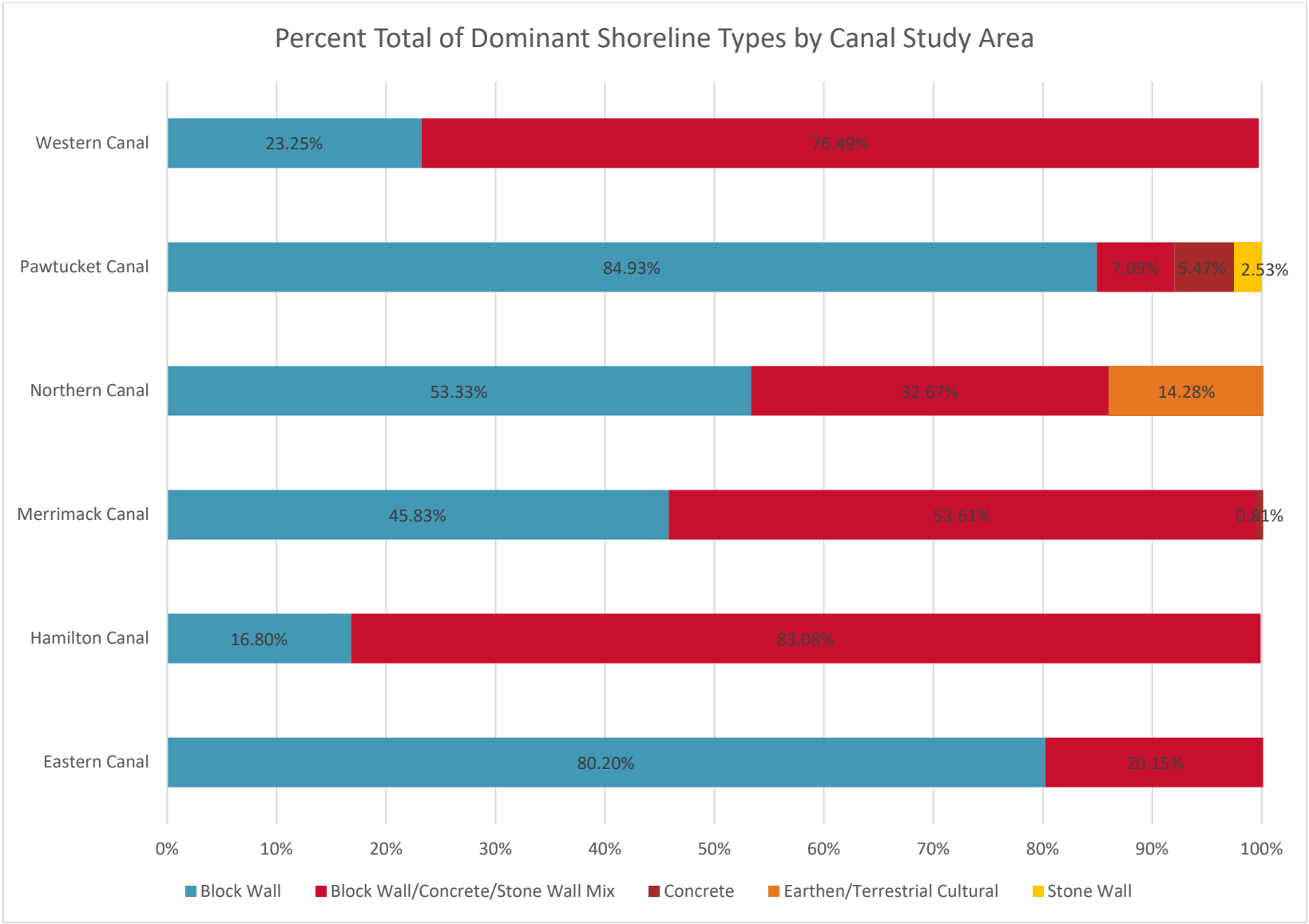
Note: Percent totals are based on mapped vegetation acreages from Vegetation Polygons; Vegetation Points (VPs) are not included in mapped vegetation acreage calculations


Dominant Shoreline Types of Vegetation Points (VPs) by Total Study Area
70
60
50
40
30
20
10
0
62.50
15
8.33
2
8.33
2
8.33
2
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
% Count

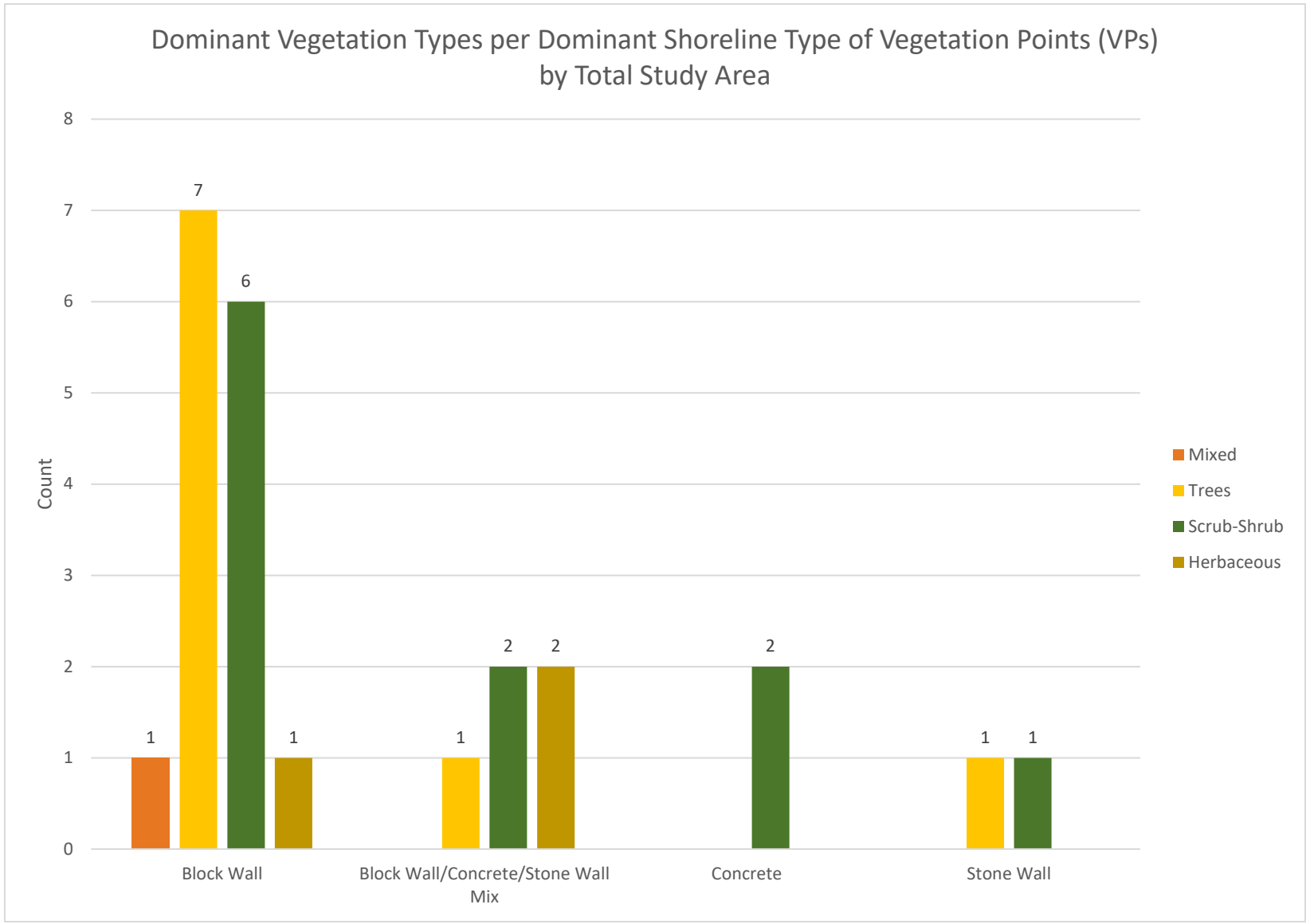

Percent Total of Dominant Shoreline Types of Vegetation Points (VPs) by Canal Study Area
Western Canal
75.00%
25.00%
Pawtucket Canal
37.50%
25.00%
12.50%
25.00%
Northern Canal
100.00%
Hamilton Canal
100.00%
Eastern Canal
33.33%
66.67%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall

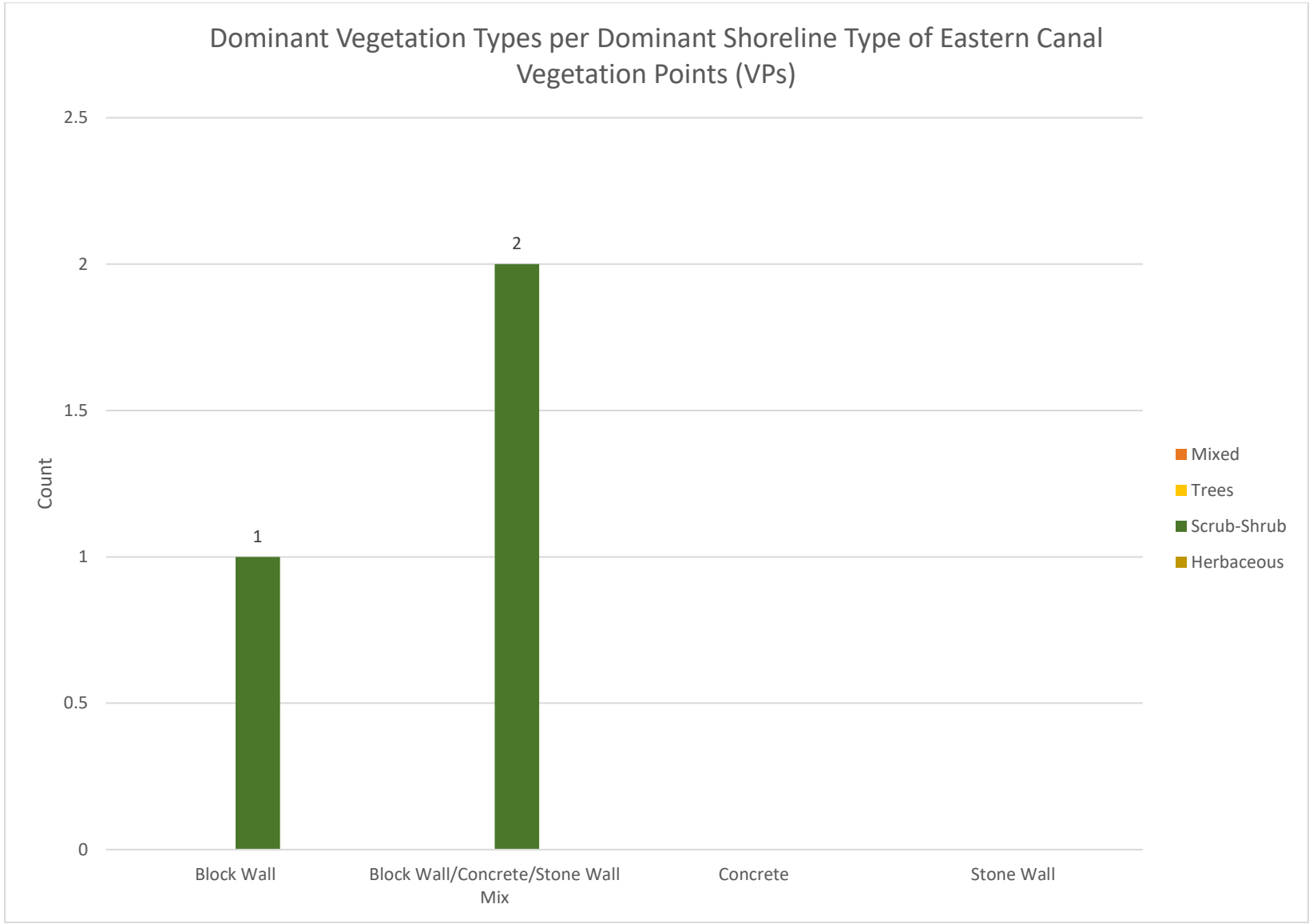


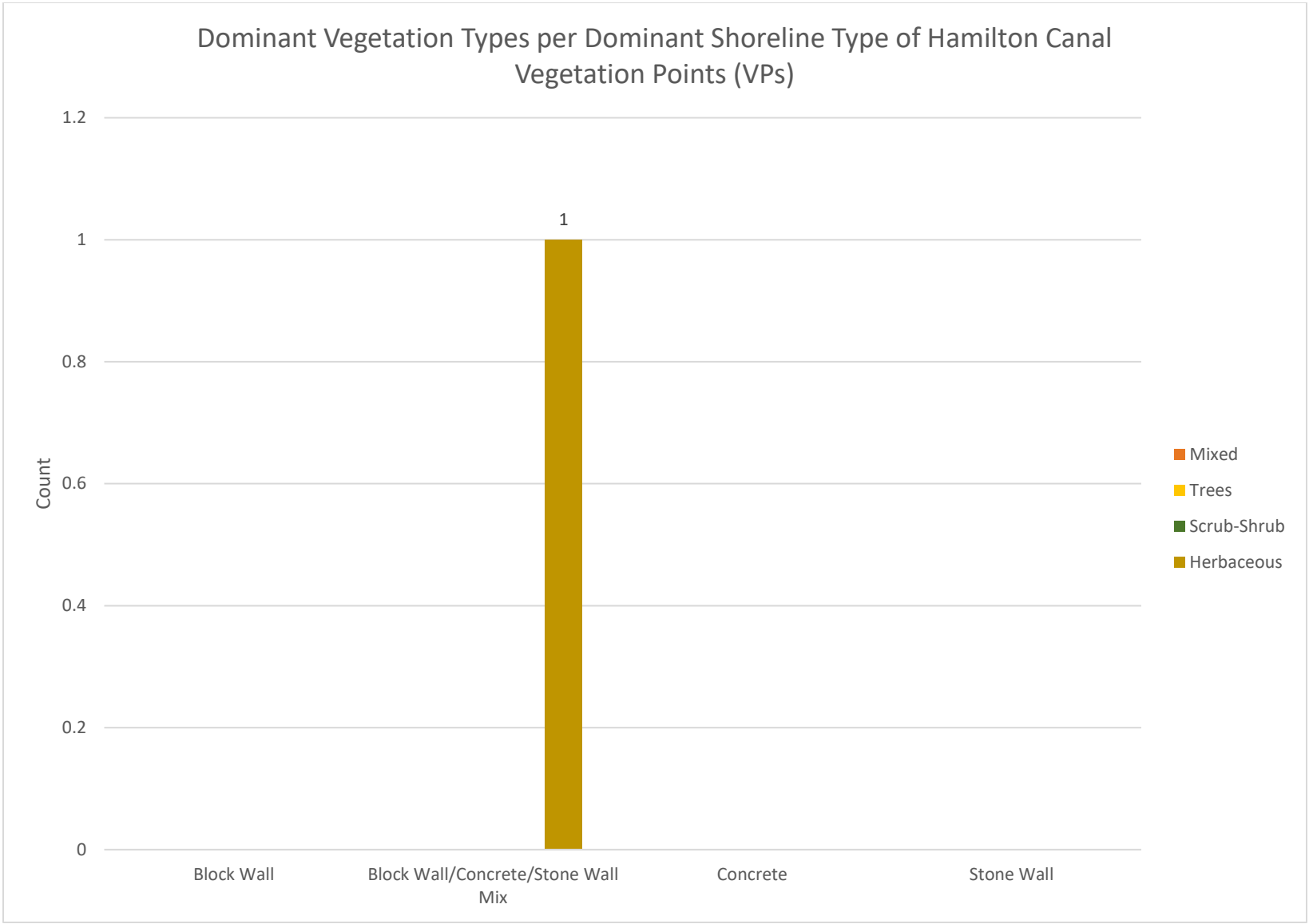
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations

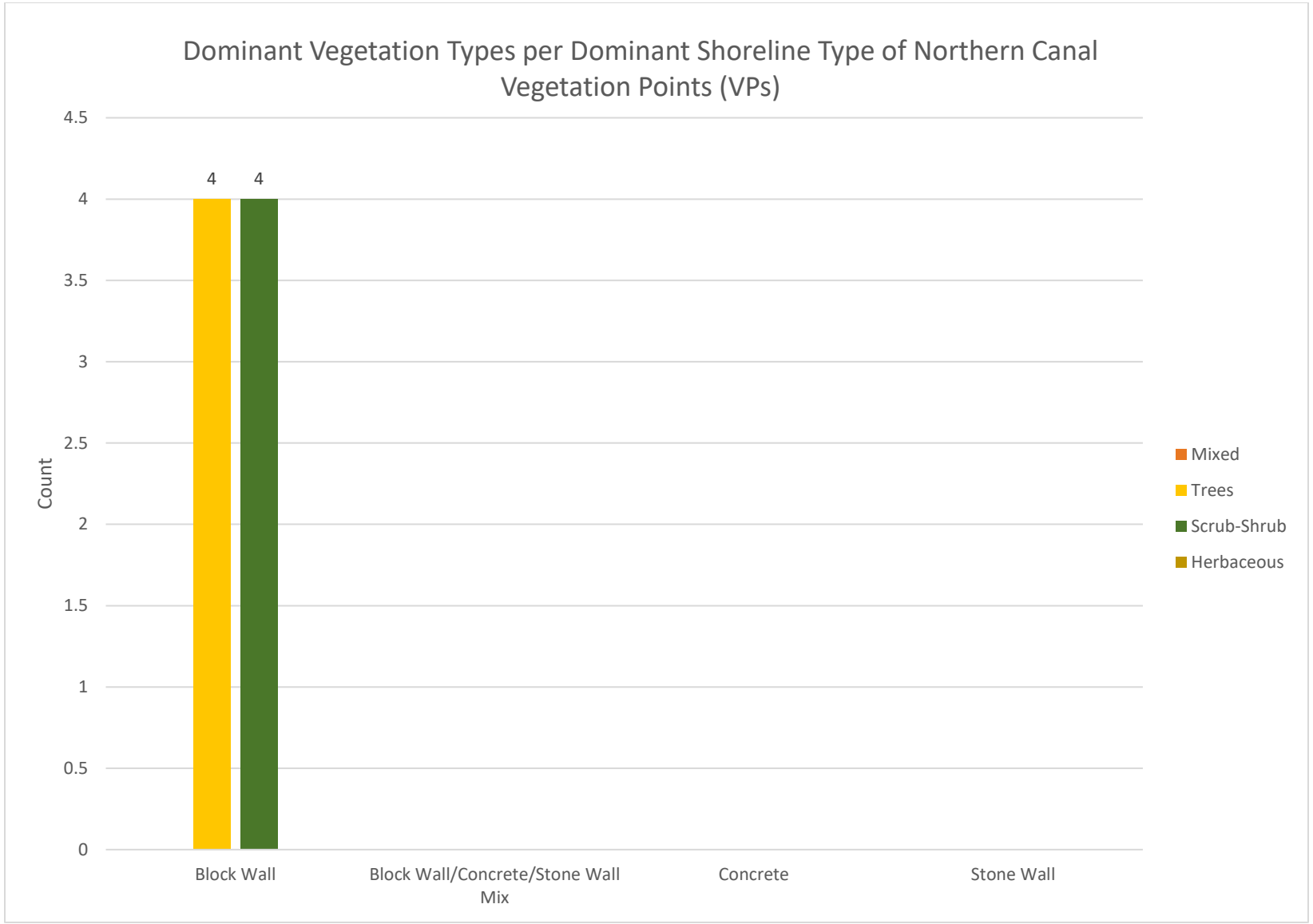


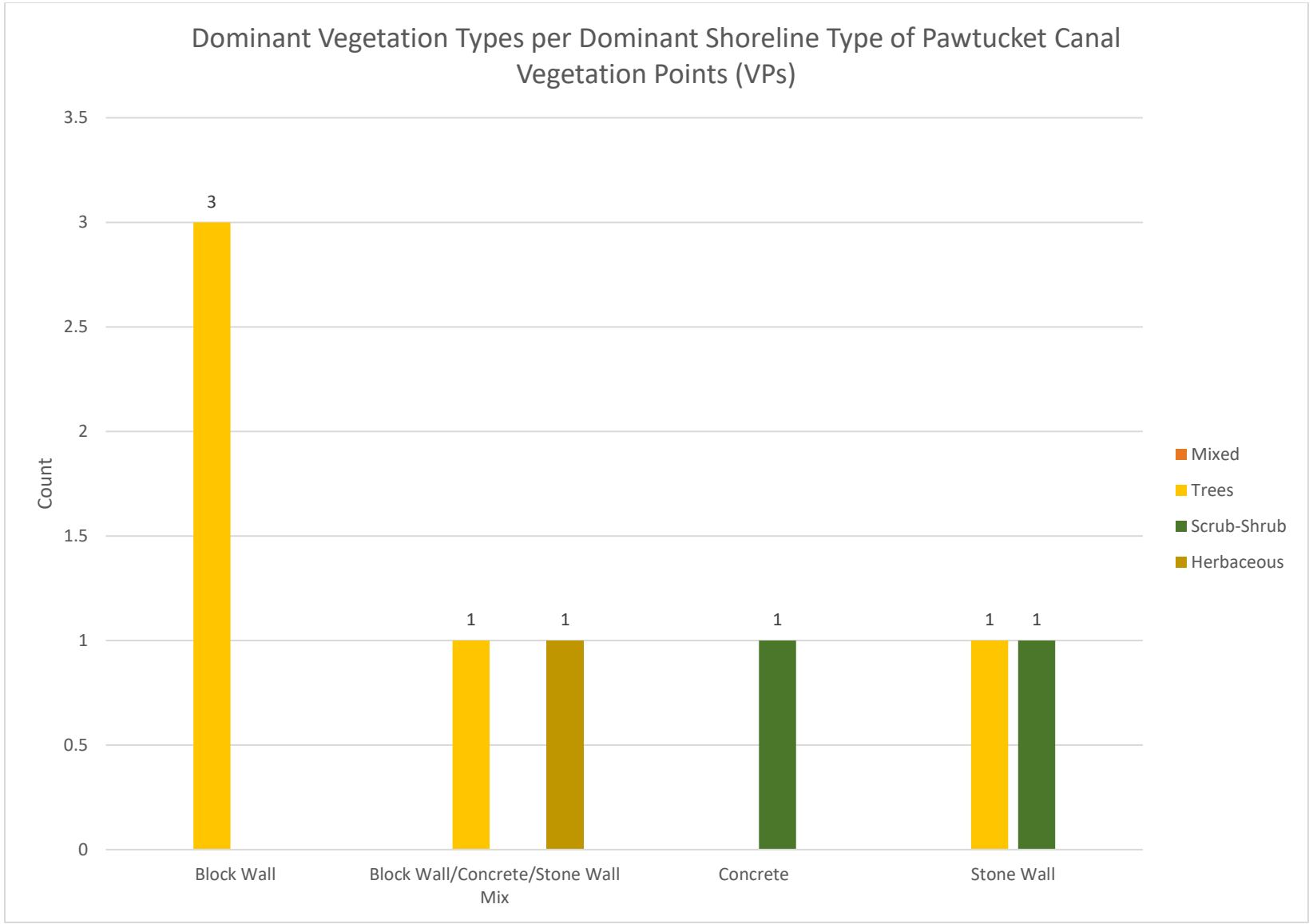
Note: Percent totals based on mapped vegetation acreages from Vegetation Polygons; Vegetation Points (VPs) are not included in mapped vegetation acreage calculations

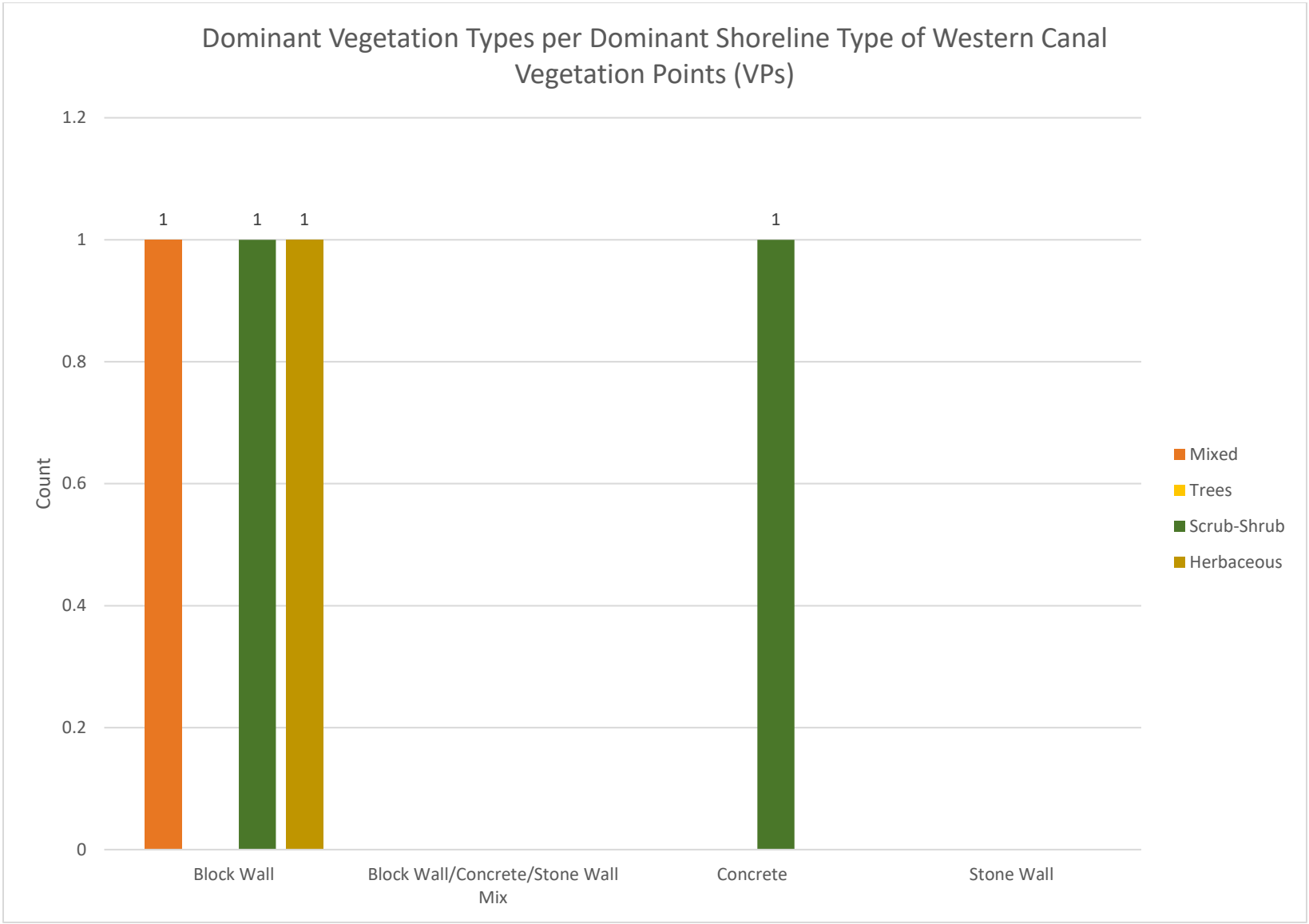

Dominant Vegetation Types per Dominant Shoreline Type of Vegetation Points (VPs) by Total Study Area
Count
8
7
6
5
4
3
2
1
0
1
7
6
1
1
2
2
2
1
1
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
Mixed
Trees
Scrub-Shrub
Herbaceous

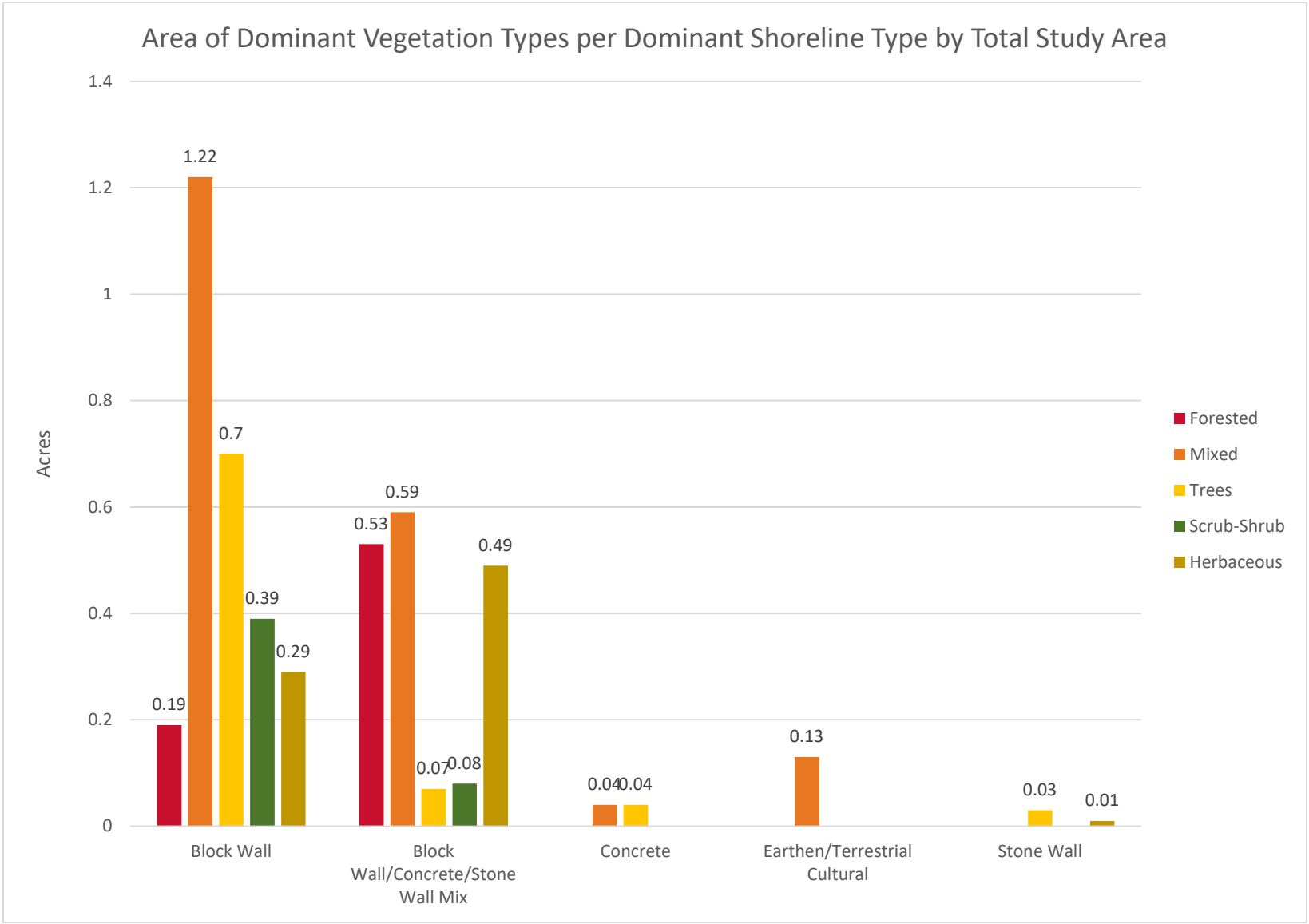

Dominant Vegetation Types per Dominant Shoreline Type of Eastern Canal
Vegetation Points (VPs)
2.5
2
1.5
1
0.5
0
Count
1
2
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
Mixed
Trees
Scrub-Shrub
Herbaceous


Dominant Vegetation Types per Dominant Shoreline Type of Hamilton Canal
Vegetation Points (VPs)
1.2
1
0.8
0.6
0.4
0.2
0
Count
1
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
Mixed
Trees
Scrub-Shrub
Herbaceous

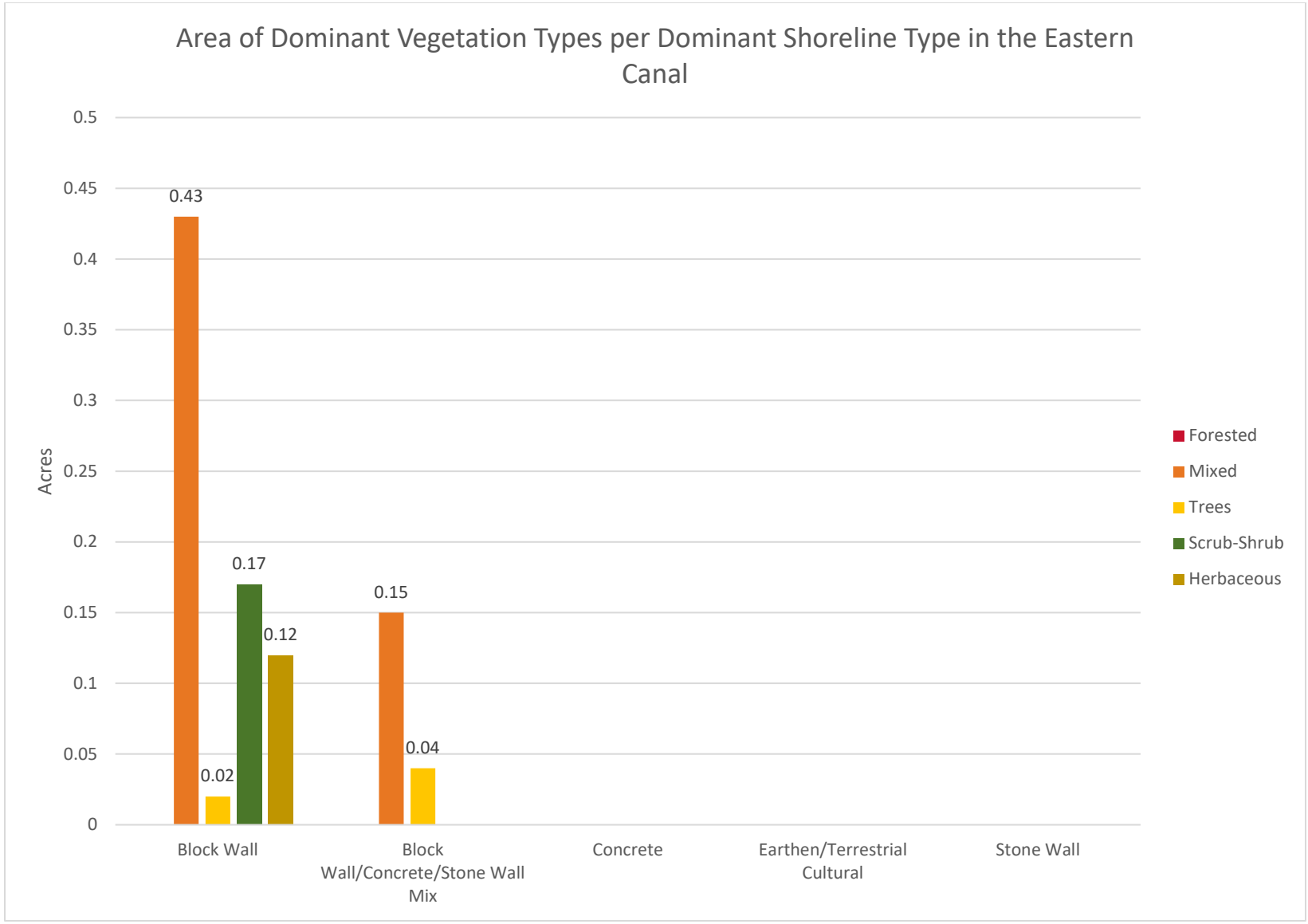

Dominant Vegetation Types per Dominant Shoreline Type of Northern Canal Vegetation Points (VPs)
Count
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
4
4
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
Mixed
Trees
Scrub-Shrub
Herbaceous


Dominant Vegetation Types per Dominant Shoreline Type of Pawtucket Canal
Vegetation Points (VPs)
Count
3.5
3
2.5
2
1.5
1
0.5
0
3
1
1
1
1
1
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
Mixed
Trees
Scrub-Shrub
Herbaceous

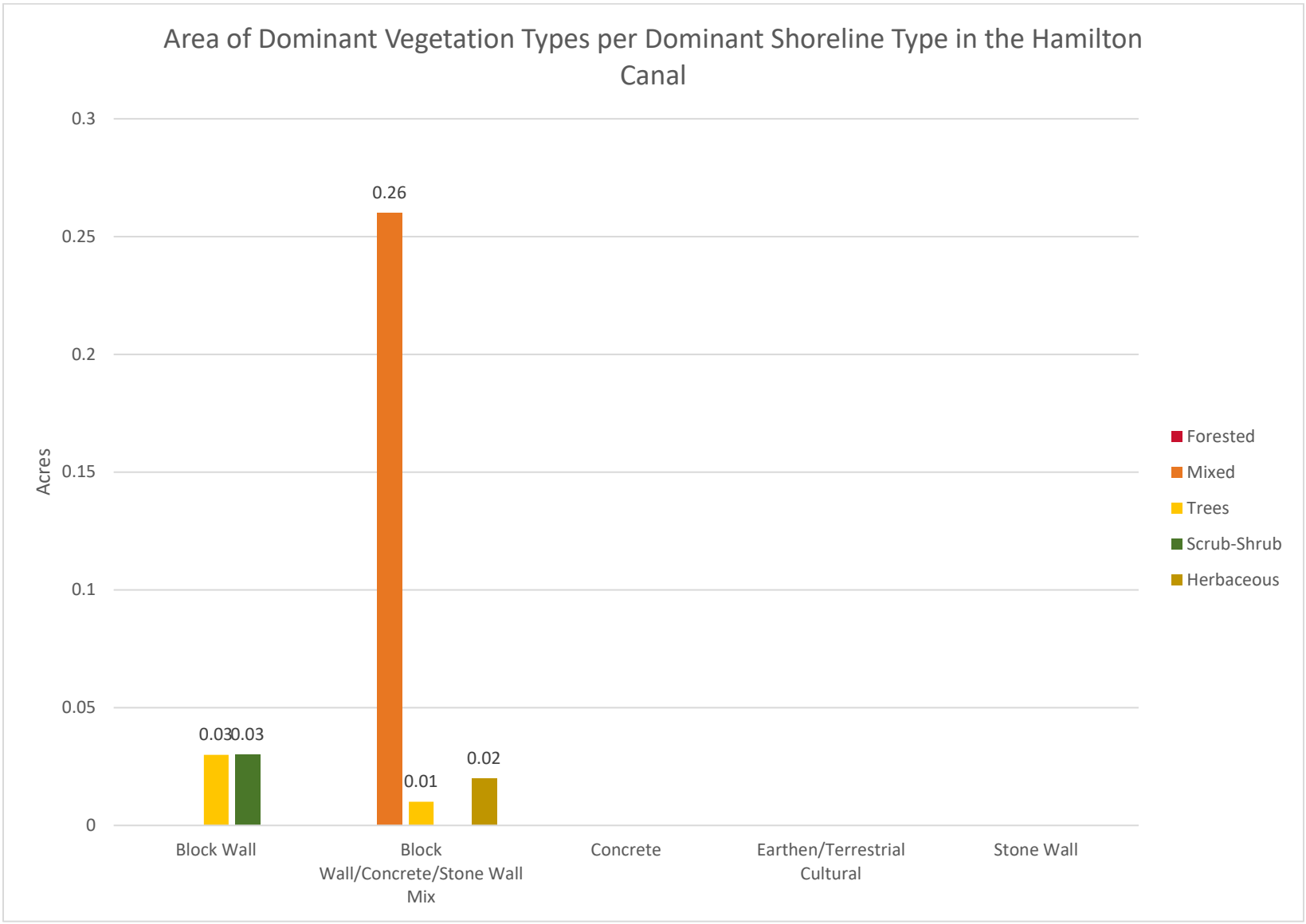

Dominant Vegetation Types per Dominant Shoreline Type of Western Canal
Vegetation Points (VPs)
1.2
1
0.8
0.6
0.4
0.2
0
Count
1
1
1
1
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Stone Wall
Mixed
Trees
Scrub-Shrub
Herbaceous



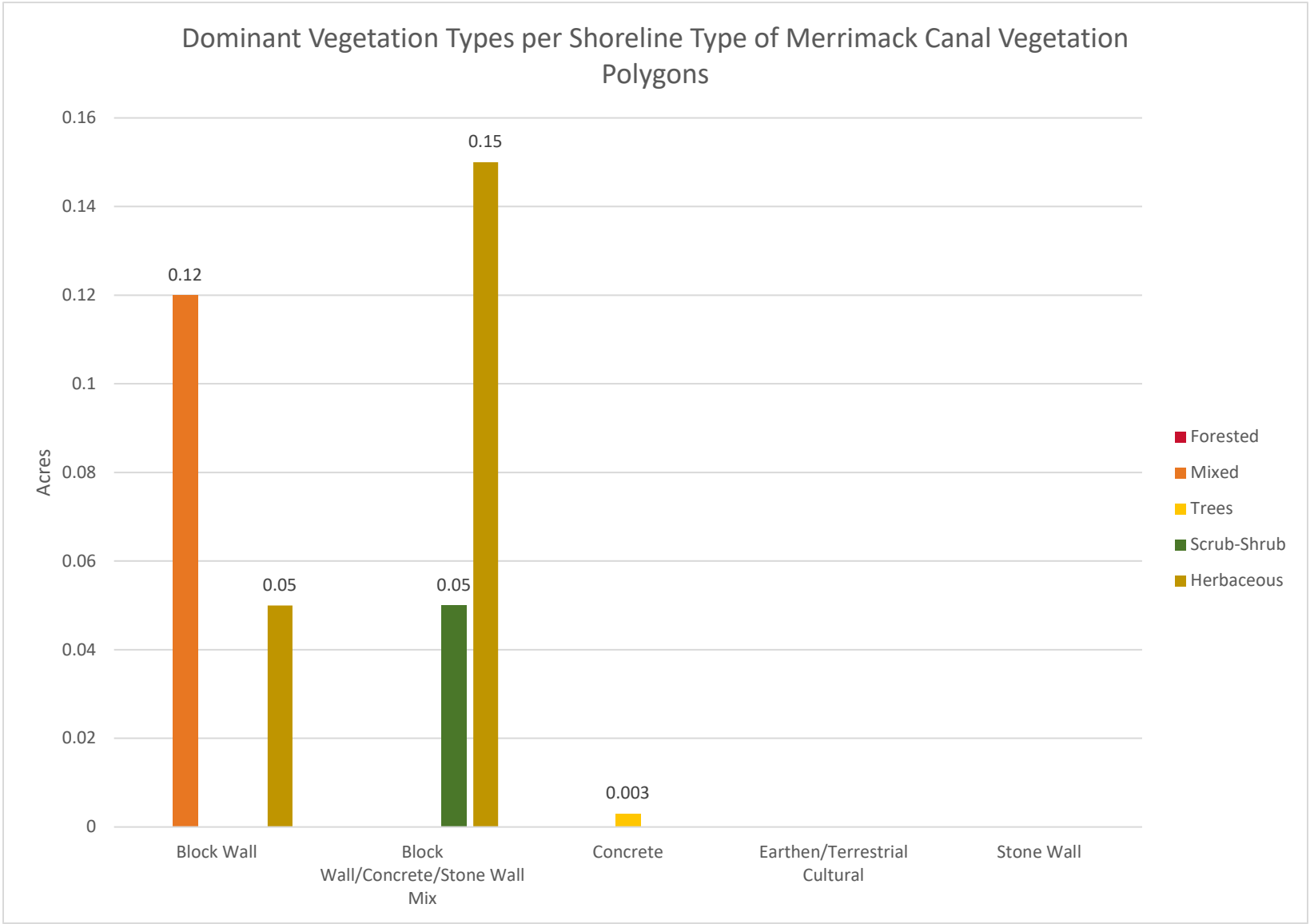
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



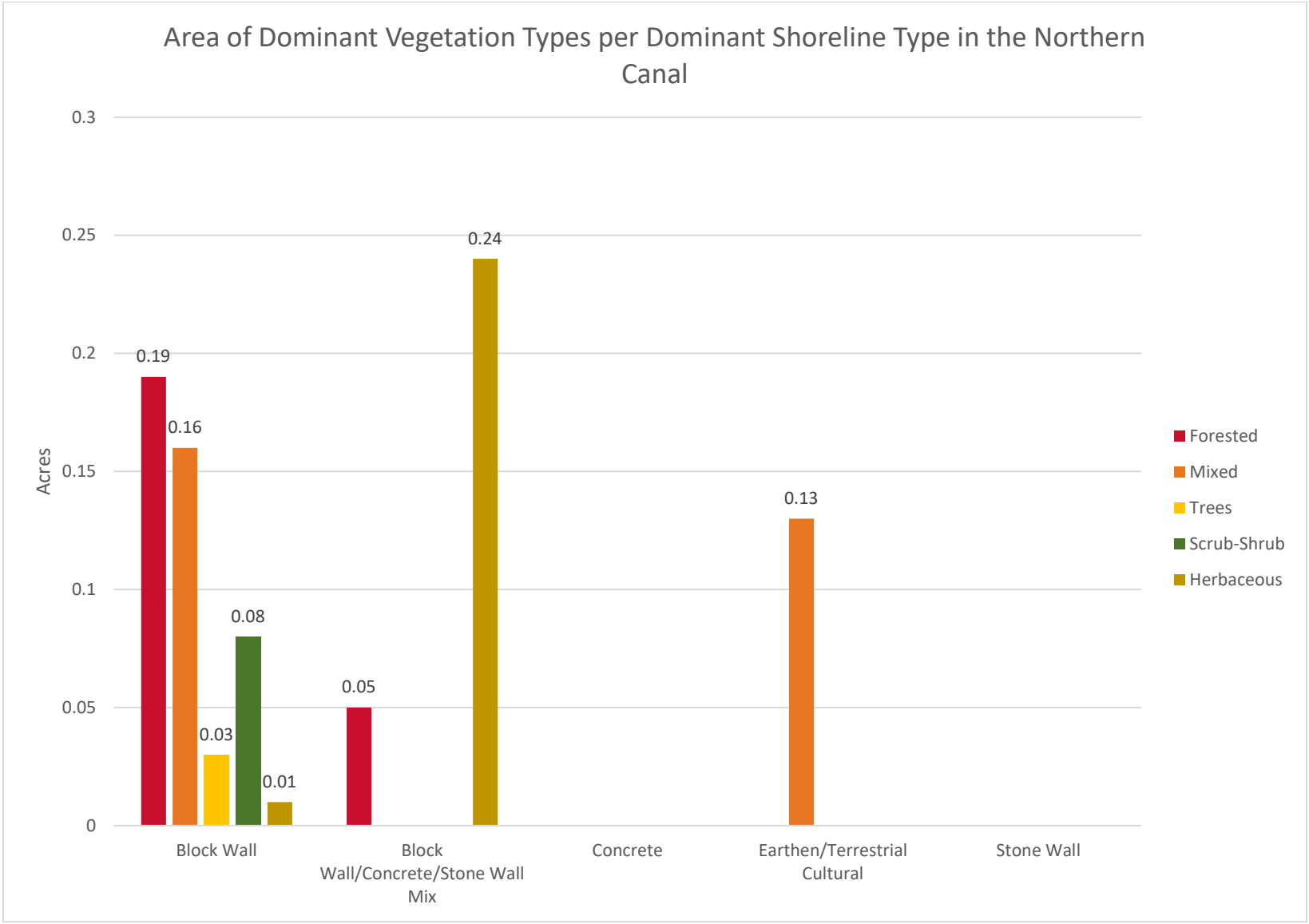
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



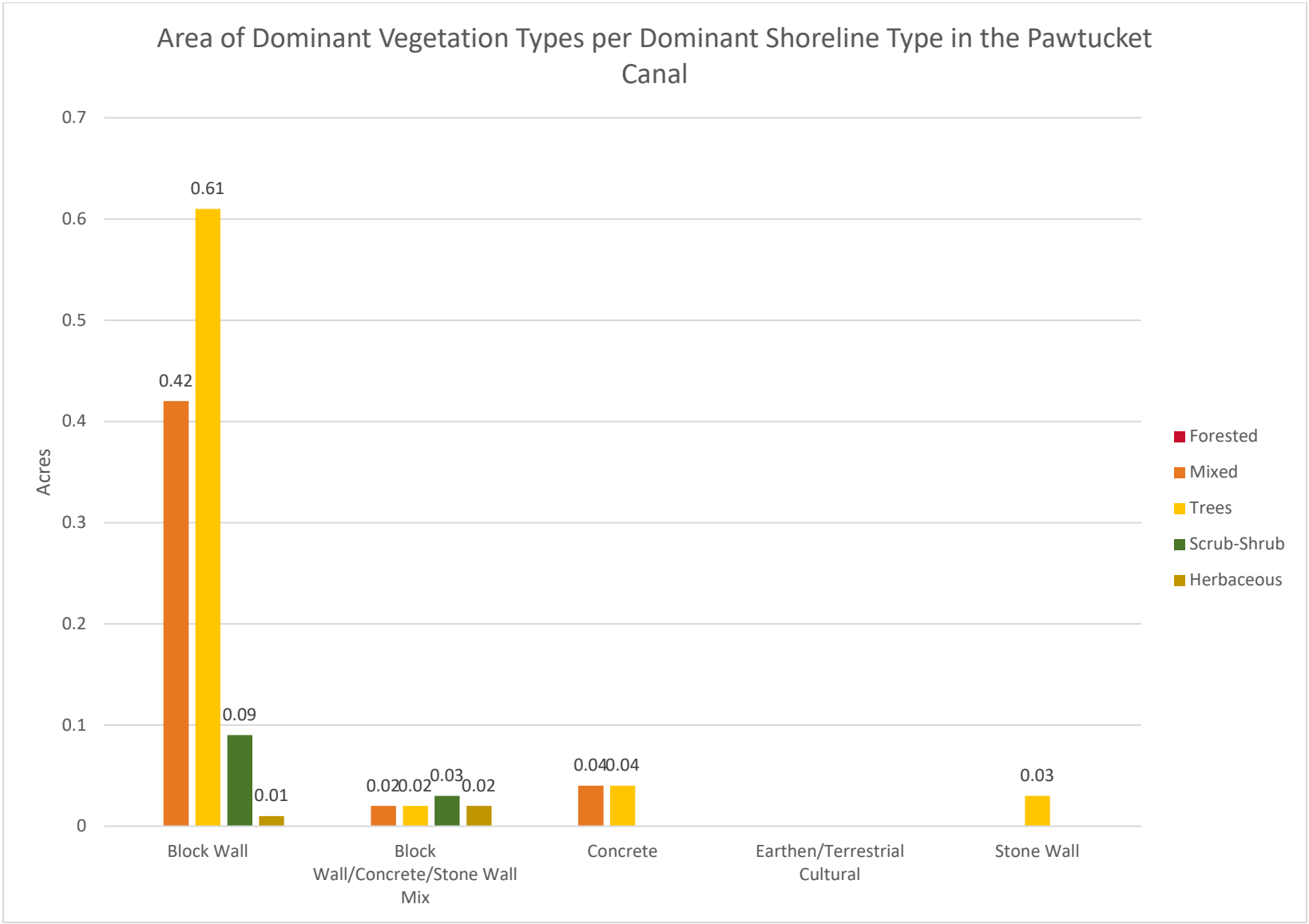
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations


Dominant Vegetation Types per Shoreline Type of Merrimack Canal Vegetation Polygons
Acres
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0.12
0.05
0.05
0.15
0.003
Block Wall
Block Wall/Concrete/Stone Wall Mix
Concrete
Earthen/Terrestrial Cultural
Stone Wall
Forested
Mixed
Trees
Scrub-Shrub
Herbaceous

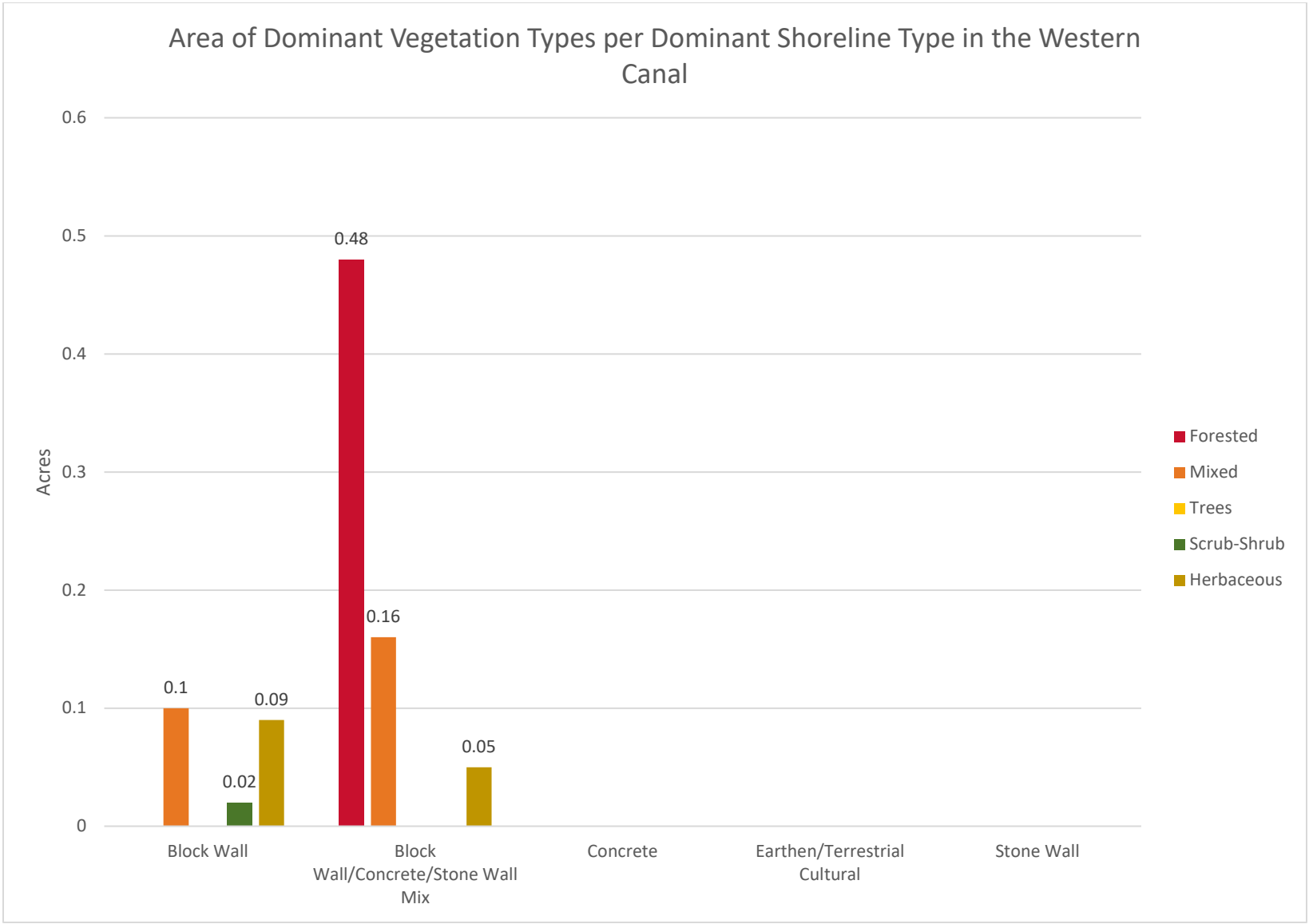
Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations



Note: Vegetation Points (VPs) are not included in mapped vegetation acreage calculations

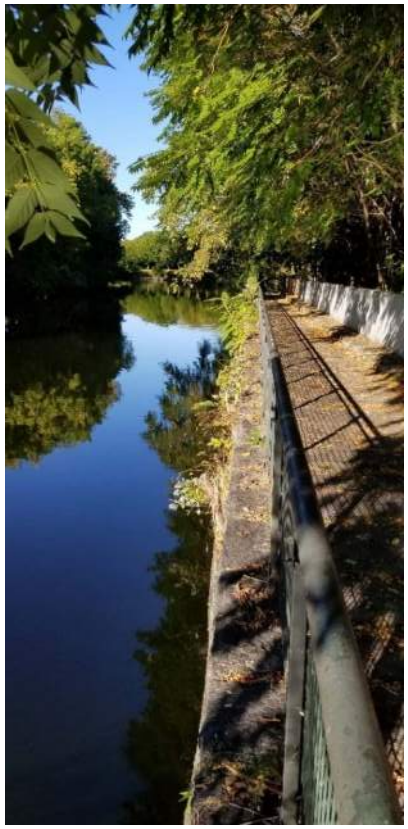
Appendix J - Visual Survey for Vegetation Growth Representative Photographic Log

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 79
Photo No.: 79
Date: 9/27/2019
Direction Photo Taken: Northeasterly
Description: Tree of heaven trees and vines are growing on top of the canal wall and within approximately 3 feet of the canal wall.



Polygon No.: 78
Photo No.: 78
Date: 9/27/2019
Direction of Photo Taken: Westerly
Description: Vegetation growing out of the canal walls include tree of heaven and mulberry and herbaceous species such as purple loosestrife and mullein.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 92
Photo No.: P-9
Date: 9/27/2019
Direction Photo Taken: Southerly
Description: Vegetation growing on top of single stone/block wall on south side of the canal is forested habitat.

Polygon No.: 77
Photo No.: 77a
Date: 9/27/2019
Direction Photo Taken: Westerly
Description: At the western edge of the polygon, the canal broadens and is forested with riparian species. The topography extends to the bypass reach. Species include elms, mulberry, and honeysuckle. Some stumps have been cut along the canal wall on the same side as the bypass reach.

Canal Wall Vegetation Mapping Photo Log

Photo Location No.: P-6
Date: 9/26/2019
Direction Photo Taken: Easterly
Description: View of Pawtucket Gatehouse. Vegetation is growing on debris deposited against the gatehouse.

Polygon No.: 75
Photo No.: 75a
Date: 9/27/2019
Direction: Northeasterly
Description: Vegetation is growing from small sill under the first block down on the canal wall and is dominated by herbaceous plants such as ragweed, purple loosestrife, aster, scattered ferns, golden rod spp., scattered mulberry, elms, and buckthorn.

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 74
Photo No.: 74
Date: 9/27/2019
Direction: Northeasterly
Description: Ragweed is growing out of the canal wall located beneath the building.

Polygon No.: 93
Photo Location No.: P-10
Date: 9/27/2019
Direction Photo Taken: Southerly
Description: Vegetation is growing on bedrock along south side of the canal.

Canal Wall Vegetation Mapping Photo Log

Photo Location No.: P-7
Date: 9/26/2019
Direction Photo Taken: Northeasterly
Description: View from E.L. Field Powerhouse deck.

Polygon No.: 94
Photo Location No.: P-8
Date: 9/26/2019
Direction Photo Taken: Northerly
Description: View looking west toward E.L. Field Powerhouse from the NPS walking trail. Vegetation is growing on bedrock along south side of the canal.

Canal Wall Vegetation Mapping Photo Log

Vegetation Point No.: VP-10
Photo No.: VP-13
Date: 9/26/2019
Direction Photo Taken: Southerly
Description: A small maple is growing out of the canal wall, near the top of the wall.

Vegetation Point No.: VP-11
Photo No.: VP-14
Date: 9/26/2019
Direction Photo Taken: Southwesterly
Description: A small clump of silver maples are growing out of the canal wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

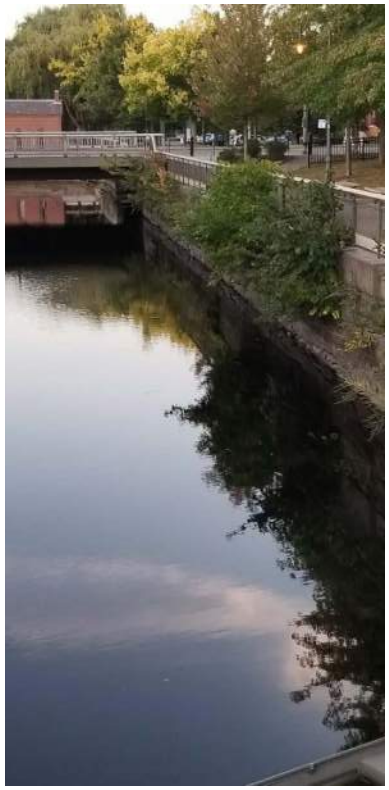
Canal Wall Vegetation Mapping Photo Log

Polygon No.: 45 and 46
Photo No.: 45
Date: 9/26/2019
Direction Photo Taken: Northeasterly
Description: Vegetation growing on the eastern side of the canal wall (left side of the photograph) includes several tree species (i.e. mulberry, buckthorn, tree of heaven, etc.) and dense vines, including Boston ivy and poison ivy. Vegetation growing on the western side of the canal wall (right side of the photograph) includes less trees than the eastern side of the canal and similar vine species.

Polygon No.: 47
Photo No.: 47
Date: 9/26/2019
Direction Photo Taken: Northeasterly
Description: The vegetation growing on the canal wall includes large locust trees and ragweed.

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 39
Photo No.: 39
Date: 9/25/2019
Direction Photo Taken: Northerly
Description: A few small tree of heaven trees are growing out of the canal wall, near the top of the wall.



Polygon No.: 38
Photo No.: 38
Date: 9/25/2019
Direction Photo Taken: Northeasterly
Description: Vegetation growing out of the canal wall, near the top of the wall consists of shrubs.

Canal Wall Vegetation Mapping Photo Log

Vegetation Point No.: VP-14
Photo No.: VP-17
Date: 9/26/2019
Direction Photo Taken: Southwesterly
Description: A small clump of shrubs growing out of the canal wall.

Polygon No.: 51
Photo No.: 51
Date: 9/26/2019
Direction Photo Taken: Northeasterly
Description: Vegetation growing on the canal wall include trees, such as mulberry and elms, and herbaceous ragweed.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 54 and 55
Photo No.: 54
Date: 9/26/2019
Direction Photo Taken: Northerly
Description: Vegetation growing on the northern side of the canal wall (left side of the photograph) consists of primarily vines. Vegetation growing on the southern side of the canal wall (right side of the photograph) consists primarily of herbaceous vegetation, such as ragweed, and vines. A few tree of heaven trees are growing primarily at the toe of the canal wall on both sides of the canal; likely on deposited sediment, especially along the northern canal wall.

Polygon No.: 86
Photo No.: CV_Poly6
Date: 9/25/2019
Direction Photo Taken: Northerly
Description: Vegetation growing on canal wall at the southwestern end of Polygon 86 is primarily herbaceous.

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 86
Photo No.: CV_Poly6b
Date: 9/25/2019
Direction Photo Taken: Easterly
Description: The vegetation growing out of the canal includes tree of heaven and potentially milfoil and *Typha* spp.; other herbaceous species are growing at the bottom of the canal.

Polygon No.: 91
Photo No.: CV_Poly6a
Date: 9/25/2019
Direction Photo Taken: Northerly
Description: The vegetation growing on the canal is primarily herbaceous; however, one maple at approximately 5-10 inches diameter at breast height is located approximately 2 feet back from the wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 1
Photo No.: 1
Date: 9/25/2019
Direction Photo Taken: Northwesterly
Description: Several large woody trees are located at the northwestern end of the canal, including river birch growing on top of the canal wall. Herbaceous plants including ragweed and Boston ivy dominate the western side of the canal wall (left side of the photograph).

Polygon No.: 1
Photo No.: 1a
Date: 9/25/2019
Direction Photo Taken: Easterly
Description: Herbaceous plants including ragweed and Boston ivy dominate the western side of the canal wall (right side of the photograph).

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

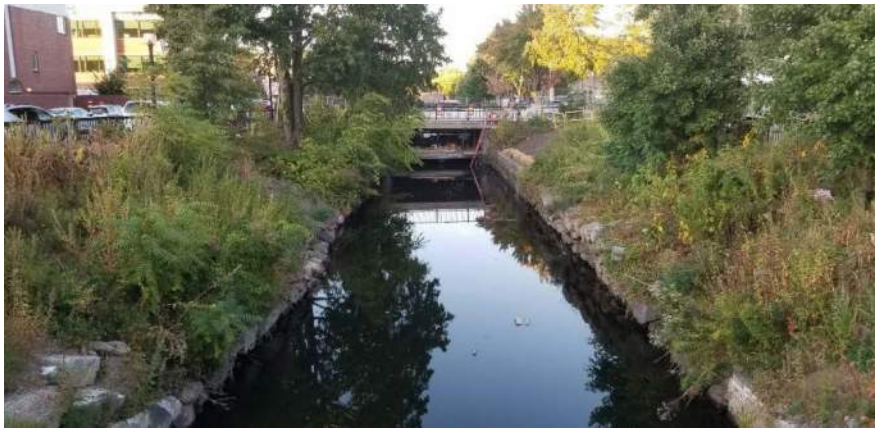
Photo Location No.: P-2
Date: 9/25/2019
Direction Photo Taken: Southwesterly
Description: Vegetation is growing on the riprap shoreline along both sides of the canal.

Photo Location No.: P-3
Date: 9/25/2019
Direction Photo Taken: Southwesterly
Description: Vegetation is growing on the riprap shoreline located on the eastern side of the canal (left side of the photograph). The western side of the canal wall (right side of the photograph) is concrete with little to no vegetation present.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log



Polygon No.: 34, 35, and 36
Photo No.: 34
Date: 9/25/2019
Direction Photo Taken: Northeasterly
Description: The vegetation growing out of the eastern side of the canal wall (right side of the photograph) is sparse and consists primarily of vines. The vegetation growing on top of and approximately 3 feet back from the western side of the canal wall (left side of the photograph) is primarily herbaceous.

Polygon No.: 82
Photo No.: CV_Poly2
Date: 9/25/2019
Direction Photo Taken: Northeasterly
Description: There is approximately 90 percent vegetative cover in this area; vegetation is mostly herbaceous, including ragweed, clover, *Aster* spp., and other common weeds. Two small tree of heaven trees are also present on the canal wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 84 and 85
Photo No.: CV_Poly4c
Date: 9/25/2019
Direction Photo Taken: Northeasterly
Description: There is approximately 20 percent vegetative cover on the western side of the canal wall (right side of the photograph) located primarily one block down from the top of the wall; vegetation includes a few maples, honeysuckle, and scattered herbaceous species. There is approximately 40 percent vegetative cover on the eastern side of the canal wall (left side of the photograph); vegetation includes several elms, approximately 5 feet tall, several birches, and a few red maples.

Polygon No.: 3
Photo No.: 3
Date: 9/25/2019
Direction Photo Taken: Northwesterly
Description: The vegetation growing on the canal wall includes one elm tree, Boston ivy, and ragweed. Scattered submerged aquatic vegetation is growing in the canal.

Canal Wall Vegetation Mapping Photo Log

Vegetation Point No.: VP-1
Photo No.: VP-4
Date: 9/25/2019
Direction Photo Taken: Northeasterly
Description: Vegetation includes a single shrub growing out of the canal wall below the brick building and sparse herbaceous species.

Polygon No.: 89
Photo No.: CV_Poly9
Date: 9/25/2019
Direction Photo Taken: Southeasterly
Description: The vegetation growing out of the canal wall includes an approximately 10-trunked tree of heaven tree at approximately 6 inches diameter at breast height and poison ivy.

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 90
Photo No.: CV_Poly10a
Date: 9/25/2019
Direction Photo Taken: Southwesterly
Description: The vegetation growing out of canal wall is a 3-trunked tree of heaven tree at approximately 4 inches diameter at breast height. A recently cut birch tree tied with rope was also observed along the canal wall.

Polygon No.: 4
Photo No.: 4
Date: 9/25/2019
Direction Photo Taken: Southerly
Description: There is one, multi-trunked tree of heaven tree at approximately 4 to 6 inches diameter at breast height growing out of the canal wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 70
Photo No.: 70
Date: 9/26/2019
Direction Photo Taken: Northwesterly
Description: The canal wall is primarily concrete with trees, such as locust and elm, growing at the toe of the wall.

Photo Location No.: P-4
Photo No.: P-15
Date: 9/26/2019
Direction Photo Taken: Easterly
Description: Dense vegetation is growing on earthen banks along the canal.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Photo Location No.: P-5
Photo No.: P-16
Date: 9/26/2019
Direction Photo Taken: Northwesterly
Description: Upstream view of dense vegetation growing on earthen banks along both sides of the canal.

Polygon No.: 41
Photo No.: 41b
Date: 9/25/2019
Direction Photo Taken: Southeasterly
Description: Portions of the canal wall at bridge crossings on each side of the canal are concrete and brick. The highest density of vegetation in the polygon consists of locust, tree of heaven, box elder, maples and scattered shrubs, some with approximately 6 to 14 inches diameter at breast height.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 13
Photo No.: 13
Date: 9/25/2019
Direction Photo Taken: Southerly
Description: There is one elm tree and one mulberry growing out of concrete portion of the canal wall.

Polygon No.: 16
Photo No.: 16
Date: 9/25/2019
Direction Photo Taken: Northerly
Description: Approximately 20 percent of the canal wall has woody trees (i.e. elms, locust, and mulberry) or herbaceous plants growing on it.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 18
Photo No.: 18
Date: 9/25/2019
Direction Photo Taken: Southwesterly
Description: Approximately 20 percent of the canal wall has woody trees, shrubs, and/or herbaceous plants growing on it. The vegetation includes tree of heaven, maple, common mullein, Japanese knot weed, and ragweed. Japanese knot weed coverage increases with closer proximity to the National Park Service boat dock.

Polygon No.: 7
Photo No.: 7a
Date: 9/25/2019
Direction Photo Taken: Easterly
Description: Several large woody trees including river birch, tree of heaven, and silver maple, all approximately 2 to 5 inches diameter at breast height are growing out of the canal wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 8
Photo No.: 8
Date: 9/25/2019
Direction Photo Taken: Easterly
Description: The canal contains potential sediment deposited against the canal wall; the sediment is topped with a layer of herbaceous plants.

Vegetation Point No.: VP-4
Photo No.: VP-7
Date: 9/25/2019
Direction Photo Taken: Southeasterly
Description: A multi-trunked clump of trees, approximately 6 to 8 feet tall, are growing out of canal wall .

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 69
Photo No.: 69
Date: 9/26/2019
Direction Photo Taken: Northwesterly
Description: The trees growing out of canal wall include tree of heaven and elms at approximately 10 feet tall.

Polygon No.: 67
Photo No.: 67
Date: 9/26/2019
Direction Photo Taken: Northwesterly
Description: Large locust and birch trees are growing on top of the canal wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 66
Photo No.: 66a
Date: 9/26/2019
Direction Photo Taken: Northerly
Description: The vegetation growing out of the eastern side of the canal wall (right side of the photograph), at the top of the wall, includes trees, such as tree of heaven and birch, and vines, such as Boston ivy.

Vegetation Point No.: VP-16
Photo No.: VP-19
Date: 9/26/2019
Direction Photo Taken: Northerly
Description: A small clump of mulberry are growing out of the canal wall.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 56
Photo No.: 56
Date: 9/26/2019
Direction Photo Taken: Southwesterly
Description: Most of the canal wall is made of concrete with riprap placed at the toe of the wall. The vegetation growing on the canal wall consists of tree of heaven, box elder, and vines, such as Boston ivy.

Polygon No.: 57
Photo No.: 57
Date: 9/26/2019
Direction Photo Taken: Easterly
Description: Vegetation growing out of the canal wall includes ash trees at approximately 6 to 8 inches diameter at breast height.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 23
Photo No.: 23
Date: 9/25/2019
Direction Photo Taken: Northerly
Description: The vegetation on the canal wall is primarily tree of heaven and ragweed, with lesser density of mullein.

Polygon No.: 25
Photo No.: 25
Date: 9/25/2019
Direction Photo Taken: Northerly
Description: The vegetation growing out of the canal wall includes one sycamore, several tree of heaven, glossy buckhorn, and ragweed.

Recreation and Aesthetics Study Report

Lowell Hydroelectric Project (FERC No. 2790)

Canal Wall Vegetation Mapping Photo Log

Polygon No.: 26 and 27
Photo No.: 26
Date: 9/25/2019
Direction Photo Taken: Northeasterly
Description: The southern side of the canal wall (right side of the photograph), west of the walking bridge, consists of portions of concrete and is primarily covered in ragweed. Vegetation on the northern side of the canal wall (left side of the photograph) consists primarily of trees with approximately 10 percent cover. The northern side of the canal wall, west of the walking bridge, consists of portions of concrete.

Polygon No.: 26 and 27
Photo No.: 26a
Date: 9/25/2019
Direction Photo Taken: Southwesterly
Description: The southern side of the canal wall (left side of the photograph), east of the walking bridge, contains trees, such as tree of heaven and elm. Trees on the northern side of the canal wall (right side of the photograph), east of the walking bridge, are smaller and less dense than west of the walking bridge.

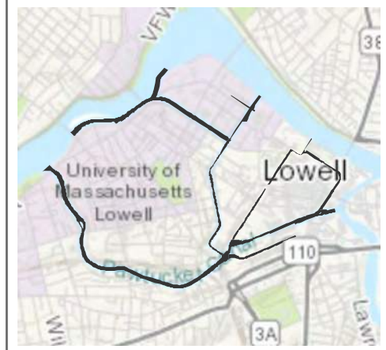
Canal Wall Vegetation Mapping Photo Log

Polygon No.: 58
Photo No.: 58b
Date: 9/26/2019
Direction Photo Taken: Southerly
Description: The vegetation growing out of the canal wall includes locust trees, tree of heaven trees, wild grape, and oriental bittersweet.

Appendix K - Visual Survey for Waterborne Trash Mapbook

Legend

- Project Facilities
- Canal System
- Canal Bed Trash
- Temporary Surface Sheen
- Waterborne Trash



0 700 1,400
Feet

BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY

LOWELL HYDROELECTRIC PROJECT

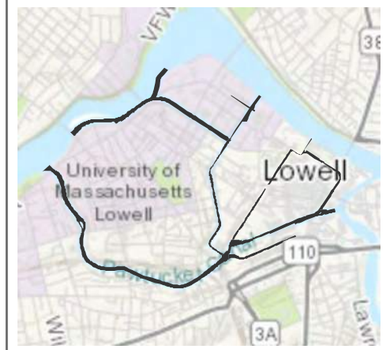
FERC NO. 2790

PATH: \\PIT-SRV05\GIS\NY\ENEL\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_TRASHSTUDY11X17_OVERALL.MXD - USER: KAUSTIN - DATE: 9/11/2020

AUGUST 2020

Legend

- Project Facilities
- Canal System
- Canal Bed Trash
- Temporary Surface Sheen
- Waterborne Trash



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BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY

LOWELL HYDROELECTRIC PROJECT

FERC NO. 2790

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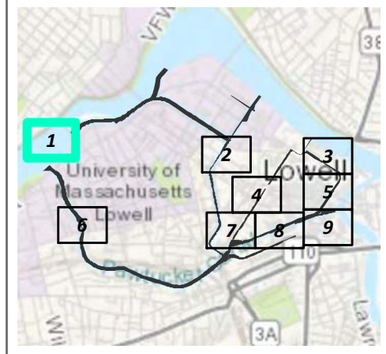
AUGUST 2020

Legend

- Project Facilities
- Canal System
- Canal Bed Trash
- Temporary Surface Sheen
- Waterborne Trash



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BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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AUGUST 2020

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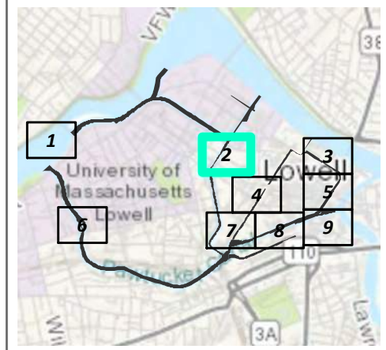

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BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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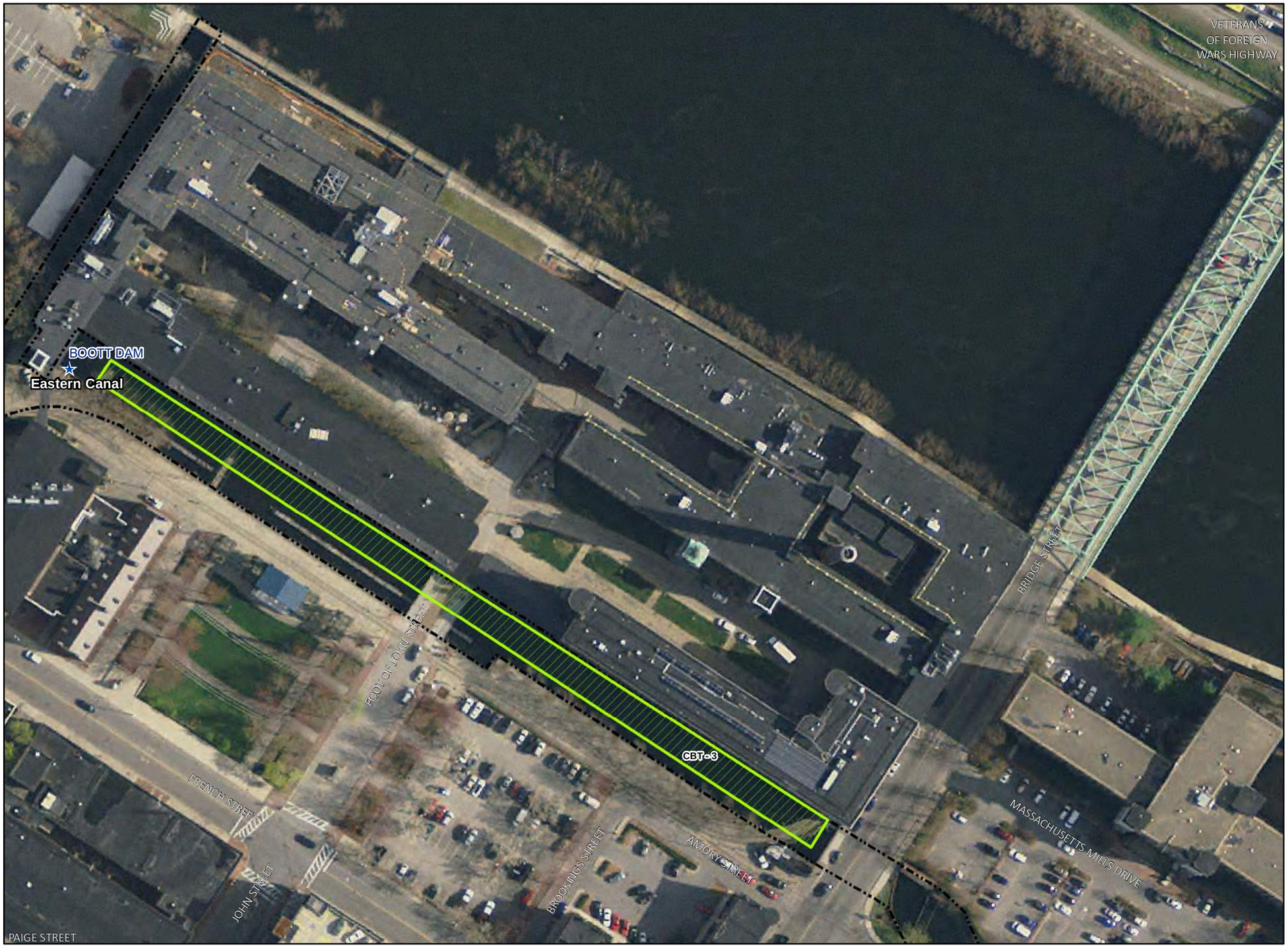
AUGUST 2020



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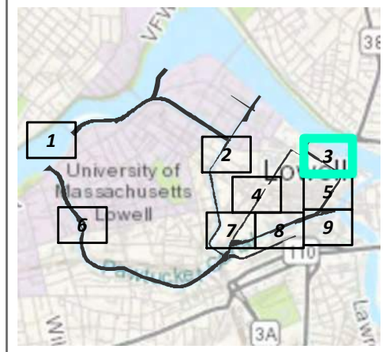

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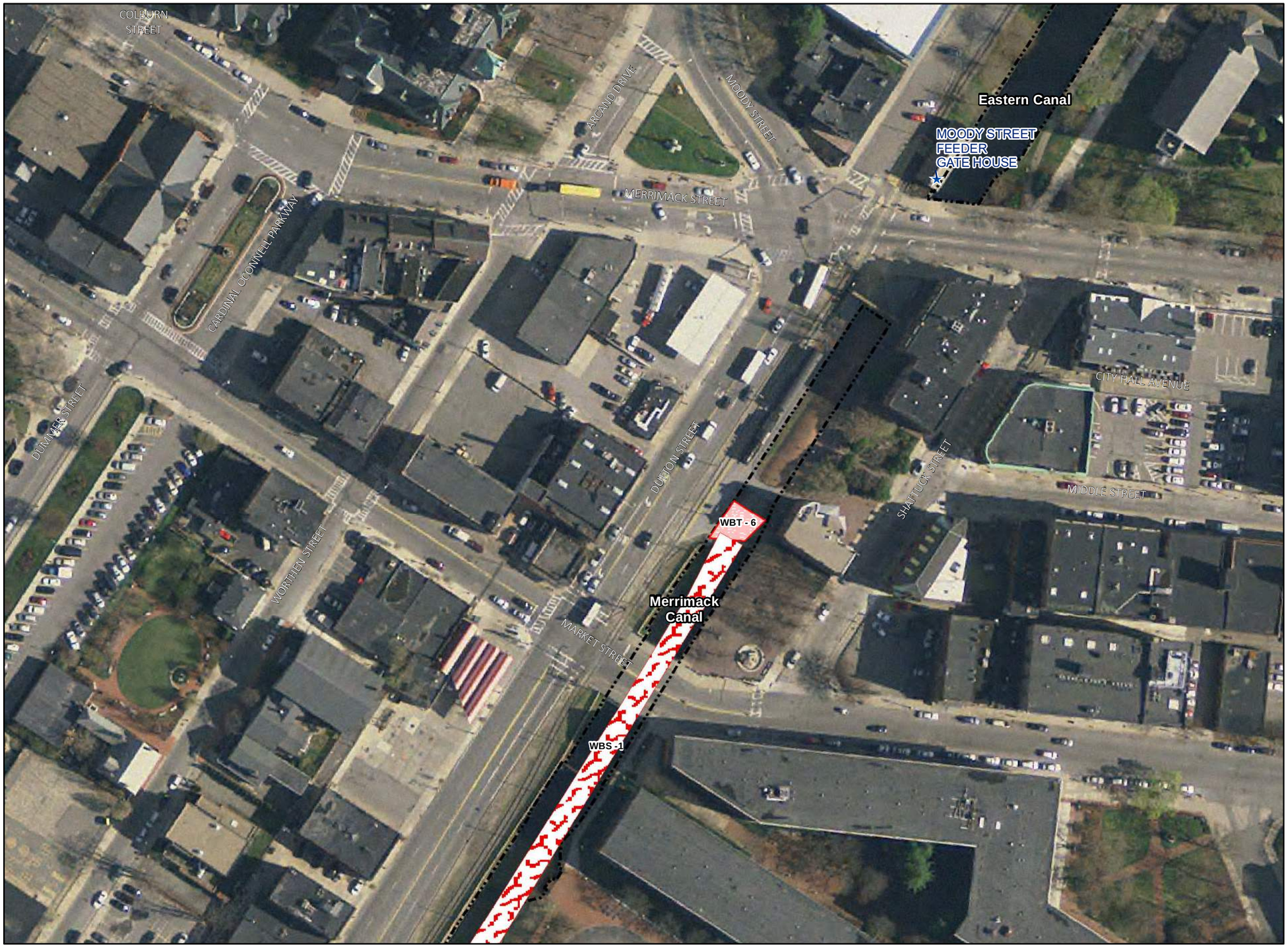

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- Temporary Surface Sheen
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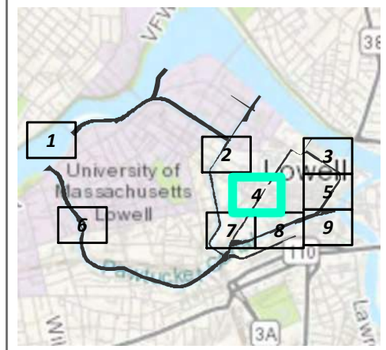

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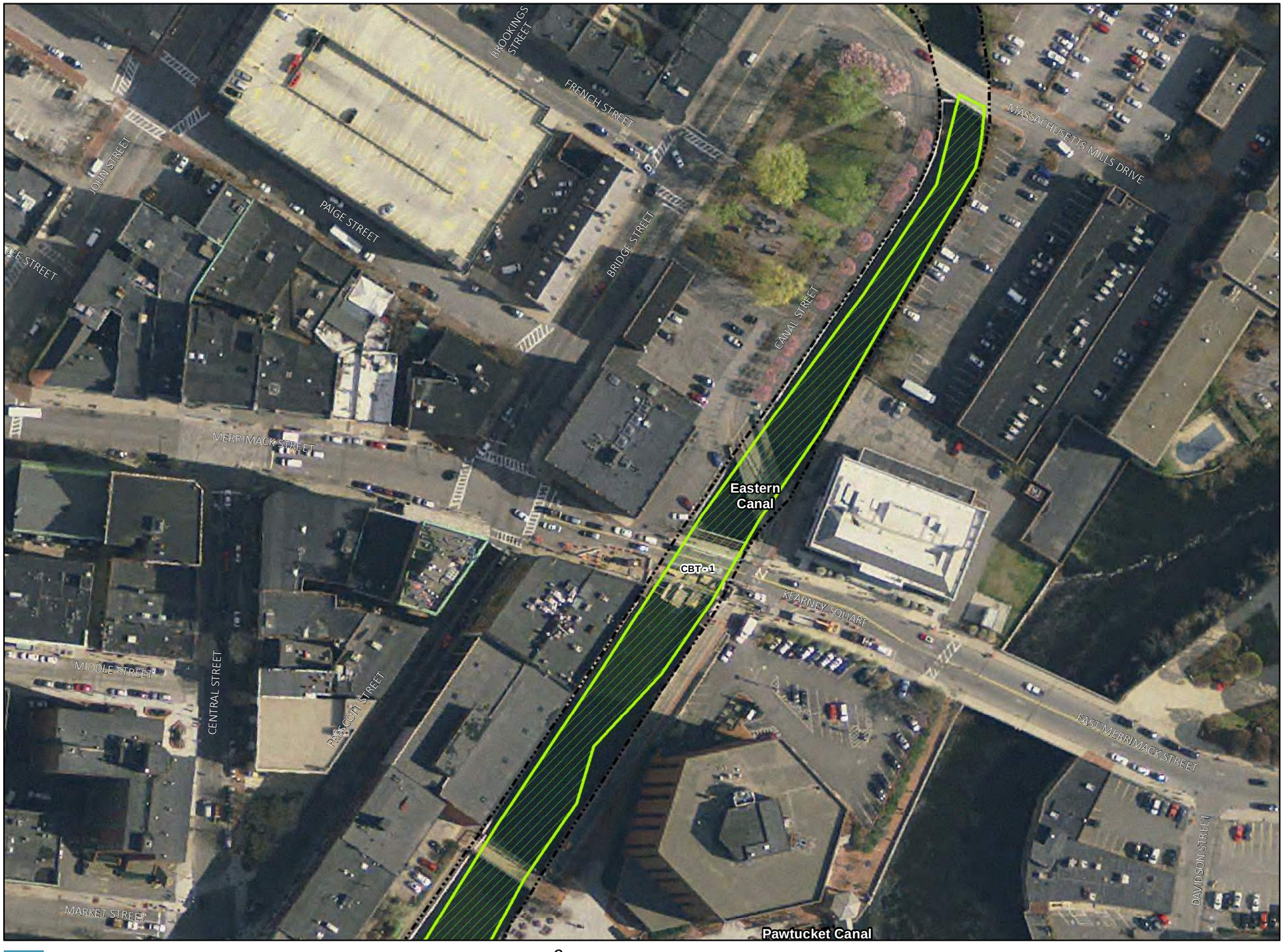

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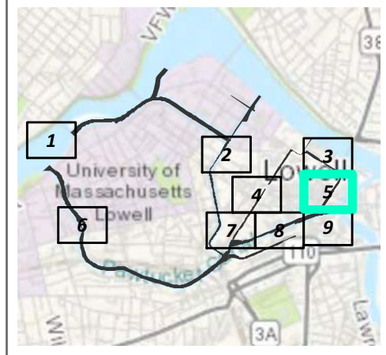
- Canal System
- Canal Bed Trash
- Temporary Surface Sheen
- Waterborne Trash



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- Canal Bed Trash
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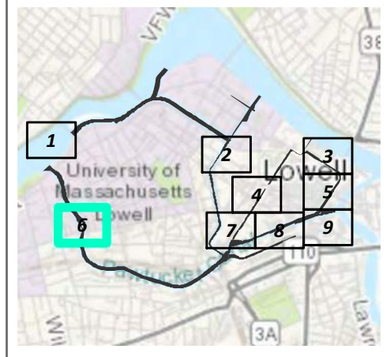

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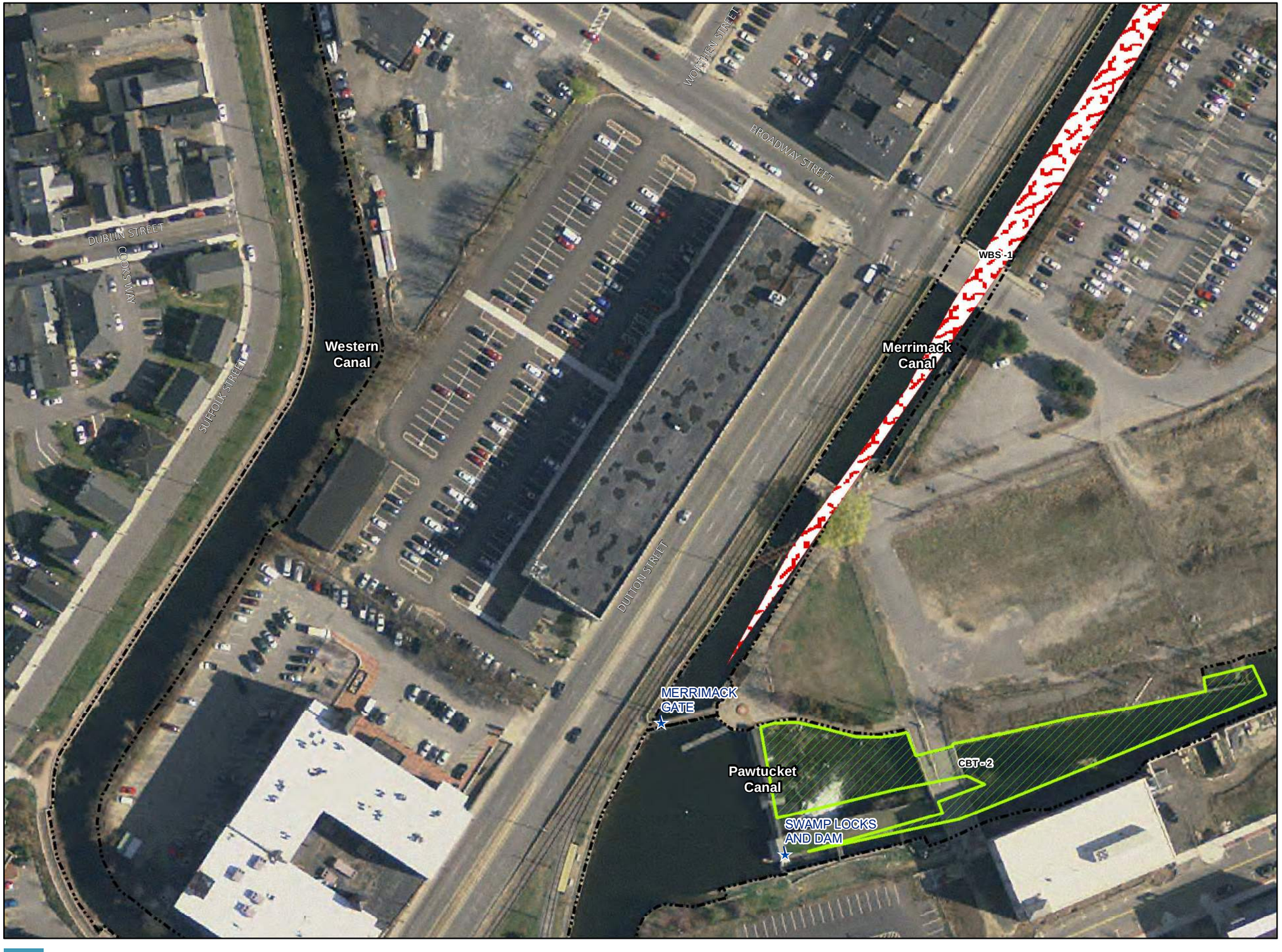

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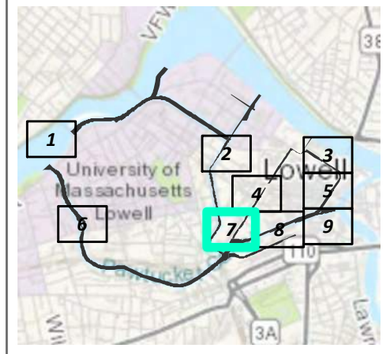
- Project Facilities
- Canal System
- Canal Bed Trash
- Temporary Surface Sheen
- Waterborne Trash



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BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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AUGUST 2020

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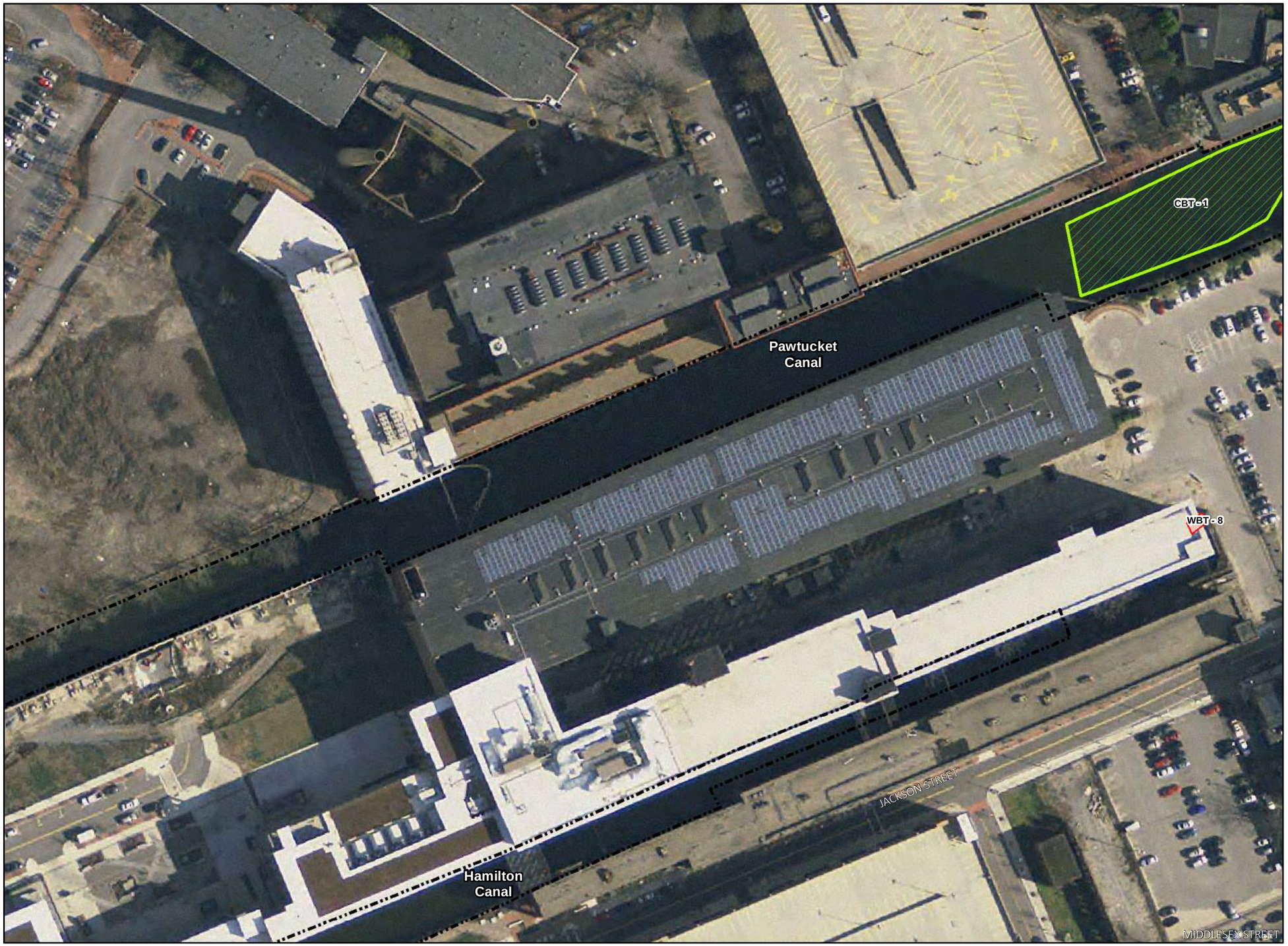

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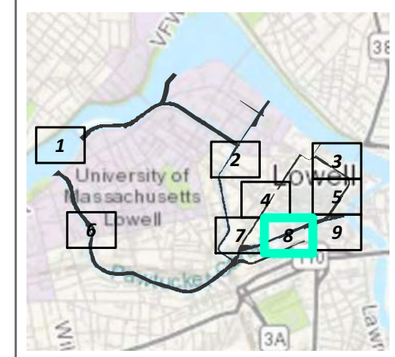
- Project Facilities
- Canal System
- Canal Bed Trash
- Temporary Surface Sheen
- Waterborne Trash



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BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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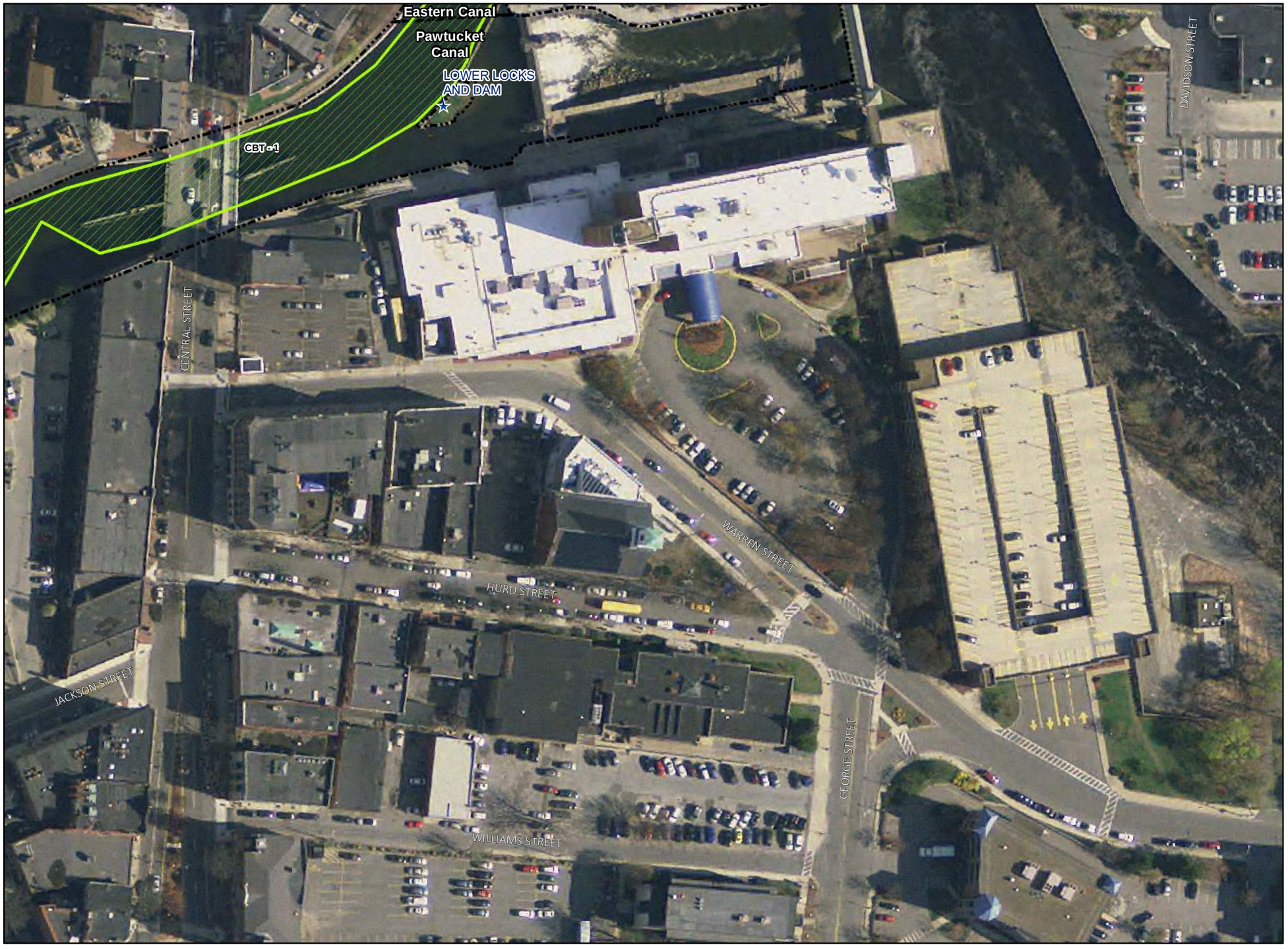
AUGUST 2020



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- Canal System
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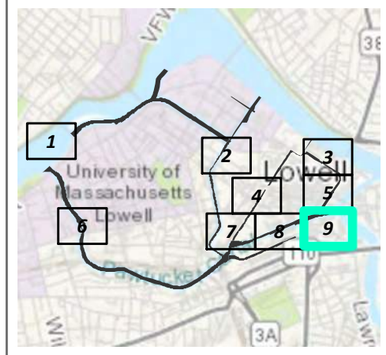

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BOOTT HYDRO, LLC.

TRASH ASSESSMENT AND MAPPING STUDY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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AUGUST 2020

Appendix L - Correspondence and Consultation Log

Scott, Kelsey

From: Quiggle, Robert
Sent: Tuesday, May 7, 2019 2:08 PM
To: celeste_bernardo@nps.gov; Bob Nasdor (bob@americanwhitewater.org); Kevin.hollenbeck@state.ma.us
Cc: Kevin_mendik@nps.gov; 'Kevin.Webb@enel.com'; Anderson, Elise (EGP North America); Gibson, Jim; MacVane, Kelly; Scott, Kelsey
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Consultation Regarding the Recreation and Aesthetics Study
Attachments: 20190507 Lowell Hydro Project Recreation Study Consultation.pdf

Ms. Bernardo, Mr. Nasdor, and Mr. Hollenbeck:

On behalf of Boott Hydropower, LLC (Boott), I am distributing the attached consultation request in support of the Federal Energy Regulatory Commission (FERC) relicensing of the Lowell Hydroelectric Project (Project). As described in the attached correspondence, Boott is consulting with the National Park Service, American Whitewater, and the Massachusetts Department of Conservation and Recreation to identify locations in the Project's vicinity to conduct visitor intercept surveys of recreationists for the approved Recreation and Aesthetics Study.

Should you have any questions regarding the attached correspondence, please contact Kevin Webb with Boott at 978-935-6039 or Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Boott Hydropower, LLC
A Subsidiary of Enel Green Power North America, Inc.

100 Brickstone Square, Suite 300 – Andover, MA 01810 – USA
T +1 978 681 1900 – F +1 978 681 7727

Via Electronic Distribution

May 7, 2019

Celeste Bernardo
Superintendent of Lowell National Historical Park
National Park Service
67 Kirk Street
Lowell, MA 01852

Robert Nasdor
NE Stewardship Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776

Kevin Hollenbeck
Metrowest District Manager
DCR Great Brook Farm State Park
984 Lowell Street
Carlisle, MA 01741

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Consultation Regarding the Recreation and Aesthetics Study

Dear Stakeholders:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the 22.4 megawatt (MW) Lowell Hydroelectric Project (Project or Lowell Project). The Lowell Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

In accordance with the Commission's Study Plan Determination issued on March 13, 2019, Boott is initiating consultation with the National Park Service (NPS), American Whitewater, and the Massachusetts Department of Conservation and Recreation (MADCR) to identify specific locations for field reconnaissance and visitor-intercept surveys. As part of the Recreation and Aesthetics Study, Boott will conduct field reconnaissance and visitor-intercept interviews at specific recreational facilities during the prime recreational season from May 2019 through October 2019. Boott will interview recreationists visiting these locations to collect data relevant to visitors' recreational experience in the Project area, including but not limited to, data regarding demographics, types of recreational activities participated in or may participate in during their visit, and their reasons for choosing the site or area. As a separate component of the Recreation and Aesthetics Study, Boott is hosting an online version of the visitor-intercept survey to capture additional recreationists that would like to participate (the online version of the visitor survey is available at: https://hdrinc.co1.qualtrics.com/jfe/form/SV_0AnPxTboxMRT8nX). Boott will install signage informing recreationists of the online survey at various locations determined in consultation with NPS.
As shown in Figure 1 provided as Attachment A, Boott is proposing the following nine locations to conduct the reconnaissance and visitor-intercept surveys:

- Lowell Heritage State Park
- Merrimack Trail System

- Pawtucket Falls Overlook
- NPS Canal Walkways
- Lowell National Historic Park
- Lowell National Historic Park Visitor Center
- Chelmsford Boat Access
- Rourke Brothers Boat Ramp
- Merrill Park

Boott is also proposing ten locations[1] (as shown in Figure 1) to install the temporary signs informing recreationists of the online survey opportunity. Boott respectfully requests any comments regarding the proposed reconnaissance and visitor-intercept locations or the signage locations within 15 days of this letter (i.e., by May 22, 2019). Following consultation with stakeholders, Boott will develop the final list of reconnaissance and visitor-intercept locations and will file the final list with the Commission and distribute to American Whitewater, NPS, and the MADCR. If we do not receive a response from your office, Boott will move forward with the study to include the visitor-intercept survey locations as shown in the attached figure.

On behalf of Boott, I appreciate the opportunity to consult with your offices regarding this study. Please do not hesitate to contact me at (978) 935-6039 if you have any questions concerning this matter.

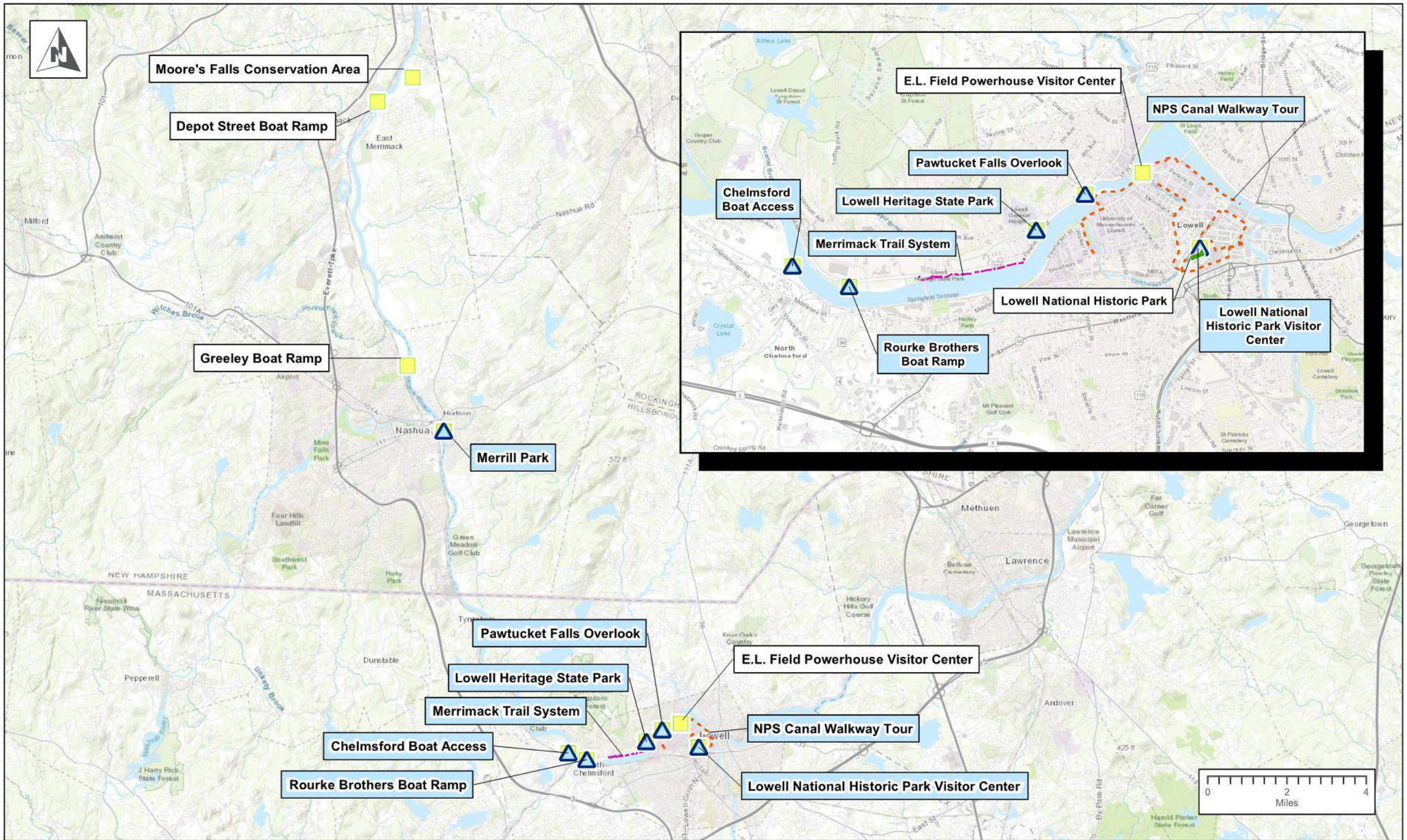
Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

cc: K. Bose, FERC
K. Mendik, NPS

Attachment A – Figure 1

[1]Boott will install temporary signs that will be removed at the completion of the study season. Boott will not affix signage to any historic structures or cultural resources without additional prior consultation with NPS and NPS partners.



BOOTT HYDRO, LLC.

Recreation Survey Location

Proposed Signage Location

Merrimack River Trail

NPS Canal Walkway Tour

RECREATION SURVEY
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

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MAY 2019

AMERICAN WHITEWATER

Robert A. Nasdor
Northeast Stewardship & Legal Director
365 Boston Post Road, Suite 250
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

www.americanwhitewater.org

May 17, 2019

Kevin Webb
Enel Green Power
100 Brickstone Square, Suite 300
Andover, MA 01810

Dear Kevin,

I write in response to your letter of May 7, 2019 regarding the proposed locations for field reconnaissance user intercept surveys for the Lowell Hydroelectic Project Recreation and Aesthetics Study. Thank you for reaching out to us to solicit our feedback in accordance with the requirements of the Study Plan Determination.

While the proposed locations will provide useful information to better understand aspects of current and future recreational use in the project area, these proposed locations will not collect information that will enable the Licensee and FERC to evaluate recreational demand for flows, access, and facilities that would support whitewater boating opportunity in the bypassed reach or in other areas that are impacted by project operations. There is well established history of whitewater boating on the Concord River during the spring freshet, demonstrating that there is strong interest in whitewater boating opportunity in the project area. Given the current lack of flows, access and information that would provide for whitewater boating opportunity in the bypassed reach, we do not believe that the survey locations will adequately collect information that will be useful for determining future whitewater boating use.

We recommend that the Licensee utilize the online survey instrument to collect information from whitewater boaters to evaluate the demand for whitewater boating opportunity at the project. In addition, the Licensee should incorporate into this study the results of the planned whitewater boating study that will evaluate the suitability of the bypassed reach for whitewater boating. We also recommend that the licensee collect user intercept surveys at the whitewater takeout on the Merrimack River below the confluence with the Concord River during weekends during the spring freshet in 2020 in order to include information from whitewater boaters in this study.

Thank you for considering this information in the development of the survey plan.

We look forward to working with you throughout the relicensing process.

Very truly yours,

Bob Nasdor
Northeast & Legal Stewardship Director
365 Boston Post Road, Suite 250
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

Scott, Kelsey

To: Jones, Scott
Subject: RE: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Friday, June 14, 2019 10:15 AM
To: Jones, Scott <Scott.Jones@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

Scott,

The City of Lowell is carrying out a number of bridge construction project this year and the crew is experiencing issues controlling water. There is a moderate probability the entire canal system will be drained down next week to diagnose and resolve the problem. City is being fined thousands of dollars daily while work cannot not resume and the water control issue cannot be delayed. Is there any chance you could rework your schedule for the following week?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

On Fri, Jun 14, 2019 at 7:52 AM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

> Christine,
>
> Right now we are scheduled for Tuesday (6/18) as I am also scheduled to be on another project on Wednesday and Thursday of that week. This other work is flow and weather dependent so if anything changes I will certainly let you know. Thanks for the update.
>
> Regards,
>
> **Scott A. Jones, B.S., PWS**
>
> Senior Environmental Scientist/Project Manager
>
> **D** 315.414.2205 **M** 315.317.6680
>
> scott.jones@hdrinc.com
>
> hdrinc.com/follow-us

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Thursday, June 13, 2019 11:54 AM
To: Jones, Scott <Scott.Jones@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

Scott,

Now that the Eastern Canal is drained for bridge work, there is a lot of trash visible on the canal bottom. This includes electronics and other hazardous items. Our staff are in a required 2-day occupational hazard training Tuesday and Wednesday next week. Would it at all be possible to meet in the field with you Thursday instead?

Christine Bruins | Community Planner

Lowell National Historical Park

978.275.1726 (office) | 978.954.1011 (cell)

On Wed, Jun 12, 2019 at 2:47 PM Bruins, Christine <christine_bruins@nps.gov> wrote:

> We can arrange to take you by trolley/boat to efficiently get you to and around most of the canal areas.
>
> **Christine Bruins | Community Planner**
>
> Lowell National Historical Park
>
> 978.275.1726 (office) | 978.954.1011 (cell)
>
> On Wed, Jun 12, 2019 at 2:44 PM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

Christine,

Thank you for following up with us. I received your message but have been tied up this afternoon. I am still solidifying my plans for next week, but we envision either Tuesday or Wednesday and can certainly meet you/staff/partners during one of those afternoons. I should know for sure by the end of this week. Thank you also for the detailed map, it will certainly make our visit more efficient. I will let you know as soon as I confirm my schedule. Thanks again,

Scott A. Jones, B.S., PWS

Senior Environmental Scientist/Project Manager

D 315.414.2205 **M** 315.317.6680

scott.jones@hdrinc.com

hdrinc.com/follow-us

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Wednesday, June 12, 2019 2:34 PM
To: Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Cc: Jones, Scott <Scott.Jones@hdrinc.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

Scott,

Celeste asked me to coordinate your trash survey next week with our staff and partners. I have gathered information from our staff on the areas where trash collects (see attached map). I am very interested in meeting with you to discuss the issues and problem areas. I'd also be interested in accompanying you and others for part of your field work. I'm collecting the availability of other staff and partners that would like to be involved in the study. Have you narrowed your field work within next week? My availability next week is as follows, will update you when I hear back from a couple of others.

Mon 6/17 - After 2 pm

Tue 6/18 - after 12 pm

Wed 6/19 before 2 pm

Thurs - anytime

Fri - anytime

Christine Bruins | Community Planner

Lowell National Historical Park

978.275.1726 (office) | 978.954.1011 (cell)

On Tue, Jun 4, 2019 at 10:35 AM Bernardo, Celeste <celeste_bernardo@nps.gov> wrote:

> Christine, in my absence, are you okay with coordinating with ENEL on this? I am fine with them attending a management team or biweekly meeting, although biweekly would be better since there are more supervisors. Or else you can set up a separate meeting. Can you check with Paul and Kevin and see who on their staffs should participate?
>
> Celeste
>
> Celeste Bernardo
>
> Superintendent
>
> Lowell National Historical Park
>
> 978 275-1703
>
> celeste_bernardo@nps.gov
>
> Like us on Facebook
>
> ---------- Forwarded message ---------
> From: **Jones, Scott** <Scott.Jones@hdrinc.com>
> Date: Mon, Jun 3, 2019 at 2:50 PM

Subject: [EXTERNAL] Lowell Project Recreation and Aesthetics Study
To: Bernardo, Celeste <celeste_bernardo@nps.gov>
Cc: Kevin.Webb@enel.com <Kevin.Webb@enel.com>, Quiggle, Robert <Robert.Quiggle@hdrinc.com>

Celeste,

As part of the Lowell Recreation and Aesthetics Study, HDR is planning on visiting the Project the week of June 17-21, 2019 to survey and document waterborne trash as outlined in the study plan approved by the Federal Energy Regulatory Commission. In accordance with the approved plan, HDR is conducting this work in the spring of 2019 when higher flows typically push trash and debris downstream. Based on our meeting last week, HDR understands that NPS staff is very familiar with locations within the canal system where waterborne trash accumulates. In anticipation of our visit, HDR would like to coordinate with your office to identify these areas so that we can accurately document and record these locations.

Accordingly, we are hoping to meet with you or your staff to briefly review project maps prior to the start of fieldwork. If you could let me know a good time during the week of June 17 to meet with you or appropriate NPS staff, it would be greatly appreciated. Please note that NPS staff is also welcome to accompany us as we conduct this fieldwork (we expect the work to take about a day to complete).

Thank you,

Scott A. Jones, B.S., PWS

Senior Environmental Scientist/Project Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2205 **M** 315.317.6680
scott.jones@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Bernardo, Celeste <celeste_bernardo@nps.gov>
Sent: Wednesday, July 3, 2019 8:25 AM
To: Jones, Scott
Cc: Kevin.Webb@enel.com; Quiggle, Robert
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

That's great Scott. Thank you for the clarification. Look forward to assisting where we can.

Celeste

Celeste Bernardo
Superintendent
Lowell National Historical Park
978 275-1703
celeste_bernardo@nps.gov
Like us on Facebook

On Tue, Jul 2, 2019 at 7:48 PM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

> Celeste,
> As the RSP and the FERC SPD indicates we will be surveying for water-borne trash after spring freshet, so with the unusual conditions this year we will be performing this component in 2020. Tomorrow we will be downloading the level loggers and installing recreational survey signs. Call or email me if you or Christine have any questions.
>
> Sent via the Samsung Galaxy S9+, an AT&T 5G Evolution capable smartphone

Scott, Kelsey

From: Scott, Kelsey
Sent: Friday, November 1, 2019 2:24 PM
To: celeste_bernardo@nps.gov; christine_bruins@nps.gov; Paul_Fontaine@nps.gov; kevin_coffee@nps.gov; laurel_racine@nps.gov; peter_reitchel@nps.gov; kevin_mendik@nps.gov; duncan_hay@nps.gov; Emily.Byrne@mail.house.gov; darryl.forgione@mass.gov; patrice.kish@mass.gov; thomas.m.walsh@mass.gov; william.cooksey@mass.gov; peter.hoffmann@mass.gov; dtradd@lowellma.gov; KKeefeMullin@lowellma.gov; cthomas@lowellma.gov; cclancy@lowellma.gov; jwinward@lowellma.gov; CRicker@lowellma.gov; chayes@lowellma.gov; CMcCall@lowellma.gov; scerand@hotmail.com; greenesh@comcast.net; jcalvin@lowelllandtrust.org; ffaust@edgegroupinc.com
Cc: Quiggle, Robert; Webb, Kevin (EGP North America); elise.anderson@enel.com
Subject: Lowell Hydroelectric Project (FERC No. 2790) Study Workshop
Attachments: November 2019_Lowell Hydro Project Workshop Agenda.pdf

Dear Stakeholders:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Recreation and Aesthetics Study, a Historically Significant Waterpower Equipment Study, and a Water Level and Flow Effects on Historic Resources Study, as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Boott intends to hold a two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders to address data needs and conduct a Project site visit related to the above studies.

The Workshop will be held in Lowell, MA over two days in November 2019. The first day will focus on stakeholder consultation, information gathering, and data needs for the three studies mentioned above. Boott anticipates this first day will take place from 9am-4pm in Lowell, MA. Additional details regarding the meeting space to follow. The second day will consist of a site visit to target specific Project facilities associated with the studies.

Boott is proposing the following dates for the two-day Workshop:

November 12-13, 2019
November 13-14, 2019
November 14-15, 2019
November 19-20, 2019

Please notify Boott of the dates you can attend the Workshop by completing the poll here: https://www.surveymonkey.com/r/YQFX7LD . Boott has developed the attached Lowell Hydroelectric Project Study Workshop Agenda. In order to facilitate the scheduling of the Workshop, Boott is asking that all interested stakeholders complete the poll by November 6, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Agenda

Project:	Lowell Hydroelectric Project (FERC No. 2790)
Date/Time:	TBD
Location:	Lowell National Historic Park, Lowell MA
Subject:	**Lowell Hydroelectric Project Study Workshop**

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and owner of the 20.2 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project). The Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations Part 5.

In support of Project relicensing, Boott is proposing to hold a two-day study workshop in Lowell, MA to consult with the National Park Service (NPS), Massachusetts Department of Conservation and Recreation (MADCR), City of Lowell (City), and other partners regarding certain studies approved in the Commission's March 13, 2019 Study Plan Determination for the Project. As described in the approved study plan, Boott is seeking information from the NPS, MADCR, and other partners regarding the Recreation and Aesthetics Study, the Historically Significant Waterpower Equipment Study, and the Water Level and Flow Effects on Historical Resources Study. The proposed two-day workshop will be an opportunity for consulting parties to share information and to identify the specific focus for field activities.

Day One: Data Needs and Information Gathering

The first day of the proposed workshop is intended to allow Boott, the NPS, MADCR, City, and other participating parties to discuss data needs and review available documentation. A proposed agenda for this day one of the workshop is presented below.

1. **Introduction**

    - Welcome and introduction
    - Overview and status of FERC relicensing process

2. **Recreation and Aesthetics Study**

    Study-specific Data Needs and Information Gathering

    - Recreation opportunities and access along the canal system;
    - Future use or planning documents that address anticipated or desired changes to the Lowell National Historic Park and Lowell Heritage State Park (e.g., The Foundation Report, or 5-year and 10-year plans);
    - Documentation of any reoccurring public safety issues or incidents within the parks associated with the canal infrastructure related to public recreation;
    - Annual maintenance schedules for the canal system;
    - Management or operations plans for the parks; and
    - Annual use records.

3. **Historically Significant Waterpower Equipment Study**

Study-specific Data Needs and Information Gathering

- Historically significant waterpower equipment owned and operated by Boott Hydropower of interest to the NPS for potential future interpretation, exhibition, or as scrap equipment to maintain and operate other historic machinery;
- Engineering reports, drawings, and/or photographs related to historically significant waterpower equipment owned and operated by Boott Hydropower of interest to the NPS; and
- Components of historically significant waterpower equipment owned and operated by Boott Hydropower that will require photography and documentation.

4. **Water Level and Flow Effects on Historic Resources Study**

Study-specific Data Needs and Information Gathering

- Engineering reports or evaluations of historic canal structures, including documentation of previous maintenance and/or repairs related to canal water levels;
- Descriptions and/or photographs of properties that have been previously affected by canal operations; and
- Engineering and architectural drawings, maintenance records, and structural modifications of the Great River Wall.

5. **Action Items and Next Steps**

Day Two: Site Visit

Day two of the proposed workshop is focused on a site visit at the Project. The purpose of the site visit is to view locations identified during day one of the workshop, including:

- Areas of potential recreation enhancements and potential recreational access areas;
- Historically significant waterpower equipment selected by the NPS for documentation, including specific equipment to be photographed;
- Canal features that have been previously impacted by flows and water levels; and
- Areas along the canal system where waterborne trash collects.

Scott, Kelsey

To: Racine, Laurel
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

From: Racine, Laurel [mailto:laurel_racine@nps.gov]
Sent: Monday, November 4, 2019 8:09 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Kelsey,
I'm writing because the NPS blocked my access to your poll. My participation would be most useful for the first day, not the site visits. Days I'm available for the day 1 workshop are November 12 or November 13, so either of the first two options are good for me. Thanks.
Laurel

_____
Laurel A. Racine, Chief of Cultural Resources
Lowell National Historical Park
67 Kirk Street
Lowell, MA 01852

Desk: 978-970-5055
Cell: (978) 423-3081

On Fri, Nov 1, 2019 at 2:24 PM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Recreation and Aesthetics Study, a Historically Significant Waterpower Equipment Study, and a Water Level and Flow Effects on Historic Resources Study, as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Boott intends to hold a two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders to address data needs and conduct a Project site visit related to the above studies.

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Thank You –

Kelsey Scott, MS

Assistant Regulatory Specialist

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Hayes, Christopher <chayes@lowellma.gov>
Sent: Monday, November 4, 2019 9:59 AM
To: Scott, Kelsey
Cc: Ricker, Claire V.; McCall, Christine
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Follow Up Flag: Follow up
Flag Status: Flagged

Hi, Kelsey,

Should I forward this to other potential interested stakeholders, or is the invitation limited to this list?

Thanks so much,
-Chris

Christopher Glenn Hayes | *Neighborhood Planner*
The City of Lowell|Department of Planning and Development
50 Arcand Drive|Lowell, MA 01852
t: 978.674.1405|f: 978.970.4262
http://www.lowellma.gov

LOWELL ***Alive. Unique. Inspiring.***

From: Scott, Kelsey [mailto:Kelsey.Scott@hdrinc.com]
Sent: Friday, November 01, 2019 2:24 PM
To: celeste_bernardo@nps.gov; christine_bruins@nps.gov; Paul_Fontaine@nps.gov; kevin_coffee@nps.gov; laurel_racine@nps.gov; peter_reitchel@nps.gov; kevin_mendik@nps.gov; duncan_hay@nps.gov; Emily.Byrne@mail.house.gov; darryl.forgione@mass.gov; patrice.kish@mass.gov; thomas.m.walsh@mass.gov; william.cooksey@mass.gov; peter.hoffmann@mass.gov; Tradd, Diane; Keefe Mullin, Kara; Thomas, Craig; Clancy, Christine; jwinward@lowellma.gov; Ricker, Claire V.; Hayes, Christopher; McCall, Christine; scerand@hotmail.com; greenesh@comcast.net; jcalvin@lowelllandtrust.org; ffaust@edgegroupinc.com
Cc: Quiggle, Robert; Webb, Kevin (EGP North America); elise.anderson@enel.com
Subject: Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

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Thank You –

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kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Scott, Kelsey

To: Scott, Kelsey
Subject: RE: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

---

From: Scott, Kelsey
Sent: Thursday, November 21, 2019 4:42 PM
To: 'celeste_bernardo@nps.gov' <celeste_bernardo@nps.gov>; 'christine_bruins@nps.gov' <christine_bruins@nps.gov>; 'Paul_Fontaine@nps.gov' <Paul_Fontaine@nps.gov>; 'kevin_coffee@nps.gov' <kevin_coffee@nps.gov>; 'laurel_racine@nps.gov' <laurel_racine@nps.gov>; 'peter_reitchel@nps.gov' <peter_reitchel@nps.gov>; 'kevin_mendik@nps.gov' <kevin_mendik@nps.gov>; 'duncan_hay@nps.gov' <duncan_hay@nps.gov>; 'Emily.Byrne@mail.house.gov' <Emily.Byrne@mail.house.gov>; 'darryl.forgione@mass.gov' <darryl.forgione@mass.gov>; 'patrice.kish@mass.gov' <patrice.kish@mass.gov>; 'thomas.m.walsh@mass.gov' <thomas.m.walsh@mass.gov>; 'william.cooksey@mass.gov' <william.cooksey@mass.gov>; 'peter.hoffmann@mass.gov' <peter.hoffmann@mass.gov>; 'dtradd@lowellma.gov' <dtradd@lowellma.gov>; 'KKeefeMullin@lowellma.gov' <KKeefeMullin@lowellma.gov>; 'cthomas@lowellma.gov' <cthomas@lowellma.gov>; 'cclancy@lowellma.gov' <cclancy@lowellma.gov>; 'jwinward@lowellma.gov' <jwinward@lowellma.gov>; 'CRicker@lowellma.gov' <CRicker@lowellma.gov>; 'chayes@lowellma.gov' <chayes@lowellma.gov>; 'CMcCall@lowellma.gov' <CMcCall@lowellma.gov>; 'scerand@hotmail.com' <scerand@hotmail.com>; 'greenesh@comcast.net' <greenesh@comcast.net>; 'jcalvin@lowelllandtrust.org' <jcalvin@lowelllandtrust.org>; 'ffaust@edgegroupinc.com' <ffaust@edgegroupinc.com>; 'Euris Gonzalez (DCR) (Euris.Gonzalez@mass.gov)' <Euris.Gonzalez@mass.gov>
Cc: 'Anderson, Elise (EGP North America)' <elise.anderson@enel.com>; 'Webb, Kevin (EGP North America)' <Kevin.Webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: RE: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Dear Stakeholders:

Based on the results of recent scheduling polls, we are confirming that the Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders will occur over two days from December 18—19, 2019. The first day will focus on stakeholder consultation, information gathering, and data needs for the three studies listed in the attached agenda. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA at the National Park Service Headquarters for the Lowell National Historical Park. The second day will consist of a site visit to target specific Project facilities associated with the studies. Boott anticipates this second day site visit to occur from 9am-12pm.

Additional information will follow this email in the weeks ahead of the Workshop meeting. Should you have any questions about the Workshop, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

Kelsey Scott, MS
Assistant Regulatory Specialist

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D 315.414.2206
kelsey.scott@hdrinc.com
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From: Scott, Kelsey
Sent: Friday, November 8, 2019 11:17 AM
To: 'celeste_bernardo@nps.gov' <celeste_bernardo@nps.gov>; 'christine_bruins@nps.gov' <christine_bruins@nps.gov>; 'Paul_Fontaine@nps.gov' <Paul_Fontaine@nps.gov>; 'kevin_coffee@nps.gov' <kevin_coffee@nps.gov>; 'laurel_racine@nps.gov' <laurel_racine@nps.gov>; 'peter_reitchel@nps.gov' <peter_reitchel@nps.gov>; 'kevin_mendik@nps.gov' <kevin_mendik@nps.gov>; 'duncan_hay@nps.gov' <duncan_hay@nps.gov>; 'Emily.Byrne@mail.house.gov' <Emily.Byrne@mail.house.gov>; 'darryl.forgione@mass.gov' <darryl.forgione@mass.gov>; 'patrice.kish@mass.gov' <patrice.kish@mass.gov>; 'thomas.m.walsh@mass.gov' <thomas.m.walsh@mass.gov>; 'william.cooksey@mass.gov' <william.cooksey@mass.gov>; 'peter.hoffmann@mass.gov' <peter.hoffmann@mass.gov>; 'dtradd@lowellma.gov' <dtradd@lowellma.gov>; 'KKeefeMullin@lowellma.gov' <KKeefeMullin@lowellma.gov>; 'cthomas@lowellma.gov' <cthomas@lowellma.gov>; 'cclancy@lowellma.gov' <cclancy@lowellma.gov>; 'jwinward@lowellma.gov' <jwinward@lowellma.gov>; 'CRicker@lowellma.gov' <CRicker@lowellma.gov>; 'chayes@lowellma.gov' <chayes@lowellma.gov>; 'CMcCall@lowellma.gov' <CMcCall@lowellma.gov>; 'scerand@hotmail.com' <scerand@hotmail.com>; 'greenesh@comcast.net' <greenesh@comcast.net>; 'jcalvin@lowelllandtrust.org' <jcalvin@lowelllandtrust.org>; 'ffaust@edgegroupinc.com' <ffaust@edgegroupinc.com>
Cc: 'Anderson, Elise (EGP North America)' <elise.anderson@enel.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Dear Stakeholders –

Due to scheduling conflicts, Boott is resurveying this group for available dates to hold the two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders. The first day of the Workshop will focus on stakeholder consultation, information gathering, and data needs. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA. Additional details regarding the meeting space to follow. The second day will consist of a site visit to target specific Project facilities.

Boott is proposing the following dates for the two-day Workshop:

December 4-5, 2019
December 5-6, 2019
December 9-10, 2019
December 10-11, 2019
December 11-12, 2019
December 17-18, 2019
December 18-19, 2019

Please notify Boott of the dates you can attend the Workshop by completing the Doodle Poll here: https://doodle.com/poll/dp2qb9232aq66awg

In order to facilitate the scheduling of the Workshop, Boott is asking that all interested stakeholders complete the poll by November 13, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

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D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

Scott, Kelsey

From: Scott, Kelsey
Sent: Monday, December 9, 2019 3:55 PM
To: 'celeste_bernardo@nps.gov'; 'christine_bruins@nps.gov'; 'Paul_Fontaine@nps.gov'; 'kevin_coffee@nps.gov'; 'laurel_racine@nps.gov'; 'peter_reitchel@nps.gov'; 'kevin_mendik@nps.gov'; 'duncan_hay@nps.gov'; 'Emily.Byrne@mail.house.gov'; 'darryl.forgione@mass.gov'; 'patrice.kish@mass.gov'; 'thomas.m.walsh@mass.gov'; 'william.cooksey@mass.gov'; 'peter.hoffmann@mass.gov'; 'dtradd@lowellma.gov'; 'KKeefeMullin@lowellma.gov'; 'cthomas@lowellma.gov'; 'cclancy@lowellma.gov'; 'jwinward@lowellma.gov'; 'CRicker@lowellma.gov'; 'chayes@lowellma.gov'; 'CMcCall@lowellma.gov'; 'scerand@hotmail.com'; 'greenesh@comcast.net'; 'jcalvin@lowelllandtrust.org'; 'ffaust@edgegroupinc.com'; 'Euris Gonzalez (DCR) (Euris.Gonzalez@mass.gov)'
Cc: 'Anderson, Elise (EGP North America)'; 'Webb, Kevin (EGP North America)'; Quiggle, Robert
Subject: RE: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop
Attachments: December 2019 Lowell Study Workshop Agenda.pdf

Dear Stakeholders:

The agenda is attached for the upcoming December 18 – 19, 2019 Study Workshop & Site Visit for the Lowell Hydroelectric Project. Boott appreciates the opportunity to consult with stakeholders and we look forward to seeing you next week.

Should you have any questions about the Study Workshop, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

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From: Scott, Kelsey
Sent: Friday, November 8, 2019 11:17 AM
To: 'celeste_bernardo@nps.gov' <celeste_bernardo@nps.gov>; 'christine_bruins@nps.gov' <christine_bruins@nps.gov>; 'Paul_Fontaine@nps.gov' <Paul_Fontaine@nps.gov>; 'kevin_coffee@nps.gov' <kevin_coffee@nps.gov>; 'laurel_racine@nps.gov' <laurel_racine@nps.gov>; 'peter_reitchel@nps.gov' <peter_reitchel@nps.gov>; 'kevin_mendik@nps.gov' <kevin_mendik@nps.gov>; 'duncan_hay@nps.gov' <duncan_hay@nps.gov>; 'Emily.Byrne@mail.house.gov' <Emily.Byrne@mail.house.gov>; 'darryl.forgione@mass.gov' <darryl.forgione@mass.gov>; 'patrice.kish@mass.gov' <patrice.kish@mass.gov>; 'thomas.m.walsh@mass.gov' <thomas.m.walsh@mass.gov>; 'william.cooksey@mass.gov' <william.cooksey@mass.gov>; 'peter.hoffmann@mass.gov' <peter.hoffmann@mass.gov>; 'dtradd@lowellma.gov' <dtradd@lowellma.gov>; 'KKeefeMullin@lowellma.gov' <KKeefeMullin@lowellma.gov>; 'cthomas@lowellma.gov' <cthomas@lowellma.gov>; 'cclancy@lowellma.gov' <cclancy@lowellma.gov>; 'jwinward@lowellma.gov' <jwinward@lowellma.gov>; 'CRicker@lowellma.gov' <CRicker@lowellma.gov>; 'chayes@lowellma.gov' <chayes@lowellma.gov>; 'CMcCall@lowellma.gov' <CMcCall@lowellma.gov>; 'scerand@hotmail.com' <scerand@hotmail.com>; 'greenesh@comcast.net' <greenesh@comcast.net>; 'jcalvin@lowelllandtrust.org' <jcalvin@lowelllandtrust.org>; 'ffaust@edgegroupinc.com' <ffaust@edgegroupinc.com>
Cc: 'Anderson, Elise (EGP North America)' <elise.anderson@enel.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Dear Stakeholders –

Due to scheduling conflicts, Boott is resurveying this group for available dates to hold the two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders. The first day of the Workshop will focus on stakeholder consultation, information gathering, and data needs. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA. Additional details regarding the meeting space to follow. The second day will consist of a site visit to target specific Project facilities.

Boott is proposing the following dates for the two-day Workshop:

December 4-5, 2019
December 5-6, 2019
December 9-10, 2019
December 10-11, 2019
December 11-12, 2019
December 17-18, 2019
December 18-19, 2019

Please notify Boott of the dates you can attend the Workshop by completing the Doodle Poll here: https://doodle.com/poll/dp2qb9232aq66awg

In order to facilitate the scheduling of the Workshop, Boott is asking that all interested stakeholders complete the poll by November 13, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR
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Agenda

Project:	Lowell Hydroelectric Project (FERC No. 2790)
Subject:	Lowell Project Study Workshop & Site Visit
Date:	December 18 – 19, 2019
Location:	Lowell National Historical Park Visitor Center (246 Market Street), Lowell, MA.

Pursuant to the Federal Energy Regulatory Commission's (FERC or Commission) Study Plan Determination (SPD) for the relicensing of the Lowell Hydroelectric Project (FERC No. 2790) (Project), Boott Hydropower, LLC (Boott) will conduct a Recreation and Aesthetics Study, a Water Level and Flow Effects on Historic Resources Study, and a Historically Significant Waterpower Equipment Study (collectively Studies). This Study Workshop to consult with stakeholders regarding these Studies will be held from 9:00 AM until 4:00 PM at the Lowell National Historical Park Visitor Center (246 Market Street) in Lowell, MA. The adjacent parking at 304 Dutton Street is free. On the following day after the Study Workshop, stakeholders are invited to participate in a site visit of the Project to consult on the field portion of the Studies, which is expected to end at noon. The proposed agenda for the Study Workshop is as follows:

Welcome and Introductions ..... 9:00 AM – 9:30 AM

Discussion of FERC Relicensing and ILP Study Process ..... 9:30 AM – 10:00 AM

Break ..... 10:00 AM – 10:15 AM

Recreation and Aesthetics Study Needs ..... 10:15 AM – 11:15 AM

Water Level and Flow Effects on Historic Resources Study Needs ..... 11:15 AM – 12:00 PM

Lunch Break ..... 12:00 PM – 1:00 PM

Historically Significant Waterpower Equipment Study Needs ..... 1:00 PM – 2:00 PM

Open discussion/Break ..... 2:00 PM – 3:00 PM

Upcoming ILP Schedule (2020-2021) ..... 3:00 PM – 3:30 PM

Action Items and Next Steps ..... 3:30 PM – 4:00 PM

Scott, Kelsey

From: Bruins, Christine <christine_bruins@nps.gov>
Sent: Thursday, December 19, 2019 9:22 AM
To: Webb, Kevin (EGP North America); Scott, Kelsey; Quiggle, Robert
Cc: Mendik, Kevin; Duncan Hay
Subject: Lowell NHP Exotic Species Treatment Schedule - Vegetation Mgmt
Attachments: 2018.9.11 EXOTIC SPECIES TREATMENT LOWELL.docx

Hi folks,

Thank you so much for hosting a meeting with the canal stewardship partners. I'm attaching a document from our maintenance department which outlines the exotic species that exist along the canals and treatment schedules.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

EXOTIC SPECIES TREATMENT CALENDAR FOR LOWELL NATIONAL HISTORICAL PARK

Prepared by Lars Boyd, Sept 11, 2018.

OUTLINE

I. Purpose of document

II. Target species for 2019

III. Tentative Treatment Calendar

IV. Best Management Practices

V. Brief description of each species with photos and treatment strategies

I. PURPOSE

This document provides a series of tables and exotic plant management information to aid in organizing of a 2019 treatment schedule for Lowell NHP.

This document will present an appropriate species to be focused on in a park for the given, and a potential control method. Often other species may be treated at the same time as the target species if the appropriate treatment method is able to be performed concurrently. For foliar spraying, a generic herbicide mixture can be used to treat a broad spectrum of species within the same day. A generic herbicide mixture can be applied to multiple species for basal bark and cut stem/stump treatments as well. Refer to the individual species treatment guides (Table 6-13) to determine if the application method is appropriate within the given time window before treating other species in the area with herbicide.

II. TARGET SPECIES FOR 2019 LOWELL NHP

Table 1: Reported Target Species W/ Locations for FY 2019

Species	NCW	BSS	FG	SW/JS	DSC&T	KP	VCC	TT	KSH	WCW
Ailanthus altissima (Tree of Heaven)	X		X		X					X
Alliaria petiolata (Garlic mustard)		X	X	X		X			X	
Celastrus orbiculatus (Asiatic Bittersweet)	X		X		X	X				X
Convolvulus arvensis (Bind Weed)										X
Cynanchum louiseae (Black Swallow-wort)	X			X	X	X	X	X		X
Fallopia japonica (Japanese Knotweed)		X		X	X					
Lythrum salicaria (Purple Loosestrife)	X			X						X
Rosa multiflora (Multiflora Rose)										X

NCW- Northern Canal Walkway
BSS- Black Smith Shop
FG- Francis Gate
SW/JS- Swamp Locks/Jackson St
DSC&T- Dutton St Canal & Tracks
KP- Kerouac Park
VCC- Visitor Center Courtyard
TT- Tremont St Tracks
KSH- Kirk St Headquarters
WCW- Western Canal Walkway

III. TENTATIVE CALENDAR FOR LOWELL NHP EXOTIC PLANT REMOVAL

Table 2: Foliar Spray Treatment Sequencing

Species	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Rosa multiflora (Multiflora Rose)			X	X					
Ailanthus altissima (Tree of Heaven)				X	X	X			
Cynanchum louiseae (Black Swallow-wort)				X	X				
Convolvulus arvensis (Bindweed)					X	X	X		
Fallopia japonica (Japanese Knotweed)						X	X		
Lythrum salicaria (Purple Loosestrife)						X			
Alliaria petiolata (Garlic mustard)							X	X	
Celastrus orbiculatus (Asiatic Bittersweet)								X	X

IV. BEST MANAGEMENT PRACTICES (ADOPTED FROM THE EXOTIC SPECIES TREATMENT CALENDAR FOR BOSTON METROPOLITAN PARKS by Lyndon Langthorne)

Non-chemical Treatment

Non-chemical treatment, when appropriate for the target species, should be attempted before chemical treatment. In most situations, chemical treatment can be made more effective when applied in conjunction with non-chemical management strategies. Non-chemical management strategies are generally labor intensive, but can be performed in most areas, including areas where chemical treatment would not be advisable.

Table 3. Non-chemical Treatment Methods

Hand pulling	Manual removal of top growth of plant, and as much of the root system as possible. Extensive, deep, and large root systems are not removable by hand. Hand pulling will prevent the formation of seed pods if consistently implemented throughout the growing season. This method is often not effective in managing regenerative species. Rhizomatous species are not generally manageable through this strategy alone.
Digging	Manual or mechanical removal of root system when hand pulling alone is not sufficient in removing the root system. Species that re-

	sprout from roots must have the root system removed. Digging is labor intensive. This method is not viable when managing regenerative plants with extensive, deep, or large roots. Digging disturbs the soil, encouraging colonization by other exotic species.
Cutting	Manual removal of the entire top growth of the plant by cutting the stem close to the ground. Plant matter removed by cutting may, depending on the species and desired conditions, be allowed to compost (either where it is cut or moved to another location), or destroyed to prevent reshooting of roots. Cutting can be effective on annuals or biennials if done before seeding, but in most perennial species, cutting alone is not capable of achieving control. Stump grinding of larger, woody stumps can prevent reshooting (e.g. *F. alnus*, *R. cathartica*, *A. altissima*). Herbicide can be applied to the cut surface to destroy the roots and prevent reshooting.
Flower clipping / Seed-heading	Manual removal of flowers or seed heads to prevent seeding or seed spread, but not removal of the plant top growth; seeds collected are destroyed. This method will limit the ability of the plant to spread through seeding, but will not prevent vegetative spread by the root system. Some plants do not rely on seeds as the primary vector of spread (e.g. *F. japonica*).
Mulching / Mats / ”Buckthorn Bags”	Covering of a disturbed or treated area to limit the ability of exotic species to grow and recolonize an area. Mulch can be layered over soil, and possible supplemented with a permeable material, like cloth or paper, to limit the ability of exotics to reshoot while also providing an area that can be used for planting. Reshooting may still occur with mulch, and monitoring is advisable. Mats of rubber or black plastic can be layered on the soil as an impervious surface. This surface cannot be used for planting, but is more likely to prevent any regrowth. If the mats are in an area of direct or partial sunlight, the heat collected will kill covered roots. “Buckthorn bags” can be placed over stumps of *F. alnus* and *R. cathartica* that are over two inches in diameter. Left in place for two years, these bags will prevent regeneration and destroy the root system of the plant.
Mowing	Mechanical removal of top growth of plants. Able to be applied quickly to large areas. Mowing is less precise than most manual methods, and is most viable on land that is already managed land. Will not destroy the root system of most plants, but often stresses the plant and prevents seed production if done consistently. Herbicide applied after mowing will often be more effective, either applying immediately after mowing as cut stem/stump treatment, or upon regrowth as a foliar spray.

Stump grinding	Perennial shrubs and trees can have their stumps ground to prevent reshooting.

Seeds forming on exotic plants should always be removed when observed. Removal of seeds can be a valuable management strategy in areas of lower priority, or where other management strategies are inadvisable. Seed removal will not disrupt existing plants, but will limit growth and spread of these populations. Seed removal also prevents exotics from further contributing to the soil seed bank, all the viable seeds existing within the soil of an area. Seeds of exotics should be burned or bagged and disposed of in a landfill to prevent further contamination.

Bare patches of soil, particularly those remaining after soil is disturbed by digging or hand pulling, is vulnerable to colonization by new exotic species. To mitigate this threat, new plants and grasses should be added to bare areas whenever possible. If a bare patch was the site of chemical treatment that will be repeated the following year, seed of an inexpensive annual ryegrass can be planted to limit the cost of further chemical treatments.

Chemical Treatment

Use pesticides at rates recommended by the label, and never exceed labeled rates. Mitigate damage to other plants and ecosystems by taking care for herbicide drift. Only apply herbicides on calm, dry days, and never any closer to standing water than is specified on the label. Herbicide applicators should always be properly fitted with Personal Protective Equipment (PPE) required by label, which represents the **minimum** PPE required for use. When applying chemicals, it is advisable to add a dye to the mix, unless otherwise stipulated, to better mark which plants have been treated. Dyes also allow contaminated gear to be easily identified for safety reasons.

Table 4. Chemical Treatment Method Overview

Foliar Spray	Broadcast or spot application of herbicide with a sprayer targeting foliage of species, wetting the leaves with herbicide to be absorbed into the root system. Apply to intact, green leaves. This is often the most efficient herbicide application method. Lower concentrations are used with foliar spray than other application methods. Foliar spray has the greatest potential to unintentionally damage surrounding plants, and may not be preferred for this reason. Foliar application is best for treating large, dense stands of invasive plants where risk of damaging surrounding plants can be minimized. When spraying, herbicide should wet leaves without dripping, as excessive spraying can harm non-target species. The extent of the application depends on the size of the area being treated. Spot spraying is application of herbicide in one location,

	generally to one plant. This type of application minimizes damage to surrounding plants. Broadcast application is more extensive than spot spraying for heavier infestations. Foliar spraying should not be performed on wet weather days as any herbicide may not be absorbed into plants, instead being washed away as runoff. Foliar spraying should not be performed on days when wind speeds are greater than 5 mph to prevent pesticide drift. Foliar spraying should also not be performed in areas where damage to non-target species is a concern. Large trees should not be treated by foliar spray.
Cut Stem/Stump	Application of herbicide either by brush or spray bottle to a cut surface to be absorbed into the root system. After cut, herbicide should be applied to the cut surface immediately for best effect, and not more than 15 minutes later; this time limit is particularly important for the best absorption of water-based herbicides, and oil based herbicides can be applied longer after cutting. Cut stump applications are more effective than basal bark on woody stems greater than 5” diameter, and thick barked species.
Basal Bark	Application of herbicide to the bark with a sprayer, from surface to 12-18 inches above the root collar, to be absorbed into root system. Useful in precisely controlling woody species. Treatment can be performed while herbaceous species are dormant. Uses oil-based herbicides that penetrate bark, mixed with a carrier (basal oil). The entire surface area of the trunk should be coated within the 12-18 inch range, and rough bark requires more spray. Application should be stopped short of runoff.
Stem Injection	Application of herbicide into the stems of hollow plants via specialized injection equipment. This method ensures absorption of the herbicide into the roots of the plant, and limits exposure to and contamination by pesticides.
Hand Wicking (“Glove of death”)	Application of herbicide to the leaf surface with an absorbent cotton glove coated in herbicide layered over a chemical resistant glove. Small spray bottles are used to wet the fingertips and palm of the glove, which is then wiped directly on the plant, coating the leaves. This method is precise, faster than cut stem/stump treatment, and limits exposure of herbicide to other plants. Cuff the ends of the glove to prevent dripping. Gloves used for this method will becomes saturated with herbicide and should not be stored with other equipment.

Herbicides

Use with caution.
Be aware of local regulations before use.
Always read the label thoroughly before use, and follow all requirements (including PPE, site location, concentration, etc.).

Chemicals should be chosen based on a variety of factors, including: effectiveness on target species, environmental impact (toxicity to animals, persistence in soil, activity in water), and safety. The correct herbicide should be chosen for the site, and herbicide labelling will list use sites.

Table 5. General Overview of Commonly Used Herbicides

Glyphosate	(*Rodeo®*)	Glyphosate is a non-selective systemic post-emergent herbicide, damaging to most plants, including broadleaf plants and grasses. Pure glyphosate is generally environmentally safe, essentially non-toxic to mammals and fish, and mildly toxic to birds. Glyphosate is quickly absorbed into soil, and has negligible lasting environmental effects, and leaching to other areas is not expected to occur. Glyphosate has a short half-life in soil and water. Glyphosate may or may not be metabolized by plants, and potentially persists in plants where it was applied, including in the roots. Be aware that not all glyphosate herbicides are registered for aquatic use, and some formulations are contain adjuvants that make them highly toxic to aquatic life. If using in an aquatic area, be sure to use a product that omits these toxic ingredients (eg. *Rodeo®*). Pure glyphosate has low human toxicity, but is often made more hazardous to humans with adjuvants that disseminate the chemical into plants. Causes significant eye irritation.
Triclopyr amine	(*Garlon® 3A*)	Triclopyr is a selective systemic post-emergent herbicide. It is relatively non-toxic to humans and terrestrial mammals, and some formulations are registered for aquatic use. Triclopyr should generally be used in areas where it is desired to protect surrounding grasses and sedges. Triclopyr amine is preferred for foliar applications over triclopyr ester.

Triclopyr ester	(*Garlon® 4 Ultra)*	Triclopyr is a selective systemic post-emergent herbicide. It is relatively non-toxic to humans and terrestrial mammals. It is not registered for aquatic use. Triclopyr ester is only recommended as a foliar spray prior to full leaf-out of the target plant. After leaf out, other herbicides would be preferred. Good for basal barking when mixed with a basal oil. Cannot be used within 35 ft. of wetland.
Imazapyr	(*Plateau®, Habitat®*)	Imazapyr is a non-selective, systemic, pre- and post-emergent herbicide. Imazapyr formulations can be registered for aquatic use. Imazapyr has a low human toxicity in skin contact or if ingested. Harmful if inhaled and may cause irreversible eye damage.

A good strategy for foliar application efficiency is to mix a general formulation of triclopyr amine and glyphosate. This mixture can be applied on a wide spectrum of species, and allow more treatment to occur during a single application session.

V. BRIEF DESCRIPTION OF EACH TARGET SPECIES (ADOPTED FROM THE EXOTIC SPECIES TREATMENT CALENDAR FOR BOSTON METROPOLITAN PARKS by Lyndon Langthorne)

Ailanthus altissima (Tree of Heaven)

Description

https://www.extension.iastate.edu/forestry/iowa_trees/trees/tree_of_heaven.html

A. altissima is a large non-native short-lived deciduous perennial tree. The trunk grows up to eighty feet tall, and is straight and gray, with smooth to bumpy bark that fissures with age. Leaves are silvery-green and pinnately compound, with alternate leaflets on one to four foot leaf veins. Leaves produce a foul smell if crushed. Five-petaled flowers are small, yellow-green, and grow in dense clusters. Reddish-brown seed pods are produced in late summer, and are twisted like helicopters, each containing one seed

The tree is resilient, and will grow in a wide range of environments, including urban where the root system can disrupt hardscaping and cause damage to structures. *A. altissima* crowds out native trees quickly with its ability to spread quickly to new areas. The roots are toxic and may limit growth potential for native plants.

Non-chemical Treatment

Seedlings and root suckers should be dug consistently to control spread. Any remaining stumps and roots will continue to generate new shoots. Cutting and mowing alone are not an effective form of management, and may increase density and spread potential. Mechanical measures that remove top growth are most effective when followed up by chemical treatment.

Chemical Treatment

Foliar spraying is the most common form of treatment for *A. altissima*] Foliar treatment best applied between full canopy and fall color. Foliar application cannot be applied to larger trees, and is most effective in treating dense stands of saplings.

Cut stump treatment is a more labor intensive method, but may be necessary in treating larger trees. After cutting tree, immediately apply herbicide to cut surface. Cutting alone will lead to increased suckering, and should be mitigated with herbicide application

Basal bark used for follow up treatments or small infestations. Root injury is maximized when used after full canopy to fall color. Following basal bark treatment, the tree is left in place to be cut at a later time. *A. altissima* may require multiple applications.

To maximize root damage, any chemical treatment should be performed within the time window where the tree has developed its full canopy and before the leaves have turned to fall colors.

Table 6: *A. altissima* Treatment Guide

Application Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Apr - Jun	Seedlings and saplings
Chemical Treatment						
Foliar	Glyphosate	*Rodeo®*	Non-selective	2%	Late Jun - Aug	Surfactant
	Triclopyr	*Garlon® 3A*	Selective	2%		
		Garlon® 4 Ultra		1.5%		
	Imazapyr	*Habitat®*	Non-selective	1%		
Cut stem/stump	Triclopyr	*Garlon® 3A, Garlon® 4 Ultra*	Selective	50%	Late Jun - Aug	
Basal bark	Triclopyr ester	*Garlon® 4 Ultra*	Selective	20-25%[1]	Mar - Oct[1]	Basal oil

Notes:
1. Contributed by BM

Alliaria petiolata (Garlic Mustard)

Description

https://www.michigan.gov/invasives/0,5664,7-324-68002_71240_73853-379483--,00.html

A. petiolata is a non-native biennial herb. First year plants are immature and resemble many native plants, such as *Viola*. In its first year leaves stay green all year long. *A. petiolata* is much easier to identify in the second year after bolting. In the second year, the leaves take on a garlicky odor and the stem forms up to three feet in height. Leaves are alternate, sharply toothed, and triangular. Flowers bloom early in the season and are white with four petals. Seed pods develop atop the stem and burst to project seeds up to five feet from the plants, leading to rapid expansion of patches. *A. petiolata* produces more seeds in wet environments.

A. petiolata populations can grow rapidly when unchecked. Roots of *A. petiolata* have an allelopathic effect on native plants, limiting growth potential in areas of infestation. The plant provides no benefits as a food source for native animal species.

Non-chemical Treatment

Stems are attached to a single root, and plants can be removed entirely by pulling, particularly in moist and loose soil. Plants can also be dug. These methods can be an effective for control, but disturbs soil and leaves bare patches, which can be recolonized. Roots must be removed completely to prevent resprouting and are easily broken.

Mowing or cutting of *A. petiolata* in its second year after bolting can also be an effective management strategy, destroying plants, especially those already under stress, and preventing seed development.

Clipping and removing of flowers will prevent the formation of new seeds, and will reduce population growth rates.

These methods must be repeated over many years until seed bank is depleted. Size of the seed bank depends on the age of the population. When utilizing these methods, it is important to clean any equipment used or worn in order to prevent seed spread.

Chemical Treatment

Foliar spray is the recommended method for chemical treatment of A. petiolata, if chemical treatment is deemed necessary. Leaves should be cleaned of debris prior to application to ensure absorption into the plant. Glyphosate and triclopyr amine application to rosettes is most effective in late fall, and is best used only on dense stands where non-chemical treatment would be prohibitively laborious. Triclopyr amine can be used to avoid damaging surrounding grasses.

Table 7. *A. petiolata* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Apr - Oct	
Mowing					Aug - Oct	Most effective if plants are already under stress (drought, etc.)
Flower clipping					Apr - Jun	
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	0.5-1%[1]	Sep - Oct	
	Triclopyr amine	*Garlon® 3A*	Selective	0.5-1%[1]		

Notes:
1. Contributed by BM

***Celastrus orbiculatus* (Asiatic Bittersweet)**

Description

https://orleansconservationtrust.org/asiatic-bittersweet-celastrus-orbiculatus/

C. orbiculatus is a non-native deciduous woody perennial that grows as either a vine or a shrub. Stem is woody with smooth brown bark. Leaves are alternate, glossy, and round with a pointed tip and shallow toothed margins. The leaves grow from two to five inches in length. Small greenish-yellow flowers with five petals form at leaf axils in clusters. Fruits are distinctive, in round orange capsules that split open in fall revealing fleshy red fruits with one or two seeds each.

The fruits persist throughout winter, and are highly attractive to birds and other animals, and to humans who often use vines and fruits in decorative manners. *C. orbiculatus* can spread far as seed, and is also capable of root suckering.

C. orbiculatus looks very similar to *C. scandens* (American Bittersweet), particularly when young. As the plant matures, it distinguishes itself with the placement of the fruit: *C. scandens* develops fruit on the tips of its branches, whereas *C. orbiculatus* develops fruits on the leaf axils. *C. scandens* leaves are also less round. Hybridization makes identification difficult. *C. orbiculatus* may be sold as *C. scandens* due to the difficulty in identification.

C. orbiculatus displaces native species through competition, and also displaces *C. scandens* through hybridization, potentially threatening *C. scandens* genetic identity. *C. orbiculatus* grows rapidly and can quickly dominate areas it is introduced into. *C. orbiculatus* also twines around native trees, increasing the load on limbs and contributing to failure.

Non-chemical Treatment

Smaller plants can be hand pulled or dug out. The entire root should be removed to prevent resprouting.

Vines climbing into trees can be cut at a comfortable height to kill any of the vine in the canopy and relieve trees. The base of the vine will continue to grow, and will require

continued treatment to manage. When cutting vines from trees, take care to limit damage done to the bark of the tree as much as possible, for the sake of continued tree health.

Chemical Treatment

Foliar spraying of triclopyr is recommended for large, dense patches. Foliar spray is best applied in autumn or early winter, after most other species are dormant. If the vine is fully leafed out at the time of spraying, it is recommended to use triclopyr amine over the ester form. Foliar spray should only be applied on calm days when ambient air temperature is above the required sixty-five degrees Fahrenheit.

Vines of the plant that grow up into the canopy cannot viably be treated with a foliar application. The cut stump method is preferable for *C. orbiculatus* vines that climb trees, as well as for vines that are in close proximity to desired plants. When cutting, cut the vine six inches above the ground, in case more cut stump applications are required. Immediately apply the herbicide with a brush or spray bottle. Cut stump treatment can be used at any time in the year as long as the ambient air temperature is above the necessary temperatures: forty degrees Fahrenheit for glyphosate application, and sixty-five degrees Fahrenheit for triclopyr application. The ground should not be frozen at the time of application.

Basal bark treatment with triclopyr ester can also be applied at any time in the year, if the ambient air temperature has been above the required sixty-five degrees Fahrenheit for several days. Basal bark treatment should also not be done if there is snow on the ground, or if any part of the application area is wet from rain or flooding. Before applying, cut any stems sprouting from the vine within the twelve to eighteen inch application range to reveal the bark, and apply the treatment to cover the entire of that area.

Systemic herbicides should destroy an entire *C. orbiculatus* plant in a week.

Table 8. *C. orbiculatus* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Mar - Nov	Small plants
Cutting					Mar - Nov	Will kill any climbing vines in canopy to relieve tree, will not destroy roots
Chemical Treatment						
Foliar spray	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	2%	Oct - Nov	Use late season so most native species are dormant; ambient temperature should still be above 65 degrees F
Cut stem/stump	Glyphosate	*Rodeo®*	Non-selective	25%	Year round	Ambient air temperature above 40°F
	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective			Ambient air temperature above 65°F, no frozen ground
Basal bark	Triclopyr ester	*Garlon® 4 Ultra*	Selective	20%	Year round	Should only be performed when ambient air temperature has been above 65°F for several days

Cynanchum louiseae (Black Swallow-wort)

Description

https://www.maine.gov/dacf/mnap/features/invasive_plants/cynanchum.htm

C. louiseae is a non-native rhizomatous perennial milkweed. Stems are yellowish-green, long and thin, vine-like and twining. The stems tend to climb and twist around other plant stems or themselves. Leaves are opposite, smooth, shiny, dark green, and elliptic or heart shaped with sharp tips. Flowers are small and dark purple, with five petals. *C. louiseae* has milkweed-like seed pods, with many small brown seeds attached to fluffy white hairs.

C. louiseae is spread long distances by its seeds, which float in wind, and many seeds will drop into already infested areas, increasing the density of *C. louiseae* in patches.

C. louiseae outcompetes native species and forms sprawling and dense mats of plant matter that completely cover areas, limiting the growth potential for native species. It will also twine around native species, stressing those plants and limiting ability to grow.

Non-chemical Treatment

Non-chemical treatment of C. louiseae has limited effects for control. Hand pulling or mowing the part of the plant above soil prevents the development of seed pods, limiting the ability of the plant to spread; this is not an effective method of long-term control.

Digging the roots of the plant is labor intensive, and any control established is limited as the plant will resprout from any remaining rhizomatous matter. The entire crown and root system must be removed in order to control by digging.

Any seed pods that do form should be pulled by hand and bagged or burned to prevent propagation.

Chemical Treatment

C. louiseae is a pervasive species and will require multiple years of treatment to achieve control. It is very important to not apply herbicide too early in the season when treating *C. louiseae*. While the shoots emerge in the early spring, herbicide should only be applied after the plants have begun to flower in June or July, and must be applied before the formation of seed pods. Foliar spraying before the formation of seed pods will greatly reduce seed viability in affected plants.

Foliar spray is optimal when treating large monotypic stands of *C. louiseae*. If the exotic plants are surrounded by desired grasses, then triclopyr can be used minimize damage to grasses. Plants will appear sick one to two weeks after herbicide treatment, exhibiting yellowed leaves, and dead spots. Do not reapply herbicide to plants that are sick, as sick plants cannot effectively absorb herbicides into roots.

For particularly sensitive areas, cut stem treatment of *C. louiseae* is a viable control method. Stems should be cut to about two inches from the ground, and non-selective herbicide should be applied immediately.

Table 9. *C. louiseae* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand-pulling					Aug - Nov	Target seedpods
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	3-5%	June - July	Spray as plants begin to flower
	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	1%		
	Imazapyr	*Habitat®*				
Cut stem/stump	Glyphosate	*Rodeo®*	Non-selective	50-100%	June - July	Cut stems to two inches from the

						ground before applicati on

***Fallopia japonica* (Japanese Knotweed)**

Description

https://www.hortweek.com/network-rail-loses-japanese-knotweed-court-ruling/landscape/article/1486930

F. japonica is a non-native rhizomatous perennial that is a particularly difficult exotic species to manage. The stems emerge in early spring and grow tall, up to ten feet. The stems are reddish-brown and hollow, resembling bamboo. Heart-shaped leaves are large, growing four to seven inches in length. Clusters of small, greenish-yellow to white flowers are formed in July. Fruits mature in August or September, and are winged to increase seed dispersal.

The seeds rarely germinate, and North American knotweed is presumed to be a sterile male clone. It is still possible to produce viable seeds, usually through hybridization. F. japonica mainly spreads vegetatively, extending its massive woody rhizome system and sending up new shoots. Any piece of rhizome material moved to a new area can lead to new infestation. As such, it is generally contained in defined patches, and will not cross impervious surfaces like roads easily.

F. japonica offers no ecological benefits to native species other than dense cover. It can colonize a variety of ecosystems, swiftly converting them to monocultures, and degrading habitat value.

Non-chemical Treatment

Digging is an ineffective method of management, as *F. japonica* grows from a thick rhizome, forming large crowns that are extremely difficult to fully remove.

Mowing of *F. japonica* alone is not an effective means of control, and must be coupled with chemical treatment.

Small stands of *F. japonica* can be managed by mowing the area and covering it with impervious mats, thick enough that *F. japonica* is unable to grow through. Leaving the mats in place for several years will prevent the root system from sending up new shoots in the covered area, preventing photosynthesis. If in an area of full or partial sun, the heat will also damage the root system.

F. japonica is limited in its ability to spread across impervious surfaces, and will be more easily contained closer to roads.

Chemical Treatment

The most effective method of chemical treatment is first to mow *F. japonica* at the beginning of July, and follow with herbicide application. At least six weeks should pass between mowing and herbicide application, and when herbicide is applied the height of *F. japonica* is limited to its regrowth: three to four feet tall instead of six to ten feet tall.

Glyphosate can be applied as a foliar spray. Glyphosate is a non-selective herbicide, and patches with *F. japonica* are generally monocultures. Glyphosate should be applied twice in the first year of treatment, first in early August, and following up in September before the first frost.Grass can be seeded in the area if it is necessary for erosion control. As knotweed requires multiple years of treatment, an inexpensive annual rye grass would be optimal.

F. japonica can also be treated by stem injection, where herbicide is injected at the nodes, the location where the leaves meet the stem. Stem injection directs as much chemical as possible to the root system, but is labor intensive and requires specialized injection equipment.

F. japonica thrives in a range of soils, from sandy roadsides to moist wetlands. In wetland areas, use mechanical methods to the greatest extent feasible (such as thick mats). Work from the upstream seed source to downstream populations. If chemical treatment is used, care should be taken to use an herbicide that will not injure amphibian food sources and rare species such as Blanding’s turtle. The table below provides guidance on using *Rodeo®.*

Application should not exceed the regulated rate per acre, of particular concern when filling hollow stems or injecting herbicide.

Herbicide should not be applied after the first frost, as *F. japonica* is frost sensitive and will die back, leaving any herbicides applied after frost unabsorbed.

Table 10. *F. japonica* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Mowing					Aug; Sep	
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	2-4%[1]	Early Aug - Late Sep	Surfactant; first application: Add surfactant, must wait 6 weeks after early July mowing, second application: add surfactant, must be applied before first frost
Stem injection	Glyphosate	*Rodeo®*	Non-selective	100%	August	Injected at the stem nodes

Notes:
1. Contributed by BM

Convolvulus arvensis (Bindweed)

Description

https://www.swcoloradowildflowers.com/White%20Enlarged%20Photo%20Pages/convolvulus%20arvensis.htm

"Deep rooted perennial vine that grows along the ground until it comes in contact with other plants or structures; then climbs aggressively. Smooth, arrowhead-shaped leaves. Slender, twining stems that can grow to 6 feet long. Trumpet-shaped flowers, light pink to white. Two small leaf bracts about one inch below the flower. Fleshy pale roots that travel deeply and widely" https://www.nwcb.wa.gov

"Reproduces vegetatively from roots, rhizomes,stem fragments and by seeds that can lie dormant in the soil for up to 20 or more years. Roots spread widely underground, both vertically and horizontally, forming dense mats. Flowering is indeterminate, so flowers continue to develop along stems until the first frost" https://www.nwcb.wa.gov

Non-chemical Treatment

"Avoid digging or tilling the soil around mature field bindweed roots; roots or rhizome fragments left behind may resprout. Repeated hand pulling works eventually, but is highly labor intensive. It is best to limit hand pulling and tilling to seedlings; do in early spring when the ground is wet. Smothering plants with mulch, black plastic or plastic-fiber mats (geotextiles) is another option, but the covering must be kept in place for several years. Success may be somewhat limited as field bindweed can persist without light, sending its underground roots beyond the edge of the covering to start a new infestation. If using coverings, check often for cracks or openings; pull or spot spray any new growth coming up through the covering. Cutting alone will not control this plant and is not recommended." https://www.nwcb.wa.gov

Chemical Treatment

"Herbicides can be painted or brushed on leaves to avoid drift onto desirable plants. Products containing glyphosate are effective when applied in the summer and fall before

the leaves die back. However, glyphosate is “non-selective” and will injure any foliage that it comes in contact with including grass. Selective broadleaf herbicides with the active ingredients triclopyr and 2,4-D work well for lawn areas as they won’t harm most grasses. Repeat on regrowth as needed. All these herbicides are absorbed by foliage and moved throughout the plant to kill the roots and shoots. If retreating with glyphosate in the same season, allow plants to grow and produce flowers before each application.” https://www.nwcb.wa.gov

Table 11. *C. arvensis* Herbicide Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand-pulling					Mar - Sept	
Digging					Mar - Sept	
Mowing					Mar - Sept	
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	2%	July - Sept	
	Triclopyr	*Garlon® 3A*	Selective	3-5%		
	Imazapyr	*Habitat®*	Non-selective	2%		

Lythrum salicaria (Purple Loosestrife)

Description

L. salicaria is a non-native herbaceous perennial forb that is an aggressive invader of wetlands. Several four-sided square erect stems grow from a single plant, two to six feet in height. Leaves are opposite on the stem or in whorls around the base, and are smooth, elongated, and heart-shaped. Flower spikes are showy and magenta, made up of many small, five-petaled individual flowers, blooming late in the growing season. The fruit is a capsule developed in autumn containing small seeds.

https://www.minnesotawildflowers.info/flower/purple-loosestrife

L. salicaria is spread by seed, which are viable for many years, and remain dormant in the soil until conditions are right for growth.

L. salicaria can dominate areas where it is introduced, displacing native species and reduces biodiversity. *L. salicaria* also degrades wetlands, catching sediment that fills in wetlands, leading to reduced water flow, and decreased flood retention.

Non-chemical Treatment

L. salicaria populations can be partially managed by pulling and digging as long as the entire taproot is removed. This is time consuming and labor intensive, and should only be implemented on small pioneer populations that can be removed efficiently.

Biological control is the best method for long term large scale. Insect species can be introduced to feed on the plants, preventing *L. salicaria* from seeding and weakening, eventually destroying the plant.

Chemical Treatment

L. salicaria most commonly is found in sensitive wetland areas. The two most effective herbicides are glyphosate and triclopyr. Glyphosate and triclopyr amine, both registered for aquatic use, are commonly applied when managing *L. salicaria*. Treatment should occur prior to seed set to prevent future spread of the species.

Glyphosate can damage surrounding grasses and sedges, leaving new opportunities for colonization by *L. salicaria*. Pesticide should be selected based on density of the stands being treated, and whether or not surrounding plants are desirable. If surrounding plants are desirable grasses and sedges, triclopyr amine should be selected. If there are many exotic plants, glyphosate should be used, or a mixture of glyphosate and triclopyr. Follow up treatments will be required for years until the seedbank is depleted.

Table 12. *L. salicaria* Herbicide Treatment Guide

Application Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Apr - Sep	
Digging					Apr - Sep	
Cutting					Apr - Sep	
Biological					Apr - Jun	Introduced insect species to feed on plant
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	1-2%	Late Aug	Apply after peak bloom; cut and dispose of flower heads prior to application
	Triclopyr amine	*Garlon® 3A*	Selective	1%		
Hand wicking					Late Aug	

***Rosa multiflora* (Multiflora Rose)**

Description

R. multiflora is a thorny non-native perennial shrub. The plants is tolerant of many conditions and can grow ten feet tall and ten feet wide. Stems are long, green to brown, with hooked thorns that make hand removal hazardous. Leaves are opposite with five to eleven leaflets, and leaflets are one to two inches in length. White to pinkish five petal flowers form in clusters in the summer. The plant produces bright red fleshy fruits (hips).

https://production.wordpress.uconn.edu/cipwg/wp-content/uploads/sites/244/2014/04/RobRoutledgeSaultCollegeBugwood.jpg

R. multiflora can generate new stems to spread, but it is predominantly spread by seed.

R. multiflora is easily distinguished from native *Rosa* species. In R. multiflora the base of leaf where it is attached to the thorny stem is fringed, and the plant's white to pinkish five petalled flowers occur in branched structures.

Benefits of the plant include the food and cover it provides to native animals. However, the overall effect this shrub has on habitat value is negative. *R. multiflora* crowds out native species and creates dense, impenetrable stands. *R. multiflora* can also act almost as a vine, and choke out native trees.

Non-chemical Treatment

Controlling small populations is much easier than attempting control dense stands. Hand pulling can be effective if the entire root of the plant is removed.

Cutting or mowing alone will not control *R. multiflora*, but are useful in preparation for herbicide treatment. Cut stem application would be impossible on dense stands, so mowing leads to better control.

Chemical Treatment

Foliar applications are made in summer when *R. multiflora* is flowering, with peak bloom being in early June. Spray should thoroughly cover the foliage of the plant, wetting as many leaves as possible without dripping. Glyphosate is less effective on multiflora rose than other herbicides but may be desirable if soil activity is a concern, or to avoid damaging surrounding grasses. Triclopyr can be applied as a foliar spray, and will eliminate top growth; future applications may be necessary to destroy the root system.

Triclopyr can also be applied to cut stems or as basal bark, and is most effective when applied in the dormant season. Cut stem use when mowing or cutting is practical; remove the top growth of the shrub and wet the stubble. This method can be applied year round. Basal bark is only feasible when the base of the plant can be accessed. It is best applied from January to autumn color. Wet the lower twelve inches of plant stem without causing runoff.

Table 13. *R. multiflora* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Mar - Nov	Remove entire root
Cutting/Mowing					Mar - Nov	Effective when followed immediately by chemical treatment
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	2%	May - Jun	
	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	1%		
Cut stump/stem	Triclopyr	*Garlon® 3A*, *Garlon®*	Selective	50%	Year round	

		4 Ultra				
Basal bark	Triclopyr ester	*Garlon® 4 Ultra*	Selective	20-25%	Jan - Aug	Basal oil

Important Note: *Mention of specific products in this document does not constitute endorsement. Specific product names are mentioned in the resources used to create this document. This document is meant to serve as a guideline for exotic plant management, and is not a legal authority. By law, pesticides must be applied according to their labeling.*

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Scott, Kelsey

To: Quiggle, Robert
Subject: RE: Lowell Heritage State Park information

From: Quiggle, Robert
Sent: Friday, December 20, 2019 3:28 PM
To: Harris, Jeffrey (DCR) <jeffrey.harris@state.ma.us>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: RE: Lowell Heritage State Park information

Jeffrey:

It was good to meet you this week, and thanks for providing this information so quickly. We'll look through this and let you know if we have additional questions, etc.

Have a great holiday,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Harris, Jeffrey (DCR) [mailto:jeffrey.harris@state.ma.us]
Sent: Friday, December 20, 2019 12:33 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Lowell Heritage State Park information

Rob-

Thank you for your presentation on the Boott Hydro relicensing project on Wednesday. As a follow-up, I wanted to provide you with some additional information that may be helpful in the various studies that are planned.

The first is a 2014 Resource Management Plan for the broader complex that includes Lowell Heritage State Park. This addresses DCR ownership, recreation, and other issues within the park. The document is available here: https://www.mass.gov/service-details/lowell-great-brook-planning-unit

Secondly, our GIS team undertook a major effort a number of years ago to clarify DCR ownership of parcels within the City of Lowell. This data is currently available through Mass GIS: https://docs.digital.mass.gov/dataset/massgis-data-protected-and-recreational-openspace

Let me know if you have any questions!

Jeffrey

Jeffrey Harris, Preservation Planner

Office of Cultural Resources
Department of Conservation and Recreation
251 Causeway Street - Suite 700
Boston, MA 02114
P: 617-626-4936
F: 617-626-1349

DCR's Office of Cultural Resources

Protecting the legacy and experience of history in Massachusetts state parks.

Scott, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, March 13, 2020 2:13 PM
To: Quiggle, Robert
Cc: Scott, Kelsey; Jones, Scott
Subject: Re: [EXTERNAL] Lowell Hydro Relicensing Waterborne Trash Mapping

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The COVID 19 situation is evolving rapidly. I don't think we can realistically schedule something this month. Let's set a tentative date 30+ days out? Week of 4/20? Monday, Thursday, Friday are free.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Quiggle, Robert
Sent: Friday, March 13, 2020 12:03 PM
To: Bruins, Christine A
Cc: Scott, Kelsey ; Jones, Scott
Subject: [EXTERNAL] Lowell Hydro Relicensing Waterborne Trash Mapping
Christine: We are looking to schedule our waterborne trash survey and mapping, and I wanted to check in with you to see if there were any specific dates that we should target or avoid. We'd like to get the fieldwork completed before mid-April, and we'd like to meet briefly with NPS staff that may have relevant information on waterborne trash issues while we're at the project.
We can be pretty flexible in terms of scheduling the fieldwork, but just let us know what makes sense on your end.
Thanks,
Robert Quiggle, RPA
Regulatory and Environmental Section Manager

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Iffert, Kelsey

From: Iffert, Kelsey
Sent: Tuesday, May 10, 2022 9:18 AM
To: Galonska, Juliet L
Cc: Lonsway, Peter; Kevin Webb; Richard Malloy; Gibson, Jim; Cassidy, Lisa A; pat_egan@nps.gov; michael_fernandes@nps.gov; tess_shatzer@nps.gov
Subject: RE: Lowell Hydro Project - Recreation and Aesthetics Study
Attachments: April_2022 NPS Discussion on Boat Tours.pdf; Boott Recreation and Aesthetics Consultation 20220405.pdf

Good morning –

As a follow-up to our April conversation regarding the Recreation and Aesthetics Study Report, please find attached the meeting minutes. Over the next few weeks, it would be appreciated if NPS can provide any information or documentation deemed relevant to the NPS canal boat tours including maps, pictures, prior consultation, schedules, or canal tour manuals. Thank you,

Kelsey Scott Iffert, MS
Environmental/Regulatory Section Lead

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From: Iffert, Kelsey
Sent: Tuesday, April 5, 2022 10:09 AM
To: Galonska, Juliet L <Julie_Galonska@nps.gov>
Cc: Lonsway, Peter <Peter_Lonsway@nps.gov>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Lowell Hydro Project - Recreation and Aesthetics Study

Julie –

As detailed in the attached letter, Boott is requesting further consultation with NPS regarding the Recreation and Aesthetics Study for the Lowell Hydroelectric Project. Specifically, Boott is seeking records associated with NPS' historical and current boat tours throughout the Lowell canal system. This could include tour maps, pictures, reports, prior consultation, schedules or canal tour manuals, or other documentation deemed relevant. Boott is requesting this information by early May 2022 to incorporate into the updated Recreation and Aesthetics Study Report.

Additionally, a conference call with NPS staff that manage boat tour operations would be beneficial. I started a Doodle Poll for a call on April 14/15, but I recognize this may be too short of notice for the NPS. If so, can coordinate for an alternate time in later April. Looking forward to hearing from you, thank you.

Kelsey Iffert, MS
Environmental/Regulatory Section Lead

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Boott Hydropower, LLC
Subsidiary of Central Rivers Power US, LLC
670 N. Commercial Street, Suite 204
Manchester, NH 03101

Via E-Mail

April 5, 2022

Superintendent
Lowell National Historical Park
National Park Service
67 Kirk Street
Lowell, MA 01852
Julie_Galonska@nps.gov

Re: Lowell Hydroelectric Project (FERC No. 2790-074);
Recreation and Aesthetics Study Report Information Request

Dear Ms. Galonska:

Boott Hydropower, LLC (Boott), a subsidiary of Central Rivers Power US, LLC, is the Licensee, owner, and operator of the 20-megawatt Lowell Hydroelectric Project (Project) (FERC No. 2790). Boott operates and maintains the Project under license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (C.F.R.) Part 5.

In support of Project relicensing, Boott is conducting a Recreation and Aesthetics Study. Boott filed with the Commission the Initial Recreation and Aesthetics Study Report on September 30, 2020. Commission staff's February 2, 2021 issuance found that Boott's initial study report should be updated to include a recreation access evaluation in the updated study report, including: (1) locations where recreation access should be restricted due to Project operation, property rights, dam safety, or public safety; (2) locations where recreational use of canals could be compatible with ongoing Project operation; and (3) an evaluation of the effects of Project operation on access to the Northern Canal and National Park Service (NPS) boat tours. On February 25, 2021, Boott filed an updated Recreation and Aesthetics Study Report to include this information.

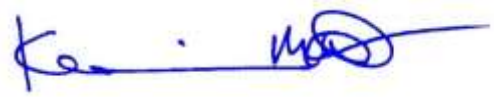
In response to NPS' comments filed in December 2021, the Commission issued a *Determination on Requests for Study Modifications for the Lowell Hydroelectric Project* (2022 Study Determination) on March 1, 2022, specifically recommending the Recreation and Aesthetics Study Report be updated with the following: (1) a description of boat tour routes used by NPS (past or present) within the Northern and Pawtucket Canal system, including a description of locks or other navigational features that the tours pass through; (2) an evaluation of the effects of

Project operation on NPS boat tours in the Northern Canal; (3) an evaluation of the effects of Project operation on NPS boat tours, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary; (4) an evaluation of the potential for expanding access to the canals for recreation (including NPS boat tours) in light of the results of Study 13 (Resources, Ownership, Boundaries, and Land Rights Study) and in consideration of Project operation under normal and high flow conditions (including an assessment of surge gate and shut down options); and (5) an analysis of the effects of Project operation on NPS boat tours and recreational rights, in relation to Boott's proposal to remove the majority of the canal system from the Project boundary.

In order to facilitate the timely completion of the Recreation and Aesthetics Study, Boott respectfully asks that the NPS provide any information or documentation deemed relevant to the above items specified in the 2022 Study Determination including NPS boat tour maps, pictures, prior consultation, schedules, or canal tour manuals. Boott requests this information on or before May 6, 2022. Boott also intends to coordinate a conference call with the NPS if it would assist your office in responding to this request or in identifying the types of specific information relevant to this study.

Please do not hesitate to contact me at (978) 935-6039 or kwebb@centralriverspower.com if you have any questions concerning this submittal.

Sincerely,
Boott Hydropower, LLC



Kevin M. Webb
Licensing Manager

cc: R. Malloy, CRP
P. Lonsway, NPS

Whitewater Boating and Access Study

Lowell Hydroelectric Project (FERC No. 2790)

December 2024

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC

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Appendix D - Whitewater Flow Documentation Report

List of Acronyms

AW	American Whitewater
Boott	Boott Hydropower, LLC (or Licensee)
CRC	Campus Recreation Center
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
COVID-19	Coronavirus Disease 2019
FERC	Federal Energy Regulatory Commission (or Commission)
ILP	Integrated Licensing Process
LNHP	Lowell National Historical Park
MADCR	Massachusetts Department of Conservation and Recreation
MassDOT	Massachusetts Department of Transportation
NGVD 29	National Geodetic Vertical Datum 1929
NHDES	New Hampshire Department of Environmental Services
NPS	National Park Service
PPE	Personal Protective Equipment
Project	Lowell Hydroelectric Project (or Lowell Project)
ROR	run-of-river
Safety Plan	Whitewater Boating and Access Study Safety Plan
SPD	Study Plan Determination
UMASS	University of Massachusetts Lowell
USGS	U.S. Geological Survey

1 Introduction and Background

1.1 Introduction

Boott Hydropower, LLC (Boott or Licensee) is the Licensee, owner, and operator of the 20.2-megawatt Lowell Hydroelectric Project (Project or Lowell Project) (FERC No. 2790). Boott operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expired on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (C.F.R.) Part 5 and continues to operate the Project under annual licenses issued by the Commission.

The Project is located along the Merrimack River in Middlesex County, Massachusetts and in Hillsborough County, New Hampshire. On April 30, 2018, Boott initiated the ILP by filing a Pre-Application Document and Notice of Intent with the Commission. In accordance with 18 C.F.R. § 5.15, Boott has conducted studies consistent with the study plan and schedule approved in the Commission's March 13, 2019 Study Plan Determination (SPD).

On March 1, 2022, the Commission issued a Determination on Requests for Study Modifications for the Lowell Hydroelectric Project. In response to this issuance, on May 31, 2022, Boott filed the Initial Whitewater Boating and Access Study Report. The initial report consisted of primary and preparation activities for the field component of the approved study.

In November of 2022, Boott and the Study Working Group coordinated to identify a date to conduct the Whitewater Boating and Access Study with the understanding that given that the Project was offline, the study would be performed under two flow conditions. The first being the available run-of-river flow, and the second being an increased flow with limited duration provided by the lowering of one of the Pawtucket Dam crest gates. Based on the river and anticipated precipitation, Boott and the Study Working Group determined that the predicted flows for November 19, 2022, were within the desired range to perform the field activities. The study was conducted on November 19, 2022, in conformance with the Commission's SPD. Although not specified in the Revised Study Plan (RSP), Boott and the Study Working Group intended to perform a controlled flow release representative of lower flow conditions at the Project (targeting up to 2,500 cubic feet per second [cfs] in the bypassed reach). However, due to the Project's operational status, the low flow run could not be performed. Following the November field event, Boott filed the Updated Whitewater Boating and Access Study Report with the Commission on January 20, 2023. On November 24, 2024, Boott and the Study Working Group were able to perform the controlled, low-flow release. This report serves as the Final Whitewater Boating and Access Study and describes the methods and results of the third and final controlled flow release.

1.2 Background

The Project is located on the Merrimack River in the City of Lowell in Middlesex County, Massachusetts. The Project generally consists of Pawtucket Dam, which is topped by 5-foot-high, pneumatically-operated, crest gates; a 720-acre impoundment; a 5.5-mile-long canal system; the main powerhouse Eldred L. Field (E.L. Field); and four additional powerhouses located throughout the canal system (Assets, Bridge Street, Hamilton, and John Street). The E.L. Field powerhouse utilizes Pawtucket Dam and the first 2,200 feet of the Northern Canal. A 440-foot-long tailrace channel, surge gate, and fish passage facilities comprise other major E.L Field powerhouse features. The Project is operated in a run of river (ROR) mode and has no useable storage capacity.

At the normal pond elevation of 92.2 feet National Geodetic Vertical Datum of 1929 (NGVD 29) (crest of the pneumatic flashboards), the surface area of the Project impoundment encompasses an area of approximately 1,236 acres. The gross storage capacity between the normal surface elevation of 92.2 feet and the minimum pond level of 87.2 feet (at spillway crest) is approximately 6,180 acre-feet. The plant has a total hydraulic capacity of up to 6,600 cfs (hydraulic capacity of the E.L. Field Powerhouse units). Given the Project's run-of-river operations, the Project is unable to store flows for whitewater or pulse flow releases. Consequently, providing whitewater flows when inflows to the Project's impoundment that are less than the hydraulic capacity of the Project's E.L. Field Powerhouse, in combination with the required fishway and compliance flows, and flows to the Project's canal system will reduce power generation.

Pursuant to existing License Article 38 and the FERC-approved Recreation Plan, Boott maintains the E. L Field Powerhouse Visitor Center. The Visitor Center is the Project's only FERC-approved recreation facility. Non-Project-related recreational facilities and opportunities in the Project's vicinity include the Depot Street Boat Ramp, Greely Boat Ramp, Lowell National Historical Park (LNHP), Lowell Heritage State Park, Merrill Park, Moore's Falls Conservation Area, University of Massachusetts Lowell (UMass Lowell) Boathouse & Kayak Center, Merrimack River Boat, William H. Brown Boathouse at Phillips Academy Andover, and the Rourke Brothers Boat Ramp.

2 Study Goals and Objectives

In accordance with the Commission's March 13, 2019 SPD, the goal of this study is to assess the Project's bypassed reach for whitewater boating and access. The objectives of the study are as follows:

- Assess a range of flows on whitewater boating opportunities in the Project's bypassed reach;
- Assess the frequency, timing, duration, and predictability of paddling flows under current and proposed Project operations;

- Define the need for put-in and take-out points for boaters; and
- Assess the flow information needs for whitewater boating and the current and potential flow information distribution system.

3 Study Area

In accordance with the Commission's SPD, the general study area for the Whitewater Boating and Access Study includes the Project's bypassed reach extending downstream from Pawtucket Dam approximately 3,500 feet to the confluence with the E.L. Field Powerhouse tailrace.

4 Methodology

The methods established for this study are based on the guidance provided in *Flows and Recreation: A Guide to Studies for River Professionals* (Whittaker et al. 2005). Consistent with the Whittaker et al. (2005) methodology, the Whitewater Boating and Access Study was performed in a stepwise approach, which included each of the activities described below.

4.1 Study Planning and Preparation

Primary planning and preparation activities for the Whitewater Boating and Access Study were: (1) literature review; (2) formation of a Study Working Group and identification of volunteers to participate in whitewater flow release evaluations; (3) identification of appropriate put-in and take-out locations for on-water evaluations; (4) development of a safety plan; (5) determine method for verifying flows in the Project's bypassed reach; and (6) development of survey forms to be used in the execution of the flow evaluations. In accordance with the SPD, Boott initiated and completed the primary planning and preparation activities for the Whitewater Boating and Access Study.

4.1.1 Formation of a Study Working Group and Identification of Volunteer Boaters for Whitewater Release Evaluations

Boott conducted a review of existing online information and anecdotal evidence regarding whitewater conditions. On July 24, 2019, Boott invited representatives from American Whitewater (AW), National Park Service (NPS), the City of Lowell, Massachusetts Department of Conservation and Recreation (MADCR), whitewater outfitters, and other interested stakeholders to form the Study Working Group and to participate in a Study Working Group meeting at the Project. Correspondence between Boott and interested stakeholders is provided in Appendix A.

4.1.2 Identification of River Access Locations for Flow Evaluations

Boott met with the Study Working Group on August 8, 2019, at the Project to coordinate study planning, identify potential put-in and take-out locations, discuss safety concerns, and identify potential volunteers to participate in whitewater flow releases. Stakeholders that attended the site visit included AW, NPS, City of Lowell Parks Department, City of Lowell Emergency Management, Lowell Parks and Conservation Trust, and Zoar Outdoor.

This Study Working Group meeting identified a need to visually document a range of flows in the Project's bypassed reach to assist participant selection of flows for the whitewater flow releases. Since the Study Working Group participants had limited experience boating the bypassed reach, participants could not make informed choices on which flows would be appropriate for boating.

Accordingly, on October 28, 2019, Boott distributed a Whitewater Flow Documentation Plan to the Study Working Group that described the methods and approach for (a) documenting the range of flow conditions in the bypassed reach, and (b) consulting with the Study Working Group to identify flows suitable for this study. Boott requested the Study Working Group provide comments by November 11, 2019. Boott modified the Whitewater Flow Documentation Plan based on comments from stakeholders, and distributed revisions to the Study Working Group on January 15, 2020.

In the Whitewater Flow Documentation Plan, Boott proposed to document flows in the bypassed reach using cellular-enabled trail cameras and to provide the Study Working Group with a summary report that presents photographs of the bypassed reach under various flow conditions. Boott deployed the cellular-enabled trail cameras in March of 2020, and the cameras remained installed through May 15, 2020. The cameras recorded photos on an hourly basis during daylight hours. The resulting photographs were date- and time-stamped.

4.1.3 Development of a Safety Plan

The Whitewater Boating and Access Study Safety Plan (Safety Plan) is intended to provide guidelines and protocols for protecting the safety of volunteer study participants boating the Project's bypassed reach during whitewater flow releases. This Safety Plan also provides procedures for emergency situations and guidance for communicating with study participants, Project staff, and emergency responders. The Safety Plan was developed in consultation the Study Working Group and distributed to stakeholders on September 10, 2020. The Safety Plan was revised and distributed in advance of the study again on November 17, 2022. The revised Safety Plan is appended to this report as Appendix B.

The volunteer boaters for the whitewater release evaluations were experienced boaters and have the skills necessary to boat the reach. AW and the whitewater boaters had the responsibility for determining who is qualified to participate in the evaluations.

Participants were also required to sign a liability waiver prior to taking part in on-water evaluations. Boott developed the Safety Plan and required that all study participants review and adhere to its requirements and applicable Boott safety policies. This included, among other items, that participants be equipped with standard safety gear as required by the "Safety Code of American Whitewater."

Additionally, as a condition to participation in the whitewater flow releases, Boott required volunteers to review the Safety Plan and understand the safety measures, guidance, and requirements herein. Boott notes that the Safety Plan includes details about Personal Protective Equipment (PPE).

4.1.4 Flow Verification Method

There is an active, existing U.S. Geological Survey (USGS) gage installed approximately 2.1 miles downstream of the Pawtucket Dam (USGS No. 01100000, *Merrimack River BL Concord River at Lowell, MA*). There is also an existing USGS gage installed on the Concord River (USGS No. 01099500, *Concord R Below R Meadow Brook, at Lowell, MA*). Flows from the USGS Gage No. 01099500 was subtracted from the flows at USGS Gage No. 01100000 to account for flows entering the Merrimack River from the Concord River. Real-time data from the existing USGS gages is available online through the USGS website. Boott used Project operations data in combination with USGS real-time flow information to verify the whitewater release flows in the bypassed reach during this study. During the flow evaluation portions of this study, information on real-time flow conditions in the bypassed reach were made available by Boott to the Study Working Group and other whitewater boating participants.

4.2 Controlled Whitewater Releases

Boott consulted with the Study Working Group to identify appropriate study flows based on the feasibility assessment, visual inspection of the survey reach, and participants' previous whitewater boating experience. Boott coordinated with AW to monitor site conditions and flow conditions to schedule the whitewater flow releases. Boott anticipated up to three flows would be studied to afford participants the opportunity to boat each flow multiple times and evaluate different lines through various portions of the study reach. Pre, post, and comparative surveys were completed by participants during this portion of the study.

4.2.1 Development of Survey Forms

Boott developed the following Whitewater Release Study forms:

- A Pre-Run Information Form to be completed prior to the start of the study runs to determine each boater's experience level and the preferred watercraft of the participants;

- A Single Flow Evaluation Form to be completed after each run to evaluate each boater's experience at that flow; and
- A Comparative Flow Evaluation Form, to be completed after all of the runs have been completed, to compare each of the flows that the boater participated in.

The Whitewater Release Study Forms were developed in consultation AW and approved by FERC in the SPD. They were distributed to AW on May 14, 2020. The completed copies of the forms are presented in Appendix C.

4.3 Whitewater Recreational Access Evaluation

Pursuant to Whittaker et al. (2005), an on-site group discussion was held following completion of the study runs, in which boaters discussed their experiences at each flow, identified safety issues, and summarized opinions about the feasibility of boating, types of opportunities, and possible flow ranges. For this study report, Boott conducted an evaluation of prospective whitewater recreational access to the bypassed reach including factors such as public safety and interest, the feasibility of potential access areas, and how potential improvements may affect aesthetic and historic resources.

5 Study Results

5.1 Literature Review

A literature review was performed to summarize existing information pertaining to whitewater recreation opportunities in the region.

The Merrimack River drops 269 vertical feet over its track to the Atlantic Ocean, dropping greater than 30 feet at Pawtucket Falls. Below Pawtucket Falls, the river's thalweg is naturally shaped by the underlying ledge formations. The Merrimack River then sharply turns southeast toward the confluence with the Concord River (Malone 2009). The topography of the City of Lowell is a combination of floodplain and gently undulating upland.

The Merrimack River provides quickwater and flatwater experiences for canoeists and kayakers and is one of the largest water bodies in the region for motor boating. Recreational boating in the Project vicinity includes canoeing, kayaking, rowing, and motorboating. Local watershed organizations sponsor a variety of paddling trips on the Merrimack River and its tributaries throughout the spring, summer, and fall for beginner and intermediate paddlers (New Hampshire Department of Environmental Service [NHDES] 2019).

Boott reviewed the American Whitewater Database (AW 2022) and identified approximately 52 documented whitewater opportunities within 60 miles of the Project and ranging in skill levels. Table 5-1 summarizes these opportunities. For whitewater enthusiasts, rivers such as the Winnipesaukee, Pemigewasset, Merrimack, and Concord

offer excellent opportunities for downriver paddling and playboating, especially during the spring runoff and periodic high-water events (AW 2021). Upstream of the northern extent of the Project's impoundment is a whitewater kayak course located in Manchester, New Hampshire. There are also Class I-II+ rapids located between Amoskeag Falls to Goffs Falls (City of Manchester 2022).

The Concord River located approximately 2-miles below the Pawtucket Dam in the City of Lowell, offers whitewater opportunities that are popular amongst boaters of varying skillsets. Whitewater opportunities are flow dependent and are typically available in the spring and fall seasons when flows are higher. In addition, the winter season provides several favorable runnable tracks. The whitewater stretch of the Concord River flows into the Merrimack River, below the Project's bypassed reach between the Bridge Street and Nemith Street bridges in Lowell. Boaters access the river either above or below the Centennial Island Dam (FERC No. 2998), with access provided through an unlocked gate (AW 2024). A public put-in located about 100 yards upstream of the Centennial Island Dam, provides boaters with access to a public park with a boat ramp and ample parking (AW 2024). Alternatively, paddlers access the river by the lower put-in just downstream of the Lawrence Street crossing. The run extends approximately 2.2 miles through the center of downtown Lowell and features four named Class III to Class IV rapids and numerous play spots (AW 2022). AW describes the stretch as featuring numerous surfing and play spots that boaters spend hours paddling (AW 2024).

River outfitters operating on the Concord River have been an integral part of the established whitewater community in the City of Lowell. The Lowell Parks and Conservation Trust has been working since 1990 to preserve the city's natural resources and engage the community in environmental stewardship. The Lowell Parks and Conservation Trust in partnership with the river outfitter, Zoar Outdoor, have provided one of the few urban whitewater rafting experiences in the country on the Concord River.

Every Saturday and Sunday through Memorial Day, the Lowell Parks and Conservation Trust and Zoar Outdoor provide outfitting and guided rafting trips on the Concord River to boaters of all skill levels (Greater Merrimack Valley Convention and Visitors Bureau 2024). Zoar Outdoor highlights their *Concord River Trip* as an urban whitewater gem. Each spring, the UMass Lowell's Outdoor Adventure Program offers students a whitewater rafting trip on the Concord outfitted and guided by Zoar Outdoor. The trip is also offered to the general public each year in the spring. The Concord River rafting trip navigates three major Class III-IV rapids: Twisted Sister, Three Beauties, and Middlesex Dam. Each trip includes two runs through this section of the river, and outings are offered on select weekends in April and May. For groups of 12 or more, weekday trips can also be arranged. Participants meet at Wannalancit Mills, located at 650 Suffolk Street in Lowell, MA, where guest parking is available in a designated participants lot (Zoar Outdoor 2024). Portions of the proceeds from these trips are donated to support the construction and maintenance of the Concord River Greenway. The Concord River Greenway is a scenic, natural, cultural, and historical resource of national importance within the Concord River stretch for whitewater boating purposes (Lowell Parks &

Conservation Trust 2024). The outfitters have been a trusted and reputable outfitter offering valuable resources to the community for over 30 years.

There is little documented information on whitewater opportunities in the Project's bypassed reach that extends downstream from the Pawtucket Dam approximately 3,500 feet to the confluence with the E.L. Field Powerhouse tailrace. In their February 25, 2021 comments filed in response to the Draft License Application, AW reports that members have experienced boating the Project's bypassed reach during times when there was spillage over Pawtucket Dam. In addition, AW reports that high-flow conditions in the Project's tailrace provide hydraulic conditions suitable for playboating[1].

As a part of the Updated Recreation and Aesthetics Study Report filed with the Commission on November 1, 2021, Boott consulted with NPS, MADCR, and AW to identify locations to conduct personal interviews and field reconnaissance. Included in the study was an informal, non-Project, whitewater takeout downstream of the Project located behind Edward A. LeLacheur Park. Due to a lack of encountered recreationalist, Boott was unable to conduct personal interviews at the downstream takeout. However, the results of the online survey indicated an interest in whitewater activity at the Project. Respondents noted the Project's close proximity to the whitewater opportunities on the Concord River and expressed interest in boating the Project's bypassed reach under the right conditions. However, respondents reported public safety and access concerns at the Project.

Table 5-1 Documented Whitewater Opportunities Within 60 Miles of the Lowell Hydroelectric Project

River Name	Site Name	Whitewater Boating Class	Approx. Length (River Miles)
Concord River	Concord City of Lowell to Merrimack River	III+(IV)	2.2
Charles River	Waltham Wave	II	0.1
Monatiquot River	Shaw's to Weymouth Landing	II-III	3.9
Clear River	Harrisville to Nasonville	I-II	6.6
Quinapoxet River	Canada Mills to Wachusett Reservoir (The Mighty Quinn)	II-III	2.9

[1] Playboating is a term commonly used in the boating community to describe a style of kayaking, canoeing, and/or rafting focused on performing stunts and tricks, rather than simply navigating from point A to point B along a specific boaters' "line" (AW 2021). It emphasizes skillful maneuvers and dynamic moves in features like waves or holes, where the boaters can engage in spins, flips, and other acrobatic feats.

River Name	Site Name	Whitewater Boating Class	Approx. Length (River Miles)
Millers River	Upper (South Royalston to Athol)	III	7.0
Millers River	Lower (Erving to Millers Falls)	II-III(IV)	2.2
Lawrence Brook	Doane Falls	V+	0.3
Ware River	Gilbertville	II-III	3.3
Connecticut River	Turners Falls Dam Bypassed reach	II-III	3.3
Blackstone River	Blackstone Gorge	III	0.8
Three Mile River	Cohannet Bridge to Bird Sanctuary	I-II	0.2
Quaboag River	Lucy Stone Park in Warren to Route 67	II-III	5.3
North River	Nottingham to South Lee	II	3.8
Kennebunk River	Route 1 Ledge	III+	0.4
Mousam River	Rte. 1 to Water St.	II-III	0.6
Little River	US202 to Lord Road	I-II	4.2
Little River	Stackpole Bridge to Hubbard Road	I-II	5.2
Isinglass River	Isinglass Falls	IV	0.1
Cocheco River	Watson Rd to Whittier St	II(IV)	2.0
Great Works	Brattle Street to Leighs Mill Pond	IV-V	0.7
Lamprey	Upper Lamprey	IV	3.9
Suncook River	Suncook dam to Center Barnstead	I-II	2.2
Suncook River	Pittsfield to North Chichester	I-II+(III)	3

River Name	Site Name	Whitewater Boating Class	Approx. Length (River Miles)
Little Suncook River	Northwood to Gossville	III+(IV)	3.3
Lamprey River	Upper Lamprey	IV	3.9
Winnipesaukee River	Tilton Road to Riverfront Park	I-II	2
Winnipesaukee River	Steven's mill dam to Odell Park (Bottom Winni) (Bottom Winni)	II	0.6
Soucook River	Near Concord, NH	I-II	11.9
Merrimack River	Amoskeag Falls to Goffs Falls (Crack Pipe, 293 Wave) (Manchester Run)	I-II+(III)	5.1
Souhegan River	Indian Ledges	I-II(III)	11.2
Souhegan River	Greenville to NH Rt. 101 Bridge	II-III	5.6
Blackwater River	Route 127 to Snyder's Mill	II-IV	1.9
Warner River	Melvin Mills to Warner	IV	5.4
Contoocook	Henniker (class II section)	II(III)	2.1
Contoocook	Hillsborough to Henniker (Freight Train Section)	III-IV	3.0
Contoocook River	Jaffrey to Peterborough	II	6.3
Piscataquog, North Branch	Lake Horace to Everett Reservoir	II-III+(IV)	6.9
Piscataquog, South Branch	New Boston to Goffstown	I-II	5.2
Piscataquog, South Branch	Francestown to New Boston	II-III(IV)	7.7
Cold River	South Acworth to Vilas Pool	II	6.0
Cold River	Vilas Pool to Alstead	III-IV	0.8
Ashuelot River	Lower Ash (Ashuelot to Hinsdale)	II-IV	3.7

River Name	Site Name	Whitewater Boating Class	Approx. Length (River Miles)
Ashuelot River	Upper Ash (Marlow to Gilsum Gorge)	III-IV	5.6
Ashuelot River	Middle Ash (Gilsum Gorge to Shaws Corner)	II	4
Ashuelot, S. Branch	Troy to Webb	III-IV	2.6
Otter Brook	East Sullivan to Otterbrook Park	III-IV	3.3
Minnewawa River	Marlborough recycling center to Otter Brook	II-IV	4.4
Stony Brook	Old Temple Road to Forest Road	IV-V	4.2
Souhegan River	NH Rte. 101 Bridge to Wilton (Trash Dump rapids)	III	1.3
Locke Brook	Pine Campground to Davis Road	IV	1.1
Nashua	C-Hole Park & Play	II-III	NA

Source: AW 2022.

5.2 Identification of River Access Locations and Boating Feasibility

Boott met with the Study Working Group on August 8, 2019, at the Project to coordinate study planning, identify potential put-in and take-out locations, discuss safety concerns, and identify potential volunteers to participate in the whitewater releases. Stakeholders who attended included AW, NPS, City of Lowell Parks Department, City of Lowell Emergency Management, Lowell Parks and Conservation Trust, and Zoar Outdoor. Boott also met with AW in September 2020 at the site to revisit the potential put-in and take-out locations and discuss safety concerns in anticipation of conducting the study in October of 2020.

Potential access locations identified during the site visit included a whitewater staging area, a put-in location, and a take-out location. The potential staging area (Figure 5-1; Photo 5-1) is located at the Blacksmith's Shop site, situated above Pawtucket Dam and the Pawtucket Gatehouse. This area is owned by MADCR and is under easement to Boott. During the study, participants utilized the staging area for parking and study preparation activities (gearing up, inflating boats, and organizing gear). As shown in Figure 5-1, a put-in location below the Pawtucket Dam was identified and is accessible from the Northern Canal Walkway Island (also referred to as Walkway) (Photo 5-2). The

take-out location is the informal, non-Project, river access location[2] downstream from the Project along the riverfront near Edward A. LeLacheur Park (Figure 5-1; Photo 5-3).

At each potential access location, Boott and AW performed shoreline and safety evaluations, including evaluations of the slope of the shoreline, road access, vegetation growth and clearing requirements, and other access benefits and constraints. In anticipation of the study being conducted in October 2020, Boott performed a site review of the put-in and take-out locations in the fall of 2020. The site review identified the need for a cleanup to clear safety hazards including overgrowth and debris. Photographs 5-2 and 5-3 were captured after these areas were cleared. An additional site review and cleanup of these put-in and take-out locations was completed as needed on November 18, 2022, prior to the study whitewater releases.

Given the portage length (± 0.9 mile), number of participants, car traffic, and other safety concerns, Boott and AW agreed it would be best to shuttle boaters by vehicle from the potential take-out to the put-in locations.

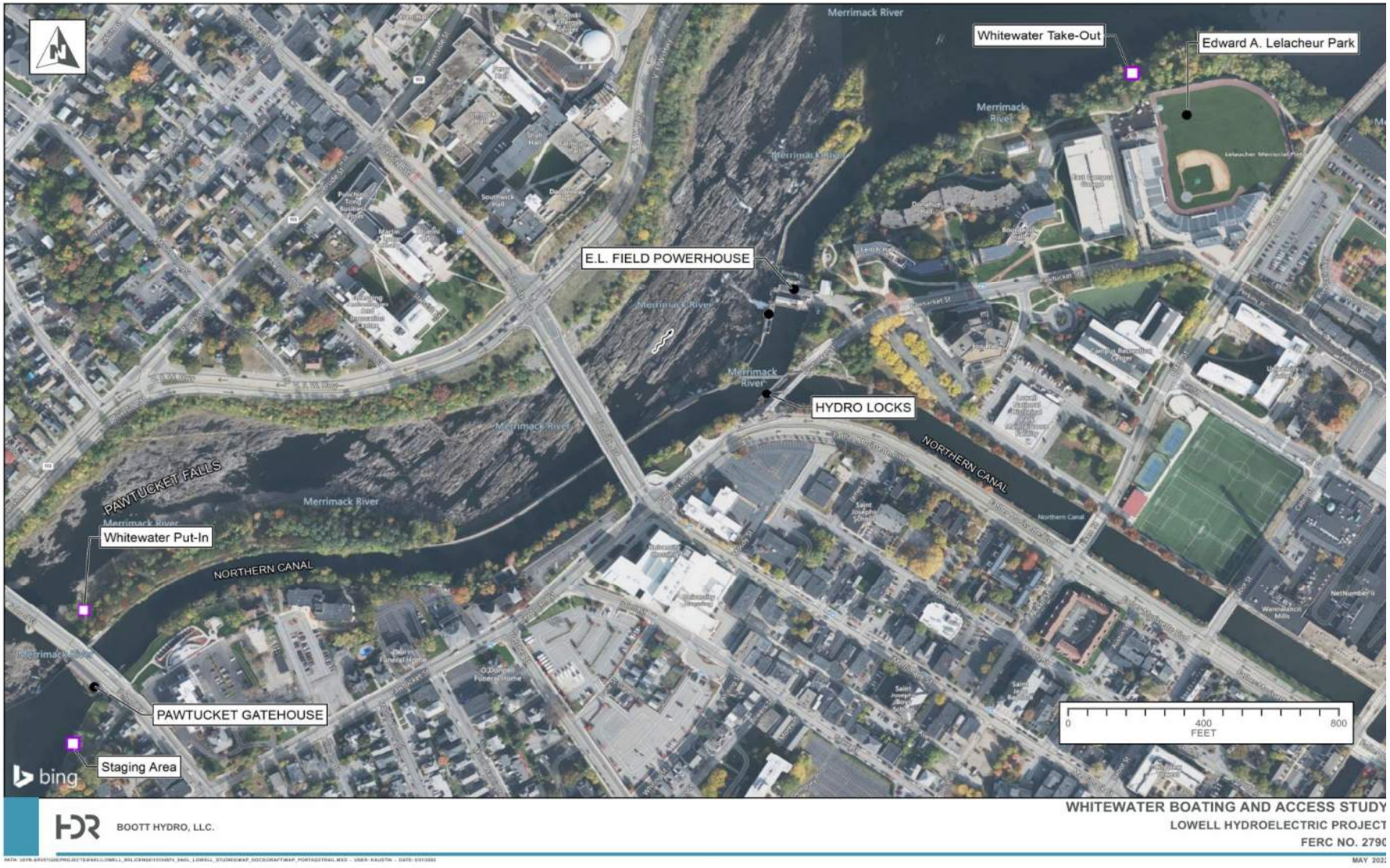
[2] This parcel of land is owned by UMass Lowell, according to the City of Lowell land property database as of the writing of this report (City of Lowell 2023).

Photo 5-1 Whitewater Staging Area Above the Pawtucket Dam

Photo 5-2 Whitewater Put-In Access Location Below Pawtucket Dam

Photo 5-3 Whitewater Take-Out River Access Point Downstream from Project

Figure 5-1 Identified Put-In/Take-Out Locations



As previously reported to the Commission, during a field reconnaissance of the Project bypassed reach in late May 2021, Boott discovered a line of rebar projecting from the bedrock that could pose a serious hazard to whitewater boaters. Boott determined that it would not be prudent to proceed with the study until the rebar hazard was addressed. To that end, once river flows dropped sufficiently to allow safe access into the Project's bypassed reach, Boott hired a contractor to cut the rebar to bedrock level to eliminate the potential hazard to the extent possible. The contractor was able to remove the majority of the rebar that had been identified in the bypassed reach. However, there are a few remaining bars that were submerged in a pool under the 500 cfs fish passage flow at the time of the work, which could not be removed. The revised Safety Plan was updated with this information and boaters were informed of the remaining known rebar locations prior to participating in the whitewater releases.

5.3 Selection of Study Flows and Flow Verification

On September 2, 2020, the Whitewater Flow Documentation Report was distributed to stakeholders for review and comment (Appendix D). Boott deployed four cellular-enabled trail cameras to capture time- and date-stamped images of the bypassed reach on an hourly basis during daylight hours. The camera captured the conditions in the bypassed reach under various flows. The camera locations were selected in consultation with the Study Working Group, with specific input from AW. Boott provided documentation of bypass flows between 1,681 cfs to 21,672 cfs.

After review of the Whitewater Flow Documentation Report and consultation with stakeholders, the Study Working Group selected bypass flows ranging from 2,500 cfs to 8,600 cfs. The Project is ROR with no usable storage capacity. The maximum hydraulic capacity of the E.L. Field Powerhouse is 6,600 cfs. Flows up to 6,600 cfs are directed to the station for power generation. In addition, a portion of river flow (e.g., a 100 cfs minimum flow) is directed to the Project's canal system. Assuming the Project is operating at maximum capacity, the Study Working Group determined that the ideal Merrimack River flow range to perform the study was between approximately 8,000 cfs and 10,000 cfs.

As shown below in Table 5-2, the average Merrimack River flows within the range of 8,000 and 10,000 cfs occur in early to late spring. During the recreation season from May through October, average flows have a 10 percent exceeding 10,000 cfs in May, June, and October.

Table 5-2 Lowell Project Hydrologic Data (1987-2016)

Month	Minimum (cfs)	90% Exceedance (cfs)	Average (cfs)	10% Exceedance (cfs)	Maximum (cfs)
January	916	3,462	7,651	12,834	39,710
February	1,478	3,272	6,813	11,415	39,180
March	1,914	4,508	11,484	21,355	50,220

Month	Minimum (cfs)	90% Exceedance (cfs)	Average (cfs)	10% Exceedance (cfs)	Maximum (cfs)
April	2,765	6,558	17,901	31,178	78,890
May	2,034	4,112	10,749	18,657	88,410
June	874	2,279	6,768	13,286	44,660
July	670	1,325	4,207	9,270	29,820
August	569	1,121	3,526	6,852	30,030
September	460	1,008	3,162	6,025	32,264
October	787	1,676	5,938	12,706	50,150
November	1,345	2,888	7,978	14,747	30,990
December	1,839	3,472	9,141	17,243	34,810
Annual	**460**	**1,723**	**7,941**	**17,059**	**88,410**

Note: Project hydrology was determined by subtracting flows from USGS Gage No. 01099500 (*Concord R Below R Meadow Brook, at Lowell, MA*) from USGS Gage No. 01100000 (*Merrimack River BL Concord River at Lowell, MA*).

In early November 2022, Boott and the Study Working Group coordinated to identify a date to conduct the Whitewater Boating and Access Study with the understanding that given that the Project was offline[3], the study would be performed under two flow conditions. Based on the river and anticipated precipitation, Boott and the Study Working Group determined that the predicted flows for November 19, 2022, were within the desired range to perform the field activities. The first flow consisted of the available ROR flow, and the second flow consisted of an increased flow with limited duration provided by lowering of one of the Pawtucket Dam crest gates.

The third and final flow and was conducted on a later date (i.e., November 24, 2024), once the Project returned to operation and flows were within the desired range. The third controlled flow release was characterized as the available ROR flow, with a portion of the flow directed through the operable units in the powerhouse and then into the bypassed reach (approximately 610 cfs). Through ongoing coordination between Boott and the Study Working Group, the third controlled flow assessment was performed on November 24, 2024.

Results from the three whitewater flow releases are discussed below. After the releases, the flows were verified as per the flow verification method established in Section 4.1.4. For the November 19, 2022 flow assessments, Boott provided the first flow of approximately 5,750 cfs at approximately 11:15 AM. For the second flow, a Boott

[3] On September 2, 2022, Boott notified the Commission that the Project was offline and filed an incident report on September 19, 2022.

operator lowered one of the Pawtucket Dam crest gates at approximately 1:00 PM. Flows for this second run started at approximately 5,250 cfs and then rose to approximately 6,700 cfs by the end of the run. During the third flow assessment on November 24, 2024, the Project was operating at 49 percent gate at approximately 8:00 AM, passing approximately 3,052 cfs. By 8:45 AM, the plant reduced operations to 21 percent gate, lowering the flow to 610 cfs. At 9:00 AM, the approximate bypass flow was calculated at 2,442 cfs. Flows continued to rise throughout the evaluation due to increasing contributions from the Nashua River. At the start of the evaluation, flows ranged between 2,500 and 3,000 cfs. Flows gradually increased throughout the evaluation and slightly exceeded 3,000 cfs by the end of the run.

5.4 Whitewater Releases and Survey Data Analysis

Extensive coordination was required in the planning of the on-water boating component of the Whitewater Boating and Access Study. Due to the COVID-19 pandemic, efforts to conduct the on-water assessment in early- to mid-2020 were postponed. The boating assessment was scheduled but postponed twice due to low flows and/or operational constraints (October 17, 2020, and May 15, 2021). Correspondence regarding these scheduled attempts and postponements are presented in Appendix A. Additionally, as noted in Section 5.2, Boott discovered a line of rebar projecting from the bedrock during a field reconnaissance in the Project's bypassed reach in late May 2021. This rebar could pose a serious hazard to whitewater boaters, and Boott determined it was not prudent to perform the study until the rebar was removed. The rebar was removed in the fall of 2022 when flows allowed for safe removal. On September 19, 2022, Boott submitted an incident report to the Commission, stating that the Project had been offline since September 2, 2024, Boott completed maintenance and repair activities, and the Project returned to service in summer of 2024.

The on-water boating assessment for the first and second flows were performed on November 19, 2022, between 9:30 am and 3:00 pm and assessed flows of 5,750 cfs and 6,700 cfs. Participants convened at the UMass Lowell Campus Recreation Center (CRC) for a health and safety meeting and study overview. Study participants included intermediate and advanced level boaters, generally corresponding to Class III-IV whitewater experience.

The on-water boating assessment for the third flow was conducted on November 24, 2024, from 9:30 am to 1:30 pm, with flows evaluated at approximately 2,500 cfs at the start of the assessment. Before launching, participants gathered at the staging area for a health and safety briefing, followed by an overview of the study by Boott. Of the six participants, three had also partaken in the 2022 assessment. All six of the study participants identified themselves as an advanced Class IV boater.

Boott identified field safety protocols and procedures, and all participants were required to adhere to the requirements throughout the field study. As noted above, Boott had developed and consulted with the Study Working Group regarding the pre-run, post-run,

and comparative survey forms. The boating participants completed evaluation forms following each of the whitewater boating runs to evaluate the reach with respect to:

- Estimate of the number of rapids, play spots, and unintended hits, stops, boat drags, and portages encountered on each run;
- Evaluation of features such as navigability, technicality, hydraulics, play areas, size/difficulty of rapids, overall whitewater challenge, crowding, access, shuttles, number of rapids, length of runs, and safety;
- Estimate of acceptable and optimal flow ranges for different types of whitewater boating opportunities (e.g., different skill levels, boat types, or types of boating);
- Qualitative description and estimate of likely demand for boating opportunities;
- Evaluation of existing and potential put-in and take-out locations;
- Comparability to similar rivers in the region; and
- Identify safety concerns related to flows, access, and river features.

Study participants completed pre-run, post-run, and comparative analysis surveys following both the 2022 and 2024 sessions. Following the on-water assessments, participants took part in focus group discussions, evaluating each of the controlled releases they participated in. One participant was unable to attend the focused group discussion. The three participants who took part in the 2022 session provided comparative feedback between the three controlled flow releases.

5.4.1 Participant Pre-Run Information

Prior to assessing the study flows for each assessment, all boating participants completed a Pre-Run Survey. For the 2022 assessment, there were a total of nine Pre-Run Surveys completed. Three participants identified their skill levels as intermediate and were comfortable running Class III whitewater, and of the three, a participant noted they are comfortable with some Class IV whitewater. Six participants identified their skill level as advanced and were comfortable with Class IV whitewater. All participants stated that a hard-shell kayak would be suitable for the bypassed reach, and two participants indicated other boat types could likely be used (i.e., open canoe with flotation, cataraft, inflatable kayak, and self-bailing raft).

For the 2024 assessment, there were a total of six Pre-Run Surveys completed. One participant identified their skill level as intermediate, indicating comfort with Class III whitewater. Another participant categorized their skill level as intermediate-advanced, comfortable navigating Class III and IV whitewater. The remaining four participants identified themselves as advanced, with comfortable experience in Class IV whitewater. All participants agreed that a hard-shell kayak would be suitable for the bypassed reach, and four suggested that other boat types, such as open canoes with flotation, catarafts, inflatable kayaks, self-bailing rafts, and stand-up paddleboards, could also be appropriate for this reach. All participants provided their home zip code, the results of

which are provided in Table 5-3 along with estimated[4] distances traveled, indicating all participants traveled from outside of Lowell to participate in the study. Participants who attended both the 2022 and 2024 assessments resided within a maximum radius of 30 miles from the Project (Table 5-3).

Table 5-3 Participant Home Zip Codes and Estimated Distance Traveled

Home Zip Code	Location	Estimated Distance (Miles)
01810[1]	Andover, MA	13
01776[1]	Sudbury, MA	28
01930	Gloucester, MA	50
02114	Boston, MA	32
01370	Shelburne Falls, MA	90
05246	East Dummerston, VT	90
01748	Hopkinton, MA	40
02144[1]	West Somerville, MA	30
02825[2]	South Foster, RI	87
02135[2]	Brighton, MA	33
01060[2]	Northampton, MA	101

[1]Participants who attended both the 2022 and 2024 sessions.
[2]Participants who attended solely the 2024 session.

Participants reported whitewater boating experience between 3 to 35 years, with a mean of 14 years. Participants reported spending between 1 to 12 days boating each month. One participant specified they boat about 12 days per month from September through April, and 4 days per month in the summer when flows are low. Similarly, another boater noted they boat about 6-10 days per month during the summer and 1-3 days per month during the winter. Seven participants indicated they have not previously participated in a whitewater boating study for a hydroelectric project. One reported they participated in a

[4] Boott estimated the distances traveled by participants based on their reported home ZIP codes and the location of the Blacksmith's Shop where parking and staging occurred.

whitewater study for the relicensing of a plant in Skowhegan, Maine, in 1994 (presumably the Weston Project P-2325), and two boaters noted their participation in the Mongaup Relicensing (Rio Project P-9690; Mongaup Falls Project P-10481; and Swinging Bridge Project P-10482), the Bear Swamp Project relicensing (P-2669), the West Canada Creek Project relicensing (P-2701), and one relicensing on the Connecticut River. One boater participated in the whitewater boating studies for the Black River Hydroelectric Project (FERC No. 2569), the Lower Barker Hydroelectric Project (FERC No. 2808, presumed), and the Rumford Falls Hydroelectric Project (FERC No. 2333) relicensings. Additionally, three boaters contributed to the Lowell Hydroelectric Project (FERC No. 2790) Relicensing[5].

All twelve[6] participants had not previously boated the Lowell bypassed reach at the time of the 2022 session. Therefore, all twelve participants had a chance to view the bypassed reach prior to the study. At approximately 10:30 am on November 19, 2022, the nine participants left UMass Lowell and were shuttled to University Avenue Bridge to scout the bypassed reach from the bridge. While scouting from the bridge, boaters noted potential whitewater features and Boott pointed out the potential hazards identified to participants in study materials and during the health and safety meeting.

The same process was followed for the six boaters prior to the November 24, 2024, flow assessment, with two exceptions: Boaters met at the designated staging area and put on appropriate safety gear necessary to scout the run. The boaters walked a short distance from School St. to Mammoth Rd. and crossed the street at the traffic light. Boaters proceeded down the Northern Canal Walkway (looking northerly) to the put-in, located just below the Northern Canal on river right. Participants then carpooled to the University Ave. Bridge to scout the bypassed reach. Some opted to leave their vehicles at the take-out site and were carpooled back to the staging area where all six participants held a pre-run discussion with Boott and final gear preparations.

5.4.2 Bypassed Reach Flow Assessment

For all three flows, all participants put-in at the Northern Canal Walkway Island, and all participants exited the bypassed reach at the take-out below Edward A. LeLacheur Park. Participant assessments of the individual flows are summarized below. The first flow was estimated at 6,600 cfs (and later verified at 5,750 cfs), the second flow was estimated at 8,000 cfs (and later verified at 6,700 cfs), and the third was estimated at 2,500 cfs (and

[5] These are the three participants who contributed to the 2022 session. Their feedback was documented on the 2024, on-water, pre-run assessment forms.

[6] One boater reported they boated the Project bypassed reach about 8 days, multiple times each day at flows from 500 to 2,000 cfs. However, in their response they also provided this link to AW's description of the 2.2-mile run on the Concord River located south of the Project. It is assumed this is an error as the link provided is for a separate run not included in this study and, additionally, the participant later reported they boated the reach zero times.

later verified at 2,750[7] cfs). To distinguish between the different boating experiences of the flows, participants were asked to complete a post-run survey for each flow. Therefore, a total of 24 post-run surveys were completed. Photo 5-4 below shows the boaters at the Staging Area above the Pawtucket Dam prior to the first flow release in 2022.

Photo 5-4 Study Participants at the Staging Area above the Pawtucket Dam

5.4.2.1 First Flow (5,750 cfs)

At approximately 11:15 am, all boaters entered the water via the put-in at the Northern Canal Walkway Island. Approximately five boaters boated upstream from the put-in location to also boat the reach under the O'Donnell Memorial Bridge before continuing downriver. Photo 5-5 shows the bypassed reach upstream from University Avenue Bridge at approximately 5,750 cfs.

[7] The third flow assessment had a flow range between 2,500 and 3,000 cfs, with this range taken as the approximate median for both the starting and ending flows of the assessment.

Of the seven participants who used hard-shell kayaks, six encountered at least one hit, stop, drag, or portage. One participant using the cataraft reported zero hits and the other cataraft boater reported two. Most participants reported experiencing two to four rapids and three play spots, but one reported as many as ten play spots. One participant reported zero rapids, and another reported zero play spots.

Photo 5-5 View of the Upper Bypassed Reach for the First Flow at Approximately 5,750 CFS

The participants evaluated the suitability of the flow for whitewater boating for various characteristics, with two stating they would definitely return in the future if this flow was available. Most participants preferred a higher flow than 5,750 cfs. Acceptability scores for characteristics of the upper reach at 5,750 cfs are presented in Table 5-4, with participants generally reporting the characteristics as acceptable or totally acceptable at this flow.

Eight participants indicated the minimum skill level necessary to successfully run the bypassed reach at 5,750 cfs was intermediate, and another noted only novice level skill necessary. Three participants did not identify any safety issues and the other participants noted that the sharp shale rocks and metal debris in the bypassed reach were potential hazards. One participant noted the rocks were fairly sharp so they were worried about

the danger of swimming rapids and recirculation (e.g., trapping a boater), and another noted the crossflows could be difficult.

Table 5-4 Acceptability Scores for Characteristics of the Bypassed Reach at 5,750 CFS

Month	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	0	6	3
Challenging Technical Boating	0	0	2	4	3
Powerful Hydraulics	0	0	2	5	1
Whitewater “Play Areas”	0	0	2	4	3
Size/Difficulty of Rapids	0	0	4	4	1
Overall Whitewater	0	0	0	7	2
Challenge	0	0	1	7	1
Safety	0	0	5	3	1

Note: One participant did not provide a response for the ‘powerful hydraulics’ prompt.

5.4.2.2 Second Flow (6,700 cfs)

At approximately 1:00 pm, the boaters entered the water via the put-in at the Northern Canal Walkway Island. Flows for this second run started at approximately 5,250 cfs and then rose to approximately 6,700 cfs by the end of the run.

Of the seven participants who used hard-shell kayaks, four encountered at least one hit, stop, drag, or portage; both cataraft boaters also reported encountering at least one hit, stop, drag, or portage. The participants reported experiencing two to three rapids and around three play spots. When evaluating the number of play spots, one of the participants did not experience any play spots, while another participant experienced more than ten.

The participants evaluated the suitability of the flow for whitewater boating for various characteristics, with four stating they would definitely return in the future if this flow was available. Most participants preferred this flow over the first provided flow. Acceptability

scores for characteristics of the upper reach at 6,700 cfs are presented in Table 5-5, with participants generally reporting the characteristics as acceptable or totally acceptable at this flow.

Eight participants indicated the minimum skill level necessary to successfully run the bypassed reach at 6,700 cfs was intermediate, and another noted only novice level skill necessary. Six participants did not identify any safety issues and the other participants noted that the sharp rocks and metal debris in the bypassed reach were potential hazards. Two participants noted the proximity to Boston, where they resided, would draw them back.

Table 5-5 Acceptability Scores for Characteristics of the Bypassed Reach at 6,700 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	0	3	6
Challenging Technical Boating	0	0	1	3	5
Powerful Hydraulics	0	0	1	3	5
Whitewater “Play Areas”	0	0	3	3	3
Size/Difficulty of Rapids	0	0	1	4	4
Overall Whitewater	0	0	1	3	5
Challenge	0	0	1	4	4
Safety	0	0	3	4	2

5.4.2.3 Third Flow (2,750 cfs)

At approximately 11:00 am, all boaters entered the water via the put-in at the Northern Canal Walkway Island on river right. At the start of the third flow assessment, flows ranged between 2,500 and 3,000 cfs and gradually increased, slightly exceeding 3,000 cfs by the conclusion of the assessment.

Of the five participants using hard-shell kayaks, four encountered at least one instance of hit, stop, drag, or portage during the assessment. The participant using an inflatable

kayak also reported facing similar challenges. Participants experienced between three and five rapids and reported encountering approximately two to six play spots. Notably, one participant mentioned finding "two really good ones," while two others identified up to six or more play spots, with one even specifying "6 +."

The participants evaluated the flow conditions for whitewater boating in terms of their likelihood to return if the low-flow conditions were provided or available. Of the six participants, four indicated that they would "definitely" return if the flow remained at this low level. The two remaining participants stated that they would “possibly” return to the site at this flow. Among the three participants who took part in all three flow assessments (2022 and 2024 sessions), the consensus was that the low-flow conditions (third flow) were optimal for their boating preferences. The only participant who did not find this flow “optimal” would have preferred a higher flow. For the three new participants who only participated during the low-flow assessment, their preferences varied across the board. One would have preferred either a higher or lower flow, another favored a higher or much higher flow, and the third participant indicated a preference for a higher flow.

Acceptability scores for characteristics of the upper reach at 2,750 cfs are presented in Table 5-6, with participants generally reporting the characteristics as neutral or acceptable at this flow.

All six participants agreed that the minimum skill level required to navigate the bypassed reach at 2,750 cfs was intermediate. One participant, however, also noted that an “advanced” skill level in addition to their "intermediate" selection was necessary. Safety concerns were noted by all participants, with potential hazards identified as sharp rocks, metal debris (rebar), fish weirs, submerged rocks, large woody debris, and powerful water currents in the bypassed reach for some of their lines. Despite these safety risks, participants noted the good play potential for playboating at this flow level, including surf waves, some Class III rapids, and the appeal of the location as a convenient urban alternative. It was also noted as a good spot for locals seeking an “after work” run because of its urban location and proximity to Boston and its surrounding metro-areas. However, most participants identified four primary constraints in their post-run assessments: a need for better put-in/take-out access, water quality concerns, natural hazards (e.g., sharp rocks and boulders in the boaters' lines), anthropogenic hazards (e.g., fish weirs, trash, and broken glass), and parking access.

Table 5-6 Acceptability Scores for Characteristics of the Bypassed Reach at 2,750 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	2	3	1
Challenging Technical Boating	0	0	0	5	1

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Powerful Hydraulics	0	0	3	3	0
Whitewater “Play Areas”	0	0	2	3	1
Size/Difficulty of Rapids	0	0	2	4	0
Overall Whitewater	0	0	3	3	0
Challenge	0	1	1	4	0
Safety	0	0	5	1	0

Photo 5-6 View of the Upper Bypassed Reach for the Third Flow at Approximately 2,750 cfs. Picture view taken northeasterly.

5.4.3 Comparative Flow Assessment

Nine study participants completed a comparative flow assessment to compare the overall satisfaction and experience of the first and second study flows from 2022. Two participants used a cataraft for both flows and all other participants used hard-shell kayak. Three participants identified their skill levels as intermediate and were comfortable running Class III whitewater, and of the three, a participant noted they are comfortable with some Class IV whitewater. Six participants identified their skill level as advanced and were comfortable with Class IV whitewater. None of the participants had boated the Lowell bypassed reach before the 2022 session.

Two of the three boaters that participated in both the 2022 and 2024 on-water boating assessments completed comparative flow evaluations. The third participant did not complete a comparative flow evaluation, however, did provide markings on a paper copy of Figure 5-1. Both of the participants boated the reach in hard-shell kayaks and identified their skill levels as advanced or intermediate-advanced whitewater boaters. In their evaluations they reported that they were comfortable navigating Class III and IV

whitewater. None of the participants had previously boated the Project's bypassed reach prior to the 2022 assessment.

On a scale of 1 to 5, with 1 being not important and 5 being very important, participants evaluated the importance of the different characteristics related to their overall satisfaction of the bypassed reach (Table 5-7). Participants also evaluated the study flows based on their skill level and craft used (Table 5-8). In the 2022 assessment, participants noted that the first flow of 5,750 cfs was the minimum required to boat the bypassed reach. However, the two boaters that participated in both the 2022 and 2024 assessments, reported that the minimum flow necessary to boat the bypassed reach ranged between 2,300 and 3,000 cfs.

The optimal range of flows for the lower reach varied depending on the participant's skill level and craft. In the 2022 assessment, participants identified a safe flow range between 6,000 and 10,000 cfs for the second flow. One participant noted that 15,000 cfs could be safe while offering a high level of challenge. By contrast, in the 2024 session, the two participants indicated an optimal flow range between 2,500 cfs and 8,000 cfs. Notably, during the 2022 assessment, the same participants reported safe flows between 10,000cfs and 15,000 cfs.

In the 2022 assessment, participants generally found the take-out facility to be acceptable and in good condition. However, the put-in at the Northern Canal Walkway Island was rated as acceptable to marginal, with suggestions for improvements such as better parking, stairs, and a more accessible path. During the 2024 assessment, participants rated the takeout as marginal to acceptable, while the put-in at Northern Canal Walkway Island was unanimously rated as marginal. It is important to note that since the three new participants in 2024 did not attend the 2022 on-water boating assessment, they did not complete the comparative flow evaluation form. However, feedback on the need for upgrades at both the put-in and take-out locations was mentioned in the 2024 pre- and post-run assessment forms. Additionally, one participant noted a potential "park and play" spot near the University Ave. Bridge in their comparative assessment form, marking it as the only edit made to the form.

Boaters compared the Project's bypassed reach to the reaches found on the Concord River; Weston Project/Kennebec River; Winnipesaukee; and Turners Falls/Connecticut River. One participant from the 2024 assessment noted that the Lowell bypassed reach reminded them of the Mill City Park at Franklin Falls urban engineered whitewater park in Franklin, NH. This comparison was further explored during the subsequent December 3, 2024, focus group discussion.

Table 5-7 Importance of Factors to Overall Whitewater Satisfaction at the Project

Factor	(1) Not Important	(2)	(3) Somewhat Important	(4)	(5) Very Important
Navigability	0	0	1	3	6

Factor	(1) Not Important	(2)	(3) Somewhat Important	(4)	(5) Very Important
Challenging Technical Boating	0	1	2	5	3
Powerful Hydraulics	1	0	6	3	1
Whitewater “Play Areas”	0	0	3	5	3
Size/Difficulty of Rapids	0	0	3	6	2
Overall Whitewater Challenge	0	0	2	6	3
Safety	0	0	4	3	4
Crowding	2	4	1	3	1
Long-run(s)	0	4	5	2	0
Short-run(s)	2	3	6	0	0
Low Number of Portages	1	1	2	4	3
High Number of Rapids	0	1	4	4	2
Low Number of Rapids	7	3	1	0	0
Easy Access	0	1	2	8	0
Easy Shuttle	0	1	5	5	0

Note: One participant did not provide a response for the ‘navigability’ prompt.

Table 5-8 Acceptability of 2022 Study Flows at the Project

Flow	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
First Flow (5,750 cfs)	1	0	1	4	1

Flow	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
Second Flow (6,700 cfs)	1	0	1	0	5

Note: Two participants did not answer this question.

Table 5-9 Acceptability of 2024 Study Flows at the Project

Flow	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
First Flow (6,600 cfs)	0	0	0	0	2
Second Flow (2,750 cfs)	0	0	0	0	2

Note: One participant did not answer this question

5.4.4 Focused Group Discussion

The Study Working Group originally decided the optimal flow ranges needed to perform the three flow assessments were between 2,500 cfs and 8,000 cfs in the bypassed reach. During the 2022 assessment, study participants noted that while they preferred the second flow, they would need to boat the bypassed reach at a lower flow (around 2,500 cfs) to complete their evaluation. Due to the weather, participants agreed that the low flows needed to boat the run were most likely to occur in early spring of 2023. The study was postponed as detailed in Section 5.4. On November 24, 2024, six boaters participated in the third and final assessment for the Lowell Whitewater Boating and Access Study. Three of the six participants had also participated in the 2022 session. The results from both the 2022 and 2024 sessions are outlined below.

Boott facilitated two focus group discussions following the comparative assessments of the study flows—first, second, and third. The first session was held on November 19, 2022 at the UMass Lowell CRC and focused on feedback regarding the first and second study flows. This Focus Group discussion included the nine boater participants and two spectators. The second Focus Group discussion took place on December 3, 2024[8], via Microsoft Teams. It focused on the third flow and provided an opportunity for the three

[8]Boott and the Study Working Group mutually decided to postpone the focus group discussion following the 2024 on-water boating session due to seasonably cold weather and strong wind gusts experienced at the staging area (i.e., location where the discussion would have occurred). Additionally, no meeting rooms were available for rental at the UMass Lowell CRC during that period.

participants who attended both the 2022 and 2024 sessions to share comparative insights based on their experiences boating all three flows. Five of the six participants from the 2024 session joined this virtual discussion. The three boaters that only participated in the 2024 assessment evaluated only the third flow. The combined results from participants across both focus group discussions are outlined below.

Participants agreed that due to potential safety hazards, interested boaters should scout the reach from the University Ave Bridge before putting in. Portage to and from the put-in and take-out sites was largely acceptable during both the 2022 and 2024 Focus Group discussions. A few participants noted traffic safety concerns but agreed that traffic will be inevitable due to the inherent urban nature of the Project location and where boating can occur. There was consensus that the reach could be classified as Class III whitewater rapids, requiring at least an intermediate skill level at all three flows. In the 2022 assessment, participants generally preferred the second flow (later verified at 6,700 cfs) and expressed interest in returning to boat at that flow. One participant, who attended both assessments (2022 and 2024), reported that the higher flow did not exceed their intermediate-advanced skill level, noting that more flow could be manageable for more skilled boaters. This participant favored the higher flows most. Overall, boaters reported a noticeable difference between the two flows in 2022, with the second flow being described as more fluid, challenging, and enjoyable.

The 2024 participants unanimously agreed that the low-flow conditions were unsuitable for beginners, citing the increased difficulty and risk associated with rescue operations under such circumstances. One participant identified specific hazards, discussing several areas within this section of the reach with potential foot entrapment points along their navigation line. This observation was the focus of the boaters concerns that this flow could pose significant risks for inexperienced boaters. For experienced paddlers, however, the flow offered a technically challenging and engaging experience.

Participants described the third flow as offering a generally comfortable, yet demanding Class III run with some channel(s). One of the study participants noted that the whitewater features offered at this flow could merit Class IV stature along river left. Regarding the Class IV channel(s) on river left, the participant noted that access is challenging, and certain sections are constricted. Participants were satisfied with the abundance of play spots, including technically challenging holes that demanded advanced maneuvering skills. They also noted numerous opportunities for playboating, as defined in Section 5.1.

The river-left line was particularly enjoyable during both the first and second flows, offering a strong surfable wave and other playful features. During the third flow assessment, one participant noted that the river-left line remained runnable and looked appealing. The boaters agreed that while the second flow was not necessarily more difficult than the first, each of the two flows presented different challenges. Among the three participants who attended both the 2022 and 2024 assessments, one highlighted that the third flow was more technically demanding than the first flow. They also noted that higher flows were better suited for “running laps,” providing more continuous and

dynamic whitewater. The participants reported that the lower flows were ideal for "park and play" activities, which allowed paddlers to focus on specific features like natural obstacles (i.e., channels, holes, rapids) and playboating techniques. One participant who evaluated all three flows provided an insightful summary for the 2024 group, stating, that the higher flows are more challenging, while the lower flows are more technical and consequential. Different types of boaters appreciate each flow differently—some prefer the higher flows, while others favor the lower flows. The participant further elaborated with an analogy to skiing, explaining, "some skiers enjoy staying in the park to do tricks, while others prefer the experience of powder and tree skiing." Each of the three flow levels offered whitewater features appealing to various boating styles and each boaters' individual preferences.

At the second flow, the weirs and sharp bedrock were less of a concern, as the increased flow helped mitigate these hazards. However, participants observed debris in the bypassed reach, particularly a piece of crushed mechanical equipment embedded in bedrock on river left of the lower bypassed reach[9]. This debris could pose a hazard to boaters. During the third flow in 2024, the group noted that boaters must be more mindful of debris and potential hazards, as lower flows expose more obstacles and require heightened awareness. Participants reported numerous occurrences of large woody debris as well as some instances of urban debris, including items such as bottles, general litter, metal scraps, and shopping carts. Participants agreed that at lower flows, caution is especially important to navigate the reach safely, as the lower water levels exposed more hidden dangers. Study participants suggested that the put-in and take-out locations should be improved by adding access stairs and clearing debris and vegetation. Many participants highlighted the presence of trash, broken glass, and hypodermic needles at the take-out site during the 2024 session, noting these posed safety risks to their health and their equipment At the put-in, participants unanimously agreed in both Focus Group discussions that access to the walkway remains a concern. They also noted that the steep slope leading to the water makes it particularly difficult for boaters to launch their boats. Boott explained that the Northern Canal Island and Walkway are owned by MADCR and managed by the NPS, so any proposed improvements or modifications to that put-in would need those agency approvals. Additionally, Boott explained that the NPS allows public access to the Northern Canal Walkway is only during the recreation season from May 15 - October 15 from 9 AM to 5 PM. Furthermore, by agreement with Boott the walkway is only opened to the public when flows in the Merrimack River are less than 3,500 cfs, due to the potential public

[9] On January 10, 2024, Boott filed an AIR response with FERC under Accession No. 20240110-5138. The filing addressed a crushed vehicle, approximately 10 feet long and 5 feet wide, was identified in the bypassed reach during the 2022 session. It is embedded in rock, sediment, and vegetation and remains visible under typical flows, including the study's peak of 6,700 cfs. Boaters acknowledged its presence but noted it lies in an area without whitewater features and away from their boating paths, specifically near the take-out on river right. Boott and the boaters agreed during the 2022 focus group discussion that the vehicle does not pose a hazard to navigation, given its visibility and location outside the main boating area. Therefore, Boott does not consider removal necessary for whitewater safety.

safety risk that would occur if the Project's surge suppression gate failed to open upon unit trip during higher flow conditions. When it is outside the recreation season or when flows in the Merrimack River are over 3,500 cfs, NPS does not unlock the entry gate on the O'Donnell Memorial Bridge. Boott further explained the details of the agreement with the NPS and the operational and safety concerns with providing increased access to the Northern Canal Walkway, which are detailed in the Recreation and Aesthetics Study Report filed with FERC on May 31, 2022.

Boaters in both the 2022 and 2024 assessments collectively requested the opportunity for scheduled or "forecasted" flows during weekends and weekdays, access to real-time flow condition data from a flow gauge, and extended access to the Walkway beyond the times outlined in the schedule above. If Boott were to provide special access for whitewater boaters to the put-in via the Northern Canal Walkway Island, it would need to request from and coordinate with NPS and MADCR. For scheduled whitewater releases this coordination would likely not be a problem in most situations. However, unscheduled, ad hoc access is less feasible, because leaving the walkway access gates open would defeat the existing public safety measures described above.

One boater stated that "if the walkway is unavailable, an alternative form of access would need to be provided." Providing a separate gate and stairway to allow access to the put-in area presents a number of challenges, including potential impacts to the historic stone masonry training wall downstream of the Northern Canal Gatehouse, and likely requiring permission from the Massachusetts Department of Transportation (MassDOT) to allow installation of a new gate and stairway off of the O'Donnell Memorial Bridge.

The group also discussed put-in access alternatives that would not require access via the Northern Canal Walkway. Boaters indicated they observed an access point and trail on river left that was used by pedestrians to access the bypassed reach via a gap in the fence along VFW Highway, although this was clearly trespassing and not safe. It was noted that a former boater of this bypassed reach reportedly parked at a nearby restaurant and accessed the bypassed reach at this point. A participant inquired about the potential to park near the UMass Lowell ballfields and walk to this potential put-in site. Boott further explained the issues identified with providing access on river left, which include: 1) there is no public parking; and 2) it is immediately adjacent to the VFW Highway, a four-laned highway owned by MassDOT and would require rights-of-way and agency approvals. Boott also summarized the Study Working Group's prior discussions regarding developing a walkway down to the Merrimack River adjacent to the Pawtucket Dam fish ladder, but this also offers no parking opportunity on the VFW Highway. However, it would be possible for boaters to park at the Blacksmith's Shop, which would require walking across the O'Donnell Memorial Bridge, then up the walkway along the VFW Highway to the put in point, a total distance of approximately 1,200 feet. Similarly, a separate staircase from the O'Donnell Memorial Bridge down to the bypassed reach would require modification of a bridge owned by MassDOT. Boott will coordinate with the AW, NPS, the MADCR, and the City of Lowell to determine the feasibility of providing freer access to the Project's bypassed reach at the locations discussed above.

Participants were unanimous in requesting additional parking availability during the 2024 session. They expressed concerns that parking is extremely limited and insufficient for medium to large groups of boaters at the Blacksmith's Shop and near the staging area. Specifically, one participant inquired whether parking at the powerhouse could be made available. For security reasons, this is not an option, as it provides access to other Project features and areas that should be restricted to the public for safety and security reasons. Another participant highlighted the lack of parking at the take-out site during regular periods (i.e., outside of planned whitewater boating studies). Boott reminded the participant that parking in the surrounding neighborhood of Edward A. Lelcheur Park involves public roadways and lots, which are not directly affiliated with UMass Lowell. These areas are already designated and available for parking within the city limits.

The consensus among boaters during the 2024 Focus Group discussion was that the number of play holes, playboating pools, and channels in the third flow assessment was highly favorable, particularly among the boaters who participated in all three study flows. At lower flows, participants favored park-and-play options. For the 2022 Focus Group discussion, participants noted hydraulic features below the tailrace, which boaters have reportedly used for playboating when the Project is generating. While the exact flow rates used are unknown, participants recognized that the high flow conditions created by the Project's generation and release at the tailrace form ideal hydraulics. This area can be accessed from the take-out location, as boaters often put in and take out at the same location when necessary.

Study participants proposed the installation of a play feature below the tailrace during the 2022 Focus Group discussion, which would allow Boott to maintain power generation as usual. Participants from the City of Boston highlighted the convenient location, stating that whitewater releases or the addition of a play feature could attract Boston-area boaters and members of the UMass Lowell community. Specifically, a participant who attended both the 2022 and 2024 assessments shared that they travel over an hour to access playboating features at the manmade whitewater facility at Mill City Park, in Franklin, NH. While they prefer this park for playboating, they expressed that if whitewater releases occurred at Lowell, similar to what they experienced during the third flow assessment in 2024, they would choose to stay in Lowell instead. They believe the unique river geomorphology of the Lowell bypassed reach offers features similar to those at Mill City Park, but in their opinion, the natural features at Lowell—especially during low flows—are superior for their level of skill, enjoyment, and personal objectives. A study spectator during the 2022 assessment that is employed by UMass Lowell suggested that additional funding for such a project could potentially come from the City of Lowell or UMass Lowell. The university currently runs programs that introduce students and others to water activities, including whitewater boating on the Concord River.

During the 2022 assessment, boaters noted that if scheduled releases were to occur, Boott should not schedule any releases on the same days as releases on the Deerfield River (32 days a year). Participants asked if there were any concerns with whitewater releases during the fish passage season, which generally runs from late April through mid-July. Boott clarified that during conversations with the fishery agencies, that the

agencies did not express any concerns with whitewater releases during fish migration season. Boaters in both the 2022 and 2024 assessments noted it is helpful to have flow information publicly available if Boott does not intend on providing specific controlled releases. Boaters unanimously requested both forecasted flows and flow information during both sessions.

Participants from both sessions frequently referenced the Concord River when comparing it to other boating rivers in the area. The Concord River was widely favored by focus group members for its whitewater features, convenient location, and proximity to work or home. In contrast, a participant in the 2024 assessment described the Lowell bypassed reach as an ideal location, emphasizing its personal benefits and noting that it is likely the only whitewater spot in the area accessible via public transportation. Participants generally agreed that the City of Lowell is the premier whitewater location within close proximity to Boston, offering access to both the Concord and Merrimack Rivers. Participants indicated that the Concord River was their preferred choice of the two options; however, they agreed that when the Concord is unavailable, the Project's bypassed reach could be an excellent alternative. They also concurred that it could serve as an appealing after-work option during days with longer daylight hours and could act as a substitute when the Concord River is not running. However, it is likely that lower flows on the Merrimack River coincide with the lower flow periods on Concord River. Additionally, participants expressed an interest in access to real-time flow data to monitor the flows within the Project's bypassed reach.

6 Analysis and Discussion

Boott conducted a Whitewater Boating and Access Study at the Project to evaluate the feasibility of whitewater boating in the 3,500-foot-long stretch of the Merrimack River between the Project's Pawtucket Dam and the confluence below the powerhouse. To support this evaluation, Boott followed the Whittaker et al. (2005) methodology and conducted a stepwise study.

In accordance with the SPD, Boott completed all primary planning and preparation activities for the Whitewater Boating and Access Study. Primary planning and preparation activities for the Whitewater Boating and Access Study were: (1) Literature Review; (2) formation of a Study Working Group and identification of volunteers to participate in whitewater release evaluations; (3) identification of appropriate put-in and take-out locations for on-water evaluations; (4) development of a safety plan; (5) determination of method for verifying flows in the Project's bypassed reach; and (6) development of survey forms to be used in the execution of the flow evaluations.

The literature review documented there are 52 whitewater opportunities within 60 miles and there are little documented whitewater opportunities in the immediate Project area except for a reach on the Concord River. The flow analysis analyzed and reviewed hydrology information as it relates to whitewater and any operational constraints and safety concerns. After review of the Whitewater Flow Documentation Report and

consultation with stakeholders, the Study Working Group decided to focus on bypass flows ranging from 2,500 cfs to 8,600 cfs. Assuming the Project is reaching its maximum hydraulic capacity of 6,600 cfs, the ideal Merrimack River flow range to perform the study was approximately 8,000 cfs to 10,000 cfs. It was found that the Project experiences average Merrimack River flows within this range in early to late spring, and during the recreation season (May-October), May, June, July, and October have at least a 10 percent exceedance of these flows.

Based on the results from the on-water assessments conducted on November 19, 2022, and November 24, 2024, participants indicated that the whitewater opportunities in the Lowell bypassed reach would be ideal for intermediate boaters (at least Class III whitewater), depending on the craft used and the location within the reach. Boott plans to install signage at the put-in location to inform boaters of the hazards that may exist within the Project's bypassed reach. Overall, participants found the bypassed reach to be enjoyable at the 6,700 cfs flow and indicated they would likely return in the future if this flow were available. For boaters who participated in both the 2022 and 2024 assessments, the third flow was described as offering good playboating opportunities, while the first and second flows were better suited for boaters looking to "run" laps in the short reach. Boater preferences for flow levels varied significantly, as each boater has unique preferences for their experience levels. As a result, the optimal flow was seen as different for each participant. Some participants preferred the features offered at the first and second flows for riding their "line," while others favored playboating during the third flow.

Safety concerns highlighted were the weirs and the sharp shale bedrock with the potential to overturn boats or trapping a boater via recirculation. Although the put-in and take-out locations were rated as generally marginal to acceptable, the put-in is in a restricted area and would only be available to boaters from May 15 – October 15 when flows in the Merrimack River are less than 3,500 cfs. Other put-in options were discussed, and their difficulties were identified. Boaters described the take-out location as steep and littered with debris, including broken glass and hypodermic needles, posing risks to both their health and their equipment.

7 Correspondence

A summary of correspondence and consultation related to the Whitewater Boating and Access Study is presented in Table 7-1. Appendix A provides copies of relevant correspondence.

Table 7-1 Summary of Consultation and Correspondence

Date	From	To	Subject
July 24, 2019	HDR, Boott	AW, NPS, DCR	Invitation to Participate in Study Working Group
July 31, 2019	American Whitewater	HDR and Boott	Logistics regarding Whitewater Boating Study

Date	From	To	Subject
July 31, 2019	HDR, Boott	American Whitewater	Logistics regarding Whitewater Boating Study
August 2, 2019	Boott	NPS, Lowell Land Trust, Lowell Fire Department	Logistics regarding Study Working Group Site Visit
October 28, 2019	HDR and Boott	Study Working Group	Whitewater Flow Documentation Plan
November 12, 2019	AW	HDR and Boott	Comments on the Whitewater Flow Documentation Plan
May 8, 2020	HDR	AW	Logistics on the Whitewater Boating Study
May 14, 2020	HDR	AW	Redistribution of Whitewater Boating Study Documents
July 29, 2020	AW	HDR, Boott	Logistics on the Whitewater Boating Study
July 31, 2020	HDR, Boott	AW	Logistics on the Whitewater Boating Study
August 21, 2020	HDR, Boott	AW	Distribution of Whitewater Flow Documentation Report
October 13, 2020	NPS	HDR, Boott	Whitewater Boating and Access Study implementation
October 13, 2020	HDR, Boott	NPS, Lowell Trust, Zoar Outdoor	Whitewater Boating and Access Study implementation
October 26, 2020	HDR, Boott	AW	Whitewater Boating and Access Study implementation
October 26, 2020	AW	HDR, Boott	Whitewater Boating and Access Study implementation
April 19, 2021	AW	Boott, HDR	Whitewater Boating and Access Study implementation
April 20, 2021	AW	Boott, HDR	Whitewater Boating and Access Study implementation
May 10, 2021	AW	Boott	Whitewater Boating and Access Study implementation
May 13, 2021	Boott	AW	Whitewater Boating and Access Study implementation
April 11, 2022	AW	Boott	Whitewater Boating and Access Study implementation
April 11, 2022	Boott	AW	Whitewater Boating and Access Study implementation
November 15, 2022	AW	Boott and Study Participants	Whitewater Boating and Access Study implementation
November 17, 2022	Boott	AW and Study Participants	Whitewater Boating and Access Study implementation
November 21, 2022	AW	Boott	Whitewater Boating and Access Study Follow up

8 Variances from FERC-Approved Study Plan

The Whitewater Boating and Access Study has experienced delays in completion due to river flows and powerhouse operations, but otherwise the study was conducted in conformance with the Commission's SPD.

9 Literature Cited

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Appendix A - Copies of Study Correspondence

Iffert, Kelsey

From: Quiggle, Robert
Sent: Wednesday, July 24, 2019 10:21 AM
To: Bob Nasdor (bob@americanwhitewater.org); celeste_bernardo@nps.gov; steve.carlin@state.ma.us
Cc: Christine_bruins@nps.gov; Anderson, Elise (EGP North America); 'Kevin.Webb@enel.com'; MacVane, Kelly; Scott, Kelsey; Gibson, Jim
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
Attachments: 20190724 Lowell Whitewater Boating Study Working Group Invite.pdf

Dear Stakeholders:

Boott Hydropower, LLC, a subsidiary of Enel Green Power North America, is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study in the Project's bypassed reach located in the City of Lowell. On behalf of Boott, we are inviting your participation in an upcoming Whitewater Boating and Access Study Working Group site visit to the Project on August 8, 2019. The site visit is an important component of the study and will be an opportunity to discuss study logistics, volunteer participation, safety, boater access, boatability, flows in the bypassed reach, and survey instruments. Additional details regarding the August 8, 2019 site visit are presented in the attached letter.

Should you have any questions regarding the upcoming site visit, please contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

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A Subsidiary of Enel Green Power North America, Inc.

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T +1 978 681 1900 – F +1 978 681 7727

Via Email and Post

July 24, 2019

Mr. Robert Nasdor
NE Stewardship Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org

Ms. Celeste Bernardo
Superintendent
Lowell National Historic Park
US National Park Service
67 Kirk Street
Lowell, MA 01852
celeste_bernardo@nps.gov

Mr. Steve Carlin
Park Supervisor
Lowell Heritage State Park
Massachusetts Department of Conservation & Recreation
160 Pawtucket Blvd.
Lowell, MA 01854
steve.carlin@state.ma.us

Mr. George Rose
Deputy Director
Office of Emergency Management
The City of Lowell Fire Department
JFK Civic Center
99 Moody Street
Lowell, MA 01852

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Whitewater Boating and Access Study

Dear Stakeholders:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and owner of the 22.4 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project or Lowell Project). The Lowell Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations Part 5.

In accordance with the ILP, Boott developed a Pre-Application Document (PAD) and Notice of Intent (NOI) which were filed with the Commission on April 30, 2018 to initiate the formal relicensing process. By letter dated August 8, 2018, American Whitewater (AW) provided comments on the PAD and NOI and requested that Boott undertake a controlled flow release whitewater study in support of Project relicensing. Pursuant

to the requirements of the ILP, Boott developed a Proposed Study Plan (PSP) that was filed with the Commission on September 28, 2018. In the PSP, Boott proposed a Whitewater Boating and Access Study to assess the Project's bypass reach for whitewater boating and boater accessibility. A revised Whitewater Boating and Access Study plan was filed in Boott's January 28, 2019 Revised Study Plan (RSP) for Project relicensing. As described in the RSP, Boott proposed to conduct a Whitewater Boating and Access Study based on the guidance provided in *Flows and Recreation: A Guide to Studies for River Professionals*[1]. FERC issued the Study Plan Determination (SPD) for the Project on March 13, 2019. The Commission's SPD approved the Whitewater Boating and Access Study plan without modifications.

As described in the approved Whitewater Boating and Access Study plan, Boott has proposed to form a Whitewater Boating and Access Study Working Group (Working Group) to assist in study planning and coordination and to identify volunteer boaters to participate in this study. As an initial step in the planning process, Boott is inviting potentially interested stakeholders to participate in a Working Group site visit at the Project to discuss the study schedule and logistics, volunteer participation, general safety, flow releases, and the survey forms included as appendices D, E, and F of the RSP. During this site visit, the Working Group will also conduct a reconnaissance of the Project's bypass reach to identify site-specific safety concerns and access areas.

Boott invites stakeholders to participate in a Working Group site visit at the Project on August 8, 2019 from 9:00 AM until 12:00 PM. Please notify the undersigned at Kevin.Webb@enel.com if you intend to participate in the Working Group site visit or if you would like to suggest a different date and/or time. Parties interested in participating should meet at the Project's E.L. Field Powerhouse located at 145 Pawtucket Street, Lowell, Massachusetts 01854. Please wear sturdy footwear; no sandals, open-toed shoes, or shorts.

At this time, Boott is not aware of other stakeholders or organizations with an interest in participating in the Working Group. If your office knows of any additional stakeholders or organizations who should be invited to participate, Boott respectfully requests that you notify the undersigned via email at your earliest convenience so that they can be invited to participate in the site visit.

On behalf of Boott, I appreciate the opportunity to consult with you, and we look forward to meeting with you in August to discuss the upcoming Whitewater Boating and Access Study. Please do not hesitate to contact me at (978) 935-6039 or via email at Kevin.Webb@enel.com if you have any questions concerning this study or Project relicensing.

Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

Cc: E. Anderson (Enel)
Christine Bruins (NPS)
R. Quiggle (HDR)

[1] Whittaker. (2005). *Flows and Recreation: A Guide to Studies for River Professionals.* Washington, DC: Hydropower Reform Coalition and National Park Service - Hydropower Recreation Assistance.

Iffert, Kelsey

From: Quiggle, Robert
Sent: Wednesday, July 31, 2019 11:24 AM
To: Bob Nasdor; Webb, Kevin (EGP North America)
Cc: Anderson, Elise (EGP North America); Scott, Kelsey
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Thanks, Bob. We are continuing to do outreach to the invited participants, and we will let you know when we have a response.

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor [mailto:bob@americanwhitewater.org]
Sent: Wednesday, July 31, 2019 6:48 AM
To: Webb, Kevin (EGP North America) <kevin.webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Anderson, Elise (EGP North America) <elise.anderson@enel.com>
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

We need to firm up whether this is happening on the 8th by Friday or wise postpone the meeting to another week.

Robert Nasdor
American Whitewater
Northeast Stewardship & Legal Director
65 Blueberry Hill Lane
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

From: Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Sent: Friday, July 26, 2019 9:58:18 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Bob Nasdor <bob@americanwhitewater.org>
Cc: Anderson, Elise (EGP North America) <elise.anderson@enel.com>
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Thanks Rob. Either of those days would work for me.

From: Quiggle, Robert [mailto:Robert.Quiggle@hdrinc.com]
Sent: Friday, July 26, 2019 9:52 AM
To: Bob Nasdor

Cc: Webb, Kevin (EGP North America); Anderson, Elise (EGP North America)
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Bob:

I haven't had any additional feedback, but I will let you know when we hear back from the group. Copying Kevin and Elise with Enel here so that they can stay in the loop for planning purposes.

Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor [mailto:bob@americanwhitewater.org]
Sent: Thursday, July 25, 2019 7:51 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Any feedback from others on the meeting? My first choice would be on the 9th, second choice on the afternoon of the 8th. Thanks

Bob

Robert Nasdor
American Whitewater
Northeast Stewardship & Legal Director
65 Blueberry Hill Lane
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

From: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Sent: Wednesday, July 24, 2019 1:03:16 PM
To: Bob Nasdor | AW <bob@americanwhitewater.org>
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

No problem, Bob. See you next month

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor | AW [mailto:bob@americanwhitewater.org]
Sent: Wednesday, July 24, 2019 12:58 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Oops. Wrong year. 2020. That should work for me.

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Wed, Jul 24, 2019 at 12:42 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob:
>
> You may be looking at the wrong month (maybe June?); August 8 is a Thursday.
>
> I think this will be a good opportunity for everyone to really have a look at the reach together and work out some of the logistics. Looking forward to meeting with you at Lowell.
>
> Thanks,
>
> **Robert Quiggle,** RPA
> *Regulatory and Environmental Section Manager*
>
> **HDR**
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us
>
> **From:** Bob Nasdor | AW [mailto:bob@americanwhitewater.org]
> **Sent:** Wednesday, July 24, 2019 12:37 PM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Subject:** Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
>
> Hi Rob,
>
> Thanks for sending this. Looking forward to the meeting. This is scheduled for Saturday, August 8th? I would have no objections to this taking place on Fiday Augist 7th if that's better for others.
>
> Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Wed, Jul 24, 2019 at 10:20 AM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Boott Hydropower, LLC, a subsidiary of Enel Green Power North America, is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study in the Project's bypassed reach located in the City of Lowell. On behalf of Boott, we are inviting your participation in an upcoming Whitewater Boating and Access Study Working Group site visit to the Project on August 8, 2019. The site visit is an important component of the study and will be an opportunity to discuss study logistics, volunteer participation, safety, boater access, boatability, flows in the bypassed reach, and survey instruments. Additional details regarding the August 8, 2019 site visit are presented in the attached letter.
>
> Should you have any questions regarding the upcoming site visit, please contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.
>
> Thank you,
>
> **Robert Quiggle,** RPA
> *Regulatory and Environmental Section Manager*
>
> **HDR**
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us

Iffert, Kelsey

From: Quiggle, Robert
Sent: Friday, August 2, 2019 2:11 PM
To: Bob Nasdor (bob@americanwhitewater.org); celeste_bernardo@nps.gov; steve.carlin@state.ma.us; jcalvin@lowelllandtrust.org; Christine_bruins@nps.gov
Cc: Anderson, Elise (EGP North America); 'Kevin.Webb@enel.com'; Battaglia, Brett; Scott, Kelsey; Gibson, Jim; Jones, Scott
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Dear Stakeholders:

Based on feedback from American Whitewater and the National Park Service, we are confirming the Whitewater Boating and Access Study Working Group site visit at the Lowell Hydroelectric Project on August 8, 2019. Participants indicated that an afternoon meeting would be best; accordingly, we are inviting interested stakeholders to **meet at 12 PM on Thursday, August 8, 2019 at the E.L. Field Powerhouse** located at 145 Pawtucket Street, Lowell, Massachusetts 01854. We expect the site visit will last about three hours. As a reminder, please wear sturdy footwear; no sandals, open-toed shoes, or shorts. Should you have any questions about the site visit, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Quiggle, Robert
Sent: Wednesday, July 24, 2019 10:21 AM
To: Bob Nasdor (bob@americanwhitewater.org) ; 'celeste_bernardo@nps.gov' ; 'steve.carlin@state.ma.us'
Cc: 'Christine_bruins@nps.gov' ; Anderson, Elise (EGP North America) ; 'Kevin.Webb@enel.com' ; MacVane, Kelly ; Scott, Kelsey ; Gibson, James (Jim.Gibson@hdrinc.com)
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Dear Stakeholders:

Boott Hydropower, LLC, a subsidiary of Enel Green Power North America, is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River in Middlesex County, Massachusetts, and in
Hillsborough County, New Hampshire. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study in the Project's bypassed reach located in the City of Lowell. On behalf of Boott, we are inviting your participation in an upcoming Whitewater Boating and Access Study Working Group site visit to the Project on August 8, 2019. The site visit is an important component of the study and will be an opportunity to discuss study logistics,

volunteer participation, safety, boater access, boatability, flows in the bypassed reach, and survey instruments. Additional details regarding the August 8, 2019 site visit are presented in the attached letter.

Should you have any questions regarding the upcoming site visit, please contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
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Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Iffert, Kelsey

From: Quiggle, Robert
Sent: Monday, October 28, 2019 3:25 PM
To: Bob Nasdor (bob@americanwhitewater.org); celeste_bernardo@nps.gov; Bruins, Christine; Cooksey, William (DCR); John Aziz; Hoffmann, Peter (DCR); 'bruce@zoaroutdoor.com'; kevin@zoaroutdoor.com; Rose, George; CMcCall@lowellma.gov
Cc: 'Kevin.Webb@enel.com'; Anderson, Elise (EGP North America); Scott, Kelsey
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
Attachments: 20191028 Lowell Whitewater Flow Documentation Plan.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Working Group Participants:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Pursuant to the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations.

During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Accordingly, Boott has developed the attached Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach and consulting with the Working Group to identify the appropriate flows for the controlled flow releases.

In order to facilitate implementation of the Whitewater Flow Documentation Plan, Boott is seeking your written (email) concurrence with the proposed plan by November 11, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
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Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Boott Hydropower, LLC
A Subsidiary of Enel Green Power North America, Inc.

100 Brickstone Square, Suite 300 – Andover, MA 01810 – USA
T +1 978 681 1900 – F +1 978 681 7727

Via Email Distribution

October 28, 2019

To: Whitewater Boating and Access Working Group

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Whitewater Boating and Access Study
Whitewater Flow Documentation Plan

Dear Whitewater Boating and Access Working Group:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and owner of the 20.2 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project). The Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations Part 5.

In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study as approved in the Commission's March 13, 2019 Study Plan Determination for the Project. Pursuant to the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations. During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Since the Working Group participants have had limited experience boating the bypass reach, participants could not make informed choices on which flows would be appropriate for boating. Accordingly, Boott has developed the enclosed Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach and consulting with the Working Group to identify the appropriate flows for the controlled flow releases.

Boott is proposing to document flows in the bypass reach using cellular-enabled trail cameras and to provide the Working Group with a summary report that presents photographs of the bypass reach under various flow conditions. To capture a wide range of flow conditions, Boott is proposing to deploy cellular-enabled trail cameras from approximately December 1, 2019 through May 15, 2020. The cameras will record photos on an hourly basis during daylight hours, and the photographs will be date- and time-stamped. In the summary report, Boott will present representative photographs at approximately 500 cubic feet-per-second (cfs) intervals (e.g., 500 cfs, 1,000 cfs, 1,500 cfs, etc.) along with the corresponding river flow data.

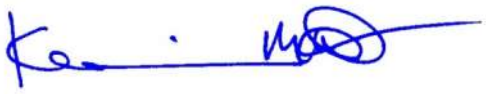
As described in the enclosed plan, Boott will consult with the Working Group based on the Whitewater Flow Documentation Report to determine the appropriate flows for the controlled flow releases. To facilitate the flow documentation and consultation, Boott anticipates conducting the controlled flow releases once the Working Group has had the opportunity to review the Whitewater Flow Documentation Report and after fish passage operations at the Project end around July 15, 2020. The timing of the controlled flow releases will be dependent on available flows in the Merrimack River.

At this time, Boott is seeking your concurrence regarding the Whitewater Flow Documentation Plan and the general schedule for documenting flows and conducting the controlled flow releases. To facilitate timely deployment of the trail cameras, Boott respectfully requests your written (email) concurrence on or

before November 11, 2019. Please send correspondence to the undersigned at the email address provided below.

On behalf of Boott, I look forward to continued discussions and consultation with the Working Group regarding this study. Please do not hesitate to contact me at (978) 935-6039 or via email at Kevin.Webb@enel.com if you have any questions concerning this study or Project relicensing.

Sincerely,
Boott Hydropower, LLC



Kevin M. Webb
Hydro Licensing Manager

Encls.

Cc: E. Anderson (Boott)
R. Quiggle (HDR)

Lowell Hydroelectric Project (FERC No. 2790- 072)
Whitewater Boating and Access Study Working Group

Email Distribution List

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bob@americanwhitewater.org

Ms. Celeste Bernardo
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US National Park Service
celeste_bernardo@nps.gov

Ms. Christine Bruins
Community Planner
Lowell National Historic Park
US National Park Service
christine_bruins@nps.gov

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Mr. Peter Hoffmann
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Mr. Bruce Lessels
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bruce@zoaroutdoor.com

Mr. Kevin McMillan
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Zoar Outdoor
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Mr. George Rose
Deputy Director
Office of Emergency Management
City of Lowell Fire Department
GRose@lowellma.gov

Ms. Christine McCall
Senior Planner
City of Lowell Dept. of Planning and Development
CMcCall@lowellma.gov

Iffert, Kelsey

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Tuesday, November 12, 2019 10:17 AM
To: Quiggle, Robert
Cc: celeste_bernardo@nps.gov; Bruins, Christine; Cooksey, William (DCR); John Aziz; Hoffmann, Peter (DCR); bruce@zoaroutdoor.com; kevin@zoaroutdoor.com; Rose, George; CMcCall@lowellma.gov; Kevin.Webb@enel.com; Anderson, Elise (EGP North America); Scott, Kelsey; Joe t
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
Attachments: Lowell Whitewater Boating Study Documentation Plan Comments.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Rob,

Thank you for the opportunity to comment on the implementation plan for the whitewater boating study. Attached are our comments.

Best regards,
Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Oct 28, 2019 at 3:24 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Working Group Participants:
>
> Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Pursuant to the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations.
>
> During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the

controlled flow releases. Accordingly, Boott has developed the attached Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach and consulting with the Working Group to identify the appropriate flows for the controlled flow releases.

In order to facilitate implementation of the Whitewater Flow Documentation Plan, Boott is seeking your written (email) concurrence with the proposed plan by November 11, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA

Regulatory and Environmental Section Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

To: Enel Green
From: American Whitewater
Date: November 8, 2019
Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Whitewater Boating and Access Study
Whitewater Flow Documentation Plan

Thank you for sharing the Whitewater Flow Documentation Plan with the Whitewater Boating and Access Study Group. We appreciate your effort to develop a plan with stakeholders that will help inform the relicensing process for the Lowell Hydroelectric Project.

The purpose of the Whitewater Flow Documentation Plan is to identify a range of flows that may be evaluated during the on-water controlled flow study of the bypassed reach between the Pawtucket Dam and the Field powerhouse. This determination is being made as part of the Level II assessment following the Wittaker protocols for whitewater boating assessments.

As we have discussed, while there is some history of whitewater boating in the bypassed reach during spill events, we do not have specific information on the minimum acceptable and optimal flows for a quality whitewater boating experience. We believe that the placement of cameras at key observation points along the bypassed reach will help in the identification of target flows.

Generally speaking, we agree with the approach described in the Whitewater Flow Documentation Plan; however, we have some concerns about several of the proposed camera locations. We agree that the fish ladder camera location would be useful to show the impact of spill on fish passage facilities. It would be helpful if you could clarify the spill location in relation to the passage facilities. We would also like to better understand the impact of spill on passage under current conditions.

Below the Pawtucket Dam, the bypassed reach consists of pools, riffles and other substrates, Under different flow conditions, these features produce hydraulic features that will be evaluated during the on-water evaluation. Camera locations that show the emergence or inundation of these features will be the basis for identifying the target flows. Consequently, key observation points should be selected on this basis.

We are concerned that the proposed locations upstream and downstream of the University Avenue Bridge as well as the location at the Field Powerhouse are similar in that they appear to be pools rather than varying substrates. We would suggest adjusting these locations in order to more clearly allow for an assessment of navigability and hydraulic features at shallow areas as well such as the location between the cameras upstream and downstream of the University Avenue Bridge.

With regard to the Field Powerhouse location, it is unclear how flows from the powerhouse spillway impact on the presence of whitewater boating features in the bypassed reach. Please clarify how these flows will be documented. Similarly, we are interested in knowing how generation flows at the Field Powerhouse impact on the presence of whitewater boating features in and below the powerhouse tailrace.

While camera locations are certainly a useful way to document the impact of various flows in the bypass reach, we might also want to consider using drone footage and personal observation to better understand the impact of these flows. While we can estimate flows in the bypassed reach subtracting the Concord flows from the Merrimack, that information doesn't tell us the flow in the bypassed reach that varies depending on whether the various powerhouses are operating a full capacity and whether there is spill from the powerhouse spillways. It would be helpful if you would provide periodic real-time information on flows from the Pawtucket Dam into the bypassed reach so that we can personally observe the impact of spill at various flows.

We appreciate the opportunity to work with you to make this a successful study.

Iffert, Kelsey

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, May 13, 2020 1:24 PM
To: Quiggle, Robert
Cc: Kevin Webb; Scott, Kelsey
Subject: Re: Lowell Hydroelectric Project Whitewater Boating Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Rob,

I'm available for a call this week to discuss the whitewater boating study tomorrow (other than mid-day) or Friday morning. Thanks for reaching out.

Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Fri, May 8, 2020 at 10:32 AM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob:
>
> I hope this note finds you well and that you're staying safe. I wanted to check in with you regarding the Lowell Whitewater Boating and Access Study to see if you had availability for a conference call next week. We'd like to setup a call to discuss the study preparation and logistics with American Whitewater. We'd like to keep the study planning moving so that we are able to conduct the controlled flow releases later this year.
>
> Please let me know if there is a good time to setup a call and I will send around an Outlook invite. Looking forward to talking with you.
>
> Thanks,
>
> **Robert Quiggle,** RPA

Regulatory and Environmental Section Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Iffert, Kelsey

From: Quiggle, Robert
Sent: Thursday, May 14, 2020 3:58 PM
To: Kevin Webb; Bob Nasdor | AW
Cc: Scott, Kelsey
Subject: RE: Lowell Hydroelectric Project Whitewater Boating Study
Attachments: Lowell Whitewater Boating Study Survey Forms.pdf

Bob:

In advance of our call tomorrow, I wanted to send along the Whitewater Boating Flow Study survey forms that were included in the Revised Study Plan for the Lowell Hydroelectric Project. During the Initial Study Report Meeting in March, you mentioned that there may be some additional edits that AW would like to discuss. We'd be happy to talk through those some of those edits with you on Friday.

Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Kevin Webb [mailto:kwebb@centralriverspower.com]
Sent: Wednesday, May 13, 2020 1:56 PM
To: Bob Nasdor | AW <bob@americanwhitewater.org>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: RE: Lowell Hydroelectric Project Whitewater Boating Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Friday would work better for me.

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, May 13, 2020 1:24 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: Lowell Hydroelectric Project Whitewater Boating Study

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

Hi Rob,

I'm available for a call this week to discuss the whitewater boating study tomorrow (other than mid-day) or Friday morning. Thanks for reaching out.

Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
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bob@americanwhitewater.org
617-584-4566

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On Fri, May 8, 2020 at 10:32 AM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob:
>
> I hope this note finds you well and that you're staying safe. I wanted to check in with you regarding the Lowell Whitewater Boating and Access Study to see if you had availability for a conference call next week. We'd like to setup a call to discuss the study preparation and logistics with American Whitewater. We'd like to keep the study planning moving so that we are able to conduct the controlled flow releases later this year.
>
> Please let me know if there is a good time to setup a call and I will send around an Outlook invite. Looking forward to talking with you.
>
> Thanks,
>
> **Robert Quiggle,** RPA
>
> *Regulatory and Environmental Section Manager*
>
> **HDR**
>
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311

Iffert, Kelsey

From: Quiggle, Robert
Sent: Friday, July 31, 2020 9:29 AM
To: Bob Nasdor | AW
Cc: Kevin Webb; Richard Malloy; Scott, Kelsey
Subject: RE: Lowell/Merrimack Whitewtater Study

Follow Up Flag: Follow up
Flag Status: Completed

Bob: Good to hear from you. Let me know what would work for your schedule, and I'll try to set up a call to catch up on study plans next week. FYI, we are going through the photos from the flow documentation study now (more than 3,500) and will be putting together a report to send to you soon.

Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
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Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor | AW [mailto:bob@americanwhitewater.org]
Sent: Wednesday, July 29, 2020 11:46 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Lowell/Merrimack Whitewtater Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Rob,
We should schedule a call to set a date and discuss logistics for the whitewater boating study. Also, I would like to get the images of the different flow levels that you all collected so we can identify a flow range for the study. Thanks.

Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

Iffert, Kelsey

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, September 2, 2020 10:23 AM
To: Scott, Kelsey
Cc: Quiggle, Robert; Joe t
Subject: Re: Lowell Whitewater Flow Documentation Plan

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IHi Scott,
Tuesday morning or anytime Friday would work for me. Thursday might also be possible if those times don't work. I've included Joe on the email as I'm sure he would like to participate.

Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Wed, Sep 2, 2020 at 10:10 AM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Hi Bob –
>
> Are you available later next week to discuss the Lowell Whitewater Flow Documentation Report? I can set up a meeting to discuss your review of the photos.
>
> **Kelsey Scott, MS**
>
> D 315.414.2206 M 315.706.5176
> kelsey.scott@hdrinc.com
>
> hdrinc.com/follow-us
>
> ---
>
> **From:** Scott, Kelsey
> **Sent:** Friday, August 21, 2020 3:44 PM
> **To:** 'bob@americanwhitewater.org' <bob@americanwhitewater.org>

Cc: Quiggle, Robert <robert.quiggle@hdrinc.com>; Kevin Webb - CRP <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Lowell Whitewater Flow Documentation Plan

Bob –

I've attached the Whitewater Flow Documentation Report for your review. Let us know once you've had a chance to review the photographs and we can touch base on next steps for the Whitewater Boating and Access Study at Lowell.

Thank You –

Kelsey Scott, MS

Assistant Regulatory Specialist

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Iffert, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, October 13, 2020 10:43 AM
To: brian@zoaroutdoor.com
Cc: Kevin Webb; Quiggle, Robert; Scott, Kelsey
Subject: Fw: [EXTERNAL] Merrimack Test Release

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Hello Brian, Sorry for a delayed response- I was out at a cabin in the woods without access to the internet all last week...

Kevin Webb, Relicensing Manager at Central Rivers Power and the consultants for the Whitewater Study are cc'd to this message. Kevin, Rob, or Kelsey - could you please provide use with the next steps and dates for the Whitewater Study activities? I had marked in my calendar that there would be some on-site activities this weekend? Is that still the case?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Brian @Zoar <brian@zoaroutdoor.com>
Sent: Saturday, October 3, 2020 10:37 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>
Subject: [EXTERNAL] Merrimack Test Release

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Christine, Jane Calvin passed your email along to me about the Boating Study on the Merrimack. Zoar Outdoor is planning on sending at least 1 raft and kayaker. Once they are determined, please let me know the put-in location, start time, and any other important details.
Thanks

Brian Pytko | Rafting Department Manager

800-532-7483 ext. 1010
www.zoaroutdoor.com
www.kayaklesson.com
Make an Impact
Instagram | Facebook | Youtube

Iffert, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, October 13, 2020 4:22 PM
To: Scott, Kelsey; brian@zoaroutdoor.com; jcalvin@lowelllandtrust.org
Cc: Kevin Webb; Quiggle, Robert
Subject: Re: [EXTERNAL] Merrimack Test Release

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thanks!

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Tuesday, October 13, 2020 4:17 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; brian@zoaroutdoor.com <brian@zoaroutdoor.com>; jcalvin@lowelllandtrust.org <jcalvin@lowelllandtrust.org>
Cc: Kevin Webb <kwebb@centralriverspower.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: RE: [EXTERNAL] Merrimack Test Release

Hi Christine, Brian, and Jane –
As of this afternoon, the site-activities scheduled for this weekend have been cancelled. We determined that the flows in the Merrimack River are too low to conduct the study.
https://water.weather.gov/ahps2/hydrograph.php?gage=LOWM3&wfo=box
We will keep you updated as the study is rescheduled. Thank you.

Kelsey Scott, MS
HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, October 13, 2020 10:43 AM
To: brian@zoaroutdoor.com
Cc: Kevin Webb <kwebb@centralriverspower.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Fw: [EXTERNAL] Merrimack Test Release

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Brian, Sorry for a delayed response- I was out at a cabin in the woods without access to the internet all last week...
Kevin Webb, Relicensing Manager at Central Rivers Power and the consultants for the Whitewater Study are cc'd to this message. Kevin, Rob, or Kelsey - could you please provide use with the next steps and dates for the

Whitewater Study activities? I had marked in my calendar that there would be some on-site activities this weekend? Is that still the case?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Brian @Zoar <brian@zoaroutdoor.com>
Sent: Saturday, October 3, 2020 10:37 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>
Subject: [EXTERNAL] Merrimack Test Release

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Christine, Jane Calvin passed your email along to me about the Boating Study on the Merrimack. Zoar Outdoor is planning on sending at least 1 raft and kayaker. Once they are determined, please let me know the put-in location, start time, and any other important details.
Thanks

Brian Pytko | Rafting Department Manager

800-532-7483 ext. 1010
www.zoaroutdoor.com
www.kayaklesson.com
Make an Impact
Instagram | Facebook | Youtube

- -

More local adventures:
www.berkshireeast.com
www.catamountski.com

Iffert, Kelsey

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, October 26, 2020 3:35 PM
To: Kevin Webb
Cc: Quiggle, Robert; Scott, Kelsey; Richard Malloy
Subject: Re: Lowell Whitewater Boating and Access Study weekly eval

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I'm reading it the same way. I'll check with Joe about Veterans Day. It would be good to have the extra option. Otherwise we would be looking at the Nov 7/8 weekend. I'll follow up after I speak to Joe.

Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

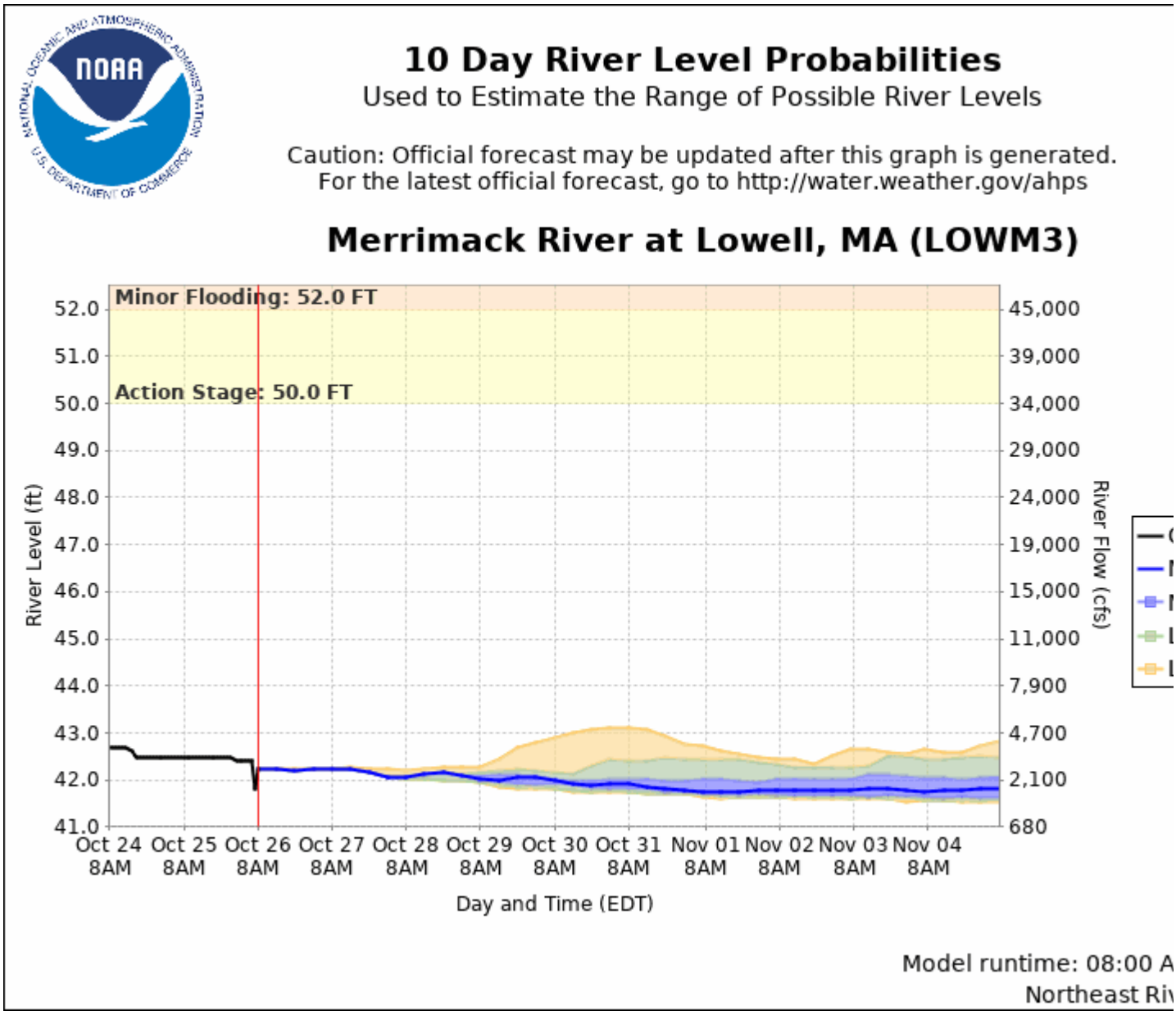
Join American Whitewater!

On Mon, Oct 26, 2020 at 3:29 PM Kevin Webb <kwebb@centralriverspower.com> wrote:

> Thanks Rob. I agree that the coming week is looking like a wash. I am open to doing this on Veteran's Day, unless of course we can't get enough paddlers.
>
> Kevin
>
> **From:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Sent:** Monday, October 26, 2020 3:24 PM
> **To:** Kevin Webb <kwebb@centralriverspower.com>; Bob Nasdor | AW <bob@americanwhitewater.org>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
> **Cc:** Richard Malloy <RMalloy@centralriverspower.com>
> **Subject:** RE: Lowell Whitewater Boating and Access Study weekly eval
>
> CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

I can try and find another time tomorrow, or maybe we can sort this out via email. The flow forecast for the next 10 days shows flows dropping all week to a low of about 2,100 cfs on Sunday. I am guessing that this will not be sufficient for the study, seeing as how we've postponed it at higher flows. If we're all in agreement that these flow conditions won't support the whitewater boating flows, we might want to skip the call this week and pick it up again on November 3rd.

One other scheduling element might be worth considering. November 11 is Veterans Day, and it falls on a Wednesday this year. I know that a lot of organizations have the day off; would it be worth adding that to the list of potential dates for the study? Might not be as good as a weekend, but if the water is there and folks have availability, it might be something to consider.



Thanks,

Robert Quiggle, RPA

Syracuse Office Principal

HDR

1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, October 26, 2020 3:13 PM
To: Bob Nasdor | AW <bob@americanwhitewater.org>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: RE: Lowell Whitewater Boating and Access Study weekly eval

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We could do after say 1:00 PM.

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, October 26, 2020 3:07 PM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: Lowell Whitewater Boating and Access Study weekly eval

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Can we pick another time for this meeting? I'm tied up from 2 to about 4:30. Early afternoon should work for me. I can also step out of my meeting Wednesday for a short call.

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Thu, Oct 22, 2020 at 1:00 PM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Lowell Whitewater Boating and Access Study — weekly evaluation of flows at Lowell to make go/no go determinations.

Iffert, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Wednesday, April 21, 2021 10:38 AM
To: Bob Nasdor | AW; Quiggle, Robert
Cc: Joe t; Richard Malloy; Scott, Kelsey; Curtis Mooney
Subject: RE: Lowell Whitewater Boating Study

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Thanks Bob. I can confirm that what you state below is consistent with our discussion yesterday.

Thanks
Kevin

Kevin Webb
Licensing Manager
Central Rivers Power
670 N Commercial Street, Suite 204| Manchester, NH 03101
C: 978.935.6039
kwebb@centralriverspower.com

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, April 21, 2021 10:27 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: Lowell Whitewater Boating Study

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Dear Kevin,
I'm confirming our conversation yesterday regarding scheduling the on-water portion of the whitewater boating study in the Lowell bypassed reach. As we discussed, while flows for the upcoming weekend are suitable for the controlled-flow study, CRP is unable to schedule the study for this coming weekend 4/24-4/25 or the following weekend 5/2-5/3 due to its priority in completing and filing its Final License Application for the project. The timing is unfortunate due to the current availability of flows for the on-water portion of the study. We will continue to monitor the flow forecast for another opportunity, but I remain concerned about when another opportunity will occur. We agreed CRP is required to complete the study as part of its FERC relicensing of the project and will need to amend its Final License Application when the study is complete to address project impacts on recreation use in the project boundary. I look forward to working with you to complete this study at the earliest possible time.

Yours truly,
Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

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On Tue, Apr 20, 2021 at 8:42 AM Bob Nasdor <bob@americanwhitewater.org> wrote:

> Flows are still looking strong for this weekend. I would like to make a tentative call on proceeding. Are folks free to chat this morning?
>
> Bob Nasdor
> Northeast Stewardship & Legal Director
> American Whitewater
> 65 Blueberry Hill Lane
> Sudbury, MA 01776
> bob@americanwhitewater.org
> 617-584-4566
>
> ---
>
> **From:** Bob Nasdor | AW <bob@americanwhitewater.org>
> **Sent:** Monday, April 19, 2021 12:24:18 PM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Cc:** Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
> **Subject:** Re: Lowell Whitewater Boating Study
>
> Thanks Rob. I got my second shot yesterday. No reactions so far. For what it's worth, I was originally scheduled for my shot Saturday but was able to easily move it to Sunday when I thought we were going to do the Missisquoi study this weekend. Maybe you can try to move your a day or so. I don't think we can wait until Thursday though to start putting things in place, so we should figure this out asap.
>
> Bob Nasdor
> Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Apr 19, 2021 at 12:03 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob:
>
> I wanted to recirculate the survey forms and the safety plan that we developed for this study and that we distributed last year. I would recommend that we setup a go/no-go call for Thursday afternoon so that we can evaluate the flows.
>
> We may also have some logistical issues with this weekend. Both Kelsey and I are needed to support this study, and we are both receiving our second dose of the COVID vaccine at the end of this week. Depending on the potential side effects, we may not be able to travel on Friday for a Saturday flow release. In any case, we should know more by Thursday afternoon.
>
> If Thursday works for you, I'll send around an Outlook invite.
>
> Thanks,
>
> **Robert Quiggle,** RPA
>
> *Syracuse Office Principal*
>
> **HDR**
>
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us
>
> **From:** Bob Nasdor | AW <bob@americanwhitewater.org>
> **Sent:** Monday, April 19, 2021 8:31 AM

To: Kevin Webb <kwebb@centralriverspower.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: Lowell Whitewater Boating Study

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That sounds perfect. The variable is the Wednesday rain that looks a little heavier up north. Hopefully we can pull this off just using the Field powerhouse. Should we proceed with the tentative assumption that this is a go and notify volunteers, agencies, and public safety? You should also be prepared for the beach put-in and take-out cleanup. Do you have an invitation ready for our volunteers that includes the logistics, Covid protocols, and pre-run survey? I have a list of names that I can forward it to and can also provide you with the contact list.

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Apr 19, 2021 at 8:20 AM Kevin Webb <kwebb@centralriverspower.com> wrote:

> Thanks Bob. The NOAA forecast is showing 9,300 cfs Wednesday AM, backing out the Concord that would put us between 8,000 and 8,500 inflow at Pawtucket Dam. Let's check back in on Wednesday and see what the forecast shows into the weekend.

Kevin

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 8:00 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>
Subject: Lowell Whitewater Boating Study

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Good morning. I'm looking at the flow and weather forecast for this week, and from what I can see, all signs point toward ideal conditions for the whitewater boating study on Saturday. Flows are currently in our target range but dropping slightly and we have some rain forecast for mid-week. We should schedule a call for tomorrow to finalize the plan for moving forward and then confirm that we are a go for lift off on Thursday if everyone agrees.What are you all seeing?

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

Iffert, Kelsey

From: Quiggle, Robert
Sent: Monday, April 19, 2021 12:04 PM
To: Bob Nasdor | AW; Kevin Webb
Cc: Joe t; Richard Malloy; Scott, Kelsey
Subject: RE: Lowell Whitewater Boating Study
Attachments: 20201009 Lowell Whitewater Safety Plan.pdf; Whitewater Study Survey Forms.pdf

Bob:

I wanted to recirculate the survey forms and the safety plan that we developed for this study and that we distributed last year. I would recommend that we setup a go/no-go call for Thursday afternoon so that we can evaluate the flows.

We may also have some logistical issues with this weekend. Both Kelsey and I are needed to support this study, and we are both receiving our second dose of the COVID vaccine at the end of this week. Depending on the potential side effects, we may not be able to travel on Friday for a Saturday flow release. In any case, we should know more by Thursday afternoon.

If Thursday works for you, I'll send around an Outlook invite.

Thanks,

Robert Quiggle, RPA
Syracuse Office Principal

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 8:31 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: Lowell Whitewater Boating Study

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That sounds perfect. The variable is the Wednesday rain that looks a little heavier up north. Hopefully we can pull this off just using the Field powerhouse. Should we proceed with the tentative assumption that this is a go and notify volunteers, agencies, and public safety? You should also be prepared for the beach put-in and take-out cleanup. Do you have an invitation ready for our volunteers that includes the logistics, Covid protocols, and pre-run survey? I have a list of names that I can forward it to and can also provide you with the contact list.

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
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bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

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> Thanks Bob. The NOAA forecast is showing 9,300 cfs Wednesday AM, backing out the Concord that would put us between 8,000 and 8,500 inflow at Pawtucket Dam. Let's check back in on Wednesday and see what the forecast shows into the weekend.
>
> Kevin
>
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> **Sent:** Monday, April 19, 2021 8:00 AM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>
> **Subject:** Lowell Whitewater Boating Study
>
> CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========
>
> Good morning. I'm looking at the flow and weather forecast for this week, and from what I can see, all signs point toward ideal conditions for the whitewater boating study on Saturday. Flows are currently in our target range but dropping slightly and we have some rain forecast for mid-week. We should schedule a call for tomorrow to finalize the plan for moving forward and then confirm that we are a go for lift off on Thursday if everyone agrees.What are you all seeing?

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

From: Kevin Webb
Sent: Thursday, May 13, 2021 8:10 AM
To: Bob Nasdor <bob@americanwhitewater.org>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: RE: Flow Study

Bob:

I hate to say it but we're running into staffing issues this weekend. Under these flow conditions we need 2 operators to back down the flow through the E.L. Field powerhouse – one at the powerhouse and another at the Northern Canal Gatehouse to close the canal headgates as the canal flow decreases. Otherwise the canal level will rapidly exceed its maximum allowed level. Unfortunately we have only one operator available this weekend. I see no option but to cancel. I am as disappointed as you undoubtedly are because it looked like we'd be able to nail both of our whitewater studies in rapid succession. We'll keep trying.

Call me if you want to discuss.

Kevin

From: Bob Nasdor <bob@americanwhitewater.org>
Sent: Thursday, May 13, 2021 7:30 AM
To: Kevin Webb <kwebb@centralriverspower.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Flow Study

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Can we talk this am to confirm we are a go? Need to confirm with my volunteers.

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Iffert, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, April 11, 2022 10:17 AM
To: Bob Nasdor
Cc: Richard Malloy; Iffert, Kelsey
Subject: RE: Lowell Whitewater Study

Follow Up Flag: Follow up
Flag Status: Completed

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Yes, let's do Bob. My schedule is fairly open this week, Thursday is wide open at this point. Let me know what works for you.

Kevin

From: Bob Nasdor <bob@americanwhitewater.org>
Sent: Monday, April 11, 2022 9:59 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Subject: Lowell Whitewater Study

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Kevin,
Let's set up a meeting to talk about the whitewater study. Thanks

Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Iffert, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, April 11, 2022 10:17 AM
To: Bob Nasdor
Cc: Richard Malloy; Iffert, Kelsey
Subject: RE: Lowell Whitewater Study

Follow Up Flag: Follow up
Flag Status: Completed

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Kevin

From: Bob Nasdor <bob@americanwhitewater.org>
Sent: Monday, April 11, 2022 9:59 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Subject: Lowell Whitewater Study

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Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Iffert, Kelsey

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Tuesday, November 15, 2022 10:39 AM
To: Bob Nasdor; cheremsha@hotmail.com; grinnelli@gmail.com; emixvt@gmail.com; a.aleksashenko@gmail.com; peedeekayak@sbcglobal.net; gpiette21@gmail.com; cocoschachtl@gmail.com; petermurray00@gmail.com; greenj314@gmail.com; amyelem@aol.com; sweetwerke@gmail.com; Stephen Glidden; jaymichaud9 @gmail.com; stefanlocher6@gmail.com; movari@gmail.com; Bill Hearn; burkley.niall@gmail.com; Ann Gillard; Jeremy Laucks-Blackfly Canoes
Cc: Kevin Webb; Gibson, Jim; Iffert, Kelsey
Subject: Merrimack River Boating Study, Saturday 11/19

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thank you all for your interest in the whitewater boating study on the Merrimack River in Lowell. Based on your responses, we are planning to conduct the study on Saturday, November 19th. The study is being conducted as part of the FERC relicensing of the Lowell Hydroelectric Project. The study will be conducted on the reach below the Partucket Dam. The purpose of the study is to evaluate the whitewater boating potential of this part of the Merrimack River and will help in the development of license conditions for the hydroelectric project. Participants need to have prior experience with and be comfortable paddling Class III whitewater and have appropriate gear for cold weather paddling. You will be receiving an email with the details for the study in the next several days. We look forward to seeing you on the river on Saturday.

Best regards,
Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Iffert, Kelsey

From: Iffert, Kelsey
Sent: Thursday, November 17, 2022 1:58 PM
To: Bob Nasdor; cheremsha@hotmail.com; grinnelli@gmail.com; emixvt@gmail.com; a.aleksashenko@gmail.com; peedeekayak@sbcglobal.net; gpiette21@gmail.com; cocoschachtl@gmail.com; petermurray00@gmail.com; greenj314@gmail.com; amyelem@aol.com; sweetwerke@gmail.com; Stephen Glidden; jaymichaud9 @gmail.com; stefanlocher6@gmail.com; movari@gmail.com; Bill Hearn; burkley.niall@gmail.com; Ann Gillard; Jeremy Laucks-Blackfly Canoes; 'jschalebaum1982 @gmail.com'
Cc: Kevin Webb; Richard Malloy; Skip Medford; Gibson, Jim
Subject: Lowell Hydroelectric Project - Whitewater Boating and Access Study
Attachments: HDR Boott_Release_of_Liability-2022.pdf; Lowell Whitewater Study_Agenda Maps.pdf; 20221115 Lowell Whitewater Safety Plan.pdf; Lowell Pre-Run Survey Form.docx

Lowell Whitewater Boaters:

Thank you for your interest in participating in the Whitewater Boating and Access Study for the Lowell Hydroelectric Project (P-2790), owned and operated by Boott Hydropower, LLC (Boott). The study will kick-off with a safety meeting at 322 Aiken Ave, Lowell, MA 01854 starting around 9:30 AM on Saturday November 19, 2022. Facilities will be accessible as early as 8:40 AM. A study agenda with approximate timing, logistics, and maps for the study is attached. Logistical specifics and items of note are included below:

- Participants need to have prior experience with and be comfortable paddling Class III whitewater and have appropriate gear for cold weather paddling, and need to be 18 years or older. Boott and HDR will rely on the whitewater paddler participants to collectively determine which participants are qualified to paddle the Lowell bypass under the conditions existing at the time of the study.
- All participants must review the attached Whitewater Boating and Access Study Safety Plan.
- All participants must complete the attached pre-run survey form and study waiver; it is helpful that these are completed in advance of the study. Participants can email the completed forms to me (Kelsey.iffert@hdrinc.com) or bring them to the site. The pre-run survey form can be completed in Word. The waiver must be printed and completed with a hand signature.
- Please arrive at **UMASS Lowell Campus Recreation Center** roundabout (322 Aiken Ave, Lowell, MA 01854) to unload your boat onto the cargo van. The roundabout can be accessed from Pawtucket Street opposite Bourgeois Hall.
- Vehicle parking is then available at the East Campus Parking Garage (47 Pawtucket St, Lowell, MA 01854). Upon entry, note to the attendant (if present) you are here for the whitewater study. If needed, metered street parking is available or at the nearby Campus Recreation Sports Complex (225 Aiken St, Lowell, MA 01854).
- The study will kick-off in the UMASS Lowell Campus Recreation Center (322 Aiken Ave, Lowell, MA 01854) Conference Room. Please access the facilities from the Pawtucket Street entrance (located across from the parking garage).
- Participant and boat transportation via shuttle bus and cargovan are available from the take-out to put-in locations.
- Maps are attached to the agenda identifying study facilities and approximate locations of identified potential hazards. Please review beforehand and be aware of the potential hazards.
- Water & snacks (granola bars, chips, donuts, etc) will be available throughout the day in the Campus Recreation Center. Lunch sandwiches and dessert cookies from Purple Carrot will be provided at noon.
- Locker rooms, lockers, and restrooms are available at the Campus Recreation Center.
- The study will conclude with a focus group discussion at the Campus Recreation Center.

Please do not hesitate to reach out to myself or Kevin Webb with Boott, at (978) 935-6039 or kwebb@centralriverspower.com if you have any questions.

Kelsey Scott Iffert, MS
Environmental/Regulatory Section Lead

HDR
231 Salina Meadows Parkway, Suite 210
Syracuse, NY 13212
M 315.706.5176
kelsey.iffert@hdrinc.com
hdrinc.com/follow-us

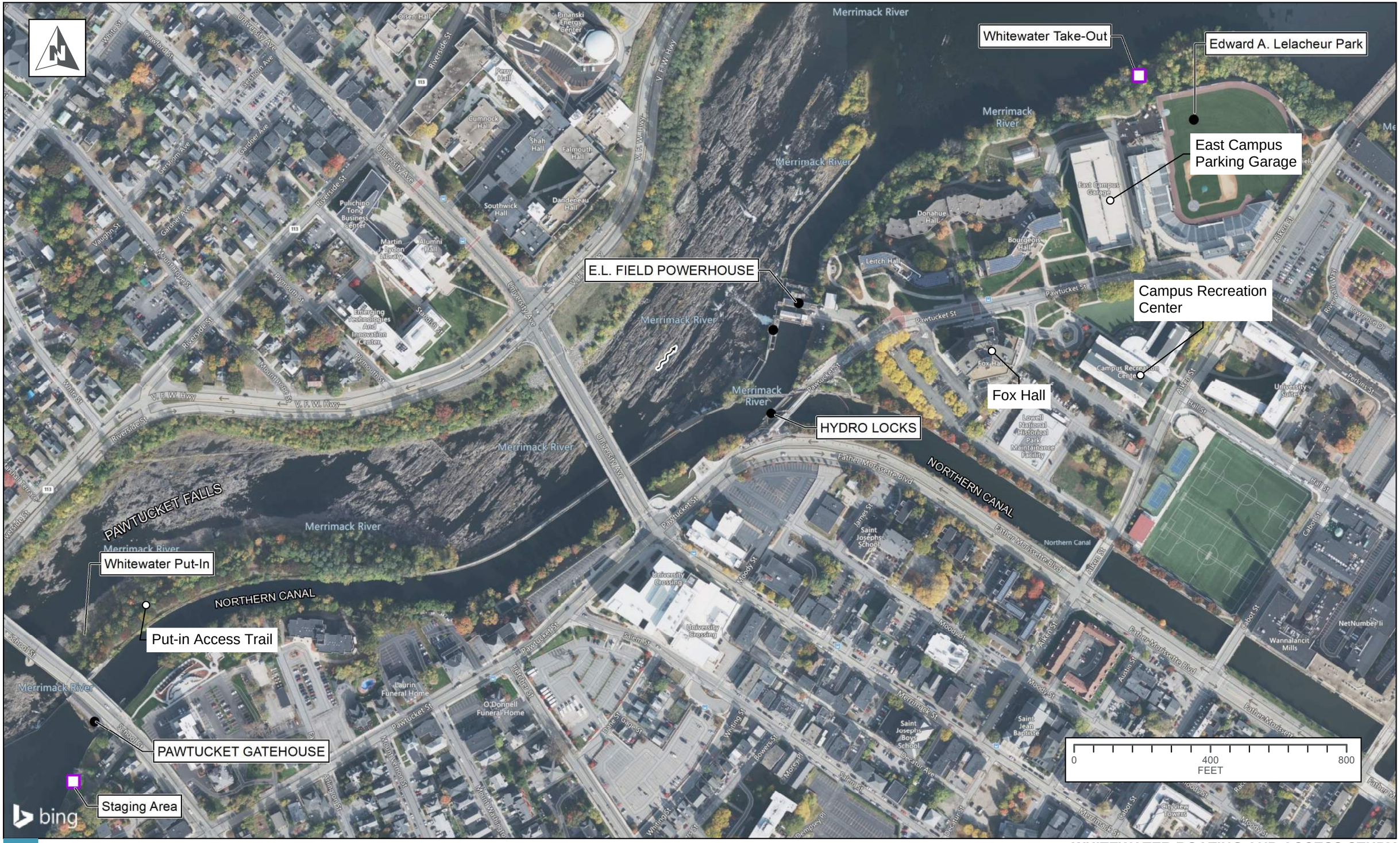
Lowell Hydroelectric Project Whitewater Boating and Access Study

November 19, 2022

Time	Task
As early as 8:30 – 9:30 AM	• Pull up to the roundabout at the UMass Lowell Campus Recreation Center (CRC) (322 Aiken Ave, Lowell, MA 01854) to unload boats. The roundabout can be accessed from Pawtucket Street opposite Bourgeois Hall. • Parking is available at the East Campus Parking Garage (47 Pawtucket St, Lowell, MA 01854) and inform attendant (if present) that you are here for the whitewater study. If needed, metered parking is available off of Hall Street at 225 Aiken St, Lowell, MA 01854. • Walk to the CRC and use the north entrance off roundabout (Pawtucket Street Entrance). • We are meeting in the CRC Conference Room and kicking off the study with a safety meeting ~9:30.
9:30 AM – 10:30 AM	• Sign in/Waiver • Study kickoff and safety debrief • Pre-study assessment forms • Scout from University Bridge • Shuttle to Staging Area above the dam
10:30 AM – 12:00 PM	• First Flow with Crest Gate Up
12:00 PM – 1:00 PM	• Walk/Shuttle to CRC • Post flow assessment form • Flow transition • Lunch
1:00 PM – 2:15 PM	• Second Flow with Crest Gate Down
2:15 PM – 2:30 PM	• Shuttle/Walk back to CRC
2:30 PM – 3:30 (ish) PM	• Post flow assessment form • Comparative assessment form • Group discussion • Finish study

NOTES:

- Participants need to have prior experience with and be comfortable paddling Class III whitewater and have appropriate gear for cold weather paddling, and need to be 18 years or older. Boott and HDR will rely on the whitewater paddler participants to collectively determine which participants are qualified to paddle the Lowell bypass under the conditions existing at the time of the study.
- Please do not show up at the Project's E.L. Field Powerhouse; facilities are down and access will be denied.
- Locker rooms with programmable locks and bathrooms will be provided at the CRC.
- Water & snacks (granola bars, chips, donuts, etc) will be available throughout the day in the CRC.
- Breakfast items (pastries, coffee, tea, etc) can be purchased at the University Dining Commons at Fox Hall (100 Pawtucket St, Lowell, MA 01854) (opens at 8 am).
- Sandwich lunches and dessert cookies will be delivered from the Purple Carrot (vegetarian options available) at noon.
- All participants must review the Whitewater Boating and Access Study Safety Plan and sign the provided waiver.
- Participants are required to complete the pre-study assessment form, post-flow assessment form for the two flows, and a comparative assessment form. All forms will be completed at the CRC and a group discussion will be held after all flows at the CRC.
- Transportation between put-in and take-out will be available. Please note that crossing the street is required at times.
- For safety and access permission reasons, participants are asked to only put-in at the designated put-in (at the Northern Canal Island) and take-out (beach area behind Edward A. LeLacheur Park). Please review the attached maps for noted access points and potential hazards identified in the bypassed reach.



BOOTT HYDRO, LLC.

WHITEWATER BOATING AND ACCESS STUDY

LOWELL HYDROELECTRIC PROJECT

FERC NO. 2790

PATH: \\SYR-SRV01\GIS\PROJECTS\ENEL\LOWELL_RELICENSE\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_PORTAGETRAIL.MXD - USER: KAUSTIN - DATE: 5/31/2022

MAY 2022

POTENTIAL HAZARDS MAP
REBAR
X
X
X
X
X
WEIR
WEIR
WEIR
University Ave
Vfw Hwy
Merrimack River
Pawtucket St
Riverside St
Plymouth St
Standish St
Colonial Ave
Southwick Hall
Alumni Hall at UMass Lowell
Starbucks
ChargePoint Charging Station
Sigma Phi Omicron
Delta Kappa Phi
Mark & Elisia Saab Emerging
Locks Temporarily Closed
Enel Green Power
Moody St Parking
blue light x
Graduate and Professional Studies Center
James St
Google
Imagery ©2022 Google, Imagery ©2022 MassGIS, Commonwealth of Massachusetts EOEA, Maxar Tech

ASSUMPTION OF RISK WAIVERS

READ CAREFULLY – Waiver and Release of Liability
Please sign on the other side

In consideration of HDR ENGINEERING, INC. and its affiliated, associated or related companies or subsidiaries ("HDR"), and BOOTT HYDROPOWER, LLC conducting a Whitewater Study allowing for whitewater boating in the bypass reach of the Lowell Hydroelectric Project, I agree as follows:

As a result of the inherent risk in this activity, I know I may die, get hurt, and/or damage my belongings. If any of these occur, I understand that neither I nor any parent, guardian, descendant and/or heir, successors and/or assigns, administrators, conservators, and/or personal representatives can make a claim, sue, or expect HDR or BOOTT HYDROPOWER, LLC, their owners, shareholders, officers, agents, employees, subsidiaries, affiliated companies and/or associates (hereinafter referred collectively as RELEASEES), to be legally responsible or pay for any damages.

ACKNOWLEDGMENT AND ACCEPTANCE OF RISK: I, the undersigned, hereby acknowledge that I have voluntarily chosen to participate in this whitewater boating event. Certain risks are inherent in any recreational activity and cannot be eliminated, altered, or controlled, and these risks that contribute to the unique character of the activity can also be the cause of injury, illness, death, and damages. I know and fully understand that a whitewater boating trip, whether on a raft, oar boat, kayak or any other type of vessel, is an outdoor adventure activity in a riverine environment with inherent risks and hazards where serious accidents can occur, participants can die, sustain injuries and property damage. Also, I understand that boating within an urban area may provide additional hazards beyond those typical of boating within a rural area and recognize that the risks associated with whitewater boating are greatly increased due to this setting. I acknowledge and willingly assume all risks and hazards in whitewater boating and river-related activities from the pre-embarkation rendezvous until the conclusion of the study, including, but not limited to: (1) loss of control of the watercraft, fall in, out, or about the watercraft, collision with other participants, equipment, other watercraft, rocks, bridge structures, weirs, trees, debris, remnant construction materials within the river, and any other portion of the interior of the watercraft, and any other man-made or natural obstacles, whether obvious or not (2) judgment, decision making, and conduct of the other participants or study coordinators (3) submersion in water, drowning (4) encounters with animals, wildlife and insects (5) exposure to urban and riverine environments, extreme temperatures, and inclement weather, inaccessible riverine areas, traffic, rocky terrain, including travel by foot or vehicle in any way related to this activity (6) assistance in lifting and/or carrying equipment (7) rescue related injuries, and (8) unavailability of immediate and appropriate medical attention in case of injury. I understand and acknowledge that the above list is not complete or exhaustive and that other risks, known or unknown, anticipated or unanticipated may also exist and result in injury, illness, disease, death or damage. My participation in this study is purely voluntary and I elect to do so at my own risk.

RELEASE: In consideration for RELEASEES allowing me to participate in this study, I voluntarily agree to release, discharge, and hold harmless RELEASEES for any and all claims of liability to the fullest extent authorized by law arising out of their negligence, fault, recklessness, or any other act or omission which causes the undersigned illness, injury, disease, death and damages of any nature in any way connected with my participation in this activity. I also agree to release and discharge RELEASEES from any act of omission or negligence in rendering or failing to render any type of rescue, emergency, or medical services. In signing this document, I fully recognize and understand that if I am hurt, die, or my property

is damaged, I am giving up my right to make any claim or file a lawsuit against RELEASEES, even if they negligently or by some act or omission cause personal injury or damage property. I further agree to hold harmless, defend, and indemnify RELEASEES from all defense costs, including, but not limited to, attorney's fees incurred in connection with claims for bodily injury, wrongful death, or property damage sustained, or which I may have caused to spectators or other third parties, whether negligent or not, in the course of my participation in this activity. No participant under the age of 18 is permitted to participate in this activity. Should emergency medical services become necessary for the undersigned participant, the expenses are the sole responsibility of the participant and not that of RELEASEES. Personal medical and travel insurance is strongly advised for all participants.

RELEASEES reserve the right to accept or deny service to any person. I hereby agree to follow all rules, regulations, and instructions of RELEASEES while participating in this study. I also certify that I am physically and mentally capable of participating in these activities. I hereby represent that I have informed RELEASEES of any pertinent medical conditions that may affect my participation in this activity. I hereby agree that RELEASEES may use film or photographic records of this activity and that such records may become part of the public record. The venue of any dispute that may arise out of this agreement or otherwise between the parties to which RELEASEES are a party shall be the State of Nebraska.

I HAVE READ THIS DOCUMENT IN ITS ENTIRETY. I understand that I am assuming all the risks inherent in this whitewater boating activity and study. I understand that it is a release of any and all claims. I understand that this is the entire agreement between the undersigned, HDR, BOOTT HYDROPOWER, LLC, and any and all RELEASEES as previously listed and that it cannot be modified or changed in any way by the representations or statements by HDR or BOOTT HYDROPOWER, LLC, and all RELEASEES or by the undersigned. I voluntarily sign my name as evidence of my acceptance of all provisions in this release and I agree to be bound by them.

By signing this Agreement, I acknowledge and agree that I have fully read and understand this Agreement and that I have been given the opportunity to consult with my attorney before executing this Agreement.

_____

Signature of Whitewater Boater

_____

Print Name of Whitewater Boater

_____

Age of Whitewater Boater

_____

Date

END OF AGREEMENT

Iffert, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, November 21, 2022 3:57 PM
To: Gibson, Jim; Iffert, Kelsey; Richard Malloy
Subject: FW: Merrimack Flows

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

From: Kevin Webb
Sent: Monday, November 21, 2022 3:09 PM
To: 'Bob Nasdor | AW' <bob@americanwhitewater.org>
Subject: RE: Merrimack Flows

We've been a bit puzzled by that as well. With Boott down we should be seeing relatively stable flows the Hunt's Falls gage. Everything from Amoskeag on up is ROR, so it's possible that the fluctuations are coming from tribs, e.g. the Nashua.

I also meant to include – screen shot below is from Google Earth virtual 3D, showing the School St. bridge and steps down to the Northern Canal Walkway. Alternative route looks a bit challenging!

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, November 21, 2022 3:01 PM
To: Kevin Webb <kwebb@centralriverspower.com>
Subject: Re: Merrimack Flows

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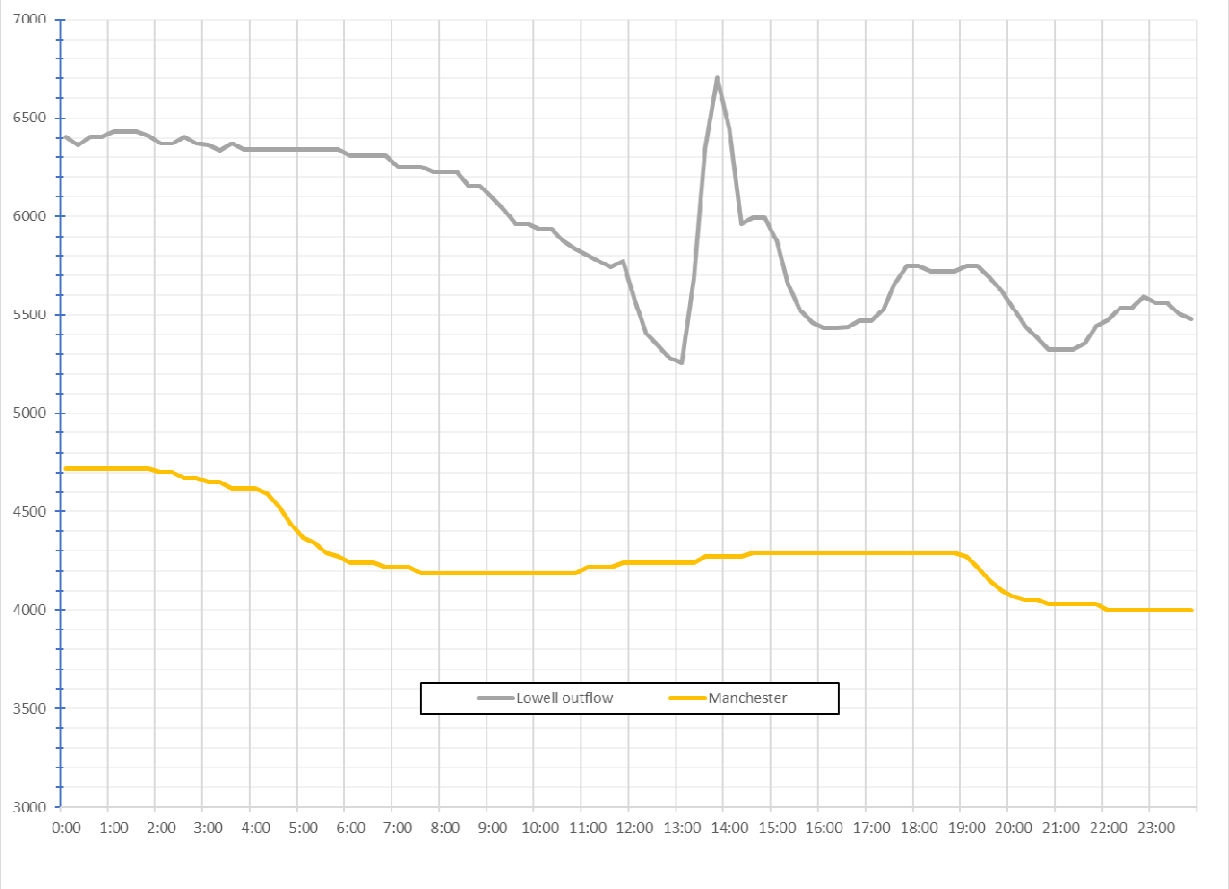
Thanks Kevin. I was looking back over the past few months and saw some significant fluctuations. This wasn't an issue over the weekend but I was curious whether there was another project that factored into fluctuations.

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

On Mon, Nov 21, 2022 at 2:55 PM Kevin Webb <kwebb@centralriverspower.com> wrote:

> Thanks Bob. I was amazed how well everything worked out, and we now have 2 solid data points to work with. We'll have to keep our eyes on the gage to plan for the low-flow event, but based on the reaction from the boaters to trying it this year in cold conditions it looks like we may have to do this as a follow-up next year.
>
> We can try to estimate how long we could augment flows within the 6-ich band allowed under the settlement. This would depend on the ratio of inflow to augmented flow. This will take some time so I'll have to get back to you on that later.
>
> Regarding flows and possibility of upstream fluctuations, things look fairly stable but we did have falling inflow from Manchester throughout the day – see graph below showing our outflow (USGS Lowell minus Concord) and the Manchester (Goff's Falls) gage. After 4:00 AM there was a drop-off in flow out of Manchester which showed up in Lowell around the time that we were heading up for the first run, which started around 11:15 according to the time stamp on my photos. The first run flow was around 5,750 to 5,800 cfs. The flow bottomed out at 5,253 cfs at 1:00 around the time that Andrew started dropping the crest gate, and reached a peak of 6,700 cfs at 1:45, so flow went up 1,450 cfs with the crest gate dropped but we started from a much lower flow than anticipated. I have shots of the first boaters going under the University Ave bridge at 1:06.
>
> Let me know if you have any questions. Thanks again for helping to make this a successful 2/3 study!
>
> Kevin



From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, November 21, 2022 8:36 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Subject: Merrimack Flows

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Hi Kevin,

Thanks for all you did this past weekend to make the boating study happen. I think we got some important information, but I'm also looking forward to getting some low boatqable flow information sometime in the future. I'm starting to look at the hydrograph, but had a couple of questions for you. It looked like the gage spiked around 1500 in the afternoon when you dropped the gate. Can you calculate the amount of time that you could augment flows before you reach the bottom of your flexibility under your settlement? I think it was around 6 inches. The other question I had was about some of the spikes on the gage. It doesn't look entirely natural. Is someone [eaking upstream or do these reflect

a lake drawdown somewhere? I want to get a better sense of when flows are available. Certainly seems like we are generally talking about spring and later fall unless the 2500 cfs flow is usable. I should probable also take another trip out there to see if there could be another way to access the bypass or whether we are strictly talking about scheduled releases and getting NPS to open the gate.

Thanks

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

From: MacVane, Kelly <Kelly.MacVane@hdrinc.com>
Sent: Saturday, November 23, 2024 10:56 AM
To: Bob Nasdor <bob@americanwhitewater.org>; Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

Hi Bob - approximately how many boaters are you thinking? Want to make sure I have enough forms. Thanks and see ya tomorrow!

Get Outlook for iOS

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Saturday, November 23, 2024 8:17:44 AM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

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Yes, I think we are all set.

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

On Sat, Nov 23, 2024 at 6:00 AM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Morning Bob – any interest from the boaters for tomorrow?
>
> **Kelsey Iffert, MS**
>
> D 315.414.2206 M 315.706.5176
> kelsey.iffert@hdrinc.com
>
> hdrinc.com/follow-us
>
> ---
>
> **From:** Bob Nasdor <bob@americanwhitewater.org>
> **Sent:** Friday, November 22, 2024 11:17 AM
> **To:** Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
> **Cc:** Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
> **Subject:** Re: Lowell Whitewater
>
> **CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.**
>
> I think 9 is too early for folks traveling and temps. Let's meet at 10. Where?

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776

bob@americanwhitewater.org

617-584-4566

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Thursday, November 21, 2024 4:35:01 PM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

Weather is a low of 30, high of 49 Sunday. I was thinking later so it would warm up. We of course have drysuits. Let me poll folks and see who is interested. Assuming it's only one lap so we can self shuttle.

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

On Thu, Nov 21, 2024 at 4:27 PM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Bob – we are a go on our side for Sunday 11/24 if you want to poll the boaters.
>
> A few basic logistics:
>
> Given that it is the one low flow run, we propose a ~9AM morning start time at the Blacksmith's shop (17 School St, Lowell, MA 01854) as our staging area to perform the morning debrief and complete paperwork. Boott is not planning portage back to the Blacksmith's shop.
>
> We can confirm other logistics once you've polled the boaters.
>
> Thanks –
>
> **Kelsey Iffert, MS**
>
> D 315.414.2206 M 315.706.5176
> kelsey.iffert@hdrinc.com
>
> hdrinc.com/follow-us

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Thursday, November 21, 2024 1:39 PM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

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What do you think about Sunday afternoon for the Lowell study?

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

On Wed, Nov 13, 2024 at 4:24 PM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Thanks Bob – Agree, we don't have the water. Let's touch base on Monday.

Kelsey Iffert, MS

D 315.414.2206 M 315.706.5176
kelsey.iffert@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, November 13, 2024 3:42 PM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

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Hi Kelsey,

I'm not seeing the flows being sufficient for the study this week. We can try again next week if anything materializes, although I will be away on 11/19 and 11/20. Let's touch base next Monday. Does that sound right to you?

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

On Mon, Nov 11, 2024 at 10:57 AM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Yes – thanks Bob. Got your voicemail and agree that we don't have the water, at least for Thursday. In a day or two, we'll confirm the same for Saturday.
>
> **Kelsey Iffert, MS**
>
> D 315.414.2206 M 315.706.5176
> kelsey.iffert@hdrinc.com
>
> hdrinc.com/follow-us
>
> ---
>
> **From:** Bob Nasdor <bob@americanwhitewater.org>
> **Sent:** Saturday, November 9, 2024 3:25 PM
> **To:** Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
> **Cc:** Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <Jim.Gibson@hdrinc.com>
> **Subject:** Re: Lowell Whitewater
>
> **CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.**
>
> Looks like the forecast is taking a turn for the worse. Let's touch base early next week.

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776

bob@americanwhitewater.org

617-584-4566

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, November 6, 2024 12:29:35 PM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

Thanks Kelsey

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane

Sudbury, MA 01776
bob@americanwhitewater.org
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On Wed, Nov 6, 2024 at 12:29 PM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Thanks Bob – we can propose to the boaters the 14th with the 16th as a backup.
>
> **Kelsey Iffert, MS**
>
> D 315.414.2206 M 315.706.5176
> kelsey.iffert@hdrinc.com
>
> hdrinc.com/follow-us
>
> ---
>
> **From:** Bob Nasdor | AW <bob@americanwhitewater.org>
> **Sent:** Tuesday, November 5, 2024 3:27 PM
> **To:** Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
> **Cc:** Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
> **Subject:** Re: Lowell Whitewater
>
> **CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Hi Kelsey,

I see that the 10-day trend looks promising. We are still a ways out though and there isn't much rain in the forecast in Lowell until Nov. 14-15. What do you think about getting availability for the 14th and 16th in case the flow is low on the 14th we could have a backup day?

Bob

Bob Nasdor

Northeast Stewardship & Legal Director

American Whitewater

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On Tue, Nov 5, 2024 at 10:33 AM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Thanks Bob – the Merrimack River flows are forecasted in that range next week, Thursday 11/14 looks ideal and works for us. Can you inquire into the availability from the boaters for 11/14?
>
> **Kelsey Iffert, MS**

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From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, October 28, 2024 9:33 AM
To: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Cc: Jillian Lawrence <jlawrence@hullstreetenergy.com>; Andrew Sutherland <asutherland@bootthydro.com>; MacVane, Kelly <kelly.macvane@hdrinc.com>; Anderson, Samantha <Samantha.Anderson@hdrinc.com>; Gibson, Jim <jim.gibson@hdrinc.com>
Subject: Re: Lowell Whitewater

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thanks for the update Kelsey. I have been keeping my eye on it as well.

Bob Nasdor

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AMERICAN Whitewater

On Mon, Oct 28, 2024 at 9:12 AM Iffert, Kelsey <Kelsey.Iffert@hdrinc.com> wrote:

> Good morning –
>
> The Merrimack River forecast for this week at Lowell is still trending too low. We are targeting ~2,500 in the reach for the low flow whitewater run. I will continue to check in each week. Thanks
>
> **Kelsey Iffert, MS**
>
> **D** 315.414.2206 **M** 315.706.5176

Appendix B - Whitewater Boating and Access Study Safety Plan

Whitewater Boating and Access Study Safety Plan

Lowell Hydroelectric Project

(FERC No. 2790)

September 2020
Revised November 2022

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC

Central Rivers Power

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List of Acronyms

Boott	Boott Hydropower, LLC
CFR	Code of Federal Regulations
cfs	cubic feet-per-second
FERC	Federal Energy Regulatory Commission (or Commission)
ILP	Integrated Licensing Process
MW	megawatt
NPS	National Park Service
Project	Lowell Hydroelectric Project (or Lowell Project)
RSP	Revised Study Plan
SPD	Study Plan Determination
Study	Whitewater Boating and Access Study
USGS	U.S. Geological Survey
Working Group	Whitewater Boating and Access Study Working Group

1 Introduction and Background

Boott Hydropower, LLC (Boott), is the Licensee and operator of the 20.2 megawatt (MW) Lowell Hydroelectric Project (FERC Project No. 2790) (Project or Lowell Project). The Project is located along the Merrimack River in Middlesex County, Massachusetts and in Hillsborough County, New Hampshire.

The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. As proposed in Boott's January 28, 2019 Revised Study Plan (RSP) and approved in the Commission's March 13, 2019 Study Plan Determination (SPD), Boott will conduct a Whitewater Boating and Access Study (Whitewater Study) in support of Project relicensing.

This Whitewater Boating and Access Study Safety Plan (Safety Plan) is intended to provide guidelines and protocols for protecting the safety of volunteer study participants boating the Project's bypass reach during controlled flow releases. This Safety Plan also provides procedures for emergency situations and guidance for communicating with study participants, Project staff, and emergency responders. The Safety Plan was developed in consultation with American Whitewater (AW), the City of Lowell (City), National Park Service (NPS), Zoar Outdoor (Zoar), and the Massachusetts Department of Conservation and Recreation (MADCR) (collectively, the "Whitewater Boating and Access Study Working Group" or "Working Group").

As a condition to participation in the controlled flow releases, Boott requires volunteers to review this Safety Plan and understand the safety measures, guidance, and requirements herein. Boott notes that this Safety Plan includes details about Personal Protective Equipment (PPE) that participants are responsible for providing, as well as mandatory pre-fieldwork COVID-19 self-screening requirements. Persons who do not have the required PPE or who do not self-evaluate for signs or symptoms of COVID-19 prior to attending will not be allowed to participate in the Whitewater Study.

1.1 Whitewater Boating and Access Study Overview

The Lowell Project is a run-of-river hydropower plant. When river flows exceed the hydraulic capacity of the two generating units located at the E.L. Field Powerhouse (combined capacity of approximately 6,600 cubic feet per second [cfs]), excess flows (up to approximately 2,000 cfs) are routed through the downtown Lowell canal system and through the canal units. When inflows exceed the 8,600 cfs capacity of the generating units and canals, all excess flows are passed over the Pawtucket Dam spillway into the bypass reach. The Project has the potential to affect whitewater boating opportunities in the bypass reach when flows are less than 8,600 cfs.

As described in the approved RSP, the goal of the study is to assess the Project's bypass reach for whitewater boating and access opportunities. The objectives of the study are as follows:

- Assess a range of flows suitable for whitewater boating opportunities in the Project's bypass reach;
- Assess the frequency, timing, duration, and predictability of paddling flows under current and proposed Project operations;
- Define potential locations for put-in and take-out points for boaters; and,
- Assess the flow information needs for whitewater boating and the current and potential flow information distribution system.

The approved study plan includes three primary tasks:

- **Task 1: Study Planning and Preparation** – The Study Planning and Preparation task includes (1) formation of the Working Group and identification of volunteers to participate in controlled flow release evaluations; (2) identification of appropriate put-in and take-out locations for on-water evaluations; (3) development of a Safety Plan; (4) determination of a method for verifying flows in the Project's bypass reach; and (5) development of survey forms to be used in the execution of the flow evaluations.

- **Task 2: Controlled Whitewater Releases** – In consultation with the Working Group, Boott will schedule controlled flow releases from the Project's Pawtucket Dam. Each flow release is expected to last approximately three hours, and volunteer boaters will have the opportunity to boat the Project's bypass reach and to make multiple passes at each flow to evaluate lines through sections of the study reach. Pre, post, and comparative surveys will be provided to controlled flow release participants for their completion during this portion of the study.

  Following completion of the controlled flow releases, Boott will conduct an on-site meeting to discuss the results of the study and summarize opinions about the feasibility or quality of different types of boating opportunities at different flows.

- **Task 3: Whitewater Recreational Access** – Based on the results of the Recreation and Aesthetics Study, and in consultation with the Working Group, Boott will conduct an evaluation of prospective whitewater recreational access to the bypass reach.

This Safety Plan has been developed pursuant to Task 1 of the approved Whitewater Boating and Access Study Plan to provide appropriate safety measures and emergency protocols for the controlled flow releases (Task 2). Boott will require that all volunteer boaters participating in the controlled flow releases review and adhere to the Safety Plan requirements and applicable Boott safety policies.

2 Safety Code of American Whitewater

Boott's Safety Plan adopts the Safety Code of American Whitewater (AW 2005) (Safety Code). The Safety Code includes guidelines for Personal Preparedness and Responsibility, Boat and Equipment Preparedness, Group Preparedness and Responsibility, and Guidelines for River Rescue. Guidance from the Safety Code is presented in the following sections***. As a precursor to participating in the controlled flow releases, volunteer boaters will review the Safety Code in its entirety on the AW Website at www.americanwhitewater.org.***

As noted in the Safety Code, the code "is only a collection of guidelines; attempts to minimize risks should be flexible, not constrained by a rigid set of rules. Varying conditions and group goals may combine with unpredictable circumstances to require alternate procedures" (AW 2005). If conditions require modifications to this Safety Plan, Boott, the Working Group, and study participants, will document and review those modifications prior to boating the controlled flow releases.

While it is appropriate to develop and review safety guidance for whitewater boating, all parties recognize that whitewater boating has inherent risks that cannot be completely avoided or mitigated. As such, volunteer boaters participating in the controlled flow releases do so at their own risk and in recognition of the inherent dangers such activities pose.

2.1 Personal Preparedness and Responsibility

1. **Be a competent swimmer**, with the ability to handle yourself underwater.
2. **Wear a life jacket.** A snugly-fitting vest-type life preserver offers back and shoulder protection as well as the flotation needed to swim safely in whitewater.
3. **Wear a solid, correctly-fitted helmet** when upsets are likely. This is essential in kayaks or covered canoes, and recommended for open canoeists using thigh straps and rafters running steep drops.
4. **Do not boat out of control.** Your skills should be sufficient to stop or reach shore before reaching danger. Do not enter a rapid unless you are reasonably sure that you can run it safely or swim it without injury.
5. **Whitewater rivers contain many hazards which are not always easily recognized. The following are the most frequent killers.**
    I. **High Water.** A river's speed and power increase tremendously as the flow increases, raising the difficulty of most rapids. Rescue becomes progressively harder as the water rises, adding to the danger. Floating debris and strainers can make even an easy rapid quite hazardous. It is often misleading to judge the river level at the put-in, since a small rise in a wide, shallow place will be multiplied many times where the river narrows. Use reliable gage information whenever

possible, and be aware that sun on snowpack, hard rain, and upstream dam releases may greatly increase the flow.

II. **Cold.** Cold drains your strength and robs you of the ability to make sound decisions on matters affecting your survival. Cold-water immersion, because of the initial shock and the rapid heat loss which follows, is especially dangerous. Dress appropriately for bad weather or sudden immersion in the water. When the water temperature is less than 50° Fahrenheit, a wetsuit or drysuit is essential for protection if you swim. Next best is wool or pile clothing under a waterproof shell. In this case, you should also carry waterproof matches and a change of clothing in a waterproof bag. If, after prolonged exposure, a person experiences uncontrollable shaking, loss of coordination, or difficulty speaking, he or she is hypothermic, and needs your assistance.

III. **Strainers.** Brush, fallen trees, bridge pilings, undercut rocks or anything else which allows river current to sweep through can pin boats and boaters against the obstacle. Water pressure on anything trapped this way can be overwhelming. Rescue is often extremely difficult. Pinning may occur in fast current, with little or no whitewater to warn of the danger.

IV. **Dams, weirs, ledges, reversals, holes, and hydraulics.** When water drops over an obstacle, it curls back on itself, forming a strong upstream current which may be capable of holding a boat or swimmer. Some holes make for excellent sport. Others are proven killers. Paddlers who cannot recognize the difference should avoid all but the smallest holes. Hydraulics around man-made dams must be treated with utmost respect regardless of their height or the level of the river. Despite their seemingly benign appearance, they can create an almost escape-proof trap. The swimmer's only exit from the “drowning machine” is to dive below the surface when the downstream current is flowing beneath the reversal.

6. **Broaching.** When a boat is pushed sideways against a rock by strong current, it may collapse and wrap. This is especially dangerous to kayak and decked canoe paddlers; these boats will collapse and the combination of indestructible hulls and tight outfitting may create a deadly trap. Even without entrapment, releasing pinned boats can be extremely time-consuming and dangerous. To avoid pinning, throw your weight downstream towards the rock. This allows the current to slide harmlessly underneath the hull.

7. **Boating alone is discouraged.** The minimum party is three people or two craft.

8. **Have a frank knowledge of your boating ability,** and don't attempt rivers or rapids which lie beyond that ability.

9. **Be in good physical and mental condition,** consistent with the difficulties which may be expected. Make adjustments for loss of skills due to age, health, fitness. Any health limitations must be explained to your fellow paddlers prior to starting the trip.

10. **Be practiced in self-rescue,** including escape from an overturned craft. The Eskimo roll is strongly recommended for decked boaters who run rapids Class IV or greater, or who paddle in cold environmental conditions.

11. **Be trained in rescue skills, CPR, and first aid** with special emphasis on recognizing and treating hypothermia. It may save your friend's life.

12. **Carry equipment needed for unexpected emergencies,** including footwear which will protect your feet when walking out, a throw rope, knife, whistle, and waterproof matches. If you wear eyeglasses, tie them on and carry a spare pair on long trips. Bring cloth repair tape on short runs, and a full repair kit on isolated rivers. Do not wear bulky jackets, ponchos, heavy boots, or anything else which could reduce your ability to survive a swim.

13. Despite the mutually supportive group structure described in this code, **individual paddlers are ultimately responsible for their own safety, and must assume sole responsibility for the following decisions:**

    I. The decision to participate on any trip. This includes an evaluation of the expected difficulty of the rapids under the conditions existing at the time of the put-in.

    II. The selection of appropriate equipment, including a boat design suited to their skills and the appropriate rescue and survival gear.

    III. The decision to scout any rapid, and to run or portage according to their best judgment. Other members of the group may offer advice, but paddlers should resist pressure from anyone to paddle beyond their skills. It is also their responsibility to decide whether to pass up any walk-out or take-out opportunity.

    IV. All trip participants should consistently evaluate their own and their group's safety, voicing their concerns when appropriate and following what they believe to be the best course of action. Paddlers are encouraged to speak with anyone whose actions on the water are dangerous, whether they are a part of your group or not.

2.2 Boat and Equipment Preparedness

1. **Test new and different equipment** under familiar conditions before relying on it for difficult runs. This is especially true when adopting a new boat design or outfitting system. Low-volume craft may present additional hazards to inexperienced or poorly conditioned paddlers.

2. **Be sure your boat and gear are in good repair** before starting a trip. The more isolated and difficult the run, the more rigorous this inspection should be.

3. **Install flotation bags** in non-inflatable craft, securely fixed in each end, designed to displace as much water as possible. Inflatable boats should have multiple air chambers and be test-inflated before launching.

4. **Have strong, properly sized paddles or oars** for controlling your craft. Carry sufficient spares for the length and difficulty of the trip.

5. **Outfit your boat safely.** The ability to exit your boat quickly is an essential component of safety in rapids. It is your responsibility to see that there is absolutely nothing to cause entrapment when coming free of an upset craft. This includes:

    I. Spray covers which won't release reliably or which release prematurely.

    II. Boat outfitting too tight to allow a fast exit, especially in low volume kayaks or decked canoes. This includes low-hung thwarts in canoes lacking adequate clearance for your feet and kayak footbraces which fail or allow your feet to become wedged under them.

    III. Inadequately supported decks which collapse on a paddler's legs when a decked boat is pinned by water pressure or inadequate clearance with the deck because of your size or build.

    IV. Loose ropes which cause entanglement. Beware of any length of loose line attached to a whitewater boat. All items must be tied tightly, and excess line eliminated; painters, throw lines, and safety rope systems must be completely and effectively stored. Do not knot the end of a rope, as it can get caught in cracks between rocks.

6. **Provide ropes** which permit you to hold on to your craft so that it may be rescued. The following methods are recommended:

    I. Kayaks and covered canoes should have grab loops of ¼-inch + rope or equivalent webbing sized to admit a normal-sized hand. Stern painters are permissible if properly secured.

    II. Open canoes should have securely anchored bow and stern painters consisting of 8 – 10 feet of ¼-inch + line. These must be secured in such a way that they are readily accessible, but cannot come loose accidentally. Grab loops are acceptable, but are more difficult to reach after an upset.

    III. Rafts and dories may have taut perimeter lines threaded through the loops provided. Footholds should be designed so that a paddler's feet cannot be forced through them, causing entrapment. Flip lines should be carefully and reliably stowed.

7. **Know your craft's carrying capacity,** and how added loads affect boat handling in whitewater. Most rafts have a minimum crew size which can be added to on day trips or in easy rapids. Carrying more than two paddlers in an open canoe when running rapids is not recommended.

8. **Car-top racks** must be strong and attach positively to the vehicle. Lash your boat to each crossbar, then tie the ends of the boats directly to the bumpers for added security. This arrangement should survive all but the most violent vehicle accident.

2.3 Group Preparedness and Responsibility

1. **Organization.** A river trip should be regarded as a common adventure by all participants, except on instructional or commercially guided trips as defined below. Participants share the responsibility for the conduct of the trip, and each participant is individually responsible for judging his or her own capabilities and for his or her own safety as the trip progresses. Participants are encouraged (but are not obligated) to offer advice and guidance for the independent consideration and judgment of others.

2. **River Conditions.** The group should have a reasonable knowledge of the difficulty of the run. Participants should evaluate this information and adjust their plans accordingly. If the run is exploratory or no one is familiar with the river, maps and guidebooks, if available, should be examined. The group should secure accurate flow information; the more difficult the run, the more important this will be. Be aware of possible changes in river level and how this will affect the difficulty of the run. If the trip involves tidal stretches, secure appropriate information on tides.

3. **Group equipment should be suited to the difficulty of the river.** The group should always have a throw-line available, and one line per boat is recommended on difficult runs. The list may include: carabiners, prussic loops, first aid kit, flashlight, folding saw, fire starter, guidebooks, maps, food, extra clothing, and any other rescue or survival items suggested by conditions. Each item is not required on every run, and this list is not meant to be a substitute for good judgment.

4. **Keep the group compact,** but maintain sufficient spacing to avoid collisions. If the group is large, consider dividing into smaller groups or using the “buddy system” as an additional safeguard. Space yourselves closely enough to permit good communication, but not so close as to interfere with one another in rapids.

    I. **A point paddler** sets the pace. When in front, do not get in over your head. Never run drops when you cannot see a clear route to the bottom or, for advanced paddlers, a sure route to the next eddy. When in doubt, stop and scout.

    II. **Keep track of all group members.** Each boat keeps the one behind it in sight, stopping if necessary. Know how many people are in your group and take headcounts regularly. No one should paddle ahead or walk out without first informing the group. Paddlers requiring additional support should stay at the center of a group, and not allow themselves to lag behind in the more difficult rapids. If the group is large and contains a wide range of abilities, a “sweep boat” may be designated to bring up the rear.

    III. **Courtesy.** On heavily used rivers, do not cut in front of a boater running a drop. Always look upstream before leaving eddies to run or play. Never enter a crowded drop or eddy when no room for you exists. Passing other groups in a rapid may be hazardous; it's often safer to wait upstream until the group ahead has passed.

5. **Float Plan.** If the trip is into a wilderness area or for an extended period, plans should be filed with a responsible person who will contact the authorities if you are overdue. It may be wise to establish checkpoints along the way where civilization could be contacted if necessary. Knowing the location of possible help and planning escape routes can speed rescue.

6. **Drugs.** The use of alcohol or mind-altering drugs before or during river trips is not recommended. It dulls reflexes, reduces decision-making ability, and may interfere with important survival reflexes.

7. **Instructional or commercially guided trips.** In contrast to the common adventure trip format, in these trip formats, a boating instructor or commercial guide assumes some of the responsibilities normally exercised by the group as a whole, as appropriate under the circumstances. These formats recognize that instructional or commercially guided trips may involve participants who lack significant experience in whitewater. However, as a participant acquires experience in whitewater, he or she takes on increasing responsibility for his or her own safety, in accordance with what he or she knows or should know as a result of that increased experience. Also, as in all trip formats, every participant must realize and assume the risks associated with the serious hazards of whitewater rivers.

8. It is advisable for instructors and commercial guides or their employers to acquire trip or personal liability insurance:

    I. An “instructional trip” is characterized by a clear teacher/pupil relationship, where the primary purpose of the trip is to teach boating skills, and which is conducted for a fee.

    II. A “commercially guided trip” is characterized by a licensed, professional guide conducting trips for a fee.

2.4 Guidelines for River Rescue

1. **Recover from an upset with an Eskimo roll** whenever possible. Evacuate your boat immediately if there is imminent danger of being trapped against rocks, brush, or any other kind of strainer.

2. **If you swim, hold on to your boat.** It has much flotation and is easy for rescuers to spot. Get to the upstream end so that you cannot be crushed between a rock and your boat by the force of the current. Persons with good balance may be able to climb on top of a swamped kayak or flipped raft and paddle to shore.

3. **Release your craft if this will improve your chances,** especially if the water is cold or dangerous rapids lie ahead. Actively attempt self-rescue whenever possible by swimming for safety. Be prepared to assist others who may come to your aid.

    I. When swimming in shallow or obstructed rapids, lie on your back with feet held high and pointed downstream. Do not attempt to stand in fast moving water; if your foot wedges on the bottom, fast water will push you under and keep you

there. Get to slow or very shallow water before attempting to stand or walk. Look ahead! Avoid possible pinning situations including undercut rocks, strainers, downed trees, holes, and other dangers by swimming away from them.

II. If the rapids are deep and powerful, roll over onto your stomach and swim aggressively for shore. Watch for eddies and slackwater and use them to get out of the current. Strong swimmers can affect a powerful upstream ferry and get to shore fast. If the shores are obstructed with strainers or undercut rocks, however, it is safer to "ride the rapid out" until a safer escape can be found.

4. **If others spill and swim, go after the boaters first.** Rescue boats and equipment only if this can be done safely. While participants are encouraged (but not obligated) to assist one another to the best of their ability, they should do so only if they can, in their judgment, do so safely. The first duty of a rescuer is not to compound the problem by becoming another victim.

5. **The use of rescue lines requires training;** uninformed use may cause injury. Never tie yourself into either end of a line without a reliable quick-release system. Have a knife handy to deal with unexpected entanglement. Learn to place set lines effectively, to throw accurately, to belay effectively, and to properly handle a rope thrown to you.

6. **When reviving a drowning victim,** be aware that cold water may greatly extend survival time underwater. Victims of hypothermia may have depressed vital signs so they look and feel dead. Don't give up; continue CPR for as long as possible without compromising safety.

3 Safety, First Aid, and Rescue Equipment

For this study, volunteer boaters participating in the controlled flow releases are required to have the following PPE, regardless of skill level or experience:

- **Personal Floatation Device:** All study participants are required to wear a Type III or V personal floatation device when boating or within 10 feet of the water.

- **Helmet:** All study participants must wear a properly fitted whitewater helmet when boating.

- **Whistle:** All study participants must carry a whistle to alert other participants or spotters of an emergency situation or to signal distress.

As noted in the Safety Code, ***it is the responsibility of the study participants to have the PPE, first aid, rescue, and other safety equipment that they determine to be appropriate.*** Participants should consider (both individually and as a group) the equipment that may be appropriate for weather conditions, flows, watercraft, and skill levels. Other appropriate PPE, first aid, rescue, and safety equipment may include (but is not limited to), wetsuits, drysuits, spraycovers, extra oars/paddles, gloves, throw ropes,

rescue knives, floatation, first aid kits, and an extra set of dry clothes. It is the responsibility of study participants to have the PPE, safety, first aid, and rescue equipment available for the controlled flow releases and to be familiar with proper use of any such equipment.

4 Alcohol and Drug Policy

For the safety of all participants, and consistent with the Safety Code, the use of alcohol or drugs is prohibited during the controlled flow releases. Whitewater rafting requires exceptional physical exertion and risk of injury or death from whitewater rafting can be mitigated by excluding those under the influence of alcohol or drugs. As noted in the Safety Code, the use of alcohol or drug, dulls reflexes, reduces decision-making ability, and may interfere with important survival reflexes. ***Persons who appear visibly intoxicated will not be allowed to participate in the study.***

5 Safety Issues

Each volunteer boater is responsible for understanding the safety issues associated with participation in the study. In addition to the safety guidance discussed in the Safety Code, volunteer boaters should be aware of these safety issues that may be encountered during the study:

- **Protruding rebar** submerged in a pool below the fish ladder and in the elevated bedrock downstream of the University Avenue bridge that could not be removed. The majority of rebar in the bypass reach has been cut to bedrock level, however additional bars may be present in addition to locations listed above.

- **Strainers and obstructions** along the Project's bypass reach that present potential pinning scenarios for boats and boaters, including downed trees, rocks/boulders, and bridge pilings.

- **Potential foot entrapments** that could result from dangling feet over or near the bottom of the river or attempting to stand in the current.

- **Weather related illness**, such as hypothermia or dehydration.

- **Severe or sudden weather events** (i.e., thunderstorms, heavy rainfall, etc.).

- **Sudden rapid flow releases** that may occur if the powerhouse is tripped offline (due to a lightning strike or equipment failure) or if water is released through the surge gate located upstream from the Projects E.L. Field Powerhouse.

- **Advice/encouragement from the general public** to attempt rivers or rapids which lie beyond the volunteer boater's ability.

- **Sudden changes in physical health or mental condition** of volunteer boater on the day of the study.

- **Unexpected emergency situations** (i.e. medical/health emergency, boating collisions, severe weather, etc.).

6 Safety Measures

Boott, the Working Group, and study participants will all have responsibilities to support safe boating during the controlled flow releases. The following safety measures will be implemented for this study:

- Volunteer boaters will be experienced and will have the skills necessary to boat the Project's bypass reach. AW will be responsible for selecting volunteers to participate in the controlled flow releases.

- The minimum age for participating in the controlled flow releases is 18. All participants will sign a waiver prior to boating the controlled flow releases. Individuals who do not sign the waiver will not be allowed to participate in the Whitewater Study.

- All study participants must adhere to the COVID-19 Protocols described in Section 7 of this Safety Plan. Boott reserves the right to remove any participant who does not adhere to the COVID-19 Protocols from the Whitewater Study.

- All study participants will be required to provide contact information for themselves and an emergency contact. Study participants will have the option to disclose medical conditions/disabilities that could be relevant to potential medical treatment/care (i.e., allergies to certain medications, asthma, etc.).

- Boott will maintain contact information for the City's fire department. The point of contact (POC) for the fire department shall be Phillip Charron, Fire Chief, 978-674-4588.

- At least 48 hours prior to boating the controlled flow releases, Boott will contact the City's fire department and any other contact designated by the City to make them aware of the timing and expected schedule for the controlled flow releases. If the fire department's POC has concerns regarding the timing or schedule for controlled flow releases, Boott will consult the working group to address any concerns. If the concerns cannot be addressed to the satisfaction of the fire department's POC, Boott reserves the right to postpone the study.

- Prior to boating the controlled flow releases, all study participants will participate in a daily "tailgate" safety discussion. During the tailgate discussion, Boot will summarize the safety plan, including the procedures for emergencies. The tailgate discussion will be an opportunity for the Working Group to provide any additional or updated

safety information to study participants, and for the volunteer boaters participating in the controlled flow releases to discuss conditions and any additional safety measures, recommendations, or guidance. Boott will document any new or modified safety measures, recommendations or guidance in the Safety Plan Addendum provided in Appendix A to this Safety Plan.

- Prior to boating the controlled flow releases, all study participants will participate in an equipment check to be sure that gear is in proper functioning condition, all loads are secured so as not to break free and cause harm to fellow study participants, and that required PPE (i.e., vest, helmet, and whistle) are not damaged in a way that would inhibit them from working properly.

- Study participants will sign in/out on a daily basis and Boott will record the names of individual volunteer boaters as they put-in and take-out their craft.

- During the controlled flow releases, Boott will place “spotters” at two locations identified in the field in consultation with the Working Group. The spotters will observe boaters during the controlled flow releases and will be prepared to call emergency services (911) if there is an observed accident, injury, pinning, or other emergency.

- Boott, the Working Group, and study participants will continually evaluate boating safety and will speak with anyone whose actions on the water are dangerous.

- Study participants will make the decision to scout any rapid, and to run or portage according to their best judgment. Do not enter a rapid unless you are reasonably sure that you can run it safely or swim it without injury. Consistent with the Safety Code, it is the responsibility of individual study participants to decide whether to pass up any walk-out or take-out opportunity.

- A “sweep boat” will be designated for each controlled flow release to ensure all study participants have safely exited the water.

- Any study participant should call 911 to report life-threatening or medical emergencies (i.e., chest pains) during the controlled flow releases. When calling 911, briefly describe the incident you are reporting to the dispatcher, remain calm, speak clearly, and stay on the line.

- If a safety incident occurs during the controlled flow releases, and a rescue is required, Boott will notify Project operations staff. If the flow in the bypass reach can safely be reduced to facilitate rescue, Project staff will reduce the flow as quickly as possible.

- Boott reserves the right to remove any participant from the Whitewater Study who does not follow the safety measures or is acting in an unsafe manner.

7 COVID-19 Protocols

Coronavirus Disease 2019 (COVID-19) is a new disease that presents hazards that must be considered and addressed as part of this Whitewater Study. Massachusetts Governor Charlie Baker declared a State of Emergency to Respond to COVID-19 on March 10, 2020, and the World Health Organization designated COVID-19 as a pandemic on March 11, 2020. On March 13, 2020, the President of the United States declared the COVID-19 pandemic a national emergency.

The Commonwealth of Massachusetts remains under an emergency declaration and has promulgated regulations and guidance to reduce the spread of COVID-19. The Commonwealth's regulations and guidance related to COVID-19 are available at https://www.mass.gov/info-details/covid-19-updates-and-information**.**

Boott notes that the Commonwealth's regulations and guidance are subject to change, and study participants must review the guidance and recommendations prior to arriving at the Project. It is the responsibility of each study participant to review and comply with the Commonwealth's regulations and guidance regarding COVID-19.

Spread of COVID-19 between humans most likely occurs when a person is within six feet of an infected person. Sources of exposure to COVID-19 include droplets of respiratory secretions produced when an infected person coughs or sneezes; these droplets are believed to enter the mouths and noses of people nearby and can be inhaled into the nose and lungs. Exposure can also occur by touching surfaces/objects contaminated with the virus (SARS-COV-2) that causes the disease and then touching the mouth, nose, or possibly the eyes. Activities that involve close (within six feet) contact with infected people or other sources of the virus, social conditions (i.e., high population density, frequent person-to-person contact, large group gatherings), or travel to areas highly affected by COVID-19 are risk factors for exposure to the virus. (OSHA 2020)

Hazards associated with exposure to the virus include developing COVID-19 illness, which has a wide range of symptoms ranging from mild to severe illness, and, in some cases, death. Symptoms may appear 2-14 days after exposure to the virus. People at higher risk for severe illness include older adults, people with severe underlying medical conditions (i.e., heart or lung disease, liver disease), people with asthma, and/or people that are immunocompromised.

Study participants are required to self-evaluate for signs or symptoms of COVID-19 prior to attending. Any study participant experiencing COVID-19 symptoms must not report to the Project. A list of common COVID-19 symptoms is provided below.

- Fever (over 100.4 degrees Fahrenheit) or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue

- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

8 Contact Information

Contact information for emergency services, law enforcement, and Boott personnel are provided below. ***In the event of a life-threatening or medical emergency, call 911.***

City of Lowell Fire Department
Phillip Charron
Fire Chief
99 Moody Street
Lowell, MA 01852
(978) 458-4588

City of Lowell Police Department
Barry Golner
Interim Superintendent of Police
50 Arcand Drive
Lowell, MA 01852
(978) 937-3200

National Park Service
Julie Galonska
Lowell National Historical Park Superintendent
67 Kirk Street
Lowell, MA 01852
978-970-5000

Lowell General Hospital
295 Varnum Avenue
Lowell, MA 01854
(978) 937-6000

Kevin Webb
Boot Hydropower, LLC
670 N. Commercial Street, Suite 204
Manchester, NH 03101
(978) 935-6039
kwebb@centralriverspower.com

9 References Cited

American Whitewater. 2005. Safety Code of American Whitewater. Available at: https://www.americanwhitewater.org/content/Wiki/safety:start. Accessed September 8, 2020.

Centers for Disease Control and Prevention (CDC). 2020. Coronavirus Disease 2019 (COVID-19). Symptoms. Available at: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html. Accessed June 1, 2020.

Occupational Health and Safety (OHSA). 2020. COVID-19. Available at: https://www.osha.gov/SLTC/covid-19/. Accessed May 28, 2020.

Appendix A

Safety Plan Addendum

Lowell Hydroelectric Project
Whitewater Boating and Access Study Safety Plan

Safety Plan Addendum

Record any revisions to the Whitewater Boating and Access Study Safety Plan in the table below. Revisions must be communicated to all study participants.

Revision	Reason	Revised By	Date
Updated COVID-19 Protocols	Protocols have been updated to reflect more recent guidelines by the Centers for Disease Control and Prevention.	Sarah Humiston	11/4/2022
Updated Safety Issues	Most of the rebar in the bypassed reach was cut to bedrock level, but potential hazards remain.	Sarah Humiston	11/4/2022
Updated Contact Information	New City of Lowell staff and NPS staff	Sarah Humiston	11/4/2022

Appendix C - Completed Participants Data Forms

2022 Pre-Run Data Forms
Flows 1 and 2

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Cameron Brown **Affiliation:**

Home Zip Code:

E-Mail Address: 101 .com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   (b) Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   7 years

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   3 days

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ___Yes ___No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   Ø

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Niall Burkley **Affiliation:** Kayaker, study volunteer

Home Zip Code: 02144

E-Mail Address: burkley.niall@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   - [X] a. Hard shell kayak / C1
   - [X] b. Inflatable kayak
   - [X] c. Open canoe with flotation
   - [X] d. Cataraft (include length)
   - [X] e. Self-bailing raft (include length)
   - [ ] f. Stand-up paddleboard
   - [ ] g. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - b. Intermediate (comfortable running Class III whitewater)
   - [X] c. Advanced (comfortable running Class IV whitewater)
   - d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   20 years

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   2 days per month

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ___Yes _X_ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   About 8 days (multiple times each day). I'm assuming it's this section of river: https://www.americanwhitewater.org/content/River/view/river-detail/680/main

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _500_ cfs to: _2000_ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         X. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Amy Fielding **Affiliation:** —
Home Zip Code: 65346
E-Mail Address: amymarie fielding 1208@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   8 years

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   8-10

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ___Yes ✓ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   0

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Stephen Glidden **Affiliation:** American White Water
Home Zip Code: 01748
E-Mail Address: glidden52@comcast.net

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   (c.) Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?
   35

4) Over the past 3 years, approximately how many days per month did you whitewater boat?
   2

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

a. ✓ Yes ___ No

b. If yes, when, and for which project(s)?
1994 Stowhegan ME.

6) How many times have you boated this reach before today?

0

a. If you have boated this reach before, what were the flows?

i. Approximately: _____ cfs to: _____ cfs

ii. What type of craft did you use? (*Please choose all that apply*)

1. Hard shell kayak / C1
2. Inflatable kayak
3. Open canoe with flotation
4. Cataraft (include length)
5. Self-bailing raft (include length)
6. Stand-up paddleboard
7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Sarah Grinnell **Affiliation:** _____
Home Zip Code: 01370
E-Mail Address: grinnelli@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   8

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   4

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ___Yes ✓ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   none

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Steve Heanue **Affiliation:** None

Home Zip Code: 01930

E-Mail Address: Steveheanue@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   30

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   Summer 6 - 10

   Winter 1 - 3

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. __Yes X No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   — 0 —

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: BOB NASDOR **Affiliation:** AMERICAN WHITEWATER
Home Zip Code: 01776
E-Mail Address: BOB@AMERICANWHITEWATER.ORG

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / ~~C1~~ K1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?
   20

4) Over the past 3 years, approximately how many days per month did you whitewater boat?
   5-10

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ✓ Yes ___ No

   b. If yes, when, and for which project(s)?

MONGAUP, DEERFIELD, WEST CANADA, CONNECTICT

6) How many times have you boated this reach before today?

0

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs

      ii. What type of craft did you use? (*Please choose all that apply*)

         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Patrick Robbins **Affiliation:** Merrimack Valley Paddlers

Home Zip Code: 01810

E-Mail Address: movari@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*) Answer: a
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level? Answer: Intermediate
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating? Answer: 3 years

4) Over the past 3 years, approximately how many days per month did you whitewater boat? Answer: About 12 days per month Sept through April and 4 per month in summer when levels are low

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. __Yes _X__ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today? Answer: Never

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Florian Schacht **Affiliation:** _____
Home Zip Code: 01376
E-Mail Address: cocoschachtl@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   (a.) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   (b.) Intermediate (comfortable running Class III whitewater) comfortable w/ Class IV some but not advanced
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?
   4

4) Over the past 3 years, approximately how many days per month did you whitewater boat?
   3

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ___Yes ✓ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   0

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Kevin Soleil **Affiliation:** UMass Lowell
Lowell Resident
Home Zip Code: 01854
E-Mail Address: Kevin_Soleil@uml.edu

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. ___Yes ___ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Play Wave on Spillway → No shut off Required

Conditions
- Web cam on River possible to get more use on opportunistic conditions?
- Lowell gage ~7000 from Bypass

Thank You for Your Participation

Notes:
- Opportunities for tubing in the canals?
- Longer Open season for Northern Canal Walkway?
- Emergency Contact Info?
- Take out (a) Ball Park. Alt. Take out (a) Beaver Brook, Beaver Street
- Parking and Take out River Left on walkway or at Bridge Street.
- Safety: Scout Big hole on R. left open from trail + gap in fence. "Spin Cycle"

2022 Post-Run Data Forms
Flows 1 and 2

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Cameron Brown **Date of Run:** 11/19/22

Flow: 600 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Northern Canal Walkway Time: 11 am

Take-out location: Bellpark Time: 12 pm

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 2

b. Play Spots 0

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	(5)
Size/Difficulty of Rapids	1	2	3	4	(5)
Overall Whitewater	1	2	3	4	(5)
Challenge	1	2	3	4	(5)
Safety	1	2	3	(4)	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
(c.) Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   (c.) About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	(4)	5
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	3	(4)	5
Catarafts	1	2	3	(4)	5
Self-bailing rafts	1	2	3	(4)	5
Stand-up paddleboards	(1)	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NO

11) Please use the space below to provide any other comments about your boating experience at this flow.

Interesting run with lots of lines to explore.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: NIALL BURKLEY **Date of Run:** 11/19/2022
Flow: 6600 **cfs**

1) What type of craft did you use for this run?
   (a.) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: NORTHERN CANAL WALKWAY Time: 11.30

Take-out location: BALLPARK Time: 12.00

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 5 times.
   b. I was stopped after hitting rocks or other obstacles about 1 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 2

   b. Play Spots 4

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	(3)	4	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   (c.) Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   b. Possibly
   c. Probably
   (e.) Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   (d.) Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	(5)
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	3	4	(5)
Catarafts	1	2	3	4	(5)
Self-bailing rafts	1	2	3	4	(5)
Stand-up paddleboards	1	2	(3)	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

No

11) Please use the space below to provide any other comments about your boating experience at this flow.

MORE WATER MIGHT BE BETTER, BUT EVEN AT THE CURRENT FLOW, I WOULD DEFINITEY TRAVEL HERE FROM BOSTON REGULARLY FOR GUARANTEED RELEASES

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Amy Fielding **Date of Run:** 11/19/22

Flow: ~~5500 about~~ **cfs**
6600 about

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length) 12
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Northern Canal walkway Time: 11:00

Take-out location: Ball park Time: 11:57

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 2 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 2

   b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	(3)	4	5
Powerful Hydraulics	1	2	(3)	4	5
Whitewater "Play Areas"	1	2	3	4	(5)
Size/Difficulty of Rapids	1	2	(3)	4	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	(3)	4	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   (b.) Novice
   c. Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   (b.) Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Metal in the river, also Rocks were sharp in Some areas.

11) Please use the space below to provide any other comments about your boating experience at this flow.

_____

_____

_____

_____

_____

_____

_____

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Stephen Glidden **Date of Run:** 11-19-22
Flow: 6600 **cfs**

1) What type of craft did you use for this run?
   a. (a.) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: N. Canal walkway Time: 11:00
Take-out location: Ballpark Time: 11:30

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 4 times.
   b. I was stopped after hitting rocks or other obstacles about 1 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 4

b. Play Spots 4

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	(3)	4	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	(3)	4	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	3	(4)	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
(c.) Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

None

11) Please use the space below to provide any other comments about your boating experience at this flow.

_____
_____
_____
_____
_____
_____
_____

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Sarah Corinnell **Date of Run:** 11/19/22

Flow: ~6000 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length) 12ft
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Northern Canal Walkway Time: 11:00

Take-out location: Ballpark Time: 11:57

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 2

b. Play Spots 3?

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Rocks are fairly sharp so I would be worried about the danger of swimming rapids, especially with the lift of the rocks and the chance of recirculation.

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: STEVE HEANUE **Date of Run:** 11/19/22

Flow: 6600 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: N. CANAL Time: 11

Take-out location: BALL PARK Time: 12

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 6 times.
   b. I was stopped after hitting rocks or other obstacles about 4 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3-4

b. Play Spots 2

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	(3)	4	5
Size/Difficulty of Rapids	1	2	(3)	4	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   (d.) Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	(4)	5
Inflatable kayaks	1	2	(3)	4	5
Open canoes with floatation	1	2	3	(4)	5
Catarafts	1	2	3	(4)	5
Self-bailing rafts	1	2	3	(4)	5
Stand-up paddleboards	1	(2)	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Lots of JAGGED SHALE

11) Please use the space below to provide any other comments about your boating experience at this flow.

NEED TO MAKE MORE RUNS TO ANSWER

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: BOB NASDOR **Date of Run:** 11/19/22
Flow: 6000 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / ~~C1~~ K1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: NORTHERN CANAL WAGICWAY ~~Time:~~
Take-out location: BALLPARK Time:

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about ~~0~~ times. 2
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots lot

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	(5)
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
(c.) Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

I did not experience any problems but the rocks are sharp

11) Please use the space below to provide any other comments about your boating experience at this flow.

Over time, boaters are likely to identify additional hazards and lines.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Patrick Robbins **Date of Run:** 11/14/22

Flow: 6800 ish **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: North Canal walkway **Time:** 11:00

Take-out location: Spinners stadium **Time:** 11:50

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 2 times.
   b. I was stopped after hitting rocks or other obstacles about _____times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about _____ times.
   d. I had to portage around rapids or sections about ___ times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 3

   b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   c. Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   b. Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal) ✓ but don't know until after higher Run
d. Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

options to avoid more difficult sections
interesting hydraulics with cross flows
could cause ~~[illegible]~~ boat to flip if not
paying attention

11) Please use the space below to provide any other comments about your boating experience at this flow.

as a second year Paddler I was a little too nervous to experiment, but I didn't see anything too bad so next time

Thank You for Your Participation

1st run

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Florian Schachl **Date of Run:** 4/19/22

Flow: 6600 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: north canal walkway Time: 11 am

Take-out location: ball park Time: 12 pm

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 1 times.
   b. I was stopped after hitting rocks or other obstacles about ____times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about ____ times.
   d. I had to portage around rapids or sections about ___ times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 6

b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	(5)
Powerful Hydraulics	1	2	(3)	4	(5)
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	4	(5)
Challenge	1	2	3	(4)	5
Safety	1	2	3	4	(5)

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
(e.) Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   (e) Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	(5)
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	(1)	2	3	4	(5)
Catarafts	(1)	2	3	4	(5)
Self-bailing rafts	(1)	2	3	4	(5)
Stand-up paddleboards	1	2	3	4	(5)
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

No very fun! Would be a big draw for paddlers but a little higher would be better

11) Please use the space below to provide any other comments about your boating experience at this flow.

Improved access would be good but all in all a good stretch, a bit more water would be fun

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Cameron Brown **Date of Run:** 9/9/22

Flow: [illegible] **cfs**

1) What type of craft did you use for this run?
   - (a.) Hard shell kayak / C1
   - b. Inflatable kayak
   - c. Open canoe with flotation
   - d. Cataraft (include length)
   - e. Self-bailing raft (include length)
   - f. Stand-up paddleboard
   - g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Northern Canal Time: 1pm

Take-out location: Bell park Time: 2pm

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 2

b. Play Spots 0

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	1	2	3	4	(5)
Whitewater "Play Areas"	1	2	3	4	(5)
Size/Difficulty of Rapids	1	2	3	4	(5)
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	3	(4)	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
(c.) Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   (c.) About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	(5)
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	3	4	(5)
Catarafts	1	2	3	4	(5)
Self-bailing rafts	1	2	3	4	(5)
Stand-up paddleboards	1	(2)	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

No safety issues.

11) Please use the space below to provide any other comments about your boating experience at this flow.

This is a short, but fun run very close to Boston, where I live.

Thank You for Your Participation

MAY

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: NIALL BURKLEY **Date of Run:** 11/19/2022

Flow: 8000 **cfs**

1) What type of craft did you use for this run?
   - (a) Hard shell kayak / C1
   - b. Inflatable kayak
   - c. Open canoe with flotation
   - d. Cataraft (include length)
   - e. Self-bailing raft (include length)
   - f. Stand-up paddleboard
   - g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: NORTHERN CANAL Time: 12.30

Take-out location: BALLPARK Time: 1.00

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 2 times.

   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).

   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.

   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 2

   b. Play Spots 6

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	1	2	3	4	(5)
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	4	(5)
Overall Whitewater	1	2	3	4	(5)
Challenge	1	2	3	4	(5)
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   (c.) Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   b. Possibly
   c. Probably
   (e.) Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

SWIMMING IN THE LEFT CHANNEL COULD BE DANGEROUS - LOTS OF SUBMERGED ROCKS

11) Please use the space below to provide any other comments about your boating experience at this flow.

GIVEN THE PROXIMITY TO BOSTON, I WOULD KAYAK HERE REGULARLY

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Amy Fielding **Date of Run:** 11/19/22
Flow: 8000 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length) 12ft
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: North Canal walkway Time: ~~12:30~~ 1245
Take-out location: Ball field Time: ~~2:00~~ 1330

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about ~~0~~ 2 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 2 Abve bridge + Below bridge

b. Play Spots Multple

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	(3)	4	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	4	(5)
Challenge	1	2	3	(4)	5
Safety	1	2	3	(4)	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
(b.) Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
(c.) Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

The Middle run was still shallow @ 8000 cfs
But left and right side were do able

11) Please use the space below to provide any other comments about your boating experience at this flow.

Better flow than 6000 cfs
I think more water would be Ideal for Rafts

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Stephen Glidden **Date of Run:** 11-19-22

Flow: 8000 **cfs**

1) What type of craft did you use for this run?
   a. (a) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Walkway Time: 13:00

Take-out location: Ball Park Time: 13:20

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 5 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 4

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	(3)	4	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	(3)	4	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	3	(4)	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
(c.) Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal)
(d) Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	(4)	5
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	3	(4)	5
Catarafts	1	2	3	(4)	5
Self-bailing rafts	1	2	3	(4)	5
Stand-up paddleboards	1	(2)	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

None

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Sarah Corinnell **Date of Run:** 11/19/22
Flow: ~~6~~ 8600 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length) 12 ft
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: North Canal Time: 12:45
Take-out location: Ballpark Time: 2

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 2 times.
   b. I was stopped after hitting rocks or other obstacles about 1 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 2

   b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	(3)	4	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	(3)	4	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   (c.) Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   (b.) Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: STEVE HEANUE **Date of Run:** 11/19/22

Flow: 800 cfs

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: WALKWAY Time: 12:45

Take-out location: BALLPARK Time: 1:30

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 10 times.
   b. I was stopped after hitting rocks or other obstacles about 5 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 2

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	(3)	4	5
Size/Difficulty of Rapids	1	2	(3)	4	5
Overall Whitewater	1	2	(3)	4	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. (Higher)
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	(5)
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	(3)	4	5
Catarafts	1	2	3	(4)	5
Self-bailing rafts	1	2	3	(4)	5
Stand-up paddleboards	1	(2)	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

MANY MANY SHALE LEDGES BELOW THE WATER THAT YOU CANT SEE UNTIL YOU ARE ON THEM
— WOULD HATE TO SWIM

11) Please use the space below to provide any other comments about your boating experience at this flow.

I NEED AT LEAST TWO DOZEN RUNS TO MAKE A COMMENT.

WITH ONLY TWO RUNS I COULD NOT FIND THE MOST FUN LINE FOR ME

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: BOB NADEAU **Date of Run:** 11/19/22
Flow: 8000 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / ~~C1~~ K1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: NORTHERN CANAL WALKWAY Time:
Take-out location: BALLPARK Time:

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 10+

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal)
d. Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

This was a terrific flow. Many Rocks were well covered. More play, strong hydraulics. Very Navigable. Put in access should be improved

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Patrick Robbins **Date of Run:** 11/19/22

Flow: 8000 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: walk in Time: 1:00

Take-out location: Spinners Stadium Time: 1:30

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 1 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about _____ times.
   d. I had to portage around rapids or sections about ___ times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal) a little more fluid than at 6100
d. Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

ND.

11) Please use the space below to provide any other comments about your boating experience at this flow.

The flow of 8K was a little more fluid than 6K without being too pushy for an intermediate paddler

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Florian Coco Schmehl **Date of Run:** 11/19/22

Flow: 8000 **cfs**

1) What type of craft did you use for this run?
   - (a) Hard shell kayak / C1
   - b. Inflatable kayak
   - c. Open canoe with flotation
   - d. Cataraft (include length)
   - e. Self-bailing raft (include length)
   - f. Stand-up paddleboard
   - g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Walkway Time: 1P

Take-out location: Ballpark Time: 1:40p

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	1	2	3	4	(5)
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	4	(5)
Overall Whitewater	1	2	3	4	(5)
Challenge	1	2	3	4	(5)
Safety	1	2	3	4	(5)

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
(d.) Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
(e.) Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher Good flow though
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	(5)
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	3	4	(5)
Catarafts	1	2	3	4	(5)
Self-bailing rafts	1	2	3	4	(5)
Stand-up paddleboards	1	2	3	4	(5)
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

no, very fun, nice

11) Please use the space below to provide any other comments about your boating experience at this flow.

Nice big waves, both flows are great. It would be good to have a good parking spot and trail to the scout spot. Rad big hole at bottom of river left.

Thank You for Your Participation

2022 Flow Comparison Data Forms
Flows 1 and 2

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Cameron Brown **Date:** 11/19/22

1) Craft used?
   a. (a.) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. (b.) Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
6000 cfs	11/19/22	✓	
8000 cfs	11/19/22	✓	

4) Approximately how many times have you boated this reach before this study?

9

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	(3)	4	5
Powerful Hydraulics	1	2	(3)	4	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater Challenge	1	2	3	(4)	5
Safety	1	2	3	4	(5)
Crowding	1	2	3	(4)	5
Long Run(s)	1	2	(3)	4	5
Short Run(s)	1	2	(3)	4	5
Low Number of Portages	1	2	3	4	(5)
High Number of Rapids	1	2	3	(4)	5
Low Number of Rapids	(1)	2	3	4	5
Easy Access	1	2	3	(4)	5
Easy Shuttles	1	2	3	(4)	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6000 cfs	8500 cfs
Totally Acceptable	(5)	(5)
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	(No)

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience: Flow:_____cfs
Hard shell kayak, standard, ~~6000cfs~~. not sure how low this would go?

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:_____cfs
Hard shell kayak, standard, ~~not sure~~ 6,000cfs.

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_____Flow: _____ cfs to _____cfs
Hard shell kayak, 6,000 cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:_____cfs
Hard shell kayak, ~~standard~~ high, not sure, maybe 10,000cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	(5)	5
Acceptable	4	4
Marginal	3	(3)
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: current location ok. Facilities: is path always open?

b. Take Out Location: current locatio ok Facilities: PARKING

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Winnipesaukee
   i. Trips per Year: 0-3 4-8 9-15 (15+)

c. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: NIALL BURKLEY **Date:** 11/19/2022

1) Craft used?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
6000 cfs	11/19/2022	X	
8000 cfs	11/19/2022	X	

4) Approximately how many times have you boated this reach before this study?

0

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	(3)	4	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	(3)	4	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	(3)	4	5
Overall Whitewater Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5
Crowding	1	2	3	(4)	5
Long Run(s)	1	2	3	(4)	5
Short Run(s)	1	(2)	3	4	5
Low Number of Portages	1	2	3	(4)	5
High Number of Rapids	1	2	(3)	4	5
Low Number of Rapids	(1)	2	3	4	5
Easy Access	1	2	3	(4)	5
Easy Shuttles	1	2	(3)	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6000 cfs	8000 cfs
Totally Acceptable	5	(5)
Acceptable	(4)	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

KI

iii. Craft: Experience: Flow: 6000 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

KI

iv. Craft: Experience: technical Flow: 6000 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

KI

v. Craft: Experience: standard Flow: 6000 cfs to 10000 cfs

d. What is the highest safe flow for your craft and skill level?

KI

vi. Craft: Experience: High Flow: 10000 cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:
ASSUMING WE HAVE THE SAME ACCESS WE HAD TODAY

	Put In	Take Out
Totally Acceptable	(5)	(5)
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: NORTHERN CANAL Facilities: PARKING

b. Take Out Location: BALL PARK Facilities: PARKING, RESTROOMS

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: CONCORD, LOWELL MA
   i. Trips per Year: 0-3 4-8 9-15 15+ 4-8

c. Whitewater reach name or description: DRYWAY, WESTERN MA
   i. Trips per Year: 0-3 4-8 9-15 15+ 4-8

d. Whitewater reach name or description: WINNI, FRANKLIN NH
   i. Trips per Year: 0-3 4-8 9-15 15+ 4-8

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Amy Fielding **Date:** 11/19/22

1) Craft used?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length) 12ft
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
6600 cfs	11/19/22	✓	
8600 cfs	11/19/22	✓	

4) Approximately how many times have you boated this reach before this study?

Never

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	1	2	3	4	(5)
Whitewater "Play Areas"	1	2	3	4	(5)
Size/Difficulty of Rapids	1	2	3	4	(5)
Overall Whitewater Challenge	1	2	3	4	(5)
Safety	1	2	3	4	(5)
Crowding	1	2	3	(4)	5
Long Run(s)	1	2	(3)	4	5
Short Run(s)	1	2	(3)	4	5
Low Number of Portages	(1)	2	3	4	5
High Number of Rapids	1	2	3	4	(5)
Low Number of Rapids	1	(2)	3	4	5
Easy Access	1	2	(3)	4	5
Easy Shuttles	1	2	(3)	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6600 cfs	8000 cfs
Totally Acceptable	5	(5)
Acceptable	(4)	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_ Flow: 6000 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

RP Shredder

iv. Craft: Experience: IV Flow: 6000 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

Shredder raft

v. Craft: Experience: RP Flow: 6000 cfs to anything above 6000 so 10,000? cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience: IV Flow: 10,000? cfs

RP shredder

Hard to say Not seeing the flow

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	(5)	(5)
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: North Canal wa/kway Facilities: More parking

b. Take Out Location: Ball field Facilities: Parking

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Rock Dam, On ~~HF~~ CT River
   i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Stephen Glidden **Date:** 11-19-22

1) Craft used?
   a. (a.) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. (c.) Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
6000 cfs	11-19-22	✓	
8000 cfs	11-19-22	✓	

4) Approximately how many times have you boated this reach before this study?

0

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	(1)	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	(5)
Size/Difficulty of Rapids	1	2	3	4	(5)
Overall Whitewater Challenge	1	2	3	4	(5)
Safety	1	2	3	4	(5)
Crowding	1	2	3	4	(5)
Long Run(s)	1	2	(3)	4	5
Short Run(s)	1	2	(3)	4	5
Low Number of Portages	1	2	3	4	(5)
High Number of Rapids	1	2	3	4	(5)
Low Number of Rapids	(1)	2	3	4	5
Easy Access	1	2	3	(4)	5
Easy Shuttles	1	2	3	(4)	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	cfs	cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:_?____cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_K1__Flow:_?____cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_K1____Flow: _?___ cfs to _?___cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_K1____Flow:_?___cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	(4)
Marginal	(3)	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: Same spot Facilities: better Path or stairs

b. Take Out Location: Same spot Facilities: better Path

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: None
   i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description: None
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: None.
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Sarah Grinnell **Date:** 11/19/22

1) Craft used?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length) 12 ft
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
6000cfs	11/19	✓	
8000cfs	11/19	✓	

4) Approximately how many times have you boated this reach before this study?

0

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Crowding	1	2	3	4	5
Long Run(s)	1	2	3	4	5
Short Run(s)	1	2	3	4	5
Low Number of Portages	1	2	3	4	5
High Number of Rapids	1	2	3	4	5
Low Number of Rapids	1	2	3	4	5
Easy Access	1	2	3	4	5
Easy Shuttles	1	2	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	1600 cfs	3100 cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:6000_cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:8000 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_____Flow:6500 cfs to 10,000cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:10,000cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	(5)
Acceptable	4	4
Marginal	3	3
Unacceptable	(2)	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: North Canal Walk Facilities: parking close by

b. Take Out Location: Ballpark Facilities: —

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Connecticut River Rock Dam
   i. Trips per Year: (0-3) 4-8 9-15 15+

c. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Steve Hemmle **Date:** 11.19.22

1) Craft used?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
6600 cfs	4/19	YES	
8000 cfs	11/19	Yes	

4) Approximately how many times have you boated this reach before this study?

NONE

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	(3)	4	5
Whitewater "Play Areas"	1	2	3	4	(5)
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater Challenge	1	2	3	(4)	5
Safety	1	2	3	(4)	5
Crowding	1	(2)	3	4	5
Long Run(s)	1	2	3	(4)	5
Short Run(s)	1	2	(3)	4	5
Low Number of Portages	1	(2)	3	4	5
High Number of Rapids	1	2	3	(4)	5
Low Number of Rapids	1	(2)	3	4	5
Easy Access	1	2	3	(4)	5
Easy Shuttles	1	2	3	(4)	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6600 cfs	8000 cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	(3)	(3)
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:_____cfs DONT KNOW – 5000

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:_____cfs DONT KNOW 5000 – 10,000

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_____Flow: _____ cfs to _____cfs + 5000

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:_____cfs ? 10,000

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience? BOTH WORKED FINE

a. Put In Location: WALLOWA Facilities: NONE

b. Take Out Location: BALLPARK Facilities: NONE

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: [illegible]
   i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Patrick Mabis **Date:** 11/19/22

1) Craft used?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
cfs	6000	✓	
cfs	8000	✓	

4) Approximately how many times have you boated this reach before this study?

0

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Crowding	1	2	3	4	5
Long Run(s)	1	2	3	4	5
Short Run(s)	1	2	3	4	5
Low Number of Portages	1	2	3	4	5
High Number of Rapids	1	2	3	4	5
Low Number of Rapids	1	2	3	4	5
Easy Access	1	2	3	4	5
Easy Shuttles	1	2	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	cfs	cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	Yes	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	Yes	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

IC1

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:_2.K_cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

Not sure

iv. Craft: Experience:_Intermediate_Flow:_2K_cfs Guess

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_Intermediate_Flow: 6K cfs to 8.1K cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:_____cfs Don't know, maybe 10K cfs as an Intermediate

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: Same Facilities: _____

b. Take Out Location: There are see Below others Facilities: _____

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

None I can think of that are like this one.

b. Whitewater reach name or description: Concord RM

i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description: _____

i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____

i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

carrying from take out back to put in
Is doable could envision walking laps and
the last one paddle to other takeouts down river

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: Flowan Coco SchachM **Date:** 11/19/22

1) Craft used?
   - (a) Hard shell kayak / C1
   - b. Inflatable kayak
   - c. Open canoe with flotation
   - d. Cataraft (include length)
   - e. Self-bailing raft (include length)
   - f. Stand-up paddleboard
   - g. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - (b) Intermediate (comfortable running Class III whitewater)
   - (c) Advanced (comfortable running Class IV whitewater)
   - d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
cfs	6600	✓	
cfs	8,000	✓	

4) Approximately how many times have you boated this reach before this study?

0

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	(5)
Challenging Technical Boating	1	2	3	4	(5)
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater Challenge	1	2	3	4	(5)
Safety	1	2	3	(4)	5
Crowding	1	(2)	(3)	4	5
Long Run(s)	1	2	(3)	4	5
Short Run(s)	(1)	2	3	4	5
Low Number of Portages	1	2	(3)	4	5
High Number of Rapids	1	2	(3)	4	5
Low Number of Rapids	(1)	2	3	4	5
Easy Access	1	(2)	3	4	5
Easy Shuttles	1	(2)	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6600 cfs	8,000 cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	(1)	(1)

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one*):

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	(No)
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience: Flow:_____cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:_____cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: K1 Experience: intermediate Flow: 8,000 cfs to 10,000 cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow: 20,000 ? cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	(4)	(4)
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: _____ Facilities: parking

b. Take Out Location: _____ Facilities: parking

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: at river Turners Falls
   i. Trips per Year: 0-3 (4-8) 9-15 15+

c. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

2024 Pre-Run Data Forms
Flow 3

* Not present for prior survey *

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Robin Ahrens **Affiliation:** AW
Home Zip Code: 02135
E-Mail Address: ROBIN.AHRENS@GMAIL.COM

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?
   5 years

4) Over the past 3 years, approximately how many days per month did you whitewater boat?
   5

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

a. ✓ Yes ___ No
b. If yes, when, and for which project(s)?
pre 2020, Mongaup

6) How many times have you boated this reach before today?

0

a. If you have boated this reach before, what were the flows?

i. Approximately: _____ cfs to: _____ cfs
ii. What type of craft did you use? (*Please choose all that apply*)
1. Hard shell kayak / C1
2. Inflatable kayak
3. Open canoe with flotation
4. Cataraft (include length)
5. Self-bailing raft (include length)
6. Stand-up paddleboard
7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: NIALL BURKLEY **Affiliation:** AW

Home Zip Code: 02144

E-Mail Address: BURKLEY.NIALL@GMAIL.COM

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?
   20

4) Over the past 3 years, approximately how many days per month did you whitewater boat?
   2

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. X Yes ___ No
   b. If yes, when, and for which project(s)?

   MERRIMACK RIVER 2024
   (SAME RIVER, HIGHER FLOW)

6) How many times have you boated this reach before today?

   2

   a. If you have boated this reach before, what were the flows?

      i. Approximately: 6600 cfs to: 8000 cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

not present for prior survey

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: John Charlwood **Affiliation:** Merrimack Valley Paddlers
Home Zip Code: 02825
E-Mail Address: johncharlwood@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   10

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   4

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. __Yes X No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   0

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

* Not present for prior survey *

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Ann Gillard **Affiliation:** AW

Home Zip Code: 01060

E-Mail Address: anngillard@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?
   10.5

4) Over the past 3 years, approximately how many days per month did you whitewater boat?
   8

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. __Yes _X_ No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   None

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____ cfs to: _____ cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: BOB NASDOR **Affiliation:** AW

Home Zip Code: 01776

E-Mail Address: BOBC AMERICANWHITEWATER.ORG

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1 K1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   22

4) Over the past 3 years, approximately how many days per ~~month~~ YEAR did you whitewater boat?

   20 days year

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. X Yes ___ No
   b. If yes, when, and for which project(s)?

DEERFIELD BLACK
CONNECTICUT LITTLE ANDRO
MONGAUP RUMFORD
MERRIMACK

6) How many times have you boated this reach before today?

1

   a. If you have boated this reach before, what were the flows?

      i. Approximately: 5000 cfs to: 6000 cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. ✓ Hard shell kayak / C1 K1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Patrick Robbins **Affiliation:** AW

Home Zip Code: 01810

E-Mail Address: movarie@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

   4

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

   12

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. X Yes ___ No
   b. If yes, when, and for which project(s)?

   This Project Lowell Merrimack

6) How many times have you boated this reach before today?

   Once Before

   a. If you have boated this reach before, what were the flows?

      i. Approximately: 5000 cfs to: 6000 cfs
      ii. ~~What~~ type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

2024 Post-Run Data Forms
Flow 3

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: _____ **Date of Run:** 11/24/24

Flow: 2506 **cfs**

1) What type of craft did you use for this run?
   a. (a.) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: put-in Time: _____

Take-out location: take-out Time: _____

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 10 times.
   b. I was stopped after hitting rocks or other obstacles about 5 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 3

   b. Play Spots 5

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	(4)	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   (c) Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   b. Possibly
   c. Probably
   (e.) Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

fish weir, wood although mostly not in play
difficult slot decisions in last rapid

11) Please use the space below to provide any other comments about your boating experience at this flow.

It is absolutely navigable but avoided some surfs b/c they looked so shallow and the rocks so unforgiving. Honestly it was cool and I wish it was longer.

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: NIALL BUNKLEY **Date of Run:** 11/24/24

Flow: 2500 **cfs**

1) What type of craft did you use for this run?
   a. (a) Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: BLACKSMITHS SHOP Time: 10:30

Take-out location: U MASS Time: 12:30

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 4 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 4

   b. Play Spots 3

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   c. Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   b. Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

LOTS OF SUBMERGED ROCKS. COULD BE DANGEROUS FOR BEGINNERS

SOME WOOD BUT IT WAS EASY TO AVOID

11) Please use the space below to provide any other comments about your boating experience at this flow.

SOME GREAT PLAY POTENTIAL
BETTER FOR PLAYBOATING AT THIS
LEVEL. I WOULD ~~PL~~ PREFER THIS LEVEL
THAN HIGHER

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: John Charlwood **Date of Run:** 11/24/24

Flow: 2500 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. (b.) Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Dam Powerhouse Time: _____

Take-out location: Park on river right Time: _____

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 10 times.
   b. I was stopped after hitting rocks or other obstacles about 4 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 6

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	(3)	4	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	3	(4)	5
Whitewater "Play Areas"	1	2	(3)	4	5
Size/Difficulty of Rapids	1	2	3	(4)	5
Overall Whitewater	1	2	3	(4)	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
(c.) Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
(e.) Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
(b.) Lower
c. About the same (this flow was optimal)
(d.) Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	(5)
Inflatable kayaks	1	2	3	(4)	5
Open canoes with floatation	1	2	3	(4)	5
Catarafts	1	(2)	3	4	5
Self-bailing rafts	1	(2)	3	4	5
Stand-up paddleboards	1	2	3	(4)	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

I swam twice in the same spot. Lots of wood. Channels are narrow & some are blocked. Water is surprisingly powerful. Some places mid-river are difficult to access to set safety. Access from the shore to the river is difficult or impossible. Type 2 fun.

11) Please use the space below to provide any other comments about your boating experience at this flow.

_____

_____

_____

_____

_____

_____

_____

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: ANN GILLARD **Date of Run:** 11-24-24

Flow: 2500 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: _____ Time: _____

Take-out location: _____ Time: _____

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 10 times.
   b. I was stopped after hitting rocks or other obstacles about Ø times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 1 times.
   d. I had to portage around rapids or sections about 1 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 5

b. Play Spots 2

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Very sharp rocks. Beginners who swim NOT advised.
Lower water led to more pin potential. Recommend pin kits for lower water runs.
Rebar + metal throughout river
Weirs were very dangerous for people out of their boats
Class 3 Scouting + river reading skills or higher

11) Please use the space below to provide any other comments about your boating experience at this flow.

World be nice for locals as an after work run due to accessibility. Needs more put in / take out accessibility. Water quality concerns. Weirs + sharp rocks were most dangerous parts. Overall an interesting run that one can take different lines at different flow levels. More experimentation needed!
Thank you!

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: BOB NASCA **Date of Run:** 11/24/24

Flow: 2500 **cfs**

1) What type of craft did you use for this run?
   a. (a) Hard shell kayak / C1 K1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.
   PAWTUCKET DAM → BALL PARK

Put-in location: _____ Time: _____

Take-out location: _____ Time: _____

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 1 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 1 times.
   d. I had to portage around rapids or sections about 1 times.

4) How many rapids and play spots did you experience at this flow?

   a. Rapids 3

   b. Play Spots 6+

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	(3)	4	5
Challenging Technical Boating	1	2	3	(4)	5
Powerful Hydraulics	1	2	(3)	4	5
Whitewater "Play Areas"	1	2	3	(4)	5
Size/Difficulty of Rapids	1	2	(3)	4	5
Overall Whitewater	1	2	(3)	4	5
Challenge	1	2	3	(4)	5
Safety	1	2	(3)	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   (c.) Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   a. Definitely no
   (b.) Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

AT THE BOTTOM RAPID, RIVER CENTER AND RIGHT LINES HAD POTENTIAL DANGEROUS HAZARD DUE TO LOW WATER. ALSO FISH WEIRS COME INTO PLAY AND CREATE POTENTIAL HAZARD TO THE UNWARY, SUITABLE FOR EXPERIENCED BOATERS. GOOD PLAY FEATURS AT THIS LEVEL!

11) Please use the space below to provide any other comments about your boating experience at this flow.

_____
_____
_____
_____
_____
_____
_____

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: Patrick **Date of Run:** 11/24/24

Flow: 2500 **cfs**

1) What type of craft did you use for this run?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Just Below Dam Time: 10:45 AM

Take-out location: UML after flattening out Time: 1:00 pm

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times. I did get out to surf a wave after I got flushed out... was worth it
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. Rapids 3

b. Play Spots 2 to 3 → Two really good ones

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NO. But I saw potential for 4.

11) Please use the space below to provide any other comments about your boating experience at this flow.

I'd call two Rapids technical Class III
a really good surf wave near the University Ave
Bridge. Parking access is the biggest issue with
More paddling the river is FUN and a great
urban adventure

Thank You for Your Participation

2024 Comparison Flows Data Forms
Flows 1 and 3

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: NIALL BURKLEY **Date:** 11/24/2024

1) Craft used?
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
cfs	2023	✓	
cfs	2024	✓	

4) Approximately how many times have you boated this reach before this study?

2

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Crowding	1	2	3	4	5
Long Run(s)	1	2	3	4	5
Short Run(s)	1	2	3	4	5
Low Number of Portages	1	2	3	4	5
High Number of Rapids	1	2	3	4	5
Low Number of Rapids	1	2	3	4	5
Easy Access	1	2	3	4	5
Easy Shuttles	1	2	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6600 cfs	2500 cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	Yes	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	Yes	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:2500_____cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:2500_____cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_____Flow:2500_____ cfs to 8000_____cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:8000_____cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	(4)
Marginal	(3)	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: _____ Facilities: BETTER ACCESS

b. Take Out Location: _____ Facilities: BETTER ACCESS

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: FRANKLIN NH, WINNI
   i. Trips per Year: 0-3 4-8 (9-15) 15+

c. Whitewater reach name or description: CONCORD ~~NH~~, LOWELL, MA
   i. Trips per Year: 0-3 4-8 (9-15) 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: BOB NASON **Date:** 11/24/24

1) Craft used?
   a. (✓) Hard shell kayak / C1 K1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. (✓) Intermediate (comfortable running Class III whitewater)
   c. (✓) Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.
PARTICIPATED IN BOTH

Study Flows	Study Date	Participated	Did Not Participate
cfs		✓	
cfs	11/24/24	✓	

4) Approximately how many times have you boated this reach before this study?

1

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Crowding	1	2	3	4	5
Long Run(s)	1	2	3	4	5
Short Run(s)	1	2	3	4	5
Low Number of Portages	1	2	3	4	5
High Number of Rapids	1	2	3	4	5
Low Number of Rapids	1	2	3	4	5
Easy Access	1	2	3	4	5
Easy Shuttles	1	2	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	6000 cfs	5000 cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

2500 CFS
5
4
3
2
1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	(Yes)	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	(Yes)	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	(Yes)	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:3000cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:3000cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_____Flow:5000 cfs to6000cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:10,000cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	4
Marginal	(3)	(3)
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: NEW BOATING ACCESS RIVER RIGHT AT DAM Facilities: _____

b. Take Out Location: BALLPARK Facilities: _____
NEEDS IMPROVEMENT

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: NONE, UNIQUE REACH
i. Trips per Year: 0-3 4-8 9-15 15+ POSSIBLY CONECTICUT RIVER

c. Whitewater reach name or description: _____
i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: _____ **Date:** _____

1) Craft used?
    a. Hard shell kayak / C1
    b. Inflatable kayak
    c. Open canoe with flotation
    d. Cataraft (include length)
    e. Self-bailing raft (include length)
    f. Stand-up paddleboard
    g. Other (please list)

2) What is your skill level?
    a. Novice (comfortable running Class II whitewater)
    b. Intermediate (comfortable running Class III whitewater)
    c. Advanced (comfortable running Class IV whitewater)
    d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
cfs			
cfs			

4) Approximately how many times have you boated this reach before this study?

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Crowding	1	2	3	4	5
Long Run(s)	1	2	3	4	5
Short Run(s)	1	2	3	4	5
Low Number of Portages	1	2	3	4	5
High Number of Rapids	1	2	3	4	5
Low Number of Rapids	1	2	3	4	5
Easy Access	1	2	3	4	5
Easy Shuttles	1	2	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	cfs	cfs
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	Yes	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	Yes	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience:_Flow:_____cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:_____Flow:_____cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience:_____Flow: _____ cfs to _____cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience:_____Flow:_____cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: _____Facilities:_____

b. Take Out Location:_____Facilities:_____

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

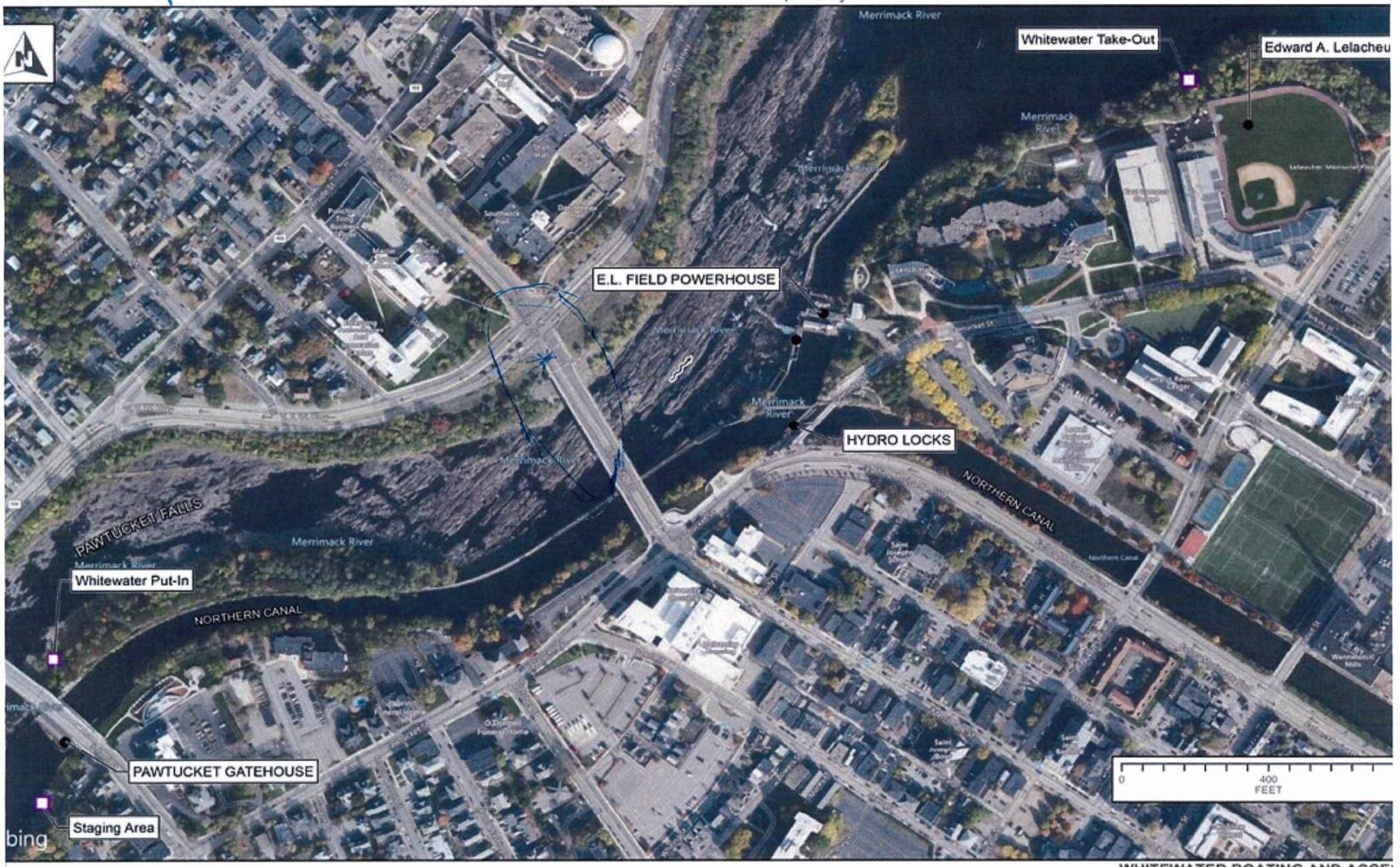
b. Whitewater reach name or description:_____
   i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description:_____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description:_____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Robbins * would be ideal Park/Play spot @ 2500 cfs



BOOTT HYDRO, LLC.

WHITEWATER BOATING AND ACCE

LOWELL HYDROELECTRI

FE

Appendix D - Whitewater Flow Documentation Report

Whitewater Flow Documentation Report

Lowell Hydroelectric Project

(FERC No. 2790)

August 21, 2020

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC

Manchester, New Hampshire

Central Rivers Power

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Appendix A Whitewater Photographs

List of Acronyms

AW	American Whitewater
Boott	Boott Hydropower, LLC
cfs	cubic feet-per-second
FERC	Federal Energy Regulatory Commission (or Commission)
Project	Lowell Hydroelectric Project (or Lowell Project)
RSP	Revised Study Plan
Study	Whitewater Boating and Access Study
USGS	U.S. Geological Survey
Working Group	Whitewater Boating and Access Study Working Group

1 Introduction and Background

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and operator of the 20.2-megawatt Lowell Hydroelectric Project (Federal Energy Regulatory Commission [FERC or Commission] Project No. 2790) (Project or Lowell Project). The Project is located along the Merrimack River in Middlesex County, Massachusetts and in Hillsborough County, New Hampshire. Boott owns and operates the Project as an independent power producer.

The existing license for the Project was issued by the Commission with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations Part 5. As proposed in Boott's January 28, 2019 Revised Study Plan (RSP) and approved in the Commission's March 13, 2019 Study Plan Determination, Boott is conducting a Whitewater Boating and Access Study (Study) in support of Project relicensing.

1.1 Whitewater Boating and Access Study Overview

The Lowell Project is a run-of-river hydropower plant. When river flows exceed the hydraulic capacity of the two generating units located at the E.L. Field Powerhouse (combined capacity of approximately 8,000 cubic feet per second [cfs]), excess flows (up to approximately 2,000 cfs) are routed through the downtown Lowell canal system and through the canal units. When inflows exceed the 10,000 cfs capacity of the generating units and canals, all excess flows are passed over the Pawtucket Dam spillway into the bypass reach. The Project has the potential to affect whitewater boating opportunities in the bypass reach when flows are less than 10,000 cfs.

As described in the approved study plan, the goal of the Study is to assess the Project's bypass reach for whitewater boating and access opportunities. The objectives of the Study are as follows:

- Assess a range of flows suitable for whitewater boating opportunities in the Project's bypass reach;
- Assess the frequency, timing, duration, and predictability of paddling flows under current and proposed Project operations;
- Define potential locations for put-in and take-out points for boaters; and,
- Assess the flow information needs for whitewater boating, and the current and potential flow information distribution system.

In accordance with the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group)[1] at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations.

During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Since the Working Group participants had limited experience boating the bypass reach, participants could not make informed choices on which flows would be appropriate for boating. Accordingly, Boott developed a Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach, and consulting with the Working Group to identify the appropriate flows for the controlled flow releases. The Whitewater Flow Documentation Plan was distributed to the Working Group on January 15, 2020, and Boott consulted with the Working Group regarding the study methodology. Boott appreciates the productive comments provided by the Working Group on the Whitewater Flow Documentation Plan.

To document the whitewater conditions in the bypass reach under various flows, Boott deployed four cellular-enabled trail cameras to capture time- and date-stamped images of the bypass reach on an hourly basis during daylight hours. The camera locations were identified in consultation with the Working Group, with specific input from AW. As shown below in Figure 1-1, cameras were deployed at the following four locations:

- The Fish Ladder at the Pawtucket Dam;
- A location along the bypass reach located upstream from the University Avenue Bridge;
- A location along the bypass reach located downstream from the University Avenue Bridge; and
- The E.L. Field Powerhouse.

[1] The Working Group includes American Whitewater (AW), the National Park Service, City of Lowell, Massachusetts Department of Conservation and Recreation, and Zoar Outdoor.

Figure 1-1. Locations of Cellular-Enabled Cameras

Trail cameras were deployed on March 10, 2020 and were removed on May 25, 2020. Boott conducted routine maintenance of the cameras during this period, including regular replacement of camera batteries.

To verify the flows represented by the photographs, Boott used Project operations data in combination with U.S. Geological Survey (USGS) gage information. There is an existing USGS gage installed approximately 2.1 miles downstream from the Pawtucket Dam (USGS No. 01100000, Merrimack River BL Concord River at Lowell, MA). There is also an existing USGS gage installed on the Concord River (USGS No. 01099500, Concord R below R Meadow Brook, at Lowell, MA). Flows from the USGS Gage No. 01099500 were subtracted from the flows at USGS Gage No. 01100000 to calculate flows at the Project. Flows in the bypass were estimated by subtracting the sum of flow at the E.L. Field Powerhouse and through the canal system from the inflow calculated from the USGS gages as described above.

2 Study Results

The cameras captured a wide range of flows in the bypass reach during that period, from approximately 500 cfs to flows in excess of 21,000 cfs. Appendix A provides photographic documentation of flows in the Project's bypass reach. For purposes of this study, Boott has provided documentation of flows between 1,681 cfs to 21,672 cfs. Where possible, Boott has provided documentation in approximately 500 cfs increments; however, due to the nature of flows in the bypass reach, and occasional technical issues with the cameras, the increments are not always consistent. As provided in Appendix A, this range of flows was ultimately selected from twenty-three days at various times throughout daylight hours.

3 Consultation with Working Group

Once the Working Group has had the opportunity to review the information provided, Boott anticipates consulting with the Working Group to select the controlled releases to be provided during the Study. The timing of the controlled flow releases will be dependent on available flows in the Merrimack River. Each of the controlled releases will be provided for approximately 3 hours. This will afford participants the opportunity to boat the reach and make multiple passes at each flow so that participants are able to evaluate different lines through various portions of the study reach. Pre, post, and comparative surveys will be provided to controlled flow release participants for their completion during this portion of the study (draft pre, post, and comparative surveys can be found in Appendices D through F of the RSP).

Appendix A
Whitewater Photographs

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 5/11/2020	**AVG. BYPASS FLOW: 1,681 cubic feet per second (cfs)**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 05:00

Camera 2 – 10:00

Camera 3 – 08:00

Camera 4 – 11:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 5/10/2020	**AVG. BYPASS FLOW: 1,958 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 06:00

Camera 2 – 07:00

Camera 3 – 06:00

Camera 4 – 06:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 05/09/2020	**AVG. BYPASS FLOW: 2,442 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 07:00

Camera 2 – 08:00

Camera 3 – 10:00

Camera 4 – 11:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 03/19/2020	**AVG. BYPASS FLOW: 2,804 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 08:00

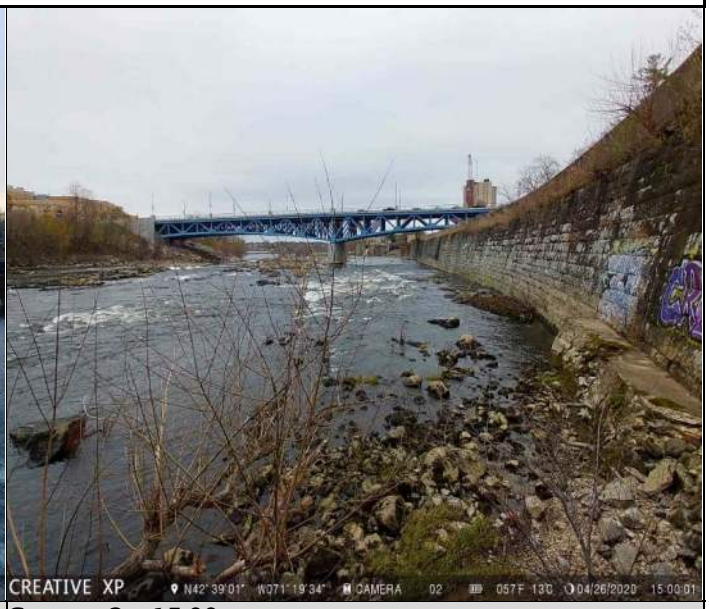
Camera 2 – 09:00

Camera 3 – 14:00

Camera 4 – 11:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/26/2020	**AVG. BYPASS FLOW: 3,088 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 05:00



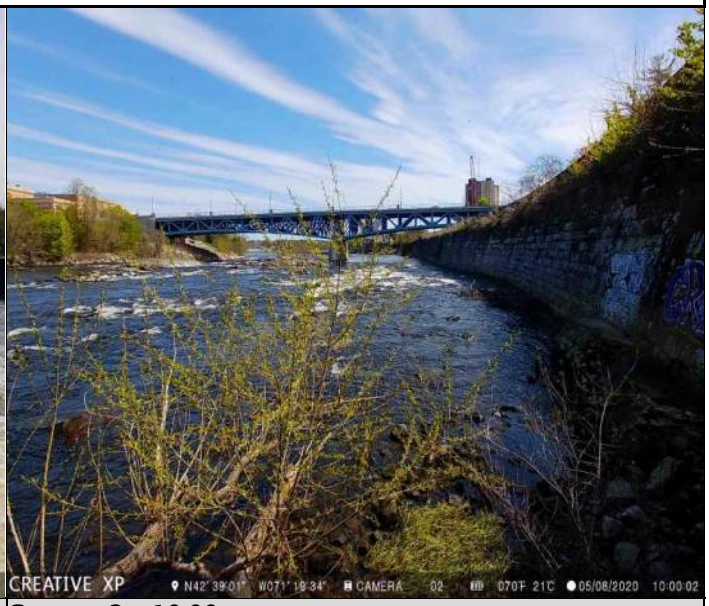
Camera 2 – 15:00

Camera 3 – 05:00

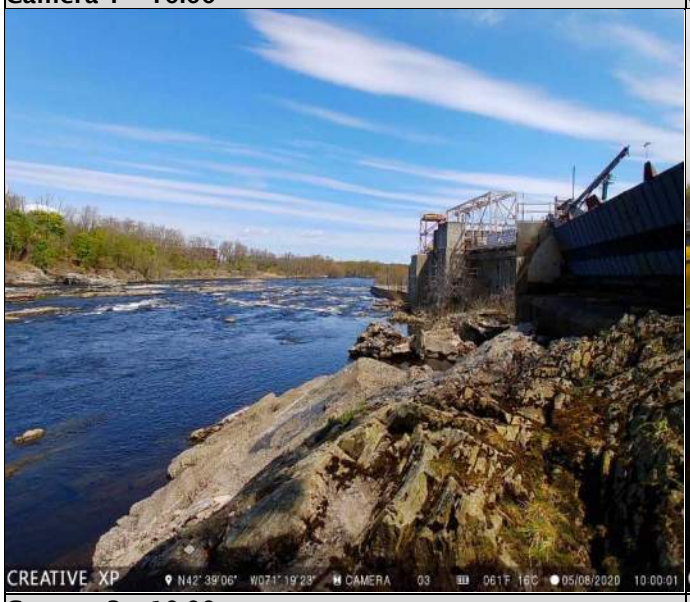
Camera 4 –17:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 5/8/2020	**AVG. BYPASS FLOW: 3,549 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 10:00 -



Camera 2 – 10:00 -



Camera 3 – 10:00

Camera 4 – 10:00 -

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 3/18/2020	**AVG. BYPASS FLOW: 4,148 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 11:00

Camera 2 – 11:00

Camera 3 – 11:00

Camera 4 – 11:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/24/2020	**AVG. BYPASS FLOW: 5,037 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

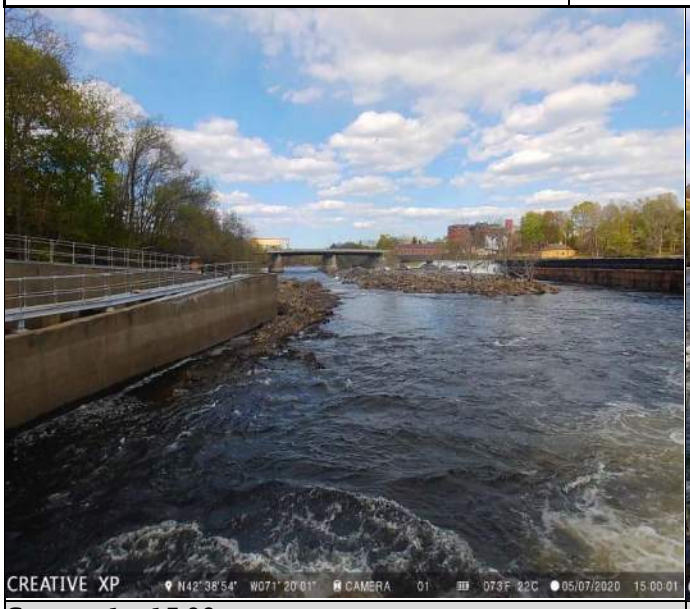
Camera 1 – 13:00

Camera 2 – 13:00

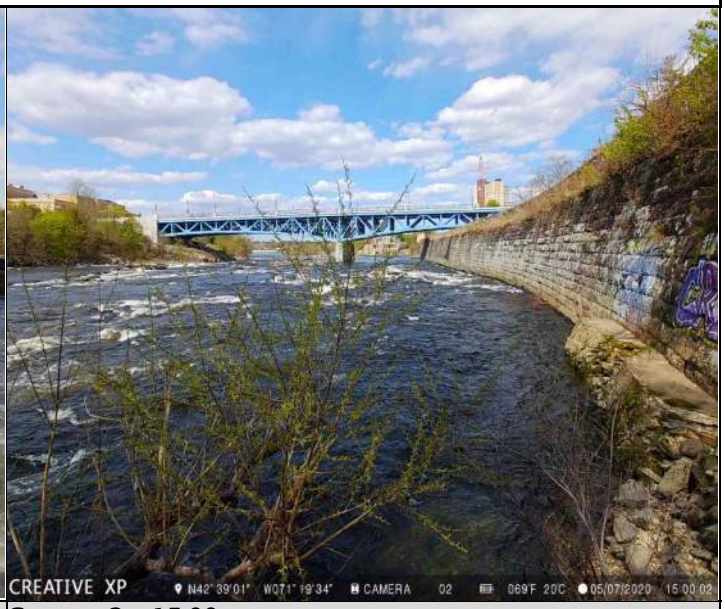
Camera 3 – 13:00

Camera 4 – 13:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 05/07/2020	**AVG. BYPASS FLOW: 5,680 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	



Camera 1 – 15:00



Camera 2 – 15:00

Camera 3 – 16:00

Camera 4 – 17:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/22/2020	**AVG. BYPASS FLOW: 5,878 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 14:00

Camera 2 – 14:00

Camera 3 – 14:00

Camera 4 – 14:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/21/2020	**AVG. BYPASS FLOW: 6,431 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 15:00

Camera 2 – 15:00

Camera 3 – 15:00

Camera 4 – 15:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/9/2020	**AVG. BYPASS FLOW: 8,022 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 12:05

Camera 2 – 13:39

Camera 3 – 9:51

Camera 4 – 9:25

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/20/2020	**AVG. BYPASS FLOW: 8,221**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 15:00

Camera 2 – 11:00

Camera 3 – 13:00

Camera 4 – 14:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/10/2020	**AVG. BYPASS FLOW: 8,988**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 13:00

Camera 2 – 13:00

Camera 3 – 16:00

Camera 4 – 15:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 04/19/2020	**AVG. BYPASS FLOW: 9,429 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 10:00

Camera 2 – 11:00

Camera 3 – 11:00

Camera 4 – 8:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/13/2020	**AVG. BYPASS FLOW: 10,106 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

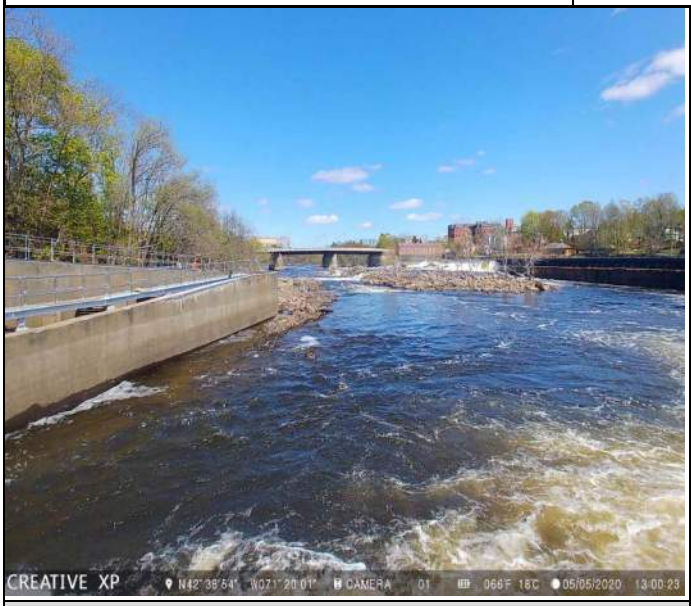
Camera 1 – 13:00

Camera 2 – 15:00

Camera 3 – 14:00

Camera 4 – 17:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 05/05/2020	**AVG. BYPASS FLOW: 10,951 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	



Camera 1 – 13:00

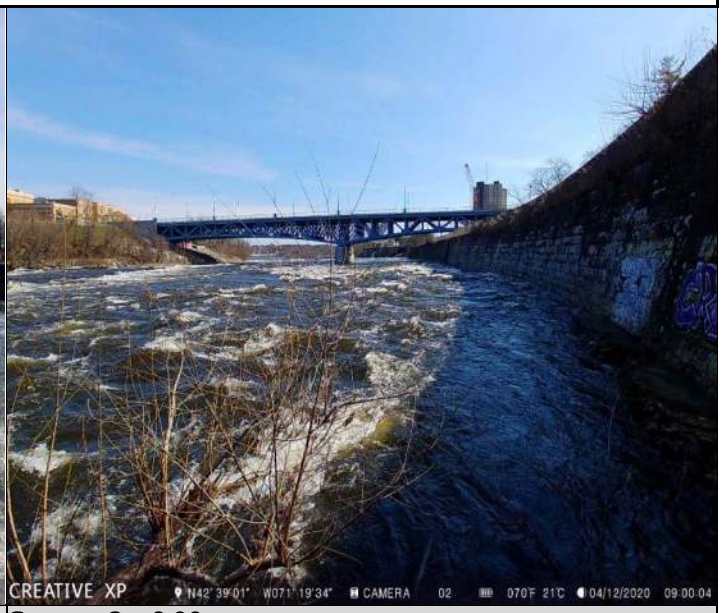
Camera 2 – 12:00

Camera 3 – 11:36

Camera 4 – 5:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/12/2020	**AVG. BYPASS FLOW: 12,555 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 11:00

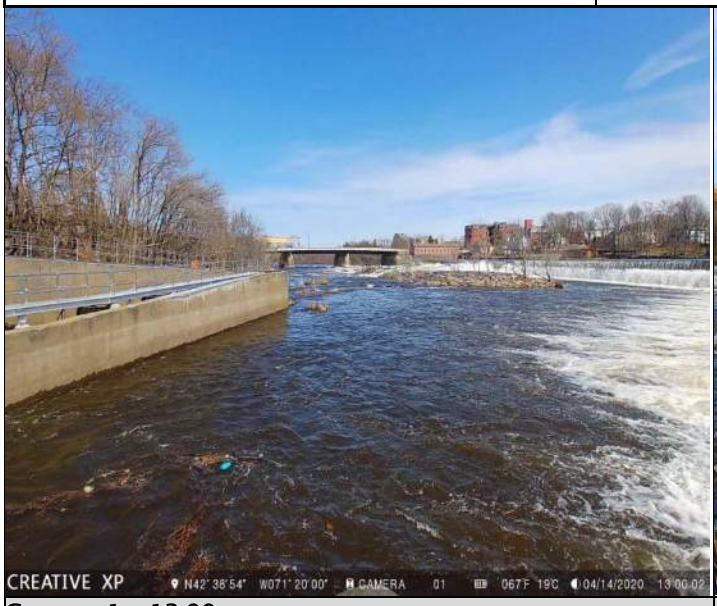


Camera 2 – 9:00

Camera 3 – 13:00

Camera 4 – 16:00

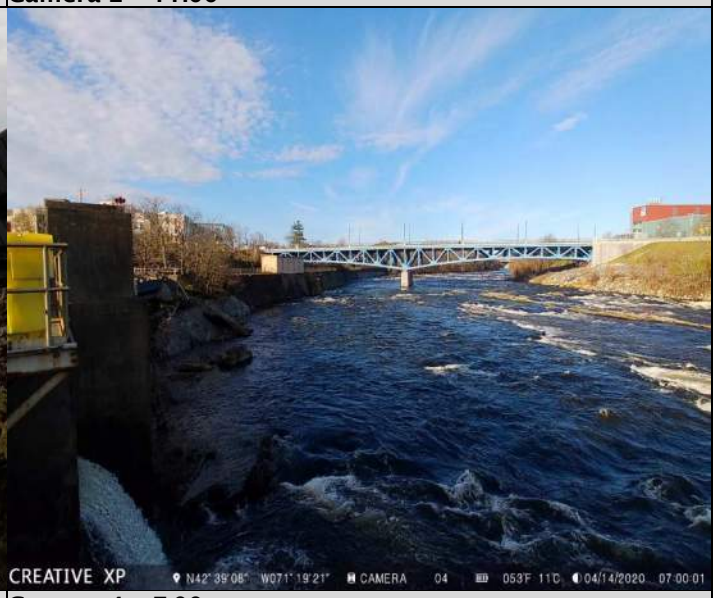
	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/14/2020	**AVG. BYPASS FLOW: 13,277 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	



Camera 1 – 13:00

Camera 2 – 11:00

Camera 3 – 9:00



Camera 4 – 7:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/11/2020	**AVG. BYPASS FLOW: 14,360 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

Camera 1 – 10:00

Camera 2 – 12:00

Camera 3 – 09:00

Camera 4 – 08:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/16/2020	**AVG. BYPASS FLOW: 19,732 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

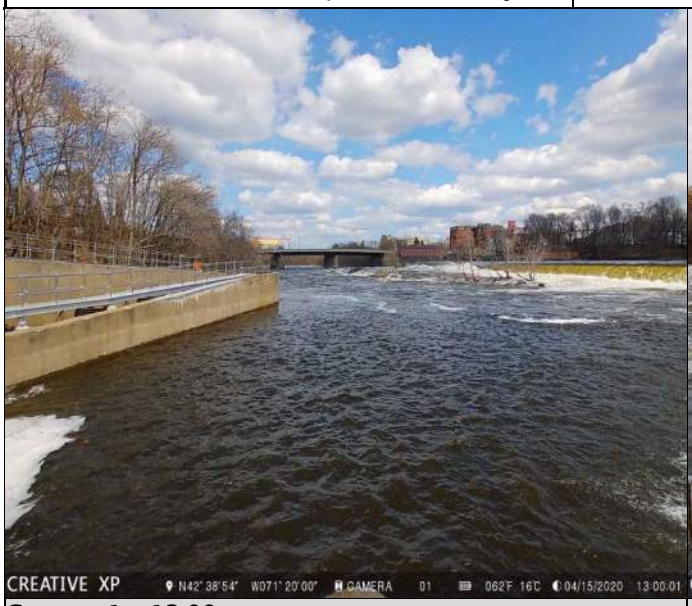
Camera 1 – 17:00

Camera 2 – 11:00

Camera 3 – 15:00

Camera 4 – 11:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 4/15/2020	**AVG. BYPASS FLOW: 20,427 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	

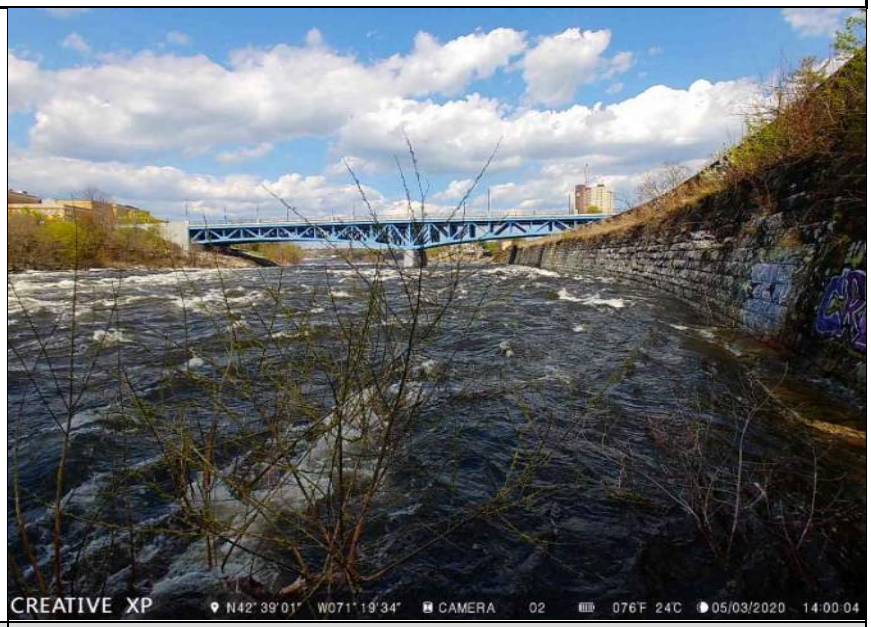


Camera 1 – 13:00

Camera 2 – 6:00

Camera 3 – 9:00

Camera 4 – 6:00

	WHITEWATER FLOW PHOTO DOCUMENTATION	
	DATE: 05/03/2020	**AVG. BYPASS FLOW: 21,627 cfs**
PROJECT NAME: Lowell Hydroelectric Project	**PROJECT NO: 2790**	
No photo available for Camera 1 on this date.		
Camera 1	**Camera 2 – 14:00**	
No photo available for Camera 3 on this date.		
Camera 3	**Camera 4 – 13:00**	

Appendix C

Copies of Correspondence

Lowell Hydroelectric Project (FERC No. 2790) Correspondence Log

Date	Type	From	To	Subject
April 26, 2017 (Accession Number 20170426-3025)	Letter	Federal Energy Regulatory Commission (FERC)	Tribes	Tribal consultation for the Lowell Hydroelectric Project.
March 6, 2018	Letter	Boott Hydropower, LLC (Boott)	Stakeholder distribution list[1]	Lowell Project Pre-Application Document (PAD) Questionnaire.
March 14, 2018	Email	Burlington Town Clerk	HDR	PAD Response
March 14, 2018	Email	Lower Merrimack River Local Advisory Committee (LMRLAC)	HDR	Additional Stakeholder
March 16, 2018	Questionnaire reply	Town of Action, Steven Ledoux, Town Manager	HDR	PAD Questionnaire Response
March 16, 2018	Questionnaire reply	Williamsburg 1 Condos, Dinell Clark, President	HDR	PAD Questionnaire Response
March 19, 2018	Questionnaire reply	Town of Hudson, Stephen Malizia, Town Administrator	HDR	PAD Questionnaire Response
March 19, 2018	Questionnaire reply	Massachusetts Division of Fisheries and Wildlife (MADFW) - Caleb Slater	HDR	PAD Questionnaire Response

[1] The stakeholder distribution list contains over 130 individuals representing federal and state agencies, municipalities, Indian tribes, and additional stakeholders.

Date	Type	From	To	Subject
March 19, 2018	Questionnaire reply	LMRLAC - Gene Porter, Chairman	HDR	PAD Questionnaire Response
March 19, 2018	Questionnaire reply	US Bureau of Indian Affairs Eastern Region, Harold Peterson, Natural Resources Officer	HDR	PAD Questionnaire Response
March 22, 2018	Questionnaire reply	Town of North Andover	HDR	PAD Questionnaire Response
March 22, 2018	Questionnaire reply and NGB Request for Database Check form	NH Natural Heritage Bureau	HDR	PAD Questionnaire Response
March 30, 2018	Questionnaire reply	Lowell Floodowners Group	HDR	PAD Questionnaire Response
April 3, 2018	Questionnaire reply	National Marine Fisheries Service (NMFS)	HDR	PAD Questionnaire Response
April 4, 2018	Email correspondence	National Park Service (NPS)	Enel/HDR	Lowell Hydro Project PAD National Park Response
April 4, 2018	Email attachment	NPS	Enel/HDR	PAD Questionnaire Response
April 4, 2018	Email attachment	NPS	Enel/HDR	Authorizing Legislation with reference to Lowell Canal System
April 4, 2018	Email attachment	NPS	Enel/HDR	Boundary Map referenced in authorizing law
April 4, 2018	Email attachment	NPS	Enel/HDR	Nomination for the Locks & Canals Historic District (1976)
April 4, 2018	Email attachment	NPS	Enel/HDR	Resource Management Report referencing the Lowell Canal System
April 6, 2018	Questionnaire reply	Massachusetts Department of	HDR	PAD Questionnaire Response

Date	Type	From	To	Subject
		Environmental Protection (MADEP)		
April 6, 2018	Email correspondence	MADEP	HDR	Links to MA DEP info regarding the Lowell Project
April 16, 2018	Email correspondence	NH Natural Heritage Bureau	HDR	NHB datacheck results letter
April 30, 2018 (Accession Number 20190430-5234)	Letter/Document	Boott, HDR	FERC, Stakeholder distribution list	Boott Hydropower filed Notice of Intent and Pre-Application Document (PAD) for the Lowell Hydroelectric Project under P-2790.
May 14, 2018	Questionnaire reply	Merrimack River Watershed Council	HDR	PAD Questionnaire Response
June 14, 2018 (Accession Number 20180614-3015)	Letter	FERC	Boott, HDR	Scoping Document 1 for the Lowell Hydroelectric Project under P-2790.
July 24, 2018 (Accession Number 20180724-0478)	Letter	Lowell City Council	FERC	Clay Pit Brook Backwater Study Report
August 08, 2018 (Accession Number 20180808-5029)	Letter	AW	FERC	Comments on PAD, and study requests
August 10, 2018 (Accession Number 20180810-5079)	Letter	MADFW	FERC	Comments on PAD, and study requests
August 13, 2018 (Accession Number 20180813-5142)	Letter	New Hampshire Fish and Game Department (NHFGD)	FERC	Study Requests
August 14, 2018 (Accession Number 20180814-5106)	Letter	NMFS	FERC	Comments on Notice of Intent, PAD, and study requests

Date	Type	From	To	Subject
August 14, 2018 (Accession Number 20180814-5103)	Letter	Massachusetts Department of Conservation and Recreation (MADCR)	FERC	Comments on Scoping Document 1 and Study Requests
August 14, 2018 (Accession Number 20180814-5118)	Letter	U.S. Department of Interior – National Park Service (NPS)	FERC	Comments on Notice of Intent, SD1, and study requests
September 27, 2018 (Accession Number 20180927-5038)	Letter	FERC	Boott	Scoping Document 2
September 28, 2018 (Accession Number 20180928-5212)	Letter	Boott	FERC, Stakeholder distribution list	Proposed Study Plan
December 14, 2018 (Accession Number 20181214-5087)	Letter	NPS	FERC, Boott, HDR	Comments on Proposed Study Plan
December 19, 2018 (Accession Number 20181219-5243)	Letter	NPS	FERC, Boott, HDR	Submission of NPS Comprehensive Plans
December 20, 2018 (Accession Number 2081220-5164)	Letter	NMFS	FERC, Boott, HDR	Comments on Proposed Study Plan
December 21, 2018 (Accession Number 20181221-5324)	Letter	USFWS	FERC, Boott, HDR	Comments on Proposed Study Plan
December 21, 2018 (Accession Number 20181221-5243)	Letter	MADFW	FERC, Boott, HDR	Comments on Proposed Study Plan
December 21, 2018 (Accession Number 20181221-5359)	Letter	AW	FERC, Boott, HDR	Comments on Proposed Study Plan

Date	Type	From	To	Subject
December 27, 2018 (Accession Number 20181221-5205)	Letter	Massachusetts Division of Marine Fisheries	FERC, Boott, HDR	Comments on Proposed Study Plan
January 28, 2019 (Accession Number 20190128-5197)	Document	HDR and Boott	FERC, stakeholder distribution list	Filing of the Revised Study Plan (RSP)
February 1, 2019 (Accession Number 20190201-5060)	Letter	USFWS	FERC	USFWS Extension of Time Requests
February 8, 2019 (Accession Number 20190208-5073)	Letter	MADFW	FERC, Boott, HDR	Comments on the RSP
February 8, 2019 (Accession Number 20190208-5111)	Letter	USFWS	FERC	USFWS RSP Comment Letter for Lowell (FERC No. 2790)
March 13, 2019 (Accession Number 20190313-0151)	Letter	Lowell Flood Homeowners Group – Steve Masse	FERC	Comments on crest gate system
May 7, 2019 (Accession Number 20190507-5079)	Letter	HDR and Boott	AW, NPS, and MADCR	Consultation regarding Recreation and Aesthetics Study
May 7, 2019 (Accession Number 20190507-5079)	Letter	HDR and Boott	NPS	Consultation regarding Water Level and Flow Effects on Historical Resources
May 17, 2019	Letter	American Whitewater	Boott	Consultation regarding recreation study
May 24, 2019	Email	HDR	NPS	Consultation regarding Water Level and Flow Effects on Historical Resources

Date	Type	From	To	Subject
May 24, 2019	Email	NPS	HDR	Consultation regarding Water Level and Flow Effects on Historical Resources
May 28, 2019	Email	HDR	NPS	Coordination regarding Water Level and Flow Effects on Historical Resources
May 28, 2019	Email	NPS	HDR	Coordination regarding Water Level and Flow Effects on Historical Resources
June 3, 2019	Email	HDR	NPS	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 4, 2019	Email	NPS	HDR	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 12, 2019	Email	NPS	HDR	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 12, 2019	Email	HDR	NPS	Schedule regarding trash mapping activities for the Lowell Recreation and Aesthetics Study
June 14, 2019	Email	National Park Service	Boott	Consultation regarding timing of the Lowell Project Recreation and Aesthetics Study
July 2, 2019	Email	HDR	NPS	Lowell Recreation and Aesthetics Study

Date	Type	From	To	Subject
July 3, 2019	Email	NPS	HDR	Lowell Recreation and Aesthetics Study
July 24, 2019	Letter	HDR and Boott	American Whitewater, National Park Service, and Massachusetts Department of Conservation and Recreation	Consultation regarding Whitewater Boating Study
July 24, 2019	Email	American Whitewater	HDR and Boott	Consultation regarding Whitewater Boating Study
July 31, 2019	Email	American Whitewater	HDR and Boott	Logistics regarding Whitewater Boating Study
July 31, 2019	Email	HDR and Boott	American Whitewater	Logistics regarding Whitewater Boating Study
August 5, 2019	Email	Boott	NPS, Lowell Land Trust, Lowell Fire	Logistics regarding Whitewater Boating Study
September 9, 2019	Email	NPS	HDR	Logistical planning for Lowell Project Study Workshop
September 17, 2019	Email	HDR and Boott	NPS (Christine Bruins)	Agenda for the Lowell Project Study Workshop
September 23, 2019 (Accession Number 20190923-5006)	Letter	Matthew Doyle	FERC	Comments on the Lowell Relicensing
October 1, 2019 (Accession Number 20191001-5038)	Letter	NPS	FERC, Boott, HDR	Comments on Study Process and the Recreation and Aesthetics Study
October 1, 2019 (Accession Number 20191001-5208)	Letter	HDR and Boott	FERC, Stakeholder distribution list	Quarterly study progress report

Date	Type	From	To	Subject
October 28, 2019	Email	HDR and Boott	Whitewater Boating Study Working Group	Whitewater Study Plan
November 1, 2019	Email	HDR and Boott	Distribution List	Meeting logistics for the Workshop Study meetings
November 1, 2019	Email	NPS	HDR	Study Workshop Planning
November 4, 2019	Email	NPS	HDR and Boott	Meeting logistics for the Workshop Study meetings
November 4, 2019	Email	City of Lowell	HDR and Boott	Meeting logistics for the Workshop Study meetings
November 8, 2019	Email	HDR and Boott	Distribution List	Meeting logistics for the Workshop Study meetings
November 11, 2019	Email	HDR and Boott	Distribution List	Meeting logistics for the Workshop Study meetings
November 12, 2019	Email/Letter	AW (Bob Nasdor)	HDR and Boott	Comments on the Whitewater Boating Study
November 15, 2019	Email/Letter	NPS	AW, HDR and Boott	Comments on the Whitewater Boating Study
November 21, 2019	Email/Letter	HDR and Boott	Distribution List	Agenda and Meeting logistics for the Workshop Study meetings
November 21, 2019	Email/Letter	NPS	HDR and Boott	Agenda and Meeting logistics for the Workshop Study meetings
December 9, 2019	Email/Letter	HDR and Boott	Distribution List	Agenda and Meeting logistics for the Workshop Study meetings
December 19, 2019	Email	NPS	HDR	Vegetation Mapping Consultation
December 20, 2019	Email	MADCR	HDR	Lowell Recreation and Aesthetics Study

Date	Type	From	To	Subject
December 20, 2019	Email/Letter	MADCR	HDR and Boott	Follow-up information regarding the Workshop Study meetings
January 20, 2020	Email	LMRLAC – Gene Porter	HDR and Boott	Comments on the Lowell Relicensing
January 16, 2020 (Accession Number 20200410-5033)	Letter	HDR and Boott	FERC, Distribution List	Quarterly Study Progress Report
February 21, 2020	Email	HDR and Boott	NPS	Information regarding the Initial Study Report Meeting
February 24, 2020	Email	HDR and Boott	NPS	Information regarding the Initial Study Report Meeting
February 24, 2020	Email	NPS	HDR and Boott	Information regarding the Initial Study Report Meeting
February 24, 2020	Email	HDR and Boott	NPS	Information regarding the Initial Study Report Meeting
March 6, 2020	Email	HDR and Boott	Distribution List	Information regarding the Initial Study Report Meeting
March 11, 2020	Email	HDR and Boott	Distribution List	Information regarding the Initial Study Report Meeting
March 13, 2020	Email	HDR and Boott	NPS	Logistics Regarding the Waterborne Trash Mapping
March 18, 2020	Email	HDR and Boott	Distribution List	Followup with Distribution List regarding the Study Report Meeting
March 25, 2020 (Accession Number 20200410-5201)	Email/Report	HDR and Boott	Distribution List	Filing of the Initial Study Report Meeting Summary
March 26, 2020	Email	HDR	Peter Severance (River Merrimack)	Comment on the Filing of the Initial Study Report Meeting

Date	Type	From	To	Subject
April 10, 2020 (Accession Number 20200410-5033)	Letter	NPS	FERC, Boott, HDR	Comments on the Recreation and Aesthetics Study
April 16, 2020 (Accession Number 20200410-5146)	Letter	USFWS	FERC, Boott, HDR	USFWS Comments on the Initial Study Report for the Lowell Project under P-2790.
April 17, 2020 (Accession Number 20200410-5229)	Letter	NOAA	FERC, Boott, HDR	NOAA Fisheries' comments on Boott Hydro's ISR for the Lowell Project, under P-2790
April 17, 2020 (Accession Number 20200417-5184)	Email/Report	HDR and Boott	Distribution List	Filing of the First Quarter Progress Report
April 21, 2020	Email	HDR	Jean Robinson (UMass)	Request of GIS Information
April 21, 2020	Email	HDR	Pamela Locke (UMass)	Request of GIS Information
April 22, 2020 (Accession Number 20200422-5027)	Letter	American Whitewater	FERC, Boott, HDR	Comments on the Recreation and Aesthetics Study
May 26, 2020 (Accession Number 20200526-5114)	Email/Letter	HDR and Boott	Distribution List	Response to Comments on the ISR Meeting Summary
June 12, 2020 (Accession Number 20200612-3001)	Letter	FERC	HDR and Boott	Revised Process Plan and Schedule
June 15, 2020	Email/Letter	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study
June 10, 2020	Email	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study
June 22, 2020	Email	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study
June 29, 2020	Email	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study

Date	Type	From	To	Subject
July 9, 2020	Email	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study
July 13, 2020	Email/Report	HDR and Boott	Distribution List	Filing of the Quarterly Progress Report
July 14, 2020	Email	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study
July 27, 2020	Email	HDR and Boott	NPS	Historically Significant Waterpower Equipment Study
July 29, 2020	Email	AW (Bob Nasdor)	HDR, Boott	Whitewater Flow and Access Study
July 31, 2020	Email	AW (Bob Nasdor)	HDR, Boott	Whitewater Flow and Access Study
July 31, 2020	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
August 4, 2020	Email	AW (Bob Nasdor)	HDR, Boott	Whitewater Flow and Access Study
August 4, 2020	Email	HDR, Boott	AW (Bob Nasdor)	Whitewater Flow and Access Study
August 4, 2020	Email	NPS	HDR and Boott	Historically Significant Waterpower Equipment Study
August 5, 2020	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
September 28, 2020	Email	LMRLAC – Gene Porter	Boott	Comments on the Lowell Relicensing
September 29, 2020	Email	LMRLAC – Gene Porter	Boott	Comments on the Lowell Relicensing
September 29, 2020	Email	Boott	LMRLAC – Gene Porter	Comments on the Lowell Relicensing
September 29, 2020	Email	LMRLAC – Gene Porter	Boott	Comments on the Lowell Relicensing
September 29, 2020	Email	Boott	LMRLAC – Gene Porter	Comments on the Lowell Relicensing

Date	Type	From	To	Subject
September 29, 2020	Email	LMRLAC – Gene Porter	Boott	Comments on the Lowell Relicensing
October 16, 2020	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
October 16, 2020	Email	NPS	Boott (Gray & Pape)	Historically Significant Waterpower Equipment Study
October 21, 2020 (Accession Number 20200410-5109)	Email	HDR and Boott	Distribution List	Quarterly Progress Report to Distribution List
October 26, 2020	Email	HDR, Boott	AW (Bob Nasdor)	Whitewater Boating and Access Study consultation
October 26, 2020	Email	AW (Bob Nasdor)	HDR, Boott	Whitewater Boating and Access Study consultation
October 30, 2020 (Accession Number 20200410-5242)	Email/Letter	Boott	Distribution List	Lowell Revised ISR Meeting Summary Submission
November 2, 2020	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
November 3, 2020	Email	NPS	Boott (Gray & Pape)	Historically Significant Waterpower Equipment Study
November 5, 2020	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
November 5, 2020	Email	NPS	Boott (Gray & Pape)	Historically Significant Waterpower Equipment Study

Date	Type	From	To	Subject
November 5, 2020	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
November 16, 2020	Email	MADEP	HDR	Retirement of Rob Kubit and replacement with Derek Standish
January 20, 2021	Email	HDR, Boott	NPS	Consultation regarding water level and flow effects on historic resources study
January 21, 2021	Email	NPS	HDR, Boott	Consultation regarding water level and flow effects on historic resources study
February 5, 2021	Email	NPS	HDR, Boott	Consultation regarding water level and flow effects on historic resources study
February 5, 2021	Email	HDR, Boott	NPS	Consultation regarding water level and flow effects on historic resources study
February 5, 2021	Email	NPS	HDR, Boott	Consultation regarding water level and flow effects on historic resources study
February 8, 2021	Email	HDR, Boott	NPS	Consultation regarding water level and flow effects on historic resources study
February 8, 2021	Email	NPS	HDR, Boott	Consultation regarding water level and flow effects on historic resources study
February 9, 2021	Email	Boott	NPS	Consultation regarding water level and flow effects on historic resources study

Date	Type	From	To	Subject
February 9, 2021	Email	NPS	HDR, Boott	Consultation regarding water level and flow effects on historic resources study
February 11, 2021	Email	Boott (Gray & Pape)	NPS	Historically Significant Waterpower Equipment Study
February 11, 2021	Email	NPS	HDR, Boott	Consultation regarding water level and flow effects on historic resources study
February 11, 2021	Email	Boott	NPS	Consultation regarding water level and flow effects on historic resources study
February 12, 2021	Email	NPS	Boott (Gray & Pape)	Historically Significant Waterpower Equipment Study
March 11, 2021	Email	NPS	HDR	ISR Meeting
March 4, 2021	Email	FERC	HDR	Logistics regarding ISR meeting
April 19, 2021	Email	AW	Boott, HDR	Whitewater Boating and Access Study
April 19, 2021	Email	Boott	AW	Whitewater Boating and Access Study
April 19, 2021	Email	AW	Boott, HDR	Whitewater Boating and Access Study
April 19, 2021	Email	Boott	AW	Whitewater Boating and Access Study

Date	Type	From	To	Subject
April 19, 2021	Email	HDR, Boott	AW	Whitewater Boating and Access Study
April 19, 2021	Email	AW	Boott, HDR	Whitewater Boating and Access Study
April 20, 2021	Email	AW	Boott, HDR	Whitewater Boating and Access Study
April 21, 2021	Email	AW	Boott	Whitewater Boating and Access Study
April 21, 2021	Email	Boott	AW	Whitewater Boating and Access Study
May 1, 2023	Email	Boott, HDR	New Hampshire Department of Environmental Services	Request for Concurrence that the Project is located outside of the state's coastal zone
May 1, 2023	Email	New Hampshire Department of Environmental Services	Boott, HDR	Concurrence that the Project is located outside of the state's coastal zone
May 1, 2023	Email	Boott, HDR	Massachusetts Office of Coastal Zone Management	Request for Concurrence that the Project is located outside of the state's coastal zone
January 23, 2025	Email	Boott, HDR	Massachusetts Office of Coastal Zone Management	Request for Concurrence that the Project is located outside of the state's coastal zone
January 23, 2025	Email	Massachusetts Office of Coastal Zone Management	Boott, HDR	Concurrence that the Project is located outside of the state's coastal zone

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the Lowell Hydroelectric Project (FERC No. 2790) (Project), with principal Project facilities located along the Merrimack River in Middlesex County, Massachusetts and a reservoir extending upstream to Hillsborough County, New Hampshire (see attached map). Boott, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the existing Project. Accordingly, Boott is preparing a Pre-Application Document (PAD) that will provide FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project that will be used to prepare documents related to analyzing the relicensing application to be prepared by Boott. To prepare the PAD, Boott will use information in its possession and information obtained from additional sources. This PAD Information Questionnaire will be used by Boott to help identify sources of existing, relevant, and reasonably available information that are not currently in Boott's possession.

1. Information about person completing the questionnaire:

Name & Title	
Organization	
Address	
Phone	
Email Address	

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

   a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

___ Yes __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	
Address	
Phone	
Email Address	

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

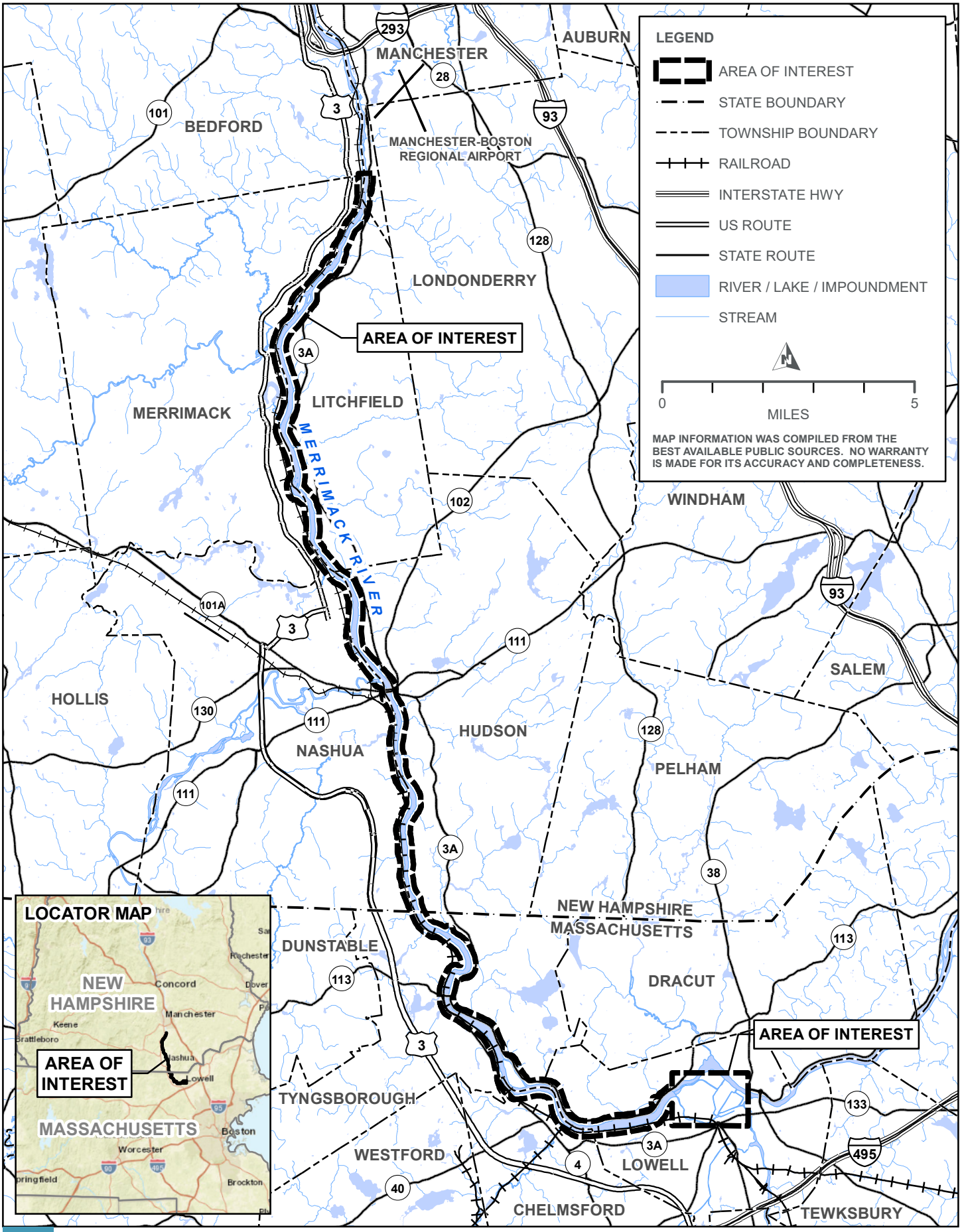
Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 21 days of receipt to allow for any follow-up contact that may be necessary by a representative from Boott or HDR. Not responding within 21 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.



LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790
BOOTT HYDRO, LLC.

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Federal and State Agencies

Charlene Dwin Vaughn
Assistant Director
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Massachusetts Department of Conservation and Recreation
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Wilmington, MA 01887

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DWM Environmental Monitoring Program
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251 Causeway Street
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Massachusetts Department of Public Utilities
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Boston, MA 02110

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Massachusetts Division of Fisheries & Wildlife
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Westborough, MA 01581

Joseph Larson
Chairman
Massachusetts Division of Fisheries & Wildlife
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Caleb Slater
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Preservation Planner
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Boston, MA 02125-3314

Brona Simon
State Historic Preservation Officer
Massachusetts Historical Commission
220 Morissey Boulevard
Boston, MA 02125-3314

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

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Boston, MA 02125-3314

Massachusetts Office of the Attorney General
1 Ashburton Place
Boston, MA 02108-1518

Bjorn Lake
National Marine Fisheries Service
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Gloucester, MA 01930

Sue Tuxbury
Fisheries Biologist
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Misty Anne Marold
Senior Review Biologist
Natural Heritage Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

Owen David
Water Quality Certification Program
New Hampshire Department of Environmental Services
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P.O. Box 95
Concord, NH 03302

Jim Gallagher
Dam Bureau Administrator
New Hampshire Department of Environmental Services
29 Hazen Drive
P.O. Box 95
Concord, NH 03302

Brad Simpkins
Director
New Hampshire Division of Forests and Lands
172 Pembroke Road
Concord, NH 03301

Elizabeth Muzzey
Director and State Historic Preservation Officer
New Hampshire Division of Historical Resources
19 Pillsbury Street
Concord, NH 03301

Matt Carpenter
Fisheries Biologist
New Hampshire Fish and Game Department
11 Hazen Drive
Concord, NH 03301

Bill McDavitt
Environmental Specialist
NOAA Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Sean McDermott
Marine Habitat Resource Specialist, Hydropower Coordinator
NOAA Fisheries Service
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Gloucester, MA 01930

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Andrew Tittler
Attorney-Advisor
US Department of the Interior
One Gateway Center
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Newton, MA 02458

Ed Reiner
Region 1 - New England
US Environmental Protection Agency
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Mail Code: OEP06-3
Boston, MA 02109-3912

David Turin
Region 1 - New England
US Environmental Protection Agency
5 Post Office Square
Mail Code: OES04-3
Boston, MA 02109-3912

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Michael Bailey
Assistant Project Leader
US Fish and Wildlife Service
151 Broad Street
Nashua, NH 03603

Tom Chapman
Supervisor, New England Field Office
US Fish and Wildlife Service
70 Commercial Street
Suite 300
Concord, NH 03301-5094

Julianne Rosset
Fish and Wildlife Biologist
US Fish and Wildlife Service
70 Commercial Street
Suite 300
Concord, NH 03301

Bryan Sojkowski
Civil Engineer
US Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035

John Warner
Assistant Supervisor Federal Activities
US Fish and Wildlife Service
70 Commercial Street
Suite 300
Concord, NH 03301

Keith Nislow
Northern Research Station
US Forest Service
11 Campus Boulevard
Suite 200
Newton Square, PA 19073

Mark Prout
Region 9 - Eastern Region (Midwest and Northeast)
US Forest Service
626 East Wisconsin Avenue
Milwaukee, WI 53202

Celeste Bernardo
Lowell National Historic Park
US National Park Service
67 Kirk Street
Lowell, MA 01852

Kevin Mendik
Hydro Program Manager
US National Park Service
15 State Street
Boston, MA 02109

Indian Tribes

Cedric Cromwell
Chairman
Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, MA 02649

Ramona Peters
Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, MA 02649

John Brown
Narragansett Indian Tribal Historic Preservation Office
Narragansett Indian Tribe
P.O. Box 268
Charlestown, RI 02813

Bonney Hartley
Tribal Historic Preservation Officer
Stockbridge Munsee Community, Wisconsin
65 1st Street
Troy, NY 12180

Shannon Holsey
Tribal President
Stockbridge Munsee Community, Wisconsin
N8476 MoHeConNuck Road
Bowler, WI 54416

Cheryl Andrew-Maltais
Chairwoman
Wampanoag Tribe of Gay Head
20 Black Brook Road
Aquinnah, MA 02535

Bettina Washington
Tribal Historic Preservation Officer
Wampanoag Tribe of Gay Head
20 Black Brook Road
Aquinnah, MA 02535

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Municipalities

James Fiorentini
Mayor
City of Haverhill, MA
4 Summer Street
Haverhill, MA 01830

Daniel Rivera
Mayor
City of Lawrence, MA
200 Common Street
3rd Floor Room 309
Lawrence, MA 01840

Nicolas Bosonetto
Interim City Engineer
City of Lowell, MA
375 Merrimack Street
3rd Floor, Room 61
Lowell, MA 01852

Edward Kennedy
Mayor
City of Lowell, MA
375 Merrimack Street
2nd Floor, Room 50
Lowell, MA 01852

Christine O'Connor
City Solicitor
City of Lowell, MA
375 Merrimack Street
3rd Floor, Room 64
Lowell, MA 01852

Joyce Craig
Mayor
City of Manchester, NH
One City Hall Plaza
Manchester, NH 03101

James Jajuga
Mayor
City of Methuen, MA
41 Pleasant Street
Methuen, MA 01844

Jim Donchess
City of Nashua, NH
229 Main Street
Nashua, NH 03060

Scott Galvin
Mayor
City of Woburn, MA
10 Common Street
Woburn, MA 01801

Paul Bergeron
District #2
Hillsborough County, NH
329 Mast Road
Suite 120
Goffstown, NH 03045

Toni Pappas
District #1
Hillsborough County, NH
329 Mast Road
Suite 120
Goffstown, NH 03045

Robert Rowe
District #3
Hillsborough County, NH
329 Mast Road
Suite 120
Goffstown, NH 03045

Steven Ledoux
Town Manager
Town of Acton, MA
472 Main Street
Acton, MA 01720

Andrew Flanagan
Town Manager
Town of Andover, MA
36 Bartlet Street
Andover, MA 01810

Jason Grosky
Chairman
Town of Atkinson, NH
21 Academy Avenue
Atkinson, NH 03811

Robert Pontbriand
Town Administrator
Town of Ayer, MA
1 Main Street
Ayer, MA 01432

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Richard Reed
Town Manager
Town of Bedford, MA
10 Mudge Way
Bedford, MA 01730

John Curran
Town Manager
Town of Billerica, MA
365 Boston Road
Billerica, MA 01821

Alan Benson
Town Administrator
Town of Boxford, MA
7A Spofford Road
Boxford, MA 01921

Amy Warfield
Town Clerk
Town of Burlington, MA
29 Center Street
Burlington, MA 01803

Jon Kurland
Town Moderator
Town of Chelmsford, MA
50 Billerica Road
Chelmsford, MA 01824

Jane Hotchkiss
Chair, Select Board
Town of Concord, MA
P.O. Box 535
Concord, MA 01742

James Morgan
Councilor
Town of Derry, NH
14 Manning Street
Derry, NH 03038

Alison Hughes
Chairman
Town of Dracut, MA
62 Arlington Street
Dracut, MA 01826

Town Manager
Town of Groton, MA
173 Main Street
Groton, MA 01450

Timothy Bragan
Town Administrator
Town of Harvard, MA
13 Ayer Road
Harvard, MA 01451

Kim Galipeau
Town Administrator
Town of Hollis, NH
7 Monument Square
Hollis, NH 03049

Thaddeus Luszey
Chairman
Town of Hudson, NH
12 School Street
Hudson, NH 03051

Suzanne Barry
Chairman
Town of Lexington, MA
1625 Massachusetts Avenue
2nd Floor, Town Office Building
Lexington, MA 02420

Timothy Higgins
Town Administrator
Town of Lincoln, MA
16 Lincoln Road
Lincoln, MA 01773

Troy Brown
Town Administrator
Town of Litchfield, NH
2 Liberty Way
Suite 2
Litchfield, NH 03052

Keith Bergman
Town Administrator
Town of Littleton, MA
37 Shattuck Street
3rd Floor, Room 306
Littleton, MA 01460

Tom Dolan
Chairman
Town of Londonderry, NH
268B Mammoth Road
Londonderry, NH 03053

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Robert Dolan
Town Administrator
Town of Lynnfield, MA
55 Summer Street
Lynnfield, MA 01940

Eileen Cabanel
Town Manager
Town of Merrimack, NH
6 Baboosic Lake Road
Merrimack, NH 03054

Andrew Sheehan
Town Administrator
Town of Middleton, MA
48 South Main Street
Middleton, MA 01949

Andrew Maylor
Town Manager
Town of North Andover, MA
120 Main Street
North Andover, MA 01845

John Murphy
Town Moderator
Town of North Reading, MA
235 North Street
North Reading, MA 01864

Douglas Viger
Chairman
Town of Pelham, NH
6 Village Green
Pelham, NH 03076

Mark Andrews
Town Administrator
Town of Pepperell, MA
One Main Street
Pepperell, MA 01463

John Arena
Chair, Board of Selectmen
Town of Reading, MA
16 Lowell Street
Reading, MA 01867

Michael Lyons
Chairman
Town of Salem, NH
33 Geremonty Drive
Salem, NH 03079

Town Administrator
Town of Shirley, MA
7 Keady Way
Shirley, MA 01464

George Seibold
Chairman
Town of Stoneham, MA
35 Central Street
2nd Floor
Stoneham, MA 02180

Richard Montuori
Town Manager
Town of Tewksbury, MA
1009 Main Street
2nd Floor
Tewksbury, MA 01876

Robert Jackson
Chair, Board of Selectmen
Town of Tyngsborough, MA
25 Bryants Lane
Tyngsborough, MA 01879

Board of Selectmen
Town of Westford, MA
55 Main Street
Westford, MA 01886

Jeffrey Hull
Town Manager
Town of Wilmington, MA
121 Glen Road
Room 11
Wilmington, MA 01887

Ross Mcleod
Chairman
Town of Windham, NH
3 North Lowell Street
Windham, NH 03087

Additional Parties

Robert Nasdor
NE Stewardship Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Norman Sims
Appalachian Mountain Club
77 Back Ashuelot Road
Winchester, NH 03470

Ross Holland
Enel Green Power North America, Inc.
One Tech Drive
Andover, MA 01810

Kevin Webb
Hydro Licensing Manager
Enel Green Power North America, Inc.
One Tech Drive
Andover, MA 01810

Robert Bersak
780 North Commercial Street
Eversource Energy
P.O. Box 330
Manchester, NH 03015

Jay Mason
President
Friends of Tyler Park
77 Tyler Park
Lowell, MA 01851

David Meeker
4920 Elm Street
Hull Street Energy, LLC
Suite 205
Bethesda, MD 20814

Dinell Clark
Lowell Flood Owner's Group
197 Wellman Avenue
North Chelmsford, MA 01863

Bob Gagnon
Lowell Flood Owner's Group
136 Townsend Avenue
Lowell, MA 01854

Lynda Ignacio
Lowell Flood Owner's Group
66 Shirley Avenue
Lowell, MA 01854

Steve Masse
Lowell Flood Owner's Group
186 Humphrey Street
Lowell, MA 01850

John Nappi
Lowell Flood Owner's Group
279 Pawtucket Boulevard
Tyngsborough, MA 01879

Gene Porter
Lower Merrimack River Local Advisory
77 Concord Street
Nashua, NH 03064

Thomas Golden, Jr.
Massachusetts House of Representatives
24 Beacon Street
Room 473B
Boston, MA 02133

Rady Mom
Massachusetts House of Representatives
24 Beacon Street
Room 43
Boston, MA 02133

David Nangle
Massachusetts House of Representatives
24 Beacon Street
Room 479
Boston, MA 02133

Eileen Donoghue
Massachusetts Senate
24 Beacon Street
Room 405
Boston, MA 02133

Kim Goddu
Merrimack River Watershed Council
60 Island Street
Suite 211-E
Lawrence, MA 01840

Rusty Russell
Executive Director
Merrimack River Watershed Council
60 Island Street
Suite 211-E
Lawrence, MA 01840

Fred Britton
Associate President
Thoreau's Landing Condominium Association
32 Walden Pond Drive
Nashua, NH 03064

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Fred Jennings
President, Nor'East Chapter
Trout Unlimited
P.O. Box 946
Ipswich, MA 01938

Arthur Faneros
Universal Apartment Rental
114 University Avenue
Lowell, MA 01854

Michele Tremblay
Upper Merrimack River Local Advisory
Committee
P.O. Box 3019
Penacook, NH 03303

Ann Kuster
US House of Representatives
137 Cannon House Office Building
2nd District
Washington, DC 20515

Seth Moulton
6th District
US House of Representatives
21 Front Street
Salem, MA 01970

Carol Shea-Porter
US House of Representatives
1530 Longworth House Office Building
1st District
Washington, DC 20515

Niki Tsongas
3rd District
US House of Representatives
126 John Street
Suite 12
Lowell, MA 01852

Margaret Hassan
US Senate
330 hart Senate Office Building
Washington, DC 20510

Edward Markey
US Senate
218 Russell Senate Office Building
Washington, DC 20510

Jeanne Shaheen
US Senate
506 Hart Senate Office Building
Washington, DC 20510

Elizabeth Warren
US Senate
317 Hart Senate Office Building
Washington, DC 20510

Dinell Clark
President
Williamsburg Condominium I
197 Wellman Avenue
North Chelmsford, MA 01863

Richard Howe
Register of Deeds - Middlesex County North
360 Gorham Street
Lowell, MA 01852

MacVane, Kelly

From: Amy Warfield [mailto:awarfield@burlington.org]
Sent: Wednesday, March 14, 2018 10:25 AM
To: Gibson, Jim <Jim.Gibson@hdrinc.com>
Subject: Lowell Hydro Project (FERC Project No. 2790)

Dear Sir,

We have no information regarding this project.

Regards,

--
Amy E. Warfield , CMC, CMMC
Town Clerk, Burlington
Webmaster
Records Access Officer
29 Center St
Burlington, MA 01803
781-270-1660

Remember to be involved!!!
Town Election - April 7th - 8 AM to 8 PM, Burlington High School

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Please remember when writing or responding, the Massachusetts Secretary of State has determined that e-mail is a public record.
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All email messages and attached content sent from and to this email account are public records unless qualified as an exemption under the Massachusetts Public Records Law.

MacVane, Kelly

From: gene porter [mailto:gporter77@gmail.com]
Sent: Thursday, March 15, 2018 12:40 PM
To: Gibson, Jim <Jim.Gibson@hdrinc.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Madeline Mineau <mineaum@nashuanh.gov>
Subject: Relicensing FERC 2709

Greetings

Thanks for sending me the Information Questionnaire, which I have mailed back today.

You will note that I have identified the Nashua Waterways Manager, Dr Madeleine Mineau, as an important stakeholder that should be afforded an opportunity to comment on your preparations for this relicensing process. One obvious near term matter of joint interest is the interaction between your future management of headpond water levels and the City's contracting process for the design and construction of a new boat launch facility in Greeley Park.

I have copied her on this note

--
Best
Gene Porter
Chair, LMRLAC

RECEIVED MAR 16 2018

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

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1. Information about person completing the questionnaire:

Name & Title	Steven Ledoux, Town Manager
Organization	Town of Acton
Address	472 Main St
Phone	775-929-6611
Email Address	Manager@acton-ma.gov

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2c)* X No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- Geology and soils
- Water resources
- Fish and aquatic resources
- Wildlife and botanical resources
- Wetlands, riparian, and littoral habitat
- Rare, threatened & endangered species
- Recreation and land use
- Aesthetic resources
- Cultural resources
- Socio-economic resources
- Tribal resources
- Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

___ Yes ☒ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	
Address	
Phone	
Email Address	

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 21 days of receipt to allow for any follow-up contact that may be necessary by a representative from Boott or HDR. Not responding within 21 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

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Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

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1. Information about person completing the questionnaire:

Name & Title	Dinell Clark President
Organization	Williamsburg I Condos
Address	197 Wellman Ave No Chelmsford MA 01863
Phone	978-866-2580
Email Address	dinellclark@verizon.net

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2c)* √ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- Geology and soils
- Water resources
- Fish and aquatic resources
- Wildlife and botanical resources
- Wetlands, riparian, and littoral habitat
- Rare, threatened & endangered species
- Recreation and land use
- Aesthetic resources
- Cultural resources
- Socio-economic resources
- Tribal resources
- Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

X Yes __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Dinell Clark
Address	197 Wellman Ave No Chelmsford MA 01863
Phone	978-866-2580
Email Address	dinellclark@verizon.net

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 21 days of receipt to allow for any follow-up contact that may be necessary by a representative from Boott or HDR. Not responding within 21 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

RECEIVED MAR 19 2018

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

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1. Information about person completing the questionnaire:

Name & Title	Gene Porter, Chairman
Organization	Lower Merrimack River Local Advisory Ctte (LMRLAC)
Address	77 Concord St Nashua, NH 03064
Phone	603 968 0015 (mob)
Email Address	gporter77@gmail.com

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

✓ Yes (*If yes, please complete 2a through 2c)* ___ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

The Project headpond in NH is a major recreational asset. The NH State NHAAB identified this water body as the highest priority for a new public access boat ramp, now being designed

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

See next page

Dr Mineau
Nashua Waterways Mgr

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

✓ Yes __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Gene Porter
Address	77 Concord St Nashua, NH 03064
Phone	603 966-0015
Email Address	gporter77@gmail.com

Additional Representative Contact Information (Optional)

Name	Dr. Madeleine Mineau
Address	Waterways Manager Nashua City Hall,
Phone	
Email Address	mmineaum@nashuanh.gov

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

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MAR 14 2018
Rec'd 55

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

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1. Information about person completing the questionnaire:

Name & Title	Caleb Slater PhD
Organization	Mass Wildlife
Address	1 Rabbit Hill Rd, Westboro MA 01581
Phone	508 389 6331
Email Address	Caleb.slater@state.ma.us

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

X Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

- fish surveys
- T+E species maps
- fish lift counts

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

me

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

(Yes) __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Caleb Slater, PhD
Address	1 Rabbit Hill Rd Westborough MA 01581
Phone	508 399 6331
Email Address	Caleb.slater@state.ma.us

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

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RECEIVED MAR 19 2018

RECEIVED MAR 19 2018

RECEIVED MAR 14 2018
TOWN OF HUDSON
SELECTMEN'S OFFICE

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

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1. Information about person completing the questionnaire:

Name & Title	Stephen Malizia, Town Administrator
Organization	Town of Hudson, NH
Address	12 School Street Hudson, NH 03051
Phone	(603) 886-6024
Email Address	smalizia@hudsonnh.gov

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2c)* XX No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- Geology and soils
- Water resources
- Fish and aquatic resources
- Wildlife and botanical resources
- Wetlands, riparian, and littoral habitat
- Rare, threatened & endangered species
- Recreation and land use
- Aesthetic resources
- Cultural resources
- Socio-economic resources
- Tribal resources
- Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

___ Yes XX No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Stephen Malizia
Address	12 School Street Hudson, NH 03051
Phone	(603) 886-6024
Email Address	smalizia@hudsonnh.gov

Additional Representative Contact Information (Optional)

Name	Elvis Dhima, P.E. Town Engineer
Address	12 School Street Hudson, NH 03051
Phone	(603) 886-6008
Email Address	edhima@hudsonnh.gov

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 21 days of receipt to allow for any follow-up contact that may be necessary by a representative from Boott or HDR. Not responding within 21 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

RECEIVED MAR 19 2018

Lowell Hydroelectric Project (FERC Project No. 2790)
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1. Information about person completing the questionnaire:

Name & Title	Harold Peterson, Natural Resources Officer
Organization	U.S. Bureau of Indian Affairs - Eastern Region
Address	545 Marriott Dr Ste 700 Nashville, TN 37214
Phone	615-564-6838
Email Address	harold.peterson@bia.gov

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

X Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

The following Tribes have historic interests in the area and should be consulted:
Mashpee Wampanoag Tribe
Wampanoag Tribe of Gay Head
Penobscot Nation

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

tribal leaders directory or www.big.gov

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

X Yes __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Harold Peterson
Address	Same
Phone	
Email Address	

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

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HDR
1304 Buckley Rd Ste 202
Syracuse, NY 13212

RECEIVED MAR 22 2018

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

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1. Information about person completing the questionnaire:

Name & Title	Amy Lamb, Ecological Information Specialist
Organization	NH Natural Heritage Bureau
Address	172 Pembroke Rd, Concord, NH 03301
Phone	603-271-2834
Email Address	amy.lamb@dncr.nh.gov

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

✓ Yes (*If yes, please complete 2a through 2c)* ___ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- (■) Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- (■) Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

The NH Natural Heritage Bureau (NHB) maintains a database of known occurrences of Threatened, Endangered plant species, and exemplary natural communities. NHB routinely provides this information for various permitting processes, through an online tool called the "NHB Datacheck Tool".

SEE PAGE 3

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

NHB Datacheck Tool: https://www2.des.state.nh.us/nhb_datacheck/

Contact: Amy Lamb (general/main contact)

Data Sharing Agreement contact: Sara Cairns, 603-271-2823 sara.cairns@dncr.nh.gov
(if interested, see pg. 3)

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

✓ Yes ___ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Amy Lamb
Address	172 Pembroke Rd, Concord, NH 03301
Phone	603-271-2834
Email Address	amy.lamb@dncr.nh.gov

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Additional Representative Contact Information (Optional)

Name	Sara Cairns data manager	Sabrina Stanwood Bureau administrator
Address	172 Pembroke Rd Concord, NH 03301	(Same)
Phone	603-271-2823	271-2861
Email Address	sara.cairns@dncr.nh.gov	sabrina.stanwood@dncr.nh.gov

Additional Information (additional space provided on the following page):

Note: NHB's database also contains data on occurrences of protected wildlife species (Threatened, Endangered, special concern, or otherwise rare/protected), which is maintained in conjunction with the NH Fish & Game Department. NHFG has jurisdiction over wildlife.

Data for both rare plants/exemplary natural communities AND NH Fish & Game rare species data is available through NHB. Preliminary data may be obtained through the NHB Databtool Tool or via the enclosed hard copy form. However, for large projects we may also be able to share our digital data, if needed, through a Data Sharing Agreement.

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

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RECEIVED MAR 22 2018

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1. Information about person completing the questionnaire:

Name & Title	Andrew G Mayor, Town Manager
Organization	Town of North Andover
Address	120 Main St. North Andover, MA 01845
Phone	978-688-9510
Email Address	amayor@northandoverma.gov

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2c)* ✓ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- Geology and soils
- Water resources
- Fish and aquatic resources
- Wildlife and botanical resources
- Wetlands, riparian, and littoral habitat
- Rare, threatened & endangered species
- Recreation and land use
- Aesthetic resources
- Cultural resources
- Socio-economic resources
- Tribal resources
- Other resource information

RECEIVED MAR 30 2018

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1. Information about person completing the questionnaire:

Name & Title	Stephen Moose
Organization	Lowell Flood Owners Group
Address	186 Humphrey St Lowell, MA 01850
Phone	978-397-4180
Email Address	SMoose64@yahoo.com

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

X Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- (■) Geology and soils
- (■) Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- (■) Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- (■) Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

The Lowell Boott Hydro Project has increased the Level of the Historic Granite Dam from its Original 3 ft to its Current Height without Payments for increased flood occurances in terms of Costs to home owners for flood insurance, Damages to Private Property and increased use of Dewatering/Ground Water Control in Private Residences, all UNCOMPENSATED as the FERC has continually allowed Taller Granite Dams, Wooden Flashboards and now, Rubber Bladder Type Flashboard structures on said Granite Dam.

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

X Yes ___ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Stephen Moss, LFOG
Address	186 Humphrey St Lowell MA 01850
Phone	978 317-4180
Email Address	SMoss64@yahoo.com

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

Additional Information (additional space provided on the following page):

LFLOG will oppose Re-Licensing of this Project until Compensation is offered to all Land owners for the Taking of their Private Property (Flood Costs, Ground De-Watering Costs & Insurance costs) for a "Public" use by a "For Profit" Corporate interest.

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

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RECEIVED APR 0 3 2018

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1. Information about person completing the questionnaire:

Name & Title	Sue Tuxbury Fishery Biologist
Organization	NOAA Fisheries
Address	55 Great Republic Dr. Gloucester, MA 01930
Phone	978-281-9176
Email Address	Susan.tuxbury@noaa.gov

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

X Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

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- ■ Fish and aquatic resources
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- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

Passage of Radio-tagged American Shad Through the Northern Canal Headgate Structure, Lowell Hydroelectric Project. Nov 1988
Prepared by RMC Environmental Services

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

We can provide a pdf upon request

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

X Yes __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Sue Tuxbury
Address	55 Great Republic Dr. Gloucester, MA 01930
Phone	978-281-9176
Email Address	susan.tuxbury@noaa.gov

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Additional Representative Contact Information (Optional)

Name	Sean McDermott
Address	55 Great Republic Dr. Gloucester, MA 01930
Phone	978-281-9113
Email Address	sean.mcdermott@noaa.gov

Additional Information (additional space provided on the following page):

The PAD should discuss the gatehouse and operation/condition of the boat lock system adjacent to the gatehouse

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

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Scida, Rebecca

From: MacVane, Kelly
Sent: Wednesday, April 04, 2018 5:26 PM
To: Scida, Rebecca
Subject: FW: Lowell Hydroelectric Project (FERC 2790) Relicensing Pre-Application Questionnaire - Lowell National Park Response
Attachments: Slingshot.txt

Follow Up Flag: Follow up
Flag Status: Flagged

HDR Employees:
Use the "Download Attachments" button after opening this message in Outlook to download attached files.

Non-HDR Recipients:
If you are not an HDR employee and this is your first time using Slingshot click here and follow the prompts to set your password.

Returning users click here to Download (files: Lowell NHP Response to Lowell Hydro Project Questionnaire.pdf; National Register Nomination Lowell 8-13-76.pdf; Lowell NHP P.L.95-290 as amended.pdf; DCR lowell-gbfm-rmp.pdf; Boundary Map 1978 LOWE_475_80008A_[id3686].pdf;)

Notice: The link in this email will only work for up to 30 days (as set by the sender). If you need access to these files for longer, please download and save a copy locally. Recipients of forwarded emails WILL NOT have access to the files using this link.

Becky-

Can you please update the consultation log? Thanks!

Kelly MacVane
D 207-239-3828 **M** 207-775-4495

hdrinc.com/follow-us

From: Gibson, Jim
Sent: Wednesday, April 4, 2018 5:12 PM
To: MacVane, Kelly <Kelly.MacVane@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: FW: Lowell Hydroelectric Project (FERC 2790) Relicensing Pre-Application Questionnaire - Lowell National Park Response

FYI

Jim Gibson, MPA, MSES
Vice President

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2202 **M** 315.415.2729
jim.gibson@hdrinc.com

hdrinc.com/follow-us

From: Aucella, Peter [mailto:peter_aucella@nps.gov]
Sent: Wednesday, April 4, 2018 5:08 PM
To: Kevin Webb <kevin.webb@enel.com>; Gibson, Jim <Jim.Gibson@hdrinc.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Lowell Hydroelectric Project (FERC 2790) Relicensing Pre-Application Questionnaire - Lowell National Park Response

Hello:

On behalf of Lowell National Historical Park, this is to reply to your survey seeking document related to the Lowell Project relicensing.

I have attached the questionnaire responses plus the following documents:

1) Lowell National Historical Park Authorizing Legislation with reference to Lowell Canal System.
2) Lowell National Historical Park Boundary Map referenced in authorizing law.
3) National Register Nomination for the Locks & Canals Historic District (1976).
4) The Lowell Heritage State Park Resource Management Report referencing the Lowell Canal System.

Please let me know if you have any questions.

Thanks,

Peter Aucella
Assistant Superintendent
Lowell National Historical Park
67 Kirk Street
Lowell, MA 01852
978-275-1722

LOWELL NATIONAL HISTORICAL PARK

BOUNDARY MAP

LOWELL, MASSACHUSETTS

Preservation District

Park

Preservation District Boundary

Park Boundary

N

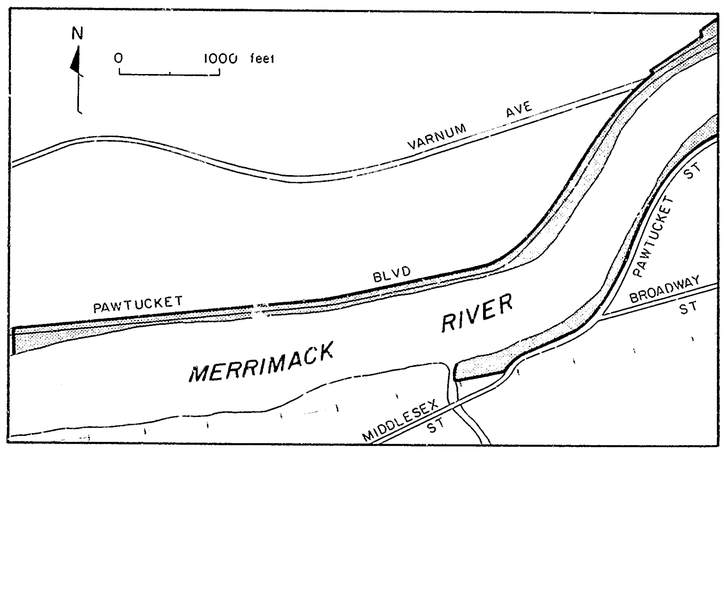
0 500 1000 feet

MARCH, 1978 NHP-LOWE-80,008 A

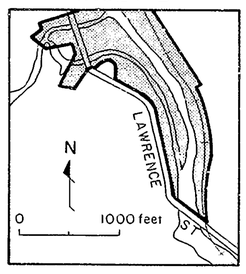
SEE INSET A

SEE INSET B

INSET A



INSET B



Massachusetts Department of Conservation and Recreation
Bureau of Planning and Resource Protection
Resource Management Planning Program

RESOURCE MANAGEMENT PLAN

Lowell/Great Brook Planning Unit

Including Lowell-Dracut-Tyngsborough State Forest, Lowell Heritage State Park, Great Brook Farm State Park, Carlisle State Forest, Warren H. Manning State Forest, Billerica State Forest, and Governor Thomas Dudley State Park

July 2014 – Public Review Draft

dcr
Massachusetts

Lowell/Great Brook Planning Unit

Including Lowell-Dracut-Tyngsborough State Forest, Lowell Heritage State Park, Great Brook Farm State Park, Carlisle State Forest, Warren H. Manning State Forest, Billerica State Forest, and Governor Thomas Dudley State Park

RESOURCE MANAGEMENT PLAN

2014

Deval L. Patrick, Governor
Maeve Vallely Bartlett, Secretary
John P. Murray, Commissioner
Kevin J. Whalen, Deputy Commissioner for Park Operations

Resource Management Plans provide guidance for managing properties under the stewardship of the Department of Conservation and Recreation (DCR). They are intended to be working documents for setting priorities, enabling the DCR to adapt to changing fiscal, social, and environmental conditions. The planning process provides a forum for communication and cooperation with park visitors and the surrounding communities to ensure transparency in the DCR's stewardship efforts.

The Lowell/Great Brook Planning Unit is as diverse as the DCR's park system as a whole. From the collection of highly significant cultural resources and urban green spaces that make up Lowell Heritage State Park, to the historic working agricultural landscape of Great Brook Farm State Park, to the roughly 1,500 acres that encompass five other heavily wooded properties in the planning unit, visitors can enjoy a range of urban, rural, and backwoods experiences all within a seven mile radius. It is really pretty remarkable.

There are also many educational and recreational opportunities available within the planning unit, from learning about the 19th century textile industry and the inner workings of a dairy farm, to hiking, biking, and cross-country skiing by moonlight, the properties provide a little bit of everything for everyone. In several cases, the DCR has partnered with private and public entities to further enhance these opportunities, and ensure that the planning unit is able to be enjoyed today, and for years to come.

This Resource Management Plan provides recommendations that protect the natural and cultural resources of each property, while providing for compatible recreation, so that they are available for future generations.

John P. Murray
Commissioner

The Massachusetts Department of Conservation and Recreation (DCR), an agency of the Executive Office of Energy and Environmental Affairs, oversees 450,000 acres of parks and forests, beaches, bike trails, watersheds, dams and parkways. Led by Commissioner John P. Murray, the agency's mission is to protect, promote and enhance our common wealth of natural, cultural and recreational resources. To learn more about the DCR, our facilities and our programs, please visit us at www.mass.gov/dcr. Contact us at mass.parks@state.ma.us.

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EXECUTIVE SUMMARY

INTRODUCTION

The Department of Conservation and Recreation is directed by a legislative mandate (M.G.L. Chapter 21, Section 2F) to prepare management plans for every reservation, park and forest, to provide guidelines for the management and stewardship of natural and cultural resources and ensure consistency between recreation, resource protection and sustainable forest management. The legislative mandate also requires the incorporation of public review and input into the development of management plans, and review and adoption by the DCR Stewardship Council.

Resource Management Plans (RMPs) consider the past, present and future of a reservation, park or forest. Through an assessment of resources and their existing conditions, clear management goals and objectives are developed, and short and long-term implementation action plans are identified for the management of properties under the stewardship of the DCR. RMPs are written to meet the information needs of a diverse audience: from the decision-makers directly involved in the operation and management of a property, to a variety of outside stakeholders. RMPs are intended to be working documents for setting priorities, budgeting and resource allocation, and establishing guidelines for balancing sustainable recreation with the stewardship of natural and cultural resources. Finally, RMPs are of value to users that are interested in learning more about specific properties, the challenges the DCR faces and how decisions affecting the properties are made.

This plan covers the Lowell/Great Brook Planning Unit in the municipalities of Lowell, Dracut, Tyngsborough, Carlisle, Chelmsford, and Billerica, Massachusetts.

THE LOWELL/GREAT BROOK PLANNING UNIT

The Lowell/Great Brook Planning Unit is very diverse and can be viewed as a microcosmic representation of the DCR state park system as a whole. From the collection of highly significant cultural resources and urban greenspaces that make up Lowell Heritage State Park, to the historic working agricultural landscape of Great Brook Farm State Park, to the roughly 1,500 acres encompassing the five other heavily wooded properties in this planning unit, and a range of recreational uses in between, there are few characteristics that can be applied to the planning unit as a whole. In addition, there are several complex partnerships and co-management relationships to balance at many of these facilities. The defining characteristics for the individual properties are as follows:

Lowell-Dracut-Tyngsborough State Forest

A large swath of protected open space that is predominantly wooded, with many low wet areas and little park infrastructure, Lowell-Dracut-Tyngsborough provides miles of trails and recreational access for the nearby urban population, along with habitat protection that is regionally important. There are also three Conservation Restrictions associated with the forest, totaling approximately 73 acres.

Lowell Heritage State Park

An urban park encompassing a variety of parcels within the City of Lowell and operated through multiple and complex shared management systems, this property was established to help showcase the history of the city. The DCR owns numerous historic and a few more recently constructed buildings, including four gatehouses that are a part of canal operations and the Mack building; greenspaces ranging from a small Victorian garden to the one-mile-long Vandenberg esplanade along the river; and some unusual resources, including air rights over many of the city's canals. Lowell Heritage State Park provides both interpretive opportunities and recreational access in a dense urban environment.

Great Brook Farm State Park

A working dairy farm connected to miles of trails that are used for a variety of recreational activities, Great Brook Farm includes historic buildings and resources alongside a new "smart" barn with a robotic milking system, interpretive programming and a cross-country ski concession.

Carlisle State Forest

A small wooded property protected from forestry activities at the turn of the 20th century to conserve an older stand of exceptionally large white pines. Undeveloped and used primarily by local residents, this small gem provides recreational access and habitat protection.

Warren H. Manning State Forest

A largely wooded property with a small recreation area, complete with a spray deck, picnic area and fitness trail. Named for the preeminent landscape architect that advocated (and donated land for) the establishment of a town forest, this property provides recreational opportunities and habitat protection in a suburban environment.

Billerica State Forest

An undeveloped and largely wooded property bordering Route 3, this property provides recreational access and habitat protection.

Governor Thomas Dudley State Park

The smallest facility within the planning unit, this 11-acre park is a small wooded parcel that provides access to the Concord River and links to other protected open space.

MANAGEMENT PRINCIPLE AND GOALS

Through the Resource Management Planning process, a principle for managing the Lowell/Great Brook Planning Unit was established and four associated goals developed.

Management Principle

Protect the natural and cultural resources of the planning unit and provide enhanced recreational and educational opportunities for visitors through the creative use of state resources and partnerships.

Management Goals

The following four management goals have been developed to achieve the management principle. These goals are of equal importance, and are not presented in order of priority.

Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.

Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.

Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.

Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.

PRIORITY RECOMMENDATIONS

Recommendations are characterized on the basis of priority (i.e., High, Medium, or Low) and resource availability. High priority recommendations are those that address regulatory compliance or public health and safety; prevent immediate damage to, or loss of, resources; or repair or replace damaged equipment or systems critical to park operations. They are typically time sensitive. Medium priority recommendations maintain existing resources and visitor experiences. Low priority recommendations enhance resources or visitor experiences; they are not time sensitive.

Resource availability considers both funding and labor. A resource availability of one indicates that funding and/or labor are available to implement the recommendation. A resource availability of two indicates that funding and/or labor are not currently available, but may become so in the near future (i.e., the next five years). A resource availability of three indicates that funding and/or labor are not anticipated in the next five years. Resources to implement these recommendations may, or may not, become available after five years.

This RMP identifies 150 management recommendations; 69 are classified as high priorities. Resources are currently available to implement 46 of these high priority recommendations. It is anticipated that resources will be available within the next five years to implement 19 additional high priority recommendations. These recommendations, and the lead DCR unit responsible for their implementation, are identified in the Action Plan that accompanies this Executive Summary.

Table ES.1. Summary of management recommendations.

Priority	Resource Availability 1	2	3	*Total*
High	41	24	4	*69*
Medium	14	30	7	*51*
Low	7	12	11	*30*
Total	*62*	*66*	*22*	

PUBLIC PARTICIPATION IN DEVELOPING THIS RMP

Notice of a public meeting and the DCR's intent to prepare a Resource Management Plan for the Lowell/Great Brook Planning Unit appeared in the July 11, 2012 issue of the Environmental Monitor. Additional announcements were posted on the DCR website and press releases were provided to the local media. Announcements were also distributed to individuals, statewide, regional and local stakeholder organizations and local officials. An initial public meeting occurred on July 23, 2012 in the Hart Barn at Great Brook Farm State Park in Carlisle. Approximately 20 people attended this initial meeting. Public input was received at the meeting and through e-mail received during a 30-day public comment period after the meeting.

A public meeting to present an overview of the draft RMP held on July 21, 2014 in Alumni Hall at the University of Massachusetts Lowell; it was attended by [#] people. Notice of the meeting was published in the July 9, 2014 issue of the Environmental Monitor and posted on the DCR website. Press releases were provided to local media and notices were sent directly to individuals, stakeholder organizations and local officials. The draft RMP was made available on the DCR website, at the Powell Memorial Library in Lowell, Gleason Public Library in Carlisle, Billerica Public Library, Parker Memorial Library in Dracut, and Tyngsborough Public Library, as well as at the Great Brook Farm State Park headquarters on [DATE].

The public comment period on the draft RMP ran from July 22, 2014 to August 29, 2014. [#] sets of comments were received and incorporated into the final RMP (see Appendix B). This Resource Management Plan was submitted to the DCR's Stewardship Council on [DATE] and was adopted by the Council on [DATE].

Action Plan 2014-2019

Priority Action	DCR Lead Unit(s)
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.	
Remove the debris at the former headquarters site that poses a threat to significant resources (i.e., the pump house cellar hole) and public safety (i.e., glass bottles). [LDT SF]	Mass Parks
Address the culverts within the forest that are blocked and/or collapsing. [LDT SF]	MassParks, Planning and Engineering
Remove the graffiti from Sheep Rock and work with the Environmental Police to curb the illegal activities that take place at the site. [LDT SF]	MassParks and Planning
Assess the condition of the interior and exterior of the Rynne bathhouse and make repairs, where necessary. [Lowell Heritage SP]	MassParks, Planning and Engineering
Meet with the National Park Service to develop and implement a preservation plan for the Hamilton Wasteway Gatehouse. [Lowell Heritage SP]	MassParks, Planning and Engineering
Revisit the draft Comprehensive Interpretive Plan; revise and update as necessary and finalize. [Great Brook Farm SP]	MassParks
Develop interpretive programs, opportunities, and products as identified in the Comprehensive Interpretive Plan, working to expand interpretive offerings beyond the smart barn tours. [Great Brook Farm SP]	MassParks
Clear the debris currently built up around the beaver deceivers to maintain water flow and keep them operational. [Great Brook Farm SP]	MassParks
Routinely monitor "The City," particularly the Garrison House site, for stability and potential disturbances. [Great Brook Farm SP]	MassParks and Planning
Remove the broken sign at the Garrison House site. [Great Brook Farm SP]	MassParks
North Schoolhouse: Carefully remove the English ivy from the walls, with guidance from DCR's Office of Cultural Resources. [Great Brook Farm SP]	MassParks and Planning
Main Farm House: Install an appropriate gutter, with guidance from DCR's Office of Cultural Resources. [Great Brook Farm SP]	Planning
Main Farm House: Complete minor repairs to the siding and the front door sill, with guidance from DCR's Office of Cultural Resources. [Great Brook Farm SP]	Planning
Tie Stall Barn: Assess the stability of the foundation in areas where it has visibly been compromised, and repair as necessary, with guidance from DCR's Office of Cultural Resources. [Great Brook Farm SP]	Planning and Engineering
Litchfield House: Complete repairs to the barn. [Great Brook Farm SP]	Planning
Update the inventory of the large eastern white pine trees, last done in 1980. [Carlisle SF]	Forestry
After completion of tree inventory update, revisit the Land Stewardship Zoning to determine if any changes are applicable. [Carlisle SF]	Planning and Forestry
Monitor for invasive pests, especially hemlock wooly adelgid. Propose biological or chemical controls if warranted on the specimen trees. [Carlisle SF]	Forestry
Clean up the dumping debris located off of Rangeway Road, and continue to monitor the area for illegal dumping. [Manning SF]	MassParks
Dismantle the fire ring located at the top of Gilson Hill, to discourage use. [Billerica SF]	MassParks
Clean up the dumping debris located adjacent to Winning Street, and continue to monitor the area for illegal dumping. [Billerica SF]	MassParks

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Action Plan 2014-2019 (Continued)

Priority Action	DCR Lead Unit(s)
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.	
Review and update or create, where appropriate, a trail map for each of the properties in the planning unit, and make the maps available through multiple outlets. [Planning Unit]	MassParks and External Affairs
Work with the Environmental Police to curb the illegal recreation activities (e.g., off-highway vehicle use and paintball games) taking place at the forest. [LDT SF]	MassParks
Post signs that clearly indicate the boundary of the forest's "No Hunting Areas." [LDT SF]	MassParks and Forestry
Improve the trail signage within the forest, adding trail names and intersection numbers where appropriate. [LDT SF]	MassParks and Forestry
Post fish consumption advisory signs in multiple, locally spoken languages at popular fishing spots along the Merrimack River and Lowell Canal System. [Lowell Heritage SP]	MassParks and External Affairs
Ensure that all of the violations noted in the most recent inspection of the Lord pool are addressed in the upcoming modernization project. [Lowell Heritage SP]	Engineering
Develop a trails plan, assessing existing density and incorporating critical information developed through the hydrological study to better address areas that have trail washout problems. [Great Brook Farm SP]	Planning
Securely cover the open well located southeast of the Litchfield House. [Great Brook Farm SP]	MassParks
Reassess all boardwalk crossings to identify older ones in need of replacement, including those on the Acorn Trail. [Great Brook Farm SP]	MassParks
Establish designated handicapped accessible parking spaces in the parking lot, total number to be determined in consultation with DCR's Universal Access Program. [Manning SF]	Engineering
Goal 3. Address vacant infrastructure to improve visitor experiences and DCR operational responsibilities.	
Former Regional HQ site: remove former sign holder and pavement to let the site return to a natural state. [Great Brook Farm SP]	MassParks and Engineering
Tie Stall Barn: Address the outstanding permit issues for the event space and renew discussions about future use. [Great Brook Farm SP]	MassParks and Engineering
Farnham Smith's Cabin: Undertake a structural assessment and reuse feasibility study to determine if reuse is possible and develop some potential options. [Great Brook Farm SP]	Planning, MassParks and Engineering
Cabin Shed: Access and clean out the interior of the shed, so that it does not become a potential nuisance. [Great Brook Farm SP]	MassParks
Boat House: Complete and submit MHC Inventory form. [Great Brook Farm SP]	Planning
Boat House: Undertake demolition. [Great Brook Farm SP]	Engineering
South House/District 6 Fire Control: Assess for any reuse possibilities by the park and/or the region, such as accommodating the storage needs currently being met by the Hadley House and the Anderson Barn. [Great Brook Farm SP]	Planning, MassParks and Forestry
Hadley House: Investigate alternative uses of the property and possibly making it available to be moved. If not possible, identify a funding source for demolition before it becomes an attractive nuisance. [Great Brook Farm SP]	Planning, MassParks and Engineering
West Farm/Manseau House: Assess for inclusion in the Historic Curatorship Program. If not a good candidate, identify a funding source for demolition, before it becomes an attractive nuisance. [Great Brook Farm SP]	Planning, MassParks and Engineering
North Farm House and Barn: Make sure the buildings are secure, and routinely monitor to ensure they aren't damaged or broken into. [Great Brook Farm SP]	MassParks

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Action Plan 2014-2019 (Continued)

Priority Action	DCR Lead Unit(s)
Goal 3. Address vacant infrastructure to improve visitor experiences and DCR operational responsibilities.	
North Farm House and Barn: Work with current long term leaseholders of other facilities within the park to identify any potential complementary reuses for this property, and explore putting out a Request for Proposals. [Great Brook Farm SP]	Planning, MassParks and External Affairs
Anderson Barn: Explore any potential interest in, and options for, permitting use of the barn by others, and relocate current storage closer to the Park HQ. [Great Brook Farm SP]	MassParks and Planning
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.	
Establish webpages on the DCR website for the properties in the planning unit that currently do not have a webpage. [Planning Unit]	MassParks and External Affairs
Renew the agreement with the Greater Lowell Indian Cultural Association (GLICA). [LDT SF]	MassParks and Legal
Arrange a meeting between the Dracut Water Supply District and appropriate DCR staff to discuss their need to replace the reservoir at the forest. [LDT SF]	MassParks and Legal
Work with the Merrimack Valley Chapter of the New England Mountain Bike Association to review and approve, where appropriate, the existing technical features in the forest. [LDT SF]	Planning, MassParks and Legal
Develop a formal agreement with the Merrimack Valley Chapter of the New England Mountain Bike Association regarding the review and approval of their trail maintenance, repair and construction projects within the forest. [LDT SF]	Planning, MassParks and Legal
Determine the owner of the Hadley House and establish an agreement that guides the management and use of the building. [Lowell Heritage SP]	Planning, MassParks and Legal
Install DCR signs at the parking areas along the Vandenberg esplanade, next to the Lord pool and on Broadway Street. [Lowell Heritage SP]	MassParks
Renew the agreements with the City of Lowell related to their management of the regatta field and Rynne beach, as well as their use of the Rynne bathhouse. [Lowell Heritage SP]	MassParks and Legal
Renew the agreement with the stakeholders in the Lowell Canal System. [Lowell Heritage SP]	MassParks and Legal
Renew the agreement with the New England Electric Railway Historical Society / Seashore Trolley Museum. [Lowell Heritage SP]	MassParks and Legal
Establish an agreement with the Boston & Maine Railroad Historical Society regarding their maintenance of the B&M 410. [Lowell Heritage SP]	MassParks and Legal
Finalize the transfer of the Bellegarde boathouse, obtaining a copy of the items listed in Section 4.4. and executing the care, custody, management and control agreement. [Lowell Heritage SP]	Legal
Conduct annual meetings with lease holders and annual property inspections of leased property as specified in lease agreements and permits. [Great Brook Farm SP]	MassParks and Legal
Woods House: Update and renew the expired lease agreement for the Woods House with the old North Bridge Hounds. [Great Brook Farm SP]	Legal
Clear the vegetation from around the former DEM sign stanchion, and hang a new DCR entrance sign from the existing sign stanchion. [Carlisle SF]	MassParks
Work with the Town of Billerica to get a Special Use Permit in place, to formalize their operation of the recreational area. [Manning SF]	MassParks and Legal
Hold bi-annual meetings with the Town of Billerica Recreation Department to discuss programs, events, and maintenance and operation of the recreational area. [Manning SF]	MassParks and External Affairs
Provide DCR information on the informational kiosk. [Manning SF]	External Affairs
Install a DCR entrance sign for the forest. [Billerica SF]	MassParks

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Action Plan 2014-2019 (Continued)

Priority Action	DCR Lead Unit(s)
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.	
Hold an annual meeting with the MA Department of Fish & Game and the Town of Billerica Conservation Commission to discuss any issues, plans or projects. [Dudley SP]	MassParks
With the MA Department of Fish & Game and the Town of Billerica Conservation Commission, conduct the stipulated 5 year review of the Management Agreement. [Dudley SP]	MassParks and Legal
Working with the Town of Billerica and the MA Department of Fish & Game, identify an appropriate location for an entrance sign that recognizes the partners. [Dudley SP]	MassParks

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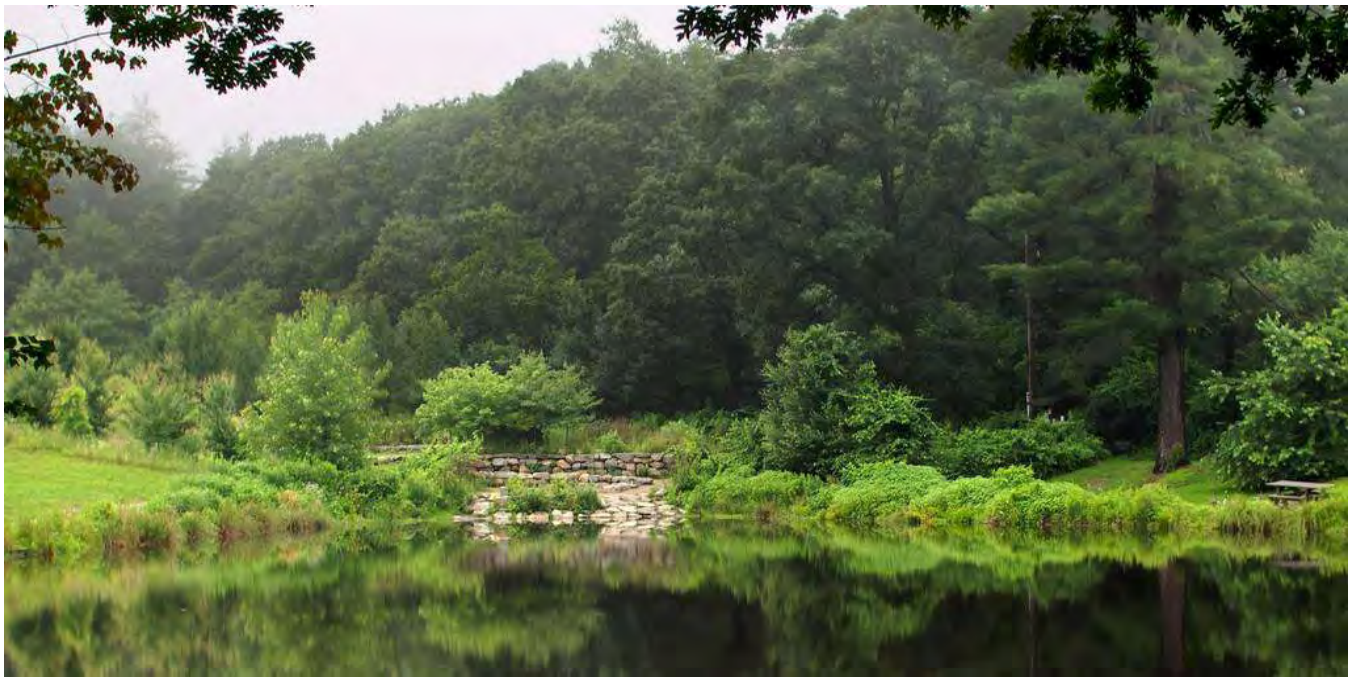

Great Brook Farm State Park (Peter E. Lee; CC BY-NC 2.0; cropped from original)

SECTION 1. INTRODUCTION

1.1. MISSION OF THE DEPARTMENT OF CONSERVATION AND RECREATION

The Department of Conservation and Recreation (DCR) is responsible for the stewardship of approximately 450,000 acres of Massachusetts' forests, parks, reservations, greenways, historic sites and landscapes, seashores, lakes, ponds, reservoirs and watersheds. The mission of the DCR is:

"To protect, promote and enhance our common wealth of natural, cultural and recreational resources for the well-being of all."

In meeting today's responsibilities and planning for tomorrow, the DCR's focus is on:

- Improving outdoor recreational opportunities and natural resource conservation;
- Restoring and improving our facilities;
- Expanding public involvement in carrying out our mission; and
- Establishing first-rate management systems and practices.

The DCR was created pursuant to state legislation that in 2003 merged the former Metropolitan District Commission and the former Department of Environmental Management. The DCR manages over 300,000 acres of the state's forests, parks, beaches, mountains, ponds, rivers and trails. The Department has broad management responsibilities for the preservation, maintenance and enhancement of the natural, scenic, historic and aesthetic qualities within these areas.

The health and happiness of people across Massachusetts depend on the accessibility and quality of our green spaces, natural and cultural resources, recreation facilities and great historic landscapes. The DCR continues to improve this vital connection between people and their environment.

1.2. INTRODUCTION TO RESOURCE MANAGEMENT PLANS

The Department of Conservation and Recreation is directed by a legislative mandate (M.G.L. Chapter 21, Section 2F) to prepare management plans for every reservation, park and forest, to provide guidelines for the management and stewardship of natural and cultural resources and ensure consistency between recreation, resource protection and sustainable forest management. The legislative

mandate also requires the incorporation of public review and input into the development of management plans, and review and adoption by the DCR Stewardship Council.

Resource Management Plans (RMPs) consider the past, present and future of a reservation, park or forest. Through an assessment of resources and their existing conditions, clear management goals and objectives are developed, and short and long-term implementation action plans are identified for the management of properties under the stewardship of the DCR. RMPs are written to meet the information needs of a diverse audience: from the decision-makers directly involved in the operation and management of a property, to a variety of outside stakeholders. RMPs are intended to be working documents for setting priorities, budgeting and resource allocation, and establishing guidelines for balancing sustainable recreation with the stewardship of natural and cultural resources. Finally, RMPs are of value to users that are interested in learning more about specific properties, the challenges the DCR faces and how decisions affecting the properties are made.

DCR staff undertook a statewide survey in 2008–2009 to assess the level of existing resource and planning data available, and correlate that with operations and management considerations. This assessment was used to identify groupings of properties that should be included together in a single RMP, i.e. planning units. The statewide survey was also used to develop a tiered sequence for preparing RMPs. The Lowell/Great Brook Planning Unit is ranked 6th out of the 80 planning units identified statewide.

1.3. The Planning Process

Resource Management Plans are developed by the DCR's Resource Management Planning Program through an iterative process of data gathering and analyses, public input, review and revision. Administrative, cultural, ecological, recreation, social and spatial information is gathered. Sources of information include interviews with DCR staff, site visits, administrative files and reports, legal documents, map data and municipal and regional plans. An initial public meeting is convened to provide an opportunity to discuss the properties included in the RMP and to solicit public input for the plan. The public meeting is announced in the Environmental Monitor and advertised electronically and through local media outlets.

An inventory of available information on natural, cultural, recreation and operational resources and an assessment of their existing conditions is the foundation of an RMP, from which recommendations for stewardship can be made. The draft is distributed within the DCR for internal review, and is repeatedly reviewed and revised to produce a draft RMP for public review and comment.

A second public meeting is convened to present an overview of the draft RMP's findings and recommendations and solicit input. Once again, the public meeting is announced in the Environmental Monitor and advertised electronically and through local media outlets. After the second public meeting, the draft RMP is made available to the public via the DCR website and local libraries. The meeting is followed by a 30-day public comment period. Comments made during the meeting and written comments received during the public comment period are taken into consideration and used to further develop the RMP.

Once revised, a final draft RMP is submitted to the DCR Stewardship Council for review and adoption. The Stewardship Council is a 13-member citizen advisory board (appointed by the Governor) that works with the Department to provide a safe, accessible, well-maintained and well-managed system of open spaces and recreation facilities that are managed and maintained on behalf of the public.

Once adopted, the Commissioner of the Department of Conservation and Recreation files copies with the Secretary of State and the Joint Committee on Environment, Natural Resources and Agriculture of the Massachusetts General Court and posts the adopted RMP on the DCR website for use. The adopted RMP provides structure and guidance for the operation and management of properties included in the plan.

1.4. Public Participation

Notice of a public meeting and the DCR's intent to prepare a Resource Management Plan for the Lowell/Great Brook Planning Unit appeared in the July 11, 2012 issue of the Environmental Monitor. Additional announcements were posted on the DCR

website and press releases were provided to the local media. Announcements were also directly distributed to individuals, statewide, regional and local stakeholder organizations and local officials. An initial public meeting occurred on July 23, 2012 in the Hart Barn at Great Brook Farm State Park in Carlisle. Approximately 20 people attended this initial meeting. Public input was received at the meeting and through e-mail received during a 30-day public comment period after the meeting.

To promote greater citizen participation and obtain additional information about visitor use, an online survey was created using Survey Monkey. Announcements of this survey were distributed electronically to stakeholders and signs were posted at individual properties. Surveys were created and made available in English and Spanish, in an effort to reach out to a broad constituency. One hundred and sixty one (161) surveys were submitted, nearly all of which were related to Great Brook Farm State Park and Lowell-Dracut-Tyngsborough State Forest.

A public meeting to present an overview of the draft RMP held on July 21, 2014 in Alumni Hall at the University of Massachusetts Lowell; it was attended by [#] people. Notice of the meeting was published in the July 9, 2014 issue of the Environmental Monitor and posted on the DCR website. Press releases were provided to local media and notices were sent directly to individuals, stakeholder organizations and local officials. The draft RMP was made available on the DCR website, at the Powell Memorial Library in Lowell, Gleason Public Library in Carlisle, Billerica Public Library, Parker Memorial Library in Dracut, and Tyngsborough Public Library, as well as at the Great Brook Farm State Park headquarters on [DATE].

The public comment period on the draft RMP ran from July 22, 2014 to August 29, 2014. [#] sets of comments were received and incorporated into the final RMP (see Appendix B). This Resource Management Plan was submitted to the DCR's Stewardship Council on [DATE] and was adopted by the Council on [DATE].

1.5. Properties Included in this RMP

This plan covers the Lowell/Great Brook Planning Unit, which includes:

- Lowell-Dracut-Tyngsborough State Forest
- Three Conservation Restrictions abutting Lowell-Dracut-Tyngsborough State Forest
- Lowell Heritage State Park
- Great Brook Farm State Park
- Carlisle State Forest
- Warren H. Manning State Forest
- Billerica State Forest
- Governor Thomas Dudley State Park

A Conservation Restriction is a legal document that limits the uses of a property to protect specific open space values of that land. Locations of these properties are indicated on Figure 1. Although these properties are not owned in fee by the DCR, they are included in the plan because of their physical proximity to Lowell-Dracut-Tyngsborough State Forest and the DCR's responsibility for overseeing the stipulations of the restrictions.

1.6. Defining Characteristics

The Lowell/Great Brook Planning Unit is very diverse and can be viewed as a microcosmic representation of the DCR state park system as a whole. From the collection of highly significant cultural resources and urban greenspaces that make up Lowell Heritage State Park, to the historic working agricultural landscape of Great Brook Farm State Park, to the roughly 1,500 acres encompassing the five other heavily wooded properties in this planning unit, and a range of recreational uses in between, there are few characteristics that can be applied to the planning unit as a whole. In addition, there are several complex partnerships and co-management relationships to balance at many of these facilities. The defining characteristics for the individual properties are as follows:

Lowell-Dracut-Tyngsborough State Forest

A large swath of protected open space that is predominantly wooded, with many low wet areas and little park infrastructure, Lowell-Dracut-Tyngsborough provides miles of trails and recreational access for the nearby urban population, along with habitat protection that is regionally important. There are also three Conservation Restrictions associated with the forest, totaling approximately 73 acres.

Placeholder for Figure 1.

Lowell Heritage State Park

An urban park encompassing a variety of parcels within the City of Lowell and operated through multiple and complex shared management systems, this property was established to help showcase the history of the city. The DCR owns numerous historic and a few more recently constructed buildings, including four gatehouses that are a part of canal operations and the Mack building; greenspaces ranging from a small Victorian garden to the one-mile-long Vandenberg esplanade along the river; and some unusual resources, including air rights over many of the city's canals. Lowell Heritage State Park provides both interpretive opportunities and recreational access in a dense urban environment.

Great Brook Farm State Park

A working dairy farm connected to miles of trails that are used for a variety of recreational activities, Great Brook Farm includes historic buildings and resources alongside a new "smart" barn with a robotic milking system, interpretive programming and a cross-country ski concession.

Carlisle State Forest

A small wooded property protected from forestry activities at the turn of the 20th century to conserve an older stand of exceptionally large white pines. Undeveloped and used primarily by local residents, this small gem provides recreational access and habitat protection.

Warren H. Manning State Forest

A largely wooded property with a small recreation area, complete with a spray deck, picnic area and fitness trail. Named for the preeminent landscape architect that advocated (and donated land for) the protection of public woodlands in the Town of Billerica, this property provides recreational opportunities and habitat protection in a suburban environment.

Billerica State Forest

An undeveloped and largely wooded property bordering Route 3, this property provides recreational access and habitat protection.

Governor Thomas Dudley State Park

The smallest facility within the planning unit, this 11-acre park is a small wooded parcel that provides access to the Concord River and links to other protected open space.

1.7. Management Principle and Goals

Through the Resource Management Planning process, a principle for managing the Lowell/Great Brook Planning Unit was established and four associated goals developed.

Management Principle

Protect the natural and cultural resources of the planning unit and provide enhanced recreational and educational opportunities for visitors through the creative use of state resources and partnerships.

Management Goals

The following four management goals have been developed to achieve the management principle. These goals are of equal importance, and are not presented in order of priority.

Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.

Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.

Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.

Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.

1.8. Regional Context

The Lowell/Great Brook Planning Unit is located within Middlesex County; the towns of Billerica, Chelmsford, Dracut and Tyngsborough and the City of Lowell are all in the northern section of Middlesex County, while the Town of Carlisle is in the southern portion of the county. Lowell is the urban focus for this region, while Carlisle provides a rural respite. The towns of Billerica, Chelmsford, Dracut and Tyngsborough are all suburban in character.

Rivers have indelibly influenced the settlement, land use and development of the communities in this region from pre-historic times through today. The City of Lowell is located at the confluence of the Merrimack River and the Concord River. The mighty Merrimack River, flowing from Franklin,

New Hampshire to the Atlantic Ocean is the engine that drove the industrial development of the City of Lowell. Flowing through Tyngsborough and Lowell, the river also serves as the southern boundary of Dracut. The smaller Concord River, a tributary of the Merrimack, flows through Lowell and Billerica, and is the southeast boundary for Carlisle.

The pre-contact Native American population in this region utilized these rivers for travel and subsistence, with major anadramous fish runs on the Concord and Merrimack. The region's landscape provided additional resources for subsistence through freshwater ponds and fertile soils ideal for agricultural use, particularly along the rivers. Traditional hunting and gathering likely occurred in the upland areas, and supported other subsistence activities.

Pawtucket Falls on the Merrimack River served as a regional focus of settlement (MHC 1980*a*). The falls became a regionally important fishing ground and the Merrimack River served as a trade corridor. The area appears to have been extensively settled by native peoples and may have served as a population core area.

The Merrimack River was first visited by the French explorer Samuel de Champlain in 1605 as he explored the New England coast. A Praying Indian town, Wamesit, was established by John Eliot by the 1640s in what is now Lowell in an effort to Christianize native peoples. European settlement in this region started in earnest in the mid 17th century. Settlement through the second half of 17th century was dispersed, with small clusters of colonists in frontier communities relying primarily on subsistence farming, fishing and small mills set up on the rivers and streams in the region.

Population in the region began to uptick in the early to mid 18th century, as villages began to take shape in town centers and near mills, and transportation improvements made in the region helped facilitate travel and trade. By the turn of the 19th century, small scale granite quarrying and early manufacturing started to develop. Construction began on the Middlesex Canal in 1794, connecting Lowell and the Merrimack Valley to Boston, opening for use in 1804. Twenty-seven miles in length, running through several communities including Billerica, Chelmsford, Tyngsborough and current day Lowell, the Middlesex Canal provided a transportation connection to haul goods and passengers from Boston to New Hampshire (Middlesex Canal Association 1993).

A range of small industries began to develop and take advantage of both the local water power and the proximity to the Middlesex Canal, and the textile industry in Lowell began in the 1820s with the establishment of the first major textile mill, the Merrimack Manufacturing Company. Others quickly followed over the course of the next dozen years, building off the early success and the application of the innovative system of manufacturing utilized here and the development of a system of power canals to run large mills. Additional industrial development also began in Chelmsford and to a smaller degree in Dracut.

The City of Lowell was established in 1826, from parts of Chelmsford, Dracut, and Tewksbury (MHC 1980*a*). Rapid growth ensued in Lowell, with the manufacturing base downtown and a series of suburban outlying neighborhoods. Railroads were introduced to the region, providing a more effective (and non-seasonal) form of transportation, and the Middlesex Canal was closed in 1853 (Middlesex Canal Commission n.d.).

Many nearby communities also experienced population growth and new immigrant populations headed to the region to work in manufacturing in Lowell (facilitated by streetcar lines providing access) and nearby towns. Carlisle however remained very rural throughout the 19th century, with agriculture remaining as the dominant focus of the local economy.

The Great Depression impacted the textile industry and the region saw a big decline in manufacturing. New highways provided enhanced regional access and with the exception of a population decline in Lowell, the nearby communities continued to grow. Post WWII suburban expansion impacted much of the region, however the City of Lowell struggled and the Town of Carlisle maintained its rural economy and character. The 1970s saw the establishment of Lowell Heritage State Park and brought the National Park Service to Lowell, as well as renovated mills, new immigrant communities and a growing interest in urban areas, which brought revitalization to downtown Lowell.

Table 1.1. Physical, Ecological and Political Settings of the Lowell/Great Brook Planning Unit

Planning Unit: Lowell/Great Brook

Location:		
	City of Lowell	Middlesex County
	Town of Dracut	Middlesex County
	Town of Tyngsborough	Middlesex County
	Town of Carlisle	Middlesex County
	Town of Chelmsford	Middlesex County
	Town of Billerica	Middlesex County

DCR Management Structure: Walden Complex
Metro West District
North Region

Properties:	***Landscape Designation***	***City/Town***	***Area (acres)[a]***	***Perimeter (miles)[a]***
Lowell-Dracut-Tyngsborough State Forest	Parkland	Lowell	320	15
		Dracut	554	
		Tyngsborough	236	
Lowell Heritage State Park	Parkland	Lowell	87	18
Great Brook Farm State Park	Parkland	Carlisle	907	16
		Chelmsford	23	
Carlisle State Forest	Parkland	Carlisle	25	1
Warren H. Manning State Forest	Parkland	Billerica	183	5
Billerica State Forest	Parkland	Billerica	141	3
Governor Thomas Dudley State Park	Parkland	Billerica	11	1

Ecoregion: Southern New England Coastal Plains and Hills

Watersheds: Sudbury-Assabet-Concord (SuAsCo)
Merrimack River

Legislative Districts:

Senate District	*House District*
First Middlesex	Second Middlesex
Second Essex and Middlesex	Fourteenth Middlesex
Third Middlesex	Sixteenth Middlesex
Fourth Middlesex	Seventeenth Middlesex
	Eighteenth Middlesex
	Twenty-second Middlesex
	Thirty-sixth Middlesex

Conservation Restrictions:	***Property***	***City/Town***	***Area (acres)[a]***	***Fee Interest***
	Lowell-Dracut-Tyngsborough State Forest	Lowell	17	Northeast Radio, Inc.
	Lowell-Dracut-Tyngsborough State Forest	Dracut	9	Boisvert Family
	Lowell-Dracut-Tyngsborough State Forest	Tyngsborough	47	Town of Tyngsborough

Designations:	**Property**	**Designations**
	Lowell-Dracut-Tyngsborough State Forest	Priority Habitat
		BioMap2 Core Habitat
		BioMap2 Critical Natural Landscape

Continued on next page.

Table 1.1. Physical, Ecological and Political Settings of the Lowell/Great Brook Planning Unit (Continued)

Designations:	Property	Designations
	Lowell Heritage State Park	Priority Habitat
		BioMap2 Core Habitat
		BioMap2 Critical Natural Landscape
		Downtown Lowell Local Historic District
		City Hall District
		Locks and Canals National Register Historic District
		Locks and Canals National Historic Landmark
		Lowell National Historical Park and Preservation District
		Historic Civil Engineering Landmark
		Historic Mechanical Engineering Landmark
		Environmental Justice Population
	Great Brook Farm State Park	Priority Habitat
		BioMap2 Core Habitat
	Carlisle State Forest	National Wild & Scenic River
	Warren H. Manning State Forest	Priority Habitat
		BioMap2 Core Habitat
	Billerica State Forest	Priority Habitat
		BioMap2 Core Habitat
	Governor Thomas Dudley State Park	BioMap2 Core Habitat
		BioMap2 Critical Natural Landscape

a. These values were calculated in GIS and rounded to the nearest whole number.

1.9. VISITATION

Visitation information for the planning unit is negligible, due in part to reduced DCR staffing and established management agreements with other entities, as well as physical constraints that make it difficult to capture the information (e.g., little or no infrastructure at a property, multiple entry points for a property, etc.).

The online survey that was undertaken as part of this RMP (see Section 1.4. Public Participation) did not provide a lot of information that could objectively be drawn from in order to get a sense of the complete visitor profile and experience for individual properties, or the planning unit as a whole. While there was a high response rate for both Lowell-Dracut-Tyngsborough State Forest and Great Brook Farm State Park, 78 responses for each, the remaining properties had minimal response rates, ranging from zero to three. This is due to the fact that the survey was very well publicized within the mountain biking community, and many members of that community responded to the survey for the two properties in the planning unit that are utilized the most for mountain biking. Despite promoting the survey to a wide variety of stakeholders, without active park friends groups for these properties to help promote the survey within other user communities, responses from outside the mountain biking community were low.

Lowell-Dracut-Tyngsborough State Forest

The state forest is not staffed and, as a result, there are no visitor estimates; however, the property is well-known as a popular mountain biking destination. Respondents to the online survey, most of whom were part of the mountain biking community, identified the state forest's convenient location and trail network as characteristics of the property that they liked the best. Among the ways that the state forest could be improved, respondents indicated enforcing regulations related to off-highway vehicle (OHV) use, adding more parking and trail signage, naming more trails and updating the trail map.

Lowell Heritage State Park

Although Lowell Heritage State Park is staffed, as an urban property with individual parcels spread across the city, visitor data is especially difficult to capture. Fortunately, the National Park Service (NPS), a partner in Lowell through their Lowell National Historical Park, collects and publicizes annual visitation data based on the number of visitors that enter their visitor center and exhibits,

and attend special events on park property. While these estimates do not provide any insight into the level of visitorship on the DCR's Vandenberg esplanade, they do highlight the number of people who view, and in some cases tour, DCR property in downtown Lowell (see Section 4 for more information).

Since 1982, annual visitation rates at Lowell National Historical Park have exceeded 400,000 (NPS 2014*a*). In 2013, over 500,000 visitors enjoyed the park (NPS 2014*a*). Half of those individuals visited the park in July and August, with July being the most popular month (174,530 visitors; NPS 2014*a*). The majority of July visitors were "Special Event Visitors," and likely participated in the Lowell Folk Festival, a very popular event held in downtown Lowell each year (NPS 2014*a*). Peak visitation for the DCR's Francis Gate Park and Pawtucket Gatehouse were in August (2,022 visitors) and September (1,292 visitors), respectively (NPS 2014*a*).

Great Brook Farm State Park

Visitation increased ten-fold at Great Brook Farm State Park between the establishment of the park (1974) and mid-1990s, but it is now on a downward slope. In the early 1980s, the annual visitation rate was approximately 20,000 – 25,000, while in 1996 car counters recorded approximately 205,000 visitors enjoying the park. In the late 1990s staffing and programming began to decrease and in the early 2000s a parking fee was established, collectively leading to a decline in visitation. By 2010, annual visitation decreased to roughly 120,000. Although the completion of the Smart Barn in 2011 seems to have generated a small spike in visitation, recent estimates are steadily decreasing, and are now at approximately 100,000 visitors per year.

Due to the wide range of activities available, unlike some of the other properties in this planning unit, Great Brook Farm State Park has high year-round visitation. The online survey indicated little seasonal variation in park use by regular visitors. Mid-week visitation includes a fair amount of older visitors, primarily active retirees who like to walk the trails. Through the online survey, park users provided high praise for the variety and quality of trails, as well as the appeal of the active farm and ice cream stand for visiting with children.

Carlisle State Forest

In the absence of a formal parking lot and on site staff, visitation estimates are not available for Carlisle State Forest. Visitation is believed to be quite low, and primarily by local residents.

Warren H. Manning State Forest

The DCR does not have estimates on visitation for this property. The spray deck area is very popular with young families during the summer, and the Town of Billerica, who manages the spray deck area, reports that on hot days, the parking lot often reaches capacity (Hannon-Rizza 2013).

Billerica State Forest

Without a formal parking lot and the presence of on site staff, visitation estimates are not available for Billerica State Forest.

Governor Thomas Dudley State Park

As a facility that is managed by the Town of Billerica and not staffed, the DCR does not have estimates of visitation levels at Governor Thomas Dudley State Park.

In a survey conducted during the preparation of the 2008 update to the Billerica Open Space and Recreation Plan, only three of the 68 respondents included Dudley Park, as it is locally known, as one of the open space or recreation properties that their family utilized in town (Northern Middlesex Council of Governments 2008).

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Park Serve Day at Lowell-Dracut-Tyngsborough State Forest (DCR)

SECTION 2. MANAGEMENT RESOURCES AND PRACTICES

2.1. INTRODUCTION

The Lowell/Great Brook Planning Unit contains a diverse set of natural, cultural and recreation resources. Managing these resources can be challenging, due to the competing demands of resource protection and providing public access to recreational opportunities. Effective management of this two-pronged goal requires an understanding of various laws, regulations, policies and legal agreements, while working with limited operational resources.

This section describes the resources available to the planning unit, as well as relevant management practices, regulations, policies and legal considerations. Variations to these resources and practices, which occur at the property-level, are addressed in Section 3 through Section 9.

2.2. NATURAL RESOURCES

Research Permits are required for all ecological research on DCR property. Additional state (e.g., Scientific Collecting) and federal (e.g., Bird Banding and Marking) permits may be required, depending on the nature of research. Research within wetland and river jurisdictional areas may also require regulatory review and approval from the local conservation commission.

Water Resources

Storm Water Management

Activities on DCR properties that affect the quantity or quality of storm water are regulated by a National Pollutant Discharge Elimination System (NPDES) storm water management plan (DCR 2007*a*). The plan describes control measures that the DCR uses to satisfy NPDES Phase II permit requirements for transportation and non-traditional Municipal Separate Storm Sewer Systems (MS4s). Best Management Practices (BMPs) are also identified in the plan, some of which are implemented at the agency-level (e.g., the detection and elimination of illicit discharges, catch basin cleaning), while others are implemented at the facility-level (e.g., the stenciling of catch basins).

Wetlands Protection

Activities within a wetland resource area or buffer are regulated by the Massachusetts Wetland Protection Act. (See Appendix F for additional information.)

Rare Species

The Massachusetts Endangered Species Act (MESA) protects rare species and their habitats by prohibiting the "take" of any plant or animal listed as Endangered, Threatened or Special Concern. Projects within Priority Habitat of Rare Species must undergo review by the Natural Heritage & Endangered Species Program (NHESP), unless otherwise exempted under the law.

The term "project" refers not only to the construction of buildings and infrastructure, but also to activities that involve grading or the destruction of plant life. (See 321 CMR 10.00 for the full definition of "project.") Many staff and volunteer activities that take place within the planning unit (e.g., invasive species removal, trail construction and maintenance, and habitat improvement activities) meet the definition of "project" and must go through regulatory review, if they occur in Priority Habitat.

State agencies, such as the DCR, have special obligations under MESA. First, agencies are directed to use their authorities in furtherance of the purposes of MESA and "use all practicable means and measures to avoid or minimize damage." Next, they are required to submit draft management plans, such as RMPs, to the NHESP for review. Finally, state-owned lands "that provide habitat for state-listed species shall be managed for the benefit of such listed species;" agencies "shall give management priority to the protection, conservation, and restoration of" state-listed species on state-owned lands. All "practicable means and measures shall be taken to resolve conflicts between the protection, conservation, and restoration of state-listed species…and other uses of such lands in favor of the listed species."

Additional information on MESA and its implementing regulations is available on the NHESP's website: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa.

Vegetation

There is no single management plan for the planning unit's vegetation. The *de facto* management policy is to permit populations of most species of plants to increase or decrease without human intervention. Exceptions include the maintenance of lawns and other turf areas, removal of hazardous trees and vegetation cutting associated with the management of plant or wildlife habitat.

Continuous Forest Inventory (CFI) monitoring plots are located throughout the planning unit. The number of these one-fifth acre, circular plots varies by property. A series of forestry related metrics, including the number of trees five or more inches in diameter, tree regeneration, amount of coarse woody debris and presence of invasive plants and tree diseases, are collected at each plot. On average, each plot is visited, and data collected, once every ten years.

Wildlife

There is no single wildlife management plan for the planning unit. The *de facto* management policy is to permit most wildlife populations to increase or decrease without human intervention. Exceptions to this include the hunting of game species and fishing at select properties. Hunting, trapping, and fishing are managed through a variety of regulations (see Section 2.4, below).

2.3. Cultural Resources

The DCR's Office of Cultural Resources (OCR) provides technical assistance on issues relating to archaeology and the preservation of landscapes, buildings, structures and objects. It also conducts a coordinated program of basic and applied research to support planning for, and management of, cultural resources on DCR properties through project management and resource management planning. The OCR also nominates properties for inclusion on the State and National Registers. A copy of the DCR Cultural Resources Policy has been included as Appendix D.

The OCR is also responsible for overseeing the historic preservation regulatory compliance responsibilities of the agency. It assesses regulatory needs and, when applicable, notifies the Massachusetts Historical Commission (MHC) through the filing of a Project Notification Form or Environmental Notification Form for any proposed projects undertaken, funded, permitted or licensed, in whole or in part, by the agency. This is done so that the MHC may make a Determination of Effect of the project on historic and archaeological

resources. Finally, the OCR coordinates all archaeological survey, testing and excavation with the State Archaeologist at the MHC through an archaeological permit.

Buildings, structures, landscapes, sites and objects that are a minimum of 50 years old, retain historic integrity and are of significance on the local, statewide or national level may be listed on the National Register of Historic Places. Repairs, rehabilitation and other preservation activities on listed and eligible resources follow guidelines in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Weeks and Grimmer 1995).

Massachusetts law requires the review of all subsurface disturbances on state property. The DCR's Archaeologist holds an archaeological permit from the MHC that allows them to provide initial review of activities that result in subsurface disturbance. They are the primary reviewer of such projects and activities in the Lowell/Great Brook Planning Unit.

The inspection, investigation or removal of underwater archaeological resources is also regulated under Massachusetts law (M.G.L. 6:179–180). No person may remove, displace, damage or destroy any underwater archaeological resource, except in conformity with permits issued by the Massachusetts Board of Underwater Archaeological Resources. This applies to both inland and coastal waters. All archaeological resources in the waters of the planning unit are subject to this law.

Two of the properties within this planning unit are part of the OCR's Historic Curatorship Program, a program in which curators are selected through a competitive process to rehabilitate and maintain historic buildings in exchange for long term leases. The Historic Curatorship Program Manager is responsible for ensuring compliance with work and maintenance plans; maintaining investment accounting totals from curator reports; ensuring up to date insurance coverage; scheduling annual or bi-annual inspections; coordinating public benefit activities; and enforcing compliance with other lease terms and responsibilities.

2.4. Recreation Resources

Regulations guiding the recreational use of forests and parks may be found in 304 CMR 12.00. (See Appendix F for a summary of these regulations.) In general, all public use of DCR property must take place from dawn through dusk.

Permits

Special Use Permits are required for "any commercial or special activity or event upon the lands or waters" of all DCR properties (304 CMR 12.17; Appendix F). Non-commercial activities requiring a Special Use Permit include, but are not limited to: concerts, charity walks, road races, cultural festivals, community service projects, small weddings and gatherings with amplified sound. Research on recreation and recreationists requires a Research Permit. Commercial filming, photography, and videography are regulated through Filming and Photography Permits. Additional information on these permits, and how they may be obtained, is available on the DCR's website: http://www.mass.gov/eea/agencies/dcr/massparks/permits-rentals/dcr-permits.html.

Camping

Camping on DCR property is restricted to designated campsites or cabins; there are no permanent camping areas in the planning unit.

Geocaching

There is no Massachusetts regulation or agency policy on the placement of geocaches on DCR property. In their absence, geocaches may be placed at any location not identified as closed to the public.

Hunting and Fishing

Hunting and freshwater fishing are addressed in Massachusetts regulations 304 CMR 12.00, 321 CMR 3.00 and 321 CMR 4.00, and the official Massachusetts hunting, freshwater fishing and trapping regulations that are published annually. In general, all DCR properties are open to hunting, fishing and trapping unless otherwise specified in the Forests and Park Rules (304 CMR 12.00). Summaries of these and other applicable regulations are presented in Appendix F.

Officers from the Executive Office of Energy and Environmental Affairs' Office of Law Enforcement (i.e., Massachusetts Environmental Police officers) enforce hunting, fishing and off-highway vehicle (OHV) use.

Trail Use

Dogs may accompany trail users provided the animals are kept under control and do not interfere with any other visitor's enjoyment of DCR property (304 CMR 12.00; Appendix F).

With the exception of DCR, public safety and utility company vehicles, motor vehicles are generally not permitted on the trails in the planning unit.

A March 15, 2011 Department of Justice ruling allows individuals with mobility disabilities to use "other power-driven mobility devices" on trails. Such devices include any device powered by batteries, fuel or other engines that are used by individuals with mobility disabilities for the purpose of locomotion. Use of such devices may be restricted on trails due to factors such as: the type, size, weight and speed of the device; the volume of pedestrian traffic; the design and operational characteristics of the device; whether or not the device may be operated safely; and the potential for substantial risk of serious harm to the environment or natural and cultural resources. None of the trails within the planning unit have been assessed for their compatibility with these devices.

2.5. INFRASTRUCTURE

Property Boundary

The Management Forester or Assistant Management Forester attempts to locate and mark property boundaries in association with forest inventory activities. They also mark the boundaries of new properties as they are acquired. Boundary marking typically involves locating and painting cement bounds or pipes, and posting boundary signs.

Buildings and Structures

The management of DCR-owned buildings is performed by DCR employees or contractors. Minor maintenance and repair is performed by on-site staff. More technical repairs (e.g., plumbing and electrical) are performed by DCR in-house trades staff or by trade or engineering contractors (e.g., well repair) whose activities are coordinated through the agency's Parks Support Operation Program. Major repairs are performed solely by licensed contractors.

Roads

The DCR maintains and repairs forest and park roads, and parkways. Management of traffic and related systems is supervised by the Parkways Section of the DCR's Division of Engineering and guided by American Association of State Highway and Transportation Officials standards, the *Manual on Uniform Traffic Control Devices* (FHA 2012) and the *Historic Parkway Preservation Treatment Guidelines* (DCR 2007*b*), if applicable. Public roads adjacent to DCR properties are maintained and repaired by either local municipalities or the Massachusetts Department of Transportation (MassDOT).

Snow removal is performed by the DCR, MassDOT and local municipalities. In general, the municipalities or MassDOT plow the public roads adjacent to forests and parks, and the DCR is responsible for plowing internal roads.

Parking

The DCR is responsible for maintaining and repairing its parking areas. Most snow removal is performed by the DCR.

Trails

A variety of regulations and policies guide the management of trails. The design, management and marking of trails are guided by the DCR *Trails Guidelines and Best Practices Manual* (DCR 2012*a*). Additional regulations, such as the Massachusetts Endangered Species Act and Wetlands Protection Act, and the DCR Cultural Resources Policy may also apply, depending on location. These regulations and policies apply to DCR employee, partner and volunteer activities.

In accordance with DCR practices, trail maintenance and construction activities should be implemented in the following order, in accordance with the regulations, policies and guidance identified above:

1. Maintain appropriate existing trails and fire roads.
2. Close or improve existing trails with known public safety hazards.
3. Close or relocate existing trails that adversely impact documented state-listed species, in consultation with the DCR's Bureau of

Planning, Design and Resource Protection and NHESP staff.

4. Close, relocate or improve existing trails that impact vernal pools.
5. Close, relocate or improve wetland crossings on existing trails that impact wetlands, streams or ponds.
6. Close redundant, dead end and unauthorized trails.
7. Close, relocate or improve existing eroded and poor condition trail segments.
8. Construct new trail connections to enhance desired, authorized recreational experiences; create additional loop opportunities; and form new connections between access points and important features.

Signs and Kiosks

The format and placement of regulatory and informational signs are governed by the *Manual of Uniform Traffic Control Devices* (FHA 2012) and guided by the DCR *Graphics Standards Manual* (DCR n.d.). The design and construction of kiosks are solely governed by the graphics manual.

Informational kiosks are managed by park staff as new information becomes available; they also perform kiosk installation and repair.

Memorials and Markers

The placement of markers or plaques is not explicitly addressed in the Forests and Park Rules (see 304 CMR 12.00; Appendix F).

2.6. Interpretive Services

Regional interpretive staff provides programming in the planning unit. There is no Comprehensive Interpretive Plan (CIP) for the entire planning unit, nor are there programs offered at every property in the planning unit.

2.7. Operational Resources

DCR Staffing

The DCR manages its forests, parks and reservations through the Division of State Parks and Recreation, otherwise known as the MassParks Division. Resources within the MassParks Division, including finances, staffing and physical equipment, are organized by regions, districts and complexes. Under this organizational structure, the Lowell/Great Brook Planning Unit is within the North Region, Metro West District and Walden Complex.

North Region

The North Region is comprised of three districts: Metro West, Middlesex Essex and Coastal. Specialized staffing resources assigned to the North Region are available on an as needed basis to the planning unit. This includes services related to interpretation, public outreach and safety, and engineering. The region is headed by a North Region Director who reports to the Deputy Director of MassParks.

Metro West District

The Metro West District is comprised of two complexes: Walden and Hopkinton. The district includes a functionally and geographically varied set of properties in the DCR system. Management is provided by a Metro West District Manager who reports to the North Region Director.

Walden Complex

The Walden Complex includes Walden Pond State Reservation in Concord and Lincoln; Carlisle State Forest and Great Brook Farm State Park in Carlisle; Billerica State Forest, Warren H. Manning State Forest and Governor Thomas Dudley State Park in Billerica; Lowell Heritage State Park, the John J. Janas Skating Rink and Raymond J. Lord Memorial Swimming Pool in Lowell; and Lowell-Dracut-Tyngsborough State Forest.

The Forest and Park Supervisor at Walden Pond State Reservation also serves as the Walden Complex Field Operation Team (FOT) Leader. The team leader is responsible for coordinating the operational needs for each facility in the Walden Complex, through the use of Field Operation Teams. The Walden Complex FOT Leader reports to the Metro West District Manager.

Table 2.1. DCR Staffing Resources in the Walden Complex, by Reporting Location[a]

Job Title[b]	Type[c]	Reporting Location
Walden Pond State Reservation		
Walden Complex FOT Leader	Y	Concord
Forest and Parks Supervisor II	Y	Concord
Clerk I	Y	Concord
Visitor Services Supervisor I	Y	Concord
Park Interpreter (2)	S	Concord
Forest and Parks Supervisor I (3)	S	Concord
Summer Worker (4)	S	Concord
Laborer I (8)	S	Concord
Recreation Facility Supervisor I	S	Concord
Park Ranger	S	Concord
Lifeguard II	S	Concord
Lifeguard I (12)	S	Concord
Great Brook Farm State Park		
Forest and Parks Supervisor III	Y	Carlisle
Laborer II	Y	Carlisle
Laborer I (3)	S	Carlisle
Park Interpreter	S	Carlisle
Park Ranger	S	Carlisle
Lowell Heritage State Park		
Forest and Parks Supervisor I	Y	Lowell
Laborer I (2)	S	Lowell
Raymond J. Lord Memorial Swimming Pool		
Recreation Facility Supervisor III	S	Lowell
Recreation Facility Supervisor I	S	Lowell
Lifeguard II	S	Lowell
Lifeguard I (10)	S	Lowell
Summer Worker (2)	S	Lowell

a. Includes staff from the Division of State Parks and Recreation who worked exclusively within the Walden Complex in 2013.
b. The number of multiple employees with the same job title are indicated in parentheses.
c. Type: Y = Year-round; S = Seasonal.

Park staff are responsible for a number of management activities in order to keep the properties clean and accessible for use year round. Duties include cleaning bathrooms, picking up litter and emptying trash barrels. Due to current limited staffing levels, these activities are not always able to be performed on a daily basis. Mowing and trimming is performed on an as needed basis, typically weekly, during the warmer months of the year.

Bureau of Forestry and Fire Control

The Bureau manages a variety of programs, including management forestry, forest fire control, forest health and urban/community forestry, that provide technical assistance and services on forestry related issues to DCR forests, parks and reservations. Bureau staff and assets are organized into districts that generally follow county boundaries.

Middlesex County is divided into two fire districts; the Lowell/Great Brook Planning Unit falls within Fire District 6, which is based out of Great Brook Farm State Park. Beyond fighting fires and managing prescribed burns, the fire staff does a lot of fire road maintenance.

Bureau of Ranger Services

The Bureau of Ranger Services includes field ranger staff who provide outreach related to Massachusetts regulations and public safety services. While other DCR districts have an assigned District Ranger, the Metro West District does not.

Division of Engineering

The Division of Engineering is responsible for the engineering and construction of parkways, dams, buildings and recreation facilities. It also provides a Regional Engineer to oversee day-to-day repair and construction projects, and to maintain a working relationship with the Regional Director in identifying capital improvement priorities. The Division also provides catch basin cleaning at Lowell Heritage State Park in support of park operations.

Bureau of Planning, Design and Resource Protection

This Bureau prepares RMPs and Trail System Plans; develops and updates GIS data; provides technical assistance with the management of archaeological and historic resources; identifies and acquires properties to be added to the DCR system; maintains an archive of park documents; provides technical support on ecological resources and the monitoring of CRs; and designs and manages projects to enhance DCR properties.

Office of External Affairs and Partnerships

The Office of External Affairs and Partnerships works to enhance DCR's constituency of supporters and users by: working in partnership with park users and supporters to develop and sustain community-based stakeholder groups; facilitating external financial assistance for the planning, design and construction of capital projects; managing the DCR partnerships Matching Funds Program, which leverages private contributions to improve DCR-

owned and managed facilities; and serving as a dedicated point of contact for individuals and nonprofit, institutional and community-based organizations.

Supplemental Staffing

Volunteers

Volunteers can provide a variety of human and intellectual resources to support the management and maintenance of the properties in the Lowell/Great Brook Planning Unit. Volunteer services include clean-ups, trail maintenance, monitoring, botanical surveys, grant writing, interpretive programming and others. Volunteers may be individuals or members of groups, businesses or organizations, and may be organized by DCR staff or partner organizations.

All volunteer activities must be conducted with prior approval and supervision of the DCR, and in accordance with DCR standards and volunteer policies, including documentation through a Volunteer/Stewardship Agreement Form, Volunteer Release Form and Volunteer Service Log (DCR 2013).

Law Enforcement and Public Safety

The Massachusetts State Police has primary law enforcement authority on state-owned lands. Local police provide additional law enforcement in the planning unit, within their respective jurisdictions. The Executive Office of Energy and Environmental Affairs' Office of Law Enforcement (i.e., the Massachusetts Environmental Police) provides primary enforcement of hunting, fishing, boating, OHV and snowmobile regulations.

DCR Rangers are not law enforcement officers, but have the authority to enforce DCR regulations and issue citations (i.e., parking tickets and dogs off leash) on DCR property. They also coordinate search and rescue activities in forests, parks and reservations.

Municipalities provide emergency fire and medical response to incidents on state lands. DCR Forest Fire Control District 6 provides assistance to Municipalities in the detection, suppression and prevention of wildfires. DCR Rangers may provide first aid.

General Budgetary Info

Operating Budget

The annual operating budget supports daily operations and maintenance, including utilities, supplies, equipment leases, administration, and the maintenance and minor repair of facilities, vehicles and equipment. In Fiscal Year 2013, the Lowell/Great Brook Planning Unit operating budget, excluding personnel costs, was $16,725. Funds are also available from the region for specific projects or activities within the planning unit.

Capital Budget

The capital budget supports projects (e.g., construction and repair) and items (i.e., equipment) with a per-unit cost of at least $5,000 and an expected lifespan of at least seven years.

Capital projects are identified and funded through a five-year capital plan. These plans identify proposed capital projects, their costs and the year in which they are to be funded. In fiscal years 2012 through 2014, improvements to the Mack building and Rynne bathhouse were completed at Lowell Heritage State Park. These projects cost $134,471. At Great Brook Farm State Park, the Fiscal Year 2012 projects were related to the design of the dairy barn and construction of a modular storage building, which cost $110,096. An additional project in Fiscal Year 2013 involved masonry work at the Hart Barn and cost $9,320.

Capital plans are extensively reviewed within the DCR, approved by the Commissioner and included in the DCR's annual budget. This budget is then reviewed by the Executive Office of Energy and Environmental Affairs, the Executive Office of Administration and Finance, and the Governor. Additional capital initiatives may be identified and added to the budget by the Commissioner, Secretary or the Governor during this review process.

Deferred Maintenance

These funds are used for infrastructure repair that exceed typical maintenance, but do not rise to the level of a capital project. They may also be used to address emergency capital projects for which funds have not been allocated. Each region is allotted deferred maintenance funds on an annual basis; the Regional Director determines how these funds are to

be used. Recent deferred maintenance projects within the planning unit include $4,500 to bring the fire security system in buildings along the Vandenberg esplanade up to compliance; $1,000 to fix the communication and video system at the Mack building; and approximately $3,000 to repair trails and build boardwalks at Great Brook Farm State Park.

Supplemental Funding

Grants

Federal and private funds, in the form of grants, are periodically awarded on a competitive basis to the DCR for park maintenance and operation activities (e.g., recreational trails grants). There have been no recent grants awarded to the planning unit.

Earmarks

Earmarks are funds directed to specific projects by the Massachusetts General Court via the annual state budget. There have been no recent earmarks for the planning unit.

Conservation Trust Fund

This trust fund uses donations to support special initiatives that go above and beyond basic property maintenance. It is funded through charitable contributions to the DCR, including those donations placed into the "iron rangers" (i.e., a secure metal donation box) located at Lowell Heritage State Park (1) and Great Brook Farm State Park (2). In 2013, Lowell Heritage State Park received over $1,000 in charitable contributions, while Great Brook Farm State Park received over $225. As of February 11, 2014, there is approximately $2,915 in the Conservation Trust Fund for Lowell Heritage State Park and $5,550 in the fund for Great Brook Farm State Park.

Heritage Parks Fund

In Fiscal Year 2014, 20 benches within the Mack plaza at Lowell Heritage State Park were replaced using approximately $45,000 from this fund.

Dedicated Funds

Dedicated property funds may come from a variety of sources (e.g., telecommunication tower fees), and are limited to use at the property on which they are derived. There are no sources of dedicated funds for any property within the planning unit.

Retained Revenues

The state operating budget specifies the maximum amount of park revenue from fees, licenses and rents charged by DCR that may be retained by the agency in a given FY (the amount changes yearly). Revenue is deposited in the state's general fund. DCR may then use (or retain) up to 80% of this revenue statewide for its operating expenses and improvements to DCR facilities statewide.

Great Brook Farm State Park is the only property in this planning unit that currently generates any retained revenue. Revenue is collected from a number of different sources, including parking, annual pass sales, rental fees and event permits. In calendar year 2013, Great Brook Farm State Park collected $33,580 in parking fees, $12,240 in annual pass sales, $1,126 in event fees, and $16,680 in rental income (from lease holders), for a total of $63,626. This total does not include revenue or in-kind investments from the farm lease or the ski concession.

In-kind Contributions

In-kind contributions are the donation of goods or services, rather than funds. The Student Conservation Association (SCA) has provided work crews to assist with trail maintenance activities at Great Brook Farm State Park, contributing their time and labor. The New England Mountain Bike Association (NEMBA) also holds annual trail days at both Great Brook Farm State Park and Lowell-Dracut-Tyngsborough State Forest. NEMBA members assist with the maintenance of trails used for mountain biking purposes, providing labor and materials.

Spruce Swamp (DCR)

SECTION 3. LOWELL-DRACUT-TYNGSBOROUGH STATE FOREST

3.1. INTRODUCTION

Lowell-Dracut-Tyngsborough State Forest (1,109 acres) is a natural treasure of the Merrimack Valley. Its location between the urban centers of Lowell, MA and Nashua, NH make it unique and valuable, in terms of the recreational and educational opportunities available. The forest's network of trails provides access to largely undisturbed woodlands and wetlands, as well as several noteworthy cultural sites, for hikers, horseback riders and mountain bikers alike. It is an ideal location to discover the rich history of the region, from the influence of retreating glaciers to the course of human settlement over the last nine thousand years.

3.2. HISTORY OF PROPERTY

The history of Lowell-Dracut-Tyngsborough State Forest dates back thousands of years to Native American settlements along the Merrimack River. The principal tribe of the Merrimack Valley was the Pennacook, who were led by Passaconaway, and later by his son Wonalancet, two of the most renowned chiefs in New England. Both men were known for their mild dispositions, "preferring the ease and comforts of peace to the hardships and deprivations of war," and were respected by all of the smaller tribes in the region (Piotrowski 2002, 17).

At the start of King Philip's War in 1675, the Pennacook fled the Merrimack Valley to avoid having to take a side in the conflict. When Wonalancet returned to the area 10 years later, he sold all of his tribe's homelands to Jonathan Tyng and his partners, reserving only the right to fish and hunt. Soon after this "million-acre" sale, Wonalancet joined a tribe in Quebec, Canada and did not return to the area until 1692 (Crowley 1904; Piotrowski 2002, 18). It was at the request of a few hardy colonists, who were comforted by his presence, that Wonalancet moved back to Tyngsborough, where he lived with Jonathan Tyng in the Tyng Mansion until his death in 1696.

The area surrounding the state forest was slow to develop through the early decades of the 18th century, primarily due to unstable frontier conditions. After 1730, increased settlement took place throughout the area, especially along the riverine lowlands of the Merrimack. By 1800, Chelmsford (part of which would become Lowell), Dracut and Tyngsborough were flourishing. Farms,

quarries, mills and other small-scale manufacturing industries supported the regional economy. A series of transportation improvements throughout the 19th century, including roads and bridges, river ferries, canals and railroad corridors, maintained the vitality of the Merrimack Valley.

During the 19th century, the character of Dracut and Tyngsborough began to shift as Lowell established itself as the industrial powerhouse in the region. Both towns became popular vacation communities with established waterfront parks and resorts attracting seasonal visitors from Boston and New York. Lakeview Park (Dracut), Willowdale and Mount Rock (Tyngsborough) were just a few of the more popular destinations in the area, all of which were situated around Lake Mascuppic.

Land for Lowell-Dracut-Tyngsborough State Forest was first acquired by the Commonwealth between 1933 and 1936. During that time, federal Works Progress Administration projects were carried out in the forest, including the reconstruction of Trotting Park Road (Lowell and Tyngsborough); creation of scenic vistas from Whortleberry Hill; improvement of timber stands on Gage Hill; and construction of a tool shed and blacksmith shop. An old spring water bottling building, remnants of a company once located on the land, was repurposed as a forest headquarters (Stone & Webster Environmental Technology & Services 1998). In 1937, a 16- by 30-foot single-story woodshed and public comfort station was built at the headquarters site, which was located on the east side of Trotting Park Road (Lowell), south of the current main entrance to the state forest (Stone & Webster Environmental Technology & Services 1998).

By the early 1950s, there was considerable interest in developing the state forest into a major facility (see Appendix H). However, early efforts to act on this interest, such as the small recreation area and ski trail established near Whortleberry Hill, never became popular with visitors (Lambert 1972). For the next 20 years, the forest remained largely undeveloped; hiking and "some" snowmobiling were the principal recreation uses (DNR 1970, 2).

In 1970, the Department of Natural Resources (DNR) wrote a plan for the state forest to "help meet the increasing need for a variety of recreation and natural experiences in the rapidly suburbanizing Lowell region" (DNR 1970, 2). According to the plan, much of the forest was "to be left in its natural state, protected and enhanced as resource management areas" (DNR 1970, 2). However, specific recommendations were made for an organized interpretive trail system, an environmental education or visitor's center, a day use area for swimming and picnicking, and a group camping area. The plan also recommended acquiring an additional 300 acres of land to provide a larger buffer between the proposed development and more natural areas of the forest.

Several years after the DNR plan was written, but before any of its recommendations were implemented, Lowell-Dracut-Tyngsborough State Forest fell into a state of disrepair. The buildings at the headquarters site were boarded-up and the forest was "ravaged by vandalism" (Sylvester 1977). "Stripping and torching" cars was one of the more notorious activities that took place within the forest; in 1976, 85 burnt cars were found in the Dracut portion alone (Sylvester 1977). The lack of supervision over the forest's Cut-A-Cord Program led to further abuse, with permit holders reportedly taking three or four times their share of wood from the forest and reselling it at a much higher price (Sylvester 1977).

One bright spot in the forest's history during this time period was the partnership and agreement between the Department of Environmental Management and Greater Lowell Indian Cultural Association (GLICA). In 1978, an initial three-year Memorandum of Understanding was signed, which granted the GLICA access to 150 acres of the state forest where the group erected temporary wigwams and teepees, laid out a ceremonial circle and held cultural festivals (Anonymous 1981). The GLICA's presence enhanced the state forest's natural and cultural resources and helped curb some of the vandalism taking place there (Anonymous 1981).

In 1996, all of the buildings associated with the headquarters site were removed and forest operation and maintenance responsibilities shifted to eight year-round and seasonal staff based out of Lowell Heritage State Park (Stone & Webster Environmental Technology & Services 1998). Today, the state forest remains largely undeveloped and staff are based out of both Great Brook Farm State Park and Lowell Heritage State Park.

3.3. EXISTING CONDITIONS

Natural Resources

Physical Features

Topography. The state forest is shaped roughly like a bowl, with a large wetland near its center and several drumlins, or elongated hills, situated around its perimeter. The highest points within the forest are atop Whortleberry Hill (364 feet) and Gage or Huckleberry Hill (324 feet), both of which are located in the northernmost portion of the forest (see Figure 2).

Geology. The bedrock in the area of Lowell-Dracut-Tyngsborough State Forest is largely comprised of calcareous sandstones, siltstones and shale, with Ayer granite and Dracut diorite intruding near the Town of Dracut (Skehan 2001). The best examples of these formations fall outside of the forest, underlying the Merrimack River, near the University Avenue Bridge in Lowell (calcareous sandstones, siltstones and shale) and at Nickel Mine Hill, north of Methuen Street in Dracut (Dracut diorite; Skehan 2001).

Within the state forest itself, several large glacial erratics, or boulders, are recognized as significant natural and cultural resources (e.g., Horsehead Rock, Sheep Rock and Indian Head Rock). There is also evidence of multiple stone quarries within the forest, where granite and gneiss were collected as building material for Lowell's canal system and textile mills (Ali and Hudon n.d.).

Soils. Soils within the forest vary based on the topography. Poorly and very poorly drained sandy loams and Freetown or Swansea mucks are associated with the low-lying wetlands. These soils are considered severely limited for picnic areas, paths and trails (Peragallo 2009). Well to excessively drained sandy loams and exposed stones or boulders dominate the rolling to moderately steep hills. These soils range from being severely to slightly limited for picnic areas, paths and trails (Peragallo 2009). The severe limitations are strictly related to picnic areas and the soils being too sandy, too rocky or too steep.

Table 3.1. Soils of Lowell-Dracut-Tyngsborough State Forest

Soil Series	% of Forest	Drainage Class
Canton fine sandy loam	18.4	Well drained
Montauk fine sandy loam	14.0	Well drained
Freetown muck	13.8	Very poorly drained
Charlton-Hollis-Rock outcrop complex	7.0	Well to somewhat excessively drained
Hollis-Rock outcrop-Charlton complex	6.6	Well to somewhat excessively drained
Deerfield loamy sand	6.0	Moderately well drained
Narragansett silt loam	5.3	Well drained
Birdsall mucky silt loam	4.4	Very poorly drained
Scituate fine sandy loam	4.4	Moderately well drained
Scarboro mucky fine sandy loam	2.9	Very poorly drained
Merrimac fine sandy loam	2.8	Somewhat excessively drained
Swansea muck	2.8	Very poorly drained
Water	2.6	N/A
Ridgebury fine sandy loam	2.4	Poorly drained
Whitman fine sandy loam	1.6	Very poorly drained
Wareham loamy fine sand	1.4	Poorly drained
Windsor loamy sand	1.1	Excessively drained
Paxton fine sandy loam	1.0	Well drained
Tisbury silt loam	0.8	Moderately well drained
Sudbury fine sandy loam	0.5	Moderately well drained
Hinckley loamy sand	0.2	Excessively drained
Woodbridge fine sandy loam	0.2	Moderately well drained
Merrimac-Urban land complex	0.0	Somewhat excessively drained

Water Resources

Ponds. There is only one named pond in Lowell-Dracut-Tyngsborough State Forest; it serves as a portion of the property's northeastern boundary (see Figure 2). Althea Lake is a relatively small, 43-acre pond with a maximum depth of 15 feet (MassWildlife 1993*a* and MassGIS 2009). The DCR owns approximately 1,735 feet of the shoreline; the remaining portion is lightly developed. Emergent

Placeholder for Figure 2.

aquatic vegetation has historically been very heavy at Althea Lake, making it difficult to fish (MassWildlife 1993*a*).

There are approximately 33 acres of other smaller, unnamed pools and ponds within the forest.

A second named pond abuts the DCR's Conservation Restriction in Tyngsborough (see Figure 2). Long Pond is a 158-acre interstate pond with a maximum depth of 25 feet (MassWildlife 1993*b* and MassGIS 2009). The DCR has an interest in approximately 1,200 feet of the shoreline; the remaining portion is heavily developed. Long Pond is an infertile body of water; it contains very little aquatic vegetation or sizeable fish (MassWildlife 1993*b*).

Wetlands. Wetlands account for nearly one-quarter of the forest's acreage (approximately 244 acres or 22%). Spruce Swamp is the largest wetland within the forest (approximately 107 acres; see Figure 2). It contains areas of deep marsh, shrub swamp and wooded swamp, as well as acidic shrub fen, a rare Priority Natural Community. Before the construction of Carney Road (Dracut and Lowell), which dammed a small stream, Spruce Swamp was known as Indian Head Lake.

Vernal Pools. There are 31 certified and 15 potential vernal pools within the state forest, several of which are Civilian Conservation Corps (CCC) water holes (see Cultural Resources, below, for more information).

Streams. There are three named streams within the forest, all of which flow into the Merrimack River (see Figure 2). Scarlet Brook flows out of a wetland southeast of Althea Lake, towards Sherburne Avenue in Lowell, and enters the Merrimack River near Greater Lowell Technical High School. Claypit Brook originates from a wetland south of Spruce Swamp. The stream flows south towards Varnum Avenue in Lowell, where it turns east and enters the Merrimack River near Pawtucket Falls. Flagg Meadow Brook is located in the easternmost portion of the forest and flows south towards Lowell General Hospital before entering the Merrimack River downstream of Claypit Brook.

Groundwater. There are no aquifers beneath the state forest.

Flood Zones. The 100-year flood zone overlaps with the wetland immediately east of Althea Lake (18 acres), the western edge of Spruce Swamp (22 acres) and portions of Scarlet Brook (29 acres). The 500-year flood zone overlaps with the northern edge of Spruce Swamp, near Forest Park Road in Dracut (six acres).

Rare Species

Lowell-Dracut-Tyngsborough State Forest is home to three state-listed species. One of these species is susceptible to collection and is not identified in this plan.

Table 3.2. State-listed Species of Lowell-Dracut-Tyngsborough State Forest, as identified by the Natural Heritage & Endangered Species Program (NHESP)

Species	Type	MESA[a]
Blanding's turtle	Reptile	T
Blue-spotted salamander[b]	Amphibian	SC
Data sensitive species[c]	Insect	T

Source: Harper 2013

a. Status of species listed under the Massachusetts Endangered Species Act (MESA): SC = Special Concern and T = Threatened.

b. Blue-spotted salamander has not been re-observed at the state forest since 1989 and will be considered to be historic at this location at the end of 2014.

c. This species is not identified in accordance with the NHESP's policy of withholding, in site-specific documents, the name or location of rare species susceptible to collection.

Blanding's turtles use a variety of habitats, including vernal pools, marshes, scrub-shrub wetlands and open uplands, during their life cycle (NHESP 2007*a*). Blue-spotted salamanders, on the other hand, rely solely on moist, moderately shaded habitats and vernal pools, in particular, for breeding (NHESP 2007*b*). The data sensitive species can be found in the forest's wetlands and nearby wooded areas.

Nearly 90% of the forest (995 acres) has been designated as Priority Habitat under the Massachusetts Endangered Species Act (321 CMR 10.00; see Appendix F). Approximately 79% of the lands on which the DCR holds a Conservation Restriction are also designated as Priority Habitat (56 acres). These same areas have been identified as Core Habitat in the MassWildlife and The Nature Conservancy publication "BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World" (MassWildlife and TNC 2010).

BioMap2 highlights two types of areas important for conservation: Core Habitat and Critical Natural Landscape. The first is crucial for the long-term persistence of rare species and other species of conservation concern. The second provides habitat for wide-ranging native wildlife, supports intact ecological processes, maintains connectivity among habitats, enhances ecological resilience and buffers aquatic Core Habitats to help ensure their long-term integrity. Protection of both areas, which may overlap, is "important to conserve the full suite of biodiversity" in Massachusetts (MassWildlife and TNC 2010).

Within Lowell-Dracut-Tyngsborough State Forest, there are also 260 acres (23%) of Critical Natural Landscape, which encompass Spruce Swamp and adjacent wetlands to the north and west.

Vegetation

Forest Types. In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified nine forest sub-types within Lowell-Dracut-Tyngsborough State Forest.

Table 3.3. Forest Sub-types of Lowell-Dracut-Tyngsborough State Forest

Forest Sub-type	Acres	% of Forest
Mixed oak	299.2	27.0
Eastern white pine-oak	274.9	24.8
Eastern white pine	72.1	6.5
Oak-hardwoods	64.3	5.8
Eastern white pine-hardwoods	36	3.2
Red maple-swamp hardwoods	33.9	3.1
Red pine plantation	30.8	2.8
Grey birch-red maple	10.8	1.0
Eastern hemlock-hardwoods	6.8	0.6
Total	*828.8*[a]	*74.8*

a. The difference in total acreage is due to the exclusion of wetlands and areas of open water, as well as changes in the forest's boundaries since 2003.

More recently (2010-2011), specific areas within the forest were visited by DCR Management Foresters as part of the Massachusetts Continuous Forestry Inventory (CFI). The CFI is a network of permanent, one-fifth-acre plots on state forest lands that are routinely monitored for sivicultural purposes. The measurements and observations made within each CFI plot are recorded in a database that dates back to 1960, when the CFI was created. Approximately 10% of the state's CFI plots are inventoried each year, on an on-going basis. As of 2010, there were 1,768 CFI plots statewide (Goodwin 2014).

There are seven CFI plots within Lowell-Dracut-Tyngsborough State Forest. They range in age from approximately 70 to 100 years and are comprised of mostly white or red pine, pitch pine, oak or swamp hardwoods. As part of the CFI process, DCR Management Foresters also look for signs of disturbances that affect the development of vegetation in the vicinity of each CFI plot. Since 2010, four disturbance agents have been observed in the forest's CFI plots. These agents, in decreasing order of occurrence, are: fire, clearing for pasture, insects and beavers.

Priority Natural Communities. One Priority Natural Community, acidic shrub fen, has been identified within Lowell-Dracut-Tyngsborough State Forest. Acidic shrub fens are typically found along wet pond margins in the eastern half of Massachusetts and consist primarily of low-growing, interwoven shrubs, with patches of Sphagnum moss growing at the shrub bases (Swain and Kearsley 2001). Acidic shrub fens have a state ranking of S3, which means that they are neither rare (S1) nor common (S5), however their conservation is encouraged. The biggest threats to this natural community are hydrological alterations that affect either water quality or quantity (Swain and Kearsley 2001).

Invasive Species. Since 2010, five invasive species have been observed by DCR Management Foresters in the forest's CFI plots. These invasive species are: common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), garlic mustard (*Alliaria petiolata*), oriental bittersweet (*Celastrus orbiculatus*) and black locust (*Robinia pseudoacacia*). Japanese knotweed (*Fallopia japonica*) was also observed in the former headquarters site while conducting fieldwork for this plan.

Pests and Disease. Since 2010, DCR Management Foresters have observed, as part of the CFI process, several biological agents responsible for tree loss. These agents are: heart rot, black knot of cherry (*Apiosporina morbosa*), white pine weevil (*Pissodes strobe*), borers, gypsy moth (*Lymantria dispar*) and other unknown insects and biological agents.

It is also worth noting that Emerald Ash Borer, an invasive wood boring insect that was first identified in Massachusetts in 2012 and adversely affects all genera of ash trees, has recently been discovered in the neighboring town of Methuen (Church 2014).

Wildlife

Birds. Approximately 150 species of birds have been recorded on, or over, the state forest in recent years (see Appendix G). Of these species, 23 are classified as Species in Greatest Need of Conservation (MassWildlife 2006).

Mammals. There is little current information on the forest's mammals. Sixteen species confirmed to occur within the forest and an additional 26 species that may possibly occur within the forest are identified in Appendix G.

Reptiles. There is little current information on the forest's reptiles. Seven species confirmed to occur within the forest, three of which are classified as Species in Greatest Need of Conservation, and an additional nine species that may possibly occur within the forest are identified in Appendix G (MassWildlife 2006).

Amphibians. There is little current information on the forest's amphibians. Eight species confirmed to occur within the forest, one of which is classified as a Species in Greatest Need of Conservation, and an additional 10 species that may possibly occur within the forest are identified in Appendix G (MassWildlife 2006).

Fish. There is no current information on the forest's fish. Surveys conducted by MassWildlife in 1978 at Althea Lake identified the following seven species: largemouth bass (*Micropterus salmoides*), chain pickerel (*Esox niger*), yellow perch (*Perca flavescens*), pumpkinseed (*Lepomis gibbosus*), bluegill (*Lepomis macrochirus*), yellow bullhead (*Ameiurus natalis*) and brown bullhead (*Ameiurus nebulosus*; MassWildlife 1993*a*). A separate MassWildlife survey at Long Pond in 1981 found these same seven species, plus white sucker (*Catostomus commersonii*) and golden shiner (*Notemigonus crysoleucas*; MassWildlife 1993*b*).

Cultural Resources

Pre-Contact Archaeological Sites

Two pre-Contact sites are documented within the state forest. During an archaeological survey, a camp site was uncovered on an upland terrace in Dracut dating to the Early Archaic Period (10,000-7,500 B.P.; Before Present). Many stone tools were recorded, as well as a unique feature unlike any other documented in the northeast. A small pit containing 1,200 fragments of calcined (burned) deer bone was located on a steep slope making this site potentially eligible for listing on the National Register of Historic Places. In another area of the forest (Lowell), a Late Archaic Period (5,000-3,000 B.P.) camp site was recorded. No archaeological sites have been recorded in the Tyngsborough section of the forest, however it has not been systematically surveyed. The physical characteristics, regional setting and known pre-Contact occupation in the area all confer a high archaeological potential for the state forest.

Historic Archaeological Resources

Timothy Coburn reportedly operated one of the earliest mills in Lowell (Richardson 1978). The remnants of this mill site may fall within the southern portion of the forest, along Claypit Brook. The remnants of a dam (see Structures, below) suggest that there was also some small scale industrial activity located along the brook. However, more research is needed to determine the nature and extent of the site, to identify any additional features, and to confirm its association with one of the six men named Timothy Coburn who resided in the area in the 18th and 19th centuries (Richardson 1978).

A spring water bottling company was established at the former headquarters site in the late 19th century, operating until c1920. When the state forest was established in the 1930s, at least one building from the former bottling plant, a pump house, was renovated for forest use. The site was utilized as the forest headquarters until the 1970s, and then left vacant until the buildings were removed in 1996. A concrete pad, the foundation from the former headquarters building and a depression with stones that is likely the cellar hole of the former pump house, are still present on site. The pump house cellar hole is currently filled with branch debris. A trash pile that contains glass bottle debris, as well as

a terra cotta pipe sticking out of the ground (possibly a part of the former bottling works), was also located nearby.

Earlier research on the history of the state forest indicates that there are at least two additional cellar holes that are expected to exist on the property (Richardson 1978). These resources were sought during the fieldwork for this plan, but could not be confidently located; additional research is needed.

Historic Resources

Buildings. There are no historic buildings within the state forest.

Structures. There are five Civilian Conservation Corps (CCC) water holes within the state forest. These water holes, typically small, stone lined ponds, were developed by the CCC in larger state forests and used as a source of water for forest fire control purposes. Two of the water holes within Lowell-Dracut-Tyngsborough State Forest are adjacent to Trotting Park Road (Lowell): one is near the former headquarters site and the other is on the edge of Spruce Swamp. A third water hole is just north of Trotting Park Road (Tyngsborough), adjacent to an unnamed administrative road and Spruce Swamp. The fourth is adjacent to Totman Road (Dracut) and is notable for being encircled by a pathway, providing more access to the resource than is typical. The fifth water hole is located north of Totman Road (Dracut) and is notable for being rectangular in shape, where the others within the forest are round. In general, the water holes are all in fair to poor condition, with some of the side walls settling and vegetation creeping in from the edges. All have drainage issues.

CCC Water Hole (DCR)

There are three stone slab bridges of unknown age located in the forest. This simple bridge type utilizes a single large, relatively flat stone, supported on either side by earth or stone abutments, to cross a small stream or brook. Two of the bridges are located in the southern portion of the forest, not far from the former headquarters site, and serve as part of the current trail system. One bridge is small, while the other is larger and covered by earth that has been held in place by wooden side rails, making the slab construction only visible from the side view. Both are in good condition. The third stone slab bridge is located off-rail, near intersection D3 on Carney Road (Dracut). This bridge is in fair condition and has some vegetative growth on it.

Stone Slab Bridge (DCR)

Four stone culverts were located during the fieldwork for this plan. One is located beneath Trotting Park Road (Lowell), adjacent to Spruce Swamp; another is located beneath the unnamed administrative road in Tyngsborough; a third culvert is located on Carney Road (Dracut), near intersection D3; and the fourth culvert is located on the former headquarter site's entrance loop road, adjacent to the CCC water hole. These culverts, which facilitate the flow of water beneath a roadway, were constructed utilizing small stones. The culvert beneath the former entrance loop road is also lined with a metal pipe, while the others are all stone. They may have been constructed as part of the Works Progress Administration improvements to the forest. All of the culverts are in poor condition, with some blockage and/or minor collapse impeding full flow.

The remnants of a dam, constructed of stone, can be found in the southern portion of the property, along

Claypit Brook. This dam may be associated with the Timothy Coburn mill site. See Historic Archaeological Resources, above, for more information on this resource.

Objects. There are four stone markers located within the state forest, identifying property and/or town boundaries.

- Located near an entrance to the forest on Trotting Park Road in Tyngsborough, this stone is leaning significantly and has some paint remnants on the top. The stone is inscribed with:

  T
  ARD
  1822

- A small property boundary marker inscribed with a "C," located in the southern portion of the forest.
- A town boundary marker with a "T" inscribed on one side and an "L" inscribed on the other. This stone is located at intersection of all three towns; it is leaning and covered in lichen.
- A town boundary marker with an "L" inscribed on one side and a "D" inscribed on the other. This stone is located just off of Trotting Park Road, near the boundary of all three towns. Despite some remnants of paint, it is in the best condition of any boundary marker in the forest.

Stone Boundary Marker (DCR)

Sheep Rock is located in the southern portion of the forest, not far from the former headquarters site. It is a large glacial erratic, approximately 10 feet long, 6 feet wide and 12 feet tall. A large split cuts through the rock and lichen is growing on some of the surface. The north face of Sheep Rock has been vandalized by graffiti and the south face contains the following inscription, in block letters:

SHEEP ROCK
IN MEMORY OF GEORGE J. CARNEY
BORN JUNE 13, 1835
DIED APRIL 24, 1906

Local legend states that Sheep Rock saved a flock of sheep owned by William Parham, a local farmer. During a blizzard, the flock found shelter under an overhang of the boulder. There, they were able to survive for several days until being rescued. The land where Sheep Rock lies was formerly owned by George Carney.

Sheep Rock (DCR)

Stone walls can be found throughout the state forest; they are remnants of the historic land use and ownership in the area, and also reflect the geology of the region. The walls are all dry laid, rubble walls that are generally in fair to poor condition. The walls were not mapped as part of this plan.

Several of the roads in the forest pre-date the establishment of the state forest itself, including Trotting Park Road (Lowell and Tyngsborough) and Totman Road (Dracut). Totman Road, in particular, has been identified as being an older road that may have been laid out along an established Native American pathway. Today it is a typical wide, unpaved forest road that is enjoyed by hikers and mountain bikers.

Landscapes. Remnants of quarrying activity dot the forested landscape, where early settlers took advantage of both the underlying geology of the area and the large collection of glacial erratics. It is a fascinating collection that ties the natural and cultural history of the forest together, and provides a connection to the industrial heritage of Lowell, as stone from the forest was reportedly utilized as building material for Lowell's canal system and textile mills (Ali and Hudon n.d.).

Most of the quarrying activity that was located during the fieldwork for this plan appears to be very small scale; five areas were identified where one or two stones retain visual evidence, in the form of drill scars, of past use for quarrying. Three of these sites are located in the northern portion of the forest, near Trotting Park Road (Tyngsborough) and an unnamed administrative road (Dracut), while the other two are located in the southern portion of the forest, not far from the former headquarters site.

Two other areas were identified where larger scale quarrying took place. One of these quarries is located on the eastern edge of the forest, not far from Gumpus Road in Dracut, and is the only area where a quarry pit, now filled with water, was observed. The other area has evidence of quarrying from exposed ledge. This area, near Sheep Rock, includes a collection of ledge rock and boulders that display drill scars and drill holes.

A boulder that has been worked for quarrying stone. (DCR)

There is undoubtedly evidence of other quarrying activity elsewhere in the forest that was not captured during the fieldwork for this plan. Richardson (1978) noted that he located 73 individual quarry works, the extent of which is unclear, between the former headquarters site and Carney Road (Dracut and Lowell), an area that is popular for mountain biking. However, only one quarry site is recorded on an MHC Inventory form (MHC #LOW.30).

The former entrance loop road that leads to the old headquarters site is a U-shaped drive located in the southern portion of the forest. It is defined by the placement of medium-sized rocks set on either side of the roadbed, approximately five feet apart. It is not known if these rocks were placed during the development of a spring water company in the late 19th century or during the transformation of the area into the state forest headquarters by the Works Progress Administration in 1936-1937.

Recreation Resources

Lowell-Dracut-Tyngsborough State Forest is primarily accessed via motor vehicle. Individuals who live nearby may also choose to walk or ride their bicycle to any one of the trailheads. The Lowell Regional Transit Authority offers an additional, likely underutilized, means of accessing the forest. There are two bus routes, 7 and 10, that run along Varnum Avenue (Lowell) and Tyngsboro Road (Dracut), respectively, and serve downtown Lowell, local high schools and universities, and suburban shopping centers. However, there are no bus stops adjacent to the forest on either bus route.

Recreation at the state forest includes trail-based activities such as hiking and running, horseback riding, mountain biking, snowmobiling and cross-country skiing. Geocaching also occurs throughout the forest, with participants both on and off trails. As of May 2013, there were 13 known geocaches at Lowell-Dracut-Tyngsborough State Forest and two geocaches on the DCR's Tyngsborough Conservation Restriction. Evidence of off-highway vehicle (OHV) use, paintball games, alcohol consumption and campfires, which are in violation of DCR regulations, have also been found along the forest's trails.

Hunting is permitted at the state forest; however there are two designated "No Hunting Areas" (see Figure 2). The first area (approximately 173 acres) is located in the western half of the forest, south of Althea Lake, and overlaps with the portion of the forest that was formerly under agreement with the Greater Lowell Indian Cultural Association (see Section 3.4. Management Resources and Practices). The second area (approximately 36 acres) is located east of Totman Road (Dracut) and south of the

Dracut town line. Neither area is clearly marked in the field.

The Greater Lowell Indian Cultural Association (GLICA) holds several annual recreation events at the state forest each year. The events range from seasonal cleanups to traditional ceremonies that are educational in nature. Each event is open to the public and held within a designated area of the forest, south of Althea Lake in Tyngsborough. Portable sanitary facilities are routinely rented by the GLICA for these events and, in the past, were permitted through a Memorandum of Understanding (MOU) with the DCR; that MOU has expired. Open fires, cooking and camping occasionally take place at GLICA-sponsored events; these activities were also permitted per the expired MOU with the DCR. For more information on the expired MOU, see Section 3.4. Management Resources and Practices.

The Merrimack Valley Chapter of the New England Mountain Bike Association (MV-NEMBA) devotes most of its resources to trail construction and maintenance in the Greater Lowell area. The primary focus of the MV-NEMBA is Lowell-Dracut-Tyngsborough State Forest, but the group is also active at other properties within the Lowell/Great Brook Planning Unit. In addition to their trail work, the MV-NEMBA organizes several group riding and cleanup events within the state forest each year. The majority of the group's activities are approved and permitted, via a Recreational Use Permit, by the Forest and Parks Supervisor.

Infrastructure

Property Boundary

Fee Interest Land. The 1,109-acre state forest is situated northeast of the Merrimack River, between Route 113 in Lowell and Mammoth Road in Dracut, where the City of Lowell and towns of Dracut and Tyngsborough meet. The forest can be reached by car in less than 15 minutes from Lowell, MA and less than 30 minutes from Nashua, NH.

Conservation Restrictions. There are three Conservation Restrictions (CRs) associated with the forest; one each in the towns of Tyngsborough and Dracut, and one in the City of Lowell (see Figure 2).

A 47-acre CR is located off of Autumn and Alden streets in the Town of Tyngsborough. The fee interest is held by the town and its Conservation Commission is responsible for the care and control of the property. The purpose of the CR is "…to retain the premises predominantly in its natural, scenic and open condition; to protect and promote the conservation of forests, wetlands, soils, natural watercourses, ponds, water supplies and wildlife thereon; to allow public access to Long Pond (a Great Pond) for fresh-water recreation and to the premises for the enjoyment of wildlife, natural resources, and passive recreation." Activities that are detrimental to the property's water and soil resources, including the use of motorized vehicles, are prohibited. The construction of two public parking areas, one on Alden Street for not more than 10 cars and one on Autumn Street for not more than five cars, is permitted.

A nine-acre CR is located off of Lakeview Terrace in the Town of Dracut. The fee interest is held by the Boisvert family. The purpose of the CR is "to retain the premises predominantly in its natural, scenic and open condition; to protect and promote the conservation of forests, wetlands, soils, natural watercourses, ponds, water supplies and wildlife thereon; to protect the horticultural resources of the premises; to protect and enhance the value of the abutting conservation areas; and to allow public access for enjoyment of wildlife and open space resources of the premises as specifically provided for herein." Activities that are detrimental to the property's water and soil resources, including the use of motorized vehicles, are prohibited.

A 17-acre CR is located off of Totman Road in the City of Lowell. The fee interest is held by Northeast Radio, Inc. There are existing structures, including four towers for radio transmission, on the property. The purpose of the CR is to allow the DCR to inspect the property on foot; to selectively cut and/or prune trees and erect signs interpreting or regulating access to the land; and to enter and pass through on foot to access the state forest. The property is not open to the public. In addition, activities that are detrimental to the property's water and soil resources are prohibited.

Buildings and Structures

On November 29, 1935, the Town of Dracut granted the Dracut Water Supply District (DWSD), an independent entity, the right to construct and maintain water supply infrastructure on its land. According to the deed, the exact location of the

infrastructure was to be determined by the Commissioners of the DWSD at the time of construction (Middlesex County Registry of Deeds, Northern District, Book 872, Page 85). However, the next day, November 30, 1935, the town conveyed approximately 335 acres to the Commonwealth, reserving the "…rights of the Dracut Water Supply District to construct and maintain a reservoir or standpipe on parcel four (4)…together with all rights necessary and incidental thereto" (Middlesex County Registry of Deeds, Northern District, Book 876, Page 228).

Parcel four includes most of Whortleberry Hill; the reservoir and related infrastructure described below are located on the eastern side of Gage Hill (or parcel five, as described in the deed; see Figure 2). To date, neither the DWSD nor the DCR have found any correspondence regarding the construction of a reservoir, or related infrastructure, on parcel five instead of parcel four. There is also no Memorandum of Agreement, or similar document, between the DWSD and DCR that guides access to and maintenance of the infrastructure on parcel five.

Reservoir. The one million gallon water supply reservoir, constructed in 1939, is located on the eastern side of Gage Hill, near the summit (Riopelle 2013*a*). It is covered by a 93-foot square concrete slab and surrounded by a six-foot tall chain-link fence topped with barbed wire. The fence features two gates that are secured with padlocks and one sign that reads: "Public Water Supply No Trespassing." The DCR is currently reviewing a proposal by the DWSD to replace the reservoir, due to the fact that it is undersized and nearly 75 years old.

Pump House. Down slope of the reservoir is a 15- by 24-foot windowless, single-story, masonry block building with a wood framed roof and asphalt shingles. The building, which was constructed within the last 10 years, serves as a pump house; it has electricity and is serviced by propane gas and fuel oil providers (Riopelle 2013*b*). A single, double-wide, locking metal door secures the building. Next to the entrance, and affixed to the exterior of the building, is a secure propane tank storage area.

At the rear of the building are one of two fire hydrants on site and a raised, circular concrete slab, approximately six feet in diameter. On top of the concrete slab is a secure access panel. Before the pump house was built, this structure was used to access and maintain critical water supply infrastructure. In the future, this structure will be removed and the area resurfaced to match the material and grade of the surrounding access road (Riopelle 2013*b*).

On the north side of the pump house are the second fire hydrant and a four- by five-foot secure, metal electrical transformer box, which is owned by National Grid. The transformer box sits on a five- by six-foot concrete slab and is surrounded by three, four-foot tall concrete bollards for safety and security purposes.

Dam. An illegal dam is located on the northeast side of Trotting Park Road (Tyngsborough), approximately 200 feet southeast of a DCR gate that separates the public and private portions of the road. The dam limits the flow of water from a wetland into Scarlet Brook through a culvert under Trotting Park Road (Tyngsborough). The dam primarily consists of logs greater than 12 inches in diameter and over 10 feet in length. It is not known when the dam was constructed or by whom.

Over time, water and sediment have collected behind the dam, creating a pond-like environment and promoting the growth of leafy vegetation on the dam itself. Water frequently overflows the dam, which floods and erodes portions of Trotting Park Road (Tyngsborough). At times, the erosion is significant enough to prevent DCR staff and emergency vehicles from entering the forest through the nearby DCR gate.

Trash Dumpsters. In the southern portion of the forest, within the former headquarters site, there are four large trash dumpsters that are in fair to poor condition. The dumpsters are primarily used by DCR staff to dispose of trash and larger debris collected at the state forest and nearby Lowell Heritage State Park.

Roads

Althea Avenue (Tyngsborough) is the only public road that runs through Lowell-Dracut-Tyngsborough State Forest; approximately 0.3 miles of the dead end, residential street are located within the northern section of the forest.

Trotting Park Road is the forest's primary administrative road (0.8 miles; see Figure 2). It is oriented in a north-south direction and connects the public portions of Trotting Park Road in Lowell and Tyngsborough. The paved portion of this road (0.6 miles) runs from the main entrance (Trotting Park Road, Lowell) to the northwest corner of Spruce Swamp. From Spruce Swamp to Trotting Park Road in Tyngsborough, the road surface is bank run gravel (0.2 miles).

The paved portion of Trotting Park Road continues north from Spruce Swamp to Dexter Avenue (Dracut) as an unnamed administrative road (0.5 miles; see Figure 2). An additional unnamed administrative road, located off of Tyngsboro Road (Dracut), provides access to the Dracut Water Supply District reservoir and related infrastructure (paved 0.2 miles; processed gravel 0.1 miles).

Parking

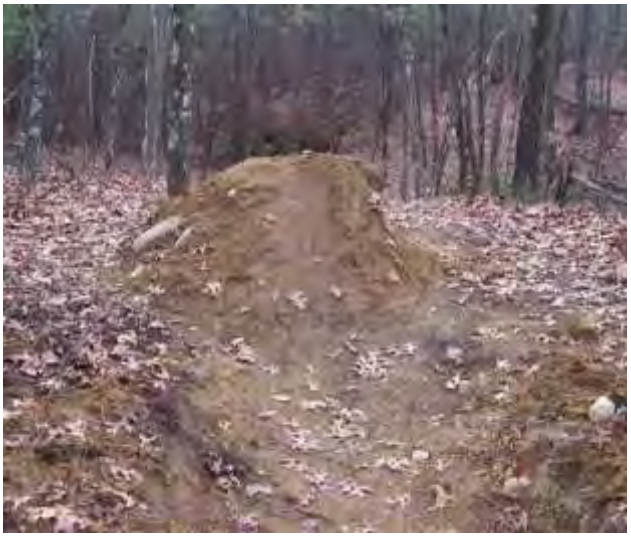
The forest has two small parking areas (see Figure 2). The first is located at the main entrance on Trotting Park Road in Lowell. It is a paved lot with a shared entrance and exit, and can accommodate approximately six vehicles. Individual spaces are not marked and there are no designated accessible spaces.

This parking area is the most popular with visitors. Vehicles are routinely parked on either end of the paved portion of the lot when there are no other spaces available. Further south on Trotting Park Road (Lowell), approximately 40 feet from the designated parking area, an "overflow" lot has been created. This unofficial parking area can accommodate three or four vehicles.

The second parking area, as indicated on the current state forest trail map, is located at the end of Trotting Park Road in Tyngsborough. It is unclear where to park when visiting this area of the forest. The most obvious location is in front of a forest gate on the west side of the road; however, this prevents DCR staff and first responders from being able to enter the forest in the event of an emergency.

Trails

There are approximately 27 miles of trails within the state forest, nearly all of which are official. An assessment of trail condition, conducted in 2009, indicated that 95% of the official trails were in good or fair condition and only 1.3 miles (5%) were in poor condition. Several official trails include technical features (e.g., banked or bermed corners, jumps and ramps), which are constructed to increase the technical challenge for mountain bike riders. It is unclear whether these features were subject to all applicable regulatory reviews and approved by the reviewing authorities and the DCR.



A mountain bike jump constructed in the forest. (DCR)

There is one, 1.5-mile long Healthy Heart Trail within the forest; it is located between the main entrance in Lowell and Spruce Swamp. Healthy Heart Trails are pathways used for hiking or walking that are easy to moderate in activity level and promoted by the DCR as a way to improve health through routine use.

The current version of the state forest trail map indicates four other named trails within the state forest (Thompson Lane, Totman Road, Carney Road and Gumpus Road), as well as "Public Safety Markers," or trail intersection numbers, that correspond to the town in which they are located (e.g., "L1" in Lowell, "D1" in Dracut, "T1" in Tyngsborough, etc.). Signs for these features are largely missing from the trail network. There are also more trails in the network than indicated on the current version of the state forest trail map.

Signs and Kiosks

There is one Main Identification Sign for the state forest. It is set back from, and parallel to, the north side of Varnum Avenue (Lowell), near the intersection of Trotting Park Road (Lowell). The orientation, material and design of this sign do not

meet DCR signage standards (DCR n.d.). There are no Road Marker Signs that lead visitors to the state forest from the surrounding communities.

There are six kiosks located within the state forest; each is constructed of wood framing and has an asphalt shingle roof. Two kiosks are near the forest's parking areas and do not meet DCR signage standards for Welcome Wayside Signs (DCR n.d.). Only one kiosk, at the main entrance on Trotting Park Road in Lowell, features the current state forest trail map. Four of the six kiosks feature information on hunting (e.g., seasons, rules and regulations). The two kiosks closest to the parking area on Trotting Park Road in Tyngsborough are completely blank.

All six kiosks are in fair to good condition. Moss is growing on the roof of the kiosk at the main entrance on Trotting Park Road in Lowell. The two kiosks on Totman Road in Dracut have been vandalized with permanent marker and paint.

Memorials and Markers

Sheep Rock is the only known memorial within the state forest. (See Section 3.3. Existing Conditions, Cultural Resources, for additional information.)

3.4. MANAGEMENT RESOURCES AND PRACTICES

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

Natural Resources

Vegetation

The Dracut Water Supply District (DWSD) maintains the vegetation along the access road leading to the summit of Gage Hill, as well as around the water supply infrastructure there. (See Section 3.3. Existing Conditions, Buildings and Structures, for additional information.) The DWSD also maintains an approximately 20-foot-wide vegetated corridor that runs from the pump house north to Tyngsboro Road (Dracut). The purpose of this corridor is to prevent woody or deep-rooted vegetation from disturbing the underground pipelines in the area (Riopelle 2013*c*). There is no Memorandum of Agreement, or similar document, between the DWSD and DCR that guides this maintenance activity.

Wildlife

For the most part, the DCR does not actively manage wildlife at the state forest. However, when beaver activity becomes a problem (e.g., it threatens public health or safety), a wildlife specialist is called upon to install one or more beaver deceivers, or to trap the animal(s). In addition, the hunting of game species is permitted outside of the forest's "No Hunting Areas" (see Section 3.3. Existing Conditions, Recreation Resources).

Cultural Resources

There are no cultural resource management activities that are unique to the state forest.

Recreation Resources

Greater Lowell Indian Cultural Association (GLICA) Memorandum of Understanding (MOU)

The purpose of the expired MOU between the DCR and the GLICA was to "authorize the GLICA to use approximately two hundred and fifty-two (252) acres of the Lowell-Dracut-Tyngsboro [sic] State Forest…for temporary American Indian cultural activities and special events…to promote understanding of American Indian people and customs." The document largely outlined the GLICA's responsibilities related to the use and maintenance of the agreed upon area. Permissible activities, public access to events and circumstances requiring advanced or immediate notification to the DCR were addressed, among other topics.

On April 13, 2012, the GLICA notified the DCR, in writing, of their interest in renewing the MOU that was scheduled to expire on July 1, 2012. The DCR sent a new five-year MOU (valid through July 1, 2017) to the GLICA for their signature on July 6, 2012, but that document was never signed and returned to the DCR.

Camping

There are no permanent campsites or cabins at Lowell-Dracut-Tyngsborough State Forest; however, temporary campsites have been designated in the past, by the Forest and Parks Supervisor, for events sponsored by the Greater Lowell Indian Cultural Association.

Hunting and Fishing

Hunting is not permitted in two separate areas of Lowell-Dracut-Tyngsborough State Forest (see Section 3.3. Existing Conditions, Recreation Resources). The Greater Lowell Indian Cultural Association was responsible for posting and maintaining DCR approved "No Hunting" signs within the portion of the forest that was under agreement.

Trail Use

Snowmobiles may be used on any unplowed forest road or way at Lowell-Dracut-Tyngsborough State Forest, provided that: the vehicle is registered; sub-surface soil is "solidly frozen and completely covered with a minimum of four inches of hard packed snow or ice;" and the vehicle is carrying a spare spark plug, flashlight, drive belt and "sufficient tools to effect minor repairs." Snow vehicles may operate on frozen waters when there are five or more inches of frozen ice and in "fields, gravel banks or similar open areas where such use is permitted by appropriate signage." (See 304 CMR 12.29; Appendix F.)

Infrastructure

Buildings and Structures

The Dracut Water Supply District (DWSD) manages the majority of the infrastructure near the summit of Gage Hill; National Grid is responsible for the maintenance of the electrical transformer box (see Section 3.3. Existing Conditions, Buildings and Structures). There is no Memorandum of Agreement, or similar document, between the DWSD and DCR that guides this management activity.

DCR staff maintain the culvert and leafy vegetation associated with the illegal dam on Trotting Park Road in Tyngsborough (see Infrastructure, above, for more information). Staff have also added a layer of course gravel to the surface of the road, however flooding remains an issue.

The four large trash dumpsters located within the former headquarters site are routinely serviced by a disposal company that is under contract with the DCR.

Roads

The DCR's Forest Fire Control District 6 provides forest road maintenance (e.g., roadside mowing, tree removal and road repairs) on an annual basis.

The Dracut Water Supply District (DWSD) plows the access road leading to the summit of Gage Hill. (See Section 3.3. Existing Conditions, Roads, for additional information.) There is no Memorandum of Agreement, or similar document, between the DWSD and DCR that guides this maintenance activity.

Trails

The Merrimack Valley Chapter of the New England Mountain Bike Association performs volunteer trail work, including trail maintenance, repair and construction, and bridge building for trails, within the state forest. In the past, this work has primarily been done in consultation with the Forest and Parks Supervisor; a more formal agreement for this work is needed to ensure compliance with any required regulatory reviews. All trail work, whether performed by DCR employees or others, must be performed in accordance with general regulations and policies identified in Section 2.

Interpretive Services

Interpretive service programming is not offered at the state forest, nor is any other interpretive information provided.

Operational Resources

DCR Staffing

The state forest is operated as a satellite of Lowell Heritage State Park and does not have any dedicated on site staff.

Supplemental Staffing

Members of the Greater Lowell Indian Cultural Association and Merrimack Valley Chapter of the New England Mountain Bike Association routinely volunteer their time at the state forest for various general cleanup and trail maintenance activities. The potential exists for members of the Friends of the Forest, a group that has been inactive for several years, and students at the Greater Lowell Regional Technical High School to become more involved in organized activities at the state forest.

Public Safety

Local emergency response and law enforcement support within the state forest is complicated by the fact that the forest occurs in three municipalities. Recent efforts to improve communication between the DCR, local responders and visitors include: adopting a town-specific trail intersection numbering system (see Section 3.3. Existing Conditions, Trails) and distributing a "safety map" of the forest to pertinent DCR staff and local officials. The safety map includes information on the forest's trails, fire roads, major trail intersections and access gates, as well as neighboring access roads and municipal boundaries.

DCR Rangers issue citations for violations of various forest and park rules. A summary of incident reports recorded in the state forest during 2013 is provided below.

Table 3.4. Lowell-Dracut-Tyngsborough State Forest Incident Reports, January 1 through December 31, 2013

Incident	Number
Illegal dumping	1
Property damage	1
Violation of DCR regulations[a]	2
Total	*4*

a. These violations were related to off-highway vehicle (OHV) use and a campsite/fire within the state forest.

Vandenberg Esplanade (Peter E. Lee; CC BY-NC 2.0; cropped from original)

SECTION 4. LOWELL HERITAGE STATE PARK

4.1. INTRODUCTION

Forty years ago, the Department of Natural Resources proposed the Commonwealth's first heritage state park in Lowell. The purpose of the park was twofold: to preserve the cultural heritage of the city and surrounding region, and to increase public appreciation and enjoyment of the area's natural and cultural resources. Through an ambitious plan of acquisition, conservation and development, the agency and its partners were able to bring their vision of urban recreation and a revitalized industrial city to life.

Lowell Heritage State Park (87 acres) is comprised of linear greenways along the Merrimack River and Lowell Canal System, and a collection of historic buildings and structures related to the industrial development of the city. The park provides much needed open space in the city's downtown; showcases the city's history, with a focus on the canal system and associated mills; and serves as an important venue for a variety of civic and social functions.

4.2. HISTORY OF PROPERTY

The story of Lowell Heritage State Park is closely tied to that of the Merrimack River. The river originates in Franklin, New Hampshire and runs southward for 116 miles, reaching the Atlantic Ocean in Newburyport, Massachusetts. Although the Merrimack descends "a modest average of 2.6 feet per mile," there are several waterfalls where the river drops more rapidly in elevation (Steinberg 1991, 50). Prior to the construction of dams, a total of 14 waterfalls existed along the course of the Merrimack. Both Native Americans and European colonists established settlements near many of these falls.

Native Americans were drawn to Lowell because of its natural resources and strategic location. Pawtucket Falls slowed the progress of migrating Atlantic salmon, American shad, lamprey and alewife, allowing them to be caught in large numbers (Stolte 1981). This abundant and predictable seasonal food supply, along with easy access to coastal and forest resources, attracted the Pennacook Tribe, who established a populous settlement downstream of the falls. In 1653, the Massachusetts General Court authorized John Elliot

to establish Wamesit, a praying village for the Pennacook, at the confluence of the Merrimack and Concord rivers (Hudon 2004). Twenty-three years later, however, the Pennacook abandoned Wamesit due to King Phillip's War.

As European settlements expanded, colonists sought ways to move timber and crops to coastal cities, and imported goods inland. However, Pawtucket Falls impeded the flow of river traffic, requiring goods to be shipped over land around the falls. In 1792, a group of wealthy Newburyport businessmen, known as the Proprietors of Locks and Canals on the Merrimack River (the Proprietors), constructed the Pawtucket Canal to solve this problem. The canal, which ran from upstream of the falls to the confluence of the Merrimack and Concord rivers, bypassed both the falls and a near 90-degree bend in the Merrimack. In 1801, five years after the Pawtucket Canal opened, work began on a competing canal. Beginning in 1803, the Middlesex Canal, which connected Chelmsford to Charlestown, moved raw materials and goods to the port of Boston. Although the Middlesex Canal outcompeted the Pawtucket Canal, its success was short-lived due to the arrival of the railroad in the 1830s.

The industrial development of Lowell began in 1821 when a second group of businessmen visited Pawtucket Falls to assess its potential for industrial water power (Hudon 2004). Within a month they had purchased over 350 acres of land between the bend in the river and the Pawtucket Canal, in what was then East Chelmsford. In 1822, they purchased water power rights from the Proprietors, the company that constructed the Pawtucket Canal 30 years earlier. This established the Proprietors as the developer and power broker of the city, selling land and leasing mill power to textile manufacturers for years to come (Hudon 2004).

In 1825, the Merrimack Canal, the city's first power canal, was completed. Four additional power canals were constructed between 1826 and 1835; by 1840 these canals were distributing power to 32 mills (Hudon 2004). One additional canal and an underground connector between canals were built in the late 1840s. A permanent dam across the Merrimack, constructed in 1830 and increased in height in 1833, created an 18-mile stretch of river as a water holding area to ensure an adequate supply of water for the mills. In 1845, the Proprietors bought outlets to several bays and lakes in New Hampshire to further ensure sufficient water to power the mills.

As the mills grew, so too did the city. In 1826, the site of the mills in East Chelmsford became the town of Lowell. Ten years later, Lowell was given a city charter and in three short years, it was the third largest city in Massachusetts. This rapid population growth was driven by the arrival of mill workers. Initially, most mill workers were single, young females from the Merrimack Valley who lived in boarding houses owned by the mills. However, immigration soon changed the demographics of mill workers.

A massive influx of immigrants, from Ireland and other parts of Europe, took place in the 1840s. By 1850, the population of Lowell was 33,000. According to the 1915 state census, one-third of Merrimack Valley residents were foreign born (Hudon 2004). These immigrants remained the major source of labor until the 1920s (Forrant and Strobel 2011). Fewer immigrants made their way to Lowell between the mid-1920s and mid-1960s due to changes in immigration laws and the closing of mills. It was at the end of this period of decline, amid a 13% unemployment rate and a surplus of abandoned, deteriorating infrastructure, that an interest in revitalizing the city first took hold.

In 1974, the Department of Natural Resources (DNR) developed a nine million dollar proposal for Lowell Heritage State Park, the first of its kind in the state system. The following year, the Department of Environmental Management (DEM), a successor to the DNR, announced the completion of a Memorandum of Understanding with the City of Lowell and an accelerated development schedule for two "nodes" within the park: Francis Gate and Pawtucket Boulevard. A few years later, in 1978, President Carter signed legislation dedicating $40 million to the creation of Lowell National Historical Park, which spurred a unique preservation partnership between local, state and federal governments, and later, the private sector.

By the mid-1980s, the DEM had exceeded its original acquisition, conservation and development goals for the park. It also created an ambitious and successful year-round interpretive program, including a living history component, which was fully integrated with the efforts of the National Park Service. At its peak in 1987, Lowell Heritage State

Park employed 16 full-time and 17 seasonal staff, and had an annual operating budget of $480,000.

Over the next five years, the DEM's budget was greatly reduced and the agency was forced to cut personnel and park budgets. Lowell Heritage State Park presented a particular challenge, since it served as the model for the heritage park concept, and was the largest and most complex heritage park in the state system. At the request of then Commissioner Peter Webber, an intradivisional task force was convened to review the status of the park and develop recommendations for its future. The task force's report concluded that the DEM should "concentrate on maximizing the riverfront component and minimizing, but not eliminating, [its] position in the downtown" (DEM 1993, ES).

Today, the Department of Conservation and Recreation (DCR), successor to the DEM, retains an ownership interest in most of the land that once comprised Lowell Heritage State Park. However, under even greater budget constraints, the DCR continues to focus its resources on the riverfront portion of the park and uses legal agreements with its original partners, the City of Lowell and National Park Service, to operate and maintain facilities park-wide.

4.3. EXISTING CONDITIONS

In this section and the following, 4.4. Management Resources and Practices, the park's resources are presented in order, from west to east. In other words, under each heading (e.g., Natural Resources), resources related to the Vandenberg esplanade are presented first, followed by resources related to the downtown portion of the park. The descriptions of the downtown resources are further organized by the flow of water. In general, resources related to the Pawtucket and Northern canals are present first, followed by resources related to the remaining canals, in the same order as the water flows through the system today.

Natural Resources

Physical Features

Topography. The Merrimack and Concord rivers are the defining features of Lowell Heritage State Park (see Figure 3). The Merrimack River flows easterly through the northern portion of Lowell, dropping approximately 60 feet in its eight-mile course through the city. The Concord River flows northerly through the eastern half of the city and enters the Merrimack near Bridge Street. In general, the Concord River is fairly level and its floodplain is mostly broad. However, within the city, the Concord River drops rapidly, due to three sets of falls, and has a relatively narrow floodplain.

Geology. The City of Lowell is located within the northern portion of the Nashoba terrane, a rock formation that consists of interlayered gneisses and schists. The Clinton-Newbury fault zone forms the northern boundary of the Nashoba terrane and is believed to have played a role in changing the course of the Merrimack River at the western limits of the city. The river originally flowed southeast through Woburn and into Boston Harbor. The buried bedrock valley from this original course provides valuable resources for the region. For example, wells that supply Lowell, Winchester and Woburn with abundant groundwater are situated along the former course of the river. In addition, glacial outwash deposits within the buried valley are mined for concrete aggregate and other building purposes.

Soils. Soils within Lowell Heritage State Park vary based on the topography and level of development near the Merrimack River. Very poorly to excessively drained silt and sandy loams are associated with the wide floodplain and limited development between the river and Varnum Avenue. These soils are considered severely limited for playgrounds and moderately limited for picnic areas, paths and trails (Peragallo 2009). Well to excessively drained glacial deposits, most of which have been disturbed by heavy development, dominate the remaining portion of the park. These soils range from being moderately to slightly limited for picnic areas, playgrounds, paths and trails (Peragallo 2009).

Table 4.1. Soils of Lowell Heritage State Park[a]

Soil Series	% of Park	Drainage Class
Udorthents	17.1	N/A
Urban land	16.1	N/A
Suncook loamy sand	12.8	Excessively drained
Merrimac-Urban land complex	10.8	Somewhat excessively drained
Occum very fine sandy loam	9.9	Well drained
Limerick silt loam	8.5	Poorly drained
Water	7.0	N/A
Winooski very fine sandy loam	7.8	Moderately well drained
Scio very fine sandy loam	3.6	Moderately well drained
Birdsall mucky silt loam	3.5	Very poorly drained
Windsor loamy sand	1.7	Excessively drained
Scio-Urban land complex	0.8	Moderately well drained
Canton-Charlton-Urban land complex	0.3	Well drained

a. Excluding the Lord swimming pool and Janas skating rink.

Water Resources

Ponds. There are no ponds within the park.

Wetlands. There are approximately 11 acres of wetlands along the Vandenberg esplanade, immediately upstream of the Rourke Bridge and north of regatta field. In addition, there is a small (0.5 acres) wetland in between the Janas skating rink and Douglas Road. (See Figure 3.)

Vernal Pools. There are no certified or potential vernal pools within the park.

Streams. There are three named streams or rivers within Lowell Heritage State Park (see Figure 3). Claypit Brook, the smallest of the water bodies, originates in Lowell-Dracut-Tyngsborough State Forest. The stream flows south from the forest towards Varnum Avenue in Lowell, where it turns east and runs near regatta field before entering the Merrimack River.

The next water body is the heart of the park and the city. Once considered one of the most polluted rivers in the country, the Merrimack River's water quality has improved greatly in the last 40 years. However, it is still considered "impaired" by the United States Environmental Protection Agency (EPA), due to a variety of chemical and biological contaminants that are routinely detected in present day water quality assessments.

Table 4.2. Causes of Impairment for Select Segments of the Merrimack River, Reporting Year 2012

Segment Location	Cause of Impairment
NH/MA State Line to Pawtucket Dam, Lowell	Fecal coliform, mercury in fish tissue
Pawtucket Dam, Lowell to Duck Island, Lowell	E. Coli, mercury in fish tissue, total phosphorus
Duck Island, Lowell to Essex Dam, Lawrence	E. Coli, mercury and PCBs in fish tissue, total phosphorus

Source: EPA 2014

The remaining water body, located on the easternmost side of the park, is the Concord River. It originates at the confluence of the Sudbury and Assabet rivers and flows north, approximately 16 miles, through Concord, Carlisle, Bedford and Billerica before entering the Merrimack River in Lowell. The EPA also considers a portion of the Concord River in Lowell, from the Rogers Street Bridge to the Merrimack River, to be "impaired." The causes of impairment are: excess algal growth, fecal coliform, mercury in fish tissue and total phosphorus (EPA 2014).

Groundwater. A portion of two medium-yield aquifers and one high-yield aquifer occur beneath two sections of the park (see Figure 3). Near the Rourke brothers boat ramp, approximately 16 acres of the park overlap with both a high- and medium-yield aquifer that follows Stony Brook and Black Brook south, past Route 3 in Chelmsford. Further east, at the bend in the Merrimack River, between Pawtucket Falls and Aiken Street, a medium-yield aquifer extends south from Pleasant Street, along Beaver Brook, to the northern shoreline of the river. Approximately two acres of the park overlap with this aquifer.

Flood Zones. The 100-year flood zone covers 64 acres (73%) of the park; its boundary approximately parallels the Merrimack River and each of the canals, where the DCR has an ownership interest. All of the developed areas along the Vandenberg esplanade are included in the 100-year flood zone. In addition, many of the historic buildings within downtown Lowell are included in the 100-year flood zone. However, it should be noted that water levels

Placeholder for Figure 3 (front).

Placeholder for Figure 3 (back).

within the canal system are regulated to reduce the likelihood of flooding in this portion of the park.

The 500-year flood zone covers an additional nine acres (10%) of the park, including the majority of the Rynne bathhouse and its parking area. In downtown Lowell, the Gatekeeper's Barn is the only historic building included in the 500-year flood zone. Further east, the 500-year flood zone also extends across the Janas skating rink parcel, impacting approximately 22% of the property (one acre), but not the skating rink itself.

Rare Species

Lowell Heritage State Park is home to three state-listed species.

Table 4.3. State-listed Species of Lowell Heritage State Park, as identified by the Natural Heritage & Endangered Species Program (NHESP)

Species	Type	MESA[a]
Bald eagle	Bird	T
Cobra clubtail	Insect	SC
Umber shadowdragon	Insect	SC

Source: Harper 2013

a. Status of species listed under the Massachusetts Endangered Species Act (MESA): SC = Special Concern and T = Threatened.

While occasionally spotted over the park, bald eagles are more common near the mouth of the Merrimack River, where there is more suitable nesting and wintering habitat (NHESP 2012). The cobra clubtail and umber shadowdragon can also be found in the park, on occasion, primarily along the Merrimack River. Both species of dragonflies prefer large, unvegetated rivers and lakes for breeding, and the surrounding upland borders for feeding, resting and maturing (NHESP 2008*a* and NHESP 2008*b*).

Nearly half of Lowell Heritage State Park (42 riverfront acres) has been designated as Priority Habitat under the Massachusetts Endangered Species Act (321 CMR 10.00; see Appendix F). Most of this same area (39 riverfront acres) has also been identified as Core Habitat in the MassWildlife and The Nature Conservancy publication "BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World" (MassWildlife and TNC 2010).

BioMap2 highlights two types of areas important for conservation: Core Habitat and Critical Natural Landscape. The first is crucial for the long-term persistence of rare species and other species of conservation concern. The second provides habitat for wide-ranging native wildlife, supports intact ecological processes, maintains connectivity among habitats, enhances ecological resilience and buffers aquatic Core Habitats to help ensure their long-term integrity. Protection of both areas, which may overlap, is "important to conserve the full suite of biodiversity" in Massachusetts (MassWildlife and TNC 2010).

Within the park, there are also 35 acres (40%) of Critical Natural Landscape adjacent to the Merrimack River.

Vegetation

Forest Types. In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified three forest sub-types along the Vandenberg esplanade.

Table 4.4. Forest Sub-types of Lowell Heritage State Park[a]

Forest Sub-type	Acres	% of Park
Oak-hardwoods	3.3	3.8
Mixed oak	3.2	3.7
Scots pine plantation	2.7	3.1
Total	*9.2*[b]	*10.6*

a. Excluding the Lord swimming pool and Janas skating rink.

b. Only the park's riverfront acres were included in the analysis. Of those acres, wetlands, areas of open water and day use and administrative areas were removed from the total.

There is also one Continuous Forest Inventory (CFI) plot within the park. The CFI is a network of permanent, one-fifth-acre plots on state forest lands that are routinely monitored for sivicultural purposes. The measurements and observations made within each CFI plot are recorded in a database that dates back to 1960, when the CFI was created. Approximately 10% of the state's CFI plots are inventoried each year, on an on-going basis. As of 2010, there were 1,768 CFI plots statewide (Goodwin 2014).

Unfortunately, the plot within Lowell Heritage State Park is located within a grassy area of the Vandenberg esplanade, so it does not provide any additional information about the health of the park's limited forest.

Priority Natural Communities. There are no Priority Natural Communities within the park.

Invasive Species. Japanese knotweed (*Fallopia japonica*) was observed along the western half of the Vandenberg esplanade, between the river and the retaining wall, while conducting fieldwork for this plan.

Pests and Disease. None has been identified at the park.

Wildlife

Birds. There is little current information on the park's birds. Five species confirmed to occur within the park are identified in Appendix G. Of these species, one is classified as a Species in Greatest Need of Conservation (MassWildlife 2006).

Mammals. There is little current information on the park's mammals. Fourteen species that may possibly occur within the park are identified in Appendix G.

Reptiles. There is little current information on the park's reptiles. One species confirmed to occur within the park and an additional four species that may possibly occur within the park are identified in Appendix G.

Amphibians. There is little current information on the park's amphibians. Five species confirmed to occur within the park and an additional three species that may possibly occur within the park are identified in Appendix G.

Fish. The Massachusetts Office of Fishing & Boating Access lists largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), northern pike (*Esox lucius*), white perch (*Morone americana*), chain pickerel (*Esox niger*), black crappie (*Pomoxis nigromaculatus*) and walleye (*Sander vitreus*) as fish species that are typically caught in the Merrimack River (OFBA 2014).

In addition, the Department of Public Health lists American eel (*Anguilla rostrata*) and white sucker (*Catostomus commersonii*) as part of the public health fish consumption advisories for the Merrimack River and canal system (DPH 2014). (See Recreation Resources, below, for more information about the advisories.)

Finally, the United States Fish & Wildlife Service, through its Central New England Fishery Resources Office, monitors migratory fish populations in the Merrimack River. Fish passage data for the Pawtucket Dam indicate American shad (*Alosa sapidissima*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*) and sea lamprey (*Petromyzon marinus*) also occur in the park (USFWS 2014).

Cultural Resources

Pre-Contact Archaeological Site

Although only three pre-Contact sites are recorded in the park, many more exist along the Merrimack River both downstream and up. Many Archaic Period village sites, camp sites and fishing grounds are documented nearby along the banks of the river. Archaeological testing along the river clearly revealed it has been reconfigured and straightened. Above Pawtucket Dam, which was constructed at the naturally occurring Pawtucket Falls, the shoreline had to be raised and straightened and Pawtucket Boulevard was constructed on the fill afterwards. Despite land modification and filling, there is a moderate potential for the complex.

Historic Archaeological Resources

The Tremont Mills powerhouse, formerly located in Tremont Yard, on the Western Canal where it meets Father Morissette Boulevard, was partially demolished when it became a part of Lowell Heritage State Park. The single-story ruin was in a state of serious deterioration when it was completely demolished in 2008, as part of a lease for redevelopment (see Infrastructure, below, for more information). The stipulations for redevelopment included preserving the historically significant below grade features, such as the original turbine pits dating from 1847-1854. It was within this powerhouse that James B. Francis, chief engineer for the Proprietors of Locks and Canals on the Merrimack River, conducted experiments that allowed for the development of a more powerful and efficient turbine technology. The original turbine pits are viewable within the office building that is now located on the site and interpretive information is provided.

Historic Resources

This section provides information on Lowell Heritage State Park's historic buildings, structures, objects and landscapes (see Figure 3). See Infrastructure, below, for information on the park's non-historic buildings and structures.

Designations

With the exception of the Rynne bathhouse, all of the resources within Lowell Heritage State Park fall within the Downtown Lowell Local Historic District. This district, initially established on December 13, 1983, and later expanded in 1986 and 2004, "…seeks to ensure that development activities within the district are consistent with the preservation of its 19th century setting" (City of Lowell 2014). More protective than a National Register of Historic Places designation, the local historic district requires review of alterations to any exterior feature by the Lowell Historic Board for compliance with the design review standards and policies that have been established for this district. The DCR has a seat on the Lowell Historic Board.

There are also three National Register Districts, with some overlaps, and a National Historic Landmark designation that apply to the DCR properties within Lowell Heritage State Park:

- The City Hall District, of which only the Mack building is a part, was listed on the National Register on April 21, 1975.
- The Locks and Canals Historic District was listed on the National Register on August 13, 1976 and became a National Historic Landmark on December 22, 1977. With the exception of the Rynne bathhouse, all of Lowell Heritage State Park falls within this district.
- The Lowell National Historical Park and Preservation District was listed on the National Register on June 5, 1978. This much larger district includes all of Lowell Heritage State Park.

The Lowell Canal System has also been recognized for its significance within the field of engineering. The American Society of Civil Engineers designated the "Lowell Waterpower System" as a Historic Civil Engineering Landmark in 1984, and the American Society of Mechanical Engineers (ASME) designated the "Lowell Power Canal System and Pawtucket Gatehouse" as a Historic Mechanical Engineering Landmark in 1985 (Reese 2014; ASME 2014).

Buildings

The ***Michael Rynne Bathhouse*** is the lone historic building on the Vandenberg esplanade. Located at 160 Pawtucket Boulevard, the building was constructed sometime between 1906 and 1924. It is named for Mike Rynne, a former Lowell police officer and highly regarded athlete that excelled in swimming. The bathhouse is a brick building with a flat roofed, square central core, flanked by two gable roofed wings, each three bays in length. Architectural details include brick piers on the wings, round headed door and window openings in the central core and a small, low parapet on the center of the street façade of the building. The wings of the building have wood trim, an asphalt shingle roof and the upper portion of the gable ends are sheathed in unpainted clapboard. Some of the former openings have been filled in with brick and some of the wood trim is exhibiting signs of deterioration or missing. Water damage to the roof framing is also evident on the interior of the building.

The bathhouse is open year-round. The central core contains public restrooms and each wing is used for office and storage space. DCR staff use one wing and the City of Lowell uses the other for their seasonal lifeguards and waterfront equipment (see Recreation Resources, below, for more information). The building has electricity, a phone line, domestic water and waste water disposal; it is in fair condition.

Rynne Bathhouse (DCR)

The majority of the park's historic buildings are located in downtown Lowell and associated with the city's canal system (see Figure 3). The National Park Service maintains these resources as part of an expired Memorandum of Understanding with the Department of Environmental Management, Boott Hydropower, Inc. and the Proprietors of Locks and Canals on the Merrimack River (see Section 4.4. Management Resources and Practices for more information). The Gatekeeper's House and barn are excluded from this arrangement, as the buildings are

part of the DCR's Historic Curatorship Program. The Mack building is also excluded because it is not directly associated with the canal system.

The ***Pawtucket Gatehouse***, located at the eastern edge of the Pawtucket Dam and the head of the Northern Canal, was constructed in 1847. The gatehouse contains the machinery designed by James B. Francis to operate 10 sluice gates via a turbine and hoisting screws. Constructed of brick, on top of the granite dam, and extending 11 bays long, the Italianate style gatehouse has a gabled slate roof. Architectural details include denticulated cornices, pediment returns, round headed door openings and recessed, round headed, six-over-six double-hung sash windows. Twin end interior chimneys complete the picture. One corner of the building is rounded, a detail that is seemingly part of the original design, but the purpose is unclear. A navigational lock, not used since 1871, is located next to the gates. One end wall of the gatehouse has experienced some cracking, but it is otherwise in good condition. The building has electricity.

Pawtucket Gatehouse (DCR)

Next to the Pawtucket Gatehouse, at 23 School Street, is the ***Gatekeeper's House***, historically home to the operator of the Pawtucket Gate. The Gatekeeper's House is a two-story, side gabled, wood frame house built in 1847, in the Italianate style. It is three bays wide by two bays deep, with a hipped roof section at the rear and a one-story kitchen ell. The projecting center entrance with enclosed pediment is an addition made sometime before 1890, and the front façade windows have round arched trim. The house is clad in wooden clapboards, has a stone foundation, asphalt shingled roof, two interior brick chimneys and wood cornerboards with a boxed cornice. The building has electricity, a phone line, domestic water and waste water disposal; it is in good condition.

Gatekeeper's House (DCR)

Behind, and perpendicular to, the Gatekeeper's House is the ***Gatekeeper's Barn***. Constructed in three separate phases (dates unknown), the barn has two gable roofed sections with a smaller, shed roofed component. Clad in a combination of clapboards and vertical board sheathing, the barn has an asphalt shingle roof and is in good condition. The building also has electricity. The oldest section of the barn, located in the center, is set up as a one car garage. Due to the slope of the surrounding land, the rear façade of the building is a full story higher than the front, which provides storage space below the garage.

Gatekeeper's Barn (DCR)

The gatekeeper's property was acquired by the DCR in 1977 and housed a staff interpreter until 1986. After being vacant for 15 years, it was included in the DCR's Historic Curatorship Program and leased by curators from 2001 through 2011. The house and barn are once again vacant and available for curatorship; proposals are currently being solicited.

Located beyond the Gatekeeper's Barn is the ***Blacksmith Shop***. Primarily utilized by the Proprietors of Locks and Canals on the Merrimack River as a boathouse and blacksmith shop, to fix and

maintain flashboard hardware, this building was brought or built on site in 1884. Clad in vertical board sheathing and clapboards, the Blacksmith Shop has a hipped roof covered with asphalt shingles and a brick chimney that pierces the roof line. A large exterior sliding door provides access. The building has electricity and is in excellent condition.

Blacksmith Shop (DCR)

Francis Gate Park is located on the Pawtucket Canal near Broadway Street and includes a series of resources associated with the Guard Locks. The first navigational lock was built in 1796-1798, with the development of the canal. This lock was subsequently rebuilt and several other features were added to the site over the course of the 19th century, including a dam, power canal, second navigational lock and flood gate. A manmade island separates the dam and sluice gates from the navigational locks and flood gate.

The oldest extant resource within Francis Gate Park is the ***Great Gate***, also known as the Francis Gate or Francis' Folly. Constructed in 1848-1850, this Portcullis gate was designed by James B. Francis for flood control purposes. The gate itself is made of wood, constructed of 17-inch-wide southern pine timbers that are held together with vertical iron rods; it is in excellent condition. The gate protected the city from serious flood damage in 1852, and again in 1936. The Great Gate is sheltered by the ***Guard Locks Great Gate Gatehouse***; a tall, narrow, wood frame building sheathed in clapboard with a cedar shingle roof. Buttresses support the building, tying it to the granite abutments. The gatehouse has electrical service, and is also in excellent condition.

Great Gate and Gatehouse (DCR)

The ***Guard Locks Gatehouse*** contains the hydraulic machinery for operating the sluice gates located at the dam, in the easternmost section of Francis Gate Park. Constructed in 1870, predominantly of brick with a single wood frame wall, this one-story building has a full height basement level on the upstream side of the dam. The gatehouse is sheathed in brick and clapboard, and has a slate roof. Italianate details include denticulated cornices; pediment returns; round headed, recessed, four-over-four, double-hung sash windows; and round headed door openings. Twin end interior chimneys complete the picture. The gatehouse has electricity, and it is in excellent condition.

Guard Locks Gatehouse (DCR)

The ***Guard Locks Lock House*** is located just north of the Guard Locks Great Gate Gatehouse, where it shelters the equipment that mechanically assists with opening the gates of the lock. Constructed in 1881, this single-story, seven-bay-long building is sheathed in clapboard and has a two stage hipped roof sheathed with slate; it is in excellent condition. Italianate architectural details include round headed,

four-over-four, double-hung sash windows; round headed door openings; projecting wooden lintels; and paneled trim along the lower portion of the building, where some of the projecting lock mechanisms are accommodated. The lock house also has electricity.

Guard Locks Gatehouse, left, and Guard Locks Lock House, right (DCR)

The ***Hadley House***, located at 719 Broadway Street, was originally located in Middlesex Village. In 1990, the Federal style home was moved from 1708 Middlesex Street by the Jaycees of Lowell in an effort to save it from demolition and restore it, possibly for housing. The building has been vacant since the move and is presumably owned by the Jaycees, who may now be incorporated as the Lowell Jaycees Housing Corporation, Jaycee-Lowell Limited Partnership, or Jaycee-Lowell, LLC. There is no Memorandum of Agreement, or similar document, between the Jaycees and the DCR that describe the terms under which the Hadley House was moved to, and remains at, Francis Gate Park.

Hadley House (DCR)

The ***Northern Canal Wasteway Gatehouse*** was constructed in 1872, when the waste gates that are part of the Northern Canal Great Wall dam were modified to be mechanically operated by a turbine. It is the only gatehouse without electricity. Accessed by a walkway, the building sits on top of the Great River Wall and was built to shelter the mechanical equipment. The gatehouse is a rectangular, two-story timber frame building with a very low pitched shed roof. Four window bays are located on the river side of the building. The gatehouse is sheathed in clapboard and has a membrane roof; it is in excellent condition.

Northern Canal Wasteway Gatehouse (DCR)

The ***Tremont Gatehouse*** is located at the intersection of the Northern and Western canals; it controls the flow of water from the Northern Canal into the lower Western Canal by a pair of offset sluice gates. These gates are operated electrically, but the manual operation equipment is still located in the building. Constructed c1855, this gatehouse is in excellent condition, reflecting maintenance work that was done to remove the extensive ivy growth that covered the building in the 1970s.

This single story, gable roofed gatehouse has a granite foundation, walls constructed of brick and a slate roof. Italianate details include denticulated cornices; pediment returns; round headed, recessed, six-over-four, double-hung sash windows; and round headed doors. Twin end interior chimneys complete the picture. One corner of the building has an unusual taper, where the corner itself has been removed in what appears to be a modification of the original design.

Tremont Gatehouse (DCR)

The ***Swamp Locks Gatehouse*** was first constructed on the crest of the Swamp Locks dam and south sluice gate in 1859, to provide some shelter and protection for the dam. The gatehouse, a wood framed, single-story, interlocking gable roofed structure, has walls sheathed in a combination of clapboard and vertical boards, and an asphalt shingle roof. The wood windows are six-over-six, double-hung sash. The gatehouse has electricity.

Four different sections currently connect across the length of the dam. The longest section, located above the flashboard crest of the dam, is present in a historic photo from 1922, but was removed years later, as it is not present in DCR file photos from 1979. This section was reconstructed sometime after 1994, as it was not present when the National Park Service documented the site in the List of Classified Structures at that time. The gatehouse is in excellent condition.

Swamp Locks Gatehouse (DCR)

The ***Hamilton Wasteway Gatehouse***, located at the head of the Hamilton Wasteway, was constructed in 1872 when the wasteway itself was rebuilt, replacing an earlier gatehouse and wasteway dating from 1850. The purpose of the wasteway was to remove ice from the Hamilton Canal and divert it into the Pawtucket Canal. The gatehouse was manually operated until an electric motor drive was installed in the early 20th century. The small, single-story hipped roof building has rolled asphalt roofing and is clad with metal panels that have been pressed to resemble brick. The three windows that overlook the visible portion of the wasteway have four-over-four, double-hung sash windows; the remaining openings are boarded up. Vegetation is encroaching on the building, some of the cladding has been peeled away and a few pieces of the simple wood trim are missing. Unlike the other gatehouses in the park, this building is in very poor condition and lacks interpretive information.

Hamilton Wasteway Gatehouse (DCR)

Two buildings have been in place at the Lower Locks Dam since the mid-19th century; they provide shelter for the dam and house some of its mechanical components. The ***Lower Locks Gatehouse***, a one-by-one-bay building clad in clapboards with a cedar shingle roof, is located at the edge of the dam, at the upstream entry to the lock. An enclosed pediment on the gable end and a diamond pane, double-hung, sash window adorn the building.

A larger, single-story, wood framed, gabled roof building is located on top of the dam. A cross gabled component of this building, known as the ***Watch House***, shields the deep gate control housing. A gabled cupola sits atop the Watch House. The walls of this building are clad with vertical board siding, the windows are fixed 12-light windows and the roof is sheathed with cedar shingles.

Both of these buildings have electricity and are in excellent condition.

Lower Locks Gatehouse and Watch House (DCR)

The ***Massachusetts Wasteway Gatehouse*** is located at the turn in the Eastern Canal and sits slightly below Bridge Street. Built in 1862, in conjunction with the wasteway, the gatehouse protects the flashboard controls that direct water through the wasteway. The wasteway connects the Eastern Canal to the Merrimack River and assisted with ice removal in the canal.

The gatehouse is a single-story, five-by-one-bay building with a gabled roof and an inaccessible center entrance that faces the canal. Clad in clapboards, the roof is sheathed with cedar shingles and the windows are four-over-four, double-hung sash with hood moldings. The roof of the building has changed over time. Photographs from 1979 show a flat roof with a slight pitch, possibly a modification of an original gabled roof that was then rebuilt sometime between 1979 and 1994 to reflect its presumably historic appearance. The gatehouse has electricity and is in excellent condition.

Massachusetts Wasteway Gatehouse (DCR)

The ***Boott Dam Gatehouse***, built above the Boott Dam in 1892 as part of a rebuilding effort, provides shelter for the dam and houses hydraulic equipment to lift the sluice gate, which controls the level of water in the Eastern Canal. The gatehouse, which has electricity, is composed of two single-story, gable roofed sections that are situated at a slight angle to each other, probably to accommodate the infrastructure below. One section, attached to the sidewall of the Boott Mills, is slightly wider and taller than the other section. The building is clad in corrugated metal sheathing and it has a rolled asphalt roof. The only architectural detailing includes a plain vergeboard made of corrugated metal. A set of seven, six-over-six, vinyl windows stretch across the side of the building facing the canal. A brick chimney extends from the center of the building. Boston ivy has started to drape itself over part of the roof of the smaller section. The building is otherwise in good condition.

Boott Dam Gatehouse (DCR)

The ***W.A. Mack & Company Building***, located at 25 Shattuck Street, is the current home of the National Streetcar Museum (first and second floors) and DCR's North Region Headquarters (third and fourth floors). The museum utilizes space within the building through an expired Memorandum of Understanding with the DCR (see Section 4.4. Management Resources and Practices for more information).

The Mack building was constructed in 1886 by Sewall Mack for the W. A. Mack & Company on land they originally leased, and later purchased, from the Proprietors of Locks and Canals on the Merrimack River. The Queen Anne style brick building, with a cast iron storefront, served as the retail arm for their ironworks. Originally a three-story building, with decorative panel brick details on the second and third floors, a fourth story was added sometime between 1890 and 1905. Four-over-two, double-hung sash windows are located in the upper stories of the façade; all 38 of the building's double-hung windows are scheduled to be replaced in the fall of 2014 (see Section 2 for more information).

A full height brick and glass, stair and elevator tower was added to the north side of the building in 1979, when it was being renovated to serve as the visitor center for Lowell Heritage State Park. The building has electricity, telephone and internet service, domestic water and waste water disposal; it is in good condition.

The Mack building, prior to the window replacement project. (DCR)

Structures

The ***Lowell Canal System*** evolved steadily from 1821, when the old Pawtucket transportation canal was purchased and, a few years later, used to channel water into a series of new power canals. These virtually unaltered waterways, together with the remaining mills and their machinery, form what is "the most historically significant extant aggregation of early 19th century industrial structures and artifacts in the United States" (NPS 2014*b*).

Table 4.5. Power Canals within Lowell Heritage State Park[a]

Name	Date(s) of Construction
Merrimack Canal	1821-1823
Hamilton Canal	1825-1826
Lowell Canal[b]	1828
Western Canal	1831-1832
Lawrence Canal[c]	1831-1832
Eastern Canal	1835
Northern Canal	1846-1847

a. See Infrastructure, below, for more information on the DCR's ownership interest in the power canals.
b. The Lowell Canal was covered in 1880 (NPS 2014*b*).
c. Most of the Lawrence Canal is covered; sections of the canal have also been filled in (Herlihy 2014).

Each canal is unique, from the Pawtucket Canal, which follows the features of the surrounding landscape, to the Northern Canal, which is the deepest and widest canal, and perfectly straight. The canals are generally eight to 20 feet deep and 30 to 100 feet wide (NPS 2014*b*). The canal walls are constructed of natural materials, ranging from earth to granite, and the canal bottoms are mostly wood (Lowell Canalwaters Cleaners 2014). The canals are generally in good condition, however some vegetative growth and localized deterioration was observed in the canal walls while conducting fieldwork for this plan.

Table 4.6. Dams within Lowell Heritage State Park, by the DCR's Ownership Interest[a]

Dam	Class[b]	Last Inspection[c]	Condition	DCR Interest
Northern Canal Great Wall	S	6/18/2012	Satisfactory	Fee and Ease
Guard Locks	S	6/18/2012	Satisfactory	Ease
Swamp Locks	S	6/18/2012	Fair	Ease
Lower Locks	L	6/1/2006	Satisfactory	Ease
Boott[d]	N/A	N/A	N/A	Ease
Rolling[d]	N/A	N/A	N/A	Ease

a. See Infrastructure, below, for more information on the DCR's ownership interest in the dams. In this table, ownership is summarized as: Fee = fee interest; Ease = easement interest.
b. Hazard Class: Low (L) = the dam is located where failure may cause minimal property damage to others and the loss of life is not expected; Significant (S) = the dam is located where a failure may cause the loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads, or cause interruption of use or service of relatively important facilities (MassGIS 2012).
c. Low hazard potential dams are inspected every 10 years; significant hazard potential dams are inspected every 5 years.
d. The DCR's Office of Dam Safety defines the Boott and Rolling dams as canal gates, which are not classified or inspected.

Northern Canal Great Wall Dam. The Northern Canal Great Wall Dam (MA-00833), also known as the Great River Wall, is an approximately 2,000-foot-long earthen island and stone wall that runs along the south side of the Merrimack River, near Pawtucket Falls. The DCR holds a fee interest in approximately 1,000 feet of the upstream portion of the dam, which consists of a naturally deposited earthen and bedrock island, as well as some man placed earth. Downstream of the island, the dam transitions into a cut granite stone wall for a length of about 1,000 feet; the DCR holds an easement interest in this portion of the structure.

The dam was constructed in 1846-1847 to provide additional water power to downstream mills and the canal system in Lowell. Today, it continues to supply water to the canals, as well as a hydroelectric power plant owned by Boott Hydropower, Inc. Sudden gate closures at the power plant can cause the water in the Northern Canal to rise rapidly and overtop the Great River Wall. Due to this threat, the walkway along the wall and island is generally closed to the public; however the National Park Service does offer periodic guided tours along the walkway.

The most recent inspection of the dam determined that the structure was in good condition, identifying excessive vegetation on the great wall and island, and voids in between the cut granite stones along the crest of the great wall. An estimated $204,000 in additional analysis, maintenance and repairs is needed to correct these issues (Haley & Aldrich, Inc. 2012*a*).

Guard Locks Dam. The Guard Locks Dam (MA-00834) includes a lock, earthen embankment, gatehouse and spillway with hydroelectric power mechanisms. The dam and lock system was constructed in 1848 to regulate water levels in the Pawtucket Canal for mills in the center of Lowell. Today, the locks are used by the National Park Service for tourism and the dam is used to regulate water levels in the canal for hydroelectric power and flood control purposes.

While the dam is in good condition, the following issues were identified during a recent inspection of the structure: vegetation in the walls and downstream earthen embankment, debris in the spillway area, and voids in between the granite stones. The total estimated repair cost for the Guard Locks dam is $120,000 (Haley & Aldrich, Inc. 2012*b*).

Swamp Locks Dam. The Swamp Locks Dam (MA-00836) was originally constructed as part of the development of the Pawtucket Canal in the 1790s. The 1822-1823 reconstruction of the Pawtucket Canal reworked the lock system from a navigational system to a power system, creating a two-tiered power canal network and placing the Swamp Locks Dam centrally within this system. This configuration was retained through several subsequent rebuilding efforts. Many of the existing components of the dam (e.g. the lock, gates, spillway and weirs) date back to those reconstruction periods in 1839-1841, 1859, 1892, 1928, 1942 and 1946. The original purpose of the dam was to regulate the flow of water as a power source for downstream mills. Today the structure is used to impound water for boat tours of the canal system and flood control purposes.

The most recent inspection of the dam identified areas of broken and missing concrete, vegetation in the stone block walls, leakage and wear on the broad crested weir and gatehouse structure. An estimated $665,000 in additional analysis, maintenance and repairs is needed to correct these issues (Haley & Aldrich, Inc. 2012*c*).

Lower Locks Dam. The Lower Locks Dam (MA-00835) was constructed in the late 18th century as part of the Pawtucket transportation canal, which allowed boat access around Pawtucket Falls. It was rebuilt in 1822-1823 and consists of two gatehouses, a primary spillway, low level outlet (deep gate), two-bay lock chamber, canal drain pipe and valve, and a culvert system that drains excess flow from the adjacent Eastern Canal into the discharge channel downstream of the dam. Today, the dam is primarily used for flood control purposes.

During a 2006 inspection of the dam, vegetation and debris were identified as minor deficiencies. The canal drain valve control platform upstream of the dam was also noted as being potentially unstable. An estimated $27,000 to $42,000 in additional analysis, maintenance and repairs was needed to correct these deficiencies (Weston & Sampson 2006).

Since the inspection, the vegetation on the spillway has been removed and the canal drain valve control platform has been stabilized with guy wires; it is

unclear whether this is a temporary or permanent solution.

Objects

Boston & Maine (B&M) Railroad No. 410, a steam locomotive built in 1911 by the American Locomotive Company's Manchester, NH works, is on permanent display at the corner of Merrimack and Dutton streets in downtown Lowell. Engines like No. 410 were used by the B&M Railroad to move freight cars around train yards throughout New England; in Lowell, the engine shuttled cars between textile mills for nearly 40 years.

In 1950, No. 410 was sold to H.E. Fletcher Company, where it was used in a quarry for approximately 30 years before being retired. In 1993, the engine was moved to its current location and is part of the interpretive components of the park. No. 410 is in excellent condition due to over 20 years of restorative work and routine annual maintenance by volunteers (see Section 4.4. Management Resources and Practices for more information). A restored 1907 Pullman Coach, owned by the National Park Service, is on display with No. 410.

Landscapes

The Lowell Canal System and its associated buildings and structures, while discussed individually in this section for inventory and management documentation purposes, collectively form a historic landscape that needs to be considered as a whole. These resources shaped the historic development and growth of the city, and continue to do so today. The canal system defines the character of downtown Lowell, and together with the remaining mills, provides a physical connection to the city's illustrious industrial past.

The parcel known as Tremont Yard, located on the Western Canal between Hall Street and Father Morissette Boulevard, is the site of the former Tremont Mills. Now predominantly paved over for parking, with remnants of the tailraces below it, the only above ground feature remaining is a one-story segment of brick wall with a concrete cap that runs along the north and east edges of the property. This wall, containing arched window openings that have been bricked in, serves as an important landscape feature and a reminder of what was once located on the site. By the late 1990s, the northern section of the wall, adjacent to Hall Street, had become a serious safety hazard, so it was dismantled by hand and partially rebuilt with the salvaged brick. The eastern section of the wall has a significant amount of vegetation growth.

The eastern section of the wall in Tremont Yard. (DCR)

Recreation Resources

Visitors to Lowell Heritage State Park can drive, bike or walk to the various facilities and points of interest within the park. In addition, the Lowell Regional Transit Authority operates buses that circulate through downtown. However, there are only three bus routes (1, 7 and 8) that cross the Merrimack River and provide indirect access to the Vandenberg esplanade. The closest bus stop to the concentration of recreation resources on the western half of the esplanade is located in front of Lowell General Hospital on Varnum Avenue.

There are a variety of active and passive recreational opportunities within Lowell Heritage State Park, including:

- Bicycling
- Boating, motorized and non-motorized
- Events (e.g., concerts, movies)
- Field sports (e.g., soccer, flag football)
- Fishing
- Geocaching
- Interpretive displays and programs
- Nature study
- Pet walking
- Photography
- Picnicking
- Swimming
- Walking/jogging/running

Boating takes place in the Merrimack and Concord rivers and, to a limited extent, in the canal system (see Figure 3). Motorized and non-motorized boats are launched into the Merrimack River from the Rourke brothers boat ramp; there are no fees charged at this facility. Non-motorized boats are also launched into the Merrimack at the Bellegarde boathouse. The Merrimac River Rowing Association (MRRA) and University of Massachusetts Lowell offer a variety of kayaking and rowing programs to the public at the boathouse; some of these programs are free of charge, while others require a fee. On a much larger scale, the MRRA also hosts two regattas, the Festival Regatta and the Textile River Regatta, at the boathouse each year.

Motorized and non-motorized boats can also be found on the Concord River. Every spring, the Lowell Parks & Conservation Trust, in partnership with Zoar Outdoor, offers a unique whitewater rafting opportunity on the Concord River, for a fee. Each trip concludes with passing through the Lower Locks Lock Chambers. Finally, the National Park Service offers motorized boat tours of the entire canal system for a nominal fee. The canal system is not open to the public for boating, aside from these two opportunities.

Fishing takes place in the rivers and canal system too. The Department of Public Health alerts the general public to the possible dangers of eating fish caught in Massachusetts waters through a public health fish consumption advisory. There are several advisories for the Merrimack River and canal system; there are no advisories for the Concord River in Lowell.

Table 4.7. Fish Consumption Advisories for the Merrimack River and Lowell Canals

Water Body	Hazard	Advisory[a]	Fish Species
Merrimack River	Mercury	P1, P3	Largemouth bass, white sucker
Canals[b]	Mercury, lead, PCBs, DDT	P1	All fish
Canals[b]	Mercury, lead, PCBs, DDT	P2, P4	American eel

Source: DPH 2014

a. P1 = Children younger than 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not consume the affected fish species; P2 = The general public should not consume the affected fish species; P3 = The general public should limit consumption of the affected fish species to two meals per month; P4 = The general public should limit consumption of non-affected fish species to two meals per month (DPH 2014).

b. For the canals, the general public is advised to consume only the fillet of non-affected fish species (DPH 2014).

Special events, such as carnivals, and athletic events take place at the Anne Dean Welcome Regatta Field (see Figure 3). The City of Lowell sells permits for the use of the field through an expired Memorandum of Understanding with the DCR (see Section 4.4. Management Resources and Practices for more information). In 2013, the city issued 46 permits; the months of May and September were the most popular for events (Faticanti 2014).

Walks for charity, large cultural events, like the Southeast Asian Water Festival, and DCR-sponsored programming also take place along the Vandenberg esplanade. In a typical year, there is a special event on the esplanade every weekend from April through October. Many of these events are coordinated from the Sampas pavilion; there are fees to use the lawn in front of the stage and the stage itself. Permits for the esplanade are issued by the Forest and Parks Supervisor or the DCR's Office of Special Events, for a fee.

Guarded, freshwater swimming is available at the Rynne beach in July and August, every year, free of charge. The City of Lowell manages the beach through an expired Special Use Permit that was issued by the Department of Environmental Management (see Section 4.4. Management Resources and Practices for more information). During the swimming season, water quality is tested weekly; if poor water quality becomes a problem,

tests are conducted daily until the results indicate improved water quality (Faticanti 2014).

Table 4.8. Water Quality Results for the Rynne Beach, May 2013-August 2013

Sample Date	*E. coli* per 100ml[a]	Days Since Last Rainfall	Amount of Last Rainfall (inches)
5/31/13	30	1	0.6
6/6/13	0	2	0.4
6/12/13	60	1	1.0
6/20/13	50	3	0.3
6/25/13	10	8	0.3
7/2/13	210	1	0.9
7/4/13	150	3	0.9
7/9/13	80	1	0.3
7/15/13	30	6	0.1
7/22/13	110	11	0.1
7/29/13	30	8	0.5
8/6/13	50	5	0.5
8/12/13	100	2	1.0
8/19/13	60	6	0.1

a. Limit = 235 *E. coli* per 100 ml.

The Merrimack River Watershed Council (MRWC) also monitors the river's water quality through its Safe Beaches Project. The closest sampling location to the Rynne beach is upstream, at the Bellegarde boathouse. The MRWC did not sample in 2013, due to a lack of volunteers (O'Mara 2013).

The Lord pool is another location within the park for visitors to enjoy guarded swimming (see Figure 3). The pool is open from June through August, every year; there are no fees charged at the facility. DCR staff are responsible for managing the pool and testing its water quality during the swimming season. In addition, the Department of Public Health (DPH) inspects the pool once each year as part of a Memorandum of Agreement with the DCR (see Section 4.4. Management Resources and Practices for more information). The DPH provides a brief report on the water quality, health and safety, and general sanitation conditions of the pool to DCR staff after the inspection.

Table 4.9. DPH Water Quality Results for the Lord Pool, August 8, 2013

Test	Allowable Result[a]	Test Result[a]
pH	7.2-7.8	7.6
Alkalinity	50-150	70
Calcium Hardness	150-1,000	210
Free Chlorine	1.0-3.0	4.2[b]
Combined Chlorine	0.0-0.2	0.0
Secchi Disk	Clearly visible	Clearly visible

a. Results are reported in parts per million (ppm), except for the pH and Secchi disk tests.

b. Additional testing was conducted 45 minutes later, after corrective actions were taken. The second test result, 3.8ppm, exceeded the allowable range, and the pool was closed until the free chlorine reading was brought into compliance.

The following health and safety, and general sanitation violations were also noted as part of the 2013 DPH inspection:

- The water depth is not marked at or above the water surface on the pool wall.
- A gap in the outside fence of greater than three inches.
- A broken step on the ladder in the deep end.
- An insufficient emergency communication system in the first aid room.
- The log book indicated the pool was not closed with free chlorine reading of 13.8ppm.
- The paint on the pool floor is peeling.
- A portion of the cement deck is raised, creating a tripping hazard.

Many of these violations, such as the broken step ladder, were addressed during the 2013 season and the remaining items, such the raised cement deck, will be addressed as part of the fall 2014 modernization project (see Infrastructure, below for more information).

Visitors to the Lord pool enjoy biking to the property; however there are no bike racks available for storing and securing their bikes. Social gatherings are also popular on the lawn and at the picnic tables that surround the pool. Two mature trees, near the corner of Cross and Fletcher streets, are the only source of shade in this open space.

The National Park Service (NPS) provides most of the interpretive programming within the downtown portion of the park. Visitors can participate in a free ranger-guided walking or trolley tour of the historic sites. A variety of indoor exhibits are open to the

public too, including the NPS's visitor center at Market Mills, the Boott Cotton Mills Museum (fees apply), the Patrick J. Morgan Cultural Center and the Wannalancit Mill. The NPS also co-sponsors one of the largest, free folk festivals in the world; the Lowell Folk Festival is held each summer and over 100,000 people come to Lowell and the park to celebrate traditional music, ethnic foods and crafts (NPS 2014*c*).

Geocaching also occurs in the park. As of March 2014, there were three known geocaches along the Vandenberg esplanade and two known geocaches in the downtown portion of the park.

Infrastructure

Property Boundary

Fee Interest. Lowell Heritage State Park (87 acres) is situated in the northern half of Lowell, adjacent to the Merrimack River and the city's historic power canals. The majority of the parcels that comprise the park are linear in nature, and most were acquired between 1976 and 1986.

By 1980, the Department of Environmental Management (DEM) purchased a fee interest in a portion of the Vandenberg esplanade, from the Rourke Bridge to the intersection of Pawtucket Boulevard and Varnum Avenue; a portion of Francis Gate Park, north of Broadway Street; the gatekeeper's property; Tremont Yard; and the Mack building. Over the next five years, the agency added a few more parcels to the Vandenberg esplanade, near the intersection of Pawtucket Boulevard and Varnum Avenue, and Francis Gate Park, south of Broadway Street.

In 1986, the DEM obtained a fee interest in the park's remaining parcels through a complicated and lengthy Order of Taking, recorded in the Middlesex County Registry of Deeds, Northern District, Book 3830, Page 70. This legal action completed the Vandenberg esplanade, from the intersection of Pawtucket Boulevard and Varnum Avenue to Pawtucket Falls, and further east, along VFW Highway. It also created a network of protected land, in combination with property owned by the National Park Service and City of Lowell, along each of the city's canals. Finally, it established the DEM's ownership interest in 13 buildings associated with the canal system (see below). Only one of these buildings, the Rolling Dam Gatehouse, has been demolished.

1. Pawtucket Gatehouse
2. Blacksmith Shop
3. Guard Locks Great Gate Gatehouse
4. Guard Locks Gatehouse
5. Guard Locks Lock House
6. Northern Canal Wasteway Gatehouse
7. Tremont Gatehouse
8. Swamp Locks Gatehouse
9. Hamilton Wasteway Gatehouse
10. Lower Locks Gatehouse
11. Massachusetts Wasteway Gatehouse
12. Boott Dam Gatehouse
13. Rolling Dam Gatehouse (demolished)

The Janas rink and Lord pool parcels were acquired before the 10-year effort to establish Lowell Heritage State Park. In 1972, the Department of Natural Resources (DNR) purchased the two-acre Lord pool parcel from the City of Lowell; the deed is recorded in the Middlesex County Registry of Deeds, Northern District, Book 2211, Page 558. The following year, the city sold the Janas rink parcel (4.5 acres) to the DNR; the deed is recorded in the Middlesex County Registry of Deeds, Northern District, Book 2091, Page 58.

Other Legal Interests. The DEM also obtained a number of other legal interests through its 1986 Order of Taking (see Middlesex County Registry of Deeds, Northern District, Book 3830, Page 70). These easements and other rights are the most complicated, and confusing, parts of the taking.

With respect to the 13 canal system buildings, the DCR holds a permanent easement in the canal walls and beds or bottoms that support each building, and the associated structures and fixtures. The Proprietors of Locks and Canals on the Merrimack River (the Proprietors), and their successors and assigns, retain the right to access the buildings in order to maintain and operate the gates and canals for hydroelectric power production. In addition, the Proprietors, their successors and assigns reserve an easement for access and the right to use the Blacksmith Shop for maintaining and operating the Pawtucket Dam for hydroelectric power production.

The DCR also holds a permanent easement in the following structures, which are specifically named in the taking:

- Pawtucket Gatehouse Wall and Lock Chamber;
- Guard Locks Lock Chambers;
- Northern Canal Walkway;
- Swamp Locks Dam;
- Swamp Locks Chamber;
- Lower Locks Dam;
- Lower Locks Lock Chambers;
- Boott Dam;
- Rolling Dam; and
- YMCA Gates.

The permanent easement is for the following purposes, provided that the Proprietors, their successors and assigns are able to use, maintain and operate the structures and surrounding property for hydroelectric power production without interference.

- Support of all fixtures or structures of the Commonwealth;
- Preservation and conservation;
- Supplemental maintenance in addition to that performed by the Proprietors, their successors and assigns;
- Landscaping and erection of exhibits and structures;
- Placement of barriers and fences;
- Placement and attachment of docks, wharves, walls and boat ramps of a temporary or permanent nature;
- Placement of lighting and other utilities;
- Operation and maintenance of boat locking chambers, if any, for any and all purposes; and
- Any and all other uses consistent with the operation of the canal system as a park.

In addition to the permanent easements described above, the DCR has an interest in the following:

1. An overarching "…permanent and exclusive easement in all canal walls and beds or bottoms and in all dams and boat lock chambers located in said canals and not otherwise referred to in [the taking]…" (Book 3830, Page 102). This permanent easement is for the same purposes as described immediately above.
2. "All air rights over the canals, including the canal walls and any dams thereon, to the extent not already lawfully obstructed or occupied, for so long as such lawful obstruction or occupation continues uninterrupted in its present form" (Book 3830, Page 103).
3. "The exclusive right to use the water in the entire canal system and the Merrimack River for recreational, educational and navigational purposes, which use shall be nonconsumptive with respect to hydroelectric power generation, except for reasonable amounts to operate locking gates" (Book 3830, Page 103).

In 2001, the Highway Department (MassHighway) granted the DEM possession, care, custody and control of Anne Dean Welcome Regatta Field through a license agreement (see Section 4.4. Management Resources and Practices for more information). The DCR's use of the property is restricted to passive recreation. MassHighway reserved the right to utilize the property, in whole or in part, for highway purposes.

Pocket Parks

The two smaller "pocket parks" within the downtown portion of Lowell Heritage State Park, the Mack plaza and Victorian garden, were designed by Carr, Lynch Associates, Inc. in 1982. The firm received multiple awards for their work, including a:

- Citation for Excellence in Urban Design from the American Institute of Architects (1990);
- Mayoral Proclamation for the Preservation of Lowell's Historic Architecture (1990);
- Citation from the American Society of Landscape Architects (1987); and
- Massachusetts Governor's Design Award (1986).

Mack Plaza. The Mack plaza is located next to the Mack building, on the corner of Shattuck and Market streets. Nineteen linden trees and 20 new benches enhance the brick plaza as a relaxing oasis in an otherwise busy section of the city. (See Section 2 for more information on the bench replacement project.) The fountain component of "The Worker" sculpture, when functioning, adds to the ambiance of the space (see Buildings and Structures, below, for more information).

An approximately three-foot-tall steel rail and granite post fence encloses the plaza along Market Street. For several decades, the condition of the granite posts has been deteriorating. Today, 11 of the 13 posts are badly cracked; several posts are being held in place by a temporary wooden support structure. In 2007, a close inspection of the fence identified the pin mounting system and temperature changes in the steel as the likely causes of cracking (DCR 2007*c*).

A cracked granite post and temporary wooden support structure in the Mack plaza. (DCR)

Mary J. Bacigalupo Victorian Garden. The Victorian garden is also located next to the Mack building, at the intersection of Shattuck and Middle streets. Raised beds dominate the space and support a variety of mature evergreen and deciduous trees, as well as smaller, shade-tolerant perennial and annual plantings. Seven benches situated along the garden's brick pathways offer a welcoming respite from city life. An approximately seven-foot-tall fence, identical to the one in the Mack plaza, surrounds the entire garden. There are 25 granite posts in this fence and 22 are badly cracked. One post that supported the garden's western gates was recently removed for public safety reasons (DCR 2007*c*).

In 2005, the garden was dedicated to Mary Bacigalupo, a Lowell citizen who was instrumental in the beautification of the City of Lowell (see Appendix H). A large granite marker bearing Mary's name is located within the garden (see Memorials and Markers, below, for more information).

Victorian Garden (DCR)

Buildings and Structures

This section provides information on Lowell Heritage State Park's non-historic buildings and structures. See Cultural Resources, above, for information on the park's historic infrastructure.

Rourke Brothers Memorial Boat Ramp. The Rourke brothers boat ramp is located at the western end of the Vandenberg esplanade, upstream of the Rourke Bridge (see Figure 3). The concrete ramp, which is approximately 45 feet wide, leads from an access road and parking area off of Pawtucket Boulevard into the Merrimack River. The ramp was constructed by the Office of Fishing and Boating Access (OFBA) in 2002 and is in good condition (Sheppard 2013). Extensive regulations govern the use of OFBA sites; see Section 4.4. Management Resources and Practices for more information.

Edmund A. Bellegarde Boathouse. The Bellegarde boathouse, situated on a parcel of land between Pawtucket Boulevard and the Merrimack River, was once the headquarters for Lowell Heritage State Park between 1993 and 2002, but is now under the care and control of the University of Massachusetts Lowell (see Section 4.4. Management Resources and Practices for more information).

Charles G. Sampas Pavilion. The Sampas pavilion is located on the Vandenberg esplanade, near the intersection of Pawtucket Boulevard and Delaware Avenue (see Figure 3). The 30- by 50-foot open-air, poured concrete and steel frame structure has functioned as the park's performing arts stage for 37 years. The stage is equipped with electricity and limited performance lighting; it is in good condition.

Merrimack River Retaining Wall. A riprap and poured concrete retaining wall is located along the Vandenberg esplanade, from the Rourke Bridge to the Sampas pavilion. It is not known when the wall was constructed. Woody vegetation, some of which is an invasive species, is growing in the riprap portion of the wall. Many sections of the poured concrete wall are also misaligned. Overall, the retaining wall is in fair condition.

Raymond J. Lord Memorial Swimming Pool. The Lord swimming pool, located at 81 Cross Street, is a complex of one pool, one spray deck (formerly a wading pool), one bathhouse and one outbuilding, constructed in 1972 (see Figure 3). The pool has a maximum depth of 12 feet; a set of stairs provides access to the shallow end of the pool. In 2010, the wading pool was converted into a spray deck with one centrally located spray feature. Both the pool and the spray deck are in good condition. Pending approval and funding, plans are in place to modernize the structures in the fall of 2014 by reducing the maximum depth of the pool to five feet; replacing the stairs in the shallow end of the pool with a "zero entry" ramp; adding more spray features to the spray deck; and constructing a shade shelter.

The bathhouse, approximately 3,300 square feet, is a single-story, masonry block building with a wood framed gabled roof clad with asphalt shingles. The 983-square-foot outbuilding, which houses pool equipment (e.g., pumps, filters and chemicals), a first aid station and staff restroom, is constructed of similar materials; however it has a flat, tar and gravel roof. Both the bathhouse and outbuilding received new roofs in 2009, and new epoxy floors and fresh interior and exterior paint in 2012. The pool's filtration system was also replaced 2012. Both buildings have electricity, domestic water and waste water disposal. In addition, the outbuilding has a phone line. Both buildings are in good condition.

Tremont Yard. For many years, the predominant feature on the Tremont Yard parcel, located at 257 Father Morissette Boulevard, was the one-story ruin of a brick powerhouse with below grade water power features (see Cultural Resources, above, for more information). In 2003, the Legislature authorized the DCR to lease the property (see Appendix H) and two years later, a Request for Proposals (RFP) was issued. In 2008, a 25-year lease was signed by Tremont Yard, LLC (see Section 4.4. Management Resources and Practices for more information). That same year, construction began on a modern, five-story office building; the ruin was demolished as part of that process, but the historic power system features were preserved. Today, the site is the headquarters for the Jeanne D'Arc Credit Union, which includes a first-floor interpretive display (see Figure 3). Although this preservation effort is open to the public, there is little promotion of the space.

Trolley Tracks. The National Park Service (NPS) operates a free trolley service for visitors to Lowell National Historical Park. The trolleys run on approximately one-mile of track that is laid out in a "T" shape within downtown Lowell. The western terminus of the track is located on the DCR's Tremont Yard parcel. The Department of Environmental Management granted the United States of America, through the Lowell Historic Preservation Commission, an easement for the construction of the tracks and associated fixtures. The easement is recorded in the Middlesex County Registry of Deeds, Northern District, Book 6249, Page 209.

Lowell Public Art Collection. From 1984 to 1995, former U.S. Senator and Lowell resident Paul Tsongas, along with staff from the Lowell Historic Preservation Commission, led the development of the Lowell Public Art Collection (Marion 2014). During that time, a series of permanent sculptures were placed throughout the downtown area, but generally within sight of the National Park Service's canalway walking path. Each work of art addresses a theme of the federal and state park systems: the industrial city, labor, machines, power and capital.

While a few of the sculptures are located on DCR property, e.g., "The Worker" in the Mack plaza, the collection is owned by the City of Lowell, through its Cultural Affairs and Special Events Department, and the National Park Service, both of whom are responsible for its ongoing maintenance. However, oversight of the collection is limited, due to a lack of resources at the municipal and federal levels (Marion 2014).

John J. Janas Memorial Skating Rink. The Janas skating rink, located at 382 Douglas Road, is managed and operated by the North Shore Rink

Management Associates, Inc. through a 25-year lease (see Section 4.4. Management Resources and Practices for more information).

Roads

Public roads, which are owned and maintained either by the City of Lowell or Department of Transportation, surround the park. Pawtucket Boulevard, or Route 113, and VFW Highway border, and provide primary access to, the riverfront portion of the park. In downtown Lowell, Broadway Street and Fletcher Street provide access to the DCR's westernmost historic resources and Lord pool, respectively. Dutton Street and Father Morissette Boulevard are the highest-capacity roads that lead to the concentration of the DCR's historic resources.

Parking

Along the Vandenberg esplanade, there are five DCR-owned parking areas (see Figure 3). The first is a paved lot, with a shared entrance and exit, located next to the Rourke brothers boat ramp. It can accommodate 64 vehicles; 44 spaces are reserved for vehicles with trailers, while the remaining 20 spaces are reserved for vehicles with car-top boats. All of the spaces are well marked, including the lot's four accessible spaces. The parking area is signed as being DCR property and gated.

The second parking area is located next to the Bellegarde boathouse; it is not under the care and control of the University of Massachusetts Lowell (see Section 4.4. Management Resources and Practices for more information). Forty-one vehicles can park in this paved lot, which has a separate entrance and exit. All of the spaces are well marked, including the four accessible spaces. The parking area is not signed as being DCR property or gated.

A third, unpaved parking area is located next to the regatta field. This unlined lot, with a shared entrance and exit, is heavily used during events and is showing serious signs of wear and tear. Vehicles, up to 40 at one time, are sometimes forced to park haphazardly due to deep ruts that fill with rain water and small patches of shrub-like vegetation. While the regatta field itself is signed as being DCR property, the parking area is not signed. The lot is also not gated.

The remaining two parking areas are located near the Sampas pavilion. Both lots are paved and marked, and utilize shared entrances and exits. The lot upstream of the pavilion has 22 spaces, including two accessible spaces. The lot downstream of the pavilion has 14 spaces, two of which are designated as accessible. Neither lot is signed or gated.

Visitors to the downtown portion of Lowell Heritage State Park most likely utilize the National Park Service's (NPS) visitor center parking lot, located near the intersection of Broadway and Dutton streets, or municipal parking options throughout the city (see Figure 3). The NPS's visitor center parking lot was formerly owned by the Department of Environmental Management (DEM). Upon selling a portion of the property to the NPS, the DEM established a Memorandum of Understanding (MOU) with the NPS regarding the use of the parking lot (see Section 4.4. Management Resources and Practices for more information). The remaining portion of the property was sold to the City of Lowell; there is no record of an MOU, or similar document, between the city and the DEM.

The DCR leases one parking area within Tremont Yard to the University of Massachusetts Lowell (see Section 4.4. Management Resources and Practices for more information). The other three DCR-owned parking areas within downtown Lowell are located outside of the concentration of historic resources (see Figure 3).

The first of these parking areas is located on Cross Street, next to the Lord pool. It is a paved lot, with a shared entrance and exit, and can accommodate approximately 40 vehicles. The majority of the individual spaces are not marked, however there are two accessible spaces that are well marked. The parking area is not signed as being DCR property or gated and, as a result, it is heavily used by residents and visitors in the immediate area.

The second downtown parking area is located on Broadway Street, near the Pawtucket Canal. Approximately 15 vehicles can park in this gravel lot, which has a separate entrance and exit. Individual spaces are not marked and there are no designated accessible spaces. Like the parking area at the Lord pool, this lot is not signed or gated and is routinely used by students, residents and visitors in the immediate area.

The final parking area is associated with the Janas skating rink, which is under the care and control of the North Shore Rink Management Associates, Inc. as part of a 25-year lease (see Section 4.4. Management Resources and Practices for more information). This lot is paved and can accommodate 80 to 90 vehicles. Individual spaces are well marked, including two designated accessible spaces. The lot's shared entrance and exit features a large DCR sign, as well as a gate.

Trails

There is one trail within Lowell Heritage State Park; it is a 10-foot-wide paved path located along the northern shoreline of the Merrimack River. The first section of the path, designated as the Scott Finneral Memorial Riverwalk, is approximately one mile long (see Appendix H). It runs from the Rourke Bridge to the Sampas pavilion on the Vandenberg esplanade. Portions of this path have been damaged by tree roots lifting and cracking the pavement. Sinkholes also appear along the path on occasion, due to water undermining the Merrimack River retaining wall (see Buildings and Structures, above, for more information).

The second, unnamed section of the path is approximately two miles long. It runs from Beaver Brook to near the Duck Island Wastewater Treatment Facility. Only the upstream portion, ending near the Hunts Falls Bridge, is on DCR property (approximately one mile of path). Small sections of this path can become overgrown, due to the dense vegetation that grows on both sides. Currently, the only connection between this section of the path and the Scott Finneral Memorial Riverwalk is the public sidewalk along VFW Highway.

Signs and Kiosks

There are very few DCR signs within Lowell Heritage State Park and there are no kiosks. Five separate Site/Facility Identification Signs exist for the Rourke brothers boat ramp, regatta field, Vandenberg esplanade, Francis Gate Park and Lord pool.

- The sign for the boat ramp, located at the ramp's main entrance, does not meet DCR signage standards (DCR n.d.).
- The regatta field sign, located on the north side of Pawtucket Boulevard near the sidewalk, within the larger of the two playing fields, meets all DCR signage standards (DCR n.d.).
- The sign for the Vandenberg esplanade, which is located on the south side of Pawtucket Boulevard near the intersection of Varnum Avenue, should be double-sided in order to meet DCR signage standards (DCR n.d.).
- The Francis Gate Park sign, located near the Guard Locks Lock House, does not meet DCR signage standards (DCR n.d.).
- The sign for the Lord pool meets all DCR signage standards (DCR n.d.).

A standard Rink Identification Sign is located at the main entrance of the Janas rink (DCR n.d.).

There is one Road Marker Sign that leads visitors to Lowell Heritage State Park from the Lowell Connector. The sign reads: "Lowell National and State Parks Exit 5B;" it does not meet DCR signage standards.

A small identification sign is attached to each of the DCR-owned buildings that the National Park Service maintains (see Section 4.4. Management Resources and Practices for more information). Although these signs do not meet DCR signage standards, they are consistent in appearance and placement, and thus easily recognizable as a component of Lowell National Historical Park.

National Park Service Identification Sign (DCR)

Within the last 10 years, Lowell General Hospital constructed a three-sided directional sign on DCR property located on the corner of Pawtucket

Boulevard and Varnum Avenue. There is no record of a legal document (e.g., permit, Memorandum of Understanding, etc.) being issued or a bill being passed that authorized the construction of this sign.

Memorials and Markers

There are five known memorials within Lowell Heritage State Park. The first, a large granite marker, is located at the entrance to the Rourke brothers boat ramp. It is inscribed with the names of three Rourke brothers, Steve, Cliff and Bud, all of whom served in World War II.

The second memorial is dedicated to Charles G. Sampas, a former columnist for the Lowell Sun. An approximately four-foot-tall, one-foot-square granite post, topped with a bronze plaque, is located near the Sampas pavilion. The plaque includes the names of the state and national parks.

Another bronze plaque, the third memorial, is mounted directly to the front of the Rynne bathhouse. It pays tribute to Michael Rynne, a former Lowell policeman and athlete, and also includes the names of the state and national parks.

The fourth memorial, located at the eastern end of the Vandenberg esplanade, is dedicated to George Scott Finneral, who was killed in action during the Persian Gulf War. It, too, is a bronze plaque mounted atop an approximately four-foot-tall, one-foot-square granite post. However, the plaque does not match the design of the other memorials.

The fifth and final memorial is small granite marker located within the Victorian garden. It is inscribed with Mary J. Bacigalupo's name and reads, in part: IN RECOGNITION FOR HER LEADERSHIP AND DEDICATION TO THE PEOPLE AND CITY OF LOWELL.

There are at least nine other bronze plaque markers, either mounted on a granite post or directly to a building, placed throughout the park. These markers provide information about the nearby buildings and objects. Each marker includes the name of the state and national parks. The plaque for the brick vault, located near the Victorian garden, was stolen and has not been replaced.

Bronze Plaque and Granite Post Marker (DCR)

Surprisingly, there is no marker for Hoyt S. Vandenberg (1899-1954), the presumed namesake of the esplanade and Lowell's highest ranking general.

4.4. Management Resources and Practices

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

Natural Resources

Vegetation management within the park consists primarily of mowing and trimming. DCR staff maintain the lawn and landscaping at the Rourke brothers boat ramp and along the Vandenberg esplanade. The city maintains regatta field (see Recreation Resources, below for more information).

Within downtown Lowell, the National Park Service maintains the grounds around the canal system resources (see Cultural Resources, below). The maintenance of the lawn and landscaping within the Gatekeeper's property falls to the curator or DCR staff, when a curator is not present. DCR staff also maintain the grounds at the Lord pool and the plantings at the Victorian garden. The lawn and landscaping at Tremont Yard and the Janas rink are maintained by Tremont Yard, LLC and North Shore

Rink Management Associates, Inc., respectively (see Infrastructure, below).

Cultural Resources

Buildings and Structures

Michael Rynne Bathhouse. In 1996, the Department of Environmental Management (DEM) issued the City of Lowell a three-year Special Use Permit "to use and occupy the [beach] adjacent to the Rynne [bathhouse] on the Merrimack River for the purpose of providing a safe, clean and accessible swimming area for the general public."

As part of this permit, the city was given one room in the bathhouse, "as designated by the Park Supervisor, for the purpose of a First Aid and storage area." In addition, the DEM agreed, "subject to appropriation and available personnel, to make major repairs to the [bathhouse] such as, roof replacement, exterior painting, heating system replacement, etc." The shared use of the bathhouse has continued, under agreeable terms, for the last 15 years without a Memorandum of Agreement or similar document in place.

Buildings and Structures Associated with the Canal System. In 1991, the four major stakeholders in downtown Lowell's historic properties – the Department of Environmental Management (DEM), Boott Hydropower, Inc. (Boott), the Proprietors of Locks and Canals on the Merrimack River (Proprietors) and the National Park Service (NPS) – signed a five-year Memorandum of Understanding (MOU) for the purpose of "maintaining and operating the Lowell Canal System for the benefit and enjoyment of the general public and for the private production of hydroelectricity and for other private uses of its waters." The agreement divided the critical tasks related to maintaining and operating the canal system, including the associated buildings and structures, among the four major stakeholders with the understanding that each held a slightly different ownership, and general, interest in the various components of the system.

In general, maintenance of the canal walls and bottoms, dams and control apparatuses fell to Boott and the Proprietors. Boott was also responsible for maintaining, and providing access to, the Eldred L. Field Power Station for interpretive tours, as well as managing the water levels and flow rates in the canal system. The cost of utilities for the associated buildings was split between the DEM and Boott, while the DEM and NPS worked together to maintain and secure the buildings and grounds. The DEM and NPS also agreed to meet each year in order to develop building maintenance, destructive vegetation clearing, canal water surface cleanup, and long term capital improvement programs.

Despite evidence that one or more of the stakeholders attempted to renew this MOU after it expired in 1996, the maintenance and operation of the canal system continues today, under somewhat agreeable, if not confusing, terms, in the absence of any legally binding document.

W.A. Mack & Company Building. In 2007, the DCR and New England Electric Railway Historical Society / Seashore Trolley Museum signed a five-year Memorandum of Understanding (MOU), which authorized the group to utilize space on the first and second floors, including the window displays, of the Mack building for the purpose of operating the National Streetcar Museum. As part of this MOU, the group is responsible for:

- Any and all utility services and costs;
- Notifying the DCR's Regional Director of any fees under consideration or charged for using and/or accessing the museum;
- Scheduling and attending an annual in-person meeting with the Regional Director;
- Receiving the approval of the Regional Director prior to making any changes or improvements to the building; and
- Notifying the Regional Director of any injuries, closures, property damage or related incidents associated with the use of the building.

Even though this MOU expired on June 30, 2012, the museum has continued to utilize the Mack building, under agreeable terms, for the last two years.

Objects

Boston & Maine (B&M) Railroad No. 410. The historic steam locomotive is maintained and cleaned, at least twice a year, by the Boston & Maine Railroad Historical Society (B&MRRHS), a non-profit historical and educational organization comprised of volunteers who share a common interest in the history and operations of the B&M

Railroad. There is no Memorandum of Agreement, or similar document, between the B&MRRHS and DCR that guides this management activity.

Recreation Resources

Anne Dean Welcome Regatta Field. In 2007, the DCR and City of Lowell signed a five-year Memorandum of Understanding (MOU), which authorized the city to "…manage, maintain, and schedule events and programs consistent with the recreational missions of both parties at the [field]…." As part of this agreement, the city:

- Retains the funds it generates through permitting fees;
- Schedules an annual meeting with the DCR's Regional Director to discuss the previous year's programs and compliance with the MOU;
- Receives approval from the Regional Director before making any changes or improvements to the property;
- Does not cut, remove or interfere in any manner with any natural vegetation or store equipment or property without approval from the Regional Director; and
- Notifies the Regional Director of any injuries, closures, property damage or related incidents associated with the use of the property.

Despite the fact that this MOU has expired, the management and maintenance of the field, as well as communications between the city and park staff, have seamlessly continued for the last two years.

Rynne Beach. In 1996, the Department of Environmental Management (DEM) issued the City of Lowell a three-year Special Use Permit "to use and occupy the [beach] adjacent to the Rynne [bathhouse] on the Merrimack River for the purpose of providing a safe, clean and accessible swimming area for the general public." As part of this permit, the city agreed, at its own expense, to:

- Assume complete management responsibility of the waterfront area, including daily maintenance of the public restrooms;
- Provide qualified personnel to staff and manage the beach from June 1st through Labor Day of each year;
- Notify the DEM of incidents, such as vandalism, accidents, serious injuries, etc.; and
- Provide the park supervisor with a weekly report that includes a summary of incidents and attendance figures.

The management and maintenance of the beach, as well as communications between the city and park staff, have seamlessly continued for the last 15 years without a Memorandum of Agreement or similar document in place. Today, the beach is generally open from July 1st through mid- to late-August; a schedule that is dependent on the availability of students to fill the lifeguard positions and the timing of the Southeast Asian Water Festival, a popular event that is held on the Vandenberg esplanade each summer (Faticanti 2014).

The lack of a small, motorized boat presents the biggest management challenge for the city (Faticanti 2014). Every year, staff must borrow a boat to place and remove moorings, or swimming area markers, in and from the river. In addition, the city borrows a boat, or more, if available, to guard the non-motorized, dragon boat races that are an integral part of the Southeast Asian Water Festival. Finally, staff are routinely called upon to assist individuals who are swimming outside of the designated area, sometimes up to a mile away.

Raymond J. Lord Memorial Swimming Pool. In 2011, the DCR and Department of Public Health (DPH) signed a Memorandum of Agreement in order facilitate compliance with the State Sanitary Code (105 CMR 435.00, see Appendix F). As part of this agreement, the two agencies meet a minimum of twice per year to discuss pool inspections and compliance issues; share seasonal information regarding the operation of each pool; and jointly inspect each pool at least once per season. The agreement is in effect until terminated by either agency, upon 60 days written notice.

Infrastructure

Property Boundary

Anne Dean Welcome Regatta Field. Under the terms of the license agreement, signed by the Department of Environmental Management (DEM) and Highway Department (MassHighway) in 2001, the DEM must obtain written approval from MassHighway before altering the property and before transferring or assigning the license, in part or in whole. In addition, the DEM is responsible for

maintaining the property, as well as any existing or additional utilities needed to utilize the property. This license is in effect until terminated by MassHighway or the DEM, now DCR.

Buildings and Structures

Rourke Brothers Memorial Boat Ramp. Extensive regulations govern the use of the Office of Fishing and Boating Access (OFBA) sites, such as the Rourke brothers boat ramp (320 CMR 2.00; Appendix F). Use of these sites is restricted to the launching of watercraft and the parking of associated vehicles. No other parking or recreational uses are allowed. Special Use Permits are required for events (e.g., fishing tournaments) at OFBA sites. Permits are issued by the OFBA, following DCR review.

Edmund A. Bellegarde Boathouse. Chapter 238 of the Acts of 2006 authorized the transfer of the boathouse from the DCR to the University of Massachusetts Lowell (UMass). Sections seven through nine of the Act describe the terms and conditions of the transfer, including the requirements for public access and consequences regarding a change in use. The following additional items were also agreed upon, in order to execute and deliver a "care, custody, management and control" agreement between the DCR and UMass:

- Any document transferring the property shall include a reversionary clause, stating that care, custody, management and control reverts back to the DCR if the property ceases to be used as a public boathouse and park land.
- The Division of Capital Asset Management (DCAM), in consultation with the DCR, shall survey and provide a legal description of the property to be transferred.
- UMass shall prepare and submit, at its own expense, an Environmental Notification Form (ENF) regarding a land transfer of Article 97 protected lands.
- The transfer shall not be completed until the Secretary issues a certificate stating that no Environmental Impact Report (EIR) is needed, or that the EIR is adequate until the expiration of the legal challenge period.
- UMass shall comply with all requirements of the National Park Service and shall seek and obtain any required approvals.

The boathouse was officially transferred by the DCAM in 2006 (a signed Transfer Request 1, or TR1, form was located during this planning process); however the care, custody, management and control agreement has yet to be finalized. Several items from the list above, including the property survey and ENF, could not be located during this planning process.

The area including the parking lot to the west of the boathouse and the boathouse itself was estimated to be 1.15 acres, which exceeds the agreed upon land transfer estimate of one-third of an acre. Based on the estimate of 1.15 acres, it is presumed that the parking lot was not included in the land transfer.

Tremont Yard. The 25-year lease signed by Tremont Yard, LLC is a lengthy and detailed document that guides the management and operation of the DCR's property located at 257 Father Morissette Boulevard, excluding the parking area (see Parking, below). Permitted uses, rent, insurance, maintenance and subletting, among other topics, are addressed in the agreement. The DCR's Long-term Permit and Lease Program staff, within the Office of the General Counsel, ensure that the terms of the lease are being met. This lease is scheduled to expire on May 21, 2033, however it may also be extended for seven additional 10-year periods.

On October 31, 2008, Tremont Yard, LLC entered into a 15-year sublease with Jeanne D'Arc Credit Union. The sublease only covers the building that was constructed at 257 Father Morissette Boulevard. The credit union has options to extend the term of the lease, expand the leased premises and to purchase the property from Tremont Yard, LLC. For this sublease, Tremont Yard, LLC is the landlord and responsible for ensuring that the terms of the sublease are being met.

John J. Janas Memorial Skating Rink. The 25-year lease signed by the North Shore Rink Management Associates, Inc. is a lengthy and detailed document that guides the management and operation of the DCR's property located at 382 Douglas Road. Permitted uses, rent, insurance, maintenance and subletting, among other topics, are addressed in the agreement. The DCR's Long-term Permit and Lease Program staff, within the Office of the General Counsel, ensure that the terms of the lease are being met. This lease is scheduled to expire on June 20, 2027.

Parking

National Park Service's Visitor Center Parking Lot. In 1982, the Department of Environmental Management (DEM) and National Park Service (NPS) signed a Memorandum of Understanding (MOU) regarding the use of the parking lot located near the intersection of Broadway and Dutton streets in downtown Lowell. As part of this MOU, the two entities agreed:

- The NPS would be solely responsible for the operation and maintenance of the property, including staffing, daily operation, trash and snow removal, and repairs;
- The DEM would maintain a continuing role in the development of management policy relative to property;
- The obligations assumed by the NPS would not be transferred, assigned or modified without written approval by the DEM;
- The NPS would maintain a sign at the entrance of property, indicating that it may be used by visitors of both state and federal parks; and
- That a reasonable number of official spaces would be reserved for use by state or federal vehicles.

The MOU acknowledged that the DEM was authorized and intended to convey a portion of the property to the NPS and to that end, stated, "This agreement shall remain in full force and effect and shall not be defeated by the execution and delivery of a deed from [the] DEM to [the] NPS in connection therewith."

Tremont Yard. On January 10, 1985 the Trustees of Wannalancit Office and Technology Center Trust (Trustees) signed a 99-year lease with the Department of Environmental Management for the parking area located in the rear of 257 Father Morissette Boulevard. On September 27, 1996, the Trustees assigned the lease to the University of Massachusetts Lowell (UMass), who remains the tenant today. UMass is responsible for maintaining and, when it deems necessary, improving the parking area. Any construction on the property must be approved by the DCR. This lease is set to expire in 2084.

Interpretive Services

The National Park Service provides all of the interpretive programming related to the historic resources in downtown Lowell, due to the lack of DCR interpretive staff assigned to Lowell Heritage State Park and the overlap between the state and federal parks.

Lowell Heritage State Park is a participant in the Park Passport Program; the passport box is located next to the Rynne bathhouse.

Operational Resources

Supplemental Staffing

The supplemental staff at Lowell Heritage State Park are truly invaluable. Without the help of the City of Lowell and National Park Service, many of the DCR's most significant resources would certainly be in a state of disrepair, inaccessible to the public, or safety hazards requiring demolition. Other important partners include the Office of Fishing and Boating Access, University of Massachusetts Lowell, Merrimac River Rowing Association and Merrimack River Watershed Council, all of whom play a role in providing quality, safe access to the Merrimack River. Finally, the many volunteers in downtown Lowell – from the Lowell Canalwaters Cleaners, to the Boston & Maine Railroad Historical Society, to Park Serve Day attendees – help preserve and enhance the park's individual resources, as well as the visitor experience overall.

Public Safety

DCR Rangers issue citations for violations of various forest and park rules. A summary of incident reports recorded in the park during 2013 is provided below.

Table 4.10. Lowell Heritage State Park Incident Reports, January 1 through December 31, 2013

Incident	Number
Vandalism	1
Violation of DCR regulations[a]	1
Total	*2*

a. This violation was related to alcohol consumption on state property and, in turn, a suspected drunk driver. The incident was relayed to the Lowell Police Department, as the individual drove their vehicle onto a city-owned road after leaving the park.

Dairy cows at Great Brook Farm State Park. (DCR)

SECTION 5. GREAT BROOK FARM STATE PARK

5.1. INTRODUCTION

Great Brook Farm State Park is a large property – 929 acres – located in the northern section of the rural community of Carlisle, with a few acres falling over the town border to the north, in Chelmsford. Main access points to the property are located off of Curve Street, North Road and Lowell Street. This is a diverse property with a variety of resources, uses and issues, including an active dairy farm; multiple historic buildings; acres of wetlands, forests and agricultural fields; miles of trails popular with walkers, equestrians and mountain bikers; and home to a cross-country ski concession.

Great Brook Farm is the largest active farm remaining in Carlisle, and is touted as the only active dairy farm within a state park in the country. The farm complex boasts a robotic milking system, the first one to be installed in Massachusetts.

5.2. HISTORY OF PROPERTY

The Concord River Valley area has a long history of human occupation, with a Native American presence that stems back thousands of years. Known archaeological sites within Great Brook Farm State Park confirm pre-contact use of this property.

European settlement of the Carlisle area took place in the mid 17th century, with the establishment of three separate small settlements, one of which, Chelmsford South End, began sometime after 1655 and was located in the area of the present day park (MHC 1980*d*). River Meadow Brook provided serviceable waterpower, and mills and dwellings began appearing along its banks in the 17th century, including the area known as "The City," a small milling community with multiple homes and even a possible garrison (Markey 2002). A fulling mill was established in 1691 by John Barrett. Saw, grist and hoop mills were also located along River Meadow Brook, operated by the Adams and Robbins families through the early 18th century. A blacksmith shop was located in the area, and small scale quarrying also took place on land that is now within the park. A hoop mill continued to operate into the late 19th century.

By the early 18th century, the Spaulding and Adams families settled in the area and established small farms. The first North District schoolhouse was authorized in 1788, and the brick school building, the second one on this site, was constructed by Benjamin Barret in 1828. Small scale agriculture continued into the early to mid 20th century.

In 1939, Farnham Smith purchased eight acres off of North Road and built himself a cabin on a small pond as a summer retreat. Attracted to the area, he began purchasing additional property – the Adams farm in 1943, the home at 886 Lowell St in 1953, and the purchase of the Hart property, including the barn and the schoolhouse shortly thereafter (Miller 1998). He ultimately purchased 29 individual parcels, owning more than 900 acres, eight houses, the former schoolhouse, and five barns (Markey 2002). Smith began dairy farming and some breeding, and in 1948 he hired a farm manager, embarking fully into the breeding of Holsteins. Great Brook Farm became one of the largest dairy farm operations in New England and a highly respected breeder of Holsteins.

In September 1974, Smith sold Great Brook Farm to the Commonwealth of Massachusetts for $4.3 million, for the establishment of a state park. Smith retained the rights to: operate the farm for an additional three years, use and lease the North Farm house for an additional five years, use the log cabin and the East Farm house for an additional eight years, and life tenancy use of the schoolhouse. Smith decided to cease farm operations just one year later, selling off equipment and animals in 1975.

Legislation was passed in 1982 for the establishment of an interpretive farm. The cross-country ski concession has been operating since the 1983-1984 ski season (weather permitting). Applicants were sought to operate the farm in 1986, and Mark and Tamma Duffy have been operating the dairy farm component of the park under lease agreements since 1987. The ice cream stand opened in 1988.

5.3. EXISTING CONDITIONS

Natural Resources

Physical Features

Topography. The topography within Great Brook Farm State Park is composed of lowlands in the south and gently rolling hills in the north. Elevation ranges from 170 to 300 feet above sea level.

Geology. Located within the Nashoba terrane, Great Brook Farm State Park lies primarily within the Nashoba formation. This formation is composed of metamorphosed volcanic rocks and includes schist, gneiss and biotite gneiss as well as an abundance of mica and sillimanite (Skehan 2001). Glacial eskers and erratics can be seen throughout the park.

Soils. The soils at Great Brook Farm State Park include large areas that are well suited to agricultural and pasture use, although there are some issues with droughtiness that limits crop production and pasture usage (Peragallo 2009). The wetlands present on the property are reflected in the high percentage of acres characterized as muck type soils. There are slight to moderate limitations on path and trail development in dry areas, depending on slope, and some limitations on picnic and playground development, based on slope and the stoniness of the soils (Peragallo 2009).

Table 5.1. Soils of Great Brook Farm State Park

Soil Series	% of Park	Drainage Class
Canton fine sandy loam	20.7	Well drained
Freetown muck	14.4	Very poorly drained
Hinckley loamy sand	10.5	Excessively drained
Charlton-Hollis-Rock outcrop complex	7.6	Well drained to somewhat excessively drained
Merrimac fine sandy loam	5.7	Somewhat excessively drained
Swansea muck	5.2	Very poorly drained
Woodbridge fine sandy loam	4.6	Moderately well drained
Scarboro mucky fine sandy loam	4.4	Very poorly drained
Saco mucky silt loam	2.7	Very poorly drained
Freetown muck, ponded	2.3	Very poorly drained
Carver loamy coarse sand	2.3	Excessively drained
Windsor loamy sand	2.2	Excessively drained
Scituate fine sandy loam	2.2	Moderately well drained
Haven silt loam	2.1	Well drained
Hollis-Rock outcrop-Charlton complex	2.1	Somewhat excessively drained to well drained
Deerfield loamy sand	2.0	Moderately well drained
Raypol silt loam	1.7	Poorly drained
Narragansett silt loam	1.7	Well drained
Water	1.2	N/A
Wareham loamy fine sand	1.1	Poorly drained
Raynham silt loam	0.8	Poorly drained
Rock outcrop-Hollis complex	0.6	Somewhat excessively drained
Udorthents	0.5	Variable
Whitman fine sandy loam	0.3	Very poorly drained
Tisbury silt loam	0.2	Moderately well drained

Water Resources

Great Brook Farm State Park is rich in water resources – almost a quarter of the park's total acreage is made up of either ponds or wetlands.

Ponds. Meadow Pond, centrally located in the park, is the largest body of water in Great Brook Farm State Park (see Figure 4). Meadow Pond has an abundant amount of water chestnut (*Trapa natans*) that is impacting the chemistry and habitat of this body of water. Beaver activity, weather, and water releases from nearby cranberry bogs impact the water level, and have led to flooding on nearby trails.

There are two smaller ponds on the property. One is the farm pond located adjacent to the farm complex and the second is located north of North Road, in the eastern portion of the park, near the site of Farnham Smith's cabin retreat (see Figure 4). There are almost 12 acres of water that are encompassed by these three ponds.

Wetlands. The southern portion of the park is dominated by Tophet Swamp, a 76 acre wooded wetland area consisting primarily of mixed trees (see Figure 4), along with two blocks of coniferous wooded swamp. A smaller (28 acre) coniferous wooded swamp can be found in the northern section of the park. Shrub swamps (approximately 33 acres) and deciduous wooded swamps (57 acres) can be found spread throughout the property. All combined, swamp areas cover almost 21% of the park.

Some shallow marsh meadow lands encompassing 10 acres are found north of Meadow Pond, in the area known as "The Meadows". Small pockets of deep marsh can be found scattered nearby, totaling almost nine acres. The largest of these deep marshes is located directly northeast of Meadow Pond.

A small bog area, just over one acre in size, is located within the southern section of Tophet Swamp.

Vernal Pools. There are seven certified vernal pools and 12 potential vernal pools located in the park.

Streams. River Meadow Brook, also locally known as Great Brook, is situated roughly west-east through the park, starting in a cranberry bog west of the park and running just south of Curve Street and North Road until it enters Meadow Pond (see Figure 4). Exiting the north end of Meadow Pond, River Meadow Brook heads northward out of the park into a series of mill ponds in Chelmsford and into the Concord River in Lowell.

Two small, unnamed streams flow into River Meadow Brook from the north, on either side of Lowell Road, while a third stream swings through a small portion of the southern border of the park, ultimately connecting to Pages Brook south of the park.

Groundwater. A small portion of a medium-yield aquifer lies beneath nine acres in the northern part of the park, extending from Meadow Pond north to the park boundary.

There are two drinking water wells located at Great Brook Farm State Park. One well (#3051017-01G) is located just east of the Main Farm house, and serves the farm and the ice cream stand. The second well (#3051017-02G) is located north of the Nature Center Pavilion, in the field just southeast of the North Farm House Barn, along the Litchfield Loop trail, and serves the Nature Center Pavilion. Both are categorized as Transient Non-Community Groundwater Sources by the Department of Environmental Protection.

Flood Zones. The 100-year flood zone covers 84 acres that fall within Great Brook Farm State Park. This zone roughly corresponds to lands adjacent to River Meadow Brook and Meadow Pond, and extends north from Meadow Pond into The Meadows. The 500-year flood zone incorporates 162 acres of land, concentrated in the Tophet Swamp area in the southern half of the park.

Rare Species

A very small component of Great Brook Farm State Park, just 33 acres, has been designated as Priority Habitat under the Massachusetts Endangered Species Act (321 CMR 10.00). Located in the westernmost parcel of the park, the Priority Habitat is located on a non-contiguous piece of land located south of Curve Street and west of Old Morse Road, and extends into nearby municipal conservation land and private lands.

Placeholder for Figure 4.

Two rare species, both reptiles, can be found in this Priority Habitat: Blanding's turtle and eastern box turtle (NHESP 2007*a*; NHESP 2007*c*). These two species are similar in appearance and have similar nesting habitats, and thus are often confused with each other.

Table 5.2. State-listed Species of Great Brook Farm State Park, as identified by the Natural Heritage & Endangered Species Program (NHESP)

Species	Type	MESA[a]
Blanding's turtle	Reptile	T
Eastern box turtle	Reptile	SC

Source: Harper 2013

a. Status of species listed under the Massachusetts Endangered Species Act (MESA): SC = Special Concern and T = Threatened.

Blanding's turtles use a variety of habitats, including vernal pools, marshes, scrub-shrub wetlands and open uplands, during their life cycle, and travel long distances during their active season (NHESP 2007*a*). Eastern box turtles are more of a terrestrial turtle and inhabit a variety of habitat types (NHESP 2007*c*).

In 2010, MassWildlife and The Nature Conservancy (TNC) issued "BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World" (MassWildlife and TNC 2010). This guide identified two types of areas important for conservation: Core Habitat and Critical Natural Landscape. The first is crucial for the long-term persistence of rare species and other species of conservation concern. The second provides habitat for wide-ranging native wildlife, supports intact ecological processes, maintains connectivity among habitats, enhances ecological resilience, and buffers aquatic Core Habitats to help ensure their long-term integrity. Protection of both areas, which may overlap, is "important to conserve the full suite of biodiversity" in Massachusetts (MassWildlife and TNC 2010). At Great Brook Farm State Park, 490 acres (54% of the park) has been designated Core Habitat, a much larger area than the MESA designated Priority Habitat, but no Critical Natural Landscape areas have been designated.

Vegetation

Forest Types. In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified seven forest sub-types within Great Brook Farm State Park (Table 5.3).

Table 5.3. Forest Sub-types of Great Brook Farm State Park

Forest Sub-type	Acres	% of Park
Eastern white pine - oak	209.3	22.5
Eastern white pine	123.8	13.3
Eastern white pine - hardwoods	83.2	9.0
Mixed oak	76.6	8.2
Oak – hardwoods	33.9	3.6
Eastern white pine - eastern hemlock	8.8	0.9
Red maple - swamp hardwood	3.6	0.4
Total	*539.2*[a]	*57.9*

a. The difference in total acreage is due to the exclusion of wetlands and areas of open water, as well as changes in the park's boundaries since 2003.

More recently (2010-2011), specific areas within the forest were visited by DCR Management Foresters as part of the Massachusetts Continuous Forestry Inventory (CFI). The CFI is a network of permanent, one-fifth-acre plots on state park and forest lands that are routinely monitored for sivicultural purposes, and help to gage forest health. The measurements and observations made within each CFI plot are recorded in a database that dates back to 1960, when the CFI was created. Approximately 10% of the state's CFI plots are inventoried each year, on an on-going basis. As of 2010, there were 1,768 CFI plots statewide (Goodwin 2014).

There are seven CFI plots at Great Brook Farm State Park. These even aged stands range in age from 70 to 100 years and are comprised mostly of white or red pine, red maple, and white, black or scarlet oak.

Some disturbance agents have been noted in these stands, including pasturing (1900 to the present); insects (1981) and wind (1985). Harvesting also occurred in these stands in 1960.

Priority Natural Communities. There are no Priority Natural Communities within the park.

Invasive Species. A number of invasive species have been observed and identified by foresters and visitors to Great Brook Farm State Park. These species include:

- Common buckthorn (*Rhamnus cathartica*), a deciduous small tree or coarse shrub that threatens wetlands, where it can suppress other species, and field edges.

- Garlic mustard (*Alliaria petiolata*), a biennial herb that can spread rapidly, displacing native vegetation and in turn altering habitat. Garlic mustard is very difficult to eradicate.
- Bittersweet, a deciduous woody vine that has the capacity to grow over 60 feet long, girdles trees and smothers other plants. Bittersweet has been observed by the ice cream stand, along the Acorn Trail, and at the small parking area at the intersection of Lowell Street and North Road.
- Purple loosestrife (*Lythrum salicaria*), an herbaceous perennial, can suppress native populations, alter wetland structure and function, and impede water flow. Dense stands can form that are unsuitable for use by wetland habitat animals. Purple loosestrife has been found in wetland areas and along the brook.
- Water chestnut (*Trapa natans*), a fast growing aquatic plant, can crowd out native species and choke waterways. Water chestnut damages habitat and can impede recreational access. This is particularly present at Meadow Pond, and has been one of the contributing factors to the decrease in recreational boating in this pond.
- Multiflora rose (*Rosa multiflora*), is a densely spreading shrub that forms thickets that crowd out native species.
- Japanese knotweed (*Polygonum cuspidatum*), a shrub-like herbaceous plant that forms dense thickets that crowd out native species and reduce wildlife habitat, posing significant threats in riparian areas in particular.
- Catalpa (*Catalpa bignonioides* or *Catalpa speciosa)*, a fast growing tree that can reach a height of 50 feet and crowd out native trees in the process.
- Winged burning bush (*Euonymus alatus*), also known as winged euonymus or burning bush, is a deciduous shrub that forms dense thickets that crowd out native species.
- Japanese barberry (*Berberis thunbergii*), a spiny shrub that forms dense stands that can displace native plants and reduce wildlife habitat and forage. Barberry also harbors deer ticks that have the potential to carry the Lyme disease bacteria, functioning as a nursery of sorts for juvenile ticks (Benson 2011).
- Privet, a rapidly maturing semi-evergreen shrub that forms dense thickets that crowd out native species.

Pests and Disease. White pine weevil (*Pissodes strobe*) has been identified in Great Brook Farm State Park. While tree mortality from this pest is low, damage does impact tree health and reduce wood quality. Leaf feeders have also been identified here as well, although to a much lesser degree than the weevils. Leaf feeders encompass a broad category of insects that are all defoliators, impacting trees and other plants.

Wildlife

Birds. Great Brook Farm State Park is popular with birders, and over 150 wild species have been recorded in or over the park in recent years (see Appendix G). Of these species, 22 are classified as Species in Greatest Need of Conservation (MassWildlife 2006). As part of the farming operation, the farmers also maintain a flock of domesticated chickens.

Mammals. There is little current information on the park's mammals. Nine species confirmed to occur within the park and an additional 34 species that may possibly occur within the park are identified in Appendix G. Of the confirmed species, one of them, the Eastern red bat, is classified as a Species in Greatest Need of Conservation (MassWildlife 2006).

As part of the farming operation, the farmers also maintain a herd of dairy cows for milk production, as well as some goats, sheep, pigs, rabbits and a horse. Some are family pets, while others are kept for visitor enjoyment and farm income.

Reptiles. There is little current information on the park's reptiles. Seven species confirmed to occur within the park and an additional nine species that may possibly occur within the park are identified in Appendix G. Of the confirmed species, two are classified as Species in Greatest Need of Conservation (MassWildlife 2006). These are the Blanding's turtle and the Eastern box turtle.

Amphibians. There is little current information on the park's amphibians. Ten species confirmed to occur within the park and an additional eight species that may possibly occur within the park are identified in Appendix G.

Fish. There is no current information on the park's fish. A survey of River Meadow Brook in 1979 yielded an American eel (*Anguilla rostrata*), a brown bullhead (*Ameiurus nebulosus*), 12 bluegill (*Lepomis macrochirus*), four pumkinseed (*Lepomis gibbosus*), and four largemouth bass (*Micropterus salmoides*) (Wineman 1980).

Cultural Resources

There is a wide range of cultural resources within Great Brook Farm State Park. Some are associated with Farnham Smith's use of the property, while others predate his acquisition of these lands. Many of the cultural resources have been documented on Massachusetts Historical Commission (MHC) inventory forms. The park was evaluated by the MHC in the late 1990s and determined at that time to be eligible for listing in the National Register of Historic Places.

Pre-Contact Archaeological Sites

Four pre-Contact sites have been recorded in the park. One site is a stone tool making workshop that dates to the Middle Archaic Period (7,500-5,000 B.P.). The remaining sites are identified as "find spots" with little more than locational information provided. Despite the low number of sites, the physical characteristics, regional setting, and the known patterns of pre-Contact occupation in the area, all confer a high archaeological potential for this park.

Historic Archaeological Resources

Remnants of the 18th – 19th century mill site operated by the Adams family are located on River Meadow Brook, adjacent to Farnham Smith's cabin. (See MHC inventory form # CAR.902.) The Adams mill site includes a dam, two sluiceways, an impoundment, and the foundation of a mill. The dam and the sluiceways were originally constructed of dry laid stone, which helped to control water and create the impoundment area. The dam, also known as Cabin Pond Dam in agency records (MA02506), has an earthen core and sluiceways with concrete reinforcing. This dam is considered non-jurisdictional, meaning it is not under the regulation or jurisdiction of the DCR Office of Dam Safety and has not been assigned a hazard code. This dam was last inspected in 2007. A gate mechanism was added in the 20th century, probably to manage the water levels in the impoundment area. The mill foundation is located just north of the dam. According to research, this building once functioned as a grist, hoop, and saw mill (Dwyer 1995).

Not far from the Adams mill site, off of the Garrison Loop Trail, is the area locally known as "The City," also known as Chelmsford South End. This area, a collection of cellar holes likely dating from the 18th century, was potentially affiliated with the nearby mill, possibly as an area of mill worker housing. An archaeological survey of the area in 1995 identified five visible cellar holes in this area (Dwyer 1995); only two definite cellar holes and a possible third cellar hole were located during the RMP fieldwork. Archaeological work revealed a low density of artifacts, suggesting the area was not inhabited for a sustained period of time.

One of the cellar holes that is still visible is locally known as the Garrison House site. Although archival research points to a garrison located in the Great Brook area in the 17th century, the archaeological investigation yielded domestic artifacts, and cannot confirm its use as a garrison (Dwyer 1995).

Another cellar hole is located next to three pieces of quarried stone. A third, possible cellar hole is located north of these other two, near the northern intersection of Garrison Loop with the Woodchuck Trail. Lots of leaf and brush debris were noted in the cellar holes during the RMP fieldwork.

Other cellar holes that may or may not be affiliated with the settlement of "The City" can be found within the park. One of these, located across the street from the Litchfield House, consists of a dry laid stone foundation in an I-shape, with a large chimney base. This was also researched and tested during the 1995 archaeological survey of the park, at which time it was determined to have been the site of a mid to late 18th century residential structure (Dwyer 1995). This particular cellar hole is currently filled with brush.

Another cellar hole is located northeast of "The City," alongside the Woodchuck Trail. This one is small and square, with a smaller cellar hole next to it, suggesting an outbuilding. Of note are some stone walls that make some unusual turns in the immediate vicinity of this cellar hole.

The stonework remnants of John Barrett's Mill, located on River Meadow Brook near the

intersection of Lowell Street and North Road, on the west side of Lowell Street, are still somewhat visible. Local historians suggest that this was established in 1691 as one of the first fulling mill sites in the U.S., and later used as a hoop mill until the late 19th century (Lapham 1970). A stone dam that may have been affiliated with this mill site is located near this same intersection, on the east side of Lowell Street, and is known as the Lowell Road dam (MA02508). This dam is considered non-jurisdictional, meaning it is not under the regulation or jurisdiction of the DCR Office of Dam Safety and has not been assigned a hazard code. This dam was last inspected in 2006.

Two historic wells were located in the park during the RMP fieldwork. One of them, located south of North Road, once serviced the Main Farm House. A small well house covered this well until relatively recently, when it was removed for safety reasons and replaced by wooden decking. The other well, which is located southeast of the Litchfield House, is an open well located just off the trail.

Historic Resources

Buildings. In the process of acquiring the acreage for his large farm, Farnham Smith acquired several nearby farms – and their buildings – over the course of about 20 years. Since the establishment of the park, some were able to be put to use for park purposes or through long-term lease agreements. However, several of them no longer function for park purposes, or are residences that in the recent past have housed DCR staff, but with the disbandment of the staff housing program are no longer utilized. The buildings are presented here in three groupings: those that are currently in active use by park staff, long-term leaseholders, or curators; those that are used solely for storage purposes by the park and/or the region; and those that are currently vacant and no longer in active use (see Figure 4).

Buildings in Active Use

North Schoolhouse, located at 984 Lowell Street, is also known as the Park Headquarters building. See MHC Inventory form #CAR.7. Constructed in 1828, this single-story, side gabled, three-by-four bay brick building has a granite block foundation and a slate roof. A single-story rear ell, perpendicular to the main block, has another ell added onto the first one, oriented parallel to the main block. Both are clad in clapboard. The building has two interior brick chimneys; one is located in the main block and the other in the rear ell.

Utilized as a grade school until 1906, the former schoolhouse was adapted in the early 20th century for vegetable storage. Farnham Smith purchased the property in 1955, and renovated the schoolhouse into his farm offices in 1959, which may have been when the side entrance was modified to the present-day central recessed entrance under the elliptical arch. The rear ells, clad in clapboard, were added in 1959 and 1969 respectively.

English ivy is growing on the end walls of the main block, and the brick chimney in the rear ell is experiencing major spalling. The building is in satisfactory condition.

The North Schoolhouse has been in use as the Park Headquarters since establishment of the park.

North Schoolhouse/Park HQ (DCR)

Hart Barn, located at 1018 Lowell Street. This one-and-one-half story, gambrel roofed barn was once a dairy barn, constructed in the first quarter of the 20th century. With a poured concrete foundation, a concrete block first floor, a clapboard second story, and an asphalt shingle roof, this barn also has an attached milk room and metal stave silo. Aluminum framed fixed sash windows and a metal vent in the roof completes the picture.

Recent mortar repairs efforts between the concrete blocks is evident, and it appears that multiple materials were used in the process. This was done in anticipation of a repainting project scheduled for later in 2014. Asbestos abatement of the window glazing was completed in 2014. The development of a plan for the remaining lead and asbestos inside the building is also anticipated. While the southern side of the roof was replaced in the recent past, the northern side has not been in some time, and lichen

growth is evident. While work has slowly been occurring here to address major issues, the building is still in unsatisfactory condition.

The Hart Barn has been in use as the Great Brook Ski Touring Center since the l983-1984 ski season.

Hart Barn (DCR)

The ***Main Farm House***, historically known as the Adams House, is located at 247 North Road. See MHC inventory form #CAR.8. The Main Farm House is a two-story, side-gabled, three-by-two bay, central chimney, Georgian style home with a single-story rear ell. A shed roof provides a covered patio area on the rear façade, between the main block and the ell. The main house has a granite block foundation, and the ell has a concrete block foundation. The entire house is clad in clapboards and has an asphalt shingle roof. Windows are primarily six-over-nine double hung sash, with exterior storms. Architectural details include cornice returns on the gable ends, wide and flat window trim with a small projecting cornice, and top lights above the main entrance. Documentation on the MHC inventory form prepared in 1993 notes interior details including original paneling, wide pine flooring, and exposed gunstock posts in one second floor bedroom, however park staff could not confirm if these features still exist.

The house was constructed in the second half of the 18th century. Local historians differ about the date of construction - Timothy Adams, who purchased the property in 1793, may have constructed a new home on the site or may have remodeled an earlier c1760 home. The main farm complex was acquired by Smith in 1943 and a rear ell was added c1949.

While there is a gutter on the ell, there is no gutter on the main block of the house. This has led to the presence of lichen on the front and rear façades of the house due to splash back, and the doorsill at the main entrance appears to have some moisture damage. Some minor woodpecker damage can be seen on a front corner board. This building is in satisfactory condition.

The Main Farm House is now in use as the residence of the farmers that operate Great Brook Farm under a long-term lease.

Main Farm House (DCR)

Garage/Apartment. Located within the core of the farm complex is a two-story, side gabled structure. This building was built for equipment storage and farm staff housing, and is still utilized for these same purposes. Constructed during Smith's ownership of the property, this concrete block and clapboard building has five vehicle bays on the first floor and a two bedroom apartment on the second floor. Park staff has use of two of these vehicle bays for storage purposes. This building is in satisfactory condition.

Garage/Apartment (DCR)

Tie Stall Barn. Constructed in phases, this long building consists of a single-story gable roofed tie stall barn constructed c1910-1920 on the eastern end; connected to a two-and-one-half-story gambrel roofed barn built in the 1950s; connected to a single-story gable roofed open ended building on the western end. Gabled dormers punctuate the gambrel roofed section, and small single-story additions

punctuate the eastern section, one of which links the barn to a wood stave silo that is no longer in use. The foundation is fieldstone on the eastern end and concrete block on the western end. The building is clad in drop board siding and roofed with asphalt shingles. Vinyl replacement windows dot the structure. Exposed rafter tails provide the only adornment on this building.

Some small sections of siding are in need of repair, due to cracking or pieces missing. There are serious sill and foundation issues in need of attention. The north facing roof has some lichen growth and staining, and may need replacement. The building is in satisfactory condition.

The Tie Stall Barn used to house the dairy herd. A seasonal ice cream stand that is operated by the farmers April through October is now located at the eastern end of the structure. An interior dining and event space was developed by the farmers just behind the pre-existing ice cream stand section, however it was done without prior consultation with the DCR (as stipulated in the farm lease agreement) and without the benefit of a building permit. Authorization of future use of this space for this purpose is still pending, and will not occur until all applicable permits are obtained. The remainder of the barn is currently utilized primarily for storage of hay and sawdust.

Tie Stall Barn (DCR)

Bull Barn. This one-and-one-half-story front gabled building, located just to the east of the Tie Stall Barn, is composed of concrete block on the first floor and clad in drop board above, and has an asphalt shingle roof. Windows are aluminum framed sliding sash, some of which may no longer function. The main entrance is located on the side of the front façade and three more doors are located on the south elevation. A door sized opening is located in the gable end of the upper floor, presumably to access the area for storage. Like the Tie Stall Barn, the only adornment here is exposed rafter tails.

Constructed during Smith's ownership of the property, severe cracking has since occurred in the foundation through the front wall. Due to this issue, the building is in unsatisfactory condition.

This building is currently used for storage. The sign on the building, "Non-Hazardous Industrial Wastewater," reflects the nearby presence of underground piping associated with the tight tank for the Smart Barn (see the Infrastructure section for more information).

Bull Barn (DCR)

The ***Litchfield House***, historically known as the East Farm, is located at 437 North Road. See MHC inventory form #CAR.6. This c1860 one-and-one-half-story front gabled Greek Revival house is composed of a three-by-three bay main block with a one-story rear ell. The ell connects to a side gabled barn and two car garage through a small shed roofed addition, forming an L-shaped plan. The home has a granite block foundation, clapboard sheathing, and an asphalt roof. Architectural details include a deep eave overhang, sidelights flanking the main entrance, and six-over-six double hung sash windows that have been fitted with exterior storms. The New England style banked barn has large at grade openings on both the front and lower rear facades. Lichen is present on the north side of the roof and some can be seen creeping up the walls. The house has two interior brick chimneys, both of which could use some minor repair work. Extensive gardens surround the house. This property was purchased by Farnham Smith in the 1940s and served as the home for his head farmer, Lowell Litchfield.

This home is currently in use as a residence under a long-term lease as a part of the DCR's Historic Curatorship Program. This building is in satisfactory condition. The curators are currently working on the rear wall of the barn, which is in poor condition.

Litchfield House (DCR)

The ***Hounds House***, historically known as the Woods House, is located at 659 North Road. The Hounds House is a two-story, flat roofed modern home, constructed in c1950 of concrete block, with vertical board wood sheathing on the second floor. With metal casement windows and a deep raking eave with exposed rafters, this home reflects the modernism movement that had a large presence in nearby communities. This building is in satisfactory condition. A small one-story, front gabled wood frame horse barn is located to the rear of the home.

This home is currently used as a residential and commercial facility. It has been operating under a long-term lease to Old North Bridge Hounds, a business that kennels hound dogs and organizes local equestrian hunts.

Hounds House (DCR)

Buildings Used for Storage Purposes

Hadley House and Garage. Located at 1003 Lowell Street, this small mid-19th century residential building is a one-and-one-half-story, side gabled, two-by-one bay main block with a full width one-story shed roofed component on the rear. The foundation is largely fieldstone, with some concrete block on the southwest corner. The sheathing is clapboard and the roof is asphalt shingle.

The windows are primarily two-over-two double hung sash, and the main entrance is located on the side of the building, on the south facing façade. A centrally located brick chimney pierces the roofline. A wide fascia board and gable returns are the only adornments on this building.

A lilac bush, along with some bittersweet, can be found in the back yard.

The building has no gutters, the paint is failing, and a hose coming from the basement suggests a water problem.

Most recently, the Hadley House had been in use as staff housing. Vacated about seven years ago, the house is now used for storage by the region, is in non-functioning condition and is on the agency demolition list. As the timing of demolition is unknown, park staff plans on repainting the building in 2014 to make it less of a potentially attractive nuisance.

Hadley House (DCR)

A well maintained, detached two car garage in satisfactory condition is located just south of the Hadley House. Built c 1960, the side gabled garage has a concrete slab foundation, clapboard walls and an asphalt shingle roof. A gutter is located on the front wall, but not the rear wall of the garage.

Park staff currently use this garage for snowmobile storage, and do not plan to demolish the building.

Anderson Barn. Located at 360 Curve Street, this one-and-one-half-story, side gabled 19th century barn has a fieldstone foundation, clapboard walls and an asphalt shingle roof. The primary façade has a pair of adjoining entrances, located slightly off center. One is composed of a set of double doors that swing inward; directly next to it is a small entrance that has an intact sliding door that is affixed to the exterior. Built into a bank, an on grade entrance to the basement level is visible on the west side façade, but not accessible due to vegetative overgrowth. Six-over-six, double-hung sash windows are present on the side and rear walls of the building. This barn has several architectural details not always present in such a utilitarian structure, including: corner boards, a full cornice that wraps the building, an overhanging eave, decorative gable end treatments, and wide and flat trim around the windows that includes a small projecting cornice.

The building is in unsatisfactory condition. Paint is failing on the wall, and some small holes have been addressed by stapling mesh wire over them to prevent access by rodents. Interior evidence suggests some recent insect damage. Lichen is starting to grow on the roof and vegetation is encroaching on the side and rear façades of the building.

This building has electrical service, and is currently utilized for storage by the regional office (including IT equipment and former exhibit materials), as well as the regional Foresters and district Fire Control. It abuts private property and is across the street from another private property that maintains horses on site.

Anderson Barn (DCR)

Vacant Buildings

Duck Coop. Located just to the east of the Main Farm House, the Duck Coop is a small shed roofed outbuilding built into a bank, with the lower level providing access to a low, poorly drained area that used to function as a seasonal pond. The building has a concrete foundation, clapboard walls and an asphalt shingle roof.

Moss and lichen are present on the roof, and the foundation has been compromised by the roots of the directly abutting trees. Due to the foundation damage, this building is in unsatisfactory condition.

Duck Coop (DCR)

Farnham Smith's Cabin. This cross-gabled, L-shaped, single-story cabin was built by Farnham Smith in 1939 as a summer retreat, prior to his establishment of Great Brook Farm. Located adjacent to the Adams Mill site, the cabin provided him with a private spot on a small pond.

Built partially on stone and concrete piers and partially on a fieldstone foundation, the building has a shed roofed front porch and a centrally located rubblestone chimney. Although at first glance it appears to be a log cabin, the building is actually a wood frame building with half round logs that have been applied as exterior sheathing. Since they are not structural, the log ends are mitered at the corners. Exposed rafter tails complete the rustic look. The building was wired for electrical and phone service, and was also outfitted with a security system by Smith (none of these services are currently live).

The cedar shake roofing has deteriorated to the point where there are a several holes in the roof, coupled with minor vegetation growth. At least one interim repair effort involving tar paper occurred, possibly covering an earlier hole. The porch steps are deteriorating as well. The building is in unsatisfactory condition.

In the sale of the property, Farnham Smith negotiated use of the log cabin for an additional eight years. After use reverted to the DCR, the cabin

was periodically rented out for day use, primarily for corporate retreats. It was then briefly utilized as staff housing in the early 1990s. The windows are now boarded over, the door is locked, and the building is posted with "No Trespassing" signs.

Farnham Smith's Cabin (DCR)

Farnham Smith's Cabin Shed. A small, one-by-one bay front gabled shed is located adjacent to Farnham Smith's Cabin. Sheathed in cedar shingles, the shed is built on piers, has a tar paper roof, and is in satisfactory condition. A small open lean-to, probably used for protecting firewood, is located directly in front of this shed. Park staff does not have a key and do not use the space. Materials stored within the shed appear to date to use of the property by the former resident.

Cabin Shed and Lean-to (DCR)

Boat House. A small, one-story, three-by-one bay front gabled building located on the southwest end of Meadow Pond, the Boat House has a full-width front porch and rear addition. Built on a concrete block foundation, the building has drop board siding and an asphalt shingle roof.

The Boat House, unused since the early 1970s, is currently in extremely poor condition and considered to be in a state of critical failure. It has been posted with "No Trespassing" signs and is marked off with snow fencing to discourage people from exploring the site. Chunks of siding are missing, portions of the roof are caving in, and a section of sill appears to no longer exist.

The building is slated for demolition. As per a Memorandum of Agreement with Massachusetts Historical Commission, documentation on an MHC inventory form is underway.

Boat House (DCR)

The ***District 6 Fire Control Office***, historically known as the South House, is located at 841 Lowell Street. This c1950 traditional Cape Cod style former residence is a one-and-one-half story, side gabled, three-by-two bay building. The house has a concrete block foundation, a clapboard exterior, and an asphalt shingle roof. The front slope of the roof was replaced in the recent past with architectural style shingles; the rear slope has standard three-tab style shingles.

Two front gabled dormers punctuate the roof line and a single story breezeway connects the main block to a two car garage. Windows are six-over-six and eight-over-twelve double hung wooden sash. A brick chimney pierces the front slope of the roof, slightly off-center.

The exterior siding has some holes, and other minor deterioration, and the paint job is failing. There may be some foundation sill issues and several window sills are deteriorating. The building no longer has gutters and as one result, the front fascia board is deteriorating. The basement has water issues, as evidenced by the pipe leading out from a basement window.

This building was utilized as the District 6 Fire Control Office and also housed some regional staff until 2010, when those operations relocated to the new, large garage and office built on site to the rear of this building. (See the Infrastructure section for

more information.) At that time, the septic system for this building was retrofitted and re-permitted for use by the new building. This house is in unsatisfactory condition, and is on the agency demolition list.

District 6 Fire Control Office (DCR)

The ***Manseau House***, historically known as the West Farm, is located at 1112 Lowell Street. This three-by-two bay, two-story, central entrance home with a hipped roof, reflects a plan that was popular in the first quarter of the 20thc. A hipped roof entry porch with some scrollwork adorns the façade, and a small single story shed roofed addition has been added to the rear entrance. The home has a fieldstone foundation, late stage aluminum siding, and an asphalt shingle roof. There are no gutters.

Two brick chimneys are present: an exterior one on the south façade and an internal one that pierces the north slope of the roof. Windows are primarily two-over-two double hung sash. Historic photos show a central hipped roof dormer, removed sometime after 1973.

The house is in poor shape. English ivy, growing up the south side and rear walls, appears to have infiltrated the interior of the home. The internal chimney is leaning and the rear entry porch is collapsing.

Most recently, the Manseau House had been in use by regional fire control as storage until about 2008, and prior to that as staff housing. Vacated by the last residents approximately 10 years ago, the house is in non-functioning condition and is on the agency demolition list.

Manseau House (DCR)

A well maintained, detatched, two car garage in excellent condition is located behind the Manseau House. Built c1960, the hipped roof garage has a concrete slab foundation, clapboard walls that have recently been repainted, and an asphalt shingle roof.

The District Fire Control staff currently uses this garage for vehicle and other storage, and there are no plans to demolish this building.

North Farm House and Barn. Located at 107 Old North Road, this well maintained, one-and-one-half-story, cross gabled, five-by-three bay home has a fieldstone foundation, clapboard sheathing and an asphalt shingle roof. The house has two brick chimneys – an exterior one on the south façade and an interior one in the north end of the building. Windows are six-over-six double hung sash. The building is situated on a small rise with nice views of the fields to the south and the barn to the east. Extensively renovated and added onto in 1961, it appears this was originally a Cape Cod style home that had the front gable added to the north half of the front façade.

This home was utilized for staff housing until March, 2014, vacated as part of the discontinuance of the staff housing program. There are no current plans for its future use, but park staff would like the house to be reused in some capacity, especially since it is located on the edge of the park property. Neighbors have already expressed concerns to park staff, and are worried about vandalism.

North Farm House (DCR)

The North Farm House Barn, just east of the house, is a one-and-one-half-story barn with a gambrel roof. Built into a small bank, the foundation is poured concrete, the sheathing is dropboard and the roof is covered with asphalt shingles. The windows appear to be fixed wooden sash and exposed rafter tails provide the only adornment. The barn has also been well maintained.

The lower level of the barn has been used for park storage for many years, while the tenant utilized the upper level of the barn. Park staff has expressed an interest in using the upper level for additional storage, ideally for equipment that cannot stay in the Hart Barn during the winter, but no decisions have been made.

Structures. There are a number of different historic structures located within the park.

Bridges and Culverts

Along the Woodchuck Trail is a small ***bridge*** that is graced on one corner by a short cobblestone pillar with a concrete cap. The pillar appears to have had electrical service to it at some point, possibly to light the bridge. This bridge, constructed of non-historic wooden decking that rests on historic stone and concrete abutments, spans a small stream bed. The abutments appear to have been originally stone, but partially rebuilt through the addition of concrete. A concrete gate is located about 20 feet upstream from the bridge, probably utilized to create a small impoundment and control water flow.

Small bridge on Woodchuck Trail (DCR)

A ***stone arch bridge*** is located on the Pine Point Loop Trail, just north of the Boat House. This at grade crossing consists of a triple arch stone bridge, composed of dressed granite blocks, with low stone curbing for sidewalls, and an earthen pathway. Round holes are visible in the granite curbing, although their original purpose is unclear. While this spans the outlet of Meadow Pond, water seems to be creating problems at either end of the bridge. Debris is visible on the upstream side of the bridge and little headspace is visible through the arched culverts, suggesting that either the water level of the pond has risen over time, or that the openings may be partially blocked and impeding water flow beneath the bridge at the rate needed.

Stone bridge on Pine Point Loop Trail (DCR)

A small stone and earthen ***causeway***, outfitted with a stone culvert, is located just west of the stone bridge. The culvert is composed of rough dry laid fieldstone.

Farm Structures

Pole Barn. This partially enclosed, side gabled barn is actually a post and beam structure with a corrugated metal roof. Where exterior walls exist, they have board and batten siding. Vegetation is

encroaching upon the rear (northern) façade of the building.

Pole Barn (DCR)

Bunk Feeder. The Bunk Feeder, an open air pavilion, provides shade for the farmers' cows and is a space used for feeding. This wood frame building has a corrugated metal roof that appears to have some minor damage, including small spots of corrosion.

Bunk Feeder (DCR)

Both the Pole Barn and the Bunk Feeder were constructed during Smith's ownership of the property, and are currently used for Heifers of breeding age. Both structures are in satisfactory condition.

Metal Stave Silo. This silo, one of two on the property, is located between the Pole Barn and the Bunk Feeder. It appears to be in satisfactory condition, but it is no longer used for silage.

Metal Stave Silo (DCR)

A few additional small farm structures of indeterminate age are located in the core farm area, most notably a chicken coop and a pig shed.

Other Structures

Segments of ***stone walls*** can be seen in many areas throughout the park, both within the woods as well as alongside some of the roadways. These walls, predominantly dry laid loose rubble, vary in condition from failing to being in good condition. These walls show how this land was used and divided over the past three centuries.

A section of ***concrete retaining wall***, poured in stages, is located on the south side of North Road, across the street from the Main Farm House. The function of this retaining wall is not entirely clear. It is almost entirely covered in moss.

A free standing ***stone and brick hearth***, designed for outdoor grilling, is located just south of the Adams Mill remnants, not far from Farnham Smith's Cabin. Designed with two levels for cooking, it has a full chimney to direct smoke away from the cook. The hearth likely dates to Smith's development of this piece of property as his cabin retreat.

Outdoor Stone and Brick Hearth (DCR)

Located outside of Great Brook Farm, proper, is a fire tower, ***Massachusetts State Tower #21***, also known as the Hollis Wilkins Memorial Tower. Situated on a small (.06 acre) parcel at the peak of Robbin Hill, the property at 30 Summit Avenue in Chelmsford was purchased by the Commonwealth for 50 cents in 1918. First used as a site for fire monitoring purposes in 1911, the 60-foot-tall steel tower is the fourth one on the site, dating from 1939. The current cab dates from 1970.

The tower has also served as a host to a number of pieces of telecommunication equipment since 1978, from ham radio antennae to microwave dish antenna and repeaters for state police to commercial users. The following entities currently have equipment on this tower: Nextel, Massachusetts Department of Transportation, Greater Boston Police Council (GBPC), Massachusetts Port Authority, and the Massachusetts State Police.

A structural analysis of the tower undertaken in July, 2009 indicated the tower is in conformance with the requirements of the TIA/EIA-222-F standard (Structural Steel Standard for Steel Antenna Towers and Supporting Structures) for the current and antenna loading. An analysis completed in April, 2013 using the TIA-222-G-2 standard (Structural Standard for Antenna Supporting Structures and Antennas*)*, a more critical standard, found the tower to be overloaded with the existing and proposed antenna load by the GBPC. However, the GBPC chose not to add the proposed antenna systems due to a lack of funding. When and if they obtain the necessary grant funding to proceed with the project, the GBPC will have to reinforce the tower to meet the TIA-222-G-2 standard and their proposed antenna load.

Objects. There are no historic objects within the park.

Landscapes. There are a range of historic landscapes within Great Brook Farm State Park that showcase the history of Carlisle.

The core of ***Great Brook Farm*** and its adjacent fields to the east and northeast collectively form an historic landscape that conveys the agricultural history of the property, and is documented on MHC inventory form #CAR.A. It is through this collection of historic buildings and structures, the farmyard, the adjacent manmade farm pond, and the immediate surrounding fields that visitors can get a sense of what this place is, and see how dairy farming has evolved through the 20th century and into the 21st. The layout of these buildings and structures, as well as the fenced enclosures, provides pathways for visitors and safe spaces for animals and also help visitors understand how the farmyard functions. While the buildings and structures are described separately, the complex as a whole needs to be considered collectively.

Two other historic landscapes, the ***Adams mill site*** and ***"The City,"*** are discussed above, in the Historic Archaeological Resources section. The individual resources within these areas collectively make up larger historic landscapes, and each individual resource within these two sites needs to be considered within the full context of their larger landscape.

Finally, what appears to be a small unmarked family ***cemetery*** can be found off of the Woodchuck Trail, in the part of the park known as "The City." A series of 11 or 12 small stones are lined up, possibly head and foot stones. While there are no inscriptions, and the stones are not formally shaped, their rectilinear layout suggests they were lined up for this purpose, and may have served the mill village community. Additional research is needed.

During the last few decades, stone features and other landscape elements in the park have been the subject of differing research perspectives. Some of the stone features in the park are interpreted as symbolic and having astronomical alignments, or anthropomorphic details, and some have been designated "prayer seats". The public, independent researchers, historians, and archaeologists have all contributed to literature on the interpretation of the stone features within the park. The interpreted origins range from Precolumbian European exploration, Native Americans, and farmers. Because of the differing backgrounds, beliefs and agendas, a consensus on the debate has not been reached.

Cemetery (DCR)

Recreation Resources

Great Brook Farm State Park is primarily accessed via motor vehicle, although some local residents and regional cyclists do visit by bicycle. There are no public transit options to reach this park.

The primary recreational activities at Great Brook Farm State Park revolve around its extensive network of trails. This network, encompassing over 26 miles of trails, provides a variety of trail experiences that help make this park a popular destination. From wooded areas, to the edges of open fields, to rocky areas with some hills, to low lying areas along wetlands, visitors are not apt to get bored with the scenery.

The trails are routinely used by walkers and hikers, often accompanied by a dog, and according to park staff, the occasional goat. Despite signs at trailheads informing users of on-leash restrictions, many dogs are off-leash.

This park is a popular destination for mountain biking, in part because the trail system provides a range of experiences that can accommodate riders of all skill levels; mountain bikers range from beginners to experienced riders, and biking occurs throughout the park. When surveying park users about their use of the park for this RMP, the majority of survey respondents (65%) indicated that they have biked here in the past year. Technically challenging sections are concentrated in the Stone Row and Indian Hill areas. Riders explore the park individually, as well as through organized club rides and events, including an annual event organized by the New England Mountain Bike Association (NEMBA) as a part of the Kona Bicycles MTB Adventure Series. Park staff reports that some mountain bikers ride some of these trails after dark, despite the park officially closing at dusk.

The park's trails are also utilized by individuals and clubs for orienteering activities. The New England Orienteering Club has held events at Great Brook Farm State Park for several years, developing courses that are on- and off-trails. Other trail user groups include the Carlisle Trails Committee, the Cambridge Sports Union, and the local school system, which holds high school cross-country races as well as a local history search for third graders within the park.

The cross-country ski concession is very popular during the winter months, and serves as a major draw of visitors to the park. Over 8 miles of machine groomed loop trails are open, when there is enough snow to ski. The ski trails are restricted for use by skiers during the winter. An active effort made in 2010 to keep hikers off of the ski trails seems to be effective in maintaining the trails in good condition for skiers. The Lantern Loop, lit for nighttime skiing on Tuesday and Thursday evenings, provides visitors with a unique and interesting way to experience the park.

The ice cream stand at the main farm is also a big draw for visitors. Located at the eastern end of the Tie Stall Barn, ice cream is available on a seasonal basis. Approximately 10 picnic tables are located here for sitting and dining and checking out the farm animals. The farmers maintain a number of small farm animals in addition to the dairy cows, including goats, pigs, chickens and rabbits, for viewing in enclosures located adjacent to the Tie Stall Barn.

Equestrian use of the trails is also popular at the park. Complimenting the trail use, a series of cross-country horse jumps are located just off-trail in the section of the park south of North Road, most notably in the open fields to the west of Meadow Pond. These jumps, wooden fencing often flanked by overgrown cedars, are in fair condition. Some visitors complain to park staff (and also evident in the user survey for this RMP) about the frequent presence of horse droppings on the trails.

A canoe launch used to be located at the northern end of Meadow Pond, providing access to this body of water for canoeing and kayaking. This launch was removed in 2009 when a new large bridge was constructed nearby; some park users were unhappy

about this outcome. While there has been some discussion of designing and installing a new canoe launch area nearby, this has not yet happened. The abundance of water chestnut growth in the pond also poses an impediment to canoeing and kayaking. As a result, the use of the pond by boaters has decreased significantly in recent years.

Infrastructure

Property Boundary

Great Brook Farm State Park is located in the northern part of the Town of Carlisle, roughly in the middle of the triangle formed by state routes 4, 225 and 27. Easily accessible by car from interstates 495 and 95/128 and state routes 3 and 2, Great Brook Farm State Park is a popular destination park within the greater metro Boston region.

Buildings and Structures

In addition to the historic buildings and structures discussed in the Cultural Resources section, there are a few more recent ones that have been constructed since establishment of the park, the two most prominent being the Nature Center Pavilion and the Smart Barn (see Figure 4).

The Nature Center Pavilion, constructed in 2002, provides a sheltered area under which interpretive programs can be held and visitors can relax at the six picnic tables. This pavilion also includes an enclosed portion that contains restrooms and an office for the seasonal interpreter.

Nature Center Pavilion (DCR)

Designed to reflect the agricultural history of the park, the cross gabled building features a standing seam metal roof, a bank of clerestory windows in the pavilion to help bring natural light into the sheltered portion, and a gable end detail intended to appear as a haymow.

The Smart Barn, constructed in 2010-2011 and located within the farm complex, is equipped with a DeLaval robotic milking system to support the dairy farm operations. This robotic system is touted as the first one to be installed in Massachusetts. The barn, a cross gabled building with a standing seam metal roof, vertical board siding and a clerestory, evokes the history of the farm and blends nicely with the nearby historic barns.

Smart Barn (DCR)

Also in line with evolving agricultural practices, the silage for the cows is no longer kept in the tall vertical silos, still found on the property. Rather it is stored in a large trench silo, an open trench with large concrete block retaining walls on three sides and a central divider, to facilitate loading and unloading by heavy equipment.

The District 6 Fire Control Office and Garage is located at 841 Lowell Street. It does not have a very visible presence, as it is set back from the road, behind the vacant Cape Cod house, and is not open to the general public. A non-descript, tall, front gabled building with corrugated metal siding and a standing seam metal roof was constructed in 2010 to house vehicles and equipment utilized for regional fire control purposes.

There are several non-historic bridges in the park, facilitating trail connections over wet areas and streams. (For a review of historic bridges, see the Cultural Resources section.) The northernmost bridge, noted on the park's trail map, is located near the intersection of Woodchuck Trail and East Farm Trail and crosses River Meadow Brook. This is a wide bridge, to accommodate park vehicles if needed, constructed of preformed concrete abutments and wooden decking.

Two wooden pedestrian bridges are located over the sluiceways at the Adams mill site, located near Farnham Smith's Cabin.

The largest bridge is located next to the parking area at the Pine Point Trail Loop. It is a wide bridge with a metal truss and wooden decking, sturdy enough to accommodate vehicular traffic. Installed in 2009, this bridge provides a connection to the other end of the loop so that trail users can avoid walking on North Road. As a part of the network of groomed ski trails, this safe connection is also important to skiers.

Non-historic culverts can also be found within the park, in an effort to control water flow. Near the northern intersection of the Woodchuck Trail and Garrison Loop is a concrete culvert, bridged by wooden decking on the trail. This culvert, equipped with a small gate controlled by wood boards to control water flow, has been outfitted with a beaver deceiver. A lot of brush debris has collected around the deceiver and the wetland itself has a lot of vegetation.

A culvert at the intersection of Woodchuck Trail and Garrison Loop. (DCR)

Two other smaller pipe culverts can be found along the Woodchuck Trail.

The last category of non-historic structures is a collection of three rock shelters located in the northern portion of the park, off of the Stone Row trail. These three shelters, one with a functioning chimney, are composed of dry laid fieldstone constructed around an existing glacial outcrop, with makeshift roofing composed of branches.

Rock Shelter (DCR)

Due to local lore suggesting that these may have past and present Native American associations, one of these rock shelters was investigated during the 1995 archaeological survey of the park (Dwyer 1995). After a walk over of the site with local Native American representatives, as well as subsurface testing within one of the shelters, it was determined at that time that these are not affiliated with past or present Native American use of this land.

Park staff indicates that these shelters have been created since the development of the property as the state park. The structures reportedly began as the work of a local park user, a mason that was interested in modern druid culture, and have since been altered, rebuilt, or new ones created by others. According to long time park staff, these have only been in place for approximately the last 25 years.

Roads

Curve Street, Lowell Street and North Road are all town-owned, locally designated scenic roads (see Figure 4). These roads provide access to Great Brook Farm State Park. While these roads are not owned by the park, impacts to any stone walls or trees on DCR land that fall in the right of way of these roads must be first seek the written consent of the Carlisle Planning Board.

Parking

The main parking area for the park, located off of North Road, provides easy access to the Nature Center Pavilion, the farm and the ice cream stand (see Figure 4). This paved lot accommodates over 80 vehicles, and has two spots allocated for handicapped parking. A parking fee of $2.00 is

charged seasonally (April 1st – December 1st) via a pay and display machine located on site. This parking lot contains over 20 signs, 12 of which concern parking and the use of the pay and display machine. Some of these signs are official looking, while others are laminated paper.

Adjacent to this parking lot is a low impact rain garden that the DCR installed in 2010. The garden is planted with native flowers and shrubs, and it catches and filters the water run off from the parking lot and the Nature Center Pavillion.

A paved parking lot is also located at the North School House that now serves as the park headquarters (see Figure 4). This parking area, which primarily serves park staff, is also available for public use. The lot can accommodate approximately seven vehicles and it has one spot that is demarcated for handicapped parking.

A small parking area is located off of North Road at the trail head for Pine Point Loop, adjacent to the former canoe launch location (see Figure 4). This unpaved lot holds four to six vehicles. This location also has a lot of signage and includes four separate signs that address parking and are clustered in one area. None of these signs utilize the actual name of the park.

Signage at the Pine Point Loop parking area. (DCR)

Another small, unpaved lot is located at the intersection of Lowell Street and North Road, and can accommodate parking for approximately four vehicles (see Figure 4). This area is needed for large vehicle turnaround purposes rather than parking, but it is not signed as such.

Parking is also available in the former field directly adjacent to the Hart Barn, and serves the cross-country ski concession (see Figure 4). This unpaved lot can accommodate approximately 120 vehicles. A parking fee of $2.00 is charged seasonally (April 1st – December 1st) via a pay and display machine located on site.

Trails

Great Brook Farm State Park has an extensive and well utilized trail network spread over its 929 acres. This network includes a little over 24 miles of official trails (see Figure 4) and almost two miles worth of additional, unofficial trails.

Of the network of official trails, 0.5 miles are administrative roads, including the entrance to the District 6 Fire Control Office and Garage, as well as the roads within the farm complex. Unpaved forest roads make up 11.5 miles of the network and the remaining 12 miles are trails.

A survey of the trail network within Great Brook Farm State Park was undertaken in 2010. At that time, 19.4 miles were deemed to be in good condition, 4.6 miles were in fair condition, and only 0.3 miles were in poor condition, a fairly low percentage (1.5%) than is typical in other DCR properties, possibly reflecting the presence of the cross-country concession and their use of the trails and the strong volunteer participation in trail construction and maintenance by the mountain biking community. This survey does not reflect the condition of those trails that were subjected to extensive flooding while conducting fieldwork for this RMP. Some of the trails around Meadow Pond in particular were impassable due to flooding, interrupting the trail network in this area.

A series of short boardwalks are placed throughout the trail system, where necessary, for erosion control or wetland and stream crossings. Some of these structures are in good condition, while others are aging.

Great Brook Farm State Park is unique within the DCR system, as it separates trail users during the winter season. During the winter, 8.3 miles of trails in the eastern section of the park are set aside for the exclusive use of cross-country skiers. These trails are groomed to facilitate use by skiers and all other users are encouraged to use the remaining trails that are open to multi-purpose use, most of which are located on the western side of the park. Some trails in the eastern section of the park are closed to all uses during the winter season, if they connect to the groomed trails, but are not groomed for use by skiers. This practice has helped to reduce user

conflicts and maintain a high quality network of groomed trails for use by skiers.

Two trail maps have been developed for Great Brook Farm State Park; one is for summer use, while the other shows the separation of trail uses during the winter. These trail maps are available on the park's webpage, on the DCR's website, as well as at the Hart Barn (during the winter) and in the park headquarters at the North Schoolhouse.

Signs and Kiosks

There is one Road Marker Sign that leads visitors to the state park, located in the center of Carlisle. There is one Main Identification Sign for the state park, located at the intersection of North and Lowell roads. The orientation, material and design of this sign does meet DCR signage standards (DCR n.d.).The sign is surrounded by ornamental plantings that are starting to get tall enough to obscure the bottom of the sign.

There are two informational kiosks located at the park; one is located at the eastern end of Hart Barn parking area, and the other is located within the farm complex.

Informational signage is also located within the Nature Center Pavilion, where a glass enclosed bulletin board is located on one wall, next to a wildlife sighting white board for use by visitors.

Additional interpretive signage is also located within the Smart Barn, informing visitors about the robotic milking system.

A routed wooden sign, now partially broken, marks the site of the Garrison House.

In the user survey undertaken for this RMP, several individuals suggested that better trail signage is needed.

Memorials and Markers

There is one memorial within the park, dedicated to Prospera, a prized cow of Farnham Smith's. Prospera was a champion Holstein heifer, who routinely won prizes from the Holstein-Friesien Association for her level of milk production. She is buried at the entrance to the farm, just off of North Road, and the spot is marked by a stone with a brass plaque that has raised lettering:

PROSPERA
1949 – 1969

5.4. MANAGEMENT RESOURCES AND PRACTICES

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

Natural Resources

Water Resources

Drinking Water. The Transient Non-community Ground Water Sources (TNCs) within the park are tested under contract by WhiteWater Environmental Inc., a Massachusetts certified operator. These systems are operated in accordance with applicable regulations (310 CMR 22; Appendix F).

Massachusetts' regulations require a circular protective area around public water supply wells, including TNCs. The radius of this protective area, known as a Zone I, is based on the well's pumping rate. The DEP requires that activities within Zone I be limited to those directly related to the provision of water. Best Management Practices (BMPs) for protecting Zone I areas include the following (DEP 2001):

- Keep out non-water supply activities.
- Do not establish parking areas.
- Do not store or use lawn chemicals, road salt/deicers, motor oil, gasoline or paints.
- Remove or relocate underground storage tanks, hazardous materials, and septic systems, if possible.
- Use propane or natural gas powered pumps.
- Seal floor drains.
- Properly label, store, and dispose of hazardous substances.
- Restrict access to the well and post water supply protection signs.

These are recommendations, and not requirements.

Vegetation

As part of the long-term lease agreement with the farmers, there are 16 separate fields, totaling 74 acres that are actively managed for agricultural purposes.

Wildlife

A population of beavers has been present in Great Brook Farm State Park for several years, and their dam building and culvert blocking activities effect water levels, impacting the surrounding trail system. The current approach to beaver management includes the installation of beaver deceivers at some of the culverts where there has been a lot of beaver activity, along with beaver trapping by a wildlife contractor through the DCR's Lake and Ponds Program. The wildlife contractor is used at least annually, and makes the final assessment on which approach will be most effective to address the problems on hand.

Great Brook Farm State Park has been included in a statewide Cerceris wasp monitoring project that started in 2010. The Cerecreis wasp is a non-stinging wasp that makes nests in sandy soils and prey on Buprestid beetles, a family of beetles that includes the Emerald Ash Borer (EAB). Monitors examine what kinds of beetles the wasps are bringing back to their nests as one method of potential early detection of EAB. The data is currently very limited, but EAB has not been detected in the nests of the population here.

Cultural Resources

The Litchfield House is under lease with the DCR and is being rehabilitated, occupied and maintained as a single family residence by Darrold and Janet Fritz-Endres through the DCR's Historic Curatorship Program. Through the program, outside partners are selected through an open and competitive proposal process to help the DCR preserve some of its vacant and dilapidated historic properties in exchange for a long-term lease. The current tenants signed a twenty-five year lease in 1996, have rehabilitated the house and grounds, and are in the final stages of restoring the historic barn. The curator's responsibilities for the property include the complete rehabilitation of the house and its systems, management of its reuse (including all utility and insurance costs), and all maintenance responsibilities for the house and surrounding 1.08 acres.

The Hounds House has been under lease to Old North Bridge Hounds since 1994. This lease was established by legislation (Chapter 424, S-1234, 1993), and there have been two subsequent lease clarifications between the Department and the lessees, in 2002 and 2007. As part of the 2007 clarification, the lessee agreed to pay the DCR $550.00 per month and to perform capital repairs on the buildings and grounds at 649 North Road. This lease expired on December 31, 2013; the business owners would like a new lease. While this issue is pending resolution, the lessees are continuing to pay their monthly rental fees to the agency.

Great Brook Farm itself has been leased to Mark and Tammy Duffy since 1987. The original lease, ten years in length, was extended first in 1997, and again in 2007, and next expires on April 30, 2017. The lease was amended in July, 2011 to include language covering the Smart Barn, and establish ownership and maintenance responsibilities, as well as to bring some other language up to date, including insurance provisions. Their lease area consists of 90 acres, including the farm complex, farm buildings several fields and the cranberry bog. As part of the lease agreement, the farmers pay two percent of their gross retail on a quarterly basis to the DCR. Stipulations include the provision of some public access in selected areas of the farm during park hours, and maintaining building interiors and equipment.

Recreation Resources

The Hart Barn has been in use as the Great Brook Ski Touring Center, operating under a series of permit agreements with the same operators since the l983-1984 ski season. The operators groom the designated ski trails and provide lighting on some of the trails during the ski season for nighttime skiing. The current permit for this operation runs through the 2017-2018 ski season.

For the equestrian features within the park, the DCR mows the fields where the equestrian jumps are located; the local equestrian group maintains the jumps.

Infrastructure

Multiple buildings and structures are managed by outside lease holders (see Cultural Resources, above, for more information). Management responsibilities for these resources are stipulated in their lease agreements. Since these resources are predominantly historic, they must also coordinate their efforts in consultation with the DCR's Office of Cultural Resources.

Interpretive Services

A Comprehensive Interpretive Plan was drafted in 2011 for Great Brook Farm State Park by the DCR's Interpretive Services staff. Due to staff workload issues, this plan has not yet been finalized.

The Nature Center Pavilion serves as the home base area for interpretive services. Tours revolve primarily around the farm complex, and currently emphasize the workings of the dairy farm and the technological aspects of the Smart Barn. Tours run on weekends from Memorial Day through Columbus Day.

A Seasonal Interpreter is on site from mid-April through mid-October, providing guided tours of the farm complex, conducting junior ranger and nature programs, guiding school groups, and assisting with the planning and implementation of two major events, Picnic on the Farm, held the first Sunday in June, and Down on the Farm, held the last Sunday of September.

Great Brook Farm State Park is a participant in the Park Passport Program; the passport box is located within the Nature Center Pavilion.

Operational Resources

Supplemental Staffing

Mark and Tamma Duffy operate and staff the agricultural business at the park as part of the terms of their long-term lease agreement. The farm is a key attraction of the park, and the farmers maintain their lease areas so that the public can access much of it.

The park occasionally gets the assistance of a crew of volunteers from the Student Conservation Association (SCA) for specific trail-related projects. In the summer of 2013, the group did work on the Acorn Trail that will be continued in the summer of 2014.

Members of the Merrimack Valley Chapter of the New England Mountain Bike Association (MV-NEMBA) also volunteer at the park, and have been involved with trail construction within the park, as well as the purchase, construction and installation of boardwalks.

Given the wide range of opportunities this park presents to visitors, the many active user groups and the network of local and regional conservation organizations, the potential exists for the reformation of a Friends of Great Brook Farm State Park and their involvement in activities at the park.

Public Safety

DCR Rangers issue citations for violations of various forest and park rules. A summary of incident reports recorded in the state park during 2013 is provided below.

Table 5.4. Great Brook Farm State Park Incident Reports, January 1 through December 31, 2013

Incident	Number
Violation of DCR regulations[a]	3
Suspicious activity	1
Total	*4*

a. These violations were related to after hours use of the park and dogs not under control.

A large eastern white pine tree at Carlisle State Forest. (DCR)

SECTION 6. CARLISLE STATE FOREST

6.1. INTRODUCTION

Carlisle State Forest is the second smallest facility in the Lowell/Great Brook Planning Unit. Covering 25 acres, this property is tucked behind some relatively recent residential development (a subdivision known as Tall Pines), west of Hutchins Road. Access to the property is provided by Forest Park Drive on the south and Barnes Place on the north. Town owned conservation land and property owned by the Carlisle Conservation Foundation, a local land trust, abuts the property to the west.

6.2. HISTORY OF PROPERTY

In November of 1901, prominent landscape architect Warren Manning learned that a collection of about 100 very large eastern white pine were about to be harvested for lumber. Concerned about preserving this collection, he obtained a stay of proceedings and secured an option on the property, and convinced his fellow members of the executive committee of the Massachusetts Forestry Association to raise the funds to purchase the property.

Working in partnership with the Appalachian Mountain Club (AMC), $1,600 was raised through subscriptions by early 1902 to purchase approximately nine acres, with some excess funds collected going towards the AMC, which had agreed to serve as the property owner (Massachusetts Forestry Association, 1902*a* and 1902*b*).

Warren Manning at the Carlisle Pines. (Iowa State University Library Special Collections)

The AMC laid out trails and posted markers, and also selectively thinned some hardwoods on the property in order to showcase the large pines, improve growing conditions, and control gypsy moths (Goodall 1970; Shepard 1913). In 1912, the AMC expanded the reservation through the purchase of approximately 10 additional acres, and increasing

the collection of very large eastern white pine to approximately 150.

In 1934, the AMC sold the Commonwealth the Carlisle Pines and two other AMC reservations in Billerica and Warwick, with the stipulation that if these properties are no longer to be used as state forests, ownership would revert back to the AMC. Following transfer of the property to the Commonwealth, some small red pine plantations, as well as some additional white pine and Norway spruce were planted. The Hurricane of 1938 caused significant damage, knocking down all but 28 of the large eastern white pines, and after the Hurricane of 1954, further pines were lost. By 1980, there were only 14 of the large eastern white pines still standing (Stoddard 1980).

6.3. EXISTING CONDITIONS

Natural Resources

Physical Features

Topography. Carlisle State Forest is located between two ridges, and has relatively level to gently rolling terrain.

Geology. Carlisle State Forest falls within the Nashoba Terrane, formed of plutonic and metamorphic rocks including metamorphosed volcanic rock rich in biotite and hornblende. Surficial glacial deposits are found in the forest (Skehan 2001).

Soils. The soil of Carlisle State Forest consists primarily of Charlton-Hollis-Rock outcrop complex, which is a combination of soils and exposed bedrock encompassing about 50% Charlton soils, 25% Hollis soils, 15% rock outcrop and 10% other soils (Peragallo 2009). Found in upland areas, the Charlton soils can be found on toe slopes, while the Hollis soils are on hilltops and ridges. There are only slight limitations when it comes to potential trail and path development, with moderate limitations in areas where slope exceeds 15%. The Hollis soils are shallow and raise the risk of blown down trees, which could impact the forest. The Deerfield loamy sand, a very deep soil type, can be found on glacial stream terraces and deltas. These soils present moderate limitations to trail and path development due to its sandy composition (Peragallo 2009).

Table 6.1. Soils of Carlisle State Forest

Soil Series	% of Forest	Drainage Class
Charlton-Hollis-Rock outcrop complex	74.0	Well drained to somewhat excessively drained
Deerfield loamy sand	18.9	Moderately well drained
Swansea muck	5.6	Very poorly drained
Whitman fine sandy loam	1.3	Very poorly drained
Scarboro mucky fine sandy loam	0.2	Very poorly drained

Water Resources

Ponds. There are no ponds within the forest.

Wetlands. There are two small wooded swamp areas in Carlisle State Forest (see Figure 5). On the western edge of the property is a 0.4 acre wooded swamp composed of deciduous trees. On the southern edge of the property is a 0.6 acre wooded swamp composed of mixed trees.

Vernal Pools. There are no vernal pools within the forest.

Streams. There are no streams within the forest.

Groundwater. There are no aquifers beneath the forest.

Flood Zones. A very small sliver of the western most corner of the forest, 0.05 acres of property, falls within the 500-year flood zone.

Rare Species

There have been no rare species recorded in the forest.

Vegetation

Forest Types. Carlisle State Forest exists today due to an effort led by Warren Manning to protect an impressive stand of 200+ year old, very large eastern white pine from being logged in 1901. At the time, there were approximately 150 large, mature growth white pine; the hurricanes of both 1938 and 1954 took a serious toll on this stand and by 1980 only 14 remained (Stoddard 1980). DCR Forestry staff recently noted that more have since come down. Known historically (and locally) as the Carlisle Pines, Carlisle State Forest includes a stand of white

Placeholder for Figure 5.

Pine, some hemlock, and a small, centrally located plantation of red pine.

In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified four forest sub-types within Carlisle State Forest (Table 6.2). Some large eastern hemlock that appear to be old was also identified here during the RMP fieldwork, some of which appear to have been impacted by Hemlock Woody Adelgid.

There are no Continuous Forest Inventory (CFI) plots within Carlisle State Forest.

Table 6.2. Forest Sub-types of Carlisle State Forest

Forest Sub-type	Acres	% of Forest
Eastern white pine	10.0	40.0
Mixed oak	7.3	29.2
Eastern white pine – oak	3.0	12.0
Red pine plantation	0.6	2.4
Total	*20.9*[a]	*83.6*

a. The difference in total acreage is due to the exclusion of wetlands and areas of open water, as well as changes in the forest's boundaries since 2003.

Priority Natural Communities. There are no Priority Natural Communities within the forest.

Invasive Species. Common buckthorn (*Rhamnus cathartica*), a deciduous small tree or coarse shrub, threatens wetlands and field edges, where it can suppress other species. It has been observed in the southern portion of this forest in the past. Common buckthorn is often spread by seed dispersal through birds.

Pests and Disease. Hemlock woolly adelgid is present in the Eastern hemlock trees on this site. No other information has been located to date on pests and disease at Carlisle State Forest.

Wildlife

Birds. There is little current information on the forest's birds. Over 175 species that have been identified in some of the other properties in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.1.

Mammals. There is little current information on the forest's mammals. Over 45 species that have been identified in some of the other properties in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.2.

Reptiles. There is little current information on the forest's reptiles. Over 15 species that have been identified in some of the other properties in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.3.

Amphibians. There is little current information on the forest's amphibians. Over 15 species that have been identified in some of the other properties in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.4.

Fish. There is no current information on the forest's fish.

Cultural Resources

Pre-Contact Archaeological Sites

There are no recorded pre-Contact sites in the Carlisle State Forest, and the forest has not been subject to an archaeological survey. The physical characteristics, regional setting, and the known patterns of pre-Contact occupation in the region all confer a high archaeological potential for the forest.

Historic Archaeological Resources

There are no recorded historic archaeological sites in the Carlisle State Forest, and the forest has not been subject to an archaeological survey.

Historic Resources

Buildings. There are no historic buildings within the forest.

Structures. A dry laid stone wall lines much of the eastern boundary of Carlisle State Forest. A segment of another dry laid stone wall is centrally located on the west side of the property, and runs east to west. Constructed of glacial till, these walls are in fair to poor condition.

A stone wall in Carlisle State Forest, with a granite boundary marker in the foreground. (DCR)

Objects. A small granite boundary marker was identified next to the stone wall that lines the eastern boundary, near the Forest Park Drive entrance.

Landscapes. The stand of very old and large eastern white pines that are located in the northwest section of the property inspired the protection of this land, and the creation of the state forest. These natural resources have not only catalyzed the protection of this land, but are the primary draw for visitors to this small parcel and have become a part of its history.

Recreation Resources

Carlisle State Forest is primarily accessed via motor vehicle or on foot by local residents. Individuals who live nearby may walk or ride their bicycle to one of the two trailheads. There are no public transit options to reach this forest.

Recreation resources are limited to a network of 0.7 miles of trails through Carlisle State Forest. These trails are used primarily for hiking, as well as some dog walking, mountain biking, horseback riding, snowshoeing and cross-country skiing.

There is one known geocache located here as of October 2013.

Infrastructure

Property Boundary

Carlisle State Forest is a 25 acre undeveloped property in the northwest section of Carlisle, located west of Curve Street and north of Westford Road /Route 225. Town owned conservation land and property owned by the Carlisle Conservation Foundation, a local land trust, abuts the property to the west. Much of the eastern boundary is marked by a stone wall.

Buildings and Structures

There are no buildings or structures in the forest.

Roads

There are no roads in the forest.

Parking

There is no parking at Carlisle State Forest. At the end of Barnes Place, there is one unpaved parking space; it appears to be located on the abutting Town of Carlisle conservation land. Neighbors do express occasional frustration with the lack of parking in the area.

Trails

There are approximately 0.7 miles of well maintained trails in Carlisle State Forest. This network was mapped and assessed in 2009, and determined to be in good condition.

A trail map has not been created for Carlisle State Forest, and there is no information on the DCR website for the forest or its network of trails.

Signs and Kiosks

There are no Lead-in or Main Identification signs for Carlisle State Forest. The remnants of a wooden sign stanchion are located just off trail at the Forest Park Drive entrance. The only indications that this is state property are some boundary markers, found mostly at the southern edge of the property.

The former entrance sign stanchion. (DCR)

There are no informational kiosks at Carlisle State Forest.

Memorials and Markers

There are no memorials or markers in the forest.

6.4. MANAGEMENT RESOURCES AND PRACTICES

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

Natural Resources

Vegetation

The DCR's forestry staff has periodically undertaken inventory of the remaining large eastern white pines, recording measurements. However, the most recent inventory was completed in 1980 (Stoddard 1980).

Wildlife

The DCR does not actively manage wildlife at Carlisle State Forest.

Cultural Resources

There are no cultural resource management activities that are unique to this state forest.

Recreation Resources

With the exception of keeping the small network of trails clear and usable, there are no other recreational resources in need of active management at this forest.

Infrastructure

With the exception of the small network of trails, there is no other infrastructure at this park to manage.

Interpretive Services

Interpretive service programs are not offered at Carlisle State Forest, nor is any other interpretive information provided.

Operational Resources

DCR Staffing

Carlisle State Forest does not have any full or part-time DCR staff on site.

Supplemental Staffing

The Carlisle Trails Committee has, in the recent past, completed volunteer trail clean ups on the trails at Carlisle State Forest, in conjunction with their work at the abutting town conservation lands.

A fitness trail through a white pine plantation at Warren Manning State Forest. (DCR)

SECTION 7. WARREN H. MANNING STATE FOREST

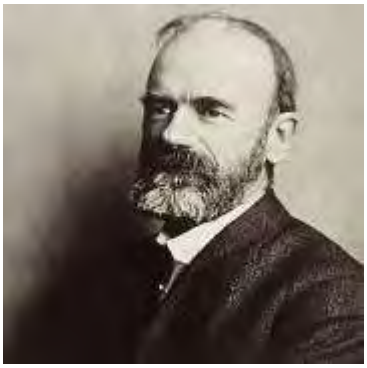
7.1. INTRODUCTION

Warren H. Manning State Forest, named for influential landscape architect Warren H. Manning (1860 – 1938), is a 183-acre property located in the northwest part of Billerica. The forest is located predominantly on the east side of Route 3, and is bisected by Chelmsford Road/Route 129 into two distinctly separate sections: a developed northern section and an undeveloped southern section (see Figure 6).

The forest includes a system of trails throughout the property, utilized mostly by local residents, as well as a picnic area, fitness trail and a small spray deck in the developed, northern section of the forest. The Billerica Recreation Department staffs the spray deck and manages the parking lot and bathhouse.

7.2. HISTORY OF PROPERTY

The area that is now Warren H. Manning State Forest is located in a part of Billerica that was not heavily settled through the 17th, 18th and most of the 19th centuries (MHC 1980*e*). One of the few settlers in this area was Samuel Manning, who built the Manning Manse, located at 56 Chelmsford Road/Route 129, in 1696. The ancestral home of Warren H. Manning, the Manning Manse was empty and in need of preservation when Manning moved to Billerica in 1895. A landscape architect who began working in his family's nursery business in Reading, MA, amassing an extensive horticultural background, Manning then honed his design skills in the Olmsted firm until branching out on his own in 1896. Manning was a founding member of the American Society of Landscape Architects in 1899, and pioneered a system of resource-based planning.



Warren Manning (The Cultural Landscape Foundation)

Placeholder for Figure 6.

After 1900, Manning began to acquire land in close proximity to the Manning Manse. In 1915, Manning moved his practice to Billerica, ultimately operating out of an octagonally-shaped office that was constructed in 1917 on the north side of Chelmsford Road (no longer extant). In 1923, Manning moved his practice to Cambridge when access to Boston and Lowell from Billerica became impossible via public transit.

Manning was very active in Billerica town affairs, and his efforts included promoting the creation of public woodlands in town, with a particular focus on developing a town forest system in Billerica. Manning developed the Billerica Town Forest Plan in the mid-1920s and it was accepted by the town in 1926. In 1934, Manning sold approximately 140 acres of his property surrounding the Manse to the Commonwealth, for the purpose of establishing a state forest, at a rate of $5.00 per acre (Manning n.d.). This property included Manning's former office, which was later removed by the Commonwealth sometime after his death in 1938 (Rockwell 2002). In 1935 and 1939, additional acreage in the area was purchased, increasing the size of the facility. In 1953, even more land was acquired through takings as the Old Middlesex Turnpike was realigned, and the new Middlesex Turnpike, Route 3, cut through a portion of the property. This project left a small portion of the forest on the western side of Route 3, impacting the trail system and making this parcel inaccessible to staff and visitors.

Around 1955, a recreation area was developed in the portion of the property north of Chelmsford Road/Route 129, in what is now known locally as Manning Park. The 1950s improvements included a wading pool, equipment cabin and picnic area.

In 1961, an Act of the Legislature led to the disposition of two parcels of land west of Route 3 to the Town of Billerica for industrial purposes. (See Appendix H for more information.) A lumber yard and self storage business are located here today.

A master plan completed for the forest in the early 1970s proposed an expansion of the picnic area and the installation of a full-sized swimming pool in the northern section of the property, and development of a camping area south of Chelmsford Road; none of these proposals came to fruition.

The Town of Billerica has been managing the recreation area in the northern section of the forest since 1990. A series of Special Use Permits from 1990 through December 2004 formalized this management arrangement. A renewed permit that was to run from 2005 through 2010 was never finalized, due to disagreements between the DCR and the Town over parking revenue. As a result, the Town of Billerica has been managing this area without any formalized agreement or permit in place for almost a decade.

In 2002, the recreation area was updated and the wading pool was replaced by a spray deck. An adult fitness trail is also located on this portion of the property, installed by the Town of Billerica in 2012.

7.3. EXISTING CONDITIONS

Natural Resources

Physical Features

Topography. Warren H. Manning State Forest is fairly level in the southern section, with some low rolling uplands in the northern portions of the forest.

Geology. Warren H. Manning State Forest lies within the Nashoba Terrane, and the bedrock of the area includes gneiss, schists and Andover granite, a pink to buff colored granite that has a granular texture (Skehan 2001). The gneiss and schists are metamorphic rocks that may have originated as volcanic rocks. Some glacial erratics are scattered throughout the property.

Soils. Warren H. Manning State Forest is comprised of a wide range of soil types, from loamy sands in the uplands to muck, reflecting the presence of wetlands. The deep Hinckley loamy sands can be found on glacial outwash plains and terraces, while the Canton fine sandy loam and the Scituate fine sandy loam soils are located on the side slopes and toe slopes of uplands (Peragallo 2009). Slight to moderate limitations on path and trail development exist in the upland areas, the limitations increasing with slope and the sandiness of the soil. Severe limitations are present in the wetter areas where the muck based soils are found. Limitations on playground and picnic area development range from slight to severe, based upon slope and the stoniness of the soils present (Peragallo 2009).

Table 7.1. Soils of Warren H. Manning State Forest

Soil Series	% of Forest	Drainage Class
Hinckley loamy sand	27.4	Excessively drained
Canton fine sandy loam	18.5	Well drained
Scituate fine sandy loam	14.2	Moderately well drained
Saco mucky silt loam	9.8	Very poorly drained
Freetown muck	9.3	Very poorly drained
Montauk fine sandy loam	6.7	Well drained
Windsor loamy sand	6.6	Excessively drained
Deerfield loamy sand	2.6	Moderately well drained
Urban land	2.4	N/A
Ridgebury fine sandy loam	1.8	Poorly drained
Charlton-Hollis-Rock outcrop complex	0.7	Well drained to somewhat excessively drained
Udorthents	0.1	Variable

Water Resources

Ponds. There are no ponds within the forest.

Wetlands. Wooded swamp areas containing deciduous trees can be found throughout the forest, totaling 14 acres; an additional 10 acres of wooded swamp area, centrally located within the forest, contains a mix of trees. Two smaller areas of shrub swamp, one in the center of the forest and one in the northern portion of the forest, have a combined total of just over seven acres in size. A small bog (0.9 acres), locally known as Spruce Pond, is located within the centrally located shrub swamp. See Figure 6.

Vernal Pools. There is one certified vernal pool located in Warren H. Manning State Forest. In addition, there are five potential vernal pools located within this facility.

Streams. Black Brook enters Warren H. Manning State Forest on the northern boundary and heads south, flowing under Route 129/Chelmsford Road and ends in the bog located in the western portion of the forest (see Figure 6).

Flood Zones. On the northern edge of the property, there are two small areas, totaling 0.09 acres of land, that abut wetlands on neighboring properties that fall within the 100-year flood zone. These same areas expand to cover nearly four acres within the 500-year flood zone.

Rare Species

Priority Habitat has been designated on 72 acres of Warren H. Manning State Forest, encompassing roughly two-thirds of the land between Route 3 and Route 129/Chelmsford Road.

The only rare species recorded here, the blue-spotted salamander, is an amphibian that utilizes wetland habitat for reproduction and upland forest habitat for foraging, both of which are present in this part of the forest (Natural Heritage and Endangered Species Program 2007*b*). This species has a MESA status of Species of Special Concern.

In 2010, MassWildlife and The Nature Conservancy (TNC) issued "BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World" (MassWildlife and TNC 2010). This guide identified two types of areas important for conservation: Core Habitat and Critical Natural Landscape. The first is crucial for the long-term persistence of rare species and other species of conservation concern. The second provides habitat for wide-ranging native wildlife, supports intact ecological processes, maintains connectivity among habitats, enhances ecological resilience and buffers aquatic Core Habitats to help ensure their long-term integrity. Protection of both areas, which may overlap, is "important to conserve the full suite of biodiversity" in Massachusetts (MassWildlife and TNC 2010).

In Warren H. Manning State Forest, there are 72 acres of Core Habitat, covering the same area that has been designated Priority Habitat. Critical Natural Landscape has not been identified at Warren H. Manning State Forest.

Vegetation

Forest Types. In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified four forest sub-types within Warren H. Manning State Forest (Table 7.2).

Table 7.2. Forest Sub-types of Warren H. Manning State Forest

Forest Sub-type	Acres	% of Forest
Mixed oak	74.1	40.5
Eastern white pine - oak	54.5	29.8
Eastern white pine	25.2	13.8
Red maple - swamp hardwood	1.9	1.0
Total	*155.7*[a]	*85.1*

a. The difference in total acreage is due to the exclusion of wetlands and areas of open water, as well as changes in the forest's boundaries since 2003.

Hardwood species – including oak – are uncommon in the town of Billerica. Most of the hardwood stands in town are located on DCR lands.

As part of the Massachusetts Continuous Forestry Inventory (CFI), a specific area within the forest was visited by DCR Management Foresters in 2000. The CFI is a network of permanent, one-fifth-acre plots on state forest lands that are routinely monitored for sivicultural purposes. The measurements and observations made within each CFI plot are recorded in a database that dates back to 1960, when the CFI was created. Approximately 10% of the state's CFI plots are inventoried each year, on an on-going basis. As of 2010, there were 1,768 CFI plots statewide (Goodwin 2014).

There is one CFI plot within Warren H. Manning State Forest. This even-aged, two storied stand is 55 to 60 years old and comprised of primarily of red maple, along with some white pine and swamp hardwoods, including American elm and gray birch.

As part of the CFI process, DCR Management Foresters also look for signs of disturbances that affect the development of vegetation in the vicinity of each CFI plot. One disturbance agent, snow and ice, was recorded here in 1996.

Priority Natural Communities. There are no Priority Natural Communities within the forest.

Invasive Species. A few invasive species have been observed within the forest by DCR staff however none of these species have been identified in the CFI plot. The invasive species observed here include:

- Common buckthorn (*Rhamnus cathartica*), a deciduous small tree or coarse shrub, has been observed by DCR Foresters. Common buckthorn threatens wetlands, where it can suppress other species, and field edges. It is often spread by seed dispersal through birds.
- Multiflora rose (*Rosa multiflora*) has also been observed here. It is a densely spreading shrub that forms thickets that crowd out native species.
- Japanese knotweed (*Fallopia japonica*) is a shrub-like herbaceous plant that forms dense thickets that crowd out native species and reduce wildlife habitat, posing significant threats in riparian areas in particular. This was observed along the edge of Black Brook during RMP fieldwork.

Pests and Disease. White pine weevil (*Pissodes strobe*) has been identified in Warren H. Manning State Forest. While tree mortality from this pest is low, damage does impact tree health and reduce wood quality. To a lesser extent, gypsy moths (*Lymantria dispar*) and Dutch elm disease have also been observed here.

Wildlife

Birds. There is little current information on the forest's birds. Over 175 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.1.

Mammals. There is little current information on the forest's mammals. Over 45 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.2.

Reptiles. There is little current information on the forest's reptiles. Over 15 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.3.

Amphibians. There is little current information on the forest's amphibians. Over 15 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.4. Only one of these, the blue-spotted salamander, has been recorded at this forest.

Fish. There is no current information on the forest's fish.

Cultural Resources

Pre-contact Archaeological Sites

There are no recorded pre-Contact sites recorded in the forest, and no archaeological surveys have been conducted. The physical characteristics, regional setting, and the known patterns of pre-Contact occupation in the region all contribute to a high archaeological potential for the forest.

Historic Archaeological Resources

The remnant of a concrete foundation (MHC Inventory Form #BIL-HA-46) from Manning's office complex is located just north of the Warren H. Manning Office Memorial Stone. A concrete curb covered by vegetation, it appears to have been approximately 12 feet square. Some of the ground cover in the area may be remnant plant material from when the office was in use. From c1911 – c1919, Manning built a series of buildings used by his practice, many of which were ultimately interconnected as spokes to a hub. All but two of the buildings were burned down or demolished after 1938.

The foundation of an outbuilding is located adjacent to Spruce Pond, just south of the Manning Manse property. This foundation of poured concrete has been built into a slope and is open on grade on the low sloped side, with a rustic stone retaining wall extending off the rear corner. In the corner formed by the retaining wall there is an overgrown tree that might date to Manning's involvement with the property.

Outbuilding Foundation (DCR)

Historic Resources

Buildings. There are no historic buildings within the forest.

Structures. Stone wall remnants are located in the southern portion of the property, extending north from Old Rangeway Road. These are dry laid, loose stone walls that are in fair to poor condition.

A concrete pad foundation is located just south of Route 129, near the intersection with Rangeway Road. This foundation, roughly 20 feet by 12 feet, is becoming covered in leafy vegetation and moss. A utility pole that once served this structure is located directly adjacent to the pad and still has some severed wires dangling from it. The structure once located on this site housed a forest fire control building.

A concrete pad is located adjacent to the spray deck, and appears to be the foundation of the former bathhouse that was installed in the 1950s as part of the recreational development. The building was removed in the 2002 improvements to the area.

A former bridge abutment was once located at the end of Old Rangeway Road (MHC Inventory From #BIL-HA-44), however that seems to have been removed in a recent culvert replacement project.

Objects. The Warren H. Manning Office Memorial Stone (MHC Inventory Form #BIL.937) is located east of the entrance, adjacent to the picnic area. This memorial stone marks the location of where Warren Manning's office once stood, when his landscape architecture practice operated seasonally out of Billerica from 1915–1923.

Warren H. Manning Office Memorial Stone(DCR)

The memorial stone marking the location of the office, installed sometime between 1938 and 1950, is inscribed as follows:

HERE STOOD THE OFFICE OF
WARREN H. MANNING
LANDSCAPE DESIGNER
A STUDENT AND LOVER OF NATURE
AND MAN. A PIONEER AND LEADER
IN THE FINE ART OF PLANNING THE
WISE USE OF THE LAND FOR THE
PLEASURE AND BENEFIT OF MANKIND.
1860 – 1938

Some lichen growth is present on the memorial stone.

A concrete marker, approximately 8 inches tall and 3 inches square, is located north of the spray deck area. Possibly a former property boundary marker, the letter "C" is inscribed on one side.

Concrete Marker (DCR)

Landscapes. The forest contains a collection of two miles of woods roads that were used in the 19th century for access to woodlots, and in the 20th century as forest roads for recreational purposes and some administrative access. These unpaved roads, approximately eight feet wide in predominantly good to fair condition, vary in terms of level vegetative growth in the road pathway and make up the bulk of the network of trails in use today.

Recreation Resources

Warren H. Manning State Forest is primarily accessed via motor vehicle. Individuals who live nearby may also choose to walk or ride their bicycle to any one of the trailheads, although the area is not particularly pedestrian friendly. The Lowell Regional Transit Authority offers an additional, though likely underutilized, means of accessing the forest. The nearest stop is about a one mile walk to the main entrance.

Recreation at the state forest includes trail-based activities such as hiking and running, dog walking and cross-country skiing. Geocaching also occurs throughout the forest, with participants both on and off trails. As of November 2013, there were three known geocaches at the state forest.

Hunting is currently allowed in Warren H. Manning State Forest. This activity is not allowed near the spray deck area, but it is still not popular with local residents. During the development of this RMP, some concerns were expressed that hunters may be coming too close to abutting properties.

Some bikers and snowmobilers use the forest as well.

The primary recreational feature at Warren H. Manning State Forest is the spray deck area (see Figure 6). A wading pool was constructed here in the 1950s and was in use until it was replaced in 2002 with the new spray deck equipment. The spray deck, which is managed by the Billerica Recreation Department, is operational from May through the end of September. This area is very popular with young families, and on hot days often reaches capacity (Hannon-Rizza 2013).

Complementing the spray deck area is an adjacent picnic area, located between the spray deck and the parking lot. This picnic area includes 18 picnic tables, three of which are accessible, as well as nine grills for use by visitors. Four of these grills are of the metal variety on a low post, while five are concrete bases on the ground. These grills get occasional use by visitors, more so in the off-season than during the summer months. Twice a year, the Billerica Recreation Department offers an outdoor cooking program here that is very popular with families (Hannon-Rizza 2013).

The Billerica Recreation Department has created a "Story Book Trail," a short trail that loops around a portion of the picnic area and includes a series of 10 wooden and plexiglass wayside panels. These panels have laminated pages of a children's book within each of them, so that it is possible to walk the trail and read a story. These panels are periodically updated with a new book so that visitors can read new stories. This trail was recently marked by local

girl scouts with green trail markers affixed to trees via screws.

The Billerica Recreation Department installed an adult fitness trail in 2012. Complete with fitness equipment composed primarily of powder coated metal piping, the fitness trail has five exercise stations with 19 total pieces of equipment and 11 signs providing instruction for safe use.

Fitness Trail (DCR)

The Billerica Recreation Department offers a pre-school program at the park in the summer. The scheduling of this program is coordinated with an adult fitness program that utilizes the fitness trail equipment, providing a unique recreational opportunity for the parents of these pre-schoolers (Hannon-Rizza 2013).

Infrastructure

Property Boundary

Warren H. Manning State Forest is a 183 acre property that is divided into three blocks of land: a developed area located north of Chelmsford Road/Route 129; an undeveloped area south of Chelmsford Road/Route 129 and bordered on the west by Route 3; and 40 acres (22% of the forest), located west of Route 3 and cut off from the remainder of the forest by the highway. This latter piece is inaccessible to DCR staff and visitors.

Billerica State Forest is located just to the south of Warren H. Manning State Forest, and those portions of Warren H. Manning State Forest that lie south of Chelmsford Road/Route 129 are often considered by the public to be a part of Billerica State Forest. Locals refer to the northern section of the forest that contains the spray deck as Manning Park.

A utility easement cuts through the park, as a part of an underground pipeline that is owned and managed by Tennesse Gas. A trail composed of loose stone is located on the northern segment of this corridor. One access stanchion pole was located during fieldwork, located on the north side of Route 129.

Buildings and Structures

There is one contact station, located at the main entrance and parking area. A small front gabled wooden structure with an asphalt roof, this station is portable, in good condition, and does not have electrical service. It is managed by the Billerica Recreation Department.

Contact Station (DCR)

There is one bathhouse at Warren H. Manning State Forest (see Figure 6). Located adjacent to the parking lot, the bathhouse is open when the park is staffed, and is also managed by the Billerica Recreation Department. It is a side gabled, concrete block structure with a metal roof that has plumbing (on town sewer system) and electrical service. It is in good condition.

Bathhouse (DCR)

The Town of Billerica has expressed interest in developing the recreation area further.

Roads

The access road into the parking lot is the only administrative, paved road within Warren H. Manning State Forest.

There are two miles of unpaved forest roads that pre-date the establishment of the forest and continue to be used for hiking and administrative purposes.

Parking

The only parking lot for the forest is at the main entrance, located off the north side of Chelmsford Road/Route 129 (see Figure 6). This paved lot holds 36 vehicles. There are no designated handicapped parking spaces. West of the main entrance on Chelmsford Road/Route 129, there is room for two or three cars to pull over on the north side of the road in front of a trail head.

Trails

There are approximately 3.4 miles of trails at Warren H. Manning State Forest (see Figure 6). All of the trails are located in the eastern portion of the property. Prior to the construction of Route 3 in 1953, some trails went through the northwestern portion of the forest, however the installation of Route 3 effectively cut off this western segment of the property, and any trails that were located here have since grown in.

Of these trails, two miles are comprised of unpaved forest roads, with an additional 1.4 miles of narrow trails that are in good to fair condition.

A trail map has not been created by the DCR for Warren H. Manning State Forest and there is no information on the DCR website for the forest or its network of trails. The Town has developed a map that covers the northern section of the park only. This map is available on the Town's website.

Signs and Kiosks

There are no Lead-in signs for this property.

The forest's Main Identification sign is located at the main entrance to the park on Chelmsford Road/Route 129. While the orientation, material and design of this sign does meet DCR signage standards (DCR n.d.), the information regarding management is not entirely accurate as this only applies to the northern section of the forest.

Main Identification Sign (DCR)

One kiosk, maintained by the Billerica Recreation Department, is located at the northern edge of the parking lot. A small mailbox for map distribution is attached to the kiosk, as is a pet waste bag dispenser.

Informational Kiosk (DCR)

The Billerica Recreation Department has created a "Story Book Trail," a short trail that loops around a portion of the picnic area. Ten panels located alongside the trail include the pages of a popular children's book, so that one reads a story from start to finish while walking along this trail.

Memorials and Markers

There is one memorial in Warren H. Manning State Forest, the Warren H. Manning Office Memorial Stone. For information on this memorial, please refer to the Cultural Resources section.

Other

Residents along the southeast side of Rangeway Road have installed their mailboxes across the street on the forest property, possibly within the road right-of-way.

Illegal Activities

At the southern end of the forest, just off the southernmost trail head off of Rangeway Road, tire dumping has been occurring. This appears to be relatively recent dumping, but may have occurred multiple times.

Dumping Area (DCR)

7.4. Management Resources and Practices

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

Natural Resources

Vegetation

In the past, the DCR used to allow Home Fuelwood harvests to occur at this state forest. However, since this property has been designated as a Parkland through the Landscape Designation process, this activity is no longer allowed at this facility.

The vegetation in the gas pipeline corridor is managed by Tennessee Gas.

Wildlife

The DCR does not actively manage wildlife at Billerica State Forest; however the hunting of game species is permitted.

Cultural Resources

The DCR's Office of Cultural Resources hired a team of cultural resource management professionals to undertake a survey of cultural resources at Warren Manning State Forest in 2002. The aforementioned MHC Inventory Forms are a result of that effort.

Recreation Resources

The Town of Billerica, through its Recreation Department, has been operating the recreation area in the northern section of the forest since 1990. A series of Special Use Permits formalizing this arrangement were in place from 1990 through December 2004. Attempts were made to get a new permit in place for the 2005 recreation season, but appear to have stalled due to questions regarding the collection and retention of revenue by the Town through the parking fees they collected. The conversation began again in 2006, but appears to have gone nowhere since then. Despite this, the Town continues to operate the area and has since invested in the property with the installation of the fitness equipment. This installation was done in consultation with the DCR Operations staff, however the town typically does not consult with the agency on smaller projects, volunteer requests and programming.

Hunting is currently allowed in Warren Manning State Forest.

Infrastructure

The parking lot, spray deck, bathhouse and "Story Book Trail" are all managed by the Billerica Recreation Department, as part of the Town's management of the northern section of the forest. The Town charges a parking fee of $3.00, and a season pass is available for $35.00. This revenue goes to the Town to help offset their operational costs.

Interpretive Services

There are no formal interpretive service programs provided here by DCR or by the Town of Billerica.

Operational Resources

DCR Staffing

DCR does not maintain a staff presence on site. DCR staff does periodically drive through the property in the off season, when the town does not actively manage the recreation area.

Supplemental Staffing

The Billerica Recreation Department provides seasonal staffing for the northern portion of the forest. There is staff at the facility seven days a week, from 8:30am to 6pm, from May through the end of September. There is one person on duty at a time, and they are responsible for collecting parking fees, maintaining the restrooms and the trash, and doing periodic walk-throughs of the facility (Hannon-Rizza 2013). Billerica Recreation Department staff manages the Town programming at the site.

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A forest road in Billerica State Forest. (DCR)

SECTION 8. BILLERICA STATE FOREST

8.1. INTRODUCTION

Billerica State Forest is a 141-acre undeveloped property located in the northwest part of the town. Utilized primarily by local residents, due to a lack of parking, the network of trails and forest roads provide hikers with an opportunity to access nature in an otherwise dense suburban setting.

8.2. HISTORY OF PROPERTY

Billerica State Forest is located in an area that was not heavily settled through the 17th, 18th and 19th centuries (MHC 1980*e*). Gilson Hill is named for an early settler of Billerica, Samuel Gilson. The name first began appearing on maps in 1853. Maps from the 19th century show this area as being wooded and undeveloped; it was utilized for logging, with wood lots in active use until the turn of the 20th century.

In 1908, Warren H. Manning and John E. Rowell gifted about 25 acres of land that included Gilson Hill to the Appalachian Mountain Club (AMC), who in turn entered into a maintenance agreement with the Billerica Improvement Association (Rockwell 2002; Shepard 1913). Several other landowners soon followed their lead, encouraged by Manning and his efforts to promote and create public woodlands in town, with a particular focus on developing a town forest system in Billerica. Manning developed the Billerica Town Forest Plan in the mid-1920s, and it was accepted by the Town in 1926. He suggested in this plan that Gilson Hill be named Start Forest, in honor of Edwin F. Start, the first Commissioner of the Massachusetts Forest Commission. Manning also suggested names for the trails through this property, many of them for friends and family members, however none of his naming suggestions were ever implemented (Rockwell 2002).

The property was sold by the AMC to the Commonwealth in 1934, along with two other AMC properties (one in Carlisle and one in Warwick), at which time it was renamed Billerica State Forest. In 1953, the Old Middlesex Turnpike was realigned, and the new Middlesex Turnpike (Route 3) cut through a portion of the property, leaving a small portion of the forest on the western side of Route 3, impacting the trail system and leaving this parcel inaccessible.

In the late 1960s and early 1970s, local interest in developing Gilson Hill into a downhill ski facility led to legislation in 1971 authorizing a transfer of this property to the Town of Billerica for this purpose. However, shortly after the town started

planning for the ski area, it was determined that the transfer was not possible due to a stipulation in the original conveyance. The deed stated that if the land were ever discontinued as a state forest it would revert to the AMC. Local pressure on the Commonwealth to develop this for ski purposes followed, but the Department of Natural Resources (DNR), a predecessor to the Department of Conservation and Recreation, staff did not feel this was possible without considerable earth moving, and did not pursue this plan (DNR 1975).

Billerica State Forest was also considered as a potential location for a regional headquarters in 1973-1974, but that plan did not move forward either (Cook 1973; Maisner 1974).

8.3. EXISTING CONDITIONS

Natural Resources

Physical Features

Topography. The primary topographic feature of Billerica State Forest is Gilson Hill (see Figure 7). At 310 feet above sea level, Gilson Hill is the second highest point in Billerica. Large glacial erratics dot the slopes of the hill, and rolling uplands surround the base of the hill.

Geology. Billerica State Forest lies within the Nashoba terrane, and the bedrock of the area includes gneiss, schists and Andover granite, a pink to buff colored granite that has a granular texture (Skehan 2001). The gneiss and schists are metamorphic rocks that may have originated as volcanic rocks. Gilson Hill, like the other low lying hills in Billerica, is a glacial drumlin covered in glacial till (Northern Middlesex Council of Governments 2008).

Soils. Over half of the state forest is covered in Paxton fine sandy loam soils, found on the convex side slopes of glaciated hills. This soil is often found alongside Montauk, Charlton and Woodbridge soils in upland areas, which are also located here. Between the stoniness of these soils and septic tank limitations due to slow percolation rates, land composed of these soils are often woodland (Peragallo 2009). Scituate fine sandy loam, found on the slopes of uplands, is also found here. All of these soils have moderate to high potential productivity for forestry. These soil types generally present slight to moderate limitations with regards to path and trail development, as well as to picnic area and playground development (Peragallo 2009).

Table 8.1. Soils of Billerica State Forest

Soil Series	% of Forest	Drainage Class
Paxton fine sandy loam	46.8	Well drained
Woodbridge fine sandy loam	12.4	Moderately well drained
Charlton fine sandy loam	9.0	Well drained
Charlton-Hollis-Rock outcrop complex	8.8	Well drained to somewhat excessively drained
Montauk fine sandy loam	8.2	Well drained
Scituate fine sandy loam	6.5	Moderately well drained
Hinckley loamy sand	2.8	Excessively drained
Windsor loamy sand	2.8	Excessively drained
Swansea muck	1.4	Very poorly drained
Deerfield loamy sand	0.7	Moderately well drained
Whitman fine sandy loam	0.6	Very poorly drained

Water Resources

Billerica State Forest is largely upland, with little in the way of water resources within this facility.

Ponds. There are no ponds within the forest.

Wetlands. There are three small wetland areas within Billerica State Forest (see Figure 7). The largest one is a 0.8-acre wooded swamp, composed of deciduous trees. There is also a 0.46-acre shallow marsh meadow or fen, and a 0.08-acre shrub swamp.

Vernal Pools. There is one potential vernal pool at Billerica State Forest.

Streams. There are no streams within the forest.

Groundwater. There are no aquifers beneath Billerica State Forest.

Flood Zones. There are no flood zones within the forest.

Placeholder for Figure 7.

Rare Species

Priority Habitat has been designated on 26 acres of Billerica State Forest, encompassing a semi-circular shaped area on the northern boundary of the forest, extending northwest from the intersection of Treble Cove Road and Winning Street.

The only rare species recorded here, the blue-spotted salamander, is an amphibian that utilizes upland forest habitat for foraging (NHESP 2007*b)*. This species has a MESA status of Species of Special Concern.

In 2010, MassWildlife and The Nature Conservancy (TNC) issued "BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World" (MassWildlife and TNC 2010). This guide identified two types of areas important for conservation: Core Habitat and Critical Natural Landscape. The first is crucial for the long-term persistence of rare species and other species of conservation concern. The second provides habitat for wide-ranging native wildlife, supports intact ecological processes, maintains connectivity among habitats, enhances ecological resilience and buffers aquatic Core Habitats to help ensure their long-term integrity. Protection of both areas, which may overlap, is "important to conserve the full suite of biodiversity" in Massachusetts (MassWildlife and TNC 2010).

In Billerica State Forest, there are 26 acres of Core Habitat, the same area that has been designated as Priority Habitat. Critical Natural Landscape has not been identified at Billerica State Forest.

Vegetation

Forest Types. In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified four forest sub-types within Billerica State Forest (Table 8.2).

Table 8.2. Forest Sub-types of Billerica State Forest

Forest Sub-type	Acres	% of Forest
Mixed oak	124.7	88.4
Eastern white pine – oak	10.2	7.2
Eastern white pine	1.4	1.0
Norway spruce - white spruce	1.3	0.9
Total	*137.6*[a]	*97.5*

a. The difference in total acreage is due to the exclusion of wetlands and areas of open water, as well as changes in the forest's boundaries since 2003.

Hardwood species, including oak and maple, are uncommon in Billerica. Most of the hardwood stands in town can be found within Billerica and Warren H. Manning state forests. The stand of Norway spruce – white spruce is a small plantation stand that may date to Warren Manning's involvement with the property. Images of Norway Spruce appear in his slide collection, and his autobiography notes that some planting was done on the land he owned in Billerica with his staff as part of their training (Manning n.d.). There is a stand of some very large eastern white pine trees along the northern border of the property, adjacent to Winning Street, which is still a town road and may in fact fall within the road right of way.

As part of the Massachusetts Continuous Forestry Inventory (CFI), a specific area within this forest was visited by DCR Management Foresters in 2000. The CFI is a network of permanent, one-fifth-acre plots on state forest lands that are routinely monitored for silvicultural purposes. The measurements and observations made within each CFI plot are recorded in a database that dates back to 1960, when the CFI was created. Approximately 10% of the state's CFI plots are inventoried each year, on an on-going basis. As of 2010, there were 1,768 CFI plots statewide (Goodwin 2014).

There is one CFI plot within Billerica State Forest. The trees in this CFI plot range in age from approximately 75 to 100 years and the stand is comprised mostly of mixed oak with maple and birch associated with this sub-type. This stand has an even-aged, two-storied structure.

As part of the CFI process, DCR Management Foresters also look for signs of disturbances that affect the development of vegetation in the vicinity of each CFI plot. One disturbance agent, likely gypsy moth, was recorded here in 1981.

Priority Natural Communities. There are no Priority Natural Communities within Billerica State Forest.

Invasive Species. A number of invasive species have been observed at Billerica State Forest by DCR Management Foresters. Surprisingly however, none of these invasive species have been identified in the CFI plot. The invasive species observed here include:

- Common buckthorn (*Rhamnus cathartica*), a deciduous small tree or coarse shrub that threatens wetlands and field edges, where it can suppress other species. It is often spread by seed dispersal through birds.
- Garlic mustard (*Alliaria petiolata*), a biennial herb that can spread rapidly, displacing native vegetation and in turn altering habitat. Garlic mustard is very difficult to eradicate.
- Multiflora rose (*Rosa Multiflora*), a densely spreading shrub that forms thickets that crowd out native species.
- Japanese knotweed (*Fallopia japonica*) is a shrub-like herbaceous plant that forms dense thickets that crowd out native species and reduce wildlife habitat, posing significant threats in riparian areas in particular.
- Winged burning bush (*Euonymus alatus*), also known as winged euonymus or burning bush, is a deciduous shrub that forms dense thickets that crowd out native species.
- Japanese barberry (*Berberis thunbergii*), a spiny shrub that forms dense stands that can displace native plants and reduce wildlife habitat and forage. Barberry also harbors deer ticks that have the potential to carry the Lyme disease bacteria, functioning as a nursery of sorts for juvenile ticks (Benson 2011).
- Privet, a rapidly maturing semi-evergreen shrub that forms dense thickets that crowd out native species.

Pests and Disease. Billerica State Forest has experienced issues with gypsy moths, defoliators that commonly feed on oak, which is prevalent here. White pine weevil and bark beetles have also been observed here, although to a lesser extent.

Wildlife

Birds. There is little current information on the forest's birds. Over 175 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.1.

Mammals. There is little current information on the forest's mammals. Over 45 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.2.

Reptiles. There is little current information on the forest's reptiles. Over 15 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are listed in Appendix G, Table G.3.

Amphibians. There is little current information on the forest's amphibians. Over 15 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the forest, are identified in Appendix G, Table G.4. Only two of these, the blue-spotted salamander and American toad, have been recorded at this forest.

An American toad observed during fieldwork. (DCR)

Fish. There is no current information on the forest's fish.

Cultural Resources

Pre-contact Archaeological Sites

One pre-Contact site is recorded in the forest, but no data is available on it. There are many sites recorded adjacent to the forest including Woodland (1650 - 450 B.P.) and Late Archaic Period (5000-3000 B.P.) campsites, a village site, and burials. The physical characteristics, regional setting, and the confirmed

nearby pre-Contact occupation of the area, all confer a high archaeological potential for the forest.

Historic Archaeological Resources

Remnants of a 19th century sawmill are reportedly located off of Rangeway Road. This site was recorded in 2002 on a Massachusetts Historical Commission (MHC) Inventory Form (in MHC Area form #BIL.S), but the site could not be located during the fieldwork for this RMP.

Evidence of quarrying activity has been located in the northwestern portion of the forest, along the northern border of Gilson Hill. Waste stone with drill scars are visible. An MHC Inventory Form completed in 2002 (#BIL.S) noted two depressions that were likely the site of the quarrying, but these were not specifically located during the RMP fieldwork.

Historic Resources

Buildings. There are no historic buildings within the forest.

Structures. Remnants of stone walls can be found in Billerica State Forest, along the southwest and northern edges of the forest where the slope is low. These are dry laid walls, constructed using the large glacial till located on site. These remnants are in fair to poor condition, and are starting to fall apart.

Objects. The Rowell Memorial Stone (MHC Inventory Form #BIL.938) is located near the top of Gilson Hill. A glacial erratic that is approximately six feet wide, by 10 feet long, by three feet high, this stone contains the following inscription, in all block letters, on the north side of the boulder:

JOHN EDWIN ROWELL
MEMORIAL

John Rowell, a Billerica resident who was active in conservation, along with Warren Manning donated the land at Gilson Hill to establish the AMC Reservation here in 1908. It is suspected that the memorial inscription was completed shortly after Rowell's death in 1927.

Inscription on Rowell Memorial Stone (DCR)

This same stone was historically called Indian Rock, due to the three large holes on the top of the boulder that are thought to have been evidence of use for grinding, a remnant of pre-contact Native American use of the area.

Grinding holes located on top of the Rowell Memorial Stone. (DCR)

Lichen growth is impacting the resource, and the inscription is becoming difficult to read, resulting in a condition assessment of unsatisfactory.

Landscapes. The core of Billerica State Forest, Gilson Hill, includes a system of nearly one-and-a-half miles of connected wood roads that were used in the 19th century for access to woodlots, and in the 20th century as forest roads for recreational purposes and administrative access. These unpaved roads, approximately 8 to 10 feet wide, vary in terms of level vegetative growth in the road pathway, and are a part of the network of trails in use today. These roads were a part of the appeal of the property to Warren Manning when he set out to protect this land for public enjoyment.

Slide from a lecture Warren Manning gave to the Billerica Improvement Association. Source: Iowa State Library – Warren H. Manning Digital Collection

Recreation Resources

Billerica State Forest is primarily accessed via motor vehicle or on foot by local residents. Individuals who live nearby may walk or ride their bicycle to any one of the trailheads, although the area is not particularly pedestrian friendly. There are no public transit options to reach this forest.

Recreation resources are limited to a network of nearly three miles of trails on the eastern portion of the forest. These trails are used primarily for hiking, as well as some dog walking, mountain biking, snowshoeing and cross-country skiing. The construction of Route 3 in 1953, which cut off a small segment of the northwest portion of the forest, disrupted trail access to this area. This segment of the forest is now inaccessible for use.

Hunting is currently allowed in Billerica State Forest.

There is one known geocache located here as of August 2013.

There are no camping facilities at Billerica State Forest, and back country camping is not allowed here. However, a makeshift lean-to using tree branches and other camping materials (e.g., tarps and other debris) was observed just west of the peak of Gilson Hill. The landscape adjacent to this area also showed evidence of minor fire damage in the past, although it is unclear if this came about through unauthorized camping or a natural cause, such as lightning.

A stone fire ring (not recently used) was also found along one of the forest roads at the top of Gilson Hill, along with evidence of its use as a party spot.

Infrastructure

Property Boundary

Billerica State Forest is a 141-acre undeveloped property located in the northwest part of Billerica, south of Rangeway Road and Winning Street (a town road that is partially gated off from use), lying primarily in between Treble Cove Road and Route 3. A small and inaccessible portion of the forest – 12 acres (8.5%) – is located just west of Route 3 (see Figure 7).

Warren H. Manning State Forest is located just to the north of this property, and the southern portion of that property is often considered by the public to be a part of Billerica State Forest.

Buildings and Structures

There are no buildings and structures within Billerica State Forest.

Roads

There are no paved roads within Billerica State Forest.

There are 1.4 miles of unpaved forest roads that pre-date the establishment of the park and continue to be used for hiking and administrative purposes.

Parking

There are no designated parking areas for Billerica State Forest. There is a place to pull off and park one vehicle in front of the northernmost gate along Treble Cove Road. This lack of access not only discourages use, but also prevents DCR staff and first responders from being able to enter the forest at that gate in the event of an emergency.

Parking also occurs informally at the gated end of Winning Street, which is not a part of the forest, but is a town road.

Trails

There are approximately 2.8 miles of trails at Billerica State Forest, 2.6 miles of which are legal trails. All of the trails are located in the eastern portion of the property. Prior to the construction of Route 3, some trails went through the northwestern

portion of the forest. However the installation of Route 3 effectively cut off this western segment of the property, and the trails that were located here have since been lost to vegetation.

Forest roads make up just about half of the trail system, with almost 1.5 miles of unpaved forest roads that pre-date the establishment of the forest. These historic pathways were mapped and evaluated in 2008, at which time it was determined that approximately 70% were in fair condition, while the remaining 30% were in poor condition.

The remainder of the trail network consists of approximately 1.2 miles of trails, 80% of which were deemed to be in fair condition; the remaining 20% of trails were categorized as poor.

It is worth noting that the percentage of trails rated as poor is higher than normal, and none of the trails at Billerica State Forest were determined to be in good condition. This is likely due, in part, to low visitation rates. Without regular use, vegetative growth impacts both the base and the width of the trail system.

A trail map has not been created for Billerica State Forest, and there is no information on the DCR website for the forest or its network of trails.

Winning Street, which is gated a short way in from Treble Cove Road, continues heading northwest and serves as the functional northern boundary for Billerica State Forest (see Figure 7). This town road is unpaved beyond the gate and is currently not in active use. It is not counted in the total trail mileage as it is not owned by the DCR and not a part of the forest. However, it does serve as a link for several trails from the forest and is used by visitors for recreational purposes.

Signs and Kiosks

There are no Lead-in or Forest Entrance signs for Billerica State Forest.

There are no informational kiosks at Billerica State Forest.

Memorials and Markers

There is one memorial in Billerica State Forest, the Rowell Memorial Stone. For information on this memorial, please refer to the Cultural Resources section.

Other

There are a set of fire hydrants along Treble Cove Road. These hydrants are located within the road right of way, are owned by the town, and maintained by the Billerica Water Department (Conway 2013).

Illegal Activities

Debris has been collecting near the eastern edge of the property, adjacent to Winning Street, reflecting some illegal dumping activity. The top of Gilson Hill also appears to be used as a party spot, with debris and a makeshift fire ring found in the area during fieldwork.

8.4. Management Resources and Practices

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

Natural Resources

Vegetation

Vegetation around fire hydrants is maintained by the Billerica Water Department.

Wildlife

The DCR does not actively manage wildlife at Billerica State Forest; however the hunting of game species is permitted.

Cultural Resources

The DCR's Office of Cultural Resources hired a team of Cultural Resource Management professionals to undertake a survey of cultural resources at Billerica State Forest in 2002, resulting in the completion of the MHC Inventory Form for the Rowell Memorial Stone.

Recreation Resources

There are no unique recreation resource management practices at this property, beyond the trail maintenance practices described under Infrastructure.

Infrastructure

Buildings and Structures

The Town of Billerica owns the fire hydrants located alongside Treble Cove Road, within the road right-of-way; these hydrants are maintained by the Billerica Water Department. There is no Memorandum of Agreement (MOA), or similar document, between the DCR and the town that guides this management activity.

Roads

The DCR's Forest Fire Control District 6 provides forest road maintenance on an annual basis.

Trails

Trail maintenance is performed on a limited basis by DCR staff, and is typically at the request of the DCR's Forest Fire Control District 6 to meet their access needs.

Interpretive Services

Interpretive service programming is not offered at Billerica State Forest, nor is any other interpretive information provided.

Operational Resources

Billerica State Forest does not have any full or part-time DCR staff on site.

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The Concord River, as viewed from Governor Thomas Dudley State Park. (DCR)

SECTION 9. GOVERNOR THOMAS DUDLEY STATE PARK

9.1. INTRODUCTION

Governor Thomas Dudley State Park is the smallest facility in the Lowell/Great Brook Planning Unit, just under 11 acres in size. The park is located off of Dudley Road in Billerica, a locally designated scenic road, providing access to the Concord River (see Figure 8). Access to the property is through an adjacent parcel of Town of Billerica conservation land, as there is no frontage on Dudley Road. Other abutting properties include a parcel owned by the Department of Fish and Game (DFG) and a parcel that is part of the Great Meadows National Wildlife Refuge. This park is approximately one quarter of a mile from the town line with Bedford.

The three properties now owned by the DCR, DFG and Town of Billerica was once a single 21 acre parcel that was split and acquired by these three entities for conservation purposes. A management agreement between these organizations exists, and the Town of Billerica is the primary management and enforcement authority for all three parcels.

This park is located within the Two Brothers Rocks-Dudley Road National Register Historic District, which is located in both Billerica and Bedford. This property was identified in the Massachusetts Scenic Landscape Inventory of 1982.

This section of the Concord River is also within the Sudbury, Assabet and Concord National Wild and Scenic Rivers designation and the Sudbury/Concord River Valley State Important Bird Area, as recognized by the National Audubon Society (National Park Service 2008; National Audubon Society 2008).

9.2. HISTORY OF PROPERTY

Part of a 1637 Massachusetts General Court land grant of 1,000 acres to then Deputy Governor Thomas Dudley, this area was known at the time as Dudley Farm. Sold in 1652 in several parcels, the farm became an early focus of settlement in Billerica (Broomer 2010). The land along this section of Dudley Road became a part of the Stearns family farm holdings in the late 17th century, and stayed in the family until 1850 when Moses Greenwood purchased the property. The western edge of the Greenwood property along the Concord River was known as Greenwood Grove as early as 1891, and likely functioned as a picnic grove. By 1910, the Greenwood family owned 10 cottages on the property, probably providing a source of income in

Placeholder for Figure 8.

the form of summer rentals. The cottage community grew to 17 by 1930, but was back down to 10 by 1939, and by 1950 only six remained (Broomer 2010). No cottages survive.

Parcels of Greenwood Grove began to be subdivided and sold off in the late 1970s. In 1985, 24 acres of the former Greenwood property were sold for the development of a subdivision known as Heatherwood Estates, with 17 individual homesites planned. In January 1988, three adjoining parcels in Billerica were jointly acquired from the developer for open space protection by the Town of Billerica, the Department of Environmental Management (the DCR's predecessor agency), and the Department of Fisheries, Wildlife and Environmental Law Enforcement (the DFG's predecessor), totaling approximately 21 acres. Acquisition of this land occurred in part to contribute to the Massachusetts Bay Circuit Trail land protection efforts. A cooperative management agreement among these three entities details how the entities agreed to manage the land. Lands adjacent to these three properties are also protected as part of the Great Meadows National Wildlife Refuge property, which is owned by the US Fish and Wildlife Service (USFWS).

9.3. EXISTING CONDITIONS

Natural Resources

A portion of the Great Meadows National Wildlife Refuge abuts Governor Thomas Dudley State Park along the park's western border. The Final Comprehensive Conservation Plan for the wildlife refuge identifies a wide range of natural resources within the property (USFWS 2005). It is worth noting that some of the resources identified within the refuge, particularly flora and fauna, may also exist within the state park.

Physical Features

Topography. The topography is rolling uplands, with a high point of approximately 150 feet above sea level roughly in the middle of the property, and decreasing elevations to the eastern side and on the western side, by the Concord River.

Geology. Falling within the Nashoba terrane, the bedrock of the area surrounding Governor Thomas Dudley State Park is largely Andover granite, commonly pink granite with a granular texture. (Skehan 2001).

Soils. Soils for this property are primarily Merrimac fine sandy loam, with some concentrations of Hinckley loamy sand. The Merrimac fine sandy loam is a very deep, somewhat excessively drained soil. The Hinckley loamy sand deposits in the Concord River Valley are three to four feet thick, and are underlain by glacial till (Northern Middlesex Council of Governments 2005). These soil types are formed in glaciofluvial deposits. Both types have primarily slight limitations for path and trail development, with some moderate to severe limitations in areas where the slope is above 15% (Peragallo 2009).

Table 9.1. Soil Types of Governor Thomas Dudley State Park

Soil Type	% of Park	Drainage Class
Merrimac fine sandy loam	66.3	Somewhat excessively drained
Hinckley loamy sand	22.3	Excessively drained
Deerfield loamy sand	9.3	Moderately well drained
Rippowam fine sandy loam	1.5	Poorly drained
Saco mucky silt loam	0.3	Very poorly drained
Windsor loamy sand	0.03	Excessively drained

Water Resources

Ponds. There are no ponds within the park.

Wetlands. There is a small shrub swamp, less than a half acre in size, located in this park.

Vernal Pools. There are no vernal pools within the park.

Streams. Governor Thomas Dudley State Park lies on the eastern shore of the Concord River, a 16 mile long river that drains an area of 27 miles. The Concord River has slow moving characteristics and little change in elevation along its length (USFWS 2005). A portion of the Concord River, including the section that abuts the park, has been designated as a Wild and Scenic River. The Town of Billerica utilizes the Concord River as its sole source of drinking water (Northern Middlesex Council of Governments 2005).

Groundwater. There are no aquifers beneath the park.

Flood Zones. A small half-acre section of the western most edge of the park, alongside the Concord River, falls within the 100-year flood zone.

Rare Species

No part of Governor Thomas Dudley State Park falls within land that has been designated as Priority Habitat. A very large swath of land just south of the park, extending into the western edge of Bedford and encompassing much of the northern half of Concord is currently designated as Priority Habitat.

In 2010, MassWildlife and The Nature Conservancy issued "BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World" (MassWildlife and TNC 2010). This guide identified two types of areas important for conservation: Core Habitat and Critical Natural Landscape. The first is crucial for the long-term persistence of rare species and other species of conservation concern. The second provides habitat for wide-ranging native wildlife, supports intact ecological processes, maintains connectivity among habitats, enhances ecological resilience, and buffers aquatic Core Habitats to help ensure their long-term integrity. Protection of both areas, which may overlap, is "important to conserve the full suite of biodiversity" in Massachusetts (MassWildlife and TNC 2010). The entire park has been designated Core Habitat, and three-and-a-half of these acres (33%) have also been designated as Critical Natural Landscape.

Despite the lack of Priority Habitat designation within this facility, two rare species have been identified by the Natural Heritage and Endangered Species Program (NHESP) here: Blanding's turtle and river bulrush.

Blanding's turtles are reptiles that use both wetland and upland habitats and travel long distances during their active season (NHESP 2007a). This species has a MESA status of Threatened.

River bulrush, a plant, was formerly protected under MESA but has been delisted, and is now on the NHESP Plant Watch list, which is a non-regulatory tool. It is robust perennial sedge that can be found on river shores and in floodplains.

Vegetation

Forest Types. In 2003, the James W. Sewall Company developed a forest inventory/land cover classification dataset for the state forests and parks. The dataset is primarily based on the interpretation of infrared aerial photography, a process that identified two forest sub-types within Governor Thomas Dudley State Park (Table 9.2).

Table 9.2. Forest Sub-types of Governor Thomas Dudley State Park

Forest Sub-type	Acres	% of Park
Eastern white pine - hardwoods	8.1	73.6
Eastern white pine	1.7	15.5
Total	*9.8*	*89.1*

a. The difference in total acreage is due to the exclusion of wetlands and areas of open water, as well as changes in the park's boundaries since 2003.

The 2008 Billerica Open Space and Recreation Plan Update identified the predominant species in town as red oak and white pine, noting that white pine thrives in this area (Northern Middlesex Council of Governments 2008).

There are no Continuous Forest Inventory (CFI) plots within Governor Thomas Dudley State Park providing additional site specific data for any part of this property.

Priority Natural Communities. There are no Priority Natural Communities within Governor Thomas Dudley State Park.

Invasive Species. No information has been located to date on invasive species within Governor Thomas Dudley State Park.

Pests and Disease. No information has been located to date on pests and disease within Governor Thomas Dudley State Park.

Wildlife

Birds. There is little current information on the park's birds. Over 175 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the park, are listed in Appendix G, Table G.1. The Final Comprehensive Conservation Plan for the wildlife refuge also contains information that may apply here (USFWS 2005).

Mammals. There is little current information on the park's mammals. Over 45 species that have been

identified in some of the other facilities in this planning unit, and may possibly occur within the park, are listed in Appendix G, Table G.2. The Final Comprehensive Conservation Plan for the wildlife refuge also contains information that may apply here (USFWS 2005).

Reptiles. There is little current information on the park's reptiles. Over 15 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the park, are listed in Appendix G, Table G.3. Only one of these, Blanding's turtle, has been recorded at this park. The Final Comprehensive Conservation Plan for the wildlife refuge also contains information that may apply here (USFWS 2005).

Amphibians. There is little current information on the park's amphibians. Over 15 species that have been identified in some of the other facilities in this planning unit, and may possibly occur within the park, are listed in Appendix G, Table G.4. The Final Comprehensive Conservation Plan for the wildlife refuge also contains information that may apply here (USFWS 2005).

Fish. A small portion of the boundary of this property is at the edge of the Concord River. The Final Comprehensive Conservation Plan for the wildlife refuge identifies 19 different species of fish, including several common varieties of pike, perch and trout (USFWS 2005). The plan also notes an alewife recovery program that was underway while the plan was being written (USFWS 2005). Many of these species may be present in the waters off of Governor Thomas Dudley State Park.

Cultural Resources

Pre-contact Archaeological Sites

Governor Thomas Dudley State Park has not been systematically surveyed and contains no recorded pre-Contact sites. The physical characteristics, regional setting, and the known patterns of pre-Contact occupation in the region all confer a high archaeological potential for the park.

Historic Archaeological Resources

Governor Thomas Dudley State Park has not been systematically surveyed and contains no recorded historic archaeological sites.

Historic Resources

Buildings. There are no historic buildings within the park.

Structures. A small stretch of dry laid stone wall can be found on this property, and more of the historic system of walls can also be seen on adjacent properties. This wall is in fair to poor condition.

Objects. There are no historic objects within the park.

Landscapes. The primary entrance trail into the property is a former cart path that passes through the Town of Billerica conservation land, and has an aging allee of white pine trees. The majority of this allee is on the town owned land, but the western end of it does fall on DCR property. This historic allee may be a remnant from Greenwood Grove.

White Pine Allee (DCR)

Recreation Resources

Governor Thomas Dudley State Park is primarily accessed via motor vehicle. There are no public transit options to reach this park.

Recreation resources within Governor Thomas Dudley State Park consist of a small network of trails for passive walking and hiking use. These trails connect the DCR parcel to the adjacent town, DFG and USFWS lands. There is no boat access to the river.

One picnic table is located alongside the entrance trail, providing a place to rest about halfway between the entrance and the western edge of the property.

There is one known geocache located here as of November 2013.

Infrastructure

Property Boundary

Governor Thomas Dudley State Park is an 11 acre undeveloped property located in the southwest corner of Billerica, very close to the town line with Bedford (see Figure 8). The park is located west of Route 4, and east of the Concord River. A small portion of the western property line abuts the river itself. Directly to the north is property owned by the DFG, and to the east is property owned by the Town of Billerica. These parcels are collectively managed by the town. Much of the western boundary abuts a portion of the Great Meadows Wildlife Refuge, which is managed by the USFWS, and to the south is private property.

No boundary markers were noted during fieldwork, and only one trail marker was located.

Buildings and Structures

There are no buildings or structures at Governor Thomas Dudley State Park.

Roads

There are no roads in Governor Thomas Dudley State Park. The main entrance trail on the property, a former cart path, is wide enough at the entry to be gated, but it quickly narrows.

Parking

There is no parking on the DCR portion of Governor Thomas Dudley State Park. This parcel does not have frontage access on nearby Dudley Road.

One small unpaved parking area is located off of Dudley Road on the adjacent parcel owned by the Town of Billerica. This lot can fit approximately six vehicles.

Trails

There are 0.4 miles of trails in good to fair condition within Governor Thomas Dudley State Park (see Figure 8). With the exception of the main entrance trail, a former cart path, the trails are narrow in nature and do not appear to be extensively utilized. Primary use of these trails is for walking and hiking. These trails connect to a similar system of trails that fall on the DFG land, with some leading further north, into the Great Meadows Wildlife Refuge.

Signs and Kiosks

There is currently no signage at this facility of any kind, and as a result, visitors and local residents are not entirely familiar with the ownership or management of the property. There are no kiosks providing any information. The management agreement between the Town, DCR and DFG stipulated that the three agencies would provide identification and informational signage, as well as a trail map for the property, but it does not appear as if this occurred.

Memorials and Markers

There are no memorials and markers in Governor Thomas Dudley State Park.

9.4. Management Resources and Practices

See Section 2, Management Resources and Practices, for a description of the management resources and practices that apply to the entire Lowell/Great Brook Planning Unit.

The facility is managed by the Billerica Conservation Commission as per the management agreement between the Commonwealth and the Town. This agreement is supposed to be reviewed every five years; however DCR staff indicates that this does not currently occur.

Despite the lack of management responsibilities here, DCR Operations staff does periodically walk through the facility.

Natural Resources

The DCR does not actively manage the natural resources at this park.

Cultural Resources

The DCR does not actively manage the cultural resources at this park.

Recreation Resources

The DCR does not actively manage the recreational resources at this park. As per the management agreement, trails are to be managed by the Town of Billerica.

Hunting is not allowed at Governor Thomas Dudley State Park.

Infrastructure

With the exception of the small network of trails, there is no other infrastructure at this park to manage.

A trail map has not been created for Governor Thomas Dudley State Park, and there is no information on the DCR website for the park or its network of trails.

Interpretive Services

There are no interpretive services provided at Governor Thomas Dudley State Park, either by DCR, DFG or the Town of Billerica.

Operational Resources

DCR Staffing

Governor Thomas Dudley State Park does not have any full or part-time DCR staff on site.

Supplemental Staffing

The facility is managed by the Billerica Conservation Commission as per the management agreement between the Commonwealth and the Town. This management agreement is supposed to be reviewed by all parties every five years.

Public Safety

As per the management agreement between the DCR, DFG and Town of Billerica, the Town is responsible for policing the property and enforcing use restrictions.

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Pawtucket Falls and Gatehouse (Peter E. Lee; CC BY-NC 2.0; cropped from original)

SECTION 10. RECOMMENDATIONS

10.1. INTRODUCTION

The DCR has a broad and dynamic mission that encompasses resource protection, providing public access to recreational opportunities, and active forest management. This multi-faceted mission often results in complex management challenges. These responsibilities are central to the agency's mission and statutory charge.

To help meet this broad mission, the DCR has developed a two-tier system for guiding the management of all state forest and park properties under its care. The two systems, known as Landscape Designations and Land Stewardship Zoning, work in an integrated fashion to accommodate primary ecosystem services while recognizing and providing site-specific resource protection.

The application of Landscape Designations and Land Stewardship Zoning to properties within the Lowell/Great Brook Planning Unit is summarized below. For a more detailed description of Landscape Designations and Land Stewardship Zoning, please see Appendix I.

10.2. LANDSCAPE DESIGNATIONS

Applied statewide at the property level to assess and guide management activities throughout the DCR system, Landscape Designations are based on primary ecosystem services and guide management decisions based upon these services. The designations also communicate the agency's landscape-level management objectives to the public.

As a result of a robust public process called Forest Futures Visioning, the DCR established the following designations for properties under its jurisdiction:

Reserves. Properties designated as reserves provide backcountry recreational experiences and protect the least fragmented forested areas and diverse ecological settings. Successional processes are allowed to progress unimpeded by human disturbance, and are monitored to assess and inform long-term forest stewardship.

Woodlands. Woodlands demonstrate exemplary forest management practices for landowners and the general public, while supporting the range of ecosystem services that sustainably-managed forests

offer, including a diversity of native species and age classes, and compatible recreational opportunities.

Parklands. Areas designated as parklands focus on providing public recreational opportunities while protecting resources of ecological and cultural significance.

Selection criteria and management guidelines for all three landscape designations are described in *Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines* (DCR 2012*b*).

Applied Landscape Designations

All properties within the Lowell/Great Brook Planning Unit have been designated as Parklands.

10.3. LAND STEWARDSHIP ZONING

Land Stewardship Zoning, and the resource management planning process of which it is a part, addresses the agency's statutory responsibilities in M.G.L. Chapter 21: Section 2F. The legislation requires the DCR to prepare management plans that encompass all reservations, forests and parks; provide for the protection and stewardship of natural, cultural and recreation resources under the agency's management; and ensure consistency between recreation, resource protection and sustainable forest management.

Land Stewardship Zoning Guidelines

The Land Stewardship Zoning Guidelines define three types of zones to ensure resource protection based upon site-specific field data and provide guidance for current and future management based upon resource sensitivities. The inventory and assessment of resources during the preparation of an RMP is factored into land use management and decision-making, and provides guidance for stewardship of these resources. The process results in zoning of areas and specific sites within DCR properties based on their sensitivity to recreational and management activities that are appropriate for each facility as recognized during the RMP process. In this way, the Land Stewardship Zoning system helps to ensure that recreational and management activities do not degrade various resources and values.

The three land stewardship zones provide a general continuum to categorize resources (relative to potential degradation from human activities) from undisturbed sites with highly sensitive resources, through stable/hardy resources, to sites that have been developed and are consistently used for intensive recreation or park administration purposes. The Land Stewardship Zoning system also includes Significant Feature Overlays that may be applied to highlight resource features that have been assessed and documented by professional resource specialists.

Below is a description on the various zones used for Land Stewardship Zoning.

Zone 1

Management Objective. Protection of sensitive resources from management, or other human activities, that may adversely impact the resources.

General Description. This zone encompasses areas with highly sensitive ecological and cultural resources that require additional management approaches and practices to protect and preserve the special features and values identified in the RMP. Zone 1 areas are not suitable for future intensive development.

Examples. Examples identified as being highly sensitive to human activities include rare species habitat or natural communities, areas with concentrations of sensitive aquatic habitats, excessively steep slopes with erodible soils, and archaeological sites or fragile cultural sites, where stewardship of these resources must be the primary consideration when assessing management and recreational activities in these areas.

Zone 2

Management Objective. Provide for a balance between the stewardship of natural and cultural resources and recreational opportunities that can be appropriately sustained.

General Description. This zone encompasses stable yet important natural and cultural resources. Zone 2 is a very important component to the DCR's management responsibilities, because the protected landscape within this zone provides a buffer for sensitive resources, recharge for surface and groundwater, and large areas where existing types of public recreational activities can be managed at sustainable levels.

Examples. Examples include areas of non-intensive use that contain diverse ecosystems, rare species habitat that is compatible with dispersed recreation and sustainable management practices, and cultural resources that are not highly sensitive to human activities.

Zone 3

Management Objective. Provide public access to safe and accessible recreational opportunities, as well as administrative and maintenance facilities that meet the needs of DCR visitors and staff.

General Description. This zone includes altered landscapes in active use and areas suitable for future administrative, maintenance and recreation purposes. The resources in this zone can accommodate concentrated use and require regular maintenance by DCR staff.

Examples. Examples of areas of concentrated use include park headquarters and maintenance areas, parking lots, swimming pools and skating rinks, paved bikeways, swimming beaches, campgrounds, playgrounds and athletic fields, parkways, golf courses, picnic areas and pavilions, and concessions. Examples of future use areas include disturbed sites with no significant ecological or cultural values that are not suitable for restoration, identified through the RMP or in a Master Plan as being suitable for intensive recreation or park administration sites. Note that development would be preceded by detailed site assessments to ensure protection of natural and cultural resources.

Significant Feature Overlays

Management Objective. Provide precise management guidance in order to maintain or preserve recognized resource features, regardless of the zone in which they occur.

General Description. The three land stewardship zones may be supplemented with Significant Feature Overlays that identify formally designated or recognized resources. These resource features have been recognized through research and assessment by professional resource specialists. Information on the significant features is brought into the RMP process via review of previous research projects and associated designations.

Examples. A natural or cultural resource, recognized through professional inventory or research, which cuts across more than one land stewardship zone, or which is located in an area characterized by intensive visitor use. In the latter case, the Significant Feature Overlay is used to highlight the potential conflict between resource stewardship and ongoing visitor use, and provide mitigation strategies. Examples include:

- National Register Historic District.
- Areas subject to public drinking water regulations.
- Priority Habitat for species that are not sensitive to human activities.
- BioMap 2 Core Habitat.
- Designated Areas of Critical Environmental Concern.
- A NHESP Priority Natural Community associated with a summit that is also a popular destination for hikers.
- A barrier beach that provides habitat for rare shorebirds and is subject to CZM barrier beach management guidelines and coastal wetlands regulations, but also supports thousands of visitors during the summer season.
- A significant cultural site such as Plymouth Rock that is subject to ongoing, intensive visitation.
- A natural or cultural resource, recognized through professional inventory or research, which is located in an area characterized by intensive visitor use.

Applied Land Stewardship Zoning

The following Land Stewardship Zoning is recommended for properties in the Lowell/Great Brook Planning Unit. A figure (i.e., Figure 9, 10 and 11) accompanies each property with more than one type of zoning. The remaining properties, which only have one type of zoning, do not have a corresponding figure.

Lowell-Dracut-Tyngsborough State Forest

Zone 1. Spruce Swamp, home to several rare species and a rare Priority Natural Community, is designated a Zone 1 (see Figure 9).

Zone 2. The remainder of the forest is designated a Zone 2; it is not particularly sensitive or heavily developed.

Zone 3. The main parking area for the forest, located at the end of Trotting Park Road, and the former headquarters site are designated a Zone 3 (see Figure 9).

Significant Feature Overlay. There are no significant feature overlays.

Lowell Heritage State Park

Zone 1. No sections of the park have been designated a Zone 1.

Zone 2. No sections of the park have been designated a Zone 2.

Zone 3. The entire park has been designated a Zone 3. While it is historically significant, it is also an integral part of a heavily developed urban landscape.

Significant Feature Overlay. There are no significant feature overlays.

Great Brook Farm State Park

Zone 1. Due to the sensitivity of the area around "The City," it is designated a Zone 1 (see Figure 10).

Zone 2. The remainder of the park is designated a Zone 2; it is not particularly sensitive or heavily developed.

Zone 3. The portion of the park that includes the active farm complex, the Hart Barn, the North Schoolhouse (home of the park headquarters), and the two largest parking areas in the park, are all designated a Zone 3 (see Figure 10).

Significant Feature Overlay. There are no significant feature overlays.

Carlisle State Forest

Zone 1. No sections of the forest have been designated a Zone 1.

Zone 2. The entire forest has been designated a Zone 2; it is not particularly sensitive or heavily developed.

Zone 3. No sections of the forest have been designated a Zone 3.

Significant Feature Overlay. There are no significant feature overlays.

The Land Stewardship Zoning for Carlisle State Forest should be reviewed following the recommendation to update the large tree inventory, in order to determine if there should be a Zone 1 designation or a Significant Feature Overlay to encompass these resources.

Warren H. Manning State Forest

Zone 1. No sections of the forest have been designated a Zone 1.

Zone 2. The remainder of the forest outside of the active recreation area has been designated a Zone 2; it is not particularly sensitive or heavily developed.

Zone 3. The active recreation area, including the parking lot, spray deck and picnic area, has been designated a Zone 3 (see Figure 11).

Significant Feature Overlay. There are no significant feature overlays.

Billerica State Forest

Zone 1. No sections of the forest have been designated a Zone 1.

Zone 2. The entire forest has been designated a Zone 2; it is not particularly sensitive or heavily developed.

Zone 3. No sections of the forest have been designated a Zone 3.

Significant Feature Overlay. There are no significant feature overlays.

Governor Thomas Dudley State Park

Zone 1. No sections of the park have been designated a Zone 1.

Zone 2. The entire park has been designated a Zone 2; it is not particularly sensitive or heavily developed.

Zone 3. No sections of the park have been designated a Zone 3.

Significant Feature Overlay. There are no significant feature overlays.

Placeholder for Figure 9.

Placeholder for Figure 10.

Placeholder for Figure 11.

10.4. MANAGEMENT RECOMMENDATIONS

Management Principle

The resource management planning process for the Lowell/Great Brook Planning Unit resulted in the following management principle:

Protect the natural and cultural resources of the planning unit and provide enhanced recreational and educational opportunities for visitors through the creative use of state resources and partnerships.

Management Goals

The following management goals have been identified to achieve the management principle. These goals are of equal importance, and are not presented in order of priority.

Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.

Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.

Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.

Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.

Recommendations

These management recommendations have been organized first by the planning unit in its entirety, for those that apply to all or most of the properties, and then by individual property. Each set of recommendations is presented by the management goals identified for the planning unit.

Recommendations are also characterized on the basis of priority (i.e., high, medium or low) and resource availability. High priority recommendations are those that address regulatory compliance or public health and safety; prevent immediate damage to, or loss of, resources; or repair or replace damaged equipment or systems critical to operations. They are typically time sensitive. Medium priority recommendations maintain existing resources and visitor experiences. Low priority recommendations enhance resources or visitor experiences; they are not time sensitive.

Resource availability considers both funding and labor. A resource availability of one (1) indicates that funding and/or labor are available to implement the recommendation. A resource availability of two (2) indicates that funding and/or labor are not currently available, but may become so in the near future (i.e., the next five years). A resource availability of three (3) indicates that funding and/or labor are not anticipated in the next five years. Resources to implement these recommendations may, or may not, become available after five years.

Table 10.1. Recommendations for the Lowell/Great Brook Planning Unit[a]

Recommendation	Priority[b]	Resources[c]	Implementation[d]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Complete the certification process for the potential vernal pools within the planning unit.	M	2	P, M, V
Develop a Vegetation Management Plan to address the invasive species observed within the planning unit.	M	2	P, C, F
Undertake a mapping effort to document the stone walls located on these properties and record their condition.	L	3	P, F
Review and apply the Best Management Practices developed by the Office of Cultural Resources for stone wall protection.	M	1	P, M
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Review and update or create, where appropriate, a trail map for each of the properties in the planning unit, and make the maps available through multiple outlets.	H	1	M, X
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
There are no recommendations associated with this goal.	-	-	-
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Fill the Metro West District Ranger position.	H	3	M
Establish webpages on the DCR website for the properties in the planning unit that currently do not have a webpage.	H	1	M, X

a. These recommendations apply to all, or most, properties in the planning unit.
b. Priorities are High (H), Medium (M), or Low (L).
c. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
d. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.2. Recommendations for Lowell-Dracut-Tyngsborough State Forest

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Work with the Natural Heritage & Endangered Species Program to conduct a survey for the blue-spotted salamander.	M	2	P, M, O, V
Investigate the nature and extent of the Coburn mill site.	L	2	P, M
Acquire additional land in the southern part of the forest, if necessary, in order to protect the Coburn mill site.	L	2	P, L
Remove the debris at the former headquarters site that poses a threat to significant resources (i.e., the pump house cellar hole) and public safety (i.e., glass bottles).	H	1	M, V
Undertake further research on the cellar holes that were not located during the fieldwork for this plan.	L	3	P, M
Stabilize the walls and remove the vegetation from the forest's CCC water holes.	M	2	P, M
Address the culverts within the forest that are blocked and/or collapsing.	H	2	P, M, E
Reposition and clean, where applicable, the stone markers within the forest.	L	2	P, M
Remove the graffiti from Sheep Rock and work with the Environmental Police to curb the illegal activities that take place at the site.	H	2	P, M, O
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Work with the Environmental Police to curb the illegal recreation activities (e.g., off-highway vehicle use and paintball games) taking place at the forest.	H	1	M, O
Post signs that clearly indicate the boundary of the forest's "No Hunting Areas."	H	1	M, F, V
Formalize the main parking area at the forest's main entrance on Trotting Park Road in Lowell; consider signing, paving and expanding the area, lining the spaces and designating at least one accessible space.	M	3	P, M, C
Investigate the options for establishing a more suitable parking area on Trotting Park Road in Tyngsborough.	L	1	P, M
Improve the trail signage within the forest, adding trail names and intersection numbers where appropriate.	H	2	M, F, V
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
Investigate the options for removing the illegal dam on Trotting Park Road in Tyngsborough.	M	1	E

Continued on next page.

Table 10.2. Recommendations for Lowell-Dracut-Tyngsborough State Forest (Continued)

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Renew the agreement with the Greater Lowell Indian Cultural Association (GLICA).	H	2	M, L
Work with the Dracut Water Supply District to address and resolve the issues surrounding the current location of their water supply infrastructure.	M	2	M, L
Establish a formal agreement with the Dracut Water Supply District regarding their access to and maintenance of the water supply infrastructure located on Gage Hill.	M	2	M, L
Arrange a meeting between the Dracut Water Supply District and appropriate DCR staff to discuss their need to replace the reservoir at the forest.	H	1	M, L
Work with the Merrimack Valley Chapter of the New England Mountain Bike Association to review and approve, where appropriate, the existing technical features in the forest.	H	1	P, M, L
Develop a formal agreement with the Merrimack Valley Chapter of the New England Mountain Bike Association regarding the review and approval of their trail maintenance, repair and construction projects within the forest.	H	1	P, M, L
Install a new Main Identification and several Road Marker signs at the forest.	M	1	M, O

a. Priorities are High (H), Medium (M), or Low (L).
b. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
c. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.3. Recommendations for Lowell Heritage State Park

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Assess the condition of the interior and exterior of the Rynne bathhouse and make repairs, where necessary.	H	2	P, E, M
Work with the National Park Service to repair the cracked end wall of the Pawtucket Gatehouse.	M	2	P, E, M, V
Meet with the National Park Service to develop and implement a preservation plan for the Hamilton Wasteway Gatehouse.	H	1	P, E, M, V
Work with the National Park Service to remove the Boston ivy from the Boott Dam Gatehouse.	M	2	P, E, M, V
Work with Boott Hydropower, Inc. to assess the condition of the Lowell Canal System and make repairs, where necessary.	L	3	P, E, M, V
Work with Boott Hydropower, Inc. to implement the recommendations featured in the DCR's Office of Dam Safety dam inspection reports for the Northern Canal Great Wall, Guard Locks, Swamp Locks and Lower Locks dams.	L	3	P, E, M, V
Repair the steel rail and granite post fences at the Mack plaza and Victorian garden.	H	3	P, E, M, C
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Post fish consumption advisory signs in multiple, locally spoken languages at popular fishing spots along the Merrimack River and Lowell Canal System.	H	1	M, X, V
Ensure that all of the violations noted in the most recent inspection of the Lord pool are addressed in the upcoming modernization project.	H	1	E, C
Install a bike rack at the Lord pool.	M	2	P, M, C, V
Plant additional trees or construct a shade structure(s) in the lawn surrounding the Lord pool.	L	3	P, M, C, V
Work with the Department of Transportation and City of Lowell to improve the parking area at regatta field.	M	2	M, O, C
Assess and repair, where necessary, the condition of the Scott Finneral Memorial Riverwalk.	M	2	P, M, C
Consider adding a formal, off-road connection between the Scott Finneral Memorial Riverwalk and the eastern end of the Vandenberg esplanade.	L	3	P, M
Consider options, such as the DCR's Matching Funds Program, for acquiring a small, motorized boat for public safety purposes at Rynne beach.	M	3	P, M, X
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
Complete an assessment of the Merrimack River retaining wall and make repairs, where needed.	M	2	M, E
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Determine the owner of the Hadley House and establish an agreement that guides the management and use of the building.	H	1	P, M, L
Meet with the University of Massachusetts Lowell to develop and implement a preservation plan for the eastern section of the wall in the Tremont Yard parking area.	M	2	P, M, L
Meet with Tremont Yard, LLC to discuss ways in which the preserved, below grade water power features within the Jeanne D'Arc Credit Union can be promoted.	L	2	M, L
Install DCR signs at the parking areas along the Vandenberg esplanade, next to the Lord pool and on Broadway Street.	H	2	M, O
Install gates at the parking areas next to the Lord pool and on Broadway Street.	H	3	M, C
Install a new Main Identification Sign at Francis Gate Park.	M	2	M, O

Continued on next page.

Table 10.3. Recommendations for Lowell Heritage State Park (Continued)

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Establish an agreement with Lowell General Hospital regarding the placement and maintenance of their three-sided directional sign.	M	2	M, L
Replace the bronze plaque for the brick vault.	L	3	P, M
Confirm that the namesake of the Vandenberg esplanade is Hoyt S. Vandenberg and update DCR signage to reflect the full and proper name of the esplanade, where needed.	L	3	P, L, O
Renew the agreements with the City of Lowell related to their management of the regatta field and Rynne beach, as well as their use of the Rynne bathhouse.	H	1	M, L
Renew the agreement with the stakeholders in the Lowell Canal System.	H	1	M, L
Renew the agreement with the New England Electric Railway Historical Society / Seashore Trolley Museum.	H	1	M, L
Establish an agreement with the Boston & Maine Railroad Historical Society regarding their maintenance of the B&M 410.	H	2	M, L
Finalize the transfer of the Bellegarde boathouse, obtaining a copy of the items listed in Section 4.4. and executing the care, custody, management and control agreement.	H	1	L
Work with the National Park Service to establish signage at the visitor center lot that indicates the parking area is open to state park visitors.	M	2	M, V

a. Priorities are High (H), Medium (M), or Low (L).
b. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
c. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.4. Recommendations for Great Brook Farm State Park

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1 Preserve natural and cultural resources through appropriate stewardship strategies.			
Work with the DCR Lakes and Ponds program to assess the water chestnut growth in Meadow Pond and make a plan for eradication.	M	1	P, O, M
Undertake a hydrological study to gain a complete understanding of water flow through the park, assessment of existing culvert capacity and impacts to trails, and make recommendations for improvements.	H	3	P, C
Revisit the draft Comprehensive Interpretive Plan; revise and update as necessary and finalize.	H	1	M
Develop interpretive programs, opportunities, and products as identified in the Comprehensive Interpretive Plan, working to expand interpretive offerings beyond the smart barn tours.	H	2	M
Clear the debris currently built up around the beaver deceivers to maintain water flow and keep them operational.	H	1	M, C
Make sure park and regional staff are aware of local scenic road designations and local review requirements.	L	1	P, M
Remove leaf and brush debris from all cellar holes and routinely monitor these sites for other disturbances.	M	2	M
Routinely monitor the Adam's Mill dam site for stability and potential disturbances.	M	2	M
Routinely monitor "The City," particularly the Garrison House site, for stability and potential disturbances.	H	1	M, P
Remove the broken sign at the Garrison House site.	H	1	M
North Schoolhouse: Carefully remove the English ivy from the walls, with guidance from DCR's Office of Cultural Resources.	H	2	M, P
North Schoolhouse: Assess the condition of the chimney, and identify and address the moisture issue that is causing the spalling.	M	2	P, E
Main Farm Area: Request a reevaluation of the Main Farm Area for National Register eligibility by the Massachusetts Historical Commission, and complete a nomination if still deemed eligible.	L	3	P
Hart Barn: Replace the roofing shingles on the north side of the barn.	M	2	E, C
Hart Barn: Assess the effectiveness and stability of the recent mortar repairs.	M	2	E
Main Farm House: Install an appropriate gutter, with guidance from DCR's Office of Cultural Resources.	H	2	P, V, C
Main Farm House: Clean the lichen growth that has appeared on the walls of the house.	M	2	V
Main Farm House: Complete minor repairs to the siding and the front door sill, with guidance from DCR's Office of Cultural Resources.	H	2	P, V, C
Tie Stall Barn: Undertake selective siding repair, with guidance from DCR's Office of Cultural Resources.	M	3	P, V, C
Tie Stall Barn: Replace the roofing shingles on the north side of the barn.	M	2	E, V, C
Tie Stall Barn: Assess the stability of the foundation in areas where it has visibly been compromised, and repair as necessary, with guidance from DCR's Office of Cultural Resources.	H	1	P, E, V, C
Pole Barn: Carefully remove vegetation from the rear façade.	L	3	V
Duck Coop: Assess the stability of the foundation.	L	3	E
Duck Coop: Work with the farmer to determine if any new uses are possible for this building.	L	2	P, E, V, M
Silos: Assess structural stability of each and explore possible interpretive opportunities with farmer, park, and interpretive staff.	M	2	E, M, V

Continued on next page.

Table 10.4. Recommendations for Great Brook Farm State Park (Continued)

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1 Preserve natural and cultural resources through appropriate stewardship strategies.			
Silos: Assess structural stability of each and explore possible interpretive opportunities with farmer, park, and interpretive staff.	M	2	E, M, V
Litchfield House: Complete repairs to the barn.	H	2	V, P
Litchfield House: Clean the lichen growth that has appeared on the walls of the house.	M	2	V
Litchfield House: Identify the cause of the lichen growth on the roof and address.	M	2	V, P
Litchfield House: Assess the chimneys to determine if any repairs are necessary.	M	3	V, P
Cemetery: Apply the BMP developed by the office of Cultural Resources.	L	1	M, P
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Working with the Lakes and Ponds program, determine if a new canoe launch should be designed and installed to reopen Meadow Pond for recreational boating.	M	1	M, O
Develop a trails plan, assessing existing density and incorporating critical information developed through the hydrological study to better address areas that have trail washout problems.	H	2	P
Work with the local equestrian community to formalize the maintenance of the horse jumps, and prune the vegetation growth around them.	M	1	M, X, V
Securely cover the open well located southeast of the Litchfield House.	H	1	M
Reassess all boardwalk crossings to identify older ones in need of replacement, including those on the Acorn Trail.	H	1	M
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
Routinely monitor the area around the rock shelters for possible illicit activities.	M	1	M
Former Regional HQ site: remove former sign holder and pavement to let the site return to a natural state.	H	2	M, E
Tie Stall Barn: Address the outstanding permit issues for the event space and renew discussions about future use.	H	2	V, E, M
Farnham Smith's Cabin: Undertake a structural assessment and reuse feasibility study to determine if reuse is possible and develop some potential options.	H	2	P, E, M
Cabin Shed: Access and clean out the interior of the shed, so that it does not become a potential nuisance.	H	1	M
Boat House: Complete and submit MHC Inventory form.	H	1	P
Boat House: Undertake demolition.	H	2	E, C
South House/District 6 Fire Control: Assess for any reuse possibilities by the park and/or the region, such as accommodating the storage needs currently being met by the Hadley House and the Anderson Barn.	H	2	F, M, P
Hadley House: Investigate alternative uses of the property and possibly making it available to be moved. If not possible, identify a funding source for demolition before it becomes an attractive nuisance.	H	2	P, M, E
West Farm/Manseau House: Assess for inclusion in the Historic Curatorship Program. If not a good candidate, identify a funding source for demolition, before it becomes an attractive nuisance.	H	2	P, M, E

Continued on next page.

Table 10.4. Recommendations for Great Brook Farm State Park (Continued)

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
North Farm House and Barn: Make sure the buildings are secure, and routinely monitor to ensure they aren't damaged or broken into.	H	1	M
North Farm House and Barn: Work with current long term leaseholders of other facilities within the park to identify any potential complementary reuses for this property, and explore putting out a Request for Proposals.	H	1	P, X, M
Anderson Barn: Explore any potential interest in, and options for, permitting use of the barn by others, and relocate current storage closer to the Park HQ.	H	2	P, M
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Conduct annual meetings with lease holders and annual property inspections of leased property as specified in lease agreements and permits.	H	1	M, L
Twice a year, hold a joint meeting of park staff and all leaseholders, to maintain the lines of communication among all parties and make sure that everyone is aware of activities, events, or other projects that have the potential to impact each other.	M	1	M, X
Encourage and support the re-establishment of a Friends of Great Brook Farm State Park.	L	1	M, X
Pine Point Loop Parking Area: Streamline the signage as to not visually overwhelm visitors, but still inform them.	M	1	M, X
Main Parking Area: Streamline the signage as to not visually overwhelm visitors, but still inform them.	M	1	M, X
Litchfield House: Identify joint interpretive and public programming opportunities with the Curators that enhance interpretive activities while promoting DCR's Historic Curatorship Program.	L	1	P, M, V, X
Woods House: Update and renew the expired lease agreement for the Woods House with the old North Bridge Hounds.	H	1	L

a. Priorities are High (H), Medium (M), or Low (L).
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c. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.5. Recommendations for Carlisle State Forest

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Update the inventory of the large eastern white pine trees, last done in 1980.	H	1	F
After completion of tree inventory update, revisit the Land Stewardship Zoning to determine if any changes are applicable.	H	1	P, F
Establish a Continuous Forest Inventory (CFI) plot within the forest.	L	2	F
Develop an interpretive program around the natural and cultural history of the Carlisle Pines.	L	1	M, P
Monitor and assess red pine stands within the forest; manage if necessary for public safety or ecological need.	M	1	F
Monitor for invasive pests, especially hemlock wooly adelgid. Propose biological or chemical controls if warranted on the specimen trees.	H	1	F
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Develop and install an informational kiosk that includes interpretive information, for installation within the interior of the property.	M	2	M
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
There are no recommendations associated with this goal.	-	-	-
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Clear the vegetation from around the former DEM sign stanchion, and hang a new DCR entrance sign from the existing sign stanchion.	H	1	M
Continue to partner with the Carlisle Trails Committee for assistance with trail work.	M	1	M, P, X,

a. Priorities are High (H), Medium (M), or Low (L).
b. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
c. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.6. Recommendations for Warren H. Manning State Forest

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Undertake further research on the outbuilding foundation located near Spruce Pond to determine if it has any connection to Warren Manning.	L	2	P
Clean up the dumping debris located off of Rangeway Road, and continue to monitor the area for illegal dumping.	H	2	M
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Establish designated handicapped accessible parking spaces in the parking lot, total number to be determined in consultation with DCR's Universal Access Program.	H	1	E, U
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
Assess the accessibility and potential uses of the portion of the state forest west of Route 3, and evaluate options to better utilize this space and/or establishing connections to other nearby open space.	L	2	P, M, V, X
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Work with the Town of Billerica to get a Special Use Permit in place, to formalize their operation of the recreational area.	H	1	L, M
Hold bi-annual meetings with the Town of Billerica Recreation Department to discuss programs, events, and maintenance and operation of the recreational area.	H	1	M, X
Provide DCR information on the informational kiosk.	H	1	X

a. Priorities are High (H), Medium (M), or Low (L).
b. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
c. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.7. Recommendations for Billerica State Forest

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Carefully clean the lichen from the Rowell Memorial Stone.	L	1	P, M
Document the network of historic forest roads on a MHC inventory form.	L	2	P
Clean up illegal camping debris located near the top of Gilson Hill.	M	1	M
Dismantle the fire ring located at the top of Gilson Hill, to discourage use.	H	1	M
Clean up the dumping debris located adjacent to Winning Street, and continue to monitor the area for illegal dumping.	H	2	M
Develop interpretive materials to tell the story of this land and the establishment of the forest – it is an interesting piece of Billerica history.	L	2	M
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
Establish a system of routine trail maintenance to address the high percentage of trails in poor condition, possibly partnering with other organizations such as the Student Conservation Association or other local organizations for assistance with specific projects.	M	3	M, P
Evaluate potential locations and establish a small formal parking area (possibly adjacent to an existing gate) to facilitate safe access to the forest.	M	3	M, E, C
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
Assess the accessibility and potential uses of the portion of the state forest west of Route 3, and evaluate options to better utilize this space and/or establishing connections to other nearby open space.	L	2	P, M, V, X
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Monitor the area for future illegal camping activities, engaging local residents and police for additional assistance.	M	1	M
Install a DCR entrance sign for the forest.	H	1	M

a. Priorities are High (H), Medium (M), or Low (L).
b. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
c. The following codes identify the party or parties responsible for implementing the recommendation: C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Office of the General Counsel; M = Division of MassParks; O = Other; P = Bureau of Planning, Design and Resource Protection; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

Table 10.8. Recommendations for Governor Thomas Dudley State Park

Recommendation	Priority[a]	Resources[b]	Implementation[c]
Goal 1. Preserve natural and cultural resources through appropriate stewardship strategies.			
Conduct further research on the historic drive and allee of trees to determine if it is a remnant of Greenwood Grove.	L	2	P
Develop interpretive materials to tell the story of this property and the connection to Governor Dudley.	M	2	M
Goal 2. Offer diverse recreational opportunities and facilities to ensure visitor safety and access.			
In coordination with abutting property owners, establish a system of routine trail maintenance for the park, possibly partnering with other organizations such as the Student Conservation Association for assistance with specific projects.	M	3	M, X, V
Goal 3. Address underutilized buildings and structures to improve visitor experiences and DCR operational responsibilities.			
There are no recommendations associated with this goal.	-	-	-
Goal 4. Improve engagement with partners, stakeholders, visitors and volunteers.			
Hold an annual meeting with the MA Department of Fish & Game and the Town of Billerica Conservation Commission to discuss any issues, plans or projects.	H	1	M
With the MA Department of Fish & Game and the Town of Billerica Conservation Commission, conduct the stipulated 5 year review of the Management Agreement.	H	1	M, L
Establish and maintain an active relationship with the Sudbury, Assabet and Concord Wild & Scenic River Stewardship Council.	M	2	M
Establish and maintain active communication with US Fish & Wildlife about the resources in this general area and potential collaborative efforts.	M	2	M, P
Working with the Town of Billerica and the MA Department of Fish & Game, identify an appropriate location for an entrance sign that recognizes the partners.	H	2	M

a. Priorities are High (H), Medium (M), or Low (L).
b. Availability of resources for implementing recommendations: 1 = funding and/or labor is currently available; 2 = funding and/or labor is currently unavailable, but may become so in the near future; and 3 = funding and/or labor is currently unavailable, but may become so in more than five years.
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Appendix E

Legislation

16 USC 410cc.

LOWELL NATIONAL HISTORICAL PARK

PART A—ESTABLISHMENT OF PARK AND PRESERVATION DISTRICT

§ 410cc. Congressional statement of findings and purpose

(a) The Congress finds that—

(1) certain sites and structures in Lowell, Massachusetts, historically and culturally the most significant planned industrial city in the United States, symbolize in physical form the Industrial Revolution;

(2) the cultural heritage of many of the ethnic groups that immigrated to the United States during the late nineteenth and early twentieth centuries is still preserved in Lowell's neighborhoods;

(3) a very large proportion of the buildings, other structures, and districts in Lowell date to the period of the Industrial Revolution and are nationally significant historical resources, including the five-and-six-tenths-mile power canal system, seven original mill complexes, and significant examples of early

housing, commercial structures, transportation facilities, and buildings associated with labor and social institutions; and

(4) despite the expenditure of substantial amounts of money by the city of Lowell and the Commonwealth of Massachusetts for historical and cultural preservation and interpretation in Lowell, the early buildings and other structures in Lowell may be lost without the assistance of the Federal Government.

(b) It is the purpose of sections 410cc to 410cc-37 of this title to preserve and interpret the nationally significant historical and cultural sites, structures, and districts in Lowell, Massachusetts, for the benefit and inspiration of present and future generations by implementing to the extent practicable the recommendations in the report of the Lowell Historic Canal District Commission.

(Pub.L. 95-290, § 1, June 5, 1978, 92 Stat. 290.)

§ 410cc-1. Definitions

For purposes of sections 410cc to 410cc-37 of this title—

(1) the term "park" means the Lowell National Historical Park, established by section 410cc-11(a)(1) of this title;

(2) the term "preservation district" means the Lowell Historic Preservation District, established by section 410cc-11(a)(1) of this title;

(3) the term "Commission" means the Lowell Historic Preservation Commission established by section 410cc-31(a) of this title;

(4) the term "Secretary" means the Secretary of the Interior; and

(5) the term "report of the Lowell Historic Canal District Commission" means the report submitted to the Congress by the Lowell Historic Canal District Commission pursuant to an Act entitled "An Act to provide for a plan for the preservation, interpretation, development and use of the historic, cultural, and architectural resources of the Lowell Historic Canal District in Lowell, Massachusetts, and for other purposes", approved January 4, 1975 (88 Stat. 2330).

(Pub.L. 95-290, § 2, June 5, 1978, 92 Stat. 290.)

References in Text. An Act entitled "An Act to provide for a plan for the preservation, interpretation development and use of the historic, cultural, and architectural resources of the Lowell Historic Canal District in Lowell, Massachusetts, and for other purposes", approved January 4, 1975 (88 Stat. 2330), referred to in par. (5), is Pub.L. 93-645, Jan. 4, 1975, 88 Stat. 2330, and is set out as a note under section 461 of this title.

§ 410cc-11. Establishment of Lowell National Historical Park; establishment and administration of Lowell Historic Preservation District; establishment, publication, and revision of boundaries

(a)(1) To carry out the purpose of sections 410cc to 410cc-37 of this title, there is established as a unit of the National Park System in the city of Lowell, Massachusetts, the Lowell National Historical Park. There is further established in an area adjacent to the park the Lowell Historic Preservation District, which will be administered by the Secretary and by the Commission in accordance with sections 410cc to 410cc-37 of this title. The boundaries of the park and preservation district shall be the boundaries depicted on the map entitled "Lowell National Historical Park, Massachusetts", dated March 1978, and numbered "Lowe—80,008A". Such map shall be on file and available for inspection in the office of the National Park Service, Department of the Interior, and in the office of the city clerk, city of Lowell.

(2) The Secretary shall publish in the Federal Register, as soon as practicable after June 5, 1978, a detailed description and map of the boundaries established under paragraph (1) of this subsection.

(b) The Secretary may make minor revisions of the park and preservation district boundaries established under subsection (a)(1) of this section, after consulting with the Commission and the city manager of Lowell, by publication of a revised drawing or other boundary description in the Federal Register; but no waters, lands, or other property outside of the park or preservation district boundaries established under such subsection may be added to the park or preservation district without the consent of the city manager of Lowell and the city council of Lowell. A boundary revision made under this subsection shall be effective only after timely notice in writing is given to the Congress.

(Pub.L. 95-290, Title I, § 101, June 5, 1978, 92 Stat. 291.)

§ 410cc-12. Consultations, cooperation, and conduct of activities by Federal entities; issuance of licenses or permits by Federal entities

(a) Any Federal entity conducting or supporting activities directly affecting the park or preservation district shall—

(1) consult with, cooperate with, and to the maximum extent practicable, coordinate its activities with the Secretary and with the Commission; and

(2) conduct or support such activities in a manner which (A) to the maximum extent practicable is consistent with the standards and criteria established pursuant to section 410cc-32(e) of this title, and (B) will not have an adverse effect on the resources of the park or preservation district.

(b) No Federal entity may issue any license or permit to any person to conduct an activity within the park or preservation district unless such entity determines that the proposed activity will be conducted in a manner consistent with the standards and criteria established pursuant to section 410cc-32(e) of this title and will not have an adverse effect on the resources of the park or preservation district.

(Pub.L. 95-290, Title I, § 102, June 5, 1978, 92 Stat. 291.)

§ 410cc-13. Authorization of appropriations

(a) General authority; maximum amounts

There are authorized to be appropriated such sums as may be necessary to carry out sections 410cc to 410cc-37 of this title, except that—

(1) the total of the amounts authorized to be appropriated for the purpose of acquisition and development under the park management plan established pursuant to section 410cc-21(b) of this title and emergency assistance under section 410cc-25(a)(1) of this title shall not exceed $18,500,000; and

(2) the total of the amounts authorized to be appropriated for the purpose of carrying out section 410cc-32(b)(2) of this title, for the payment of grants and loans under section 410cc-33 of this title, for the acquisition of property under section 410cc-34 of this title, and for carrying out any transportation program and any educational and cultural program described in section 410cc-32(c) of this title shall not exceed $21,500,000.

(b) Commencement date

No funds shall be authorized pursuant to this section prior to October 1, 1978.

(c) Availability of appropriations

Funds appropriated under subsection (a) of this section shall remain available until expended.

(d) Aggregate amount of money expended; certifying statement to Congress as limiting availability of appropriated amounts

(1) Within 60 days after June 5, 1978, and on each subsequent October 1 and March 1, the Secretary shall submit to the Congress a statement certifying the aggregate amount of money expended by the Commonwealth of Massachusetts, the city of Lowell, and by any nonprofit entity for activities in the city of Lowell consistent with the purpose of sections 410cc to 410cc-37 of this title during the period beginning on January 1, 1974, and ending on the date such statement is submitted.

(2) The aggregate amount of funds made available by the Secretary to the Commission from funds appropriated under subsection (a)(2) of this section may not exceed the amount certified by the Secretary in the most recent statement submitted to the Congress under paragraph (1) of this subsection.

(Pub.L. 95-290, Title I, § 103, June 5, 1978, 92 Stat. 292.)

§ 410cc–14. Funding limitations

Notwithstanding any other provision of sections 410cc to 410cc–36 of this title, no authority to enter into agreements or to make payments under sections 410cc to 410cc–37 of this title shall be effective except to the extent, or in such amounts, as may be provided in advance in appropriation Acts.

(Pub.L. 95–290, Title I, § 104, June 5, 1978, 92 Stat. 292.)

PART B—POWERS AND DUTIES OF SECRETARY

§ 410cc–21. Park management plan; submission date and contents of preparatory statement to Congress; establishment, submission date, contents, etc., of plan

(a) The Secretary shall submit a statement to the Congress, within two years after the date on which funds are made available to carry out sections 410cc to 410cc–37 of this title, which—

(1) reports on the progress that the Secretary has made in acquiring the properties identified under section 410cc–22 of this title, and describes the way the Secretary intends to use these properties;

(2) identifies the properties within the park and preservation district respecting which the Secretary has entered into or intends to enter into agreements relating to interpretive exhibits or programs under section 410cc–23(a) of this title;

(3)(A) reports on the progress of the Secretary in leasing a portion of the Lowell Manufacturing Company, located on Market Street, for the purpose of establishing a visitors' center in close proximity to parking and other transportation facilities, and (B) identifies any other property within the park which the Secretary has leased or intends to lease for purposes of the park;

(4) reports any other activities which the Secretary has taken or intends to take to carry out the purpose of sections 410cc to 410cc–37 of this title; and

(5) contains a tentative budget for the park and preservation district for the subsequent five fiscal years.

(b)(1) Not later than three years after the date on which funds are made available to carry out sections 410cc to 410cc–37 of this title, the Secretary shall establish and submit to the Congress a park management plan containing the information described in subsection (a) of this section. Such plan shall, upon request, be available to the public.

(2) After consulting with the Commission, the city manager of Lowell, and the Commonwealth of Massachusetts, the Secretary may make revisions in the park management plan established pursuant to paragraph (1) of this subsection by publication of such revisions in the Federal Register. A revision made under this paragraph shall be effective 90 days after written notice of the revision is submitted to the Congress.

(Pub.L. 95–290, Title II, § 201, June 5, 1978, 92 Stat. 292.)

§ 410cc–22. Acquisition of property

(a) Specified property; manner of acquisition

(The Secretary is authorized to acquire the properties designated in paragraph (2) of this subsection, or any interest therein, by donation, purchase with donated or appropriated funds, condemnation, or otherwise. Any property or interest therein owned by the Commonwealth of Massachusetts or any political subdivision thereof may be acquired only by donation. The Secretary may initiate condemnation proceedings under this paragraph only after making every reasonable effort to acquire property through negotiations and purchase, and consulting with the Commission (if established) and the city council of Lowell.

(2) The properties referred to in paragraph (1) of this subsection are the following:

(A) The Linus Childs House, 63 Kirk Street.

(B) The H and H Paper Company (commonly referred to as Boott Mill Boarding House), 42 French Street.

(C) Old City Hall, 226 Merrimack Street.

(d) Merrimack Gatehouse, 269 Merrimack Street.

(E) The Wannalancit Textile Company, 562 Suffolk Street.

(F) The structures containing the Jade Pagoda and Solomon's Yard Goods, 210 and 200 Merrimack Street.

(b) Other property within park or preservation district; criteria for acquisition; manner of acquisition

Until the date on which the Commission conducts its first meeting, the Secretary may acquire any property within the park or preservation district not designated in subsection (a)(2) of this section, or any interest therein, if such property—

(1) is identified in the report of the Lowell Historical Canal District Commission as a property which should be preserved, restored, managed, developed, or maintained in a manner consistent with the purpose of sections 410cc to 410cc–37 of this title;

(2) is listed in the National Register of Historic Places, as maintained by the Secretary pursuant to section 470a(a) of this title, and section 462(b) of this title; or

(3) is determined by the Secretary to be of national significance;

and would be subject to demolition or major alteration in a manner inconsistent with the purposes of sections 410cc to 410cc–37 of this title unless acquired by the Secretary. Such property may be acquired only as provided in subsection (a)(1) of this section.

(c) Easements; manner of acquisition

The Secretary may acquire easements within the park for the purpose of carrying out sections 410cc to 410cc–37 of this title. Such easements may be acquired only as provided in subsection (a)(1) of this section.

(Pub.L. 95–290, Title II, § 202, June 5, 1978, 92 Stat. 293.)

§ 410cc–23. Agreements and technical assistance

(a) The Secretary may enter into agreements with any owner of property with national historic or cultural significance within the park to provide for interpretive exhibits or programs. Such agreements shall provide, whenever appropriate, that—

(1) the public may have access to such property at specified, reasonable times for purposes of viewing such property or the exhibits or attending the programs established by the Secretary under this subsection; and

(2) the Secretary may make such minor improvements to such property as the Secretary deems necessary to enhance the public use and enjoyment of such property, exhibits, and programs.

(b)(1) The Secretary shall provide, upon request, technical assistance to—

(A) the city of Lowell to assist the city in establishing regulations or laws consistent with the standards and criteria established pursuant to section 410cc–32(e) of this title; and

(B) the Commission to assist the Commission in establishing the index and the standards and criteria required by section 410cc–32 of this title.

(2) The Secretary may provide to any owner of property within the park or preservation district, the Commission, the Commonwealth of Massachusetts, the city of Lowell, and any other Federal entity or any institution such technical assistance as the Secretary considers appropriate to carry out the purpose of sections 410cc to 410cc–37 of this title.

(Pub.L. 95–290, Title II, § 203, June 5, 1978, 92 Stat. 294.)

§ 410cc–24. Withholding of funds; criteria

The Secretary may refuse to obligate or expend any money appropriated for the purposes described in section 410cc–13(a)(1) or section 410cc–13(a)(2) of this title if the Secretary determines that—

(a) the city of Lowell has failed to establish regulations or laws consistent with the standards and criteria established pursuant to section 410cc–32(e) of this title within one year after the date such standards and criteria have been established, except that the Secretary may extend such one-year period for not

more than six months if the Secretary determines that the city has made a good faith effort to establish such regulations or laws;

(b) the city of Lowell has failed to notify the Commission of (1) applications for building permits or zoning variances respecting any property which is included in the index established pursuant to section 410cc-32(d) of this title, or (2) any proposals of the city of Lowell to change the regulations or laws described in paragraph (c) (1) of this subsection;

(c) (1) during the period before the city of Lowell has established regulations or laws consistent with the standards and criteria established pursuant to section 410cc-32(e) of this title, the city of Lowell has granted any building permit or zoning variance or has taken any other action respecting any property within the park or preservation district, which either the Secretary or the Commission consider to be inconsistent with such standards and criteria;

(2) after the city of Lowell has established the regulations or laws described in subparagraph (1) of this paragraph, the city of Lowell has granted any building permit or zoning variance or has taken any other action respecting any property within the park or preservation district, which either the Secretary or the Commission consider to be inconsistent with such regulations or laws; or

(d) the Commission has not made good faith efforts to (1) provide for the preservation, restoration, management, development, or maintenance of property within the park and preservation district or (2) carry out the park preservation plan approved under section 410cc-32 of this title.

(Pub.L. 95-290, Title II, § 204, June 5, 1978, 92 Stat. 294.)

§ 410cc-25. Administrative functions

(a) Implementation of park management plan; emergency assistance for protection of property owners; availability of funds for Commission

(1) The Secretary, acting through the National Park Service, shall take appropriate actions to implement to the extent practicable the park management plan established pursuant to section 410cc-21(b) of this title. In carrying out such plan, the Secretary shall administer the park in accordance with laws, rules, and regulations applicable to the national park system. Before the date on which the Commission conducts its first meeting, the Secretary may take any other action the Secretary deems necessary to provide owners of property with national historic or cultural significance within the park or preservation district with emergency assistance for the purpose of preserving and protecting their property in a manner consistent with the purpose of sections 410cc to 410cc-37 of this title.

(2) Subject to sections 410cc-24 and 410cc-32(b) of this title, the Secretary shall make available to the Commission any funds appropriated under section 410cc-13(a) (2) of this title for the purpose of carrying out sections 410cc-31 to 410cc-36 of this title.

(b) Acceptance of donations of funds, property, or services for implementation of park management plan

Notwithstanding any other provisions of law, the Secretary may accept donations of funds, property, or services from individuals, foundations, corporations, and other private entities, and from public entities, for the purpose of implementing the park management plan.

(c) Sponsorship or coordination of educational or cultural programs

The Secretary may sponsor or coordinate within the park and preservation district such educational or cultural programs as the Secretary considers appropriate to encourage appreciation of the resources of the park and preservation district.

(d) Acquisition of leases respecting property within park

The Secretary may acquire such leases respecting property within the park as may be necessary to carry out the purpose of sections 410cc to 410cc-37 of this title.

(Pub.L. 95-290, Title II, § 205, June 5, 1978, 92 Stat. 295.)

Part C—Powers and Duties of Preservation Commission

§ 410cc-31. Lowell Historic Preservation Commission

(a) Establishment and administrative role; composition of membership

There is established within the Department of the Interior a commission to be known as the Lowell Historic Preservation Commission which shall administer the preservation district and provide certain services within the park in accordance with this part. The Commission shall consist of fifteen members appointed by the Secretary as follows:

(1) Three members who are members of the city council of Lowell, appointed from recommendations made by the mayor of Lowell.

(2) Three members appointed from recommendations made by the city manager of Lowell of persons who are representative of organized labor, the business community, local neighborhoods, and cultural institutions, and who are not elected officials.

(3) One member appointed from recommendations made by the president of the University of Lowell.

(4) Three members appointed from recommendations made by the Governor of the Commonwealth of Massachusetts.

(5) One member appointed from recommendations made by the Secretary of Commerce and who shall be an employee of the Department of Commerce.

(6) One member appointed from recommendations made by the Secretary of Transportation and who shall be an employee of the Department of Transportation.

(7) One member appointed from recommendations made by the Secretary of Housing and Urban Development and who shall be an employee of the Department of Housing and Urban Development.

(8) Two members who are qualified to serve on the Commission because of their familiarity with programs of the Department of the Interior involving national parks and historic preservation and who shall be an employee of the Department of the Interior.

(b) Continuation of status as appointed member for member leaving government office or becoming elected official of government; duration

If any member of the Commission who was appointed to the Commission under paragraph (1) or (4) of subsection (a) of this section as a member of the city council of Lowell or any other government leaves that office, or if any member of the Commission who was appointed from persons who are not elected officials of any government becomes an elected official of a government, such person may continue as a member of the Commission for not longer than the thirty-day period beginning on the date such person leaves that office or becomes such an elected official, as the case may be.

(c) Terms of office and reappointment of members

(1) Except as provided in paragraph (2) of this subsection, members shall be appointed for terms of two years. A member may be reappointed only three times unless such member was originally appointed to fill a vacancy pursuant to subsection (e) (1) of this section, in which case such member may be reappointed four times.

(2) Of the members first appointed pursuant to subsection (a) of this section, the following shall be appointed for terms of three years:

(A) The members appointed pursuant to paragraphs (2), (3), and (8) of such subsection.

(B) One of the members appointed pursuant to paragraph (4) of such subsection, as designated by the Secretary at the time of appointment upon recommendation of the Governor.

(d) Chairman; election by members; term of office

The chairman of the Commission shall be elected by the members of the Commission. The term of the chairman shall be two years.

(e) Vacancies; appointment and term of office; service by member after expiration of term

(1) Any vacancy in the Commission shall be filled in the same manner in which the original appointment was made.

(2) Any member appointed to fill a vacancy shall serve for the remainder of the term for which his predecessor was appointed. Any member may serve after the expiration of his term for a period not longer than thirty days.

(f) Quorum and holding of hearings

Eight members of the Commission shall constitute a quorum, but a lesser number may hold hearings.

(g) Meetings

The Commission shall meet at least once each month, at the call of the chairman or a majority of its members.

(h) Compensation; travel expenses and per diem

(1) Except as provided in paragraph (2) of this subsection, members of the Commission shall each be entitled to receive $100 for each day (including travel time) during which they are engaged in the performance of the duties of the Commission.

(2) Members of the Commission who are full-time officers or employees of the United States, the city of Lowell, or the Commonwealth of Massachusetts shall receive no additional pay on account of their service on the Commission.

(3) While away from their homes or regular places of business in the performance of services for the Commission, members of the Commission shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of Title 5.

(i) Termination

The Commission established pursuant to sections 410cc to 410cc–37 of this title, shall cease to exist ten years from June 5, 1978.

(Pub L. 95–290, Title III, § 301, June 5, 1978, 92 Stat. 295.)

§ 410cc–32. Park preservation plan and index

(a) Submission by Commission and approval or disapproval by Secretary of draft and final plans; procedures applicable; revisions in approved plan

(1) Within one year after the date on which the Commission conducts its first meeting, the Commission shall submit to the Secretary a draft park preservation plan meeting the requirements of subsection (c) of this section. The Secretary shall review the draft park preservation plan and, within ninety days after the date on which such plan is submitted to the Secretary, suggest appropriate changes in such plan to the Commission.

(2) Within eighteen months after the date on which the Commission conducts its first meeting, the Commission shall submit to the Secretary a park preservation plan which meets the requirements of subsection (c) of this section. The Secretary shall, within ninety days after the date on which such plan is submitted to the Secretary, approve or disapprove such plan. The Secretary may not approve such plan unless the Secretary determines that such plan would adequately carry out the purpose of sections 410cc to 410cc–37 of this title.

(3) If the Secretary disapproves a park preservation plan, the Secretary shall advise the Commission of the reasons for such disapproval together with the recommendations of the Secretary for revision of such plan. Within such period as the Secretary may designate, the Commission shall submit a revised park preservation plan to the Secretary. The Secretary shall approve or disapprove any revised park preservation plan in the same manner as required in paragraph (2) of this subsection for the approval or disapproval of the original park preservation plan.

(4) If the Secretary approves a park preservation plan, the Secretary shall publish notice of such approval in the Federal Register and shall forward copies of the approved plan to the Congress.

(5) Any park preservation plan or draft plan submitted to the Secretary under this subsection shall, upon request, be available to the public.

(6) No changes other than minor revisions may be made in the approved park preservation plan without the approval of the Secretary. The Secretary shall approve or disapprove any proposed change in the approved park preservation plan, except minor revisions in the same manner as required in paragraph (2) of this subsection for the approval or disapproval of the original park preservation plan.

(b) Funding availability and requirements for plan implementation, activities, etc.

(1) Except as provided in paragraph (2) of this subsection, the Secretary shall not make any funds available to the Commission to carry out section 410cc–33 or 410cc–34 of this title until a park preservation plan has been approved under subsection (a) of this section.

(2) Before a park preservation plan is approved under subsection (a) of this section, the Secretary may make available to the Commission such funds as the Commission may request to carry out any activity specified in paragraph (3) of this section. However, no funds shall be made available under this paragraph unless a proposal describing such activity is reviewed and approved by the Secretary.

(3) The Commission may request funds from the Secretary to—

(A) carry out activities to preserve, restore, manage, develop, or maintain any property identified in subsection (c) (1) of this section;

(B) take any action the Commission considers necessary to provide owners of property with national historical or cultural significance within the park or preservation district with emergency assistance for the purpose of preserving and protecting their property in a manner consistent with the purpose of sections 410cc to 410cc–37 of this title; or

(C) acquire in accordance with section 410cc–34 of this title, any property within the park which—

(i) is identified in the report of the Lowell Historic Canal District Commission as a property which should be preserved, restored, managed, developed, or maintained in a manner consistent with the purpose of sections 410cc to 410cc–37 of this title;

(ii) is listed in the National Register of Historic Places, as maintained by the Secretary pursuant to section 470a(a) of this title, and section 462(b) of this title; or

(iii) is determined by the Secretary to be of national significance;

and would be subject to demolition or major alteration in a manner inconsistent with the purpose of sections 410cc to 410cc–37 of this title unless acquired by the Commission.

(c) Requirements for plan

Any plan submitted to the Secretary under subsection (a) of this section shall—

(1) describe the manner in which the Commission, to the extent practicable in accordance with the recommendations in the report of the Lowell Historic Canal District Commission, proposes to provide for the preservation, restoration, management, development, or maintenance of—

(A) the Welles Block, 169 Merrimack Street;

(B) the Jordan Marsh Company Building, 153 Merrimack Street and 15 Kirk Street;

(C) the Yorick Club, 91 Dutton Street;

(D) the Lowell Gas Light Company, 22 Shattuck Street;

(E) St. Anne's Church and Rectory, 237 Merrimack Street;

(F) Lowell Institution for Savings, 18 Shattuck Street;

(G) the Ahepa Building, 31 Kirk Street;

(H) Boott Mill, Foot of John Street;

(I) Lowell Manufacturing Company on Market Street; and

(J) the structure commonly referred to as the Early Residence, 45, 47, and 49 Kirk Street;

(2) identify the properties included in the index established pursuant to subsection (d) of this section;

(3) identify the properties which the Commission intends to acquire under section 410cc-34 of this title and specify how such properties shall be used;

(4) include the standards and criteria established pursuant to subsection (e) of this section;

(5) provide a detailed description of the manner in which the Commission intends to implement the grant and loan programs under section 410cc-33 of this title, including information relating to the estimated amount of such grants and the manner in which such grants shall be awarded by the Commission;

(6) provide for a transportation program by which the Commission shall provide, directly or by agreement with any person or any public or private entity, transportation services and facilities for park and preservation district visitors, including barge equipment, docking facilities, and local rail facilities;

(7) provide for educational and cultural programs to encourage appreciation of the resources of the park and preservation district; and

(8) include a tentative budget for the subsequent five fiscal years.

(d) Establishment and contents of index; modification of index

The Commission shall establish, within one year after the date on which the Commission conducts its first meeting, an index which includes—

(1) any property in the park or preservation district (except for any property identified in section 410cc-21(a)(2) of this title) which should be preserved, restored, managed, developed, maintained, or acquired by the Commission because of its national historic or cultural significance; and

(2) any property which should be preserved, restored, managed, developed, or maintained in a manner compatible with the purpose of sections 410cc to 410cc-37 of this title because of its proximity to (A) any property referred to in paragraph (1) of this subsection, or (B) any property designated in section 410cc-21(a)(2) of this title.

The index may be modified only by a majority vote of the members of the Commission, taken when a quorum is present.

(e) Standards and criteria for construction, preservation, etc., of properties within preservation district and park; authorization; establishment; revisions; publication in Federal Register

(1) The Commission shall establish standards and criteria applicable to the construction, preservation, restoration, alteration, and use of all properties within the preservation district with the advice of the Commonwealth of Massachusetts and of the Secretary, and the consent of the city manager of Lowell.

(2) The Commission shall establish the standards and criteria described in paragraph (1) of this subsection for any property within the park with the advice of the Commonwealth of Massachusetts and the city manager of Lowell and subject to the review and approval of the Secretary.

(3) The Commission shall establish standards and criteria under paragraphs (1) and (2) of this subsection within one year after the date on which the Commission conducts its first meeting. Such standards and criteria may be revised in the same manner in which they were originally established.

(4) The Secretary shall publish the standards and criteria established under paragraphs (1) and (2) of this subsection, and any revisions thereof, in the Federal Register.

(Pub.L. 95-290, Title III, § 302, June 5, 1978, 92 Stat. 297.)

§ 410cc-33. Financial and technical assistance

(a) Loans to Lowell Development and Financial Corporation for loans for preservation, etc., of property; terms of loan agreement with corporation; determination of compliance by corporation with requirements for loans; repayment by corporation

The Commission may make loans to the Lowell Development and Financial Corporation (established under chapter 844 of the Massachusetts General Laws and hereinafter referred to as the "corporation") to enable the corporation to provide low interest loans for the preservation, restoration, or development of any property described in section 410cc-32(d)(1) of this title. The Commission may make any such loan to the corporation only after entering into a loan agreement with the corporation which includes the following terms:

(1) The loan to the corporation shall have a maturity of thirty-five years. At the end of such period, the corporation shall repay to the Secretary of the Treasury (in a lump sum) for deposit in the general fund of the Treasury the full amount of the loan and any additional amounts accruing to the corporation pursuant to this subsection excepting those amounts expended by the corporation for reasonable administrative expenses.

(2) The money received from the Commission, and any interest earned on such money, may be obligated by the corporation only for low interest loans made under paragraphs (6) and (7) of this subsection, except that the corporation may use such money to the extent the Commission considers reasonable to satisfy the costs of the corporation in administering the loan or procuring loan guarantees or insurance.

(3) Within five years after receiving the loan from the Commission, the corporation shall make loans under paragraphs (6) and (7) of this subsection which, in the aggregate, obligate the full amount of money received from the Commission (minus any amount required to satisfy the costs described in paragraph (2) of this subsection).

(4) As loans made under paragraphs (6) and (7) of this subsection are repaid, the corporation shall make additional loans under such paragraphs with the money made available for obligation by such repayments.

(5) The corporation shall make available to the Commission and to the Secretary, upon request, all accounts, financial records, and other information related to loans made under paragraphs (6) and (7) of this subsection.

(6) Before the corporation approves any application for a low interest loan for which money has been made available to the corporation by the Commission, the corporation shall require the prospective borrower to furnish the corporation with a statement from the Commission stating that the Commission has reviewed the application and has determined that any loan received by the prospective borrower will be spent in a manner consistent with—

(A) the standards and criteria established pursuant to section 410cc-32(e) of this title, and

(B) the goals of the park preservation plan approved under section 410cc-32(a) of this title.

(7) The corporation may approve any application for a low interest loan which meets the terms and conditions prescribed by the corporation with the approval of the Commission and for which money has been made available to the corporation by the Commission if—

(A) the prospective borrower furnishes the corporation with the statement described in paragraph (6) of this subsection;

(B) the corporation determines that such borrower has sufficient financial resources to repay the loan; and

(C) such borrower satisfies any other applicable credit criteria established by the corporation.

In order to determine whether the corporation has complied with this subsection, the Commission, or such other appropriate person or entity as the Commission may designate, shall conduct an audit at least once every two years of all accounts, financial records, and other information related to loans made under paragraphs (6) and (7) of this subsection. If the Commission determines, after conducting a hearing on the record, that the corporation has substantially failed to comply with this subsection, the outstanding balance of any loan made to the corporation under this subsection shall become payable in full upon the demand of the Commission.

(b) Grants to property owners for preservation, etc., of property; grants to persons or public or private entities for educational and cultural programs or for necessary services; terms of grant agreements; recovery of amounts for inconsistent uses

(1) The Commission may make grants to owners of property described in section 410cc-32(d)(1) of this title for the preservation, restoration, management, development, or maintenance of such property in a manner consistent with the standards and criteria established pursuant to section 410cc-32(e) of this title.

(2) The Commission, with the approval of the Secretary, may make grants to any person or any public or private entity to provide for (i) educational and cultural programs which encourage appreciation of the resources of the park and preservation district, or (ii) any planning, transportation, maintenance, or other services the Commission considers necessary to carry out the purposes of sections 410cc to 410cc-37 of this title.

(3) Grants under this subsection shall be made under agreements which specify the amount of the grant, the installments (if any) by which the grant shall be paid to the grant recipient, the purpose for which the grant may be used, and any other condition the Commission considers appropriate. The Commission shall be entitled, under the terms of any grant agreement, to recover from the recipient any funds used in a manner inconsistent with such grant agreement.

(c) Technical assistance to property owners, etc.

The Commission with the advice of the Secretary may provide technical assistance to—

(1) owners of property within the park or preservation district to assist such owners in (A) making repairs to or improvements in any property included in the index established pursuant to section 410cc-32(d) of this title, or (B) applying for loans under subsection (a) of this section; and

(2) any other person or public or private entity to assist such person or entity in taking actions consistent with the purpose of sections 410cc to 410cc-37 of this title.

(d) Availability to Secretary of all accounts, financial records, and other information relating to loans and grants

The Commission shall make available to the Secretary, upon request, all accounts, financial records, and other information of the Commission relating to grants and loans made under this section.

(e) Annual report to Congress; contents

The Secretary shall make an annual report to the Congress describing the loans, grants, and technical assistance provided under this section and under section 410cc-23 of this title. Such report shall specify the amount, recipient, and purpose of any loan, grant or technical assistance so provided and contain such additional information as the Secretary considers appropriate.

(Pub.L. 95-290, Title III, § 303, June 5, 1978, 92 Stat. 300.)

§ 410cc-34. Acquisition and disposition of property

(a) Acquisition of specified property; manner of acquisition

(1) The Commission may acquire any property designated in paragraph (3) of this subsection, any property described in section 410cc-32(d)(1) of this title, or any interest therein, by donation, by purchase with donated or appropriated funds, or by condemnation in accordance with paragraph (2) of this subsection.

(2) Only properties within the park or property designated in paragraph (3) of this subsection may be acquired by the Commission by condemnation. The Commission may initiate condemnation proceedings only after making every reasonable effort to acquire any such property through negotiations and purchase and consulting with the city council of Lowell. No lands or interests therein may be acquired by the Commission by condemnation without the approval of the Secretary.

(3) The Commission may acquire in accordance with paragraph (1) of this subsection the following properties, or any interest therein:

(A) World Furniture Building, 125 Central Street; and

(B) The Martin Building, 102-122 Central Street.

(b) Sale or lease of specified property; conditions

The Commission, with the approval of the Secretary, may sell or lease any property which it acquires under subsection (a) of this section subject to such deed restrictions or other conditions as the Commission deems appropriate to carry out the purpose of sections 410cc to 410cc-37 of this title.

(c) Agreement for disposal of specified property to Commonwealth of Massachusetts; purposes of transfers

Pursuant to a written agreement between the Commission and the Commonwealth of Massachusetts, the Commission, with the approval of the Secretary, may sell, donate, lease, or in any other manner the Commission and the Secretary deem appropriate make available to the Commonwealth any property which the Commission has acquired under subsection (a) of this section in order to provide for the administration or maintenance of such property by the Commonwealth in a manner consistent with the purpose of sections 410cc to 410cc-37 of this title.

(Pub.L. 95-290, Title III, § 304, June 5, 1978, 92 Stat. 302.)

§ 410cc-35. Powers of Commission

(a) Conduct of hearings, etc.

The Commission may for the purpose of carrying out sections 410cc to 410cc-37 of this title hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence, as the Commission may deem advisable. The Commission may administer oaths or affirmations to witnesses appearing before it.

(b) Authorization of action by member or agent

When so authorized by the Commission, any member or agent of the Commission may take any action which the Commission is authorized to take by this section.

(c) Receipt of necessary information from other Federal departments or agencies; information furnished upon request by Chairman

Subject to section 552a of Title 5, the Commission may secure directly from any department or agency of the United States information necessary to enable it to carry out sections 410cc to 410cc-37 of this title. Upon request of the chairman of the Commission, the head of such department or agency shall furnish such information to the Commission.

(d) Authorization to seek and accept donations of funds, property, or services

Notwithstanding any other provision of law, the Commission may seek and accept donations of funds, property, or services from individuals, foundations, corporations, and other private entities, and from public entities, for the purpose of carrying out its duties.

(e) Use of funds for obtaining additional moneys

The Commission may use its funds to obtain money from any source under any program or law requiring the recipient of such money to make a contribution in order to receive such money.

(f) Use of mails

The Commission may use the United States mails in the same manner and upon the same conditions as other departments and agencies of the United States.

(g) Purchase, rental, donation, etc., of property, facilities, and services; manner of acquisition; transfers to Department of Interior upon termination of Commission

The Commission may obtain by purchase, rental, donation, or otherwise, such property, facilities, and services as may be needed to carry out its duties. Any acquisition of property by the Commission shall be in accordance with section 410cc-34 of this title: *Provided, however,* That the Commission may not acquire lands or interests therein pursuant to this subsection by condemnation. Upon the termination of the Commission, all property, personal and real, and unexpended funds shall be transferred to the Department of the Interior.

(Pub.L. 95-290, Title III, § 305, June 5, 1978, 92 Stat. 302.)

§ 410cc-36. Staff of Commission

(a) Appointment and compensation of Director

The Commission shall have a Director who shall be appointed by the Commission and who shall be paid at a rate not to exceed the rate of pay payable for grade GS-15 of the General Schedule.

(b) Appointment and compensation of additional personnel

The Commission may appoint and fix the pay of such additional personnel as the Commission deems desirable.

(c) Applicability of civil service provisions to appointment and compensation of Director and staff

The Director and staff of the Commission may be appointed without regard to the provisions of Title 5 governing appointments in the competitive service, and may be paid without regard to the provisions of chapter 51, and subchapter III of chapter 53 of such title relating to classification and General Schedule pay rates, except that no individual so appointed may receive pay in excess of the annual rate of basic pay payable for grade GS-15 of the General Schedule.

(d) Temporary or intermittent services; procurement and compensation

Subject to such rules as may be adopted by the Commission, the Commission may procure temporary and intermittent services to the same extent as is authorized by section 3109(b) of Title 5, but at rates determined by the Commission to be reasonable.

(e) Detail of personnel from other Federal agencies represented by members on Commission; reimbursement by Commission; administrative support services by Administrator of General Services Administration; reimbursement by Commission

(1) Upon request of the Commission, the head of any Federal agency represented by members on the Commission may detail, on a reimbursable basis, any of the personnel of such agency to the Commission to assist it in carrying out its duties under sections 410cc to 410cc-37 of this title.

(2) The Administrator of the General Services Administration shall provide to the Commission on a reimbursable basis such administrative support services as the Commission may request.

(Pub.L. 95-290, Title III, § 306, June 5, 1978, 92 Stat. 303.)

§ 410cc-37. Use of funds; maintenance of financial records; audits

(a) Any revenues or other assets acquired by the Commission by donation, the lease or sale of property or fees for services shall be available to the Commission, without fiscal year limitation, to be used for any function of the Commission authorized under sections 410cc to 410cc-37 of this title. The Commission shall keep financial records fully disclosing the amount and source of revenues and other assets acquired by the Commission, and shall keep such other financial records as the Secretary may prescribe.

(b) The Secretary shall require audits of the financial records of the Commission to be conducted not less frequently than once each year in order to ensure that revenues and other assets of the Commission are being used in a manner authorized under sections 410cc to 410cc-37 of this title.

(Pub.L. 95-290, Title III, § 307, as added Pub.L. 96-344, § 10, Sept. 8, 1980, 94 Stat. 1136.)

An Act

Oct. 16, 1987
[H.R. 2035]

To amend the Act establishing Lowell National Historical Park, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. AMENDMENTS.

The Act entitled "An Act to provide for the establishment of the Lowell National Historical Park in the Commonwealth of Massachusetts, and for other purposes", approved June 5, 1978 (92 Stat. 290; 16 U.S.C. 410cc et seq.), is amended—

16 USC 410cc-13.

(1) in section 103(a)—

(A) by striking "$18,500,000" and inserting "$19,800,000" in paragraph (1); and

(B) by striking "$21,500,000" and inserting "$33,600,000" in paragraph (2);

16 USC 410cc-31.

(2) in section 301(e)(2) by striking "for a period not longer than thirty days" and inserting "until his successor is appointed"; and

(3) in section 301(i) by striking "ten" and inserting "seventeen".

16 USC 410cc-13 note.

SEC. 2. EFFECTIVE DATES.

(a) IN GENERAL.—Except as provided in subsection (b), the amendments made by section 1 shall take effect on the date of the enactment of this Act.

(b) EFFECTIVE DATE OF AUTHORIZATION OF APPROPRIATION.—The amendments made by section 1(1) shall take effect on October 1, 1987.

Approved October 16, 1987.

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the Lowell Hydroelectric Project (FERC No. 2790) (Project), with principal Project facilities located along the Merrimack River in Middlesex County, Massachusetts and a reservoir extending upstream to Hillsborough County, New Hampshire (see attached map). Boott, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the existing Project. Accordingly, Boott is preparing a Pre-Application Document (PAD) that will provide FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project that will be used to prepare documents related to analyzing the relicensing application to be prepared by Boott. To prepare the PAD, Boott will use information in its possession and information obtained from additional sources. This PAD Information Questionnaire will be used by Boott to help identify sources of existing, relevant, and reasonably available information that are not currently in Boott's possession.

1. Information about person completing the questionnaire:

Name & Title	PETER AUCELLA, ASSISTANT SUPERINTENDENT
Organization	LOWELL NATIONAL HISTORICAL PARK
Address	67 KIRK ST., LOWELL, MA. 01852
Phone	978-275-1722
Email Address	PETER_AUCELLA@NPS.GOV

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

✓ Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- Geology and soils
- Water resources
- Fish and aquatic resources
- Wildlife and botanical resources
- Wetlands, riparian, and littoral habitat
- Rare, threatened & endangered species
- Recreation and land use
- Aesthetic resources
- (Cultural resources)
- Socio-economic resources
- Tribal resources
- Other resource information

Additional Representative Contact Information (Optional)

Name	CELESTE BERNARDO, SUPERINTENDENT
Address	LOWELL NHP, 67 KIRK ST, LOWELL, MA. 01852
Phone	978-275-1700
Email Address	CELESTE_BERNARDO@NPS.GOV

Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 21 days of receipt to allow for any follow-up contact that may be necessary by a representative from Boott or HDR. Not responding within 21 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

Form No. 10-300 (Rev. 10-74)

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UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
Locks and Canals Historic District

AND/OR COMMON
same

2 LOCATION

STREET & NUMBER
multiple

CITY, TOWN
Lowell — VICINITY OF

__NOT FOR PUBLICATION

CONGRESSIONAL DISTRICT
5

STATE
Massachusetts

CODE
025

COUNTY
Middlesex

CODE
017

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
X DISTRICT	__PUBLIC	X OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	__UNOCCUPIED	X COMMERCIAL	X PARK
__STRUCTURE	X BOTH	X WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	X IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	X YES: UNRESTRICTED	X INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME
multiple ownership

STREET & NUMBER

CITY, TOWN
Lowell — VICINITY OF

STATE
Massachusetts

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Northern Middlesex District Registry of Deeds

STREET & NUMBER
Goreham Street

CITY, TOWN
Lowell

STATE
Massachusetts

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Inventory of the Historic Assets of the Commonwealth/ HAER

DATE
1976 — X FEDERAL X STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS
Massachusetts Historical Commission/ Library of Congress

CITY, TOWN
Boston/ Washington D.C.

STATE
Massachusetts

DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
X GOOD	__RUINS	X ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Locks and Canals Historic District encompasses all of the canals in Lowell, (built between 1793 and 1848), their associated locks, and the mills that were powered by the canals. There are about five miles of canals, and the associated mill yards increase the acreage of the nominated district to approximately 100 acres. The canals are all contiguous though they meander throughout the city. The mill buildings and yards are all associated directly with a canal, and three boarding houses, not contiguous to the canals but built by mill owners for their workers, are also included in the district.

The Pawtucket Canal, the first canal to be built in Lowell, leaves the Merrimack River a few hundred yards upstream from the Pawtucket Dam. The site of the guard locks, about ,000 feet from the head of the canal, has been in continuous use since the canal was opened to navigation in 1796, and the present structures and facilities include the Francis ate, a lock house and a sluice gate house. The Francis Gate (#2) also known locally as rancis' Folly, is a proticullis flood gate, built in 1848-1850. The lock house (#1), uilt in 1881 over the upstream gate of the locking chamber, replaced an earlier 1852 tructure. It is a wooden frame building with round arched windows and a slate hipped oof. The sluice gate house (#3) built in 1870, is a brick Romanesque structure with ound arched windows and a slate ridge roof, containing machinery for five gates. Masonry work around the Guard Locks includes the lower part of the dam (1832), the upper dam ortion (1848), the walls of the upstream island and lock chamber (1801) and downstream ock chamber (1877) and the downstream wall of the power canal chamber, built in 1867 nd 1900.

he Northern Canal (#7), the last canal to be built, was constructed in 1846-48. It was uilt as a feeder canal to supplement the Pawtucket Canal and to raise the water level t the lower end of the canal system. Its construction provided for almost perfect control of the water level in the canal system and greatly increased its complexity by reersing flows and transforming some canals from power to feeder uses.

he Great River Wall surmounted by the Northern Canal Walk (#8) was created by the construction of the Northern Canal. The Great Wall is a 2,200 foot section of the canal all that separates the Northern Canal from the river. The Northern Canal Gatehouse, he blacksmith shop and the Gate Keeper's Cottage are all located at the head of the orthern Canal. The Gatehouse (#4), constructed in 1847, is a one-story brick Romanesque Revival structure with round arched windows and a slate ridge roof; the interior contains ten guard sluice gates and the Francis turbine. Opposite the building is a navgation lock. The Locks and Canals Blacksmith Shop (#5) is a simple wood shed built next o the river, and is used to repair the lock machinery after spring flooding. Next to the ate House is the Gate Keeper's Cottage (#6), a one and one-half story Victorian wood rame cottage built c. 1850 to serve as living quarters for the gate keeper.

e Suffolk Millyard (#9) adjacent to the Northern Canal, covers approximately five acres. e of the earliest corporations, the yard was built in 1831, but the major courtyard was built in 1863. The buildings are primarily Romanesque Revival although much of the rly Federal styling remains. Structures of particular interest are the Counting House d an 1831 boarding house converted for industrial use. The Suffolk Manufacturing Comny Boarding Houses (#3) across French Street from the Suffolk Yard, were constructed 1845. Five units at the northern end of this fine example of workers' row housing re removed in the 1960's to allow construction of the French Street extension, a part of e Northern Canal Urban Renewal Project, but the remaining block has been re-habed.

continued

SIGNIFICANCE

PERIOD

—PREHISTORIC
—1400-1499
—1500-1599
—1600-1699
X 1700-1799
X 1800-1899
—1900-

AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW

—ARCHEOLOGY-PREHISTORIC	—COMMUNITY PLANNING	—LANDSCAPE ARCHITECTURE	—RELIGION
—ARCHEOLOGY-HISTORIC	—CONSERVATION	—LAW	—SCIENCE
—AGRICULTURE	—ECONOMICS	—LITERATURE	—SCULPTURE
—ARCHITECTURE	—EDUCATION	—MILITARY	—SOCIAL/HUMANITARIAN
—ART	X ENGINEERING	—MUSIC	—THEATER
X COMMERCE	—EXPLORATION/SETTLEMENT	—PHILOSOPHY	X TRANSPORTATION
—COMMUNICATIONS	X INDUSTRY	—POLITICS/GOVERNMENT	—OTHER (SPECIFY)
	—INVENTION		

SPECIFIC DATES 1790–1870 BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Locks and Canals Historic District in Lowell is significant for its contributions to the development of Lowell as the first great industrial city in the United States. The industrial revolution in North America was first initiated on a large scale in Lowell, and our industrial economy and present levels of technology are a reflection of Lowell's manufacturing experiments.

In 1792 Governor John Hancock signed a charter incorporating the Proprietors of the Locks and Canals on the Merrimack River. The charter gave to this group of Newburyport merchants riparian rights on the Merrimack River from the Massachusetts border to the Atlantic Ocean, and more specifically, the right to build locks and a canal to circumvent the Pawtucket Falls. This canal, opened in 1796, formed an island between itself and the Merrimack River, where the City of Lowell later developed. The canal was used to transport lumber, foodstuffs and people around the Pawtucket Falls on their journey from New Hampshire to Newburyport. In 1803 the Middlesex Canal opened, funnelling off to Boston the traffic which had been going to Newburyport, and caused the Pawtucket Canal to fail financially.

In 1822 the Merrimack Manufacturing Company, founded by Patrick Tracy Jackson and Nathan Appleton, bought up the holdings of the Proprietors and all of the land between the Merrimack River and the Pawtucket Canal. Both Jackson and Appleton had been partners of Francis Cabot Lowell in his successful mill at Waltham, Massachusetts where, for the first time, cotton was processed into cloth within a single building. At the Waltham mill Francis Lowell had developed the system of boarding houses and strict social regulation, which brought New England farm girls into the mills and had such an impact on the early days of the American industrial revolution. Expansion of the mill at Waltham was not possible because the Charles River was too slow moving to provide sufficient power, so after Lowell's death in 1816, his partners, searching for a new site, chose the area that is now the city of Lowell.

In 1825 the Merrimack Manufacturing Company had widened the Pawtucket Canal and constructed the Merrimack Canal. They built the first large mill (no longer extant) to be established in Lowell between the Merrimack River and Merrimack Canal and paved the way for future mill development. The first mill used only a fraction of the available water power, so the Merrimack Company, determined to keep out of the development business, sold its water power rights and unused land back to the Proprietors of the Locks and Canals, who were reorganized to develop the area by selling land and water power, building additional canals and supplying textile machinery to the mills. The Locks and Canals Company built the Hamilton Canal in 1826, the Lowell Canal in 1828, the Western Canal in 1831-32, the Eastern Canal in 1835, and finally the Northern Canal in 1847. Each of the new canals supplied power to new mill companies, built on the best sites to obtain power. The first priority in the development of the town was to bring water power to these mills; corporate housing, private businesses, and homes were built only where they did not interfere with the

continued

UNITED STATES DEPARTMENT OF THE INTERIOR
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#7:

The Tremont Gatehouse (#10), a one-story ridge roof Romanesque Revival building, five bays wide, was constructed in 1855 as a component of the Northern Canal Project. Its purpose was to direct the flow of water from the Northern Canal through the upper level of the Western Canal to the Lawrence Yard, should the flow from the Suffolk and Tremont tailraces prove insufficient. The Tremont Yard (#11), next to the Western Canal, incorporates a site of about five acres and was the location of the Tremont Corporation, formed in 1830. The structures were razed in the 1930's and only fragments of the buildings remain.

The Lawrence Yard (#12), bounded by the Western Canal and the Merrimack River, covers approximately nine acres and contains structures ranging in date from 1826 to 1909. The weaving and spinning mills are principally Federal in style, four to six stories in height with Romanesque Revival additions and ornamentation. The Counting House is a particularly notable two-story High Victorian Gothic structure distinguished by the polychromatic banding of its slate roof. The Lawrence Canal, about 500 feet long, was constructed in 1831 and runs westerly from the Western Canal to provide water power for the Lawrence Yards.

Completed in 1848, the Moody Street Feeder (#13) was also built as part of the Northern Canal project, to increase the supply of water flowing into the Merrimack and Eastern Canals via the Boott Penstock. The Feeder extends from the Western Canal to the Merrimack Canal and consists of three brick vaulted tunnels. The Merrimack Canal Gate House (#14), built over the Moody Street Feeder and completed in 1848, is a Romanesque Revival building, two bays wide and six bays long. The building is distinguished by its fine dentiled cornice. The Gate House contains three service gates, each manually operated with counterweighted rock and pinion equipment over the waterway. The gate operating equipment is original to the feeder construction except for the counterweight system which was added in 1853. The building is already listed in the National Register as part of the City Hall Historic District.

The Eastern Canal (#22) runs northerly from the Pawtucket Canal just above the lower locks and, bending 90°, runs parallel to the Merrimack River but flows in the opposite direction. The Canal is 1,913 feet long and provided power to the Prescott, Massachusetts and Boott Mills. The Boott Mills (#15), bounded by the Merrimack River and the Eastern Canal, were founded in 1839. The cores of the majority of the buildings date from this period, but the yard was extensively rebuilt in the 1860's. The Romanesque Revival style of this completely intact millyard is enhanced by a graceful octagonal cupola and bell tower. The site comprises about six acres and is completely enclosed by buildings which form two interior courtyards.

The Massachusetts Mills Boarding House (#18), constructed in the 1840's by the Massachusetts Mills, is a three and one-half story Greek Revival building. The first floor has been altered for commercial use. The Boott Mills Boarding House (#17), across French Street from the Massachusetts Mills Boarding House, was also constructed in the 1840's. In the 1890's a Queen Anne facade was applied to the Bridge Street elevation and a wing was attached at the southwest corner, facing French Street.

continued

UNITED STATES DEPARTMENT OF THE INTERIOR
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#7:

The Pawtucket Canal, both upper (#31) and lower (#23) portions, was originally constructed between 1792-96 with four sets of locks, for use as a navigation canal around the Pawtucket Falls on the Merrimack River. Falling into disuse after the opening of the Middlesex Canal in 1805, it was extensively rebuilt between 1821-25 to provide both transportation and water power to the Lowell mills. The canal is 9,188 feet long and is the backbone of the locks and canals system. The Lower Locks (#19) on the Lower Pawtucket Canal were originally built in 1822, and rebuilt in 1841. The locks consist of a dam and two navigation locks, covered by a frame structure. The Merrimack Canal (#27) was built in 1822-23 to provide water power to the Merrimack Manufacturing Co., Lowell's first mill yard, no longer extant. It runs in a northerly direction 2,586 feet from the Pawtucket Canal at the Swamp Locks and eventually discharges into the Merrimack River. It includes a dam and a connector to the Eastern Canal, the Boott Penstock. The Bigelow Yard (#20), originally founded in 1828, is located between the Merrimack and Lower Pawtucket Canals. The only extant structures include a four-story Romanesque Revival structure from the 1870's and three other buildings from the 1890's. The Lowell Canal, now covered, was built in 1828 to supply water to this yard. It is 500 feet long, has a drop of thirteen feet, and runs between the Merrimack and Lower Pawtucket Canals.

The Hamilton Canal (#25), 1,771 feet long, runs parallel to the Pawtucket Canal from the Swamp Locks and discharges into the Pawtucket Canal by raceways through the Hamilton and Appleton Yards. It was constructed in 1826 to power the aforementioned mills, and has a fall of 13 feet. The Hamilton Yard (#21) was the site of Lowell's second oldest manufacturing company, the Hamilton Mills, incorporated in 1825. The structure now standing along the Pawtucket Canal is early Greek Revival distinguished by triangular granite pediments over the windows, and granite lintels on square brackets. The fifth and sixth floors and the other structures in the yard are Romanesque Revival dating from the rebuilding of the 1860's and 70's. The Appleton Mills (#24) east of the Hamilton Yard, were founded in 1828. The structures on the island between the Hamilton and Pawtucket Canals nearly all date from the c. 1905 rebuilding; the structures on the south side of Jackson Street were built in 1873 and are Romanesque Revival. The Swamp Locks (#26) similar to the Lower Locks, were built in 1822-23 and rebuilt in 1839-41.

The Lowell Machine Shop (#28), razed in the 1930's, stood in the island formed by the Lowell, Merrimack and Pawtucket Canals. The only remaining portions of the shop are on Dutton Street; a mill, constructed c. 1890 and c. 1910, and a reinforced concrete plant built in 1911 now cover the site of the Machine Shop boarding houses. The Proprietors of the Locks and Canals Yard, containing one and one-half and two-story buildings now used as offices and shops, are frame Italianate structures built in the 1850's to serve as the administrative headquarters for the canal system.

The Western Canal (#30), a mile long, originally ran northwesterly from the Pawtucket Canal to provide water power to the Tremont, Suffolk and Lawrence Mills. The construction of the Northern Canal changed its direction so that it now flows south from the Northern Canal to the Swamp Locks, but continues to flow north from the Tremont Gate House to power

continued

#7:
the Tremont, Suffolk and Lawrence Mills.

The Pawtucket Dam (#32), built between 1826-1830 at the Pawtucket Falls, created a "mill pond" on the Merrimack River eighteen miles long. The dam has been continually modified throughout the nineteenth century.

#8:
routing of water power and the production of textiles. The population of Lowell mushroomed during this period, from 200 people in 1822 to over 33,000 in 1850.

The engineering involved in the construction of the canals was extremely complex, and each new canal was built in an attempt to solve the problem of keeping all the mills supplied with a sufficient supply of power. The construction of the Northern Canal, the most complex of all because it reversed the flow of the Western Canal, finally increased the average flow of water to each mill sufficiently to solve the distribution problem. The hydro-engineering breakthroughs of the canal engineers, including James Francis and George Whistler, received international acclaim and recognition, and their techniques were used world-wide. The sociological pattern of corporate paternalism in Lowell, manifested by the mill-owned boarding houses and strictly run social functions, also received international recognition and served as a model for Utopian industrial communities in the United States and Europe.

Unfortunately, Lowell's position as a leader in the field of science and as an ideal industrial society was lost in the last quarter of the nineteenth century. The latter nineteenth century mill owners were more concerned about making a profit than in their workers' welfare and the waves of immigrants who poured into Lowell completed the destruction of the boarding house system; speculative tenement flats became the norm. In this century, when many of the major textile companies left the north to move south to cheaper power and labor sources, Lowell was left with huge empty mill buildings, a large canal system and a high level of unemployment. The entire city has been affected by this economic depression and most of the commercial, industrial and residential buildings in the district have deteriorated.

Prospects for Lowell are now looking brighter. The State of Massachusetts, through the Department of Environmental Management, is in the process of acquiring all of the locks and canals and turning them into a state heritage park. The Federal government is considering the creation of an urban cultural park in Lowell, and Federal funds, through the Department of Housing and Urban Development and funds appropriated especially for Lowell are being expended to upgrade housing and to rehab existing mill buildings. New uses are being sought for the abundant mill space in the district, both in order to save the buildings and to provide jobs.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Historic American Engineering Record Survey Inventory; Spec Struc:Hydra (81.2), 1975
Coolidge, John, Mill and Mansion, Russell & Russell, New York 1967
Malone, Patrick, The Power Canals of Lowell, Massachusetts; Human Services Corporation Lowell, 1973

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY approximately 100 acres

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	19	309,960	4,724,900
B	19	311,290	4,723,840
C	19	309,360	4,722,680
D	19	308,540	4,724,160

VERBAL BOUNDARY DESCRIPTION

see district sketch map

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Christine Boulding, Preservation Planner, and Joe Orfant

ORGANIZATION — DATE

Massachusetts Historical Commission — March 1976

STREET & NUMBER — TELEPHONE

294 Washington Street — 617-727-8470

CITY OR TOWN — STATE

Boston — Massachusetts 02108

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL X STATE X LOCAL ____

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE Elizabeth Reed Amadon

TITLE Executive Director, Massachusetts Historical Commission — DATE 3/30/76

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

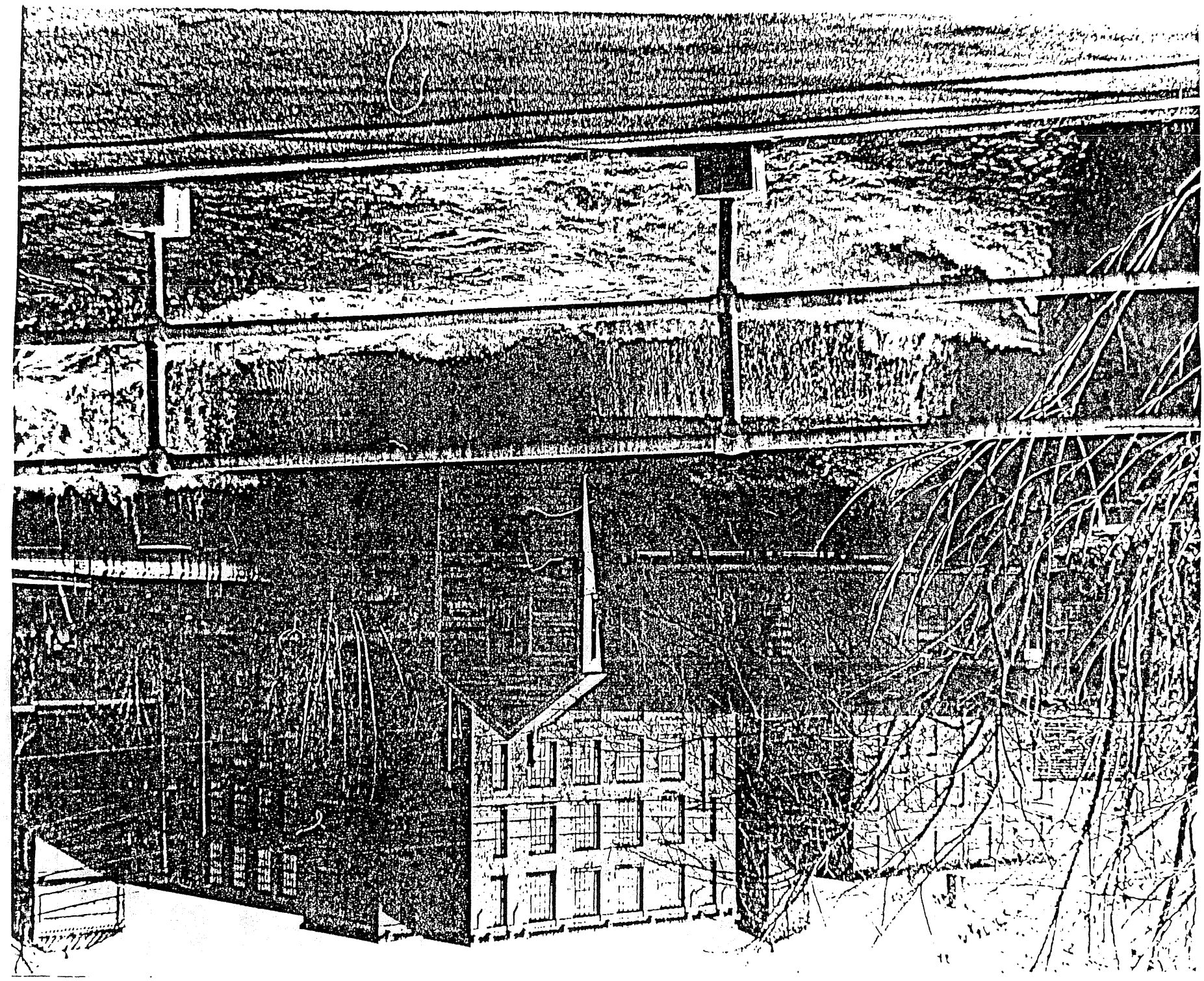
DATE

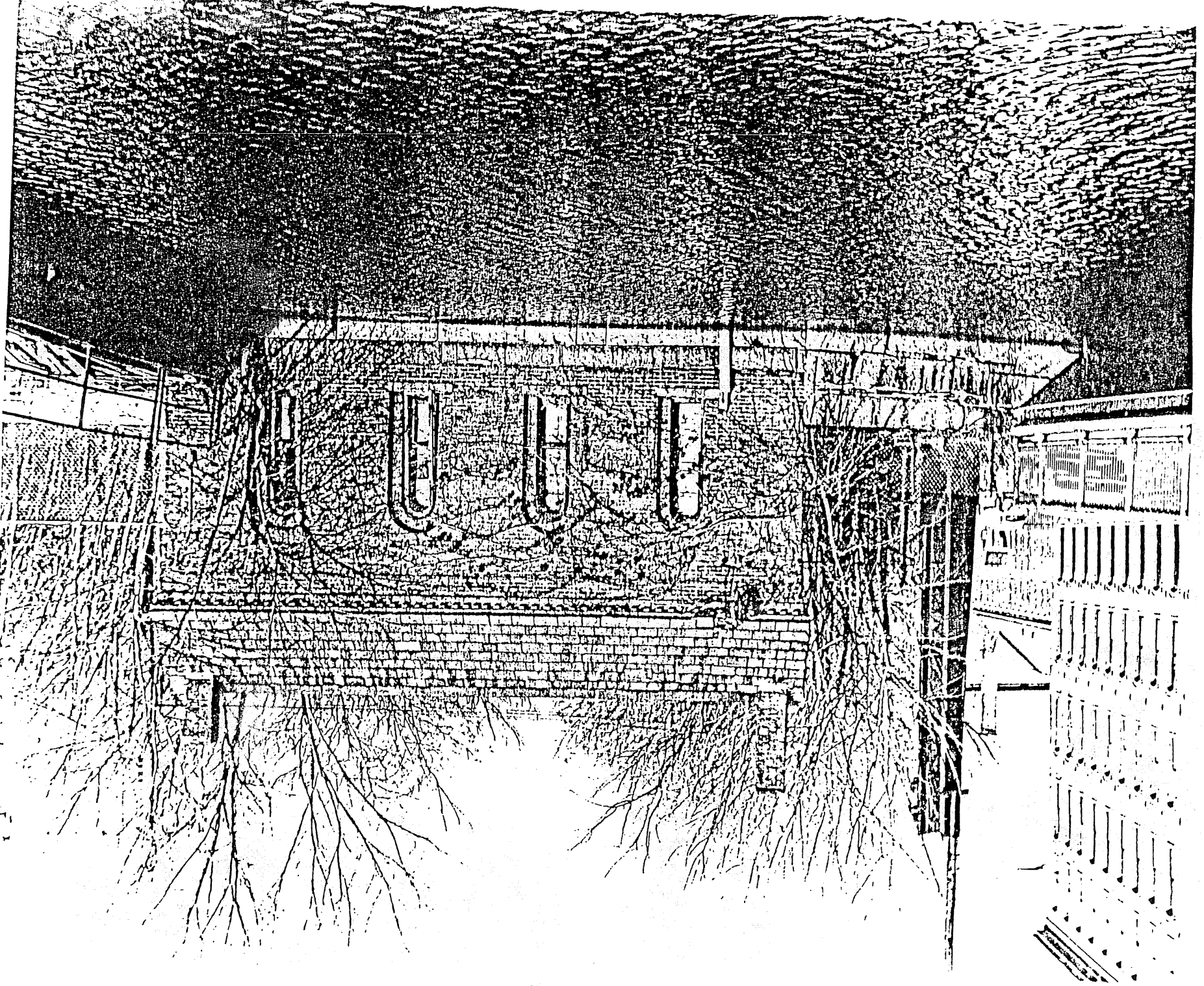
DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

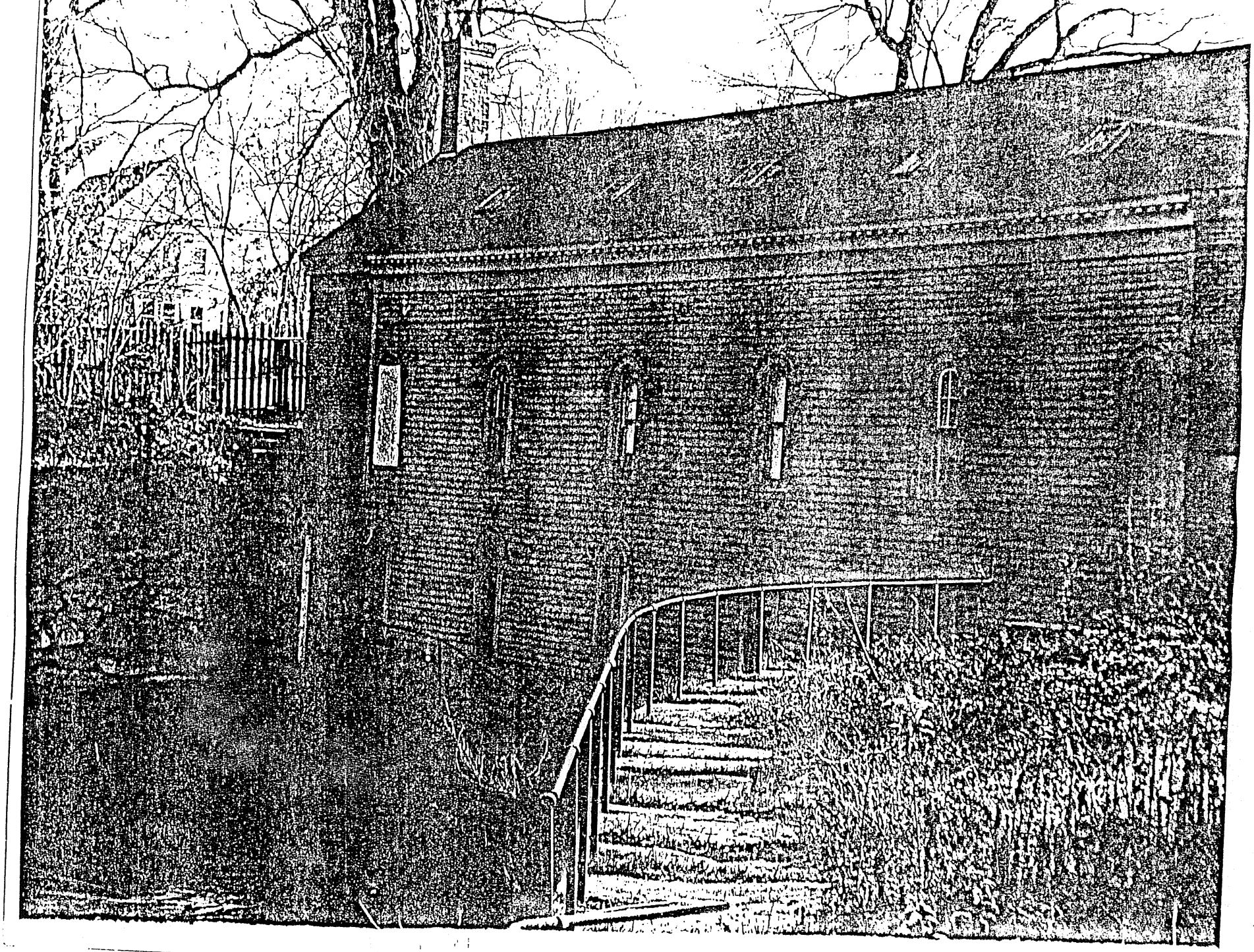
ATTEST: DATE

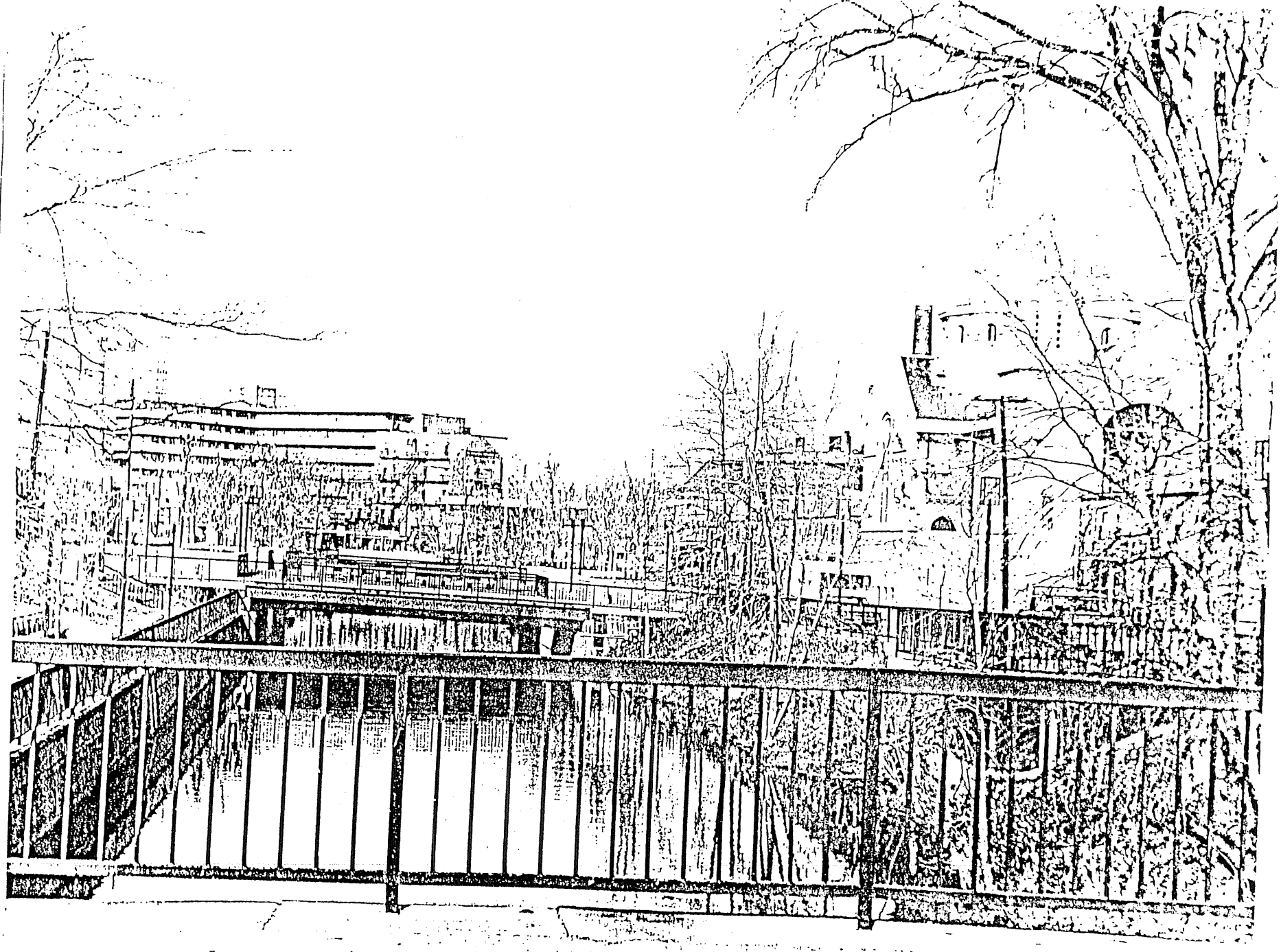
KEEPER OF THE NATIONAL REGISTER

GPO 892-453









ocks and Canals Historic District, Lowell, MA
e Orfant, 1975
ty Development Authority, Lowell, MA
oking northeasterly from the O'Donnell Bridge
at the Northern Canal and the Canal Walk
oto #1

cks and Canals Historic District, Lowell, MA
e Orfant, 1975
A, 50 Arcand Drive, Lowell
oking southwest at the Swamp Locks Dam and
Sluicway, in the Background is the 1890
plant of the Lowell Machine Shop
oto #2

and Canals Historic District, Lowell, MA
fant, 1975
0 Arcand Drive, Lowell
g north from French Street Extension to
Tremont Gatehouse and the Suffolk Yard
he left
3

and Canals Historic District, Lowell, MA
fant, 1975
0 Arcand Drive, Lowell
g north on Suffolk Street to the Suffolk
on the left, the Lawren ce County House :
he background, and the Tremont Yard on
right

#4

Locks and Canals Historic District, Lowe
Joe Orfant, 1975
CDA, 50 Arcand Drive, Lowell
looking south at the sluiceways gatehouse
the Francis Gate site
photo #5

Locks and Canals Historic District, Lowe
Joe Orfant, 1975
CDA, 50 Arcand Drive, Lowell
looking northwest from Broadway at the
Western Canal
photo #6

10-300a
74

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CONTINUATION SHEET ITEM NUMBER PAGE 4

Key to sketch Map

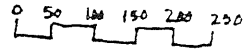
Number	Property name
1 - 1141	B Lock House - Broadway
2 - 1145	B Francis Gate and House - Francis
3 - 1146	B Sluice gate house - Eastern Canal
4	Northern Canal Gatehouse
5 - 1147	B Locks and Canals Blacksmith Shop School St
6 - 1148	B Gate Keeper's Cottage - School St
7 - 1149	S Northern Canal - Northern Canal
8 - 1150	S Northern Canal Walk and Great River Wall - Northern Canal
9	Suffolk Millyard
10	Tremont Gatehouse
11 - 1151	B Tremont Yard - Hall St
12	Lawrence Yard
13 - 1152	S Moody Street Feeder Moody St
14 - 1153	B Moody Street Feeder Gatehouse Pawtucket St
15	Boott Mills
16	Massachusetts Mills
17 - 1154	B Boott Mills Boarding House Broadway
18	Massachusetts Mills Boarding House
19 - 1155	S Lower Locks, ~~Pawtucket Canal~~ Lower Pawtucket Canal
20 - 1156	B Bigelow Yard - Market St
21	Hamilton Yard
22 - 1157	S Eastern Canal Eastern Canal
23 - 1158	S Lower Pawtucket Canal Lower Pawtucket Canal
24	Appleton Mills
25 - 1159	B Hamilton Canal Hamilton Canal
26 - 1160	S Swamp Locks - Lower Pawtucket Canal
27 - 1161	S Merrimack Canal - Merrimack Canal
28 - 1162	B Lowell Machine Shop - DUTTON St
29 - 1163	B Proprietors of Locks and Canals Yard - Broadway
30 - 1164	S Western Canal - Western Canal
31 - 1165	S Upper Pawtucket Canal - Upper Pawtucket Canal
32 - 1166	S Pawtucket Dam - Pawtucket Canal
33	Suffolk Manufacturing Company Boarding Houses

Locks and Canals Historic District

including existing

Mill Yards

Scale: 1" - 250'



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AUG 7 1980
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32-NAR(PC)

Memorandum

To: Assistant Manager, Cultural Resources Management Division, Washington (560)

From: Regional Director, North Atlantic Region

Subject: National Register Data for Lowell National Historical Park

Enclosed are continuation sheets for the five properties which will eventually come under federal ownership. All of the structures are already listed on the National Register, but because they are included as parts of large historic districts, the existing forms contain little specific information. This amplification of sections seven and eight will provide a greater understanding of those sites for all who are involved in the management and compliance processes. Please forward them on to the National Register at your earliest convenience.

(SGD.) RICHARD L. STANTON

Richard L. Stanton

cc: LOWE, Supt.
Mass. SHPO

project file

DPitcaithley:id 7/31/80

Form No. 10-300a
(Rev. 10-74)

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Merrimack Gate House

Situated over the eastern terminus of the Moody Street Feeder, this rectangular one-and-one-half-story brick gate house was built in 1848[1]. The Merrimack Gate House extends approximately 60' along Dutton Street and the Merrimack Canal. Its southern facade faces Merrimack Street. The waters of the Moody Street Feeder flow through the three granite arches on which this structure rests. Its exterior walls are red brick laid in Flemish bond. The pitched roof is covered in slate shingles. Chimneys are situated at the ridge near the north and south end walls.

Stylistically, the Merrimack Gate House is a hybrid of the Italianate and Romanesque Revival styles. Its windows are inscribed and round arched. The cornice features brick dentils. The date "1848" appears incised on its eastern foundation and in raised brick on the gable of its southern facade.

There are three gates for the Moody Street Feeder housed within the Merrimack Gate House. The gates are original with the exception of the woodbox counterweights which were added in 1853[2].

Structurally, the Merrimack Gate House is in good condition. Exterior and interior alterations date, with a few exceptions, from the early 1970s[3]. A doorway has replaced a window on the Merrimack Street facade. Other alterations include the addition of interior platforms, stairs, restrooms and a heating system. At some point in the late nineteenth or early-twentieth-century the two original stoves disappeared and a vent was added to the center of the roof.

[1] Shepley, Bulfinch, Richardson and Abbott, Lowell National Historical Park and Preservation District Cultural Resources Inventory, 1979, n.p.

[2] Merrimack Valley Textile Museum and H.A.E.R., The Lower Merrimack River Valley, An Inventory of Historic Engineering and Industrial Sites. p. 80, 1976.

[3] Roberts, Shelley K., Historic Structures Report-Merrimack Gate House, 1979 p.36.

Francis Gate Complex

The structures located at the head of the Pawtucket Canal, presently referred to as the Francis Gate Complex, include a Guard Dam Gate House, Guard Locks Lock House, and the Great Gate. An island, formed in 1822[1], is situated between the canal and boat lock. The Guard Dam Gate House and Great Gate stand atop the dam. The Guard Locks Lock House which shelters the headgates is upstream of the dam at a lower level.

The Guard Dam Gate House, built in 1870[2], contains the controls to the sluice gates. The upstream side of the Guard Dam Gate House shelters five sluice gates, some of which retain their original lifting machinery. Although most of the openings in the brick portion of the building have been bricked in, much of the original fabric is intact and is in good condition.

The present guard dam may contain elements of the earlier dam (1832) which served the same purpose on this site. [3] This rectangular structure is built of wood frame and is two stories tall. The rest of the building is brick and a single story in height. Both portions display round headed openings and a plain freize and dentils at the cornice. A brownstone plaque set into the east end of the Gate House near the gable is inscribed:

Guard Dam built A.D. 1832
Raised A.D. 1848
Sluice Gates reconstructed A.D. 1970

This Italianate/Romanesque structure culminates in chimneys situated at either end of the ridge roof. The slope of the roof features five small square skylights.

The Pawtucket Canal Guard Locks Lock House was built in 1881. This Lock House structure stands over the upstream pair of gates for the navigational lock. [4] The single-story Lock House is constructed of wood and is of an "I" shaped plan. It has a granite foundation and exterior walls faced with painted clapboards approximately four inches wide. The hipped roof is covered with slate shingles. A hybrid of the Italianate and Romanesque Revival in style, the exterior walls of the Lock House are pierced by narrow round-arched openings.

The chain and windlass equipment which assists in opening the navigational lock date from 1881. [5] The head lock gates are badly deteriorated. The Guard Locks Lock House has been severely vandalized in recent years, threatening the structural integrity of the southern end of the building. That end was built with long horizontal slots through the walls to accommodate the ends of the gate-lever beams. These beams have been broken and burned away.

The navigation lock below the Lock House extends beneath the Francis Gate, ending at a downstream pair of gates which appear to be in good condition. [6]

The Great or Francis Gate was built 1848-50 for the purpose of flood control. This portcullis gate is sheltered by a rectangular wood frame structure. The Great Gate consists of 26 timbers, each 27' long and 17" wide, assembled in two separate sections held together by vertical iron rods. The wooden gate is suspended over the boat lock by an iron strap. [7] Both the Great Gate and its shelter are in good condition.

1 Robbins, John, Historic Structure Report, Architectural Data, Pawtucket Canal Guard Gates, Locks and Great Gate and Northern Canal Guard Gates and Lock (NPS: February, 1980), pg. 54.

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2 Shepley, Bulfinch, Richardson and Abbott, Lowell National Historical Park and Preservation District Cultural Resource Inventory, Lowell Canal System, (1979)

3 Ibid.

4 Ibid.

5 Ibid.

6 Ibid.

7 Ibid., pg. 16

Tremont Gate House/Tremont Yard

1. The Tremont Gate House is located at the point where the northern and western canals meet. It was built in 1855 to replace a temporary installation that had performed the same function since 1847[1]. The gate house shelters sluice gates which control the flow of water into the lower level of the Western Canal which in turn feeds the Lawrence Canal.

   This diminutive one-story building is of a rectangular plan. It rests on a granite ashlar foundation. The gate house's exterior walls are constructed of red brick laid in common bond. The pitched roof is covered with slate shingles. Chimneys are at the ridge near the east and west ends. Access to the guard house's interior is gained via the narrow round-arched doorway on the western facad

   Stylistically, the Tremont Gate House is a hybrid of the Italianate and Romanesque Revival styles. Its windows are inset and round arched. The cornice features brick dentils.

   Structurally, the Tremont Gate House is in good condition. The northern facade's wide round-arched doorways are boarded over. The slate shingles of the roof's southern slope are in need of replacement.

2. Tremont Yard is the site of the Tremont Mill complex which existed from 1831 until its demolition during the 1930s[2]. The western boundary of this rectangular parcel is Suffolk Street. To the east is Tremont Street. The southern boundary is adjacent to the Tremont Gate House and railroad tracks.

   Foundations of buildings which pre- and post-date the 1862[3] reconstruction of the Tremont Mill complex are still evident as are traces of three tail races which date from the late 1860s[4], the remains of a cloth shute, and the locations of hydrants from the mills' fire-fighting system.

   The Tremont Yard is presently framed on the east, north and west by the exterior walls of Mills No. 1, 9, 4 and 3 which have been reduced to a height of 5 to 6'.

   Mill No. 2 at the south end of the yard is also in ruins. Beneath the floor of Mill No. 2 are four Morgan-Smith 46" turbines for electric power which date from 1919-1924[5].

[1]Peter M. Molloy, editor. The Lower Merrimack River Valley. An Inventory of Historic Engineering and Industrial Sites sponsored by Merrimack Valley Textile Museum, North Andover, Mass. and Historic American Engineering Record. National Park Service, Washington, D. C. 1976. p. 76.

[2] Shepley, Bulfinch, Richardson and Abbott, Lowell National Historical Park and Preservation District, Cultural Resource Inventory, prepared for Division of Cultural Resources, North Atlantic Regional Office, National Park Service. see volume entitled "Industrial: Merrimack Manufacturing Company Site through Whipple's Mills and Wamesit Canal. Research Report: Suffolk Manufacturing Co." pp. 2 and 28.

[3]ibid. p. 14

[4]ibid. p. 24

[5]ibid. p. 28.

Wannalancit Textile Company (Suffolk Manufacturing Company)

Mill buildings formerly owned by the Suffolk Manufacturing Company occupy a large squa parcel within Lowell's northwestern industrial district. The Suffolk site is bounded by Hall Street to the north, Suffolk Street to the east, the Northern Canal to the south and Cabot Street to the west.

With the exception of the William J. Graham Company building (Suffolk Machine Shop) the eastern half of the Suffolk complex is owned by the Wannalancit Textile Company. This company leases the first floor of Mills No. 8 and 6 to the Lowell Museum.

To the west of Wannalancit property are Suffolk buildings which are presently controll by Stoney Brook Properties and Tewksbury Wood Products Company. These buildings include Mill No. 10 and its annex, Boiler House No. 2, and Building No. 12.

The Wannalancit buildings are grouped around a large rectangular open yard which is parallel to Suffolk Street. Entrance and egress to the Suffolk Yard is provided by a passage defined by the southern wall of the Counting House and Mill No. 8's northern wall. Mill No. 8 and Mill No. 6 frame the southeastern corner of the yard. Mill No. is parallel to the Northern Canal. The central portion of Mill No. 6's northern wall is abutted by Mill No. 5. Running from Mill No. 6 to Hall Street, Mill No. 5 forms the yard's western boundary. The former Suffolk Machine Shop and the Repair Shop portion of the Counting House enclose the yard's northeastern corner.

The mills surrounding the Suffolk Yard display a uniformity of plan, materials, and height. These rectangular red brick buildings rise to a height of five stories. Mill roofs are either flat or slightly pitched. Most of the Suffolk building stock dates from 1862-1900[1]. The two-story Counting House, however, was built prior to 1850[2]. Its flat, simply detailed facades show the influence of the Federal Style. The majority of Suffolk buildings exhibit a surface plasticity characteristic of the

Italianate style. Projecting from factory facades are brick segmental lintels and corbelled cornices. Particularly picturesque are the octagonal stair towers situated at the southeastern and northeastern corners of Mill No. 5. The towers' facades are ornamented with the curved forms of narrow round-arched openings and oculus windows inset in recessed eliptical panels. Below the cornice of the eastern facade of Mill No. 5's central pavillion are three granite pl[illegible] Placed at regular intervals, these plaques proclaim in raised lettering, "[illegible]31.... Suffolk Mills... Rebuilt 1862."

The Suffolk Complex has served as a manufacturing facility for almost one hundred and fifty years. The good condition of Suffolk Manufacturing Company buildings' exterior and interior fabric is probably attributable to the periodic maintenance which accompanies continuous occupancy.

[1]Shepley, Bulfinch, Richardson, and Abbott. Lowell National Historical Park and Preservation District Cultural Resource Inventory prepared for Division of Cultural Resources, North Atlantic Regional Office, Na[illegible] Park Service. See volume entitled Industrial: Merrimack Manufacturing Company [illegible]hrough Whipples Mills and Wameset Canal." Suffolk Mfg. Co. 1979 Research Report" pp. 14-29.

[2]Cornelia E. Wyma and Paul C. Cloyd, Historic Structures Report Wannalancit Textile Company, Lowell National Historical Park 1979. n.p. See Existing Conditions chapter-raises questions about traditional 1831 dates for the Counting House.

Dutton Street Parking Lot

The Dutton Street Parking Lot is a roughly trapezoidal parcel situated to the southeast of the Market and Dutton Streets intersection. The northern boundary of this asphalt-paved parking facility is in line with the southern wall of two brick additions which project from Bigelow Lowell Building #1. Its eastern and southern boundaries are demarcated by a chain link fence which separates the lot from Pandel Bradford and Pellon Corporation property. The eastern boundary is parallel to the Merrimack Canal. A ten-foot-wide strip of Locks and Canals land is situated between the Dutton Street Parking Lot and the Merrimack Canal

Entrance and egress to the lot is provided via a road which leads from Dutton Street into the southwestern portion of this site. To the immediate north of this entrance is a portion of the Lowell Machine Shop offices' western wall.

This parking lot site and adjacent areas were covered by Lowell Machine Shop and Lowell Manufacturing Company buildings, Canal Components, and railroad tracks. The lot was paved with asphalt sometime after the 1930s[1]. Accompanying this description are maps which show the locations of these earlier structures and features.

[1]Shepley, Bulfinch, Richardson and Abbott, Lowell National Historical Park and Preservation District Cultural Resource Inventory. Industrial: Lowell Machine Shop Site through Massic Falls Industrial Site. Lowell Machine Shop Research Report pg. 6.

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Merrimack Gate House

The Merrimack Gatehouse is a significant element of the district because it possesses a high degree of structural integrity. The exterior of the structure as well as the interior with its three original gates has changed only slightly since the mid-nineteenth century.

Despite its rather diminutive scale, the Merrimack Gate House occupies a commanding position in the downtown streetscape. The effects of its canal-side site is maximized through considerable length compared to width and its crisp detailing (including locally unusual use of Flemish bond brickwork).

Francis Gate Complex

The Francis Gate Complex is a key component of the Lowell Power Canal System. Since the mid-nineteenth century it has functioned as a power, navigation and flood control facility on the Pawtucket Canal. It is significant that a high percentage of its original structural and mechanical fabric dating from 1848-1881 is still extant.[1]

The Francis Gate Complex has important historical associations with James B. Francis. Francis was chief engineer and agent of the Proprietors of the Locks and Canals from 1834-1885. He designed the Francis Gate Complex's most famous feature, the Francis or Great Gate. Initially dubbed Francis' Folly upon its completion in 1850, the Great Gate saved the heart of the city from the great floods of 1852 and 1936[2].

Francis gained international recognition for his improvement of water turbine design and the publication of Lowell Hydraulic Experiments (1855)[3]. He might well be called "the Father of American Hydraulic Engineering."

The Francis Gate Complex was the last major hydraulic engineering project completed in Lowell during the Ante-bellum era.

[1]Merrimack Valley Textile Museum and Historic American Engineering Record. The Lower Merrimack River Valley, an Inventory of Historic Engineering and Industrial Sites. p. 1976.

[2]Shepley, Bulfinch, Richardson and Abbott. Lowell National Historical Park and Preservation District Cultural Resources Inventory. prepared for Division of Cultural Resources North Atlantic Regional Office, National Park Service. Industrial Lowell Canal System Volume . n.p. Pawtucket Canal North of Broadway.

[3]Arthur L. Eno, Jr. ed. Cotton was King, a History of Lowell, Massachusetts. p. 219 New Hampshire Publishing Company 1976.

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Tremont Gate House/Tremont Yard

1. The Tremont Gate House, built in 1855[1], is significant as a Lowell Power Canal System component which retains most of its mid-nineteenth century structural and mechanical fabric. The sluice gates' original manually operated rack and pinion equipment is sheltered within the gate house[1].

   Despite its diminutive scale, the Tremont Gate House occupies a commanding position on the southern perimeter of Lowell's northwestern industrial district. Its ivy-covered red brick southern wall, pierced by narrow round-arched openings, picturesquely presides over the Western Canal's northern terminus.

2. Construction of the Tremont Mill buildings was begun in 1832[3]. During the 1860s, however, this complex was dismantled and the Tremont Mills were rebuilt[4]. The final phase of building on the Tremont site occurred in the 1890s[5]. The Tremont Millyard was demolished between 1929 and 1933[6]. The significance of this site is its potential for yielding significant information. It could be developed as an interpreted industrial archeological site.

   The razed Tremont Yard is a perfect foil for the largely intact Suffolk Yard as its original configuration was essentially the mirror image of the adjacent Suffolk Complex. The Tremont site affords the opportunity to view features of a hydropower system (e.g. turbines and tail races) which were originally located underground. A similarly disposed and equipped hydropower system exists beneath the Suffolk millyard.

[1]Peter M. Molloy, editor. The Lower Merrimack River Valley, an Inventory of Historic Engineering and Industrial Sites. sponsored by the Merrimack Valley Textile Museum and Historic American Engineering Record. 1976. p. 77.

[2]ibid. p. 77

[3]Shepley, Bulfinch, Richardson and Abbott. Lowell National Historical Park and Preservation District Cultural Resources Inventory. prepared for Division of Cultural Resources North Atlantic Regional Office, National Park Service. see volume-Industrial Merrimack Manufacturing Co. Site through Whipple Mill and Wamesit Canal. Research Report: Suffolk Manufacturing Co. p. 5.

[4]ibid. p. 16.

[5]ibid. p. 27.

[6]ibid. p. 28.

Wannalancit Textile Co. (Suffolk Mfg. Co.)

From 1831 until 1926[1] the buildings currently occupied by the Wannalancit Textile Company were known as the Suffolk Mills. The Suffolk Manufacturing Company was incorporated in 1831[2]. Mill building construction began in the spring of 1832[3]. During the 1860s[4] the Suffolk and Tremont Yards were the scene of an ambitious rebuild campaign. The modernized mills merged in 1872[5]. Sold to the Nashua Manufacturing Company in 1926, the Suffolk Complex survived the 1930s essentially intact[6]. Edward A. Lartner, Jr., owner and president of the Wannalancit Mills has controlled most of the Suffolk Millyard since 1950[7].

The Suffolk Complex is an important survivor of the initial phase of the American Industrial Revolution. It is the only Lowell mill still engaged in the manufacturing of textiles. Virtually every stage of the Suffolk Millyard's development is presently represented by buildings dating from 1831-1915[8]. The Suffolk Mills have significant historical associations with prominent nineteenth-century Boston and Lowell business leaders. Its founders included "Proper Bostonians" such as Amos and Abbott Lawrence, Samuel and William Appleton, Henry Cabot and George W. Lyman.[9] Local patent medicine tycoon James C. Ayer directed the Suffolk and Tremont's merger in 1872[10].

[1]Shepley, Bulfinch, Richardson and Abbott. Lowell National Historical Park and Preservation District Cultural Resource Inventory. prepared for Division of Cultural Resources, North Atlantic Regional Office, National Park Service. see volume entitled Industrial: Merrimack Manufacturing Company Site through Whipples Mills and Wamesit Canal. Suffolk Mfg. Co. Research Report pgs. 2-28.

[2]ibid. pg. 2.

[3]ibid. pg. 2.

[4]ibid. pg. 14-25.

[5]ibid. pg. 25

[6]ibid. pp. 28-31

[7]ibid. p. 29

[8]ibid. pp. 2, 28.

[9]ibid. p.2.

[10]ibid. p. 25.

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The Dutton Street Parking Lot

The Dutton Street Parking Lot has a high potential for yielding subsurface archeological remains. From the 1820s until the 1930s[1], Lowell Machine Shop and Lowell Manufacturing Company buildings covered portions of this site. Presumably the foundations of machine shops, storehouses, and offices exist below ground. An understanding of 19th and early 20th century onsite activities would be fostered by the recovery of mechanical apparatus, tools and other artifact deposits associated with social and industrial activities.

This asphalt-paved parcel overlies, as well, components of the Lowell Power Canal System. No longer visible are the Lowell Canal, three penstocks and a rectangular "basin." The Lowell Canal, laid out in 1828[2], is covered for its entire 500' length. It was filled in during the 1930s[3]. Three penstocks lie beneath the central and southern portion of this lot.

Immediately to the southeast of the junction of the Merrimack and Lowell Canals was a rectangular body of water labeled "basin" on an 1828 Lowell Manufacturing Company plan[4]. A raceway lead from the basin to a sawmill. The sawmill was situated to the east of the present lot. The basin is of particular interest because it was aligned with a semicircular basin to the west of Dutton Street which was apparently designed for purely decorative purposes[5]. All of these canal features are significant remnants of the important Lowell industrial power system which was one of the most elaborate and sophisticated ever developed. In addition to being the physical remains of this historically important sytem, their configuration and characteristics probably contain important information about the construction, modification and maintenance of the canal system.

[1]Shepley, Bulfinch, Richardson and Abbott. Lowell National Historical Park and Preservation District Cultural Resource Inventory. Inventory Forms and Research Reports. Industrial: Lowell Machine Shop site through Massic Falls Industrial site. Lowell Machine Shop research report pp. 1-8. Lowell Manufacturing Co. research report pp. 1-19.

[2]ibid, Industrial: Lowell Canal Systeml Lowell Canal System Research Report. p. 6.

[3]ibid, p. 7.

[4]ibid. Industrial: Lowell Machine Shop site through Massic Falls Industrial site. Lowell Manufacturing Company Research Report Fig. 2.

[5]ibid. Lowell Machine Shop Research Report Figure 3A.

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the Lowell Hydroelectric Project (FERC No. 2790) (Project), with principal Project facilities located along the Merrimack River in Middlesex County, Massachusetts and a reservoir extending upstream to Hillsborough County, New Hampshire (see attached map). Boott, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the existing Project. Accordingly, Boott is preparing a Pre-Application Document (PAD) that will provide FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project that will be used to prepare documents related to analyzing the relicensing application to be prepared by Boott. To prepare the PAD, Boott will use information in its possession and information obtained from additional sources. This PAD Information Questionnaire will be used by Boott to help identify sources of existing, relevant, and reasonably available information that are not currently in Boott's possession.

1. Information about person completing the questionnaire:

Name & Title	Robert Kubit, Environmental Engineer
Organization	MA Department of Environmental Protection Central Regional Office
Address	8 New Bond St, Worcester MA 01606
Phone	508 767 2854
Email Address	robert.kubit@state.ma.us

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

✓ Yes (*If yes, please complete 2a through 2c)* __ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

✓ Yes __ No

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	Robert Kubit
Address	MA Dept. Environmental Protection Central Regional Office 8 New Bond St Worcester MA 01606
Phone	508 767 2854
Email Address	robert.kubit@state.ma.us

Additional Representative Contact Information (Optional)

Name	
Address	
Phone	
Email Address	

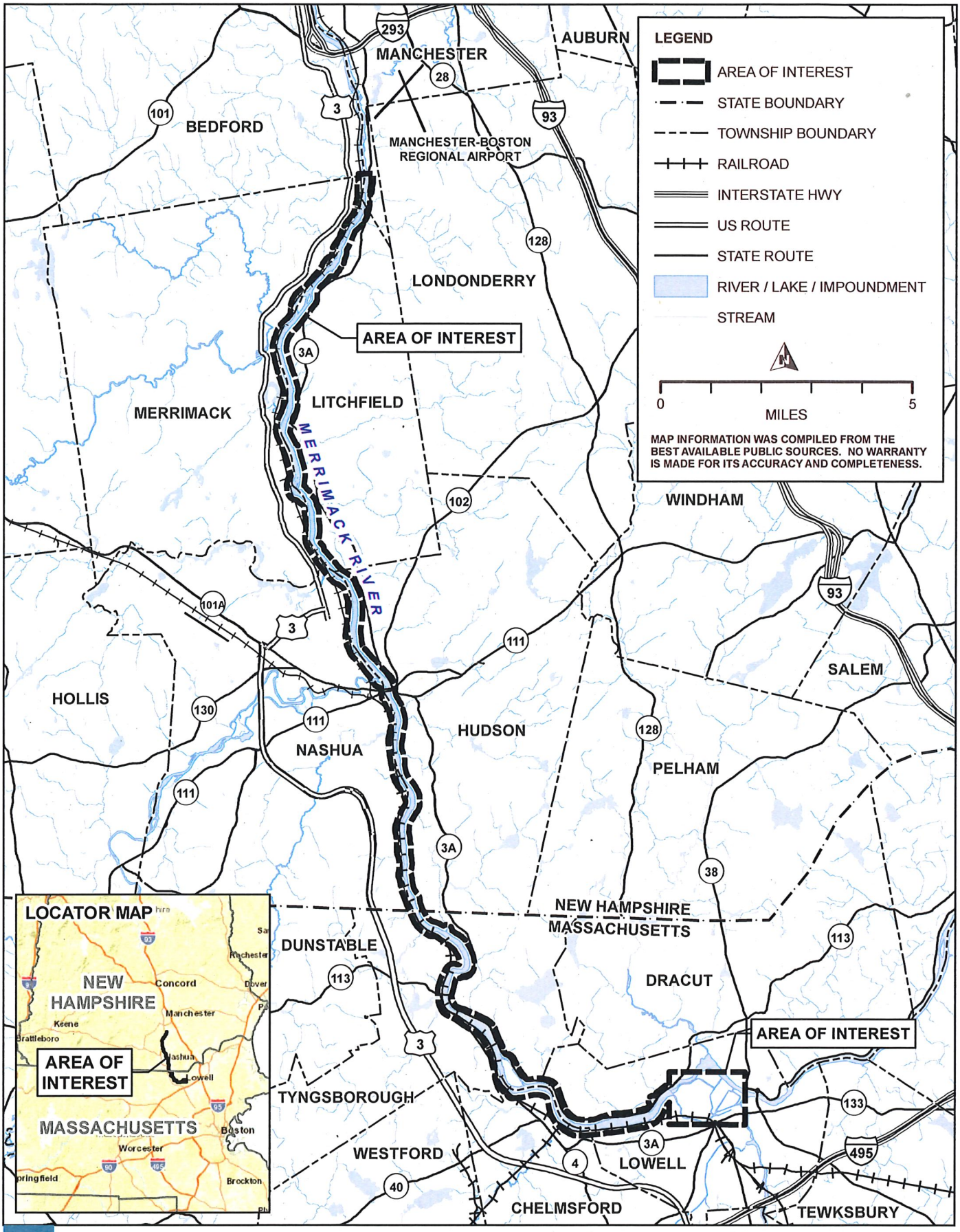
Additional Information (additional space provided on the following page):

Comments and/or questions may be sent via email to:

Jim Gibson, HDR, at Jim.Gibson@hdrinc.com or
Rob Quiggle, HDR, at Robert.Quiggle@hdrinc.com

If you have any questions about the Project, or the upcoming FERC licensing processes, please contact Mr. Kevin Webb, Enel Relicensing Manager for the Lowell Hydroelectric Project, at (978) 681-1900 ext. 809 or Kevin.Webb@enel.com; Jim Gibson at (315) 414-2202; or Rob Quiggle at (315) 414-2216.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 21 days of receipt to allow for any follow-up contact that may be necessary by a representative from Boott or HDR. Not responding within 21 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.



LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790
BOOTT HYDRO, LLC.

Scida, Rebecca

From: MacVane, Kelly
Sent: Friday, April 06, 2018 11:45 AM
To: Scida, Rebecca
Cc: Gibson, Jim; Quiggle, Robert
Subject: FW: Request for Integrated Report or Assessment Report
Attachments: 20180406114453026.pdf

Hi Becky-

Can you please add this response to the log? Also please PDF the email and attach to the PAD response.

Thanks,
Kelly

Kelly MacVane
D 207-239-3828 **M** 207-775-4495

hdrinc.com/follow-us

From: Gibson, Jim
Sent: Friday, April 6, 2018 11:41 AM
To: MacVane, Kelly <Kelly.MacVane@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: FW: Request for Integrated Report or Assessment Report

Note the links at the bottom of the email

Jim Gibson, MPA, MSES
Vice President

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2202 **M** 315.415.2729
jim.gibson@hdrinc.com

hdrinc.com/follow-us

From: Kubit, Robert (DEP) [mailto:robert.kubit@state.ma.us]
Sent: Friday, April 6, 2018 11:39 AM
To: Gibson, Jim <Jim.Gibson@hdrinc.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: FW: Request for Integrated Report or Assessment Report

Gentlemen,

The attachment and information below provides the information you need from the MA Department of Environmental Protection.

Thanks.

Bob

Robert Kubit, P.E.
MassDEP
Division of Watershed Management
8 New Bond Street
Worcester MA 01606
Telephone: (508) 767-2854
Email: robert.kubit@state.ma.us
Fax: (508) 791-4131

From: Kennedy, Laurie (DEP)
Sent: Thursday, April 05, 2018 2:31 PM
To: Kubit, Robert (DEP)
Subject: RE: Request for Integrated Report or Assessment Report

Hi Bob,
Here is the link to the Merrimack River water quality assessment reports:
https://www.mass.gov/lists/water-quality-assessment-reports-merrimack-through-weymouth-weir-watersheds

Here is the link to the Interactive Mapping of the Integrated List of Waters
http://www.mass.gov/eea/agencies/massdep/water/watersheds/integrated-list-of-waters.html

Here is the link to the 2014 Integrated List of Waters
http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf

Link to MassDEP 1994-2014 Water Quality Monitoring Stations and to the data
https://docs.digital.mass.gov/dataset/massgis-data-massdep-1994-2014-water-quality-monitoring-stations
https://www.mass.gov/guides/water-quality-monitoring-program-data

Hope this helps!
Laurie

From: Kubit, Robert (DEP)
Sent: Thursday, April 05, 2018 12:30 PM
To: Kennedy, Laurie (DEP)
Subject: Request for Integrated Report or Assessment Report

Hi Laurie,

If you could provide public links to the Integrated/Assessment Reports for the Merrimack River Watershed, I will be able to fulfill a public record request.

Thank you.

Bob

Robert Kubit, P.E.
MassDEP
Division of Watershed Management
8 New Bond Street
Worcester MA 01606

Telephone: (508) 767-2854
Email: robert.kubit@state.ma.us
Fax: (508) 791-4131

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

Jack Buckley, *Director*

April 18, 2018

Kelly MacVane
HDR Engineering, Inc
970 Baxter Boulevard, Suite 301
Portland ME 04103

RE: Project Location: Lowell Hydroelectric Project, Merrimack River
Town: LOWELL
NHESP Tracking No.: 07-21482

To Whom It May Concern:

Thank you for contacting the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for information regarding state-listed rare species in the vicinity of the above referenced site. Based on the information provided, this project site, or a portion thereof, is located **within** *Priority Habitat 1987* (PH 1987) and *Estimated Habitat 1320* (EH 1320) as indicated in the *Massachusetts Natural Heritage Atlas* (14th Edition). Our database indicates that the following state-listed rare species have been found in the vicinity of the site:

Scientific name	Common Name	Taxonomic Group	State Status
Haliaeetus leucocephalus	Bald Eagle	Bird	Threatened
Stylurus amnicola	Riverine Clubtail	Dragonfly	Endangered

The species listed above are protected under the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (WPA) (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.00). Fact sheets for most state-listed rare species can be found on our website (www.mass.gov/nhesp).

Please note that projects and activities located within Priority and/or Estimated Habitat **must** be reviewed by the Division for compliance with the state-listed rare species protection provisions of MESA (321 CMR 10.00) and/or the WPA (310 CMR 10.00).

Wetlands Protection Act (WPA)
If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the Division so that it is received at the same time as the local conservation commission. If the Division determines that the proposed project will adversely affect the actual Resource Area habitat of state-protected wildlife, then the proposed project may not be permitted (310 CMR 10.37, 10.58(4)(b) & 10.59). In such a case, the project proponent may request a consultation with the Division to discuss potential project design modifications that would avoid adverse effects to rare wildlife habitat.

A streamlined joint MESA/WPA review process is available. When filing a Notice of Intent (NOI), the applicant may file concurrently under the MESA on the same NOI form and qualify for a 30-day streamlined joint review. For a copy of the NOI form, please visit the MA Department of Environmental Protection's website: http://www.mass.gov/eea/agencies/massdep/service/approvals/wpa-form-3.html.

MA Endangered Species Act (MESA)

If the proposed project is located within Priority Habitat and is not exempt from review (see 321 CMR 10.14), then project plans, a fee, and other required materials must be sent to Natural Heritage Regulatory Review to determine whether a probable Take under the MA Endangered Species Act would occur (321 CMR 10.18). Please note that all proposed and anticipated development must be disclosed, as MESA does not allow project segmentation (321 CMR 10.16). For a MESA filing checklist and additional information please see our website: www.mass.gov/dfw/nhesp/regulatory-review.

We recommend that rare species habitat concerns be addressed during the project design phase prior to submission of a formal MESA filing, as avoidance and minimization of impacts to rare species and their habitats is likely to expedite endangered species regulatory review.

This evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. If the purpose of your inquiry is to generate a species list to fulfill the federal Endangered Species Act (16 U.S.C. 1531 et seq.) information requirements for a permit, proposal, or authorization of any kind from a federal agency, we recommend that you contact the National Marine Fisheries Service at (978)281-9328 and use the U.S. Fish and Wildlife Service's Information for Planning and Conservation website (https://ecos.fws.gov/ipac). If you have any questions regarding this letter please contact Emily Holt, Endangered Species Review Assistant, at (508) 389-6385.

Sincerely,

Thomas W. French, Ph.D.
Assistant Director

Scott, Kelsey

From: Cheeseman, Melany (FWE) <melany.cheeseman@state.ma.us>
Sent: Wednesday, April 18, 2018 3:22 PM
To: MacVane, Kelly
Subject: MESA Info Request, Lowell Hydroelectric Project. NHESP 07-21482.
Attachments: Lowell_07-21482.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Kelly,

We received the Information Request form and fee (check #905, $50) for the Lowell Hydroelectric project. Please see the attached letter. The rare species Priority/Estimated habitat mapping is only in a portion of the project site. This area extends from just south of the New Hampshire border on the northern end to just south of the Greater Lowell Technical High School on the southern end. The priority habitat polygon can be viewed on our interactive map viewer : https://www.mass.gov/service-details/regulatory-maps-priority-estimated-habitats
Let me know if you have any questions.

Thank you,

Melany Cheeseman
Endangered Species Review Assistant
Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
1 Rabbit Hill Road, Westborough, MA 01581
ph: 508.389.6357 | fax: 508.389.7890
melany.cheeseman@state.ma.us | www.mass.gov/nhesp

Scott, Kelsey

From: Lamb, Amy <Amy.Lamb@dncr.nh.gov>
Sent: Monday, April 16, 2018 4:16 PM
To: MacVane, Kelly
Cc: Tuttle, Kim
Subject: NHB review: NHB18-1178
Attachments: NHB18-1178_MacVane.pdf

Attached, please find the review we have completed. If your review memo includes potential impacts to plants or natural communities please contact me for further information. If your project had potential impacts to wildlife, please contact NH Fish and Game at the phone number listed on the review.

Best,
Amy

Amy Lamb
Ecological Information Specialist

NH Natural Heritage Bureau
DNCR - Forests & Lands
172 Pembroke Rd
Concord, NH 03301
603-271-2834

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

To: Kelly MacVane, HDR Engineering, Inc.
970 Baxter Boulevard
Portland, ME 04103

From: Amy Lamb, NH Natural Heritage Bureau
Date: 4/16/2018 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB18-1178 Town: Bedford, Merrimack, Litchfield, Nashua, Hudson Location: Merrimack River from Lowell, MA to Bedford, NH

Description: On behalf of Boott Hydropower, LLC (Boott), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Lowell Hydroelectric Project (FERC No. 2790) (Project). In support of this process, HDR is requesting information regarding the following within the Project area:
- State-listed threatened or endangered species;
- Species proposed for listing as threatened or endangered, or species of concern;
- Designated or proposed critical habitat; and
- Candidate species.

The Lowell Hydroelectric Project is located on the Merrimack River in in Middlesex County, Massachusetts, and an impoundment extending upstream to Hillsborough County, New Hampshire.

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments: This site is within an area flagged for possible impacts on the state-listed *Alasmidonta varicosa* (brook floater) in the Merrimack River

Invertebrate Species	**State[1]**	**Federal**	**Notes**
Brook Floater (*Alasmidonta varicosa*)	E	--	Contact the NH Fish & Game Dept (see below).

Natural Community	**State[1]**	**Federal**	**Notes**
Hemlock forest*	--	--	Threats include logging, introduction of invasive species, and direct destruction due to development.
High-gradient rocky riverbank system	--	--	Threats are primarily changes to the hydrology of the river, land conversion and fragmentation, introduction of invasive species, and increased input of nutrients and pollutants.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

Plant species	State[1]	Federal	Notes
arrow-head rattlebox (*Crotalaria sagittalis*)*	E	--	
bird-foot violet (*Viola pedata var. pedata*)	T	--	This species occurs in sandplains, disturbed openings, dry forests, and thin woods. Threats would include direct destruction of the plants or major alterations in their habitat.
clasping milkweed (*Asclepias amplexicaulis*)*	T	--	This species grows in sandplains and disturbed openings, and is sensitive to disturbances that eliminate its habitat.
dry land sedge (*Carex siccata*)*	E	--	Threats to this species are mainly loss of habitat.
long-spined sandbur (*Cenchrus longispinus*)*	E	--	This species grows in sandplains and disturbed openings, and is sensitive to disturbances that eliminate its habitat.
red-footed spikesedge (*Eleocharis erythropoda*)*	E	--	This wetland species, which occurs in bogs/fens/seeps, and marshes, would be threatened by changes to local hydrology, including increased nutrient input from stormwater runoff, and sedimentation from nearby disturbance.
river birch (*Betula nigra*)	T	--	The population could be deleteriously affected by any project activities that alter the hydrology of its habitat, by increased sedimentation, and by increased nutrients/pollutants in stormwater runoff.
unpretentious yellow-seeded false pimpernel (*Lindernia dubia var. anagallidea*)*	E	--	The pond shore habitat that supports this species can only withstand a limited amount of human disturbance. Trampling, removal, and burying of vegetation are all destructive and can also result in the introduction of non-native invasive species. Dams that reduce natural fluctuations in water level threaten the long-term survival of this habitat, e.g., by allowing woody shrubs and other more competitive vegetation to become established. Another threat is the contamination of water quality by road and agricultural runoff.
wild lupine (*Lupinus perennis ssp. perennis*)	T	--	This wildflower grows in extremely dry, sandy openings and is easily identified in the field (see any wildflower guide) between early May and August. It is tolerant of surrounding disturbance and depends upon periodic mowing (or, historically, wildfire) to eliminate trees that would otherwise shade it out. It does not transplant well due to a tap root that can be more than three feet long.
Wright's spikesedge (*Eleocharis diandra*)	E	--	Primarily vulnerable to changes to the hydrology of its wetland habitat, especially alterations that change water levels. It may also be susceptible to increased pollutants and nutrients carried in stormwater runoff.

Vertebrate species	State[1]	Federal	Notes

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

American Eel (*Anguilla rostrata*)	SC	--	Contact the NH Fish & Game Dept (see below).
Bald Eagle (*Haliaeetus leucocephalus*)	SC	--	Contact the NH Fish & Game Dept (see below).
Banded Sunfish (*Enneacanthus obesus*)	SC	--	Contact the NH Fish & Game Dept (see below).
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (*Heterodon platirhinos*)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Meadowlark (*Sturnella magna*)	T	--	Contact the NH Fish & Game Dept (see below).
Grasshopper Sparrow (*Ammodramus savannarum*)	T	--	Contact the NH Fish & Game Dept (see below).
New England Cottontail (*Sylvilagus transitionalis*)	E	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (*Coluber constrictor constrictor*)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Leopard Frog (*Lithobates pipiens*)	SC	--	Contact the NH Fish & Game Dept (see below).
Peregrine Falcon (*Falco peregrinus anatum*)	T	--	Contact the NH Fish & Game Dept (see below).
Redfin Pickerel (*Esox americanus americanus*)	SC	--	Contact the NH Fish & Game Dept (see below).
Sea Lamprey (*Petromyzon marinus*)	SC	--	Contact the NH Fish & Game Dept (see below).
Smooth Green Snake (*Opheodrys vernalis*)	SC	--	Contact the NH Fish & Game Dept (see below).
Sora (*Porzana carolina*)	SC	--	Contact the NH Fish & Game Dept (see below).
Spotted Turtle (*Clemmys guttata*)	T	--	Contact the NH Fish & Game Dept (see below).
Vesper Sparrow (*Pooecetes gramineus*)	SC	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, “SC” = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

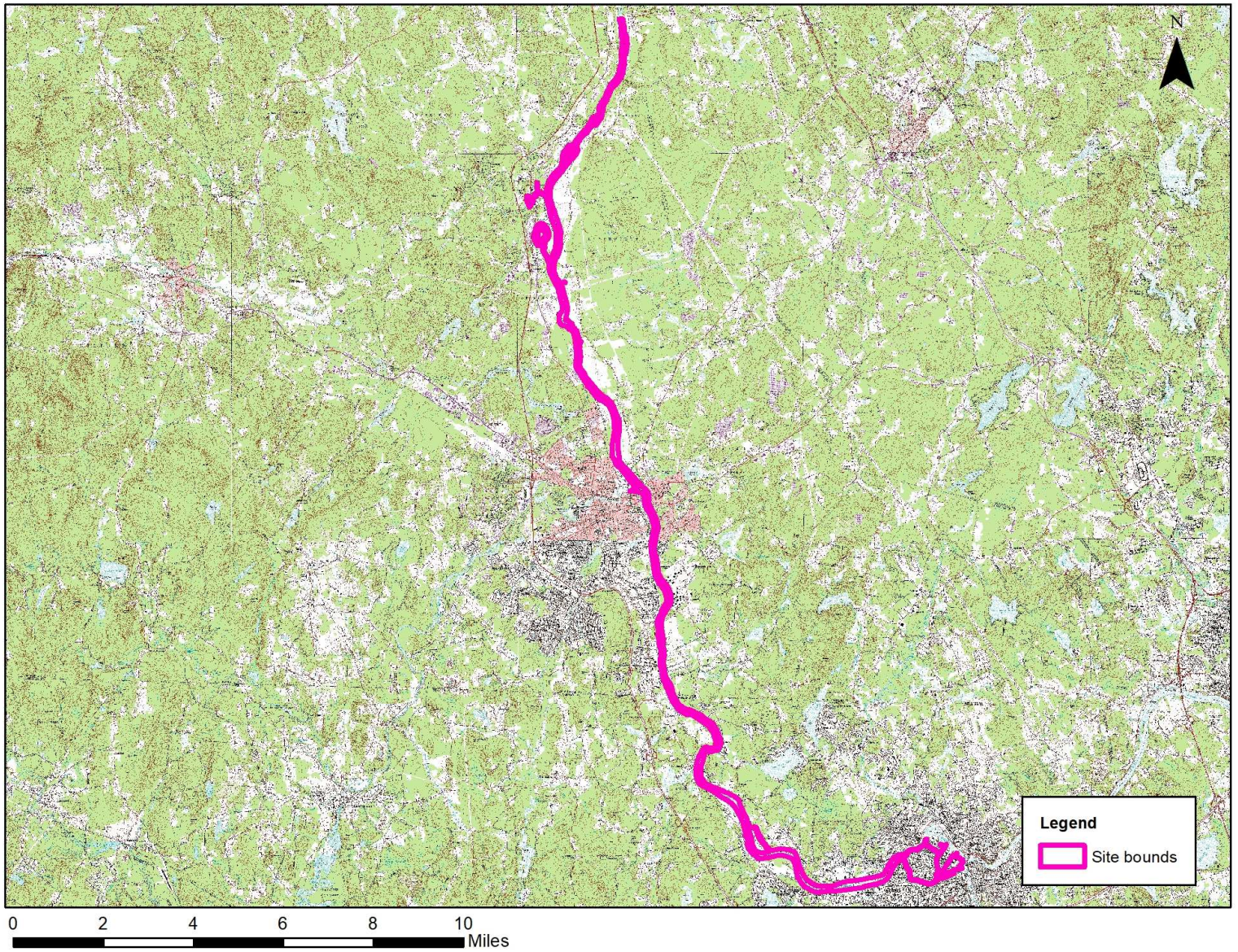
Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

NHB18-1178



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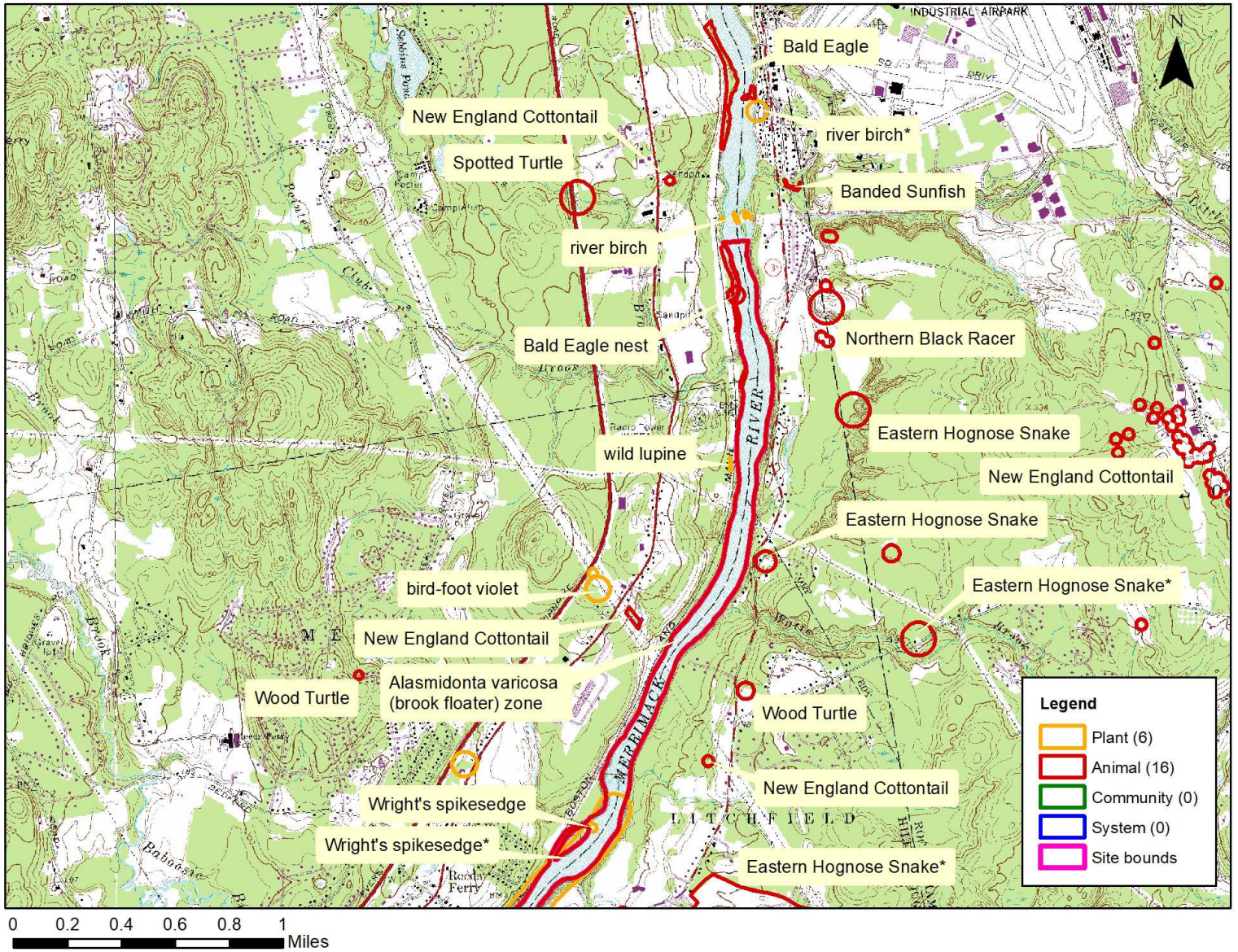
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New England Cottontail
river birch*
Spotted Turtle
Banded Sunfish
river birch
Northern Black Racer
Bald Eagle nest
Eastern Hognose Snake
wild lupine
New England Cottontail
Eastern Hognose Snake
bird-foot violet
Eastern Hognose Snake*
New England Cottontail
Alasmidonta varicosa
(brook floater) zone
Wood Turtle
Wood Turtle
New England Cottontail
Wright's spikesedge
Wright's spikesedge*
Eastern Hognose Snake*
MERRIMACK RIVER
LITCHFIELD
INDUSTRIAL AIRPARK
N
Legend
Plant (6)
Animal (16)
Community (0)
System (0)
Site bounds
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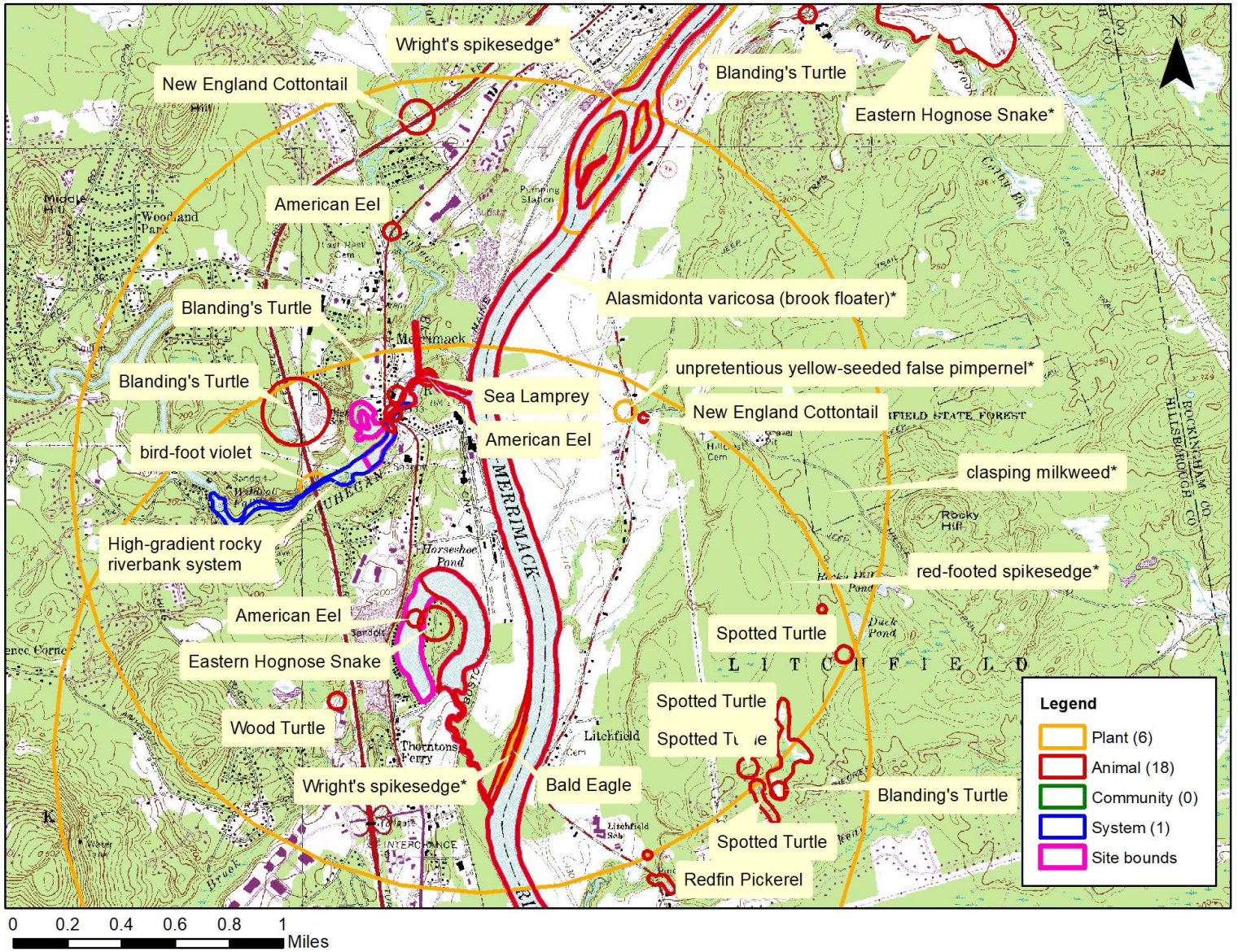
Miles

NHB18-1178


Wright's spikesedge*
New England Cottontail
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Eastern Hognose Snake*
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Alasmidonta varicosa (brook floater)*
Blanding's Turtle
unpretentious yellow-seeded false pimpernel*
Blanding's Turtle
Sea Lamprey
New England Cottontail
American Eel
bird-foot violet
clasping milkweed*
High-gradient rocky riverbank system
red-footed spikesedge*
American Eel
Spotted Turtle
Eastern Hognose Snake
Spotted Turtle
Wood Turtle
Spotted Turtle
Wright's spikesedge*
Bald Eagle
Blanding's Turtle
Spotted Turtle
Redfin Pickerel
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Site bounds
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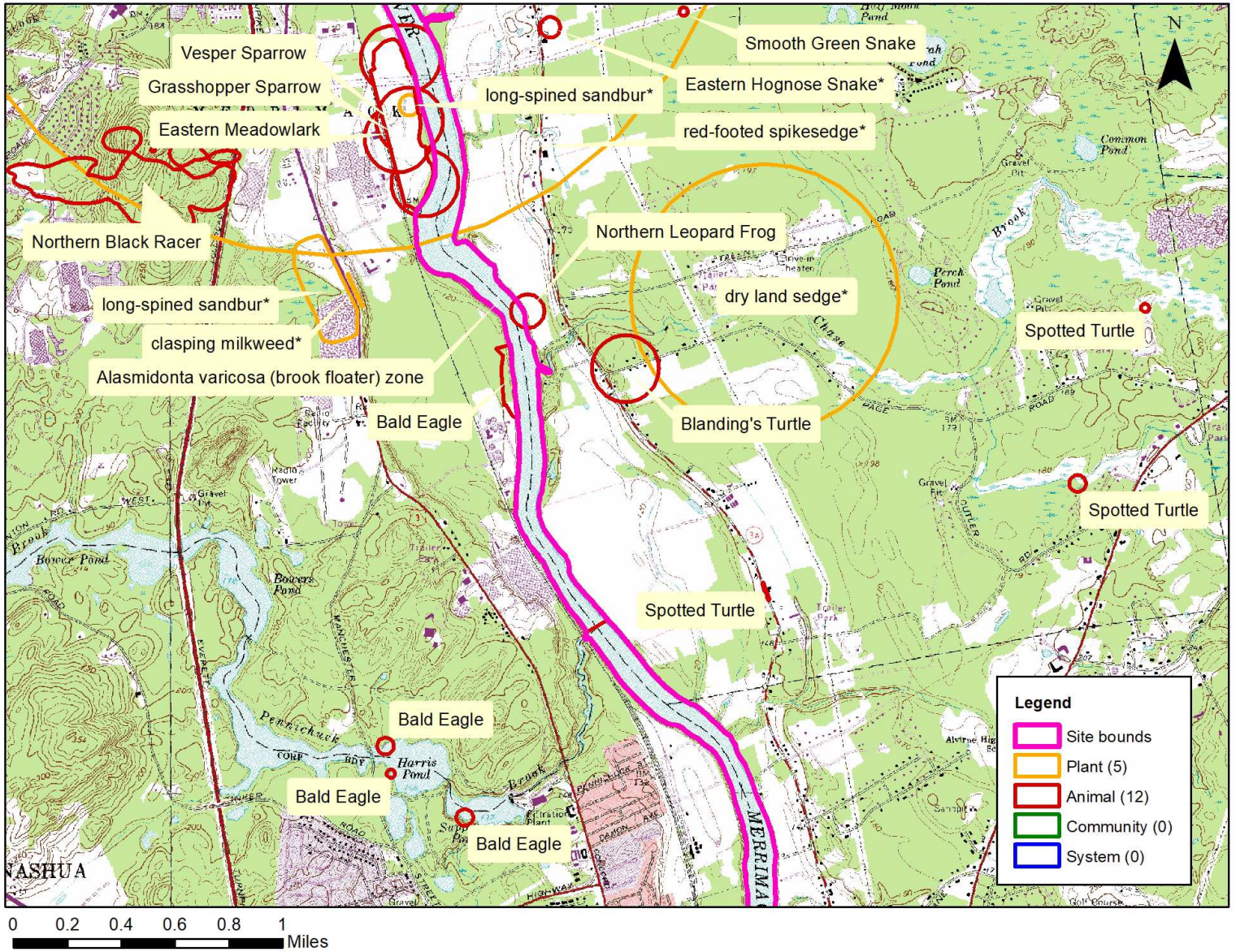
NHB18-1178


Vesper Sparrow
Grasshopper Sparrow
Eastern Meadowlark
Northern Black Racer
long-spined sandbur*
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Alasmidonta varicosa (brook floater) zone
Bald Eagle
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Northern Leopard Frog
dry land sedge*
Blanding's Turtle
Spotted Turtle
Spotted Turtle
Spotted Turtle
N
Legend
Site bounds
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Animal (12)
Community (0)
System (0)
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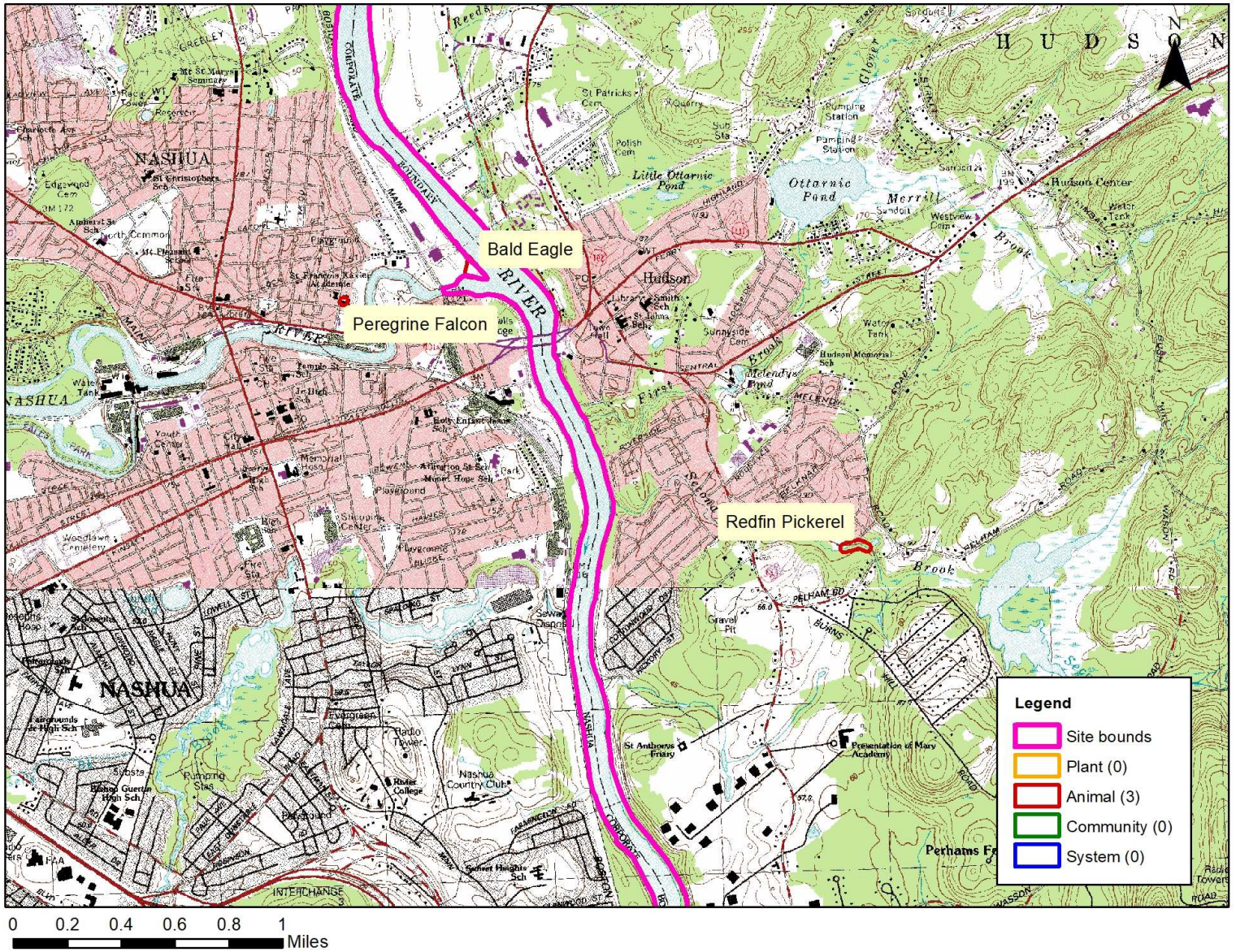
Miles

NHB18-1178


Bald Eagle
Peregrine Falcon
Redfin Pickerel
NASHUA
HUDSON
Legend
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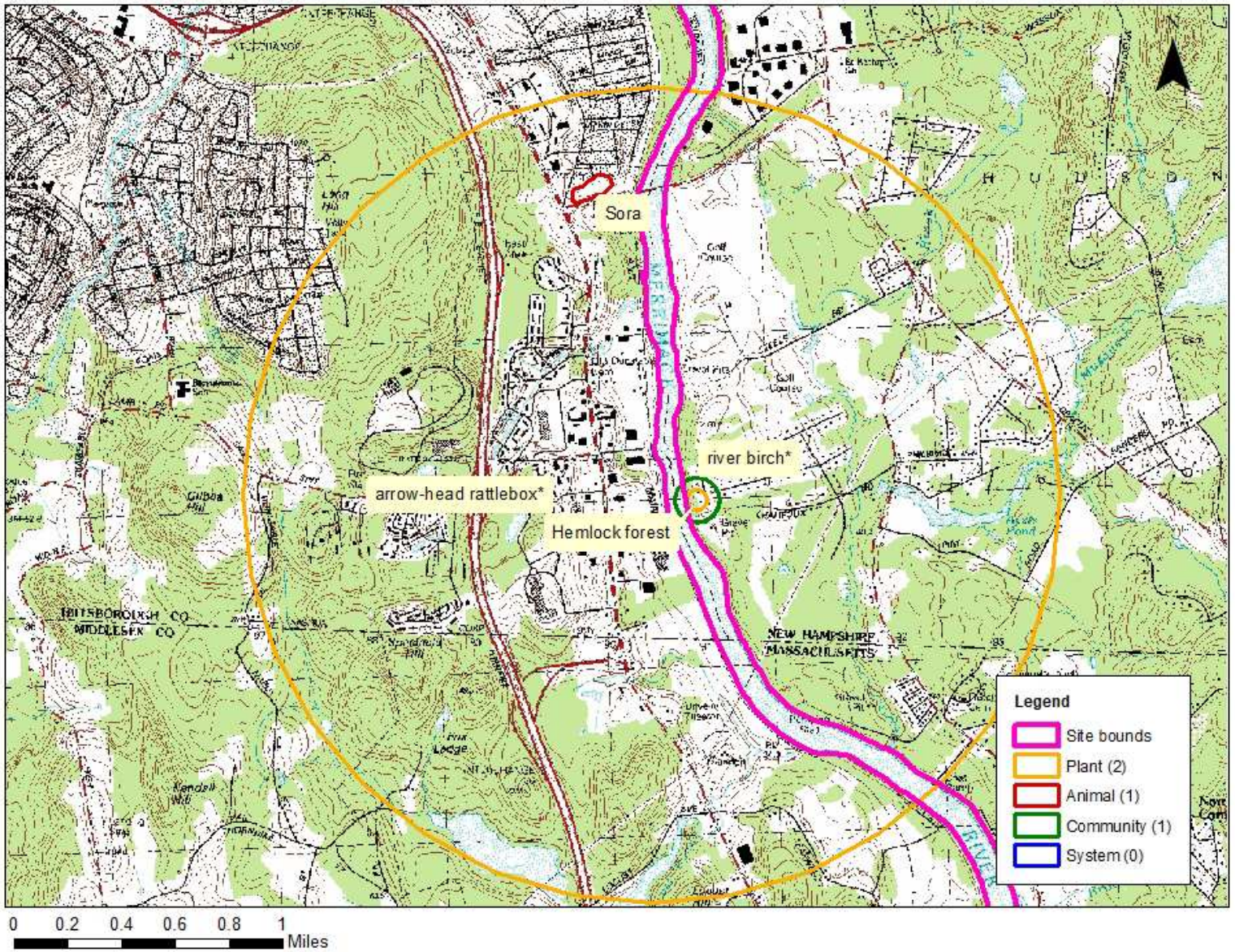
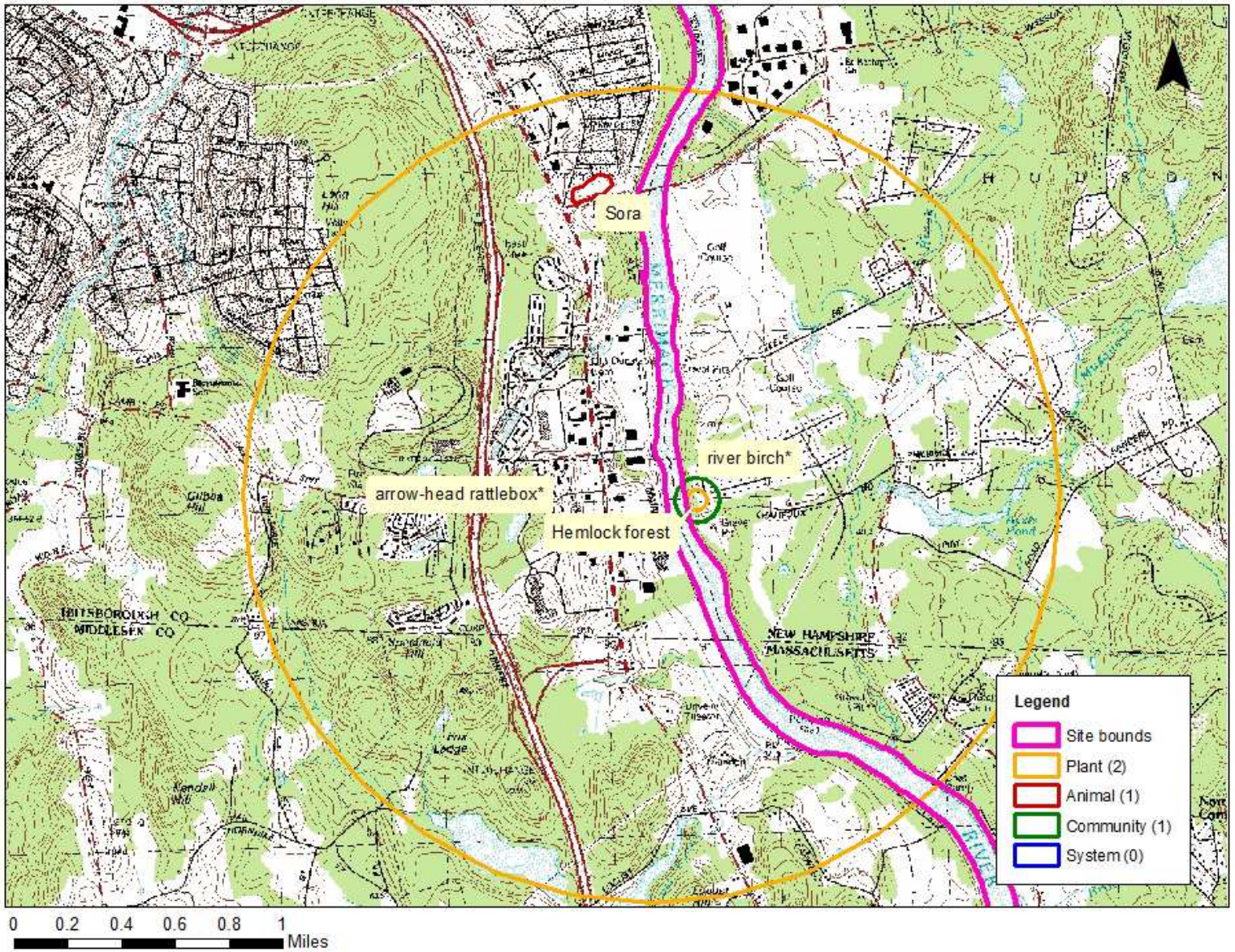
Animal (3)
Community (0)
System (0)
0 0.2 0.4 0.6 0.8 1
Miles

NHB18-1178


Sora
river birch*
arrow-head rattlebox*
Hemlock forest
HILLSBOROUGH CO
MIDDLESEX CO
NEW HAMPSHIRE
MASSACHUSETTS
Legend
Site bounds
Plant (2)
Animal (1)
Community (1)
System (0)
0 0.2 0.4 0.6 0.8 1
Miles

NHB18-1178


Sora
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Legend
Site bounds
Plant (2)
Animal (1)
Community (1)
System (0)
0 0.2 0.4 0.6 0.8 1
Miles

New Hampshire Natural Heritage Bureau - Community Record

Hemlock forest

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Not ranked (need more information)
State:	Not listed	State:	Apparently secure but with cause for concern

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank: Small, formerly cut over

Detailed Description: 1985: Small area of steep bank with *Thuja* and *Tsuga* dominant. Similar to a disjunct occurrence of *Thuja* on Cape Cod, MA. Both sites with steep western exposure, dense *Tsuga* and access to constant light source from adjacent opening.
General Area: 1985: Steep forested riverbluff above Merrimack River with unusual occurrence of *Thuja*.
General Comments: Lack of escaped *Thuja* in acidic soils of SNE also supports native probability.
Management Comments:

Location

Survey Site Name: Riverbluff West of Chalifoux Road
Managed By: Hi-Tension Realty Corp.

County: Hillsborough
Town(s): Hudson
Size: 13.6 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Hudson. Riverbluff west of Chalifoux Road. Small, steep bluff along the Merrimack River, due west of Chalifoux Road. Just north of `Sanders'.

Dates documented

First reported: 1985 Last reported: 1985-07-06

New Hampshire Natural Heritage Bureau - System Record

High-gradient rocky riverbank system

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Not ranked (need more information)
State:	Not listed	State:	Rare or uncommon

Description at this Location

Conservation Rank:	Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank:	2010: This is a borderline EO (BC rank for an S3 system). Because this type of system is rare in this part of the state, it is considered exemplary with the BC score.
Detailed Description:	2010: This system supports ***acidic riverbank outcrop***, ***boulder - cobble river channel***, and ***cobble - sand river channel*** communities. Sections of the mapped polygon are also moderate-gradient. 1984: Canopy consists of *Quercus alba*, *Pinus strobus*, *Tsuga canadensis*, and *Acer rubrum*. Possible vegetative stems of *Allium schoenoprasm* var. *sibiricum* found on gravel bar.
General Area:	2010: Upland communities adjacent to river include ***hemlock - beech - oak - pine forest*** and ***dry Appalachian oak forest***. This system crosses below two large roads (F.E. Everett Turnpike and the old Rte. 3 [Daniel Webster Highway]). Residential and commercial land use also occur adjacent to river in several areas. 1984: Steep, sandy, forested riverbank and rocky gorge along steep gradient of river, with sandy gravel bar terraces.
General Comments:	1984: Field check for Allium schoenoprasm var. sibiricum during June or July.
Management Comments:	

Location

Survey Site Name:	Wildcat Falls
Managed By:	Currier Road Conservation Area
County:	Hillsborough
Town(s):	Merrimack
Size:	17.1 acres
Elevation:	
Precision:	Within (but not necessarily restricted to) the area indicated on the map.
Directions:	2010: From Baboosic Lake Road, turn south onto Currier Road and follow to end (0.45 miles). Park at Currier Road Conservation Area trailhead. 1984: Wildcat Falls of the Souhegan River, west of the Daniel Webster Highway (Rte. 3).

Dates documented

First reported:	1984-09-24	Last reported:	2010-09-27

New Hampshire Natural Heritage Bureau - Plant Record

arrow-head rattlebox (*Crotalaria sagittalis*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1958: In limited numbers. Specimen collected.
General Area: Sandplain.
General Comments: First New Hampshire record.
Management Comments:

Location

Survey Site Name: Merrimack River
Managed By: Hi-Tension Realty Corp.

County: Hillsborough
Town(s): Nashua
Size: 4592.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: Nashua. Merrimack River. Sandplain of western side of Merrimack River ca. 1 to 2 miles south of city.

Dates documented

First reported: 1958-09-11 Last reported: 1958-09-11

New Hampshire Natural Heritage Bureau - Plant Record

bird-foot violet (*Viola pedata var. pedata*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank:	Plants transplanted; survival and management are questionable.
Detailed Description:	2016: Area 4: 2 plants, 1 mature with 9 blossoms, the other a seedling. 1993: Site 1 (east side) had over 70 plants (flowering and not flowering). Site 1A had over 100 plants (flowering and not flowering). Site 2 had 15 plants in northern subpopulation (more had been transplanted originally), southern sub-population could not be located. Sites 3 and 4 were not visited in 1993. 1991: plants were transplanted from a site that was going to be destroyed. Plants were just beginning to flower.
General Area:	2016: Area 4: The plants were found growing in the mowed grassy shoulder immediately adjacent to the northbound side of the Everett Turnpike and beneath electric transmission corridor. The immediate area where the larger of the 2 plants are growing is moss covered with scattered grasses and herbaceous growth. The seedling is growing in an area with short grasses. 1993: Mowed grassy area on the side of a highway.
General Comments:	All plants were transplanted to these sites.
Management Comments:	2016: Area 4: Management plans for transmission tower maintenance will include maps with plant locations marked as sensitive with instructions to avoid. 1993: DOT is aware that mowing should be done after June (post seed set) or done with a blade at least 6 inches high so that seeds plants are not cut before seed set.

Location

Survey Site Name: Old Toll Booth Site
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 11.1 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2016: Area 4: Side of Everett Turnpike at power line crossing [42.900804, -71.464557].
1993: Five sites along either side of the Everett Turnpike. All are transplants. Site 1 (east) and 1A (west) are on each side of turnpike just north of the Souhegan River crossing. Site 2 is 0.3 miles north of Souhegan River bridge on east side of road, about 30 yards east of road and 20 yards south of lone pine tree. Plants are in 2 groups, 1 group about 20 yards south of lone pine, another about 20 yards south of first group. Site 3 is along the northbound side 0.4 miles north of exit 12. Site 4 is along the northbound side under powerlines ca. 1.1 miles north of exit 12.

Dates documented

First reported: 1991 Last reported: 2016-05-03

New Hampshire Natural Heritage Bureau - Plant Record

clasping milkweed (*Asclepias amplexicaulis*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1963: Hodgdon specimen at NHA (ARH & FLS 12733).
General Area: Dry bank, riverside.
General Comments:
Management Comments:

Location

Survey Site Name: Merrimack River
Managed By: Currier Road Conservation Area

County: Hillsborough
Town(s): Merrimack
Size: 4592.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: Merrimack. Merrimack River, western side, on dry roadside bank.

Dates documented

First reported: 1963 Last reported: 1963-07-01

New Hampshire Natural Heritage Bureau - Plant Record

clasping milkweed (*Asclepias amplexicaulis*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank: 1 plant, hardly defensible.

Detailed Description: 2010: Searched for but not found. 1984: 1 plant, in fruit.
General Area: 1984: Sandy roadside.
General Comments:
Management Comments:

Location

Survey Site Name: Sanders Trailer Park
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: .1 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1984: East side of Rte. 3, ca. 100 meters north of entrance to Sanders Trailer Park.

Dates documented

First reported:	1984-09-19	Last reported:	1984-09-19

New Hampshire Natural Heritage Bureau - Plant Record

dry land sedge (*Carex siccata*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1931: Specimen collected.
General Area: 1931: Sandy bank.
General Comments:
Management Comments:

Location

Survey Site Name: Darrah Pond, SW of
Managed By: Town of Litchfield Land

County: Hillsborough
Town(s): Litchfield
Size: 494.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: 1931: 1 mile SW of Darrah Pond.

Dates documented

First reported: 1931-08-09 Last reported: 1931-08-09

New Hampshire Natural Heritage Bureau - Plant Record

long-spined sandbur (*Cenchrus longispinus*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Historical records only - current condition unknown.
Comments on Rank:	Habitat destroyed by development and road construction.
Detailed Description:	2010: Searched for but not found. Habitat destroyed. Presumed extirpated. But area searched was probably south of the original observation.1984: Abundant ("much").
General Area:	1984: Sandy, disturbed field. [Possibly "a south-facing sandy slope with an abundance of dwarf chestnut oak (*Quercus prinoides*) and pitch pine (*Pinus rigida*)", but this description could refer to another nearby area.]
General Comments:	2010: (Area south of probable original observation): Based on this area now being a parking lot for several BAE (and aerial) systems and the altered nature of the landscape west of the lot (fill, mowing, etc.), suggest changing status to extirpated.
Management Comments:	

Location

Survey Site Name:	Merrimack
Managed By:	Merrimack Technology Park
County:	Hillsborough
Town(s):	Merrimack
Size:	35.2 acres
Elevation:	
Precision:	Within (but not necessarily restricted to) the area indicated on the map.
Directions:	1984: [West side of Rte. 3, sandy disturbed field north of Sanders Associates].

Dates documented

First reported:	1984-09-19	Last reported:	1984-09-19

New Hampshire Natural Heritage Bureau - Plant Record

long-spined sandbur (*Cenchrus longispinus*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1986: Details not recorded.
General Area: 1986: Edge of field.
General Comments:
Management Comments:

Location

Survey Site Name: Merrimack River, near Anheuser-Busch Brewery
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 2.8 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Edge of field behind Anheuser-Busch plant near salt storage barn.

Dates documented

First reported: 1986
Last reported: 1986-09

New Hampshire Natural Heritage Bureau - Plant Record

red-footed spikesedge (*Eleocharis erythropoda*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1929: COLLECTED BY PEASE 1929.
General Area: 1929: Sandy riverbank.
General Comments:
Management Comments:

Location

Survey Site Name: Thorntons Ferry
Managed By: Merrimack Village District Land

County: Hillsborough
Town(s): Merrimack
Size: 4592.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: Merrimack. Thorntons Ferry. Sandy riverbank.

Dates documented

First reported: 1929 Last reported: 1929

New Hampshire Natural Heritage Bureau - Plant Record

river birch (*Betula nigra*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:	
Detailed Description:	2015: Area 1: 8 plants. Area 2: 13 plants. Area 3: 8 plants. Area 4: 7 plants. In addition to the tree and shrub size individuals, seedlings were also observed. The plants are located within a ROW and show evidence of past maintenance. Many of the shrubs are vigorous stump sprouts. 1992: River birch saplings were found growing within riverside outcrop community.
General Area:	2015: Individual shrubs and saplings were tightly associated with the ordinary high water mark of the river, at the base of steep slopes, and on an island in the river. 1992: Riverside outcrop community.
General Comments:	
Management Comments:	2015: Trees occur in a power line right-of-way and show evidence of past maintenance. Many of the shrubs are vigororous stump sprouts.

Location

Survey Site Name:	Peninsula North of Goffs Falls
Managed By:	Merrimack Riverfront
County:	Hillsborough
Town(s):	Manchester
Size:	.5 acres
Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2015: Area 1: From the rear (east side) of the industrial building at 15 Iron Horse Drive in Bedford, walk approximately 300 feet east across the railroad and into the powerline corridor to the Merrimack River. Individuals are located on the west bank of the Merrimack River. Area 2: From 285 Hazleton Ave in Manchester where the street intersects the powerline corridor, walk approximately 500 feet west down the corridor to the east bank of the Merrimack River. Individuals are located along the west bank of the roughly 800 foot long island in the river. Note that depending on current water levels, the island may be inaccessible by foot. Areas 3 and 4: From 285 Hazleton Ave in Manchester where the street intersects the powerline corridor, walk approximately 500 feet west down the corridor to the east bank of the Merrimack River. Individuals are located along the bank of the river, and along the east bank of an adjacent island roughly 800 feet long. Note that depending on current water levels, the island may be inaccessible by foot.
Manchester. Island in Merrimack River.

Dates documented

First reported:	1992	Last reported:	2015-09-16

New Hampshire Natural Heritage Bureau - Plant Record

river birch (*Betula nigra*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank: 1 tree seen.

Detailed Description: 1985: 1 tree found, vigourous and mature. On a bench 15 feet above the river.
General Area: Moist bottom land in open light of western aspect. With *Acer saccharinum*, *Quercus rubra*.
General Comments: Searches farther upstream are needed.
Management Comments:

Location

Survey Site Name: Riverbluff West of Chalifoux Road
Managed By:

County: Hillsborough
Town(s): Hudson
Size: 2.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Small, steep bluff along the Merrimack River, due west of Chalifoux Road, just north of `Sander's'.

Dates documented

First reported: 1985 Last reported: 1985-06-07

New Hampshire Natural Heritage Bureau - Plant Record

river birch (*Betula nigra*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1992: River birch saplings were found growing within riverside outcrop community.
General Area: 1992: Riverside outcrop community.
General Comments:
Management Comments:

Location

Survey Site Name: Peninsula South of Goffs Falls
Managed By:

County: Hillsborough
Town(s): Manchester
Size: 2.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Manchester. Merrimack River corridor subsites. Peninsula south of Goffs Falls.

Dates documented

First reported: 1992 Last reported: 1992

New Hampshire Natural Heritage Bureau - Plant Record

unpretentious yellow-seeded false pimpernel (*Lindernia dubia var. anagallidea*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1992: No detailed notes taken. *Lindernia* occurs along with the similar but more common *Lindernia dubia*. Other associated spp include: *Eleocharis ovata*, *Juncus canadensis*, and *Cyperus strigosus*.
General Area: 1992: Disturbed marshy wetland scrape surrounded by golf course.
General Comments:
Management Comments:

Location

Survey Site Name: Litchfield Golf Course
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 2.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Litchfield. Located just north of the Hillcrest Road and Rte 3A junction in wetland scrape surrounded by golf course and fairly close to the road.

Dates documented

First reported: 1992-09-23 Last reported: 1992-09-23

New Hampshire Natural Heritage Bureau - Plant Record

wild lupine (*Lupinus perennis ssp. perennis*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank: Small population along well-used trail but apparently increasing in size.

Detailed Description: 2011: 22 stems in scattered clumps. 6 plants in flower, 3 plants with seed. Evidence of herbivory on one plant. Population observed for at least two years and the number of plants has increased.2010: No details (see 2011).

General Area: 2011: Flat trail, sandy soil. Associated plants include sweet-fern (*Comptonia peregrina*), eastern white pine (*Pinus strobus*), pitch pine (*P. rigida*), scrub oak (*Quercus ilicifolia*), northern red oak (*Q. rubra*), and common lowbush blueberry (*Vaccinium angustifolium*).

General Comments:
Management Comments:

Location

Survey Site Name: Pointer Club Brook, south of
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: .0 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2011: Travel south on Daniel Webster Highway and park at Table of Stone, 759 Daniel Webster Highway. Access the Heritage Trail from adjacent property after getting landowner permission. Alternatively (longer walk), access the Heritage Trail at new bridge over the Merrimack River. Head south on trail to a storage facility (currently named Extra Space Storage). Plants start parallel with unit 560 and continue along both sides of the trail up to the end of the storage facility. There is a fence between the trail and the storage facility.

Dates documented

First reported: 2010 Last reported: 2011-06-10

New Hampshire Natural Heritage Bureau - Plant Record

Wright's spikesedge (*Eleocharis diandra*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Imperiled due to rarity or vulnerability
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2016: 10 plants observed in two locations, in an area totaling approximately 5 x 0.5 meters.
General Area: 2016: Plants are scattered along a very narrow sandy/silty strip that is between the river and the eroded drop-off edge of a vegetation mat, all near the upstream end of the island. The back channel is now impounded by beavers, and significant ATV use has created a worn track a short distance from the bank dropoff. Associated species include nodding beggar-ticks (*Bidens cernua*), two stamens umbrella sedge (*Cyperus diandrus*), red-root umbrella sedge (*Cyperus erythrorhizos*), incurved umbrella sedge (*Cyperus squarrosus*), straw-colored umbrella sedge (*Cyperus strigosus*), American barnyard grass (*Echinochloa muricata*), blunt spikesedge (*Eleocharis obtusa* var. *obtusa*), slender fimbry (*Fimbristylis autumnalis*), clammy hedge-hyssop (*Gratiola neglecta*), dwarf St. John's-wort (*Hypericum mutilum*), Canada rush (*Juncus canadensis*), rice cut grass (*Leersia oryzoides*), red lobelia (*Lobelia cardinalis*), common water-primrose (*Ludwigia palustris*), and purple loosestrife (*Lythrum salicaria*).
General Comments:
Management Comments:

Location

Survey Site Name: Reeds Ferry
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: .4 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2016: [Plants are along water's edge at bottom of eroded bank of sand bar island on west side of river, near Reed's Ferry, Merrimack].

Dates documented

First reported: 2016-10-20 Last reported: 2016-10-20

New Hampshire Natural Heritage Bureau - Plant Record

Wright's spikesedge (*Eleocharis diandra*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Imperiled due to rarity or vulnerability
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 2016: Searched for but not found.
1929: Specimen collected.
General Area: 1929: Sandy riverbank.
General Comments: 2016: "Chris Kane spent a couple of hours on September 22, 2016 scouring up and downstream of the general site area known as Thornton's Ferry, Merrimack. Knowing exactly where the original collection site was will probably never be known. Very few *Eleocharis* of any kind were observed, the habitat did not look particularly suitable for *Eleocharis diandra*, and none of the notable associated species such as *Cyperus squarrosus* and *Cyperus diandrus* were present."
Management Comments:

Location

Survey Site Name: Thornton's Ferry
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 4.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Thornton's Ferry.

Dates documented

First reported: 1929-07-31 Last reported: 1929-07-31

New Hampshire Natural Heritage Bureau - Plant Record

Wright's spikesedge (*Eleocharis diandra*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Imperiled due to rarity or vulnerability
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1931: Specimen collected.
General Area: 1931: Muddy bank.
General Comments:
Management Comments:

Location

Survey Site Name: Reeds Ferry
Managed By: Moores Falls Conservation Area

County: Hillsborough
Town(s): Litchfield
Size: 121.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: Reeds Ferry.

Dates documented

First reported: 1931-08-27 Last reported: 1931-08-27

New Hampshire Natural Heritage Bureau - Animal Record

American Eel (*Anguilla rostrata*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2000: Area 13216: Not enumerated.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Baboosic Brook
Managed By: Twin Bridges Park

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2000: Baboosic Brook

Dates documented

First reported: 2000 Last reported: 2000

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

American Eel (*Anguilla rostrata*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2008: Area 13321M: 1 observed.2007: Area 13321M: 1 observed.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Beaver Brook
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2008: Souhegan River, below Merrimack Village Dam to Merrimack River.

Dates documented

First reported: 2007-08-21 Last reported: 2008-07-02

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

American Eel (*Anguilla rostrata*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2009: Area 13333: 1 observed.
General Area: 2009: Area 13333: Ledge/boulder habitat downstream of Rte. 3.
General Comments:
Management Comments:

Location

Survey Site Name: Beaver Brook
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: Souhegan River

Dates documented

First reported: 2009-08-20 Last reported: 2009-08-20

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

American Eel (*Anguilla rostrata*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2011: Area 11369: Not enumerated.
General Area: 2011: Area 11369: Good number of downed trees, lots of vegetation (milfoil).
General Comments:
Management Comments:

Location

Survey Site Name: Litchfield Tributaries
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2011: Horseshoe Pond.

Dates documented

First reported: 2011-07-21 Last reported: 2011-07-21

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002-2012: Wintering eagles regularly observed at locations along the Merrimack River, day perching and night roosts:2012: Solitary eagles observed at 2 separate locations on 1/7. Solitary eagles observed at 2 separate locations on 1/31. 2 eagles observed at a single location on 2/7. 1 eagle observed on 2/9. Solitary eagles observed at 3 separate locations on 2/25.2011: 3 eagles observed at a single location and 2 at a separate location on 1/8. 1 eagle observed on 1/9. 1 eagle observed on 1/11. 1 eagle observed on 1/13. 2 eagles observed at a single location on 2/7. 1 eagle observed on 2/9. 1 eagle observed on 2/15. 1 eagle observed on 2/17. 1 eagle observed on 2/22. 1 eagle observed on 3/2. 4 eagles observed at a single location, 2 eagles at 2 separate locations, and a soliltary eagle observed on 2/26. 1 eagle observed on 12/13. 1 eagle observed on 12/15. 2010: 7 eagles observed at a single location, 4 eagles at a single location, 2 eagles at a single location, and solitary eagles at 6 locations on 1/9. Solitary eagles at 2 separate locations on 2/28. 1 eagle observed on 12/17. 1 eagle observed on 12/20. 1 eagle observed on 12/22. 1 eagle observed on 12/30.2009: 4 eagles observed at a single location, 2 eagles observed at 2 separate locations, and solitary eagles at 5 separate locations on 1/10. 4 eagles observed at a single location, and 2 eagles located at 4 separate locations on 2/28.2008: 3 eagles observed at a single location, 2 eagles at a single location, and solitary eagles at 2 separate locations on 1/12. 2 eagles observed at a single location and 1 at a separate location on 2/23.2007: 6 eagles observed at a single location, 2 eagles at a single location, and solitary eagles at 2 separate locations on 2/24.2006: 3 eagles observed at 3 separate locations, 2 eagles at 3 separate locations, and solitary eagles at 7 separate locations on 1/7. 2 eagles observed at a single location and 1 at a separate location on 2/18. 6 eagles observed at a single location, 3 at a single location, 2 eagles at 2 separate locations, and a solitary eagle at 1 location on 2/25.2005: Solitary eagles observed at 6 separate locations on 1/8. 1 eagle observed on 1/10. 12 eagles observed at a single location, 5 eagles at a single location, and 3 eagles at 2 separate locations on 2/4. 5 eagles observed at a single location, 3 eagles at a single location, and solitary eagles at 4 separate locations on 2/26.2004: Solitary eagles observed at 6 separate locations on 1/10. 1 eagle observed on 12/20.2003: 4 locations with 2 eagles observed on 1 location with a single eagle on 1/9. 2 eagles at a single location on 1/11. 1 eagle observed on 1/31. 4 eagles at a single location on 2/1. 5 eagles at one location and 2 at another location on 2/2. 9 eagles at a single location on 2/28. 3 eagles at a single location, 2 eagles at 2 separate locations, and 1 eagle at 2 separate locations on 3/1.2002: 2 eagles observed at separate locations on 1/12. Observations of 2 and 3 eagles at 2 separate locations on 12/22.1993: Near Amoskeag Bridge, suspected roosting behind the Youth Center, perching on north side of bridge. Perching on Amoskeag Islands. Some sightings near mouth of Piscataquog River. Also roosting behind Caldor's, NSS Corporation. Confirmed roosting at Sebbins Brook between Rte 3 and the river. Also at Reed's Ferry islands, Pennichuck Brook, all the way south to the Nashua River. 1991: Consistent perching near Amoskeag Bridge, between Queen City bridge and 101/283. Roosting behind Youth Development Center north of Amoskeag Bridge.
General Area: Eagles perch, sometimes roost in large white pines along the riverbank.
General Comments:
Management Comments:

Location

Survey Site Name: Lower Merrimack River
Managed By: Smiths Ferry Heritage Park

County: Hillsborough
Town(s): Manchester
Size: 116.0 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Various locations along the banks of the Merrimack River.

Dates documented

First reported: 198? Last reported: 2012-02-25

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2017: Nest 3: Nest active, no chicks fledged.
2016: Nest 2: Nest active, no chicks fledged.
2014: Nest 2: 2 chicks fledged.
2013: Nest 1: 2 chicks fledged.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Pennichuck Brook
Managed By: Pennichuck Water Works

County: Hillsborough
Town(s): Nashua
Size: 4.3 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported:	2013	Last reported:	2017

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Banded Sunfish (*Enneacanthus obesus*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2005: Area 8978: 2 observed, age and sex unknown. Area 8972: 1 observed, age and sex unknown. 2000: Area 260: 1 observed, age and sex unknown (Obs_id 368). 1938: Cohas Brook: Specimen collected.

General Area: 2005: Area 8978: Freshwater - stream or river. Area 8972: Freshwater - stream or river. Wide channel with a lot of pickerel weed and submerged vegetation. Marsh and pond-like area. 2000: Area 260: Freshwater - stream or river (Obs_id 368). 1938: Cohas Brook: Vegetation moderate, rushes and *Potamogeton* (pondweed). Partly wooded shore, moderate current.

General Comments: 2000: Area 260: Sampled by DES electrofishing 150 meter index site (Obs_id 368).
Management Comments:

Location

Survey Site Name: Cohas Brook
Managed By: NHDOT Mitigation

County: Hillsborough
Town(s): Manchester
Size: 84.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1938: Cohas Brook: Cohas Brook from I93 W to Little Island Pond. 2000: Area 260: Cohas Brook at DES Station 00m-50. 2005: Area 8978: Little Cohas Brook on Hall Rd. Area 8972: Cohas Brook on Auburn Rd. at sand and gravel pit.

Dates documented

First reported: 1938 Last reported: 2005-10-03

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:

Detailed Description: 2001: Area 996: 1 adult male.
General Area: 2001: Area 996: Highway breakdown lane near wetland.
General Comments:
Management Comments:

Location

Survey Site Name: Wildcat Falls
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 30.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2001: Area 996: On Rte. 293 north, in breakdown lane just north of wetland (north of Souhegan River).

Dates documented

First reported: 2001-08-06 Last reported: 2001-08-06

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002: Area 1007: 1 turtle.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Nesenkeag Brook
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 30.8 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2002: Area 1007: Page Road, couple hundred yards east of Rte. 3A, forested wetlands and stream system of Chase Brook.

Dates documented

First reported:	2002-06-15	Last reported:	2002-06-15

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2006: Area 12084: 1 observed.
General Area: 2006: Area 12084: [Sand plain basin marsh].
General Comments:
Management Comments:

Location

Survey Site Name: Nesenkeag Brook
Managed By: Town of Litchfield Land

County: Hillsborough
Town(s): Litchfield
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2006: Area 12084: Grassy Pond at Pinecrest Rd.

Dates documented

First reported: 2006-06-26 Last reported: 2006-06-26

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Area 13118: 1 adult observed.
General Area: 2010: Area 13118: Grassy field at town park.
General Comments:
Management Comments:

Location

Survey Site Name: Souhegan River Mouth
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2010: Area 13118: Watson Park, Merrimack.

Dates documented

First reported: 2010-06-23 Last reported: 2010-06-23

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2012: Area 13546: 1 adult female observed.
General Area: 2012: Area 13546: Urban/suburban. Near sandy area adjacent to Colby Brook.
General Comments: 2012: Area 13546: Observation comment: Crossing Charles Bancroft Hwy and released in Colby Brook.
Management Comments:

Location

Survey Site Name: Reeds Ferry
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 1.9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2012: Area 13546: Charles Bancroft Hwy, Litchfield, NH.

Dates documented

First reported:	2012-06-23	Last reported:	2012-06-23

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2012: Area 13089: 1 adult observed, 18-20" in length.2008: Area 11548: 1 adult seen. 1984: Area 12169M: 1 observed.1979: Area 11548a: 1 snake found in garden and killed.1972: Area 6596: 1 seen. Adult. Area 12169M: 1 individual observed, 16-18 inches long.

General Area: 2012: Area 13089: Residential yard in wooded area.2008: Area 11548: It was located just to the north and east of the bigger pond on the north end of the parcel. 1979: Area 11548a: Snake found in garden. 1972: Area 12169M: In a small cemetary. Area shaded and grassy.

General Comments: 2003: Area 12169M: Formerly Pettengill Cemetery. Now busy road.NHNHB was contacted on 29 June 1984 by a neighbor of individual who killed the snake.

Management Comments:

Location

Survey Site Name: Litchfield
Managed By: NHDOT Mitigation

County: Rockingham
Town(s): Londonderry
Size: 12.5 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2012: Area 13089: End of Sunflower Lane in Londonderry. The woods in the back border the Manchester town line.1979: Litchfield. About 4 houses over town line from Manchester on Rte. 3. 1972: Area 6596: Bill Boucher residence, 272 Litchfield Road, 1/2 mile east of Route 3A at the junction of Watts Brook. Area 12169M: Londonderry. Found in a small old cemetary on north side of Pettingill Road which runs west off of Harvey Road. Near Little Cohas Marsh.

Dates documented

First reported: 1972-07-01 Last reported: 2012-09-02

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2004: 1 seen. Adult. (Obs_id 2004.0093).
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Horseshoe Pond
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 7.7 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2004: Near Horseshoe Pond. 79 Island Drive in yard (Obs_id 2004.0093).

Dates documented

First reported: 2004-06-05 Last reported: 2004-06-05

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1966: 1 individual 18 inches long seen.
General Area: 1966: Pine knoll in field.
General Comments:
Management Comments:

Location

Survey Site Name: Litchfield Field
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 60.7 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: North of Colby Brook on pine knoll in field between brook and powerline right-of-way to east of Rte 3A.

Dates documented

First reported: 1966 Last reported: 1966

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1993: Ca. 7.5 inches; run over by lawnmower.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Litchfield
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 2.8 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Litchfield. Whittemore Drive, sandy area near open fields and powerlines.

Dates documented

First reported: 1993-09-11 Last reported: 1993-09-11

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Hognose Snake (*Heterodon platirhinos*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1972: Area 6596: 1 seen. Adult.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Watts Brook
Managed By: The Pathway Common Land

County: Rockingham
Town(s): Londonderry
Size: 7.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1972: Area 6596: Bill Boucher residence, 272 Litchfield Road, 1/2 mile east of Route 3A at the junction of Watts Brook.

Dates documented

First reported: 1972-07-01 Last reported: 1972-07-01

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Eastern Meadowlark (*Sturnella magna*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2011: 2 observed between 5/24 and 7/5.
2005: 2 observed on 5/17, including nest with 5 eggs.
2004: 2 observed on 5/27.
2003: 5 observed between 5/22 and 7/10, including nest with 5 eggs, juveniles.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Merrimack River, near Anheuser-Busch Brewery
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 48.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported:	2003-05-22	Last reported:	2011-07-05

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Grasshopper Sparrow (*Ammodramus savannarum*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2011: Searched for, not found.
2006: Searched for, not found.
2005: Field Polygon: 3 observed on 7/14, including 1 juvenile.
2004: 1 adult male, 1 adult female. How observed: heard, seen (Obs_id 2444).
2002: 2 adult males, 1 adult female seen (Obs_id 147). 2002: 2 adult males, 1 adult female, 2 immature, sex unknown seen (Obs_id 148).
2001: 1 adult male seen, also singing (Obs_id 253). 2001: 1 adult male, 1 adult, sex unknown seen. Perched on "No Trespassing" sign (Obs_id 252).
1999: 2 adult males seen and heard (Obs_id 268). 1999: 2 adult males, 1 adult, sex unknown seen. Two birds singing. (Obs_id 265). 1999: 3 adult males, 2 adult, sex unknown seen. Three birds singing, two non-singing birds probably females (Obs_id 266). 1999: 1 adult male seen and heard singing, 1 adult female seen (Obs_id 267).
1998: 1 adult male seen, also singing (Obs_id 255).
1996: 1 adult, sex unknown seen on mullien stalk with grub in beak, flew down (Obs_id 254).

General Area: 2004, 2002, 2001, 1999, 1998, 1996: Terrestrial - Grassland / Field.
General Comments:
Management Comments:

Location

Survey Site Name: Merrimack River, near Anheuser-Busch Brewery
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 101.2 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: 2004: North end of fields behind Anheuser-Busch [along Merrimack River (Obs_id 2444).

Dates documented

First reported: 1996-07-10 Last reported: 2005-07-14

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

New England Cottontail (*Sylvilagus transitionalis*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002: Seen (Obs_id 450).
General Area: 2002: (Obs_id 450).
General Comments: 2002: Results from J. Litvaitis Regional NEC survey; small patch (Obs_id 450). Everett Turnpike. 780 (Obs_id 450).
Management Comments:

Location

Survey Site Name: Bumbo Hill, east of
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 7.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2002: Everett Turnpike (Obs_id 450).

Dates documented

First reported: 2002-01-01 Last reported: 2002-01-01

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

New England Cottontail (*Sylvilagus transitionalis*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002: 2 age and sex unknowns (Obs_id 734).
General Area: 2002: Terrestrial: scrub / shrubland (Obs_id 734).
General Comments: 2002: Results from J. Litvaitis Regional Study - 2003 (Obs_id 734).
Management Comments:

Location

Survey Site Name: Merrimack River, west of
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.0 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2002: Powerlines [east of] Rte. 3 (Obs_id 734).

Dates documented

First reported: 2002-01-30 Last reported: 2002-01-30

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

New England Cottontail (*Sylvilagus transitionalis*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002: 1 age and sex unknown (Obs_id 736).
General Area: 2002: (Obs_id 736).
General Comments: 2002: Results of J. Litvaitis Regional NEC Survey - 2003 (Obs_id 736).
Management Comments:

Location

Survey Site Name: Sebbins Brook, east of
Managed By:

County: Hillsborough
Town(s): Bedford
Size: .4 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2002: Sports complex, [east of] Rte. 3 (Obs_id 736).

Dates documented

First reported: 2002-01-30 Last reported: 2002-01-30

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

New England Cottontail (*Sylvilagus transitionalis*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002: 1+ age and sex unknowns (Obs_id 742).
General Area: 2002: (Obs_id 742).
General Comments: 2002: Results of J. Litvaitis Regional NEC Survey-2003 (Obs_id 742).
Management Comments:

Location

Survey Site Name: Hillcrest Cemetery, west of
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: .4 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2002: Rte. 3A and Hillcrest Rd (Obs_id 742).

Dates documented

First reported: 2002-02-02 Last reported: 2002-02-02

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

New England Cottontail (*Sylvilagus transitionalis*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Not ranked
Comments on Rank:	
Detailed Description:	2017: Winter observation at 1 point. 2016: Winter observations at 3 points. 2015: Winter observations at 5 points. 2014: Winter observations at 3 points. 2013: Winter observations at 13 points. 2011: Winter observations at 32 points. 2002: 1+ age and sex unknowns (Obs_id 744).
General Area:	2002: Terrestrial: grassland / field (Obs_id 744).
General Comments:	2002: Results of J. Litvaitis Regional NEC Survey - 2003 (Obs_id 744).
Management Comments:	

Location

Survey Site Name:	Little Cohas Brook, south of		
Managed By:	NHDOT Mitigation		
County:	Rockingham		
Town(s):	Londonderry		
Size:	32.6 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2002: Stonyfield Farm (Obs_id 744).

Dates documented

First reported:	2002-02-02	Last reported:	2017

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

New England Cottontail (*Sylvilagus transitionalis*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2018: Winter observation of 1 individual (pellet).
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Moores Falls
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: .7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2018: Moores Falls Conservation Area, Litchfield.

Dates documented

First reported: 2018-01-26 Last reported: 2018-01-26

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Northern Black Racer (*Coluber constrictor constrictor*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2004: 1 seen. Adult. (Obs_id 2004.0054).
General Area: 2004: Dirt road next to field with old grass, near beaver pond. Restored gravel pit. Lots of dirt bike/ATV trails. Big housing development nearby. (Obs_id 2004.0054).
General Comments:
Management Comments:

Location

Survey Site Name: Manchester Industrial Park, south of
Managed By:

County: Rockingham
Town(s): Londonderry
Size: 7.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2004: Rehabilitated gravel pit on west end of Pettingil Road (Obs_id 2004.0054).

Dates documented

First reported: 2004-04-27 Last reported: 2004-04-27

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Northern Black Racer (*Coluber constrictor constrictor*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Extirpated - no longer present at this site.
Comments on Rank:	2011: Habitat destroyed according to herpetologists with NH Fish and Game.
Detailed Description:	2010: R005, R008, R009: 3 radiotracked individuals (later relocated to site in Hopkinton, EO ID 7399). 2009: Area 12296: 1 observed. Areas 12418-12422: 1 individual observed at each of 5 sites.
General Area:	2010: R005, R008, R009: Habitat apparently destroyed by development. 2009: Area 12296: Forest around cell tower.
General Comments:	
Management Comments:	

Location

Survey Site Name: Industrial Dirve, Merrimack
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 106.3 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: Area 12296: Woods around cell tower north of Industrial Drive.

Dates documented

First reported: 2009-04-27 Last reported: 2010-08-21

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Northern Leopard Frog (*Lithobates pipiens*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2006: Area 11937: 1 observed.
General Area: 2006: Area 11937: Riverbank adjacent to old field habitat.
General Comments:
Management Comments:

Location

Survey Site Name: Merrimack River, Litchfield
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 7.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2006: Area 11937: [Along Merrimack River bank, west of the intersection of Rte.3A and Talent Rd.]

Dates documented

First reported: 2006-10-18 Last reported: 2006-10-18

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Peregrine Falcon (*Falco peregrinus anatum*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2016: Nest 1: 2 chicks fledged.
2015: Nest 1: 3 chicks fledged.
2014: Nest 1: 2 chicks fledged.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Nashua
Managed By:

County: Hillsborough
Town(s): Nashua
Size: .4 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2014: Nest 1: St. Mary and Archangel Michael Coptic Orthodox Church, Nashua.

Dates documented

First reported:	2014	Last reported:	2016

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Redfin Pickerel (*Esox americanus americanus*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2000: Area 625: 1 individual observed.
General Area: 2000: Area 625: Freshwater stream.
General Comments:
Management Comments:

Location

Survey Site Name: Nesenkeag Brook
Managed By: Parker Park

County: Hillsborough
Town(s): Litchfield
Size: 2.3 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2000: Area 625: Nesenkeag Brook at Rte. 3A in Litchfield.

Dates documented

First reported: 2000-07-03 Last reported: 2000-07-03

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Redfin Pickerel (*Esox americanus americanus*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2000: Area 627: 3 individuals observed.
General Area: 2000: Area 627: Freshwater stream.
General Comments:
Management Comments:

Location

Survey Site Name: Second Brook, south of Tate Street
Managed By:

County: Hillsborough
Town(s): Hudson
Size: 2.2 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2000: Area 627: Second Brook just upstream of crossing at Pelham Road, south of the bend in Tate Street, in Hudson.

Dates documented

First reported:	2000-07-03	Last reported:	2000-07-03

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Sea Lamprey (*Petromyzon marinus*)

Legal Status

Federal: Not listed
State: Special Concern

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2008: 1 observed.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Souhegan River
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2008: Below Merrimack Village Dam to Merrimack River.

Dates documented

First reported: 2008-07-02
Last reported: 2008-07-02

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Smooth Green Snake (*Opheodrys vernalis*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2015: Area 13999: 1 adult male observed.
2011: Area 12919: 1 adult observed, 12" long.
General Area: 2015: Area 13999: Consisting of mostly dense shrubs within survey parcel. Small path, slash pile, and wetland areas identified as potential habitat.
2011: Area 12919: Residential yard.
General Comments:
Management Comments:

Location

Survey Site Name: Nesenkeag Brook
Managed By:

County: Rockingham
Town(s): Londonderry
Size: 2.4 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2015: Area 13999: Powerline between Brickyard Drive and Hamel Circle, Litchfield.
2011: Area 12919: 22 Colonial Drive, Londonderry.

Dates documented

First reported: 2011-09-10 Last reported: 2015-08-28

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Sora (*Porzana carolina*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: 4 observed, including copulating pair, between 6/25 and 7/2.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Long Hill, east of
Managed By:

County: Hillsborough
Town(s): Nashua
Size: 5.5 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported: 2010-06-25 Last reported: 2010-07-02

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Spotted Turtle (*Clemmys guttata*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2013: Area 13405: 1 adult female observed.
 2012: Area 13084: 1 adult observed. Area 13545: 1 adult female observed laying eggs.
 1999: Area 1652: 1 young seen (hatchling).
 1996: Area 6456: 1 female seen. Adult.
 1993: 1 seen by Jim Taylor.

General Area: 2013: Area 13405: Roadside, coniferous forest.
 2012: Area 13084: Crossing road. Area 13545: Roadside, suburban area near woodland.
 1999, 1996: Area 1652, Area 6456: NE basin marsh vernal pool.

General Comments:
Management Comments:

Location

Survey Site Name: Grassy Pond
Managed By: Litchfield School Conservation Area

County: Hillsborough
Town(s): Litchfield
Size: 24.0 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2013: Area 13405: Albuquerque Avenue, Litchfield. Crossing Road.
 2012: Area 13084: Crossing Albuquerque Avenue at Meadowbrook Lane, Litchfield. Area 13545: Pinecrest Road, Litchfield.
 1999: Area 1652: Grassy pond.
 1996: Area 6456: Whittemore Dr. - Crossing Rd.
 1993: Grassy pond.

Dates documented

First reported: 1993 Last reported: 2013-07-11

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Spotted Turtle (*Clemmys guttata*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank:

Detailed Description: 2015: Area 14083: 1 adult observed, sex unknown.
2005: Area 9306: 1 adult male turtle observed.
1992: Four adult turtles observed: one 12-14 year old with carapace 114 cm and plastron 92 cm, sex undetermined; one ca. 12 year old very active female with carapace 125 cm and plastron 100 cm; one 11 or 12 year old very inactive female with carapace 127 cm and plastron 100 cm; and one 14-15 year old female with carapace 115 cm and plastron 92 cm.

General Area: 2015: Area 14083: Residential yard [property backs up to wetlands associated with Chase Brook].
2005: Area 9306: Residential lot surrounded by some agriculture.
1992: Adjacent to a large wetland.

General Comments: 1992: Drawings of each turtle's most distinctive spots and other markings included.

Management Comments:

Location

Survey Site Name: Cutler Road, north of
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 2.6 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2015: Area 14083: In yard at 21 Mayflower Drive, Litchfield.
2005: Area 9306: [Rte 3A ca. 2.8 miles north of the junction with Rte. 111 in Nashua.]
1992: Adjacent to a large wetland at 19 Woodburn Drive, near Cutler Road, [west of Rte. 102, in the southeast corner of Litchfield.]

Dates documented

First reported: 1992-06-08 Last reported: 2015-06-15

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Spotted Turtle (*Clemmys guttata*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:

Detailed Description: 2004: 1 seen, dead on road. Adult. (Obs_id 2004.0122).
General Area:
General Comments: 2004: Roadkill (Obs_id 2004.0122).
Management Comments:

Location

Survey Site Name: Stebbins Brook
Managed By: Reeds Ferry State Forest

County: Hillsborough
Town(s): Bedford
Size: 7.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2004: Approximately where Stebbins Brook crosses Everett Turnpike (Obs_id 2004.0122).

Dates documented

First reported:	2004-07-07	Last reported:	2004-07-07

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Vesper Sparrow (*Pooecetes gramineus*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Special Concern	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2002: 1 seen (Obs_id 149). 1999: 1 adult male heard (Obs_id 548).
General Area: 2002, 1999: Terrestrial - Grassland / Field (Obs_id 149, 548).
General Comments:
Management Comments:

Location

Survey Site Name: Merrimack River, near Anheuser-Busch Brewery
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 48.6 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Fields behind Anheuser-Busch brewery (Obs_id 149, 548).

Dates documented

First reported: 1999-07-03 Last reported: 2002-06-20

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2005: Area 11962: 1 observed.
General Area: 2005: Area 11962: Residential yard with pool.
General Comments:
Management Comments:

Location

Survey Site Name: Watts Brook
Managed By:

County: Hillsborough
Town(s): Litchfield
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2005: Area 11962: [Behind house on Rte. 3A in Litchfield, just north of intersection with Corning Rd.].

Dates documented

First reported: 2005-06-19 Last reported: 2005-06-19

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2013: Area 13484: 1 adult observed, sex unknown.
General Area: 2013: Area 13484: Parking lot near highway. Turtle was emerging from a small water course next to the parking lot which is directly next to Route 3 south.
General Comments:
Management Comments:

Location

Survey Site Name: Horseshoe Pond, west of
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2013: Area 13484: 9 Executive Park Drive, Merrimack. Nashua Regional Planning Commission parking lot.

Dates documented

First reported:	2013-08-26	Last reported:	2013-08-26

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2015: 1 adult male observed.
General Area: 2015: Residential road.
General Comments:
Management Comments:

Location

Survey Site Name: Belmont Drive, Merrimack
Managed By:

County: Hillsborough
Town(s): Merrimack
Size: .4 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported:	2015-03-31	Last reported:	2015-03-31

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

RECEIVED MAY 14 2018

Lowell Hydroelectric Project (FERC Project No. 2790)
Relicensing Pre-Application Document Information Questionnaire

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the Lowell Hydroelectric Project (FERC No. 2790) (Project), with principal Project facilities located along the Merrimack River in Middlesex County, Massachusetts and a reservoir extending upstream to Hillsborough County, New Hampshire (see attached map). Boott, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the existing Project. Accordingly, Boott is preparing a Pre-Application Document (PAD) that will provide FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project that will be used to prepare documents related to analyzing the relicensing application to be prepared by Boott. To prepare the PAD, Boott will use information in its possession and information obtained from additional sources. This PAD Information Questionnaire will be used by Boott to help identify sources of existing, relevant, and reasonably available information that are not currently in Boott's possession.

1. Information about person completing the questionnaire:

Name & Title	ROBERT H. RUSSELL, EXECUTIVE DIRECTOR
Organization	MERRIMACK RIVER WATERSHED COUNCIL
Address	60 ISLAND STREET, SUITE 211-E LAWRENCE, MA 01840
Phone	978-655-4742
Email Address	RRUSSELL@MERRIMACK.ORG

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Project's environment (e.g., information regarding the Merrimack River in or close to the Lowell Hydroelectric Project)?

X Yes (*If yes, please complete 2a through 2c)* ___ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- ■ Geology and soils
- ■ Water resources
- ■ Fish and aquatic resources
- ■ Wildlife and botanical resources
- ■ Wetlands, riparian, and littoral habitat
- ■ Rare, threatened & endangered species
- ■ Recreation and land use
- ■ Aesthetic resources
- ■ Cultural resources
- ■ Socio-economic resources
- ■ Tribal resources
- ■ Other resource information

b. Please briefly describe the information referenced above or list available documents *(additional information may be provided on pages 3 or 4 of this questionnaire).*

WE'VE ACCUMULATED INFORMATION ABOUT THE ABOVE TOPICS. IT'S NOT POSSIBLE TO SUMMARIZE IT HERE.

c. Where can Boott obtain this information? Please include contact information if there is a specific representative that you wish to designate for potential follow-up contact by Boott's or HDR's representative *(additional information may be provided on pages 3 or 4 of this questionnaire).*

3. Do you or your organization plan to participate in the Lowell Hydroelectric Project relicensing proceeding?

___ Yes __ No UNCERTAIN

If you answered yes to Question 3, please provide contact information for your organization's representative(s) that can be used for future communications regarding this relicensing:

Primary Representative Contact Information

Name	RUSTY RUSSELL
Address	60 ISLAND STREET, SUITE 211-E 01840, LAWRENCE, MA
Phone	617-515-9522 (CELL)
Email Address	RRUSSELL @ MERRIMACK.ORG

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Boott Hydropower, LLC	Lowell Hydroelectric Project
Application for New License	Project No. 2790-072 – Massachusetts

AMERICAN WHITEWATER COMMENTS & STUDY REQUESTS IN RESPONSE TO NOTICE OF INTENT TO FILE LICENSE APPLICATION, FILING OF PRE-APPLICATION DOCUMENT (PAD), COMMENCEMENT OF PRE-FILING PROCESS, AND SCOPING; REQUEST FOR COMMENTS ON THE PAD AND SCOPING DOCUMENT, AND IDENTIFICATION OF ISSUES AND ASSOCIATED STUDY REQUESTS REGARDING THE LOWELL HYDROELECTRIC PROJECT (FERC PROJECT NO 2790-072)

American Whitewater (AW) submits the following Comments and Study Requests in response to the filing of the Pre-Application Document (PAD) filed by Boott Hydropower, LLC for the Lowell Hydroelectric Project, FERC Project No. 2790, located in Lowell, Massachusetts. The project consists of the 1,093 long, 15-foot high Pawtucket Dam that impounds the Merrimack River and diverts flows into the Northern and Pawtucket canals leading to powerhouses with a total installed capacity of 24.8 MW. The 720-acre impoundment extends 23-miles upstream from the project. The project diverts nearly all flows from the Merrimack River into the canal system, bypassing approximately two miles of the natural river channel. Of particular concern is the 0.7-mile reach between the Pawtucket Dam and the E.L. Field Powerhouse that has been nearly completely dewatered by the project, destroying aquatic habitat and eliminating recreation opportunity that would otherwise provide a valuable whitewater boating opportunity under natural flow conditions.

American Whitewater is a national non-profit 501(c)(3) river conservation and recreation organization founded in 1954. With approximately 6,000 members and 100 affiliate clubs, representing tens of thousands of whitewater paddlers across the nation, American Whitewater's mission is to protect and restore our nation's whitewater resources and to enhance opportunities to enjoy them safely. Our members are primarily conservation-oriented kayakers and canoeists, many of whom live and/or engage in recreational boating in the New England region within easy proximity of the Merrimack River. Located in northeastern Massachusetts, the Lowell Hydroelectric Project is easily accessible to large population centers in and around the Boston area with the potential to provide a whitewater recreation experience unique to the area. American Whitewater has long been involved with the FERC licensed hydropower projects in the region, including hydropower projects located on the Deerfield and Connecticut rivers in Massachusetts, as well as other projects on the Kennebec, Rapid, Green, Moose, Black, Beaver,

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and Raquette rivers, and are party to settlement agreements that provide for whitewater boating opportunities that partially mitigate for project impacts.

Comments

From a recreation perspective, the Lowell Hydroelectric Project is problematic due to the lack of flow information, bypassed reach access, and flow alteration. These concerns are generally described below:

Issue 1: Flow Information

The Licensee states in the PAD that the project has a hydraulic capacity of 10,000 cfs with up to 8,000 cfs feeding the E.L. Field Powerhouse followed by the other canal units. Flows above the project hydraulic capacity are spilled into bypassed reach via the Pawtucket Dam spillway. There are no minimum flows into the bypassed reach other than the attraction flow for the fishway when operating plus leakage that Enel Green estimates at 300 cfs. For the recreating public, understanding the flow into the bypassed reach is impossible since the Licensee does not provide that information on its website or on Waterline. The Licensee states in the PAD, however, that the "estimated flow over the spillway is the flow at the Merrimack River (U.S. Geological Survey [USGS] gage No. 01100000) minus the flow at the Concord River (USGS gage No. 01099500) and minus any flow released through Boott's turbines and the downtown canal system." At best, flows into the bypassed reach could be estimated by subtracting flows from the Concord River from the Merrimack River below the project minus the hydraulic capacity of the project assuming that all units were operating and then adding the fishway flows and leakage. The Licensee needs to provide the recreating public with instantaneous and accessible information on flows into the bypassed reach.

Issue 2: Access & Navigability

Access into the natural river channel bypassed by the project is extremely limited. While there are several access points in the impoundment, access to the bypassed reach is only possible down steep, rugged and overgrown trails. There is no portage around the Pawtucket Dam that would allow a through paddler to navigate the Merrimack River through the project boundary. The Merrimack River is a navigable river subject to FERC jurisdiction, and the public right to navigation is protected under federal law. In addition, Massachusetts law protects the public's right to boat, fish, and fowl in navigable waters. [Opinion of the Justices, 383 Mass. 895 (1981)]. Even in non-navigable waters, the public still retains the right to "passage up and down the stream in boats or other craft, for purposes of business, convenience, or pleasure." Brosnan v. Gage, 240 Mass. 113 (1921). The Licensee cannot simply obstruct the river and divert all flow through its hydropower operation, eliminating nearly all public access. The FERC license to

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operate the project is granted subject to all applicable state laws and regulation. Under Massachusetts law and regulations, any water-dependent use project which interferes with the public's right to free passage over and through water, including "the right to float on, swim in, or otherwise move freely within the water column without touching the bottom," is required to provide "compensation to the public for interfering with its broad rights to use such lands for any lawful purpose … commensurate with the extent of interference caused, and shall take the form of measures deemed appropriate by the Department to promote public use and enjoyment of the water, at a location on or near the project site if feasible." [310 CMR 9.35]

Issue 3: Flow Alteration

The Licensee's hydropower operation diverts virtually all flow into the canal system for energy generation, eliminating practically all flow between the Pawtucket Dam and the E.L. Field Powerhouse. With no minimum aquatic base flow to sustain aquatic habitat for resident fish, macroinvertebrates, plants, and other aquatic dependent species, this portion of the bypassed reach is effectively a wasteland in the heart of Lowell. The current project license only requires a minimum flow of 1990 cfs below the project. While the Licensee maintains that the project is operated in run-of-river mode, its operations disrupt the natural flow regime in the bypassed reach, reducing the quantity of suitable aquatic habitat and the benefits of natural flow variability.

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Fig. 1: Natural river channel dewatered by the Lowell Hydroelectric Project

The lack of a natural flow variability also eliminates the possibility recreational boating in the natural river channel, assuming access was provided, except during periods of spillage when inflows exceed 10,000 cfs, generally during the spring freshet in April and May. Other recreational uses of the bypassed reach are also impacted by the Licensee's operations including angling. There is evidence of multiple informal access point below the E.L. Field Powerhouse that are used for angling in the bypassed reach.

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Fig. 1: Bypassed reach down river view from University Bridge at high water

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Fig. 2: Merrimack River across from the outflow of E.L. Field tailrace at high water

Given the lack of portage and access into the bypassed reach below the Pawtucket Dam, little information is available about the quality of whitewater boating on the Merrimack River in the project boundary. The Licensee does cite to the American Whitewater Rivers Database for information on whitewater boating on the Concord River adjacent to the project, and whitewater boating is known to occur on other sections of the Merrimack River in New Hampshire. There is anecdotal information from whitewater boaters who have bushwhacked their way into the bypassed reach below the dam that there is a valuable whitewater boating resource in the bypassed reach when there is sufficient flow. In addition, a visual observation of the bypassed reach from the shoreline and bridges reveals a structure that is suitable for whitewater boating under certain conditions. With approximately 25 feet of gradient between the base of the Pawtucket dam and the E.L. Field Powerhouse tailrace and the presence of extensive rock formations that channelize the flow, it is likely that the Licensee's flow alteration eliminates whitewater boating in the bypassed reach.

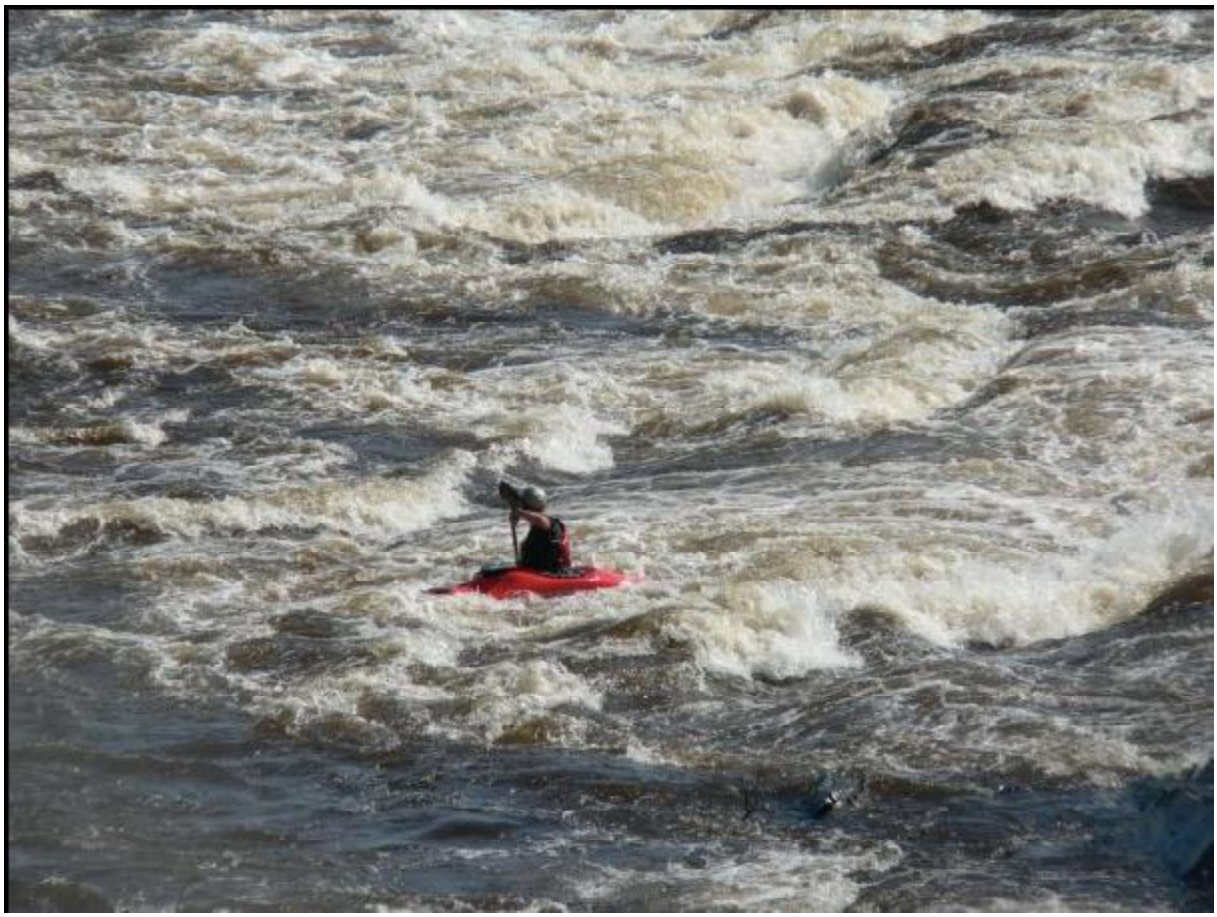

Fig. 3: Kayaking the rapids in the bypass downstream of the university street bridge.

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In addition, the E.L. Field Powerhouse tailrace releases up to 8,000 cfs into the natural river channel 0.7 miles below the Pawtucket Dam. The tailrace provides sufficient flows to create hydraulics that could be utilized by whitewater boaters for playboating under either current or enhanced conditions that are suitable for playboating, a style of whitewater boating that is frequently enjoyed by whitewater boaters where suitable hydraulic conditions are present.

Fig. 4: Whitewater boating feature in tailrace at Holtwood Hydroelectric Project (FERC Project No. P-1881)

Study Requests

- Study Request 1: Recreation Facilities, Use, and Aesthetics Study

Goals and Objectives
§5.9(b)(1)

The goals of the Recreation Facilities, Use, and Aesthetics Study are to:

1. Obtain information about the condition of existing recreation facilities and access to project lands and waters at the project; and existing recreation use, and demand at the project;
2. Evaluate the adequacy of existing access to the impoundment, canals, and

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bypassed reaches in the project boundary, including formal and informal access areas that are utilized for boating, angling, hiking, and other recreational use;

3. Conduct an assessment of the need to enhance recreation opportunities and access in the project boundary;

4. Determine the minimum acceptable and optimal aesthetic flow in the bypassed reaches below the Pawtucket Dam sufficient to protect aesthetic values; and,

5. Develop a Recreation Management Plan for the implementation of any enhancement measures and long-term monitoring of recreation demand and adequacy of facilities at the project over the term of a new licenses.

§5.9(b)(2)

Not applicable.

§5.9(b)(3)

Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, aesthetics, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. Recreation and aesthetics have been identified as a legitimate project purpose by the Commission. The Lowell Hydroelectric Project reservoir, bypassed reach, and canals, have the potential to offer recreational opportunities unique to the region provided that sufficient flow and access are provided

Background and Existing Information
§5.9(b)(4)

Section 6.1.7 provides a general description of public recreation facilities, activities, and demand at the projects. However, the PAD provides no detailed information regarding the condition of existing facilities or type or location of various uses. The PAD provides no project-specific information regarding visitor perceptions and identified needs at the projects. Information on current use and whether existing access to facilities in the area are meeting recreation demand would inform a decision on whether additional designated public access at the projects is necessary to meet existing and future recreation demand at the projects.

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Although the Licensee partially describes recreation uses in and near the project boundary, it does not fully describe the current and potential future use or adequacy of recreational opportunities and facilities. The Licensee does not propose to conduct any recreation studies as part of this relicensing process, and is silent on the impact of project operations on boating, angling, and hiking opportunities in the project area. Further, no information is provided in the PAD regarding the impact of project operations on aesthetic values in the bypassed reach.

While the PAD references American Whitewater's Rivers Database for information on whitewater boating opportunities on the Concord River, the PAD contains no information on the impact of the Licensee's flow diversion and power generating activities on potential whitewater boating use in the bypassed reach.

Project Nexus
§5.9(b)(5)

The project impounds the Merrimack River and diverts natural river inflows into two canal systems leading to a series of powerhouses. The Pawtucket Dam and the Licensee's hydropower operations have a significant impact on recreational opportunities on the Merrimack River in the project boundary including but not limited to whitewater boating by inundating rapids in the impoundment, dewatering the natural river channel, obstructing public access, and preventing the public from navigating the Merrimack River through the project boundary. An analysis of existing recreation use and access at the project would help form the basis for determining the projects' impacts upon, and ability to enhance, public recreation access opportunities. Flow over the dam and in the bypass reach directly impacts aesthetics. Also, an assessment of the current level of recreation use would provide information necessary to develop a Recreation Management Plan for efficient management of the recreational components of the project over the term of a new license.

Proposed Methodology
§5.8(b)(6)

1. Provide the methods and results of the investigation of the existing recreation facilities conditions, as referenced in the PAD.

2. The facility inventory will include characterization of the suitability of the bypassed reach below the Pawtucket Dam for whitewater boating (e.g., gradient, length, character of potential flows).

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3. The use and needs assessment will include all recreation activity types known to occur or potentially occurring in the project area. Specific methods should include visitor observations; on-site visitor intercept surveys at formal and informal public recreation areas at the project reservoirs, bypassed reach, canals, tailraces, and riverine areas; and mail and/or internet surveys targeting unique stakeholder groups that may not be practically accessed through on-site surveys (e.g., adjacent residential land owners, residents of the counties in which the projects are located, rock climbers, whitewater boaters).

4. The needs assessment will include the demand for whitewater boating in the bypassed reach, existing boating opportunities within the project region, feasibility of providing additional public access at the project reservoir and riverine reaches (potential locations, type of facilities and access, and any associated costs), identifying visitor perceptions regarding the adequacy of recreation facilities, need for additional real-time flow information, access in the project area, and assessing future recreation demand and facility needs at the project under different modes of operation..

5. The aesthetic assessment will include a range of alternate spillages that should be videotaped and qualitatively analyzed, and a demonstration study should be arranged for direct observation of flows by a team for subjective grading. A rating form is employed to provide a structure for the individual observations.

6. Assess visitor perceptions of the effects of project operations and management on recreation and recreation opportunities at the project (including fluctuating reservoir levels, minimum flow releases, and anticipated changes) over a new license term. Identify potential measures to alleviate any negative effects as well as to enhance existing recreation opportunities and access.

7. A Recreation Management Plan for the projects should be included in the license application and should include, at a minimum:
(1) a description of any proposed protection, mitigation, and enhancement measures, including: location of any proposed facilities and/or access areas (including description and figure depicting the relationship of any proposed facilities to the existing project boundaries), proposed ownership and management of any proposed facilities, associated capital, and operation and maintenance costs; and a timeline for implementation;
(2) a description of operation and management measures associated with project-related recreation access and facilities; and
(3) a description of measures for future monitoring of recreation demand and adequacy of project-related facilities to meet this demand over the term of new licenses.

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Level of Effort and Cost
§5.9(b)(7)

The estimated cost of the Recreation Facilities, Use, and Aesthetics Study for the Lowell Hydroelectric Project is about $60,000, including field studies, study report development, and drafting of a Recreation Management Plan. One field season should be sufficient to collect the required data and prepare the report.

- Study Request 2: Controlled-flow Whitewater Boating and Access Study

Goals and Objectives
§5.9(b)(1)

The goals of the Controlled-flow Whitewater Boating and Access Study are to:

(a) assess the presence, quality, access needs, flow information needs, and preferred flow ranges for river-based boating resources in a stepwise manner;
(b) assess the effects of a range of optimal and acceptable flows on whitewater recreation opportunities for whitewater paddling in the natural river channel between the Pawtucket Dam and the end of the project boundary;
(c) assess the frequency, timing, duration and predictability of optimal and acceptable paddling flows under current, proposed, and alternative modes of operation;
(d) identify the need for, and define adequate put-in and take-out points that promote car-top boating, and also identify the needs for parking areas;
(e) identify the location, challenge, and other recreational attributes associated with specific rapids and other river features;
(f) assess the flow information needs of whitewater boating and the current and potential flow information distribution system.
(g) evaluate the potential for whitewater playboating in the bypassed reach at various flow levels, including but not limited to assessing the potential for developing whitewater boating features below the tailrace of the E.F. Field Powerhouse.

§5.9(b)(2)

Not applicable.

§5.9(b)(3)

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Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, aesthetics, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Conducting the necessary studies and implementing measures to ensure public access to outdoor recreation is in the public interest. It is widely accepted that outdoor recreation has significant benefits to participants including health, well-being, and quality-of-life. Outdoor recreation also has proven economic benefits for communities located near recreational resources. FERC has concluded elsewhere that to fully evaluate the project's effect on whitewater recreation opportunities and to balance potential enhancement opportunities with their cost, a controlled-flow whitewater boating study is relevant to Commission's public interest determination. The bypassed reach below the Pawtucket Dam has the potential to offer recreational opportunities unique to the region provided that sufficient flow and access are provided.

Background and Existing Information
§5.9(b)(4)

The Licensee acknowledges in the PAD that whitewater boating is currently an existing recreational use in the Project area, principally on the Concord River at its confluence with the Merrimack River. There is anecdotal information that whitewater boating has occurred in the bypassed reach when project inflows exceed the hydraulic capacity of the project. Beyond limited anecdotal information, little is known about the whitewater boating potential of the bypassed reach at various flow levels, necessitating a controlled-flow whitewater boating study. The PAD contains no information on whitewater boating use in the bypassed reach or the extent to which the Licensee's operations impact on the availability of sufficient flows for whitewater boating in the bypassed reach below the Pawtucket dam.

Project Nexus
§5.9(b)(5)

Lowell Hydroelectric Project diverts flows from the Merrimack River into the Northern and Pawtucket Canal System, destroying aquatic habitat and valuable whitewater boating opportunity between the Pawtucket Dam and the E.L. Field Powerhouse. There is

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currently no meaningful access into the bypassed reach below the Pawtucket Dam making whitewater boating nearly impossible even during periods of high spring flows that exceed the project hydraulic capacity. While the Licensee maintains that this is a run-of-river project, its assertion is inaccurate with respect to the bypassed reach where a large section of the river is effectively dewatered and all natural whitewater boating opportunity has been lost due to project operation. The diversion of natural flows through hydropower operations alters the landscape in the natural river channel, and reduces recreational opportunities that would otherwise be available.

Study Methodology
§5.9(b)(6)

The study we request on the Lowell Hydroelectric Projects should follow the standard methodology as described in Whittaker, et. al. (2005). This methodology is designed to assess the presence, quality, and preferred flow ranges for river-based boating resources in a step-wise manner. The process steps are generally 1) desktop analyses, 2) on-land feasibility assessment, 3) on-water single flow assessment, 4) on-water multiple flow assessment. We expect and request the full implementation of this methodology. Because the quality of the resource has not been fully analyzed with current metrics, we request that on-water multiple flow assessments be conducted. The study should focus on the 2-mile bypassed reach below the Pawtucket Dam. The Licensee should work with the boating groups to identify target flows for the evaluation.

Given the limited known information about the boating characteristics of the bypassed reach below the Pawtucket Dam, it will be necessary to conduct an on-land physical inspection of the reach to identify access points and potential hazards. An on-land observation of demonstration flows will also be required to identify a range of flows that should be evaluated, during an on-water controlled flow study following widely accepted protocols. A controlled-flow whitewater boating study will identify the minimum acceptable and optimal boating flows on identified whitewater and recreational boating reaches, analyze the frequency with which boating opportunities at various flow levels are available under current operations, and analyze the extent to which boating opportunities would be available under alternate modes of operation.

The Licensee should also assess the relationship between its discharge from the E.L. Field Powerhouse and the presence of hydraulic features that can be utilized for whitewater playboating, a style of whitewater boating that utilizes a different type of whitewater craft than are used for downriver boating. The Licensee should identify suitable consultants with experience in evaluating the potential for developing hydraulic features suitable for playboating in the bypassed reach, and in particular, in the tailrace of

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the E.L. Field Powerhouse.

We will work with the licensee to document the known information regarding the river. We will provide volunteers and technical support for the studies as appropriate. We hope to work collaboratively with the licensee on this study. The whitewater boating study methodology we have requested has been used on dozens of other FERC regulated reaches.

The Licensee PAD proposes no whitewater feasibility analysis. This no-action step would reveal nothing about the current project impacts on whitewater recreation or opportunities for protection, mitigation, or enhancement measures. We currently do not know the relationship between specific low and moderate flows and the paddling experiences they provide. A desktop analysis can't generate this information. Without this information we cannot fully define the project impacts, nor propose and consider provision of releases that provide targeted recreational experiences.

Level of Effort and Cost
§5.9(b)(7)

We are willing to work with the licensee on the whitewater paddling controlled-flow study to keep costs reasonable and the quality of information high. The study will need to integrate any known information with information from the controlled-flow flow study during which several flows are paddled by boaters. Consultants usually employ still image and video documentation, surveys of the boaters, a guided conversation among the boaters, and subsequently a written report. Given the collaborative approach sought by the paddling community, including in-kind contributions of time and expertise, a consultant should be able to complete this study on behalf of the licensee for a very reasonable cost. We estimate that the cost of conducting the controlled flow whitewater boating study will be approximately $50,000 including the field work and final report preparation.

Conclusion

We respectfully request that FERC require the Licensee to complete the above described (1) Recreation Facilities, Use, and Aesthetics Study, and, (2) Controlled-flow Whitewater Boating and Access Study, in order to provide FERC with sufficient information to complete its NEPA analysis of project impacts to determine appropriate license conditions that are protective of recreation values and mitigate project impacts. Thank you for considering these comments.

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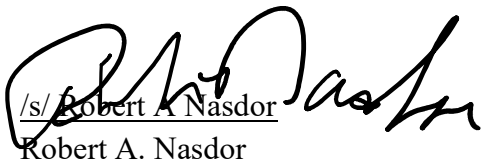
Respectfully submitted this 8th day of August, 2018.



/s/ Robert A Nasdor
Robert A. Nasdor
Northeast Stewardship and Legal Director
American Whitewater
365 Boston Post Road, Suite 250
Sudbury, MA 01776

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Boott Hydropower, LLC	Lowell Hydroelectric Project
Application for New License	Project No. 2790-072 – Massachusetts

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated this 8th day of August 2018.

Carla Miner

Carla Miner
American Whitewater
Stewardship Assistant

Service List for P-2790-000 BOOTT HYDROPOWER, INC.

Contacts marked ** must be postal served

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MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

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August 10, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

Lowell Hydropower Project, FERC No. 2790
Comments of the Massachusetts Division of Fisheries and Wildlife
Preliminary Application Document
Study Requests

Dear Secretary Bose:

The Massachusetts Division of Fisheries and Wildlife (MassWildlife) is the agency responsible for the protection and management of the fish and wildlife resources of the Commonwealth. The Division is also responsible for the regulatory protection of imperiled species and their habitats as codified under the Massachusetts Endangered Species Act (M.G.L. c.131A). The Massachusetts Endangered Species Act (MESA) was enacted in December 1990. Implementing regulations (321 CMR 10.00) were promulgated in 1992 and recently revised and implemented as of November 2010. The MESA provides a framework for review of projects or activities that occur within mapped areas of the state, called *Priority Habitat*, and published in the Natural Heritage Atlas. As such, we monitor operations at hydroelectric projects within the Commonwealth, as well as comment on proposed hydroelectric facilities. The Division offers the following comments on the Preliminary Application Document (PAD) for Lowell Hydropower Project (FERC No. 2790) submitted by Boott Hydropower, LLC, (Boott) on April 30, 2018.

PROJECT DESCRIPTION

The Lowell Project consists of a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) topped by a 5-foot-high, pneumatic crest gate system, which creates a 720-acre impoundment extending approximately 23 miles upstream. The dam has a gross storage capacity of approximately 3,600 feet between the maximum normal water surface elevation of 92.2 feet National Geodetic Vertical Datum of 1929 (NGVD) and the minimum water surface elevation of 87.2 feet NGVD when all five pneumatic gates are fully lowered. The spillway is 980.5 feet long. The project includes a two-tiered network of man-made canals, totaling approximately 5.5 miles in length, which provide flow to 21 Boott-owned hydroelectric units. Nineteen of the units are located in four powerhouses (Assets, Bridge Street, Hamilton, and John Street) situated in the canal and have various runner speeds and diameters. The remaining two units are located in the main powerhouse (E.L. Field) on the Merrimack River, which uses water from the northern canal to generate power. The units in the E.L. Field powerhouse are identical, 8.6-MW horizontal Kaplan turbine-generator units, each with a maximum hydraulic capacity of 4,000 cfs.

Boott currently operates the project in a run-of-river mode. The current license requires an instantaneous minimum flow of 1,990 cfs or inflow, whichever is less, as measured immediately downstream of the project.

Boott operates both upstream and downstream fish passage facilities at the project. These include a lift at the E.L. Field powerhouse which conveys fish to the northern canal, an upstream anadromous vertical-slot fishway at the Pawtucket dam, and a downstream bypass facility at the E.L. Field powerhouse. The fish ladder has a total operating flow of 500 cfs and acts as the primary source of flow in the 0.7-mile-long bypass reach (other than

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spillage over the Pawtucket dam spillway when inflow exceeds the maximum hydraulic capacity of the project's stations). The current license contains no minimum bypass flow requirement.

In the PAD, Boott has proposed no additional protection, mitigation, or enhancement (PME) measures.

FISH AND WILDLIFE RESOURCES

The Merrimack River provides essential habitats and a migratory corridor for numerous species of fish and wildlife. As the second impassable barrier to upstream migration on the Merrimack River, the Pawtucket Dam has a significant impact on these resources, particularly anadromous and catadromous fish. These species require safe and effective passage past the dam on their upstream and downstream migrations. Likewise the bypass reach below the dam provides a unique riffle area for quality resident fish and macroinvertebrate habitat. Additionally, the dam acts as a passage barrier to resident fishes who act as host-fishes to freshwater mussels located both up and downstream of the dam.

COMMENTS

Preliminary Application Document

General
The PAD is comprehensive and provides most of the information necessary.

Specific

4.0 Project Location, Facilities, and Operations

Boott provided a detailed description of the project facilities; however, several important pieces of information are missing:

- the minimum hydraulic capacities, runner diameters and runner speeds of the turbines at the project (housed in the E.L. Field, Assets Station, Bridge Street, Hamilton Station, and John Street powerhouses);
- clear spacing of the trashracks at the intakes to all of the turbines; and
- the calculated approach velocity at the trashracks/intakes (based on the wetted trashrack area).

4.1 Civil Works

Tailrace

Telemetry studies in 2002, 2011, and 2013 showed emigrating American Shad which approach Lowell via the tailrace have difficulty using the entrance of the fishway (Sprankle 2005; Alden 2011; Blue Leaf Environmental 2013). In 2016, Gomez and Sullivan engineers performed an analysis of upstream passage at the lift and recommended Boott excavate the ledge outcropping in the tailrace channel to approximately 10 feet below normal tailwater level extending 50 to 100 feet downstream from the entrance (Gomez and Sullivan 2016). On July 18, 2017, Boott submitted design plans to the Merrimack River Technical Committee (MRTC; comprised of Federal and State agencies) for review prior to the start of construction. On July 26, 2017, the MRTC submitted their recommendations. On August, 18, 2017, at the request of Boott, the National Oceanic and Atmospheric Administration (NOAA) and the United States Fish and Wildlife Service (Service) provided additional information pertaining to the MRTC's recommendations (Attachment A). The PAD does not contain any information regarding the tailrace excavation project. We recommend Boott update the PAD to include the details we have provided here.

In the PAD, and the Commission's pre-filing milestone timetable included in the scoping document, the first study season is scheduled to begin during the spring of 2019. However, Boott plans to complete the tailrace excavation project during late summer of 2019 (Attachment B). The tailrace excavation project will change flow dynamics in the tailrace channel and therefore the hydraulic conditions fish will likely encounter as they migrate upstream. As such, we ask that the studies requested herein (related to upstream fish migration and flow in the tailrace area) occur after the excavation is complete so the natural resource agencies can properly assess the impacts project operations might have on migratory fish and develop adequate passage and protection measures if necessary.

4.5 Description of Project Operations

Fish Passage Operations

Boott states they have provided, and assessed the effectiveness of, American Eel passage at Lowell. The effort to pass eels at the project began in 2014 when temporary eel ramps were deployed near the ladder. However, the effectiveness of these structures has never been quantified. In 2018, Boott agreed to: (1) continue to operate the existing anadromous fish ladder for eels (releasing 30 cfs) until September 30; and (2) perform six, dewatered, visual inspections of the ladder. To date, there have been no siting surveys performed at Lowell. Therefore, it is unknown if eels congregate at other areas within the project boundary (e.g., the outfall of the canal power stations) or if passing eels at the ladder is the most appropriate technique. MassWildlife likely will include, in any fishway prescription issued for the project, a requirement that Boott conduct an upstream eel passage siting survey after a new bypass flow regime has been implemented, to determine areas of eel concertation so permanent upstream passage facilities can be properly sited.

National Park Service Requirements

In this section of the PAD, Boott states they maintain canal water levels "within appropriate limits during the May 15 to October 15 tour boat operating season," however no additional information is provided. We recommend Boott update the PAD to include further information regarding the water levels maintained in the canal and any additional, relevant, information regarding the operations agreement they have with the National Park Service.

5.4 Fish and Aquatic Resources

Overview

The fish ladder at the Pawtucket dam has a total operating flow of 500 cfs and is the primary source of flow in the 0.7-mile-long bypass reach which extends from the Pawtucket dam downstream to the E.L. Field powerhouse. However, there is no information provided in the PAD to support this flow release is adequate to meet the life history requirements of fish and wildlife (including invertebrates such as freshwater mussels). Therefore, MassWildlife recommends Boott undertake a study which evaluates habitat in the bypass reach at a range of flows, including the existing 500 cfs release. The study design should include habitat mapping of the entire bypass reach in addition to collecting hydraulic and habitat measurements (i.e., depth, velocity, wetted perimeter, substrate) along a number of transects to assess the existing flow release and alternative flows.

Boott states "fish are capable of bypassing the Project's entire canal system via the Merrimack River and can use the existing upstream and downstream fish passage facilities at the Pawtucket Dam and the E.L. Field Powerhouse." While fish can potentially avoid entering the canal, despite there being no exclusionary measures in place, a study by Normandeau Associates, Inc., found only 7 percent of juvenile alewives utilized the bypass (Normandeau 1991). A follow up study (Normandeau 1995) performed after the bypass was enlarged found of 1,779 marked fish, only 37 percent utilized the downstream fish passage facilities. While efficiency increased by approximately 30 percent from 1991 to 1995, the bypass remains over 60 percent ineffective at passing fish downstream.

Although bypass effectiveness studies were performed at Lowell in the early 1990s, it is still unclear as to which route American Shad, Alewife, Blueback Herring, and eel select as they move downstream (spillway, fish ladder, canal, turbines, existing bypass), the survival estimates associated with each route, the effect the Pawtucket gatehouse has on downstream movement, the effect the pneumatic crest gates have on emigration, etc. To fill these data gaps and better understand downstream passage at Lowell, especially in relation to the canal, MassWildlife recommends Boott conduct studies which assess: (1) the behavior, approach routes, passage success, survival and delay of adult American Shad and River Herring as they emigrate to the ocean; and (2) the impact project operations have on the downstream migration of juvenile Alewife (which can serve as a proxy for Blueback Herring and American Shad in this instance); and (3) downstream route of passage and survival of adult silver-phase American Eel.

Abundance

The Merrimack River supports a variety of migratory fish species, including American Shad, River Herring (Alewife and Blueback Herring), American Eel, and Sea Lamprey. Table 5.4-2 lists the number of river herring, shad, and eel that have passed the Lawrence Project (FERC No. 2800, the first hydroelectric dam on the Merrimack River), and Lowell since 1983. In 2017, Boott claims 177,738 eels swam upstream past Lawrence. However, our records indicate an estimated 8,645 elvers were lifted in the hopper and 17,691 passed the eelway at the dam (26,336 eels total). MassWildlife recommends Boott update Table 5.4-2 to: (1) ensure listed, annual, fish passage counts are accurate; and (2) include sea lamprey passage counts.

Other Site-Specific Fisheries Information

In this section of the PAD, Boott states American Shad studies were conducted in 1999 and 2000, which led to significant modifications and upgrades to the E.L. Field powerhouse fish lift, thereby improving passage efficiency. However, it is unclear as to which modifications Boott is referring.

According to our records, a lack of modifications and upgrades to the project coupled with poor fish passage led to a radio-telemetry study of shad migration in 2002 (Sprankle 2005). This study found 55 percent of the shad which passed upstream of Lawrence made their way into the Lowell tailrace near the fishway entrance. However, only 6.2 percent of the tagged shad were actually passed upstream of the project via the fish lift. This was consistent with fish passage counts taken at Lowell in 2002; only 9.7 percent of the shad which passed Lawrence subsequently passed Lowell. These data led to a dye test, also conducted by Ken Sprankle, in June 2003. During this qualitative evaluation, concentrated dye was released into the fishway entrance channel and observed. Results demonstrated the flow field extends downstream from the fishway and stalls approximately 35 feet from the entrance, effectively cutting off the progression of shad moving up the tailrace and into the fishway. Based on fish counts at Lawrence and Lowell, passage efficiencies for American shad have not improved at the project over the past 20 years. From 1996 to 2017, passage efficiency at the project has not exceeded 30 percent. Additionally, the internal fish lift efficiency has remained low. In 1996, fish lift efficiency ranged from 0.5 to 2.4 percent. In 2000, studies conducted by Boott suggested efficiency increased to 42 percent (Boott 2000). While this latest assessment does suggest an improvement in operations compared to previous years, an internal fish lift efficiency of 42 percent is still low as overall passage efficiency is based on the combined near/far field attraction efficiency and internal lift and ladder efficiency. Based on the information above, and considering the ledge removal improvements which will take place in 2019, MassWildlife recommends Boott perform a study assessing American shad upstream route selection passage effectiveness and migratory delay.

Boott goes on to state, “A 1988 acoustic telemetry study performed by RMC Environmental Services (RMC) of adult American shad movement through the Northern canal demonstrated successful passage through the Pawtucket Gatehouse, as well as incidental information regarding downstream passage routes for post-spawning individuals. In a follow-up study in 1991 by Normandeau Associates, Inc., found similar findings as the 1988 adult American

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shad telemetry study." While it is true that 80 percent of the fish successfully exited the canal, it should be noted: (1) the sample size was small, only 25 fish were used in the analysis; and (2) the delay caused by existing infrastructure was substantial, ranging from 1 to 5 days. Also, as a point of clarification, there were two studies conducted in 1991 by Normandeau Associates, Inc., which focused on downstream passage of river herring and shad. The scope and findings of these studies did not include upstream passage through the gatehouse, which was the focus of the RMC 1988 study. To date, the RMC study has been the only evaluation of upstream passage of shad in the northern canal and gatehouse. As a component of the studies provided herein, we recommend Boott track and monitor clupeid behavior in the canal.

Major Findings of Fish Passage Studies Since 1988

In the PAD, Boott provides an overview of the fish passage facilities at both projects, when they began operating, and studies which have been conducted to determine their effectiveness at passing target species. We would like to offer some points of clarification, specifically on the information listed in Table 5.4-3.

- 1988: Passage of Radio-Tagged American Shad through the Northern Canal Headgate Structure. Boott states "24 of 25 radio-tagged shad (96%) released at fish lift exit passed the Northern Canal headgate structure with little delay." However, 19 of the 24 shad (80 percent) which successfully passed did not pass through the headgate structure but rather the adjacent boat lock facility. When the boat lock was closed, delay ranged from 1 to 5 days. Since a majority of the shad were observed reaching the headgate structure within an hour, the delay in migration associated with closing the boat lock was approximately 23-119 hours. The study notes most fish approached the road bridge adjacent to the gatehouse but fell back downstream. The delay experienced by these shad is significant and, from the information provided by Boott, it is unclear how often the boat lock has been open during the upstream migratory season since the 1988 study was performed. We are concerned that the operation and management of the northern canal headgate may contribute to migratory delay and is an issue that will need to be resolved in order to successfully pass fish upstream and achieve a sustainable population of shad in the Merrimack River.

- 1991: An Assessment of the Effectiveness of a Fish Bypass for Passing Juvenile Alewives at the Lowell Hydroelectric Project. The findings listed in the table fail to include two critical results: (1) the bypass effectiveness for juvenile alewife was only percent, even when bypass flows reached 2 percent of the turbine flow; and (2) when the bypass flow was increased by 50 percent, due to the units shutting down, the number of fish using the bypass increased by a significant amount (4,250 alewives in 10 minutes versus 0 in the previous 4.5 hours).

- 1996: Lowell Hydroelectric Project Internal Fish Lift Efficiency Monitoring Program. The internal fish lift efficiencies should be included in the findings, as they were extremely low, ranging from 0.5 percent to 2.4 percent.

- 1999: An Assessment of Internal Fish Lift Efficiency at the Lowell Hydroelectric Project. The study findings section states "The ratio of total shad lifted at the Lowell Project to the total lifted at the downstream Lawrence facility was nearly doubled, reaching approximately 29% in 1999 compared to a historic ratio of 15% since 1986, and in the preceding two years." While this statistic may technically be correct, it actually represents a decrease from 1992 and 1995, when the ratios of total shad lifted at Lowell were 31 percent and 38 percent, respectively.

- Boott performed two fish lift internal efficiency studies and in the major findings column claims the crowder position has a beneficial impact on fish passage efficiency. However, this contradicts the study findings listed for the 1996 Normandeau Associates, Inc. study. As noted above, MassWildlife suggests Boott include information regarding modifications made to the fish lift which supports its contention of improved internal efficiency.

- A report by Gomez and Sullivan titled "Analysis of Upstream Fish Passage Facilities and Operations" was not included in the PAD. We recommend Boott update Table 5-4.3 to include this study, which identifies specific areas of improvement needed to increase the Lowell fishways reliability and upstream passage efficiency. Recommendations provided in the report include: (1) installing a pivot gate to update the existing vertical gate; (2) excavating the ledge outcrop downstream of the fishway entrance; (3) reopening the street side entrance; and (4) installing an entrance extension. The analysis also highlights the aging infrastructure at the project and the need to replace specific components, along with cost estimates.

6.0 Preliminary Issues, Project Effects, and Potential Studies

Fish and Aquatic Resources

Boott has not proposed any studies for relicensing at this time, but has identified potential resource issues which include: bypass flows, fish passage, historical resources, boating access, and inundation of upstream floodplains. Relevant to fish and aquatic resources, MassWildlife believes new studies need to be conducted, with sufficient fish sample sizes, to better understand upstream and downstream passage at the project as well as a complete instream flow study in the bypass reach.

Downstream Passage

MassWildlife recommends Boott conduct new studies to fully understand how post-spawned adult shad and river herring, juvenile shad and river herring, and adult silver phase eels move past the Pawtucket dam, through the canal system, turbine intakes, and the downstream bypass facility. In addition, turbine injury and mortality studies are needed and should be used in conjunction with the results of the passage routing studies, where applicable, to calculate total through-project survival rates. MassWildlife herein provides study requests in order to address these information needs.

Upstream Passage

Yearly site inspections, performed by MassWildlife, have identified a number of problems with respect to shad at the lift and ladder fishway entrances. MassWildlife believes that a comprehensive radiotelemetry study is needed to understand the relationship between project operations, including spill flows, and shad and river herring movement through the Merrimack River (including attraction to and passage through these facilities). Additionally, a study to define the relationship of the complex hydraulic conditions at the spillway fish ladder entrance and the tailrace fish lift entrance is needed in order to evaluate data on fish behavior and passage at those locations. Therefore, MassWildlife is providing herein study requests to address these information needs.

Instream Flows in the Lowell Bypass

The bypass reach is 0.7 mile long (from the Pawtucket dam to the E.L. Field powerhouse) and contains diverse habitat. There are approximately 11 miles of free-flowing river downstream of the Pawtucket dam which also contain a diversity of habitat, including important spawning and rearing habitat for migratory fish species such as American Shad. To date, there have not been any empirical studies which assess the adequacy of the existing flow protocols. MassWildlife herein submits study requests intended to address these information gaps.

ADDITIONAL INFORMATION

The following information is needed:

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- the minimum hydraulic capacities, runner diameters and speeds of the turbines in each powerhouse associated with the project;
- a more thorough description of how project operations are monitored and recorded;
- hourly data (water surface elevations, dam discharge, generation) for the project in spreadsheet format for the past 5 years;
- a detailed description of modifications made to the existing fish passage facilities, including dates changes were made;
- a detailed description of canal operations; and
- a detailed description of modifications made to the bypass extending from the Pawtucket dam to the E.L. Field powerhouse (weir installation, excavation, etc.).

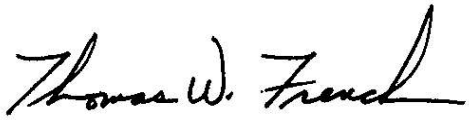
RECOMMENDED STUDIES

The pages below contain the studies requested by MassWildlife. They are presented in the format required pursuant to CFR §4.38(b)(5) and therefore each contain the rational for the request which will not be repeated here. Please note that MassWildlife also supports the study requests provided by the other agencies including, but not limited to, National Marine Fisheries Service, US Fish and Wildlife Service, and Massachusetts Department of Environmental Protection.

Massachusetts Division of Fisheries and Wildlife list of requested studies under P-2790

1. In-stream Flow Habitat Assessment
2. Adult Alosine Downstream Passage Assessment and Protection Evaluation
3. Telemetry Study of Upstream and Downstream Migrating Adult American Shad and River Herring
4. Impact of Project Operations on Downstream Migration of Juvenile Alosines
5. Downstream American Eel Passage Assessment
6. Operations Analysis of the Lowell Canal
7. CFD Modeling in the Vicinity of Fishway Entrances and Powerhouse Forebays
8. Bypass Reach Zone of Passage Study
9. Fish Assemblage Assessment

Thank you for this opportunity to comment.

Sincerely, Caleb Slater, Ph.D. Anadromous Fish Project Leader	Sincerely,  Thomas W. French, Ph.D. Assistant Director for the Natural Heritage & Endangered Species Program

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Alden. 2011 Shad Upstream Passage Assessment at Lowell Hydroelectric Project. Submitted to Boott Hydro, LLC. Final Report. Alden Research Laboratory, Inc. Andover, Massachusetts. 43 pp.

Blue Leaf Environmental. 2013. Additional Analysis of American Shad Three- Dimensional Behavior in the Tailrace of the Lowell Project. Submitted to Boott Hydro, LLC. Final Report. Blue Leaf Environmental, Inc. Ellensburg, Washington. 4 pp.

Boott. 2000. Assessment of Internal Fish Lift Efficiency at Lowell Hydroelectric Project. Submitted to Boot Hydro, LLC. Final Report. Boott Hydropower, Inc. 16 pp.

Gomez and Sullivan. 2016. Analysis of Upstream Fish Passage Facilities and Operation. Submitted to Boott Hydroelectric Project. Submitted to Boott Hydro, LLC. Final Report. Gomez and Sullivan Engineers, D.P.C. Henniker, New Hampshire. 62 pp.

Normandeau. 1991. An Assessment of the Effectiveness of a Fish Bypass for Passing Juvenile Alewives at the Lowell Hydroelectric Project, Lowell, Massachusetts. Submitted to Consolidated Hydro, Inc. Final Report. Normandeau Associates, Inc. Bedford, New Hampshire. 26 pp.

Normandeau. 1995. Use of the Fish Bypass by Juvenile Clupeids at the Lowell Hydroelectric Project During Fall 1994. Submitted to Consolidated Hydro, Inc. Final Report. Normandeau Associates, Inc. Bedford, New Hampshire. 18 pp.

Sprankle, K. 2005. Interdam movements and passage attraction of American shad in the lower Merrimack River main stem. North American Journal of Fisheries Management, 25, 1456-1466.

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Boott Study Request # 1

Instream Flow Habitat Assessment of the Lowell Bypassed Reach
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine an appropriate flow regime which will protect and enhance the aquatic resources in the bypass reach between the Pawtucket dam and the E.L. Field powerhouse. Specifically, the objective of this study is to conduct an instream flow habitat study to assess the impacts of a range of project discharges on the wetted area and optimal habitat for key species, including the quantity and location of suitable habitat.

The specific objectives of this field study, at a minimum, include:

1. characterize and map wetted perimeter of the bypass reach over a range of bypass flows;
2. survey and evaluate the water depth and mean channel velocity at transects within the bypass reach over a range of flows; and
3. map and assess the value of aquatic habitat in the bypass reach over a range of flows, focusing on potential habitat for resident species, and spawning and migration habitat or rest/regrouping areas for migratory species.

Target fish species should include American shad, river herring (alewife and blueback herring), fallfish, white sucker, freshwater mussels and benthic macroinvertebrates. The final target species list should be developed in consultation with the fisheries agencies and based on the results of the mesohabitat mapping.

Resource Management Goals

The U.S. Fish and Wildlife Service (Service) seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources within the Lowell bypassed reach, MassWildlife's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide a flow regime in the bypassed reach that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) and diadromous fishes.
3. Minimize current and potential negative project operation effects on water quality and aquatic habitat.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), and the Federal Power Act (16 U.S.C. §791a, et seq.).

Public Interest

The requester is a natural resource agency.

Existing Information

The Lowell Project bypasses a 0.7-mile-long section of the Merrimack River, from the Pawtucket dam to the E.L. Field powerhouse. There is presently no required minimum bypass flow. However, during the upstream fish passage season, the bypass reach receives 500 cfs through operation of the spillway fish ladder. In addition, the bypass reach receives flow whenever inflow exceeds the hydraulic capacity of all the project's stations. Pursuant to Article 37, Boott Hydropower, LLC, (Boott) maintains a minimum flow of 1,990 cfs or inflow, whichever is less, as measured immediately downstream of the project.

Available information in the PAD does not indicate how project operations have altered downstream hydrology, habitat quantity and quality, and water quality, which may affect resident and migratory fish, macroinvertebrates, aquatic plants and other biota and natural processes in the Merrimack River. The PAD provides no detailed description of the physical or biological characteristics of the bypassed reach.

An empirical study is needed to provide information on the relationship between flow and habitat in the bypassed reach for MassWildlife to use in determining a flow recommendation.

Nexus to Project Operations and Effects

Although the project license requires Boott to maintain a minimum flow of 1,990 cfs or inflow (if less), downstream of the project, Boott states in practice the project operates in a true run-of-river mode. The Department of the Interior is not recommending a below-project flow study based on the assumption that any new license issued for the project will require instantaneous run-of-river operation (essentially codifying current operations).

The project includes a 0.7-mile-long bypassed reach. The current license contains no minimum bypass flow requirement. During the upstream fish passage season, the bypass reach receives 500 cfs via operation of the spillway fish ladder; otherwise, the reach only receives flow when inflow exceeds the hydraulic capacity of the project's generating capacity. To our knowledge, the lack of a required bypass flow was not based on any quantitative, rigorous scientific studies.

This section of the Merrimack River contains habitat which supports native riverine species, including important spawning and rearing habitat for migratory species like American shad and river herring. While the existing license does not require a minimum bypass flow, MassWildlife believes one is needed to sufficiently protect the aquatic resources inhabiting the bypassed reach.

Results of the flow study will be used by MassWildlife to determine an appropriate flow recommendation which will protect and/or enhance the aquatic resources in the bypassed reach for the duration of any new license issued by the Federal Energy Regulatory Commission (Commission).

Methodology Consistent with Accepted Practice

Bypass flow habitat assessments are commonly employed in developing flow release protocols which will reduce impacts or enhance habitat conditions in reaches of river bypassed by hydroelectric projects.

Given the size of the bypassed reach (0.7 mile long) and the important resources known to inhabit the reach (i.e., diadromous fishes); we believe a study methodology which utilizes an instream flow incremental methodology (IFIM) approach is appropriate for this site. This same protocol was used during the relicensing of the Housatonic River Project (FERC No. 2576), and has been accepted by the Commission in other licensing proceedings.

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The study should have two components. The first component entails mapping habitat within the bypass reach. The number, location, and size (area and linear distance) of each mesohabitat type in the reach should be documented, including qualitative characterizations (e.g., dominant substrate, average depth, overhead and instream cover, etc.). The second component consists of conducting an instream flow study.

At a minimum, the study design should involve collecting wetted perimeter, depth, velocity, and substrate data within a range of discharge levels along transects located in the reach of river between the dam and the E.L. Field powerhouse. The measurements should be taken over a range of test flows, to be agreed upon by the natural resource agencies. This information should then be synthesized to quantify habitat suitability (using mutually agreed upon Habitat Suitability Index curves) of each test flow for target species/life stages identified by the fisheries agencies. We recommend Boott perform habitat modeling using one dimensional modeling techniques to better characterize flows and velocities in this complex channel area.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Field work for flow studies can be reasonably extensive but will depend on consultation with Boott on study methodology and on-site decisions on locations for data collection and the number of collection locations. Post-field work data analysis would result in a moderate cost and effort. We anticipate that the level of effort and costs will be comparable to those experienced on similar Commission relicensing projects (e.g., the Glendale Project, FERC No. 2801).

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Boott Study Request # 2

Adult Alosine Downstream Passage Assessment and Protection Evaluation
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to assess the adequacy of the turbines at the E.L. Field, Assets, Bridge Street, Hamilton, and John Street powerhouses, to minimize injury, entrainment, and mortality of fishes residing in the Merrimack River, and to recommend appropriate mitigative measures as necessary.

The specific objectives of the field study, at a minimum, are: (1) assess the risk of adult American shad and alewife becoming injured, impinged, or entrained in the E.L. Field, Assets, Bridge Street, Hamilton, and John Street powerhouse units; (2) estimate turbine survival; (3) assess the risk of injury or mortality at the spillway and downstream bypass; and (4) evaluate potential passage and protection measures.

Resource Management Goals

The Atlantic States Marine Fisheries Commission has developed several documents related to the management of American shad and river herring:

1. Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999.
2. Atlantic States Marine Fisheries Commission. 2000. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.
3. Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.
4. Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.

Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring includes an objective of maximizing the number of juvenile recruits emigrating from freshwater stock complexes and recommends enhancing survival at dams during emigration by evaluating survival of post-spawned adults and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implementing measures to pass fish via the route with the best survival rate.

Specific to resident riverine and migratory fish entrainment, MassWildlife's goals are:

1. Minimize current and potential negative project operation effects such as turbine entrainment that could hinder management goals and objectives.

2. Minimize project-related sources of mortality to resident and migratory fishes in order to restore natural food web interactions and ecosystem functions and values.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), and the Federal Power Act (16 U.S.C. §791a, et seq.).

Public Interest

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The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

No project-specific information exists regarding risk of impingement and/or entrainment of adult alosines. In the PAD, Boott provided little information which would inform the relative risk of impingement or entrainment in any of the 21 units associated with the project. Moreover, information regarding fish mortality at the spillway and the downstream bypass was not discussed. While Normandeau Associates, Inc., performed a study in 2003 pertaining to the survival of Atlantic salmon smolts through the turbines, (1) the sample size was small (20 fish); (2) the study was not performed at a full range of gate settings; and (3) salmon are a robust fish species and cannot be used as a proxy for alosines. The 2003 study did shed light on a predation issue, however, in the project's tailrace. Of the salmon that passed downstream, 69 percent were suspected to be preyed upon after using the downstream bypass facility. As Normandeau Associates, Inc., noted in their study results, predators residing in the tailrace can have a large impact on emigrating migratory fish species that use the current bypass facility at the project.

To date, no directed studies of alosine injury, entrainment, or mortality have been conducted at the project's modified spillway, the downstream fish bypass facility, or through the turbines. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating adult alosines and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

Hydropower projects generate electricity by moving water through a turbine-generator system. Typically, there are trashracks in front of the intakes leading to the turbines. If the rack spacing is narrow and the velocities at the racks too high (relative to the swim speeds of fish species inhabiting or moving through the headpond), fish may become impinged against the racks and die. If the rack spacing is wide and the velocities too high (relative to the swim speeds of fish species inhabiting or moving through the headpond), fish may become entrained (i.e., pass through the racks) and get injured or die while passing through the turbines.

Lowell's configuration likely presents problems with respect to providing safe, timely, and effective passage for outmigrating alosines. Pre-spawned adult American shad and river herring pass upstream through the Lowell fishways and/or are stocked into upstream habitats. These fish need to be able to migrate back downstream because they are iteroparous in this region. Therefore, it is necessary to understand how alosines move through the project area and the level of injury or mortality caused by entrainment through the project's turbines and/or passage via the dam spillway and downstream bypass facility.

Methodology Consistent with Accepted Practice

MassWildlife proposes a phased approach to this study.

Phase 1:

Spill, bypass, and turbine mortality should be assessed using a balloon-tag method.

For spill mortality sites (dam spillway and downstream bypass), tagged alosines will be injected or released into spill flow at points where water velocity exceeds 10 ft/sec to minimize the possibility of the fish swimming upstream into the headpond or canal. Passed balloon-tagged alosines will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

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For turbine mortality sites, tagged alosines will be injected into the intakes of units operating at or near full generation at points where intake water velocity exceeds 10 ft/sec to minimize the possibility of fish swimming back upstream through the intakes. Passed balloon-tagged alosines will be recovered in the tailrace and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

Phase 2:

Boott should investigate existing or potential future operational and/or physical measures that would minimize injury or mortality to outmigrating adult alosines moving past the project. Based on the results of this investigation, we recommend Boott provide a range of potential alternatives (e.g., increasing attraction to the existing downstream bypass, installing exclusionary screening, etc.).

Project operations (flows, levels, gate openings, number of units operating, and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) should be monitored regularly (hourly measurements if possible) throughout the duration of the study.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The cost and effort of each individual phase of this study are expected to be moderate. Based on the scale and scope of the subject study, we estimate the cost to be $25,000 to $50,000. In the PAD, Boott proposes no studies to address this issue. MassWildlife is not aware of any previously conducted or ongoing studies related to impingement, entrainment or survival of adult alosines at the project.

REFERENCES

Normandeau. 2003. Passage Route Selection and Survival of Atlantic Salmon Smolts Passed through the Lowell Hydroelectric Project. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc. Westmoreland, New Hampshire. 130 pp.

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Boott Study Request # 3

Telemetry Study of Upstream and Downstream Migrating Adult American Shad and River Herring to Assess Passage Routes, Effectiveness, and Delay
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to assess the behavior, approach routes, passage success, survival, and delay of adult American shad and river herring as they encounter the Lowell Project during their upstream and downstream migrations to determine if project operations negatively impact their survival and production.

The following objectives will address this request:

1. assess project operations effects on the timing, orientation, routes, and migration rates of shad and river herring;
2. determine route selection and behavior of upstream migrating shad and river herring at the project under varied operational conditions, including a range of spill conditions (e.g., movement to the dam, attraction to the E.L. Field station discharge, movement between locations, delay, timing, etc.);
3. determine delay/fallback associated with the northern canal;
4. assess near field attraction to, and entrance efficiency of, the fish lift under a range of spill conditions and with the river-side entrance and street-side entrances open;
5. assess near field attraction to, and entrance efficiency of, the spillway ladder under a range of spill conditions;
6. evaluate the internal efficiency of the Pawtucket dam ladder;
7. collect ladder and lift efficiency data, to include rates of approach to fishway entrances, entry into fishways, and passage under varied operational conditions, including a range of spill conditions;
8. determine the proportion of post-spawned adults that select the power canal as a downstream passage route under varied operation conditions, including a range of spill conditions up to full spill; determine post-spawned adult downstream migration route selection, passage efficiency, and delay associated with the power canal under various operational conditions, including a range of spill conditions; and
9. compare rates and measures of delay and movement among project areas and routes utilized (e.g., spill at dam vs. power canal) under the range of permitted and proposed spill and operational conditions.

If project operations are adversely affecting shad or river herring migration timing or are resulting in other deleterious population effects, we recommend Boott identify operational solutions or other passage measures that will reduce and minimize these impacts within the project area.

This study will require 3 years of field data due to the tailrace ledge excavation project which will be completed in 2019 and to capture inter-annual variability of river discharge, water temperatures, and variability in outmigration timing. We recommend Boott perform the downstream routing portion of the study in 2019 (pre-ledge excavation) and 2020 (post-ledge excavation). In 2020 and 2021, after the ledge has been excavated, we recommend Boott perform the upstream portion of this study.

Resource Management Goals

The Atlantic States Marine Fisheries Commission, Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring, approved in 2010, includes the following objectives:

Upstream Passage

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1. Fish must be able to locate, enter, and pass the passage facility with little effort and without stress.
2. Where appropriate, upstream fish passage effectiveness should be improved through operational or structural modifications.
3. Fish which have ascended the passage facility should be guided to an appropriate area so they can continue their upstream migration and avoid being swept back downstream.

Downstream Passage

1. Enhance survival at dams during emigration.
2. Evaluate survival of post-spawned adults and juvenile fish passed via each project route (e.g., turbines, spillage, bypass facilities, or a combination of the three).
3. Implement measures to pass fish via the route with the least delay and best survival rate.

MassWildlife seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to American shad and river herring movement and migration, MassWildlife's goal is to minimize current and potential negative project operation effects on the safe, timely and effective upstream and downstream passage of adult American shad and river herring.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), the Federal Power Act (16 U.S.C. §791a, et seq.), the Atlantic States Marine Fisheries Compact (P.L. 539, 77th Congress, as amended by P.L. 721, 81st Congress), and the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5107).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

Several studies pertaining to the fish lift and downstream passage facilities at Lowell have been conducted for American shad. Studies of alewife passage are limited to a single downstream test performed in 1991. Previous studies pertaining to upstream shad migration (listed in Table 5.4-3 of the PAD) demonstrate passage through the existing lift at Lowell is relatively poor. Also, when analyzing annual passage counts for river herring and shad, the number of fish which utilize the Lowell lift versus those that pass at Lawrence is low (from 1996 to 2017 passage efficiency at Lowell has not exceeded 30 percent).

Until 2016, the fish lift has been the primary route of upstream passage at the project. The ladder, located at the Pawtucket dam, has typically only been operated during periods of high flow. Therefore, to date, studies performed at Lowell have not tested the nearfield attraction, entrance efficiency, or internal efficiency of the ladder. Moreover, past studies have had statistically low sample sizes (less than 60 fish) and were all performed prior to the ledge excavation project which will occur in August 2019. Future studies should have a robust sample size (at a minimum, 150 fish per species) and array system. Additionally, to obtain a comprehensive understanding

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of fish behavior at Lowell, for both upstream and downstream migration, studies are needed to: (1) determine if project operations affect pre-spawned and post-spawned river herring and shad migration timing; (2) assess fish movement to, and through, the ladder at the Pawtucket dam; and (3) assess passage success at the tailrace fish lift post-ledge removal.

Nexus to Project Operations and Effects

Lowell tailrace turbulence (potentially exacerbated by the existing ledge outcropping) creates attraction issues at the entrance of the fish lift. Moreover, a lack of effective protection at the 21 turbines associated with the project increases the risk of entrainment and mortality alosines may experience as they migrate downstream to the ocean. During the upstream fish passage season, the Lowell bypass reach receives 500 cfs during the day and 300 cfs at night via operation of the spillway fish ladder; otherwise, the reach only receives flow when inflow exceeds the hydraulic capacity of the project's generating capacity. The spillway ladder is, therefore, only partially effective due to lack of flow.

Existing project operations and limited bypass flows can have a direct impact on diadromous fish migration. Migration delays, increased predation, mortality during passage over the dam or through turbines, and changes in route selection under different flow conditions are potential influences of the project on shad and river herring populations in the Merrimack River. Effective upstream and downstream passage and successful spawning and juvenile production are necessary to help achieve shad and river herring management restoration goals for the Merrimack River, particularly in the upstream reaches.

Methodology Consistent with Accepted Practice

The movement of migratory shad and river herring would be best studied by using radio telemetry, including passive integrated transponder (PIT) tags. Radio telemetry is an accepted technology that has been used for a number of studies associated with hydropower projects, including at the Bellows Falls (FERC No. 1855), Wilder (FERC No. 1892), and Vernon (P-1904) projects.

The study design must specify sample sizes, as well as tag and receiver configurations, to ensure rates of entry and exit to the tailrace, fish lift and fish ladder, downstream bypass, the bypassed reach, and canal, can be calculated with sufficient precision. We recommend Boott capture shad and river herring below Lawrence and tag at least 150 individuals per species. Double-tagged (radio and PIT) shad and river herring should be released upstream of the Lawrence dam and upstream of the Lowell dam. Fish should also be released directly into the Pawtucket canal to adequately assess project conditions likely to be encountered during downstream migration. Additional, tagged, individuals may need to be released farther upstream to ensure enough fish encounter the dam during a sufficient range of turbine and operational conditions to test for project effects (especially in 2020 and 2021). A large array of stationary monitoring stations (radio and PIT) will be needed to provide an appropriate level of resolution for data analyses and to answer the natural resource agencies' questions regarding project operation effects. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017); a minimum of 25 dead river herring and 25 dead shad should also be released as a control group in this study. A plan and schedule for spill releases should be developed which provides sufficient periods of spill and various generating levels (treatments will require multiple days of consistent discharge).

Each component of this study will require 2 years of field data collection to attempt to account for inter-annual variability in river discharge, water temperatures, and the ledge excavation project which will be completed in 2019. We recommend Boott perform the downstream routing portion of the study in 2019 (pre-ledge excavation) and 2020 (post-ledge excavation). In 2020 and 2021, after the ledge has been excavated, the upstream portion of this study should be performed.

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A related study request on computational fluid dynamics (CFD) modeling in the Lowell tailrace, in and around the fish lift and fish ladder entrances and powerhouse forebay, will complement this study and address related project operational effects.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Estimated cost for this study is expected to range from $400,000 to $500,000, with the majority of costs associated with equipment (radio and PIT tags, radio receivers, and PIT readers) and related field work labor. Since tagged shad and river herring will move throughout the area, to varying degrees, there will be expected cost savings (e.g., radio tags) to Boott, provided cooperation in study planning and implementation occurs.

Boott did not propose any studies to meet this need in the PAD.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

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Boott Study Request # 4

Impact of Project Operations on Downstream Migration of Juvenile Alosines
(Lowell, P-2790)

Goals and Objectives

The goals of this study are: (1) conduct a field study of juvenile alewife outmigration in the Lowell impoundment, the power canal, and at the Pawtucket dam, to determine if project operations negatively impact juvenile alosine survival and production; and (2) determine if project operations affect juvenile alosine outmigration survival, recruitment, and production.

The following objectives will address this request:

1. assess project operations effects of the Pawtucket dam on the timing, orientation, passage routes, migration rates, and survival of juvenile alewife;
2. determine the proportion of juvenile alewife that select the Lowell canal versus the Pawtucket powerhouse, downstream bypass facility, or dam spill as a downstream passage route, under varied operational conditions;
3. determine if there are any delays associated with downstream movement related to either dam spill or the Pawtucket powerhouse due to operations;
4. determine the juvenile downstream passage timing and route selection in the Lowell canal, assess delays associated with the canal, and with project operations (e.g., stockpiling in the canal).

If it is determined the project operations are adversely affecting juvenile alosine survival, migration timing, or other deleterious population effects, identify operational solutions or other passage measures which will reduce and minimize these impacts within the project area. This study will require 2 years of field data to capture inter-annual variability of river discharge and water temperatures.

Resource Management Goals

The Atlantic States Marine Fisheries Commission Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (American Shad Management), approved in 2010, includes the following objective:

Maximize the number of juvenile recruits emigrating from freshwater stock complexes.
To enhance survival at dams during emigration, evaluate survival of post spawning and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implement measures to pass fish via the route with the best survival rate.

MassWildlife seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to juvenile American shad and river herring movement and migration, MassWildlife's goal is to minimize current and potential negative project operation effects on the safe, timely and effective downstream passage.

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Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), the Silvio O. Conte National Fish and Wildlife Refuge Act (P.L. 102-212; H.R. 794), the Federal Power Act (16 U.S.C. §791a, et seq.), the Atlantic States Marine Fisheries Compact (P.L. 539, 77th Congress, as amended by P.L. 721, 81st Congress), and the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5107).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

The seaward migration of juvenile alosines is of great importance to the restoration of alewife, blueback herring, and American shad in the Merrimack River. However, data on the downstream migratory movements and rates of alosines past Lowell is sparse and relatively incomplete. In 1994 and 1995, Normandeau Associates, Inc., documented the use of the bypass facility by downstream migrating alosines via the installation of a removable box trap. Passage efficiencies were 7 percent and 37 percent, respectively. However, to date, no directed studies of downstream alosine passage route selection has been conducted at the Lowell Project. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating juvenile alosines and develop adequate passage and protection measures to meet management goals and objectives.

Studies conducted farther upstream on the Merrimack River, at Garvins Falls (FERC No. 1893), have shown it is possible to radio-tag juvenile alewife to evaluate alosine outmigration (Normandeau 2016). Alewife can be used as a proxy, in this instance, for the natural resource agencies to assess blueback herring and shad downstream migration patterns.

Nexus to Project Operations and Effects

Adult alosines, passed at Lowell via the fishways and/or stocking efforts, utilize upstream habitat to spawn on an annual basis. Similarly, juvenile alosines require safe and timely downstream passage measures at the project in order to successfully emigrate back to the ocean to contribute to the population. Presently, downstream migrants can easily enter the Lowell canal system, via the Pawtucket canal, as there are no exclusionary measures in place. There are 19 turbines located in the canal, housed at four powerhouses (Assets, Bridge Street, Hamilton, and John Street), none of which have passage or protection measures. There are a variety of unit-types housed in each of the powerhouses, ranging in speed from 100 to 150 rpm. A study is needed to assess the impacts project operations have on outmigrating juvenile alosines.

MassWildlife is not aware of any studies conducted specifically designed to determine:

1. What is the rate of alewife survival under a range of spill and gate configurations?
2. Are there delays in migration/movement at the dam, gatehouse, or in the canal?
3. For juveniles that enter the Pawtucket canal, what proportion subsequently enter the Western, Merrimack, Pawtucket, or Hamilton canals?
4. What is the rate of movement through the canal, what is the delay to juvenile alosine outmigration, and the potential accumulation of juveniles in the canal?
5. What proportion of juvenile alosines use the downstream bypass sluice versus the E.L. Field powerhouse turbines under varied operational conditions?

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MassWildlife is concerned project operations are: (1) impacting juvenile alosine outmigration survival; and (2) contributing to the failure of the Merrimack River alosine population to meet management targets.

Methodology Consistent with Accepted Practice

The impact of project operations to juvenile alewife outmigration, passage route selection, and migratory delay would be best studied via radio telemetry. This methodology has successfully been tested and employed by Normandeau Associates, Inc., at the Garvins Falls hydroelectric project (FERC No. 1893; Normandeau 2013; Normandeau 2016). Project discharge over a full range of existing and, to the extent possible, potential future operational conditions at the dam (likely increased bypass reach flows in new license), should be examined relative to migration rate and passage route selection of juvenile alosines to, and through, various areas of the project.

In addition, study fish should be collected and balloon-tagged to empirically determine rates of survival for fish passed over or through the dam's bypass sluice, main powerhouse, and 19 canal units under varied operations. For spill mortality sites (dam spillway and downstream bypass), tagged alosines should be injected or released into spill flow at points where water velocity exceeds 10 ft/sec to minimize the possibility of the fish swimming upstream into the headpond or canal. Passed balloon-tagged alosines will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

For turbine mortality sites, tagged alosines will be injected into intakes of units operating at or near full generation at points where intake water velocity exceeds 10 ft/sec to minimize the possibility of fish swimming back upstream through the intakes. Passed balloon-tagged alosines will be recovered in the tailrace and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

Radio-tagged juvenile alewife will be released in areas upstream of the project at multiple release locations, to determine operation effects on migration rates, route, orientation, and entrainment, over a full range of permitted and operational conditions. The release of radio-tagged fish upstream of the project, and induction into the power canal, will provide data on concerns of delay and route selection to the canal, downstream bypass, crest gates, and turbines. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017); a minimum of 50 dead alewife should also be released as a control group in this study.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Boott does not propose any studies to meet this need. Estimated costs for the study are expected to be moderate to high, between $100,000 and $300,000, with the majority of costs associated with equipment (radio tags, radio receivers) and related field work labor.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

Normandeau 2013. Juvenile Alosine Radio Tag Attachment Test. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 2 pp.

Normandeau 2016. Garvins Falls Juvenile Alosine Downstream Passage Telemetry Assessment. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 13 pp.

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Boott Study Request # 5

Downstream American Eel Passage Assessment
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine the impact of the Lowell hydroelectric project on the outmigration of silver eels in the Merrimack River. Entrainment in the canal and at the conventional turbines at the project powerhouses (E.L. Field, Assets Station, Bridge Street, Hamilton Station, and John Street) can result in mortality or injury. It is important to understand the passage routes at the project and the potential for delay, injury, and mortality to assess alternative management options to increase survival.

The objectives of this study are:

1. Quantify the movement rates (including delays) and relative proportion of eels passing via various routes at the project (i.e., through the turbines, through the downstream bypass, spilled at the dams, etc.).
2. Evaluate instantaneous and latent mortality and injury of eels passed via each potential route.

Resource Management Goals

The Atlantic States Marine Fisheries Commission has developed two documents related to the management of American eel:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.

Objectives of the management plan include: (1) protect and enhance American eel abundance in all watersheds where eel now occur; and (2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre-spawning adult eel.

Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Commission relicensing process.

MassWildlife seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to downstream passage of American eel, MassWildlife's goals are:

1. Minimize current and potential negative project operation effects that could hinder management goals and objectives.

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2. Minimize project-related sources of downstream passage delay, injury, stress, and mortality in order to maximize the number of silver eels migrating to the spawning grounds.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), and the Federal Power Act (16 U.S.C. §791a, et seq.).

Public Interest

The requester is a natural resource agency.

Existing Information and the Need for Additional Information

Data on downstream migratory movements and rates of American eels past the project are sparse and relatively incomplete. A single study was performed by Normandeau Associates, Inc., in 2017 (Normandeau 2017). Seventeen silver-phase eels were tagged and released into the Merrimack River upstream of the Garvins Falls project. Of the 17 released individuals, 14 approached the Pawtucket dam. Eight were determined to have passed through the gatehouse and enter the forebay canal upstream of the E.L. Field powerhouse. Five eels passed the project via spill flow. One eel's passage route was classified as unknown. Zero individuals used the downstream bypass. This study had a small sample size, was of a relatively short duration (October 20-November 28, 2017), did not include monitoring stations or antenna arrangements in the canal, and was performed prior to the installation of the pneumatic crest gate system.

To date, no other directed studies of eel entrainment or mortality have been conducted at the Lowell Project. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating eels and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

The project configuration presents problems with respect to providing safe, timely, and effective passage for outmigrating eels. The intakes are likely deep and, while no specification for the trashracks were provided in the PAD, it is unlikely they would prevent entrainment of eels. The anadromous downstream passage facility at the project is also not expected to be effective for eels; the target anadromous species are surface-oriented, while eels tend to move much deeper in the water column. Additionally, there are no data pertaining to eel movements in the Lowell canal. Eels which move into the canal potentially have no alternative but to pass through hydropower turbines at the Assets, Bridge Street, Hamilton, and John Street powerhouses. Eels are known to occur upstream of the dam; therefore, it is necessary to understand how eels move through the project and the level of injury and/or mortality resulting from each potential passage route (i.e., the spillway, the downstream bypass facility, or the 21 turbines associated with the project).

Methodology Consistent with Accepted Practice

In order to understand the movements of outmigrating silver eels as they relate to operations at Lowell, radio telemetry technology should be utilized. Radio telemetry is an accepted technology which has been used for a number of studies associated with hydropower projects, including at the Bellows Falls (FERC No. 1855), Wilder (FERC No. 1892), and Vernon (P-1904) projects.

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Studies should be designed to investigate route selection (i.e., entrainment vs. spill) independently from estimation of mortality/injury, because these metrics require different methodologies. Studies will also likely benefit from data collected over 2 study years (especially route selection studies, which may be more significantly affected by environmental conditions during a given season than mortality/injury studies). It is also envisioned that the results from route selection studies can guide design of turbine mortality studies. Therefore, it is proposed, at a minimum, route selection studies be conducted in multiple years, but mortality/injury studies may be conducted after the first year of route selection studies have been completed.

Objective 1: Route Selection

This study will involve systematic releases of radio-tagged silver phase eels at strategic points above areas of interest, to assess general routes of passage (i.e., via spill, bypass, or turbines). Active downstream migrants should be collected within-basin if possible (i.e., Cabot or Holyoke bypass samplers), but fish sourced from out-of-basin may be acceptable to meet sample size demands. Experimental fish must meet morphometric (e.g., eye diameter relative to body size) criteria to ensure they are migrant silver phase. Collections should be made within the migratory season (late August to mid-October), and eels should be tagged and released within 21 days after capture, but preferably within 7 days (particularly if the test eels are from out-of-basin).

All telemetered eels will be radio- and PIT-tagged. PIT antennas will be installed and monitored continuously to verify passage of eels via bypass channels.

A minimum number of 150 telemetered eels (e.g., five separate groups of approximately 30 eels each) will be required to maximize the data return. Tagged eels should be released at least 5 km upstream of the Lowell Project. Groups of eels should be released during spill (if any) and non-spill and during periods of low, moderate, and high generation conditions. Up to 50 additional eels should also be released in the upper canal and allowed to volitionally descend through the canal to assure that a sufficient number of eels are exposed to canal conditions. Groups of eels should be released when the canal units are running and when the canal units are off. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017), a minimum of 25 dead eels should also be released as a control group in this study.

Telemetry receivers and antennas should be located upstream and downstream of the spillway, at the canal entrance, within the canal, in the downstream fish bypass entrance, at turbine intakes, the station tailrace, and downstream of the confluence of the Merrimack and Concord rivers. These locations will permit assessment of passage via the following potential routes: the power canal; spillway; downstream fish bypass; station turbines; and upstream fishway attraction water intake. The final placement of receivers and antennas should be developed in consultation with the fisheries agencies.

Mobile tracking (i.e., via boat) in the River and canal between release sites and several km downstream will be performed at regular intervals during and after releases to confirm routes and fates of passed fish or lost fish.

Movement rates (time between release and detection at radio antenna locations, and between radio antenna locations) of eels passing the projects by various routes will also be quantified.

The route selection portion of this study should occur in both study years.

Objective 2: Spill, Bypass, and Turbine Mortality/Injury Studies

Spill, bypass, and turbine mortality will be assessed using a balloon-tag method.

For spill mortality sites (dam spillways and downstream bypasses), tagged eels will be injected or released into spill flow at points where water velocity exceeds 10 ft/sec to minimize the possibility of eels swimming upstream into

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the headpond or canal. Passed balloon-tagged eels will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged eels will be censored from the data.

For turbine mortality sites, tagged eels will be injected into intakes of all 21 units associated with the project, operating at a full range of settings where intake water velocity exceeds 10 ft/sec to minimize the possibility of eels swimming back upstream through the intakes. Passed balloon-tagged eels will be recovered in the tailrace(s) and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged eels will be censored from the data.

If the balloon-tag mortality component of the study occurs in study year one, all possible route selection sites would need to be evaluated. If the balloon-tag mortality component of the study occurs in study year two, results from the route selection study could be used to inform which sites need to be evaluated for mortality. Eels recovered from balloon-tag studies should not be used for route selection studies.

Data analyses of route selection and mortality (instantaneous and latent) will follow standard methodology.

Project operation (flows, levels, gate openings, number of units operating and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) will be monitored regularly (hourly measurements if possible) throughout the duration of the studies and assessed for potential relationships to passage route selection, migratory delay, and/or passage survival.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The level of cost and effort for the downstream eel passage study will be moderate to high; silver eels would need to be collected, tagged, and released in several locations over the course of the migration season. Antennas and receivers would need to be installed throughout the canal, at the intakes of the E.L. Field powerhouse, at the dam spillways and station bypass and monitored regularly. Data would need to be retrieved periodically, then analyzed. A multi-site route selection study conducted by the USGS Conte Lab on the Shetucket River in Connecticut cost approximately $75,000 for the first year of study. Costs are estimated at $100,000 per year for the route selection study and $50,000 to $75,000 for the spill, bypass, canal, and turbine mortality/injury study.

Boott did not propose any studies to meet this need in the PAD.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

Normandeau Associates, Inc. 2017. Downstream Passage Evaluation for Silve-Phase American Eels at the Lowell Hydroelectric Project. 2017. Submitted to the City of Holyoke Gas and Electric Department. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 17 pp.

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Boott Study Request # 6

Operations Analysis of the Lowell Canal
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to understand the operations of the Lowell canal system. The specific objective of this study is to describe the operations of the Lowell canal (how all of the canal units interact with the main units, how the canal units are sequenced, how often each of the units operate, the prioritization sequence of canal unit operations, the amount of time the units are operated during the downstream passage season, etc.).

Resource Management Goals

MassWildlife seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources, MassWildlife's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Minimize current and potential negative project operation effects on fish in the project area.

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

The Merrimack River supports a variety of migratory fish species. However, there is no information pertaining to fish mortality and population effects resulting from entrainment in the canal and/or the canal units. Since there are no exclusionary measures at the entrance of the project's canal system, fish can easily enter the two-tiered network of man-made canals, which are approximately 5.5 miles in length. These man made canals provide flow to 19 Boott-owned hydroelectric units. Since obtaining the original license for the project, there have been no directed studies of the Pawtucket, Western, Merrimack, or Hamilton canal units. Additionally, the PAD provides little operational information regarding the canal: flows of up to 2,000 cfs are routed into the canal, typically once the E.L. Field station's hydraulic capacity of 8,000 cfs has been reached. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on riverine fishes and migratory alosines which may be moving through, or inhabiting, the canal and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

The Lowell Project consists of a two-tiered, 5.5-mile-long, network of man-made canals which include several small dams and 19 turbine units. Flows enter the canal system upstream of the Pawtucket dam via the Pawtucket canal.

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There are no exclusionary measures for fish in place. Therefore, the Lowell canal presents problems with respect to providing safe, timely, and effective passage for fish trying to move past the project through the canal system.

Methodology Consistent with Accepted Practice

In order to determine the relative risk the canal units present to riverine and migratory fishes, it is necessary to understand how the canal operates. Therefore, we request Boott provide a detailed description of the operational protocol it uses to determine when and how much water flows into the canal at a time scale relevant to the migratory fish species expected to potentially utilize the canal as a passage route (e.g., May, June, and July for spent alosines; August through November for adult eels and juvenile alosines). Historical operations data should be examined relative to the hydrological data set to determine the percent of time the canal units would be expected to operate during each passage month. This analysis should be used in conjunction with the results of the passage route and turbine mortality studies to estimate total through project mortality for each target fish species/life stage.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The expected level of effort and anticipated cost will be low. Operations and hydrologic data are readily available and only need to be compiled and analyzed. We estimate the cost to be less than $10,000.

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Boott Study Request # 7

Three-Dimensional Computational Fluid Dynamics (CFD) Modeling in the Vicinity of Fishway Entrances and Powerhouse Forebays
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine the flow field conditions which exist in and around fishway entrances and the powerhouse forebay. The information from this request is meant to be coupled with data from the telemetry studies, such that a comprehensive understanding of fish behavior is developed.

The objective of this study is to create a series of color contour maps of velocity magnitude at select discharges agreed upon by the resource agencies and the licensee. With respect to upstream passage, the results will show approach velocities and flow fields that may create a response in fish. This information can be coupled with telemetry data (from the requested shad and river herring telemetry study) and passage counts to understand which conditions are optimal for guiding migrating fish to the fishway entrances and stimulating fishway entry.

With respect to downstream migration, the results will show velocities and flow fields in front of the E.L. Field powerhouse. Additionally, the results will indicate to what degree, if any, flow directs downstream migrating fish towards the downstream bypass facility.

Resource Management Goals

The management goals of this study request are to obtain information that will assist in enhancing the effectiveness of the current upstream fish passage facilities for upstream migrating trust species and reduce impingement, entrainment, and delay for downstream migrating fish. CFD models are a relatively cost effective way to analyze existing and future conditions. As such, changes in the amount of attraction water, changes in which turbines are operating, and which spillway gates are releasing water can all be examined. As stated, the results from this study are meant to be used along with the data generated from the requested telemetry study. The combined analysis from these two data sources can help assess which flow conditions are most advantageous for migrating trust species to enter the fishway under current and proposed conditions.

As for downstream migration of adult and juvenile shad, river herring, and adult eel, the results from the models will reveal flow magnitude and direction in front of the powerhouse. Given the limited information that currently exists on survival through the project, our management goal is to direct as many downstream migrating fish as possible towards the downstream bypass facility. With respect to upstream passage, we want to maximize the number of fish that find and enter the fishway entrances.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), and the Federal Power Act (16 U.S.C. §791a, et seq.).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

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To date, no CFD modeled data exists in front of either the fish ladder or lift, nor do they exist in front of the E.L. Field powerhouse. A comprehensive understanding of fish behavior at the ladder and lift entrance, and the powerhouse forebay, is needed in order to create safe, timely, and effective upstream and downstream passage for American shad, river herring, and eels. Additionally, a better understanding of flow and how it affects fish passage is needed after Boott performs the ledge removal excavation project.

Nexus to Project Operations and Effects

The Lowell Project has direct impacts to upstream and downstream migrating shad, river herring, and eel. The development of these models will give resource agencies valuable information into the hydraulic cues which may elicit a response from upstream migrants. For downstream passage, MassWildlife has approach velocity guidelines; the output from these models would inform the resource agencies under what conditions appropriate approach velocities are being met and when they are being exceeded.

With respect to upstream migration, the auxiliary water system (AWS) plays a critical role in determining whether or not fish are attracted to the entrance. The results from this study would allow us to assess how well the AWS is performing and under what conditions it attracts the most fish.

With respect to downstream migration, the development of a CFD model under existing conditions also informs the design of future modifications and improves the survivability of downstream migrating shad, river herring, and eel.

The CFD models for the Pawtucket fishway and fish lift should be developed as part of year two studies, after the ledge excavation project is complete. It would be useful to have the gatehouse area CFD modeling completed in year one. This analysis may provide information on adjustments to canal operations or structures that can subsequently be analyzed.

Understanding the entrance conditions of the Pawtucket fishway under a range of spill conditions would be informative. If developed prior to the year one upstream shad telemetry studies, it would provide information on spill gate settings which would likely best achieve entrance and ultimately passage. Further work with the model can help in evaluating changes in ladder entrance or spill conditions that could improve passage and be tested with telemetry, video, and/or count data.

CFD modeling of the flows leading to the canal would aide in our interpretation of year one downstream passage telemetry results, but would not need to be completed prior to the year one telemetry (downstream juvenile alewife and downstream eel) studies. Those studies will provide the context for how and where shad, river herring, and eels are passing the project and how successful passage is. The CFD modeling could focus on the locations identified as important in the study results and Boott could assess changes to structures or operations and evaluate them in the model. Promising alternatives would then be tested in year three studies.

Methodology Consistent with Accepted Practice

A three-dimensional CFD model has become an increasingly common standard of analysis at hydroelectric projects around the nation. Within the northeast region, we have seen these types of models developed at the Holyoke (P-2004), Brunswick (P-2284), Shawmut (P-2322), Milford (P-2534) and Orono (P-2710) projects. We would expect to engage with the licensee in terms of determining the appropriate area and flows to be modeled. We expect the spatial extent of the model at each study site will vary. Given the large number of ways in which output from these models can be presented and the near infinite number of flows which could potentially be modeled, we would expect to consult with the licensee to reach agreed upon modeling efforts and scenarios to be examined.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

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The cost of developing, running and testing a CFD model can vary tremendously; one large variable in determining the cost is based on the amount of existing bathymetric data to which Boott currently has access. We roughly estimate that the cost of each CFD model could run as high as $50,000, assuming no bathymetric data currently exists. Proactive communication with resource agencies will reduce the cost and iterative effort. Given the level of effort that has occurred at other projects that have proposed to amend their license, we see the level of effort requested here as reasonable, given that Boott is seeking a renewal of its license.

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Boott Study Request # 8

Bypass Reach Zone of Passage Study
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine zone-of-passage flows in the bypass reach which facilitate safe, timely, and effective fish passage through the project.

Specifically, the objectives of this study are:

1. complete a detailed survey of the bypass reach;
2. develop a high-resolution, two-dimensional hydraulic model of the bypass reach;
3. release multiple flows from the dam to collect calibration data for the model;
4. simulate additional flows through the bypass reach with the calibrated model; and
5. determine minimum and optimal zone-of-passage flows for the project.

Resource Management Goals

MassWildlife seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources within the Lowell bypassed reach, MassWildlife's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide a flow regime in the bypassed reach that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) and diadromous fishes.
3. Minimize current and potential negative project operation effects on water quality and aquatic habitat.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, et seq.), and the Federal Power Act (16 U.S.C. §791a, et seq.).

Public Interest

The requester is a natural resource agency.

Existing Information and the Need for Additional Information

Article 36 of the original license required the licensee, in consultation with resource agencies, to develop an in-stream flow study plan to determine: (1) the relationship between project discharges and downstream aquatic habitat; and (2) a fishery study plan to determine project discharges necessary to provide for the migration of anadromous fish (i.e., zone of passage). After completion of the approved studies, the licensee was to file a report

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on the results of the studies, and, for Commissions approval, recommendations for the flow releases from the project. The study plan was filed on August 13, 1983, with proof of agency consultation (Accession No. 19830818-0191). However, there are no study reports included in the record. Therefore, we have no quantitative data supporting the agreement that 300 cfs at night and 500 cfs during the day are adequate flows for zone of passage in the bypass reach.

In the Comprehensive Fish Passage Plan filed on March 9, 2000 (Accession No. 20000313-0322), the licensee states "The adequacy of flows for upstream fish passage at the Project was addressed by BHI's construction of six (6) concrete flow control weirs (with adjustable stoplog sections) in the bypass reach, at the request of U.S. Fish and Wildlife Service and in response to Article 36, section (2) of the Project's FERC license." Similar to the study plan, this is an agreement with no supporting information to substantiate the conclusion flows in the bypass reach are adequate for the full suite of diadromous species.

As part of compliance for Article 34 of the original license, the licensee filed as-built drawings of the existing fish passage facilities (Accession No. 19860902-0215). Within this abbreviated drawing set, drawing number 344D-PC001, 3844D-FC001, and 3844D-FC004 show topographic surveys for portions of the bypass reach. However, the drawings do not document the accuracy and precision of the survey, do not show the majority of the bypass reach, and are otherwise illegible.

Since agreeing upon the current zone-of-passage flows during the original license, there have been developments in topographic survey capabilities, a better understanding of the hydraulic requirements of diadromous species, multi-dimensional hydraulic modeling capabilities, and an increased need to pass fish at the spillway ladder.

Nexus to Project Operations and Effects

Diadromous fish orient their migration based on the environmental conditions of the river: flow, depth, velocity, and temperature (Goodwin 2014). Project operations affect the environmental conditions in the River, specific to this study request, the bypass reach. Two key hydraulic model outputs from the requested study are depth and depth-averaged velocity, which can be used to determine the likelihood of predation, delay, and the cessation of migration. Evaluating the flow fields in the bypass reach under different spill conditions will assist in the consultation process for determining an appropriate zone-of-passage flow in the bypass reach to optimize fish passage at the project. These data will also contribute to the development of an administrative record in support of a potential settlement agreement, Section 18 fishway prescriptions, or 10(j) recommendations.

Methodology Consistent with Accepted Practice

We proposed the following methodology to accomplish the five objectives and ultimately the goal of the study, to determine zone-of-passage flows for the bypass reach.

Topographic survey

The bypass reach area is large, making traditional topographic survey methods laborious and costly. We recommend using Light Detection and Ranging (LiDAR) methods with limited traditional surveying. Outside of the fish passage season and during a river flow when the project is in control of the River, the bypass reach will be mostly dewatered. At this time, a licensed surveyor can fly the area to collect LiDAR data. Once this data is processed, traditional methods will fill in the gaps (e.g., pooled water areas, under bridges). The topographic survey shall be of sufficient resolution and quality to complete the remaining objectives.

Two-dimensional hydraulic model

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There are many two-dimensional hydraulic models that are acceptable for accomplishing the goal of this requested study, many of which are open source. We are not requiring one model over the other, but Boott should understand and document the limitations of the modeling software used. At a minimum, the modeling output should produce depth-average velocity and depth for each cell in the mesh. The modeling domain shall be of sufficient size and mesh to delineate a zone of passage through the entire length and width of the bypass reach.

Calibration flows

The licensee should collect calibration data by spilling a minimum of two flows from the Pawtucket dam. The calibration flows should bracket the range of simulated flows in the study. We recommend 300 cfs for the low flow as it represents the current lowest operation flow for the fish ladder. For the high calibration flow, we recommend collecting data near the high fish passage design flow (i.e., the 5 percent exceedance value for the migratory period of record) which is approximately 26,000 cfs in the Merrimack River (bypass flow would be approximately 17,000 cfs with full project operation). Boott should collect calibration data (depth-averaged velocity and depth) with an Acoustic Doppler Current Profiler (ADCP) at a minimum of four cross sections, including the downstream boundary condition and use the ADCP in locations spread evenly throughout the bypass which are less turbulent.

Additional flow simulations

After calibrating the model, additional bypass flows should be simulated (and agreed upon with the natural resource agencies), including 500 cfs, 1,000 cfs, and up to the high calibration flow. The additional simulations should represent the full range of hydraulic conditions in the bypass reach from the low to high fish passage design flow.

Zone-of-passage determination

The model output should be used to delineate a zone-of-passage pathway for each of the modeled flows. To determine the zone of passage, we recommend Boott use the SprintSwim model developed by U.S. Geological Survey researchers (Haro et al. 2004).

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The licensee should be able to finish the bypass zone-of-passage study in one year depending on seasonal flow conditions. The level of effort and cost is commensurate with a project the size of the Lowell facility and the likely license term. No alternatives are proposed.

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Haro, A., T. Castro-Santos, J. Noreika and M. Odeh. 2004. Swimming performance of 716 upstream migrant fishes in open-channel flow: a new approach to predicting passage through velocity barriers. Canadian Journal of Fish and Aquatic Science. 61: 1590-1601.

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Boott Study Request # 9

Fish Assemblage Assessment
(Lowell, P-2790)

Goals and Objectives

The goal of this study request is to determine the assemblage of fish species present in the areas affected by the Lowell Hydroelectric Project, which potentially includes Species of Greatest Conservation Need (SGCN) for Massachusetts.

Specific objectives include:

1) Describe fish assemblage structure, distribution and abundance within the project affected area along spatial and temporal gradients.

2) Compare historical records of fish species occurrence in the project area to results of this study.

Resource Management Goals

The mission of the Massachusetts Division of Fisheries and Wildlife (MassWildlife) is to protect and conserve fish, wildlife and their habitats. Anadromous, Catadromous, and Riverine fish species are important components of the river's ecology and are the basis for the sport fishery.

Our study requests are intended to facilitate the collection of information necessary to conduct impact analyses and develop reasonable conservation, protection, mitigation and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661 et seq.), the Federal Power Act (16 U.S.C. §791a, et seq.), the Clean Water Act (33 U.S.C. §1251 et seq.), and the WPA.

Determining species occurrence, distribution, and abundance of fish species more generally will better clarify what species occur in the project area both spatially and temporally relative to habitats which may be affected by Project operations. This information will better inform results from other study requests that will be examining the effects of Project operation on various aquatic habitats, water quality and other related concerns. This information will be used to make recommendations and enable full consideration for all species, including those that might not otherwise be known to occur in the Project-affected area and impacts that may affect their population status through direct or indirect effects of Project operations.

Public Interest

The requestor is a fish and wildlife resource agency, with regulatory authority under the MESA and the WPA.

Existing Information

The PAD cites general information on the fish community found in the Lower Merrimack River Management Plan which is 10 years old (Lower Merrimack River Local Advisory Committee [LMRLAC] 2008) and is unclear on where the information come from.

Nexus to Project Operations and Effects

Project operations have the potential to directly impact fish species life history requirements, biological interactions, and habitat quantity and quality. For example, headpond and tailwater water level fluctuations could dewater important spawning areas, limiting productivity of fish species by direct impacts to their spawning success and indirectly limiting the spawning success of forage fish species. Accordingly, a thorough understanding of the current fish assemblage structure and associated metrics are needed in order to examine potential Project impacts. Determining species distribution and abundance will better clarify what species occur in the Project area, spatially and temporally, relative to habitats that may be affected by Project operations.

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The information requested through this study will help assess how the Project has and will affect the structure, distribution and abundance of fish species, and help the Division develop recommendations that will protect and/or enhance populations of these species.

Methodology Consistent with Accepted Practice

An accepted and robust field sampling design (e.g., as described in Pollock et al. 2002 or MacKenzie et al. 2006) and accepted methods for collecting fish species likely to be present in the project-affected areas (Bonar et al. 2009) should be used to conduct field surveys. Fish sampling, measuring length and weight, and calculating associated metrics are commonly used methods to determine fish assemblages and assess fish populations (Bonar et al. 2009). Randomly sampling multiple habitat types using a multi-gear approach will be required to ensure that all fish species present are sampled. The spatial scope of the study will be from the upstream extent of the impoundment downstream to the head of the Lawrence Projects impoundment, including the bypassed reach. Sampling should occur at each selected site across multiple seasons (spring, summer, and fall). Digital photographs should be taken to avoid misidentification of certain species such as Cyprinids.

This will be a one-year study, provided river discharge conditions fall within the 25th to 75th percentile for weekly averages.

Specific Methodology

The study will employ a stratified-random sampling design. The study area will be divided into strata based on mesohabitat type. Each mesohabitat type will be further stratified into two broad microhabitat types. Proposed sampling methods include daytime boat/barge electrofishing, nighttime boat electrofishing, gill nets, seine nets, and minnow traps. Sampling should be performed during in the spring, summer and fall.

The stratified random sampling design will randomly assign sampling stations within particular mesohabitat types in proportion to their linear habitat distance. Multiple methods of fish capture will be used in each stratum, and both near-shore (shallow) and mid-channel (deep) habitats will be sampled to evaluate the potential differential effect of hydropeaking on the fish species and life stages that utilize these two habitat types (Bain 1985). Selected locations within each station will be sampled either by day and nighttime boat/barge electrofishing (shoreline and littoral habitat), gill nets (deeper, benthic areas), seine net (wadeable shoreline and littoral habitat), minnow traps, and eel pots. The exact number of sampling locations will be dependent on the weighted stratification of the study area by mesohabitat and sampling within each station will be further stratified by depth and proximity to shore.

In addition to biological data, supporting data also will be collected for each sample site including: location (GPS), sampling gear type, sampling effort, mesohabitat type, average depth, average velocity, river flow, water temperature, turbidity, predominant substrate, time of day, day of year, presence of cover, and proportion of vegetation cover. All data will be recorded on dedicated data sheets.

All data will be standardized by effort expended (seconds of electrofishing, net/trap-hours, and number of seine hauls. Catch per unit effort (CPUE) and standard errors will be calculated for each species, station, and sampling technique. Data will also be separated into groups by size and a CPUE per size group will be calculated. Values of CPUE for each segment and gear type will be calculated as the sum of catch from all samples within a station divided by the sum effort expended within that station. The Shannon-Weiner index of diversity, which is a function of species richness and evenness, will also be calculated.

Information collected during this study will be compiled and presented in a final report. The report will include tabular data summarizing length, weight, and size class of fish captured, a map of the study area to depict the location of sample stations, and overall results including occurrence, distribution and relative abundance. Comparisons will be made with historical records. Results will be described in relation to other studies. Raw data should be provided to stakeholders in digital format upon request.

This study design is similar to the one detailed in Study 3.3.11 of FirstLight Power Resources Revised Study Plan for the relicensing of its Turners Falls Project (FERC No. 1889),[1] which was approved by the Commission (with modifications) in its Study Plan Determination letter dated February 21, 2014; therefore, the methodology is consistent with accepted practice.

Task 1: Sampling Location Selection

During this assessment, a stratified-random sampling design will be utilized to provide unbiased and precise fish assemblage data. The proposed design incorporates general river morphology along with mesohabitat through the use of strata and sub-strata. To accomplish this, the underlying strata allow for delineation of the study area spatially, based on locations where changes in river morphology occur.

Due to inherent variability of flows, water levels, and likely fish movements within the study area, different sampling locations will be selected for each sampling event; this statistically valid practice will avoid bias. Prior to field sampling, stations to be sampled will be selected to ensure all mesohabitat types are adequately represented. Mesohabitat types include:

- **Riffle:** shallow, moderate velocity, turbulent, high gradient, moderate to large substrates (cobble/gravel)
- **Rapid:** shallow, moderate to high velocity, turbulent, chutes and eddies present, high gradient, large substrates or bedrock
- **Run:** moderately deep to deep, well defined non-turbulent laminar flow, low to moderate velocity, well defined thalweg, typically concave stream geometry, varying substrates, gentle slope
- **Glide:** moderately shallow, well defined non-turbulent laminar flow, low velocity, well defined thalweg, typically flat stream geometry, typically finer substrates, transitional from pool
- **Pool:** deep, low velocity, well defined hydraulic control at outlet
- **Backwater:** varying depth, minimal or no velocity, long backwatered reaches
- **Impounded:** varying depth, low velocity influenced by the presence of a dam
    - **Nearshore/Shallow**: less than 8ft in depth
    - **Mid-Channel**
    - **Deep water:** depths greater than 20ft

Alternative sampling locations will also be identified by mesohabitat in case a selected sampling station is inaccessible. Furthermore, within each mesohabitat type, each of two general microhabitats will be sampled (Bain 1985):

- Nearshore areas: shallow water and lower flow velocities
- Mid-channel areas: deeper water and higher flow velocities

Task 2: Fish Capture

A variety of techniques will be used to sample the various habitat types within the study area, including day and night boat/barge electrofishing, gill netting, seining, and minnow traps as described below. The type of gear utilized will be largely dictated by habitat type. In addition to biological data, supporting data will also be collected for each sample site including: location (GPS), sampling gear type, sampling effort, mesohabitat type, average depth, average velocity, river flow, water temperature, turbidity, predominant substrate, time of day, day of year, presence of cover, and proportion of vegetation cover. All data will be recorded on dedicated data sheets. Upon return from the field, data sheets will be reviewed for quality assurance and archived.

[1] Study 3.3.11 of the Revised Study Plan for the Turners Falls Hydroelectric Project (No. 1889) and Northfield Mountain Pumped Storage Project (No. 2485). August 14, 2013. FirstLight Power Resources.

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Boat/barge Electrofishing

Boat electrofishing will occur during the day and at night. Barge electrofishing will be day only. All electrofishing transects will be standardized by time (500 seconds fished) such that a catch per unit effort (CPUE) may be calculated. Boat/barge electrofishing can effectively sample fish from most near-shore littoral habitats present within the Deerfield River (typically 10 feet deep or less).

Electrofishing will be accomplished with the use of a boat electrofisher with the capacity to adjust the pulse rates between 30 - 120 pulses/second and vary voltage to accommodate ambient conductivity. A barge capable of negotiating riffles and shoals, similarly rigged with an electrofishing unit may be deployed for sampling in the shallower riverine habitats.

Electrofishing will be conducted in a downstream manner, following standardized methods developed specifically for large river quantitative electrofishing surveys (MBI, 2002, Yoder and Kulik, 2003). The start point, end point, and boat track for each sampling station will be geo-referenced using a handheld GPS and transposed to corresponding topographic mapping software program to produce maps of areas sampled.

All stunned fish will be collected with ¼-inch mesh dip nets and deposited into a live-well filled with aerated ambient river water. At the conclusion of each sample, all captured fish will be identified to species, classified as adult, juvenile or Young-of-Year (YOY), enumerated, weighed, measured for total length, and then released. If large numbers (n > 25) of small fish (YOY fish or cyprinids less than 100 mm) are captured, they will be grouped by size class, enumerated, and batch-weighed with length measurements only taken from one large and one small representative specimen within each group. Fish that are not able to be identified in the field, such as small cyprinids, will be brought back to the lab for identification.

Gill Netting

For sampling deeper habitat sub-strata (Depth 12-25 feet; Depth 25-40 feet; Depth > 40 feet), where electrofishing will not be effective, sampling will be conducted with experimental gill nets consistent with standardized methods for fish capture from rivers (Bonar, Hubert, & Willis, 2009). The nets will be 12-foot feet high by 100-foot in length and will be constructed of 4 to 5 panels of increasing mesh size (e.g., 1.5, 2, 2.5, 3, 3.5-inch stretched mesh) to accommodate collection of the various sized fish in the project waters.

The nets will be deployed to maximize capture area where water depths are greater than net height. Nets will be set in selected locations and allowed to fish for at least 4 hours prior to retrieval.

The exact locations of each net set will be recorded using a handheld GPS and the time of deployment and retrieval will also be recorded. Fish processing will occur as described above for electrofishing.

Seining

In shallow shoreline locations where boat access may not be feasible sampling will be performed via seining with a 100-ft long, 6-ft deep, 1/4-inch mesh bag seine net.

Seine samples will be collected by extending the net parallel to shore and then pulling the upstream end of the net into the water and in a downstream direction for a 180 degree sweep while the opposite end of the net is held in place (Bonar, Hubert, & Willis, 2009). The start point and end point for each sweep will be geo-referenced using a handheld GPS and transposed to corresponding topographic mapping software program to produce maps of areas sampled. Total fish catch will be processed following each haul in the same manner as described above for electrofishing and gill netting.

Minnow traps/eel pots

For sampling deeper habitat sub-strata (Depth 12-25 feet; Depth 25-40 feet; Depth > 40 feet), where electrofishing will not be effective, sampling will be conducted with minnow traps and eel pots to sample fish too small to be captured by gill nets (minnows) and to determine presence of American Eel. The exact locations of each trap will be recorded using a handheld GPS and the time of deployment and retrieval will also be recorded. Fish processing will occur as described above for electrofishing.

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Task 3: Data Analysis and Reporting

All data will be standardized by effort expended (seconds of electrofishing, net/trap-hours, and number of seine hauls. Catch per unit effort (CPUE) and standard errors will be calculated for each species, station, and sampling technique. Data will also be separated into groups by size and a CPUE per size group will be calculated. Values of CPUE for each segment and gear type will be calculated as the sum of catch from all samples within a station divided by the sum effort expended within that station. The Shannon-Weiner index of diversity, which is a function of species richness and evenness, will also be calculated.

Information collected during this study will be compiled and presented in a final report. The report will include tabular data summarizing length, weight, and size class of fish captured, a map of the study area to depict the location of sample stations, and overall results including occurrence, distribution and relative abundance. Comparisons will be made with historical records. Raw data will be provided to stakeholders in digital format upon request.

Level of Effort/Cost, and Why Alternative Studies will not suffice

This study will require sampling of the Project-affected areas of during spring, summer, and fall. Sampling multiple mesohabitat types and from several microhabitat types (including shallow, near-shore microhabitats and deeper, mid-channel microhabitats), and using a multi-gear approach will be required to ensure that all fish species present are sampled. The cost of the study would be moderate to high. Based on first year study results, a second year of sampling or specific studies examining impacts of Project Operations on specific fish species may be requested. MassWildlife estimates the cost of this study to be $50,000 to $75,000, based on the estimated cost to conduct a similar study at the Turners Falls Project (FERC No. 1889).[2]

Boott did not propose any studies to meet this need in the PAD.

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New Hampshire
Fish and Game Department

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Headquarters: (603) 271-3421
Web site: www.WildNH.com

TDD Access: Relay NH 1-800-735-2964
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Glenn Normandeau
Executive Director

August 13, 20018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: Study Requests for FERC Hydroelectric Projects P-2790 Lowell Hydropower Project located on the Merrimack River in Middlesex County, Massachusetts

Dear Secretary Bose:

As the agency responsible for protecting fish and wildlife resources in New Hampshire, the New Hampshire Fish and Game Department (NHFGD) monitors and attempts to reduce the impacts of hydroelectric facilities on fish and wildlife species and their habitats. The mission of the NHFGD is to conserve, manage and protect the state's fish, wildlife and marine resources and their habitats, and to provide the public with opportunities to use and appreciate these resources. The NHFGD's 1998-2010 Strategic Plan contains four goals relevant to the relicensing process under the Federal Energy Regulatory Commission (FERC). These goals are to ensure that New Hampshire:

1) has a wide range of naturally occurring habitats and healthy, naturally functioning ecosystems.

2) has abundant and varied fish, wildlife, and marine species at levels that ensure sustainable, healthy populations.

3) has fish, wildlife, and marine populations that support desirable levels of hunting, trapping, fishing, and wildlife viewing.

4) Human activities and land uses are compatible with desired population and recreational goals for fish, wildlife, and marine species and the ecosystems that sustain them.

Also, the New Hampshire Wildlife Action Plan identifies a number of fish and wildlife species of concern, which may be impacted by the project under review. The complete New Hampshire Wildlife Action Plan is available online at: http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm.

Although the Lowell project is not located in the State of New Hampshire, we feel it is prudent to comment on this project and support all study requests because the Lowell hydropower project has the potential to impact fish migrating to and from New Hampshire waters within the Merrimack River watershed. For example, American eel, American shad, River herring, and sea lamprey all have to successfully migrate upstream past the Lowell hydropower facility; in order to reach New Hampshire waters. Additionally, fish that are reared (American shad and sea lamprey), spawn (American shad), and grow to maturity (American eel) in New Hampshire portions of the Merrimack River watershed all have to successfully migrate downstream past the Massachusetts hydropower projects; in order to complete their life cycle.

Boott has not proposed any studies for relicensing at this time, but has identified potential resource issues which include: bypass flows, fish passage, historical resources, boating access, and inundation of upstream floodplains. Relevant to fish and aquatic resources, the Department believes new studies need to be conducted, with sufficient fish sample sizes, to better understand upstream and downstream passage at the project; as well as instream flows in the bypass reach.

Fish and Aquatic Resources

Downstream Passage

The Department recommends Boott conduct new studies to fully understand how post-spawned adult shad and river herring, juvenile shad and river herring, and adult silver phase eels move past the Pawtucket dam, through the canal system, turbine intakes, and the downstream bypass facility. In addition, turbine injury and mortality studies are needed and should be used in conjunction with the results of the passage routing studies, where applicable, to calculate total through-project survival rates. The Department herein provides study requests in order to address these information needs.

Upstream Passage

Yearly site inspections, performed by the USFWS, have identified a number of problems with respect to American shad at the lift and ladder fishway entrances. The Department believes that a comprehensive radiotelemetry study is needed to understand the relationship between project operations, including spill flows, and shad and river herring movement through the Merrimack River (including attraction to and passage through these facilities). Additionally, a study to define the relationship of the complex hydraulic conditions at the spillway fish ladder entrance and the tailrace fish lift entrance is needed in order to evaluate data on fish behavior and passage at those locations. Therefore, the Department is providing herein study requests to address these information needs.

Instream Flows in the Lowell Bypass

The bypass reach is 0.7 mile long (from the Pawtucket dam to the E.L. Field powerhouse) and contains diverse habitat. There are approximately 11 miles of free-flowing river downstream of the Pawtucket dam which also contain a diversity of habitat, including important spawning and rearing habitat for migratory fish species, such as American shad. To date, there have not been any empirical studies, which assess the adequacy of the existing flow protocols. The Department herein submits study requests intended to address these information gaps.

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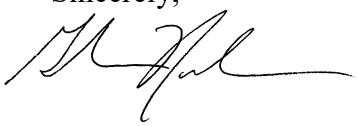
RECOMMENDED STUDIES

The following formal study requests will expand on the information presented in the Pre-Application Document (PAD) and lead to informed management decisions intended to reduce impacts on fish and wildlife. It is understood that there is overlap between some of the requested studies, and where appropriate, the NHFGD supports the combination of studies to reduce cost and effort as long as the goals and objectives within each individual study proposal are still achieved.

Enclosed please find our formal study requests (Attachment A) in the format required pursuant to 18 CFR §4.38(b)(5). In addition to the study requests provided herein, please note that NHFGD also supports the study requests submitted by other natural resource agencies, including but not limited to, the Massachusetts Division of Environmental Protection, New Hampshire Department of Environmental Services (NHDES), the Massachusetts Department of Fish and Game (MADFG), National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS).

Thank you for this opportunity to comment.

Sincerely,



Glenn Normandeau
Executive Director

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Attachment A

Study Request # 1

Instream Flow Habitat Assessment of the Lowell Bypassed Reach
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine an appropriate flow regime which will protect and enhance the aquatic resources in the bypass reach between the Pawtucket dam and the E.L. Field powerhouse. Specifically, the objective of this study is to conduct an instream flow habitat study to assess the impacts of a range of project discharges on the wetted area and optimal habitat for key species, including the quantity and location of suitable habitat.

The specific objectives of this field study, at a minimum, include:

1. characterize and map wetted perimeter of the bypass reach over a range of bypass flows;
2. survey and evaluate the water depth and mean channel velocity at transects within the bypass reach over a range of flows; and
3. map and assess the value of aquatic habitat in the bypass reach over a range of flows, focusing on potential habitat for resident species, and spawning and migration habitat or rest/regrouping areas for migratory species.

Target fish species should include American shad, river herring (alewife and blueback herring), fallfish, white sucker, freshwater mussels and benthic macroinvertebrates. The final target species list should be developed in consultation with the fisheries agencies and based on the results of the mesohabitat mapping.

Resource Management Goals

The Department seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources within the Lowell bypassed reach, the Department's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide a flow regime in the bypassed reach that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) and diadromous fishes.
3. Minimize current and potential negative project operation effects on water quality and aquatic habitat.

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Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requester is a natural resource agency.

Existing Information

The Lowell Project bypasses a 0.7-mile-long section of the Merrimack River, from the Pawtucket dam to the E.L. Field powerhouse. There is presently no required minimum bypass flow. However, during the upstream fish passage season, the bypass reach receives 500 cfs. through operation of the spillway fish ladder. In addition, the bypass reach receives flow whenever inflow exceeds the hydraulic capacity of all the project's stations. Pursuant to Article 37, Boott Hydropower, LLC, (Boott) maintains a minimum flow of 1,990 cfs. or inflow, whichever is less, as measured immediately downstream of the project.

Available information in the PAD does not indicate how project operations have altered downstream hydrology, habitat quantity and quality, and water quality, which may affect resident and migratory fish, macroinvertebrates, aquatic plants and other biota and natural processes in the Merrimack River. The PAD provides no detailed description of the physical or biological characteristics of the bypassed reach.

An empirical study is needed to provide information on the relationship between flow and habitat in the bypassed reach for the Department to use in determining a flow recommendation.

Nexus to Project Operations and Effects

Although the project license requires Boott to maintain a minimum flow of 1,990 cfs. or inflow (if less), downstream of the project, Boott states in practice the project operates in a true run-of-river mode. The Department is not recommending a below-project flow study based on the assumption that any new license issued for the project will require instantaneous run-of-river operation (essentially codifying current operations).

The project includes a 0.7-mile-long bypassed reach. The current license contains no minimum bypass flow requirement. During the upstream fish passage season, the bypass reach receives 500 cfs. via operation of the spillway fish ladder; otherwise, the reach only receives flow when inflow exceeds the hydraulic capacity of the project's generating capacity. To our knowledge, the lack of a required bypass flow was not based on any quantitative, rigorous scientific studies.

This section of the Merrimack River contains habitat which supports native riverine species, including important spawning and rearing habitat for migratory species like American shad and river herring. While the existing license does not require a minimum bypass flow, the Department believes one is needed to sufficiently protect the aquatic resources inhabiting the bypassed reach.

Results of the flow study should be used to determine an appropriate flow recommendation, which will protect and/or enhance the aquatic resources in the bypassed reach for the duration of any new license issued by the Federal Energy Regulatory Commission (Commission).

Methodology Consistent with Accepted Practice

Bypass flow habitat assessments are commonly employed in developing flow release protocols which will reduce impacts or enhance habitat conditions in reaches of river bypassed by hydroelectric projects.

Given the size of the bypassed reach (0.7 mile long) and the important resources known to inhabit the reach (i.e., diadromous fishes); we believe a study methodology which utilizes an instream flow incremental methodology (IFIM) approach is appropriate for this site. This same protocol was used during the relicensing of the Housatonic River Project (FERC No. 2576),[1] and has been accepted by the Commission in other licensing proceedings.[2]

The study should have two components. The first component entails mapping habitat within the bypass reach. The number, location, and size (area and linear distance) of each mesohabitat type in the reach should be documented, including qualitative characterizations (e.g., dominant substrate, average depth, overhead and instream cover, etc.). The second component consists of conducting an instream flow study.

At a minimum, the study design should involve collecting wetted perimeter, depth, velocity, and substrate data within a range of discharge levels along transects located in the reach of river between the dam and the E.L. Field powerhouse. The measurements should be taken over a range of test flows, to be agreed upon by the natural resource agencies. This information should then be synthesized to quantify habitat suitability (using mutually agreed upon Habitat Suitability Index curves) of each test flow for target species/life stages identified by the fisheries agencies. We recommend Boott perform habitat modeling using one dimensional modeling techniques to better characterize flows and velocities in this complex channel area.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Field work for flow studies can be reasonably extensive but will depend on consultation with Boott on study methodology and on-site decisions on locations for data collection and the number of collection locations. Post-field work data analysis would result in a moderate cost and effort. We anticipate that the level of effort and costs will be comparable to those experienced on similar Commission relicensing projects (e.g., the Glendale Project, FERC No. 2801).

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[1] Housatonic River Project License Application, Volume 4, Appendix F. Connecticut Light and Power Company, August 1999.

[2] Glendale Project (FERC No. 2801) Final Bypass Reach Aquatic Habitat and Instream Flow Study in Glendale Hydroelectric Project Application for Subsequent License (FERC No. 2801), Volume 2, Appendix B, pp. 7-8, October 2007.

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Study Request # 2

Adult Alosine Downstream Passage Assessment and Protection Evaluation
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to assess the adequacy of the turbines at the E.L. Field, Assets, Bridge Street, Hamilton, and John Street powerhouses, to minimize injury, entrainment, and mortality of fishes residing in the Merrimack River, and to recommend appropriate mitigative measures as necessary.

The specific objectives of the field study, at a minimum, are: (1) assess the risk of adult American shad and alewife becoming injured, impinged, or entrained in the E.L. Field, Assets, Bridge Street, Hamilton, and John Street powerhouse units; (2) estimate turbine survival; (3) assess the risk of injury or mortality at the spillway and downstream bypass; and (4) evaluate potential passage and protection measures.

Resource Management Goals

The Atlantic States Marine Fisheries Commission has developed several documents related to the management of American shad and river herring:

1. Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999.
2. Atlantic States Marine Fisheries Commission. 2000. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.
3. Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.
4. Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.

Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring includes an objective of maximizing the number of juvenile recruits emigrating from freshwater stock complexes and recommends enhancing survival at dams during emigration by evaluating survival of post-spawned adults and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implementing measures to pass fish via the route with the best survival rate.

Specific to resident riverine and migratory fish entrainment, the Department's goals are:

1. Minimize current and potential negative project operation effects such as turbine entrainment that could hinder management goals and objectives.

2. Minimize project-related sources of mortality to resident and migratory fishes in order to restore natural food web interactions and ecosystem functions and values.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and

protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

No project-specific information exists regarding risk of impingement and/or entrainment of adult alosines. In the PAD, Boott provided little information, which would inform the relative risk of impingement or entrainment in any of the 21 units associated with the project. Moreover, information regarding fish mortality at the spillway and the downstream bypass was not discussed. While Normandeau Associates, Inc., performed a study in 2003 pertaining to the survival of Atlantic salmon smolts through the turbines, (1) the sample size was small (20 fish); (2) the study was not performed at a full range of gate settings; and (3) salmon are a robust fish species and cannot be used as a proxy for alosines. The 2003 study did shed light on a predation issue, however, in the project's tailrace. Of the salmon that passed downstream, 69 percent were suspected to be preyed upon after using the downstream bypass facility. As Normandeau Associates, Inc., noted in their study results, predators residing in the tailrace can have a large impact on emigrating migratory fish species that use the current bypass facility at the project.

To date, no directed studies of alosine injury, entrainment, or mortality have been conducted at the project's modified spillway, the downstream fish bypass facility, or through the turbines. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating adult alosines and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

Hydropower projects generate electricity by moving water through a turbine-generator system. Typically, there are trashracks in front of the intakes leading to the turbines. If the rack spacing is narrow and the velocities at the racks too high (relative to the swim speeds of fish species inhabiting or moving through the headpond), fish may become impinged against the racks and die. If the rack spacing is wide and the velocities too high (relative to the swim speeds of fish species inhabiting or moving through the headpond), fish may become entrained (i.e., pass through the racks) and get injured or die while passing through the turbines.

Lowell's configuration likely presents problems with respect to providing safe, timely, and effective passage for outmigrating alosines. Pre-spawned adult American shad and river herring pass upstream through the Lowell fishways and/or are stocked into upstream habitats. These fish need to be able to migrate back downstream because they are iteroparous in this region. Therefore, it is necessary to understand how alosines move through the project area and the level of injury or mortality caused by entrainment through the project's turbines and/or passage via the dam spillway and downstream bypass facility.

Methodology Consistent with Accepted Practice

The Department proposes a phased approach to this study.

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Phase 1:

Spill, bypass, and turbine mortality should be assessed using a balloon-tag method. For spill mortality sites (dam spillway and downstream bypass), tagged alosines will be injected or released into spill flow at points where water velocity exceeds 10 ft./sec to minimize the possibility of the fish swimming upstream into the headpond or canal. Passed balloon-tagged alosines will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

For turbine mortality sites, tagged alosines will be injected into the intakes of units operating at or near full generation at points where intake water velocity exceeds 10 ft. /sec to minimize the possibility of fish swimming back upstream through the intakes. Passed balloon-tagged alosines will be recovered in the tailrace and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

Phase 2:

Boott should investigate existing or potential future operational and/or physical measures that would minimize injury or mortality to outmigrating adult alosines moving past the project. Based on the results of this investigation, we recommend Boott provide a range of potential alternatives (e.g., increasing attraction to the existing downstream bypass, installing exclusionary screening, etc.).

Project operations (flows, levels, gate openings, number of units operating, and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) should be monitored regularly (hourly measurements if possible) throughout the duration of the study.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The cost and effort of each individual phase of this study are expected to be moderate. Based on the scale and scope of the subject study, we estimate the cost to be $25,000 to $50,000. In the PAD, Boott proposes no studies to address this issue. The Department is not aware of any previously conducted or ongoing studies related to impingement, entrainment or survival of adult alosines at the project.

REFERENCES

Normandeau. 2003. Passage Route Selection and Survival of Atlantic Salmon Smolts Passed through the Lowell Hydroelectric Project. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc. Westmoreland, New Hampshire. 130 pp.

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Study Request # 3

Telemetry Study of Upstream and Downstream Migrating Adult American Shad and River Herring to Assess Passage Routes, Effectiveness, and Delay

(Lowell, P-2790)

Goals and Objectives

The goal of this study is to assess the behavior, approach routes, passage success, survival, and delay of adult American shad and river herring as they encounter the Lowell Project during their upstream and downstream migrations to determine if project operations negatively impact their survival and production.

The following objectives will address this request:

1. assess project operations effects on the timing, orientation, routes, and migration rates of shad and river herring;
2. determine route selection and behavior of upstream migrating shad and river herring at the project under varied operational conditions, including a range of spill conditions (e.g., movement to the dam, attraction to the E.L. Field station discharge, movement between locations, delay, timing, etc.);
3. determine delay/fallback associated with the northern canal;
4. assess near field attraction to, and entrance efficiency of, the fish lift under a range of spill conditions and with the river-side entrance and street-side entrances open;
5. assess near field attraction to, and entrance efficiency of, the spillway ladder under a range of spill conditions;
6. evaluate the internal efficiency of the Pawtucket dam ladder;
7. collect ladder and lift efficiency data, to include rates of approach to fishway entrances, entry into fishways, and passage under varied operational conditions, including a range of spill conditions;
8. determine the proportion of post-spawned adults that select the power canal as a downstream passage route under varied operation conditions, including a range of spill conditions up to full spill; determine post-spawned adult downstream migration route selection, passage efficiency, and delay associated with the power canal under various operational conditions, including a range of spill conditions; and
9. compare rates and measures of delay and movement among project areas and routes utilized (e.g., spill at dam vs. power canal) under the range of permitted and proposed spill and operational conditions.

If project operations are adversely affecting shad or river herring migration timing or are resulting in other deleterious population effects, we recommend Boott identify operational solutions or other passage measures that will reduce and minimize these impacts within the project area.

This study will require 3 years of field data due to the tailrace ledge excavation project which will be completed in 2019 and to capture inter-annual variability of river discharge, water temperatures, and variability in outmigration timing. We recommend Boott perform the downstream routing portion of the study in 2019 (pre-ledge excavation) and 2020 (post-ledge excavation). In 2020 and 2021, after the ledge has been excavated, we recommend Boott perform the upstream portion of this study.

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Resource Management Goals

The Atlantic States Marine Fisheries Commission, Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring, approved in 2010, includes the following objectives:

Upstream Passage

1. Fish must be able to locate, enter, and pass the passage facility with little effort and without stress.
2. Where appropriate, upstream fish passage effectiveness should be improved through operational or structural modifications.
3. Fish which have ascended the passage facility should be guided to an appropriate area so they can continue their upstream migration and avoid being swept back downstream.

Downstream Passage

1. Enhance survival at dams during emigration.
2. Evaluate survival of post-spawned adults and juvenile fish passed via each project route (e.g., turbines, spillage, bypass facilities, or a combination of the three).
3. Implement measures to pass fish via the route with the least delay and best survival rate.

The Department seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to American shad and river herring movement and migration, the Department's goal is to minimize current and potential negative project operation effects on the safe, timely and effective upstream and downstream passage of adult American shad and river herring.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), the Federal Power Act (16 U.S.C. §791a, *et seq*.), the Atlantic States Marine Fisheries Compact (P.L. 539, 77th Congress, as amended by P.L. 721, 81st Congress), and the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5107).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

Several studies pertaining to the fish lift and downstream passage facilities at Lowell have been conducted for American shad. Studies of alewife passage are limited to a single

downstream test performed in 1991. Previous studies pertaining to upstream shad migration (listed in Table 5.4-3 of the PAD) demonstrate passage through the existing lift at Lowell is relatively poor. Also, when analyzing annual passage counts for river herring and shad, the number of fish which utilize the Lowell lift versus those that pass at Lawrence is low (from 1996 to 2017 passage efficiency at Lowell has not exceeded 30 percent).

Until 2016, the fish lift has been the primary route of upstream passage at the project. The ladder, located at the Pawtucket dam, has typically only been operated during periods of high flow. Therefore, to date, studies performed at Lowell have not tested the near field attraction, entrance efficiency, or internal efficiency of the ladder. Moreover, past studies have had statistically low sample sizes (less than 60 fish) and were all performed prior to the ledge excavation project which will occur in August 2019. Future studies should have a robust sample size (at a minimum, 150 fish per species) and array system. Additionally, to obtain a comprehensive understanding of fish behavior at Lowell, for both upstream and downstream migration, studies are needed to: (1) determine if project operations affect pre-spawned and post-spawned river herring and shad migration timing; (2) assess fish movement to, and through, the ladder at the Pawtucket dam; and (3) assess passage success at the tailrace fish lift post-ledge removal.

Nexus to Project Operations and Effects

Lowell tailrace turbulence (potentially exacerbated by the existing ledge outcropping) creates attraction issues at the entrance of the fish lift. Moreover, a lack of effective protection at the 21 turbines associated with the project increases the risk of entrainment and mortality alosines may experience as they migrate downstream to the ocean. During the upstream fish passage season, the Lowell bypass reach receives 500 cuffs. during the day and 300 cfs. at night via operation of the spillway fish ladder; otherwise, the reach only receives flow when inflow exceeds the hydraulic capacity of the project's generating capacity. The spillway ladder is, therefore, only partially effective due to lack of flow.

Existing project operations and limited bypass flows can have a direct impact on diadromous fish migration. Migration delays, increased predation, mortality during passage over the dam or through turbines, and changes in route selection under different flow conditions are potential influences of the project on shad and river herring populations in the Merrimack River. Effective upstream and downstream passage and successful spawning and juvenile production are necessary to help achieve shad and river herring management restoration goals for the Merrimack River, particularly in the upstream reaches.

Methodology Consistent with Accepted Practice

The movement of migratory shad and river herring would be best studied by using radio telemetry, including passive integrated transponder (PIT) tags. Radio telemetry is an accepted technology that has been used for a number of studies associated with hydropower projects, including at the Bellows Falls (FERC No. 1855), Wilder (FERC No. 1892), and Vernon (P-1904) projects.

The study design must specify sample sizes, as well as tag and receiver configurations, to ensure rates of entry and exit to the tailrace, fish lift and fish ladder, downstream bypass, the bypassed reach, and canal, can be calculated with sufficient precision. We recommend Boott capture shad and river herring below Lawrence and tag at least 150 individuals per species. Double-tagged (radio and PIT) shad and river herring should be released upstream of the Lawrence dam and upstream of the Lowell dam. Fish should also be released directly into the Pawtucket canal to adequately assess project conditions likely to be encountered during

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downstream migration. Additional, tagged, individuals may need to be released farther upstream to ensure enough fish encounter the dam during a sufficient range of turbine and operational conditions to test for project effects (especially in 2020 and 2021). A large array of stationary monitoring stations (radio and PIT) will be needed to provide an appropriate level of resolution for data analyses and to answer the natural resource agencies' questions regarding project operation effects. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017); a minimum of 25 dead river herring and 25 dead shad should also be released as a control group in this study. A plan and schedule for spill releases should be developed which provides sufficient periods of spill and various generating levels (treatments will require multiple days of consistent discharge).

Each component of this study will require 2 years of field data collection to attempt to account for inter-annual variability in river discharge, water temperatures, and the ledge excavation project which will be completed in 2019. We recommend Boott perform the downstream routing portion of the study in 2019 (pre-ledge excavation) and 2020 (post-ledge excavation). In 2020 and 2021, after the ledge has been excavated, the upstream portion of this study should be performed.

A related study request on computational fluid dynamics (CFD) modeling in the Lowell tailrace, in and around the fish lift and fish ladder entrances and powerhouse forebay, will complement this study and address related project operational effects.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Estimated cost for this study is expected to range from $400,000 to $500,000, with the majority of costs associated with equipment (radio and PIT tags, radio receivers, and PIT readers) and related field work labor. Since tagged shad and river herring will move throughout the area, to varying degrees, there will be expected cost savings (e.g., radio tags) to Boott, provided cooperation in study planning and implementation occurs.

Boott did not propose any studies to meet this need in the PAD.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

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Study Request # 4

Impact of Project Operations on Downstream Migration of Juvenile Alosines

(Lowell, P-2790)

Goals and Objectives

The goals of this study are: (1) conduct a field study of juvenile alewife outmigration in the Lowell impoundment, the power canal, and at the Pawtucket dam, to determine if project operations negatively impact juvenile alosine survival and production; and (2) determine if project operations affect juvenile alosine outmigration survival, recruitment, and production.

The following objectives will address this request:

1. assess project operations effects of the Pawtucket dam on the timing, orientation, passage routes, migration rates, and survival of juvenile alewife;
2. determine the proportion of juvenile alewife that select the Lowell canal versus the Pawtucket powerhouse, downstream bypass facility, or dam spill as a downstream passage route, under varied operational conditions;
3. determine if there are any delays associated with downstream movement related to either dam spill or the Pawtucket powerhouse due to operations;
4. determine the juvenile downstream passage timing and route selection in the Lowell canal, assess delays associated with the canal, and with project operations (e.g., stockpiling in the canal).

If it is determined the project operations are adversely affecting juvenile alosine survival, migration timing, or other deleterious population effects, identify operational solutions or other passage measures which will reduce and minimize these impacts within the project area. This study will require 2 years of field data to capture inter-annual variability of river discharge and water temperatures.

Resource Management Goals

The Atlantic States Marine Fisheries Commission Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (American Shad Management), approved in 2010, includes the following objective:

> Maximize the number of juvenile recruits emigrating from freshwater stock complexes.
> To enhance survival at dams during emigration, evaluate survival of post spawning and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implement measures to pass fish via the route with the best survival rate.

The Department seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.

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2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to juvenile American shad and river herring movement and migration, the Department's goal is to minimize current and potential negative project operation effects on the safe, timely and effective downstream passage.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), the Silvio O. Conte National Fish and Wildlife Refuge Act (P.L. 102-212; H.R. 794), the Federal Power Act (16 U.S.C. §791a, *et seq*.), the Atlantic States Marine Fisheries Compact (P.L. 539, 77th Congress, as amended by P.L. 721, 81st Congress), and the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5107).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

The seaward migration of juvenile alosines is of great importance to the restoration of alewife, blueback herring, and American shad in the Merrimack River. However, data on the downstream migratory movements and rates of alosines past Lowell is sparse and relatively incomplete. In 1994 and 1995, Normandeau Associates, Inc., documented the use of the bypass facility by downstream migrating alosines via the installation of a removable box trap. Passage efficiencies were 7 percent and 37 percent, respectively. However, to date, no directed studies of downstream alosine passage route selection has been conducted at the Lowell Project. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating juvenile alosines and develop adequate passage and protection measures to meet management goals and objectives.

Studies conducted farther upstream on the Merrimack River, at Garvins Falls (FERC No. 1893), have shown it is possible to radio-tag juvenile alewife to evaluate alosine outmigration (Normandeau 2016). Alewife can be used as a proxy, in this instance, for the natural resource agencies to assess blueback herring and shad downstream migration patterns.

Nexus to Project Operations and Effects

Adult alosines, passed at Lowell via the fishways and/or stocking efforts, utilize upstream habitat to spawn on an annual basis. Similarly, juvenile alosines require safe and timely downstream passage measures at the project in order to successfully emigrate back to the ocean to contribute to the population. Presently, downstream migrants can easily enter the Lowell canal system, via the Pawtucket canal, as there are no exclusionary measures in place. There are 19 turbines located in the canal, housed at four powerhouses (Assets, Bridge Street, Hamilton, and John Street), none of which have passage or protection measures. There are a variety of unit-types housed in each of the powerhouses, ranging in speed from 100 to 150 rpm. A study is needed to assess the impacts project operations have on outmigrating juvenile alosines.

The Department is not aware of any studies conducted specifically designed to determine:

1. What is the rate of alewife survival under a range of spill and gate configurations?
2. Are there delays in migration/movement at the dam, gatehouse, or in the canal?
3. For juveniles that enter the Pawtucket canal, what proportion subsequently enter the Western, Merrimack, Pawtucket, or Hamilton canals?
4. What is the rate of movement through the canal, what is the delay to juvenile alosine outmigration, and the potential accumulation of juveniles in the canal?
5. What proportion of juvenile alosines use the downstream bypass sluice versus the E.L. Field powerhouse turbines under varied operational conditions?

The Department is concerned project operations are: (1) impacting juvenile alosine outmigration survival; and (2) contributing to the failure of the Merrimack River alosine population to meet management targets.

Methodology Consistent with Accepted Practice

The impact of project operations to juvenile alewife outmigration, passage route selection, and migratory delay would be best studied via radio telemetry. This methodology has successfully been tested and employed by Normandeau Associates, Inc., at the Garvins Falls hydroelectric project (FERC No. 1893; Normandeau 2013; Normandeau 2016). Project discharge over a full range of existing and, to the extent possible, potential future operational conditions at the dam (likely increased bypass reach flows in new license), should be examined relative to migration rate and passage route selection of juvenile alosines to, and through, various areas of the project.

In addition, study fish should be collected and balloon-tagged to empirically determine rates of survival for fish passed over or through the dam's bypass sluice, main powerhouse, and 19 canal units under varied operations. For spill mortality sites (dam spillway and downstream bypass), tagged alosines should be injected or released into spill flow at points where water velocity exceeds 10 ft./sec to minimize the possibility of the fish swimming upstream into the headpond or canal. Passed balloon-tagged alosines will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

For turbine mortality sites, tagged alosines will be injected into intakes of units operating at or near full generation at points where intake water velocity exceeds 10 ft./sec to minimize the possibility of fish swimming back upstream through the intakes. Passed balloon-tagged alosines will be recovered in the tailrace and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

Radio-tagged juvenile alewife will be released in areas upstream of the project at multiple release locations, to determine operation effects on migration rates, route, orientation, and entrainment, over a full range of permitted and operational conditions. The release of radio-tagged fish upstream of the project, and induction into the power canal, will provide data on concerns of delay and route selection to the canal, downstream bypass, crest gates, and turbines. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017); a minimum of 50 dead alewife should also be released as a control group in this study.

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Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Boott does not propose any studies to meet this need. Estimated costs for the study are expected to be moderate to high, between $100,000 and $300,000, with the majority of costs associated with equipment (radio tags, radio receivers) and related field work labor.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

Normandeau 2013. Juvenile Alosine Radio Tag Attachment Test. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 2 pp.

Normandeau 2016. Garvins Falls Juvenile Alosine Downstream Passage Telemetry Assessment. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 13 pp.

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Study Request # 5

Downstream American Eel Passage Assessment
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine the impact of the Lowell hydroelectric project on the outmigration of silver eels in the Merrimack River. Entrainment in the canal and at the conventional turbines at the project powerhouses (E.L. Field, Assets Station, Bridge Street, Hamilton Station, and John Street) can result in mortality or injury. It is important to understand the passage routes at the project and the potential for delay, injury, and mortality to assess alternative management options to increase survival.

The objectives of this study are:

1. Quantify the movement rates (including delays) and relative proportion of eels passing via various routes at the project (i.e., through the turbines, through the downstream bypass, spilled at the dams, etc.).
2. Evaluate instantaneous and latent mortality and injury of eels passed via each potential route.

Resource Management Goals

The Atlantic States Marine Fisheries Commission has developed two documents related to the management of American eel:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.

Objectives of the management plan include: (1) protect and enhance American eel abundance in all watersheds where eel now occur; and (2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre-spawning adult eel.

Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Commission relicensing process.

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The Department seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to downstream passage of American eel, the Department's goals are:

1. Minimize current and potential negative project operation effects that could hinder management goals and objectives.
2. Minimize project-related sources of downstream passage delay, injury, stress, and mortality in order to maximize the number of silver eels migrating to the spawning grounds.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requester is a natural resource agency.

Existing Information and the Need for Additional Information

Data on downstream migratory movements and rates of American eels past the project are sparse and relatively incomplete. A single study was performed by Normandeau Associates, Inc., in 2017 (Normandeau 2017). Seventeen silver-phase eels were tagged and released into the Merrimack River upstream of the Garvins Falls project. Of the 17 released individuals, 14 approached the Pawtucket dam. Eight were determined to have passed through the gatehouse and enter the forebay canal upstream of the E.L. Field powerhouse. Five eels passed the project via spill flow. One eel's passage route was classified as unknown. Zero individuals used the downstream bypass. This study had a small sample size, was of a relatively short duration (October 20-November 28, 2017), did not include monitoring stations or antenna arrangements in the canal, and was performed prior to the installation of the pneumatic crest gate system.

To date, no other directed studies of eel entrainment or mortality have been conducted at the Lowell Project. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating eels and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

The project configuration presents problems with respect to providing safe, timely, and effective passage for outmigrating eels. The intakes are likely deep and, while no specification for the trashracks were provided in the PAD, it is unlikely they would prevent entrainment of eels. The anadromous downstream passage facility at the project is also not expected to be effective for eels; the target anadromous species are surface-oriented, while eels tend to move much deeper in the water column. Additionally, there are no data pertaining to eel movements in the Lowell canal. Eels which move into the canal potentially have no alternative but to pass through hydropower turbines at the Assets, Bridge Street, Hamilton, and John Street powerhouses. Eels are known to occur upstream of the dam; therefore, it is necessary to understand how eels move through the project and the level of injury and/or mortality resulting from each potential passage route (i.e., the spillway, the downstream bypass facility, or the 21 turbines associated with the project).

Methodology Consistent with Accepted Practice

In order to understand the movements of outmigrating silver eels as they relate to operations at Lowell, radio telemetry technology should be utilized. Radio telemetry is an accepted technology which has been used for a number of studies associated with hydropower projects, including at the Bellows Falls (FERC No. 1855), Wilder (FERC No. 1892), and Vernon (P-1904) projects.

Studies should be designed to investigate route selection (i.e., entrainment vs. spill) independently from estimation of mortality/injury, because these metrics require different methodologies. Studies will also likely benefit from data collected over 2 study years (especially route selection studies, which may be more significantly affected by environmental conditions during a given season than mortality/injury studies). It is also envisioned that the results from route selection studies can guide design of turbine mortality studies. Therefore, it is proposed, at a minimum, route selection studies be conducted in multiple years, but mortality/injury studies may be conducted after the first year of route selection studies have been completed.

Objective 1: Route Selection

This study will involve systematic releases of radio-tagged silver phase eels at strategic points above areas of interest, to assess general routes of passage (i.e., via spill, bypass, or turbines). Active downstream migrants should be collected within-basin if possible (i.e., Cabot or Holyoke bypass samplers), but fish sourced from out-of-basin may be acceptable to meet sample size demands. Experimental fish must meet morphometric (e.g., eye diameter relative to body size) criteria to ensure they are migrant silver phase. Collections should be made within the migratory season (late August to mid-October), and eels should be tagged and released within 21 days after capture, but preferably within 7 days (particularly if the test eels are from out-of-basin).

All telemetered eels will be radio- and PIT-tagged. PIT antennas will be installed and monitored continuously to verify passage of eels via bypass channels.

A minimum number of 150 telemetered eels (e.g., five separate groups of approximately 30 eels each) will be required to maximize the data return. Tagged eels should be released at least 5 km upstream of the Lowell Project. Groups of eels should be released during spill (if any) and non-spill and during periods of low,

moderate, and high generation conditions. Up to 50 additional eels should also be released in the upper canal and allowed to volitionally descend through the canal to assure that a sufficient number of eels are exposed to canal conditions. Groups of eels should be released when the canal units are running and when the canal units are off. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017), a minimum of 25 dead eels should also be released as a control group in this study.

Telemetry receivers and antennas should be located upstream and downstream of the spillway, at the canal entrance, within the canal, in the downstream fish bypass entrance, at turbine intakes, the station tailrace, and downstream of the confluence of the Merrimack and Concord rivers. These locations will permit assessment of passage via the following potential routes: the power canal; spillway; downstream fish bypass; station turbines; and upstream fishway attraction water intake. The final placement of receivers and antennas should be developed in consultation with the fisheries agencies.

Mobile tracking (i.e., via boat) in the River and canal between release sites and several km downstream will be performed at regular intervals during and after releases to confirm routes and fates of passed fish or lost fish.

Movement rates (time between release and detection at radio antenna locations, and between radio antenna locations) of eels passing the projects by various routes will also be quantified.

The route selection portion of this study should occur in both study years.

Objective 2: Spill, Bypass, and Turbine Mortality/Injury Studies

Spill, bypass, and turbine mortality will be assessed using a balloon-tag method.

For spill mortality sites (dam spillways and downstream bypasses), tagged eels will be injected or released into spill flow at points where water velocity exceeds 10 ft./sec to minimize the possibility of eels swimming upstream into the headpond or canal. Passed balloon-tagged eels will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged eels will be censored from the data.

For turbine mortality sites, tagged eels will be injected into intakes of all 21 units associated with the project, operating at a full range of settings where intake water velocity exceeds 10 ft/sec to minimize the possibility of eels swimming back upstream through the intakes. Passed balloon-tagged eels will be recovered in the tailrace(s) and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged eels will be censored from the data.

If the balloon-tag mortality component of the study occurs in study year one, all possible route selection sites would need to be evaluated. If the balloon-tag mortality component of the study occurs in study year two, results from the route selection study could be used to inform which sites need to be evaluated for mortality. Eels recovered from balloon-tag studies should not be used for route selection studies.

Data analyses of route selection and mortality (instantaneous and latent) will follow standard methodology.

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Project operation (flows, levels, gate openings, number of units operating and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) will be monitored regularly (hourly measurements if possible) throughout the duration of the studies and assessed for potential relationships to passage route selection, migratory delay, and/or passage survival.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The level of cost and effort for the downstream eel passage study will be moderate to high; silver eels would need to be collected, tagged, and released in several locations over the course of the migration season. Antennas and receivers would need to be installed throughout the canal, at the intakes of the E.L. Field powerhouse, at the dam spillways and station bypass and monitored regularly. Data would need to be retrieved periodically, then analyzed. A multi-site route selection study conducted by the USGS Conte Lab on the Shetucket River in Connecticut cost approximately $75,000 for the first year of study. Costs are estimated at $100,000 per year for the route selection study and $50,000 to $75,000 for the spill, bypass, canal, and turbine mortality/injury study.

Boott did not propose any studies to meet this need in the PAD.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

Normandeau Associates, Inc. 2017. Downstream Passage Evaluation for Silve-Phase American Eels at the Lowell Hydroelectric Project. 2017. Submitted to the City of Holyoke Gas and Electric Department. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 17 pp.

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Study Request # 6

Operations Analysis of the Lowell Canal
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to understand the operations of the Lowell canal system. The specific objective of this study is to describe the operations of the Lowell canal (how all of the canal units interact with the main units, how the canal units are sequenced, how often each of the units operate, the prioritization sequence of canal unit operations, the amount of time the units are operated during the downstream passage season, etc.).

Resource Management Goals

The Department seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources, the Department's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Minimize current and potential negative project operation effects on fish in the project area.

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

The Merrimack River supports a variety of migratory fish species. However, there is no information pertaining to fish mortality and population effects resulting from entrainment in the canal and/or the canal units. Since there are no exclusionary measures at the entrance of the project's canal system, fish can easily enter the two-tiered network of man-made canals, which are approximately 5.5 miles in length. These man made canals provide flow to 19 Boott-owned hydroelectric units. Since obtaining the original license for the project, there have been no directed studies of the Pawtucket, Western, Merrimack, or Hamilton canal units. Additionally, the PAD provides little operational information regarding the canal: flows of up to 2,000 cfs. are routed into the canal, typically once the E.L. Field station's hydraulic capacity of 8,000 cfs. has been reached. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on riverine fishes and migratory alosines which may be moving through, or inhabiting, the canal and develop adequate passage and protection measures to meet management goals and objectives.

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Nexus to Project Operations and Effects

The Lowell Project consists of a two-tiered, 5.5-mile-long, network of man-made canals which include several small dams and 19 turbine units. Flows enter the canal system upstream of the Pawtucket dam via the Pawtucket canal. There are no exclusionary measures for fish in place. Therefore, the Lowell canal presents problems with respect to providing safe, timely, and effective passage for fish trying to move past the project through the canal system.

Methodology Consistent with Accepted Practice

In order to determine the relative risk the canal unit's present to riverine and migratory fishes, it is necessary to understand how the canal operates. Therefore, we request Boott provide a detailed description of the operational protocol it uses to determine when and how much water flows into the canal at a time scale relevant to the migratory fish species expected to potentially utilize the canal as a passage route (e.g., May, June, and July for spent alosines; August through November for adult eels and juvenile alosines). Historical operations data should be examined relative to the hydrological data set to determine the percent of time the canal units would be expected to operate during each passage month. This analysis should be used in conjunction with the results of the passage route and turbine mortality studies to estimate total through project mortality for each target fish species/life stage.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The expected level of effort and anticipated cost will be low. Operations and hydrologic data are readily available and only need to be compiled and analyzed. We estimate the cost to be less than $10,000.

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Study Request # 7

Three-Dimensional Computational Fluid Dynamics (CFD) Modeling in the Vicinity of Fishway Entrances and Powerhouse Forebays

(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine the flow field conditions which exist in and around fishway entrances and the powerhouse forebay. The information from this request is meant to be coupled with data from the telemetry studies, such that a comprehensive understanding of fish behavior is developed.

The objective of this study is to create a series of color contour maps of velocity magnitude at select discharges agreed upon by the resource agencies and the licensee. With respect to upstream passage, the results will show approach velocities and flow fields that may create a response in fish. This information can be coupled with telemetry data (from the requested shad and river herring telemetry study) and passage counts to understand which conditions are optimal for guiding migrating fish to the fishway entrances and stimulating fishway entry.

With respect to downstream migration, the results will show velocities and flow fields in front of the E.L. Field powerhouse. Additionally, the results will indicate to what degree, if any, flow directs downstream migrating fish towards the downstream bypass facility.

Resource Management Goals

The management goals of this study request are to obtain information that will assist in enhancing the effectiveness of the current upstream fish passage facilities for upstream migrating trust species and reduce impingement, entrainment, and delay for downstream migrating fish. CFD models are a relatively cost effective way to analyze existing and future conditions. As such, changes in the amount of attraction water, changes in which turbines are operating, and which spillway gates are releasing water can all be examined. As stated, the results from this study are meant to be used along with the data generated from the requested telemetry study. The combined analysis from these two data sources can help assess which flow conditions are most advantageous for migrating trust species to enter the fishway under current and proposed conditions.

As for downstream migration of adult and juvenile shad, river herring, and adult eel, the results from the models will reveal flow magnitude and direction in front of the powerhouse. Given the limited information that currently exists on survival through the project, our management goal is to direct as many downstream migrating fish as possible towards the downstream bypass facility. With respect to upstream passage, we want to maximize the number of fish that find and enter the fishway entrances.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

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Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

To date, no CFD modeled data exists in front of either the fish ladder or lift, nor do they exist in front of the E.L. Field powerhouse. A comprehensive understanding of fish behavior at the ladder and lift entrance, and the powerhouse forebay, is needed in order to create safe, timely, and effective upstream and downstream passage for American shad, river herring, and eels. Additionally, a better understanding of flow and how it affects fish passage is needed after Boott performs the ledge removal excavation project.

Nexus to Project Operations and Effects

The Lowell Project has direct impacts to upstream and downstream migrating shad, river herring, and eel. The development of these models will give resource agencies valuable information into the hydraulic cues which may elicit a response from upstream migrants. For downstream passage, the Department has approach velocity guidelines; the output from these models would inform the resource agencies under what conditions appropriate approach velocities are being met and when they are being exceeded.

With respect to upstream migration, the auxiliary water system (AWS) plays a critical role in determining whether or not fish are attracted to the entrance. The results from this study would allow us to assess how well the AWS is performing and under what conditions it attracts the most fish.

With respect to downstream migration, the development of a CFD model under existing conditions also informs the design of future modifications and improves the survivability of downstream migrating shad, river herring, and eel.

The CFD models for the Pawtucket fishway and fish lift should be developed as part of year two studies, after the ledge excavation project is complete. It would be useful to have the gatehouse area CFD modeling completed in year one. This analysis may provide information on adjustments to canal operations or structures that can subsequently be analyzed.

Understanding the entrance conditions of the Pawtucket fishway under a range of spill conditions would be informative. If developed prior to the year one upstream shad telemetry studies, it would provide information on spill gate settings which would likely best achieve entrance and ultimately passage. Further work with the model can help in evaluating changes in ladder entrance or spill conditions that could improve passage and be tested with telemetry, video, and/or count data.

CFD modeling of the flows leading to the canal would aide in our interpretation of year one downstream passage telemetry results, but would not need to be completed prior to the year one telemetry (downstream juvenile alewife and downstream eel) studies. Those studies will provide the context for how and where shad, river herring, and eels are passing the project and how successful passage is. The CFD modeling could focus on the locations identified as important in the study results and Boott could assess changes to structures or operations and evaluate them in the model. Promising alternatives would then be tested in year three studies.

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Methodology Consistent with Accepted Practice

A three-dimensional CFD model has become an increasingly common standard of analysis at hydroelectric projects around the nation. Within the northeast region, we have seen these types of models developed at the Holyoke (P-2004), Brunswick (P-2284), Shawmut (P-2322), Milford (P-2534) and Orono (P-2710) projects. We would expect to engage with the licensee in terms of determining the appropriate area and flows to be modeled. We expect the spatial extent of the model at each study site will vary. Given the large number of ways in which output from these models can be presented and the near infinite number of flows which could potentially be modeled, we would expect to consult with the licensee to reach agreed upon modeling efforts and scenarios to be examined.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The cost of developing, running and testing a CFD model can vary tremendously; one large variable in determining the cost is based on the amount of existing bathymetric data to which Boott currently has access. We roughly estimate that the cost of each CFD model could run as high as $50,000, assuming no bathymetric data currently exists. Proactive communication with resource agencies will reduce the cost and iterative effort. Given the level of effort that has occurred at other projects that have proposed to amend their license, we see the level of effort requested here as reasonable, given that Boott is seeking a renewal of its license.

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Study Request # 8

Bypass Zone of Passage
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine zone-of-passage flows in the bypass reach which facilitate safe, timely, and effective fish passage through the project.

Specifically, the objectives of this study are:

1. complete a detailed survey of the bypass reach;
2. develop a high-resolution, two-dimensional hydraulic model of the bypass reach;
3. release multiple flows from the dam to collect calibration data for the model;
4. simulate additional flows through the bypass reach with the calibrated model; and
5. determine minimum and optimal zone-of-passage flows for the project.

Resource Management Goals

The Department seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources within the Lowell bypassed reach, the Department's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide a flow regime in the bypassed reach that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) and diadromous fishes.
3. Minimize current and potential negative project operation effects on water quality and aquatic habitat.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

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Public Interest

The requester is a natural resource agency.

Existing Information and the Need for Additional Information

Article 36 of the original license required the licensee, in consultation with resource agencies, to develop an in-stream flow study plan to determine: (1) the relationship between project discharges and downstream aquatic habitat; and (2) a fishery study plan to determine project discharges necessary to provide for the migration of anadromous fish (i.e., zone of passage). After completion of the approved studies, the licensee was to file a report on the results of the studies, and, for Commissions approval, recommendations for the flow releases from the project. The study plan was filed on August 13, 1983, with proof of agency consultation (Accession No. 19830818-0191). However, there are no study reports included in the record. Therefore, we have no quantitative data supporting the agreement that 300 cfs. at night and 500 cfs. during the day are adequate flows for zone of passage in the bypass reach.

In the Comprehensive Fish Passage Plan filed on March 9, 2000 (Accession No. 20000313-0322), the licensee states "The adequacy of flows for upstream fish passage at the Project was addressed by BHI's construction of six (6) concrete flow control weirs (with adjustable stoplog sections) in the bypass reach, at the request of U.S. Fish and Wildlife Service and in response to Article 36, section (2) of the Project's FERC license." Similar to the study plan, this is an agreement with no supporting information to substantiate the conclusion flows in the bypass reach are adequate for the full suite of diadromous species.

As part of compliance for Article 34 of the original license, the licensee filed as-built drawings of the existing fish passage facilities (Accession No. 19860902-0215). Within this abbreviated drawing set, drawing number 344D-PC001, 3844D-FC001, and 3844D-FC004 show topographic surveys for portions of the bypass reach. However, the drawings do not document the accuracy and precision of the survey, do not show the majority of the bypass reach, and are otherwise illegible.

Since agreeing upon the current zone-of-passage flows during the original license, there have been developments in topographic survey capabilities, a better understanding of the hydraulic requirements of diadromous species, multi-dimensional hydraulic modeling capabilities, and an increased need to pass fish at the spillway ladder.

Nexus to Project Operations and Effects

Diadromous fish orient their migration based on the environmental conditions of the river: flow, depth, velocity, and temperature (Goodwin 2014). Project operations affect the environmental conditions in the River, specific to this study request, the bypass reach. Two key hydraulic model outputs from the requested study are depth and depth-averaged velocity, which can be used to determine the likelihood of predation, delay, and the cessation of migration. Evaluating the flow fields in the bypass reach under different spill conditions will assist in the consultation process for determining an appropriate zone-of-passage flow in the bypass reach to optimize fish passage at the project. These data will also contribute to the development of an administrative record in support of a potential settlement agreement, Section 18 fishway prescriptions, or 10(j) recommendations.

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Methodology Consistent with Accepted Practice

We proposed the following methodology to accomplish the five objectives and ultimately the goal of the study, to determine zone-of-passage flows for the bypass reach.

Topographic survey

The bypass reach area is large, making traditional topographic survey methods laborious and costly. We recommend using Light Detection and Ranging (LiDAR) methods with limited traditional surveying. Outside of the fish passage season and during a river flow when the project is in control of the River, the bypass reach will be mostly dewatered. At this time, a licensed surveyor can fly the area to collect LiDAR data. Once this data is processed, traditional methods will fill in the gaps (e.g., pooled water areas, under bridges). The topographic survey shall be of sufficient resolution and quality to complete the remaining objectives.

Two-dimensional hydraulic model

There are many two-dimensional hydraulic models that are acceptable for accomplishing the goal of this requested study, many of which are open source. We are not requiring one model over the other, but Boott should understand and document the limitations of the modeling software used. At a minimum, the modeling output should produce depth-average velocity and depth for each cell in the mesh. The modeling domain shall be of sufficient size and mesh to delineate a zone of passage through the entire length and width of the bypass reach.

Calibration flows

The licensee should collect calibration data by spilling a minimum of two flows from the Pawtucket dam. The calibration flows should bracket the range of simulated flows in the study. We recommend 300 cfs. for the low flow as it represents the current lowest operation flow for the fish ladder. For the high calibration flow, we recommend collecting data near the high fish passage design flow (i.e., the 5 percent exceedance value for the migratory period of record) which is approximately 26,000 cfs. in the Merrimack River (bypass flow would be approximately 17,000 cfs. with full project operation). Boott should collect calibration data (depth-averaged velocity and depth) with an Acoustic Doppler Current Profiler (ADCP) at a minimum of four cross sections, including the downstream boundary condition and use the ADCP in locations spread evenly throughout the bypass which are less turbulent.

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Additional flow simulations

After calibrating the model, additional bypass flows should be simulated (and agreed upon with the natural resource agencies), including 500 cfs., 1,000 cfs., and up to the high calibration flow. The additional simulations should represent the full range of hydraulic conditions in the bypass reach from the low to high fish passage design flow.

Zone-of-passage determination

The model output should be used to delineate a zone-of-passage pathway for each of the modeled flows. To determine the zone of passage, we recommend Boott use the SprintSwim model developed by U.S. Geological Survey researchers (Haro et al. 2004).

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The licensee should be able to finish the bypass zone-of-passage study in one year depending on seasonal flow conditions. The level of effort and cost is commensurate with a project the size of the Lowell facility and the likely license term. No alternatives are proposed.

REFERENCES

Goodwin, R. A., M. Politano, J.W. Garvin, J.M. Nestler, D. Hay, J.J. Anderson and M. Timko. 2014. Fish navigation of large dams emerges from their modulation of flow field experience. Proceedings of the National Academy of Sciences. p. 201311874.

Haro, A., T. Castro-Santos, J. Noreika and M. Odeh. 2004. Swimming performance of 716 upstream migrant fishes in open-channel flow: a new approach to predicting passage through velocity barriers. Canadian Journal of Fish and Aquatic Science. 61: 1590-1601.

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United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
15 State Street – 8th Floor
Boston, Massachusetts 02109-3572

August 14, 2018

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ER 18/0281

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

RE: COMMENTS ON PRE-APPLICATION DOCUMENT
COMMENTS ON SCOPING DOCUMENT 1
STUDY REQUESTS
Boott Hydropower, LLC
Lowell Hydroelectric Project, FERC No. 2790-072
Merrimack River, Middlesex County, MA, and Hillsborough County, NH

Dear Secretary Bose:

This responds to the Pre-Application Document (PAD) for the Lowell Hydroelectric Project, (Project) located on the Merrimack River in Middlesex County, Massachusetts and in Hillsborough County, New Hampshire. The PAD is being provided in preparation of an application for a new Federal license for the project. The U.S. Department of the Interior (Department) offers the following comments based on the PAD (submitted to us by Boott Hydropower, LLC, [Boott] on April 30, 2018) and additional information obtained at the Federal Energy Regulatory Commission (Commission, FERC) scoping meeting held on July 17, 2018, and the site visit held on July 18, 2018. The comments represent contributions from the Department's U.S. Fish and Wildlife Service (Service) and the Lowell National Historical Park, National Park Service (NPS).

U.S. FISH and WILDLIFE SERVICE

PRE-APPLICATION DOCUMENT

PROPOSAL

The Lowell Project consists of a 1,093-foot-long, 15-foot-high masonry gravity dam (Pawtucket dam) topped by a 5-foot-high, pneumatic crest gate system,[1] which creates a 720-acre

[1] On April 18, 2013, the Commission amended the project license authorizing Boott to replace the wooden flashboards on the Pawtucket dam with a pneumatic crest gate system (143 FERC ¶ 61,048). Installation of the crest gate system is currently in progress.

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impoundment extending approximately 23 miles upstream. The dam has a gross storage capacity of approximately 3,600 feet between the maximum normal water surface elevation of 92.2 feet National Geodetic Vertical Datum of 1929 (NGVD) and the minimum water surface elevation of 87.2 feet NGVD when all five pneumatic gates are fully lowered. The spillway is 980.5 feet long. The project includes a two-tiered network of man-made canals, totaling approximately 5.5 miles in length, which provide flow to 21 Boott-owned hydroelectric units.[2] Nineteen of the units are located in four powerhouses (Assets, Bridge Street, Hamilton, and John Street) situated in the canal and have various runner speeds and diameters. The remaining two units are located in the main powerhouse (E.L. Field) on the Merrimack River, which uses water from the northern canal to generate power. Units in the E.L. Field powerhouse are identical, 8.6-MW horizontal Kaplan turbine-generator units, each with a maximum hydraulic capacity of 4,000 cfs.

Boott currently operates the project in a run-of-river mode. The current license requires an instantaneous minimum flow of 1,990 cfs or inflow, whichever is less, as measured immediately downstream of the project.

Boott operates both upstream and downstream fish passage facilities at the project. These include a lift at the E.L. Field powerhouse that conveys fish to the northern canal, an upstream anadromous vertical-slot fishway at the Pawtucket dam, and a downstream bypass facility at the E.L. Field powerhouse. The fish ladder has a total operating flow of 500 cfs and acts as the primary source of flow in the 0.7-mile-long bypass reach (other than spillage over the Pawtucket dam spillway when inflow exceeds the maximum hydraulic capacity of the project's stations). The current license contains no minimum bypass flow requirement.

In the PAD, Boott has proposed no additional protection, mitigation, or enhancement (PME) measures.

COMMENTS

4.0 Project Location, Facilities, and Operations

Boott provided a detailed description of the project facilities. However, several important pieces of information are missing:

- the minimum hydraulic capacities, runner diameters and runner speeds of turbines at the project (housed in the E.L. Field, Assets Station, Bridge Street, Hamilton Station, and John Street powerhouses);
- clear trashrack spacing at intakes to all of the turbines; and,
- the calculated approach velocity at the trashracks/intakes (based on the wetted trashrack area).

[2] Boott submitted an Application for Amendment of License to the Commission on March 16, 2017. The amendment of license proposes the removal of four of the project's currently authorized generating units from the license. These units include Bridge Street 1, 2, 3, and 12.

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4.1 Civil Works

Tailrace Channel

Telemetry studies in 2002, 2011, and 2013, showed emigrating American shad that approach the Project via the tailrace have difficulty using the fishway entrance (Sprankle 2005; Alden 2011; Blue Leaf Environmental 2013). In 2016, Gomez and Sullivan engineers performed an analysis of upstream passage at the lift and recommended that Boott excavate the ledge outcropping in the tailrace channel to approximately 10 feet below normal tailwater level extending 50 to 100 feet downstream from the entrance (Gomez and Sullivan 2016). On July 18, 2017, Boott submitted design plans to the Merrimack River Technical Committee (MRTC; comprised of Federal and State agencies) for review prior to the start of construction. On July 26, 2017, the MRTC submitted their recommendations. On August, 18, 2017, at the request of Boott, the National Oceanic and Atmospheric Administration (NOAA) and the United States Fish and Wildlife Service (Service) provided additional information pertaining to the MRTC's recommendations (Attachment A). The PAD does not contain any information regarding the tailrace excavation project. We recommend Boott update the PAD to include the details we have provided here.

In the PAD, and the Commission's pre-filing milestone timetable included in the scoping document, the first study season is scheduled to begin during spring of 2019. However, Boott plans to complete the tailrace excavation project during late summer of 2019 (Attachment B). The tailrace excavation project will change flow dynamics in the tailrace channel and therefore the hydraulic conditions fish will likely encounter as they migrate upstream. As such, we ask that the studies requested herein related to upstream fish migration and flow in the tailrace area occur after the excavation is complete (second study season, or 2020) so natural resource agencies can properly assess the impacts project operations might have on migratory fish and develop adequate passage and protection measures if necessary.

4.5 Description of Project Operations

Fish Passage Operations

Boott states it has provided, and assessed the effectiveness of, American eel (*Anguilla rostrata*) passage at Lowell. The effort to pass eels at the project began in 2014 when temporary eel ramps were deployed near the ladder. However, the effectiveness of these structures has never been quantified. In 2018, Boott agreed to: (1) continue to operate the existing anadromous fish ladder for eels (releasing 30 cfs) until September 30; and, (2) perform six, dewatered, visual inspections of the ladder. To date, there have been no siting surveys performed at Lowell. Therefore, it is unknown if eels congregate at other areas within the project boundary (e.g., the outfall of the canal power stations) or if passing eels at the ladder is the most appropriate technique. The Department likely will include, in any fishway prescription issued for the project, a requirement that Boott conduct an upstream eel passage siting survey after a new bypass flow regime has been implemented to determine areas of eel concertation so permanent upstream passage facilities can be properly sited.

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National Park Service Requirements

In this section of the PAD, Boott states that it maintains canal water levels "within appropriate limits during the May 15 to October 15 tour boat operating season," however no additional information is provided. We recommend Boott update the PAD to include further information regarding water levels maintained in the canal and any additional, relevant, information regarding the operations agreement they have with the National Park Service.

5.4 Fish and Aquatic Resources

Overview

The fish ladder at the Pawtucket dam has a total operating flow of 500 cfs and is the primary source of flow in the 0.7-mile-long bypass reach which extends from the Pawtucket dam downstream to the E.L. Field powerhouse. However, there is no information provided in the PAD to support this flow release is adequate to meet the life history requirements of fish and wildlife (including invertebrates such as freshwater mussels). Therefore, the Department recommends that Boott undertake a study that evaluates habitat in the bypass reach at a range of flows, including the existing 500 cfs release. The study design should include habitat mapping of the entire bypass reach in addition to collecting hydraulic and habitat measurements (i.e., depth, velocity, wetted perimeter, substrate) along a number of transects to assess the existing flow release and alternative flows.

Boott states, "fish are capable of bypassing the Project's entire canal system via the Merrimack River and can use the existing upstream and downstream fish passage facilities at the Pawtucket Dam and the E.L. Field Powerhouse." While downstream-migrating fish can potentially avoid entering the canal, despite there being no exclusionary measures in place, a study by Normandeau Associates, Inc., found only 7 percent of juvenile alewives utilized the bypass (Normandeau 1991). A follow up study (Normandeau 1995) performed after the bypass was enlarged found that of 1,779 marked fish, only 37 percent utilized the downstream fish passage facilities. While efficiency increased by approximately 30 percent from 1991 to 1995, the bypass remains less than 40 percent effective at passing fish downstream.

Although bypass effectiveness studies were performed at Lowell in the early 1990s, it is still unclear as to which route American shad (*Alosa sapidissima*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), and eel select as they move downstream (spillway, fish ladder, canal, turbines, existing bypass), the survival estimates associated with each route, the effect the Pawtucket gatehouse has on downstream movement, the effect the pneumatic crest gates have on emigration, etc. To fill these data gaps and better understand downstream passage at Lowell, especially in relation to the canal, the Department recommends that Boott conduct studies which assess: (1) the behavior, approach routes, passage success, survival and delay of adult American shad and river herring as they emigrate to the ocean; (2) the impact project operations have on the downstream migration of juvenile alewife which can serve as a proxy for blueback herring and American shad in this instance; and (3) downstream route of passage and survival of adult silver-phase American eel.

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Abundance

The Merrimack River supports a variety of migratory fish species, including American shad, river herring (alewife and blueback herring), American eel, and sea lamprey (*Petromyzon marinus*). Table 5.4-2 lists the number of river herring, shad, and eel that have passed the Lawrence Project (FERC No. 2800, the first hydroelectric dam on the Merrimack River), and Lowell since 1983. In 2017, Boott claims that 177,738 eels swam upstream past Lawrence. However, our records indicate an estimated 8,645 elvers were lifted in the hopper and 17,691 passed the eelway at the dam (26,336 eels total). The Department recommends that Boott update Table 5.4-2 to: (1) ensure listed, annual, fish passage counts are accurate; and (2) include sea lamprey passage counts.

Other Site-Specific Fisheries Information

In this section of the PAD, Boott states that American shad studies were conducted in 1999 and 2000, which led to significant modifications and upgrades to the E.L. Field powerhouse fish lift, thereby improving passage efficiency. However, it is unclear as to which modifications Boott is referring.

According to our records, a lack of modifications and upgrades to the project coupled with poor fish passage led to a radio-telemetry study of shad migration in 2002 (Sprankle 2005). This study found 55 percent of the shad that passed upstream of Lawrence made their way into the Project tailrace near the fishway entrance. However, only 6.2 percent of the tagged shad were actually passed upstream of the project via the fish lift. This was consistent with fish passage counts taken at Lowell in 2002; only 9.7 percent of the shad which passed Lawrence subsequently passed Lowell. These data led to a dye test, also conducted by Ken Sprankle, in June 2003. During this qualitative evaluation, concentrated dye was released into the fishway entrance channel and observed. Results demonstrated the flow field extends downstream from the fishway and stalls approximately 35 feet from the entrance, effectively cutting off the progression of shad moving up the tailrace and into the fishway. Based on fish counts at Lawrence and Lowell, passage efficiencies for American shad have not improved at the project over the past 20 years. From 1996 to 2017, passage efficiency at the project has not exceeded 30 percent. Additionally, the internal fish lift efficiency has remained low. In 1996, fish lift efficiency ranged from 0.5 to 2.4 percent. In 2000, studies conducted by Boott suggested efficiency increased to 42 percent (Boott 2000). While this latest assessment does suggest an improvement in operations compared to previous years, an internal fish lift efficiency of 42 percent is still low as overall passage efficiency is based on the combined near/far field attraction efficiency and internal lift and ladder efficiency. Based on the information above, and considering the ledge removal improvements which will take place in 2019, the Department recommends that Boott perform a study assessing American shad upstream route selection passage effectiveness and migratory delay after the ledge is removed.

Boott goes on to state, “A 1988 acoustic telemetry study performed by RMC Environmental Services (RMC) of adult American shad movement through the Northern canal demonstrated successful passage through the Pawtucket Gatehouse, as well as incidental information regarding downstream passage routes for post-spawning individuals. In a follow-up study in 1991 by Normandeau Associates, Inc., found similar findings as the 1988 adult American shad telemetry study.” While it is true that 80 percent of the fish successfully exited the canal, it should be

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noted: (1) the sample size was small, only 25 fish were used in the analysis; and (2) the delay caused by existing infrastructure was substantial, ranging from 1 to 5 days. Also, as a point of clarification, there were two studies conducted in 1991 by Normandeau Associates, Inc., which focused on downstream passage of river herring and shad. The scope and findings of these studies did not include upstream passage through the gatehouse, which was the focus of the RMC 1988 study. To date, the RMC study has been the only evaluation of upstream passage of shad in the northern canal and gatehouse. As a component of the studies provided herein, we recommend that Boott track and monitor clupeid behavior in the canal.

Major Findings of Fish Passage Studies Since 1988

In the PAD, Boott provides an overview of the fish passage facilities at both projects, when they began operating, and studies which have been conducted to determine their effectiveness at passing target species. We would like to offer some points of clarification, specifically on information listed in Table 5.4-3.

- 1988: Passage of Radio-Tagged American Shad through the Northern Canal Headgate Structure. Boott states that "24 of 25 radio-tagged shad (96%) released at fish lift exit passed the Northern Canal headgate structure with little delay." However, 19 of the 24 shad (80 percent) which successfully passed did not pass through the headgate structure but rather the adjacent boat lock facility. When the boat lock was closed, delay ranged from 1 to 5 days. Since a majority of the shad were observed reaching the headgate structure within an hour, the delay in migration associated with closing the boat lock was approximately 23-119 hours. The study notes that most fish approached the road bridge adjacent to the gatehouse but fell back downstream. The delay experienced by these shad is significant and, from the information provided by Boott, it is unclear how often the boat lock has been open during the upstream migratory season since the 1988 study was performed. We are concerned that the operation and management of the northern canal headgate may contribute to migratory delay and is an issue that will need to be resolved in order to successfully pass fish upstream and achieve a sustainable population of shad in the Merrimack River.

- 1991: An Assessment of the Effectiveness of a Fish Bypass for Passing Juvenile Alewives at the Lowell Hydroelectric Project. The findings listed in the table fail to include two critical results: (1) the bypass effectiveness for juvenile alewife was only 7 percent, even when bypass flows reached 2 percent of the turbine flow; and (2) when the bypass flow was increased by 50 percent, due to the units shutting down, the number of fish using the bypass increased by a significant amount (4,250 alewives in 10 minutes versus 0 in the previous 4.5 hours)

- 1996: Lowell Hydroelectric Project Internal Fish Lift Efficiency Monitoring Program. The internal fish lift efficiencies should be included in the findings, as they were extremely low, ranging from 0.5 percent to 2.4 percent.

- 1999: An Assessment of Internal Fish Lift Efficiency at the Lowell Hydroelectric Project. The study findings section states, "The ratio of total shad lifted at the Lowell Project to the total lifted at the downstream Lawrence facility was nearly doubled, reaching approximately 29% in 1999 compared to a historic ratio of 15% since 1986, and in the

preceding two years." While this statistic may technically be correct, it actually represents a decrease from 1992 and 1995, when the ratios of total shad lifted at Lowell were 31 percent and 38 percent, respectively.

- Boott performed two fish lift internal efficiency studies and in the major findings column claims the crowder position has a beneficial impact on fish passage efficiency. However, this contradicts the study findings listed for the 1996 Normandeau Associates, Inc. study. As noted above, the Department suggests that Boott include information regarding modifications made to the fish lift which supports its contention of improved internal efficiency.

- A report by Gomez and Sullivan (2016) titled "Analysis of Upstream Fish Passage Facilities and Operations" was not included in the PAD. We recommend Boott update Table 5-4.3 to include this study, which identifies specific areas of improvement needed to increase the Lowell fishways reliability and upstream passage efficiency. Recommendations provided in the report include: (1) installing a pivot gate to update the existing vertical gate; (2) excavating the ledge outcrop downstream of the fishway entrance; (3) reopening the street side entrance; and (4) installing an entrance extension. The analysis also highlights the aging infrastructure at the project and the need to replace specific components, along with cost estimates.

6.0 Preliminary Issues, Project Effects, and Potential Studies

Fish and Aquatic Resources

Boott has not proposed any studies for relicensing at this time, but has identified potential resource issues which include: bypass flows, fish passage, historical resources, boating access, and inundation of upstream floodplains. Relevant to fish and aquatic resources, the Department believes new studies need to be conducted, with sufficient fish sample sizes, to better understand upstream and downstream passage at the project as well as instream flows in the bypass reach.

Downstream Passage

The Department recommends that Boott conduct new studies to fully understand how post-spawned adult shad and river herring, juvenile shad and river herring, and adult silver phase eels move past the Pawtucket dam, through the canal system, turbine intakes, and the downstream bypass facility. In addition, turbine injury and mortality studies are needed and should be used in conjunction with results of the passage routing studies, where applicable, to calculate total through-project survival rates. The Department herein provides study requests in order to address these information needs.

Upstream Passage

Yearly site inspections, performed by the Service, have identified a number of problems with respect to American shad at the lift and ladder fishway entrances. The Department believes that a comprehensive radiotelemetry study is needed to understand the relationship between project operations, including spill flows, and shad and river herring movement through the Merrimack River, including attraction to and passage through these facilities. Additionally, a study to define

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the relationship of the complex hydraulic conditions at the spillway fish ladder entrance and the tailrace fish lift entrance is needed in order to evaluate data on fish behavior and passage at those locations. Therefore, the Department is providing herein study requests to address these information needs.

Instream Flows in the Lowell Bypass

The bypass reach is 0.7 mile long (from the Pawtucket dam to the E.L. Field powerhouse) and contains diverse habitat. There are approximately 11 miles of free-flowing river downstream of the Pawtucket dam which also contain a diversity of habitat, including important spawning and rearing habitat for migratory fish species such as American shad. To date, there have not been any empirical studies which assess the adequacy of the existing flow protocols. The Department herein submits study requests intended to address these information gaps.

ADDITIONAL INFORMATION

The following information is needed:

- the minimum hydraulic capacities, runner diameters and speeds of the turbines in each powerhouse associated with the project;
- a more thorough description of how project operations are monitored and recorded;
- hourly data (water surface elevations, dam discharge, generation) for the project in spreadsheet format for the past 5 years;
- a detailed description of modifications made to the existing fish passage facilities, including dates changes were made;
- a detailed description of canal operations; and
- a detailed description of modifications made to the bypass extending from the Pawtucket dam to the E.L. Field powerhouse (weir installation, excavation, etc.).

RECOMMENDED STUDIES

Boott is not proposing to undertake any studies as part of this relicense proceeding. Enclosed please find formal study requests (Attachment C) by the Service in the format required pursuant to 18 CFR §4.38(b)(5). Please note the Service also supports the study requests provided by the other agencies including, but not limited to, National Marine Fisheries Service, Massachusetts Division of Fish and Wildlife, and Massachusetts Department of Environmental Protection.

SCOPING DOCUMENT 1

3.6.3 Project Decommissioning

The Commission proposes to eliminate this alternative from detailed study in the environmental analysis, because no party has suggested project decommissioning would be appropriate in this case. The Commission asserts that there would be significant costs involved with decommissioning the project, including lost energy production.

We recommend that the Commission include project decommissioning in the environmental analysis. Although no party has suggested this alternative, up to this point in the Integrated

Licensing Process, there has been no formal opportunity to provide such a recommendation. Further, the Commission has supplied no supporting information to justify the contention of significant decommissioning costs (which could run the gamut from "locking the door" to full dam removal at the Lowell Project). Given the substantial increase in the numbers of proposed renewable energy projects, it is possible that there may be no net loss of energy production when viewed on a regional basis. Also, we are requesting a number of studies to understand the impacts of the project. Study results could identify impacts which either cannot be mitigated or would be prohibitively expensive to mitigate. In light of that possibility, decommissioning of the Lowell Project should be retained as a potential alternative that the Commission may need to address.

4.1.2 Geographic Scope

The Service recommends the geographic scope of the Commission's environmental analysis (pertaining to impacts to cumulatively affected fishery, water quantity, and water quality resources) extend from the Eastman Falls dam (FERC No. 2457) and Lake Winnipesaukee to the confluence of the Pemigewasset and Winnipesaukee Rivers, downstream to the Atlantic Ocean, as this represents the extent in which river herring and American eel are managed in the basin.

4.2.1 Aquatic Resources

Effects of project facilities and operations on fish migration should be analyzed cumulatively as well as for individual projects. Additionally, effects of entrainment should not be limited to fish populations, but should include impacts to food web interactions and overall ecosystem productivity.

LOWELL NATIONAL HISTORICAL PARK, NATIONAL PARK SERVICE

COMMENTS

PAD Section 1.0 Introduction and Background

The 5.6 miles of historic canals are wholly within the boundary of Lowell National Historical Park and are a principle resource that Congress directed the Park to protect. Additionally, the canal system and support buildings are designated as a National Historic Landmark, offering the highest provision of historic preservation protection under the National Historical Policy Act of 1966. The canal system is also located within the boundaries of:

- Lowell Locks and Canals National Historic Landmark District;
- Lowell Water Power System National Historic Civil Engineering Landmark; and
- Lowell Power Canal System and Pawtucket Gatehouse National Historic Mechanical Engineering Landmark.

The first mention of historic resources in the PAD is located on Page 28, section 4.9 following the description of all resources. These significant designations should be inserted into the Intro/Background Section.

PAD Section 4.0 Project Location, Facilities, and Operations

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Nearly all of the Civil Works described in Section 4.1 are historically significant structures, listed as contributing features within the National Historic Landmark District. Please include date of construction for each of the Civil Works referenced on pages 10-15 or Sections 4.1.1 through 4.1.11. Please also include, where applicable, a reference to significant historical resources in this section. For example, "Constructed in 1847, the Pawtucket Gatehouse is located at the southern abutment of the Pawtucket Dam…The Pawtucket Gatehouse is the site of origin for the historically significant Francis Turbine which is still intact within the building."
The following table cross-references PAD names with the language produced by Proprietors of Locks and Canals on Merrimack River (PLC) as recorded in the "Lowell Canal Survey" by the 1976 Historic American Engineering Record (HAER). The current PAD names of certain Civil Works do not match the naming convention used in the National Register Nomination or by the National Historical Park and should be revised accordingly.

PAD ID	**PAD name**	**Historic Name (construction dates) [alternate names]**
4.1-1	Pawtucket Dam	Pawtucket Dam (1826, 1830, 1847,1875)
4.1.2	Northern Canal	Northern Canal (1848)
4.1.2a		Great River Wall (1848)
4.1.2b		Northern Canal Waste Gates (1848,1872)
4.1.3	Pawtucket Gatehouse	Pawtucket Gatehouse (1848) [a.k.a. Northern Canal Gatehouse]
4.1.4	Pawtucket and Downtown Canals	
4.4.4a		Pawtucket Canal (1796, 1823)
4.4.4b		Merrimack Canal (1823)
4.4.4c		Lowell Canal (1828)
4.4.4d		Hamilton Canal (1828)
4.4.4e		Western Canal (1831)
4.4.4f		Lawrence Canal (c. 1831)
4.4.4g		Eastern Canal (1836)
4.4.4h		Moody Street Feeder (1848) [see 4.1.5.2 below]
4.1.5	Miscellaneous Canal Structures	
4.1.5.1	Guard Lock and Gates Facility	
4.1.5.1a		Guard Locks (1824, 1850) [Gatehouse over upper lock gates constructed 1881]
4.1.5.1b		Francis Gate (1850)
4.1.5.1c		Pawtucket Canal Gatehouse (1870)
4.1.5.2	Moody Street Feeder Gatehouse	Moody Street Feeder Gatehouse (1848)
4.1.5.3	Lawrence Dam	Lawrence Dam (1831) [at junction of Western and Lawrence Canals]
4.1.5.4	Hall Street Dam	[on Western Canal]
4.1.5.5	Tremont Wasteway [Treemont on map – PAD fig 4.0.2]	[at confluence of Western and Northern canals]
4.1.5.6	Lower Locks and Dam	Lower Locks (1824, 1843) [includes two chamber navigation lock, dam, gatehouse, spillway, and associated structures]

4.1.5.7	Swamp Locks and Dam	Swamp Locks (1824, 1841) [Where the upper Pawtucket Canal splits into the Western, Merrimack, Lower Pawtucket, and Hamilton canals. Swamp Locks complex includes two chamber navigation lock, dam, spillway, control house, and associated structures]
4.1.5.8	Merrimack Dam and Merrimack Gate	[at foot of Merrimack Canal]
4.1.5.9	Rolling Dam	[controls flow from Merrimack Canal into Boott Mill arm of the Eastern Canal]
4.1.5.10	Boott Dam	
4.1.5x	[Historic canal water control structures not identified in PAD of concern to National Park Service]	
		Western Canal Guard Gates [between Merrimack and Moody streets]
		Hamilton Canal Guard Gates [at head of Hamilton Canal near Swamp Locks]
		Hamilton Wasteway and Gatehouse [at foot of Hamilton Canal near Central St]
		Massachusetts Wasteway Gatehouse [at Bridge St, where Eastern Canal bents to feed Boott Mills/John Street Powerhouse]
4.1.6	Mill Buildings	The PAD notes that only the turbines and associated equipment are included in the project boundary, not the buildings that surround them. Nonetheless, it would be useful to cross reference generating facilities and the mill complexes where they are housed
	John Street Power Station	Boott Mills
	Bridge Street Power Station	Massachusetts Mills (unit numbers?) and Prescott Mills (unit numbers?)
	Hamilton Power Station	Hamilton Mills (unit numbers?) and Appleton Mills (unit numbers)
	Assets Power Station	Market Mills Powerhouse
4.1.7	Tailrace Channel	
4.1.8	Bypass Reach	
4.1.9	Control Structures	[across Northern Canal at EL Field powerhouse. Colloquially called “Hydro Lock” by National Park Service staff. Need more precise name to avoid confusion with 4.1.3 Pawtucket Gatehouse, a.k.a. Northern Canal Gatehouse.]
4.1.10	Fish Passage Structures	
4.1.11	Eldred L. Field Powerhouse	

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PAD Section 5.8 Recreation and Land Use

In Section 5.8.1 – Please include canal-adjacent walkways and NPS boat tours as recreational resources.

On Page 108, please revise "Portions of the Lowell National Historical Park are within the project boundary" to "The entire 5.6 mile power canal system and supporting historic structures and equipment along with paved recreational trails constructed immediately adjacent to the canals are recreational resources within the Project Area and boundary of the National Historical Park. Additionally, the 5.6 mile power canal system is located within the boundary of the Lowell Locks and Canals National Historic Landmark District, Lowell Water Power System National Historic Civil Engineering Landmark; and Lowell Power Canal System and Pawtucket Gatehouse National Historic Mechanical Engineering Landmark."

Please add in the system of interconnected walkways/multi-use trails located along the canal and river edge as existing recreational facilities. Lowell National Historical Park has worked for decades, together with our partners, to build a system of interconnected river and canal adjacent trails. Boott has helped facilitate the construction of some trails by providing necessary easements. As key links in the trail network are constructed, we've witnessed increases in both recreational and transportation use by park visitors and the local community. Trails are an essential component of the Park's alternative transportation system – which also includes trolleys and tour boats – designed to link the Park's scattered sites located throughout the densely developed city. The vision for the trail system is outlined in the Park's 1980 General Management Plan and sister documents, the Preservation Plan (1980) and the Preservation Plan Amendment (1990). Because Lowell was developed as a textile factory town, with industrial efficiency as the most important factor in determining historical land uses, very few parks exists. These linear trails connect residents to waterfronts and offer a reprieve from the industrial city. In addition, trail systems have been an economic engine for the City with $54 million in public investments toward trail development resulting in over $527M in private investment in the development of adjacent properties. With strong support from our partners and local community, developing the missing links and connecting to other regional trails, increasing public access, and maintaining trails in good condition continues to be a priority of the national park.

The National Park Service offers seasonal ranger-guided canal and river boat tours which provide unprecedented access to the historic canals. Each summer, thousands of visitors experience the canals and learn about their history in NPS-led boat tours, https://www.nps.gov/lowe/planyourvisit/guidedtours.htm.

PAD Section 5.9 Aesthetic Resources

Please include mention of trash accumulation and vegetation in the Aesthetic Resources as an existing condition. One of the top public complaints/concerns regarding aesthetics relates to the presence of trash and the overgrowth of vegetation which collects additional trash. (See photo, August 2018 near Hamilton Gatehouse).

PAD Section 5.10 Cultural Resources

The section on Historic Resources is only 3 pages long, does not reference the Congressional mandate for the National Park Service to protect and preserve the historic 5.6 mile canal system for this and future generations, and does not include any photos. Many of the resources listed as "Key Components" of the Locks and Canals Historic District on pages 135-136 are also described in Section 4.1 "Civil Works." The historical significance of these structures and date of construction should be described in further detail in this section of the report given their national significance, location within the boundary of multiple protected areas, and because the resources contribute to the significance of the Lowell National Historical Park; Lowell Locks and Canals National Historic Landmark District; Lowell Water Power System National Historic Civil Engineering Landmark; and Lowell Power Canal System and Pawtucket Gatehouse National Historic Mechanical Engineering Landmark.

Please find and replace reference to National Historic Park to the correct naming convention Lowell National Historical Park throughout the document.

"The Lowell National Historical Park" Section contains numerous inaccuracies. Please reference PL 95-290, Lowell Canal System Cultural Resources Inventory, and subsequent plans and studies referenced in this letter to correct, or to incorporate text below:

> Lowell National Historical Park was established by Congress June 5, 1978 (PL 95-290). Although the area within the park boundary is 142 acres and the larger Lowell Historic Preservation District encompasses 583 acres, only 19 acres are in federal ownership. The Park is by design a partnership park in which federal, state, and local governments as well as the private sector and local community carry out the legislative intent of the park unit. Physical resources protected by the park include the original 5.6-mile power canal system, a nationally recognized engineering marvel with its sophisticated dams, locks, and gatehouses; 7 of the original 10 textile mill complexes (5.3 million square feet); significant examples of early housing types, institutions, and transportation facilities; and diverse museum collections. In addition to the industrial artifacts, Lowell retains much of its rich cultural heritage, as reflected in the ethnic diversity and preserved traditions of its citizens.
>
> Lowell National Historical Park's museum collection includes the Proprietors of Locks and Canals (PLC) Records from 1747 through 2008 which document the original construction and on-going maintenance of the canal system and includes 9,304 architectural / engineering drawings, 6,770 original photographic prints, 79 film

negatives, 9 glass-plate negatives, and 39 glass lantern-slides produced by PLC between the years 1883 and 1956.

PLC Volume I https://www.nps.gov/lowe/learn/historyculture/upload/LOWE-ARCHIV-FindingAid-0908-PL-CI.pdf
PLC Volume II https://www.nps.gov/lowe/learn/historyculture/upload/LOWE-ARCHIV-FindingAid-0908-PL-CII.pdf

Lowell National Historical Park together with the University of Massachusetts Lowell College of Education facilitate education programs at the Tsongas Industrial History Center at the Boott Mills that reach approximately 40,000 students and teachers annually. These programs use the resources of the National Park including the historic canals, industrial mills powered by the canals, and the Merrimack River.

Lowell National Historical Park would not be a unit of the national park system if the historic canal system were not present. Continued preservation of and public access to the 5.6 mile historic canal system and supporting historic structures are essential to meet Lowell National Historical Park's Congressional intent.

There is no reference to the Lowell Heritage State Park in the Historic Resources section of the PAD. A summary description of the state park should be included in the Historic Resources Section. The Massachusetts Department of Conservation and Recreation (DCR) issued a comprehensive Resource Management Plan in 2014, that describes its complex rights on the canal system, including gatehouse structures and other elements.

Page 137 – The current condition of buildings in the historic district is not up to date and requires additional research and revision. As of August 2018, the collaboration between Lowell National Historical Park and its partners has resulted in the rehabilitation of over 98% of the 5.3 million square feet of historic mill space adjacent to the canals and hundreds of additional buildings in the downtown historic district.

PAD Section 6.2.1 – Preliminary List of Resource Issues Table

Please add "**Historic Resources**" as a "Resource Area" and "**Ownership and maintenance responsibilities / obligations of the 5.6 mile historic canal system and supporting historic buildings and mechanical equipment, Impacts of High/Low Water Levels, Vegetation"** as "Issues pertaining to Specific Resource Areas."
Please add "**Aesthetic Resources**" as a resource area and "**Vegetation and Trash**" as "Issues…"

Under **Recreation**, please also include "**Flow rates, water levels, and functional lock chambers**" under "Issues."

In April 2008, FERC initiated a request to Lowell National Historical Park for information regarding compliance and status of the license agreement. NPS enumerated several on-going license issues in a response letter. The NPS letter was forwarded to Enel/Boott Hydropower, Inc. and an additional response was provided by Enel/Boott Hydropower, Inc. These letters illuminate many on-going issues and areas of concern between the national park and licensee and are attached as Attachment D for reference.

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Additionally, preliminary discussions with staff and partners following the July 17 Scoping Meeting revealed the following specific issues which are directly related to Boott Hydropower Inc.'s (Boott's) current license / project operations.

IMPACT OF PROJECT OPERATIONS ON CULTURAL RESOURCES

Cultural Resource Issues Requiring Repair

1. **Great River Wall Maintenance:** The structural integrity of the Great River Wall and public safety are issues of highest concern to the NPS, given a past collapse of a portion of the wall. Vegetation management, water levels, and other factors related to Boott's operation may affect the structural integrity of this National Historic Landmark District feature as well as the life and safety of trail and canal users.
2. **Repair Hydro Locks:** This set of locks was installed by Boott as part of the mitigation for their 1983 FERC license and remains under the applicant's ownership. The Park has been unable to use the lock chamber because the gates need repair and are mired in mud. This needed repair is also a high priority for the NPS.
3. **Repair Northern Canal Waste Gatehouse:** The water level in the Northern Canal runs high and damages some of the wood structure under this gatehouse at the Great River Wall. The National Park hired EYP Architects to assess the repair needs which are now substantial (See Attachment E, 2017 Northern Canal Waste Gatehouse Project Scoping Report). Plans and specifications can be provided. The damage is directly attributable to Boott operations and should be repaired.
4. **Replace/Repair of Moody St Feeder Gatehouse Gate:** Boott cut a hole in a portion of one of the gates some years ago to install a high voltage power line and never replaced the gate materials. If the hole in the gate was filled, the Park could continue using its historic water turbine for student and visitor programs at Suffolk Mill when the system is drained. This will also be an essential issue if partner organizations would like to move forward with plans to activate ice skating or other recreational activities in the Merrimack Canal.
5. **Lower Locks Fill Valve:** The Lower Locks Fill Valve is owned by Boott while DCR owns the adjacent lock chambers and gatehouse superstructure. Boott does not use the valve in its canal system control operations and no longer maintains it. The valve, which is no longer operable, is needed for the operation of the locks, which are most often used for recreational purposes by the Lowell Parks and Conservation Trust for its whitewater rafting program. In addition, the above-water part of the valve mechanism, the granite platform, and its railing are a focal point of the Lower Locks site, forming a part of the historic scene. The valve is in failure mode because of the deterioration of the section of canal wall on which the mechanism and its operating platform are set. The National Park had 50% construction documents prepared by a consultant in 2012 for the rehabilitation of the valve, which would consist of reconstruction of the section of failing wall beneath and the resetting of the valve operating mechanism and its granite platform slab atop the wall. Those documents can be shared with Boott, but would have to be finalized to be used as contract documents. The NPS consultant's contract has since expired. The full repairs were not completed because that contract was modified due to funding limitations

to instead provide documents for a temporary stabilization of the valve mechanization, which was exhibiting signs of potential catastrophic failure. In 2012, the National Park contracted the stabilization of the valve platform as a temporary stopgap measure. However, that stabilization was presumed to be a temporary fix to last 2 or 3 years because it could not address the root problem of the deterioration of the wall supporting the valve. Permanent repairs are needed.

6. **Hall Street Dam & Lawrence Dam:** This is a scenic area beside the arena and Lawrence Mills. There is a lot of vegetation that has grown on and around the dam so that the point may be lost on a visitor that it is a dam. The vegetation is further damaging the existing stone work. Rebuilding the dam would allow the water to cascade over the stepped dam as it did in the past and refill the pond that existed behind the dam. The nearby Lawrence Dam needs rehabilitation work so that the gates will allow the basin between Hall Street Dam and the Lawrence Dam to be maintained at a higher water level more regularly. The reconstruction of the missing gatehouse structure on the dam is a long term goal.
7. **Western Canal Sectional Gates:** Repairs are needed to many gates which isolate water levels within the system. If the Western Canal Sectionalized Gates are repaired, areas of the canals could be de-watered without interrupting power production while keeping the optimal water levels in other areas throughout construction duration.

IMPACT OF PROJECT OPERATIONS ON RECREATIONAL, LAND USE, AND AESTHETIC RESOURCES

Recreational, Land Use, and Aesthetic Resource Issues Requiring Repair

1. **Repair Hydro Locks:** This set of locks was installed by Boott as part of the mitigation for its FERC license. They have not been transferred to NPS and remain owned by Boott. The Park has been unable to use the lock chamber because the gates need repair and are mired in mud. NPS cannot operate boat tours along the Northern Canal without repair to the locks.
2. **Replace/Repair of Moody St Feeder Gatehouse Gate:** Boott cut a hole in a portion of one of the gates some years ago to install a high voltage power lines and never replaced the gate materials. Water leaks through the whole cut in the gate for the cable and as a result water levels cannot be controlled. This could prohibit future on-water recreation proposed by partners due to lack of water control.
3. **Trash removal:** One of the top public complaints Lowell NHP hears is regarding trash floating in the canal. Trash accumulation can result in negative impacts to recreational users as well as aesthetic resources. A plan for optimal trash removal should be documented in a formal agreement among parties.

PAD Section 7.1 Qualifying Comprehensive Plans Deemed Applicable

The NPS intends to file a number of the plans listed below with FERC for certification as Comprehensive Plans pursuant to Section 10(a)(2)(A) of the Federal Power Act.

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Legislative History of the Lowell National Historical Park (LOWE) and Associated Planning and Management Documents.

In 1976, the Lowell Locks and Canals National Historic District (the District) was listed on the National Register of Historic Places (NR). It was included as part of Lowell National Historical Park's designation as a National Historic Landmark (NHL) in 1977. The NHL District encompasses approximately 125 acres of land including canals, gates, locks, dams and associated structures. The first canal dates to 1796 and was initially used for transportation of goods around Pawtucket Falls. The canal system was adapted in 1822 to provide waterpower for the developing textile industry. The District also included several mill yards and worker housing associated with the textile industry that were constructed in the early 19th century.
On June 5, 1978, Congress established Lowell National Historical Park. The enabling legislation states that the purpose of the park is to "preserve and interpret the nationally significant historical and cultural sites, structures, and districts in Lowell, Massachusetts, for the benefit and inspiration of present and future generation by implementing to the extent practicable the recommendations in the Report of the Lowell Historic Canal District Commission." The "five-and-sixth-tenths-mile power canal system" is named specifically as a historical resource to be protected and preserved by the NPS and is located wholly within the 142 acre boundary of the National Historical Park and the 583 acre Preservation District established under the 1978 Act.

The Lowell Canal Survey by the Historic American Engineering Record (1976) documented the history of the development of the canal system in Lowell and includes detailed narrative, photographs, drawings, and maps of the historic canal system.

The Brown Book (1977) entitled *Report of the Lowell Historic Canal District Commission to the Ninety Fifth Congress of the United States of America*
https://www.nps.gov/lowe/learn/management/upload/1977_-Brown-Book-_reduced.pdf provided the justification for the **establishment of the Lowell National Historical Park (LOWE) in 1978. PL 95-290 June 5, 1978** https://www.gpo.gov/fdsys/pkg/STATUTE-92/pdf/STATUTE-92-Pg290.pdf established LOWE and tasked the Commission with develop what became the ***Preservation Plan* in 1980**
https://www.nps.gov/lowe/learn/management/upload/LOWE_475_D5_A_0001-18-0613.pdf.
That plan set out the primary themes and responsibilities for LOWE which are listed at page 5 as 1. "Preserving the 19th Century Setting," 2. Encouraging the Varieties of Cultural Expression," and 3. Projects Mandated by the enabling legislation. ***Details of the Preservation Plan*** was issued shortly afterward.
https://www.nps.gov/lowe/learn/management/upload/LOWE_475_D5_18-0612.pdf.

The 1981 General Management Plan for Lowell National Historical Park (LOWE)
https://www.nps.gov/lowe/learn/management/upload/1981-LOWE-GMP.pdf was the initial long term planning document for LOWE. Included in the GMP at page 37 is a discussion on Canal System Management which identifies the initial parties to the cooperative agreement that formed the basis for future MOU's, the most recent of which was signed 1991 in association with the original licensing of the hydro project in 1983. Those parties included the NPS, the City of Lowell and the Commonwealth of Massachusetts. The NPS, along with the City of Lowell and the Commonwealth of Massachusetts (DCR) intend to work with the applicant to develop a new MOU to address canal operations and management.

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LOWE and its associated canal system was designated a National Historic Landmark in 1977. The Commonwealth of Massachusetts effected a Taking (see Middlesex North Registry of Deeds Book 3830 Page 70) in 1986 whereby the Commonwealth took ownership of various canal resources in order to consolidate ownership. This gave the Commonwealth the right to provide public access to the canal system and adjacent walkways, and provided authority to spend money to improve and maintain various historic structures.

In 1987, Congress (PL 100-143) reauthorized the Lowell Historic Preservation Commission http://uscode.house.gov/statutes/pl/100/134.pdf and directed them to prepare a **Preservation Plan Amendment which was submitted to the Secretary of the Interior on May 19, 1990.** https://www.nps.gov/lowe/learn/management/upload/LOWE_475_D5_A_0001-18-0613.pdf. The Amendment focuses on development, management and use of the canal system and adjacent properties, many of which were developed into public walkways which remain an integral part of the park and the visitor experience.

In 1995, the Commonwealth granted an easement, assigning the Commonwealth's non-fee interests to the NPS for the purpose of developing canal resources, preservation of historic resources associated with the canal and providing continued and additional public access. The 1978 enabling legislation provided for the NPS to manage resources associated with the District without fee ownership, in what is now referred to as a Partnership Park.

In 2003, the NPS completed the **Addendum to the 1981 General Management Plan for LOWE** https://www.nps.gov/lowe/learn/management/upload/2003-LOWE-2003-GMP-Addendum.pdf, focused primarily on re-establishing roles and responsibilities following the sunset of the Commission. Most of the Commission's responsibilities were transferred to NPS staff at LOWE.

The most recent NPS prepared document is the **September 2017 *Foundation Document*** https://www.nps.gov/lowe/learn/management/upload/2017_LOWE-Foundation-Doc_Email-Size.pdf for LOWE, outlines why LOWE was established, which resources are nationally significant, and updates our management priorities. The Foundation Document (FD) reaffirms our Legislative Purpose, National Significance and Fundamental Resources and Values. As part of the FD, NPS prepares Significance Statements (P.6) that express why a park's resources and values are important enough to merit designation as a unit of the National Park System. Among those are The Lowell Canal System[3] and Integrity of Historical Urban Landscape.[4] The plan identified LOWE's Fundamental Resources and Values, those resources or values essential to meeting the legislated purpose of the park and warrant primary consideration for future planning and management decisions including maintenance and operations.

[3] The Lowell canal system is nationally recognized as one of the most impressive civil and mechanical engineering achievements of the 19th century because of its grand scale and technological complexity, and is the site of origin for the famed "Francis" turbine. The canal system, used as both a transportation corridor and power source, facilitated the growth of the industrial city. Lowell NHP Foundation Document (Lowell, MA: NPS, 2017) p6.

[4] A very large proportion of original buildings, structures, and urban landscapes have survived in Lowell's park and preservation district and now are recognized as important historical artifacts. These include the entire 5.6-mile power canal system with its sophisticated dams, locks, and gatehouses, 7 of the original 10 mill complexes, and significant examples of early housing types, institutions, and transportation facilities. Lowell NHP Foundation Document (Lowell, MA: NPS, 2017) p7.

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Fundamental Resources and Values (P.7) include the **Water Power System/Canal System**[5] and the **Immersive Experience**[6] provided to visitors, including water-based tours of the canal system and hands on interpretive and educational opportunities that provide insights into Lowell's industrial past and that of the nation as a whole. Significance Statements outlined current conditions and trends, and identified key threats to NPS resources as well as opportunities to protect and enhance those resources. NPS developed a fundamental resources and values table in the 2017 Foundation Document that provides details on data and planning needs associated with the **Water Power System/Canal System** (P.12-14) and for the **Immersive Experience** (P.18-20). Key Issues and Associated Data Needs were identified at pages 33-35 and the associated tables at pages 36-41. Among them are the Renewal of the Enel Green Power License, Jurisdictional Challenges (land rights and ownership), and Private Ownership in the Park and Preservation District. See Attachment F for further detail.

RECOMMENDED STUDIES

Please see Attachment G for study requests recommended by NPS.

[5] **Water Power System / Canal System.** The Lowell National Historical Park boundary includes 9.6 miles of major riverbanks and all 5.6 miles of historic canals in Lowell, all of which comprise the waterpower system that harnessed waters of the Merrimack River to power the city's mills. In fact, the Merrimack River and its natural attributes dictated the location of the city itself. The water power and canal system includes the Pawtucket, Merrimack, Hamilton, Western, Eastern, Lowell, and Northern Canals and canal banks, as well as several associated locks, gatehouses and dams, and Pawtucket Falls. This system, which still operates as a source of hydroelectric power, provides an opportunity to interpret both the historic significance of water in industry, as well as the engineering of a waterpower system. Public access has been expanded over the years to support these interpretive opportunities, including creation of a pedestrian canalway and riverwalk and the development of related exhibits and programs such as the Suffolk Mill Turbine Exhibit.

[6] **Immersive Experience.** Lowell National Historical Park provides a variety of hands-on interpretive and educational opportunities that allow visitors to immerse themselves in Lowell's industrial past. Key park experiences include exhibits that feature a working turbine and weave room, as well as boat tours of the canal system and rides through the park on historic replica trolleys, which are among the most popular and unique experiences in the park. The Tsongas Industrial History Center, a partnership between Lowell National Historical Park and the University of Massachusetts Lowell College of Education, is a hands-on center where students can learn about the American Industrial Revolution through interactive activities such as weaving, working on an assembly line, creating canal systems and testing water wheels, and measuring water quality.

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Thank you for the opportunity to review and comment on this project. If you have questions regarding these comments, please contact Julianne Rosset, U.S. Fish and Wildlife Service at julianne_rosset@fws.gov, (603) 227-6436 or Kevin Mendik, National Park Service at kevin_mendik@nps.gov, (617) 223-5299. Please contact me at (617) 223-8565 if I can be of further assistance.

Sincerely,

Andrew L. Raddant
Regional Environmental Officer

ATTACHMENTS

CC: Enel (kevin.webb@enel.com

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ATTACHMENT A

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

September 26, 2017

Mr. Randald Bartlett, P.E.
ENEL Green Power North America, Inc.
100 Brickstone Square, Suite 300
Andover, Massachusetts 01810

Dear Mr. Bartlett:

Ref: Lowell Hydro Project – FERC No. 2790
Ledge Excavation Design Comments and Recommendations

This responds to the Lowell Ledge Excavation Designs that you submitted to us via email on July 18, 2017. We have been working with ENEL Green Power North America, Inc. (ENEL) for many years to enhance upstream fish passage, and the proposed ledge removal is part of a larger effort to address upstream fish passage performance at the Lowell Hydroelectric Project (FERC No. 2790). Thus far, progress has been made to improve internal fish lift operations protocols, fish lift entrance evaluations, and fish ladder repairs and maintenance. However, the U.S. Fish and Wildlife Service (Service), along with other agencies, have indicated in prior meetings and correspondence that additional measures are necessary at both the tailrace fish lift and spillway fish ladder in order to achieve adequate American shad and river herring passage effectiveness.

At a meeting on August 15, 2017, ENEL's proposed ledge removal designs were discussed and the Service and other agency representatives outlined our recommendations on the proposed designs. As agreed to at the meeting, the Service's Bryan Sojkowski and Bjorn Lake (of the National Marine Fisheries Service) prepared the attached memo which provides more explanation and details regarding our recommendations.

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Thank you for meeting with us and providing us the opportunity to comment on the designs. If you have any questions, please contact John Warner at 603-227-6420 or Julianne Rosset at 603-227-6436.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Enclosure

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cc: CNEFRO - Joe McKeon, Mike Bailey (via email)
RO/Fisheries - Bryan Sojkowski (via email)
NHFGD - Matt Carpenter (via email)
MDFW- Caleb Slater (via email)
MDMF- Gloucester - Ben Gahagan (via email)
NMFS - Sue Tuxbury (via email)
NMFS - Bjorn Lake (via email)
FERC - Division of Hydropower Administration and Compliance
Reading File
ES: JRosset: 9-26-17:603-227-6436

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Technical Memorandum

To: Randald Bartlett, P.E., Senior Operations Manager – Northeast, ENEL Green Power North America, Inc.

From: Bjorn Lake, P.E., PhD, NOAA Fisheries; Bryan Sojkowski, P.E., USFWS

Re: P-2790 Lowell Ledge Removal Project

Date: August 18, 2017

OBJECTIVE

The purpose of this project is to remove a ledge outcropping that is a potential deterrent to immigrating diadromous fish readily detecting and entering the fish lift entrance at the Lowell Hydroelectric Project (P-2790). Telemetry studies in 2002, 2011, and 2013 have shown that immigrating American shad that approach the project via the tailrace have difficulty utilizing the entrances of the fishway (Sprankle 2005; Alden 2011; 2013). In 2016, Gomez and Sullivan Engineers completed an analysis of the upstream passage system and recommended excavation of the ledge outcropping to approximately 10 feet below normal tailwater level extending 50 to 100 feet downstream from the entrance. During the March 30, 2017, Merrimack River Technical Committee meeting, we all agreed that the ledge removal project should move forward.

On July 18, 2017, the Merrimack River Technical Committee received the design plans for review before the commencement of construction. We sent a technical memorandum to ENEL Green Power North America, Inc., on July 26, 2017, providing our recommendations. Upon the request of ENEL, Julianne Rosset, Bryan Sojkowski, and Bjorn Lake met with ENEL representatives on August 15, 2017, at their Andover, Massachusetts office to discuss our recommendation. At that meeting, it was determined that the agencies should provide updated information on the low design flow for the upstream fishway and the corresponding tailwater elevation. This technical memorandum provides those updates.

RECOMMENDATION

The provided design drawings show a vertical excavation limit at an elevation of 48 feet (NAVD 88), extending approximately 80 feet downstream from the centerline of the fishway entrance. This excavation limit elevation roughly corresponds with the existing floor elevation of the fishway entrance chamber of 48.2 feet (NAVD 88), not including the 1-foot-high concrete lip at the entrance gate. Our criteria (both NOAA Fisheries and USFWS) for fishways is to be operational between the 5-95 percent flow exceedance values. Therefore, we recommend that the fishway be operational at tailwater elevations down to approximately 50 feet (NAVD 88), which corresponds to the tailwater elevation at the 95 percent exceedance flow.

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Additionally, we recommend that the minimum water depth above the entrance channel floor sit at 4 feet. Typically, gate structures are utilized to constrict the flow at the entrance in order to achieve an attraction jet with a 4-6-foot-per-second velocity. Lowell currently operates a vertical gate that varies from 0.3-3 feet above the lip of concrete at the downstream end of the entrance floor. An ancillary criterion to the minimum of 4 feet of depth is that the water surface elevation of the tailwater is recommended to be, at a minimum, two times the body depth of the largest target species. An American shad with a body depth of 10" would require a minimum of 1.5 feet of depth. The current entrance at Lowell does not meet this criterion for the full range of fish passage flows and tailwater fluctuations. Therefore, only excavating the ledge to an elevation of 48 feet (NAVD88) will necessitate additional future ledge excavation, when modifications to the gate and entrance channel are made to meet our design criteria. We understand that those entrance modifications are outside the scope of work for the ledge removal project, however, we recommend altering the ledge removal design such that additional excavation is not necessary in the future.

In support of our flow and tailwater elevation recommendation, we conducted a hydrologic analysis of the project flows. We downloaded daily average flow data from the U.S. Geological Survey gauges on the Merrimack River below the confluence with the Concord River (USGS #01100000) and the Concord River immediately upstream from the Lowell canal system (USGS #01099500). The difference between these average daily flow values is the flow in the Merrimack River that passes through the Lowell Project. We downloaded the last 30 years of record (1987 to 2016) and calculated a flow duration curve for the upstream migration season (April 15-July 15). In addition, to predict corresponding tailwater elevations at the upstream fishway operational flow range, we used the updated tailwater rating curve provided in the recent upstream fish passage assessment (Gomez and Sullivan 2016). We fit a logarithmic function to the provided tailwater data ($R^2 = 0.9991$) such that we could use the resulting equation ($y = 2.786\ln[x] + 29.824$) to predict the corresponding tailwater elevation for the flow exceedance values. Table 1 shows the results of this analysis providing the justification for a design tailwater elevation of approximately 50 feet (NAVD 88).

Table 1. Flow duration exceedance values and predicted tailwater elevations for the Lowell Project.

Flow Exceedance Value	Project Flow (cfs)	Tailwater Elevation (ft)
5%	26,210	58.17
10%	19,870	57.40
25%	12,470	56.10
35%	9,752	55.41
50%	6,912	54.46
65%	4,938	53.52
75%	3,830	52.81
85%	2,851	51.99
95%	1,735	50.60

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The three-dimensional telemetry studies conducted by Alden Labs in 2011 generated fish density plots that showed where immigrating American shad congregated in the tailrace (Figure 1 and Figure 2). The 80-foot length of the proposed ledge excavation appropriately reaches the zone of highest density at the turn in the tailrace (Figure 1). However, the proposed elevation of ledge excavation does not match the highest density of fish depth-wise (Figure 2). Over 80 percent of the fish detections occurred between the tailwater elevations of 40-50 feet with the highest density in the 45- to 50-foot bin (Figure 2). During the 2011 study period, the flow in the River was at or above the median for the period of record with the exception of one week in June when flow was lower than normal, suggesting that the density plots represent conditions during normal flow conditions, not low flow conditions (Figure 3). This provides further evidence that the entrance elevation needs to be lower than the existing 49.2 feet (NAVD 88), and only excavating the ledge to an elevation of 48 feet (NAVD 88) would not provide appropriate conditions for optimal entrance efficiency for the Lowell fish lift.

There are likely many ways to modify the entrance conditions at Lowell to improve fish passage performance. As the Technical Committee continues working with ENEL to improve passage at the Lowell Project, we can discuss various options that satisfy our fisheries management goals. At this time, we believe it is appropriate to excavate ledge down to an elevation of 44 feet (NAVD 88), as this provides more flexibility for future fishway entrance modifications.

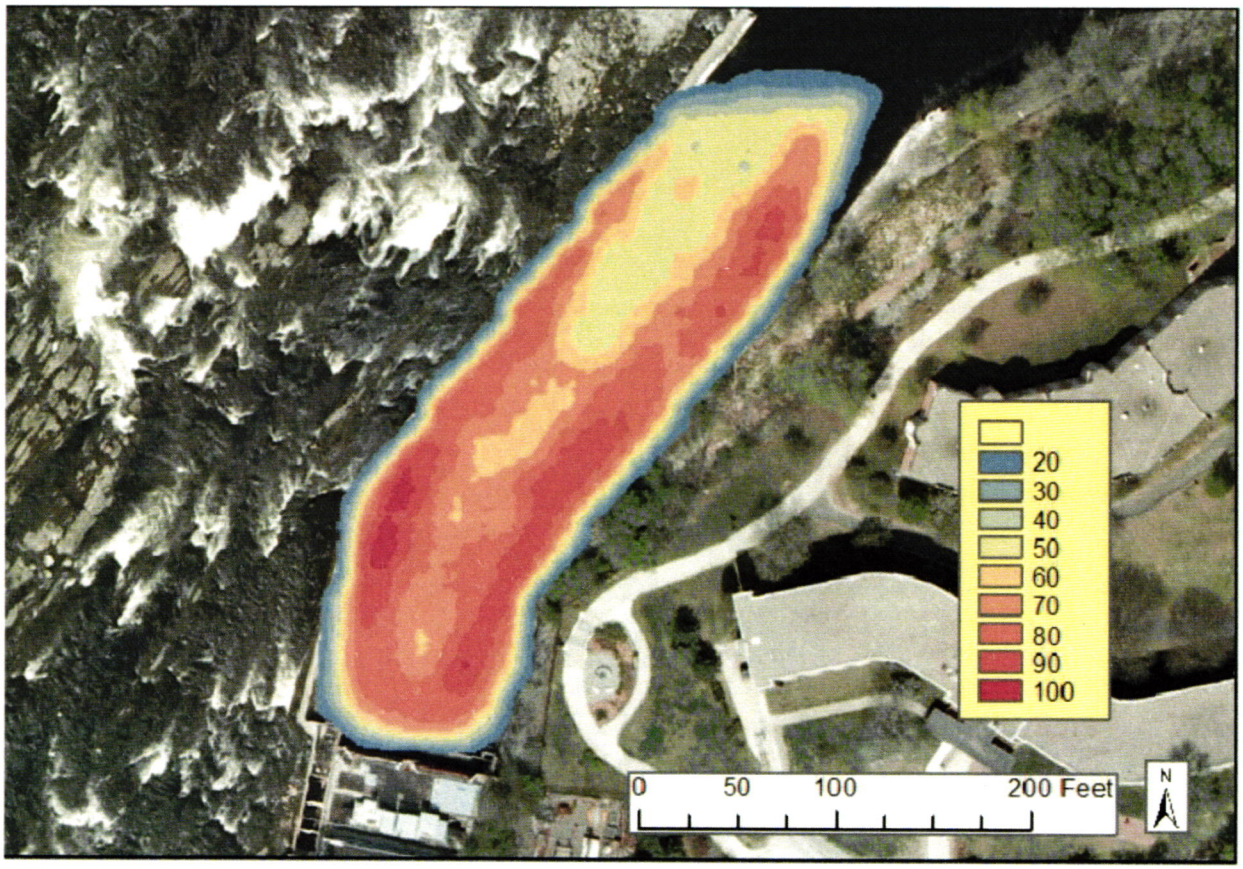

Figure 1. Bin density of tagged American shad during the study period (May 27-June 21) in the Lowell tailrace (Alden 2011).

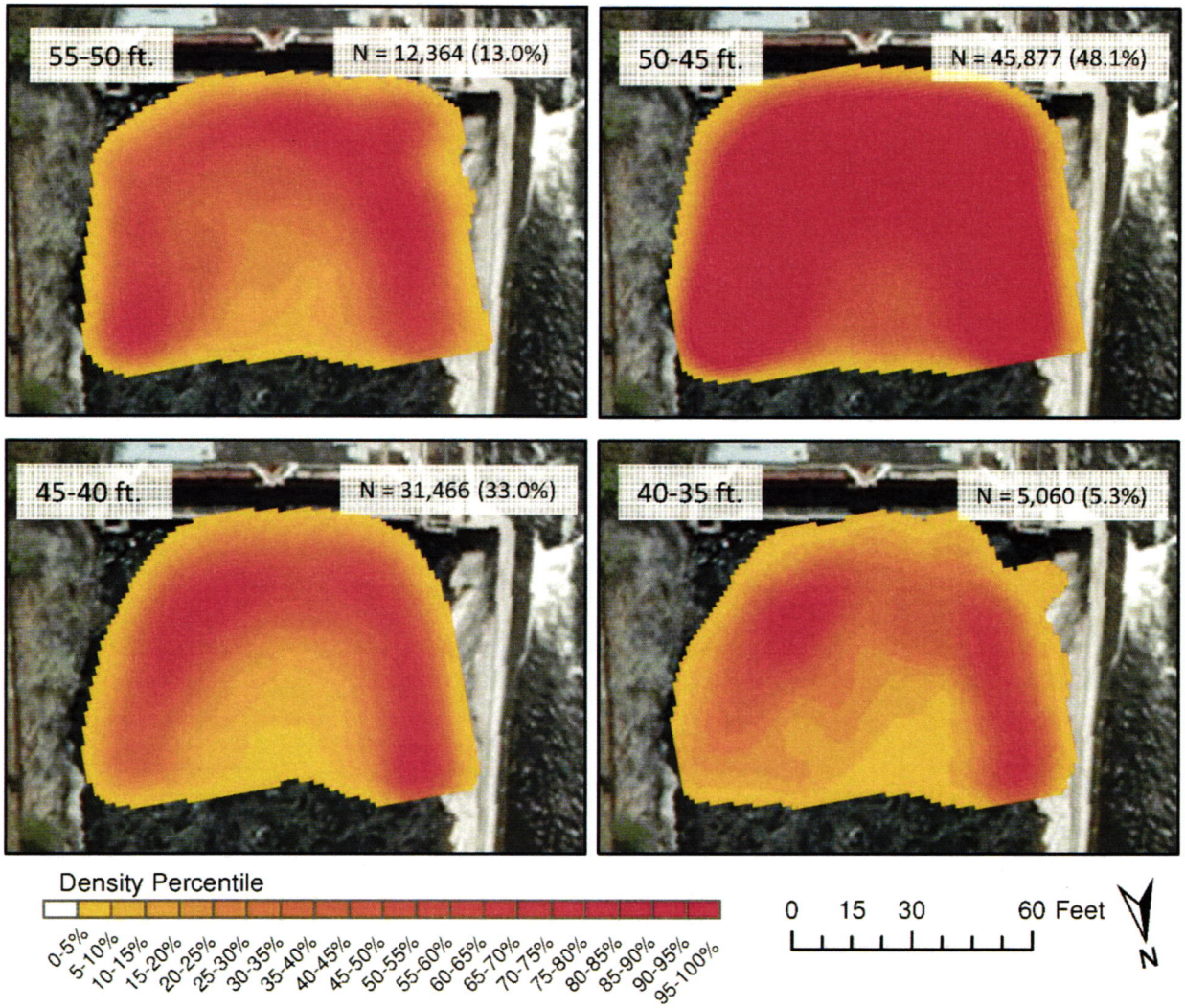

Figure 2. Bin density of tagged American shad within 65 feet of the Lowell powerhouse during the study period (May 27-June 21). Data are presented in 5-foot elevation bins (Alden 2013).

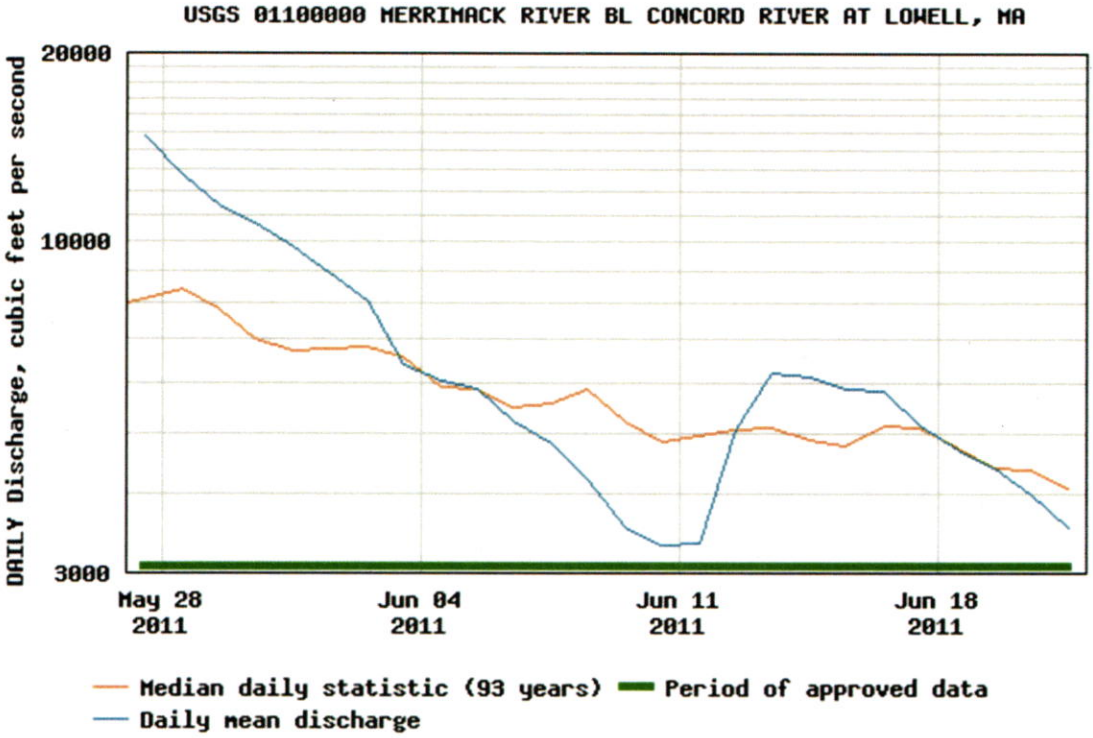

Figure 3. Hydrograph during the 2011 study period.

Document Content(s)

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lowell ledge removal attachment-tech memo.PDF.....4-8

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ATTACHMENT B

Rosset, Julianne <julianne_rosset@fws.gov>

[EXTERNAL] Lawrence and Lowell 2018 Action Items List

1 message

St Pierre, Conrad (EGP North America) <Conrad.StPierre@enel.com> Tue, Jun 19, 2018 at 2:37 PM
To: "Rosset, Julianne" <julianne_rosset@fws.gov>
Cc: "Smithwood, Doug" <doug_smithwood@fws.gov>, Bryan Sojkowski <Bryan_Sojkowski@fws.gov>, Michael_bailey <Michael_bailey@fws.gov>, Matthew A Carpenter <Matthew.Carpenter@wildlife.nh.gov>, "Donahue, Pat (EGP North America)" <Pat.Donahue@enel.com>, "Medford, Skip (EGP North America)" <Skip.Medford@enel.com>, "Fournier, Scott (EGP North America)" <Scott.Fournier@enel.com>, "ben.gahagan" <ben.gahagan@state.ma.us>, Bjorn Lake - NOAA Federal <bjorn.lake@noaa.gov>, "claudia_hernandez@fws.gov" <claudia_hernandez@fws.gov>, Caleb Slater <caleb.slater@state.ma.us>, "Tuxbury, Sue" <Susan.Tuxbury@noaa.gov>

To All—Per our meeting in March, we now have an update on the Lowell tailrace excavation project. Early in 2018, Enel permitting staff submitted applications for the project to local, state and federal agencies for approval. Unfortunately, some of these approval processes now appear to approach or exceed 9 months in duration. Also, after receiving only a single initial bid for the 2018 work, we received several competitive proposals in a second RFP, when the schedule was extended to summer, 2019. Because of these factors, Boott plans to complete the tailrace excavation project during late summer of 2019.

We appreciate your understanding and patience on this important but long-awaited improvement. Please feel free to contact me or anyone on the team with questions.

Thank you,

Conrad St. Pierre, PE.
Sr. Director of Hydro North America
Operations and Maintenance

Enel Green Power North America, Inc.

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ATTACHMENT C

U.S. Fish and Wildlife
Study Requests

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Boott Study Request # 1

Instream Flow Habitat Assessment of the Lowell Bypassed Reach
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine an appropriate flow regime that will protect and enhance the aquatic resources in the bypass reach (Northern Canal) between the Pawtucket dam and the E.L. Field powerhouse. Specifically, the objective of this study is to conduct an instream flow habitat study to assess the impacts of a range of project discharges on the wetted area and optimal habitat for key species, including the quantity and location of suitable habitat.

The specific objectives of this field study, at a minimum, include:

1. Characterize and map wetted perimeter of the bypass reach over a range of bypass flows;
2. Survey and evaluate the water depth and mean channel velocity at transects within the bypass reach over a range of flows; and
3. Map and assess the value of aquatic habitat in the bypass reach over a range of flows, focusing on potential habitat for resident species, and spawning and migration habitat or rest/regrouping areas for migratory species.

Target fish species should include American shad, river herring (alewife and blueback herring), fallfish, white sucker, freshwater mussels and benthic macroinvertebrates. The final target species list should be developed in consultation with the fisheries agencies and based on the results of the mesohabitat mapping.

Resource Management Goals

The U.S. Fish and Wildlife Service (Service) seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources within the Lowell bypassed reach, the Service's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide a flow regime in the bypassed reach that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) and diadromous fishes.

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3. Minimize current and potential negative project operation effects on water quality and aquatic habitat.

These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requester is a natural resource agency.

Existing Information

The Lowell Project bypasses a 0.7-mile-long section of the Merrimack River, from the Pawtucket dam to the E.L. Field powerhouse. There is presently no required minimum bypass flow. However, during the upstream fish passage season, the bypass reach receives 500 cfs through operation of the spillway fish ladder. In addition, the bypass reach receives flow whenever inflow exceeds the hydraulic capacity of all the project's stations. Pursuant to Article 37, Boott Hydropower, LLC, (Boott) maintains a minimum flow of 1,990 cfs or inflow, whichever is less, as measured immediately downstream of the project.

Available information in the PAD does not indicate how project operations have altered downstream hydrology, habitat quantity and quality, and water quality, which may affect resident and migratory fish, macroinvertebrates, aquatic plants and other biota and natural processes in the Merrimack River. The PAD provides no detailed description of the physical or biological characteristics of the bypassed reach.

An empirical study is needed to provide information on the relationship between flow and habitat in the bypassed reach for the Service to use in determining a flow recommendation.

Nexus to Project Operations and Effects

Although the project license requires Boott to maintain a minimum flow of 1,990 cfs or inflow (if less), downstream of the project, Boott states that in practice the project operates in a true run-of-river mode. The Department of the Interior is not recommending a below-project flow study, based on the assumption that any new license issued for the project will require instantaneous run-of-river operation (essentially codifying current operations).

The project includes a 0.7-mile-long bypassed reach. The current license contains no minimum bypass flow requirement. During the upstream fish passage season, the bypass reach receives 500 cfs via operation of the spillway fish ladder; otherwise, the reach only receives flow when inflow exceeds the hydraulic capacity of the project's generating capacity. To our knowledge, the lack of a required bypass flow was not based on any quantitative, rigorous scientific studies.

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This section of the Merrimack River contains habitat which supports native riverine species, including important spawning and rearing habitat for migratory species like American shad and river herring (MRTC 2010). While the existing license does not require a minimum bypass flow, the Service believes one is needed to sufficiently protect the aquatic resources inhabiting the bypassed reach.

Results of the flow study will be used by the Service to determine an appropriate flow recommendation which will protect and/or enhance the aquatic resources in the bypassed reach for the duration of any new license issued by the Federal Energy Regulatory Commission (Commission).

Methodology Consistent with Accepted Practice

Bypass flow habitat assessments are commonly employed in developing flow release protocols that will reduce impacts or enhance habitat conditions in reaches of river bypassed by hydroelectric projects.

Given the size of the bypassed reach (0.7 mile long) and the important resources known to inhabit the reach (i.e., diadromous fishes); we believe a study methodology which utilizes an instream flow incremental methodology (IFIM) approach is appropriate for this site. This same protocol was used during the relicensing of the Housatonic River Project (FERC No. 2576),[1] and has been accepted by the Commission in other licensing proceedings.[2]

The study should have two components. The first component entails mapping habitat within the bypass reach. The number, location, and size (area and linear distance) of each mesohabitat type in the reach should be documented, including qualitative characterizations (e.g., dominant substrate, average depth, overhead and instream cover, etc.). The second component consists of conducting an instream flow study.

At a minimum, the study design should involve collecting wetted perimeter, depth, velocity, and substrate data within a range of discharge levels along transects located in the reach of river between the dam and the E.L. Field powerhouse. The measurements should be taken over a range of test flows, to be agreed upon by the natural resource agencies. This information should then be synthesized to quantify habitat suitability (using mutually agreed upon Habitat Suitability Index curves) of each test flow for target species/life stages identified by the fisheries agencies. We recommend Boott perform habitat modeling using one dimensional modeling techniques to better characterize flows and velocities in this complex channel area.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

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[1] Housatonic River Project License Application, Volume 4, Appendix F. Connecticut Light and Power Company, August 1999.

[2] Glendale Project (FERC No. 2801) Final Bypass Reach Aquatic Habitat and Instream Flow Study in Glendale Hydroelectric Project Application for Subsequent License (FERC No. 2801), Volume 2, Appendix B, pp. 7-8, October 2007.

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Field work for flow studies can be reasonably extensive but will depend on consultation with Boott on study methodology and on-site decisions on locations for data collection and the number of collection locations. Post-field work data analysis would result in a moderate cost and effort. We anticipate that the level of effort and costs will be comparable to those experienced on similar Commission relicensing projects (e.g., the Glendale Project, FERC No. 2801).

REFERENCES

MRTC, 2010. A Plan for the restoration of American shad, Merrimack River Watershed. Prepared by the Technical Committee for Anadromous Fish Management of the Merrimack River Basin. 12 pp.

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Boott Study Request # 2

Adult Alosine Downstream Passage Assessment and Protection Evaluation
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to assess the adequacy of the turbines at the E.L. Field, Assets, Bridge Street, Hamilton, and John Street powerhouses, to minimize injury, entrainment, and mortality of fishes residing in the Merrimack River, and to recommend appropriate mitigative measures as necessary.

The specific objectives of the field study, at a minimum, are: (1) assess the risk of adult American shad and alewife becoming injured, impinged, or entrained in the E.L. Field, Assets, Bridge Street, Hamilton, and John Street powerhouse units; (2) estimate turbine survival; (3) assess the risk of injury or mortality at the spillway and downstream bypass; and (4) evaluate potential passage and protection measures.

Resource Management Goals

The Atlantic States Marine Fisheries Commission has developed several documents related to the management of American shad and river herring:

1. Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999.
2. Atlantic States Marine Fisheries Commission. 2000. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.
3. Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.
4. Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.

Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring includes an objective of maximizing the number of juvenile recruits emigrating from freshwater stock complexes and recommends enhancing survival at dams during emigration by evaluating survival of post-spawned adults and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implementing measures to pass fish via the route with the best survival rate.

Specific to resident riverine and migratory fish entrainment, the Service's goals are:

1. Minimize current and potential negative project operation effects such as turbine entrainment that could hinder management goals and objectives.

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2. Minimize project-related sources of mortality to resident and migratory fishes in order to restore natural food web interactions and ecosystem functions and values.

These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

No project-specific information exists regarding risk of impingement and/or entrainment of adult alosines. In the PAD, Boott provided little information that would inform the relative risk of impingement or entrainment in any of the 21 units associated with the project. Moreover, information regarding fish mortality at the spillway and the downstream bypass was not discussed. While Normandeau Associates, Inc., performed a study in 2003 pertaining to the survival of Atlantic salmon smolts through the turbines, (1) the sample size was small (20 fish); (2) the study was not performed at a full range of gate settings; and (3) salmon are a robust fish species and cannot be used as a proxy for alosines. The 2003 study did shed light on a predation issue, however, in the project's tailrace. Of the salmon that passed downstream, 69 percent were suspected to be preyed upon after using the downstream bypass facility. As Normandeau Associates, Inc., noted in their study results, predators residing in the tailrace can have a large impact on emigrating migratory fish species that use the current bypass facility at the project.

To date, no directed studies of alosine injury, entrainment, or mortality have been conducted at the project's modified spillway, the downstream fish bypass facility, or through the turbines. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating adult alosines and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

Hydropower projects generate electricity by moving water through a turbine-generator system. Typically, there are trashracks in front of the intakes leading to the turbines. If the rack spacing is narrow and velocities at the racks too high (relative to the swim speeds of fish species inhabiting or moving through the headpond), fish may become impinged against the racks and die. If rack spacing is wide and the velocities too high (relative to the swim speeds of fish species inhabiting or moving through the headpond), fish may become entrained (i.e., pass through the racks) and get injured or die while passing through the turbines.

Lowell's configuration likely presents problems with respect to providing safe, timely, and effective passage for outmigrating alosines. Pre-spawned adult American shad and river herring pass upstream through the Lowell fishways and/or are stocked into upstream habitats. These fish

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need to be able to migrate back downstream because they are iteroparous in this region (McBride et al. 2016). Therefore, it is necessary to understand how alosines move through the project area and the level of injury or mortality caused by entrainment through the project's turbines and/or passage via the dam spillway and downstream bypass facility.

Methodology Consistent with Accepted Practice

The Service proposes a phased approach to this study.

Phase 1:

Spill, bypass, and turbine mortality should be assessed using a balloon-tag method.

For spill mortality sites (dam spillway and downstream bypass), tagged alosines will be injected or released into spill flow at points where water velocity exceeds 10 ft/sec to minimize the possibility of the fish swimming upstream into the headpond or canal. Passed balloon-tagged alosines will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

For turbine mortality sites, tagged alosines will be injected into the intakes of units operating at or near full generation at points where intake water velocity exceeds 10 ft/sec to minimize the possibility of fish swimming back upstream through the intakes. Passed balloon-tagged alosines will be recovered in the tailrace and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

Phase 2:

Boott should investigate existing or potential future operational and/or physical measures that would minimize injury or mortality to outmigrating adult alosines moving past the project. Based on the results of this investigation, we recommend Boott provide a range of potential alternatives (e.g., increasing attraction to the existing downstream bypass, installing exclusionary screening, etc.).

Project operations (flows, levels, gate openings, number of units operating, and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) should be monitored and recorded regularly (hourly measurements if possible) throughout the duration of the study to establish a more comprehensive understanding of how migration patterns are influenced by these parameters.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The cost and effort of each individual phase of this study are expected to be moderate. Based on the scale and scope of the subject study, we estimate the cost to be $25,000 to $50,000. In the

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PAD, Boott proposes no studies to address this issue. The Service is not aware of any previously conducted or ongoing studies related to impingement, entrainment or survival of adult alosines at the project.

REFERENCES

McBride, R. S., Ferreri, R., Towle, E. K., Boucher, J. M., & Basilone, G. 2016. Yolked oocyte dynamics support agreement between determinate-and indeterminate-method estimates of annual fecundity for a northeastern United States Population of American Shad. PloS one, 11:e0164203.

Normandeau. 2003. Passage Route Selection and Survival of Atlantic Salmon Smolts Passed through the Lowell Hydroelectric Project. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc. Westmoreland, New Hampshire. 130 pp.

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Boott Study Request # 3

Telemetry Study of Upstream and Downstream Migrating Adult American Shad and River Herring to Assess Passage Routes, Effectiveness, and Delay

(Lowell, P-2790)

Goals and Objectives

The goal of this study is to assess the behavior, approach routes, passage success, survival, and delay of adult American shad and river herring as they encounter the Lowell Project during their upstream and downstream migrations to determine if project operations negatively impact their survival and production.

The following objectives will address this request:

1. Assess project operations effects on the timing, orientation, routes, and migration rates of shad and river herring;
2. Determine route selection and behavior of upstream migrating shad and river herring at the project under varied operational conditions, including a range of spill conditions (e.g., movement to the dam, attraction to the E.L. Field station discharge, movement between locations, delay, timing, etc.);
3. Determine delay/fallback associated with the northern canal;
4. Assess near field attraction to, and entrance efficiency of, the fish lift under a range of spill conditions and with the river-side entrance and street-side entrances open;
5. Assess near field attraction to, and entrance efficiency of, the spillway ladder under a range of spill conditions;
6. Evaluate the internal efficiency of the Pawtucket dam ladder;
7. Collect ladder and lift efficiency data, to include rates of approach to fishway entrances, entry into fishways, and passage under varied operational conditions, including a range of spill conditions;
8. Determine the proportion of post-spawned adults that select the power canal as a downstream passage route under varied operation conditions, including a range of spill conditions up to full spill; determine post-spawned adult downstream migration route selection, passage efficiency, and delay associated with the power canal under various operational conditions, including a range of spill conditions; and
9. Compare rates and measures of delay and movement among project areas and routes utilized (e.g., spill at dam vs. power canal) under the range of permitted and proposed spill and operational conditions.

If project operations are adversely affecting shad or river herring migration timing or are resulting in other deleterious population effects, we recommend Boott identify operational solutions or other passage measures that will reduce and minimize these impacts within the project area.

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This study will require 3 years of field data due to the tailrace ledge excavation project which will be completed in 2019 and to capture inter-annual variability of river discharge, water temperatures, and variability in outmigration timing. We recommend that Boott perform the downstream routing portion of the study in 2019 (pre-ledge excavation) and 2020 (post-ledge excavation). In 2020 and 2021, after the ledge has been excavated, we recommend Boott perform the upstream portion of this study.

Resource Management Goals

The Atlantic States Marine Fisheries Commission, Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring, approved in 2010, includes the following objectives:

Upstream Passage

1. Fish must be able to locate, enter, and pass the passage facility with little effort and without stress.
2. Where appropriate, upstream fish passage effectiveness should be improved through operational or structural modifications.
3. Fish which have ascended the passage facility should be guided to an appropriate area so they can continue their upstream migration and avoid being swept back downstream.

Downstream Passage

1. Enhance survival at dams during emigration.
2. Evaluate survival of post-spawned adults and juvenile fish passed via each project route (e.g., turbines, spillage, bypass facilities, or a combination of the three).
3. Implement measures to pass fish via the route with the least delay and best survival rate.

The Service seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to American shad and river herring movement and migration, the Service's goal is to minimize current and potential negative project operation effects on the safe, timely and effective upstream and downstream passage of adult American shad and river herring.

These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), the Federal Power Act (16 U.S.C. §791a, *et seq*.), the Atlantic States Marine Fisheries Compact (P.L. 539, 77th Congress, as amended by P.L. 721, 81st Congress), and the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5107).

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Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

Several studies pertaining to the fish lift and downstream passage facilities at Lowell have been conducted for American shad. Studies of alewife passage are limited to a single downstream test performed in 1991. Previous studies pertaining to upstream shad migration (listed in Table 5.4-3 of the PAD) demonstrate passage through the existing lift at Lowell is relatively poor. Also, when analyzing annual passage counts for river herring and shad, the number of fish that utilize the Lowell lift versus those that pass at Lawrence is low (from 1996 to 2017 passage efficiency at Lowell has not exceeded 30 percent).

In 2016, for the first time since the issuance of the original license for the project, Boott agreed to operate the fish ladder at the Pawtucket dam for the duration of the anadromous fish upstream passage season, consistent with the operating timeframes defined for the powerhouse fish lift in the project's Commission-approved Comprehensive Fish Passage Plan. Therefore, to date, studies performed at Lowell have not tested the nearfield attraction, entrance efficiency, or internal efficiency of the ladder. Moreover, past studies have had statistically low sample sizes (less than 60 fish) and were all performed prior to the ledge excavation project which will occur in August 2019. Future studies should have a robust sample size (at a minimum, 150 fish per species) and array system. Additionally, to obtain a comprehensive understanding of fish behavior at Lowell, for both upstream and downstream migration, studies are needed to: (1) determine if project operations affect pre-spawned and post-spawned river herring and shad migration timing; (2) assess fish movement to, and through, the ladder at the Pawtucket dam; and (3) assess passage success at the tailrace fish lift post-ledge removal.

Nexus to Project Operations and Effects

Lowell tailrace turbulence, potentially exacerbated by the existing ledge outcropping, creates attraction issues at the entrance of the fish lift. Moreover, a lack of effective protection at the 21 turbines associated with the project increases the risk of entrainment and mortality alosines may experience as they migrate downstream to the ocean. During the upstream fish passage season, the Lowell bypass reach receives 500 cfs during the day and 300 cfs at night via operation of the spillway fish ladder; otherwise, the reach only receives flow when inflow exceeds the hydraulic capacity of the project's generating capacity. The spillway ladder is, therefore, only partially effective due to lack of flow.

Existing project operations and limited bypass flows can have a direct impact on diadromous fish migration. Migration delays, increased predation, mortality during passage over the dam or through turbines, and changes in route selection under different flow conditions are potential influences of the project on shad and river herring populations in the Merrimack River. Effective upstream and downstream passage and successful spawning and juvenile production are necessary to help achieve shad and river herring management restoration goals for the Merrimack River, particularly in the upstream reaches.

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Methodology Consistent with Accepted Practice

The movement of migratory shad and river herring would be best studied by using radio telemetry, including passive integrated transponder (PIT) tags. Radio telemetry is an accepted technology that has been used for a number of studies associated with hydropower projects, including at the Bellows Falls (FERC No. 1855), Wilder (FERC No. 1892), and Vernon (P-1904) projects.

The study design must specify sample sizes, as well as tag and receiver configurations, to ensure rates of entry and exit to the tailrace, fish lift and fish ladder, downstream bypass, the bypassed reach, and canal, can be calculated with sufficient precision. We recommend that Boott capture shad and river herring below Lawrence and tag at least 150 individuals per species. Double-tagged (radio and PIT) shad and river herring should be released upstream of the Lawrence dam and upstream of the Lowell dam. Fish should also be released directly into the Pawtucket canal to adequately assess project conditions likely to be encountered during downstream migration. Additional, tagged, individuals may need to be released farther upstream to ensure enough fish encounter the dam during a sufficient range of turbine and operational conditions to test for project effects (especially in 2020 and 2021). A large array of stationary monitoring stations (radio and PIT) will be needed to provide an appropriate level of resolution for data analyses and to answer the natural resource agencies' questions regarding project operation effects. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017); a minimum of 25 dead river herring and 25 dead shad should also be released as a control group in this study. A plan and schedule for spill releases should be developed which provides sufficient periods of spill and various generating levels (treatments will require multiple days of consistent discharge).

Each component of this study will require 2 years of field data collection to attempt to account for inter-annual variability in river discharge, water temperatures, and the ledge excavation project which will be completed in 2019. We recommend Boott perform the downstream routing portion of the study in 2019 (pre-ledge excavation) and 2020 (post-ledge excavation). In 2020 and 2021, after the ledge has been excavated, the upstream portion of this study should be performed.

A related study request on computational fluid dynamics (CFD) modeling in the Lowell tailrace, in and around the fish lift and fish ladder entrances and powerhouse forebay, will complement this study and address related project operational effects.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Estimated cost for this study is expected to range from $400,000 to $500,000, with the majority of costs associated with equipment (radio and PIT tags, radio receivers, and PIT readers) and related field work labor. Since tagged shad and river herring will move throughout the area, to varying degrees, there will be expected cost savings (e.g., radio tags) to Boott, provided cooperation in study planning and implementation occurs.

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Boott did not propose any studies to meet this need in the PAD.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

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Boott Study Request # 4

Impact of Project Operations on Downstream Migration of Juvenile Alosines

(Lowell, P-2790)

Goals and Objectives

The goals of this study are: (1) conduct a field study of juvenile alewife outmigration in the Lowell impoundment, the power canal, and at the Pawtucket dam, to determine if project operations negatively impact juvenile alosine survival and production; and (2) determine if project operations affect juvenile alosine outmigration survival, recruitment, and production.

The following objectives will address this request:

1. Assess project operations effects of the Pawtucket dam on the timing, orientation, passage routes, migration rates, and survival of juvenile alewife;
2. Determine the proportion of juvenile alewife that select the Lowell canal versus the Pawtucket powerhouse, downstream bypass facility, or dam spill as a downstream passage route, under varied operational conditions;
3. Determine if there are any delays associated with downstream movement related to either dam spill or the Pawtucket powerhouse due to operations;
4. Determine the juvenile downstream passage timing and route selection in the Lowell canal, assess delays associated with the canal, and with project operations (e.g., stockpiling in the canal).

If it is determined the project operations are adversely affecting juvenile alosine survival, migration timing, or causing other deleterious population effects, identify operational solutions or other passage measures which will reduce and minimize these impacts within the project area. This study will require 2 years of field data to capture inter-annual variability of river discharge and water temperatures.

Resource Management Goals

The Atlantic States Marine Fisheries Commission Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (American Shad Management), approved in 2010, includes the following objective:

> Maximize the number of juvenile recruits emigrating from freshwater stock complexes. To enhance survival at dams during emigration, evaluate survival of post spawning and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implement measures to pass fish via the route with the best survival rate.

The Service seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

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1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to juvenile American shad and river herring movement and migration, the Service's goal is to minimize current and potential negative project operation effects on the safe, timely and effective downstream passage.

These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), the Silvio O. Conte National Fish and Wildlife Refuge Act (P.L. 102-212; H.R. 794), the Federal Power Act (16 U.S.C. §791a, *et seq*.), the Atlantic States Marine Fisheries Compact (P.L. 539, 77th Congress, as amended by P.L. 721, 81st Congress), and the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5107).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

The seaward migration of juvenile alosines is of great importance to the restoration of alewife, blueback herring, and American shad in the Merrimack River. However, data on the downstream migratory movements and rates of alosines past Lowell is sparse and relatively incomplete. In 1994 and 1995, Normandeau Associates, Inc., documented use of the bypass facility by downstream migrating alosines via the installation of a removable box trap. Passage efficiencies were 7 percent and 37 percent, respectively. However, to date, no directed studies of downstream alosine passage route selection has been conducted at the Lowell Project. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating juvenile alosines and develop adequate passage and protection measures to meet management goals and objectives.

Studies conducted farther upstream on the Merrimack River, at Garvins Falls (FERC No. 1893), have shown it is possible to radio-tag juvenile alewife to evaluate alosine outmigration (Normandeau 2016). Alewife can be used as a proxy, in this instance, for the natural resource agencies to assess blueback herring and shad downstream migration patterns.

Nexus to Project Operations and Effects

Adult alosines, passed at Lowell via the fishways and/or stocking efforts, utilize upstream habitat to spawn on an annual basis. Similarly, juvenile alosines require safe and timely downstream passage measures at the project in order to successfully emigrate back to the ocean to contribute to the population. Presently, downstream migrants can easily enter the Lowell canal system, via

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the Pawtucket canal, as there are no exclusionary measures in place. There are 19 turbines located in the canal, housed at four powerhouses (Assets, Bridge Street, Hamilton, and John Street), none of which have passage or protection measures. There are a variety of unit-types housed in each of the powerhouses, ranging in speed from 100 to 150 rpm. A study is needed to assess the impacts project operations have on outmigrating juvenile alosines.

The Service is not aware of any studies conducted specifically designed to answer the following questions:

1. What is the rate of alewife survival under a range of spill and gate configurations?
2. Are there delays in migration/movement at the dam, gatehouse, or in the canal?
3. For juveniles that enter the Pawtucket canal, what proportion subsequently enter the Western, Merrimack, Pawtucket, or Hamilton canals?
4. What is the rate of movement through the canal, what is the delay to juvenile alosine outmigration, and the potential accumulation of juveniles in the canal?
5. What proportion of juvenile alosines use the downstream bypass sluice versus the E.L. Field powerhouse turbines under varied operational conditions?

The Service is concerned project operations are: (1) impacting juvenile alosine outmigration survival; and (2) contributing to the failure of the Merrimack River alosine population to meet management targets.

Methodology Consistent with Accepted Practice

The impact of project operations to juvenile alewife outmigration, passage route selection, and migratory delay would be best studied via radio telemetry. This methodology has successfully been tested and employed by Normandeau Associates, Inc., at the Garvins Falls hydroelectric project (FERC No. 1893; Normandeau 2013; Normandeau 2016). Project discharge over a full range of existing and, to the extent possible, potential future operational conditions at the dam (likely increased bypass reach flows in new license), should be examined relative to migration rate and passage route selection of juvenile alosines to, and through, various areas of the project.

In addition, study fish should be collected and balloon-tagged to empirically determine rates of survival for fish passed over or through the dam's bypass sluice, main powerhouse, and 19 canal units under varied operations. For spill mortality sites (dam spillway and downstream bypass), tagged alosines should be injected or released into spill flow at points where water velocity exceeds 10 ft/sec to minimize the possibility of the fish swimming upstream into the headpond or canal. Passed balloon-tagged alosines will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

For turbine mortality sites, tagged alosines will be injected into intakes of units operating at or near full generation at points where intake water velocity exceeds 10 ft/sec to minimize the possibility of fish swimming back upstream through the intakes. Passed balloon-tagged alosines will be recovered in the tailrace and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged alosines will be censored from the data.

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Radio-tagged juvenile alewife will be released in areas upstream of the project at multiple release locations, to determine operation effects on migration rates, route, orientation, and entrainment, over a full range of permitted and operational conditions. The release of radio-tagged fish upstream of the project, and induction into the power canal, will provide data on concerns of delay and route selection to the canal, downstream bypass, crest gates, and turbines. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017); a minimum of 50 dead alewife should also be released as a control group in this study.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

Boott does not propose any studies to meet this need. Estimated costs for the study are expected to be moderate to high, between $100,000 and $300,000, with the majority of costs associated with equipment (radio tags, radio receivers) and related field work labor.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

Normandeau 2013. Juvenile Alosine Radio Tag Attachment Test. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 2 pp.

Normandeau 2016. Garvins Falls Juvenile Alosine Downstream Passage Telemetry Assessment. Submitted to Boot Hydro, LLC. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 13 pp.

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Boott Study Request # 5

Downstream American Eel Passage Assessment
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine the impact of the Lowell hydroelectric project on the outmigration of silver eels in the Merrimack River. Entrainment in the canal and at the conventional turbines at the project powerhouses (E.L. Field, Assets Station, Bridge Street, Hamilton Station, and John Street) can result in mortality or injury. It is important to understand the passage routes at the project and the potential for delay, injury, and mortality to assess alternative management options to increase survival.

The objectives of this study are:

1. Quantify the movement rates (including delays) and relative proportion of eels passing via various routes at the project (i.e., through the turbines, through the downstream bypass, spilled at the dams, etc.).
2. Evaluate instantaneous and latent mortality and injury of eels passed via each potential route.

Resource Management Goals

The Atlantic States Marine Fisheries Commission has developed two documents related to the management of American eel:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.

Objectives of the management plan include: (1) protect and enhance American eel abundance in all watersheds where eel now occur; and (2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre-spawning adult eel.

Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Commission relicensing process.

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The Service seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to downstream passage of American eel, the Service's goals are:

1. Minimize current and potential negative project operation effects that could hinder management goals and objectives.
2. Minimize project-related sources of downstream passage delay, injury, stress, and mortality in order to maximize the number of silver eels migrating to the spawning grounds.

These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requester is a natural resource agency.

Existing Information and the Need for Additional Information

Data on downstream migratory movements and rates of American eels past the project are sparse and relatively incomplete. A single study was performed by Normandeau Associates, Inc., in 2017 (Normandeau 2017). Seventeen silver-phase eels were tagged and released into the Merrimack River upstream of the Garvins Falls project. Of the 17 released individuals, 14 approached the Pawtucket dam. Eight were determined to have passed through the gatehouse and enter the forebay canal upstream of the E.L. Field powerhouse. Five eels passed the project via spill flow. One eel's passage route was classified as unknown. Zero individuals used the downstream bypass. This study had a small sample size, was of a relatively short duration (October 20-November 28, 2017), did not include monitoring stations or antenna arrangements in the canal, and was performed prior to the installation of the pneumatic crest gate system.

To date, no other directed studies of eel entrainment or mortality have been conducted at the Lowell Project. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on outmigrating eels and develop adequate passage and protection measures to meet management goals and objectives.

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Nexus to Project Operations and Effects

The project configuration presents problems with respect to providing safe, timely, and effective passage for outmigrating eels. The intakes are likely deep and, while no specification for the trashracks were provided in the PAD, it is unlikely they would prevent entrainment of eels. The anadromous downstream passage facility at the project is also not expected to be effective for eels; the target anadromous species are surface-oriented, while eels tend to move much deeper in the water column. Additionally, there are no data pertaining to eel movements in the Lowell canal. Eels that move into the canal potentially have no alternative but to pass through hydropower turbines at the Assets, Bridge Street, Hamilton, and John Street powerhouses. Eels are known to occur upstream of the dam; therefore, it is necessary to understand how eels move through the project and the level of injury and/or mortality resulting from each potential passage route (i.e., the spillway, the downstream bypass facility, or the 21 turbines associated with the project).

Methodology Consistent with Accepted Practice

In order to understand the movements of outmigrating silver eels as they relate to operations at Lowell, radio telemetry technology should be utilized. Radio telemetry is an accepted technology which has been used for a number of studies associated with hydropower projects, including at the Bellows Falls (FERC No. 1855), Wilder (FERC No. 1892), and Vernon (P-1904) projects.

Studies should be designed to investigate route selection (i.e., entrainment vs. spill) independently from estimation of mortality/injury, because these metrics require different methodologies. Studies will also likely benefit from data collected over 2 study years (especially route selection studies, which may be more significantly affected by environmental conditions during a given season than mortality/injury studies). It is also envisioned that results from route selection studies can guide design of turbine mortality studies. Therefore, it is proposed, at a minimum, route selection studies be conducted in multiple years, but mortality/injury studies may be conducted after the first year of route selection studies have been completed.

Objective 1: Route Selection

This study will involve systematic releases of radio-tagged silver phase eels at strategic points above areas of interest, to assess general routes of passage (i.e., via spill, bypass, or turbines). Active downstream migrants should be collected within-basin if possible (i.e., Cabot or Holyoke bypass samplers), but fish sourced from out-of-basin may be acceptable to meet sample size demands. Experimental fish must meet morphometric (e.g., eye diameter relative to body size) criteria to ensure they are migrant silver phase. Collections should be made within the migratory season (late August to mid-October), and eels should be tagged and released within 21 days after capture, but preferably within 7 days (particularly if the test eels are from out-of-basin).

All telemetered eels will be radio- and PIT-tagged. PIT antennas will be installed and monitored continuously to verify passage of eels via bypass channels.

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A minimum number of 150 telemetered eels (e.g., five separate groups of approximately 30 eels each) will be required to maximize the data return. Tagged eels should be released at least 5 km upstream of the Lowell Project. Groups of eels should be released during spill (if any) and non-spill and during periods of low, moderate, and high generation conditions. Up to 50 additional eels should also be released in the upper canal and allowed to volitionally descend through the canal to assure that a sufficient number of eels are exposed to canal conditions. Groups of eels should be released when the canal units are running and when the canal units are off. Additionally, since fish can drift a considerable distance downstream after they have died (Havn et al. 2017), a minimum of 25 dead eels should also be released as a control group in this study.

Telemetry receivers and antennas should be located upstream and downstream of the spillway, at the canal entrance, within the canal, in the downstream fish bypass entrance, at turbine intakes, the station tailrace, and downstream of the confluence of the Merrimack and Concord rivers. These locations will permit assessment of passage via the following potential routes: the power canal, spillway, downstream fish bypass, station turbines,and upstream fishway attraction water intake. The final placement of receivers and antennas should be developed in consultation with the fisheries agencies.

Mobile tracking (i.e., via boat) in the River and canal between release sites and several km downstream will be performed at regular intervals during and after releases to confirm routes and fates of passed fish or lost fish.

Movement rates (time between release and detection at radio antenna locations, and between radio antenna locations) of eels passing the projects by various routes will also be quantified.

The route selection portion of this study should occur in both study years.

Objective 2: Spill, Bypass, and Turbine Mortality/Injury Studies

Spill, bypass, and turbine mortality will be assessed using a balloon-tag method.

For spill mortality sites (dam spillways and downstream bypasses), tagged eels will be injected or released into spill flow at points where water velocity exceeds 10 ft/sec to minimize the possibility of eels swimming upstream into the headpond or canal. Passed balloon-tagged eels will be recovered below areas of spill and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged eels will be censored from the data.

For turbine mortality sites, tagged eels will be injected into intakes of all 21 units associated with the project, operating at a full range of settings where intake water velocity exceeds 10 ft/sec to minimize the possibility of eels swimming back upstream through the intakes. Passed balloon-tagged eels will be recovered in the tailrace(s) and held for 48 hours in isolated tanks for observation of injury and latent mortality; unrecovered balloon-tagged eels will be censored from the data.

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If the balloon-tag mortality component of the study occurs in study year one, all possible route selection sites would need to be evaluated. If the balloon-tag mortality component of the study occurs in study year two, results from the route selection study could be used to inform which sites need to be evaluated for mortality. Eels recovered from balloon-tag studies should not be used for route selection studies.

Data analyses of route selection and mortality (instantaneous and latent) will follow standard methodology.

Project operation (flows, levels, gate openings, number of units operating and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) will be monitored regularly (hourly measurements if possible) throughout the duration of the studies and assessed for potential relationships to passage route selection, migratory delay, and/or passage survival.

These methodologies are consistent with accepted practice.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The level of cost and effort for the downstream eel passage study will be moderate to high; silver eels would need to be collected, tagged, and released in several locations over the course of the migration season. Antennas and receivers would need to be installed throughout the canal, at the intakes of the E.L. Field powerhouse, at the dam spillways and station bypass and monitored regularly. Data would need to be retrieved periodically, then analyzed. A multi-site route selection study conducted by the USGS Conte Lab on the Shetucket River in Connecticut cost approximately $75,000 for the first year of study. Costs are estimated at $100,000 per year for the route selection study and $50,000 to $75,000 for the spill, bypass, canal, and turbine mortality/injury study.

Boott did not propose any studies to meet this need in the PAD.

REFERENCES

Havn, T. B., F. Økland, M.A. Teichert, L. Heermann, J. Borcherding, S.A. Sæther, O.H. Tambets and E.B. Thorstad. 2017. Movements of dead fish in rivers. Animal Biotelemetry, 5: 7.

Normandeau Associates, Inc. 2017. Downstream Passage Evaluation for Silve-Phase American Eels at the Lowell Hydroelectric Project. 2017. Submitted to the City of Holyoke Gas and Electric Department. Final report. Normandeau Associates, Inc., Westmoreland, New Hampshire. 17 pp.

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Boott Study Request # 6

Operations Analysis of the Lowell Canal
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to understand the operations of the Lowell canal system. The specific objective of this study is to describe the operations of the Lowell canal which include, but are not limited to: how all of the canal units interact with the main units, how the canal units are sequenced, how often each of the units operate, the prioritization sequence of canal unit operations, the amount of time the units are operated during the downstream passage season, etc.

Resource Management Goals

The Service seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation, and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources, the Service's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Minimize current and potential negative project operation effects on fish in the project area.

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

The Merrimack River supports a variety of migratory fish species. However, there is no information pertaining to fish mortality and population effects resulting from entrainment in the canal and/or the canal units. Since there are no exclusionary measures at the entrance of the project's canal system, fish can easily enter the two-tiered network of man-made canals, which are approximately 5.5 miles in length. These man made canals provide flow to 19 Boott-owned hydroelectric units. Since the issuance of the original license for the project, there have been no directed studies of the Pawtucket, Western, Merrimack, or Hamilton canal units. Additionally, the PAD provides little operational information regarding the canal: flows of up to 2,000 cfs are routed into the canal, typically once the E.L. Field station's hydraulic capacity of 8,000 cfs has

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been reached. These information gaps need to be filled so the natural resource agencies can assess the relative and cumulative impacts of project operations on riverine fishes and migratory alosines which may be moving through, or inhabiting, the canal and develop adequate passage and protection measures to meet management goals and objectives.

Nexus to Project Operations and Effects

The Lowell Project consists of a two-tiered, 5.5-mile-long, network of man-made canals which include several small dams and 19 turbine units. Flows enter the canal system upstream of the Pawtucket dam via the Pawtucket canal. There are no exclusionary measures for fish in place. Therefore, the Lowell canal presents problems with respect to providing safe, timely, and effective passage for fish trying to move past the project through the canal system.

Methodology Consistent with Accepted Practice

In order to determine the relative risk the canal units present to riverine and migratory fishes, it is necessary to understand how the canal operates. Therefore, we request Boott provide a detailed description of the operational protocol it uses to determine when and how much water flows into the canal at a time scale relevant to the migratory fish species expected to potentially utilize the canal as a passage route (e.g., May, June, and July for spent alosines; August through November for adult eels and juvenile alosines). Historical operations data should be examined relative to the hydrological data set to determine the percent of time the canal units would be expected to operate during each passage month. This analysis should be used in conjunction with the results of the passage route and turbine mortality studies to estimate total through project mortality for each target fish species/life stage.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The expected level of effort and anticipated cost will be low. Operations and hydrologic data are readily available and only need to be compiled and analyzed. We estimate the cost to be less than $10,000.

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Boott Study Request # 7

Three-Dimensional Computational Fluid Dynamics (CFD) Modeling in the Vicinity of Fishway Entrances and Powerhouse Forebays

(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine the flow field conditions that exist in and around fishway entrances and the powerhouse forebay. The information from this request is meant to be coupled with data from the telemetry studies, such that a comprehensive understanding of fish behavior is developed.

The objective of this study is to create a series of color contour maps of velocity magnitude at select discharges agreed upon by the resource agencies and the licensee. With respect to upstream passage, the results will show approach velocities and flow fields that may create a response in fish. This information can be coupled with telemetry data (from the requested shad and river herring telemetry study) and passage counts to understand which conditions are optimal for guiding migrating fish to the fishway entrances and stimulating fishway entry.

With respect to downstream migration, the results will show velocities and flow fields in front of the E.L. Field powerhouse. Additionally, the results will indicate to what degree, if any, flow directs downstream migrating fish towards the downstream bypass facility.

Resource Management Goals

The management goals of this study request are to obtain information that will assist in enhancing the effectiveness of the current upstream fish passage facilities for upstream migrating trust species and reduce impingement, entrainment, and delay for downstream migrating fish. CFD models are a relatively cost effective way to analyze existing and future conditions. As such, changes in the amount of attraction water, changes in which turbines are operating, and which spillway gates are releasing water can all be examined. As stated, the results from this study are meant to be used along with the data generated from the requested telemetry study. The combined analysis from these two data sources can help assess which flow conditions are most advantageous for migrating trust species to enter the fishway under current and proposed conditions.

As for downstream migration of adult and juvenile shad, river herring, and adult eel, the results from the models will reveal flow magnitude and direction in front of the powerhouse. Given the limited information that currently exists on survival through the project, our management goal is to direct as many downstream migrating fish as possible towards the downstream bypass facility. With respect to upstream passage, we want to maximize the number of fish that find and enter the fishway entrances.These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and

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Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

Public Interest

The requestor is a natural resource agency.

Existing Information and the Need for Additional Information

To date, no CFD modeled data exists in front of either the fish ladder or lift, nor do they exist in front of the E.L. Field powerhouse. A comprehensive understanding of fish behavior at the ladder and lift entrance, and the powerhouse forebay, is needed in order to create safe, timely, and effective upstream and downstream passage for American shad, river herring, and eels. Additionally, a better understanding of flow and how it affects fish passage is needed after Boott performs the ledge removal excavation project.

Nexus to Project Operations and Effects

The Lowell Project has direct impacts to upstream and downstream migrating shad, river herring, and eel. The development of these models will give resource agencies valuable information into the hydraulic cues which may elicit a response from upstream migrants. For downstream passage, the Service has approach velocity guidelines; the output from these models would inform the resource agencies under what conditions appropriate approach velocities are being met and when they are being exceeded.

With respect to upstream migration, the auxiliary water system (AWS) plays a critical role in determining whether or not fish are attracted to the entrance. The results from this study would allow an assessment of how well the AWS is performing and under what conditions it attracts the most fish.

With respect to downstream migration, the development of a CFD model under existing conditions also informs the design of future modifications and improves the survivability of downstream migrating shad, river herring, and eel.

The CFD models for the Pawtucket fishway and fish lift should be developed as part of year two studies, after the ledge excavation project is complete. It would be useful to have the gatehouse area CFD modeling completed in year one. This analysis may provide information on adjustments to canal operations or structures that can subsequently be analyzed.

Understanding the entrance conditions of the Pawtucket fishway under a range of spill conditions would be informative. If developed prior to the year one upstream shad telemetry studies, it would provide information on spill gate settings which would likely best achieve entrance and ultimately passage. Further work with the model can help in evaluating changes in ladder entrance or spill conditions that could improve passage and be tested with telemetry, video, and/or count data.

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CFD modeling of the flows leading to the canal would aide in our interpretation of year one downstream passage telemetry results, but would not need to be completed prior to the year one telemetry (downstream juvenile alewife and downstream eel) studies. Those studies will provide the context for how and where shad, river herring, and eels are passing the project and how successful passage is. The CFD modeling could focus on the locations identified as important in the study results and Boott could assess changes to structures or operations and evaluate them in the model. Promising alternatives would then be tested in year three studies.

Methodology Consistent with Accepted Practice

A three-dimensional CFD model has become an increasingly common standard of analysis at hydroelectric projects around the nation. Within the northeast region, we have seen these types of models developed at the Holyoke (P-2004), Brunswick (P-2284), Shawmut (P-2322), Milford (P-2534) and Orono (P-2710) projects. We would expect to engage with the licensee in terms of determining the appropriate area and flows to be modeled. We expect the spatial extent of the model at each study site will vary. Given the large number of ways in which output from these models can be presented and the near infinite number of flows which could potentially be modeled, we would expect to consult with the licensee to reach agreed upon modeling efforts and scenarios to be examined.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The cost of developing, running and testing a CFD model can vary tremendously; one large variable in determining the cost is based on the amount of existing bathymetric data to which Boott currently has access. We roughly estimate that the cost of each CFD model could run as high as $50,000, assuming no bathymetric data currently exists. Proactive communication with resource agencies will reduce the cost and iterative effort. Given the level of effort that has occurred at other projects that have proposed to amend their license, we see the level of effort requested here as reasonable and in line with frequent modern industry practice.

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Boott Study Request # 8

Bypass Zone of Passage
(Lowell, P-2790)

Goals and Objectives

The goal of this study is to determine zone-of-passage flows in the bypass reach that facilitate safe, timely, and effective fish passage through the project.

Specifically, the objectives of this study are:

1. Complete a detailed survey of the bypass reach;
2. Develop a high-resolution, two-dimensional hydraulic model of the bypass reach;
3. Release multiple flows from the dam to collect calibration data for the model;
4. Simulate additional flows through the bypass reach with the calibrated model; and
5. Determine minimum and optimal zone-of-passage flows for the project.

Resource Management Goals

The Service seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the project.

Specific to aquatic resources within the Lowell bypassed reach, the Service's goals are:

1. Protect, enhance, or restore diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide a flow regime in the bypassed reach that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) and diadromous fishes.
3. Minimize current and potential negative project operation effects on water quality and aquatic habitat.

These study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661, *et seq*.), and the Federal Power Act (16 U.S.C. §791a, *et seq*.).

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Public Interest

The requester is a natural resource agency.

Existing Information and the Need for Additional Information

Article 36 of the original license required the licensee, in consultation with resource agencies, to develop an in-stream flow study plan to determine: (1) the relationship between project discharges and downstream aquatic habitat; and (2) a fishery study plan to determine project discharges necessary to provide for the migration of anadromous fish (i.e., zone of passage). After completion of the approved studies, the licensee was to file a report on the results of the studies, and, for Commissions approval, recommendations for the flow releases from the project. The study plan was filed on August 13, 1983, with proof of agency consultation (Accession No. 19830818-0191). However, there are no study reports included in the record. Therefore, we have no quantitative data supporting the agreement that 300 cfs at night and 500 cfs during the day are adequate flows for zone of passage in the bypass reach.

In the Comprehensive Fish Passage Plan filed on March 9, 2000 (Accession No. 20000313-0322), the licensee states “The adequacy of flows for upstream fish passage at the Project was addressed by BHI’s construction of six (6) concrete flow control weirs (with adjustable stoplog sections) in the bypass reach, at the request of U.S. Fish and Wildlife Service and in response to Article 36, section (2) of the Project’s FERC license.” Similar to the study plan, this is an agreement with no supporting information to substantiate the conclusion flows in the bypass reach are adequate for the full suite of diadromous species.

As part of compliance for Article 34 of the original license, the licensee filed as-built drawings of the existing fish passage facilities (Accession No. 19860902-0215). Within this abbreviated drawing set, drawing number 344D-PC001, 3844D-FC001, and 3844D-FC004 show topographic surveys for portions of the bypass reach. However, the drawings do not document the accuracy and precision of the survey, do not show the majority of the bypass reach, and are otherwise illegible.

Since agreeing upon the current zone-of-passage flows during the original license, there have been developments in topographic survey capabilities, a better understanding of the hydraulic requirements of diadromous species, multi-dimensional hydraulic modeling capabilities, and an increased need to pass fish at the spillway ladder.

Nexus to Project Operations and Effects

Diadromous fish orient their migration based on the environmental conditions of the river: flow, depth, velocity, and temperature (Goodwin 2014). Project operations affect the environmental conditions in the River, specific to this study request, the bypass reach. Two key hydraulic model outputs from the requested study are depth and depth-averaged velocity, which can be used to determine the likelihood of predation, delay, and the cessation of migration. Evaluating the flow fields in the bypass reach under different spill conditions will assist in the consultation process for determining an appropriate zone-of-passage flow in the bypass reach to optimize fish passage

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at the project. These data will also contribute to the development of an administrative record in support of a potential settlement agreement, Section 18 fishway prescriptions, or 10(j) recommendations.

Methodology Consistent with Accepted Practice

We proposed the following methodology to accomplish the five objectives and ultimately the goal of the study, to determine zone-of-passage flows for the bypass reach.

Topographic survey

The bypass reach area is large, making traditional topographic survey methods laborious and costly. We recommend using Light Detection and Ranging (LiDAR) methods with limited traditional surveying. Outside of the fish passage season and during a river flow when the project is in control of the River, the bypass reach will be mostly dewatered. At this time, a licensed surveyor can fly the area to collect LiDAR data. Once this data is processed, traditional methods will fill in the gaps (e.g., pooled water areas, under bridges). The topographic survey shall be of sufficient resolution and quality to complete the remaining objectives.

Two-dimensional hydraulic model

There are many two-dimensional hydraulic models that are acceptable for accomplishing the goal of this requested study, many of which are open source. We are not requiring one model over the other, but Boott should understand and document the limitations of the modeling software used. At a minimum, the modeling output should produce depth-average velocity and depth for each cell in the mesh. The modeling domain shall be of sufficient size and mesh to delineate a zone of passage through the entire length and width of the bypass reach.

Calibration flows

The licensee should collect calibration data by spilling a minimum of two flows from the Pawtucket dam. The calibration flows should bracket the range of simulated flows in the study. We recommend 300 cfs for the low flow as it represents the current lowest operation flow for the fish ladder. For the high calibration flow, we recommend collecting data near the high fish passage design flow (i.e., the 5 percent exceedance value for the migratory period of record) which is approximately 26,000 cfs in the Merrimack River (bypass flow would be approximately 17,000 cfs with full project operation). Boott should collect calibration data (depth-averaged velocity and depth) with an Acoustic Doppler Current Profiler (ADCP) at a minimum of four cross sections, including the downstream boundary condition and use the ADCP in locations spread evenly throughout the bypass which are less turbulent.

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Additional flow simulations

After calibrating the model, additional bypass flows should be simulated (and agreed upon with the natural resource agencies), including 500 cfs, 1,000 cfs, and up to the high calibration flow. The additional simulations should represent the full range of hydraulic conditions in the bypass reach from the low to high fish passage design flow.

Zone-of-passage determination

The model output should be used to delineate a zone-of-passage pathway for each of the modeled flows. To determine the zone of passage, we recommend Boott use the SprintSwim model developed by U.S. Geological Survey researchers (Haro et al. 2004).

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

The licensee should be able to finish the bypass zone-of-passage study in one year depending on seasonal flow conditions. The level of effort and cost is commensurate with a project the size of the Lowell facility and the likely license term. No alternatives are proposed.

REFERENCES

Goodwin, R. A., M. Politano, J.W. Garvin, J.M. Nestler, D. Hay, J.J. Anderson and M. Timko. 2014. Fish navigation of large dams emerges from their modulation of flow field experience. Proceedings of the National Academy of Sciences. p. 201311874.

Haro, A., T. Castro-Santos, J. Noreika and M. Odeh. 2004. Swimming performance of 716 upstream migrant fishes in open-channel flow: a new approach to predicting passage through velocity barriers. Canadian Journal of Fish and Aquatic Science. 61: 1590-1601.

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ATTACHMENT D

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FEDERAL ENERGY REGULATORY COMMISSION
Office of Energy Projects
Division of Dam Safety and Inspections – New York Regional Office
19 West 34th Street, Suite 400
New York, NY 10001
Telephone No. (212) 273-5900 **Fax No. (212) 631-8124**

April 30, 2008

Re: Hydropower Projects Inspection and Compliance

To the Party Addressed:

Staff from this office conduct periodic inspections to ensure that hydropower projects licensed or exempted by the Federal Energy Regulatory Commission (FERC) are properly operated and maintained in compliance with license and exemption terms and conditions.

During FERC staff dam safety inspections, the project's structural features are inspected and all matters of dam safety, operations, maintenance and compliance are reviewed and discussed with the licensee or exemptee. During FERC Environmental and Public Use Inspections (EPUI), recreation, fish, and wildlife requirements are specifically addressed. Any concerns or questions resulting from the inspections are discussed at the projects, with follow-up letters as necessary.

Since an important part of these inspections includes an assessment as to whether the projects are being operated and maintained in compliance with their license or exemption terms and conditions, it is requested that you provide this office with information relative to any project-specific concerns within 45 days from the date of this letter. Following receipt of this information, we will contact your staff as appropriate.

To help ensure that projects are operating in compliance with the licenses and exemptions, and to improve liaison among the licensees, exemptees, FERC staff, and

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resource agencies, we will continue to notify you of each EPUI and dam safety inspection, as appropriate, by forwarding a copy of our inspection confirmation letter to your agency. Because of our workload and the necessity to maintain tight scheduling during the inspection season, the scheduled time and dates for the inspections cannot be changed. If your representatives plan to accompany our staff on the inspection, they should contact our inspector sufficiently in advance of the scheduled inspection so that arrangements can be made to accommodate all participants, and they should arrive at the site at the scheduled time. We also wish to emphasize that, should your representative have any questions about matters of compliance or project operations during the inspections, these questions or concerns should be directed to the FERC representative who has the responsibility to ensure compliance with the license or exemption. We will then take whatever action is appropriate to resolve any problems or answer your questions.We appreciate your continued cooperation in our inspection program and look forward to working with you. If you have any questions, please call me at (212) 273-5930.

Sincerely,

Peter R. Valeri

Peter R. Valeri
Acting Regional Engineer

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File FERC Boott Hydro

United States Department of the Interior

NATIONAL PARK SERVICE
Lowell National Historical Park
67 Kirk Street
Lowell, Massachusetts 01852-1029

IN REPLY REFER TO:

June 12, 2008

Peter R. Valeri
Acting Regional Engineer
Office of Energy Projects
Division of Dam Safety and Inspections
Federal Energy Regulatory Commission
19 West 34th Street, Suite 400
New York, NY 10001

Re: FERC Project no. 2790-000, Lowell, MA

Dear Mr. Valeri:

Thank you for the opportunity to comment on the above referenced hydropower project located on the Lowell Canal System in Lowell, MA by Enel/Boott Hydropower, Inc.

We do work with this licensee on a regular basis to accommodate the canal tours offered by the Lowell National Historical Park and on protection of the historic resources that make up the Lowell Canal System, which is a National Engineering Landmark and on the National Register of Historic Places, as well as being located fully within the Lowell National Historical Park, a unit of the National Park Service, as designated by P. L. 95-290, Title I § 103.

First and foremost, we wish to reinforce the requirements enacted in the law establishing the National Park in Lowell, which are applicable to FERC actions:

§ 410cc-12. **Consultations, cooperation, and conduct of activities by Federal entities; issuance of licenses or permits by Federal entities**

(a) "Any federal entity conducting of supporting activities directly affecting the park or preservation district shall-

(1) Consult with, cooperate with, and to the maximum extent practicable, coordinate its activities with the Secretary and the Commission; and

(2) Conduct or support such activities in a manner which (A) to the maximum extent practicable is consistent with the standards and criteria established pursuant to section 410cc-32(e) of this title, and (B) will not have an adverse effect on the resources of the park or preservation district.

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(b) No Federal entity may issue any license or permit to any person to conduct an activity within the park or preservation district unless such entity determines that the proposed activity will be conducted in a manner consistent with the standards and criteria established pursuant to section 410cc-32(e) of this title and will not have an adverse effect on the resources of the park or preservation district.

The Commission referenced in the law is the Lowell Historic Preservation Commission which is defunct, but whose legal obligations have been assumed by the Lowell National Historical Park. The Secretary reference is the Secretary of the Interior, under which the Lowell National Historical Park operates.

The National Park's primary concerns fall within two categories:

1. Operation of National Park canal-related programs in a safe manner and allow for consistent public programming based on the Park's annual operating program.
2. Preservation of the Canal and related structures that make up the Lowell Canal system.

1. Operation of National Park canal related programs in a safe and responsive manner.

Article 33, Section 7 of the License calls for "the Advisory Council on Historic Preservation to review and comment upon any future actions related to the project that would change the mean seasonal water levels in the canal system or that would impair navigability in the system."

a. Maintaining appropriate water levels for tour operations: The National Park Service has made considerable public investment in the development of the Canalway that includes public walkways and boat tour operations. The main attraction for visitors to come to Lowell National Historical Park is to experience Lowell by boat via the canals. The park collects a fee for the general public boat tours as well as a school group fee that is charged for school's participating in our daylong programs. The school programs in particular, are programmed well in advance. The inability to use the canals because of unexpected water levels drops causes great concern due to the loss of revenue and credibility to a nationally recognized education experience.

At the current level of the river (June 2008) National Park tour boats cannot enter the river pond for two reasons: 1) because of the removal of the flashboards, the water level is too low to operate above the guard lock chambers of both the Northern and Pawtucket Canals a and in the Merrimack River above the Pawtucket Dam, and 2) the trash boom is still across the mouth of the Pawtucket Canal. Because the water is so low, National Park Maintenance crews cannot get a work boat into the river to open up the boom. If the water levels are not raised soon this will have a major impact in the park tour operation for the beginning of our full summer season.

b. Timely Communication of Changing Water Levels for Safe Tour Operations: The park is respectful of the operational requirements for Boott Hydro but there needs to be a more formalized agreement/plan in place to ensure that changes in operation that effect water levels are communicated to the park to ensure that there will not be damage to property,

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injury to park visitors that use the canals, and a loss of revenue and integrity to the visitor's experience. As boat tours expand in the canal system, as they have by the restoration of the Swamp Locks this year, certain bridge clearances have become tighter which requires slower more deliberate changes in the canal surface elevations to help assure the safety of the boat passengers. Unsafe operational procedures which quickly change canal levels without proper notice need to be reduced to a minimum with continual effort made to eliminate them.

c. Impairing Navigability: Many of the Boott Hydro owned bridges that the Park visitors pass under are in poor condition. This year the Pawtucket Street Bridge over the Northern Canal by the Hydro Plant is in particularly rough shape with the reinforced concrete walkways on each side sending concrete chunks falling to the lock chamber below. This condition makes it unsafe for the Park to exercise its right to run boat tours and open the walkway under the bridge without some protective scaffolding type structure or heavy duty netting to protect Park visitors from the falling concrete. Similarly, the Pawtucket Street Bridge over the Upper Pawtucket Canal has some exposed reinforcing and deteriorating concrete although not to the extent of the bridge over the Northern Canal. Lastly, the Broadway Street Bridge over the Pawtucket Canal requires constant vigilance in order to prevent an unsafe condition for Park visitors.

d. Accommodating Public Use; Operation of Surge Gate: The Commonwealth of Massachusetts acquired Recreation and Transportation Rights to sections of the Lowell Canal System, which have been made available to the National Park by easements provided by acts of the State Legislature. The National Park and other city and state agencies concurred with installation of a surge gate in the Northern Canal by the Licensee based on a stated, if not written, understanding that adding this structure would increase recreation access. However, Licensee's policy of locking down the surge gate "for safety reasons" whenever there are tours scheduled or walkway access is occurring along that canal negates what we were given to believe was the purpose of the surge gate. In other words, "Why did the surge gate get built if it's not operational when the public has access?" We understood that boating and pedestrian safety would be enhanced by having the surge gate operational at the times of public use and that the time of pedestrian access could potentially be extended as well.

2. Preservation of the Canal and related structures that make up the Lowell Canal system.

In the Cultural Resources section of the FERC License, mitigation is defined in order to address potential adverse effects of the original plant development to the Locks and Canal Historic District. However, this mitigation does not allow inconsistent actions after the date of the license that could result in adverse effects to the historic resources of the Lowell Canal System. Several past and proposed actions should be subjected to appropriate reviews:

a. Overtopping The Great River Wall: As a result of running the water at high levels within the Northern Canal, overtopping, extended surcharge loading, and lack of maintenance of the Great River Wall resulted in a failure of a section of that wall March 15, 1994.While repairs were accomplished with historical sensitivity, the National Park Service continues to be concerned that practice could result in further wall failures that would constitute an adverse effect to the historic district. There is a need to adjust the

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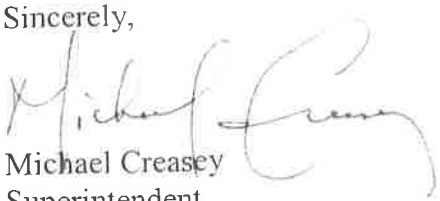
operating levels in this canal to assure that overtopping does not occur and historic resources are protected.

b. **Pawtucket Dam:** Preservation of the historic Pawtucket Dam is a major preservation objective of the Lowell National Historical Park. We have communicated on several occasions with the Licensee in response to proposals to install a Bladder Dam system. The Pawtucket Dam is the reason the city of Lowell, MA exists and a fundamental element of the historic resources that justified the creation of a National Park here. The National Park will continue to oppose a Bladder Dam solution on this historic site.

c. **Flashboards & Pins:** As FERC is aware, there are great concerns in the community that the flashboard system is not working in the same manner as in the past and there is a belief that the pins and/or the flashboard system have been strengthened to prevent the purposeful bending over of the flashboards to reduce upstream flooding. We note that Boott Hydro was issued a permit by the Lowell Historic Board in 2000 to drill a new row of flashboard pin holes in the capstones, which Boott Hydro represented in that permit application as "moving the hole location" so as "to decrease or eliminate capstone breaking problems." As actually carried out, it now appears that many more pin holes were made in the new row than in the earlier two rows closer to the face of the dam. In addition to other problems this situation has been causing, we are especially concerned that this practice of more closely spaced pins could result in damage to the capstones of the Pawtucket Dam. The National Park has not been included in any correspondence on this issue locally and request that FERC not take any action to finalize an agreement with regard to the pins and flashboards without consultation with us and a determination as to whether further Section 106 action is needed. We are also concerned that the unilateral change from using smaller boards to plywood sheets as flashboards some years ago occurred without such consultation and may have resulted in higher water levels and the risk of additional damage to historic resources.

On behalf of the Lowell National Historical Park, I would like to thank you for consideration of these issues and would respectfully request a meeting to review them with you or your staff so that proper procedures will be in place going forward to assure that the power generation can occur without the impacts described above. I look forward to hearing from you at your earliest convenience. I may be reached at 978-275-1700 or Michael_creasey@nps.gov

Sincerely,



Michael Creasey
Superintendent

cc: Bernard Lynch, City Manager
U. S. Rep. Niki Tsongas
ENEL/Boott Hydropower, Inc.

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Enel
Energy in tune with you.

BOOTT HYDROPOWER, INC.
A SUBSIDIARY OF ENEL NORTH AMERICA, INC.

Enel North America, Inc.

One Tech Drive, Suite 220, Andover, MA 01810
Tel. 978 681 1900 Fax 978 681 7727

Via eFiling

August 4, 2008

Peter R. Valeri, P.E.
Regional Engineer
Federal Energy Regulatory Commission
19 West 34th Street, Suite 400
New York, NY 10001

Re: Lowell Hydroelectric Project (FERC No. 2790-MA);
Response to National Park Service letter.

Dear Mr. Valeri:

We are in receipt of your letter of June 20, 2008 in which you requested our response to a letter from the National Park Service (NPS) dated June 12, 2008, which raised a number of issues regarding the perceived impact of the Lowell Hydroelectric Project on the NPS' operations at the Lowell National Historical Park. For the record, we note that the NPS' letter is dated the day before the June 13 Operations Inspection of the project by your staff, which inspection was attended by an NPS representative. None the concerns listed in the NPS' letter were voiced by the NPS representative during the inspection.

Our response to each of the concerns raised by the NPS follow:

1. Operation of National Park canal related programs in a safe and responsive manner.

Article 33, Section 7 of the License calls for "the Advisory Council on Historic Preservation to review and comment upon any future actions related to the project that would change the mean seasonal water levels in the canal system or that would impair navigability in the system."

Response: There presently are no future actions proposed by BHI which would change the mean seasonal water levels in the canal system, that would impair navigability, or which would otherwise invoke review and comment by the Advisory Council on Historic Preservation under Article 33.

a. ***Maintaining appropriate water levels for tour operations:***
The National Park Service has made considerable public investment in the development of the Canalway that includes public walkways and boat tour operations. The main attraction for visitors to come to Lowell National Historical Park is to experience Lowell by boat via the canals. The park collects a fee for the general public boat tours as well as a school group fee that is charged for school's participating in our daylong programs. The school programs in particular, are programmed well in advance. The inability to use the canals because of unexpected water levels drops causes great concern due to the loss of revenue and credibility to a nationally recognized education experience.

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At the current level of the river (June 2008) National Park tour boats cannot enter the river pond for two reasons: 1) because of the removal of the flashboards, the water level is too low to operate above the guard lock chambers of both the Northern and Pawtucket Canals a and in the Merrimack River above the Pawtucket Dam, and 2) the trash boom is still across the mouth of the Pawtucket Canal. Because the water is so low, National Park Maintenance crews cannot get a work boat into the river to open up the boom. If the water levels are not raised soon this will have a major impact in the park tour operation for the beginning of our full summer season.

Response: The Lowell canal system has multiple uses and operating conditions based on river flows and corresponding river elevations which are neither predictable nor constant. BHI manages and maintains canal system water levels to the best of its ability within the limits as agreed to with the NPS. In many cases the target operating band is relatively narrow, constrained by the minimum level necessary to pass tour boats through the locks and the maximum level necessary to allow for safe passage of tour boats under bridges. Any adjustments necessary to maintain the proper water levels and system water balance typically take time to achieve and must be done gradually.

BHI has the right to maintain its project works, including the flashboards, and to the extent feasible attempts to accommodate the needs of other water and canal users, including the NPS, in its operations and maintenance planning. BHI provides ample prior notice of all water level changes to the NPS and other affected parties.

With respect to the low water levels experienced during 2008, BHI removed the flashboards from the crest of the Pawtucket Dam on May 30, 2008 in direct response to a Commission order. BHI expeditiously undertook the necessary corrective measures, and after gaining Commission approval and purchasing new flashboard pins, completed reinstallation of the flashboards on June 20, 2008. BHI immediately began to refill the headpond while maintaining the project's downstream minimum flow requirement, and restored the headpond to normal levels on June 25, 2008. Shortly after refilling the impoundment, damage to the flashboards occurred as a result of elevated river flows and debris impact. Had BHI not repaired the flashboards quickly, the impoundment could not have been maintained near normal levels, due to low river inflows, likely resulting in impacts to recreational use upstream of the Pawtucket Dam. Notifications were made that the impoundment was to be lowered again for the repairs which were accomplished on July 10, 2008.

b. ***Timely Communication of Changing Water Levels for Safe Tour Operations:***
The park is respectful of the operational requirements for Boott Hydro but there needs to be a more formalized agreement/plan in place to ensure that changes in operation that effect water levels are communicated to the park to ensure that there will not be damage to property, injury to park visitors that use the canals, and a loss of revenue and integrity to the visitor's experience. As boat tours expand in the canal system, as they have by the restoration of the Swamp Locks this year, certain bridge clearances have become tighter which requires slower more deliberate changes in the canal surface elevations to help assure the safety of the boat passengers. Unsafe operational procedures which quickly change canal levels without proper notice need to be reduced to a minimum with continual effort made to eliminate them.

Response: BHI keeps the NPS and other affected parties informed of any planned changes in operations that would impact river or canal water levels. Other than for emergencies or in unusual circumstances, BHI provides at least a 24 to 48 hour advance notification of any major water level changes (e.g., drawdowns) by email or telephone. For planning purposes, BHI has requested and obtained the NPS' anticipated event schedule which, to the extent possible, BHI attempts to accommodate by postponing scheduled maintenance canal draw downs to avoid conflicts.

Canal water surface elevations and bridge clearances are addressed in BHI's Revised Report on Recreational Resources, filed pursuant to license Article 38, which included a

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canal system water elevation maintenance plan. BHI's Article 38 filing was approved by the Commission on September 12, 1984. As noted above, in many cases the target operating band for the lower canal system is relatively narrow, constrained by the minimum level necessary to pass tour boats through the locks and the maximum level necessary to allow for safe passage of tour boats under bridges. The lower canal system below the Swamp Locks has siphon outlets to assist in maintaining the water surface elevations within this narrow elevation band.

c. ***Impairing Navigability:***

Many of the Boott Hydro owned bridges that the Park visitors pass under are in poor condition. This year the Pawtucket Street Bridge over the Northern Canal by the Hydro Plant is in particularly rough shape with the reinforced concrete walkways on each side sending concrete chunks falling to the lock chamber below. This condition makes it unsafe for the Park to exercise its right to run boat tours and open the walkway under the bridge without some protective scaffolding type structure or heavy duty netting to protect Park visitors from the falling concrete. Similarly, the Pawtucket Street Bridge over the Upper Pawtucket Canal has some exposed reinforcing and deteriorating concrete although not to the extent of the bridge over the Northern Canal. Lastly, the Broadway Street Bridge over the Pawtucket Canal requires constant vigilance in order to prevent an unsafe condition for Park visitors.

Response: BHI owns and maintains several bridges which provide public access across the canal system throughout downtown Lowell. All of these bridges are specifically excluded from the project boundary as shown on the approved Exhibit G-2, and furthermore are not described as project features within the Lowell Project's license. These bridges are therefore not subject to the Commission's jurisdiction.

Nevertheless, BHI has a program of continually monitoring, performing engineering evaluations of and repairing its bridges. As was discussed during a meeting with the NPS in early June, BHI anticipates that repair work will be performed on each of the bridges referenced above during 2008. As it has recently done during previous work on its bridges, BHI will provide the NPS with ample advance notice of its anticipated work schedule, and will ensure that its bridge repair contractors make special provisions to not impede tour boat operations and canal navigability during construction activities.

d. ***Accommodating Public Use; Operation of Surge Gate:***

The Commonwealth of Massachusetts acquired Recreation and Transportation Rights to sections of the Lowell Canal System, which have been made available to the National Park by easements provided by acts of the State Legislature. The National Park and other city and state agencies concurred with installation of a surge gate in the Northern Canal by the Licensee based on a stated, if not written, understanding that adding this structure would increase recreation access. However, Licensee's policy of locking down the surge gate "for safety reasons" whenever there are tours scheduled or walkway access is occurring along that canal negates what we were given to believe was the purpose of the surge gate. In other words, "Why did the surge gate get built if it's not operational when the public has access?" We understood that boating and pedestrian safety would be enhanced by having the surge gate operational at the times of public use and that the time of pedestrian access could potentially be extended as well.

Response: Following the partial failure of the bayboard section of the canal wall in 1994, BHI undertook feasibility studies to determine the best option for surge suppression in the Northern Canal. A hydraulically-activated surge control gate was installed in January, 1997 and was fully automated in 1999. The surge gate is designed to automatically open when the E.L. Field station is tripped off-line to mitigate overtopping of the Great River Wall to provide safe pedestrian access to the wall and island areas, to prevent flooding of the historic Northern Gatehouse, and to prevent undermining and/or weakening of the gatehouse and portions of the Northern Canal. The gate was never intended to enhance boating in the Northern Canal, and in fact raises the safety concern that should the station trip off-line while the NPS is operating tour boats on the Northern Canal, the boat and passengers could be drawn through the open surge gate. Because it has been

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demonstrated that the transient wave produced on unit trip is not large enough to overtop the Great River Wall when the Northern Canal flow is less than 3,500 cfs, the gate may be temporarily deactivated under such conditions. Thus, NPS and BHI have agreed that boating tour operations can occur on the Northern Canal only if the canal flow is less than 3,500 cfs and if the surge gate is locked out and tagged out to prevent automatic opening. This lock-out/tag-out procedure is jointly undertaken by BHI and NPS personnel.

There are also circumstances under which BHI can not deactivate the surge gate in order to protect worker safety and/or to ensure compliance with the project's minimum flow requirement. For example, during any work on the crest of the Pawtucket Dam, such as during flashboard maintenance, the surge gate must remain active to prevent spillage from occurring in the event of a unit trip. Likewise, while the impoundment is being refilled following flashboard repairs the gate must remain active to ensure minimum flow compliance should the E.L. Field Station trip off-line. In such situations BHI notifies the NPS and advises against any boat access to the Northern Canal until normal operations resume. BHI has never denied pedestrian access to the Canal Walkway due to inactivation of the surge gate, and has only recommended that the NPS restrict such access due to general safety concerns not related to the surge gate (e.g., lack of appropriate safety fencing).

2. Preservation of the Canal and related structures that make up the Lowell Canal system.

In the Cultural Resources section of the FERC License, mitigation is defined in order to address potential adverse effects of the original plant development to the Locks and Canal Historic District. However, this mitigation does not allow inconsistent actions after the date of the license that could result in adverse effects to the historic resources of the Lowell Canal System. Several past and proposed actions should be subjected to appropriate reviews:

a. Overtopping The Great River Wall:

As a result of running the water at high levels within the Northern Canal, overtopping, extended surcharge loading, and lack of maintenance of the Great River Wall resulted in a failure of a section of that wall March 15, 1994. While repairs were accomplished with historical sensitivity, the National Park Service continues to be concerned that practice could result in further wall failures that would constitute an adverse effect to the historic district. There is a need to adjust the operating levels in this canal to assure that overtopping does not occur and historic resources are protected.

Response: There is no need to adjust the water level in the Northern Canal to prevent overtopping, because overtopping is prevented by the surge gate. Following the 1994 Northern Canal wall failure, BHI installed the surge gate, as described above, to prevent to overtopping of the Great River Wall when the two generating units at the E.L. Field Station are suddenly tripped offline. During normal operations BHI maintains the water level within the Northern Canal at or near El. 91.5 with the surge gate engaged in automatic mode. The only time the Great River Wall can become overtopped is when the Northern Canal flow is greater than 3,500 cfs (i.e., more than the capacity of one unit at the E.L. Field Station) while the surge gate is disengaged from automatic mode. Overtopping of the Great River Wall may also occur when NPS personnel inadvertently leave the lock chamber open at the Northern Gatehouse, which allows the Northern Canal to rise to the same level as the project impoundment.

b. Pawtucket Dam:

Preservation of the historic Pawtucket Dam is a major preservation objective of the Lowell National Historical Park. We have communicated on several occasions with the Licensee in response to proposals to install a Bladder Dam system. The Pawtucket Dam is the reason the city of Lowell, MA exists and a fundamental element of the historic resources that justified the creation of a National Park here. The National Park will continue to oppose a Bladder Dam solution on this historic site.

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Response: Historical preservation is but one of many resource areas which would need to be considered in any assessment of installing a "Bladder Dam" or inflatable crest gate system on the crest of the Pawtucket Dam. Such a system would have positive benefits for a wide range of resource areas including water management, fish passage, upstream recreation, reduction of upstream backwatering impacts, worker safety, and most importantly with respect to the NPS' concerns, protection of the historical structure from debris and ice.

BHI does not agree that an inflatable crest gate system would be inconsistent with the historical nature of the Pawtucket Dam. The history of Lowell is founded on continual innovation in hydropower technology, most notably the numerous developments by James B. Francis. The construction of the E.L. Field powerhouse along the historic canal system juxtaposes these historic technologies with more modern technologies. If determined to be feasible, installation of a crest gate system on the Pawtucket Dam would be in keeping with this line of innovation. The compatibility of an inflatable crest gate system mounted on a historic dam is clearly demonstrated immediately downstream at the historic Great Stone Dam at the Lawrence Project (P-2800).

Should BHI actively pursue the installation of an inflatable crest gate system on the Pawtucket Dam in the future, an application for amendment of license would be filed with the Commission. In preparing any such application BHI would conduct the necessary consultation with all appropriate agencies, including the Advisory Council on Historic Preservation, the Lowell Historic Board and the NPS. BHI has already consulted with the NPS on this subject on two separate occasions.

c. ***Flashboards & Pins:***

As FERC is aware, there are great concerns in the community that the flashboard system is not working in the same manner as in the past and there is a belief that the pins and/or the flashboard system have been strengthened to prevent the purposeful bending over of the flashboards to reduce upstream flooding. We note that Boott Hydro was issued a permit by the Lowell Historic Board in 2000 to drill a new row of flashboard pin holes in the capstones, which Boott Hydro represented in that permit application as "moving the hole location" so as "to decrease or eliminate capstone breaking problems." As actually carried out, it now appears that many more pin holes were made in the new row than in the earlier two rows closer to the face of the dam. In addition to other problems this situation has been causing, we are especially concerned that this practice of more closely spaced pins could result in damage to the capstones of the Pawtucket Dam. The National Park has not been included in any correspondence on this issue locally and request that FERC not take any action to finalize an agreement with regard to the pins and flashboards without consultation with us and a determination as to whether further Section 106 action is needed. We are also concerned that the unilateral change from using smaller boards to plywood sheets as flashboards some years ago occurred without such consultation and may have resulted in higher water levels and the risk of additional damage to historic resources.

Response: BHI has previously submitted evidence to the Commission demonstrating that the flashboard and pin materials in use today are the same as those used prior to commercial operation of the Lowell Project in 1985. Furthermore, the NPS' charge that the use of plywood flashboards instead of "smaller boards" may have resulted in higher water levels and damage to the Pawtucket Dam is without basis. The strength of the flashboard system and the height of failure are controlled by the spacing and strength of the supporting pins and have little, if anything to do with the material used for flashboard panels. We note that in their review of BHI's updated flashboard design specifications, Commission staff did not raise any concerns over the use of plywood flashboards on the Pawtucket Dam, and in fact approved same in the Commission's order authorizing re-installation of the flashboards dated June 4, 2008.

Contrary to the NPS's claim there are **fewer**, not more, holes in the row of flashboard pin holes now used by BHI than exist in the original alignment. The flashboard pin socket holes have been re-drilled several times over the dam's 150+ year history as the original holes

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have become worn or broken. These holes are generally aligned in three rows running along the dam's axis: 1) the original alignment of 776 holes drilled approximately 6 inches upstream from the downstream face of the capstones; 2) a row of 333 more widely spaced holes drilled approximately 12 inches back from the downstream face of the capstones, which were historically used as a safety measure to tie off workboats when working on the dam crest; and 3) a total of 723 holes in the row currently used by BHI which are drilled approximately 16 inches upstream from the downstream face of the capstones. As noted by the NPS, this latter alignment of pin socket holes includes the 660 holes drilled by BHI in 2000, to prevent damage to the capstones and to preserve the dam. As now installed, BHI has selectively eliminated flashboard pins such that only 588 of the holes in the back row are being used, in order to achieve the 20-inch average pin spacing approved by the Commission.

Thank you for this opportunity to clarify and address the issues raised by the National Park Service. Please do not hesitate to contact me at (978) 681-1900, extension 809 if you have any questions concerning any of the topics addressed above.

Sincerely,
Boott Hydropower, Inc.

/S/

Kevin M. Webb
Environmental Affairs Coordinator

cc: M. Creasey, NPS
V. Engel, BHI

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ATTACHMENT E

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Project Scoping Report

Task Order #P17PD03094; Contract #P15PC00036; PMIS #225866

Northern Canal Waste Gatehouse

13 November 2017

EYP/

EYP Architecture & Engineering, PC
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NATIONAL PARK SERVICE

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Introduction

On 17 August 2017, architects and engineers from EYP (Eric Ward, RA; Rebecca Young, RA; and Mark Kanonik, PE) visited the site to observe the general condition of the Northern Canal Waste Gatehouse. On 19 and 20 October 2017, Mark Kanonik and Chuck Volans of EYP again visited the site to observe the general condition of the building. The Gatehouse is a single-story, heavy-timber-framed building that measures approximately 70' by 15' in plan. The building was built circa 1872 atop a dam that was built circa 1847 and houses the canal gates, including the machinery that operates the gates. Refer to Photograph 1 for additional information.

We understand that the canals and gatehouse structure are owned by the Commonwealth of Massachusetts but maintained by Lowell National Historical Park and that the operational machinery within the gatehouse is controlled and maintained by Enel Green Power North America, Inc. It is our understanding that the wood siding, the roofing membrane, and a portion of the sill at the northeast corner of the building were replaced in the 1980s by NPS staff. At an unknown time in the past, supplemental steel shoring was installed to support both the south and north walls of the building.

Please note that no calculations were performed to determine the load-carrying capacity of any of the elements of the gatehouse building; furthermore, no destructive tests were performed, and no material samples were collected. Lastly, no evaluations of any of the utilities inside or outside of the building were made.

Observations

The Northern Canal Waste Gatehouse is a single-story, heavy-timber-framed, building that measures approximately 70' by 15' in plan. The gatehouse building is built atop a horizontally-curved masonry dam that separates the Northern Canal above from the Merrimack River below. The sills of the sidewalls do not bear directly on the dam; the sill of the north (downstream) wall bears on iron posts which are themselves bolted into the masonry dam, and the sill on the south (upstream) side bears on a wooden ledger that was bolted into the masonry dam. The sills of the endwalls bear directly on the dam.

The roofing is not original and is estimated to be about 30 years old; while it appears to be generally watertight, the edges of the roof membrane are delaminating around the perimeter of the roof. Refer Photograph 2 for additional information. The roofing has reached the end of its useful life and should be replaced. The siding appears to be original, but some siding boards at the eastern end of the north wall were replaced about 30 years ago. The siding is in remarkably good condition except for a few missing siding boards at the eastern end of the north wall. Refer to Photograph 3 for additional information. The paint is reaching the end of its useful life, and the siding should be repainted.

Except for the sills under the north and south walls, the wood framing is in very good condition. The sills themselves are in very poor condition. The eastern end of the north sill was replaced about 30 years ago, but it is now completely missing in some areas. Refer to Photographs 3 and 4 for additional information.

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It appears that the normal operating elevation of the Northern Canal was raised when the hydroelectric power plant was installed to the east of the gatehouse building. Photograph 5 (Historic American Engineering Record [HAER] Photograph MA-8C-2, taken in either 1974 or 1975) shows the south face of the dam and gatehouse when the Northern Canal was dewatered and the walkway decking was removed. Photograph 6 is a close-up of the southeast corner of the building, showing the heavy timber ledger which supports the south (upstream) sidewall. Staining of the large masonry units under the gatehouse, as well as vegetation growing in a few masonry joints, indicate that the elevation of the Northern Canal was typically about 4 feet below the top of the dam. However, it appears that the "normal" canal elevation is now only a few inches below the top of the dam, and the heavy timber ledger is now nearly constantly partially submerged. Refer to Photograph 5 for additional information. Not surprisingly, the heavy timber ledger and the wall sill plate atop the ledger are badly deteriorated and are completely missing in some areas. Refer to Photographs 7 and 8 for additional information. At an unknown time in the recent past, 12 shoring posts (with shoring beams and cable ties) were installed throughout the gatehouse building, presumably to redistribute the load away from the deteriorated walls. Given the level of deterioration of the wood framing, it is possible that the building would have partially collapsed if these shoring posts were not installed. Please note that it is impossible to repair the deteriorated heavy timber ledger and south wall sill to match the original design without permanently lowering the elevation of the canal; we assume that this is not feasible, so an alternate method to repair / restore the south (upstream) sidewall will be detailed in the construction documents that are currently progressing.

HAER Photograph MA-8C-2 (Photograph 5) appears to indicate several open joints in the larger masonry units at the top of the dam, directly underneath the eastern half of the gatehouse building. Inside the gatehouse building, the capping stones atop the dam are separated and have settled a couple of inches, and water can be both seen and heard flowing through the open joints. At some time in the recent past, steel staples were installed in the capping stones, presumably to stop the stones from separating further. Refer to Photograph 9 for additional information. Vegetation is growing on the north face of the dam, and a significant quantity of water can be seen flowing through the side of the dam. Refer to Photograph 10 for additional information. It seems very likely that the water flowing through the dam is eroding the mortar joints, thus causing both the lateral movement and the settlement seen in the capping stones at the top of the dam. It seems very unlikely that the issues in the capping stones are caused by uneven settlement of the dam as a whole since bedrock is visible throughout the bed of the Merrimack River. We understand that NPS does not "own" the dam and is not, therefore, responsible for maintaining and/or repairing the dam; however, we recommend that NPS share our concerns expressed in this Report with the Enel Green Power North America, Inc., at which point they may choose to commission a detailed engineering study. Our concerns expressed in this Report are based solely on very limited information; it should be noted that we did not perform an analysis of the dam to determine its load-carrying capacity, nor did we perform any destructive tests or any investigations of the dam.

Recommendations

The deterioration noted in the bases of the walls is adversely affecting the structural stability of the gatehouse building, although it is not yet affecting the operation of the gates. If no action is taken to address these areas of deterioration, the deterioration will continue to worsen until the building settles

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or shifts to such an extent that the operation of the canal gates is compromised. Consequently, we recommend the following:

1. Shore the building until all loads are removed from the wall framing and/or the temporary shoring posts.
2. Remove all deteriorated sections of the wall framing (such as wall studs, sill plates, etc.) at the north and south walls, estimated to be about 6 to 12" above the top of the dam.
3. Install new steel framing to support the north wall.
4. Install additional steel framing to support the south wall.
5. Provide wood decking atop the steel framing along both the south and north walls.
6. Remove all temporary shoring posts, beams, and cables.
7. Remove and replace the roofing with an adhered EPDM roof membrane.
8. Repair all windows on the north wall so that the windows may be opened if desired.

No work will be performed to the gates or the gate-operating machinery, including active utilities serving the gate-operating machinery.

Refer to Appendix A for a Class C cost estimate corresponding to the recommended work listed above.

Photographs

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Photograph 1 – Northern Canal Waste Gatehouse, viewed from the southeast.

Photograph 2 – Delaminated edge of roof membrane at northeast corner of roof.

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Photograph 3 – Deteriorated / missing sill and missing siding boards at eastern end of north wall; entire building has settled in this area, as evidenced by the downward curvature of the siding boards under the left-most window.

Photograph 4 – Deteriorated / missing sill under eastern edge of north wall; note large gap between dam and wall.

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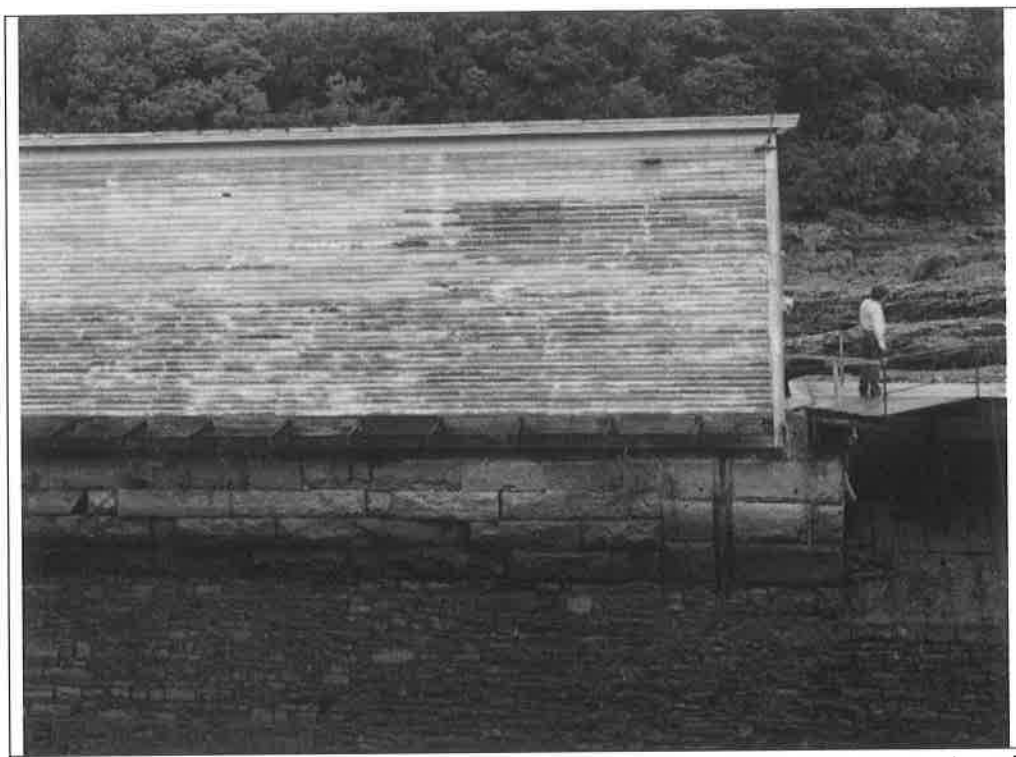

Photograph 5 – HAER Photograph MA-8C-2, taken in 1974 or 1975; note staining in wall and vegetation in joints below gatehouse, indicating that the normal elevation of the Northern Canal was several feet below what it is today. Also, note many open joints in larger masonry units at the top of the dam.

Photograph 6 – Close-up of HAER Photograph MA-8C-2, taken from Photograph 5, showing heavy timber ledger and wall sill.

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Photograph 7 – Underside of walkway along south side of gatehouse; the deteriorated sill that is now partially submerged in water is visible in Photographs 5 and 6.

Photograph 8 – Deteriorated heavy timber ledger and wall sill plate at eastern end of south wall.

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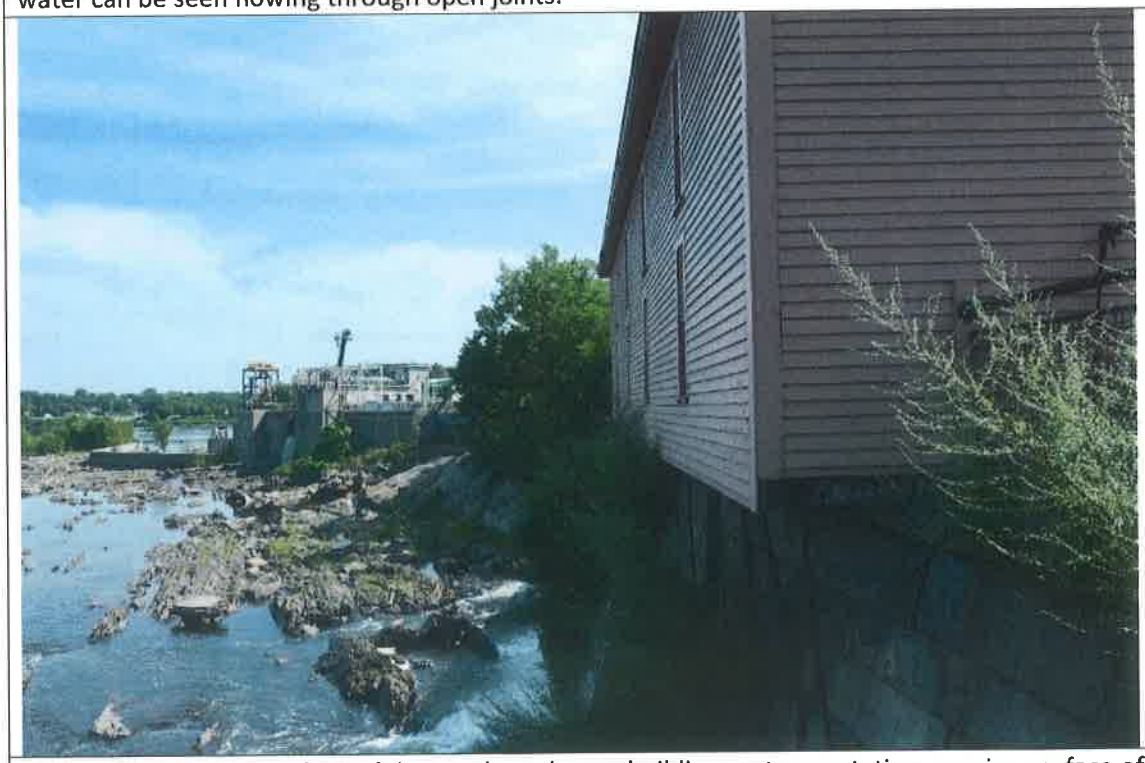
Photograph 9 – Capping stones atop dam, inside gatehouse building; several units have separated, and water can be seen flowing through open joints.



Photograph 10 – North face of dam and gatehouse building; note vegetation growing on face of dam and significant water flowing through dam.

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ATTACHMENT F

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PARK PURPOSE

The purpose statement identifies the specific reason(s) for establishment of a particular park. The purpose statement for Lowell National Historical Park was drafted through a careful analysis of its enabling legislation and the legislative history that influenced its development. The park was established when the enabling legislation adopted by Congress was signed into law on June 5, 1978 (see appendix A for enabling legislation and legislative acts). The purpose statement lays the foundation for understanding what is most important about the park.

Lowell National Historical Park preserves and interprets the historic structures and stories of the Industrial Revolution and its legacies in Lowell, serving as a catalyst for revitalization of the city's physical and economic environment and promoting cultural heritage and community programming.

PARK SIGNIFICANCE

Significance statements express why a park's resources and values are important enough to merit designation as a unit of the national park system. These statements are linked to the purpose of Lowell National Historical Park, and are supported by data, research, and consensus. Statements of significance describe the distinctive nature of the park and why an area is important within a global, national, regional, and systemwide context. They focus on the most important resources and values that will assist in park planning and management.

The following significance statements have been identified for Lowell National Historical Park. (Please note that the sequence of the statements does not reflect the level of significance.)

1. Lowell's (economic) success was based in innovation, from manufacturing technology and processes, to new business models, to city planning designed to benefit both industry and the worker. Unique industrial concepts were implemented and demonstrated at a massive scale at the Lowell mills, which served as a model for textile production and industrial cities.

2. A very large proportion of original buildings, structures, and urban landscapes have survived in Lowell's park and preservation district and now are recognized as important historical artifacts. These include the entire 5.6-mile power canal system with its sophisticated dams, locks, and gatehouses, 7 of the original 10 mill complexes, and significant examples of early housing types, institutions, and transportation facilities.

3. The Lowell canal system is nationally recognized as one of the most impressive civil and mechanical engineering achievements of the 19th century because of its grand scale and technological complexity, and is the site of origin for the famed "Francis" turbine. The canal system, used as both a transportation corridor and power source, facilitated the growth of the industrial city.

4. Lowell National Historical Park preserves and interprets the stories and heritage of the people of Lowell, including the early female workforce (aka "mill girls") and those who came from across the globe seeking opportunities. Today, Lowell's residents continue to shape the culture of the city and contribute to its revitalization.

5. The collaboration between Lowell National Historical Park and its partners has resulted in the rehabilitation of almost all of the 5.3 million square feet of historic mill space and hundreds of additional buildings in the downtown historic district. This effort continues to serve as a successful example of leveraging public-private partnerships for economic development through historic preservation.

6. Lowell National Historical Park embraces partnerships as an integral approach to accomplishing park and community goals. Lowell National Historical Park serves as a model for leveraging collaborative public-private partnerships and community engagement.

FUNDAMENTAL RESOURCES AND VALUES

Fundamental resources and values (FRVs) are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements.

Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized.

The following fundamental resources and values have been identified for Lowell National Historical Park:

Water Power System / Canal System. The Lowell National Historical Park boundary includes 9.6 miles of major riverbanks and all 5.6 miles of historic canals in Lowell, all of which comprise the waterpower system that harnessed waters of the Merrimack River to power the city's mills. In fact, the Merrimack River and its natural attributes dictated the location of the city itself. The water power and canal system includes the Pawtucket, Merrimack, Hamilton, Western, Eastern, Lowell, and Northern Canals and canal banks, as well as several associated locks, gatehouses and dams, and Pawtucket Falls. This system, which still operates as a source of hydroelectric power, provides an opportunity to interpret both the historic significance of water in industry, as well as the engineering of a waterpower system. Public access has been expanded over the years to support these interpretive opportunities, including creation of a pedestrian canalway and riverwalk and the development of related exhibits and programs such as the Suffolk Mill Turbine Exhibit.

Boott Cotton Mills Complex. This complex is architecturally and historically the most significant mill site in the city, and the only one with buildings owned and managed by the National Park Service. The millyard was constructed and then adapted over a 100-year period by the Boott Cotton Mills company, one of the 10 major textile corporations in Lowell. Of the city's original millyards, the Boott Cotton Mills complex is the most intact example of Lowell's historic

mill complexes. Changes in technology and production capability influenced the development and appearance of the millyard over time. Its clock tower, completed about 1865, survives today as one of the most distinctive architectural monuments in Lowell and has become a symbol of the park. Today, the restored mill complex houses the park's Boott Cotton Mills Museum, the Tsongas Industrial History Center, and several NPS Northeast Region offices.

Immersive Experience. Lowell National Historical Park provides a variety of hands-on interpretive and educational opportunities that allow visitors to immerse themselves in Lowell's industrial past. Key park experiences include exhibits that feature a working turbine and weave room, as well as boat tours of the canal system and rides through the park on historic replica trolleys, which are among the most popular and unique experiences in the park. The Tsongas Industrial History Center, a partnership between Lowell National Historical Park and the University of Massachusetts Lowell Graduate School of Education, is a hands-on center where students can learn about the American Industrial Revolution through interactive activities such as weaving, working on an assembly line, creating canal systems and testing water wheels, and measuring water quality.

Cultural Heritage and Arts Programming. Immigration and cultural expression were a part of Lowell's story from the beginning—from the Yankee "mill girls" who flocked to the city in search of economic independence to the Irish, French-Canadians, Greeks, Poles, Portuguese, and other ethnic groups that came in search of the American Dream. This cultural heritage, its evolution over time, and its impacts on the cultural character of Lowell today are expressed through programming and exhibitions at the park, including the Mill Girls &Immigrant Exhibit at the Patrick J. Mogan Cultural Center, the Lowell Folk Festival, and the Lowell Summer Music Series. Cultural heritage and arts events are among the most well known and best attended at the park, and feature a range of activities that appeal to local and nonlocal visitors alike.

Historic Urban Industrial Landscape. Lowell is often recognized as one of America's most significant industrial cities, and, as such, the assemblage of buildings, structures, and public spaces that comprise its historic urban industrial landscape are critical to telling the story of the mills and the Industrial Revolution in America. Lowell was an innovative mill town where the focus was on both industry and the worker, and it includes not only extensive mill space and supporting structures but also boardinghouses, churches, and parks. Although the landscape is central to the story of Lowell, many of the buildings, structures, and greenscapes are owned and managed by other entities. Lowell National Historical Park works with the community and partner organizations as well as private owners and developers to ensure continued preservation of the historic urban industrial landscape, including mill buildings and smokestacks. This collaborative preservation effort is fundamental and will continue to be a central focus for Lowell National Historical Park into the future.

Partnerships. Since its establishment Lowell National Historical Park has embraced partnerships as an integral tool for accomplishing park and community goals. Partnerships with entities such as the City of Lowell, the state, and community organizations have allowed the leverage of funds for historic preservation and supported the economic growth of the city. These partners have been critical to meeting the mission of the park, assisting with interpretation, education, and resource stewardship. Through strong, mutually beneficial relationships with its partners, the park has not only succeeded but thrives as a model for community cooperation in the National Park Service.

Museum Collections. The museum collections at Lowell National Historical Park contain more than one-half million artifacts and historical documents, spanning from the early 19th century to

the present. These objects and documents provide a tangible link to the Industrial Revolution in Lowell and its enduring legacies.

INTERPRETIVE THEMES

Interpretive themes are often described as the key stories or concepts that visitors should understand after visiting a park—they define the most important ideas or concepts communicated to visitors about a park unit. Themes are derived from, and should reflect, park purpose, significance, resources, and values. The set of interpretive themes is complete when it provides the structure necessary for park staff to develop opportunities for visitors to explore and relate to all park significance statements and fundamental resources and values.

Interpretive themes are an organizational tool that reveal and clarify meaning, concepts, contexts, and values represented by park resources. Sound themes are accurate and reflect current scholarship and science. They encourage exploration of the context in which events or natural processes occurred and the effects of those events and processes. Interpretive themes go beyond a mere description of the event or process to foster multiple opportunities to experience and consider the park and its resources. These themes help explain why a park story is relevant to people who may otherwise be unaware of connections they have to an event, time, or place associated with the park.

The following interpretive themes have been identified for Lowell National Historical Park:

The creation of the Waltham-Lowell system helped to change the nature and meaning of work by revolutionizing labor relations in the United States and transforming gender, racial, and ethnic identities ultimately leading to socioeconomic opportunity and inequity.

The accumulation of capital led to new investment opportunities in the United States centered on industrialization. Innovations in large-scale production systems in Lowell affected society in social, political, and economic ways and became a model for the future.

Through innovations in textile production, transportation, waterpower, and canal engineering, Lowell became a premier industrial city and helped propel the United States into a new industrial age. Cycles of innovation and technological development shaped, and continue to shape, the city and Lowell's influence on the world.

The commodification and use of abundant natural resources in Lowell, as part of a global Industrial Revolution, changed human relationships with the environment and modernized societies throughout the world but resulted in environmental damage that presents challenges today.

Lowell is a microcosm of the historical and contemporary shifting of cultural identities and tensions brought about by broader social changes such as industrialization, urbanization, and globalization.

From its earliest days as a planned industrial city, through boom and bust economic cycles to today's historic preservation renaissance, Lowell's urban landscape has evolved and now serves as a model of development and revitalization.

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Analysis of Fundamental Resources and Values

The fundamental resource or value analysis table includes current conditions, potential threats and opportunities, planning and data needs, and selected laws and NPS policies related to management of the identified resource or value.

Fundamental Resource or Value	Water Power System / Canal System
Related Significance Statements	Lowell's (economic) success was based in innovation, from manufacturing technology and processes, to new business models, to city planning designed to benefit both industry and the worker. Unique industrial concepts were implemented and demonstrated at a massive scale at the Lowell mills, which served as a model for textile production and industrial cities. A very large proportion of original buildings, structures, and urban landscapes have survived in Lowell's park and preservation district and now are recognized as important historical artifacts. These include the entire 5.6-mile power canal system with its sophisticated dams, locks, and gatehouses, 7 of the original 10 mill complexes, and significant examples of early housing types, institutions, and transportation facilities. The Lowell canal system is nationally recognized as one of the most impressive civil and mechanical engineering achievements of the 19th century because of its grand scale and technological complexity, and is the site of origin for the famed "Francis" turbine. The canal system, used as both a transportation corridor and power source, facilitated the growth of the industrial city.
Current Conditions and Trends	**Conditions** ▪ The canal system is in fairly good condition overall. ▪ The canal system actively generates power and houses high-voltage submarine cables. ▪ All canals are within the park boundary. The canal system comprises roughly half of the overall park acreage. ▪ Elements of the canal system are owned and operated by a variety of entities that are responsible for the overall condition of the system. The canal walls and floor and waterpower equipment are owned by Enel Green Power, whereas the buildings and gatehouses, with the exception of the Moody Street Feeder Gatehouse, are owned by the Massachusetts Department of Conservation and Recreation. ▪ The park has easements associated with properties owned by the state and hydropower company, such as the gatehouses, canal walls, and much of the canal margins. These easements enable the park to create walkways, install railings, support trolley tracks, and perform related maintenance. ▪ The public walkways along the canal are in fairly good condition. ▪ Water flow through the canal affects the overall condition of the canal infrastructure, including walls that support NPS-owned assets (e.g., walkways, trolley, Boott Mill). ▪ There are 52 interpretive waysides. As areas are added to the park, additional waysides will be needed. **Trends** ▪ Use of the canalway system is increasing as additional disparate segments are connected. ▪ Visitation to the canalway system is increasing as community efforts to bring new events to the canalway increase. ▪ Use of the canalway system will increase as downtown development continues.

Fundamental Resource or Value	Water Power System / Canal System
	▪ Activation of a new canal lighting system by the City of Lowell has increased attention to the canalway. If proposals by the public to expand the lighting system are implemented, visitation could increase.
Threats and Opportunities	**Threats** ▪ There is a negative public response to trash in and around the canal system. The cleanup of debris remains a challenge due to the active power generation function and subsequent limitations on access authorized by Enel Green Power. ▪ Some perceive the canalways to be unsafe, particularly at night, and poor lighting is often identified as a concern. ▪ Gatehouses are sometimes broken into and vandalized. ▪ Clear lines of jurisdictional law enforcement authority have not been defined for much of the canal's resources (see key issue on "Jurisdictional Challenges"). ▪ Lack of maintenance of the canal walls, which are not owned by the National Park Service, can threaten the stability of canal walkways and the trolley system, much of which runs adjacent to the canalway. ▪ Vegetation growing along the canal walls can cause structural deterioration over time and poses an ongoing maintenance challenge, especially as NPS staff levels decrease. ▪ The park is monitoring environmental containment efforts to manage the lasting effects of prior industrial uses along the canal. These effects are most prominent along the Upper Pawtucket Canal adjacent to the former location of a coal/gas plant. ▪ Water flow and levels are controlled by Enel Green Power. Fluctuating water levels directly affect public access, historic structures, the natural environment, and the overall visitor experience (e.g., presence of visible debris). ▪ Modernization of the historic dam, approved by the Federal Energy Regulatory Commission, has changed a system used for more than 200 years. The effects of the new crestgate system on water levels in the canal system, and on the scenic wonder of the falls over the dam, remain to be seen. **Opportunities** ▪ Continue dialogue with Enel Green Power on how it could work with the park and its partners to allow for increased public use and/or interpretation. ▪ Work with independent volunteer groups to clean up the canal system. ▪ Expand recreational access through walkways along all of the canal system. ▪ Explore new recreational opportunities through increased use of surface water, such as kayaking and paddle boating and ice skating in the winter. ▪ Expand signage along walkways, which could increase visitation. ▪ Consider offering science-based programming along the canals. This programming could include expanded discussions about the tradeoffs between industrial uses and the environment and the effects of climate change. ▪ Collaborate with community partners on an anti-litter campaign to discourage littering along and in the canalway. ▪ Engage the community in discussions related to safety along the canals. Explore opportunities to install LED lighting along canalways as that technology improves. ▪ Install additional lighting and retrofit existing lighting to LED to reduce energy footprint. Additional lighting would probably attract visitors and improve public perception of threats to safety. ▪ Advocate for an overlook at Pawtucket Falls within the preservation district. ▪ Advocate for completion of the final section of the canalway along the Upper Pawtucket Canal.
Data and/or GIS Needs	▪ Visitor surveys. ▪ Visitor counts. ▪ Population survey. ▪ GIS data for jurisdictional inventory and cooperative management. ▪ Customized high-water study.

Fundamental Resource or Value	Water Power System / Canal System
	▪ Mapping of List of Classified Structures data related to the canal system. ▪ Wayfinding study. ▪ List of roles and responsibilities related to maintenance, leasing agreements, special events, and jurisdiction. ▪ Administrative history. ▪ Historic resource study.
Planning Needs	▪ Updated Downtown Lowell Historic District Design Review Standards (in collaboration with Lowell Historic Board). ▪ Lighting plan for canalways. ▪ Comprehensive interpretive and education plan. ▪ Planning for adaptation to climate change. ▪ Accessibility self-evaluation and transition plan. ▪ Preservation advocacy and funding strategy.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** ▪ Clean Air Act (42 USC 7401 et seq.) ▪ Clean Water Act (33 USC 1251-1387,33 USC 1151) ▪ Historic Sites Act of 1935 (54 USC 320101 et seq.) ▪ National Environmental Policy Act of 1969 (42 USC 4321) ▪ National Historic Preservation Act of 1966, as amended (54 USC 300101 et seq.) ▪ Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** ▪ NPS *Management Policies 2006* (§4.1) "General Management Concepts" ▪ NPS *Management Policies 2006* (§4.1.4) "Partnerships" ▪ NPS *Management Policies 2006* (§4.7.2) "Weather and Climate" ▪ NPS *Management Policies 2006* (chapter 7) "Interpretation and Education" ▪ NPS *Management Policies 2006* (chapter 8) "Use of the Parks" ▪ NPS *Management Policies 2006* (chapter 9) "Park Facilities" ▪ Director's Policy Memorandum 12-02, "Applying National Park Service Management Policies in the Context of Climate Change" ▪ Director's Policy Memorandum 15-01, "Addressing Climate Change and Natural Hazards for Facilities"

Fundamental Resource or Value	Immersive Experience
Related Significance Statements	A very large proportion of original buildings, structures, and urban landscapes have survived in Lowell's park and preservation district and now are recognized as important historical artifacts. These include the entire 5.6-mile power canal system with its sophisticated dams, locks, and gatehouses, 7 of the original 10 mill complexes, and significant examples of early housing types, institutions, and transportation facilities. The Lowell canal system is nationally recognized as one of the most impressive civil and mechanical engineering achievements of the 19th century because of its grand scale and technological complexity, and is the site of origin for the famed "Francis" turbine. The canal system, used as both a transportation corridor and power source, facilitated the growth of the industrial city.

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Fundamental Resource or Value	Immersive Experience
	Lowell National Historical Park preserves and interprets the stories and heritage of the people of Lowell, including the early female workforce (aka "mill girls") and those who came from across the globe seeking opportunities. Today, Lowell's residents continue to shape the culture of the city and contribute to its revitalization. The collaboration between Lowell National Historical Park and its partners has resulted in the rehabilitation of almost all of the 5.3 million square feet of historic mill space and hundreds of additional buildings in the downtown historic district. This effort continues to serve as a successful example of leveraging public-private partnerships for economic development through historic preservation.
Current Conditions and Trends	**Conditions** ▪ A wide variety of well-received, full-sensory experiences are offered at the park, including canal boat tours, Lowell Folk Festival, Tsongas Industrial History Center programs, weave room, and Lowell Summer Music Series. ▪ The Tsongas Industrial History Center provides popular programs targeted at providing students with curriculum-based, place-based immersive experiences. ▪ Overall, visitors report consistently high levels of satisfaction with immersive experiences at the park. ▪ Existing signage does not provide consistent or adequate direction to visitors navigating to and through the park. ▪ Educational offerings at the Tsongas Industrial History Center continue to be responsive to changing curriculum standards. **Trends** ▪ Visitation by different grade levels varies at the Tsongas Industrial History Center because of changing curriculums and educational standards. For example, visitation by fourth grade classes has increased because of the current framework for social studies education, whereas visitation by eighth grade classes has decreased because the topic of industrialization is now addressed in the high school curriculum. ▪ Visitation for external partner-led/coordinated programs is increasing. ▪ The need for science, technology, engineering, and mathematics educational programs is increasing. ▪ The park's immersive experiences meet the needs of 21st-century learners who desire more engaging, free-choice, and self-directed learning environments.
Threats and Opportunities	**Threats** ▪ Immersive experiences are generally staff intensive, requiring more personnel with specialized skills than other interpretive experiences. Thus, these experiences can be difficult to sustain as employees retire and staff levels decrease. ▪ Immersive experiences have high operating costs and require ongoing infrastructure improvements and maintenance. ▪ Hiring uniquely skilled employees (e.g., trolley operators and maintenance staff, weavers and loom fixers, museum curators, bilingual interpreters) can be challenging. ▪ Immersive experiences require attention to safety and related training, staffing, and equipment, including the operation of heavy equipment and machinery (e.g., boats, trolleys, looms) and the movement and management of large numbers of people during bigger events (e.g., Tsongas Industrial History Center programs, Lowell Summer Music Series, Lowell Folk Festival). ▪ There are challenges associated with offering immersive experiences in an urban environment such as traffic, noise, etc. ▪ Immersive experiences are considered the primary driver for attracting audiences, but their use is not up to date with trends in delivering immersive and other interpretive experiences to new and diverse audiences.

Fundamental Resource or Value	Immersive Experience
	▪ Fluctuations in canal levels, which are managed by the power company, limit the park's ability to use the canals for immersive experiences. **Opportunities** ▪ Continue to update and evolve programming to ensure relevancy. Examples include updating exhibits using 21st-century practices, co-leading programs with community members to explore contemporary topics, and conducting evening programming that uses park resources in creative ways (e.g., open-mic nights based on park themes and tied to community-relevant topics). ▪ Continue to explore and evolve business models and partnerships that support operational costs, needs, and staffing required by immersive programming. ▪ Continue to develop community engagement and partner-led initiatives that use immersive experiences to attract new audiences and build the next generation of park stewards. ▪ Research and institute new techniques to improve current immersive experiences and develop new experiences at Lowell National Historical Park and the Tsongas Industrial History Center. These could include greater emphasis on audience-centered learning, family learning, audio tours and experiences, and bilingual offerings. ▪ Leverage assistance of nonprofit groups, partners, and volunteers to help meet staffing needs. ▪ Adapt programs and facilities at the Tsongas Industrial History Center to engage nonstudent visitors. ▪ Develop succession plan and training opportunities to maintain skilled staffing levels necessary to offer immersive experiences. ▪ Pursue phased design and funding strategy to introduce 21st century immersive experiences to park exhibits. ▪ Engage with partners to expand awareness of park's immersive experiences and attract new audiences. ▪ Continue to develop creative programming in response to shifts in visitation and/or other trends. ▪ Consider ways in which the National Park Service might certify canal boat operators for watercraft use as an alternative to the U.S. Coast Guard certification process.
Data and/or GIS Needs	▪ Visitor surveys. ▪ Visitor counts. ▪ Wayfinding study. ▪ Customized high-water study. ▪ Population survey. ▪ Administrative history. ▪ Trolley system condition assessment.
Planning Needs	▪ Marketing plan and visitation/tourism plan. ▪ Comprehensive interpretive and education plan. ▪ Wayfinding/sign plan. ▪ Succession plan. ▪ Collection management plan (update). ▪ Accessibility self-evaluation and transition plan.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** ▪ Americans with Disabilities Act (42 USC 12101 et seq.) ▪ Architectural Barriers Act (42 USC 4151 et seq.) ▪ Rehabilitation Act of 1973 (29 USC 701 et seq.) ▪ "Architectural Barriers Act Accessibility Guidelines" (36 CFR1191.1) **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)**

Fundamental Resource or Value	Immersive Experience
	▪ NPS *Management Policies 2006* (chapter 7) "Interpretation and Education" ▪ NPS *Management Policies 2006* (chapter 8) "Use of the Parks" ▪ NPS *Management Policies 2006* (chapter 9) "Park Facilities" ▪ Director's Order 6: *Interpretation and Education* ▪ Director's Order 42: *Accessibility for Visitors with Disabilities in National Park Service Programs and Services*

Identification of Key Issues and Associated Planning and Data Needs

This section considers key issues to be addressed in planning and management and therefore takes a broader view over the primary focus of part 1. A key issue focuses on a question that is important for a park. Key issues often raise questions regarding park purpose and significance and fundamental resources and values. For example, a key issue may pertain to the potential for a fundamental resource or value in a park to be detrimentally affected by discretionary management decisions. A key issue may also address crucial questions that are not directly related to purpose and significance, but that still affect them indirectly. Usually, a key issue is one that a future planning effort or data collection needs to address and requires a decision by NPS managers.

The following are key issues for Lowell National Historical Park and the associated planning and data needs to address them:

Jurisdictional Challenges. Lowell National Historical Park has complicated boundaries and multiple jurisdictions. As a result, there can be confusion regarding ownership, boundaries, and law enforcement jurisdiction. It can be difficult to determine ownership of key parcels and identify areas lacking lands processing. Continued collaboration with partners to update agreements specifically regarding law enforcement and maintenance jurisdictions is needed. The park should continue to work with the NPS Northeast Region to advocate that the state legislature update designated national park lands in Massachusetts to concurrent law enforcement jurisdiction.

Associated data needs:
Updating and digitization of park segment maps
GIS data for jurisdictional inventory and cooperative management
Jurisdictional inventory (update)

Outreach and Relevancy. Lowell National Historical Park has evolved with the city of Lowell, and it is a challenge to effectively communicate that changing story in an inclusive and relevant way. Conveying the historic context of Lowell and the national historical park to community members is particularly challenging because some exhibits are outdated. It is essential to connect with people and their stories more effectively, including updating interpretative media to provide information to nonnative English speakers. Tourism should be promoted more broadly to increase visitation and overcome the negative perception of Lowell that began during the city's post-industrial decline.

Associated planning needs:
Marketing plan and visitation/tourism plan
Wayfinding/sign plan

Comprehensive interpretive and education plan
Exhibit plan for Mill Girls & Immigrant Exhibit and Boott Cotton Mills Museum

Associated data needs:
Visitor surveys
Visitor counts
Population survey
Wayfinding study
Historic resources study: *Lowell, A City of Spindles* (update)

Maintenance/Preservation of Park-Owned Resources and Facilities. The park owns and operates a variety of resources and assets that require significant staffing and funding, including historic mill buildings, boardinghouses, boats, trolleys, and associated infrastructure. Collaboration with park partners to identify ways to leverage funding for maintenance is essential. Reclassification of maintenance positions would allow greater flexibility within the park's diminishing workforce (e.g., maintenance mechanics vs. specialists). Continued creative thinking about appropriate paths for hiring, as well as effective ways to attract and retain maintenance staff, is necessary, including using University of Massachusetts Lowell work-study students and partnering with the local vocational technical high school, social services agencies, and the Student Conservation Association.

Associated planning need:
Comprehensive management and maintenance plan

Associated data needs:
List of roles and responsibilities related to maintenance, leasing agreements, special events, and jurisdiction
Trolley system condition assessment

Loss of Specialized Skills and Knowledge. The nature of the resources of the park requires a large number of staff having specialized skills, such as loom fixers, masons, and woodworkers. Many staff members have worked with the park since its establishment or were part of the Lowell Historic Preservation Commission. They have knowledge of the park and city that is irreplaceable, including the history of preservation and changes in park management over time. As those individuals retire or otherwise move on from the park, specialized skills and knowledge will be lost and must be replaced if possible or somehow captured.

Associated planning needs:
Succession plan
Record management plan
Collection management plan (update)

Associated data needs:
Administrative history
Oral history project on development/preservation

Private Ownership in the Park and Preservation District. Many lands and buildings within the park and preservation district are privately owned but are major components of the historic urban industrial landscape. Their preservation, maintenance, and integrity of design are critically important to the park. Although there are certain mechanisms in place to ensure historic and new buildings in the district meet design and preservation standards, such as city design review

processes, maintaining historic integrity is a continual challenge. As the economy has improved and development pressures have increased, challenges increase. The City of Lowell and the commonwealth are exempt from the Lowell Historic Board standards and controls. Additionally, development of structures on nonpark land could encroach on historic resources (e.g., gatehouses and canalways) and diminish the visitor experience. Review of the Lowell Historic Board standards and new, creative approaches to preservation and design control might provide new solutions to these challenges.

Associated planning needs:
Updated Downtown Lowell Historic District Design Review Standards (in collaboration with Lowell Historic Board)
Preservation advocacy and funding strategy

Renewal of Enel Green Power License. The water power license, issued by the Federal Energy Regulatory Commission to Enel Green Power, is near its renewal date. Use of the canal system, a major component of the park experience and interpretation, is subject to terms in that agreement, and the National Park Service should be involved in renewal conversations. Terms should be sought that allow for expanded recreational use of the canalways. Through proactive NPS involvement, the needs of both Enel Green Power and the National Park Service could be met.

Associated data need:
Customized high-water study

Climate Change. Some parts of the park, including the Boott Mill No. 6 building and Counting House, are within a designated floodplain that primarily is related to the canal system surrounding the central part of the city of Lowell. As a result, a majority of park buildings, structures, and other resources are at risk to the effects of climate change, with the threat of increased storm incidents and more regular flooding. Resources most at risk include those associated with the water power system / canal system, which is identified as a fundamental resource. Planning is needed to determine potential impacts and provide mitigation strategies.

Associated planning need:
Planning for adaptation to climate change

Associated data need:
Customized high-water study

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ATTACHMENT G

National Park Service
Study Requests

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NPS Boott Study Request #1

Resources, Ownership, Boundaries and Land Rights Study
(Lowell, P-2790)

Goals and Objectives

Ownership and use of the canal system in Lowell is very complex. In any given area, there could be several entities with land rights or other entitlements granting authority to access, maintain, or utilize the canal system. The objectives of a boundary study would be to determine current ownership of resources within the canal system in a comprehensive manner, record maintenance responsibilities and obligations to those resources, clarify FERC jurisdiction, and document recreational, educational, or other land access rights to resources within the canal system. The study should also project future conditions for the terms of the license. Decommissioning downtown power stations could result in impairment to historic resources. The large historic water power infrastructure will continue to require costly maintenance, but risks disinvestment if it is no longer needed for on-going project operations and remains under the licensee's ownership. Decommissioning of canal infrastructure and other reasonably foreseeable changes in project operations that could result in changes in ownership or maintenance liabilities should also be considered within the study.

The ultimate goal of this study would be to denote which entity is ultimately responsible for specific resources, in light of overlapping jurisdictions and to serve as a factual baseline document to update the MOU for Canal Maintenance Responsibilities in the Project Area with Boott Hydropower Inc., Lowell National Historical Park, the Department of Conservation and Recreation, and the City of Lowell as signatories.

Resources Management Goals

See Attachment E from September 2017 Foundation Document.

Public Interest

Requester is a Federal Resource Agency.

Existing Information

NPS has a complete record of its land rights and can provide this for the study. Land rights obtained by Boott Hydropower Inc., Massachusetts Department of Conservation and Recreation, City of Lowell, and private entities would also need to be accessed for this study.

Nexus to Project Operations and Effects

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Property ownership and less than fee easement rights are directly related to the ongoing maintenance and preservation of the historic canal system. Identifying which parties have authority to maintain and use and/or an obligation/right to maintain/use the canal system will inform the development of license requirements as well as roles and responsibilities of any future MOUs for the historic canals. Boott also needs the rights necessary to comply with license requirements; a firm understanding of what rights Boott has or may need to acquire will be essential to the licensing determination.

Methodology Consistent with Accepted Practice

The information from this study can be pulled from title and land records, existing legislation, and other legal documents.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

This type of study can be completed at a reasonable cost within the FERC study period.

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NPS Boott Study Request #2

Water Level and Flow Effects on Historic Resources
(Lowell, P-2790)

Goals and Objectives

Changes to the elevation of water or flow rates throughout the system directly affect the condition of historic resources. Abnormally high water levels in the Northern Canal, for example, have caused damage to wooden structural elements of the Northern Canal Waste Gatehouse and structural undermining of the Great River Wall. Conversely, extended drain downs and low water levels have caused damage to historic turbines and waterwheels made of wood and leather elsewhere in the system. The effects of the Crest Gate operation are unstudied and may include acute or prolonged impacts to historic resources throughout the system. Decommissioning downtown power stations may also result in changes to water levels and flows in some areas of the canal system and the effects are unstudied and unknown.

The objectives of this study should include evaluating how project operations, including manipulation of the newly installed Crest Gate, canal headgates, spillways, locks, fish passage structures, and generating units will change water levels in any location within the canal, and determine the extent to which water flows or elevations can be modified and or controlled to diminish loss of historic resources. The study would:

- Document impacts of current project operations on nationally significant historic resources, including a structural engineering assessment of the Great River Wall.
- Project future water levels and flows as a result of reasonably foreseeable changes to the project operation such as operating the Crest Gate system, decommissioning certain facilities, or modifying operations for fish passage.
- Evaluate impact of on-going and future project operations on nationally significant historic resources.
- Develop 100 and 500-year flood plans to protect nationally significant historic resources.

Resources Management Goals

See Attachment E from September 2017 Foundation Document.

Public Interest

Requester is a Federal Resource Agency.

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Existing Information

NPS can provide an architectural and engineering evaluations of historic structures at multiple locations as well as maintenance records for previous repairs. Boott Hydro Power may have existing data on the impacts high and low water flows and elevations have on historic resources, but new data demonstrating how the new Crest Gate System effects water levels and flows would also need to be analyzed.

Nexus to Project Operations and Effects

Understanding the impacts water levels and flows will have on nationally significant historic resources will directly inform the development of license requirements and will inform future MOUs. The study data can also be used to better understand public and dam safety threats.

Methodology Consistent with Accepted Practice

The study would compare existing conditions of structures associated with canal operations and identify potential changes in conditions that may result from changes in project operations and resulting water and flow levels. This study would require an engineering assessment of the Great River Wall and may require additional structural assessment of other historic properties damaged by current project operations.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

This type of study can be conducted within the study period.

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NPS Boott Study Request #3

Water Level and Flow Effects on Recreation Study:
(Lowell, P-2790)

Goals and Objectives

Water levels and flows directly affect public recreational access to and within the canals. The elevation and flow rates currently limit the number of days canal walkways are safely accessible to the public, particularly the Northern Canal Walkway which opens seasonally when flow rates are lower than 3,500 cubic feet per second (cfs). For years, NPS has received numerous complaints regarding the walkway's closure and the public has repeatedly requested increased access to the Northern Canal Island and Great River Wall. This study would assess if changes to project operations can be made to increase recreational access and whether 3,500 cfs is an appropriate threshold for the walkway's closure.

NPS boat passage is another recreational issue affected by water level and flows. NPS boats barely pass under the Pawtucket Street Bridge over Pawtucket Canal and the Central Street Bridge over the Lower Pawtucket Canal. With even 1 foot elevation rise to the crest pool, NPS boats would be unable to pass under the Pawtucket Street Bridge. A study is needed to determine the effects the Crest Gate system on on-going project operations will have on NPS tour boats and other potential future on-water recreational uses.

Additionally, NPS partners and the public have expressed interest in new, different, and expanded recreational access to and within the canals. The canal system should be evaluated to determine which segments are most suitable for various recreational opportunities (paddle boarding, ice skating, kayaking, etc.) so that recreational and economic development partners develop plans only where deemed compatible with on-going project operations and preservation of nationally significant historic resources.

The objectives of this study should include evaluating how project operations, including manipulation of the newly installed Crest Gate, canal headgates, spillways, locks, fish passage structures, and generating units will change water levels in any location within the canal, determine the extent to which water flows or elevations can be modified and or controlled to diminish public access restrictions to recreational amenities. Information to be obtained would come from photos, videos and direct observations of flows under different levels, magnitude and duration. The study would address the following issues:

- Effect of water levels and flow rates on existing recreational facilities and activities, including the Northern Canal Walkway and NPS Boat Operations
- Potential for future recreation within or adjacent to the canal system.

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Resources Management Goals

See Attachment F from September 2017 Foundation Document.

Public Interest

Requester is a Federal Resource Agency.

Existing Information

Boott Hydro Power may have existing data on the impacts high and low water flows and elevations have on historic resources and recreation, but new data demonstrating how the new Crest Gate System effects water levels and flows would also need to be analyzed.

Nexus to Project Operations and Effects

Understanding the impacts water levels and flows will have on recreational opportunities and nationally significant historic resources will directly inform the development of license requirements and will inform future MOUs.

Methodology Consistent with Accepted Practice

The study would compare existing conditions on structures associated with canal operations and identify potential changes in conditions that may result from changes in project operations and resulting water and flow levels.

Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

This type of study can be conducted within the study period.

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NPS Boott Study Request #4

Vegetation and Aquatic Trash Management Study
(Lowell, P-2790)

Goals and Objectives

Study the impact of vegetation growth on historic canal walls and propose appropriate techniques and schedules for vegetation removal to prevent deterioration and obviate long term capital needs. Review the current waterborne trash removal operation, determine the extent to which the operation can be changed to prevent damage to historic resources, improve access to recreation, aesthetics, and public safety.

Resources Management Goals

See Attachment E from September 2017 Foundation Document.

Public Interest

Requester is a Federal Resource Agency.

Existing Information

The study could pull maintenance records from stakeholders to determine the baseline cyclical vegetation and trash management activities and use condition assessment data to determine asset condition. The study could also involve a public feedback component to better understand areas of particular concern.

Nexus to Project Operations and Effects

The results of the study will have a direct impact on the terms of the license agreement and corresponding updates to the canal maintenance MOU among stakeholders.

Methodology Consistent with Accepted Practice

The study would use baseline vegetation and trash removal activities as a no action alternative and develop at least two alternatives to demonstrate how changes in frequency or level of effort would result in changes to the condition of historic resources, the total dollar amount of deferred maintenance, access to recreation, canal aesthetics, and public safety. Results of the study will enable stakeholders to determine an optimal and appropriate maintenance reoccurring maintenance schedule for clearing vegetation and trash which would hopefully result in fewer major capital investments towards stabilizing canal walls and increased protection of the historic resources, and increased public safety.

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Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

This type of study can be conducted within the study period.

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NPS Boott Study Request #5

Historically Significant Water Power Equipment Study
(Lowell, P-2790)

Goals and Objectives

The objectives of this study are to identify historically significant water power equipment and develop plans to preserve the equipment and provide public access for their future enjoyment or make use of scrap parts from the equipment. The ultimate goal of this study is to diminish loss of historic property. Protection of historically significant water power equipment is complicated by boundary issues. Vertical ownership is current set at 101 ft. MSL. Historic hoisting equipment, gates, and control equipment that are not used for modern operations fall into a state of disrepair and can be abandoned or thrown away without communication. For example, two hydraulic cylinders at Guard Locks were discarded and NPS would have liked to interpret them to visitors. As power buildings are decommissioned, NPS may want to evaluate equipment for exhibit potential or for scrap equipment to maintain and operate other historic machinery.

Resources Management Goals

See Attachment E from September 2017 Foundation Document.

Public Interest

Requester is a Federal Resource Agency.

Existing Information

The study could reference Lowell National Historical Park's Scope of [Museum] Collections.

Nexus to Project Operations and Effects

The results of the study will have a direct impact on the terms of the license agreement and corresponding updates to the canal maintenance MOU among stakeholders. It will also be essential information in the Commission's consultation under the NHPA.

Methodology Consistent with Accepted Practice

The study would photograph existing mechanical equipment, provide documentation of the history of that equipment, and document current equipment ownership. This information would be used in subsequent meetings between the applicant and the National Park Service so that historical equipment worthy of preservation and interpretation may be saved for the enjoyment of current and future generations.

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Level of Effort/Cost, and Why Alternative Studies Will Not Suffice

This type of study can be conducted within the study period.

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DOI comments-LowellHydroelectric-PAD-SD1-StudyRequests.PDF.....1-112

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dcr
Massachusetts

August 14, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E. Room 1A
Washington, D.C. 20246

RE: Lowell Hydroelectric Project (P-2790-072)

Dear Secretary Bose:

The Department of Conservation and Recreation ("DCR" or the "Department") is pleased to submit the following comments in response to the Scoping Document 1 for the Lowell Hydroelectric Project (the "Project"). The Scoping Document is the first formal submission to FERC by Boott Hydropower LLC ("Boott" or the "Proponent") to relicense the Project. The current license for the project expires on April 30, 2023. The Project consists of the Pawtucket Dam, located on the Merrimack River, and other assets within nearby canals that include several small dams, gatehouses, power stations, and other associated infrastructure.

Overseeing one of the largest state parks agencies in the country, DCR manages 450,000 acres that includes a wealth of natural, cultural, and recreational resources including forests, parks, greenways, historic sites and landscapes, seashores, lakes, ponds, reservoirs and watersheds.

In 1986, a predecessor agency to DCR (the Department of Environmental Management or "DEM") took land along the Merrimack River and certain canal systems in Lowell that created the majority of Lowell Heritage State Park (the "State Park") and its holdings in the vicinity of the Project. Under the terms of the acquisition, DEM acquired fee interest in land and structures near the Pawtucket Dam, including the Pawtucket Gatehouse, the Gatekeeper's House and Barn, the Blacksmith Shop and a parcel between Varnum Avenue and the Merrimac River where the Pawtucket Dam meets the northern Merrimack River shoreline. DCR understands that it has care and control of assets used by the Proponent for its hydropower activities including the Northern Great Wall, Guard Locks and Gates Facility, Swamp Locks Dam, and Lower Locks Dam, from the terms of the 1986 taking.

In 1996, a Memorandum of Agreement lapsed between DEM, the National Park Service, and Boott that, when active, arranged roles and responsibilities for maintenance of the various overlapping infrastructure among the entities. DCR collaborates closely with the National Park Service in maintaining the infrastructure related to the canal system and interpreting the historic resources of the canal system.

In addition to historic resources, DCR also oversees recreational infrastructure upstream from the Project including the Michael Rynne Bathhouse, located at 160 Pawtucket Boulevard approximately one-half mile westerly from the Pawtucket Dam; and the Rourke Brothers Boat Ramp (approximately two miles westerly from the Pawtucket Dam).

Memorandum of Agreement

As part of the relicensing process, DCR requests that the Proponent be required to undergo a process to develop a joint agreement with DCR and the National Park Service that outlines agreed rights and responsibilities of properties in Lowell related to the Project. Items should include all dams, waterway training walls, trash racks, gates, valves, pipes, conduits, locks, canal walls, canal bottoms or floors, canal wall capstones, appurtanances that abut canal walls, and gate houses (including the interior and exterior

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Karyn E. Polito
Lt. Governor

Matthew A. Beaton, Secretary, Executive
Office of Energy & Environmental Affairs

Leo Roy, Commissioner
Department of Conservation & Recreation

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space, abutting grounds, and water control devices in the gatehouses). DCR believes such an agreement is necessary to ensure proper ongoing maintenance and repair of the resources that comprise the Project, as the lack of a current agreement among the parties leaves corresponding roles and responsibilities undefined, and, consequently, subject to neglect.

Recreational Resources

The Proponent is in the final stages of improving the Pawtucket Dam with a pneumatic crest gate system that will allow rapid raising and lowering of the water level above the dam. DCR notes that ongoing operation of the dam could potentially affect water levels at the Rynne Bathhouse and the Rourke Brothers Boat Ramp (located upstream from the dam) during the prime recreational season (between late May and early October). As part of the scoping, DCR requests that the Proponent evaluate whether and how upstream recreational facilities will be affected with water level changes during the prime recreational season, resulting from ongoing use of the Pawtucket Dam.

As part of this study, DCR requests that the Proponent predict the range of anticipated water levels at the Rynne Bathhouse and Rourke Brothers Boat Ramp under normal conditions and extreme weather events. DCR requests that the Proponent commit to communicating any anticipated water level changes with the Department prior to execution of those changes. DCR further requests that the Proponent describe any existing agreements regarding water levels that will affect the Proponent's operation of its hydroelectric infrastructure.

As part of the Environmental Assessment, DCR requests that the Proponent develop and implement a plan to install a dam safety barrier upstream to prevent boaters from going over the Pawtucket Falls Dam. The current safety barrier is maintained and installed seasonally by others. DCR believes dam safety should be the responsibility of the Proponent and the upstream barrier should be installed and removed seasonally by the Proponent.

Access to DCR Property

Under the Environmental Assessment process, DCR requests that the Proponent map protected recreational lands in the vicinity of the Project, and identify the locations where DCR property needs to be accessed for routine or emergency maintenance. This section should include a narrative that discusses the recreational lands, how they are used by the public, how traditionally under the No-Action Alternative these lands are accessed including size and weight of equipment and the duration of access. DCR notes that Construction and Access permits are required for any construction access on DCR property. As part of the Environmental Assessment, the Proponent should make the commitment to repair any damage to recreational assets resulting from their use.

During extreme flooding, the Proponent's plan to access the Francis Gate lock (to install a steel barrier by crane) is through the rear of DCR property at 719 Broadway. DCR notes that the 719 Broadway property may be sold and developed by a private party, as legislation has been filed to authorize the conveyance of this property to the City of Lowell. If this conveyance occurs, the rear access could be limited or removed. To help plan for future contingencies, DCR requests that the Proponent evaluate alternative methods of access for the Francis Gate lock. As part of its evaluation, DCR notes that the Proponent could consider installing a wide curb cut and multi-use paved path at 719 Broadway that would facilitate visitor access to the Francis Gate lock.

DCR also requests that the Proponent identify the anticipated maintenance activities for the Pawtucket Dam and associated infrastructure over the course of a new license agreement, and evaluate alternatives for accessing sites required for ongoing maintenance. DCR notes that its nearby Gatekeeper's House, Barn and Blacksmith Shop and landscape features such as retaining wall and fences have been adversely impacted by ongoing activities over the course of the existing license, with heavy construction equipment

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impacting landscaping. DCR leases the Gatekeeper's House to a curator, under a long term (15 years) agreement, who resides at the property while providing labor to rehabilitate, manage and maintain the property. The ongoing access has been problematic at times for the lessee/curator to adequately care for the property. Accordingly, the use of barges should be included in the analysis for any routine maintenance activities that requires heavy machinery, such as cranes.

For the alternative exploring maintaining existing access from the road, DCR requests that the license require certain protocols to protect the structures and grounds. For instance, all grounds and property should be repaired each time the crane accesses the site, including the repair of any displaced soil, and loaming and seeding the area. Prior to access, the Proponent should meet with a DCR arborist on site to plan for the pruning and dead-limbing of all trees on the property impacted by the crane's activity. The Proponent should avoid any damage to the buildings and landscape features on the site, including the house, barn and fences. If damage does occur, the Proponent should be required to coordinate repairs with the Lessee and with DCR and perform any repairs, once approved, in a timely manner. DCR encourages alternative treatments to the southeast corner of the house that would allow crane access without requiring the installation and removal of the gravel and steel plates. DCR also encourages a less destructive solution for the removal of the fence section. Possibilities include hinging a section of the gate to swing clear of the entry path. Lastly, the Proponent and/or its contractors should directly contact the lessee prior to accessing the Gatekeeper's House property. DCR is available for consultation on this request.

Recreational Use Data
As part of the Environmental Assessment, DCR requests that the Proponent study how visitors currently use the project areas, including the Visitor Center at the E.L Field Powerhouse, including number of visitors, type of recreation, time of year, etc. A number of the project facilities are an important part of the recreational network in Lowell and the applicant should develop a plan to maintain and improve those opportunities.

American Disabilities Act (ADA)
As part of the recreational uses study of the project area, DCR requests that the Proponent assess required improvements to recreational or educational facilities within the Project area to meet current ADA (Americans with Disabilities Act) requirements for access.

Thank you for the opportunity to comment on the first Scoping Document. Should you have any questions, please do not hesitate to contact Kevin Hollenbeck, Metrowest District Manager at 617-828-1634 or kevin.hollenbeck@state.ma.us. Questions regarding access near the Gatekeeper's House can be directed to Kevin Allen at 617-626-1361 or kevin.allen@state.ma.us.

Sincerely,

Leo Roy
Commissioner

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Document Content(s)

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

August 14, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Division
888 First Street, N.E.
Washington, D.C. 20426

RE: Comments on Enel's Notice of Intent to File License Application and Filing of Pre-Application Document for the Lowell Hydro Electric Project (No. 2790)

Dear Secretary Bose,

On June 15, 2018, you issued a *Notice of Intent to file a license application, filing of Pre-Application Document (PAD), commencement of pre-filing process, and scoping; request for comments on the PAD and Scoping Document*, and identification of issues and associated study requests by Enel (P-2790). The PAD contains information about the project itself and the environmental resources affected by the project. As part of the Integrated Licensing Process, we (National Marine Fisheries Service (NMFS)) have an opportunity to comment on the PAD and to submit study requests.

Attached for filing, please find our comments regarding the PAD. In addition, we are including six requested studies. If you have any questions or need additional information, please contact Sean McDermott (sean.mcdermott@noaa.gov) or 978-281-9113.

Sincerely,

Louis A. Chiarella
Assistant Regional Administrator
for Habitat Conservation

cc: Service List

National Marine Fisheries Service's Comments and Study Requests on Enel Pre-Application Document for the Lowell Hydro Electric Project (FERC No.2790)

August 14, 2018

1 PROJECT BACKGROUND

Boott Hydropower, LLC (Licensee) owns and operates the Lowell Hydroelectric Project (FERC No. 2790) on the Merrimack River in the City of Lowell, Massachusetts. The project is located at river mile 41 and has a 23-mile long impoundment extending into New Hampshire. The project has an authorized capacity of 24.8 megawatts (MW) operating in run-of-river mode with no useable storage capacity. The major project components include:

- the 1,090-foot long, stone masonry Pawtucket Dam with 5-foot tall pneumatic crest gates,
- an upstream fish ladder at the apex of the Pawtucket Dam,
- a two-tiered, 5.5-mile long canal system through downtown Lowell with various hydraulic control structures including 19 Francis units housed in four powerhouses,
- a main powerhouse containing two 8.6 MW Kaplan units, and
- an upstream fish lift and downstream bypass system at the main powerhouse.

The Federal Energy Regulatory Commission (FERC) issued the existing license on April 13, 1983 and it expires on April 30, 2023. The Licensee must file an application for a new license with FERC no later than April 30, 2018. The Licensee filed their Notice of Intent and Pre-Application Document electing to pursue a new license using the Integrated Licensing Process with FERC. On June 15, 2018, FERC issued the Scoping Document 1 commencing the licensing proceeding.

2 NOAA TRUST RESOURCES

As NOAA's National Marine Fisheries Service (NMFS), under the U.S. Department of Commerce (DOC), we are responsible for the stewardship of the nation's living marine resources, fisheries and their habitat. Estuaries and coastal riverine habitat systems, including rivers such as the Merrimack River, provide an integral component of significant ecological functions for the larger marine environment. Many living marine resources are supported by estuaries and coastal rivers throughout their life cycles. Species such as the endangered shortnose sturgeon (*Acipenser brevirostrum),* Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) the endangered Atlantic salmon (*Salmo salar*), alewife (*Alosa pseudoharengus),* blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), American eel (*Anguilla rostrata*), and sea lamprey (*Petromyzon marinus*) rely on these coastal systems for refuge, spawning, rearing and nursery habitat. NOAA's 2009-2014 National Strategic Plan (Strategic Plan) recognizes the significance of these resources in its mission goals, which include "Protect,

restore, and manage the use of coastal and ocean resources through an ecosystem approach to management." Historically, these species were present within the Lowell project boundary. Currently, there is no critical habitat for shortnose sturgeon, Atlantic sturgeon or Atlantic salmon designated in this reach of the Merrimack River. Our primary goal in carrying out our trust responsibilities in the Merrimack River watershed is to rebuild and ultimately maintain self-sustaining diadromous fish runs in the Merrimack River basin and to fully use the available habitat and production potential.

Atlantic salmon are present in the project area. However, the project area is not designated critical habitat nor is the species actively managed in the Merrimack River.

3 FEDERAL STATUTORY REQUIREMENTS

We are responsible for conservation, management, and protection of America's living marine and aquatic resources throughout jurisdictional river basins in coordination with other state and federal agencies, local governments, Indian tribes, fisheries commissions, commercial and recreational fishers, and conservation organizations. Our authority to manage diadromous fish in these river basins comes from Congress. Specifically, Congress has directed us (NMFS) to manage diadromous species in river basins, including a grant of discretionary authority to order fish passage at dams licensed by the Federal Energy Regulatory Commission. NMFS' congressionally mandated statutory authorities include the Federal Power Act, the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Atlantic Coastal Fisheries Cooperative Management Act, the Fish and Wildlife Coordination Act, and the National Environmental Policy Act.

3.1 THE FEDERAL POWER ACT (FPA) (AS AMENDED)(16 USC §§791A, *ET SEQ*.)

Section 18 of the FPA - Section 18 of the FPA expressly grants to the DOC and the Department of the Interior (DOI) unilateral authority to prescribe fishways. Section 18 of the FPA states that FERC must require construction, maintenance, and operation by a licensee at the licensee's own expense of such fishways, as may be prescribed by the Secretary of Commerce or the Secretary of the Interior. Within the DOC, the authority to prescribe fishways is delegated to the NMFS Regional Administrators.

Section 10(j) of the FPA - Under Section 10(j) of the FPA, licenses for hydroelectric projects must include conditions to protect, mitigate damages to, and enhance fish and wildlife resources, including related spawning grounds and habitat. These conditions are to be based on recommendations received from Federal and State fish and wildlife agencies. FERC is required to include such recommendations unless it finds that they are inconsistent with Part I of the FPA or other applicable law, and that alternative conditions must adequately address fish and wildlife issues. Before rejecting an agency recommendation, FERC must attempt to resolve the inconsistency, giving due weight to the agency's recommendations, expertise, and statutory authority. If FERC does not adopt a Section 10(j) recommendation, in whole or in part, it must publish findings that adoption of the recommendation is inconsistent with the purposes and requirements of Part 1 of the FPA or other applicable provisions of law, and that conditions selected by FERC adequately and equitably protect, mitigate damages to, and enhance fish and wildlife and their habitats.

Section 10(a)(1) of the FPA - Resource agencies may also recommend conditions under Section 10(a)(1) of the FPA for the protection, mitigation and enhancement of fish and wildlife (including related spawning grounds and habitat).

3.2 ENDANGERED SPECIES ACT (ESA) (AS AMENDED) (16 USC §1531 *ET SEQ.*)

Section 7(a)(2) of the ESA, states that each Federal agency shall, in consultation with the Secretary, insure that any action an agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Any discretionary federal action that may affect a listed species must undergo Section 7 consultation. Section 7(a)(1) requires Federal agencies to use their authorities to further the conservation of listed species.

3.3 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (MSA) (AS AMENDED) (MSA) (16 USC §§1801, *ET SEQ*)

The 1996 amendments to the MSA set forth a number of mandates for us, the Fishery Management Councils (Councils), and other Federal agencies to identify and protect important marine and diadromous fish habitats. The councils are required to identify and describe essential fish habitat (EFH) for all managed species in order to protect habitat from fishing impacts and to allow for consultation with federal agencies whose actions may adversely impact essential fish habitat. EFH is defined as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity" 16 U.S.C. § 1853(a)(7) and § 1802(10). The MSA requires federal agencies to consult with the Secretary of Commerce, through us, with respect to "any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act" 16 U.S.C. § 1855(b)(2). In the EFH consultation process, the federal action agency initiates consultation by preparing and submitting a completed EFH assessment describing the potential impacts of the action on EFH.

3.4 ATLANTIC COASTAL FISHERIES COOPERATIVE MANAGEMENT ACT (ACFCMA) (AS AMENDED) (16 USC §§5101, *ET SEQ*.)

The purpose of the ACFCMA is to provide for more effective fishery resource conservation of coastal fish species that are distributed across the jurisdictional boundaries of the Atlantic States and the Federal Government. These coastal fish species, which include American eel, shad and river herring, are managed by various species boards of the Atlantic States Marine Fisheries Commission (ASMFC), which develop fishery management plans and recommend management action to the states and NMFS.

3.5 FISH AND WILDLIFE COORDINATION ACT (FWCA) (AS AMENDED) (16 USC §§661, *ET SEQ*.)

The FWCA provides that fish and wildlife conservation shall receive equal consideration and be coordinated with other features of water resource development programs. A Federal action agency, such as the Federal Energy Regulatory Commission (FERC), shall consult with us with a view to the conservation of fish and wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof in connection with

such water resource development. We may provide recommendations to the Federal action agency to which the action agency shall give full consideration.

3.6 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) (AS AMENDED) (42 USC §§4321, *ET SEQ*.)

The NEPA of 1969 (42 USC §§4321 *et seq*.) and its implementing regulations require Federal action agencies to analyze the direct and indirect environmental effects and cumulative impacts of project alternatives and connected actions. The NEPA requires the Federal action agency to conduct a comparative evaluation of the environmental benefits, costs, and risks of the proposed action, and alternatives to the proposed action.

3.7 POLICY AND COORDINATION

Based on the above listed laws, we have developed policies designed to implement these laws.

3.7.1 NOAA STRATEGIC PLAN

To achieve this mission, NOAA's Next Generation Strategic Plan identifies the Habitat program for the protection and restoration of coastal marine habitats that support NOAA trust resources. An important objective of the Habitat program is to "improve ecosystem health through conservation and restoration of habitat." Our strategic plan further identifies the Protected Resources program to protect and work to recover species at risk of extinction, and the Fisheries Management program to ensure maintenance of fisheries at productive levels for supporting sustainability and the ecosystems to which they contribute. Strategies utilized to achieve this objective include implementing cooperative approaches at the local level in habitat conservation and restoration, including greater involvement in the review of FERC activities; and, by working to increase the survival of anadromous fish passing through hydroelectric facilities.

3.7.2 ATLANTIC STATES MARINE FISHERIES COMMISSION (ASMFC)

The role of the ASMFC is to facilitate cooperative management of inter-jurisdictional fish stocks. ASMFC does this by creating Interstate Fisheries Management Plans for jurisdictional species. These plans set forth the management strategy for the fishery and are based upon the best available information from the scientists, managers, and industry. The plans are created and adopted at the ASMFC Policy Board level and the plans provide recommendations to the states and Federal government that allow all jurisdictions to independently respond to fishery conditions in a unified, coordinated way. The Atlantic Coastal Fisheries Cooperative Management Act requires the Federal government to support the ASMFC's management efforts. The Federal government enacts regulations to complement ASMFC recommendations when appropriate. To the extent the Federal government seeks to regulate an ASMFC managed species, those Federal regulations must be compatible with the ASMFC's plan and consistent with the 10 National Standards set forth in the Magnuson-Stevens Act.

The ASMFC has developed two plans that relate to our trust species. We highlight the plans' goals and recommendations below.

3.7.3 ASMFC's Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (2010)

The Atlantic States Marine Fisheries Commission, Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (American Shad Management), approved in 2010 includes the following objective:

1. Maximize the number of juvenile recruits emigrating from freshwater stock complexes

When considering options for restoring alosine habitat, NOAA should include study of impacts and possible alteration of dam-related operations to enhance river habitat.

This document includes the following recommendations:

General Fish Passage

1) States should work in concert with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's (NOAA)National Marine Fisheries Service (NMFS) to identify hydropower dams that pose significant impediment to diadromous fish migration, and target them for appropriate recommendations during FERC relicensing.
2) States should identify and prioritize barriers in need of fish passage based on clear ecological criteria (e.g., amount and quality of habitat upstream of barrier, size, and status of affected populations). These prioritizations could apply to a single species, but are likely to be more useful when all diadromous species are evaluated together.
3) A focused, coordinated, well supported effort among federal, state, and associated interests should be undertaken to address the issue of fish passage development and efficiency. The effort should attempt to develop new technologies and approaches to improve passage efficiency with the premise that existing technology is insufficient to achieve restoration and management goals for several Atlantic coast river systems.
4) Where obstruction removal is not feasible, install appropriate passage facilities, including fish lifts, fish locks, fishways, navigation locks, or notches (low-head dams and culverts).
5) At sites with passage facilities, evaluate the effectiveness of upstream and downstream passage; when passage is inadequate, facilities should be improved.
6) Facilities for monitoring the effectiveness of the fish passage devices should be incorporated into the design where possible.
7) When designing and constructing fish passage systems, the behavioral response of each species of interest to appropriate site-specific physical factors should be considered.
8) If possible, protection from predation should be provided at the entrance, exit, and throughout the passage.
9) The passage facility should be designed to work under all conditions of head and tail water levels that prevail during periods of migration.
10) Passages are vulnerable to damage by high flows and waterborne debris. Techniques for preventing damage include robust construction, siting facilities where they are least exposed to adverse conditions, and removing the facilities in the winter.

11) Passage facilities should be designed specifically for passing alosines at optimum efficiency.

Upstream Fish Passage

1) American shad must be able to locate and enter the passage facility with little effort and without stress.
2) Where appropriate, improve upstream fish passage effectiveness through operational or structural modifications at impediments to migration.
3) Fish that have ascended the passage facility should be guided/routed to an appropriate area so that they can continue upstream migration, and avoid being swept back downstream below the obstruction.

Downstream Fish Passage

1) To enhance survival at dams during emigration, evaluate survival of post spawning and juvenile fish passed via each route (e.g., turbines, spillage, bypass facilities, or a combination of the three) at any given facility, and implement measures to pass fish via the route with the best survival rate.

Other Dam Issues

1) Where practicable, remove obstructions to upstream and downstream migration in lieu of fishway construction.
2) Locate water intakes where impingement/entrainment rates are likely to be lowest, employ intake screens or deterrent devices to prevent egg and larval mortality, and alter water intake velocities to reduce mortalities.
3) To mitigate hydrological changes from dams, consider operational changes such as turbine venting, aerating reservoirs upstream of hydroelectric plants, aerating flows downstream, and adjusting in-stream flows.
4) Natural river discharge should be taken into account when instream flow alterations are being made to a river (flow regulation) because river flow plays an important role in the migration of diadromous fish.
5) Ensure that decisions on river flow allocation (e.g., irrigation, evaporative loss, out of basin water transport, hydroelectric operations) take into account instream flow needs for American shad migration, spawning, and nursery use, and minimize deviation from natural flow regimes.
6) When considering options for restoring alosine habitat, include study of impacts and possible alteration of dam-related operations to enhance river habitat.

The relicensing process for the Lowell project provides an excellent opportunity to incorporate many of the ASMFC recommendations.

3.7.4 ASMFC's Interstate Fisheries Management Plan for American Eel (2000)

The goals in this plan include the following:

1. Protect and enhance the abundance of American eel in inland and territorial waters of the Atlantic States and jurisdictions and contribute to the viability of the American eel spawning population

2. Protect and enhance American eel abundance in all watersheds where eel now occur
3. Where practical, restore American eel abundance in all watersheds where they had historical abundance but may now be absent by providing access to inland waters for glass eel, elvers and yellow eel and adequate escapement to the ocean for pre-spawning adult eel.

Recommendations for Federal Energy Regulatory Commission Relicensing

The ASMFC recognizes that many factors influence the American eel population, including harvest, barriers to migration, habitat loss, and natural climatic variation. The ASMFC's authority, through its member states is limited to controlling commercial and recreational fishing activity; however, to further promotes the rebuilding of the American eel population, the ASMFC strongly encourages member states and jurisdictions, as well as the USFWS, to consider and mitigate, if possible, other factors that limit eel survival. Specifically, the ASMFC requests that member states and jurisdictions request special consideration for American eel, in the FERC relicensing process. This consideration should include, but not be limited to, improving upstream passage and downstream passage, and collecting data on both means of passage.

4 NMFS COMMENTS ON THE PRE-APPLICATION DOCUMENT (PAD)

Based on our review of the PAD submitted by Licensee, we offer the following comments.

4.1 PAD SECTION 4.0 PROJECT LOCATION, FACILITIES, AND OPERATIONS

Figure 4.0-1 shows two approximate upstream Project Boundary locations. One in Tyngsborough, MA and the other in Merrimack/Litchfield, NH. The Licensee should explain the significance of these two points in the project boundary. We recommend the geographic scope under the environmental analysis of fisheries resource be extended to fully evaluate cumulative effects. The geographic scope should extend from the Eastman Falls dam (FERC no. 2457 and Lake Winnipesaukee to the confluence of the Pemigewasset and Winnipesaukee Rivers, downstream to the Atlantic Ocean.

4.2 PAD SECTION 4.5 DESCRIPTION OF PROJECT OPERATIONS

According to information described in the PAD, the Lowell Project operates in a run-of-river (ROR) mode and has no usable storage capacity. The Licensee should describe how they are defining ROR: instantaneous, daily average, or some other time step. In addition, with the pneumatic crest gates now operational, typical headpond fluctuation should also be clarified and described in detail.

4.2.1 PAD SUBSECTION 4.5.1.1 GENERAL OPERATION

The Licensee should describe the tolerance of the automatic pond level control. In the previous description of the E.L. Field Powerhouse turbines, the rated hydraulic capacity of each turbine is 3,300 cfs. We understand that under different headpond and tailwater conditions, the maximum hydraulic capacity can vary, but the description should remain consistent throughout the draft license application to prevent confusion by the reader. Therefore, the maximum hydraulic capacity of the E.L. Field Powerhouse is 6,600 cfs, and river flow that exceeds that value goes through the Pawtucket Canal up to 2,000 cfs with the remainder spilling over the Pawtucket Dam. Minimum flow is 1,990 cfs or inflow, whichever is less, as measured downstream from the

project. The license application should describe the purpose of this flow and why it proposes to continue to operate in this manner. In addition, at flows below 6,600 cfs, the license application should describe the preferential operation of the two turbines and state the minimum hydraulic capacity. Such details are necessary to fully understand project operation and evaluate potential impacts of project operation on fisheries resources.

4.2.2 PAD Subsection 4.5.1.2 Canal System Operations

The Licensee should provide more detail on canal operations. For example, it is not clear from the PAD when the Pawtucket Canal generation begins once river flow exceeds the E.L. Field Powerhouse hydraulic capacity. During the recent site visit on July 18, 2018, we learned that the Licensee decommissioned the Assets Power Station as part of the City's redevelopment plans. The license application should describe in detail, which generation assets will be operating during the upcoming license and the routing protocol through the Pawtucket Canal system, which turbines are first on and last off, etc. based on hydraulic conditions. In addition, the license application should provide estimates of leakage flow and other latent flow conveyed through the canal when National Park Service tour boats are operating, if measurable.

4.2.3 PAD Subsection 4.5.1.3 Pneumatic Crest Gate Operations

The pneumatic crest gate consists of multiple zones from the Pawtucket Gatehouse to the fish ladder. The Licensee should describe the actuation of these zones during times of spill (e.g., first on, etc.). This information is important to understand project impacts on fisheries resources, as zones that are distal from the fish ladder may result in false attraction away from the fish ladder entrance, which can lead to significant migratory delay.

4.2.4 PAD Subsection 4.5.1.4 Fish Passage Operations

The license application should append the existing Comprehensive Fish Passage Plan (CFPP). In addition, much of the existing CFPP is outdated and the Licensee should provide updates to the plan based on current and proposed fish passage measures and operations.

4.3 PAD Section 5.4 Fish and Aquatic Resources

4.3.1 PAD Subsection 5.4.5.6 Alosine Clupeids

The license application should state that river herring are currently under status review by NMFS for listing under the Endangered Species Act.

4.3.2 PAD Subsection 5.4.6 Other Site-Specific Fisheries Information

This section of the PAD describes past studies at the site, including a 1988 study evaluating fish passage at the Pawtucket Gatehouse (RMC Environmental Services 1988). The Licensee states, "In addition, a 1988 acoustic telemetry study performed by RMC Environmental Services of adult American shad movement through the Northern Canal demonstrated successful passage through the Pawtucket Gatehouse, as well as incidental information regarding downstream passage routes for post-spawning individuals". We do not consider the conclusions drawn from this study to be accurate. In that study, gatehouse passage was extremely limited and the majority of fish that did pass upstream went through the boat lock. All the fish in the study had significant delay. We do not deem this as successful passage through the Pawtucket Gatehouse.

The license application should include information from the recent study entitled, *Analysis of Upstream Fish Passage Facilities and Operation* (Gomez and Sullivan Engineers 2016). As part of that study, one of the recommendation was to remove part of the ledge downstream from the E.L. Field Powerhouse fish lift entrance to improve entrance efficiency. The licensee has previously agreed to remove ledge downstream of the fish lift entrance. Our agency engineer, as well as the U.S. Fish and Wildlife Service (USFWS) worked with the Licensee on the excavation design plans, providing feedback through an August 2017 technical memo, which was filed with FERC on September 28, 2017. The Licensee confirmed plans, in an email dated June 19, 2018, to complete this work during the 2019 construction season. A detailed description of the ledge excavation is important information to include in the license application. We expect some studies evaluating upstream passage at the project may need to be delayed until the ledge excavation is complete.

Table 5.4-3 includes major findings of fish passage studies performed during the last license term. In that table, the Licensee labels the first column 'Year'; we determined some inconsistencies with the year representing either the year published or the migratory year the study occurred. We have the following comments regarding the conclusions and omissions in the table.

- The 1988 Study (RMC Environmental Services, Inc.) – We disagree that there was 'little delay' for the tagged fish that passed to upstream spawning grounds. Tagged fish released at E.L. Field power station reached the Pawtucket Gatehouse in a few hours, but then exhibited delay behaviors going up and down the Northern Canal numerous times. Fish that used the boat lock (after opening) passed usually within a day, but the fish that used the gatehouse wells took up to 3 days to pass. We do not consider this timely fish passage. We do not agree with the statement, 'The Pawtucket Canal should not entrap emigrating adult shad'. One tagged shad passed the Francis Guard Locks gatehouse. Six other shad initially approached the Francis Guard Locks gatehouse exhibiting delay behavior. Overall project mortality estimated from stationary tags was 61.5%.
- The 1991 Juvenile Study (Normandeau Associates, Inc.) – The corrected bypass efficiency was 7%. Delay was less than 72 hours with 95% passing within 24 hours.
- The 1991 Adult Study (Normandeau Associates, Inc.) – In this study, release of the tagged fish was in the Northern Canal testing the effectiveness the Pawtucket Gatehouse passage. Only 72% of the fish passed the gatehouse to upstream spawning habitat and the boat lock was open throughout the study. Twelve post-spawn adults approached the project with 42% passing through the turbines, 17% passing through the downstream bypass, 17% through the Pawtucket Canal, and 25% passing over the Pawtucket Dam. Of the 23 tagged fish that passed downstream of the project (both post-spawn fish and fish that did not pass the Pawtucket Gatehouse), an estimated 61% died. E.L. Field Powerhouse turbine mortality was 64%.
- The 1994 Study (Normandeau Associates, Inc.) – Though much better than the corrected bypass efficiency of 7% from the 1991 study, we do not consider a downstream bypass efficiency of 32% as 'very efficient'.

- The 1995 Study (Normandeau Associates, Inc.) – no comments.
- The 1996 Fish Lift Efficiency Study (Normandeau Associates, Inc.) – Publication date was 1997.
- The 1996 Downstream Passage Smolt Study (Normandeau Associates, Inc.) – This study included a mixture of hatchery and wild sources of fish. Of the 49 released fish, 61% passed the project via the powerhouse (77%), the fish bypass (13%), the Pawtucket Canal (7%), and an unknown route (3%). Of the fish that passed the project, hatchery fish took approximately 100 hours to pass and wild fish took about 28 hours.
- From 1999 through 2001, the Licensee performed yearly internal fish lift efficiency studies. Table 5.4-3 in the Pre-Application Document does not clearly describe the chronology, the purpose, and results of these studies. The Licensee should be consistent by only using the publication date to avoid confusion. Each study tested a specific component or modification these tests need more clarification.
- The 2002 USFWS Study – no comments.
- The 2003 Downstream Passage and Smolt Survival Study (Normandeau Associates, Inc.) – The Licensee studied three fish bypass flows (2%, 3.5%, and 4.5% station discharge) with 20 tagged smolts each. Bypass efficiency improved with increased flow, though none of the tests resulted in adequate passage efficiency. Cumulatively, 59% went through the turbines, 32% went through the bypass, and 9% were undetermined. Turbine survival was very high, but predation in the tailrace was also extremely high. We consider tailrace predation a project effect. Turbine passage and other designated downstream passage routes that concentrate the migration into a small area provide predators unfettered access to easy prey. Without the project, dispersal of prey would result in decreased predatory efficiency.
- The 2011 Upstream Three-Dimensional Study (Alden Research Laboratory, Inc. – no comments.
- The 2013 Upstream Three-Dimensional Study Further Analysis (Blue Leaf Environmental) – The study showed that greater than 80% of the detections of tagged shad were between the elevations of 40 and 50 feet suggesting that fishway entrance efficiency would dramatically improve by lowering the invert of the entrance and maintaining the entrance jet velocity.
- The Licensee should include a description of the 1990 Normandeau Associates study entitled, “An assessment of the effectiveness of a fish bypass for passing downstream migrating Atlantic salmon smolts and estimated survival of salmon smolts passed through the 8.6-MW Kaplan Turbines at the E.L. Field Hydroelectric Project, Lowell, Massachusetts”.
- The Licensee should include a description of the 2016 study entitled, “Analysis of Upstream Fish Passage Facilities and Operation”.

5 REQUESTED STUDIES

Our study requests intend to facilitate the collection of information necessary to conduct effects analyses; develop reasonable and prudent conservation measures; and protection, mitigation, and enhancement measures pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661 *et seq.),* and the Federal Power Act (16 U.S.C. §791a, *et seq.).*

5.1 REQUESTED STUDY #1: AMERICAN EEL PASSAGE DOWNSTREAM STUDY

The Merrimack River is a migratory corridor for American eel. This species must be able to pass the project without undue harm or delay to complete their life cycle. Poor passage at the project limits access to spawning habitats in the Sargasso Sea harming genetic diversity and resilience within the population. The Lowell project includes potential emigration routes over the Pawtucket Dam, through the E.L. Field Powerhouse turbines, over the E.L. Field Powerhouse fish bypass, and through the Pawtucket Canal including multiple dams and powerhouses. The Licensee is installing a pneumatic crest gate at the dam that decreases leakage through the flashboards and provides more control of spill over the dam. We request a study to determine the downstream passage routes at multiple river flows and operating conditions to inform safe, timely, and effective passage measures at the project.

GOALS AND OBJECTIVES

The goal of this study is to determine the impact of the Lowell hydroelectric project on the emigration of silver eels in the Merrimack River. Project operations can result in delay, mortality or injury during emigration. We need to understand the extent of delay, the passage routes, and the potential for mortality to determine measures and recommendations to increase survival and improve fish passage at the project.

The objectives of this study are:

- Quantify the movement rates and delay caused by multiple river flows and project operations
- Quantify the relative proportion of eels passing each emigration route at the project during multiple river flows and various project operations.
- Quantify instantaneous and latent mortality of eels passed via each emigration route.

RESOURCE MANAGEMENT GOALS

The ASMFC has developed five documents related to the management of American eel including:

- Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
- Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.

Objectives of the fishery management plan include:

(1) protect and enhance American eel abundance in all watersheds where eel now occur; and

(2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre- spawning adult eel.

Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Federal Energy Regulatory Commission relicensing process.

The American eel population is severely depressed in the Merrimack River watershed. Our goal is to restore American eel to historical habitats and ensure safe migratory pathways to build abundance and resilience in the population.

PUBLIC INTEREST

The requestor, NMFS, is a federal resource agency.

EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

Upstream of the Lowell Hydroelectric Project is the Merrimack Project (FERC No. 1893) which has been conducting ongoing silver eel downstream passage studies. In 2017, the Licensee installed receivers at the Lowell project to continue the monitoring of the tagged eels that passed the Merrimack Project (Normandeau Associates 2018). The study detected fourteen eels near the Lowell Project with eight going through the turbines, five passing over the spillway, and one undetermined route. One of the eels that passed through the E.L. Field Powerhouse died. The study did not monitor the Pawtucket Canal or the downtown project facilities. Throughout the study, the canal system was not operating though there was sufficient river flow to operate. Therefore, the study lacks information regarding project effects in the canal system on silver eel emigration. In addition, the study has an insufficient sample size and does not have a control group or mobile tracking to account for drifting of dead eels.

PROJECT NEXUS

The Lowell Hydroelectric Project does not have entrainment prevention at any of the turbine intakes. Adult eels have an average mortality of 10.9% (±13.0 S.D.) passing through Francis turbines and an average mortality of 25.7% (±10.6 S.D.) passing through Kaplan turbines (Pracheil et al. 2016). E.L. Field Powerhouse has two Kaplan turbines and the canal system has 19 Francis turbines (12 still operate). Silver eels emigrate during the mid-summer through late fall (Haro 2003), a time of year when Merrimack River flows equal or exceed the operating capacity of the stations only part of the time. Therefore, we expect the project to spill infrequently during the silver eel emigration forcing eels to pass through the canal system, the E.L. Field Powerhouse, or the fish bypass. We assume entrained eel at the project powerhouses will incur unacceptable levels of mortality. We base this assumption on published mortality statistics, the age and specifications of the turbines, the complexity of canal routing, and the likelihood that emigrating silver eels will have to pass two turbines to reach downstream of the project (upper canal and lower canal). Therefore, as a first step in understanding overall project mortality, we need to understand the routes of emigration and the potential for delay under different river flow conditions and project operations. This study will contribute to the development of an administrative record in support of potential Section 18 fishway prescriptions or 10(j) recommendations.

PROPOSED METHODOLOGY

This study should be conducted using radio telemetry, with a study design that specifies sample size and tag and receiver configurations. A statistically significant number of telemetered eels are necessary to establish a clear understanding of how project operations affect eel emigration. The Licensee should release groups of eels during spill and non-spill periods. The Licensee should operate the Pawtucket Canal system turbines during the study. The Licensee should record river flow and project operations throughout the study. Release of tagged eels should be a few kilometers (km) upstream of the Pawtucket Dam. The project design should include a smaller sample of dead eel to act as a control group, as fish can drift significant distances downstream after they have died (Havn et al. 2017). Telemetry receivers and antennas should be located above and below the project to assess passage. Receivers should monitor the following potential routes: entrance into Pawtucket Canal via the Guard Lock and Gates Facility, passage over the Pawtucket Dam, entrance into Northern Canal at Pawtucket Gatehouse, entrance into E.L. Field Powerhouse turbines, and entrance into the E.L. Field Powerhouse bypass.

Mobile tracking (i.e., via boat) in river reaches between release sites and several km downstream of E.L. Field Powerhouse should be performed at regular intervals during and after releases to confirm routes and fates of fish.

Movement rates (time between release and passage) of eels passing the projects by various routes should also be quantified using time-to-event analyses (Castro-Santos and Perry 2012).

This study will require two years of field data collection to account for inter-annual variability in river discharge and water temperatures.

LEVEL OF EFFORT AND COST

The level of cost and effort for the downstream eel passage study is moderate to high. We anticipate the study will require two migratory seasons to acquire enough data. The Licensee will need to purchase silver eels from a distributor with ample supply, as the Merrimack River does not have an adequate population to harvest. To use the acquired eels, the Licensee will need to permit the use of out-of-basin eels in the study. Each group of eels will require tagging and release over the course of each migration season representing seasonal flows and project operations. The Licensee will download the data periodically, analyze it, and report the results. We estimate the cost will be approximately $150,000 per year for the study. No alternatives are proposed.

5.2 REQUESTED STUDY #2: JUVENILE ALOSINE DOWNSTREAM STUDY

The Merrimack River is a migratory corridor for juvenile alosines. These species must be able to pass the project without undue harm or delay to complete their life cycle. Poor passage at the project limits access to marine habitats harming stock recruitment and resilience within the population and ecosystem benefits to other trophic levels. The Lowell project includes potential emigration routes over the Pawtucket Dam, through the E.L. Field Powerhouse turbines, over the E.L. Field Powerhouse fish bypass, and through the Pawtucket Canal including multiple dams and powerhouses. The Licensee is installing a pneumatic crest gate at the dam that decreases leakage through the flashboards and provides more control of spill over the dam. We request a study to determine the downstream passage routes at multiple river flows and operating conditions to inform safe, timely, and effective passage measures at the project.

GOALS AND OBJECTIVES

The goal of this study is to determine the impact of the Lowell Hydroelectric Project on the emigration of juvenile alosines in the Merrimack River. Project operations can result in delay, mortality or injury during emigration. We need to understand the extent of delay, the passage routes, and the potential for mortality to determine measures and recommendations to increase survival and improve fish passage at the project.

The objectives of this study are:

- Quantify the movement rates and delay caused by project operations
- Quantify the relative proportion of juvenile alosines passing each emigration route at the project during various project operations.
- Quantify instantaneous and latent mortality of juvenile alosines passed via each emigration route.

RESOURCE MANAGEMENT GOALS

The NMFS is a federal resource agency with a mandate to protect and conserve fishery resources and associated habitat. Regulatory statutes codify our resource management goals and plans. We rely on the best available data to support conservation recommendations and management decisions. Data sought in this study are not available. This study is an appropriate request for the pre-application period.

The ASMFC has developed six documents related to the management of alosines including:

- Interstate Fishery Management Plan for American Shad and River Herring. October 1985. Atlantic States Marine Fisheries Commission.
- Supplement to American Shad and River Herring Fishery Management Plan. October 1988. Atlantic States Marine Fisheries Commission.
- Amendment II to the Interstate Fishery Management Plan for Shad and River Herring (River Herring Management). May 2009. Atlantic States Marine Fisheries Commission.
- Amendment III to the Interstate Fishery Management Plan for shad and river herring (American Shad Management). February 2010. Atlantic States Marine Fisheries Commission.

Relevant objectives in the fishery management plans include:

(1) Improve habitat accessibility and quality in a manner consistent with appropriate management actions for non-anadromous fisheries.

   a. Improve or install fish passage facilities at dams and other obstacles preventing fish from reaching potential spawning areas

   b. Ensure that decisions on river flow allocation (e.g., hydroelectric operations) take into account flow needs for alosine migration, spawning, and nursery usage

   c. Ensure that water withdrawal effects (e.g., impingement and entrainment)

do not affect alosine stocks to the extent that they result in stock declines

Addendum II and III contains specific management recommendations for improving upstream and downstream passage of alosines, including requesting that member states and jurisdictions seek special consideration for alosines in the Federal Energy Regulatory Commission relicensing process.

The alosine population is severely depressed in the Merrimack River watershed (Technical Committee for Anadromous Fishery Management of the Merrimack River Basin 2010). We have achieved dramatic increases in alewife returns in recent years through a stocking effort lead by fisheries agencies and compliance with fish passage conditions in existing hydroelectric licenses, but American shad and blueback herring populations still have not shown improvement. Our goal is to restore alosines to historical habitats and ensure safe migratory pathways to build abundance and resilience in the population.

PUBLIC INTEREST

The requestor, NMFS, is a federal resource agency.

EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

The Licensee conducted three separate mark-recapture studies of emigrating juvenile alosines from 1990 to 1995 (Normandeau Associates, Inc., 1991, 1994, 1995). These studies examined only entrainment into E.L. Field Powerhouse turbines and the fish bypass at the powerhouse as potential routes of passage. The early 1990's studies used antiquated technology that did not adequately address the goals and objectives of this study. We have no information regarding usage of the Pawtucket Canal or the spillway as emigration routes for juvenile alosines at the Lowell Hydroelectric Project.

PROJECT NEXUS

The Lowell Hydroelectric Project does not have entrainment prevention at the turbine intakes or designated spillway passage routes. The designated fish bypass system at the E.L. Field Powerhouse has a documented poor entrance efficiency and is unable to operate throughout the diurnal cycle. Juvenile alosines emigrate during the fall at the project, a time of year when Merrimack River flows equal or exceed the operating capacity of the power stations only part of the time. Therefore, we expect juvenile alosines have the opportunity to use multiple routes of passage during emigration. We assume entrained juvenile alosines at the Pawtucket Canal powerhouses will incur unacceptable levels of delay, injury and mortality. We base this assumption on published mortality statistics, the age and specifications of the turbines, the complexity of canal routing, and the likelihood that emigrating juvenile alosines will have to pass two turbines to reach downstream of the project (upper canal and lower canal). Conversely, we assume that turbine passage at the E.L. Field Powerhouse and passage over the spillway may be viable routes of downstream passage, but we do not have delay or mortality information supporting those assumptions. Therefore, to determine overall project survival, we need to understand the routes of emigration and the potential for delay under different river flow conditions and project operations. This study will contribute to the development of an administrative record in support of potential Section 18 fishway prescriptions or 10(j) recommendations.

PROPOSED METHODOLOGY

This study should be conducted using radio telemetry, with a study design that specifies sample size and tag and receiver configurations. Through the agency-led stocking program in the Merrimack River watershed, large numbers of juvenile alewife emigrate from the upper watershed on a yearly basis. The Licensee should catch these juveniles for the study, as these fish have been used successfully in acoustic telemetry studies for other facilities on the Merrimack River (Accession No. 20170223-5040). A statistically significant number of telemetered juvenile alewife are necessary to establish a clear understanding of how project operations affect juvenile alosine emigration (juvenile alewife will serve as a proxy for juvenile American shad and blueback herring). The Licensee should release groups of juvenile alewife during spill and non-spill periods. The Licensee should operate the Pawtucket Canal system turbines during the study. The Licensee should record river flows and project operations throughout the study. Release of tagged juvenile alewife should be a few kilometers (km) upstream of the Pawtucket Dam. Telemetry receivers and antennas will be located above and below the project to assess passage. Receivers should monitor the following potential routes: entrance into Pawtucket Canal via the Guard Lock and Gates Facility, passage over the Pawtucket Dam, entrance into Northern Canal at Pawtucket Gatehouse, entrance into E.L. Field Powerhouse turbines, and entrance into the E.L. Field Powerhouse bypass.

Mobile tracking (i.e., via boat) in river reaches between release sites and several km downstream of E.L. Field Powerhouse will be performed at regular intervals during and after releases to confirm routes and fates of fish.

Movement rates (time between release and passage) of juvenile alewife passing the projects by various routes will also be quantified using time-to-event analyses (Castro-Santos and Perry 2012).

This study will require two years of field data collection to account for inter-annual variability in river discharge and water temperatures.

Level of Effort and Cost

The level of cost and effort for the downstream juvenile alosine passage study is moderate to high. We anticipate the study will require two migratory seasons to acquire enough data. The Licensee will download the data periodically, analyze it, and report the results. We estimate the cost will be approximately $125,000 per year for the study. No alternatives are proposed.

5.3 Requested Study #3: Upstream and Downstream Adult Alosine Passage Study

The Merrimack River is a migratory corridor for alosines. These species must be able to pass the project without undue harm or delay to complete their life cycle. Poor passage at the project limits access to freshwater spawning habitats and marine habitats harming resilience within the population and ecosystem benefits to other trophic levels. The Lowell project includes potential immigration routes through the E.L. Field Powerhouse fish lift and the Pawtucket Dam fish ladder. Potential emigration routes include over the Pawtucket Dam, through the E.L. Field Powerhouse turbines, over the E.L. Field Powerhouse fish bypass, and through the Pawtucket Canal including multiple dams and powerhouses. The Licensee is installing a pneumatic crest gate at the dam that decreases leakage through the flashboards and provides more control of spill over the dam. We request a study to determine the effectiveness of the upstream fishways and

downstream passage routes at multiple river flows and operating conditions to inform safe, timely, and effective passage measures at the project.

GOALS AND OBJECTIVES

The goal of this study is to determine the impact of the Lowell Hydroelectric Project on the migration of adult alosines in the Merrimack River. Project operations can result in delay, mortality or injury during migration. We need to understand the extent of delay, the passage routes, and the potential for mortality to determine measures and recommendations to increase survival and improve fish passage at the project.

The objectives of this study are:

- Quantify the movement rates and delay caused by project operations at multiple river flows.
- Quantify the relative proportion of alosines passing each migration route at the project during various project operations at multiple river flows.
- Quantify instantaneous and latent mortality of alosines passed via each migration route at multiple river flows.

RESOURCE MANAGEMENT GOALS

The NMFS is a federal resource agency with a mandate to protect and conserve fishery resources and associated habitat. Regulatory statutes codify our resource management goals and plans. We rely on the best available information and data to support conservation recommendations and management decisions. Data sought in this study are not available. This study is an appropriate request for the pre-application period.

PUBLIC INTEREST

The requestor, NMFS, is a federal resource agency.

EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

Since the commissioning of the fish passage facilities at the Lowell Hydroelectric Project, passage of alosines has been unable to meet management goals. For example, greater than 50% of the tagged adult American shad that pass the downstream Lawrence Hydroelectric Project reach the Lowell tailrace, yet only a small percentage of those fish use the designated upstream fishways (Sprankle 2005), (Alden Research Laboratory 2011). Therefore, through the course of the original license, the Licensee conducted numerous studies to investigate fish passage at the project (Table 1).

Table 1. Adult Alosine Upstream and Downstream Fish Passage Studies.

Year	Study Title	Author	Study Results
1988	Passage of Radio-tagged American shad through the Northern Canal Headgate Structure: Lowell	RMC Environmental Services, Inc.	Upstream Results: Of the 25-tagged fish, 24 passed the Northern Canal Gatehouse and one died through turbine passage. Of the 24 passed fish, 19 used the boat lock and 5 used the gate wells. Fish took a few hours to reach the gatehouse from the fish lift. Those that

	Hydroelectric Project		passed the boat lock took less than a day and those that passed through the gate wells took 1 to 3 days to get to the headpond. Downstream Results: Of the 24-tagged fish, 13 approached Lowell after spawning. One of these entered the Pawtucket Canal and died. Eight went through either the Northern Canal and the remainder were undetermined routes. Only 5 fish reached Lawrence suggesting a project mortality of 61.5%. There was delay behavior approaching the gatehouse and Pawtucket Canal.
1991	Downstream Passage Routes of Radio-tagged Adult American shad at the Lowell Hydroelectric Project on the Merrimack River: Lowell, Massachusetts	Normandeau Associates, Inc.	Upstream Results: 28 of the 45-tagged fish passed the gatehouse. Downstream Results: 12 of the 28 fish approached the project after spawning. 5 went through the turbines, 2 went through the Pawtucket Canal, 2 went through the fish bypass, and 3 went over the dam. Of the 17 fish that did not pass upstream of the gatehouse, 6 died in the Northern Canal, 8 went through the powerhouse, and 3 went through the fish bypass. Project mortality through various downstream passage routes was 61%.
1997	Lowell Hydroelectric Project Internal Fish Lift Efficiency Monitoring Program, Spring 1996	Normandeau Associates, Inc.	At 50 cfs attraction flow, the fishway efficiency was 0.5%. At 90 cfs, the fishway efficiency was 2.4%. Both entrances were operating. Entrance #2 was a net loss of 4,175 shad and entrance #1 was a net gain of 113 shad.
1999	An Assessment of Internal Fish Lift Efficiency at the Lowell Hydroelectric Project, Spring 1998	Normandeau Associates, Inc.	The fishway internal efficiency increased by 10% from previous years after modifications.
2000	An Assessment of Internal Fish Lift Efficiency at the Lowell	Normandeau Associates, Inc.	At 120 cfs attraction flow, the fishway efficiency was 42% ranging from 9% to 98%.

	Hydroelectric Project, Spring 1999		
2001	An Assessment of Internal Fish Lift Efficiency at the Lowell Hydroelectric Project, Spring 2000	Normandeau Associates, Inc.	At 120 cfs attraction flow, the fishway average efficiency was 46.4% ranging from 13% to 92%. Efficiency was best at the 2-foot crowder opening (72%) and worst at the 4-foot opening (29%)
2002	Interdam Movements and Passage Attraction of American shad in the Lower Merrimack River Main Stem	U.S. Fish and Wildlife Service	Upstream results: Of the tagged fish at Lawrence, 55% entered the Lowell tailrace and 66% reached the project. Passage efficiency was 6% using tagged fish and was 10% using count room data. Downstream results: Of the four-tagged fish that passed Lowell, one died upstream, one died using the fish bypass, and the other two reached Lawrence suggesting a 33% project mortality.
2011	Shad Upstream Passage Assessment at Lowell Hydroelectric Project (FERC 2790)	Alden Research Laboratory, Inc.	Of the tagged fish at Lawrence, 57% reach the Lowell project. Shad explored the tailrace in a "U" shaped pattern along the edges. Only three fish entered the fishway.
2013	Additional Analysis of American Shad Three-Dimensional Behavior in the Tailrace of the Lowell Project	Blue Leaf Environmental	Shad exhibited a random roaming behavior within the previously determined "U" shaped pattern. Greater than 80% of the detections were between the elevations of 40 and 50 feet.

Though the Licensee has completed numerous studies over the course of their original license, additional information is necessary to determine appropriate fish passage and protection measures for adult alosines in the upcoming license. Concerning upstream passage, none of the studies simultaneously focused on both the Pawtucket Dam fish ladder and the E.L. Field Powerhouse fish lift. As both facilities are necessary to meet management goals, we need to understand route selection and delay approaching the project with both fish passage facilities operating and monitored. In 2019, the Licensee will excavate part of the Lowell tailrace to improve attraction to the riverside fish lift entrance. Therefore, we need to understand whether this measure will improve entrance efficiency. In addition, none of the previous studies incorporated both Passive Integrated Transponder (PIT) tags and radio tags on the same fish. Dual tagging of the upstream migrating fish will allow us to quantify route selection, delay, and internal fishway efficiency. Concerning downstream passage, none of the previous studies had a

statistically significant number of fish to account for tagging effects, natural post-spawn mortality, or the myriad of route selections during emigration. In addition, the new pneumatic crest gate constitutes a new hydraulic condition that may affect route selection during emigration. Finally, none of the previous studies focused on adult river herring, which exhibit different migratory behaviors than American shad.

PROJECT NEXUS

The Lowell Hydroelectric Project has two fishways that have not met alosine management goals for the Merrimack River watershed. The project also does not have entrainment prevention at any of the operating turbine intakes. In addition, project operations produce a myriad of migratory routes, both upstream and downstream, that can lead to delay, increased predation, and mortality. Information gained from this study will greatly increase our understanding of project effects. This study will contribute to the development of an administrative record in support of potential Section 18 fishway prescriptions or 10(j) recommendations.

PROPOSED METHODOLOGY

We recommend incorporating state-of-the-art telemetry methods for this study including both PIT and radio tag technology. The study design should specify sample size and tag and receiver configurations and include two years of field data collection to attempt to account for inter-annual variability in river discharge and water temperatures. Because ledge excavation in the tailrace will be occurring in 2019, a third year of study may be necessary to account for delay of the upstream passage evaluation.

The first year of study, prior to the completion of the ledge excavation, should focus on downstream passage and upstream passage through the Northern Canal only. The Licensee should tag a statistical significant number of both adult river herring and American shad during the migration run of each species captured at the Lawrence project. Each species should have two release locations, one group at the E.L. Field Powerhouse fish lift exit and the other in the Lowell project impoundment. The E.L. Field Powerhouse group should be dual tagged and the Northern Canal Gatehouse wells should be equipped with PIT tag receivers (if the boat lock is open, then receivers should be installed there as well). Release of radio-tag only groups of American shad and river herring should be a few kilometers (km) upstream of the Pawtucket Dam. A small sample of dead river herring and shad should be included in this release to act as a control group, as fish can drift significant distances downstream after they have died (Havn et al. 2017) Radio telemetry receivers and antennas will be located above and below the project to assess passage. Receivers should monitor the following potential routes: entrance into Pawtucket Canal via the Guard Lock and Gates Facility, passage over the Pawtucket Dam, entrance into Northern Canal at Pawtucket Gatehouse, entrance into E.L. Field Powerhouse turbines, and entrance into the E.L. Field Powerhouse bypass.

During the study seasons following the ledge excavation, the Licensee should tag a statistical significant number of both adult river herring and adult American shad captured at the Lawrence project during their migration run. Half of the test specimens for each species should be dual-tagged. The release location for all test specimens should be the Lawrence impoundment. In addition to the receivers installed during the first year of study, the Licensee should equip the entrance and exit of both fishways with PIT tag receivers (the ladder should have an additional PIT receiver in the turning pool) to evaluate fishway efficiencies. The Licensee should also equip the tailrace entrance, the fish lift entrance, and three equally spaced locations within the bypass

reach (e.g., downstream cross-section, mid-point cross-section, and proximal to the ladder entrance) with radio tag receivers.

The Licensee should release groups of test specimens during spill and non-spill periods. The Licensee should operate the Pawtucket Canal system turbines during the study. The Licensee should record river flows and project operations throughout the study.

Mobile tracking (i.e., via boat) in river reaches between release sites and several km downstream of E.L. Field Powerhouse will be performed at regular intervals during and after releases to confirm routes and fates of fish.

Movement rates (time between release and passage) of juvenile alewife passing the projects by various routes will also be quantified using time-to-event analyses (Castro-Santos and Perry 2012).

Level of Effort and Cost

The level of cost and effort for the upstream and downstream alosine passage study is high. The study will require at least two migratory seasons to acquire enough data. Because of the ledge excavation, a third year of study is likely for the comprehensive upstream and downstream telemetry study depending on the environmental and operating conditions of the second year. The Licensee will download the data periodically, analyze it, and report the results. We estimate the cost will be approximately $150,000 for the first year study and $300,000 per year for the comprehensive study. No alternatives are proposed.

5.4 Requested Study #4: Project Survival Study

The Merrimack River is migratory corridor for a multitude of diadromous fish species including American eel, American shad, river herring, and Atlantic salmon. These species must be able to pass the Lowell Hydroelectric Project without significant mortality. The Lowell project includes 2 identical full Kaplan units at the E.L. Field Powerhouse and 19 Francis units of various specifications through a two-tiered canal system in downtown Lowell (12 units are still operating). Each of these turbine passage routes represent a significant risk of mortality to emigrating fish. In addition, the Licensee installed new pneumatic crest gates on the Pawtucket Dam with improved spill control that may provide a safe emigration route. We request a study to determine project survival by quantifying turbine mortality and injury under multiple operating conditions to inform safe, timely, and effective downstream passage measures at the project.

Goals and Objectives

The goal of this study is to quantify project survival for emigrating diadromous species that pass through project turbines. The objectives of the study are to:

- Conduct a field study of turbine survival at the E.L. Field Powerhouse with adult American eels and adult American shad.
- Conduct a desktop survival study for the full suite of diadromous species and life stages through all of the project units.

Resource Management Goals

The NMFS is a federal resource agency with a mandate to protect and conserve fishery resources and associated habitat. Regulatory statutes codify our resource management goals and plans. We

rely on the best available data to support conservation recommendations and management decisions. Data sought in this study are not available. This study is an appropriate request for the pre-application period.

PUBLIC INTEREST

The requestor, NMFS, is a federal resource agency.

EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

Turbine mortality is a well-documented effect of hydroelectric facility operation on the fisheries resource. In the last half-century, dozens of previous licensing studies quantified the effects of many types of turbines. Industry professionals have compiled much of this information in a database (EPRI 1997). In general, American eels have higher survival passing Francis turbines and alosines have higher survival passing Kaplan turbines (Pracheil et al. 2016). However, the extent of turbine mortality relates to the species, life stage, and the specifications of the turbine, which result in dramatic differences in turbine survival. Fish length, runner rotational speed, and the number of runner blades are key variables determining turbine mortality (Headrick 2001).

In 2003, the Licensee completed a comprehensive study of the Atlantic salmon smolt survival through the E.L. Field Powerhouse (Normandeau Associates Inc. 2003). The results from that study were favorable with the desktop analysis predicting 94% survival and the field test results showing 100% survival. However, the average length of the Atlantic salmon smolts in that study was 202.8 millimeters (mm). Adult American eel and American shad are much longer, approximately 1,000 mm and 450 mm, respectively. Because fish length is a key determinant of turbine survival, we need quantitative field data for larger fish with different swimming forms and abilities to conclude that the E.L. Field Powerhouse turbines are a safe route of emigration for the full suite of diadromous species. In addition, the previous smolt study only looked at one operational scenario for the full Kaplan units. Unlike smolts, both American eel and American shad will emigrate past the facility during times when river flow is well below operational capacity. Finally, American eels are more susceptible to blade strike with Kaplan turbines and the previous telemetry studies of American shad suggested poor turbine survival at the E.L. Field Powerhouse (RMC Environmental Services 1988) (Normandeau Associates Inc. 1991).

None of the previous studies conducted at the Lowell Hydroelectric Facility examined the potential for eel or alosine turbine mortality in the Pawtucket Canal units using estimates from either turbine mortality equations or field studies. Based on our hydrologic analysis, during the downstream fish passage season as defined in the existing Comprehensive Fish Passage Plan, the downtown canal units will be operating approximately 40% of the time (Figure 1). Therefore, the Pawtucket Canal may be an emigration route. We need to understand the risks of mortality for fish that migrate through the Pawtucket Canal.

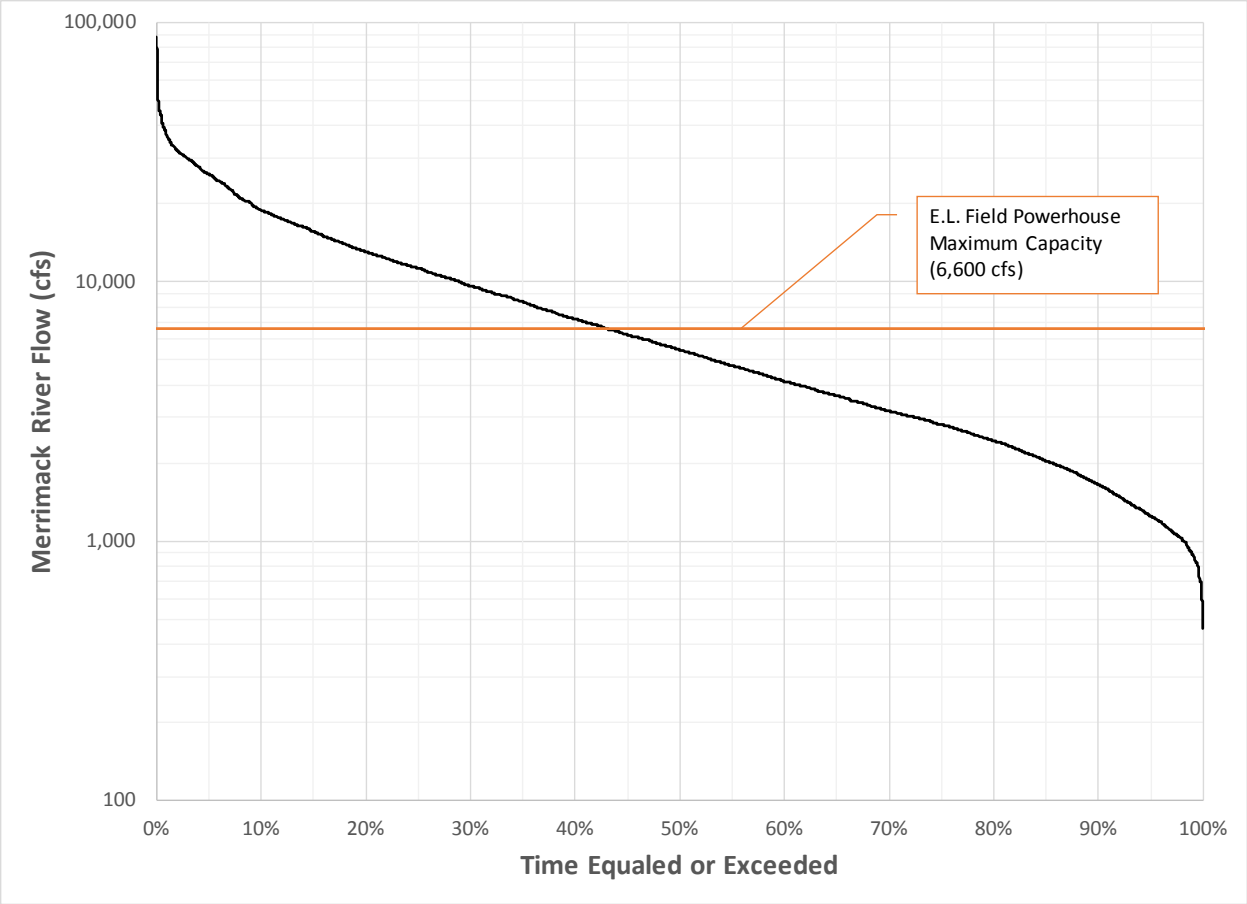

Figure 1. Flow duration curve for the Merrimack River during the downstream fish passage season showing the amount of time river flow equals or exceeds the E.L. Field Powerhouse maximum discharge capacity.

PROJECT NEXUS

Operation of the Lowell Hydroelectric Project has a direct effect on the survival of emigrating diadromous fish through turbine passage. None of the 14 operating turbines has entrainment prevention leading to the potential for high turbine mortality at the project. Information gained from this study will greatly increase our understanding of project effects. This study will contribute to the development of an administrative record in support of potential Section 18 fishway prescriptions or 10(j) recommendations.

PROPOSED METHODOLOGY

The E.L. Field Powerhouse turbine field study should use the balloon tag-recapture technology. A methodology similar to the one outlined in the previous Atlantic salmon study is acceptable (Normandeau Associates Inc. 2003). A statistically significant number of both adult American eels and American shad are necessary for testing at two turbine settings, a low operational flow (less than 1,200 cfs) and a high operational flow (between 1,800 and 3,300 cfs). The Licensee should evaluate and document the fitness of the test specimens used in the study.

The desktop turbine survival study should use standard methodology appropriate for the type of turbine and empirical information available (Franke et al. 1997). The Licensee should evaluate each of the unique turbines still in operation including:

- the E.L. Field, Fuji Horizontal Full Kaplan,
- the Bridge Street, Hercules Type D Single Runner,
- the Hamilton, Leffel Type Z Single Runner at
    - 120 rpm
    - 133 rpm
    - 150 rpm,
- the John Street, Leffel Single Runner, and
- the John Street, Allis Chalmers Singe Runner.

The turbine survival assessment should evaluate American shad, American eel, and river herring. The Licensee should evaluate both adult and juvenile life stages for the alosines. The study should use published average length values for each species and life stage in the calculations. Alewife may be used as a proxy for both river herring species. After determining estimates for each unique turbine, the Licensee will derive overall project survival estimates using typical operating curves and expected flows (i.e., the flow duration curve) during the downstream migration season for each species. The Licensee should use the rule of thumb that fish will emigrate proportionally with flow to estimate overall project survival. Where applicable, the Licensee should use turbine survival based on field collected data instead of calculated estimates.

Level of Effort and Cost

The level of cost and effort for the project survival study is moderate. The study will likely take one year. The Licensee will collect the field data during the migratory season, calculate the turbine survival estimates, estimate overall project survival, and report the results. We estimate the cost will be approximately $120,000 for the study. No alternatives are proposed.

5.5 Requested Study #5: Three-dimensional Hydraulic Modeling

Complex flow fields occur upstream of the entrance to powerhouse intakes and dedicated fish bypasses, downstream of fishway entrances, and internally within a fishway. With respect to downstream passage, we need to understand the direction and magnitude of flow fields that are upstream of the turbine intakes and fish bypass in order to inform license conditions that may improve downstream passage. Concerning upstream passage, we need to understand the hydraulic conditions proximal to the entrances of both fishways to inform license conditions that may improve fishway attraction. In addition, internal hydraulics (particularly upwelling from floor diffusers) can cause fallback from committed immigrants in a fishway. We request a three-dimensional computational fluid dynamics (CFD) modeling study to understand the hydraulics of integral components of the fish passage facilities at the Lowell Hydroelectric Project.

Goals and Objectives

The goal of this study is to determine the flow field conditions that exist in and around the Lowell fish passage facilities. The objectives of the study are to:

- Develop and calibrate a three-dimensional model of the E.L. Field Powerhouse forebay and downstream bypass facility then run simulations of various operational conditions.
- Develop and calibrate a three-dimensional model of the E.L. Field Powerhouse fish lift then run simulations of various operational conditions.
- Develop and calibrate a three-dimensional model of the Pawtucket Dam fish ladder then run simulations of various operational conditions.

RESOURCE MANAGEMENT GOALS

The NMFS is a federal resource agency with a mandate to protect and conserve fishery resources and associated habitat. Regulatory statutes codify our resource management goals and plans. We rely on the best available data to support conservation recommendations and management decisions. Data sought in this study are not available. This study is an appropriate request for the pre-application period.

PUBLIC INTEREST

The requestor, NMFS, is a federal resource agency.

EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

No three-dimensional models exist for the fish passage facilities at the Lowell Hydroelectric Project. Documented issues with the fish passage facilities include poor entrance efficiency at the E.L. Field Powerhouse downstream bypass, poor entrance efficiency at the E.L. Field Powerhouse upstream fish lift, and fallback in both fishways. Detailed hydraulic modeling of the fish passage facilities will elucidate potential license conditions and measures that may improve fish passage at the project.

PROJECT NEXUS

With the existing fish passage facilities, the Lowell Hydroelectric Project has not met management goals for anadromous fish in the Merrimack River Watershed. Either new infrastructure, operational changes, or both are necessary to avoid and minimize project effects on fish populations in the Merrimack River and the Atlantic Ocean. The results of this study will inform future measures at the project to improve fish passage.

PROPOSED METHODOLOGY

A three-dimensional CFD model has become an increasingly common standard of analysis at hydroelectric projects around the nation. Within the Northeast region, we have used these models to address fish passage issues at the Holyoke (P-2004), Turners Falls (P-1889) Brunswick (P-2284), Shawmut (P-2322), Milford (P-2534) and Orono (P-2710) projects. Many three-dimensional hydraulic software packages are acceptable for this requested study, one of which is open source. We are not recommending one model over another, but the Licensee shall understand and document the limitations of the modeling software used. At a minimum, the modeling output should produce velocity, turbulence, and water depth for each cell in the mesh. The modeling domain shall be of sufficient size and mesh to characterize the hydraulic environment for each fishway evaluated. The domain for the forebay model should include the Northern Canal where the flow is relatively uniform and continue to the trash racks and to the point of free discharge in the fish bypass. The domain for the E.L. Field Powerhouse fish lift model should include upstream of the hopper through the tailrace where the highest density of detections occurred in the three-dimensional telemetry study (Alden Research Laboratory 2011), (Blue Leaf Environmental 2013). This model

should reflect conditions after ledge removal in the tailrace. The domain of the Pawtucket Dam fish ladder model should include the exit flume through the ladder and past the influence of the entrance jet and any auxiliary attraction water supply (e.g., adjacent crest gate and sluice gates). Calibration of each model should include a low and a high design flow to bracket the simulated hydraulic conditions, if possible. In order to understand project effects, multiple simulations of each calibrated model are necessary to evaluate hydraulic issues for the full range of design flows (i.e., up to 5% exceedance values during the migratory period) and typical existing operating conditions. At a minimum, we expect the following simulations:

- Forebay model with downstream bypass set at 5% E.L. Field Powerhouse turbine discharge.
    - Minimum flow, Unit 1
    - Minimum flow, Unit 2
    - 5% exceedance, both units
    - 75% exceedance, typical unit setting
- Fish lift model with auxiliary water supply (AWS) set at recommended settings.
    - Minimum flow, Unit 1
    - Minimum flow, Unit 2
    - 5% exceedance, both units
    - 50% exceedance, both units
- Fish ladder model with AWS set at recommended settings.
    - Minimum flow, AWS from adjacent crest gate
    - Minimum flow, AWS from sluice gate
    - 5% exceedance, typical spill settings

Model output should show potential hydraulic conditions that effect fish passage. For example, eddy formation, zones of rapid acceleration/deceleration, upwelling, high/low velocity, and high turbulence areas.

LEVEL OF EFFORT AND COST

The level of cost and effort for the three-dimensional CFD modeling study is moderate. The study will likely take one year. The Licensee will develop the models using existing drawings supplemented with limited survey, collect calibration data, run simulations, and report the results. We estimate the cost will be approximately $175,000 for the study. No alternatives are proposed.

5.6 REQUESTED STUDY #6: BYPASS ZONE-OF-PASSAGE STUDY

The Merrimack River is migratory corridor for a multitude of diadromous fish species including American eel, American shad, river herring, sea lamprey, and Atlantic salmon. These species must be able to pass the project without undue harm or delay to complete their life cycles. Poor passage at the project limits access to upstream spawning habitats harming genetic diversity and resilience within the population. The Lowell project includes an approximately 0.7-mile-long bypass reach from Pawtucket Dam to the E.L. Field Powerhouse tailrace. The powerhouse houses a fish lift and the dam includes a fish ladder that provide fish passage. The Licensee installed the dam fish ladder as a condition under the original license to provide passage at the dam during periods when river flow was high enough that the Project spilled. Due to increased numbers of diadromous species and fish observed at Lowell over the last decade and the

ineffectiveness of the fish lift, the Merrimack River Anadromous Fish Restoration Technical Committee decided to operate the fish ladder throughout the season, regardless of spill conditions. In addition, the Licensee has subsequently installed a pneumatic crest gate at the dam that decreases leakage through the flashboards and provides more control of spill over the dam. We request a study to determine a zone-of-passage through the bypass reach at multiple flows to ensure safe, timely, and effective passage at the project. A zone-of-passage is defined as the contiguous area of sufficient lateral, longitudinal, and vertical extent in which adequate hydraulic and environmental conditions are maintained to provide a route of passage through a stream reach influenced by a hydroelectric project (USFWS 2017).

GOALS AND OBJECTIVES

The goal of this study is to determine the zone-of-passage at multiple flows in the bypass reach that facilitate safe, timely, and effective fish passage through the project. The objectives of the study are to:

- complete a detailed survey of the bypass reach,
- develop a high-resolution, two-dimensional hydraulic model of the bypass reach,
- release multiple flows from the dam to collect calibration data for the model,
- simulate additional flows through the bypass reach with the calibrated model, and
- determine minimum and optimal zone-of-passage in the project bypass reach.

RESOURCE MANAGEMENT GOALS

The NMFS is a federal resource agency with a mandate to protect and conserve fishery resources and associated habitat. Regulatory statutes codify our resource management goals and plans. We rely on the best available data to support conservation recommendations and management decisions. Data sought in this study are not available. This study is an appropriate request for the pre-application period.

PUBLIC INTEREST

The requestor, NMFS, is a federal resource agency.

EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

Article 36 of the original license required the Licensee, after consultation with resource agencies, to develop an in-stream flow study plan to determine the relationship between project discharges and downstream aquatic habitat and a fishery study plan to determine project discharges necessary to provide for the migration of anadromous fish (i.e., zone of passage). After completion of the approved studies, the Licensee shall file a report on the results of the studies, and, for Commission approval, recommendations for the flow releases from the project. The Licensee filed the study plan on August 13, 1983 with proof of agency consultation (Accession No. 19830818-0191). However, we have been unable to obtain the reports required under Article 36. We have no reports on file nor have we found that the Licensee filed the reports in the eLibrary. Therefore, we have no quantitative data supporting the agreement that 300 cubic feet per second (cfs) at night and 500 cfs during the day are adequate for a zone-of-passage in the bypass reach as mentioned in the letter dated August 8, 1983 accompanying the study plan.

In the Comprehensive Fish Passage Plan filed on March 9, 2000 (Accession No. 20000313-0322), the Licensee states:

The adequacy of flows for upstream fish passage at the Project was addressed by BHI's construction of six (6) concrete flow control weirs (with adjustable stoplog sections) in the bypass reach, at the request of U.S. Fish and Wildlife Service and in response to Article 36, section (2) of the Project's FERC license.

Similar to the study plan, we have an agreement with no supporting information that substantiates the conclusion that these are adequate flows for a zone-of-passage in the bypass reach for the full suite of diadromous species.

As part of compliance for Article 34 of the original license, the Licensee filed as-built drawings of the fish passage facilities (Accession No. 19860902-0215). Within this abbreviated drawing set, drawing number 344D-PC001, 3844D-FC001, and 3844D-FC004 show topographic survey for small portions of the bypass reach. However, the drawings do not document the accuracy and precision of the survey, the drawing quality is illegible, and the drawings do not show the majority of the bypass reach.

This existing, supporting data is sparse, antiquated, and inadequate to determine the zone-of-passage at multiple flows in the bypass reach. Since agreeing upon the current zone-of-passage flows during the original license, we have new technologies in topographic survey methods, a better understanding of the hydraulic requirements of diadromous species, multi-dimensional hydraulic modeling capabilities, and an increased need to pass fish at the spillway ladder.

PROJECT NEXUS

Diadromous fish orient their migration based on the environmental conditions of the river: flow, depth, velocity, and temperature (Goodwin et al. 2014). Project operations affect the environmental conditions in the river, including the bypass reach. Two key hydraulic model outputs from the requested study are depth and depth-averaged velocity, which we can use to determine the likelihood of predation, delay, and the cessation of migration. Evaluating the flow fields in the bypass reach under different spill conditions will assist in the consultation process for determining a zone-of-passage in the bypass reach to optimize fish passage at the project. These data will contribute to the development of an administrative record in support of a potential settlement agreement, Section 18 fishway prescriptions, or 10(j) recommendations.

PROPOSED METHODOLOGY

We proposed the following methodology to accomplish the five objectives and ultimately the goal of the study, to determine zone-of-passage flows for the bypass reach.

1) Topographic survey

   The bypass reach area is large making traditional topographic survey methods laborious and costly. We recommend using Light Detection and Ranging (LiDAR) methods with limited traditional surveying. Outside of the fish passage season and during a river flow when the project is in control of the river, the bypass reach will be mostly dewatered. At this time, a licensed surveyor can fly the area to collect LiDAR data. Once this data is processed, traditional methods will fill in the gaps (e.g., pooled water areas, under bridges). The topographic survey shall be of sufficient resolution and quality to complete the remaining objectives.

2) Two-dimensional hydraulic model

There are many two-dimensional hydraulic models that are acceptable for accomplishing the goal of this requested study, many of which are open source. We are not requiring one model over the other, but the Licensee shall understand and document the limitations of the modeling software used. At a minimum, the modeling output should produce depth-average velocity and water depth for each cell in the mesh. The modeling domain shall be of sufficient size and mesh to delineate a zone-of-passage through the entire length and width of the bypass reach.

3) Calibration flows

The Licensee shall collect calibration data by spilling a minimum of two flows from the Pawtucket Dam. The calibration flows shall bracket the range of simulated flows in the study. We recommend 300 cfs for the low flow as it represents the current lowest operation flow for the fish ladder. For the high calibration flow, we recommend collecting data near the high fish passage design flow (i.e., the 5% exceedance value for the migratory period of record) which is approximately 26,000 cfs in the Merrimack River (bypass flow would be approximately 17,000 cfs with full project generation). The Licensee shall collect calibration data (depth-averaged velocity and depth) with an Acoustic Doppler Current Profiler (ADCP) at a minimum of four cross sections, including the downstream boundary condition. The Licensee shall use the ADCP in locations spread evenly throughout the bypass that have hydraulic conditions that are conducive to accurate readings (i.e., less turbulence).

4) Additional flow simulations

After calibrating the model, the Licensee shall simulate additional bypass flows including 500 cfs, 1,000 cfs, and couple other flows up to the high calibration flow. The additional simulations should represent the full range of hydraulic conditions in the bypass reach from the low to high fish passage design flow.

5) Zone-of-passage determination

The Licensee will use the model output to delineate a zone-of-passage pathway for each of the modeled flows. To determine the zone-of-passage, the Licensee will use the SprintSwim model developed by U.S. Geological Survey researchers (Haro et al. 2004).

LEVEL OF EFFORT AND COST

The level of cost and effort for the project survival study is low to moderate. The Licensee should be able to finish the bypass zone-of-passage study in one year depending on seasonal flow conditions. We estimate the cost to be approximately $80,000. No alternatives are proposed.

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Scott, Kelsey

From: Quiggle, Robert
Sent: Tuesday, May 7, 2019 2:08 PM
To: celeste_bernardo@nps.gov; Bob Nasdor (bob@americanwhitewater.org); Kevin.hollenbeck@state.ma.us
Cc: Kevin_mendik@nps.gov; 'Kevin.Webb@enel.com'; Anderson, Elise (EGP North America); Gibson, Jim; MacVane, Kelly; Scott, Kelsey
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Consultation Regarding the Recreation and Aesthetics Study
Attachments: 20190507 Lowell Hydro Project Recreation Study Consultation.pdf

Ms. Bernardo, Mr. Nasdor, and Mr. Hollenbeck:

On behalf of Boott Hydropower, LLC (Boott), I am distributing the attached consultation request in support of the Federal Energy Regulatory Commission (FERC) relicensing of the Lowell Hydroelectric Project (Project). As described in the attached correspondence, Boott is consulting with the National Park Service, American Whitewater, and the Massachusetts Department of Conservation and Recreation to identify locations in the Project's vicinity to conduct visitor intercept surveys of recreationists for the approved Recreation and Aesthetics Study.

Should you have any questions regarding the attached correspondence, please contact Kevin Webb with Boott at 978-935-6039 or Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
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Robert.Quiggle@hdrinc.com

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Boott Hydropower, LLC
A Subsidiary of Enel Green Power North America, Inc.

100 Brickstone Square, Suite 300 – Andover, MA 01810 – USA
T +1 978 681 1900 – F +1 978 681 7727

Via Electronic Distribution

May 7, 2019

Celeste Bernardo
Superintendent of Lowell National Historical Park
National Park Service
67 Kirk Street
Lowell, MA 01852

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Consultation Regarding the Water Level and Flow Effects on Historic Resources Study

Dear Ms. Bernardo,

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the 22.4 megawatt (MW) Lowell Hydroelectric Project (Project or Lowell Project). The Lowell Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

In accordance with the Commission's Study Plan Determination issued on March 13, 2019, Boott is initiating consultation with the National Park Service (NPS) regarding the locations of water level loggers (pressure transducers) to be placed within the Lowell canal system for the Water Level and Flow Effects on Historic Resources Study. As part of the study, Boott will temporarily install level loggers at up to ten locations within the canal system. At each location, Boott will install one primary and one backup level logger, for a total of twenty level loggers. The level loggers will record water elevations in 15-minute increments from May 2019 through May 2020. In addition to these loggers, water levels at the Pawtucket Dam and E.L. Field Powerhouse forebay are logged by the Project's control system

The information collected will be compared to Project operational and flow data for the period of record to assess how Project operations and flows into the canal system effect water levels, which in turn may affect historic resources and NPS operations. Boott will conduct the assessment of the data in the spring and summer of 2020.

As shown in Figure 1 provided as Attachment A, Boott is proposing ten strategic and representative locations to deploy the level loggers within the Lowell canal system. These level logger locations may be slightly revised based on site conditions encountered during deployment. As we are planning on deploying these loggers in the near term, Boott respectfully requests any comments regarding these proposed deployment locations within 15 days of this letter (i.e. by May 22, 2019). If we do not receive a response from your office, Boott will move forward with the temporary installation of the level loggers at the locations shown on the attached map.

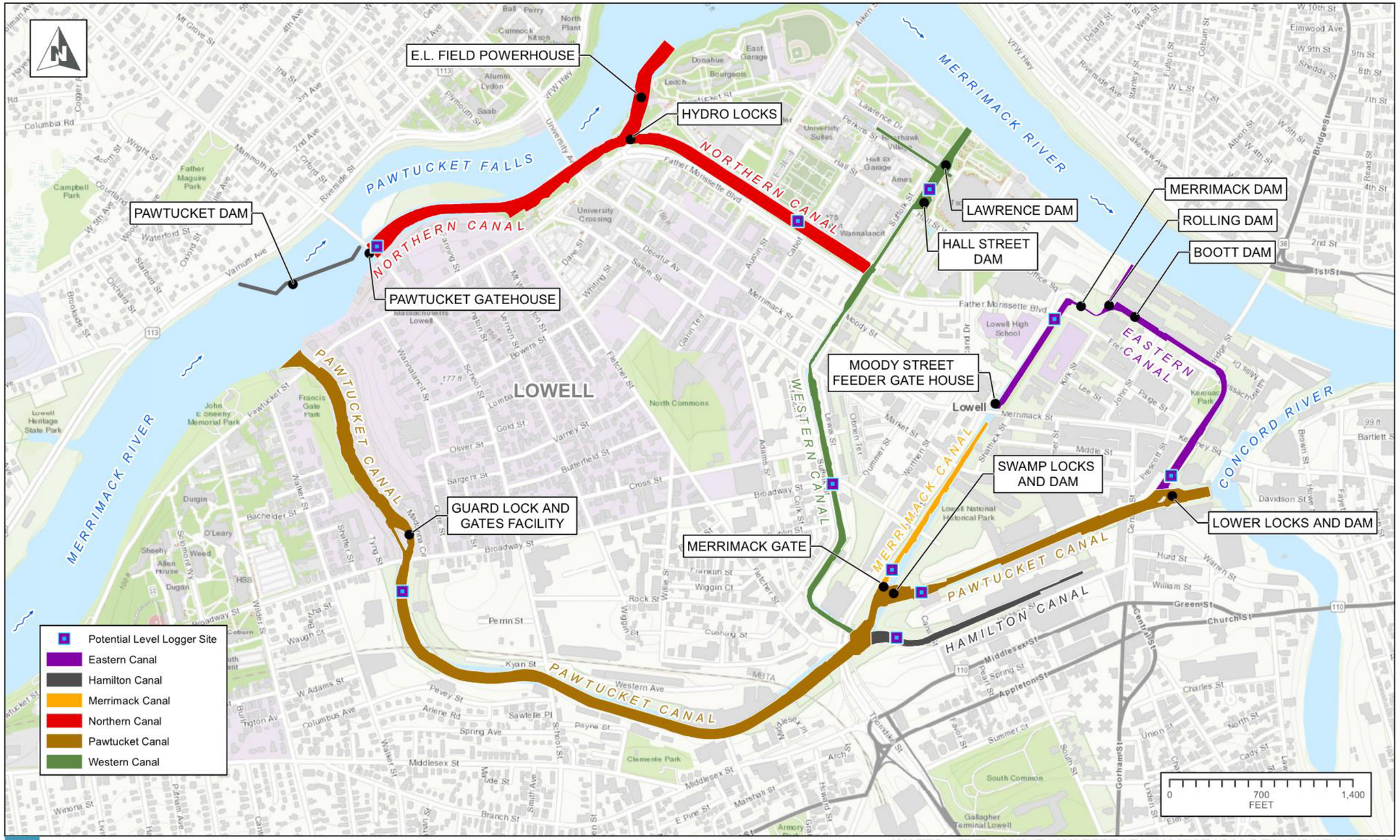
On behalf of Boott, I appreciate the opportunity to consult with the NPS regarding this study. Please do not hesitate to contact me at (978) 935-6039 if you have any questions concerning this matter.

Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

cc: K. Bose, FERC
K. Mendik, NPS

Attachment A – Figure 1



BOOTT HYDRO, LLC.

WATER LEVEL AND FLOW EFFECTS ON HISTORIC RESOURCES STUDY

LOWELL HYDROELECTRIC PROJECT

FERC NO. 2790

PATH: \\PIT-SRV01\GIS\NY\ENEL\10194574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\MAP_LEVELLOGGER_LOCATIONS.MXD - USER: KAUSTIN - DATE: 5/6/2019

MAY 2019

Boott Hydropower, LLC
A Subsidiary of Enel Green Power North America, Inc.

100 Brickstone Square, Suite 300 – Andover, MA 01810 – USA
T +1 978 681 1900 – F +1 978 681 7727

Via Electronic Distribution

May 7, 2019

Celeste Bernardo
Superintendent of Lowell National Historical Park
National Park Service
67 Kirk Street
Lowell, MA 01852

Robert Nasdor
NE Stewardship Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776

Kevin Hollenbeck
Metrowest District Manager
DCR Great Brook Farm State Park
984 Lowell Street
Carlisle, MA 01741

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Consultation Regarding the Recreation and Aesthetics Study

Dear Stakeholders:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and operator of the 22.4 megawatt (MW) Lowell Hydroelectric Project (Project or Lowell Project). The Lowell Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

In accordance with the Commission's Study Plan Determination issued on March 13, 2019, Boott is initiating consultation with the National Park Service (NPS), American Whitewater, and the Massachusetts Department of Conservation and Recreation (MADCR) to identify specific locations for field reconnaissance and visitor-intercept surveys. As part of the Recreation and Aesthetics Study, Boott will conduct field reconnaissance and visitor-intercept interviews at specific recreational facilities during the prime recreational season from May 2019 through October 2019. Boott will interview recreationists visiting these locations to collect data relevant to visitors' recreational experience in the Project area, including but not limited to, data regarding demographics, types of recreational activities participated in or may participate in during their visit, and their reasons for choosing the site or area. As a separate component of the Recreation and Aesthetics Study, Boott is hosting an online version of the visitor-intercept survey to capture additional recreationists that would like to participate (the online version of the visitor survey is available at: https://hdrinc.co1.qualtrics.com/jfe/form/SV_0AnPxTboxMRT8nX). Boott will install signage informing recreationists of the online survey at various locations determined in consultation with NPS.
As shown in Figure 1 provided as Attachment A, Boott is proposing the following nine locations to conduct the reconnaissance and visitor-intercept surveys:

- Lowell Heritage State Park
- Merrimack Trail System

- Pawtucket Falls Overlook
- NPS Canal Walkways
- Lowell National Historic Park
- Lowell National Historic Park Visitor Center
- Chelmsford Boat Access
- Rourke Brothers Boat Ramp
- Merrill Park

Boott is also proposing ten locations[1] (as shown in Figure 1) to install the temporary signs informing recreationists of the online survey opportunity. Boott respectfully requests any comments regarding the proposed reconnaissance and visitor-intercept locations or the signage locations within 15 days of this letter (i.e., by May 22, 2019). Following consultation with stakeholders, Boott will develop the final list of reconnaissance and visitor-intercept locations and will file the final list with the Commission and distribute to American Whitewater, NPS, and the MADCR. If we do not receive a response from your office, Boott will move forward with the study to include the visitor-intercept survey locations as shown in the attached figure.

On behalf of Boott, I appreciate the opportunity to consult with your offices regarding this study. Please do not hesitate to contact me at (978) 935-6039 if you have any questions concerning this matter.

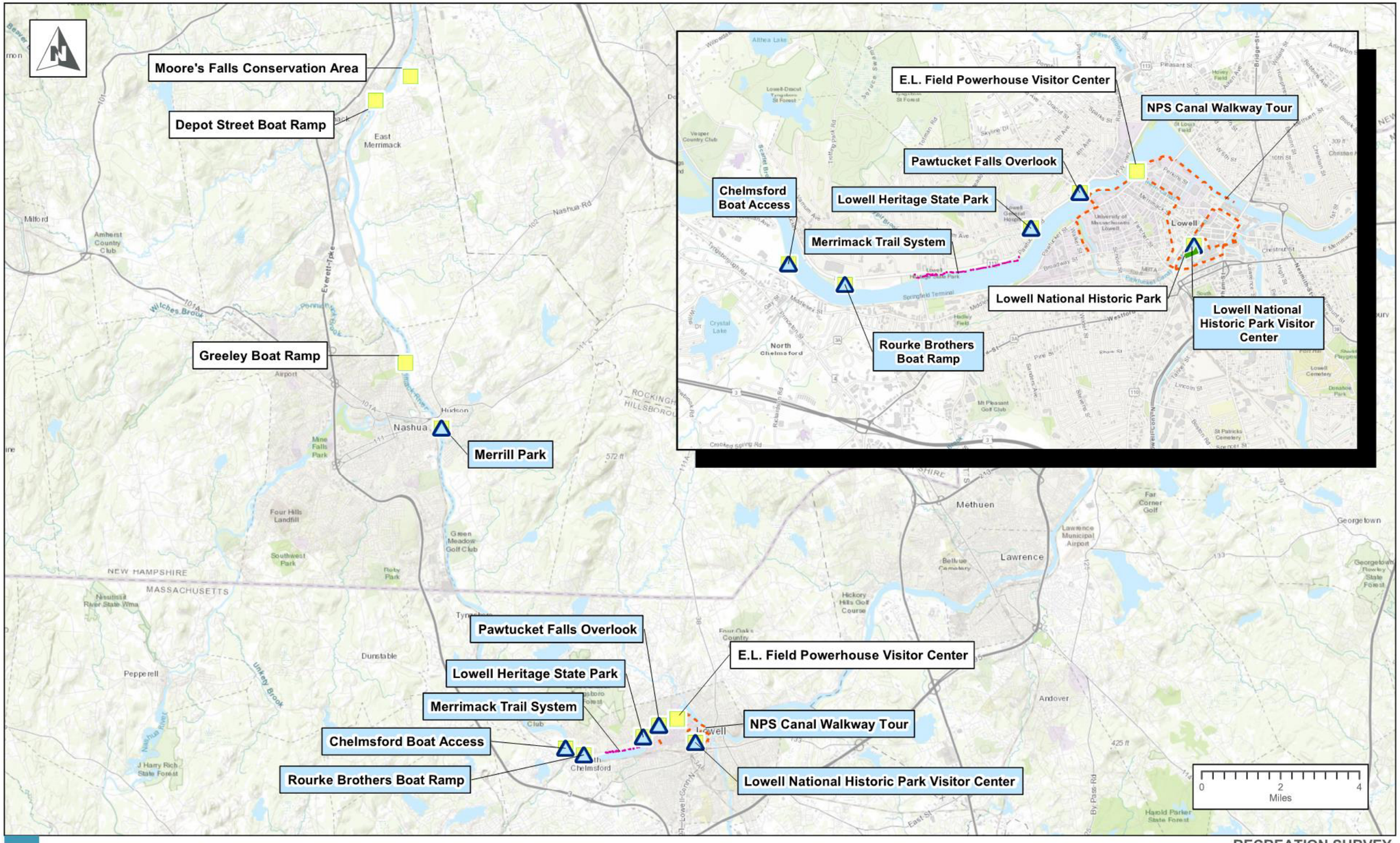
Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

cc: K. Bose, FERC
K. Mendik, NPS

Attachment A – Figure 1

[1]Boott will install temporary signs that will be removed at the completion of the study season. Boott will not affix signage to any historic structures or cultural resources without additional prior consultation with NPS and NPS partners.



BOOTT HYDRO, LLC.

Recreation Survey Location | Proposed Signage Location | Merrimack River Trail | NPS Canal Walkway Tour

RECREATION SURVEY

LOWELL HYDROELECTRIC PROJECT

FERC NO. 2790

PATH: \\PIT-SRV05\GIS\NY\ENEL\10104574_ENEL_LOWELL_STUDIES\MAP_DOCS\DRAFT\COPY_OF_MAP_RECREATIONSURVEY_9SITES.MXD - USER: KAUSTIN - DATE: 5/7/2019

MAY 2019

Scott, Kelsey

From: Quiggle, Robert
Sent: Tuesday, May 7, 2019 1:45 PM
To: celeste_bernardo@nps.gov
Cc: kevin.mendik@nps.gov; 'Kevin.Webb@enel.com'; Gibson, Jim; MacVane, Kelly; Anderson, Elise (EGP North America); Scott, Kelsey
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Consultation Regarding the Water Level and Flow Effects on Historic Resources Study
Attachments: 20190507 Lowell Hydro Project Flow Effects Study Consultation.pdf

Ms. Bernardo:

On behalf of Boott Hydropower, LLC (Boott), I am distributing the attached consultation request in support of the Federal Energy Regulatory Commission (FERC) relicensing of the Lowell Hydroelectric Project (Project). As described in the attached correspondence, Boott is consulting with the National Park Service to identify locations at the Project where water surface level loggers will be temporarily installed to record data for the approved Water Level and Flow Effects on Historic Resources Study.

Should you have any questions regarding the attached correspondence, please contact Kevin Webb with Boott at 978-935-6039 or Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
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AMERICAN WHITEWATER

Robert A. Nasdor
Northeast Stewardship & Legal Director
365 Boston Post Road, Suite 250
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

www.americanwhitewater.org

May 17, 2019

Kevin Webb
Enel Green Power
100 Brickstone Square, Suite 300
Andover, MA 01810

Dear Kevin,

I write in response to your letter of May 7, 2019 regarding the proposed locations for field reconnaissance user intercept surveys for the Lowell Hydroelectic Project Recreation and Aesthetics Study. Thank you for reaching out to us to solicit our feedback in accordance with the requirements of the Study Plan Determination.

While the proposed locations will provide useful information to better understand aspects of current and future recreational use in the project area, these proposed locations will not collect information that will enable the Licensee and FERC to evaluate recreational demand for flows, access, and facilities that would support whitewater boating opportunity in the bypassed reach or in other areas that are impacted by project operations. There is well established history of whitewater boating on the Concord River during the spring freshet, demonstrating that there is strong interest in whitewater boating opportunity in the project area. Given the current lack of flows, access and information that would provide for whitewater boating opportunity in the bypassed reach, we do not believe that the survey locations will adequately collect information that will be useful for determining future whitewater boating use.

We recommend that the Licensee utilize the online survey instrument to collect information from whitewater boaters to evaluate the demand for whitewater boating opportunity at the project. In addition, the Licensee should incorporate into this study the results of the planned whitewater boating study that will evaluate the suitability of the bypassed reach for whitewater boating. We also recommend that the licensee collect user intercept surveys at the whitewater takeout on the Merrimack River below the confluence with the Concord River during weekends during the spring freshet in 2020 in order to include information from whitewater boaters in this study.

Thank you for considering this information in the development of the survey plan.

We look forward to working with you throughout the relicensing process.

Very truly yours,

Bob Nasdor
Northeast & Legal Stewardship Director
365 Boston Post Road, Suite 250
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

Scott, Kelsey

From: Bernardo, Celeste <celeste_bernardo@nps.gov>
Sent: Tuesday, May 28, 2019 9:16 AM
To: Jones, Scott
Subject: Re: [EXTERNAL] Lowell Level Logger Deployment

Great. Thank you!
Celeste

Celeste Bernardo
Superintendent
Lowell National Historical Park
978 275-1703
celeste_bernardo@nps.gov
Like us on Facebook

On Tue, May 28, 2019 at 7:56 AM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

> Celeste,
>
> Made it in safely last night. I will meet you at the Boot Mills Museum Conference Room at 10:30 this morning. Thanks,
>
> **Scott A. Jones, B.S., PWS**
>
> Senior Environmental Scientist/Project Manager
>
> **D** 315.414.2205 **M** 315.317.6680
>
> scott.jones@hdrinc.com
>
> hdrinc.com/follow-us
>
> **From:** Bernardo, Celeste [mailto:celeste_bernardo@nps.gov]
> **Sent:** Friday, May 24, 2019 2:56 PM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Cc:** Kevin.Webb@enel.com; Gibson, Jim <Jim.Gibson@hdrinc.com>; Anderson, Elise (EGP North America) <elise.anderson@enel.com>; Jones, Scott <Scott.Jones@hdrinc.com>
> **Subject:** Re: [EXTERNAL] Lowell Level Logger Deployment

Great! We will actually be meeting at the Boott Cotton Mills Museum at the Foot of John Street. There is pay parking in the Joseph Downes Garage at 75 John Street. He can walk to the Boott Mills Museum, but rather than going in the entrance, he should continue down the mill courtyard to the business entrance. There he can enter and take the elevator up to the 5th floor where we will be meeting in the conference room (left out of the elevators). My cell phone is 508.415.4715 should he need to reach me.

Celeste

Celeste Bernardo

Superintendent

Lowell National Historical Park

978 275-1703

celeste_bernardo@nps.gov

Like us on Facebook

On Fri, May 24, 2019 at 2:47 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Celeste:
>
> It was good to talk with you this afternoon. Scott Jones, a Senior Scientist with HDR, will be at the project on Tuesday to install the equipment as we discussed. Scott will be travelling part of the way on Monday evening, and will try to be at your office by 10:30 AM on Tuesday morning. If he is delayed due to traffic he will head over to your office as soon as he gets into town.
>
> I am passing along Scott's contact information so that you or your staff can reach out to him directly while he's in the field:
>
> **Scott A. Jones, B.S., PWS**

Senior Environmental Scientist/Project Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2205 **M** 315.317.6680
scott.jones@hdrinc.com

If you could let Scott know the best way to contact you (email, phone, text), he'll contact you on Tuesday morning so that you'll know his schedule.

Thanks again for taking the time to review the maps and material with your team on Tuesday, and we look forward to working with the Park Service on these upcoming studies.

Sincerely,

Robert Quiggle, RPA

Regulatory and Environmental Section Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

To: Jones, Scott
Subject: RE: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Friday, June 14, 2019 10:15 AM
To: Jones, Scott <Scott.Jones@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

Scott,

The City of Lowell is carrying out a number of bridge construction project this year and the crew is experiencing issues controlling water. There is a moderate probability the entire canal system will be drained down next week to diagnose and resolve the problem. City is being fined thousands of dollars daily while work cannot not resume and the water control issue cannot be delayed. Is there any chance you could rework your schedule for the following week?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

On Fri, Jun 14, 2019 at 7:52 AM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

> Christine,
>
> Right now we are scheduled for Tuesday (6/18) as I am also scheduled to be on another project on Wednesday and Thursday of that week. This other work is flow and weather dependent so if anything changes I will certainly let you know. Thanks for the update.
>
> Regards,
>
> **Scott A. Jones, B.S., PWS**
>
> Senior Environmental Scientist/Project Manager
>
> **D** 315.414.2205 **M** 315.317.6680
>
> scott.jones@hdrinc.com
>
> hdrinc.com/follow-us

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Thursday, June 13, 2019 11:54 AM
To: Jones, Scott <Scott.Jones@hdrinc.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

Scott,

Now that the Eastern Canal is drained for bridge work, there is a lot of trash visible on the canal bottom. This includes electronics and other hazardous items. Our staff are in a required 2-day occupational hazard training Tuesday and Wednesday next week. Would it at all be possible to meet in the field with you Thursday instead?

Christine Bruins | Community Planner

Lowell National Historical Park

978.275.1726 (office) | 978.954.1011 (cell)

On Wed, Jun 12, 2019 at 2:47 PM Bruins, Christine <christine_bruins@nps.gov> wrote:

> We can arrange to take you by trolley/boat to efficiently get you to and around most of the canal areas.
>
> **Christine Bruins | Community Planner**
>
> Lowell National Historical Park
>
> 978.275.1726 (office) | 978.954.1011 (cell)
>
> On Wed, Jun 12, 2019 at 2:44 PM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

Christine,

Thank you for following up with us. I received your message but have been tied up this afternoon. I am still solidifying my plans for next week, but we envision either Tuesday or Wednesday and can certainly meet you/staff/partners during one of those afternoons. I should know for sure by the end of this week. Thank you also for the detailed map, it will certainly make our visit more efficient. I will let you know as soon as I confirm my schedule. Thanks again,

Scott A. Jones, B.S., PWS

Senior Environmental Scientist/Project Manager

D 315.414.2205 **M** 315.317.6680

scott.jones@hdrinc.com

hdrinc.com/follow-us

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Wednesday, June 12, 2019 2:34 PM
To: Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Cc: Jones, Scott <Scott.Jones@hdrinc.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

Scott,

Celeste asked me to coordinate your trash survey next week with our staff and partners. I have gathered information from our staff on the areas where trash collects (see attached map). I am very interested in meeting with you to discuss the issues and problem areas. I'd also be interested in accompanying you and others for part of your field work. I'm collecting the availability of other staff and partners that would like to be involved in the study. Have you narrowed your field work within next week? My availability next week is as follows, will update you when I hear back from a couple of others.

Mon 6/17 - After 2 pm

Tue 6/18 - after 12 pm

Wed 6/19 before 2 pm

Thurs - anytime

Fri - anytime

Christine Bruins | Community Planner

Lowell National Historical Park

978.275.1726 (office) | 978.954.1011 (cell)

On Tue, Jun 4, 2019 at 10:35 AM Bernardo, Celeste <celeste_bernardo@nps.gov> wrote:

> Christine, in my absence, are you okay with coordinating with ENEL on this? I am fine with them attending a management team or biweekly meeting, although biweekly would be better since there are more supervisors. Or else you can set up a separate meeting. Can you check with Paul and Kevin and see who on their staffs should participate?
>
> Celeste
>
> Celeste Bernardo
>
> Superintendent
>
> Lowell National Historical Park
>
> 978 275-1703
>
> celeste_bernardo@nps.gov
>
> Like us on Facebook
>
> ---------- Forwarded message ---------
> From: **Jones, Scott** <Scott.Jones@hdrinc.com>
> Date: Mon, Jun 3, 2019 at 2:50 PM

Subject: [EXTERNAL] Lowell Project Recreation and Aesthetics Study
To: Bernardo, Celeste <celeste_bernardo@nps.gov>
Cc: Kevin.Webb@enel.com <Kevin.Webb@enel.com>, Quiggle, Robert <Robert.Quiggle@hdrinc.com>

Celeste,

As part of the Lowell Recreation and Aesthetics Study, HDR is planning on visiting the Project the week of June 17-21, 2019 to survey and document waterborne trash as outlined in the study plan approved by the Federal Energy Regulatory Commission. In accordance with the approved plan, HDR is conducting this work in the spring of 2019 when higher flows typically push trash and debris downstream. Based on our meeting last week, HDR understands that NPS staff is very familiar with locations within the canal system where waterborne trash accumulates. In anticipation of our visit, HDR would like to coordinate with your office to identify these areas so that we can accurately document and record these locations.

Accordingly, we are hoping to meet with you or your staff to briefly review project maps prior to the start of fieldwork. If you could let me know a good time during the week of June 17 to meet with you or appropriate NPS staff, it would be greatly appreciated. Please note that NPS staff is also welcome to accompany us as we conduct this fieldwork (we expect the work to take about a day to complete).

Thank you,

Scott A. Jones, B.S., PWS

Senior Environmental Scientist/Project Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2205 **M** 315.317.6680
scott.jones@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Bernardo, Celeste <celeste_bernardo@nps.gov>
Sent: Wednesday, July 3, 2019 8:25 AM
To: Jones, Scott
Cc: Kevin.Webb@enel.com; Quiggle, Robert
Subject: Re: [EXTERNAL] Lowell Project Recreation and Aesthetics Study

That's great Scott. Thank you for the clarification. Look forward to assisting where we can.

Celeste

Celeste Bernardo
Superintendent
Lowell National Historical Park
978 275-1703
celeste_bernardo@nps.gov
Like us on Facebook

On Tue, Jul 2, 2019 at 7:48 PM Jones, Scott <Scott.Jones@hdrinc.com> wrote:

> Celeste,
> As the RSP and the FERC SPD indicates we will be surveying for water-borne trash after spring freshet, so with the unusual conditions this year we will be performing this component in 2020. Tomorrow we will be downloading the level loggers and installing recreational survey signs. Call or email me if you or Christine have any questions.
>
> Sent via the Samsung Galaxy S9+, an AT&T 5G Evolution capable smartphone

Boott Hydropower, LLC
A Subsidiary of Enel Green Power North America, Inc.

100 Brickstone Square, Suite 300 – Andover, MA 01810 – USA
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Via Email and Post

July 24, 2019

Mr. Robert Nasdor
NE Stewardship Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org

Ms. Celeste Bernardo
Superintendent
Lowell National Historic Park
US National Park Service
67 Kirk Street
Lowell, MA 01852
celeste_bernardo@nps.gov

Mr. Steve Carlin
Park Supervisor
Lowell Heritage State Park
Massachusetts Department of Conservation & Recreation
160 Pawtucket Blvd.
Lowell, MA 01854
steve.carlin@state.ma.us

Mr. George Rose
Deputy Director
Office of Emergency Management
The City of Lowell Fire Department
JFK Civic Center
99 Moody Street
Lowell, MA 01852

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Whitewater Boating and Access Study

Dear Stakeholders:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and owner of the 22.4 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project or Lowell Project). The Lowell Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations Part 5.

In accordance with the ILP, Boott developed a Pre-Application Document (PAD) and Notice of Intent (NOI) which were filed with the Commission on April 30, 2018 to initiate the formal relicensing process. By letter dated August 8, 2018, American Whitewater (AW) provided comments on the PAD and NOI and requested that Boott undertake a controlled flow release whitewater study in support of Project relicensing. Pursuant

to the requirements of the ILP, Boott developed a Proposed Study Plan (PSP) that was filed with the Commission on September 28, 2018. In the PSP, Boott proposed a Whitewater Boating and Access Study to assess the Project's bypass reach for whitewater boating and boater accessibility. A revised Whitewater Boating and Access Study plan was filed in Boott's January 28, 2019 Revised Study Plan (RSP) for Project relicensing. As described in the RSP, Boott proposed to conduct a Whitewater Boating and Access Study based on the guidance provided in *Flows and Recreation: A Guide to Studies for River Professionals*[1]. FERC issued the Study Plan Determination (SPD) for the Project on March 13, 2019. The Commission's SPD approved the Whitewater Boating and Access Study plan without modifications.

As described in the approved Whitewater Boating and Access Study plan, Boott has proposed to form a Whitewater Boating and Access Study Working Group (Working Group) to assist in study planning and coordination and to identify volunteer boaters to participate in this study. As an initial step in the planning process, Boott is inviting potentially interested stakeholders to participate in a Working Group site visit at the Project to discuss the study schedule and logistics, volunteer participation, general safety, flow releases, and the survey forms included as appendices D, E, and F of the RSP. During this site visit, the Working Group will also conduct a reconnaissance of the Project's bypass reach to identify site-specific safety concerns and access areas.

Boott invites stakeholders to participate in a Working Group site visit at the Project on August 8, 2019 from 9:00 AM until 12:00 PM. Please notify the undersigned at Kevin.Webb@enel.com if you intend to participate in the Working Group site visit or if you would like to suggest a different date and/or time. Parties interested in participating should meet at the Project's E.L. Field Powerhouse located at 145 Pawtucket Street, Lowell, Massachusetts 01854. Please wear sturdy footwear; no sandals, open-toed shoes, or shorts.

At this time, Boott is not aware of other stakeholders or organizations with an interest in participating in the Working Group. If your office knows of any additional stakeholders or organizations who should be invited to participate, Boott respectfully requests that you notify the undersigned via email at your earliest convenience so that they can be invited to participate in the site visit.

On behalf of Boott, I appreciate the opportunity to consult with you, and we look forward to meeting with you in August to discuss the upcoming Whitewater Boating and Access Study. Please do not hesitate to contact me at (978) 935-6039 or via email at Kevin.Webb@enel.com if you have any questions concerning this study or Project relicensing.

Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

Cc: E. Anderson (Enel)
Christine Bruins (NPS)
R. Quiggle (HDR)

[1] Whittaker. (2005). *Flows and Recreation: A Guide to Studies for River Professionals.* Washington, DC: Hydropower Reform Coalition and National Park Service - Hydropower Recreation Assistance.

Scott, Kelsey

From: Quiggle, Robert
Sent: Wednesday, July 31, 2019 11:24 AM
To: Bob Nasdor; Webb, Kevin (EGP North America)
Cc: Anderson, Elise (EGP North America); Scott, Kelsey
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Thanks, Bob. We are continuing to do outreach to the invited participants, and we will let you know when we have a response.

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor [mailto:bob@americanwhitewater.org]
Sent: Wednesday, July 31, 2019 6:48 AM
To: Webb, Kevin (EGP North America) <kevin.webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Anderson, Elise (EGP North America) <elise.anderson@enel.com>
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

We need to firm up whether this is happening on the 8th by Friday or wise postpone the meeting to another week.

Robert Nasdor
American Whitewater
Northeast Stewardship & Legal Director
65 Blueberry Hill Lane
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

From: Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Sent: Friday, July 26, 2019 9:58:18 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Bob Nasdor <bob@americanwhitewater.org>
Cc: Anderson, Elise (EGP North America) <elise.anderson@enel.com>
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Thanks Rob. Either of those days would work for me.

From: Quiggle, Robert [mailto:Robert.Quiggle@hdrinc.com]
Sent: Friday, July 26, 2019 9:52 AM
To: Bob Nasdor

Cc: Webb, Kevin (EGP North America); Anderson, Elise (EGP North America)
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Bob:

I haven't had any additional feedback, but I will let you know when we hear back from the group. Copying Kevin and Elise with Enel here so that they can stay in the loop for planning purposes.

Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor [mailto:bob@americanwhitewater.org]
Sent: Thursday, July 25, 2019 7:51 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Any feedback from others on the meeting? My first choice would be on the 9th, second choice on the afternoon of the 8th. Thanks

Bob

Robert Nasdor
American Whitewater
Northeast Stewardship & Legal Director
65 Blueberry Hill Lane
Sudbury, MA 01776
617-584-4566
bob@americanwhitewater.org

From: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Sent: Wednesday, July 24, 2019 1:03:16 PM
To: Bob Nasdor | AW <bob@americanwhitewater.org>
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

No problem, Bob. See you next month

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor | AW [mailto:bob@americanwhitewater.org]
Sent: Wednesday, July 24, 2019 12:58 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Oops. Wrong year. 2020. That should work for me.

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Wed, Jul 24, 2019 at 12:42 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob:
>
> You may be looking at the wrong month (maybe June?); August 8 is a Thursday.
>
> I think this will be a good opportunity for everyone to really have a look at the reach together and work out some of the logistics. Looking forward to meeting with you at Lowell.
>
> Thanks,
>
> **Robert Quiggle,** RPA
> *Regulatory and Environmental Section Manager*
>
> **HDR**
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us
>
> **From:** Bob Nasdor | AW [mailto:bob@americanwhitewater.org]
> **Sent:** Wednesday, July 24, 2019 12:37 PM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Subject:** Re: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
>
> Hi Rob,
>
> Thanks for sending this. Looking forward to the meeting. This is scheduled for Saturday, August 8th? I would have no objections to this taking place on Fiday Augist 7th if that's better for others.
>
> Bob

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Wed, Jul 24, 2019 at 10:20 AM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Boott Hydropower, LLC, a subsidiary of Enel Green Power North America, is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study in the Project's bypassed reach located in the City of Lowell. On behalf of Boott, we are inviting your participation in an upcoming Whitewater Boating and Access Study Working Group site visit to the Project on August 8, 2019. The site visit is an important component of the study and will be an opportunity to discuss study logistics, volunteer participation, safety, boater access, boatability, flows in the bypassed reach, and survey instruments. Additional details regarding the August 8, 2019 site visit are presented in the attached letter.
>
> Should you have any questions regarding the upcoming site visit, please contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.
>
> Thank you,
>
> **Robert Quiggle,** RPA
> *Regulatory and Environmental Section Manager*
>
> **HDR**
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us

Scott, Kelsey

From: Anderson, Elise (EGP North America) <elise.anderson@enel.com>
Sent: Monday, August 5, 2019 2:38 PM
To: Quiggle, Robert; Bob Nasdor (bob@americanwhitewater.org); celeste_bernardo@nps.gov; steve.carlin@state.ma.us; jcalvin@lowelllandtrust.org; Christine_bruins@nps.gov
Cc: Webb, Kevin (EGP North America); Battaglia, Brett; Scott, Kelsey; Gibson, Jim; Jones, Scott; Clark, Jeff (EGP North America)
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Hi All-

We have invited the Lowell Fire Chief to attend the working group meeting (awaiting confirmation).
The City's perspective on emergency responder access to the bypass area will be an important component to consider for the study.

Looking forward to our meeting Thursday.

Thank you,

Elise Anderson
Sr. Environmental Permitting Specialist
Business Development

Enel Green Power North America
100 Brickstone Square– Ste 300 – Andover , MA – 01810- USA
M +1-978-447-4408
elise.anderson@enel.com

This message is intended for the following use only: PUBLIC – INTERNAL – CONFIDENTIAL – STRICTLY CONFIDENTIAL

This e-mail is confidential and may well also contain information privileged by law. If you have received it in error, you are on notice of its status. Please notify us immediately by reply e-mail and then delete this message from your system. Please do not copy it or use it for any purposes, or disclose its contents to any other person, unless authorised. Any misuse could be a breach of confidence.

From: Quiggle, Robert [mailto:Robert.Quiggle@hdrinc.com]
Sent: Friday, August 2, 2019 2:11 PM
To: Bob Nasdor (bob@americanwhitewater.org) <bob@americanwhitewater.org>; celeste_bernardo@nps.gov; steve.carlin@state.ma.us; jcalvin@lowelllandtrust.org; Christine_bruins@nps.gov
Cc: Anderson, Elise (EGP North America) <elise.anderson@enel.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>; Battaglia, Brett <Brett.Battaglia@hdrinc.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>;

Gibson, Jim <Jim.Gibson@hdrinc.com>; Jones, Scott <Scott.Jones@hdrinc.com>
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Dear Stakeholders:

Based on feedback from American Whitewater and the National Park Service, we are confirming the Whitewater Boating and Access Study Working Group site visit at the Lowell Hydroelectric Project on August 8, 2019. Participants indicated that an afternoon meeting would be best; accordingly, we are inviting interested stakeholders to **meet at 12 PM on Thursday, August 8, 2019 at the E.L. Field Powerhouse** located at 145 Pawtucket Street, Lowell, Massachusetts 01854. We expect the site visit will last about three hours. As a reminder, please wear sturdy footwear; no sandals, open-toed shoes, or shorts. Should you have any questions about the site visit, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Quiggle, Robert
Sent: Wednesday, July 24, 2019 10:21 AM
To: Bob Nasdor (bob@americanwhitewater.org) <bob@americanwhitewater.org>; 'celeste_bernardo@nps.gov' <celeste_bernardo@nps.gov>; 'steve.carlin@state.ma.us' <steve.carlin@state.ma.us>
Cc: 'Christine_bruins@nps.gov' <Christine_bruins@nps.gov>; Anderson, Elise (EGP North America) <elise.anderson@enel.com>; 'Kevin.Webb@enel.com' <Kevin.Webb@enel.com>; MacVane, Kelly <Kelly.MacVane@hdrinc.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Gibson, James (Jim.Gibson@hdrinc.com) <Jim.Gibson@hdrinc.com>
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study

Dear Stakeholders:

Boott Hydropower, LLC, a subsidiary of Enel Green Power North America, is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study in the Project's bypassed reach located in the City of Lowell. On behalf of Boott, we are inviting your participation in an upcoming Whitewater Boating and Access Study Working Group site visit to the Project on August 8, 2019. The site visit is an important component of the study and will be an opportunity to discuss study logistics, volunteer participation, safety, boater access, boatability, flows in the bypassed reach, and survey instruments. Additional details regarding the August 8, 2019 site visit are presented in the attached letter.

Should you have any questions regarding the upcoming site visit, please contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

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1304 Buckley Road, Suite 202
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D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

To: Scott, Kelsey
Subject: RE: [EXTERNAL] RE: Agenda / Schedule for 2 day FERC Study Plan Work Session

From: Quiggle, Robert
Sent: Tuesday, September 17, 2019 3:50 PM
To: Bruins, Christine <christine_bruins@nps.gov>
Cc: 'Kevin.Webb@enel.com' <Kevin.Webb@enel.com>; Anderson, Elise (EGP North America) <elise.anderson@enel.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Gibson, Jim <Jim.Gibson@hdrinc.com>
Subject: RE: [EXTERNAL] RE: Agenda / Schedule for 2 day FERC Study Plan Work Session

Christine:

Attached is a draft agenda for the proposed two-day workshop in support of the Lowell Hydroelectric Project FERC relicensing. Once you've had a chance to review with your team, we can look to see what dates would make sense. I'd like to try for a mid-October timeframe, as there is a field/site visit component associated with this, and it would probably be better to get that done before things get too snowy/icy.

If you have questions or would like to discuss further, please don't hesitate to call or email me.

Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Monday, September 16, 2019 5:05 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Re: [EXTERNAL] RE: Agenda / Schedule for 2 day FERC Study Plan Work Session

Hi Rob,

Have you made progress on a 2-day work session agenda?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

On Mon, Sep 9, 2019 at 10:17 AM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Christine:

We are working on finalizing that agenda now, and will provide to you shortly.

Thanks,

Robert Quiggle, RPA

Regulatory and Environmental Section Manager

HDR

1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Monday, September 9, 2019 10:15 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Agenda / Schedule for 2 day FERC Study Plan Work Session

Rob,

Can you please forward the agenda / schedule for the planned 2 day FERC Study work session so that I can get a list of contacts to reach out to regarding scheduling?

Christine Bruins | Community Planner

Lowell National Historical Park

978.275.1726 (office) | 978.954.1011 (cell)

Scott, Kelsey

From: Quiggle, Robert
Sent: Monday, October 28, 2019 3:25 PM
To: Bob Nasdor (bob@americanwhitewater.org); celeste_bernardo@nps.gov; Bruins, Christine; Cooksey, William (DCR); John Aziz; Hoffmann, Peter (DCR); 'bruce@zoaroutdoor.com'; kevin@zoaroutdoor.com; Rose, George; CMcCall@lowellma.gov
Cc: 'Kevin.Webb@enel.com'; Anderson, Elise (EGP North America); Scott, Kelsey
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
Attachments: 20191028 Lowell Whitewater Flow Documentation Plan.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Working Group Participants:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Pursuant to the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations.

During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Accordingly, Boott has developed the attached Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach and consulting with the Working Group to identify the appropriate flows for the controlled flow releases.

In order to facilitate implementation of the Whitewater Flow Documentation Plan, Boott is seeking your written (email) concurrence with the proposed plan by November 11, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

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Boott Hydropower, LLC
A Subsidiary of Enel Green Power North America, Inc.

100 Brickstone Square, Suite 300 – Andover, MA 01810 – USA
T +1 978 681 1900 – F +1 978 681 7727

Via Email Distribution

October 28, 2019

To: Whitewater Boating and Access Working Group

Re: Lowell Hydroelectric Project (FERC No. 2790-072);
Whitewater Boating and Access Study
Whitewater Flow Documentation Plan

Dear Whitewater Boating and Access Working Group:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and owner of the 20.2 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project). The Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations Part 5.

In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study as approved in the Commission's March 13, 2019 Study Plan Determination for the Project. Pursuant to the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations. During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Since the Working Group participants have had limited experience boating the bypass reach, participants could not make informed choices on which flows would be appropriate for boating. Accordingly, Boott has developed the enclosed Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach and consulting with the Working Group to identify the appropriate flows for the controlled flow releases.

Boott is proposing to document flows in the bypass reach using cellular-enabled trail cameras and to provide the Working Group with a summary report that presents photographs of the bypass reach under various flow conditions. To capture a wide range of flow conditions, Boott is proposing to deploy cellular-enabled trail cameras from approximately December 1, 2019 through May 15, 2020. The cameras will record photos on an hourly basis during daylight hours, and the photographs will be date- and time-stamped. In the summary report, Boott will present representative photographs at approximately 500 cubic feet-per-second (cfs) intervals (e.g., 500 cfs, 1,000 cfs, 1,500 cfs, etc.) along with the corresponding river flow data.

As described in the enclosed plan, Boott will consult with the Working Group based on the Whitewater Flow Documentation Report to determine the appropriate flows for the controlled flow releases. To facilitate the flow documentation and consultation, Boott anticipates conducting the controlled flow releases once the Working Group has had the opportunity to review the Whitewater Flow Documentation Report and after fish passage operations at the Project end around July 15, 2020. The timing of the controlled flow releases will be dependent on available flows in the Merrimack River.

At this time, Boott is seeking your concurrence regarding the Whitewater Flow Documentation Plan and the general schedule for documenting flows and conducting the controlled flow releases. To facilitate timely deployment of the trail cameras, Boott respectfully requests your written (email) concurrence on or

before November 11, 2019. Please send correspondence to the undersigned at the email address provided below.

On behalf of Boott, I look forward to continued discussions and consultation with the Working Group regarding this study. Please do not hesitate to contact me at (978) 935-6039 or via email at Kevin.Webb@enel.com if you have any questions concerning this study or Project relicensing.

Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

Encls.

Cc: E. Anderson (Boott)
R. Quiggle (HDR)

Lowell Hydroelectric Project (FERC No. 2790- 072)
Whitewater Boating and Access Study Working Group

Email Distribution List

Mr. Robert Nasdor
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American Whitewater
bob@americanwhitewater.org

Ms. Celeste Bernardo
Superintendent
Lowell National Historic Park
US National Park Service
celeste_bernardo@nps.gov

Ms. Christine Bruins
Community Planner
Lowell National Historic Park
US National Park Service
christine_bruins@nps.gov

Mr. William Cooksey
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Mr. Peter Hoffmann
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Mr. Bruce Lessels
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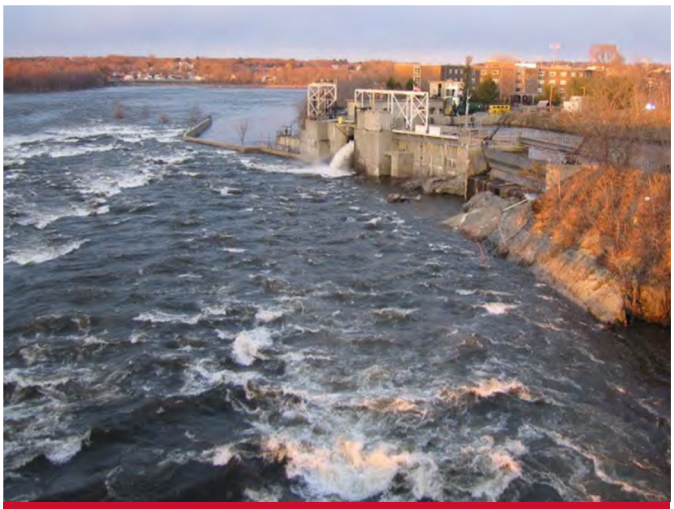
kevin@zoaroutdoor.com

Mr. George Rose
Deputy Director
Office of Emergency Management
City of Lowell Fire Department
GRose@lowellma.gov

Ms. Christine McCall
Senior Planner
City of Lowell Dept. of Planning and Development
CMcCall@lowellma.gov



Whitewater Flow Documentation Plan

Lowell Hydroelectric Project

(FERC No. 2790)

October 2019

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC
Andover, Massachusetts

enel Green Power

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Figures

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List of Acronyms

Boott	Boott Hydropower, LLC
CFR	Code of Federal Regulations
cfs	cubic feet-per-second
FERC	Federal Energy Regulatory Commission (or Commission)
ILP	Integrated Licensing Process
MW	megawatt
NPS	National Park Service
Project	Lowell Hydroelectric Project (or Lowell Project)
RSP	Revised Study Plan
SPD	Study Plan Determination
Study	Whitewater Boating and Access Study
USGS	U.S. Geological Survey
Working Group	Whitewater Boating and Access Study Working Group

1 Introduction and Background

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and operator of the 20.2 megawatt (MW) Lowell Hydroelectric Project (FERC Project No. 2790) (Project or Lowell Project). The Project is located along the Merrimack River in Middlesex County, Massachusetts and in Hillsborough County, New Hampshire. Boott owns and operates the Project as an independent power producer.

The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. As proposed in Boott's January 28, 2019 Revised Study Plan (RSP) and approved in the Commission's March 13, 2019 Study Plan Determination (SPD), Boott will conduct a Whitewater Boating and Access Study (Study) in support of Project relicensing.

1.1 Whitewater Boating and Access Study Overview

The Lowell Project is a run-of-river hydropower plant. When river flows exceed the hydraulic capacity of the two generating units located at the E.L. Field Powerhouse (combined capacity of approximately 8,000 cubic feet per second [cfs]), excess flows (up to approximately 2,000 cfs) are routed through the downtown Lowell canal system and through the canal units. When inflows exceed the 10,000 cfs capacity of the generating units and canals, all excess flows are passed over the Pawtucket Dam spillway into the bypass reach. The Project has the potential to affect whitewater boating opportunities in the bypass reach when flows are less than 10,000 cfs.

As described in the approved Revised Study Plan, the goal of the Study is to assess the Project's bypass reach for whitewater boating and access opportunities. The objectives of the study are as follows:

- Assess a range of flows suitable for whitewater boating opportunities in the Project's bypass reach;
- Assess the frequency, timing, duration, and predictability of paddling flows under current and proposed Project operations;
- Define potential locations for put-in and take-out points for boaters; and,
- Assess the flow information needs for whitewater boating and the current and potential flow information distribution system.

In accordance with the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations.

During the August 8, 2019, meeting and site visit, the Working Group indicated a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Since the Working Group participants had limited experience boating the bypass reach, participants could not make informed choices on which flows would be appropriate for boating. Accordingly, Boott has developed this Whitewater Flow Documentation Plan that describes the methods for documenting a range of flow conditions in the bypass reach and consulting with the Working Group to identify the appropriate flows for the controlled flow releases.

2 Methodology

To document the whitewater conditions in the bypass reach under various flows, Boott proposes to deploy cellular-enabled trail cameras to capture time- and date-stamped images of the bypass reach on an hourly basis during daylight hours.

In general, the average flows at the Project from June through February are within the operating range of the Project's E.L. Field Powerhouse and the units along the downtown canal system; however, seasonal high water events (in excess of 10,000 cfs) do occasionally occur in the late fall. Boott also maintains flows in the canal system to facilitate National Park Service (NPS) boat tours from May 15 through October 15, annually[1]. Therefore, to capture flows in the bypass reach during months where higher flows typically occur (March through May), and to document a broad range of flow conditions, Boott is proposing to deploy cellular-enabled trail cameras from approximately December 1, 2019 through May 15, 2020.

Boott will deploy cellular-enabled trail cameras at four locations along the bypass reach to capture images of different sections of the reach under the various flows conditions. As shown below in Figure 2-1, Boott is proposing to deploy cameras at the following four locations:

- The Fish Ladder at the Pawtucket Dam;
- A location along the bypass reach located upstream from the University Avenue Bridge;
- A location along the bypass reach located downstream from the University Avenue Bridge; and
- The E.L. Field Powerhouse.

To verify the flows represented by the photographs, Boott will use Project operations data in combination with U.S. Geological Survey (USGS) information. There is an

[1] Although there is no formal flow requirement for the canal system, Boott maintains an operating agreement with the NPS to allow tour boat operations to navigate the canal system. Boott maintains canal water levels within appropriate limits during the May 15 to October 15 tour boat operating season. Operations are maintained through a series of locks and gatehouses along the Canal System

existing USGS gage installed approximately 2.1 miles downstream from the Pawtucket Dam (USGS No. 01100000, Merrimack River BL Concord River at Lowell, MA). There is also an existing USGS gage installed on the Concord River (USGS No. 01099500, Concord R below R Meadow Brook, at Lowell, MA). Flows from the USGS Gage No. 01099500 will be subtracted from the flows at USGS Gage No. 01100000 to calculate flows at the Project. Flows in the bypass can be estimated by applying the weir formula to the depth of flow over each crest gate zone (plus any flow provided via the fish ladder). Bypass flows can also be estimated by subtracting the sum of flow at the E.L. Field Powerhouse and through the canal system from the inflow calculated from the USGS gages as described above.

3 Consultation with Working Group

Boott will prepare a summary Whitewater Flow Documentation Report that provides photographic documentation of a range of flows in the Project's bypass reach. Boott anticipates providing images and verified flows in intervals of approximately 500 cfs (e.g., 500 cfs, 1,000 cfs, 1,500 cfs, etc.). Boott also intends to provide images of verified flows at the lowest and highest flows observed from December 1 through May 15. Once the Working Group has had the opportunity to review the Whitewater Flow Documentation Report, Boott anticipates conducting the controlled flow releases after fish passage operations end around July 15, 2020, to avoid any interference with fish passage studies scheduled for the Spring/Summer 2020 fish passage season.

Based on the information presented in the Whitewater Flow Documentation Report, Boott will consult with the Working Group to select the controlled releases to be provided during the Study in 2020. The timing of the controlled flow releases will be dependent on available flows in the Merrimack River. Each of the controlled releases will be provided for approximately 3 hours. This will afford participants the opportunity to boat the reach and make multiple passes at each flow so that participants are able to evaluate different lines through various portions of the study reach. Pre, post, and comparative surveys will be provided to controlled flow release participants for their completion during this portion of the study (draft pre, post, and comparative surveys can be found in Appendices D through F of the RSP).

Figure 2-1. Locations of Cellular-Enabled Cameras

Scott, Kelsey

From: Scott, Kelsey
Sent: Friday, November 1, 2019 2:24 PM
To: celeste_bernardo@nps.gov; christine_bruins@nps.gov; Paul_Fontaine@nps.gov; kevin_coffee@nps.gov; laurel_racine@nps.gov; peter_reitchel@nps.gov; kevin_mendik@nps.gov; duncan_hay@nps.gov; Emily.Byrne@mail.house.gov; darryl.forgione@mass.gov; patrice.kish@mass.gov; thomas.m.walsh@mass.gov; william.cooksey@mass.gov; peter.hoffmann@mass.gov; dtradd@lowellma.gov; KKeefeMullin@lowellma.gov; cthomas@lowellma.gov; cclancy@lowellma.gov; jwinward@lowellma.gov; CRicker@lowellma.gov; chayes@lowellma.gov; CMcCall@lowellma.gov; scerand@hotmail.com; greenesh@comcast.net; jcalvin@lowelllandtrust.org; ffaust@edgegroupinc.com
Cc: Quiggle, Robert; Webb, Kevin (EGP North America); elise.anderson@enel.com
Subject: Lowell Hydroelectric Project (FERC No. 2790) Study Workshop
Attachments: November 2019_Lowell Hydro Project Workshop Agenda.pdf

Dear Stakeholders:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Recreation and Aesthetics Study, a Historically Significant Waterpower Equipment Study, and a Water Level and Flow Effects on Historic Resources Study, as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Boott intends to hold a two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders to address data needs and conduct a Project site visit related to the above studies.

The Workshop will be held in Lowell, MA over two days in November 2019. The first day will focus on stakeholder consultation, information gathering, and data needs for the three studies mentioned above. Boott anticipates this first day will take place from 9am-4pm in Lowell, MA. Additional details regarding the meeting space to follow. The second day will consist of a site visit to target specific Project facilities associated with the studies.

Boott is proposing the following dates for the two-day Workshop:

November 12-13, 2019
November 13-14, 2019
November 14-15, 2019
November 19-20, 2019

Please notify Boott of the dates you can attend the Workshop by completing the poll here: https://www.surveymonkey.com/r/YQFX7LD . Boott has developed the attached Lowell Hydroelectric Project Study Workshop Agenda. In order to facilitate the scheduling of the Workshop, Boott is asking that all interested stakeholders complete the poll by November 6, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Scott, Kelsey

To: Racine, Laurel
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

From: Racine, Laurel [mailto:laurel_racine@nps.gov]
Sent: Monday, November 4, 2019 8:09 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Kelsey,
I'm writing because the NPS blocked my access to your poll. My participation would be most useful for the first day, not the site visits. Days I'm available for the day 1 workshop are November 12 or November 13, so either of the first two options are good for me. Thanks.
Laurel

_____
Laurel A. Racine, Chief of Cultural Resources
Lowell National Historical Park
67 Kirk Street
Lowell, MA 01852

Desk: 978-970-5055
Cell: (978) 423-3081

On Fri, Nov 1, 2019 at 2:24 PM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Recreation and Aesthetics Study, a Historically Significant Waterpower Equipment Study, and a Water Level and Flow Effects on Historic Resources Study, as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Boott intends to hold a two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders to address data needs and conduct a Project site visit related to the above studies.

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Thank You –

Kelsey Scott, MS

Assistant Regulatory Specialist

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Agenda

Project:	Lowell Hydroelectric Project (FERC No. 2790)
Date/Time:	TBD
Location:	Lowell National Historic Park, Lowell MA
Subject:	**Lowell Hydroelectric Project Study Workshop**

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and owner of the 20.2 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project). The Project is located on the Merrimack River in Middlesex County, Massachusetts, and in Hillsborough County, New Hampshire. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations Part 5.

In support of Project relicensing, Boott is proposing to hold a two-day study workshop in Lowell, MA to consult with the National Park Service (NPS), Massachusetts Department of Conservation and Recreation (MADCR), City of Lowell (City), and other partners regarding certain studies approved in the Commission's March 13, 2019 Study Plan Determination for the Project. As described in the approved study plan, Boott is seeking information from the NPS, MADCR, and other partners regarding the Recreation and Aesthetics Study, the Historically Significant Waterpower Equipment Study, and the Water Level and Flow Effects on Historical Resources Study. The proposed two-day workshop will be an opportunity for consulting parties to share information and to identify the specific focus for field activities.

Day One: Data Needs and Information Gathering

The first day of the proposed workshop is intended to allow Boott, the NPS, MADCR, City, and other participating parties to discuss data needs and review available documentation. A proposed agenda for this day one of the workshop is presented below.

1. **Introduction**

    - Welcome and introduction
    - Overview and status of FERC relicensing process

2. **Recreation and Aesthetics Study**

    Study-specific Data Needs and Information Gathering

    - Recreation opportunities and access along the canal system;
    - Future use or planning documents that address anticipated or desired changes to the Lowell National Historic Park and Lowell Heritage State Park (e.g., The Foundation Report, or 5-year and 10-year plans);
    - Documentation of any reoccurring public safety issues or incidents within the parks associated with the canal infrastructure related to public recreation;
    - Annual maintenance schedules for the canal system;
    - Management or operations plans for the parks; and
    - Annual use records.

3. **Historically Significant Waterpower Equipment Study**

Study-specific Data Needs and Information Gathering

- Historically significant waterpower equipment owned and operated by Boott Hydropower of interest to the NPS for potential future interpretation, exhibition, or as scrap equipment to maintain and operate other historic machinery;
- Engineering reports, drawings, and/or photographs related to historically significant waterpower equipment owned and operated by Boott Hydropower of interest to the NPS; and
- Components of historically significant waterpower equipment owned and operated by Boott Hydropower that will require photography and documentation.

4. **Water Level and Flow Effects on Historic Resources Study**

Study-specific Data Needs and Information Gathering

- Engineering reports or evaluations of historic canal structures, including documentation of previous maintenance and/or repairs related to canal water levels;
- Descriptions and/or photographs of properties that have been previously affected by canal operations; and
- Engineering and architectural drawings, maintenance records, and structural modifications of the Great River Wall.

5. **Action Items and Next Steps**

Day Two: Site Visit

Day two of the proposed workshop is focused on a site visit at the Project. The purpose of the site visit is to view locations identified during day one of the workshop, including:

- Areas of potential recreation enhancements and potential recreational access areas;
- Historically significant waterpower equipment selected by the NPS for documentation, including specific equipment to be photographed;
- Canal features that have been previously impacted by flows and water levels; and
- Areas along the canal system where waterborne trash collects.

Scott, Kelsey

From: Hayes, Christopher <chayes@lowellma.gov>
Sent: Monday, November 4, 2019 9:59 AM
To: Scott, Kelsey
Cc: Ricker, Claire V.; McCall, Christine
Subject: RE: Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Follow Up Flag: Follow up
Flag Status: Flagged

Hi, Kelsey,

Should I forward this to other potential interested stakeholders, or is the invitation limited to this list?

Thanks so much,
-Chris

Christopher Glenn Hayes | *Neighborhood Planner*
The City of Lowell|Department of Planning and Development
50 Arcand Drive|Lowell, MA 01852
t: 978.674.1405|f: 978.970.4262
http://www.lowellma.gov

LOWELL ***Alive. Unique. Inspiring.***

From: Scott, Kelsey [mailto:Kelsey.Scott@hdrinc.com]
Sent: Friday, November 01, 2019 2:24 PM
To: celeste_bernardo@nps.gov; christine_bruins@nps.gov; Paul_Fontaine@nps.gov; kevin_coffee@nps.gov; laurel_racine@nps.gov; peter_reitchel@nps.gov; kevin_mendik@nps.gov; duncan_hay@nps.gov; Emily.Byrne@mail.house.gov; darryl.forgione@mass.gov; patrice.kish@mass.gov; thomas.m.walsh@mass.gov; william.cooksey@mass.gov; peter.hoffmann@mass.gov; Tradd, Diane; Keefe Mullin, Kara; Thomas, Craig; Clancy, Christine; jwinward@lowellma.gov; Ricker, Claire V.; Hayes, Christopher; McCall, Christine; scerand@hotmail.com; greenesh@comcast.net; jcalvin@lowelllandtrust.org; ffaust@edgegroupinc.com
Cc: Quiggle, Robert; Webb, Kevin (EGP North America); elise.anderson@enel.com
Subject: Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Dear Stakeholders:

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Thank You –

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kelsey.scott@hdrinc.com
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Scott, Kelsey

From: Scott, Kelsey
Sent: Friday, November 8, 2019 11:17 AM
To: 'celeste_bernardo@nps.gov'; 'christine_bruins@nps.gov'; 'Paul_Fontaine@nps.gov'; 'kevin_coffee@nps.gov'; 'laurel_racine@nps.gov'; 'peter_reitchel@nps.gov'; 'kevin_mendik@nps.gov'; 'duncan_hay@nps.gov'; 'Emily.Byrne@mail.house.gov'; 'darryl.forgione@mass.gov'; 'patrice.kish@mass.gov'; 'thomas.m.walsh@mass.gov'; 'william.cooksey@mass.gov'; 'peter.hoffmann@mass.gov'; 'dtradd@lowellma.gov'; 'KKeefeMullin@lowellma.gov'; 'cthomas@lowellma.gov'; 'cclancy@lowellma.gov'; 'jwinward@lowellma.gov'; 'CRicker@lowellma.gov'; 'chayes@lowellma.gov'; 'CMcCall@lowellma.gov'; 'scerand@hotmail.com'; 'greenesh@comcast.net'; 'jcalvin@lowelllandtrust.org'; 'ffaust@edgegroupinc.com'
Cc: 'Anderson, Elise (EGP North America)'; Webb, Kevin (EGP North America); Quiggle, Robert
Subject: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop
Attachments: December 2019_Lowell Hydro Project Workshop Agenda.pdf

Dear Stakeholders –

Due to scheduling conflicts, Boott is resurveying this group for available dates to hold the two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders. The first day of the Workshop will focus on stakeholder consultation, information gathering, and data needs. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA. Additional details regarding the meeting space to follow. The second day will consist of a site visit to target specific Project facilities.

Boott is proposing the following dates for the two-day Workshop:

December 4-5, 2019
December 5-6, 2019
December 9-10, 2019
December 10-11, 2019
December 11-12, 2019
December 17-18, 2019
December 18-19, 2019

Please notify Boott of the dates you can attend the Workshop by completing the Doodle Poll here: https://doodle.com/poll/dp2qb9232aq66awg

In order to facilitate the scheduling of the Workshop, Boott is asking that all interested stakeholders complete the poll by November 13, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

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Assistant Regulatory Specialist

HDR
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D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

Agenda

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Date/Time:	TBD
Location:	Lowell National Historic Park, Lowell MA
Subject:	**Lowell Hydroelectric Project Study Workshop**

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- Canal features that have been previously impacted by flows and water levels; and
- Areas along the canal system where waterborne trash collects.

United States Department of the Interior

NATIONAL PARK SERVICE
Lowell National Historical Park
67 Kirk Street
Lowell, Massachusetts 01852-1029

IN REPLY REFER TO:

Kevin Webb, Hydro Licensing Manager
Enel Green Power North America, Inc.
100 Brickstone Square, Suite 300
Andover, MA 01810

November 15, 2010
E filed at FERC – Non-ER

RE: NPS Response to Whitewater Boating and Access Study
Whitewater Flow Documentation Plan
Boott Hydropower, LLC
Lowell Hydroelectric Project, FERC No. 2790-072
Merrimack River, Middlesex County, MA, and Hillsborough County, NH

Thank you for providing an opportunity to comment on the Whitewater Flow Documentation Plan. Upon review, Lowell National Historical Park staff do not have comments for the proposed methodology to identify target flows. We do have questions and comments relating to data collected during the controlled flow releases in the study period.

NPS Boat Tours and Northern Canal Walkway

Page 2: We greatly appreciate that you have noted the arrangement between Boott Hydropower, LLC and the National Park Service (NPS) in regard to NPS boat tours and have planned study parameters with this operation in mind. Please also note that public access to the Northern Canal Walkway is dependent on flow conditions in the Merrimack River being under 3500 cubic feet per second (CFS). The normal operating season for the Northern Canal Walkway is also May 15-Oct 15. There is strong public support for increasing walkway access through longer daily hours and/or lengthening the operating season.

Controlled Flow Releases for Whitewater Rafting

Page 3: In regard to the controlled flow releases to be performed around July 2020 for the study:

1. How far up and downstream will flows in the Merrimack River and Canal System be affected by controlled flow releases at the dam? How will the Whitewater Boating and Access Study monitor flow impacts outside of the bypass reach? Please note:
    a. Merrimack River flow rate must be under 18,500 CFS for NPS to operate education programs on a river boat along the Merrimack River. NPS offers river boat education programs annually May 1 through October 15.
    b. Merrimack River flow must be under 12,500 CFS for NPS canal boats to enter Merrimack River from Pawtucket Canal. The NPS canal boat operating season occurs annually May 15 through October 15.
    c. Merrimack River flow rate must be under 3500 CFS to open the NPS Northern Canal Walkway. The operating season for the Northern Canal Walkway is May 15 through October 15. There is strong public support to increase the operating season for this walkway.
    d. With the Pawtucket Dam measured at 0'0", if water level readings at Francis Gate go below 1'0" canal boats cannot navigate through lock chamber at Francis Gate as boat engines will run into ground on granite ledge upstream of Francis Gate. If water level readings are above 6'0", boats cannot fit under Pawtucket Street Bridge. The NPS canal boat operating season occurs annually May 15 through October 15.
2. Would controlled flow releases impact water flow and/or fish access to the fish ladder? How will this be monitored in the study period?
3. Could controlled flow releases cause scour conditions or other negative impacts to historic properties, particularly along the foundation wall of the Northern Canal/Pawtucket Gatehouse and the Great Wall separating the Northern Canal from the Merrimack River? How will this be monitored in the study period?

We appreciate the opportunity to assist Enel in the development, conduct and evaluation of the Whitewater Boating and Access Study.

Sincerely,

Celeste Bernardo

Celeste Bernardo,

Superintendent, Lowell National Historical Park

Scott, Kelsey

From: Scott, Kelsey
Sent: Thursday, November 21, 2019 5:04 PM
To: Quiggle, Robert
Subject: FW: [EXTERNAL] RE: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

FYI an item to discuss tomorrow.

From: Bruins, Christine [mailto:christine_bruins@nps.gov]
Sent: Thursday, November 21, 2019 5:00 PM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>
Subject: Re: [EXTERNAL] RE: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Kelsey and Kevin,

I don't see the "Resources, Ownership, Boundaries, and Land Rights Study" on the agenda. City, DCR, NPS are very invested in the success of that study. We're hoping it can serve as the basis for a new MOU among parties for maintenance and canal stewardship. Could you add it to the agenda as item 2 or 3? We can host this size of group in our Visitor Center (246 Market Street). Meeting attendees can park for free in our visitor center parking lot.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

On Thu, Nov 21, 2019 at 4:43 PM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Based on the results of recent scheduling polls, we are confirming that the Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders will occur over two days from December 18—19, 2019. The first day will focus on stakeholder consultation, information gathering, and data needs for the three studies listed in the attached agenda. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA at the National Park Service Headquarters for the Lowell National Historical Park. The second day will consist of a site visit to target specific Project facilities associated with the studies. Boott anticipates this second day site visit to occur from 9am-12pm.
>
> Additional information will follow this email in the weeks ahead of the Workshop meeting. Should you have any questions about the Workshop, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

Kelsey Scott, MS

Assistant Regulatory Specialist

HDR

1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

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Sent: Friday, November 8, 2019 11:17 AM
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Kelsey Scott, MS

Assistant Regulatory Specialist

HDR

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Scott, Kelsey

To: Scott, Kelsey
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Agenda

Project:	Lowell Hydroelectric Project (FERC No. 2790)
Subject:	Lowell Project Study Workshop & Site Visit
Date:	December 18 – 19, 2019
Location:	Lowell National Historical Park Visitor Center (246 Market Street), Lowell, MA.

Pursuant to the Federal Energy Regulatory Commission's (FERC or Commission) Study Plan Determination (SPD) for the relicensing of the Lowell Hydroelectric Project (FERC No. 2790) (Project), Boott Hydropower, LLC (Boott) will conduct a Recreation and Aesthetics Study, a Water Level and Flow Effects on Historic Resources Study, and a Historically Significant Waterpower Equipment Study (collectively Studies). This Study Workshop to consult with stakeholders regarding these Studies will be held from 9:00 AM until 4:00 PM at the Lowell National Historical Park Visitor Center (246 Market Street) in Lowell, MA. The adjacent parking at 304 Dutton Street is free. On the following day after the Study Workshop, stakeholders are invited to participate in a site visit of the Project to consult on the field portion of the Studies, which is expected to end at noon. The proposed agenda for the Study Workshop is as follows:

Welcome and Introductions ..... 9:00 AM – 9:30 AM

Discussion of FERC Relicensing and ILP Study Process ..... 9:30 AM – 10:00 AM

Break ..... 10:00 AM – 10:15 AM

Recreation and Aesthetics Study Needs ..... 10:15 AM – 11:15 AM

Water Level and Flow Effects on Historic Resources Study Needs ..... 11:15 AM – 12:00 PM

Lunch Break ..... 12:00 PM – 1:00 PM

Historically Significant Waterpower Equipment Study Needs ..... 1:00 PM – 2:00 PM

Open discussion/Break ..... 2:00 PM – 3:00 PM

Upcoming ILP Schedule (2020-2021) ..... 3:00 PM – 3:30 PM

Action Items and Next Steps ..... 3:30 PM – 4:00 PM

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Stakeholders –

There is strong interest in discussing the Resources, Ownership, Boundaries, and Land Rights Study that is being performed as part of the relicensing of the Lowell Hydroelectric Project. Boott added the study to the agenda for the upcoming Study Workshop on December 18, 2019. Please see the attached updated agenda (the most recent version) and we look forward to seeing you next week.

Should you have any questions about the Study Workshop, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

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From: Scott, Kelsey
Sent: Thursday, November 21, 2019 4:42 PM
To: 'celeste_bernardo@nps.gov' <celeste_bernardo@nps.gov>; 'christine_bruins@nps.gov' <christine_bruins@nps.gov>; 'Paul_Fontaine@nps.gov' <Paul_Fontaine@nps.gov>; 'kevin_coffee@nps.gov' <kevin_coffee@nps.gov>; 'laurel_racine@nps.gov' <laurel_racine@nps.gov>; 'peter_reitchel@nps.gov' <peter_reitchel@nps.gov>; 'kevin_mendik@nps.gov' <kevin_mendik@nps.gov>; 'duncan_hay@nps.gov' <duncan_hay@nps.gov>; 'Emily.Byrne@mail.house.gov' <Emily.Byrne@mail.house.gov>; 'darryl.forgione@mass.gov' <darryl.forgione@mass.gov>; 'patrice.kish@mass.gov' <patrice.kish@mass.gov>; 'thomas.m.walsh@mass.gov' <thomas.m.walsh@mass.gov>; 'william.cooksey@mass.gov' <william.cooksey@mass.gov>; 'peter.hoffmann@mass.gov' <peter.hoffmann@mass.gov>; 'dtradd@lowellma.gov' <dtradd@lowellma.gov>; 'KKeefeMullin@lowellma.gov' <KKeefeMullin@lowellma.gov>; 'cthomas@lowellma.gov' <cthomas@lowellma.gov>; 'cclancy@lowellma.gov' <cclancy@lowellma.gov>; 'jwinward@lowellma.gov' <jwinward@lowellma.gov>; 'CRicker@lowellma.gov' <CRicker@lowellma.gov>; 'chayes@lowellma.gov' <chayes@lowellma.gov>; 'CMcCall@lowellma.gov' <CMcCall@lowellma.gov>; 'scerand@hotmail.com' <scerand@hotmail.com>; 'greenesh@comcast.net' <greenesh@comcast.net>; 'jcalvin@lowelllandtrust.org' <jcalvin@lowelllandtrust.org>; 'ffaust@edgegroupinc.com' <ffaust@edgegroupinc.com>; 'Euris Gonzalez (DCR) (Euris.Gonzalez@mass.gov)' <Euris.Gonzalez@mass.gov>
Cc: 'Anderson, Elise (EGP North America)' <elise.anderson@enel.com>; 'Webb, Kevin (EGP North America)' <Kevin.Webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: RE: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Dear Stakeholders:

Based on the results of recent scheduling polls, we are confirming that the Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders will occur over two days from December 18—19, 2019. The first day will focus on stakeholder consultation, information gathering, and data needs for the three studies listed in the attached agenda. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA at the National Park Service Headquarters for the Lowell National Historical Park. The second day will consist of a site visit to target specific Project facilities associated with the studies. Boott anticipates this second day site visit to occur from 9am-12pm.

Additional information will follow this email in the weeks ahead of the Workshop meeting. Should you have any questions about the Workshop, please contact me at the phone number or email address below, or contact Mr. Kevin Webb, Enel Hydro Licensing Manager, at 978-935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

Kelsey Scott, MS
Assistant Regulatory Specialist

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From: Scott, Kelsey
Sent: Friday, November 8, 2019 11:17 AM
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Cc: 'Anderson, Elise (EGP North America)' <elise.anderson@enel.com>; Webb, Kevin (EGP North America) <Kevin.Webb@enel.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Update - Lowell Hydroelectric Project (FERC No. 2790) Study Workshop

Dear Stakeholders –

Due to scheduling conflicts, Boott is resurveying this group for available dates to hold the two-day Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders. The first day of the Workshop will focus on stakeholder consultation, information gathering, and data needs. Boott anticipates this first day will take place from 9am-4:30pm in Lowell, MA. Additional details regarding the meeting space to follow. The second day will consist of a site visit to target specific Project facilities.

Boott is proposing the following dates for the two-day Workshop:

December 4-5, 2019
December 5-6, 2019
December 9-10, 2019
December 10-11, 2019
December 11-12, 2019
December 17-18, 2019
December 18-19, 2019

Please notify Boott of the dates you can attend the Workshop by completing the Doodle Poll here: https://doodle.com/poll/dp2qb9232aq66awg

In order to facilitate the scheduling of the Workshop, Boott is asking that all interested stakeholders complete the poll by November 13, 2019. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

Thank You –

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Agenda

Project:	Lowell Hydroelectric Project (FERC No. 2790)
Subject:	Lowell Project Study Workshop & Site Visit
Date:	December 18 – 19, 2019
Location:	Lowell National Historical Park Visitor Center (246 Market Street), Lowell, MA.

Pursuant to the Federal Energy Regulatory Commission's (FERC or Commission) Study Plan Determination (SPD) for the relicensing of the Lowell Hydroelectric Project (FERC No. 2790) (Project), Boott Hydropower, LLC (Boott) will conduct a Recreation and Aesthetics Study; a Resources Ownership, Boundaries, and Land Rights Study; a Water Level and Flow Effects on Historic Resources Study; and a Historically Significant Waterpower Equipment Study (collectively Studies). This Study Workshop to consult with stakeholders regarding these Studies will be held from 9:00 AM until 4:00 PM at the Lowell National Historical Park Visitor Center (246 Market Street) in Lowell, MA. The adjacent parking at 304 Dutton Street is free. On the following day after the Study Workshop, stakeholders are invited to participate in a site visit of the Project to consult on the field portion of the Studies, which is expected to end at noon. The proposed agenda for the Study Workshop is as follows:

Welcome and Introductions ..... 9:00 AM – 9:30 AM

Discussion of FERC Relicensing and ILP Study Process ..... 9:30 AM – 10:00 AM

Break ..... 10:00 AM – 10:15 AM

Recreation and Aesthetics Study Needs ..... 10:15 AM – 11:15 AM

Resources, Ownership, Boundaries, and Land Rights Study Needs ..... 11:15 AM – 12:00 PM

Lunch Break ..... 12:00 PM – 1:00 PM

Historically Significant Waterpower Equipment Study Needs ..... 1:00 PM – 2:00 PM

Water Level and Flow Effects on Historic Resources Study Needs ..... 2:00 PM – 3:00 PM

Upcoming ILP Schedule (2020-2021) ..... 3:00 PM – 3:30 PM

Action Items and Next Steps ..... 3:30 PM – 4:00 PM

Scott, Kelsey

From: Bruins, Christine <christine_bruins@nps.gov>
Sent: Thursday, December 19, 2019 9:22 AM
To: Webb, Kevin (EGP North America); Scott, Kelsey; Quiggle, Robert
Cc: Mendik, Kevin; Duncan Hay
Subject: Lowell NHP Exotic Species Treatment Schedule - Vegetation Mgmt
Attachments: 2018.9.11 EXOTIC SPECIES TREATMENT LOWELL.docx

Hi folks,

Thank you so much for hosting a meeting with the canal stewardship partners. I'm attaching a document from our maintenance department which outlines the exotic species that exist along the canals and treatment schedules.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

EXOTIC SPECIES TREATMENT CALENDAR FOR LOWELL NATIONAL HISTORICAL PARK

Prepared by Lars Boyd, Sept 11, 2018.

OUTLINE

I. Purpose of document

II. Target species for 2019

III. Tentative Treatment Calendar

IV. Best Management Practices

V. Brief description of each species with photos and treatment strategies

I. PURPOSE

This document provides a series of tables and exotic plant management information to aid in organizing of a 2019 treatment schedule for Lowell NHP.

This document will present an appropriate species to be focused on in a park for the given, and a potential control method. Often other species may be treated at the same time as the target species if the appropriate treatment method is able to be performed concurrently. For foliar spraying, a generic herbicide mixture can be used to treat a broad spectrum of species within the same day. A generic herbicide mixture can be applied to multiple species for basal bark and cut stem/stump treatments as well. Refer to the individual species treatment guides (Table 6-13) to determine if the application method is appropriate within the given time window before treating other species in the area with herbicide.

II. TARGET SPECIES FOR 2019 LOWELL NHP

Table 1: Reported Target Species W/ Locations for FY 2019

Species	NCW	BSS	FG	SW/JS	DSC&T	KP	VCC	TT	KSH	WCW
Ailanthus altissima (Tree of Heaven)	X		X		X					X
Alliaria petiolata (Garlic mustard)		X	X	X		X			X	
Celastrus orbiculatus (Asiatic Bittersweet)	X		X		X	X				X
Convolvulus arvensis (Bind Weed)										X
Cynanchum louiseae (Black Swallow-wort)	X			X	X	X	X	X		X
Fallopia japonica (Japanese Knotweed)		X		X	X					
Lythrum salicaria (Purple Loosestrife)	X			X						X
Rosa multiflora (Multiflora Rose)										X

NCW- Northern Canal Walkway
BSS- Black Smith Shop
FG- Francis Gate
SW/JS- Swamp Locks/Jackson St
DSC&T- Dutton St Canal & Tracks
KP- Kerouac Park
VCC- Visitor Center Courtyard
TT- Tremont St Tracks
KSH- Kirk St Headquarters
WCW- Western Canal Walkway

III. TENTATIVE CALENDAR FOR LOWELL NHP EXOTIC PLANT REMOVAL

Table 2: Foliar Spray Treatment Sequencing

Species	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Rosa multiflora (Multiflora Rose)			X	X					
Ailanthus altissima (Tree of Heaven)				X	X	X			
Cynanchum louiseae (Black Swallow-wort)				X	X				
Convolvulus arvensis (Bindweed)					X	X	X		
Fallopia japonica (Japanese Knotweed)						X	X		
Lythrum salicaria (Purple Loosestrife)						X			
Alliaria petiolata (Garlic mustard)							X	X	
Celastrus orbiculatus (Asiatic Bittersweet)								X	X

IV. BEST MANAGEMENT PRACTICES (ADOPTED FROM THE EXOTIC SPECIES TREATMENT CALENDAR FOR BOSTON METROPOLITAN PARKS by Lyndon Langthorne)

Non-chemical Treatment

Non-chemical treatment, when appropriate for the target species, should be attempted before chemical treatment. In most situations, chemical treatment can be made more effective when applied in conjunction with non-chemical management strategies. Non-chemical management strategies are generally labor intensive, but can be performed in most areas, including areas where chemical treatment would not be advisable.

Table 3. Non-chemical Treatment Methods

Hand pulling	Manual removal of top growth of plant, and as much of the root system as possible. Extensive, deep, and large root systems are not removable by hand. Hand pulling will prevent the formation of seed pods if consistently implemented throughout the growing season. This method is often not effective in managing regenerative species. Rhizomatous species are not generally manageable through this strategy alone.
Digging	Manual or mechanical removal of root system when hand pulling alone is not sufficient in removing the root system. Species that re-

	sprout from roots must have the root system removed. Digging is labor intensive. This method is not viable when managing regenerative plants with extensive, deep, or large roots. Digging disturbs the soil, encouraging colonization by other exotic species.
Cutting	Manual removal of the entire top growth of the plant by cutting the stem close to the ground. Plant matter removed by cutting may, depending on the species and desired conditions, be allowed to compost (either where it is cut or moved to another location), or destroyed to prevent reshooting of roots. Cutting can be effective on annuals or biennials if done before seeding, but in most perennial species, cutting alone is not capable of achieving control. Stump grinding of larger, woody stumps can prevent reshooting (e.g. *F. alnus*, *R. cathartica*, *A. altissima*). Herbicide can be applied to the cut surface to destroy the roots and prevent reshooting.
Flower clipping / Seed-heading	Manual removal of flowers or seed heads to prevent seeding or seed spread, but not removal of the plant top growth; seeds collected are destroyed. This method will limit the ability of the plant to spread through seeding, but will not prevent vegetative spread by the root system. Some plants do not rely on seeds as the primary vector of spread (e.g. *F. japonica*).
Mulching / Mats / ”Buckthorn Bags”	Covering of a disturbed or treated area to limit the ability of exotic species to grow and recolonize an area. Mulch can be layered over soil, and possible supplemented with a permeable material, like cloth or paper, to limit the ability of exotics to reshoot while also providing an area that can be used for planting. Reshooting may still occur with mulch, and monitoring is advisable. Mats of rubber or black plastic can be layered on the soil as an impervious surface. This surface cannot be used for planting, but is more likely to prevent any regrowth. If the mats are in an area of direct or partial sunlight, the heat collected will kill covered roots. “Buckthorn bags” can be placed over stumps of *F. alnus* and *R. cathartica* that are over two inches in diameter. Left in place for two years, these bags will prevent regeneration and destroy the root system of the plant.
Mowing	Mechanical removal of top growth of plants. Able to be applied quickly to large areas. Mowing is less precise than most manual methods, and is most viable on land that is already managed land. Will not destroy the root system of most plants, but often stresses the plant and prevents seed production if done consistently. Herbicide applied after mowing will often be more effective, either applying immediately after mowing as cut stem/stump treatment, or upon regrowth as a foliar spray.

Stump grinding	Perennial shrubs and trees can have their stumps ground to prevent reshooting.

Seeds forming on exotic plants should always be removed when observed. Removal of seeds can be a valuable management strategy in areas of lower priority, or where other management strategies are inadvisable. Seed removal will not disrupt existing plants, but will limit growth and spread of these populations. Seed removal also prevents exotics from further contributing to the soil seed bank, all the viable seeds existing within the soil of an area. Seeds of exotics should be burned or bagged and disposed of in a landfill to prevent further contamination.

Bare patches of soil, particularly those remaining after soil is disturbed by digging or hand pulling, is vulnerable to colonization by new exotic species. To mitigate this threat, new plants and grasses should be added to bare areas whenever possible. If a bare patch was the site of chemical treatment that will be repeated the following year, seed of an inexpensive annual ryegrass can be planted to limit the cost of further chemical treatments.

Chemical Treatment

Use pesticides at rates recommended by the label, and never exceed labeled rates. Mitigate damage to other plants and ecosystems by taking care for herbicide drift. Only apply herbicides on calm, dry days, and never any closer to standing water than is specified on the label. Herbicide applicators should always be properly fitted with Personal Protective Equipment (PPE) required by label, which represents the **minimum** PPE required for use. When applying chemicals, it is advisable to add a dye to the mix, unless otherwise stipulated, to better mark which plants have been treated. Dyes also allow contaminated gear to be easily identified for safety reasons.

Table 4. Chemical Treatment Method Overview

Foliar Spray	Broadcast or spot application of herbicide with a sprayer targeting foliage of species, wetting the leaves with herbicide to be absorbed into the root system. Apply to intact, green leaves. This is often the most efficient herbicide application method. Lower concentrations are used with foliar spray than other application methods. Foliar spray has the greatest potential to unintentionally damage surrounding plants, and may not be preferred for this reason. Foliar application is best for treating large, dense stands of invasive plants where risk of damaging surrounding plants can be minimized. When spraying, herbicide should wet leaves without dripping, as excessive spraying can harm non-target species. The extent of the application depends on the size of the area being treated. Spot spraying is application of herbicide in one location,

	generally to one plant. This type of application minimizes damage to surrounding plants. Broadcast application is more extensive than spot spraying for heavier infestations. Foliar spraying should not be performed on wet weather days as any herbicide may not be absorbed into plants, instead being washed away as runoff. Foliar spraying should not be performed on days when wind speeds are greater than 5 mph to prevent pesticide drift. Foliar spraying should also not be performed in areas where damage to non-target species is a concern. Large trees should not be treated by foliar spray.
Cut Stem/Stump	Application of herbicide either by brush or spray bottle to a cut surface to be absorbed into the root system. After cut, herbicide should be applied to the cut surface immediately for best effect, and not more than 15 minutes later; this time limit is particularly important for the best absorption of water-based herbicides, and oil based herbicides can be applied longer after cutting. Cut stump applications are more effective than basal bark on woody stems greater than 5” diameter, and thick barked species.
Basal Bark	Application of herbicide to the bark with a sprayer, from surface to 12-18 inches above the root collar, to be absorbed into root system. Useful in precisely controlling woody species. Treatment can be performed while herbaceous species are dormant. Uses oil-based herbicides that penetrate bark, mixed with a carrier (basal oil). The entire surface area of the trunk should be coated within the 12-18 inch range, and rough bark requires more spray. Application should be stopped short of runoff.
Stem Injection	Application of herbicide into the stems of hollow plants via specialized injection equipment. This method ensures absorption of the herbicide into the roots of the plant, and limits exposure to and contamination by pesticides.
Hand Wicking (“Glove of death”)	Application of herbicide to the leaf surface with an absorbent cotton glove coated in herbicide layered over a chemical resistant glove. Small spray bottles are used to wet the fingertips and palm of the glove, which is then wiped directly on the plant, coating the leaves. This method is precise, faster than cut stem/stump treatment, and limits exposure of herbicide to other plants. Cuff the ends of the glove to prevent dripping. Gloves used for this method will becomes saturated with herbicide and should not be stored with other equipment.

Herbicides

Use with caution.
Be aware of local regulations before use.
Always read the label thoroughly before use, and follow all requirements (including PPE, site location, concentration, etc.).

Chemicals should be chosen based on a variety of factors, including: effectiveness on target species, environmental impact (toxicity to animals, persistence in soil, activity in water), and safety. The correct herbicide should be chosen for the site, and herbicide labelling will list use sites.

Table 5. General Overview of Commonly Used Herbicides

Glyphosate	**(*Rodeo®*)**	Glyphosate is a non-selective systemic post-emergent herbicide, damaging to most plants, including broadleaf plants and grasses. Pure glyphosate is generally environmentally safe, essentially non-toxic to mammals and fish, and mildly toxic to birds. Glyphosate is quickly absorbed into soil, and has negligible lasting environmental effects, and leaching to other areas is not expected to occur. Glyphosate has a short half-life in soil and water. Glyphosate may or may not be metabolized by plants, and potentially persists in plants where it was applied, including in the roots. Be aware that not all glyphosate herbicides are registered for aquatic use, and some formulations are contain adjuvants that make them highly toxic to aquatic life. If using in an aquatic area, be sure to use a product that omits these toxic ingredients (eg. *Rodeo®*). Pure glyphosate has low human toxicity, but is often made more hazardous to humans with adjuvants that disseminate the chemical into plants. Causes significant eye irritation.
Triclopyr amine	**(*Garlon® 3A*)**	Triclopyr is a selective systemic post-emergent herbicide. It is relatively non-toxic to humans and terrestrial mammals, and some formulations are registered for aquatic use. Triclopyr should generally be used in areas where it is desired to protect surrounding grasses and sedges. Triclopyr amine is preferred for foliar applications over triclopyr ester.

Triclopyr ester	**(*Garlon® 4 Ultra)***	Triclopyr is a selective systemic post-emergent herbicide. It is relatively non-toxic to humans and terrestrial mammals. It is not registered for aquatic use. Triclopyr ester is only recommended as a foliar spray prior to full leaf-out of the target plant. After leaf out, other herbicides would be preferred. Good for basal barking when mixed with a basal oil. Cannot be used within 35 ft. of wetland.
Imazapyr	**(*Plateau®, Habitat®*)**	Imazapyr is a non-selective, systemic, pre- and post-emergent herbicide. Imazapyr formulations can be registered for aquatic use. Imazapyr has a low human toxicity in skin contact or if ingested. Harmful if inhaled and may cause irreversible eye damage.

A good strategy for foliar application efficiency is to mix a general formulation of triclopyr amine and glyphosate. This mixture can be applied on a wide spectrum of species, and allow more treatment to occur during a single application session.

V. BRIEF DESCRIPTION OF EACH TARGET SPECIES (ADOPTED FROM THE EXOTIC SPECIES TREATMENT CALENDAR FOR BOSTON METROPOLITAN PARKS by Lyndon Langthorne)

Ailanthus altissima (Tree of Heaven)

Description

https://www.extension.iastate.edu/forestry/iowa_trees/trees/tree_of_heaven.html

A. altissima is a large non-native short-lived deciduous perennial tree. The trunk grows up to eighty feet tall, and is straight and gray, with smooth to bumpy bark that fissures with age. Leaves are silvery-green and pinnately compound, with alternate leaflets on one to four foot leaf veins. Leaves produce a foul smell if crushed. Five-petaled flowers are small, yellow-green, and grow in dense clusters. Reddish-brown seed pods are produced in late summer, and are twisted like helicopters, each containing one seed

The tree is resilient, and will grow in a wide range of environments, including urban where the root system can disrupt hardscaping and cause damage to structures. *A. altissima* crowds out native trees quickly with its ability to spread quickly to new areas. The roots are toxic and may limit growth potential for native plants.

Non-chemical Treatment

Seedlings and root suckers should be dug consistently to control spread. Any remaining stumps and roots will continue to generate new shoots. Cutting and mowing alone are not an effective form of management, and may increase density and spread potential. Mechanical measures that remove top growth are most effective when followed up by chemical treatment.

Chemical Treatment

Foliar spraying is the most common form of treatment for *A. altissima*] Foliar treatment best applied between full canopy and fall color. Foliar application cannot be applied to larger trees, and is most effective in treating dense stands of saplings.

Cut stump treatment is a more labor intensive method, but may be necessary in treating larger trees. After cutting tree, immediately apply herbicide to cut surface. Cutting alone will lead to increased suckering, and should be mitigated with herbicide application

Basal bark used for follow up treatments or small infestations. Root injury is maximized when used after full canopy to fall color. Following basal bark treatment, the tree is left in place to be cut at a later time. *A. altissima* may require multiple applications.

To maximize root damage, any chemical treatment should be performed within the time window where the tree has developed its full canopy and before the leaves have turned to fall colors.

Table 6: *A. altissima* Treatment Guide

Application Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Apr - Jun	Seedlings and saplings
Chemical Treatment						
Foliar	Glyphosate	*Rodeo®*	Non-selective	2%	Late Jun - Aug	Surfactant
	Triclopyr	*Garlon® 3A*	Selective	2%		
		Garlon® 4 Ultra		1.5%		
	Imazapyr	*Habitat®*	Non-selective	1%		
Cut stem/stump	Triclopyr	*Garlon® 3A, Garlon® 4 Ultra*	Selective	50%	Late Jun - Aug	
Basal bark	Triclopyr ester	*Garlon® 4 Ultra*	Selective	20-25%[1]	Mar - Oct[1]	Basal oil

Notes:
1. Contributed by BM

***Alliaria petiolata* (Garlic Mustard)**

Description

https://www.michigan.gov/invasives/0,5664,7-324-68002_71240_73853-379483--,00.html

A. petiolata is a non-native biennial herb. First year plants are immature and resemble many native plants, such as *Viola*. In its first year leaves stay green all year long. *A. petiolata* is much easier to identify in the second year after bolting. In the second year, the leaves take on a garlicky odor and the stem forms up to three feet in height. Leaves are alternate, sharply toothed, and triangular. Flowers bloom early in the season and are white with four petals. Seed pods develop atop the stem and burst to project seeds up to five feet from the plants, leading to rapid expansion of patches. *A. petiolata* produces more seeds in wet environments.

A. petiolata populations can grow rapidly when unchecked. Roots of *A. petiolata* have an allelopathic effect on native plants, limiting growth potential in areas of infestation. The plant provides no benefits as a food source for native animal species.

Non-chemical Treatment

Stems are attached to a single root, and plants can be removed entirely by pulling, particularly in moist and loose soil. Plants can also be dug. These methods can be an effective for control, but disturbs soil and leaves bare patches, which can be recolonized. Roots must be removed completely to prevent resprouting and are easily broken.

Mowing or cutting of *A. petiolata* in its second year after bolting can also be an effective management strategy, destroying plants, especially those already under stress, and preventing seed development.

Clipping and removing of flowers will prevent the formation of new seeds, and will reduce population growth rates.

These methods must be repeated over many years until seed bank is depleted. Size of the seed bank depends on the age of the population. When utilizing these methods, it is important to clean any equipment used or worn in order to prevent seed spread.

Chemical Treatment

Foliar spray is the recommended method for chemical treatment of A. petiolata, if chemical treatment is deemed necessary. Leaves should be cleaned of debris prior to application to ensure absorption into the plant. Glyphosate and triclopyr amine application to rosettes is most effective in late fall, and is best used only on dense stands where non-chemical treatment would be prohibitively laborious. Triclopyr amine can be used to avoid damaging surrounding grasses.

Table 7. *A. petiolata* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Apr - Oct	
Mowing					Aug - Oct	Most effective if plants are already under stress (drought, etc.)
Flower clipping					Apr - Jun	
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	0.5-1%[1]	Sep - Oct	
	Triclopyr amine	*Garlon® 3A*	Selective	0.5-1%[1]		

Notes:
1. Contributed by BM

Celastrus orbiculatus (Asiatic Bittersweet)

Description

C. orbiculatus is a non-native deciduous woody perennial that grows as either a vine or a shrub. Stem is woody with smooth brown bark. Leaves are alternate, glossy, and round with a pointed tip and shallow toothed margins. The leaves grow from two to five inches in length. Small greenish-yellow flowers with five petals form at leaf axils in clusters. Fruits are distinctive, in round orange capsules that split open in fall revealing fleshy red fruits with one or two seeds each.

https://orleansconservationtrust.org/asiatic-bittersweet-celastrus-orbiculatus/

The fruits persist throughout winter, and are highly attractive to birds and other animals, and to humans who often use vines and fruits in decorative manners. *C. orbiculatus* can spread far as seed, and is also capable of root suckering.

C. orbiculatus looks very similar to *C. scandens* (American Bittersweet), particularly when young. As the plant matures, it distinguishes itself with the placement of the fruit: *C. scandens* develops fruit on the tips of its branches, whereas *C. orbiculatus* develops fruits on the leaf axils. *C. scandens* leaves are also less round. Hybridization makes identification difficult. *C. orbiculatus* may be sold as *C. scandens* due to the difficulty in identification.

C. orbiculatus displaces native species through competition, and also displaces *C. scandens* through hybridization, potentially threatening *C. scandens* genetic identity. *C. orbiculatus* grows rapidly and can quickly dominate areas it is introduced into. *C. orbiculatus* also twines around native trees, increasing the load on limbs and contributing to failure.

Non-chemical Treatment

Smaller plants can be hand pulled or dug out. The entire root should be removed to prevent resprouting.

Vines climbing into trees can be cut at a comfortable height to kill any of the vine in the canopy and relieve trees. The base of the vine will continue to grow, and will require continued treatment to manage. When cutting vines from trees, take care to limit damage done to the bark of the tree as much as possible, for the sake of continued tree health.

Chemical Treatment

Foliar spraying of triclopyr is recommended for large, dense patches. Foliar spray is best applied in autumn or early winter, after most other species are dormant. If the vine is fully leafed out at the time of spraying, it is recommended to use triclopyr amine over the ester form. Foliar spray should only be applied on calm days when ambient air temperature is above the required sixty-five degrees Fahrenheit.

Vines of the plant that grow up into the canopy cannot viably be treated with a foliar application. The cut stump method is preferable for *C. orbiculatus* vines that climb trees, as well as for vines that are in close proximity to desired plants. When cutting, cut the vine six inches above the ground, in case more cut stump applications are required. Immediately apply the herbicide with a brush or spray bottle. Cut stump treatment can be used at any time in the year as long as the ambient air temperature is above the necessary temperatures: forty degrees Fahrenheit for glyphosate application, and sixty-five degrees Fahrenheit for triclopyr application. The ground should not be frozen at the time of application.

Basal bark treatment with triclopyr ester can also be applied at any time in the year, if the ambient air temperature has been above the required sixty-five degrees Fahrenheit for several days. Basal bark treatment should also not be done if there is snow on the ground, or if any part of the application area is wet from rain or flooding. Before applying, cut any stems sprouting from the vine within the twelve to eighteen inch application range to reveal the bark, and apply the treatment to cover the entire of that area.

Systemic herbicides should destroy an entire *C. orbiculatus* plant in a week.

Table 8. *C. orbiculatus* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes

Non-chemical Treatment						
Hand pulling					Mar - Nov	Small plants
Cutting					Mar - Nov	Will kill any climbing vines in canopy to relieve tree, will not destroy roots
Chemical Treatment						
Foliar spray	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	2%	Oct - Nov	Use late season so most native species are dormant; ambient temperature should still be above 65 degrees F
Cut stem/stump	Glyphosate	*Rodeo®*	Non-selective	25%	Year round	Ambient air temperature above 40°F
	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective			Ambient air temperature above 65°F, no frozen ground
Basal bark	Triclopyr ester	*Garlon® 4 Ultra*	Selective	20%	Year round	Should only be performed when ambient air temperature has been above 65°F for several days

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***Cynanchum louiseae* (Black Swallow-wort)**

Description

C. louiseae is a non-native rhizomatous perennial milkweed. Stems are yellowish-green, long and thin, vine-like and twining. The stems tend to climb and twist around other plant stems or themselves. Leaves are opposite, smooth, shiny, dark green, and elliptic or heart shaped with sharp tips. Flowers are small and dark purple, with five petals. *C. louiseae* has milkweed-like seed pods, with many small brown seeds attached to fluffy white hairs.

https://www.maine.gov/dacf/mnap/features/invasive_plants/cynanchum.htm

C. louiseae is spread long distances by its seeds, which float in wind, and many seeds will drop into already infested areas, increasing the density of *C. louiseae* in patches.

C. louiseae outcompetes native species and forms sprawling and dense mats of plant matter that completely cover areas, limiting the growth potential for native species. It will also twine around native species, stressing those plants and limiting ability to grow.

Non-chemical Treatment

Non-chemical treatment of C. louiseae has limited effects for control. Hand pulling or mowing the part of the plant above soil prevents the development of seed pods, limiting the ability of the plant to spread; this is not an effective method of long-term control.

Digging the roots of the plant is labor intensive, and any control established is limited as the plant will resprout from any remaining rhizomatous matter. The entire crown and root system must be removed in order to control by digging.

Any seed pods that do form should be pulled by hand and bagged or burned to prevent propagation.

Chemical Treatment

C. louiseae is a pervasive species and will require multiple years of treatment to achieve control. It is very important to not apply herbicide too early in the season when treating *C. louiseae*. While the shoots emerge in the early spring, herbicide should only be applied after the plants have begun to flower in June or July, and must be applied before

the formation of seed pods. Foliar spraying before the formation of seed pods will greatly reduce seed viability in affected plants.

Foliar spray is optimal when treating large monotypic stands of *C. louiseae*. If the exotic plants are surrounded by desired grasses, then triclopyr can be used minimize damage to grasses. Plants will appear sick one to two weeks after herbicide treatment, exhibiting yellowed leaves, and dead spots. Do not reapply herbicide to plants that are sick, as sick plants cannot effectively absorb herbicides into roots.

For particularly sensitive areas, cut stem treatment of *C. louiseae* is a viable control method. Stems should be cut to about two inches from the ground, and non-selective herbicide should be applied immediately.

Table 9. *C. louiseae* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand-pulling					Aug - Nov	Target seedpods
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	3-5%	June - July	Spray as plants begin to flower
	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	1%		
	Imazapyr	*Habitat®*				
Cut stem/stump	Glyphosate	*Rodeo®*	Non-selective	50-100%	June - July	Cut stems to two inches from the ground before application

Fallopia japonica (Japanese Knotweed)

Description

https://www.hortweek.com/network-rail-loses-japanese-knotweed-court-ruling/landscape/article/1486930

F. japonica is a non-native rhizomatous perennial that is a particularly difficult exotic species to manage. The stems emerge in early spring and grow tall, up to ten feet. The stems are reddish-brown and hollow, resembling bamboo. Heart-shaped leaves are large, growing four to seven inches in length. Clusters of small, greenish-yellow to white flowers are formed in July. Fruits mature in August or September, and are winged to increase seed dispersal.

The seeds rarely germinate, and North American knotweed is presumed to be a sterile male clone. It is still possible to produce viable seeds, usually through hybridization. F. japonica mainly spreads vegetatively, extending its massive woody rhizome system and sending up new shoots. Any piece of rhizome material moved to a new area can lead to new infestation. As such, it is generally contained in defined patches, and will not cross impervious surfaces like roads easily.

F. japonica offers no ecological benefits to native species other than dense cover. It can colonize a variety of ecosystems, swiftly converting them to monocultures, and degrading habitat value.

Non-chemical Treatment

Digging is an ineffective method of management, as *F. japonica* grows from a thick rhizome, forming large crowns that are extremely difficult to fully remove.

Mowing of *F. japonica* alone is not an effective means of control, and must be coupled with chemical treatment.

Small stands of *F. japonica* can be managed by mowing the area and covering it with impervious mats, thick enough that *F. japonica* is unable to grow through. Leaving the mats in place for several years will prevent the root system from sending up new shoots in the covered area, preventing photosynthesis. If in an area of full or partial sun, the heat will also damage the root system.

F. japonica is limited in its ability to spread across impervious surfaces, and will be more easily contained closer to roads.

Chemical Treatment

The most effective method of chemical treatment is first to mow *F. japonica* at the beginning of July, and follow with herbicide application. At least six weeks should pass between mowing and herbicide application, and when herbicide is applied the height of *F. japonica* is limited to its regrowth: three to four feet tall instead of six to ten feet tall.

Glyphosate can be applied as a foliar spray. Glyphosate is a non-selective herbicide, and patches with *F. japonica* are generally monocultures. Glyphosate should be applied twice in the first year of treatment, first in early August, and following up in September before the first frost.Grass can be seeded in the area if it is necessary for erosion control. As knotweed requires multiple years of treatment, an inexpensive annual rye grass would be optimal.

F. japonica can also be treated by stem injection, where herbicide is injected at the nodes, the location where the leaves meet the stem. Stem injection directs as much chemical as possible to the root system, but is labor intensive and requires specialized injection equipment.

F. japonica thrives in a range of soils, from sandy roadsides to moist wetlands. In wetland areas, use mechanical methods to the greatest extent feasible (such as thick mats). Work from the upstream seed source to downstream populations. If chemical treatment is used, care should be taken to use an herbicide that will not injure amphibian food sources and rare species such as Blanding's turtle. The table below provides guidance on using *Rodeo®*.

Application should not exceed the regulated rate per acre, of particular concern when filling hollow stems or injecting herbicide.

Herbicide should not be applied after the first frost, as *F. japonica* is frost sensitive and will die back, leaving any herbicides applied after frost unabsorbed.

Table 10. *F. japonica* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Mowing					Aug; Sep	
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	2-4%[1]	Early Aug - Late Sep	Surfactant; first application: Add surfactant, must wait 6 weeks after early July mowing, second application: add surfactant, must be applied before first frost
Stem injection	Glyphosate	*Rodeo®*	Non-selective	100%	August	Injected at the stem nodes

Notes:
1. Contributed by BM

Convolvulus arvensis (Bindweed)

Description

https://www.swcoloradowildflowers.com/White%20Enlarged%20Photo%20Pages/convolvulus%20arvensis.htm

"Deep rooted perennial vine that grows along the ground until it comes in contact with other plants or structures; then climbs aggressively. Smooth, arrowhead-shaped leaves. Slender, twining stems that can grow to 6 feet long. Trumpet-shaped flowers, light pink to white. Two small leaf bracts about one inch below the flower. Fleshy pale roots that travel deeply and widely" https://www.nwcb.wa.gov

"Reproduces vegetatively from roots, rhizomes,stem fragments and by seeds that can lie dormant in the soil for up to 20 or more years. Roots spread widely underground, both vertically and horizontally, forming dense mats. Flowering is indeterminate, so flowers continue to develop along stems until the first frost" https://www.nwcb.wa.gov

Non-chemical Treatment

"Avoid digging or tilling the soil around mature field bindweed roots; roots or rhizome fragments left behind may resprout. Repeated hand pulling works eventually, but is highly labor intensive. It is best to limit hand pulling and tilling to seedlings; do in early spring when the ground is wet. Smothering plants with mulch, black plastic or plastic-fiber mats (geotextiles) is another option, but the covering must be kept in place for several years. Success may be somewhat limited as field bindweed can persist without light, sending its underground roots beyond the edge of the covering to start a new infestation. If using coverings, check often for cracks or openings; pull or spot spray any new growth coming up through the covering. Cutting alone will not control this plant and is not recommended." https://www.nwcb.wa.gov

Chemical Treatment

"Herbicides can be painted or brushed on leaves to avoid drift onto desirable plants. Products containing glyphosate are effective when applied in the summer and fall before

the leaves die back. However, glyphosate is “non-selective” and will injure any foliage that it comes in contact with including grass. Selective broadleaf herbicides with the active ingredients triclopyr and 2,4-D work well for lawn areas as they won’t harm most grasses. Repeat on regrowth as needed. All these herbicides are absorbed by foliage and moved throughout the plant to kill the roots and shoots. If retreating with glyphosate in the same season, allow plants to grow and produce flowers before each application.” https://www.nwcb.wa.gov

Table 11. *C. arvensis* Herbicide Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand-pulling					Mar - Sept	
Digging					Mar - Sept	
Mowing					Mar - Sept	
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	2%	July - Sept	
	Triclopyr	*Garlon® 3A*	Selective	3-5%		
	Imazapyr	*Habitat®*	Non-selective	2%		

Lythrum salicaria (Purple Loosestrife)

Description

L. salicaria is a non-native herbaceous perennial forb that is an aggressive invader of wetlands. Several four-sided square erect stems grow from a single plant, two to six feet in height. Leaves are opposite on the stem or in whorls around the base, and are smooth, elongated, and heart-shaped. Flower spikes are showy and magenta, made up of many small, five-petaled individual flowers, blooming late in the growing season. The fruit is a capsule developed in autumn containing small seeds.

https://www.minnesotawildflowers.info/flower/purple-loosestrife

L. salicaria is spread by seed, which are viable for many years, and remain dormant in the soil until conditions are right for growth.

L. salicaria can dominate areas where it is introduced, displacing native species and reduces biodiversity. *L. salicaria* also degrades wetlands, catching sediment that fills in wetlands, leading to reduced water flow, and decreased flood retention.

Non-chemical Treatment

L. salicaria populations can be partially managed by pulling and digging as long as the entire taproot is removed. This is time consuming and labor intensive, and should only be implemented on small pioneer populations that can be removed efficiently.

Biological control is the best method for long term large scale. Insect species can be introduced to feed on the plants, preventing *L. salicaria* from seeding and weakening, eventually destroying the plant.

Chemical Treatment

L. salicaria most commonly is found in sensitive wetland areas. The two most effective herbicides are glyphosate and triclopyr. Glyphosate and triclopyr amine, both registered for aquatic use, are commonly applied when managing *L. salicaria*. Treatment should occur prior to seed set to prevent future spread of the species.

Glyphosate can damage surrounding grasses and sedges, leaving new opportunities for colonization by *L. salicaria*. Pesticide should be selected based on density of the stands being treated, and whether or not surrounding plants are desirable. If surrounding plants are desirable grasses and sedges, triclopyr amine should be selected. If there are many exotic plants, glyphosate should be used, or a mixture of glyphosate and triclopyr. Follow up treatments will be required for years until the seedbank is depleted.

Table 12. *L. salicaria* Herbicide Treatment Guide

Application Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Apr - Sep	
Digging					Apr - Sep	
Cutting					Apr - Sep	
Biological					Apr - Jun	Introduced insect species to feed on plant
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	1-2%	Late Aug	Apply after peak bloom; cut and dispose of flower heads prior to application
	Triclopyr amine	*Garlon® 3A*	Selective	1%		
Hand wicking					Late Aug	

***Rosa multiflora* (Multiflora Rose)**

Description

R. multiflora is a thorny non-native perennial shrub. The plants is tolerant of many conditions and can grow ten feet tall and ten feet wide. Stems are long, green to brown, with hooked thorns that make hand removal hazardous. Leaves are opposite with five to eleven leaflets, and leaflets are one to two inches in length. White to pinkish five petal flowers form in clusters in the summer. The plant produces bright red fleshy fruits (hips).

https://production.wordpress.uconn.edu/cipwg/wp-content/uploads/sites/244/2014/04/RobRoutledgeSaultCollegeBugwood.jpg

R. multiflora can generate new stems to spread, but it is predominantly spread by seed.

R. multiflora is easily distinguished from native *Rosa* species. In R. multiflora the base of leaf where it is attached to the thorny stem is fringed, and the plant's white to pinkish five petalled flowers occur in branched structures.

Benefits of the plant include the food and cover it provides to native animals. However, the overall effect this shrub has on habitat value is negative. *R. multiflora* crowds out native species and creates dense, impenetrable stands. *R. multiflora* can also act almost as a vine, and choke out native trees.

Non-chemical Treatment

Controlling small populations is much easier than attempting control dense stands. Hand pulling can be effective if the entire root of the plant is removed.

Cutting or mowing alone will not control *R. multiflora*, but are useful in preparation for herbicide treatment. Cut stem application would be impossible on dense stands, so mowing leads to better control.

Chemical Treatment

Foliar applications are made in summer when *R. multiflora* is flowering, with peak bloom being in early June. Spray should thoroughly cover the foliage of the plant, wetting as many leaves as possible without dripping. Glyphosate is less effective on multiflora rose than other herbicides but may be desirable if soil activity is a concern, or to avoid damaging surrounding grasses. Triclopyr can be applied as a foliar spray, and will eliminate top growth; future applications may be necessary to destroy the root system.

Triclopyr can also be applied to cut stems or as basal bark, and is most effective when applied in the dormant season. Cut stem use when mowing or cutting is practical; remove the top growth of the shrub and wet the stubble. This method can be applied year round. Basal bark is only feasible when the base of the plant can be accessed. It is best applied from January to autumn color. Wet the lower twelve inches of plant stem without causing runoff.

Table 13. *R. multiflora* Treatment Guide

Method	Herbicide	Brand	Selectivity	Concentration	Time	Notes
Non-chemical Treatment						
Hand pulling					Mar - Nov	Remove entire root
Cutting/Mowing					Mar - Nov	Effective when followed immediately by chemical treatment
Chemical Treatment						
Foliar spray	Glyphosate	*Rodeo®*	Non-selective	2%	May - Jun	
	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	1%		
Cut stump/stem	Triclopyr	*Garlon® 3A*, *Garlon® 4 Ultra*	Selective	50%	Year round	

Basal bark	Triclopyr ester	*Garlon® 4 Ultra*	Selective	20-25%	Jan - Aug	Basal oil

Important Note: *Mention of specific products in this document does not constitute endorsement. Specific product names are mentioned in the resources used to create this document. This document is meant to serve as a guideline for exotic plant management, and is not a legal authority. By law, pesticides must be applied according to their labeling.*

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Scott, Kelsey

To: Quiggle, Robert
Subject: RE: Lowell Heritage State Park information

From: Quiggle, Robert
Sent: Friday, December 20, 2019 3:28 PM
To: Harris, Jeffrey (DCR) <jeffrey.harris@state.ma.us>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: RE: Lowell Heritage State Park information

Jeffrey:

It was good to meet you this week, and thanks for providing this information so quickly. We'll look through this and let you know if we have additional questions, etc.

Have a great holiday,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

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From: Harris, Jeffrey (DCR) [mailto:jeffrey.harris@state.ma.us]
Sent: Friday, December 20, 2019 12:33 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: Lowell Heritage State Park information

Rob-

Thank you for your presentation on the Boott Hydro relicensing project on Wednesday. As a follow-up, I wanted to provide you with some additional information that may be helpful in the various studies that are planned.

The first is a 2014 Resource Management Plan for the broader complex that includes Lowell Heritage State Park. This addresses DCR ownership, recreation, and other issues within the park. The document is available here: https://www.mass.gov/service-details/lowell-great-brook-planning-unit

Secondly, our GIS team undertook a major effort a number of years ago to clarify DCR ownership of parcels within the City of Lowell. This data is currently available through Mass GIS: https://docs.digital.mass.gov/dataset/massgis-data-protected-and-recreational-openspace

Let me know if you have any questions!

Jeffrey

Jeffrey Harris, Preservation Planner

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DCR's Office of Cultural Resources

Protecting the legacy and experience of history in Massachusetts state parks.

Scott, Kelsey

From: Scott, Kelsey
Sent: Wednesday, January 15, 2020 3:21 PM
To: Bob Nasdor (bob@americanwhitewater.org); celeste_bernardo@nps.gov; Bruins, Christine; Cooksey, William (DCR); John Aziz; Hoffmann, Peter (DCR); 'bruce@zoaroutdoor.com'; kevin@zoaroutdoor.com; Rose, George; CMcCall@lowellma.gov
Cc: Quiggle, Robert; 'Kevin.Webb@enel.com'; Anderson, Elise (EGP North America)
Subject: Lowell Hydroelectric Project (FERC No. 2790-072) -- Whitewater Boating and Access Study
Attachments: 20200115 Lowell Whitewater Flow Documentation Plan Cover Letter.pdf

Working Group Participants:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790)(Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study as approved in FERC's March 13, 2019 Study Plan Determination for the Project. Pursuant to the approved study plan, Boott met with the Whitewater Boating and Access Study Working Group (Working Group) at the Project on August 8, 2019. Boott provided the Whitewater Flow Documentation Plan (WFDP) to the Working Group on October 28, 2019 for review and comment.

Boott appreciates the comments on the WFDP provided by the Working Group. Please find the response to comments attached. If you have questions or need additional information, please contact Kevin Webb, Boott Hydro Licensing Manager, at (978) 935-6039 or via email at Kevin.Webb@enel.com.

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Via Email Distribution

January 15, 2020

To: Whitewater Boating and Access Working Group

Re: Response to Comments on the Lowell Hydroelectric Project (FERC No. 2790-072);
Whitewater Boating and Access Study
Whitewater Flow Documentation Plan

Dear Whitewater Boating and Access Working Group:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc., is the Licensee and owner of the 20.16 megawatt Lowell Hydroelectric Project (FERC No. 2790) (Project). The Project is operated under a license issued by the Federal Energy Regulatory Commission (FERC or Commission) that expires on April 30, 2023. The existing license for the Project was issued by the Commission with an effective date of May 1, 1973, and the license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations Part 5.

In support of Project relicensing, Boott is conducting a Whitewater Boating and Access Study (WBAS) as approved in the Commission's March 13, 2019 Study Plan Determination for the Project. In accordance with the approved study plan, Boott met with the WBAS Working Group (Working Group) at the Project on August 8, 2019 to coordinate study planning, identify potential volunteers to participate in controlled flow releases, and to identify potential put-in and take-out locations.

Consultation with the Working Group during the August 8, 2019 site visit indicated that there was a need to visually document a range of flows in the Project's bypass reach in order to assist the participants in identifying which flows to select for the controlled flow releases. Since the Working Group participants had limited experience boating the bypass reach, participants could not make informed choices on which flows would be appropriate for boating. Accordingly, Boott developed a Whitewater Flow Documentation Plan (WFDP) that describes the methods for documenting a range of flow conditions in the bypass reach, and methods for selecting study flows in consultation with the Working Group. The WFDP was submitted to the Working Group on October 28, 2019. In the WFDP, Boott proposed to document flows in the bypass reach using cellular-enabled trail cameras and Project operational data.

Boott appreciates the comments provided by American Whitewater (AW) on November 8, 2019. Based on AW's comments regarding the proposed locations of the cameras, Boott has attached a revised figure showing the updated locations for camera placement. These modified locations will capture more of the area of interest to AW, while also keeping the cameras at locations appropriate to reduce the risk of theft or vandalism. To the extent practicable, field technicians installing the cameras will adjust the locations based on field conditions with the intent of maximizing the visual documentation of whitewater features.

Boott also appreciates comments by the National Park Service (NPS) provided on November 11, 2019, and information provided regarding their operating parameters for various recreational experiences. The purpose of the WFDP is to consult with the Working Group on the methods for documenting a range of flow conditions in the bypass reach. The selection of appropriate flows for the WBAS will take place after May 15, 2020, and will occur in consultation with NPS and other members of the Working Group. Since the selection of proposed flows has not occurred, Boott believes it is premature at this time to attempt to define

the effects of WBAS flows (if any), on flows in the Merrimack River or throughout the canal system. Generally, the Working Group will likely focus on flows ranging from 500 cubic feet per second (cfs) to 2,000 cfs, which are average bypass flows the Project normally experiences. Additional consultation on the WBAS will occur in late spring of 2020.

Boott appreciates the comments by AW and NPS regarding potential impacts of the study on fishway structures and fish passage. Boott is required to operate the upstream and downstream fish bypass facilities from April 1 through July 15 and from September 1 through November 15. As a result, Boott anticipates conducting the controlled flow releases after July 15, 2020 and before September 1, 2020, therefore the controlled flow releases will not interfere with fish passage or fishway structures.

On behalf of Boott, I look forward to continued discussions and consultation with the Working Group regarding this study. Please do not hesitate to contact me at (978) 935-6039 or via email at Kevin.Webb@enel.com if you have any questions concerning this study or Project relicensing.

Sincerely,

Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

Encls.

Cc: R. Quiggle (HDR)
K. Scott (HDR)
E. Anderson (Boott)

Lowell Hydroelectric Project (FERC No. 2790- 072)
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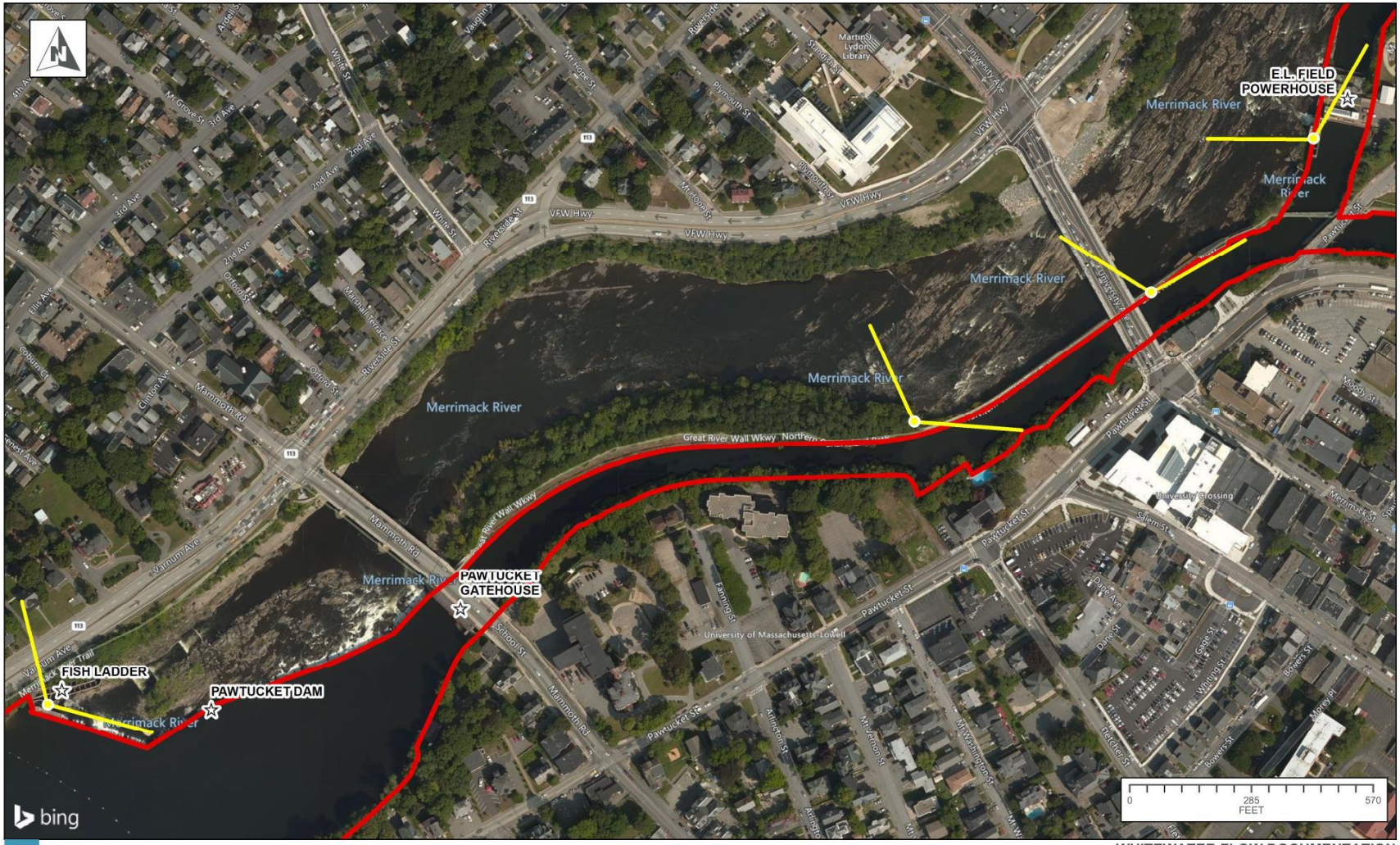
Figure 1. Locations of Cellular-Enabled Cameras



Scott, Kelsey

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Sent: Thursday, January 16, 2020 10:36 AM
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Cc: Quiggle, Robert; 'Kevin.Webb@enel.com'; Anderson, Elise (EGP North America)
Subject: Lowell Hydroelectric Project (FERC No. 2790) -- Study Progress Report for Quarter 4 of 2019
Attachments: P-2790 2019 Quarterly Progress Report .pdf

Dear Stakeholders:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project. Boott is currently conducting studies approved by FERC in support of Project relicensing. On January 16, 2020, Boott filed the attached Study Progress Report for Quarter 4 (Q4) of 2019 with FERC in accordance with the approved study plan. The progress report describes the activities performed through the Q4 study period, as well as relicensing study activities generally expected to be conducted within the next quarter.

Should you have any questions regarding the attached progress report, please contact Kevin Webb, Hydro Relicensing Manager with Boott, at (978) 935-6039 or kevin.webb@enel.com.

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January 16, 2020 **Via eFiling**

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Lowell Hydroelectric Project (FERC No. 2790-072)
Fourth Quarterly Study Progress Report

Dear Secretary Bose:

Boott Hydropower, LLC (Boott), a subsidiary of Enel Green Power North America, Inc. (Enel), is the Licensee and owner of the 20.2 megawatt Lowell Hydroelectric Project (Project or Lowell Project). The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) in 1973 and expires on April 30, 2023. Accordingly, Boott is pursuing a new license from the Commission for the continued operation and maintenance of the Project. Boott has elected to utilize the Commission's Integrated Licensing Process (ILP) for the relicensing of the Lowell Project.

As proposed in Boott's January 28, 2019 Revised Study Plan (RSP) and approved in the Commission's March 13, 2019 Study Plan Determination (SPD), Boott is hereby filing the Study Progress Report for the fourth quarter of 2019 (Q4 2019). This progress report describes the activities performed through the Q4 2019 study period, as well as ILP activities generally expected to be conducted within the next quarter (Q1 2020). Unless otherwise described, all relicensing studies are being conducted in conformance with the approved RSP and the Commission's SPD.

1. Downstream American Eel Passage Assessment
    - Boott obtained silver eels for radio-tagging from a commercial vendor in Maine during early October.
    - Boott tagged and released a total of 100 adult silver eels upstream of the Project's impoundment during October.
    - Boott monitored the downstream progress of radio-tagged eels during October and November using a series of stationary receivers which were checked regularly during the passage season.
    - During Q1 2020, Boott will be analyzing downstream passage data collected during October and November on fish movement, river conditions, and station operations.

2. Juvenile Alosine Downstream Passage Assessment
    - Boott collected juvenile alosines from Turtle Pond in Concord, NH during October.
    - Boott tagged and released a total of 150 juvenile alosines upstream of the

Pawtucket Dam during October.

- Boott monitored the downstream progress of radio-tagged juvenile alosines during October and November using a series of stationary receivers which were checked regularly during the passage season.
- During Q1 2020, Boott will be analyzing downstream passage data collected during October and November on fish movement, river conditions, and station operations.

3. Upstream and Downstream Adult Alosine Passage Assessment
   - Boott is currently in the planning stages of this study.
   - Planning for this study will continue during Q1 2020.
4. Fish Passage Survival Study
   - Boott will initiate preparation of the draft fish passage survival study during Q1 2020.
   - Efforts will include compilation of all required Project and turbine parameters as well as a review of results from the American eel and juvenile alosine telemetry studies.
5. Three-Dimensional Computational Fluid Dynamics Modeling
   - Boott is currently planning and scheduling the initial 3D-Computational Fluid Dynamics (CFD) Model working group meeting for this study. This CFD Model working group will serve as a platform for discussion and refinement of the eight scenarios to be modeled among the three locations as outlined in the RSP.
   - Activities to occur during Q4 2019 include continued study planning and field data collection.
6. Instream Flow Habitat Assessment and Zone of Passage Study in the Bypassed Reach
   - Boott conducted a drone-based LiDAR survey of the bypassed reach during November.
   - Boott conducted foot-based substrate mapping and bathymetric data collected for permanently wetted sections of the bypassed reach during November.
   - Boott collected the water surface elevation and discharge measurements associated with the “low” calibration flow.
   - During Q1 2020 Boott will assemble the elevation mesh for the 2D model to identify any areas which may require additional surveying during Q2 2020.
   - Boott anticipates field data collection for the mid- and high-calibration flows will occur during Q2 2020.
7. Fish Assemblage Study
   - During Q4 2019, Boott conducted the fall sampling for the fish assemblage

study using electrofishing, gill netting, and minnow traps in the impoundment and utilizing portable electrofishing gear in the bypassed reach. This completed the sampling effort for this study.

- Boott anticipates that data analysis and report preparation will continue during Q1 2020.

8. Recreation and Aesthetics Study

- In accordance with the SPD, Boott has initiated the desktop research and literature review to identify and describe the existing recreational uses in the Project area.
- Boott consulted with the National Park Service (NPS), American Whitewater and other stakeholders to develop a list of reconnaissance and visitor intercept survey locations.
- Boott conducted field reconnaissance and visitor intercept surveys on random weekdays and weekend days through the months of May, June, July, August, September, and October. The online recreation survey is still available at the Project's relicensing website (http://www.lowellprojectrelicensing.com/).
- Boott conducted the field inventory to document existing formal and informal recreation facilities within the Project Boundary. Boott will continue to analyze this data in Q1 2020.
- Boott held a Study Workshop meeting with NPS and other stakeholders on December 18, 2019, to discuss recreation trends, utilization, facilities, and vegetation and waterborne trash in the canal system.
- Boott conducted a vegetation growth survey throughout the Project's canal system. This included a visual survey, identification of dominant vegetation types, and global positioning system (GPS) mapping of vegetative growth locations. Boott will continue to analyze this data in Q1 2020.

9. Historically Significant Waterpower Equipment Study

- In accordance with the SPD, Boott is conducting background research and consulting with the NPS and other parties to develop a list of historically significant waterpower equipment at the Project.
- Boott held a Study Workshop with the NPS and other stakeholders to collect information regarding this study in Q4 2019.
- During Q1 2020, Boott intends to work closely with an architectural historian to review significant historical equipment owned and operated by Boott within the Project Boundary.

10. Resources, Ownership, Boundaries, and Land Rights Study

- Boott has initiated an internal search for rights-of-way, land lease agreements, surveys, easements, and maintenance agreements related to the Lowell Project.
- Boott has obtained and initiated a review of the three main documents that establish the framework of this study: The Great Deed, the Order of Taking of

the Commonwealth of Massachusetts, and the lease from the Commonwealth of Massachusetts to the Lowell National Historical Park.

- On December 18, 2019, Boott held a consultation meeting with stakeholders, including the NPS and the City of Lowell, to collect information regarding this study.
- During Q1 2020, Boott anticipates a continued review of documents regarding property rights, roles, and responsibilities in coordination with the NPS, Massachusetts Department of Conservation and Recreation (MADCR), the City of Lowell, and private land owners (as applicable).

11. Water Level and Flow Effects on Historic Resources Study

- Boott consulted with the NPS to determine the locations of pressure transducers (level loggers) to monitor flow levels in the canal system.
- Boott deployed water level loggers in June 2019. This is a minor variance in the study plan which called for deployment and data collection to begin on May 1, 2019. Boott plans on collecting continuous data for one full calendar year from the initial date of data collection.
- Monthly water level downloads occurred during Q4 2019. Data download is expected to continue through Q1 2020.
- On December 18, 2019, Boott held a consultation meeting with stakeholders, including the NPS and the City of Lowell, to collect information regarding this study in Q1 2020. During this meeting, stakeholders clarified that their interest is related to the effects of the new crest gate system and potential effects on historic resources at higher water levels. Boott explained that any effects would be limited to structures along the Northern Canal and the Upper Pawtucket Canal. Stakeholders agreed that the historic resources along the Northern Canal and Upper Pawtucket Canal should be the focus of this study. Stakeholders and Boott agreed that Boott should move level loggers to those locations (Upper Pawtucket Canal and Northern Canal), and remove the remaining level loggers from the downtown canal system.

12. Whitewater Boating and Access Study

- Boott initiated consultation with the stakeholders to establish a Whitewater Boating and Access Study Working Group (Working Group). The Working Group conducted a site visit at the Project in August 2019 (Q3 2019) and identified action items necessary to facilitate the study, including flow documentation and a plan for accessing the bypass reach.
- During Q4 2019, Boott developed a Whitewater Flow Documentation Plan (WWFD Plan) and submitted it to stakeholders for review and comment. The WWFD Plan documents the methodologies proposed by Boott to capture the bypass reach under various flow conditions to determine the optimal flows to include during the controlled flow releases in the summer of 2020.
- Boott anticipates continued consultation with the Working Group through Q1 2020, with the intent of conducting controlled flow releases in Q3 2020 when flow

conditions and operational restraints permit.

13. Operation Analysis of the Lowell Canal Study

- Boott is continuing to review and prepare documentation on Project operations, including the operation of the Project's canal system.
- In Q1 2020, Boott anticipates continued review of Project operations and initial development of a study report documenting the findings of the operation analysis.

Please do not hesitate to contact me at (978) 935-6039 or kevin.webb@enel.com if you have any questions concerning this matter.

Sincerely,

Boott Hydropower, LLC

Kevin M. Webb
Hydro Licensing Manager

cc: C. St. Pierre, Boott
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Town of Litchfield, NH
2 Liberty Way
Suite 2
Litchfield, NH 03052

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Keith Bergman
Town Administrator
Town of Littleton, MA
37 Shattuck Street
3rd Floor, Room 306
Littleton, MA 01460

Tom Dolan
Chairman
Town of Londonderry, NH
268B Mammoth Road
Londonderry, NH 03053

Robert Dolan
Town Administrator
Town of Lynnfield, MA
55 Summer Street
Lynnfield, MA 01940

Eileen Cabanel
Town Manager
Town of Merrimack, NH
6 Baboosic Lake Road
Merrimack, NH 03054

Andrew Sheehan
Town Administrator
Town of Middleton, MA
48 South Main Street
Middleton, MA 01949

Andrew Maylor
Town Manager
Town of North Andover, MA
120 Main Street
North Andover, MA 01845

John Murphy
Town Moderator
Town of North Reading, MA
235 North Street
North Reading, MA 01864

Douglas Viger
Chairman
Town of Pelham, NH
6 Village Green
Pelham, NH 03076

Mark Andrews
Town Administrator
Town of Pepperell, MA
One Main Street
Pepperell, MA 01463

John Arena
Chair, Board of Selectmen
Town of Reading, MA
16 Lowell Street
Reading, MA 01867

Michael Lyons
Chairman
Town of Salem, NH
33 Geremonty Drive
Salem, NH 03079

Town Administrator
Town of Shirley, MA
7 Keady Way
Shirley, MA 01464

George Seibold
Chairman
Town of Stoneham, MA
35 Central Street
2nd Floor
Stoneham, MA 02180

Richard Montuori
Town Manager
Town of Tewksbury, MA
1009 Main Street
2nd Floor
Tewksbury, MA 01876

Richard Reault
Chair, Board of Selectmen
Town of Tyngsborough, MA
25 Bryants Lane
Tyngsborough, MA 01879

Board of Selectmen
Town of Westford, MA
55 Main Street
Westford, MA 01886

Jeffrey Hull
Town Manager
Town of Wilmington, MA
121 Glen Road
Room 11
Wilmington, MA 01887

Ross Mcleod
Chairman
Town of Windham, NH
3 North Lowell Street
Windham, NH 03087

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Additional Parties

Robert Nasdor
NE Stewardship Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776

Norman Sims
Appalachian Mountain Club
77 Back Ashuelot Road
Winchester, NH 03470

Kevin Hollenbeck
Metrowest District Manager
DCR Great Brook Farm State Park
984 Lowell Street
Carlisle, MA 01741

Kevin Webb
Hydro Licensing Manager
Enel Green Power North America, Inc.
100 Brickstone Square, Suite 300
Andover, MA 01810

Robert Bersak
780 North Commercial Street
Eversource Energy
P.O. Box 330
Manchester, NH 03015

Jay Mason
President
Friends of Tyler Park
77 Tyler Park
Lowell, MA 01851

David Meeker
Hull Street Energy, LLC
4920 Elm Street
Suite 205
Bethesda, MD 20814

Jeffrey J. Winward
Fire Chief
Lowell Fire Department
99 Moody Street
Lowell, MA 01852

Dinell Clark
Lowell Flood Owner's Group
197 Wellman Avenue
North Chelmsford, MA 01863

Bob Gagnon
Lowell Flood Owner's Group
136 Townsend Avenue
Lowell, MA 01854

Lynda Ignacio
Lowell Flood Owner's Group
66 Shirley Avenue
Lowell, MA 01854

Steve Masse
Lowell Flood Owner's Group
186 Humphrey Street
Lowell, MA 01850

John Nappi
Lowell Flood Owner's Group
279 Pawtucket Boulevard
Tyngsborough, MA 01879

Gene Porter
Lower Merrimack River Local Advisory
77 Concord Street
Nashua, NH 03064

Thomas Golden, Jr.
Massachusetts House of Representatives
24 Beacon Street
Room 473B
Boston, MA 02133

Rady Mom
Massachusetts House of Representatives
24 Beacon Street
Room 43
Boston, MA 02133

David Nangle
Massachusetts House of Representatives
24 Beacon Street
Room 479
Boston, MA 02133

Edward Kennedy
Massachusetts Senate
24 Beacon Street
Room 405
Boston, MA 02133

Kim Goddu
Merrimack River Watershed Council
60 Island Street
Suite 211-E
Lawrence, MA 01840

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Rusty Russell
Executive Director
Merrimack River Watershed Council
60 Island Street
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Lawrence, MA 01840

Chris Countie
Water Supply Manager
Pennichuck Water Works
P.O. Box 1947
25 Manchester Street
Merrimack, NH 03054

Fred Jennings
President, Nor'East Chapter
Trout Unlimited
P.O. Box 946
Ipswich, MA 01938

Arthur Faneros
Universal Apartment Rental
114 University Avenue
Lowell, MA 01854

Michele Tremblay
Upper Merrimack River Local Advisory
Committee
P.O. Box 3019
Penacook, NH 03303

Ann Kuster
US House of Representatives
137 Cannon House Office Building
2nd District
Washington, DC 20515

Seth Moulton
6th District
US House of Representatives
21 Front Street
Salem, MA 01970

Carol Shea-Porter
US House of Representatives
1530 Longworth House Office Building
1st District
Washington, DC 20515

Lori Trahan
3rd District
US House of Representatives
126 John Street
Suite 12
Lowell, MA 01852

Margaret Hassan
US Senate
330 hart Senate Office Building
Washington, DC 20510

Edward Markey
US Senate
218 Russell Senate Office Building
Washington, DC 20510

Jeanne Shaheen
US Senate
506 Hart Senate Office Building
Washington, DC 20510

Elizabeth Warren
US Senate
317 Hart Senate Office Building
Washington, DC 20510

Dinell Clark
President
Williamsburg Condominium I
197 Wellman Avenue
North Chelmsford, MA 01863

Richard Howe
Register of Deeds - Middlesex County North
360 Gorham Street
Lowell, MA 01852

Scott, Kelsey

From: Scott, Kelsey
Sent: Monday, January 20, 2020 10:00 AM
To: Quiggle, Robert
Subject: FW: Lowell Hydroelectric Project (FERC No. 2790) -- Study Progress Report for Quarter 4 of 2019

Just FYI

From: gene porter [mailto:gporter77@gmail.com]
Sent: Monday, January 20, 2020 9:58 AM
To: Scott, Kelsey
Cc: kevin.webb@enel.com; ChisholmD@nashuanh.gov; beckanamin@hotmail.com
Subject: Re: Lowell Hydroelectric Project (FERC No. 2790) -- Study Progress Report for Quarter 4 of 2019

Thanks for this report. I regret that I was unable to represent the NH LMRLAC at the December Stakeholders Meetings. I trust that the City of Nashua, a major abutter of the Impoundment, is a Stakeholder and was represented.

Questions for Kevin Webb:

1.The Crestgate installation has important but unknown implications for the Impoundment shoreline in New Hampshire below Cromwells Falls. To what extent do the depth logging and analysis activities include the area at or above the NH-MA border?

2. To what extent did your outreach to recreational users include the NH Paddlers (**www.nhamcpaddlers.org) or other NH recreational communities?**

Thanks
Gene Porter
Chair NH LMRLAC

On Thu, Jan 16, 2020 at 10:35 AM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the Lowell Hydroelectric Project. Boott is currently conducting studies approved by FERC in support of Project relicensing. On January 16, 2020, Boott filed the attached Study Progress Report for Quarter 4 (Q4) of 2019 with FERC in accordance with the approved study plan. The progress report describes the activities performed through the Q4 study period, as well as relicensing study activities generally expected to be conducted within the next quarter.
>
> Should you have any questions regarding the attached progress report, please contact Kevin Webb, Hydro Relicensing Manager with Boott, at (978) 935-6039 or kevin.webb@enel.com.
>
> **Kelsey Scott, MS**
>
> *Assistant Regulatory Specialist*
>
> **HDR**
>
> 1304 Buckley Road, Suite 202
> Syracuse, NY 13212
>
> **D** 315.414.2206 **M** 315.706.5176
> kelsey.scott@hdrinc.com
>
> hdrinc.com/follow-us

Scott, Kelsey

From: Scott, Kelsey
Sent: Friday, February 21, 2020 12:41 PM
To: Bruins, Christine
Cc: Celeste Bernardo - Lowell NHP; Quiggle, Robert; kwebb@centralriverspower.com
Subject: Lowell Initial Study Report Meeting - March 11, 2020

Hi Christine –

Boott Hydropower is filing the Lowell Hydroelectric Project Initial Study Report (ISR) on February 25, 2020 and planning a subsequent ISR meeting with NPS and partners on March 11, 2020. The conference room in the LNHP Visitor Center worked out well for our last meeting. The ISR meeting will be long with a similar sized group.

If possible, we would like to hold the upcoming March 11 ISR meeting in the LNHP Visitor Center conference room again. Can you let us know if this will work for your team? Let us know if you have any questions.

Thank You -

Kelsey Scott, MS
Assistant Regulatory Specialist

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Syracuse, NY 13212
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kelsey.scott@hdrinc.com
hdrinc.com/follow-us

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Thank You -

Kelsey Scott, MS
Assistant Regulatory Specialist

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Syracuse, NY 13212
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kelsey.scott@hdrinc.com
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Scott, Kelsey

From: Scott, Kelsey
Sent: Monday, February 24, 2020 4:59 PM
To: Kevin Webb; Bruins, Christine A
Cc: Bernardo, Celeste; Quiggle, Robert
Subject: RE: Lowell Initial Study Report Meeting - March 11, 2020

Hi Christine –

To follow up on this as well, these types of meetings can last all day but usually do not. Does it work with your team to hold the meeting in the conference room on March 11?

Kelsey Scott, MS
Assistant Regulatory Specialist

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kelsey.scott@hdrinc.com
hdrinc.com/follow-us

From: Kevin Webb [mailto:kwebb@centralriverspower.com]
Sent: Friday, February 21, 2020 4:17 PM
To: Bruins, Christine A ; Scott, Kelsey
Cc: Bernardo, Celeste ; Quiggle, Robert
Subject: RE: Lowell Initial Study Report Meeting - March 11, 2020

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Christine:

As for timing of the meeting, FERC requires us to hold the ISR meeting within 15 days of filing the ISR report, so the 11th is our last day to hold the meeting. I know that the 10th wouldn't work for us, the 9th is a maybe at best. The previous week we are meeting with the fish agencies, prior to getting together with FERC for the ISR meeting. BTW, we expect that Amy Chang, the new FERC project leader and possibly other FERC staff will plan to attend.

Regarding attendance by CRP, I expect that Jason will attend. Hopefully I can get Matt Stanley, our General Manager, and Curt Mooney, our Regulatory Affairs Manager, to attend at least part of the day. Agree 100% that face-to-face time is very important.

Have a great weekend!

Kevin

From: Bruins, Christine A
Sent: Friday, February 21, 2020 3:46 PM
To: Scott, Kelsey

Cc: Bernardo, Celeste ; Quiggle, Robert ; Kevin Webb
Subject: Re: Lowell Initial Study Report Meeting - March 11, 2020

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

Kevin, I had been exchanging emails with Jason Bush about his plans to visit Lowell the week of March 10. Will he or any other new points of contact from Central Rivers Power be attending the stakeholder meeting? NPS is very interested in meeting face-to-face with new folks we will be working with.

Kelsey, would the stakeholder meeting be the whole day, a couple of hours? Does the meeting have to happen on Tuesday or could we look at Wednesday or Thursday?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Friday, February 21, 2020 12:41 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Bernardo, Celeste <Celeste_Bernardo@nps.gov>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; kwebb@centralriverspower.com <kwebb@centralriverspower.com>
Subject: [EXTERNAL] Lowell Initial Study Report Meeting - March 11, 2020

Hi Christine –

Boott Hydropower is filing the Lowell Hydroelectric Project Initial Study Report (ISR) on February 25, 2020 and planning a subsequent ISR meeting with NPS and partners on March 11, 2020. The conference room in the LNHP Visitor Center worked out well for our last meeting. The ISR meeting will be long with a similar sized group.

If possible, we would like to hold the upcoming March 11 ISR meeting in the LNHP Visitor Center conference room again. Can you let us know if this will work for your team? Let us know if you have any questions.

Thank You -

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR
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Syracuse, NY 13212

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kelsey.scott@hdrinc.com

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Scott, Kelsey

From: Scott, Kelsey
Sent: Friday, March 6, 2020 4:38 PM
To: Andrew MacLean - Town of Pepperell; Andrew Maylor - Town of North Andover, MA; Andrew Sheehan - Town of Middleton; Tittler, Andrew; Arthur Johnson - MADES; Ben Gahagan - MADMF; Benjamin Wilson - NHDHR; Bill McDavitt - NOAA; Bjorn Lake - NMFS; bob@americanwhitewater.org; Sojkowski, Bryan; Bub Durand - MAOEEA; Caleb Slater, Ph.D.; Bernardo, Celeste; dam.safety@state.ma.us; dam.safety@state.ma.us; Daniel Rivera - City of Lawrence, MA; David Meeker - Hull Street Energy LLC; David Turin - USEPA; Dinell Clark - Lowell Flood Owners Group and Williamsburg Condominium I; Hay, Duncan E; Ed Reiner - USEPA; Fred Jennings - TU; Gene Porter - LMRLAC; Peterson, Harold S; jack.buckley@state.ma.us; Jim Donchess - City of Nashua, NH; John Eddins - ACHP; John Nappi - Lowell Flood Owners Group; Jon Kurland - Town of Chelmsford, MA; Rosset, Julianne; Keith Nislow - USFS; Kevin Hollenbeck - DCR Great Brook Farm State Park; Mendik, Kevin R; Kevin Webb - CRP; Kim Galipeau - Town of Hollis, NH; Mark Prout - USFS; Matt Carpenter - NHFGD; Bailey, Michael; michael.judge@state.ma.us; Misty Anne Marold; Norman Sims - AMC 2; Owen David - NHDES; Rachel Freed - MADEP; Richard Reault - Town of Tyngsborough; Robert Bersak - Eversource Energy; Rusty Russell; Scott Galvin - City of Woburn, MA; Sean McDermott - NOAA; Steve Carlin - MADCR; Sue Tuxbury - NMFS; Timothy Higgins - Town of Lincoln, MA; Chapman, Tom; Tom Dolan - NMFS; Troy Brown - USFWS; jmacone@merrimack.org; Amy.Chang@ferc.gov; Stephen.Kartalia@ferc.gov; peter.severance@rivermerrimack.org
Subject: Lowell Hydroelectric Project Initial Study Report Meeting March 11, 2020

Dear Stakeholders -

The Initial Study Report meeting for the Lowell Hydroelectric Project will be held on March 11, 2020 at 246 Market Street, Lowell, MA 01852.

If you cannot attend the meeting in person, please use the following conference call information:

Dial-in number: (866) 583-7984
Conference Code: 989-014-9046#

Should you have any questions regarding the upcoming meeting, please contact Kevin Webb at kwebb@centralriverspower.com.

Kelsey Scott, MS
HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Scott, Kelsey

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Syracuse, NY 13212
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kelsey.scott@hdrinc.com
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Scott, Kelsey

From: Scott, Kelsey
Sent: Wednesday, March 11, 2020 9:04 AM
To: Andrew MacLean - Town of Pepperell; Andrew Maylor - Town of North Andover, MA; Andrew Sheehan - Town of Middleton; Tittler, Andrew; Arthur Johnson - MADES; Ben Gahagan - MADMF; Benjamin Wilson - NHDHR; Bill McDavitt - NOAA; Bjorn Lake - NMFS; bob@americanwhitewater.org; Sojkowski, Bryan; Bub Durand - MAOEEA; Caleb Slater, Ph.D.; Bernardo, Celeste; dam.safety@state.ma.us; dam.safety@state.ma.us; Daniel Rivera - City of Lawrence, MA; David Meeker - Hull Street Energy LLC; David Turin - USEPA; Dinell Clark - Lowell Flood Owners Group and Williamsburg Condominium I; Hay, Duncan E; Ed Reiner - USEPA; Fred Jennings - TU; Gene Porter - LMRLAC; Peterson, Harold S; jack.buckley@state.ma.us; Jim Donchess - City of Nashua, NH; John Eddins - ACHP; John Nappi - Lowell Flood Owners Group; Jon Kurland - Town of Chelmsford, MA; Rosset, Julianne; Keith Nislow - USFS; Kevin Hollenbeck - DCR Great Brook Farm State Park; Mendik, Kevin R; Kevin Webb - CRP; Kim Galipeau - Town of Hollis, NH; Mark Prout - USFS; Matt Carpenter - NHFGD; Bailey, Michael; michael.judge@state.ma.us; Misty Anne Marold; Norman Sims - AMC 2; Owen David - NHDES; Rachel Freed - MADEP; Richard Reault - Town of Tyngsborough; Robert Bersak - Eversource Energy; Rusty Russell; Scott Galvin - City of Woburn, MA; Sean McDermott - NOAA; Steve Carlin - MADCR; Sue Tuxbury - NMFS; Timothy Higgins - Town of Lincoln, MA; Chapman, Tom; Tom Dolan - NMFS; Troy Brown - USFWS; jmacone@merrimack.org; Amy.Chang@ferc.gov; Stephen.Kartalia@ferc.gov; peter.severance@rivermerrimack.org
Subject: Lowell ISR Meeting

Hello –

For stakeholders dialing in, we are currently setting up in the conference room. We will be dialing into the number in a few minutes.

Dial-in number: (866) 583-7984
Conference Code: 989-014-9046#

Thank You -

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Scott, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, March 13, 2020 2:13 PM
To: Quiggle, Robert
Cc: Scott, Kelsey; Jones, Scott
Subject: Re: [EXTERNAL] Lowell Hydro Relicensing Waterborne Trash Mapping

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The COVID 19 situation is evolving rapidly. I don't think we can realistically schedule something this month. Let's set a tentative date 30+ days out? Week of 4/20? Monday, Thursday, Friday are free.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Quiggle, Robert
Sent: Friday, March 13, 2020 12:03 PM
To: Bruins, Christine A
Cc: Scott, Kelsey ; Jones, Scott
Subject: [EXTERNAL] Lowell Hydro Relicensing Waterborne Trash Mapping
Christine: We are looking to schedule our waterborne trash survey and mapping, and I wanted to check in with you to see if there were any specific dates that we should target or avoid. We'd like to get the fieldwork completed before mid-April, and we'd like to meet briefly with NPS staff that may have relevant information on waterborne trash issues while we're at the project.
We can be pretty flexible in terms of scheduling the fieldwork, but just let us know what makes sense on your end.
Thanks,
Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

To: Scott, Kelsey
Subject: RE: [EXTERNAL] Lowell Hydro Relicensing Waterborne Trash Mapping

From: Quiggle, Robert
Sent: Friday, March 13, 2020 4:25 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Jones, Scott <Scott.Jones@hdrinc.com>
Subject: RE: [EXTERNAL] Lowell Hydro Relicensing Waterborne Trash Mapping

Thanks, Christine. We will look to target the week of April 20, and I'll follow up with you on the specific dates.

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

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To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
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Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

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Central Rivers Power

Boott Hydropower, LLC

Subsidiary of Central Rivers Power US, LLC
670 N. Commercial Street, Suite 204
Manchester, NH 03102

Via Email Distribution

March 18, 2020

Re: Lowell Hydroelectric Project (FERC No. 2790)
ILP Process Plan and Schedule

Dear Stakeholders,

Boott Hydropower, LLC (Boott) is the Licensee, owner, and operator of the 20 megawatt Lowell Hydroelectric Project (Project) (FERC No. 2790). Boott operates the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 C.F.R. Part 5.

Pursuant to the ILP, Boott filed the Initial Study Report (ISR) with the Commission on February 25, 2020, and conducted the ISR Meeting on March 11, 2020. As noted during the ISR Meeting, the ILP Process Plan and Schedule presented in the ISR was inaccurate. The correct Process Plan and Schedule can be found in FERC's September 27, 2018 Scoping Document 2 (SD2). A copy of the Process Plan and Schedule presented in SD2 is attached for your reference. Upcoming milestones related to the ISR are presented in Table 1, below.

Table 1. Upcoming ILP Pre-filing Milestones Related to the ISR.

Responsible Party	Pre-filing Milestone	Date	FERC Regulations
Boott	Initial Study Report	2/25/2020	5.15(c)(1)
All stakeholders	Initial Study Report Meeting	3/11/2020	5.15(c)(2)
Boott	Initial Study Report Meeting Summary	3/26/2020	5.15(c)(3)
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	4/25/2020	5.15(c)(4)
All stakeholders	Responses to Disputes/Amendment Requests Due	5/25/2020	5.15(c)(5)
FERC	Director's Determination on Disputes/Amendments	6/24/2020	5.15(c)(6)

Please also note that the contact information for Boott's Licensing Manager is:

Mr. Kevin Webb
Licensing Manager
Boott Hydropower, LLC
607 N. Commercial Street, Suite 204
Manchester, NH 03102

Should you have any additional questions, please do not hesitate to contact me at (978) 935-6039 or kwebb@centralriverspower.com.

Sincerely,
Boott Hydropower, LLC

Kevin M. Webb
Licensing Manager

Attachment

Cc: Distribution List

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Federal and State Agencies

John Eddins, PhD
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Advisory Council on Historic Preservation
401 F Street NW
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Kimberly Bose
Secretary
Federal Energy Regulatory Commission
888 1st Street NE
Washington, DC 20426

Office of Dam Safety
Massachusetts Department of Conservation and Recreation
John Augustas Hall
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West Boylston, MA 01583-1109

Steve Carlin
Park Supervisor
Massachusetts Department of Conservation and Recreation
Lowell Heritage State Park
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Renewable Energy Division Director
Massachusetts Department of Energy Resources
100 Cambridge Street
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Northeast Region Section Chief
Massachusetts Department of Environmental Protection
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DWM Environmental Monitoring Program
Massachusetts Department of Environmental Protection
8 Bond Street
Worcester, MA 01606

Massachusetts Department of Fish and Game
251 Causeway Street
Suite 400
Boston, MA 02114

Massachusetts Department of Public Utilities
One South Station
Boston, MA 02110

Matthew Ayer
Massachusetts Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

Joseph Larson
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Westborough, MA 01581

Caleb Slater
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Brona Simon
State Historic Preservation Officer
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Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

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Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

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Ramona Peters
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Shannon Holsey
Tribal President
Stockbridge Munsee Community, Wisconsin
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Cheryl Andrew-Maltais
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Bettina Washington
Tribal Historic Preservation Officer
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Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

Municipalities

James Fiorentini
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4 Summer Street
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Daniel Rivera
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City of Lawrence, MA
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Christine Clancy
City of Lowell Engineer
City of Lowell, MA
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Edward Kennedy
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Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

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Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

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55 Summer Street
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Board of Selectmen
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Lowell Hydroelectric Project (FERC No. 2790)
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Rady Mom
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Room 43
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David Nangle
Massachusetts House of Representatives
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Edward Kennedy
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Rusty Russell
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Lawrence, MA 01840

Lowell Hydroelectric Project (FERC No. 2790)
Distribution List

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Research/Program Director
River Merrimack

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President, Nor'East Chapter
Trout Unlimited
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Universal Apartment Rental
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Michele Tremblay
Upper Merrimack River Local Advisory
Committee
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Penacook, NH 03303

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Seth Moulton
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US House of Representatives
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Manchester, NH 03101

Lori Trahan
3rd District
US House of Representatives
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Lowell, MA 01852

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Washington, DC 20510

Edward Markey
US Senate
218 Russell Senate Office Building
Washington, DC 20510

Jeanne Shaheen
US Senate
506 Hart Senate Office Building
Washington, DC 20510

Elizabeth Warren
US Senate
317 Hart Senate Office Building
Washington, DC 20510

Dinell Clark
President
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197 Wellman Avenue
North Chelmsford, MA 01863

Richard Howe
Register of Deeds - Middlesex County North
360 Gorham Street
Lowell, MA 01852

APPENDIX A
LOWELL HYDROELECTRIC PROJECT PROCESS PLAN AND SCHEDULE

Shaded milestones are unnecessary if there are no study disputes. If the due date falls on a weekend or holiday, the due date is the following business day. Early filings or issuances will not result in changes to these deadlines. As appropriate, the process plan and schedule may be revised in the future.

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
Boott Hydropower, LLC	File NOI/PAD with FERC	4/30/18	5.5, 5.6
FERC	Tribal Consultation	5/30/18	5.7
FERC	Issue Notice of Commencement of Proceeding; Issue Scoping Document 1	6/15/18	5.8
FERC	Scoping Meetings and Project Site Visit	7/17/18-7/18/18	5.8(b)(3)(viii)
All stakeholders	PAD/SD1 Comments and Study Requests Due	8/14/18	5.9
FERC	Issue Scoping Document 2	9/27/18	5.10
Boott Hydropower, LLC	File Proposed Study Plan (PSP)	9/28/18	5.11(a)
All stakeholders	Proposed Study Plan Meeting	10/28/18	5.11(e)
All stakeholders	Proposed Study Plan Comments Due	12/27/18	5.12
Boott Hydropower, LLC	File Revised Study Plan	1/26/19	5.13(a)
All stakeholders	Revised Study Plan Comments Due	2/10/19	5.13(b)
FERC	Director's Study Plan Determination	2/25/19	5.13(c)
Mandatory Conditioning	Any Study Disputes Due	3/17/19	5.14(a)

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
Agencies			
Dispute Panel	Third Dispute Panel Member Selected	4/1/19	5.14(d)(3)
Dispute Panel	Dispute Resolution Panel Convenes	4/6/19	5.14(d)
Boott Hydropower, LLC	Applicant Comments on Study Disputes Due	4/11/19	5.14(i)
Dispute Panel	Dispute Resolution Panel Technical Conference	4/16/19	5.14(j)
Dispute Panel	Dispute Resolution Panel Findings Issued	5/6/19	5.14(k)
FERC	Director's Study Dispute Determination	5/26/19	5.14(l)
Boott Hydropower, LLC	First Study Season	2019	5.15(a)
Boott Hydropower, LLC	Initial Study Report	2/25/20	5.15(c)(1)
All stakeholders	Initial Study Report Meeting	3/11/20	5.15(c)(2)
Boott Hydropower, LLC	Initial Study Report Meeting Summary	3/26/20	5.15(c)(3)
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	4/25/20	5.15(c)(4)
All stakeholders	Responses to Disputes/Amendment Requests Due	5/25/20	5.15(c)(5)
FERC	Director's Determination on Disputes/Amendments	6/24/20	5.15(c)(6)
Boott Hydropower, LLC	Second Study Season	2020	5.15(a)
Boott Hydropower, LLC	Updated Study Report due	2/25/21	5.15(f)
All	Updated Study Report Meeting	3/11/21	5.15(f)

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
stakeholders			
Boott Hydropower, LLC	Updated Study Report Meeting Summary	3/26/21	5.15(f)
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	4/25/21	5.15(f)
All stakeholders	Responses to Disputes/Amendment Requests Due	5/25/21	5.15(f)
FERC	Director's Determination on Disputes/Amendments	6/24/21	5.15(f)
Boott Hydropower, LLC	File Preliminary Licensing Proposal	12/1/20	5.16(a)
All stakeholders	Preliminary Licensing Proposal Comments Due	3/1/21	5.16(e)
Boott Hydropower, LLC	File Final License Application	4/30/21[11]	5.17
Boott Hydropower, LLC	Issue Public Notice of License Application Filing	5/14/21	5.17(d)(2)

[11] Pursuant to section 15 of the Federal Power Act and 18 C.F.R § 5.17, any application for a license for this project must be filed with the Commission at least 24 months prior to the expiration of the existing license. Because the current license expires on April 30, 2023, all applications for license for this project must be filed by April 30, 2021.

Scott, Kelsey

From: Scott, Kelsey
Sent: Wednesday, March 18, 2020 5:15 PM
To: Andrew MacLean - Town of Pepperell; Andrew Sheehan - Town of Middleton; Tittler, Andrew; Arthur Johnson - MADES; Ben Gahagan - MADMF; Benjamin Wilson - NHDHR; Bjorn Lake - NMFS; bob@americanwhitewater.org; Kim Galipeau - Town of Hollis, NH; Sojkowski, Bryan; Caleb Slater, Ph.D.; Bernardo, Celeste; dam.safety@state.ma.us; Bruins, Christine A; Dinell Clark - Lowell Flood Owners Group and Williamsburg Condominium I; David Meeker - Hull Street Energy LLC; Hay, Duncan E; Fred Jennings - TU; Bub Durand - MAOEEA; Gene Porter - LMRLAC; Peterson, Harold S; Timothy Higgins - Town of Lincoln, MA; jack.buckley@state.ma.us; John Eddins - ACHP; Jon Kurland - Town of Chelmsford, MA; Rosset, Julianne; Kevin Hollenbeck - DCR Great Brook Farm State Park; Mendik, Kevin R; Keith Nislow - USFS; Kevin Webb - CRP; Matt Carpenter - NHFGD; Daniel Rivera - City of Lawrence, MA; michael.judge@state.ma.us; Bailey, Michael; Misty Anne Marold; Andrew Maylor - Town of North Andover, MA; Mark Prout - USFS; John Nappi - Lowell Flood Owners Group; Jim Donchess - City of Nashua, NH; Norman Sims - AMC 2; Owen David - NHDES; peter.severance@rivermerrimack.org; Rachel Freed - MADEP; Ed Reiner - USEPA; Robert Bersak - Eversource Energy; Richard Reault - Town of Tyngsborough; Sean McDermott - NOAA; Scott Galvin - City of Woburn, MA; Rusty Russell; Steve Carlin - MADCR; Tom Dolan - NMFS; Chapman, Tom; Troy Brown - USFWS; David Turin - USEPA; Bill McDavitt - NOAA
Cc: Quiggle, Robert
Subject: Lowell Hydroelectric Project ILP Process Plan and Schedule
Attachments: Lowell Project ILP Process Plan and Schedule.pdf

Dear Stakeholders –

Boott Hydropower, LLC held the Initial Study Report (ISR) Meeting on March 11, 2020. Thank you to all those attended or called in.

As noted during the ISR Meeting, the Integrated Licensing Process (ILP) Process Plan and Schedule presented in the ISR was inaccurate. The correct Process Plan and Schedule can be found in FERC's September 27, 2018 Scoping Document 2 (SD2), which is posted on the Lowell Relicensing website here: http://www.lowellprojectrelicensing.com/

Please see attached for additional information on the upcoming ILP Pre-filing milestones. Should you have any questions, please contact Kevin Webb at kwebb@centralriverspower.com.

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR
Syracuse, NY 13212
1304 Buckley Road, Suite 202
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Scott, Kelsey

From: Scott, Kelsey
Sent: Thursday, March 26, 2020 9:10 AM
To: Peter Severance (RM)
Subject: RE: Lowell Initial Study Report Meeting Summary

Thanks Peter –

After review of the ISR Meeting Summary, stakeholders may file disagreements with the meeting summary. Disagreements with the ISR Meeting Summary must be filed with the Commission no later than April 25, 2020.

Kelsey Scott, MS
Assistant Regulatory Specialist

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212
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kelsey.scott@hdrinc.com
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From: Peter Severance (RM) [mailto:peter.severance@rivermerrimack.org]
Sent: Thursday, March 26, 2020 8:52 AM
To: Scott, Kelsey
Subject: Re: Lowell Initial Study Report Meeting Summary

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thanks, Kelsey.

I have one correction - on page 12:

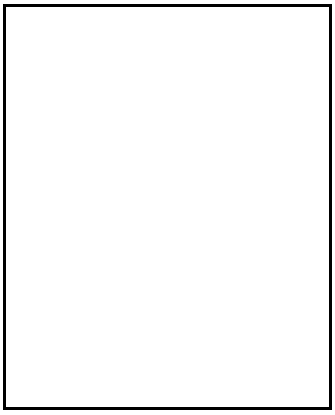
> *River Merrimack asked if there were plans to look at water quality, especially given combined sewer overflow (CSO) events in Manchester, NH.*

This was not River Merrimack - it was the Merrimack River Watershed Council.

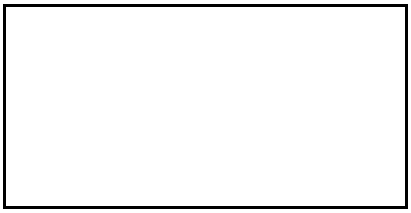
Thanks,

Peter

Peter Severance
Research/Program Director



peter.severance@rivermerrimack.org
978-727-2252



On Wed, Mar 25, 2020 at 4:18 PM Scott, Kelsey <Kelsey.Scott@hdrinc.com> wrote:

> Dear Stakeholders:
>
> Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission for the Lowell Hydroelectric Project. Boott held the
>
> Initial Study Report (ISR) Meeting on March 11, 2020 at the Lowell National Historical Park in Lowell, MA. The Commission's regulations require Boott file this summary of the ISR Meeting within 15 days of the ISR Meeting.
>
> Should you have any questions regarding the attached ISR Meeting Summary, please contact Kevin Webb, Licensing Manager with Boott, at (978) 935-6039 or kwebb@centralriverspower.com.
>
> **Kelsey Scott, MS**
>
> **HDR**
>
> 1304 Buckley Road, Suite 202
> Syracuse, NY 13212
>
> **D** 315.414.2206 **M** 315.706.5176
> kelsey.scott@hdrinc.com
>
> hdrinc.com/follow-us

Scott, Kelsey

From: Scott, Kelsey
Sent: Tuesday, April 21, 2020 12:52 PM
To: 'Jean_Robinson@uml.edu'
Cc: Quiggle, Robert
Subject: UMass Lowell GIS files
Attachments: 20191218 Lowell Study Workshop Meeting Minutes.pdf

Hi Jean,

We are working with Boott Hydropower, LLC to conduct studies for relicensing of the Lowell Hydroelectric Project (FERC No. 2790). During the Study Workshop with stakeholders on December 18, 2019, you kindly offered to provide additional information and GIS shapefiles regarding UMass Lowell facilities throughout the Lowell Downtown and Canal System. Are you able to provide these at this time?

I've attached the Study Workshop meeting minutes as a reminder of the discussions. Thank you for any updates and information you can provide.

Best regards,

Kelsey Scott, MS
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Meeting Minutes

Project:	Lowell Hydroelectric Project (P-2790-72)
Subject:	Lowell Hydroelectric Project Study Workshop
Date:	Wednesday, December 18, 2019
Location:	Lowell National Historical Park Visitor Center - Lowell, MA

Attendees:	Chris Hayes – City of Lowell	Euris Gonzalez – Massachusetts DCR
	Christine Bruins – National Park Service	Christine Clancy – City of Lowell
	Celeste Bernardo – National Park Service	Kevin Mendik – National Park Service
	Paul Fontaine – National Park Service	Emily Byrne – Congresswomen Trahen's Office
	Kevin Coffee – National Park Service	
	Becky Warren – National Park Service	Michael Fernandes – National Park Service
	John Aziz – MADCR	Jean Robinson – UMass Lowell
	Peter Hoffman – MADCR	Steve Cerand – Lowell Canal Cleaners
	Jeffery Harris – MADCR	Duncan Hay – National Park Service
	Fred Faust – Lowell Heritage Partnership	Kevin Webb – Boott Hydropower
	Robert Quiggle – HDR	Patrick Donahue – Boott Hydropower
	Stephen Greene – Lowell Canal Cleaners	Kelsey Scott - HDR

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC) for the continued operation of the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Recreation and Aesthetics Study; Water Level and Flow Effects on Historic Resources Study; Historically Significant Waterpower Equipment Study; and the Resources, Ownership, Boundaries, and Land Rights Study (Resources Study). Boott requested a Lowell Hydroelectric Project Study Workshop (Workshop) with interested stakeholders to address data needs regarding the four studies of interest. Boott appreciates the participation of stakeholders and the thoughtful discussions during the Workshop. At the request of Workshop participants, Boott has developed this general summary of Workshop topics and discussion.

Introduction

- The Workshop began with a general overview of the Project, the FERC relicensing process, and a discussion of the study schedule. A copy of the PowerPoint presentation is included as Attachment A to this meeting summary.

Resources Study

- Stakeholders and Boott agreed that identifying resource ownership, boundaries, and land rights is a foundational study task that will inform a number of other studies, and eventually any management measures included Boott's license application documents.
- Stakeholders recommended that the Resources Study evaluate which parties have the authority to address issues, and which have the obligation to do so, based on a review of easements, deeds, and land rights documentation. Stakeholders and Boott agreed that the end result of the Resources Study should be a document that clearly identifies who has responsibilities and obligations with respect to the canal system, so that when future issues related to maintenance, repair, or public safety arise, the party or parties responsible for resolving these issues can respond quickly and effectively.
- These rights and responsibilities need to be detailed in a GIS database as well as a written report.
  - The responsibility of maintaining the GIS database and documentation will be evaluated through future conversations.
- To inform the Resources Study, Boott is proposing to review the Great Deed, Letter of Taking, and the lease from the Commonwealth of Massachusetts to the NPS.
  - Stakeholders indicated that the City of Lowell (City) may also have relevant property records.
  - The City also previously undertook limited research into ownership and responsibilities for the walkways adjacent to the Canal. Boott requested any records from the City that may be helpful in determining ownership and responsibilities for Project features.
  - The NPS indicated that they had developed a preliminary matrix of ownership and responsibilities based on a limited review of documents. Boott requested the existing matrix from the NPS, recognizing that the matrix is preliminary and would require additional review/documentation.
- The University of Massachusetts at Lowell (UMass Lowell) indicated concerns regarding infrastructure in the canal system, including submerged cables and pipelines. UMass Lowell has infrastructure in the canal system, and agreed to share relevant records with Boott.
- Boott suggested that a Resources Study Working Group may be appropriate to coordinate a review of relevant documents. Boott expects that a review of the existing documentation would take place in quarter one of 2020.

Recreation

- On-water recreation and access is the primary public request received by National Park Service (NPS) and Massachusetts Department of Conservation and Recreation (MADCR). Stakeholders are not necessarily interested in a study which looks at every aspect of recreation; rather, parties are looking for specific practical opportunities for community on-water recreation which provide paths of least resistance. Stakeholders want to know the recreational opportunities they can maximize, and which opportunities are not feasible or are too risky

based on public safety, public interest, and hydropower operational constraints. Boott's primary concern is public safety issues associated with providing recreational access to the Project's canal system.

- Stakeholders noted that parties looking for specific recreational opportunities can focus on expanding current recreational opportunities, such as expanding boat tours on the Pawtucket Canal, and providing more access for the Annual Point of Life Festival on the Western Canal. The parties can also look at specific future opportunities of interest, like providing safe seasonal access at Swamp Locks or kayaking in the Western Canal for organized events.
- Boott indicated that the results of visitor–intercept surveys and the online recreation survey could provide information regarding public interest in on-water recreation.
- Boott expects to assess the potential for safe recreational access to the canal system as a component of the Recreation and Aesthetics study and looks forward to continued conversations with stakeholders regarding this issue.

Vegetation Growth along the Canal System

- Vegetation growth along the canal system is a significant issue for the NPS and other stakeholders. Vegetation growth is not only an aesthetic issue, but has the potential to cause structural damage to the canal system walls and other structures. The NPS requested that Boott consider vegetation growth not just from an aesthetic standpoint but also as it relates to potential structural damages. Boott recognizes this concern and believes that the ongoing vegetation mapping along the canal system will inform both the aesthetics concerns and the potential structural integrity of the canal system.
- The NPS currently undertakes vegetation management along the canal system, but funding for these programs is limited and competitive. The current procedures implemented by the NPS are not intended to be long-term solutions, but rather to keep the problems at bay. Under the NPS's current vegetation management program, it takes approximately five years for the NPS to treat/manage the vegetation along the entire canal system.
- The NPS does not have the capability to address the removal of larger trees that may cause damage to canal structures.
- The NPS also treats exotic/invasive plan species along the canal system. The NPS agreed to share the Exotic Species Treatment Calendar with Boott.
- Stakeholders recognize that it may be appropriate to identify priority areas for vegetation management (e.g., areas where vegetation along the canal system has the highest potential to adversely affect structures), with the goal of addressing these areas first. Vegetation treatment measures should eventually be undertaken for the entirety of the canal system, with the goal of implementing routine management measures to stop new vegetation growth.
- The NPS's current management of vegetation along the canal system is limited in part because the ownership of and responsibility for canal structures is not clear. Understanding the ownership and responsibility for maintenance of the canal structures is an important component in determining how any vegetation management issues can be implemented.

Trash in the Canal System

- Waterborne trash accumulation in the canals is the main complaint reported to the City. The waterborne trash floats down the Merrimack River and builds up behind the gatehouses, or is thrown/blown into the downtown canals.
- Trash at the bottom of canals is a concern to stakeholders due to the hazardous nature (e.g., electronics) but also the aesthetics when the canals are drawn down. Both Boott and stakeholders acknowledged that there are significant safety and liability concerns with managing trash at the bottom of the canals.
- All parties acknowledged the liability concerns of collecting and disposing of any hazardous materials.
- The current methods of flushing the trash out are not meeting the visual and structural safety goals of stakeholders.
- The Studies conducted as part of the relicensing should examine the feasibility of different options for removing waterborne trash from the canals, and also how the other stakeholders can participate. Boott is interested in targeting the source of the trash problem. Examples of the contributions of stakeholders include community education regarding trash and placement of trash bins in strategic areas. A trash management plan for the canal system could incorporate how all stakeholders can contribute to best manage the problem. Boott and stakeholders acknowledged that trash management is not the sole responsibility of the licensee, but would require input and assistance from the City, NPS, and other stakeholders.

Historically Significant Waterpower Equipment

- The NPS would like to determine what equipment owned/operated by Boott is historically significant on a national level. This study does not need to go down the path of documenting every single component, but rather determining what equipment owned/operated by Boott is nationally significant, original, and within the Project boundary. This will tie into the Resources Study, since the ownership and responsibilities of the equipment will need to be determined.
- Boott noted that FERC is very likely to require the development of a Historic Properties Management Plan (HPMP) as a result of the relicensing process. The HPMP would describe how Boott would manage historic waterpower equipment within the Project boundary during the term of the new license; and the HPMP could incorporate provisions for consultation with the NPS regarding historic waterpower equipment. For example, the HPMP could establish provisions such as the right of refusal by NPS when historic waterpower equipment is being replaced or decommissioned. FERC would require the HPMP to be developed in consultation with the NPS and the State Historic Preservation Officer pursuant to a Programmatic Agreement.
- Boott noted that this study had been initiated, and that Boott's cultural resources management consultant, Gray & Pape, Inc., was in the process of reviewing historical documentation. Boott expects that a field visit will occur in quarter one of 2020.

Water Level and Flow Effects on Historic Resources

- Boott has been collecting water level data in the canal system since the spring of 2019. During the Workshop, the NPS clarified that their interest is related to the effects of the new crest gate system and potential effects on historic resources at higher water levels. Boott explained that any effects would be limited to structures along the Northern Canal and the Upper Pawtucket Canal (upstream from the Francis Gate and Guard Locks), as the water levels in the remainder of the canal system are not affected by the crest gate. Given the lack of higher water levels elsewhere through the canal, stakeholders agreed that the historic resources along the Northern Canal and Upper Pawtucket Canal should be the focus of this study. Therefore, stakeholders and Boott agreed that Boott should move level loggers to those locations (Upper Pawtucket Canal and Northern Canal), and remove the remaining level loggers from the downtown canal system.
- The NPS noted that certain recreation activities are prohibited based on water levels and flows. Recreational activities on the Northern Canal and the Upper Pawtucket Canal can be impacted by higher flows (the boat tours and canal walkway).
- There is interest in knowing what impacts (if any) low water levels (i.e., drawdowns) can have on historic resources and canal infrastructure. If possible, stakeholders would like to develop recommendations regarding maintenance drawdowns (e.g., timing and duration) to limit impacts to historic structures.

Other Considerations

- The City and other stakeholders are concerned about potential impacts to water quality in the canal system as a result of stormwater discharges and combined sewage overflows (CSO). Boott noted that the Massachusetts Department of Environmental Protection (MADEP) will issue a Water Quality Certificate (WQC) for the Project under Section 401 of the Clean Water Act. Stakeholders did not request a water quality study during the FERC study scoping process, and FERC did not require Boott to conduct a water quality study. Since any impacts to water quality that may occur as a result of stormwater discharges and CSOs are not Project-related and there is no nexus to Project operations, it is unlikely that FERC would require Boott to study this issue during relicensing.
- The City has an MS4 Permit executed through the wastewater team. This permit may provide information regarding discharges into the canal system. It is unknown what these outfalls are for, who they belong to, and what the discharge is (weep holes, etc.). Documenting outfalls would be an extensive undertaking and would not necessarily absolve stormwater concerns.

Thank you again for your participation in the Workshop. Should you have any additional comments on or clarifications to this meeting summary, please notify Kevin Webb of Boott Hydropower at kwebb@centralriverspower.com.

Scott, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Monday, June 15, 2020 3:05 PM
To: Scott, Kelsey; Bernardo, Celeste
Cc: Quiggle, Robert; Kevin Webb; Richard Malloy; Lonsway, Peter; Racine, Laurel A; Lieb, David M
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Kelsey,

Thanks for giving me a call. To summarize, NPS units are directed to follow state and local guidance for COVID. To stay consistent with MA guidelines, the Gray & Pape site visit should be limited to a gathering of <10 people, face coverings should be worn by all, social distancing should be practiced wherever possible, and folks should take separate vehicles between sites.

cc'd: Laurel Racine, Cultural Resources Chief and David Lieb, Historical Architect should attend and Peter Lonsway, Deputy Superintendent would like to attend. To make the most of the field visit, could you please share draft documents from Gray & Pape's research in advance of the visit?

July 9th is the NPS preferred field visit date; July 16th alternate. Please let us know if you'd like more date options. Thanks!

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Wednesday, June 10, 2020 10:19 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

Hi Christine and Celeste,

We would like to re-engage with you regarding the ongoing studies as part of the Lowell Relicensing. As per your request at the Initial Study Report meeting, we can schedule with you the onsite visit with the architectural historian (Gray & Pape) for the Historically Significant Waterpower Equipment Study. Regarding this field visit, as well as the other ongoing studies, a conference call with this group would be helpful to understand how LNHP is currently approaching operations, hours, safety measures, etc during COVID-19.

Feel free to propose times that work for you in the coming weeks, and we'll set up a conference call. Thank you -

Kelsey Scott, MS
HDR
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Syracuse, NY 13212

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Scott, Kelsey

From: Scott, Kelsey
Sent: Monday, June 22, 2020 11:38 AM
To: Bruins, Christine A
Cc: Quiggle, Robert
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

Hi Christine –

We've let Gray & Pape know the preferred dates for the site visit and I hope to have an update for you in the coming days. Currently, the COVID-19 safety requirements for HDR, Gary & Pape, and LNHP are similar enough that it is not expected to be an issue (in terms of planning the site visit).

Thank you –

Kelsey Scott, MS
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From: Bruins, Christine A [mailto:Christine_Bruins@nps.gov]
Sent: Monday, June 15, 2020 3:05 PM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Scott, Kelsey

From: Scott, Kelsey
Sent: Monday, June 29, 2020 10:43 AM
To: 'Bruins, Christine A'
Cc: Quiggle, Robert; Kevin Webb; Richard Malloy; Lonsway, Peter; Racine, Laurel A; Lieb, David M; 'Celeste Bernardo - Lowell NHP'
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

Hi Christine –

The best date that works is the option of July 16, 2020 to conduct the site visit associated with the Historically Significant Waterpower Equipment Study. On our end, the likely participants are Robert Quiggle from HDR, Patrick O'Bannon from Gray & Pape, and Andrew and Kevin from Boott Hydropower.

Thank you –

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Sent: Monday, June 15, 2020 3:05 PM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Scott, Kelsey

To: Scott, Kelsey
Subject: FW: Boott Hydro Equipment Background

Rob & Kelsey,

As per your request, I've conducted background research to determine the extent of the available documentation on the Lowell Hydroelectric Project (FERC No. 2790). Documentation of the hydroelectric components of the larger Lowell Canal System is scant.

The 2018 Pre-Application Document (PAD) for the Lowell Hydroelectric Project notes the Project's major civil works, which include:

- The 1,093-foot-long, stone-masonry gravity Pawtucket Dam (1847 & 1875), topped by a 5-foot high pneumatic crest gate system;
- The 5.5-mile Pawtucket & Downtown canal system that provides flow to four small hydroelectric stations (Hamilton, Assets, Bridge Street, & John Street) located in historic mill buildings;
- The Pawtucket Canal with its Guard Lock & Gates Facility that controls flow into the canal system;
- The main powerhouse containing two 8.6 MW horizontal Kaplan turbine-generator units;
- A fish-lift system at the powerhouse, and;
- A fish ladder adjacent to the Pawtucket Dam

Many of these civil works date from the nineteenth century and are associated with the use of the Merrimack River waterpower as a mechanical power source for the city's textile mills. The use of the river's waterpower to generate electricity came slowly. Patrick Malone's *Waterpower in Lowell: Engineering and Industry in Nineteenth Century America* (2009) notes that while all Lowell's mill complexes had either installed new hydroelectric units or linked generators to some of their existing turbines by 1918, the Lawrence Manufacturing Company continued to rely solely upon mechanical drive as late as 1927 (p. 223). The Historic American Engineering Record (HAER) documentation of the Lowell Canal System (1983) describes the civil and mechanical works in considerable detail, but closes its narrative in the 1880s, prior to the introduction of hydroelectric power. Similarly, other major sources on the history of Lowell, including Laurence Gross' *The Course of Industrial Decline: The Boott Cotton Mills of Lowell, Massachusetts, 1835-1955* (2000) and Theodore Steinberg's *Nature Incorporated: Industrialization and the Waters of New England* (2004) do not provide any detail on the hydroelectric facilities at Lowell.

It seems clear that historians' interest in Lowell and its waterpower system is largely limited to the period of mechanical power transmission between about 1825 and 1880. The introduction of hydroelectric facilities in the Lowell mills has yet to be explored.

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager

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HERITAGE MANAGEMENT

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Mobile 513-300-1511
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Structure	Historic American Engineering Record Number	Massachusetts Cultural Resource Information System Inventory Number(s)	Included in National Register of Historic Places Inventory Nomination Form	Included Lowell National Historical Park 1980 Cultural Resources Inventory
Pawtucket Canal	HAER MASS,9-LOW,9-; HAER MASS, 9-LOW,8-	LOW.929; LOW9.019	X	X
Guard Locks	HAER MASS,9-LOW,9A-; HAER MASS, 9-LOW,8-	LOW.9028	X	X
Swamp Locks	HAER MASS,9-LOW,9B-; HAER MASS, 9-LOW,8-	LOW.932	X	X
Lower Locks	HAER MASS,9-LOW,9C-; HAER MASS, 9-LOW,8-	LOW.931	X	X
Merrimack Canal	HAER MASS,9-LOW,10-; HAER MASS, 9-LOW,8-	LOW.933	X	X
Merrimack Dam	HAER MASS,9-LOW,10A-; HAER MASS, 9-LOW,8-	LOW.984	X	
Rolling Dam	HAER MASS,9-LOW,10A-; HAER MASS, 9-LOW,8-	LOW.983	X	
Moody Street Feeder	HAER MASS,9-LOW,16A-; HAER MASS, 9-LOW,8-	LOW.934	X	X
Lawrence Dam	HAER MASS,-LOW,13A-; HAER MASS, 9-LOW,8-	LOW.979	X	

Eastern Canal	HAER MASS,9-LOW,14-; HAER MASS, 9-LOW,8-	LOW.923	X	X
Boott Dam	HAER MASS,-LOW,14A-; HAER MASS, 9-LOW,8-	LOW.961	X	
Pawtucket Dam	HAER MASS,-9-LOW,8A-; HAER MASS, 9-LOW,8-	LOW.937	X	X
Northern Canal & Waste Gates	HAER MASS,9-LOW,15C-; HAER MASS, 9-LOW,8-	LOW.9018	X	X
Hamilton Canal	HAER MASS,9-LOW,11-; HAER MASS, 9-LOW,8-	LOW.930	X	X
Pawtucket Gatehouse and Hydraulic Turbine	HAER MASS,9-LOW,15A-; HAER MASS, 9-LOW,8-	LOW.73	X	X
Western Canal	HAER MASS,9-LOW,12-; HAER MASS, 9-LOW,8-	LOW.939	X	X

Scott, Kelsey

From: Scott, Kelsey
Sent: Thursday, July 9, 2020 11:04 AM
To: 'Bruins, Christine A'; 'Celeste Bernardo - Lowell NHP'
Cc: Quiggle, Robert; Lonsway, Peter; Racine, Laurel A; Lieb, David M; Richard Malloy; 'Kevin Webb - CRP'
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study
Attachments: Boott Hydro Document Review Summary.pdf

Hello –

Please find attached further information regarding the records review conducted for the Historically Significant Waterpower Equipment Study.

Currently, the headcount for the site visit on July 16th is eight. Participants are Patrick O'Bannon (Gray & Pape), Laurel Racine, Peter Lonsway, David Lieb, Robert Quiggle (HDR), and Kevin, Richard, and Andrew from Boott Hydropower.

Any questions or comments, let us know. Thank You –

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Sent: Monday, June 29, 2020 5:04 PM
To: Richard Malloy <RMalloy@centralriverspower.com>; Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
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Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Please count in from NPS, Laurel Racine, Cultural Resources Chief and David Lieb, Historical Architect. If there is space for one additional body keeping the group under 10, Lowell NHP Deputy Superintendent, Peter Lonsway is interested in attending.

Are there any documents from the consultant NPS can review in advance of July 16 to make the most of this field visit?

Christine Bruins | Community Planner
Lowell National Historical Park

978.275.1726 (office) | 978.954.1011 (cell)

From: Richard Malloy <RMalloy@centralriverspower.com>
Sent: Monday, June 29, 2020 11:35 AM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

Thanks Kevin.

Yes, please count me in for the 16th if it is at all possible. Thanks!

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, June 29, 2020 11:31 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Celeste Bernardo - Lowell NHP <celeste_bernardo@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

I think that Richard would like to attend as well. Let's make sure that we get a total headcount so that we stay within the 10 person limit.

Kevin

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Monday, June 29, 2020 10:43 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Celeste Bernardo - Lowell NHP <celeste_bernardo@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Hi Christine –

The best date that works is the option of July 16, 2020 to conduct the site visit associated with the Historically Significant Waterpower Equipment Study. On our end, the likely participants are Robert Quiggle from HDR, Patrick O'Bannon from Gray & Pape, and Andrew and Kevin from Boott Hydropower.

Thank you –

Kelsey Scott, MS
HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

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From: Bruins, Christine A [mailto:Christine_Bruins@nps.gov]
Sent: Monday, June 15, 2020 3:05 PM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Kelsey,

Thanks for giving me a call. To summarize, NPS units are directed to follow state and local guidance for COVID. To stay consistent with MA guidelines, the Gray & Pape site visit should be limited to a gathering of <10 people, face coverings should be worn by all, social distancing should be practiced wherever possible, and folks should take separate vehicles between sites.

cc'd: Laurel Racine, Cultural Resources Chief and David Lieb, Historical Architect should attend and Peter Lonsway, Deputy Superintendent would like to attend. To make the most of the field visit, could you please share draft documents from Gray & Pape's research in advance of the visit?

July 9th is the NPS preferred field visit date; July 16th alternate. Please let us know if you'd like more date options. Thanks!

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Wednesday, June 10, 2020 10:19 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: [EXTERNAL] Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

Hi Christine and Celeste,

We would like to re-engage with you regarding the ongoing studies as part of the Lowell Relicensing. As per your request at the Initial Study Report meeting, we can schedule with you the onsite visit with the architectural historian (Gray & Pape) for the Historically Significant Waterpower Equipment Study. Regarding this field visit, as well as the other ongoing studies, a conference call with this group would be helpful to understand how LNHP is currently approaching operations, hours, safety measures, etc during COVID-19.

Feel free to propose times that work for you in the coming weeks, and we'll set up a conference call. Thank you -

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HDR
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Syracuse, NY 13212

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kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Scott, Kelsey
Sent: Tuesday, July 14, 2020 2:27 PM
To: Lonsway, Peter; Racine, Laurel A; Lieb, David M
Cc: 'Patrick O'Bannon'; 'Kevin Webb'; Richard Malloy; Quiggle, Robert; 'Bruins, Christine A'; 'Celeste Bernardo - Lowell NHP'
Subject: Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study
Attachments: 20200716 Lowell Site Visit Agenda.pdf

Hello –

An agenda is attached to provide more logistical information regarding the upcoming site visit this week for the Historically Significant Waterpower Equipment Study. Please plan to meet at the Visitor's Center parking lot (304 Dutton Street) at 9am on Thursday, July 16. Thank you.

Kelsey Scott, MS
HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212
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kelsey.scott@hdrinc.com
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Agenda

Project:	Lowell Hydroelectric Project (FERC No. 2790)
Subject:	Historically Significant Waterpower Equipment Study
Date:	Thursday, July 16, 2020
Location:	Lowell, MA

Boot Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission (FERC or Commission) for the Lowell Hydroelectric Project (FERC No. 2790) (Project) located along the Merrimack River. In support of Project relicensing, Boott is conducting a Historically Significant Waterpower Equipment Study. In consultation with the National Park Service (NPS) Boott clarified the goals of this study during the December 18, 2019 Study Workshop held at the Lowell National Historical Park Visitor Center. Boott understands that NPS's goals for this study are to determine what original hydroelectric equipment owned/operated by Boott within the Project boundary is historically significant on a national level.

As a component of this study, Boott is conducting a site visit of certain Project facilities on July 16, 2020. The purpose of this site visit is to conduct an initial assessment of the historic significance of Project hydroelectric equipment and collect additional documentation. Boott notes that many of the Project's civil and mechanical components have been well documented in the Historic American Engineering Record (HAER), but those facilities pre-date the introduction of hydroelectric power at Lowell. As a result, the significance of hydroelectric components have not been assessed. Boott's July 16, 2020 site visit will focus on identifying historic hydroelectric equipment, and will include the following facilities:

- Pawtucket Gatehouse
- Hamilton Power Station
- John Street Power Station
- Assets Power Station

Site visit participants are invited to meet at the NPS Visitor Center parking lot at 9:00 a.m. on July 16, 2020 (GPS address 304 Dutton Street, Lowell, MA 01852).

If you require additional information, please contact Kevin Webb with Central Rivers Power at 978-935-6039 or Kwebb@centralriverspower.com or Rob Quiggle with HDR at 724-989-1579 or Robert.Quiggle@hdrinc.com.

Scott, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Friday, July 31, 2020 12:19 PM
To: Scott, Kelsey; Lonsway, Peter; Racine, Laurel A; Lieb, David M
Cc: Patrick O'Bannon; Richard Malloy; Quiggle, Robert; Bruins, Christine A; 'Celeste Bernardo - Lowell NHP'
Subject: RE: Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study
Attachments: Proprietors canal system magic book of facts.pdf

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All:

Following up on our on-site meeting on the 16th, attached is a copy of Mel Lezberg's "Magic Book" of facts and figures – at least I think that's what he called it. I do not know where the original is. My guess is that it is early 1950's vintage as the latest date recorded in the tables is 1949. Note that all elevations are PL&C datum which is 5.2 feet higher than "mean sea level" or NGVD29 datum. Interesting table on page 4 compares the numerous datum planes in MA.

To my best understanding, the downtown turbines that are (or were) part of the Lowell Project are:

- Hamilton (page 29; Textron American, Inc.) – All 5 units listed are authorized under the FERC license. Associated generators are listed on page 30.
- John St. (page 31; Boott Mills – Amory St.) Unit #'s 3, 4, 5, and 6 are authorized under the license. Unit 1 was originally included in the license but was removed in the early 1980's. Associated generators are listed on page 32.
- Section 8 (page 33, Boott Mills – "Massachusetts Yard") – these are Units 4, 5 and 6 denoted "Section 8" in the left margin.
- The 4 "Massachusetts Mills" units that we recently removed from the license are also listed on page 33, as "Main Power" Units 1-3 plus Unit 12.
- Assets (page 36 – Boott Mills "Bigelow Yard") - Units 1-3 are currently in the FERC license but will be removed via relicensing as they are no longer functional. Associated generators are on page 37.

Let me know if you have any questions.

Kevin

Kevin Webb
Licensing Manager
Central Rivers Power
670 N Commercial Street, Suite 204| Manchester, NH 03101
C: 978.935.6039
kwebb@centralriverspower.com

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Tuesday, July 14, 2020 2:27 PM
To: Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Patrick O'Bannon <pobannon@graypape.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Bruins, Christine A <Christine_Bruins@nps.gov>; 'Celeste Bernardo - Lowell NHP' <celeste_bernardo@nps.gov>
Subject: Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Hello –

An agenda is attached to provide more logistical information regarding the upcoming site visit this week for the Historically Significant Waterpower Equipment Study. Please plan to meet at the Visitor's Center parking lot (304 Dutton Street) at 9am on Thursday, July 16. Thank you.

Kelsey Scott, MS
HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us

Scott, Kelsey

From: Quiggle, Robert
Sent: Tuesday, August 4, 2020 12:35 PM
To: Kevin Webb; Bob Nasdor | AW
Cc: Richard Malloy; Scott, Kelsey
Subject: RE: Lowell/Merrimack Whitewtater Study

Would a call tomorrow afternoon at 1 or 2 PM work? I am in meetings all day on Thursday and Friday, but I'd like to touch base this week before Kevin goes on vacation.

If that schedule works for folks, I will send a WebEx invite.

Thanks,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Kevin Webb [mailto:kwebb@centralriverspower.com]
Sent: Tuesday, August 4, 2020 11:46 AM
To: Bob Nasdor | AW <bob@americanwhitewater.org>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: RE: Lowell/Merrimack Whitewtater Study

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My schedule fairly open the rest of this week, Thursday is wide open. Next week I'm on vacation.

Kevin

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Tuesday, August 4, 2020 10:15 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: Lowell/Merrimack Whitewtater Study

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Thanks Rob. Can we set up a time to talk this week? My schedule is flexible. Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Fri, Jul 31, 2020 at 9:29 AM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob: Good to hear from you. Let me know what would work for your schedule, and I'll try to set up a call to catch up on study plans next week. FYI, we are going through the photos from the flow documentation study now (more than 3,500) and will be putting together a report to send to you soon.
>
> Thanks,
>
> **Robert Quiggle,** RPA
>
> *Regulatory and Environmental Section Manager*
>
> **HDR**
>
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us
>
> **From:** Bob Nasdor | AW [mailto:bob@americanwhitewater.org]
> **Sent:** Wednesday, July 29, 2020 11:46 AM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Subject:** Lowell/Merrimack Whitewtater Study

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Hi Rob,

We should schedule a call to set a date and discuss logistics for the whitewater boating study. Also, I would like to get the images of the different flow levels that you all collected so we can identify a flow range for the study. Thanks.

Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

Scott, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, August 4, 2020 8:18 AM
To: Kevin Webb; Scott, Kelsey; Lonsway, Peter; Racine, Laurel A; Lieb, David M
Cc: Patrick O'Bannon; Richard Malloy; Quiggle, Robert; Bernardo, Celeste
Subject: Re: [EXTERNAL] RE: Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study
Attachments: 1_LOWE-ARCHIV-FindingAid-0908-PL-CI.pdf; 2_LOWE-ARCHIV-FindingAid-0908-PL-CII.pdf; 3_PL&C Finding Aid Transcript_Draft.pdf; 4_PL&C Drawings Inventory.xlsx; 5_LHPC-FindingAid-2012-UPDATED.pdf; 6_Lowell NHP Planning Document Library List.pdf

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Thanks, Kevin! I for one am pretty excited to have access to "a magic book of canal facts." Our notes on next steps from the Historical Water Power Eqauipment Study site meeting are:

1. Central Rivers Power / HDR / Gray & Pape to have an internal call about the study scope and following would reach out to NPS to confirm scope.
2. NPS to provide HSRs and other archives from the park's PLC collection by request.

Attached are 6 documents for you to look through and develop your request for additional information as needed per the agreed upon study scope. Please let me know if there are questions or anything that I can clarify. Happy researching- we look forward to touching base on the scope when you're ready.

1. **Finding Aid Part I for Proprietor's of Locks and Canals** - LOWE-ARCHIV-FindingAid-0908-PL-CI
   This is searchable and has more current (1980s). Look for whatever terms you think are relevant and make a list of Boxes/Folders you would like to see.
2. **Finding Aid Part II for Proprietor's of Locks and Canals** - LOWE-ARCHIV-FindingAid-0908-PL-CII
   This is primarily not searchable, but it does explain how the collection was broken up. It may help you find out who has drawings that don't belong to the park. Since this isn't searchable the next two documents have transcriptions of the relevant sections of the finding aid.
3. **PL&C Finding Aid Transcript_Draft**
   This is a transcription of most of the photos in the collection. A list of photo numbers and titles that you want to see is fine for this.
4. **PL&C Drawings Inventory**
   This is a spreadsheet of most of the drawings in the park's PL&C collection. A list of Plan Nos. and Titles that you want to see works for the drawings. As a general rule if there are no dimensions listed we do not have the drawing. It may be at Center For Lowell History. Their findings can be searched online at https://libguides.uml.edu/archives
5. **LHPC-FindingAid-2012-UPDATED**

   This is the finding aid for the Lowell Historic Preservation Commission Records. As with the PL&C info you can make a list of Boxes/Folders you would like to see.

6. **Lowell National Historical Park Planning Document Library**
   This is our list of digitized HSRs and related studies available upon request.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Friday, July 31, 2020 12:18 PM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Patrick O'Bannon <pobannon@graypape.com>; Richard Malloy <RMalloy@centralriverspower.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Bruins, Christine A <Christine_Bruins@nps.gov>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Subject: [EXTERNAL] RE: Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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All:

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Let me know if you have any questions.

Kevin

Kevin Webb
Licensing Manager
Central Rivers Power

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Subject: Lowell Hydroelectric Project - Historically Significant Waterpower Equipment Study

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Kelsey Scott, MS
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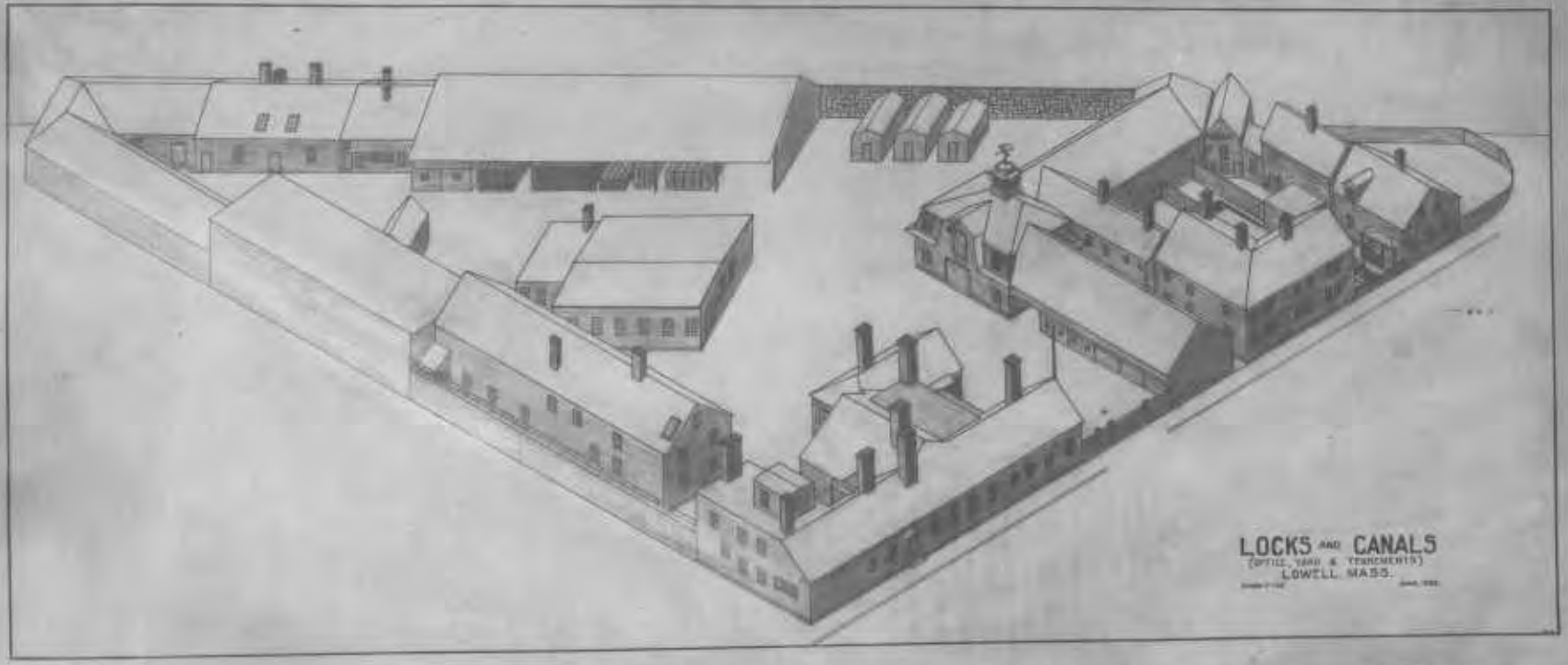
D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com
hdrinc.com/follow-us


LOCKS AND CANALS
(OFFICE, YARD & TENEMENTS)
LOWELL, MASS.

LOWELL NATIONAL HISTORICAL PARK
LOWELL, MASSACHUSETTS

FINDING AID FOR

PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER RECORDS, 1747-2008 (BULK DATES 1844-1970):

VOLUME I

CATALOG NUMBER: LOWE 5058 -- COLLECTION

PREPARED BY

ANTHONY REED
JALIEN HOLLISTER
TERI DEYOUNG
PATRICIA MILLER
DAN WALSH
MARGARET WELCH

Northeast
MUSEUM SERVICES CENTER

September 2008

Cover illustration: "Locks and Canals (Office Yard and Tenements), Lowell, Mass.", June 1920. Artist unknown.
From Lowell National Historical Park, Proprietors of the Locks & Canals Records, File 1081 (box 66, folder 3).

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PREFACE

This document, *Finding Aid for Proprietors of the Locks & Canals on Merrimack River Records, 1747-2008 (bulk dates 1844-1970)*, describes records created and maintained by the Proprietors of the Locks & Canals corporation which built the canals and established the waterpower in Lowell, Massachusetts. This finding aid, comprising Volume I, represents the culmination of a multi-stage cataloging project carried out in three phases between 1999 and 2008 by staff at the Northeast Museum Services Center (NMSC). Backlog catalog money funded the three phases. Volume II contains guides to the photographs and drawings written by former Lowell National Historical Park (LOWE) Collection Manager Dan Walsh.

Throughout the process, the NMSC catalogers expressed their gratitude towards the staff of the Lowell National Historical Park for their assistance in carrying out this work, in particular, Mr. Walsh who cared for, described, and gave access to this collection for many years. In the FY08 phase, thanks go to Museum Specialist Jack Herlihy and David Blackburn, Chief of Cultural Resources and Programs.

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This institution reserves the right to refuse to accept a copying order if fulfillment of the order is judged in violation of copyright or federal or state privacy or publicity law. This institution also places restrictions on the use of cameras, photocopiers and scanners in the research room.

INTRODUCTION

This finding aid describes the Proprietors of the Locks & Canals (PL&C) Records, 1747-2008 (bulk dates 1844-1970), which consist of correspondence, legal documents, photographs, charts, graphs, maps, tables, reports, newspaper clippings and other technical and administrative materials related to the extended business dealings of the PL&C.

From the time of their active use by PL&C to their physical relocation to the Park's collections area, the records remained with the corporation at their offices, variously in the Boott Mill Counting House (attached to Boott Mill #6), Boott Mill #8, and 9 Central Street. Portions of the collection were physically transferred to Lowell National Historical Park in the 1980s and 1990s. In the summer of 1999, the Directors' Records and General Files were brought to the Charlestown, Massachusetts headquarters of NMSC for processing. The records processed during the 1999 project include the Directors' Records and the General Files, the files maintained by the corporation's administration for the purposes of reference and record-keeping. These two types of records comprise the initial two series of the collection (Series I. Directors' Records and Series II. General Files). Anthony Reed and Jalien Hollister, working for the Society for the Preservation of New England Antiquities (SPNEA, now Historic New England) under a cooperative agreement with the National Park Service, processed these series, and Mr. Reed wrote their description. The records were rehoused in acid-free containers; photocopies of the original containers were made onto acid-free paper and placed at the front of the new folders to preserve any data on them.

In 2002 and early 2003, Museum Specialist Teri DeYoung and Lead Museum Technician Patricia ("Tricia") Miller cataloged the deeds, tax records, flowage records, and stock records of the Proprietors' records. Student interns Anika Skogstrom, Dacia Metes, and Mary McCann, along with Ms. Miller, processed these series under the direction of Ms. DeYoung, Senior Archivist Liz Banks, and former NPS/SPNEA Archivist Jennifer Lyons. This FY02 and FY03 phase encompassed five series based on administrative function: Physical Data of Canal Operation (Series III.), Deeds (Series IV.), Flowage Records (Series V.), Tax Records (Series VI.) and Stock Records (Series VII). Ms. DeYoung wrote the finding aid for this phase.

In FY08, the remainder of Proprietors of the Locks and Canals records in the park's collection storage facilities was transferred to NMSC for cataloging. Between the second and third phases, two surveys conducted by NMSC staff identified these additional materials.[1] Minute books from the recent past were donated to the park and complete the series of Directors' Records. [2] NMSC Archivist Margaret Welch organized and catalogued these remaining series including legal records and files belonging to the engineers' office and compiled this finding aid incorporating the first two finding aids. A small amount of material belonging to previously catalogued series makes up the Addendum.

[1] Ms. Banks and Ms. DeYoung conducted a February 2003 survey of unprocessed Proprietors materials. Regional Archivist David Vecchioli found additional materials in his 2005 survey for a Collection Management Plan. Ms. Banks and former SPNEA technician Jennifer Quinn made the initial survey of Proprietors materials in July 1999.
[2] Part of accession LOWE-769.

The park's staff is responsible for the item-level descriptions of the Photographs and Architectural and Engineering Drawings series. Between 2000 and 2002 park staff, led by Dan Walsh, cataloged the photographs from the collection. In total, 4,030 catalog records representing more than 6000 images have been entered into the park's ANCS+ database. For several years, park staff also described the over 11,000 individual plans and drawing. Dan Walsh served as project coordinator with Rebecca Hartwell and Michelle Verfaillie from LOWE park staff, along with volunteers Clee A. Ace, Kathy Dery, and Steven Sussman. Volume II of this finding aid contains Mr. Walsh's guides to the photographs and drawings.

The PL&C records collection contains a significant amount of oversize material (larger than the 8½" x 14" folders), often folded within the original files. All oversize material was removed to more appropriately-sized containers. Separation sheets were left in the original location as well as with the oversize item in its new location. Both separation sheets describe the item and indicate both original location and subsequent relocation.

The finding aid is divided into five sections:

- Part 1: Collection Description:
  - Scope and content note
  - Outline showing the organization of the collection;
  - Descriptions of the series into which the collection is organized.
- Part 2: Corporate History.
- Part 3: Collection Listing:
  - Document boxes: a box and folder list;
  - Oversize material .
- Bibliography.
- Appendices:
  - A: Alphabetical index of General Files (photocopied from File 10xx).
  - B: List of files known to be missing.
  - C: Maps of Lowell, 1828 and 1975

PART 1:

COLLECTION DESCRIPTION

SCOPE AND CONTENT NOTE

Proprietors of the Locks & Canals Records, 1747-2008 (bulk dates 1844-1970)

Accession number: LOWE-111, LOWE-132, and LOWE-769.

Catalog number: LOWE 5058.[3]

Quantity: 229.5 linear feet (approximately 367,200 items); approximately 11,000 items (Architectural and Engineering Drawings series); approximately 6,000 items (Photographs series).

Storage: 202 legal archives boxes, 4 half-size legal archives boxes, 39 print boxes, 30 flat boxes, 23 index boxes, 41 map folders and 4 rolled storage boxes.[4]

Location: Lowell National Historical Park, 67 Kirk Street, Lowell, Massachusetts 01852-1029, (978) 970-5241.

Description: The Proprietors of the Locks & Canals Records, 1744-2008 (bulk dates 1844-1970), consist of administrative records, correspondence, charts, graphs, deeds, photographs, technical notebooks, reports, maps, legal documents and newspaper clippings. The corporation, chartered in 1792, began as an affiliation of businessmen interested in using the Merrimack River to promote commerce to Newburyport. Into the later 19th and earlier 20th century, PL&C existed primarily for the administration and maintenance of Lowell's complex series of canals and locks, all the while developing a strong local economy based on the town's numerous textile mills that ran on the abundant hydropower and maintaining a firm control of both land and water rights. After the establishment of Lowell National Historical Park in 1978, PL&C sold rights for usage of the canals and walkways.

Cross-references: There are several other collections which closely relate to these records:

- Harvard University's Baker Library maintains numerous record groups relating to PL&C and affiliated companies (Boott Cotton Mills, Hamilton Manufacturing Company, Tremont and Suffolk Mills, among others).

[3] Additional numbers LOWE 6391 (Architectural and Engineering Drawings), and individual numbers for photographs in that series.
[4] See Volume II for storage of photographs and architectural and engineering drawing series.

- University of Massachusetts-Lowell maintains a significant collection of PL&C plans and drawings, as well as a collection of the company's technical photographs.

- The LOWE museum collection holds related items:

  - *Boott Mills Records (LOWE 15733). The two companies shared an interlocking directorate in the late 20th century and the records in this era frequently refer to PL&C.*
  - *Individual PL&C artifacts.*

Organization: *Proprietors of the Locks & Canals Records, 1747-2008 (bulk dates 1844-1970)*

I. Directors' Records, 1813 - 1955

II. General Files, 1836 - 1962

III. Physical Data of Canal Operations
- A. Master Reference Material of James B. Francis
  - 1. General Books
  - 2. Log Books
  - 3. Day Books
  - 4. Waste Books
    - *a.)* J.B. Francis
    - *b.)* Hiram Mills
  - 5. Experiments
    - *a.)* Hydraulic/weir
    - *b.)* Dynanometers
  - 6. Water measurements/ Discharge
  - 7. Surveys
  - 8. Mills
  - 9. Turbines
    - *a.)* Design
    - *b.)* Tables
    - *c.)* Tests
      - (1) General Tests
      - (2) James B. Francis Field Tests
  - 10. Franklin Forbes (5 Volumes- Francis took over 5th volume when Forbes died)
- B. General Operations Logbooks
  - 1. Rainfall/ Temperature Readings
  - 2. Tables/ Weirs/ Canals
  - 3. Mill Memoranda
- C. Daily Field Notes

1. General Notebooks
2. Day Books
3. Work Records
   - *a.)* Buildimgs
   - *b.)* Bridges
4. Rainfall/ Temperature
5. Water Level/ Measurements
6. Surveys
7. Level Books
8. Experiments
9. Tests
10. Turbines
    - *a.)* General
    - *b.)* Inspections
11. Employees and Records
    - *a.)* Walter H. Durfee
    - *b.)* Noah R. Harlow
      - (1) General Books
      - (2) Field Books
      - (3) Index to Books
    - *c.)* Edward Pierce Hamilton
    - *d.)* J.P. Frizell
      - (1) Water Measurements
      - (2) Experiments
    - *e.)* G.M. Hintley
    - *f.)* Robert Libby
    - *g.)* C.S. Gowen
    - *h.)* Foster and Others
12. Middlesex County

IV. Deeds

V. Flowage Records
   - A. Agreements/ Judgements
   - B. Geographical location
     1. Lowell
     2. Chelmsford
     3. Tyngsborough
     4. Hudson
     5. Litchfield
     6. Nashua
     7. Merrimack
   - C. Fourth Flashboard Damage Control
   - D. Flowage Index

VI. Tax Records
   - A. Street Resolutions

B. Taxes
1. General
2. Collector's Schedules
3. Collector's Notices
4. Petitions/Protests
5. Bridges
6. Federal and State (See Addendum)

VII. Stock Records
VIII. Financial Records
A. Financial Statements
B. Accounts
C. Insurance
IX. Legal Records
X. Engineers' Files
A. Hiram F. Mills
B. Reference Materials
1. Companies
2. Product Catalogs
3. Professional Literature
4. Subject Files
XI. Subject Files
XII. Labor Records
XIII. Reservoir Records
XIV. Physical Plant Records
XV. Real Estate Records
XVI. Affiliated Companies Records
A. Joint Records
B. Corporation Investments, Inc. (CII)
C. Wisconsin Investments, Inc. (WII)
D. Ocwen, Inc.
E. Lowell Land Company
F. Lowell Industries Limited
XVII. Miscellaneous Materials
XVIII. Photographs
XIX. Architectural and Engineering Drawings
XX. Oversize

Addendum
III. Physical Data of Canal Operations (cont.)
B. General Operations Logbooks
2. Tables/ Weirs/ Canals
C. Daily Field Notes
5. Water Level Measurements (cont.)
11. Employees and Records (cont.)
h. Foster and Others

VI. Tax Records (cont.)
B. Taxes
6. Federal and State

Series Descriptions

The Proprietors of the Locks & Canals Records, 1747-2008 (bulk dates 1844-1970), are arranged into series based on their function within the corporation.

Series I. Directors' Records, 1813 - 1988

The first series is a collection of minutes of the meetings held by the corporation. The initial 4 volumes in this series ("Directors' Records" 1813 – 1877; gap 1826-1842) are original manuscript bound volumes. The following 7 volumes ("Locks & Canals Directors' Records" 1792 – 1941) are also bound volumes, although these are typed transcriptions of minutes from the meetings of the Directors and, starting in 1921, the Executive Committee of PL&C. Finally, there is one volume of minutes from the annual and special meetings of the corporation, 1876 – 1940. A recent accession added minutes up to and including 1988.

Series II. General Files, 1836 - 1962

The second series is a collection of primarily subject files maintained by the corporation's administration. These files were used by the corporation for reference and record-keeping. Within these files, subject strengths include the administrative organization of the corporation, design and research of various aspects of hydropower technology, waterway and meteorological data for the New England region, commercial and industrial history of Lowell and the broader textile industries, and, to a lesser degree, the professional careers of some of PL&C's more significant characters.

Approximately one-third of the General Files were held in the corporation's library as sewn-spine bound volumes, separate from the post-bound volumes and office folders that housed the materials more routinely used by the corporation's administrative offices. This original numerical order has been preserved, although the bound volumes have been reunited with the post-bound volumes and foldered records.

The General Files are organized by a numerical order created and maintained by the PL&C, based on, primarily, a four-digit number and title (file "1027 Engineering Instruments, 1895-1947", for example) expanded variously by decimals (file "1006.1 Nashua Yard, 1947-1955"), letters (file "1004-D Newmarket Mfg. Co., 1933-1954") and combinations thereof (file "1012.04B Merrymeeting Lake Dam Construction, 1921-1924").

While the numbering convention employed by the corporation is of logical construction, it does not always functionally perform as such. Subjects are often grouped near one another, but -

given the complex administrative workings of the corporation's holdings - there are occasional overlaps and breaches. Particular attention should be paid to placement and order of file number elements as well as punctuation. File "1004-A1 Columbia Textile Company Fire Protection, 1920-1928 …" is different from file "1004.1A Bigelow-Hartford Carpet Co. New Fire Pump, 1918-1919".

Also reflective of the complex nature of the numbering system is the occasional duplication of file numbers (duplications not noted in the corporation's indexes), necessitating the addition of bracketed numbers by park staff. Often these duplicate numbers are closely related in subject, sometimes identical save for date ranges and the added number in brackets.

Additionally, some of the file numbers listed in the corporation's indexes are known to be absent, either files created and no longer existing, or file numbers created as "space holders" but never utilized. (See Appendix B for a list of missing files.) Conversely, some items exist in the collection that are nowhere in the indexes. These instances are rare and, when encountered in processing, a folder title was created based on the file's contents and bracketed to indicate an artificial title created in processing.

Items of particular interest to researchers include: information regarding the Lowell Industrial Development Company in boxes 17 through 20; individual letters from Uriah Boyden to Kirk Boott (1836), to James B. Francis and to P. T. Jackson (both 1840) in box 34, folder 1; information about land acquired or owned by PL&C in box 52, folders 5 and 6; materials on the history of water wheels and engineers in box 52, folders 8 and 9; draft and illustrations for The American Mixed Flow Turbine and Its Setting (1922) in box 53, folders 2 through 4; materials on PL&C dealings with the City of Lowell, boxes 64-66; information regarding the contents and disposition of materials in the PL&C library, in box 66, folder 6; information on floods affecting PL&C, boxes 68 and 69; a 1921 inventory of materials belonging to the PL&C, including mill equipment and office supplies, in box 90, folder 2. Moreover, a group of files dealing - largely but not exclusively - with financial matters (taxes, boxes 77-79; insurance, box 80; reports to the treasurer of PL&C, boxes 81-83; tax list statements to assessors, boxes 83-85; real estate, boxes 85-88) is notable for its relatively large mass.

Lastly, some materials deserve specific listing for their infrequent and isolated placement throughout the collection. Appendix A., an alphabetical index to the General Files. It may prove useful to researchers for this series of PL&C materials, and for other related portions of this collection as well.

Series III. Physical Data of Canal Operations, 1837 - 1967[5]

Series III will be of particular interest to researchers as it contains primary documentation created by James B. Francis while at the PL&C. As Agent from 1845 to 1889 Francis developed and oversaw construction improvements that revolutionized hydropower in the United States and

[5] These dates include those of items in the Addendum.

propelled Lowell to the first manufacturing center in the country.[6]

The third series is a collection of notebooks that contain physical data of canal construction, hydropower development and general canal operation. This series includes logbooks, day books, waste books, experiments and daily field notes. Importantly, this series represents the work and master reference material of engineer James B. Francis. In particular, Sub-series A contains the data, designs and experiments generated by Francis. Sub-series B deals with general operation information and includes precipitation measurements, memoranda and information about the weirs and canals. Sub-series C is a compilation of data from tests and field surveys produced by PL&C employees under the guidance of Francis.

The notebooks are organized by type chronologically therein numerically or alphabetically. In some cases the labels seem random, as with Sub-sub-series 1. General Books. The notebooks start at "8" then go to "9", "10" and "10a" then skip to "16". After "16" the notebooks are labeled Vol. "A" then Vol. "F" through "I" and then "O", "Q" and "T". Although there appear to be missing volumes, the notebooks are somewhat chronological with few interruptions. The order created by the PL&C was maintained as near as possible throughout.

The Addendum contains related twentieth-century records including a few water measurement logs from the 1960s.

Series IV. Deeds, 1747 - 1952

The fourth series documents the PL&C's acquisition of rights for access, ownership and construction along the Merrimack and Concord Rivers from the mid-eighteenth century through the mid-twentieth century. The Deeds were originally tri-folded and housed in envelopes organized numerically from 1 to 7001. Two large blocks of numbers, 1415 to 5001, and, 5814 to 7001, had not been located by the park and were not found during processing. Each envelope contained information relating to a particular transaction such as a deed, lease agreement, survey, plans, maps or receipts. Although there appears to be no apparent chronological or alphabetical order to the overall series, it is possible that the records are arranged geographically. An alphabetical index accompanied the records.

Series V. Flowage Records, 1834 - 1903

The fifth series is a collection of documents concerning indemnification for property damaged by flooding along canals and waterways owned or maintained by the PL&C. The collection was organized in envelopes numerically from 8001 to 8452. An alphabetical index accompanied the records.

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[6] Hands, Divers. *Illustrated History of Lowell and Vicinity Massachusetts.* Lowell, Mass., Courier-Citizen Company, 1897, 164.

Series VI. Tax Records, 1828 - 1986

The sixth series is a collection of documents that provide a general accounting of taxes paid by the PL&C from 1900-1919. The records consist of plot surveys or schedules, assessments, petitions and published notices. Sub-series A. Street Resolutions is arranged alphabetically. Sub-series B. Taxes 1900-is arranged chronologically. These series is continued in the Addendum with various federal and state tax records.

Series VII. Stock Records, 1854 - 1954

The seventh series is a collection of stock certificates, receipts and associated documentation relating to shares owned by stock holders in the PL&C. Currently there are two bound volumes in this series.

Series VIII. Financial Records, 1890 - 1985

This series is composed of incomplete runs of records. For example, the financial statements in sub-series A. required to be filed by the Commonwealth of Massachusetts cover only 1981-1985 (one dates from 1955). Sub-series B. holds several indexes to accounts such as those for canal water usage. The bank account records are from the 1920s. Sub-series C. contains insurance policies from the 1950s.

Series IX. Legal Records, 1822 - 1921

This series is composed of the published charters, indentures and agreements related to PL&C and the mills with which it engaged.

Series X. Engineers' Files, ca. 1870 - 1956

The files in the first sub-series, created by Chief Engineer Hiram Mills (1836-1921) and organized presumably by his office staff, relate to a range of subjects including the mill companies and land negotiations. The largest file describes the legal case of Judge Charles Cowley vs. the Proprietors in which Cowley accused PL&C of Merrimack River contamination, which caused him to become gravely ill. The files were ordered in numbered envelopes. Sub-series B., Reference Materials, contains the hydropower machinery illustrations and catalogs compiled for engineering purposes. These materials were found in labeled magazine boxes. Chief Engineer Arthur Safford received most of the drawings from non-PL&C projects for which he acted as consultant; the PL&C staff kept the material for reference.

Series XI. Subject Files, 1948 - 1987

These files are apparently the successors to the General Files in Series II. Unlike those files, they are not numbered but are identified only by a label title. They contain newspaper clippings on the creation of the Lowell Heritage State Park and Lowell National Historical Park. Possibly

the President's Office kept these records for the entire company's reference as several folders hold copies of correspondence to the president.

Series XII. Labor Records, 1956

The very small amount of index cards documents the pay scale of retired and disabled works in 1956. Only park staff may view the cards because access is restricted due to the presence of personal information. Park staff may disclose most of the information.

Series XIII. Reservoir Records1920, 1950 - 1953

The PL&C maintained a reservoir across the Merrimack which provided water for fire suppression to its clients. Two record books document the height and amount of water pumped.

Series XIV. Physical Plant Records, 1896 - 1921

The PL&C was responsible for providing water and electricity to its clients. Index cards describing the various meters are the only records present in this series.

Series XV. Real Estate Records, 1900 - 1948

The PL&C held many tracts of land in downtown Lowell. These indexes give names of the tenants to whom PL&C leased property. They refer to "rent books" which are not present in this collection.

Series XVI. Affiliated Companies Records, 1962 - 2008

By 1964, outside interests led by George Horvath of New York City had burdened PL&C with debt. A group of Lowell investors took back control of the company (along with the Boott Mills) and ran companies closely affiliated with PL&C to, in large part, manage the debt. Corporation Investments, Inc. (CII) was formed by this "Lowell Group" of investors, and it eventually held PL&C, Stone Investments, Inc. (SII), Boott Mills, Wisconsin Investments, Inc. (WII), and Ocwen, Inc. as wholly-owned subsidiaries. A plan of refinancing the debt was entered into by CII and its subsidiaries in 1964 with a committee authorized to control all the assets of the companies. Records indicating these complex financial arrangements including a 1975 refinancing agreement with the Teamsters' group are in this series.

Because these companies were so closely related, they filed their taxes in concert and kept copies of financial records in the PL&C/ Boott Mills record offices. Sub-series A. "Joint Records" has some of these records. The minutes of directors' and stockholders' meetings and articles of organization comprise the sub-series related to CII, WII, SII, and Ocwen. This series also holds the documentation of the major debt refinancing plans.

The Lowell Land Company was formed to sell off real estate formerly held by PL&C. Its officers were managers of the mills, and PL&C engineer Arthur T. Safford served also as its engineer. The company voluntarily dissolved 19 December 1945.

Little is known about Lowell Industries. It is assumed it had a close relationship to PL&C because its minutes were included in PL&C records.

Series XVII. Miscellaneous Materials, 1945-1957

These items were located in PL&C records but do not belong to a currently defined series.

Series XVIII. Photographs

Volume II describes the majority of photographs created for and managed by PL&C. The researcher should note that some individual photographs were integrated originally in document files. They remain in the files, now in archival housing, and their presence is recorded in footnotes.

Series XIX. Architectural and Engineering Drawings

See Volume II for description.

Series XX. Oversize Materials

These items are grouped together because of their common size. All are intellectually associated with the letter- and legal-size materials but are too large to be stored in standard legal-size folders and boxes.

PART 2:

CORPORATE HISTORY

HISTORY OF THE PROPRIETORS OF THE LOCKS & CANALS

The Proprietors of the Locks & Canals on Merrimack River (PL&C) was chartered in 1792 by a group of merchants and ship owners from Newburyport, Massachusetts. They intended to boost commerce at Newburyport by improving the navigability of the Merrimack River through construction of the Pawtucket Canal around the rapids at East Chelmsford. Although they succeeded, completion of the Middlesex Canal in 1803 linked the Merrimack watershed directly to Boston and diverted the majority of the trade away from Newburyport. The Pawtucket Canal languished until December 1821, when PL&C was bought out and reorganized by the Boston investors who capitalized the Merrimack Manufacturing Company earlier that year. Their objective was to turn the under-used transportation canal into the main feeder of a waterpower delivery system for a large industrial complex. In 1825, PL&C's charter was amended to allow it to own real estate, water rights, and mill privileges. In 1826, the Merrimack Manufacturing Company transferred back to PL&C its ownership of the Pawtucket Canal and the land and water rights it had held since 1821, as well as its machine shop. Consequently, due to its unprecedented control of land and water, PL&C became a primary instrument of the economic and social development of Lowell, as the community was renamed in 1826.

In 1826, PL&C began actively selling land and waterpower privileges, in units called "mill powers", to the newly chartered textile companies. The Merrimack and Hamilton Manufacturing Companies were first, in May 1826, followed by the Appleton, Middlesex, Suffolk, Tremont, Lawrence, Lowell, Boott, Massachusetts, and Prescott companies, and the Lowell Machine Shop, between 1828 and 1845. In 1845, PL&C's machine shop and foundry were separately incorporated as the Lowell Machine Shop and PL&C began selling surplus land to individual small holders. Its role as a waterpower company first and foremost became clear as its secondary functions were pared away. Under the direction of its Chief Engineer James B. Francis, PL&C completed the canal system in 1848, thus capturing the full 11,000 constant horsepower potential of the Merrimack River. By the 1870s this system powered eleven textile corporations, which employed close to 15,000 people and produced over 3.6 million yards of cloth per week. As the first such waterpower company of its kind in the nation, PL&C became the model for other large suppliers, notably the Amoskeag Company of Manchester, New Hampshire, and the Essex Company of Lawrence, Massachusetts.

PL&C continued to improve individual canals and maintain its water rights well into the twentieth century. As a result, its managers and engineers participated in the growing development of hydroelectric power generation in Lowell and eastern Massachusetts. As the major textile corporations began leaving Lowell during the 1920s, local investors, including Boott Mills, formed the Lowell Industrial Development Company and the Assets Realization Company to purchase and manage the water rights and properties of those companies as they liquidated or left. These two successors to the textile companies worked with PL&C to manage the waterpower resources, which included seventeen working turbines, four of which were seriously damaged in the flood of 1936 and taken off line.

The PL&C utilized its water resources in other ways. It provided water from its reservoir to the

fire suppression systems in the remaining mill structures until 1994, and, through its ownership of the Pawtucket Canal, continues to sell industrial process water (as opposed to waterpower) to various customers.

In the early 1960s PL&C underwent a change of ownership when a group of Lowell investors took back the corporation from New York City based interests led by George and Ernest Horvath. The Horvaths, after taking over Massachusetts Mohair Plush Company and Boott Mills, had acquired PL&C in 1959 and quickly borrowed large sums from the Trustees of the Central States, Southeast and Southwest Pension Fund (belonging to the Teamsters' Union), the Archdiocese of Boston, and Lowell's Union National Bank. The Lowell investors, deeply concerned about the Lowell institutions' financial viability, bought the Boott Mills, PL&C, and other Horvath holdings.[7]

This "Lowell Group," having assumed these large debts, created new companies Wisconsin Investments, Inc., Stone Investments, Inc., and Ocwen, Inc., to ease the financial burden of PL&C, the Boott Mills, and the Union National Bank. Corporations Investments, Inc., owned PL&C , the Boott Mills, and these companies as subsidiaries, and an interlocking directorate, led by Eldred L. Field, the McKittrick family, and others, managed the companies and were the primary stockholders. Selling stock in the new companies raised capital, and the companies filed joint tax returns to share tax writeoffs in the 1960s through the 1980s.

The Boott Mills and PL&C became so intertwined in the 1970s that joint directors meetings were held. For the last quarter of the twentieth century, Marshall Field and Mel Lezburg led the firms. Both firms greatly benefited when the state and federal government bought their real estate and the rights to use the canals and waterways for the new state heritage and national parks.

The most visible legacy today of PL&C waterpower, apart from the canal system, is Boott Hydropower. Boott Mills and PL&C arranged for construction of the Eldred L. Field Powerhouse facility on the Merrimack River at its junction with the Northern Canal in the early 1980s. In 1986, Boott Hydropower became a wholly owned subsidiary of Consolidated Hydropower, and now Enel (North America) runs Boott Hydropower. In addition to the Field Powerhouse, thirteen working turbines located in the old textile mill structures remain able to provide additional power generation as demand requires and available water allows.

[7] Mehmet Ali explains this complex financial situation in his dissertation "To Save a City: From Urban Renewal to Historic Preservation in Lowell, Massachusetts, 1920 -1978," University of Connecticut, 2006, pp.279 -286.

PART 3:

COLLECTION LISTING

PHASE 1 (FY99) PROJECT

Series I. Directors' Records

Box 1 (5.0" legal size)
Folder:

1. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound manuscript volume], 1813-1825[8]
2. Directors' Records, #2 [Minutes from the meetings of the Directors of the PL&C; bound manuscript volume], 1843-1853[9]
3. Directors' Records, #3 [Minutes from the meetings of the Directors of the PL&C; bound manuscript volume], 1853-1877[10]
4. Directors' and Executive Committee Records [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; bound manuscript volume], Vol. 7, 1921-1939. (Part 1 of 2)[11]
5. Directors' and Executive Committee Records [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; materials removed from sleeve], Vol. 7, 1921-1939. (Part 2 of 2) †
6. Records of the Directors - Proprietors of the Locks & Canals on Merrimack River [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; signed, typed copies of record], 1940-1955. (Part 1 of 2)
7. Records of the Directors - Proprietors of the Locks & Canals on Merrimack River [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; signed, typed copies of record], 1940-1955. (Part 2 of 2)
8. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound typed transcripts], Vol. 1, 1792-1812

Box 2 (5.0" legal size)
Folder:

1. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound typed transcripts], Vol. 2, 1813-1842
2. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound typed transcripts], Vol. 3, 1843-1853
3. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound typed transcripts], Vol. 4, 1853-1877
4. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound typed transcripts], Vol. 5, 1877-1889

[8] Bound volume removed to oversize box 1; typed transcripts available in box 2, folder 1.
[9] Bound volume removed to oversize box 2; typed transcripts available in box 2, folder 2.
[10] Bound volume removed to oversize box 2; typed transcripts available in box 2, folder 3.
[11] PL&C's Executive Committee began meeting in 1921.

5. Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound typed transcripts], Vol. 6, 1889-1904

Box 3 (5.0" legal size)
Folder:

1. Directors' Records [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; bound typed transcripts], Vol. 7, 1904-1921[12]
2. Directors' Records [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; bound typed transcripts], Vol. 8, 1921-1931
3. Directors' Records [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; bound typed transcripts], Vol. 9, 1931-1941
4. Directors' Records [Minutes from the annual and special meetings of the PL&C; bound manuscript volume], 1876-1940[13]

Box 3a (5.0" legal size)[14]
Folder:

1. Directors' Records [Minutes from the meetings of the Directors; signed, typed copies of record], January 1956-January 1960 (Part 1 of 2)
2. Directors' Records [Minutes from the meetings of the Directors; signed, typed copies of record], January 1956-January 1960 (Part 2 of 2)
3. Cover to above
4. Directors' Records [Minutes from the meetings of the Directors; signed, typed copies of record], February 1960-June 1964 (Part 1 of 2)
5. Directors' Records [Minutes from the meetings of the Directors; signed, typed copies of record], February 1960-June 1964 (Part 2 of 2)
6. Cover to above

Box 3b (5.0" legal size)[15]
Folder:

1. Directors' Records [Minutes from the meetings of the Directors], 1965-1988[16] [photocopy]
2. Stockholder Meetings Minutes, 1941-January 1960 (Part 1 of 2)
3. Stockholder Meetings Minutes, 1941-January 1960 (Part 2 of 2)
4. Cover to above
5. Stockholder Meetings Minutes, 1964-1981 (with Minutes from the meetings of the Directors, 1964-1965) [photocopy]

[12] PL&C's Executive Committee began meeting in 1921.
[13] Bound volume removed to oversize box 3.
[14] All items from accession LOWE-769.
[15] All items from accession LOWE-769.
[16] Includes sets of minutes from special joint meetings of PL&C, Boott Mills, and Boott Hydropower beginning in 1980.

Series II. General Files

Box 4 (5.0" legal size)
Folder:
1. 1001[03] Merrimack Mfg. Company, 1940-1955 (Part 1 of 2)*†
2. 1001[03] Merrimack Mfg. Company, 1940-1955 (Part 2 of 2)†
3. 1001[05] Merrimack Mfg. Company, Southern Mills, Huntsville, Ala., 1924-1928 *†
4. 1001.1 Merrimack Mfg. Company, Fire Protection & Fire Pumps, 1903-1953†

Box 5 (5.0" legal size)
Folder:
1. 1002[01] Hamilton Mfg. Company, 1894-1926
2. 1002[03] Hamilton Mfg. Company, 1926-April 1927 / Marden & Murphy Inc., April 1927-April 1933 / Hamilton Company, May 1933- , 1926-1952 (Part 1 of 4)†
3. 1002[03] Hamilton Mfg. Company, 1926-April 1927 / Marden & Murphy Inc., April 1927-April 1933 / Hamilton Company, May 1933- , 1926-1952 (Part 2 of 4)*†

Box 6 (5.0" legal size)
Folder:
1. 1002[03] Hamilton Mfg. Company, 1926-April 1927 / Marden & Murphy Inc., April 1927-April 1933 / Hamilton Company, May 1933- , 1926-1952 (Part 3 of 4)*
2. 1002[03] Hamilton Mfg. Company, 1926-April 1927 / Marden & Murphy Inc., April 1927-April 1933 / Hamilton Company, May 1933- , 1926-1952 (Part 4 of 4)*
3. 1002[04] Hamilton Mfg. Co. New Hydro Electric Units, 1918-1926 (Part 1 of 2)*†
4. 1002[04] Hamilton Mfg. Co. New Hydro Electric Units, 1918-1926 (Part 2 of 2)†
5. 1002.1 Hamilton Mfg. Co. Fire Protection, 1907-1927 / Marden & Murphy Inc. Fire Protection, 1927-1933 / Hamilton Co. Fire Protection, 1933- , 1907-1937 (Part 1 of 2)*†
6. 1002.1 Hamilton Mfg. Co. Fire Protection, 1907-1927 / Marden & Murphy Inc. Fire Protection, 1927-1933 / Hamilton Co. Fire Protection, 1933- , 1907-1937 (Part 2 of 2)†
7. 1002.2 Hamilton Yard, 1946-1954
8. 1003[01] Appleton Company, 1868-1927 (Part 1 of 3)*†

Box 7 (5.0" legal size)
Folder:
1. 1003[01] Appleton Company, 1868-1927 (Part 2 of 3)*†
2. 1003[01] Appleton Company, 1868-1927 (Part 3 of 3)†
3. 1003[02] Appleton Company. Jackson Properties, 1928-1953 (Part 1 of 3)*†
4. 1003[02] Appleton Company. Jackson Properties, 1928-1953 (Part 2 of 3)†
5. 1003[02] Appleton Company. Jackson Properties, 1928-1953 (Part 3 of 3)*
6. 1003.1 Appleton Company. Fire Protection, 1903-1954 (Part 1 of 2)†
7. 1003.1 Appleton Company. Fire Protection, 1903-1954 (Part 2 of 2)†

Box 8 (5.0" legal size)

Folder:
1. 1003.2 Jackson Properties Inc. Yard, 1946-1954†
2. 1004 Bigelow Carpet Co., 1901-Feb. 1918 / Bigelow-Hartford Carpet Co., 1918-1921, (Part 1 of 4)
3. 1004 Bigelow Carpet Co., 1901-Feb. 1918 / Bigelow-Hartford Carpet Co., 1918-1921, (Part 2 of 4)†
4. 1004 Bigelow Carpet Co., 1901-Feb. 1918 / Bigelow-Hartford Carpet Co., 1918-1921. (Part 3 of 4)*†
5. 1004 Bigelow Carpet Co., 1901-Feb. 1918 / Bigelow-Hartford Carpet Co., 1918-1921. (Part 4 of 4)†
6. 1004-A[01] Columbia Textile Company, 1920-Feb. 1928 / Assets Realization Company, March 1928-1929, 1920-1929 (Part 1 of 2)*†
7. 1004-A[01] Columbia Textile Company, 1920-Feb. 1928 / Assets Realization Company, March 1928-1929, 1920-1929 (Part 2 of 2)†
8. 1004-A[02] Assets Realization Company, 1930-1946†
9. 1004-A.1 Columbia Textile Company Fire Protection, 1920-1928 / Assets Realization Company Fire Protection, 1929- , 1920-1945
10. 1004-C Bigelow-Hartford Carpet Co. Successors. Newmarket Yard, 1920-1957†

Box 9 (5.0" legal size)
Folder:
1. 1004-D Newmarket Mfg. Co., 1933-1954†
2. 1004.1A Bigelow-Hartford Carpet Co. New Fire Pump, 1918-1919
3. 1005[02] Middlesex Company, 1930-1954*†
4. 1006[02] Nashua Mfg. Company-Suffolk Mills, 1927†
5. 1006[03] Courier Citizen Co.-Tremont Weave Shed, 1947†
6. 1006-1007 Tremont & Suffolk Mills and Lawrence Section, 1892-1926

Box 10 (5.0" legal size)
Folder:
1. 1006.1 Tremont & Suffolk Mills-Fire Protection, 1914-1926. Nashua Mfg. Company-Fire Protection, 1914-1927†
2. 1006.2 Nashua Yard, 1947-1955
3. 1007 Tremont Mills-Lawrence Section, 1926-1949*†
4. 1007.1 Lawrence Section-Fire Protection, 1909-1932†
5. 1008[01] Lawrence Mfg. Company, 1894-1926
6. 1008[02] Lawrence Mfg. Company, 1926-1956 (Part 1 of 2) †
7. 1008[02] Lawrence Mfg. Company, 1926-1956 (Part 2 of 2) †

Box 11 (5.0" legal size)
Folder:
1. 1008-A Lawrence Mfg. Company Yard, 1954-1957
2. 1008.1 Lawrence Mfg. Company Fire Protection, 1906-1954 (Part 1 of 2)†
3. 1008.1 Lawrence Mfg. Company Fire Protection, 1906-1954 (Part 2 of 2)*†

4. 1008.A Atlantic Rayon Corp. Textron Incorporated, 1939-1953†
5. 1009[01] Boott Mills, 1895-1926

Box 12 (5.0" legal size)
Folder:
1. 1009[02] Boott Mills, 1917-1923
2. 1009[03] Boott Mills, 1917-1930 (Part 1 of 4)*
3. 1009[03] Boott Mills, 1917-1930 (Part 2 of 4)*†
4. 1009[03] Boott Mills, 1917-1930 (Part 3 of 4)†

Box 13 (5.0" legal size)
Folder:
1. 1009[03] Boott Mills, 1917-1930 (Part 4 of 4)†
2. 1009[04] Boott Mills. No. 6 Unit, 1921-1923
3. 1009[05] Boott Mills, 1931-1954 (Part 1 of 5)†

Box 14 (5.0" legal size)
Folder:
1. 1009[05] Boott Mills, 1931-1954 (Part 2 of 5)†
2. 1009[05] Boott Mills, 1931-1954 (Part 3 of 5)†
3. 1009[05] Boott Mills, 1931-1954 (Part 4 of 5)†
4. 1009[05] Boott Mills, 1931-1954 (Part 5 of 5)
5. 1009[06] Boott Mills. Memo-Mr. Safford Re: Boott Mills Water Power & Waterwheels Particularly Nos. 3, 4 & 5, 1947*†
6. 1009[07] Boott Mills. Envelope Containing Data On New Wheel, 1943-1946†
7. 1009.1 Boott Mills New Fire Pump & Fire Protection, 1903-1954†

Box 15 (5.0" legal size)
Folder:
1. 1010[01] Massachusetts Cotton Mills, 1894-1923

Box 16 (5.0" legal size)
Folder:
1. 1010[02] Massachusetts Cotton Mills. Prescott Water Wheels-#12 Water Wheel, 1918-1921
2. 1010[03] Massachusetts Cotton Mills #4, 5 & 6 Water Wheels, 1917-1920
3. 1010[04] Massachusetts Cotton Mills. Cost Of #12 Unit & Cost of New Turbine & Oil Burner and Almont Plant, 1919-1921†
4. 1010[05] Massachusetts Cotton Mills, 1924-1947 (Part 1 of 3)†

Box 17 (5.0" legal size)
Folder:
1. 1010[05] Massachusetts Cotton Mills, 1924-1947 (Part 2 of 3)†

2. 1010[05] Massachusetts Cotton Mills, 1924-1947 (Part 3 of 3)*†
3. 1010[07 & 08] Lowell Industrial Development Company, 1930 (Part 1 of 3)
4. 1010[07 & 08] Lowell Industrial Development Company, 1930 (Part 2 of 3)*†
5. 1010[07 & 08] Lowell Industrial Development Company, 1930 (Part 3 of 3)†
6. 1010[09] Lowell Industrial Development Company, 1931†
7. 1010[10&11] Lowell Industrial Development Company, 1932-1933 (Part 1 of 2)†

Box 18 (5.0" legal size)
Folder:

1. 1010[10&11] Lowell Industrial Development Company, 1932-1933 (Part 2 of 2)†
2. 1010[12] Lowell Industrial Development Company, 1934-1935
3. 1010[13] Lowell Industrial Development Company, 1940-1942 (Part 1 of 4)*†
4. 1010[13] Lowell Industrial Development Company, 1940-1942 (Part 2 of 4)†
5. 1010[13] Lowell Industrial Development Company, 1940-1942 (Part 3 of 4)†
6. 1010[13] Lowell Industrial Development Company, 1940-1942 (Part 4 of 4)†
7. 1010[14] Lowell Industrial Development Company. Valve Inspection, 1932†

Box 19 (5.0" legal size)
Folder:

1. 1010[16] Assets Div. Of L.I.D.C., 1943-1956 (Part 1 of 4)†
2. 1010[16] Assets Div. Of L.I.D.C., 1943-1956 (Part 2 of 4)
3. 1010[16] Assets Div. Of L.I.D.C., 1943-1956 (Part 3 of 4)†
4. 1010[16] Assets Div. Of L.I.D.C., 1943-1956 (Part 4 of 4)
5. 1010[18] L.I.D. Employment Records, 1946-1955
6. 1010-A Prescott Yard, 1927-1953 (Part 1 of 2)†
7. 1010-A Prescott Yard, 1927-1953 (Part 2 of 2)†
8. 1010-B Lowell Industrial Development Company-Statements of Expense Accounts, 1930-1940 (Part 1 of 4)†

Box 20 (5.0" legal size)
Folder:

1. 1010-B Lowell Industrial Development Company-Statements of Expense Accounts, 1930-1940 (Part 2 of 4)†
2. 1010-B Lowell Industrial Development Company-Statements of Expense Accounts, 1930-1940 (Part 3 of 4)†
3. 1010-B Lowell Industrial Development Company-Statements of Expense Accounts, 1930-1940 (Part 4 of 4)†
4. 1010.1 Massachusetts Cotton Mills-Fire Protection, 1903-1931 (Part 1 of 2)*†
5. 1010.1 Massachusetts Cotton Mills-Fire Protection, 1903-1931 (Part 2 of 2)*†
6. 1011[02] Saco-Lowell Shops, 1924-1932 / Kitson Machine Shop, 1932-1952, 1924-1952 (Part 1 of 3)†
7. 1011[02] Saco-Lowell Shops, 1924-1932 / Kitson Machine Shop, 1932-1952, 1924-1952 (Part 2 of 3)*†

Box 21 (5.0" legal size)
Folder:
1. 1011[02] Saco-Lowell Shops, 1924-1932 / Kitson Machine Shop, 1932-1952, 1924-1952 (Part 3 of 3)†
2. 1011[03] Saco-Lowell Shops Yard, 1943-1952
3. 1011-A Kitson Machine Shop. J.A.E. Realty Trust, 1943-1950
4. 1011.1[01] Saco-Lowell Shops-Fire Protection, 1897-1923 (Part 1 of 2)*†
5. 1011.1[01] Saco-Lowell Shops-Fire Protection, 1897-1923 (Part 2 of 2)*†
6. 1011.1[02] Saco-Lowell Shops-Fire Protection, 1924-1932 / Kitson Machine Shop, 1932-1951, 1924-1951†
7. 1012.0 Merrimack River above Lowell & Tributaries, 1898-1955 (Part 1 of 3)†
8. 1012.0 Merrimack River above Lowell & Tributaries, 1898-1955 (Part 2 of 3)
9. 1012.0 Merrimack River above Lowell & Tributaries, 1898-1955 (Part 3 of 3)†

Box 22 (5.0" legal size)
Folder:
1. 1012.01[01] Merrimack River at Lowell, 1881-1923
2. 1012.01[02] Merrimack River at Lowell, 1917-1924 (Part 1 of 3)†
3. 1012.01[02] Merrimack River at Lowell, 1917-1924 (Part 2 of 3)†
4. 1012.01[02] Merrimack River at Lowell, 1917-1924 (Part 3 of 3)†

Box 23 (5.0" legal size)
Folder:
1. 1012.01[03] Merrimack River at Lowell, 1918-1924†
2. 1012.02[01] Technical Board et al. Report, 1927
3. 1012.02[02] Hydro Development, 1917-1923

Box 24 (5.0" legal size)
Folder:
1. 1012.02[03] Hydro Development, Harvard, 1914
2. 1012.02[04] Interconnection of Lowell Mills, 1912-1933 (Part 1 of 2)†
3. 1012.02[04] Interconnection of Lowell Mills, 1912-1933 (Part 2 of 2)†
4. 1012.02[06] Water Power Review. A.T.S. [Arthur T. Safford]. Different Water Power Studies Past 20 Years, 1941

Box 25 (5.0" legal size)
Folder:
1. 1012.02[08] Interconnection of Lowell Mills. C.F. Palmer Files. Quotations, 1933-1935
2. 1012.02[09] Interconnection of Lowell Mills. C.F. Palmer Files. G.E. Co. Drawing Lists, Progress Reports, Bills of Material, etc., 1933-1934†
3. 1012.02[10] Interconnection of Lowell Mills. C.F. Palmer Files. Estimates & Reports. Proprietors of the Locks & Canals, 1933-1935†
4. 1012.02A[01] Interconnection-Week-End Running, 1955-1958

5. 1012.02A[02] Interconnection of Lowell Mills, 1933
6. 1012.02A[03] Electrical Interconnection Material List, 1933
7. 1012.03[01] Merrimack River Pollution-Lowell, Lawrence & Haverhill, 1909-1944 (Part 1 of 2)
8. 1012.03[01] Merrimack River Pollution-Lowell, Lawrence & Haverhill, 1909-1944 (Part 2 of 2)†
9. 1012.03[02] Merrimack River Pollution-Lowell, Lawrence & Haverhill, 1945-1962†

Box 26 (5.0" legal size)
Folder:
1. 1012.04[01] Merrimack River Storage. General Correspondence, 1918-1922
2. 1012.04[02] Merrimack River Storage. Blackwater Reservoir, 1920-1923

Box 27 (5.0" legal size)
Folder:
1. 1012.04[03] Merrimack River Storage. Lake Winnipisseogee, 1900-1922
2. 1012.04[04] Merrimack River Storage. General, 1922-1932 (Part 1 of 6)*
3. 1012.04[04] Merrimack River Storage. General, 1922-1932 (Part 2 of 6)*
4. 1012.04[04] Merrimack River Storage. General, 1922-1932 (Part 3 of 6)*†

Box 28 (5.0" legal size)
Folder:
1. 1012.04[04] Merrimack River Storage. General, 1922-1932 (Part 4 of 6)*†
2. 1012.04[04] Merrimack River Storage. General, 1922-1932 (Part 5 of 6)*
3. 1012.04[04] Merrimack River Storage. General, 1922-1932 (Part 6 of 6)*†
4. 1012.04[05] Merrimack River Storage. General, 1933-1947 (Part 1 of 2)*
5. 1012.04[05] Merrimack River Storage. General, 1933-1947 (Part 1 of 2)*†
6. 1012.04[06] Water Storage Compensation for Diversion from Merrymeeting Lake by N.H. Water Supply Co. A.T. Safford, 1914 (Part 1 of 3)*†
7. 1012.04[06] Water Storage Compensation for Diversion from Merrymeeting Lake by N.H. Water Supply Co. A.T. Safford, 1914 (Part 2 of 3)*†

Box 29 (5.0" legal size)
Folder:
1. 1012.04[06] Water Storage Compensation for Diversion from Merrymeeting Lake By N.H. Water Supply Co. A.T. Safford, 1914 (Part 3 of 3)*†
2. 1012.04[07] Probable Water Diversion Damages. N.H. Water Supply Co. by John R. Freeman, 1914 (Part 1 of 2)
3. 1012.04[07] Probable Water Diversion Damages. N.H. Water Supply Co. by John R. Freeman, 1914 (Part 2 of 2)†
4. 1012.04[08] Merrimack River Storage, 1920†
5. 1012.04[09] "Merrimack Valley Flood Control" Merrimack Valley Authority, 1946-1947†
6. 1012.04[10] Merrimack River Storage. Suncook Ponds, 1921-1938†

7. 1012.04[11] Suncook Storage Report, 1923*†

Box 30 (5.0" legal size)
Folder:
1. 1012.04[12] Merrimack River Storage, 1933-1934†
2. 1012.04[13] Blackwater Reservoir, 1933-1941
3. 1012.04[14] Flood Control-Merrimack River. Appendices B, C, D, E, F, G & H. Survey Report Flood Control Merrimack River, N.H. & Mass., 1938†
4. 1012.04[15] Survey Report for Navigation, Flood Control & Water Power. Merrimack River, Mass. & N.H., 1940†
5. 1012.04[16] Appendices to Accompany Survey Report for Navigation, Flood Control & Water Power, Merrimack River, Mass. & N.H., 1940†
6. 1012.04[17] New Hampshire Reservoirs, 1935-1938†

Box 31 (5.0" legal size)
Folder:
1. 1012.04B Merrymeeting Lake Dam Construction, 1921-1924
2. 1012.05 Merrimack River Run-Off Records. Vol. 2, 1879-1921†[17]

Box 32 (5.0" legal size)
Folder:
1. 1012.06[01] Pemigewasset River At Plymouth, N.H., 1899-1931 (Part 1 of 2)*†
2. 1012.06[01] Pemigewasset River At Plymouth, N.H., 1899-1931 (Part 2 of 2)*†
3. 1012.06[02] Pemigewasset River At Plymouth, N.H., 1932-1953 (Parts 1 of 2)*†
4. 1012.06[02] Pemigewasset River At Plymouth, N.H., 1932-1953 (Parts 2 of 2)*†
5. 1012.08[01] Lake Winnipiseogee, N.H., 1879-1915 (Part 1 of 3)*†
6. 1012.08[01] Lake Winnipiseogee, N.H., 1879-1915 (Part 2 of 3)*†
7. 1012.08[01] Lake Winnipiseogee, N.H., 1879-1915 (Part 3 of 3)*†
8. 1012.08[02] Lake Winnipiseogee, N.H., 1932-1949†

Box 33 (5.0" legal size)
Folder:
1. 1012.08[03] Lake Winnepesaukee, N.H. Height of Water & Precipitation, 1850-1922†
2. 1012.09 Winnepesaukee River, 1899-1944†
3. 1012.10[01] Merrimack River at Franklin Jct., N.H., 1905-1931 (Part 1 of 2)†
4. 1012.10[01] Merrimack River at Franklin Jct., N.H., 1905-1931 (Part 2 of 2)†
5. 1012.10[02] Merrimack River at Franklin Jct., N.H., 1932-1952†
6. 1012.12 Blackwater River, 1923-1944†
7. 1012.13 Merrimack River at Sewalls Falls, N.H., 1906-1931
8. 1012.14 Suncook River., 1922-1925†
9. 1012.15 Merrimack River at Garvins Falls, Bow Jct. & Hooksett, N.H., 1900-1936*†

[17] Volume one of file 1012.05 is neither listed in the corporation's index, nor present within the collection.

10. 1012.16[01] Merrimack River at Manchester, N.H., 1895-1955 (Part 1 of 2)†
11. 1012.16[01] Merrimack River at Manchester, N.H., 1895-1955 (Part 2 of 2)*†
12. 1012.16[02] Power Measurements at Amoskeag Mfg. Co., Manchester, N.H., 1923*†
13. 1012.17 Souhegan River, 1916-1925

Box 34 (5.0" legal size)
Folder:

1. 1012.18[01] Merrimack River at Cromwells Falls, 1836-1921*†
2. 1012.18[02] Merrimack River at Cromwells Falls, 1922
3. 1012.20[02] Merrimack River at Lowell, 1908-1923 (Part 1 of 2)*†
4. 1012.20[02] Merrimack River at Lowell, 1908-1923 (Part 2 of 2)
5. 1012.20[03] Merrimack River at Lowell. Gage Back of Boott Mills, 1923-1932
6. 1012.20[04] Merrimack River at Lowell. Gage Back of Boott Mills, 1933-1945 (Part 1 of 2)†
7. 1012.20[04] Merrimack River at Lowell. Gage Back of Boott Mills, 1933-1945 (Part 2 of 2)†
8. 1012.21 Merrimack River at Lowell. Gage Back of Boott Mills Tables, 1848-1925†
9. 1012.22 Merrimack River below Lowell, 1896-1954 (Part 1 of 3)†

Box 35 (5.0" legal size)
Folder:

1. 1012.22 Merrimack River below Lowell, 1896-1954 (Part 2 of 3)*†
2. 1012.22 Merrimack River below Lowell, 1896-1954 (Part 3 of 3)†
3. 1013[02] Locks & Canals Accounts, 1932-1946 (Part 1 of 2)
4. 1013[02] Locks & Canals Accounts, 1932-1946 (Part 2 of 2)†
5. 1013[03] Locks & Canals Accounts, 1947-1955 (Part 1 of 2)
6. 1013[03] Locks & Canals Accounts, 1947-1955 (Part 2 of 2)
7. 1014 Holyoke Water Power Co., 1900-1954 (Part 1 of 2)†

Box 36 (5.0" legal size)
Folder:

1. 1014 Holyoke Water Power Co., 1900-1954 (Part 2 of 2)*†
2. 1015[01] Precipitation, 1873-1923
3. 1015[02] Precipitation Correspondence, 1923-1932 (Part 1 of 2)†
4. 1015[02] Precipitation Correspondence, 1923-1932 (Part 2 of 2)

Box 37 (5.0" legal size)
Folder:

1. 1015[03] Precipitation. General, 1933-1946
2. 1015[04] Precipitation, 1946-1959 (Part 1 of 3)†
3. 1015[04] Precipitation, 1946-1959 (Part 2 of 3)
4. 1015[04] Precipitation, 1946-1959 (Part 3 of 3)
5. 1015.1[01] Precipitation at Different Stations on Merrimack River (Tables), 1912-1932†
6. 1015.1[02] Precipitation at Different Stations on Merrimack River (Tables), 1933-1938†

7. 1016[01] Priorities & Price Regulations, 1942-1946†
8. 1017 [01] Concord River, 1916-1925 (Part 1 of 2)*†
9. 1017 [01] Concord River, 1916-1925 (Part 2 of 2)*†
10. 1018 Western Canal, 1916-1948 (Part 1 of 2)*†

Box 38 (5.0" legal size)
Folder:

1. 1018 Western Canal, 1916-1948 (Part 2 of 2)*†
2. 1019 Theatre Platform-Central St., 1916-1954 (Part 1 of 2)*
3. 1019 Theatre Platform-Central St., 1916-1954 (Part 2 of 2)*†
4. 1020 Locks & Canals Trees and Gardens, 1917-1955*†
5. 1021 Locking Boats, 1860-1933*
6. 1022[01] Leffel Wheels, 1914-1925 (Part 1 of 3)*†
7. 1022[01] Leffel Wheels, 1914-1925 (Part 2 of 3)†
8. 1022[01] Leffel Wheels, 1914-1925 (Part 3 of 3)*†
9. 1022[02] Leffel Wheels, 1925-1933*

Box 39 (5.0" legal size)
Folder:

1. 1023 U.S.G.S., 1914-1956*†
2. 1024[01] Gauges, 1917-1954*†
3. 1024[02] Report by A.T. Safford-"Water Power Records", 1949
4. 1025 Loan of Apparatus & Supplies, 1915-1942
5. 1026 Office Supplies, 1890-1946
6. 1027 Engineering Instruments, 1895-1947*
7. 1028 Current Meters. Ratings, 1905-1946 (Part 1 of 2)*†
8. 1028 Current Meters. Ratings, 1905-1946 (Part 2 of 2)*†
9. 1029 Venturi Meters. Ratings, 1912-1922*†
10. 1030[01] Data Furnished by Locks & Canals to Outside Parties, 1913-1932 (Part 1 of 2)
11. 1030[01] Data Furnished by Locks & Canals to Outside Parties, 1913-1932 (Part 2 of 2)
12. 1030[02] Data Furnished by Locks & Canals to Outside Parties, 1933-1957 (Part 1 of 3)†

Box 40 (5.0" legal size)
Folder:

1. 1030[02] Data Furnished by Locks &Canals to Outside Parties, 1933-1957 (Part 2 of 3)
2. 1030[02] Data Furnished by Locks & Canals to Outside Parties, 1933-1957 (Part 3 of 3)
3. 1031[01] Index of Negatives, 1919-1939 (Part 1 of 2)
4. 1031[01] Index of Negatives, 1919-1939 (Part 2 of 2)
5. 1031[02] Index of Negatives, 1919-1948 (Part 1 of 2)
6. 1031[02] Index of Negatives, 1919-1948 (Part 2 of 2)
7. 1032[01] Studies of Automatic Controls, 1941-1955
8. 1033 Concentration Factor, 1921-1922†

9. 1034 Forestry, 1912-1927
10. 1035 New American Water Wheel, 1894-1898†
11. 1036[01] Lowell Experiments: Nozzle Discharges, Venturi Meter, Friction Loss, Canal Measurements, Draft Tube, Miscellaneous, 1913-1944 (Part 1 of 2)*

Box 41 (5.0" legal size)
Folder:

1. 1036[01] Lowell Experiments: Nozzle Discharges, Venturi Meter, Friction Loss, Canal Measurements, Draft Tube, Miscellaneous, 1913-1944 (Part 2 of 2)†
2. 1036[02] Lowell Experiments. Canal & River Slopes, Friction Loss Tests, etc., 1903-1952 (Part 1 of 2)*†
3. 1036[02] Lowell Experiments. Canal & River Slopes, Friction Loss Tests etc., 1903-1952 (Part 2 of 2)*†
4. 1036[03] Lowell Experiments. Head & Sluice Gates, 1868-1937*†
5. 1036[04] Lowell Experiments. Weir Experiments, 1929†
6. 1036[05] Lowell Experiments. Swamp Locks Tests & Experiments, 1922†
7. 1036[06] Lowell Experiments. Swamp Locks Tests & Experiments, 1922-1923*†
8. 1036[07] Lowell Experiments. Harvard University, 1925-1951 (Part 1 of 2)*†
9. 1036[07] Lowell Experiments. Harvard University, 1925-1951 (Part 2 of 2)†

Box 42 (5.0" legal size)
Folder:

1. 1036[08] Lowell Experiments. An Experimental Determination of the Loss by Friction in a Long Pipe. C. S. Robinson, 1923†
2. 1036[09] Lowell Experiments. Tests of Loss of Pressure thru Pipe & Specials in L.& C. Yard, 1916†
3. 1037 Water Wheel Tests-General, 1905-1924†
4. 1038[01] Flashboards & Flowage, 1847-1920 (Part 1 of 2)†
5. 1038[01] Flashboards & Flowage, [Index to file 1038[01]] 1847-1920 (Part 2 of 2)

Box 43 (5.0" legal size)
Folder:

1. 1038[02] Flashboards & Flowage, 1921-1956 (Part 1 of 2)†
2. 1038[02] Flashboards & Flowage, 1921-1956 (Part 2 of 2)*†
3. 1038.1 Flashboards. General, 1908-1938*†
4. 1039 Canals & Wasteways. General, 1901-1956†
5. 1039.1[01] Drawing-Off Notices, 1931-1944 (Part 1 of 3)
6. 1039.1[01] Drawing-Off Notices, 1931-1944 (Part 2 of 3)
7. 1039.1[01] Drawing-Off Notices, 1931-1944 (Part 3 of 3)
8. 1039.1[02] Drawing-Off Notices, 1945-1961 (Part 1 of 2)

Box 44 (5.0" legal size)
Folder:

1. 1039.1[02] Drawing-Off Notices, 1945-1961 (Part 2 of 2)

2. 1040[01] Locks & Canals Bridges. General, 1901-1923 (Part 1 of 2)
3. 1040[01] Locks & Canals Bridges. General, 1901-1923 (Part 2 of 2)*
4. 1040[02] Locks & Canals Bridges. General, 1924-1953*†
5. 1040.01 Fletcher Street Bridge, 1903-1949 (Part 1 of 2)*†
6. 1040.01 Fletcher Street Bridge, 1903-1949 (Part 2 of 2)*†
7. 1040.02 Pawtucket St. Bridge over Pawtucket Canal, 1915-1948*†
8. 1040.03 East Merrimack St. Bridge over Eastern Canal, 1915-1953*†
9. 1040.04 Bridge St. Bridge over Eastern Canal, City Since 1938, 1901-1948*†

Box 45 (5.0" legal size)
Folder:

1. 1040.05 Central St. Bridge over Pawtucket Canal, 1908-1945 (Part 1 of 4)*
2. 1040.05 Central St. Bridge over Pawtucket Canal, 1908-1945 (Part 2 of 4)*
3. 1040.05 Central St. Bridge over Pawtucket Canal, 1908-1945 (Part 3 of 4)*†
4. 1040.05 Central St. Bridge over Pawtucket Canal, 1908-1945 (Part 4 of 4)*†
5. 1040.06 Merrimack St. Bridge over Western Canal, 1901-1938*†
6. 1040.07 Suffolk St. Bridge over Northern Canal, 1915-1928*†
7. 1040.08 Broadway Bridge over Western Canal, City. 1915-1950 (Part 1 of 2)*

Box 46 (5.0" legal size)
Folder:

1. 1040.08 Broadway Bridge over Western Canal. City, 1915-1950 (Part 2 of 2)*†
2. 1040.09 High St. Bridge over Northern Canal, 1915-1939*†
3. 1040.10 School St. Bridge over Pawtucket Canal. City, 1903-1944 (Part 1 of 2)*†
4. 1040.10 School St. Bridge over Pawtucket Canal. City, 1903-1944 (Part 2 of 2)*
5. 1040.11 Proposed Bridge over Lower Locks, 1898-1928 (Part 1 of 2)*†
6. 1040.11 Proposed Bridge over Lower Locks, 1898-1928 (Part 2 of 2)*
7. 1041[01] Flood Control Project at Lowell Merrimack River, 1936-1945 (Part 1 of 2)
8. 1041[01] Flood Control Project at Lowell Merrimack River, 1936-1945 (Part 2 of 2)

Box 47 (5.0" legal size)
Folder:

1. 1041[02] Report on Proposal by the Cooperative Service Association of New Hampshire for Power Development, Franklin Falls, N.H., 1942†
2. 1042 Lowell Land Company, 1938-1950 (Part 1 of 2)†
3. 1042 Lowell Land Company, 1938-1950 (Part 2 of 2)†
4. 1043 Reference Memo, 1941-1942
5. 1044 Air Raid Blackouts. L.I.D.C. & L.&C. Civilian Defense. Documents, 1942-1950
6. 1045 Central Street West Platform (Motley Dunbar). Sold 1955, 1917-1951†
7. 1046 Locks & Canals Private Telephones, 1899-1953†
8. 1047 Contractors-Equipment & Supplies, 1915-1956 (Part 1 of 2)
9. 1047 Contractors-Equipment & Supplies, 1915-1956 (Part 2 of 2)*†

Box 48 (5.0" legal size)
Folder:
1. 1048 Northern Canal & Waste Gates, 1899-1955 (Part 1 of 2)*†
2. 1048 Northern Canal & Waste Gates, 1899-1955 (Part 2 of 2)*†
3. 1049 Rationing Applications, 1942-1945†
4. 1050 Victor Wheels, 1895-1917†
5. 1051[01] Hercules Wheels, 1882-1907 (Part 1 of 2)†
6. 1051[01] Hercules Wheels, 1882-1907 (Part 2 of 2)*†
7. 1051[02] Hercules Wheels, 1908-1940 (Part 1 of 2)*†
8. 1051[02] Hercules Wheels, 1908-1940 (Part 2 of 2)*†
9. 1052 Boyden Wheels, 1882-1922

Box 49 (5.0" legal size)
Folder:
1. 1053[01] Swain Wheels. Catalogues and Papers, 1870
2. 1053[02] Swain Wheels, 1875-1935†
3. 1054 McCormick Wheels, 1890-1913†
4. 1055[01] S. Morgan Smith Wheels, 1899-1920 (Part 1 of 2)*†
5. 1055[01] S. Morgan Smith Wheels, 1899-1920 (Part 2 of 2)*†
6. 1055[02] S. Morgan Smith Wheels, 1921-1931*†
7. 1056 I.P. Morris Co. Wheels, 1914-1925†
8. 1057 Old Guard Locks, 1914-1948*†
9. 1058 Lower Locks, 1923-1941†

Box 50 (5.0" legal size)
Folder:
1. 1059 Swamp Locks, 1897-1952*†
2. 1060 Tremont Gates, 1911-1948*†
3. 1061 Boott Dam, 1915-1946*
4. 1062 Lawrence Dam, Wasteway & Canal, 1913-1917*†
5. 1063 Merrimack Dam, 1915-1918
6. 1064 Hamilton Gates, 1931-1953
7. 1065 Gates on (Northern Canal) Wall-Gow Company, Inc. [Blueprint of Work Done In Same File], 1936†

7a. 1068 Merrimack River by Dwight Porter [photocopy]

8. 1066[02] Applications for Employment. Addresses & Business Cards, 1933-1950 (Part 1 of 2)
9. 1066[02] Applications for Employment. Addresses & Business Cards, 1933-1950 (Part 2 of 2)*

Box 51 (5.0" legal size)
Folder:
1. 1066[03] Applications for Employment, 1950-1958
2. 1066[04] Selective Service, 1944-1953
3. 1066[05] Assistant Engineer's Position, 1943
4. 1067 Water Power Agreements, Opinions, Decisions & Compensations, 1914-1940
5. 1071[01] Metered Water, 1909-1922†

6. 1071[02] Metered Water, 1922-1947
7. 1072 Patents, 1840-1922
8. 1073[01] Ice and Snow Records, 1904-1960*†
9. 1073[02] Government Snow Surveys, 1933-1946 (Part 1 of 2)†
10. 1073[02] Government Snow Surveys, 1933-1946 (Part 2 of 2)*†

Box 52 (5.0" legal size)
Folder:

1. 1073[03] Snow Survey Aerial Photographs, n.d.*†
2. 1073.1 Ice and Snow Bulletins, 1921-1929
3. 1074 Cement and Concrete, 1912-1926†
4. 1075[01] Original Indentures, Mill Powers, Great Deed-Merrimack Co. to L. & C., Cyril French Indenture. Copies, 1826-1864
5. 1075[02] Plans and Deeds of Some of the Land Acquired by P. L.& C., 1792-1928 (Part 1 of 2)*†
6. 1075[02] Plans and Deeds of Some of the Land Acquired by P. L.& C., 1792-1928 (Part 2 of 2)*†
7. 1076 Water Wheels. General, 1898-1945*†
8. 1076.1[01] History of Water Wheels & Engineers. Preliminary, 1922 (Part 1 of 2)*
9. 1076.1[01] History of Water Wheels & Engineers. Preliminary, 1922 (Part 2 of 2)*†

Box 53 (5.0" legal size)
Folder:

1. 1076.1[02] History of Water Wheels & Engineers. Preliminary, 1925-1934*
2. 1076.2[01] The American Mixed Flow Turbine and Its Setting, 1922 (Part 1 of 2)*
3. 1076.2[01] The American Mixed Flow Turbine and Its Setting, 1922 (Part 2 of 2)*†
4. 1076.2[02] Originals of Illustrations Used in Mixed Flow Turbine Book, 1923*†
5. 1077[01] Fire Protection. General, 1855-1903

Box 54 (5.0" legal size)
Folder:

1. 1077[02] Fire Protection. General, 1905-1909
2. 1077[03] Fire Protection. General, 1910-1916

Box 55 (5.0" legal size)
Folder:

1. 1077[04] Fire Protection. General, 1917
2. 1077[05] Fire Protection. General, 1918-1919
3. 1077[06] Fire Protection. General, 1920-1929 (Part 1 of 5)*†
4. 1077[06] Fire Protection. General, 1920-1929 (Part 2 of 5)*†

Box 56 (5.0" legal size)
Folder:

1. 1077[06] Fire Protection. General, 1920-1929 (Part 3 of 5)†
2. 1077[06] Fire Protection. General, 1920-1929 (Part 4 of 5)*†
3. 1077[06] Fire Protection. General, 1920-1929 (Part 5 of 5)*†
4. 1077[07] Fire Protection. General. Gate Inspection, 1932-1951 (Part 1 of 3)†
5. 1077[07] Fire Protection. General. Gate Inspection, 1932-1951 (Part 2 of 3)*†
6. 1077[07] Fire Protection. General. Gate Inspection, 1932-1951 (Part 3 of 3)
7. 1077[08] Fire Protection. General. Gate Inspection, 1952-1958*†
8. 1077[09] National Board of Fire Underwriters. Reports on Lowell, 1908, 1914 & 1922. 1908-1922

Box 57 (5.0" legal size)
Folder:

1. 1077-A Fire Protection. General. Inspection of Mills, 1929-1955
2. 1077.1[01] Fire Protection. Supplies, 1903-1919
3. 1077.1[02] Fire Protection. Supplies, 1920-1935
4. 1077.2[01] Reservoir Shut-Off Notices, 1919-1949 (Part 1 of 2)
5. 1077.2[01] Reservoir Shut-Off Notices, 1919-1949 (Part 2 of 2)
6. 1077.2[02] Reservoir Shut-Off Notices. 1950-1960

Box 58 (5.0" legal size)
Folder:

1. 1078[01] Lowell Electric Light Corp. Butler Family Interests, 1916-1920. Report to Middlesex Co., 1896-1906, 1896-1920 (Part 1 of 2)†
2. 1078[01] Lowell Electric Light Corp. Butler Family Interests, 1916-1920. Report to Middlesex Co., 1896-1906, 1896-1920 (Part 2 of 2)
3. 1078[02] Lowell Electric Light Corp., 1920-1952 (Part 1 of 2)*†
4. 1078[02] Lowell Electric Light Corp., 1920-1952 (Part 2 of 2)*†
5. 1079 Locks & Canals Indexing System, n.d.
6. 1080[01] Surplus Power Accounts, 1874-1929 (Part 1 of 2)†
7. 1080[01] Surplus Power Accounts, 1874-1929 (Part 2 of 2)†

Box 59 (5.0" legal size)
Folder:

1. 1080[02] Surplus Power Accounts, 1930-1937 (Part 1 of 2)
2. 1080[02] Surplus Power Accounts, 1930-1937 (Part 2 of 2)
3. 1080[03] Water Power Accounts. General, 1930-1958†
4. 1080[04] Surplus Power Limitation Notice, 1944-1946 (Part 1 of 2)
5. 1080[04] Surplus Power Limitation Notice, 1944-1946 (Part 2 of 2)
6. 1080[05] Surplus Power Limitation Notice, 1947-1951 (Part 1 of 2)
7. 1080[05] Surplus Power Limitation Notice, 1947-1951 (Part 2 of 2)

Box 60 (5.0" legal size)
Folder:

1. 1080-A Surplus Power Accounts, 1938-1939†

2. 1080.1[01] Surplus Power Limitations, 1913-1926 (Part 1 of 2)†
3. 1080.1[01] Surplus Power Limitations, 1913-1926 (Part 2 of 2)†
4. 1080.1[02] Surplus Power Limitations, 1927-1938 (Part 1 of 2)†
5. 1080.1[02] Surplus Power Limitations, 1927-1938 (Part 2 of 2)
6. 1080.1[03] Surplus Power Limitations, 1939-1943 (Part 1 of 2)

Box 61 (5.0" legal size)
Folder:
1. 1080.1[03] Surplus Power Limitations, 1939-1943 (Part 2 of 2)†
2. 1080.1[04] Surplus Power Limitations, 1952-1959
3. 1081 Office and Yard. 66 Broadway, 1897-1956
4. 1082 Pawtucket Dam. General, 1903-1939*†
5. 1082.1 Pawtucket Dam. Repairs To, 1915-1919†
6. 1082.2 Pawtucket Dam. Headgates, 1902-1936*†
7. 1083 Upper Pawtucket Canal, 1902-1955 (Part 1 of 3)*†
8. 1083 Upper Pawtucket Canal, 1902-1955 (Part 2 of 3)*†

Box 62 (5.0" legal size)
Folder:
1. 1083 Upper Pawtucket Canal, 1902-1955 (Part 3 of 3)*†
2. 1084 Hamilton Canal, 1915-1930*†
3. 1085[01] Hearings. Water Conservation, Mass. 1917-1919

Box 63 (5.0" legal size)
Folder:
1. 1085[02] Hearings. Water Conservation. Water Power Development. State and Federal Legislation, 1917-1923
2. 1085[03] Water Power & Storage Developments. Transmission System & Power Markets, 1916-1949†
3. 1086 Weather Bureau. Climatological Service, 1935-1956†
4. 1087 Wood Preserving. Kyanizing, 1914-1917*†

Box 64 (5.0" legal size)
Folder:
1. 1088 Labor Relations. Committee, etc., 1946-1947
2. 1090 Construction Costs, 1922-1937†
3. 1091 Rights of Way & Posting Same, 1946
4. 1092[01] City of Lowell. Cold Patch Case. Hearings, 1925
5. 1092[02] City of Lowell. Tax Lists, 1911, 1915, 1919. 1911-1919

Box 65 (5.0" legal size)
Folder:
1. 1092.01 City of Lowell. Streets, 1926-1952*

2. 1092.02 City of Lowell. Fire Protection, 1922-1933 (Part 1 of 2)*†
3. 1092.02 City of Lowell. Fire Protection, 1922-1933 (Part 2 of 2)*†
4. 1092.05 City of Lowell. Finances & Taxes, 1895-1941 (Part 1 of 2)
5. 1092.05 City of Lowell. Finances & Taxes, 1895-1941 (Part 2 of 2)*†
6. 1092.08 City of Lowell. Bridges, 1918-1949 (Part 1 of 2)
7. 1092.08 City of Lowell. Bridges, 1918-1949 (Part 2 of 2)*†
8. 1092.09[01] City of Lowell. Lowell Water Works, 1914-1927 (Part 1 of 2)†

Box 66 (5.0" legal size)
Folder:

1. 1092.09[01] City of Lowell. Lowell Water Works, 1914-1927 (Part 2 of 2)*†
2. 1092.09[02] City of Lowell. Lowell Water Works, 1928-1949†
3. 1092.09[03] City of Lowell. Boulevard Well Heights, 1918-1933
4. 1092.11 City of Lowell. Sewers, 1905-1948†
5. 1092.12 Water Survey Board. Lowell Water Works, 1890-1926†
6. 1093 Locks & Canals Library, 1915-1957
7. 1094 Doble Nozzles, 1903-1914*†
8. [Correspondence from Howard M. Turner to S. Stanley Kent, Flood Hydrographs], 1927-1939†
9. 1095[01] Great Flood. March 19-23, 1936, 1936-1937
10. 1095[02] Freshets, 1883-1928 (Part 1 of 4)*†

Box 67 (5.0" legal size)
Folder:

1. 1095[02] Freshets, 1883-1928 (Part 2 of 4)*†
2. 1095[02] Freshets, 1883-1928 (Part 3 of 4)*†
3. 1095[02] Freshets, 1883-1928 (Part 4 of 4)†
4. 1095[03] Freshets, 1929-1952†
5. 1095-1 Merrimack River, 1936 Flood. U.S.G.S. Records, 1936†
6. 1096 Droughts, 1883-1941†
7. 1097[01] Merrimack River Flood Control Report. Arthur T. Safford, 1945

Box 68 (5.0" legal size)
Folder:

1. 1097[02] Merrimack River Flood Control Report. Arthur T. Safford, 1945
2. 1097[03] Merrimack River Flood Control Report. Arthur T. Safford, 1945†
3. 1098 Sewers & Drains Into Canals-Oil And Waste In Canals, 1931 1955*
4. 1099 Run-Off Committee, 1931-1935 (Part 1 of 2)
5. 1099 Run-Off Committee, 1931-1935 (Part 2 of 2)
6. 1100[01] Flood Committee, Precipitation. 1927-1929
7. 1100[02] Flood Committee, Run-Off. 1927-1938†

Box 69 (5.0" legal size)
Folder:

1. [Two publications related to floods, 1936 and 1938][18]
2. 1100[03] Flood Committee. Reports, 1929†
3. 1100[04] Flood Committee. General, 1927-1934 (Part 1 of 2)†
4. 1100[04] Flood Committee. General, 1927-1934 (Part 2 of 2)*†
5. 1100-1 Flood Committee-1936 (Part of 1 of 2)†
6. 1100-1 Flood Committee-1936 (Part of 2 of 2)*†

Box 70 (5.0" legal size)
Folder:
1. 1101 Worthington Water Wheels, 1922
2. 1102[01] Merrimack Valley Waterways. Correspondence, 1912-1923

Box 71 (5.0" legal size)
Folder:
1. 1102[02] Merrimack Valley Waterways. Documents, 1898-1923
2. 1102[03] Merrimack Valley Waterways, 1912-1937†
3. 1103 Rodney Hunt Water Wheels, 1921-1935†
4. 1104 Factory Mutual Fire Ins. Co. Monthly Reports, 1950-1954

Box 72 (5.0" legal size)
Folder:
1. 1104.1 Factory Mutual Fire Ins. Co. Special Bulletins, 1899-1916 (Part 1 of 2)*
2. 1104.1 Factory Mutual Fire Ins. Co. Special Bulletins, 1899-1916 (Part 2 of 2)
3. 1104.3 Factory Mutual Fire Ins. Co. Records, 1940-1954 (Part 1 of 4)
4. 1104.3 Factory Mutual Fire Ins. Co. Records, 1940-1954 (Part 2 of 4)
5. 1104.3 Factory Mutual Fire Ins. Co. Records, 1940-1954 (Part 3 of 4)
6. 1104.3 Factory Mutual Fire Ins. Co. Records, 1940-1954 (Part 4 of 4)

Box 73 (5.0" legal size)
Folder:
1. 1105 New England Hurricane, 1938-1939
2. 1106 Remote Control. Tremont Dam Gate, 1932-1938†
3. 1107 Average Outside Falls for Different Corporations, 1892-1942†
4. 1108 Coefficients of Discharge-Water Wheels, 1944-1952†
5. 1109 Report by Arthur T. Safford "Ownership of Pawtucket Dam and Operation of Grist Mill", 1950 (Part 1 of 4)†
6. 1109 Report by Arthur T. Safford "Ownership of Pawtucket Dam and Operation of Grist Mill", 1950 (Part 2 of 4)*
7. 1109 Report by Arthur T. Safford "Ownership of Pawtucket Dam and Operation of Grist

[18] Titles in this folder include: (1) Drs. Henry I. Baldwin and Charles F. Brooks "Forest and Floods in New Hampshire (Publication No. 47)" Boston, MA: New England Regional Planning Committee, December 1936. (2) *Telephone Topics* (Employee Publication of the New England Telephone and Telegraph Company); Vol. 32, No. 6; October, 1938.

Mill", 1950 (Part 3 of 4)*
8. 1109 Report by Arthur T. Safford "Ownership of Pawtucket Dam and Operation of Grist Mill", 1950 (Part 4 of 4)*
9. 1110 Mill Powers-Transfer of-Arthur T. Safford, 1947
10. 1113 Unusual Types of Water Wheels, 1884-1899†
11. 1114[01] Water Used for Other Purposes than Power. General. Condenser Pipe Book, 1896-1912†[19]
12. 1114[02] Water Used for Other Purposes than Power. General. Condenser Pipe Book, 1908-1952 (Part 1 of 2)†

Box 74 (5.0" legal size)
Folder:
1. 1114[02] Water Used for Other Purposes than Power. General. Condenser Pipe Book, 1908-1952 (Part 2 of 2)*†
2. 1114[03] Nashua Country Club, 1953-1954†
3. 1114.01 Jean's Laundry, 1906-1930*†
4. 1114.02 N.E. Steam Laundry, 1912-1951
5. 1114.03 Nausika Steam Laundry, 1912-1920
6. 1114.04 A.L. Brooks & Co. & Tenants, 1912-1932
7. 1114.05 Mass. Mohair Plush Co., 1901-1951
8. 1114.06 Middlesex Steam Laundry, 1912-1921
9. 1114.07 Lamson Co., 1899-1923
10. 1114.08 Chas. L. Dodge, 1912-1933
11. 1114.09 John Pilling Shoe Co., 1912-1955
12. 1114.10 Highland Steam Laundry, 1912-1920
13. 1114.11 Geo. L. Cady & Son, 1912-1932
14. 1114.12 Davis & Sargent, 1912-1932
15. 1114.13 Lowell Gas Light Co., 1917-1952†
16. 1114.14 B. & M. Railroad, 1917-1955*†
17. 1114.15 Gillespie Mfg. Co., 1919-1920†
18. 1114.16 General Electric, 1947-1950†
19. 1115 Hiram F. Mills. Index of Materials in Tin Box in Safe off Acc. Dep., 1894-1923[20]

Box 75 (5.0" legal size)
Folder:
1. 1116[01] Pawtucket Bridge, 1915-1916
2. 1116[02] Pawtucket Bridge, 1916-1920 (Part 1 of 2)*†
3. 1116[02] Pawtucket Bridge, 1916-1920 (Part 2 of 2)*†
4. 1117[01] L. & C. Valuation and Depreciation, 1922†
5. 1117[02] L. & C. Valuation. Basis of Construction Cost, 1921
6. 1118[01] Committee on Waterways. Drownings, 1914-1917 (Part 1 of 3)*†

[19] *See also:* copy of item in #1114, "Names of parties drawing water from canal for other purposes than power " 19 July 1917, in A.L. Brooks & Co. file, [Index to Canal Water Usage Accounts Payable], Box 87 .
[20] The materials are in the Engineers' Files series, Hiram F. Mills sub-series, oxes 97-100.

7. 1118[01] Committee on Waterways. Drownings, 1914-1917 (Part 2 of 3)*†

Box 76 (5.0" legal size)
Folder:
1. 1118[01] Committee on Waterways. Drownings, 1914-1917 (Part 3 of 3)*†
2. 1118[02] Committee on Waterways. Drownings, 1918-1943 (Part 1 of 2)*
3. 1118[02] Committee on Waterways. Drownings, 1918-1943 (Part 2 of 2)*†
4. 1118.1[01] Fences, Division of Responsibility, 1917-1952 (Part 1 of 2)*†
5. 1118.1[01] Fences, Division of Responsibility, 1917-1952 (Part 2 of 2)*†
6. 1118.1[02] Fences, Division of Responsibility, 1953-1956
7. 1118.1[03] Fences, Reports on, 1952†

Box 77 (5.0" legal size)
Folder:
1. 1118.1[04] Fences, Reports on, 1953*
2. 1118.1[05] Fences, Photos, 1950-1951*
3. 1119[01] Locks & Canals Taxes, 1860-1934 (Part 1 of 2)†
4. 1119[01] Locks & Canals Taxes, 1860-1934 (Part 2 of 2)†
5. 1119[02] Locks & Canals Taxes, 1935-1948 (Part 1 of 3)†
6. 1119[02] Locks & Canals Taxes, 1935-1948 (Part 2 of 3)†
7. 1119[02] Locks & Canals Taxes, 1935-1948 (Part 3 of 3)†
8. 1119[03] Locks & Canals Taxes, 1949-1958
9. 1119-A[01] Locks & Canals Taxes. 1933 Cases, 1933-1935 (Part 1 of 2)†

Box 78 (5.0" legal size)
Folder:
1. 1119-A[01] Locks & Canals Taxes. 1933 Cases, 1933-1935 (Part 2 of 2)†
2. 1119-A[02] Locks & Canals Taxes. A.T. Safford Report on 1933 Petitions, 1933-1935 (Part 1 of 2)*†
3. 1119-A[02] Locks & Canals Taxes. A.T. Safford Report on 1933 Petitions, 1933-1935 (Part 2 of 2)*†
4. 1119-A[03] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1933 (Part 1 of 4)
5. 1119-A[03] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1933 (Part 2 of 4)*
6. 1119-A[03] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1933 (Part 3 of 4)*
7. 1119-A[03] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1933 (Part 4 of 4)*†
8. 1119-A[04] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1935 (Part 1 of 4)
9. 1119-A[04] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1935 (Part 2 of 4)*†

10. 1119-A[04] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1935 (Part 3 of 4)*†

Box 79 (5.0" legal size)
Folder:
1. 1119-A[04] Locks & Canals Taxes. Photographs Used in Tax Abatement Case, 1935 (Part 4 of 4)*
2. 1119-A[05] Locks & Canals Taxes. Evaluation of Riparian Rights. W. A. Hall, 1933
3. 1119-A[06] Testimonies in Case of Chemical Paper Mfg. Co. and Crocker McElwain Co., 1934
4. 1119-A[07] Testimonies of W.A. Hall in Various Cases, 1929, 1931, 1933, 1934. 1929-1934
5. 1119-A[08] Testimonies-1935 Tax Case, 1935
6. 1119-A[10] Preliminary Report on Valuation of Water Power of L.& C, 1935
7. 1119-A[11] Petition for Tax Abatement Year 1934. A.T. Safford, 1935†
8. 1119-A[12] Appraisal of L.& C. Real Estate. Marden & Murphy, 1933
9. 1119-A[13] Land and Mill Valuations, 1927-1935†
10. 1119-A[14] Merrimack Tax Abatement Cases, 1930-1931†
11. 1120 Locks & Canals Employees, 1950-1959

Box 80 (5.0" legal size)
Folder:
1. 1122 Merrimack Canal, 1895-1954*†
2. 1123 Industrial Situation, 1925-1944 (Part 1 of 3)
3. 1123 Industrial Situation, 1925-1944 (Part 2 of 3)
4. 1123 Industrial Situation, 1925-1944 (Part 3 of 3)
5. 1124 Votes of Directors of P. L.& C. as Received Each Month, 1942-1943
6. 1124.1 Data Regarding Votes & Meetings of Directors, 1917-1943
7. 1125[01] Locks & Canals Insurance, 1917-1952 (Part 1 of 2)
8. 1125[01] Locks & Canals Insurance, 1917-1952 (Part 2 of 2)†
9. 1125[02] Locks & Canals Insurance, 1953-1956

Box 81 (5.0" legal size)
Folder:
1. 1126[01] Reports to Treasurer of the Proprietors, 1917
2. 1126[02] Reports to Treasurer of the Proprietors, 1918-1920

Box 82 (5.0" legal size)
Folder:
1. 1126[03] Reports to Treasurer of the Proprietors, 1920-1922
2. 1126[04] Reports to Treasurer of the Proprietors, 1923-1933
3. 1126[05] Reports to Treasurer of the Proprietors, 1934-1938

Box 83 (5.0" legal size)

Folder:
1. 1126[06] Reports to Treasurer of the Proprietors, 1938-1940†
2. 1126[07] Reports to Treasurer of the Proprietors, 1941-1951
3. 1126[08] Reports to President or Treasurer, 1933-1940
4. 1126.1 Letters to Treasurer. Miscellaneous, 1920-1946
5. 1127[01] Tax List Statement to Assessors, 1913-1916

Box 84 (5.0" legal size)
Folder:
1. 1127[02] Tax List Statement to Assessors, 1917-1920
2. 1127[03] Tax List Statement to Assessors, 1921-1924
3. 1127[04] Tax List Statement to Assessors, 1925-1928
4. 1127[05] Tax List Statement to Assessors, 1929-1933

Box 85 (5.0" legal size)
Folder:
1. 1127[06] Tax List Statement to Assessors, 1934-1938
2. 1127[07] Tax List Statement to Assessors, 1949, 1942, 1943. 1940-1943†
3. 1127[08] Locks & Canals Real Estate. General, 1917-1930 (Part 1 of 2)†
4. 1127[08] Locks & Canals Real Estate. General, 1917-1930 (Part 2 of 2)*†
5. 1127[09] Locks & Canals Real Estate, 1931-1955 (Part 1 of 2)†
6. 1127[09] Locks & Canals Real Estate, 1931-1955 (Part 2 of 2)*†
7. 1127-0 Real Estate. General. (A.D. Raymond), 1926-1955†
8. 1127.002 Land Both Sides Thorndike St. Bordering Pawtucket Canal. Lynn Sign Co., 1898-1955 (Part 1 of 2)*†

Box 86 (5.0" legal size)
Folder:
1. 1127.002 Land Both Sides Thorndike St. Bordering Pawtucket Canal. Lynn Sign Co., 1898-1955 (Part 2 of 2)
2. 1127.004 Land Southerly Side of Pawtucket Canal, 1917-1955†
3. 1127.006 Land Between School St. and B. & M. R.R. Near Walker St. Pratt & Forest, 1920-1940†
4. 1127.007 Land Westerly Side of Pawtucket Canal to Broadway, 1917-1955*
5. 1127.008 Land Westerly Side of Pawtucket Canal Broadway to Pawtucket, 1918-1946†
6. 1127.009 Land Southwesterly of Pawtucket Canal Pawtucket St. to River, 1929-1945†
7. 1127.013 Land Easterly Side of Pawtucket Canal Pawtucket St. to Railroad, 1917-1952*
8. 1127.016 Land on Kyan Street Called Kyanizing Lot, 1917-1938†
9. 1127.017 Land on Kyan Street, 1920-1951†
10. 1127.023 Land Northerly Side of Pawtucket Canal to Fletcher St., 1919-1952*†
11. 1127.025 Land Southwesterly of Western Canal, Worthen St., 1918-1950*†
12. 1127.026 Land Between Western Canal, Suffolk St. and Broadway, 1917-1955*
13. 1127.028 Land Between Dutton Street and Pawtucket Canal. Nelson-Morris Platform,

1915-1936*†

Box 87 (5.0" legal size)
Folder:

1. 1127.030 Land Between Pawtucket, Moody Streets and Northern Canal, 1920-1947*†
2. 1127.031 Land on Melvin Street, 1917-1955†
3. 1127.034 Land Between Cheever, Ward and Hall Streets, 1922-1930*†
4. 1127.035 Land Between Perkins, Hall and Tucker Streets, 1921-1934*
5. 1127.064 Land on Cheever, Aiken Streets and Northern Canal, 1920-1955†
6. 1127.065 Land at Hanover and Moody Streets, 1918-1955*
7. 1127.067 Land on Broadway (L.& C. Tenements), 1917-1951*†
8. 1127.068 & 1127.069 Land on Dummer, Broadway and Worthen Streets, 1918-1920*
9. 1127.074[01] Grist Mill, 1902-1938†
10. 1127.074[02] Grist Mill, 1945-1950
11. 1127.080 Land Between Stackpole Street and Merrimack River and Northwestern Side Eastern Canal and Northerly Side of Jackson St., 1917-1954†
12. 1127.084 Land Between Merrimack River and Stackpole Street to Tewksbury Line, 1917-1954†
13. 1127.086 Reservoir Lot on Fairmount Street, 1934-1953†
14. 1127.089 Land on Easterly Side of Aiken Street, 1919-1936†
15. 1127.091 Aiken Street Dump, 1913-1946†
16. 1127.092 Land Between Conduit St. & Merrimack River, 1917-1939

Box 88 (5.0" legal size)
Folder:

1. 1127.094 First Street Dump, 1916-1946 (Part 1 of 2)†
2. 1127.094 First Street Dump, 1916-1946 (Part 2 of 2)*†
3. 1127.103 H-1127.104 Land Between Riverside Street & Merrimack River, 1902-1932†
4. 1127.106 Land On Westerly Side Of Lakeview Ave. Frye Lot, 1919-1922*
5. 1128[01] Book Of Photostat Maps "Boston & Lowell R.R. Corp. Location Of Branch Tracks Of Lowell", 1883
6. 1128[03] Railroad Tracks & Bridges, 1917-1918 (Part 1 of 2)*†
7. 1128[03] Railroad Tracks & Bridges, 1917-1918 (Part 2 of 2)*
8. 1128[04] Railroad Tracks & Bridges, 1919-1934 (Part 1 of 3)*†
9. 1128[04] Railroad Tracks & Bridges, 1919-1934 (Part 2 of 3)*†
10. 1128[04] Railroad Tracks & Bridges, 1919-1934 (Part 3 of 3)*

Box 89 (5.0" legal size)
Folder:

1. 1128[05] Railroad Tracks & Bridges, 1935-1955†
2. 1129 Parks & Playgrounds, 1917-1953 (Part 1 of 3)
3. 1129 Parks & Playgrounds, 1917-1953 (Part 2 of 3)*†
4. 1129 Parks & Playgrounds, 1917-1953 (Part 3 of 3)*†
5. 1129-A Stop & Shop, Inc. Lot 33-C, 1955-1956†

6. 1130 Eastern & Lower Pawtucket Canals, 1899-1954 (Part 1 of 4)*
7. 1130 Eastern & Lower Pawtucket Canals, 1899-1954 (Part 2 of 4)*†
8. 1130 Eastern & Lower Pawtucket Canals, 1899-1954 (Part 3 of 4)*†

Box 90 (5.0" legal size)
Folder:

1. 1130 Eastern & Lower Pawtucket Canals, 1899-1954 (Part 4 of 4)*
2. 1131 Locks & Canals Inventory, 1921
3. 1133 Taxation-General, 1890-1940 (Part 1 of 2)†
4. 1133 Taxation-General, 1890-1940 (Part 2 of 2)
5. 1134 Governors, 1924
6. 1136 Taxation-Corporations, 1921-1947†
7. 1140 Legal Opinions, 1871-1944 (Part 1 of 2)
8. 1140 Legal Opinions, 1871-1944 (Part 2 of 2)
9. 1142 Legality of Proposed Use of Connecticut River by Turners Falls Power & Electric Co., Brief as to - , 1916-1917

Box 91 (5.0" legal size)
Folder:

1. 1144 Temperatures, 1896-1954†
2. 1144.1[01] Temperatures Maximum & Minimum, 1885-1938
3. 1144.1[02] Temperatures Maximum & Minimum, 1885-1959
4. 1145 Fuel & Fuel Conservation, 1917-1919

Box 92 (5.0" legal size)
Folder:

1. 1148 Power Costs-Steam, Water, Electric, 1870-1941 (Part 1 of 2)†
2. 1148 Power Costs-Steam, Water, Electric, 1870-1941 (Part 2 of 2)†
3. 1148.1 Electric Power and Light Schedules, 1920-1947
4. 1151 Grades, Elevations & Benchmarks, 1896-1956†
5. 1152[01] Fishway-Pawtucket Dam, 1912-1944 (Part 1 of 2)*
6. 1152[01] Fishway-Pawtucket Dam, 1912-1944 (Part 2 of 2)*†
7. 1152[02] Fishways Pamphlets, 1900-1914

Box 93 (5.0" legal size)
Folder:

1. 1153 Draft Tubes, 1904-1926 (Part 1 of 2)*†
2. 1153 Draft Tubes, 1904-1926 (Part 2 of 2)†
3. 1154 Motors, Generators, Electrical Apparatus, 1918-1941†
4. 1155[01] Allis-Chalmers, 1911-1922 (Part 1 of 2)*†
5. 1155[01] Allis-Chalmers, 1911-1922 (Part 2 of 2)*†
6. 1155[02] Allis-Chalmers, 1923-1925†
7. 1156 Leaks to and From Canals, 1894-1954†

Box 94
Folder:
1. Consecutive Index of Drawings Belonging to Proprietors of the Locks & Canals on the Merrimack River, n.d. (Part 1 of 3)
2. Consecutive Index of Drawings Belonging to Proprietors of the Locks & Canals on the Merrimack River, n.d. (Part 2 of 3)
3. Consecutive Index of Drawings Belonging to Proprietors of the Locks & Canals on the Merrimack River, n.d. (Part 3 of 3)
4. Indexes to Arthur T. Safford's Files and Books, 1928, 1929, 1932, 1939, 1942, 1948 and n.d.
5. Locks & Canals Files Indexes, n.d.
6. Index of Volumes to Papers by James B. Francis et al, 1919.

Box 95
Folder:
1. Transcripts of Deeds With Indexes, n.d. (Part 1 of 4)
2. Transcripts of Deeds With Indexes, n.d. (Part 2 of 4)
3. Transcripts of Deeds With Indexes, n.d. (Part 3 of 4)
4. Transcripts of Deeds With Indexes, n.d. (Part 4 of 4)

Box 96
Folder:
1. New England Flood of 1927, Vol. I, 1927
2. New England Flood of 1927, Vol. II, 1927
3. "Merrimack River Flood Control" by Arthur T. Safford from his Report in 1945.[21]

Box 97
Folder:
1. "Conservation and Water Power Development" by Arthur T. Safford, 1926.

PHASE 2 (FY02-FY03) PROJECT

Series III. Physical Data of Canal Operations

A. Master Reference Material of James B. Francis
1. General Books

Box 1 (5.0” Legal size)
Folder:

[21] This item was removed from Volume II of The New England Flood of 1927, and is an abstract of Safford's 1945 report. See "Merrimack River Flood Control Report. Arthur T. Safford, 1945" in Box 67, Folder 7 and Box 68, Folders 1 and 2.

1. Records, 1882 (no. 8)
2. Records 1884-1895 (no. 9) †
3. Records, 1892-1900 (no. 10)
4. Records, 1884-1891 (Vol. 10a) †

Box 2 (5.0" Legal size)
Folder:
1. Records, 1901-1947 (no. 16) †
2. Records, 1837-1865 (Vol. A) †
3. Records, 1855-1863 (Vol. F)
4. Flume Measurements, 1855 (Vol. G)

Box 3 (5.0" Legal size)
Folder:
1. Records, 1866-1879 (Vol. H) †
2. Records, 1866-1875 (Vol. I)
3. Records, 1876-1882 (Vol. O) †
4. Records, 1877-1882 (Vol. Q) †
5. Records and Newspaper Clippings, 1879-1915 (Vol. T) †

Box 4 (5.0" Legal size)
Folder:
1. Bridges, 1883
2. Equations, Drawings & Surveys, 1836-1844
3. Land, 1881-1882
4. Prescott Mill Foundations, 1843-1845 †
5. Records, 1882-1909 †

Box 5 (5.0" Legal size)
Folder:

1.Stock Account, 1885-1893
2.Stock Account, 1894-1898

2. Logbooks

Box 5 (5.0" Legal size)
Folder:
3. Level Notes, Pertaining to Water Measurements, Comparison at the Stop Watch with the Chronometer, 1868-1869
4. Levels, Measurements and Memoranda, 1867-1870
5. Measurements, Memoranda, Pertaining to Water Measurements
6. Memoranda, 1871-1873

7. Memoranda, 1874-1875
8. Memoranda, Surveys, Levels, Pawtucket Dam, 1872-1875
9. Memoranda, Surveys, Levels, 1875
10. Miscellaneous, Levels, Notes, and Memoranda, 1868-1871
11. Miscellaneous Notes, 1870-1871
12. Notebook, 1866-1867
13. Notebook, 1867
14. Notes, Levels, Tremont Raceway, 1868-1869

3. Daybooks

Box 6 (5.0" Legal size)
Folder:
1. Daybook, 1853-1864
2. Daybook, 1866-1876, no. 12 †
3. Daybook, 1871-1876 †
4. Daybook, 1876-1881 †
5. Daybook, 1881-1892 †
6. Daybook, 1882-1883 †

4. Waste books
***a)*. James B. Francis**

Box 6 (5.0" Legal size)
Folder:
7. James B. Francis- Waste Book, 1841-1845
8. James B. Francis- Waste Book, 1845-1846, Turbines, Weir Experiments- Northern Canal (No.1)
9. James B. Francis – Waste Book, Jan-Oct, 1846, Gradation of Dynamometer, Turbines, Northern Canal (No. 2)
10. James B. Francis – Waste Book, Oct- Nov, 1846, Guard Gates, Northern Canal. (No. 3)
11. James B. Francis- Waste Book, 1847, Turbine experiments, Calculation of Maximum Coefficient of effect of Appleton Company's 3 large turbines (No. 6)

Box 7 (5.0" Legal size)
Folder:
1. James B. Francis- Waste Book, 1846-1847 (no. 4)
2. James B. Francis- Waste Book, 1847-1848 (no. 5)
3. James B. Francis- Waste Book, 1847-1854 (No. 6) †
4. James B. Francis- Waste Book, 1849-1850 (no. 7) †
5. James B. Francis- Waste Book, Apr – Sept. 1850 (No. 8)
6. James B. Francis- Waste Book, 1851-1854 (No.9) †

Box 8 (5.0" Legal size)

Folder:
1. James B. Francis- Waste Book, 1854-1861 (no. 10) †
2. James B. Francis- Waste Book, 1861-1866 (no. 11) †
3. James B. Francis- Waste Book, 1866-1871 (no. 12)

***b.*) Hiram Mills**

Box 8 (5.0" Legal size)
Folder:
4. Hiram Mills- Waste Book, 1862-1863

5. Experiments
***a).* Hydraulic/ Weir**

5. Calculations on abnormal experiments in comparison of flume and weir measurements, Dec. 1863 †
6. Experiments, Weir, Jul- Aug, 1843
7. Experiments, Weir, Aug. 1843-1844

Box 9 (5.0" Legal size)
Folder:
1. Exp[eriments] & Trans[lation] [from French Hydrology] 1845-1851
2. Hydraulic Experiments, 1851-1856 (no. D 10)

***b.)* Dynamometer**

3. Experiments- Dynamometer, Apr-May, 1850
4. Experiments- Dynamometer, May 1850
5. Experiments- Dynamometer, May-Nov, 1850 †
6. Dynamometer Exp[eriments] 1853-1855 [Book 11)
7. Measurements of Power with Dynamometer 1870-1893

6. Water measurements/ Discharge

Box 10 (5.0" Legal size)
Folder:
1. Discharge Tables, Victor Wheels, Tremont Mils [N.D.]
2. Heights of water at Pawtucket Dam and Lake Winnipisseogee Rainfall, 1891-1893
3. Heights of water in Winnipisseogee Lake, 1883-1902
4. Heights, Winnipisseogee Lake, 1894
5. Levels, Aug. 11, 1859
6. Levels etc. Pertaining to Water Measurements, 1866
7. Memo – Levels & Meas'ts at City Reservoir in July 1873

8. Memo- Meas't of flashboards & Flashboard irons at Pawtucket Dam, Jan 1876, Levels [?] at Middlesex Dam
9. Record of Locks & Canals Reservoir, July 1920-Feb.1931†
10. Notes on the Calculation and Excavation of Embankments, 1834
11. Table √ 2gh [N.D]
12. Table of √ 2gh

Box 11 (5.0" Legal size)
Folder:
1. Tables, Miscellaneous √ 2gh √ h/h1†
2. Tables- Water Flowing over Weirs [N.D]
3. Tables- Water Flowing over Weirs [N.D.]
4. Tables- Water Flowing over Weirs [N.D.]
5. Tables- Water Flowing over Weirs [N.D.] †
6. Tables- Water Flowing over Weirs [N.D.] †
7. Waste book, 1848-1850 (no. 7)
8. Water Measurements, Jun- Jul 1852 (no. 1)
9. Water Measurements, Jul- Aug 1852 (no. 2)

Box 12 (5.0" Legal size)
Folder:
Water Measurements, Aug- Oct 1852 (no. 3)
Water Measurements, Oct-Nov 1852 (no. 4) †
Water Measurements, July 1852
Water Measurements, Aug-Sep 1852
Water Measurements, Aug-Nov 1852
Water Measurements, Oct-Nov 1852

7. Surveys

Box 13 (5.0" Legal size)
Folder:
1. Coordinate Surveys-F. Gilman's Calculation Book, 1866-1891
2. James B. Francis, Sept. 28, 1844 (D.B.?) [Oct 1, 1884-Dec 19, 1884]
3. Land Surveys, 1841-1844 (Vol. S)
4. Land Surveys, 1869-1884 (Vol. S, formerly Vol. R)
5. Lawrence New Mills, Dec. 1853-Jan 5, 1860
6. Memoranda relating to the rebuilding of the Tremont Mills, 1862

8. Mills

Box 14 (5.0" Legal size)
Folder:
1. Mills – Floor Plans and property surveys †

2. Schedule and Description of the Mills and other Buildings in the Yard of the Boott Cotton Mills, 1873 (2 copies)
3. Tremont Mills Enlargement, Apr. 26 – Jun 19, 1862

9. Turbines

***a).* Design**

Box 14 (5.0" Legal size)
Folder:
4. Massachusetts Turbines – Design Mar. 1856-Jul 1857
5. Turbines- Merrimack MFG Co.- Design †

***b).* Tables**

Box 14 (5.0" Legal size)
Folder:
6. Tables- Appleton Co. †
7. Tables-Boott Cotton Mills †
8. Tables-Hamilton MFG Co. †
9. Tables- Lawrence MFG. Co †
10. Tables- Lowell Machine Shop †
11. Tables-Lowell & Middlesex Turbines
12. Tables – Mass Cotton Mills †
13. Tables-Merrimack MFG. Co †
14. Tables-T&S Mills †
15. Miscellaneous tests etc, 1891-95 (no. 11) †

***c).* Tests**

(1) General Tests

Box 14 (5.0" Legal size)
Folder:
16. Turbines Tests, etc, 1846-68 †
17. Turbines Tests, etc, 1868-77 (vol. L) †
18. Turbine Tests – J. Emerson, 1869-71

(2) James B. Francis Field Tests

19. Houston Turbine – Test of Turbine Water-wheel

Box 15 (5.0" Legal size)
Folder:
1. Kidleberger Turbine-Worcester Mass.- Test of Turbine Water-Wheels
2. Luther Scroll Wheel – Test of Turbine Water-Wheels
3. Reynolds & Breast Wheels- Test of Turbine Water Wheel
4. Stetson Turbine- Uvbridge- Test of Turbine Water Wheels
5. Trullinger Turbine- Test of Turbine Waterwheels
6. Upham Turbine- Test of Turbine Water Wheel
7. Wheeler Turbine- Berlin Mass. – Test of Turbine Water Wheels
8. Whitney Turbine- Leominster, Mass- Test of Turbine Water Wheels
9. Wynkoop Turbine- Test of Turbine Water Wheels
10. Experiments on Merrimack Turbine No. 4 in Sept 1850

10. Franklin Forbes

Box 16 (5.0" Legal size)
Folder:
Franklin Forbes- Vol. 1, October 15, 1845-Marhc 30, 1846 †
Franklin Forbes- Vol. 2. April 18, 1846 – January 6, 1847
Franklin Forbes- Vol. 3 January 7, 1847-March 20, 1848
Franklin Forbes- Vol. 4, March 22, 1848-April 12, 1849
Franklin Forbes-Vol. 5 [James B. Francis completed volume after Forbes's Death]

B. General Operations Logbooks

1. Rainfall/Temperature Readings

Box 17 (5.0" Legal size)
Folder:
1. Rainfall and Temperature at Pawtucket Dam-1895-1919, Temperature at Old Guard Locks 1889-1919

2. Record of Rainfall kept by Props. Locks & Canals at Guard Gates of Northern Canal- 1855-1944, Record of Temperature kept by PL& C at Pawtucket Dam- 1848-1944-Lowell, Mass
3. Record of Rainfall kept by Props. Locks & Canals at Guard Gates of Northern Canal Lowell, Mass. 1945-1958
4. Record of Rainfall Kept by Props. Locks & Canals at Guard Gates of Northern Canal, 1855-1938, Record of Temperatures kept by P.L& C at Pawtucket Dam, 1848-1937, Record of Temperatures kept by P.L. & C at Old Guard Locks, 1889-1937 †
5. Water Measurements, Tabulations, Diagrams and General Info †

2. Tables/ Weirs/ Canals[22]

Box 17 (5.0" Legal size)
6. The book of Useful Information, 1945?
7. Flow of Merrimack River at Boott River Gauge, Oct. 10, 1943
8. Merrimack Valley Flood Control- Determination of Basin Design Flood, August 1946
9. Observations at the Lower Locks in Lowell, Mass. June 1939- August 1945 †
10. Observations at the Swamp Locks, March 1942 – May 1948 †
11. Pump no. 1 & 2 †
12. Tremont Gates, October 19, 1948 †
13. Mill Memoranda- F.F. B. August 1880-May 1889, W.W.S. July 1889- November 1891, "3rd Book" †

3. Mill Memoranda

Box 18 (5.0" Legal size)
Folder:
1. Mill Memoranda, Nov. 1891- June 1896, "No. 4 W.W.S."
2. Mill Memoranda, June 1896-October 1902, "No. 5- W.W.S."

D. Daily Field Notes

1. General Notebooks

Box 19 (7.5x11x4.5")
Folder:
1. Clayton's Octavo Diaries, 1863
2. General Records (illegible) 1922-23
3. Untitled, 1839
4. Untitled, 1843
5. Untitled, 1844-45
6. Untitled, 1863
7. Untitled, 1929
8. Untitled, Measurements About Boott Blocks of Houses
9. Untitled, No Date
10. Untitled, No Date
11. Untitled, No Date
12. Untitled, No Date
13. Untitled, No Date
14. Untitled, No Date

[22] *See also* materials in Addendum.

2. Day Books

Box 19 (7.5x11x4.5")
Folder:
15. Untitled, Day Book, 1843
16. Untitled, 1939-40
17. Untitled, Day Book, 1940

3. Work Records

a.) Buildings

Box 19 (7.5x11x4.5")
Folder:
18. Tremont Mills Rebuilding, June 26-Aug.7, 1862. No. 2, Hiram F. Mills, Asst. Engineer
19. Tremont Mills Rebuilding, Aug.7- Sept. 26, 1862, No. 3, Hiram F. Mills, Asst. Engineer
20. Tremont Mills Rebuilding, Dec. 4, 1862- , No. 6, Hiram F. Mills, Asst. Engineer

b.) Bridges

Box 19 (7.5x11x4.5")
Folder:
21. Bridge Street Bridge Near Boott Mill, Lowell, Mass., 1897-1917
22. Broadway Bridge Near Guard Locks, Lowell, Mass., 1847-1916
23. Central Street Bridge, Lowell, Mass., 1897-1917
24. East Merrimack Street Bridge Near Prescott Mill, East Merrimack Street Bridge, Lowell, Mass., 1897-1917
25. High Bridge Near Little Canada, Lowell, Mass., 1897-1917
26. Merrimack St. Bridge Between Suffolk and Hanover Streets, Lowell, Mass., 1897-1917
27. Pawtucket Street Bridge Near Vesper Boat House, 1897-1917
28. Race Street Bridge and Merrimack Street Bridge Over Merrimack Canal, 1899-1916
29. School Street Bridge Near Gas House, Lowell, Mass., 1897-1916
30. Suffolk Street Bridge Near Suffolk Mill, Lowell, Mass., 1897-1917
31. Thorndyke Street Bridge

4. Rainfall/Temperature

Box 20 (7.5x11x4.5")
Folder:
1. Dec. 12, 1860 – Dec. 31, 1864, Account of Weather (ripped label)
2. Precipitation Records, June 1846-October 1852
3. Swamp Locks Dam, Temperature and Rainfall Records, March 1919
4. Temperatures and Precipitation, Dec. 1952- June 1959

5. Water Level/Measurements

Box 20 (7.5x11x4.5")
Folder:

5. Appleton & Hamilton Flume, Aug. 22, 1899-Aug. 15, 1900, Full
6. Appleton and Hamilton Flume Book, July 24, 1900-Oct. 8, 1900, Regular Flume and Flume Just Below Appleton Counting Room Appleton & Hamilton Water Measurements, Flume, Sept. 9, 1896-Aug. 16,1898 [Book 3 of 7 in bundle]
7. Appleton & Hamilton Water Measurements, Appleton Turbines, Aug 25, 1896-Feb. 26, 1897 [Book 2 of 7 in bundle]
8. Appleton & Hamilton Water Measurements, Flume, Feb. 26 1897-Aug. 23, 1899 [Book 5 of 7 in bundle]
9. Boott & Mass. Flume Measurements, Mass. Flume Oct. 19, 1896-Nov. 8, 1897 [Book 4 of 5 in bundle]
10. Boott & Mass. Water Measurements, Boott Flume, Nov. 8, 1897-Nov. 15-1898 [Book 7 of 15 in bundle]
11. Boott & Mass. Flume Measurements, Mass. Flume, Nov. 8, 1897-July 28, 1899 [Book 8 of 15 in bundle]
12. Boott & Mass. Water Measurements, Boott Flume, Oct. 19, 1898-March 9, 1900 [Book 9 of 15 in bundle]
13. Boott & Massachusetts Water Measurements, Boott Turbine, June 1892 – Aug. 11, 1899 [Book 1 of 15 in bundle]
14. Boott & Mass. Water Measurements, Mass. Turbines, Nov. 7, 1895-Aug. 13, 1897 [Book 2 of 15 in bundle]
15. Boott & Massachusetts Water Measurements, Boott Flume, Apr. 29, 1896-July 9, 1897 [Book 3 of 15 in bundle]
16. Boott & Massachusetts Water Measurements, Boott Flume, July 9, 1897-Aug. 3, 1898 [Book 5 of 15 in bundle]
17. Boott & Mass. Water Measurements, Mass. Flume, From Aug. 13, 1897-July 28, 1899 [Book 6 of 15 in bundle]
18. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, From Gauge Back of the Boott Cotton Mills in Merrimack River
19. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, From Gauge Back of the Lawrence Mfg. Co.'s Mills in Merrimack River
20. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers from Gauge Back of the Massachusetts Cotton Mills in Concord River
21. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, from Gauge Back of Merrimack [illegible] Co. Mills
    Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, From Gauge in Merrimack River Above Guard Gates of the Northern Canal
22. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, Wooden Gauges Above and Below the Dam on Concord River at the Middlesex Co. Mills

23. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, Wooden Gauge in Concord River at the Foot of the Lower Locks
24. Comparison of the Heights of Water at Several Points in the Merrimack and Concord Rivers, Wooden Gauge at Hunts Falls on the South Side of Merrimack River about 114 feet Below the Line of City Pipe Which Crosses the River
25. Comparison of the Telehydrobarometer Dials at the Office and the Pawtucket Dam, Kept at the Office, 1904, 1905, 1906
26. Comparison of the Telehydrobarometer Dials at the Office and the Pawtucket Dam, Kept at the Office Jan. 1, 1900, Jan 1, 1901, 1902, 1903, 1904, J. C. Hamm
27. Flume in Middlesex Company's Race, May 27, 1898-Nov. 7, 1899 [Book 12 of 15 in bundle]
28. Flume Measurements at Lowell Machine Shop From May 5 1899-Nov. 1900

Box 21 (7.5x11x4.5")
Folder:

1. Foot of Cromwells Falls, Aug. 1844, Head of Cromwells Falls, Aug. 1844, Mouth Nashua River, Aug. 1844 (separate notebooks)
2. Hamilton & Appleton Water Measurements, Appleton Turbines, Aug. 23, 1896-[illeg.] 26, 1891 [Book 1 of 7 in bundle]
3. Hamilton & Appleton Water Measurement [illeg.] Turbine, Oct. 24, 1896 – Nov. 17, 1899 [Book 4 of 7 in bundle]
4. Hamilton & Appleton Water Measurements, Hamilton Turbine [illeg.] 1894 to May 31, 18 [sic] [Book 10 of 15 in bundle]
5. Hamilton & Appleton Water Measurements from Apr. 1897 to Nov. 1899 [Book 6 of 7 in bundle]
6. Hamilton & Appleton Water Measurements, Flume, Oct 11, 1898-Apr. 27, 1900, Full [Book 11 of 15 in bundle]
7. Hamilton Turbines 1,2,3,4,5,6,7,8,9 and 10, From Nov. 16, 1897-Nov. 17, 1899 [Book 7 of 7 in bundle]
8. Lowell Machine Shop, Measurement at Flume in Nos. 1 & 2 Race, May 5, 1899-Nov. 1900
9. Morris Special, Mass and Prescott, Middlesex, Apr. 29, 1846 – Mar. 9, 1900, E. H. Morris [Book 13 of 15 in bundle]
10. Noon Readings, January 1, 1926 [1927]
11. Regular Flume and Flume Below Appleton Counting Room, Appleton and Hamilton Flume Book, Aug. 15, 1900-Oct. 8, 1900, Full

6. Surveys

Box 21 (7.5x11x4.5")
Folder:

12. 101, July 14, 1895-Aug. 19, 1897

13. 102, Transit Book No. 2, May 7, 1896-Oct. 23, 1898 [M.S. Army]

14. 103, Transit Book No. 3, Apr. 26, 1896-1898
15. 104, May 16, 1897-Oct. 30, 1898
16. 105, Oct. 15, 1898-May 8, 1910
17. 106, July 1898-Nov. 17, 1901 [G.W. Mansur]
18. Transit Book 107, Hunt's Falls, July 17, 1899-Aug. 25, 1900
19. 109, Apr. 29, 1900-Oct. 31, 1909

Box 22 (8.5x11x5")
Folder:

1. No. 111, Tape Survey at Suffolk Mfg. Co. & Merrimack Mfg. Co., also Merrimack River Survey
2. No. 112, Containing Notes of New (1878) Pipe Lines and Sprinkler Branches: Also, Notes of Surveys, Levels, etc., Taken by A. W. Hunking
3. No. 113, Tape Survey at Merrimack, Lawrence and Lawrence Sec. Triangulation, Notes
4. No. 114, Surveys, A, Pawtucket Canal, Long Island, Pawtucketsville Swamp Locks, Lowell M. Shop
5. No. 115, Boott Cotton Mills, Merrk [sic] River Triangulation, Mass. Cotton Mills, Middlesex Co. Lower Lakes Basin
6. No. 116, Survey's Nortern [sic] Canal, Pawtucket Dam to Pawtucket St., Pawtucket Canal, Merrimack River-Thorndike Street
7. No. 117 Survey's at Tremont & Suffolk, Appleton
8. No. 118 Surveys at Stackpole St., 1893-1903
9. Transit Book No. 120, Merrimack Penstock Survey, Concluded, Dec. 1901 to
10. 1845-1847
11. Suncook Profiles, July 1923, Suncook Storage, Road Profiles
12. Untitled, 1832-1856
13. Untitled, 1836-37
14. Untitled, 1894
15. Untitled, No Date
16. Untitled, No Date

7. Level Books

Box 23 (7.5x11x4.5")
Folder:

1. Level Note Book No. 1
2. Level Book No. 2
3. Level Book No. 3
4. Level Book No. 4
5. Level Book No. 5
6. Level Notes Book No. 6

7. [Level Book] No. 7
8. [Level Book] No. 8
9. [Level Book] No. 9
10. [Level Book] No. 10
11. [Level Book] No. 11
12. [Level Book] No. 12
13. [Level Book] No. 13
14. Level Book 14
15. Level Book 15
16. Level Book 16
17. Level Book 17
18. Level Book 18
19. Level Book 19
20. Level Book 20
21. Level Book 21
22. [Level Book] 22

Box 24 (7.5x11x4.5")
Folder:
Level Book 23
Level Book 24
Level Book 25
Level Book 26
[Level Book] 27
[Level Book] 28
[Level Book] 29
[Level Book] 30
Level Book 31
Level Book 32
Level Book 33
Level Book 34
Level Book 35
Level Book 41
Level Book 40
Level Book 43
Level Book 44
Level Book 45
Level Book 47
Level Book 48

Box 25 (8.5x11x5")
Folder:
1. Level Book 49
2. Level Book 51

3. Level Book 52

8. Experiments

Box 25 (8.5x11x5")
Folder:
4. Experiments on the Loss of Head - Boott Canal Gauge
5. Experiments on the Loss of Head – Boott Penstock Gauges, Dec. 1871-Nov. 1874
6. Experiments on the Loss of Head – Boott Penstock Gauges, [No Date]
7. Experiments on the Loss of Head – Boott Wheelpit Gauges, Dec. 1871 – Nov. 1874
8. Experiments on the Loss of Head – Boott Wheelpit Gauges, July 1872
9. Experiments on the Loss of Head – Canal Gauge Opposite Mass. Counting Room
10. Experiments on the Loss of Head – Concord River Gauge Back of Mass. Cotton Mill
11. Experiments on the Loss of Head – Memoranda, 1871
12. Experiments on the Loss of Head – Merrimack River Gauge Back of Mass. Cotton Mill
13. Experiments on the Loss of Head – Swain Wheel No. 1, Prescott Mill, Wheelpit Gauge, Mass. 10 ft. Turbine No.3, Mass. 9 ft. Turbine No. [illeg.]
14. Experiments on the Loss of Head - Swain Wheel No. 1, Prescott Mill, Wheelpit Gauge, Mass. 10 ft. Turbine No. 3, Mass. 9 ft. Turbine No. 1
15. Experiments on the Loss of Head - Swain Wheel No. 4, Prescott Mill, Wheelpit Gauge, Mass. 10 ft. Turbine No. 4 & 5, Mass. 9 ft. Turbine No. 2
16. Shafting – Merrimack Man^{g} Co., Canal Gauge Opposite Counting Room
17. Shafting – Merrimack Man^{g} Co., Memoranda
18. Shafting – Merrimack Man^{g} Co., Mer^{k} River Gauge, Back of No. 6 Mill
19. Shafting – Merrimack Man^{g} Co., Speed Gate Gauges [1872]

9. Tests

Box 25 (8.5x11x5")
Folder:

20. A. T. Safford on Water Wheels, Sept. 1910
21. Tests of Cement, July 6, 1920

10. Turbines

***a.)* General**

Box 25 (8.5x11x5")
Folder:

22. App. Turbines and Prescott 6
23. Massachusetts Co. Turbines, 1851-1852
24. Prescott Turbines, April 1896-Nov. 1898

25. Turbine Measurements, April 1841
26. Turbine Measurements, Dec. 1841
27. Turbine Measurements, March 1842
28. Turbine Measurements, June 1845
29. Water Wheels
30. Wheel Inspection
31. [illeg.] Penstock Turbine, April 1896-1898, Boott Turbines

32. [no title] Speed Gate Readings, Sept. 1910
33. [no title] Speed Gate Readings, Sept. 1913

***b.)* Inspections**

Box 26 (7.5x11x4.5")
Folder:
1. Inspection – Tremont & Suffolk Water Wheel, 1913
2. Water wheel Inspection – Tremont & Suffolk Mills, Boott Mills, 1915

11. Employees and Records

***a.)* Walter H. Durfee**

Box 26 (7.5x11x4.5")
Folder:
3. Walter H. Durfee – Miscellaneous Notes, Dec. 1917 – Nov. 1918, No. 1
4. General Notes – Walter H. Durfee, Nov. 1918 – Sept. 1919, No. 2
5. Wheel Inspection, Sept. 1922
6. General Notes – Walter H. Durfee, Sept. 1919 – Dec 1919, No 3
7. General Notes – Walter H. Durfee, Dec. 1919 – July 1920, No. 4
8. General Notes – Walter H. Durfee, July 1920 – Apr. 1921 No. 5
9. General Notes – Walter H. Durfee, Apr. 1921 – May 1921, No. 6
10. General Notes No.7 – Walter H. Durfee, May 1921 – Aug. 1921

***b).* Noah R. Harlow**

(1.) General Books

Box 26 (7.5x11x4.5")
Folder:
11. Levels – by N. R. Harlow, April 1859
12. Location of Reservoir Pipe, March 1863-Apr. 1865
13. Location of Water Pipe, Oct. 1861-Aug. 1864
14. Repairs at the Tremont Mills, Apr. – Dec. 1862
15. Speed of Machines, July 1862, Weighing Power, May 1864

16. Weighing Sp'ng Frames at Lawrence Co.'s Mills, 1866
17. Weighing Power to Drive Machines & Survey of Theodore Hamlet's Land in Dracut, Aug. 1861-July 1862.

(2.) Field Books

Box 26 (7.5x11x4.5")
Folder:
18. Field Book, N. R. Harlow, May, 1859
19. Field Book, N. R. Harlow, Apr. 24, 1860-Nov. 26, 1860
20. Field Book, N. R. Harlow, Sept. 17, 1860-July 5, 1861
21. Field Book, N. R. Harlow, July 6th 1861-Feb. 6th 1862
22. Field Book, N. R. Harlow, Feb. 13-June 27, 1862
23. Field Book, N. R. Harlow, June 30-Sept. 26, 1862
24. Field Book, N. R. Harlow, Sept. 26, 1862-July 26, 1865
25. Field Book- N.R. Harlow, April 11, 1863 – Nov. 15, 1865
26. Field Book, Dec. 1865-Dec. 1862

(3.) Index to Books

Box 26 (7.5x11x4.5")
Folder:
27. Index to Books Kept by Props. Locks & Canals, Containing Copies of, and Extracts From, Deeds of Real Estate, Dec. 22, 1862 †

***c).* Edward Pierce Hamilton**

Box 26 (7.5x11x4.5")
Folder:
28. Data-E. P. Hamilton, #1
29. #2, E. P. Hamilton
30. E. P. Hamilton, Notebook #3
31. E. P. Hamilton, Notebook #3A
32. Edward Pierce Hamilton, Notebook No. 4

Box 27 (7.5x11x4.5")
Folder:
1. E. P. Hamilton, No. 5
2. E. P. Hamilton, #6
3. E. P. Hamilton, #9A
4. E. P. Hamilton, Diverging Tubes & Current Meter Experiments
5. Suncook, E. P. Hamilton, July-August 1923

***d).* J. P. Frizzel**

(1.) Water Measurements

Box 27 (7.5x11x4.5")
Folder:

6. Drought Turbines
7. Flume
8. Grist Mill Gauges
9. Levels etc. Pertaining to Water Measurement, 1859
10. Levels etc. Pertaining to Water Measurement, 1859
11. Levels & Measurement, 1860
12. Levels, Measurements of Flumes, Adjustment of Apparatus
13. Merrimack Weir & Boott Penstock Gates
14. Merrimack Print Works Weir From Aug. 1889
15. Notes Relating to Water Measurement, 1861
16. Several Measurements & Experiments Relating to a Screw [?] Twist Turbine

(2) Experiments

Box 27 (7.5x11x4.5")
Folder:

17. Experiments with Small Dynamometer at Merrimack Mill No. 1, 1859
18. Experiments with Small Dynamometer at Merrimack Mill No. 1, 1859
19. Experiments with Small Dynamometer at Merrimack Mill No. 1, 1859
20. Experiments with Small Dynamometer at Merrimack Mill No. 1, 1859
21. Experiments with Dynamometer Upon a Spinning Frame
22. Experiments with Dynamometer at Suffolk Mills, 1859-60

***e).* G. M. Hintley**

Box 27 (7.5x11x4.5")
Folder:

23. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in June 1881 [?illeg.]
24. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in June-Sept.1881
25. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in Dec. 1881
26. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in June and Sept. 1882
27. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in March and June 1883
28. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in Sept.[?illeg.] and Dec. 1883

29. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in June, 1884
30. Examination of Apparatus in Extinguishing Fires in Mills in Lowell Covered by Mutual Insurance in Sept.1886

Box 28 (7.5x11x4.5")
Folder:

1. Examination of Apparatus for Extinguishing Fires in the Mills in Lowell, Dec. 1885-March 1886
2. Examination of Approaches for Extinguishing Fires in the Mills Covered by Mutual Insurance, June 1887
3. Examination of Approaches for Extinguishing Fires in the Mills in Lowell, June-Sept.

Examination of Approaches for Extinguishing Fires in the Mills in Lowell Covered by Mutual Insurance

4. Record of an Examination of Sprinkler Pipes in the Dust [illeg.]
5. [Illeg.]

f). Robert Libby

Box 28 (7.5x11x4.5")
Folder:

6. Miscellaneous Notes – C. Robert Libby, Nov. 1909-Jan. 1915
7. Miscellaneous Notes – C. Robert Libby, Jan. 1915-Oct. 1915
8. Work Notes – C. Robert Libby, 1910
9.

g). C. S. Gowen

Box 28 (7.5x11x4.5")
Folder:

10. Notes, Memoranda, etc. – C. S. Gowen, Dec. 1869
11. Notes, Esq., April 1871
12. Levels etc. – C. S. Gowen, 1872
13. Levels, Notes, etc. – C. S. Gowen, 1872-1873
14. Gowen – Levels, etc., 1873-1874
15. Gowen – Levels, 1874-1875
16. Levels, Notes, etc. – C. S. Gowen, 1875
17. C. S. Gowen – Surveys, Levels, 1875-1876

h). Foster and others

Box 28 (7.5x11x4.5")
Folder:

17. Appleton, F.E. Notebook No. 2, 1888
18. No. 1 Levels, Aug-Sept, 1855, Foster
19. No. 2 Levels – Repetitions of Sept.-Oct., 1895, Foster
20. Edwin C. Gerrisle
21. Frank Gilman
22. Fred W. Maxwell, 1925-1929
23. General Notes, Oct. 1919 to - , J. McFadyen [?]
24. General Notes - 2, J. E. McFadyen, Sept. 18, 1921
25. John A. Rundlett
26. John A. Rundlett
27. Wm. E. Stanley
28. Geo. J. Sargent
29. Notebook – Wm. J. Shea
30. Merrimack Mill No. 1, Oct. 1853
31. Untitled, Dec. 1842 – Apr. 1844
32. Untitled, July 1853-Jan. 1854
33. File 1022, Index Page 1, 30" Leffel Type Wheel Tests Made at Holyoke, July 15-19, 1919
34. C. W. Frost Notebook, Oct. 21 1919

12. Middlesex County

Box 29 (7.5x11x4.5")
Folder:
1. Measurements at Flume in Middlesex Race
2. Middlesex Co. Current Meter Work, June 7, 1901-
3. Middlesex Flume
4. Middlesex Race Water Measurements, Flume, Oct. 28, 1898-
5. Middlesex Turbines
6. Middlesex Turbines
7. Middlesex Turbines
8. Prop'rs of Locks and Canals on Merrimack River (no further label)
9. Prop'rs of Locks and Canals on Merrimack River (no further label)
10. Prop'rs of Locks and Canals on Merrimack River, Levels etc. from June 1855
11. Sam'l Hutchinson Notebook, 1846-1847
12. Special #1, Heights in Middlesex Co's. #1&2 Race Gauge at Head of Race Point in No. 1 Tower, Gauge in Race 185 Below Tower, From Dec. 6, 1897
13. Special #2, Heights in Middlesex Co's. #1&2 Race, Piphyr[?] Front, #2 Tower, Gauge at Tower End of Race, From Dec. 1897
14. Special Obs. #3, Tremont Forbay & Whrek [?] Middlesex Race
15. Special #4, Heights in Middlesex Co's. #1&2 Race Turbines from Dec. 6, 1897
16. Untitled [Measurements 1847-1848]

LOOSE ITEMS – (2 Boxes of loose material found in notebooks)

Box 1 (5.0" Legal size)
Folder:

1. From "Records 1884 – 1895 (No. 9)" (Removed from Box 1, Folder 2.)
   List of Master Keys, May 13, 1913.
   Note card "Key of Locks and Canal…"
   Empty envelope
   List "Disposition of 24 master keys, Sept 21, 1899." General Records
2. From "Records 1901 – 1947 (No. 16)" (Removed from Box 2, Folder 1.)
   Sketch of "Largest size Buffalo Pitts Steam Roller"
3. From "Records 1837 – 1865 (Vol. A)" (Removed from Box 2, Folder 2.)Note regarding quantity of hose.
   Blueprint drawing of map of Chelmsford.
4. From "Records 1866 – 1879. (Vol. H)" (Removed from Box 3, Folder 1.)
   Sketch showing location of repairs. From "Records 1876 – 1882. (Vol. O)" (Removed from Box 3, Folder 3.)
5. Note with mathematical equations. Note – "Some dimensions of Lowell Machine Shop's No.5 Swain Wheel.
6. From "Records and Newspaper Clippings, 1879 - 1915. (Vol. T)" (Removed from Box 3, Folder 4.)
   Bound Index.
   Graph paper note.
7. From "Prescott Mill Foundations, 1843 – 1845." (Removed from Box 4, Folder 4.)
   Note card with mathematical equations.
8. From "Records 1882 – 1908." (Removed from Box 4, Folder 5.) Note on sprinkler
9. From "Daybook, 1866 – 1876." (Removed from Box 6, Folder 2.)
   Detached pages.
   Note
   Note re: Lynn Pumping Engine, Dec. 12, 1873.
   Notes – Collins Pumping Sta. & Prov. Water Works.
   Printed Template
   Pamphlet – American Society of Civil Engineers
   Correspondence
10. From "James B. Francis Waste books No.6." (Removed from Box 7, Folder 3.)
    James B. Francis Waste books No. 6 – Receipt.
11. From "James B. Francis Waste books No. 7." (Removed from Box 7, Folder 4.)
    James B. Francis Waste books No. 7 – 2 Receipts.
12. From "James B. Francis Waste books No.9." (Removed from Box 7, Folder 5.)
    James B. Francis Waste books No. 9 – Scrap of paper w/numbers.
    James B. Francis Waste books No. 9 – Receipt.
13. From "James B. Francis Waste books (No.10.)" (Removed from Box 8, Folder 1.)
    James B. Francis Waste books No.10 – Note card.

14. From "James B. Francis Waste books, 1861 – 1866 (No. 11)." (Removed from Box 8, Folder 2.)
    Note regarding "Shingle roof of building over waste bays on Northern Canal."
    Note to James B. Francis from O.H. Moulton.
    Note headed "Fishways – remove ledge that was blasted."
15. From Tables, Miscellaneous, √ 2gh √ h/h' (Removed from Box 11, Folder 1.)
    Original measurements, sketches etc.
    Numerical Tables.
    √ h/h', √ h' = 21. From Tables, Miscellaneous, √ 2gh √ h/h'
    √ h'/h or √ 21/x From Tables, Miscellaneous, √ 2gh √ h/h'
    √ h/h' of √ x/36
16. From Water Measurements – July 1852. (Removed from Box 12, Folder 3.)
    Note.
17. From Turbines – Merrimack MFG Co. – Design Mar. 1856- Jun. 19 1862. (Removed from Box 14, Folder 5.)
    Correspondence.
    Fragment of note card.
    Scrap with equations.
18. From Franklin Forbes – Vol. 1, Oct. 15, 1845 – March 30, 1846. (Removed from Box 16, Folder 1.)
    Note reading "F. Forbes Wastebooks."
19. From Pump No. 1 & 2, 1879 – 1910. (Removed from Box 17, Folder 11.)
    Label from "Pump No. 1 & 2."
    Note card from "Pump No. 1 & 2."
    Blueprint Drawing of the Lawrence Pumps.
20. From Mill Memoranda – F.F.B. August 1880 – May 1889, W.W.S. July 1889 – November 1891, "3rd Book. (Removed from Box 17, Folder 13.)
    Flyer from "Mill Memoranda – F.F.B. August 1880 – May 1889..."
21. From Work Notes – C. Robert Libby- 1910

Box 2 (17x 21")
Folder:

From "Experiments – Dynamometer, May – Nov. 1850. (Removed from Box 9, Folder 5.)
Notes.

Series IV. Deeds

Box 30 (5.0" Legal size)
Folder:
1. 1. Deeds of the Great or Old Bunt and Little Bunt, Land & Fishway
2. 2.
3. 3. Deed to Joseph Varnum to Jesse Coburn, Nov. 26, 1829
4. 4. Deed- Jesse Colburn to Locks & Canals, April 13, 1847 †

5. 5. Deed- Joseph Varnum to Locks & Canals, April 13, 1847 †
6. 6. Deed- Joseph B. Varnum to Locks & Canals, April 29, 1847 †
7. 7. Ali Johnson & al to Jesse Colburn
8. 8. Deed- Coburn Blood Jr. Assignee to Joseph Varnum
9. 9. Polly Varnum, Jonas Varnum, William Varnum and Nathaniel Varnum to Joseph B. Varnum
10. 10. Deed- Colburn Blood Jr. Assignee to James H. Wilson
11. 11. Able Mackintine to Jesse Colburn
12. 12. Wilson to Richardson
13. 13. Quitclaim Deed- James Ferguson to Jesse Colburn
14. 14. Pascal C. Colburn and Daniel Good have to Jesse Colburn
15. 15. Joseph Parker and al to Prop's of Locks & Canals, Oct 27, 1841 †
16. 16. Heirs of Phineas Whiting. Apr. 10, 1849, Release- Flowage & Fishway- Damages
17. 17. Sundry Papers. Relating to Fisheries in Merrimack River at Lowell
18. 18. Sarah & Hannah Johnson to Theodore Hamblet
19. 19. Pertaining to Bunt Privilege – 1846
20. 20. Plot of Land Connected with the Great or Old Bunt and Little Bunt Fisheries, Nov. 20, 1876 †
21. 21. Land Connected with Great Bunt Fishery 1847 †
22. 22. †
23. 23. Release for Past Damages to Fishery by J. Holdrith, May 8, 1847
24. 24. Memo of Conversation with Mr. Henry Rud, Nov. 20, 1874
25. 25. James S. Mitchell & Wife to Locks & Canals, Dec. 23, 1846
26. 26. James L. Mitchell to Locks and Canals, Nov. 5, 1846 †
27. 27. Parker Varnum to Locks and Canals Props. Dec. 4, 1838
28. 28. James & Jonathan Bowers to P.L.&C, Nov. 16, 1846 †
29. 29. Jonas Varnum to P.L. & C March 23, 1826. B 268 – P 401 Quitclaim
30. 30. Jonathan Varnum to P.L. & C, March 10, 1846. B468 P. 200 – Quitclaim
31. 31.
32. 32.
33. 33. Henry Richardson deed of Point Fishery Near Beaver Brook, Apr. 12, 1847 †
34. 34. †
35. 35.
36. 36.
37. 37.
38. 38.
39. 39.
40. 40.
41. 41.
42. 42.
43. 43.
44. 44.
45. 45. †

46. 46.
47. 47.
48. 48.
49. 49.
50. 50.
51. 51. Barrsilla Sew to Tappan Wentworth, Nov. 17, 1847 †
52. 52. James Pain & al. To Tappan Wentworth, Nov. 17, 1847 †
53. 53. Amasiah Hartnell – Prop. of the Locks & Canals on Merrimack River
54. 54. Quit claim Deed Hildreth to Props. Locks & C. Dated Mar. 18, 1857
55. 55. Tappan Wentworth to Props. of Locks & Canals, March 10, 1853 †
56. 56. Tappan Wentworth to Props of Locks & Canals on Merrimack River
57. 57. Lew Fishway Act
58. 58. Daniel Coburn to Thomas Hurd, Oct. 26, 1825
59. 59. Phineas Whiting to Thomas Hurd- Jan. 22, 1822
60. 60. Moses Hale to Artemas Holden- Nov. 29
61. 61. An Agreement- Phineas Whiting to Shepherd Leach
62. 62. Release J. B. Verman to Thomas Hurd
63. 63. Daniel Coburn by Thomas Hurd, May 14, 1825
64. 64. Jonas Varnum to Thomas Hurd, April 2-3, 1822
65. 65. James Bowers & al to Thomas Hurd, Nov 27, 1821
66. 66. Whiting to Hurd
67. 67. Phineas Whiting to Thomas Hurd, March 22, 1822
68. 68. Parker Varnum to Thomas Hurd, April 4, 1822
69. 69. Joseph B. Varnum to Daniel Coburn, Oct. 11, 1824
70. 70. James Varnum to Daniel Coburn, Jr. July 2, 1846 †
71. 71. James Varnum to Merrimack Man. co. May 2, 1822
72. 72. James Varnum to Merrimack Man. Co. March 21, 1822
73. 73.
74. 74. Thomas Hurd to Locks & Canals
75. 75. James Varnum to Kirk Boott, January 23, 1822
76. 76. Benjamin Melvin to James Melvin, April 14, 1813
77. 77. Deed Nathan Parker to Francis Hodgeman
78. 78. Deed- Henry C. Parker to Francis Hodgeman
79. 79. Bond of Joseph Parker & Ephram Adams †
80. 80. Tappan Wentworth, Award of expenses in purchase of fisheries
81. 81.
82. 82. Fishery near Frye lot claimed by Francis Hodgeman
83. 83. Fishway in Pawtucket Dam
84. 84. †
85. 85. A. C. Osgood September 4, 1846
86. 86. William F. Osgood, Deed to Props of Locks & Canals, July 18, 1846
87. 87. Quitclaim Deed- Herbert Marshall to Props Locks & Canals, Feb. 2, 1846
88. 88. Quitclaim Deed Herbert Marshall to Props. Locks & Canals, Jan. 27, 1846
89. 89. A.W. Fisher to Props. of Locks & Canals, July 29, 1846 †

90. 90. Thomas Hurd to Props Locks & Canals †
91. 91. Warranty Deed- James Russell & Cummings Barr to Herbert Marshall- Jany. 27, 1846
92. 92. Nathaniel Marsh to Props. Locks & Canals †
93. 93. Jeremiah Varnum to Props Locks & Canals †
94. 94. Parker Varnum to P.L. & C, Dec. 3, 1827 †
95. 95. Mill of John Varnum
96. 96. Leonard Burbank to Props of Locks & Canals, July 1, 1861 †

Box 31 (5.0" Legal size)
Folder:
1. 97. Release- Props of Pawtucket Bridge to Proprietors of Locks and Canals on Merrimack River
2. 98. May 15, 1863 – Daniel Brooks to Proprietors of Locks and Canals on Merrimack River †
3. 99.
4. 100. Tappan Wentworth to Locks & Canals, Nov. 4, 1847 †
5. 101. Betsey Frye to Tappan Wentworth, May 28, 1847
6. 102.
7. 103. Rufus Litchfield & Wife to Tappan Wentworth, May 20, 1847
8. 104. John L. Wright & Wife to Tappan Wentworth, May 20, 1847 †
9. 105. Timothy Frye to Tappan Wentworth, July 15, 1847 †
10. 106. James Fry & Tappan Wentworth, Nov. 7, 1847 †
11. 107. Ellsworth Fry to Tappan Wentworth, May 28, 1847
12. 108. Frye v. Locks & Canals
13. 109. George Frye & Props of Locks & Canals
14. 110.
15. 111. Frye Lot, 1869
16. 112. Israel Hildreth to William Adams & Al. Oct. 1, 1836
17. 113. †
18. 114. Opinion by H.A. B.
19. 115. Asa Richardson et al to William Adams et al
20. 116. †
21. 117. Memo of search of Record – Conveyances to and from Isreal Hildreth and J. Hidreth Jr. from 1800 down †
22. 118. Memo relating to lot originally part of the Adams Lot near Long Island †
23. 119. Indenture, Props of Locks & Canals with John McMahon, April 20th 1864
24. 120. Perley Parks to Red et al, Jan 2, 1860
25. 121. Read et al to Props of Locks & Canals, Nov. 18, 1860
26. 122. Perley Parks & J.M.G. Parker to Benj. F. Butler
27. 123. B.F. Butler to Props. Locks & Canals, Nov. 19, 1860
28. 124. George W. Farr to Props. Locks & Canals, July 17, 1852 †
29. 125. Deed- Josiah B. French to the Props. of Locks & Canals, March 12, 1853 †

30. 126.
31. 127. Sketch of Centre St. Centralville – 1858
32. 128.
33. 129. Lorenzo G. Howe to Props. Of Locks & Canals Apr. 3, 1849 †
34. 130. Fisher A. Hildreth & al to Props. Locks & Canals, Nov. 9, 1860 †
35. 131. Jacob Sawyer to props of Locks & Canals on Merrimack River †
36. 132. Harriet S. Dexter & al Pet. to sell real estate June 1, 1852
37. 133. Daniel Copeland Trustee to Props. of Locks & Canals, Nov. 1, 1852 †
38. 134. Frederick Nickerson to Props. of Locks & Canals, Sept. 21, 1857 †
39. 135. Abby B. Nickerson, Andrew Nickerson, Emily C. Nickerson to Props of Locks & Canals, Sept. 21, 1857 †
40. 136. Isaac D. Farnsworth to Props of Locks & Canals, Sept. 21, 1857 †
41. 137. Franklin Mead to Locks & Canals on M.R.- April 21, 1851
42. 138. Sabrina S. Dexter to Props of Locks & Canals, Nov. 6, 1852 †
43. 139. Land in Centralville opposite the mills of the Merrimack M. Co.
44. 140. Deed of Warranty Eli Cooper to Daniel Sawyer †
45. 141.
46. 142.
47. 143. Deed- Jonathan Bancroft to Locks & Canals, April 1, 1856 †
48. 144. Deeds & Papers relating to Land in Centralville, Opposite Lawrence M. Co. Formerly belonging to J. Bancrott & others
49. 145. Warranty Deed- John green to Props of L & Canals October 23, 1862 †
50. 146. Hugh Green & Margaret Green to Props. Locks & Canals †
51. 147. Warranty Deed Asa & Samuel Richardson to John Green June 19, 1848 †
52. 148. Mortgage Deed- John Green v. Asa & Samuel Richardson †
53. 149.
54. 150. Plan of John Green Lot and Land Exchanged with John McMahan in Centralville †
55. 151.
56. 152. Seth Ames to Tappan Wentworth
57. 153. Deed- Tappan Wentworth to Locks and Canals, May 15, 1847 †
58. 154. T. Wentworth to Locks & Canals – April 12, 1849 †
59. 155. Deed of Lock in Centralville on the Bank of the Merrimack River †
60. 156. Jefferson Bancroft to Tappan Wentworth, March 26, 1845
61. 157. Quitclaim- Assignees of Thomas Hurd to Proprietors of Locks & Canals, July 6, 1831 †
62. 158. Quitclaim- Daniel P. Parker to Props of L. & C. On Merrimack River, July 29, 1826†
63. 159. Quitclaim John Parker to Daniel P. Parker, June 18, 1831†
64. 160. Joshua Thissell to Theodore Hamblet, Oct. 24, 1822
65. 161. Sylvester Durne to Theodore Hamblet, Oct. 23, 1822
66. 162. John Parker to Theodore Hamblet, Oct. 22, 1822
67. 163. Theodore Hamblet to Thomas Hurd, March 11, 1823
68. 164. Locks & Canals- Memo of title to Land in Dracott part of Bradley Farm
69. 165. Tappan Wentworth to Props. Locks & Canals, March 26, 1845

70. 166. Joseph B. N. Coburn to Jefferson Bancroft, March 26, 1845
71. 167. Tappan Wentworth to Props Locks & Canals, May 5, 1845 †
72. 168. Plan of Lot in Winthrops Meadow Dracut.†
73. 169. Deed J. Thissell to J. Bancroft, April 25, 1845
74. 170. David Gove to J. Bancroft, Apr. 5, 1845
75. 171. Tappan Wentworth to Props Locks & Canals, June 17, 1845 †
76. 172. Deed- David Gove to Props Locks & Canals †
77. 173. Perley Parker to Tappan Wentworth, April 1, 1845
78. 174. Perley Parker to Tappan Wentworth – Abbott Islands, April 1, 1845
79. 175. Joseph L. Wright to Tappan Wentworth †
80. 176. Tappan Wentworth to Props. Locks & Canals, April 7, 1845 †
81. 177. †
82. 178. Jefferson Bancroft to Tappan Wentworth, May 5, 1845 †
83. 179. Indenture- Props of Locks & Canals with Henry J. Durant †
84. 180.
85. 181. †
86. 182.
87. 183. Exchange. Props of Locks & Canals with William Wyman, Nov. 12, 1849 †
88. 184. Benjamin F. Funck to Props. of Locks & Canals, Nov. 12, 1849
89. 185. Nesmith et al to Locks & Canals, Apr, 19, 1849
90. 186. Q.C. Deed Wm. W. & Sam' G. Wyman to Props of Locks & Canals Nove 12, 1849
91. 187. Deeds relating to the Reservoir Lot- Lines Hill †
92. 188. †
93. 189.
94. 190. Deed- Nathaniel Wright to M. M Company
95. 191. Deed- Joseph Fletcher to M.M Company, Nov 23, 1822
96. 192. Deed of Nathaniel Howard to the Merrimack Manufacturing Company †
97. 193. Deed- Joel Foster to Mer. Man. Company
98. 194. Deed-James Melvin Jr. to Mer. Manuf. Company †
99. 195. Deed- Rebecca Warren to MM Company
100. 196. Deed-Joseph C. Hall to MM Company
101. 197. Deed- Aaron Mansur to M.M. Company
102. 198. Deed- Nathaniel Stickney to M.M Company
103. 199. James Varnum to M.M Company
104. 200.
105. 201.
106. 202. Deed-Joseph Fletcher to Mill Company Nov. 20, 1822
107. 203. Henry Rice to Merrimack manufacturing Company, Nov. 9, 1824
108. 204. Deed- Joseph Fletcher to Mill company Nov. 16, 1822
109. 205. Artimas Holden to M.M. Company
110. 206. Silas Dean to the M.M. Co
111. 207. Joseph Fletcher to Mer. Man. Co.
112. 208. Joseph Fletcher to M.M. Comp, 26 April, 1824

113. 209. Joseph Fletcher to Mer. Man. Co. (1824)
114. 210. Mer. Man Compy to Jos. Fletcher, Nov. 23, 1822 †
115. 211. Kirk Boott to Merrimack Man. Comp.
116. 213.
117. 214. Deeds to Thomas M. Clark- Isiah Fletcher to P.L.C.
118. 215. Deed- Moses Chever to Thomas M. Clark †
119. 216. Deed Moses Chever to Thomas M. Clark.

Box 32 (5.0" Legal size)
Folder:
1. 217.
2. 218. Jeptha Spaulding to J. M. Clark, June 11, 1793
3. 219.
4. 220. The Land between High Water Park and the road
5. 221. Deed- Phineas Whiting to Thomas Hurd
6. 222. Release – Parker Varnum to Thomas Hurd
7. 223.
8. 224.
9. 225.
10. 226. Deed- Jonas Varnum to Thomas Hurd
11. 227. Deed Artimas Holden to Thomas Hurd
12. 228.
13. 229. Anna Bowers to Thomas Hurd
14. 230.
15. 231.
16. 232.
17. 233.
18. 234.
19. 235. Jona Richardson- Deed to Moses Hale. Dec. 1, 1812
20. 236. Charles Hunshaw To Oliver Kittridge, Dec. 1821
21. 237. John Putnam to Phineas Whiting, 1794, May 12
22. 238. Deed-Benjamin Parker to and W. Fletcher, Sept. 3, 1747
23. 239. Eli Forbes to Moses Cheever
24. 240. Eli Forbes to Moses Cheever
25. 241. Moses Cheever to Eli Forbes
[242 *Not Located During Processing*]
26. 243.
27. 244.
28. 245. Samuel Frye- Guardian to Josiah Wood Jr. June 16, 1823 †
29. 246. Lucius Wright to Moses Cheever
30. 247. Jeptha Spaulding to Searle & Tyler, June 11, 1793
31. 248. Deed- Moses Hale- Guardian to Artimas Holden †
32. 249. Bradley & Hildreth to Robt. Brinly, 1809
33. 250. Asaph Kitteridge to Moses Cheever

34. 251. Samuel Converse to Moses Cheever
35. 252. †
36. 253. Fletcher Bond to Spaulding
37. 254. *Not Located During Processing*
38. 255.
39. 256.
40. 257. Benja Melvin to Joseph Chamers, 1782
41. 258. Benjamin Adams to Josiah Fletcher Jr, March 7, 1754
42. 259. Benjamin Parker to Andrew Fletcher, May 28, 1754
43. 260. Thomas Fletcher to Andrew Fletcher, March 6, 1749
44. 261. James Bowers & al. to Joseph Fletcher
45. 262. Release- Phineas Whiting to Benj. Melvin Jr.
46. 263. Josiah Fletcher to Andrew Fletcher, Dec. 20, 1786
47. 264. Quitclaim deed- John Parker to Nathl Wright
48. 265. James Varnum to Danl Coburn Jr. July 2, 1825
49. 266. Joseph B. Varnum to Danl Coburn Jr.
50. 267. Jerathmeel Bowers & Oliver Bowers to Jonah Fletcher, April 25, 1790
51. 268.
52. 269. Josiah Fletcher Jr. & Shevebiah Fletcher Deed to Joel Spaulding
53. 270. Fletcher Bond to Spaulding
54. 271.
55. 272. Deed- Melvin to Fletcher, Feb. 19, 1785
56. 273. Deed- Oliver Bowers to Josiah Fletcher, 1765, May 31
57. 274. Deeds to Nathaniel Wright – Josiah Wood Jr. to Nathaniel Wright
58. 275. Huse & wife to Wright
59. 276. Samuel F. Frye to Nathaniel Wright, Oct. 30, 1831 †
60. 277. Q.C. Deed- Henry Rankin & Wife to Nathaniel Wright
61. 278. Q.C. Deed- Adaline Sawyer to Nathaniel Wright, Sept. 13, 1839
62. 279. Aaron P Frye to Nathaniel Wright Sept. 29, 1831 †
63. 280. Herman Frye & wife to Nath'l Wright, Oct. 25, 1838
64. 281. *Not Located During Processing*
65. 282. *Not Located During Processing*
66. 283. *Not Located During Processing*
67. 284. Capt. Stephen Poor's Deed to Luke Bowers, Sept. 22, 1802
68. 285.
69. 286.
70. 287. †
71. 288. †
72. 289. Wm. Winthrop Plan †
73. 290. Wm. Wlt Prentice Plan †
74. 291. J. Goulding Argument, May 27, 1816
75. 292.
76. 293. Deeds- Joseph Tyler to the Proprietors, March 16, 1797

77. 294.
78. 295. Lease of Proprietors to J. Tyler, February 21, 1816
79. 296. Jacob Kitteridge & wife to Benjamin Melvin, April 27, 1782
80. 297. Jacob Kitteridge to Benjamin Melvin, April 17, 1793
81. 298. Benjamin Melvin- Deed of Release of Proprietors of Locks & Canals, 10 Nov, 1795
82. 299. Benjamin Melvin to Proprietors of Locks & Canals on Merrimack River
83. 300. Oliver Kitteridge to Moses Cheever, Jany 10, 1822
84. 301.
85. 302. Moses Tyler to Joseph Warren, Nov. 18, 1801
86. 303.
87. 304.
88. 305.
89. 306. Henry Fletcher's Widow's D[?]
90. 307.
91. 308. Papers Relating to Pawtucket Street and Lot on Merrimack River near Pawtucket Canal occupied by the heirs of Jonathan Bowers
92. 30.
93. 310. Joseph Tyler Deposition
94. 311. †
95. 312.
96. 313. †
97. 314. J.M. Clark's plan of Land
98. 315.
99. 316. Jonathan Parker to P.L. & C. May 25, 1826
100. 317. Thomas Hurd to P.L.& C June 23, 1826

Box 33 (5.0" Legal size)
Folder:
1. 318. Henry Rice to P.L. & C, Dec. 14, 1826
2. 319. †
3. 320. *Not Located During Processing*
4. 321. Deed- Nathaniel Wright to Props of the Locks & Canals, June 30, 1823
5. 322. Deed Phineas Whiting to M.M. Company, July 15, 1825
6. 323. J. Stephen Leach to P.L.& C. 18 Apr. 1828
7. 324. P.L.& C. Martin- Adams Lot Western Avenue
8. 325. Jona Tyler and Props Locks & Canals O M. River †
9. 326. †
10. 327. Deed Tyler to Proprietors
11. 328. †
12. 328 A. †
13. 329.
14. 330. Livermore Farm †
15. 331. Josiah Abbott & wife to the Proprietors of the Locks & Canals
16. 332. Sarah C. Livermore to the Props of the Locks & Canals †

17. 333. Bond- Livermore to Props of L&C, 22 June 1839 †
18. 334. Sarah S. Lawrence & al to Locks & Canals, Aug 9, 1842
19. 335. Jefse Moors to Props of the L&C. Feb. 6, 1832 †
20. 336. Jason Sanders to Props L& C. February 8, 1832
21. 337. Jedulthan Warren to Props L&C, February 8, 1832
22. 338. Esther Marshall to Prop of L&C, February 3, 1832
23. 339. Joseph Tyler to Props at Locks & Canals, March 22, 1832 †
24. 340. Sherebiah Fletcher to Props of Locks & Canals, Oct. 22, 1831
25. 341. Henry Fletcher to the Props at Locks & Canals, Nove. 11, 1881
26. 342. Betsy Davies to Props Locks & Canals, 5 Nov. 1831
27. 343. Nehemiah Fletcher to Proprietors of Locks & Canals, Augt 17th 1832
28. 344. Moses Fletcher to Proprietors of Locks & Canals, Aug. 18, 1832
29. 345. †
30. 346. †
31. 347.
32. 348. James Tyler Quitclaim, July 9, 1833
33. 349. Merrimack Manf. Co. to Props. Locks & Canals, Sept. 1, 1835
34. 350. John Smith to Props Locks & Canals, April 4, 1837 †
35. 351. J.M. Clark to Props. Locks & Canals, Oct. 25, 1832
36. 352. Henry Rice to Props of L&C Nov. 19, 1831 †
37. 353.
38. 354. Nathaniel Wright to Props. Locks & Canals, April 4, 1832
39. 355. Nichols, Johnson & Shattuck Bond, Oct. 15, 1822
40. 356. Paul R. George's Bond- Aug. 1, 1835
41. 357. Johnson & Carlson's Bonds- June 19, 1835
42. 358. Wentworth, George and Leavitt Bonds, June 19, 1835
43. 359. Lowell Brewery Bond, July 24, 1835
44. 360. Bennett & Morse to Locks & Canals, Oct. 1, 1809
45. 361.
46. 362. †
47. 363. Elisha Ford to Props Locks & Canals, Jan. 14, 1846
48. 364.
49. 365. Props Locks & Canals to Joshua Converse, Apr. 14, 1846 †
50. 366. Joshua Converse Deed to Props Locks & Canals, Sept. 30, 1846
51. 367. Joshua Converse to Props of the Locks & Canals, May 5, 1846
52. 368. Iram Chase & Joshua Converse to Props at Locks & Canals
53. 369. Bond to Stephen Castle
54. 370. Mary Weston to Props. Locks & Canals, April 29, 1846
55. 371. Phillip Hardy to Locks & Canals, March 31, 1847
56. 372. Sarah C. Whiting to Props Locks & Canals, Feb. 16, 1846
57. 373. Real Estate Purchased for the Northern Canal 1846 & 1847
58. 374. †
59. 375. †

60. 376.
61. 377.
62. 378. Harlin Pillsburg to Locks & Canals
63. 379. Wm. F. Pennington & Wife to Locks & Canals †
64. 380. Lawrence Riodan & Other to Prop't's of Locks & Canals †
65. 381. Locks & Canals to Harlan Pillsburg †
66. 382. Props Locks & Canals to Geo. H. Carlton, June 14, 1844 †
67. 383. George H. Carlton to Locks & Canals
68. 384. Wm. Livingston to Locks & Canals, Sept. 10, 1847
69. 385. Nath. Wright to Props of the Locks & Canals, Oct. 20, 1841
70. 386. Lowell Manf. Company to Locks & Canals, Sept 10, 1841
71. 387. Spaulding to Locks & Canals, March 3, 1849 †
72. 388.
73. 389. †
74. 390. Tyler & al to Locks & Canals – Aug. 26, 1843 †
75. 391.
76. 392. Samuel Lawrence to Props Locks & Canals, March 12, 1845
77. 393. S.A. Brown to P.L.&C Nov. 3, 1846 †
78. 394.
79. 395.
80. 396. Thomas Nesmith to John Nesmith †
81. 397.
82. 398.
83. 399.
84. 400. John Nesmith to George Hedrick †
85. 401.
86. 402. †
87. 403. †
88. 404.
89. 405. Grenville Parker to
90. 406.
91. 407.
92. 408. Wm. Fiske to A.L. Brooks March 1, 1850
93. 409. A.L. Brooks to J.W. Boynton, July 5, 1860
94. 410.
95. 411.
96. 412. Executors of the Will of the Nesmith to Alanson Nichols, Oct. 4, 1870
97. 413. Frances Sabrina Nichols to Props of Locks & Canals †
98. 414. Wm. F.S. Nichols to Props Locks & Canals, Nov. 9, 1876
99. 415. Encroachment at railroad onto the sidetrack of Nichols Lot, Legal- Harry Browne's Opinion, Sept. 1889
100. 416. †
101. 417. †
102. 418. Geo. F. Richardson & Charles W. Wilder to Props. Locks & Canals Mortgages of

John H. Larrabee
103. 419. John S. Larrabee to Benj. F. Sargent †

Box 34 (5.0" Legal size)
Folder:
1. 420. B.F. Sargent to Props Locks & Canals †
2. 421. †
3. 422. †
4. 423. †
5. 424. †
6. 425. Sarah W. Whitman, Charles Wyman to Proprietors at Locks & Canals
7. 426. John H. Wyman et al to Proprietors at Locks & Canals †
8. 427. Warrant Deed-Phineas Whiting to Props Locks & Canals, July 20, 1887 †
9. 428. Indenture- Props of Locks & Canals and P. Whiting & D.H. Bradt
10. 429. Stanley to Locks & Canals
11. 430. Joseph A. Coram to Props Locks & Canals, Dec. 9, 1898
12. 431. Harry L. Stanely to Props. Locks & Canals, Nov. 15, 1898
13. 432. Merrk. Man. Co. and Locks & Canals
14. 433. Walter H. McDaniels to Props Locks & Canals
15. 434. Props Locks & Canals, Lowell from M. Mills, Mar. 3, 1894 †
16. 435. Boston & Lowell R.R. Co. Boston & Maine R.R. Co. June 29, 1888
17. 436. Props Locks & Canals and Boston & Lowell R.R. & Boston & Maine R.R., March 25, 1892
18. 437.
19. 438. Lowell Manufacturing company to Props. Locks & Canals, Oct. 30, 1899
20. 439.
21. 440. Indenture- Mass Cotton Mills & Props Locks & Canals, Jan 16, 1901
22. 441. Indenture, Props Locks & Canals & Tremont & Suffolk Mills
23. 442. Tremont & Suffolk Mills and Lawrence M. Co. to Props. Locks & Canals
24. 443. Indenture Props. Locks & Canals, Merrimack M. Co. Boston & Lowell R.R., Nov. 3, 1892
25. 444. Indenture Props Of Locks & Canals with Boston & Lowell R.R. Co. Feb. 5, 1863
26. 445. Indenture Props of Locks & Canals with Boston & Lowell R.R. Co. Aug. 10, 1874
27. 446.
28. 447. Indenture- Props of Locks & Canals, Suffolk Manf Lawrence Man. Co. and Props of Tremont Mills, April 7, 1851 †
29. 448. Lawrence Manfg. Co. to Props. Locks & Canals, Sept 20, 1859
30. 449. Indenture- Locks & Canals & Lawrence Manuf. Co. June 5, 1871
31. 450. Locks & Canals to & With Lowell Manuf. Co. December 4, 1841
32. 451. Indenture- Massachusetts Cotton Mills with Props. Locks & Canals, July 1, 1862 †
33. 452. Merrimack Manf. Co. to Props. Locks & Canals, June 5, 1848
34. 453. Indenture Merrimack Man. Co. and Props of Locks & Canals. Aug 15, 1862 †

35. 454. Indenture- Props Locks & Canals with Merrimack Man. Co, Feb, 5, 1863
36. 455.
37. 456. †
38. 457. Indenture – Props Locks & Canals, Suffolk Manf. Co. & Props Tremont Mills †
39. 458. Suffolk Manf. Co. to Props Locks & Canals, Sept. 20, 1859
40. 459. Suffolk Manufacturing Co. to Props Locks & Canals, January 30, 1865
41. 460. Props Locks & Canals to Commonwealth of Massachusetts, April 17, 1896
42. 461. Props Locks & Canals & Bigelow Carpet Co. September 19, 1902
43. 462. City of Lowell with Props Locks & Canals
44. 463. Props. Locks & Canals & City of Lowell, Nov. 26, 1878
45. 464. City of Lowell and Props Locks & Canals, Dec. 18, 1885
46. 465.
47. 466. River lines of Merrimack River in Lowell, fined and Defined, Oct. 30, 1882
48. 467. Act to Authorize the Defining and Improvement of the Channel of Merrimack River in the city of Lowell
49. 468.
50. 469.
51. 470. Massachusetts Cotton Mills to Props. Locks & Canals on Merrimack River
52. 471. Lowell Manuf. Co. to Props Locks and Canals, February 15, 1865
53. 472. James Stringer to Proprietors of Locks & Canals
54. 473. George Motley to Props Locks & Canals, February 15, 1875
55. 474. Albert G. Cook to Props Locks & Canals, July 29, 1876
56. 475.
57. 476. Disclaimer- Joshua B. Morse to Props Locks & Canals, May 23, 1877
58. 477. W.A. Burke to Props Locks & Canals, Nov. 1, 1877
59. 478. O.H. Moulton to Props. Locks & Canals, Nov. 1, 1877
60. 479. Peter S. Coburn to Drain on, over or through land of Locks & Canals on the southwesterly side of Varnum Avenue, Nov. 29, 1881
61. 480. Disclaimer- Joel Spaulding M.D. and sister, to enter City Sewer in gate Keepers Lot on School Street June 28, 1882
62. 481. Props. Locks & Canals to New England Tel & Tel Co. August 12, 1889
63. 482. Lambert to Locks & Canals, Feb. 1, 1894
64. 483.
65. 484. City of Lowell to Props. Locks & Canals
66. 485.
67. 486. Lowell Electric Light Co. to Props. Locks & Canals, July 18, 1898
68. 487. Tremont & Suffolk Mills to Props. Locks & Canals Dec. 8, 1899
69. 488. City of Lowell to Props Locks & Canals, May 26, 1900
70. 489. New England Telephone & Telegraph Co. & Lowell Electric Light Corp to Props Locks
71. 490. New England Telegraph Company to Props Locks & Canals, Nov. 1, 1901
72. 491. Lowell Electric Lt. Co. to Props Locks & Canals, Nov. 12, 1901
73. 492. Lowell Electric Light Co. to Props Locks & Canals, Nov. 20, 1901
74. 493. *Not Located During Processing*

75. 494. *Not Located During Processing*
76. 495. John Putnam Jr. to Edw. Scott May 1, 1807
77. 496.
78. 497. Solo. Hunt to James Bowers & al, March 29, 1825
79. 498. James Bowers to Jona. Bowers, April 2, 1842

Box 35 (5.0" Legal size)
Folder:
1. 499. Copies to several Lots on the North Side at Middlesex St. adjoining Land of Locks & Canals
2. 500. Livingston to Farmer, Oct. 11, 1844
3. 501. Gilbert Farmer to Oliver Maguire January 22, 1856, Oliver Magquire to Patrick Maguire, May 14, 1859
4. 502.
5. 503.
6. 504. James Nabuah to Josiah Richardson – Indian title to La [illegible] belonging to the Massachusetts [?] Cotton Mills et al, January 19, 1688
7. 505. Joseph Bradley to Thomas Hurd, March 8, 1823
8. 506.
9. 507. Phineas Whiting & al to S.C. Whiting
10. 508. Jefferson Bancroft to James c. Ayer, June 17, 1854
11. 509. Deed from J. Spaulding to Josiah Fletcher
12. 510. Levi J. Prescott to Nathan Oliver, September 9, 1824
13. 511. Hale A. Tyler, October 12, 1815
14. 512. J. Kitteridge & a to Benja Melvin, Oct. 26, 1809
15. 513. Benjamin Melvin to Reuben Melvin
16. 514. Benjn Melvin to Benjn Melvin Jr., Copy, Feby. 1, 1812
17. 515. P. Fletcher to Benj. Melvin
18. 516. Ebenezer Parker, Moses James/ Benj. Parker/ Jona Parker to Thos Fletcher
19. 517.
20. 518. Props Locks & Canals to Lowell Machine Shop, Oct. 25, 1895
21. 519. Props Locks & Canals to Edw. P. Bliss and Henry W. Bliss. Sept. 29, 1899
22. 520. Props of Locks & Canals to Trustees of the Lowell Textile School, Jan 30, 1903
23. 521. Locks & Canals George Mansfield, Civil Coburn & Simon Adams to Lay out passageway from Bartlett Street, May 26, 1843
24. 522. Props of Locks & Canals with James Payne, April 18, 1884
25. 523. Props Locks & Canals and Valentine L. Wilson, June 11, 1884
26. 524. Props of Locks & Canals, Valentine L. Wilson, and James Payne, July 25, 1884
27. 525. Indenture J. Bancroft and Props of Locks & Canals, Nov. 1, 1830
28. 526. Props Locks & Canals and Chas H Allen, My 31, 1895
29. 527. Agreement with P. Whitney relating to Fletcher Street, May 8, 1832 †
30. 528. Agreement – Props. Locks & Canals & Fuller & Adams, May 25, 1832
31. 529. Agreement of Patrick Lynch to Build Fence, Nov. 6, 1864

32. 530.
33. 531. Proprietors Of Locks & Canals on Merrimack River to Tremont Suffolk Mills
34. 532.
35. 533.
36. 534. Lawrence M. Co. to Props. Locks & Canals, May 25, 1895
37. 535.
38. 536. Locks & Canals
39. 537.
40. 538.
41. 539.
42. 540. †
43. 541. Merrimack M. Co. and Props of Locks & Canals to City of Lowell
44. 542.
45. 543. Bond- Tremont Company to Locks & Canals, July 1, 1834
46. 544. Bond- Suffolk Company to Locks & Canals, July 1, 1834
47. 545. Memo. Committee of P.L& C with Lowell, Lawrence & Haverhill Street Railway
48. 546. Middlesex Company to Props Locks & Canals, Sept. 5, 1868
49. 547. Tremont Suffolk Mills Conditions of Drawing Condenser Water from Dam Below Hall street
50. 548. Indenture Props Of Locks & Canals to the Lowell Gas Light Company, Sept. 26, 1847 †
51. 549. †
52. 550. Consent & Correspondence Props. Locks & Canals with Lowell Gas Light Co. May 21, 1890
53. 551.
54. 552.
55. 553.
56. 554.
57. 555. Bond – City of Lowell to Props of Locks & Canals, Oct 19, 1849 †
58. 556. †
59. 557. Merrimack M. Co. & City of Lowell, Jan. 2, 1880
60. 558.
61. 559. Agreement- Locks & Canals with City of Lowell, July 12, 1854
62. 560.
63. 561. †
64. 562. Storm Overflow into Western Canal at intersection of Broadway and Suffolk Streets- City of Lowell and Props of Locks & Canals, October 14, 1887
65. 563. †
66. 564. Props of Locks & Canals to City of Lowell, Oct. 15, 1898 †
67. 565.
68. 566. †
69. 567.
70. 568.
71. 569.

72. 570.

Box 36 (5.0" Legal size)
Folder:
1. 571. Sewer Under Eastern Canal †
2. 572. †
3. 573.
4. 574.
5. 575.
6. 576. 1893-4-5
7. 577. †
8. 578. Agreement Props of Locks & Canals with Boston & Lowell R.R. Co.
9. 579. Related to Pier of R.R. Bridge on Nashua & Lowell Railroad in Pawtucket Canal between Broadway & School Street, Sept. 26, 1879
10. 580. Obligation of N&L. R. Road Corp. to Props Locks & Canals to Maintain Fences, Jany 25, 1842
11. 581. Obligation of Boston & Lowell R.R. Corporation to Build a bridge over Pawtucket Canal in Conformity to the requirements of the Props of Locks & Canals
12. 582. Temporary Supports of B&L R.R. for Bridge over Pawtucket Canal
13. 583. †
14. 584. †
15. 585. Agreement N&L R.R. with P.L.&C, Aug. 14, 1846 †
16. 586. Nashua & Lowell R.R. to Boston & Lowell R.R. Co. Jan 5, 1850
17. 587. Nashua & Lowell R.R. Co. with Locks & Canals, Aug 14, 1846
18. 588. Hamilton Mange. Co., Tremont and Suffolk Mills, Props of Locks and Canals vs. Boston and Lowell Railroad Co. A.A. Strout, Atty. B. and L.R.R> Co to Richard Olney, Esq. Side Tracks, July 30, 1885 †
19. 589.
20. 590.
21. 591. †

Box 37 (5.0" Legal size)
Folder:
1. 592. Location of the Nashua & Lowell Railroad through Land of Props of Locks & Canals in Tynsborogh †
2. 593. Notice to Boston and Lowell R.R.
3. 594.
4. 595. Props. Locks & Canals to Boston & Lowell R.R. Corp.
5. 596. Notice to Prevent Easement Props. Locks & Canals to Nashua & Lowell Railroad
6. 597. Notice to Prevent acquisition of easement Props. Locks & Canals to Lowell & Lawrence Railroad
7. 598.

8. 599. Notice to Prevent easement to Boston & Lowell Railroad Corp. Dec. 23, 1884
9. 600. Certificate of witnesses to the entry upon premises claimed by the Boston & Lowell Railroad near Dutton Street, May 21, 1858
10. 601. Tremont & Suffolk Mills to Props. Locks & Canals, 18-inch condenser pipe- October 30, 1903
11. 602. †
12. 603. Public Notice Lower Free Landing, 1867 †
13. 604. Public Notice- Upper free Landing, 1867 †
14. 605. †
15. 606. Public Notice Right of Way & Drainage on the Southerly side of Pawtucket Canal
16. 607. Public Notice to Prevent easement on land south side of Hamilton Canal and North of Land Leased to Boston & Lowell Railroad Corporation, Nov. 21, 1871
17. 608. Props Locks & Canals- Public Notice- Land Between Suffolk Yard & Northern Canal, Nov. 27, 1876
18. 609. Public Notice by Props of Locks & Canals Southerly Bank of Pawtucket Canal between Thorndike & School Streets
19. 610. Margin of Pawtucket Canal Easterly of School Street- Posted July 24 to 29, 1882
20. 611. Public Notice to Prevent Easement Merrimack Canal December 16, 1884
21. 612. Public Notice to Prevent Easement Merrimack River, December 1884
22. 613. Notice- Land Bordering on the Westerly side of Eastern Canal between East Merrimack and Bridge Street
23. 614. †
24. 615. †
25. 616. Notice relating to Passage & Footbridge in rear of Counting room Lot on Mechanic Street, on Broadway, Western Canal †
26. 617. Recorded Notices-Northerly bank of Pawtucket Canal between Upper Free Landing & School St. 1859
27. 618. Notice- Proprietors of the Locks & Canals on Merrimack River to Artimas L. Brooks & Others, 1856
28. 619. Proprietors of Locks & Canals to Royal Southwick
29. 620. Notice-Props Locks & Canals to J. Wentworth, Oct. 1, 1859
30. 621. Notice- Props of Locks & Canals to William Stiles, June 30, 1859
31. 622. Notice to prevent the acquisition of the right easement Merrmc. Manufacturing Co to Proprietors of Locks & Canals & Boott Cotton Mills, Dec 1855
32. 623. Drains entering the western Canal near the corner of Suffolk & Fletcher Streets
33. 624. Notice to City of Lowell – Sewers
34. 625. Notices to Owners of Lots on Drummer Street, at Southwest Corner of Lot Occupied by the agent of Locks & Canals
35. 626. Notices to abutters on Margin of Pawtucket & Eastern Canals Near Central Street to Prevent acquisition of easement May 9, 1859
36. 627. Notice Locks & Canals M.R. to Geo. W. Emerson, 1841
37. 628.
38. 629. Notice Props of Locks & Canals to Richard Rhodes, May 3, 1866
39. 630. Notice- Props of Locks & Canals to the Lowell Gas Light Co. May 3, 1866

40. 631. Acknowledgement of tenancy in the Land on Kink Street through which their drain papers by John Clark & Others, June 6, 1843
41. 632. Notice- Props of Locks & Canals to William Livingston, Nov. 15, 1867
42. 633. Notice- Locks & Canals to McFarlin, Jan. 13, 1864
43. 634. Notice Props of Locks & Canals to the Appleton Company
44. 635. Notice Props of Locks & Canals to the Hamilton Manufacturing Co.
45. 636. Notice – Props of Locks & Canals to the Lowell Mang Company, March 15, 1866
46. 637. Notice Props of Locks & Canals to the Lowell Machine Shop
47. 638.
48. 639.
49. 640. Notice to Prevent Easement to City of Lowell Dec. 8, 1884
50. 641. Notice to Prevent Easements to Appleton Company, Dec. 8, 1884
51. 642. Notice to Prevent Easement to Hamilton M. Co. Dec. 8, 1884
52. 643. Notice Props of Locks & Canals to Lawrence M. Co. Dec 16, 1884
53. 644. Props Of Locks and Canals to City of Lowell, Nov. 6, 1885
54. 645. Notice to City of Lowell, July 5, 1892
55. 646. Notice to Trustees of Dartmouth College & George H. Stevens their Agent to Desert from trespassing on L&C land adjourning "Wentworth Block" Feb. 23, 1892
56. 647. †
57. 648.
58. 649.
59. 650. Copy to Notice Serviced on Robert Hoyle and Ann Hoyle, his wife, July 9, 1883
60. 651.
61. 652. Notice to Heyekiah Ashton House on Middle Street, November 2, 1848
62. 653. †
63. 654. Notice to owners of Building on Stackpole street of Intention of Props Locks & Canals to cut off all the Private Drains entering on their levels, August 1881 †
64. 655. Rough Draft of Notice to S.F. Gladwin, Encroachment on Passages, Dec. 17, 1862
65. 656.
66. 657. Notice Props. of Locks & Canals to the City of Lowell, July 25, 1865
67. 658.
68. 659.
69. 660.
70. 661.
71. 662.
72. 663.
73. 664. Notice Props of Locks & Canals to Alden B. Richardson, May 14, 1866
74. 665.

Box 38 (5.0" Legal size)
Folder:
1. 666. Notice- Proprietors of the Locks & Canals on Merrimack River to Otis Allen, 1856
2. 667. Notice Proprietors of the Locks & Canals on Merrimack River to Merrimack

Lumber co. 1856

3. 668. Deed Of Proprietors of Lee Street Church, Lowell, February 16, 1850
4. 669. †
5. 670.
6. 671.
7. 672.
8. 673.
9. 674. †
10. 675.
11. 676. Indenture City of Lowell & town of Dracut with Props of Locks & Canals on Merrk. River, May 19, 1871
12. 677. †
13. 678. †
14. 679. Public Notice to Prevent Acquisition of Easement on the Upper free Landing, May 27, 1873
15. 680. Agreement Artimas L. Brooks with Props. Locks
16. 681.
17. 682. Agreement Props Of the Locks & Canals and city of Lowell establishing a new "Upper Free Landing" December 22, 1900 †
18. 683. †
19. 684.
20. 685.
21. 686. Indenture between the Props of Locks & Canal, the heirs of Geo. W. Lyman and the City of Lowell, Oct. 31, 1896
22. 687.
23. 688. Locks & Canals to Lowell Mand. Co. June 3, 1852
24. 689. Locks & Canals to Lyman, Feb. 23, 1837
25. 690. G.W. Lyman to Lowell Citizens, February 24, 1837
26. 691.
27. 692. Lowell Mang. Co. to City of Lowell Nov. 30, 1847
28. 693.
29. 694.
30. 695. Release Props of Locks & Canals to city of Lowell, June 1, 1877
31. 696.
32. 697. †
33. 698. Certificate John F. Doherty, William C. Doherty, & Winnifred Doherty, February 10, 1902
34. 699. †
35. 700.
36. 701. Release Hiram Whitney to Props of Locks & Canals
37. 702. Mortgage Justine Lavallie to Proprietors of the Locks & Canals on Merrimack River. Discharge, Mar. 19, 1904
38. 703. William Livingston to the Props of the L & Canals, Dec. 10, 1849 †
39. 704. Eliph Baker to P.L.&C on Merr. R. Release of Damages to Mills on Concord River,

Feb. 5, 1847
40. 705. Disclaimer- Appleton Company to Props Locks & Canals, November 11, 1904
41. 706. Disclaimer- Tremont & Suffolk Mills to Props. Locks & Canals, November 25, 1904
42. 707. Disclaimer Lowell Machine Shop to Props. Locks & Canals, May 3, 1895
43. 708.

Box 39 (5.0" Legal size)
Folder:
1. 709. Lyman C. Prouty et al to Prop'rs Locks & Canals- Bond
2. 710. Deed- Lowell Machine Shop to Lowell Manufacturing Co.
3. 711.
4. 712. Indenture- Lawrence Mfg. Tremont & Suffolk mills- October 1, 1896
5. 713.
6. 714. Boott Cotton Mills to Boott Mills- Deed, February 18, 1905
7. 715. Agreement- Boott Mills to Props. Locks & Canals- February 24, 1905
8. 716. Agreement- Boott Mills to Props. Locks & Canals- March 31, 1905
9. 717.
10. 718. †
11. 719.
12. 720. †
13. 721. Quitclaim Deed- Props. Locks & Canals to Appleton Company- Sept. 30, 1904
14. 722. Agreement- Props, Locks & Canals on Merrimack River and Appleton Company, Oct. 21, 1904
15. 723. Release- Hiram Whitney to Props. Locks & Canals, April 25, 1905
16. 724.
17. 725. Memorandum of Agreement- Props Locks & Canals and Lowell Machine Shop [726 *Not Located During Processing*]
18. 727. Agreement- Lawrence Mfg. Co and Props. Locks & Canals, Aug 24, 1905
19. 728. †
20. 729. †
21. 730.
22. 731-794. Bound in Portfolios "A"-"B" *See Oversize Box 51*.
23. 795. Agreement-Props of Locks & Canals with Bens. F, Butler, July 5, 1865
24. 796.
25. 797. Agreement with Middlesex Company-Aug. 25, 1905, Pumping Water
26. 798. Agreement with Mass. Cotton Mills, Aug 25, 1905, Pumping Water
27. 799. Agreement with Appleton Company, Sept. 12, 1905, Pumping Water
28. 800. Agreement with Merrimack Mfg. Co. Sept. 12, 1905
29. 801. Boott Mills to Props, Locks and Canals- Grant of Right to Construct and Maintain New Steel Penstock and to fill up old Boott Penstock, July 27, 1906
30. 802. Disclaimer- Lowell Electric Light Corporation to Props. Locks & Canals
31. 803. Fiske & Norcross to Merrimack River Lumber Co. January 20, 1851

32. 804. Merrimack River Lumber Co. Mar. 24, 1855 †
33. 805. Deed- Dan Saunders to C.W. Saunders- Dec. 15, 1877
34. 806. †
35. 807. Disclaimer- Hamilton Man & Company to Props, Locks & Canals, Trolley wire over Lowell Level of Pawtucket Canal. Trolley wire over Lowell Level of Pawtucket Canal, June 28, 1907
36. 808. Disclaimer- Lowell Gas Light Company to Props. Locks & Canals. July 2, 1907
37. 809. †
38. 810. Disclaimer- Lowell Electric Light Corporation, Props, Locks & Canals, July 21, 1907
39. 811. Order of Lowell City Council- Relating to Fencing Western Canal- June 22, 1869
40. 812. Disclaimer- Lowell Electric Light Corporation to Props. Locks & Canals
41. 813. Agreement with Merrimack Mfg. Co. Sept. 19, 1907 Pumping water
42. 814. Agreement with Mass Cotton Mills, Sept. 19, 1907, Pumping Water
43. 815. Agreement- Bigelow Carpet Co. to Props. Locks & Canals, Oct. 7, 1907
44. 816. Memorandum- Props Locks & Canals & Lowell Machine Shop, Nov. 24, 1905
45. 817. Props. Locks & Canals on Merrimack River to Bigelow Carpet Company
46. 818.
47. 819.
48. 820.
49. 821.
50. 822.
51. 823.
52. 824. Lowell Gas Light Company & Prop'rs of Locks & Canals
53. 825. Disclaimer- Lowell Electric Light Corporation to Prop's Locks & Canals Pole Location near Peveys Foundry – Nov. 17, 1908
54. 826. City of Lowell et al and Massachusetts Cotton Mills
55. 827. Agreement with Merrimack Mfg. Co. Maintaining Steam Pump, Getting up Steam & Pumping March 11, 1909
56. 828. Agreement with Mass. Cotton Mills, Maintaining Steam Pump, Keeping up Steam and Pumping, March 11, 1909
57. 829.
58. 830.
59. 831. Indenture- Agreement Props Locks & Canals & Bigelow Carpet Co. Sept. 24, 1909
60. 832. Agreement- Props Locks & Canals & Bigelow Carpet Company, Sept 24, 1909
61. 833. Disclaimer- The New England Telephone & Telegraph Co. to Props. Locks & Canals, Sept. 25, 1909
62. 834. Boott Mills to Props. Locks and Canals, February 18, 1910 †
63. 835.
64. 836.
65. 837. Agreement Middlesex Co. & Props. Locks & Canals, July 23, 1910 – Pump †
66. 838.
67. 839. Vote of B&M R.R.
68. 840. Vote of B&M R.R.

69. 841. Boston & Lowell R.R. Corp. to Props. Locks & Canals on Merrimack River
70. 842. Boston & Lowell R.R. Corp. with Proprietors of Locks & Canals on Merrimack River
71. 843. Boston & Lowell R.R. Corp. to Proprietors of Locks & Canals on Merrimack River
72. 844. Boston & Lowell R.R. Corp & Proprietors of Locks & Canals on Merrimack River
73. 845. Boston & Lowell R.R. Corp & Proprietors of Locks & Canals on Merrimack River

See also: Oversize Box 51 (20 ½ x 24 ½ X 3" flat box)
"A. Index Nos. 731-783: Original Indentures, Land & Water Power, 1826-1845 … Also Quit-Claim Deeds. Water Power, December 1, 1853" Some pressure-sensitive tape – untie cover, folder individual sections, slight red rot on covers
"B. Index Nos. 784-1794: Indentures, Dec. 1, 1853 – Mill Powers" Heavily acidified cover pages to indentures

Box 40 (5.0" Legal size)
Folder:
1. 846.
2. 847.
3. 848. Disclaimer- Ayer Hume to Props Locks & Canals- Bathing Pool and Shelter in Rear of the home
4. 849.
5. 850.
6. 851. Helen A.W. Remick, F.C. to Props Locks & Canals on Merrimack River †
7. 852. †
8. 853. Agreement P.L. & C. & Burnham & Davis Lumber Co. July 21, 1911
9. 854.
10. 855. Hamilton M. Co. to Chas. E. Bradley, Wm. J. Bradley †
11. 856. Hamilton Mfg. Co. to Props. Locks & Canals
12. 857. Quitclaim Deeds Props Locks & Canals & William E. Badger
13. 858. Declaration of Trust Locks & Canals on Merrimack River
14. 859. Disclaimer City of Lowell to Props. Locks & Canals
15. 860. Removal of Ice from the Eastern Canal
16. 861.
17. 862. Agreement Props Locks & Canals to City of Lowell Oct. 18, 1912
18. 863. Lawson Company- Suction pipe and Drain on L&C Land- Oct. 30, 1912
19. 864. Artemas B. Woodworth et al to Props. Locks & Canals on Merrimack River
20. 865.
21. 866.
22. 867. Props. Locks & Canals on Merrimack River to Lowell Corporation Hospital
23. 868. Props Locks & Canal on Merrimack River & Mary F. Dillon
24. 869. Fisher H. Pearson to Props. Locks & Canals on Merrimack River
25. 870. Lowell Electric Light Corporation & Props. Locks & Canals. Pole on Payne Street, May 26, 1913

26. 871. Agreement- Props. Locks & Canals & Saco. Lowell Shops, July 10, 1913
27. 872. Corporation of the Members of Association Catholique to Props Locks & Canals. Fire Escape, Feb. 28, 1914
28. 873. Forster H. Smith to William E. Badger
29. 874. William E. Badger to Props Locks & Canals on Merrimack River
30. 875. Props Locks & Canals to Lowell Corporation Hospital
31. 876. Lowell Hospital Assn. to Props Locks & Canals on Merrimack River
32. 877.
33. 878.
34. 879.
35. 880.
36. 881.
37. 882.
38. 883.
39. 884.
40. 885. Kitson Machine Shop to Lowell Machine Shop- Jan. 4, 1912
41. 886. Kitson Machine Shop to Lowell Machine Shop, Jan. 31, 1917
42. 887. Agreement- Bigelow Carpet Corporation with Props. Locks & Canals. Relative to Mill Power Rentals, Aug 26, 1914
    [888 *Not Located During Processing*]
43. 889.
44. 890. *Not Located During Processing*
45. 891. Agreement – Bigelow-Hartford Carpet Co. & Props. Locks & Canals, Dec. 17, 1914
46. 892. Agreement Saco- Lowell Shops Mil Power Rentals, June 16, 1915
47. 893
48. 894.
49. 895. Appleton Co. and Props. Locks & Canals Pumping Agreement, Dec. 9, 1915
50. 896. Lawrence Manufacturing Company & Props Locks & Canals, Pumping Agreement
51. 897.
52. 898.
53. 899. Disclaimer- Margaret W. Merrill, Smokestack, Feb. 12, 1916
54. 900.
55. 901. Disclaimer National Engineering Corporation to Props. Locks & Canals, June 21, 1916
56. 902.
57. 903.
58. 904. Hannah Varnum to Props. Locks & Canals
59. 905. Props Locks & Canals to William E. Badger
60. 906. William E. Badger to Props. Locks & Canals, (in Trust)
61. 907. Board of Treasurers to Props. Locks & Canals
62. 908. Disclaimer- Saco- Lowell shops to Props. Locks & Canals, Jan. 2, 1917
63. 909.
64. 910. †

65. 911. Disclaimer- Massachusetts- Mohair Plush Company to Props. Locks & Canals, May 29, 1912
66. 912.
67. 913.
68. 914. Strand Realty Co. to Props of Locks & Canals on Merrimack River
69. 915.
70. 916.
71. 917.
72. 918. Disclaimer- Boston & Maine Railroad to Props Locks & Canals, Jan 10, 1918
73. 919. Disclaimer- Tremont & Suffolk Mills to Props. Locks & Canals, March 28, 1919
74. 920. J. Murray House with Props. Locks & Canals on Merrimack River
75. 921. Lawrence Manufacturing CO. to Suffolk Manufacturing Co.
76. 922. Lawrence Manufacturing Co. to Proprietors Tremont Mills
77. 923. Disclaimer-Saco- Lowell Shops to Props, Locks & Canals, August 22, 1919
78. 924. Agreement Boston & Maine R.R. & Props. Locks & Canals, June 11, 1919 †
79. 925. Percy Gulline with Props, Locks & Canals, on Merrimack River
80. 926. Percy Gulline to Props. Locks & Canals, on Merrimack River
81. 927. J. Murray Howe to Props Locks & Canals on Merrimack River
82. 928. Percy Gulline to Props. Locks & Canals on Merrimack River
83. 929. William E. Badger to Props. Locks & Canals on Merrimack River
84. 930. Board of Treasures to Props. Locks & Canals on Merrimack River
85. 931. Props Locks & Canals to William E. Badger
86. 932. Lowell Gas Light Company to Props. Locks & Canals on Merrimack River
87. 933. †
88. 934. Disclaimer- Hamilton Mfg. Co. to Props. Locks & Canals †
89. 935. Disclaimer Hamilton Mfg. Co. to Props. Locks & Canals, June 14, 1920
90. 936.
91. 937.
92. 938. Middlesex Company to Ipswich Mills, May 10, 1920

Box 41 (5.0" Legal size)
Folder:

1. 939. Agreement – Props Locks & Canals & Boston & Maine Railroad, July 7, 1920
2. 940. Quitclaim deed- Bigelow, Hartford Carpet Company to J. Murray Hose, Feb 17, 1920
3. 941. Agreement Saco- Lowell Shops with Props Locks & Canals, Nov. 3, 1920
4. 942. Disclaimer. Saco- Lowell Sharps to Props. Locks & Canals, Dec. 10, 1920 †
5. 943. Saco Lowell Shops to Props Locks & Canals Dec. 15, 1920 †
6. 944. Disclaimer W.J. Barry Shoe company to Props Locks & Canals, Oct. 1, 1920
7. 945. Disclaimer- Boott Mills to Props Locks & Canals, Nov. 9, 1920 †
8. 946. Disclaimer- Hamilton mfg. Co. to Props. Locks & Canals, Nov. 29, 1920
9. 947.
10. 948. Ipswich Mills & Props Locks & Canals on Merrimack River

11. 949. Locks & Canals on Merrimack River- Consent
12. 950. †
13. 951. †
14. 952.
15. 953. Bigelow- Hartford Carpet Company to Props Locks & Canals at al as Lowell Hospital Association, July 14, 1920
16. 954. Props Locks & Canals on Merrimack River & Middlesex County †
17. 955. *Not Located During Processing*
18. 956. †
19. 957. Saco- Lowell Shop to Props Locks & Canals
20. 958. Disclaimer- New England Tel & Tel Co. to Props Locks & Canals
21. 959.
22. 960.
23. 961.
24. 962. †
25. 963.
26. 964.
27. 965.
28. 966.
29. 967. Contract Between George H. Jones, New Durham N.H./ F.C. Dumaine, Moore's Falls Corporation, Ames Construction Company by H.V.S. Sheaham, for work at Merry Meeting Lake Date Somersworth, N.H, Sept. 30, 1922
30. 968.
31. 969.
32. 970. Props Locks & Canals with E.A. Wilson Company
33. 971.
34. 972.
35. 973.
36. 974. Disclaimer- John F. & Wm. C. Doherty to Props Locks & Canals, May 29, 1923
37. 975.
38. 976. Props Locks & Canals to Commonwealth of Massachusetts, textiles school Lot, 1921
39. 977.
40. 978.
41. 979.
42. 980.
43. 981.
44. 982. Deed from Massachusetts Cotton Mills to Courier- Citizen Company, Prescott Store house Lot, July 23, 1923
45. 983. Disclaimer- Appleton Company to Props. Locks & Canals, August 7, 1923
46. 984.
47. 985.
48. 986.
49. 987. Indenture- City of Lowell & Props. Locks & Canals, Oct. 21, 1923

50. 988. Massachusetts Cotton Mills to Courier Citizen Company- Sublease, July 27, 1923
51. 989. Massachusetts Cotton Mills to Courier- Citizen Company- Sublease Sept. 29, 1923
52. 990. Disclaimer- Saco- Lowell Shops to Props. Locks & Canals
53. 991. †
54. 922. Burnham & Davis Lumber Co. Nov. 30, 1923 †
55. 993. †
56. 994. †
57. 995.
58. 996. Disclaimer- Courier- Citizen Company to Props. Locks & Canals
59. 997.
60. 998.
61. 999.
62. 1000.
63. 1001.
64. 1002.
65. 1003.
66. 1004.
67. 1005.
68. 1006. Lowell Light Co.
69. 1007.
70. 1008.
71. 1009.
72. 1010. Agreement- City of Lowell & Props. Locks & Canals – Boston & Maine R.R.
73. 1011.
74. 1012. †
75. 1013.
76. 1014.
77. 1015. †
78. 1016. †
79. 1017. †
80. 1018. †
81. 1019. †
82. 1020. †

Box 42 (5.0 Legal size)
Folder:
1. 1021. †
2. 1022. †
3. 1023. †
4. 1024. †
5. 1025. †
6. 1026. †
7. 1027. †

8. 1028. †
9. 1029. †
10. 1030. †
11. 1031. †
12. 1032. †
13. 1033. †
14. 1034. †
15. 1035. †
16. 1036.
17. 1037.
18. 1038. †
19. 1039.
20. 1040. Lawrence Manf. Co. With Props. Locks & Canals
21. 1041.
22. 1042. Nashua Manufacturing co. with Proprietors at the Locks & Canals on Merrimack River
23. 1043.
24. 1044. Massachusetts Cotton Mills Inc. to Proprietors of the Locks & Canals on Merrimack River, January 29, 1927
25. 1045. Massachusetts Cotton Mills into Proprietors of the Locks & Canals on Merrimack River
26. 1046. Props of Locks & Canals with Edwin A. Simpson
27. 1047. Massachusetts Cotton Mills Inc. Assignment of Lease, December 13, 1926
28. 1048. Edwin A. Simpson et al to Props. Locks & Canals, Release
29. 1049. Lowell Gas Light Co. to Tremont & Suffolk Mills
30. 1050. †
31. 1051.
32. 1052.
33. 1053. †
34. 1054. Props of Locks & Canals to Modern & Murphy †
35. 1055. Morden & Murphy Inc to Proprietors of the Locks & Canals on Merrimack River †
36. 1056. Lawrence Manufacturing Co. Proprietors of the Locks & Canals on Merrimack River
37. 1057.
38. 1058.
39. 1059. Marden & Murphy Inc. with Proprietors of the Locks & Canals on Merrimack River
40. 1060.
41. 1061.
42. 1062.
43. 1063. Appleton Co. Lowell to Lowell Hospital Association, Release & Vote
44. 1064. Pepperell Mfg. Co. to Lowell Hospital Association Release, Nov. 21, 1927
45. 1065.

46. 1066.
47. 1067. Assets Realization Company to Proprietors of the Locks &Canals on Merrimack River
48. 1068.
49. 1069.
50. 1070.
51. 1071.
52. 1072.
53. 1073.
54. 1074.
55. 1075.
56. 1076.
57. 1077. †
58. 1078. †
59. 1079. Arthur J. Safford- Locks & Canals 66 Broadway City
60. 1080.
61. 1081. Copy of Deed PL&C to Pepperell [Manufacturing Company]

Box 43 (5.0" Legal size)
Folder:
1. 1082. PL&C to [sic]
2. 1083. †
3. 1084.
4. 1085. †
5. 1086.
6. 1087.
7. 1088.
8. 1089.
9. 1090.
10. 1091.
11. 1092.
12. 1093.
13. 1094. Appleton Co. Disclaimer to Steam pipe in Pawtucket Canal
14. 1095.
15. 1096.
16. 1097. Not in Force
17. 1098.
18. 1099. †
19. 1100.
20. 1101.
21. 1102.
22. 1103. †
23. 1104.

24. 1105. Disclaimer for wires across Pawtucket Canal [?] *
25. 1106.
26. 1107. †
27. 1108. Covenant Agreement LID& PL&C
28. 1109. Copy of Deed Props & LID
29. 1110.
30. 1111.
31. 1112. *
32. 1113.
33. 1114. *
34. 1115. *
35. 1116. *
36. 1117. Disclaimer *
37. 1118.
38. 1119.
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43. 1124. Arthur T. Safford Esq.
44. 1125.
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47. 1128.
48. 1129. †
49. 1130. †
50. 1131.
51. 1132. †
52. 1133. †
53. 1134. †
54. 1135. Appleton Co. & [?] Connector
55. 1136. †
56. 1137. †
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69. 1150. †
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Box 44 (5.0” Legal size)
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8. 1161. †
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24. 1177. †
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27. 1180.
28. 1181.
29. 1182.
30. 1183.
31. 1184.
32. 1185. Duplicate of 1181
33. 1186. †
34. 1187. †
35. 1188. Deed E.A. Wilson Co. includes the sue of Thomas Street †

36. 1189. †
37. 1190. †
38. 1191. †
39. 1192.
40. 1193.
41. 1194.
42. 1195. †
43. 1196.
44. 1197. †
45. 1197-A. Lowell Housing Authority, Lib. Ins. Policy
46. 1198. †
47. 1199.
48. 1200.
49. 1201.

Box 45 (5.0" Legal size)
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1. 1202.
2. 1203.
3. 1204.
4. 1205.
5. 1206.
6. 1207.
7. 1208. †
8. 1209.
9. 1210. Pope agreement, Fire Protection Agreement
10. 1211. Return of Portion of Lot 96-B and all of 96-D
11. 1212. Appleton co. to Jackson Prpts.
12. 1213. Deed City of Lowell to Lowell Land Company
13. 1214. Deed: City of Lowell to Lowell Land Co. 10,573 sq. ft. Part of Lot 96B
14. 1215. Moise Edmond
15. 1216. Fauvel.
16. 1217. St. John's Hospital †
17. 1218. Saco-Lowell Shops †
18. 1219. Us government Agreement – Also Termination and Release
19. 1220. B&M R.R. E.A. Wilson
20. 1221. Lowell Land Company
21. 1222. Lowell Land Company
22. 1223. Lowell Land Company
23. 1224. New England Tel & Tel Co.
24. 1225. Disclaimer, J.A.E. Realty to Proprietors Drainage
25. 1226. John Georges Deed †
26. 1227. John Georges, Agreement, Now owned by N.E. Theaters
27. 1228. Lowell Ind. Dev. Co. Rent of Pump Canceled due to installation of new pump,

April 1957

28. 1229. Lowell Land Co. & City of Lowell
29. 1230. Lowell Elec. Light Corp & Lowell Motor boat Club
30. 1231. Jackson Propts & General Electric
31. 1232. John Pilling Shoe Co. Inc. Deed †
32. 1233. Sydney Corp. Megowen Education etc. Gas Pipe Agreement
33. 1234. The Lowell Electric Light Cow. Disclaimer
34. 1235. Merrimack Manufacturing Co. Transfer of Mill Powers
35. 1236. City of Lowell, Agreement (Over-flow pipe) †
36. 1237. Lowell Gas Light Company, Canal Water
37. 1238. Lowell Electric Light Corp. disclaimer
38. 1239. Nathan N.E. Bldg. Specialties (Z.Narkum)
39. 1240. General Electric Co. Disclaimer
40. 1241. Merrimack Mfg. Co. (1946) Covenant
41. 1242. New Market Mfg. co. Covenant
42. 1243. Lowell Elect. Right disclaimer
43. 1244. Lowell Ind. Deo. Co. Covenant
44. 1245. Atlantic Ray on Corporation Props of the Locks & Canals Covenant
45. 1246. Merrimack Mfg. Company (Temper 6 ½ P.M.P) Indenture
46. 1247. Textron Incorporation to Textron Inc. Covenant
47. 1248. Lowell Liquidation Corporation
48. 1249. General Electric Company Water from Merrimack River
49. 1250. General Electric company (Jackson Street Plant) †
50. 1251. Boston and Maine Railroad Agreement
51. 1252. Dancause Inc. Charles
52. 1253. Copy Assts Realization Co. to United Elastic Corporation Deed
53. 1254. Copy united Elastic Corp to Abbot Houston Co. Deed
54. 1255. Release St. Anne's Church 8 Passageway
55. 1256. Merrimack Mfg. Co.- 6,030 sq. ft. – 2 parcels of land westerly end of Front St. between Front St. and land taken by the state for highway purpose

Box 46 (5.0" Legal size)
Folder:

1. 1257. Easement, Lowell Ind. Dev. Co. – Right to install and maintain submarine cable in the Lower Pawtucket Danal [sic] from LIOCO- Mass Div to Assets Div.
2. 1258. Lowell Ind. Dev. Co, Void, Contract for Electric Power, Jan. 31, 1851, see #1307
3. 1259. Agreement Mass Mohair Plush Mec. of Canal Water, Void, See 1308
4. 1260. McCarty's Laundry Agreement [illegible] of canal water
5. 1261. Void- see #1275, Attantee Parachute Corp.
6. 1262. †
7. 1263. Maintaining of Bridges over Canals
8. 1264. E.A. Wilson Agreement Land 2
9. 1265. City of Lowell, Release

10. 1266. Pellon Corporation Disclaimer
11. 1267. Corporation members of the Catholic Association (CMAC) Assent †
12. 1268. M. Francis Dillon & L.I. D. Co. Mass Div. Agreement
13. 1269. E.A. Wilson Co. Parking Agreement Canceled, 4/6/56.†
14. 1270. City of Lowell License †
15. 1271. Lowell Gas Co. Letter †
16. 1272. Lowell Electric Light Corp. License †
17. 1273. Appleton Company- J.P. Stephens & Co. Inc. Agreement
18. 1274. Edward I. Garry & William F. Herlihy Agreement
19. 1275. Textron Incorporated Covenant
20. 1276. *Not Located During Processing*
21. 1277. Bloomburg Realty Co. Indenture †
22. 1278. Robert L.D. Mason Indenture of Lease
23. 1279. City of Lowell Erection of Pole †
24. 1280. City of Lowell Modification of Agreement Install and maintain steam pipeline †
25. 1281. City of Lowell Ingress & Egress to Parking Area †
26. 1282. City of Lowell Agreement Land off Sutton St.
27. 1283. Deed, United Elastic to Abbot Worsted Co. Sale of Bldg. 17 & 17A
28. 1284. Indenture. Appleton Co.- Saco. Lowell †
29. 1285. Agreement, License to dump snow off Stackpole street, city of Lowell †
30. 1286. Merrimack Mfg. (1952) Covenant
31. 1287. Merrimack Mfg. Co. (1952) Supplemental Covenant
32. 1288. Norman P. Mason, Indenture of Lease
33. 1289. Deed Hamilton Co. New Market Mfg. Co, June 18, 1947.
34. 1290. Covenant, New Market Mfg. Co. to Textron Incorporation
35. 1291. Quitclaim Covenants, Marden & Murphy inc. to Hamilton Company
36. 1292. *Not Located During Processing*
37. 1293. Mortgage Dillon Dye works
38. 1294.
39. 1295. Doherty Realty Company, Incorporated Transfer, of 8 – 2/3 Mill Pow.
40. 1296. Indenture – P.L.&C Boott Mills and Lowell Realty Corporation Release of Liability for P.M.P. water rights on land
41. 1297. Boott Mills. Agreement in Reference to Bridges & Walkways over Eastern Canal at Boott Mills
42. 1298. Agreement 6 15/30 P.M.Ps of Tremont 8 19/30 P.M.Ps of Lawrence Section to be used in main yard of Merrimack Mfg. Co.
43. 1299. Disclaimer chain link fence & Bldg. on southerly bank of Pawtucket Canal †
44. 1300 Boott Mills, 7ft. Walkway across eastern canal northeasterly of main entrance bridge of Boott Mills
45. 1301. Agreement – Transfer of Mills. LIDCO Mass & Assets Division into Main Yard (Boott)
46. 1302. Stop & Shop Inc. Deed, Agreement and other papers in the purchases of lot 33 C-Aiken St. Playground

47. 1303. New England Tel & Tel co. Install and Maintain There on a Commercial Wire and a Pole & Stackpole St.
48. 1304. Del Realty Trust Indenture
49. 1305. Hastings Realty Trust †
50. 1306. Pellon Corporation Disclaimer, Sewer outlet to Lower Pawtucket Canal †
51. 1307. Boott Mills Contract for Power
52. 1308. Royan Corporation, Letter of Knowledge on use of Canal Water

Box 47 (5.0" Legal size)
Folder:

1. 1309. Boott Mills, Prescott Pump
2. 1310. Boott Mills, Merging of Mass and assets division with the Boott
3. No. 1311. Capital Stock, Certificate of Articles for agreement
4. No. 1312. Deed Part of Lot # 96 – B First Street the First Church of the Nazarene †
5. No. 1313. Disclaimer, Merrimack- Essex Electric Co. 2 pole platform structure with wires & Cables, Tyng Street
6. No. 1314. Release Courier- Citizen Co. Construction of 1-story Brick Building- N.E. of Tilden Street
7. No. 1315. City of Lowell Foot path and Foot Bridge across P. Locks & Canals Land and Lower Locks Locking area and wasteway
8. No. 1316. Pellon Corporation Bridge proposed to be built by Pellon Corp. between their now existing building and the new proposed building in the Pellon Corporation Yard
9. #1317. Pipe agreement Lowell Gas Company gas pipe over and adjacent to Hamilton, Lower Pawtucket and Merrimack Canals- Between Dutton & Jackson Streets
10. #1318. Deed John J. Hurley Jr. Sale of Land & Buildings @ # 719 Broadway, Lowell, Mass †
11. 1319. Lowell Motor Boat Club Inc. Mortgage deed, etc. Purchase of Lot #9 – near Pawtucket Canal †
12. No. 1320. Disclaimer, Pellon Trust & Pellon Corp. Unloading of liquids from railroad Tank cars. †
13. 1321. Deed, the Robertson Company sale of Land- Lot #80
14. 1322. Deed, Elmer P. Margaret Rynne sale of Land Lot #80-0
15. #1323. Disclaimer, Merrimack – Essex Electric Co. Location of 3 Anchor guys, Suffolk Street
16. No. 1324. Jackson Properties inc. foot path between Dutton and Jackson Street †
17. 1325. Deed, John J. & Gertrude B/ Scullion , Sale of Land,- Lot #25
18. 1326. Deed- Trustees of Sullivan Trust
19. 1327. Agreement E.A. Wilson Company
20. 1328. Deed, E.A. Wilson Company
21. 1329. Deed Vernon McDowell
22. 1330. Easement- Lot #84, United States of America †
23. 1331. Saco- Lowell Shops and Proprietors of the Locks & Canals, Nov. 23, 1942.

24. 1332. Order of taking, easement – Lot #80 –F, Bill of Sale, City of Lowell †
25. 1333. Deed, Appleton Service, Sale of land – Lot #80- F †
26. 1334. Suffolk Knitting Company. Release: Re: Water Damage, May 17th, 1959
27. 1335. Order of Taking perpetual easement Dutton St. and other Parcels of land, City of Lowell.
28. 1336. Release- Land on South common for School, City of Lowell
29. 1337. Agreement- Exchange of stock of buckeye Corp. for stock of Proprietors of Locks & Canals on Merrimack River
30. 1338. Agreement Power Transmission Wanskuck & Merrimack Mfg. Company †
31. 1339. Agreement- Mill Power Wanskuck & Merrimack Manufacturing Co.
32. 1340. Agreement- Fire Protection, Wanskuck & Merrimack Manufacturing co.
33. 1341. Agreement- Textron, Textron, Inc.
34. 1342. Agreement- Merrimack
35. 1343. Courier- Citizen Co. Deed to Weave Shed †
36. No. 1344. disclaimer, 16" Gas main-each end of Brewery Bridge and across Pawtucket Canal NE of said Bridge Lowell Gas Company
37. 1345. City of Lowell Contract Re: repair, Etc. due to Bridge construction. etc. across canal
38. #1346. Wanskuck Company Lease, Re: Tremont Power Station
39. #1347. Boott Mills Lease, Re: Tremont Power Station
40. 1348. Middlesex paper tube company, inc. land on Kyan street
41. 1349. Ovide and Alberta Levasseur House and Land at #23 School Street †
42. 1350. Emile Langlais et ux Land- South westerly side of Cheever Street †
43. 1351. J. Emile Lemire et ux Land- South Westerly side of Cheever Street
44. 1352. Jackson Properties, Inc. Land- Jackson Street, Lowell, Mass
45. 1353. Emile St. Louis, et us Land #111 Ford Street Lowell, Mass
46. 1354. Ernest A. Baribeault Land #204 Cheever Street Lowell, Mass.
47. 1355. Alexandrine Defour Land - #105 Ford Street, Lowell, Mass.†
48. 1356. JAE. Realty Trust Land - # 491 Dutton Street, Lowell, Mass.
49. 1357. Harvey P. St. Louis et. ex. Land- Ford Street and Cabot Street, Lowell, Mass
50. 1358. Riggs & Lombard Inc. Land, adjacent to and North of Perkins Street, Lowell, Mass †
51. 1359. Stream Associates. Inc. Land, adjacent to and North of Perkins Street, Lowell, Mass.
52. 1360. Deed- Anastase Beaudoin, Land at #93 Ford Street, Lowell, Mass
53. 1361. Deed- Joseph J. Flynn, Inc. Land for Billboards
54. 1362. Deed Zenon W. Narkun etc ux Landat 4 to 6 Fletcher St.
55. 1363. Clarinda Burr, 3038 sq. ft. of land on Ford St. Lots #64 – D-I and 64-H Deed
56. 1364. Hub Properties Inc Deed, Land #12-14, Perkins Street, Lowell, Mass
57. 1365. Indenture- Release- Charles Don Cause, Inc. Lot 80- E Kearney Square
58. 1366. Deed, release, easements- sale of Prescott property by Boott Mills to Appleton Service Company, see L&C 5621.
59. 1367. License Agreement Wakefield Industries, Inc. Re: conveyor- Easterly side of Armory Street, Lowell, Mass.

Box 48 (5.0" Legal size)
Folder:

1. 1368. Lots #80A and #80 D Lowell Sun Realty Company
2. 1368. Mrs. Albertine St. Francis, 1691 sq. ft. of Land on Ford Street- Lot # 64-G Deed
3. 1369. George R. Macheras, et al Deed, Land and Buildings #66 to #108 Broadway etc.
4. 1370. Joseph H. and Marie A. Corbeil and Props. Locks & Canals, June 23, 1961, Land on Ford St. Lot #64-D
5. 1371. American Investment Homes Inc. and Props. Locks & Canals, Sept. 8, 1961, Lot on Broadway St. Lot #13-A †
6. 1372. Props of the Locks & Canals & Rudolph & Rita Normandin
7. 1373. Props of Locks & Canals & Vincent P. Morton, Inc. †
8. 1374. Corporation de L'Orphelint Franco-Amrican [sic] and Props of the Locks & Canals
9. 1375. Joseph Cholette- Deed to Lots 64-A-1, Lots 64-A-3
10. 1376. William N. Kahn Lot corner of Fletcher street bordering Pawtucket Canal
11. 1377. Boston & Maine R.R. Nine (9) Parcels of Land sold to B&M for $23,000 8/24/62
12. 1378. LWI Buildings Trust- Margaret Latter, Edw. Larter Jr. James Ellis Agreement relative to LWL rebuilding flume and maintain gate thereat [sic] 9/13/65
13. 1379. Deed L&C to Patrick F. & Mary A. Plunkett Land Located on the Northwesterly side of Pawtucket St. (Parcel No.11) 6150 sq ft 12/30/65
14. 1380. Sale of Land by L&C to Commonwealth of Mass- Lot #31 Approx. 40,930 sq. ft. Northwesterly side of Pawtucket Street and southwesterly side of Melvin Street, 2/1/66
15. 1381. Between Dellon Corp. & Props of Locks & Canals agreement reinstallation of self-cleaning filters on Pellon Reservoir water line at Jackson St. April 28, 1966
    [1382 *Not Located During Processing*]
16. 1383. Agreement between L&C and Union National Bank Re: Canal wall adjoining new Union National Bank Building †
17. 1384. Agreement between L&C and Wanskuck Co. regarding the relocation of 20" water main to be installed by Wanskuck. †
18. 1385. Release, Agreement for compensation regarding [sic] hub properties, building #14 situated on the Northeasterly side of Perkins Street
19. 1386. Deed to Riggs & Lombard 1,386 sq. feet. †
20. 1387. Easement Lowell Redevelopment Authority, April 6, 1969 †
21. 1388. 3/6/67. Disclaimer, New England Telephone & Telegraph Co.
22. 1389. Land Grant St. Joseph's Hospital, November 13, 1967 †
23. 1390. Easement- City Development Authority
24. 1391. Land Grant- City Development Authority
25. 1392. Disclaimer- Lowell Gas Co. May 23, 1968.
26. 1393. disclaimer- N.E. Telephone & Telegraph†
27. 1394. Agreement- Wanskuck Company- 3/19/69 Re Tremont
28. 1395. Deed- Lowell Technological Institute, August 29, 1969. †
29. 1396. Assent to Lease Assignment: Bristol Real Estate Association

30. 1397. Assent to Lease Assignment: Doherty Realty Co. Inc.
31. 1398. Covenant: Vincent P. Morton, Inc.
32. 1399. Disclaimer: New England Tel & Tel Company
33. 1400. Covenant: Atlantic Associates/ Donald Sisson
34. 1401. Agreement: Pellon Corporation
35. 1402. Agreement: Wanskuck Company
36. 1403. Bill of Sale: Chandler Leasing Division January 19, 1972
37. 1404. Lease between Locks & Canals and Land art associated Inc.
38. 1405. Deed of Easement Between Locks & Canals and City of Lowell, Western Canal-Parcel "A" – "H" †
39. 1406. Jan 2, 1974. Massachusetts Quitclaim Deed between Locks & Canals and John B. Todd, Lot 29A †
40. 1407. Release and Discharge of Reservation between Locks and Canals and Boston & Maine R.R. 9/11/74
41. 1408. Release Locks & City of Lowell, Lots 8 & 13
42. 1409. Boott Mills, New Mass. Electric Contract. 9/11/75, Amendment 7/1/75 Contract 12/27/61
43. 1410. Agreement Locks & Canals and Textron Inc. (Aa6) Regarding Real Estate Rights
44. 1411. License between Locks & Canals and Dept. of Environmental management, commonwealth of Mass. 6/21/76
45. 1412. License between Props of L& C and Mobil Chemical Company 7/21/76. site plan of proposed storage silos, 10/10/75
    [1413 *Not Located During Processing*]
    [1414 *Not Located During Processing*]
46. 1415.

Note: Deeds jump from 1415 to 5001. Location of those between 1415-5001 is unknown at the time of processing.

Box 49 (5.0" Legal size)
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42. 5201. N. Mason Est. Payable By L. and C. Jan. 1 and July 1.
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33. 5245. Not In Force
34. 5246. Not In Force
35. 5247. Not In Force
36. 5248.
37. 5249. Not In Force
38. 5250. Not In Force
39. 5251. Not In Force
40. 5252. Not In Force
41. 5253. Not In Force
42. 5254. Not In Force
43. 5255. Not In Force
44. 5256. Not In Force
45. 5257. Not In Force
46. 5258. Not In Force
47. 5259. Not In Force
48. 5260. Not In Force
49. 5261. Not In Force
50. 5262. Not In Force
51. 5263. Not In Force
52. 5264. Not In Force
53. 5265. Not In Force

54. 5266. Not In Force
55. 5267. Not In Force
56. 5268. Not In Force
57. 5269. Not In Force
58. 5270. Not In Force
59. 5271. Not In Force
60. 5272. Not In Force
61. 5273. Not In Force
62. 5274. Not In Force
63. 5275. Not In Force
64. 5276. Not In Force
65. 5277. Not In Force

Box 53 (5.0" Legal size)
Folder:
1. 5278. Not In Force
2. 5279. Not In Force
3. 5280. Not In Force
4. 5281. Not In Force
5. 5282. Not In Force
6. 5283. Not In Force
7. 5284. Not In Force
8. 5285. Not In Force
9. 5286. Not In Force
10. 5287. Not In Force
11. 5288. Not In Force
12. 5289. Not In Force
13. 5290. Not In Force
14. 5291. Not In Force
15. 5292. Not In Force
16. 5293. Not In Force
17. 5294. Not In Force
18. 5295. Not In Force
19. 5296. Not In Force
20. 5297. Not In Force
21. 5298. Not In Force
22. 5299. Not In Force
23. 5300. Not In Force
24. 5301. Not In Force
25. 5302. Not In Force
26. 5303. Not In Force
27. 5304. Not In Force
28. 5305. B&L RR. Crop. Due Jan. 1 for year ending Dec 31 past

29. 5306. Lot 14-A B&MRR Due yearly Dec. 31
30. 5307. Not In Force
31. 5308. Not In Force
32. 5309. Not In Force
33. 5310. Not In Force †
34. 5311. Not In Force
35. 5312. Not In Force
36. 5313. Not In Force
37. 5314. Not In Force †
38. 5315. Not In Force
39. 5316. Not In Force
40. 5317. Not In Force
41. 5318. Not In Force
42. 5319. Not In Force
43. 5320. Not In Force. Lot on North side of Pawtucket Canal, July 1, 1882
44. 5321. Not In Force
45. 5322. Not In Force
46. 5323. Not In Force
47. 5324. Not In Force
48. 5325. Not In Force
49. 5326. Not In Force
50. 5327. Not In Force

Box 54 (5.0" Legal size)
Folder:

1. 5328. Not In Force
2. 5329. Not In Force
3. [5330] Not In Force
4. 5331. Not In Force
5. 5332. Not In Force
6. 5333. Not In Force †
7. 5334. Not In Force †
8. 5335. Not In Force, Saco-Lowell Shops Due Quarterly Mar. 31, June 30, Sept 30, Dec. 31
9. 5336. Not In Force, Saco-Lowell Shops, Due Yearly Dec. 31
10. 5337. Not In Force †
11. 5338. Not In Force
12. 5339. Not In Force
13. 5340. Not In Force
14. 5341. Not In Force
15. 5342. Not In Force
16. 5343. Appleton Co. Due Jan. 1 for year ending Sept. 30 following. Recorded Bk. 108 – Pg. 201

17. 5344. Not In Force. Railroad track on So. Bank of Hamilton Canal, Sept. 25, 1879
18. 5345. Appleton Co. Jackson Prpts. Due Jan 1 for year ending Dec. 31 past. See 1058
19. 5346. Copy B&L.R.R Copr. Due Jan 1, For year ending Dec. 31 past, Not in Force †
    Original 5346. B&L.R.R. Corp, Not In Force, Due Jan 1, For Year ending, Dec. 31 Past†
20. 5347. B&L.R.R. Corp, Due Jan 1 for year ending Dec 31 past, Not in F. †
21. 5348. B&L RR Corp Due Jan1 for year Ending Dec. 31 past
22. 5349. B& L. R.R. Corp, Due Jan 1, for year ending Dec. 31 past †
23. 5350. Not In Force, Printed 1897, Page 200 †
24. 5351. Not In Force, Printed 1879, Page 204 †
25. 5352. B&L RR Corp Due Jan1 for year Ending Dec. 31 past
26. 5353. B&L RR Corp Due Jan1 for year Ending Dec. 31 past
27. 5354. B&L RR Corp Due Jan1 for year Ending Dec. 31 past
28. 5355. Lots on Southerly bank of Hamilton Canal, Oct. 1, 1853, Not in force, Printed 1879, Page 18 †
29. 5356. Lands on southerly Bank of Hamilton Canal, July 1, 1873, Not in Force, Printed 1879, Page 24
30. 5357. Not In Force, Land on West Side of Central St. July 1, 1873
31. 5358. N&L.R.R. corp. Due Jan. 1 for year ending Dec. 31 past †
32. 5359. (Props. Tremont Mills) T&S Mills †
33. 5360. (Props. Tremont Mills) T&S Mills †
34. 5361. Not in Force, Printed 1879, Page 108 †
35. 5362. T&S Mills
36. 5363. Not In Force
37. 5364. Not In Force
38. 5365. Not In Force
39. 5366. Not In Force
40. 5367. Not In Force
41. 5368. Not In Force
42. 5369. Not In Force
43. 5370. Not In Force
44. 5371. Not In Force
45. 5372. Not In Force
46. 5373. Not In Force †
47. 5374. Not In Force †
48. 5375. Not In Force †
49. 5376. Not In Force †
50. 5377. Not In Force †
51. 5378. Not In Force †
52. 5379. Not In Force
53. 5380. Not In Force
54. 5381. Not In Force
55. 5382. Not In Force
56. 5383. Not In Force

57. 5384. Not In Force

Box 55 (5.0” Legal size)
Folder:
1. 5385. Not In Force
2. 5386. Not In Force
3. 5387. Not In Force
4. 5388. Not In Force
5. 5389. Not In Force
6. 5390. Not In Force †
7. 5391. Not In Force
8. 5392. Not In Force
9. 5393. Not In Force
10. 5394. Not In Force
11. 5395. Not In Force
12. 5396. Not In Force
13. 5397. Not In Force
14. 5398. Not In Force
15. 5399. Not In Force
16. 5400. Not In Force
17. 5401. Not In Force †
18. 5402. Not In Force
19. 5403. Not In Force
20. 5404. Not In Force
21. 5405. Not In Force
22. 5406. Not In Force
23. 5407. Not In Force
24. 5408. Not In Force
25. 5409. Not In Force †
26. 5410. Not In Force
27. 5411. Not In Force
28. 5412. Not In Force
29. 5413. Not In Force
30. 5414. Not In Force
31. 5415. Not In Force †
32. 5416. Not In Force
33. 5417. Not In Force
34. 5418. Not In Force
35. 5419. Not In Force
36. 5420. Not In Force
37. 5421. Not In Force
38. 5422. Not In Force
39. 5423. Not In Force
40. 5424. Not In Force †

41. 5425. Not In Force
42. 5426. Not In Force
43. 5427. Not In Force
44. 5428. Not In Force
45. 5429. Not In Force
46. 5430. Not In Force
47. 5431. Not In Force
48. 5432. Not In Force
49. 5433. Not In Force
50. 5434. Not In Force
51. 5435. Not In Force
52. 5436. Not In Force
53. 5437. Not In Force
54. 5438. Not In Force
55. 5439. Not In Force
56. 5440. Not In Force
57. 5441. Not In Force
58. 5442. Not In Force
59. 5443. Not In Force
60. 5444. Not In Force
61. 5445. Not In Force
62. 5446. Not In Force
63. 5447. Not In Force
64. 5448. Not In Force. ~~Rent Due~~ [sic]. See Agreement. Paid in Full
65. [5448.] Doherty 1914

Box 56 (5.0" Legal size)
Folder:

1. 5449. Not In Force. ~~Rent Due~~ [sic]. See Agreement. Paid in Full. Tenants Copy in here- To be Destroyed.
2. 5450. Not In Force. Rent Due. See Agreement. Pd in full. Tenants copy in here – to be destroyed.
3. 5451. Not In Force.
4. 5452. Not In Force.
5. 5453. Not In Force.
6. 5454. Not In Force.
7. 5455. Not In Force.
8. 5456. Not In Force.
9. 5457. Not In Force.
10. 5458. Not In Force.
11. 5459. Not In Force.
12. 5460. Not In Force.
13. 5461. Not In Force.

14. 5462. Not In Force.
15. 5463. Not In Force.
16. 5464. Not In Force.
17. 5465. Not In Force.
18. 5466. Not In Force.
19. 5467. Not In Force.
20. 5468. Not In Force.
21. 5469. Not In Force.
22. 5470. Not In Force.
23. 5471. Not In Force.
24. 5472. Not In Force.
25. 5473. Not In Force.
26. 5474. Not In Force.
27. 5475. Not In Force.
28. 5476. Not In Force.
29. 5477. Not In Force.
30. 5478. Not In Force.
31. 5479. Not In Force.
32. 5480. Not In Force.
33. 5481. Not In Force.
34. 5482. Not In Force.
35. 5483. Not In Force.
36. 5484. Not In Force.
37. 5485. Not In Force.
38. 5486. Not In Force.
39. 5487. Not In Force.
40. 5488. Not In Force.
41. 5489. Not In Force.
42. 5490. Not In Force.
43. 5491. Not In Force.
44. 5492. Not In Force.
45. 5493. Not In Force.
46. 5494. Not In Force.
47. 5495. Not In Force.
48. 5496. Not In Force.
49. 5497. Not In Force.
50. 5498. Not In Force.
51. 5499. Not In Force.

Box 57 (5.0” Legal size)
Folder:
1. 5500. Not In Force.
2. 5501. Not In Force.
3. 5502. Not In Force.

4. 5503. Not In Force.
5. 5504. Not In Force.
6. 5505. Not In Force.
7. 5506. Not In Force.
8. 5507. Not In Force.
9. 5508. Not In Force.
10. 5509. Not In Force.
11. 5510. Not In Force.
12. 5511. Not In Force.
13. 5512. Not In Force.
14. 5513. Not In Force.
15. 5514. Not In Force.
16. 5515. Not In Force.
17. 5516. Not In Force.
18. 5517. Not In Force.
19. 5518. Not In Force.
20. 5519. Not In Force.
21. 5520. Not In Force.
22. 5521. Not In Force.
23. 5522. Not In Force.
24. 5523. Not In Force.
25. 5524. Not In Force.
26. 5525. Not In Force.
27. 5526. ~~Mass Cotton Mills Pepper Mfg. Co~~. Lowell Ind. Div.
28. 5527. Not In Force.
29. 5528. Not In Force.
30. 5529. Not In Force.
31. 5530. Not In Force.
32. 5531. Not In Force.
33. 5532. Not In Force.
34. 5533. Not In Force.
35. 5534. Not In Force.
36. 5535. Not In Force.
37. 5536. Lot 15-0-2 Boston & Maine Railroad. Due Quarterly Mar. 31 June 30 Sept. 30 Dec. 31
38. 5537. Not In Force.
39. 5538. Not In Force.
40. 5539. Not In Force. †
41. 5540. Not In Force.
42. 5541. Not In Force. †
43. 5542. Not In Force.
44. 5543. Not In Force.

Box 58 (5.0" Legal size)
Folder:
1. 5544. Not In Force.
2. 5545. Not In Force.
3. 5546. Not In Force.
4. 5547. B&M Railroad 17-0-4, Due Quarterly, Mar. 31, June 30, Sept. 30, Dec. 31
5. 5548. Not In Force.
6. 5549. Not In Force.
7. 5550. Not In Force.
8. 5551. Not In Force.
9. 5552. Not In Force.
10. 5553. Not In Force.
11. 5554. Not In Force.
12. 5555. Not In Force.
13. 5556. Not In Force.
14. 5557. Not In Force.
15. 5558. Not In Force.
16. 5559. Not In Force.
17. 5560. Not In Force.
18. 5561. Not In Force.
19. 5562. Not In Force.
20. 5563. Not In Force.
21. 5564. Not In Force.
22. 5565. Not In Force.
23. 5566. Not In Force.
24. 5567. Not In Force.
25. 5568. Not In Force.
26. 5569. Not In Force.
27. 5570. Not In Force.
28. 5571. Not In Force.
29. 5572. Not In Force.
30. 5573. Not In Force.
31. 5574. City of Lowell. Due Yearly. Dec. 31 Render Bill Dec. 1. Lot 100A
32. 5575. Not In Force.
33. 5576. Not In Force.
34. 5577. Not In Force.
35. 5578. Not In Force.
36. 5579. Not In Force.
37. 5580. Not In Force.
38. 5581. Not In Force.
39. 5582. Not In Force.
40. 5583. *Not Located During Processing*
41. 5584. Not In Force.
42. 5585. Not In Force.

43. 5586. Middlesex Co. Due Yearly June 30. ~~Due Monthly on 19th~~
44. 5587. Not In Force.
45. 5588. Not In Force.
46. 5589. Not In Force.
47. 5590. Not In Force.
48. 5591. Not In Force.

Box 59 (5.0" Legal size)
Folder:
1. 5592. Not In Force.
2. 5593. Not In Force.
3. 5594. City of Lowell, Due Aug 31
4. 5594-A. City of Lowell, Due Aug 31
5. 5595. Not In Force.
6. 5596. Not In Force.
7. 5597. Not In Force.
8. 5598. Not In Force.
9. 5599. Not In Force.
10. 5600. Not In Force.
11. 5601. Not In Force.
12. 5602. Not In Force.
13. 5603. Not In Force.
14. 5604. Not In Force.
15. 5605.
16. 5606. Not In Force.
17. 5607. Not In Force.
18. 5608. Not In Force.
19. 5609. Not In Force.
20. 5610. Not In Force.
21. 5611. Not In Force.
22. 5612. Not In Force. Gookin
23. 5613. Not In Force. Robertson
24. 5614. Not In Force.
25. 5615. Not In Force.
26. 5616. Not In Force.
27. 5617.
28. [5617] Grandville & Pratt. Not in Force.
29. 5618. Not In Force.
30. 5619. Not In Force.
31. 5620. Not In Force.
32. 5621. Lowell Ind. Dev. Co. Prescott. Po. Ho. Section
33. 5622. Not In Force.
34. 5623. Not In Force.

35. 5624. Not In Force.
36. 5625. Not In Force.
37. 5626. Not In Force.
38. 5627. Not In Force.
39. 5628. Not In Force.
40. 5629. Not In Force.
41. 5630. Mary F. Dillon. No Rent except for violation of conditions
42. 5631. Not In Force.
43. 5632. Merrimack M. Co. Due Monthly Last Day
44. 5633. Not In Force.
45. 5634.
46. 5635. Not In Force.
47. 5636. Not In Force.
48. 5637. Not In Force.
49. 5638. Not In Force.

Box 60 (5.0" Legal size)
Folder:

1. 5639. Not In Force.
2. 5640. Not In Force.
3. 5641. Not In Force.
4. 5642. Not In Force.
5. 5643. Not In Force.
6. 5644. Not In Force.
7. 5645. Not In Force.
8. 5646. Not In Force.
9. 5647. A.F. St. Amand. Canceled 8/31/46. Due Quarterly. Mar. 31, June 30, Sept. 30, Dec. 30
10. 5648. Not In Force.
11. 5649. Not In Force.
12. 5649-B. Joseph Cholette, 180 Ford St. Lowell, Mass. 64-A-1
13. 5650. Not In Force.
14. 5651. Not In Force.
15. 5652. Not In Force.
16. 5653. E&L. D. St. Louis. (See No. 5796)
17. 5654. Not In Force.
18. 5655. Not In Force.
19. 5656. Not In Force.
20. 5657. Not In Force. See New Lease to Damatis #5661
21. 5658. Not In Force.
22. 5659. Not In Force.
23. 5660. Not In Force.
24. 5661. Not In Force.
25. 5662. Not In Force.

26. 5663. Not In Force.
27. 5664. Not In Force.
28. 5665. Not In Force.
29. 5666. Not In Force.
30. 5667. Not In Force.
31. 5668. Not In Force.
32. 5669. Not In Force.
33. 5670. Not In Force.
34. 5671. Not In Force.
35. 5672. Not In Force.
36. 5673. Not In Force.
37. 5674. Not In Force.
38. 5675. Not In Force.
39. 5676. Not In Force.
40. 5677. Not In Force.
41. 5678. Not In Force.
42. 5679. Daco Lowell Shops. Due Yearly Dec. 31
43. 5680. Not In Force.
44. 5681. Not In Force.

Box 61 (5.0" Legal size)
Folder:
1. 5682. Not In Force.
2. 5683. Pratt & Forrest. Yearly Jan. 1
3. 5684. Not In Force.
4. 5685. Not In Force.
5. 5686. Not In Force.
6. 5687. Not In Force.
7. 5688. Not In Force.
8. 5689. Not In Force.
9. 5690. Not In Force.
10. 5691. Not In Force.
11. 5692. Not In Force.
12. 5693. Saco-Lowell Shops. Due Quarterly, Mar. 31, June 30, Sept 30, Dec. 31
13. 5694. Not In Force.
14. 5695. Not In Force.
15. 5696. Burnham and Davis Lumber Leo. See Document 1147 †
16. 5697. J.E. & B.R. Lemire. 5697-A. Lot 64-A-4
17. 5698. Not In Force.
18. 5699. Not In Force.
19. 5700. Not In Force.
20. 5701. Not In Force.
21. 5702. Not In Force.

22. 5703. Not In Force.
23. 5704. Not In Force.
24. 5705. Not In Force. Davis & Sargent Lumber Co. †
25. 5706. Not In Force.
26. 5707. Not In Force.
27. 5708. Not In Force.
28. 5709. Not In Force.
29. 5710. Not In Force.
30. 5711. Marie Louis Grenun, Transfers to Durand.
31. 5712. Not In Force.
32. 5713. Armor & Company
33. 5714. Not In Force.
34. 5715. Not In Force.
35. 5716. Charles Dancause, Inc. Lowell. ~~Gas Light Co. Kearney Sq. Co~~. †
36. 5717. Not In Force.
37. 5718. Not In Force.
38. 5719. Not In Force.
39. 5720. Not In Force.
40. 5721. Boott Mills. 37 years from Jan. 1, 1928
41. 5722. Not In Force.
42. 5723. Not In Force.
43. 5724. Not In Force.
44. 5725. Mass Mohair Plush Co. Joan Corp.
45. 5726.

Box 62 (5.0" Legal size)
Folder:

1. 5727. The Stevens Trust. Not In Force.
2. 5728. Not In Force.
3. 5729. Not In Force.
4. 5730. Not In Force.
5. 5731. Not In Force.
6. 5732. Boston Maine R.R.
7. 5733. Not In Force.
8. 5734. Not In Force.
9. 5735. Not In Force.
10. 5736. Not In Force.
11. 5737. Not In Force.
12. 5738. Not In Force.
13. 5739. Lawrence Mfg. Co. Rec. North Dist. Bk. 778- Pg. 127
14. 5740. Lawrence Mfg. Co. Bridge
15. 5741. Not In Force.
16. 5742. Ildevert Gagnon
17. 5743. Not In Force.

18. 5744. Not In Force.
19. 5745. Not In Force. †
20. 5746. Not In Force.
21. 5747.
22. 5748. Not In Force.
23. 5749. Not In Force. †
24. 5750. Lowell Industrial Development Co.
25. 5751. Langlais, Geo. And E. (See Lease No. 5804)
26. 5752. Not In Force.
27. 5753. Not In Force.
28. 5754. Bennet Bros. Discontinued Mar. 31/38. Bad Acct. Not In Force.
29. 5755. Not In Force.
30. 5756. Not In Force.
31. 5757. Not In Force. †
32. 5758. Not In Force.
33. 5759. George E. Cossette
34. 5760. Not In Force.
35. 5761. Not In Force.
36. 5762. Rex Inc.
37. 5763. Not In Force.
38. 5764. Not In Force.
39. 5765. Not In Force.
40. 5766. Not In Force.
41. 5767. Not In Force.
42. 5768. Not in Force. The Stevens Trust. T at W. Fo. July 1/35
43. 5769. Not in Force. See 5792-A
44. 5770. Not In Force.
45. 5771. Lawrence Mfg. Co. Replaced by #5789- Riggs & Lombard. Not In Force.
46. 5772. Lowell Motor Boat Club. Inc
47. 5773. Not in Force. Cancelled. W.A. Mack Co. Lowell. Cancelled 6/1/30
48. 5774 & 5774A. Henry Martineau and Flora Dufresne. Lot 64-E-1
49. 5775. Boott Mills
50. 5775-A. Boott Mills. Expires May 31, 1957
51. 5776. Middlesex Paper Tube Co. Inc.

Box 63 (5.0" Legal size)
Folder

1. 5777. Not In Force.
2. 5778. Joseph Dofour. Not in Force. See 5795.
3. 5779 & 5779-A Mrs. Domatie Pelletier. Mrs. Albertina St. Francois. Ford Street Lot 64-G. $127.00 per ann.
4. 5780-5780A. Adeland Demers and Cleinda Demra. 81 Ford Street. $161.00 per ann.
5. 5781. Lowell, City of. Lot 33-C. Replaced by 5781-H

6. 5781-A. City of Lowell- Aiken St. Lot 33-C. Not in Force. Lot Sold to Stop & Shop. 3. 21, 1956 for $50,000.00
7. 5782. Lowell, City of . Lot 99-100†
8. 5783. Lowell, City of . Replaced by 5783H. Lot 102 †
9. 5783-A. City of Lowell Riverside St. Lot #102 †
10. 5784. Lowell, City of. Lot 103†
11. 5785. The Robertson Company (See 5802)
12. 5786. Gookin Furniture Company 5 yrs from 4/1/39. (See Lease No 5803)
13. 5787 & 5787-A. Henry Martineau & Flora Dufresne. Lot 64-E
14. 5788. Textron Inc. 5 yrs from Aug 1, 1939. Replaced by 5807 †
15. 5789. Riggs and Lombard. 7 years & 5 Mos. From Aug. 1, 1939
16. 5789-A. Riggs & Lombard. Also Extension to 1/1/59. Also Extension to 1/1/61 †
17. 5790. Not in Force.
18. 5791. Cancelled 8/30/46 George L. & Lillian A. Cady. Pt. Of Lot 23.
19. 5792 [&5792-A] Brockelman Pros. Inc. Canal Street. Expired. Replaced by 5792-A
20. 5792-B. Garage Realty Trust
21. 5792-B. Garage Realty Trust
22. 5793-A. Zenon Narkun and Cecelia Navoric. S.W. side of Fletcher St.
23. 5794. A.V. Vignola &U.R. Bacon. 656 Aiken Street at W. Lease
24. 5795. 5795-A.. Joseph Durfour. Lot #64-B
25. 5796. 5796-A. Lot 64-F. E. St. Louis
26. 5797. Not In Force. Lot 64-A-6. Raymond Durand
27. 5798. Replaced by #5806. E.A. Baribeault. Moise Emond
28. 5799. Jos. & Alice Carpentier. See T. at W. to 5811. Not in Force.
29. 5799. J&A Carpentier
30. 5800. Not In Force. New Lease 1947. #5800A J.A. E. Realty Trust
31. 5800-A. J.A. E. Realty Tr. Co. 5 year Lease from 6/8/47
32. 5800-B. J.A.E. Realty Tr. Co. 10 years. Lease from 6/8/52 at end of 5 yrs. Check Lease- 6/8/57
33. 5801. 5801. Lot 64-A-3. Not in Force. See Joseph Cholette, Adelard J. Tessler.
34. 5801-B. Joseph Cholette. 180 Ford St. Lowell, Mass. 64-A-3
35. 5802- Lot 5802-A. The Robertson Co. Inc
36. 5802-A
37. 5803. Gookin Furn. Co.
38. 5803-A. Gookin Furniture co. Letter of Termination in this File, 9/14/56 7003
39. 5804. 5804-A Lot 64-A-7 E.&P. Langlais

Box 64 (5.0" Legal size)
Folder:

1. 5805. Eugene L Fauvel
2. 5806. 5806-A Lot 64-A-6. Earnest A. Baribeault. Loretta Baribeault
3. 5807. Textron Incorporates. Canceled. See 5812 †
4. 5808. John Georges Realty Trust. Canceled 4/21/46
5. 5809. Zenon W. Naikun

6. 5810. Adelard and Clerinda M. Demers
7. 5811 and 5811-A. Anastage and Aurore Beaudoin
8. 5812. Textron Inc. [illegible] †
9. 5813. License. Lowell Industrial Dev. Co.
10. 5814 and 5814-A. Corbeil. #64-D

NOTE: Deeds jump from 5814 to 7001. Location of those between 5814-7001 is not known at time of processing.

11. 7001. Not in Force
12. 7002. Not in Force
13. 7003. Not in Force.
14. 7004. N&LRR Cor. Due Yearly September 30
15. 7005. N&LRR Cor. Due Yearly September 30
16. 7006. Not in Force.
17. 7007. Not in Force.
18. 7008. Not in Force.
19. 7009. Not in Force.
20. 7010. Not in Force.
21. 7011. Not in Force.
22. 7012. Not in Force.
23. 7013. Hamilton M. Co. Due Jan. 1 For Year Ending Dec. 31 past
24. 7014. Not in Force.
25. 7015. Not in Force.
26. 7016. Not in Force. Saco-Lowell Shops
27. 7017. Not in Force.
28. 7018. Not in Force.
29. 7019. Not in Force.
30. 7020. Not in Force.
31. 7021. Appleton Co. Due. Jan. 1 for year ending Dec. 31 past. Appleton Co. Maintenance of Platform
32. 7022. Appleton Co. Due Jan. 1 for year ending Dec. 31 past. Appleton co. Privilege of Maintaining Well.
33. 7023. Not In Force.
34. 7024. Not In Force.
35. 7025. Not In Force.
36. 7026. Not In Force.
37. 7027. Not In Force.
38. 7028. Not In Force.
39. 7029. Not In Force.
40. 7030. Not In Force.
41. 7031. Not In Force.
42. 7032. Not In Force.

43. 7033. Not In Force.
44. 7034. Not In Force.
45. 7035. Not In Force.
46. 7036. Not In Force.
47. 7037. Not In Force.
48. 7038. J. Pilling Shoe Co. Due Quarterly. Mar. 31, June 30, Sept. 30, Dec. 31
49. 7039. Not In Force.
50. 7040. Not In Force.
51. 7041. Not In Force.
52. 7042. Not In Force.
53. 7043. Not In Force.
54. 7044. Not In Force.
55. 7045. Not In Force.
56. 7046. Not In Force.
57. 7047. Not In Force.
58. 7048. Not In Force.
59. 7049. Not In Force.
60. 7050. Not In Force.
61. 7051. Not In Force.
62. 7052. Not In Force.
63. 7053. Not In Force.

Box 65 (5.0" Legal size):
Folder:
1. Deeds 1, L&C [Bound Volume]
2. Deeds 2, Locks & Canals [Bound Volume]

Box 66 (5.0" Legal size):
Folder:
1. Deeds 3 [Bound Volume]
2. Deeds 4 [Bound Volume]

Box 67 (5.0" Legal size):
Folder:
1. Deeds 5 [Bound Volume]
2. Deeds 6 [Bound Volume]

Box 68 (5.0" Legal size):
Folder:
1. [Deeds] 7 [Bound Volume]
2. Deeds 8 [Bound Volume]

Series V. Flowage Records

A. Agreements/Judgements

Box 69 (5.0" Legal size):
Folder:
1. 8001. †
2. 8002. *Not Located During Processing.*
3. 8003. †
4. 8004.
5. 8005.
6. 8006.
7. 8007.
8. 8008.
9. 8009.
10. 8010.
11. 8011.
12. 8012.
13. 8013.
14. 8014.
15. 8015.
16. 8016.
17. 8017.
18. 8018.
19. 8019.
20. 8020.
21. 8021. †
22. 8022.
23. 8023.
24. 8024. †
25. 8025.
26. 8026.
27. 8027.
28. 8028.
29. 8029.
30. 8030.
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34. 8034.
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39. 8039.

40. 8040.
41. 8041.
42. 8042.
43. 8043.
44. 8044.
45. 8045.
46. 8046.
47. 8047.
48. 8048. Deeds-Chelmsford
49. 8049.
50. 8050.
51. 8051.
52. 8052.
53. 8053.
54. 8054.
55. 8055.
56. 8056.
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60. 8060.
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76. 8076.
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78. 8078.
79. 8079.
80. 8080.
81. 8081. †
82. 8082.
83. 8083. †

84. 8084.
85. 8085. †
86. 8086.
87. 8087.
88. 8088.
89. 8089.
90. 8090.
91. 8091.
92. 8092.
93. 8093.
94. 8094.
95. 8095.
96. 8096.
97. 8097. †
98. 8098.
99. 8099. †

Box 70 (5.0" Legal size)
Folder:
1. 8100.
2. 8101. †
3. 8102.
4. 8103.
5. 8104.
6. 8105.
7. 8106.
8. 8107. †
9. 8108.
10. 8109.
11. 8110.
12. 8111.
13. 8112.
14. 8113.
15. 8114.
16. 8115.
17. 8116.
18. 8117.

B. Geographical Locations

19. 8118.
20. 8119.
21. 8120.

22. 8121.
23. 8122.
24. 8123.
25. 8124.
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27. 8126.
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Box 71 (5.0” Legal size)
Folder:
1. 8170.
2. 8171.
3. 8172. †
4. 8173.
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6. 8175.
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83. 8252.
84. 8253.
85. 8254.
86. 8255.
87. 8256.
88. 8257.
89. 8258. *Not Located During Processing.*
90. 8259. *Not Located During Processing.*
91. 8260.

C. Fourth Flashboard Damage Control

Box 72 (5.0” Legal size)
Folder:
1. 8261. †
2. 8262. †
3. 8263.
4. 8264.
5. 8265.
6. 8266.
7. 8267.
8. 8268.
9. 8269.
10. 8270.
11. 8271.
12. 8272.
13. 8273.
14. 8274.
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17. 8277.
18. 8278.
19. 8279.
20. 8280.
21. 8281.
22. 8282.
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36. 8296.
37. 8297.
38. 8298.
39. 8299.
40. 8300.
41. 8301.
42. 8302.
43. 8303.
44. 8304.
45. 8305.
46. 8306.
47. 8307.
48. 8308.

Box 73 (5.0” Legal size)
Folder:
1. 8309.
2. 8310.
3. 8311.
4. 8312.
5. 8313.
6. 8314.
7. 8315.
8. 8316.
9. 8317.
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30. 8338.
31. 8339.
32. 8340.
33. 8341.
34. 8342. †
35. 8343.
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42. 8350.
43. 8351.
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52. 8360.
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56. 8364.
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72. 8380.
73. 8381.
74. 8382.
75. 8383.

Box 74 (5.0” Legal size)
Folder:
1 8384.
2 8385.
3 8386.
4 8387.
5 8388.
6 8389.
7 8390.
8 8391.
9 8392.
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11 8394.
12 8395.
13 8396.
14 8397.
15 8398.
16 8399.
17 8400.
18 8401.
19 8402.
20 8403.
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26 8409.
27 8410.
28 8411.

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62 8445.
63 8446.
64 8447.
65 8448.
66 8449.
67 8450.
68 8451.
69 8452.

D. Flowage Index

70. Index Flowage [#8001-8541]

Series VI. Tax Records

A. Street Resolutions

Box 75 (5.0" Legal size)

Folder:

1. Aiken Street* Cheaver to Ford St. 1897 * see "Shaever" St. for Res. Cheaver to Hall St Hall St. Access Merrik. River to River St., Oct 18, 18-?
2. Andover Street
3. Anne Street. Merrimack St. to French St. 1847
4. Bridge Street. To lay out bridge St. a new, and Rebuild central bridge. Became in force, Dec. 31, 1881. Change in Easterly Lane between First and Second Sts. May 23, 1865
5. Broadway/Assessment for sidewalk on Broadway 1872
6. Broadway-Relating to Sidewalk on Broadway, July 1873
7. Broadway: Mechanic St. from Western Canal to Dulton St. and Lewis St. from Merr'K St. to Mechanic (Broadway) St. 1834. Broadway " [to] Suffolk St. – Lewis St. 1882. Broadway " " " [to Suffolk St.] – Pawtucket St. 1851. Change of Grade near Pawtucket Canal June 1902
8. Cabot Street to Ford St. To Merrimack St. June 21, 1847. " " [Ford St. To] Hall St. July 29, 1885
9. Central Street. Merrimack St. from Cabot St. To Central and Central St. From Merrimack St. to Church St. Mar. 21, 1843. Merr'k to Pawtucket Canal, Jan 16, 1843
10. Cheever St, Coolidge St., Aiken St., Tucker St, Cheever St. From 100 Westerly of Packer St. to Cabot. St. Coolidge, Aiken , and Tucker Sts from Cheever to Hall St. Chelmsford Road 1828
11. Colonial Avenue Moody St. to River St. Dec. 16, 1857 †
12. Davidson Street 1849
13. Dummer Street- From Lowell (Market) St. to Mechanic (Broadway) St. Little " " [Dummer Street] Dummer St. to Lewis St., 1849
14. Dulton Street. Merrimack St. to Fletcher St., April. 1, 1845, East Side near Merrimack Disc. Oct. 26, 1899. Fletcher St. From Dutton to Thorndike- Apr. 1, 1845. Thorndike St. " [from] Fletcher to Chelmsford St. Apr. 1, 1845
15. East Merr'k Street & Merrimack Square. Near Tewksbury Line 1859, 1887." [Near] East Merrik St and Merr'k St. ad Merr'k Square from Prescott St. to Davidson St. 1893
16. Fairmont Street. Sept. 13-27, 1853 Manser St. to Tewksbury Town line. Dec. 22, 1874 from former to New Tewksbury Town line
17. Fayette Street. East Merr'k St. to Stackpole St.
18. Ford Street. Cabot St. to Moody St. 1846
19. French Street. Anne St. to Kirk St.

20. Front Street. Sept. 28, 1876, Sept. 15, 1877
21. Hall Street. Cabot St. to Tucker St. Oct. 1, 1880
22. Hanover Street Laying out- North from Moody St. 1853. Discontinuation of Northerly Part. Oct. 25, 1881
23. Hanover Street. City Resolution Discontinuing part of Hanover Street †
24. Jackson Street Hamilton (Middlesex) St. Union St. Gorham St. Laid out by County Commissioners and accepted by the town in 1835
25. Jefferson Street. Lowell (Market St.) to Lewis St. 1848. Lewis St. to Suffolk 1891
26. Kyan Street. April 20, 1909
27. Lakeview Ave. Bridge St. to Dracut Line Oct. 12, 1852
28. Mammoth Road 1886
29. Mansure Street. May 9-12, 1882 Fairmount St. to Belmont Ave. Sept. 13-27, 1853 Nesmith St. to Fairmont Ave.
30. Market Street. Merrimack Canal to Landing S. (widening) Oct. 6, 1845
31. Merrimack St. 1835-1840. Alterations of Merr'k St. East of Central St., 1835. Letters in regard to sidewalk and bridge over Merrimack Canal †
32. Merrimack Street. Res. Widening Merr'k St. Fr. Cabot to Western Canal 1841 etc
33. Middle Street-Central St. to Shattuck St. , Sept. 1844
34. Moody Street. Alteration in Grade from Tilden St. to Western Canal Nov. 20, 1849. Pawtucket St. to Old Meadow Road, 1894. Colonial Ave to Riverside St. 1897
35. Nesmith Street, Establishing grade, Sept. 22, 1844
36. Pawtucket St. Easterly from Merrimack St. to Cit. Landing 1850. Res. Laying out City Landing, Jan. 2, 1850. School St. to Pawtucket Canal. Dec. 1848
37. Pawtucket St. Dec. 3, 1896, Widened from head of Merrimack St. to "High Bridge" Dec. 7, 1901, Curve Joining Pawtucket & Merrimack
38. Payne and Saunders Sts.
39. Prescott Street 1846
40. School Street. Middlesex St. to Bridge over Merr'k River, 1848. Straightening North of Pawtucket St. 1855. Near Pawtucket Canal, 1873. Widening near Pawtucket St. 1873
41. Stackpole St. Bartlett, Livermore, Rider & Stackpole. Livermore St. to "Essex" St., July 31, 1849, Alder St. to E. Merr'k St. Dec. 1881. Livermore St. to Fayette St. Dec. 17, 1892 †
42. [Resolution to re-establish a portion of the easterly line of Suffolk Street]
43. Extension of Suffolk St. Sewer from Suffolk St. to Merrimack River. June 16, 1874
44. Streets by North and South Grammar School
45. Suffolk Street and Shattuck Street
46. Thorndike and Fletcher Resolutions. Nov. 9, 1847; July 7, 1863
47. Thorndike St., Fletcher St. Fletcher St.- Dutton To Thorndike, 1845. Thorndike St. – Middlesex to Pawtucket Canal, 1847-1871. Res. Relating to Sidewalk on east side "Brewery Bridge"
48. Tremont St., 1850
49. Varnum Ave. Copy of Old Records Relaiting [sic] to Varnum Ave. Lower end by Res. 1894-1895, 1903

50. Walker St. 1849
51. Warren Street. From Central St., June 1868
52. Washington St. 1845
53. Western Ave. Fletcher St. to School St. 1853. Res. Charging Location of Part of Western Ave, 1872
54. [Resolution Laying out west Jackson St. Approved. Sept. 26, 1906]
55. West Street, 1882
56. Worthern Street. Kitson St. to Fletcher St., 1874

B. Taxes 1900 - 1916

1. General

Box 76 (5.0" Legal)
1. [Sidewalks 1842 & 1843]
[Taxes Paid, 1898-1910]
[Tax Law and Taxes Paid]
[Changes in PL&C Taxed Real Estate 1908 to 1910, 1915]
[Tax List 1910]
[Changes in Tax Lists, 1911]
Schedule of Real Estate Owned by Props. Locks & Canals in Lowell, Mass & Assessed Valuation. April 1, 1914 †
[Assessment of PL&C Land]
Tax List 1919

See also: (Oversize) Box 52 (20 ½ X 24 ½ X 3" drop-front box)
"Taxes" Portfolio [Lists and Valuations], 1917-1936[23]
"Taxes" Portfolio [Lists and Valuations], 1905-1918
"Taxes" Portfolio [Lists and Valuations], 1894-1904
Portfolio Cover

2. Collector's schedule

Box 77 (5.0" Legal)
Folder:
1. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1900
2. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1901
3. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1902
4. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1903
5. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1904
6. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1905
7. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1906

[23] Contents appeared in reverse chronological order. Receipt for use of reservoir water moved to Box 106, Folder 5.

8. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1907
9. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1908
10. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1909
11. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1910
12. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1911
13. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1912
14. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1914
15. Schedule of Taxable Property in Lowell Belonging to the PL&C, 1915

Schedule of Taxable Property in Lowell Belonging to the PL&C, 1916

3. Collectors Notices

Box 78 (5.0" Legal)
Folder:
1. [Published Collector's Notice, 1906] †
2. [Published Collector's Notice, 1907] †
3. [Published Collector's Notice, 1909] †
4. [Published Collector's Notice, 1911] †
5. [Published Collector's Notice, 1912] †
6. [Published Collector's Notice, 1913] †
7. [Published Collector's Notice, 1914] †
8. [Published Collector's Notice, 1915] †
9. [Petition for Abatement of Street Watering Tax, Oct. 26, 1892]

4. Petitions/Protest

10. [Protest Against Assessment and Payment of Taxes for Watering street, Oct. 28, 1892]
11. [Petition for Abatement of Taxes, 1899]
12. [Petition Against Excessive Taxes, 1911]
13. [Petition Against Excessive Taxes, 1914]
14. [Letters to the Assessors of he City o Lowell] 1915
15. [Petition Against Excessive Taxes, 1915]
16. [Protest Against Tax Bill, 1916]
17. [Petition Against Excessive Taxes, 1917]
18. [Protest Against Excessive Taxes, 1917]
19. Memo of Fluctuations in assessed valuation of the "General item" in L&C Tax List, 1915
20. [Petition Against Excessive Taxes, 1918]
21. [Protest Against Excessive Taxes, 1918]

5. Bridges

22. Bridges-Central St. Bridge

23. Bridges- Lowell St. Bridge over Merr'k Canal, Argued SJC Oct. 7, 1843
24. [Bridges-Central Bridge 1881]
25. [Moody Street Bridge 1892]

6. Federal and State -- See Addendum)

Series VII. Stock Records

Box 79 (2.5" Legal)
Folder
1. Deeds Vol. 7 [Stock information]

Box 80 (2.5" Legal)
Folder:
Documents from Deeds Vol. 7 Box 79
1. Vol. 7 Stock Certificate #60
2. Vol. 7 Stock Certificate # 2, 20 & 4. Receipt of 736 shares of stocks
3. Vol. 7 Stock Certificate #24 and Receipt. Stock Certificate #25 and receipt.
4. Vol. 7 Stock Certificate #36 and receipt
5. Vol. 7 Stock Certificate #44, 32, 42, 43, 34, & 57 & associated material
6. Vol. 7 Stock Certificate #14 and associated documentation
7. Vol. 7 Stock Certificate #32 and associated documentation
8. Ipswich Mills' receipt for 87 shared of PL&C Stock
9. Vol. 7 Stock Certificate #29 and associated documents
10. Vol. 7 Stock Certificate #40 & 38 associated material
11. Vol. 7 Stock Certificate #39 and associated documentation
12. Vol. 7 Stock Certificate #45 and associated documents
13. Vol. 7 Stock Certificate #46 and associated documents
14. Vol. 7 Stock Certificate #48 and associated documents
15. Vol. 7 Stock Certificate #69 and associated documents
16. Vol. 7 Stock Certificate #51 and associated documents
17. Vol. 7 Stock Certificate #52 and associated documents
18. Vol. 7 Stock Certificate #13 and associated documents
19. Vol. 7 Stock Certificate #37 and associated documents
20. Vol. 7 Stock Certificate #35 and associated documents
21. Vol. 7 Stock Certificate #56 and 54 associated material
22. Vol. 7 Stock Certificate #50, 49, &47 and associated documents
23. Vol. 7 Stock Certificate #51 and 8 blank stock certificates

Box 81 (2 ½" letter size)[24]

Stock Certificate Book, 1844-1954

[24] Phase 3 (FY08) processing begins here.

Series VIII. Financial Records

A. Financial Statements[25]

Box 82 (5.0 legal size)
Folder:

1. 1955
2. 1981, 1982
3. 1983, 1984
4. 1984, 1985

B. Accounts

Box 83 (5 1/2 X 7 ½ X 12" negative box)[26]
Index to Vouchers, 1890-1899
Box 84 (5 1/2 X 7 ½ X 12" negative box)[27]
Index to Vouchers, 1900-1909
Box 85 (5 1/2 X 7 ½ X 12" negative box)[28]
Index to Vouchers, 1910-1919
Box 86 (5 1/2 X 7 ½ X 5" negative box)[29]
Index to Vouchers, 1920-1929
Box 82 (cont.)
Folder:

5. Billing List inserted in Vouchers

Box 87 (5 ½ X 7 ½ X 5" negative box)[30]

[Index to Payments for Canal Water Usage Accounts Payable], 1916-1922
Box 82 (cont.)
Folder:

6. Items Inserted in Accounts Payable Index, 1917-1921

Box 88 (5½ X 7 ½ X 12" negative box)[31]

[25] Accession LOWE-111.
[26] Accession LOWE-132.
[27] Accession LOWE-132.
[28] Accession LOWE-132.
[29] Accession LOWE-132.
[30] Accession LOWE-132.

[Expenditures by Categories], 1921-1924
Box 89 (5 1/2 X 7 ½ X 12" negative box)

Petty Cash Vouchers – Union National Bank, 1922
Cancelled Checks – Payroll – Union National Bank, 1922
Petty Cash Vouchers – Union National Bank, 1923

Box 90 (5 ½ X 7 ½ X 12" negative box)

Cancelled Checks – Payroll – Union National Bank, 1923
Petty Cash Vouchers – Union National Bank, 1924
Petty Cash Vouchers – Union National Bank, 1925
Petty Cash Vouchers – Union National Bank, 1926

Box 82 (cont.)
Folder:

7. Statements – Union National Bank, 1922
8. Statements – Petty Cash – Union National Bank, 1922
9. Statements – Union National Bank, 1923-1924[32]
10. Statements – Petty Cash – Union National Bank, 1923
11. Statements – Petty Cash – Union National Bank, 1924
12. Statements – Petty Cash -- Union National Bank, 1925-January 1926
13. Statements – Union National Bank, 1926-1927[33]
14. Statements – Union National Bank, 1928-1929[34]
15. Cancelled Checks – Union National Bank, December 1923-1924[35]
16. Cancelled Checks – Union National Bank, 1925

Box 91 (5.0" legal)
Folder:

1. Cancelled Checks – Union National Bank, 1926
2. Cancelled Checks – Union National Bank, 1927
3. Cancelled Checks – Union National Bank, 1928
4. Cancelled Checks – Union National Bank, 1929
5. Blank Checks and Checkbook – Union National Bank, 1920s
6. Booklets – Deposits Received, Union National Bank, 1920-1935
7. U.S. Treasury Bond Receipts, March 1954, October 1957

[31] Accession LOWE-111.
[32] Accession LOWE-111.
[33] Accession LOWE-111.
[34] Accession LOWE-111.
[35] Cancelled checks Accession LOWE-111.

C. Insurance[36]

Box 92 (5.0" legal)
Folder:

1. "Current Papers/ Liability Insurance" [Policies and Correspondence], 1960-1961 (Part 1 of 3)
2. "Current Papers/ Liability Insurance" [Policies and Correspondence], 1960-1961 (Part 2 of 3)
3. "Current Papers/ Liability Insurance" [Policies and Correspondence], 1960-1961 (Part 3 of 3)
4. Policies, 1960
5. Policies, 1959
6. Policies, 1958 (Part 1 of 2)
7. Policies, 1958 (Part 2 of 2)
8. Policies, 1957
9. Policies, 1956
10. Policies, 1955

Box 93 (5.0" legal)
Folder:

1. Policies, 1954
2. Policies, 1953
3. Policies, 1949-1952
4. Lowell Housing Authority Correspondence, 1951-1959

Series IX. Legal Records[37]

Box 94 (5.0" legal)
Folder:

1. Pamphlet – *Charters and Additional Acts of the Manufacturing Companies at Lowell*, [1822-1848]
2. Pamphlets re: Water Power Issues, 1848-1881
3. *Charters, Additional Acts, and Other Documents* (1857)
4. *Indentures, Agreements, and Other Documents* (1879)
5. *Indentures, Agreements, and Other Documents* (1887) (c. 1)[38]

[36] Policies arranged in reverse chronological order.
[37] Accession LOWE-132 unless otherwise noted.
[38] With 1949 chronological index; heavily annotated with documents keyed to PL&C deed numbers.

Box 95 (5.0" legal)
Folder:

1. *Indentures, Agreements, and Other Documents* (1887) (c. 2)
2. *Indentures, Agreements, and Other Documents* (1887) (c. 3)
3. *Indentures, Agreements, and Other Documents* (1887) (c. 4)

Box 96 (5.0" legal)
Folder:

1. *Charters, Additional Acts, and Other Documents* (1889); *Acts and Ordinances Relating to the Lowell Water Works* (1876)
2. [Indenture, PL&C and Swift and Company re: Flashboard Maintenance, 9 December 1910] [copy]
3. Trustee Writs/ Orders Assignments, [1911-1919] (Part 1 of 2)
4. Trustee Writs/ Orders Assignments, [1911-1919] (Part 2 of 2)
5. *Indentures, Agreements, and Other Documents* (1921) (c. 1)
6. *Indentures, Agreements, and Other Documents* (1921) (c. 2)

Box 97 (5.0" legal)
Folder:

1. *Indentures, Agreements, and Other Documents* (1921) (c. 3)[39]
2. *Indentures, Agreements, and Other Documents* (1921) [typescript manuscript]

Series X. Engineers' Files

A. Hiram F. Mills[40]

3. List of File Headings and Contents ["Index of large brown envelopes in Mr. Mills' tin box'], 29 September 1931 (General Files #1115) [photocopy]
4. "Miscellaneous," 1902-1915[41]
5. #1 Appleton Company, 1902-1914
6. #4 Bigelow Carpet Co., 1901-1946[42]
7. #5 Bigelow Carpet Water Wheel, 1910[43]
8. #7 Boott Mills, 1906-1915[44]

[39] "Counting Room" copy.
[4040] Accession LOWE-132.
[41] Oversize item moved to Box 46, Folder 1.
[42] Includes newsprint, photographs.
[43] Oversize item moved to Map Folder #4. Includes photographs.

Box 98 (5.0" legal)
Folder:

1. #8 Boston & Maine R.R., 1902-1913[45]
2. #9 Boston & Northern Street Railway[46]
3. #16 Dunbar, Frank A., Attorney, 1900-1915
4. #19 Hamilton Mfg. Co., 1901-1911
5. #20 Hamilton Mfg. Co., 1901-1911
6. #24 Lawrence Mfg. Co., 1909-1914
7. #26 Wm. Livingston, 1898-1903
8. #28 Lowell Card Co., 1899-1900
9. #29 Lowell, City of. City Engineer, 1900-1915
10. #30 Lowell, City of. Mayor, City Solicitor, et al., 1898-1914
11. #33 Lowell Hospital Association and Lowell Corporation Hospital, 1900-1914 [1 of 3] (re: vs. Barnstead P. Waterstill Co.)
12. #33 Lowell Hospital Association and Lowell Corporation Hospital, 1901-1914 [2 of 3][47]
13. #33 Lowell Hospital Association [Lowell Corporation Hospital]: Reports, Forms, Staff, 1905-1912 [3 of 3]
14. #36 Lyman, Arthur T., 1894-1915
15. #39 Massachusetts Mohair Plush Co., 1900-1907
16. #40 Merrimack Mfg. Co., 1899-1914[48]
17. #43 Middlesex Co., 1867-1895

Box 99 (5.0" legal)
Folder:

1. #44 Nelson-Morris Co. [New Building], 1898-1899
2. #47 Parks and Playgrounds, 1908-1914[49]
3. #49 Pontoon Bridge, Automobile Races, August - September 1909[50]
4. #51 Proprietors of Locks & Canals. Correspondence [W.E. Badger][51], 1899-1914[52]
   Photos deteriorated – no image visible

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[44] Oversize item moved to Box 47, Folder 1.
[45] Oversize item moved to Map Folder #4.
[46] Empty envelope.
[47] Oversize item moved to Box 46, Folder 2; oversize item moved to Box 47, Folder 1.
[48] Oversize item moved to Box 46, Folder 3. Includes photographs.
[49] Oversize item moved to Map Folder #4.
[50] Oversize newsprint items moved to Box 47, Folder 1.
[51] Assistant Engineer.

5. #52 Proprietors of Locks & Canals. Correspondence [George Atkinson], 1897-1903
6. #54 Proprietors of Locks & Canals. Reports to Directors, 1893-1894 [1 of 2]
7. #54 Proprietors of Locks & Canals. Reports to Directors, 1895-1919 [2 of 2]
8. #57 Proprietors of Locks & Canals. James B. Francis, 1853, 1893-1894
9. #58 Proprietors of Locks & Canals. Free Landing, 1900[53]
10. #60 Proprietors of Locks & Canals. Hunt's Falls: Lowering the Bed of the Merrimack River, 1893-ca. 1901[54]
11. #61 Proprietors of Locks & Canals. Land Negotiations: Complaints, Damages, Permits, 1894-1914
12. #62 Proprietors of Locks & Canals. Land Negotiations: Leases, Real Estate, 1899-1915[55]
13. #63 Proprietors of Locks & Canals. Legal Data: Brandeis, Louis D., … 1895-1915[56]
14. #69 Saco-Lowell Shops, 1904-1915
15. #70 School Street Grade Crossing, 1908-1911

Box 100 (5.0" legal)
Folder:

1. #74 Tremont & Suffolk Mills, 1901-1911[57]
2. #78 YMCA Lowell, 1905-1910[58]
3. #81 Hiram F. Mills, 1873-1894[59]
4. #82 Letters – W.E. Badger [Other Correspondence], 1897-1917
5. Cowley, Charles vs. Proprietors of Locks and Canals, 1903-1918 (Part 1 of 6)[60]
6. Cowley, Charles vs. Proprietors of Locks and Canals, 1903-1918 (Part 2 of 6)
7. Cowley, Charles vs. Proprietors of Locks and Canals, 1903-1918 (Part 3 of 6)
8. Cowley, Charles vs. Proprietors of Locks and Canals, 1903-1918 (Part 4 of 6)
9. Cowley, Charles vs. Proprietors of Locks and Canals, 1903-1918 (Part 5 of 6)
10. Cowley, Charles vs. Proprietors of Locks and Canals, 1903-1918 (Part 6 of 6)[61]

B. Reference Materials[62]

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[52] Includes photographs.
[53] Oversize item moved to Box 47, Folder 2.
[54] Oversize item moved to Map Folder #5. Includes photographs.
[55] Oversize item moved to Box 47, Folder 2.
[56] Includes copy of 20 October 1891 legal opinion of Louis D. Brandeis re: common law rights of riparian proprietors.
[57] Oversize item moved to Box 47, Folder 2.
[58] Includes newsprint. Oversize newsprint moved to Map Folder #5.
[59] Oversize item moved to Box 48, Folder 1.
[60] Oversize item moved to Box 47, Folder 3, Box 48, Foldder 1.
[61] Oversize items moved to Box 47, Folder 3.
[62] Accession LOWE-132.

1. Companies

Box 101 (5.0" legal)
Folder:

1. Allis-Chambers – Proposal for Reconstruction of Grinder Unit for Hollingsworth & Whitney Paper Co., 1910-1918[63]
2. Allis-Chambers – [Possible Specifications for Grinder Reconstruction Proposal, 1918?][64]
3. Allis-Chambers – Catalogs, 1912-1924 (Part 1 of 2)[65]
4. Allis-Chambers – Catalogs, 1912-1924 (Part 2 of 2)
5. Allis-Chalmers, Re: Boott Mills Units' Efficiency Curves, October 1916-1919[66]
6. Allis-Chalmers – Proposal for Single Verticle Hydroelectric Units for Berlin Mills Co., 1916[67]
7. Allis-Chalmers – Proposals for Hydroelectric Unit for Boott Mills, September 1917
8. Allis-Chalmers – Proposal for Power House Arrangement for Topp-Stewart Co., December 1917[68]
9. Allis-Chalmers – Proposal for Hydroelectric Units for Amoskeage Co., 1920[69]
10. Hollingsworth & Whitney Paper Co. – Specifications for Hydroelectric Machinery, 1915-1926[70]
11. Holyoke Machine Co. – Catalogs, 1871, n.d.
12. Holyoke Machine Co. – Dimensions Tables, 1893-1925
13. Holyoke Machine Co. – Proposal for Horizontal Wheels for Chicopee Mfg. Co., 1923[71]

Box 102 (5.0" legal)
Folder:

1. I.P. Morris Co. – Turbine Projects, 1915-1919[72]
2. I.P. Morris Co. – Catalogs, 1915-1925
3. I.P. Morris Co. – Proposal for Turbines for Amoskeag Co., February 1920[73]

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[63] Includes photographs.
[64] Oversize item moved to Box 48, Folder 2.
[65] *See also:* Allis-Chalmers file in General Files, Box 93, Folder 4-6.
[66] Oversize item moved to Box 46, Folder 4.
[67] Oversize item moved to Map Folder #6.
[68] Oversize item moved to Map Folder #6.
[69] Oversize item moved to Map Folder #6.
[70] Oversize item moved to Map Folder #6. *See also*: for plan made for Hollingsworth and I.P. Morris – Turbine Projects.
[71] Oversize item moved to Map Folder #7.
[72] Oversize item moved to Map Folder #7. William Cramp & Sons Ship and Engine Building Co. owned I.P. Morris.

4. James Leffel & Co. – Product Literature, ca. 1870-1934
5. James Leffel & Co. – Turbine Proposals, 1914-1923[74]
6. S. Morgan Smith – Product Literature, 1902-1938 (Part 1 of 2)[75]
7. S. Morgan Smith – Product Literature, 1902-1938 (Part 2 of 2)

2. Product Catalogs

Box 103 (5.0" legal)
Folder:

1. Gates, 1915-1952 (Part 1 of 2)
2. Gates, 1915-1952 (Part 2 of)
3. Governors, 1903-1921 (Lombard Governor Co.)[76]
4. Meters, 1958, n.d.
5. Thrust Bearings, 1921-1951
6. Turbines, 1874-1921

Box 104 (5.0" legal)
Folder:

1. Water Wheels, 1909, n.d.
2. Water Wheels, 1872-1897 (Swain Turbine Co.)
3. Water Power Equipment (General), 1885-1921

3. Professional Literature

4. General, 1893-1897[77]
5. Turbines, 1914-1949[78]

4. Subject Files

6. "Pantex Electric Boiler," 1949-1956

[73] Oversize item moved to Map Folder #7.
[74] Includes photographs. Oversize item moved to Map Folder #8.
[75] Includes photographs. Oversize item moved to Map Folder #8
[76] Oversize items moved to Box 48, Folder 3.
[77] Contains pamphlet once owned by James B. Francis.
[78] Pamphlets have a file code number "115" (not related to General Files).

Series XI. Subject Files

7. "Division of Planning & Development" [City of Lowell], 1976-1987
8. "Donald Van Greenby" [re: Corrigan Ave. Real Estate], 1982-1985[79]
9. "Heritage State Park," 1976-1987 (File #1)[80]
10. "Heritage State Park," 1977-1979 (File #2)[81]
11. "H[istoric] A[merican] E[ngineering] R[ecord] Team/ Canal Study (1974)," 1974-1986
12. "Human Services Corporation" [Canal Barge Project], 1975-1978[82]
13. "Lowell Historic Preservation Com[mission]," 1979-1984[83]

Box 105 (5" legal)
Folder:

1. "Lowell Museum Corp.," 1976-1983[84]
2. "Lowell National Historical Park," 1976-1987[85]
3. "Lowell *Sun*" [re: Real Estate], 1948-1957[86]
4. "Lower Locks/ Reconstruction by D.E.M. …," 1983-1987 (Part 1 of 3)[87]
5. "Lower Locks/ Reconstruction by D.E.M. …," 1983-1987 (Part 2 of 3)
6. "Lower Locks/ Reconstruction by D.E.M. …," 1983-1987 (Part 3 of 3)[88]
7. "Model Cities [Agency]," 1971-1973[89]
8. [National Register Nomination Process], 1975
9. [Pawtucketville Sewerage Feasibility Report], 1962
10. "Urban National Cultural Park," 1957, 1973 (File #1)

Box 106 (5" legal)
Folder:

1. "Urban National Cultural Park," 1972-1981 (File #2)[90]
2. "Urban National Cultural Park," 1972-1978 (File #3)[91]

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[79] *See also:* Real Estate series. Oversize item moved to Box 47, Folder 4.
[80] Oversize newsprint moved to Box 47, Folder 5.
[81] Oversize newsprint moved to Box 47, Folder 5.
[82] *See also*: related items in the Drawings -- Assets Series Plans 09-16-1, -2, and -3.
[83] Contains newsprint.
[84] Contains newsprint. Oversize item moved to Box 47, Folder 6.
[85] Contains newsprint.
[86] *See also:* Real Estate series . Oversize item moved to Box 46, Folder 5.
[87] Oversize items moved to Map Folder #9.
[88] Contains newsprint. Oversize items moved to Map Folder #9.
[89] Oversize newsprint moved to Box 46, Folder 6.
[90] Oversize items moved to Map Folder #10.
[91] Newsprint.

3. "Urban National Cultural Park," 1976-1978 (File #4)[92]
4. "Water River Pollution," [1949]-1964[93]

Series XII. Labor Records

Box 107 (5 ½ X 7 ½ X 4 ½ " negative box)

"Inactive [Pay] Rate Cards," 16 February 1956

Series XIII. Reservoir Records

Box 106 (cont.)

5. Bill for Reservoir Water to Massachusetts Cotton Mills, 30 September 1920
6. Reservoir Water Meter Sheets, 1950-1953

Box 108 (20 ½ X 24 ½ x 1 ½")

"Record of Heights of Locks and Canals Reservoir and Number of U.S. Gallons Pumped," 1931-1940
"Record of Heights of Locks and Canals Reservoir and Number of U.S. Gallons Pumped," 1941-1950

Series XIV. Physical Plant Records

Box 109 (5 ¾ X 7 ¾ x 5" negative box)

[Index to Meters], 1869-1921
See also: Meter Sheets in Lowell Industrial Development Company Records, Box 5, Folder 10.

Series XV. Real Estate Records

Box 110 (5 ½ X 7 ½ X 12 ½" negative box)
Index to Leases by Tenant Name, ca. 1900-1948 (A – Li)

Box 111 (5 ½ X 7 ½ X 12 ½" negative box)
Index to Leases by Tenant Name, ca. 1900-1948 (Lo – Z)

Box 112 (5 ½ X 7 ½ X 12 ½" negative box)
Index to Parcels, ca. 1900-1928[94]

[92] Newsprint. Oversize items moved to Box 48, Folder 4.
[93] Oversize items moved to Box 48, Folder 5.
[94] Some index cards indicate whether the parcel's taxes were paid by PL&C or by the tenant.

Box 106 (cont.)

7. Notebook – Valuations of Canal System and Reservoir, 1921, 1936[95]
8. Appraisal, 6 February 1963 (2 copies)

Series XVI. Affiliated Companies Records

A. Joint Records

Box 113 (5.0" legal)

1. Mass. Certificates of Condition, 1974-1980[96]
2. Loan Documents – [Teamsters] Pension Fund – CII, SII, PL&C, and Boott Mills, 1975-1976[97]
3. Bank Confirmation Forms, 1975[98]
4. Record Box Label, post 1965

B. Corporation Investments, Inc. (CII)

5. Directors' Records and Associated Documentation, 1964-1969 (Part 1 of 4)[99]
6. Directors' Records and Associated Documentation, 1964-1969 (Part 2 of 4)[100]
7. Directors' Records and Associated Documentation, 1964-1969 (Part 3 of 4)[101]
8. Directors' Records and Associated Documentation, 1964-1969 (Part 4 of 4)[102]
9. Notebook Cover to Above[103]

Box 114 (5.0" legal)
Folder:

1. Notes Receivable, 1964-1968[104]
2. "U[nion] N[ational] B[ank] – CII – F[our] W[heel] D[rive Corp.] Transactions, Vol. I," [re: Refinancing Plan], 1968-1969 (Part 1 of 3)[105]

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[95] See also: #1117 in General Files series, Box 75, Folder 4, 5. LOWE-132.
[96] LOWE-111.
[97] LOWE-111.
[98] LOWE-111.
[99] LOWE-769. Includes articles of merger with Fabricon and North Carolina Investment Co.
[100] LOWE-769.
[101] LOWE-769.
[102] LOWE-769.
[103] LOWE-769.
[104] LOWE-111.
[105] LOWE-769.

3. "U[nion] N[ational] B[ank] – CII – F[our] W[heel] D[rive Corp.] Transactions, Vol. I," [re: Refinancing Plan], 1968-1969 (Part 2 of 3)[106]
4. "U[nion] N[ational] B[ank] – CII – F[our] W[heel] D[rive Corp.] Transactions, Vol. I," [re: Refinancing Plan], 1968-1969 (Part 3 of 3)[107]
5. "U[nion] N[ational] B[ank] – CII – F[our] W[heel] D[rive Corp.] Transactions, Vol. II," [re: Refinancing Plan], 1968-1969 (Part 1 of 3)[108]
6. "U[nion] N[ational] B[ank] – CII – F[our] W[heel] D[rive Corp.] Transactions, Vol. II," [re: Refinancing Plan], 1968-1969 (Part 2 of 3)[109]
7. "U[nion] N[ational] B[ank] – CII – F[our] W[heel] D[rive Corp.] Transactions, Vol. II," [re: Refinancing Plan], 1968-1969 (Part 3 of 3)[110]
8. Committee Under Plan of Refinancing of CII – Meeting Minutes and Related Documents, 1969-1989 (Part 1 of 3)[111]

Box 115 (5.0" legal)
Folder:

1. Committee Under Plan of Refinancing of CII – Meeting Minutes and Related Documents, 1969-1989 (Part 2 of 3) [112]
2. Committee Under Plan of Refinancing of CII – Meeting Minutes and Related Documents, 1969-1989 (Part 3 of 3) [113]
3. Plan of Refinancing of Corporation Investments, Inc. and Related Documents, 1969 (c. 1)[114]
4. Plan of Refinancing of Corporation Investments, Inc. and Related Documents, 1969 (c. 2)[115]
5. Transactions Related to Plan of Refinancing of Corporation Investments, Inc., 1970 (c. 1) [116]

Box 116 (5.0" legal)
Folder:

[106] LOWE-769.
[107] LOWE-769.
[108] LOWE-769.
[109] LOWE-769.
[110] LOWE-769.
[111] LOWE-769.
[112] LOWE-769.
[113] LOWE-769.
[114] LOWE-769.
[115] LOWE-769.
[116] LOWE-769.

1. Transactions Related to Plan of Refinancing of Corporation Investments, Inc., 1970 (c. 2) [117]
2. Directors' Records and Related Documents, 1970-2008 [photocopy] [118]
3. Consolidating Balance Sheets, 1971[119]
4. Consolidating Balance Sheets, 1972[120]
5. "Work Sheets from October 1971 – September 1972" [Consolidated Balance Sheets] [121]
6. FY 1972 Financial Statements, 1972[122]
7. 1978 Federal Tax Return, 1980[123]
8. 1978, 1979 Mass. Excise Returns, 1980
9. 1979 Tax Returns – Federal Corporation and Mass. Excise, 1980
10. FY 1981-1984 Financial Statements, 1982-1985[124]
11. Tax Documents, 1989-2006

C. Wisconsin Investments, Inc. (WII)

12. Directors' and Stockholders' Meeting Minutes and Related Documents, 1965-1990 (Part 1 of 3)[125]
13. Directors' and Stockholders' Meeting Minutes and Related Documents, 1965-1990 (Part 2 of 3)[126]

Box 117 (5.0" legal)

1. Directors' and Stockholders' Meeting Minutes and Related Documents, 1965-1990 (Part 3 of 3)[127]
2. FY 1984, 1985 Financial Statements, 1985 (2 copies)[128]

D. Ocwen, Inc.

[117] LOWE-769.
[118] LOWE-769.
[119] LOWE-111. Oversize items moved to Box 47, Folder 7.
[120] LOWE-111. Oversize items moved to Box 47, Folder 8.
[121] LOWE-111. Oversize items moved to Box 47, Folder 9.
[122] LOWE-111.
[123] LOWE-111.
[124] LOWE-111.
[125] LOWE-769.
[126] LOWE-769.
[127] LOWE-769.
[128] LOWE-111.

3. Directors' and Stockholders' Meeting Minutes and Related Documents, 1970-1984 (Part 1 of 3)[129]
4. Directors' and Stockholders' Meeting Minutes and Related Documents, 1970-1984 (Part 2 of 3)[130]
5. Directors' and Stockholders' Meeting Minutes and Related Documents, 1970-1984 (Part 3 of 3)[131]
6. "Transactions Related to Plans of Refinancing of Corporation Investments, Inc.," 1970 [Ocwen copy] [132]

Box 118 (5.0" legal)
Folder:

1. Notebook Cover to Above
2. Balance Sheets, 1972[133]
3. FY 1981-1985 Financial Statements, 1982-1985[134]

E. Lowell Land Company[135]

4. Records, 1938-1946 (Part 1 of 2
5. Records, 1938-1946 (Part 2 of 2)
6. Charter, 3 November 1938[136]

[129] LOWE-769.
[130] LOWE-769.
[131] LOWE-769.
[132] LOWE-769.
[133] LOWE-111.
[134] LOWE-111.
[135] LOWE-132.
[136] Oversize item moved to Box 47, Folder 10.

F. Lowell Industries Limited

7. Directors' Meeting Minutes and Related Documents, 1964-1965[137]

Box 119 (2 ½" legal)

1. Notebook Cover to Above

Series XVII. Miscellaneous Materials

2. Administrative (?) Notebook, 1945-1958[138]
3. Loose Records in Administrative Notebook, 1956-1957[139]
4. Surplus Water Power Regulations, Revised May 1949
5. Sign-out for Office Files, 2 February 1956

Series XVIII. Photographs ***See Finding Aid Volume II: Guides to the Photographs Series and Architectural and Engineering Drawing Series***

Series XIX. Drawings ***See Finding Aid Volume II: Guides to the Photographs Series and Architectural and Engineering Drawing Series***

Series XX. Oversize

Series XX. Oversize Material

The following is oversize material removed from Series I. Directors' Records, boxes 1-3.
Oversize Box 1 (12" x 15" x 3" flat box)

Directors' Records [Minutes from the meetings of the Directors of the PL&C; bound manuscript volume], 1813-1825[140]

Oversize Box 2 (12" x 15" x 3" flat box)

Directors' Records, #2 [Minutes from the meetings of the Directors of the PL&C; bound manuscript volume], 1843-1853[141]

Directors' Records, #3 [Minutes from the meetings of the Directors of the PL&C; bound manuscript volume], 1853-1877[142]

Oversize Box 3 (12" x 15" x 3" flat box)

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[137] LOWE-769.
[138] Oversize items moved to Box 46, Folder 7.
[139] Includes photographs. Oversize items moved to Box 47, Folder 11, Map Folder #11.
[140] Item removed from Box 1, Folder 1. Typed transcripts of this item are available in Box 1, Folder 6.
[141] Item removed from Box 1, Folder 2. Typed transcripts of this item are available in Box 1, Folders 6-8.
[142] Item removed from Box 1, Folder 3. Typed transcripts of this item are available in Box 1, Folder 7.

Directors' Records [Minutes from the annual and special meetings of the PL&C; bound manuscript volume], 1876-1940[143]

Oversize Box 4 (23" x 30" x 3" flat box)
Folder:

1. Materials from Directors' and Executive Committee Records [Minutes from the meetings of the Directors and the Executive Committee of the PL&C; materials removed from sleeve], Vol. 7, 1921-1939. (Part 2 of 2)

The following is oversize material removed from Series II. General Files, boxes 4-97.

2. Materials from files 1001[03] – 1001[05]
3. Materials from file 1001.1
4. Materials from files 1002[03] – 1002[04]
5. Materials from file 1002.1
6. Materials from file 1003[01] (Part 1 of 3)
7. Materials from file 1003[01] (Parts 2 & 3 of 3)

Oversize Box 5 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1003[02]
2. Materials from file 1003.1 (Part 1 of 2)
3. Materials from file 1003.1 (Part 2 of 2)
4. Materials from file 1003.2
5. Materials from file 1004 (Part 2 of 4)
6. Materials from file 1004 (Part 3 of 4)
7. Materials from file 1004 (Part 4 of 4)
8. Materials from files 1004-A – 1004-D

Oversize Box 6 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1005[02]
2. Materials from file 1006[02]
3. Materials from files 1006[03] – 1006.1
4. Materials from files 1007[01] – 1007.1
5. Materials from file 1008[02]
6. Materials from file 1008.1 (Part 1 of 2)
7. Materials from file 1008.1 (Part 2 of 2)
8. Materials from file 1008.A

Oversize Box 7 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1009[03]
2. Materials from file 1009[05] (Parts 1 & 2 of 5)
3. Materials from file 1009[05] (Parts 3-5 of 5)
4. Materials from files 1009[06] – 1009[07]

[143] Item removed from Box 3, Folder 4.

5. Materials from file 1009.1
6. Materials from files 1010[04] – 1010[05]

Oversize Box 8 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1010[07 and 08] – 1010[10 and 11]
2. Materials from files 1010[13] – 1010[16]
3. Materials from files 1010A, 1010B
4. Materials from file 1010.01 (Part 1 of 2)
5. Materials from file 1010.01 (Part 2 of 2)
6. Materials from file 1011[02]

Oversize Box 9 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1011.1[01] (Part 1 of 2)
2. Materials from file 1011.1[01] (Part 2 of 2)
3. Materials from file 1011.1[02]
4. Materials from file 1012.0
5. Materials from file 1012.01[02] (Part 1 of 3)
6. Materials from file 1012.01[02] (Part 2 of 3)
7. Materials from file 1012.01[02] (Part 3 of 3)

Oversize Box 10 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1012.01[03]
2. Materials from files 1012.02[04] – 1012.03[02]
3. Materials from files 1012.04[04] – 1012.04[05]
4. Materials from file 1012.04[06] (Part 1 of 3)
5. Materials from file 1012.04[06] (Part 2 of 3)
6. Materials from file 1012.04[06] (Part 3 of 3)

Oversize Box 11 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1012.04[07] – 1012.04[09]
2. Materials from file 1012.04[10]
3. Materials from file 1012.04[11]
4. Materials from file 1012.04[12]
5. Materials from file 1012.04[14] (Appendix A, Part 1 of 2)
6. Materials from file 1012.04[14] (Appendix A, Part 2 of 2)
7. Materials from file 1012.04[14] (Appendices B-G)

Oversize Box 12 (23" x 30" x 3" flat box)
Folder:

1. Materials from files 1012.04[15] – 1012.04[17]
2. Materials from file 1012.05
3. Materials from file 1012.06[01] (Part 1 of 2)
4. Materials from file 1012.06[01] (Part 2 of 2)
5. Materials from file 1012.06[02] (Part 1 of 2)
6. Materials from file 1012.06[02] (Part 2 of 2)

Oversize Box 13 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1012.08[01]
2. Materials from files 1012.08[02] – 1012.08[03]
3. Materials from file 1012.09
4. Materials from file 1012.10[01] (Part 1 of 2)
5. Materials from file 1012.10[01] (Part 2 of 2)
6. Materials from file 1012.10[02]

Oversize Box 14 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1012.12 – 1012.15
2. Materials from file 1012.16[01] (Part 1 of 2)
3. Materials from file 1012.16[01] (Part 2 of 2)
4. Materials from file 1012.16[02]
5. Materials from file 1012.18[01] [Oversize folder 1 of 2]
6. Materials from file 1012.18[01] [Oversize folder 2 of 2]

Oversize Box 15 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1012.20[01]
2. Materials from file 1012.20[04]
3. Materials from file 1012.21
4. Materials from file 1012.22 (Part 1 of 3)
5. Materials from file 1012.22 (Parts 2 & 3 of 3)

Oversize Box 16 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1013[02] – 1015[04]
2. Materials from file 1015.1[01] (1912-1916)
3. Materials from file 1015.1[01] (1917-1921)
4. Materials from file 1015.1[01] (1922-1925)
5. Materials from file 1015.1[01] (1926-1932)

Oversize Box 17 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1015.1[02]

2. Materials from file 1016[01]
3. Materials from file 1017 (Part 1 of 2)
4. Materials from file 1017 (Part 2 of 2)
5. Materials from file 1018
6. Materials from file 1019

Oversize Box 18 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1020
2. Materials from file 1022[01]
3. Materials from files 1023 – 1029
4. Materials from files 1030[02] – 1035
5. Materials from file 1036[01]

Oversize Box 19 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1036[02] (Part 1 of 2)
2. Materials from file 1036[02] (Part 2 of 2)
3. Materials from file 1036[03]
4. Materials from file 1036[04]
5. Materials from file 1036[05]

Oversize Box 20 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1036[06]
2. Materials from file 1036[07] (Part 1 of 2)
3. Materials from file 1036[07] (Part 2 of 2)
4. Materials from files 1036[08] – 1037
5. Materials from file s1038[02] – 1039

Oversize Box 21 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1040[02]
2. Materials from file 1040.01
3. Materials from files 1040.02 – 1040.04
4. Materials from file 1040.05 (Part 1 of 2)
5. Materials from file 1040.05 (Part 2 of 2)

Oversize Box 22 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1040.06 – 1040.07
2. Materials from files 1040.08 – 1040.09
3. Materials from files 1040.10 – 1041[02]

4. Materials from file 1042
5. Materials from file 1046
6. Materials from files 1047 – 1049

Oversize Box 23 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1050
2. Materials from file 1051[01] (Part 1 of 2)
3. Materials from file 1051[01] (Part 2 of 2) [Oversize folder 1 of 2]
4. Materials from file 1051[01] (Part 2 of 2) [Oversize folder 2 of 2]

Oversize Box 24 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1051[02] (Part 1 of 2)
2. Materials from file 1051[02] (Part 2 of 2)
3. Materials from file 1053[02]
4. Materials from file 1054

Oversize Box 25 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1055[01] (Part 1 of 2)
2. Materials from file 1055[01] (Part 2 of 2)
3. Materials from files 1055[02] – 1056
4. Materials from files 1057 – 1062
5. Materials from file 1065

Oversize Box 26 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1071[01] – 1073[01]
2. Materials from file 1073[02] (Part 1 of 2)
3. Materials from file 1073[02] (Part 2 of 2)
4. Materials from files 1073[03] – 1074
5. Materials from file 1075[02]

Oversize Box 27 (23" x 30" x 3" flat box)
Folder:
1. Materials from files 1076 – 1076.2[01]
2. Materials from file 1076.2[02]
3. Materials from file 1077[06] (Parts 1 & 2 of 5)
4. Materials from file 1077[06] (Parts 3-5 of 5)
5. Materials from files 1077[07] – 1078[01]

Oversize Box 28 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1078[02]
2. Materials from file 1080[01]
3. Materials from file 1080[03]
4. Materials from files 1080-A – 1080.1[01]
5. Materials from files 1080.1[02] – 1082

Oversize Box 29 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1082.1
2. Materials from files 1082.2 – 1083
3. Materials from files 1084 – 1085[03]
4. Materials from files 1086 – 1090
5. Materials from files 1092.01 – 1092.02

Oversize Box 30 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1092.05
2. Materials from file 1092.08
3. Materials from file 1092.09[01]
4. Materials from files 1092.09[02] – 1092.11
5. Materials from file 1092.12

Oversize Box 31 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1094
2. Materials from "Correspondence from Howard M. Turner to S. Stanley Kent and Flood Hydrographs"
3. Materials from file 1095[02] (Parts 1-3 of 4)
4. Materials from file 1095[02] (Part 4 of 4) – 1095[03]
5. Materials from file 1095-1 [Oversize folder 1 of 2]
6. Materials from files 1095-1 [Oversize folder 2 of 2] – 1096

Oversize Box 32 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1097[03] [Oversize folder 1 of 2]
2. Materials from file 1097[03] [Oversize folder 2 of 2]
3. Materials from file 1100[02]
4. Materials from file 1100[03]
5. Materials from file 1100[04]

Oversize Box 33 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1100-1
2. Materials from file 1107
3. Materials from files 1108 – 1109
4. Materials from files 1113 – 1114[02]
5. Materials from files 1114[03] – 1114.14
6. Materials from files 1114.15 – 1116[02]

Oversize Box 34 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1117[01]
2. Materials from file 1118[01]
3. Materials from files 1118[02] – 1118.1[03]
4. Materials from file 1119[01] (Part 1 of 2)
5. Materials from file 1119[01] (Part 2 of 2)
6. Materials from file 1119[02]

Oversize Box 35 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1119-A[01] (Part 1 of 2)
2. Materials from file 1119-A[01] (Part 2 of 2)
3. Materials from file 1119-A[02]
4. Materials from file 1119-A[03]
5. Materials from file 1119-A[11]
6. Materials from file 1119-A[13]

Oversize Box 36 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1122
2. Materials from file 1125[01]
3. Materials from file 1126[07]
4. Materials from files 1127[07] – 1127[08]
5. Materials from files 1127[09] – 1127-0

Oversize Box 37 (23" x 30" x 3" flat box)
Folder:

1. Materials from files 1127.002 – 1127.006
2. Materials from files 1127.008 – 1127.025
3. Materials from files 1127.030 – 1127.067
4. Materials from files 1127.074 – 1127.080
5. Materials from files 1127.084 – 1127.086
6. Materials from files 1127.089 – 1127.103-H/1127.104

Oversize Box 38 (23" x 30" x 3" flat box)
Folder:

1. Materials from file 1128[03]

2. Materials from file 1128[04]
3. Materials from files 1128[05] – 1129-A
4. Materials from files 1130 – 1133
5. Materials from files 1136 – 1144

Oversize Box 39 (23" x 30" x 3" flat box)
Folder:
1. Materials from file 1148
2. Materials from files 1151 – 1152[01]
3. Materials from file 1153 (Part 1 of 2)
4. Materials from file 1153 (Part 2 of 2)
5. Materials from files 1154 – 1155[01]
6. Materials from files 1155[02] – 1156

Rolled Material

Oversize Box 40 (43" x 6" x 6" box)
1. Item from "Director's and Executive Committee Records, Vol. 7, 1921 – 1939"
2. Item from file 1065

Oversize Box 41 (12" x 5" x 3" box)
1. Item from file 1114.14

Map Folder Materials

Folder:
1. Materials from file 1001[05]
2. Materials from file 1003[01]
3. Materials from file 1004
4. Materials from files 1008 – 1008.1
5. Materials from file 1009[07]
6. Materials from file 1012.04[06]
7. Materials from file 1012.04[14] (Appendix A, figures 4, 32, 34-37)
8. Materials from file 1012.04[14] (Appendix A, figures 53, 54, 58, 59, 69)
9. Materials from file 1012.04[14] (Appendices B-E)
10. Materials from files 1012.04[16] and 1012.0[17]
11. Materials from files 1012.05 – 1012.08
12. Materials from file 1012.16[02]
13. Materials from file 1022[01]
14. Materials from file 1036[08]
15. Materials from files 1038[02] – 1038.1
16. Materials from files 1040.03 – 1045
17. Materials from files 1055[01] – 1060

18. Materials from files 1077[07] – 1078[02]
19. Materials from files 1082.1 – 1095-1
20. Materials from files 1097[03] – 1109
21. Materials from files 1114[01] – 1118[02]
22. Materials from file 1119-A[13]
23. Materials from files 1127.006 – 1127.016
24. Materials from files 1127.028 – 1127.089
25. Materials from files 1128[04] – 1133

Phase 2 and 3 Oversize Materials

Oversize Material

The following is oversize material removed from Series III. Physical Data of Canal Operations.

Box 1 (15”x11.5”x1.5” Flat Box)
Records, 1884-1891 (Vol. 10a) (Removed from Box 1 Folder 4)

Box 2 (15” x 11.5” x 1.5” Flat Box)
Records 1877-1882 (Vol. Q) (Removed from Box 3 Folder 4)

Box 3 (15”x 11.5” x 3” Flat Box)
Day Book 1871-1876 (Removed from Box 6 folder 3)

Box 4 (15”x 11.5” x 3” Flat Box)
Day Book 1876-1881 (Removed from Box 6 Folder 4)

Box 5 (15”x 11.5” x 3” Flat Box)
Day Book 1881-1892 (Removed from Box 6, Folder 5)

Box 6 (18.5”x 14.5” x 3” Flat Box)
Record of Locks and Canals Reservoir, July 1920- February 1931 (Removed from Box 10 Folder 9)

Box 7 (15”x 11.5” x 1.5” Flat Box)
Tables- Water Flowing over Weirs (Removed from Box 11 Folder 5)

Box 8 (15”x 11.5” x 1.5” Flat Box)
Tables- Water Flowing over Weirs (Removed from Box 11 Folder 6)

Box 9 (18.5”x 14.5” x 1.5” Flat Box)
Mills- Floor Plan and Property Surveys. (Removed from Box 14 Folder 1)

Box 10 (15”x 11.5” x 1.5” Flat Box)

Tables-Appleton Co. (Removed from Box 14 Folder 6)

Box 11 (15”x 11.5” x 1.5” Flat Box)
Tables- Boott Cotton Mills (Removed from Box 14 Folder 7)

Box 12 (15”x 11.5” x 1.5” Flat Box)
Tables- Hamilton MFG Co. (Removed from Box 14 Folder 8)

Box 13 (15”x 11.5” x 1.5” Flat Box)
Tables- Lawrence MFG. Co. (Removed from Box 14 Folder 9)

Box 14 (15”x 11.5” x 1.5” Flat Box)
Tables- Lowell Machine Shop (Removed from Box 14 Folder 10)

Box 15 (15”x 11.5” x 1.5” Flat Box)
Tables- Mass. Cotton Mills (Removed from Box 14 Folder 12)

Box 16 (15”x 11.5” x 1.5” Flat Box)
Tables – Merrimack MFG Co (Removed from Box 14 Folder 13)

Box 17 (15”x 11.5” x 1.5” Flat Box)
Tables- T&S Mills (Removed from Box 14 Folder 14)

Box 18 (15”x 11.5” x 1.5” Flat Box)
Miscellaneous Tests etc. 1891-95 (no. 11) (Removed from Box 14, Folder15)

Box 19 (15”x 11.5” x 1.5” Flat Box)
Turbine Tests Etc. 1846-68 (Vol. E) (Removed from Box 14, Folder 16)

Box 20 (15”x 11.5” x 1.5” Flat Box)
Turbine Tests Et. 1868- 77 (Vol. L) (removed from Box 14 Folder 17)

Box 21 (15”x 11.5” x 1.5” Flat Box)
Records of rainfall kept by props. Locks and Canals at guard gates of Northern Canal Records of Temperatures kept by Props. Locks and Canals at Pawtucket Dam. Records of Temperatures kept by Props. Locks and Canals at Old Guard Locks (Removed from Box 17 Folder 4)

Box 22 (15”x 11.5” x 1.5” Flat Box)
Water Measurements, Tabulations, Diagrams, and General Information (Removed from Box 17 folder 5)

Box 23 (15”x 11.5” x 1.5” Flat Box)
Observations at the Lower Locks in Lowell, Mass. June 1939-August 1945 (Removed from Box

17 Folder 9)

Box 24 (15”x 11.5” x 1.5” Flat Box)
Observations at the Swamp Locks, March 1942 – May 1945 (Removed from Box 17 Folder 10)

Box 25 (15”x 11.5” x 1.5” Flat Box)
Termont Gates, October 8, 1868-October 19, 1948 (Removed from Box 17 Folder 12)

Box 26 (15”x 11.5” x 1.5” Flat Box)
Index to books kept by the *Proprietors of the Locks and Canals on Merrimack River*, Containing Copies of and extracts from Deeds of Real Estate, December 22, 1862 (Removed from Box 26 Folder 27)

The following is material removed from Series IV. Deeds, Series V. Flowage Records and Series IV. Tax Records.

Box 27 (17 x 11½ x 3 ½)
Folder:
1. Material from Deeds 4, 5, 6, 15, 21, 26, 28
2. Material from Deeds 33 (2 documents), 34, 45, 51, 52
3. Material from Deeds 79, 90, 92, 94, 96, 104
4. Material from Deeds 105, 106, 113, 118 (2 Documents), 125, 129
5. Material from Deeds 131, 133, 134, 135, 136, 138
6. Material from Deeds 140, 143, 145, 146, 147, 153
7. Material from Deeds 154, 155, 157, 167, 171, 172, 175
8. Material from Deeds 176, 178, 183, 188, 245
9. Material from Deeds 248, 252, 279, 313, 319, 325
10. Material from Deeds 328 (2 Documents), 332
11. Material from Deeds 333, 335, 339, 345, 346 (2 Documents)
12. Material from Deeds 352, 365, 374, 379, 380
13. Material from Deeds 381, 382, 387, 393, 396, 400
14. Material from Deeds 401, 403, 427, 556
15. Material from Deeds 561, 583, 585, 591, 674
16. Material from Deeds 703, 718, 806, 956, 1015, 1016

Box 28 (17 x 11½ x 3 ½)
Folder:
1. Material from Deeds 1050, 1083, 1085, 1137, 1177, 1187
2. Material from Deeds 1190, 1250, 1267, 1269, 1271, 1279
3. Material from Deeds 1312, 1318, 1330, 1343, 1349, 1383, 1384
4. Material from Deeds 5198, 5310, 5314, 5333, 5337, 5338
5. Material from Deeds 5346 (2 documents), 5347, 5349, 5350

6. Material from Deeds 5351, 5355, 5373, 5374, 5375, 5376

7. Material from Deeds 5377, 5378, 5390, 5401, 5409
Material from Deeds 5410, 5415, 5539, 5784, 5800B

Box 29 (20½ x 16½ x 1½)
Folder:
1. Material from Deeds 41, 55, 89, 93, 98, 100
2. Material from Deeds 124, 130, 148, 158, 159, 168, 179
3. Material from Deeds 181, 187, 276, 285, 288, 290
4. Material from Deeds 311, 350, 362, 374, 375, 389 (2 documents)

Box 30 (20½ x 16½ x 1½)
Folder:
1. Material from Deeds 390, 402, 403, 413, 416, 417 (2 Documents)
2. Material from Deeds 419, 420, 422, 423, 424, 425, 426
3. Material from Deeds 447, 451, 453, 456, 457, 540

Box 31 (20½ x 16½ x 1½)
Folder:
1. Material from Deeds 548, 549, 555, 561, 563
2. Material from Deed 583
3. Material from Deed 592
4. Material from Deeds 603 (2 documents), 604, 605 (3 documents)
5. Material from Deed 615
6. Material from Deeds 669, 677, 697, 704
7. Material from Deeds 720
8. Material from Deeds 728, 729, 795, 796, 804

Box 32 (20½ x 16½ x 1½)
Folder:
1. Material from Deed 837
2. Material from Deeds 942, 943, 945, 950, 993, 994
3. Material from Deeds 1008, 1017, 1035, 1055, 1103, 1107
4. Material from Deeds 1137, 1161, 1177, 1189, 1191

Box 33 (20½ x 16½ x 1½)
Folder:
1. Material from Deeds 1198, 1218, 1221, 1269, 1270 (2 documents), 1277
2. Material from Deeds 1319, 1320, 1333, 1338, 1358, 1384, 1393 (13 documents)
3. Material from Deeds 5191, 5196, 5359, 5360, 5424, 5783-A
4. Material from Deeds 5788, 5789A, 5807, 5812

Box 34 (28 ¾ x 22 ¾ x 1 ½)
Folder:
1. Material from Deeds 20, 21, 117, 150, 192, 194, 326, 421, 561, 564, 577 (2 documents)
2. Material from Deeds 583, 588 (2 documents), 602-A, 602-B, 602-C, 614, 615, 654, 675, 678
3. Material from Deeds 682, 796, 834, 852, 910, 933, 934, 945, 962, 991
4. Material from Deeds 1012, 1016, 1018, 1019, 1020, 1021, 1022, 1023
5. Material from Deeds 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1034

Box 35 (20½ x 16½ x 1½)
Folder:
1. Material from Deeds 1038, 1054, 1078, 1099, 1132, 1133, 1134, 1136, 1164, 1166, 1169
2. Material from Deeds 1187, 1188, 1195, 1197, 1208 (2 documents), 1226, 1232, 1236, 1271
3. Material from Deeds 1281, 1284, 1299, 1305, 1306, 1324, 1332, 1350
4. Material from Deeds 1371, 1373, 1386, 1387, 1395, 1406
5. Material from Deeds 5343, 5696, 5745 (2), 5749, 5783

Box 36 (37 ½ x 24 ½ x 3)
Folder:

1. Material from Deeds 22, 177, 287 (3 documents), 289, 330
2. Material from Deeds 434, 527, 571, 584, 588
3. Material from Deed 591 (7 documents)
4. Material from Deeds 699, 809, 826, 851, 855, 1053 (2 documents), 1077, 1130
5. Material from Deeds 1145, 1150, 1158, 1165, 1168
6. Material from Deeds 1217, 1262, 1280, 1405
7. Material from Deeds 5011, 5361, 5409, 5705, 5716, 5757, 5782

Box 37 (20 ½ x 16 ½ x 1 ½)
Index of Deeds 1-1311

Box 38 (20 ½ x 16 ½ x 1 ½)
Index of Deeds 5001-5818

Box 39 (20 ½ x 16 ½ x 1 ½)
Index to Flowage Records

Box 40 (20 ½ x 16 ½ x 1 ½)
Folder:
1. Material from Flowage Records 8001 and 8003
2. Material from Flowage Record 8083
3. Material from Flowage Record 8101

Box 41 (24 ¾ x 21 x 1½)
Folder:
1. Material from Flowage Record 8021
2. Material from Flowage Record 8024
3. Material from Flowage Record 8081
4. Material from Flowage Record 8085
5. Material from Flowage Record 8097
6. Material from Flowage Record 8099
7. Material from Flowage Record 8107
8. Material from Flowage Record 8262
9. Material from Flowage Record 8342

Box 42 (20 ½ x 16 x 1 ½)
Folder:
1. Material from Tax Record, Street Resolution for Colonial Ave
2. Material from Tax Record, Street Resolution for Hanover St.
3. Material from Tax Record, Street Resolution for Merrimack St.
4. Material from Tax Record, General Tax Information on Schedule of Real Estate Owned by PL&C

Box 43 (24 ¾ x 20 ½ x 1 ½)
Folder:
1. Material from Tax Records, Street Resolution for Stackpole Street.
2. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1906
3. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1907
4. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1909

Box 44 (29 x 23 x 1 ½)
Folder:
1. Material from Flowage Records 8172 and 8261

Box 45 (31 x 23 x 3)
Folder:
1. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1912
2. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1913
3. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1914
4. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1915

Box 46 (14 ½ x 18 ½ x 1 ½")
Folder:

The following materials are removed from Series X. Engineers' Files, Series XI. Subject Files, and Series XII. Miscellaneous:

1. Material from Mills "Miscellaneous" File
2. Material from Mills File #33 – Lowell Hospital Photograph, n.d.
3. Material from Mills File #40 – Chart, 1901
4. Velocity Diagram for Boott Mills Waterwheel, 1916[144]
5. Material from *Lowell Sun* File – Plan of Lot 80-0, 1957
6. Material from Model Cities Agency File – "Lowell – A Junk Shop?" *Boston Globe*, 10 December 1972
7. Materials from Administrative Notebook – Schedules of Real Estate, 1945-1958[145]

Box 47 (20 ½ x 24 ½ x 1 ½")

The following materials are removed from Series X. Engineers' Files, Series XI. Subject Files, and Addendum: III. Physical Data of Canal Operations (cont.):

1. Materials from: Mills File #7 (Boott Mills)
   Mills File #33 (Lowell Hospital)
   Mills File #49 (Pontoon Bridge, Automobile Races)
2. Materials from: Mills File #58 (PL&C Free Landing)
   Mills File #62 (Land Negotiations)
   Mills File #74 (Tremont & Suffolk Mills)
3. Materials from Cowley, Charles vs. PL&C (Parts 1 & 6)
4. Material from "Donald Van Greenby" File
5. Material from "Heritage State Park" Files (#1 & #2)
6. Material from Lowell Museum File
7. Balance Sheets, 1971
8. Balance Sheets, 1972
9. Balance Worksheets October 1971-1972
10. Lowell Land Company Charter
11. Materials from Administrative Notebook[146]

Box 48 (22 ½ X 30 ½ X 3")

The following materials are removed from Series X. Engineers' Files, Series XI. Subject Files, and Addendum: III. Physical Data of Canal Operations (cont.):

1. Material from Mills File #81 (Moody Street Feeder)
2. Drawings for Hollingsworth & Whitney Co. Turbines[147]

[144] Moved from Box 101, Folder 5.
[145] Moved from Box 119, Folder 2.
[146] Moved from Box 119, Folder 3.
[147] Moved from Box 101, Folder 2.

3. Drawings of Governors[148] One item too brittle to unfold; one soiled, section missing
4. Clippings re: Creation of Lowell NHP, 1976-1978[149]
5. Materials from [Merrimack] "River Pollution" File[150]
6. "Map of Merrimack River Drainage Area Showing Rainfall and Stream Gaging [sic] Stations," October 1940[151]

Box 49 (14 ½ x 18 ½ x 1 ½")

Journal Kept at Guard Gates [of Pawtucket Dam], May 1947-December 1954

Box 50 (16 ½ x 20 ½ x 1 ½")

[Merrimack River Level Readings from Official Gauge], September 1950 – July 1961

Box 51 (20 ½ x 24 ½ X 3" flat box)

"A. Index Nos. 731-783: Original Indentures, Land & Water Power, 1826-1845 … Also Quit-Claim Deeds. Water Power, December 1, 1853" Some pressure-sensitive tape – untie cover, folder individual sections, slight red rot on covers
"B. Index Nos. 784-1794: Indentures, Dec. 1, 1853 – Mill Powers" Heavily acidified cover pages to indentures

Box 52 (20 ½ X 24 ½ X 3" drop-front box)

"Taxes" Portfolio [Lists and Valuations], 1917-1936[152]
"Taxes" Portfolio [Lists and Valuations], 1905-1918
"Taxes" Portfolio [Lists and Valuations], 1894-1904
Portfolio Cover

Map Folders
Folder:
1. Material from Deeds 81, 566, 572, 951, 954
2. Material from Tax Records, Taxes 1900-1916, Published Collector's Notice, 1911
3. Material from Tax Record, Street Resolution for East Merrimack Street & Merrimack Square
4. Material from: Mills File #5 (Bigelow Carpet Co. Turbine)

[148] Moved from Box 103, Folder 3.
[149] Moved from Box 106, Folder 3.
[150] Moved from Box 106, Folder 4.
[151] Moved from Addendum Box 1, Folder 7.
[152] Contents appeared in reverse chronological order. Receipt for use of reservoir water moved to Box 106, Folder 5.

Mills File #8 (Boston & Maine R.R.)
Mills File #47 (Parks and Playgrounds) [Plan of Vicinity of Moody and Pawtucket Streets]

5. Material from: Mills File #60 (Hunt Falls)
Mills File #78 (Y.M.C.A.)
6. Plans for Hydroelectric Machinery[153] 1916 Map torn, sections missing
7. Plans for Hydroelectric Machinery (Holyoke, I.P. Morris Co.)[154]
8. Plans for Hydroelectric Machinery (James Leffel & Co., S. Morgan Smith Co.)[155]
9. Material from "Lower Lock Reconstruction by D.E.M." File (Parts 1 & 3)
10. Material from "Urban National Cultural Park" (File #2)
11. Material from Administrative (?) Notebook[156]
12. Measurements at Stations, January – May 1966
13. Measurements at Stations, June – October 1966
14. Measurements at Stations, November 1966 – March 1967
15. Measurements at Stations, April – November 1967

Rolled oversize:
Roll 1 (44 x 6 x 6 ½): Material from Deeds 647, 683, 1129
Roll 2 (12 x 8 ½ x 5 ½): Material from Deed 5358

Deed File Card Index

Box 1 (12" x 9.5" x 6")
Index cards to Deeds, A - Fisheries

Box 2 (12" x 9.5" x 6")
Index cards to Deeds, Fishways - Lowell and Co.

Box 3 (12" x 9.5" x 6")
Index cards to Deeds, Lowell Land Co. - Pumping Water Reservoir

Box 4 (12" x 9.5" x 6")
Index cards to Deeds, Racete - Wyman

Flowage File Card Index

Box 1 (12" x 9.5" x 6")
Index cards to Flowage Records, Abott, Amos – Wilmont, Lucus W. P.

[153] Moved from Box 101, Folders 6,8,9, 10.
[154] Moved from Box 101, Folder 13; Box 102, Folders 1, 3.
[155] Moved from Box 102, Folders 5, 6.
[156] Moved from Box 119, Folder 3.

Box 2 (12” x 9.5” x 6”)
Index cards to Flowage Records, Winn, Althea – Young, William D.

ADDENDUM
Addendum Box 1 (5.0" legal)
Folder:

Series III. Physical Data of Canal Operations (cont.)[157]
B. General Operations Logbooks (cont..)
2. Tables/ Weirs/ Canals (cont.)

1. ["Useful Information" Notebook (?)], ca. 1939
2. "Useful Compilation of Information Pertaining to the L&C System in General," 1943-1945
3. Notebook – Tables – Quantities of Water for the Corporations, 1941-1957

C. Daily Field Notes
5. Water Level/ Measurements (cont.)

4. Journal Kept at Guard Gates [of Pawtucket Dam], May 1947-December 1954[158]
5. [Merrimack River Level Readings from Official Gauge], September 1950 – July 1961[159]
6. Measurements at Stations, 1966-1967[160]

Measurements at Stations, January – May 1966
Measurements at Stations, June – October 1966
Measurements at Stations, November 1966 – March 1967
Measurements at Stations, April – November 1967

11. Employees and Records (cont.)
h. Foster and others

7. Notebook – W. Ryder, ca. 1954[161]

Series VI. Tax Records (cont.)

6. Federal and State, 1900-1960

8. Federal and State Witholding, 1959-1960[162]
9. Federal Witholding, 1957-1958
10. Federal Witholding, 1953-1955
11. Federal Witholding, 1951-1952

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[157] LOWE-132.
[158] Oversize item moved to Box 49.
[159] Oversize item moved to Box 50.
[160] Oversize items moved to Map Folders 12-15. Includes night usage and surplus water measurements.
[161] Oversize item moved to Box 48, Folder 6.
[162] The withholding records were arranged in reverse chronological order.

12. Witholding Receipts (Federal), 1950[163]
13. Witholding Receipts (Federal), 1949

Addendum Box 2 (5.0" legal)
Folder:

1. Witholding Receipts (Federal), 1948
2. Witholding Receipts (Federal), 1947
3. Witholding Receipts (Federal), 1946
4. Witholding Receipts (Federal), 1945
5. Witholding Receipts (Federal), 1944
6. FY 1985 Mass. Corporation Franchise Tax Return, 26 February 1986[164]

See also: (Oversize) Box 52 (20 ½ X 24 ½ X 3" drop-front box)
"Taxes" Portfolio [Lists and Valuations], 1917-1936[165]
"Taxes" Portfolio [Lists and Valuations], 1905-1918
"Taxes" Portfolio [Lists and Valuations], 1894-1904
Portfolio Cover

[163] LOWE-111.
[164] LOWE-111.
[165] Contents appeared in reverse chronological order. Receipt for use of reservoir water moved to Box 106, Folder 5.

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Merrimack Manufacturing Company, Records, 1821-1957.
Proprietors of the Locks and Canals on Merrimack River, Records, 1792-1947.
Saco-Lowell Shops, Records, 1855-1960.
Tremont and Suffolk Mills, Records, 1831-1936.

APPENDIX A:

ALPHABETIC INDEX OF GENERAL FILES

The following is a photocopy of the alphabetically-listed index compiled by the administrators of the Proprietors of the Locks and Canals of Lowell for the General Files, the original of which can be found in box 94, folder 5. A numerical list also exists and can be found in the same location. It should be noted, however, that while this index is a useful tool, it should not be relied upon unquestionably, in that its accuracy was subject to the peculiarities of its creators and the records to which it refers, to the hardship of time.

Additionally, some manuscript marginalia are not clearly discernable on the following photocopy. Please consult with park staff for assistance if there are any questions about the index.

1003	Appleton Company. 1868-1927 (in library)
1003	" " 1928-
1003.1	" " fire protection. 1903-
1004-A	Assets Realization Company. March 1928-1929
1004-A	" " " 1930-
1004-A.1	" " " fire protection 1929-
1006	Abatement of Taxes - Petition for. Tremont & Suffolk Mills. March 22, 1900 (bound in library)
1012.16	Amoskeag Mfg. Co., Manchester, N.H. 1923. Power Measurements at -
1013	Accounts - Locks and Canals. 1917-1931 (in library)
1013	" " " " 1932-
1025	Apparatus and Supplies - Loan of. 1915-
1035	American (New) Water Wheel
1066	Applications for employment. 1912-1932 (in library)
1066	" " " 1933-
1067	Agreements (water power), opinions, decisions & compensations
1076.2	American Mixed Flow Turbine and Its Setting Originals of Illustrations used in
1080	Accounts - Surplus Power. 1874-1929 (in library)
1080	" " " 1930-
1107	Average Outside Falls for different corporations
1114.4	A. L. Brooks & Co. & tenants
1119-A	Abatement Case (Tax) Photographs used in L. & C. case. 1933
1127.91	Aiken Street Dump
1155	Allis-Chalmers. 1911-1922
1155	" " 1923-
1008-A	Atlantic Rayon Corp.
1010	Assets Div. of LIDCO
1032	Automatic Control Studies
1044	Air Raid Blackouts

1002 Board of Tax Appeals. Marden & Murphy Inc. vs. Board of Assessors 1931. (in library)

1004 Bigelow Carpet Co. 1901-Feb. 1918 (in library)
Bigelow-Hartford Carpet Co. Mar. 1918-1921 (in library)
1004.1 Bigelow Carpet Co. fire protection. 1908-1918
Bigelow-Hartford Carpet Co. " 1918-1920
1004.1A " " " " new fire pump. 1918-1919
1004-C " " " " Successors. 1920-
1004-C.1 " " " " " fire protection. 1920-

1009 Boott Mills. 1895-1916 (bound in library)
1009 " " 1917-1923 " " "
1009 " " 1917-1930 " "
1009 " " No. 6 Unit. 1921-1923 (bound in library)
1009 " " 1931-
1009.1 " " new fire pump & Fire Protection. 1903-

1012.4 Blackwater Reservoir. May 1920-Dec. 1923 (bound in library)
1012.4 " " 1933-
1012.12 " River. 1923-

1012.15 Bow Jct. N. H. 1900-
1021 Boats - locking
1040 Bridges - Locks and Canals. General 1901-1923
1040 " " " " " 1924-

1040.1 " Fletcher Street. 1903-

1040.2 " Pawtucket St. over Pawtucket Canal. 1915-

1040.3 " East Merrimack St. over Eastern Canal. 1915-

1040.4 " Bridge St. over Eastern Canal. 1901-

1040.5 " Central St. over Pawtucket " 1908-

1040.6 " Merrimack St. " Western " 1901-

1040.7 " Suffolk " " Northern " 1915-

1040.8 " Broadway " Western " 1915-

1040.9 " High " Northern " 1915-

1040.10 " School St. " Pawtucket " 1903-

1040.11 " Proposed " Lower Locks [redacted]-

1052 Boyden Wheels.

1061 Boott Dam. 1915-

1076.3 Boyden, Uriah A. Paper on Turbines.

1078 Butler Family Interests. Lowell Electric Light Corp. 1916-1920

1092.9 Boulevard Hell Heights.

1114.14 Boston and Maine Railroad. Water used for other purposes than power

1116 Bridge - Pawtucket. June 1915-July 1916 (in library)
1116 " " 1916

1128 Boston & Lowell R.R. Corporation Location of Branch Tracks of Lowell. March 23, 1883. Book of photostat maps of -
Envelop containing blue print plans showing R.R. locations.
1128 Bridges - Railroad tracks and - 1917-1918
1128 " " " " 1919-1934
1128 " " " " 1935-

1142 Brief as to Legality of Proposed Use of Connecticut River by Turners Falls Power & Electric Co.

1151 Benchmarks, grades and elevations

. . . Badger, William E. personal. 2 volumes bound in library 1899-1906 and 1907-1924.

1083 Canal - Upper Pawtucket. 1902-

1084 Canal - Hamilton. 1915-

1085 Conservation (Water) Hearings, Mass. 1917-1919 (bound in library)
1085 " - Water Power Developments State and Federal Legislati 1917-1923 (bound in library)

1086 Climatological Service - Weather Bureau

1090 Construction Costs

1092 Cold Patch Case Hearings. City of Lowell. 1925 (bound in library)

1102 Canal (Merrimack Ship) Merrimack Valley Waterway (bound in library)

1108 Coefficients of discharge - water wheels

1114.14 Cady & Son, Geo. L. Water used for other purposes than power.

1118. Committee on Waterways. Drownings. 1914-1917
1118 " " " " 1918-

1119-A Chemical Paper Mfg. Co. & Crocker McElwain Co. - Testimonies in case of - 1934.

1122 Canal - Merrimack. 1895-

1130 Canals - Eastern and Lower Pawtucket. 1899-

1142 Connecticut River - Legality of Proposed Use of - by Turners Falls Power & Electric Co. Brief as to -

1145 Conservation (Fuel) and Fuel - 1917-1919 (bound in library)

1148 Costs (Power) - Steam, Water and Electric

1156 Canals - leaks to and from

1002.2 Courier-Citizen Co. - Hamilton Yard

1006 " " " " - Tremont Weave Shed. 1947
1006.2 Cabot-Lowell Corporation (Vanetta)
1006.2 Central Mills Supply Co., Inc.-Nashua Yard

1044 Civilian Defense

1098 Canal - sewers & drains into; oil wastes in canals

1127-0 Curran-Morton of Lowell, Inc.

1004-A Columbia Textile Company. 1920-Feb. 1928
1004-A.1 " " " fire protection. 1920-1928

1010 Cost of #12 Unit & Cost of New Turbine & Oil Burner - Massachusetts Cotton Mills. (in library)

1012.4 Compensation (Water Storage) for Diversion from Merrymeeting Lake by N. H. Water Supply Co. Oct. 26, 1914. A. T. Safford

1012.4 Contoocook River Storage 1920.

1012.4 Conservation of Waters in New Hampshire to Governor of New Hampshire, January 29, 1934 - report by Metcalf & Eddy.

1012.18 Cromwells Falls - Merrimack River at. 1836-1921 (in library)
1012.18 " " " " " 1922-

~~1016~~ ~~Code - NHA~~

1017 Concord River. 1916-1925
1926-

1018 Canal - Western. 1916-

1019 Central St. Theatre Platform. 1916-

1028 Current meters. Ratings. 1905-

1033 Concentration Factor.

1036 Canal measurements - Lowell Experiments

1036 Canal & River slopes " " - also drawing off notices

1039 Canals & Wasteways. General. 1901-

1040.5 Central St. Bridge over Pawtucket Canal. 1908-

1045 Central St. West Platform (Motley-Dunbar) 1917-

1047 Contractors - equipment & supplies. 1915-

1048 Canal - Northern. 1899-

1062 Canal - Lawrence Dam, wasteway and - 1913-

1067 Compensations (Water power), agreements, opinions and decisions.

1074 Cement and concrete

1012.4 Diversion from Merrymeeting Lake by N. H. Water Supply Co. - (Water Storage Compensation for - Oct. 26,1914. A.T.Safft

1012.4 Diversion Damages - Probable Water - N. H. Water Supply Co. May 16, 1914 and May 18, 1914 by John R. Freeman

1012.19 Diversion of water from Merrimack River by Metropolitan Water Board, 1894. Nashua River.

1030 Data furnished outside parties by L. & C. 1913-1932 (in library)
1030 " " " " " " " 1933-

1036 Draft tube experiments - Lowell Experiments.

1036 Determination (An Experimental) of the Loss by Friction in a Long Pipe. C. S. Robinson, 1923.

1039.1 Drawing off notices. 1931-

1061 Dam - Boott. 1915-

1062 Dam - Lawrence, wasteway and canal. 1913-

1063 Dam - Merrimack. 1915-

1067 Decisions, compensations, opinions and water power agreements.

1082 Dam - Pawtucket. General. 1903-
1082.1 " " Repairs to. 1915-
1082.2 " " Headgates. 1902-

1094 Dobble nozzles

1096 Droughts 1883-1928 (in library)
1096 " 1929-

1114.8 Dodge, Chas. L. Water used for other purposes than power.

1114.12 Davis & Sargent " " " " " " "

1117 Depreciation and valuation - L. & C. 1922

1118 Drownings. Committee on Waterways. 1914-1917
1118 " " " 1918-

1124 Directors of the Locks and Canals - Votes of -
1124.1 " " " " " " - data regarding votes & meetings of

1153 Draft Tubes

. . . Directors Records. 7 volumes bound in library 1792 to 1921
" " 1921-1931

1017 Dillon wall - Concord River - most of material in L.D.W. case

1098 Drains, sewers into canals - oil wastes in canals

1008-A Dickison Pile Fabrics Corp. (Law. yard)

1010 Dancause Inc., Chas. (Prescott yard)

1027 Engineering instruments

1036 Experiments - Lowell
Venturi Meter
Friction Loss
Draft Tube
Miscellaneous
Weir
Swamp Locks Tests & (2 vols.)
Experimental Determination of the Loss by Friction in a Long Pipe. C. S. Robinson. 1923.
Nozzle Discharges
Canal measurements
Canal & River Slopes
Friction Loss Tests etc.
Head & Sluice Gates
Harvard University
Tests of Loss of Pressure thru Pipe & Specials in L. & C. yard. Jan. 12, 1916.

1040.3 East Merrimack St. Bridge over Eastern Canal. 1915-

1047 Equipment and supplies - Contractors. 1915-

1066 Employment - application for - 1912-1932. (in library)
1066 " " " 1933-

1119-A Evaluation of Riparian Rights. W. A. Hall. Apr. 1, 1933

1120 Employees - Locks and Canals. 1907-

1130 Eastern and Lower Pawtucket Canals. 1899-

1148 Electric, Steam, Water Power Costs
1148.1 " power & light schedules

1151 Elevations, grades & benchmarks

1154 Electrical apparatus, motors and generators

1006.2 Eastern Wool Warehouse Inc. - Nashua Yard

1001.1	Fire Protection -	Merrimack Mfg. Company.	1903-
1002.1	" "	Hamilton Mfg. Company.	1907-1927
		Marden & Murphy Inc.	1927-1933
		Hamilton Company	1933-
1003.1	" "	Appleton Company	1903-
1004.1	" "	Bigelow Carpet Co.	1908-1918
		Bigelow-Hartford Carpet Co.	1918-1920
1004.1-A	Fire Pump (new)	" " " "	1918-1919
1004-A.1	Fire Protection	Columbia Textile Co.	1920-1928
		Assets Realization Co.	1929-
1004-C.1	" "	Bigelow-Hartford Carpet Co. Successors.	1920-
1006.1	" "	Tremont & Suffolk Mills.	1914-1926
		Nashua Mfg. Co.	1927-
1007.1	" "	Lawrence Section	1909-
1008.1	" "	Lawrence Mfg. Co.	1906-
1009.1	" "	and new fire pump - Boott Mills.	1903-
1010.1	" "	Massachusetts Cotton Mills.	1903-1931
1011.1	" "	Saco-Lowell Shops.	1897-1923
		" " "	1924-1932
		Kitson Machine Shop.	1932-
1012.10	Franklin Jct., N. H.	Merrimack River at.	1905-1931 (in library)
1012.10	" " "	" " "	1932-
1032	~~Fire Protection (Mill) Inspection.~~		
~~1032.1~~(0?)	Fire apparatus report.	Feb. 7, 1880-March 15, 1880 (Library)	
1034	Forestry		
1036	Friction Loss Experiments - Lowell Experiments		
1036	Friction Loss Tests etc.		
1038	Flashboards & Flowage.	1847-1920 (bound in library)	
1038	" " "	1921-	incl. data on riparian rig
1038.1	" General.	1908-	
1040.1	Fletcher Street Bridge.	1903-	
1012.4	Flood Control, Merrimack Valley.	1946	
1041	" "	Project, Lowell, Merrimack River.	1936

1077	Fire Protection. Locks and Canals. General. 1855-1903 (bound in lib
1077	" " " " " " 1905-1909 " "
1077	" " " " " " 1910-1916 " "
1077	" " " " " " 1917- " "
1077	" " " " " " 1918-1919 " "
1077.1	" " " " " supplies 1903-1919 " "
1077	Fire Underwriters, National Board of, Reports on Lowell. 1908-14-22 (bound in lib
1077	Fire Protection. Locks and Canals. General. 1920-1929 (inlibrary)
1077	" " " " " " 1932-
1077.1	" " " " " Supplies 1920-
1077.2	" " " " " Reservoir Shut-off Notices. 1919-
1077-A	" " Inspection of mills.
1092.2	" " City of Lowell.
1092.5	Finances & Taxes, City of Lowell.
1095	Freshets. 1859-1928 (in library) see also Surveys, Files in library
1095	" 1929- 1936 Flood (2)
1100	Flood Committee. Precipitation. 1927
1100	" " Run-off
1100	" " Report. 1929
1100	" " General. 1927-1933
1100-1	" " 1936
1104	Factory Mutual Fire Ins. Co. monthly reports
1104.1	" " " " " special bulletins. 1899-1916
1104.2	" " " " " 50th anniversary of Arkwright (bound)
1104.3	" " records
1112	Flume - Merrimack Measuring
1118.1	Fences, Division of Responsibility. 1917-
1127.96	First Street Dump
1145	Fuel and Fuel Conservation. 1917-1919 (bound in library)
1152	Fishway - Pawtucket Dam
. . .	Flood (New England) of 1927. 2 volumes bound in library
1097	Flood Control, Merrimack River. Report of Arthur T. Safford. 1945
1129	First Street Oval.

1015.15	Garvins Falls, N. H. Merrimack River at. 1900-
1012.20	Gage back of Boott Mills - Merrimack River at Lowell. (in library)
1012.20	" charts (Boott) 6 vols. 1923-1928 (bound in library)
1012.20	" back of Boott Mills, Merrimack River at Lowell. 1933-
1012.21	" " " " " . " " " " . Tables. 1848-1925 (in library)
1020	Gardens and Trees. Locks and Canals. 1917-
1024	Gauges. 1917-
1060	Gates - Tremont. 1911-
1064	Gates - Hamilton. 1931-
1082.2	Gates (head), Pawtucket Dam. 1902-
1114.15	Gillispie Mfg. Co. Water used for other purposes than power.
1127.74	Grist Mill
1134	Governors
1151	Grades, elevations & benchmarks
1154	Generators, motors and electrical apparatus
1048	Gates on Northern Canal (waste)
1065	Gates " " " Wall - Gow Company report. 1936
1003.2	General Electric Co. Jackson St.
1008.2	Daniel Gage Co. Inc. - Lawrence yard
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1114.16	General Electric Co., Marginal St. Use of river water
1127	Giant Store Inc. (assessed to Esther Wasserman)
1077-A	Gate inspections
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1002	" " " 1926-April 1927
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1014	Holyoke Water Power Co. 1900-
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1012.2	Interconnection of Lowell Mills. 1912-1933
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1031	Index of Negatives
1056	I. P. Morris Co. wheels. 1914-
1073	Ice and snow records. 1904-
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1127.2	"	"	"	" "	Thorndike St., Pawtucket Canal	
1127.4	"	"	"	" "	southerly side " "	
1127.6	"	"	"	" "	School St., B. & M. R.R. near Walker St	
1127.7	"	"	"	" "	Pawtucket Canal to Broadway	
1127.8	"	"	"	" "	" " , Broadway to Pawtucket	
1127.9	"	"	"	" "	Pawtucket St. to river	
1127.13	"	"	"	" "	" " " railroad	
1127.16	"	"	"	" "	Kyan St. called Kyanizing lot	
1127.17	"	"	"	" "	" "	
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1127.25	"	"	"	" "	" " Worthen St.	
1127.26	"	"	"	" "	Western Canal, Suffolk St. & Broadway	
1127.28	"	"	"	" "	Pawtucket Canal & Dutton St.	
1127.30	"	"	"	" "	Northern Canal, Pawtucket & Moody Stree	
1127.31	"	"	"	" "	Melvin St.	
1127.34	"	"	"	" "	Cheever, Ward and Hall Streets	
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1127.86 Locks and Canals Real Estate. Reservoir Lot on Fairmount St.

1127.89 " " " " " Aiken Street

1127.91 " " " " " Aiken Street dump

1127.92 " " " " " Conduit Street & Merrimack River

1127.93 " " " " " First Street Dump

1127.103-H & 104 " " " " " Riverside Street & Merrimack River

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1075 Land acquired by L & C 1792-1828,- Plan and Deeds of some, 1951. with copy of Indentures in safe

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1029 " Venturi - " 1912-

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1036 Miscellaneous Experiments (Lowell Experiments)

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1045 Motley-Dunbar Platform, Central Street Bridge 1917-

1054 McCormick Wheels

1063 Merrimack Dam. 1915-

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1004-D	Newmarket Mfg. Company 1933-
1006	Nashua Mfg. Company - Suffolk Mills. 1927-
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1012.4	Newfound Lake - Merrimack River Storage. 1920
1012.19	Nashua River. Diversion of water from Merrimack River by Metropolitan Water Board. 1894.
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1031	Negatives - Index of
1036	Nozzle Discharges - Lowell Experiments
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1107 Outside (average) Falls for different corporations

1140 Opinions - Legal. Locks and Canals.

1098 Oil in canals

1109 "Ownership of Pawtucket Dam and Operation of Grist Mill" Arthur T. Safford, Jan. 1950

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1015 " General. 1933-
1016 Priorities + Civil Regulations
1019 Platform (Theatre), Central Street. 1916-

1036 Pipe & Specials in L. & C. yard - Tests of Loss of Pressure thru - Jan. 12, 1916

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1045 Platform (Motley-Dunbar) Central Street West. 1917-

1072 Patents

1076.3 Paper on Turbines. Uriah A. Boyden

1082 Pawtucket Dam. General. 1903-
1082.1 " " Repairs to - 1915-
1082.2 " " Headgates. 1902-

1083 Pawtucket (Upper) Canal. 1902-

1085 Power Markets and Transmission systems. Water Power & Storage Developments. 1916-

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1114 Pipe Book - Condenser. Water used for other purposes than power.
1114.9 Pilling, John, Hhoe Co. " " " " " " "
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1148 Power Costs - Steam, Water, Electric

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1068 Dwight Porter "Merrimack River" - "Water Power of" 1899

Acc.Dept(Plans and Deeds of some of the Land acquired by L & C 1792-1828. 1951
also)(with original Indentures, book) 1 copy with copy of Oridinal Indentures
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Including report of Arthur T. Safford - March 27, 1939 on "Property
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1003.2 Pellon Corporation 1951

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1012.5 Run-off records, Merrimack River. Vol. 2

1028 Ratings. Current meters. 1905-

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1036 River and Canal Slopes. Lowell Experiments.

1077. Reservoir - Fire Protection (Gate Inspection)

1077.2 Reservoir Shut-off Notices. L. & C. 1919-

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1128 Railroad tracks and Bridges. 1917-1918

1128 " " " " 1919-1934

1128 " " " " 1935-

1127-0 Raymond - A. D.

1043 Reference Memo.

1049 Rationing applications

1091 Rights of way and posting same.

1008-A Riggs & Lombard - Lawrence Yard

1101.1 Remote control

" " " - Tremont dam gate control C.F.Palmer-1937

1005.1 Steam pump belonging to L. & C. at Middlesex Co. 1892-1916
1005.1 " " " " " " " " " 1917-

1006 Suffolk Mills of the Nashua Mfg. Co. 1927-

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1011 " " " 1924-1932
1011.1 " " " fire protection. 1897-1923
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1012.4 " - Lake Winnipiseogee 1900-July 1922 " " "
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Smith River (1920
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1047	Supplies & Equipment - Contractors.
1053	Swain wheels
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1073	Snow and Ice records. 1904-
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1080	Surplus power accounts. 1874-1929 (in library)
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1085	Storage & Water Power Developments. Transmission systems & Power Markets. 1916-
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1092.11	Sewers. " " "
1111	Section Map of Pipes, etc. 1915. City of Lowell & Locks and Canals
1148	Steam, Water, Electric Power Costs.
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1098	Sewers, drains into canals - also oil and wastes in canals
1004.A	Stein, David. Mutual Shoe Sales
1129-A	Stop & Shop, Inc. Lot #33-A
1008.2	Steam Associates, Inc.
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1092 Tax Lists City of Lowell. 1911-1915-1919 (bound in library)

1113 Types (unusual) of Water Wheels

1119 Taxes - Locks and Canals. 1860-1934

1119 " " " " 1935-

1119-A " " " " 1933 cases

1119-A " " " " A. T. Safford's report on 1933 petitions. 1-

1119-A " " " " Photographs used in Tax Abatement Case 1933.

1119-A " " " " Evaluation of Riparian Rights. W.A.Hall-4/1/

1119-A Testimonies in case of Chemical Paper Mfg. Co. & Crocker McElwain Co.

1119-A " of W. A. Hall in various cases. 1929-1931-1932-1934

1119 Data compiled for L & C Tax Abatement suit. Power Costs. C.F.Palmer 193

19

T (cont.)

1127	Tax list.	Statement	to	Assessors.	1913-1916	(bound	in	library)
1127	" "	"	"	"	1917-1920	"	"	"
1127	" "	"	"	"	1921-1924	"	"	"
1127	" "	"	"	"	1925-1928	"	"	"

1133 Taxation. General. 1890-

1136 " Lowell Corporations. 1921- incl. Lowell Taxpayers Assn.

1142 Turners Falls Power & Electric Co. Brief as to Legality of Proposed Use of Connecticut River by -

1144 Temperatures
1144.1 " Maximum & Minimum

1110 Transfer of Mill Powers A. T. Safford 1947

1023 U. S. Geological Survey

1076.3 Uriah A. Boyden - Paper on Turbines.

1083 Upper Pawtucket Canal. 1902-

1113 Unusual types of Water Wheels

1004-C United Elastic Co.

1010 Valve inspection, Lowell Industrial Development Co. 1932-

1029 Venturi Meters - Ratings. 1912-

1036 Venturi Meter Experiments.

1050 Victor wheels

1124 Votes of Directors of the Locks and Canals as received each month.

. . . " " " " " " " " 7 volumes in library
1792-1812
1913-1842
1843-1853
1853-1877
1877-1889
1889-1904
1904-1921
~~not~~ bound in library 1921-1931

1117 Valuation and Depreciation. Locks and Canals. 1922.
1117 " of L. & C. System. Basis of Construction Cost, 1921.

1004-2 Valley Associates - E. I. McGarry

1008-A Vanetta Cordoroy Corporation - Lawrence Yard

1080 Water Power Accounts (surplus)

1062 Wasteway,(Lawrence), Canal and Dam. 1913-

1067 Water power agreements, opinions, decisions & compensations

1071 Water - Metered. 1904-1921
1071 " " 1922-

1076 Water wheels, General. 1898-
1076.1 " " & Engineers - History of. Preliminary. Jan. 1922

1085 Water Conservation, Mass. Hearings. 1917-1919 (bound in library)
1085 " " Water Power Development. State and Federal Legislation. 1917-1923 (bound in library)
1085 Water Power & Storage Developments. Transmission systems & Power Markets. 1916-

1086 Weather Bureau. Climatological Service

1087 Wood Preserving. Kyanizing. 1914-

1092.12 Water Survey Board. Lowell, Mass. Water Works.

1101 Worthington Water Wheels. 1922-

1102 Waterways - Merrimack Valley. Correspondence Aug. 1921-1923 (bound in library)
1102 " " " Documents. 1898-1913 (bound in library
1102 " " " 1912-

1103 Water Wheels - Rodney Hunt. 1923-

1108 " " - coefficients of discharge

1113 " " - Unusual types

1114 Water used for other purposes than power. General
1114 " " " " " " " Condenser Pipe Book.
1114.1 " " " " " " " Jean's Laundry
1114.2 " " " " " " " N.E. Steam Laundry
1114.3 " " " " " " " Natsika Steam Laundry
1114.4 " " " " " " " A. L. Brooks & Co. & tenants
1114.5 " " " " " " " Mass. Mohair Plush Co.
1114.6 " " " " " " " Middlesex Steam Laundry
1114.7 " " " " " " " Lamson Co.
1114.8 " " " " " " " Chas. L. Dodge
1114.9 " " " " " " " John Pilling Shoe Co.
1114.10 " " " " " " " Highland Steam Laundry
1114.11 " " " " " " " Geo. L. Cady & Son
1114.12 " " " " " " " Davis & Sargent
1114.13 " " " " " " " Lowell Gas Light Co.
1114.14 " " " " " " " B. & M. Railroad
1114.15 " " " " " " " Gillispie Mfg. Co.
1114.16 " " " " " " " [illegible]

1010 Water wheels at Prescott - Mass. Cotton Mills. #12 Water wheel 1918-1921 (bound in library)
1010 " " #4, 5 & 6. Mass. Cotton Mills. 1917-1920 (bound in libr
1010 " " - Cost of #12 Unit & Cost of New Turbine & Oil Burner("

1012.2 Water Power of the Proprietors. 1933 Point of View. Report of A. T. Safford. May 23,1933

1012.4 Winnipiseogee (Lake) Merrimack River Storage. 1900-July 1922 (bound in library)
1012.4 Water Storage Compensation for Diversion from Merrymeeting Lake by N. H. Water Supply Co. Oct. 26, 1914. A. T. Saffor
1012.4 Water Diversion Damages (Probable). N. H. Water Supply Co. May 16, 1914 and May 18, 1914 by John R. Freeman
1012.4 Winnepesaukee - Merrimack River Storage - 1920

1012.8 Winnipiseogee (Lake), N.H. 1879-1888-1915 (in library)
1012.8 " " " 1932-
1012.8 " " bound copy of Height of Water & Precipitation 1850-1922

1012.9 " River. 1899-

1018 Western Canal. 1916-

1022 Water wheels - Leffel. 1914-1925
1022 " " " 1925-

1035 " " - New American

1036 Weir Experiments - Lowell Experiments

1037 Water wheel Tests - General. 1905-

1039 Wasteways and Canals. General. 1901-

1050 Water wheels - Victor

1051 " " - Hercules. 1882-1907
1051 " " " 1908-

1052 " " - Boyden.

1053 " " - Swain

1054 " " - McCormick

1055 " " - S. Morgan Smith. 1899-1920
1055 " " " " " 1921-

1056 " " - I. P. Morris Co. 1914-

1118	Waterways, Committee on -	Drownings 1914-1917
1118	" " "	" 1918-
1148	Water, Steam, Electric - Power Costs	
1098	Waste disposal into canals	
1006.2	Wannalancit Textile Co. - Nashua Yard (L.W.L. Bldg.Trust of Lowell)	
1024	"Water Power Records" - Arthur T. Safford 1-13-49	
1012-2-A	Week end running - Interconnection	

Z

1006.2	Ziskind (Jacob) Foundation - Nashua Yard

APPENDIX B:

LIST OF FILES KNOWN TO BE MISSING

The information following is a list of files mentioned in the PL&C General Files index (box 94, folder 5) and known to be absent from the collection. This list is based on work done by Lowell National Historical Park staff indexing the General Files and tracking their presence or absence.

1001[01]	Merrimack Mfg. Company.
1001[02]	Merrimack Mfg. Company.
1001[04]	Merrimack Mfg. Company. Tax Abatement Cases.
1002[02]	Board of Tax Appeals. Marden & Murphy Inc. vs. Board of Assessors.
1004-C.1	Bigelow-Hartford Carpet Co. Successors Fire Protection.
1004.1[01]	Bigelow Carpet Co. Fire Protection.
1004.1[02]	Bigelow-Hartford Carpet Co. Fire Protection.
1004.2	Bigelow Yard.
1005[01]	Middlesex Company.
1005-A	Ipswich Mills.
1005.1[01]	Middlesex Company. Steam Pump Belonging to L.& C. *(This file may have been merged with file 1005.1[02] to form one file.)*
1005.1[02]	Middlesex Company. Steam Pump Belonging to L.& C. *(This entry was crossed out except for the date. This file may have been merged with file 1005.1[01] to form one file.)*
1006[01]	Tremont & Suffolk Mills vs. City of Lowell. Petition for Abatement of Taxes.22 March, 1900.
1008.2	Lawrence Mfg. Co. Yard.
1010[06]	Pepperell Mfg. Company vs. City of Lowell.
1010[15]	Industrial Opportunities. Chamber of Commerce. L.I.D.C.
1010[17]	Prescott Yard-Chas. Dancause, Inc. *(May be included in file 1010-A)*
1010-C	Lowell Industrial Development Company-Taxes.
1011[01]	Saco-Lowell Shops.
1012.02[05]	Purchase of Hydroelectric Power from Lowell Mills Associated with the Proprietors of the Locks And Canals by the Lowell Electric Light Corp. (December, 1919)
1012.02[07]	Water Power of the Proprietors. 1933 Point of View. Report of Arthur T. Safford. (23 May, 1933)
1012.07	[No title; see below] *(This file number appears in the PL&C files index without a title. No file was located. It would appear that no file was ever created.)*
1012.11	[No title; see below]

	(This file number appears in the PL&C files index without a title. No file was located. It would appear that no file was ever created.)
1012.19	Nashua River. Diversion of Water from Merrimack River by Metropolitan Water Board.
1012.20[01]	6 Vols. of Boott Gage Charts.
1013[01]	Locks and Canals Accounts.
1016[02]	N.R.A. Code.
	(Superceded by the title "Priorities & Price Regulations" in PL&C files index. See 1016[01] above.)
1017[02]	Concord River & Dillon Wall. Given to Wm. E. Field by G. E. Whitaker. Taken and Filed by L.I.D. Co.
	(Given to Wm. E. Field by G.E. Whitaker)
1032[02]	Mill Fire Protection Inspection.
	(File title has been crossed out and superceded by "Studies of Automatic Controls" in the PL&C files index. Contents may have been discarded or merged.)
1032.1	Fire Apparatus Report. Feb. 7, 1880-March 15, 1880.
	(This entry has been crossed out entirely in the PL&C file index. Contents may have been discarded.)
1066[01]	Applications For Employment.
	(May have been discarded.)
1068	Merrimack River by Dwight Porter. *[Photocopy as placeholder.]*
1069	Proprietors of the Locks and Canals. Historical.
1070	Proprietors of the Locks and Canals. Hydraulic Engineers.
1076.3	Paper on Turbines. Uriah A. Boyden.
1077[10]	Fire Apparatus Report.
1089	Reservoir Records.
1089.1	Reservoir Records.
1092[03]	City of Lowell. General.
1104.2	Factory Mutual Fire Ins. Co. 50th Anniversary of Arkwright.
1111	Section Map Of Pipes, Etc. City of Lowell & P. L.& C.
1112	Merrimack Measuring Flume.
1119-A[09]	Appraisal of L.& C. Land & Bldgs. E.F. Slattery. (1 April, 1933)
1121	[No title; see below]
	(This file number appears in the PL&C files index without a title. No file was located. It would appear that no file was ever created.)
1128[02]	Envelope Containing Blue Print Plans Showing R.R. Locations.
1132	Historical-Miscellaneous.
1135[01]	William E. Badger-2 Volumes-Personal.
	(May have been taken by Badger upon leaving Locks & Canals.)
1135[02]	William E. Badger-2 Volumes-Personal.
	(May have been taken by Badger upon leaving Locks & Canals.)
1137	[No title; see below]
1138	[No title; see below]
1139	[No title; see below]

1141 [No title; see below]
1143 [No title; see below]
1146 [No title; see below]
1147 [No title; see below]
1149 [No title; see below]
1150 [No title; see below]
(These file numbers appear in the PL&C files index without titles. No files were located. It would appear that no files were ever created.)

APPENDIX C:

MAPS OF LOWELL, 1828 AND 1975

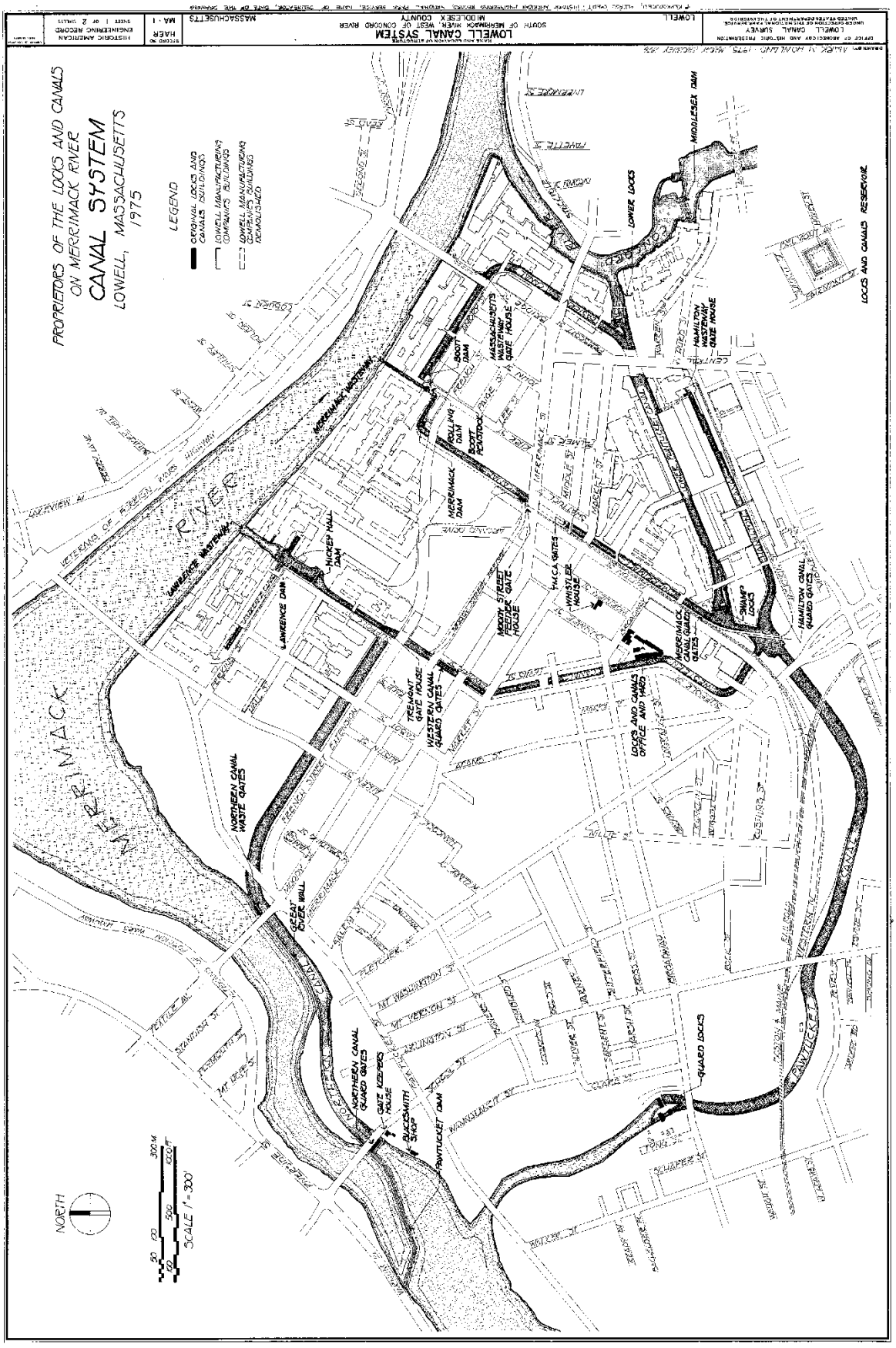
The following maps are included to assist the researcher in placing the various locales mentioned in these records.

The two images that follow are available under the heading “Lowell Canal System, Merrimack & Concord Rivers, Lowell, Middlesex County, MA” at http://lcweb2.loc.gov/ammem/collections/habs_haer/:

"Lowell Canal System, 1828", Historic American Engineering Record, National Park Service, Mark M. Howland, 1975.

"Proprietors of the Locks and Canals on Merrimack River; Canal System; Lowell, Massachusetts; 1975", Historic American Engineering Record, National Park Service, Mark M. Howland, 1975.

2
LOWELL CANAL SYSTEM
1828
NORTH
100
300M
250
1000FT
UPPER CANAL
LOWER CANAL
MERRIMACK
RIVER
PAWTUCKET DAM
PAWTUCKET
CANAL
MACHINE SHOP
LOWELL MILLS
HAMILTON MILLS
APPLETON MILLS
THOMAS AUSOS MILLS
CONCORD
RIVER
MERRIMACK MILLS


PROPRIETORS OF THE LOCKS AND CANALS
ON MERRIMACK RIVER
CANAL SYSTEM
LOWELL, MASSACHUSETTS
1975
LEGEND
ORIGINAL LOCKS AND CANALS BUILDINGS
LOWELL MANUFACTURING COMPANIES BUILDINGS
LOWELL MANUFACTURING COMPANIES BUILDINGS DEMOLISHED
MERRIMACK RIVER
LOWELL
LOWELL CANAL SURVEY
LOWELL CANAL SYSTEM
SOUTH OF MERRIMACK RIVER, WEST OF CONCORD RIVER
MIDDLESEX COUNTY
MASSACHUSETTS
HAER MA-1
HISTORIC AMERICAN ENGINEERING RECORD
LOCKS AND CANALS RESERVOIR
MIDDLESEX DAM
LOWER LOCKS
HAMILTON WASTEWAY GATE HOUSE
MASSACHUSETTS WASTEWAY GATE HOUSE
BOOTT DAM
BOOTT AQUATOCK
MERRIMACK DAM
NICKEY HALL DAM
LAWRENCE DAM
LAWRENCE WASTEWAY
MOODY STREET FEEDER GATE HOUSE
PACIFIC GATES
WHISTLER HOUSE
MERRIMACK CANAL GUARD GATES
SWAMP LOCKS
HAMILTON CANAL GUARD GATES
TSIENONT GATE HOUSE
WESTERN CANAL GUARD GATES
LOCKS AND CANALS OFFICE AND YARD
NORTHERN CANAL WASTE GATES
GREAT STONE WALL
NORTHERN CANAL GUARD GATES
GATE KEEPERS HOUSE
BLACKSMITH SHOP
PAWTUCKET DAM
GUARD LOCKS
PAWTUCKET CANAL
NORTH
SCALE 1" = 300'

LOWELL NATIONAL HISTORICAL PARK
LOWELL, MASSACHUSETTS

FINDING AID FOR

PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER RECORDS, 1747-2008 (BULK DATES 1844-1970):

VOLUME II

GUIDES TO THE PHOTOGRAPHS SERIES AND ARCHITECTURAL AND ENGINEERING DRAWINGS

PREPARED BY

DAN WALSH

2007; revised 2008

Edited by
Margaret Welch
Northeast Museum Services Center
Fall 2008

Cover illustrations: "Buildings on Lots 64-B, 64-F, 64-G, 64-H, Ford St. from Aiken St.," June 14, 1938. PL&C print #3084; ANCS+ number and LOWE individual catalog no. 7298.

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4. *Merrimack River Valley Sewerage Disposal, Plans, Diagrams, Etc.*

5. Assets Division of Boott Mills plans case drawer lists.

6. Map list.

PREFACE to GUIDE TO PHOTOGRAPHS

This document describes the extensive collection of documentary photographs produced by the Proprietors for their use in creating, maintaining, altering, and expanding their waterpower delivery system to the textile manufacturers of Lowell, Mass., and later to the New England electrical power grid. It includes only that portion of the photographs collection purchased by Lowell National Historical Park. Another portion of the collection was separately donated by the Proprietors to the University of Massachusetts Lowell Center for Lowell History.

The processing of this collection was completed in March 2007 by staff and volunteers at Lowell National Historical Park. These include Dan Walsh as project coordinator and LOWE volunteers Clee A. Ace and Steven Sussman.

Related materials include a large collection Proprietors of Locks and Canals management and operations records at Lowell National Historical Park (LOWE-5058) including an extensive series of Architectural and Engineering Drawings also at Lowell National Historical Park, and a large collection of business records, including the papers of such notable principals as James B. Francis, Uriah A. Boyden, Patrick T. Jackson, Kirk Boott, George W. Whistler, *et al*., at the Baker Library, Harvard Business School.

The PL&C photograph collection may be accessed directly via the NPS Museum Management homepage at www.cr.nps.gov/museum. This guide will be of help in locating the PL&C photographs within the total Lowell National Historical Park cultural resources collection found at that web site.

Researchers may contact the Lowell National Historical Park by phone at 978- 970-5241 for further assistance in accessing and using this material.

INTRODUCTION

The Proprietors of the Locks and Canals on Merrimack River Photograph collection as received by Lowell National Historical Park is an organic collection of 6,770 original photographic prints and copies thereof, 79 film negatives, 9 glass-plate negatives, and 39 glass lantern-slides produced by PL&C between the years 1883 and 1956.

It documents the construction and ongoing maintenance of the first comprehensive industrial water-power delivery system in the United States but beyond that it provides unique insights into the fabric and quality of life of the city of Lowell, Massachusetts, at the height of its industrial development on into its decline. In this respect, it is remarkable in its historical depth and, since it is almost entirely field photography, it is remarkable in its breadth.

As with the other materials received by Lowell National Historical Park from the Proprietors, these photographs were well, if incompletely documented. For this collection, the Proprietors created several finding aids, the largest being the typed 172 page sequential numerical list which may be found herein at Appendix 1. While it stops at the end of the year 1941, it is largely complete. Other finding aids were simple hand-written lists such at that for the X prefix photographs, which may be found herein at Appendix 2. They also began a typed subject list for the sequentially numbered photographs, which runs from A through Me, but was not completed. In addition to being incomplete, it only indexed photographs made between January 1, 1928, and early 1941. It is Appendix 3. At the opposite extreme, groups such as T. D. H. prefix photoprints or the glass lantern-slides or had no indexing at all.

Like the Proprietors' Architectural and Engineering Drawings series, a portion of the photographs was also separately donated to the UMASS Lowell Center for Lowell History. It consists of the glass-plate negative collection, 5 bound volumes of numbered photoprints, a group of prefix-numbered, unbound photoprints, and a group of 709 unnumbered, unbound photoprints later numbered by the Center using their own M-prefix numbering system.

SCOPE AND CONTENT NOTE

Accession number:	LOWE-132.
Catalog numbers:	LOWE 5058 (entire PL&C collection); individual catalogue on page 5.
Quantity/ Storage:	3976 original photographic prints with over 1000 additional copies; 33 glass lantern slides; 19 film negatives; 9 glass plate negatives.
Location:	Lowell National Historical Park, 67 Kirk Street, Lowell, Massachusetts 01852–1029. Phone 978-970-5000.
Description:	This photograph series was produced in the commonly available photographic media and on the commonly available photographic supports of its time. The vast majority of the positive imagery was rendered on paper. The majority of the prints are gelatin prints with a much smaller group of albumen prints and a handful of cyanotypes. The majority of the negative imagery was on cellulose nitrate film and was transferred to safety film by Lowell National Historical Park. The cellulose nitrate originals, which were actively deteriorating, required disposal as hazardous material. However, the negative holdings of LOWE give an uncharacteristic impression of the overall PL&C negative collection. The PL&C historic negative collection at UMASS Lowell Center for Lowell History is definitive on this subject. The negatives, from no.1 to no. 2230 (10/22/1926), are glass plates while those from no. 2231 to the end of the collection are film negatives.

The Photographs as Administered by the Proprietors of Locks and Canals:

The Proprietors of the Locks and Canals on Merrimack River (PL&C) photograph series at Lowell National Historical Park is an organic grouping of 6770 original photographic prints and copies thereof, along with 79 film negatives, 9 glass-plate negatives and 39 glass lantern- slides, produced by PL&C between the years 1883 and 1956.

Basically, it is documentary photography and illustrates both PL&C and textile manufacturing company project work such as new construction, reconstruction, or repair of buildings, dams and canals and their appurtenances, turbine installations and power generation equipment, and streets and bridges, as well as documentation of railroad related issues, and PL&C properties. But to characterize these photographs as simply project documentary photography is to vastly understate its value as a historical record of the urban fabric of Lowell, Massachusetts, during the apex of its development as an industrial city. That function was tangential to PL&C's purposes when they generated these photographs, if it occurred to them at all, but because location photography almost always includes context as well as subject, it almost always illustrates many things other than just its subject. It is that context, rather than simply their subjects, that gives these photographs their unique value as a historical record.

Judging from the various sizes of the photographic prints and negatives they produced, PL&C used more than one camera during the history of this collection. If the prints are, in fact, contact prints then PL&C had at least one 8x10 camera and one 5x7 camera since the vast majority of the prints were produced in these sizes. This is confirmed by the film negatives and glass-plate negatives which were also found in both these sizes. However, in addition to these sizes, there is a group of film negatives in a 2 ¼ x 3 ½ inch format. This implies the existence of another camera but they could also have been produced as half-size negatives on a 5x7 format camera. There are also a few low-resolution snapshot prints at 2 ¾ by 4 ¾ inches from the 1950s included with the larger format prints but they represent the end of the line for photography at PL&C It would seem that PL&C had a staff photographer who knew how to use large-format view cameras and do darkroom work for most of the history of this collection.

The collection was produced in the usual late-19th and 20th century media and supports. The glass-plate negatives are standard format Eastman dry plates. The original film negatives were produced on cellulose nitrate bases but were copied directly onto safety film by Lowell National Historical Park after which the cellulose nitrate originals were disposed of as hazardous material. The majority of the prints are gelatin prints but there are some albumen prints among the earlier photographs. There are also a few cyanotypes.

It should be noted here that the holdings of Lowell National Historical Park represent only one portion of the total PL&C photograph collection. Another portion was separately donated by PL&C to the University of Massachusetts, Lowell. Their holdings

include almost all of the glass plate negatives and some historic prints. The researcher should also note that PL&C staff members integrated photographs into the office files of various departments; their presence is noted in the collection listing for those files (see Vol. I of this finding aid).

P.L. & C. Photographs Numbering Schemes:

The Proprietors of the Locks and Canals on Merrimack River numbered many of its photographs, but not all of them, and among the numbered photographs it employed several different numbering schemes. This implies a subject-group function for each of the different numbering schemes but, except for the two sequential numbering schemes, the HJ prefix numbering scheme, and the X prefix numbering scheme it is not known what broader subject each group represents.

1. The largest numbered group was that represented by a sequential numbering scheme beginning with number 1 and ending with number 3276. It contained interpolated imagery bearing duplicate print numbers with an –A suffix (e.g. 1589 vs. 1589-A) which imagery was often not related to the print whose number was thus used in modified form. Without these interpolations, the original numbering scheme would have been basically chronological; however, the interpolations typically introduced later imagery back into a number sequence of earlier images, thereby interrupting the otherwise chronological character of the sequential numbering. Clearly, this numbering scheme represents the fundamental PL&C photo-documentation.

2. There were also several smaller numbered groups.

> The first consisted of 88 images using Roman numerals beginning with I and ending with LXXXVIII.
>
> The second consisted of 73 images employing a mixed alpha-alpha and alpha-numeric numbering scheme (e.g. A, A-1, BB, YY-1). While not identified as such, this group seems to consist of images of both banks of the Merrimack River.
>
> The third consisted of 72 images using a B prefix (e.g. B-1 through B-72).
>
> The fourth consisted of 23 images using a C prefix (e.g. C-2 through C-24).
>
> The fifth consisted of 16 images using an HJ prefix (e.g. HJ-1 through HJ-16). This is the only small numbered grouping whose purpose or subject is identified. This prefix scheme applies to photo-documentation of a *Special Hamilton* [Mfg. Co.] *Job – December 1921*.
>
> The sixth consisted of 80 images using a T.D.H. prefix (e.g. T.D.H. 1 through T.D.H. 78, plus T.D.H. 15A and 53A).

The seventh consisted of 26 images employing an X prefix (e.g. X-0 through X-25). This prefix scheme applies to *Miscellaneous Images* as noted on the PL&C handwritten X- prefix list of March 31, 1921.

The eighth consisted of at least 654 glass lantern-slides sequentially numbered without prefixes but with some suffixes (e.g. 638a and 638b).

3. There were also three unnumbered groups.

The first consisted of an unnamed album containing 88 unnumbered images from the years 1909 and following which illustrate such subjects as the construction of the new Massachusetts Mills power house and their new cotton storehouse.

The second consisted of an envelope entitled "Fire Protection" containing images primarily of fire hose and pressure tests conducted by PL&C at the various textile mill complexes where they provided water for indoor sprinkler systems and outdoor hydrants.

The third consisted of 708 truly miscellaneous original images in the collection of the UMASS Lowell Center for Lowell History which it, in turn, numbered with an M- prefix followed by a number, the range being M-1 through M-708. There were 31 copies of images that fell into the group which came to Lowell National Historical Park when it purchased the portion of the PL&C collections that it holds.

4. There was also a large group of unnumbered photographs found among the P.L. & C. General Files (LOWE-5058). These were used to illustrate the letters, reports, etc. found in those files. It was in this group that the photo-documentation for several PL&C upper Merrimack River functions was found. These functions include PL&C's reservoirs and pondings, such as Merrymeeting Lake, and their dams, along with PL&C operations at the Lake Company on Lake Winnipesaukee in New Hampshire.[1]

P.L. & C. Photographs Indexes:

PL&C produced typed numerical indexes to its photograph collections through 1941 (see Appendix 1). It also produced a handwritten list of photographs created between 1942 and the end of December 1948 and another handwritten list of X- prefix photographs entitled *Miscellaneous Negatives* dated March 31, 1920 (Appendix 2). In addition, it produced a typed alphabetical subject index to those photographs (Appendix 3). These indexes were found in the PL&C General Files (LOWE-5058) under file number 1031.

The 172 page typed numerical index includes indexes to the B- prefix, C-prefix, and Roman numeral photographs at pages 91 through 93 (B- prefix), page 94 (C- prefix), and pages 95 through 98 (Roman numerals) (Appendix 1). The numerical sequence, which

[1] The Collection Listing for the General Files in Vol. I. notes the locations of photographs integrated into these files.

was interrupted by the insertion of these otherwise unrelated photographs, resumes at page 99 and continues uninterrupted to the end.

The typed alphabetical subject index is partial in that it only covers subject headings from A to Me. The typing stops at Me in mid-page, which suggests that its creation never got beyond that point (Appendix 3).

Ultimate Disposition of the P.L. & C. Photograph Collection:

In October 1996, Lowell National Historical Park purchased the PL&C photographs collection except for the portion that had been donated earlier by the PL&C to the University of Massachusetts, Lowell.

The Collection as Received by Lowell National Historical Park:

1. Seventeen bound volumes of original photographic prints. These comprise two copies of volume no.1; volume no.7; volume no.7-A; volume no.8; and volumes nos. 9 through 15. They contain prints bearing PL&C numbers:

1-213 (vol. 1)
1361-1589-A (vol. 7)
1623A-1695 (duplicate prints, vol. 7-A)
1590-1812 (vol. 8)
1813-2035 (vol. 9)
2036-2260 (vol. 10)
2261-2483 (vol. 11)
2484-2706 (vol. 12)
2707-2927 (vol. 13)
2928-3156 (vol. 14)
3157-3276 (vol. 15)

2. All of the original and copy photographic prints contained in the PL&C General Files (LOWE-5058). There were many duplicate prints from the sequentially numbered print group noted above found within the General Files. However, there were also quite a number of original prints that did not bear any PL&C numbering at all and were largely of subjects relating to PL&C's reservoirs and pondings, and their dams, in New Hampshire along with PL&C operations at the Lake Company on Lake Winnipesaukee.

3. Seven prints from the group of 88 using Roman numerals.

4. Six prints from the group of 73 using the mixed alpha-alpha and alpha-numeric numbering scheme.

5. Twenty three prints from the group of 72 using the B prefix.

6. Fourteen prints from the group of 23 images using the C prefix.

7. Twenty three prints from the group of 80 using the T.D.H. prefix.

8. Twenty six prints, which is a complete set, from the group using the X prefix.

9. Thirty three glass lantern slides from a sequentially numbered group whose highest number among those received was 653.

10. The unnamed album containing 88 unnumbered prints from the years 1909 and following which illustrate such subjects as the construction of the new Massachusetts Mills power house and their new cotton storehouse.

11. Nineteen unnumbered film negatives.

12. Nine unnumbered glass-plate negatives.

The Collection as Processed by Lowell National Historical Park:

Because of the image-bearing capabilities of artifact catalogue records created in the ANCS+ cataloguing system, which has been adopted by the National Park Service for service-wide use, LOWE chose to individually catalogue the PL&C photographs it owns.

Although item level processing is not generally done for archival collections, in the case strong user interest in PL&C images coincided with the capabilities of the cataloguing system to present a compelling argument for item level cataloguing.

Given that all the collections of Lowell National Historical Park can be accessed through the National Park Service web catalogue, item level cataloguing of this collection was the most expeditious way to make all these images available for perusal by researchers nationwide. It also parallels the cataloguing of other imagery in the LOWE collection.

At the item level, each individual image has its own unique ANCS+ catalogue number. These ANCS+ catalogue numbers are separate from and bear no organizational relationship to any numbering schemes employed by PL&C or others. They were applied to each individual image as it was processed, basically, in the order received. However, the PL&C numbers are recorded in the ANCS+ catalogue records in a data field called “other numbers” and are not lost to an image simply because it was given an ANCS+ number upon cataloguing.

In order to facilitate searching the Lowell National Historical Park website by ANCS+ catalogue number, the following list of ANCS+ catalogue number as applied to PL&C imagery is provided:

PL&C photographic prints:

LOWE-7001 through LOWE-9955
LOWE-10026 through LOWE-10099
LOWE-11001 through LOWE-11905
LOWE-11969 through LOWE-11999
LOWE-15544 through LOWE-15547

PL&C glass plate negatives:

LOWE-14529 through LOWE-14537

PL&C film negatives (replicated as inter-positives and film negatives on safety film):

LOWE-10003 through LOWE-10025
LOWE-12565 through LOWE-12575

PL&C glass lantern slides:

LOWE-14515 through LOWE-14528
LOWE-15557 through LOWE-15575

The Collection as Received by UMASS Lowell Center for Lowell History:

The University of Massachusetts Lowell Center for Lowell History received the bulk of the PL&C photographic negatives.

It also received those bound volumes of original photographic prints donated to it before the purchase of the remainder by Lowell National Historical Park. They contain prints originally generated from the negatives noted above.

In addition, it received all 16 images using the HJ prefix (e.g. HJ-1 through HJ-16) representing photo-documentation of a *Special Hamilton* [Mfg. Co.] *Job – December 1921*.

It also received the bulk of the imagery from the other numbered groups of images employing prefixes.

Lastly, it received 708 miscellaneous original images which it then numbered with an M- prefix followed by a number, the range being M-1 through M-708, in order to gain basic intellectual control of these images.

The holdings of the UMASS Lowell Center for Lowell History are not detailed in this finding aid. To access their collection and survey its contents, researchers may contact the Center at 978-934-4000.

Searching the NPS web catalogue for PL&C Photographs:

All of the PL&C imagery at Lowell national Historical Park covered by this finding aid is accessible for perusal through the NPS web catalogue. It can be found via the NPS Museum Management web page at www.cr.nps.gov/museum/. Once there, select Web Catalog from the bar menu. Then select Lowell NHP from the list. The catalogue allows you to Browse or Search. Use the Search function in conjunction with this finding aid.

To search by PL&C numbers as found in Appendix 2, simply type a number into the block provided and strike the search button below. Your selection will appear on the screen. You may also find a second selection. This is because some PL&C photograph numbers have the same number component as some LOWE catalogue numbers. When they do, both selections will appear even though the LOWE catalogue number will have no relationship to the PL&C photograph number.

For example, a search on number 1761 will bring up two records. One is LOWE catalogue number 1761, which is a pharmacist's chemical bottle (catalogued in 1989), the other is LOWE catalogue number 8135, which is PL&C photoprint number 1761 (catalogued in 2000). The two artifacts have nothing to do with each other except that they happen to have one number in common in their respective catalogue records. Both appeared in this sample search but the user of this finding aid would only be seeking the photoprint.

Other PL&C numbers will yield only the PL&C photoprint. A search on number 1672A, for example yields only the PL&C photoprint with that number. That print happens to carry the LOWE catalogue number 7996 but LOWE catalogue numbers do not have alphabetic suffixes so no other item was found in a search for number 1672A.

Searches can also be conducted in the search mode using words rather than numbers. The PL&C titles or captions that appear on the photographs themselves were transcribed literally into the Web Catalogue records, thus, the titles that appear in Appendix 2 should be searchable in the Web Catalogue. However, a word of caution regarding text searches is necessary and it is that the more words used in any given search entry, the longer the search will take. Therefore, it is better to use the fewest number of words possible and to rely on key terms. For example, PL&C photoprint number 363 bears the title "Left shore Merrimack River from north pier of Aiken St. bridge, looking upstream. Shows head of Long Island." If one attempted a search on the entire title, the search would take quite a

long time. If, however, one searched just on the words “Long Island”, the search would be much faster and this photograph would appear in the results along with any others of the same subject.

The database is larger than the body of photographs that appears in the PL&C Index of Photograph Plates, however. Therefore, when doing a broad-based, general search use any term or terms that might lead to the subject being pursued, especially if that subject has a name or its location is known. For example, a search for photographs of Merrymeeting Lake (using the single search term “merrymeeting”) would yield a large number of images outside the numbered series of photographs covered by the PL&C Index of Photograph Plates. In this case the PL&C Index would provide a useful search term but is hardly definitive in and of itself and only a database search would yield the full scope of Merrymeeting Lake imagery in the collection.

A final note on two popular search subjects:

The first is “Little Canada”, the old Franco-American neighborhood that was lost to an urban renewal project. A search of the database under the term Little Canada will yield only a few images but there are actually over thirty images in the collection. The explanation for this is that the term Little Canada was not usually used by the Proprietors to identify the subjects of photographs taken there. This is because they were not photographing a neighborhood but, rather, some much more specific subject, such as a piece of property they might own, which happened to be in that neighborhood. As a result, they typically identified the photograph by the name of the street on which the subject was located and not by the neighborhood in which it is was found. Therefore, the best way to locate Little Canada photographs is by searching street names in that neighborhood. The following streets in Little Canada were photographed by the Proprietors of the Locks & Canals: Aiken Street, Cabot Street, Cheever Street, Coolidge Street, Ford Street, Hall Street, James Street, Moody Street, and Perkins Street.

The second is the “Francis Gate” dam and lock complex. This is current rather than historic nomenclature and, thus, was not used by the Proprietors of the Locks & Canals for that location. They routinely referred to it as the “Old Guard Locks” and that is the search terminology that will yield the desired results.

Proprietors of the Locks and Canals

on Merrimack River Photographs

Appendix 1

PL&C Index of Photograph Plates. This is the sequential numerical list of the main body of glass-plate negatives and their prints created by the Proprietors between 1883 and 1941. It contains the B-prefix sequence (pages 91-93), the C-prefix sequence (page 94), and the Roman numeral sequence (pages 95-98) and is 172 typewritten pages in its entirety. The original is located in the General Files #1031, Box 40, Folders 3-6.

Proprietors of the Locks and Canals

on Merrimack River Photographs

Appendix 2

PL&C Miscellaneous Negatives. This is the sequential numerical list of X-prefix negatives and their prints created by the Proprietors between October 18, 1896, and Nov. 28, 1899. The list contains 26 entries and all have dates but only X-1 through X-16 are identified by subject.

File 1031-[02]

March 31, 1920 Miscellaneous Negatives.

X0		
X1	Armour Foundation	Oct. 18, 1896
X2	" "	" " "
X3	" "	" " "
X4	Hamilton Mfg. Co's. Foundation	Oct. 25, 1896
X5	" " " "	Nov. 15, 1896
X6	Armour Foundation	" " "
X7	Canals in vicinity of Lowell Machine Shop.	Nov. 22, 1896
X8	" " " " "	" " "
X9	" " " " "	" " "
X10	" " " " "	" " "
X11	View of Pawtucket Canal	Dec. 5, 1897
X12	" " " "	" " "
X13	" " " "	" " "
X14	" " " "	" " "
X15	" " " "	" " "
X16	" " " "	" " "
X17		Sept. 11, 1897
X18		" " "
X19		" " "
X20		" " "
X21		" " "
X22		" " "
X23		Nov. 28, 1899
X24		" " "
X25		" " "

Proprietors of the Locks and Canals

on Merrimack River Photographs

Appendix 3

PL&C Alphabetical Index to Photograph Plates, A-M. This is a partial index complementing the sequential numerical list in Appendix 1.

P. L. & C Photo List Appendices

A, C, D, E, F, G, H, I, J, K, L, & M

From Jan. 1, 1928 to date

A

Accident - location of manhole for L & C valve #76, on sidewalk in front of U. S. Postoffice, Lowell, Mass. where Daisy Niles calimed injury Feb. 21, 1938	#3065	Mar. 22, 1938
Aiken St. dump near Conduit St. looking northwest - location of end of proposed 6" drain in -	2624	Sept. 28, 1931
ditto looking southeast	2625	" " "
Aiken St. bridge and bank of Merrimack River adjoining - northerly end and westerly side of -	2667	Mar. 2, 1932
Aiken St. dump - Maxey's side show at -	2735	Aug. 9, 1933
Aiken St. dump - City no dumping sign on -	2816	Jan. 9, 1935
Aiken St. dump - general view of, looking easterly across Beaver Brook	2819 2819A	Jan. 11, 1935
Aiken St. bridge over Merrimack River during flood	2918A	Mar. 20, 1936
Aiken St. dump showing tree stumps left there after the Sept. 21, 1938 hurricane	3105	Nov. 2, 1938
Aiken St. dump showing tree branches left there after the Sept. 1938 hurricane	3106	Nov. 2, 1938
Aiken St. dump showing tin cans and rubbish, also dike for high water	3107	Nov. 2, 1938
Air compressor and pipe lines for drilling holes in ledge on left hand bank of Merrimack River above Moody St. bridge	2993A 2993B	Mar. 19, 1937
Ames Worsted Co. - reconstructing headworks and racks in rear of	2617	Aug. 25, 1931
" " " - reconstruction of headworks & racks in rear of - Wamesit Power Co. Looking downstream 2 negatives	2621	Sept. 13, 1931
ditto looking upstream	2622	" " "
Appleton and Hamilton Mills looking east	2375A	Mar. 1928
Appleton Company and Assets Realization Co. - Lower Pawtucket Canal showing 4" steam pipe between -	2454	May 23, 1929
Appleton Company and Assets Realization Co. - transmission lines from -	2500	Jan. 11, 1930
ditto	2501	Jan. 11, 1930
Appleton and Hamilton Mills - transmission lines and steam pipes from Bigelow to -	2729	June 16, 1933
Appleton Co. - guides of new #4 wheel - 38" Rodney Hunt	3123	June 5, 1939
Appleton Co. - buckets of " " " " " "	3124	June 8, 1939

A (cont.)

Approach to Centralville bridge from southerly side	#3079	May 18, 1938
Area over Merrimack Canal between Market St. and Y.M.C.A.	2532	Apr. 23, 1930
ditto	2533	" " "
Assets Realization Co. and Appleton Co. - Lower Pawtucket Canal showing 4" steam pipe between -	2454	May 23, 1929
Assets Realization Co. to Mill #7 of Marden & Murphy, Hamilton yard - 2" steam pipe over Lower Pawtucket Canal from -	2498	Nov. 26, 1929
Assets Realization Co. - transmission lines from Appleton Co. to	2500	Jan. 11, 1930
ditto	2501	" " "
Automobile drowning accident at end of Merrimack Canal looking from French St. picture taken at 8.30 a.m.	2630	Oct. 20, 1931
ditto " " " 3.00 p.m.	2631	" " "

Cables, electric, being put in under Bridge St. bridge from Mass. Mills to Boott Mills	#2534	Apr. 23, 1930
Cady Bldg. corner of Western Ave. and Fletcher St. northerly side of Pawtucket Canal	#3077	May 9, 1938
Canal St. bridge - Nashua, N. H.	#2409	Aug. 27, 1928
Canal St. bridge - " showing roadway	#2410	Aug. 27, 1928
Canal, Eastern, looking downstream from Bridge St.	#2412	Sept. 9, 1928
Canal, do " Boott office	#2413	Sept. 9, 1928
Canal, do " #6 racks	#2414	Sept. 9, 1928
Canal, Northern, - Suffolk St. boom in -; also Nashua Mfg. Co.'s conveyor bridge	#2416	Oct. 4, 1928
Canal, Eastern, wall - opening to let in water from Boott penstock	#2417	Oct. 15, 1928
Canal, do	#2418	Oct. 15, 1928
Canal, Western - Suffolk St. fence from Jefferson to Market Sts.	#2421	Oct. 25, 1928
Canal, Hamilton, south side - broken concrete wall at end of -	#2424	Nov. 20, 1928
Canal, do looking north	#2425	Nov. 20, 1928
Canal wall, Northern, north side, below School St. bridge looking downstream. Elev. of water 82.60 at 12.30 pm	#2441	Mar. 26, 1929
Canal wall, Northern, south side, do Elev. of water 81.10 at 12.05 pm	#2442	Mar. 27, 1929
Canal wall, Northern, north side, below School St. bridge looking upstream. Elev. of water 81.50 at 12.10 pm	#2443	Mar. 27, 1929
Canal wall do	#2444	Mar. 27, 1929
Canal, Western, looking downstream between Market & Jefferson Sts.	#2445	Mar. 27, 1929
Canal, Western, between Jefferson and Broadway Sts. looking downstream	#2447	Mar. 27, 1929
Canal, Hamilton, looking upstream	#2467	June 24, 1929
Canal, Eastern, looking upstream - lefthand side Merrimack wasteway wall at end of -	$2471	June 28, 1929
Canal, Eastern, looking downstream - lefthand side of wall at end of -	#2472	June 28, 1929
Canal, Eastern - bridge for L & C 24" pipe across -	#2481	Sept. 23, 1929
Canal do	#2482	Sept. 23, 1929

C

Canal, Eastern - L & C 24" pipe across -	#2483	Sept. 26, 1929
Canal Street - laying L & C 20" main on -	#2491	Oct. 24, 1929
Canal, Merrimack between Market St. and Y.M.C.A. - area over -	#2532	Apr. 23, 1930
Canal do	#2533	Apr. 23, 1930
Canal St. railroad crossing in Kearney Sq. - spike in north sidewalk of -	#2538	June 17, 1930
Canal at Boston Mfg. Co., Waltham, Mass.	#2543	July 15, 1930
Canal and dam, part of, of Boston Mfg. Co., Waltham, Mass.	#2545	July 15, 1930
Canal, Hamilton - new walls at end of -	#2563	Aug. 12, 1930
Canal, Northern - iron fence on Ford St. below High Bridge which was broken about Jan. 12, 1931	#2578	
Canal, Eastern - rubbish on sidewalk in rear of Brockelman's restaurant	#2581	Feb. 2, 1931
Canal, Pawtucket, through 12" C.I. pipe under School St. bridge at 2.30 p.m. - tar oil etc. from Lowell Gas Light Co. emptying into -	#2595	May 6, 1931
Canal, Pawtucket - do	#2596	May 6, 1931
Canal, Pawtucket - do at 8.45 a.m.	#2597	May 7, 1931
Canal St. at entrance to Kearney Square - rubbish etc. on -	#2599	May 16, 1931
Canal, Pawtucket, at Thompson's Field - fence repaired & holes filled in on east side of -	#2601	May 27, 1931
Canal, Pawtucket - sign put up to keep boys out of canal; also new hole in fence	#2604	June 1, 1931
Canal, Western, near junction of Pawtucket Canal where little girls was drowned	#2605	June 18, 1931
Canal, Eastern, from Kearney Square bridge looking downstream	#2628	Oct. 14, 1931
Canal, Merrimack, looking from French St. - location of automobile drowning accident at end of - Picture taken at 8.30 am	#2630	Oct. 20, 1931
Canal, Merrimack, looking from Dutton St. - location of automobile drowning accident at end of - picture taken at 3.00 p.m.	#2631	Oct. 20, 1931

C

Canal, Eastern, looking downstream - sidewalk along L & C 5 foot strip, east side of -	#2637	Nov. 25, 1931
Canal, Eastern, west side, near Kearney Square opposite new post office	#2638	Nov. 25, 1931
Canal, Eastern,-sidewalk along 5 foot strip east side of - looking downstream	#2640	Dec. 23, 1931
Canal St. near Kearney Sq. at 11.20 a.m.	#2645	Dec. 24, 1931
Canal, Hamilton, - end of -	#2648	Jan. 4, 1932
Canal, Eastern, at Lower Locks dam - new fence east side of -	#2658	Mar. 2, 1932
Canal, Pawtucket, above Guard Locks - fence west of -	#2659	Mar. 2, 1932
Canal, Pawtucket, near Red Bridge - fence on Kyan St. northeasterly side of -	#2660	Mar. 2, 1932
Canal, Pawtucket, opposite Merrimack Valley Supply Co. - fence on Kyan St. northerly side of -	#2661	Mar. 2, 1932
Canal, Hamilton, from Appleton bridge looking west - fence on Jackson St., south side of -	#2662	Mar. 2, 1932
Canal, Hamilton, from Saco bridge looking west - fence on Jackson St. south side of -	#2663	Mar. 2, 1932
Canal, Hamilton, from Saco bridge looking east - fence on Jackson St. south side of -	#2664	Mar. 2, 1932
Canal, Pawtucket, above Guard Locks showing holes - fence east side of -	#2665	Mar. 2, 1932
Canal, Northern at foot of Race Street - stop signs put up by City on Ford St. Fence south side of -	#2666	Mar. 2, 1932
Canal, Northern, above High Bridge - fence on northerly side of -	#2668	Mar. 2, 1932
Canal, Eastern, opposite post office - new wall and fence on westerly side of -	#2670	Mar. 16, 1932
Canal St. near Kearney Square - driving artesian well on -	#2709	Feb. 18, 1933
Canal, Eastern - Sterling Motor Lines truck whose rear wheels went through L.I.D. Co.'s bridge over -	#2722	Apr. 7, 1933
Canal, Pawtucket - building over - Lot #28-A	#2761	Jan. 22, 1934
Canal, Northern, looking downstream from School St.	#2763	Feb. 8, 1934
Canal, Lawrence - end of -	#2764	Feb. 8, 1934
Canal, Western, looking upstream from Moody St.	#2765	Feb. 8, 1934

C

Canal, Northern, looking downstream from Cabot St.	#2766	Feb. 8, 1934
Canal, Eastern - fence and gate in rear of Gookins Furniture store near -	#2774	May 28, 1934
Canal, Eastern - fence and gate repaired in rear of Gookins Furniture Store near -	#2776	June 14, 1934
Canal, Eastern near Lower Locks - plank put on west end of bridge over -	#2777	June 14, 1934
Canal St. looking towards L. I. D. Co.	#2789	Aug. 2, 1934
Canal St. looking towards Kearney Square	#2790	Aug. 2, 1934
Canal, Northern, above Cabot St. - rubbish and garbage on ice in	#2828	Mar. 14, 1935
Canal, Northern, above Suffolk St. - do	#2829	Mar. 14, 1935
Canal St., Kearney Sq. - cars parked on L & C land on -	#2835	Apr. 3, 1935
Canal St. - L & C No Trespassing signs and cars parked on -	#2836	Apr. 3, 1935
Canal St. - parking sign on -	#2886	Dec. 27, 1935
Canal, Northern, from Suffolk to Cabot St. - rubbish on ice in -	#2895	Mar. 4, 1936
Canal, Northern, from Cabot to Aiken St. - do	#2896	Mar. 4, 1936
Canal, Northern, from Aiken to Pawtucket St. - do	#2897	Mar. 4, 1936
Canal, Northern, during flood - Merrimack River flowing into -	#2909B	Mar. 20, 1936
Canal, Northern - Merrimack River below School St. bridge, showing high water flowing into - Elev.of water at dam 101.82 at 3.00 p.m.	#2915	Mar. 20, 1936
Canal, Northern - Moody St. waste gates, showing how foundation was washed away during freshet	#2919	Mar. 31, 1936
Canal, Northern, wall in rear of Ayer Home showing capstone washed off by freshet	#2921	Mar. 31, 1936
Canal, Northern, wall above Moody St. showing leakage through wall	#2922	Mar. 31, 1936
Canal, Merrimack - fence which was broken when an automobile backed into canal	#2933	Apr. 27, 1936
Canal, Merrimack - do (different view)	#2934	
Canal, Northern - Moody St. gate house on - showing how foundation was washed away	#2936	May 13, 1936
Canal, Northern, wall under Moody St. gate house - repairs being made to -	#2937	May 29, 1936

C

Canal, Northern, wall under Moody St. gate house - repairs being made to -	#2938	June 5, 1936
Canal, Northern, wall under Moody St. do	#2939	June 11, 1936
Canal, Northern, wall - Derrick and concrete mixer on Moody St. bridge used for repairs to wall	#2940	June 11, 1936
Canal, Northern, wall under Moody St. gate house - repairs to	#2941	June 19, 1936
Canal, Northern, wall opposite Ayer Home - break in - canal side	#2942	June 20, 1936
Canal, Northern, do river "	#2943	June 20, 1936
Canal, Northern, wall, right hand side, below School St. - holes in -	#2944A	June 20, 1936
Canal, Northern, wall do	#2944B	June 20, 1936
Canal, Northern, wall under Moody St. gate house - repairs to -	#2945	June 26, 1936
Canal, Northern, wall opposite Ayer Home - break in - Canal side	#2946	June 27, 1936
Canal, Northern, do	#2947A	June 27, 1936
Canal, Northern, looking towards Moody St.	#2947B	June 27, 1936
Canal, Northern, wall under Moody St. gate house - repairs to -	#2948	July 3, 1936
Canal, Northern, do finished	#2949	July 8, 1936
Canal, Northern, wall in rear of Ayer Home - repairs to -	#2950A #2950B	July 11, 1936
Canal, Northern, wall above Moody St. showing leakage through wall	#2951	July 14, 1936
Canal, Northern, wall in rear of Ayer Home - repairs to - elev. canal 77.1 at 2.30 p.m.	#2952	July 17, 1936
Canal, Northern, wall, river side opposite Ayer Home, showing leakage with canal at elev. 77.1 at 2.30 p.m.	#2953	July 17, 1936
Canal, Northern, wall in rear of Ayer Home - repairs to	#2954	July 18, 1936
Canal, Northern, wall in rear of Ayer Home - leakage through -	#2955	July 20, 1936
Canal, Northern, wall - repairs to	#2958	July 25, 1936
Canal, Northern, wall was repaired - leakage stopped after -	#2959	July 27, 1936
Canal, Northern, wall, canal side - repairs to -	#2962	Aug. 1, 1936

,C

Canal, Northern, wall, Merrimack River side - footing at foot of	#2963	Aug. 6, 1936
Canal, Northern, flood wall - westerly end of -	#2969	Oct. 8, 1936
Canal, Northern, " "	#2970	Oct. 8, 1936
Canal, Northern, wall from Moody Street bridge	#2971	Oct. 9, 1936
Canal, Northern, wall - figures put on by Textile boys	#2972	Oct. 9, 1936
Canal, Northern, flood wall	#2973A #2973B	Oct. 9, 1936
Canal, Pawtucket - concrete block for holding boom at head of	#2974 #2975	Oct. 21, 1936
Canal, Northern, gate house - new fence in front of -	#2977	Oct. 21, 1936
Canal, Pawtucket, looking down stream - new wire fence on westerly bank of -	#3009	June 16, 1937
Canal, Pawtucket, looking upstream - new wire fence on westerly bank of -	#3010	June 16, 1937
Canal, Hamilton, in front of Appleton Co. - new wire fence on bank of -	#3028	Aug. 10, 1937
Canal, Pawtucket, wall below pole 1 on, belonging to Pratt & Forrest Lumber Co.	#3029	Aug. 14, 1937
Canal, Northern, looking upstream from Suffolk St. - rubbisb in	#3053	Feb. 11, 1938
Canal, Northern, do " Cabot St.	#3054	Feb. 11, 1938
Canal, Northern, do " Aiken St.	#3055	Feb. 11, 1938
Canal, Eastern, on Bridge St. - Progress of bridge over -	#3064	Mar. 22, 1938
Canal, Pawtucket - wall along easterly side of Tyng. St. put in by the L & C	#3066	Apr. 18, 1938
Canal, Pawtucket above Old Guard Locks - Boys playing baseball on L & C Lot #8, westerly side of -	#3067	Apr. 18, 1938
Canal, Eastern, on Bridge St. - Progress of new bridge over - also shows Gofkauf's new store front	#3051	Jan. 14, 1938
Canal, Pawtucket, above Guard Locks - Boys playing baseball on L & C Lot #13, easterly side of -	#3070 #3070A	Apr. 26, 1938
Canal, Pawtucket - Wall and fence along easterly side of Tyng St. put up by L & C	#3076	May 9, 1938

C

Canal, Pawtucket - Cady Bldg. corner of Western Ave. and Fletcher St. northerly side of - #3077 May 9, 1938

Canal, Western, near Worthen St. - part of lot #27 on bank of - #3094 July 28, 1938

Canal, Western - part of lot #27 and lot #24 between Worthen and Dutton Sts. on banks of - #3095 July 28, 1938

Canal, Northern - portion of old timber bulkhead removed and concrete one being put in at head of - #3125 July 25, 1939

Canal, Northern - some of timbers taken out of bulkhead at head of - #3126 July 25, 1939

Canal, Northern - new concrete bulkhead and flood wall at head of - upstream side #3127 Aug. 11, 1939

Canal, Northern - downstream side - new concrete bulkhead, platform and flood wall at head of - #3128 Aug. 11, 1939

Canal, Pawtucket, above Guard Locks - Boys swimming from boom in- #3131 Aug. 24, 1939

Canal, Pawtucket, above railroad bridge across from Wilson yard - Boysswimming in - #3132 Aug. 24, 1939

Canal, Lower Western - Boys and girls swimming at Hickey Hall dam in - #3134 Aug. 24, 1939

Canal street fence and lumber logs looking from Kearney Sq. #3137 Dec. 12, 1939

Canal Street fence looking down Eastern Canal from Kearney Sq. # 3138 Dec. 12, 1939

Canal, Eastern, to Bridge St. bridge over Eastern Canal - Wire fence from L. I. D. Co. bridge over - #3139 Dec.12, 1939

Canal, Eastern, in front of the L. I. D. Co. - Wire fence along Bridge St. and iron rail bridge fence over - #3140 Dec. 12, 1939

Canal, Pawtucket, wall, looking towards corner of Payne and School Sts. End of 48" concrete pipe surface drain showing thru - (see also #3148) #3141 Feb. 27, 1940

Canal, Pawtucket - 48" concrete pipe surface drain looking from Payne St. towards - #3142 Feb. 27, 1940

Canal at Merrimack Mfg. Co. - Cave in of portion of wall and racks of inner - #3144 Mar. 26, 1940

Canal at Merrimack Mfg. Co. - Men puddling concrete for new wall of inner - #3145 Apr. 2, 1940

Canal at Merrimack Mfg. Co. - Forms for new wall of inner - #3146 Apr. 2, 1940

C

Canal at the Merrimack Mfg. Co. - Concrete mat in front of racks in inner -	#3147	Apr. 5, 1940
Canal at Merrimack Mfg. Co. - Forms for concrete face wall beyond end of racks in inner -	#3148	Apr. 5, 1940
Canal, Pawtucket, wall below School St. - End of 48" concrete pipe surface drain showing thru righthand side of -	#3149	Aug. 26, 1940
Canal, Western, below Market St. for Federal Housing Project - Pipe bridge crossing -	#3153	Feb. 10, 1941
Canal, Eastern, in rear of Gookin Furniture Co. - Bridge across -	#3154	Feb. 18, 1941
Canal, Eastern - Broken fence in rear of Gookin Furniture Co.	#3155	Feb. 18, 1941
Capstone washed off by freshet - Northern Canal wall in rear of Ayer Home showing -	#2921	Mar. 31, 1936
Cave in of portion of wall and racks of inner canal at the Merrimack Mfg. Co.	#3144	Mar. 26, 1940
Central St. bridge looking towards Merrimack St.	#2654	Jan. 29, 1932
Central St. " " " Gorham St.	#2655	Jan. 29, 1932
Central St. bridge showing repairs between tracks made by Eastern Mass. Rwy. Co. Picture taken	#2683	July 19, 1932
Central St. bridge showing holes	#2935	Apr. 30, 1936
Central St. bridge open preparatory to putting in 4 new 30" I-beams	#3068	Apr. 22, 1938
Central St. bridge - 4 new 30" I-beams and 10" cross connection I-beams put in place on -	#3069	Apr. 25, 1938
Central St. bridge - Asphaltic surface put on roadway over -	#3081	May 18, 1938
Centralville bridge across Merrimack River - Demolishing old -	#3036	Oct. 3, 1937
Centralville bridge - Demolishing old - and also shows piling around old stone piers	#3037	Oct. 3, 1937
Centralville bridge over Merrimack River on Bridge St. - Progress of new -	#3057	Feb. 11, 1938
Centralville bridge do	#3058	Feb. 11, 1938
Centralville bridge over Merrimack River on Bridge St. - Progress of -	#3062	Mar. 22, 1938
Centralville bridge do	#3063	Mar. 22, 1938
Centralville bridge at Centralville approach - Wooden store & tenement block on upstream side of -	#3078	May 18, 1938

C

Centralville bridge - Approach from southerly side to -	#3079	May 18, 1938
Centralville bridge from Centralville side	#3080	May 18, 1938
Cheever and Aiken Sts. - Lowell Ice Co.'s filling station corner of -	#2542	July 1930
Cheever St. park - sidewalk in front of -	#2579	Jan. 30, 1931
Cheever St. park and adjacent to #136 Cheever St. - Portion of sidewalk in front of -	#2580	Jan. 30, 1931
Cheever St., 200 and 202, Lot #64-A-4 - L & C land leased to Emile Lemire	#2684	July 22, 1932
Cheever St. do (different view)	#2685	July 22, 1932
Cheever St. from Pawtucket St. - Buildings on L & C lots #64-A-1, 64-A-6, 64-A-4 -	#3085	June 15, 1938
Chipewa Street, 40-44	#2882	Dec. 18, 1935
Clothroom Bldg. at the Mass. Mills	#2521	Mar. 10, 1930
Clothroom Bldg., 3d floor, Mass. Mills	#2529	Mar. 13, 1930
Clothroom Bldg. - new stairway and entrance for Sullivan Bros. printers to 2d floor - L.I.D.	#2893	Jan. 27, 1936
Cold House, old, being removed - laying L & C 20" main, showing part of concrete foundation of old -	#2489	Oct. 16, 1929
Cold House do	#2490	Oct. 16, 1929
Concord River looking downstream from East Merrimack St.	#2726	Apr. 20, 1933
Concord River " upstream " " "	#2727	Apr. 20, 1933
Concord, River - Leaks under Middlesex Dam	#2791	Aug. 21, 1934
Concord River - " " " "	#2792	Aug. 21, 1934
Concord River wall - Ramp and fill on Slasher Bldg. site, L.I.D.	#3002	Apr. 22, 1937
Concord River wall where Slasher Bldg. is being razed. "	#3000	Apr. 22, 1937
Concord River at Middlesex dam, showing high water	#3092	July 28, 1938
Concord River do (different view)	#3093	July 28, 1938
Conduit St. looking across Beaver Brook showing high water	#2901	Mar. 14, 1936
Construction of new Post Office, Lowell, Mass. (2 negatives)	#2592	Apr. 3, 1931
Coolidge St., #12 - lot #43	#3097	July 28, 1938

C

Covers, gate well, over L & C valves in Saco-Lowell yard, put on by John Simpson, contractor	#2639	Nov. 25, 1931
Crack in concrete wall at end of Hamilton Canal, south side	#2424	Nov. 20, 1928
Crack in " " around end of Hamilton Canal, looking north	#2425	Nov. 20, 1928
Cracks in 30" pipe taken out at break on 6th St., Lowell,Mass.	#2590	Mar. 31, 1931
Cracks in 30" pipe do	#2591	Mar. 31, 1931
Cracks between windows of 2d and 3d floors of Boott Mills, also 1st and 2d floors of Mill #7	#2987	Mar. 3, 1937
Cracks between windows of 2d and 3d floors of Boott Mills, also 3d and 4th floors of Mill #7	#2988	Mar. 3, 1937
Cracks (3) in Mill #7 at Boott Mills, near bridge on Bridge St. between sidewalk and windows	#3011	July 8, 1937
Cracks (2) in Mill #7 do	#3012	July 8, 1937
Curbings - Broadway bridge over Pawtucket Canal showing new sidewalks and wooden -	#3025	Aug. 10, 1937
Curbings - Pawtucket St. bridge over Northern Canal showing new concrete -	#3026	Aug. 10, 1937
Curbing, end of, broken on downstream side of Pawtucket St. bridge over Northern Canal	#3030	Aug. 14, 1937

Dam of Boston Mfg. Co. on Charles River, Waltham, Mass.	#2544	July 15, 1930
Dam " " , part of - " "	#2545	July 15, 1930
Dam and flood wall at Old Guard Locks. Elev. of water 101.77 at 2.30 p.m.	#2910	Mar. 20, 1936
Dam, flood, at Old Guard Locks and water in Thompsons Field Elev. of water 101.77 at 2.30 p.m.	#2911A #2911B	Mar. 20, 1936
Dam across B & M RR tracks above Wilder St. during high water	#2912	Mar. 20, 1936
Dam do	#2913	Mar. 20, 1936
Dam, Pawtucket, looking upstream	#3059	Mar. 2, 1938
Dam, " " downstream	#3060	Mar. 2, 1938
Dam, " . Elev. of water 85.92 at 2.30 p.m.	#3102	Sept. 29, 1938
Dam, " " " 83.60 at 10.45 a.m.	#3103	Oct. 7, 1938
Dam, " , looking upstream. 10.30 a.m.	#3119	Mar. 14, 1939
Dam, " " downstream 10.30 a.m.	#3120	Mar. 14, 1939
Davis & Sargent Lumber Co. land conveyed by L & C Dec. 26, 1924. Area 87,727	#2838	Apr. 18, 1935
Derrick and concrete mixer on Moody St. bridge used for repairs to wall	#2940	June 11, 1936
Dexter & Son, R. K., buildings at the corner of Fletcher and Dutton Sts.	#2469	June 24, 1929
Dexter & Son, R. K. do	#2470	June 24, 1929
Diagram, flood, showing flood of	#2915A	Mar. 20, 1936
Diagram - City of Lowell Financial -	#2998	Mar. 22, 1937
Dike and excavation on north side of river - Merrimack River at Hunts Falls looking downstream showing -	#3042	Nov. 6, 1937
Dike and do looking upstream	#3043	Nov. 6, 1937
Dike being made for high water - Northerly side of Merrimack River westerly of Beaver Brook showing -	#3072	Apr. 26, 1938
Dike for high water - Northerly side of Merrimack River below Aiken St. bridge showing excavating river along shore and -	#3073	Apr. 27, 1938

D

Dike being made for high water - Northerly side of Merrimack River easterly of Beaver Brook showing -	#3074	Apr. 27, 1938
Dike for high water - Aiken St. dump showing tin cans and rubbish, also -	#3107	Nov. 2, 1938
Diner, Paradise, at the corner of Amory and Bridge Sts.	#3135	Aug. 24, 1939
Ditch in which 24" main on Kearney Sq. will be laid showing foundation of old #12 Mill of the Pepperell Mfg. Co.	#2492	Nov. 8, 1929
Ditch being dug in Tyng St. for 20" city pipe looking south towards Broadway	#2603	May 28, 1931
Ditch open for City 20" pipe on School St. over Merrimack River and Northern Canal. Shows end of canal curtain wall	#2606	June 19, 1931
Diver shuts valve under water at Merrimack Mfg. Co. during flood of	#2917A	Mar. 20, 1936
Document No.314 - copy of L & C -	#2389	May 28, 1928
Drain, proposed 6", in Aiken St. dump, near Conduit St. looking northwest - Location of end of -	#2624	Sept. 28, 1931
Drain, proposed 6", do looking southeast	#2625	Sept. 28, 1931
Drain, End of 48" concrete pipe surface - showing thru Pawtucket Canal wall, looking towards corner of Payne and School Sts. (see also #3148)	#3141	Feb. 27, 1940
Drain, 48" concrete pipe surface - looking from Payne St. towards Pawtucket Canal	#3142	Feb. 27, 1940
Drain, End of 48" concrete pipe surface - showing thru right hand side of Pawtucket Canal wall below School St.	#3149	Aug. 26, 1940
Driveway from Bridge St. - Opening up area between Storehouses A & B and Mill #2 for -	#2635	Nov. 10, 1931
Drowning - Western Canal near junction of Pawtucket Canal where little girl was drowned	#2605	June 18, 1931
Drowning, Location of automobile accident, at end of Merrimack Canal looking from French St. Picture taken at 8.30 am	#2630	Oct. 20, 1931
Drowning, do looking from Dutton St. Picture taken at 3.00 p.m.	#2631	Oct. 20, 1931
Duct lines, 3-4", for electrical interconnection between Boott Mills and Merrimack Mfg. Co. 1 duct to carry a 3/c 500,000 CM. lead cable, 2 ducts reserved for future development - Looking east towards manhole #22, in Boott Mill yard, showing -	#2751	Dec. 5, 1933
Duct lines do looking west	#2752	Dec. 5, 1933

D

Ducts, fibre, carrying transmission lines, incased in concrete, beside river wall of the Slasher Bldg., L.I.D.Co.	#3001	Apr. 22, 1937
Dump on L & C land on bank of Merrimack River near Lowell & Dracut line, looking downstream	#2430	Dec. 6, 1928
Dump do " upstream	#2431	Dec. 6, 1928
Dump on L & C land on bank of Merrimack River do	#2560	Aug. 12, 1930
Dump near Conduit St.looking northwest - Location of end of proposed 6" drain in Aiken St. -	#2624	Sept. 28, 1931
Dump do looking southeast	#2625	Sept. 28, 1931
Dump, Indian Orchard, looking west	# 2642	Dec. 2, 1931
Dump do " east	#2643	Dec. 2, 1931
Dump - Maxey's side show at Aiken Street -	#2735	Aug. 9, 1933
Dump on L & C land, Lawrence Boulevard near Dracut Line	#2782	June 25, 1934
Dump, Aiken St. - City No Dumping Sign on -	#2816	Jan. 9, 1935
Dump, " - General view of, looking easterly across Beaver Brook	#2819 #2819A	Jan. 11, 1935
Dump, Aiken St., showing tree stumps left there after the Sept. 21, 1938 hurricane	#3105	Nov. 2, 1938
Dump, Aiken St., showing tree branches left there after the Sept. 1938 hurricane	#3106	Nov. 2, 1938
Dump, Aiken St., showing tin cans and rubbish, also dike for high water	#3107	Nov. 2, 1938
Dutton St. - Bridge ~~St~~ entrance to Kitson Machine Shop on -	#2693	Nov. 17, 1932
Dutton St. and Swamp Locks basin - L & C lot #28 between -	#3088	June 15, 1938
Dye house at the Mass. Mills	#2522	Mar. 10, 1930
Dye house being torn down at L.I.D.Co.	#2700	Dec. 6, 1932
Dye house at L.I.D. being torn down	#2704	Jan. 13, 1933
Dye house do	#2707	Jan. 25, 1933
Dye house " " torn down	#2720	Mar. 29, 1933

Eastern Canal looking downstream from Bridge St.	#2412	Sept. 9, 1928
Eastern " " " " Boott office	#2413	Sept. 9, 1928
Eastern " " " " #6 racks	#2414	Sept. 9, 1928
Eastern Canal wall - opening to let in water from Boott penstock	#2417	Oct. 15, 1928
Eastern Canal wall - do	#2418	Oct. 15, 1928
Eastern Canal looking upstream - Left hand side Merrimack wasteway wall at end of -	#2471	June 28, 1929
Eastern Canal looking downstream - left hand side of wall at end of -	#2472	June 28, 1929
Eastern Canal - Bridge for L & C 24" pipe across -	#2481	Sept. 23, 1929
Eastern Canal - do	#2482	Sept. 23, 1929
Eastern Canal - L & C 24" pipe across -	#2483	Sept. 26, 1929
Eastern Canal from Kearney Square bridge looking downstream	#2628	Oct. 14, 1931
Eastern Canal looking downstream - Sidewalk along L & C 5 foot strip, east side of -	#2637	Nov. 25, 1931
Eastern Canal near Kearney Sq. opposite new post office - west side of -	#2638	Nov. 25, 1931
Eastern Canal, looking downstream - Sidewalk along 5 foot strip, east side of -	#2640	Dec. 23, 1931
Eastern Canal opposite Post Office - New wall and fence on westerly side of -	#2670	Mar. 16, 1932
Eastern Canal - Sterling Motor Lines truck whose rear wheels went through L I D Co.'s bridge over -	#2722	Apr. 7, 1933
Eastern Canal - Fence and gate in rear of Gookins Furniture Store near -	#2774	May 28, 1934
Eastern Canal - Fence and gate repaired do	#2776	June 14, 1934
Eastern Canal near Lower Locks - Plank put on west end of bridge over -	#2777	June 14, 1934
Eastern Canal on Bridge St. - Progress of bridge over -	#3064	Mar. 22, 1938
Eastern Canal on Bridge St. - do also shows Gofkauf's new store front	#3051	Jan. 14, 1938
Eastern Canal - Wire fence from L.I.D. bridge to Bridge St. bridge over -	#3139	Dec. 12, 1939

E

Eastern Canal in front of L.I.D. - Wire fence along Bridge St. and iron rail bridge fence over -	#3140	Dec. 12, 1939
Eastern Canal in rear of Gookin Furniture Co. - Bridge across -	#3154	Feb. 18, 1941
Eastern Canal - Broken fence in rear of Gookin Furniture Co.	#3155	Feb. 18, 1941
Elevation of water 82.60 at 12.30 p.m. North side of Northern Canal wall below School St. bridge looking downstream	#2441	Mar. 26, 1929
Elevation of water 81.10 at 12.05 p.m. South side do	#2442	Mar. 27, 1929
Elevation of water 81.50 at 12.10 p.m. North side do looking upstream	#2443	Mar. 27, 1929
Elevation of water do	#2444	Mar. 27, 1929
Elevation of Merrimack River l.h. side below School St. bridge 101.82 at 3.00 p.m.	#2916A #2916B	Mar. 20, 1936
Elevation of Merrimack River. 1936 and 1852 high water marks below School St. bridge, Pawtucketville side	#2968	Oct. 8, 1936
Elevation of water at Middlesex Dam, Concord River	#3092	July 28, 1938
Elevation of water 85.92 at 2.30 p.m. Pawtucket Dam	#3102	Sept. 29, 1938
Elevation " " 83.60 " 10.45 a.m. "	#3103	Oct. 7, 1938
Elevator at L.I.D. - Shoe rack that was broken in Mill #1, Section 7 -	#3111	Dec. 28, 1938
Elevator at L.I.D. which had 1 cable broken on it - Mill #1, Section 7	#3112	Dec. 28, 1938
Ellsworth St. north side, - Buildings which caught fire from the Federal Shoe Co. building	#3732	June 26, 1933
Entrance to the Mass. Mill yards	#2504	Feb. 10, 1930
Entrance do	#2508	Feb.12, 1930
Entrance to Golf Course in Mill #2, 1st floor, L.I.D.	#2570	Oct. 23, 1930
Entrance, front, to Country Club Miniature Golf Course on Bridge St. L.I.D. Mill #2	#2573	Nov. 26, 1930
Entrance do inside view	#2574	Nov. 26, 1930
Entrance, new, to L.I.D. on Bridge St. between Mill #2 and Storehouses A & B	#2641	Dec. 23, 1931
Entrance, Canal St., to L.I.D., looking into yard	#2656	Feb. 19, 1932

E

Entrance, Canal St., to L.I.D., looking towards Bridge St.	#2657	Feb. 19, 1932
Excavation for new post office, west end - 3 prints from Marion Studio	#2478	Aug. 16, 1929
Excavation and piers for girders over penstock for Section 8 Power House - Post office site showing -	#2575	Nov. 25, 1930
Excavating on L & C reservoir lot for erection of standpipe for City of Lowell water works	#2832	Mar. 19, 1935
Excavation for proposed City standpipe - rear of L & C reservoir lot showing - PWA Docket #6004	#2850	June 3, 1935
Excavation do (different view)	#2851	June 3, 1935
Excavating ledge and dirt on northerly bank of Merrimack River below Pawtucketville bridge	#2979	Feb. 1, 1937
Excavating ledge do (different view)	#2980	Feb. 1, 1937
Excavating ledge do Progress picture showing -	#2981	Feb. 17, 1937
Excavation on northerly side of Merrimack River for temporary bridge, while new Centralville bridge is being constructed	#2984	Feb. 17, 1937
Excavation of bank of r.h. side of Merrimack River at Hunts Falls, L & C lot #85	#2991	Mar. 9, 1937
Excavating bed of Merrimack River below Aiken St. bridge	#2997	Mar. 22, 1937
Excavation of bank of south side of Merrimack River at Hunt's Falls, L & C lot #85	#2999	Apr. 12, 1937
Excavation of Merrimack River, southerly side, looking upstream, under School St. bridge, showing -	#3015	July 16, 1937
Excavation do	#3016	July 16, 1937
Excavation northerly side do	#3017	July 16, 1937
Excavation of Merrimack River, southerly side, looking downstream under School St. bridge, showing -	#3018	July 16, 1937
Excavation northerly side do	#3019	July 16, 1937
Excavation - Looking upstream, opposite Abbot Islands, at easterly end of cofferdam in Merrimack River	#3021	July 29, 1937
Excavation - Looking downstream, opposite "Minuet Tea Room" (Merrimack River) at cofferdam	#3022	July 29, 1937
Excavation and cofferdam - Southerly side of Merrimack River near easterly end of Stackpole St., showing -	#3023	July 29, 1937

E

Excavation and cofferdam - same as #3023 (different view)	#3024	July 29, 1937
Excavating ledge - Merrimack River above School St. bridge showing progress in -	#3031	Aug. 25, 1937
Excavation and cofferdam in middle and southerly side of Merrimack River at Hunts Falls - Looking downstream opposite Minuet Tea Room at -	#3032A	Oct. 1, 1937
Excavation Continuation of 3032A	#3032B	Oct. 1, 1937
Excavation under arches and around piers of School St. bridge - Picture taken from northerly side of Merrimack River looking upstream and showing -	#3033	Oct. 1, 1937
Excavation do Picture taken from southerly side of Merrimack River	#3034	Oct. 1, 1937
Excavation - Looking downstream between coffer dam and northerly side of Merrimack River at Hunts Falls showing rocks etc. to be cleaned out. Boott gauge 41.90 at 10 am	#3038A #3038B	Oct. 10, 1937
Excavation and dike on north side of river at Hunts Falls looking downstream	#3042	Nov. 6, 1937
Excavation and dike do looking upstream	#3043	Nov. 6, 1937
Excavation that has been done on north side of Merrimack River. Water at dam 88.90 at 2.45 p.m. Downstream side of School St. bridge showing -	#3047	Nov. 30, 1937
Excavation along shore, northerly side of Merrimack River above Moody St. bridge	#3071	Apr. 26, 1938

Federal Shoe Co. Fire on Dix St. (2 negatives)	#2731	June 26, 1933
Federal Housing Project - pipe bridge crossing Western Canal below Market St. for -	#3153	Feb. 10, 1941
Fences in front of Boott Mills	#2361	Jan. 17, 1928
Fence damaged at corner of Market and Suffolk Sts. L & C	#2434	Dec. 26, 1928
Fence, board, repaired on Varnum Ave. by L & C 94 feet upstream from end of Pawtucket Dam	#2439	Mar. 21, 1929
Fence do	#2440	Mar. 21, 1929
Fence, Suffolk St., along Western Canal from Jefferson to Market Streets	#2421	Oct. 25, 1928
Fence, iron, at corner of Suffolk & Merrimack Sts.	#2499	Nov. 29, 1929
Fence, iron, on Ford St. below High Bridge which was broken about Jan. 12, 1931	#2578	
Fence repaired & holes filled in on east side of Pawtucket Canal at Thompson's Field	#2601	May 27, 1931
Fences and stop signs at end of French St.	#2649	Jan. 26, 1932
Fences do	#2650	Jan. 26, 1932
Fence, new, east side of Eastern Canal at Lower Locks dam	#2658	Mar. 2, 1932
Fence west of Pawtucket Canal above Guard Locks	#2659	Mar. 2, 1932
Fence on Kyan St. northeasterly side of Pawtucket Canal near Red Bridge	#2660	Mar. 2, 1932
Fence on Kyan St. northerly side of Pawtucket Canal opposite Merrimack Valley Supply Co.	#2661	Mar. 2, 1932
Fence on Jackson St., south side of Hamilton Canal from Appleton Bridge looking west	#2662	Mar. 2, 1932
Fence on Jackson St. south side of Hamilton Canal from Saco bridge looking west	#2663	Mar. 2, 1932
Fence do looking east	#2664	Mar. 2, 1932
Fence east side of Pawtucket Canal above Guard Locks showing holes	#2665	Mar. 2, 1932
Fence south side of Northern Canal at foot of Race St. Stop signs put up by City on Ford St.	#2666	Mar. 2, 1932
Fence on northerly side of Northern Canal above High Bridge	#2668	Mar. 2, 1932
Fence and new wall on westerly side of Eastern Canal opposite Post Office	#2670	Mar. 16, 1932

F

Fence, wooden, on Ford St. between Race and Cabot Sts. 8 new pickets on -	#2687	Sept. 6, 1932
Fence on Pawtucket St. near corner of Moody St. - Hole made by Brady's truck Nov. 10, 1932 in -	#2690	Nov. 12, 1932
Fence recently put up by L & C, also railroad bridge at Jackson St. Entrance to Kitson Machine Shop	#2698	Nov. 17, 1932
Fence between Suffolk and Cabots Sts. - One of three signs put up by L & C on Ford St. -	#2699	Dec. 3, 1932
Fence in rear of Bartlett School - One of the holes under L & C-	#2733	June 30, 1933
Fence on upstream side of Merrimack St. bridge over Western Canal	#2740	Sept. 26, 1933
Fence on downstream side do	#2741	Sept. 26, 1933
Fence, wire, between L & C land and Wannalancit St.	#2745	Nov. 1, 1933
Fence do	#2746	Nov. 1, 1933
Fence and gate in rear of Gookins Furniture Store near Eastern Canal	#2774	May 28, 1934
Fence and gate repaired in rear of Gookins Furniture Store near Eastern Canal	#2776	June 14, 1934
Fence and sidewalk Lowell and Lawrence Boulevard near west end of taking. Looking westerly	#2872	Oct. 25, 1935
Fence and sidewalk east of Minuet on Lowell and Lawrence Bldv.	#2874	Oct. 28, 1935
Fence and sidewalk Lowell and Lawrence Blvd. near east end of taking. Looking easterly	#2875	Oct. 28, 1935
Fence along Merrimack Canal which was broken when an automobile backed into canal	#2933	Apr. 27, 1936
Fence do (different view)	#2934	
Fence, new, in front of Northern Canal gate house	#2977	Oct. 21, 1936
Fence on Front St. being repaired	#2983	Feb. 17, 1937
Fence " " " "	#2986	Feb. 24, 1937
Fence, new wire, on westerly bank of Pawtucket Canal looking down stream	#3009	June 16, 1937
Fence do looking upstream	#3010	June 16, 1937
Fence, new wire, on bank of Hamilton Canal in front of Appleton Co.	#3028	Aug. 10, 1937

F

Fence and wall along easterly side of Tyng St. put up by L & C	#3076	May 9, 1938
Fence broken by auto accident, opposite Hunts Falls, in Merrimack River on Lowell and Lawrence Blvd.	#3113	Jan. 2, 1939
Fence and lumber logs on Canal St., looking from Kearney Sq.	#3137	Dec. 12, 1939
Fence looking down Eastern Canal from Kearney Sq. - Canal St.	#3138	Dec. 12, 1939
Fence, wire, from L.I.D. Co. bridge over Eastern Canal to Bridge St. bridge over Eastern Canal	#3139	Dec. 12, 1939
Fence, wire, along Bridge St. and iron rail bridge fence over canal in front of the L.I.D.Co.	#3140	Dec. 12, 1939
Fence broken in rear of Gookin Furniture Co.	#3155	Feb. 18, 1941
Financial diagram of City of Lowell	#2998	Mar. 22, 1937
Front St. - fence being repaired	#2983	Feb. 17, 1937
Front St. do	#2986	Feb. 24, 1937
Fire on Dix St. - Federal Shoe Co.	#2731	June 26, 1933
Fire - Buildings on Ellsworth St. northerly side, which caught fire from the Federal Shoe Co.	#2732	June 26, 1933
Fire escape on Napping Bldg., L.I.D. Co.	#2778	June 14, 1934
Five foot strip of land owned by L & C; also section #12 Pepperell Mfg. Co. being razed for new post office	#2450	Apr. 25, 1929
Fletcher and Dutton Sts. - R. K. Dexter & Sons building at corner of -	#2469	June 24, 1929
Fletcher and Dutton Sts. - do	#2470	June 24, 1929
Flood waters - Pawtucket Dam	#2898	Mar. 14, 1936
Flood " ice jam at Pawtucket Dam gate house	#2899	Mar. 14, 1936
Flood " - lot #89	#2900	Mar. 14, 1936
Flood " - Conduit St. looking across Beaver Brook	#2901	Mar. 14, 1936
Flood " - Beaver St. bridge over Beaver Brook	#2902	Mar. 14, 1936
Flood " - Upstream side of Moody St. bridge	#2903	Mar. 14, 1936
Flood " around boiler house, Picker Bldg. and Mill #1 of L.I.D. Co.	#2904	Mar. 14, 1936

F

Flood waters - Lawrence Blvd. showing rip rap on northerly bank of Merrimack River opposite Hunts Falls	#2905	Mar. 14, 1936
Flood " - Pumping out boiler house at L.I.D.	#2906	Mar. 17, 1936
Flood " - " " power house " "	#2907	Mar. 17, 1936
Flood " - Francis Gate at Old Guard Locks. Elev. 101.77 at 2.30 p.m.	#2908	Mar. 20, 1936
Flooded areas on map of Lowell	#2908A	Mar. 20, 1936
Flood - Moody St. bridge over Merrimack River during -	#2909A	Mar. 20, 1936
Flood - Merrimack River flowing into Northern Canal during -	#2909B	Mar. 20, 1936
Flood wall and dam at Old Guard Locks. Elev. of water 101.77 at 2.30 p.m.	#2910	Mar. 20, 1936
Flood dam at Old Guard Locks and water in Thompson Field. Elev. of water 101.77 at 2.30 p.m.	#2911A #2911B	Mar. 20, 1936
Flood - Dam across B & M RR tracks above Wilder St. during -	#2912	Mar. 20, 1936
Flood do	#2913	Mar. 20, 1936
Flood - Merrimack River showing high water on right hand side above Pawtucket Dam. Elev. of water 101.82 at 3 p.m.	#2914	Mar. 20, 1936
Flood - School St. bridge over Merrimack River during -	#2914A	Mar. 20, 1936
Flood - Merrimack River below School St. bridge showing high water flowing into Northern Canal. Elev. of water at dam 101.82 at 3.00 p.m.	#2915	Mar. 20, 1936
Flood diagram showing flood of	#2915A	Mar. 20, 1936
Flood - Merrimack River left hand side below School St. bridge showing high water. Elev. 101.82 at 3 p.m.	#2916A #2916B	Mar. 20, 1936
Flood - Merrimack River and Varnum Ave. looking upstream from Mammoth Road. Elev. of water 101.82 at 3.30 p.m.	#2917	Mar. 20, 1936
Flood - Diver shuts valve under water at Merrimack Mfg. Co. during -	#2917A	Mar. 20, 1936
Flood - Varnum Ave. near Starbird St. showing high water looking upstream. Elev. of water at dam 101.82 at 3.30 p.m.	#2918	Mar. 20, 1936
Flood - Aiken St. bridge over Merrimack River during -	#2918A	Mar. 20, 1936
Flood - Bridge St. bridge during -	#2919A	Mar. 20, 1936

F

Flood - Bridge St. bridge during -	#2920	Mar.31, 1936
Flood marks of 1936 and 1852 below School St. bridge Pawtucketville side	#2968	Oct. 8, 1936
Flood wall of Northern Canal	#2973A #2973B	Oct. 9, 1936
Flynn, Jos. J., advertiser - Sign on L & C land off Lakeview Ave.	#2569	Oct. 6, 1930
Flynn, Jos. J., sign on lot #89, Lakeview Ave. opposite Bunker Hill Ave.	#3090	June 15, 1938
Flynn, Jos. J., sign on lot #89, Lakeview Ave. opposite Ferry Lane	#3091	June 15, 1938
Ford St. below High Bridge - iron fence which was broken about Jan. 12, 1931 on -	#2578	
Ford St. - Stop signs put up by City. Fence south side of Northern Canal at foot of Race St.	#2666	Mar. 2, 1932
Ford St. between Race and Cabot Streets - 8 new pickets on wooden fence on -	#2687	Sept. 6, 1932
Ford St. fence between Suffolk and Cabot Streets - one of three signs put up by L & C on -	#2699	Dec. 3, 1932
Ford St., #71 and #81 - Building on lots #64-D and 64-D-1 Street view	#2843	Apr. 23, 1935
Ford St. do canal view	#2844	Apr. 23, 1935
Ford St. from Cabot St. - Buildings on L & C lots #64-E, 64-D-1, 64-D and 64-D-1	#3082	June 14, 1938
Ford St. from Aiken St. - Buildings on L & C lots #64-C, 64-D, 64-D-1 and 64-E-1	#3083	June 14, 1938
Ford St. from Aiken St. - Buildings on L & C lots 64-B, 64-F, 64-G and 64-H	#3084	June 14, 1938
Foundation, concrete, of old Cold House being removed - Laying L & C 20" main showing part of -	#2489	Oct. 16, 1929
Foundation, do	#2490	Oct. 16, 1929
Foundation of old #12 Mill of the Pepperell Mfg. Co. - Trench in which 24" main on Kearney Sq. will be laid showing-	#2492	Nov. 8, 1929
Foundation do	#2493	Nov. 12, 1929
Foundation was washed away during freshet - Moody St. waste gates on Northern Canal showing how -	#2919	Mar. 31, 1936

F

Francis, James B. - Picture of	#2748	Nov. 1933
Francis Gate at Old Guard Locks. Elev. of water 101.77 at 2.30 pm	#2908	Mar.20,1936
Francis Gate looking upstream	#2925	Apr. 24, 1936
Francis Gate, rear of	#2927	Apr. 24, 1936
Francis Gate House. Roof being repaired because of tree which fell on it during hurricane of Sept. 21, 1938	#3104	Oct. 7, 1938
Francis Gate House showing repairs finished on roof	#3109	Nov. 2, 1938
Franklin, North, Court, looking north from Franklin St.	#2858	Sept. 10, 1935
French St. from Kirk St. in rear of High School	#2460	June 18, 1929
French St. looking towards Merrimack Canal from John St.	#2461	June 18, 1929
French St. - Fences and stop signs at end of -	#2649	Jan. 26, 1932
French St. - do	#2650	Jan. 26, 1932
Freshet - Turbine room basement during high water at Boott Mills	#2723	Apr. 20, 1933
Freshet - Lot 96-B Showing high water	#2818	Jan. 11, 1935
Freshet - Lot 105 during -	#2820	Jan. 11, 1935
Freshet - Lot 89 during -	#2821	Jan. 11, 1935

Gage and tailrace of Boston Mfg. Co. emptying into Charles River, Waltham, Mass.	#2546	July 15, 1930
Gage and racks in canal of Boston Mfg. Co., Waltham, Mass.	#2547	July 15, 1930
Gage Co.'s artificial ice plant in Pawtucket St. - Artesian wells and pipe line for -	#3156	Apr. 21, 1941
Gaging station, U.S.G.S., at Hunts Falls on southerly bank of Merrimack River	#2753	Dec. 18, 1933
Gaging station, U.S.G.S. at Hunts Falls, Merrimack River	#2754	Dec. 18, 1933
Gate - Swamp Locks new sluice -	#2411	Sept. 9, 1928
Gate - Merrimack " " -	#2425A	Nov. 25, 1928
Gatehouse, L & C, near Saco Foundry Yard	#2692	Nov. 17, 1932
Gate and fence in rear of Gookins Furniture Store near Eastern Canal	#2774	May 28, 1934
Gate and fence do repaired	#2776	June 14, 1934
Gate house at Old Guard Locks and lot #13 as seen from Broadway	#2496	Nov. 22, 1929
Gate house, Tremont, and vicinity	#2557	July 18, 1930
Gate house at Pawtucket Dam - Ice and snow in front of -	#2892	Jan. 27, 1936
Gate house, Pawtucket Dam, showing ice jam	#2899	Mar. 14, 1936
Gate house, hydraulic, and sand bag dam east of Francis Gate	#2926	Apr. 24, 1936
Generators in the Tremont wheel house - 3 of the 4 - (Mill #2)	#3117	Jan. 19, 1939
Glenwood St., #151	#2880	Dec. 18, 1935
Gofkauf's Stores on Bridge St. in front of Mill #2, L.I.D. - Store front of -	#2612	July 29, 1931
Gofkauf's Store front on Bridge St. in L.I.D..Mill #2	#2634	Oct. 23, 1931
Gofkauf's anniversary sign over Bridge St.	#2758	Jan. 22, 1934
Gofkauf's Store, Mill #2, L.I.D. yard side	#2989	Mar. 9, 1937
Gofkauf's do Bridge St. side	#2990	Mar. 9, 1937
Gofkauf's new store front; also Progress of new bridge over Eastern Canal on Bridge St.	#3051	Jan. 14, 1938
Gofkauf's store front, Bridge St., Lowell	#3056	Feb. 11, 1938
Gofkauf's store on Bridge St. - Repaired defective sidewalk in front of -	#3150	Oct. 24, 1940

G

Golf course on L & C land, First St. Blvd. - site of proposed miniature -	#2559	Aug. 12, 1930
Golf course, miniature, on Pawtucket Blvd.	#2561	Aug. 12, 1930
Golf " " " L & C land at Indian Orchard	#2568	Oct. 5, 1930
Golf " , Campbells, on L & C land First St. Blvd.	#2644	Dec. 2, 1931
Goodell, Wm. N. - Jan. 1, 1921 to March 31, 1929	#2448	Mar. 29, 1929
Goodell, do	#2449	Mar. 30, 1929
Grease, barrels of, stored in Boiler House	#2736	Aug. 9, 1933
Guides, new, welded in guide ring of 30" Swain wheel. Kalix Cup Co., West Chelmsford	#2423	Nov. 9, 1928
Guides of Appleton Co.'s new #4 wheel - 38" Rodney Hunt	#3123	June 5, 1939

Hamilton Canal, south side - Broken concrete wall at end of -	#2424	Nov. 20, 1928
Hamilton " looking north do	#2425	Nov. 20, 1928
Hamilton " " upstream	#2467	June 24, 1929
Hamilton yard - 2" steampipe over Lower Pawtucket Canal from Assets Realization Co. to Mill #7 of Hamilton Co.	#2498	Nov. 26, 1929
Hamilton Canal - new walls at end of -	#2563	Aug. 12, 1930
Hamilton " - end of -	#2648	Jan. 4, 1932
Hamilton " from Appleton bridge looking west - Fence on Jackson St., south side of -	#2662	Mar. 2, 1932
Hamilton Canal from Saco Bridge looking west - do	#2663	Mar. 2, 1932
Hamilton " do east - do	#2664	Mar. 2, 1932
Hamilton and Appleton Mills - Transmission lines and steam pipes from Bigelow to -	#2729	June 16, 1933
Hamilton rack platform replanked	#2795	Dec. 6, 1934
Hamilton yard - Bleach and dyehouse being torn down in - Clothroom Bldg.	#2866	Oct. 21, 1935
Hamilton yard - Part of Bleachery bldgs. being torn down in -	#2894	Jan. 27, 1936
Hamilton Canal in front of Appleton Co. - New wire fence on bank of -	#3028	Aug. 10, 1937
Hamilton Mill yard - Side track and freight car in -	#3048	Nov. 30, 1937
Hamilton Co. Mill #7 - Indicator posts for sprinkler service in front of -	#3061	Mar. 14, 1938
Headgate of #12 wheel at Mass. Mills - Repairs to -	#2539	June 23, 1930
Holes in fence east side of Pawtucket Canal above Guard Locks	#2665	Mar. 2, 1932
Hole in fence made by Brady's truck Nov. 10, 1932 on Pawtucket St. near corner of Moody St.	#2690	Nov. 12, 1932
Hole under L & C fence in rear of Bartlett School	#2733	June 30, 1933
Holes in floor of bridge between car tracks - Merrimack St. bridge over Western Canal	#2870	Oct. 28, 1935
Holes in Central Street bridge	#2935	Apr. 30, 1936
Hunts Falls, Merrimack River - Roadway made by drag bucket to excavate river bed at -	#2992	Mar. 9, 1937

H

Hunts Falls - temporary jetty to hold water out in order to excavate bed of river at -	#3013	July 11, 1937
Hunts Falls do	#3014	July 11, 1937
Hunts Falls Boott gauge 52.16 at 2.10 p.m.	#3045	Nov. 30, 1937
Hurricane of Sept. 21, 1938 - Francis Gate house roof being repaired because of tree which fell on it during -	#3104	Oct. 7, 1938
Hurricane of Sept. 21, 1938 - Aiken St. dump showing tree stumps left there after the -	#3105	Nov. 2, 1938
Hurricane of Sept.21, 1938 - Aiken St. dump showing tree branches left there after the -	#3106	Nov. 2, 1938
Hurricane of Sept. 21, 1938 - Lot #84 Stackpole St. showing branches and tree left there after -	#3108	Nov. 2, 1938
Hurricane of Sept. 21, 1938 - Francis Gate house showing repairs finished on roof due to -	#3109	Nov. 2, 1938
Hydrant #14, Bigelow yard, which was run into Oct. 3, 1933	#2743	
Hydrant #6, Middlesex yard, which was run into Oct. 10, 1933 and repaired Oct. 14, 1933	#2744	

Ice going over Pawtucket Dam looking upstream	#2822	Jan. 13, 1935
Ice downstream	#2823	Jan. 13, 1935
Ice infront of Gate house at Pawtucket Dam	#2824	Jan. 13, 1935
Ice in river above Pawtucket Dam looking upstream	#2825	Jan. 13, 1935
Ice on Pawtucket Dam looking downstream	#2826	Jan. 18, 1935
Ice upstream	#2827	Jan. 18, 1935
Ice, anchor, on Pawtucket Dam	#2889	Jan. 27, 1936
Ice, " , and open channel at Pawtucket Dam	#2890	Jan. 27, 1936
Ice, do	#2891	Jan. 27, 1936
Ice and snow in front of Gate House at Pawtucket Dam	#2892	Jan. 27, 1936
Ice jam at Pawtucket Gate House	#2899	Mar. 14, 1936
Ice frozen on dam; also showing L & C men cutting channel in front of dam - Pawtucket Dam, from Varnum Ave.	#3049	Jan. 14, 1938
Ice do - " " " School St.	#3050	Jan. 14, 1938
Indian Orchard - Miniature golf course on L & C land at -	#2568	Oct. 5, 1930
Indian Orchard dump looking west	# 2642	Dec. 2, 1931
Indian " " " east	#2643	Dec. 2, 1931
Indicator posts for sprinkler service in front of Mill #7, Hamilton Co.	#3061	Mar. 14, 1938
Interconnection, electrical - three 667 KVA, 2400 to 600 volt Wagner Transformer at Lawrence Section for -	#2742	Sept. 26, 1933
Interconnection, electrical, between Boott Mills and Merrimack Mfg. Co. - Looking east towards manhole #22, in Boott Mill yard, showing 3-4" duct lines for - 1 duct to carry a 3/c 500,000 CM lead cable, 2 ducts reserved for future development	#2751	Dec. 5, 1933
Interconnection, do looking west	#2752	Dec. 5, 1933
Interconnection, electrical - 3-667 KVA, 2400 to 600 volt, Wagner transformers at the Boott Mills for -	#2784	July 23, 1934
Interconnection, electrical - Oil switches in transformer vault at Boott Mills for -	#2785	July 23, 1934

I

Ipswich Mills - #1 72" Swain wheel being junked. Installed in 1878 taken out 1928	#2419	Oct. 19, 1928
Ipswich Mills do	#2420	Oct. 19, 1928
Ipswich penstocks - cut off wall at head of -	#2429	Dec. 6, 1928

J

Jackson St., south side of Hamilton Canal, from Appleton bridge looking west - fence on -	#2662	Mar. 2, 1932
Jackson St., do from Saco bridge looking west	#2663	Mar. 2, 1932
Jackson St. do looking east	#2664	Mar. 2, 1932
Jackson St. entrance to Saco yard	#2691	Nov. 17, 1932
Jackson " " " " - Fence recently put up by L & C, also r.r. bridge at -	#2698	Nov. 17, 1932
Jetty, temporary, at Hunts Falls to hold water out in order to excavate bed of river	#3013	July 11, 1937
Jetty, do	#3014	July 11, 1937
Junk and old automobiles in rear of Lakeview Ave. garage on L & C land	#2775	May 28, 1934
John St. looking towards Boott Mills from Paige St.	#2463	June 18, 1929

Kalix Cup Co., West Chelmsford - New guides welded in guide ring of 30" Swain wheel -	#2423	Nov. 9, 1928
Keiths theatre,-B. F. - Private way between Pepperell Mfg. Co. storehouse "C" and -	#2488	Oct..11, 1929
Kirk St. looking towards Merrimack St. from French St.	#2458	June 18, 1929
Kyan St., - fence on northeasterly side of Pawtucket Canal near Red bridge	#2660	Mar. 2, 1932
Kyan St. - fence on northerly side of Pawtucket Canal opposite Merrimack Valley Supply Co.	#2661	Mar. 2, 1932
Kyan St., Lot #17-E - Land and building on	#2837	Apr. 18, 1935
Kyan St. L & C lots #16 and 17	#3087	June 15, 1938

Lakeview Ave. - Lowell Ice Co.'s filling station corner of Conduit Ave. and -	#2541	July 2, 1930
Lakeview Ave., 742 to 754 - Rear view of tenement block owned by Edward Atkinson	#2623	Sept. 29, 1931
Lakeview Ave. garage on L & C land - Old automobiles and junk in rear of -	#2775	May 28, 1934
Lakeview Ave. opposite Bunker Hill Ave. - Jos. J. Flynn's sign on-	#3090	June 15,1938
Lakeview Ave. " Ferry Lane do lot #89	#3091	June 15, 1938
Lamson's Field, looking southwest	#2677	Apr. 13, 1932
Lawrence Mfg. Co. along river	#2390	May 31, 1928
Lawrence " " "	#2390A	May 31, 1928
Lawrence Sect. of Merrimack Mfg. Co. along river	#2391	May 31, 1928
Lawrence Mfg. Co. Mill #12 & 14, looking west	#2453	May 13, 1929
Lawrence St. opposite Waterhead Mills, looking south - proposed playground	#2502	Jan. 20, 1930
Lawrence St. do " north	#2503	Jan. 20, 1930
Lawrence wasteway from Merrimack Mfg. Co. to Lawrence Mfg. Co.- New power lines across -	#2564	Aug. 13, 1930
Lawrence wasteway dam - Concrete facing on west side of -	#2567	Sept. 25, 1930
Lawrence " - Concrete facing -	#2571	Oct. 23, 1930
Lawrence Section - 3-667 KVA-2400 to 600 volt Wagner transformer at - for electrical interconnection	#2742	Sept.26, 1933
Lawrence Canal - end of -	#2764	Feb. 8, 1934
Lawrence Section of Merrimack Mfg. Co. - Housing over 3-667 KVA-2400 to 600 volt, Wagner Transformers at the -	#2786	July 24, 1934
Lawrence Section of Merrimack Mfg. Co. - 2300 volt oil switch in rear of 667 KVA Wagner transformers at -	#2787	July 24, 1934
Lawrence dam house - repairs to finished	#2879	Nov. 23, 1935
Lee St. looking towards John St. from Kirk St.	#2459	June 18, 1929
Lee St., 50-54	#2883	Dec. 18, 1935
Leaks from Section #8 penstock and part of #12 basement wall	#2479	Aug. 30, 1929
Leaks under Middlesex dam, Concord River	#2791	Aug. 21, 1934
Leak under " " "	#2792	Aug. 21, 1934

L

Leakage through wall of Northern Canal above Moody St.	#2922	Mar. 31, 1936
Leakage do	#2951	July 14, 1936
Leakage with canal at elev. 77.1 at 2.30 p.m. - Northern Canal wall, river side opposite Ayer Home, showing -	#2953	July 17, 1936
Leakage through Northern Canal wall in rear of Ayer Home	#2955	July 20, 1936
Ledge above Pawtucketville bridge on northerly side of Merrimack River before any excavation	#2982	Feb. 17, 1937
Ledge on left hand bank of Merrimack River above Moody St. bridge - Air compressor and pipe lines for drilling holes in -	#2993A #2993B	Mar. 19, 1937
Lewis St. near corner of Market St. looking from Lewis St.	#2859	Sept. 10, 1935
Lincoln St. bridge over Hale's Brook - driving piles	#2415	Oct. 4, 1928
Locomotives, B & M, on Dutton St. at Centennary celebration - One of first and latest -	#2535	June 5, 1930
Locomotives, do	#2536	June 5, 1930
Locomotives, do	#2537	June 5, 1930
Lot on bank of Merrimack River near Lowell & Dracut line opened for dump, looking downstream	#2430	Dec. 6, 1928
Lot on bank do " upstream	#2431	Dec, 6, 1928
Lot between Northern Canal & Merrimack River below School St. bridge	#2446	Mar. 27, 1929
Lot #13 and gate house at Old Guard Locks as seen from B'way	#2496	Nov. 22, 1929
Lot on bank of Merrimack River near Lowell-Dracut line, used for dump	#2560	Aug. 12, 1930
Lot off Lakeview Ave. and sign of Jos. J. Flynn, advertiser	#2569	Oct. 6, 1930
Lot - L & C two horse team on 10 foot strip east side of Office and yard, Broadway	#2584	Feb. 24, 1931
Lot do	#2584A	Apr. 22, 1931
Lot do	#2585	Feb. 24, 1931
Lot do	#2585A	Apr. 22, 1931
Lot on west side of Pawtucket Canal near Pawtucket St. looking north - lumber on -	#2593	Apr. 9, 1931
Lot do looking southwest	#2594	Apr. 9, 1931
Lot do do	#2598	May 16, 1931

L

Lot west of Pawtucket Canal between Broadway & Pawtucket Sts. looking towards Broadway - City 20" pipe being laid in -	#2600	May 21, 1931
Lot west side of Pawtucket Canal looking north towards Pawtucket St. - City 20" pipe & truck in -	#2602	May 28, 1931
Lot between Red Bridge and Broadway - City 20" pipe being covered up in -	#2607	June 19, 1931
Lot on First St. Blvd. - Campbells golf course on -	#2644	Dec. 2, 1931
Lot - Lamson's Field - looking southwest	#2677	Apr. 13, 1932
Lot east side of L & C Office and Yard, looking north, Broadway	#2678	Apr. 23, 1932
Lot #64-A-4 at 200 and 202 Cheever St., leased to Emil Lemire	#2684	July 22, 1932
Lot do different view	#2685	July 22, 1932
Lot - private way west of Ayer Home	#2686	Sept. 3, 1932
Lot east of yard and Office Bldg., looking north - right of way	#2749	Nov. 22, 1933
Lot do " south	#2750	Nov. 22, 1933
Lot 28-A Building over Pawtucket Canal	#2761	Jan. 22, 1934
Lot rear of Lakeview Ave. garage - Old automobiles and junk on-	#2775	May 28, 1934
Lot #96-C, easterly end, corner of First St. & Lawrence Blvd.	#2797	Dec. 6, 1934
Lot #84, westerly end, near junction of Merrimack and Concord Rivers	#2798	Dec. 6, 1934
Lot #96-B. looking towards Bridge St. from southerly side of Merrimack River	#2799	Dec. 6, 1934
Lot #96-D , easterly end, looking west	#2800	Dec. 6, 1934
Lot, Abbott Islands, looking upstream	#2801	Dec. 6, 1934
Lots 91, 92, 92A and 107, portions of, looking westerly from Aiken Sts.	#2802 #2802A	Dec. 18, 1934
Lot #105 looking westerly from Beaver Brook	#2803	Dec. 18, 1934
Lot #103-J looking northerly from Moody St. bridge	#2804	Dec. 18, 1934
Lot #89 looking northwest towards Aiken St.	#2805	Dec. 18, 1934
Lots #92 and 107 looking westerly towards Beaver Brook	#2806	Dec. 18, 1934
Lot #91 on Aiken St. - No Trespassing signs at entrance to -	#2807	Dec. 19, 1934
Lots 33-C-2 and 31-C looking westerly	#2808	Dec. 19, 1934

L

Lot #13 looking south from Pawtucket St.	#2809	Dec. 19, 1934
Lot #29 looking easterly	#2810	Dec. 19, 1934
Lot #33-C-1 looking westerly from Aiken St.	#2811	Dec. 19, 1934
Lot #29-A looking easterly from School St.	#2812	Dec. 19, 1934
Lot #8 looking south from Pawtucket St.	#2813	Dec. 19, 1934
Lot #87 looking west	#2814	Dec. 19, 1934
Lot #88 looking west	#2815	Jan. 9, 1935
Lot - City No Dumping Sign on Aiken St. dump	#2816	Jan. 9[illegible], 1935
Lot #31-A Melvin St.	#2817	Jan. 11, 1935
Lot #96-B showing high water	#2818	Jan. 11, 1935
Lot - General view of Aiken St. dump looking easterly across Beaver Brook	#2819 #2819A	Jan. 11, 1935
Lot #89 during high water	#2821	Jan. 11, 1935
Lot #84, Stackpole St. opposite Livermore St. - Rubbish and garbage on -	#2830	Mar. 14, 1935
Lot #96-D near Dracut and Lowell line - Rubbish and garbage on sidewalk in front of -	#2831	Mar. 19, 1935
Lot #96-B after widening of Lawrenve Blvd.	#2833	Apr. 3, 1935
Lot #96-B do	#2834	Apr. 3, 1935
Lot #17-E Kyan St. -	#2837	Apr. 18, 1935
Lot c nved to Davis & Sargent Lumber Co. Area 87,727 12/26/24	# 2838	Apr. 18, 1935
Lot #2-B-1, #5 Thorndike St.	#2839	Apr. 18, 1935
Lot " "	#2840	Apr. 23, 1935
Lot #25 #495 Worthen St. (street view)	#2841	Apr. 23, 1935
Lot #25 " (canal view)	#2842	Apr. 23, 1935
Lots #64-D and 64-D-1. #71 and 81 Ford St. (street view)	#2843	Apr. 23, 1935
Lots " (canal view)	#2844	Apr. 23, 1935
Lot #64-A-5. Aiken St. corner of Cheever St.	#2845	Apr. 23, 1935

L

Lot #64-A. #200 Cheever St. corner of Cheever St.	#2845-A Apr. 23, 1935
Lots #28-A and 28-B. (street view)	#2846 Apr. 24, 1935
Lot 28-A. North side view	#2847 Apr. 24, 1935
Lot #96-B. character of river bank	#2852 June 26, 1935
Lot " "	#2852-A June 26, 1935
Lot #96-B, portion of, showing rip rap	#2853 June 26, 1935
Lot #96-B, - showing rip rap being placed	#2854 June 26, 1935
Lot #96-B - character of river bank	#2855 June 26, 1935
Lot #28-A. Fletcher St. - Building being torn down	#2862 Oct. 2, 1935
Lots #28-A and 28-B " torn down	#2865 Oct. 21, 1935
Lot #89 showing high water	#2900 Mar. 14, 1935
Lot #96-B looking east toward westerly end of taking	#2928 Apr. 24, 1936
Lot " " " showing riprap which has slid down bank due to flood	#2929 Apr. 24, 1936
Lot #96-B looking east towards "The Minuet"	#2930 Apr. 24, 1936
Lot #96-D " " from "	#2931 Apr. 24, 1936
Lot " " " towards easterly end of taking	#2932 Apr. 24, 1936
Lot #25	#2978 Oct. 21, 1936
Lot - Entrance to Thompson Field from Broadway	#2995 Mar. 19, 1937
Lot #8, westerly side of Pawtucket Canal above Old Guard Locks - boys playing baseball on -	#3067 Apr. 18, 1938
Lots #64-E, 64-D-1, 64-D and 64-D-1, Ford St. from Cabot St. Buildings on -	#3082 June 14, 1938
Lot #13, easterly side of Pawtucket Canal above Guard Locks - Boys playing baseball on -	#3070 #3070A Apr. 6, 1938
Lots #64-D, 64-C, 64-D-1 and 64-E-1, Ford St. from Aiken St.	#3083 June 14, 1938
Lots #64-B, 64-F, 64-G and 64-H. Ford St. from Aiken St.	#3084 June 14, 1938
Lots #64-A-1, 64-A-6, 64-A-4, Cheever St. from Pawtucket St.	#3085 June 15, 1938
Lots #13-C, 14 and 14-A rear of Wilson's coal yard	#3086 June 15, 1938
Lots #16 and 17, Kyan St.	#3087 June 15, 1938

L

Lot #28 between Dutton St. and Swamp Locks basin	#3088	June 15, 1938
Lots #17-D-4 and 17-D-2, also portion of lot #15	#3089	June 15, 1938
Lot #27, part of, on bank of Western Canal near Worthen St.	#3094	July 28, 1938
Lot #27 and 24, part of, between Worthen and Dutton Sts. on banks of Western Canal	#3095	July 28, 1938
Lot #80-F rear of Rex Center	#3096	July 28, 1938
Lot #43 - 12 Coolidge St.	#3097	July 28, 1938
Lot #84 Stackpole St. showing branches and tree left there after Sept. 21, 1938 hurricane	#3108	Nov. 2, 1938
Lot #91-B - Victor Provencher's filling station and Cocoa-Cola Bottling Co.	#3143	Feb. 27, 1940
Lots 2-B, 2-B-1 and 2-D looking towards Thorndike St.	#3151	Oct. 24, 1940
Lots 2-C and 2-B looking towards Nashua and Lowell R.R. location	#3152	Oct. 24, 1940
Lowell Industrial Development Company		
No. 1 Mill of the Mass. Cotton Mills	#2516	Mar. 6, 1930
No. 2 " " " " " "	#2516A	Mar. 6, 1930
New For Rent Sign on Store House "A"	#2517	Mar. 6, 1930
Repair Shop, Machine Shop, Office and Watch House	#2518	Mar. 6, 1930
Store Houses "A" and "B"	#2519	Mar. 10, 1930
Power House, Boiler House & Slasher Bldg.	#2520	Mar. 10, 1930
Cloth Room Bldg.	#2521	Mar. 10, 1930
Dye House	#2522	Mar. 10, 1930
Entrance	#2523	Mar. 10, 1930
Waste House	#2524	Mar. 10, 1930
Picker Bldg., Showing Section 11	#2525	Mar. 10, 1930
Napping Bldg.	#2526	Mar. 10, 1930
Fourth floor of Mill No. 1	#2527	Mar. 13, 1930
Second floor of Napping Bldg.	#2528	Mar. 13, 1930
Third floor of ClothRoom Bldg.	#2529	Mar. 13, 1930
The mills from Pepperell Store House	#2530	Apr. 17, 1930

Lowell Industrial Development Co.

Mills from Fairburn Bldg.	#2531	Apr. 17, 1930
Electric cables being put in under Bridge St. bridge to Boott Mills	#2534	Apr. 23, 1930
Repairs to headgate of No. 12 wheel	#2539	June 23, 1930
Almont property, Tewksbury, Mass. - showing oil tanks	#2550	July 16, 1930
Almont property, Tewksbury, Mass. - showing boiler house, coal house and railroad tracks	#2551	July 16, 1930
Almont property, Tewksbury, Mass. - showing boiler house, coal house, oil tanks and oil filling stands	#2552	July 16, 1930
Entrance to Golf course in Mill #2, 1st floor	#2570	Oct. 23, 1930
Front entrance to Country Club Miniature Golf course on Bridge St. Mill #2	#2573	Nov. 26, 1930
Inside view of #2573	#2574	Nov. 26, 1930
Mill #1, Sect. 1 and 6	#2576	Dec. 3, 1930
Same as #2576	#2577	Dec. 3, 1930
Oil House looking towards Bridge St.	#2582	Feb. 24, 1931
Brick wall in front of Oil House	#2583	Feb. 24, 1931
Store front of Gofkauf's Stores on Bridge St. in front of Mill #2	#2612	July 29, 1931
Oil truck unloading oil	#2626	Oct. 9, 1931
Same as #2626	#2627	Oct. 9, 1931
Between Repair Shop & Post Office	#2629	Oct. 14, 1931
Gofkauf's Store front on Bridge St. in Mill #2	#2634	Oct. 23, 1931
Opening up area between Storehouses A and B and Mill #2 for driveway from Bridge St.	#2635	Nov. 10, 1931
Repairing racks for Section 8 Power House	#2636	Nov. 10, 1931
New entrance on Bridge St. between Mill #2 and Storehouses A & B	#2641	Dec. 23, 1931
Canal St. entrance looking into yard	#2656	Feb. 19, 1932
Canal St. entrance looking towards Bridge St.	#2657	Feb. 19, 1932
Becker Shoe Co. Mill #2, Sect. 4, Stitching Room	#2673	Mar. 26, 1932
Becker Shoe Co. Mill #2, Sect. 3, Cuttong Room	#2674	Mar. 26, 1932

Lowell Industrial Development Co. Becker Shoe Co. Mill #2, Sect. 4, Finishing Room	#2675	Mar. 26, 1932
Becker Shoe Co. Mill #2, Sect. 3, Lasting Room	#2676	Mar. 26, 1932
Dye House being torn down	#2700	Dec. 6, 1932
Mr. Robert Becker's private office, Becker Bros. Shoe Co. Mill #1	#2702	Dec. 16, 1932
Becker Bros. Shoe Co. main office in Mill #1	#2703	Dec. 16, 1932
Tearing down Dye House	#2704	Jan. 13, 1933
Dye House being torn down	#2707	Jan. 25, 1933
750 Kw steam turbine	#2710	Feb. 22, 1933
1500 Kw steam turbine	#2711	Feb. 22, 1933
3000 Kw steam turbine	#2712	Feb. 22, 1933
Steam turbines and water wheels in Main Power House	#2713	Feb. 22, 1933
Tearing down Boiler House at Almont property	#2714	Mar. 16, 1933
Boiler House torn down at the Almont property	#2715	Mar. 23, 1933
ditto	#2716	Mar. 23, 1933
Dye House torn down	#2720	Mar. 29, 1933
Sterling Motor Lines truck whose rear wheels went through bridge over Eastern Canal	#2722	Apr. 7, 1933
Safes	#2730	June 1933
Top floor of Picker Bldg.	#2734A B C	July 31, 1933
Boiler House showing barrels of grease stored there	#2736	Aug. 9, 1933
Picker Bldg.	#2737	Sept. 1, 1933
First floor Mill #1	#2756	Jan. 8, 1934
Prescott yard from Sect. 8	#2757	Jan. 8, 1934
Gofkauf's anniversary sign over Bridge St.	#2758	Jan. 22, 1934
Fifth floor Mill #2	#2759	Jan. 22, 1934
Fourth floor Mill #2	#2760	Jan. 22, 1934
First floor Slasher Bldg.	#2770	Apr. 23, 1934
Second floor Slasher Bldg.	#2771	Apr. 23, 1934

Lowell Industrial Development Company

Storehouses A and B being torn down	#2772	Apr. 25, 1934
ditto	#2773	May 28, 1934
Fire escape on Napping Bldg.	#2778	June 14, 1934
Site of Storehouses A & B	#2779	June 18, 1934
ditto	#2780	June 18, 1934
Site of Storehouses A & B showing entrance to yard on line with Merrimack Laundry	#2781	June 18, 1934
Site of Storehouses A & B. Beginning of grading	#2788	July 23, 1934
Directory sign board at entrance on Bridge St.	#2869	Oct. 21, 1935
Mill #1, Section 7	#2887	Dec. 27, 1935
New stairway and entrance for Sullivan Bros. printers, to 2d floor of Clothroom Bldg.	#2893	Jan. 27, 1936
Showing high water around Boiler House, Picker Bldg. & Mill #1	#2904	Mar. 14, 1936
Pumping out Boiler House	#2906	Mar. 17, 1936
ditto	#2907	Mar. 17, 1936
Slasher Bldg. being torn down	#2895	Feb. 24, 1937
Gofkauf's Store, Mill #2, yard side	#2898	Mar. 9, 1937
ditto Bridge St. front	#2990	Mar. 9, 1937
Tearing down Slasher Bldg.	#2994	Mar. 19, 1937
River wall where Slasher Bldg. is being razed	#3000	Apr. 22, 1937
Fibre ducts carrying transmission lines, incased in concrete beside river wall of the Slasher Bldg.	#3001	Apr. 22, 1937
Ramp and fill on Slasher Bldg. site	#3002	Apr. 22, 1937
Site of Storehouses A & B	#3003	May 21, 1937
ditto	#3004	May 21, 1937
Directing sign at entrance on Bridge St.	#3007	May 21, 1937
Repairing Prescott racks	#3035	Oct. 3, 1937
Gofkauf's new store front	#3051	Jan. 14, 1938
ditto	#3056	Feb. 11, 1938
Slasher Bldg. area and river wall	#3098	Aug. 4, 1938
ditto	#3099	Aug. 4, 1938
Shoe rack that was broken in Mill #1, Section 7 elevator	#3111	Dec. 28, 1938
Mill #1, Section 7 elevator which had 1 cable broken on it	#3112	Dec. 28, 1938
Boiler House inside	#3118	Mar. 8, 1939

Lowell Industrial Development Co. Taken at junction of Merrimack & Concord Rivers	#3122-A	May 15, 1939
Tenant's sign and factory space sign on Clothroom Bldg.	3136	Aug. 24, 1939
Repaired defective sidewalk in front of Gofkauf's store on Bridge St.	3150	Oct. 24, 1940
Lowell, City of, Plan of 1856 - Copy of old picture in Massachusetts Mill Yard on	2428	Nov. 26, 1928
Lowell, City of - Rain gage on filter beds at Boulevard Pumping station	2562	Aug. 12, 1930
New Boulevard well, 4 feet in diam. completed	2565	Aug. 19, 1930
One boulevard well discontinued on account of quicksand	2566	Aug. 19, 1930
Break in 30" water main 6th Street near corner of Bridge St. Lowell, Mass. 3.15 p.m.	2588	Mar. 30,1931
ditto	2589	Mar. 30, 1931
Cracks in 30" pipe taken out at break on 6th St. Lowell, Mass.	2590	Mar. 31, 1931
ditto	2591	Mar. 31, 1931
20" pipe being laid in field west of Pawtucket Canal between Broadway & Pawtucket St. looking towards Broadway	2600	May 21, 1931
20" pipe & truck in L & C field west side of Pawtucket Canal looking north towards Pawtucket St.	2602	May 28, 1931
Trench being dug in Tyng St. for 20" city pipe looking south towards Broadway	2603	May 28, 1931
Ditch open for City 20" pipe on School St. over Merrimack River and Northern Canal. Shows end of canal curtain wall	2606	June 19, 1931
20" pipe being covered up in field between Red Bridge and Broadway	2607	June 19, 1931
Pawtucket St. bridge over Pawtucket Canal being made ready for city 20" water main, looking east at 9.30 a.m.	2613	Aug. 4, 1931
ditto looking west at 9.30 a.m.	2614	Aug. 4, 1931
20" water main under south sidewalk of Pawtucket St. bridge over Pawtucket Canal, looking east	2618	Sept. 1,1931
ditto looking west	2619	Sept. 1, 1931
ditto looking northeast	2620	Sept. 1, 1931
Excavating on L & C reservoir lot for erection of standpipe for City of Lowell Water Works	2832	Mar. 19, 1935
Rear of L & C reservoir lot showing excavation for proposed City standpipe. P.W.A. Docket #6004	2850	June 3, 1935

Lowell, City of (cont.)

Foundation for pump house on L & C land; Stackpole St. near Alden St. P.W.P. #6004	#2871	Oct. 28, 1935
Pump house on L & C land, Stackplle St. near Alden. P.W.P. #6004	2877	Nov. 21, 1935
City pumping station on Stackpole St. formerly portion of L & C lot #84. P.W.P. #6004	2888	Dec. 27, 1935
Financial diagram	2998	Mar. 22, 1937
Lowell Ice Co.'s filling station corner of Conduit Ave. & Lakeview Ave.	2541	July 2, 1930
Lowell Ice Co.'s filling station corner of Aiken and Cheever Sts.	2542	
Lowell Gas Light Co. - tar oil etc. emptying into Pawtucket Canal through 12" C.I. pipe under School St. bridge at 2.30 p.m.	2595	May 6, 1931
ditto	2596	May 6, 1931
ditto @ 8.45 a.m.	2597	May 7, 1931
Lucy Larcom Park - Railroad centennial tablet & tracks at -	2540	June 23, 1930
Lumber on L & C land on west side of Pawtucket Canal near Pawtucket St. looking north	2593	Apr. 9, 1931
ditto looking southwest	2594	Apr. 9, 1931
ditto " "	2598	May 16, 1931
Lumber etc. belonging to D. H. Walker in "Thompson's Field" looking west	2615	Aug. 25, 1931
ditto looking east	2616	Aug. 25, 1931

Manhole cover in northerly sidewalk of Pawtucket St. bridge over Pawtucket Canal for fire hose - easterly end	2848	Apr. 24, 1935
ditto westerly "	2849	Apr. 24, 1935
Manhole location for L & C valve #76 on sidewalk in front of U.S.Postoffice, Lowell, Mass. where Daisy Niles claimed injury. Feb. 21, 1938	3065	Mar. 22, 1938
Map of Lowell showing flooded areas	2908-A	Mar. 20, 1936
Market and Suffolk St. - Damaged L & C fence corner of -	2434	Feb. 5, 1929
Massachusetts Mill yard on City of Lowell plan of 1856 - Copy of old picture in -	2428	Nov. 26, 1928
Massachusetts Mill Yards - entrance to the -	2504	Feb. 10, 1930
Massachusetts Mills - switchboard of Sect. 8 Power House at	2507	Feb. 12, 1930
Massachusetts Mill yard - entrance to	2508	Feb. 12, 1930
Massachusetts dye house - broken windows in	2509	Feb. 13, 1930
Massachusetts dye house - broken windows in, from Brown St.	2510	Feb. 13, 1930
Melvin St. Lot 31-A	2817	Jan. 11, 1935
Merrimack Mfg. Co. along river - Lawrence Section	2391	May 31, 1928
" " " " "	2392	May 31, 1928
Merrimack Boom	2422	Oct. 25, 1928
Merrimack New Sluice Gate	2425-A	Nov. 25, 1928

PREFACE to GUIDE TO ARCHITECTURAL AND ENGINEERING DRAWINGS

This document describes the extensive collection of drawings produced or acquired by the Proprietors for their use in creating, maintaining, altering, and expanding their waterpower delivery system to the textile manufacturers of Lowell, Mass., and later to the New England electrical power grid.

The processing of this collection was completed in February 2007 after several years of inventorying and data entry by staff and volunteers at Lowell National Historical Park. These include Dan Walsh as project coordinator, Rebecca Hartwell and Michelle Verfaillie from LOWE park staff, along with LONG volunteers Clee A. Ace, Kathy Dery, and Steven Sussman.

Related materials include a large collection Proprietors of Locks and Canals management and operations records at Lowell National Historical Park (LOWE-5058), a large collection of individually catalogued historic PL&C photographic prints also at Lowell National Historical Park, a small collection of PL&C architectural and engineering drawings as well as historic glass plate negatives and some historic photographic prints at the University of Massachusetts/Lowell Center for Lowell History, and a large collection of business records including the papers of such notable principals as James B. Francis, Uriah A. Boyden, Patrick T. Jackson, Kirk Boott, George W. Whistler, *et al*.

Researchers may contact the Lowell National Historical Park by phone at 978-970-5241 for assistance in accessing and using this material.

INTRODUCTION

The Proprietors of the Locks and Canals on Merrimack River Architectural and Engineering Drawings series holds over 11,000 plans, elevations, renderings, charts, graphs, templates and copies thereof produced by PL&C and its partners and suppliers between the years 1801 and 1987.

It covers all aspects of the design, construction, and ongoing maintenance of the first comprehensive industrial water-power delivery system in the United States and, as such, provides a unique record for what would become the prototypical industrial power delivery system before and into the age of steam and electrical power. It also provides key information for this power delivery system today since the entire system is extant and functioning as a hydropower component of the New England regional electrical power grid.

The collection consists of six separate sub-series of drawings. They are as follows:

1. Assets Division of Boott Mills series: 1295 original drawings and copies covering the period 1828-1987.

2. Lowell Industrial Development Company boiler series: 49 copies covering the period 1948-1950.

3. Maps series: 101 maps, generally published, covering the period 1818-1939.

4. Massachusetts Mills series: 327 original drawings and copies covering the period 1856-1943.

5. Merrimack Valley sewers project of 1948 series: 161 original drawings and copies covering the period 1876-1948.

6. Numbered series: 9218 original drawings and plans covering the period 1801-1980 for original drawings with a group of nine copies of earlier plans covering the period 1729-1794.

Page 9 describes briefly the business relationships of the Assets Division of Boott Mills, the Lowell Industrial Development Company, Massachusetts Mills, and the Proprietors of the Locks and Canals. That description will illustrate why and how these seemingly unrelated drawings series were incorporated into the Proprietors of the Locks and Canals drawings collection.

SCOPE AND CONTENT NOTE

Accession number:	LOWE-132
Catalog number:	LOWE 5058 (PL&C collection); LOWE-6391
Quantity/ Storage:	11151 drawings in: 82 standard map case drawers (flat storage) 14 smaller plans case drawers 147 six foot capped tubes (rolled storage) 2 open shelves (oversize foldered, flat storage)
Location:	Lowell National Historical Park, 67 Kirk Street, Lowell, Massachusetts 01852–1029. Phone 978-970-5000.
Description	This collection was produced in all of the various rendering and copying media and on all of the various drawing supports typically employed throughout the nineteenth and most of the twentieth centuries. Its drawing quality ranges from the near-artistic to the casual and perfunctory. Its supports range from fine all-cotton rag paper and drafting cloth to low quality brittle wood-fiber paper as well as some mylar and acetate film. Several of the early drawings bear the names of such noteworthy figures as James B. Francis, Uriah A. Boyden and George R. Baldwin.

The Collection as Administered by the Proprietors of the Locks and Canals:

The Proprietors of the Locks and Canals on Merrimack River (PL&C) Architectural and Engineering Drawings is an organic series of over 11,000 plans, elevations, renderings, charts, graphs, templates and copies thereof produced by PL&C and its partners and suppliers between the years 1801 and 1987.

It covers all aspects of the design, construction, and ongoing maintenance of the first comprehensive industrial water-power delivery system in the United States and, as such, provides a unique record for what would become the prototypical industrial power delivery system before and into the age of steam and electrical power. It also provides key information for this power delivery system today since the entire system is extant and functioning as a hydropower component of the New England regional electrical power grid.

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The Drawings Series:

The collection consists of six separate sub-series series of drawings. They are as follows:

1. Assets Division of Boott Mills sub-series: 1295 original drawings and copies covering the period 1828-1987.

2. Lowell Industrial Development Company boiler sub-series: 49 copies covering the period 1948-1950.

3. Maps sub-series: 101 maps, generally published, covering the period 1818-1939.

4. Massachusetts Mills sub-series: 327 original drawings and copies covering the period 1856-1943.

5. Merrimack Valley sewers project of 1948 sub-series: 161 original drawings and copies covering the period 1876-1948.

6. Numbered sub-series: 9218 original drawings and plans covering the period 1801-1980 for original drawings with a group of nine copies of earlier plans covering the period 1729-1794.

There are two broad groups within which these six groups are contained. The first broad group is plans created by and for the PL&C in its functions and includes the Maps sub-series, the Merrimack Valley sewers project of 1948 sub-series, and the Numbered plans sub-series. The

second broad group is plans created by subsidiaries or partners or those created for a purpose outside the functions of the PL&C *per se* and includes the Assets Division of Boott Mills sub-series, the Lowell Industrial Development Company (L.I.D.C.) boiler sub-series, and the Massachusetts Mills sub-series.

Origins, Growth, and Development of the Collection:

First broad group:

The first broad group of drawings is understandable without having to go into a discussion of other or parallel business relationships. It sprang from the needs of the P.L. & C. itself and was created by them for their fundamental business objectives, the provision of water for power production or other industrial processes not related to power production.

The Numbered sub-series is the first and most fundamental of the PL&C drawings collections. It is also the oldest and the largest collection. It contains original drawings dating from 1801 and copies of drawings dating from 1729 and covers every aspect of the creation and maintenance of the water power delivery system, which is the canals, dams, gates, locks, wasteways, and their appurtenant structures, as well as the penstocks, raceways, turbine pits, and turbines themselves, and the equipment necessary to operate them. The last dated drawing is from 1980.

The Maps sub-series is primarily devoted to published maps of the Merrimack River and its watershed, along with published maps of the city of Lowell. There are also a small number of maps dealing with other areas of the country or areas of Massachusetts outside of the Merrimack River watershed. Originally the maps collection was larger and contained maps of other parts of the country or the hemisphere but these were no longer part of the collection when it was received by Lowell National Historical Park. The majority of this collection is from the nineteenth and early twentieth centuries.

The 1948 Merrimack Valley sewers project is unusual in that it is a discrete collection intended to meet a specific short-term objective to document the historic and, what was then, the current water quality of the Merrimack River. That need arose out of an initiative to address, on a regional scale, the problems of sewage and other water-borne waste in the Merrimack River Valley in Massachusetts. It involved federal, state, and local government as well as business and industry and ultimately led to a resolution of what were long standing problems.

Second broad group:

The second broad group requires some further description in order to understand how these sub-series found their way into the P.L. & C. drawings collection.

The Assets Division of Boott Mills represents a partnership involving the Boott Mills and the PL&C that dealt with the real estate assets of former Lowell textile manufacturing companies and in hydropower generation and mill sprinkler-system water delivery. Its real estate interests were in properties at 200 Market Street, at the Foot of John Street (Boott Mills complex), and at 95 Bridge Street (Massachusetts Mills). The majority of this drawings sub-series dates from the period 1950 to1987, which makes it the most recent of the collections.

The Lowell Industrial Development Company represents another partnership, origjnally between Boott Mills and the Merrimack Mfg. Co. As described by Laurence Gross in his work *The Course of Industrial Decline* (p. 232), Boott Mills "…united with the Merrimack [Mfg. Co.] (controlled by the same investors) in the LIDC to buy up the real estate of the Massachusetts Mills, along with its waterpower rights plus those of the Lowell [Mfg. Co.] and Middlesex Mills and the 622 shares of Locks and Canals associated with them." The 49 plans of this sub-series cover the period 1948 to 1950 and relate to the design and installation of a steam turbine boiler by a single contractor. It is the smallest of the drawings collections. There is also a much larger group of L.I.D.C. plans in the Numbered sub-series at shelf/folio number prefix 156- , which nicely illustrates the interrelatedness of the L.I.D.C. and the PL&C but which had no provisions in its structure for this group of boiler plans.

Massachusetts Mills was one of the original 11 textile manufacturing companies and, like Boott Mills, was one of the last to remain in textile production in Lowell. As a partner in its successor, P.L. & C. seems to have inherited the extant Massachusetts Mills drawings collection, probably because it was the most logical partner to hold these drawings in view of the fact that it already maintained a large collection of its own drawings. In any case, this is the only collection of actual mill building plans held by PL&C This is not really surprising since P.L. & C. was less concerned with the actual structures raised by the textile manufacturers for their production purposes than they were with the structures of their own water power delivery system. This sub-series is also unique in that the existence or whereabouts of any other Lowell cotton mill plans are not known and, thus, it represents the only such documentation available.

These business relationships are complex because they are intertwined and involve the same individuals and the same properties. To illustrate the point even further, there was another entity known as the Assets Realization Company (1920-1946. See PL&C General Files), and another known as the Assets Division of L.I.D.C. (1943-1956. See PL&C General Files), and yet another local partnership known as Boott Hydropower, which became a wholly owned subsidiary of Consolidated Hydropower which is, itself, now a subsidiary of Enel, a major Italian-owned electric power company.

PL&C Drawing Sub-series Numbering Schemes:

1. Assets Division of Boott Mills sub-series. This sub-series was not numbered as such by PL&C but was simply held in a map case the contents of whose drawers were identified by drawer labels. Each drawer contained a typed list of abbreviated drawings titles for what was intended to have been its contents but these lists did not use plan numbers. Thus the numbering scheme employed for this sub-series of plans by Lowell National Historical Park (LOWE) staff in creating the database for this drawings sub-series uses a PL&C model, namely, a compound number consisting of an applied drawer number and an applied plan number, e.g. 01-01. In point of fact, many of the plans in this sub-series are copies of plans from other sub-series, such as the PL&C numbered sub-series, copies which bear the plan number of their sub-series of origin but which were not used in the sub-series in which they were found. Those other sub-series numbers are recorded in the database for this sub-series in a field named "Other Numbers".

2. Lowell Industrial Development Company boiler sub-series. This sub-series was not numbered by PL&C but did carry a plan numbering scheme of its creator, the Wickes Boiler Co. of Saginaw, Michigan, e.g. 51838. . This is the numbering scheme that was employed by LOWE staff in creating its database for this sub-series, with the addition of the prefix LIDC, resulting in the plan number LIDC 51838.

3. The Maps sub-series had a numbered list for its contents that was generated by PL&C The list actually consists of seven categories (i.e. Lowell Maps, New Hampshire State Maps, New Hampshire county and city maps, United States Maps, Massachusetts State Maps, Boston Maps, and Other maps) but is numbered continuously from 1 through 54 irrespective of the categorized organizational scheme. This PL&C numbering scheme is the numbering employed by LOWE staff in creating its database for this sub-series, along with the prefix Maps, e.g. Maps 001.

4. The Massachusetts Mills sub-series carries a numbering scheme that was evidently developed by Massachusetts Mills itself and simply left unaltered by PL&C This numbering scheme consists of compound alpha-numeric numbers for each of the plans, e.g. A-43, and seemingly reflects an intended categorized organizational scheme although what its categories may have been is not clear in the absence of any documentation other than the plans themselves. It is also discontinuous in its alphabetic prefixes lacking, as it does, any D-, H-, I-, J-, O-, P-, Q-, or T- through Z- prefix plans. In addition, it is discontinuous in its numbering within any given prefix group. As a typical example, the collection begins with drawing A-43 and goes next to A-47. The whereabouts of drawings A-1 through A-42 or A-44 through A-46 are unknown, as are the whereabouts of any of the other missing numbers within the other existing prefix groups, except for eight drawings still bearing their Massachusetts Mills sub-series numbers, which were renumbered by PL&C and added to their own Numbered sub-series of drawings. This may have been the fate of other missing Massachusetts Mills sub-series plans but without direct evidence there is no point in attempting to deduce what they may have been.

5. The Merrimack Valley sewers project of 1948 sub-series is like the Assets Division of Boott Mills sub-series in that it was not numbered but had typed lists of abbreviated drawings titles which, in this case, were pasted to the exterior of the large envelopes which contained the drawings. Based on the model of the Maps sub-series, the numbering scheme employed for this sub-series of plans by Lowell National Historical Park (LOWE) staff in creating the database for this drawings sub-series uses a simple continuous numbering scheme beginning with 001.

6. The Numbered sub-series is by far and away the largest of the drawings sub-series in this collection and currently bears a numbering scheme that seems to have been developed by PL&C in stages over the course of the 19th century. In its most basic form, it is a compound numero-numeric scheme the first element of which is a “shelf” or folio number separated by a hyphen from a drawing number, e.g. 131-001.

However, as the collection grew, so did the elaboration of the its numbering scheme. Since not all drawings were small enough to be stored flat by PL&C, large drawings had to be stored rolled but weren’t given “shelf” or folio numbers. Instead, they were typically stored in paste-board tubes housed in sheet-metal cases, which PL&C termed “pigeon holes”, and were given compound numbers consisting of “P.H.” prefixes followed by drawing numbers, e.g. P.H. 6-E. As the collection continued to grow, additional storage had to be found and this resulted in a yet another refinement of the numbering scheme.

In the 20th century, at least, PL&C housed its drawings in a plans vault. Evidently, at some point, that vault was expanded since the latest PL&C numbering scheme uses a locator pre-prefix to distinguish between the Upper Vault and the Lower Vault, both of which contained flat and rolled drawings. The upper vault drawings were given a “C-“ pre-prefix, e.g. C-114-1 or C-P.H. 8, while the lower vault drawings were not given any pre-prefix and continued to be numbered as shown above. The necessity of PL&C having to employ the C- locator pre-prefix stems from the

fact that it reused its shelf and pigeon hole numbers and, thus, without a location indicator, one would not know whether any given plan was in an upper or lower vault folio or pigeon hole. Since the same upper and lower vault folio and pigeon hole numbers were used for different drawing topic groups, the possibility for confusion in actual location and the annoying consequences of misfiling would indeed have been a constant problem without a location designator.

That vault expansion point seems to have been reached about the year 1900. The evidence for this is found both in the drawing dates and in the new plan number labels that begin to appear. PL&C procured a type of preprinted paper label which could be affixed to a drawing and had blank spaces following the terms "No." and "Shelf" which were to be filled in with a drawing number and a shelf number. The printer included the year in which the labels were made, along with other proprietary information, on the margins of the label. There are three distinct groups of labels in terms of printing date: 1900, 1909, and 1913. Clearly, a compound-numbering system was in use by 1900 since it is reflected in the preprinted label form itself. In addition, the first appearance of the distinction between the "C-" plans and the non-"C-" plans found in the PL&C typed "Consecutive Index of Drawings" coincides with drawings dated at the turn of the 20th century. What PL&C appears to have done in making the distinction between upper and lower vault drawings was to have consolidated the older drawings in the upper vault and, folio by folio, given the C- designator to them. At the same time, PL&C seems to have instituted a uniform compound plan numbering scheme for new drawings, within which each numbered "shelf"/folio began its own internal sequence of drawing numbers starting with the number 1., e.g. 136-1>, 140-1>, etc., and which superseded an older compound numbering scheme.

It is not clear exactly why PL&C recycled shelf and pigeon hole numbers rather than simply creating a distinct sub-series of numbers for each level of its vault, especially in view of the fact that the shelf and pigeon hole numbers represent subject classifications, e.g. the subject of shelf 132 drawings is Water Wheels while the subject of shelf C-132 drawings is Hydrant Tests. Had PL&C simply given a shelf or folio sequence of 100-199 to the upper vault and 200-299 to the lower vault, with a similar distinction within the P.H. sequences, there would have been no need of yet another prefix in the form of "C-". The existence of this pre-prefix caused no end of difficulty in processing this drawings sub-series since LOWE was not in possession of the documentation explaining it until it received the PL&C Files collection in 1997 and, within the drawings themselves, PL&C had not been consistent in correctly labeling all the "C-" drawings as such while, in its later years, it often mixed "C-" and non-"C-" drawings together rather than storing them separately as was originally intended.

As noted above, the current classified numbering scheme for this drawings sub-series was developed by PL&C but it was not the original numbering scheme, which was characterized by unnecessary complexity. Beginning with number 1, it remained sequential until it reached at least number 4697 before being superseded by the newer scheme. Number 4697 is the last number clearly incorporated into the current shelf/folio or pigeon hole compound-numbering scheme at drawing number C-134-4697. This is also reflected in "Consecutive Index of Drawings". However, a classification mechanism which unfortunately did not allow for plan number growth within its classifications was superimposed on this older sequential PL&C consecutive numbering scheme prior to the use of the "C-" pre-prefix location designators. It resulted in anomalies such as broken plan number sequences within shelf/folio numbers, e.g. C-117-154-188 & 282-342. In this case, since the numbers between 189 and 381 had already been incorporated into shelf/folio C-118, the only thing to do was jump to the next unused sequence of numbers. The point at which

this scheme was introduced seems to have been at the time of the construction of the Northern Canal in 1846-47.

Normally, in a compound numbering scheme of the type originally employed by PL&C, one would expect to see the earliest sequential plan numbers falling within the earliest sequential shelf/folio number. However, that is not the case with these drawings. The earliest shelf/folio number is 105 (currently C-105) but it contains plans numbers 402-535. In fact, it is folio114 (currently C-114) that contains drawings 1-61, followed by folio 115 (currently C-115) which continues with drawings 62-93. Both of these folios were devoted to the topic "Northern Canal. Sections 1 and 2. General Plans. Excavations. Masonry. 1846-47." Thus it seems that earlier classified numbering scheme for this drawings sub-series appeared about 1846 and that it must also have had to incorporate all the earlier drawings which had been generated up that time (over 200 by date from 1801 through 1845). Since James B. Francis was the chief engineer for PL&C at the time of the construction the Northern Canal, he may very well have developed this earlier classified plans numbering system. That could explain why drawing number 1 is a Northern Canal drawing rather than being the earliest drawing generated by PL&C Again, probably in answer to the awkwardness of the original compound numbering scheme, PL&C seems to have instituted, about the turn of the 20th century, a uniform plan numbering scheme for new drawings within which each numbered shelf/folio began its own internal sequence of drawing numbers starting with the number 1., e.g. 136-1>, 140-1>, etc.

PL&C Generated Drawings Collection Indices:

1. **The Card Index File.** This extensive subject index to the collection utilizes typed 4x6 ruled cards and is contained in a hardwood case that was evidently a custom-made by or for PL&C.

Intellectually, it is organized systematically using an alphabetically-arranged controlled subject-indexing vocabulary developed by PL&C. In this respect, it is similar in appearance and organization to library subject catalogues, albeit utilizing a much more restricted indexing vocabulary than Sear's or the Library of Congress List of Subject Headings. The broader subject headings (e.g. Boott Cotton Mills) can have secondary level subject groups within them (e.g. Waterwheels and Equipment) which can have, in turn, tertiary level subject groups within them (e.g. Draft Tubes). Tacked to the inside of the lid of the card file case is a typed list showing the subject-indexing vocabulary and the secondary and tertiary levels beneath whatever primary headings have secondary or tertiary level indexing. The subject cards themselves have either buff or blue colored tab divider cards to indicate their subject categories: buff for a primary subject level, blue for secondary and tertiary subject levels. Their subject headings reflect those of the typed list.

As with library subject catalogues, there can be multiple references in this subject catalogue to the same work since every drawing, like every book, is about more than just one thing. The entries on the subject cards consist of a subject heading at the tops of the cards with plan numbers and short form titles and, sometimes, dates and references to the type of the plan (e.g. BP, for blueprint) or the support of the plan (e.g. TP for tracing paper) listed below.

This was the finding aid that came with the collection when it was received by LOWE in 1989. Processing the collection was made more difficult by this subject index because it acted as only an imperfect check list owing to the existence of multiple entries, which often had conflicting or ambiguous information for the same plan number. For example, questions constantly arose as to

whether the subject card references were to original drawing or to copies of original drawings. In addition, it is not complete in that quite a number of drawings were found in the collection that were not listed in this index.

2. **The Consecutive Index of Drawings Belonging to Proprietors of the Locks and Canals on the Merrimack River.** This plan number index exists in the form of typed letter sized sheets. It functions in the same way as a library shelf list, that is, as a simple first number to last number list of the total plans collection with only one entry per drawing. It came to LOWE in 1997 with the final transaction between PL&C and LOWE for the disposition of the collection and has proven very helpful in resolving anomalies within the drawings collection itself. Its only drawback is that, like the card form subject index, it is not complete in that, again, quite a number of drawings were found in the collection that were not listed in this index (a selection forms Appendix 1).

3. **Other lists.** As noted above, under **PL&C drawings sub-series numbering schemes**, the Assets Division of Boott Mills sub-series, the Maps sub-series, and the Merrimack Valley sewers project of 1948 sub-series each had typed contents lists associated with them showing, at the least, a short form title (Appendices 4 and 5). The Maps sub-series list also numbered the maps starting with 1 and ending with 54. Like the Card Index File and the Consecutive Index, none of these lists was complete and each drawings sub-series contained many more drawings than were shown on its respective list.

Ultimate Disposition of the P. L.& C. Drawings Collection:

In October 1996, Lowell National Historical Park purchased the PL&C Architectural and Engineering drawings collection except for a selection of drawings donated earlier by the PL&C to what was then the Lowell Textile Institute (later incorporated into the University of Massachusetts, Lowell). The PL&C Consecutive Index of Drawings notes, on its Pigeon Hole and Shelf Index Upper Vault page, the shelf/folio numbers whose drawings were donated to the Lowell Textile Institute. They are: shelf/folio C-105, C-106, C-107, C-108, C-109, C-110, C-111, C-112, C-113, C-119, C-120, C-121, C-129, and C-130.

The drawings from that donation are currently maintained at the UMASS Lowell Center for Lowell History. There they have been entered into a shelf list on standard library catalogue cards and will also be found in the LOWE Access database for the drawings collection. Indeed, the entries in that database were made from the Center for Lowell History's shelf list in order to create a single, comprehensive list for entire collection. The drawings at the UMASS Center for Lowell History are given a location designator in comprehensive database for the collection.

The upper vault index page also notes that shelf/folio C-122 "Locks & Canals Office Plans" is "Gone" and that shelf/folios C-123 and C-124, both holding "Old Land Plans", were "not indexed". In fact, these notations are accurate in that no C-122 drawings were found in the processing of this collection and that C-123 and C-124 drawings do not appear in either the Card Index File or the Consecutive Index of Drawings.

The drawings collection is, however, only one element in the larger PL&C archives. Other elements are its 1) Photographs collection, 2) Directors' Records, 3) General Files, 4) Deeds, 5) Flowage Records, 6) Tax Records, 7) Stock Records, 8) Physical Data of Canal Operations

Records, and 9) 355 volumes of management records including papers of the early principals of the company such as James B. Francis and Uriah Boyden, at the Baker Library, Harvard Business School.

The Photographs collection, like the drawings collection, is shared between Lowell National Historical Park, which holds the bulk of the historic prints, and UMASS Lowell Center for Lowell History, which holds the glass plate negatives and some historic prints. The photographs held by LOWE have been catalogued and are publicly accessible through the National Park Service web catalogue beginning with number LOWE-7001. The glass plate negatives held by UMASS Lowell Canter for Lowell History have been reproduced and printed and are publicly available there on-site. In addition, according to its inventory, Baker Library also holds a small number of photographs relating to canal construction.

The Directors' Records and General Files are held by Lowell National Historical Park under catalogue number LOWE-5058. They have been processed and have had a comprehensive finding aid produced for them. According to its inventory, Baker Library holds microfilm copies of the Directors' Records.

The Deeds, Flowage Records, Tax Records, Stock Records, and Physical Data of Canal Operations Records are also held by Lowell National Park under catalogue number LOWE-5058. They too have been processed and have had a comprehensive finding aid produced for them as well. Again, according to its inventory, Baker Library holds some of the types of records noted above as Physical data of Canal Operations such as Daybooks (1826-1831 and 1839-1845. LOWE holds six daybooks covering the period 1853 through 1883) or Computations on Northern Canal 1846-1848.

The large body of PL&C business records was donated to the Baker Library, Harvard Business School, in 1960 has been processed by them to the point where an inventory exists for their holdings.

The Collection as Administered by Lowell National Historical Park:

The Inventory Process:

Although Lowell National Historical Park only took formal title of all the drawings collections through purchase on October 24, 1996, its responsibilities to the Numbered sub-series, the Maps sub-series, and the Massachusetts Mills sub-series began with the signing of a Memorandum of Understanding of June 20, 1984, between the PL&C and LOWE regarding the disposition of the drawings. Thus, the National Park Service provided funding for professional conservation for the earliest of the Numbered sub-series of drawings covered by the terms of that agreement. This MOU also stipulated that a loan agreement would be arrived at between the two parties. This was effected in October, 1989, and it gave LOWE the right of first refusal in any future purchase of the collection. The loan agreement stipulated that LOWE would inventory the drawings collection.

At that point, the inventorying of the collections began in earnest. The LOWE Collection Manager developed a uniform manual inventory spreadsheet form and the process of entering drawings data onto that form began. The collection, as it was received in 1988, was accounted for on these forms, folio by folio, pigeon hole by pigeon hole, drawing by drawing. Thus, the manual inventory serves to document the "original" order of the collection as it was received by LOWE

from PL&C This is worthy of note here since the order in which those drawings were received was not the order in which PL&C intended them to be maintained according to its finding aids. In fact, the mildly chaotic order in which the drawings were received represented substantial disorder in terms of the organizational structure for them created by PL&C itself as shown in its finding aids. Returning the collection to the order intended for it by PL&C, then, would be part of the final product of the processing of the collection. The inventory process would also reveal the inclusion of the Maps and Massachusetts Mills drawings with the Numbered sub-series of drawings although they are not to be found in either the Card Index File or the Consecutive Index of Drawings.

In addition to acting as a record of the order in which the Numbered sub-series, the Maps sub-series, and the Massachusetts Mills sub-series collection was received, the manual spreadsheet inventory form was created with the ultimate objective in mind of generating an electronic database from it. It should be noted here that the Assets Division of Boott Mills drawings, the LIDC boiler sub-series drawings, and the Merrimack Valley sewers sub-series drawings were entered directly into their respective data files without being first entered first onto any manual inventory form. Advances in computer technology by 1997 had made a one step inventory process much more feasible that it had been in 1988 although the same basic data entry matrix, which reflected the old manual inventory form, was used for all of the component drawings sub-series.

That goal was accomplished and since the database incorporates both the LOWE portion of the Numbered drawings sub-series and the UMASS Lowell Center for Lowell History portion of the Numbered drawings sub-series as well as the other five drawings sub-series, and all of the information contained in both the PL&C generated Card Index File and Consecutive Index of Drawings and its Other Lists, it serves as the most complete and comprehensive access tool the total collection that currently exists.

The P. L.& C. Drawings Databases in Detail:

All six of the drawings databases are basically constructed in the same way as the original Numbered sub-series database is constructed. The data fields in order from left to right are as follows: Plan Number, Title, Date, Scale, Draftsman, Dimensions, Medium, Support, Type, Condition, Conserved, Notes, LC Topic, LC Index 1, LC Index 2, LC Index 3, Inventory Page Number, Location, Photo Negative, Photo Print, Photo Transparency. This is from the most fully developed example of a database record, namely, the Numbered sub-series of drawings.

Other sub-series may have fewer fields. If there would be no potential data for input into a particular field in a given sub-series, that field was not created for that sub-series' database. For example: the Assets division of Boott Mills sub-series, Lowell Industrial Development Company boiler sub-series, and the Massachusetts Mills sub-series do not have a Type field since there were no indexes or lists for these sub-series to compare the received body of drawings against. Again, most drawings sub-series do not have a Draftsman field since only historically significant draftsmen (e.g. James B. Francis, Uriah Boyden, etc.) were recorded in this field and the drawings in most of the sub-series were not produced directly by such individuals. Only one drawings sub-series uses a field unique to that sub-series, namely, the Assets Division of Boott Mills sub-series which uses a field titled Other Numbers. Most of the drawings in this sub-series are copies of drawings from other sub-series and, as copies, they bear the plan numbers of the originals from which they were made. Although those numbers were not applied by PL&C to

these drawings in this drawings sub-series, it proved useful to record them for cross-referencing purposes.

Data fields primarily used for drawings management purposes:

The fields Dimensions, Condition, Conserved, Inventory Page Number, Location, Photo Negative, Photo Print, and Photo Transparency are basically object management fields and do not contain information that really contributes to any genuine understanding of any of the drawings. The Dimensions are recorded for defining storage configuration needs; Condition is recorded to aid in defining potential conservation needs; Conserved defines whether, when, and by whom a plan has had professional conservation; Inventory Page Number is recorded in order to find the original manual inventory entry (there are 2426 pages in the manual inventory) in the event it has to be consulted; Location records a plan's current storage location which makes retrieval and refiling possible and also can be used for inventory control and management; the three Photo fields identify the location of any contemporary photographic copy of drawings regardless of format of why they were produced.

Data fields primarily used for description and understanding of the drawings:

The fields that are significant for understanding the drawings are Plan Number, Title, Date, Scale, Draftsman, Medium, Support, Type, Notes, LC Topic, LC Index 1, LC Index 2, and LC Index 3.

The Data Fields Described:

Plan number: The plan number is, of course, a fundamental element. Each drawing has to have a unique identifier and that identifier is the plan number. The individual numbering schemes for the various plans sub-series have been described above under P.L. & C. drawing sub-series numbering schemes and, thus, do not need to be repeated here. But it is necessary to define the use of square bracketing in the plan numbers as they appear in the databases because this bracketing was not developed by PL&C but, rather, represent LOWE inclusions.

Square brackets indicate elements in a plan number that came from some source other than PL&C

Because the database was prepared in Access, which does not support highlights such as Italics, or bolding, square brackets were the only device available to identify plan number elements that needed to be added by LOWE staff in order to provide a complete and unique drawing number and, thereby, properly incorporate plans left partially numbered or completely unnumbered by PL&C into the database. Most commonly, square brackets involve copy numbers added by LOWE to otherwise complete PL&C plan numbers, as found on the plans themselves or in the Card Index File or the Consecutive Index of Drawings (e.g. 131-001 and 131-001-[Copy 1]), where the number on the copy did not have such a suffix. This inclusion was necessary for database creation purposes but at the same time needed to be highlighted as not part of the original PL&C number as found.

In addition, wherever another plan number element was needed to make a complete number, square brackets were used in the same way, for example C-118-[345], where this drawing was found bearing the shelf/folio number C-118 without a plan number. In this case, LOWE added what would have been the next number added by PL&C if PL&C had numbered the drawing itself (C-118-344 having been the last actual number applied to a plan in this shelf/folio by PL&C).

There are other examples but they do not have to be explicated here since the general principle should be clear from the foregoing. Suffice it to say, again, that square brackets indicate elements in a plan number that came from some source other than PL&C

Title: The title is also a fundamental drawing element and titles were transcribed literally from their sources. Sources for titles are the drawings themselves, the Card Index File, the Consecutive Index of Drawings, the entries in the catalogue records created by the UMASS Lowell Center for Lowell History for the drawings it holds, and on very rare occasions, LOWE staff.

Since the titles were usually found on the drawings in title blocks, wherein they were arrayed in text lines broken to create an aesthetically appealing appearance, the line breaks created their draftsmen recorded, as found, in the title fields in the database by the use of slashes thus …(text) / (text)… in order to preserve the sense of the title as it appears on the drawing itself. This form of title entry also unexpectedly became helpful in determining the proper plan numbers for many titled but unnumbered drawings. This convention, however, applies only to titles found on actual drawings.

Whole titles taken from any source other than the drawings themselves are recorded in square brackets. This applies to all untitled plans that were otherwise identifiable and to all plans whose titles were transcribed from the catalogue card entries of the UMASS Lowell Center for Lowell History. If more than one external source was used to construct a title, each element is bracketed separately. For example, drawing C-121-2761 is in the collection of UMASS Lowell Center for Lowell History and was given by them the title "Proprietors of the Locks and Canals on the Merrimack River. Tube.", undoubtedly from the drawing itself. However, the title as shown in the database for drawing C-121-2761 reads "[Plans & Sections of Apparatus used in Experiments on Diffuser Pipes.] [Proprietors of the Locks and Canals on the Merrimack River. Tube.]". Thus the database uses both the UMASS Center for Lowell History transcribed drawing title and information from the PL&C Consecutive Index of Drawings to provide more complete title information while clearly indicating that two different external sources provided that information.

This convention also applies to title elements added by LOWE staff from the PL&C Card Index File, the Consecutive Index of Drawings, or any other outside source, to drawings that have titles but whose titles were excessively laconic or lacking in important specifics. The reasoning was that if PL&C itself enhanced its drawings titles with clarifying information in its own finding aids, such clarification should be respected by being incorporated into the LOWE database as well. For example, drawing C-126-3138 bears the title "Bridge over Pawtucket Canal, as Rebuilt in 1880" but the title as shown in the database reads "[Plan & Sections of Trussed Stringer of] Bridge over Pawtucket Canal, as Rebuilt in 1880" after the inclusion of further title information from the Consecutive Index of Drawings.

Lastly, it should be pointed out that title information in the database appears in full capital letters rather than mixed upper and lower case letters both for ease of reading and in order to avoid the idiosyncratic usages of case that appear on the plans themselves. The only exception is in the use Mc or Mac.

Date: A uniform convention was developed by LOWE for this data field irrespective of any date form that appeared on any drawing, any list or index, or on records received from UMASS Lowell Center for Lowell History. The date form applied consists of year/month/day, e.g. 1900/10/22. This conventional date form allows the entire database to be displayed in date order,

which was very helpful during the inventory and analysis phase of the processing of this collection. It also allows for very convenient searching of the database by date range, e.g. the month of March, 1922.

The only caveat here is that not every drawing bears a date. If the Card Index File or the Consecutive Index of Drawings were also lacking dates for drawings that did not bear them, there is no way of finding such drawings through searching the date field in the database. This is worth noting since about 20% of the drawings in the collection lack formal dates. However, less than half of these drawings are totally dateless. Of the 20% lacking formal dating, 60% have title or other information that would enable a user to place the drawing in either a span of time or infer a specific date. In such cases, the notations "SEE TITLE" or "SEE NOTES" appear in the date field and refer the user to the Title field or the Notes field of the database record where some type of date information (e.g. a dated watermark on the drawing paper) will be found. Those drawings that are truly dateless, under 10% of the total collection, bear the note "UNDATED" in the date field. The only other exceptions to the date field convention involve drawings with months or days of the month given but without a year, e.g. 0000/02/07. There only four such drawings in the total collection.

There are no blank date fields in the database as it would be self-defeating to create a field by which the database could be meaningfully ordered but create records for it that would be outside the scope of meaningful order. When the database is put in date order, Access places the numerical dates in order first, followed by the text entries in alphabetical order.

Scale: The drawing scale is usually entered in the database as it is found on the drawing. A surprising number of drawings did not bear formal scales. Unusual scales (e.g. Marquois scale) are entered in the Notes field with the reference "SEE NOTES" in the Scale field.

Draftsman: This field records only historically significant draftsmen. These include George R. Baldwin, John F. Baldwin, Kirk Boott, William Boott, Uriah A. Boyden, James B. Francis, Hiram Mills, Patrick Tracy Jackson, Benjamin Mather, and George Whistler. Only 150 the drawings in the Numbered plans sub-series were drawn by, or at least supervised by, these men and the majority of those drawings, 68 or 45%, were by James B. Francis. The names are into the field entered last name first in order that the field can be displayed in a useful alphabetical order.

The only two plans sub-series to employ the Draftsman field are the Numbered sub-series and the Maps sub-series and in the case of the Maps sub-series, which is largely published material, the "Draftsman" name is as often the name of publisher of the map as it is the individual who actually drew it (in many cases they were one in the same). However, it is still useful to have this information accessible in a discrete field where it is easily retrievable and able to be displayed in alphabetical order.

Medium: These drawings sub-series span a wide period of time and, because of this, the image rendering media employed in their creation are quite varied. They range from black ink, colored ink, water color, graphite and colored pencil, which were used commonly in all periods, to copying techniques used largely from the later 19th century to the 1980s.

Early 19th century copies were made by hand using the same media as the original drawings themselves. Another copy method was to use lithographed base-drawings and to add details to each copy by hand. By the 1880s blueprint copying processes were beginning to appear later to be followed by diazo process copying. Other forms of copy process were usually photographic in

nature with positive and negative images appearing on paper and on transparent supports, once chemically stable sheet-form substrates, such as acetate, began to appear in the 1930s. All of these processes are represented in the PL&C drawings collection.

Support: Because these drawings sub-series span a wide period of time there is a wide range of image supports, or substrates, to be found in the collection. It should also be noted that the drawings were produced in a wide range of sizes on the wood-pulp paper and drafting cloth supports probably because PL&C procured these supports in roll form and simply cut the stock to fit its perceived drawing size need. The cotton-rag paper and mylar or film supports were very likely produced in sheet form by their manufacturers which makes them more uniform in size, and often smaller, than the other supports. Sheet form supports also require the drawing on them to be fitted to the support rather than fitting the size of the support to the needs of the drawing.

Quite a number of drawings made between 1820 and 1863 are found on high quality cotton-rag English laid paper manufactured by J. Whatman, Turkey Mill, Kent. An American manufacturer of laid paper, J. Robeson of Philadelphia, is also found in drawings from the 1840s.

Sized cotton drafting cloth, sometimes referred to as "linen", was used by PL&C for drawings from 1834 to well into the 20th century. Together with the laid paper, drafting cloth represents the most durable of the supports.

The availability of low-cost wood-pulp papers following the Civil War caused such paper to be routinely used for drawings as well as a publishing and host of other purposes. Since its availability coincided with the era of cyanotype blueprint copying and preceded the era of diazo copying, copies from these drawings sub-series in these rendering media are on such paper and suffer accordingly.

A small group of sheet safety film negative copies was produced by PL&C in 1955 and a negative copy on sheet acetate of a 1923 graph was produced at an unknown date.

Drafting mylar was used to by PL&C produce a another small group of drawings in 1957. Both film and mylar were very minor supports in this collection largely because PL&C was in a state of contraction by the time that these supports were becoming significant in the realm of architectural and engineering drawing production.

Type: This field was developed during the processing of these drawings in order to provide a quick reference to their existential status. During the processing phase four categories were necessary to understand any given drawing's status.

They are:

> Type A. Drawings whose existence in known from either from the Card Index File or the Consecutive Index of Drawings or the unnumbered title lists for the Assets Division drawings, the Maps, and the Merrimack Valley sewer sewers project but which were not received by LOWE from PL&C
>
> Type B. Drawings whose existence was known from those indexes and lists and which were received by LOWE from PL&C

Type C. Drawings which were received by LOWE from PL&C but whose existence was not recorded in those indexes and lists as such.

Type D. Numbered sub-series drawings donated by PL&C to Lowell Textile Institute, now UMASS Lowell and its Center for Lowell History, prior to 1984.

Type A drawings were not received by either institution nor are they held by PL&C and are probably no longer extant. In fact, the fate of one group of type A plans (shelf/folio C-122 "Locks & Canals Office Plans") is stated on the Consecutive Index of Drawings upper vault index page as "Gone".

Since the completion of collection processing, the distinction between types B and C has basically become moot. In point of fact, both type B and type C drawings are owned by LOWE and the National Park Service. Type D plans continue to be owned by UMASS Lowell but this type designation applies only to Numbered sub-series drawings since PL&C did not donate any plans from the other five sub-series to Lowell Textile Institute or its successor.

Notes: The Notes field is the only field in the inventory designed to receive extraneous information. It was provided for the inclusion of information considered significant, or at least potentially significant, by staff processing the collection but which had no other logical place to be put in the inventory matrix. In practice, much of what appears in the Notes field does come from PL&C sources, such as notations appearing on the drawings or from the finding aids, but inventory staff could add observations of their own such as "This plan number was used twice by PL&C" to assure any user of the database that a duplicate plan number was, in fact, created by PL&C and was not the result of processing error.

Over time, the notations in this field have shown themselves to be very helpful in locating drawings and it is well worth searching the Notes field in addition to the Title field when using the database to do comprehensive searches.

Other numbers: This field applies only to the Assets Division of Boott Mills drawings sub-series and is not found in any other datasheet. Most of the drawings in this sub-series are copies of drawings from other sub-series and, as copies, they bear the plan numbers of the originals from which they were made. Although those numbers were not applied by PL&C to these drawings in this drawings sub-series, it proved useful to record them for cross-referencing purposes.

Locks and Canals topic: This field did not originally exist in the database but was added after the Consecutive Index of Drawings was found in the PL&C Files. It reflects the subject or topic covered by the individual folio/shelves or pigeon holes of Numbered sub-series drawings as defined by PL&C in that Consecutive Index. Like the Card Index File it employs a controlled indexing vocabulary but not the same one as the Card Index File and that is the key to its value since it provides yet another way or accessing or understanding the drawings. All drawings have Locks and Canals Topic indexing. Appendix 1 provides examples of the topic headings created by PL&C for the folio/shelves and pigeon holes.

Unlike the index headings used in the Card Index File, which apply to individual drawings, the topic headings from the Consecutive Index of Drawings apply to large groups of drawings and thereby act as categorical descriptors, as opposed to the discrete descriptors used by the card

index. As a searchable field, it provides one more avenue of approach to locating the drawings any given searcher might be attempting to find.

Historically, searching plan titles for key words was not a viable search strategy option. The computer has made that possible now and, thus, key-word-in-title searches would probably be the first choice of users today. Thus, these topic headings are not as crucial today as in the past but they can still be of great utility as long as the user has access to the controlled indexing vocabulary used to create them.

Basically this field was developed for the Numbered sub-series of drawings but it has been employed by LOWE for use with the Maps sub-series and the Assets sub-series as well since they also had their own broad categories applied to them in their PL&C finding aids.

Locks and Canals index 1: This is the primary level of indexing used in the Locks and Canals subject Card Index File. All drawings have indexing at this level and that includes Type C drawings, which were not located as such in the Card Index File. In many cases Type C drawings were copies whose originals were located in the card index but were not shown in the index in any copy form. This distinction was logical and helpful at the beginning of the inventory process prior to the advent of the consecutive index because PL&C often (but not always) noted on the index cards if a drawings were a BP (blueprint) or a TP (tracing paper, but often a misnomer for drafting cloth which is as efficient as tracing paper for making copies) drawing but was no longer really significant after completion of the inventory process. Because of this, PL&C card index information was added by LOWE staff based on the indexing for the original from which the copy was made or on the subject of the plan, if discernable, in order that all drawings be searchable at this primary subject level. In a few cases this was not possible and the note "Not Assigned by PL&C" was entered in order that the field not be left blank and give the impression of being an oversight.

Locks and Canals index 2: This is the secondary level of indexing used in the Locks and Canals subject Card Index File. Unlike level 1 indexing, which PL&C applied to every drawing, they applied this level of indexing only if they believed index level 1 subjects warranted further subject breakdown. In practice, the majority of index level 1 subject headings were not developed to the secondary level.

Locks and Canals index 3: This is the tertiary level of indexing used in the Locks and Canals subject Card Index File. Indexing to this level was only used with drawings relating to the textile manufacturing firms or Saco-Lowell Shops and, even then, many drawings relating to those entities did not require subject breakdown to a third level of specificity. It is clear from the database how many fewer drawings required subject indexing to this level than even to level 2.

Appendix 3 provides the hierarchical outline structure created by PL&C for the generation and maintenance of the Card Index File and shows all of the subject headings employed by PL&C This index and the fields it uses in the database apply only to the Numbered sub-series of drawings since, unlike the Consecutive Index of Drawings, the other sub-series have no analog to the Card Index File.

Searching the Databases:

The database format for each sub-series of drawings is basically the same structure with more or fewer fields depending on the data provided by or about each sub-series. The first and the fullest manifestation of a database is that for the Numbered sub-series of drawings. The others contain either the same number or fewer fields than the Numbered sub-series database. The only exception to this general rule is the Other Numbers field in the Assets Division of Boott Mills drawings database, which is unique and whose function is described above.

Since the datasheet for each sub-series uses the same basic matrix, they are easily comprehended when moving from one drawing sub-series to the next. In addition, they all function the same way. For example, any datafield in any drawings sub-series can be searched for any specific search term for that entire drawings sub-series. Simply highlight the datafield, in column, and click on the binoculars icon in the Access toolbar. When the “Find and Replace” window pops up, enter your search term but be certain to select “Any part of Field” in the “Match” block rather than “Whole Field”. Traditionally this feature is most often used for Title and Notes field searches since they are the largest narrative fields and contain the type of data most amenable to word searches. But any field can be searched in this way. The other choices in the “Match” block are not as useful as “Any part of Field” for general searching.

Another helpful function is the ability to arrange any datafield in alphabetical or numerical order for an entire drawings sub-series. Again, simply highlight the datafield, in column, and click on the binoculars icon in the Access toolbar. When the “Find and Replace” window pops up, enter your search term but be certain to select “Any part of Field” in the “Match” block rather than “Whole Field”. This feature is particularly useful with the Plan Number field, the Date field, the Type field, the Locks and Canals Topic field, the three Locks and Canals Index fields, and the Location field.

This ability permits the use of the Location field as an inventory control field by identifying drawings as well simply a drawing locator field. For example, used this way the drawings can be arranged in folder number (created by LOWE) order within shelf/folio (created by PL&C) The only drawback is that the drawings within that field order do not display in plan number order but entry order. However, this is only a minor inconvenience.

For the other fields, arranging the data in hierarchical order by that field enables one to 1) keep the drawings sub-series data in plan number order or return them to that order as the basic order, 2) arrange the sub-series data in date order to easily survey plans grouped by year, and within year, by month and day, 3) easily survey the entire sub-series by holder and group all Type A (not received) plans together, 4) arrange and search the drawings by their PL&C Topic headings (if they apply to the sub-series one is searching), and 5) arrange and search the Numbered sub-series drawings in PL&C Card Index File headings. As with the arranging the database in the Location field order, the drawings within that field order do not display in plan number order but entry order.

Proprietors of the Locks and Canals

on Merrimack River

Architectural and Engineering Drawings

Appendix 1

Consecutive Index of Drawings Belonging to Proprietors of the Locks and Canals on the Merrimack River: Cover sheet, Upper Vault (C- prefix) and Lower Vault summary sheets, and example of first sheet of detailed C- prefix (Upper Vault) drawings list. Because this index is both incomplete and 330 pages in length, it is not appended in full. The C- prefix detailed sheet is included to illustrate how that prefix's function was discovered given the fact that the Upper Vault summary sheet created by P.L.& C inexplicably does not show the C- prefix. This index was created by the Proprietors of the Locks and Canals.

PIGEON HOLE AND SHELF INDEX

LTI = LOWELL TECH

UPPER VAULT

-.ooo.-

NUMBER	TOPIC
1.	Merrimack River Heights.
2.	Merrimack River
3.	Hunts Falls.
4.	Postal Map.
5.	Land Plan of Centreville.
6.	Land Plan of Lowell.
7.	Factory Mutual Mill Yard Plans.
8.	Northern Canal Gate House.
9.	Pawtucket Canal.
10	Merrimack River.
11.	Boott Penstock.
12.	Hamilton Wasteway.
13.	Northern Canal.
14.	Merrimack River.
15.	Merrimack River.
16.	Lake Village & Bristol, N.H.
17.	Merrimack River.
18.	Land Plan of Lowell.
19.	Map of Boston.
20.	Pawtucket Canal.
21.	Appleton Mfg. Co.
22.	Merrimack Mfg. Co.
23.	Lawrence Mfg. Co.
24.	Tremont Mills.
25.	Map of Lowell.
26.	Lawrence Mfg. Co.
27.	Dynamometer.
28.	Land Plan of Pawtucketville.
29.	Boott Penstock.
30.	Tremont & Suffolk Mills.
31.	Merrimack River.
32.	Land Plan on First St.
33.	Croton Acqueduct Commission.
34.	Northern Canal.
35.	Western Canal.
36.	Merrimack River.
37.	Same.
38.	Same.
39.	B. & M. R.R. Tracks.
40.	Merrimack River.
41.	Pawtucket Canal.
42.	Hunts Falls.
43.	Swamp Locks Gates.
44.	L. & C. Reservoir.
45.	
to	Vacant.
49.	
50.	Merrimack River.
51.	
52.	
53.	Merrimack River Heights.
54.	
to	Vacant
57.	
58.	Old Mill Yard Plans.
59.	Suffolk Street Bridge.
60	
to	Vacant.
78.	
79.	Reservoir Plans.
80	
to	Vacant.
104.	
105. LTI	Merrimack Mfg. Co. Turgines.
106. LTI	Merrimack Mfg. Co.
107. LTI	Hamilton Mfg. Co.
108. LTI	Appleton Mfg. Co.
109. LTI	Columbia Textile & Saco-Lowell.
110. LTI	Tremont & Suffolk Mills.
111. LTI	Lawrence Mfg. Co.
112. LTI	Boott Mills.
113. LTI	Massachusetts Cotton Mills.
114. ✓	Northern Canal.
115. ✓	Northern Canal.
116. ✓	Northern Canal.
117. ✓	Moody St Feeder & Old Guard Locks.
118.	Canals, Wasteways, & Waste Dams.
119. LTI	Grist Mill - Kyanizing & Rosin Oil Apparatus.
120. LTI	Boyden Patents & Atlantic Mills.
121. LTI	Miscellaneous.
122.	Locks & Canals Office Plans. (COPIES)
123.	Land Plans.
124.	Land Plans. NOT INDEXED
125.	Railroad Plans.
126.	Bridges.
127.	Flow of Water in Pipes & Conduits.
128.	Pawtucket Dam & Streets and Sewers.
129. LTI	Miscellaneous
130. LTI	Miscellaneous Turbine Experiments.
131.	Book of Land Plans.
132.	Hydrant Tests.
133.	Old Mill Yard Plans.
134.	Pipe Crossings & Pipe Specials.
135.	J.B.Francis File.
136.	Merrimack River.

PIGEON HOLES - UPPER VAULT

-.oOo.-

P.H.
No. C-

1. Diagrams showing Heights of River at Lake Winnipiseogee, Plymouth, Sewell's Falls, Garvins' Falls, Manchester, Nashua, and Lowell from 1895 to 1904.

2. Plan of Merrimack River between School and Moody Streets showing contours of Falls Field on North Bank.

3. Plan and Sections of Bed of Upper Portion of Hunts Falls. 1871.

4. Post Map of Pennsylvania, New Jersey, Maryland, Deleware, with adjacent territory of New York, Ohio, Virginia and West Virginia. 1869. 6m.=1"

5. Plan of Land in Lowell and Dracut (Now Centerville) West of Bridge St. 1856.

6. Plan of Chelmsford (Now Lowell) as surveyed by Jas. Baldwin in 1825 for the Merrimack Mfg. Co and recorded in the Register of Deeds Office in Middlesex County. 1874.

7. Old Factory Mutual Mill Yard Plans.

8. Plan of part of the Northern Canal Gate House showing Hoisting Wheel with Waterways to and from same. March 1902.

9. Plan of Pawtucket Canal from School Street Bridge to Central Street Bridge showing adjacent land and streets. Large Size. 1898.

10. Profile of Merrimack and Nashua Rivers from Lowell to Nashua by U.A. Boyden, (4 drawings) 1836.
Profile showing falls or slopes between different stations and the whole fall from Jackson's Factory on the Nashua River to the Lowell Dam on the Merrimack River from June 20 to July 18, 1834, inclusive. by L. Baldwin Eng. (Orig. Tracing and Blue Print)

11. Old Plans (6) pertaining to the Boott Penstock as built in 1873, and to the Extension built in 1889.

12. Old Pland pertaining to the construction of the Hamilton Wasteway 1882-84.

13. Plan of Northern Canal and Merrimack River from above Dam to below Moody St by Chas F. Reed. 1848.
Plan of Merrimack River (in 3 parts) from Bever Brook to Mouth of Concord. Large Scale. 1881.

14. Profile of Merrimack River by Gen. Thom, U.S. Engr. Corps., from Newburyport to Manchester, N. H. showing bench gauges, etc. and obstructions to navigation from Head of Mitchell's Falls below Lawrence to Manchester. Scale 1:100 (elevation) 1881.
Profile and Plan of Hunts Falls, by Gen. Thom U.S.Eng. Corps. showing soundings and proposed cuts to made a 4' channel for navigation. Scale 1:2000. 1881.

15. Plan of Land on the Northerly side of Merrimack River in Lowell and Dracut. 1875.
Plan and profile of Merrimack from Hunts Falls to Mitchells Falls based upon proposed canal surveys.. January 1844.

PIGEON HOLE AND SHELF INDEX

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NUMBER	TOPIC
1.	
2.	Middlesex Mills.
3.	Saco-Lowell Shops.
4.	Same.
5.	Same.
6.	Merrimack River.
7.	Same.
8.	Corporation Hospital.
9.	Pawtucket Dam.
10.	
11.	Merrimack River.
12.	Grist Mill.
13.	Merrimack River.
14.	Tremont & Suffolk Mills.
15.	Boott Cotton Mills.
16.	Massachusetts Cotton Mills.
17.	Same.
18.	Hamilton Mfg. Co.
19.	Centrifugal Pumps.
20.	Broadway Bridge at Pawtucket Canal.
21.	Massachusetts Cotton Mills.
22.	Map of New England.
23.	Map of N.Y. and Penn.
24.	First St. Boulevard
25.	U. S. Gov. Map of Nevada.
to	Vacant
30	Water Wheel Discharge Diagrams
41	
42.	Appleton Company.
43.	Hamilton Company.
44.	Bigelow Carpet Company.
45.	
46.	Mill Yard Plans.
47.	Proscott Mills.
48	
49.	Hunts Falls.
50.	Hunts Falls.
51.	Hunts Falls & Merrimack River.
to	Vacant
64	
65.	Bigelow Carpet Co.
66.	Tremont Mills.
67.	Lawrence Mfg. Co.
68.	Massachusetts Cotton Mills.
69.	Boott Cotton Mills.
70.	Same.
71.	Pipe Lines. 20".
72.	Pipe Lines. 24".
73.	Massachusetts Cotton Mills.
74.	Pipe Lines
75.	Pawtucket Bridge.
76.	Old Guard Locks.
77.	Mill Yard Plans.
78.	Suffolk Mills.
79.	Nashua River.
80.	Saco-Lowell Shops.
81.	Canal Margins & Canals.
82.	Merrimack River.
83.	Appleton Company.
84.	Middlesex Company.
85.	Proposed Merrimack River channel.
86.	Pipe Lines
87.	Pawtucket Canal.
88.	Maps of Lowell.
89.	Blackwater Project.
90.	Livingston Sewer.
	[illegible]
130.	
131.	Water Wheels.
132.	Same.
133.	Same.
134.	Land Plans.
135.	Same.
136.	Same.
137.	Same.
138.	Mill Yard Plans.
139.	Land Plans and Canals.
140.	Canals.
141.	Same.
142.	Canals, Slopes & Booms.
143.	Canal Sections.
144.	Canals & Swamp Locks.
145.	
146.	Merrimack Manufacturing Co.
147.	Hamilton Manufacturing Co.
148.	Appleton Company.
149.	Columbia Textile & Ipswich Co.
150.	Saco-Lowell & Tremont & Suffolk.
151.	Lawrence Mfg. Company.
152.	Massachusetts Cotton Mills.
153.	Boott Cotton Mills.
154.	Merrimack River.
155.	Small Originals.
156.	Flowage - Fifth Flashboard.
157.	Same.
158.	Reservoir & Pipe Lines.
159.	Canal System and Parts.
160.	Head Gates, Guard Gates & Dams.
161.	
162.	Miscellaneous
163.	Miscellaneous Water Measurements.
164.	Bridges and Concord River.
165.	Maps.
166.	Rainfall.

Appendix 2

Proprietors of the Locks and Canals Architectural and Engineering Drawings Collection:
Numbered Drawings Sub-series Topic Headings

This list was created by LNHP staff to supplement the Consecutive Index of Drawings Upper and Lower Vault summary sheets by providing a current and complete list of the folio/shelf and pigeon hole topic headings. This was necessary because those summary sheets, as created by P.L.& C., are incomplete in this respect due to the fact that they had not been properly updated by them. Thus, this list provides the necessary indexing vocabulary for searching the LCTOPIC field in the database.

These topic headings were taken from the individual shelf/folio and pigeon hole lists generated by P.L.& C. as constituent parts of the Consecutive Index of Drawings. They represent a more complete list than sum of those headings found on the Upper Vault and Lower Vault summary sheets alone because those summaries were properly not updated by P. L.& C. This list is meant to supplement those vault summary sheets, which are also part of this Appendix, in order to provide a complete list topic headings for database users wishing to search the database field LCTOPIC in the Numbered sub-series of drawings.

1936 FLOOD

AMOSKEAG MFG. CO.

APPLETON MFG. CO.

B. & M. R.R. TRACKS

BIGELOW CARPET COMPANY

BLACKWATER PROJECT

BOOTT COTTON MILLS

BOOTT PENSTOCK

BOYDEN PATENTS & ATLANTIC MILLS

BRIDGE STREET & MERRIMACK RIVER BRIDGE

BRIDGES

BRIDGES & CONCORD RIVER

BROADWAY BRIDGE AT PAWTUCKET CANAL

CANAL MARGINS & CANALS

CANAL SECTIONS

CANAL SYSTEM & PARTS, ALSO FENCES

CANALS

CANALS & SWAMP LOCKS

CANALS, SLOPES & BOOMS

CANALS, WASTEWAYS, & WASTE DAMS

CENTRAL STREET BRIDGE DRAWINGS

CENTRIFUGAL PUMPS

COLUMBIA TEXTILE & IPSWICH CO.

COLUMBIA TEXTILE & SACO-LOWELL

CORPORATION HOSPITAL

CROTON ACQUADUCT COMMISSION

DRAWINGS OF BOOTT MILLS 1700 HP UNIT

DYNAMOMETER

ELECTRIC INTERCONNECTION

FACTORY MUTUAL YARD PLANS

FIRST ST. BOULEVARD

FLOOD DATA

FLOW OF WATER IN PIPES & CONDUITS

FLOWAGE-FIFTH FLASHBOARD

GRIST MILL

GRIST MILL-KYANIZING & ROSIN OIL APPARATUS

HAMILTOM MFG. CO.

HAMILTON WASTEWAY

HEAD GATES, GUARD GATES & DAMS

HUNTS FALLS

HUNTS FALLS & MERRIMACK RIVER

HYDRANT TESTS

J. B. FRANCIS FILE

L. & C. RESERVOIR

LAKE VILLAGE & BRISTOL N.H.

LAND PLAN OF CENTREVILLE

LAND PLAN OF LOWELL

LAND PLAN OF PAWTUCKETVILLE

LAND PLAN ON FIRST STREET

LAND PLANS

LAND PLANS AND CANALS

LAWRENCE MFG. CO.

LIVINGSTON SEWER

LOCKS & CANALS OFFICE PLANS

LOWELL INDUSTRIAL DEVELOPMENT CO.

MAP OF BOSTON

MAP OF NEW ENGLAND

MAP OF NEW YORK AND PENN.

MAPS

MAPS OF LOWELL

MASSACHUSETTS COTTON MILLS

MERRIMACK MFG. CO.

MERRIMACK MFG. CO. TURBINES

MERRIMACK RIVER

MERRIMACK RIVER HEIGHTS

MIDDLESEX CO.

MIDDLESEX MILLS

MILL YARD ELEVATIONS AND FLOOD HEIGHTS

MILL YARD PLANS

MISCELLANEOUS

MISCELLANEOUS TURBINE EXPERIMENTS

MISCELLANEOUS WATER MEASUREMENTS

MOODY ST. FEEDER & OLD GUARD LOCKS

NASHUA MFG. CO.

NASHUA RIVER

NORTHERN CANAL

NORTHERN CANAL GATEHOUSE

NOT ASSIGNED BY P.L.& C.

OLD GUARD LOCKS

OLD MILL YARD PLANS

PAWTUCKET BRIDGE

PAWTUCKET CANAL

PAWTUCKET DAM

PAWTUCKET DAM & STREETS & SEWERS

PIPE CROSSINGS & PIPE SPECIALS

PIPE LINES

PIPE LINES. 20 INCH

PIPE LINES. 24 INCH

POSTAL MAP

PRESCOTT MILLS

PROPOSED DEVELOPMENT OF NOS. 3, 4, & 5 WHEELS AT BOOTT

PROPOSED MERRIMACK RIVER CHANNEL

PROPOSED STREET

RAILROAD PLANS

RAINFALL

RESERVOIR & PIPE LINES

RESERVOIR PLANS

SACO-LOWELL & TREMENT & SUFFOLK

SACO-LOWELL SHOPS

SIPHON SPILLWAY

SMALL ORIGINALS

SUFFOLK MILLS

SUFFOLK STREET BRIDGE

SURPLUS POWER STATION PLANS

SWAMP LOCKS GATES

TAX ABATEMENT CASE 1933-1934

TRACING OF LAND PLANS

TREMONT & SUFFOLK MILLS

TREMONT MILLS

U. S. GOV. MAP OF NEVADA

W. E. BADGER PLANS

WATER WHEEL DISCHARGE DIAGRAMS

WATER WHEELS

WESTERN CANAL

Proprietors of the Locks and Canals

on Merrimack River

Architectural and Engineering Drawings

Appendix 3

Outline of Locks & Canals Card Index File. This index was created by the Proprietors of the Locks and Canals and appears to be complete. The two- and three-level indexing structure created by P.L.& C. for some subject headings is clearly illustrated in this outline. This list provides the necessary indexing vocabulary for searching the LCINDEX 1, LCINDEX 2, and LCINDEX 3 fields in the database.

CROSS REFERENCES/SEE REFERENCES USED IN THE

OUTLINE OF LOCKS & CANALS CARD INDEX FILE

Assets Realization Company:	See Columbia Textile Company
Bigelow Carpet Company:	See Columbia Textile Company
Boot Dam:	See Dams
Boott Gage:	See Merrimack River at Lowell
Boott Penstock:	See Canals
Concord River:	See Merrimack River - General & Tributaries
Contoocook River:	See Merrimack River - General & Tributaries
Discharge Diagrams:	See Waterwheels under corporation names
Efficiency Curves:	See Waterwheels under corporation names
Feeder, Moody Street:	See Canals
Flumes:	See Canals and also Waterways under corporation names
Hamilton Wasteway:	See Waterways under Hamilton Mfg. Co.
Hickey Hall Locks:	See Lawrence Dam under Dams
Lawrence Dam:	See Dams
Lower Locks:	See Lower Pawtucket Canal under Canals
Marden & Murphy Inc. Hamilton Mills:	See Hamilton Mfg. Co.
Massachusetts Wasteway:	See Eastern Canal under Canals
Meters:	See Reservoir
Merrimack Wasteway:	See Merrimack Canal under Canals
Mill Yard Plans:	See General under corporation names
Middlesex Mills:	See Ipswich Mills
Nashua Mfg. Co. - Suffolk Mills:	See Tremont & Suffolk Mills
Nashua River:	See Merrimack River - General & Tributaries
Prescott Mills:	See Massachusetts Cotton Mills
Pawtucket Dam:	See Dams
Pemmigewasset River:	See Merrimack River - General & Tributaries
Pipe Lines:	See Reservoir and Reservoir Pipe Lines under corporation name
Pumps:	See Reservoir and Reservoir Pipe Lines under corporation name
Rolling Dam:	See Dams
Suncook River:	See Merrimack River - General & Tributaries
Swamp Locks:	See Dams
Swamp Locks Basin:	See Upper Pawtucket Canal under Canals
Tremont Gates:	See Dams
Winnipiseogee [sic] Lake:	See Merrimack River - General & Tributaries
Water Pipes:	See Reservoir and Reservoir Pipe Lines under corporation names

OUTLINE OF LOCKS & CANALS CARD INDEX FILE

This outline differs from that generated by Locks & Canals in three particulars. First, it accurately reflects the guide cards as they appear in the card index itself rather than the subject headings as they appear in the old outline. This eliminates the inconsistencies, anomalies and contradictions that grew up over the years between Locks & Canals' philosphy, as reflected in the outline, and practice, as reflected in the index card file. Secondly, the cross-referenced subject headings incorporated into the original outline have been dropped from this outline and printed separately. Those cross references (except for Brewery, Fletcher Street and High Bridge under Bridges - Locks & Canals) were not represented by guide cards in the card index itself and, thus, were outside the scope of this index. Thirdly, the guide card colors are now buff and blue. Salmon pink was no longer available in the 4 x 6 size and thus could not be used in restoring the Locks & Canals card index. All primary subject headings at the left margin have buff guide cards, secondary subject headings at the first indention have blue guide cards. No tertiary subject headings at the third indention have guide cards, which parallels Locks & Canals' practice.

A [Includes "Additional A"]

Apparatus
Appleton Company
    Current Meter Measurements
        (Includes all water measurements)
    Reservoir Pipe Lines
        Pipe and Pipe Lines
        Pumps
        Hydrants
    Waterways, Headgates, etc.
        Gates pertaining to waterways
        Flumes
        Penstocks
        Raceways
        Waterways
    Waterwheels and Equipment
        Waterwheels (arranged alphabetically)
        Draft Tubes
        Discharge, Efficiency, and Horse Power Diagrams
        Runners
    General
        (Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)

B [Includes "Additional B"]

Booms (See also canal in which located) [no cards]
Boott Cotton Mills
    Current Meter Measurements
        (Includes all water measurements)
    Reservoir Pipe Lines
        Pipe and Pipe Lines
        Pumps
        Hydrants
    Waterways, Headgates, etc.
        Gates pertaining to waterways
        Flumes
        Penstocks
        Raceways
        Waterways
    Waterwheels and Equipment
        Waterwheels (arranged alphabetically)
        Draft Tubes
        Discharge, Efficiency, and Horse Power Diagrams
        Runners
    General
        (Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)
Bridges - Locks & Canals
    Brewery [no cards] (See Thorndike St. Bridge)
    Bridge Street over Eastern Canal

Broadway over Pawtucket Canal
Central Street over Pawtucket Canal
East Merrimack Street over Eastern Canal
Fletcher Street [no cards] (See Thorndike St. Bridge)
High Bridge [no cards] (See Thorndike St. Bridge)
Merrimack Street over Merrimack Canal
Merrimack Street over Western Canal
Pawtucket Street over Northern Canal
Pawtucket Street over Pawtucket Canal
Suffolk Street over Northern Canal
Thorndike Street over Pawtucket Canal
Miscellaneous L & C Bridge Plans

Bridges other than Locks & Canals (arranged alphabetically)

Boston & Maine Railroad [See also R. R. Tracks]

C [Includes "Additional C"]

Canals
Eastern Canal
Boott Penstock Plans
Massachusetts Wasteway Plans
Hamilton Canal
Lawrence Canal
Lower Pawtucket Canal
Moody Street Feeder
Merrimack Canal
Northern Canal
Upper Pawtucket Canal
Western Canal
General data (pertaining to all canals)

Cement Tests

Columbia Textile Company
Current Meter Measurements
(Includes all water measurements)
Reservoir Pipe Lines
Pipe and Pipe Lines
Pumps
Hydrants
Waterways, Headgates, etc.
Gates pertaining to waterways
Flumes
Penstocks
Raceways
Waterways
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)

Corporation Hospital
Costs of Power Used
Current Meter Measurements (See also under corporations to which they pertain)

D [Includes "Additional D"]

Dams
- Boott Dam
- Lawrence Dam
- Lower Locks Dam
- Merrimack Dam
- Rolling Dam & Merrimack Wasteway
- Pawtucket Dam
- Swamp Locks Dam
- Tremont Gate House
- Middlesex Dam
- General

E

Experiments

F [Includes [Additional F"]

Fences
Flashboards
Flow of Water (Experiments, etc.)
Flowage (Land plans with reference to settlements on the Mill Pond)
Forms (Blanks used by L. & C.)

G [Includes "Additional G"]

Gates (See also Reservoir, canals by name and Waterways under Corporation names)
Gears
Grist Mills

H [Includes "Additional H"]

Hamilton manufacturing company
- Current Meter Measurements
  - (Includes all water measurements)
- Reservoir Pipe Lines
  - Pipe and Pipe Lines
  - Pumps
  - Hydrants
- Waterways, Headgates, etc.
  - Gates pertaining to waterways
  - Flumes
  - Penstocks

Raceways
Waterways
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)
Holyoke Testing Flume
Hydrographs

I

Ipswich Mills
Current Meter Measurements
(Includes all water measurements)
Reservoir Pipe Lines
Pipe and Pipe Lines
Pumps
Hydrants
Waterways, Headgates, etc.
Gates pertaining to waterways
Flumes
Penstocks
Raceways
Waterways
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)

J

K

L
Land Plans (By lot numbers)
Lawrence Manufacturing Company
Current Meter Measurements
(Includes all water measurements)
Reservoir Pipe Lines
Pipe and Pipe Lines
Pumps
Hydrants

Waterways, Headgates, etc.
Gates pertaining to waterways
Flumes
Penstocks
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)
Lawrence Section of Tremont & Suffolk (See also Merrimack Mfg. Co)
Current Meter Measurements
(Includes all water measurements)
Reservoir Pipe Lines
Pipe and Pipe Lines
Pumps
Hydrants
Waterways, Headgates, etc.
Gates pertaining to waterways
Flumes
Penstocks
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)
Locks & Canals
Lowell-City of
Finances
Fire
Miscellaneous
Streets
Water
Lowell Electric Light Corporation
Lowell Industrial Development Company (See also Massachusetts Cotton Mills)

M [Includes "Additional M"]

Maps
Massachusetts Cotton Mills
Current Meter Measurements
(Includes all water measurements)
Reservoir Pipe Lines
Pipe and Pipe Lines
Pumps
Hydrants

Waterways, Headgates, etc.
Gates pertaining to waterways
Flumes
Penstocks
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)
Massachusetts Mohair Plush Company
Measurements-Miscellaneous
Merrimack Manufacturing Company
Current Meter Measurements
(Includes all water measurements)
Reservoir Pipe Lines
Pipe and Pipe Lines
Pumps
Hydrants
Waterways, Headgates, etc.
Gates pertaining to waterways
Flumes
Penstocks
Waterwheels and Equipment
Waterwheels (arranged alphabetically)
Draft Tubes
Discharge, Efficiency, and Horse Power Diagrams
Runners
General
(Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)
Merrimack River - General & Tributaries
Below Lowell
Concord River
Nashua River
Moores Falls and Manchester
Hooksett to Franklin Junction
Suncook River
Contoocook River
Lake Winnipisseegee [sic] and Tributaries
Merrymeeting Lake
Pemmigewasset River and Tributaries
River in General
Merrimack River at Lowell
Boott Mill River Gage
Hunts Falls
Pawtucket Dam
Plans and Sections
Proposed Hydro-Electric Development
Slopes and Guage Heights
Cromwell's Falls
General
Mill Powers (See also under Corporations, General)

N

O

Old Guard Locks

P

Q

R [Includes "Additional R"]

R. R. Tracks (See also Boston & Maine R. R.)
Rainfall
Reservoir
- Friction Loss
- Gates
- Meters
- Nozzles
- Pipe Lines
- Pumps
- L. & C. Reservoir
- General

Revenue (Charts showing statistics)
Run-off, Committee on

S [Includes "Additional S"]

Saco Lowell Shops
- Current Meter Measurements
  - (Includes all water measurements)
- Reservoir Pipe Lines
  - Pipe and Pipe Lines
  - Pumps
  - Hydrants
- Waterways, Headgates, etc.
  - Gates pertaining to waterways
  - Flumes
  - Penstocks
  - Raceways
  - Waterways
- Waterwheels and Equipment
  - Waterwheels (arranged alphabetically)
  - Draft Tubes
  - Discharge, Efficiency, and Horse Power Diagrams
  - Runners
- General
  - (Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)

Sewers [no cards]
Streets [~~no cards~~]

T [Includes "Additional T"]

Tables (of various kinds)
Temperatures
Transmission Lines and Power Stations
Tremont & Suffolk Mills
    Current Meter Measurements
    (Includes all water measurements)
Reservoir Pipe Lines
    Pipe and Pipe Lines
    Pumps
    Hydrants
Waterways, Headgates, etc.
    Gates pertaining to waterways
    Flumes
    Penstocks
    Raceways
    Waterways
Waterwheels and Equipment
    Waterwheels (arranged alphabetically)
    Draft Tubes
    Discharge, Efficiency, and Horse Power Diagrams
    Runners
General
    (Miscellaneous subjects pertaining to the corporation arranged in alphabetical order)

U

V

Valves
Venturi Meter

W

Wamesit Power Company
Waterwheels
    Discharge Curves
    Efficiency Curves
    Horse-Power Curves
    Allis-Chalmers
    Boyden
    Breast
    Hercules
    Hunt-McCormick

I. P. Morris
Leffel
McCormick
Nagler
New American [no cards]
Risdon
Rodney-Hunt
S. Morgan Smith
Smith McCormick
Swain
Victor
General

Weirs (See also various dams under Dams)

X-Y

Z

Proprietors of the Locks and Canals

on Merrimack River

Architectural and Engineering Drawings

Appendix 4

Merrimack River Valley Sewerage Disposal, Plans, Diagrams, Etc. This abbreviated drawings titles list was created by the Proprietors of the Locks and Canals and affixed to the large manila envelope in which the drawings were found.

Employees in some of the Lowell Mills (1836 - 1895 long hand table)

Lowell Water Works Average Daily Pumpage (from City Hall 1873 - 1947)

Cities and Towns in Merrimack River Watershed Area in Massachusetts showing Sewage Disposal. (long hand table)

Average Daily Consumption for Work of Lowell Water Works (1927 - 1932 long hand.)

Monthly Yeild of Merrimack River at Lawrence Mass. in order of Dryness Sec. Ft. per Sq. Mile. (1880 - 1947 long hand table.)

Some Industrial Wastes in Lowell May 25, 1948. (1898 - 1947 long hand table.)

Average Daily Flow of Merrimack at Lawrence, Mass. July 14, 1948.(1880 - 1947 long hand table.

Increase in the Amount of Impurities in the Merrimack River from above Lowell to above Lawrence.--Parts per 100,000. (Obtained by subtraction 1887 - 1946)

Merrimack River, above Lowell(1887 - 1947 Chemical Analysis, long hand table)

Merrimack River, below Lowell(1903 - 1946 Chemical Analysis, long hand table)

Merrimack River, above Lawrence(1887 - 1946 Chemical Analysis, long hand table)

Diagram of Ammonia content 1890 - 1945 Merrimack River above Lawrence.

Diagram of Oxygen consumed 1890 - 1945 Merrimack River above Lowell.

Diagram of Chlorine content 1890 - 1945 Merrimack River above Lowell.

Diagram of Ammonia content 1890 - 1945 Merrimack River above Lowell.

Diagram of Ammonia content 1900 - 1945 Merrimack River below Lowell.

Diagram of Chlorine content 1900 -1945 Merrimack River Below Lowell.

Diagram of Oxygen consumed 1900 - 1945 Merrimack River below Lowell.

Diagram of Oxygen consumed 1895 - 1945 Merrimack River at Lawrence.

Diagram of Chlorine content 1890 - 1945 Merrimack River above Lawrence.

Flow of Merrimack River at Lawrence, Mass. and Chlorine in Merrimack River below Lawrence Mass.

Flow of Merrimack River at Lawrence, Mass. and Chlorine in Merrimack River at Central Bridge, Lowell, Mass.

Increase of Free Ammonia between Lowell and Lawrence - Parts per 100,000 also population of Lowell.

Increase of Chlorine between Lowell and Lawrence - Parts per 100,000 also population of Lowell 1840 to 1946.

Flow of Merrimack River at Lawrence Mass and Chlorine in Merrimack River above Lowell.

Proprietors of the Locks and Canals

on Merrimack River

Architectural and Engineering Drawings

Finding Aid

Appendix 5

Assets Division of Boott Mills plans case drawer lists.
These abbreviated drawings titles lists were created by the Proprietors of the Locks and Canals. One copy of each list was found in the drawer with the plans to which it pertained. Neither the drawers nor the lists were numbered. The list headers were use by LNHP staff in creating the database for these drawings in the same way as the list headers in the Consecutive Index of Drawings were used for the Numbered sub-series of drawings, that is, to provide the necessary indexing vocabulary for searching the LCTOPIC field in the database.

TRACINGS AND PRINTS - ASSETS, 200 MARKET STREET

Originals - Assets Division
Details of 1 Pair of 48" - C - Cylinder Gate, Horizontal Hercules Turbines
Compiled Plan of "Bigelow Yard" showing Property Lines, Bldgs. and Owners
Plan of "Bigelow Yard" showing Passageways to be kept open.
Plan showing Rights of Way in Parcels 2, 7A & 7B
Plat Boott Mills - Assets Realization Division
Proposed 4" H.P. Gas Line to Pandel, Inc.
Plan of Former Mill Yard of the Bigelow-Hartford Carpet Co. showing subdivision due to Sundry Sales
Brush Holder for Assets Exciter
Location of Bulk Storage Tank belonging to Pandel, Inc., 246 Market St., Bldg. #2
Plan of Land & Bldgs. belonging to Saco-Lowell Shops
Diagram of Special Shaft
Plan showing Permanent Rights of Way in "Bigelow Yard"
Plan showing 15-ft. Wide Right of Way granted by Westgate Realty Trust to Valhalla Mills
Plan showing Land & Bldgs. belonging to Boott Mills - Assets Division-200 Market Street
Plan of Land Proposed to be bought by Valhalla Mills from City of Lowell
Plan showing Land & Bldg. #12 belonging to Boott Mills - Assets Division - 200 Market St.
Plan showing Support for G.E. AK-5 Low Voltage Cubicle - Assets Station
Plan showing Portion of Land belonging to City of Lowell, MA, 200 Market St."Bigelow Yard
Scheme #1 - Proposed Passageway for Valhalla Mills
Scheme #2 - Proposed Passageway for Valhalla Mills
High Pressure Water Line Plan - 200 Market Street

TRACINGS - FOOT OF JOHN STREET

Mill #1 and 1-1 Annex
Mill #5, 1st floor
Floor Plans - Originals
Lowell Facility
Proposed plan of addition to Mineral Industries Corp.
Electrical Distribution
Intermediate Shaft
Condensate Tank - Pellon Job
Parking Maps
First Floor plans, Bldgs. #3, 4, 3&4, 5 Connector, Fill-in 4 &5
Elevations of #1 & 6 Mills
Plan of 6-4 East
Plan - 1st floor, Bldg. #8
Second Floor Plan "Boott Office"
Proposed Alterations for 2nd Floor "Boott Office"
Floor Plan of Jet Containers
Mill #5-4East - Proposed Relocations
Plan of first floor of Mills #8 & 9
#1 Warehouse
New area 5 - 4 East, Jamppa Mfg. Co.
Floor Plan of J. C. White Stores - Storehouse
Floor Plan of Bldg. #4 for Jet Containers
Canopy for Symphonic Electronics Shipping Platform Bldg. #8
Plan of John St. Property showing proposed New Warehouse on land of Wanskuck Company adjacent to Bldgs. 9-3 and 5 West
Covered Shipping - Bldg. #1 & 2 - Upper Yard
Plan showing portion of Boott Mills Property
Furnace Area Annex
Lowell Plant Layout
Plan showing Fire Protection Control Valves
Plan and Elevation of Loading Platform
Floor Plan - Bldgs. #2, 1 & 2 Connector 4th floor
#3, 4 & 5 Wheels
Graph showing Boott Mills Steam Rates
Bldg. #3, 1st floor
Bldg. #3, 2nd floor
Bearings "A" & "B"
Plan of Connection to By-Pass Sprinkler Protection at former McDonald -Gage Properties at Perkins St. between Collidge & Aiken Streets.
Bearing Mount for Wide Gate
Plan of Proposed Loading Platform, Bldg. #6
Guide Template for Walkway Racks
Rectagrid Flooring
1st Floor plan of Storehouse # 1, 2 and 3
Tremont Station Land Area L & C lease from Wanskuck
Proposed Warehouse
Parking Plan on Roof of Proposed Warehouse
Proposed Warehouse "B"
Proposed Warehouse "A"
Proposed Warehouse "C"
Proposed Modernization of 2nd and 3rd floors stairway, Bldg. #1, leading to New offices of Symphonic Electronics
Building #1
Mass. Mohair Plush Company
Proposed additional area for Mineral Industries Corp., 1st floor, Bldg. #5-West
Canopy for 5-West Shipping Platform
Railing for Handling Iron Pins (Dam)

Proposed Location of Transformers 8C Switches, Scheme 2
Proposed Location of Transformers 8C Cables
Boott Mills, 2nd Floor
Proposed Vestibule Bldg. 3 & 4 Shipping Deck for Conveyor System of Symphonic Electronics
Proposed Conveyor over Canal for Wakefield Industries
Canopy for Warehouse Shipping Platform
Boott Mills 2nd floor plan, 5-West
Canopy for Shipping Platform, Lower Yard, Bldg. 5-East
Canopy Loading Platform Storehouse #1, 2nd Floor
Elevation of Bridge from #2 to #6 (Proposed)
Proposed Loading Platform, 4 trucks, Bldg. #3
Scrim Weaving, Boott Mills, Mass. Mohair Plush Company
Floor Plan Bldg. #4
Real Estate Belonging to Boott Mills as of November 4, 1936
Boott Mills Yard Horizontal Scale
Bldg. #1, 2 and 1&2 Connector Floor Plan
Proposed High Temp Materials in area of Bldg. 1 - 2 Connector
Proposed Garage at John Street
Scale between Post columns, Bldgs. #5-West, 3, 4, and #3&4 Connector
Scale of Bldg. #5-East, 1&2 Connector, 1 and 2
Floor Plan of Bldg. #1, 2 & 3, First thru third Floors.

TRACINGS - 95 BRIDGE STREET

Special Parking Area - 95 Bridge Street
Howdy Beefburger Plans
Head Gate Plan, #1 & 2 Hydro - Main Power
Original Floor Plans with and without Dimensions
Gate - Section 8
Head Gates - #12 Wheel
Blueprint of Unit #3
Fire Protection Control Valves for Boott Mills - Mass. Division
Proposed Office Extension for Paris Shoe Co., Bldg. #3, 4th Floor
#3 Gate - Main Power
Proposed Relay & Metering - One Line Wiring Diagram
Proposed Floor Plan of Remodeled Elevator and Toilet Tower, Bldg. #1, Section 2 & 7
Lignum Vitae Center Bearing for #3 Wheel - Main Power
Machine Room Section Proposed Elevator #2, Bldg. #1, Section 7
Proposed Hatchway for Hydroulic Freight Elevator
Plan of Office for Ideal Dresses, Inc.
Proposed Ladies Room & Private Toilet, Bldg. #2, 4th Floor
River Barge - Steel (2 Sheets) MOVE TO REGISTER DRAW
Shaft Details #2 Hercules Hydro Turbine - Main Power House
Proposed Lift Between 3rd and 4th Floors of Bldg. #3
Map of Massachusetts Cotton Mills - Surveyed 2/27/22
Sketch Showing Platform and Bldg. of Howdy Beefburger
Proposed Shipping Deck Over Canal - Two Truck Capacity
Proposed Hatchway for Elevator Between Mill #5-West and 3&4 Connection
Proposed Area for Paris Shoe Company, Inc.
Proposed Steam Line LIDCO Assets Division to M.M.P. Co.
Section 8, Rack
Proposed Bridge and Shipping Deck over Canal to Bldg. #5
Outside Stairway and Ramp, #2 Mill
Proposed New Front for Entrance to Sleep Shopp, Inc.
Fire Protection Control Valves - 95 Bridge Street
Base for Boiler Feed Pump
Pipe Locations as of 6-24-64 Before Construction of New Office, Bldg. #1, Section #1
Canopy for Shipping Dock, Section 7
Canopy for Bldg. #1
Land, 95 Bridge Street, Sullivan Brothers Bldg.

PRINTS - BRIDGE STREET

Location of Drainage System in Cloth Room Addition - Mass. Mills, L.I.D.C.
Sullivan Trust Bldg. Plans
Boott Mills-Mass Division - Fire Protection Control Valves (Blueprints)
Location of New Condenser Pipe
Sketch of Frame for New Switchboard Section 8 - Wheelhouse
Elevator & Toilet Tower, Section 7 - 95 Bridge Street
Blueprint of Sketch showing area between Eastern Canal, Bridge Street and Mill #5 at LIDC
Floor Plan for Fenway Mfg. Company of Bldg. #2, Section 3, 2nd Floor
Blueprint showing Plan of Proposed Boott Mills Steam Line to Supply RKO Keith Theatre
also Proposed Property Lines for Curran-Morton's Storehouse on Canal Street
Blueprint showing Distribution of Power based on HP Ratings of Motors Installed
Floor plan of Lowell Shoe, Bridge Details
Plan & Sections of # 1 & 2 Wheel Racks
Floor plan of Paris Shoe
Blueprint of Plan showing Land of the Pepperell Mfg. Co. sold to LIDCo
Proposed Municipal Easements on Plan showing Land belonging to L&C in Vicinity of Lower Lo
Plan showing Vacant Areas at The Boott Mills, Mass. Division
Plan showing Ages of Bldgs. up to 1932, LIDCO
Plan of Land in Lowell, MA
Proposed Floor Plan of Remodeled Elevator & Toilet Tower Bldg. #1, Section 2 &7, Bridge St
Outside Stairway & Ramp, #2 Mill - 95 Bridge Street
Wiring Diagrams - Generators, Exciters, etc.
Proposed Bridge & Shipping Deck over Canal to Bldg. #5
Diagram of Boott Mills and 95 Bridge St. Elevator Shafts.
Heat Pipe Plan - 95 Bridge Street - Bldge. 1 & 2

PRINTS - FOOT OF JOHN STREET

Furnace Water Feed and Drain - Schematic - Lowell Facility
Canal System and Portion of Merrimack and Concord Rivers
Plan of the Penstocks & Raceways for Wheels #1, 2, 3, 4, 5, 6, 7, 8 & 9 of the Boott Mills
Mass. Mohair Plush Co., Inc. - Premises: Boott Mills
Layout of entrances to #6 and #9 Penstocks - Boott Mills
Plan of Section A - A
Plan of Boott Mills - January 18, 1965
Survey of North Wall - #4 Mill
Plan of Working Area - Section 3, 4, & 5
Drawing of Boott Mills - Outside Dimensions
Layout of Symphonic Parking - June 1, 1972
Plan showing Fire Protection Control Valves for Boott Mills - Foot of John Street
Plan of Boott Mills (Cotton Mill)
Plan of Boott Mills (Cotton Cloth)
Plan of Boott Mills - April 1959
Plan of existing machinery arrangement - Bldgs. north of canal.
Plans showing Mill #1, 2, 4, 5, 6, 7 & 9
Drawing of Foundation for 2500 KW Turbine
Plan of Floor and Yard Elevations - Boott Mills
Plan of the relative floor levels of the principal buildings, Main Yard
Plan of 1st, 2nd, 3rd, 4th, 5th and 6th floors - Boott Mills
Plan and elevation of first and second floors of #1-2 Connection
Plan of Mill #5 East - 2nd Floor
Plan of First Floor - Mill #2
Property Map showing modern wide mills, replacing the present groups
Map of #6 Mill - Space Under First Floor
Plan of #4 Mill - June 1939 - (John & French Streets)
Plan of proposed Boott Mills steam line to supply Keith's Theatre; also proposed property lines for Curran-Morton's Storehouse on Canal Street
Machine Room Plan
Plan of Piers and Columns placed in Foundation of Boott #6 Mill July and August 1926
Drawing of John Street Property Showing Proposed Reconstruction of 5th Floor of Mill #6
Drawing of Elevation of Mill #6
Plan of John Street Property Showing Proposed New Warehouse on Land of Wonskuck Co.
Plan of first floor - Bldgs. #3, 4 & 5
Plan of Building #10 West
Plan of Voltage Characteristics for Wagner 2000 KVA Transformers
Plan of ACB Drawout Switchgear
Plan of Proposed Warehouse Protection for Conveyor System Floor to Floor (Symphonic)
Plan of New Bridge Between Buildings 2 & 3 at 4th Floor
Plan of Cross Sections of Boott Mills showing arrangement of machinery and processes
Plan of proposed electrical tie from Massachusetts to Boott Mills
Locks & Canal Plan of Electrical Interconnection - Diagram of Electrical Connections
Plan of Section Showing Proposed Steel Racks for 3, 4, & 5 Wheels - Boott Mills
Plan of Boott Mills 1700 H.P. Unit Elevations of Power House - Locks & Canals
Copy of original plan to accompany deed for the sale of land from L & C to Boott Mills
Sketch Showing Chimney
Plan of Elevations - Boott Mills
Plan of Proposed Alterations on Partition Walls on First Floor of 3 & 4 Connection
Plan of Tracks and Buildings West of Bridge Street Near Boott Mills
Plan of Piers - #4 Mill
Sketch Showing 8" Pipe Line in Open Area Between Mill #4 & #5 West
Plan of Building Between Mill #4 & 5
Floor Plan of Building #2 - Boott Mills

Plan of Mill #8 and Mill #9
Floor Plan #8 & 9 buildings
Plans of yard parking
Plans of yard parking - John & French Streets
Plan of Mills #3 & 4 - 3rd floor
Plan of location and detail of tie rods - Mill #6
Plans of details of beam reenforcement
Plans of storehouse between #4 & #5 West
Plan of proposed bridge over Eastern Canal
Plan of deflections of mill walls from the vertical
Plans of Mill #5 East - 2nd floor
Drawing of proposed Warehouse "A"
Drawing of proposed Warehouse "B"
Drawing of proposed Warehouse "C"
Drawing of proposed front - Boott Mills
Plan of method of renewing wooden cornice on flat roof
Plan for Transformer Shelter - Adjacent to Bldg. #8
One Electric Freight Elevator #1 Storehouse
Storehouse Elevators Installation
Storehouse #1, Fire doors for elevator
Fire Escape #1 Storehouse
Plan of Bridge between 8-3 and Storehouse dated 4/18/23
Map of Lowell showing Boott Mills dated Jan. 17, 1930

ELECTRICITY

Blueprint of cylinder for hydraulic lifts (Locks & Canals)
Blueprint of Turbine Room floor plan
Drawing of proposed reenforced concrete bridge over Merrimack River
Flood Profile of Merrimack River
Drawing - Profile of the Merrimack River
Plan of land in Lowell, Massachusetts
Blueprint - Layout of 2500 K. W. Turbine
Plan showing land of the Pepperell Manufacturing Co. sold to the Lowell Industrial Development Co.
Plan of new bridge between buildings 2 & 3 at fourth floor
Drawing showing land, buildings and waterways of the Merrimack Manufacturing Co.
Blueprint of A. C. Generator and Exciter panel
Generator A.C. Type Outline
Switchboard Front View
Outline
Switchboard Wiring Backview
Solenoid Operated Circuit Breaker
Anchoring Arrangement for Lower End of Vertical Slator Slot Sticks and Fillers
Boott Mills Foundation for 2500 KW Turbine
Plan and Elevation of #1 Penstock and Head Gate Boott Mills
Diagrammatic Sketch Showing Connections and Locations of Meters
Proposed Location of Fransformers and Switches 8/7/33
Electrical Interconnection Transformer Vault at Boott Mills 9/9/33
Plan of Generator Room Operating Floor
Proposed Location of 3 Pittsburh Transformers
Detail of 60, 100 and 200 AMP Fuse Term C'ST'GS and S.P. Fuse Block Drilling Layout
Wall Supports for Compensator arranged for Conduit Wiring.
Plan of Land in Lowell, MA drawn for Boott Mills
Detail of Openings in B.M. Turbine Room Floor
Boott Mills Present Truss Between Bldgs. #2,& 3 at 3rd and 5th Floors - Footbridge and High way Bridge over Canal. Miscellaneous Details 9/15/16
Boott Mills New Bridge between Bldgs. 2 &3 at 4th Floor, Framing Plan, Cross Section & Deta
Proposition A - Boott Mills Layout of 2500 KW Turbine 1/24/17
Proposition A - Boott Mills Layout of 2500 KW Turbine 12/20/16
L & C Electrical Interconnection General Arrangement Transformers and Switches at Boott Mil
Plan and Elevations of Area between Mill #1 and Mill #7 at Boott Mills
Plan of Mill Yard of the Lawrence Mfg. Company showing Waterways for Water Power
Portion of the Mill Yard of Boott Mills Sept. 1939
Sprinkler Layout for #12 LIDC 5/5/54
Plan and Sections of Present & Suggested Waterwheels at LIDC Assets Div. 5/20/48
Plan showing Main Pipe Lines of the Fire Protection System 12/18/39
Blueprint of Flood of 1895 at Boott Mills Gauge
Map entitled "A Plan of Sundry Farms at Patucket in the Town of Chelmsford with Present City of Lowell Superposed 3/29/23
Blueprint showing monthly Flow of Merrimack River at Lowell, MA -Cubic Feet per Second from 1923-1940
Map showing Props. of L & C Canal System portion of City Mills, Merrimack and Concord River
Boott MillsDischarge of Wheel #1
Boott Mills Discharge of Wheel #9
Normal & Actual Flow of Merrimack River at Lowell, MA 1939-1944
Plan of Prescott Yard showing Existing Bldgs, "Prescott" Power House and Contributing Waterways also existing Conditions and Changes Made Prior to August 1, 1939
Plan showing Proposed Miniature Golf Course in Mill #2, Section 4, 1st Floor 9/29/30
Plan of Mill Yards of the Mass. Cotton Mills showing Pipes laid for extinguishings Fire.
Schemes 1-7 of Bldgs. & Parking

BUILDINGS

Drawing of Jet Containers
Drawing of Mill #9
Drawing of Mill #5 - First Floor
Floor plan of Building #2 and 1 & 2 Connectors
Blueprint of Storehouse #1 - Basement

POWER & SHOPS

Drawing of "Grist Mill" - Locks & Canals
Plan of Canal System and portion of Merrimack and Concord Rivers
Plan of the Main Yard of the Merrimack Manufacturing Company, showing fire protection, pipes and waterways.
United States Post Office plot plan.
Map showing watermains of Locks & Canals
Map of the Props. of the Locks and Canals and portion of Merrimack and Concord Rivers
Plan of F. W. D. Corp.
Plan of the Lowell Industrial Development Corporation.
Plan of the Tremont and Lawrence Yards of the Merrimack Manufacturing Company.

REAL ESTATE

Plan of land belonging to Proprietors of Locks & Canals on Canal Street and portion of Amory Street
Location Map
U. S. Department of the Interior - Geological Survey
Map of Merrimack River Drainage Area showing rainfall and stream gaging stations.
Map of New Hampshire showing rainfall, stream gaging and fire observation stations.
Plan of Profile
Plan of land of the Proprietors of the Locks and Canals, containing approximately 2,850 square feet, bordering on the Northern Canal, and land of the former Ayer Home on Pawtucket Street, Lowell, Mass.
Plan of the Props. of the Locks and Canals - Courier-Citizen Storage Shed.
Plan of the Props. of the Locks and Canals - Riggs & Lombard
Envelope containing numbered list of parts for Duplex Plunger Pumps L.I.D. Co.
Envelope containing Massachusetts Mills plans
List of Locks & Canals floor areas of mills for fire protection service
List showing changes in 1942 Locks & Canals tax schedule.
Offer to sell real estate to the Commonwealth of Massachusetts.
Photostats of real estate plans - correct to December 1, 1926.
Plan showing permanent rights of way in "Bigelow Yard".
Site Development Plan - Boring details Lowell Boys' Club.
Plan showing Mill #6 property lines at the Boott Mills
Plan of Swamplocks Dam showing contours in front of Dam.
Sketch for patching Swamplocks gate.
Plan of land in Lowell, Mass. owned by Wanskuck Co.
Sketch of section of Swamplocks Dam showing concrete apron.
Sketch of frame - Swamplocks Dam.
Sketch of Lawrence Dam as proposed.
Plan of land near Pawtucket Canal on the northerly side of Broadway, belonging to Proprietors of Locks and Canals.
Plan showing land belonging to Locks & Canals, southerly of Broadway.
Plan of land belonging to Locks & Canals, known as Lot 13-A
Plan of Locks & Canals showing elevation of Tremont Gatehouse and electric gate hoist.
Plan of Lowell Gas Co. regarding pipe line easement through L & C property
Plan of the Main Yard - Boot Mills
Plan of Pawtucket Bridge over Pawtucket Canal, showing repairs made in 1927.
Plan of Pellon Corporation
Plan of Falls Street and adjoining property, showing land of the Props. of the Locks & Canals used by the Marist Brothers.
Drawing of the Central Street Bridge.
Plan of land in Lowell, Mass. belonging to Van Greenby Realty Trust.
Plan of Locks & Canals land - Lots #7 and 14 between Broadway and N. & L. R.R.
Plan of iron rack on Eastern Canal for 12' tube through yard of Massachusetts Cotton Mills.
Plan showing present fences in and around the "Saco Yards"
Map showing Canal System and portion of Merrimack and Concord Rivers
Map of land of the Proprietors of Locks & Canals
Plan of land on the southerly side of the Merrimack River, known as Lots #84 & 85.
Plan of land owned by Pellon Corporation.
Sketch of proposed Building #7 - Pellon Corporation.
Sketches of land of the Locks & Canals.
Plan showing fences in and around Dutton Street parking area
Proposed Municipal easements on plan of land belonging to Locks & Canals in vicinity of the Lower Locks Dam

Plan of land in Lowell, Mass. surveyed for Saco-Lowell Co.
Plan of Lot #78
Plan showing redivision of Locks and Canals Lots 2-B, 2-C and 2-D, and Lowell Land Company's Lot 2-B-1.
Plan showing land on Bridge and Canal Streets and adjacent to the Eastern Canal, belonging to the Proprietors of the Locks and Canals.
Plan showing land to be converted to Riggs & Lombard.
Plan showing Area "B" to be conveyed and Area "C" over which easement is to be granted by Props. of Locks & Canals toSteam Associates.
Plan of land on southerly side of Merrimack River known as Lot #85.
Plan of land no southerly side of Merrimack River known as Lot #84.
Plan showing land conveyed to Appleton Co. by original indenture, also present property lines.
Plan showing portion of land and buildings belonging to Boott Mills at 95 Bridge St.
Plan showing Lot 65-B belonging to Props. of Locks & Canals
Plan showing Lots #80, 80-D and 80-F, belonging to Props. of Locks & Canals
Plan of land known as Lot 80 belonging to Props. of Locks & Canals
Plan of portion of lot #84 known as Ramp Area, belonging to Lowell Land Co.
Plan showing easement to U.S.G.S. Gauging House on Lot #84 belonging to L & C
Plan of suggested bumper cap and fence near and on Canal Street Wall
Plan of land situated between Merrimack River, Pawtucket Canal and Pawtucket St., belonging to Locks & Canals.
Plan of land showing Lot #80-F, belonging to Props. of Locks & Canals
Compiled plan of land in Lowell, Mass., for Locks & Canals.
Plan of land in vicinity of Thorndike, Fletcher, Dutton, Jackson Streets and Western Avenue, belonging to Props. of Locks and Canals
Plan of land near Pawtucket Canal and on the southerly side of Merrimack River, belonging to Props. of Locks & Canals.
Plan of land along Northern Canal between Pawtucket and Cabot Streets, belonging to Props. of Locks & Canals
Plan of land showing Props. of Locks & Canals' lots bordering Western Canal from Dutton to Broadway Streets
Plan of land easterly of School Street and northerly of Pawtucket Canal, belonging to the Props. of the Locks & Canals.
Preliminary plan of land in Lowell showing subdivision of land owned by Wanskuck Company
Compiled plan of Bigelow Yard showing property lines, buildings and owners
Plan showing real estate surveys to date belonging to Boott Mills
Plan showing P. L&C property at end of and over Eastern Canal, also property near and over Merrimack Wasteway.
Plan of Northern Canal Renewal Area
Sketch of section of School Street

HYDRO WHEELS

Props. of Locks & Canals - Water Wheels Inspection Sheet
Drawing of Thrust Bearing Thrust Plate
Drawing of bearing bushing - vertical
Copies of G. E. Prints - Tremont #4 Wheel
Blueprint - Boott Mills: Discharge of Wheel #5 - 72" Swain Wheel
Blueprint - Boott Mills: Discharge of Wheels #3 & 4 - 72" Swain Wheels
Drawing of Section 8 Gate
Print of waterwheel data
Plan showing waterways and wheels under Columbia Textile Power House
Blueprint - Boott Mills - Discharge of Wheel #6
Drawings of Headgate - #12 Wheel
Drawings of #1 Wheel at Hamilton
Drawing of Assets rack platform
Drawing of electric interconnection
Official Zoning Map of the City of Lowell
Thrust Bearing Assembly #6 Wheel
Bearing Housing Upper Type AV_{72} 153--. 9" x 16" Bushing #6 Wheel
Bearing Bushing Type AV for #6 Wheel
Thrust Bearing Thrust Plate for #6
Generator -AC-Type-AV_{72} 153-$12\frac{1}{2}$ Assembly #6
Bearing Bushing - Vertical 11" x 16" Bushing #6
$10\frac{1}{2}$ to $11\frac{1}{2}$ Lubricated Lignum Vitae Bearing Used on Hydraulic Turbine - #6
Boott Mills Final Powerhouse Arrangement for 1700 H.P. Hydro-Electric Unit - #6

HYDRO-WHEELS - MISCELLANEOUS

Data Sheets Electrical Interconnections
Proposed Electrical Tie from Mass. to Boott Mills 3/17/30
Spiral Chute for Boott Mills dated 12/15/20
Draft Tube Extension for #3 & #6 Wheels
Draft Tube Extensions for #1 Wheel
Extension to Draft Tubes A & B June 1, 1895
Plan and Elevation of #1 Waterwheel
Electrical Interconnection 600 Volt Switchgear Details - Boott Mills Engine Room 7/15/33
Plan showing transmission line between Boott and Merrimack Mills. 1/27/32
Electrical Interconnection-Details of Switchboard and Wiring Diagram June 22, 1933
Changes to Switchgear Concrete Details of Balcony 11/10/36
Summary of Switching Equipment
Location of Cables in Duct System
Worm and Worm Shaft for Morse Elevator 1/29/17
Hook and Link for Spreader Arm 7/28/16
Step for Wheels #1-2-3-4-6-7 dated 6/7/12
Step for #9 Wheel
Paddle Wheel for #3-4-5-6-7 & 8 Water Wheels
Layout of Jack Shaft of #3-4-5 Water Wheels
Layout of Jack Shaft of #1 & 2 Water Wheels
Layout of Jack Shaft of #9 Wheel
Switchboard Wiring Backview
Color Scheme for Pipes in Mill dated 11/29/17
Power House Switchboard 8/17/55
Assembly
Vacuum Pump and Standard Cement Foundation
Details of 22", 25" and 28" Elev. Sheave 3/16/21
Gate Hoisting Apparatus 72 inch Swain Fubine #3 & 4 Mill, dated May 1881
Average Daily Power Consumption in Kilowatt equivalents from 10/27/12 to 12/31/12
Boott Mills Switchboard Front and Rear View
New Floor in 6-7-8 Wheelhouse 3/28/23
Waste House Press
Reversible Belt Conveyor
Blending and Opening System
Blending and Opening System Plan "A"
Blending and Opening System Plan "B"
Opening Room dated 11/21/30
Blending and Opening Systems 3/23/34
Blending and Opening Systems 5/11/33

OFFICE

Plan showing location of 4 areas over and upon property of the Props. of the Locks & Canals and used by Boott Mills, also one area used for measuring water in Eastern Canal by Props. of the Locks & Canals

Plan showing real estate as far as known to date belonging to Boott Mills - Lots 12 to 16

Map showing Props. of the Locks & Canal - Canal System and portion of Merrimack and Concord Rivers

Blueprint of Mill #4

Blueprint of relative floor levels of present buildings - Main Yard

Preliminary Plan for Parking Meter Locations

NORTHERN CANAL RENEWAL AREA

Road A Over Western Canal General Plan and Elevation
Road A Over Western Canal Deck Plan and Details
Road A Over Western Canal Steel Details
Road A Over Western Canal Substructure Details
Utilities Plate #10, Drawing #21
Utilities Plate #09, Drawing #20
Layout Plate #6, Drawing #11
Layout Plate #7, Drawing #12
Layout Plate #8, Drawing #13
Layout Plate #9, Drawing #14
Layout Plate#10, Drawing #15
Layout Plate#11, Drawing #16
Layout Plate#12, Drawing #17
Layout Plate#16, Drawing #21
Utilities Plate # 9, Drawing #30
Utilities Plate #10, Drawing #31
Utilities Plate #11, Drawing #32
Utilities Plate #16, Drawing #37
Utilities Plate #10, Drawing #21
Utilities Plate #11, Drawing #22
Utilities Plate #09, Drawing #20

WESTERN CANAL BEAUTIFICATION

Lowell Sunday Sun - 4/23/62 - "Lowell: All-America City."
Lowell Sun - Article: "Old Mill Cannot Be Given Away."
Boston Sunday Globe - 4/23/72 - Article: "The Incredible Ditch" - The Old Middlesex Canal.
Boston Herald - 2/14/72 - "Lowell and King Cotton."
Lowell Sunday Sun - 8/20/72 - "Urban National Park".
Brochure: Urban National Cultural Park.
Compilation of drawings entitled "Western Canal Beautification."
Plan of Northern and Western Canals.
Plan of Western Canal Margins - Broadway to Moody Street.
Compilation of drawings entitled "Ecumenical Plaza".
Envelope containing:
- Brochure: Transit System Plan for the City of Lowell (July, 1973)
- Picture and article from the New Englander, February, 1973
- Article from Lowell Sun of July 20, 1973 entitled: "Raytheon gets O. K. to Seek Monorail Planning Funds."
- Article from Lowell Sun - 6/11/73 - Entitled "Vista Workers to Join Urban Park Crew".
- Article from Lowell Sun - 6/2/74 - entitled: "Decision on Monorail Study Due.
- Blueprint: Lowell PRT Project - Provisional Base Route.
- Two photographs of mill buildings and canal.

Brochure: Historic Districts City Committee - Final Report (1973)
Notes made by M. G. Lezberg - 9/12/73 Re: Anticipated Electric Requirement for Monorail.
Brochure: "Boott Mill Cultural Center Community".
Compilation from Bruce Campbell, Commissioner Re: Public Information Meeting in the City of Lowell - 11/1/73
Brochure: "The Power Canals of Lowell, Massachusetts - 1822 to 1860 - by Larry D. Lankton
Forms for Sub-Bid.
Western Canal Alternate Parking Plans.
Brochure: "Western Canal Beautification - Model Cities Project - Specifications.
Brochure: A study of the Lowell Canal System.
Article from the Lowell Sun - 1/22/74 - "Urban Park Project Wins Prize for Design".
Brochure: Lowell National Cultural Park Development - Proposal and Cost Analysis.
Brochure: "Specifications for Ecumenical Plaza".
Drawing of Western Canal Beautification Project.
PHOTOS:

#7 - Dam at the Head of Pawtucket Falls, Lowell, MA - Sept. 20, 1875
#6 - " " " " " " " " - Sept. 4, 1875
#5 " " " " " " " " - Aug. 31, 1875
#4 " " " " " " " " - Aug. 26, 1875
#3 " " " " " " " " - July 30, 1875
#3 " " " " " " " " - July 20, 1875
#1 " " " " " " " " - June 8, 1875

RESERVOIR

Middlesex Yard owned by Gilet Carbonizing Co., Inc. and others showing Pipes, Etc., for Fire Protection, Waterways, Etc. for Waterpower.
Plan showing Location of Reservoir
Control for Reservoir Pump at Swamplocks
Plan showing Piping of 10" Centrifugal Pump and 24" Condenser Line at Boott Mills
Plan showing Location of 10" Centrifugal Pump installed Oct. 1919 in Prescott Power House of Mass. Cotton Mills.
Location of Sewers and Drains under Section 5, Mill #2 L.I.D.C. May 1940
Plan Showing Proposed Pipe Changes on Fire Protection System Saco-Lowell Shops
Plan showing Water Lines for Merrimack Plaza
Plan of the Jackson Properties originally Appleton Co. Showing Pipes Etc. for Fire Protection Waterways Etc for Waterpower.
20" CI Water Line with Relation to New Bank Bldg.
Work Sketch Feed and Return (Steam) Pellon Corp. Additions 5/13/69
Diagram showing the Quantity of Water (U.S. Gallons) in L & C Reservoir on Lynde's Hill for Different Gauge Readings in the Reservoir.
Plan and Elevation of Piping to Automatic Gauge Transmitter at L & C Reservoir.
Plan showing L & C Reservoir 1907 & 1912.
Plan showing Contours of L & C Reservoir Lot
RIVER BARGE - STEEL (2 SHEETS)

Proprietors of the Locks and Canals

on Merrimack River

Architectural and Engineering Drawings

Finding Aid

Appendix 6

Map list. This list was created, classified, and numbered by the Proprietors of the Locks and Canals. The group headers were use by LNHP staff in creating the database for these drawings in the same way as the list headers in the Consecutive Index of Drawings were used for the Numbered sub-series of drawings, that is, to provide the necessary indexing vocabulary for searching the LCTOPIC field in the database.

Lowell Maps.

1. Old plan of Lowell. No date or author given.
2. Plan of Sundry Farms at Patucket in the town of Chelmsford, by J.G.Hales,-1821.
*3. Same as 2, (to be framed).
*4. Plan of land and buildings belonging to the Merrimack Mfg. Co., with neighboring farms and roads, at Patucket, in town of Chelmsford, by G.R.Baldwin,-1825. (to be framed).
5. Plan of buildings and land belonging to the Merrimack and Hamilton Mfg. Cos. and the Locks and Canals in towns of Lowell and Dracut, by J.C.Hales,-1827.
*6. Plan of town of Lowell and Belvidere Village, from measurements taken by Benj. Mather,-1832, (to be framed).
7. Plan of part of Lowell, from a survey made by U.A.Boyden in 1833-4, with additions by J.B.Francis,-1837.
*8. Map of city of Lowell, surveyed in 1841, by I.A.Beard and J.Hoar, (to be framed).
*9. Same as 8, but showing banks belonging to Locks and Canals, (to be framed).
10. Same as 8, but showing pipe lines.
11. Plan of land in Lowell belonging to Locks and Canals, by J.B.Francis,-1844.
*12. Plan of city of Lowell from actual surveys by Sidney and Neff,-1850, (to be framed).
*13. Map of city of Lowell, by R.W.Baker,-1868, (to be framed).
14. Same as 13, but showing pipe lines.
15. Same as 13, but with red lines for purposes unknown.
16. Same as 13, but showing city water pipes.
17. Index map of Lowell, by Rippley,-1888.

Massachusetts State Maps.

41. Topographical map of Mass. from surveys by Simeon Borden.
42. Topographical map of Mass. from astronomical, trigonometrical, and various local surveys, - 1844.

Boston Maps.

43. Plan of Boston and vicinity, showing drainage area of Stony Brook, from surveys by H.M. Wightman. (no date given).
44. Plan of lands on Back Bay, showing Streets, Grades, and Sewers, with portions of adjacent territory in Boston, Roxbury, and Brookline, by Jas. Slade, - Dec. 31, 1861.
45. Same map as 44, but drawn by H.M. Wightman, Feb. 20, 1863.
46. Same map as 44, but drawn by H.M. Wightman, Dec. 6, 1864.

Other Maps.

47. Map of city of Lawrence, by J.H. Barker, - 1853.
48. Illustrated map of the World on Mercator's Projection, by D.G. Johson, - 1852.
49. Post Route map of New York, and parts of Vt., Mass., Conn., N.J., and Pa., also adjacent portions of Canada, by W.L. Nicholson, - 1868.
*50. Map of Middlesex County, (Mass.), by H.F. Walling, - 1856, (to be framed)
*51. Railroad and township map of New England, with portions of New York and Provinces, by G.W. Colton - 1855, (to be framed).
52. Centennial Postal Statistical map of Mass., R.I., and Conn., showing railroads, post-routes, and post-offices; also population of cities and towns, by M.G. Cook and Frank O. Ellis, - 1876.
53. Map of the World, - Rand-McNally.
54. Map of New England, - Geo. H. Walker, - 1905.

New Hampshire State Maps.

18 Map of N.H. from surveys made by "supreme authority," about 1830.
19. Map of mountain and lake regions of N.H. with railroad routes, by M. Conant, - 1852.
20. Township and railroad map of N.H. from actual surveys, - 1854.
21. Same.
*22. Map of N.H. from latest official surveys and records, - 1878. (to be framed).
*23. Same. (to be framed).

New Hampshire County and City Maps. Also Winnipisseogee Lake.

24. Map of Strafford County, by J. Chace, Jr., - 1856.
25. Map of Lake Winnipisseogee, Long Bay, and Smith's Pond, - 1858, by W.P. Crocker, copied by W.C. Pickersgill.
26. Map of Merrimack County, from surveys under direction of H.F. Walling, - 1858.
27. Map of Cheshire County, from surveys by L. Fagan, - 1858.
28. Map of Hillsboro County, from surveys by J. Chace, - 1858.
29. Topographical map of Carroll County, from surveys by H.F. Walling, - 1860.
30. Topographical map of Sullivan County, from surveys by H.F. Walling, - 1860.
31. Map of Rockingham County, from surveys by J. Chace, Jr., - 1860.
32. Topographical map of Grafton County, from surveys by H.F. Walling, - 1860.
33. Map of Belknap County, from surveys by E.M. Woodford, - 1869.
34. Map of city of Manchester, by J.A. Weston, - 1870.

United States Maps.

35. Map of U.S., Provinces, Mexico, West Indies, by J.H. Colton, - 1851.
36. Map of U.S., by A. Petermann, - 1874.
37. Map of U.S. and territories with details, compiled under direction of Hon. S.S. Burdett, - 1874.
38. Map of U.S. and territories with adjacent parts of Canada and Mexico, and parts of West Indies, with details, from official surveys of the General Land Office and other authentic sources, drawn by G.P. Strum, - 1885.
39. Map of U.S. and territories with adjacent parts of Canada and Mexico, also part of West Indies, with details, by Harry King, C.E., - 1894.
40. Map of U.S., issued by the Chicago, Burlington, and Quincy R.R.

May 19, 1919

When a red star (*) appears after the note
"No Negative" it means that the negative
was found after the index was made up.
G. D. B.

Index of Photograph Plates.

No.	Description	Date	Copy in BK. No.
1.	(Tracing cloth) "The following experiments were made in the fall of 1897, at an experimental flume at the Swamp Locks, Lowell. Plan No. 1638 gives plan and sections of the flume".	1897	0
2.	(Tracing cloth) "Condition A. Expts. Nos. 1 to 12"		0
3.	(Tracing cloth) "Condition A. Expts. No. 3"		0
4.	Experiment No. 3, Condition A. Vel. 5.7ft. per sec.	Oct. 8, 1897	0
5.	Same as # 4 but different location.	Oct. 8, 1897	0
6.	Same as # 4 but different location.	Oct. 8, 1897	0
7.	Photo. of gauge glasses – Expt. # 3, Condition A, Vol. 5.7 ft. per sec.	Oct. 8, 1897	0
8.	(Tracing cloth) "Condition A, Expt. # 7"		0
9.	Expt. # 7 – Condition A. Vol. 4.2 ft. per sec.	Oct. 8, 1897	0
10.	Expt. # 7 – Condition A. Vol. 4.2 ft. per sec. (different location)	Oct. 8, 1897	0
11.	(Tracing cloth) "Condition A, Expt. # 10"		0
12.	Expt. No. 10, Condition A, Vol. 3.9 ft. per sec.	Oct. 8, 1897	0
13.	(Same as 12, different location)	Oct. 8, 1897	0
14.	(Same as 12, different location)	Oct. 8, 1897	0
15.	(Tracing cloth) "Condition A, Expt. No. 11"		0
16.	Expt. No. 11, Condition A, Vol. 3.0 ft. per sec.	Oct. 8, 1897	0
17.	(Same as 16, different location)	Oct. 8, 1897	0
18.	(Same as 16, different location)	Oct. 8, 1897	0
19.	(Tracing cloth) Condition B, Expts. # 13-23		0
20.	(Tracing cloth) Condition B, Expts. # 13		0
21.	Expt. # 13, Condition B, Vol. 8.1 ft. per sec.	Oct. 11, 1897	0

Index (cont.)

No.	Description	Date	Copy in BK. No.
22.	Same as # 21, but different location	Oct. 11, 1897	0
23.	Same as # 21, but different location	Oct. 11, 1897	0
24.	Same as # 21, but different location	Oct. 11, 1897	0
25.	Experiment No. 14, Condition B. (Tracing cloth)	Oct. 11, 1897	0
26.	Expt. # 14, Condition B, Vol. 7.0 ft per sec.	Oct. 11, 1897	0
27.	Same as # 26 - different location	Oct. 11, 1897	0
28.	Same as # 26 - different location	Oct. 11, 1897	0
29.	Expt. # 15, Condition B. (Tracing cloth)	Oct. 11, 1897	0
30.	Expt. # 15, Condition B. Vol. 6.1 ft. per sec.	Oct. 11, 1897	0
31.	Same as # 30, - different location	Oct. 11, 1897	0
32.	Same as # 30, - different location	Oct. 11, 1897	0
33.	Expt. # 19, Condition B. (Tracing cloth)	Oct. 12, 1897	0
34.	Expt. # 19, Condition B. Vol. 4.8 ft. per sec.	Oct. 12, 1897	0
35.	Same as # 34 - different location	Oct. 12, 1897	0
36.	Same as # 34 - different view	Oct. 12, 1897	0
37.	Experiment # 20, Condition B. (tracing cloth)	Oct. 12, 1897	0
38.	Experiment # 20, Condition B. Vol. 3.0 ft. per sec.	Oct. 12, 1897	0
39.	Same as # 38 - different view	Oct. 12, 1897	0
40.	Same as # 38 - different view	Oct. 12, 1897	0
41.	Expt. # 21, Condition B (Tracing cloth)	Oct. 12, 1897	0
42.	Expt. # 21, Condition B Vol. 2.4 ft. per sec.	Oct. 12, 1897	0
43.	Same as # 42 - different view	Oct. 12, 1897	0
44.	Same as # 42 - different view	Oct. 12, 1897	0

Index (cont.)

No.	Description	Date	Copy in BK. No.
45.	(Tracing cloth) "Condition C. This condition covers all expts. with flaring sides (10 to 1 slope) and bottom (5 to 1 slope) at mouth of narrow part of flume. Expts. Nos. 24 to 32."		0
46.	(Tracing cloth) "Condition C. Expt. No. 24	Oct. 13, 2897	0
47.	Expt. # 24, Condition C. Vol. 8.1 ft. per sec.	Oct. 13, 1897	0
48.	Same as # 47 – different view	Oct. 13, 1897	0
49.	Same as # 47 – different view	Oct. 13, 1897	0
50.	(Tracing cloth) "Condition C. Expt. No. 25	Oct. 13, 2897	0
51.	Expt. # 25, Condition C. Vol. 6.4 ft. per sec.	Oct. 13, 1897	0
52.	Same as # 51 – different view	Oct. 13, 1897	0
53.	Same as # 51 – different view	Oct. 13, 1897	0
54.	(Tracing cloth) "Condition C. Expt. No. 26	Oct. 13, 2897	0
55.	Expt. # 26, Condition C. Vol. 4.7 ft. per sec.	Oct. 13, 1897	0
56.	Same as # 55 – different view	Oct. 13, 1897	0
57.	Same as # 55 – different view	Oct. 13, 1897	0
58.	(Two plates practically the same) Expt. 26 Same as # 55 – different view	Oct. 13, 1897	0
59.	(Tracing cloth) Condition C. Expt. No. 27	Oct. 13, 2897	0
60.	Expt. No. 27, Condition C, Vol. 2.7 ft. per sec.	Oct. 13, 1897	0
61.	Same as # 60 – different view	Oct. 13, 1897	0
62.	Same as # 60 – different view	Oct. 13, 1897	0
63.	(Tracing cloth) "Condition D. Expts. Nos. 33 to 41"		0
64.	(Tracing cloth) Condition D. Expt. No. 34	Oct. 15, 2897	0
65.	Expt. # 34, Condition D, Vol. 3.0 ft. per sec.	Oct. 15, 1897	0
66.	Same as # 65 – different view	Oct. 15, 1897	0

Index (cont.)

No.	Description	Date	Copy in BK. No.
67.	(Tracing cloth) Condition D. Expt. No. 35	Oct. 15, 2897	0
68.	Expt. # 35, Condition D, Vol. 4.8 ft. per sec.	Oct. 15, 1897	0
69.	Same as # 68 – different view	Oct. 15, 1897	0
70.	Same as # 68 – different view	Oct. 15, 1897	0
71.	(Tracing cloth) Condition No. 36 .	Oct. 15, 2897	0
72.	Expt. # 36, Condition D, Vol. 6.4 ft. per sec.	Oct. 15, 1897	0
73.	Same as # 72 – different view	Oct. 15, 1897	0
74.	Same as # 72 – different view	Oct. 15, 1897	0
75.	Piezometer gauges. Expt. 36 Condition D. Vol. 6.4 ft. per sec.	Oct. 15, 1897	0
76.	Same as # 72 – different view	Oct. 15, 1897	0
77.	(Tracing cloth) Condition No. 37 .	Oct. 15, 2897	0
78.	Expt. # 37, Condition D, Vol. 2.5 ft. per sec.	Oct. 15, 1897	0
79.	Same as # 78 – different view	Oct. 15, 1897	0
80.	(Tracing cloth) Condition No. 38.	Oct. 15, 2897	0
81.	Expt. # 36, Condition D, Vol. 5.7 ft. per sec.	Oct. 15, 1897	0
82.	Same as # 81 – different view	Oct. 15, 1897	0
83.	(Tracing cloth) Condition No. 39.	Oct. 15, 2897	0
84.	Expt. # 39, Condition D, Vol. 4.0 ft. per sec.	Oct. 15, 1897	0
85.	Same as # 84 – different view	Oct. 15, 1897	0
86.	(Tracing cloth) Condition No. 40.	Oct. 15, 2897	0
87.	Expt. # 40, Condition D, Vol. 2.4 ft. per sec.	Oct. 15, 1897	0
88.	Same as # 87 – different view	Oct. 15, 1897	0

Index (cont.)

No.	Description	Date	Copy in BK. No.
89.	(Tracing cloth) "Condition D-1. This condition covers all expts. with flaring sides and bottom (10 to 1 slope) at the mouth of narrow part of flume and top partly covered. Expts. Nos. 42 to 48."		0
90.	(Tracing cloth) Condition D-1. Expt. No. 42	Nov. 1, 1897	0
91.	Expt. # 42, Condition D-1. Vol. 6.7 ft. per sec.	Nov. 1, 1897	0
92.	Same as # 91, – different view	Nov. 1, 1897	0
93.	Condition D-1, Expt. No. 43. (Tracing cloth)	Nov. 1, 2897	0
94.	Expt. # 43, Condition D-1. Vol. 5.1 ft. per sec.	Nov. 1, 1897	0
95.	Same as # 94, – different view	Nov. 1, 1897	0
96.	(Tracing cloth) Condition D-1, Expt. No. 44	Nov. 1, 1897	0
97.	Expt. # 44, Condition D-1. Vol. 3.2 ft. per sec.	Nov. 1, 1897	0
98.	Same as # 97, – different view	Nov. 1, 1897	0
99.	(Tracing cloth) Condition D-1, Expt. No. 45	Nov. 1, 1897	0
100.	Expt. No. 45, Condition D-1. Vol. 2.5 ft. per sec.	Nov. 1, 1897	0
101.	Same as # 100 – different view	Nov. 1, 1897	0
102.	(Tracing cloth) "Condition E. This condition covers all expts. with flaring sides and bottom (10 to 1 slope) at mouth of narrow part of flume and cover removed. Expts. Nos. 49 to 58".		0
103.	(Tracing cloth) Condition E, Expt. No. 49	Nov. 4, 1897	0
104.	Expt. No. 49, Condition E, Vol. 9.2 ft. per sec.	Nov. 4, 1897	0
105.	Same as # 104 – different view	Nov. 4, 1897	0
106.	Same as # 104 – different view	Nov. 4, 1897	0
107.	Tracing cloth) Condition E, Expt. No. 50	Nov. 4, 1897	0
108.	Expt. No. 50, Condition E, Vol. 6.7 ft. per sec.	Nov. 4, 1897	0

Index (cont.)

No.	Description	Date	Copy in BK. No.
109.	Same as # 108 – different view	Nov. 4, 1897	0
110.	Same as # 108 – different view	Nov. 4, 1897	0
111.	Tracing cloth) Condition E, Expt. No. 51	Nov. 4, 1897	0
112.	Expt. No. 51, Condition E, Vol. 4.9 ft. per sec.	Nov. 4, 1897	0
113.	Same as # 112 – different view	Nov. 4, 1897	0
114.	Same as # 112 – different view	Nov. 4, 1897	0
115.	Tracing cloth) Condition E, Expt. No. 52	Nov. 4, 1897	0
116.	Expt. No. 52, Condition E, Vol. 3.2 ft. per sec.	Nov. 4, 1897	0
117.	Same as # 116 – different view	Nov. 4, 1897	0
118.	Same as # 116 – different view	Nov. 4, 1897	0
119.	Tracing cloth) Condition E, Expt. No. 53	Nov. 4, 1897	0
120.	Expt. No. 53, Condition E, Vol. 2.6 ft. per sec.	Nov. 4, 1897	0
121.	Same as # 120 – different view	Nov. 4, 1897	0
122.	Same as # 120 – different view	Nov. 4, 1897	0
123.	Tracing cloth) Condition E, Expt. No. 54	Nov. 4, 1897	0
124.	Expt. No. 54, Condition E, Vol. 5.8 ft. per sec.	Nov. 4, 1897	0
125.	Same as # 124 – different view	Nov. 4, 1897	0
126.	Same as # 124 – different view	Nov. 4, 1897	0
127.	Same as # 124 – different view	Nov. 4, 1897	0
128.	(Tracing cloth) Condition F. This condition covers all expts. with flaring sides and bottom (10 to 1 slope) at mouth of narrow part of flume and cleats nailed on sides and bottom of narrow part. Expts. Nos. 59 to 64".		0
129.	(Tracing cloth) Condition F, Expt. No. 59	Nov. 10, 1897	0
130.	Expt. No. 59, Condition F, Vol. 7.4 ft. per sec.	Nov. 10 1897	0

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No.	Description	Date	Copy in BK. No.
131.	Same as # 130 – different view	Nov. 10, 1897	0
132.	Same as # 130 – different view	Nov. 10, 1897	0
133.	Same as # 132 – different time	Nov. 10, 1897	0
134.	(Tracing cloth) Condition F, Expt. No. 60	Nov. 10, 1897	0
135.	Expt. No. 60, Condition F, Vol. 5.9 ft. per sec	Nov. 10, 1897	0
136.	Same as # 135 – different view	Nov. 10, 1897	0
137.	Same as # 135 – different view	Nov. 10, 1897	0
138.	No plate, but print same as # 137 – different time, in Book No. 0 (plate found later & put in proper place.)	Nov. 10, 1897	0
139.	(Tracing cloth) Condition F, Expt. No. 61	Nov. 10, 1897	0
140.	Expt. No. 61, Condition F, Vol. 4.5 ft. per sec	Nov. 10, 1897	0
141.	Same as # 140 – different view	Nov. 10, 1897	0
142.	Same as # 140 – different view	Nov. 10, 1897	0
143.	(Tracing cloth) Condition F, Expt. No. 62	Nov. 10, 1897	0
144.	Expt. No. 62 Condition F, Vol. 3.9 ft. per sec.	Nov. 10, 1897	0
145.	Same as # 144 – different view	Nov. 10, 1897	0
146.	Same as # 144 – different view	Nov. 10, 1897	0
147.	(Tracing cloth) Condition F, Expt. No. 63 .	Nov. 10, 1897	0
148.	Expt. No. 63, Condition F, Vol. 3.0 ft. per sec.	Nov. 10, 1897	0
149.	Same as # 148 – different view	Nov. 10, 1897	0
150.	Same as # 148 – different view	Nov. 10, 1897	0
151.	(Tracing cloth) Condition F, Expt. No. 64	Nov. 10, 1897	0
152.	Expt. No. 64, Condition F, Vol. 2.4 ft. per sec.	Nov. 10, 1897	0
153.	Same as # 148 – different view	Nov. 10, 1897	0
154.	Same as # 148 – different view	Nov. 10, 1897	0

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No.	Description	Date	Copy in BK. No.
155.	(Tracing cloth) Condition F-1. This condition covers all expts. with flaring sides (10 to 1 slope) and bottom (5-1 slope) and cleats nailed on slides and bottom of narrow part of flume, Expts. Nos. 65 to 71".		0
156.	(Tracing cloth) Condition F-1, Expt. No. 65	Nov. 11, 1897	0
157.	Expt. No. 65, Condition F-1, Vol. 7.3 ft. per sec.	Nov. 11, 1897	0
158.	Same as # 157 – different view	Nov. 11, 1897	0
159.	Same as # 157 – different view	Nov. 11, 1897	0
160.	Same as # 157 – different time	Nov. 11, 1897	0
161.	(Tracing cloth) Condition F-1. Expt. No. 66	Nov. 11, 1897	0
162.	Expt. No. 66, Condition F-1, Vol. 5.9 ft. per sec.	Nov. 11, 1897	0
163.	Same as # 162 – different view	Nov. 11, 1897	0
164.	Same as # 162 – different view	Nov. 11, 1897	0
165.	Same as # 162 – different time	Nov. 11, 1897	0
166.	(Tracing cloth) Condition F-1. Expt. No. 67	Nov. 11, 1897	0
167.	Expt. No. 67, Condition F-1, Vol. 5.1 ft. per sec.	Nov. 11, 1897	0
168.	Same as # 167 – different view	Nov. 11, 1897	0
169.	(Tracing cloth) Condition F-1. Expt. No. 68	Nov. 11, 1897	0
170.	Expt. No. 68, Condition F-1, Vol. 4.4 ft. per sec.	Nov. 11, 1897	0
171.	Same as # 170 – different view	Nov. 11, 1897	0
172.	Same as # 170 – different view	Nov. 11, 1897	0
173.	(Tracing cloth) Condition F-1. Expt. No. 69	Nov. 11, 1897	0
174.	Expt. No. 69, Condition F-1, Vol. 3.6 ft. per sec.	Nov. 11, 1897	0
175.	Same as # 174 – different view	Nov. 11, 1897	0
176.	Same as # 174 – different view	Nov. 11, 1897	0

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No.	Description	Date	Copy in BK. No.
177.	(Tracing cloth) Condition F-1. Expt. No. 70	Nov. 11, 1897	0
178.	Expt. No. 70, Condition F-1, Vol. 2.4 ft. per sec.	Nov. 11, 1897	0
179.	Same as # 178 – different view	Nov. 11, 1897	0
180.	Same as # 178 – different view	Nov. 11, 1897	0
181.	(Tracing cloth) Condition F-1. Expt. No. 71	Nov. 11, 1897	0
182.	Expt. No. 71, Condition F-1, Vol. 1.9 ft. per sec.	Nov. 11, 1897	0
183.	Same as # 182 – different view	Nov. 11, 1897	0
184.	Same as # 182 – different view	Nov. 11, 1897	0
185.	(Tracing cloth) “Condition G. This condition covers all expts. with flume as first built and cleats nailed on sides and bottom of narrow part, Expts. Nos. 72 to 78”.		0
186.	(Tracing cloth) Condition G. Expt. No. 72	Nov. 12, 1897	0
187.	Expt. No. 72, Condition G, Vol. 6.5 ft. per sec.	Nov. 12, 1897	0
188.	Same as # 187 – different view	Nov. 12, 1897	0
189.	Same as # 187 – different view	Nov. 12, 1897	0
190.	(Tracing cloth) Condition G. Expt. No. 73	Nov. 12, 1897	0
191.	Expt. No. 73, Condition G, Vol. 5.5 ft. per sec.	Nov. 12, 1897	0
192.	Same as # 191– different view	Nov. 12, 1897	0
193.	Same as # 191 – different view	Nov. 12, 1897	0
194.	(Tracing cloth) Condition G. Expt. No. 74	Nov. 12, 1897	0
195.	Expt. No. 74, Condition G, Vol. 4.9 ft. per sec.	Nov. 12, 1897	0
196.	Same as # 195– different view	Nov. 12, 1897	0
197.	Same as # 195 – different view	Nov. 12, 1897	0
198.	(Tracing cloth) Condition G. Expt. No. 75	Nov. 12, 1897	0

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No.	Description	Date	Copy in BK. No.
199.	Expt. No. 75, Condition G, Vol. 4.3 ft. per sec.	Nov. 12, 1897	0
200.	Same as # 199– different view	Nov. 12, 1897	0
201.	Same as # 199 – different view	Nov. 12, 1897	0
202.	(Tracing cloth) Condition G. Expt. No. 76	Nov. 12, 1897	0
203.	Expt. No. 76, Condition G, Vol. 3.4 ft. per sec.	Nov. 12, 1897	0
204.	Same as # 203– different view	Nov. 12, 1897	0
205.	Same as # 203 – different view	Nov. 12, 1897	0
206.	(Tracing cloth) Condition G. Expt. No. 77	Nov. 12, 1897	0
207.	Expt. No. 77, Condition G, Vol. 2.4 ft. per sec.	Nov. 12, 1897	0
208.	Same as # 207– different view	Nov. 12, 1897	0
209.	Same as # 207 – different view	Nov. 12, 1897	0
210.	(Tracing cloth) Condition G. Expt. No. 78	Nov. 12, 1897	0
211.	Expt. No. 78, Condition G, Vol. 1.9 ft. per sec.	Nov. 12, 1897	0
212.	Same as # 211– different view	Nov. 12, 1897	0
213.	Same as # 211 – different view	Nov. 12, 1897	0
Book No. 1 Contains Duplicates Photos. In Book No. 0			
214.	North Wall Pawtucket Canal (no plate)	Built 1891	2
214-A	North wall Pawtucket Canal East of School Street, Built 1891	(Vote Feb. 26, 1891)	2
215.	Pawtucket Canal Wall below School St. (no plate)	Feb. 26, 1891	2
216.	View of School St. wall	Nov. 26, 1893	2
217.	Foundation of Pawtucket Canal wall, below School St.	Nov. 5, 1893	2
218.	(No plate) View of wall, etc. School St.	Nov. 20, 1893	2

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No.	Description	Date	Copy in BK. No.
219.	View of work below waterways at Old Guard Locks	Nov. 26, 1893	2
220.	View of waterways back of gates at Old Guard Locks	Nov. 26, 1893	2
221.	Mouth of Hamilton wasteway	Dec. 24, 1893	2
222.	(no plate) View showing section of box for shear wall at Lower Locks dam set Nov. 12, 1893. This section rose to surface when canal was filled.	Nov. 14, 1893	2
223.	Flooring Lower Level Pawtucket Canal	Sept. 3, 1893	2
224.	(No plate) Flooring Lower Level Pawtucket Canal –	Sept. 3, 1893	2
225.	Flooring Lower Level Pawtucket Canal – Lowering Pipe front of L. L. Dam.	Sept. 3, 1893	2
226.	Merrimack Nos. 10 & 11 – 42" Hercules – put in 1894 – Type A	1894	2
227.			
228.			
229.	Apparatus used in testing Rodney Hunt wheels # 4 Pair at Appleton Co.	1894	2
230.	Apparatus used for testing Rodney Hunt wheels at Appleton Co. # 4 Pair.	1894	2
231.	Apparatus used in testing Rodney Hunt wheels # 4 Pair at Appleton Co.	1894	2
232.	Apparatus used in testing Rodney Hunt wheels # 4 Pair at Appleton Co.	1894	2
233.	Weir used in Measuring Quantity passing Rodney Hunt Wheels # 4 Pr. at Appleton Co. during test of 1894. Hook-gages at right of picture.	1894	2

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No.	Description	Date	Copy in BK. No.
234.			
235.	39th McCormick No. 3 at Appleton Co. New July 1895.	1895	2
236.	(No plate) 39th McCormick No. 3 at Appleton Co. New July 1895	1895	2
237.	39th McCormick No. 3 at Appleton Co. New July 1895	1895	2
238.	(No plate) Inside case with Suffolk No. 3 & 3A wheels, 48" Standard Victor. New 1895	1895	2
239.	48" Victor at Tremont Mills, taken out 1895	1895	2
240.	48" Victor at Tremont Mills, taken out 1895 (guides) (2 plates)	1895	2
241.	48" Victor at Tremont Mills, taken out 1895 (guides) - (2 plates)	1895	2
242.	48" Victor at Tremont Mills, New 1895	1895	2
243.	48" Victor at Tremont Mills, New 1895 (2 plates)	1895	2
244.	48" Victor at Tremont Mills, New 1895 (2 plates)	1895	2
245.	48" Victor at Tremont Mills, New 1895	1895	2
246.	Tremont # 4A in Case, 48" Victor, New 1895	1895	2
247.	Section # 6- Iron penstock pipe at Merrimack M. Co.	July 1896	2
248.	Speed-gate of Merrimack Mfg. Co. 45" L. H. McCormick wheel put in Aug. 1896 (two plates)	1896	2
249.	Merrimack M. Co.'s 45" L. H. McCormick wheel put In Aug. 1896 (2 plates)	1896	2
250.	Part of dome of 45" L. H. McCormick wheel put in at Merrimack M. Co. Aug. 1896 (2 plates)	1896	2
251.	Moody St. Feeder during repairs.	Sept. 13, 1896	2

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252.	Moody St. Feeder during repairs.	Sept. 13, 1896	2
253.	Moody St. Feeder	June 20, 1897	2
254.	Moody St. Feeder	June 20, 1897	2
255.	Moody St. Feeder	une 20, 1897	2
256.	Moody St. Feeder	June 20, 1897	2
257.	Moody St. Feeder	June 20, 1897	2
258.	Moody St. Feeder	June 20, 1897	2
259.	Moody St. Feeder	June 20, 1897	2
260.			
261.	Method of lowering foundation of arches of raceway in Middlesex Co.'s No. 3 Mill	Oct. 12, 1896	2
262.	Arches of raceway in Middlesex Co.'s No. 3 Mill with new foundation stones set under middle pier (2 plates).	Oct. 17, 1896	2
263.	Pr. Of 30" Hercules wheels for Middlesex Co.'s No. 3 Mill, tested at Holyoke, Mass.	Dec. 18, 1896	2
264.	Middlesex Co. – Brake used in testing 30" Hercules wheel, at Holyoke, Mass. Horizontal shaft.	Dec. 18, 1896	2
265.	Brake Arm, Dash-Pot, etc. of Dynamometer used in testing 30" Hercules wheels at Holyoke, Mass.	Dec. 18, 1896	2
266.	Brake Arm, etc. of Dynamometer used to test 30" Hercules wheels at Holyoke.	Dec. 18, 1896	2
267.	View shows # 1 Guides at T. & S. Mills Tremont side broken Feb. 3, 1897. 48" Victor put in 1895. (2 plates)	1897	2
268.	View shows # 1 Guides at T. & S. Mills Tremont side broken Feb. 3, 1897. 48" Victor put in 1895. (2 plates)	1897	2
269.	Tremont – Victor 48" wheel put in to replace No. 1 wheel which was broken Feb. 3, 1897.	1897	2

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No.	Description	Date	Copy in BK. No.
270.	View of Boott Canal from waste dam looking upstream	Apr. 19, 1897	2
271.	View of Boott Canal from 50 ft. upstream from waste dam, looking downstream.	Apr. 19, 1897	2
272.	View of Boott Canal from 25 ft. down-stream from Counting Room Bridge, looking downstream.	Apr. 19, 1897	2
273.	View of Boott Canal from 25 ft. down-stream from Counting Room Bridge, looking downstream.	Apr. 19, 1897	2
274.	View of Boott Canal from Mass. wasteway looking downstream.	Apr. 19, 1897	2
275.	View of Boott Canal from 25 ft. downstream from the upstream end of Boott Flume, looking upstream & showing Mass. wasteway on left.	Apr. 19, 1897	2
275A	Blast south side of Pawtucket Canal just above School St.	May 23, 1897	2
276.	Race below Swamp Locks Dam, from middle of dam, 14 ½ bays wasting, water at 68.7 in Lower Locks	Apr. 3, 1897	2
277.	Swamp Locks Dam, from little below the end of the Apron on the R. H. end of dam, 14 ½ bays wasting, water at 68.7 in Lower Locks	Apr. 3, 1897	2
278.	View shows Swamp Locks Dam Looking up from Lowell Machine Shop Bridge.	Apr. 3, 1897	2
279.	View shows Lower Pawtucket Canal taken from Machine Shop Bridge looking downstream.	Apr. 3, 1897	2
280.	Race below Swamp Locks Dam from Ramp 125 - below Machine Shop Bridge, looking upstream.	Apr. 3, 1897	2
281.	Lower Pawtucket Canal from 125 - below Machine Shop Bridge, looking downstream.	Apr. 3, 1897	2
282.	Pawtucket Dam	Aug. 10, 1897	2
283.	Pawtucket Dam	Aug. 10, 1897	2
284.	Pawtucket Dam	Aug. 10, 1897	2
285.	Pawtucket Dam	Aug. 10, 1897	2
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287.	Clay Pit Brook, East of Boulevard	Jun. 11, 1897	2
288.	Clay Pit Brook, from Boulevard looking downstream	Jun. 11, 1897	2
289.	Clay Pit Brook, 200- ft. upstream from Boulevard	Jun. 11, 1897	2
290.	Clay Pit Brook, from East line of Lucy M. Fay Est. looking upstream.	Jun. 11, 1897	2
291.	Clay Pit Brook, from East line of Lucy N. Fay Est. looking upstream.	Jun. 11, 1897	2
292.	Clay Pit Brook, from Dunbar Ave. on Lucy M. Fay Est. looking downstream.	Jun. 11, 1897	2
293.	Clay Pit Brook, from Dunbar Ave. looking upstream	Jun. 11, 1897	2
294.	Clay Pit Brook, from crossing back of Wm. Hull's barn looking downstream	Jun. 11, 1897	2
295.	Clay Pit Brook, from crossing back of Wm. Hull's barn looking upstream.	Jun. 11, 1897	2
296.	Clay Pit Brook, from Thos. Varnum's E. Div. line looking upstream.	Jun. 11, 1897	2
297.	Clay Pit Brook, 300 ft. W. of Thos. Varnum's E. Div. line looking upstream.	Jun. 11, 1897	2
298.	Clay Pit Brook, from farm crossing back of Thos. Varnum's homestead looking upstream.	Jun. 11, 1897	2
299.	Clay Pit Brook, from wall back of Varnum Cabin looking upstream.	Jun. 11, 1897	2
300.	Clay Pit Brook, from Thos. Varnum's W. Div. line looking upstream.	Jun. 11, 1897	2
301.	Clay Pit Brook, from Bedford Ave. looking downstream	Jun. 11, 1897	2
302.	Clay Pit Brook, from Bedford Ave. looking upstream	Jun. 11, 1897	2
303.	Clay Pit Brook, from Lexington Ave. looking upstream	Jun. 11, 1897	2
304.	Clay Pit Brook, from W. line of Geo. L. Goodale Est. looking upstream.	Jun. 12, 1897	2
305.	Clay Pit Brook, from W. line of Geo. L. Goodale Est. looking down stream.,	Jun. 12, 1897	2
306. 306A	Clay Pit Brook, from cor. Varnum & Townsend Ave., up & downstream. (4 sections)	Jun. 11, 1897	2
307.	Black Brook from Middlesex St. Looking downstream	Jun. 11, 1897	2
308.	Black Brook from Middlesex St. Looking upstream	Jun. 11, 1897	2
309.			
310.	Clay Pit Brook – 30 ft. E. of T. Varnum's E. line looking upstream	July 15, 1897	2

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No.	Description	Date	Copy in BK. No.
311.	Clay Pit Brook, from crossing 300 ft. W. of T. Varnum's E. line, looking downstream	July 15, 1897	2
312.	(no plate) Clay Pit Brook, from farm crossing 300 ft. W. of Thos. Varnum's E. line looking downstream	July 15, 1897	2
313.	Clay Pit Brook, from crossing back of T. Varnum Homestead looking downstream.	July 15, 1897	2
314.	Clay Pit Brook, from wall back of Varnum Cabin, looking upstream.	July 15, 1897	2
315.	(no plate) Clay Pit Brook, from Thos. Varnum's W. line looking upstream.	July 15, 1897	2
316.	Clay Pit Brook, from Bedford Ave., looking downstream	July 15, 1897	2
317.	Clay Pit Brook, from Bedford Ave., looking upstream	July 15, 1897	2
318.	Clay Pit Brook, from Lexington Ave., looking upstream.	July 15, 1897	2
319.	Clay Pit Brook, from cor. Varnum & Townsend Ave., looking downstream.	July 15, 1897	2
320.	Clay Pit Brook, from cor. Varnum & Townsend Ave., looking upstream	July 15, 1897	2
321.	Clay Pit Brook, from W. line of Geo. L. Goodale Est., looking downstream	July 15, 1897	2
322.	Clay Pit Brook, from crossing at W. line of Geo. Goodale Est. looking upstream	July 15, 1897	2
323.	Clay Pit Brook, from Totman St. looking downstream	July 15, 1897	2
324.			
325.			
326.	Right shore Merrimack River below Boott upper property line looking upstream	Oct. 19, 1897	2
327.	Right shore Merrimack River below Boott wasteway looking upstream	Oct. 19, 1897	2
328.	Right shore Merrimack River above Boott wasteway looking downstream	Oct. 19, 1897	2

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No.	Description	Date	Copy in BK. No.
329.	Right shore Merrimack River, 340 ft. above Boott wasteway, looking upstream.	Oct, 19, 1897	2
330.	Right shore Merrimack River, 500 ft. above Boott wasteway, looking downstream.	Oct. 19, 1897	2
331.	Right shore Merrimack River, 500 ft. above upper property line of Boott C. Mills, upstream	Oct. 19, 1897	2
332.	Right shore Merrimack River, from Merr'k. M. Co's upper property line, looking downstream	Oct. 19, 1897	2
333.	Right shore Merrimack River, from Merrimack M. Co.'s upper property line looking upstream	Oct. 19, 1897	2
334.	Right shore Merr'k River, from 250 ft. above Lawrence wasteway, looking downstream	Oct. 21, 1897	2
335.	Right shore Merrimack River, from 500 ft. above Lawrence wasteway, looking downstream	Oct. 19, 1897	2
336.	Right shore Merrimack River, from 500 ft. above Lawrence wasteway, looking upstream	Oct. 19, 1897	2
337.	Right shore Merrimack River, from 250 ft. below Aiken St. Bridge, Looking downstream	Oct. 19, 1897	2
338.	Right shore Merrimack River, from 250 ft. below Aiken St. Bridge, Looking upstream	Oct. 19, 1897	2
339.	Right shore Merr'k River, from Aiken St. Bridge looking downstream.	Oct. 29, 1897	2
340.	Right shore Merrimack River, from South Pier Aiken St. Bridge, looking upstream	Oct. 30, 1897	2
341.	Right shore Merrimack River, from 250 ft. above Aiken St. Bridge, looking downstream	Oct. 19, 1897	2
342.	Right shore Merrimack River, from Moody St. Bridge, over Canal Wall, looking downstream	Oct. 30, 1897	2
343.	Left shore Merrimack River, 40 ft. below mouth of Broughton Ave. Sewer looking upstream	Oct. 20, 1897	2
344.	Left shore Merrimack River, from 20 ft. below mouth of Broughton Ave. Sewer, looking downstream	Oct. 20, 1897	2

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No.	Description	Date	Copy in BK. No.
345.	Left shore Merrimack River, from 15 ft. downstream from Broughton Ave. sewer looking downstream	Oct. 26, 1897	2
346.	Left shore Merrimack River, from 15 ft. downstream from Broughton Ave. sewer looking upstream	Oct. 26, 1897	2
347.	Left shore Merrimack River, from Broughton Ave. sewer, looking upstream	Oct. 29, 1897	2
348.	Left shore Merrimack River, from opposite Merrimack M. Co. 's # 3 & 4 Races, looking downstream	Oct. 25, 1897	2
349.	Left shore Merrimack River, from opposite Merrimack M. Co. 's # 3 & 4 Races, looking upstream	Oct. 26, 1897	2
350.	Left shore Merrimack River, from 150 ft. above Broughton Ave. looking upstream	Oct. 20, 1897	2
351.	Left shore Merrimack River, from opposite Fulton St., looking upstream	Oct. 20, 1897	2
352.	Left shore Merrimack River, from opposite Fulton St., looking downstream	Oct. 20, 1897	2
353.	Left shore Merrimack River, from 200 ft. above West St. looking downstream	Oct. 20, 1897	2
354.	Left shore Merrimack River, from 200 ft. above West St., looking upstream	Oct. 20, 1897	2
355.	Left shore Merrimack River, from 200 ft. above Lawrence wasteway, looking downstream	Oct. 20, 1897	2
356.	Left shore Merrimack River, from 200 ft. above Lawrence wasteway, looking upstream	Oct. 20, 1897	2
357.	Left shore Merrimack River, from 400 ft. above Lawrence wasteway, looking downstream	Oct. 21, 1897	2

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No.	Description	Date	Copy in BK. No.
358.	Left shore Merrimack River, from 400 ft. above Lawrence wasteway, looking upstream	Oct. 21, 1897	2
359.	Left shore Merrimack River, from 300 ft. below Aiken St. Bridge, looking upstream	Oct. 21, 1897	2
360.	Left shore of Merrimack River, from 300 ft. below Aiken St. Bridge, looking upstream.	Oct. 21, 1897	2
361.	Left shore of Merrimack River, from North Pier of Aiken St. Bridge, looking downstream.	Oct. 25, 1897	2
362.	Left shore of Merrimack River, from North abutment of Aiken St. Bridge, looking upstream	Oct. 30, 1897	2
363.	Left shore of Merrimack River, from North Pier of Aiken St. Bridge, looking upstream. Shows head of Long Island	Oct. 30, 1897	2
364.	From North Bank of Merrimack River on West line of Aiken St. looking towards Moody St.	Oct. 30, 1897	2
365.	Left shore of Merrimack River, from 125 ft. above Aiken St. Bridge, looking downstream	Oct. 21, 1897	2
366.	Left shore of Merrimack River, from 125 ft. above Aiken St. Bridge, looking towards mouth of Beaver Brook.	Oct. 21, 1897	2
367.	Left shore of Merrimack River, from about 400 ft. downstream from Moody St., looking downstream.	Oct. 30, 1897	2
368.	Left shore of Merrimack River, from top of old wall, about 525 ft. downstream from Moody St. looking north	Oct. 30, 1897	2
369.	View of Merrimack River, from Moody St. Bridge, 160 ft. – from Northern Canal, looking downstream. Paw. Dam 88.53	Dec. 16, 1897	2
370.	School St. from Paw. Bridge looking toward Pawtucket St.	Feb. 1, 1898	2

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371.	School St. near Pawtucket, showing Paw. Bridge.	Feb. 1, 1898	2
372.	Pawtucket St.	Feb. 1, 1898	2
373.	L. & C. yard	Feb. 1, 1898	2
374.	L. & C. yard (different view)	Feb. 1, 1898	2
375.	L. & C. yard (different view)	Feb. 1, 1898	2
376.	L. & C. yard from Worthen St. (no negative)	Feb. 1, 1898	2
377.	Worthen St. from Broadway looking toward Fletcher	Feb. 1, 1898	2
378.	Worthen St. from Broadway looking toward Merrimack St.	Feb. 1, 1898	2
379.	Residence of Mr. C. C. Campbell	Feb. 1, 1898	2
380.	City Library	Feb. 1, 1898	2
381.	Pawtucket St. from Merrimack looking toward School.	Feb. 1, 1898	2
382.	Merrimack St. from Pawtucket looking toward City Hall	Feb. 1, 1898	2
383.	Pawtucket Dam (1 duplicate negative)	Feb. 1, 1898	2
384.	Residence of Mr. A. T. Safford (no negative)	Feb. 1, 1898	2
385.	Branch St. from School, looking toward Wilder	Feb. 1, 1898	2
386.	Broadway from School St. looking East	Feb. 1, 1898	2
387.	Residence of Mr. F. E. Appleton	Feb. 1, 1898	2
388.	Middlesex St. from Fletcher, looking West.	Feb. 1, 1898	2
389.	L. & C. yard	Feb. 2, 1898	2
390.	L. & C. yard (different view)	Feb. 2, 1898	2
391.	Broadway St. from Dutton	Feb. 3, 1898	2
392.	Dutton St. from Broadway looking toward Merrimack	Feb. 3, 1898	2
393.	Merrimack St. from Shattuck.	Feb. 3, 1898	2

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394.	Merrimack St. from Palmer looking east.	Feb. 3, 1898	2
395.	Central St. from Middle, looking toward Merrimack.	Feb. 3, 1898	2
396.	Central St. from Market looking towards Middlesex	Feb. 3, 1898	2
397.	Broadway from Mt. Vernon looking East (no negative)	Feb. 4, 1898	2
398.	Daniel Gage's Dump for ice shavings.	Feb. 4, 1898	2
399.	Daniel Gage's Dump for ice shavings. (different view)	Feb. 4, 1898	2
400.	Daniel Gage's Elevator	Feb. 4, 1898	2
401.	Daniel Gage's Snow scrapers	Feb. 4, 1898	2
402.	Daniel Gage's Ice plows	Feb. 4, 1898	2
403.	Daniel Gage's snow scrapers (another view)	Feb. 4, 1898	2
404.	N. Bank Merrimack River from mouth of Clay Pit Brook, looking downstream.	Feb. 4, 1898	2
405.	Blank		
406.	Blank		
407.	Test of Macombar Chemical Attachment for fire buckets.	Mar. 23, 1898	2
408.	Test of Macombar Chemical Attachment for fire buckets. (different view)	Mar. 23, 1898	2
409.	Same as # 408 – different view	Mar. 23, 1898	2
410.	Northern Canal from below School St. looking downstream.	Mar. 16, 1898	2
411.	Northern Canal from School St. looking upstream	Mar. 16, 1898	2
412.	Northern Canal from above Gate Ho. On wall looking downstream	Mar. 16, 1898	2
413.	Northern Canal from Gate Ho. On wall looking upstream. Quan. passing # 5166 c.f.p.s.	Mar. 16, 1898	2
414.	Northern Canal from Paw. St. Bridge looking upstream. Quan. passing = 4978 c.f.p.s.	Mar. 16, 1898	2

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No.	Description	Date	Copy in BK. No.
415.	Northern Canal from Paw. St. bridge looking downstream. Quan. passing 4978 c.f.p.s.	Mar. 16, 1898	2
416.	Western Canal at head of Moody St. Feeder. Ht. water 85.43, Quan. passing Feeder = 2046 c.f.p.s.	Mar. 16, 1898	2
417.	Western Canal from Moody St. looking upstream Quan. passing = 2476 c.f.p.s.	Mar. 16, 1898	2
418.	Western Canal from Merrimack St. Quan. passing gates = 430 c.f.p.s.	Mar. 16, 1898	2
419.	L & C. Reservoir	May 8, 1898	2
420.	L & C. Reservoir – different view.	May 8, 1898	2
421.	L & C. Reservoir – different view.	May 8, 1898	2
422.	L & C. Reservoir – different view.	May 8, 1898	2
423.	L & C. Reservoir – different view.	May 8, 1898	2
424.	(Blank)		
425.	View of Middlesex Co.'s No. 2-wheel pit showing Addition to draught tube put on Oct. 8, 1898 (no negative)		2
426.	View of Middlesex Co.'s No. 1-wheel outlet after draught tube extension of Oct. 8, 1898 was added (no negative)		2
427.	View of Middlesex Co.'s No. 2-wheel looking downstream, after improvements of July 23 – Sept. 1898 (no negative)		2
428.	View from Race showing outlet of Middlesex Co.'s No. 2-wheel after improvements of July 23 – Sept. 5, 1898 (no negative).		2
429.	View from Race showing outlet of Middlesex Co.'s No. 1-wheel after improvements of July 23 – Sept. 5, 1898 (no negative).		2
430.	View from upper end of Race at Middlesex Co.'s No. 5 Mill after improvements of July 23 – Sept. 5, 1898 (no negative)		2
431.	View of upper end of Race at Middlesex Co.'s No.1 Mill after improvements of July 23 – Sept. 5, 1898 (no negative)		2
432.	View of Outlet of No. 1 wheel at Middlesex Co., showing condition before concrete was put in by Mr. Ward (no negative)		2

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No.	Description	Date	Copy in BK. No.
433.	View of one of the Swain wheels at the Middlesex Co.'s Mill (no negative)		2
434.	(Blank)		
435.	Swamp Locks Dam (no negative)	1899	2
436.	Lower Locks Basin (no negative)	1893	2
437.	(Blank)		
438.	Northern Canal Gate House (no negative)		2
439.	Old Guard Locks Gate House (no negative)		2
440.	Great Gate Old Guard House (no negative)		2
441.	Great Gate Old Guard Locks (no negative)		2
442.	Old Guard Locks (no negative)		2
443.	Above the Old Guard Locks (no negative)		2
444.	L. & C. Yard		2
445.	Merrimack River from Andover St. (no negative)		3
446.	Merrimack River from end of Old wall (5 exposures – part of negatives in 446-A)	June 10, 1899	3
447.	View of Merrimack River from Alder St.	June 10, 1899	3
448.	View of Merrimack River from Head Lower Rapids. (4 exposures some negatives in # 448-A)	June 10, 1899	3
449.	View of Merrimack River. End of Old wall (5 exposures some negatives in # 449-A)	Oct. 29, 1899	3
450.	Same as # 449 – different view (negatives also in 450-A)	Nov. 25, 1899	3
451.	Merrimack River from Alder St. (negatives also in # 451-A	Nov. 25, 1899	3
452.	(Blank)		
453.	Merrimack River, from end Old wall, Hunt's Falls (some negatives in #453-A	Aug. 5, 1900	3
454.	Hunts Falls from opp. Alder St. (some negatives in # 454-A)	Aug. 5, 1900	3

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No.	Description	Date	Copy in BK. No.
455.	Hunt's Falls from Head Lower Rapids (some negatives in # 455-A)	Aug. 5, 1900	3
456.	Hunt's Falls from Mass. Co.'s Big Chimney (negatives also in # 456-A)	Aug. 26. 1904	3
457.	North shore Merrimack River from top Mass. Mill No. 5	Dec. 25, 1904	3
458.	Hunt's Falls from top of Mass. Mill No. 5 (one duplicate)	Dec. 25, 1904	3
459.	(Blank)		
460.	View at Hunt's Falls		3
461.	View at Hunt's Falls		3
462.	View at Hunt's Falls		3
463.	View at Hunt's Falls (no negative)		3
464.	View at Hunt's Falls Still water Upp. Shore (no negative)	Sept. 29, 1895	3
465.	(Blank)		
466.	(Blank)		
467.	(Blank)		
468.	View at Hunt's Falls	July 8, 1896	3
469.	View at Hunt's Falls	July 8, 1896	3
470.	View at Hunt's Falls (water in pool 43.50)	July 8, 1896	3
471.	Ledge below the "Pool" Hunt's Falls	July 11, 1896	3
472.	Ledge lower end of "Pool"	July 11, 1896	3
473.	Hunt's Falls from Barton's upper dump (S. side)	July 11, 1896	3
474.	Hunt's Falls from Lower end of wall S. side of River.	July 11, 1896	3
475.	Hunt's Falls from end of wall S. side	July 11, 1896	3
476.	Hunt's Falls from end of wall S. side	July 11, 1896	3
477.	Hunt's Falls, from lower end of wall S. side of River	July 11, 1896	3

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No.	Description	Date	Copy in BK. No.
478.	Hunt's Falls from Bluff in rear of St. John's Hospital	July 11, 1896	3
479.	Hunt's Falls from Bluff in rear of St. John's Hospital	July 11, 1896	3
480.	Hunt's Falls from Bluff at crossing of City water pipes.	July 11, 1896	3
481.	Hunt's Falls from Barton's upper dump	July 11, 1896	3
482.	Hunt's Falls from Barton's upper dump	July 11, 1896	3
483.	Hunt's Falls Lower Channel from Big Rock	July 19, 1896	3
484.	Hunt's Falls Lower Channel	July 19, 1896	3
485.	Hunt's Falls Lower Channel	July 19, 1896	3
486.	Hunt's Falls Lower Channel	July 19, 1896	3
487.	Hunt's Falls from E. Pier of Cent. Br.	July 19, 1896	3
488.	Hunt's Falls E. Pier of Cent Br.	July 19, 1896	3
489.	Hunt's Falls	Sept. 6, 1896	3
490.	Hunt's Falls	Sept. 6, 1896	3
491.	Hunt's Falls	Sept. 6, 1896	3
492.	Hunt's Falls	Sept. 6, 1896	3
493.	Hunt's Falls	Sept. 6, 1896	3
494.	Hunt's Falls	Sept. 6, 1896	3
495.	Hunt's Falls, from Mass. C. Mill	Sept. 6, 1896	3
496.	Hunt's Falls	Sept. 6, 1896	3
497.	Hunt's Falls	Sept. 6, 1896	3
498.	Hunt's Falls	Sept. 18, 1896	3
499.	Hunt's Falls	Sept. 18, 1896	3

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500.	Hunt's Falls	Nov. 21, 1896	3
501.	Hunt's Falls	Nov. 21, 1896	3
502.	Hunt's Falls	Nov. 21, 1896	3
503.	Hunt's Falls	Dec. 5, 1896	3
504.	Hunt's Falls	Dec. 5, 1896	3
505.	Hunt's Falls	Dec. 5, 1896	3
506.	Hunt's Falls	Dec. 5, 1896	3
507.	Hunt's Falls	Dec. 5, 1896	3
508.	Hunt's Falls	Dec. 5, 1896	3
509.	Hunt's Falls	Dec. 5, 1896	3
510.	Hunt's Falls	Dec. 5, 1896	3
511.	Hunt's Falls	Dec. 5, 1896	3
512.	Hunt's Falls	Dec. 5, 1896	3
513.	Hunt's Falls	Dec. 5, 1896	3
514.	Hunt's Falls	Dec. 5, 1896	3
515.	Hunt's Falls	Dec. 5, 1896	3
516.	Hunt's Falls	Dec. 5, 1896	3
517.	Hunt's Falls	Dec. 5, 1896	3
518.	Hunt's Falls	Dec. 5, 1896	3
519.	Hunt's Falls	Dec. 5, 1896	3
520.	Hunt's Falls	Dec. 5, 1896	3
521.	Hunt's Falls	Dec. 5, 1896	3
522.	Hunt's Falls	Dec. 5, 1896	3
523.	Hunt's Falls	Dec. 5, 1896	3
524.	Hunt's Falls	Dec. 5, 1896	3
525.	Hunt's Falls	Dec. 19, 1896	3

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526.	Hunt's Falls	Dec.19, 1896	3
527.	Hunt's Falls	Dec.19, 1896	3
528.	Hunt's Falls	Jan. 16, 1897	3
529.	Hunt's Falls	Jan. 16, 1897	3
530.	Hunt's Falls	Jan. 16, 1897	3
531.	Hunt's Falls	Jan. 16, 1897	3
532.	Hunt's Falls	Jan. 16, 1897	3
533.	Hunt's Falls	Jan. 30, 1897	3
534.	Hunt's Falls	Jan. 30, 1897	3
535.	Hunt's Falls	Jan. 30, 1897	3
536.	Hunt's Falls	Jan. 30, 1897	3
537.	Hunt's Falls	Jan. 30, 1897	3
538.	Hunt's Falls	Jan. 30, 1897	3
539.	Hunt's Falls	Feb. 6, 1897	3
540.	Hunt's Falls	Feb. 6, 1897	3
541.	Hunt's Falls	Feb. 6, 1897	3
542.	Hunt's Falls	Apr. 26, 1897	3
543.	Hunt's Falls	Apr. 26, 1897	3
544.	Hunt's Falls	Apr. 26, 1897	3
545.	Hunt's Falls	Apr. 26, 1897	3
546.	Hunt's Falls	Apr. 26, 1897	3
547.	Hunt's Falls	Apr. 26, 1897	3
548.	Hunt's Falls	Sept. 11, 1897	3
549.	Hunt's Falls	Sept. 11, 1897	3
550.	Hunt's Falls	Sept. 11, 1897	3
551.	Hunt's Falls	Sept. 11, 1897	3

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552.	Hunt's Falls (no negative)	Sept. 11, 1897	3
553.	Hunt's Falls	Oct. 16, 1897	3
554.	Hunt's Falls	Oct. 16, 1897	3
555.	Hunt's Falls	Oct. 16, 1897	3
556.	Hunt's Falls	Oct. 16, 1897	3
557.	Hunt's Falls	Oct. 16, 1897	3
558.	Hunt's Falls	Oct. 16, 1897	3
559.	Hunt's Falls	Oct. 16, 1897	3
560.	Hunt's Falls	Oct. 16, 1897	3
561.	Hunt's Falls	Oct. 16, 1897	3
562.	Hunt's Falls	Oct. 16, 1897	3
563.	Hunt's Falls	Oct. 16, 1897	3
564.	Hunt's Falls	Oct. 16, 1897	3
565.	Hunt's Falls	Oct. 16, 1897	3
566.	Hunt's Falls	Oct. 16, 1897	3
567.	Hunt's Falls	Oct. 16, 1897	3
568.	Hunt's Falls	Oct. 16, 1897	3
569.	Hunt's Falls	Oct. 16, 1897	3
570.	Hunt's Falls (no negative)	Oct. 16, 1897	3
571.	Hunt's Falls	Oct. 30, 1897	3
572.	Hunt's Falls	Oct. 30, 1897	3
573.	Hunt's Falls	Oct. 30, 1897	3
574.	Hunt's Falls	Oct. 30, 1897	3
575.	Hunt's Falls	Oct. 30, 1897	3
576.	Hunt's Falls	Oct. 30, 1897	3
577.	(Blank)		
578.	(Blank)		

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No.	Description	Date	Copy in BK. No.
579.	(Blank)		
580.	Hunt's Falls (no negative)	Dec. 4, 1897	3
581.	Hunt's Falls (no negative)	Dec. 4, 1897	3
582.	Hunt's Falls (no negative)	Dec. 4, 1897	3
583.	Hunt's Falls (no negative)	Dec. 4, 1897	3
584.	Hunt's Falls (no negative)	Dec. 4, 1897	3
585.	(Blank)		
586.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
587.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
588.	Hunt's Falls just above Lower Channel. (no negative)	Sept. 13, 1908	3
589.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
590.	Hunt's Falls just above Lower Channel. (no negative)	Sept. 13, 1908	3
591.	Hunt's Falls just above Lower Channel. (no negative)	Sept. 13, 1908	3
592.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
593.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
594.	Hunt's Falls just above Lower Channel. (no negative)	Sept. 13, 1908	3
595.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
596.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
597.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
598.	Hunt's Falls Lower Channel. (no negative)	Sept. 13, 1908	3
599.	Hunt's Falls just above Lower Channel. (no negative)	Sept. 13, 1908	3
600.	Hunt's Falls just above Lower Channel. (no negative)	Sept. 13, 1908	3
601.	Hunt's Falls)	Oct. 22, 1908	3
602.	Mouth Concord River from top Mass. Dye House	Oct. 22, 1908	3

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603.	Hunt's Falls from top Mass. Picker	Oct. 22, 1908	3
604.	Hunt's Falls	Oct. 22, 1908	3
605.	Hunt's Falls	Oct. 22, 1908	3
606.	Hunt's Falls (no negatives)	Oct. 22, 1908	3
607.	Hunt's Falls from Mass. Dye House (no negative)	Oct. 22, 1908	3
608.	Hunt's Falls from Mass. Dye House (no negative)	Oct. 22, 1908	3
609.	Hunt's Falls	Oct. 22, 1908	3
610.	Hunt's Falls	Oct. 22, 1908	3
611.	Hunt's Falls	Oct. 22, 1908	3
612.	Hunt's Falls from top Mass. Dye House	Oct. 25, 1908	3
613.	Hunt's Falls from Mass. Picker	Oct. 25, 1908	3
614.	Hunt's Falls from top of "Whittier Mill"	Oct. 25, 1908	3
615.	Hunt's Falls from top of "Whittier Mill"	Oct. 25, 1908	3
616.	Hunt's Falls	Oct. 25, 1908	3
617.	Hunt's Falls	Oct. 25, 1908	3
618.	Hunt's Falls from Mass. Picker	Oct. 25, 1908	3
619.	(Blank)		
620.	(Blank)		
621.	(Blank)		
622.	(Blank)		
623.	(Blank)		
624.	Hunt's Falls from Mass. Dye House	Dec. 6, 1908	3
625.	Hunt's Falls from Mass. Dye House	Dec. 6, 1908	3
626.	Hunt's Falls from Mass. Dye House	Dec. 6, 1908	3
626A	Hunt's Falls from dump on bank abt. 300 ft. west of Alder St.	Oct. 30, 1910	3
627.	Ledge in Merrimack River near mouth of Concord River	Dec. 5, 1909	3

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627A	Hunt's Falls from point opposite Alder St.	Oct. 30, 1910	3
628.	Hunt's Falls from top of Mass. Picker	Dec. 5, 1909	3
628A	Hunt's Falls from point about 300 feet west of Alder St.	Oct. 30, 1910	3
629.	Hunt's Falls from looking up Concord River from point at junction of Concord & Merr'k. Rivers	Dec. 5, 1909	3
629A	Hunt's Falls from bank opposite Alder St.	Oct. 30, 1910	3
630.	Hunt's Falls from Mass. Picker	Dec. 5, 1909	3
630A	Hunt's Falls from point opposite Alder St.	Oct. 30, 1910	3
631.	Hunt's Falls from top of Whittier Mill	Dec. 5, 1909	3
631A	Hunt's Falls from point about 300 ft. west of Alder St.	Oct. 30, 1910	3
632.	Hunt's Falls from Whittier Mill	Dec. 5, 1909	3
632A	Hunt's Falls from dump opp. Stackpole St.	Oct. 30, 1910	3
633.	Hunt's Falls	Mar. 11, 1911	3
634.	Hunt's Falls	Mar. 11, 1911	3
635.	Hunt's Falls	Mar. 11, 1911	3
636.	Hunt's Falls	Mar. 11, 1911	3
637.	Hunt's Falls	Mar. 11, 1911	3
638.	Hunt's Falls	Mar. 11, 1911	3
639.	Hunt's Falls	Mar. 11, 1911	3
640.	Hunt's Falls	Mar. 11, 1911	3
641.	(Blank)		
642.	(Blank)		
643.	(Blank)		
644.	(Blank)		
645.	(Blank)		
646.	(Blank)		

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No.	Description	Date	Copy in BK. No.
647.	(Blank)		
648.	(Blank)		
649.	(Blank)		
650.	(Blank)		
651.	(Blank)		
652.	(Blank)		
653.	(Blank)		
654.	(Blank)		
655.	(Blank)		
656.	(Blank)		
657.	(Blank)		
658.	to 675 incl. (Blank).		
676.	Nelson Norris Foundation	Mar. 31, 1899	4
677.	Nelson Norris 2 Foundation	Mar. 31, 1899	4
678.	Nelson Norris Foundation	Mar. 31, 1899	4
679.	Nelson Norris Foundation	Mar. 31, 1899	4
680.	Nelson Norris Foundation	Mar. 31, 1899	4
681.	(Blank)		
682.	(Blank)		
683.	Appleton No. 5 Expt. No. 129	Aug. 14, 1899	4
684.	Appleton No. 5 Expt. No. 129	Aug. 14, 1899	4
685.	Appleton No. 5 Expt. No. 129	Aug. 14, 1899	4
686.	Appleton No. 5 Expt. No. 129	Aug. 14, 1899	4
687.	Appleton No. 5 Expt. No. 130	Aug. 14, 1899	4
688.	Appleton No. 5 Expt. No. 130	Aug. 14, 1899	4
689.	Appleton No. 5 Expt. No. 131	Aug. 15, 1899	4
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693.	Appleton No. 5 Expt. No. 133	Aug. 16, 1899	4
694.	Appleton No. 5 Expt. No. 133	Aug. 16, 1899	4
695.	Appleton No. 5 Expt. No. 133	Aug. 16, 1899	4
696.	Appleton No. 5 Expt. No. 134	Aug. 17, 1899	4
697.	Appleton No. 5 Expt. No. 134	Aug. 17, 1899	4
698.	Appleton No. 5 Expt. No. 135	Aug. 18, 1899	4
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701.	Appleton No. 5 Expt. No. 136	Aug. 18, 1899	4
702.	Appleton No. 5 Expt. No. 136	Aug. 18, 1899	4
703.	Appleton No. 5 Expt. No. 137	Aug. 19, 1899	4
704.	Appleton No. 5 Expt. No. 137	Aug. 19, 1899	4
705.	Appleton No. 5 Expt. No. 137	Aug. 19, 1899	4
706.	(Blank)		
707.	Appleton No. 5 Expt. No. 138	Aug. 21, 1899	4
708.	Appleton No. 5 Expt. No. 138	Aug. 21, 1899	4
709.	Appleton No. 5 Expt. No. 139	Aug. 21, 1899	4
710.	Appleton No. 5 Expt. No. 139	Aug. 21, 1899	4
711.	Appleton No. 5 Expt. No. 140	Aug. 22, 1899	4
712.	Appleton No. 5 Expt. No. 140	Aug. 22, 1899	4
713.	Appleton No. 5 Expt. No. 141	Aug. 22, 1899	4
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715.	Appleton No. 5 Expt. No. 142	Aug. 22, 1899	4
716.	Appleton No. 5 Expt. No. 142	Aug. 22, 1899	4

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719.	Appleton No. 5 Expt. No. 145	Aug. 25, 1899	4
720.	Appleton No. 5 Expt. No. 146	Aug. 25, 1899	4
721.	Appleton No. 5 Expt. No. 146	Aug. 26, 1899	4
722.	Appleton No. 5 Expt. No. 146	Aug. 26, 1899	4
723.	Appleton No. 5 Expt. No. 147	Aug. 26, 1899	4
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733.	Appleton No. 5 Expt. No. 152	Aug. 26, 1899	4
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737.	Appleton No. 5 Expt. No. 154	Aug. 26, 1899	4
738.	Appleton No. 5 Expt. No. 154	Aug. 26, 1899	4
739.	Appleton No. 5 Expt. No. 155	Aug. 26, 1899	4
740.	Appleton No. 5 Expt. No. 155	Aug. 26, 1899	4
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746.	Appleton No. 5 Expt. No. 158	Aug. 29, 1899	4
747.	Appleton No. 5 Expt. No. 158	Aug. 29, 1899	4
748.	Appleton No. 5 Expt. No. 159	Aug. 30, 1899	4
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750.	Appleton No. 5 Expt. No. 160	Aug. 30, 1899	4
751.	Appleton No. 5 Expt. No. 160	Aug. 26, 1899	4
752.	Appleton No. 5 Expt. No. 161	Sept. 1, 1899	4
753.	Appleton No. 5 Expt. No. 161	Sept. 1, 1899	4
754.	(Blank)		4
755.	Appleton No. 5 Expt. No. 172	Sept. 5, 1899	4
756.	Appleton No. 5 Expt. No. 172	Sept. 5, 1899	4
757.	Appleton No. 5 Expt. No. 173	Sept. 7, 1899	4
758.	Appleton No. 5 Expt. No. 173	Sept. 7, 1899	4
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760.	Appleton No. 5 Expt. No. 174	Sept. 9, 1899	4
761.	Appleton No. 5 Expt. No. 175	Sept. 11, 1899	4
762.	Appleton No. 5 Expt. No. 175	Sept. 11, 1899	4
763.	Appleton No. 5 Expt. No. 176	Sept. 14, 1899	4
764.	Appleton No. 5 Expt. No. 176	Sept. 14, 1899	4
765.	(Blank)		
766.	(Blank)		
767.	(Blank)		
768.	(Blank)		
769.	Lowell Mch. Shop No. 6, Expt. No. 5	May 6, 1899	4

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771.	Lowell Mch. Shop No. 6, Expt. No. 6	May 6, 1899	4
772.	Lowell Mch. Shop No. 6, Expt. No. 7	May 6, 1899	4
773.	Lowell Mch. Shop No. 6, Expt. No. 8	May 6, 1899	4
774.	Lowell Mch. Shop No. 6, Expt. No. 9	May 6, 1899	4
775.	Lowell Mch. Shop No. 6, Expt. No. 10	May 6, 1899	4
776.	(Blank)		
777.	Lowell Mch. Shop No. 6, Expt. No. 73	June 24, 1899	4
778.	Lowell Mch. Shop No. 6, Expt. No. 74	June 24, 1899	4
779.	Lowell Mch. Shop No. 6, Expt. No. 75	June 24, 1899	4
780.	Lowell Mch. Shop No. 6, Expt. No. 76	June 24, 1899	4
781.	Lowell Mch. Shop No. 6, Expt. No. 77	June 24, 1899	4
782.	Lowell Mch. Shop No. 6, Expt. No. 78	June 24, 1899	4
783.	(Blank)		
784.	Lowell Mch. Shop No. 6, Expt. No. 90	July 1, 1899	4
785.	Lowell Mch. Shop No. 6, Expt. No. 91	July 1, 1899	4
786.	Lowell Mch. Shop No. 6, Expt. No. 92	July 1, 1899	4
787.	Lowell Mch. Shop No. 6, Expt. No. 93	July 1, 1899	4
788.	Lowell Mch. Shop No. 6, Expt. No. 94	July 1, 1899	4
789.	Lowell Mch. Shop No. 6, Expt. No. 95	July 1, 1899	4
790.	Lowell Mch. Shop No. 6, Expt. No. 96	July 1, 1899	4
791.	Lowell Mch. Shop No. 6, Expt. No. 97	July 1, 1899	4
792.	Lowell Mch. Shop No. 6, Expt. No. 98 (Negative with # 798)	July 1, 1899	4

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No.	Description	Date	Copy in BK. No.
793.	Lowell Mch. Shop No. 6, Expt. No. 99	July 1, 1899	4
794.	Lowell Mch. Shop No. 6, Expt. No. 100	July 1, 1899	4
795.	Lowell Mch. Shop No. 6, Expt. No. 101	July 1, 1899	4
796.	Lowell Mch. Shop No. 6, Expt. No. 102	July 1, 1899	4
797.	Lowell Mch. Shop No. 6, Expt. No. 103	July 1, 1899	4
798.	Same as # 792 (Negative with # 798)	July 1, 1899	4
799.	Tremont & Suffolk Cotton Store No. Burned June 8, P.M. 1899	1899	4
800.	Tremont & Suffolk Cotton Store from Coolidge & Perkins St.	June 9, 1899	4
801.	Tremont & Suffolk Cotton Store No. Burned June 8, 1899, from Perkins St.	June 8, 1899	4
802.	Tremont & Suffolk Cotton Store No. from Perkins & Cabot St.	June 9, 1899	4
803.	(Blank)		
804.	Pawtucket Dam, from fishway looking southerly. Several places under wall Repaired Aug. 1899	Aug. 23, 1899	4
805.	Pawtucket Dam, 80 - ft. southerly from fishway, repaired Aug. 1899	Aug. 23, 1899	4
806.	Pawtucket Dam, from 100 - ft. from fish way looking toward fishway, several places under wall repaired Aug. 1899	Aug. 23, 1899	4
807.	Pawtucket Dam, from 110 - ft. from fish way looking toward fishway, several places under wall repaired Aug. 1899	Aug. 23, 1899	4
808.	Pawtucket Dam, from 110 - ft. from fish way southerly from fishway, repaired Aug. 1899	Aug. 23, 1899	4
809.	(Blank)		
810.	Gage on abutment of R. R. Bridge at Bow Junction, Aug. 24, 1899	Aug. 24, 1899	4
811.	B. M. Gr. 239065 on edge of wall cut on cor. Of stone – Bow Junction	Aug. 24, 1899	4
812.	View of low water gage above R. R. bridge at Bow Junction. R.H. side looking downstream	Aug. 24, 1899	4
813.	View shows location of low water gage at Bow Junc., looking upstream	Aug. 24, 1899	4

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No.	Description	Date	Copy in BK. No.
814.	Low water gage at Bow Junction, from right bank of river.	Aug. 24, 1899	4
815.	(Blank)		
816.	Gates on wall, 2nd gate from Moody St.	Aug. 26, 1899	4
817.	Gates on wall, 3nd gate from Moody St.	Aug. 26, 1899	4
818.	Gates on wall, 1d gate from Moody St.	Aug. 26, 1899	4
819.	Gates on wall, 1d gate from Moody St.	Aug. 27, 1899	4
820.	(Blank)		
821.	Flume in Northern Canal, looking upstream	Sept. 17, 1899	4
822.	Flume in Northern Canal, looking upstream	Sept. 17, 1899	4
823.	Flume in Northern Canal, looking upstream	Sept. 17, 1899	4
824.	Flume in Northern Canal, looking downstream	Sept. 17, 1899	4
825.	Flume in Northern Canal, looking downstream	Sept. 17, 1899	4
826.	Flume in Northern Canal, looking downstream	Sept. 17, 1899	4
827.	(Blank)		
828.	72” Swain Wheel placed in No. 7 wheel-pit at Mass. Cotton Mills. Guides not renewed	Sept. 1899	4
829.	72” Swain Wheel placed in No. 7 wheel-pit at Mass. Cotton Mills. Guides not renewed	Sept. 1899	4
830.	72” Swain Wheel placed in No. 7 wheel-pit at Mass. Cotton Mills. Guides not renewed	Sept. 1899	4
831.	(Blank)		
832.	Fishway at Pawtucket Dam, shows repairs of 1899	Sept. 29, 1899	4

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No.	Description	Date	Copy in BK. No.
833.	Fishway at Pawtucket Dam, shows repairs of 1899	Sept. 29, 1899	4
834.	Fishway at Pawtucket Dam, shows repairs of 1899	Sept. 29, 1899	4
835.	(Blank)		
836.	Improvements of Middlesex Co.'s 1 & 2 Penstock (Note on negative "negative is A. T. Safford's" not in envelope #836)	Sept. 4, 1899	4
837.	Improvements of Middlesex Co.'s 1 & 2 Penstock (Same note as in # 836)	Sept. 4, 1899	4
838.	Excavation at downstream end of new rack at Middlesex Co.'s No. 1 & 2 Penstock (Same note as in # 836)	Sept. 4, 1899	4
839.	Middlesex Co.'s 1 & 2 Penstock, view of top with earth removed. (Same note as in # 836)	Sept. 4, 1899	4
840.	Middlesex Co.'s 1 & 2 Penstock, view of top raised & posts taken out.	Sept. 4, 1899	4
841.	View of upper end of Middlesex Co.'s No. 1 & 2 Penstock during improvements of 1899 (Same note as in # 836)	Oct. 1, 1899	4
842.	New rack & upper end of Middlesex Co.'s No. 1 & 2 Penstock during improvements of 1899 (Same note as in # 836)	Oct. 1, 1899	4
843.	New rack & upper end of Middlesex Co.'s No. 1 & 2 Penstock during improvements of 1899 (Same note as in # 836)	Oct. 1, 1899	4
844.	(Blank)		
845.	(Blank)		
846.	(Blank)		
847.	Low water gage at Plymouth, N.H. shows condition previous to resetting of Oct. 19, 1899 (no negative)	Oct. 19, 1899	4
848.	Gages showing height of Pemigewasset River at Plymouth, N.H.	Oct. 18, 1899	4
849.	L. & C. gages at Plymouth, N. H.	Oct. 18, 1899	4

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No.	Description	Date	Copy in BK. No.
850.	Low water gage at Plymouth, N. H. set correct	Oct. 19, 1899	4
851.	Plymouth, N. H. (shows gage)	Oct. 27, 1899	4
852.	Low water gage Plymouth, N. H. after repairs of	Oct. 1899	4
853.	Pemigewasset River at Plymouth, N.H., looking downstream from Holderness Bridge	Oct. 21, 1899	4
854.	Pemigewasset River at Plymouth, N.H., looking upstream about 200 ft. below Holderness Bridge	Oct. 21, 1899	4
855.	Junc. Badger's & Pemigewasset River at Plymouth, N.H. (no negative)	Oct. 1899	4
856.	Livermore, Falls, N. H. (no negative)	Oct. 1899	4
857.	Livermore, Falls, N. H.	Oct. 1899	4
858.	(Blank)		
859.	Brown's Mill, Bow, N. H.	Oct. 1899	4
860.	Brown's Mill Bow, N. H.	Oct. 28, 1899	4
861.	Brown's Mill Bow, N. H. from dam. Looking downstream, Bow, N. H.	Oct. 28, 1899	4
862.	Bow, N. H. from dam looking upstream	Oct. 28, 1899	4
863.	Brown's Saw Mill, Bow, N. H.	Oct. 1899	4
864.	Grinding Room, Brown's Mill.	Oct. 28, 1899	4
865.	Grinding Room, Brown's Mill.	Oct. 28, 1899	4
866.	Under the Grist Mill, Brown's Mill, Bow, N. H.	Oct. 28, 1899	4
867.	Brown's Mill, Breast wheel in Grist Mill, Bow, N. H.	Oct. 1899	4
868.	Old Tub Wheel, casing gone, Brown's Mill Bow, N. H.	Oct. 1899	4
869.	Brown's Saw Mill, old tub wheel with iron buckets, this was replaced by wheel with wooden paddles, Bow, N. H.	Oct. 1899	4
870.	Old tub wheel and pair of Rose Wheels, Brown's Sawmill, Bow, N. H.	Oct. 1899	4
871.	Brown's Mill, Bow, N. H. Reaction wheel.	Oct. 1899	4

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No.	Description	Date	Copy in BK. No.
872.	Brown's Mill, Bow, N. H. Reaction wheel. A pair of these wheels were replaced by Rose wheels	Oct. 1899	4
873.	Pair of Rose Wheels, Brown's Sawmill, Bow, N. H.	Oct. 1899	4
874.	Wheel-pit Brown's Mill, Bow, N. H.	Oct. 1899	4
875.	(Blank)		
876.	Guides of 108" 5/8 Boyden wheel, Mass. Co's new No. 1	Nov. 1899	4
877.	Guides and Runner 108" 5/8 Boyden, Mass. Co.'s New No. 1	Nov. 1899	4
878.	(Blank)		
879.	From Boott No. 3, 4 & 5 races	Nov. 25, 1899	4
880.	Boott # 3, 4 & 5 Races	Nov. 25, 1899	4
881.	Boott # 1 & 2 Races	Nov. 25, 1899	4
882.	From Boott No. 2 Race	Nov. 25, 1899	4
883.	Boott No. 6, & 7 & 8 Races	Nov. 25, 1899	4
884.	From Boott No. 9 Race	Nov. 18, 1899	4
885.	From Merrimack Co.'s No. 5 & 6 Race, shows also channel from Boott No. 9	Nov. 18, 1899	4
886.	Merrimack Company's No. 7 Race	Nov. 18, 1899	4
887.	From Merrimack Co.'s No. 8 Race	Nov. 18, 1899	4
888.	Merrimack Co.'s No. 9 Race	Nov. 18, 1899	4
889.	Merrimack Co.'s No. 3 & 4 Races	Nov. 18, 1899	4
890.	From upper outlet of Merrimack Co.'s No. 10 & 11 Races	Nov. 18, 1899	4
891.	From Merrimack P. W. Weir	Nov. 18, 1899	4
892.	Merrimack P. W. Weir	Nov. 18, 1899	4
893.	Outlets of Law. Sec. of T. & S. wheels	Nov. 18, 1899	4
894.	Lawrence Co.'s Nos. 1, 2 & 3 Races	Nov. 18, 1899	4

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No.	Description	Date	Copy in BK. No.
895.	Lawrence Co.'s No. 4, 5 & 6 Races	Nov. 18, 1899	4
896.	Lawrence Co.'s No. 4, 5 & 6 Races	Nov. 18, 1899	4
897.	(Blank)		
898.	24" gate at Reservoir	May 19, 1904	4
899.	Trench for 24" pipe at Reservoir	May 26, 1904	4
900.	Laying 24" pipe at Reservoir	May 27, 1904	4
901.	Laying 24" pipe at Reservoir	May 27, 1904	4
902.	Trench for 24" pipe at Reservoir	May 26, 1904	4
903.	24" pipe trench at Reservoir	May 26, 1904	4
904.	(Blank)		
905.	Waste gates Northern Canal (No negative)	Sept. 8, 1896	5
906.	Work on wall of Pawtucket Canal near Doherty's Foundry	May 10, 1903	5
907.	Same as # 906 – different view	May 10, 1903	5
908.	Same as # 906 – different view	May 10, 1903	5
909.	Pawtucket Canal, above Thorndike St.	June 11, 1899	5
910.	Pawtucket Canal, above Thorndike St.	June 11, 1899	5
911.	Plush Mill Wall	Oct. 15, 1899	5
912.	Plush Mill Wall	Oct. 15, 1899	5
913.	Plush Mill Wall	Nov. 26, 1900	5
914.	Plush Co. Wall	Nov. 26, 1899	5
915.	Wall back of Doherty's Foundry, right bank Paw. Canal	Sept. 4, 1899	5
916.	Wall back of Doherty's Foundry, Paw. Canal	Sept. 4, 1899	5
917.	R. H. wall Paw. Canal, opp. Doherty's Bros. Foundry	Oct. 8, 1899	5
918.	R. H. wall Paw. Canal, opp. Doherty's Bros. Foundry	Oct. 8, 1899	5
919.	R. H. wall Paw. Canal, opp. Doherty's Bros. Foundry	Oct. 15, 1899	5

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No.	Description	Date	Copy in BK. No.
920.	Doherty's Bros. Wall, R. H. side Paw. Canal	Nov. 26, 1899	5
921.	R. H. Wall Paw. Canal at rear of Doherty Bros. Foundry	Nov. 26, 1899	5
922.	Below Doherty Wall	Nov. 26, 1899	5
923.	End of Wall S. side Hunt's Falls built 1899	1899	
924.	Left wall of Pawtucket Canal below School St.	Feb. 25, 1900	5
925.	Left wall of Pawtucket Canal below School St.	Feb. 25, 1900	5
926.	Left wall of Pawtucket Canal below School St.	Feb. 25, 1900	5
927.	Pawtucket Dam	Mar. 12, 1900	5
928.	Boom at head Paw. Canal	Mar. 12, 1900	5
929.	Pawtucket Dam	Feb. 26, 1900	5
930.	Pawtucket Dam	Feb. 26, 1900	5
931.	Pawtucket Dam	Feb. 26, 1900	5
932.	39" Rodney Hunt Wheel, Broken 1899. Rumford Falls. (note on envelope "Negative is at A. T. Safford's" not in # 932)	1899	5
933.	39" Rodney Hunt Wheel, Broken 1899. (Same note as in # 932)	1899	5
934.	N. Shore Tyng's Island from 760 ft. – above bridge looking upstream	May 22, 1900	5
935.	From N. Shore Tyng's Island from 450 ft. – above bridge looking downstream	May 22, 1900	5
936.	N. Shore Tyng's Island looking upstream from 90 – ft. above bridge	May 22, 1900	5
937.	From N. Shore Tyng's Island 360 ft. – below bridge looking N.	May 22, 1900	5
938.	North Shore Tyng's Island from 1500 ft. – below bridge looking upstream	May 22, 1900	5
939.	(Blank)		
940.	N. Shore Tyng's Island from 700 ft. – above bridge looking upstream	May 29, 1900	5
941.	From N. Shore Tyng's Island from 450 ft. – above bridge looking downstream	May 29, 1900	5
942.	N. Shore Tyng's Is. Looking upstream 90 ft. above bridge	May 29, 1900	5

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No.	Description	Date	Copy in BK. No.
943.	From N. Shore Tyng's Island from 360 ft. – below bridge looking N.	May 29, 1900	5
944.	N. Shore Tyng's Island from 1500 ft. – below bridge, looking upstream	May 29, 1900	5
945.	(Blank)		
946.	(Blank)		
947.	Mass. # 1 & 2 Races	Aug. 26, 1900	5
948.	L. H. outlet of Mass. No. 1 & 2 Races	Aug. 26, 1900	5
949.	Middle outlet of Mass. No. 1 & 2 Races	Aug. 26, 1900	5
950.	R. H. outlet of Mass. No. 1 & 2 Races	Aug. 26, 1900	5
951.	Mass. No. 7 Race	Aug. 26, 1900	5
952.	Mass. No. 7 Race	Aug. 26, 1900	5
953.	Boott No. 1 Race	Aug. 26, 1900	5
954.	Boott No. 2 Race	Aug. 26, 1900	5
955.	L. H. outlet Boott 3, 4 & 5 Races	Aug. 26, 1900	5
956.	R. H. outlet Boott 3, 4 & 5 Races	Aug. 26, 1900	5
957.	L. H. outlet Boott 6, 7 & 8 Races	Aug. 26, 1900	5
958.	R. H. outlet Boott 6, 7 & 8 Races	Aug. 26, 1900	5
959.	Boott No. 9 Race	Aug. 26, 1900	5
960.	Merrimack No. 5 & 6 Race	Aug. 26, 1900	5
961.	Merrimack No. 7 Race	Aug. 26, 1900	5
962.	Merrimack No. 8 Race	Aug. 26, 1900	5
963.	Merrimack No. 9 Race	Aug. 26, 1900	5
964.	Merrimack No. 10 Race	Aug. 26, 1900	5
965.	Merrimack No. 11 Race	Aug. 26, 1900	5
966.	Law. Sec. T. & S. Races	Aug. 26, 1900	5
967.	Lawrence Section T. & S. Outlet of No. 4 wheel	Aug. 26, 1900	5

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No.	Description	Date	Copy in BK. No.
968.	Lawrence Wasteway from river looking upstream	Oct. 13, 1900	5
969.	Lawrence Wasteway from lower end looking upstream	Oct. 13, 1900	5
970.	Lawrence Wasteway	Oct. 13, 1900	5
971.	Lawrence Wasteway from lower end looking downstream	Oct. 13, 1900	5
972.	R. H. outlet of Lawrence No. 1, 2 & 3 Races	Aug. 26, 1900	5
973.	L. H. outlet of Lawrence No. 1, 2 & 3 Races	Aug. 25, 1900	5
974.	R. H. outlet of Lawrence No. 4, 5 & 6 Races	Aug. 26, 1900	5
975.	L. H. outlet of Lawrence No. 4, 5 & 6 Races	Aug. 26, 1900	5
976.	Improvements at Old Guard Locks,	Summer 1900	5
977.	Improvements at Old Guard Locks,	Summer 1900	5
978.	Improvements at Old Guard Locks,	Summer 1900	5
979.	Improvements at Old Guard Locks,	Summer 1900	5
980.	Appleton No. 1 wheel, 11 ft. Boyden, taken out Oct. 1900	Oct. 1900	5
980A	Appleton No. 1 wheel, 11 ft. Boyden, taken out Oct. 1900	Oct. 1900	5
981	Appleton No. 1 wheel, 11 ft. Boyden, taken out Oct. 1900	Oct. 1900	5
982.	Appleton No. 1 Pair wheel, 54" McCormick, looking downstream – New Jan. 1901	Jan. 1901	5
983.	54" McCormick, Appleton # 1 & 1A, new in 1901 (no negative)	1901	5
984.	Appleton No. 1 Pair wheels 54" McCormick New 1901	1901	5
985.	Appleton Co.'s No. 1 Pr. 54" McCormick, put in, in 1901 to replace old No. 1 a 132" Boyden	1901	5
986.	Appleton No. 1 wheel 54" L. H. McCormick, New Jan. 1901	1901	5
987.	Appleton No. 1 wheels, 54" McCormick, new	Jan. 1901	5
988.	Appleton No. 1 wheels, 54" McCormick, new	Jan. 1901	5

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No.	Description	Date	Copy in BK. No.
989.	Appleton No. 1 wheels, 54" McCormick, new	Jan. 1901	5
990.	Wicasse Dam	1901	5
991.	Clearing out of channel of Merrimack River, at Wicasse Dam (no negative)	Feb. 19, 1901	5
992.	Clearing out of channel of Merrimack River, at Wicasse Dam	Feb. 19, 1901	5
993.	Clearing out of channel of Merrimack River, at Wicasse Dam	Feb. 19, 1901	5
994.	Clearing out of channel of Merrimack River, at Wicasse Dam	Feb. 19, 1901	5
995.	Clearing out of channel of Merrimack River, at Wicasse Dam	Feb. 19, 1901	5
996.	Pickering's Mill from Middlesex St.	Apr. 9, 1901	5
997.	Pickering's Mill from Middlesex St.	Apr. 9, 1901	5
998.	Mouth Black Brook from Middlesex St.	Apr. 9, 1901	5
999.	Richardson's property from Middlesex St.	Apr. 9, 1901	5
1000.	W. E. Livingston's property on Black Brook, from Middlesex St.	Apr. 9, 1901	5
1001.	Percy Parker Estate from Middlesex St.	Apr. 9, 1901	5
1002.	Pawtucket St. between Rolph & Broadway, looking upstream	Apr. 9, 1901	5
1003.	Pawtucket Dam	Apr. 9, 1901	5
1004.	Upstream side Pawtucket bridge from L. & C. Gate-ho.	Apr. 9, 1901	5
1005.	Merrimack River from Moody St., looking upstream	Apr. 9, 1901	5
1006.	Merrimack River from N. end of Central Bridge looking downstream	Apr. 9, 1901	5
1007.	Merrimack River from S. end of Central Bridge looking downstream	Apr. 9, 1901	5
1008.	Concord River from E. Merrimack St., looking downstream	Apr. 9, 1901	5

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No.	Description	Date	Copy in BK. No.
1009.	Concord River from Lower Lock, looking downstream	Apr. 9, 1901	5
1010.	Middlesex Co.'s Concord River Dam	Apr. 9, 1901	5
1011.	Fishway of Pawtucket Dam	June 25, 1901	5
1012.	Fishway of Pawtucket Dam	June 25, 1901	5
1013.	Fishway of Pawtucket Dam	June 25, 1901	5
1014.	Pawtucket Dam from the Fishway	June 25, 1901	5
1015.	(Blank)		
1016.	Gage on Merrimack River opp. Middlesex Station	July 10, 1901	5
1017.	Gage on Merrimack River at mouth Stony Brook	July 10, 1901	5
1018.	Gage on Merrimack River above, Old Toll Road	July 10, 1901	5
1019.	Gage on Merrimack River below Wicasse Dam	July 10, 1901	5
1020.	Gage on Merrimack River opp. Head of Tyng's Is.	July 10, 1901	5
1021.	Gage on Merrimack River opp. John Perham's	July 10, 1901	5
1022.	Gages on Merrimack River, opp. Perham's Tavern, Tyngsboro, Mass.	July 10, 1901	5
1023.	Gage on Merrimack River at mouth of Bridge Meadow Brook	July 10, 1901	5
1024.	Mouth of 3 ft. round sewer R. H. side Paw. Canal 100 ft. – below Red Bridge (storm overflow)	July 14, 1901	5
1025.	Mouth of 3 ft. storm overflow. Sewer 100 ft. – below Red Bridge on R. H. side Paw. Canal.	July 14, 1901	5
1026.	Pawtucket Dam (2 views)	Dec. 18, 1901	5
1027.	Pawtucket Dam	Dec. 18, 1901	5
1028.	Northern Canal below Pawtucket Dam	Dec. 18, 1901	5
1029.	Old Guard Locks	Dec. 15, 1901	5
1030.	Old Guard Locks	Dec. 15, 1901	5
1031.	Pawtucket Dam	Dec. 24, 1901	5

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No. Description	Date	Copy in BK. No.
1032. Pawtucket Dam (no negative)*	Dec. 24, 1901	5
1033. Pawtucket Dam	Mar. 1, 1902	5
1034. Stone Post near Vesper Boat House Bent over, (no negative) *	Mar. 1, 1902	5
1035. Middlesex Co.'s Dam	Mar. 4, 1902	5
1036. View of Pawtucket Canal under Central St., Lowell. (no negative)	Oct. 25, 1902	5
1037. Lower Pawtucket Canal	Mar. 23, 1902	5
1038. Lower Pawtucket Canal	Mar. 23, 1902	5
1039. Lower Pawtucket Canal	Mar. 23, 1902	5
1040. Lower Pawtucket Canal	Mar. 23, 1902	5
1041. Lower Pawtucket Canal	Mar. 23, 1902	5
1042. Lower Pawtucket Canal	Mar. 23, 1902	5
1043. Lower Pawtucket Canal	Mar. 23, 1902	5
1044. Lower Pawtucket Canal	Mar. 23, 1902	5
1045. Lower Pawtucket Canal	Mar. 23, 1902	5
1047. Old Guard Locks – outlet from gates	Nov. 2, 1902	5
1048. Old Guard Locks – outlet from gates	Nov. 2, 1902	5
1049. Old Guard Locks – outlet from gates	Nov. 2, 1902	5
1050. Gov. Allen Boat	July 10, 1903	5
1051. Gov. Allen Boat	July 10, 1903	5
1052. Merrimack River looking downstream, Tyngsboro Bridge	July 10, 1903	5
1053. Merrimack River looking downstream, Tyngsboro Bridge	July 10, 1903	5
1054. Same as # 1052 – different view	July 10, 1903	5
1055. Merrimack River looking upstream, Tyngsboro Bridge	July 10, 1903	5
1056. Under side of Vesper Country Club, suspension bridge, looking East	July 10, 1903	5

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No.	Description	Date	Copy in BK. No.
1057.	Fire at Merrimack Mfg. Co., inside of Picker Building Law. Sec. of T. & S. Mills, end next to fire	July 18, 1903	5
1058.	Fire at Merrimack Mfg. Co., No. 1 Mill Law. Sect. T & S. Mill, end next to fire, windows burned out.	July 18, 1903	5
1059.	Fire at Merrimack Mfg. Co., Coal shed looking southwest	July 18, 1903	5
1060.	Fire at Merrimack Mfg. Co., Picker No. 1 Mill of Law. Sect. of T. & S. mills, adjacent to fire	July 18, 1903	5
1061.	Fire at Merrimack Mfg. Co., S. W. view top of No. 1 Mill Law. Sect. T & S. Mills.	July 18, 1903	5
1062.	Fire at Merrimack Mfg. Co., Coal shed looking S. W.	July 18, 1903	5
1063.	Fire at Merrimack Mfg. Co., inside of Picker building Card Room, Law. Sect. T. & S. Mills, end next to fire	July 18, 1903	5
1064.	Fire at Merrimack Mfg. Co., inside of spinning room, No. 1 Mill of Law. Sect. T. & S. Mills, end next to fire	July 18, 1903	5
1065.	Fire at Merrimack Mfg. Co., inside of weave room – No. 1 Mill of Law. Sect. T. & S. Mills, end next to fire, windows burned out.	July 18, 1903	5
1066.	Fire at Merrimack Mfg. Co., inside of weave room – No. 1 Mill of Law. Sect. T.& S. Mills, end next to fire	July 18, 1903	5
1067.	Fire at Merrimack Mfg. Co., inside of upper Mule Room, Mill No. 1 Law. Sect. T. & S. Mills, end next to fire	July 18, 1903	5
1068.	Fire at Merrimack Mfg. Co., Lowell North east end of Coal Shed & Boiler Ho.	July 18, 1903	5
1069.	Doherty wall Looking downstream	Aug. 16, 1903	5
1070.	Doherty wall upper end view looking downstream, section where ledge is, grade 73.00	Aug. 16, 1903	5
1071.	Doherty Wall lower end view looking upstream	Aug. 16, 1903	5

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No.	Description	Date	Copy in BK. No.
1072.	Gate at Swamp Locks		5
1073.	Screen for intake	Sept. 27, 1903	5
1074.	Back of Mass. Cotton Mills	Sept. 27, 1903	5
1075.	View of Creek at Tyng's Is., from the bridge looking up the creek	Oct. 1, 1903	5
1076.	View of Creek at Tyng's Is., from the bridge looking up the creek	Oct. 1, 1903	5
1077.	View of Creek at Tyng's Is., from the bridge looking down the creek	Oct. 1, 1903	5
1078.	View of Creek at Tyng's Is., from the back of the club buildings, looking upstream	Oct. 1, 1903	5
1079.	Test of Mass. New Pump, Suction from River	Jan. 16, 1904	5
1080.	Test of Mass. New Pump, Suction from Canal	Jan. 16, 1904	5
1081.	Field at Old Guard Locks, showing shed or barn which fell under weight of snow		5
1082.	Same as # 1081 – different view		5
1083.	Same as # 1081 – different view		5
1084.	Same as # 1081 – different view		5
1085.	Explosion at Lowell of U. S. Cartridge, corner of River & Acton Sts.	July 29, 1903	5
1086.	Same as # 1085 – different view	July 29, 1903	5
1087.	Explosion of U. S. Cartridge Co.'s magazine at Lowell, site of magazine & beyond piles of wrecked houses	July 29, 1903	5
1088.	Explosion of U. S. Cartridge Co.'s Magazines at Lowell	July 29, 1903	5
1089.	Explosion of U. S. Cartridge Co.'s Magazines view on Acton Street	July 29, 1903	5
1090.	Explosion at Lowell of U. S. Cartridge Co.'s magazines – site of nitro-powder House	July 29, 1903	5
1091.	Explosion of U. S. Cartridge Co.'s magazine view easterly on River St., near foot of Acton	July 29, 1903	5

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No.	Description	Date	Copy in BK. No.
1092.	Explosion at Lowell of U. S. Cartridge Co.'s magazines Acton St. 1/8 mile away	July 29, 1903	5
1093.	Explosion at Lowell of U. S. Cartridge Co.'s magazines view from site of nitro-powder house	July 29, 1903	5
1094.	Explosion at Lowell of U. S. Cartridge Co.'s magazines	July 29, 1903	5
1095.	Explosion at Lowell of U. S. Cartridge Co.'s magazines at Lowell, Wm. Rigg's house 500 ft. from explosion	July 29, 1903	5
1096.	Explosion at Lowell of U. S. Cartridge Co.'s magazines at Lowell	July 29, 1903	5
1097.	Explosion at Lowell of U. S. Cartridge Co.'s magazines view from site of nitro-powder house	July 29, 1903	5
1098.	Explosion at Lowell of U. S. Cartridge Co.'s magazines, view of River Street	July 29, 1903	5
1099.	Explosion at Lowell of U. S. Cartridge Co.'s magazines, house on Boyden St. 1/8 mile from explosion	July 29, 1903	5
1100.	Explosion at Lowell of U. S. Cartridge Co.'s magazines, view from site of Nitro-powder house	July 29, 1903	5
1101.	Explosion at Lowell of U. S. Cartridge Co.'s magazines, near corner of River St.	July 29, 1903	5
1102.	Explosion at Lowell of U. S. Cartridge Co.'s magazines, view on Acton St.	July 29, 1903	5
1103.	Explosion at Lowell of U. S. Cartridge Co.'s magazines, Burgess' house – more than 1/8 mile from powder house	July 29, 1903	5
1104.	Merrimack River	Apr. 8, 1901	5
1105.	Pawtucket Dam	Apr. 8, 1901	5
1106.	North wall Paw. Canal, below Central St.	1901	5
1107.	North wall rear Central St.	1901	5
1108.	R. R. track near Merrimack Mill No. 3	Feb. 10, 1904	5
1109.	Track near Merrimack Mill No. 3	Feb. 10, 1904	5
1110.	Merrimack St. Depot, Lowell, Mass.	Feb. 1904	5
1111.	Same as # 1110 – different view	Feb. 1904	5

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No. Description	Date	Copy in BK. No.
1112. Merrimack St. Depot, Lowell, Mass.	Feb. 1904	5
1113. Coffer Dam at Reservoir	May 26, 1904	5
1114. Coffer Dam at Reservoir	May 26, 1904	5
1115. L. & C. Reservoir – 24" pipe	June 3, 1904	5
1116. L. & C. Reservoir – 24" pipe	June 3, 1904	5
1117. Friction test of 12" pipe – 1849	May 20, 1904	5
1118. Friction test of 12" pipe – 1849	May 20, 1904	5
1119. Friction test of 12" pipe – 1849	May 20, 1904	5
1120. Friction test of 12" pipe – 1849	May 21, 1904	5
1121. Friction test of 12" pipe – 1849	May 19, 1904	5
1122. Two horse team drawing piece of 24" (?) pipe		5
1123. U. A. Boyden's first turbine built 1844 for the Appleton Co.		5
1124. 108" Boyden wheel taken out July 1904, Mass. Cotton Mills No. 2	1904	5
1125. 108" Boyden wheel taken out July 1904, Mass. Cotton Mills No. 2	1904	5
1126. Friction test new 24" Main	Aug. 5, 1904	5
1127. Friction test new 24" Main	Aug. 5, 1904	5
1128. Friction test new 24" Main	Aug. 5, 1904	5
1129. Cor. E. Merrimack & High St.	Sept. 15, 1904	5
1130. E. Merrimack St.	Sept. 15, 1904	5
1131. E. Merrimack St.	Sept. 15, 1904	5
1132. Merrimack St. Depot	Nov. 1904	6
1133. Merrimack St. Depot	Nov. 7, 1904	6
1134. Merrimack St. Depot	Nov. 7, 1904	6
1135. Merrimack St. Depot	Nov. 7, 1904	6
1136. Merrimack River from top of Mass. No. 5	Dec. 25, 1904	6

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No. Description	Date	Copy in BK. No
1137. 12” Pipe to reservoir laid about 1849, taken up 1904	1904	6
1138. 12” Pipe to reservoir laid about 1849, taken up 1904	1904	6
1139. 12” Pipe to reservoir laid about 1849, taken up 1904	1904	6
1140. 12” Pipe to reservoir laid about 1849, taken up 1904	1904	6
1141. 12” Pipe to reservoir laid about 1849, taken up 1904	1904	6
1142. Same as # 264		6
1143. Center case quarter turn. (no negative)		6
1144. Same as # 433		
1145. Picture of runner & buckets of water wheel (no negative)		6
1146. Appleton No. 1 wheel, 11 ft. Boyden, taken out Oct. 1900	1900	6
1147. Same as # 265		6
1148. Same as # 263		6
1149. Picture showing buckets of water wheel (no negative)		6
1150. Same as # 232		6
1151. 51” L. H. Smith Special – Hamilton M. Co.	Oct. 12, 1905	6
1152. 51” L. H. Smith Special – Hamilton M. Co.	Oct. 12, 1905	6
1153. 51” L. H. Smith Special – Hamilton M. Co.	Oct. 12, 1905	6
1154. Merrimack River	Nov. 3, 1905	6
1155. Merrimack River	Nov. 7, 1905	6
1156. Merrimack River	Nov. 7, 1905	6
1157. Merrimack River	Nov. 7, 1905	6
1158. 51” L. H. Smith Special, – Hamilton M. Co. No. 7	Nov. 13, 1905	6
1159. Lower Locks	Oct. 1, 1905	6

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No. Description	Date	Copy in BK. No
1160. Lower Locks	Oct. 1, 1905	6
1161. Lower Locks	Oct. 1, 1905	6
1162. Lower Locks	Oct. 1, 1905	6
1163. Lower Locks	Oct. 1, 1905	6
1164. Lower Locks	Oct. 1, 1905	6
1165. Appleton Co. Pr. 48" McCormick wheels	Dec. 6, 1905	6
1166. Appleton Co. Pr. 48" McCormick wheels	Dec. 6, 1905	6
1167. Appleton Co. Pr. 48" McCormick wheels	Dec. 7, 1905	6
1168. Appleton Co. Pr. 48" McCormick wheels	Dec. 7, 1905	6
1169. Boott Mills No. 6 72" Swain, put in July 1880	Jan. 26, 1906	6
1170. View of Westerly gauge, Easterly gauge also Mass. Mills	Apr. 17, 1906	6
1171. View of Easterly Gauge Mass. Mills	Apr. 17, 1906	6
1172. Blank		
1173. New wall downstream from School St.	Aug. 3, 1907	6
1174. New wall downstream from School St.	Aug. 3, 1907	6
1175. New wall downstream from School St.	Aug. 3, 1907	6
1176. New wall downstream from School St.	Aug. 3, 1907	6
1177. New wall downstream from School St.	Aug. 3, 1907	6
1178. Paw. Canal Wall below School St.	Sept. 22, 1907	6
1179. Paw. Canal Wall below School St.	Sept. 22, 1907	6
1180. Paw. Canal Wall below School St.	Sept. 22, 1907	6
1181. New wall below School St.	Dec. 1, 1907	6
1182. New wall below School St.	Dec. 1, 1907	6
1183. New wall below School St.	Dec. 1, 1907	6
1184. New wall below School St.	Dec. 1, 1907	6
1185. New wall below School St.	Dec. 1, 1907	6

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No.	Description	Date	Copy in BK. No
1186.	New wall below School St.	Dec. 1, 1907	6
1187.	Interior of Lowell Water Works Gate House at Reservoir on Beacon St.	1907	6
1188.	L. W. W. Reservoir – Beacon St.	Nov. 1907	6
1189.	Paw. Dam	Nov. 18, 1907	6
1190.	North end of Pawtucket Dam	Nov. 18, 1907	6
1191.	North end of Pawtucket Dam	Nov. 18, 1907	6
1192.	Steel girders placed under tracks on Central St. Bridge	Sept., Oct. 1907	6
1193.	Lawrence M. Co. No. 1 wheel pit, showing work of tearing out for new penstock	Sept. 4, 1908	6
1194.	Lawrence M. Co. No. 1 wheel pit, showing work of tearing out for new penstock	Sept. 4, 1908	6
1195.	Guided No. 3 wheel taken out at Lawrence M. Co. 1908	Sept. 4, 1908	6
1196.	Old No. 3 wheel taken out at Lawrence M. Co. in 1908	Sept. 4, 1908	6
1197.	Old guides and parts of Nos. 1 & 2 Turbines taken out at Lawrence M. Co. in 1908	Sept. 4, 1908	6
1198.	New rack at Bigelow Carpet Co.	Feb. 1908	6
1199.	New rack at Bigelow Carpet Co.	Feb. 1908	6
1200.	Site of Wicassee Falls Dam Tyngs. Is. End (no negative)	Sept 16, 1908	6
1201.	Site of Wicassee Falls Dam Tyngs. Is. End (no negative)	Sept. 16, 1908	6
1202.	Site of Wicassee Falls Dam from Tyngsboro Shore	Sept. 16, 1908	6
1203.	Site of Wicassee Falls Dam – Tyngs Is. End	Sept. 16, 1908	6
1203A	Alden Dynamometer on No. 2 wheel at Boott Mills	Nov. 17, 1908	6
1204.	Guides Lawrence M. Co.'s new No. 2 & 3 turbines – type B 51" Hercules	Nov. 6, 1908	6
1204A	The Alden Dynamometer at No. 2 turbine Boott Cotton Mills	Nov. 17, 1908	6
1205.	Lawrence M. Co.'s new No. 2 turbine 51 in. type B Hercules	Nov. 6, 1908	6

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No.	Description	Date	Copy in BK. No
1205A	Ledge in excavation at Pilling Shoe Shop	Jan. 6, 1909	6
1206.	Lawrence M. Co.'s New (Hercules) No. 3 Turbine – Type B 51"	Nov. 6, 1908	6
1206A	Ledge in the excavation at Pilling Shoe Shop	Jan. 6, 1909	6
1207.	Merrimack River (no negative)	Jan. 27, 1909	6
1208.	Merrimack River up by Vesper Country Club (no negative)	Jan. 27, 1909	6
1209.	Merrimack River up by Vesper Country Club (no negative)	Jan. 27, 1909	6
1210.	Merrimack River up by Vesper Country Club (no negative)	Jan. 27, 1909	6
1211.	Merrimack River up by Vesper Country Club (no negative)	Jan. 27, 1909	6
1212.	Merrimack River up by Vesper Country Club (no negative)	Jan. 27, 1909	6
1213.	Rat Island	Mar. 26, 1909	6
1214.	Merrimack Canal Wall along Anne St.	Apr. 11, 1909	6
1215.	Merrimack Canal Wall along Anne St.	Apr. 11, 1909	6
1216.	Merrimack Canal Wall along Anne St.	Apr. 11, 1909	6
1217.	Merrimack Canal Wall along Anne St.	Apr. 11, 1909	6
1218.	Merrimack Canal Wall along Anne St.	Apr. 11, 1909	6
1219.	Merrimack Canal Wall along Anne St.	Apr. 25, 1909	6
1220.	Merrimack Canal Wall along Anne St.	Apr. 25, 1909	6
1221.	Merrimack Canal Wall along Anne St.	Apr. 25, 1909	6
1222.	Merrimack Canal Wall along Anne St.	Apr. 25, 1909	6
1223.	Pawtucket Dam.	May 15, 1909	6
1224.	Pawtucket Dam.	May 11, 1909	6
1225.	Pawtucket Dam.	May 15, 1909	6
1226.	Test of outside sprinklers by Factory Mutual at Bigelow Carpet & Co.	July 2, 1909	6
1227.	Test of outside sprinklers by Factory Mutual at Bigelow Carpet & Co.	July 2, 1909	6
1228.	Test of outside sprinklers by Factory Mutual at Bigelow Carpet & Co.	July 2, 1909	6

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No.	Description	Date	Copy in BK. No
1229.	Test of outside sprinklers by Factory Mutual at Bigelow Carpet & Co.	July 2, 1909	6
1230.	Test of outside sprinklers by Factory Mutual at Bigelow Carpet & Co.	July 2, 1909	6
1231.	Merrimack Canal Wall along Anne St.	July 4, 1909	6
1232.	Merrimack Canal wall along Anne St.	July 4, 1909	6
1232A	Pawtucket St.	July 29, 1909	6
1233.	Blank		
1233A	Merrimack River near Textile School	July 29, 1909	6
1234.	Merrimack St. cor. Of Pawtucket St.	July 15, 1909	6
1234A	Merrimack River	July 29, 1909	6
1235.	Merrimack River	July 15, 1909	6
1235A	Pawtucket St.	July 29, 1909	6
1236.	Pawtucket St. & Merrimack River	July 29, 1909	6
1236A	Pawtucket St.	July 29, 1909	6
1237.	Blackberry Tree cor. Cheever and Pawtucket Sts.	July 15, 1909	6
1237A	Northern Canal	July 29, 1909	6
1238.	Swamp Locks	July 18, 1909	6
1239.	Mass. Cotton Mills on Concord River	July 18, 1909	6
1240.	Mass. Cotton Mills on Concord River	July 18, 1909	6
1241.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1242.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1243.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1244.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1245.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1246.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1247.	Mass. Cotton Mills on Concord River	July 25, 1909	6
1248.	Blank		

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No. Description	Date	Copy in BK. No
1249. Blank		
1250. Dutton St. Bridge	Aug. 2, 1909	6
1251. Merrimack River- looking upstream No. Chelmsford	Aug. 14, 1909	6
1252. Merrimack River- looking upstream No. Chelmsford	Aug. 14, 1909	6
1253. Merrimack River- looking upstream No. Chelmsford	Aug. 14, 1909	6
1254. Merrimack River- looking upstream No. Chelmsford	Aug. 14, 1909	6
1255. Merrimack River- looking downstream No. Chelmsford	Aug. 14, 1909	6
1256. Merrimack River- looking downstream No. Chelmsford	Aug. 14, 1909	6
1257. Merrimack River- looking downstream No. Chelmsford	Aug. 14, 1909	6
1258. Same as # 1229 (negative in # 1229)	July 2, 1909	6
1259. Same as # 1226 (negative in # 1226)	July 2, 1909	6
1260. Same as # 1227 (negative in # 1227)	July 2, 1909	6
1261. Same as # 1228 (negative in # 1228)	July 2, 1909	6
1262. Same as # 1230 (negative in # 1230)	July 2, 1909	6
1263. Views showing pieces of broken pipe (no negative)		6
1264. Same as # 1263 – different view (no negative)		6
1265. 12” pipe to reservoir laid about 1849 Taken up 1904 (no negative)		6
1266. 12” pipe to reservoir laid about 1849 Taken up 1904 (no negative)		6
1267. Pontoon Bridge	Aug. 22, 1909	6
1268. Pontoon Bridge	Aug. 22, 1909	6
1269. Pontoon Bridge	Aug. 30, 1909	6
1270. Pontoon Bridge	Aug. 30, 1909	6
1271. Pontoon Bridge (no negative)	Aug. 30, 1909	6
1272. Pontoon Bridge	Aug. 30, 1909	6
1273. Pontoon Bridge	Aug. 30, 1909	6
1274. Pontoon Bridge	Aug. 30, 1909	6

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No.	Description	Date	Copy in BK. No
1275.	Pontoon Bridge (no negative)	Aug. 30, 1909	6
1275A	Photo shows everything that remained of the "Pontoon Bridge" that was built across Merrimack River for the Auto Races at Lowell, Mass. In Sept. 1909	Oct. 8, 1909	6
1276.	Pontoon Bridge	Aug. 30, 1909	6
1277.	30' below 4-5-6 Law. M. Co.	Aug. 29, 1909	6
1278.	50' above 4-5-6 Law. M. Co.	Aug. 29, 1909	6
1279.	75' above Merrimack M. Co. Suction Pipe	Aug. 29, 1909	6
1280.	Repairs at Wamesit Dam (no negative)	Sept. 13, 1909	6
1281.	Repairs at Wamesit Dam (no negative)	Sept. 13, 1909	6
1282.	Repairs at Wamesit Dam (no negative)	Sept. 13, 1909	6
1282A	Wamesit Dam (no negative)	Nov. 27, 1909	6
1283.	Repairs at Wamesit Dam (no negative)	Sept. 13, 1909	6
1283A	Wamesit Dam (no negative)	Nov. 27, 1909	6
1284.	Repairs at Wamesit Dam (no negative)	Sept. 19, 1909	6
1285.	Repairs at Wamesit Dam (no negative)	Sept. 19, 1909	6
1286.	Repairs at Wamesit Dam (no negative)	Oct. 7, 1909	6
1287.	Wamesit Dam after repairs	Oct. 7, 1909	6
1288.	Rebuilding E. Merrimack St. Bridge (no negative)	Oct. 1909	6
1289.	Rebuilding E. Merrimack St. Bridge	Oct. 1909	6
1290.	Rebuilding E. Merrimack St. Bridge	Oct. 1909	6
1291.	Rebuilding E. Merrimack St. Bridge	Oct. 1909	6
1292.	Grist Mill wheel, rebuilt Oct. 1909	Oct. 1909	6
1293.	Grist Mill wheel, rebuilt Oct. 1909	Oct. 1909	6
1294.	Grist Mill wheel, rebuilt Oct. 1909	Oct. 1909	6
1295.	Outside sprinkler test by Factory Mutual Bigelow-Carpet Co. Test # 1	Nov. 9, 1909	6
1296.	Outside sprinkler test by Factory Mutual Bigelow-Carpet Co. Test # 2	Nov. 9, 1909	6

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No.	Description	Date	Copy in BK. No
1297.	Outside sprinkler test by Factory Mutual Bigelow-Carpet Co. Test # 3	Nov. 9, 1909	6
1298.	Outside sprinkler test by Factory Mutual Bigelow-Carpet Co. Test # 3	Nov. 9, 1909	6
1299.	Outside sprinkler test by Factory Mutual Bigelow-Carpet Co. Test # 5	Nov. 9, 1909	6
1300.	Site of new power hou8se on Merrimack River Back of Mass. Cotton Mills	Aug. 22, 1909	No print
1301.	Flooring being laid in Lower Pawtucket Canal in front of Bigelow Carpet Company Wasteway	Nov. 14, 1909	No print
1302.	Construction work book of Mass.	Aug. 8, 1909	6
1303.	Construction work book of Mass.	Sept. 12, 1909	6
1304.	Construction work book of Mass.	Sept. 12, 1909	6
1305.	Section of Draft-tube in yard of Mass. Cotton Mills	Sept. 20, 1909	6
1306.	Outlet of Draft-tube Mass. Cotton Mills	Sept. 20, 1909	6
1307.	Outlet of Draft-tube Mass. Cotton Mills	Sept. 20, 1909	6
1308.	Outlet of Draft-tube Mass. Cotton Mills	Sept. 25, 1909	6
1309.	Outlet of Draft-tube Mass. Cotton Mills	Sept. 25, 1909	6
1310.	Outlet of Draft-tube Mass. Cotton Mills	Sept. 25, 1909	6
1311.	Outlet of Draft-tube Mass. Cotton Mills	Oct. 14, 1909	6
1312.	Mass. Cotton Mills	Oct. 31, 1909	6
1313.	Mass. Cotton Mills	Oct. 31, 1909	6
1314.	Mass. Cotton Mills New Power House inside	Dec 6, 1909	6
1315.	Mass. Cotton Mills Piers built in to support No. 3 Mill – N. side, where New penstock passes	Dec. 6, 1909	6
1316.	Mass. Cotton Mills – new penstock as it approaches foundation of Mill # 3	Dec. 6, 1909	6
1317.	Mass. Cotton Mills Pr. 48” type C. Hercules	Mar. 14 1910	6
1318.	Mass. Cotton Mills Pr. 48” type C. Hercules	Mar. 14 1910	6
1319.	Mass. Cotton Mills Pr. 48” type C. Hercules	Mar. 14 1910	6
1320.	Mass. Cotton Mills Pr. 48” type C. Hercules	Mar. 14 1910	6

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No.	Description	Date	Copy in BK. No
1321.	Mass. Cotton Mills Pr. 48” type C. Hercules	Mar. 14 1910	6
1322.	Mass. Cotton Mills Pr. 48” type C. Hercules	Mar. 23 1910	6
1323.	Mass. Cotton Mills Runners & settings	Apr. 15, 1910	6
1324.	Mass. Cotton Mills Pr. 48” type C. Hercules	Apr. 15, 1910	6
1325.	Mass. Cotton Mills Pr. 48” type C. Hercules	Apr. 15, 1910	6
1326.	to 1330 incl. Blank		
1331.	Country Club Bridge (no negative)	Dec.7, 1909	6
1332.	Country Club Bridge (no negative)	Dec.7, 1909	6
1333.	Country Club Bridge (no negative)	Dec.7, 1909	6
1334.	Country Club Bridge (no negative)	Dec.7, 1909	6
1335.	Pawtucket Dam	Jan. 28, 1910	6
1336.	Fence along School St. opposite Gate Ho.	May 6, 1910	6
1337.	Fence along School St. opposite Gate Ho.	May 6, 1910	6
1338.	Bigelow Carpet Co.’s Wall – Lower Canal Where L. & C. are putting in concrete toe wall	May 22, 1910	6
1339.	Same as # 1338 – different view	May 22, 1910	6
1340.	Bigelow Carpet Co.’s Wall – Lower Canal	June 5, 1910	6
1341.	Same as # 1340 – different view	June 5, 1910	6
1342.	Same as # 1338 – different view	May 22, 1910	6
1343.	Same as # 1338– different view	May 22, 1910	6
1344.	Same as # 1338– different view	May 22, 1910	6
1345.	Bigelow Carpet Co.’s Wall – Lower Canal showing concrete toe wall put in by L. & C.	May 30, 1910	6
1346.	Same as # 1345 – different view	May 30, 1910	6
1347.	Same as # 1345 – different view	May 30, 1910	6
1348.	Same as # 1345 – different view	May 30, 1910	6
1349.	Same as # 1340 – different view	June 5, 1910	6

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No.	Description	Date	Copy in BK. No
1350.	Bigelow Carpet Co.'s Wall – Lower Canal	June 5, 1910	6
1351.	Same as # 1350 – different view	June 5, 1910	6
1352.	Same as # 1350 – different view	June 5, 1910	6
1353.	Land in rear of Lowell Textile School	June 22, 1910	6
1354.	Land in rear of Lowell Textile School	June 22, 1910	6
1355.	Land in rear of Lowell Textile School	June 22, 1910	6
1356.	Temporary Bridge over Concord River, built by Mass. Cotton Mills	July 21, 1910	6
1356A	Taylors Falls Bridge, Nashua, N. H.	Nov. 21, 1913	6
1357.	Taylor's Falls Bridge, Nashua & Hudson, N. H. being replace by a new concrete bridge	July 14, 1910	6
1358.	Same as # 1357 – different view	July 14, 1910	6
1358A	Taylor Falls Bridge, Nashua, N. H.	Nov. 21, 1913	6
1359.	Same as # 1357 – different view	July 14, 1910	6
1359A	Nashua & Rochester R. R. bridge, Nashua, N. H.	July 14, 1910	6
1360.	Taylor Galls Bridge over Merrimack River, Nashua & Hudson, N. H. to be replaced with new concrete bridge	July 14, 1910	6
1361.	Concrete foot wall in front of Bigelow Carpet Co.'s Mill #b 19 – Lower Canal	July 24, 1910	7
1362.	Same as # 1361 – different view	July 24, 1910	7
1363.	Same as # 1361 – different view	July 24, 1910	7
1364.	Same as # 1361 – different view	July 24, 1910	7
1365.	Concrete wall in rear of Hamilton H. Co.	July 24, 1910	7
1366.	Same as # 1365 – different view	July 24, 1910	7
1367.	Lower Level of Pawtucket Canal.	July 24, 1910	7
1368.	Concrete Foundation in rear of Hamilton M. Co.	July 24, 1910	7
1369.	Same as # 1368 – different view	July 24, 1910	7
1370.	Same as # 1367 – different view	July 24, 1910	7
1371.	Same as # 1366 – different view	July 24, 1910	7
1372.	Washout under Mass. Cotton Mills Repair Shop	July 28, 1910	No print
1373.	Washout under S. end of Mass. Cotton Mills Repair Shop	July 28, 1910	No print

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No.	Description	Date	Copy in BK. No
1374.	Washout under Mass. Cotton Mills Repair Shop	July 28, 1910	No print
1375.	Same as #1374 – different view	July 28, 1910	7
1376.	Same as #1374 – different view	July 28, 1910	7
1377.	Lower Pawtucket Canal	Aug. 21, 1910	7
1378.	Same as #1377 – different view	Aug. 21, 1910	7
1379.	Same as #1377 – different view	Aug. 21, 1910	7
1380.	Same as #1377 – different view	Aug. 21, 1910	7
1381.	Same as #1377 – different view	Aug. 21, 1910	7
1382.	Boott Mills (No. 5 wheel) Old Draft Tube extension	Aug. 31, 1910	7
1383.	Boott Mills (No. 3 wheel) Old Draft Tube extension	Aug. 31, 1910	7
1384.	Boott Mills (No. 4 wheel) shows new draft tube extension In place but not riveted up	Sept. 1, 1910	7
1385.	Boott Mills (No. 4 wheel) shows end of quarter turn	Sept. 1, 1910	7
1386.	Boott Mills (No. 4 wheel) showing end of draft tube	Sept. 7, 1910	7
1387.	Boott Mills – showing # 3-4-5 Raceways (East & West)	Aug. 29, 1910	7
1388.	Boott Mills – showing # 3-4-5 Raceways (East)	Aug. 29, 1910	7
1389.	Boott Mills – showing # 3-4-5 Raceways (West)	Aug. 29, 1910	7
1390.	Boott Mills – showing # 1 & 2 Raceways	Sept. 4, 1910	7
1391.	Boott Mills – showing # 1 Raceway	Sept. 4, 1910	7
1392.	Boott Mills – showing # 2 Raceway	Sept. 4, 1910	7
1393.	Boott Mills – showing # 6-7-8 Raceways (East & West)	Sept. 4, 1910	7
1394.	Boott Mills – showing # 6-7-8 Raceways (West)	Sept. 4, 1910	7
1395.	Same as # 1393 – different view	Sept. 4, 1910	7
1396.	Plate girder under Mass. Cotton Mills new Mill over Eastern Canal	Sept. 7, 1910	7

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No.	Description	Date	Copy in BK. No
1397.	Structural work under Mass. Cotton Mills new mill over Eastern Canal	Sept. 7, 1910	7
1398.	Same as # 1397 – different view	Sept. 7, 1910	7
1399.	River bed at waste gates N. Canal	Sept. 19, 1910	7
1400.	Same as # 1399 – different view	Sept. 19, 1910	7
1401.	Boott Mills – shows draft tube	Sept. 23, 1910	7
1401A	Boott Mills – shows draft tube (no negative)		7
1402.	Boott Mills – shows draft tube	Sept. 23, 1910	7
1403.	Boott Mills shows # 6-7-8 Raceways (East & West)	Oct. 11, 1910	7
1404.	Boott Mills shows # 6-7-8 Raceways (East & West)	Oct. 11, 1910	7
1405.	Same as # 1403 – different view	Oct. 11, 1910	7
1406.	Boott Mills – shows # 1 & 2 Raceways	Oct. 13, 1910	7
1407.	Same as # 1406 – different view	Oct. 13, 1910	7
1408.	Same as # 1406 – different view	Oct. 13, 1910	7
1409.	Boott Mills – shows # 6-7-8 Raceways (East & West)	Nov. 2, 1910	7
1410.	Same as # 1409 – different view	Nov. 2, 1910	7
1411.	Same as # 1406 – different view	Nov. 2, 1910	7
1412.	Same as # 1406 – different view	Nov. 2, 1910	7
1413.	Same as # 1406 – different view	Nov. 2, 1910	7
1414.	Boott Mills – shows # 3-4-5 Raceways (East & West)	Nov. 2, 1910	7
1415.	Boott Mills – shows # 6-7-8 Raceways (East)	Dec. 11, 1910	7
1416.	Boott Mills – shows # 6-7-8 Raceways (East)	Dec. 11, 1910	7
1417.	Boott Mills (# 9 wheel)	Feb. 26, 1911	7
1418.	Blank		
1419.	Blank		
1420.	Pawtucket Canal below School St.	Dec. 4, 1910	7
1421.	Pawtucket Canal below School St.	Dec. 4, 1910	7
1422.	Pawtucket Canal below School St.	Dec. 4, 1910	7

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No.	Description	Date	Copy in BK. No
1423.	Pawtucket Canal below School St.	Dec. 4, 1910	7
1424.	Bigelow Carpet Co. 4 guides west unit 33" type C Hercules (no negative)	Nov. 15, 1910	7
1425.	Bigelow Carpet Co. Type C Hercules (no negative)	Nov. 15, 1910	7
1426.	Bigelow Carpet Co. R. H. wheel West unit 33" type C. Hercules (no negative)	Nov. 21, 1910	7
1427.	Bigelow Carpet Co. wheel of west unit 33" type C. Hercules (no negative)	Nov. 21, 1910	7
1428.	Bigelow Carpet Co. R. H. wheel west unit 33" type C. Hercules (no negative)	Nov. 21, 1910	7
1429.	No. 7 Boyden turbine – Merrimack M. Co. 107" Dia. Now being broken up, built in 1879 by Lowell Mach. Shop	Jan. 24, 1911	7
1430.	Same as # 1429 – different view	Jan. 24, 1911	7
1431.	Hand tub Merrimack M. Co. No. 4 built by Hunneman & Co. – Boston 1847 Picture taken Merr'k Mfg. Co.'s yard	Jan. 26, 1911	7
1432.	Wreck at Boott Mills caused by bursting fly wheel	Jan. 26, 1911	7
1433.	Wreck at Boott Mills caused by bursting fly wheel	Jan. 26, 1911	7
1434.	Site of Wicasse Falls Dam Feb. 17, 1911	Feb. 17, 1911	7
1435.	Same as # 1434 – different view	Feb. 17, 1911	7
1436.	Stone tie taken out from N. H. track of B. & L. R. R. on Six Arch Bridge over Concord River, Lowell, Mass. Probably laid in 1834.	Oct. 1901	7
1437.	Merrimack St. Bridge over Merrimack Canal (no negative)	May 25, 1911	7
1438.	Varnum Avenue near Pawtucket Dam (no negative)	May 24, 1911	7
1439.	Upper Pawtucket St. (no negative)	May 24, 1911	7
1440.	Upper Pawtucket St. (no negative)	May 24, 1911	7
1441.	Upper Pawtucket St. (no negative)	May 24, 1911	7
1442.	Jefferson St. Bridge (City Bridge) No negative	May 26, 1911	7

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No. Description	Date	Copy in BK. No
1443. Little Canada Playground	May 26, 1911	7
1444. Looking downstream from Pawtucket Bridge	May 25, 1911	7
1445. Looking upstream from Moody St. Bridge	May 26, 1911	7
1446. Looking towards Colonial Ave. from Moody St. Bridge	May 24, 1911	7
1447. Looking toward Pawtucket St. from Moody St. Bridge	May 24, 1911	7
1448. Rear of Davis & Sargent's Lumber yard	May 25, 1911	7
1449. Davis & Sargent's Lumber Yard	May 25, 1911	7
1450. W. E. Livingston's Yard	May 25, 1911	7
1451. Rear of Davis & Sargent's Lumber Yard	May 25, 1911	7
1452. Blank		
1453. Gov. Allen, showing top removed	May 26, 1911	7
1454. Rear of Bigelow Carpet Co. – Toe Wall (negative found later)	July 2, 1911	7
1455. Rear Bigelow Carpet Co.	July 2, 1911	7
1456. Lower Pawtucket Canal	Oct. 1, 1911	7
1456A Saco-Lowell Shop Yard – Near Merrik Canal	Sept. 30, 1912	7
1456B Bigelow Hartford Carpet Co. Raceways	Aug. 20, 1911	7
1457. Bigelow Hartford Carpet Co. Raceways	Aug. 20, 1911	7
1457A Saco-Lowell Shop Yard, near Merr'k Canal	Sept. 30, 1912	7
1458. Butcher's Field, Broadway & Paw. Sts.	Aug. 6, 1911	7
1458A Expt. # 1 – Finish – Swamp Locks	Oct. 28, 1911	7
1459. Expt. # 1 – Start – Swamp Locks	Oct. 28, 1911	7
1459A Shows trench at location of break in 12" (1868) main to L. & C. Reservoir, over arch of Church St. bridge, over Concord River.	Mar. 23, 1912	7
1460. Fence on Railroad Bridge at Boott Mills near Bridge St.	July 8, 1912	7
1460A Piece of 12" (1868) pipe to L. & C. reservoir from arch of Church St. Bridge over Concord River.	Mar. 23, 1912	7

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No.	Description	Date	Copy in BK. No
1461.	Pawtucket Canal from N. & L. R. R. Bridge	May 11, 1913	7
1461A	Venturi Meter Measm'ts. at Swamp Locks	June 11, 1913	7
1462.	Venturi Meter Measm'ts. at Swamp Locks	June 11, 1913	7
1462A	Venturi Meter Measm'ts. at Swamp Locks	June 13, 1913	7
1463.	Pawtucket Canal just above N. & L. R. R. Bridge	May 11, 1913	7
1464.	Pawtucket Canal just above N. & L. R. R. Bridge	May 11, 1913	7
1464A	Venturi Meter Measm'ts. at Swamp Locks	June 4, 1913	7
1465.	Venturi Meter Measm'ts. at Swamp Locks	June 4, 1913	7
1465A	West Section Lawrence Dam, before improvements showing running mark	June 30, 1913	7
1466.	Same as # 1464A – different view	June 4, 1913	7
1466A	West Section Lawrence Dam, before improvements showing running mark	June 30, 1913	7
1467.	Same as # 1466 – different view	June 5, 1913	7
1467A	From Aiken St. Bridge at cor. Of Law. Mfg. Co. Mill	Aug. 22, 1913	7
1468.	From Aiken St. Bridge at cor. Of Law. Mfg. Co. Mill	Aug. 28, 1913	7
1468A	From Aiken St. Bridge at cor. Of Law. Mfg. Co. Mill	Sept. 17, 1913	7
1469.	From Aiken St. Bridge at cor. Of Law. Mfg. Co. Mill	Sept. 30, 1913	7
1469A	L. W. W. 24" pipe laid in bed Merr'k River	Sept. 30, 1913	7
1470.	Pawtucket Boulevard (no negative)	Aug. 17, 1913	7
1470A	Bigelow Co. yard 31" stype D Hercules	Aug. 21, 1913	7
1471.	Fishway Paw. Dam	Sept. 18, 1913	7
1471A	Boott Mills, showing work in # 1 race	Oct. 19, 1913	no print
1472.	Boott Mills, showing draft tube extension on # 2 wheel	Oct. 19, 1913	7
1472A	Thorntons Ferry Rain Gauge	Oct. 27, 1913	7
1473.	Thorntons Ferry Rain Gauge	Oct. 27, 1913	7

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No.	Description	Date	Copy in BK. No
1473A	Cromwells Falls measuring station	Oct. 27, 1913	7
1474.	Nashua River, measuring station	Oct. 27, 1913	7
1474A	Lunch at Cromwells Falls	Oct. 27, 1913	7
1475.	Wall south side Pawtucket Canal just above N. L. R. R. Bridge 260 ft. built 1913 beginning 25.6 ft. from pier	Nov. 23, 1913	7
1475A	Current Meter Meas. Sta. Merrik Canal (south of racks)	Nov. 16, 1913	7
1476.	Current Meter Meas. Sta. Market St. Bridge	Nov. 16, 1913	7
1476A	Work done this season – concrete and plank on slope in rear of Saco-Lowell Shop	Nov. 23, 1913	7
1477.	Planking the slope in Lower Paw. Canal in rear of Lowell Mach. Shop.	Nov. 23, 1913	7
1477A	Lawrence Dam	Dec. 14, 1913	7
1478.	Gauge just below Thorntons Ferry.	Feb. 26, 1914	7
1478A	Cromwells Falls, gauge at measuring station	Feb. 26, 1914	7
1479.	Cromwells Falls, looking from east side of River on line of measuring station	Feb. 26, 1914	7
1479A.	Cromwells Falls, looking downstream from measuring station	Feb. 26, 1914	7
1480.	Cromwells Falls looking upstream from measuring station	Feb. 26, 1914	7
1480A	Two Small pictures of Pawtucket Dam (no negative)	Mar. 16, 1914	7
1481.	Blank		
1481A	Two small pictures of Pawtucket Dam (no negatives)	Mar. 16, 1914	7
1482.	Blank		
1482A	Two small pictures of Pawtucket Dam (no negatives)	Mar. 16, 1914	7
1483.	Blank		
1483A	Penstock gages (2 views) Mass. Cotton Mills Apr. 1914, and gage set up in paint shop for photo. Apr. 1914. Extra set of prints in envelope.	Apr. 9, 1914	7
1484.	Blank		

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No. Description	Date	Copy in BK. No
1485. Law. Dam (2 views)	May 2, 1914	7
1485A Lawrence Mfg. Co. yard, showing water in front of paint shop caused by Law. Co. shutting down	May 2, 1914	7
1486. Lawrence Canal	May 2, 1914	7
1486A Westerly end of Lawrence Canal	May 10, 1914	7
1487. Paint Shop at westerly end of Lawrence Canal	May 10, 1914	7
1487A Westerly end of Lawrence Canal	May 10, 1914	7
1488. Lawrence Dam – Gate raised 1 ft.	May 9, 1914	7
1488A Lawrence Dam – Gate wide open	May 9, 1914	7
1489. Lawrence Dam – Gate wide open	May 9, 1914	7
1489A Mouth of No. 10 & 11 Raceway Merr'k Mfg. Co.	May 26, 1914	7
1490. Merrimack Print Works Weir	May 26, 1914	7
1490A Gauge at Bow Junction, N. H. before removing sand and stones	May 27, 1914	7
1491. Gauge at Bow Junction, N. H. after removing sand and stones	May 27, 1914	7
1491A East Wall Reservoir Lot looking south	May 28, 1914	7
1492. South wall reservoir lot, looking south	May 28, 1914	7
1492A South Wall Reservoir Lot, looking west	May 28, 1914	7
1493. Fishway at Pawtucket Dam	June 5, 1914	7
1493A Vesper Country Club Suspension Bridge, partly demolished by tornado, from west side looking toward Island	July 12, 1914	7
1494. Same as # 1493A – different view	July 12, 1914	7
1494A Same as # 1493A – different view	July 12, 1914	7
1495. Same as # 1493A – different view	July 12, 1914	7
1495A. Same as # 1493A – different view	July 12, 1914	7

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No.	Description	Date	Copy in BK. No
1496.	Vesper Country Club Suspension Bridge partly demolished by tornado, from Island looking west	July 12, 1914	7
1496A	Vesper Country Club Bridge, detail of parts which failed during tornado	July 12, 1914	7
1497.	Fishway at Pawtucket Dam	Aug. 25, 1914	7
1497A	Two small photos of Central Bridge & Merrimack House (no negative)	No date	7
1498.	Three small photos: School St. Bridge Paw. Falls Fishway & Barrister Hall (no negative)	No date	7
1498A	Broken Piston Rod from 1500 gal. underwriter pump at Mass. Cotton Mills	Dec. 19, 1914	7
1499.	Boott Mills River Gauge	Jan. 3, 1915	7
1499A	Deane Vertical Triple Plunger Pump 13 x 12 Single Acting, 750 gals per min. each installed Saco-Lowell Shop (no negative)	Jan. 13, 1915	7
1500.	Same as # 1499A – different view	Jan. 13, 1915	7
1501.	Deane Vertical Triple Plunger Pump 13 x 12 Single Acting, 750 gals per min. each installed Saco-Lowell Shop (no negative)	Jan. 13, 1915	7
1501A	Pawtucket Dam	Jan. 20, 1915	7
1502.	Pawtucket Dam	Jan. 26, 1915	7
1502A	Pawtucket Dam	Mar. 3, 1915	7
1503.	Thorntons Ferry, N. H.	Mar. 2, 1915	7
1503A	Gauge at Throntons, Ferry N. H.	Mar. 2, 1915	7
1504.	Thorntons Ferry, N. H. looking upstream from just below reg. gauge	Mar. 2, 1915	7
1504A	Fishway Pawtucket Dam	Mar. 10, 1915	7
1505.	Thorntons Ferry, N. H. new gauge set in brook near old “Ferry Road”, nearly opposite depot.	Mar. 2, 1915	7
1505A	Country Club Bridge	Mar. 16, 1915	7
1506.	Country Club Bridge looking toward Island	Mar. 16, 1915	7
1506A	Merrimack Measuring Flume from Lucy Larcom Park.	May 9, 1915	7

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No. Description	Date	Copy in BK. No
1507. Merrimack Measuring Flume from Dutton St. side	May 9, 1915	7
1507A Regular gauge at Thornton Ferry, N. H.	June 3, 1915	7
1508. Blank		
1508A Showing old suction pipes in Merrimack Canal Card Clothing Bldg. taken May 9, 1915	May 9, 1915	7
1509. Showing stone drain Taking out of Merrimack Canal to supply water to new concrete tank in basement of Card Clothing Bldg.	May 9, 1915	7
1509A 18" Alden Dynamometer 12" Smith-McCormick turbine at Swamp Locks Testing flume.	June 10, 1915	7
1510. Draft tube and vacuum gauge 12" Smith-McCormick turbine at Swamp Locks Testing flume	June 10, 1915	7
1510A Measuring Station Swamp locks Testing flume	June 10, 1915	7
1511. Measuring Station Swamp locks Testing flume	June 10, 1915	7
1511A Piezometer gauge at measuring Testing flume, Swamp Locks	June 10, 1915	7
1512. Rain gauges at Pawtucket Dam	June 4, 1915	7
1512A L. & C. rain gauge at Swamp Locks	June 10, 1915	7
1513. L. & C. rain gauge at Old guard Locks	Oct. 26, 1915	7
1513A L. & C. rain gauge at Lower Locks	Oct. 29, 1915	7
1514. Blank		
1514A Gate House at Pawtucket Dam	Apr. 20, 1915	7
1515. Upper end of Northern Canal looking toward Gate House	Apr. 20, 1915	7
1515A Head of Northern Canal, looking toward Gate House	May 9, 1915	7
1516. Gate House at Old Guard Locks	June 4, 1915	7
1516.0 Gates at Old Guard Locks	May 9, 1915	7
1517. Waste Gates Northern Canal	Apr. 20, 1915	7
1517A Waste Gates Northern Canal	May 9, 1915	7
1518. Waste Gates in wall Northern Canal, from Merrimack River	June 4, 1915	7

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No.	Description	Date	Copy in BK. No
1518A.	Gate House at T. & S.	Apr. 20, 1915	7
1519.	Same as # 1518A – different view	May 9, 1915	7
1520.	Moody St. Feeder	May 9, 1915	7
1521.	Boott Dam, showing gate, bays, etc. (2 views)	June 27, 1915	7
1521A	Leak from T. & S. wheels, wasting at Law. Dam	July 4, 1915	7
1522.	Mouth of Tremont Raceways, discharging into Western Canal just below Hall St.	July 4, 1915	7
1523.	Mouth of Tremont Raceways, discharging into Law. Canal, showing leak (2 views)	July 4, 1915	7
1523A	Merrimack Print Works Wasteway, Weir removed , looking toward Mill.	June 27, 1915	7
1524.	Merrimack Print Works Wasteway	June 27, 1915	7
1524A	School St. Bridge over Merrimack River	June 29, 1915	7
1525.	School St. Bridge over Merrimack River (different view than # 1524A)	June 29, 1915	7
1525A	Same as # 1525 – different view	June 29, 1915	7
1526.	Same as # 1525 – different view	June 29, 1915	7
1527	River bed just below Paw. Dam (2 views)	June 29, 1915	7
1527A	Same as # 1525 – different view	July 6, 1915	7
1528.	Same as # 1525 – different view	July 6, 1915	7
1528A	Same as # 1525 – different view	July 6, 1915	7
1529.	Pawtucket Dam (no negative)*	July 10, 1915	7
1529A	Same as # 1525 – different view	July 10, 1915	7
1530.	Pawtucket Dam (no negative)	Mar. 3, 1915	7
1530A	Pawtucket Dam (no negative)	Mar. 3, 1915	7
1531.	Merrimack River	Mar. 3, 1915	7
1531A	Merrimack River	Mar. 3, 1915	7

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No.	Description	Date	Copy in BK. No
1530B	Repairing Pawtucket Dam – Water 81.50	July 23, 1915	7A
1531B	Repairing Pawtucket Dam – Water 81.50	July 23, 1915	No print
1532B	Repairing Pawtucket Dam – Water 81.40	July 23, 1915	7A
1533B	Pawtucket Dam Repairs	July 23, 1915	7A
1534B	Pawtucket Dam Repairs	July 23, 1915	7A
1535B	Pawtucket Dam Repairs – Water abt. 81.50	July 23, 1915	No print
1536B	Pawtucket Dam Repairs – Water abt. 81.50	July 23, 1915	7A
1537B	Pawtucket Dam Repairs	July 27, 1915	No print
1538B	Pawtucket Dam Repairs	July 27, 1915	No print
1539B	Pawtucket Dam Repairs	July 27, 1915	No print
1540B	Pawtucket Dam Repairs	July 27, 1915	7A
1541B	Pawtucket Dam Repairs	July 27, 1915	7A
1542B	Pawtucket Dam Repairs – Water 83.2	July 28, 1915	7A
1543B	Pawtucket Dam Repairs – Water 83.2	July 29, 1915	7A
1544B	Pawtucket Dam Repairs – Water 83.2	July 29, 1915	7A
1545B	Pawtucket Dam Repairs	July 29, 1915	7A

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No.	Description	Date	Copy in BK. No
1532.	Merrimack River	Mar. 3, 1896	7
1532A	Flat East of Textile School (no negative)	Mar. 3, 1896	7
1533.	Break in Pawtucket Dam (no negative)	July 12, 1915	7
1533A	Break in Pawtucket Dam (no negative)	July 13, 1915	7
1534.	Break in Pawtucket Dam (no negative)	July 13, 1915	7
1534A	Merrimack Print Works Wasteway, New pipes leading to river	Oct. 3, 1915	7
1535.	Outlet of Merrimack Print Works discharge pipe	Oct. 24, 1915	7
1535A	Gate on Bridge Merrimack Meas. Flume	Oct. 25, 1915	7
1536.	View of Upper Bridge Merrimack Meas. Flume	Oct. 25, 1915	7
1536A	Boott Regular Gauge and Self Recording Continuous Gauge	Oct. 24, 1915	7
1537.	Obstruction in 2” pipe leading to tenements cor. Broadway and Dummer Sts., taken out.	Oct. 14, 1915	7
1537A	Pawtucket St. Bridge (High Bridge) over Northern Canal – looking east	Oct. 25, 1915	7
1538.	St. Bridge (High Bridge) over Northern Canal – looking upstream	Oct. 25, 1915	7
1538A	Same as # 1537A – different view	Oct. 26, 1915	7
1539.	Same as # 1538 – different view	Oct. 26, 1915	7
1539A	Broadway Bridge over Pawtucket Canal looking East	Oct. 26, 1915	7
1540.	Broadway Bridge over Pawtucket Canal looking upstream	Oct. 26, 1915	7
1540A	Thorndike St. Bridge over Pawtucket Canal Looking North	Oct. 26, 1915	7
1541.	Thorndike St. Bridge over Pawtucket Canal Looking downstream	Oct. 26, 1915	7
1541A	Merrimack St. Bridge over Western Canal looking toward City Hall	Oct. 28, 1915	7
1542.	Merrimack St. Bridge over Western Canal looking upstream	Oct. 28, 1915	7

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No.	Description	Date	Copy in BK. No
1542A	Suffolk St. Bridge over Northern Canal, looking downstream	Oct. 28, 1915	7
1543.	Suffolk St. Bridge over Northern Canal, looking toward Law. Mfg. Co.	Oct. 28, 1915	7
1543A	Central St. Bridge over Lower Pawtucket Canal, looking upstream	Oct. 29, 1915	7
1544.	Central St. Bridge over Lower Pawtucket Canal, looking towards Merrimack St.	Oct. 29, 1915	7
1544A	East Merrimack St. Bridge over Eastern Canal, looking downstream	Oct. 29, 1915	7
1545.	East Merrimack St. Bridge over Eastern Canal, looking toward Merrimack Square	Oct. 29, 1915	7
1545A	Bridge St. Bridge Eastern Canal, looking downstream	Oct. 29, 1915	7
1546.	Bridge St. Bridge over Eastern Canal, toward Merrimack River	Oct. 29, 1915	7
1546A	Merrimack Canal, looking towards Merrimack Mfg. Co., from opp. Feeder Gate House	Jan. 26, 1916	7
1546B	Repairing Pawtucket moved 50 ft. upstream (2 negatives) Water = 83.60	July 30, 1916	7
1547.	Merrimack Canal, looking toward Merrimack Mfg. Co., from rear of Feeder Gate House	Jan. 26, 1916	7
1547A	Merrimack Canal, from R. R. Bridge, looking under Y. M. C. A.	Jan. 26, 1916	7
1547B	Repairing Pawtucket Dam – Water 84.50 (2 no negatives)	July 31, 1915	7 A
1548.	Break in Northern Canal Wall, Ford St. side just below Cabot St. Bridge	July 30, 1916	7
1548A	Fire at Middlesex Co. # 2 Store House	Jan. 29 & 30-1916	7
1549.	Fire at Middlesex Co. # 2 Store House	Jan. 29 & 30-1916	7
1549A	Section of diagram from Merrimack River, Telehydrobarometer	Feb. 2, 1916	7
1549B	(2 negatives – 1 broken) Repairing Pawtucket Dam – Water 82.60	Aug. 2, 1915	7A
1550.	Broadway St. at L. & C. office (no negative)	Feb. 25, 1916	7

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No.	Description	Date	Copy in BK. No
1550A	Lower Appleton Gauge – Water 68.47	Apr. 6, 1916	7
1550B	Repairing Pawtucket Dam – Water 82.95	Aug. 3, 1915	7A
1551.	Blank		
1551B	Repairing Pawtucket Dam – Water 82.95	Aug. 3, 1915	7A
1552.	Shore of Merrimack River above Pawtucket Bridge – Water 88.15 above Dam	Feb. 29, 1916	7
1552A	Shore of Merrimack River downstream from Pawtucket Bridge, view from cor. of abutment – Water 88.15 above Dam	Feb. 29, 1916	7
1552B	Repairing Pawtucket Dam – Water 82.95	Aug. 3, 1915	7A
1553.	Front St. fence along River Bank West	Feb. 29, 1916	7
1553A	Front St. fence along River Bank East	Feb. 29, 1916	7
1553B	Pawtucket Dam – Water 84.70 at 11: 02 AM	Aug. 5, 1915	7A
1554.	Pawtucket Bridge – Lowell (2 negatives)	Mar. 28, 1916	7
1554A	Break in Western Canal Wall – east of side - south of Merrimack Street	Apr. 30, 1916	7
1554B	Pawtucket Dam – Water 85.25	Aug. 5, 1915	7A
1555.	Break in Western Canal Wall – east side - south of Merrimack Street	Apr. 30, 1916	7
1555A	Break in Western Canal Wall – east side - south of Merrimack Street	May. 14, 1916	7
1555B	Pawtucket Dam – 85.25	Aug. 5, 1915	7A
1556.	Break in Western Canal Wall – east side – south of Merrimack Street	May 14, 1916	7
1556A	Recently built fence on north side of Broadway near Old Guard Locks	June 14, 1916	7
1556B	Pawtucket Dam – Water 86.00	Aug. 7, 1915	7A
1557.	Appleton Lower Gauge	June 25, 1916	7
1557A	Appleton New Mill	June 25, 1916	7
1557B	Repairing Pawtucket Dam – Water 86.00	Aug. 7, 1915	7A

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No. Description	Date	Copy in BK. No
1558. Elm tree on L. & C. land opp. 48 Lewis St. from which large limb broke off and fell to street	July 6, 1916	7
1558A Removing part of Hoisting apparatus from Northern Canal Gate House	July 10, 1916	7
1558B Repairing Pawtucket Dam – Water 86.00	Aug. 7, 1915	7A
1559. Lower Pawtucket Canal Wall, near American House	July 16, 1916	7
1559A Swamp Locks Dam now being raised one foot the left hand side has already been raised (no negative)	Sept. 5, 1918	7
1559B Repairing Pawtucket Dam – Water 86.20	Aug. 10, 1915	7A
1560. East Wall of Western Canal showing repair just finished (no negative)	Sept. 5, 1918	7
1560A Theatre Platform – Central St. (no negative)	Sept. 27, 1916	7
1560B Pawtucket Dam – Water 86.20	Aug. 10, 1915	7A
1561. Theatre Platform – Central St.	Sept. 27, 1916	7
1561A Theatre Platform – Central St.	Sept. 27, 1916	7
1561B Repairing Pawtucket Dam – Rebuilding coffer dam where washed away – Water 83.70	Aug. 11, 1915	7A
1562. Theatre Platform – Central St. Placing 24” beam	Sept. 27, 1916	7
1562A Theatre Platform – Central St. Placing 24” beam	Sept. 27, 1916	7
1562B Repairing Pawtucket Dam – rebuilding coffer dam where washed away – Water 83.70	Aug. 11, 1915	7A
1563. Theatre Platform – Central St.	Sept. 27, 1916	7
1563A 24” steel beam being installed for support of platform over Pawtucket Canal on East Side of Central Street	Sept. 29, 1916	7
1563B Repairing Pawtucket Dam – rebuilding coffer dam – cleaning joints for grouting – Water 83.85 (2 negatives)	Aug. 12, 1915	7A
1564. 24” steel beams being installed for support of platform over Pawtucket Canal on the E. side of Central street	Sept. 29, 1916	7

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No.	Description	Date	Copy in BK. No
1564A	24" steel beams being installed for support of platform over Pawtucket Canal on the East side of Central street	Sept. 29, 1916	7
1564B	Repairing Pawtucket Dam – Water 83.55	Aug. 13, 1915	7A
1565.	Theatre Platform – Central Street	Sept. 27, 1916	7
1565A	24" steel beams being installed for support of platform over Pawtucket Canal on the East side of Central street	Sept. 29, 1916	7
1565B	Repairing Pawtucket Dam – Water 83.55	Aug. 13, 1915	7A
1566.	Theatre Platform work – S. side of Canal	Oct. 8, 1916	7
1566A	Theatre Platform work – N side of Canal	Oct. 8, 1916	7
1566B	Repairing Pawtucket Dam – Water 84.30	Aug. 14, 1915	7A
1567.	Looking down Concord River from E. Merrimack Street	Oct. 11, 1916	7
1567A	Bank Concord River near "Whittier Cotton Mill"	Oct. 11, 1916	7
1567B	Repairing Pawtucket Dam – Water 84.30	Aug. 14, 1915	7A
1568.	Pawtucket Bridge under construction	Oct. 14, 1916	7
1568A	Same as # 1568 – different view	Oct. 14, 1916	7
1568B	Repairing Pawtucket Dam – Water 84.30	Aug. 14, 1915	7A
1569.	Merrimack Canal Wall	Oct. 15, 1916	7
1569A	Merrimack Canal Wall	Oct. 15, 1916	7
1569B	Repairing Pawtucket Dam – Water 84.65	Aug. 15, 1915	7A
1570.	Looking up Pawtucket Canal from point on South Wall 1200 ft. below School St.	Oct. 28, 1916	7
1570B	Repairing Pawtucket Dam – Water 84.20	Aug. 16, 1915	7A
1571.	Looking down Pawtucket Canal from point on South Wall 1200 ft. below School St.	Oct. 28, 1916	7
1571A	Looking up Pawtucket Canal from Nashua & Lowell R. R. Bridge	Oct. 28, 1916	7
1571B	Repairing Pawtucket Dam – Water 84.20	Aug. 16, 1915	7A
1572.	Looking up Pawtucket Canal from Fletcher St. Bridge	Oct. 28, 1916	7

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No.	Description	Date	Copy in BK. No
1572A	Looking up Pawtucket Canal from Old B & M. R. R. Bridge (Below Fletcher St.)	Oct. 28, 1916	7
1572B	Repairing Pawtucket Dam – Water 84.20	Aug. 16, 1915	7A
1573.	Looking down Pawtucket Canal Saco-Lowell Shops Mill Yard	Oct. 28, 1916	7
1573A	Looking down Pawtucket Canal from building on West side of Central St.	Oct. 28, 1916	7
1573B	Repairing Pawtucket Dam – Water 83.15	Aug. 17, 1915	7A
1574.	Looking up Pawtucket Canal from point near Central Street (2 views)	Oct. 28, 1916,	7
1574A	New Pawtucket Bridge Canal Construction (no negative)	Nov. 9, 1916	7
1574B	Repairing Pawtucket Dam – Water 83.15	Aug. 17, 1915	7A
1575.	Looking up Pawtucket Canal from the Old Boston Lowell R. R. Bridge (below Fletcher St.)	Nov. 2, 1916	7
1575A	Wall at entrance to Hamilton Canal along land leased to B. & L. R. R.	Nov. 25, 1916	7
1575B	Repairing Pawtucket Dam – Water 83.20	Aug. 18, 1915	7A
1576.	Merrimack River, Lowell, Mass. (near dam)	Jan. 17, 1917	7
1576A	West Bank Pawtucket Canal above Old Guard Locks	Jan. 17, 1917	7
1576B	Repairing Pawtucket Dam – Water 83.20	Aug. 18, 1915	7A
1577.	Work at New Pawtucket Bridge	Jan. 17, 1917	7
1577A	Front St. Lowell (showing new fence)	Mar. 19, 1917	7
1577B	Repairing Pawtucket Dam – Water 83.20	Aug. 18, 1915	7A
1578.	Front St. Lowell (showing new fence)	Mar. 19, 1917	7
1578A	Pawtucket Bridge (3 negatives)	Mar. 28, 1917	7
1578B	Repairing Pawtucket Dam – Water 82.85	Aug. 19, 1915	7A
1579.	Pawtucket Bridge (3 negatives)	Mar. 28, 1917	7
1579A	Recently built fence – Hamilton Canal near Saco-Lowell Foundry	Apr. 5, 1917	7

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No.	Description	Date	Copy in BK. No
1579B	Repairing Pawtucket Dam – Water 82.85	Aug. 19, 1915	7A
1580.	Recently built Hamilton Canal Fence	Apr. 5, 1916	7
1580A	Obstructed passageway from Stackpole St to Merrimack River – near Barry Shoe Co.	Apr. 16, 1917	7
1580B	Repairing Pawtucket Dam – Water 82.45	Aug. 20, 1915	7A
1581.	Recently built fence at East End of "High Bridge" over Northern Canal	May 15, 1917	7
1581A	Recently built fence at East End of "High Bridge" over Northern Canal	May 15, 1917	7
1581B	Repairing Pawtucket Dam – Water 82.45	Aug. 20, 1915	7A
1582.	Recently built fence at West End of "High Bridge" over Northern Canal	May 15, 1917	7
1582A	View from Broadway Bridge over Western Canal, showing rear of Suffolk St. Tenement Blocks	May 19, 1917	7
1582B	Repairing Pawtucket Dam – Water 82.45	Aug. 20, 1915	7A
1583.	"Motley & Kimball Block" Central St.	May 21, 1917	7
1583A	Cars on R. R. curve over Merrimack Canal at foot of Dutton St. – near Merrimack M. Co.	May 26, 1917	7
1583B	Repairing Pawtucket Dam – Water 82.45	Aug. 20, 1915	7A
1584.	Dutton St. Wall – Merrimack Canal (rebuilding of top just finished)	June 3, 1917	7
1584A	R. R. Bridge over Merrimack Canal at the foot of Dutton St.	June 3, 1917	7
1584B	Repairing Pawtucket Dam – Water 83.56	Aug. 21, 1915	7A
1585.	Dutton St. Wall – Merrimack Canal rebuilding of top just finished)	June 4, 1917	7
1585A	Recently built fence on east bank of Pawtucket Canal, near Vesper Boat House	June 14, 1917	7
1585B	Repairing Pawtucket Dam – Water 83.50	Aug. 21, 1915	7A
1586.	Recently built fence on west shore at junction of Pawtucket Canal and Merrimack River	June 14, 1917	7
1586A	Recently built fence on shore of Merrimack River near head of Pawtucket Canal	June 14, 1917	7
1586B	Repairing Pawtucket Dam -	Aug. 23, 1915	7A

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No.	Description	Date	Copy in BK. No
1587.	Recently built fence on passageway leading from Stackpole St. to river near Barry's Shoe Shop	June 14, 1917	7
1587A	Recently built fence on North side of Broadway, near Old Guard Locks (no negative)	June 14, 1917	7
1587B	Repairing Pawtucket Dam – view from angle at upper end of break	Aug. 23, 1915	7A
1588.	Railroad curve – between Merrimack Mill Yard and Amory Street, near Boott Store House	June 19, 1917	7
1588A	Railroad curve crossing Sutton Street near Moody Street	June 19, 1917	7
1588B	Repairing Pawtucket Dam -	Aug. 23, 1915	7A
1589.	B. & L. R. R. Bridge No. 333 rebuilt June 24, 1917 (near Merrimack Canal Gates)	June 24, 1917	7
1589A	Eastern Canal Wall near Canal Street, being reinforced on back side	June 25, 1917	7
1589B	Repairing Pawtucket Dam – shows one of the dislodged cap stones	Aug. 23, 1915	7A
1590.	Eastern Canal Wall near Canal Street, being reinforced on back side	June 25, 1917	8
1590A	B. & L. R. R. Bridge No. 339 – rebuilt July 1917 (near Y. M. C A. Lowell)	July 1917	8
1590B	Repairing Pawtucket Dam	Aug. 24, 1915	7A
1591.	Eastern Canal Wall along Canal Street, reinforced with concrete on back side	July 1917	8
1591A	"Test Wall" near Davis & Sargent's fell over Aug. 5, 1917	Aug. 6, 1917	8
1591B	Repairing Pawtucket Dam	Aug. 24, 1915	7A
1592.	Test Wall rear Davis & Sargent's – fell over Aug. 5, 1917	Aug. 6, 1917	8
1592A	Hydrant near Hamilton Blue Dye House in rear of "Motley Platform"	Aug. 8, 1917	8
1592B	Repairing Pawtucket Dam	Aug. 24, 1915	7A
1593.	Central St. Bridge over Pawtucket Canal	Sept. 26, 1917	8

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No.	Description	Date	Copy in BK. No
1593A	Explosion 8:30 P. M. Oct. 1, 1917 Amory St. (2 negatives)	Oct. 1, 1917	8
1593B	Repairing Pawtucket Dam	Aug. 25, 1915	7A
1594.	Photo of board giving "Rates of Toll" (2 negatives)	Oct. 17, 1917	8
1594A	Old Board Fence corner of Suffolk & Market Sts. (2 negatives)	Oct. 22, 1917	8
1594B	Repairing Pawtucket Dam	Aug. 25, 1915	7A
1595.	New iron fence corner Suffolk & Market Sts. (2 negatives)	Oct. 23, 1917	8
1595A	South abutment Thorndike St. Bridge	Nov. 3, 1917	8
1595B	Repairing Pawtucket Dam	Aug. 25, 1915	7A
1596.	South abutment of Thorndike St. Bridge	Nov. 3, 1917	8
1596A	Old Middlesex Canal and Toll House	Nov. 6, 1917	8
1596B	Repairing Pawtucket Dam	Aug. 25, 1915	7A
1597.	Site of Water Tank and Pumping Plant of B. & M. R. R. at Middlesex Village Station	Nov. 6, 1917	8
1597A	of Water Tank and Pumping Sts. of B. & M. R. R. at Middlesex Village Station, now being erected	Nov. 6, 1917	8
1597B	Repairing Pawtucket Dam	Aug. 25, 1915	7A
1598.	Temporary fence built by P. L. & C. on West Sidewalk of Thorndike St. Bridge as it stood Nov. 6, 1917	Nov. 7, 1917	8
1598A	Northerly wall of Northern Canal near Suffolk M. Co. looking west – now having the top part rebuilt	Nov. 8, 1917	8
1598B	Repairing Pawtucket Dam	Aug. 28, 1915	7A
1599.	Southerly wall of Northern Canal, looking from Cabot St. Bridge	Nov. 8, 1917	8
1599A	Northerly wall of Northern Canal near Suffolk Mills, looking west. Wall now having top rebuilt	Nov. 8, 1917	8

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No. Description	Date	Copy in BK. No
1599B Repairing Pawtucket Dam	Aug. 29, 1915	7A
1600. Railroad curve at foot of Tremont Street	Nov. 8, 1917	8
1600A Railroad curve at foot of Tremont Street	Nov. 8, 1917	8
1600B Repairing Pawtucket Dam	Aug. 30, 1915	7A
1601. Photo of freight car, which run off the rails at the curve at foot of Dutton St., near Merrimack M. Co. Nov. 9, 1917	Nov. 9, 1917	8
1601A R. R. Tracks at Boott Store House	Nov. 16, 1917	8
1601B Repairing Pawtucket Dam	Aug. 31, 1915	7A
1602. R. R. Tracks at Boott Store House	Nov. 15, 1917	8
1602A R. R. curve from Dutton St. Track	Nov. 16, 1917	8
1602B Repairing Pawtucket Dam	Aug. 31, 1915	7A
1603. R. R. Tracks at Woolen Store House of T. & S. Mills	Nov. 16, 1917	8
1603A R. R. Tracks at Woolen Store House of T. & S. Mills	Nov. 16, 1917	8
1603B Repairing Pawtucket Dam	Aug. 31, 1915	7A
1604. Northern Canal looking West from Suffolk St.	Nov. 16, 1917	8
1604A Western Canal from Moody Street	Nov. 17, 1917	8
1604B Repairing Pawtucket Dam	Sept. 1, 1915	7A
1605. Open iron fence at Lewis, & Market Sts. and at Suffolk & Market Sts. recently erected by P. L. & C.	Nov. 24, 1917	8
1605A Open iron fence at Hanover and Market Sts. and at Suffolk & Market Sts. recently erected by P. L. & C.	Nov. 24, 1917	8
1605B Repairing Pawtucket Dam	Sept. 1, 1915	7A
1606. Open iron fence at Suffolk & Merrimack Sts. recently erected by P. L. & C.	Nov. 24, 1917	8
1606A R. R. curves at foot of Dutton Street	Nov. 24, 1917	8
1606B Repairing Pawtucket Dam	Sept. 1, 1915	7A

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No.	Description	Date	Copy in BK. No
1607.	R. R. curves at Boott Store House	Nov. 25, 1917	8
1607A	R. R. curves at Boott Store House	Nov. 25, 1918	8
1607B	Repairing Pawtucket Dam	Sept. 3, 1915	7A
1608.	South abutment of Thorndike St. Bridge, now being rebuilt	Nov. 25, 1917	8
1608A	Recently erected wire fence on East side of Pawtucket Canal, starts at Pawtucket Street – 984 ft. long – 8 ft. high	Nov. 26, 1917	8
1608B	Repairing Pawtucket Dam	Sept. 3, 1915	7A
1609.	Recently erected wire fence on East side of Pawtucket Canal, starts at Pawtucket St.	Nov. 26, 1917	8
1609A	Open iron fence at Merrimack & Hanover Sts. and at Merrimack & Suffolk Sts., recently erected by P. L. & C.	Nov. 26, 1917	8
1609B	Repairing Pawtucket Dam	Sept. 3, 1915	7A
1610.	Locks and Canals Gate House at Pawtucket Dam – rain & snow water running into house at door “A” and over window at sill “B” the latter place bring directly over large drive belt	Jan. 12, 1918	8
1610A	Removing ice from L. & C. Reservoir – some 27” thick	Jan. 24, 1918	8
1610B	Repairing Pawtucket Dam	Sept. 4, 1915	7A
1611.	Repairing Easterly Wall of Lawrence Wasteway	Feb. 15, 1918	8
1611A	Repairing Easterly Wall of Lawrence Wasteway	Feb. 15, 1918	8
1611B	Repairing Pawtucket Dam	Sept. 4, 1915	7A
1612.	Repairing East wall of Lawrence Wasteway	Feb. 15, 1918	8
1612A	Ice Jam in Western Canal – looking upstream from Worthen St.	Feb. 21, 1918	8
1612B	Repairing Pawtucket Dam	Sept. 5, 1915	7A

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No.	Description	Date	Copy in BK. No
1613.	Ice jam in Western Canal – view looking upstream from Worthen Street.	Feb. 21, 1918	8
1613A	Cady Building Fire	Mar. 18, 1918	8
1613B	Repairing Pawtucket Dam	Sept. 7, 1915	7A
1614.	Same as # 1613A – different view	Mar. 18, 1918	8
1614A	Sidewalk in front of Locks & Canals office – 66 Broadway	Jan. 12, 1918	8
1614B	Repairing Pawtucket Dam	Sept. 8, 1915	7A
1615.	8” pipe from L. & C. Main in Prescott Mill Yard	Feb. 15, 1918	8
1615A	Ice jam in Western Canal, view looking upstream from Dutton St.	Feb. 21, 1918	8
1615B	Repairing Pawtucket Dam	Sept. 8, 1915	7A
1616.	North abutment of Central St. Bridge and Motley Bldg., shows at West line of Street and front line of Bldg.	Apr. 7, 1918	8
1616A	South abutment of Central St. Bridge, shows line of W. side of Street and Front Line of Motley Bldg.	Apr. 7, 1918	8
1616B	Repairing Pawtucket Dam – setting last capstone	Sept. 9, 1915	7A
1617.	Easterly Wall of Lawrence Wasteway Recently repaired	Apr. 15, 1918	8
1617A	Pawtucket Canal above Old Guard Locks, shows “Upper Free Landing” unfenced	Apr. 19, 1918	8
1617B	Repairing Pawtucket Dam	Sept. 9, 1915	7A
1618.	“Upper Free Landing” – unfenced	Apr. 19, 1918	8
1618A	North Wall of Hamilton Canal near Saco-Lowell Shops, being repaired	Apr. 22, 1918	8
1618B	Repairing Pawtucket Dam	Sept. 9, 1915	7A
1619.	Easterly Wall of Western Canal, top part soon to be replaced (re-laid)	Apr. 28, 1918	8

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No.	Description	Date	Copy in BK. No
1619A	Fishway at Pawtucket Dam	May 8, 1918	8
1619B	Repairing Pawtucket Dam – Finished	Sept. 9, 1915	7A
1620.	Fishway at Pawtucket Dam	May 8, 1918	8
1620A	New Retaining wall at Cady Building (no negative)	May 12, 1918	8
1620B	Pawtucket Dam	Sept. 9, 1915	7A
1621.	Guides for new 42 ½ “, All is Chalmer Turbine at Boott Mills (no negative)*	May 14, 1918	8
1621A	Now 42 ½ “, All is-Chalmers Turbine at Boott Mills (no negative)*	May 14, 1918	8
1621B	Repairing Pawtucket Dam – Finished	Sept. 9, 1915	7A
1622.	Now 42 ½ “, All is-Chalmers Turbine at Boott Mills (no negative)*	May 14, 1918	8
1622A	Location of proposed swimming place Northern Canal	May 17, 1918	8
1622B	Pawtucket Dam – all stone reset	Sept. 9, 1915	7A
1623.	Exposed bank being protected with canvas from Erosion – Western Canal	May 1918	8
1623A	Building on North side of Central St. on N. Bank of Pawtucket Canal	June 9, 1918	8
1623B	Pawtucket Dam – all stone reset	Sept. 9, 1915	7A
1624.	Motley & Dunbar Building on North side of Central St. Lowell – to be remodeled	June 9, 1918	8
1624A	Northerly Wall of Hamilton Canal – top part recently re-laid	June 16, 1918	8
1624B	Pawtucket Dam – showing upstream part of repaired portion in commission again	Oct. 2, 1915	7A
1625.	Easterly Wall of Western Canal near entrance to Moody St. Feeder – soon to be re-laid	June 17, 1918	8
1625A	Wall at head of Swamp Locks now being given a facing of concrete	July 28, 1918	8
1625B	Pawtucket Dam – shows inscription stone with added inscription	Oct. 2, 1915	7A
1626.	North abutment wall of Central St. Bridge – now being given a concrete facing averaging 8 in. thick	July 28, 1918	8

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No.	Description	Date	Copy in BK. No
1626A	North abutment wall of Central St. Bridge now being given a concrete facing averaging 8" thick	July 28, 1918	8
1626B	Pawtucket Dam – shows part of the 1847 Dam	Oct. 15, 1915	7A
1627.	Basement of Appleton Co.'s New Coal Pocket, Jackson & Revere Sts.	July 30, 1918	8
1627A	L. & C. new 16" water main being laid through Saco-Lowell Shops yard – view shows under the "Archway"	July 31, 1918	8
1628.	Shows bucket of Hercules type "A". "B", "C" & "D" wheels		8
1628A	Runners for type "A". "B", "C" & "D" Hercules wheels		8
1629.	Recently laid L. & C. 12" water Main, showing method of supporting it by means of trusses, where it crosses under bridge in Saco-Lowell Shops Yard (no negative)	Aug. 10, 1918	8
1629A	Outlet of Raceway between Saco-Lowell Shops & Bigelow – Hartford Carpet Co. – into Lower Pawtucket Canal	Aug. 10, 1918	8
1630.	Concrete facing just made on wall at head of Merrimack Canal	Aug. 11, 1918	8
1630A	Concrete facing of North abutment of Central St. Bridge, just finished (no negative)	Aug. 25, 1918	8
1631.	West Wall of Eastern Canal upstream from Mass. Measuring Flume	Aug. 25, 1918	8
1631A	West Wall of Eastern Canal upstream from Mass. Measuring Flume	Aug. 25, 1918	8
1632.	Western Canal Wall – east side, repairs just finished (2 negatives)	Sept. 5, 1918	8
1632A	Swamp Locks Dam now being raised one foot – the left hand side has already been raised	Sept. 5, 19118	8
1633.	Swamp Locks Dam being raised one foot – left hand side has already raised	Sept. 5, 19118	8
1633A	Prescott Mills – outlet s of wheel races into Concord River	Sept. 19, 1918	8
1634.	Prescott Mills – outlet s of wheel races into Concord River	Sept. 19, 1918	8

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No.	Description	Date	Copy in BK. No
1634A	39" Type "3" Leffel wheel guides L. H. Hamilton Mfg. Co. # 9	Sept. 23, 1918	8
1635.	39" Type "3" Leffel wheel L. H. Hamilton Mfg. Co. # 9	Sept. 23, 1918	8
1635A	Guide rings 42" Hercules R. H. Type "D" – Mass. Cotton Mills, new # 5 wheel	Sept. 24, 1918	8
1636.	42" Hercules R. H. Type "D" – Mass. Cotton Mills, new # 5 wheel	Sept. 24, 1918	8
1636A	Swamp Locks Dam – just raised one foot	Oct. 3, 1918	8
1637.	Swamp Locks Dam – just raised one foot – Water O2.95	Oct. 7, 1918	8
1637A	Tenement block and store house belonging to proprs. Locks & Canals (Greek School beyond)	Oct. 8, 1918	8
1638.	Greek School corn. Broadway & Worthen Sts. Locks & Canals Store House and tenements block beyond	Oct. 8, 1918	8
1638A	West Wall of Eastern Canal	Oct. 13, 1918	8
1639.	Work of re-in forcing Westerly Wall of Eastern Canal with a face of concrete Finished Oct. 6, 1918	Oct. 13, 1918	8
1639A	Work reinforcing Westerly wall of Eastern Canal with a face a concrete	Oct. 13, 1918	8
1640.	Broadway Bridge over Pawtucket Canal, looking west – now being repaired	Oct. 18, 1918	8
1640A	Broadway Bridge over Pawtucket Canal, looking East – now being repaired	Oct. 18, 1918	8
1641.	Broadway Bridge over Pawtucket Canal, downstream side – looking west, now being repaired	Oct. 23, 1918	8
1641A	Broadway Bridge over Pawtucket Canal, downstream side – looking west, now being repaired	Oct. 23, 1918	8
1642.	Swamp Locks Dam	Nov. 15, 1918	8
1642A	Entrance to Hamilton Canal	Nov. 15, 1918	8

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No.	Description	Date	Copy in BK. No
1643.	Racks of Mass. Cotton Mills – Just below Counting Room Bridge – shows washing in front of Racks now being filled with stones	Nov. 17, 1918	8
1643A	Washout of bottom of wall under corner of Cloth Room Building, Mass. Cotton Mills.	Nov. 17, 1918	8
1644.	West wall of Eastern Canal – 114 ft. in length just reinforced with a facing of concrete (work done Sept. 10 to Nov. 10, 1918)	Nov. 17, 1918	8
1644A	Same as # 1644 – different view	Nov. 17, 1918	8
1645.	Blue Dye House Ice Boom in Lower Pawtucket Canal, now being erected	Nov. 17, 1918	8
1645A	Blue Dye House Ice Boom – Lower Pawtucket Canal, just built	Nov. 24, 1918	8
1646.	Blue Dye House Ice Boom – Lower Pawtucket Canal, rear view – just finished	Nov. 24, 1918	8
1646A	West wall of Eastern Canal – 114 ft. long. just finished with a concrete face	Nov. 24, 1918	8
1647.	West wall of Eastern Canal – showing 114 ft. of new concrete facing – just finished	Nov. 24, 1918	8
1647A	West wall of Eastern Canal – showing 114 ft. of concrete facing, just finished	Nov. 24, 1918	8
1648.	West wall of Eastern Canal, showing 114 ft. in length of concrete facing – just finished (Sept. 10 to Nov. 10, 1918)	Nov. 24, 1918	8
1648A	Eastern Canal along Canal Street	Nov. 24, 1918	8
1649.	Eastern Canal near Mass. Cotton Mills	Nov. 24, 1918	8
1649A	Eastern Canal near Mass. Cotton Mills	Nov. 24, 1918	8
1650.	Collapse of Dillon Dye House Building 6-7 A. M. Nov. 27, 1918 – east side of Concord River, Lowell, Mass.	Nov. 27, 1918	8
1650A	Collapse of Dillon Dye House Building 6-7 A. M. Nov. 27, 1918 – east side of Concord River, Lowell, Mass. (negative cracked)	Nov. 27, 1918	8
1651.	Collapse of Dillon Dye House Building 6-7 A. M. Nov. 27, 1918 – east side of Concord River, Lowell, Mass.	Nov. 27, 1918	8

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No.	Description	Date	Copy in BK. No
1651A	Collapse of Dillon Dye House Building 6-7 A. M. Nov. 27, 1918 – east side of Concord River, Lowell, Mass.	Nov. 27, 1918	8
1652.	Collapse of Dillon Dye House Building 6-7 A. M. Nov. 27, 1918 – east side of Concord River, Lowell, Mass.	Dec. 2, 1918	8
1652A	Collapse of Dillon Dye House Building 6-7 A. M. Nov. 27, 1918 – east side of Concord River, Lowell, Mass.	Dec. 10, 1918	8
1653.	26" R. H. Type "S" S. Morgan Smith Co. to replace old # 5 Saco-Lowell Shop	Dec. 19, 1918	8
1653A	26" R. H. Type "S" S. Morgan Smith Co. to replace old # 5 Saco-Lowell Shop	Dec. 19, 1918	8
1654.	26" R. H. Type "S" S. Morgan Smith Co. to replace old # 5 Saco-Lowell Shop	Dec. 19, 1918	8
1654A	Merrimack St. Bridge over Western Canal, now being rebuilt by P. L. & C. – looking East	Dec. 31, 1918	8
1655.	R. R. Bridge over Western Canal – opposite Kitson Machine Shop – Dutton St.	Jan. 10, 1919	8
1655A	New Hydro-Electric Plant at Mass. Cotton Mills Unit No. 5 & No. 6 (2 Negatives)	Jan. 15, 1919	8
1656.	Prescott Mills – installing 3-33" Hercules turbine with electric generators – view shows mouth of draft tubes at Concord River	Feb. 4, 1919	8
1656A	Prescott Mills – installing mouth of draft take as Concord River wall (Easterly tube) 3-33 inch Hercules turbines – view from E. Merrimack St. Bridge	Feb. 4, 1919	8
1657.	Installing easterly draft tube at Concord River wall of Prescott Mills, 3-33" Hercules turbine going in	Feb. 4, 1919	8
1657A	Prescott Mills, installing Hydro-electric Plant 3-33 inch Hercules turbine – view from E. Merrimack St. Bridge	Feb. 11, 1919	8
1658.	3-33" Hercules turbine R. H. "Type" "D" – now being set at Prescott Mills (middle one of 3)	Feb. 11, 1919	8

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No.	Description	Date	Copy in BK. No
1658A	33" Hercules Turbine R. H. Type D now being set at Prescott Mills (middle one of three)	Feb. 11, 1919	8
1659.	Cross Section of 4.5 & 6 wheels, Mass. Cotton Mills		
1659A	hydro-electric Plant of Hamilton M. Co. Turbine No. 8	Mar. 3, 1919	8
1660.	Merrimack St. Bridge over Western Canal, being rebuilt of steel and concrete by P. L. & C.	Mar. 7, 1919	8
1660A	Merrimack St. Bridge over Western Canal, being rebuilt of steel and concrete by P. L. & C.	Mar. 7, 1919	8
1661.	Merrimack St. Bridge over Western Canal, recently rebuilt of steel and concrete (2 negatives)	Mar. 21, 1919	8
1661A	Howard St. Bridge over N. Y. N. H. & H. R. R., Electric Street Car accident, Brockton, Mass.	Apr. 18, 1919	8
1662.	Same as above (#1661A) – different view, shows street car	Apr. 18, 1919	8
1662A	Western Canal from Broadway looking North	Apr. 10, 1919	8
1663.	Western Canal from Jefferson St. Bridge towards Broadway	Apr. 10, 1919	8
1663A	Western Canal from Jefferson St. Bridge towards Market	Apr. 10, 1919	8
1664.	Merrimack St. Bridge over Western Canal – recently rebuilt by L. & C. of steel & concrete	May 3, 1919	8
1664A	Prescott Power House – High Water	Mar. 28, 1919	8
1665.	Dillon Wall – High water	Mar. 28, 1919	8
1665A	Merrimack St. Bridge over Western Canal (street view)	Mar. 21, 1919	8
1666.	West wall of Eastern Canal along Canal St.	Apr. 27, 1919	8
1666A	East wall of Eastern Canal along Canal St.	June 1, 1919	8
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B-8	View from top of Mass. Picker	Dec. 5, 1909	7B
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LXXVIII.	Sanitary Built over Hamilton Canal without L. & C. Consent	May 16, 1918	
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LXXXIV.	Picture if Col. Francis sitting at his desk (negative in Box # 10)		
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LXXXVII.	Tremont & Suffolk Mills, Law. Sect. discharge of wheels # 3 & 4 – R. H. 54" Hercules, in use from Nov. 13, 1896		

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1668A	Prescott Power House – Completed	June 6, 1919	8
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1669A	Hamilton new No. 7 Mill, Lower Pawtucket Canal	June 21, 1919	8
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1670A	Same as above, different view	June 21, 1919	8
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1671A	Victory Gardens on L. & C. Land	June 25, 1919	8
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1673A	Dillion Wall – rebuilding the	Aug. 19, 1919	8
1674.	Dillion Wall – rebuilding the	Aug. 19, 1919	8
1674A	Looking up Eastern Canal from Massachusetts Counting Room Bridge	Aug. 24, 1919	8
1675.	Nearly same view as above	Aug. 24, 1919	8
1675A	Eastern Canal looking down under bridge	Aug. 24, 1919	8
1676.	View of Lowell on East Merrimack St.	Aug. 27, 1919	8
1676A	View on Brown St. showing old brick house	Aug. 27, 1919	8
1677.	Dillon Wall – completed	Sept. 24, 1919	8
1677A	Same as above – different view	Sept. 24, 1919	8
1678.	Fletcher St. Bridge – rebuilt of steel and concrete – finished – Sept. 8, 1919	Sept. 25, 1919	8
1678A	Prescott Hydro-Elec. Plant, 33” R. H. Type D	Sept. 25, 1919	8

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1680.	Eastern Canal from under bridge	Sept. 28, 1919	8
1680A	20" Main under Hamilton New Mill	Sept. 28, 1919	8
1681.	Northern Canal Wall along Ford St.	Oct. 5, 1919	8
1681A	Northern Canal Wall along Ford St.	Oct. 5, 1919	8
1682.	"Jenny Lind Block" cor. Dummer St. & Broadway	Oct. 6, 1919	8
1682A	Broadway Bridge – rebuilding over Pawtucket Canal	Oct. 10, 1919	8
1683.	Hamilton Hydro-Elec. No. 9 – 39" L. H. Leffel wheel	Oct. 17, 1919	8
1683A	Northern Canal wall from Cabot St.	Nov. 16, 1919	8
1684.	Northern Canal wall from Suffolk St.	Nov. 23, 1919	8
1684A	Eastern Canal looking downstream from Merrimack St.	Nov. 16, 1919	8
1685.	Eastern Canal from Massachusetts Mill No. 8	Nov. 16, 1919	8
1685A	Saco-Lowell Shops No. 5 Hydro-Elec. plant	Nov. 17, 1919	8
1686.	Pump at Prescott Hill	Nov. 20, 1919	8
1686A	East Bank of Pawtucket Canal, just below Pawtucket Street	Nov. 20, 1919	8
1687.	West Bank of Pawtucket Canal, above Old Guard Locks	Nov. 20, 1919	8
1687A	Broadway Bridge completed	Nov. 20, 1919	8
1688.	Boott No. 1, 45" R. H. Allis-Chalmere turbine	Nov. 20, 1919	8
1688A	Eastern Canal along Canal St.	Nov. 23, 1919	8
1689.	Eastern Canal along Canal St.	Nov. 23, 1919	8
1689A	Eastern Canal along Canal St.	Nov. 23, 1919	8

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1690A	Tremont No. 3, Morgan-Smith 40.8" R. H. Type S.	Dec. 3, 1919	8
1691.	Tremont & Suffolk – New No. 4 (5x8) Morgan-Smith 44" R. H. Type S.	Dec. 3, 1919	8
1691A	Tremont & Suffolk – New No. 4 (5x8) Morgan-Smith 44" R. H. Type S.	Dec. 3, 1919	8
1692.	Dillon Wall and completed	Jan. 9, 1920	8
1692A	Dillon Wall and building fully restored and Prescott New Wall	Jan. 9, 1920	8
1693.	Locks and Canal Carpenter Shop (inside)	Dec. 15, 1919	8
1693A	Cross-section of Unit No. 9, Hamilton Mfg. Co.	Dec. 1919	8
1694.	Cross-section of Unit No. 1, at Boott Mills	Jan. 1920	8
1694A	Shifting engine recently acquired by B. & M. R. R.	Feb. 11, 1920	8
1695.	Removing ice in L. & C. Reservoir	Mar. 2, 1920	8
1695A	Flood Heights on Pawtucket Dam	Mar. 2, 1920	8
1696.	Landslide on First Street due to cutting of new boulevard	Mar. 16, 1920	8
1696A	Land starting to slide on First St.	Mar. 16, 1920	8
1697.	Flood Heights at Boott River Gauge	Mar. 1920	8
1697A	Pawtucket Dam, Water 86.0	Mar. 31, 1920	8
1698.	Putting Flashboards on Pawtucket Dam Water at 83.70	Apr. 12, 1920	8
1698A	Bridge # 331 about to be rebuilt by B. & M.	Apr. 18, 1920	8
1699.	Bridge # 331 about to be rebuilt by B. & M.	Apr. 18, 1920	8
1699A	Bridge # 331 finished	May 11, 1920	8
1700.	Bridge # 331 finished	May 11, 1920	8
1700A	High Bridge over Northern Canal being rebuilt	May 27, 1920	8
1701.	High Bridge over Northern Canal being rebuilt	May 27, 1920	8

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1702.	Friction Test on 24" Pipe, 3" nozzle 500 G. P. M.	May 28, 1920	8
1702A	Same as 1702 but with 3" nozzle wide open	May 28, 1920	8
1703.	Same as 1702 but with 5" nozzle wide open	May 28, 1920	8
1703A	High Bridge; South Abutment ready for new girders	June 24, 1920	8
1704.	High Bridge; South Abutment & Middle pier	June 24, 1920	8
1704A	Merrimack River Red below waste-gates looking downstream	July 1, 1920	8
1705.	Merrimack River Red below waste-gates looking east	July 1, 1920	8
1705A	Merrimack River Red below waste-gates looking upstream	July 1, 1920	8
1706.	Condition on L. & C. land near city landing	July 7, 1920	8
1706A	Line between Barber Mfg. Co. and P. L. & C.	July 7, 1920	8
1707.	High Bridge: placing last girder	July 20, 1920	8
1707A	Central St. Bridge: R. M. S. Ry. Co. men making repairs	July 29, 1920	8
1708.	High Bridge: placing forms for concrete	Aug. 9, 1920	8
1708A	High Bridge: showing reinforcing	Sept. 3, 1920	8
1709.	Tablet placed by P. L. & C. on Brewery Bridge	Sept. 20, 1920	8
1709A	Debris near upper lock at Swamp Locks	Sept. 20, 1920	8
1710.	Same as above (different view)	Sept. 20, 1920	8
1710A	Central St. Bridge: H. M. S. Hy. Co. men renewing tie rods L. & C. men renewing plank outside tracks	Sept. 21, 1920	8
1711.	Old Guard Locks: Gatehouse interior Hydraulic lifts installed in 1870	Oct. 20, 1920	8
1711A	High Bridge: rebuilt in summer of 1920 of steel and concrete by P. L. & C.	Oct. 22, 1920	8
1712.	High Bridge: rebuilt in summer of 1920 of steel and concrete by P. L. & C.	Oct. 22, 1920	8
1712A	High Bridge: rebuilt in summer of 1920 of steel and concrete by P. L. & C.	Oct. 22, 1920	8

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1713A	Northern Canal wall along Cheever St.	Oct. 24, 1920	8
1714.	Northern Canal wall along Cheever St.	Oct. 24, 1920	8
1714A	Northern Canal Gatehouse interior built 1847	Oct. 26, 1920	8
1715.	L. & C. land between Broadway and Red Bridge	Oct. 26, 1920	8
1715A	L. & C. land between Broadway and Red Bridge	Oct. 26, 1920	8
1716.	L. & C. 12" pipe laid over penstock of # 6 & # 7 turbines at Hamilton Mfg. Co.	Nov. 4, 1920	8
1716A	Hamilton Mfg. Co. # 6 & # 7	Nov. 4, 1920	8
1717.	Looking down Black Brook from bank near car barns on Middlesex Street Water 87.74 at 10:35 A. M.	Nov. 5, 1920	8
1717A	Looking up Stony Brook from R. R. track Water 87.69 at 11:05 A. M.	Nov. 5, 1920	8
1718.	Looking up Deep (or Swain) brook from road near R. R. track. Water at 87.69 at 11:30 A. M.	Nov. 5, 1920	8
1718A	Looking down Bridge meadow (or Flint) brook from foot of hill in rear of mill Water at 88.02 at 12:06 P. M.	Nov. 5, 1920	8
1719.	Looking Howard (or Washburn's) brook from bank at point a short distance upstream from R. R. track.	Nov. 5, 1920	8
1719A	looking up Salmon brook from R. R. track near American Box and Lumber Company Water at 88.60 at 1:16 P. M.	Nov. 5, 1920	8
1720.	Looking down Nashua River from south abutment of R. R. Bridge Water at 89.03 at 1:45 P. M.	Nov. 5, 1920	8
1720A.	looking up Pennichuk brook from R. R. track. Water t 89.99 at 3:28 P. M.	Nov. 5, 1920	8
1721.	L. & C. passageway along Merrimack Canal showing debris placed there by S. L. S.	Nov. 9, 1920	8
1721A	S. L. Shops foundry yard showing pile of iron junk over L. & C. gate valve on 12" main	Nov. 9, 1920	8
1722.	Hamilton Mfg. Co. # 6 & # 7 penstock scroll Leffel wheels 45" Type Z	Nov. 13, 1920	8

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1722A.	Hamilton Mfg. Co. # 6 & # 7 penstock scroll Leffel wheels 45" Type Z	Nov. 13, 1920	8
1723.	Merrimack Canal at Saco-Lowell Shops New concrete facing wall and new pier under R. R. Bridge built this year	Nov. 14, 1920	8
1723A	Wall being built on west side of Pawtucket Canal near Broadway	Nov. 14, 1920	8
1724.	Saco-Lowell Shops foundry yard showing pile of iron junk over L. & C. gate valve on 12" and 16" main placed by S. L. S.	Nov. 16, 1920	8
1724A	Hamilton Mfg. Co. New penstocks for # 6 & # 7 turbines. This date the temporary bulkhead broke and let in the water.	Nov. 18, 1920	8
1725.	Flaggy Meadow brook from Pawtucket boulevard Water 88.09 at 12:17 P. M.	Nov. 26, 1920	8
1725A	Looking up Clay Pit brook from Pawtucket Boulevard. Water 83.06 at 12:07 P. M.	Nov. 26, 1920	8
1726.	Scarlet brook from boulevard. 88.13 at 10:40	Nov. 26, 1920	8
1726A	Lawrence brook from point near boulevard Water 86.37 at 10:14 A. M.	Nov. 26, 1920	8
1727.	Musquash brook from point near river. Water 88.49 at 9:36 A. M.	Nov. 26, 1920	8
1727A	Musquash brook 200 yards from river. Water 88.49 at 9:36 A. M.	Nov. 26, 1920	8
1728.	Black Brook from Middlesex St. Water 88.15 at 9:09 A. M.	Nov. 26, 1920	8
1728A	Pawtucket Canal Wall, west side immediately below Broadway	Nov. 24, 1920	8
1729.	Waste at Swamp Locks Dam	Nov. 29, 1920	8
1729A	New overhead bridge between Appleton's # 1 and # 6 mills.	Nov. 29, 1920	8
1730.	Hamilton Mfg. Co.'s New 4 and 5 wheels in place	Nov. 30, 1920	8
1730A	Hamilton Mfg. Co.'s # 5 wheel in place	Nov. 30, 1920	8
1731.	L. & C. Milwaukee mixer in operation	Dec. 8, 1920	8
1731A	Wall being built on west side of Pawtucket Canal near Broadway	Dec. 8, 1920	8

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1732A	Northern Canal wall along Cheever St.	Dec. 20, 1920	8
1733.	Northern Canal wall – Gagnon Building showing ends of three supports put under building by L. & C.	Dec. 20, 1920	8
1733A	Removing Bridge # 333 over Merrimack Canal through Saco-Lowell yard	Dec. 21, 1920	8
1734.	Pawtucket Canal wall – West side immediately below Broadway being built	Jan. 22, 1921	8
1734A	Copy of insurance Co.'s plan of Boott yard	Feb. 4, 1921	8
1735.	Copy of insurance Co.'s plan of Boott yard	Feb. 4, 1921	8
1735A	Mass. Mills new # 12 turbine being installed	Feb. 11, 1921	8
1736.	Mass. Mills new # 12 turbine concrete penstock	Feb. 11, 1921	8
1736A	Mass. Mills new # 12 S. Morgan-Smith 46 ½ Type S turbine	Mar. 1, 1921	8
1737.	Looking up one of penstock tunnels of Mass. # 12 turbine	Mar. 1, 1921	8
1737A	Diagram of expenditures – City of Lowell	March 1921	8
1738.	Middle gate at Swamp Locks	March 30, 1921	8
1738A	Looking down Western Canal from Broadway	Apr. 3, 1921	8
1739.	Looking up Western Canal from curve in rear of L. & C.	Apr. 3, 1921	8
1739A	Western Canal at bend in rear of L. & C. blacksmith shop	Apr. 3, 1921	8
1740.	Looking down Western Canal from curve near L. & C. tool house	Apr. 3, 1921	8
1740A	Western Canal in rear of buildings, Nos. 25 – 65 Suffolk St.	Apr. 10, 1921	8
1741.	Western Canal in rear of buildings, Nos. 61 – 89 Suffolk St.	Apr. 10, 1921	8
1741A	Western Canal in rear of buildings Nos. 133 – 173 Suffolk St.	Apr. 10, 1921	8
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1742A	Western Canal in rear of buildings, Nos. 87 – 107 Suffolk St.	May 1, 1921	8

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1744AX Pawtucket Canal wall being built on west side below Broadway from R. R. Bridge	May 15, 1921	8
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1746. Western Canal after cleaning out	June 19, 1921	8
1746A Western Canal after cleaning out	June 19, 1921	8
1747. Western Canal after cleaning out	June 19, 1921	8
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1748A Northern Canal wall being rebuilt	July 11, 1921	8
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1750. Northern Canal – north wall looking upstream from Aiken St.	July 17, 1921	8
1750A Repairs to north wall of Northern Canal under building of Gagnon and Boissoneault	July 17, 1921	8
1751. Repairs to north wall of Northern Canal under building of Gagnon and Boissoneault General view	July 17, 1921	8
1751A Merrimack Canal – Bigelow Carpet wall	July 17, 1921	8
1752. Merrimack Canal – Bigelow Carpet wall	July 17, 1921	8
1752A Looking down Concord River from East Merrimack	July 17, 1921	8
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1756.	Concord River iron E. Merrimack	Aug. 14, 1921	8
1756A	Repairs to Northern Canal wall north side just above Aiken St.	Aug. 21, 1921	8
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1760A	Pawtucket Can – new wall below Broadway	Sept 24, 1921	8
1760B	3 Ihouse Mill Yard Plans, No prints in Book		8
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1762.	Merrimack River in rear of Boott Mills	Sept. 30, 1921	8
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1763.	Amoskeag Mfg. Co. – Now Dam	Sept. 29, 1921	8
1763A	Amoskeag Mfg. Co. – New power plant placing Turbine	Sept. 29, 1921	8
1764.	Amoskeag Mfg. Co. – inlets of penstocks	Sept. 29, 1921	8
1764A	Amoskeag Mfg. Co. – Freight track entrance	Sept. 29, 1921	8
1765.	Amoskeag Mfg. Co. – Downstream side of wheel house	Sept. 29, 1921	8
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1769A	Amoskeag Mfg. Co. Façade, penstock inlets	Sept. 29, 1921	8
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1774.	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
1774A	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
1775.	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
1775A	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
1776.	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
1776A	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
1777.	Fishway's Pawtucket Dam, just completed	Nov. 7, 1921	8
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1782A Trees above old guard Locks damaged by storm	Dec. 7, 1921	8
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1787. Pawtucket Canal from N. & L. R. R. Bridge	Dec. 19, 1921	8
1787A Hamilton Canal from Saco-Lowell Bridge	Dec. 19, 1921	8
1788. Hamilton Canal from Counting-Room Bridge	Dec. 19, 1921	8
1788A Eastern Canal from Strand Theatre	Dec. 19, 1921	8
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1789A Boott Canal from bridge St.	Dec. 19, 1921	8
1790. Merrimack Canal from Saco-Lowell bridge	Dec. 19, 1921	8
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1791. U. A. Boyden's first turbine A. D. 1844	Dec. 29, 1921	8
1791A Uriah Atherton Boyden	Jan. 16, 1922	8
1792. View of land in rear of Merrimack Mfg. Co. from across river	Jan. 27, 1922	8
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1795A	Boott Mills – Brass plate on # 1 unit	Feb. 28, 1922	8
1796.	Table showing current rather readings Exp. by F. Nagler & E. H. Brown	Mar. 2, 1922	8
1796A	Table showing current rather readings Exp. by F. Nagler & E. H. Brown	Mar. 2, 1922	8
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1797A	Plans of different current meters	Mar. 3, 1922	8
1798.	Cross-section drawing of Merrimack # 9 unit	Mar. 6, 1922	8
1798A	Cross-section drawing of Massachusetts's # 12 unit	Mar. 6, 1922	8
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1805.	Amoskeag Co.'s new dam and power house	Apr. 21, 1922	8
1806.	Amoskeag Co.'s new dam and power house	Apr. 21, 1922	8
1807.	Amoskeag Co.'s interior of power house showing runners	Apr. 21, 1922	8
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1810.	Amoskeag Co.'s New power house from rear	Apr. 21, 1922	8
1811.	Rail water from Amoskeag new power house	Apr. 21, 1922	8
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1815.	Pawtucket Canal – west wall below Broadway	Apr. 26, 1922	9
1816.	Boyden Turbine Model by U. A. Boyden	May 11, 1922	9
1817.	L. & C. Land back of new wall near Red bridge being filled and graded	May 18, 1922	9
1818.	New wall being built below Red bridge	May 18, 1922	9
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1820.	Central St. Bridge – Making pre-cast concrete slabs – forms ready for pouring concrete	June 17, 1922	9
1821.	Central St. Bridge – Making pre-cast concrete slabs – forms ready for pouring concrete	June 17, 1922	9
1822.	Old Truax water wheel	June 17, 1922	9
1823.	Rebuilding Central St. Bridge 11:00 A.M.	July 16, 1922	9
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1826A	Rebuilding Central St. Bridge	July 16, 1922	9
1826.	Rebuilding Central St. Bridge	July 16, 1922	9
1827.	Rebuilding Central St. Bridge 11:00 A.M.	July 18, 1922	9
1828.	Rebuilding Central St. Bridge 11:00 A.M.	July 18, 1922	9
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1831.	Western Canal – Repairs to wall under Ryan building	Aug. 10, 1922	9
1832.	New Pawtucket Canal above School St.	Aug. 13, 1922	9
1833.	New Pawtucket Canal above School St.	Aug. 20, 1922	9
1834.	Boott Mills – Beginning work on new unit	Aug. 31, 1922	9
1835.	Boott Mills – Second week of work	Sept. 9, 1922	9
1836.	C. M. A. C. Clubhouse, 103 Pawtucket St.	Sept. 11, 1922	9
1837.	C. M. A. C. Clubhouse, 103 Pawtucket St.	Sept. 11, 1922	9

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1841.	First St. Boulevard – work at culverts over pipes	Sept. 15, 1922	9
1842.	First St. Boulevard – work at culverts over pipes	Sept. 15, 1922	9
1843.	First St. Boulevard – work at culverts over pipes	Sept. 15, 1922	9
1844.	Boott Mills – Removing old masonry for new unit	Sept. 19, 1922	9
1845.	Boott Mills – Removing old masonry for new unit	Sept. 19, 1922	9
1846.	First St. – work at culverts over city pipes	Sept. 19, 1922	9
1847.	First St. – work at culverts over city pipes	Sept. 19, 1922	9
1848.	Boott Mills – Work on new unit	Sept. 26, 1922	9
1849.	Boott Mills – Work on new unit	Sept. 26, 1922	9
1850.	Boott Mills – Work on new unit	Sept. 26, 1922	9
1851.	Amoskeag Co.'s new dam and power plant	Sept. 29, 1922	9
1852.	Amoskeag Co.'s New dam	Sept. 29, 1922	9
1853.	Amoskeag Co.'s Power house use – excavating channel below tailraces	Sept. 29, 1922	9
1854.	Amoskeag Co.'s looking downstream below tailraces	Sept. 29, 1922	9
1855.	Amoskeag Co.'s excavating channel below tailraces	Sept. 29, 1922	9
1856.	Amoskeag Co.'s area below power house	Sept. 29, 1922	9
1857.	Amoskeag Co.'s looking downstream from power house	Sept. 29, 1922	9
1858.	Amoskeag Co.'s new power house	Sept. 29, 1922	9
1859.	Amoskeag Co.'s new power house	Sept. 29, 1922	9
1860.	Boott Mills – New 1700 HP unit	Oct. 4, 1922	9
1861.	Boott Mills – New 1700 HP unit	Oct. 4, 1922	9
1862.	School St. Bridge – New boards in fence	Oct. 5, 1922	9
1863.	School St. Bridge – New boards in fence	Oct. 5, 1922	9
1864.	Boott Mills – New unit	Oct. 13, 1922	9
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1868.	Boott Mills – New unit	Oct. 19, 1922	9
1869.	Boott Mills – New unit	Oct. 21, 1922	9
1870.	Boott Mills – New unit	Oct. 21, 1922	9
1871.	New wall being built above School St.	Oct. 22, 1922	9
1872.	Form for draft tube for new Boott unit	Oct. 26, 1922	9
1873.	Boott Mills – new unit, draft tube form placed	Oct. 27, 1922	9
1874.	Boott Mills – new unit, draft tube form placed	Oct. 27, 1922	9
1875.	Boott Mills showing reinforcing around table	Oct. 31, 1922	9
1876.	Boott Mills showing reinforcing around table	Oct. 31, 1922	9
1877.	Boott Mills showing reinforcing around table	Oct. 31, 1922	9
1878.	Boott Mills showing reinforcing around table	Oct. 31, 1922	9
1879.	Boott Mills showing forms along river front	Nov. 8, 1922	9
1880.	Boott Mills inside of wheel-pit, during work	Nov. 11, 1922	9
1881.	Boott Mills general view of outside	Nov. 11, 1922	9
1882.	Boott Mills mouth of penstock, during construction	Nov. 11, 1922	9
1883.	Riprap along bank of First St. boulevard	Nov. 21, 1922	9
1884.	Boott Mills – Old 72” Swain wheels, # 6 & # 7	Nov. 18, 1922	9
1885.	Experiment station at Swamp Locks	Nov. 27, 1922	9
1886.	Experiment station at Swamp Locks	Nov. 27, 1922	9
1887.	Experiment station at Swamp Locks	Nov. 27, 1922	9
1888.	Boottt Mills – Bird’s eye view showing form work over turbine	Dec. 4, 1922	9
1889.	First St. boulevard – view of trench at city pipes	Sept. 22, 1922	9
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1894.	Amoskeag Co.'s Battery of switches	Decd. 14, 1922	9
1895.	Amoskeag Co.'s showing # 1 Unit p 7500 HP	Dec. 14, 1922	9
1896.	Amoskeag Co.'s Main switchboard	Dec. 14, 1922	9
1897.	Amoskeag Co.'s submarine cables leaving power house	Dec. 14, 1922	9
1898.	Amoskeag Co.'s Showing shaft of # 1 turbine	Dec. 14, 1922	9
1899.	Water storage map of Merrimack River basin	Dec. 15, 1922	9
1900.	Amoskeag Co.'s – river bed before improvements	Dec. 29, 1922	9
1901.	Amoskeag Co.'s – river bed before improvements	Dec. 29, 1922	9
1902.	Boot Mills – View of outside – turbine being placed	Jan. 2, 1923	9
1903.	Boott Mills 72" Allis-Chalmars turbine	Jan. 2, 1923	9
1904.	Boott Mills 72" Allis- Chalmars about to be turned over	Jan. 2, 1923	9
1905.	Boott Mills Turbine runner ready to be lowered	Jan. 3, 1923	9
1906.	Boott Mills Turbine runner ready to be lowered	Jan. 3, 1923	9
1907.	Amoskeag Co. – Typical section through one unit (Dam on Saco River)	Feb. 1, 1923	9
1908.	Cumberland County Power Co. – Flashboard section Central Maine Power Co. – Skowhegan River dam	Feb. 6, 1923	9
1909.	Cumberland County Power Co. – Flashboard section Central Maine Power Co. – Skowhegan River dam	Feb. 6, 1923	9
1910.	Hamilton Mfg. Co. – # 4 & # 5 units, generators	Feb. 8, 1923	9
1911.	Hamilton Mfg. Co. – outside view of power house	Feb. 8, 1923	9
1912.	Columbia Textile Co. generator room	Feb. 9, 1923	9
1913.	Boott Mills - # 2 wheel room	Feb. 9, 1923	9
1914.	Boott Mills – general outside view of the unit	Feb. 9, 1923	9
1915.	Merrimack Mfg. Co. – steam turbine room	Feb. 12, 1923	9
1916.	Merrimack Mfg. Co. – Shafting, basement of # 2 mill	Feb. 12, 1923	9
1917.	Appleton Co. - # 3 & # 4 wheel room	Feb. 13, 1923	9

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1919. Saco-Lowell - # 4 unit	Feb. 21, 1923	9
1920. Saco-Lowell - # 4 unit	Feb. 21, 1923	9
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1922. Third Street– Accumulation of snow	Feb. 21. 1923	9
1923. Worthen Street – Accumulation of snow	Feb. 21. 1923	9
1924. Middlesex Co. # 1 & # 2 Turbine	Feb. 26, 1923	9
1925. Mass. Cotton Mills – Prescott Wheel Room	Feb. 26, 1923	9
1926. Mass. Cotton Mills – Turbine # 1, 2, 3	Mar. 1, 1923	9
1927. Mass. Cotton Mills – Steam Turbine	Mar. 11, 1923	9
1928. Mass. Cotton Mills - Section 8 units	Mar. 2, 1923	9
1929. Prescott Power house outside	Mar. 2, 1923	9
1930. Boott Mills – 1700 HP Unit	Mar. 2, 1923	9
1931. Seating plan of St. Anne's Church	Mar. 2, 1923	9
1932. Locomotive		
1933. Locomotive		
1934. Broadway – Accumulation Snow	Mar. 9, 1923	9
1935. O'Connell Parkway Accumulation Show	Mar. 9, 1923	9
1936. Hamilton Mfg. co. # 8 unit (Old # 10)	Mar. 22, 1923	9
1937. Boott Mills – Wheel and chamber of new unit	Mar. 21, 1923	9
1938. Boott Mills – Wheel pit and Draft Tube	Mar. 21, 1923	9
1939. Boott Mills – Removing coffer-dam	Mar. 23, 1923	9
1940. Boott Mills – Removing coffer-dam	Mar. 25, 1923	9
1941. Eugene A. Clark	Mar. 25, 1923	9
1942. L. & C. Men putting on Flashboards	Mar. 28, 1923	9
1943. Another ice in river above Pawtucket Dam	Mar. 29, 1923	9
1944. Another ice in river above Pawtucket Dam	Mar. 29, 1923	9

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1947.	Old Saco-Lowell cottage tenements on Worthen St.	Apr. 27, 1923	9
1948.	Old Saco-Lowell cottage tenements on Worthen St.	Apr. 27, 1923	9
1949.	Old Saco-Lowell buildings on Dutton St.	Apr. 27, 1923	9
1950.			
1951.			
1952.	L. & C. Truck and “Bill” Hibbard	Apr. 27, 1923	9
1953.	Entrance to Pawtucket boulevard under water	May 1, 1923	9
1954.	Claypit Brook overflow near Coburn farm	May 1, 1923	9
1955.	Townsend Ave. from Varnum Ave.	May 1, 1923	9
1956.	Claypit brook from jct. of Varnum and Townsend	May 1, 1923	9
1957.	Looking down Merrimack River from Tyngsboro bridge	May 1, 1923	9
1958.	Nashua River from Highway Bridge	May 1, 1923	9
1959.	Nashua River from Highway Bridge	May 1, 1923	9
1960.	Looking up Merrimack River from C. C. Bridge	May 1, 1923	9
1961.	Looking down Merrimack River from C. C. Bridge	May 1, 1923	9
1962.	Pawtucket Dam Water 90.10	May 1, 1923	9
1963.	Rapids below Moody St. Bridge	May 1, 1923	9
1964.	L. & C. Fences – Lower end of Stackpole St.	May 11, 1923	9
1965.	L. & C. Fences – Lower end of Stackpole St.	May 11, 1923	9
1966.	L. & C. Fences – Lower end of Stackpole St.	May 11, 1923	9
1967.	L. & C. Fences – Lower end of Stackpole St. opp. Alder St.	May 11, 1923	9
1968.	L. & C. Fences – Broadway	May 11, 1923	9
1969.	L. & C. Fences – Riverside St.	May 11, 1923	9
1970.	L. & C. Fences – Riverside St.	May 11, 1923	9
1971.	L. & C. Fences – Riverside St. cor. Colonial Ave.	May 11, 1923	9
1972.	L. & C. Fences – Front St.	May 11, 1923	9

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1975B Passageway near Swamp Locks obstructed by S. L. S.	May 29, 1923	9
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1977. Lowell Fire System Tests – Fairmont St.	May 31, 1923	9
1978. Lowell Fire System Tests – Fairmont St.	May 31, 1923	9
1979. Lowell Fire System Tests – Fairmont St.	May 31, 1923	9
1980. Lowell Fire System Tests – Belmont & Fairmont St.	May 31, 1923	9
1981. Lowell Fire System Tests – Belmont & Fairmont St.	May 31, 1923	9
1982. Gang swimming in Pawtucket canal at Red Bridge	July 13, 1923	9
1983. Lowell Fire System Tests – Belmont Ave. & Summit	May 31, 1923	9
1984. Lowell Fire System Tests – Beacon & Sixth Sts.	May 31, 1923	9
1984A Lowell Fire System Tests – Beacon & Sixth Sts.	May 31, 1923	9
1985. Lowell Fire System Tests – Beacon & Sixth Sts.	May 31, 1923	9
1986. Lowell Fire System Tests – Beacon & Eleventh Sts.	May 31, 1923	9
1986A Lowell Fire System Tests – Beacon & Eleventh Sts.	May 31, 1923	9
1987. Lowell Fire System Tests – Beacon & Eleventh Sts.	May 31, 1923	9
1988.		
1989. Lowell Fire System Tests – Bridge St. & Eustis Ave.	May 31, 1923	9
1989A Lowell Fire System Tests – Bridge St. & Eustis Ave.	May 31, 1923	9
1990. Lowell Fire System Tests – Bridge St. & Eustis Ave.	May 31, 1923	9
1991. Lowell Fire System Tests – Bridge St. & Eustis Ave.	May 31, 1923	9
1992. Lowell Fire System Tests – E. Meadow Road & Lamb St.	May 31, 1923	9
1993. Lowell Fire System Tests – E. Meadow Road & Lamb St.	May 31, 1923	9
1994.		
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1997.	Abbott Island and Head of Lawrence Mill Pond	June 11, 1923	9
1998.	Merrimack River from Hunt's Falls upstream	June 11, 1923	9
1999.	Mesers, Mansur, lundboon and Kent	June 1, 1923	9
2000.			
2001.			
2002.			
2003.	Current Meter Measurement at Boott Mills	June 28, 1923	9
2004.	Current Meter Measurement at Boott Mills	June 28, 1923	9
2005.	Tall race of new Boott Unit during measurement	June 28, 1923	9
2006.			
2007.	Outlet of overflow sewer below Lower Locks dam	Aug. 15, 1923	9
2008.	Outlet of overflow sewer below Lower Locks dam	Aug. 15, 1923	9
2009.	Shacks on Western canal bank	Aug. 15, 1923	9
2010.	Shacks on Western canal bank	Aug. 15, 1923	9
2011.	Shacks on Western canal bank	Aug. 15, 1923	9
2012.	De Laval Fire pump at Lawrence Mfg. Co.	Sept. 7, 1923	9
2013.	Mass. Dye house – Work on Concord River wall	Sept. 6, 1923	9
2014.	Mass. Dye house – Work on Concord River wall	Sept. 6, 1923	9
2015.	Mass. Dye house – Work on Concord River wall	Sept. 6, 1923	9
2016.	Outside of New Boott Power house	Sept. 12, 1923	9
2017.	Generator and Governor of New Boott Unit	Sept. 12, 1923	9
2018.	Eastern Canal – Facing west wall	Sept. 23, 1923	9
2019.	Eastern Canal – Facing west wall	Sept. 23, 1923	9
2020.	Eastern Canal – Facing west wall	Sept. 23, 1923	9
2021.			
2022.	Mass. Cotton Mills – Protective paving along Concord river wall	Sept. 14, 1923	9
2023.	Mass. Cotton Mills – Protective paving along Concord river wall	Sept. 14, 1923	9
2024.	Indian Orchard – Not graded be Power Bros.	Oct. 8, 1923	9

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No.	Description	Date	Copy in BK. No
2025.	De Laval Pump at T. & S. Mills	Oct. 22, 1923	9
2026.	Eastern Canal – facing west wall with concrete	Oct. 28, 1923	9
2027.	Eastern Canal – facing west wall with concrete	Oct. 28, 1923	9
2028.	Eastern Canal – facing west wall with concrete	Oct. 28, 1923	9
2029.			
2030.	Wall along Cheever St. – Top recently rebuilt	Nov. 22, 1923	9
2031.	Wall along Cheever St. – Top recently rebuilt	Nov. 22, 1923	9
2032.	Wall along Cheever St. – Top recently rebuilt	Nov. 22, 1923	9
2033.	New Hamilton Canal Ice – boom	Nov. 25, 1923	9
2034.	Eastern Canal – facing west wall with concrete	Nov. 25, 1923	9
2035.	New R. R. Track above School St. looking west	Dec. 17, 1923	9
2036.	New R. R. Track above School St. looking east	Dec. 17, 1923	10
2037.	New R. R. Track below School St. looking west	Dec. 17, 1923	10
2038.	New R. R. Track below School St. looking east	Dec. 17, 1923	10
2039.	Accident to Mary Mahoney near 260 Andover St.	Dec. 19, 1923	10
2040.	Accident to Mary Mahoney near 260 Andover St.	Dec. 19, 1923	10
2041.	School St. Bridge	Jan. 2, 1924	10
2042.	School St. Bridge	Jan. 2, 1924	10
2043.	Freight cars on Dutton St. track	Jan. 14, 1924	10
2044.	Freight cars on Dutton St. track	Jan. 14, 1924	10
2045.	Putting on Flashboards	Jan. 24, 1924	10
2046.	Saco-Lowell Shops - # 6 Turbine, damaged buckets	Feb. 29, 1924	10
2047.	Pawtucket Canal above O. G. L. Driving piling	Mar. 11, 1924	10
2048.	Pawtucket Canal above O. G. L. Driving piling	Mar. 11, 1924	10
2049.	Pawtucket Canal above O. G. L. Driving piling	Mar. 11, 1924	10
2050.	Pawtucket Canal above O. G. L. Driving piling	Mar. 11, 1924	10
2051.	Highway Bridge – Sandy Hill, N. Y.	Mar. 31, 1924	10
2052.	Union Bag & Paper Co. – Sandy Hill, N. Y.	Mar. 31, 1924	10
2053.	Union Bag & Paper Co. – Sandy Hill, N. Y.	Mar. 31, 1924	10

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No.	Description	Date	Copy in BK. No
2054.	Union Bag & Paper Co. – Sandy Hill, N. Y.	Mar. 31, 1924	10
2055.	Lawrence Section wheels	Mar. 31, 1924	10
2056.	Pair Horizontal Turbines, Int. Paper Co. Glen Falls, N. Y.	Mar. 31, 1924	10
2057.	Diagram of test of above wheels	Mar. 31, 1924	10
2058.	Moving bldg. from corner of Broadway and Suffolk	Apr. 8, 1924	10
2059.	Moving bldg. from corner of Broadway and Suffolk	Apr. 8, 1924	10
2060.	L. & C. Reservoir fence blown down	Apr. 9, 1924	10
2061.	L. & C. Reservoir fence blown down	Apr. 9, 1924	10
2062.	Nesmith Bldg. – Corner of Merrimack and John	Apr. 15, 1924	10
2063.	Associate Bldg. Fire – Worthen St. side	Apr. 27, 1924	10
2064.	Associate Bldg. Fire – Dutton St. side	Apr. 27, 1924	10
2065.	Associate Bldg. Fire – From City Hall	Apr. 27, 1924	10
2066.	Ayer Home	June 5, 1924	10
2067.	One of the oldest houses in Lowell being occupied, on Pawtucket St.	June 5, 1924	10
2068.	Whistler House	June 5, 1924	10
2069.	House at 266 Andover St.	June 5, 1924	10
2070.	Hole made by boys under fence above Guard Locks	June 16, 1924	10
2071.	Hole made by boys under fence above Guard Locks	June 16, 1924	10
2072.	Tearing down bldgs. on Suffolk St.	June 18, 1924	10
2073.	Tearing down bldgs. on Suffolk St.	June 18, 1924	10
2074.	Tearing down bldgs. on Suffolk St.	June 29, 1924	10
2075.	New wall and ramp above Guard Locks	June 29, 1924	10
2076.	New wall and Part not finished	June 29, 1924	10
2077.	Indian Orchard supposed to have been graded	July 11, 1924	10
2078.	Orchard supposed to have been graded	July 11, 1924	10
2079.	Orchard supposed to have been graded	July 11, 1924	10
2080.	New Wall – Pawtucket Canal – Cutting off sheet piling	July 11, 1924	10
2081.	Dodge St. looking west	July 11, 1924	10

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2082. Dodge St. looking west	July 21, 1924	10
2083. Eastern Canal looking upstream	July 23, 1924	10
2084. Eastern Canal looking downstream – Courier Citizen Bldg.	July 23, 1924	10
2085. Lower monument at Hunt's Falls	July 29, 1924	10
2086. Cheever St. Park	Aug. 6, 1924	10
2087. Tearing down bldgs. on Suffolk St.	Aug. 6, 1924	10
2088. Broadway after storm of Aug. 7, 1924	Aug. 7, 1924	10
2089. Repairing Boott Mills Bridge	Aug. 9, 1924	10
2090. Repairing Boott Mills Bridge	Aug. 9, 1924	10
2091. Debris on Pawtucket Dam	Sept. 15, 1924	10
2092. New wall west side of Western Canal downstream	Sept. 24, 1924	10
2093. New wall west side of Western Canal upstream	Sept. 24, 1924	10
2094. E. Merrimack St. bridge over Western Canal repaved	Oct. 22, 1924	10
2095. Merrimack St. bridge over Western Canal replanked	Oct. 26, 1924	10
2096. Transportation of U. S. whale boats by L. & C.	Nov. 7, 1924	10
2097. Breaks in Lowell water mains at First St. oval	Dec. 2, 1924	10
2098. Break in 30" main at First St. oval	Dec. 2, 1924	10
2099. Beaver Brook looking ME across Conduit St.	Dec. 9, 1924	10
2100. Conduit St. looking west from Beaver Brook	Dec. 9, 1924	10
2101. Conduit St. looking SE across Beaver Brook	Dec. 9, 1924	10
2102. Conduit St. looking south towards Beaver Brook	Dec. 9, 1924	10
2103. Conduit St. looking south from Beaver Brook	Dec. 9, 1924	10
2104. Conduit St. looking NW across Beaver Brook	Dec. 9, 1924	10
2105. Conduit St. looking north towards Beaver Brook	Dec. 9, 1924	10
2106. Merry meeting Lake Dam, front view	Dec. 12, 1924	10
2107. Merry meeting Lake Dam rear view	Dec. 12, 1924	10
2108. Western canal wall below Broadway	Dec. 20, 1924	10

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2108A	Western canal wall below Broadway	Dec. 20, 1924	10
2109.	Fire at Cady's Box Shop	Jan. 30, 1925	10
2110.	Diagram showing City of Lowell's expenditures	Feb. 5, 1925	10
2111.	Diagram showing City of Lowell's departmental payrolls	Mar. 10, 1925	10
2112.	Beaver Brook Bridge site; elev. of water 57.45	Mar. 30, 1925	10
2113.	Beaver Brook Bridge site; elev. of water 57.45	Mar. 30, 1925	10
2114.	Beaver Brook Bridge site; elev. of water 57.45	Mar. 30, 1925	10
2115.	Beaver Brook Bridge site; elev. of water 58.35	Mar. 31, 1925	10
2116.	Beaver Brook Bridge site; elev. of water 58.35	Mar. 31, 1925	10
2117.	Eastern Canal wall below Broadway	Apr. 4, 1925	10
2117A.	Eastern Canal wall below Broadway	Apr. 4, 1925	10
2118.	Eastern Canal wall below Broadway	Apr. 22, 1925	10
2118A	Eastern Canal wall below Broadway	Apr. 22, 1925	10
2119.	Western Canal below Broadway	Apr. 22, 1925	10
2120.	Diagram showing City of Lowell Valuation, Payroll & Debt.	Apr. 24, 1925	10
2121.	C. M. A. C. Rear view, looking east	May 7, 1925	10
2122.	C. M. A. C. Rear view, looking west	May 7, 1925	10
2123.	C. M. A. C. Rear view, looking south	May 7, 1925	10
2124.	Plan showing water mains of Locks and Canals	May 14, 1925	10
2125.	Western Canal below Broadway	May 27, 1925	10
2126.	Five-foot strip, Cady property, for B. & M.	June 24, 1925	10
2127.	Five-foot strip, Cady property, for B. & M.	June 24, 1925	10
2128.	Prescott Mill remodeled for an office building	June 25, 1925	10
2129.	Western Canal below Broadway	July 2, 1925	10
2130.	New fence at 108 Broadway	July 6, 1925	10
2131.	New playground along Western Canal below Broadway	July 6, 1925	10

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2132.	New footing on river side of Lawrence Mfg. Co. dye house	July 9, 1925	10
2133.	New footing on river side of Lawrence Mfg. Co. dye house	July 9, 1925	10
2134.	Weekly payroll of Street Dept., City of Lowell, 1918-1925	Sept. 1925	10
2135.	Weekly payroll of Water Works Dept. City of Lowell, 1918-1925	Sept. 1925	10
2136.	Experiment showing load of 145.5 lbs. on 1 ½ Flashboard pin	July 30, 1925	10
2137.	Middlesex Dam looking towards Ipswich Hosiery	Aug. 11, 1925	10
2138.	Middlesex Dam looking toward Belvidere Mills	Aug. 11, 1925	10
2139.	Middlesex Dam looking towards Ipswich Hosiery	Aug. 17, 1925	10
2140.	Scum on Concord River near Ames Worsted Co.	Aug. 19, 1925	10
2141.	George W. Whistler, Civil Engineer	Aug. 21, 1925	10
2142.	City of Lowell Ladder # 4 truck in Western Canal	Sept. 4, 1925	10
2143.	City of Lowell Ladder # 4 truck in Western Canal	Sept. 4, 1925	10
2144.	City of Lowell Ladder # 4 truck in Western Canal	Sept. 4, 1925	10
2145.	New sluiceway at Middlesex Dam, looking downstream	Sept. 13, 1925	10
2146.	New sluiceway at Middlesex Dam, looking upstream	Sept. 13, 1925	10
2147.	Middlesex Dam and Sluiceway	Sept. 13, 1925	10
2148.	Middlesex Dam showing new addition	Sept. 13, 1925	10
2149.	Repairs to rack platform in rear of Ames Worsted Co.	Sept. 13, 1925	10
2150.	Weekly payroll of Ash and Waste Collection	Sept. 1925	10
2151.	Old leveling party (taken from text book)	Sept. 1925	10
2152.	Old current meters	Sept. 1925	10
2153.	Old leveling instruments	Sept. 1925	10
2154.	Diagram showing tax rates in Massachusetts	Oct. 1925	10
2155.	Middlesex Dam looking upstream	Oct. 12, 1925	10
2156.	Middlesex Dam looking downstream	Oct. 12, 1925	10
2157.	Middlesex Dam looking downstream	Oct. 12, 1925	10

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2159. Dalton Street, from Farmland Road	Oct. 28, 1925	10
2160. Caroline Street, from Ennell St.	Oct. 28, 1925	10
2161. Cumberland Road, from Aiken Ave.	Oct. 28, 1925	10
2162. Western Canal wall below Broadway	Nov. 8, 1925	10
2162A Western Canal wall below Broadway	Nov. 8, 1925	10
2163. Western Canal wall below Broadway	Nov. 15, 1925	10
2164. Western Canal wall below Broadway	Nov. 15, 1925	10
2165. Cambridge St. Bridge,	Nov. 3, 1925	10
2166. Cambridge St. Bridge,	Nov. 3, 1925	10
2167. Cheever St. looking NW	Nov. 19, 1925	10
2168. Ward St, looking NW	Nov. 19, 1925	10
2169. Hall St. looking NW	Nov. 19, 1925	10
2170. Hall & Perkins Sts. Looking SE	Nov. 19, 1925	10
2171. Ice in Western Canal near Kitson plant	Dec. 29, 1925	10
2172. Ice in Western Canal near Kitson plant	Dec. 29, 1925	10
2173. Eastern Canal wall at Boott Mills	Mar. 8, 1926	10
2174. Diagram of Heights and Monthly Draft of l. Winnepesukee	Mar. 20, 1926	10
2175. The Old Durkee House, 1657. (taken Sept. 10, 1921)	Mar. 24, 1926	10
2176. Western Canal above Broadway Bridge	Mar. 30, 1926	10
2177. Eastern Canal at Boott Mills	Apr. 9, 1926	10
2178. Lower end of Moody St. Feeder	Apr. 12, 1926	10
2179. Merrimack Canal at Merrimack Dam	Apr. 12, 1926	10
2180. Davis & Sargent side track	Apr. 27, 1926	10
2181. Doherty Bros. – side track	Apr. 27, 1926	10
2182. Western canal wall above Broadway	May 17, 1926	10
2183. Western canal wall above Broadway	May 17, 1926	10
2184. Thompson's field, rear pf Bartlett School	May. 17, 1926	10

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2185.	Thompson's field, rear of Omicron Pi fraternity house	May 17, 1926	10
2186.	Fishway at Pawtucket Dam	May 18, 1926	10
2187.	Fishway at Pawtucket Dam	May 18, 1926	10
2188.	Northern Canal wall along Ford Street	May 23, 1926	10
2189.	Northern Canal wall along Ford Street	May 23, 1926	10
2190.	School St. bridge repairs	May 24, 1926	10
2191.	School St. bridge repairs	May 24, 1926	10
2192.	Western canal wall below Broadway	May 26, 1926	10
2192A	Western canal wall below Broadway	May 26, 1926	10
2193.	Western canal wall below Broadway	May 26, 1926	10
2194.	Western canal wall below Broadway	May 26, 1926	10
2195.	Eastern canal at Lower Locks	June 9, 1926	10
2196.	Western canal wall above Broadway	June 13, 1926	10
2197.	Eastern canal at Lower Locks	June 9, 1926	10
2198.	Eastern canal at Lower Locks	June 9, 1926	10
2199.	K. W. H. delivered at switchboard, Merrimack River at Lowell	June 1926	10
2200.	Net Horsepower of water wheels, Merrimack River at Lowell	June 1926	10
2201.	24-hour flow in c. f. p. s., Merrimack River	June 1926	10
2202.	Eastern canal wall at Boott Mills	June 27, 1926	10
2203.	Western canal wall above Broadway	July 11, 1926	10
2204.	Leak in LAC 12" main in Bigelow yard	July 14, 1926	10
2205.	Copy of a tombstone for Mr. Owen of the Appleton Co.	July 1, 1926	10
2206.	Copy of a tombstone for Mr. Owen of the Appleton Co.	July 1, 1926	10
2207.	Holes made by boys under fence above Guard Locks	July 22, 1926	10
2208.	Holes made by boys under fence above Guard Locks	July 22, 1926	10
2209.	Land of Stackpole St. adjoining Y. M. C. I.	July 23, 1926	10
2210.	Land of Stackpole St. adjoining Y. M. C. I.	July 23, 1926	10

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2211.	Land of Stackpole St. adjoining Y. M. C. I.	July 23, 1926	10
2212.	Guard Gate and 1852 High Water mark at Old Guard locks	July 27, 1926	10
2213.	Conduit St. and vicinity looking South-west from Beaver Brook	Aug. 5, 1926	10
2214.	Conduit St. and vicinity looking South-west from Beaver Brook	Aug. 5, 1926	10
2215.	Roadway of Beaver Brook Bridge looking towards Conduit St.	Aug. 5, 1926	10
2216.	Sewer Manhole and Beaver Brook Bridge under-pinning	Aug. 5, 1926	10
2217.	Beaver Brook Bridge looking upstream	Aug. 5, 1926	10
2218.	Eastern canal wall at Boott Mills.	Aug. 8, 1926	10
2219.	Beaver Brook Bridge. Looking east. (2 negatives)	Aug. 14, 1926	10
2220.	Side Track and Bridge Coal Pocket of Boott Mills.	Sept.3, 1926	10
2221.	Rain Gage at Pawtucket Dam.	Sept. 16, 1926	10
2222.	Lawrence Company's Playground	Sept. 21, 1926	10
2223.	Lawrence Company's Playground	Sept. 21, 1926	10
2224.	Eastern Canal Wall at Boott Mills looking downstream	Sept. 21, 1926	10
2225.	Eastern Canal Wall at Boott Mills looking upstream	Sept. 21, 1926	10
2226.	Old Suffolk St. Bridge over Northern Canal being torn up	Sept. 27, 1926	10
2227.	Dutton St. Bridge over Western Canal	Oct. 7, 1926	10
2228.	Suffolk St. Bridge over Northern Canal showing new I Beams in place	Oct. 10, 1926	10
2229.	Suffolk St. Bridge over Northern Canal Showing Reinforcing Rods on downstream side	Oct. 22, 1926	10

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2230.	Suffolk St. Wall looking downstream from Jefferson St.	Oct. 22, 1926	10
2231.	Suffolk St. Wall looking upstream from Broadway	Oct. 22, 1926	10
2232.	Boott Mills. Racks for No. 6 Wheel. Looking upstream	Oct. 24, 1926	10
2233.	Boott Mills. Racks for No. 6 Wheel Looking downstream	Oct. 24, 1926	10
2234.	Suffolk St. Bridge over Northern Canal showing upstream side being torn up.	Nov. 2, 1926	10
2235.	Suffolk St. Bridge over Northern Canal showing Downstream side being torn up.	Nov. 2, 1926	10
2236.	Concrete facing on pier under East Merrimack Street	Nov. 7, 1926	10
2237.	Eastern Canal looking upstream from East Merrimack Street Bridge	Nov. 7, 1926	10
2238.	Eastern Canal showing slope paved below Massachusetts Racks near Bridge St. (2 negatives)	Nov. 7, 1926	10
2239.	Suffolk St. Bridge over Northern Canal showing new I Beams on upstream side of Bridge.	Nov. 10, 1926	10
2240.	Mayor Donovan's Record of Service to the People of Pawtucketville. Copy of signboard	Nov. 12, 1926	10
2241.	New Trusses under Railroad Bridge over Western Canal and old wooden Pier being removed	Nov. 14, 1926	10
2242.	Suffolk St. Bridge over Northern Canal showing reinforcing rods on upstream side	Nov. 15, 1926	10
2243.	Copy of Title Page in F. N. Burham's Descriptive Pamphlet on New Turbine Water Wheel	Nov. 19, 1926	10
2244.	Copy of Table giving size, Discharge of Water and price list of Water Wheels in F. N. Burham's pamphlet	Nov. 19, 1926	10
2245.	Copy of tables on page 24 and 25 in F. N. Burham's pamphlet.	Nov. 19, 1926	10
2246.	Worthen St. Bridge over Western canal showing old wooden beams	Nov. 26, 1926	10

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No.	Description	Date	Copy in BK. No
2247.	Worthen St. Bridge over Western Canal showing City 6" Water Mains.	Nov. 26, 1926	10
2248.	Copy of R. R. Track Plan of 1883 Cover	Apr. 1918	10
2249.	Copy of R. R. Track Plan of 1883 Location Description	Apr. 1918	10
2250.	Copy of R. R. Track Plan of 1883 Moody and Tilden Sts.	Apr. 1918	10
2251.	Copy of R. R. Track Plan of 1883 Tremont St.	Apr. 1918	10
2252.	Copy of R. R. Track Plan of 1883 Tremont & Perkins.	Apr. 1918	10
2253.	Copy of R. R. Track Plan of 1883 Jackson St.	Apr. 1918	10
2254.	Copy of R. R. Track Plan of 1883 Dutton St.	Apr. 1918	10
2255.	Copy of R. R. Track Plan of 1883 Dutton & Moody Sts.	Apr. 1918	10
2256.	Copy of R. R. Track Plan of 1883 Amory & Canal Sts.	Apr. 1918	10
2257.	Copy of R. R. Track Plan of 1883 Dutton & Amory Sts.	Apr. 1918	10
2258.	Worthen St. Bridge over Western Canal showing new "I" Wooden Beams	Dec. 9, 1926	10
2259.	Suffolk St. Bridge over Northern Canal looking towards Moody St.	Dec. 14, 1926	10
2260.	Suffolk St. Bridge over Northern Canal looking towards Tremont and Suffolk Mills	Dec. 15, 1926	10
2261.	Worthen St. Bridge over Western Canal	Dec. 15, 1926	11
2262.	Tremont No. 2 Generator (2 negatives)	Jan. 26, 1927	11
2263.	Typical setting of Hydro-Electric plant at Tremont Mills	Feb. 1, 1927	11
2264.	Tremont Store Houses A and B on Tremont St.	Mar. 3, 1927	11
2265.	Northern Canal looking downstream from Cabot St.	Mar. 15, 1927	11
2266.	Hamilton Mfg. Company No. 2 Mill on Jackson St.	Mar. 22, 1927	11
2267.	Central St. over Pawtucket Canal	Mar. 22, 1927	11
2268.	Monthly Expenditures of City of Lowell Water Works beginning in 1925	Mar. 22, 1927	11

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No.	Description	Date	Copy in BK. No
2269.	Hamilton Canal with Hamilton & Appleton Co.'s shut down. Picture taken at 11:50 A. M. Gauge at Swamp Locks 82.65 at 11:45, and 83.10 at 11:00 A. M.	Apr. 11, 1927	11
2270.	Eastern Canal showing races at Massachusetts Cotton Mills near Cloth Room Building	May 29, 1927	11
2271.	Hole in wall back of Massachusetts Racks under Cloth Room Building Foundation	May 29, 1927	11
2272.	Passageway through Mill No. 6 to Boott Mills Coal Pocket, looking in from Eastern Canal	June 1, 1927	11
2273.	Boott Mill Coal Pocket Trestle looking towards Boiler House	June 1, 1927	11
2274.	Boott Mill Coal Pocket Trestle looking towards Amory Street	June 1, 1927	11
2275.	Boott Mill Coal Pocket under Trestle looking in from Boiler House	June 1, 1927	11
2276.	L. & C. Gate House at the end of Hamilton Canal.	June 1, 1927	11
2277.	Nashua Mfg. Co.'s Sign on Suffolk Mills	June 1, 1927	11
2278.	Pawtucket Bridge over Pawtucket Canal	June 3, 1927	11
2279.	Eastern Canal looking upstream from Mass. Counting Room Bridge	June 19, 1927	11
2280.	Hole made in Canal wall looking for leak in Mass. Cloth Room Cellar	June 19, 1927	11
2281.	Boott Mills Picker House over Eastern Canal	June 21, 1927	11
2282.	Boott Mills Picker House over Eastern Canal	June 21, 1927	11
2283.	R. R. bumper near Hamilton Mfg. Co.	June 21, 1927	11
2284.	Girders for Boott Mills R. R. Bridge	June 28, 1927	11
2285.	Girders for Boott Mills R. R. Bridge	June 28, 1927	11
2286.	Girders for Boott Mills R. R. Bridge	June 28, 1927	11
2287.	Corner of Colonial Ave, & Riverside St. looking up Colonial Avenue	July 14, 1927	11
2288.	Boott Mills R. R. Bridge Girder set in place	July 21, 1927	11

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2289.	Boott Mills R. R. Bridge Girder set in place	July 21, 1927	11
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2291.	Lawrence Canal & Hickway Hall Dam	July 26, 1927	11
2292.	Lawrence Canal & Hickway Hall Dam	July 26, 1927	11
2293.	Lawrence Canal & Hickway Hall Dam	July 26, 1927	11
2294.	Locks and Canals “Yard” Baseball Nine	Aug. 8, 1927	11
2295.	Locks and Canals “Office” Baseball Nine	Aug. 8, 1927	11
2296.	Hall St. Bridge Repairs	Aug. 9, 1927	11
2297.	Hall St. Bridge Repairs	Aug. 9, 1927	11
2298.	Boott Mills R. R. Bridge showing Bridge Floor and track	Aug. 16, 1927	11
2299.	Boott Mills R. R. Bridge showing Bridge Floor and track	Aug. 16, 1927	11
2300.	East Merrimack St. Bridge over Eastern Canal	Aug. 16, 1927	11
2301.	Hall St. Bridge showing new floor planking (2 negatives)	Aug. 16, 1927 Sept. 2, 1927	11 11
2302.	Proposed location for Bridge over Hamilton Canal by Courier-Citizen Co.	Aug. 24, 1927	11
2303.	Proposed location for Bridge over Hamilton Canal by Courier-Citizen Co.	Aug. 24, 1927	11
2304.	Lawrence Mfg. Co.’s Box Shop & Store house # 13 looking north	Sept. 2, 1927	11
2305.	Lawrence Mfg. Co.’s Box Shop & Store house # 13 looking down Coolidge St. from Perkins	Sept. 2, 1927	11
2306.	Bridge St. Bridge over Eastern Canal	Sept. 2, 1927	11
2307.	Miles Laffay and Leon Proulx or (“Black Joe”)	Sept. 9, 1927	11
2308.	Below Mariposa Ave. looking southeast	Sept. 15, 1927	11
2309.	Near Corner of Westford & Baldwin Sts. looking southeast	Sept. 15, 1927	11
2310.	Staples St. looking south	Sept. 15, 1927	11

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2312. Pawtucket St. Bridge over Pawtucket Canal	Sept. 21, 1927	11
2313. Boott Dam and vicinity	Sept. 23, 1927	11
2314. Boott Dam and vicinity	Sept. 23, 1927	11
2315. Lower end of Eastern Canal	Sept. 27, 1927	11
2316. Pawtucket St. Bridge over Pawtucket Canal	Oct. 6, 1927	11
2317. Swamp Locks Dam	Oct. 9, 1927	11
2318. Pawtucket St. Bridge over Pawtucket Canal	Oct. 15, 1927	11
2319. Pawtucket St. Bridge over Pawtucket Canal	Oct. 21, 1927	11
2320. Pawtucket St. Bridge over Pawtucket Canal	Oct. 26, 1927	11
2320A Walker St. looking south from Broadway	Nov. 4, 1927	11
2321. Middlesex St. above Black Brook, looking east	Nov. 4, 1927	11
2322. Middlesex St. below Pawtucket St., looking east	Nov. 4, 1927	11
2323. Worthen St. from Market St., looking west	Nov. 4, 1927	11
2324. Shattuck St. from Market St., looking north	Nov. 4, 1927	11
2325. Twelfth St. looking uphill from Bridge St.	Nov. 4, 1927	11
2326. Jewett St. from Fourth toward W. Sixth	Nov. 4, 1927	11
2327. Woburn St. looking toward Lowell	Nov. 4, 1927	11
2328. Pawtucket dam – water at El. 91.5	Nov. 5, 1927	11
2329. Public Bath House showing high water in river	Nov. 5, 1927	11
2330. Junction of Pawtucket Boulevard and Varnum Ave.	Nov. 5, 1927	11
2331. Beaver Brook bridge showing high water	Nov. 5, 1927	11
2332. Beaver Brook, looking downstream toward river	Nov. 5, 1927	11
2333. Concord River showing high water	Nov. 5, 1927	11
2334. Salem St. looking west from Decatur St.	Nov. 8, 1927	11
2335. Dunbar Avenue bridge over Clay Pit brook	Nov. 8, 1927	11

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No.	Description	Date	Copy in BK. No
2336.	Midland St. looking east from S. Wilder St.	Nov. 8, 1927	11
2337.	Broadway looking east above School St.	Nov. 8, 1927	11
2338.	Lawrence St. looking northwest from Moore St.	Nov. 8, 1927	11
2339.	School St. looking south from Broadway	Nov. 8, 1927	11
2340.	Middlesex Dam wasteway	Nov. 15, 1927	11
2341.	Middlesex Dam wasteway	Nov. 15, 1927	11
2342.	Wooden penstock to New England Bunting Co.	Nov. 15, 1927	11
2343.	Wasting at Swamp Locks dam	Nov. 23 1927	11
2344.	Excavating for new gate at Swamp Locks	Nov. 23, 1927	11
2345.	Excavating for new gate at Swamp Locks	Dec. 1, 1927	11
2346.	Waste bays in back of locking gate at Swamp Locks	Dec. 1, 1927	11
2347.	Tearing out wall for spillway of new gate	Dec. 1, 1927	11
2348.	Air chamber on discharge line of Saco-Lowell # 2 pump (picture taken Dec. 1, 1927)	Nov. 28, 1927	11
2349.	Wasting through temporary Bays at Swamp Locks	Dec. 2, 1927	11
2350.	Excavation for new gate at Swamp Locks	Dec. 17, 1927	11
2351.	Wasting at Swamp Locks and location of new gate	Dec. 17, 1927	11
2352.	Ice at Pawtucket Dam	Dec. 22, 1927	11
2353.	Ice at Pawtucket Dam	Dec. 22, 1927	11
2354.	New Sluice gate at Swamp Locks – gate up	Jan. 12, 1928	11
2355.	New Sluice gate at Swamp Locks – gate down	Jan. 12, 1928	11
2356.	Fan house on top of Mill # 10 – Nashua Mfg. Co.	Jan. 12, 1928	11
2357.	Fan house on top of Mill # 10 – Nashua Mfg. Co.	Jan. 12, 1928	11
2358.	Tearing out masonry in front of sluice gate	Jan. 15, 1928	11
2359.	Dodge truck	Jan. 17, 1928	11
2360.	Boott Mills side track to coal pocket	Jan. 17, 1928	11

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No. Description	Date	Copy in BK. No
2361. Corner of Bridge and Amory Street, showing fences in front of Boott Mills	Jan. 17, 1928	11
2362. Swamp Locks and Sluice Gate	Jan. 17, 1928	11
2363. Cracks in Mill # 6 – Nashua Mfg. Co.	Feb. 7, 1928	11
2364. Cracks in Mill # 6 – Nashua Mfg. Co.	Feb. 7, 1928	11
2365. Fan House on top of mill # 10 – Nashua Mfg. Co.	Feb. 16, 1928	11
2366. Starting erection of conveyor bridge – Nashua Mfg. Co.	Feb. 16, 1928	11
2367. Site of proposed street through Prescott yard	Feb. 22, 1928	11
2368. Site of proposed street across Lower Locks wasteway	Feb. 22, 1928	11
2369. Site of proposed street through Ipswich Mills	Feb. 22, 1928	11
2370. Northern Canal looking upstream from Suffolk St.	Feb. 24, 1928	11
2371. Lawrence Section of Merrimack Mfg. Co.	Feb. 24, 1928	11
2372. Merrimack River mills, looking downstream	Feb. 24, 1928	11
2373. Erection of conveyor bridge – Nashua Mfg. Co.	Feb. 24, 1928	11
2374. Nashua Mfg. Co. looking northwest from Suffolk St.	Feb. 24, 1928	11
2375. Lawrence Mfg. Co. from Lawrence Section	Feb. 24, 1928	11
2375A Appleton and Hamilton Mills looking east	March 1928	11
2376. Ipswich Mills and Middlesex Co. looking south	March 1928	11
2377. Pepperell Mfg. Co. looking north	March 1928	11
2378. Merrimack Mfg. Co. looking east	March 1928	11
2379. Boott Mills looking east	March 1928	11
2380. Saco-Lowell Shops looking northeast	March 1928	11
2381. Site of proposed Plain St. playground looking south	March 29, 1928	11
2382. Site of proposed Plain St. playground looking north	March 29, 1928	11
2383. Taking boat through Lower Locks	March 29, 1928	11
2384. Island below Middlesex Dam in Concord river	May 22, 1928	11
2384A Island below Middlesex Dam in Concord river	May 22, 1928	11
2385. Present wasteway below Middlesex Dam	May 22, 1928	11

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No. Description	Date	Copy in BK. No
2386. Present wasteway below Middlesex Dam	May 22, 1928	11
2387. Locks and Canal reservoir – east side	May 22, 1928	11
2388. Locks and Canal reservoir – east side	May 22, 1928	11
2389. Copy pf L. & C. Document No. 314	May 28, 1928	11
2390. Lawrence Mfg. Co. along river	May 31, 1928	11
2390A. Lawrence Mfg. Co. along river	May 31, 1928	11
2391. Lawrence Section of Merrimack Mfg. Co. along river	May 31, 1928	11
2392. Merrimack Mfg. Co. along river	May 31, 1928	11
2392A Merrimack Mfg. Co. along river	May 31, 1928	11
2393. Boott Mills along river	May 31, 1928	11
2393A Boott Mills along river	May 31, 1928	11
2394. Pepperell Mfg. Co. along river	May 31, 1928	11
2394A Pepperell Mfg. Co. along river	May 31, 1928	11
2395. Saco-Lowell Shops – Building # 5	July 6, 1928	11
2396. Diagram of Flood Heights at Lowell	July 21, 1928	11
2397. Financial Diagram of Locks & Canals	July 21, 1928	11
2398. Ziskinds wall on Pawtucket Canal	Aug. 3, 1928	11
2399. Ziskinds wall on Pawtucket Canal	Aug. 3, 1928	11
2400. Ford St. Park looking west	Aug. 3, 1928	11
2401. Suffolk St. Park looking south	Aug. 3, 1928	11
2402. Wilson wall showing boys in swimming and on ramp	Aug. 3, 1928	11
2403. Land taken by city at corner of Salem & Pawtucket sts.	Aug. 27, 1928	11
2404. Land taken by city at corner of Salem & Pawtucket sts.	Aug. 27, 1928	11
2405. High water marks at Jackson Mills, Nashua, N. H.	Aug. 27, 1928	11
2406. High water marks at Jackson Mills, Nashua, N. H.	Aug. 27, 1928	11
2407. High water marks at Jackson Mills, Nashua, N. H.	Aug. 27, 1928	11
2408. Canal St. bridge – Nashua, N. H.	Aug. 27, 1928	11

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No.	Description	Date	Copy in BK. No
2409.	Canal St. bridge – Nashua, N. H.	Aug. 27, 1928	11
2410.	Canal St. bridge – Nashua, N. H. Showing roadway	Aug. 27, 1928	11
2411.	Swamp Locks new Sluice gate	Sept. 9, 1928	11
2412.	Eastern Canal looking downstream from Bridge St.	Sept. 9, 1928	11
2413.	Eastern Canal looking downstream from Boott Office	Sept. 9, 1928	11
2414.	Eastern Canal looking downstream from # 6 racks	Sept. 9, 1928	11
2415.	Lincoln St. bridge over Hale's Brook – driving piles	Oct. 4, 1928	11
2416.	Suffolk St. boom in Northern Canal, also Nashua Mfg. Co.'s Conveyor Bridge	Oct. 4, 1928	11
2417.	Opening Eastern Canal Wall to let in water from Boott Penstock	Oct. 15, 1928	11
2418.	Opening Eastern Canal Wall to let in water from Boott Penstock	Oct. 15, 1928	11
2419.	No. 1 – 72" Swain Wheel of Ipswich Mills being junked. Installed in 1878 taken out 1928	Oct. 19, 1928	11
2420.	No. 1 – 72" Swain Wheel of Ipswich Mills being junked. Installed in 1878 taken out 1928	Oct. 19, 1928	11
2421.	Suffolk St. Fence, along Western Canal, from Jefferson to Market St.	Oct. 25, 1928	11
2422.	Merrimack Boom	Oct. 25, 1928	11
2423.	New Guides welded in Guide Ring of 30" Swain Wheel. Kelix Cup Co. West Chelmsford	Nov. 9, 1928	11
2424.	Broken Concrete Wall around end of Hamilton Canal. South side	Nov. 20, 1928	11
2425.	Broken Concrete Wall at end of Hamilton Canal. Looking North	Nov. 20, 1928	11
2425A	Merrimack New Sluice Gate	Nov. 25, 1928	11
2426.	Pepperell Mfg. Co. Racks in Eastern Canal which feed wheels in Section 8	Nov. 25, 1928	11
2427.	Pepperell Mfg. Co. looking North from Section # 12	Nov. 25, 1928	11
2428.	Copy of old picture in Massachusetts Mill Yard on City of Lowell Plan 1856	Nov. 26, 1928	11
2429.	Cut off wall at Head of Ipswich Penstocks	Dec. 6, 1928	11
2430.	L. & C. Land on bank of Merrimack River near Lowell & Dracut line opened for Dump looking downstream	Dec. 6, 1928	11

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No.	Description	Date	Copy in BK. No
2431.	L. & C. Land on bank of Merrimack River near Lowell & Dracut line opened for Dump looking downstream	Dec. 6, 1928	11
2432.	Now 1928 "Red Bridge" of the Boston & Maine R. R. temporary Supports Removed Sunday Dec. 2, 1928. (2 negatives)	Dec. 13, 1928	11
2433.	Copy of the Spencer Pierce House, Tewksbury, Mass.	Dec. 14, 1928	11
2434.	Damaged L. & C. Fence, corner of Market & Suffolk St.	Dec. 26, 1928	11
2435.	Site of Old Tremont Mill # 3 which has been torn down	Feb. 5, 1928	11
2436.	Site of old Tremont Mill # 3 which has been torn down, looking down Suffolk St.	Feb. 5, 1928	11
2437.	House and Land at Junction of Pawtucket, Perkins and Aiken St. Looking down Perkins to Aiken	Mar. 15, 1928	11
2438.	House and Land at Junction of Pawtucket, Perkins and Aiken St. Looking from Aiken to Perkins	Mar. 15, 1928	11
2439.	Board Fence repaired on Varnum Ave., by Locks & Canals 94 feet upstream from end of Pawtucket Dam.	Mar. 21, 1928	11
2440.	Board Fence repaired on Varnum Ave., by Locks & Canals 94 feet upstream from end of Pawtucket Dam.	Mar. 21, 1928	11
2441.	North side of Northern Canal Wall below School St. Bridge looking downstream Elev. of water 82.60 at 12:30 P. M.	Mar. 26, 1928	11
2442.	South side of Northern Canal Wall below School St. Bridge looking downstream. Elev. of water 81.10 at 12:05 P. M.	Mar. 27, 1928	11
2443.	North side of Northern Canal Wall below School St. Bridge looking upstream Elev. of water 81.50 at 12:10 P. M.	Mar. 27, 1928	11
2444.	Same as # 2443	Mar. 27, 1928	11
2445.	Western Canal looking downstream between Market & Jefferson Sts.	Mar. 27, 1928	11
2446.	Land between Northern Canal & Merrimack River below School St. Bridge	Mar. 27, 1928	11
2447.	Western Canal between Jefferson & Broadway Dts. looking downstream	Mar. 27, 1928	11
2448.	W. N. Goodell Jan. 1, 1921 to March 31, 1929	Mar. 29, 1929	11
2449.	W. N. Goodell Jan. 1, 1921 to March 31, 1929	Mar. 30, 1929	11

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No.	Description	Date	Copy in BK. No
2450.	Section # 12 Pepperell Mfg. Co. being razed for new Post office, also 5 foot strip of land owned by L. & C.	Apr. 25, 1929	11
2451.	Middlesex St. looking East from Stevens St.	Apr. 30, 1929	11
2452.	Stevens St. looking North form Middlesex St.	Apr. 30, 1929	11
2453.	Mill # 12 & 14 of Lawrence Mfg. Co. looking west	May 13, 1929	11
2454.	Lower Pawtucket Canal showing 4" Steam Pipe between Assets Realization Co. and Appleton Co.	May 23, 1929	11
2455.	Bridge St. Bridge over Eastern Canal	June 5, 1929	11
2456.	Old Cottage House on Warren St. beside W. H. Bagshaw Mill, which is to be torn down	June 5, 1929	11
2457.	High School Girls on Lucy Larcom Park	June 18, 1929	11
2458.	Kirk St. looking towards Merrimack St. from French St.	June 18, 1929	11
2459.	Lee St. looking towards John St. from Kirk St.	June 18, 1929	11
2460.	French St. from Kirk St. in rear of High School	June 18, 1929	11
2461.	French St. looking towards Merrimack Canal from John St.	June 18, 1929	11
2462.	Paige St. looking towards Kirk St. from John St.	June 18, 1929	11
2463.	John St. looking towards Boott Mills from Paige St.	June 18, 1929	11
2464.	Boott Mills Upper Yard showing repairs to Stair Towers recently made by Locks and Canals	June 18, 1929	11
2465.	Lucy Larcom Park	June 19, 1929	11
2466.	Lucy Larcom Park	June 19, 1929	11
2467.	Hamilton Canal looking upstream	June 24, 1929	11
2468.	Merrimack Mfg. Co., Tremont Yard	June 24, 1929	11
2469.	R. K. Dexter & Son buildings at the corner of Fletcher and Dutton Streets	June 24, 1929	11
2470.	R. K. Dexter & Son buildings at the corner of Fletcher and Dutton Streets	June 24, 1929	11
2471.	Left hand side Merrimack Wasteway Wall at end of Eastern Canal Looking upstream	June 28, 1929	11

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No.	Description	Date	Copy in BK. No
2472.	Left hand side Merrimack Wasteway Wall at end of Eastern Canal Looking downstream	June 28, 1929	11
2473.	Mill No. 12 of Pepperell Mfg. Co. being torn down for Post office looking northeast	July 23, 1929	11
2474.	Mill No. 12 of Pepperell Mfg. Co. being torn down for Post office looking south	July 23, 1929	11
2475.	Mill No. 12 of Pepperell Mfg. Co. being torn down for Post office looking north	July 24, 1929	11
2476.	Pepperell Mfg. Co. Section 8 Wheel house and end of Mill # 1	Aug. 16, 1929	11
2477.	Post Office Site Kearney Square looking east	Aug. 16, 1929	11
2478.	Post Office Site Kearney Square looking northwest Also three prints from Marion Studio showing west end of P. O. excavation. Sept. 1930	Aug. 16, 1929	11
2479.	Leaks from Section # 8 Penstock and part of # 12 basement wall	Aug. 30, 1929	11
2480.	Partition wall in basement of No. 12 Mill	Aug. 30, 1929	11
2481.	Bridge for L. & C. 24” Pipe across Eastern Canal	Sept. 23, 1929	11
2482.	Bridge for L. & C. 24” Pipe across Eastern Canal	Sept. 23, 1929	11
2483.	L. & C. 24” Pipe across Eastern Canal	Sept. 23, 1929	11
2484.	L. & C. Thermometer shelter at Pawtucket Dam Lowell	Oct. 8, 1929	12
2485.	L. & C. Thermometer shelter at Pawtucket Dam Lowell	Oct. 8, 1929	12
2486.	Overhead Bridge at Pepperell Mfg. Co. between Store House “C” and “B”	Oct. 11, 1929	12
2487.	Store House “C” pm Canal St. side also laying of L. & C. 20” Water Main (2 negatives)	Oct. 11, 1929	12

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No.	Description	Date	Copy in BK. No
2488.	Private way between Pepperell Mfg. Store House "C" and B. F. Keith's Theatre	Oct. 11, 1929	12
2489.	Laying L. & C. 20" main showing part of concrete foundation of old Cold House removed	Oct. 16, 1929	12
2490.	Laying L. & C. 20" main showing part of concrete foundation of old Cold House removed	Oct. 16, 1929	12
2491.	Laying L. & C. 20" main on Canal Street.	Oct. 24, 1929	12
2492.	Trench in which 24" main on Kearney Square will be laid showing foundation of old # 12 Mill of the Pepperell Mfg. Co.	Nov. 8, 1929	12
2493.	L. & C. 24" Main being laid in Kearney Square also showing old foundation # 12 Mill of the Pepperell Mfg. Co.	Nov. 12, 1929	12
2494.	No Negative		
2495.	Last connection between 24" & 20" Main in Kearney Square Nov. 15, 1929. Water let into the main at 11:00 A. M. Nov. 16, 1929	Nov.	12
2496.	Gate House at Old Guard Locks and Lot # 13 as seen from Broadway	Nov. 22, 1929	12
2497.	Building & Yard at Old Guard Locks opposite Lot # 13	Nov. 22, 1929	12
2498.	2" Steam pipe over Lower Pawtucket Canal from Assets Realization Co. to Mill No. 7 of Marden & Murphy – Hamilton Yard	Nov. 26, 1929	12
2499.	Iron Fence at the corner of Suffolk & Merrimack Streets, Lowell, Mass.	Nov. 29, 1929	12
2500.	Transmission lines from Appleton Co. to Assets Realization Co.	Jan. 11, 1930	12
2501.	Transmission lines from Appleton Co. to Assets Realization Co.	Jan. 11, 1930	12
2502.	Proposed Playground on Lawrence St. opposite Watershed Mills looking South	Jan. 20, 1930	12

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No.	Description	Date	Copy in BK. No
2503.	Proposed Playground on Lawrence St. opposite Watershed Mills looking South	Jan. 20, 1930	12
2504.	Entrance to the Massachusetts Mill Yards	Feb. 10, 1930	12
2505.	Telephone wire across Western Canal from Suffolk St. to this so called Sawyer Carriage Building, looking North	Feb. 10, 1930	12
2506.	Same as # 2506 but looking east	Feb. 10, 1930	12
2507.	Switch Board of Section 8 Power House at Massachusetts Mills	Feb. 12, 1930	12
2508.	Entrance to Mass. Mill Yard	Feb. 12, 1930	12
2509.	Broken windows in Mass. Dye House	Feb. 13, 1930	12
2510.	Broken windows in Mass. Dye House from Brown St.	Feb. 13, 1930	12
2511.	For Sale sign on Mill No. 1 East side Pepperell Mfg. Co.	Feb. 5, 1930	12
2512.	For sale sign on Store House “C” Bridge St. side	Feb. 5, 1930	12
2513.	Bridge St. Looking towards Kearney Square	Feb. 5, 1930	12
2514.	Bridge Street Looking towards Merrimack River	Feb. 5, 1930	12
2515.	For Sale Sign on Pepperell Power House North side	Feb. 5, 1930	12
2516.	No. 1 Mill of the Mass. belonging to the Lowell Industrial Development Co.	Mar. 6, 1930	12
2516A	No. 2 Mill of the Mass. belonging to the Lowell Industrial Development Co.	Mar. 6, 1930	12
2517.	New For Rent sign on Store House “A” of the Mass. Mills, Lowell Ind. Dev. Co.	Mar. 6, 1930	12
2518.	Repair Shop, Machine Shop, Office and Watch House of the Mass. Mills, Lowell Industrial Dev. Co.	Mar. 6, 1930	12
2519.	Store Houses “A” & “B” at the Mass. Mills	Mar. 10, 1930	12
2520.	Power House, Boiler House & Slasher Building at the Massachusetts Mills	Mar. 10, 1930	12
2521.	Cloth Room Building at the Massachusetts Mills	Mar. 10, 1930	12
2522.	Dye House at the Massachusetts Mills	Mar. 10, 1930	12
2523.	Entrance to Massachusetts Mills showing Lowell Industrial Development sign	Mar. 10, 1930	12
2524.	Waste House at Massachusetts Mills	Mar. 10, 1930	12

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No.	Description	Date	Copy in BK. No
2525.	Picker House at Massachusetts Mills showing Section 11	Mar. 10, 1930	12
2526.	Mapping Building at Massachusetts Mills	Mar. 10, 1930	12
2527.	Fourth Floor of Mill No. 1 Mass. Mills	Mar. 13, 1930	12
2528.	Second Floor of Mapping Building Mass. Mills	Mar. 13, 1930	12
2529.	Third Floor Cloth Room Building, Mass. Mills	Mar. 13, 1930	12
2530.	Lowell Industrial Mfg. Co. Mass. Mills from Pepperell Mfg. Co.'s Store House	Apr. 17, 1930	12
2531.	Lowell Industrial Mfg. Co. Mass. Mills from Fairburn Building	Apr. 17, 1930	12
2532.	Area over Merrimack Canal between Market St. & Y. M. C. A.	Apr. 23, 1930	12
2533.	Area over Merrimack Canal between Market St. & Y. M. C. A.	Apr. 23, 1930	12
2534.	Electric Cables being put in under Bridge St. Bridge from Mass. Mills to Boott Mills	Apr. 23, 1930	12
2535.	One of first and latest B. & M. locomotives on Dutton St. at Centenary celebration	June 5, 1930	12
2536.	One of first and latest B. & M. locomotives on Dutton St. at Centenary celebration	June 5, 1930	12
2537.	One of first and latest B. & M. locomotives on Dutton St. at Centenary celebration	June 5, 1930	12
2538.	Spike in north side walk of Canal St. Railroad Crossing in Kearney Square	June 17, 1930	12
2539.	Repairs to Head gate of No. 12 wheel at Mass. Mills	June 23, 1930	12
2540.	Railroad centennial Tablet & tracks at Lucy Larcom Park	June 23, 1930	12
2541.	Lowell ice Co.'s filling station corner of Conduit Ave. & Lakeview Ave.	July 2, 1930	12
2542.	Lowell ice Co.'s filling station corner Aiken and Cheever Sts.	July 2, 1930	12
2543.	Canal at Boston Mfg. Co. Waltham, Mass.	July 15, 1930	12
2544.	Part of Dam & Canal on Charles River, Waltham, Mass.	July 15, 1930	12
2545.	Part of Dam & Canal of Boston Mfg. Co. Waltham, Mass.	July 15, 1930	12
2546.	Tailgate & Gage of Boston Mfg. Co. emptying into Charles River, Waltham, Mass.	July 15, 1930	12
2547.	Racks & Gage in canal of Boston Mfg. Co. Waltham, Mass.	July 15, 1930	12

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No.	Description	Date	Copy in BK. No
2548.	Inside of wheel house looking south Boston Mfg. Co., Waltham, Mass.	July 15, 1930	12
2549.	Inside of wheel house looking north Boston Mfg. Co. Waltham, Mass.	July 15, 1930	12
2550.	Almost property, Tewksbury, Mass. belonging to Lowell Industrial Development Co. showing all Tanks	July 16, 1930	12
2551.	Almost property, Tewksbury, Mass. belonging to Lowell Industrial Development Co. showing boiler House, coal house, and railroad tracks	July 16, 1930	12
2552.	Almost property, Tewksbury, Mass. belonging to Lowell Industrial Development Co. showing boiler house, coal house, oil tanks and oil filing stands	July 16, 1930	12
2553.	Tremont Mill # 1, Merrimack Mfg. Co. looking south inside of yard	July 18, 1930	12
2554.	Tremont Mill # 1, Merrimack Mfg. Co. looking north inside yard	July 18, 1930	12
2555.	Tremont Mill # 1, Merrimack Mfg. Co. looking south on Tremont St.	July 18, 1930	12
2556.	Tremont Mill # 1, Merrimack Mfg. Co. looking north on Tremont St.	July 18, 1930	12
2557.	Tremont Gate House & vicinity	July 18, 1930	12
2558.	Broadway Bridge showing new planking between tracks put in by Eastern Mass. Railway	July 23, 1930	12
2559.	Site of proposed miniature Golf Course on L. & C. land, First St. Boulevard	Aug. 12, 1930	12
2560.	L. & C. land, on bank of Merrimack River near Lowell & Dracut line, used for dump.	Aug. 12, 1930	12
2561.	Miniature golf course on Pawtucket Boulevard	Aug. 12, 1930	12
2562.	City of Lowell Rain Gage on filter beds at Boulevard Pumping station	Aug. 12, 1930	12
2563.	New walls at end of Hamilton Canal	Aug. 12, 1930	12
2564.	New Power lines across Lawrence wasteway from Merrimack Mfg. Co. to Lawrence Mfg. Co.	Aug. 13, 1930	12
2565.	New Boulevard wall, 4 feet in diam. competed	Aug. 19, 1930	12
2566.	One boulevard well discontinued on account of quicksand	Aug. 19, 1930	12

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No. Description	Date	Copy in BK. No
2567. Concrete facing on West side Lawrence wasteway Dam	Sept. 25, 2930	12
2568. Miniature golf course on Locks and Canals Land at Indian Orchard	Oct. 5, 1930	12
2569. Sign of Jos. J. Flynn, advertiser, on L. & C. land off Lakeview Ave.	Oct. 6, 1930	12
2570. Entrance to Golf Course in Mill # 2, First Floor Lowell Industrial Development Company	Oct. 23, 1930	12
2571. Concrete facing, Lawrence wasteway	Oct. 23, 1930	12
2572. Socony Fuel Oil Truck, Standard Oil Co. of N. Y.	Nov. 13, 1930	12
2573. Front entrance to Country Club miniature Golf Course on Bridge St. Lowell Ind. Dev. Co. Mill # 2	Nov. 26, 1930	12
2574. Inside view of # 2573	Nov. 26, 1930	12
2575. Post Office Site showing excavation and piers for girders over penstock for Section 8 Power House	Nov. 25, 1930	12
2576. Mill No. 1 Section 1 and 6, Lowell Ind. Dev. Co.	Dec. 3, 1930	12
2577. Same as # 2576		
2578. Iron Fence on Ford St. below High Bridge which was broken about Jan. 12, 1931.		
2579. Sidewalk in front of Cheever St. Park	Jan. 30, 1931	12
2580. Portion of sidewalk in front of Cheever St. Park and adjacent to # 136 Cheever St.	Jan. 30, 1931	12
2581. Rubbish on sidewalk in rear of Brockelman's restaurant	Feb. 2, 1931	12
2582. Oil House at Lowell Ind. Dev. Co. looking towards Bridge St.	Feb. 24, 1931	12
2583. Brick Wall in front of Oil House at Lowell Ind. Dev. Co.	Feb. 24, 1931	12
2584. L. & C. 2 horse team on 10 foot Strip East of office and yard	Feb. 24, 1931	12
2584A L. & C. 2 horse team on 10 foot Strip East of office and yard	Apr. 22, 1931	12
2585. L. & C. 2 horse team on 10 foot Strip East of office and yard	Feb. 24, 1931	12
2585A L. & C. 2 horse team on 10 foot Strip East of office and yard	Apr. 22, 1931	12

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No.	Description	Date	Copy in BK. No
2586.	Saco-Lowell Shops No. 3 being torn down looking South	Mar. 19, 1931	12
2587.	Saco-Lowell Shops No. 3 being torn down looking North east	Mar. 19, 1931	12
2588.	Break in 30" City water main 6th Street near corner of Bridge St. Lowell, Mass. 3:15 P. M.	Mar. 30, 1931	12
2589.	Break in 30" City water main 6th Street near corner of Bridge St. Lowell, Mass. 3:15 P. M.	Mar. 30, 1931	12
2590.	Cracks in 30" pipe taken out at break on 6th Street, Lowell, Mass.	Mar. 31, 1931	12
2591.	Cracks in 30" pipe taken out at break on 6th Street, Lowell, Mass.	Mar. 31, 1931	12
2592.	Construction of New Post Office Lowell, Mass. (2 negatives)	Apr. 3, 1931	12
2593.	Lumber on L. & C. land on West side of Pawtucket Canal near Pawtucket St. Looking north	Apr. 9, 1931	12
2594.	Lumber on L. & C. land on west side of Pawtucket Canal near Pawtucket St. Looking south west.	Apr. 9, 1931	12
2595.	Tar oil etc. from Lowell Gas Light Co. emptying in to Pawtucket Canal through 12" C. I. Pipe under School St. Bridge @ 2:30 P. M.	May 6, 1931	12
2596.	Same as # 2595	May 6, 1931	12
2597.	Tar oil etc. from Lowell Gas Light Co. emptying in to Pawtucket Canal through 12" C. I. Pipe under School St. Bridge @ 8:45 P. M.	May 7, 1931	12
2598.	Lumber on L. & C. land on west side of Pawtucket Canal near Pawtucket St. looking south west	May 16, 1931	12
2599.	Rubbish etc. on Canal St. at entrance to Kearney Square	May 16, 1931	12
2600.	City 20" pipe being laid in field west of Pawtucket Canal between Broadway & Pawtucket St. looking towards Broadway	May 21, 1931	12
2601.	Fence repaired & holes filled in on East side of Pawtucket Canal at "Thompson's Field"	May 27, 1931	12

Index (cont.)

No.	Description	Date	Copy in BK. No
2602.	City 20" Pipe & truck in L. & C. field west side of Pawtucket Canal looking north towards Pawtucket St.	May 28, 1931	12
2603.	Trench being dug in Tyng Street for 20" city pipe looking south towards Broadway	May 28, 1931	12

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No.	Description	Date	Copy in BK. No
2604.	Sign put up on East side of Pawtucket Canal to keep boys out of Canal, also new hole in fence	June 1, 1931	12
2605.	Western Canal near junction of Pawtucket canal where little girl was drowned	June 18, 1931	12
2606.	Ditch open in City 20" Pipe on School Street over Merrimack River and Northern Canal. Shows end of Canal Curtain Wall	June 19, 1931	12
2607.	City 20" pipe being covered up in field between Red Bridge and Broadway	June 19, 1931	12
2608.	Pawtucket Dam	July 1, 1931	12
2609.	Pawtucket Dam	July 8, 1931	12
2610.	Saco Lowell Shops buildings 4 & 5	July 15, 1931	12
2611.	Saco Lowell Shops building # 4	July 15, 1931	12
2612.	Store front of Gofgauf's Stores on Bridge St. in front of Mill # 2 Lowell Industrial Development Company	July 29, 1931	12
2613.	Pawtucket Street Bridge over Pawtucket Canal being made ready for city 20" Water main looking east at 9:30 A. M.	Aug. 4, 1931	12
2614.	Pawtucket Street Bridge over Pawtucket Canal being made ready for city 20" Water main looking west at 9:30 A. M.	Aug. 4, 1931	12
2615.	Lumber etc. belonging to D. H. Walker in "Thompsons Field" looking west	Aug. 25, 1931	12
2616.	Lumber etc. belonging to D. H. Walker in "Thompsons Field" looking east	Aug. 25, 1931	12
2617.	Reconstructing head works and racks in rear of Ames Worsted Company	Aug. 25, 1931	12
2618.	City of Lowell 30" Water Main under south sidewalk of Pawtucket St. Bridge over Pawtucket Canal, looking east	Sept. 1, 1931	12
2619.	Same as # 2618 looking west	Sept. 1, 1931	12
2620.	Same as # 2618 looking north east	Sept. 1, 1931	12

Index (cont.)

No.	Description	Date	Copy in BK. No
2621.	Reconstruction of Headworks & Racks, in rear of old "Ames Worsted Mill", by Wamesit Power Co. looking downstream (2 negatives)	Sept. 13, 1931	12
2622.	Reconstruction of Headworks & Racks, in rear of old "Ames Worsted Mill", by Wamesit Power Co. looking upstream (2 negatives)	Sept. 13, 1931	12
2623.	Rear view of Tenement Block, 742 to 754 Lakeview Ave., owned by Edward Atkingnson.	Sept. 29,	12
2624.	Location of end of proposed 6" Drain in Aiken St. Dump, near Conduit St. looking Northwest	Sept. 29, 1931	12
2625.	Same as above looking south east	Sept. 28, 1931	12
2626.	Oil Truck unloading oil at Lowell Industrial Development Co.	Oct. 9, 1931	12
2627.	Same as # 2626	Oct. 9, 1931	12
2628.	Eastern Canal from Kearney Square Bridge looking downstream	Oct. 14, 1931	12
2629.	Lowell Industrial Development Co. between Repair Shop & Post Office	Oct. 14, 1931	12
2630.	Location of Automobile Drowning Accident at end of Merrimack Canal Looking from French St. Picture taken at 8:30 A. M.	Oct. 20, 1931	12
2631.	Location of Automobile Drowning Accident at end of Merrimack Canal Looking from French St. Picture taken at 3:00 P. M.	Oct. 20, 1931	12
2632.	Perchet's Greasing Station side view	Oct. 23, 1931	12
2633.	Perchet's Greasing Station front view	Oct. 23, 1931	12
2634.	Gofgauf's Store front on Bridge St. in L. I. D. Co.'s mill # 2	Oct. 23, 1931	12
2635.	Opening up area between Store House A & B and Mill # 2 for driveway from Bridge Street	Nov. 10, 1931	12
2636.	Repairing racks for Section 8 Power House of Lowell Industrial Development Co.	Nov. 10, 1931	12
2637.	Sidewalk along L. & C. five foot strip, east side of Eastern Canal looking downstream	Nov. 25, 1931	12

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No.	Description	Date	Copy in BK. No
2638.	West side of Eastern Canal near Kearney Square opposite new Post Office	Nov. 25, 1931	12
2639.	Gate Well Covers over L. & C. valves in Saco-Lowell yard, put on by John Simpson, Contractor	Nov. 25, 1931	12
2640.	Sidewalk along five foot strip East side of Eastern Canal. Looking downstream	Dec. 23, 1931	12
2641.	New Entrance to Lowell Industrial development Company on Bridge Street between Mill No. 2 and Storehouse A & B	Dec. 23, 1931	12
2642.	Indian Orchard Dump looking west	Dec. 2, 1931	12
2643.	Indian Orchard Dump looking east	Dec. 2, 1931	12
2644.	Campbells Golf Course on L. & C. land First St. Boulevard	Dec. 2, 1931	12
2645.	Canal Street near Kearney Sq. at 11:20 A. M.	Dec. 24, 1931	12
2646.	Prescott Spinning Mill & Power House looking southwest	Jan. 4, 1932	12
2647.	Prescott Spinning Mill looking southeast	Jan. 4, 1932	12
2648.	End of Hamilton Canal	Jan. 4, 1932	12
2649.	Fences and Stop Signs at end of French Street	Jan. 26, 1932	12
2650.	Fences and Stop Signs at end of French Street	Jan. 26, 1932	12
2651.	Putting up transmission lines between “Prescott Power House” and Middlesex Company	Jan. 26, 1932	12
2652.	Putting up transmission lines between “Prescott Power House” and Middlesex Company	Jan. 26, 1932	12
2653.	Putting up transmission lines between “Prescott Power House” and Middlesex Company	Jan. 26, 1932	12
2654.	Central Street Bridge looking towards Merrimack St.	Jan. 29, 1932	12
2655.	Central Street bridge looking towards Gorham Street	Jan. 29, 1932	12
2656.	Canal St. entrance to Lowell Industrial Development Co. looking into yard	Feb. 19, 1932	12
2657.	Canal St. entrance to Lowell Industrial Development Co. looking towards Bridge Street	Feb. 19, 1932	12
2658.	New Fence east side of Eastern Canal at Lower Locks Dam	Mar. 2, 1932	12
2659.	Fence west of Pawtucket Canal above Guard Locks	Mar. 2, 1932	12

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No.	Description	Date	Copy in BK. No
2660.	Fence on Kyan St. northeasterly side of Pawtucket Canal near Red Bridge	Mar. 2, 1932	12
2661.	Fence on Kyan St. northeasterly side of Pawtucket Canal opposite Merrimack Valley Supply Company	Mar. 2, 1932	12
2662.	Fence on Jackson Street, south side of Hamilton Canal from Appleton Bridge looking west	Mar. 2, 192	12
2663.	Fence on Jackson Street, south side of Hamilton Canal from Saco Bridge looking west	Mar. 2, 1932	12
2664.	Fence on Jackson Street, south side of Hamilton Canal from Saco Bridge looking east	Mar. 2, 1932	12
2665.	Fence east side of Pawtucket Canal above Guard Locks showing holes	Mar. 2, 1932	12
2666.	Stop Signs put up by City on Ford St. Fence south side of Northern Canal at the foot of Race Street	Mar. 2, 1932	12
2667.	Northerly end and westerly side of Aiken Street Bridge and Bank of Merrimack River adjoining	Mar. 2, 1932	12
2668.	Fence on Northerly side of Northern Canal above High Bridge	Mar. 2, 1932	12
2669.	Prescott Spinning Mill being torn down	Mar. 16, 1932	12
2670.	New Wall and Fence on westerly side of Eastern Canal opposite Post Office	Mar. 16, 1932	12
2671.	Saco Lowell Shops being torn down looking Northeast	Mar. 16, 1932	12
2672.	Saco Lowell Shops being torn down looking Southeast	Mar. 16, 1932	12
2673.	Becker Show Co. Mill # 2 Section 4, Stitching Room at Lowell Industrial Development Company	Mar. 26, 1932	12
2674.	Becker Show Co. Mill # 2 Section 3, Cutting Room at Lowell Industrial Development Company	Mar. 26, 1932	12
2675.	Becker Show Co. Mill # 2 Section 4, Finishing Room at Lowell Industrial Development Company	Mar. 26, 1932	12
2676.	Becker Show Co. Mill # 2 Section 3, Lasting Room at Lowell Industrial Development Company	Mar. 26, 1932	12
2677.	“Lamson’s Field” looking southwest	Apr. 13, 1932	12
2678.	Land on East side of L. & C. Office and Yard looking north	Apr. 23, 1932	12
2679.	Saco Lowell Shops being torn down looking northeast	May 2, 1932	12

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No.	Description	Date	Copy in BK. No
2680.	Saco Lowell Shops being torn down looking southeast	May. 2, 1932	12
2681.	Prescott Spinning as torn down to date	May 2, 1932	12
2682.	Motor Boat being transported by L. & C. from Pawtucket Dam to Hunts Falls	May 30, 1932	12
2683.	Central St. Bridge showing repairs between tracks made by Eastern Mass. Railway Co. Picture taken	July 19, 1932	12
2684.	L. & C. Land at 200 and 202 Cheever St. Lot No. 64-A-4 leased to Emil Lemire	July 22, 1932	12
2685.	Same as # 2684 Different view	July 22, 1932	12
2686.	L. & C. private way west of Ayer Home	Sept. 3, 1932	12
2687.	8 new Pickets on wooden fence on Ford St. between Race and Cabot Streets.	Sept. 6, 1932	12
2688.	No. 2 Mill and part of No. 1 “Tremont Yard”	Sept. 12, 1932	12
2689.	Part of Nos. 1 & 2 Mills Tremont Yard	Sept. 12, 1932	12
2690.	Hole in fence made by Brady’s Truck Nov. 10, 1932 on Pawtucket St. near corner of Moody	Nov. 12, 1932	12
2691.	Kitson Machine Shop Jackson Street Entrance (Saco Yard)	Nov. 17, 1932	12
2692.	Locks & Canals Gate House near Saco Foundry Yard	Nov. 17, 1932	12
2693.	Bridge St. Entrance to Kitson Machine Shop on Dutton St.	Nov. 17, 1932	12
2694.	Open space between R. R. Bridge near Corner of Bigelow and Saco Yards.	Nov. 17, 1932	12
2695.	Switch Board Room and Wooden Buildings over # 3 and # 4 wheels at Kitson Machine Shop	Nov. 17, 1932	12
2696.	Wooden Building over # 5 wheel at Kitson Machine Shop	Nov. 17, 1932	12
2697.	Bulkhead over # 6 wheel. Kitson Machine Shop, Foundry Yard	Nov. 17, 1932	12
2698.	Fence recently put up by Locks and Canals also R. R. Bridge at Jackson St. Entrance to Kitson Machine Shop	Nov. 17, 1932	12
2699.	One of three signs put up by L. & C. on Ford St. fence between Suffolk and Cabot Streets	Dec. 3, 1932	12
2700.	Dye House being torn down at the Lowell Industrial Development Co.	Dec. 6, 1932	12

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No.	Description	Date	Copy in BK. No
2701.	"Tremont Mills" being torn down	Dec. 6, 1932	12
2702.	Mr. Robert Becker's private office. Becker Bros. Shoe Co. at Lowell Industrial Development Co. Mill # 1	Dec. 16, 1932	12
2703.	Becker Bros. Shoe Co. Main Office in the Lowell Industrial Development Co.'s Mill # 1	Dec. 16, 1932	12
2704.	Tearing down Dye House at the Lowell Industrial Development Co.	Jan. 13, 1933	12
2705.	Prescott Spinning Mill as torn down to date	Jan. 13, 1933	12
2706.	Tremont Mill being torn down.	Jan. 13, 1933	12
2707.	Lowell Industrial Development Co.'s Dye House being torn down	Jan. 25, 1933	13
2708.	Tremont Mill being torn down	Feb. 18, 1933	13
2709.	Driving Artesian Well on Canal St. near Kearney Square	Feb. 22, 1933	13
2710.	750 Kw Steam Turbine at Lowell Industrial Development Co.	Feb. 22, 1933	13
2711.	1500 Kw Steam Turbine at Lowell Industrial Development Co.	Feb. 22, 1933	13
2712.	3000 Kw Steam Turbine at Lowell Industrial Development Co.	Feb. 22, 1933	13
2713.	Steam Turbines and Water Wheels in Main Power House at Lowell Industrial Development Co.	Feb. 22, 1933	13
2714.	Tearing down Boiler House at the Almont Property	Mar. 16, 1933	13
2715.	Boiler House torn down at the Almont Property	Mar. 23, 1933	13
2716.	Boiler House torn down at the Almont Property	Mar. 23, 1933	13
2717.	Tearing down "Tremont Mills"	Mar. 23, 1933	13
2718.	Kitson Machine Shop (Formerly Saco-Lowell Shops)	Mar. 24, 1933	13
2719.	Kitson Machine Shop (Formerly Saco-Lowell Shops)	Mar. 24, 1933	13
2720.	Lowell Industrial Development Co. Dye House torn down	Mar. 29, 1933	13
2721.	Merrimack Store House # 4 being torn down	Mar. 29, 1933	13
2722.	Sterling Motor Lines Truck whose rear wheels went through L. I. D. Co.'s Bridge over Eastern Canal	Apr. 7, 1933	13
2723.	Turbine Room basement during high water at Boott Mills	Apr. 20, 1933	13
2724.	Pawtucket Dam	Apr. 20. 1933	13

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No.	Description	Date	Copy in BK. No
2725.	Merrimack River looking downstream from School Street	Apr. 20, 1933	13
2726.	Concord River looking downstream from East Merrimack St.	Apr. 20, 1933	13
2727.	Concord River looking upstream from East Merrimack St.	Apr. 20, 1933	13
2728.	Old Colonial Carpenter copied	Apr. 1933	13
2729.	Transmission lines and steam pipes from Bigelow to Hamilton and Appleton Mills	June 16, 1933	13
2730.	Safes at Lowell Industrial Development Co.	June 1933	13
2731.	Federal Shoe Co. Fire on Dix Street (2 Negatives) picture taken	June 26, 1933	13
2732.	Buildings on Ellsworth St. northerly side, which caught fire from Federal Shoe Co. building	June 26, 1933	13
2733.	One of the holes under L. & C. fence in rear of Bartlett School	June 30, 1933	13
2734A	Top floor of Picker Building at the Lowell Industrial Development Company	July 31, 1933	13
2734B	Top floor of Picker Building at the Lowell Industrial Development Company	July 31, 1933	13
2734C	Top floor of Picker Building at the Lowell Industrial Development Company	July 31, 1933	13
2735.	Maxey's side show at Aiken Street Dump	Aug. 9, 1933	13
2736.	Boiler House showing barrels of grease stored there	Aug. 9, 1933	13
2737.	Picker Building Lowell Industrial Development Co.	Sept. 1, 1933	13
2738.	Bricks on walk over racks to Prescott Power House wheels, Eastern Canal looking downstream	Sept. 23, 1933	13
2739.	Same as # 2738, different view	Sept. 23, 1933	13
2740.	Merrimack St. Bridge over Western Canal, upstream side showing fence	Sept. 26, 1933	13
2741.	Merrimack Street bridge over Western Canal, downstream side showing fence	Sept. 26, 1933	13
2742.	3 – 667 K>VA – 2400 to 600 Volt Wagner Transformer at Lawrence Section for Electrical Interconnection	Sept. 26, 1933	13
2743.	Hydrant # 14, Bigelow Yard, which run into Oct. 3, 1933		13
2744.	Hydrant # 6, Bigelow yard, which was run into Oct. 10, 1933		13

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No.	Description	Date	Copy in BK. No
2745.	Wire Fence between L. & C. Land and Wannalancit St.	Nov. 1, 1933	13
2746.	Wire Fence between L. & C. Land and Wannalancit St.	Nov. 1, 1933	13
2747.	Picture of Hiram F. Mills	(Copied)	13
2748.	Picture of James B. Francis	(Copied)	13
2749.	Locks and Canals right of way, east of Yard and office Buildings, looking north.	Nov. 22, 1933	13
2750.	Locks and Canals right of way, east of Yard and office Buildings, looking south.	Nov. 22, 1933	13
2751.	Looking East towards Manhole # 22, in Boott Mill Yard, showing 3-4" Duct Lines for Electrical Interconnection between Boott Mills and Merrimack Mfg. Co. 1 Duct to carry a 3/c 500,000 CM. lead cable, 2 Ducts reserved for future development	Dec. 5, 1933	13
2752.	Same as above looking west	Dec. 5, 1933	13
2753.	United States Geological Survey gauging station at Hunt's Falls on southerly bank of Merrimack River.	Dec. 18, 1933	13
2754.	United States Geological Current Meter Station at Hunt's Falls, Merrimack River	Dec. 18, 1933	13
2755.	Spike in tie at the easterly end of Boott Store House track purchased from the Boston & Maine Railroad	Dec. 18, 1933	13
2756.	First Floor Mill # 1. Lowell Industrial Development Co.	Jan. 8, 1933	13
2757.	Prescott Yard from Section 8. Lowell Industrial Dev. Co.	Jan. 8, 1933	13
2758.	Gofkaufs Anniversary sign over Bridge St.	Jan. 22, 1933	13
2759.	Fifth floor Mill # 2. Lowell Industrial Development Co.	Jan. 22, 1933	13
2760.	Fourth floor Mill # 2. Lowell Industrial Development Co.	Jan. 22, 1933	13
2761.	Building over Pawtucket Canal. lot 28-A	Jan. 22, 1933	13

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No.	Description	Date	Copy in BK. No
2762.	Pawtucket Dam looking downstream	Feb. 8, 1934	13
2763.	Northern Canal, looking downstream from Scholl St.	Feb. 8, 1934	13
2764.	End of Lawrence Canal	Feb. 8, 1934	13
2765.	Western Canal, looking upstream from Moody St.	Feb. 8, 1934	13
2766.	Western Canal, looking downstream from Cabot St.	Feb. 8, 1934	13
2767.	Pawtucket Dam from School St. Bridge	Feb. 26, 1934	13
2768.	Pawtucket Dam from Varnum Ave.	Feb. 26, 1934	13
2769.	Pawtucket Dam looking upstream	Feb. 26, 1934	13
2770.	First Floor of Slasher Bldg. Lowell Ind. Dev. Co.	Apr. 23, 1934	13
2771.	First Floor of Slasher Bldg. Lowell Ind. Dev. Co.	Apr. 23, 1934	13
2772.	Store House A & B being torn down at the Lowell Ind. Dev. Co.	Apr. 25, 1934	13
2773.	Store House A & B being torn down at the Lowell Ind. Dev. Co.	May 28, 1934	13
2774.	Fence and Gate in rear of Gookins Furniture Store near Eastern Canal	May 28, 1934	13
2775.	Old Automobiles and junk in rear of Lakeview Ave. garage on L. & C. land.	May 28, 1934	13
2776.	Fence and Gate repaired in rear of Gookins Furniture Store near Eastern Canal	June 14, 1934	13
2777.	Plank put on west end of Bridge over Eastern Canal, near Lower Locks.	June 14, 1934	13
2778.	Fire Escape on Napping Bldg. at Lowell Ind. Dev. Co.	June 14, 1934	13
2779.	Site of Store House A & B at Lowell Ind. Dev. Co.	June 18, 1934	13
2780.	Site of Store House A & B at Lowell Ind. Dev. Co.	June 18, 1934	13
2781.	Site of Store House A & B at Lowell Ind. Dev. Co. showing entrance to yard on line with Merrimack Laundry	June 18, 1934	13
2782.	Dump on L. & C. land, Eastern Canal to Merrimack River.	June 25, 1934	13
2783.	Bridge St. from Eastern Canal to Merrimack River	June 25, 1934	13
2784.	3 – 667 KVA – 2400 to 600 Volt, Wagner Transformers at the Boott Mills for Electrical Interconnection.	July 23, 1934	13

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No.	Description	Date	Copy in BK. No
2785.	Oil Switches in Transformer Vault at Boott Mills for Electrical Interconnection.	July 23, 1934	13
2786.	Housing over 3 – 667 KVA – 2400 to 600 Volt, Wagner Transformers at the Lawrence Section of Merrimack Mfg. Co.	July 24, 1934	13
2787.	2300 Volt Oil Switch in rear of 667 KVA Wagner Transformers at Lawrence Section, Merrimack Mfg. Co.	July 24, 1934	13
2788.	Site of Store House A & B. Beginning of grading.	July 23, 1934	13
2789.	Canal St. looking towards Lowell Ind. Dev. Co.	Aug. 2, 1934	13
2790.	Canal St. looking towards Kearney Square	Aug. 21, 1934	13
2791.	Leaks under Middlesex Dam, Concord River.	Aug. 21, 1934	13
2792.	Leak under Middlesex Dam, Concord River.	Aug. 21, 1934	13
2793.	Broadway Bridge over Pawtucket Canal. Finished replanking and taring today	Aug. 25, 1934	13
2794.	Rolling Dam Apron replaced with concrete.	Dec. 6, 1934	13
2795.	Hamilton Rack Platform replanked.	Dec. 6, 1934	13
2796.	Bridge St. Bridge over Eastern Canal replanked	Dec. 6, 1934	13
2797.	Easterly end of L. & C. Lot 96-C corner of First Street and Lawrence Boulevard	Dec. 6, 1934	13
2798.	Westerly and of Lot 84 neat Junction of Merrimack and Concord River.	Dec. 6, 1934	13
2799.	Lot 96-B. Looking toward Bridge St. from Southerly side of Merrimack River	Dec. 6, 1934	13
2800.	Easterly end of Lot 96-D looking west.	Dec. 6, 1934	13
2801.	Abbott Islands looking upstream	Dec. 6, 1934	13
2802.	Portions of L. & C. Lots 91-92-92A & 107 looking westerly from Aiken Streets	Dec. 18, 1934	13
2802A	Portions of L. & C. Lots 91-92-92A & 107 looking westerly from Aiken Streets	Dec. 18, 1934	13
2803.	L. & C. Lot 105 looking westerly from Beaver Brook	Dec. 18, 1934	13
2804.	L. & C. Lot 103-J looking northerly from Moody St. Bridge	Dec. 18, 1934	13
2805.	L. & C. Lot 89 looking northwest towards Aiken St.	Dec. 18, 1934	13
2806.	L. & C. Lot 92 and 107 looking westerly towards Beaver Brook.	Dec. 18, 1934	13

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No.	Description	Date	Copy in BK. No
2807.	No Trespassing signs at entrance to L. & C. Lot 91 on Aiken Street.	Dec. 19. 1934	13
2808.	L. & C. Lot 33-C-2 and 31-C, looking westerly	Dec. 19. 1934	13
2809.	L. & C. Lot 13 looking south from Pawtucket Street.	Dec. 19. 1934	13
2810.	L. & C. Lot 29 looking easterly.	Dec. 19. 1934	13
2811.	L. & C. Lot 33-C-1 looking westerly from Aiken St.	Dec. 19. 1934	13
2812.	L. & C. Lot 29-A looking easterly from School St.	Dec. 19. 1934	13
2813.	L. & C. Lot 8 looking south from Pawtucket Street.	Dec. 19. 1934	13
2814.	L. & C. Lot 87 looking west.	Dec. 19. 1934	13
2815.	Lot 88 looking west.	Jan. 9, 1935	13
2816.	City no Dumping Sign on Aiken St. Dump	Jan. 9, 1935	13
2817.	Lot 31-A. Melvin Street	Jan. 11, 1935	13
2818.	Lot 96-B Showing high water.	Jan. 11, 1935	13
2819.	General view of Aiken St. Dump looking easterly across Beaver Brook.	Jan. 11, 1935	13
2819A	General view of Aiken St. Dump looking easterly across Beaver Brook.	Jan. 11, 1935	13
2820.	Lot 105 during high water.	Jan. 11, 1935	13
2821.	Lot 89 during high water.	Jan. 11, 1935	13
2822.	Ice going over Pawtucket Dam looking upstream.	Jan. 13, 1935	13
2823.	Ice going over Pawtucket Dam looking downstream.	Jan. 13, 1935	13
2824.	Ice in front of Gate House at Pawtucket Dam.	Jan. 13, 1935	13
2825.	Ice in River above Pawtucket Dam looking upstream	Jan. 13, 1935	13
2826.	Ice on Pawtucket Dam looking downstream.	Jan. 18, 1935	13
2827.	ice on Pawtucket Dam looking upstream.	Jan. 18, 1935	13
2828.	Rubbish and garbage on ice in Northern Canal above Cabot St.	Mar. 14, 1935	13
2829.	Rubbish and garbage on ice in Northern Canal above Suffolk St.	Mar. 14, 1935	13
2830.	Rubbish and garbage on L. 7 C. Lot # 84 Stackpole Street opposite Livermore Street.	Mar. 14, 1935	13
2831.	Rubbish and garbage on sidewalk in front of Lout 96-D near Dracut and Lowell line.	Mar. 19, 1935	13

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No.	Description	Date	Copy in BK. No
2832.	Excavation on L. & C. Reservoir Lot for erection of Standpipe for City of Lowell Water Works	Mar. 19, 1935	13
2833.	Lot 96-B after widening of Lawrence Boulevard	Apr. 3, 1935	13
2834.	Lot 96-B after widening of Lawrence Boulevard	Apr. 3, 1935	13
2835.	Cars parked on L. & C. land on Canal St. near Kearney Sq.	Apr. 3, 1935	13
2836.	L. & C. Trespassing Signs and cars parked on L. & C. land on Canal St.	Apr. 3, 1935	13
2837.	Land and Building Lot 17-E Kyan St.	Apr. 18, 1935	13
2838.	Davis & Sargent Lumber Co. Land conveyed by Locks & Canals Dec. 26, 1924. Area 87, 727.	Apr. 18, 1935	13
2839.	Land and Building lot 2-B-1. # 5 Thorndike St.	Apr. 18, 1935	13
2840.	Building on Lot 2-B-1. # 5 Thorndike St.	Apr. 23, 1935	13
2841.	Building on Lot 25. # 495 Worthen St. (Street view)	Apr. 23, 1935	13
2842.	Building on Lot 25. # 495 Worthen St. (Canal view)	Apr. 23, 1935	13
2843.	Building on Lots 64*d and 64-D-1 # 71 and # 81 Ford St. (Street view)	Apr. 23, 1935	13
2844.	Building on Lots 64-D and 65-D-1 # 71 and # 81 Ford St. (Canal view)	Apr. 23, 1935	13
2845.	Building on Lot 64-A-5. Aiken St. corner of Cheever St.	Apr. 23, 1935	13
2845A	Building on Lot 64-A. # 200 Aiken St. corner of Cheever St.	Apr. 23, 1935	13
2846.	Building on Lot 28-A and 28-B (Street view)	Apr. 24, 1935	13
2847.	Building on Lot 28-A. North side view	Apr. 24, 1935	13
2848.	Manhole cover in northerly sidewalk of Pawtucket St. Bridge cover Pawtucket Canal for fire hose, (Easterly end)	Apr. 24, 1935	13
2849.	Same as # 2848 (Westerly end)	Apr. 24, 1935	13
2850.	Rear of L. C. Reservoir Lot showing excavation for proposed City Standpipe. P.W.A. Docket # 6004	June 3, 1935	13

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2851.	Same as # 2850. Different view	June 3, 1935	13
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2852A.	Character of river bank. Lot 96-B	June 26, 1935	13
2853.	Portion of Lot 96-B, showing rip rap	June 26, 1935	13
2854.	View of Lot 96 B, showing rip rap being placed	June 26, 1935	13
2855.	Character of river bank. Lot 96-B	June 26, 1935	13
2856.	Area between Worthen and Dummer Sts. looking south	Sept. 10, 1935	13
2857.	Area between Worthen and Dummer Sts. looking north	Sept. 10, 1935	13
2858.	North Franklin Court looking north from Franklin St.	Sept. 10, 1935	13
2859.	Lewis St. near corner of Market St. looking from Lewis St.	Sept. 10, 1935	13
2860.	North side of Brooks St, looking west	Sept. 10, 1935	13
2861.	Brook St. looking west from Fletcher St.	Sept. 10, 1935	13
2862.	Building on L. & C. Lot 28-A – Fletcher St. Being torn down.	Oct. 2, 1935	13
2863.	Repairing Bulkhead on upstream side of Guard Locks Gate House	Oct. 17, 1935	13
2864.	Repairs to Bulkhead on upstream side of Guard Locks Gate House. El. of water 83.15	Oct. 18, 1935	13
2865.	Building torn down on Lots 28-A and 28-B	Oct. 21, 1935	13
2866.	Cloth Room Bldg. Bleach and Dye House being torn down in Hamilton Yard	Oct. 21, 1935	13
2867.	New Filling Station at the corner of Market and Dutton St. also Milne Provision Co. on Market St.	Oct. 21, 1935	13
2868.	Milne Provision Co. on Market Street	Oct. 21, 1935	13
2869.	Directory Sign Board at entrance to Lowell Industrial Development Co. on Bridge St.	Oct. 21, 1935	13
2870.	Merrimack St. Bridge over Western Canal showing holes in floor of Bridge between car tracks	Oct. 28, 1935	13
2871.	Foundation for Pump House on L. & C. land; Stackpole St. near Aiken St. Public Works Project # 6004	Oct. 28, 1935	13

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2873.	Sidewalk in front of Minuet on Lowell and Lawrence Boulevard	Oct. 28, 1935	13
2874.	Fence and side east of Minuet on Lowell and Lawrence Boulevard	Oct. 28, 1935	13
2875.	Fence and side Lowell and Lawrence Boulevard near east and taking. Looking easterly.	Oct. 28, 1935	13
2876.	Merrimack St. Bridge over Western Canal showing replanking by the Eastern Mass. R. R.	Nov. 19, 1935	13
2877.	Pump House on L. & C. Land, Stackpole St. near Alden. Public Works Project. # 6004	Nov. 21, 1935	13
2878.	Moody St. Bridge over Merrimack River. New wood work complete Steel work painted.	Nov. 21, 1935	13
2879.	Repairs to Lawrence Dam House. Finished	Nov. 25, 1935	13
2880.	151 Glenwood Street	Dec. 18, 1935	13
2881.	256 Westford Street	Dec. 18, 1935	13
2882.	40-44 Chipewa Street	Dec. 18, 1935	13
2883.	50-54 Lee Street	Dec. 18, 1935	13
2884.	100-102 South Whipple Street	Dec. 18, 1935	13
2885.	896 Varnum Avenue	Dec. 18, 1935	13
2886.	Parking sign on Canal St.	Dec. 27, 1935	13
2887.	Mill # 1, Section 7, L. I. D. Company.	Dec. 27, 1935	13
2888.	City Pumping Station on Stackpole St. formerly portion of L. & C. lot 84. Public Works Project # 6004	Dec. 27, 1935	13
2889.	Anchor Ice on Pawtucket Dam	Jan. 27, 1936	13
2890.	Anchor Ice and Open Channel at Pawtucket Dam	Jan. 27, 1936	13
2891.	Anchor Ice and Open Channel at Pawtucket Dam	Jan. 27, 1936	13
2892.	Ice and Snow in front of Gate House at Pawtucket Dam	Jan. 27, 1936	13
2893.	New stairway and entrance for Sullivan Bros. Printers, to 2nd floor of the Cloth Room Bldg. at the L. I. D. Co.	Jan. 27, 1936	13

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2896.	Rubbish on Ice in Northern Canal from Cabot to Aiken St.	Mar. 4, 1936	13
2897.	Rubbish on Ice in Northern Canal from Aiken to Pawtucket St.	Mar. 4, 1936	13
2898.	Pawtucket Dam showing high water.	Mar. 14, 1936	13
2899.	Pawtucket Dam gate house showing ice jam	Mar. 14, 1936	13
2900.	Lot 89 showing high water	Mar. 14, 1936	13
2901.	Conduit St. looking across Beaver Brook showing high water	Mar. 14, 1936	13
2902.	Beaver Street Bridge over Beaver Brook showing high water	Mar. 14, 1936	13
2903.	Upstream side of Moody St. Bridge showing high water	Mar. 14, 1936	13
2904.	Lowell Industrial Development Co. showing high water around Boiler House, Picker building and Mill # 1	Mar. 14, 1936	13
2905.	Lawrence Boulevard showing rip rap on Northerly bank of Merrimack River opposite Hunts Falls	Mar. 14, 1936	13
2906.	Pumping out Boiler House at Lowell Industrial Development Co.	Mar. 17, 1936	13
2907.	Pumping out Boiler House at Lowell Industrial Development Co.	Mar. 17, 1936	13
2908.	Francis Gate at Old Guard Locks. Elev. of Water 101.77 at 2:30 P. M.	Mar. 20, 1936	13
2908A	Map of Lowell showing Flooded Areas	Mar. 20, 1936	13
2909.	Blank		
2909A	Moody St. Bridge over Merrimack River during flood of	Mar. 20, 1936	13
2909B	Merrimack River flowing into Northern Canal during flood of	Mar. 20, 1936	13
2910.	Flood wall and Dam at Old Guard Locks. Elev. of water 101.77 at 2:30 P. M.	Mar. 20, 1936	13
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2913. Dam across B. & M. R. R. Tracks above Wilder St. during high water	Mar. 20, 1936	13
2914. Merrimack River showing High Water on R. H. side above Pawtucket Dam. Elev. of Water 101.28 at 3:00 P. M.	Mar. 20, 1936	13

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2915. Merrimack River below School St. Bridge showing high water 101.82 at 3:00 P. M.	Mar. 20, 1936	13
2915A Flood Diagram showing food of	Mar. 20 1936	13
2916A Merrimack River L. H. side below School St. Bridge showing high water. Elev. of Water 102.82 at 3:00 P. M.	Mar. 20, 1936	13
2016B Merrimack River L. H. side below School St. Bridge showing high water. Elev. of Water 101.82 at 3:00 P. M.	Mar. 20, 1936	13
2917. Merrimack River and Varnum Avenue looking upstream from Mammoth Road. Elev. of water 101.82 at 3:30 P. M.	Mar. 20, 1936	13
2917A Diver shuts Valve under water at Merrimack Mfg. Co. during flood of	Mar. 20, 1936	13
2918. Varnum Avenue near Starbird St. showing high water looking upstream. Elev. Water at Dam. Elev. water at Dam. 101.82 3:30 P. M.	Mar. 20, 1936	13
2018A Aiken St. Bridge over Merrimack River during flood of	Mar. 20, 1936	13
2919. Moody Street Waste Gates on Northern Canal showing how foundation was wasted away during freshet	Mar. 31, 1936	13
2919A Bridge St. Bridge during flood of	Mar. 20, 1936	13
2920. Bridge St. Bridge during flood of	Mar. 20, 1936	13
2921. Northern Canal wall in rear of Ayer Home showing Capstone washed off by freshet	Mar. 31, 1936	13
2922. Northern Canal above Moody St. showing leakage through wall	Mar. 31, 1936	13
2923. Pawtucket Dam	Apr. 24, 1936	13
2924. Sandbag Dam and wall west of Francis Gate	Apr. 24, 1936	13
2925. Francis Gate looking upstream	Apr. 24, 1936	13
2926. Hydraulic Gate House and sandbag dam east of Francis Gate	Apr. 24, 1936	13
2927. Rear of Francis Gate	Apr. 24, 1936	13
2928. Lot 96-B looking east towards westerly end of taking	Apr. 24, 1936	14
2929. Lot 96-B looking east showing rip-rap which was slid down bank due to flood	Apr. 24, 1936	14
2930. Lot 96-B looking east towards “The Minuet”	Apr. 24, 1936	14

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No.	Description	Date	Copy in BK. No
2931.	Lot 96-D looking east from "The Minuet".	Apr. 24, 1936	14
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2933.	Fence along Merrimack Canal which was broken when an automobile backed into Canal	Apr. 27, 1936	14
2934.	Same as # 2933. Different view		
2935.	Central Street Bridge showing holes	Apr. 30, 1936	14
2936.	Moody St. Gate House on Northern Canal Wall showing how foundation was washed away	May 13, 1936	14
2937.	Repairs being made to Northern Canal wall under Moody St. Gate House	May 29, 1936	14
2938.	Repairs being made to Northern Canal wall under Moody St. Gate House	June 5, 1936	14
2939.	Repairs to Northern Canal wall under Moody St. Gate House	June 11, 1936	14
2940.	Derrick and Concrete Mixer on Moody St. Bridge used for repairs to wall	June 11, 1936	14
2941.	Repairs to Northern Canal Wall under Moody St. Gate House	June 19, 1936	14
2942.	Break in Northern Canal wall opposite Ayer Home. Canal side	June 20, 1936	14
2943.	Break in Northern Canal wall opposite Ayer Home. River side	June 20, 1936	14
2944A	Holes in Northern Canal wall, right hand side, below School St.	June 20, 1936	14
2944B	holes etc. same as 2944A	June 20, 1936	14
2945.	Repairs to Northern Canal wall under Moody St. Gate House	June 26, 1936	14
2946.	Break in Northern Canal wall opposite Ayer Home. Canal side	June 27, 1936	14
2947A	Break in Northern Canal wall opposite Ayer Home. Canal side	June 27, 1936	14
2947B	Break in Northern Canal wall opposite Ayer Home. Canal side	June 27, 1936	14
2948.	Repairs to Northern Canal wall under Moody St. Gate House	July 3, 1936	14
2949.	Repairs to Northern Canal wall under Moody St. Gate House finished	July 8, 1936	14

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No.	Description	Date	Copy in BK. No
2950A	Repairs to Northern Canal wall in rear of Ayer Home	July 11, 1936	14
2950B	Repairs to Northern Canal wall in rear of Ayer Home	July 14, 1936	14
2951.	Northern Canal wall above Moody St. showing leakage through wall	July 14, 1936	14
2952.	Repairs to Northern Canal wall in rear of Ayer Home Elev. canal 77.1 at 2:30 P. M.	July 17, 1936	14
2953.	Northern Canal wall, river side opposite Ayer Home, showing leakage with Canal at Elev. 77.1 at 2:30 P. M.	July 17, 1936	14
2954.	Repairs to Northern Canal wall in rear of Ayer Home	July 18, 1936	14
2955.	Leakage through northern canal wall in rear of Ayer Home	July 20, 1936	14
2956.	New Concrete mixer on Northern Canal wall	July 25, 1936	14
2957.	New Concrete mixer on Northern Canal wall	July 25, 1936	14
2958.	Repairs to Northern Canal wall	July 25, 1936	14
2959.	Leakage stopped after Canal wall was repaired	July 27, 1936	14
2960.	Boat moorings below Lowell Water Pumping Station in Merrimack River	July 31, 1936	14
2961.	Boat moorings below Lowell Water Pumping Station in Merrimack River	July 31, 1936	14
2962.	Repairs to Northern Canal wall, Canal side	Aug. 1, 1936	14
2963.	Footing at foot of Northern Canal wall. Merrimack R. side	Aug. 6, 1936	14
2964.	Merrimack River above School St. Bridge, looking downstream	Sept. 11, 1936	14
2965.	Merrimack River below School St. Bridge, looking downstream	Sept. 11, 1936	14
2966.	Merrimack River above Moody St. Bridge, looking downstream	Sept. 11, 1936	14
2967.	Boott Mills (a Negative)	Sept 1936	14
2968.	1936 and 1852 High water marks below School St. Bridge, Pawtucketville side.	Oct. 8, 1936	14
2969.	Westerly end of Northern Canal Flood wall	Oct. 8, 1936	14
2970.	Northern Canal flood wall	Oct. 8, 1936	14
2971.	Northern Canal wall from Moody St. Bridge	Oct. 9, 1936	14
2972.	Figures on Northern Canal wall put on by Textile Boys	Oct. 9, 1936	14

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No.	Description	Date	Copy in BK. No
2973A	Northern Canal Flood wall	Oct. 9, 1936	14
2973B	Northern Canal Flood wall	Oct. 9, 1936	14
2974.	Concrete Block for holding boom at head of Pawtucket Canal	Oct. 21, 1936	14
2975.	Concrete Block for holding boom at head of Pawtucket Canal	Oct. 21, 1936	14
2976.	River wall at Pawtucket Dam being repaired	Oct. 21, 1936	14
2977.	New fence in front of Northern canal gate house	Oct. 21, 1936	14
2978.	L. & C. Lot 25	Oct. 21, 1936	14
2979.	Excavating ledge and dirt on Northerly bank of Merrimack River below Pawtucketville Bridge	Feb. 1, 1937	14
2980.	Same as # 2979 (Different view)	Feb. 1, 1937	14
2981.	Progress picture showing ledge and dirt exaction on Northerly bank Merrimack River below Pawtucketville Br.	Feb. 17, 1937	14
2982.	Ledge above Pawtucketville Bridge on Northerly side of Merrimack River before any excavation	Feb. 17, 1937	14
2983.	Fence on Front St. being repaired	Feb. 17, 1937	14
2984.	Excavation on Northerly side of Merrimack River for temporary bridge, while new Centerville Bridge is being constructed.	Feb. 17, 1937	14
2985.	Slasher Bldg. at the Lowell Industrial Development Co. being torn down	Feb. 24, 1937	14
2986.	Fences repaired on Front Street	Feb. 24, 1937	14
2987.	Boott Mills – Cracks between windows of 2nd and 3rd floors also 1st and 2nd floors of Mill No. 7	Mar. 3, 1937	14
2988.	Boott Mills – Cracks between windows of 2nd and 3rd floors also 3rd and 4th floors of Mill No. 7	Mar. 3, 1937	14
2989.	Gofkauf's Store Mill No. 2, l. I. D. Co., Yard side	Mar. 9, 1937	14
2990.	Gofkauf's Store Mill No. 2, l. I. D. Co., Bridge street Front	Mar. 9, 1937	14
2991.	Excavation of Bank of R. H. Side of Merrimack River at Hunt's Falls, L. & C. Lot 85	Mar. 9, 1937	14
2992.	Roadway made by drag bucket to excavate River Bed at hunt's Falls, Merrimack River	Mar. 9, 1937	14
2993A	Air Compressor and pipe lines for drilling holes in ledge on left hand bank of Merrimack River above Moody Street Bridge	Mar. 19, 1937	14
2993B	Air Compressor and pipe lines for drilling holes in ledge on left hand bank of Merrimack River above Moody Street Bridge	Mar. 19, 1937	14

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2994.	Tearing down Slasher Bldg. at the L. I. D. Co.	Mar. 19, 1937	14
2995.	Entrance to "Thompson field" From Broadway	Mar. 19, 1937	14
2996.	Merrimack River above Moody St. Bridge before the bridge was built, copied from 1897 History of Lowell	Mar. 19, 1937	14
2997.	Excavating bed of Merrimack River below Aiken St. Bridge	Mar. 22, 1937	14
2998.	City of Lowell Financial Diagram	Mar. 22, 1937	14
2999.	Excavation of Bank on South Side of Merrimack River at Hunt's Falls, L. & C., Lot 85	Apr. 12, 1937	14
3000.	River Wall where Slasher Bldg. Site, L. I. D. Co.,	Apr. 22, 1937	14
3001.	Fibre Ducts carrying Transmission Lines, incased in concrete, beside River Wall of the Slasher Bldg. L. I. D. Co.	Apr. 22, 1937	14
3002.	Ramp and Fiil on Slasher Bldg. Site, L. I. D. Co.	Apr. 22, 1937	14
3003.	Site of Store House A & B at L. I. D. Co.,	May 21, 1937	14
3004.	Site of Store House A & B at L. I. D. Co.	May 21, 1937	14
3005.	Looking towards Store House C on 15 foot strip is to be used for widening of Bridge Street	May 21, 1937	14
3006.	Erecting temporary suspension Bridge across Merrimack River near Bridge Street	May 21, 1937	14
3007.	Directing Sign at entrance to L. I. D. Co., on Bridge St.	May 21, 1937	14
3008.	Temporary Wooden suspension bridge across Merrimack River near Bridge Street	June 16, 1937	14
3009.	New wire Fence on westerly bank of Pawtucket Canal looking downstream	June 16, 1937	14
3010.	New wire Fence on westerly bank of Pawtucket Canal looking upstream	June 16, 1937	14
3011.	3 cracks in Mill # 7 at Boott Mills, near bridge on Bridge St. between sidewalk and windows	July 8, 1937	14
3012.	2 cracks in Mill # 7 (same as above)	July 8, 1937	14
3013.	Temporary jetty at hunts Falls to hold water out in order to excavate bed of river	July 11, 1937	14
3014.	Same as above	July 11, 1937	14
3015.	Southerly side of Merrimack River, looking upstream, under School Street Bridge, showing excavation	July 16, 1937	14

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No.	Description	Date	Copy in BK. No
3016.	Southerly side of Merrimack River, looking upstream, under School Street Bridge, showing excavation	July 16, 1937	14
3017.	Northerly side of Merrimack River looking upstream under School St. Bridge, showing excavation	July 16,1937	14
3018.	Southerly side of Merrimack River, looking downstream, under School Street Bridge, showing excavation	July 16, 1937	14
3019.	Northerly side of Merrimack River looking downstream under School St. Bridge, showing excavation	July 16,1937	14
3020.	Broadway bridge over Pawtucket Canal showing new cold patch surface	July 16, 1937	14
3021.	Looking upstream, opposite Abbott Islands, at easterly and of cofferdam in Merrimack River	July 29, 1937	14
3022.	Looking downstream, opposite “Minuet Tea Room” (Merrimack River) at cofferdam	July 29, 1937	14
3023.	Southerly side of Merrimack River near easterly end of Stackpole St. showing cofferdam and excavation	July 29, 1937	14
3024.	Same as # 3023 different view	July 29, 1937	14
3025.	Broadway bridge over Pawtucket Canal showing new sidewalks and wooden curbing	Aug. 10, 1937	14
3026.	Pawtucket St. bridge over Northern Canal showing new concrete curbing	Aug. 10, 1937	14
3027.	E. A. Wilson Co.’s new showroom front	Aug. 10, 1937	14
3028.	New wire fence on bank of Hamilton Canal in front of Appleton Co.	Aug. 10, 1937	14
3029.	Pole on Pawtucket Canal wall belonging to Pratt & Forest Lumber Co.	Aug. 14, 1937	14
3030.	End of curbing broken on downstream side of Pawtucket St. Bridge over Northern Canal	Aug. 14, 1937	14
3031.	Merrimack River above School St. Bridge showing progress in excavating ledge	Aug. 25, 1937	14
3032A	Looking downstream opposite “Minuet Tea Room” at cofferdams in middle and southerly side of Merrimack River at “Hunts Falls”	Oct. 1, 1937	14
3032B	Continuation of 3032A	Oct. 1, 1937	14
3033.	Picture taken from northerly side of Merrimack River looking upstream and showing excavation under arches and around piers of School St. Bridge	Oct. 1, 1937	14

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No.	Description	Date	Copy in BK. No
3034.	Picture taken southerly side of Merrimack River looking upstream and showing excavation etc. (same as 3033)	Oct. 1, 1937	14
3035.	Repairing Prescott racks	Oct. 3, 1937	14
3036.	Demolishing old Central Bridge across Merrimack River	Oct. 3, 1937	14
3037.	Demolishing old Central Bridge and also shows piling around old stone piers	Oct. 3, 1937	14
3038A	Looking downstream between coffer dam and Northerly side of Merrimack River at "Hunts Falls" showing rocks etc. to be cleaned out. Boott gauge 41.90 at 10 A. M.	Oct. 10, 1937	14
3039.	Merrimack River at Hunts Falls showing deepening northerly side of channel, also preparing to take off some ledge on bank in rear of "Minuet Tea Room"	Oct. 15, 1937	14
3040.	School St. bridge over Merrimack River showing concrete forms and reinforcing rods around rock foundation of middle pier	Nov. 5, 1937	14
3041.	Wall above Pawtucket Dam gate house which has been raised. Granite face with concrete backing	Nov. 5, 1937	14
3042.	Merrimack River at Hunts Falls looking downstream showing dikes and excavation on north side of river	Nov. 6, 1937	14
3043.	Merrimack River at Hunts Falls looking upstream showing dikes and excavation on north side of river	Nov. 6, 1937	14
3044.	School St. bridge over Merrimack River showing concrete forms on north side of middle pier	Nov. 10, 1937	14
3045.	Hunts Falls Nov. 30, 1937. Boott gauge 42.16 at 2:10 P. M.		14
3046.	Upstream side of School Street Bridge showing dirt dumped on northerly side of river. Water at dam 88.90 at 2:45 P. M.	Nov. 30, 1937	14
3047.	Downstream side of School Street Bridge showing excavation that has been done on north side of river. Water at dam 88.90 at 2:45 P. M.	Nov. 30, 1937	14
3048.	Side track and freight car in Hamilton Mill Yard	Nov. 30, 1937	14
3049.	Pawtucket Dam, from Varnum Ave. showing L. & C. men cutting channel in front of dam; also ice frozen on dam	Jan. 14, 1938	14
3050.	Pawtucket Dam from School Street Bridge showing L. & C. men cutting channel in front of dam; also ice frozen on dam	Jan. 14, 1938	14
3051.	Progress of new bridge over Eastern Canal on Bridge Street; also shows Gofkauf's new store front	Jan. 14, 1938	14

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No.	Description	Date	Copy in BK. No
3052.	Progress of new bridge over Merrimack River on Bridge St.	Jan. 14, 1938	14
3053.	Rubbish in Northern Canal looking upstream from Suffolk St.	Feb. 11, 1938	14
3054.	Rubbish in Northern Canal looking upstream from Cabot St.	Feb. 11, 1938	14
3055.	Rubbish in Northern Canal looking upstream from Aiken St.	Feb. 11, 1938	14
3056.	Gofkauf's store front, Bridge St., Lowell, Mass.	Feb. 11, 1938	14
3057.	Progress of new bridge over Merrimack River on Bridge St.	Feb. 11, 1938	14
3058.	Progress of new bridge over Merrimack River on Bridge St.	Feb. 11, 1938	14
3059.	Pawtucket Dam, looking upstream	Mar. 2, 1938	14
3060.	Pawtucket Dam, looking downstream	Mar. 2, 1938	14
3061.	indicator posts for sprinkler service in front of Mill # 7, Marden & Murphy Inc.	Mar. 14, 1938	14
3062.	Progress of bridge over Merrimack River on Bridge St.	Mar. 22, 1938	14
3063.	Progress of bridge over Merrimack River on Bridge St.	Mar. 22, 1938	14
3064.	Progress of bridge over Eastern Canal on Bridge St.	Mar. 22, 1938	14
3065.	Location of manhole for L. & C. valve #76, on sidewalk in front of U. S. Postoffice, Lowell, Mass. where Daisy Niles claimed injury Feb. 21, 1938	Mar. 22, 1938	14
3066.	Wall along easterly side of Tyng St. put in by the Locks and Canals	Mar. 22, 1938	14
3067.	Boys playing baseball on Locks & Canals lot # 8 westerly side of Pawtucket Canal above Old Guard Locks	Apr. 18, 1938	14
3068.	Central Street bridge open preparatory to putting in 4 new 30" I-beams	Apr. 22, 1938	14
3069.	4 new 30" I-beams and 10" cross connection I-beams put in place on Central Street bridge	Apr. 25, 1938	14
3070.	Boys playing baseball on Locks and Canals lot # 13, easterly side of Pawtucket Canal above Guard Locks	Apr. 26, 1938	14
3070A	Boys playing baseball on Locks and Canals lot # 13, easterly side of Pawtucket Canal above Guard Locks	Apr. 26, 1938	14
3071.	Northerly side of Merrimack River above Moody Street Bridge showing ledge excavation along shore	Apr. 26, 1938	14
3072.	Northerly side of Merrimack River westerly of Beaver Brook showing dike being made for high water	Apr. 26, 1938	14
3073.	Northerly side of Merrimack River below Aiken Street bridge showing excavating river along shore and dike for high water	Apr. 27, 1938	14
3074.	Northerly side of Merrimack River westerly of Beaver Brook showing dike being made for high water	Apr. 27, 1938	14

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No.	Description	Date	Copy in BK. No
3075.	Northerly side of Merrimack River near First St. Oval showing regarding of present bank	Apr. 27, 1938	14
3076.	Well and fence along easterly side of Tyng St. put up by the Locks and Canals	May 9, 1938	14
3077.	Cady Bldg. corner of Western Avenue and Fletcher St. northerly side of Pawtucket Canal	May 9, 1938	14
3078.	Wooden store & tenement block on upstream side of Centrerville Bridge at Centralville approach building	May 18, 1938	14
3079.	Approach to Centralville Bridge from Southerly side	May 18, 1938	14
3080.	Centralville Bridge from Centralville side	May 18, 1938	14
3081.	Asphaltic surface put on roadway over Central Street bridge	May 18, 1938	14
3082.	Buildings on L. & C. lots # 64-E, 64-D-1, 64-D and 64-D-1 Ford St. from Cabot St.	June 14, 1938	14
3083.	Buildings on L. & C. lots # 64-C, 64-D, 64-D-1 and 64-E-1 Ford St. from Aiken St.	June 14, 1938	14
3084.	Buildings on L. & C. lots # 64-B, 64-F, 64-G and 64-H Ford St. from Aiken St.	June 14, 1938	14
3085.	Buildings on L. & C. lots # 64-A-1, 64-A-6, 64-A-4. Cheever St. from Pawtucket St.	June 15, 1938	14
3086.	L. & C. lots 13-C, 14 and 14-A rear of Wilson's coal yard	June 15, 1938	14
3087.	L. & C. lots # 16 and 17 Kyan St.	June 15, 1938	14
3088.	L. & C. lots # 28 between Dutton St. and Swamp Locks basin	June 15, 1938	14
3089.	L. & C. lots 17-D-4 and 17-D-2 also portion of lot # 15	June 15, 1938	14
3090.	Jos. J. Flynn's sign on lot # 89, Lakeview Ave. opposite Bunker Hill Ave.	June 15, 1938	14
3091.	Jos. J. Flynn's sign on lot # 89, Lakeview Ave. opposite Ferry Lane	June 15, 1938	14
3092.	Concord River at Middlesex Dam showing high water	July 28, 1938	14
3093.	Concord River (same as # 3092 different view)	July 28, 1938	14
3094.	Part of lot # 27 on bank of Western Canal near Worthen St.	July 28, 1938	14
3095.	Part of lot # 27 and lot # 24 between Worthen and Dutton Sts. on bank of Western Canal	July 28, 1938	14
3096.	Lot # 80-F rear of Rex Canter	July 28, 1938	14

Index (cont.)

No.	Description	Date	Copy in BK. No
3097.	Lot # 43 – 12 Coolidge St.	July 28, 1938	14
3098.	Slasher Bldg. area and river wall	Aug. 4, 1938	14
3099.	Slasher Bldg. area and river wall	Aug. 4, 1938	14
3100.	Merrimack St. bridge over Western Canal during construction of middle section	Aug. 26, 1938	14
3101.	Pawtucket St. bridge over Pawtucket Canal being repaired	Sept. 17, 1938	14
3102.	Pawtucket Dam. Elev. of water 85.92 at 2:30 P. M.	Sept. 29, 1938	14
3103.	Pawtucket Dam. Elev. of water 83.60 at 10:45 A. M.	Oct. 7, 1938	14
3104.	Francis Gate house. Roof being repaired because of tree which fell on it during hurricane of Sept. 21, 1938	Oct. 7, 1938	14
3105.	Aiken St. dump showing tree stumps left there after the Sept. 21, 1938 hurricane	Nov. 2, 1938	14
3106.	Aiken St. dump showing tree stumps left there after the Sept. 1938 hurricane	Nov. 2, 1938	14
3107.	Aiken St. dump showing tin cans and rubbish, also dike for high water	Nov. 2, 1938	14
3108.	Lot # 84 Stackpole St. showing branches left there after Sept. 21, 1938 hurricane	Nov. 2, 1938	14
3109.	Francis Gate house showing repairs finished on roof due to Sept. 21, 1938 hurricane	Nov. 2, 1938	14
3110.	School Street Bridge over Merrimack River showing repairs, such as new footings for piers, steel noses on piers and guniting around piers, arches and abutments	Nov. 21, 1938	24
3111.	Show rack that was broken in Mill # 1, Section 7 Elevator at the Lowell Industrial Development Co.	Dec. 28, 1938	14
3112.	Mill # 1 Section 7 Elevator at the Lowell Industrial Development Company which and one cable broken on it.	Dec. 28, 1938	14
3113.	Broken fence caused by auto accident, opposite Hunts Falls in Merrimack River on Lowell and Lawrence Boulevard	Jan. 2, 1939	14
3114.	Merrimack Mfg. Co.'s "Tremont Mill # 2" looking southwest from Tremont St.	Jan. 19, 1939	14
3115.	Merrimack Mfg. Co.'s "Tremont Mill # 2" looking northwest from Tremont St.	Jan. 19, 1939	14
3116.	Three of the four generators in the Tremont wheel house of Mill # 2	Jan. 19, 1939	14
3117.	Three of the four generators in the Tremont wheel house of Mill # 2	Jan. 19, 1939	14
3118.	Lowell Industrial Development Co. boiler house inside	Mar. 8, 1939	14

Index (cont.)

No.	Description	Date	Copy in BK. No
3119.	Pawtucket Dam looking upstream 10:30 A. M.	Mar. 14, 1939	14
3120.	Pawtucket Dam looking downstream 10:30 A. M.	Mar. 14, 1939	14
3121.	Easterly sidewalk showing concrete slab in front of Armor & Co. at 2 Thorndike St., Lowell, Mass. looking southeast towards B. & M. R. R. Station	Apr. 12, 1939	14
3122.	Easterly sidewalk showing concrete slab in front of Armor & Co. at 2 Thorndike St., Lowell, Mass. looking northwest towards Dutton St.	Apr. 12, 1939	14
3122A.	Lowell Industrial Development Co. taken at junction of Merrimack and Concord Rivers	May 15, 1939	14
3123.	Guides of Appleton Co.'s new # 4 wheel 38" Rodney Hunt (poor negative)	June 5, 1939	14
3124.	Buckets of Appleton's Co.'s new # 4 wheel 38" Rodney Hunt	June 8, 1939	14
3125.	Portion of old timer bulkhead at head of northern Canal, upstream side	July 25, 1939	14
3126.	Some of timbers taken out of bulkhead at head of Northern Canal, downstream	July 25, 1939	14
3127.	New concrete bulkhead and flood wall at head of Northern Canal, Upstream side	Aug. 11, 1939	14
3128.	New concrete bulkhead, platform and flood wall at head of Northern Canal, downstream side	Aug. 11, 1939	14
3129.	Children swimming in Merrimack River in rear Aiken St. playground	Aug. 24, 1939	14
3130.	Bathers at municipal bathing beach on northerly side of Merrimack River above Pawtucket Dam	Aug. 24, 1939	14
3131.	Boys swimming from boom in Pawtucket Canal above Guard Locks	Aug. 24, 1939	14
3132.	Boys swimming in Pawtucket Canal above Railroad bridge across from Wilson Coal yard	Aug. 24, 1939	14
3133.	Boys swimming from boom in Swamp Locks basin	Aug. 24, 1939	14
3134.	Boys and girls swimming at Hickey Hall dam in Lower Western Canal	Aug. 24, 1939	
3135.	Paradise Diner at the corner of Amory and Bridge St.	Aug. 24, 1939	
3136.	Lowell Industrial Development Co. tenants' sign and factory space sign on Cloth Room Bldg.	Aug. 24, 1939	
3137.	Canal Street fence and lumber logs looking from Kearney Square	Dec. 12, 1939	
3138.	Canal Street fence looking down Eastern Canal form Kearney Square	Dec. 12, 1939	

Index (cont.)

No.	Description	Date	Copy in BK. No
3139.	Wire fence from Lowell Ind. Dev. Co. bridge over eastern Canal to Bridge St.	Dec. 12, 1939	
3140.	Wire fence along Bridge St. and iron rail bridge fence over canal in front of the Lowell Ind. Dev. Co.	Dec. 12, 1939	
3141.	End of 48" concrete pipe surface drain showing thru Pawtucket Canal wall, looking towards corner of Payne and School Sts. (see also # 3148)	Feb. 27, 1940	
3142.	48" concrete pipe surface drain looking from Payne St. towards Pawtucket Canal	Feb. 27, 1940	
3143.	Victor Provencher's filling station and Cocoa-Cola Bottling Co.	Feb. 27, 1940	
3144.	Cave in of portion of wall and racks of inner canal at the Merrimack Mfg. Co.	Apr. 2, 1940	
3145.	Men puddling concrete for new wall of wall of inner canal at the Merrimack Mfg. Co.	Apr. 2, 1940	
3146.	Forms for new wall of inner canal at the Merrimack Mfg. Co.	Apr. 2, 1940	
3147.	Concrete mat in front of racks in inner canal at the Merrimack Mfg. Co.	Apr. 5, 1940	
3148.	Forms for concrete face wall beyond end of racks in inner canal at Merrimack Mfg. Co.	Apr. 5, 1940	
3149.	End of 48" concrete pipe surface drain showing thru right hand side of Pawtucket Canal wall below School St.	Aug. 26, 1940	
3150.	Repaired defective sidewalk in front of Gofkauf's store on Bridge St.	Oct. 24, 1940	
3151.	Lots 2-B, 2-B-1 and 2-D looking towards Thorndike St.	Oct. 24, 1940	
3152.	Lots 2-C and 2-B looking towards Nashua and Lowell R. R. location	Oct. 24, 1940	
3153.	Pipe bridge crossing Western Canal below Market St. for Federal Housing Project	Feb. 10, 1941	
3154.	Bridge across Eastern Canal in rear of Gookin Furniture Co.	Feb. 18, 1941	
3155.	Broken fence in rear of Gookin Furniture Co.	Feb. 18, 1941	
3156.	Artesian wells and pipe line for Gage Co.'s artificial ice plant in Pawtucket St.	Apr. 21, 1941	

Proprietors of Locks and Canals

On Merrimack River Photographs

Appendix 2

PL&C Miscellaneous Negatives. This is the sequential numerical list of X-prefix negatives and their prints created by the proprietors between October 18, 1896 and Nov. 28, 1899. The list contains 26 entries and all have dates but only X-1 through X-16 are identified by subject.

No.	Title	Date
X0		
X1	Armor Foundation	Oct. 18, 1896
X2	Armor Foundation	Oct. 18, 1896
X3	Armor Foundation	Oct. 18, 1896
X4	Hamilton Mfg. Co.'s Foundation	Oct. 25, 1896
X5	Hamilton Mfg. Co.'s Foundation	Nov. 15, 1896
X6	Armor Foundation	Nov. 15, 1896
X7	Canals in vicinity of Lowell Machine Shop	Nov. 22, 1896
X8	Canals in vicinity of Lowell Machine Shop	Nov. 22, 1896
X9	Canals in vicinity of Lowell Machine Shop	Nov. 22, 1896
X10	Canals in vicinity of Lowell Machine Shop	Nov. 22, 1896
X11	View of Pawtucket Canal	Dec. 5, 1897
X12	View of Pawtucket Canal	Dec. 5, 1897
X13	View of Pawtucket Canal	Dec. 5, 1897
X14	View of Pawtucket Canal	Dec. 5, 1897
X15	View of Pawtucket Canal	Dec. 5, 1897
X16	View of Pawtucket Canal	Dec. 5, 1897
X17	View of Pawtucket Canal	Sept. 11, 1897
X18		
X19		
X20		
X21		
X22		
X23		Nov. 28, 1899
X24		
X25		

Proprietors of Locks and Canals

On Merrimack River Photographs

Appendix 3

PL&C Alphabetical Index to photograph Plates, A-M. This is a partial index complementing the sequential numerical list in Appendix 1.

P. L. & C. Photo List Appendices

A, C, D, E, F, H, I, J, K, L, & M

From Jan. 1, 1928 to date

A

Name	No. #	Date
Accident – location of manhole for l. & C. valve # 76, on sidewalk in front of U. S. Post office, Lowell, Mass. Where Daisy Niles claimed injury Feb. 21, 1938	3065	Mar. 22, 1938
Aiken St. dump near Conduit Sty. Looking northwest – location of end of proposed 6" drain in –	2624	Sept. 28, 1931
ditto looking southeast	2625	Sept. 28, 1931
Aiken St. bridge and bank of Merrimack River adjoining – northerly end and westerly side of	2667	Mar. 2, 1932

PLAN_NO	TITLE	DATE	SCALE	DIMENSIONS	MEDIUM	SUPPORT
155	SECTION OF HAMILTON CANAL ABOVE THE WASTEGATES / LOOKING DOWNSTREAM. [ORIGINALS - FLOOR PLANS.]	1931/04/26	NONE	H 21.5, W 30.5 CM	INK	PAPER
02-03-30	BOOTT MILLS / LOWELL, MASS.	1971/05/26	1" = 50'	H 21.5, W 28 CM	GRAPHITE	TRACING PAPER
03-04-30	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BOOTT MILLS / LIDCO DIVISION / 95 BRIDGE ST./ LOWELL, MASS., PARKING PLAN.	1958/12/02	1" = 50'	H 21.5, W 27.5 CM	GRAPHITE	TRACING PAPER
03-04-31	ORIGINAL FLOOR PLANS WITH DIMENSIONS. PARKING PLANS FOR AN UNIDENTIFIED BUILDING.	UNDATED	1" = 50'	H 27.5, W 21.5 CM	PHOTOCOPY	PAPER
09-31	BOOTT MILLS / LOWELL, MASS / PROPOSED STEAM PLANT.	1965/03/12	1" = 20'	H 36, W 21.5 CM	GRAPHITE	PAPER
03-32	BASE FOR BOILER FEED PUMP.	UNDATED	NONE	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER
03-04-32	ORIGINAL FLOOR PLANS WITH DIMENSIONS. PARTIAL PLAN FOR AN UNIDENTIFIED BUILDING PLATFORM.	UNDATED	NONE	H 21.5, W 27.5 CM	GRAPHITE	TRACING PAPER
09-32	PELLON CORPORATION LOWELL, MASSACHUSETTS / UNDERGROUND PLAN.	1969/03/04	1" = 20'	H 60, W 88.5 CM	BLACK LINE PRINT, GRAPHITE	PAPER
12-32	[WASTE HOUSE PRESS.]	UNDATED				
03-33	PIPE LOCATION AS OF 6-24-64 / BEFORE CONSTRUCTION OF NEW OFFICE / 95 BRIDGE STREET: BLDG. # 1, SECT. # 1.	1964/06/24	1/2" - 1'	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER

03-04-33	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BOOTT MILLS / FOOT OF JOHN STREET / LOWELL MASSACHUSETTS / INVITATION FOR OFFERS / MASSACHUSETTS MILLS / 95 BRIDGE STREET / LOWELL, MASSACHUSETTS.	1986/08/29	NONE	H 28, W 21.5 CM	BLACK INK,	PAPER
06-33	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / GENERAL ARRANGEMENT, / TRANSFORMERS & SWITCHES AT BOOTT MILLS.	1933/06/15	1/4" = 12"	H 76, W 94 CM	BLUEPRINT	PAPER
12-33	[REVERSIBLE BELT CONVEYOR.]	UNDATED				
03-04-34	ORIGINAL FLOOR PLANS WITH DIMENSIONS. AREAS, HEIGHT AND FACILITIES, BY ROOMS AND ADJOINING AREAS.	1981/08/01	NONE	H 21.5, W 28 CM	BLACK INK,	PAPER
12-34	[BLENDING AND OPENING SYSTEM.]	UNDATED				
03-35	[CANOPY FOR BLDG. # 1.]	UNDATED				
03-04-35	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST.	1939/03/00	1"=100'	H 23, W 29 CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
06-35	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY, SHOWING WATERWAYS FOR WATER POWER.	1919/01/00	1" = 40'	H 73, W 108.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
12-35	[BLENDING AND OPENING SYSTEM PLAN A.]	UNDATED				
03-36	[UNTITLED.] [LAND, 95 BRIDGE STREET, SULLIVAN BROTHERS BLDG.]	UNDATED	NONE	H 45.2, W 61.5 CM	BLACK LINE PRINT	PAPER

03-04-36	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS., MAIN POWER HOUSE.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK,	DRAFTING CLOTH
06-36	[PORTION OF THE MILL YARD OF BOOTT MILLS SEPT. 1939.]	UNDATED				
12-36	[BLENDING AND OPENING SYSTEM PLAN B.]	UNDATED				
03-37	BOOTT MILLS / LOWELL, MASS. A PAWTUCKET CANAL PLAN.	1966/09/13	1" = 60'	H 21.5 W 33 CM	GRAPHITE	PAPER
03-04-37	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 1.	UNDATED	1" = 40'	H 22.5, W 35 CM	BLACK INK,	DRAFTING CLOTH
06-37	SPRINKLER LAYOUT FOR NO # 12, / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1954/05/05	1" = 20'	H 27.5, W 40 CM	BLUEPRINT	PAPER
12-37	[OPENING ROOM.]	1930/11/21				
03-38	[UNTITLED.] BOOTT MILLS / BOILERS.	1977/02/28	NONE	H 28, W 43 CM	GRAPHITE	PAPER
03-04-38	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 1, BASEMENT.	UNDATED	1" = 40'	H 22.5, W 35 CM	BLACK INK,	DRAFTING CLOTH
06-38	PLAN AND SECTIONS / OF / PRESENT & SUGGESTED WATERWHEELS / AT THE LOWELL INDUSTIRAL DEVELOPMENT CO. ASSETS DIVISION.	1948/05/20	1/8" = 1'	H 54, W 76 CM	BLUEPRINT	PAPER
12-38	[BLENDING AND OPENING SYSTEMS.]	1924/03/23				
03-39	[UNTITLED.]	UNDATED	3/8" = 1'	H 28, W 43 CM	GRAPHITE	PAPER

03-04-39 12-39	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 1, FIRST FLOOR. [BLENDING AND OPENING SYSTEMS.]	UNDATED 1933/05/11	1" = 40'	H 22.5, W 35 CM	BLACK INK,	DRAFTING CLOTH
03-40	ELEVATOR SHAFT - MILL # 5 WEST & # 3 & # 4 CONNECTION.	1961/07/11	NONE	H 61, W 90 CM	BLUE LINE PRINT, GRAPHITE	PAPER
03-04-40	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 2, BASEMENT.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
06-40	FLOOD OF 1895 / AT / BOOTT MILLS GAUGE.	1922/05/11	NONE	H 83.5, W 43 CM	BLUEPRINT	PAPER
12-40	[UNTITLED.] [LONGITUDINAL PROFILE ELEVATION OF CANAL WATER LEVEL AND HEIGHT OF UNIDENTIFIED WALL AND DAM.]	UNDATED	NONE	H 43, W 56 CM	GRAPHITE	GRAPH PAPER
03-04-41	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 2, 1ST FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
06-41	A PLAN / OF SUNDRY FARMS &C. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD / MDCCCXXI..	1923/03/29	1" = 300'	H 56, W 73 CM	BLACK LINE PRINT, WATER COLORS	PAPER
03-42	[UNTITLED] NO. 1 MILL / 1ST. FLOOR.	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK, GRAPHITE	DRAFTING CLOTH
03-04-42	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 2, 2ND FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH

06-42	MONTHLY FLOW OF MERRIMACK RIVER / AT LOWELL, MASS. - CUBIC FEET PER SECOND.	1940/00/00	0 - 40,000 PER MO.	H 27.5, W 76.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
03-43	[UNTITLED.] NO. 1 MILL / SECTION 7. ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL,	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH
03-04-43	MASS., BUILDING NO. 2, 3RD FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
06-43	MAP SHOWING / PROPS OF LOCKS AND CANALS / CANAL SYSTEM / PORTION OF CITY / MILLS. MERRIMACK AND CONCORD RIVERS / LOWELL, MASS.	1939/03/00	1/4" = 400'	H 67, W 91 CM	BLUEPRINT	PAPER
03-44	[UNTITLED] NO. 2 MILL / 1ST, FLOOR, SECTION 3, 4, & 5. ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL,	UNDATED	1" = 40'	H 23, W 29.5	BLACK LINE PRINT, GRAPHITE	DRAFTING CLOTH
03-04-44	MASS., BUILDING NO. 2, 4TH FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK, GRAPHITE	DRAFTING CLOTH
06-44	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 1 / 45 INCH R.H. ALLIS CHALMERS / USE FROM NOV. 1. 1919.	1938/04/00	NONE	H 21.5, W 41.8 CM	BLUEPRINT, COLORED PENCIL	PAPER BACKED PAPER
03-45	[UNTITLED] NO. 2 MILL / 2ND. FLOOR, SECTION 3 & 4] ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL,	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH
03-04-45	MASS., BUILDING NO. 2, 5TH FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
06-45	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 9 / 50 INCH SWAIN WHEEL.	UNDATED	NONE	H 21.5, W 41.8 CM	BLUEPRINT, COLORED PENCIL	PAPER

03-46	[UNTITLED] SECTION 5 / NO. 2 MILL / 7TH. FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-04-46	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO. 2, 6TH FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
03-47	[UNTITLED] DYE HOUSE / BASEMENT.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-04-47	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO.3.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
06-47	PLAN MADE FROM VARIOUS SOURCES / OF / PRESCOTT YARD / SHOWING / EXISTING BUILDINGS, "PRESCOTT" POWER HOUSE / AND CONTRIBUTIING WATERWAYS ALSO EXISTING / CONDITIONS AND CHANGES MADE PRIOR TO AUG. 1, 1939 / LOWELL, MASS.	1940/01/24	AS NOTED	H 60.5, W 94 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
03-48	[UNTITLED] DYE HOUSE / 1ST. FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-04-48	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO.3, BASEMENT.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK, GRAPHITE	DRAFTING CLOTH
06-48	PLAN SHOWING / PROPOSED MINIATURE GOLF COURSE / IN / MILL NO. 2, SECTION 4, FIRST FLOOR / AT LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/09/29	1/8" = 1'	H 58, W 75.5 CM	BLUEPRINT	PAPER
03-49	[UNTITLED] DYE HOUSE / 2ND. FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH

03-04-49	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO.3, 1ST FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
06-49	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1916/12/00	1" = 40'	H 66, W 100.5 CM	BLUEPRINT	PAPER
03-50	[UNTITLED] SLASHER BUILDING / 1ST. FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-04-50	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO.3, 5TH FLOOR.	UNDATED	1" = 40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-51	[UNTITLED] SLASHER BUILDING / 2ND. & 3RD. FLOORS.	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH
03-04-51	ORIGINALS 95 BRIDGE ST. NO DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST./ LOWELL, MASS., BUILDING NO.4, BASEMENT, FIRST AND SECOND FLOORS.	UNDATED	1" = 20'	H 23, W 29.5 CM	BLACK INK,	DRAFTING CLOTH
06-51	MASSACHUSETTS ELECTRIC COMPANY / BOOTT MILL - BRIDGE STREET SUBSTATION / LOWELL, MASS. / ELECTRICAL ARRANGEMENT - SH 3 / CONDUIT, GROUNDING & LIGHTING PLAN.	1962/12/00	NONE	H 63, W 103.5 CM	BLUE LINE PRINT	PAPER
03-52	[UNTITLED] REPAIR SHOP AND OFFICE BLDG., THREE FLOORS.	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH
03-53	[UNTITLED] NAPPING BUILDING, BASEMENT, 1ST. & 2ND. FLOORS.	UNDATED	1" = 40'	H 28.5, W 23	BLACK INK, GRAPHITE	DRAFTING CLOTH

06-53	LOCATION DESIRED BY / THE LOWELL ELECTRIC LIGHT CORP. / FOR POLES OR WIRES ON PRIVATE PROPERTY.	1930/08/20	NONE	H 27.5, W 21 CM	BLUEPRINT	PAPER
03-54	[UNTITLED] PICKER HOUSE / 2ND. FLOOR, SECTION 8, 10, & 11.	UNDATED	1" = 40'	H 23, W 29.5	BLACK LINE PRINT, GRAPHITE	DRAFTING CLOTH
06-54	LOWELL HYDRO-ELECTRIC PROJECT / FEASIBILITY STUDY / LOCATION OF PROJECT.	UNDATED	NONE	H 28, W 43.5 CM	BLUE LINE PRINT	PAPER
03-55	[UNTITLED] CLOTH ROOM BUILDING / BASEMENT.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
06-55	BOOTT BOILER ROOM / LOWELL IND. DEVELOPMENT CO.	1941/03/05	NONE	H 37, W 101 CM	BLUEPRINT	PAPER
03-56	[UNTITLED] CLOTH ROOM BUILDING / FIRST FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
06-56	BOOTT MILLS / LOWELL, MASS. PRELIMINARY.	UNDATED	AS NOTED	H 65, W 101 CM	BLUEPRINT	PAPER
03-57	[UNTITLED] CLOTH ROOM BUILDING / 2ND. FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-58	[UNTITLED] CLOTH ROOM BUILDING / THIRD FLOOR.	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-59	[UNTITLED] [STOREHOUSE "A", 3RD FLOOR, AND STOREHOUSE "B" 2ND FLOOR.]	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-60	[UNTITLED] [STOREHOUSE "A", 2ND, AND 1ST. FLOORS, AND STOREHOUSE "B" 1ST FLOOR.]	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH
03-61	[UNTITLED] [STOREHOUSE "A", 4TH, 5TH, & 6TH FLOORS, AND STOREHOUSE "B", 3RD, 4TH, & 5TH FLOORS.]	UNDATED	1" = 40'	H 23, W 30	BLACK INK,	DRAFTING CLOTH

03-62	[UNTITLED] [STOREHOUSE "C", TYPICAL PLAN OF ALL FLOORS.]	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH
03-63	[UNTITLED] [SECTION 8, 1ST. FLOOR.]	UNDATED	1" = 40'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH
03-64	[UNTITLED] [SECTION 8, NO. 1 MILL, MULTIPLE FLOORS.]	UNDATED	NONE	H 263, W 33	BLACK INK, GRAPHITE	DRAFTING CLOTH
03-65	BOOTT MILLS / LOWELL, MASS./ MILL NO. 1, 3RD. FLOOR.	UNDATED	1" = 20'	H 34, W 77 CM	GRAPHITE	TRACING PAPER
03-66	SCHEME 1 / BOOTT MILLS / LOWELL, MASS. NO. 2 MILL - SECTION 3 / 27 PARKING SPACES ' X 22' / BASEMENT FLOOR.	1959/04/15	1" = 10'	H 37, W 52 CM	GRAPHITE	TRACING PAPER
03-67	SCHEME 2 / BOOTT MILLS / LOWELL, MASS. NO. 2 MILL - SECITON 3 / 18 PARKING SPACES ' X 22' / BASEMENT FLOOR.	1959/05/07	1" = 10'	H 37, W 52 CM	GRAPHITE	TRACING PAPER
03-68	SCHEME 1 / BOOTT MILLS / LOWELL, MASS. NO. 3 MILL - SECITON 10 / 34 PARKING SPACES ' X 22' / FIRST FLOOR.	1959/04/15	1" = 10'	H 37, W 52 CM	GRAPHITE	TRACING PAPER
03-69	SCHEME 2 / BOOTT MILLS / LOWELL, MASS. NO. 3 MILL - SECITON 10 / 34 PARKING SPACES ' X 22' / FIRST FLOOR.	1959/05/14	1" = 10'	H 37, W 52 CM	GRAPHITE	TRACING PAPER
03-70	PROPOSED PASSAGE FROM / SECTION 3 THRU SECTION 5 / TO NO. 6 ELEVATOR AND CORRIDOR / TO STAIRWAY SECTION NO. 3./ BOOTT MILLS / LOWELL, MASS.	1962/05/08	1" = 20'	H 31, W 56 CM	GRAPHITE	TRACING PAPER
03-71	BOOTT MILLS / LOWELL, MASS. / MILL NO. 1 / 2ND FLOOR.	UNDATED	11" = 20'	H 34, W 77 CM	GRAPHITE	TRACING PAPER
03-72	BOOTT MILLS / LOWELL, MASS. / BLDG NO. 2, 3RD. FLOOR.	1962/01/23	11" = 20'	H 46, W 56 CM	GRAPHITE	TRACING PAPER

03-73	[UNTITLED.]	UNDATED	NONE	H 54.5, W 91.5 CM	GRAPHITE	TRACING PAPER
03-74	95 BRIDGE NO. 3.	UNDATED	NONE	H 35.5, W 91 CM	GRAPHITE, COLORED PENCIL	PAPER
03-75	BOOTT MILLS / LOWELL, MASS.	1958/10/07	1" = 40'	H 35, W 38 CM	GRAPHITE	TRACING PAPER
03-76	[UNTITLED.]	UNDATED	1/8" = 1'	H 45, W 46 CM	GRAPHITE	TRACING PAPER
03-77	[UNTITLED]	UNDATED	1" = 40'	H 21.5, W 41.5 CM	GRAPHITE	TRACING PAPER
03-78	BOOTT MILLS / HALF SIZE DETAIL / COL. & RAFTER.	UNDATED	NONE	H 46, W 56 CM	GRAPHITE	TRACING PAPER
03-79	BOOTT MILLS / LOWELL, MASS./ BLDG. NO. 2 / 3RD. FLOOR.	1958/11/26	1/8" = 1'	H 44.5, W 87 CM	GRAPHITE	TRACING PAPER
03-80	BOOTT MILLS / LOWELL, MASS. / BLDG. NO. 2 - SECITON 4 / 95 BRIDGE STREET.	UNDATED	1/8" = 1'	H 55, W 85 CM	GRAPHITE	TRACING PAPER
03-81	BOOTT MILLS / LOWELL, MASS. / FLOOR PLAN / MILL NO. 2 - 3RD. FLOOR - SECITON 5.	1958/11/25	1/8" = 1'	H 44, W 69.5 CM	GRAPHITE	TRACING PAPER
03-82	[UNTITLED] [3RD. FLOOR & 4TH FLOOR.]	UNDATED	NONE	H 52.5, W 74 CM	GRAPHITE	TRACING PAPER
03-83	[UNTITLED.] [ELEVATOR GATE.]	UNDATED	NONE	H 43, W 76 CM	GRAPHITE	TRACING PAPER
03-84	[UNTITLED.] PLATFORM TO CANOPY / ROOF OVER STAIRS' 6 FT.	UNDATED	NONE	H 21.5, W 28 CM	GRAPHITE	PAPER
03-85	[UNTITLED.] [CANOPY, SECTION A-A.]	UNDATED	NONE	H 56.5, W 87CM	GRAPHITE	TRACING PAPER
03-86	[UNTITLED] [CANOPY OR PLATFORM.]	UNDATED	NONE	H 48.5, W 61 CM	GRAPHITE	PAPER

03-87	[UNTITLED]	UNDATED	NONE	H 22, W 35.5 CM	GRAPHITE	TRACING PAPER
03-88	[UNTITLED]	UNDATED	NONE	H 28, W 43 CM	GRAPHITE	TRACING PAPER
03-89	TH FLOOR. [L.I.D.C. PICKER BUILDING / 3RD. FLOOR.]	1968/03/01	1/8" = 1'	H 46, W 138 CM	GRAPHITE	TRACING PAPER
03-90	BOOTT MILLS / LOWELL, MASS. / MILL NO. 1 / 3RD. FLOOR	UNDATED	1"=20'	H 33.5, W 75 CM	PHHOTOCOPY	PAPER
03-02-01	HOWDY BEEFBURGER PLANS - ELEVATIONS	1965/06/25	14" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-01	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET.	1981/08/01	NONE	H 22, W 28 CM	INK	PAPER
09-16-1	PLAN OF RIVER BARGE, BOW AND STERN FRAMING.	UNDATED	1/2" = 1'	H 60.5, W 91.5 CM	BLUE LINE PRINT, GRAPHITE	PAPER
09-18-01	SUGGESTED SAFETY PRECAUTIONS FOR LOCKS AND CANALS / FIRE PROTECTION SYSTEM.	1942/07/07	NONE	H 28 W 21.5 CM	TYPEWRITTEN	PAPER
03-02-02	HOWDY BEEFBURGER PLANS - FLOOR PLAN	1965/06/25	14" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-02	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET. MAIN POWER HOUSE.	UNDATED	1"=40'	H 22.3, W 28.9 CM	BLACK INK	DRAFTING CLOTH
09-16-2	PLAN OF RIVER BARGE, BOW VIEW, PORT SIDE, DECK AND TRANSOM.	UNDATED	NONE	H 60.5, W 91.5 CM	BLUE LINE PRINT	PAPER
09-18-02	LOCKS AND CANALS FIRE PROTECTION PROBLEMS.	1942/07/07	NONE	H 28 W 21.5 CM	TYPEWRITTEN	PAPER
03-02-03	HOWDY BEEFBURGER PLANS - FOUNDATION PLAN	1965/06/25	14" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER

03-04-03	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, BASEMENT.	UNDATED	1"=40'	H 22.5, W 33 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
09-16-3	PLAN OF RIVER BARGE, SECTION M-M.	UNDATED	1/2" = 1'	H 60.5, W 91.5 CM	BLUE LINE PRINT	PAPER
03-02-04	HOWDY BEEFBURGER PLANS - FLOOR & ROOF FRAMING PLAN	1965/06/25	1/4" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-04	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, FIRST FLOOR.	UNDATED	1"=40'	H 22.5, W 33 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
09-16-4	[UNTITLED.] [RENDERING OF THREE VIEWS OF RIVER BARGE.]	UNDATED	NONE	H 22, W 28 CM	COLORED PENCIL	PAPER
03-02-05	HOWDY BEEFBURGER PLANS - SECTION "A-A".	1965/06/25	1/2" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-05	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 2ND FLOOR.	UNDATED	1"=40'	H 22.5, W 33 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-06	HOWDY BEEFBURGER PLANS - SECTION "B-B".	1965/06/25	1/2" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-06	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 3RD FLOOR.	UNDATED	1"=40'	H 22.5, W 33 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-07	HOWDY BEEFBURGER PLANS - PLUMBING PLAN.	1965/06/25	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-07	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 4TH FLOOR.	UNDATED	1"=40'	H 22.5, W 33 CM	BLACK INK, COLORED INK	DRAFTING CLOTH

03-04-08	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 5TH FLOOR.	UNDATED	1"=40'	H 22.5, W 33 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-09	HOWDY BEEFBURGER PLANS - ELECTRIC - POWER.	1965/06/25	1/4" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-09	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, BASEMENT.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-10	HOWDY BEEFBURGER PLANS - ELECTRICAL LIGHTING PLAN.	1965/06/25	1/4" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-10	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 1ST FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	INK, COLORED INK	DRAFTING CLOTH
03-02-11	HOWDY BEEFBURGER PLANS - HOWDY BASEMENT ELECTRICAL SCHEDULES..	1965/03/10	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-11	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 2ND FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-12	HOWDY BEEFBURGER PLANS - HEATING PLAN.	1965/06/25	1/4" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-12	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 3RD FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-13	HOWDY BEEFBURGER PLANS - FRONT WINDOW DETAILS.	1965/06/25	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-13	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 4TH FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH

03-02-14	HOWDY BEEFBURGER PLANS - COUNTER DETAILS.	1965/06/25	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-14	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 5TH FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-15	HOWDY BEEFBURGER PLANS - VESTIBULE DETAILS.	1965/01/29	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-15	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 6TH FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-02-16	HOWDY BEEFBURGER PLANS - SITE PLAN	1965/06/25	1"= 10'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-04-16	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, BASEMENT.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-04-17	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 1ST FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-04-18	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 2ND FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
01-01	ORIGINALS - ASSETS DIVISION.	UNDATED	NONE	H 28.5, W 21.5 CM	INK	PAPER
01-04	PLAN OF / "BIGELOW YARD" / SHOWING / PASSAGEWAYS TO BE KEPT OPEN.	1959/04/03	1" = 60'	H 40.7 , W 53 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

01-05	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 24.2, W 35.2 CM	GRAPHITE	TRACING PAPER
01-08	PLAN OF LAND / IN / LOWELL MASS. [FORMER MILL YARD OF THE BIGELOW-HARTFORD CARPET CO. SHOWING SUBDIVISION DUE TO SUNDRY SALES.]	1964/04/30	1" = 40'	H 61, W 77.5 CM	BLACK LINE PRINT	PAPER
01-09	BRUSH HOLDER FOR / ASSETS EXCITER.	0000/05/27	NONE	H 21.5, W 28 CM	BLACK LINE PRINT	PAPER
01-10	LOCATION OF BULK STORAGE / TANK BELONGING TO PANDEL INC / 246 MARKET ST., BLDG NO. 2.	1966/10/11	NONE	H 21.5, W 28 CM	GRAPHITE	PAPER
01-12	[DIAGRAM OF SPECIAL SHAFT.]	UNDATED				
01-14	[UNTITLED] [PLAN SHOWING 15 FT. WIDE RIGHT OF WAY GRANTED BY WESTGATE REALTY TRUST TO VALHALLA MILLS, INC. IN MILL YARD AT LOWELL, MASSACHUSETTS.]	1959/05/26	1" = 40'	H 30, W 41	GRAPHITE	TRACING PAPER
01-15	PLAN SHOWING / LAND AND BUILDINGS / BELONGING TO / BOOTT MILLS-ASSETS DIVISION / 200 MARKET STREET, LOWELL, MASS.	UNDATED	1" = 60 '	H 45.1, W 55.5 CM	GRAPHITE, INK	PAPER
01-16	PLAN SHOWING LAND / PROPOSED TO BE BOUGHT BY / VALHALLA MILLS INC. / FROM / CITY OF LOWELL.	1959/06/05	1" = 40'	H 24.5, W 35 CM	GRAPHITE, RED INK	TRACING PAPER
01-18	SUPPORT FOR G.E.-A.K.-5 LOW VOLTAGE CUBICLE / ASSETS STATION.	1962/10/19	1/2 " = 1', 1/8 " = 1'	H 45, W 56 CM	GRAPHITE	PAPER

01-19	PORTION OF LAND / BELONGING TO / CITY OF LOWELL, MASS. / 200 MARKET ST. "BIGELOW YARD".	1959/06/05	1" = 40'	H 24.5, W 35.6 CM	BLACK NK GRAPHITE,	DRAFTING CLOTH
01-20	SCHEME 1 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 41, W 53.5 CM	COLORED PENCIL GRAPHITE,	TRACING PAPER
01-21	SCHEME 2 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 39, W 53 CM	COLORED PENCIL BLACK INK,	TRACING PAPER
01-23	[UNTITLED] [BUILDING NO. 11, / 2ND FLOOR.]	UNDATED	1" = 10''	H 23, W 30.5 CM	COLORED INK BLACK INK,	DRAFTING CLOTH
01-24	[UNTITLED] [BUILDING NO. 11 /, 3RD FLOOR.]	UNDATED	1" = 10''	H 23, W 30.5 CM	COLORED INK	DRAFTING CLOTH
01-25	PLAN OF LAND NEAR / SAW MILL SHADED RED / DEEDED THIS DAY TO THE / LOWELL MANUFACTURING COMPANY.	1828/03/15	NONE	H 35, W 21.5 CM	PHOTOCOPY	PAPER
01-26	BOOTT MILLS INC. / MARKET STREET, LOWELL, MASS / REVISED TOILET FACILITIES AND PLUMBING TIE IN.	UNDATED	1/4" = 1'	H 61.5, W 81.. CM	BLACK LINE PRINT	MYLAR
03-01	BOOTT MILLS, LOWELLL, MASS / SPECIAL PARKING AREA 95 BRIDGE ST.	1965/04/28	1" = 20'	H 27, W 21.5 CM	GRAPHITE	TRACING PAPER
03-04-19	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 3RD FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-05	GATE - SEC. 8.	UNDATED	NONE	H 28, W 33.5 CM	GRAPHITE	TRACING PAPER
03-06	NEW GATES - # 12 WHEEL. [HEAD GATES - # 12 WHEEL.]	UNDATED	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
03-07	[BLUEPRINT OF UNIT # 3.]	UNDATED				

03-08	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS DIVISION, LOWELL, MASS.	1959/05/07	1" = 50'	H 62, W 88 CM	GRAPHITE	TRACING PAPER
03-09	BOOTT MILLS / LOWELL, MASS - PROPOSED OFFICE EXTENSION / FOR / PARIS SHOE COMPANY / BLDG. NO. 3, 4TH FL., 95 BRIDGE ST.	1968/01/05	NONE	H 22, W 35.5 CM	GRAPHITE	TRACING PAPER
03-10	NO. 3 GATE / BOOTT MILLS / MAIN POWER.	1967/10/16	NONE	H 27.5, W 21.5 CM	GRAPHITE	PAPER
03-11	STUDY / PROPOSED RELAY & METERING / ONE LINE WIRING DIAGRAM / BOOTT MILLS - LOWELL MASS. / MERRIMACK-ESSEX ELECTRIC CO.	1962/01/24	NONE	H 63.5, W 96 CM	BLUE LINE PRINT	PAPER
03-13	7 1/2 - 8 1/2 LIGNUM VITAE CENTER BEARING [FOR # 3 WHEEL - MAIN POWER] / USED ON / HYDRAULIC TURBINE.	1927/07/05	NONE	H 55, W 87 CM	BLUEPRINT	PAPER
03-14	BOOTT MILL / LOWELL MASS. - MACHINE ROOM SECTION / PROPOSED ELEVATOR NO. 2 / BLDG. NO. 1 SEC. 7 - 95 BRIDGE ST.	1967/10/19	NONE	H 22, W 35.5 CM	GRAPHITE	TRACING PAPER
03-15	BOOTT MILLS / PROPOSED HATCHWAY FOR 8' 0 X 12' 0 / HYDRAULIC FREIGHT ELEVATOR 5000 LB. / CAPACITY.	1967/07/19	NONE	H 60, W 90 CM	GRAPHITE	TRACING PAPER
03-16	BOOTT MILLS / LOWELL, MASS. - PLAN OF OFFICE FOR IDEAL DRESSES, INC.	1967/08/03	1/4 " = 1'	H 35.5, W 21.6 CM	GRAPHITE	TRACING PAPER
03-17	BOOTT MILLS / LOWELL, MASS. - BLDG. NO. 2 - 4TH FLOOR.	UNDATED	1" = 20'	H 31, W 54.5 CM	GRAPHITE	TRACING PAPER
03-18	[RIVER BARGE - STEEL (2 SHEETS).]	UNDATED				

03-19	BOOTT MILLS / LOWELL, MASS. - SHAFT DETAILS NO. 2 HERCULES HYDRO / TURBINE - MAIN POWER HOUSE, 95 BRIDGE ST.	1966/12/12	NONE	H 21.7, W 36 CM	GRAPHITE	TRACING PAPER
03-21	[MAP OF MASSACHUSETTS COTTON MILLS - SURVEYED 2/27/22.]	UNDATED				
03-22	[SKETCH SHOWING PLATFORM AND BLDG. OF HOWDY BEEFBURGER.]	UNDATED				
03-23	PROPOSED SHIPPING DECK / OVER CANAL - TWO TRUCK CAPACITY.	UNDATED	1" = 40'	H 33, W 38.4 CM	GRAPHITE	TRACING PAPER
03-24	PROPOSED HATCHWAY / FOR ELEVATOR BETWEEN / MILL NO. 5 - WEST AND 3 & 4 CONNECTION.	1959/04/00	1/4" = 1'	H 80, W 61 CM	GRAPHITE	TRACING PAPER
03-25	BOOTT MILLS / LOWELL, MASS. - PROPOSED AREA FOR PARIS SHOE COMPANY, INC. / FLOOR AREA 15,155 SQ. FT.	1958/10/10	1/8" = 1'	H 50, W 86 CM	GRAPHITE	TRACING PAPER
03-26	PROPOSED STEAM LINE / LIDCO ASSETS DIV. TO M.M.P CO.	UNDATED	NONE	H 24, W 37 CM	GRAPHITE	TRACING PAPER
03-27	SECTION # 8, RACK.	UNDATED	1/8' 1'	H 54, W 48 CM	BLACK LINE PRINT, GRAPHITE	PAPER
03-28	SULLIVAN BROS. / LOWELL, MASS. - PROPOSED BRIDGE AND SHIPPING / DECK OVER CANAL TO BLDG. NO. 5.	1958/07/10	1" = 40'	H 35, W 37 CM	GRAPHITE	TRACING PAPER
03-29	BOOTT MILL / OUTSIDE STAIRWAY & RAMP / NO. 2 MILL - 95 BRIDGE ST.	1963/05/23	1/2' = 1'	H 40.5, W 55.5 CM	GRAPHITE	TRACING PAPER
03-30	BOOTT MILL / LOWELL, MASS. - PORPOSED NEW FRONT FOR / ENTRANCE TO SLEEP SHOPP, INC. / AREA BRIDGE STREET.	UNDATED	1/4" = 1'	H 22, W 28 CM	GRAPHITE	TRACING PAPER

03-31	FIRE PROTECTION CONTROL VALVES / BOOTT MILLS - 95 BRIDGE / LOWELLL, MASS.	1959/05/00	NONE	H 43.5, W 60.5 CM	GRAPHITE	TRACING PAPER
06-01	[BLUEPRINT OF CYLINDER FOR HYDRAULIC LIFTS (LOCKS & CANALS).]	UNDATED				
06-03	PROPOSED / REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / AT / SCHOOL STREET.	1915/08/00	1" = 10'	H 107, W 165.5 CM	PHOTOCOPY, COLORED PENCIL	PAPER
06-04	FLOOD PROFILE / MERRIMACK RIVER / MASS. GEODETIC SURVEY / MARCH. 1936 / SEC. 2 - HAVERHILL TO N.H. STATE LINE.	1936/03/00	SEE NOTES	H 31.5, W 21.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
06-05	PROFILE OF THE MERRIMACK RIVER.	UNDATED	1" = 10 MI.	H 21.5, W 18 CM	PHOTOFOPY	PAPER
06-06	[PLAN OF LAND IN LOWELLL, MASSACHUSETTS.]	UNDATED				
06-08	[PLAN SHOWING LAND OF THE PEPPERELL MANUFACTURING CO. SOLD TO THE LOWELL INDUSTRIAL DEVELOPMENT CO.]	UNDATED				
06-09	BOOTT MILLS / LOWELL, MASS. / NEW BRIDGE BETW'N BLDGS. # 2 & 3 AT 4TH FLOOR.	1917/10/04	3/4" = 1'	H 74, W 104 CM	BLUEPRINT	PAPER
06-10	LAND, BUILDINGS & WATERWAYS / MERRIMACK MFG. CO. / LOWELL, MASS.	1947/08/00	1" = 120'	H 61, W 51 CM	BLACK LINE PRINT	PAPER
06-11	A.C. GENERATOR / AND EXCITER PANEL, FRONT & REAR-VIEW.	1916/07/05	1 1/2" = 12"	H 56, W 43 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-14	OUTLINE / EASTERN MFG. CO.	1913/02/05	NONE	H 45.5, W 60.5 CM	BLUEPRINT	PAPER

06-15	SWITCHBOARD WIRING / BACK VIEW / BOOTT COTTON MILLS , LOWELL, MASS.	1910/10/08	NONE	H 45, W 60 CM	BLUEPRINT	PAPER
06-16	SOLENOID OPERATED / CIRCUIT BREAKER.	1910/06/30	NONE	H 45, W 60.5 CM	BLUEPRINT	PAPER
06-18	BOOTT MILLS / LOWELL, MASS. / FOUNDATION FOR 2500 K.W. TURBINE.	1917/02/05	1/2" = 1'	H 73.5, W 103.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-19	PLAN AND ELEVATION / 0F / NO. 1 PENSTOCK AND HEAD GATE / BOOTT MILLS.	1945/04/27	1/2" = 1'	H 54, W 73 CM	BLUEPRINT	PAPER
06-20	DIAGRAMMATIC SKETCH SHOWING CONNECTIONS / AND LOCATION OF METERS / L.I.D. - BOOTT MILLS - MERRIMACK MFG. CO. TIE LINES.	1932/02/16	NONE	H 21, W 27 CM	BLUEPRINT	PAPER
06-21	PROPOSED LOCATION OF TRANSFORMERS & / SWITCHES / BOOTT MILLS.	1933/08/03	SEE NOTES	H 34, W 83 CM	BLUEPRINT	PAPER
06-22	PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / TRANSFORMER VAULT AT / BOOTT MILLS.	1933/09/09	AS NOTED	H 78, W 92 CM	BLUEPRINT	PAPER
06-23	BOOTT MILLS / LOWELL, MASS. PLAN OF GENERATOR ROOM OPERATING FLOOR.	UNDATED	1/4" = 1'	H 74.5, W 100 CM	BLUEPRINT	PAPER
06-24	PROPOSED LOCATION OF / 3 PITTSBURGH TRANSFORMERS / BOOTT MILLS, LOWELL, MASS.	1919/11/17	1" = 40'	H 25.5, W 60.5 CM	BLUEPRINT	PAPER
06-25	DETAIL OF 60, 100 AND 200 AMP FUSE TERM. C'STG'S / AND S.P. FUSE BLOCK DRILLING LAYOUT / FOR / WETMORE SAVAGE CO - BOOTT MILLS JOB.	1912/12/12	NONE	H 38, W 43.5 CM	BLUEPRINT	PAPER

06-26	BOOTT MILLS, / LOWELL, MASS. / WALL SUPPORTS FOR COMPENSATOR / ARRANGED FOR CONDUIT WIRING.	1913/06/13	3" = 1'	H 29, W 66 CM	BLUEPRINT	PAPER
06-27	PLAN OF LAND IN LOWELL, MASS / DRAWN FOR / BOOTT MILLS.	1927/11/01	1" = 20'	H 45, W 30 CM	BLUEPRINT	PAPER
06-28	DETAILS OF OPENINGS / IN / BOOTT MILLS TURBINE ROOM FLOOR.	1910/11/23	1/2" = 1'	H 75.5, W105.5 CM	BLUEPRINT	PAPER
06-29	BOOTT MILLS / LOWELL, MASS / PRESENT TRUSS BETWN. BLDGS. # 2 AND # 3 AT 3RD. AND 5TH FLS. - FOOTBRIDGE & HIGHWAY BRIDGE OVER CANAL.	1916/09/15	AS NOTED	H 74, W 103 CM	BLUEPRINT, COLORED PENCIL	PAPER BACKED PAPER
07-01	JET CONTAINERS, INC. / BOOTT MILLS / LOWELL, MASS.	1971/05/26	1" = 50'	H 21.5, W 28 CM	PHOTOCOPY	PAPER
07-03	# 5 MILL, FIRST FLOOR	1972/06/09	1/8" = 1'	H 56, W 87 CM	PHOTOCOPY	PAPER
07-04	FLOOR PLAN BLDGS. # 2 AND 1 & 2 CONNECTORS.	1957/01/23	NONE	H 50.5, W 87.5 CM	PHOTOCOPY,GRAPHITE	PAPER
07-05	BLUEPRINT OF STOREHOUSE # 1 - BASEMENT.	1915/06/18	1/16" = 1"	H 50, W 83 CM	BLUEPRINT	PAPER
07-06	BOOTT MILLS / LOWELL, MASS.	1931/10/28	1" = 100'	H 21.5, W 28 CM	PHOTOCOPY	PAPER
08-01	BOOTT MILLS - JOHN ST. / NEW "GRIST MILL" LOCK / MODIFICATIONS.	1969/06/12	1/2" - 1'	H 54.5, W 66 CM	GRAPHITE	PAPER
08-02	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL MASSACHUSETTS.	SEE NOTES	1" = 1000'	H 61, W 80.5 CM	BLACK LINE PRINT, WATERCOLOR	PAPER

08-03	[PLAN OF THE MAIN YARD OF THE MERRIMACK MANUFACTURING COMPANY, SHOWING FIRE PROTECTION, PIPES AND WATERWAYS.] PLAN OF THE / "MAIN YARD".	UNDATED	1" = 40'	H 60.5, W 92 CM	BLUE LINE PRINT, INK	PAPER
08-04	UNITED STATES POST OFFICE / LOWELL MASS. - PLOT PLAN.	UNDATED	1" = 30'	H 61.5, W 91 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
08-05	MAP / SHOWING WATER MAINS / OF / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1959/00/00	1" = 200'	H 77.5, W 130 CM	BLUE LINE PRINT	PAPER
08-07	PLAN OF F.W.D. CORP.	1965/09/20	1/4" = 1'	H 92, W 138, CM	BLUE LINE PRINT	PAPER
08-08	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / (TENANTED) / LOWELL, MASS.	1933/08/16	1" = 80'	H 53.5, W 63.5 CM	BLUE LINE PRINT	PAPER
08-09	PLAN OF THE / TREMONT AND LAWRENCE SECTION YARDS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	UNDATED	1/2 " = 10'	H 76, W 105 CM	BLUEPRINT, COLORED PENCIL	PAPER
08-10	[UNTITLED.] [TEMPLATE FOR A MACHINE LEG AND FOOT.]	UNDATED	NONE	H 31, W 64 CM	COLORED PENCIL	PAPER
08-11	PLAN FOR SELSYN'S MOTOR AT LOWER LOCKS & LAWRENCE DAM.	UNDATED	NONE	H 21.5, W 28CM	GRAPHITE	PAPER
08-12	[UNTITLED.] [DRAWING FOR A PLATE THAT INCLUDES A BAR OF FORESTAY, A ROLLER REEFING, AND AN AULER BIT.]	UNDATED	NONE	H 35.5, W 53 CM	GRAPHITE	PAPER

09-02	PLAN / SHOWING / LOCATION OF RESERVOIR.	UNDATED	1" = 150'	H 27.5, W 28.5 CM	BLUE LINE PRINT	PAPER
09-04	PLAN AND SECTIONS / OF THE / 1000 G.P.M CENTRIFUGAL PUMP/ BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/04/15	AS NOTED	H 59, W 77 CM	BLUE LINE PRINT	PAPER
09-05	PLAN SHOWING LOCATION OF / 10" CENTRIFUGAL PUMP INSTALLED OCT. 1919 / IN PRESCOTT POWER HOUSE OF / MASSACHUSETTS COTTON MILLS.	1919/11/14	1/4" = 1'	H 77, W 126.5 CM	BLUE LINE PRINT	PAPER
09-06	LOCATION OF / SEWERS AND DRAINS / UNDER / SECTION 5, MILL NO. 2 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1940/05/12	1" = 10'	H 28, W 43.3 CM	BLUE LINE PRINT	PAPER
09-07	PLAN SHOWING / PROPOSED PIPE CHANGES / ON FIRE PROTECTION SYSTEM / SACO - LOWELL SHOPS / LOWELL, MASS.	SEE NOTES	1" = 40'	H 44.5, W 77 CM	BLUEPRINT, COLORED PENCIL	PAPER
09-10	20" C.I. WATER LINE WITH RELATION / TO NEW BANK BLDG.	1966/07/06	1" = 20'	H 56, W 77 CM	BLUE LINE PRINT, GRAPHITE	PAPER
09-11	WORK SKETCH / FEED & RETURN (STEAM) / PELLON CORP. ADDITIONS.	1969/05/13	1" = 40'	H 56, W 86.5 CM	BLUE LINE PRINT	PAPER
09-12	DIAGRAM SHOWING / THE / QUANTITY OF WATER (U.S. GALLONS) / IN / LOCKS & CANALS RESERVOIR ON LYNDE'S HILL / FOR / DIFFERENT GAUGE READING IN THE RESERVOIR.	1912/02/29	NONE	H 53, W 69.5 CM	BLUE LINE PRINT, GRAPHITE, INK	PAPER

09-15	PLAN SHOWING CONTOURS / OF / LOCKS & CANALS / RESERVOIR LOT.	1920/11/14	1" = 20'	H 63, W 51.5 CM	BLACK LINE PRINT, INK	PAPER
09-17	PELLON CORPORATION / LOWELL, MASS.	1978/04/18	NONE	H 92, W 60.5 CM	PHOTOCOPY	PAPER
09-20	RESERVOIR PUMP / PELLON - DUTTON ST.	UNDATED	NONE	H 21.5, W 28 CM	IINK	PAPER
09-23	PIPE CHANGES ON / CANAL / STREET.	1938/04/01	1" = 40'	H 21, W 35 CM	BLUEPRINT	PAPER
09-24	SUGGESTED ARRANGEMENT OF SPRINKLERS FOR / STAIR & ELEVATOR SHAFT / BOOTT MILLS / LOWELL, MASS.	1943/02/27	1" = 10'	H 27.5, W 22 CM	BLUEPRINT	PAPER
09-29	MAP OF WATERSHED OF MERRIMACK RIVER FROM NEW HAMPSHIRE TO MASSACHUSETTS.	UNDATED	NONE	H 106, W 76 CM	BLUE LINE PRINT, INK, COLORED INK	PAPER
09-30	AS BUILT PLAN / OF / EXISTING SEWER LAYOUT / IN / LOWELL, MASS.	1983/11/08	1" = 20'	H 61, W 92 CM	BLUE LINE PRINT, GRAPHITE	PAPER
11-01	[PROPS OF LOCKS AND CANALS - WATER WHEELS INSPECTION SHEET.]	UNDATED				
11-02	[DRAWING OF THRUST BEARING THRUST PLATE.]	UNDATED				
11-03	[DRAWING OF BEARING BUSHING - VERTICAL.]	UNDATED				
11-04	[COPIES OF G.E. PRINTS - TREMONT # 4 WHEEL.]	UNDATED				
11-05	[BLUEPRINT - BOOTT MILLS: DISCHARGE OF WHEEL # 5, 72" SWAIN WHEEL.]	UNDATED				
11-06	[BLUEPRINT - BOOTT MILLS: DISCHARGE OF WHEELS # 3 & 4 - 72" SWAIN WHEELS.]	UNDATED				

11-07	[DRAWING OF SECTION 8 GATE.]	UNDATED				
11-08	[PRINT OF WATERWHEEL DATA.]	UNDATED				
11-09	COLUMBIA TEXTILE CO. / PARCELS I - V WITH / ADDITIONAL INFORMATION	1927/05/11	SEE NOTES	H 55.5, W 86.5 CM	BLUE LINE PRINT	PAPER
11-10	[BLUEPRINT - BOOTT MILLS - DISCHARGE OF WHEEL # 6.]	UNDATED				
11-11	[DRAWINGS OF HEADGATE - # 12 WHEEL.]	UNDATED				
11-12	[DRAWINGS OF # 1 WHEEL AT HAMILTON.]	UNDATED				
11-13	[DRAWINGS OF ASSETS RACK PLATFORM.]	UNDATED				
11-14	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / GENERAL ARRANGEMENT / LINES CONNECTING LAWRENCE SEC. - M.M. CO. - BOOTT MILLS.	1933/06/16	1"=60'	H 68, W 113 CM	BLACK LINE PRINT	PAPER
11-15	[OFFICIAL ZONING MAP OF THE CITY OF LOWELL.]	UNDATED				
11-16	[THRUST BEARING ASSEMBLY # 6 WHEEL.]	UNDATED				
11-17	[BEARING HOUSING UPPER TYPE AV 72 153---. 9" X 16" BUSHING # 6 WHEEL.]	UNDATED				
11-18	[BEARING BUSHING TYPE AC FOR # 6 WHEEL.]	UNDATED				
11-19	[THRUST BEARING THRUST PLATE FOR # 6.]	UNDATED				
11-20	[GENERATOR - AC TYPE AV 72 153-12 1/2 ASSEMBLY # 6.]	UNDATED				
11-21	[BEARING BUSHING - VERTICAL 11" X 16" BUSHING # 6.]	UNDATED				
11-22	[10 1/2 TO 11 1/2 LUBRICATED LIGNUM VITAE BEARING USED ON HYDRAULIC TURBINE - # 6.]	UNDATED				

11-23	[BOOTT MILLS FINAL POWERHOUSE ARRANGEMENT FOR 1700 H.P. HYDRO-ELECTRIC UNIT - # 6.]	UNDATED
12-01	[DATA SHEETS ELECTRICAL IINTERCONNECTIONS.]	UNDATED
12-02	[PROPOSED ELECTRICAL TIE FROM MASS. TO BOOTT MILLS.]	1930/03/17
12-03	[SPIRAL CHUTE FOR BOOTT MILLS DATED.]	1920/12/15
12-04	[DRAFT TUBE EXTENSION FOR # 3 & # 6 WHEELS.]	UNDATED
12-05	[DRAFT TUBE EXTENSION FOR # 1 WHEEL.]	UNDATED
12-06	[EXTENSION TO DRAFT TUBES A & B.]	1895/06/01
12-07	[PLAN AND ELEVATION OF # 1 WATERWHEEL.]	UNDATED
12-08	[ELECTRICAL INTERCONNECTION 600 VOLT SWITCHGEAR DETAILS - BOOTT MILLS ENGINE ROOM.]	1933/07/15
12-09	[PLAN SHOWING TRANSMISSION LINE BETWEEN BOOTT AND MERRIMACK MILLS.]	1932/01/27
12-10	[ELECTRICAL INTERCONNECTION - DETAILS OF SWITCHBOARD AND WIRING DIAGRAM.]	1922/06/22
12-11	[CHANGES TO SWITCHGEAR CONCRETE DETAILS OF BALCONY.]	1936/11/10
12-12	[SUMMARY OF SWITCHING EQUIPMENT.]	UNDATED
12-14	[WORM AND WORM SHAFT FOR MORSE ELEVATOR.]	1917/01/29
12-15	[HOOK AND LINK FOR SPREADER ARM.]	1916/07/28
12-16	[STEP FOR WHEELS # 1 - 2 - 3 - 4 - 6 - 7 DATED.]	1912/06/07
12-17	[STEP FOR # 9 WHEEL.]	UNDATED

12-18	[PADDLE WHEEL FOR # 3 - 4 - 5 - 6 - 7 - & 8 WATER WHEELS.]	UNDATED				
12-19	[LAYOUT OF JACK SHAFT OF # 3 - 4 - 5 WATER WHEELS.]	UNDATED				
12-20	BOOTT MILLS / LOWELL, - MASS. / LAYOUT OF JACK SHAFT / OF # 1 & 2 WATER WHEELS.	1915/02/25	NONE	H 17, W 55 CM	BLUEPRINT	PAPER
12-21	[LAYOUT OF JACK SHAFT OF # 9 WATER WHEEL.]	UNDATED				
12-22	[SWITCHBOARD WIRING BACKVIEW.]	UNDATED				
12-23	[COLOR SCHEME FOR PIPES IN MILL.]	1917/11/29				
12-24	[POWER HOUSE SWITCHBOARD.]	1955/08/17				
12-25	ASSEMBLY.	1905/11/27	NONE	H 45, W 60 CM	BLUEPRINT	PAPER
12-26	[VACUUM PUMP AND STANDARD CEMENT FOUNDATION.]	UNDATED				
12-27	[DETAILS OF 22", 25", AND 28" ELEV. SHEAVE.]	1921/03/16				
12-28	[GATE HOISTING APPARATUS 72 INCH SWAIN TURBINE # 3 & 4 MILL.]	1881/05/00				
12-30	[BOOTT MILLS SWITCHBOARD FRONT AND REAR VIEW.]	UNDATED				
12-31	[NEW FLOOR IN 6 - 7 - 8 WHEELHOUSE.]	1923/03/28				
03-04-20	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 4TH FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-04-21	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 5TH FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH

03-04-22	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 4, (FORMERLY WASTE HOUSE) / AREAS / BASEMENT / 1ST FLOOR / 2ND FLOOR.	UNDATED	1"=20'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-04-23	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BOOTT MILLS - 95 BRIDGE ST. LOWELL, MASS., BOILER HOUSE.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK,	DRAFTING CLOTH
03-04-24	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING FOOTAGE FOR BOOTT MILLS - 95 BRIDGE ST. LOWELL, MASS., MILL NO. 2, SECTION 4.	UNDATED	1"=20'	H 22, W 27.3 CM	BLACK INK,	DRAFTING CLOTH
03-04-25	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING AREA FOR MILL NO. 2, SECTION 4 / LOWELL, MASS..	UNDATED	1"=20'	H 22, W 27.3 CM	BLACK INK,	DRAFTING CLOTH
03-04-26	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING AREAS FOR STOREHOUSE "C" / TYPICAL PLAN OF ALL FLOORS / FLOOR AREAS FROM BASEMENT THROUGH 11TH FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-04-27	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST / LOWELL, MASS., AREA FOR SECTION 8, 1ST FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
02-03-28	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / SIXTH FLOOR.	UNDATED	NONE	H 22, W 28 CM	GRAPHITE	TRACING PAPER

03-04-28	ORIGINAL FLOOR PLANS WITH DIMENSIONS. TOTAL AREA FOR NEW KNIT MFG. CO. / 5TH AND 6TH FLOORS OF MILL NO. 2.	UNDATED	1"=40'	H 22, W 36 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
03-04-29	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BOOTT MILLS / 95 BRIDGE ST./ LOWELL, MASS. PLAN OF BUILDING NO. 1, UNDEFINED FLOOR.	UNDATED	1" = 50'	H 20, W 27.5 CM	GRAPHITE	TRACING PAPER
01-02-A	DETAILS OF 1 PAIR OF 48"-CYLINDER GATE, HORIZONTAL HERCULES TURBINES / FOR THE / HOLLINGSWORTH AND WHITNEY CO. / MADISON, MAINE.	1908/12/31	3/4" = 1' 0"	H 87, W 128.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
01-02-B	DETAILS OF 1 PAIR OF 48"-CYLINDER GATE, HORIZONTAL HERCULES TURBINES / FOR THE / HOLLINGSWORTH AND WHITNEY CO. / MADISON, MAINE.	1918/11/05	3/4" = 1' 0"	H 65, W 112 CM	BLUEPRINT	PAPER
01-03-A	COMPILED PLAN / OF / "BIGELOW YARD" / SHOWING / PROPERTY LINES, BUILDINGS & OWNERS / LOWELL, MASS.	1950/09/26	1" = 60'	H 32, W 62.2 CM	BLACK NK, COLORED INK, COLORED PENCIL, WATER COLOR	DRAFTING CLOTH
01-03-B	COMPILED PLAN / OF / "BIGELOW YARD" / SHOWING / PROPERTY LINES, BUILDINGS & OWNERS / LOWELL, MASS.	1950/09/26	1" = 60'	H 32, W 6O.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
01-03-C	COMPILED PLAN / OF / "BIGELOW YARD" / SHOWING / PROPERTY LINES, BUILDINGS & OWNERS / LOWELL, MASS.	1950/09/26	1" = 60'	H 37.5, W 62 CM	BLUEPRINT, COLORED PENCIL	PAPER

01-04-COPY 1	PLAN OF / "BIGELOW YARD" / SHOWING / PASSAGEWAYS TO BE KEPT OPEN.	1959/04/03	1" = 60'	H 40.3 , W 52.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
01-04-COPY 2	PLAN OF / "BIGELOW YARD" / SHOWING / PASSAGEWAYS TO BE KEPT OPEN.	1959/04/03	1" = 60'	H 40.3 , W 52.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
01-04-COPY 3	PLAN OF / "BIGELOW YARD" / SHOWING / PASSAGEWAYS TO BE KEPT OPEN.	1959/04/03	1" = 60'	H 43 , W 55.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
01-05-COPY 1	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 30.5, W 45.6 CM	BLUE LINE PRINT	PAPER
01-05-COPY 2	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 30, W 43 CM	BLUE LINE PRINT	PAPER
01-05-COPY 3	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 29.5, W 43.5 CM	BLUE LINE PRINT	PAPER
01-05-COPY 4	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 30.5, W 45.3 CM	BLUE LINE PRINT	PAPER
01-05-COPY 5	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 31, W 43 CM	BLUE LINE PRINT	PAPER

01-05-COPY 6	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 24, W 35.5 CM	BLACK LINE PRINT	PAPER
01-05-COPY 7	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A AND 7B / ON "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30, 1958".	1959/04/24	1" = 50'	H 29, W 40 CM	BLACK LINE PRINT	PAPER
01-06-COPY 1	PLAT / BOOTT MILLS / ASSETS REALIZATION DIVISION / LOWELL, MASSACHUSETTS	1960/05/07	1" = 80'	H 27.7, W 43 CM	BLUE LINE PRINT	PAPER
01-06-COPY 2	PLAT / BOOTT MILLS / ASSETS REALIZATION DIVISION / LOWELL, MASSACHUSETTS	1960/05/07	1" = 80'	H 27.7, W 43 CM	BLUE LINE PRINT	PAPER
01-07-A	PROPOSED 4" H. P. GAS / LINE TO PANDEL INC.	1971/12/27	1" = 40'	H 45.5, W 61 CM	BLUE LINE PRINT	PAPER
01-07-B	[PROPOSED 4" H. P. GAS / LINE TO PANDEL INC.] A COVER LETTER FROM LOWELL GAS COMPANY REFERENCING THE GAS LINE PROJECT.	1972/12/14	NONE	H 28, W 21.5.CM	TYPEWRITTEN	PAPER
01-07-C	[PROPOSED 4" H. P. GAS / LINE TO PANDEL INC.] A BUSINESS CARD, IN A HOLDER THAT ATTACHES TO 01-17-B. THE CARD BELONGS TO RUSSELL N. KEIRSTEAD OF THE LOWELL GAS COMPANY.	UNDATED	NONE	H 13, W 10 CM	INK	PAPER
01-11-COPY 1	PLAN OF / LAND AND BUILDINGS / BELONGING TO / SACO-LOWELL SHOPS / LOWELL, MASSACHUSETTS.	1940/05/22	1" = 100'	H 27.5, W 51 CM	BLACK LINE PRINT	PAPER
01-11-COPY 2	PLAN OF / LAND AND BUILDINGS / BELONGING TO / SACO-LOWELL SHOPS / LOWELL, MASSACHUSETTS.	1940/05/22	1" = 100'	H 27.5, W 51 CM	BLACK LINE PRINT	PAPER

01-13-COPY 1	PLAN SHOWING / PERMANENT RIGHTS OF WAY / IN / "BIGELOW YARD" / 200 MARKET ST. / LOWELL, MASS.	1959/05/27	1" = 60'	H 41.5, W 60.6 CM	BLUE LINE PRINT	PAPER
01-14-COPY 1	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 30.5, W 43.1	BLUE LINE PRINT	PAPER
01-14-COPY 2	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 30.5, W 43.1	BLUE LINE PRINT	PAPER
01-14-COPY 3	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 30.5, W 43.1	BLUE LINE PRINT	PAPER
01-14-COPY 4	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 30.5, W 43.1	BLUE LINE PRINT	PAPER
01-14-COPY 5	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 30.5, W 43.1	BLUE LINE PRINT	PAPER
01-14-COPY 6	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 24.4, W 35.5	BLUEPRINT	PAPER

01-14-COPY 7	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC./ IN MILL YARD AT LOWELL, MASSACHUSETTS.	1959/05/26	1" = 40'	H 24.4, W 35.5	BLUEPRINT	PAPER
01-17-COPY 1	PLAN SHOWING / LAND AND BUILDING NO. 12 / BELONGING TO / BOOTT MILL-ASSETS DIVISION, 200 MARKET ST.	1959/05/21	1" = 40'	H 30.5, W 43 CM	BLUE LINE PRINT	PAPER
01-17-COPY 2	PLAN SHOWING / LAND AND BUILDING NO. 12 / BELONGING TO / BOOTT MILL-ASSETS DIVISION, 200 MARKET ST.	1959/05/21	1" = 40'	H 30.5, W 43 CM	BLUE LINE PRINT	PAPER
01-17-COPY 3	PLAN SHOWING / LAND AND BUILDING NO. 12 / BELONGING TO / BOOTT MILL-ASSETS DIVISION, 200 MARKET ST.	1959/05/21	1" = 40'	H 24, W 35.5 CM	BLUEPRINT	PAPER
01-20-COPY 1	SCHEME 1 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 43, W 55.7 CM	BLACK LINE, COLORED PENCIL	PAPER
01-20-COPY 2	SCHEME 1 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 43, W 55.7 CM	BLACK LINE, COLORED PENCIL	PAPER
01-21-COPY 1	SCHEME 2 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 42.7, W 55.7 CM	BLACK LINE, COLORED PENCIL	PAPER
01-21-COPY 2	SCHEME 2 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 42.7, W 55.7 CMCM	BLACK LINE, COLORED PENCIL	PAPER
01-21-COPY 3	SCHEME 2 / PROPOSED PASSAGEWAY / FOR / VALHALLA MILLS / LOWELL, MASS.	1959/04/14	1" = 40'	H 42.7, W 55.7 CM	BLACK LINE, COLORED PENCIL	PAPER
01-22-A	200 MARKET ST. / PLAN / HIGH PRESSURE / WATER / LINE / PLAN.	UNDATED	NONE	H 12.5, W 7.5 CM	GRAPHITE	PAPER

01-22-B	[HIGH PRESSURE WATER LINE PLAN - 200 MARKET ST.] ASSETS PUMP ROOM / HIGH PRESSURE WATER.	UNDATED	NONE	H 30.3, W 22.5 CM	GRAPHITE	PAPER
01-22-C	[HIGH PRESSURE WATER LINE PLAN - 200 MARKET ST.] USING EXISTING 6" AS MANIFOLD.	UNDATED	NONE	H 27.5, W 21.5 CM	PHOTOCOPY, GRAPHITE, INK	PAPER
01-22-D	[HIGH PRESSURE WATER LINE PLAN - 200 MARKET ST.] PIT 20 ' X 32' X 8' DEEP.	UNDATED	NONE	H 30.3, W 22.5 CM	GRAPHITE	PAPER
02-001	BOOTT MILLS / LOWELL, MASS. 1-1 ANNEX / MILL # 1.	1970/06/10	1/8 " = 1'	H 43, W 63 CM	GRAPHITE	TRACING PAPER
02-002	[MILL] # 5 EAST - FIRST FLOOR.	1972/06/09	1/8"=c.1'-0"	H 55.5, W 86 CM	GRAPHITE	PAPER
02-002-COPY1	[MILL] # 5 EAST - FIRST FLOOR.	1972/06/09	1/8"=c.1'-0"	H 55.5, W 86.5 CM	BLUE LINE PRINT	PAPER
02-003-01	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS.	1953/16/10	NONE	H 22, W 30.5 CM	GRAPHITE	TRACING PAPER
02-003-02-A	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIRST AND SECOND FLOORS OF BUILDING NO. 1 & 2.	1959/04/00	1" = 50'	H 21.5, W 27 CM	GRAPHITE	TRACING PAPER
02-003-02-B	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIRST AND SECOND FLOORS OF BUILDING NO. 1 & 2.	1959/04/00	1" = 50'	H 221.5, W 27 CM	BLACK LINE PRINT, GRAPHITE	PAPER
02-003-02-C	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIRST AND SECOND FLOORS OF BUILDING NO. 1 & 2.	1959/04/00	1" = 50'	H 21.5, W 27 CM	BLACK LINE PRINT, GRAPHITE	PAPER

02-003-03	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIRST AND SECOND FLOORS OF BUILDING NO. 3 & 4.	1959/04/00	1" = 50'	H 2.5, W 30.5 CM	GRAPHITE	TRACING PAPER
02-003-04	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIRST AND SECOND FLOORS OF BUILDING NO. 5 EAST & 7.	1959/04/00	1" = 50'	H 22.5, W 27.7 CM	GRAPHITE	TRACING PAPER
02-003-05	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. THIRD AND FOURTH FLOORS OF BUILDING NO. 3 & 4.	1959/04/00	1" = 50'	H 24.5, W 30.7 CM	GRAPHITE	TRACING PAPER
02-003-06-COPY 1	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. THIRD AND FOURTH FLOORS OF BUILDING NO. 5 EAST & NO. 7.	1959/04/00	1" = 50'	H 21.4, W 28.8 CM	BLACK LINE PRINT	PAPER
02-003-07	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIFTH AND SIXTH FLOORS OF BUILDING NO. 1 & 2.	1959/04/00	1" = 50'	H 23, W 28.8 CM	GRAPHITE	TRACING PAPER
02-003-07-COPY 1	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. BOOTT MILLS / LOWELL, MASS. FIFTH AND SIXTH FLOORS OF BUILDING NO. 1 & 2.	1959/04/00	1" = 50'	H 21.5, W 28.5 CM	BLACK LINE PRINT	PAPER
02-003-08	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIFTH AND SIXTH FLOORS OF BUILDING NO. 3 & 4.	1959/04/00	1" = 50'	H 24.8, W 30.6 CM	GRAPHITE	TRACING PAPER
02-003-09	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] FIRST AND SECOND FLOORS OF BUILDING NO. 5 WEST.	1959/05/00	1" = 50'	H 24.8, W 30.6 CM	GRAPHITE	TRACING PAPER

02-003-10	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. FIRST AND SECOND FLOORS OF BUILDING NO. 8 & 9.	1959/05/00	1" = 50'	H 24.5, W 30.5 CM	GRAPHITE	TRACING PAPER
02-003-11	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. THIRD AND FOURTH FLOORS OF BUILDING NO. 5 WEST.	1959/05/00	1" = 50'	H 24, W 30 CM	GRAPHITE	TRACING PAPER
02-003-12	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. THIRD AND FOURTH FLOORS OF BUILDING NO. 8 & 9.	1959/05/00	1" = 50'	H 21.3, W 27.2 CM	GRAPHITE	TRACING PAPER
02-003-13	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. STOREHOUSE NO. 1, 2, & 3.	1959/05/00	1" = 30'	H 24.5, W 30.5 CM	GRAPHITE	TRACING PAPER
02-003-14	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. THIRD AND FOURTH FLOORS OF BUILDING NO. 1 & 2.	1959/05/00	1" = 50'	H 21.5, W 28 CM	GRAPHITE	TRACING PAPER
02-003-15	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. [SHOWING BUILDING 5 WEST, AND PART OF BUILDING 5 EAST].	UNDATED	NONE	H 21, W 29 CM	GRAPHITE	TRACING PAPER
02-003-16	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. [SHOWING BUILDING # 5 WEST, AND NO. 6 HYDRO GENERATOR, AND AREA OCCUPIED BY CHEMICAL & MINERALS DEV. CORP.].	UNDATED	NONE	H 20.5, W 28 CM	GRAPHITE	PAPER

02-003-17	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / LOWELL, MASS. [SHOWING BUILDING NOS 4, 8, 9, AND NO. 9 ELEVATOR]	UNDATED	NONE	H 21.5, W 27.7 CM	GRAPHITE	TRACING PAPER
02-003-18	[BOOTT MILLS FLOOR PLANS - ORIGINALS.] BOOTT MILLS / FOOT OF JOHN ST. / LOWELL, MASS. [SHOWING SOUTH INDUSTRIES, INC.AREA].	UNDATED	1' = 20'	H 21.4, W 28 CM	GRAPHITE	TRACING PAPER
02-003-19	[UNTITLED.] [BOOTT MILLS FLOOR PLANS - ORIGINALS.]	UNDATED	NONE	H 23, W 28.5 CM	GRAPHITE	TRACING PAPER
02-003-20-01	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / THIRD FLOOR.	1956/05/00	NONE	H 22.5, W 49 CM	GRAPHITE	TRACING PAPER
02-003-20-02	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FOURTH FLOOR.	1956/05/00	NONE	H 22.5, W 49 CM	GRAPHITE	TRACING PAPER
02-003-20-03	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / SECOND FLOOR.	1956/05/00	NONE	H 22.5, W 49 CM	GRAPHITE	TRACING PAPER
02-003-20-04	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FIRST FLOOR.	1956/05/00	NONE	H 22.5, W 49 CM	GRAPHITE	TRACING PAPER
02-003-20-04-COPY 1	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FIRST FLOOR.	1956/05/00	NONE	H 22.5, W 51 CM	BLUE LINE PRINT, GRAPHITE	PAPER
02-003-20-05	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FIFTH FLOOR.	1956/05/00	NONE	H 22.5, W 49 CM	GRAPHITE	TRACING PAPER
02-003-20-06	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / SIXTH FLOOR.	1956/05/00	NONE	H 22.5, W 49 CM	GRAPHITE	TRACING PAPER

02-003-21	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS.	UNDATED	NONE	H 22, W 28.4CM	GRAPHITE	TRACING PAPER
02-003-22	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FIRST FLOOR.	UNDATED	1" = 50 '	H 22, W 49 CM	GRAPHITE	TRACING PAPER
02-003-23	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / SECOND FLOOR.	UNDATED	NONE	H 22, W 49 CM	GRAPHITE	TRACING PAPER
02-003-25	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FOURTH FLOOR.	UNDATED	NONE	H 22, W 49.5 CM	GRAPHITE	TRACING PAPER
02-003-26	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS. / FIFTH FLOOR.	UNDATED	NONE	H 22, W 49.5 CM	GRAPHITE	TRACING PAPER
02-003-29	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS - FOOT OF JOHN ST. / LOWELL, MASS.	UNDATED	1" = 100'	H 23, W 29 CM	GRAPHITE	TRACING PAPER
02-003-31	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / JOHN ST. / LOWELL, MASS.	1971/10/08	1" = 30'	H 21.5, W 43 CM	GRAPHITE	TRACING PAPER
02-003-32	[ORIGINALS - FLOOR PLANS.] SYMPHONIC / BOOTT MILLS / LOWELL, MASS.	UNDATED	NONE	H 22, W 49 CM	GRAPHITE	TRACING PAPER
02-003-33	[ORIGINALS - FLOOR PLANS.] SYMPHONIC / BOOTT MILLS / LOWELL, MASS.	UNDATED	NONE	H 22, W 48.5 CM	GRAPHITE	TRACING PAPER
02-003-34	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS.	UNDATED	NONE	H 22, W 48.5 CM	GRAPHITE	TRACING PAPER
02-003-35	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS.	UNDATED	NONE	H 22, W 49 CM	GRAPHITE	TRACING PAPER
02-003-36	[ORIGINALS - FLOOR PLANS.] BOOTT MILLS / LOWELL, MASS.	UNDATED	1' = 50'	H 21.7, W 49.5 CM	GRAPHITE	TRACING PAPER

02-003-37	[ORIGINALS - FLOOR PLANS.] SIXTH FLOOR / BOOTT MILLS.	UNDATED	NONE	H 21.5, W 49 CM	BLACK LINE PRINT	PAPER
02-004	LOWELL FACILITY. PROPOSED PLAN OF ADDITION / TO MINERAL INDUSTRIES CORP. / JOHN ST., LOWELL, MASS.	UNDATED	1/8" = 1'	H 56, W 87.2 CM	GRAPHITE	TRACING PAPER
02-005		1966/03/00	1/4" = 1'	H 43.2, W 55CM	GRAPHITE	TRACING PAPER
02-006	ELECTRICAL DISTRIBUTION. BOOTT MILLS / LOWELL, MASS. INTERMEDIATE SHAFT / FORGES STEEL / MAT.: 4140 N1. STEEL	UNDATED	NONE	H 26.5, W 31.5 CM	GRAPHITE	TRACING PAPER
02-007		1970/08/26	1/8" = 1"	H 21.5, W 28 CM	GRAPHITE	TRACING PAPER
02-008	BOOTT MILLS / JOHN ST. - LOWELL, MASS. / CONDENSATE TANK - JOAN JOB.	1970/03/24	3/4"=1'	H 28, W 43.5 CM	GRAPHITE	TRACING PAPER
02-008-COPY 1	BOOTT MILLS / JOHN ST. - LOWELL, MASS. / CONDENSATE TANK - JOAN JOB.	1970/03/24	3/4"=1'	H 28, W 43.5 CM	BLUE LINE PRINT	PAPER
02-009-01	[PARKING MAPS] SCHEME NO. 1 = 6190 SQ. FT. / POSSIBLE PARKING AREA	1930/01/00	1' = 20'	H 39.4, W 86.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
02-009-02	[PARKING MAPS] SCHEME NO. 3 = 27,707 SQ. FT. / POSSIBLE PARKING AREA	1930/01/00	1' = 20'	H 39, W 86.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
02-009-03	[PARKING MAPS] SCHEME NO. 4 = 39,2567 SQ. FT. / POSSIBLE PARKING AREA	1930/01/00	1' = 20'	H 39, W 86.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
02-009-04	[PARKING MAPS] BOOTT MILLS / LOWELL, MASS.	1964/06/20	1' = 20'	H 38, W 50 CM	GRAPHITE	TRACING PAPER
02-009-05	[PARKING MAPS] BOOTT MILLS / PLAN OF PARKING / UPPER JOHN ST. YARD.	UNDATED	1" = 20'	H 28, W 43 CM	GRAPHITE	TRACING PAPER

02-009-06	[PARKING MAPS] BOOTT MILLS / PLAN OF PARKING / UPPER JOHN ST. YARD PARK.	UNDATED	NONE	H 28, W 43 CM	GRAPHITE	TRACING PAPER
02-009-07	[PARKING MAPS] BOOTT MILLS / LOWELL, MASS. / PLAN OF YARD PARKING / RESTRICTED - PERMIT ONLY.	1964/06/20	1" = 50'	H 27.5, W 54.5 CM	GRAPHITE	PAPER
02-009-08	[PARKING MAPS] BOOTT MILLS / LOWELL, MASS. / PLAN OF PARKING / JOHN STREET YARD ("BOOTT YARD").	1969/07/29	1" = 50'	H 23, W 35.7 CM	BLACK LINE PRINT, INK	PAPER
02-009-09	[UNTITLED] [PARKING MAPS.]	UNDATED	NONE	H 28, W 43 CM	BLUE LINE PRINT, INK	PAPER
02-009-10	[PARKING MAPS] SYMPHONIC PARKING / BOOTT MILLS YARDS / GROUND LEVEL.	1972/06/08	1" = 50'	H 43, W 56 CM	BLUE LINE PRINT, INK	PAPER
02-009-11	[PARKING MAPS] SYMPHONIC PARKING / BOOTT MILLS YARDS / GROUND LEVEL.	1972/05/10	NONE	H 43, W 56 CM	BLUE LINE PRINT, INK	PAPER
02-009-12	[PARKING MAPS] LOWER BOOTT YARD / BOOTT MILLS YARDS / GROUND LEVEL.	1974/01/30	1" = c. 50'	H 43, W 56 CM	GRAPHITE	PAPER
02-009-13	[UNTITLED.] [PARKING MAPS.]	UNDATED	NONE	H 43, W 55.5 CM	BLUE LINE PRINT, GRAPHITE	PAPER
02-009-14	[UNTITLED] [PARKING MAPS.]	UNDATED	NONE	H 43, W 55.5 CM	BLUE LINE PRINT, GRAPHITE, INK	PAPER
02-009-15	[PARKING MAPS] BOOTT MILLS / LOWER BOOTT YARD.	UNDATED	NONE	H 36, W 49.8 CM	GRAPHITE	PAPER

02-010	[FIRST FLOOR PLANS, BLDGS. # 3, 4, 3 & 4, 5 CONNECTOR, FILL IN 4 & 5] BOOTT MILLS / LOWELL, MASSACHUSETTS.	UNDATED	1" = 20'	H 46, W 85.5 CM	GRAPHITE	TRACING PAPER
02-010-COPY 1	[FIRST FLOOR PLANS, BLDGS. # 3, 4, 3 & 4, 5 CONNECTOR, FILL IN 4 & 5] BOOTT MILLS / LOWELL, MASSACHUSETTS.	UNDATED	1" = 20'	H 46, W 83.5 CM	BLUE LINE PRINT, GRAPHITE	PAPER
02-011	ELEVATIONS / OF # 1 & 6 MILLS.	1917/09/20	1/8" = 1'	H 34.5, W 36 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
02-012	BOOTT MILLS LOWELL, MASS. / PLAN OF 6 - 4 EAST.	1917/11/22	1/8" = 1'	H 43.5, W 55.5 CM	BLACK INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
02-013	BOOTT MILLS / LOWELL, MASS. / PLAN - FIRST FLOOR, BUILDING # 8.	1964/08/26	1" = 50'	H 21.4, W 28 CM	GRAPHITE	TRACING PAPER
02-014	[SECOND FLOOR PLAN "BOOTT OFFICE".]	UNDATED				
02-015	[PROPOSED ALTERATIONS FOR 2ND FLOOR "BOOTT OFFICE"]. PROPOSED ALTERATIONS / NEW PARTITIONS / REMOVED.	UNDATED	NONE	H 20, W 36 CM	GRAPHITE	TRACING PAPER
02-016	[FLOOR PLAN OF JET CONTAINERS.]	UNDATED				
02-017	# 5 MILL - 4 EAST / PROPOSED RELOCATIONS.	1971/07/26	1/8" = 1'	H 56, W 86 CM	BLACK TAPE, GRAPHITE	MYLAR
02-018	PLAN OF / FIRST FLOOR OF MILLS NOS. 8 AND 9 / BOOTT MILLS.	1955/10/21	1" = 10'	H 45, W 118 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
02-018-COPY 1	PLAN OF / FIRST FLOOR OF MILLS NOS. 8 AND 9 / BOOTT MILLS.	1955/10/21	1" = 10'	H 45, W 118 CM	BLUE LINE PRINT	PAPER

02-019-A	[# 1 WAREHOUSE] BOOTT MILLS / LOWELL MASSACHUSETTS / WAREHOUSE.	1955/08/22	1" = 20'	H 59, W 85.5 CM	GRAPHITE	TRACING PAPER
02-019-B	[# 1 WAREHOUSE] WAREHOUSE FLOOR.	UNDATED	1" = 20'	H 21.5, W 38 CM	GRAPHITE	PAPER
02-020-A	BOOTT MILLS / LOWELL, MASS. / NEW AREA 5 - 4 E / JAMPPA MFG. CO.	UNDATED	1/8" = 1'	H 57, W 92 CM	GRAPHITE	PAPER
02-020-A-COPY 1	BOOTT MILLS / LOWELL, MASS. / NEW AREA 5 - 4 E / JAMPPA MFG. CO.	UNDATED	1/8" = 1'	H 57, W 92 CM	BLUE LINE PRINT	PAPER
02-020-B	BOOTT MILLS / LOWELL, MASS. / NEW AREA 5 - 4 E / JAMPPA MFG. CO.	UNDATED	1/8" = 1'	H 61, W 92 CM	BLUE LINE PRINT, GRAPHITE, INK	PAPER
02-020-C	[UNTITLED.] [BOOTT MILLS / LOWELL, MASS. / NEW AREA 5 - 4 E / JAMPPA MFG. CO.]	UNDATED	NONE	H 28, W 92 CM	PHOTOCOPY, GRAPHITE	PAPER
02-021-A	J. C. WHITE STORES, INC. / BOOTT MILLS / LOWELL, MASS. / STOREHOUSE.	1960/09/21	NONE	H 23.5, W 29.5 CM	GRAPHITE	TRACING PAPER
02-021-A COPY 1	J. C. WHITE STORES, INC. / BOOTT MILLS / LOWELL, MASS. / STOREHOUSE.	UNDATED	NONE	H 21.5, W 27.7 CM	PHOTOCOPY	PAPER
02-021-B	J. C. WHITE STORES, INC. / BOOTT MILLS / LOWELL, MASS. / STOREHOUSE.	1956/10/00	NONE	H 23.5, W 29.5 CM	GRAPHITE	TRACING PAPER
02-021-B COPY 1	J. C. WHITE STORES, INC. / BOOTT MILLS / LOWELL, MASS. / STOREHOUSE.	UNDATED	NONE	H 21.5, W 28 CM	PHOTOCOPY	PAPER
02-022-A	JET CONTAINERS INC. / BOOTT MILLS / LOWELL, MASS.	UNDATED	NONE	H 21, W 28 CM	GRAPHITE	PAPER
02-022-B	FLOOR PLAN OF BUILDING NO. 4 / FOR / JET CONTAINERS INC. / JOHN STREET / BOOTT MILLS / LOWELL, MASS.	1964/05/14	1" = 20'	H 32.5, W 51 CM	GRAPHITE	TRACING PAPER

02-023	BOOTT MILLS / LOWELL, MASS. / CANOPY FOR SYMPHONIC ELECTRONIC CO. / SHIPPING PLATFORM BUILDING NO. 8.	1961/09/25	1/4" =1'	H 48, W 71 CM	GRAPHITE	TRACING PAPER
02-024	BOOTT MILLS / LOWELL, MASS. / PLAN OF JOHN STREET PROPERTY / SHOWING PROPOSED NEW WAREHOUSE / ON LAND OF WANSKUCK COMPANY / ADJACENT TO BLDGS 9 - 3 - 5 WEST.	1965/01/11	1" = 60'	H 48, W 75 CM	GRAPHITE	TRACING PAPER
02-025	BOOTT MILLS / LOWELL, MASS. COVERED SHIPPING - BLDG. NOS. 1 & 2 - UPPER YARD.	1958/09/08	1" = 1'	H 66, W 72 CM	GRAPHITE	TRACING PAPER
02-026-A	PORTION OF MILL YARD / OF THE / BOOTT MILLS.	1939/09/00	1/8" = 1'	H 65.5. W 136.4 CM	BLUEPRINT BLUEPRINT.	PAPER
02-026-B	PORTION OF MILL YARD / OF THE / BOOTT MILLS.	1939/09/00	1/8" = 1'	H 65.5. W 136.4 CM	COLORED PENCIL	PAPER
02-026-B-01	PORTION OF MILL YARD / OF THE / BOOTT MILLS.	1939/09/00	1/8" = 1'	H56. W 86.5 CM	BLUE LINE PRINT	PAPER
02-027	FURNACE AREA ANNEX.	UNDATED	1/4" = 1'	H 55.5, W 86 CM	GRAPHITE	MYLAR
02-028	LOWELL PLAN LAYOUT.	1964/08/19	1/8" = 1'	H 56, W 87 CM	BROWN LINE PRINT, GRAPHITE	MYLAR
02-029-A	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - FOOT OF JOHN ST.	1959/05/15	1' = 50' APPROX.	H 46, W 81 CM	GRAPHITE	TRACING PAPER
02-029-B	FIRE PROTECTION CONTROL VALVES / BOOTT MILLS / LOWELL, MASS.	1959/05/00	NONE	H 32.2, W 56.3 CM	GRAPHITE	TRACING PAPER

02-030	BOOTT MILLS / LOWELL, MASS. / PLAN AND ELEVATION OF LOADING PLATFORM / FOR NEW ELEVATOR NO. 3 BLDG. 3, 95 BRIDGE ST. [FLOOR PLAN - BLDGS. 3 & 2, 1 & 2 CONNECTOR 4TH FLOOR / # 3,4 & 5 WHEELS].	1967/10/03	1/4" = 1 '	H 54.5, W 76 CM	GRAPHITE	PAPER
02-031	BOOTT MILLS / LOWELL, MASS. / FLOOR PLAN BLDG. NO. 2 & 1 & 2 CONNECTION / FOURTH FLOOR / JAMPPA MFG. CO.	1957/01/23	1/8" = 1 '	H 50.5, W 87 CM	GRAPHITE	TRACING PAPER
02-032	BOOTT MILLS STEAM RATES / STEAM RATES.	1954/05/19	NONE	H 28, W 58.8 CM	INK	PAPER
02-032-COPY 1	BOOTT MILLS STEAM RATES / STEAM RATES.	1954/05/19	NONE	H 28, W 58.8 CM	PHOTOCOPY	PAPER
02-032-COPY 2	BOOTT MILLS STEAM RATES / STEAM RATES.	1954/05/19	NONE	H 28, W 58.8 CM	PHOTOCOPY	PAPER
02-033-A	BOOTT MILLS / LOWELL, MASS. BLDG. NO.3 - 1ST. FLOOR..	UNDATED	1/8" = 1 FT.	H 39.2, W 71 CM	GRAPHITE	TRACING PAPER
02-033-B	BOOTT MILLS / LOWELL, MASS. BLDG. NO.3 - 1ST. FLOOR..	UNDATED	1/8" = 1 FT.	H 41.5, W 71.5 CM	GRAPHITE	TRACING PAPER
02-034	BOOTT MILLS / LOWELL, MASS. BLDG. NO.3 - 2ND FLOOR..	1957/03/12	1/8" = 1 FT.	H 34, W 68.5 CM	GRAPHITE	TRACING PAPER
02-035	[BEARINGS "A" & "B.]	UNDATED				
02-036	PLAN OF CONNECTION TO BY-PASS SPRINKLER PROTECTION AT/ FORMER MCDONALD - GAGE PROPERTIES AT PERKINS STREET / BETWEEN COOLIDGE & AIKEN STREETS. / LOCKS & CANALS / LOWELL, MASS.	1965/11/16	NONE	H 22, W 28.5 CM	GRAPHITE	PAPER
02-037	BOOTT MILLS / LOWELL, MASS./ BEARING MOUNT FOR WIDE GATE / LOCKS & CANALS SWAMP LOCKS.	UNDATED	NONE	H 58, W 72.5 CM	GRAPHITE	PAPER

02-038	PLAN / OF/ PROPOSED LOADING PLATFORM / FOR / LOWELL REALTY CORPORATION / LOWELLL, MASS.	UNDATED	NONE	H 27, W 63.5 CM	GRAPHITE	PAPER
02-039	GUIDE TEMPLATE FOR / WALKWAY RACKS.	UNDATED	1" = 1"	H 26, W 37 CM	GRAPHITE	TRACING PAPER
02-040	RECTAGRID FLOORING.	UNDATED	FULL SIZE	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER
02-041	BOOTT MILLS / LOWELL, MASS. 1ST FLOOR PLAN, STOREHOUSE # 1, 2, AND 3.	UNDATED	NONE	H 22.5, W 53 CM	BLUE LINE PRINT, GRAPHITE	PAPER
02-042	TREMONT STATION / LAND AREA / L & C LEASE FROM WANSKUCK.	UNDATED	NONE	H 36.5, W 47.9 CM	GRAPHITE	TRACING PAPER
02-043	BOOTT MILLS / LOWELL, MASS. PROPOSED WAREHOUSE/ PLAN OF FIRST FLOOR.	1965/01/18	1" = 20'	H 53, W 86.5CM	GRAPHITE	TRACING PAPER
02-044	BOOTT MILLS / LOWELL, MASS. - PARKING PLAN ON ROOF OF PROPOSED / WAREHOUSE - FRENCH AND JOHN STREETS / CAPACITY 280 CARS.	1965/01/18	1" = 20'	H 53, W 86.5CM	GRAPHITE	TRACING PAPER
02-045	BOOTT MILLS / LOWELL, MASS. - PROPOSED WAREHOUSE "B".	1965/01/18	1" = 20'	H 48.5, W 63.3 CM	GRAPHITE	TRACING PAPER
02-046	BOOTT MILLS / LOWELL, MASS. - PROPOSED WAREHOUSE "A".	1965/01/18	1" = 20'	H 48.5, W 72 CM	GRAPHITE	TRACING PAPER
02-047	BOOTT MILLS / LOWELL, MASS. - PROPOSED WAREHOUSE "C".	1965/01/18	1" = 20'	H 48.5, W 75.5 CM	GRAPHITE	TRACING PAPER
02-048	BOOTT MILLS / LOWELL, MASS. / PROPOSED MODERNIZATION OF / 2ND & 3RD. FLOORS STAIRWAY BLDG. NO. 1 / LEADING TO NEW OFFICES OF / SYMPHONIC ELECTRONICS CORP.	1961/11/03	1/4' = 1'	H 28, W 43 CM	GRAPHITE	TRACING PAPER

02-049	BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS. / BUILDING NO. 1 / FLOOR.	UNDATED	1" = 40'	H 22.3, W 34.5 CM	BLUE LINE PRINT, INK	PAPER
02-050-1	BOOTT MILLS - MASSACHUSETTS MOHAIR PLUSH COMPANY / LOWELL, MASSACHUSETTS.	1955/06/20	1" = 20'	H 46, W 89 CM	GRAPHITE	TRACING PAPER
02-050-2	BOOTT MILLS - MASSACHUSETTS MOHAIR PLUSH COMPANY / LOWELL, MASSACHUSETTS.	1955/06/20	1" = 20'	H 45.5, W 86 CM	GRAPHITE	TRACING PAPER
02-051	BOOTT MILLS / LOWELL, MASS. / PROPOSED ADDITIONAL AREA FOR / MINERAL INDUSTRIES CORPORATION OF AMERICA / FIRST FLOOR - BLDG. NO. 5 WEST / TOTAL FLOOR AREA 4225 SQ. FT.	1963/10/28	1" = 20'	H 45.5, W 55.7 CM	GRAPHITE	TRACING PAPER
02-052	BOOTT MILLS / LOWELL, MASS. / CANOPY FOR 5 W SHIPPING PLATFORM.	1958/08/05	1/4 " = 1'	H 54.5, W 74.5 CM	GRAPHITE	TRACING PAPER
02-053	RAILING FOR HANDLING / IRON PINS (DAM) / BOOTT MILL.	1963/06/03	1/4 " = 1'	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER
02-054	[ELECTRICAL INTERCONNECTION] PROPOSED LOCATION OF TRANSFORMERS & / SWITCHES / BOOTT MILLS / SCHEME 2.	1953/08/03	1/4"=12'	H 45, W 88 CM	GRAPHITE	PAPER
02-055	[PROPOSED LOCATION OF TRANSFORMERS 8C CABLES]	UNDATED				
02-056	BOOTT MILLS / LOWELL, MASS. / 2ND FLOOR. PROPOSED VESTIBULE / BLDG. 3 & 4 SHIPPING DECK / FOR CONVEYOR SYSTEM OF / SYMPHONIC ELECTRONIC CO.	1961/04/21	1/8 " = 1'	H 28.5, W 42.5 CM	GRAPHITE	TRACING PAPER
02-057	/ BOOTT MILLS / LOWELL, MASS.	1961/10/31	1/4 " = 1'	H 30.5, W 55.5 CM	GRAPHITE	TRACING PAPER

02-058	PROPOSED CONVEYOR OVER CANAL / FOR WAKEFIELD INDUSTRIES.	1960/12/00	NONE	H 33, W 48 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
02-059	BOOTT MILLS, LOWELLL, MASS. / CANOPY FOR WAREHOUSE / SHIPPING PLATFORM.	1955/12/05	1/4" = 1'	H 51, W 75.5 CM	GRAPHITE	TRACING PAPER
02-060	BOOTT MILLS, LOWELLL, MASS. [2ND FLOOR PLAN, 5 WEST].	1959/04/07	3/4" = 1, 1/4" =1'	H 60, W 80.5 CM	GRAPHITE	TRACING PAPER
02-061	BOOTT MILLS, LOWELLL, MASS. / STEEL CANOPY FOR SHIPPING PLATFORM / LOWER YARD BLDG. 5E.	1958/08/19	1/4" =1'	H 65, W 91 CM	GRAPHITE	TRACING PAPER
02-062	CANOPY LOADING PLATFORM / STOREHOUSE NO. 1, 2ND. FLOOR / FRENCH ST.	1958/09/03	1" =1'	H 33, W 91 CM	GRAPHITE	TRACING PAPER
02-063	BOOTT MILLS, LOWELL, MASS. / ELEVATION OF BRIDGE FROM # 2 TO # 6 (PROPOSED).	1916/02/21	1/8" = 1'	H 32, W 48 CM	GRAPHITE	DRAFTING CLOTH
02-064	BOOTT MILLS, LOWELL, MASS. / PROPOSED LOADING PLATFORM / BUILDING NO. 3.	1956/01/09	1" = 20'	H 42.5, W 104 CM	GRAPHITE	TRACING PAPER
02-065	SCRIM WEAVING / BOOTT MILLS / MASSACHUSETTS MOHAIR PLUSH COMPANY / LOWELL, MASSACHUSETTS.	1955/07/07	1" = 20'	H 45.5, W 87 CM	GRAPHITE	TRACING PAPER
02-066	BOOTT MILL NO. 4 PLAN.	1905/05/00	1" = 6'	H 46. W 95 CM	BLACK INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
02-067-A	PLAN SHOWING REAL ESTATE AS FAR AS KNOWN / TO DATE, BELONGING TO THE / BOOTT MILLS.	1936/11/04	1" = 50'	H 43.5, W 66 CM	BLUE LINE PRINT	PAPER

02-067-B-1	PLAN SHOWING REAL ESTATE AS FAR AS KNOWN / TO DATE, BELONGING TO THE / BOOTT MILLS.	1955/05/19	1" = 50'	H 43.5, W 65 CM	BLUEPRINT	PAPER
02-067-B-2	[UNTITLED.] [LETTER TO ACCOMPANY PLAN SHOWING REAL ESTATE AS FAR AS KNOWN / TO DATE, BELONGING TO THE / BOOTT MILLS.]	1955/05/20	NONE	H 27.5, W 21.5 CM	TYPEWRITTEN	PAPER
02-068	BOOTT MILLS / LOWELL, MASS. [BOOTT MILLS YARD HORIZONTAL SCALE].	1969/01/18	1" = 50', 1/8" = 1'	H 35.5, W 43.5 CM	GRAPHITE	TRACING PAPER
02-069	BOOTT MILLS / LOWELL, MASS.	UNDATED	1/8" = 1'	H 42.5, W 132.5 CM	GRAPHITE	TRACING PAPER
02-070	[PROPOSED HIGH TEMP MATERIALS IN AREA OF BLDG. 1 - 2 CONNECTOR.] LOWELL PLAN LAYOUT.	1964/09/01	1/8" = 1'	H 56, W 87 CM	GRAPHITE	PAPER
02-071	[PROPOSED GARAGE AT JOHN STREET].	UNDATED				
02-072	JOHN STREET NO. 2. [SCALE BETWEEN POST COLUMNS, BLDGS. # 5 WEST, 3, 4, AND 3 & 4, AND # 3 & 4 CONNECTOR].	UNDATED	NONE	H 35.5, W 50.5 CM	GRAPHITE, COLORED PENCIL	PAPER
02-073	JOHN STREET NO.1. [SCALE OF BLDG. 5 EAST, 1 & 2 CONNECTOR, 1 AND 2].	UNDATED	NONE	H 35.5, W 50.5 CM	GRAPHITE, COLORED PENCIL	PAPER
02-074	[FLOOR PLAN OF BLDG.# 1, 2 & 3, FIRST THRU THIRD FLOORS].	UNDATED				
02-075	SYMPHONIC ELECTRONIC CORP. / LOWELL, MASS. / NEW RECEIVING DEPT.	1972/09/12	1/4" = 1'	H 56, W 86 CM	BLACK LINE PRINT, GRAPHITE	PAPER
02-076	SYMPHONIC ELECTRONIC CORP. / LOWELL, MASS. / GENERAL OFFFICES	1972/06/12	1/4" = 1'	H 56, W 118 CM	BLACK LINE PRINT, GRAPHITE	PAPER

02-077	# 1 MILL - 2ND FLOOR. [SYMPHONIC ELECTRONIC CORP.]	UNDATED	1/4" = 1'	H 56, W 102 CM	BLACK LINE PRINT, GRAPHITE	PAPER
02-078	BOOTT MILLS / JOHN ST. / LOWELL, MASS.	1973/06/08	1" = 30'	H 22, W 28 CM	GRAPHITE	TRACING PAPER
02-079	[UNTITLED TEMPLATE.]	UNDATED	NONE	H 23, W 30.5 CM	GRAPHITE	TRACING PAPER
02-080	BOOTT MILL / LOWELL MASS.	1967/10/17	NONE	H 28.5, W 22 CM	GRAPHITE	TRACING PAPER
02-081	BOOTT MILL / LOWELL MASS.	1921/04/14	1" = 100 "	H 23, W 30 CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
02-081-COPY 1	BOOTT MILL / LOWELL MASS.	1921/04/14	1" = 100 "	H 23, W 30 CM	BLUEPRINT, COLORED PENCIL	PAPER
02-082	BOOTT MILLS / FOOT OF JOHN ST. / LOWELL MASS./ PLAN INDICTING R.R. / LOCATION TO BE PAVED.	1970/06/19	1" = 50 "	H 21.5, W 28 CM	GRAPHITE	TRACING PAPER
02-083	[UNTITLED.]	UNDATED	NONE	H 22, W 34 CM	GRAPHITE	TRACING PAPER
02-084	BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 22, W 28 CM	GRAPHITE	TRACING PAPER
02-085-COPY 1	BOOTT MILLS / LOWELL MASS.	1959/04/00	1" = 50'	H 21, W 27 CM	BLACK LINE PRINT	PAPER
02-085-COPY 2	BOOTT MILLS / LOWELL MASS.	1959/04/00	1" = 50'	H 21, W 27 CM	BLACK LINE PRINT	PAPER
02-086	BOOTT MILLS / JOHN STREET / LOWELL MASS.	UNDATED	NONE	H 22, W 28 CM	GRAPHITE	TRACING PAPER
02-087-COPY 1	BOOTT MILLS / LOWELL MASS.	1971/05/26	1" = 50'	H 22, W 28 CM	BLACK LINE PRINT	PAPER

02-088	BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 23, W 28 CM	GRAPHITE	TRACING PAPER
02-088-COPY 1	BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 23, W 28 CM	BLACK LINE PRINT	PAPER
02-089-A	BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 22.5, W 27.5 CM	GRAPHITE	TRACING PAPER
02-089-B	BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 22.5, W 27.5 CM	GRAPHITE	TRACING PAPER
02-089-C	BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 22.5, W 27.5 CM	GRAPHITE	TRACING PAPER
02-090-COPY 1	BOOTT MILLS / LOWELL MASS.	1959/04/00	1" = 50'	H 21.5, W 30 CM	BLACK LINE PRINT	PAPER
02-091-COPY 1	BOOTT MILLS / LOWELL MASS.	1959/04/00	1" = 50'	H 21.5, W 29 CM	BLACK LINE PRINT	PAPER
02-092	BOOTT MILLS / JOHN STREET / LOWELL MASS.	UNDATED	1" = 10'	H 22, W 28 CM	BLACK LINE PRINT, GRAPHITE	TRACING PAPER
02-093	BOILER ROOM BLDG. NO. 7 / BOOTT MILLS / LOWELL MASS.	UNDATED	NONE	H 22, W 33.5 CM	GRAPHITE	TRACING PAPER
02-094	OFFICE BLDG. / BOOTT MILLS / LOWELL MASS.	1958/10/01	1/8" = 1'	H 22, W 36 CM	GRAPHITE	TRACING PAPER
02-095-A	BOOTT MILLS / LOWELL MASS.	1964/02/04	FULL SIZE	H 45, W 56 CM	GRAPHITE	TRACING PAPER
02-095-B	BOOTT MILLS / LOWELL MASS.	1964/03/18	FULL SIZE	H 45, W 56 CM	GRAPHITE	TRACING PAPER
02-096	[UNTITLED.]	UNDATED	NONE	H 45.5, W 60 CM	GRAPHITE	TRACING PAPER

02-097	[UNTITLED.]	UNDATED	NONE	H 34, W 26.5 CM	GRAPHITE	TRACING PAPER
02-098	[UNTITLED.]	UNDATED	NONE	H 36.5, W 23 CM	GRAPHITE	TRACING PAPER
02-099	[UNTITLED.]	UNDATED	NONE	H 28, W 36 CM	GRAPHITE	TRACING PAPER
02-100-A	LOCKS & CANALS / LOWELL MASS.	1965/10/08	AS SHOWN	H 45.6, W 56 CM	GRAPHITE	TRACING PAPER
02-100-B	LOCKS & CANALS / LOWELL MASS.	1965/10/08- NOTES	AS SHOWN	H 45.6, W 56 CM	GRAPHITE	TRACING PAPER
02-101	[UNTITLED.] [SHOWS PLAN OF MILLS.]	UNDATED	NONE	H 46.5, W 53 CM	GRAPHITE	TRACING PAPER
02-102	[UNTITLED.] [SHOWS PLAN BLDGS. 3, 4, & 5 W.]	UNDATED	NONE	H 44.5, W 86 CM	GRAPHITE	TRACING PAPER
02-103	[UNTITLED.] [SHOWS PLAN BLDGS. 3, 4, & 5 W, 2ND FLOOR, AND WHAT IS STORED IN EACH PART.]	UNDATED	NONE	H 47, W 87.5 CM	GRAPHITE	TRACING PAPER
02-104	[UNTITLED.] [SHOWS PLAN OF 5TH FLOOR.]	UNDATED	1" = 50 '	H 36, W 70 CM	GRAPHITE	TRACING PAPER
02-105	[UNTITLED.]	UNDATED	NONE	H 35, W 77 CM	GRAPHITE	TRACING PAPER
02-106	[UNTITLED.] [PLAN OF A VERTICAL, COLUMNAR FRAME WITH A CRANK THAT PERFORMS AN UNDEFINED FUNCITON.]	UNDATED	1/2" = 1"	H 77, W 61 CM	GRAPHITE	TRACING PAPER
02-107	[UNTITLED] [PLAN OF UNIDENTIFIED CANOPY.]	UNDATED	NONE	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER
02-108	BOOTT MILLS / LOWELL, MASS.	UNDATED	1" = 20'	H 43.5, W 84 CM	GRAPHITE	TRACING PAPER
02-109	[UNTITLED.]	UNDATED	NONE	H 49, W 77 CM	GRAPHITE	TRACING PAPER

02-110	BOOTT MILL / LOWELL MASS.	1955/11/22	1" = 30'	H 22, W 40 CM	GRAPHITE	TRACING PAPER
02-111	BOOTT MILL / LOWELL MASS.	UNDATED	NONE	H 22, W 62 CM	GRAPHITE	TRACING PAPER
02-112	BOOTT MILL / LOWELL MASS.	1961/07/19	1" = 20'	H 22, W 35.5 CM	GRAPHITE	TRACING PAPER
02-113	BOOTT MILL / LOWELL MASS.	1967/10/11	1/4" = 1'	H 22, W 36 CM	GRAPHITE	TRACING PAPER
02-114	[UNTITLED.]	UNDATED	AS NOTED	H 28, W 24.5 CM	GRAPHITE	TRACING PAPER
02-115	BOOTT MILLS / LOWELL MASS.	1957/11/06	1/4" = 1'	H 6, W 85 CM	GRAPHITE	TRACING PAPER
02-116	[UNTITLED.]	UNDATED	NONE	H 45, W 77 CM	GRAPHITE	TRACING PAPER
02-117	[UNTITLED.]	UNDATED	NONE	H 35.5, W 51 CM	GRAPHITE	PAPER
02-118	[UNTITLED.]	UNDATED	NONE	H 35.5, W 51 CM	GRAPHITE, PEN	PAPER
02-119	[UNTITLED.]	UNDATED	NONE	H 35.5, W 51 CM	GRAPHITE, PEN	PAPER
02-120	[UNTITLED TEMPLATE.]	UNDATED	NONE	H 33.5, W 77 CM	GRAPHITE	TRACING PAPER
02-121	[UNTITLED TEMPLATE.]	UNDATED	NONE	H 46, W 55.5 CM	GRAPHITE	TRACING PAPER
03-01-COPY 1	BOOTT MILLS, LOWELLL, MASS / SPECIAL PARKING AREA 95 BRIDGE ST.	1965/04/28	1" = 20'	H 27, W 21.5 CM	PHOTOCOPY, COLORED INK	PAPER
03-02-03-A	HOWDY BEEFBURGER PLANS - FOUNDATION SECTIONS	1965/06/25	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-02-05-A	HOWDY BEEFBURGER PLANS - ROOF DETAILS.	1965/06/25	1" = 1'	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER

03-02-08-A	HOWDY BEEFBURGER PLANS - BSMT. PLUMBING PLAN.	1965/06/25	AS NOTED	H 56.5, W 96 CM	BLUE LINE PRINT	PAPER
03-03-A	DETAILS OF HEAD GATES. / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1909/06/22	3/4" = 12"	H 69, W 99 CM	BLUEPRINT	PAPER
03-03-B	DETAILS OF HEAD GATES. / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. DETAILS OF # 1 WHEEL - BRIDGE ST. / BOTTOM GATE.	1977/12/05	3/4" = 1"	H 28, W 43.5 CM	BLUE LINE PRINT	PAPER
03-03-C	DETAILS OF HEAD GATES. / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. DETAILS OF # 1 WHEEL - BRIDGE ST. / TOP GATE.	1977/12/05	3/4" = 1"	H 28, W 43.5 CM	BLUE LINE PRINT	PAPER
03-03-D	DETAILS OF HEAD GATES. / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. DETAILS OF # 1 WHEEL - BRIDGE ST. / TOP GATE. TWO PAGES OF CALCULATIONS FOR TOP AND BOTTOM OF WHEEL # 1 - BRIDGE ST.	UNDATED	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
03-04-01-COPY 1	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET.	UNDATED	NONE	H 28, W 22 CM	PHOTOCOPY, INK	PAPER
03-04-01-COPY 2	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET.	UNDATED	NONE	H 28, W 22 CM	PHOTOCOPY, INK	PAPER
03-04-01-COPY 3	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET.	UNDATED	NONE	H 28, W 22 CM	PHOTOCOPY, INK	PAPER
03-04-01-COPY 4	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET.	1981/08/01	NONE	H 28, W 22 CM	PHOTOCOPY	PAPER
03-04-01-COPY 5	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET.	1981/08/01	NONE	H 28, W 22 CM	PHOTOCOPY	PAPER

03-04-02-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET. MAIN POWER HOUSE.]	UNDATED	1"=40'	H 21.5, W 35.5CM	PHOTOCOPY	PAPER
03-04-02-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET. MAIN POWER HOUSE.]	UNDATED	1"=40'	H 21.5, W 35.5CM	PHOTOCOPY	PAPER
03-04-02-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET. MAIN POWER HOUSE.]	UNDATED	1"=40'	H 21.5, W 35.5CM	PHOTOCOPY	PAPER
03-04-03-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-03-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-03-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-04-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, FIRST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-04-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, FIRST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-04-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, FIRST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-05-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-05-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-05-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-06-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-06-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-06-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-07-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-07-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-07-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-08-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-08-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-08-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 1, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-09-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-09-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-09-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-10-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 1ST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-10-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 1ST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-10-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 1ST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-11-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-11-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-11-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-12-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-12-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-12-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-13-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-13-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-13-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-14-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-14-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-14-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-15-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 6TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-15-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 6TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-15-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 2, 6TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-16-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-16-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, BASEMENT.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-16-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, BASEMENT].	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-17-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 1ST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5CM	PHOTOCOPY	PAPER
03-04-17-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 1ST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5CM	PHOTOCOPY	PAPER
03-04-17-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 1ST FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5CM	PHOTOCOPY	PAPER
03-04-18-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-18-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-18-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 2ND FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-19-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-19-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-19-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 3RD FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-20-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-20-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-20-COPY3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 4TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-21-COPY 1	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 5TH FLOOR.	UNDATED	1"=40'	H 22.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-21-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-21-COPY 4	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-21-COPY 5	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 3, 5TH FLOOR.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-22-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 4, (FORMERLY WASTE HOUSE) / AREAS / BASEMENT / 1ST FLOOR / 2ND FLOOR.]	UNDATED	1"=20'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-22-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 4, (FORMERLY WASTE HOUSE) / AREAS / BASEMENT / 1ST FLOOR / 2ND FLOOR.]	UNDATED	1"=20'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER

03-04-22-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BRIDGE STREET, MILL NO. 4, (FORMERLY WASTE HOUSE) / AREAS / BASEMENT / 1ST FLOOR / 2ND FLOOR.]	UNDATED	1"=20'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-23-COPY 1	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BOOTT MILLS - 95 BRIDGE ST. LOWELL, MASS., BOILER HOUSE.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-23-COPY 2	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BOOTT MILLS - 95 BRIDGE ST. LOWELL, MASS., BOILER HOUSE.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-23-COPY 3	[UNTITLED] [COPY OF FLOOR PLANS WITH DIMENSIONS. BUILDING DIMENSIONS & AREA FOR BOOTT MILLS - 95 BRIDGE ST. LOWELL, MASS., BOILER HOUSE.]	UNDATED	1"=40'	H 21.5, W 35.5 CM	PHOTOCOPY	PAPER
03-04-27-COPY 1	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST / LOWELL, MASS., AREA FOR SECTION 8, 1ST FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	PHOTOCOPY	PAPER
03-04-27-COPY 2	ORIGINAL FLOOR PLANS WITH DIMENSIONS. BOOTT MILLS - 95 BRIDGE ST / LOWELL, MASS., AREA FOR SECTION 8, 1ST FLOOR.	UNDATED	1"=40'	H 22.5, W 29 CM	PHOTOCOPY	PAPER
03-04-35-COPY 1	[UNTITLED.] [COPY OF 95 BRIDGE ST. BOOTT MILLS.]	UNDATED	1"=100'	H 21.53, W 28 CM	PHOTOCOPY	PAPER

03-04-35-COPY 2	[UNTITLED.] [COPY OF 95 BRIDGE ST. BOOTT MILLS.]	UNDATED	1"=100'	H 21.53, W 28 CM	PHOTOCOPY	PAPER
03-10-COPY 1	NO. 3 GATE / BOOTT MILLS / MAIN POWER.	1967/10/16	NONE	H 27.5, W 21.5 CM	PHOTOCOPY	PAPER
03-12-A	BOOTT MILLS - LOWELL MASS. PROPOSED FLOOR PLAN / OF / REMODELED ELEVATOR AND / TOILET TOWER BUILDNG NO. 1 / SECTION 2 & 7 - 95 BRIDGE STREET.	1964/01/31	1/2" = 1'	H 40.5, W 56 CM	GRAPHITE	TRACING PAPER
03-12-B	[UNTITLED.] [PROPOSED FLOOR PLAN OF REMODELED ELEVATOR AND TOILET TOWER, BLDG. # 1, SECTION 2 & 7.]	UNDATED	NONE	H 39, W 40 CM	GRAPHITE	PAPER
03-20-A	BOOTT MILLS / LOWELL, MASS. - [PROPOSED LIFT BETWEEN 3RD. AND 4TH. FLOORS OF BLDG. # 3.]	1966/10/21	NONE	H 22, W 35.7 CM	GRAPHITE	TRACING PAPER
03-20-B	SPECIFICATIONS FOR PROPOSED LIFT BETWEEN 3RD. AND 4TH. FLOORS OF BLDG. # 3	1966/10/21	NONE	H 22, W 35.7 CM	BLACK INK,	TRACING PAPER
03-22-A	[SKETCH SHOWING PLATFORM AND BLDG. OF HOWDY BEEFBURGER.] LETTER FROM FIELD & DRURY GIVING P.L.& C. PERMISSION TO HOWDY BEEFBERGER TO BUILD A PLATFORM OVER THE PAWTUCKET CANAL.	1965/09/01	NONE	H 28.5, W 21.5	TYPEWRITTEN	PAPER
03-34-A	BOOTT MILLS / LOWELL, MASS. - CANOPY FOR SHIPPING DOCK, SECTION 7.	1963/12/03	1/2" - 1'	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER
03-34-B	[UNTITLED.] [CANOPY FOR SHIPPING DOCK, SECTION 7.]	UNDATED	NONE	H 45.5, W 56 CM	GRAPHITE	TRACING PAPER
03-41-01	PEPPERELL MFG. CO. / PLAN OF LOWELL PLANT	UNDATED	1" = 100'	H 23, W 29.5	BLACK INK,	DRAFTING CLOTH

03-41-02	PEPPERELL MFG. CO. / PLAN OF LOWELL PLANT	UNDATED	1" = 100'	H 24, W 29.5	BLACK INK,	DRAFTING CLOTH
03-41-03	PEPPERELL MFG. CO. / PLAN OF LOWELL PLANT	UNDATED	1" = 100'	H 25, W 29.5	BLACK LINE PRINT	DRAFTING CLOTH
03-89-COPY 1	TH FLOOR. [L.I.D.C. PICKER BUILDING / 3RD. FLOOR.]	1968/03/01	1/8" = 1'	H 49, W 140 CM	PHOTOCOPY	PAPER
04-001	LOCATION OF DRAINAGE SYSTEM IN CLOTH ROOM ADDITION - MASSACHUSETTS MILLS, LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/05/09	1/8" = 1'	H 31.5, W 70 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-002-01	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO. 5 / FIRST FLOOR, BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK,	DRAFTING CLOTH
04-002-02	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO. 5 / SECOND FLOOR, BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS..	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK,	DRAFTING CLOTH
04-002-03	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO. 5 / THIRD FLOOR, BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS..	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK,	DRAFTING CLOTH
04-002-04	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO. 7 / BASEMENT, BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS..	UNDATED	1" = 20'	H 22, W 28.5 CM	BLACK INK,	DRAFTING CLOTH
04-002-05	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO. 5 / BASEMENT, BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS..	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK,	DRAFTING CLOTH

04-002-06	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO. 6 - OFFICE BUILDING / BASEMENT, BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS..	UNDATED	1" = 20'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-07	[SULLIVAN TRUST BUILDING PLANS] - NO. 6 MILL - FIRST FLOOR - OFFICE BLDG./ NO. 6 MILL - SECOND FLOOR - OFFICE BLDG./ NO 6 MILL - THIRD FLOOR - OFFICE BLDG.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-08	[SULLIVAN TRUST BUILDING PLANS] - NO. 5 MILL- THIRD FLOOR.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-09	[SULLIVAN TRUST BUILDING PLANS] - NO. 5 MILL- 2ND FLOOR.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-10	[SULLIVAN TRUST BUILDING PLANS] - NO. 5 MILL- 2ND FLOOR.	UNDATED	NONE'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-11	[SULLIVAN TRUST BUILDING PLANS] - NO. 5 MILL- BASEMENT.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-12	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO 6 - FIRST FLOOR - OFFICE BLDG. / BUILDING NO 6 - SECOND FLOOR - OFFICE BLDG./ BUILDING NO 6 - THIRD FLOOR - OFFICE BLDG. / BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS.	UNDATED	1" = 40'	H 22, W 28.5 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-002-13	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO7 - 2ND FLOOR / 1ST FLOOR / BASEMENT / BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS.	UNDATED	1" = 40'	H 28.5, W 22 CM	BLACK INK,	DRAFTING CLOTH

04-002-14	[SULLIVAN TRUST BUILDING PLANS] - BUILDING NO7 - 2ND FLOOR / 1ST FLOOR / BASEMENT.	UNDATED	1" = 40'	H 28.5, W 22 CM	BLACK INK, COLORED INK	DRAFTING CLOTH
04-003-COPY 1	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS. DIVISION / LOWELL, MASS.	1959/05/07	1" = 50'	H 60.5, W 91 CM	BLUE LINE PRINT, BLACK INK,	PAPER
04-003-COPY 2	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS. DIVISION / LOWELL, MASS.	1959/05/07	1" = 50'	H 60.5, W 91 CM	BLUE LINE PRINT	PAPER
04-003-COPY 3	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS. DIVISION / LOWELL, MASS.	1959/05/07	1" = 50'	H 60.5, W 91 CM	BLUE LINE PRINT	PAPER
04-003-COPY 4	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS. DIVISION / LOWELL, MASS.	1959/05/07	1" = 50'	H 60.5, W 91 CM	BLUE LINE PRINT	PAPER
04-003-COPY 5	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS. DIVISION / LOWELL, MASS.	1959/05/07	1" = 50'	H 60.5, W 91 CM	BLUE LINE PRINT	PAPER
04-003-COPY 6	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - MASS. DIVISION / LOWELL, MASS.	1959/05/07	1" = 50'	H 60.5, W 91 CM	BLUE LINE PRINT	PAPER
04-004	[LOCATION OF NEW CONDENSER PIPE.]	UNDATED				
04-005	SKETCH OF FRAME FOR NEW SWITCH-BOARD / SECTION EIGHT - WHEEL HOUSE / MASS. COTTON MILLS, LOWELL, MASS.	1918/10/09	1/2" = 1'	H 54, W 89 CM	BLACK INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
04-006	ELEV. & TOILET TOWER / SECTION 7 - 95 BRIDGE.	UNDATED	NONE	H 37, W 44	GRAPHITE	PAPER

04-007	[BLUEPRINT OF SKETCH SHOWING AREA BETWEEN EASTERN CANAL, BRIDGE STREET, AND MILL # 5 AT LIDC.]	UNDATED				
04-008	FENWAY MFG. CO, INC., SECTION 5 / BUILDING NO. 2 / 2ND FLOOR / BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS.	UNDATED	1" = 40'	H 23, W 29 CM	BLACK LINE PRINT	PAPER
04-009	PLAN OF PROPOSED / BOOTT MILLS STEAM LINE / TO SUPPLY R.K.O. KEITHS THEATRE / ALSO PROPOSED / PROPERTY LINES / FOR CURRAN-MORTON'S STORE HOUSE ON CANAL STREET / LOWELL, MASS.	1956/09/21	1" = 20'	H 41.5, W 86 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-010	DISTRIBUTION OF POWER / BASED ON HP RATINGS OF MOTORS INSTALLED / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1922/09/01	NONE	H 30.5, W 64 CM	BLUE LINE PRINT,	PAPER
04-011	[FLOOR PLAN OF LOWELL SHOE, BRIDGE DETAILS] BRIDGE DETAILS.	UNDATED	3/4" = 1'	H 34, W 64 CM	BLUE LINE PRINT,	PAPER
04-012	LOWELL INDUSTRIAL DEVELOPMENT CO. / PLAN & SECTIONS OF NO 1 & 2 WHEEL RACKS. SECTION PLAN AT HORIZONTAL STRINGER.	1936/07/15	1/4 " = 12"	H 56.5, W 69 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
04-013	PARIS SHOE CO / LOWELL MASS. 4TH FLOOR.	1966/12/07	1/8" = 1'	H 45.5, W 138 CM	BLUELINE PRINT,	PAPER
04-014	PLAN SHOWING / LAND OF THE PEPPERELL MFG. CO., / SOLD TO LOWELL INDUSTRIAL DEVELOPMENT CO. / BY DEED OF JAN. 21, 1930.	1930/01/21	1" = 40'	H 62,5, W 98 CM	BLUEPRINT, WATER COLOR, COLORED PENCIL	PAPER

04-015	PROPOSED MUNICIPAL EASEMENTS / ON / PLAN SHOWING / LAND BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / IN VICINITY OF LOWER LOCKS DAM.	1957/10/25	1" = 30'	H 40.5, W 58 CM	BLACK LINE PRINT	PAPER
04-016	PLAN SHOWING / VACANT AREAS / AT THE / BOOTT MILLS, MASSCHUSETTS DIVISION.	1956/05/28	1" = 20'	H 40.5, W 54 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-017	[UNTITLED.] [PLAN SHOWING AGES OF BLDGS. UP TO 1932, LIDCO].	UNDATED	NONE	H 28.5, W 21.5 CM	PHOTOCOPY, GRAPHITE	PAPER
04-018-COPY 1	PLAN OF LAND / IN LOWELL, MASS.	1964/01/10	1" = 50'	H 57, W 61 CM	BLACK LINE PRINT	PAPER
04-018-COPY 2	PLAN OF LAND / IN LOWELL, MASS.	1964/01/10	1" = 50'	H 57, W 61 CM	BLACK LINE PRINT	PAPER
04-019	PROPOSED FLOOR PLAN / OF / REMODELED ELEVATOR AND / TOILET TOWER BUILDING NO.1 / SECTION 2 & 7 - 95 BRIDGE STREET	1964/31/10	1/2' = 1'	H 43.5, W 56 CM	BLUE LINE PRINT	PAPER
04-020	OUTSIDE STAIRWAY & RAMP / NO. 2 MILL - 95 BRIDGE ST.	1963/05/23	1/2' = 1'	H 43.5, W 56 CM	BLUE LINE PRINT	PAPER
04-021-01-A-COPY 1	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. DETAILED OUTLINE - THIRD ANGLE PROJECTION.	1911/07/19	NONE	H 26.8, W 23.3 CM	BLUEPRINT	PAPER
04-021-01-A-COPY 2	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. DETAILED OUTLINE - THIRD ANGLE PROJECTION.	1911/07/19	NONE	H 26.3, W 20 CM	BLUEPRINT	PAPER

04-021-01-B-COPY 1	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. THIRD ANGLE PROJECTION . SWITCHBOARD BOOTT MILLS, LOWELL, MA., COMPLETED.	1912/11/14	NONE	H 26.5, W 20.3 CM	BLUEPRINT	PAPER
04-021-01-B-COPY 2	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. THIRD ANGLE PROJECTION . SWITCHBOARD BOOTT MILLS, LOWELL, MA., COMPLETED.	1912/11/14	NONE	H 26.3, W 20 CM	BLUEPRINT	PAPER
04-021-01-C	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. THIRD ANGLE PROJECTION. SWITCHBOARD BOOTT MILLS, LOWELL, MA., NOT COMPLETED.	1912/11/14	NONE	H 26.5, W 20.3 CM	BLUEPRINT	PAPER
04-021-01-D-COPY 1	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. THIRD ANGLE PROJECTION. ARRANGEMENT OF SWITCHING APPARATUS, BOOTT MILLS, LOWELL, MASS.	1912/11/27	NONE	H 26.5, W 20.3 CM	BLUEPRINT	PAPER
04-021-01-D-COPY 2	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. THIRD ANGLE PROJECTION. ARRANGEMENT OF SWITCHING APPARATUS, BOOTT MILLS, LOWELL, MASS.	1912/11/27	NONE	H 26.3, W 20 CM	BLUEPRINT	PAPER
04-021-02	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. IMPROVED GOVERNOR.	UNDATED	1" = 1'	H 22.5, W 32.7 CM	BLUEPRINT	PAPER

04-021-03	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. DIAGRAM OF CONNECTIONS / FOR TYING IN THE L.E.L. / AND B.G.M. SYSTEMS / THE LOWELL ELECTRIC LIGHT CORP.	1911/12/19	NONE	H 23, W 30 CM	BLUEPRINT	PAPER
04-021-04	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. / LINE OF SUPPORTS FOR BARE WIRE AND CABLES.	UNDATED	NONE	H 26.5, W 20.2 CM	BLUE LINE PRINT	PAPER
04-021-05	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. A.C. GENERATOR & EXCITER PANEL / WIRING DIAGRAM.	1916/06/19	NONE	H 27, W 21 CM	BLUEPRINT	PAPER
04-021-06	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. CONNECTIONS FOR GRID TYPE FLD. REGULATOR WITH / ALT. PARALLEL RES. AND FIELD DISCHARGE - 3 TERMINALS.	1911/06/08	NONE	H 28, W 23 CM	BLUEPRINT	PAPER
04-021-07	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. H.P. CIRCULATING KIER / WITH OUTSIDE HEATER AND PUMP.	UNDATED	NONE	H 29.5, W 22.6 CM	BLUEPRINT	PAPER
04-021-08	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. MANNER OF CONNECTING UP / BRISTOL'S RECORDING WATT METER.	UNDATED	NONE	H 21.3, W 26 CM	BLUEPRINT	PAPER
04-021-09	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. CONNECTIONS FOR THE 105/125 VOLT MULTIPLE AUTO / TRANSFORMER FOR THE 600 OR 400 C.P. MAZDA "C" LAMP.	UNDATED	NONE	H 26.4,W 20 CM	BLUEPRINT	PAPER

04-021-10	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. CIRCUIT DIAGRAM / OF / FARADAY MODEL FOG DOUBLE-GONG / FOR ALTERNATING CURRENT, LIGHTING / OR POWER CIRCUITS.	UNDATED	NONE	H 21 W 27 CM	BLUEPRINT	PAPER
04-021-11	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. WATER HEATER / WIRING DIAGRAM.	UNDATED	NONE	H 21.5, W 27.5 CM	BLUEPRINT	PAPER
04-021-12	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. CONNECTIONS OF / POLYPHASE WATTHOUR METER TYPE D3.25 CYCLES AND OVER / FOR USE ON 3 WIRE 2 AND 3 PHASE & MONOCYCLIC CIRCUITS / WITH CURRENT TRANSFORMERS / FOR VOLTAGES NOT EXCEEDING 650 VOLTS.	UNDATED	NONE	H 27, W 21.2 CM	BLUEPRINT	PAPER
04-021-13-A-COPY 1	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. BOOTT MILLS CO. / WIRING DIAGRAM.	1922/03/23	NONE	H 28, W 22 CM	BLUEPRINT	PAPER
04-021-13-A-COPY 2	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. BOOTT MILLS CO. / WIRING DIAGRAM.	1922/03/23	NONE	H 28, W 22 CM	BLUEPRINT	PAPER
04-021-13-B	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. CONNECTIONS FOR GRID FIELD RHEOSTAT, ENDS PARALLEL.	1916/12/12	NONE	H 26.8, W 21 CM	BLUEPRINT	PAPER
04-021-13-C	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. DIRECT CURRENT GENERATORS TYPE "E".	UNDATED	NONE	H 27.5, W 21 CM	INK	PAPER
04-021-13-D	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. INDUCTION MOTORS, TYPE "AN".	UNDATED	NONE	H 27.5, W 21 CM	INK	PAPER

04-021-14	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. ADJUSTING WAHSER / 1 1/2" SCREW.	1917/12/22	12"	H 27.5, W 22 CM	BLUEPRINT	PAPER
04-021-15	WIRING DIAGRAMS GENERATORS, EXCITERS, ETC. A.C. GENERATOR & EXCITER PANEL / WIRING DIAGRAM.	1917/12/24	NONE	H 28, W 22 CM	BLUEPRINT	PAPER
04-022-COPY 1	PROPOSED BRIDGE AND SHIPPING / DECK OVER CANAL TO BLDG. NO. 5	1958/07/10	1" = 40'	H 35, W 37 CM	BLACK LINE PRINT	PAPER
04-022-COPY 2	PROPOSED BRIDGE AND SHIPPING / DECK OVER CANAL TO BLDG. NO. 5	1958/07/10	1" = 40'	H 35, W 37 CM	BLACK LINE PRINT	PAPER
04-023-01	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, MISC. ITEMS.	1967/09/21	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-02	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, COLUMNS.	1967/08/12	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-03	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, COLUMNS.	1967/08/12	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-04	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, COLUMNS.	1967/08/12	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-05	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, COLUMNS.	1967/08/13	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-06	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, COLUMN.	1967/08/13	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER

04-023-07	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, BEAMS.	1967/08/22	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-08	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, BEAMS & CHANNELS.	1967/09/19	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-09	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, BEAMS & CHANNELS.	1967/09/20	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-10	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, BEAMS & CHANNELS & L'S.	1967/08/24	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-11	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, CHANNELS.	1967/09/20	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-12	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, PENTHOUSE STAIR.	1967/09/21	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-13	[DIAGRAM OF BOOTT MILLS AND 95 BRIDGE ST. ELEVATOR SHAFTS.] ELEVATOR SHAFT, BLDG. # 3, GRATING PLAN & PENTHOUSE FL.	1967/09/21	NONE	H 36, W 61 CM	BLUE LINE PRINT	PAPER
04-023-A	BOOTT MILLS / 95 BRIDGE ST.LOWELL, MASS. / ELEVATOR SHAFT, BLDG. # 3 / ERECTION PLAN.	1967/08/04	NONE	H 61, W 81 CM	BLUE LINE PRINT	PAPER
04-023-B	BOOTT MILLS / ABOVE 95 BRIDGE ST. LOWELL, MASS. / ELEVATOR SHAFT BLDG. # 3 / PENTHOUSE FLOOR PLAN.	1967/09/19	NONE	H 61, W 81 CM	BLUE LINE PRINT	PAPER

04-024-01	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 5 / BUILDING NO. 2 / 2ND. FLOOR.	UNDATED	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-02	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 5 / BUILDING NO. 2 / 3RD. FLOOR.	UNDATED	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-03	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 5 / BUILDING NO. 2 / 4TH. FLOOR.	UNDATED	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-04	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 5 / BUILDING NO. 2 / 5TH. FLOOR.	UNDATED	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-05	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 5 / BUILDING NO. 2 / 6TH. FLOOR.	UNDATED	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-06	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 5 / BUILDING NO. 2 / 1ST. FLOOR.	UNDATED	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-07	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 6 / BUILDING NO. 1 / 6TH. FLOOR.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	PHOTOCOPY, GRAPHITE, COLORED PENCIL	PAPER
04-024-08	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 6 / BUILDING NO. 1 / 5TH. FLOOR.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	PHOTOCOPY, GRAPHITE	PAPER
04-024-09	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 6 / BUILDING NO. 1 / 4TH. FLOOR.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	PHOTOCOPY, GRAPHITE, COLORED PENCIL	PAPER
04-024-10	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 6 / BUILDING NO. 1 / 3RD. FLOOR.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	PHOTOCOPY, GRAPHITE	PAPER

04-024-11	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 6 / BUILDING NO. 1 / 2ND. FLOOR.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	PHOTOCOPY, GRAPHITE, COLORED PENCIL	PAPER
04-024-12	[HEAT PIPE PLAN - 95 BRIDGE STREET - BLDGS 1 & 2]. SECTION 6 / BUILDING NO. 1 / 1ST. FLOOR.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	PHOTOCOPY, GRAPHITE	PAPER
04-025	WIRING FOR # 5 BOILER / BOOTT MILLS.	1978/04/01	NONE	H 48, W 91CM	BLUE LINE PRINT	PAPER
04-026	TEST OF 2" GEM METER # 623376.	1916/03/15	GAL. / MIN.	H 27.5, W 21 CM	BLUEPRINT	PAPER
04-027	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	UNDATED	1" = 200'	H 27.5, W 37 CM	BLACK LINE PRINT, COLORED PENCIL	DRAFTING CLOTH
04-028	NO. 1 MILL / BASEMENT. SQ. FOOTAGE NUMBERS FOR SECTIONS 1, 2 & 6, FLOORS BASEMENT - 5TH.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, COLORED PENCIL, RED PEN	DRAFTING CLOTH
04-029	NO. 1 MILL / SECTION 7. SQ. FOOTAGE NUMBERS FOR BASEMENT AND 1ST FLOOR.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK LINE PRINT, COLORED PENCIL	DRAFTING CLOTH
04-030	NO. 2 MILL / BASEMENT. SQ. FOOTAGE NUMBERS FOR SECTIONS 3, 4, & 5, FOR BASEMENT AND 1ST - 6TH FLOORS.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-031	NO. 2 MILL / 1ST. FLOOR. FOOTAGE NUMBERS FOR SECTIONS 3, 4, & 5.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-032	NO. 2 MILL / 6TH FLOOR / SECTION 5. SQ. FOOTAGE NUMBERS.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-033	NO. 3 MILL / 2ND FLOOR / SQ. FOOTAGE NUMBERS.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH

04-034	STOREHOUSES "A" & "B". / SQ. FOOTAGE NUMBERS FOR FLOORS OF RESPECTIVE STOREHOUSES STARTING AT 4 FOR "A" AND 3 FOR "B".	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-035	STOREHOUSES "A" & "B". / SQ. FOOTAGE NUMBERS FOR FLOORS OF RESPECTIVE STOREHOUSES STARTING AT FLOORS 1 & 2 FOR "A" AND 1 FOR "B".	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-036	STOREHOUSES "A" & "B". / SQ. FOOTAGE NUMBERS FOR FLOORS OF RESPECTIVE STOREHOUSES STARTING AT 3RD FLOOR FOR "A" AND 2ND FOR "B".	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-037	SLASHER BUILDING / 1ST FLOOR / SQ. FOOTAGE NUMBERS.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-038	SLASHER BUILDING / 2ND & 3RD FLOOR / SQ. FOOTAGE NUMBERS.	UNDATED	1" = 40'	H 23, W 30 CM	BLACK INK, RED PEN	DRAFTING CLOTH
04-039	ENTRANCES AND EXITS / TO THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1937/09/01	1" = 100'	H 21, W 27CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
04-040	[UNTITLED] [NO. 1 MILL / BASEMENT FLOOR AREA.]	1930/04/01	1" = 40'	H 23.5, W 31.5 CM	BLACK INK, GRAPHITE	DRAFTING CLOTH
04-041	[UNTITLED] [NO. 1 MILL / FIRST FLOOR AREA.]	1930/04/01	1" = 40'	H 23.5, W 31.5 CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
04-042	[UNTITLED] [NO. 1 MILL / SECOND FLOOR AREA.]	1930/04/01	1" = 40'	H 24, W 31 CM	GRAPHITE	DRAFTING CLOTH
04-043	[UNTITLED] [NO. 1 MILL / THIRD FLOOR AREA.]	1930/04/01	1" = 40'	H 24.5, W 30.5 CM	GRAPHITE	DRAFTING CLOTH
04-044	[UNTITLED] [NO. 1 MILL / FOURTH FLOOR AREA.]	1930/04/01	1" = 40'	H 25, W 30.5 CM	GRAPHITE	DRAFTING CLOTH

04-045	[UNTITLED] [NO. 1 MILL / FIFTH FLOOR AREA.]	1930/04/01	1" = 40'	H 24, W 30 CM	GRAPHITE	DRAFTING CLOTH
04-046	[UNTITLED] [NO. 2 MILL / BASEMENT FLOOR AREA.]	1930/04/01	1" = 40'	H 23, W 29 CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
04-047	[UNTITLED] [NO. 2 MILL / FIRST FLOOR AREA.]	1930/04/01	1" = 40'	H 23, W 29 CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
04-048	[UNTITLED] [NO. 2 MILL / SECOND FLOOR AREA.]	1930/04/01	1" = 40'	H 23, W 29 CM	BLACK INK, COLORED PENCIL	DRAFTING CLOTH
04-049	[UNTITLED] [NO. 2 MILL / THIRD FLOOR AREA.]	1930/04/01	1" = 40'	H 25, W 30.5 CM	GRAPHITE	DRAFTING CLOTH
04-050	[UNTITLED] [NO. 2 MILL / FOURTH FLOOR AREA.]	1930/04/01	1" = 40'	H 25, W 32 CM	GRAPHITE	DRAFTING CLOTH
04-051	[UNTITLED] [NO. 2 MILL / FIFTH FLOOR AREA.]	1930/04/01	1" = 40'	H 25, W 30.5 CM	GRAPHITE	DRAFTING CLOTH
04-052	[UNTITLED] [NO. 2 MILL / SIXTH FLOOR AREA, SECTION 5.]	UNDATED	NONE	H 25, W 31.5 CM	GRAPHITE	DRAFTING CLOTH
04-053	[UNTITLED] [NO. 1 MILL / 1ST FLOOR, SECTION 1, 2 & 6.]	1936/02/00	1" = 40'	H 23, W 30 CM	BLACK INK	DRAFTING CLOTH
04-054	[UNTITLED] [NO. 1 MILL / 2ND FLOOR, SECTION 1, 2 & 6.]	1936/02/00	1" = 40'	H 23, W 30 CM	BLACK INK	DRAFTING CLOTH
04-055	[UNTITLED] [NO. 1 MILL / 3RD FLOOR, SECTION 1, 2 & 6.]	1936/02/00	1" = 40'	H 23, W 30 CM	BLACK INK	DRAFTING CLOTH
04-056	[UNTITLED] [NO. 1 MILL / 4TH FLOOR, SECTION 1, 2 & 6.]	1936/02/00	1" = 40'	H 23, W 30 CM	BLACK INK	DRAFTING CLOTH
04-057	FOR SALE - LOWELL PLANT / OF PEPPERELL MANUFACTURING COMPANY.	UNDATED	NONE	H 44, W 36 CM	PRINT, PHOTOS	PAPER

04-058	[UNTITLED] [PART OF THE SALE DOCUMENT FOR THE LOWELL PLANT OF PEPPERELL MANUFACTURING COMPANY.]	UNDATED	NONE	H 44, W 36 CM	PRINT, PHOTOS	PAPER
04-059	[UNTITLED] [PART OF A DOCUMENT DETAILING THE INFORMATION ABOUT L.I.D.C. PROPERTY FOR SALE.]	UNDATED	NONE	H 13, W 21.5 CM	PRINT, PHOTO	PAPER
04-060	[UNTITLED] [PART OF A DOCUMENT DETAILING THE INFORMATION ABOUT L.I.D.C. PROPERTY FOR SALE.]	UNDATED	NONE	H 1.5 W 25 CM	PRINT, PHOTO	PAPER
04-061	[UNTITLED] [PART OF A DOCUMENT DETAILING THE INFORMATION ABOUT L.I.D.C. PROPERTY FOR SALE.]	UNDATED	NONE	H 13 W 21.5 CM	PRINT, PHOTO	PAPER
04-062	[UNTITLED] [PART OF A DOCUMENT DETAILING THE INFORMATION ABOUT L.I.D.C. PICKER BUILDING PROPERTY FOR SALE.]	UNDATED	NONE	H 21.5 W 28 CM	PRINT, PHOTO	PAPER
04-063	CUT MANUFACTURING COSTS. [4 PAGE DOCUMENT DETAILING THE INFORMATION ABOUT L.I.D.C. PROPERTY FOR SALE.]	UNDATED	NONE	H 30.5 W 21.5 CM	PRINT, PHOTO	PAPER
04-064	SIGN FOR BOILER HOUSE / AT THE / LOWELL INDUSTIRAL DEVELOPMENT CO.	1939/03/28	AS SHOWN	H 51.5, W 60.5 CM	BLACK LINE PRINT, COLORED PENCIL	DRAFTING CLOTH
04-065-A	BOILER HOUSE AND POWER HO. / MASS. MILLS.	1930/11/00	NONE	H 18, W 21.5 CM	PHOTO	PAPER
04-065-B	SIGN TITLED SKETCH FOR SIGN THAT READS "HEATED INDUSTRIAL SPACE / LOWE COST POWER PROCESS STEAM."	UNDATED	NONE	H18, W 89 CM	INK	TRACING PAPER

04-066-01-COPY 1	5 TON INDUSTRIAL SCALE - ALL STEEL PLATFORM.	1945/08/14	AS NOTED	H 46.5, W 57 CM	BLUEPRINT	PAPER
04-066-01-COPY 2	5 TON INDUSTRIAL SCALE - ALL STEEL PLATFORM.	1945/08/14	AS NOTED	H 46.5, W 57 CM	BLUEPRINT	PAPER
04-066-02-COPY 1	5 TON INDUSTRIAL SCALE - ALL STEEL PLATFORM.	1945/08/14	AS NOTED	H 46.5, W 57 CM	BLUEPRINT	PAPER
04-066-02-COPY 2	5 TON INDUSTRIAL SCALE - ALL STEEL PLATFORM.	1945/08/14	AS NOTED	H 46.5, W 57 CM	BLUEPRINT	PAPER
04-067	[UNTITLED] [PLAN OF CANAL STREET SHOWING STORE HOUSE, KEITH'S THEATRE, AND THE FAIRBURN BUILDING.]	UNDATED	NONE	H 56, W 140 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-068-A	[UNTITLED] [DETAIL OF BLUEPRINT 04-14, SHOWING THE MASS MILLS COMPLEX.]	UNDATED	NONE	H 36, W 50 CM	BLUEPRINT	PAPER
04-068-B	[UNTITLED] [DETAIL OF BLUEPRINT 04-14, SHOWING THE MASS MILLS COMPLEX.]	UNDATED	NONE	H 36, W 50 CM	BLUEPRINT	PAPER
04-068-C	[UNTITLED] [DETAIL OF BLUEPRINT 04-14, SHOWING THE MASS MILLS COMPLEX.]	UNDATED	NONE	H 38, W 51 CM	BLUEPRINT	PAPER
04-069	SUPPLY TO BOOTT MILLS, LOWELL, MASS / PROPOSED 13.8/2400V & 600V SUBSTATION / BRIDGE ST.	1962/03/00	1/8" = 1'	H 68, W 101.5 CM	BLUE LINE PRINT	PAPER
04-070	BOILER HOUSE PLAN OF ANCHOR BOLTS / FOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/06/24	AS NOTED	H 60.5, W 91 CM	BLUEPRINT	PAPER
04-071	BOOTT MILLS. [INSTRUCTIONS FOR A 1/2" STEEL PLATE.}	1963/08/09	HALF SIZE	H 46, W 56 CM	GRAPHITE	TRACING PAPER
04-072	[UNTITLED] [PLAN FOR ALTERATIONS TO AN UNIDENTIFIED BUILDING.]	UNDATED	NONE	H 57, W 79 CM	GRAPHITE	TRACING PAPER

04-073	BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS./ BUILDING NO. 2 / 6TH FLOOR / SECTION 5.	1980/06/24	1" = 40'	H 22, W 29 CM	BLACK LINE PRINT, GRAPHITE	PAPER
04-074-01-COPY 1	BOOTT MILLS - EAST / SANITARY SEWERS / SITE LAYOUT.	1981/04/17	1" = 40'	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-01-COPY 2	BOOTT MILLS - EAST / SANITARY SEWERS / SITE LAYOUT.	1981/04/17	1" = 40'	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-02-COPY 1	BOOTT MILLS / SANITARY SEWERS / DETAIL SHEET	1981/04/21	AS NOTED	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-02-COPY 2	BOOTT MILLS / SANITARY SEWERS / DETAIL SHEET	1981/04/21	AS NOTED	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-03-COPY 1	BOOTT MILLS - WEST / SANITARY SEWERS / SITE LAYOUT & DETAILS.	UNDATED	1" = 40'	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-03-COPY 2	BOOTT MILLS - WEST / SANITARY SEWERS / SITE LAYOUT & DETAILS.	UNDATED	1" = 40'	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-04-COPY 1	BOOTT MILLS / PIPING PROFILE. / HYDRAULIC PROFILE.	1981/04/30	AS NOTED	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-074-04-COPY 2	BOOTT MILLS / PIPING PROFILE. / HYDRAULIC PROFILE.	1981/04/30	AS NOTED	H 56, W 87 CM	BLUE LINE PRINT	PAPER
04-075	[UNTITLED] [PLAN FOR FIVE DOORS FOR EDWARD RICHARDS FOR LOWELL SHOE CO.]	1966/10/01	NONE	H 21, W 28 CM	GRAPHITE	PAPER
04-076	[UNTITLED] [PLAN FOR PROPOSED FEED IN UNIDENTIFIED BUILDING.]	UNDATED	NONE	H 35.5, W 51CM	GRAPHITE, COLORED PENCIL	ISOMETRIC ELEVATION
04-077	BOOTT MILLS / LOWELL, MASS. / DIAGRAM OF LOADS / ON WATER WHEELS.	1916/01/19	NONE	H 21, W 27.5 CM	BLUEPRINT	PAPER
04-078	BOOTT MILLS / 95 BRIDGE ST. / LOWELL, MASS. / BUILDING NO. 2, BASEMENT, SECTION 5.	UNDATED	1" = 40'	H 22, W 28 CM	PHOTOCOPY, PEN	PAPER

04-079	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / BASEMENT.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-080	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / 1ST FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-081	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / 2ND FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-082	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / 3RD FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-083	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / 4TH FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-084	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / 5TH FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-085	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 2 / 6TH FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-086	BOOTT MILLS / 95 BRIDGE ST. / LOWELL, MASS. / BUILDING NO. 1, 5TH FLOOR. PLEASANT DRESS CO.	UNDATED	1" = 40'	H 22, W 35 CM	BLACK LINE PRINT, GRAPHITE	PAPER
04-087	BOOTT MILLS / 95 BRIDGE ST. / LOWELL, MASS. / BUILDING NO. 1, 5TH FLOOR. PLEASANT GARMENT CUTTING CO.	UNDATED	1" = 40'	H 22, W 35 CM	BLACK LINE PRINT, GRAPHITE	PAPER
04-088	BOOTT MILLS / 95 BRIDGE ST. / LOWELL, MASS. / BUILDING NO. 1, BASEMENT. ROBINSON TOP & YARN DYE WORKS, INC.	UNDATED	1" = 40'	H 22, W 35 CM	BLACK LINE PRINT, GRAPHITE	PAPER

04-089	BOOTT MILLS / 95 BRIDGE ST. / BUILDING NO. 1 / BASEMENT.	UNDATED	1" = 40'	H 22, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-090	BOOTT MILLS / 95 BRIDGE ST. / BUILDING NO. 1 / FIRST FLOOR.	UNDATED	1"=40'	H 22, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-091	BOOTT MILLS / 95 BRIDGE ST. / BUILDING NO. 1 / 2ND FLOOR.	UNDATED	1"=40'	H 22, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-092	BOOTT MILLS / 95 BRIDGE ST. / BUILDING NO. 1 / 3RD FLOOR.	UNDATED	1"=40'	H 22, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-093	BOOTT MILLS / 95 BRIDGE ST. / BUILDING NO. 1 / 4TH FLOOR.	UNDATED	1"=40'	H 22, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-094	BOOTT MILLS / 95 BRIDGE ST. / BUILDING NO. 1 / 5TH FLOOR.	UNDATED	1"=40'	H 22, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-095	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 3 / BASEMENT.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-096	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 3 / 1ST FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-097	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 3 / 2ND FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-098	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 3 / 3RD FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-099	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 3 / 4TH FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER

04-100	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 3 / 3RD FLOOR.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-101	BOOTT MILLS - 95 BRIDGE ST. / BOILER HOUSE.	1959/10/30	1"=40'	H 22, W 28 CM	BLUE LINE PRINT	PAPER
04-102	[UNTITLED. SHOWS SECTION 8 OF FIRST FLOOR OF WHAT APPEARS TO BE A GENERATOR ROOM IN BUILDING NO. 1.]	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT	PAPER
04-103	LOWELL INDUSTRIAL DEVELOPMENT CO. / BUILDING NO. 4.	1963/00/00	1"=20'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-104	LOWELL INDUSTRIAL DEVELOPMENT CO.	UNDATED	1"=20'	H 22, W 28 CM	BLUEPRINT, GRAPHITE	PAPER
04-105	LOWELL INDUSTRIAL DEVELOPMENT CO. / MAIN POWER HOUSE.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, GRAPHITE	PAPER
04-106	LOWELL INDUSTRIAL DEVELOPMENT CO. / MAIN POWER HOUSE. / BUILDING NO. 7.	UNDATED	1"=40'	H 22, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
04-107	BOOTT MILLS - 95 BRIDGE ST. / BUILDING NO. 6.	UNDATED	1"=40'	H 22, W 28 CM	BLUE LINE PRINT	PAPER
04-108-COPY 1	SKETCH SHOWING / PLATFORM AND BUILDING / FORMERLY LEASED TO NORTH AMERICAN PROVISION CO. / NOW LEASED TO HERBERT F. JACOBS / OF BILLERICA MASSACHUSETTS.	1934/01/20	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY	PAPER

04-108-COPY 2	SKETCH SHOWING / PLATFORM AND BUILDING / FORMERLY LEASED TO NORTH AMERICAN PROVISION CO. / NOW LEASED TO HERBERT F. JACOBS / OF BILLERICA MASSACHUSETTS.	1934/01/20	1" = 40'	H 21.5, W 28 CM	PHOTOCOPY	PAPER
05-001-COPY 1	FURNACE WATER FEED & DRAIN / SCHEMATIC - LOWELL FACILITY	1964/09/25	1/8" = 1'	H 56, W 86 CM	BLUE LINE PRINT	PAPER
05-001-COPY 2	FURNACE WATER FEED & DRAIN / SCHEMATIC - LOWELL FACILITY	1964/09/25	1/8" = 1'	H 56, W 86.5 CM	BLUE LINE PRINT	PAPER
05-002	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS	1956/10/00	NONE	H 43, W 54.8 CM	BLACK LINE PRINT	PAPER
05-003-COPY 1	PLAN / OF THE / PENSTOCKS AND RACEWAYS / FOR WHEELS NOS. 1, 2, 3, 4, 5, 6, 7, 8, & 9 / OF THE / BOOTT MILLS.	UNDATED	1" = 20' 1" = 10'	H 50.5, W 67.5 CM	PHOTO COPY	PAPER
05-003-COPY 2	PLAN / OF THE / PENSTOCKS AND RACEWAYS / FOR WHEELS NOS. 1, 2, 3, 4, 5, 6, 7, 8, & 9 / OF THE / BOOTT MILLS.	UNDATED	1" = 20' 1" = 10'	H 51.5, W 71CM	PHOTO COPY	PAPER
05-003-COPY 3	PLAN / OF THE / PENSTOCKS AND RACEWAYS / FOR WHEELS NOS. 1, 2, 3, 4, 5, 6, 7, 8, & 9 / OF THE / BOOTT MILLS.	UNDATED	1" = 20' 1" = 10'	H 51.5, W 71CM	PHOTO COPY	PAPER
05-004	[MASS. MOHAIR PLUSH CO., INC. - PREMISES: BOOTT MILLS.]	UNDATED				
05-005	LAYOUT OF / ENTRANCES TO "6 & 9" PENSTOCKS / BOOTT MILLS, LOWELL, MASS.	1924/01/28	1" = 20'	H 26, W 42.6 CM	BLUEPRINT	PAPER

05-006-A	[UNTITLED.] [PLAN OF SECTION A - A.]	UNDATED	1" = 60' 1" = 30'	H 28, W 36 CM	BLUE LINE PRINT	PAPER
05-006-B	[UNTITLED.] [PLAN OF SECTION A - A.]	UNDATED	NONE	H 19.3, W 28 CM	BLUE LINE PRINT	PAPER
05-007	BOOTT MILLS / LOWELLL MASS. PLAN OF BOOTT MILLS.	1965/01/18	1" = 50' 1/8" = 1'	H 27, W 33 CM	PHOTOCOPY	PAPER
05-008-A	BOOTT MILLS / LOWELL, MASS / SURVEY / NORTH WALL - NO. 4 MILL.	1940/09/20	1/8" = 1'	H 50, W 82 CM	BLUEPRINT	PAPER
05-008-B	LETTER ATTACHED TO BOOTT MILLS / LOWELL, MASS / SURVEY / NORTH WALL - NO. 4 MILL. FROM JOHN A STEVEN, INC. CONSULTING ENGINEERS.	1940/09/14	NONE	H 27.5, W 21.5 CM	INK	PAPER
05-009	BOOTT MILLS / LOWELL, MASSACHUSETTS. [PLAN OF WORKING AREA - SECTION 3, 4, & 5.]	UNDATED	1' = 20'	H 43, W 87 CM	PHOTOCOPY	PAPER
05-010	BOOTT MILLS / OUTSIDE DIMENSIONS.	UNDATED	NONE	H 27.5, W 61.5 CM	BLUEPRINT	PAPER
05-011	SYMPHONIC PARKING BOOTT MILLS YARDS / GROUND LEVEL.	1972/06/01		H 43, W 56 CM	BLACK LINE PRINT	PAPER
05-012-COPY 1	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - FOOT OF JOHN ST. / LOWELL, MASS.	1959/05/15	1" = 50'	H 45.5, W 83 CM	PHOTOCOPY	PAPER
05-012-COPY 2	PLAN SHOWING / FIRE PROTECTION CONTROL VALVES / FOR / BOOTT MILLS - FOOT OF JOHN ST. / LOWELL, MASS.	1959/05/15	1" = 50'	H 45.5, W 83 CM	PHOTOCOPY	PAPER
05-013	[PLAN OF BOOTT MILLS (COTTON MILL).]	UNDATED				

05-014	BOOTT MILLS / (COTTON CLOTH) / LOWELL, MASS.	1940/10/11	1" = 60'	H 45.5, W 57.5 CM	PHOTOCOPY	PAPER
05-015	BOOTT MILLS / LOWELL, MASS.	1959/04/00	1" = 50'	H 23, W 30.5 CM	BLUELINE PRINT	PAPER
05-016-A	BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / EXISTING MACHINERY ARRANGEMENT, AT ELEVATIONS # 84 AND # 95.	1945/09/26	1" = 50'	H 56, W 90 CM	BLUEPRINT	PAPER
05-016-B	BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / EXISTING MACHINERY ARRANGEMENT, AT ELEVATIONS # 105 AND # 117.	1945/09/26	1" = 50'	H 56, W 90 CM	BLUEPRINT	PAPER
05-016-C	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / SCHEME A - PLAN AT ELEV 62 +/-.	1945/10// 02	1" = 30'	H 56, W 90 CM	BLUEPRINT	PAPER
05-016-D	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / SCHEME A - PLAN AT ELEV 73 +/-.	1945/10// 02	1" = 30'	H 56, W 90 CM	BLUEPRINT, GRAPHITE	PAPER
05-016-E	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / SCHEME A - PLAN AT ELEV 84 +/-.	1945/10// 02	1" = 30'	H 56, W 90 CM	BLUEPRINT, GRAPHITE	PAPER

05-016-F	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / SCHEME A - PLAN AT ELEV 95 +/-.	1945/10//02	1" = 30'	H 56, W 90 CM	BLUEPRINT, GRAPHITE	PAPER
05-016-G	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / PLAN AT ELEV. 73 +/-, SCHEME B.	1945/10/02	1" = 30'	H 56, W 90 CM	BLUEPRINT	PAPER
05-016-H	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / PLAN AT ELEV. 84 +/-, SCHEME B.	1945/10/02	1" = 30'	H 56, W 90 CM	BLUEPRINT	PAPER
05-016-I	[PLAN OF EXISTING MACHINERY ARRANGEMENT - BLDGS. NORTH OF CANAL.] BOOTT MILLS / LOWELL, MASS. / BUILDINGS NORTH OF CANAL / PLAN AT ELEV. 95 +/-, SCHEME B.	1945/10/02	1" = 30'	H 56, W 90 CM	BLUEPRINT	PAPER
05-017	[PLANS SHOWING MILL # 1, 2, 4, 5, 6, 7 & 9.] BOOTT MILLS / LOWELL, MASS.	UNDATED				
05-018	FOUNDATION FOR 2500 K.W. TURBINE.	1977/02/05	1/2" = 1'	H 74, W 103.5 CM	BLUEPRINT	PAPER
05-019	FLOOR & YARD ELEVATIONS / BOOTT MILLS - LOWELL, MASS.	1918/07/26	1/8" = 12"	H 55, W 77 CM	PHOTOCOPY	PAPER
05-020-COPY 1	BOOTT MILLS / LOWELL, MASS. / RELATIVE FLOOR LEVELS OF / PRINCIPAL BUILDINGS, MAIN YARD.	1945/09/24	1/4" = 1'	H 55.5, W 89.5 CM	BLUEPRINT	PAPER

05-020-COPY 2	BOOTT MILLS / LOWELL, MASS. / RELATIVE FLOOR LEVELS OF / PRINCIPAL BUILDINGS, MAIN YARD.	1945/09/24	1/4" = 1'	H 55.5, W 89.5 CM	BLUEPRINT	PAPER
05-021-01	PLAN OF 1ST, 2ND, 3RD, 4TH, 5TH, AND 6TH FLOORS - BOOTT MILLS. [NO. 6 MILL, 1ST. FLOOR).]	1925/03/00	1/10" = 1'	H 29, W 69 CM	BLUEPRINT	PAPER
05-021-02	PLAN OF 1ST, 2ND, 3RD, 4TH, 5TH, AND 6TH FLOORS - BOOTT MILLS. [NO. 6 MILL, 2ND. FLOOR).]	1925/03/00	1/10" = 1'	H 29, W 69 CM	BLUEPRINT	PAPER
05-021-03	PLAN OF 1ST, 2ND, 3RD, 4TH, 5TH, AND 6TH FLOORS - BOOTT MILLS. [NO. 6 MILL, 3RD. FLOOR).]	1925/03/00	1/10" = 1'	H 29, W 69 CM	BLUEPRINT	PAPER
05-021-04	PLAN OF 1ST, 2ND, 3RD, 4TH, 5TH, AND 6TH FLOORS - BOOTT MILLS. [NO. 6 MILL, 4TH. FLOOR).]	1925/03/00	1/10" = 1'	H 29, W 69 CM	BLUEPRINT	PAPER
05-021-05	PLAN OF 1ST, 2ND, 3RD, 4TH, 5TH, AND 6TH FLOORS - BOOTT MILLS. [NO. 6 MILL, 5TH. FLOOR).]	1925/03/00	1/10" = 1'	H 29, W 69 CM	BLUEPRINT	PAPER
05-022	PLAN AND ELEVATION / OF / FIRST AND SECOND FLOORS / OF NO. 1 AND 2 CONNECTION / BOOTT MILLS.	1929/12/00	1" = 50', 1/8" = 1'	H 42.5, W 72 CM	BLACK INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
05-023-COPY 1	PLAN OF / MILL NO. 5 EAST 2ND FLOOR / BOOTT MILLS.	1940/08/28	1/8" = 1'	H 42.7, W 96 CM	BLUEPRINT	PAPER
05-023-COPY 2	PLAN OF / MILL NO. 5 EAST 2ND FLOOR / BOOTT MILLS.	1940/08/28	1/8" = 1'	H 42.7, W 54.5 CM	BLUE LINE PRINT	PAPER
05-023-COPY 3	PLAN OF / MILL NO. 5 EAST 2ND FLOOR / BOOTT MILLS.	1940/08/28	1/8" = 1'	H 56, W 80.5 CM	BLUE LINE PRINT, GRAPHITE	PAPER
05-023-COPY 4	PLAN OF / MILL NO. 5 EAST 2ND FLOOR / BOOTT MILLS.	1940/08/28	1/8" = 1'	H 56, W 105.5 CM	BLACK LINE PRINT, GRAPHITE	PAPER

05-024	FIRST FLOOR - MILL NO. 2 / BOOTT MILLS.	1933/09/26	1/8" = 1'	H 37, W 74 CM	BLUEPRINT	PAPER
05-025	PROPERTY MAP / SHOWING MODERN WIDE MILLS / REPLACING PRESENT GROUPS.	1909/11/24	1/40" = 1'	H 57.5, W75.5 CM	BLUEPRINT	PAPER
05-026	NO. 6 MILL / SPACE UNDER 1ST. FLOOR.	1925/03/00	1/10" = 1'	H 29, W 69 CM	BLUEPRINT	PAPER
05-027	[PLAN OF # 4 MILL - JUNE 1939 - (JOHN AND FRENCH STREETS).]	1939/06/00				
05-028	PLAN OF PROPOSED / BOOTT MILLS STEAM LINE / TO SUPPLY R.K.O. KEITHS THEATRE / ALSO PROPOSED / PROPERTY LINES / FOR CURRAN-MORTON'S STORE HOUSE ON CANAL STREET / LOWELL, MASS.	1956/09/21	1" = 20'	H 41.5, W 86.3 CM	BLUEPRINT	PAPER
05-028-COPY 1	AREA ON CANAL STREET / LEASED TO / GARAGE REALTY TRUST THOMAS J. SULLIVAN, TRUSTEE.	UNDATED	1" = 40'	H 21.5, W 35.5 CM	BLACK LINE PRINT	PAPER
05-029-01	MACHINE ROOM PLAN.	UNDATED	3/4" = 1'	H 28, W 21.5 CM	PHOTOCOPY	PAPER
05-029-02	MACHINE ROOM PLAN, HOISTWAY PLAN.	UNDATED	3/4" = 1'	H 28, W 21.5 CM	PHOTOCOPY	PAPER
05-030-A	PLAN SHOWING / PIERS AND COLUMNS PLACED IN FOUNDATION / OF BOOTT NO. 6 MILL, JULY AND AUG. 1926.	1926/08/10	1/8" = 1'	H 37, W 58 CM	BLUEPRINT	PAPER
05-030-B	PLAN SHOWING / PIERS AND COLUMNS PLACED IN FOUNDATION / OF BOOTT NO. 6 MILL, JULY AND AUG. 1926.	1926/08/10	1/8" = 1'	H 26.5, W 57 CM	BLUEPRINT, RED WATERCOLOR	PAPER
05-031	ELEVATION SHOWING / PROPOSED RECONSTRUCITON ON 5TH FLOOR, MILL NO. 6 / BOOTT MILLS.	1929/05/20	1/2" = 1'	H 29.5, W 75.5 CM	INK, RED WATERCOLOR	PAPER

05-032	BOOTT MILLS / ELEVATION OF MILL NO. 6 / EAST END.	1929/05/13	1/4" = 1'	H 51, W 38.5 CM	GRAPHITE	PAPER
05-033-COPY 1	BOOTT MILLS / LOWELL, MASS. / PLAN OF JOHN STREET PROPERTY / SHOWING PROPOSED NEW WAREHOUSE / ON LAND OF WONSKUCK CO. / ADJACENT TO BLDGS. - 9 - 3 - 5 WEST.	1965/01/11	1" = 50'	H 48, W 74 CM	PHOTOCOPY	PAPER
05-033-COPY 2	BOOTT MILLS / LOWELL, MASS. / PLAN OF JOHN STREET PROPERTY / SHOWING PROPOSED NEW WAREHOUSE / ON LAND OF WONSKUCK CO. / ADJACENT TO BLDGS. - 9 - 3 - 5 WEST.	1965/01/11	1" = 50'	H 56, W 86.5 CM	PHOTOCOPY	PAPER
05-034	[PLAN OF FIRST FLOOR - BLDGS. # 3, 4, & 5.]	UNDATED				
05-035	BOOTT MILLS / LOWELL, MASS. / BUILDING # 10 WEST / PLANS AND SECTION.	1945/10/19	1" = 30'	H 56, W 89.5 CM	BLUEPRINT	PAPER
05-036	VOLTAGE CHARACTERISTICS / FOR / WAGNER 2000 KVA / TRANSFORMERS WITH 5 - 4 1/3 % TAPS - SECTION 8 / TRANSFORMERS WITH 5 - 2 1/6% TAPS - ASSETS.	1949/03/31	NONE	H 58.5, W 45 CM	BLUEPRINT	PAPER
05-037-A	A.C.B. DRAWOUT SWITCHGEAR / BOOTT MILLS, LOWELL, MASS.	1947/04/01	NONE	H 62, W 92 CM	BLUEPRINT	PAPER
05-037-B	TYPICAL AL -2 - 50 & AE -1 - 25 INCOMING LINE UNIT / A.C.B. DRAWOUT SWITCHGEAR / (CONDITION "A")	1947/02/20	NONE	H 26.5, W 21CM	BLUEPRINT	PAPER
05-037-C	INDOOR A.C.B. DRAW OUT / SWITCHGEAR / INSTALLATION DETAILS.	1947/04/12	NONE	H 28, W 35.5 CM	INK	PAPER

05-038	PROPOSED HATCHWAY PROTECTION / FOR CONVEYOR SYSTEM FLOOR TO FLOOR (SYMPHONIC) / BOOTT MILLS / LOWELL, MASS.	1961/11/03	NONE	H 30, W 56 CM	PHOTOCOPY	PAPER
05-039-A-COPY 1	BOOTT MILLS / LOWELL, MASS/ NEW BRIDGE BETW'N BLDGS. # 2 & 3 AT 4TH FLOOR.	1917/10/04	3/4" = 1'	H 63, W 104 CM	BLUEPRINT	PAPER
05-039-A-COPY 2	BOOTT MILLS / LOWELL, MASS/ NEW BRIDGE BETW'N BLDGS. # 2 & 3 AT 4TH FLOOR.	1916/11/23	3/4" = 1'	H 65.5, W 94 CM	BLUEPRINT	PAPER
05-039-B	BOOTT MILLS / LOWELL, MASS/ NEW BRIDGE BETW'N BLDGS. # 2 & 3 AT 4TH FLOOR./ FRAMING PLAN, CROSS SECTION & DETAILS.	1916/11/23	3/4" = 1 1/2", 3" = 1'	H 66, W 63 CM	BLUEPRINT	PAPER
05-039-C-COPY 1	BOOTT MILLS / LOWELL, MASS/ PRESENT BRIDGE OVER CANAL FROM BLDG. # 8 TO RAILROAD.	1916/09/07	1.2" = 1'	H 54, W 97.5 CM	BLUEPRINT	PAPER
05-039-C-COPY 2	BOOTT MILLS / LOWELL, MASS / PRESENT BRIDGE OVER CANAL FROM BLDG. # 8 TO RAILROAD.	1916/09/07	1.2" = 1'	H 54, W 97.5 CM	BLUEPRINT	PAPER
05-040-A	CROSS SECTIONS OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY AND PROCESSES.	1931/03/27	1" = 40'	H 39.5, W 89 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-040-B	CROSS SECTIONS OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY AND PROCESSES.	1931/09/00	1" = 40'	H 39.5, W 89 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-040-C	CROSS SECTIONS OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY AND PROCESSES.	1931/09/00	1" = 40'	H 39.5, W 89 CM	BLUEPRINT	PAPER

05-040-D	CROSS SECTIONS OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY AND PROCESSES.	1931/09/00	1" = 40'	H 39.5, W 89 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-040-E	CROSS SECTIONS OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY AND PROCESSES.	1931/09/00	1" = 40'	H 39.5, W 89 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-041-A	PROPOSED ELECTRICAL TIE / FROM / MASSACHUSETTS TO BOOTT MILLS.	1930/03/17	1" = 40'	H 25, W 59 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-041-B	PROPOSED ELECTRICAL TIE / FROM / MASSACHUSETTS TO BOOTT MILLS.	1930/03/17	1" = 40'	H 25, W 59 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-042	PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DIAGRAM OF ELECTRICAL CONNECTIONS.	1943/12/15	NONE	H 74, W 96 CM	BLUEPRINT, WATERCOLOR	PAPER
05-043	PLAN AND SECTION SHOWING / PROPOSED STEEL RACKS / FOR 3, 4, & 5 WHEELS / BOOTT MILLS / LOWELL, MASS.	SEE NOTES	AS NOTED	H 44, W 87 CM	BLUEPRINT	PAPER
05-044	BOOTT MILLS - 1700 HP UNIT / ELEVATIONS OF POWER HOUSE / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/04/27	1/4" = 1'	H 62.5, W 92 CM	BLUEPRINT	PAPER
05-045	[COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE OF LAND FROM L. & C. TO BOOTT MILLS.]	UNDATED				
05-046	BOOTT MILLS / LOWELL, MASS. / SKETCH SHOWING CHIMNEY / DRAWN FROM MEMORY OF JOHN JENNINGS AND ACTUAL DIMENSIONS TAKEN.	SEE NOTES	1/8" = 1'	H 74, W 27.5 CM	BLUEPRINT	PAPER

05-047	[PLAN OF ELEVATIONS - BOOTT MILLS.]	UNDATED				
05-048-COPY 1	PROPOSED ALTERATIONS / OF / PARTITION WALLS ON FIRST FLOOR / OF 3 AND 4 CONNECTION / BOOTT MILLS / LOWELL, MASS.	1935/05/28	AS NOTED	H 72, W 110 CM	BLUEPRINT	PAPER
05-048-COPY 2	PROPOSED ALTERATIONS / OF / PARTITION WALLS ON FIRST FLOOR / OF 3 AND 4 CONNECTION / BOOTT MILLS / LOWELL, MASS.	1935/05/28	AS NOTED	H 72.5, W 110 CM	BLUEPRINT	PAPER
05-049	B & M R.R. / SOUTHERN DIVISION CORPORATION TRACKS / TRACKS AND BUILDINGS WEST OF BRIDGE ST. / NEAR BOOTT MILLS / LOWELL, MASS.	SEE NOTES	1" = 40'	H 20, W 69 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-050	PIERS NO. 4 MILL.	1905/05/00	NONE	H 27.5, W 62 CM	BLUEPRINT	PAPER
05-051	SKETCH SHOWING / 8" PIPE LINE IN OPEN AREA / BETWEEN / MILL NO. 4 AND MILL NO. 5 WEST / BOOTT MILLS.	1940/09/06	1" = 20'	H 30.5, W 54 CM	BLUEPRINT	PAPER
05-052	BOOTT MILLS / LOWELL, MASS. / BUILDING BETWEEN NO. 4 MILL AND NO. 5 MILL. NO. 2 MILL, FIFTH FLOOR.	1940/09/05	1/4" = 1'	H 73, W 107 CM	BLUEPRINT, GRAPHITE BLACK	PAPER
05-053	[PLAN OF BUILDING # 2 - BOOTT MILLS.]	UNDATED	1" = 40'	H 23, W 27.5 CM	LINE PRINT	PAPER
05-054	BOOTT MILLSL / LOWELL, MASS / MILL NO. 8 & MILL NO. 9 / RAMP CONNECTING 3RD AND 4TH FLOORS.	1927/09/16	1/8" = 1/2", 3" = 1'	H 74.5, W 104 CM	BLUEPRINT	PAPER
05-055	FLOOR PLAN # 8 & 9 BLDGS. / COLUMN SPACING & / GENERAL LAYOUT.	1968/02/07	1/16" = 1'	H 35.5, W 85.5 CM	PHOTOCOPY	PAPER
05-056	BOOTT MILLS / LOWELL, MASS. / PLAN OF YARD PARKING / RESTRICTED & PERMIT ONLY.	1964/06/20	1" = 50'	H 28, W 55.6 CM	PHOTOCOPY	PAPER

05-057-COPY 1	BOOTT MILLS / LOWELL, MASS. [PLAN OF YARD PARKING AT JOHN AND FRENCH STREETS.]	1964/06/20	1" = 2-'	H 40, W 50 CM	PHOTOCOPY	PAPER
05-057-COPY 2	BOOTT MILLS / LOWELL, MASS. [PLAN OF YARD PARKING AT JOHN AND FRENCH STREETS.]	1964/06/20	1" = 2-'	H 38, W 50 CM	PHOTOCOPY	PAPER
05-058-COPY 1	PLAN OF / MILLS NOS. 3 AND 4, THIRD FLOOR / BOOTT MILLS / LOWELLL, MASS.	1936/03/21	1/8" = 1'	H 44, W 143 CM	BLUEPRINT	PAPER
05-058-COPY 2	PLAN OF / MILLS NOS. 3 AND 4, THIRD FLOOR / BOOTT MILLS / LOWELLL, MASS.	1936/04/21	1/8" = 1'	H 44, W 143 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-058-COPY 3	PLAN OF / MILLS NOS. 3 AND 4, THIRD FLOOR / BOOTT MILLS / LOWELLL, MASS.	1936/04/21	1/8" = 1'	H 44.5, W 142 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-059-COPY 1	BOOTT MILLS / LOWELL, MASS. / LOCATION & DETAIL OF TIE RODS / MILL NO. 6.	1926/06/14	1/2" & 3/4" =1'	H 74, W 104 CM	BLUEPRINT	PAPER
05-059-COPY 2	BOOTT MILLS / LOWELL, MASS. / LOCATION & DETAIL OF TIE RODS / MILL NO. 6.	1926/06/14	1/2" & 3/4" =1'	H 73, W 104 CM	BLUEPRINT	PAPER
05-060-01-COPY 1	BOOTT MILLS / LOWELL, MASS. / DETAILS OF BEAM REINFORCEMENT / WITH 12" CHANNELS. TYPICAL.	1927/07/16	1" = 1'	H 20.5, W 27 CM	BLUEPRINT	PAPER
05-060-01-COPY 2	BOOTT MILLS / LOWELL, MASS. / DETAILS OF BEAM REINFORCEMENT / WITH 12" CHANNELS. TYPICAL.	1927/07/16	1" = 1'	H 20.5, W 27 CM	BLUEPRINT	PAPER
05-060-02-COPY 1	BOOTT MILLS / LOWELL, MASS. SECTION ON A - A.	1927/07/00	NONE	H 20.5, W 27 CM	BLUEPRINT	PAPER
05-060-02-COPY 2	BOOTT MILLS / LOWELL, MASS. SECTION ON A - A.	1927/07/00	NONE	H 20.5, W 27 CM	BLUEPRINT	PAPER
05-061-01	BOOTT MILLS / LOWELL, MASS. / STORE HOUSE BETWEEN NO. 4 & 5 W / FOUNDATION PLAN & DETAILS.	1940/05/02	AS NOTED	H 54, W 90 CM	BLUEPRINT	PAPER

05-061-02	BOOTT MILLS / LOWELL, MASS. / STORE HOUSE BETWEEN NO. 4 & 5 W / STEEL PLAN & DETAILS.	1940/04/22	AS NOTED	H 54, W 90 CM	BLUEPRINT	PAPER
05-061-03	BOOTT MILLS / LOWELL, MASS. / STORE HOUSE BETWEEN NO. 4 & 5 W / ROOF PLAN & DETAILS.	1940/05/30	1/4" = 1'	H 54, W 90 CM	BLUEPRINT	PAPER
05-062	[PLAN OF PROPOSED BRIDGE OVER EASTERN CANAL.]	UNDATED				
05-063	SECTIONS SHOWING / DEFLECTIONS OF MILL WALLS / FROM THE VERTICAL / BOOTT MILLS / LOWELL, MASS.	1935/08/21	SEE NOTES	H 58.5, W 93 CM	BLUEPRINT	PAPER
05-064-A	PLAN OF / MILL NO. 5 EAST 2ND. FLOOR / BOOTT MILLS.	1940/08/28	1/8" = 1'	H 33, W 101 CM	BLUEPRINT, GRAPHITE	PAPER
05-064-B	PLAN OF / MILL NO. 5 EAST 2ND. FLOOR / BOOTT MILLS.	1940/08/28	1/8" = 1'	H 33, W 101 CM	BLUEPRINT, GRAPHITE	PAPER
05-065	BOOTT MILLS / LOWELL, MASS. / PROPOSED WAREHOUSE "A".	1965/01/18	1" = 20'	H 48, W 76 CM	PHOTOCOPY	PAPER
05-066-A	BOOTT MILLS / LOWELL, MASS./ PROPOSED WAREHOUSE "B".	1965/01/18	1" = 20'	H 48, W 76 CM	PHOTOCOPY, GRAPHITE	PAPER
05-066-B	BOOTT MILLS / LOWELL, MASS./ PROPOSED WAREHOUSE "B".	UNDATED	NONE	H 43.5, W 56 CM	PHOTOCOPY	PAPER
05-067	BOOTT MILLS / LOWELL, MASS / PROPOSED WAREHOUSE "C".	1965/01/18	1" = 20'	H 48, W 76 CM	PHOTOCOPY	PAPER
05-068	PROPOSED FRONT / BOOTT MILL - LOWELL, MASS.	1956/09/14	NONE	H 43, W 55.6 CM	BLACK LINE PRINT	PAPER
05-069	METHOD OF REMOVING WOODEN CORNICE / ON FLAT ROOF.	SEE NOTES	1" = 1'	H 27.8, W 21 CM	BLUEPRINT	PAPER
05-070	JOHN ST. PLAN / FOR TRANSFORMER SHELTER ADJ. TO BLDG. #8.	UNDATED	1/4" = 1'	H 21.5, W 28 CM	GRAPHITE DRAWING	PAPER

05-071-A	ONE ELECTRIC FREIGHT ELEVATOR / NO. 1 STOREHOUSE, LOWELL, MASS / BOOTT MILLS.	1943/02/25	AS NOTED	H 65.5, W 86 CM	BLUEPRINT, GRAPHITE	PAPER
05-071-B	ONE ELECTRIC FREIGHT ELEVATOR / NO. 1 STOREHOUSE, LOWELL, MASS / BOOTT MILLS.	1943/02/25	AS NOTED	H 65.5, W 86 CM	BLUEPRINT	PAPER
05-072-A	BOOTT MILLS / LOWELL, MASS. / STORE HOUSE ELEVATOR / INSTALLATION.	1943/02/17	1/4" = 1'	H 69.5, W 79 CM	BLUEPRINT	PAPER
05-072-B	BOOTT MILLS / LOWELL, MASS. / STORE HOUSE ELEVATOR / INSTALLATION.	1943/02/17	1/4" = 1'	H 69.5, W 79 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-073	BOOTT MILLS # 1 STOREHOUSE / LOWELL, MASS - FIRE DOORS.	1942/03/06	NONE	H 55.6, W 48.5 CM	PHOTOCOPY	PAPER
05-074-1	BOOTT MILLS / FIRE ESCAPE, NO. 1, STORE HOUSE.	1923/08/06	NONE	H 26.4, W 34.5 CM	BLUEPRINT	PAPER
05-074-2	BOOTT MILLS / FIRE ESCAPE, NO. 1, STORE HOUSE.	1923/08/06	NONE	H 26.4, W 34.5 CM	BLUEPRINT	PAPER
05-075	PLAN OF BRIDGE BETWEEN 8-3 AND STOREHOUSE./ BOOTT MILLS, LOWELL.	1923/04/18	1" = 40'	H 20.3, W 27.5 CM	DRAWING	DRAFTING CLOTH
05-076	MAP OF THE / CITY OF / LOWELL.	1923/00/00	1' = 1000'	H 53.5, W 71.5 CM	BLACK LINE PRINT	PAPER
05-077	BOOTT MILLS.	UNDATED	1/4" = 1'	H 60, W 82 CM	GRAPHITE, COLORED PENCILE	PAPER
05-078-COPY 1	BOOTT MILLS / NO. 4 MILL.	1940/05/01	NONE	H 28, W 21 CM	BLUEPRINT	PAPER
05-078-COPY 2	BOOTT MILLS / NO. 4 MILL.	1940/05/01	NONE	H 28, W 21 CM	BLUEPRINT	PAPER
05-079	[UNTITLED] [SQUARE FOOTAGE ON SECOND FLOOR OF UNIDENTIFIED BUILDING.]	UNDATED	NONE	H 48, W 76.5 CM	BLUE LINE PRINT	PAPER

05-080	CITY OF / LOWELL, MASS. / 1953.	1953/00/00	1" - 1000'	H 55.5, W 72.5 CM	INK	PAPER
05-081	PLAN OF THE / MILL YARD / OF THE / BOOTT MILLS / FORMERLY / LOWELL INDUSTIRAL DEVELOPMENT CO. / SHOWING WATERWAYS FOR WATER POWER.	1919/01/00	1" = 40'	H 77, W 62.5 CM	BLUE LINE PRINT	PAPER
05-082	PORTION OF / BOOTT MILLS PROPERTY	1929/05/22	1" = 20'	H 38.5, W 91 CM	BLACK LINE PRINT, WATER COLORS	TRACING PAPER
05-083	PLAN OF / FOR 2ND FLOOR OF MILLS NOS 8 & 9 / BOOTT MILLS / LOWELL, MASS.	1955/10/21	1" = 10'	H 45, W 118.5 CM	BLUE LINE PRINT / INK	PAPER
05-084	PROPOSAL B : 118 STALLS.	UNDATED	1" = 20'	H 39.5, W 69.5 CM	BLUE LINE PRINT	PAPER
05-085	EXISTING CONDITIONS : 84 STALLS.	UNDATED	1" = 20'	H 39.5, W 69.5 CM	BLUE LINE PRINT	PAPER
05-086	PROPOSAL A : 143 STALLS.	UNDATED	1" = 20'	H42, W 69.5 CM	BLUE LINE PRINT	PAPER
05-087	PROPERTY BELONGING / TO / BOOTT MILLS / ON JOHN AND FRENCH STREETS.	1939/06/27	1" = 30'	H 48, W 65 CM	BLUEPRINT	PAPER
05-088	PLAN AND ELEVATIONS / OF PROPOSED / BULKHEAD FOR NO. 9 WHEEL / BOOTT MILLS / LOWELL MASS.	1944/04/00	1" = 40'	H 43, W 63.5 CM	BLUEPRINT. COLORED PENCIL	PAPER
05-089-A	BOOTT MILLS / LOWELL MASS./ FIRST FLOOR.	UNDATED	1" = 50'	H 28, W 50 CM	PHOTOCOPY BLACK LINE PRINT, GRAPHITE,	PAPER
05-089-B	BOOTT MILLS / LOWELL MASS./ FIRST FLOOR.	1956/05/00	NONE	H 41.5, W 48 CM	COLORED PENCIL	PAPER

05-090-01	BOOTT MILLS / LOWELL MASS./ FIRST FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-090-02	BOOTT MILLS / LOWELL MASS./ SECOND FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-090-03	BOOTT MILLS / LOWELL MASS./ THIRD FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-090-04	BOOTT MILLS / LOWELL MASS./ FOURTH FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-090-05	BOOTT MILLS / LOWELL MASS./ FIFTH FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-090-06	BOOTT MILLS / LOWELL MASS./ SIXTH FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-090-07	BOOTT MILLS / LOWELL MASS. / STOREHOUSES 1, 2, & 3..	UNDATED	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE	PAPER

05-091-01	BOOTT MILLS / LOWELL MASS. / FIRST FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-091-02	BOOTT MILLS / LOWELL MASS. SECOND FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-091-03	BOOTT MILLS / LOWELL MASS. THIRD FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-091-04	BOOTT MILLS / LOWELL MASS. FOURTH FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-091-05	BOOTT MILLS / LOWELL MASS. FIFTH FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-091-06	BOOTT MILLS / LOWELL MASS. SIXTH FLOOR TENANTS.	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
05-091-07	BOOTT MILLS / LOWELL MASS.STOREHOUSES 1, 2, & 3..	1956/05/00	NONE	H 23, W 50 CM	BLACK LINE PRINT, GRAPHITE	PAPER

05-092	[UNTITLED] [SHOWS BOOTT MILL COMPLEX AS FAR AS THE MERRIMACK WASTEWAY.]	UNDATED	NONE	H 53, W 116 CM	BLUEPRINT, COLORED PENCIL	PAPER
05-093	[UNTITLED] [SQUARE FOOTAGE OF STOREHOUSES 1, 2, & 3. HYDRAULIC LIFT 1ST. & 2ND. FLOORS OF AN UNIDENTIFIED BUILDING.}	UNDATED	NONE	H 48, W 76.5 CM	PHOTOCOPY	PAPER
05-094	BOOTT MILLS / LOWELL, MASS.	UNDATED	1" = 20'	H 57, W 67 CM	PHOTOCOPY	PAPER
05-095-A	BOOTT MILLS / LOWELL, MASS.	UNDATED	1/8" = 1'	H 49.5, W 136 CM	BLACK LINE PRINT	PAPER
05-095-B	BOOTT MILLS / LOWELL, MASS.	UNDATED	1/8" = 1'	H 49.5, W 136 CM	BLACK LINE PRINT, GRAPHITE	PAPER
05-096-01-COPY 1	PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / MERRIMACK WASTEWAY / LOWELL, MASSACHUSETTS.	1974/0825	NONE	H 33.5, W 142 CM	BLUE LINE PRINT	PAPER
05-096-01-COPY 2	PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / MERRIMACK WASTEWAY / LOWELL, MASSACHUSETTS.	1974/0825	NONE	H 47, W 148 CM	BLUE LINE PRINT	PAPER
05-096-02-COPY 1	PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / MERRIMACK WASTEWAY / LOWELL, MASSACHUSETTS.	1974/0825	1/8" = 1'	H 33.5, W 142 CM	BLUE LINE PRINT	PAPER
05-096-02-COPY 2	PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / MERRIMACK WASTEWAY / LOWELL, MASSACHUSETTS.	1974/0825	1/8" = 1'	H 47, W 148 CM	BLUE LINE PRINT	PAPER
05-096-03-COPY 1	WASTEWAY / LOWELL, MASSACHUSETTS.	1974/0825	1/8" = 1'	H 33.5, W 142 CM	BLUE LINE PRINT	PAPER

05-096-03-COPY 2	PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / MERRIMACK WASTEWAY / LOWELL, MASSACHUSETTS.	1974/0825	1/8" = 1'	H 47, W 148 CM	BLUE LINE PRINT	PAPER
05-097-COPY 1	BOOTT MILLS / LOWELL, MASS.	UNDATED	1" = 20'	H 47, W 84 CM	BLACK LINE PRINT, GRAPHITE	PAPER
05-097-COPY 2	BOOTT MILLS / LOWELL, MASS.	UNDATED	1" = 20'	H 47, W 84 CM	BLACK LINE PRINT, GRAPHITE	PAPER
05-098	BOOTT MILLS.	1934/12/21	1/8" = 1'	H 60, W 82 CM	GRAPHITE, COLORED PENCILE	PAPER
06-02-A	TURBINE ROOM / FLOOR PLAN / BOOTT MILLS / LOWELL, MASS.	1910/06/06	1/4" = 1'	H 75, W 90 CM	BLUEPRINT	PAPER
06-02-B	BOOTT MILLS / LOWELL, MASS./ TURBINE ROOM FLOOR PLAN	1917/02/16	1/2" = 1'	H 66.5, W 53.5 CM	BLUEPRINT	PAPER
06-07-COPY 1	BOOTT MILLS / LOWELL, MASS. / LAYOUT OF 2500 K.W. TURBINE.	1917/01/25	1/2' - 1'	H 52, 71.5 CM	BLUEPRINT	PAPER
06-07-COPY 2	BOOTT MILLS / LOWELL, MASS. / LAYOUT OF 2500 K.W. TURBINE.	1917/01/25	1/2' - 1'	H 51, 71 CM	BLUEPRINT	PAPER
06-07-COPY 3	BOOTT MILLS / LOWELL, MASS. / LAYOUT OF 2500 K.W. TURBINE.	1917/01/25	1/2' - 1'	H 52.5, 71.5 CM	BLUEPRINT	PAPER
06-12-COPY 1	GENERATOR A.C. TYPE AH 12 38 1/2-11/ 312 KVA, 600 VOLTS, 600 RPM, 3 PH, 60 CY / OUTLINE.	1913/06/14	NONE	H 55.5, W 43 CM	BLUEPRINT	PAPER
06-12-COPY 2	GENERATOR A.C. TYPE AH 12 38 1/2-11/ 312 KVA, 600 VOLTS, 600 RPM, 3 PH, 60 CY / OUTLINE.	1918/05/16	NONE	H 55.5, W 43 CM	BLUEPRINT	PAPER
06-13-A-COPY 1	SWITCHBOARD / FRONT VIEW / BOOTT COTTON MILLS, / LOWELL, MASS.	1910/22/10	NONE	H 45.5, W 61 CM	BLUEPRINT	PAPER

06-13-A-COPY 2	SWITCHBOARD / FRONT VIEW / BOOTT COTTON MILLS, / LOWELL, MASS.	1910/22/10	NONE	H 45.5, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-13-B	SWITCHBOARD / BACK VIEW / BOOTT COTTON MILLS. / LOWELL, MASS.	1910/22/10	NONE	H 45.5, W 61 CM	BLUEPRINT	PAPER
06-17-A	ANCHORING ARRANGEMENT / FOR LOWER END OF / VERTICAL STATOR / SLOT, STICKS & FILLERS.	1933/02/10	NONE	H 27.5, W 21.5 CM	BLUEPRINT	PAPER
06-17-B	WINDING DIAGRAM.	1938/06/23	NONE	H 43, W 27.5 CM	BLUEPRINT	PAPER
06-30-A	BOOTT MILLS / LOWELL, MASS / NEW BRIDGE BETW'N BLDGS.# 2 AND # 3 AT 4TH FLOOR / FRAMING PLAN, CROSS SECTION & DETAILS.	1916/11/23	3/4" & 1/1/2" & 3" = 1'	H 73.5, W 101.5 CM	BLUEPRINT	PAPER
06-30-B	BOOTT MILLS / LOWELL, MASS / NEW BRIDGE BETW'N BLDGS. # 2 AND # 3 AT 4TH FLOOR / FRAMING PLAN, CROSS SECTION & DETAILS.	1917/10/04	3/4" & 1/1/2" & 3" = 1'	H 73, W 101.5 CM	BLUEPRINT	PAPER
06-31-COPY 1	PROPOSITION A / BOOTT MILLS / LOWELL, MASS. / LAYOUT OF 2500 K.W. TURBINE.	1917/01/24	1/2' = 1'	H 72.5, W 102 CM	BLUEPRINT	PAPER
06-31-COPY 2	PROPOSITION A / BOOTT MILLS / LOWELL, MASS. / LAYOUT OF 2500 K.W. TURBINE.	1917/01/24	1/2' = 1'	H 73, W 102.5 CM	BLUEPRINT	PAPER
06-31-COPY 3	PROPOSITION A / BOOTT MILLS / LOWELL, MASS. / LAYOUT OF 2500 K.W. TURBINE.	1917/01/24	1/4' = 1'	H 71.5, W 104 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-32-COPY 1	PROPOSITION A / BOOTT MILLS / LOWELL, MASS / LAYOUT OF 2500 K.W. TURBINE	1916/12/20	1/2" = 1'	H 51.5, W 73.5 CM	BLUEPRINT	PAPER
06-32-COPY 2	PROPOSITION A / BOOTT MILLS / LOWELL, MASS / LAYOUT OF 2500 K.W. TURBINE	1916/12/20	1/2" = 1'	H 52, W 73 CM	BLUEPRINT	PAPER

06-32-COPY 3	PROPOSITION A / BOOTT MILLS / LOWELL, MASS / LAYOUT OF 2500 K.W. TURBINE	1916/12/20	1/2" = 1'	H 52, W 73 CM	BLUEPRINT	PAPER
06-34-A	PLAN AND ELEVATIONS / OF/ AREA BETWEEN MILL # 1, AND MILL # 7/ AT THE / BOOTT MILLS / LOWELL, MASS.	1938/10/22	1/4" = 1'	H 57.5, W 89 CM	BLUEPRINT, WATERCOLOR	PAPER
06-34-B	PLAN AND ELEVATIONS / OF/ AREA BETWEEN MILL # 1, AND MILL # 7/ AT THE / BOOTT MILLS / LOWELL, MASS.	1938/10/22	1/4" = 1'	H 57.5, W 135 CM	BLUEPRINT, WATERCOLORCOLORED PENCIL	PAPER
06-34-C	PLAN AND ELEVATIONS / OF/ AREA BETWEEN MILL # 1, AND MILL # 7/ AT THE / BOOTT MILLS / LOWELL, MASS.	1938/10/22	1/4" = 1'	H 55, W 131 CM	BLUEPRINT, WATERCOLORCOLORED PENCIL	PAPER
06-39-A	PLAN SHOWING / MAIN PIPE LINES / OF THE / FIRE PROTECTION SYSTEM / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1939/12/18	1/2" = 100'	H 58, W 92.5 CM	BLUEPRINT	PAPER
06-39-B	PLAN SHOWING / MAIN PIPE LINES / OF THE / FIRE PROTECTION SYSTEM / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1939/12/18	1/2" = 100'	H 59.5, W 91.5 CM	BLACK LINE PRINT	PAPER
06-46-A	NORMAL AND ACTUAL FLOW / MERRIMACK RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 31, W 42 CM	BLUEPRINT, COLORED PENCIL,	PAPER
06-46-B	NORMAL AND ACTUAL FLOW / OF / MERRIMACK RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 31, W 42 CM	BLUEPRINT	PAPER
06-50-1	SCHEME 1 / BUILDINGS FOR SALE OR RENT. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/01/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

06-50-2	SCHEME 2 / BUILDINGS AND PARKING. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/01/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-50-3	SCHEME 3 / BUILDINGS FOR SALE / OR TO RENT WITH R.R. TRACKS. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/01/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-50-4	SCHEME 4 / BUILDINGS AND PARKING SPACE / WITH LANE TO KEARNEY SQ. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/01/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-50-5	SCHEME 5. [BUILDINGS AND PARKING SPACE / WITH LANE TO KEARNEY SQ. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/01/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-50-6	SCHEME 6./ PROPOSED STREET AND / PARKINGING [SIC] SPACE FOR 600 CARS. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/02/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-50-7	SCHEME 7 / PROPOSED STREET AND / PARKING SPACE FOR 800 CARS. [SCHEMES 1 - 7 OF BLDGS. & PARKING].	1930/02/00	1" = 60'	H 51, W 85.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
06-52-COPY 1	HEIGHT OF RIVER / AT / BOOTT MILLS / LOWELL, MASS FOR 1920, 1921, & 1922.	UNDATED	NONE	H 21.5, W 55 CM	BLUEPRINT	PAPER
06-52-COPY 2	HEIGHT OF RIVER / AT / BOOTT MILLS / LOWELL, MASS FOR 1920, 1921, & 1922.	UNDATED	NONE	H 21.5, W 55 CM	BLUEPRINT	PAPER
07-02-A	MILL NO. 9	UNDATED	"1 = 10'	H 28, W 43.5 CM	PHOTOCOPY, GRAPHITE	PAPER
07-02-B	MILL NO. 9	UNDATED	NONE	H 28, W 43.5 CM	PHOTOCOPY,	PAPER

08-05-COPY 1	MAP / SHOWING WATER MAINS / OF / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	UNDATED	1" = 200'	H 6, W 23 CM	PHOTOCOPY	PAPER
08-06-A	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / A PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELLL, MASSACHUSETTS.	1956/10/00	1" = 200'	H 43, W 56 CM	BLACK LINE PRINT, COLORED PENCIL, GRAPHITE	PAPER
08-06-B	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / A PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELLL, MASSACHUSETTS.	1956/10/00	1" = 200'	H 43, W 56 CM	BLUEPRINT	PAPER
09-01-COPY 1	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO., INC. / AND OTHERS / SHOWING / PIPES FOR FIRE PROTECTION, WATERWAYS, ETC. FOR WATERPOWER.	1954/03/00	1" = 40'	H 69.5, W 104 CM	BLUE LINE PRINT	PAPER
09-01-COPY 2	PLAN OF THE / MINERAL YARD / OWNED BY / GILET CARBONIZING CO., INC. / AND OTHERS / SHOWING / PIPES FOR FIRE PROTECTION, WATERWAYS, ETC. FOR WATERPOWER.	1954/03/00	1" = 40'	H 69.5, W 104 CM	BLUE LINE PRINT	PAPER

09-01-COPY 3	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO., INC. / AND OTHERS / SHOWING / PIPES FOR FIRE PROTECTION, WATERWAYS, ETC. FOR WATERPOWER.	1954/03/00	1" = 40'	H 69.5, W 104 CM	BLUE LINE PRINT	PAPER
09-01-COPY 4	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO., INC. / AND OTHERS / SHOWING / PIPES FOR FIRE PROTECTION, WATERWAYS, ETC. FOR WATERPOWER.	1954/03/00	1" = 40'	H 77.5, W 133 CM	BLUE LINE PRINT	PAPER
09-03-COPY 1	CONTROL FOR RESERVOIR PUMP AT SWAMP LOCKS.	1965/03/00	NONE	H 22, W 35 CM	GRAPHITE	PAPER
09-03-COPY 2	CONTROL FOR RESERVOIR PUMP AT SWAMP LOCKS.	1965/03/00	NONE	H 22, W 36 CM	PHOTOCOPY	PAPER
09-03-COPY 3	CONTROL FOR RESERVOIR PUMP AT SWAMP LOCKS.	1965/03/00	NONE	H 22, W 36 CM	PHOTOCOPY	PAPER
09-08-A	MERRIMACK PLAZA / LOWELL, MASSACHUSETTS. [PLAN SHOWING WATER LINES FOR MERRIMACK PLAZA.]	1974/11/19	1' = 30'	H 76, W 107 CM	PHOTOCOPY, INK	PAPER
09-08-B	MERRIMACK PLAZA / LOWELL, MASSACHUSETTS. [PLAN SHOWING WATER LINES FOR MERRIMACK PLAZA.]	1974/11/19	1' = 30'	H 76, W 107 CM	PHOTOCOPY, INK	PAPER
09-09-A-COPY 1	PLAN OF THE / JACKSON PROPERTIES, INC. / ORIGINALLY APPLETON COMPANY / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	1954/04/00	1" = 40'	H 68, W 108 CM	BLUE LINE PRINT	PAPER

09-09-A-COPY 2	PLAN OF THE / JACKSON PROPERTIES, INC. / ORIGINALLY APPLETON COMPANY / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	1954/04/00	1" = 40'	H 67, W 108 CM	BLUE LINE PRINT	PAPER
09-09-B	PLAN OF THE / JACKSON PROPERTIES, INC. / ORIGINALLY APPLETON COMPANY / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	UNDATED	1" = 40'	H 56, W 87 CM	BLUE LINE PRINT, GRAPHITE, INK	PAPER
09-09-C	PLAN OF THE / JACKSON PROPERTIES, INC. / ORIGINALLY APPLETON COMPANY / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	SEE NOTES	1" = 40'	H 56, W 87 CM	BLUE LINE PRINT, INK, COLORED PENCIL	PAPER
09-13-COPY 1	PLAN AND ELEVATIONS / OF / PIPING TO AUTOMATIC GAUGE TRANSMITTER / AT L. & C. RESERVOIR.	1942/04/00	AS NOTED	H 54, W 69.5 CM	BLUE LINE PRINT	PAPER
09-13-COPY 2	PLAN AND ELEVATIONS / OF / PIPING TO AUTOMATIC GAUGE TRANSMITTER / AT L. & C. RESERVOIR.	1942/04/00	AS NOTED	H 54, W 69.5 CM	BLACK LINE PRINT	PAPER
09-14-COPY 1	LOCKS & CANALS / RESERVOIR.	SEE NOTES	1" = 25'	H 58, W 44.5 CM	BLACK LINE PRINT, INK	PAPER
09-14-COPY 2	LOCKS & CANALS / RESERVOIR.	SEE NOTES	1" = 25'	H 58, W 44.5 CM	BLUE LINE PRINT	PAPER
09-19-01-A	TRANSMITTAL SHEET BYPASS FIRE PROTECTION LOOP.	1987/04/20	NONE	H 28 W 21.5 CM	TYPEWRITTEN	PAPER

09-19-01-B-COPY 1	A SKETCH L & C FIRE PROTECTION LOOP BYPASS ATTACHED TO 09-19-1-A.	1986/12/00	NONE	H 28 W 21.5 CM	BLACK LINE PRINT	PAPER
09-19-01-B-COPY 2	A SKETCH L & C FIRE PROTECTION LOOP BYPASS ATTACHED TO 09-19-1-A.	1986/12/00	NONE	H 28 W 21.5 CM	BLACK LINE PRINT	PAPER
09-19-01-COPY 1	PELLON CORPORATION / LOWELL, MASSACHUSETTS	1969/06/27	1" = 20'	H 71, W 92 CM	BLUE LINE PRINT	PAPER
09-19-01-COPY 2	PELLON CORPORATION / LOWELL, MASSACHUSETTS	1969/06/27	1" = 20'	H 71, W 92 CM	BLUE LINE PRINT	PAPER
09-21-A	RELOCATION OF 20" WATER LINE / WANG TRAINING CENTER / MERRIMACK STREET / LOWELL, MASSACHUSETTS.	1984/02/09	NONE	H 21.5, W 28 CM	TYPEWRITTEN	PAPER
09-21-B-COPY 1	WANG LABORATORIES INCORPORATED / TRAINING CENTER / LOWELL MASSACHUSETTS.	1984/02/03	1" = 20'	H 76, W 106 CM	BLUE LINE PRINT	PAPER
09-21-B-COPY 2	WANG LABORATORIES INCORPORATED / TRAINING CENTER / LOWELL MASSACHUSETTS.	1984/02/03	1" = 20'	H 76, W 106 CM	BLUE LINE PRINT	PAPER
09-21-C-COPY 1	WANG LABORATORIES INCORPORATED / TRAINING CENTER / LOWELL MASSACHUSETTS.	1984/02/03	NONE	H 76, W 106 CM	BLUE LINE PRINT	PAPER
09-21-C-COPY 2	WANG LABORATORIES INCORPORATED / TRAINING CENTER / LOWELL MASSACHUSETTS.	1984/02/03	NONE	H 76, W 106 CM	BLUE LINE PRINT	PAPER
09-22-COPY-1	SECTION 02713 / EXTERIOR WATER SUPPLY SYSTEM.	1984/02/10	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
09-22-COPY-2	SECTION 02713 / EXTERIOR WATER SUPPLY SYSTEM.	1984/02/10	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER

09-25-A-COPY 1	TRANSMITTAL SHEET FOR PLUMBING AS BUILT DRAWINGS, PLUMBING SCHEMATIC, AND PIPE TEST REPORTS FOR MARKET STREET PARKING STRUCTURE / LOWELL, MASSACHUSETTS.	1980/07/09	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-25-A-COPY 2	TRANSMITTAL SHEET FOR PLUMBING AS BUILT DRAWINGS, PLUMBING SCHEMATIC, AND PIPE TEST REPORTS FOR MARKET STREET PARKING STRUCTURE / LOWELL, MASSACHUSETTS.	1980/07/09	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-25-B-COPY 1	PIPING TEST REPORTS / LOWELL PARKING GARAGE.	1978/03/06	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-25-B-COPY 2	PIPING TEST REPORTS / LOWELL PARKING GARAGE.	1978/03/06	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-25-C-COPY 1	MARKET STREET / PARKING GARAGE / LOWELL, MASS	UNDATED	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-25-C-COPY 2	MARKET STREET / PARKING GARAGE / LOWELL, MASS	UNDATED	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-25-D-COPY 1	MARKET STREET PARKING STRUCTURE / LOWELL, MASSACHUSETTS / GROUND LEVEL PLAN.	ILLEGIBLE	NONE	H 28, W 90 CM	PHOTOCOPY	PAPER
09-25-D-COPY 2	MARKET STREET PARKING STRUCTURE / LOWELL, MASSACHUSETTS / GROUND LEVEL PLAN.	ILLEGIBLE	NONE	H 28, W 90 CM	PHOTOCOPY	PAPER
09-25-D-COPY 3	MARKET STREET PARKING STRUCTURE / LOWELL, MASSACHUSETTS / GROUND LEVEL PLAN.	ILLEGIBLE	NONE	H 28, W 90 CM	PHOTOCOPY	PAPER
09-26-A-COPY 1	VTM ENGINEERS ARCHITECTS PLANNERS, CONSULTANTS TO LOCAS AND CANALS RE:16", 112", AND 8" WATER MAIN PROJECT.	1980/03/24	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER

09-26-A-COPY 2	VTM ENGINEERS ARCHITECTS PLANNERS, CONSULTANTS TO LOCAS AND CANALS RE:16", 112", AND 8" WATER MAIN PROJECT.	1980/03/24	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-26-B	YALE SURVEY / CONT # 8.	1980/03/05	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-26-C	YALE SURVEY INC. PROJECT LOWELL.	1980/03/10	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-26-D	YALE SURVEY INC. PROJECT LOWELL.	1980/03/17	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-26-E-COPY 1	YALE SURVEY INC. PROJECT LOWELL - PROFILE.	1980/03/19	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-26-E-COPY 2	YALE SURVEY INC. PROJECT LOWELL - PROFILE.	1980/03/19	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-27-A	LETTER FROM ALBERT J. WELCH CORP. TO PROPRIETORS OF LOCKS AND CANALS ON MERRIMACK RIVER.	1980/09/16	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-27-B	LETTER FROM THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER, LOWELL, MASS. TO ALBERT J. WELCH, CORP.	1980/09/22	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-27-C	A TWO PAGE SPECIFICATION FOR RELOCATION OF A 12" WATER MAIN AT 246 MARKET STREET, LOWELL, MASS.	UNDATED	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
09-27-D	PRELIMINARY DRAWING FOR GRADING / DRAINAGE AND / SEWAGE PLAN, FOR LOWELL MARKET MILLS.	1980/07/21	1" = 20'	H 61, W 91.5 CM	BLUE LINE PRINT, INK	PAPER
09-28-A-1	ANDOVER STREET PAVEMENT STRUCTURE.	UNDATED	NONE	H 70.5, W 97 CM	BLACK LINE PRINT, INK	PAPER

09-28-A-2	LETTER FROM GREINER ENGINEERING TO MR. LAZBERG, LOCKS AND CANLS ECLOSING THE PROPOSED DESIGN OF ANDOVER STREET, LOWELL, MASSACUSETTS	1980/04/08	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-28-A-3	LETTER FROM GREINER ENGINEERING DEFINING THE SCOPE OF WORK: BORINGS AND CORINGS FOR THE JOB ON ANDOVER STREET, LOWELL, MASS.	SEE NOTES	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-28-A-4	LETTER FROM PROPRIETORS OF THE LOCKS AND CANASL ON MERRIMACK RIVER CONFIRMING THAT THEY HAVE NO PLANS TO ALTER THE LOCATION OF THE 12" WATER MAIN.	1980/04/14	NONE	H 28, W 21.5 CM	PHOTOCOPY	PAPER
09-28-B-1	"LOWELL" / "ANDOVER STREET" / DRAINAGE DETAILS.	1980/00/00	NONE	H 61, W 91.5 CM	BLACK LINE PRINT, GRAPHITE	PAPER
09-28-B-2	LETTER FROM GREINER ENGINEERING TO MR. LEZBERG, PRESIDENT PROPRIETORS OF THE LOCKS AND CANALS.	1980/06/02	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
09-28-C	DRAINAGE DESIGN / ANDOVER ST. - LOWELL / PROFILE AND UTILITY ELEVATION..	UNDATED	1" = 20'	H 63, W 198 CM	BLACK LINE PRINT, INK	PAPER
10-001	PLAN OF LAND BELONGING TO / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER ON / CANAL STREET AND PORTION OF AMORY STREET.	1957/12/10	1" = 50'	H 39, W 54.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-002	[LOCATION MAP.]	UNDATED				

10-003	U.S. DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY. / DRAINAGE BASINS.	1906/03/00	1" = 300 MI	H 50, W 77 CM	COLOR PRINT	PAPER, LINEN
10-004	[MAP OF MERRIMACK RIVER DRAINAGE AREA SHOWING RAINFALL AND STREAM GAGING STATIONS.]	UNDATED				
10-005	[MAP OF NEW HAMPSHIRE SHOWING RAINFALL, STREAM GAGING AND FIRE OBSERVATION STATIONS.]	UNDATED				
10-006	[PLAN OF PROFILE.]	UNDATED				
10-007	PLAN OF LAND OF THE PROPRIETORS / CONTAINING APPROXIMATELY 2,850 SQ. FEET / BORDERING ON THE NORTHERN CANAL / AND LAND OF THE FORMER AYER HOME / PAWTUCKET STREET, LOWELL, MASS.	1967/07/23	NONE	H 33, W 21.5 CM	BLACK LINE PRINT, GRAPHITE	TRACING PAPER
10-008	PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. / COURIER CITIZEN CO / STORAGE SHED.	1966/01/13	1" = 40'	H 21.5, W 28 CM	GRAPHITE	PAPER
10-009	LOCKS AND CANALS /' PARCEL A & B / - RIGGS & LOMBARD.	1966/04/15	NONE	H 21.5, W 32.5 CM	BALCK LINE PRINT, GRAPHITE	PAPER
10-010-A	ENVELOPE CONTAINING NUMBERED LIST OF PARTS FOR DUPLEX PLUNGER PUMPS L.I.D. CO.	1943/02/09	NONE	H 31, W 25 CM		PAPER
10-010-B	[ENVELOPE CONTAINING NUMBERED LIST OF PARTS FOR DUPLEX PLUNGER PUMPS L.I.D. CO.] WARREN STEAM PUMP CO. NUMBERS LIST OF PARTS FOR / DUPLEX PLUNGER PUMPS.	UNDATED	NONE	H 35, W 51 CM	BLUEPERINT	PAPER

10-010-C	[ENVELOPE CONTAINING NUMBERED LIST OF PARTS FOR DUPLEX PLUNGER PUMPS L.I.D. CO.] L.I.D.CO. FEEDER PANELS MAIN POWER.	SEE NOTES	2" = 1'	H 47.5, W 82.5 CM	BLUEPERINT, COLORED PENCIL	PAPER
10-011	[ENVELOPE CONTAINING MASSACHUSETTS MILLS PLANS.]	UNDATED				
10-012	LIST OF LOCKS AND CANALS FLOOR AREAS OF MILLS FOR FIRE PROTECTION SERVICE COMPANY.	UNDATED	NONE	H 33, W 21 CM	TYPEWRITTEN	PAPER
10-013-A-1	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1942/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-A-2	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION - JAN. 1942.	1942/01/00	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-B	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1946/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-C	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1948/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-D	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1949/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-E	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1950/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER

10-013-F	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1951/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-G	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1952/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-H	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1953/01/01	NONE	H 43, W 52 CM	BLUEPRINT	PAPER
10-013-I	SCHEDULE OF REAL ESTATE, TAXED TO PROPS. LOCKS & CANALS IN LOWELL, MASS. AND ITS ASSESSED VALUATION.	1957/01/01	NONE	H 43, W 60 CM	BLUEPRINT COLORED PENCIL	PAPER
10-014	OFFER TO SELL REAL ESTATE TO THE / COMMONWELATH OF MASSACHUSETTS.	1957/08/08	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
10-015-A	FOLDER FOR 19 PHOTOSTATS OF / REAL ESTATE PLANS / CORRECT TO DEC. 1, 1926.	1926/12/01	NONE	H 49. W 59.5 CM	INK	PAPER
10-015-A-01	PHOTOSTAT NUMBER 1 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-01-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 1 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-02	PHOTOSTAT NUMBER 2 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-02-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 2 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER

10-015-A-03	PHOTOSTAT NUMBER 3 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-03-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 3 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-04	PHOTOSTAT NUMBER 4 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-04-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 4 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-05	PHOTOSTAT NUMBER 5 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-05-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 5 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 19268.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-06	PHOTOSTAT NUMBER 6 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-06-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 6 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-07	PHOTOSTAT NUMBER 7 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-07-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 7 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER

10-015-A-08	PHOTOSTAT NUMBER 8 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-08-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 8 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-09	PHOTOSTAT NUMBER 9 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-10	PHOTOSTAT NUMBER 10 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-11	PHOTOSTAT NUMBER 11 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-11-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 11 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-12	PHOTOSTAT NUMBER 12 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-12-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 12 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-13	PHOTOSTAT NUMBER 13 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-13-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 13 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER

10-015-A-14	PHOTOSTAT NUMBER 14 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-14-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 14 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-15	PHOTOSTAT NUMBER 15 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-15-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 15 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-16	PHOTOSTAT NUMBER 16 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-16-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 16 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-17	PHOTOSTAT NUMBER 17 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-17-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 17 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-A-18	PHOTOSTAT NUMBER 18 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 100'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-18-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 18 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 40'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER

10-015-A-19	PHOTOSTAT NUMBER 19 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-A-19-COPY 1	BLACK AND WHITE PHOTOSTAT NUMBER 19 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1926.	1926/12/01	1" = 50'	H 32.5. W 54.5. CM	PHOTOCOPY	PAPER
10-015-B	FOLDER FOR 19 PHOTOSTATS OF / REAL ESTATE PLANS / CORRECT TO DEC. 1, 1928.	1928/12/01	NONE	H 49. W 59.5 CM	INK	PAPER
10-015-B-01	PHOTOSTAT NUMBER 1 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59. CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-02	PHOTOSTAT NUMBER 2 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-03	PHOTOSTAT NUMBER 3 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-04	PHOTOSTAT NUMBER 4 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-05	PHOTOSTAT NUMBER 5 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-06	PHOTOSTAT NUMBER 6 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-07	PHOTOSTAT NUMBER 7 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-08	PHOTOSTAT NUMBER 8 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER

10-015-B-09	PHOTOSTAT NUMBER 9 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-10	PHOTOSTAT NUMBER 10 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-11	PHOTOSTAT NUMBER 11 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-12	PHOTOSTAT NUMBER 12 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-13	PHOTOSTAT NUMBER 13 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-14	PHOTOSTAT NUMBER 14 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-15	PHOTOSTAT NUMBER 15 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 100'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-16	PHOTOSTAT NUMBER 16 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 100'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-17	PHOTOSTAT NUMBER 17 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 100'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-18	PHOTOSTAT NUMBER 18 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 100'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER
10-015-B-19	PHOTOSTAT NUMBER 19 IN THE SERIES OF REAL ESTATE PLANS CORRECT TO DEC. 1, 1928.	1928/12/01	1" = 120'	H 46. W 59 CM	PHOTOCOPY, WATERCOLOR	PAPER

10-016	PLAN SHOWING / PERMANENT RIGHTS OF WAY / IN / "BIGELOW YARD" / 200 MARKET ST. / LOWELL, MASS.	1959/00/00	1" = 60'	H 40.5, W 50.5 CM	BLUEPRINT	PAPER
10-017-A	LETTER FROM LOWELL BOYS CLUB ASSOCIATION TO LOCKS AND CANALS FOR PERMISSION TO DRAIN SWIMMING POOL WATER DIRECTLY INTO A CANAL IN CASE OF AN EMERGENCY NEED TO DRAIN THE POOL AT THE CLUB.	1972/06/30	NONE	H 27.5, W 21.5 CM	TYPEWRITTEN	PAPER
10-017-B	SITE DEVELOPMENT PLAN - BORING DETAILS LOWELL BOYS' CLUB.	1972/06/29	1" = 20'	H 76, W 104.5 CM	BLUE LINE PRINT	PAPER
10-018	[PLAN SHOWING MILL # 6 PROPERTY LINES AT THE BOOTT MILLS.]	UNDATED				
10-019	PLAN OF / SWAMP LOCKS DAM / SHOWING / CONTOURS IN FRONT OF DAM.	1927/10/00	1" = 10'	H 28, W 43 CM	BLUE LINE PRINT, GRAPHITE	PAPER
10-020	PATCH - SWAMPLOCKS GATE.	1972/05/25	1" = 1'	H 28, W 42.5 CM	BLUE LINE PRINT	PAPER
10-021	PLAN OF LAND IN LOWELL, MASS OWNED BY WANSKUCK CO.	1966/04/00	1" = 50'	H 27, W 44.5 CM	PHOTOCOPY	PAPER
10-022	TYPICAL SECTION OF / SWAMP LOCKS DAM / SHOWING / CONCRETE APRON.	1945/05/00	1/2' = 1'	H 27, W 37.5 CM	BLUE LINE PRINT, GRAPHITE	PAPER
10-023	FRAME - SWAMP LOCKS DAM / WELDED CONSTR. / BOOTT MILLS / LOWELL, MASS.	1971/05/06	1" = 1'	H 43, W 23 CM	BLUE LINE PRINT	PAPER
10-024	SKETCH / OF / LAWRENCE DAM / AS PROPOSED.	1913/07/00	1/4" = 1'	H 33.5, W 74 CM	BLUE LINE PRINT	PAPER

10-025	PLAN OF LAND NEAR PAWTUCKET CANAL / ON THE NORTHERLY SIDE OF BROADWAY / AVAILABLE FOR SALE AND / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1957/05/02	1" = 40'	H 32.5, W 63 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-026	PLAN SHOWING / LAND BELONGING TO / PROPS. OF LOCKS & CANALS / SOUTHERLY OF / BROADWAY.	1906/01/00	1" = 40'	H 38.5, W 50 CM	BLUE LINE PRINT	PAPER
10-027	PLAN OF LAND / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / KNOWN AS LOT 13 - A / LOWELL, MASS.	1959/01/26	1" = 40'	H 40.5, W 53 CM	BLACK LINE PRINT	PAPER
10-028	TREMONT WASTEWAY / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1921/02/15	SEE NOTES	H 54.5, W 63.5 CM	BLUE LINE PRINT	PAPER
10-029-A	LOWELL GAS COMPANY COVER LETTER TO PRESIDENT OF LOCKS AND CANALS FOR A REQUEST FOR A SPECIFIC PLAN.	1973/09/24	NONE	H 28.5, W 21.5 CM	TYPEWRITTEN	PAPER
10-029-B	LOWELL GAS CO. / LOCATION & ELEVATION / PROPOSED PIPE BRIDGE & EASEMENT.	1973/09/24	1" = 20' - H, 1" = 40' -V	H 56, W 86 CM	BLUE LINE PRINT	PAPER
10-029-C	PLAN & PROFILE / PROPOSED GAS LINE FROM / PEVEY ST. TO GAS CO.	1972/05/00	1" = 20' - H, 1" = 40' -V	H 55.5, W 86 CM	BLUE LINE PRINT	PAPER
10-029-D	NOTE TO DON GOODICK AT THE LOWELL GAS CO. ABOUT A CHANGE TO THE PLAN 10-29-C.	1973/09/17	NONE	H 20, W 12.5 CM	GRAPHITE	PAPER
10-029-E	LOWELL GAS CL. / PAWTUCKET CANAL PIPE BRIDGE.	1977/07/30	SEE NOTES	H 86.5, W 112 CM	BLUE LINE PRINT	PAPER

10-029-F	LOWELL GAS CO. / PAWTUCKET CANAL PIPE BRIDGE.	1973/07/30	SEE NOTES	H 86.5, W 112 CM	BLUE LINE PRINT	PAPER
10-030	[PLAN OF THE MAIN YARD - BOOTT MILLS.]	UNDATED				
10-031	[PLAN OF PAWTUCKET BRIDGE OVER PAWTUCKET CANAL, SHOWING REPAIRS MADE IN 1927.]	UNDATED				
10-032	PELLON CORPORATION / 221 JACKSON ST. LOWELL, MASS. / PROPOSED SITE PLAN.	1966/12/09	1" = 40'	H 61, W 91 CM	BLACK LINE PRINT	PAPER
10-033	PLAN OF / FALLS STREET & ADJOINING PROPERTY / SHOWING / LAND OF PRORIETORS [SIC] OF THE LOCKS AND CANALS / USED BY THE MARIST BROTHERS / LOWELL, MASS.	1952/04/28	1" = 50'	H 46, W 61 CM	BLUE LINE PRINT/ GRAPHITE	PAPER
10-034	DRAWING TRACED / FROM BLUEPRINT MADE BY / N.E. STRUCTURAL CO. / EVERETT, MASS. DATE 3-7-22 / SHOWING / CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/03/23	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-035	PLAN OF LAND IN / LOWELL MASS. / BELONGING TO / VAN GREENBY REALTY TRUST.	1965/04/29	NONE	H 42, W 58.5 CM	BLUE LINE PRINT	PAPER
10-036	PLAN OF LOCKS & CANALS LAND / LOTS NO. 7 & 14 / BETWEEN / BROADWAY AND N. &. l.R.R.	1921/04/00	1" = 40'	H 48, W 73.5 CM	BLUE LINE PRINT	PAPER
10-037	IRON RACK ON EASTERN CANAL / FOR / 12 FOOT TUBE THROUGH YARD / MASS. COTTON MILLS - LOWELL, MASS.	1909/12/13	1/2" = 1'	H 61, W 91.5 CM	BLUE LINE PRINT	PAPER
10-038	PLAN SHOWING / PRESENT FENCES / IN AND AROUND THE / "SACO YARDS" / LOWELL, MASS.	1951/01/08	1" = 50'	H 61, W 85 CM	BLUE LINE PRINT	PAPER

10-039	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL MASSACHUSETTS.	1956/10/00	1/4" = 50'	H 93, W 113 CM	BLUE LINE PRINT, WATERCOLOR	PAPER
10-040	FOLDER COVER CONTAINING 17 BLUEPRINTS OF SEVERAL LOCKS AND CANALS NUMBERED LOTS.	UNDATED	NONE	H 61, W 76 CM		PAPER
10-040-01	BLUEPRINT NUMBER 1, TITLED PLAN OF LOCKS & CANAL LAND / LOT NO. TWO / ON THORNDIKE & JACKSON STS. / AND PART OF APPLETON COMPANY.	1920/09/00	1" = 50'	H 40, W 73 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-02	BLUEPRINT NUMBER 2, TITLED PLAN OF LOCKS & CANALS LAND / IN VICINITY OF / THORNDIKE ST. BRIDGE.	1921/04/00	1" = 50'	H 23, W 49 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-03	BLUEPRINT NUMBER 3, TITLED PLAN OF LOCKS & CANALS LAND / LOTS NO. 3 & 3-A / ON SOUTHERLY SIDE OF / PAWTUCKET CANAL.	1921/04/00	1" = 40'	H 39.5, W 62 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-04	BLUEPRINT NUMBER 4, TITLED PLAN OF LOCKS & CANALS LAND / ALONG PAWTUCKET CANAL / BELOW SCHOOL STREET.	1921/04/00	1" = 40'	H 41, W 69.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-05	BLUEPRINT NUMBER 5, TITLED PLAN OF LOCKS & CANALS LAND / LOTS NO. 5 & 6. / ON SOUTHERLY SIDE / OF PAWTUCKET CANAL / BETWEEN / RED BRIDGE AND SCHOOL ST.	1921/04/00	1" = 40'	H 45, W 87 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-040-06	BLUEPRINT NUMBER 6, TITLED PLAN OF LOCKS & CANALS LAND / LOTS NO. 7 & 14 / BETWEEN / BROADWAY AND N. & L. R.R.	1921/04/00	1" = 40'	H 48.5, W 73.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-07	BLUEPRINT NUMBER 7, TITLED LAND IN 175 FOOT STRIP / ON / CHEEVER, WARD, HALL AND PERKINS STREETS / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1925/12/00	1" = 40'	H 49, W 49.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-08	BLUEPRINT NUMBER 8, TITLED PLAN OF L & C LAND / ON PAWTUCKET CANAL / FROM / MERRIMACK RIVER TO BROADWAY.	1920/07/00	1" = 150''	H 37, W 44.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-09	BLUEPRINT NUMBER 9, TITLED PLAN OF / SUNDRY OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / SHOWING DATA PERTAINING TO LEASES.	1920/08/00	1" = 40'	H 28, W 73.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-10	BLUEPRINT NUMBER 10, TITLED SKETCH SHOWING SOME OF LOCKS / AND CANALS LAND THAT MIGHT / BE SOLD.	1921/02/17	1" = 50'	H 23, W 30 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-11	BLUEPRINT NUMBER 11, TITLED PLAN OF LOCKS & CANALS LAND / LOTS NO. 84 & 85 / ON / SOUTHERLY SIDE OF RIVER / ALONG / STACKPOLE AND E. MER'K STS.	1921/04/00	1" = 100'	H 38, W 115.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-12	BLUEPRINT NUMBER 12, TITLED PLAN OF LOCKS & CANALS LAND / LOTS NO. 87 & 88 / BETWEEN / LAKEVIEW AVE, AND RIVER.	1921/04/00	1" = 50'	H 38, W 115.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-040-13	BLUEPRINT NUMBER 13, TITLED PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS ON MERR'K RIVER / LOWELL, MASS. / SHOWING PRESENT AND FUTURE POSSIBILITIES FOR / LAYING OUT BUILDING LOTS.	1920/09/00	1" = 50'	H 43, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-14	BLUEPRINT NUMBER 14, TITLED PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS ON MERR'K RIVER / LOWELL, MASS. / SHOWING PRESENT AND FUTURE POSSIBILITIES FOR / LAYING OUT BUILDING LOTS.	1920/08/00	1" = 50'	H 69, W 109.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-15	BLUEPRINT NUMBER 15, TITLED PLAN OF LOCKS & CANALS LAND / LOTS NO. 95, 96, & 96-A / ON / NORTHERLY SIDE OF RIVER / BELOW BRIDGE ST.	1921/04/00	1" = 100'	H 55, W 115.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-16	BLUEPRINT NUMBER 16, TITLED PLAN OF LOCKS & CANALS LAND / LOT NO. 103-I AND J / BETWEEN / RIVERSIDE ST., AND COLONIAL AVE. / AND COLONIAL AVE. AND RIVER.	1921/04/00	1" = 100'	H 40, W 57.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-040-17	BLUEPRINT NUMBER 17, TITLED PLAN OF LOCKS & CANALS LAND / LOT NO. 105 / BETWEEN / COLONIAL AVE., BEAVER BROOK / AND RIVER.	1921/04/00	1" = 50'	H 30, W 61.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-041-A	PLAN OF LAND ON SOUTHERLY SIDE OF MERRIMACK RIVER / AND KNOWN AS LOTS 84 AND 85. / AVAILABLE FOR SALE BY THE / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/04	1" = 100'	H 33, W 94 CM	BLUEPRINT	PAPER
10-041-B	PLAN OF LAND ON SOUTHERLY SIDE OF MERRIMACK RIVER / AND KNOWN AS LOTS 84 AND 85. / AVAILABLE FOR SALE BY THE / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/04	1" = 100'	H 33, W 94 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-042	PLAN OF LAND / IN / LOWELL, MASS. / OWNED BY / PELLON CORPORATION.	1970/08/00	1" = 40'	H 60.5, W 91 CM	BLUE LINE PRINT	PAPER
10-043-A	PELLON CORPORATION / LOWELL, MASS. / PROPOSED BUILDING # 7.	1971/12/09	1" = 20'	H 56, W 86.5 CM	BLUE LINE PRINT	PAPER
10-043-B	ARCHITECT'S SKETCH OF PELLON CORPORATION / LOWELL, MASS. / PROPOSED BUILDING # 7.	1971/12/09	NONE	H 56, W 86.5 CM	BLUE LINE PRINT	PAPER
10-044	[UNTITLED.] [SKETCHES OF LAND OF THE LOCKS & CANALS.]	UNDATED	NONE	H 57, W 76.5 CM	BLUE LINE PRINT	PAPER
10-045-A	PROPRIETORS OF THE LOCKS AND CANALS ON / MERRIMACK RIVER.	1958/00/00	NONE	H 33, W 21.5 CM	BLUEPRINT, COLORED PENCIL	TYPEWRITTEN
10-045-B-COPY 1	PLAN SHOWING / FENCES IN AND AROUND / DUTTON STREET PARKING AREA.	1958/03/25	1" = 50'	H 40, W 54 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-045-B-COPY 2	PLAN SHOWING / FENCES IN AND AROUND / DUTTON STREET PARKING AREA.	1958/03/25	1" = 50'	H 40, W 54 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-046-A	PROPOSED MUNICIPAL EASEMENTS / ON / PLAN SHOWING / LAND BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / IN VICINITY OF LOWER LOCKS DAM.	1957/10/25	1" = 30'	H 41, W 53.5 CM	BLUE LINE PRINT	PAPER
10-046-B	PROPRIETORS OF THE LOCKS AND CANALS TO THE CITY OF LOWELL.	1972/11/09	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
10-046-C	TEMPORARY EASEMENT / LOCKS & CANALS TO THE CITY OF LOWELL.	1972/11/02	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
10-046-D-1	EASEMENT PLAN OF SOUTH BANK INTERCTRPTOR SEWER / FOR THE CITY OF LOWELL IN / LOWELL, MASS.	1972/11/02	1" = 50'	H 41, W 54 CM	BLUE LINE PRINT	PAPER
10-046-D-2	EASEMENT PLAN ALONG SOUTHERLY / SIDE OF LOWER PAWTUCKET CANAL / LOWELL, MASS.	1972/11/09	AS NOTED	H 41, W 54 CM	BLUE LINE PRINT	PAPER
10-046-D-3	EASEMENT PLAN ALONG SOUTHERLY / SIDE OF LOWER PAWTUCKET CANAL / LOWELL, MASS.	1972/11/09	AS NOTED	H 41, W 54 CM	BLUE LINE PRINT	PAPER
10-046-D-4	EASEMENT PLAN ALONG SOUTHERLY / SIDE OF LOWER PAWTUCKET CANAL / LOWELL, MASS.	1972/11/09	AS NOTED	H 41, W 54 CM	BLUE LINE PRINT	PAPER
10-047	PLAN OF LAND IN LOWELL, MASS / SURVEYED FOR / SACO-LOWELL SHOPS.	1942/09/24	NONE	H 45.5, W 60.5 CM	BLUEPRINT	PAPER
10-048	LOWELL, MASS / LOT 78.	1957/06/12	1" = 20'	H 25.5, W 33 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-049-A	PLAN SHOWING / REDIVISION OF LOCKS AND CANALS LOTS 2-B, 2-C, AND 2-D / AND LOWELL LAND COMPANY'S LOT 2-B-1.	1940/10/17	1" = 30'	H 31, W 49 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-049-B	A LETTER DEFINING THE BOUNDARIES OF P.L. & C. LOT # 84 - PARCEL NO. 2.	1958/11/14	NONE	H 25, W 21.5 CM	TYPEWRITTEN	PAPER
10-050-A	PLAN SHOWING / LAND ON BRIDGE AND CANAL STREETS / AND ADJACENT TO THE EASTERN CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1958/11/14	1" = 40'	H 40.5, W 53.5 CM	BLUEPRINT	PAPER
10-050-B	LAND ON BRIDGE AND CANAL STREETS / AND ADJACENT TO THE EASTERN CANAL.	1958/11/14	NONE	H 28.5, W 21.5 CM	TYPEWRITTEN	PAPER
10-051	PLAN SHOWING / LAND TO BE CONVEYED TO RIGGS & LOMBARD / BY P. OF L. & C.	1960/12/00	1" = 10'	H 30.5, W 46 CM	BLACK LINE PRINT	PAPER
10-052	PLAN SHOWING AREA "B" TO BE CONVEYED AND AREA "C" OVER / WHICH EASEMENT IS TO BE GRANTED BY P. L. & C / TO / STEAM ASSOCIATES / LOWELL, MASS.	1960/12/00	1" = 1'	H 30.5, W 45.5 CM	BLACK LINE PRINT	PAPER
10-053-A	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / KNOWN AS LOT 85 / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/05/19	1" = 100'	H 23.5, W 35.5 CM	BLUEPRINT	PAPER
10-053-B	QUITCLAIM DEED FOR LOT #85.	1958/07/08	NONE	H 28, W 21.5 CM	PHOTOCOPY, PEN, GRAPHITE	PAPER

10-054	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / KNOWN AS LOT # 84 / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/07/03	1" = 100'	H 40.5, W 53 CM	BLUEPRINT	PAPER
10-055-COPY 1	PLAN SHOWING / LAND CONVEYED TO APPLETON COMPANY / BY ORIGINAL INDENTURE / ALSO / PRESENT PROPERTY.	1942/07/25	1" = 50'	H 61.5, W 58.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-055-COPY 2	PLAN SHOWING / LAND CONVEYED TO APPLETON COMPANY / BY ORIGINAL INDENTURE / ALSO / PRESENT PROPERTY.	1942/07/25	1" = 50'	H 62, W 42 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-056	PLAN SHOWING / PORTION OF LAND AND BUILDINGS BELONGING TO / BOOTT MILLS AT 95 BRIDGE STREET / IN LOWELL, MASS.	1958/11/19	1" = 30'	H 40.5, W 53.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-057	PLAN SHOWING / LOT 65-B / BELONGING TO / PROPRIETORS OF LOCKS AND CANALS ON MERRIMACK RIVER / LOWELLL, MASS.	1958/06/25	1" = 50'	H 23, W 38.5 CM	BLUEPRINT, WATER COLOR	PAPER
10-058	PLAN SHOWING / LOTS 80-A, 80-D, 80-F / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/06/25	1" = 50'	H 25, W 35 CM	BLUEPRINT, WATER COLOR	PAPER
10-059	PLAN OF LAND KNOWN AS LOT 80 / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/11/22	1" = 20'	H 24, W 35.5 CM	BLUEPRINT	PAPER

10-060	PORTION OF LOT 84 / KNOWN AS RAMP AREA / BELONGING TO / LOWELL LAND COMPANY / LOWELL, MASS.	1942/10/06	1" = 100'	H 21, W 44 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-061-COPY 1	PLAN SHOWING / EASEMENT FOR PATH TO / U.S.G.S. GAUGING HOUSE / ON LOT 84 BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1959/03/01	1" = 40'	H 24, W 35.5 CM	BLUEPRINT	PAPER
10-061-COPY 2	PLAN SHOWING / EASEMENT FOR PATH TO / U.S.G.S. GAUGING HOUSE / ON LOT 84 BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1959/03/01	1" = 40'	H 24, W 35.5 CM	BLUEPRINT	PAPER
10-062	SUGGESTED BUMPER, CAP AND FENCE / AND AND ON / CANAL STREET WALL.	UNDATED	SEE NOTES	H 21.5, W 35 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-063	PLAN OF LAND / SITUATED BETWEEN MERRIMACK RIVER, / PAWTUCKET CANAL AND PAWTUCKET STREET / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/11/22	1" = 30'	H 24, W 35.5 CM	BLUEPRINT	PAPER
10-064	PLAN OF LAND / SHOWING LOT 80-F BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1959/07/06	1" = 30'	H 35, W 24 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-065	COMPILED / PLAN OF LAND / IN / LOWELL, MASS / FOR / LOCKS & CANALS.	1968/12/24	1" = 100'	H 40.5, W 53 CM	BLUE LINE PRINT	PAPER

10-066	[PLAN OF LAND IN VICINITY OF THORNDIKE, FLETCHER, DUTTON, JACKSON STREETS AND WESTERN AVENUE, BELONGING TO PROPS. OF LOCKS AND CANALS.]	UNDATED				
10-067	[PLAN OF LAND NEAR PAWTUCKET CANAL AND ON THE SOUTHERLY SIDE OF MERRIMACK RIVER, BELONGING TO PROPS. OF LOCKS & CANALS.]	UNDATED				
10-068	PLAN OF LAND ALONG NORTHERN CANAL / BETWEEN PAWTUCKET AND CABOT STREETS / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.]	1957/04/30	1" = 50'	H 33, W 84.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-069	PLAN OF LAND SHOWING / P.L.& C. LOTS BORDERING WESTERN CANAL / FROM DUTTON TO BROADWAY STREETS / LOWELL, MASS.	1947/09/29	1" = 50'	H 32.5, W 56 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-070-COPY 1	PLAN OF LAND / EASTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/13	1" = 40'	H 32.5, W 75.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-070-COPY 2	PLAN OF LAND / EASTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/13	1" = 40'	H 32, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-070-COPY 3	PLAN OF LAND / EASTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/13	1" = 40'	H 32, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-071	PRELIMINARY / PLAN OF LAND IN LOWELL / SHOWING SUBDIVISION OF LAND / OWNED BY WANSKUCK COMPANY.	1967/05/18	1" = 50'	H 76, W 77 CM	BLUE LINE PRINT, INK	PAPER
10-072	COMPILED PLAN / OF / "BIGELOW YARD" / SHOWING / PROPERTY LINES, BUILDINGS & OWNERS / LOWELL, MASS.	SEE NOTES	1" = 60'	H 35, W 62 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-073-01	[PLAN SHOWING REAL ESTATE SURVEYS TO DATE BELONGING TO BOOTT MILLS.] SITE PLAN OF LAND / IN / LOWELL, MASS. / PREPARED FOR / PROPRIETORS OF THE LOCKS AND / CANALS ON THE MERRIMACK RIVER.	1982/08/18	1" = 50'	H 45.5, W 61 CM	BLUE LINE PRINT	PAPER
10-073-02	[PLAN SHOWING REAL ESTATE SURVEYS TO DATE BELONGING TO BOOTT MILLS.] SITE PLAN OF LAND / IN / LOWELL, MASS. / PREPARED FOR / PROPRIETORS OF THE LOCKS AND / CANALS ON THE MERRIMACK RIVER.	1982/08/18	1" = 50'	H 45.5, W 61 CM	BLUE LINE PRINT	PAPER
10-073-03	[PLAN SHOWING REAL ESTATE SURVEYS TO DATE BELONGING TO BOOTT MILLS.] SITE PLAN OF LAND / IN / LOWELL, MASS. / PREPARED FOR / PROPRIETORS OF THE LOCKS AND / CANALS ON THE MERRIMACK RIVER.	1982/08/18	1" = 40'	H 45.5, W 61 CM	BLUE LINE PRINT	PAPER

10-073-04	[PLAN SHOWING REAL ESTATE SURVEYS TO DATE BELONGING TO BOOTT MILLS.] SITE PLAN OF LAND / IN / LOWELL, MASS. / PREPARED FOR / PROPRIETORS OF THE LOCKS AND / CANALS ON THE MERRIMACK RIVER.	1982/08/18	1" = 40'	H 45.5, W 61 CM	BLUE LINE PRINT	PAPER
10-073-05	[PLAN SHOWING REAL ESTATE SURVEYS TO DATE BELONGING TO BOOTT MILLS.] SITE PLAN OF LAND / IN / LOWELL, MASS. / PREPARED FOR / PROPRIETORS OF THE LOCKS AND / CANALS ON THE MERRIMACK RIVER.	1982/08/18	1" = 20'	H 45.5, W 61 CM	BLUE LINE PRINT	PAPER
10-074	PLAN SHOWING / PROP. OF THE LOCKS AND CANALS PROPERTY / AT END OF AND OVER EASTERN CANAL / ALSO / PROPERTY NEAR AND OVER MERRIMACK WASTEWAY.	1955/01/24	1" = 50'	H 39.5, W 58 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-075	CITY OF LOWELL MASSACHUSETTS / NORTHERN CANAL RENEWAL AREA / PROJECT UR MASS. 16 / LIMITS OF STREET CONSTRUCTION.	1967/04/03	1" = 100'	H 77.5, W 106 CM	BLACK LINE PRINT, COLORED INK.	
10-076-A	SECTION OF SCHOOL STREET / AT MIDDLE OF NORTHERN CANAL.	1917/03/30	1" = 8'	H 43, W 56 CM	BLUE LINE PRINT	PAPER
10-076-B	SECTION OF SCHOOL STREET / AT MIDDLE OF NORTHERN CANAL.	1917/03/30	1" = 8'	H 43, W 56 CM	BLUE LINE PRINT, COLORED INK	PAPER
10-077	PELLON BUILDING # 8 / COND. RETURN..	UNDATED	NONE	H 44.5, W 76.5 CM	GRAPHITE	PAPER
10-078	PELLON CORPORATION / LOWELL, MASS. / SEWERAGE FACILITIES	1979/04/10	NONE	H 60.5, W 91 CM	INK	PAPER

10-078-01	PELLON CORPORATION / LOWELL, MASS. / SEWERAGE FACILITIES-SITE PLAN I.	1979/04/10	1" = 10'	H 60.5, W 91 CM	INK	PAPER
10-078-02	PELLON CORPORATION / LOWELL, MASS. / SEWERAGE FACILITIES-SITE PLAN II.	1979/04/10	1" = 10'	H 60.5, W 91 CM	INK	PAPER
10-078-03	PELLON CORPORATION / LOWELL, MASS. / SEWERAGE FACILITIES-SITE PLAN III.	1979/04/10	1" = 10'	H 60.5, W 91 CM	INK	PAPER
10-078-04	PELLON CORPORATION / LOWELL, MASS. / SEWERAGE FACILITIES- PROFILE SHEET	1979/04/10	AS NOTED	H 60.5, W 91 CM	INK	PAPER
10-078-05	PELLON CORPORATION / LOWELL, MASS. / SEWERAGE FACILITIES- DETAIL SHEET	1979/04/10	AS NOTED	H 60.5, W 91 CM	INK	PAPER
10-078-06	ALDRICH COMPANY, INC. / GREG TAYLOR / STRUCTURAL ENGINEER.	UNDATED	NONE	H 9, W 5.5 CM	INK	PAPER
10-079-01	PELLON CORP. / ADDITION TO BUILDING NO. 8 - 1984.	1984/02/03	NONE	H 76, W 105.5 CM	GRAPHITE, COLORED PENCIL	PAPER
10-079-02	PELLON CORP. / ADDITION TO BUILDING NO. 8 - 1980 / SITE PLAN..	1984/02/03	1' = 30'	H 76, W 105.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-079-03	PELLON CORP. / ADDITION TO BUILDING NO. 8 - 1984 / ROOF FRAMING PLAN - ADDITION # 5.	1984/02/03	1/8" = 1'	H 76, W 105.5 CM	BLACK LINE PRINT, GRAPHITE,	PAPER
10-079-04	PELLON CORP. / ADDITION TO BUILDING NO. 8 - 1984 / ROOF FRAMING PLAN - ADDITION # 6.	1984/02/03	1/8" = 1'	H 76, W 105.5 CM	BLACK LINE PRINT, GRAPHITE,	PAPER
10-079-05	PELLON CORP. / ADDITION TO BUILDING NO. 8 - 1984 / FOUNDATION PLANS , BASE FL. AND PIER DETAILS.	1984/02/03	1/8" = 1'	H 76, W 105.5 CM	BLACK LINE PRINT, GRAPHITE,	PAPER

10-079-06	[PELLON CORP. / ADDITION TO BUILDING NO. 8 - 1984] / TRANSMITTAL LETTER FROM ALDRICH COMPANY, INC., ARCHITECTS.	1984/02/03	NONE	H 28, W 21.5 CM	TYPEWRITTEN	PAPER
10-080	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS. LOCKS & CANALS / LOWELL, MASS.	1918/06/00	1" = 40'	H 77, W 119.5 CM	BLUE LINE PRINT	PAPER
10-081	PLAN OF LAND NEAR PAWTUCKET CANAL AND / ON THE SOUTHERLY SIDE OF MERIMACK RIVER / AVAILABLE FOR SALE AND / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELLL, MASS.	1957/05/09	1" = 30'	H 32.8, W 63 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-082	PLAN SHOWING / LOTS 8-A, 8-B, 8-C, 13-A, 13-B. / BELONGING TO /PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1948/09/15	1" = 40'	H 50.5, W 120 CM	BLUE LINE PRINT	PAPER
10-083-COPY 1	[UNTITLED] [PLAN SHOWING AREA "B" TO BE CONVEYED AND AREA "C" OVER WHICH EASEMENT IS TO BE GRANTED BY PROPS. OF LOCKS & CANALS TO STEAM ASSOCIATES.]	UNDATED	NONE	H 35.5, W 42 CM	BLACK LINE PRINT	PAPER
10-083-COPY 2	[UNTITLED] [PLAN SHOWING AREA "B" TO BE CONVEYED AND AREA "C" OVER WHICH EASEMENT IS TO BE GRANTED BY PROPS. OF LOCKS & CANALS TO STEAM ASSOCIATES.]	UNDATED	NONE	H 35.5, W 42 CM	BLACK LINE PRINT	PAPER

10-083-COPY 3	[UNTITLED] [PLAN SHOWING AREA "B" TO BE CONVEYED AND AREA "C" OVER WHICH EASEMENT IS TO BE GRANTED BY PROPS. OF LOCKS & CANALS TO STEAM ASSOCIATES.]	UNDATED	NONE	H 35.5, W 42 CM	BLACK LINE PRINT	PAPER
10-083-COPY 4	[UNTITLED] [PLAN SHOWING AREA "B" TO BE CONVEYED AND AREA "C" OVER WHICH EASEMENT IS TO BE GRANTED BY PROPS. OF LOCKS & CANALS TO STEAM ASSOCIATES.]	UNDATED	NONE	H 35.5, W 42 CM	BLACK LINE PRINT	PAPER
10-084	COMPILED / PLAN OF LAND / IN / LOWELL, MASS.	1976/08/18	1" = 40'	H 63, W 92 CM	BLUE LINE PRINT	PAPER
10-085	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1957/07/00	1/4" = 50'	H 92, W 115 CM	BLUE LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
10-086	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL MASSACHUSETTS.	1956/10/00	1/4" = 50'	H 88, W 112 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
10-087	LOWELL, MASS. / P. L. & C. LOT 23.	1946/08/27	1" = 40'	H 34.5 W 21 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-088	PLAN OF LAND / IN / LOWELL MASS.	1964/04/28	1" = 40'	H 78, W 121.5 CM	BLACK LINE PRINT	PAPER
10-089-COPY 1	PLAN OF LAND / IN / LOWELL MASS.	1984/10/16	1" = 40'	H 46, W 61 CM	BLUE LINE PRINT	PAPER
10-089-COPY 2	PLAN OF LAND / IN / LOWELL MASS.	1984/10/16	1" = 40'	H 46, W 61 CM	BLUE LINE PRINT	PAPER

10-090	PLAN OF LAND / IN / LOWELL MASS.	1984/10/16	1" = 40'	H 46, W 61 CM	BLUE LINE PRINT, GRAPHITE	PAPER
10-091	PLAN OF LOT 65 - Z / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1956/08/07	1" = 20'	H 42.5, W 76 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-092	LAND OF / PROPS LOCKS & CANALS / LOWELL, MASS.	1920/03/00	1" = 40'	H 48, W 70 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-093	PLAN OF LAND IN THE CITY OF LOWELL / AND THE TOWN OF DRACUT / MIDDLESEX COUNTY / TO BE CONVEYED TO THE / COMMONWEALTH OF MASSACHUSETTS / DEPARTMENT OF PUBLIC WORKS.	1957/11/20	1" = 20'	H 44.5, W 57 CM	BLUEPRINT	PAPER
10-094	LAND AREAS LEASED TO RAILROAD / IN VICINITY OF THORNDIKE, FLETCHER, DUTTON, JACKSON STREETS AND WESTERN AVENUE / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	SEE NOTES	1" = 50'	H 36, W 74 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-095-COPY 1	PLAN OF LAND / WESTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/10	1" = 40'	H 33, W 76 CM	BLUEPRINT, COLORED PENCIL	PAPER

10-095-COPY 2	PLAN OF LAND / WESTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/10	1" = 40'	H 33, W 76 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-095-COPY 3	PLAN OF LAND / WESTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/10	1" = 40'	H 33, W 76 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-096	SKETCH SHOWING / AREA DEED TO ARTHUR J. LAMBERT AND MATHILDA LECOURT / BY / PROPRIETORS OF THE LOCKS & CANALS.	1933/03/31	1" = 30'	H 56, W 63 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-097	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1938/11/15	1/4" = 20'	H 64,5, W 86 CM	BROWN LINE PRINT, COLORED PENCIL	PAPER, CLOTH
10-098	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	SEE NOTES	1/4" = 20'	H 64,5, W 86 CM	BROWN LINE PRINT, COLORED PENCIL	PAPER, CLOTH
10-099	PLAN OF LOWELL HILTON / LOWELL MASSACHUSETTS.	1982/02/03	1" = 20'	H 76, W 107 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER

10-100-01	LOWELL HILTON HOTEL / LOWELL LMASSACHUSETTS / SEWER AND WATER RELOCATION / LAYOUT PLAN.	1982/03/01	1" = 20'	H 76.5, W 107 CM	BLUE LINE PRINT	PAPER
10-100-02	LOWELL HILTON HOTEL / LOWELL, MASSACHUSETTS / SEWER AND WATER RELOCATION / SECTIONS AND DETAILS.	1982/03/01	AS NOTED	H 76.5, W 107 CM	BLUE LINE PRINT	PAPER
10-100-03	LOWELL HILTON HOTEL / LOWELL, MASSACHUSETTS / SEWER AND WATER RELOCATION / PROFILE.	1982/03/01	AS NOTED	H 76.5, W 107 CM	BLUE LINE PRINT	PAPER
10-101-01	SKETCH PLAN OF PROPOSED BRIDGE / IN LOWELL / EAST MERRIMACK STREET / OBVER / CONCORD RIVER.	1982/11/15	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT, INK	PAPER
10-101-02-A	SKETCH PLAN OF PROPOSED BRIDGE / IN LOWELL / EAST MERRIMACK STREET / OBVER / CONCORD RIVER.	1982/11/15	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT, INK	PAPER
10-101-02-B	REVISED SKETCH OF A SECTION OF THE PROPOSED BRIDGE / IN LOWELL / EAST MERRIMACK STREET / OBVER / CONCORD RIVER FROM A MEETING DATED 11/15/82.	1982/11/15	NONE	H 61.5, W 92 CM	PHOTOCOPY	PAPER
10-101-02-C	LIST OF MEETING ATTENDEES AT ABOVE REFERENCED MEETING.	1982/11/15	NONE	H 21.5, W 28 CM	PHOTOCOPY	PAPER
10-102-01	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.	1982/06/18	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER

10-102-02	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.TYPICAL SECTIONS: SECTION AT BRIDGE APPROACHES/ ROADWAY SECTION / SECTION AT BRICK SIDEWALK.	1982/06/18	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-03-A	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.DRAINAGE DETAILS.	1982/06/18	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-03-B	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.DRAINAGE DETAILS, NOTING A REVISION.	1982/06/18	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-04	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.PROFILE PAVEMENT MARKINGS.	1982/06/18	AS NOTED	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-05	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT. LOWELL, EAST MERRIMACK ST.	1982/06/18	1" = 4'	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-06	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.LOWELL, EAST MERRIMACK ST.	1982/06/18	1" = 4'	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER

10-102-07	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.LOWELL, EAST MERRIMACK ST.	1982/06/18	1" = 4'	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-08	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.LOWELL, EAST MERRIMACK ST.	1982/06/18	1" = 4'	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-102-09	PLAN AND PROFILE OF / BRIDGE REPLACEMENT PROJECT / IN THE CITY OF LOWELL / MIDDLESEX COUNTY / FEDERAL AID PROJECT.LOWELL, EAST MERRIMACK ST.	1982/06/18	1" = 4'	H 61.5, W 92 CM	BLUE LINE PRINT	PAPER
10-103-A	COVER LETTER FROM COURIER CORPORATION TO LOCKS & CANALS ENCLOSING THE "AS BUILT" DRAWINGS OF THE HALL ST. PLANT.	1981/02/25	NONE	H 28, W 22 CM	TYPEWRITTEN	PAPER
10-103-B-01	COURIER CITIZEN COMPANY / LOWELL, MASSACHUSETTS / SITE PLAN.	1980/09/02	1" = 40'	H 76, W 107 CM	BLUE LINE PRINT	PAPER
10-103-B-02-COPY 1	COURIER CITIZEN COMPANY / LOWELL, MASSACHUSETTS / UTILITY PLAN..	1980/01/17	NONE	H 76, W 107 CM	BLUE LINE PRINT	PAPER
10-103-B-02-COPY 2	COURIER CITIZEN COMPANY / LOWELL, MASSACHUSETTS / UTILITY PLAN..	1980/09/02	NONE	H 76, W 107 CM	BLUE LINE PRINT	PAPER
10-103-B-03	COURIER CITIZEN COMPANY / LOWELL, MASSACHUSETTS / PARTIAL SITE PLAN..	1980/09/02	NONE	H 76, W 107 CM	BLUE LINE PRINT	PAPER

10-103-B-04	COURIER CITIZEN COMPANY / LOWELL, MASSACHUSETTS / EXISTING SITE INFORMATION..	1980/09/02	NONE	H 76, W 107 CM	BLUE LINE PRINT	PAPER
10-103-B-05	COURIER CITIZEN COMPANY / LOWELL, MASSACHUSETTS / SITE DETAILS.	1980/09/02	NONE	H 76, W 107 CM	BLUE LINE PRINT	PAPER
10-103-C	TOPOGRAPHICAL PLAN OF LAND / IN / LOWELL, MASS. PREPARED FOR / COURIER-CITIZEN COMPANY	1972/03/00	1" = 40'	H 28, W 42 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER, FILM
10-104	ATLAS / OF / AMERICAN AGRICULTURE / PART II / CLIMATE / SECTION A / PRECIPITATION AND HUMIDITY.	1922/03/15	AS NOTED	H 48, W 34.5 CM	COLOR	PAPER
10-105	REPORT OF THE SURVEY OF THE MERRIMACK RIVER, THE OUTLET OF THE MIDDLESEX CANAL, AND THE ENTRANCE TO THE LOCKS AND CANALS ON MERRIMACK RIVER. ALSO PAWTUCKET FALLS AND THE DEPTH OF WATER AT THE WICASSEE LOCKS IN TYNGSBORO.	1902/01/03	NONE	H 100, W 55 CM	BLUE LINE PRINT	PAPER
10-106-A	PROPRIETORS OF THE LOCKS AND CANALS - LEASES WITH RENT.	1956/03/06	NONE	H 28, W 35.5 CM	TYPEWRITTEN	PAPER
10-106-B	PROPRIETORS OF THE LOCKS AND CANALS - LEASES WITH RENT.	1957/05/07	NONE	H 28, W 35.5 CM	TYPEWRITTEN	PAPER
10-107	CITY OF LOWELL, MASS / OFF-STREET PARKING PROGRAM / GILET LOT / GRADING PLAN.	1957/05/00	1" = 40'	H 62, W 91 CM	BLUE LINE PRINT	PAPER
10-108	PLAN OF THE TOWN OF / LOWELL / IN THE COUNTY OF / MIDDLESEX.	UNDATED	NOT LEGIBLE	H 43.5, W 47 CM	BLACK LINE PRINT	PAPER

10-109	PLAN SHOWING / LAND BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / IN VICINITY OF LOWER LOCKS DAM / LOWELL, MASS.	1957/10/25	1"= 30'	H 41, W 73 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-110	PLAN SHOWING / SIDE TRACK / ALONG SOUTHERLY SIDE OF PAWTUCKET CANAL / FROM DOHERTY BRO'S FOUNDRY TO / LOCKS AND CANALS PRIVATE WAY OF MIDDLESEX PLACE / LOWELL, MASS.	1923/01/30	1" = 40'	H 32, W 203 CM	BLUEPRINT	PAPER
10-111	JOAN FABRICS / PLANT-4 PARKING.	1976/08/05	1" = 40'	H 46, W 61 CM	BLUE LINE PRINT	PAPER
10-112	SITE PLAN [OF PART OF DOWNTOWN LOWELL, BUT HIGHLIGHTING BOOTT MILL COMPLEX.]	UNDATED	NONE	H 43, W 56 CM	BLUE LINE PRINT	PAPER
10-113	PLAN OF LAND SHOWING / PROPOSED STATE TAKINGS / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / ON THORNDIKE STREET IN LOWELL, MASS.	1958/05/20	1" = 20'	H 50, W 67 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-113-COPY 1	PLAN OF LAND SHOWING / PROPOSED STATE TAKINGS / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / ON THORNDIKE STREET IN LOWELL, MASS.	1958/05/20	1" = 20'	H 50, W 67 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-114	[UNTITLED] [PLAN AND ELEVATION OF A STRUCTURE THAT COULD BE A BRIDGE.]	UNDATED	1/4" = 1''	H 66, W 93 CM	BLACK LINE PRINT, INK	PAPER

10-115-01	PLAN SHOWING / AREAS LEASED TO / MERRIMACK MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 40'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-02	PLAN SHOWING / AREAS LEASED TO / TRE, & SUFF. MILLS. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 40'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-03	PLAN SHOWING / AREAS LEASED TO / MASS COTTON MILLS / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 50'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-04	PLAN SHOWING / AREAS LEASED TO / HAMILTON MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 50'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-05	PLAN SHOWING / AREAS LEASED TO / MIDDLESEX COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 20'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-06	PLAN SHOWING / AREAS LEASED TO / LAWRENCE MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 50'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-07	PLAN SHOWING / AREAS LEASED TO / BOOTT MILLS. / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 50'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-08-COPY 1	PLAN SHOWING / AREAS LEASED TO / SACO-LOWELL SHOPS / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 100'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
10-115-08-COPY 2	PLAN SHOWING / AREAS LEASED TO / SACO-LOWELL SHOPS / BY / PROPS LOCKS & CANALS.	1919/01/00	1" = 100'	H 56, W 71 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER

10-116-COPY 1	A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER.	1959/00/00	1" = 100'	H 80, W 110 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-116-COPY 2	A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER.	1959/00/00	1" = 100'	H 80, W 110 CM	BLUEPRINT, COLORED PENCIL	PAPER
10-117-01	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / LOCATION PLAN.	1960/05/00	1" = 200'	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-02	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / GENERAL PLAN.	1960/05/00	1" = 20'	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-03	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / PROFILES.	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-04	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / PLAN AND PROFILE DUTTON STREET.	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-05	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / TYPICAL SECTIONS / AND DRAINAGE DETAILS.	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-06	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / CONSTRUCTION DETAILS.	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-07	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / BRIDGE LAYOUT..	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-117-08	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / BRIDGE ABUTMENTS.	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER

10-117-09	CITY OF LOWELL / FRENCH STREET BRIDGE / AND APPROACHES / BRIDGE DECK.	1960/05/00	AS NOTED	H 61.5, W 93 CM	BLUEPRINT	PAPER
10-118-01	[UNTITLED] [PLAN SHOWING BROADWAY AND A CANAL.]	UNDATED	1" = 20'	H 28.5, W 22 CM	GRAPHITE	GRAPH PAPER
10-118-02	[UNTITLED] [PLAN SHOWING A ROAD AND A CANAL.]	UNDATED	1" = 20'	H 28.5, W 22 CM	GRAPHITE	GRAPH PAPER
10-118-03	[UNTITLED] [PLAN SHOWING A ROAD AND A CANAL.]	UNDATED	NONE	H 28.5, W 22 CM	GRAPHITE	GRAPH PAPER
10-118-04	[UNTITLED] [PLAN SHOWING BROADWAY AND A CANAL.]	UNDATED	NONE	H 23, W 17 CM	GRAPHITE	GRAPH PAPER
10-118-05	[UNTITLED] [NOTE TO MR. FOSSE NOTING THAT DANA PERKINS HAS THE DEEDS … OF BOTH ON THE M. RIVER AS LISTED AS OF 4/1/64..]	UNDATED	NONE	H 8.5, W 12.5 CM	GRAPHITE	PAPER
10-119	PLAN OF LAND / CONVEYED TO / PRATT & FORREST COMPANY / LOWELL MASS.	1922/12/00	1" = 40'	H 24.5, W 87 CM	BLUE LINE PRINT	PAPER
10-120	PLAN OF / SUNDRY LOTS OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / SHOWING DATA PERTAINING TO LEASES.	1920/08/00	1" = 40'	H 31, W 87 CM	BLUE LINE PRINT	PAPER
12-13-A	LOCATION OF / CABLES IN DUCT SYSTEM / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1942/12/00	NONE	H 77, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
12-13-B	LOCATION OF / CABLES IN DUCT SYSTEM / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1952/09/00	1" = 60'	H 77, W 90	BLUEPRINT, COLORED PENCIL	PAPER
12-29-A	[AVERAGE DAILY POWER CONSUMPTION IN KILOWATT EQUIVALENTS FROM 10/27/12 TO 12/31/12.]	1912/12/31				

12-29-B	[AVERAGE DAILY POWER CONSUMPTION IN KILOWATT EQUIVALENTS FROM 10/27/12 TO 12/31/12.] BOOTT MILLS / LOWELL, MASS. / AVERAGE DAILY POWER CONSUMPTION IN / KILOWATTS FROM OCT. 27, 1912 TO APRIL 26, 1913.	1913/04/28	NONE			
12-29-C	[AVERAGE DAILY POWER CONSUMPTION IN KILOWATT EQUIVALENTS FROM 10/27/12 TO 12/31/12.] KILOWATT DAILY POWER CONSUMPTION / APRIL 27, 1913 - JULY 2, 1913.	SEE TITLE	NONE			
13-01-A	PLAN SHOWING LOCATION OF FOUR AREAS OVER AND UPON PROPERTY OF THE PROPS. OF THE LOCKS & CANALS AND USED BY BOOTT MILLS.	1955/05/31	1" = 40'	H 48, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
13-01-B-COPY 1	PLAN SHOWING LOCATION OF FOUR AREAS OVER AND UPON PROPERTY OF THE / PROPS. OF THE LOCKS & CANALS ON MERRIMACK RIVER /AND USED BY BOOTT MILLS / ALSO / ONE AREA USED FOR MEASURING WATER IN EASTERN CANAL / BY PROPS.OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1955/06/07	1" = 53'	H 41, W 53 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER

13-01-B-COPY 2	PLAN SHOWING LOCATION OF FOUR AREAS OVER AND UPON PROPERTY OF THE / PROPS. OF THE LOCKS & CANALS ON MERRIMACK RIVER /AND USED BY BOOTT MILLS / ALSO / ONE AREA USED FOR MEASURING WATER IN EASTERN CANAL / BY PROPS.OF THE LOCKS & CANALS ON MERRIMACK RIVER.	SEE NOTES	1" = 40''	H 44, W 71 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
13-02	[PLAN SHOWING REAL ESTATE AS FAR AS KNOWN TO DATE BELONGING TO BOOTT MILLS - LOTS 12 TO 16.]	UNDATED				
13-03	MAP SHOWING / PROPRIETORS OF THE LOCKS & CANALS / CANAL SYSTEM / AND PORTION OF/ MERRIMACK AND CONCORD RIVERS / LOWELL MASSACHUSETTS.	1956/10/00	1/4" = 50'	H 87.5, W 112 CM	BLUE LINE PRINT	PAPER
13-04	BOOTT MILL # 4.	1905/05/00	1" = 6'	H 46, W 94 CM	BLUEPRINT	PAPER
13-05	[BLUEPRINT OF RELATIVE FLOOR LEVELS OF PRESENT BUILDINGS - MAIN YARD.]	UNDATED				
13-06	PRELIMINARY PLAN / FOR / PARKING METER LOCATONS / JOHN - FRENCH ST. PARKING LOT.	1955/07/00	1" = 30'	H 62, W 49.5 CM	BLACK LINE PRINT	PAPER
131-001	[BOYDEN] TURBINES FOR MERRIMACK MILL NO. 1 [NOS. 7 & 8].	1908/06/12	1/4 FULL SIZE	H 64.8, W 91.6 CM	INK, COLORED INK	DRAFTING CLOTH
131-001-[COPY 1]	[BOYDEN] TURBINES FOR MERRIMACK MILL NO. 1 [NOS. 7 & 8].	1908/06/12	1/4 FULL SIZE	H 67.3, W 96.7 CM	BLUEPRINT	CLOTH BACKED PAPER
131-002	MERRIMACK [BOYDEN] TURBINES / NOS. 9 & 10.	1857/01/00	1/4 FULL SIZE		H 67, W 92.2 CM	INK, COLORED INK

131-002	MERRIMACK [BOYDEN] TURBINES / NOS. 9 & 10.	1857/01/00	1/4 FULL SIZE	H 67, W 92.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
131-003	DESIGN FOR TURBINE NO. 6, MERRIMACK MFG. CO.'S PICKING HOUSE.	UNDATED	1.5"=1'	H 81.2, W 62.3 CM	INK	CLOTH BACKED PAPER
131-004	PROPOSED ARRANGEMENT FOR TWO 10' [BOYDEN] TURBINES / FOR THE HAMILTON MFG. CO., LOWELL, MASS. / NOS. 9 & 10.	1881/02/00	1/2"=1'	H 77.7, W 95.2 CM	INK, COLORED INK	DRAFTING CLOTH
131-005	[PLAN OF] ONE PAIR OF 42 IN. R. & L. HORIZONTAL HERCULES TURBINES / FOR THE / WEBSTER M.F.G. CO. / SUNCOOK, N. H.	1890/03/19	1/2"=1'	H 82.6, W 115.6 CM	BLUEPRINT	PAPER
131-006-[A]	TWO L.H. 42 IN. HERCULES TURBINES / FOR THE / MERRIMACK MANUFACTURING CO. / LOWELL, MASS. [NOS. 10 & 11].	1915/01/24	3/4"=1'	H 91, W 120.6 CM	BLUEPRINT, COLORED INK	PAPER
131-006-[B]	SKETCH OF BOILER WORK FOR / MERRIMACK M'F'G. CO. / LOWELL, MASS.	1894/01/16	1/2"=1'	H 111.8, W 120.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
131-007	DIAGRAM / OF / OPENING BETWEEN BUCKETS / AT / PLACE OF FINAL DISCHARGE / 42" HERCULES TURBINE [NOS. 10 & 11] / AT / MERRIMACK MFG. CO. [UNFINISHED PLAN AND ELEVATION OF GUIDES AND SPEEDGATES.]	1894/02/28	NONE	H 75.3, W 49.5 CM	GRAPHITE	PAPER
131-007-[A]	[UNTITLED.]	1894/03/00	NONE	H 71, W 56 CM	GRAPHITE, INK, COLORED INK	PAPER

131-008	DIAGRAM / SHOWING / PERCENT OF EFFICIENCY / OF A NUMBER OF / DIFFERENT KINDS OF / WATERWHEELS / HAVING A DIAMETER OF OVER 39" / FOR DIFFERENT PERCENTS OF / FULL WATER [FOR DIFFERENT GAGE OPENINGS].	1903/01/00	NONE	H 96, W 56.2 CM	INK	PAPER
131-009	SKETCH SHOWING BUCKET OUTLETS FOR 46" VICTOR WHEELS PUT IN AT / TREMONT & SUFFOLK MILLS, TREMONT SIDE IN 1895, TO REPLACE / OLD STYLE VICTORS.	1896/03/07	NONE	H 51.5, W 79.6 CM	INK, COLORED INK	CLOTH BACKED PAPER
131-010	[UNTITLED.] [DISCHARGE OF DIFFERENT SWAIN TURBINES.]	1894/07/01	NONE	H 57.5, W 94.6 CM	INK, COLORED INK	CLOTH BACKED PAPER
131-011-[A]	BOOTT # 9.	SEE NOTES	NONE	H 30.8, W 18 CM	GRAPHITE	CLOTH BACKED PAPER
131-011-[B]	[UNTITLED.] [DIAGRAM OF SWAIN WHEELS SHOWING PERCENT OF CHANGE IN RELATIVE VELOCITY.]	1894/07/01	NONE	H 67.5, W 58.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
131-011-[C]	DIAGRAM SHOWING CHANGES IN QUANTITY DUE DIFFERENCE IN REL. VEL. [OF SWAIN TURBINES.]	1894/07/01	NONE	H 80, W 59.8 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
131-012	MEAN AREA / OF / WHEEL OUTLET / FOR / NEW 72-INCH SWAIN WHEEL / HAMILTON MFG. CO.'S NO. 3.	1894/11/21	FULL SIZE	H 59.9, W 91.7 CM	INK, COLORED INK, GRAPHITE	PAPER
131-013	MILL POWERS / DRAWN / BY WHEELS OF / LOWELL MACHINE SHOP (SACO-LOWELL SHOPS) / THE GIVEN FALL IS FROM UPPER / CANAL TO LOWER CANAL.	1894/11/16	NONE	H 52, W 70.5 CM	BLUEPRINT	CLOTH BACKED PAPER

131-014	PLAN / OF / BUCKET OUTLETS / OF / HAMILTON MFG. CO.'S / NO. 2 WHEEL 72" SWAIN.	1894/12/13	FULL SIZE	H 49, W 80.4 CM	INK, COLORED INK	PAPER
131-014-[A]	[UNTITLED.]	1894/12/07	NONE	H 27.6, W 21.5 CM	INK	PAPER
131-015	[DIAGRAM SHOWING DISCHARGE CHARACTERISTICS OF] 51" R. H. HERCULES WHEEL / TESTED BY HOLYOKE WATER POWER CO., APRIL 28, 1890. / SHOWING CHANGE IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. / QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FT.	1895/01/19	NONE	H 58.5, W 76.2 CM	INK, COLORED INK	PAPER
131-016	[DIAGRAM SHOWING DISCHARGE CHARACTERISTICS OF] 51" L. H. HERCULES WHEEL / TESTED BY HOLYOKE WATER POWER COMPANY, JUNE 1883. / SHOWING CHANGE IN RELATIVE VELOCITY. / QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FT.	1895/01/19	NONE	H 58.5, W 76.2 CM	INK, COLORED INK, GRAPHITE	PAPER
131-017	[DIAGRAM SHOWING DISCHARGE CHARACTERISTICS OF] 39" R. H. HERCULES WHEEL / TESTED BY HOLYOKE WATER POWER CO., JANUARY 15, 1891. / SHOWING CHANGE IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. / QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FT.	1895/01/19	NONE	H 58.5, W 76.2 CM	INK, COLORED INK, GRAPHITE	PAPER

131-018	[DIAGRAM SHOWING DISCHARGE CHARACTERISTICS OF] 39" L. H. HERCULES WHEEL. / TESTED BY HOLYOKE WATER POWER CO., JANUARY 17, 1891. / SHOWING CHANGE IN RELATIVE VELOCITY. / QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FT.	1895/01/19	NONE	H 58.5, W 76.2 CM	INK, COLORED INK, GRAPHITE	PAPER
131-019	[DIAGRAM SHOWING DISCHARGE CHARACTERISTICS OF A] 42" L. H. HERCULES WHEEL. TESTED BY HOLYOKE WATER POWER CO., JANUARY 29, 1887. SHOWING CHANGE IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. / QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FT.	1895/01/19	NONE	H 58.5, W 76.2 CM	INK, COLORED INK, GRAPHITE	PAPER
131-020	HERCULES WHEELS. / PROPORTIONAL DISCHARGE FOR PROPORTIONAL HEIGHT OF SPEEDGATE. / DATA FROM TESTS BY HOLYOKE WATER POWER CO. / [AND] HERCULES WHEELS / PERCENT OF CHANGE IN QUANTITY / CORRESPONDING TO / CHANGE OF 0.10 IN RELATIVE VELOCITY /(.600 TO .700).	1895/01/21	NONE	H 56, W 65.5 CM	INK, COLORED INK	PAPER
131-021	PATTERN OF BUCKET OUTLET / OF / LAWRENCE MFG. CO.'S, / NEW 61" SPECIAL HERCULES WHEELS / TO REPLACE NOS. 1, 2, & 3.	1908/12/04	NONE	H 66.8, W 82 CM	INK, COLORED INK	PAPER

131-022	[PLAN OF] 3-48" HORIZONTAL HERCULES TURBINES / FOR THE / CABOT M.F.G. CO., BRUNSWICK MAINE. 72"x 84" QUARTER TURN.	1895/08/16	1/2"=1'	H 86.4, W 118.4 CM	BLUEPRINT	PAPER
131-023	[FOR HERCULES WHEELS FOR LAWRENCE MFG. CO.'S # 5 MILL.]	1895/09/16	1"=1'	H 33.2, W 50.8 CM	GRAPHITE	PAPER
131-024	DIAGRAM SHOWING RELATIVE DISCHARGE / CORRESPONDING TO RELATIVE HEIGHT OF / SPEED-GATE FOR McCORMICK WHEELS.	1895/09/00	NONE	H 56.2, W 65.6 CM	INK, COLORED INK	PAPER
131-025-[A]	DIAGRAM [SHOWING] EFFICIENCY [CURVE] OF / 54" VICTOR WHEEL TESTED AT / HOLYOKE, OCTOBER 18 & 19, 1895.	1895/10/18-19	NONE	H 76.4, W 58.5 CM	INK, GRAPHITE, COLORED INK	PAPER
131-025-[B]	SHOWS CHANGE IN QUANTITY DUE CHANGE / IN / REL. VEL. 54' CYLINDRICAL GATE VICTOR / WHEEL.	1895/10/18-19	NONE	H 76.4, W 58.5 CM	INK, COLORED INK	PAPER
131-026	DIAGRAM / SHOWING / PERCENT OF [EFFICIENCY OF] HERCULES, McCORMICK, SWAIN, NEW AMERICAN & BOYDEN WHEELS / FOR DIFFERENT PERCENTS OF / FULL WATER.	1897/02/16	NONE	H 81.2, W 56.5 CM	INK, COLORED INK	PAPER
131-027	APPLETON CO., / LOWELL, MASS. / ONE PAIR OF 51" McCORMICK TURBINES [HEAD 13'].	1903/02/14	1/4"=1'	H 109.1, W 72.5 CM	BLUEPRINT, INK	PAPER
131-028-[C]	FERNANDO MINING CO. [VERSO].	SEE NOTES	NONE	H 63.9, W 90.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
131-028-A-[1]	ARRANGEMENT OF 6-18 IN. N. S., HORIZONTAL, HERCULES TURBINES / FOR THE / FERNANDO MINING CO. / SAN FERNANDO DE DURANGO, MEXICO.	1897/12/27	1/2"=1'	H 90.1, W 118.2 CM	BLUEPRINT	PAPER

131-028-A-[2]	ARRANGEMENT OF 10-18 IN. N. S., HORIZONTAL, HERCULES TURBINES / FOR THE / FERNANDO MINING CO. / SAN FERNANDO DE DURANGO, MEXICO.	1897/12/27	1/2"=1'	H 90.1, W 118.2 CM	BLUEPRINT	PAPER
131-028-B-[COPY 1]	DETAILS OF 10-18" N. S. HORIZONTAL HERCULES TURBINES / FOR THE / FERNANDO MINING CO. / SAN FERNANDO, ESTADO DE DURANGO, MEXICO.	1897/12/31	1 1/2"& 1/2"=1'	H 87.5, W 122 CM	BLUEPRINT	PAPER
131-028-B-[COPY 2]	DETAILS OF 10-18" N. S. HORIZONTAL HERCULES TURBINES / FOR THE / FERNANDO MINING CO. / SAN FERNANDO, ESTADO DE DURANGO, MEXICO.	1897/12/31	1 1/2"& 1/2"=1'	H 87.5, W 122 CM	BLUEPRINT	PAPER
131-029-01	[PLAN AND ELEVATION OF] HOLYOKE TESTING FLUME / PIT & TAILRACE.	UNDATED	1"=10'	H 29, W 45.7 CM	INK, WATER COLOR	PAPER
131-029-A	TEST # 2611. / HOLYOKE TEST OF A 42" R.H. SPECIAL TYPE "D" / HERCULES TURBINE WHEEL-SWING GATE, MADE JUNE 26-27, 1918, FOR MASSACHUSETTS COTTON MILLS, LOWELL, MASS. / (HOLYOKE DRAFT TUBE).	1918/06/26-27	NONE	H 30.2, W 21.5 CM	INK, COLORED INK	PAPER
131-029-B	TEST # 2612. / HOLYOKE TEST OF A 42" R.H. SPECIAL TYPE "D" / HERCULES TURBINE WHEEL-SWING GATE, MADE JULY 1-2, 1918, FOR MASSACHUSETTS COTTON MILLS, LOWELL, MASS. / (HOLYOKE DRAFT TUBE).	1918/07/01-02	NONE	H 30.2, W 21.5 CM	INK, COLORED INK	PAPER
131-029-C	GUARANTEED H. P. OF 42" R. H. SPECIAL TYPE "D" HERCULES WHEEL-SWING GATE, FOR MASS. / COTTON MILLS.	1919/03/20	NONE	H 30.2, W 21.5 CM	INK, COLORED INK	PAPER

131-029-D	NO.4. [GUARANTEED H. P. OF 42" R. H. SPECIAL TYPE "D" HERCULES WHEEL-SWING GATE WHEEL AT DIFFERENT FALLS.]	1919/04/09	NONE	H 21.5, W 30.2 CM	INK, COLORED INK, GRAPHITE	PAPER
131-029-E	NO. 5. / GUARANTEED H. P. [AND EXCESSIVE POWER OF ABOVE WHEEL] OF 42" R. H. SPECIAL TYPE / "D" HERCULES WHEEL.	1919/03/20	NONE	H 21.5, W 30.2 CM	INK, GRAPHITE	PAPER
131-029-F	NO. 6. [GUARANTEED H. P. AND EXCESSIVE POWER OF ABOVE WHEEL OF 42" R. H. SPECIAL TYPE "D" HERCULES WHEEL SHOWING WHERE IT FALLS SHORT.]	1919/03/20	NONE	H 21.5, W 30.2 CM	INK, COLORED INK, GRAPHITE	PAPER
131-029-G	[UNTITLED.] [SUMMARY OF TESTS.]	1919/03/20	NONE	H 30.2, W 21.5 CM	INK, COLORED INK	PAPER
131-029-H	DIAGRAM SHOWING RATIO OF GUIDE AREA TO BUCKET AREA FOR MASS. MFG. CO. SECTION 8, # 4, 5, 6, WHEELS - 42" R. H. TYPE D, HERCULES WHEELS.	UNDATED	NONE	H 30.2, W 21.5 CM	INK	PAPER
131-029-I	HOLYOKE TEST 2546 / [OF A] 33" R. H. [TYPE] D HERCULES / [FOR BOSTON DUCK CO.].	1919/03/28	NONE	H 30.2, W 21.5 CM	GRAPHITE	PAPER
131-029-J	HOLYOKE TEST 2667 / FEB. 26, 1919 / 33" R. H. [TYPE] D HERCULES / [FOR PRESCOTT MILL].	1917/00/00	NONE	H 30.2, W 21.5 CM	GRAPHITE	PAPER
131-029-K	33" R. H. TYPE "D" HERCULES / HOLYOKE TEST NO. 2667 / [SHOWING] EFFICIENCY VS. RELATIVE VELOCITY / 21' FALL / TESTED AT HOLYOKE FEB. 26, 1919.	1919/02/26	NONE	H 45.5, W 19 CM	INK	PAPER

131-029-L	33" R. H. TYPE "D" HERCULES / HOLYOKE TEST NO. 2667 / [SHOWING] EFFICIENCY VS. RELATIVE VELOCITY / 21' FALL / TESTED AT HOLYOKE FEB. 26, 1919.	1919/02/26	NONE	H 45.5, W 19 CM	INK	PAPER
131-029-M	45" TYPE 12, ALLIS-CHALMERS WHEEL / HOLYOKE TEST NO. 2121 ON 30" TYPE / TYPE 12 WHEEL STEPPED UP TO 45" WHEEL / 21' HEAD [FOR EFFICIENCY, HORSE POWER & DISCHARGE VS. SPEED FACTOR].	UNDATED	NONE	H 45.5, W 19 CM	INK	PAPER
131-029-N-[A]	30" R.H. TYPE Z LEFFEL WHEEL / [DIAGRAM SHOWING RESULT OF] HOLYOKE TEST # 2680 / [SHOWING] EFFICIENCY VS. SPEED FACTOR @ GATE OPENING / MODEL WHEEL.	1919/06/08	NONE	H 45.7, W 29 CM	INK, COLORED INK, GRAPHITE	PAPER
131-029-N-[B]	[UNTITLED DIAGRAM. SEE NOTES.]	1919/06/08	NONE	H 22.4, W 11.9 CM	INK, GRAPHITE	PAPER
131-029-O	[BLUEPRINT SHOWING] PLAN OF PIT FLOOR / HOLYOKE TESTING FLUME / SHOWING LOCATION OF IRON COLUMNS / SUPPORTING THE FLUME DECK.	1908/05/00	1"=1'	H 52, W 60.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
131-029-P	[BLUEPRINT SHOWING] SECTION [OF HOLYOKE TESTING FLUME].	1908/05/00	3/8"=1'	H 24.4, W 32.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
131-029-Q	PROPRIETORS OF LOCKS AND CANALS / DATA SHEET FOR [VARIOUS CATAGORIES OF DATA]. [FORM OF DATA SHEET FOR WATER WHEELS.]	UNDATED	NONE	H 28, W 21 CM	INK, COLORED INK	PAPER
131-029-R	[UNTITLED.] [FORM OF DATA SHEET FOR WATER WHEELS.]	UNDATED	NONE	H 39.2, W 28 CM	INK	DRAFTING CLOTH

131-029-S	POWER CURVES OF TYPE "S" S. MORGAN SMITH WHEELS-HOLYOKE TEST NO. 2663, MASS. # 12 WHEEL & TREMONT # 4 WHEEL.	UNDATED	NONE	H 21.5, W 30.2 CM	INK, COLORED INK	PAPER
131-029-T	HORSE POWER VS. SPEED FACTOR / HOLYOKE TEST NO. 2261 / 36" L. H. TYPE N MORGAN-SMITH / REDUCED TO 16' HEAD.	UNDATED	NONE	H 45.7, W 29 CM	GRAPHITE	PAPER
131-029-U	TEST OF 72" SWAIN WHEEL / MADE BY J. B. FRANCIS / AUGUST 1-6, 1874 / SPEED FACTOR VS. EFFICIENCY.	1874/08/01-06	NONE	H 45.5, W 29 CM	INK, COLORED INK	PAPER
131-029-V	[DIAGRAM SHOWING RESULTS OF TEST OF] SPEED FACTOR VS. EFFICIENCY / 72" SWAIN WHEEL [MADE BY J. B. FRANCIS IN PLACE, AUGUST 1-4, 1874].	1874/08/01-06	NONE	H 45.7, W 29 CM	INK, GRAPHITE, COLORED INK	PAPER
131-029-W	[DIAGRAM SHOWING] SPEED FACTOR / VS. / EFFICIENCY / 72" SWAIN WHEEL J. B. FRANCIS TEST [OF AUGUST 1-4, 1874 IN PLACE].	1874/08/01-06	NONE	H 45.7, W 29 CM	INK, COLORED INK	PAPER
131-029-X	[DIAGRAM SHOWING RESULTS OF] TEST OF 35 1/2" LEFFEL "F" WHEEL / EFFICIENCY VS. SPEED FACTOR / HOLYOKE TEST NO. 2359 / REDUCED TO 17' HEAD.	1921/07/27	NONE	H 45.7, W 29 CM	INK	PAPER
131-029-Y	[DIAGRAM SHOWING] EFFICIENCY VS. HEAD FACTOR / HOLYOKE TEST NO. 2261 / 36" L. H. MORGAN-SMITH TYPE N.	1921/07/30	NONE	H 45.7, W 29 CM	INK, COLORED INK, GRAPHITE	PAPER
131-029-Z	[DIAGRAM SHOWING] DISCHARGE VS. SPEED FACTOR / HOLYOKE TEST NO. 2261 / [OF] 36" L. H. MORGAN-SMITH TYPE N / REDUCED TO 16' HEAD.	UNDATED	NONE	H 45.5, W 29.5 CM	GRAPHITE	PAPER

131-030	PATTERN OF MEAN BUCKET OUTLET / OF / NOS. 10 & 11. 33" R.H. TYPE "D" HERCULES WHEELS / FOR / PRESCOTT MILLS.	1919/12/10	NONE	H 63.5, W 54.2 CM	INK	PAPER
131-031	PATTERN OF BUCKET OUTLET[S] / OF 44" R.H. TYPE "S" SMITH McCORMICK WHEEL[S] / FOR / TREMONT MILLS.	1919/12/16	NONE	H 91.3, W 91 CM	INK	PAPER
131-032	POWER HOUSE & FOUNDATION ARRGT. / FOR / DETROIT EDISON CO. GEDDES PLANT.	1917/02/20	3/8"	H 75.6, W 106.5 CM	BLUEPRINT	PAPER
131-033	GENERAL SECTION OF TURBINE / SPECIFICATION B. / -FROM- / THE JAMES LEFFEL & CO., / SPRINGFIELD, OHIO.	1917/12/31	NONE	H 41.4, W 47.2 CM	BLUEPRINT	PAPER
131-034	GENERAL SECTION OF TURBINE / SPECIFICATION B. / -FROM- / THE JAMES LEFFEL & CO., / SPRINGFIELD, OHIO.	1918/01/04	NONE	H 38.8, W 47.5 CM	BLUEPRINT	PAPER
131-035	DIAGRAM / SHOWING / PERCENT OF EFFICIENCY / OF A NUMBER OF DIFFERENT KINDS OF / WATER-WHEELS / HAVING A DIAMETER OF OVER 39" / FOR DIFFERENT PERCENTS OF / FULL WATER.	1899/01/00	NONE	H 86.5, W 56.6 CM	INK, COLORED INK	PAPER
131-036	WHEEL EFFICIENCY / VS. / PERCENT OF FULL WATER / FOR / SOME RECENT WATER WHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	NONE	H 78.7, W 55.7 CM	INK, COLORED INK	DRAFTING CLOTH
131-036-[COPY 1]	WHEEL EFFICIENCY / VS. / PERCENT OF FULL WATER / FOR / SOME RECENT WATER WHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	NONE	H 81.9, W 55.9 CM	BLUEPRINT	PAPER

131-037	[PLAN SHOWING] PROPOSED ARRANGEMENT OF 4-42" D VERTICAL HERCULES TURBINES HILL MFG. CO. LEWISTON, ME. HOLYOKE MACHINE CO. WORCESTER, MASS.	1921/04/29	1/4"=1'	H 39.4, W 89 CM	BLUEPRINT	PAPER
131-038	NO. 2 WHEEL HOUSE-A667 / NO.1 WHEEL HOUSE-A269 25 FT. HEAD / DETAILS OF THREE 36" D VERTICAL HERCULES TURBINES FOR / HILL MFG. CO. / LEWISTON, MAINE.	1921/07/26	1 1/2"=1'	H 137.3, W 85.8 CM	BLUEPRINT	PAPER
131-039	[BLUEPRINT SHOWING] WOODEN DRAFT TUBE / FOR / SOUTHERN INDIANA PR. TEST. [ALLIS CHALMERS MFG. CO.]	1921/11/15	6"=1'	H 77, W 106.9 CM	BLUEPRINT	PAPER
131-040	[BLUEPRINT SHOWING] MIO DEVELOPMENT / CONCRETE DRAFT TUBE [ALLIS-CHALMERS MFG. CO.]	1915/05/04	1/2"=1',1"=2'	H 76, W 106.9 CM	BLUEPRINT	PAPER
131-041	[BLUEPRINT SHOWING] "B" / CONCRETE DRAFT TUBE / FOR EASTERN MICHIGAN EDISON CO. / GARDNER S. WILLIAMS ENGR. / ARGO PLANT. [ALLIS-CHALMERS MFG. CO.]	UNDATED	3/4"=1'	H 75, W 106.1 CM	BLUEPRINT	PAPER
131-042	CHICOPEE MFG. CORP. / COMPARISON OF HOLYOKE TEST EFFICIENCIES [FOR LEFFEL 35 1/2" TYPE F. TEST # 2359. HUNT 33" TYPE E. TEST # 1844. HERCULES 39" TYPE D. TEST # 2582].	SEE NOTES	NONE	H 56, W 94 CM	INK, COLORED INK	PAPER
131-043	[PLAN OF] WASHINGTON MILLS, LAWRENCE, MASS. / 54" RISDON TURBINE [AT WASHINGTON MILLS].	1881/07/00	1"=1'	H 87.9, W 75.3 CM	BLUEPRINT	PAPER

131-1764	SKETCH OF / PAWTUCKET DAM, / SHOWING LENGTH & DISTANCES BETWEEN ANGLES, ETC.	1903/01/00	1"=40'	H 33.5, W 80.6 CM	BLUEPRINT	PAPER
132-[038]	DIAGRAM SHOWING DISCHARGE OF / ONE 33" STYLE C HERCULES WATER TURBINE / FOR BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / LOWELL, MASS.	1910/12/00	NONE	H 76.5, W 56 CM	GRAPHITE	PAPER
132-[039]	MERRIMACK MFG. CO.'S 39" HERCULES WHEELS / DIAGRAM SHOWING QUANTITY OF WATER (FOR 1 WHEEL) / DISCHARGES FOR 38' FALL WITH REL.[ATIVE] VEL.[OCITY] FOR / DIFFERENT FALLS / WITH THE SAME SPEED OF 200 R.P.M.	1911/09/15	NONE	H 106, W 106 CM	INK, COLORED INK, GRAPHITE	PAPER
132-[040]	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED FOR 38' FALL WITH REL. VEL. FOR / DIFFERENT FALLS WITH THE SAME SPEED. / 200 R.P.M.	UNDATED	NONE	H 76.7, W 56 CM	GRAPHITE	PAPER
132-[041]-[A]	[UNTITLED DIAGRAM. SEE NOTES]	UNDATED	NONE	H 76.7, W 56 CM	INK, COLORED INK, GRAPHITE	PAPER
132-[041]-[B]	[UNTITLED DIAGRAM. SEE NOTES]	UNDATED	NONE	H 76.7, W 56 CM	INK, COLORED INK, GRAPHITE	PAPER
132-[042]	[UNTITLED DIAGRAM]	UNDATED	NONE	H 76.7, W 73.7 CM	INK, COLORED INK	PAPER
132-[043]	[UNTITLED DIAGRAM]	UNDATED	NONE	H 56, W 76.7 CM	GRAPHITE	PAPER

132-[044]	DIAGRAM SHOWING QUANTITIES FOR 17' FALL / WITH RELATIVE VELOCITIES OF DIFFERENT FALLS / OF LAWRENCE SECTION 1-2 L. H. WHEELS.	1910/12/01	NONE	H 56, W 76.7 CM	GRAPHITE	PAPER
132-[045]	[UNTITLED DIAGRAM]	UNDATED	NONE	H 56, W 76.7 CM	INK, COLORED INK	PAPER
132-001	PLAN OF BUCKET OUTLET OF / NEW LAWRENCE SECTION WHEEL # 4 [(HERCULES)].	1906/07/00	NONE	H 81.4, W 65.4 CM	GRAPHITE	PAPER
132-002	[UNTITLED.] [PHOTOGRAPHS OF OLD & NEW 48" VICTOR WHEELS & GUIDES INSTALLED IN TREMONT & SUFFOLK.]	1895/00/00	NONE	H 34.7, W 68.6 CM	PHOTOGRAPHS, INK	PAPER
132-003	[UNTITLED.] [PHOTOGRAPHS OF APPLETON CO.'S # 3, 39" McCORMICK, NEW 1895, ALSO TREMONT CO.'S # 4A, 48" VICTOR, NEW 1895.]	SEE TITLE	NONE	H 45.7, W 68.9 CM	PHOTOGRAPHS, INK	PAPER
132-004-[A]	[UNTITLED.] [PHOTO OF 42" HERCULES WHEEL INSTALLED IN MERRIMACK MFG. CO. (NO. 10 & 11)].	1894/00/00	NONE	H 34.7, W 68.6 CM	PHOTOGRAPHS, INK	PAPER
132-004-[B]	[UNTITLED.] [PHOTO OF 45" McCORMICK WHEEL INSTALLED IN MERRIMACK MFG. CO.]	1896/08/00	NONE	H 34.7, W 68.6 CM	PHOTOGRAPHS, INK	PAPER
132-004-[C]	[UNTITLED.] [PHOTO OF DRAFT TUBE OF TREMONT CO'S. # 4A, 48" VICTOR.]	1896/08/00	NONE	H 34.7, W 68.6 CM	PHOTOGRAPHS, INK	PAPER
132-005	PLAN SHOWING BUCKET OUTLETS FOR 54" HERCULES / WHEELS AT LAWRENCE SECTION OF TREMONT & SUFFOLK MILLS / PUT IN IN 1896. THESE OUTLETS WERE OBTAINED BY PLOTTING / SHORTEST DISTANCES FROM THE OUTER [...SEE NOTES]	1896/10/15	NONE	H 42.8, W 125.2 CM	INK, COLORED INK	PAPER

132-006	DIAGRAM[S] / SHOWING / PERCENTS OF EFFICIENCY / OF / HERCULES, McCORMICK, VICTOR / SWAIN & BOYDEN WHEELS / FOR DIFFERENT PERCENTS OF / FULL WATER.	1895/11/00	NONE	H 76.2, W 58.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-007-[A]	DIAGRAM SHOWING PER CENT OF EFFICIENCY [QUANTITIES DISCHARGED IN C.F.P.S., & HORSE POWER OBTAINED] FOR 17' / FALL OF A 54" LEFT HAND HERCULES WHEEL FOR LAWRENCE / NO. 5 MILL TESTED AT HOLYOKE ON FEB. 21,1896.	SEE NOTES	NONE	H 79.7, W 61 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-007-[B]	DIAGRAM SHOWING QUANTITIES IN C.F.P.S. WITH / 17 FT. FALL DISCHARGED BY A LEFT HAND 54"HERCULES / WHEEL FOR LAWRENCE NO.5 MILL TESTED AT HOLYOKE ON FEB. 21,1896.	SEE NOTES	NONE	H 79.7, W 61 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
132-007-[C]	DIAGRAM SHOWING HORSE POWER FOR 17 FT. FALL / OBTAINED BY A 54" LEFT HAND HERCULES / WHEEL FOR LAWRENCE NO.5 MILL TESTED AT HOLYOKE ON FEB. 21,1896.	SEE NOTES	NONE	H 79.7, W 61 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-008	PLAN SHOWING BUCKET OUTLETS FOR 39" McCORMICK WHEELS / PUT INTO 42" RODNEY HUNT WHEEL CASES AT APPLETON CO.'S / MILLS IN 1895.	1895/00/00	NONE	H 56, W 71.4 CM	INK, COLORED INK	PAPER
132-009-[A]	25 APERATURES. / 72" HAMILTON WHEEL.	SEE NOTES	NONE	H 30.2, W 25 CM	LITHOGRAPH, INK	CLOTH BACKED PAPER
132-009-[B]	[SECTION OF HAMILTON MFG. CO.] 72" SWAIN TURBINE. / RIGHT HAND.	1893/10/00	1"=1'	H 63.6, W 79.5 CM	BLUEPRINT	CLOTH BACKED PAPER

132-009-[C]	HAMILTON MFG. CO.	1893/10/00	NONE	H 51.5, W 79 CM	BLUEPRINT	CLOTH BACKED PAPER
132-010	SKETCH SHOWING BUCKET OUTLET FOR 54" VICTOR WHEEL PUT / IN SUFFOLK MILLS IN 1895.	1896/03/07	NONE	H 59.8, W 73.9 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-011	SKETCH SHOWING BUCKET OUTLETS FOR 48" VICTOR WHEELS PUT IN AT / TREMONT AND SUFFOLK MILLS, SUFFOLK SIDE, IN 1895.	1896/03/07	NONE	H 61, W W 74 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-012	36" R.H. SWAIN WHEEL / TESTED BY HOLYOKE WATER POWER CO. JUNE 1, 1896. / SHOWS PROPORTIONAL DISCHARGE COR / RESPONDING TO PROPORTIONAL HEIGHT OF / SPEED-GATE.	1896/06/16	NONE	H 59.5, W 78.5 CM	INK	CLOTH BACKED PAPER
132-013-[A]	45" R.H. McCORMICK WHEEL / TESTED BY HOLYOKE WATER POWER CO. MAY 14, 1896. / SHOWS PROPORTIONAL HEIGHT OF / SPEED-GATE.	1896/06/16	NONE	H 63.5, W 81.4 CM	INK	CLOTH BACKED PAPER
132-013-[B]	45" R. H. SPECIAL L.H. McCORMICK WHEEL / TESTED BY HOLYOKE WATER POWER CO. MAY 15 & 16, 1896. / SHOWS CHANGE IN QUANTITY DUE CHANGE IN / RELATIVE VELOCITY.	1896/06/15	NONE	H 63.5, W 81.4 CM	INK	CLOTH BACKED PAPER
132-014-[A]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED, 17' FALL / WITH DIFFERENT SPEEDS & OPENINGS OF THE SPEED GATE / OF A 45" R.H. SPECIAL McCORMICK WHEEL FOR THE / MERRIMACK MFG. CO. LOWELL, MASS.	1896/06/16	NONE	H 81.2, W 64 CM	INK, COLORED INK	CLOTH BACKED PAPER

132-014-[B]	DIAGRAM SHOWING PER CENT OF EFFICIENCY / WITH DIFFERENT SPEEDS & OPENINGS OF THE SPEED / GATE OF A 45" R.H. SPECIAL McCORMICK WHEEL FOR THE / MERRIMACK MFG. CO., LOWELL, MASS.	1896/06/15	NONE	H 81.2, W 64 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-014-[C]	DIAGRAM SHOWNG [DISCHARGE, EFFICIENCY] HORSE POWER WITH (17' FALL) / [WITH DIFFERENT] SPEEDS & OPENINGS OF THE SPEED GATE / OF A 45" L. H. SPECIAL McCORMICK WHEEL FOR THE / MERRIMACK MFG., CO. LOWELL, MASS. [TESTED AT HOLYOKE, JUNE 22, 1896.]	1896/07/16	NONE	H 79.9, W 60.7 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-014-[D]	DIAGRAM SHOWING HORSE POWER WITH DIFFERENT (17' FALL) / SPEEDS AND OPENINGS OF THE SPEED GATE / OF A 45" L. H. SPECIAL McCORMICK WHEEL FOR THE / MERRIMACK MFG. CO. LOWELL, MASS. / TESTED AT HOLYOKE, JUNE 16, 1896.	1896/07/17	NONE	H 79.9, W 60.7 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-015-[A]	DIAGRAM SHOWING PER CENT OF EFFICIENCY WITH / DIFFERENT SPEEDS AND OPENINGS OF THE SPEED GATE / OF A 45" L. H. SPECIAL McCORMICK WHEEL FOR THE / MERRIMACK MFG. CO. LOWELL, MASS. / TESTED AT HOLYOKE JUNE 16, 1896.	1896/06/29	NONE	H 79.9, W 60.7 CM	INK, COLORED INK	CLOTH BACKED PAPER

132-015-[B]	DIAGRAMS SHOWING PER CENT OF EFFICIENCY WITH [HORSE POWER (17 FOOT FALL)] WITH DIFFERENT SPEEDS & OPENINGS OF THE SPEED GATE / OF A 45" L. H. SPECIAL McCORMICK WHEEL FOR THE / MERRIMACK MFG. CO. LOWELL, MASS. / TESTED AT HOLYOKE, JUNE 16, 1896.	1896/06/30	NONE	H 79.9, W 60.7 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-016	DIAGRAM OF / QUANTITY DISCHARGED WITH 13' FEET FALL / OF A / 51" INCH L. H. SPECIAL HERCULES. (NO. 1077) / TESTED AT HOLYOKE FEB. 25, 1898.	1898/02/25	NONE	H 83, W 64.5 CM	INK, GRAPHITE	CLOTH BACKED PAPER
132-017	DIAGRAM OF / QUANTITY DISCHARGED WITH 15' FEET FALL / OF A / 51" INCH R. H. SPECIAL HERCULES. (NO. 1050) / TESTED AT HOLYOKE NOV. 1ST 1897.	1897/11/01	NONE	H 83, W 64.5 CM	INK, GRAPHITE	CLOTH BACKED PAPER
132-018	36" SWAIN L.H. WHEEL / TESTED BY HOLYOKE WATER POWER CO. JUNE 1,1896. / SHOWS CHANGE IN QUANTITY DUE CHANGE / IN RELATIVE VELOCITY.	1896/06/13	NONE	H 60, W 77.8 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-019	[DIAGRAM SHOWING CAPACITY OF] ATLANTIC COTTON MILLS [OF LAWRENCE, MASS.] WHEELS 3 & 4 72 INCH RISDON.	UNDATED	NONE	H 78.7, W 59.7 CM	GRAPHITE	CLOTH BACKED PAPER
132-020	PLAN SHOWING BUCKET OUTLETS FOR A PAIR [NOS. 3 & 4] OF 45" SPECIAL McCORMICK WHEELS / PUT INTO MERRIMACK MFG. CO'S. NO. 6 MILL, JULY & AUGUST 1896.	1896/08/00	NONE	H 51.3, W 58.8 CM	INK, COLORED INK	CLOTH BACKED PAPER

132-021	[PLAN SHOWING DETAILS OF] POINTER FOR SPEED-GATE GUAGE.	1896/08/11	ACTUAL SIZE	H 26.8, W 24 CM	INK	PAPER
132-022-[A]	DIAGRAM SHOWING CHANGE IN / QUANTITY OF WATER, / WITH 14 FEET FALL & DIFFERENT SPEEDS, / DISCHARGED BY A 48" STANDARD VICTOR / WHEEL (TREMONT NO.4A) R. H., TESTED AT HOLYOKE AUG. 6,1896.	1896/08/26	NONE	H 76.2, W 58.5 CM	INK, COLORED INK	PAPER
132-022-[B]	DIAGRAM SHOWING PER CENT OF / EFFICIENCY WITH DIFFERENT SPEEDS OF NO. 4A TREMONT A R. H. STANDARD 48" VICTOR WHEEL TESTED AT HOLYOKE / AUG. 6,1896.	1896/08/27	NONE	H 76.2, W 58.5 CM	INK, COLORED INK, GRAPHITE	PAPER
132-022-[C]	DIAGRAM SHOWING HORSE POWER / FOR DIFFERENT SPEEDS OF NO. 4A TREMONT / A R. H. STANDARD 48" VICTOR WHEEL TESTED AT HOLYOKE AUG. 6,1896.	1896/08/27	NONE	H 76.2, W 58.5 CM	INK, COLORED INK	PAPER
132-023-[A]	DIAGRAM SHOWING PER CENT OF [DISCHARGE] EFFICIENCY / [HORSE POWER] WITH [14 FEET FALL & AT] DIFFERENT SPEEDS OF NO. 1 TREMONT, A L. H. STANDARD 48" VICTOR WHEEL TESTED / AT HOLYOKE, AUG. 8, 1896.	1896/08/25	NONE	H 76.4, W 58.6 CM	INK, COLORED INK	PAPER
132-023-[B]	DIAGRAM SHOWING QUANTITY OF WATER, WITH / 14 FEET FALL & DIFFERENT SPEED, DISCHARGED / BY NO.1 TREMONT, A L. H. STANDARD 48" VICTOR WHEEL TESTED AT HOLYOKE AUG. 8, 1896.	1896/08/25	NONE	H 76.4, W 58.6 CM	INK, COLORED INK	PAPER

132-023-[C]	DIAGRAM SHOWING HORSE POWER WITH 14 FEET / FALL & DIFFERENT SPEEDS OF NO. 1 TREMONT / A L. H. STANDARD 48" VICTOR WHEEL, TESTED / AT HOLYOKE AUG. 8, 1896.	1896/08/26	NONE	H 76.4, W 58.6 CM	INK, COLORED INK	PAPER
132-024	PLAN SHOWING BUCKET OUTLET FOR A 48" L. H. / VICTOR WHEEL NO. 1 TREMONT PUT IN TO REPLACE / A 48" [L. H.] VICTOR WHEEL BROKEN FEB. 1897.	1897/04/00	NONE	H 57, W 71.9 CM	INK, COLORED INK	CLOTH BACKED PAPER
132-025-[A]	DIAGRAM SHOWING QUANTITIES [EFFICIENCY, HORSE POWER] IN C. F. P. S. / WITH 17 FEET FALL DISCHARGED BY A RIGHT / HAND 54" HERCULES WHEEL FOR LAWRENCE / [SECTION] NO.5 MILL TESTED AT HOLYOKE, AUG. 18, 1896.	SEE NOTES	NONE	H 76.4, W 58.6 CM	INK, COLORED INK, GRAPHITE	PAPER
132-025-[B]	DIAGRAM SHOWING PER CENT OF EFFICIENCY FOR 17 / FT. FALL OF A 54" R. H. HERCULES WHEEL FOR LAWRENCE / NO.5 MILL TESTED AT HOLYOKE ON AUG. 18, 1896.	SEE NOTES	NONE	H 76.4, W 58.6 CM	INK, COLORED INK, GRAPHITE	PAPER
132-025-[C]	DIAGRAM SHOWING HORSE POWER WITH / 17 FT. FALL OBTAINED BY A 54" RIGHT HAND / HERCULES WHEEL FOR LAWRENCE NO. 5 MILL / TESTED AT HOLYOKE, AUG. 18, 1896.	SEE NOTES	NONE	H 76.4, W 58.6 CM	INK, COLORED INK	PAPER

132-026-[A]	[DIAGRAM SHOWING DISCHARGE OF 36" LEFFEL WHEEL NO. 8 HAMILTON MFG. CO. ALSO OF] 30" R. H. TYPE Z LEFFEL WHEEL / HOLYOKE TEST # 2680 / HORSE POWER VS. RELATIVE VELOCITY / 13' FALL [OF 30" R. H. TYPE Z LEFFEL WHEEL].	1918/10/15	NONE	H 45.6, W 29.2 CM	INK, COLORED INK	PAPER
132-026-[B]	30" R.H. TYPE Z LEFFEL WHEEL / HOLYOKE TEST # 2680 / HORSE POWER VS. RELATIVE VELOCITY / 13' FALL.	SEE NOTES	NONE	H 45.6, W 29.2 CM	INK, COLORED INK	PAPER
132-026-[C]	DIAGRAM SHOWING / DISCHARGE / OF / 36" LEFFEL WHEEL NO. 8 / AT / HAMILTON MFG. CO.	1918/10/15	NONE	H 29.2, W 45.6 CM	INK, COLORED INK	PAPER
132-027	30" SPARKS SPECIAL-TEST WHEEL. / FROM / THE JAMES LEFFEL & CO. / SPRINGFIELD, OHIO.	1914/06/23	1"=1'	H 62.4, W 39.4 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
132-028	GENERAL PLAN. / PLAN FOR / DAM & POWER PLANT / ON THE ST. JOSEPH RIVER. / AT BERRIEN SPRINGS, MICH., / FOR THE / INDIANA & MICHIGAN ELECTRIC CO., SO. BEND, IND. [(LEFFEL WHEEL)].	SEE NOTES	1"=20'	H 60.4, W 90.4 CM	BLUEPRINT	PAPER
132-029	TAILSTOCK PLANS / SECTIONS THRU DRAFT TUBES / PLANS FOR / DAM & POWER PLANT / ON THE ST. JOSEPH RIVER / AT BERRIEN SPRINGS, MICH. / FOR THE INDIANA & MICHIGAN ELECTRIC CO. SUCCEEDING THE / BERRIEN SPRINGS POWER & ELECTRIC CO. / SO. BEND, IND.	1907/07/00	1/4"=1'	H 60.3, W 91 CM	BLUEPRINT	PAPER

132-030	SOUTH END. / GENERAL ARRANGEMENT OF A 42" D VERTICAL HERCULES TURBINE FOR THE / CONTINENTAL MILLS. LEWISTON, ME. / HOLYOKE MACHINE CO. WORCESTER, MASS.	1924/10/04	1/4"& 3/4"=1'	H 61.6, W 79.5 CM	BLUERINT	PAPER
132-031	[S. MORGAN SMITH CO.'S BLUEPRINT SHOWING DRAFT TUBE & GENERATOR FOR GREENFIELD CO.'S] GARDINERS FALLS EXTENSION [PLANT].	1924/05/02	1/2"=1'	H 86, W 70.6 CM	BLUEPRINT	PAPER
132-032	[BLUEPRINT SHOWING RUNNER FOR DRAFT TUBE & GENERATOR FOR] GARDNERS FALL EXTENSION [PLANT].	1924/05/02	1/2"=1'	H 83.5, W 136.4 CM	BLUEPRINT	PAPER
132-033	[DIAGRAM OF] MERRYMEETING LAKE / STATION NO. 1 / DISCHARGE VS. GATE / 17" LEFFEL-TYPE "F."	1927/10/00	NONE	H 35.6, W 40.7 CM	INK	PAPER
132-033-[COPY 1]	MERRYMEETING LAKE / STATION NO. 1 / DISCHARGE VS. GATE / 17" LEFFEL-TYPE "F."	1927/10/00	NONE	H 35.6, W 40.7 CM	BLUEPRINT	PAPER
132-034	PATTERN OF BUCKET OUTLET / 2+2A PAIR OF / 39" SPECIAL HERCULES WHEELS / APPLETON COMPANY.	SEE NOTES	NONE	H 63.4, W 58.5 CM	INK	PAPER
132-035	COMPARISON OF / BUCKET OUTLETS OF THE APPLETON CO. / NO.2A-39" L. H. McCORMICK WHEEL (NOT IN USE) / NO. 2 PAIR-39" L. H. & R. H. HERCULES WHEELS (NOW IN USE) / NO.4-38" L. H. RODNEY HUNT WHEEL (NOW IN USE).	1944/12/00	NATURAL SCALE	H 69.2, W 59 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

132-035-A	COMPARISON OF / BUCKET OUTLETS OF THE APPLETON CO. / NO.2A-39" L. H. McCORMICK WHEEL (NOT IN USE) / NO. 2 PAIR-39" L. H. & R. H. HERCULES WHEELS (NOW IN USE) NO.4-38" L. H. RODNEY HUNT WHEEL (NOW IN USE).	1944/12/00	NATURAL SCALE	H 67.7, W 58.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
132-036	PATTERN OF BUCKET OUTLET / OF A / 38 INCH L. H. RODNEY HUNT WHEEL / FOR THE / APPLETON COMPANY.	1943/09/00	NONE	H 69.2, W 49 CM	INK	PAPER
132-037	DRAWINGS OF / RACK & PINION GEARS, SHAFTS & ROLLERS / FOR NO.5-48" McCORMICK WHEEL / BELONGING TO / JACKSON PROPERTIES, INC. / LOWELL, MASS.	1959/04/01	3"=1'	H 48.9, W 76 CM	BLUEPRINT	PAPER
133-[132]	PATTERN OF BUCKET OUTLET / OF A / 33 IN. TYPE "Z" LEFFEL WHEEL / FOR / BOOT MILLS.	1947/08/00	NONE	H 75.6, W 69.2 CM	INK	PAPER
133-001	[DIAGRAM SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THRU GUIDES FOR DIFFERENT GUIDE AREAS BUCKET AREAS.]	1893/02/10				
133-002	[DIAGRAM SHOWING CHANGE IN QUANTITY DUE CHANGE IN REL. VEL., DISCHARGE OF DIFFERENT McCORMICK WHEELS.]	1895/07/01				
133-003	[TRACING OF LOWER PART OF MASS. CO'S NO. 7 WHEEL, A 72" SWAIN.]	SEE NOTES	1"=1'			
133-004	[SKETCH OF BUCKET OUTLET OF] APPLETON CO'S. 54" McCORMICK [NOS. 1 & 1A] WHEELS.	1900/12/17	NONE	H 52.2, W 97.1 CM	INK, COLORED INK	CLOTH BACKED PAPER

133-005	[SKETCH OF BUCKET OUTLET OF A 72" SWAIN TURBINE PUT IN MASS. COTTON MILLS, NO. 7 WHEELPIT.]	1889/09/00	
133-006	[PATTERN OF BUCKET OUTLET OF APPLETON CO.'S NO. 2A WHEEL, A 39" L. H. McCORMICK. MEASURED AUG. 29, 1902.]	SEE TITLE	
133-007	[PATTERN OF BUCKET OUTLET OF HAMILTON NO. 2 WHEEL A 72" SWAIN.]	UNDATED	
133-008-A	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/00	TP
133-008-B	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/00	TP
133-008-C	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/00	TP
133-008-D	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/00	TP

133-008-E	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/0 0			TP
133-008-F	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/0 0			TP
133-008-G	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/0 0			TP
133-008-H	[DIAGRAMS SHOWING DIFFERENT COEFFICIENTS OF DISCHARGE THROUGH BUCKETS & GUIDES FOR DIFFERENT GUIDE AREAS DIVIDED BY BUCKET AREAS. (A TO H).]	1910/01/0 0			TP
133-009	[PRINT OF NO. 6 WHEEL, 80" SWAIN TURBINE, MASS. COTTON MILLS.]	1904/09/1 4	1"=1'	BP	
133-010	[DRAWING OF FLOATS FOR 90" BOYDEN TURBINE FOR THE MENICK THREAD CO. 34 GUIDES & 54 FLOATS.]	1872/12/0 0		BP	
133-011	[PLAN OF CURVES FOR 90" BOYDEN TURBINE FOR THE MENICK THREAD COMPANY.]	1881/12/0 0	FULL SIZE	BP	
133-012	[PLAN SHOWING VERTICAL THROUGH WHEEL FROM CENTER OF JACK SHAFT TO BOTTOM OF STEP OF A 90" BOYDEN.]	UNDATED		BP	

133-013	[TYPICAL DIAGRAM SHOWING AVERAGE PROPORTIONAL DISCHARGE OF BOYDEN, VICTOR, HERCULES, SWAIN, McCORMICK & NEW AMERICAN WHEELS.]	UNDATED				
133-014	[SKETCH SHOWING ELEVATION OF DRAFT TUBE, SPICKET MILL, LAWRENCE, MASS.]	UNDATED	1"=1'			TP
133-014-[COPY 1]	[SKETCH SHOWING ELEVATION OF DRAFT TUBE, SPICKET MILL, LAWRENCE, MASS.]	UNDATED	1"=1'		BP	
133-015	[DIAGRAM OF] HOLYOKE TESTING FLUME. / SKETCHES SHOWING GENERAL ARRANGEMENT & DISTRIBUTION OF [DISCHARGE] VELOCITY 6' AND 10' UP FROM WEIR, / DURING TEST OF 54" R. H. McCORMICK WHEEL / FOR APPLETON MFG. CO.	1900/10/16	NONE	H 53.3, W 79 CM	INK	PAPER
133-016	[SKETCH OF BUCKET OUTLET AT PLACE OF FINAL DISCHARGE OF 60" SWAIN WHEEL TO REPLACE PRESCOTT (MASS. COTTON MILLS) OLD NO. 1.]	1905/09/00				
133-017	[DIAGRAM SHOWING PROPORTIONAL DISCHARGE OF BOYDEN WHEELS.]	UNDATED				
133-018-[B]	DIAGRAM SHOWING HORSE-POWER / WITH 14 FEET FALL AND DIFFERENT SPEEDS AND OPEN / INGS OF SPEED-GATE OF TWO 33 INCH STYLE "C" / HERCULES TURBINE WHEELS.	1910/12/00	NONE	H 76, W 56 CM	INK	PAPER

133-018-[C]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED / WITH 14 FEET FALL AND DIFFERENT SPEEDS AND OPEN / INGS OF SPEED-GATE OF TWO 33 INCH STYLE "C" / HERCULES TURBINE WHEELS.	1910/12/00	NONE	H 76, W 56 CM	INK	PAPER
133-018-[D]	DIAGRAM SHOWING QUANTITY OF / WATER DISCHARGED WITH 14 FEET FALL. / 31 INCH L. H. HERCULES WHEEL (STYLE D) / FOR BIGELOW CARPET CO.	1913/10/00	NONE	H 76, W 56 CM	INK, COLORED INK	PAPER
133-018-[E]	DIAGRAM SHOWING QUANTITY OF / WATER DISCHARGED WITH 14 FEET FALL. / 33 INCH R. H. HERCULES WHEEL (STYLE C) / INSTALLED AT BIGELOW CARPET CO. IN 1911.	1913/10/00	NONE	H 76, W 56 CM	INK, COLORED INK	PAPER
133-018-A	DIAGRAM SHOWING PER CENT EFFICIENCY / WITH 14 FEET FALL & DIFFERENT SPEEDS / & OPENINGS OF SPEEDGATE OF TWO 33" STYLE "C" HERCULES TURBINE WHEELS. / CYLINDER GATE & CONICAL DRAFT TUBE [FOR BIGELOW CARPET CO.].	1910/12/00	NONE	H 76, W 56 CM	INK	PAPER
133-019	[DIAGRAM SHOWING COEFFICIENT OF DISCHARGE THRU GUIDES FOR DIFFERENT RELATIVE VELOCITIES FOR DIFFERENT GUIDE AREAS BUCKET AREAS OF 72" SWAIN TURBINE WHEEL OF BOOTT MILLS NO. 2.]	1911/01/00				

133-020	[DIAGRAM SHOWING DISCHARGE WITH 17 FEET FALL & DIFFERENT SPEEDS & OPENINGS OF SPEED-GATE OF 72" SWAIN TURBINE WHEEL, IN BOOTT COTTON MILL (NO.5) (WHEEL NO. 2).]	SEE NOTES				
133-021-[A]	DIAGRAM[S] SHOWING [DISCHARGE] PERCENT OF EFFICIENCY / [HORSE POWER] WITH 21' FEET FALL, & DIFFERENT SPEEDS & OPENINGS / OF THE SPEED-GATE OF TWO 48" STYLE C, HERCULES WHEELS / FOR [MASS. COTTON MILLS].	1910/04/04	NONE	H 76.1, W 56 CM	INK, COLORED INK	PAPER
133-021-[B]	DIAGRAM SHOWING HORSE POWER / WITH 21' FALL & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATE OF TWO 48" STYLE "C" HERCULES / WHEELS FOR THE MASS. COTTON MILL OF LOWELL.	1910/04/04	NONE	H 76.1, W 56 CM	INK, COLORED INK	PAPER
133-021-[C]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED / FOR 21 FEET FALL WITH REL. VEL. FOR DIFFERENT FALLS WITH THE / SAME SPEED (133 REV. PER MIN.).	UNDATED	NONE	H 76.1, W 56 CM	GRAPHITE, COLORED INK	PAPER
133-021-[D]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED / WITH 21' FALL, & DIFFERENT SPEEDS & OPENINGS OF / THE SPEEDGATE OF TWO 48" STYLE "C" HERCULES WHEELS / FOR THE MASS. COTTON MILLS OF LOWELL.	1910/04/04	NONE	H 76.1, W 56 CM	INK, COLORED INK, GRAPHITE	PAPER

133-022	[SKETCH SHOWING LOCATION OF SHAFT OF ONE PAIR OF TYPE B, 30" HERCULES WHEELS, TOGETHER WITH LOCATION OF A PAIR EACH OF S. MORGAN SMITH & 42" TYPE C HERCULES WHEELS.]	1908/01/29	1 1/2"=1'			TP
133-023	[SKETCH SHOWING AVERAGE BUCKET OUTLETS OF 51" SMITH McCORMICK'S TO REPLACE OLD NO'S. 6 & 7, WHEELS FOR HAMILTON MFG. CO.]	1905/11/10				
133-024	PLAN OF BUCKET OUTLET / OF NEW APPLETON WHEELS [4 & 5A]. / 48" R. H. & L. H. McCORMICK TURBINE [FOR APPLETON COMPANY].	1905/12/00	12"=1'	H 71.4, W 64 CM	INK, COLORED INK, GRAPHITE	PAPER
133-025	[DIAGRAMS SHOWING DISCHARGE WITH 13 FEET FALL & WITH DIFFERENT SPEEDS & OPENINGS OF THE SPEED-GATE OF TWO 51" SMITH-McCORMICK WHEELS FOR THE HAMILTON MFG. CO.]	1907/00/00				
133-026	[DIAGRAMS SHOWING DISCHARGE, EFFICIENCY, HORSE POWER UNDER DIFFERENT SPEEDS & OPENINGS OF SPEED-GATE FOR A PAIR OF 36" SPECIAL HERCULES TYPE C SWING GATE FOR HAMILTON MFG. CO. (TO REPLACE OLD NO.1).]	1907/00/00				
133-027	[FULL SIZE PATTERN OF BUCKET OUTLET OF L. H. & R. H. 36" TYPE C, HERCULES WHEELS FOR HAMILTON MFG. CO.]	1907/06/00				

133-030	[DETAILS OF TWO UNITS OF 42" HORIZONTAL HERCULES "C" TURBINES FOR THE SMITH-HEWITT ENG. CO. OF COLLIERS, N. Y.]	1906/11/20	1&1 1/2"=1'		BP	
133-031	[PLAN & ELEVATION & SECTIONS OF HOLYOKE TESTING FLUME.]	1881/00/00	1/2"=1'			
133-032	PATTERN OF BUCKET OUTLET / OF A / 39" TYPE "Z" LEFFEL WHEEL / FOR / HAMILTON MFG. CO.	1918/10/08	NONE	H 79.4, W 71.8 CM	INK	PAPER
133-033	PATTERN OF BUCKET OUTLET / OF A / 36 IN. TYPE "Z" LEFFEL WHEEL / FOR / HAMILTON MFG. CO.	1918/09/13	NONE	H 75, W 68.8 CM	GRAPHITE, INK	PAPER
133-034	[TRACING OF 28 1/2" TYPE S, S. MORGAN SMITH RUNNER.]	1918/11/21	1 1/2=1'			TP
133-035	[SKETCH SHOWING 28 1/2" TYPE S, S. MORGAN SMITH WHEEL SETTING.]	1918/11/08				TP
133-035-[COPY 1]	[SKETCH SHOWING 28 1/2" TYPE S, S. MORGAN SMITH WHEEL SETTING.]	1918/11/08			BP	
133-037	[SKETCH OF HOLYOKE TEST DRAFT TUBE SECTION, 28 1/2" TYPE S, S. MORGAN SMITH.]	1918/11/07				TP
133-038	PATTERN OF BUCKET OUTLET / OF A / 42" HERCULES (TYPE D) R. H. WHEEL / FOR / MASS. COTTON MILLS.	1918/11/13	NONE	H 80, W 67 CM	INK, GRAPHITE	PAPER
133-039	PATTERN OF BUCKET OUTLET / OF / # 7, 8 & 9, -33", R. H. TYPE `D', HERCULES WHEELS / FOR / PRESCOTT MILLS [(MASS. MFG. CO.)].	1919/03/20	NONE	H 67, W 62.6 CM	INK	PAPER
133-040	[PATTERN OF BUCKET OUTLET OF A 28 1/2" R. H. TYPE S, SMITH McCORMICK WHEEL FOR SACO-LOWELL SHOPS.]	1919/01/21				

133-042	PATTERN OF BUCKET OUTLET / OF A / 40.8" R. H. TYPE "S" / MORGAN-SMITH WHEEL / FOR / TREMONT MILLS.	1919/02/03	NONE	H 78.8, W 77.9 CM	INK, GRAPHITE	PAPER
133-043	[PATTERN OF A BUCKET OUTLET OF A 26" R.H. TYPE S, SMITH-McCORMICK WHEEL FOR SACO-LOWELL SHOPS.]	1919/01/07				
133-044	[PATTERN OF BUCKET OUTLET OF BIGELOW CARPET CO., 31" STYLE D].	UNDATED				
133-045	MEAN AREAS OF / BUCKET OUTLETS FOR SIX 31 INCH L. H. STYLE "D" / HERCULES WHEELS / FOR / BIGELOW HARTFORD CARPET COMPANY.	1917/03/19	NONE	H 56, W 57.2 CM	INK	DRAFTING CLOTH
133-046	[PATTERN OF BUCKET OUTLET OF A 50" ALLIS-CHALMERS WHEEL FOR MERRIMACK MFG. CO.]	1919/01/08				
133-047	[SKETCH SHOWING FOUR SETTINGS FOR WATER WHEELS AS FOLLOWS: PAIR 27" D, CYLINDER GATE HORIZONTAL HERCULES. PAIR 39" D, HORIZONTAL HERCULES. ONE 33" D, VERTICAL CYLINDER GATE HERCULES.. TWO 45" TURBINES ON HORIZONTAL SHAFT (MERR'K MFG.).]	1918/09/07				TP
133-048	[DIAGRAM SHOWING DIASCHARGE OF WHEELS NO. 3 (R. H.) & NO. 4 (L. H.) 45" SPECIAL McCORMICKS, OF MERRIMACK MFG. CO.]	1917/10/31				TP
133-050-[128]	DIAGRAM SHOWING / LOSS OF POWER DUE TO LOSS OF HEAD / ON PRESCOTT WHEELS / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	SEE NOTES	NONE	H 43, W 28 CM	INK	PAPER

133-050-028-[A]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED WITH 13 FEET FALL, & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATES OF TWO 36" SPECIAL HERCULES WHEELS / NO. 1614A, SOLID LINES, TESTED AT HOLYOKE, JUNE 21 & 22, 1906.	1906/00/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-028-[B]	DIAGRAM SHOWING HORSE POWER / WITH 13 FEET FALL, & DIFFERENT SPEEDS & OPENINGS OF THE SPEEDGATES OF TWO 36 INCH / SPECIAL HERCULES WHEELS.	1906/00/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-028-[C]	DIAGRAM SHOWING PERCENT OF EFFICIENCY / WITH 13 FEET FALL, & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATES OF TWO 36" SPECIAL HERCULES WHEELS.	1906/00/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-029-[A]	McCORMICK WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[B]	HERCULES WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[C]	SWAIN WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[D]	NEW AMERICAN TURBINE. TYPICAL DIAGRAM. AVERAGE OF 6 WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 20.5 CM	INK, COLORED INK	PAPER

133-050-029-[E]	VICTOR WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[F]	NEW AMERICAN WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[G]	BOYDEN TURBINES. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[H]	McCORMICK TURBINE. TYPICAL DIAGRAM. AVERAGE OF 6 WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[I]	HERCULES TURBINE. TYPICAL DIAGRAM. AVERAGE OF 6 WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[J]	VICTOR TURBINE. TYPICAL DIAGRAM. AVERAGE OF 5 WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[K]	SWAIN TURBINE.TYPICAL DIAGRAM. AVERAGE OF 5 WHEELS.	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-029-[L]	BOYDEN TURBINE. TYPICAL DIAGRAM AVERAGE OF 6 WHEELS. [PROPORTIONAL DISCHARGE OF DIFFERENT WATER WHEELS.]	1906/05/00	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-036-[COPY 1]	VELOCITY DIAGRAM / FOR / BOOTT MILLS NO.1 WATERWHEEL / 42 1/2" ALLIS-CHALMERS RUNNER.	1918/09/04	NONE	H 29, W 45.2 CM	BLUEPRINT	PAPER
133-050-036-[COPY 2]	VELOCITY DIAGRAM / FOR / BOOTT MILLS NO.1 WATERWHEEL / 42 1/2" ALLIS-CHALMERS RUNNER.	1918/09/04	NONE	H 29, W 45.2 CM	BLUEPRINT	PAPER

133-050-041	DIAGRAM SHOWING / QUANTITY OF WATER DISCHARGED.	1918/12/00	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
133-050-041-[COPY 1]	DIAGRAM SHOWING / QUANTITY OF WATER DISCHARGED.	1918/12/00	NONE	H 45.2, W 29 CM	BLUEPRINT	PAPER
133-050-049	CURVES SHOWING / DISCHARGE HORSE-POWER & EFFICIENCY / R. H. 28 1/2" TYPE "S"-S. MORGAN SMITH RUNNER / HOLYOKE TEST # 2663-DEC.30-31, 1918. / 13FT. HEAD 200 R.P.M.	1919/01/08	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
133-050-050	EFFICIENCY CHARACTERISTICS / R. H. 28 1/2" TYPE S-S. MORGAN SMITH / HOLYOKE TEST # 2663.	1919/01/08	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
133-050-050-A	EFFICIENCY CHARACTERISTICS / R. H. 28 1/2" TYPE "S" S. MORGAN SMITH RUNNER / HOLYOKE TEST # 2663-DEC. 30-31, 1918.	1919/01/08	NONE	H 30.5, W 21.5 CM	INK, COLORED INK, GRAPHITE	PAPER
133-050-051	HORSE POWER CHARACTERISTICS / 28 1/2" TYPE "S"-S. MORGAN SMITH RUNNER / HOLYOKE TEST # 2663-DEC. 30-31, 1918.	1919/01/08	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
133-050-052	CURVES SHOWING / GUARANTEED & HOLYOKE TEST PERFORMANCES / R. H. 28 1/2" TYPE "S"-S. MORGAN SMITH RUNNER / HOLYOKE TEST # 2663-DEC. 30-31, 1918.	1919/01/08	NONE	H 21.5, W 30.5 CM	INK, COLORED INK, GRAPHITE	PAPER

133-050-053	DISCHARGE CHARACTERISTICS / 28 1/2 TYPE "S" S. MORGAN SMITH RUNNER / HOLYOKE TEST # 2663-DEC. 30-31, 1918.	1919/01/08	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
133-050-054	VELOCITY DIAGRAM / FOR / 42" D HERCULES WHEELS / VERTICAL OPEN FLUME SETTING / FOR / MASS. COTTON MILLS.	1918/03/19	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-055	VELOCITY DIAGRAM / FOR / BOOTT NO.1 WHEEL / WITH / NEW ALLIS-CHALMERS RUNNER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/07/30	NONE	H 21.3, W 28 CM	INK	PAPER
133-050-056	VELOCITY IN HOLYOKE TEST DRAFT TUBE / FOR / 28".5 TYPE "S", S. MORGAN SMITH WATERWHEEL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/11/07	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-057	VELOCITY DIAGRAM / FOR / NEW PRESCOTT WHEELS / 33" D HERCULES.	1919/01/10	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-058	VELOCITY DIAGRAM / PROPOSED DRAFT TUBE / TREMONT # 3 / 40".8 TYPE "S"- S. MORGAN SMITH RUNNER.	1918/12/20	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-059	VELOCITY DIAGRAM / PROPOSED DRAFT TUBE / TREMONT # 3, 40.8" TYPE "S", S. MORGAN-SMITH RUNNER.	1919/01/13	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
133-050-060	VELOCITY DIAGRAM / HOLYOKE TEST OF / R. H. 28 1/2" TYPE "S"-SMITH WHEEL / TEST # 2663-DEC. 30-31, 1918 / 156.5 C. F. P. S. 16.065 FT. HEAD.	1919/01/08	H1"=20'	H 21.5, W 30.5 CM	INK	PAPER

133-050-061	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED WITH 21 FEET FALL & DIFFERENT / SPEEDS & OPENINGS OF THE SPEEDGATE OF / A 42" R. H. SPECIAL TYPE "D" HERCULES WHEEL FOR / MASS. COTTON MILLS OF LOWELL, MASS.	1918/10/08	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-062-[COPY 1]	DIAGRAM SHOWING QUANTITY OF / WATER DISCHARGED [VS. RELATIVE VELOCITY FOR TYPE 15, 30" R. H. ALLIS-CHALMERS FOR COMPUTATIONS IN MERRIMACK NO. 9 WHEEL. TEST NO. 2202.]	SEE NOTES	NONE	H 43.8, W 29 CM	BLUEPRINT	PAPER
133-050-062-[COPY 2]	DIAGRAM SHOWING QUANTITY OF / WATER DISCHARGED [VS. RELATIVE VELOCITY FOR TYPE 15, 30" R. H. ALLIS-CHALMERS FOR COMPUTATIONS IN MERRIMACK NO. 9 WHEEL. TEST NO. 2202.].	SEE NOTES	NONE	H 44.2, W 29 CM	BLUEPRINT	PAPER
133-050-063	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED [OF A 30" R. H. TYPE Z LEFFEL TURBINE. TEST NO. 2363. USED IN COMPUTATIONS OF NOS. 8 & 9 FOR HAMILTON MFG. CO.].	SEE NOTES	NONE	H 43.8, W 29 CM	BLUEPRINT	PAPER
133-050-066	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED WITH 16 FEET FALL & DIFFERENT / SPEEDS & OPENINGS / OF THE SPEEDGATE OF A / 30" R. H. ALLIS-CHALMERS WHEEL. TYPE # 12 / TESTED AT HOLYOKE MARCH 15, 16 & 18, 1912. / TEST NO. 2121.	1919/02/21	NONE	H 45.7, W 29.2 CM	INK	PAPER

133-050-067	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED WITH 16 FEET FALL & DIFFERENT / SPEEDS & OPENINGS OF THE SPEEDGATE OF TWO / 33" R. H. TYPE "D" HERCULES WHEELS.	1919/03/17	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
133-050-067-[COPY 1]	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED WITH 16 FEET FALL & DIFFERENT / SPEEDS & OPENINGS OF THE SPEEDGATE OF TWO / 33" R. H. TYPE "D" HERCULES WHEELS.	1919/03/17	NONE	H 45.2, W 29 CM	BLUEPRINT, COLORED PENCIL	PAPER
133-050-068	TEST OF "33"-RIGHT HAND-HERCULES / STYLE "D" TURBINE WHEEL. / CYLINDER GATE. CONICAL DRAFT TUBE. / THIS WHEEL FOR MASS. COTTON MILLS / (PRESCOTT SIDE).	1917/00/00	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-069	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED / WITH 13 FEET FALL & DIFFERENT SPEEDS & OPENINGS OF / SPEED-GATE OF A 30" R. H. LEFFEL TYPE "Z" TURBINE WHEEL / REG. GATE & CONICAL DRAFT TUBE.	1914/00/00	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
133-050-070	DIAGRAM SHOWING VELOCITY / AT POINTS IN THE DISCHARGE FROM / 33" R. H. "D" HERCULES WHEEL / # 1 UNIT IN PLACE AT PRESCOTT MILL.	1919/03/03	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
133-050-072	VELOCITY DIAGRAM / FOR / MIDDLESEX WHEELS / NOS.1 & 2.	1919/03/09	NONE	H 29, W 45.7 CM	INK, COLORED INK	PAPER

133-050-074	DIAGRAM SHOWING QUANTITY OF / WATER DISCHARGED / WITH 16 FT. HEAD & DIFFERENT SPEED / GATES OF A 30" R.H. ALLIS-CHALMERS / TYPE # 15 TURBINE WHEEL.	1919/09/07	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-076	36" TYPE Z VERTICAL TURBINE (LEFFEL) # 8 WHEEL / FOR / HAMILTON MFG. CO. LOWELL, MASS. / ARTHUR T. SAFFORD, ENG'R, LOWELL, MASS.	1918/02/21	NONE	H 22.8, W 31 CM	INK, COLORED PENCIL	DRAFTING CLOTH
133-050-077	[FORM OF WATER WHEEL INSPECTION SHEET AND SKETCH SHEET.]	UNDATED				
133-050-079	28 1/2" TYPE "S" / S. MORGAN SMITH WHEEL / HOLYOKE TEST NO. 2663 / HORSE POWER VS. RELATIVE VELOCITY / 13 FT. FALL / TESTED DEC. 30-31, 1918.	1919/00/00	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-080	EFFICIENCY CHARACTERISTICS / 30" R. H. ALLIS CHALMERS / TYPE 12 RUNNER / HOLYOKE TEST 2121.	1921/08/08	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-080-[COPY 1]	EFFICIENCY CHARACTERISTICS / 30" R. H. ALLIS CHALMERS / TYPE 12 RUNNER / HOLYOKE TEST 2121.	1921/08/08	NONE	H 45.7, W 29.2 CM	BLUEPRINT	PAPER
133-050-081	NAGLER RUNNER-PROBABLY 34" / DISCHARGE CHARACTERISTICS / HOLYOKE TEST-REDUCED TO 20 FT. FALL / FROM ALLIS-CHALMERS BULLETIN # 1640.	1921/08/12	NONE	H 45.7, W 29.2 CM	INK	PAPER

133-050-082	NAGLER RUNNER-PROBABLY 34" / POWER CHARACTERISTICS / HOLYOKE TEST-REDUCED TO 20 FT. FALL / FROM ALLIS-CHALMERS BULLETIN # 1640.	1921/08/12	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-083	NAGLER RUNNER-PROBABLY 34" / EFFICIENCY CHARACTERISTICS / HOLYOKE TEST-REDUCED TO 20 FT. FALL / FROM ALLIS-CHALMERS BULLETIN # 1640.	1921/08/12	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-084	EFFICIENCY CHARACTERISTICS / 24" R. H. HUNT McCORMICK / SWING GATE; CONICAL DRAFT TUBE / HOLYOKE TEST # 2779, MAY 13, 14, 16, 1921 / REDUCED TO 17 FT. FALL.	1921/08/19	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-085	POWER CHARACTERISTICS / 24" R. H. HUNT-McCORMICK / SWING GATE, CONICAL DRAFT TUBE / HOLYOKE TEST # 2779, MAY 13, 14, 16, 1921 / REDUCED TO 17 FT. FALL.	1921/08/17	NONE	H 45.7, W 29.2 CM	INK	DRAFTING CLOTH
133-050-086	DISCHARGE CHARACTERISTICS / 24" R. H. HUNT McCORMICK / SWING GATE, CONICAL DRAFT TUBE / HOLYOKE TEST # 2779, MAY 13, 14, 16, 1921. / REDUCED TO 17 FT. FALL.	1921/08/10	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-087	42" R.H. TYPE "D" HERCULES / WATER WHEEL / HOLYOKE TEST NO. 2611 / [DIAGRAM SHOWING] EFFICIENCY VS. RELATIVE VELOCITY / TESTED JUNE 26-27, 1918.	1918/06/26-27	NONE	H 45.7, W 29.2 CM	INK	PAPER

133-050-088	48" R.H.-TYPE "C" HERCULES / WATER WHEEL / HOLYOKE TEST NO. 1865 / [DIAGRAM SHOWING] EFFICIENCY VS. RELATIVE VELOCITY / TESTED NOV. 30, 1909.	1909/11/30	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-089	POWER VS. RELATIVE SPEED / 30" R. H. ALLIS CHALMERS WHEEL TYPE 15 / FROM HOLYOKE TEST NO. 2202 / TEST USED IN COMPUTATIONS FOR / MERRIMACK NO. 9 WHEEL.	UNDATED	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-090	[DIAGRAM SHOWING] EFFICIENCY VS. RELATIVE VELOCITY / [OF A] 30" ALLIS-CHALMERS TYPE 15 / HOLYOKE TEST # 2202.	UNDATED	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-092	[DIAGRAM SHOWING] EFFICIENCY CHARACTERISTICS / [OF] NOMINAL 54" STANDARD VICTOR / 78.3 R.P.M., R. H. / HOLYOKE TEST # 875 / SUFFOLK WHEEL # 2.	UNDATED	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
133-050-093	EFFICIENCY CHARACTERISTICS / 48" STANDARD VICTOR / 90 R.P.M., R. H. / HOLYOKE TEST # 940 / SUFFOLK WHEEL 4A.	UNDATED	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-094	EFFICIENCY CHARACTERISTICS / 48" STANDARD VICTOR / 90 R.P.M. L. H. / HOLYOKE TEST 940 / OF TREMONT # 1, 1A, 3, 3A & 4.	UNDATED	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-095-A	VELOCITIES THRU QUARTER-TURN & / DRAFT TUBE OF LAWRENCE SECTION / OF T.& S. WHEEL NO.4, AND 5, A 54" R. H. / HERCULES.	1921/12/00	1"=5'	H 21.5, W 30.5 CM	INK, GRAPHITE	PAPER

133-050-095-B	VELOCITIES THRU SWAIN TURBINE / FROM / A TEST MADE ON A 42" WHEEL IN 1869 / BY HIRAM F. MILLS, C. E.	1921/11/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL, COLORED INK	PAPER
133-050-095-C	VELOCITIES THRU BOYDEN WHEEL / UNIT # 8 OF MERRIMACK MFG. CO. / 104.75 INCH.	1921/11/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL, COLORED INK	PAPER
133-050-095-D	VELOCITIES THRU DRAFT TUBE. [RODNEY HUNT WHEELS 39" AT THE CHEMICAL ASSOC., RUMFORD FALLS, ME.]	1921/11/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL	PAPER
133-050-095-E	DRAFT TUBE PROPOSED FOR / UNITED UTILITIES CO., / MARTINTOWN PLANT, / BY S. MORGAN SMITH CO.	1921/11/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL	PAPER
133-050-095-F	VELOCITIES THRU DRAFT TUBE OF / BOOTT MILLS # 9 MILL, AN 80" R. H. SWAIN.	1921/12/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL	PAPER
133-050-095-G	VELOCITIES THRU DRAFT TUBE OF APPLETON / CO'S # 4 UNIT, PAIR OF 39" L. H. & R. H. McCORMICK / WHEELS. DRAFT TUBE EXTENSION PUT ON IN 1895.	1921/12/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL	PAPER
133-050-095-H	VELOCITIES THRU DRAFT TUBE OF MASS. COTTON / MILLS # 6 WHEEL, A 42" TYPE "D" HERCULES.	1921/12/00	1"=4'	H 21.5, W 30.5 CM	INK, COLORED PENCIL	PAPER
133-050-095-I	VELOCITIES THRU DRAFT TUBE OF 58" S. MORGAN / SMITH TURBINE AT GARDNERS FALLS PLANT OF / GREENFIELD ELECTRIC LIGHT & POWER CO.	1921/12/00	1"=4'	H 30.5, W 21.5 CM	INK	PAPER

133-050-095-J	VELOCITIES THRU ORIGINAL / & PRESENT DRAFT TUBES FOR / 51" TYPE "Z" LEFFEL WHEEL OF / LOCKWOOD CO., WATERVILLE, ME.	1921/12/00	1"=4'	H 21.5, W 30.5 CM	INK	PAPER
133-050-096-A	SETTING FOR / SWAMP LOCKS TESTS # 16 & 17 / DRAFT TUBE # 16-A-12", 12" TYPE Z LEFFEL / TEST 17-A-7", 12" TYPE Z LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-096-B	SETTING FOR / SWAMP LOCKS TEST # 15 / DRAFT TUBE # 5 WITH PLATE BENEATH / A=13 3/4" 12" TYPE Z LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-096-C	SETTING FOR / SWAMP LOCKS TESTS 5 & 6 / DRAFT TUBE # 6 / TEST # 5-12" TYPE Z LEFFEL / TEST # 6-17" TYPE F LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-096-D	SETTING FOR / SWAMP LOCKS TEST # 7 / DRAFT TUBE # 3 / 12" TYPE Z LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-096-E	SETTING FOR / SWAMP LOCKS TEST # 4 / DRAFT TUBE # 1 / 12" TYPE Z LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-096-F	SETTING FOR / SWAMP LOCKS TESTS # 10, 11, 12, 13, 14 / DRAFT TUBE # 3 WITH PLATE BENEATH / TEST # 10-A=11 1/2 12" TYPE Z LEFFEL. / TEST # 11-A=13 3/4 12" TYPE Z LEFFEL. / TEST #12-A=9" 12" TYPE Z LEFFEL. / TEST #13-A=13 3/4" 12" SPECIAL LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-096-G	SETTING FOR / SWAMP LOCKS TESTS 8 & 9 / DRAFT TUBE # 3 / TYPE 8-BOOTT SETTING # 1-A=13 3/4" / TEST # 9-BOOTT SETTING # 2-A-11 1/2" / 12" TYPE Z LEFFEL.	1922/00/00	NONE	H 30.5, W 21.5 CM	INK	PAPER

133-050-097	[PLAN SHOWING SET-UP FOR LEFFEL WHEEL TESTS.]	1922/04/25				
133-050-098	[DRAWING SHOWING VARIOUS EXPERIMENTAL DRAFT TUBES.]	1922/06/15				
133-050-099	[LAYOUT OF SWAMP LOCKS FLUME FOR EXPERIMENTS.]	1922/05/10				
133-050-100-A	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 4 / 12" TYPE Z LEFFEL WITH DRAFT TUBE # 1 (LONG / STRAIGHT).	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-B	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 5 / 12" TYPE Z LEFFEL WITH DRAFT TUBE # 6 (CURVED).	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-C	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 6 / 17" TYPE F LEFFEL WITH DRAFT TUBE # 6 (CURVED).	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-D	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 7 / 12" TYPE Z LEFFEL WITH DRAFT TUBE # 3 (SHORT U.A.).	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-E	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 8 / 12" TYPE Z LEFFEL WITH / DRAFT TUBE # 3 (SHORT U.A. BOOTT SETTING # 1).	1922/00/00	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
133-050-100-F	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 10 / 12" TYPE Z LEFFEL WITH / DRAFT TUBE # 3 (SHORT U.A.) / BOOTT SETTING # 2 WITH NO SIDES / IN TAIL RACE.	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-G	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 11 / 12" TYPE Z LEFFEL WITH DRAFT TUBE # 3 BOOTT SET- / TING # 1 WITH NO SIDES.	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER

133-050-100-H	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 12 / 12" TYPE Z LEFFEL WITH / DRAFT TUBE # 3 BOOTT / SETTING # 3 WITH NO SIDES.	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-I	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 13 / 12" SPECIAL LEFFEL WITH / DRAFT TUBE # 3 (SHORT U.A.) / WITH FLOOR 13 3/4" BELOW.	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-J	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 14 / 17" SPECIAL LEFFEL WITH / DRAFT TUBE # 3 (SHORT U.A.) / WITH FLOOR 13 3/4" BELOW.	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-K	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 15 / 12" TYPE Z LEFFEL WITH / DRAFT TUBE # 5 (STRAIGHT / FLARE) WITH FLOOR 13 3/4" BELOW.	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-100-L	CHARACTERISTIC CURVES / SWAMP LOCKS TEST # 16 / 12" TYPE Z LEFFEL WITH / DRAFT TUBE # 4 (HYDRAU- / CONE) WITH PLATE 12" BELOW. / TESTED NOV. 27, 1922 [...SEE NOTES].	1922/00/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
133-050-101	[DRAWING OF VARIOUS EXPERIMENTAL DRAFT TUBES.]	1923/12/05				
133-050-102	COMPARATIVE EFFICIENCIES / LEFFEL "Z" VS. SMITH "S". [EFFICIENCY CURVES HOLYOKE TEST # 2363 FOR 30" LEFFEL & HOLYOKE TEST # 2663 28 1/2" SMITH "S"].	1923/03/26	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-103	EXPERIMENTAL DRAFT TUBES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/02/21	1"=1'	H 23.8, W 44.5 CM	INK	DRAFTING CLOTH

133-050-106	DIAGRAM SHOWING POWER OUTPUT / OF / TWO DIFFERENT TYPES OF RUNNERS / OPERATED AT A CONSTANT SPEED / WITH A FALLING HEAD / NORMAL HEAD 21 FT.	UNDATED	NONE	H 30.5, W 21.5 CM	INK	PAPER
133-050-107	HOLYOKE TEST NO. 2160 / 25" I. P. MORRIS TYPE "O" / DISCHARGE VS. GATE / 16' HEAD.	1923/06/00	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-108	HOLYOKE TEST # 2160 / RAISED TO 85 3/4" DIA. 49 3/4" GUIDES / 46' HEAD 112.5 RPM.	UNDATED	NONE	H 30.5, W 21.5 CM	GRAPHITE	PAPER
133-050-109	HOLYOKE TEST NO 2160 / 25" I. P. MORRIS TYPE "O" / EFFICIENCY VS. GATE / 16' HEAD	1923/06/00	NONE	H 45.7, W 29,2 CM	INK, GRAPHITE	PAPER
133-050-110	HOLYOKE TEST NO.2160 / 25" I. P. MORRIS TYPE "O" / HORSE POWER VS. GATE / 16' HEAD.	1923/06/00	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-113	HOLYOKE TEST # 2872 / 30" WORTHINGTON "E" / NS=124.	1923/05/15	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-116-A	P. L.& C. LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 1.	1924/04/15	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-116-B	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / FRANCIS' EXPERIMENTS / SECTIONS A B C D.	1924/04/15	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-116-C	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES.	1924/04/15	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-116-D	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / OUTLINE OF TUBES.	1924/04/15	1/2 SIZE	H 21.5, W 30.5 CM	INK	PAPER
133-050-116-E	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 2.	1924/04/15	NONE	H 21.5, W 30.5 CM	INK	PAPER

133-050-116-F	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 2 WITH PLATE.	1924/04/15	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-116-G	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 3.	SEE NOTES	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-116-H	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBES NO.1 & 3 / WITH WHIRL.	SEE NOTES	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-118	DIAGRAM SHOWING VARIOUS / DRAFT TUBES REDUCED TO THE / SAME THROAT DIAMETER / SHEET # 1.	1924/10/22	NONE	H 30, W 30.5 CM	INK	DRAFTING CLOTH
133-050-119	EXPERIMENTS ON DIVERGING TUBES / SKETCH OF TESTING FLUME / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1924/04/09	1/2"=1'	H 21.7, W 32.8 CM	INK	DRAFTING CLOTH
133-050-120	SKETCH SHOWING VARIOUS STRAIGHT FLARING DRAFT TUBES COMPARED WITH TUBE G (ALLENS TESTS) & WITH / EXPANDING TUBES.	1924/04/00	NONE	H 30.5, W 21.5 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	PAPER
133-050-121-[A]	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 4.	1924/09/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-121-[B]	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 4 / WITH BELL.	1924/09/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
133-050-121-[C]	P. L.& C., LOWELL, MASS. / EXPERIMENTS ON DIVERGING TUBES / TUBE NO. 5.	1924/09/00	NONE	H 21.5, W 30.5 CM	INK	PAPER

133-050-123	HAMILTON MFG. CO. # 8 WHEEL / 36"-R. H.-150 R.P.M.-PHI=813 / 13' / LEFFEL UNIT.TYPE Z / STEPPED FROM HOLYOKE TEST # 2680.	UNDATED	NONE	H 45.7, W 29.2 CM	INK	PAPER
133-050-124-[A]	EFFICIENCY CURVES / # 8 WHEEL / HAMILTON MFG. CO. / 36"-R. H. TYPE Z LEFFEL WHEEL / FROM HOLYOKE TEST # 2680. / [ALSO] EFFICIENCY CURVES / # 9 WHEEL / HAMILTON MFG. CO. / 39"-R. H. TYPE Z LEFFEL WHEEL / FROM HOLYOKE TEST # 2680.	UNDATED	NONE	H 29, W 45.7 CM	GRAPHITE	PAPER
133-050-124-[B]	HAMILTON MFG. CO. # 9 WHEEL / 39"-R. H. TYPE Z LEFFEL UNIT L / 13' FALL-133 R.P.M.-PHI=.781 / STEPPED UP FROM HOLYOKE TEST # 2680.	UNDATED	NONE	H 29, W 45.7 CM	INK	PAPER
133-050-125	MASSACHUSETTS COTTON MILLS / EFFICIENCY CURVES / OF / WATER WHEELS [1, 2 & 3; 4, 5, & 6, AND PRESCOTT WHEELS 7 TO 11 FROM HOLYOKE TESTS # 1865, # 2611 AND # 2667 RESPECTIVELY].	UNDATED	NONE	H 29, W 45.7 CM	INK, GRAPHITE	PAPER
133-050-126	PROPOSED LOWER LOCKS FLUME / 30"LEFFEL "Z" / MAXIMUM HEAD=14 FEET.	1921/11/00	1/4"=1'	H 29.2, W 37.5 CM	GRAPHITE	PAPER
133-050-127	TAFEL 4 / FIG 1 / THEORIE UND BAU / DER / TURBINEN / VON / F. REDENBACHER / MANNHIEM 1860. [THEORY OF VERTICAL TURBINE.]	1945/10/07	NONE	H 23, W 17 CM	INK	DRAFTING CLOTH
133-064-[A]	[A STUDY OF DRAFT TUBES INCLUDING A 45" ALLIS-CHALMERS FOR PIT NO.1, BOOTT MILLS (SECTION OF PROPOSED 600 H.P. HYDRO-ELECTRIC UNIT).]	1919/04/26	1/2"=1'			

133-064-[B]	[A STUDY OF DRAFT TUBES INCLUDING 39" TYPE Z, VERTICAL SHAFT LEFFEL TURBINE.]	1919/04/26	1/2" & 3/4"=1'			
133-064-[C]	[A STUDY OF DRAFT TUBES INCLUDING A 114" I. P. MORRIS WHEEL FOR THE TURNERS FALL CO.]	1919/04/26				
133-064-[D]	[A STUDY OF DRAFT TUBES FOR VARIOUS WHEELS INCLUDING 42" D R. H. SPECIAL VERTICAL HERCULES.]	1919/04/26	1"=1'			TP
133-064-[E]	[A STUDY OF DRAFT TUBES INCLUDING 58" S. MORGAN SMITH TURBINE AT GARDINERS FALLS PLANT.]	1919/04/26	1/4"=1'			TP
133-065	[BLUEPRINT SHOWING PROPOSED HORIZONTAL SETTING WITH HYDRAUCONE. 45" ALLIS-CHALMERS WHEEL. ALLIS-CHALMERS MFG. CO.]	1919/04/26			BP	
133-071	DIAGRAM SHOWING VELOCITY / AT POINTS IN THE DISCHARGE FROM / 33" R. H. "D" HERCULES WHEEL / AS TESTED AT HOLYOKE FEB. 26, 1919 / FOR PRESCOTT MILL	1918/11/04	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
133-073	VELOCITY DIAGRAM / FOR / BOOTT MILLS NO.1 WATERWHEEL / 42 1/2" ALLIS-CHALMERS RUNNER.	1918/11/04	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
133-075	PATTERN OF BUCKET OUTLET / OF A / 45", ALLIS-CHALMERS WHEEL / FOR / BOOTT MILLS.	1918/05/14	NONE	H 85.6, W 74.3 CM	INK	PAPER
133-078	[DIAGRAMS FOR CONVERTING CUBIC FEET PER SECOND INTO MILL POWERS.]	1919/01/00			BP	
133-091	[BLUEPRINT SHOWING ASSEMBLY OF HOLYOKE TEST # 30-34" DIA. RUNNER.]	UNDATED			BP	

133-104	[DRAWING OF EXPERIMENTAL DRAFT TUBE.]	1922/02/23	1"=1'			
133-105	[DRAFT TUBE EXPERIMENTS.]	1923/01/00				
133-111	[CURVES SHOWING HORSE POWER VS. EFFICIENCY. SWAMP LOCKS DRAFT TUBE EXPERIMENTS. 12" TYPE Z LEFFEL WHEEL. AUG. TO NOV.,1922.]	1923/11/30				
133-112	[BLUEPRINT SHOWING ASSEMBLY OF TEST NO.181. ALLIS-CHALMERS MFG. CO.]	1921/03/11	1"=1'			
133-114	[BLUEPRINT SHOWING 8" GUIDE VANES FOR 72" TYPE # 13 RUNNER USED ON HYDRAULIC TURBINE. ALLIS-CHALMERS MFG. CO.]	1916/11/18	1 1/2",6" & 12"=1'		BP	
133-115	[CURVES SHOWING HORSE POWER VS. EFFICIENCY. SWAMP LOCKS DRAFT TUBE TUBE EXPERIMENTS. 17" TYPE F LEFFEL WHEEL. AUG. TO NOV.,1922.]	1923/11/30				
133-117	[BLUEPRINT SHOWING TWO VERTICAL TURBINES FOR P. L. & C., LOWELL, MASS., FROM THE JAMES LEFFEL & CO. 17" VERTICAL TYPE F & 12" VERTICAL TYPE Z.]	1922/02/02	1 1/2"=1'		BP	
133-122	[PLAN AND SECTION OF PROPOSED S. MORGAN SMITH COS. WHEELS TO TAKE THE PLACE OF BOOTT 3, 4, & 5 WHEELS.]	1944/09/13	3/8"=1', 1/8"=1'		BLUEPRINT	
133-128	PLAN & SECTIONS / OF / PRESENT & SUGGESTED WATERWHEELS / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO. ASSETS DIVISION.	1948/05/20	1/8"=1'	H 54.7, W 79 CM	INK, COLORED INK, WATERCOLOR	DRAFTING CLOTH

133-128-[COPY 1]	PLAN & SECTIONS / OF / PRESENT & SUGGESTED WATERWHEELS / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO. ASSETS DIVISION.	1948/05/20	1/8"=1'	H 54.7, W 76 CM	BLUEPRINT	PAPER
133-129-[COPY 1]	CLOSING INLETS TO SUFFOLK WHEELS.	1949/06/02	1/4"=1'	H 41.5, W 136.6 CM	BLUEPRINT	PAPER
133-129-[COPY 2]	CLOSING INLETS TO SUFFOLK WHEELS.	1949/06/02	1/4"=1'	H 41.3, W 137 CM	BLUEPRINT	PAPER
133-130	SKETCH SHOWING / 5" PLANK BULKHEAD / FOR THE / NASHUA MFG. COMPANIES PENSTOCKS / NOS. 3, 3A, 4, 4A WHEELS / LOWELL, MASS.	1941/10/26	1/4"=1'	H 25.6, W 40 CM	INK, WATER COLOR	DRAFTING CLOTH
133-131	DIAGRAM SHOWING PRESSURE / ON 5" PLANK BULKHEAD / OF THE / NASHUA MFG. COMPANIES PENSTOCKS / LOWELL, MASS.	1941/10/26	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
134-[170]	[UNTITLED.] [PLAN OF TWO LOTS BETWEEN MANSFIELD ROAD AND THE MERRIMACK RIVER ALONG RAVEN ROAD. THE LARGER LOT IS APPROXIMATELY 56.4 ACRES, THE SMALLER IS APPROXIMATELY 12.5 ACRES.]	UNDATED	1"=100'	H 87.3, W 66.7 CM	INK	DRAFTING CLOTH
134-[171]	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO J. A. E. REALTY TRUST.	SEE NOTES	1"=20'	H 45.6, W 60.1 CM	BLUE LINE PRINT	PAPER
134-001	SKETCH SHOWING PROPERTY LINE BETWEEN / MIDDLESEX COMPANY & PROPS. OF LOCKS & CANALS / WITH PROPOSED STRIP TO BE LEASED TO MIDDLESEX CO. / FOR PENSTOCK & POWER HOUSE. [LOT # 79.]	1917/06/22	1"=40'	H 50.9, W 109.9 CM	INK, COLORED INK	DRAFTING CLOTH
134-001-4127	[UNTITLED.]	1895/09/01	1"=40'	H 23.6, 39.1 CM	INK, COLORED INK	DRAFTING CLOTH

134-002	[UNTITLED.] [SKETCH SHOWING SECTION OF WEST BANK & WALL OF THE EASTERN CANAL. LOT # 80.]	1917/08/30	NONE	H 20.6, W 26.8 CM	INK, COLORED INK	DRAFTING CLOTH
134-002-4125	PLAN OF LAND OF / PROPS. LOCKS & CANALS / LOWELL, MASS.	1900/02/14	1"=40'	H 39.2, W 64.6 CM	INK, WATER COLOR	PAPER
134-003-4123	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS AND CANALS / NEAR / BROADWAY.	1890/05/26	1"=10'	H 50.5, W 61.6 CM	INK, WATER COLOR	CLOTH BACKED PAPER
134-003-4220	PLAN OF / LAND IN PAWTUCKETVILLE / BELONGING TO PROPS OF L.& C. / [ALONG NORTH BANK OF RIVER & WEST OF MOODY ST.] LOWELL, MASS. [LOT # 103.]	1899/01/00	1"=50'	H 74.8, W 119.5 CM	INK, WATER COLOR	CLOTH BACKED PAPER
134-004	SKETCH SHOWING CERTAIN LOTS / IN / LITTLE CANADA / NEAR PROPOSED NEW POWER HOUSE. [LOTS # 31 & 33.]	1920/11/23	1"=250'	H 22.8, W 22.8 CM	INK, WATER COLOR	DRAFTING CLOTH
134-004-[COPY 1]	SKETCH SHOWING CERTAIN LOTS / IN / LITTLE CANADA / NEAR PROPOSED NEW POWER HOUSE. [LOTS # 31 & 33.]	1920/11/23	1"=250'	H 22.8, W 22.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-004-4126	LAND OF / PROPS OF LOCKS AND CANALS / LAND OF THE LOWELL GAS LIGHT CO.	1890/08/00	1"=40'	H 39.5, W 52.5 CM	INK, COLORED PENCIL	PAPER
134-005-4128	LAMSON CONSOLIDATED / STORE SERIVCE CO.	1889/07/10	1"=20'	H 50.5, W 75 CM	BLUEPRINT	PAPER
134-005-4355	[PLAN SHOWING PREMISES BOUGHT BY DAVID ZISKIND IN NOV. 1919 FROM WM. E. LIVINGSTON NEAR UPPER PAWTUCKET CANAL & MIDDLESEX ST.]	1902/01/24	1"=50'			

134-005-4355-[COPY 1]	PLAN SHOWING PREMISES / OWNED BY WM. E. LIVINGSTON / LOWELL, MASS. / NOV. 1919-LIVINGSTON PROPERTY BOUGHT BY / DAVID ZISKIND.	1902/01/24	1"=50'	H 53.7, W 104.3 CM	BLUEPRINT	PAPER
134-006	PLAN OF LOCKS & CANALS LOTS / NEAR / PAWTUCKET FREE LANDING [ON MERRIMACK RIVER NEAR PERKINS ST.]	1921/03/22	1"=100'	H 54.9, W 61 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
134-006	LOCATION / OF A PART OF THE / LAND WEST OF SCHOOL ST. / TAKEN FROM THE PROPS. OF LOCKS & CANALS / BY THE / NASHUA & LOWELL RAILROAD CORPORATION.	1884/07/00	1"=20'	H 46.4, W 97.2	INK, COLORED INK	PAPER
134-007	[PLAN SHOWING COUNTOURS OF] TOPOGRAPHY / AIKEN ST. DUMP / PROPRIETORS OF LOCKS & CANAL / LOWELL, MASS. [LOTS # 91, 92, AND 107.]	1921/04/00	1"=50'	H 70, W 119.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
134-007-4130-[A]	PLAN OF LAND / [NEAR "RED" BRIDGE] / LEASED TO DANIEL GAGE.	1899/10/26	1"=20'	H 46.4, W 97.6 CM	INK, COLORED INK	PAPER
134-007-4130-[B]	PLAN OF LAND / [NEAR "RED" BRIDGE] / LEASED TO DANIEL GAGE.	1899/10/26	1"=20'	H 44.5, W 79.4 CM	INK, WATER COLOR, COLORED INK	PAPER
134-008	[PLAN SHOWING CONTOURS OF] L. & C. LAND EAST OF AIKEN ST. [ON NORTH BANK OF RIVER] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. [LOT # 89.]	1921/05/00	1"=50'	H 42.1, W 88.3 CM	INK, COLORED INK	DRAFTING CLOTH

134-008-[COPY 1]	[PLAN SHOWING CONTOURS OF] L. & C. LAND EAST OF AIKEN ST. [ON NORTH BANK OF RIVER] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. [LOT # 89.]	1921/05/00	1"=50'	H 42.1, W 88.3 CM	BLUEPRINT	PAPER
134-008-4131	PLAN SHOWING CERTAIN LAND IN / LOWELL, MASS. / BELONGING TO PROPS LOCKS AND CANALS.	1895/11/26	1"=20'	H 40, W 125 CM	INK, GRAPHITE	DRAFTING CLOTH
134-009	[UNTITLED.] [PLAN OF LOT # 64 ON BANK OF NORTHERN CANAL OPPOSITE TUCKER ST.]	UNDATED	1"=40'	H 28.9, W 21.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-009-4132-A	PLAN OF LAND / BELONGING TO / PROPS OF LOCKS & CANALS.	1899/11/18	1"=20'	H 46, W 70 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
134-010-4132	PLAN OF LAND / BELONGING TO / PROPS. OF LOCKS & CANALS.	1899/06/00	1"=20'	H 40.5, W 88 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
134-010-4145	SKETCH SHOWING / LAND [LOT # 2] TO BE LEASED TO THE / ARMOUR COMPANY / [ON PAWTUCKET CANAL] LOWELL, MASS.	1896/08/24	1"=20'	H 34.7, W 21.4 CM	INK	PAPER
134-011-4153-A	[UNTITLED.] [PLAN SHOWING LOTS ALONG BANK OF NORTHERN CANAL BETWEEN PAWTUCKET & CABOT STS.]	1901/07/26	1"=50'	H 32, W 91.2 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
134-011-4153-B	PLAN OF LAND / LEASED TO MERRIMACK PAVING CO. / FROM OCT. 1, 1901.	1901/10/01	1"=20'	H 45, W 85 CM	INK, GRAPHITE	TRACING PAPER
134-012-4133	PLAN OF LAND / PROPOSED TO BE LEASED TO THE CITY OF LOWELL FOR / A PIPE YARD.	1892/01/07	1"=40'	H 37, W 55.5 CM	INK, COLORED PENCIL, GRAPHITE	PAPER

134-012-4425	PLAN OF LAND / OWNED BY / PROPS OF LOCKS & CANALS / EASTERLY OF / CENTRAL & PRESCOTT STS. [LOTS # 79-80.]	1904/04/15	1"=20'	H 41.8, W 64.1 CM	INK, WATER COLOR, COLORED INK	PAPER
134-013-4159-[A]	EXTRACTS FROM STREET RECORDS, CITY OF LOWELL.	SEE NOTES	NONE	H 27.4, W 21.3 CM	INK	PAPER
134-013-4159-[B]	PLAN OF A PART OF MERRIMACK ST. / DATA FROM STREET RESOLUTION / DATED DEC. 15, 1846.	1890/07/00	1"=40'	H 30, W 53.7 CM	BLUEPRINT, COLORED INK	PAPER
134-014-4135	PLAN OF LAND / BELONGING TO / PROPS. OF LOCKS & CANALS.	1899/09/21	1"=40'	H 32, W 49.5 CM	INK, COLORED INK, GRAPHITE	PAPER
134-014-4162	PLAN OF LAND / BELONGING TO / PROPS OF LOCKS & CANALS / [BETWEEN PAWTUCKET ST. & NORTHERN CANAL] SHOWING / CONTOUR LINES & OTHER DATA. [LOT # 30.]	1896/10/29	1"=20'	H 45, W 99.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
134-015-[A]-4136	PLAN OF LAND / NEAR / UPPER FREE LANDING.	1899/07/29	1"=40'	H 40, W 65 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-015-[B]-4137	PLAN OF LAND / NEAR / UPPER FREE LANDING.	1899/07/29	1"=40'	H 40, W 65 CM	BLUEPRINT, INK	PAPER
134-015-4170	PLAN OF YARD & ADJACENT PROPERTY / BELONGING TO / PROP'S. OF LOCKS & CANALS [ON BROADWAY]. [LOT # 66.]	1892/01/01	1"=20'	H 55.1, W 84 CM	COLORED INK, INK, COLORED PENCIL, GRAPHITE	PAPER
134-016	[WEST ST. PROFILE.]	1914/01/22			BP	

134-016-4138	PLAN OF LAND IN LOWELL / COMPILED FROM PLANS & DOCUMENTS IN THE / OFFICE OF / THE PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER.	1876/10/00	1"=20'	H 37.5, W 61 CM	INK, WATER COLOR	CLOTH BACKED PAPER
134-016-4171	LAND OF PROPS LOCKS & CANALS / COUNTING ROOM LOT / AND / ADJOINING LOT.	1895/07/30	1"=20'	H 54.5, W 86.5 CM	COLORED INK, GRAPHITE	PAPER
134-017-4139	PLAN OF LAND ON WESTERN AVENUE / BELONGING TO PROPS OF LOCKS AND / CANALS, TOGETHER WITH LOCA- / TION OF THE NASHUA & LOWELL / R. R. TRACKS, AS NOW LAID / BETWEEN WESTERN AVE. AND / PAWTUCKET CANAL.	1889/04/03	1"=10'	H 40, W 91	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
134-017-4172	PLAN OF LAND / ON / WESTERN CANAL / BETWEEN / BROADWAY & DUTTON STS. / BELONGING TO / PROPS. OF LOCKS & CANALS.	1889/05/00	1"=40'	H 55.6, W 71.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
134-018	[PLAN OF LAND IN LOWELL NEAR JUNCTION OF PAWTUCKET BOULEVARD & VARNUM AVE., BELONGING TO DANIEL GAGE & OTHERS.]	1898/04/00	1"=50'			
134-018-[COPY 1]	PLAN OF LAND IN LOWELL / BELONGING TO / DANIEL GAGE & OTHERS. / TRACED FROM A PLAN CITY ENGINEER'S OFFICE.	1898/04/00	1"=50'	H 44.6, W 74.4 CM	BLUEPRINT	PAPER
134-018-4140	PLAN OF THE / UPPER FREE LANDING / AND LAND LEASED TO / JOSEPH A. CORAM.	1898/09/00	1"=20'	H 43, W 71 CM	INK, COLORED INK, GRAPHITE	PAPER

134-019-4141	PLAN OF LAND / NEAR / UPPER FREE LANDING / TO BE LEASED TO / JOSEPH A. CORAM.	1897/09/31	1"-20'	H 43, W 65 CM	INK, COLORED INK, GRAPHITE	PAPER
134-019-4178	PLAN / OF A PART OF [LAND NEAR] FLAGGY MEADOW BROOK / PREVIOUS TO THE CONSTRUCTION OF THE / FILTERING GALLERY OF THE L. W. W. [LOWELL WATER WORKS].	1871/04/00	1"=30'	H 48.9, W 76.3 CM	LITHOGRAPH, COLORED PENCIL, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
134-020-4142	[UNTITLED.]	1899/09/08	1"=5'	H 71, W 95 CM	INK, COLORED INK, GRAPHITE	PAPER
134-020-4180-A	[PLAN OF LAND ON NORTH BANK OF RIVER BETWEEN RIVER & COLONIAL AVENUE, WEST OF MOODY ST. LOT # 103.] SKETCH OF STREETS WHERE / SEWERS ARE PETITIONED FOR BY A. J. SAFFORD & OTHERS / HEARING APRIL 11, 1904.	1904/04/11	1"=50'	H 59, W 91 CM	INK, WATER COLOR, GAPHITE	PAPER
134-021-4143	PLAN OF THE / UPPER FREE LANDING / LOWELL, MASS.	1900/02/00	1"=40'	H 41, W 73 CM	INK	DRAFTING CLOTH
134-021-4185	PLAN OF LAND / EAST OF / PAWTUCKET CANAL / & BETWEEN / BROADWAY & PAWTUCKET STS. [SHOWING CONTOURS] / BELONGING TO / PROPS. OF LOCKS & CANALS. [LOT # 13.]	1894/07/00	1"=40'	H 54, W 126.6 CM	INK, COLORED INK	PAPER

134-022-4189	[UNTITLED.] [PLAN OF LAND SOUTH OF PAWTUCKET CANAL BETWEEN SCHOOL, MIDDLESEX, WALKER, & BROADWAY. LOTS # 6 & 7.]	1901/04/00	1"=50'	H 75.1, W 121.2 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	TRACING PAPER
134-022-4189-A	[UNTITLED.] [PLAN OF LAND NORTH OF MIDDLESEX STREET.]	1910/01/07	1"=50'	H 58.2, W 104.7 CM	GRAPHITE	TRACING PAPER
134-023-4188	PLAN OF LAND [LOTS # 6 & 7] / BELONGING TO / PROPS. OF LOCKS & CANALS / SOUTHERLY OF / PAWTUCKET CANAL / & BETWEEN / SCHOOL ST. & B. & M. R. R. / SHOWING CONTOURS TAKEN NOV. 12-15,1900.	1900/12/06	1"=40'	H 61.6, W 118 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
134-024	SKETCH SHOWING LAND [LOT # 30 BETWEEN NORTHERN CANAL & PAWTUCKET ST. WEST OF MOODY ST., SHOWING CONTOURS.] ON OPPOSITE / SIDE OF PAWTUCKET ST. / FROM LOWELL HOSPITAL.	1917/11/17	1"=50'	H 43, W 50 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
134-025-4147	[UNTITLED.] [PLAN OF LAND BETWEEN MARKET ST. AND PAWTUCKET CANAL WEST OF CENTRAL ST.]	1893/03/10	1"=40'	H 21, W 35 CM	INK, COLORED INK, GRAPHITE	PAPER
134-025-4197	PLAN OF LAND [LOT # 6] / BELONGING TO / PROPS. OF LOCKS & CANALS / SOUTHERLY OF / PAWTUCKET CANAL / AND BETWEEN SCHOOL ST AND B.& M. R .R. / SHOWING CONTOURS TAKEN MAY 2, 1901.	1901/05/03	1"=40'	H 56, W 92 CM	INK, WATER COLOR, GRAPHITE	PAPER

134-026	SKETCH OF SOUTH SHORE OF MERRIMACK RIVER / NEAR BOAT HOUSES.	1888/08/00	1"=20'	H 47, W 98 CM	INK, WATER COLOR, GRAPHITE	PAPER
134-026-4206	SKETCH OF AMORY ST. / SHOWING / LOCKS & CANALS PROPERTY LINE.	1904/06/10	1"=50'	H 25.9, W 78.8 CM	INK, WATER COLOR	TRACING PAPER
134-027	LOWELL.	1882/03/22	1"=20'	H 81, W 92 CM	INK, COLORED INK, GRAPHITE	PAPER
134-027-4197-A	PLAN OF / LAND [LOT # 6 SOUTH OF PAWTUCKET CANAL BETWEEN] WEST OF SCHOOL ST. [& B. & L. R. R. BRIDGE SHOWING LOCATION OF BRICK SEWER] / BELONGING TO / PROPS. LOCKS & CANALS.	1905/12/00	1"=50'	H 44.8, W 93 CM	BLUEPRINT, COLORED INK	PAPER
134-028-4150	[UNTITLED.]	UNDATED	1"=20'	H 48, W 66 CM	INK, GRAPHITE	PAPER
134-028-4209 (1)	PLAN OF A PART / OF / MERRIMACK RIVER / [BETWEEN BEAVER BROOK & CONCORD RIVER] SHOWING AN ADOPTED MODIFICATION OF THE / SOUTHERLY BOUNDARY LINE ADJACENT TO / MASSACHUSETTS COTTON MILLS.	1908/12/00	1"=100'	H 54.3, W 81.5 CM	BLUEPRINT, COLORED INK	PAPER
134-029	[PLAN OF LAND, SHOWING CONTOURS] LOT NO. 7 / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/07/02	1"=30'	H 53.2, W 76.2 CM	INK, WATER COLOR	CLOTH BACKED PAPER

134-029-4251	[UNTITLED.]	1894/02/12	NONE	H 43, W 55 CM	INK, WATER COLOR INK, COLORED INK, WATER	TRACING PAPER
134-030	LOT NO. 8 [SHOWING CONTOURS] / PROPRIETORS OF LOCKS & CANALS.	1922/07/13	1"=50'	H 53, W 76.2 CM	COLOR, PHOTOGRAPH	CLOTH BACKED PAPER
134-030-4124	NEW UPPER FREE LANDING.	SEE NOTES	NONE	H 47, W 84 CM	INK, GRAPHITE	PAPER
134-030-4124-A	[UNTITLED.]	UNDATED	NONE	H 31, W 51 CM	GRAPHITE	PAPER
134-031	[PLAN OF LAND, SHOWING CONTOURS] LOT NO. 13 / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/07/18	1"=50'	H 53, W 76 CM	INK, COLORED INK, WATER COLOR, PHOTOGRAPH	CLOTH BACKED PAPER
134-032	MEMORANDUM PLAN / [OF] LAND [IN VICINITY OF LAWRENCE MFG. CO.] BELONGING TO THE PROPS. LOCKS & CANALS, LOWELL, MASS. [SHOWING RESERVED STRIP & LOT NO. 33.]	1922/08/00	1"=100'	H 47.3, W 69.5 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
134-032-[COPY 1]	MEMORANDUM PLAN / [OF] LAND [IN VICINITY OF LAWRENCE MFG. CO.] BELONGING TO THE PROPS. LOCKS & CANALS, LOWELL, MASS. [SHOWING RESERVED STRIP & LOT NO. 33.]	1922/08/00	1"=100'	H 47.3, W 68.5 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER

134-032-4144	TRANSIT LINE / WESTERN AVE. / DUTTON ST.	UNDATED	1"=20'	H 56, W 64 CM	INK, COLORED INK, GRAPHITE	PAPER
134-033	[PLAN OF LAND] LOT # 8 / REAL ESTATE [SHOWING TREES, PHONE LINES, & CONTOURS] PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/10/14	1"=40'	H 45.6, W 74.3 CM	INK, WATER COLOR	CLOTH BACKED PAPER
134-033-4152	PLAN OF LAND LEASED TO ALFRED BIHEAULT / BY PROPS. LOCKS & CANALS, LOWELL, MASS.	1895/02/00	1"=20'	H 39, W 71 CM	INK, COLORED INK, COLORED PENCIL	PAPER
134-034	[UNTITLED.] [PLAN SHOWING LAND BETWEEN LAKEVIEW AVE. & MERRIMACK RIVER & BETWEEN WEST STS., WITH CONTOURS. LOTS # 87 & 88.]	UNDATED	1"=50'	H 47, W 116.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
134-034-4153	[UNTITLED. SEE NOTES.]	UNDATED	1"=20'	H 56, W 132.3 CM	INK, WATER COLOR	PAPER
134-035	PLAN OF / LAND IN PAWTUCKETVILLE / BELONGING TO / PROPS. OF LOCKS & CANALS / LOWELL, MASS.	1899/01/01	1/8"=10'	H 40.7, W 61 CM	HELIOTYPE, COLORED INK	PAPER
134-035-4155	PLAN OF LAND / BETWEEN / NORTHERN CANAL AND MERRIMACK RIVER / BELONGING TO / PROPS OF LOCKS AND CANALS.	SEE NOTES	1"=80'	H 65, W 71 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
134-036	MAP OF LOTS 3 & 3A / & VICINITY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1924/01/11	1"=40'	H 50, W 75 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-036-[COPY 1]	MAP OF LOTS 3 & 3A / & VICINITY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1924/01/11	1"=40'	H 49.9, W 74.1 CM	BLUEPRINT, COLORED PENCIL	PAPER

134-036-[COPY 2]	MAP OF LOTS 3 & 3A / & VICINITY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1924/01/11	1"=40'	H 49.9, W 74.7 CM	BLUEPRINT	PAPER
134-036-4155-A	[UNTITLED.] [PLAN OF LAND / BETWEEN NORTHERN CANAL AND MERRIMACK RIVER / BELONGING TO / PROPS OF LOCKS AND CANALS].	1899/03/17	1"=80'	H 56, W 71 CM	INK, GRAPHITE	PAPER
134-037	PLAN OF LAND / BETWEEN / NORTHERN CANAL & MERRIMACK RIVER / BELONGING TO / PROPS OF LOCKS & CANALS.	1887/03/00	1/8"=10'	H 63.2, W 68.5 CM	LITHOGRAPH, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
134-037-[130]	AREA ON CANAL STREET / LEASED TO / GARAGE REALTY TRUST, THOMAS J. SULLIVAN, TRUSTEE / LOWELL, MASS.	1957/05/17	1"=40'	H 21.7, W 35.5 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-001	PLAN SHOWING / PROPOSED R. R. TRACK ON SOUTHERLY SIDE / OF PAWTUCKET CANAL / LOWELL, MASS.	1923/11/00	1"=40'	H 39.4, W 104.2 CM	INK	TRACING PAPER
134-037-002	PLAN OF / LOCKS & CANALS LAND / ALONG PAWTUCKET CANAL / FROM SCHOOL ST. TO [PAWTUCKET ST.] THORNDIKE ST.	1923/05/00	1"=150'	H 26.7, W 46.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-003	PLAN OF L. & C. LAND / ON PAWTUCKET CANAL / FROM / MERRIMACK RIVER TO BROADWAY.	1920/07/00	1"=150'	H 27, W 45.9 CM	INK	DRAFTING CLOTH
134-037-004	[UNTITLED.] [PLAN SHOWING LOT 8 & VICINITY.]	UNDATED	NONE	H 26.7, W 34.3 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH

134-037-005	PLAN OF / LOCKS & CANALS LAND / ALONG PAWTUCKET CANAL / FROM BROADWAY TO SCHOOL ST.	1922/01/00	1"=150'	H 27, W 39 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-006	PLAN OF / LAND IN PAWTUCKETVILLE / BELONGING TO / PROPS. OF LOCKS & CANALS / LOWELL, MASS.	1899/01/01	1/8"=10'	H 33.1, W 48.7 CM	INK	DRAFTING CLOTH
134-037-007	PLAN OF LAND / ON / VARNUM AVE., LOWELL, BELONGNG TO PETER COUREMBIS.	1921/10/21	1"=80'	H 42, W 42 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-008	LOWELL, MASS. [PLAN OF LOTS IN VICINITY OF MELVIN & PAWTUCKET STS.]	1938/12/21	1"=50'	H 24.6, W 38.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-009	[PLAN OF] LAND IN 175 FOOT STRIP / ON / CHEEVER, WARD, HALL AND PERKINS STREETS / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1925/12/01	1"=40'	H 53, W 76 CM	INK	DRAFTING CLOTH
134-037-010	LAND IN TUCKER & PERKINS STREETS / BELONGING TO / PROPRIETORS LOCKS & CANALS ON MERRIMACK RIVER.	1926/03/15	1"=40'	H 30.6, W 37.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-011	PLAN OF [CHEEVER ST.] LAND / CONVEYED BY / PROPS. LOCKS & CANALS / TO / UBALD RACETTE.	1926/04/07	1"=50'	H 24.3, W 44.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-012	PLAN SHOWING GOULET HOUSE / AT / CORNER OF HALL & PERKINS STREETS.	1926/01/18	1"=5'	H 32.2, W 39 CM	INK, COLORED PENCIL, COLORED INK	PAPER
134-037-013	PLAN SHOWING / PRESCOTT MILL / OF / MASSACHUSETTS COTTON MILLS.	1925/08/03	1"=50'	H 37, W 47.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-037-014	PLAN OF / LAND ON PERKINS STREET LEASED TO / EMILE MARQUISE.	1926/11/09	1"=50'	H 29.5, W 37 CM	INK	DRAFTING CLOTH
134-037-015	PLAN OF LAND [ON NORTHERLY SIDE OF AIKEN ST., PART OF LOT # 91] / CONVEYED BY PROPS. LOCKS & CANALS / TO / VICTOR PROVENCHER TRUSTEE.	1928/09/00	1"=50'	H 25.9, W 40.2 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
134-037-016	PLAN SHOWING LAND TAKEN BY / CITY OF LOWELL / AT JUNCTION OF / PAWTUCKET & SALEM STREETS.	1928/06/00	1"=20'	H 30.7, W 35.2 CM	INK	DRAFTING CLOTH
134-037-017	A PART OF LAND TO BE ATTACHED TO LEASE. [SKETCH SHOWING LAND ON KYAN ST.LEASED TO MIDDLESEX PAPER TUBE CO. BY LEASE NO. 5700].	UNDATED	1"=60'	H 21.5, W 34 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-018	SKETCH SHOWING / PLATFORM & BUILDINGS / FORMERLY LEASED TO NORTH AMERICA PROVISION CO. / OF CHICAGO ILLINOIS / NOW LEASED TO HERBERT F. JACOBS / OF BILLERICA, MASSACHUSETTS [LOT 28A].	1934/01/20	1"=40'	H 21.5, W 36 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-019	PLAN OF PREMISES / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS / ON WESTERLY SIDE OF / CENTRAL STREET / OVER & ADJOINING PAWTUCKET CANAL / LOWELL, MASS. [LOT 76-77 AND 77A].	1936/01/00	1"=20'	H 35.5, W 22 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-020	SKETCH SHOWING / TEMPORARY SEWER / FROM REX INCORPORATED / TO WASTEWAY OF THE / PROPRIETORS OF THE LOCKS & CANALS.	1934/05/16	1"=20'	H 25.8, W 20.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-037-021	JUNK IN REAR / OF / LAKEVIEW AVE. GARAGE.	1934/05/23	1"=50'	H 24.5, W 42.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-022	SKETCH SHOWING / AREA IN CANAL STREET / LEASED TO / BROCKELMAN BROS. INC.	1934/05/00	1"=40'	H 21.5, W 35.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-023	PLAN SHOWING LOCATION / OF / STACKPOLE STREET PUMPING STATION / & VICINITY.	1935/12/06	1"=40'	H 22, W 28.6 CM	BLUEPRINT	PAPER
134-037-024	SKETCH TO ACCOMPANY / DISCLAIMER FOR SEWER DRAINS [MINUET LOT].	1936/12/12	1"=60'	H 20.7, W 27 CM	INK, COLORED INK	DRAFTING CLOTH
134-037-025	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN OF MINUET LOT [PORTION OF LOT 96-D].	1937/07/00	1/2"& 1"=20'	H 26.1, W 38.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-037-026	LOWELL, MASS. [PLAN OF LAND ALONG EASTERN CANAL, LOTS 80 AND 80-0 LEASED TO THE ROBERTSON FURNITURE CO. AND GOOKIN FURNITURE CO.]	UNDATED	1"=20'	H 21, W 34.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-027	COPY OF PORTION OF / LAND PLAN / OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER [SHOWING LAND DEEDED TO MERRIMACK MFG. CO. SEPT. 1, 1835.]	1935/02/01	1"=50'	H 21.3, W 27.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-028	PLAN SHOWING / AREA REQUESTED BY CITY OF LOWELL / FOR TEMPORARY USE AS A STREET / BETWEEN / LAKEVIEW AVENUE & AIKEN STREET.	1937/06/25	1"=30'	H 32.2, W 44 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
134-037-028-A	PASSAGEWAY 25 FT. WIDE TAKEN BY CITY FOR NEW STREET.	1937/06/11	1"=50'	H 37.1, W 24.5 CM	INK, COLORED INK	DRAFTING CLOTH
134-037-028-A-[COPY 1]	PASSAGEWAY 25 FT. WIDE TAKEN BY CITY FOR NEW STREET.	1937/06/11	1"=50'	H 37.1, W 24.5 CM	BLUEPRINT	PAPER

134-037-029	AREA ON CANAL STREET / LEASED TO BROCKELMAN BROS. INC.	1937/11/01	1"=40'	H 21.6, W 35.5 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-030	SKETCH SHOWING / TWO PARCELS OF LAND DEEDED MAY 23,1936. / TO / RICHARD O. EDWARDS BY KATINA POULIKAKOS.	1938/11/05	1"=200'	H 45.2, W 29.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-031-[A]	PLAN OF EASTERLY END OF LOT 85 / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER SHOWING / PORTION DESIGNATED AS LOT "B" / & / DEEDED TO AGNES F. REYNOLDS.	1939/01/12	1"=50'	H 28, W 54 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-031-[B]	[UNTITLED DOCUMENT.] [EASTERLY END OF LOT 85 BELONGING TO PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER, PORTION DESIGNATED AS LOT "B" & DEEDED TO AGNES F. REYNOLDS.]	1939/01/10	NONE	H 28, W 21.5 CM	INK	PAPER
134-037-032	SKETCH SHOWING / DIMENSIONS, AREAS & VALUATION / PER SQUARE FOOT OF LOCKS & CANALS / LAND IN VICINITY OF LOWER LOCKS.	1939/04/24	1"=50'	H 29.2, W 48.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-033	PLAN SHOWING / PORTION OF LOT 92-A / TO BE DEEDED TO THE / CENTRALVILLE SOCIAL CLUB.	1939/06/00	1"=40'	H 27, W 34.4 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
134-037-034	SKETCH SHOWING / LAND BETWEEN SHAFFER & TYNG STREETS / BELONGING TO / JOHN PILLING SHOE COMPANY / & / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1939/07/03	1"=40'	H 31.9, W 46.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-037-035	SKETCH SHOWING / LAND ON CLARE STREET / BELONGING TO / LOWELL LAND COMPANY.	1939/07/05	1"=20'	H 28, W 47 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-036	SKETCH SHOWING LOCATION / OF / PROPOSED DINER CAR / AT THE / CORNER OF BRIDGE & AMORY STREETS / LOWELL, MASS.	1939/07/19	1/8"=1'	H 20.4, W 43.2 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-037	[UNTITLED.] PLAN OF LAND ON MELVIN STREET CONVEYED BY LOWELL LAND CO. TO GEORGE J. TRUDEL.]	1939/06/00	NONE	H 29.8, W 37.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-038	PLAN SHOWING / PORTION OF LOT 91 / OF THE / LOWELL LAND COMPANY / IN REAR OF / COCOA-COLA BOTTLING CO.	1939/07/31	1"=30'	H 29.8, W 37.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-039	PLAN SHOWING / LAND ON THE SOUTHERLY SIDE / OF PAWTUCKET STREET & / WESTERLY OF PAWTUCKET CANAL.	1939/09/14	1"=30'	H 29.8, W 37.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-040	SKETCH SHOWING / PROPERTY BELONGING TO / ST. JOHN'S HOSPITAL / AND / OTHER SURROUNDING PROPRIETORS / LOWELL, MASS.	1940/05/08	1"=100'	H 33.3, W 51.2 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-041	SKETCH SHOWING / LAND OF VICTOR PROVENCHER / AND / COCOA-COLA BOTTLING COMPANY / ON / NORTHWESTERLY SIDE OF AIKEN STREET.	1940/02/19	1"=40'	H 20.3, W 29.4 CM	INK, WATER COLOR	DRAFTING CLOTH

134-037-042	[UNTITLED.] [SKETCH SHOWING LAND LEASED TO GEO. CADY, JOSEPH J. SWEENEY AND OTHERS ALONG NORTHERLY SIDE OOF PAWTYCKET CANAL BETWEEN NASHUA & LOWELL RAILROAD BRIDGES AND FLETCHER STREET.]	UNDATED	1"=40'	H 21.2, W 35.2 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-042-A	LOWELL, MASS. / P. L & C. LOT 23.	1946/08/27	1"=40'	H 21.6, W 35.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-043	PLAN SHOWING PROPERTY / AT CORNER OF / AIKEN ST. & LAKEVIEW AVE. / NEAR TENEMENTS OF / STANLEY & WHEELER.	1931/11/04	1"=20'	H 31.5, W 43.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-044	LAND BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS / IN VICINITY OF / OLD GRIST MILL BUILDING.	1932/10/15	1"=20'	H 20.7, W 35 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-045	PROPOSED SALE / OF LAND FROM BURNHAM & DAVIS / TO / CHARLES McCARTY.	1933/06/24	1"=40'	H 18.9, W 34 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-046	PLAN SHOWING / SOUTH COMMON / & EDSON SCHOOL LOT / IN 1845.	1940/08/07	1"=8 RODS	H 31.4, W 38.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-047	SKETCH SHOWING / LOT 26A, WESTERN CANAL BORDER / OF THE / LOWELL LAND COMPANY.	1940/03/01	1"=80'	H 20, W 33.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-048	PLAN OF LAND / KNOWN AS LOT 26 [ALONG WESTERN CANAL].	1941/05/03	1"=80'	H 20, W 33.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-048-[COPY 1]	PLAN OF LAND / KNOWN AS LOT 26 [ALONG WESTERN CANAL].	1941/05/03	1"=80'	H 20, W 33.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-037-049	SKETCH SHOWING / LOTS 9, 9-A & 9-B / PROPS. OF THE LOCKS & CANALS / LOWELL, MASS.	1942/10/00	1"=30'	H 21.8, W 35.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-037-050	PROFILE OF / CANALS, BUILDINGS ETC. / ALONG A SUGGESTED STREET / FROM PALMER TO SOUTH STREETS.	UNDATED	NONE	H 27.9, W 43.2 CM	INK, WATER COLOR, COLORED PENCIL	TRACING PAPER
134-037-051	PLAN OF / SUGGESTED PALMER ST. EXTENSION / LOWELL MASS.	1946/08/00	1"=200'(APPROX.)	H 28, W 43 CM	INL, WATER COLOR, COLORED PENCIL	PAPER
134-037-052	WATER SURFACE AT PAWTUCKET DAM / 85.56 AT 4:00 P.M. [PLAN OF LAND FROM ALONG CLAY PIT BROOK FROM STOCKBRIDGE AVENUE TO POINT ABOVE DUNBAR AVENUE SHOWING CONTOURS.]	1939/09/06	NONE	H 22, W 37.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-037-053	[UNTITLED.] [P. L. & C. LOT 27, LEASED TO J. A. E. REALTY TRUST.]	UNDATED	1"=40'	H 21.6, W 35.6 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-054	[UNTITLED.] [P. L. & C. LOT 74A, AMORY ST.]	UNDATED	1"=50'	H 21.6, W 35.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-055	SKETCH SHOWING / LOCATION OF BRIDGE / CONNECTING MILL NO. 1 & NO. 6 / OF THE / APPLTON COMPANY / LOWELL, MASS.	1920/05/17	1"=40'	H 24, W 35.9 CM	INK	DRAFTING CLOTH
134-037-056	AREA ON CANAL STREET / LEASED TO / BROCKELMAN BROS. INC.	1947/03/28	1"=40'	H 21.6, W 35.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-057	[PLAN OF LAND SHOWING P. L.& C. LOTS BORDERING WESTERN CANAL FROM DUTTON TO BROADWAY STREETS.]	1947/09/29	1"=50'			
134-037-058	PLAN OF / LOTS 30-A & 31 / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1947/08/25	1"=50'	H 20.3, W 33 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-037-059	DRAWING FOR / DISCLAIMER OF / ELEC. LT. POLE & WIRES.	1947/04/00	1"=50'	H 20.4, W 27 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
134-037-060	PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR / THE LOWELL, MASONIC ASSOCIATION INC.	1927/05/00	NONE	H 45.4, W 30.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-037-061	PLAN OF LAND IN LOWELL, MASS. / COMPILED FOR / MERRIMACK MANUFACTURING COMPANY.	1938/09/08	NONE	H 30.2, W 45 CM	BLUEPRINT	PAPER
134-037-062	PLAN SHOWING / P. L.& C. LEASED AREAS TO J. A. E. REALTY TRUST / & ADJACENT PROPERTY.	1951/12/00	1"=40'	H 35.5, W 28 CM	INK, WATER COLOR, COLORED PENCIL	PAPER
134-037-063	PLAN OF / AIKEN STREET PLAYGROUND / LEASED TO CITY OF LOWELL / BY / THE PROPRIETORS OF THE LOCKS & CANALS.	1948/11/00	1"=120'	H 32.4, W 21.6 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
134-037-064	PLAN OF / 8 FOOT PASSAGEWAY / BETWEEN / SAINT ANNE'S CHURCH & PARISH HOUSE.	1950/03/21	1"=30'	H 21.6, W 28 CM	INK, COLORED PENCIL, COLORED INK	PAPER
134-037-065	PLAN OF / PREMISES LEASED BY THE / PROPRIETORS OF THE LOCKS & CANALS / TO THE / CITY OF LOWELL / FOR PARK PURPOSES.	1948/11/00	1"=50'	H 45, W 35.3 CM	INK, WATER COLOR	DRAFTING CLOTH
134-037-066	[UNTITLED.] [PROPS. OF LOCKS & CANALS. LOTS 100 AND 100A.]	1948/11/22	1"=50'	H 28, W 48.2 CM	GRAPHITE, COLORED PENCIL	PAPER

134-037-067	PLAN SHOWING / TAKINGS ON LAKEVIEW AVE. CENTRALVILLE, IN LOWELL, MASS. & PORTIONS / ABANDONED BY STATE AFTER ORIGINAL TAKING FOR HIGHWAY PURPOSES. / BELONGING TO / MERRIMACK MFG. CO. & CITY OF LOWELL [WESTERLY END OF FRONT STREET AND OPPOSITE WEST ST.].	1950/04/14	1"=50'	H 35, W 44.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-068	PLAN SHOWING / AREA SUB-LEASED TO / DIAMOND TAXI, OF LOWELL, INC. / FROM STOP & SHOP INC. / LOWELL, MASS.	1954/03/24	1/4"=1'	H 25, W 44.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
134-037-069	PLAN SHOWING / TENANT-AT-WILL LEASED AREA TO E. A. WILSON CO. / FROM P. L. & C. LOTS 13-A & 13-B.	1952/06/01	1"=40'	H 34, W 54.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-037-070	[UNTITLED.] [PLAN SHOWING MIDDLESEX PLACE AND RIGHT OF PASAGE TO P. L. & C. LAND. SEE P. L. & C. DOCUMENT NO. 384.]	1954/03/20	1"=40'	H 28, W 35.5 CM	INK, COLORED PENCIL	PAPER
134-037-071	LOWELL, MASS. [PLAN SHOWING P. L. & C. CANAL BORDER FROM MARKET STREET TO Y. M. C. A.]	1953/01/07	1"=50'	H 25.4, W 45 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
134-037-072	PORTION OF LOT 13-A & B / LEASED TO E. A. WILSON CO. / APPROXIMATE AREA 18,600 SQ. FT.	1952/06/01	1"=20'	H 26, W 38.8 CM	INK, COLORED INK	DRAFTING CLOTH
134-037-073	SKETCH SHOWING / FENCING ON P. L. & C. LOT 11 / LOWELL, MASS.	1951/10/00	1"=40'	H 28.3, W 22 CM	INK, COLORED INK	PAPER
134-037-125	PLAN OF LAND [AT CORNER OF AIKEN & PAWTUCKET STS.] CONVEYED TO JOHN E. REGAN / BY / PROPRIETORS LOCKS & CANALS.	1929/06/28	1"=30'	H 30.4, W 43.5 CM	INK	DRAFTING CLOTH

134-037-129	PROFILE OF / PRESENT CANALS, BUILDINGS ETC. / ALONG WEST SIDE OF PROPOSED STREET / FROM PALMER TO SOUTH STREET.	UNDATED	NONE	H 29.3, W 45.8 CM	INK, COLORED PENCIL	PAPER
134-038	PLAN OF LOCKS & CANALS LOT # 2 / ON THORNDIKE & JACKSON STS. / & PART OF APPLETON CO.	1920/09/00	1"=50'	H 40, W 76.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-038-4156-A	PLAN / SHOWING BUILDINGS BELONGING TO / D. H. LAPORTE / WHICH ARE ON LAND OF PROP. LOCKS & CANALS / LOWELL, MASS.	1898/01/06	1"=40'	H 50, W 75 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-039-4158	[UNTITLED. SEE NOTES.]	1881/12/21	1"=20'	H 61.1, W 58.4 CM	INK, COLORED INK	PAPER
134-040-4203	[UNTITLED. SEE NOTES.]	UNDATED	1"=50'	H 59.7, W 109.2 CM	INK, WATER COLOR	PAPER
134-044-4165	PLAN OF LAND / BETWEEN / STACKPOLE ST. & MERRIMACK RIVER / BELONGING TO PROPS. OF LOCKS & CANALS.	1895/06/00	1"=40'	H 48.2, W 76.6 CM	INK, WATER COLOR	PAPER
134-045-[A]	[UNTITLED. SEE NOTES.]	1871/12/19	1"=40'	H 50.9, W 69 CM	INK	DRAFTING CLOTH
134-045-[B]	[UNTITLED. SEE NOTES.]	1871/12/19	NONE	H 25, W 19.8 CM	INK	PAPER
134-046-4166	SKETCH SHOWING / LAND BELONGING TO PROPS LOCKS & CANALS / AT CORNER OF LAKEVIEW AVE. & AIKEN STREET.	1893/00/00	1"=40'	H 55.7, W 71.1 CM	INK	PAPER
134-047-[A]-4167	PLAN OF LAND / BELONGING TO / PROPS OF LOCKS & CANALS.	1900/02/16	1"=20'	H 66.1, W 91.5 CM	INK, COLORED INK	PAPER
134-047-[B]-4167-A	PLAN OF LAND / BELONGING TO / PROPS OF LOCKS & CANALS.	1900/02/16	1"=20'	H 77.2, W 96.9 CM	INK, COLORED INK	DRAFTING CLOTH

134-049	[UNTITLED. SEE NOTES.]	1882/04/00	1"=60'	H 64.3, W 86.4 CM	INK, WATER COLOR	CLOTH BACKED PAPER
134-053-4173	[UNTITLED. SEE NOTES.]	1890/04/00	1"=20'	H 85.8, W 83 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
134-054-4174	[UNTITLED. SEE NOTES.]	SEE NOTES	1"=10'	H 44.8, W 88.9 CM	INK, COLORED INK	PAPER
134-055-4174-A	PLAN SHOWING RAILROAD / TRACKS NEAR CARD [?] & MERRIMACK STREET STATION & / ALSO THE BRANCH CROSSING THE / CANAL & SHATTUCK STREET / LOWELL, MASS.	1904/11/07	1"=10'	H 67.4, W 98.2 CM	INK	PAPER
134-057-4176	COPY / PLAN & PROFILE / MUSIC HALL AVENUE.	1898/03/19	H1"=20', V1"=2'	H 35.3, W 70.8 CM	INK	DRAFTING CLOTH
134-061-4180	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 29.4, W 53.6 CM	INK, COLORED INK	PAPER
134-063-[A]-4181	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 30, W 54.1 CM	INK, COLORED INK	PAPER
134-063-[B]	[UNTITLED. SEE NOTES.]	1896/05/29	NONE	H 27.9, W 21.6 CM	INK	PAPER
134-064-4182	PLAN OF LAND / CONVEYED TO THE / LOWELL TEXTILE SCHOOL / BY / ALPHONSE S. COVEL.	1900/08/00	1"=100'	H 36, W 23.5 CM	INK, DRAFTING CLOTH	PAPER
134-066-4183	SECTION THROUGH CENTER OF PROPOSED STREET IN "FRYE LOT."	1901/01/12	NONE	H 45.8, W 58.8 CM	INK	PAPER
134-067-4184	PLAN OF PAWTUCKET CANAL.	UNDATED	NONE	H 56, W 140 CM	GRAPHITE, INK, COLORED INK	PAPER

134-069-4186	PLAN OF THE / FRYE LOT / BETWEEN LAKEVIEW AVENUE AND MERRIMACK / RIVER / IN CENTRALVILLE, LOWELL, MASS / BELONGING TO THE / PROPS. OF LOCKS AND CANALS.	1896/07/00	1"=30'	H 64, W 102.5 CM	INK, COLORED INK, GRAPHITE	PAPER
134-072-4190	PLAN SHOWING PROPERTY / BELONGING TO THE / MIDDLESEX COMPANY / LOWELL, MASS.	1901/06/00	1"=20'	H 48, W 74 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
134-073-4191	[UNTITLED. SEE NOTES.]	1901/05/27	1"=50'	H 29.3, W 57.9 CM	INK	PAPER
134-074-4192	[UNTITLED. SEE NOTES.]	1896/08/17	1"=20'	H 47.3, W	INK	PAPER
134-075-4193	PLAN SHOWING / A PART OF / CHEEVER, TUCKER, AIKEN, COOLIDGE, / CABOT, & HALL STREETS.	1901/07/19	1"=40'	H 51, W 71.5 CM	INK, COLORED INK	TRACING PAPER
134-076-4194	[UNTITLED. SEE NOTES.]	1901/08/23	1"=20'	H 46.1, W 76.6 CM	INK	PAPER
134-078-4196	[UNTITLED. SEE NOTES.]	1901/03/25	1"=50'	H 35.8, W 59.4 CM	BLUEPRINT	PAPER
134-081-4198	PLAN OF LAND / BELONGING TO / BIGELOW CARPET COMPANY / LOWELL, MASS.	1901/07/15	1"=40'	H 33.7, W 54.6 CM	INK, COLORED PENCIL	
134-081-4198-A	PLAN OF LAND BELONGING TO / BIGELOW CARPET COMPANY / LOWELL, MASS.	1901/07/15	1"=40'	H 31.2, W 41.4 CM	BLUEPRINT	PAPER
134-082-4199	[UNTITLED. SEE NOTES.]	1901/08/01	1"=20'	H 48.4, W 76.5 CM	INK	PAPER
134-083-4200	SKETCH SHOWING ANGLE POINT "B" IN / SOUTH LINE OF PAWTUCKET ST. AS / AGREED TO BY CITY ENGR.	1901/07/17	1"=20'	H 48.4, W 76.4 CM	INK, COLORED INK	PAPER

134-084-4201	PLAN / SHOWING THE / TWO LOTS OF LAND / EXCHANGED BY / PROPS. LOCKS & CANALS ON MERRIMACK RIVER / & / JOHN F. & WILLIAM C. DOHERTY / & OTHER ADJACENT LAND.	1903/12/17	1"=20'	H 38.7, W 94.9 CM	INK, WATER COLOR	PAPER
134-085-4201-A	PLAN SHOWING / DIMENSIONS & AREAS / OF THE / TWO LOTS OF LAND / EXCHANGED BY / PROPRIETORS OF THE LOCKS & CANALS / & / JOHN F. & WM. C. DOHERTY.	UNDATED	1"=10'	H 50.2, W 91.4 CM	INK, COLORED INK	PAPER
134-086-4201-B	PLAN SHOWING / DIMENSIONS & AREAS / OF THE TWO LOTS OF LAND / EXCHANGED BY / PROPRIETORS OF THE LOCKS & CANALS / & DOHERTY BROTHERS.	UNDATED	1"=10'	H 42.5, W 80 CM	INK, COLORED INK	PAPER
134-087-4201-C	[UNTITLED. SEE NOTES]	1900/07/13	1"=40'	H 32.4, W 46.7 CM	INK, COLORED PENCIL	PAPER
134-088-4201-D	[UNTITLED. SEE NOTES]	UNDATED	NONE	H 21, W 46 CM	INK, COLORED INK, GRAPHITE	PAPER
134-089-4210	SKETCH SHOWING WEST JACKSON STREET AS LAID OUT / BY CITY RESOLUTION APPROVED SEP. 29,1906.	1906/12/00	1"=20'	H 23.9, W 39.3 CM	INK, COLORED INK, COLORED PENCIL	PAPER
134-090-4202	SKETCH SHOWING / MARKET STREET / IN THE VICINITY OF / MERRIMACK CANAL / WHERE IT IS PROPOSED TO WIDEN THE BRIDGE.	1903/11/17	1"=10'	H 48, W 74 CM	INK, COLORED INK	PAPER

134-091-4204	PLAN OF / PAWTUCKET CANAL / SHOWING / ADJACENT LAND OWNED BY / PROPS. OF LOCKS & CANALS / BETWEEN / SCHOOL STREET & BROADWAY.	1901/00/00	1"=40'	H 61.9, W 91.4 CM	INK	PAPER
134-091-4204-[COPY 1]	PLAN OF / PAWTUCKET CANAL / SHOWING / ADJACENT LAND OWNED BY / PROP. OF LOCKS & CANALS BETWEEN / SCHOOL STREET & BROADWAY.	UNDATED	1"=40'	H 61.9, W 91.4 CM	INK	PAPER
134-093-4208	PLAN SHOWING PREMISES / NEAR JUNCTION OF / MERRIMACK & CONCORD RIVERS / LOWELL, MASS.	1907/09/00	1"=100'	H 60.3, W 91.1 CM	INK, WATER COLOR	PAPER
134-096-4222	[UNTITLED.] [STIRLING ST.-CROSS SECTIONS TAKEN 25' APART LOOKING FROM FALMOUTH TOWARDS MOULTON & PROFILE.]	UNDATED	NONE	H 45.5, W 58.8 CM	COLORED INK, GRAPHITE	PAPER
134-097-4223	FALMOUTH ST. [-CROSS SECTIONS & PROFILE] / SHOWING GRADES:-THE RED LINES SHOW THE GRADE TO WHICH THE ST. WAS MADE BY L.& C. SIDEWALKS 6 FT. WIDE. GUTTERS 4" BELOW NOMINAL GRADE.	1899/06/19	NONE	H 45.5, W 58.8 CM	COLORED INK, INK, GRAPHITE	PAPER
134-098-4224	CROSS-SECTIONS OF WOODSTOCK ST. [& SKETCH SHOWING LOCATION.]	UNDATED	NONE	H 45.5, W 58.8 CM	GRAPHITE	PAPER
134-099-4225	CROSS SECTIONS OF WAVERLY ST. [SECTIONS & SKETCH SHOWING LOCATION.]	UNDATED	NONE	H 45.5, W 58.8 CM	GRAPHITE	PAPER
134-100-4226	CROSS SECTIONS OF STIRLING ST. FROM MOULTON TO WAVERLY ST. / SECTIONS TAKEN LOOKING TOWARD WAVERLY ST.	UNDATED	NONE	H 45.5, W 58.8 CM	GRAPHITE	PAPER

134-101-4227	CROSS-SECTIONS OF MOULTON ST. [& SKETCH SHOWING LOCATION.]	UNDATED	NONE	H 45.5, W 58.8 CM	GRAPHITE, COLORED INK	PAPER
134-102-4229	CROSS-SECTION OF COLONIAL AVE. [SHOWING LOCATION.]	SEE NOTES	NONE	H 45.5, W 58.8 CM	GRAPHITE, COLORED INK	PAPER
134-103-4228	SECTIONS AT KYAN ST. [& SKETCH SHOWING LOCATION.]	UNDATED	NONE	H 45.5, W 58.8 CM	GRAPHITE	PAPER
134-104-4230	SECTION OF PROPOSED NEW ST. OFF FIRST ST.	UNDATED	NONE	H 45.5, W 58.8 CM	GRAPHITE	PAPER
134-105-4231	SECTIONS SHOWING HOW MUCH WALL HAS BULGED OUT AT RYAN'S LOT ON SUFFOLK ST.	1900/04/12	NONE	H 21.7, W 45.8 CM	GRAPHITE	PAPER
134-106-4232	ESTIMATE OF AMOUNT OF FILLING / REQUIRED TO MAKE A 20 FT. [...?] WAY / SOUTH OF PRESENT BY M. TRACK ALONG / [PROPOSED ST. ALONG] PAWTUCKET CANAL DOWNSTREAM / FROM SCHOOL ST.	1899/11/08	NONE	H 45.5, W 58.8 CM	GRAPHITE, COLOREC INK	PAPER
134-107-4233	GRADE OF EAST SIDE OF EAST ST. (OLD GUARD LOCKS)	1895/00/00	NONE	H 45.5, W 58.8 CM	INK, COLORED INK, GRAPHITE	PAPER
134-108-4234	MT. HOPE STREET.[-PROFILE BETWEEN RIVERSIDE & COLONIAL AVE.]	UNDATED	NONE	H 28.3, W 34.5 CM	BLUEPRINT	PAPER
134-109-4235	PROFILE OF / PLYMOUTH ST. [BETWEEN RIVERSIDE & COLONIAL AVE.]	SEE NOTES	40'& 4'	H 29.4, W 48.6 CM	INK	DRAFTING CLOTH
134-110-4236	PROFILES OF PROPOSED STS. THROUGH / LOCKS & CANALS LAND SOUTHWEST / OF MOODY ST. EXTENSION / LOWELL.	1895/05/00	NONE	H 45.5, W 58.8 CM	INK, COLORED INK	PAPER

134-111-4237	SKETCH SHOWING GRADES ON SUFFOLK ST. / BETWEEN MOODY ST. & THE NORTHERN CANAL.	1897/10/00	NONE	H 56, W 99.2 CM	INK, COLORED INK, GRAPHITE	PAPER
134-112	PLAN & PROFILE / SHOWING PROPOSED EXTENSION OF / WEST, COBURN & FULTON STREET SEWERS / INTO MERRIMACK RIVER / LOWELL, MASS.	1911/09/00	1"=40'	H 46, W 75.9 CM	BLUEPRINT	PAPER
134-112-4238-[SHEET 1]	GRADE OF CONCORD RIVER BED AT EAST MERRIMACK ST. BRIDGE.	1894/09/00	NONE	H 25, W 44 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
134-112-4238-[SHEET 2]	CONCORD RIVER / AT BRIDGE. [GRADE OF CONCORD RIVER BED AT EAST MERRIMACK ST. BRIDGE].	1894/09/00	NONE	H 25, W 44 CM	INK, COLORED INK	PAPER
134-112-4238-[SHEET 3]	EAST CHANNEL. [GRADE OF CONCORD RIVER BED AT EAST MERRIMACK ST. BRIDGE].	1894/09/00	NONE	H 36, W 21 CM	GRAPHITE	PAPER
134-113-4239	PROFILE OF COLONIAL AVE. [BETWEEN MOODY & MOULTON ST.]	1901/06/24	1"=40'& 4'	H 36.7, W 68.8 CM	BLUEPRINT	PAPER
134-114-4240	FALMOUTH ST. PROFILE FROM RIVERSIDE TO COLONIAL AVE.	1902/03/31	1"=40'& 4'	H 39.7, W 64.5 CM	INK, COLORED INK	TRACING PAPER
134-115-4241	PROFILE OF / EAST MERRIMACK ST. / FROM / BRIDGEGATE [TO] HOWE ST.	1892/00/00	NONE	H 37, W 83.2 CM	GRAPHITE	TRACING PAPER
134-116-4242	GRADES USED IN CONSTRUCTION / OF MELVIN ST.	1908-1909/00/00	1"=20'	H 33.4, W 49.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
134-117	[SKETCH SHOWING] PERKINS ST. RELOCATION.	1926/09/00	1"=50'	H 21.5, W 28 CM	GRAPHITE	PAPER

134-117-4270	PLAN OF CERTAIN PREMISES / OF PROPS. LOCKS & CANALS WHERE THERE / ARE ENCROCHMENTS BY THE ABUTTORS.	1910/01/00	1"=20'	H 43, W 87 CM	INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
134-118	SKETCH SHOWING / LAND LEASED TO BOOTT MILLS [BY LEASE # 5332 TO BE RENEWED OCT. 1927 BY LEASE #].	1927/09/00	1"=10'	H 26, W 32.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-118-[COPY 1]	SKETCH SHOWING LAND LEASED TO BOOTT MILLS.	1927/09/00	1"=10'	H 26, W 32.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-119	PLAN OF / LAND AT END OF EASTERN CANAL [LEASED TO BOOTT MILLS COVERED BY LEASE NO. 5721].	1927/09/26	1"=10'	H 39.5, W 68.5 CM	INK, WATER COLOR	DRAFTING CLOTH
134-120	PLAN OF / AIKEN ST. PLAYGROUND [& 75' STRIP RESERVED BY L.& C.] / LEASED TO CITY OF LOWELL / BY / THE PROPRIETORS OF THE LOCKS & CANALS.	1927/10/20	1"=50'	H 52, W 62 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
134-121	[PLAN SHOWING] LAND & BUILDINGS / OF THE / C.M.A.C. / & THE / LOWELL CORP. HOSPITAL.	1928/07/18	1"=20'	H 59.3, W 79.4 CM	INK, WATER COLOR	DRAFTING CLOTH
134-122	PLAN OF / LAND & BUILDING / BELONGING TO / WILLIAM E. LIVINGSTON / LOWELL, MASS. / 1874.	1928/05/18	1"=20'	H 70.2, W 48.8 CM	INK	DRAFTING CLOTH
134-123	PLAN OF LAND [ON SOUTHEASTERLY SIDE OF AIKEN ST. ACROSS RIVER] / CONVEYED TO STANDARD OIL CO. OF N.Y. / BY / PROPS. LOCKS & CANALS, LOWELL, MASS.	1929/02/25	1"=50'	H 28.5, W 47 CM	INK, WATER COLOR	DRAFTING CLOTH

134-124	PLAN OF LAND / AT / CORNER OF DUTTON & FLETCHER STS. / [SHOWING DEED CONDITIONS] SURVEYED BY PROPS. LOCKS & CANALS.	1929/06/00	1"=20'	H 34.2, W 43 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-126	PLAN OF LAND [ON EAST MERRIMACK ST.] CONVEYED TO JANE K. TANSEY / BY / PROPRIETORS OF LOCKS & CANALS.	1929/09/00	1"=50'	H 28, W 39 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
134-127	PLAN OF LAND ON EAST MERRIMACK STREET [SOLD TO DR. A. E. SHAW] / AT / OLD TOWN LINE PREVIOUS TO 1874.	1929/11/22	1"=50'	H 31.5, W 37.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-128	PLAN OF LAND CONVEYED / TO / FRED D. MARTIN, ET UX.	1930/04/00	1"=40'	H 38, W 38 CM	INK	DRAFTING CLOTH
134-130	SKETCH SHOWING / LOT 96-D.	1932/03/00	1"=40'	H 35.2, W 51.5 CM	INK, GRAPHITE	TRACING PAPER
134-131	PLAN SHOWING / LAND LEASED TO E. A. WILSON CO.	1930/03/00	1"=40'	H 46.1, W 48.5 CM	BLUEPRINT	PAPER
134-132	SKETCH SHOWING / LAND OF / BERMAN REALTY CO. [VARNUM AVE.] / AND OTHER INFORMATON.	1936/01/14	1"=250'	H 33, W 49 CM	INK, COLORED PENCIL, WATER COLOR	DRAFTING CLOTH
134-132-[COPY 1]	SKETCH SHOWING / LAND OF / BERMAN REALTY CO. [VARNUM AVE.] / AND OTHER INFORMATION.	1936/01/14	1"=250'	H 32.4, W 47.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-133	SKETCH SHOWING / SOUTHERLY END OF CANAL STREET, / ADJOINING PROPERTIES AND RESERVATIONS / LOWELL, MASS.	1934/08/12	1"=20'	H 35, W 58.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

134-134	PLAN OF / CANAL STREET / & NEIGHBORHOOD.	1935/09/12	1"=20'	H 39.9, W 93.1 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
134-135	PLAN OF LAND IN LOWELL, MASS. [VARNUM AVE.] / SURVEYED FOR / GEORGE A. BERMAN.	1936/01/22	1"=40'	H 60.9, W 45.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-136	PLAN OF LOCKS & CANALS LAND / LOT NO. 84 / BETWEEN / STACKPOLE ST. & MERRIMACK RIVER.	1936/06/30	1"=100'	H 37.3, W 96.9 CM	INK, WATER COLOR	DRAFTING CLOTH
134-137	PLAN OF LAND / BETWEEN / WESTERN CANAL & SUFFOLK STREET / SOUTHERLY / FROM BROADWAY TO T. FAY ESTATE.	1935/02/21	1"=50'	H 38.5, W 71.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-138	PLAN OF LAND / IN LOWELL, MASSACHUSETTS / SOUTHERLY OF THE / LOWELL & LAWRENCE BOULEVARD / KNOWN AS / "THE MINUET" LOT.	1936/07/10	1"=40'	H 40.9, W 79.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-139	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 26 & 67.	1935/01/16	1"=100'	H 38.4, W 68.7 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
134-140-A	PROPERTY IN VICINTY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 87, 88, 89, 90, 90-B, 91-E, 91-D, 91-X.	1935/01/16	1"=100'	H 38.4, W 49.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-140-B	[UNTITLED.] [PROPERTY IN VICINTY OF PROPRIETORS OF THE LOCKS & CANALS LOTS 87, 88, 89, 90, 90-B, 91-E, 91-D, 91-X.]	SEE NOTES	NONE	H 38.4, W 69.4 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH

134-141	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 31-A, 31-B, 31-C, 33-C-2, 33-C-1, 103-J, 105,107, 91, 92, 92-A, 91-D, 91-E, 91-X.	1935/01/16	1"=200'	H 56.7, W 76.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
134-142	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOT 29 & 29-A.	1935/01/16	1"=100'	H 48.8, W 73.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-143	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 84, 85, 96-B, 96-C, 96-D, 97.	1935/01/16	1"=200'	H 48.9, W 72.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-144	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 8, 9,11,13 & 13-O.	1935/01/16	1"=100'	H 48.8, W 75.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
134-145	PROPOSED STREET / FROM PALMER TO GORHAM STREETS / LOWELL, MASS.	1934/08/30	1"=100'	H 57.5, W 38.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-146	PLAN OF LAND / ON EAST MERRIMACK STREET / BELONGING TO / MATILDA J. SHAW.	1939/02/27	1"=20'	H 46.9, W 70.9 CM	INK, WATER COLOR	DRAFTING CLOTH
134-147	PLAN SHOWING / LAND CONVEYED BY PROPRIETORS OF THE LOCKS & CANALS / TO / SACO-LOWELL SHOPS, APPLETON CO. & HAMILTON MFG. CO. / ALONG / SOUTHERLY BORDER OF LOWER PAWTUCKET CANAL.	1939/02/00	1"=50'	H 35, W 97.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-148	PLAN SHOWING / LAND SOLD TO E. A. WILSON COMPANY / BY / PROPRIETORS OF THE LOCKS & CANALS.	1939/05/05	1"=40'	H 46.3, W 48.8 CM	DRAFTING CLOTH	DRAFTING CLOTH
134-149	PLAN SHOWING / LAURIER PARK / & / AIKEN STREET PLAYGROUND.	1939/05/12	1"=50'	H 61.5, W 78.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-150	PLAN SHOWING / AREAS & RIGHTS CONVEYED / TO THE / LOWELL Y. M. C. A. / BY / PROPRIETORS OF THE LOCKS & CANALS.	1939/09/08	1"=10'& 20'	H 43, W 66.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-151	PLAN SHOWING / LAND OF PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LEASED TO TREMONT & SUFFOLK MILLS / NOW OCCUPIED BY / NASHUA & MERRIMACK MANUFACTURING COMPANIES.	1932/07/15	1"=40'	H 68.4, W 88 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-152	SKETCH SHOWING AREA DEEDED TO ARTHUR J. LAMBERT & MATHILDA LECOURT / BY / PROPRIETORS OF THE LOCKS & CANALS [FORMERLY LOT 33].	1933/03/31	1"=50'	H 45.4, W 78.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-153	[UNTITLED.] [SKETCH OF PAWTUCKET, WARD, HALL, AND TUCKER STREETS.]	SEE NOTES	1"=40'	H 47, W 114.5 CM	GRAPHITE	TRACING PAPER
134-154	[UNTITLED.] [SKETCH OF PAWTUCKET STREET FROM NORTHERN CANAL (HIGH BRIDGE) TO CITY LANDING.]	1933/03/00	1"=60'	H 52.9, W 40 CM	GRAPHITE	TRACING PAPER
134-155	PLAN OF LOT 89 / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERR'K RIVER / LOWELL, MASS. / SHOWING PRESENT & FUTURE POSSIBILITIES FOR LAYING OUT BUILDING LOTS.	1939/12/00	1"=50'	H 50.5, W 94.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-156	LAURIER PARK / PROPOSED REVISION FOR LOWELL ATHLETIC COMMISSION.	1939/06/01	1"=50'	H 49.6, W 61 CM	RED LINE PRINT	PAPER

134-157	PLAN SHOWING / GRADES ON CANAL STREET / [NOTE TEXT CHANGES FROM INK TO GRAPHITE] BEFORE NEW CURB & FENCE WERE PUT ON CANAL WALL.	1941/04/18	1"=20'	H 32.2, W 84.9 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
134-158	PLAN SHOWING / LAND & BUILDINGS BELONGING TO / E. A. WILSON COMPANY / LOWELL, MASS.	1941/06/12	1"=40'	H 38.7, W 59.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-159-[A]	PLAN SHOWING / LAND CONVEYED TO APPLETON COMPANY / BY ORIGINAL INDENTURE / ALSO / PRESENT PROPERTY.	1944/08/03	1"=50'(APPROX.)	H 62.3, W 43.9 CM	INK, COLORED PENCIL,GRAPHITE	DRAFTING CLOTH
134-159-[B]	[UNTITLED.] [PLAN SHOWING LAND CONVEYED TO APPLETON COMPANY BY ORIGINAL INDENTURE ALSO PRESENT PROPERTY.]	1944/08/03	1"=50'(APPROX.)	H 58, W 20 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-159-[COPY 1]-[A]&[B]	PLAN SHOWING / LAND CONVEYED TO APPLETON COMPANY / BY ORIGINAL INDENTURE / ALSO / PRESENT PROPERTY.	1944/08/03	1"=50'(APPROX.)	H 61.7, W 58.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
134-160	PROPERTY BELONGING TO / PROPERTIES OF THE LOCKS & CANALS ON MERRIMACK RIVER / KNOWN AS THE / RAMP AREA [NEAR JUNCTION OF CONCORD AND MERRIMACK RIVERS] / LOWELL, MASS.	1942/12/26	1"=40'	H 31.4, W 92.2 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
134-161	PLAN SHOWING / PROPERTY AT # 415 PAWTUCKET STREET / & ADJACENT PROPERTIES / LOWELL, MASS.	1955/02/18	1"=150'	H 29.1, W 39.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
134-161-SHEET-1	SHEET 1 / TAKINGS FOR BOULEVARD / NORTH SIDE OF MERRIMACK RIVER.	1949/09/17	1"=50'	H 38.5, W 121 CM	GRAPHITE, COLORED PENCIL	PAPER
134-161-SHEET-2	SHEET 2 / TAKINGS FOR BOULEVARD.	1949/09/17	1"=50'	H 38.2, W 121 CM	GAPHITE, COLORED PENCIL	PAPER

134-161-SHEET-3	SHEET 3 / TAKINGS FOR BOULEVARD / NORTH SIDE OF MERRIMACK RIVER.	1949/09/17	1"=50'	H 38.2, W 121 CM	GRAPHITE, COLORED PENCIL	PAPER
134-161-SHEET-4	SHEET 4 / TAKINGS FOR BOULEVARD / NORTH SIDE OF MERRIMACK RIVER.	1949/09/17	1"=50'	H 38, W 121 CM	GRAPHITE, COLORED PENCIL	PAPER
134-161-SHEET-5	SHEET 5 / TAKINGS FOR BOULEVARD / NORTH SIDE OF MERRIMACK RIVER.	1949/09/17	1"=50'	H 38.2, W 121 CM	GRAPHITE, COLORED PENCIL	PAPER
134-162	PROPERTY PETITIONED FOR CONDEMNATION / BY / UNITED STATES GOVERNMENT.	1947/06/23	1"=50'	H 54.2, W 57.2 CM	INK	DRAFTING CLOTH
134-162-[COPY 1]	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / JACOB ZISKIND FOUNDATION.	1947/10/00	1"=20'	H 65.5, W 90 CM	BLUE LINE PRINT, WATER COLOR	PAPER
134-162-[COPY 2]	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / JACOB ZISKIND FOUNDATION.	1947/10/00	1"=20'	H 63, W 87.7 CM	RED LINE PRINT, COLORED PENCIL	PAPER
134-162-[COPY 3]	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / JACOB ZISKIND FOUNDATION.	1947/10/00	1"=20'	H 62.2, W 87 CM	BLUEPRINT	PAPER
134-163	PLAN OF / FALLS STREET & ADJOINING PROPERTY / SHOWING / LAND OF PROPRIETORS OF THE LOCKS & CANALS / USED BY THE MARIST BROTHERS / LOWELL, MASS.	1952/02/28	1"=50'	H 37.2, W 65.5 CM	INK, WATER COLOR	DRAFTING CLOTH
134-163-[COPY 1]	PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR / JACOB ZISKIND FOUNDATION.	1948/06/00	1"=20'	H 68.5, W 87.6 CM	RED LINE PRINT, WATER COLOR	PAPER
134-163-[COPY 2]	PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR / JACOB ZISKIND FOUNDATION.	1948/06/00	1"=20'	H 68.5, W 87.1 CM	BLUEPRINT	PAPER

134-164	PLAN SHOWING / PASSAGEWAY FROM HAMILTON CANAL / TO PAWTUCKET CANAL THROUGH OLD / "SACO FOUNDRY YARD."	1952/12/04	1"=20'	H 30.6, W 69.4 CM	INK, COLORED INK	DRAFTING CLOTH
134-164	PLAN OF LAND / IN / LOWELL, MASS.	1957/07/29	1"=100'	H 54, W 90.5 CM	GRAPHITE	PAPER
134-165	PLAN SHOWING / LAND & BUILDINGS / OF / VALLEY ASSOCIATES & MERRIMACK TEXTILE FIBERS INC. / LOWELL, MASS.	1958/03/06	1"=40'	H 43, W 71.3 CM	INK, COLORED INK	DRAFTING CLOTH
134-165	PLAN SHOWING LOTS 8-A, 8-B, 8-C, 13-A, 13-B. / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1948/09/15	1"=40'	H 50.8, W 119.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
134-165-[COPY 1]	PLAN SHOWING / LAND & BUILDINGS / OF / VALLEY ASSOCIATES & MERRIMACK TEXTILE FIBERS INC. / LOWELL, MASS.	1958/03/06	1"=40'	H 43.6, W 74 CM	BLUE LINE PRINT	PAPER
134-165-[COPY 2]	PLAN SHOWING / LAND & BUILDINGS / OF / VALLEY ASSOCIATES & MERRIMACK TEXTILE FIBERS INC. / LOWELL, MASS.	1958/03/06	1"=40'	H 46.4, W 73.2 CM	BLUE LINE PRINT	PAPER
134-165-[COPY 3]	PLAN SHOWING / LAND & BUILDINGS / OF / VALLEY ASSOCIATES & MERRIMACK TEXTILE FIBERS INC. / LOWELL, MASS.	1958/03/06	1"=40'	H 42.1, W 73 CM	BLUE LINE PRINT	PAPER
134-166	COMPILED PLAN SHOWING / "DILLON ALL" & PROPERTY / OF MARY F. DILLON / LOWELL, MASS.	1951/05/03	1/4"=1', 1"=20'	H 48.2, W 78.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH

134-166	PLAN SHOWING / RIGHTS OF WAY IN PARCELS 2, 7A & 7B / ON / "PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR CITY OF LOWELL, JULY 30,1958. / BY D. F. PERKINS & SONS, INC., C.E.'S."	1959/04/24	1"=50'	H 24, W 35.5 CM	BLUEPRINT	PAPER
134-167	SUBDIVISION PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / ASSOCIATED INVESTMENT HOUSES / SURVEYED & SUBDIVIDED NOVEMBER 1960.	1960/11/00	1"=30'	H 40.6, W 53.6 CM	BLUE LINE PRINT	PAPER
134-167	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / WILLIAM J. & LILLIAN V.	1950/06/30	1'=10'	H 46.2, W 61.4 CM	BLUE LINE PRINT	PAPER
134-168	PLAN SHOWING / STREETS, CANALS, MILLS ETC. / IN VICINITY OF OLD "SACO YARD" / LOWELL, MASS.	1952/11/21	1"=100'	H 54.2, W 72.7 CM	GRAPHITE	TRACING PAPER
134-168	PLAN SHOWING / 15 FT. WIDE RIGHT OF WAY / GRANTED BY / WESTGATE REALTY TRUST / TO VALHALLA MILLS, INC. / IN MILL YARD AT / LOWELL, MASSACHUSETTS.	1959/05/26	1"=40'	H 24, W 35.3 CM	BLUEPRINT	PAPER
134-169	SKETCH OF / BUILDINGS IN VICINITY / OF Y. M. C. A.	1942/10/02	1"=50'	H 25.9, W 51.8 CM	INK, WATER COLOR	DRAFTING CLOTH
134-169	PLAN AND PROFILE OF / MERRIMACK SQUARE AND A PART OF / EAST MERRIMACK STREET.	1893/10/00	V 1"=4', H 1"=40'	H 67, W 99 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
135-[053]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1"=300'	H 64.8, W 80.4 CM	INK, WATER COLOR	PAPER

135-[054]-[COPY 1]	PLANS AND CONDITIONS OF SALE, / 123 LOTS OF LAND IN LOWELL & DRACUT / BELONGING TO / THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1857/05/27	NONE		H 50, W 43.5 CM	LITHOGRAPH
135-[054]-[COPY 1]	PLANS AND CONDITIONS OF SALE, / 123 LOTS OF LAND IN LOWELL & DRACUT / BELONGING TO / THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1857/05/27	NONE	H 50, W 43.5 CM	LITHOGRAPH	PAPER
135-[054]-[COPY 2]	PLANS AND CONDITIONS OF SALE, / 123 LOTS OF LAND IN LOWELL & DRACUT / BELONGING TO / THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1857/05/27	NONE		H 50, W 43.5 CM	LITHOGRAPH
135-[054]-[COPY 2]	PLANS AND CONDITIONS OF SALE, / 123 LOTS OF LAND IN LOWELL & DRACUT / BELONGING TO / THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1857/05/27	NONE	H 50, W 43.5 CM	LITHOGRAPH	PAPER

135-[055]	PLAN OF LAND / IN / LOWELL, MASS. / BELONGING / TO / ETHAN A. SMITH, FREEMAN B. SHEDD / ELI W. HOYT, THOMAS R. GARRITY / SURVEYED BY / OSGOOD AND SNELL / LOWELL.	1883/06/18	NONE	H 61, W 66.5 CM	LITHOGRAPH	PAPER
135-[056]	[UNTITLED.] [LIST OF LOTS WITH LESSEES AND RENTS FOR 1892 AND 1893.]	1893/00/00	NONE	H 58, W 109 CM	GRAPHITE	PAPER
135-[057]	LOWELL, MASS.	SEE NOTES	1"=200'	H 28, W 21.5 CM	INK, COLORED INK	PAPER
135-[058]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1"=300'	H 68.5, W 83.2 CM	COLORED PENCIL	CLOTH BACKED PAPER
135-[059]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1"=300'	H 64.8, W 80.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-[060]	LOWELL INDUSTRIAL DEVELOPMENT CO. / POWER STATIONS AND INTERCONNECTIONS.	1951/02/00	1"=250'	H 26.6, W 37.1	INK, WATER COLOR	DRAFTING CLOTH
135-001	MAP SHOWING / PRESENT & PROPOSED / ELECTRICAL INTERCONNECTIONS OF LOWELL MILLS / LOWELL, MASS.	1930/05/00	1/4"=50'	H 69.2, W 94 CM	BLUE LINE PRINT, WATER COLOR, INK	PAPER
135-002	MAP SHOWING / PRESENT & PROPOSED / STEAM INTERCONNECTIONS OF LOWELL, MILLS / LOWELL, MASS.	1930/05/00	1/4"=50'	H 67.2, W 94 CM	BLUE LINE PRINT, WATER COLOR, INK	PAPER
135-003	ELECTRIC INTERCONNECTION.	1951/02/00	1"=250'	H 45, W 46.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

135-003-[A]-[COPY 1]	ELECTRIC INTERCONNECTION.	1960/07/00	1"=250'	H 46, W 49 CM	BLUE LINE PRINT	PAPER
135-003-[A]-[COPY 2]	ELECTRIC INTERCONNECTION.	1960/07/00	1"=250'	H 46, W 49 CM	BLUE LINE PRINT	PAPER
135-003-[A]-[COPY 3]	ELECTRIC INTERCONNECTION.	1960/07/00	1"=250'	H 46, W 49 CM	BLUE LINE PRINT, COLORED INK	PAPER
135-003-[COPY 1]	ELECTRIC INTERCONNECTION.	1951/02/00	1"=250'	H 44.5, W 46 CM	BLUEPRINT	PAPER
135-004	ELECTRIC INTERCONNECTION [SHOWING PRESENT TIE LINES AND PROPOSED IMMEDIATE INSTALLATION].	1933/06/00	1"=250'	H 46.3, W 47.7 CM	BLUE LINE PRINT, COLORED INK, WATER COLOR	PAPER
135-004-[A]	ELECTRIC INTERCONNECTION [SHOWING PRESENT TIE LINES AND PROPOSED IMMEDIATE INSTALLATION].	1933/06/00	1"=400'	H 28, W 31.5 CM	BLACKLINE PRINT, COLORED INK, WATERCOLOR	PAPER
135-004-[COPY 1]	ELECTRIC INTERCONNECTION [SHOWING PRESENT TIE LINES AND PROPOSED IMMEDIATE INSTALLATION].	1933/06/00	1"=250'	H 28.6, W 31.2 CM	PHOTOGRAPH	PAPER
135-005	PLAN SHOWING / TRANSMISSION LINE / BETWEEN / BOOTT & MERRIMACK MILLS.	1932/01/27	1"=40'	H 36.2, W 118 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
135-006	PRESENT & PROPOSED / ELECTRIC INTERCONNECTION / OF MILLS ON THE UPPER LEVEL / ALSO / PRESENT WATER WHEELS.	1933/01/00	1"=250'	H 25.9, W 50.8 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH

135-007	SKETCH SHOWING / PROPOSED TIE LINE / BETWEEN / LOWELL INDUSTRIAL DEVELOPMENT CO. & MIDDLESEX CO.	1931/12/26	1"=40'	H 34.4, W 53.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
135-008	SKETCH SHOWING PROPOSED / 550 VOLT TIE LINE / BETWEEN / MERRIMACK MFG. CO. & BOOTT MILLS.	1931/04/09	1"=40'	H 42.5, W 48.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
135-008	PART OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS.	1933/02/00	1/4"=25'	H 102.3, W 88.3 CM	BLUE LINE PRINT, WATER COLOR	PAPER
135-009	PART OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS.	1933/02/00	1"=125'	H 104.4, W 79 CM	BLUE LINE PRINT, INK, COLORED INK, WATER COLOR	PAPER
135-010	DIAGRAMATICAL SKETCH SHOWING CONNECTIONS / & LOCATION OF METERS / L.I.D.-BOOTT.	1932/02/16	NONE	H 21, W 27.4 CM	INK	DRAFTING CLOTH
135-011	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS. / SHOWING PROPOSED ELECTRICAL INTERCONNECTION.	1925/12/00	NONE	H 83.5, W 110.3 CM	CHROMO LITHOGRAPHY	CLOTH BACKED PAPER
135-012	ELECTRIC INTERCONNECTION / OF / LOWELL, MILLS / GENERAL PLAN / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/08/04	1"=250'	H 38.8, W 43.9 CM	INK	DRAFTING CLOTH

135-012-A	ELECTRICAL INTERCONNECTION / OF / LOWELL MILLS / GENERAL PLAN / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/08/04	1"=250'	H 38.5, W 43.9 CM	BLUEPRINT, COLORED INK	PAPER
135-012-B	ELECTRIC INTERCONNECTION / OF / LOWELL MILLS / GENERAL PLAN / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/08/04	1"=250'	H 38.6, W 43.7 CM	BLUEPRINT, INK	PAPER
135-013	ELECTRIC INTERCONNECTION / OF / LOWELL, MASS. [PROPOSED WIRING DIAGRAM].	1926/08/05	1"=250'	H 26.8, W 41.9 CM	INK	DRAFTING CLOTH
135-013-[A]	PART OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS / POWER REQUIREMENTS / AS OF 1933.	1933/11/21	1/8"=25'	H 50.9, W 44.9 CM	PHOTOGRAPH	PAPER
135-013-[COPY 1]	ELECTRIC INTERCONNECTION / OF / LOWELL MILLS / WIRING DIAGRAM / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/08/04	1"=250'	H 21.5, W 28 CM	PHOTOGRAPH	PAPER
135-014	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION LAWRENCE SEC.-M. M. CO.-BOOTT MILLS [GENERAL ARRANGEMENT].	1933/06/16	1"=60'& 12"	H 78, W 113.7 CM	INK, COLORED INK	DRAFTING CLOTH
135-014-[A]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRIC INTERCONNECTION / GENERAL ARRANGEMENT / LINES CONNECTING LAWRENCE SEC.-M.M. CO.-BOOTT MILLS.	1933/06/16	SEE NOTES	H 28.3, W 43.6 CM	PHOTO NEGATIVE PRINT, INK	PAPER

135-014-A	[GENERAL ARRANGEMENT - LINES CONNECTING LAWRENCE SECTION, MERRIMACK MFG. CO., AND BOOTT MILLS SHOWING PROGRESS AS OF SEPT. 26, 1932.]	1933/09/26			BLUEPRINT	
135-015	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / TRANSFORMER VAULT AT / BOOTT MILLS.	1933/09/09	1/4"& 1/2"=12"	H 78.8, W 94 CM	INK	DRAFTING CLOTH
135-016	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / 600 VOLT SWITCHGEAR DETAILS / BOOTT MILLS ENGINE ROOM.	1933/07/15	1"=12"	H 79, W 95.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
135-016-[A]-[A]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / 600 VOLT SWITCHGEAR DETAILS / BOOTT MILLS ENGINE ROOM.	SEE NOTES	1"=12"	H 78.1, W 94.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-016-[A]-[B]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / 600 VOLT SWITCHGEAR DETAILS / BOOTT MILLS ENGINE ROOM.	SEE NOTES	1"=12"	H 78.1, W 94.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-016-[COPY 1]-[A]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / 600 VOLT SWITCHGEAR DETAILS / BOOTT MILLS ENGINE ROOM.	1933/07/15	1"=12"	H 78.1, W 94.7 CM	BLUEPRINT	PAPER

135-016-[COPY 1]-[B]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / 600 VOLT SWITCH FOR DETAILS / BOOTT MILLS ENGINE ROOM.	1953/08/01	1"=12"	H 77.5, W 94 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-016-[COPY 2]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / 600 VOLT SWITCHGEAR DETAILS / BOOT MILLS ENGINE ROOM.	1933/07/15	1"=12"	H 72, W 94.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-017	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF SWITCHGEAR / BOOTT MILLS-ECONOMIZER ROOM.	1933/07/21	1/2"& 1"=12"	H 78.8, W 95.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
135-017-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF SWITCHGEAR / BOOTT MILLS-ECONOMIZER ROOM.	1933/07/21	1/2"& 1"=12"	H 78.8, W 95.9 CM	BLUEPRINT	PAPER
135-018	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION DETAILS OF SWITCHBOARD & WIRING DIAGRAM / BOOTT MILLS.	1934/01/02	1"=12"	H 78.7, W 95.3 CM	INK	DRAFTING CLOTH
135-018-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF SWITCHBOARD & WIRING DIAGRAM / BOOTT MILLS.	1934/02/01	1"=12"	H 78.2, W 94 CM	BLUEPRINT	PAPER

135-018-[COPY 2]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF SWITCHBOARD & WIRING DIAGRAM / BOOTT MILLS.	1934/02/01	1"=12"	H 78.2, W 94 CM	BLUEPRINT	PAPER
135-019	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DETAILS / NEW 4000A STUB BUS-BOOTT MILLS.	1934/09/17	1" & 3"=12"	H 79.5, W 94.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
135-019-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DETAILS / NEW 4000A STUB BUS-BOOTT MILLS.	1934/02/24	1" & 3"=12"	H 77.5, W 94 CM	BLUEPRINT, COLORED PENCIL INK, GRAPHITE,	PAPER
135-020	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION.	1933/10/08	1/2"& 1'=12"	H 74.6, W 95.5 CM	COLORED PENCIL	DRAFTING CLOTH
135-021	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DETAILS OF SWITCH PLATFORM-BOOTT M.	1934/01/24	1"=12"	H 75, W 97 CM	GRAPHITE	TRACING PAPER
135-022	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / ADDITIONAL TIE LINES BETWEEN / BOOTT MILLS & LOWELL INDUSTRIAL DEVELOPMENT CO.	1933/08/01	1"=20',1/4"=12"	H 76.6, W 94.7 CM	INK	DRAFTING CLOTH

135-022-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / ADDITIONAL TIE LINES BETWEEN / BOOTT MILLS & LOWELL INDUSTRIAL DEVELOPMENT CO.	1933/08/01	1"=20',1/4"=12"	H 75, W 94 CM	BLUEPRINT	PAPER
135-023	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF PIPE FRAMEWORK / BOOTT MILLS.	1933/07/19	1"=12"	H 77.8, W 94.5 CM	INK	DRAFTING CLOTH
135-023-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF PIPE FRAMEWORK / BOOTT MILLS.	1933/07/19	1"=12"	H 29 3/4", W 37"	BLUEPRINT	PAPER
135-024	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DETAILS OF SWITCHGEAR (600 VOLT) LAWRENCE SECTION.	1933/09/02	1/2"& 1"=12"	H 76.2, W 95 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
135-025	PROPRIETORS OF THE LOCKS AND CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF TRANSFORMER STATION / LAWRENCE SECTION.	1933/09/02	AS NOTED	H 74.5, W 97 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-026	PROPRIETORS OF THE LOCKS AND CANALS / ELECTRICAL INTERCONNECTION / DETAILS OF TRANSFORMER STATION / LAWRENCE SECTION.	1933/11/01	1"=12"	H 76.9, W 94 CM	INK	DRAFTING CLOTH
135-027	DETAILS OF / CONDUIT MANHOLES.	UNDATED	1"=12"	H 76.9, W 91.5 CM	INK, GRAPHITE	DRAFTING CLOTH

135-028	PROPRIETORS OF THE LOCKS & CANALS / STORAGE BATTERY INSTALLATION, / FOR SWITCH & RELAY OPERATION AT / BOOTT MILLS.	1933/09/05	1/2",1/4" & 1"=12"	H 79.4, W 94 CM	INK	DRAFTING CLOTH
135-029	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / 600V TRANSFORMER DELTA BUS / DETAILS (LAWRENCE SECTION).	1933/11/14	1"=12"	H 75.9, W 94.7 CM	INK	DRAFTING CLOTH
135-030	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DAIGRAQM OF ELECTRICAL INTERCONNECTIONS.	1934/08/04	NONE	H 74.9, W 95.6 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-030-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DIAGRAM OF ELECTRICAL INTERCONNECTIONS.	1934/08/20	NONE	H 29 1/8", W 37 1/4""	BLUEPRINT, COLORED PENCIL	PAPER
135-030-[COPY 2]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DIAGRAM OF ELECTRICAL INTERCONNECTIONS.	1934/08/20	NONE	H 29 1/8", W 37 1/4""	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[A]	WAGNER ELECTRIC CORPORATION / SAINT LOUIS, U.S.A. / TRANSFORMER PERFORMANCE SPECIFICATION.	1933/06/29	NONE	H 28, W 21.6 CM	INK, COLORED INK	PAPER
135-031-[AA]	PROPOSAL / WAGNER ELECTRIC / CORPORATION / ST. LOUIS. U.S.A.	1933/06/29	1/2"=12'	H 28.5, W 22 CM	INK, BLUEPRINT	PAPER

135-031-[C]	DIMENSIONS OF TYPES E-21 & E-22 POTENTIAL TRANSFORMERS / WITH & WITHOUT FUSES.	1927/11/01	NONE	H 26.5, W 20.4 CM	UNKNOWN PRINTING PROCESS	PAPER
135-031-[D]	GENERAL ELECTRIC / COMPANY / 6901 ELMWOOD AVE. PHILA. PA.	1953/07/18	NONE	H 26.5, W 20.4 CM	BLUE LINE PRINT	PAPER
135-031-[E]	DIMENSIONS.	1932/02/05	NONE	H 26.5, W 20.4 CM	BLUEPRINT	PAPER
135-031-[F]	[UNTITLED PLAN. SEE NOTES.]	1915/04/24	NONE	H 26.5, W 20.4 CM	BLUEPRINT	PAPER
135-031-[G]	DIMENSIONS.	1932/02/02	NONE	H 26.5, W 20.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[H]	DIMENSIONS OF CURRENT TRANS.	1931/02/17	NONE	H 26.5, W 20.4 CM	BLUEPRINT	COLORED PENCIL
135-031-[I]	DIMENSIONS OF CURRENT TRANSFORMER.	1931/02/17	NONE	H 26.5, W 26.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[J]	DIMENSIONS.	1931/10/13	NONE	H 26.5, W 20.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[K]	DIMENSIONS.	1928/11/13	NONE	H 26.5, W 20.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[L]	DIMENSIONS FOR ALL CIRCUITS EXCEPT 4 WIRE 3 PHASE.	1930/03/20	NONE	H 26.5, W 20.4 CM	BLUEPRINT, COLORED PENCIL	PAPER

135-031-[M]	DIMENSION SKETCH OF TYPE DS-19 / POLYPHASE WATTHOUR METER 3W-3PH.	1927/08/24	NONE	H 26.5, W 20.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[N]	CONTACT CLIP BLOCK / (LAMINATED STUD SLOTTED VERTICALLY).	1927/08/24	NONE	H 20.4, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[O]	HINGE CLIP BLOCK / (LAMINATED STUD, SLOTTED HORIZONTALLY).	1927/08/24	NONE	H 20.4, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[P]-[COPY 1]	SWITCHBOARD.	1933/10/09	NONE	H 30.5, W 45.8 CM	BLUEPRINT	PAPER
135-031-[P]-[COPY 2]	SWITCHBOARD.	1933/10/09	NONE	H 30.5, W 45.8 CM	BLUEPRINT	PAPER
135-031-[Q]	SWITCHBOARD.	1933/08/21	NONE	H 30.5, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[R]	SOLENOID MECHANISM.	1929/10/23	NONE	H 30.5, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[S]	OUTLINE.	1929/05/17	NONE	H 30.5, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[T]	BASES.	1919/01/30	NONE	H 30.5, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[U]-[COPY 1]	INDEX & OUTLINE.	1931/04/23	NONE	H 30.5, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[U]-[COPY 2]	INDEX & OUTLINE.	1931/04/23	NONE	H 30.5, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER

135-031-[V]	SWITCHBOARD MANUAL WIRING / BACK VIEW.	1933/08/22	NONE	H 47, W 61 CM	BLUEPRINT	PAPER
135-031-[W]	OUTLINE / OF DISCONNECTING SWITCH T.P.S.T. 5000 V. / TYPE LG-118.	1933/05/09	NONE	H 47, W 61 CM	BLUEPRINT	PAPER
135-031-[X]	OUTLINE.	1933/08/16	NONE	H 47, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[Y]	SWITCHBOARD MANUAL WIRING / BACK VIEW.	1933/08/22	NONE	H 47, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-031-[Z]	OUTLINE.	1933/09/25	NONE	H 47, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-032	TRANSFORMERS AT LAWRENCE SECTION.	UNDATED	1/2"=12"	H 28, W 54 CM	GRAPHITE	TRACING PAPER
135-033	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / SHELTER FOR TRANSFORMERS / LAWRENCE SECTION.	1933/09/20	1/2"=12"	H 46.3, W 80.8 CM	GRAPHITE	TRACING PAPER
135-034	ARRANGEMENT OF CONCRETE FORMS / FOR BOOTT TRANSFORMER VAULT.	UNDATED	NONE	H 35.5, W 90.9 CM	GRAPHITE	TRACING PAPER
135-035-[A]	PROPRIETORS OF LOCKS & CANALS / ELECTRICAL INTERCONNECTION / GENERAL ARRANGEMENT / TRANSFORMERS & SWITCHES AT BOOTT MILLS.	1933/06/15	1/4"=12"	H 75.5, W 90,5 CM	BLUEPRINT, COLORED PENCIL	PAPER

135-035-[B]	[ELECTRICAL INTERCONNECTION] PROPOSED LOCATION OF TRANSFORMERS & / SWITCHES / BOOTT MILLS. / SCHEME 2.	1933/08/03	1/4"=12"	H 45, W 88 CM	GRAPHITE	PAPER
135-036	[ELECTRICAL INTERCONNECTION] PROPOSED LOCATION OF / TRANSFORMERS & / CABLES - BOOTT MILLS.]	1933/08/02	1/4"=12, 1"=40'	H 60, W 85 CM	GRAPHITE, COLORED PENCIL	
135-037	ELECTRICAL INTERCONNECTIONS / LOCKS & CANALS, LOWELL.	1934/08/01	1"=400'	H 26.8, W 33.4 CM	INK, COLORED INK, WATER COLOR	PAPER
135-038	LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION-RELAY DIAGRAM.	1934/02/13	NONE	H 34, W 20 CM	INK, COLORED INK	DRAFTING CLOTH
135-039	PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / RELAY SETTINGS.	UNDATED	NONE	H 28.3, W 24.2 CM	INK, GRAPHITE	DRAFTING CLOTH
135-040	PART OF CITY / SHOWING / MILLS & CANALS / POWER REQUIREMENTS / AS OF 1933.	1938/05/01	1/4"=25'	H 102.1, W 89 CM	BLUE LINE PRINT, COLORED INK, WATER COLOR, INK	PAPER
135-040-[COPY 1]	PART OF CITY / SHOWING / MILLS & CANALS / POWER REQUIREMENTS / AS OF 1933.	1938/05/00	1/8"=25'	H 50.7, W 46 CM	PHOTOGRAPH, WATER COLOR, COLORED INK, INK	PAPER

135-041	PLAN SHOWING / WATERWHEELS & WATERWAYS / OF THE / NASHUA MFG. COMPANY, "TREMONT YARD" MERRIMACK MFG. CO. / & THE / "TREMONT GATES", PROP. OF THE LOCKS & CANALS.	1936/08/04	1"=40'	H 58.9, W 75.3 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
135-041-[COPY 1]	PLAN SHOWING / WATERWHEELS & WATERWAYS / OF THE / NASHUA MFG. COMPANY, / "TREMONT YARD MERRIMACK MFG. CO. / & THE / "TREMONT GATES" PROP. OF THE LOCKS & CANALS.	1936/08/04	1"=40'	H 58.5, W 75 CM	BLUEPRINT	PAPER
135-042	PORTIONS OF / BIGELOW HAMILTON & APPLETON / MILL YARDS / SHOWING / TRANSMISSION LINES.	1955/07/01	1"=40'	H 45.8, W 73.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
135-042-[COPY 1]	PORTIONS OF / BIGELOW HAMILTON & APPLETON / MILL YARDS / SHOWING / TRANSMISSION LINES.	1955/07/01	1"=40'	H 45.5, W 74 CM	BLUEPRINT, COLORED PENCIL	DRAFTING CLOTH
135-042-A	PORTION OF / "BIGELOW" MILL YARD / SHOWING / TRANSMISSION LINES.	1955/07/01	1"=40'	H 37, W 73.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
135-043	PORTION OF LOWELL / SHOWING / PRESENT HYDRO UNITS / & TRANSMISSION LINES / AT THE / BOOTT MILLS & LOWELL INDUSTRIAL DEVELOPMENT CO. LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD & CANALS. / POSSIBLE ELECTRICAL INTERCONNECTION.	1937/12/00	1/4"=50'	H 33.8, W 46.3 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
135-044		1918/07/24	1"=200'	H 75.5, W 101.1 CM	CHROMO LITHOGRAPHY	CLOTH BACKED PAPER

135-045	PLAN SHOWING / ELECTRICAL INTERCONNECTION / BETWEEN / MILLS OF THE JACKSON STREET / & DUTTON STREET GROUP / PROPRIETORS OF THE LOCKS & CANALS.	1941/00/00	1"=40'	H 62, W 76.4 CM	INK, COLORED INK	DRAFTING CLOTH
135-045-[A]-[COPY 1]	PLAN SHOWING / ELECTRICAL INTERCONNECTION / BETWEEN / MILLS OF THE JACKSON STREET, MARKET STREET / & DUTTON STREET GROUP / PROPRIETORS OF THE LOCKS & CANALS.	1937/07/29	1"=40'	H 61.5, W 75.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-045-[A]-[COPY 2]	PLAN SHOWING / ELECTRICAL INTERCONNECTION / BETWEEN / MILLS OF THE JACKSON STREET, MARKET STREET / & DUTTON STREET GROUP / PROPRIETORS OF THE LOCKS & CANALS.	1937/07/29	1"=40'	H 61.5, W 75.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-046	PART OF CITY / SHOWING / MILLS & CANALS [WATERWAYS AND ELECTRIC POWER TIE LINES] / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS.	1933/05/20	1/4"=25'	H 94.6, W 82.6 CM	BLUE LINE PRINT, COLORED INK, INK	CLOTH BACKED PAPER
135-047	PROPRIETORS OF THE LOCKS & CANALS / PROPOSED CHANGES TO BOOTT MILL SWITCHGEAR.	1936/06/15	1/4"=12"	H 47, W 67.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
135-047-[A]	PROPRIETORS OF THE LOCKS & CANALS / PROPOSED CHANGES TO BOOTT MILLS SWITCHGEAR.	1936/06/15	1/2"=12"	H 46.3, W 66.6 CM	BLUEPRINT, COLORED PENCIL	PAPER

135-048	LOWELL, MASS. / PROPRIETORS OF THE LOCKS & CANALS / ELECTRICAL INTERCONNECTION / SECOND TIE LINE BETWEEN THE PRESCOTT / & THE MIDDLESEX CO.	1936/06/18	1/2"=12", 1"=50'	H 44.8, W 62.9 CM	INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
135-049	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / BOOTT MILLS / CHANGES TO SWITCHGEAR / PLAN & ELEVATION OF RELOCATED SWITCHGEAR ON BALCONY.	1936/10/25	1"=12"	H 65.4, W 93.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-050	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / BOOTT MILLS / CHANGES TO SWITCHGEAR / STEEL DETAILS- PLATFORM.	1936/11/02	1"& 1/2"=12"	H 50.8, W 76.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
135-051	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / BOOTT MILLS / CHANGES TO SWITCHGEAR / CONCRETE DETAILS OF BALCONY.	1936/11/10	1"=12"	H 63.6, W 95.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
135-051-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / BOOTT MILLS / CHANGES TO SWITCHGEAR / CONCRETE DETAILS OF BALCONY.	1936/11/10	1"=12"	H 63.3, W 94 CM	BLUEPRINT	PAPER
135-052-[A]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / LOWER LEVEL / DIAGRAM OF ELECTRICAL CONNECTIONS.	1955/02/09	NONE	H 74.9, W 96.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH

135-052-[A]-[A]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / LOWER LEVEL / DIAGRAM OF ELECTRICAL CONNECTIONS.	1949/02/01	NONE	H 75 W 96 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
135-052-[A]-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / LOWER LEVEL / DIAGRAM OF ELECTRICAL CONNECTIONS.	1955/02/09	NONE	H 74, W 92 CM	BLUEPRINT	PAPER
135-052-[B]	PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / UPPER LEVEL / DIAGRAM OF ELECTRICAL CONNECTIONS.	1955/02/09	NONE	H 65, 95 CM	INK, COLORED PENCIL	DRAFTING CLOTH
135-052-[B]-[A]	PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / UPPER LEVEL / DIAGRAM OF ELECTRICAL CONNECTIONS.	1949/05/21	NONE	H 65, 94 CM	BLUEPRINT	PAPER
135-052-[B]-[COPY 1]	PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION / UPPER LEVEL / DIAGRAM OF ELECTRICAL CONNECTIONS.	1955/02/09	NONE	H 65.5, 92 CM	BLUEPRINT	PAPER

135-053	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS. / OWNERSHIP OF TRANSFORMER BANKS / ON ELECTRICAL INTERCONNECTION SYSTEMS / AS FAR AS KNOWN AUG.1, 1939.	1951/02/14	1/4"=100'	H 45.3, W 56.9 CM	PHOTOGRAPH, COLORED INK	PAPER
135-4020	[UNTITLED PLAN.] [TUCKER & WARD STS. PROFILES OF.]	1887/06/17	H1"=40', V1"=4'	H 40, W 54.3 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4021	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1'=20'	H 55.6, W 71.1 CM	INK, GRAPHITE, COLORED INK	TRACING PAPER
135-4022	SKETCH / SHOWING / LAND LEASED TO GEO. W. HARRIS / IN "LITTLE CANADA."	1894/04/05	1"=20'	H 48.2, W 76.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
135-4023	SKETCH OF LAND ON PERKINS ST. LEASED TO ALDRED BIHEAULT.	1895/02/00	1"=20'	H 54.6, W 70 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
135-4025	PLAN SHOWING DIVISION LINE BETWEEN / LAND SOLD TO ALISHA FRAPPIER & LAND / LEASED TO JOSEPH ALBERT, WITH EXISTING / BUILDINGS NEAR THE SAME.	1898/05/26	1"=10'	H 43.4, W 60.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER

135-4026	[UNTITLED PLAN. SEE NOTES.]	1897/04/14	1"=40'	H 32.3, W 28.3 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
135-4028	PLAN OF LAND / IN / LOWELL.	1887/12/20	1"=80'	H 64, W 70.5 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	[SEE NOTES]
135-4029	PLAN OF LAND IN LOWELL.	1871/08/00	1"=25'	H 65.8, W 86.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-4031	[UNTITLED PLAN. SEE NOTES.]	1897/12/04	1"=50'	H 32, W 60.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-4032	[UNTITLED PLAN. SEE NOTES.]	1892/01/00	1"=100',40'& 133.3'	H 49, W 90.2 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
135-4033	[UNTITLED PLAN. SEE NOTES.]	1888/05/16	NONE	H 49.5, W 45.2 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
135-4034	[UNTITLED.] [PLANS OF LAND AT BOOTT WASTEWAY & VICINITY.]	UNDATED	1/8"=1'	H 48.8, W 59.8 CM	INK, GRAPHITE, COLORED INK	PAPER
135-4035	[PLANS OF LAND AT BOOTT WASTEWAY & VICINITY.] JOURNAL BOX / ON SHAFT AT / BOOTT DAM.	1892/03/00	FULL SIZE	H 60, W 76 CM	INK, COLORED INK, GRAPHITE	PAPER

135-4036	PLAN OF DAM AT END OF BOOTT CANAL.	UNDATED	1"=4'	H 47.6, W 60.7 CM	INK, COLORED INK, GRAPHITE	CLOTHBACKED PAPER
135-4037	PLAN SHOWING / PART OF THE FLOORING SYSTEM / AT THE / BOOTT WASTEWAY.	UNDATED	1/2"=1'	H 58.9, W 61.1 CM	INK, GRAPHITE, COLORED INK	PAPER
135-4038	ELEVATION SHOWING / FRAMING BESIDE WASTEWAY AND GATE / AT BOOTT DAM.	UNDATED	1/2"=1'	H 55.5, W 62.2 CM	INK, GRAPHITE, COLORED INK	PAPER
135-4038-A	PLAN SHOWING / LOCATION OF BOOTT PENSTOCK / AND / PROPOSED NEW STEEL PENSTOCK / LOWELL, MASS.	1906/07/27	1"=20'	H 21, W 34.3 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
135-4039	PLAN / OF A PART OF THE / BOOTT MILL YARD.	1888/05/07	1"=50'	H 36.1, W 70.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
135-4040	PLAN OF UPPER END OF BOOTT PENSTOCK SHOWING / LOCATION OF POINTS ON NORTHERLY SIDE.	1889/05/01	1"=10'	H 36.7, W 41.2 CM	INK, GRAPHITE, WATER COLOR, COLORED INK	PAPER
135-4041	SKETCH OF LAND NEAR COUNTING / ROOM OF THE MASS. COTTON MILLS / SHOWING LINE OF FENCE, TRACKS, / PLATFORM & BRIDGES.	UNDATED	1"=8'	H 62.9, W 64.8 CM	INK, GRAPHITE, COLORED INK	PAPER

135-4042	SKETCH SHOWING RELATION OF LINE / OF FOUNDATION OF NEW HIGH SCHOOL / BUILDING TO DEED LINES OF LOTS ON ANNE STREET.	1892/06/27	1"=40'	H 37.4, W 61 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
135-4043	PLAN OF LAND IN LOWELL / BELONGING TO THE / PROPS OF LOCKS & CANALS ON MERRIMACK RIVER, / FORMERLY THE SHATTUCK ST. MALL.	1872/10/16	1"=10'	H 64.6, W 75.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
135-4044	[UNTITLED PLAN. SEE NOTES.]	1877/00/00	1"=10'	H 31.9, W 47.5 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	TRACING PAPER
135-4045	PLAN / SHOWING PART OF / MERRIMACK CANAL / NEAR / L. M. SHOP COUNTING ROOM.	1883/08/04	1"=10'	H 40.2, W 63.3 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4046	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=8'	H 62.9, W 64.8 CM	INK, GRAPHITE, COLORED INK	PAPER
135-4047	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1892/01/00	1"=40',100'& 133.3'	H 57.8, W 73.9 CM	BLUEPRINT, COLORED INK	PAPER
135-4048	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1892/01/00	1"=100',40'& 133.3'	H 57.5, W 75.5 CM	BLUEPRINT, COLORED INK	PAPER
135-4050	[UNTITLED PLAN. SEE NOTES]	1867/02/00	1"=100'	H 26.6, W 50.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER

135-4051	PLAN OF / LAND CONVEYED TO / TREMONT & SUFFOLK MILLS / BY / LAWRENCE MFG. CO.	1896/10/01	1"=80'	H 34.8, W 21.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE, COLORED PENCIL	TRACING PAPER
135-4052	PLAN / OF / LAND IN LAWRENCE M. CO'S YARD.	1883/04/30	1"=10'	H 61.4, W 47.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
135-4053	PLAN OF THE / B. & L. BRANCH TRACKS / IN THE / YARD OF THE TREMONT MILLS.	1885/12/14	1"=20'	H 60.2, W 57.5 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER
135-4054	PLAN OF / PREMISES CONVEYED BY / LAWRENCE M. CO. / TO / TREMONT & SUFFOLK MILLS / BY DEED DATED / SEP. 1896.	1896/09/00	1"=80'	H 41.2, W CM	GRAPHITE, COLORED INK	PAPER
135-4055	[UNTITLED PLAN. SEE NOTES.]	1892/03/10	1"=20'	H 27.5, W 40.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-4056	[UNTITLED PLAN. SEE NOTED.]	1885/01/00	1"=40'	H 31.2, W 30.4 CM	WATER COLOR, INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

135-4057	PLAN OF / MERRIMACK M. CO'S / LAND ON MOODY ST.	UNDATED	1"=30'	H 28.2, W 87.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
135-4057-A	MER'K. MAN'F'G. CO.	1894/02/00	1"=50'	H 18.1, W 45 CM	BLUEPRINT, GRAPHITE, COLORED INK	PAPER
135-4058	PLAN OF PREMISES IN LOWELL.	1877/01/31	1"=20'	H 39.7, W 38.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
135-4059	PLAN / OF / RAIL ROAD TRACKS / ON / MOODY & HANOVER STREETS.	1886/10/08	1"=20'	H 26.8, W 43 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4060	A SKETCH SHOWING / MALL / BETWEEN TREMONT & TILDEN STS. / & SURROUNDINGS.	1894/11/00	1"=40'	H 28.5, W 71.2 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER
135-4061	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=10'	H 36, W 52.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-4062	SKETCH OF PART OF PROP'S LOCKS & CANALS YARD / 22 BROADWAY, LOWELL.	1880/12/08	1"=20'	H 34.1, W 84.5 CM	COLORED INK, GRAPHITE	PAPER

135-4063	SKETCH SHOWING BOUNDARY LINE OF / SHERBURNE & WILLIAMS LOT ON SUFFOLK / STREET WITH 2 FEET ADDITIONAL TAKEN / APRIL 1ST 1889.	1889/03/29	1"=10'	H 30.3, W 57.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
135-4064	[UNTITLED PLAN. SEE NOTES.]	1865/11/15	1/4"=1'	H 50.7, W 58.1 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
135-4065	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=5'	H 74, W 103.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-4066	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=40'	H 14.8, W 19.8 CM	INK, COLORED INK	TRACING PAPER
135-4067	PROPOSED LINES FOR / MOODY ST. / AT / PAWTUCKET ST.	1896/10/24	1"=20'	H 48.8, W 106.2 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
135-4068	PLAN OF LAND / SOLD BY THE / PROP'S OF LOCKS & CANALS.	1860/07/09	1"=20'		H 55.4, W 74 CM	INK, WATER COLOR, COLORED INK
135-4068	PLAN OF LAND / SOLD BY THE / PROP'S OF LOCKS & CANALS.	1860/07/09	1"=20'	H 55.4, W 74 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
135-4069	PLAN OF SUNDRY PARCELS OF LAND LEASED TO / TREMONT & SUFFOLK MILLS FOR RAILROAD PURPOSES.	1895/02/20	1"=20'	H 53.4, W 81.2 CM	INK, COLORED INK, GRAPHITE, WATER COLOR GRAPHITE,	PAPER
135-4070	[UNTITLED PLAN. SEE NOTES.]	1894/05/04	1"=40'	H 28.5, W 71.2 CM	COLORED INK	TRACING PAPER

135-4071	PLAN OF LAND IN PAWTUCKETVILLE (LOWELL) / BELONGING TO / PROPS. OF LOCKS & CANALS.	1893/00/00	1"=50'	H 95.3, W 58 CM	BLUEPRINT, INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
135-4072	PLAN OF / LAND IN PAWTUCKETVILLE (LOWELL) / BELONGING TO / PROPS. OF LOCKS & CANALS.	1895/09/00	1"=50'	H 48.6, W 61.1 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
135-4073	PLAN OF LAND SOLD BY / PROPS. OF LOCKS & CANALS / TO / ALPHONSE S. COVEL OF BOSTON.	1896/01/01	1"=100'	H 35.5, W 21.4 CM	BLUEPRINT	PAPER
135-4074	[UNTITLED PLAN. SEE NOTES.]	1894/01/00	1"=10'	H 55.2, W 63.1 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
135-4075	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=40'	H 48.2, W 150 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
135-4076	PLAN OF LAND / IN / CENTRALVILLE, LOWELL / BELONGING TO / PROP'S. OF LOCKS & CANALS.	1896/11/13	1"=20'	H 29.1, W 34.2 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
135-4077	SKETCH SHOWING LAND ON RIVER ST. / OCCUPIED BY LOWELL BASEBALL CLUB / AS A BALL GROUND.	1887/09/16	1"=40'	H 37, W 52.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER

135-4078	PLAN OF LAND / ON / RIVER & AIKEN STREETS / BELONGING TO / PROPS. OF LOCKS & CANALS.	1887/09/22	1"=40'	H 47.8, W 148.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
135-4079	SKETCH SHOWING / ENCROACHMENTS ONTO LAND / OWNED BY / PROPS OF LOCKS & CANALS.	1881/08/23	1"=8'	H 30.4, W 91.3 CM	INK, COLORED INK, WATER COLOR	PAPER
135-4080	SKETCH OF A PART OF / LOCKS & CANALS' LAND ON / NORTHERLY SIDE OF MERRIMACK RIVER / SHOWING THE / PROPOSED LINE OF NEW RIVER WALL.	1897/02/01	1"=40'	H 37.5, W 65.4 CM	BLUEPRINT, INK, GRAPHITE	PAPER
135-4081	PLAN / OF / STACKPOLE STREET / LOWELL, MASS.	1892/07/09	1"=40'	H 26.5, W 71.6 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4082	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=10'	H 53.5, W 43.6 CM	GRAPHITE, COLORED INK	PAPER
135-4083	SKETCH OF CERTAIN LAND / BELONGING TO P. L.& C. WHICH MR. F. B. SHEDD / DESIRES TO PURCHASE.	1895/09/19	1"=20'	H 56, W 60.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE, WATER COLOR	TRACING PAPER
135-4085	PLAN OF THE "KILLET LOT." / EAST MERRIMACK STREET / LOWELL, MASS.	1894/11/17	1"=10'	H 23.8, W 34.4 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER

135-4087	SKETCH OF LOT OWNED BY P. L.& C.	1892/00/00	1 1/2"=30'	H 21.7, W 43.8 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4089	LAND BELONGING TO THE LOWELL FELTING MILLS, 1881.	1881/03/25	1"=60'	H 38.8, W 50.8 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
135-4090	SKETCH OF LAND AT THE HEAD OF / PAWTUCKET CANAL.	1882/04/28	1"=10'	H 57.9, W 52.2 CM	INK, WATER COLOR	PAPER
135-4091	PLAN OF LOT LEASED TO OTIS ALLEN & SON.	1895/05/25	1"=10'	H 53.3, W 81.2 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4092	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	1"=10'	H 22.5, W 33 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4093	SHOWING LAND LEASED / TO HAW[..ILLEG.] BROTHERS & CO.	1889/07/00	1"=40'	H 48.1, W 57.1 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
135-4094	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	1"=10'	H 28.4, W 38.7 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4096	[PLAN OF] PAWTUCKET CANAL BETWEEN SCHOOL STREET AND N. & L. R. R. BRIDGE [SHOWING PROPOSED NEW CANAL WALL & HEIGHTS OF BOTTOM OF CANAL & BANKS.]	1867/00/00	1"=40'	H 41.2, W 117 CM	INK, COLORED INK, GRAPHITE	CLOTHBACKED PAPER

135-4097	SKETCH / SHOWING SEWER RUNNING FROM / LOWELL HOSIERY, MT. VERNON / STREET TO PAWTUCKET CANAL.	1887/12/00	1"=100'	H 31, W 48 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
135-4098	SKETCH OF SUNDRY LANDS BELONGING TO / PROPS. LOCKS & CANALS, BETWEEN SCHOOL / STREET & BROADWAY.	1893/12/27	1"=40'	H 55.8, W 71.1 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	TRACING PAPER
135-4099	PLOT OF A SURVEY / NEAR NASHUA & LOWELL RAILROAD, WEST OF SCHOOL STREET, / BY J. B. FRANCIS, SEPT. 12, 1843.	1854/03/00	1"=40'		H 59.5, W 85.6 CM	INK, COLORED INK
135-4099	PLOT OF A SURVEY / NEAR NASHUA & LOWELL RAILROAD, WEST OF SCHOOL STREET, / BY J. B. FRANCIS, SEPT. 12, 1843.	1854/03/00	1"=40'	H 59.5, W 85.6 CM	INK, COLORED INK	CLOTH BACKED PAPER
135-4100-[A]	PLAN OF LAND / ON PAWTUCKET ST. / -NEAR THE HEAD OF CHEEVER STREET- [ON MERRIMACK RIVER SHOWING DETAILS] / BELONGING TO PROPS. OF LOCKS & CANALS.	1895/06/01	1"=20'	H 48, W 88.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-4100-[B]	PLAN OF LAND / PROPOSED TO BE LEASED TO CITY OF LOWELL FOR A PIPE YARD.	1892/01/07	1"=10'	H 38.1, W 62.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
135-4101	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	1"=10'	H 41, W 42.4 CM	INK, COLORED INK, GRAPHITE	PAPER

135-4102	PLAN OF LANDS SOLD BY PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER, TO PATRICK T. JACKSON, THE CITY OF LOWELL & HORACE HOWARD.	1860/06/09-19	1"=80'		H 37.4, W 85.5 CM	INK, COLORED INK, GRAPHITE
135-4102	PLAN OF LANDS SOLD BY PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER, TO PATRICK T. JACKSON, THE CITY OF LOWELL & HORACE HOWARD.	1860/06/09-19	1"=80'	H 37.4, W 85.5 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
135-4103	PROPS. LOCKS & CANALS.	1897/02/23	1"=40'	H 31, W 52.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	TRACING PAPER
135-4104	[UNTITLED PLAN. SEE NOTES.]	1892/06/07	1"=5'	H 24.8, W 46.5 CM	COLORED INK, GRAPHITE	PAPER
135-4106	PLAN OF THE / UPPER FREE LANDING.	1898/05/00	1"=20'	H 29, W 42.8 CM	INK, COLORED INK	DRAFTING CLOTH
135-4107	[UNTITLED PLAN. SEE NOTES.]	1894/03/00	1"=40'	H 23.6, W 38.3 CM	COLORED INK, INK, GRAPHITE	PAPER
135-4108	SKETCH SHOWING ENCROACHMENT OF B. & L. R. R. TRACK ON / LOCKS & CANALS LAND ON THE SOUTHERLY SIDE OF HAMILTON / CANAL NEAR GATE HOUSE.	1879/08/07	1"=20'	H 33.5, W 74.5 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4109	[UNTITLED PLAN. SEE NOTES.]	1891/11/00	1"=20'	H 54.6, W 96.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER

135-4110	[UNTITLED PLAN. SEE NOTES.]	1852/09/15	1"=40'		H 57, W 82.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE
135-4110	[UNTITLED PLAN. SEE NOTES.]	1852/09/15	1"=40'	H 57, W 82.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
135-4111	PLAN OF LAND / LEASED BY PROPS OF LOCKS & CANALS TO [...ILLEG.].	1893/10/27	1"=40'	H 31, W 52.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
135-4117	PLAN OF RESEVOIR LOT / -BELONGING TO THE- / PROPRIETORS OF LOCKS & CANALS [SHOWING STONE BOUNDS & ADJOINING LOTS.].	1879/11/06	1"=40'	H 38.8, W 64.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
135-4118	PROFILE OF "RESERVOIR LOT" NEAR NORTHERLY FENCE.	1892/04/11	H3/8"=10', V3/8"=1'	H 26.1, W 63.5 CM	INK, COLORED INK, GRAPHITE	PAPER
135-4119	DESIGN FOR / PROPOSED DAM / AT / MIDDLESEX CO'S YARD / LOWELL, MASS. [AND] SECTION OF / CAPPING STONE / FOR / PROPOSED DAM AT MIDDLESEX CO.	1890/09/00	SEE NOTES	H 91.9, W 77.5 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER

135-4120	[UNTITLED PLAN. SEE NOTES.]	1889/10/04	1"=30'	H 94, W 57.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
135-4421	PLAN OF / CERTAIN PREMISES / BETWEEN / ANNE ST. & MERRIMACK CANAL.	1899/11/24	1"=50'	H 16.4, W 56.2 CM	BLUEPRINT, COLORED INK, GRAPHITE, INK	PAPER
135-4422	PLAN OF LAND / BELONGING TO / PROPS. OF THE LOCKS & CANAL / & MERRIMACK M. CO. / ABBUTTING [SIC] ON FRENCH ST.	1899/11/24	1"=20'	H 27.6, W 48.2 CM	BLUEPRINT, COLORED INK, INK, GRAPHITE	PAPER
135-4423	SECTION OF SEWER IN MOODY ST. / LAID BY L. & C. / FOR THE CITY OF LOWELL.	1890/12/22	1"=1'	H 58.4, W 45.7 CM	INK, COLORED INK, WATER COLOR	PAPER
135-4507	PLAN OF LAND / IN LOWELL, MASS. / BELONGING TO / H. M. LITCHFIELD, / SURVEYED MARCH 1908.	1908/07/14	1"=20'	H 33.6, W 48.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
135-E-001	PULL BOX ITEM 205.	1933/07/08	1 1/2"=12"	H 28, W 21.5 CM	INK	TRACING PAPER
135-E-002	ELECTRICAL INTERCONNECTION / DIAGRAMATIC SKETCH SHOWING / CABLE LENGTHS.	1933/07/11	NONE	H 21.5, W 28 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
135-E-003	PROPRIETORS OF THE LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION / COPPER BUS BENDING DETAILS.	1933/07/17	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH

135-E-003-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION / COPPER BUS BENDING DETAILS.	1933/07/17	NONE	H 28, W 21.5 CM	BLUEPRINT	PAPER
135-E-004	PROPRIETORS OF THE LOCKS & CANALS-LOWELL MASS. / ELECTRICAL INTERCONNECTION / COPPER BUS BENDING DETAILS.	1933/08/01	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
135-E-004-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION / COPPER BUS BENDING DETAILS.	1933/07/17	NONE	H 28, W 21.5 CM	BLUEPRINT	PAPER
135-E-005	PROPRIETORS OF THE LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION / STRUCTURAL STEEL DETAILS.	1933/07/17	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
135-E-006	LOCATION OF INSTRUMENTS ON PANELS / FOR / LAWRENCE SECTION.	1933/07/23	NONE	H 28, W 21.5 CM	GRAPHITE	TRACING PAPER
135-E-008	LAWRENCE SECTION-MERRIMACK PO.HO. LINE.	1933/10/10	1"=60'	H 21.5, W 28 CM	INK, GRAPHITE	DRAFTING CLOTH
135-E-009	DIAGRAM FOR CONNECTIONS / BETWEEN EXCITER FOR NO. 3, 4 & 5 WHEEL / GENERATOR & INDUSTRIAL TRUCK.	1930/11/24	NONE	H 25.3, W 20.3 CM	GRAPHITE	PAPER
135-E-010	LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION / PERSPECTIVE OF CONNECTIONS 4000A / DISCONNECTING SWITCHES / BOOTT BUS.	SEE NOTES	NONE	H 24, W 22.9 CM	INK, WATER COLOR	DRAFTING CLOTH

135-E-011	PROPRIETORS OF THE LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION / COLOR KEY TO CONTROL WIRING.	1934/08/07	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
135-E-012	PROPRIETORS OF THE LOCKS & CANALS-LOWELL, MASS. / ELECTRICAL INTERCONNECTION.	1934/08/06	NONE	H 28, W 21.5 CM	INK	PAPER
135-E-013	LIST OF DISCONNECTING SWITCHES / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION.	1933/00/00	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
135-E-014	LIST OF CIRCUIT BREAKERS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / ELECTRICAL INTERCONNECTION.	SEE NOTES	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
135-E-016	ELECTRICAL INTERCONNECTIONS / LOCKS & CANALS-LOWELL.	1933/12/29	1"=400'	H 21.5, W 28 CM	INK	DRAFTING CLOTH
135-E-017	STANDARD TITLE BOX.	1933/06/27	NONE	H 28, W 21.5 CM	INK	TRACING PAPER
135-E-018	PROPRIETORS OF THE LOCKS & CANALS, LOWELL, MASS. / ELECTRICAL INTERCONNECTION / DIAGRAM OF CONNECTIONS FOR TIRRELL REGULATOR.	1934/08/08	NONE	H 28, W 21.5 CM	INK, GRAPHITE	DRAFTING CLOTH
135-E-019	VOLTAGE CHARACTERISTICS / FOR / WAGNER 667 KVA 2400 / 600V / TRANSFORMERS WITH 4-2 1/2% TAPS.	1934/08/09	NONE	H 31, W 21.7 CM	INK	PAPER
135-E-019-[COPY 1]	VOLTAGE CHARACTERISTICS / FOR / WAGNER 667 KVA 2400 / 600V / TRANSFORMERS WITH 4-2 1/2% TAPS.	1934/08/09	NONE	H 31, W 21.7 CM	BLUEPRINT	PAPER

135-E-020	PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. / DIAGRAMS FOR ELECTRICALLY / OPERATED SWITCH B-5- BOOTT TRANS. VAULT.	1934/08/31	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
136-001	[UNTITLED PLAN.] [SKETCH OF PROPOSED POWER STATION AT LAWRENCE DAM.]	SEE NOTES	NONE	H 76.3, W 96 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-001	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-001	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-002	PROPRIETORS OF LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF PROPOSED SURPLUS PLANT.	1912/07/00	1"=250'	H 65.4, W 101 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER
136-002	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-002	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-003	PROFILE & CROSS SECTIONS / OF / WATERWAYS FROM TREMONT / GATE HOUSE TO MERRIMACK RIVER.	1927/06/10	1"=10'& 40'	H 68.9, W 105.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

136-003	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK
136-003	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK	CLOTH BACKED PAPER
136-004	PROPOSED CENTRAL POWER PLANT / BELOW MOODY ST.-3 UNITS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/08/00	1"=50'	H 69.2, W 106.4 CM	INK	DRAFTING CLOTH
136-004	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25"", W 29 1/2"	INK
136-004	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25"", W 29 1/2"	INK	CLOTH BACKED PAPER
136-005	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-005	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER

136-005-A	OPEN CANAL. [PROPOSED CENTRAL POWER PLANT BELOW MOODY ST.-3 UNITS PROPRIETORS OF THE LOCKS & CANALS LOWELL, MASS.]	UNDATED	NONE	H 76.1, W 111.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-005-B	[UNTITLED PLAN.] [PROPOSED CENTRAL POWER PLANT BELOW MOODY ST.-3 UNITS PROPRIETORS OF THE LOCKS & CANALS LOWELL, MASS.]	UNDATED	NONE	H 76.2, W 110.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-005-C	[UNTITLED PLAN.] [PROPOSED CENTRAL POWER PLANT BELOW MOODY ST.-3 UNITS PROPRIETORS OF THE LOCKS & CANALS LOWELL, MASS.]	UNDATED	NONE	H 69, W 105.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-006	PROPOSED CENTRAL POWER PLANT / BELOW MOODY ST.-3 UNITS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/08/24	1"=10'	H 71.4, W 99.8 CM	INK, COLORED INK	DRAFTING CLOTH
136-006	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-006	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-007	BI-PLANE VIEW / OF / PROPOSED SURPLUS POWER STATION / FOR / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1921/07/00	NONE	H 44.4, W 65.8 CM	INK	DRAFTING CLOTH

136-007	PLAN OF LAND BELONGING TO THE LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 19 1/2"	INK, WATER COLOR
136-007	PLAN OF LAND BELONGING TO THE LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 19 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-007-1	POWER STATION-2500 K. W. / BELOW MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/19	1/4"=1'	H 63.1, W 95.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
136-007-2	POWER STATION-2500 K. W. / BELOW MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/19	1/4"=1'	H 63.1, W 95.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
136-007-3	POWER STATION-2500 K. W. / BELOW MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/19	1"=50'	H 63.1, W 95.5 CM	INK, COLORED INK	DRAFTING CLOTH
136-008	HEADGATE STRUCTURE / & WASTEWAY / FOR / PROPOSED CENTRAL POWER STATION AT LAWRENCE SECTION / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/08/19	1"=10'& 5'	H 69.3, W 92.2 CM	INK, COLORED INK	DRAFTING CLOTH
136-008	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'		H 25 1/2", W 29 1/2"	INK, WATER COLOR
136-008	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'	H 25 1/2", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER

136-009	PROPOSED CENTRAL POWER STATION / PROPRIETORS LOCKS & CANALS-LOWELL, MASS. [PLAN, ELEVATION AND SECTION.]	1927/07/29	1"=10'	H 69.9, W 92.1 CM	INK, COLORED INK	DRAFTING CLOTH
136-009	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-009	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-009-[COPY 1]	[PROPOSED CENTRAL POWER STATION PROPRIETORS LOCKS & CANALS-LOWELL, MASS. PLAN, ELEVATION AND SECTION.]	1927/07/28	1"=10'		BLUEPRINT	
136-010	PROPOSED CENTRAL POWER STATION / AT LAWRENCE SECTION / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/09/00	1"=40'	H 75.6, W 109.5 CM	INK, GRAPHITE	DRAFTING CLOTH
136-010	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/4"	INK, WATER COLOR
136-010	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/4"	INK, WATER COLOR	CLOTH BACKED PAPER

136-011	RELOCATION OF RAILROAD / TO NASHUA MFG. CO. / ACROSS CANAL TO / PROPOSED POWER STATION / PROPOSED CHANGES SHOWN IN RED / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/07/11	SEE NOTES	H 87, W 115.6 CM	INK, COLORED INK	DRAFTING CLOTH
136-011	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-011	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-012	PROPOSED 4,500 K.W. HYDRO-ELECTRIC UNIT / IN LAWRENCE WASTEWAY / PROPRIETORS OF THE LOCKS & CANALS ON THE MERRIMACK RIVER / LOWELL, MASS.	1927/09/00	1"=40'& 20'	H 52.8, W 106.8 CM	INK, COLORED INK	DRAFTING CLOTH
136-012	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'		H 25 1/2", 29 1/2"	INK, WATER COLOR
136-012	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MER. RIVER.	1844/00/00	1/8"=10'	H 25 1/2", 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-013	PLAN OF THE / MILL YARDS / OF THE / TREMONT MILLS / & / LAWRENCE SECTION OF T.& S. MILLS / SHOWING / WATERWAYS FOR WATER POWER.	SEE NOTES	1"=40'	H 74.9, W 109.3 CM	BLUEPRINT, COLORED INK, WATER COLOR	PAPER

136-013	PLAN OF LAND BELONGING TO THE / LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-013	PLAN OF LAND BELONGING TO THE / LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-014	PROPOSED 1,200 K. W. HYDRO-ELECTRIC UNIT / IN MERRIMACK WASTEWAY / PROPRIETORS OF THE LOCKS & CANALS ON THE MERRIMACK RIVER / LOWELL, MASS.	1927/10/00	1"=40'& 20'	H 45.9, W 75.9 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
136-014	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR
136-014	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-015	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25", W 29 1/2"	INK, WATER COLOR

136-015	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25", W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER
136-015-[COPY 1]	PLAN OF THE / MILLS & PRINT WORKS OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / WATER-WAYS FOR WATER POWER.	SEE NOTES	1"=40'	H 87.8, W 99.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-015-[COPY 2]	PLAN OF THE / MILLS & PRINT WORKS / OF THE MERRIMACK MANUFACTURING COMPANY / SHOWING / WATER-WAYS FOR WATER POWER.	SEE NOTES	NONE	H 67.6, W 94.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-016	PLAN SHOWING / PORTION OF CITY OF LOWELL / MERRIMACK RIVER, CONCORD RIVER & CANALS / ALSO / EXISTING WATERWHEELS / & PROPOSED ALTERNATIVE CENTRAL STATIONS.	SEE NOTES	3/16"=50'	H 35, W 49.2 CM	PHOTOGRAPH	PAPER
136-016	PLAN OF LAND BELONGING TO / PROPRIETORS OF LOCKS & CANAL ON MERRIMACK RIVER.	1844/00/00	1/8"=10'		H 25, W 29 1/2"	INK, WATER COLOR
136-016	PLAN OF LAND BELONGING TO / PROPRIETORS OF LOCKS & CANAL ON MERRIMACK RIVER.	1844/00/00	1/8"=10'	H 25, W 29 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER

136-017-[01]	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1846/05/00	1/8"=10'		H 63.5, W 100 CM	INK, WATER COLOR
136-017-[01]	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1846/05/00	1/8"=10'	H 63.5, W 100 CM	INK, WATER COLOR	CLOTH BACKED PAPER
136-017-[02]	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	SEE NOTES			H 63.5, W 91.5 CM	INK, WATER COLOR
136-017-[02]	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	SEE NOTES	1/4"=10'	H 63.5, W 91.5 CM	INK, WATER COLOR	CLOTH BACKED PAPER
136-017-A	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER. / PLAN OF / LAND IN LOWELL.	1878/00/00			H 26 18", W 35	INK, WATER COLOR

136-017-A	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER. / PLAN OF / LAND IN LOWELL.	1878/00/00	1/4"=10'	H 26 18", W 35"	INK, WATER COLOR	CLOTH BACKED PAPER
136-018	DRAWING SHOWING / 13,500 K. W. HYDRO-ELECTRIC STATION / FOR THE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/06/00	1"=40'& 20'	H 71.8, W 108 CM	RED LINE PRINT	PAPER
136-018	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER. / PLAN OF / LAND IN LOWELL.	1878/00/00			H 27 1/2", W 29"	INK, WATER COLOR
136-018	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER. / PLAN OF / LAND IN LOWELL.	1878/00/00	1/4"=10'	H 27 1/2", W 29"	INK, WATER COLOR	CLOTH BACKED PAPER
136-019	BI-PLANE VIEW / OF / PROPOSED CENTRAL POWER PLANT / FOR / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1920/07/00	NONE	H 41, W 66 CM	INK	DRAFTING CLOTH
136-019	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF LAND IN LOWELL.	1868/00/00			H 27 1/4", W 29"	INK, WATER COLOR, COLORED INK

136-019	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF LAND IN LOWELL.	1868/00/00	1"=80'	H 27 1/4", W 29"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-020	BI-PLANE VIEW / OF / PROPOSED CENTRAL POWER PLANT / FOR / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1920/08/00	NONE	H 41, W 66 CM	INK	DRAFTING CLOTH
136-020	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF LAND IN LOWELL.	1868/00/00		H 27 1/2", W 29 1/2"	INK, WATER COLOR, COLORED INK	
136-020	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF LAND IN LOWELL.	1868/00/00	1/4"=10'	H 27 1/2", W 29 1/2"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-021	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / PLAN OF POWER HOUSE, CANAL & TAIL RACE [OF HYDRO-ELECTRIC PLANT 6 UNITS].	1920/07/15	1"=50'	H 68.6, W 108 CM	INK, COLORED PENCIL	DRAFTING CLOTH

136-021	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1874/00/00			H 27 1/2", W 29 1/2"	INK, WATER COLOR, COLORED INK
136-021	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1874/00/00	1/4"= 10'	H 27 1/2", W 29 1/2"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-022	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / PROPOSED CENTRAL POWER PLANT [ON MERRIMACK RIVER].	1920/07/15	1"=16'	H 68.6, W 108 CM	INK	DRAFTING CLOTH
136-022	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00			H 25", W 34"	INK, WATER COLOR
136-022	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00	1/4"=10'	H 25", W 34"	INK, WATER COLOR	CLOTH BACKED PAPER

136-022-[COPY 1]	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / PROPOSED CENTRAL POWER PLANT [ON MERRIMACK RIVER].	1920/07/15	1"=16'	H 68.9, W 106.7 CM	BLUEPRINT	PAPER
136-023	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF DEVELOPMENT.	1920/07/16	1"=150',1"=5'PER SEC	H 69, W 107.4 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
136-023	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00			H 25", W 34"	INK, WATER COLOR
136-023	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00	1/4"=10'	H 25", W 34"	INK, WATER COLOR	CLOTH BACKED PAPER
136-023-[COPY 1]	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF DEVELOPMENT.	1920/07/16	SEE NOTES	H 68.8, W 106.7 CM	BLUEPRINT	PAPER

136-024	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00			H 26", W 35"	INK, WATER COLOR, COLORED INK
136-024	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00	1/4"=10'	H 26", W 35"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-024-[A]	PROPRIETORS LOCKS & CANALS LOWELL, MASS. / POWER REDEVELOPMENT. / LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS.	1920/07/16	3/16"=50'	H 70.5, W 103.4 CM	LITHOGRAPH, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
136-024-[B]	[PROPOSED INTERCONNECTION OF MILLS.]	1925/02/00				
136-025	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / PLAN OF POWER HOUSE, CANAL & TAIL RACE [THREE UNITS].	1920/08/07	1"=50'	H 69, W 107.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH

136-025	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00			H 25", W 34"	INK, WATER COLOR
136-025	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00	1/8"=10'	H 25", W 34"	INK, WATER COLOR	CLOTH BACKED PAPER
136-026	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF DEVELOPMENT / AT LAWRENCE SECTION.	1932/04/07	1"=40'	H 67.4, W 107.7 CM	INK, COLORED INK	DRAFTING CLOTH
136-026	PROPS OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00			H 25", W 34"	INK, WATER COLOR
136-026	PROPS OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1875/00/00	1/4"=10'	H 25", W 34"	INK, WATER COLOR	CLOTH BACKED PAPER
136-026-[COPY 1]	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF DEVELOPMENT / AT LAWRENCE SECTION.	1932/04/07	1"=40'	H 67.3, W 106.4 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER

136-027	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF DEVELOPMENT / AT LAWRENCE SECTION.	1932/04/07	1"=16',1/8"=1'	H 67.4, W 107.7 CM	INK	DRAFTNG CLOTH
136-027	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00			H 25", W 34"	INK, WATER COLOR, COLORED INK
136-027	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00	1/1600, 1/16"=10'	H 25", W 34"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-027-[COPY 1]	PROPRIETORS LOCKS & CANALS-LOWELL, MASS. / PROPOSED CENTRAL POWER PLANT. / AT LAWRENCE.	1932/04/07	1"=16'& 1/8"=1'	H 67, W 106.8 CM	BLUEPRINT	PAPER
136-028	PROPS OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00			H 25", W 34"	INK, WATER COLOR, COLORED INK
136-028	PROPS OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00	1/16"=10'	H 25", W 34"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER

136-028	[CENTRAL POWER STATION SCHEME A.] [PLANS OF] CENTRAL POWER STATION [ON MERRIMACK RIVER AT LOWELL] / SCHEME A / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/24				
136-029	TREMONT & LAWRENCE SECTION YARD / OF THE / MERRIMACK MFG. COMPANY / SHOWING / POSSIBLE HYDRO-ELECTRIC DEVELOPMENT.	1933/03/06	1"=125'	H 21.8, W 39.7 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
136-029	PROPS OF LOCKS & CANAL ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00			H 25", W 34"	INK, WATER COLOR, COLORED INK
136-029	PROPS OF LOCKS & CANAL ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00	1/8"=10'	H 25", W 34"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-030	POSSIBLE HYDRO-ELECTRIC DEVELOPMENT [IN LAWRENCE SECTION YARD] / PROPRIETORS OF LOCKS & CANALS.	1933/06/00	1"=40'& 125'	H 22, W 41 CM	INK, GRAPHITE	DRAFTING CLOTH

136-030	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00			H 25", W 34"	INK, WATER COLOR, COLORED INK
136-030	PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN / OF LAND IN LOWELL.	1876/00/00	1/8"=10'	H 25", W 34"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
136-031	HYDRO-ELECTRIC DEVELOPMENT / AS PROPOSED BY MR. HALL / IN TAX ABATEMENT CASE OF 1933 & 1934.	1935/01/00	1"=50'	H 62.7, W 111.8 CM	INK, COLORED INK	DRAFTING CLOTH
136-031	PLAN OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF / LAND IN LOWELL.	1878/00/00			H 25", W 34 1/2"	INK, WATER COLOR
136-031	PLAN OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF / LAND IN LOWELL.	1878/00/00	1/4"=10'	H 25", W 34 1/2"	INK, WATERCOLOR	CLOTH BACKED PAPER
136-032	[PROPOSED] LOWELL CENTRAL POWER STATION / & / LOWELL WATER POWER PROJECT.	1914/03/30	1"=50'	H 76.2, W 105.8 CM	BLUEPRINT	PAPER
136-033	[PROPOSED] PRELIMINARY / LOWELL CENTRAL POWER STATION / LOWELL WATER POWER PROJECT. / GENERAL LAYOUT.	1914/03/30	1"=50'	H 74, W 128 CM	BLUEPRINT	PAPER

136-034-[COPY 1]	[PROPOSED] LOWELL CENTRAL POWER STATION / & / LOWELL WATER POWER PROJECT / ON THE MERRIMACK RIVER.	1913/10/15	1"=50'	H 75.2, W 133.4 CM	BLUEPRINT	PAPER
136-034-[COPY 2]	[PROPOSED] LOWELL CENTRAL POWER STATION / & / LOWELL POWER PROJECT / ON THE MERRIMACK RIVER.	1913/10/15	1"=50'	H 75.2, W 133.4 CM	BLUEPRINT	PAPER
136-035	[PROPOSED] SURPLUS POWER STATION / AT BOOTT PENSTOCK / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/03/15	1/4"& 1"=50'	H 54.5, W 62.4 CM	INK, GRAPHITE	DRAFTING CLOTH
136-036	SURPLUS POWER STATION / NORTHERN CANAL AT MOODY ST. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/03/28	1"=250',10'& 1/4"=1'	H 54, W 61.6 CM	INK, GRAPHITE	DRAFTING CLOTH
136-037	TREMONT & LAWRENCE SECTION / SHOWING / WATERWAYS.	1940/07/18	1"=40'	H 63.9, W 96.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
136-037-[A]	TREMONT & LAWRENCE SECTION / SHOWING / WATERWAYS.	1940/07/18	1"=40'	H 67.2, W 95.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-037-[B]	SUGGESTED 2-12 FT. PENSTOCKS & REPAIRS TO PRESENT LAWRENCE SECTION WHEELS / SCHEME "E".	1940/11/15	NONE	H 28, W 21.5 CM	INK	PAPER
136-037-[C]	TREMONT & LAWRENCE SECTION / SHOWING / WATERWAYS.	1940/07/18	NONE	H 67.2, W 95.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-037-[D]	SUGGESTED HYDRO-ELECTRIC UNIT-LAWRENCE SECTION / SCHEME "D".	1940/11/15	NONE	H 28, W 21.5 CM	INK	PAPER

136-037-[E]	POSSIBLE CENTRAL POWER PLANT / BELOW / HICKEY HALL DAM / SCHEME "A".	1940/07/20	1"=40'	H 67.2, W 95.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-037-[F]	POSSIBLE CENTRAL POWER PLANT / IN VICINITY OF / HICKEY HALL DAM / SCHEME "B".	1940/07/22	1"=40'	H 67.2, W 95.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-037-[G]	CENTRAL POWER STATION-TREMONT & LAWRENCE SECTION YARDS. / SCHEME B AT HICKEY HALL DAM.	1940/09/04	NONE	H 28, W 21.5 CM	INK	PAPER
136-037-[H]	POSSIBLE CENTRAL POWER PLANT / IN VICINITY OF / LAWRENCE DAM / SCHEME "C".	1940/07/23	1"=40'	H 67.2, W 91 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-038	POSSIBLE HYDRO-ELECTRIC DEVELOPMENT / IN LAWRENCE SECTION YARD.	1940/00/00	1"=125'	H 24.4, W 49.6 CM	BLUE LINE PRINT, INK, WATER COLOR	PAPER
136-039	HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS. / DATE, MARCH 1914 / MARCH 1919 / NOVEMBER 1930.	SEE TITLE	NONE	H 28, W 110 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER
136-039-[A]	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS.	1938/01/00	1/8"=50'	H 46.4, W 56.8 CM	PHOTOGRAPH, COLORED INK, WATER COLOR	PAPER
136-039-[A-A]	PLAN OF / NORTHERN CANAL / SHOWING / POSITION OF SECTIONS / TRACED FROM LARGE PLAN OF CANAL.	1901/04/00	1"=100'	H 70.4, W 111.8 CM	BLUEPRINT	PAPER
136-039-[A-B]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 105.5, W 158.8 CM	BLUEPRINT	PAPER

136-039-[C]	KILOWATT HOUR OUTPUT / OF MERRIMACK RIVER AT LOWELL / UNDER DIFFERENT CONDITIONS AS SHOWN / PROPRIETORS OF THE LOCKS & CANALS.	1933/06/00	NONE	H 28, W 42 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-039-[D]	CUBIC FEET PER SECOND / OF MERRIMACK RIVER AT LOWELL / 24 FLOW, 3967 SQ. MILES DRAINAGE AREA / PROPRIETORS OF THE LOCKS & CANALS.	1933/06/00	NONE	H 28, W 42 CM	BLUEPRINT	PAPER
136-039-[E]	TABLE SHOWING / CUBIC FEET PER SECOND, HORSE POWER, / KILOWATTS ON SWITCHBOARD & CAPACITY OF GENERATORS .80 POWER FACTOR / OF / LOWELL MILLS / BELONGING TO / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1931/02/21	NONE	H 20.4, W 111.8 CM	BLUEPRINT	PAPER
136-039-[F]	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	NONE	H 37.8, W 178.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-039-[G]	PART OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS / POWER REQUIREMENTS / AS OF 1933.	1933/02/00	1/8"=25'	H 57.7, W 51 CM	PHOTOGRAPH, INK, COLORED INK	PAPER
136-039-[H]	PLAN OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS / POWER REQUIREMENTS / AS OF 1933.	1933/02/00	1/8"=24'	H 57.7, W 51 CM	PHOTOGRAPH, INK, COLORED INK	PAPER

136-039-[I]	PLAN SHOWING / ELECTRICAL INTERCONNECTION / BETWEEN / MILLS OF THE JACKSON STREET MARKET / & DUTTON STREET GROUP / PROPRIETORS OF THE LOCKS & CANALS.	1937/07/29	1"=40'	H 61.7, W 75.6 CM	BLUEPRINT	PAPER
136-039-[J]	PLAN SHOWING / WATERWAYS / OF THE / NASHUA MFG. COMPANY, / "TREMONT YARD" MERRIMACK MFG. CO. / & THE / "TREMONT GATES" PROP. OF THE LOCKS & CANALS.	1936/08/04	1"=40'	H 58.2, W 74.3 CM	BLUEPRINT	PAPER
136-039-[K]	PLAN SHOWING / PORTION OF CITY OF LOWELL / MERRIMACK RIVER, / CONCORD RIVER & CANALS / ALSO / EXISTING WATERWHEELS / & PROPOSED ALTERNATIVE CENTRAL STATIONS.	1928/00/00	1/4"=50'	H 67, W 92.8 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER
136-039-[L]	SKETCH OF / TREMONT SECTION OF MERRIMACK MFG. COMPANY / SHOWING / LAND AREAS, BUILDINGS, FLOOR AREAS, WATERWAYS, / AREAS LEASED FROM PROPRIETORS OF THE LOCKS & CANALS / & OTHER INFORMATION.	1932/08/08	1"=50'	H 47.6, W 90.9 CM	BLUE LINE PRINT, COLORED PENCIL, WATER COLOR	PAPER
136-039-[M]	VELOCITY CURVES / LOWER PAWTUCKET CANAL PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/12/00	NONE	H 28.8, W 44.5 CM	BLUEPRINT	PAPER
136-039-[N]	[SECTIONS OF VARIOUS CANALS.]	SEE NOTES	NONE	H 44.5, W 28.8 CM	BLUEPRINT	PAPER

136-039-[O]	SECTION OF GREAT RIVER WALL, LOWELL, MASS.	SEE NOTES	1"=5'	H 28.7, W 22.3 CM	BLUEPRINT	PAPER
136-039-[P]	SECTION OF PAWTUCKET DAM, LOWELL, MASS.	SEE NOTES	3/16"=1'	H 28.7, W 22.3 CM	BLUEPRINT	PAPER
136-039-[Q]	HARVARD UNIVERSITY, COURSE 6 L. / WATER POWER ENGINEERING / APPROXIMATE ELEVATIONS OF WATER / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1915/04/00	NONE	H 29.7, W 23.2 CM	BLUEPRINT	PAPER
136-039-[R]	MERRIMACK RIVER / PLAN SHOWING DRAINAGE BASIN ABOVE LAWRENCE / LOCATION OF PRECIPITAION STATIONS & / LENGTH OF PRECIPITATION RECORDS.	SEE NOTES	1/16"=1 MILE	H 43, W 26.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
136-039-[S]	HARVARD UNIVERSITY, COURSE 6 L. / WATER POWER ENGINEERING / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	1/2"=50'	H 28, W 55.4 CM	BLUEPRINT	PAPER
136-039-[T]	HARVARD UNIVERSITY, COURSE 6 L. / WATER POWER ENGINEERING / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	NONE	H 28, W 55.4 CM	BLUEPRINT	PAPER
136-039-[U]	HARVARD UNIVERSITY, COURSE 6 L. / WATER POWER ENGINEERING.	1914/03/00	1/2"& 1/4"=10'	H 28, W 55.4 CM	BLUEPRINT	PAPER
136-039-[V]	PLAN / OF / PAWTUCKET DAM / FOR / HYDRO-ELECTRIC DEVELOPMENT OF LOWELL, MASS.	1914/03/00	1/4"=10'	H 27.9, W 80 CM	BLUEPRINT	PAPER
136-039-[W]	COURSE 6-L HARVARD UNIVERSITY NORTHERN CANAL SECTIONS-LOWELL, MASS. / SECTIONS TAKEN LOOKING DOWNSTREAM.	SEE NOTES	1"=10'	H 59, W 50.7 CM	BLUEPRINT	PAPER

136-039-[Z]	HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS. / DATE, MARCH, 1919 / NOVEMBER 1930.	SEE TITLE	NONE	H 28, W 110 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER
136-040-001	SKETCH SHOWING / SUGGESTED CENTRAL STATION / THROUGH LAURIER PARK / LOWELL, MASS.	1914/03/27	1"=150'& 50'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-002	SKETCH SHOWING / CENTRAL HYDRO & STEAM STATIONS / SUGGESTED BY JOHN A. STEVENS INC. / LOWELL, MASS.	1914/03/30	1"=150'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-003	SKETCH SHOWING / SUGGESTED CENTRAL STATION / BELOW MOODY STREET BRIDGE / LOWELL, MASS.	1920/06/07	1"=150'& 60'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-004	SKETCH SHOWING / SUGGESTED CENTRAL STATION / BELOW MOODY STREET BRIDGE / LOWELL, MASS.	1920/07/21	1"=150'& 60'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-005	SKETCH SHOWING / SUGGESTED CENTRAL STATION / BELOW MOODY STREET BRIDGE / LOWELL, MASS.	1927/08/22	1"=150'& 60'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-006	SKETCH SHOWING / SUGGESTED CENTRAL STATION / BY WATER A. HALL IN 1935 / FOR TAX ABATEMENT CASE OF 1933 & 1934.	SEE TITLE	1"=150'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-007-A	SKETCH SHOWING / SUGGESTED CENTRAL STATION / MERRIMACK MFG. CO. "LAWRENCE SECTION" / LOWELL, MASS.	1932/04/00	1"=125'& 60'	H 28, W 48.9 CM	INK	DRAFTING CLOTH

136-040-007-B	SKETCH SHOWING / SUGGESTED CENTRAL STATION / MERRIMACK MFG. CO. "LAWRENCE SECTION" / LOWELL, MASS.	1933/06/00	1"=125'& 60'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-008	SKETCH SHOWING / SUGGESTED / CENTRAL STATION / AT HICKEY HALL DAM / LOWELL, MASS.	1940/10/15	1"=125'& 60'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-009	SKETCH SHOWNG / SUGGESTED 2-12 FT. PENSTOCKS / & 3000 KW. UNIT / MERRIMACK MFG. CO. "LAWRENCE SECTION" / LOWELL, MASS.	1940/11/15	1"=125'& 60'	H 28, W 48.9 CM	INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
136-040-010	SKETCH SHOWING / USE OF EXISTING HYDRO-UNITS / & / SUGGESTED NEW STEEL PENSTOCKS / MERRIMACK MFG. CO. "LAWRENCE SECTION" / LOWELL, MASS.	1940/11/15	1"=60'& 125'	H 28, W 48.9 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
136-040-011	SKETCH SHOWING / USE OF EXISTING HYDRO-UNITS / & / SUGGESTED WIDENING OF INNER CANAL / MERRIMACK MANUFACTURING COMPANY / LOWELL, MASS.	1940/11/21	1"=60'	H 28, W 48.9 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-012	PLAN OF / CANALS & MILL YARDS / SHOWING / LOCATION OF SUGGESTED POWER STATIONS / LOWELL, MASS.	1941/01/00	1"=500'	H 35.6, W 57.8 CM	INK, WATER COLOR	DRAFTING CLOTH
136-040-013	PERCENT OF TIME-DURATION / MERRIMACK RIVER AT LAWRENCE MASS. / 50 YEAR PERIOD-OCT.1, 1879 TO SEPT.30, 1929.	SEE TITLE	NONE	H 29.3, W 43.5 CM	INK	DRAFTING CLOTH
136-040-014	[UNTITLED.] [ORIGINAL DIAGRAM OF PRICES PER KW HOUR FOR POWER AT LOWELL MILLS FROM 1923 TO 1940.]	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER

136-040-015	LOWELL INDUSTRIAL DEVELOPMENT COMPANY [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-016	BOOTT MILLS [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-017	ASSETS REALIZATION CO. [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-018	ATLANTIC RAYON CORPORATION [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-019	APPLETON COMPANY / (INCLUDES SACO LOWELL SHOPS PERMANENT POWERS) [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER

136-040-020	MERRIMACK MFG. COMPANY / "TREMONT SECTION." [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-021	NEW MARKET MFG. COMPANY / "HAMILTON YARD." [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-022	MERRIMACK MFG. COMPANY. [ORIGINAL DIAGRAM SHOWING MISCELLANEOUS LIMITATIONS FOR AUGUST 1939 AND 200% LIMITATIONS FOR MAY 1940].	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
136-040-023	[UNTITLED.] [ORIGINAL DIAGRAM SHOWING LOCKS AND CANALS RECEIPTS AND EXPENSES FOR WATER POWER ALSO TOTAL KW HOURS AND 24 HOUR FLOW OF MERRIMACK RIVER FROM 1914 TO 1940.]	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
136-040-024	DIAGRAM SHOWING / KILOWATTS DEVELOPED / BY THE CORPORATIONS / FROM PERCENT OF PERMANENT WATER.	SEE NOTES	NONE	H 42, W 28 CM	INK	PAPER
136-040-025	DIAGRAM SHOWING / KILOWATTS VS. CUBIC FEET PER SECOND / FROM PERMANENT WATER.	UNDATED	NONE	H 28, W 42 CM	INK	PAPER

136-040-026	[UNTITLED.] [ORIGINAL DIAGRAM SHOWING LOWELL WATER WORKS COAL PRICES; LOCKS AND CANALS WATER POWER VALUATION CONSTRUCTION COSTS WITH YEAR 1913 TAKEN AS INDEX OF 100% AND TAX ON WATER POWER FROM 1914 TO 1940.]	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
136-041	LOWELL INDUSTRIAL DEVELOPMENT CO. ASSETS DIVISION / POWER HOUSE SWITCH BOARD / 200 MARKET ST. LOWELL, MASS.	1955/08/17	NONE	H 24.4, W 49.6 CM	GRAPHITE	TRACING PAPER
137-001	[UNTITLED PLAN.] [LAND IN VICINITY OF SWAMP LOCKS BORDERING ON CANALS].	UNDATED	1"=50'	H 78.7, W 134.7 CM	INK, WATERCOLOR, COLORED INK, COLORED PENCIL	CLOTH BACKED PAPER
137-002	[UNTITLED PLAN.] [LAND IN VICINITY OF TREMONT GATE.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR, COLORED PENCIL	CLOTH BACKED PAPER
137-003	[UNTITLED PLAN.] [LAND IN VICINITY OF MERRIMACK DAM.]	UNDATED	1"=50'	H 81.4, W 135.4 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-004	[UNTITLED PLAN.] [LAND IN VICINITY OF HIGH BRIDGE AND AIKEN ST. BRIDGE.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
137-005	[UNTITLED PLAN.] [LAND IN VICINITY OF LOCKS & CANALS OFFICE ON BROADWAY.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
137-006	[UNTITLED PLAN.] [LAND IN VICINITY OF LOCKS & CANALS RESERVOIR, 266 ANDOVER ST. AND HUNTS FALLS, EAST SIDE.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER

137-007	[UNTITLED PLAN.] [LAND BORDERING OF MERRIMACK RIVER AND STACKPOLE STREET.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-008	[UNTITLED PLAN.] [LAND BORDERING ON MERRIMACK RIVER IN VICINITY OF INDIAN ORCHARD.]	UNDATED	SEE NOTES	H 81.3, W 134.7 CM	INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
137-009	[UNTITLED PLAN.] [LAND BORDERING ON MERRIMACK RIVER IN VICINITY OF FIRST & BEACON.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-010	[UNTITLED PLAN.] [LAND BORDERING ON MERRIMACK RIVER IN VICINITY OF FIRST ST. DUMP.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-011	[UNTITLED PLAN.] [LAND BORDERING ON CONCORD RIVER IN VICINITY OF MERRIMACK SQUARE.]	UNDATED	1"=50'	H 81.3, W 134,7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-012	[UNTITLED PLAN.] [LAND BORDERING PWATUCKET CANAL BETWEEN SCHOOL STREET & FLETCHER.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-013	[UNTITLED PLAN.] [LAND BORDERING ON PAWTUCKET CANAL BETWEEN BROADWAY AND SCHOOL ST.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
137-014	[UNTITLED PLAN.] [LAND BORDERING ON PAWTUCKET CANAL BEWTEEN PAWTUCKET ST. AND BROAD'Y.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-015	[UNTITLED PLAN.] [LAND BORDERING ON MERRIMACK RIVER BETWEEN AIKEN ST. AND BRIDGE ST.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
137-016	[UNTITLED PLAN.] [LAND BORDERING ON MERRIMACK RIVER BETWEEN BEAVER BROOK AND AIKEN ST.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER

137-017	[UNTITLED PLAN.] [LAND BORDERING MERRIMACK RIVER BETWEEN MOODY STREET AND BEAVER BROOK.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-018	[UNTITLED PLAN.] [LAND BORDERING MERRIMACK RIVER BETWEEN PAWTUCKET BRIDGE AND MOODY ST.]	UNDATED	1"=40'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-019	[UNTITLED PLAN.] [LAND BORDERING ON MERRIMACK RIVER ABOVE PAWTUCKET BRIDGE, BOTH SIDES.]	UNDATED	1"=50'	H 81.3, W 134.7 CM	INK, WATER COLOR	CLOTH BACKED PAPER
137-020-[COPY 1]	PLAN & PROFILE / LOWELL WATER WORKS SUPPLY LINES / AT MERRIMACK RIVER CROSSING.	1918/07/00	1"=20'	H 55.5, W 69.4 CM	BLUE LINE PRINT	PAPER
137-020-[COPY 2]	PLAN & PROFILE / LOWELL WATER WORKS SUPPLY LINES / AT MERRIMACK RIVER CROSSING.	1918/07/00	1"=20'	H 55.5, W 69.4 CM	BLUE LINE PRINT	PAPER
137-021	PLAN & PROFILE OF / PROPOSED STATE HIGHWAY IN / LOWELL.	1916/12/05	H1"=40', V1"=8'	H 61, W 97.3 CM	BLUEPRINT	PAPER
137-022	[PLAN OF STATE HIGHWAY COMMISSION & L.& C. SHOWING PROPOSED BOULEVARD BETWEEN FIRST ST. & MERRIMACK RIVER WITH CONTOURS, ETC.]	1916-1918/00/00				
137-023	[L. & C. MAP OF LOWELL SHOWING LOCATION OF LIFE SAVING APPARATUS AND SWIMMING PLACES ON RIVERS AND CANALS.]	UNDATED				

137-024	PLAN OF STREETS / BORDERING ON / WESTERN CANAL [BETWEEN MOODY & BROADAWY] / SHOWING / WROUGHT IRON FENCE CORNERS [& THE NAMES OF DIFFERENT TREES SET OUT IN 1919 WITH THEIR LOCATIONS.]	SEE NOTES	1"=50'	H 43.4, W 96.5 CM	RED LINE PRINT, INK, CRAYON, COLORED INK	CLOTH BACKED PAPER
138-[037]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1941/00/00	1"=40'	H 77.5, W 106 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-[037]-[COPY 1]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1941/00/00	1"=40'	H 77.5, W 106 CM	BLUE LINE PRINT	PAPER
138-[037]-[COPY 2]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1941/00/00	1"=40'	H 77.5, W 106 CM	BLUE LINE PRINT	PAPER
138-[037]-[COPY 3]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1941/00/00	1"=40'	H 77.5, W 106 CM	BLUE LINE PRINT	PAPER
138-[037]-[COPY 5]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1941/00/00	1"=40'	H 77.5, W 106 CM	BLUE LINE PRINT	PAPER
138-[037]-[COPY4]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1941/00/00	1"=40'	H 77.5, W 106 CM	BLUE LINE PRINT	PAPER
138-[038]	PLAN OF THE / BIGELOW YARD / OWNED BY / BOOTT MILLS, VALLEY ASSOCIATES, UNITED ELASTIC CORP. / AND OTHERS, NOW OR FORMERLY, AS SHOWN ON THIS PLAN / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	1954/01/00	1"=40'	H 71.5, W 102 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

138-[039]	PLAN OF THE / "HAMILTON YARD" / TEXTRON AMERICAN, INC., / SIDNEY CORPORATION, / COURIER CITIZEN CO. / AND LAGANAS SHOW CO. / SHOWING / PIPES FOR FIRE PROTECTION / WATERWAYS ETC. FOR WATERPOWER.	1954/05/00	1"=40'	H 71, W 102 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
138-[039]-[COPY 1]	PLAN OF THE / "HAMILTON YARD" / TEXTRON AMERICAN, INC., / SIDNEY CORPORATION, / COURIER CITIZEN CO. / AND LAGANAS SHOW CO. / SHOWING / PIPES FOR FIRE PROTECTION / WATERWAYS ETC. FOR WATERPOWER.	1954/05/00	1"=40'	H 71, W 102 CM	BLUE LINE PRINT	PAPER
138-[039]-[COPY2]	PLAN OF THE / "HAMILTON YARD" / TEXTRON AMERICAN, INC., / SIDNEY CORPORATION, / COURIER CITIZEN CO. / AND LAGANAS SHOW CO. / SHOWING / PIPES FOR FIRE PROTECTION / WATERWAYS ETC. FOR WATERPOWER.	1954/05/00	1"=40'	H 71, W 102 CM	BLUE LINE PRINT	PAPER
138-[040]	PLAN OF THE / LAWRENCE YARD / SHOWING / WATER PIPES, WATERWAYS AND PROPERTY LINES / COMPILED FROM VARIOUS SOURCES.	1958/00/00	1"=40'	H 75.5, W 105 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

138-[041]	MILL YARD PLAN / OF THE / BOOTT MILLS [WRITTEN OVER LOWELL INDUSTRIAL DEVELOPMENT CO. WHICH HAS BEEN SCRAPED AWAY] / MASSACHUSETTS DIVISION / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	1958/00/00	1"=40'	H 75.5, W 107 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-[042]	BUS & CONNECTIONS ON EASTERLY EXTERIOR WALL / OF TOILET-STAIR TOWER OF UNITED ELASTIC CORP'S. / BUILDING NO. 16 AT THE THIRD FLOOR, AS CONNECTED, 11/9/54.	1954/11/09	NONE	H 21.5, W 28 CM	GRAPHITE	PAPER
138-[043]	PLAN OF THE / MILL YARD / OF THE / SUFFOLK MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1947/09/27	1'=40'	H 75.5, W 110.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
138-[044]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1892/03/00	NONE	H 87.3, W 116 CM	LITHOGRAPH, WATERCOLOR	CLOTH BACKED PAPER
138-[045]	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY SHOWING / PIPES LAID FOR EXTINGUSHING FIRE.	1934/03/00	1"=40'	H 73.6, W 103 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-[046]-[COPY 1]	PLAN OF THE / MILL YARD / OF THE BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1896/08/01	1/4"=1'	H 69.4, W 104.2 CM	LITHOGRAPH	CLOTH BACLED PAPER
138-[046]-[COPY 2]	PLAN OF THE / MILL YARD / OF THE BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1896/08/01	1/4"=1'	H 69.8, W 104.2 CM	LITHOGRAPH	CLOTH BACLED PAPER

138-[046]-[COPY 3]	PLAN OF THE / MILL YARD / OF THE BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1896/08/01	1/4"=1'	H 69.7, W 104.3 CM	LITHOGRAPH	CLOTH BACLED PAPER
138-[047]	PLAN OF THE / "HAMILTON MILL YARD" / SHOWING / FIRE PROTECTION AND WATERWAYS.	1957/09/00	1/4"=10	H 75.6, W 116.7 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-[048]	PLAN OF THE / MILL YARD / OF THE FORMER / LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1"=40'	H 74, W 106 CM	BLUE LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-[049]-[A]	PLAN OF THE / MILLLYARD / OF THE / KITSON PLANT / OF THE / SACO-LOWELL SHOPS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1926/02/00	1/2"=10 '	H 29.7, W 111.6 CM	BLACK LINE PRINT, INK, COLORED INK, GRAPHITE, WATER COLOR	CLOTH BACKED PAPER
138-[049]-[B]	PLAN OF THE / MILL YARD / OF THE / "KITSON PLANT" / OF THE [SACO-LOWELL SHOPS] J. A. E. REALTY TRUST / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1/2"=10'	H 70, W 111 CM	BROWN LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

138-[050]	PLAN OF THE / MILL YARD / OF THE / [APPLETON CO.] JACKSON PROPERTIES INC. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1"=40"	H 65, W 98 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
138-[051]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / GILET CARBONIZING CO. INC. AND OTHERS / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1"=40'	H 62, W 91 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-[052]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / GILET CARBONIZING CO. INC. AND OTHERS / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1"=40'	H 67.3, W 99.5 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-[053]	PLAN OF THE / MILL YARD / OF THE FORMER / BIGELOW CARPET COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1959/01/00	1"=40'	H 59.5, W 91 CM	BROWN LINE PRINT, INK, COLORED PENCIL, WATER COLOR	CLOTH BACKED PAPER
138-[054]	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY SHOWING / PIPES LAID FOR EXTINGUSHING FIRE.	1940/01/00	1"=40'	H 75, W 101.6 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

138-[055]	PLAN OF THE / MILLYARD / OF THE / HAMILTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1924/02/00	1/4"=10	H 73, W 114.4 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-[056]	PLAN OF THE / MILLYARD / OF THE / MIDDLESEX COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1892/03/00	1/4"=10'	H 66, W 105 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
138-[057]	PLAN OF THE / MILLYARD / BOOTT MILLS / FORMERLY / LOWELL INDUSTRIAL DEVELOPMENT CO. / MASSACHUSETTS DIVISION / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1916/12/00	1"=40	H 66.7, W 96 CM	BLACK LINE PRINT, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
138-[058]	PLAN OF THE / "SUFFOLK MILL YARD" / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1957/09/00	1"=40'	H 76.5, W 105.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-001	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS / ALSO / LAWRENCE SECTION / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/00/00	1"=40'	H 29", W 42 1/2"	BLUEPRINT	PAPER
138-002-[COPY 1]	PLAN OF THE / MILLYARD / HAMILTON MFG. CO. / SHOWING / PIPES FOR EXTINGUISHING FIRE.	1911/03/00	NONE	H 61, W 103.5 CM	LITHOGRAPH, INK COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-002-[COPY 2]	PLAN OF THE / MILL YARD / OF THE HAMILTON MFG. CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 73.5, W 114.5 CM	BLUEPRINT	PAPER

138-003	PLAN OF THE / MILL YARD / OF THE / [MASSACHUSETTS COTTON MILLS] LOWELL INDUSTRIAL DEVELOPMENT CO. / MASS. DIVISION / PIPES LAID FOR EXTINGUISHING FIRE.	1947/00/00	1"=40'	H 74, W 107 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-003-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 29", W 42 1/2"	BLUEPRINT	PAPER
138-004	PLAN OF THE / MILL YARD / OF THE / BOOTT MILLS / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1"=40'	H 65.5, W 98 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-004-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / BOOTT MILLS / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 74, W 108 CM	BLUEPRINT	PAPER
138-004-[COPY 2]	PLAN OF THE / MILL YARD / OF THE / BOOTT MILLS / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1916/00/00	1"=40'	H 61, W 92 CM	BLACK LINE PRINT, INK, WATER COLOR	PAPER
138-005	PLAN OF THE / MILL YARD / OF THE / SACO LOWELL SHOPS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 29", W 42 1/2"	BLUEPRINT	PAPER
138-005-[B]	PLAN OF PROPERTIES / BELONGING TO / CITY OF LOWELL-"SACO YARD", PELLON CORP. / GIANT STORES INC. / J. A. E. REALTY TRUST AND SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1953/12/00	1"=40'	H 77, W 107 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

138-005-[B]-[COPY 1]	PLAN OF PROPERTIES / BELONGING TO / CITY OF LOWELL-"SACO YARD", PELLON CORP. / GIANT STORES INC. / J. A. E. REALTY TRUST AND SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1953/12/00	1"=40'	H 77, W 107 CM	BLUE LINE PRINT	PAPER
138-005-[C]	[PLAN OF THE MILL YARD OF THE] SACO LOWELL SHOPS [CROSSED OUT] / CITY OF LOWELL AND OTHERS [SHOWING PIPES LAID FOR EXTINGUISHING FIRE].	1952/00/00	1"=40'	H 77, W 107 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-005-A	PLAN OF THE / MILL YARD / OF THE / [KITSON PLANT OF THE SACO-LOWELL SHOPS] J. A. E. REALTY TRUST / AND / GIANT STORE / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1952/12/00	1/2"=10'	H 68, W 111 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-005-A-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / KITSON PLANT / OF THE / SACO-LOWELL SHOPS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/11	1/2"=10'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-006	PLAN OF THE / MILL YARD / OF THE LAWRENCE MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 73, W 108.5 CM	BLUEPRINT	PAPER
138-006-[A]	DOHERTY REALTY CO. INC. / ATLANTIC PARACHUTE CORPORATION INC. [CROSSED OUT] / TEXTRON INC. [CROSSED OUT] / ATLANTIC RAYON CORPORATION INC. [CROSSED OUT] / LAWRENCE MANUFACTURING COMPANY / AND OTHERS.	1926/00/00	1"=40'	H 76, W 106.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

138-006-[A]-[COPY 1]	LAWRENCE MANUFACTURING COMPANY.	1926/00/00	1"=40'	H 73.5, W 105.1 CM	BLACK LINE PRINT	PAPER
138-006-[B]	DOHERTY REALTY CO. INC. / ATLANTIC PARACHUTE CORPORATION [CROSSED OUT] / LAWRENCE MANUFACTURING COMPANY / AND OTHERS.	1955/05/00	1"=40'	H 73, W 102 CM	BLACK LINE PRINT, INK, COLORED INK, GRAPHITE, WATER COLOR	CLOTH BACKED PAPER
138-006-[C]	DOHERTY REALTY CO. INC. / ATLANTIC PARACHUTE CORPORATION [CROSSED OUT] / LAWRENCE MANUFACTURING COMPANY / AND OTHERS.	1957/09/00	1"=40'	H 75, W 102 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-007	PLAN OF THE / MILL YARD / OF THE / [APPLETON CO.] JACKSON PROPERTIES INC. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1952/06/00	1"=40"	H 60.5, W 97 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-007-[COPY 1]	PLAN OF THE / MILLYARD / OF THE / APPLETON COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-008-[A]	PLAN OF THE / MILL YARD / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO. ASSETS DIV. / AND OTHERS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1952/06/00	1"=40'	H 62. W 94.5 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
138-008-[B]	PLAN OF THE / MILLYARD / OF THE BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1920/02/13	1"=40'	H 62.5, W 94.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

138-008-[B]-[COPY 1]	PLAN OF THE / MILLYARD / OF THE BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 108, W 73.6 CM	BLUEPRINT	PAPER
138-008-[B]-[COPY 2]	PLAN OF THE / MILLYARD / OF THE BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1917/02/10	1"=40'	H 108, W 73.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
138-009	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-010-[COPY 1]	PLAN OF THE / HAMILTON YARD / SHOWING / WATER PIPES, WATERWAYS AND PROPERTY LINES / COMPILED FROM VARIOUS SOURCES.	1942/00/00	1"=40"	H 62.5, W 96.5 CM	BLACK LINE PRINT, COLORED PENCIL, WATER COLOR	CLOTH BACKED PAPER
138-010-[COPY 2]	PLAN OF THE / HAMILTON YARD / SHOWING / WATER PIPES, WATERWAYS AND PROPERTY LINES / COMPILED FROM VARIOUS SOURCES.	1952/06/00	1"=40'	H 64, W 96 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-011-[A]	PLAN OF THE / MILL YARD / OF THE / [MIDDLESEX COMPANY] [IPSWICH CO'S MILLS] GILET CARBONIZING CO. INC. / AND OTHERS / PIPES LAID FOR EXTINGUISHING FIRE.	1952/06/00	1"=40'	H 29", W 42 1/2"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
138-011-[A]-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY [IPSWICH CO'S MILLS] / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1922/04/00	1"=40'	H 29", W 42 1/2"	BLUEPRINT	PAPER

138-011-[B]	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO. INC. / AND OTHERS / SHOWING / PIPES ETC. FOR FIRE PROTECTION, WATERWAYS ETC. FOR WATERPOWER.	1954/03/00	1"=40'	H 62, W 91 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
138-011-[B]-[COPY 1]	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO. INC. / AND OTHERS / SHOWING / PIPES ETC. FOR FIRE PROTECTION, WATERWAYS ETC. FOR WATERPOWER.	1954/03/00	1"=40'	H 62, W 91 CM	BLUE LINE PRINT	PAPER
138-011-[B]-[COPY 2]	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO. INC. / AND OTHERS / SHOWING / PIPES ETC. FOR FIRE PROTECTION, WATERWAYS ETC. FOR WATERPOWER.	1954/03/00	1"=40'	H 62, W 91 CM	BLUE LINE PRINT	PAPER
138-011-[B]-[COPY 3]	PLAN OF THE / MIDDLESEX YARD / OWNED BY / GILET CARBONIZING CO. INC. / AND OTHERS / SHOWING / PIPES ETC. FOR FIRE PROTECTION, WATERWAYS ETC. FOR WATERPOWER.	1954/03/00	1"=40'	H 62, W 91 CM	BLUE LINE PRINT	PAPER
138-012	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / WATER-WAYS FOR WATER POWER.	1954/02/00	1"=40'	H 89.5, W 100 CM	INK, COLORD INK, COLORED PENCIL	DRAFTING CLOTH

138-013	[PLAN OF THE MILL YARD OF THE] DOHERTY REALTY CO. / TEXTRON INCORPORATED [CROSSED OUT] / LAWRENCE MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1947/08/00	1"=40'	H 74.5, W 111 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
138-013-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1909/11/00	1"=40'	H 75, W 108 CM	BLUEPRINT	CLOTH BACKED PAPER
138-013-[COPY 2]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 65, W 110 CM	BLUEPRINT	PAPER
138-013-[COPY 3]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 74, W 109.7 CM	BLACK LINE	PAPER
138-014	PLAN OF THE / MILL YARDS / OF THE / TREMONT MILLS / AND / LAWRENCE SECTION OF [THE T.& S. MILLS] MERRIMACK CO. / SHOWING / WATERWAYS FOR WATER POWER.	1926/11/00	1"=40'	H 75, W 110 CM	INK, WATER COLOR	DRAFTING CLOTH
138-014-[COPY 1]	PLAN OF THE MILL YARDS / OF THE / TREMONT MILLS / AND / LAWRENCE SECTION OF T.& S. MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1909/11/00	1"=40'	H 74.5, W 108.8 CM	BLUEPRINT	CLOTH BACKED PAPER
138-014-[COPY 2]	PLAN OF THE MILL YARDS / OF THE / TREMONT MILLS / AND / LAWRENCE SECTION OF T.& S. MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 74, W 108 CM	BLUEPRINT	PAPER

138-015	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1909/12/00	1"=40'	H 75, W 109 CM	BLUEPRINT, COLORED INK	CLOTH BACKED PAPER
138-015-[A]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-016	PLAN OF THE / MILL YARD / OF THE / [[IPSWICH] MIDDLESEX CO.] GILET CARBONIZING CO. INC. / AND / OTHERS / SHOWING / WATERWAYS FOR WATER POWER.	1954/02/00	1"=40'	H 76, W 111 CM	INK, COLORED PENCIL	DRAFTING CLOTH
138-016-[COPY 1]	PLAN OF THE / MILL YARD / OF THE [IPSWICH] MIDDLESEX CO. / SHOWING / WATERWAYS FOR WATER POWER.	1909/12/00	1"=40'	H 75, W 108 CM	BLUEPRINT	CLOTH BACKED PAPER
138-016-[COPY 2]	PLAN OF THE / MILL YARD / OF THE [IPSWICH] MIDDLESEX CO. / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30", W 43 5/8"	BLUEPRINT	PAPER
138-017	PLAN OF THE / YARD OF THE FORMER / [SACO-]LOWELL MACHINE SHOP / SHOWING / WATERWAYS FOR WATER POWER.	1952/11/00	1"=40'	H 76, W 111 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
138-017-[COPY 1]	PLAN OF THE / YARD OF THE / LOWELL MACHINE SHOP / SHOWING / WATERWAYS FOR WATER POWER.	1909/12/00	1"=40'	H 76, W 110.5 CM	BLUEPRINT	PAPER
138-017-[COPY 2]	PLAN OF THE / YARD OF THE / LOWELL MACHINE SHOP / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30", W 43 5/8"	BLUEPRINT	PAPER

138-018	PLAN OF THE / MILLYARD / OF THE / BOOTT COTTON [CROSSED OUT] MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1954/05/00	1"=40'	H 76, W 111 CM	INK, COLORED PENCIL	DRAFTING CLOTH
138-018	PLAN OF THE / [BOOTT] MILL YARD.	SEE NOTES	NONE	H 47, W 76 CM	BLUEPRINT, COLORED INK	PAPER
138-018-[COPY 1]	PLAN OF THE / MILLYARD / OF THE / BOOTT COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1909/12/00	1"=40'	H 75, W 108 CM	BLUEPRINT	CLOTH BACKED PAPER
138-018-[COPY 2]	PLAN OF THE / MILLYARD / OF THE / BOOTT COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-019	PLAN OF THE / "BIGELOW" MILL YARD [COLUMBIA TEXTILE CO.] / SHOWING / WATERWAYS FOR WATER POWER.	1952/05/00	1"=40'	H 76, W 111 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
138-019-[COPY 1]	PLAN OF THE / MILL YARD / OF THE BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / SHOWING / WATERWAYS.	1919/01/00	1"=40'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-020-[A]	PLAN OF THE / "HAMILTON YARD" / TEXTRON AMERICAN, INC. / AND / OTHERS / SHOWING / WATERWAYS FOR WATER POWER.	1926/05/00	1"=40'	H 76, W 111 CM	INK, COLORED PENCIL	DRAFTING CLOTH
138-020-[A]-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1921/03/00	1"=40'	H 76.2, W 110.8 CM	BLUEPRINT	PAPER

138-020-[A]-[COPY 2]	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1926/05/00	1"=40'	H 76.2, W 110.8 CM	BLUEPRINT	PAPER
138-020-[B]	PLAN OF THE / HAMILTON YARD / SHOWING / WATERWAYS FOR WATER POWER.	1958/12/11	1"=40'	H 63.5, W 98 CM	INK, COLORED PENCIL	DRAFTING CLOTH
138-020-[B]-[COPY 1]	PLAN OF THE / HAMILTON YARD / SHOWING / WATERWAYS FOR WATER POWER.	1958/12/11	1"=40'	H 63.5, W 98 CM	BLUE LINE PRINT	PAPER
138-020-[B]-[COPY 2]	PLAN OF THE / HAMILTON YARD / SHOWING / WATERWAYS FOR WATER POWER.	1958/12/11	1"=40'	H 63.5, W 98 CM	BLUE LINE PRINT	PAPER
138-021-[A]	PLAN OF THE / MILL YARD / OF THE / JACKSON PROPERTIES, INC. / SHOWING / WATERWAYS FOR WATER POWER.	1932/03/00	1"=40'	H 76, W 111 CM	INK, COLORED PENCIL	DRAFTING CLOTH
138-021-[A]-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / APPLETON COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1909/12/00	1"=40'	H 74, W 108 CM	BLUEPRINT	PAPER
138-021-[A]-[COPY 2]	PLAN OF THE / MILL YARD / OF THE / APPLETON COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1909/12/00	1"=40'	H 30", W 43 1/2"	BLUEPRINT	PAPER
138-021-[A]-[COPY 3]	PLAN OF THE / MILL YARD / OF THE / APPLETON COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30", W 43 5/8"	BLUEPRINT	PAPER
138-021-[B]	PLAN OF THE / JACKSON PROPERTIES, INC. / ORIGINALLY APPLETON COMPANY / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	1954/04/00	1"=40'	H 67, W 108 CM	INK, COLORED INK, COLORED PENCIL, WATER COLOR	DRAFTING CLOTH

138-021-[B]-[COPY 1]	PLAN OF THE / JACKSON PROPERTIES, INC. / ORIGINALLY APPLETON COMPANY / SHOWING / PIPES ETC. FOR FIRE PROTECTION, / WATERWAYS ETC. FOR WATERPOWER.	1954/04/00	1"=40'	H 67, W 108 CM	BLUE LINE PRINT	PAPER
138-022	PLAN OF THE / MILL YARD / OF THE / SUFFOLK MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30", W 43 5/8"	BLUEPRINT	PAPER
138-024	[PLAN OF THE MILL YARD OF THE COLUMBIA TEXTILE, BIGELOW HARTFORD CO., SHOWING, WASHING & SCOURING MACHINES, PUMPS & DYE KETTLES WHICH USE CANAL WATER.]	1909/02/16				
138-025	PLAN OF THE / MILL YARD / OF THE / BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1904/02/19	1"=40'	H 62.5, W 94 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
138-026	PLAN OF THE / MILL YARD / OF THE / SACO-LOWELL SHOPS [SHOWING WATERWAYS FOR WATER POWER].	1918/03/00	1"=40'	H 71, W 94 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
138-027	PLAN OF THE / MILL YARD / OF THE / BIGELOW-HARTFORD CARPET CO.	1918/03/00	1"=40'	H 56, W 96 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
138-028	PART OF THE / MILL YARD / OF THE / MERRIMACK MFG. COMPANY [SHOWING WATERWAYS].	1918/00/00	1"=40'	H 55.5, W 58 CM	INK, COLORED PENCIL	DRAFTING CLOTH

138-028	PLAN OF A PART / OF / MERRIMACK RIVER / [BETWEEN BEAVER BROOK & CONCORD RIVER] SHOWING AN ADOPTED MODIFICATION OF THE / SOUTHERLY BOUNDARY LINE ADJACENT TO / MASSACHUSETTS COTTON MILLS.	1908/12/00	1"=100'	H 54.3, W 81.5 CM	BLUEPRINT, COLORED INK	PAPER
138-029	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING. CO. [SHOWING WATERWAYS FOR WATER POWER, AND] WITH DATA IN REFERENCE TO RAISING / CANAL TO ELEV. 83.0.	1919/04/30	1"=40'	H 54, W 96.5 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
138-030	PLAN OF THE / BOOTT YARD / NORTH OF AMORY STREET / SHOWING / WATER PIPES, WATERWAYS AND PROPERTY LINES / COMPILED FROM VARIOUS SOURCES.	UNDATED	1"=40'	H 66.5, W 99 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
138-031	PLAN SHOWING / LAND AND BUILDING NO. 12 / BELONGING TO / BOOTT MILLS - ASSETS DIVISION, 200 MARKET STREET / LOWELL, MASS.	1959/05/21	1"=40'	H 24.5, W 35.5 CM	BLUEPRINT	PAPER
138-035	PLAN OF THE / MILL YARD / OF THE / BOOTT MILLS / FORMERLY / LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 77, W 111 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
138-036	PLAN OF THE / MILL YARD / OF THE / BIGELOW CARPET COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1908/01/01	1"=40'	H 63.5, W 95 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

139-[115]	PLAN OF LAND / IN VICINITY OF THRONDIKE, FLETCHER, DUTTON, / JACKSON STREETS AND WESTERN AVENUE / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1957/05/07	1"=50'	H 32.7, W 76.3 CM	INK, WATER COLOR	DRAFTING CLOTH
139-[115]-[COPY 1]	PLAN OF LAND / IN VICINITY OF THORNDIKE, FLETCHER, DUTTON, / JACKSON STREETS AND WESTERN AVENUE / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1957/05/07	1"=50'	H 36, W 73 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-[116]	[UNTITLED PLAN OF LAND LEASED TO BOOTT MILLS AT END OF EASTERN CANAL AT MERRIMACK WASTEWAY.]	UNDATED	1"=10'	H 35.5, W 24 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-[117]	SACO-LOWELL SHOPS.	1927/00/00	1"=400'	H 64, W 94.5 CM	BLUE LINE PRINT, WATERCOLOR	PAPER
139-[118]	LEASED AREAS TO RAILROAD / WESTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1958/04/08	1"=40'	H 32.7, W 76.3 CM	INK, WATER COLOR	PAPER
139-[119]	PLAN OF LAND DEEDED TO / BOSTON AND MAINE RAILROAD / UNDER CERTAIN CONDITIONS BY / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1958/04/09	1"=50'	H 32.7, W 76.3 CM	INK, WATER COLOR	PAPER

139-001	PLAN OF / PAWTUCKET CANAL / FROM / BROADWAY TO BELOW B. & M. R. R. [RED BRIDGE] / PLOTTED FROM SURVEY MADE IN 1891 & ADDITIONAL NOTES TAKEN IN 1902.	1902/12/00	1"=20'	H 67.9, W 134 CM	INK, COLORED INK	PAPER
139-002	PLAN OF / A PART OF STACKPOLE ST. / & / ADJACENT LAND [TO MERR. RIV. FROM ABOVE JCT. OF CONCORD RIV. TO BELOW ALDER ST. WITH CONTOURS, JCT. OF RIVERS, BUILDINGS, WALLS, & PIPE LINES AT BROWN & ALDER STS] BELONGING TO PROPS. LOCKS & CANALS / LOWELL, MASS.	1892/12/00	1"=40'	H 53.5, W 128.6 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
139-003	[UNTITLED.] [PLAN OF PERKINS ST. IN FRONT OF LAWRENCE MFG. CO.]	SEE NOTES	1"=20'	H 37.8, W 140.3 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
139-004	PLAN SHOWING / LAND BETWEEN STACKPOLE ST. & MERRIMACK RIVER. / COMPILED FROM MAPS IN OFFICE OF LOCKS & CANALS [SURVEY OF 1888].	1888/05/02	1"=20'	H 40.3, W 141 CM	INK, WATER COLOR	CLOTH BACKED PAPER
139-005	PLAN OF MADE LAND / IN / SWAMP LOCKS BASIN [WHERE SACO-LOWELL FOUNDRY IS NOW LOCATED].	UNDATED	NONE	H 60.5, W 76 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER

139-006	PLAN SHOWING LOCATION OF BOUNDS, WALLS, FENCES, ETC. ON THE WESTERLY[SIDE OF THOMPSON'S FIELD ON WEST BANK OF PAWTUCKET CANAL] BETWEEN BROADWAY / & PAWTUCKET STREETS AT / THE "OLD GUARD LOCKS."	1891/04/22	H1"=20',V 1"=4'	H 66.3, W 114.5 CM	INK, COLORED INK	PAPER
139-007	PLAN OF / PAWTUCKET CANAL / & / ADJACENT LAND BETWEEN / BROADWAY & MERRIMACK RIVER.	1891/09/00	1"=40'	H 76, W 132.6 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
139-008	PLAN OF / PAWTUCKET CANAL / & ADJACENT / BETWEEN / BROADWAY & SCHOOL ST.	1887/08/00	1"=40'	H 75.4, W 131.2 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
139-009	PLAN OF / PAWTUCKET CANAL / & / ADJACENT LAND BETWEEN / SCHOOL ST. & N. & L. R. R. BRIDGE.	1891/05/00	1"=40'	H 75.6, W 131.2 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
139-010	PLAN OF / SWAMP LOCKS BASIN / & VICINITY [FROM & INCLUDING THE FLETCHER ST. BRIDGE TO THE ENTRANCES OF THE MERRIMACK & HAMILTON CANALS SHOWING OUTLINES OF WALLS, THE R.R BRIDGE WITH PIERS, ETC. &, BUILDINGS] / FROM SURVEYS MADE 1895 TO 1898.	SEE TITLE	1"=20'	H 84, W 134.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
139-011	OLD GUARD LOCKS.	UNDATED	NONE	H 71.6, W 128 CM	GRAPHITE, COLORED INK, INK	PAPER

139-011	[UNFINISHED PLAN] PROFILE OF PROPOSED ST. / BETWEEN / BROADWAY & PAWTUCKET ST. [ON EAST SIDE OF PAWTUCKET CANAL].	UNDATED	NONE	H 48.2, W 61 CM	GRAPHITE	PAPER
139-012	[UNTITLED.] [PLAN OF PAWTUCKET CANAL BETWEEN SCHOOL & FLETCHER STS. SHOWING LOCATION OF SECTIONS.]	UNDATED	1"=40'	H 81.9, W 190 CM	INK, COLORED INK, GRAPHITE	PAPER
139-013	PLAN OF LAND / BETWEEN / N. & L. R. R. & THE PAWTUCKET CANAL / BELONGING TO THE PROP'S OF LOCKS & CANALS / LOWELL, MASS.	1887/12/10	1"=20'	H 32.9, W 123.3 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
139-014	PROP'S OF LOCKS & CANALS ON MERRIMACK RIVER / PLAN OF / LAND IN LOWELL, MASS.	1892/05/00	1"=40'	H 76.5, W 132.9 CM	INK, WATER COLOR, GRAPHITE	PAPER
139-015	PLAN OF / PAWTUCKET CANAL / FROM [BETWEEN] BROADWAY & [RED BRIDGE SHOWING CONTOURS IN CANAL & ON BANK] B. & M. R. R. / PLOTTED FROM SURVEY MADE IN 1891 & / ADDITIONAL NOTES TAKEN IN 1902.	1902/12/00	1"=20'	H 79.8, W 131.1 CM	INK, COLORED INK	TRACING PAPER
139-016	[PLAN SHOWING LAND BETWEEN MERRMACK AND MACK BLDG. LOT # 71-A].	UNDATED				
139-017	PLAN OF / DUTTON ST. & / SURROUNDINGS / MERRIMACK MFG. CO., LOWELL, MASS.	1923/11/20	NONE	H 76, W 120.1 CM	BLUEPRINT	PAPER
139-020	PLAN OF / PREMISES [ON RIVERSIDE ST.] LEASED BY THE / PROPRIETORS OF THE LOCKS & CANALS / TO THE / CITY OF LOWELL / FOR PARK PURPOSES.	1925/01/19	1"=50'	H 44, W 39.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH

139-022	PLAN [OF LAND ALONG PAWTUCKET CANAL] / CONVEYED TO / DAVIS & SARGENT LUMBER CO.	1924/12/26	1"=40'	H 34.3, W 75.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-023	PLAN SHOWING / PROPOSED SIDE TRACK / ALONG SOUTHERLY SIDE OF PAWTUCKET CANAL / FROM DOHERTY BRO'S. FOUNDRY TO / L. & C. PRIVATE WAY AT MIDDLESEX PLACE.	1925/01/00	1"=40'	H 34.4, W 72.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-024	PLAN SHOWING / PROPOSED SIDE TRACK / ALONG SOUTHERLY SIDE OF PAWTUCKET CANAL / [FROM SCHOOL ST. TO DOHERTY BROS] LOWELL, MASS.	1923/11/10	1"=40'	H 37.3, W 62.5 CM	INK, WATER COLOR	DRAFTING CLOTH
139-025	SKETCH SHOWING BARTLETT SCHOOL LOT / & SURROUNDINGS [ABOVE OLD GUARD LOCKS].	1924/06/00	1"=100'	H 30.1, W 55.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-029	PLAN OF / L. & C. LAND / ON PAYNE ST.	1923/06/00	1"=40'	H 30.2, W 69.9 CM	INK, WATER COLOR	DRAFTING CLOTH
139-030	SKETCH OF / LOCKS & CANALS LAND / ON / CHEEVER ST. BORDERING NORTHERN CANAL / SKETCH OF PROPOSED WADING POOL.	1918/05/16	1"=50'	H 27.2, W 31.1 CM	INK, COLORED INK	DRAFTING CLOTH
139-031	[PLAN OF PLAYGROUND LOT BELONGING TO] LAWRENCE MFG. CO.	SEE NOTES	1"=50'	H 59.4, W 66.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-032	PLAN OF LAND / CONVEYED TO / PRATT & FORREST COMPANY [ON SOUTHERLY SIDE ABOVE SCHOOL ST.] / LOWELL, MASS.	1922/12/00	1"=40'	H 23.1, W 79.3 CM	INK, GRAPHITE	DRAFTING CLOTH

139-033	PLAN OF LAND / [BELOW SCHOOL ST.ON SOUTHERLY SIDE OF PAWTUCKET CANAL] CONVEYED TO / BURNHAM & DAVIS LUMBER COMPANY / LOWELL, MASS.	1923/12/00	1"=40'	H 37.5, W 62.2 CM	INK, WATER COLOR	DRAFTING CLOTH
139-035	DAVIS & SARGENT LUMBER COMPANY / [TRACING] SHOWING SPUR TRACK ALONG BOX SHOP.	1925/02/09	1"=10'	H 34.4, W 96.4 CM	INK, COLORED INK	DRAFTING CLOTH
139-036	TOPOGRAPHY / [OF] AIKEN ST. DUMP [WITH ADDITIONAL CONTOURS OBTAINED OCT. 30, 1924] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	SEE NOTES	1"=50'	H 70, W 116.3 CM	BLUEPRINT, INK	PAPER
139-037	[TRACING, SKETCH SHOWING] PLAN OF PROPOSED SIDETRACK / TO / DOHERTY'S [BROS.] FOUNDRY / LOWELL, MASS.	1927/01/00	1"=20'	H 41.1, W 65.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-039	CONTOUR PLAN / OF / LAND WEST OF BEAVER BROOK / BETWEEN / MARTIN ST. & MERRIMACK RIVER.	1927/03/00	1"=50'	H 64.5, W 93 CM	INK, COLORED INK	DRAFTING CLOTH
139-039-A	CONTOUR PLAN / OF / LAND WEST OF BEAVER BROOK / BETWEEN / MARTIN STREET AND MERRIMACK RIVER.	1927/03/00	1"=50'	H 54.5, W 96 CM	INK	PAPER
139-040	[TRACING SHOWING] PLAN OF LAWRENCE MFG. CO.'S PLAYGROUND [LOT].	1926/09/22	1"=50'	H 44.5, W 53 CM	INK, GRAPHITE	DRAFTING CLOTH
139-041	[TRACING SHOWING] PLAN OF LAND / ON STACKPOLE ST., LOWELL, MASS. / & / PRIVATE DRIVEWAY BELONGING TO LOCKS & CANALS.	1926/07/16	1"=20'	H 29.2, W 44.4 CM	INK, WATER COLOR	DRAFTING CLOTH

139-043	[BLUEPRINT OF CITY SEWER MAP SHOWING AREA CONTRIBUTING TO CROSS ST. SURFACE DRAIN.] PLAN SHOWING / LOCATION OF SEWERS / IN CENTRAL PART OF LOWELL.	1925/06/06	1"=500'	H 43, W 59 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-044	PLAN [& PROFILE OF LAND] IN VICINITY OF / OLD GUARD LOCKS SHOWING ELEVATIONS OF GROUND & ABUTMENTS [PLACES & HIGH WATER MARKS] / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1928/02/07	1"=10'& 40'	H 67.5, W 77.2 CM	INK, COLORED INK	DRAFTING CLOTH
139-045	DISCHARGE TEST [& DATA REGARDING TEST] / OF / 8" DRAIN FROM ZISKIND WALL TO SWAMP LOCKS.	1928/07/11	1"=10', 1"=50'	H 36.5, W 70.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
139-046-001	LOWELL, MASS. [PLAN OF LAND NORTH OF PAWTUCKET CANAL & KYAN ST. LOTS 15, 16, 16A, 17A, 17C, 17D-2, 17D4. 17E, 17F.]	1924/10/00	1"=80'	H 21.9, W 34.2 CM	INK	DRAFTING CLOTH
139-046-002	PLAN OF LAND IN LOWELL, MASS. [SHOWING TRANSFORMER HOUSE / SURVEYED FOR / LOWELL ELECTRIC LIGHT CORP. [ON JACKSON STREET.]	1932/10/07	1"=20'	H 45.4, W 30.5 CM	BLUEPRINT	PAPER
139-046-003	[UNTITLED.] [PLAN OF LAND IN VICINITY OF FLETCHER ST., THORNDIKE ST. & PAWTUCKET CANAL. LOTS 2D-1, 2B, 2B-1 LEASED TO JOHN KORSAK FOR 5 YEARS FROM DECEMBER 1, 1940.]	SEE TITLE	1"=20'	H 21.6, W 35.6 CM	INK	DRAFTING CLOTH

139-046-004	PLAN SHOWING / LAND BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER [AND LOWELL LAND CO. WESTERLY SIDE OF THORNDIKE ST. AND SOUTHERLY SIDE OF PAWTUCKET CANAL].	1940/06/00	1"=50'	H 22.3, W 35.5 CM	INK	DRAFTING CLOTH
139-046-005	PROPOSED PLAN SHOWING / REDIVISION OF LOCKS & CANALS LOTS 2-B, 2-C, & 2-D / AND LOWELL LAND COMPANY'S LOT 2-B-1 [WEST OF THORNDIKE ST, AND SOUTH OF PAWTUCKET CANAL.]	1940/10/17	5/16"=10'	H 29.8, W 49.3 CM	INK	DRAFTING CLOTH
139-046-006	PLAN SHOWING / LOTS 2-B, 2-B-1, 2-C & 2-D [WEST OF THORNDIKE ST, AND SOUTH OF PAWTUCKET CANAL.] / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1944/12/00	1"=30'	H 28, W 49.8 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-007	LAND AREAS / LOTS 2-B, 2-B-1, 2-C-1, 2-C-2, 2-D-1 & 2-D-2 [WEST OF THORNDIKE ST, AND SOUTH OF PAWTUCKET CANAL.] / PROPRIETORS OF THE LOCKS AND CANALS.	1945/05/01	1"=30'	H 24.9, W 49.5 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-008	SKETCH SHOWING / LOT 17-B, KYAN ST. / OF THE / LOWELL LAND COMPANY.	1941/03/26	1"=40'	H 21.3, W 36 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-009	[PLAN OF] AREA ON CANAL STREET / LEASED TO / BROKELMAN BROS. INC.	1942/05/01	1"=50'	H 29.3, W 41.6 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-010	LAND IN / LOWELL, MASS. / JOHN L. ROBERTSON-TO- / BOSTON & MAINE RAILROAD.	1927/09/00	1"=30'	H 35.3, W 23.8 CM	BLUEPRINT	PAPER

139-046-011	PLAN SHOWING / LAND AREAS LEASED / BY THE LOCKS & CANALS / AT THE / END OF THE LAWRENCE CANAL.	1939/06/19	1"=20'	H 21.9, W 47.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-011-A	PLAN SHOWING / LAND AREAS LEASED / BY THE PROPS. OF THE LOCKS & CANALS / AT THE / END OF THE LAWRENCE CANAL.	1945/08/01	1"=20'	H 21.7, W 47.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-012	PLAN SHOWING / LAND TO BE CONVEYED TO THE / SACO-LOWELL SHOPS / BY THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1942/10/00	1"=10'	H 21.8, W 49.3 CM	BLUEPRINT	PAPER
139-046-013	PLAN OF LAND [ALONG THE HAMILTON CANAL] IN LOWELL, MASS. / BELONGING TO / APPLETON COMPANY INC.	1943/05/04	1"=40'	H 30.5, W 45.4 CM	BLUEPRINT	PAPER
139-046-014	LOCATION OF / GUY WIRES FOR L.& C. DERRICK / AT SWAMP LOCKS.	1943/09/14	1"=40'	H 39.7, W 48.6 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-015	PORTION OF "FOUNDRY YARD" [ALONG HAMILTON CANAL] / BELONGING TO / SACO-LOWELL SHOPS [SHOWING PROPS. LOCKS & CANALS GAE HOUSE AND LOCKING GATE WINCH].	1943/09/22	1/4"=1'	H 23.9, W 40.4 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-016	PLAN SHOWING / ADDITIONAL POINTS ON PROPERTY LINE / NEAR ENTRANCE TO "SACO YARD."	1944/08/23	1"=10'	H 27, W 38.2 CM	INK, COLORED INK	DRAFTING CLOTH
139-046-017	PLAN OF LAND IN LOWELL, MASS. [BETWEEN THORNDIKE STREET AND BOSTON & MAINE RAILROAD] / BELONGING TO / LOWELL FIVE CENT SAVINGS BANK.	1944/11/28	1"=40'	H 44.2, W 28.9 CM	RED LINE PRINT	PAPER

139-046-018	PLAN OF LAND [ON COOLIDGE ST.] / CONVEYED BY / PROPS. LOCKS & CANALS / TO / LILLIAN L. COGNAC [LOT 35-A].	1923/00/00	1"=50'	H 35, W 21.6 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-019	PLAN OF LAND [ON SOUTHERLY BANK OF PAWTUCKET CANAL BELOW RED BRIDGE] / CONVEYED TO SACO-LOWELL SHOPS.	1922/12/00	1"=40'	H 36.8, W 23.5 CM	INK	DRAFTING CLOTH
139-046-020	[PLAN OF LAND KNOWN AS] P. L.& C. LOT 23. [ON NORTHERLY SIDE OF UPPER PAWTUCKET CANAL ABOVE FLETCHER STREET LEASED BY PROPS. LOCKS & CANALS ZENON AND IRENE NARKUN.]	1946/08/27	1"=40'	H 21.3, W 35.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-021	PLAN OF LOCKS & CANALS LEASED LAND / BETWEEN DUTTON ST. & PAWTUCKET CANAL / AT MOUTH OF WESTERN CANAL.	1924/09/00	1"=50'	H 29.5, W 41.6 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-022	LOCATION PLAN / SHOWING / LOWELL LAND COMPANY LOTS / DEEDED TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1945/01/05	1"=500'	H 30.6, W 51.4 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-022-A	LOCATION PLAN / SHOWING / LOWELL & COMPANY LOTS / DEEDED TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1945/01/05	1"=500'	H 28.5, W 49.8 CM	UNKNOWN PHOTOGRAPHIC PROCESS, WATER COLOR	PAPER

139-046-023	PLAN OF LAND [BETWEEN THORNDIKE STREET AND BOSTON & MAINE RAILROAD] / SHOWING REVISED PROPERTY LINES OF / LOT 2-B-1 / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1945/05/01	1"=20'	H 28.7, W 50 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-024	PLAN OF LAND [ON NORTH SIDE OF AIKEN STREET ADJACENT TO EAST END OF AIKEN END OF AIKEN STREET BRIDGE] / BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1945/04/00	1"=50'	H 26.1, W 41.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-025	PLAN OF LAND [AT THE CORNER OF BROADWAY AND TYNG STREETS] / IN / LOWELL, MASS. / KNOWN AS LOT 8-B BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1946/11/29	1"=30'	H 35, W 54.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-026	PLAN SHOWING / ENCROACHMENT BY BUILDINGS BELONGING TO GEORGE VAROUNIS ON LAND OF PROPS. LOCKS & CANALS [LOT 34-B].	1922/06/00	1"=10'	H 27, W 47 CM	INK, COLORED INK	DRAFTING CLOTH
139-046-027	LAND IN VICINITY OF CHEEVER, TUCKER, & HALL STS.	1921/10/05	1"=50'	H 32.4, W 31.8 CM	INK, GRAPHITE	DRAFTING CLOTH
139-046-028	LAND IN VICINITY OF CHEEVER, / PERKINS & AIKEN STS.	1922/05/24	1"=50'	H 30.5, W 46.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-029	PLAN SHOWING / AREAS BELONGING TO APPLETON CO. & OTHERS / NEAR SWAMP LOCKS.	1944/08/02	1"=50'	H 24.9, W 41 CM	INK, COLORED PENCIL	DRAFTING CLOTH

139-046-030	A PLAN / OF SUNDRY PIECES OF LAND, BELONGING TO THE / MERRIMACK MANUFACTURING CO. [CHELMSFORD].	1945/11/07	3/16"=10'	H 40, W 55.6 CM	INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
139-046-030-[A]	A PLAN / OF SUNDRY PIECES OF LAND, BELONGING TO THE / MERRIMACK MANUFACTURING CO. [CHELMSFORD].	1945/11/07	3/16"=10'	H 41.3, W 55.9 CM	BLUE LINE PRINT, WATER COLOR	PAPER
139-046-030-[B]	A PLAN / OF SUNDRY PIECES OF LAND, BELONGING TO THE / MERRIMACK MANUFACTURING CO. [CHELMSFORD].	1945/11/07	3/16"=10'	H 35.6, W 52 CM	BLUEPRINT, WHITE CHALK	PAPER
139-046-030-[COPY 1]	A PLAN / OF SUNDRY PIECES OF LAND, BELONGING TO THE / MERRIMACK MANUFACTURING CO. [CHELMSFORD].	1945/11/07	3/16"=10'	H 41.3, W 55.9 CM	BLUE LINE PRINT, WATER COLOR, COLORED INK	PAPER
139-046-030-[COPY 2]	A PLAN / OF SUNDRY PIECES OF LAND, BELONGING TO THE / MERRIMACK MANUFACTURING CO. [CHELMSFORD].	1945/11/07	3/16"=10'	H 41.3, W 55.9 CM	PHOTOGRAPH	PAPER
139-046-031	PLAN SHOWING / DIVIDING LINE ALONG MERRIMACK CANAL / BETWEEN / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / & THE / BIGELOW HARTFORD CARPET COMPANY-SEPT. 19,1902.	1945/11/07	1"=50'	H 47, W 40.1 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-032	PROPRIETORS OF THE LOCKS & CANALS-LOT # 43 [ON COOLIDGE ST.].	1945/04/02	1"=40'	H 31.8, W 21.4 CM	INK, WATER COLOR	PAPER
139-046-033	PLAN & PROFILE / WEST SIDE OF PAWTUCKET CANAL / MERRIMACK RIVER TO B.& M.R. R.	1945/09/14	1"=150'	H 22.3, W 57.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH

139-046-034	[PLAN SHOWING TRIANGULAR PLOT OF] LAND ON SHATTUCK ST. NEAR / MERRIMACK ADJACENT TO OLD CITY / HALL BUILDING [WHICH REVERTED TO L.& C. WHEN STREEET WAS RELOCATED].	1924/11/00	1"=20'	H 37.8, W 39.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-035	SKETCH OF RAILROAD TRACKS, BRIDGES / & AREAS LEASED TO THE RAILROAD / AT THE LOWER END OF WESTERN CANAL.	1942/04/00	1"=50'	H 29.3, W 41.6 CM	INK, WATER COLOR	DRAFTING CLOTH
139-046-038	SKETCH SHOWING / 6" AKRON SURFACE WATER DRAIN / FROM FRENCH ORPHANAGE TO NORTHERN CANAL.	1926/10/08	1"=50'	H 24.5, W 36.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-046-042	PLAN SHOWING / GRADES ON CROSS & SUFFOLK STS.	1928/11/00	1"=50'	H 49.9, W 33 CM	INK	DRAFTING CLOTH
139-047	PLAN OF LAND [ALONG HAMILTON CANAL] IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1952/12/22	1"=40'	H 45.7, W 60.7 CM	GRAPHITE	TRACING PAPER
139-047-[COPY 1]	PLAN OF LAND [ALONG HAMILTON CANAL] IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1942/08/17	1"=40'	H 45.7, W 61 CM	BLUEPRINT	PAPER
139-047-A	PLAN OF LAND [ALONG HAMILTON CANAL] IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1942/08/17	1"=40'	H 45.7, W 61 CM	BLUEPRINT	PAPER
139-048	PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1943/09/20	1"=40'	H 45.7, W 61 CM	BLUEPRINT	PAPER
139-048-[A]	PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1943/09/20	1"=40'	H 45.7, W 61 CM	BLUEPRINT	PAPER
139-049	PLAN OF LAND [FORMERLY KNOWN AS THE FOULDRY YARD] IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1943/09/20	1"=40'	H 61, W 45.5 CM	BLUEPRINT	PAPER

139-050	PLAN OF LAND [BETWEEN JACKSON, MIDDLESEX AND MARSTON STREETS] IN LOWELL, MASS.	1944/12/23	1"=40'	H 45.4, W 61.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-051	PLAN SHOWING / LAND AREAS / BELOW BRIDGE ST. ON [BOTH SIDES] BANKS OF MERRIMACK RIVER.	1944/04/00	1"=100'	H 78.1, W 121.4 CM	INK, WATER COLOR	DRAFTING CLOTH
139-052	AREAS OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / USED BY THE / NEW AMERICAN HOTEL / LOWELL, MASS.	1945/10/05	3/16"=1',1"=10'& 50'	H 44.5, W 74.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-053	PLAN SHOWING / LAND & BUILDINGS [AT THE CORNER OF CENTRAL AND WARREN STREETS], / BELONGING TO / THE STEVENS TRUST / LOWELL, MASS.	1945/11/00	1"=20'	H 61.2, W 45.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-054	PLAN OF / P. L.& C. LOT 85 [WEST OF BARASFORD AVE.] / ALSO / SOME CONTOURS & SECTION EAST OF NUMBER 588 EAST MERRIMACK ST. / LOWELL, MASS.	1945/11/28	1"=20'& 50'	H 44.4, W 70.5 CM	INK	DRAFTING CLOTH
139-055	PLAN OF LAND IN LOWELL, MASS. [ALONG NORTH SIDE OF LOWER PAWTUCKET CANAL ABOCE FREE LANDING-(PART OF BIGELOW YARD).]	1946/01/29	1"=20'	H 45, W 61	BLUEPRINT, COLORED PENCIL	PAPER
139-056	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO JACKSON PROPERTIES INC., / TO BE CONVEYED TO / GENERAL ELECTRIC COMPANY.	1946/05/18	1"=20'	H 61, W 45.4 CM	BLUEPRINT, INK	PAPER

139-057	PLAN OF / LAND IN LOWELL, MASS. [EAST OF CENTRAL STREET ADJACENT TO PROPS. LOCKS AND CANALS PASSAGEWAY CONTAINING 199 SQ. FT.]	1946/07/10	1"=10'	H 41.5, W 69.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-058	[PLAN OF PROPS. LOCKS & CANAL LOT 20-A, ALONG UPPER PAWTUCKET CANAL, LEASED TO BOSTON & MAINE RAILROAD.]	1946/06/26	1"=40'			TRACING PAPER
139-059	PLAN [OF LAND] SHOWING / P. L.& C. LOT 31. [BETWEEN THE NORTHERN CANAL, MERRIMACK RIVER, PAWTUCKET AND MELVIN STREETS.]	1947/02/24	1"=20'	H 48, W 82 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
139-060	PLAN OF LAND / WESTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/10	1"=40'	H 34, W 77.8 CM	BLUE LINE PRINT	PAPER
139-060-[A]	PLAN OF LAND / EASTERLY OF SCHOOL STREET AND / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/13	1"=40'	H 32.7, W 76.3 CM	INK, WATER COLOR	PAPER
139-061	PLAN OF LAND NEAR PAWTUCKET CANAL AND / ON THE SOUTHERLY SIDE OF MERRIMACK RIVER / AVAILABLE FOR SALE AND / BELONGING TO / PROPRIETORS OF LOCKS AND CANALS ON MERRIMACK RIVER.	1957/05/09	1"=30'	H 33, W 63.5 CM	INK, COLORED PENCIL	PAPER

139-062	PLAN OF LAND [ON THE SOUTHERLY SIDE OF THE PAWTUCKET CANAL - 20' WIDE BORDER] / BELONGING TO / PROPS. OF LOCKS & CANALS / LOWELL, MASS.	1921/08/00	1"=40'	H 41.3, W 64.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-063	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / GENERAL ELECTRIC COMPANY.	1950/06/02	1"=40'	H 45, W 60 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-064	PLAN OF LAND IN LOWELL, MASS. / SURVEYED FOR / SACO-LOWELL SHOPS.	1942/08/13	1"=40'	H 45, W 61.2 CM	BLUEPRINT	PAPER
139-065	PLAN SHOWING LOT 8-A BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/12/01	1"=40'	H 33.5, W 43.5 CM	INK, COLORED INK, COLORED PENCIL	PAPER
139-066	PLAN OF LAND FOR SALE BY / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOT 79 & PORTION OF LOTS 78 & 80 / LOWELL, MASS.	1956/05/10	1"=20'	H 40.7, W 53.5 CM	BLUEPRINT	PAPER
139-067	PLAN SHOWING / LOT 80-F / BELONGING TO / PROP. OF THE LOCKS & CANALS ON MERR'K RIVER / LOWELL, MASS.	1958/06/25	1"=40'	H 28, W 21.5 CM	INK, COLORED INK, COLORED PENCIL	PAPER
139-068	PLAN OF LAND / KNOWN AS LOT 80-D / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/11/21	1"=20'	H 23.8, W 35 CM	BLUEPRINT	PAPER
139-069	PLAN SHOWING / PORTION OF LOT 96-B / REAR OF COCA COLA BOTTLING CO. / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/06/28	1"=40'	H 40.8, W 53.4 CM	INK, GRAPHITE	DRAFTING CLOTH

139-069-[COPY 1]	PLAN SHOWING / PORTION OF LOT 96-B / REAR OF COCA COLA BOTTLING CO. / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/06/28	1"=40'	H 40.8, W 53.4 CM	BLUEPRINT	PAPER
139-069-[COPY 2]	PLAN SHOWING / PORTION OF LOT 96-B / REAR OF COCA COLA BOTTLING CO. / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/06/28	1"=40'	H 40.8, W 53.4 CM	BLUEPRINT	PAPER
139-070	PLAN OF LAND / SITUATED BETWEEN MERRIMACK RIVER, / PAWTUCKET CANAL & PAWTUCKET STREET / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/11/22	1"=30'	H 23.7, W 35.6 CM	BLUEPRINT	PAPER
139-071	[PLAN OF LAND BELONGING TO PROPS. OF LOCKS & CANALS KNOWN AS LOT 80.]	1957/11/22	1"=20'			
139-072	PLAN SHOWING / PROP. OF THE LOCKS & CANALS PROPERTY / AT THE END OF [AND OVER EASTERN CANAL AND ALSO PEOPERTY NEAR] & OVER MERRIMACK WASTEWAY / LOWELL, MASS.	1955/01/24	1"=50'	H 40, W 58 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

139-073	PLAN SHOWING / PORTION OF LOT 96-B / REAR OF COCA COLA BOTTLING CO. / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/06/28	1"=40'	H 40.7, W 53.5 CM	BLUEPRINT	PAPER
139-074	PLAN SHOWING / LOTS 80-A, 80-D, 80-F / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/06/25	1"=50'	H 25.2, W 35.2 CM	GRAPHITE, COLORED PENCIL	PAPER
139-075	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / KNOWN AS LOT 85 / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/05/19	1"=100'	H 23.7, W 35.6 CM	BLUEPRINT, WATER COLOR	PAPER
139-076	PLAN SHOWING / LAND ON BRIDGE & CANAL STREETS / & ADJACENT TO THE EASTERN CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/11/04	1"=40'	H 40.7, W 53.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-077	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / KNOWN AS LOT 84 / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/07/03	1"=100'	H 40.7, W 53.5 CM	BLUEPRINT	PAPER

139-077-[A]	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / KNOWN AS LOT 84 / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/07/03	1"=100'	H 40.7, W 53.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-078	PLAN SHOWING / PORTION OF CANAL BORDER ALONG CANAL ST. / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/06/25	1"=50'	H 28, W 47.8 CM	GRAPHITE, COLORED PENCIL	PAPER
139-079	PLAN OF LAND / LEASED BY THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / TO THE / CITY OF LOWELL / FOR PARK PURPOSES.	1958/05/22	1"=50'	H 25.3, W 47 CM	INK, WATER COLOR	DRAFTING CLOTH
139-080	PLAN OF LAND / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / KNOWN AS LOT 13-A / LOWELL, MASS.	1959/01/26	1"=40'	H 40.6, W 52.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-081	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / KNOWN AS LOT 85 / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/05/19	1"=100'	H 23.7, W 35.5 CM	BLUEPRINT, WATER COLOR	PAPER
139-082	PLAN OF LAND / SITUATED ON NORTHERLY SIDE OF BROADWAY / & THE EASTERLY SIDE OF TYNG STREET / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/11/22	1"=30'	H 23.7, W 35.6 CM	BLUEPRINT	PAPER

139-083	PLAN SHOWING LOT 8-A BELONGING TO THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1958/07/16	1"=40'	H 25.4, W 42.2 CM	INK, WATER COLOR	PAPER
139-084	PLAN OF LAND ALONG NORTHERN CANAL / BETWEEN PAWTUCKET CABOT STREETS / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/04/30	1"=50'	H 33, W 85.2 CM	INK, WATER COLOR	PAPER
139-085	PLAN OF LAND NEAR PAWTUCKET CANAL / ON THE NORTHERLY SIDE OF BROADWAY / AVAILABLE FOR SALE & / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/02	1"=40'	H 32.8, W 64 CM	INK, WATER COLOR	PAPER
139-086	PLAN OF LAND / ON SOUTHERLY SIDE OF MERRIMACK RIVER / & KNOWN AS LOTS 84 & 85. / AVAILABLE FOR SALE BY THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/05/04	1"=100'	H 33, W 94.5 CM	INK, WATER COLOR	PAPER
139-087	PLAN OF LAND FOR SALE BY / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOT 79 & PORTIONS OF LOTS 78 & 80 / LOWELL, MASS.	1957/11/22	1"=20'	H 31.1, W 37.5 CM	INK	PAPER

139-088	PLAN OF LAND / WESTERLY OF SCHOOL STREET & / NORTHERLY OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1956/08/07	1"=20'	H 33.2, W 76.3 CM	INK, WATER COLOR	PAPER
139-089	PLAN OF LAND / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / KNOWN AS LOT 13-A / LOWELL, MASS.	1959/01/26	1"=40'	H 40.7, W 53.3 CM	BLUE LINE PRINT	PAPER
139-090	PLAN SHOWING / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOT 31.	1954/06/08	1"=20'	H 52, W 80.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
139-090-[COPY 1]	PLAN SHOWING / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOT 31.	1954/06/08	1"=20'	H 52, W 80.5 CM	BLUEPRINT	PAPER
139-091	PLAN OF LAND BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / PORTION OF LOT 78 & ALL OF LOT 79 / LOWELL, MASS.	1956/02/10	1"=20'	H 40.8, W 53.6 CM	INK, WATER COLOR	DRAFTING CLOTH
139-092	PLAN SHOWING / LOT 96-B & 96-D / BELONGING TO PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1956/11/23	1"=100'	H 65.1, W 110.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

139-093	PLAN SHOWING LAND / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / AND PROPOSED PROPERTY LINES FOR / STRAND THEATRE LOBBY.	1956/01/10	1"=10'	H 40.5, W 53 CM	BLUEPRINT	PAPER
139-094	PLAN SHOWING / PORTION OF LOT 96-B / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/06/24	1"=50'	H 40.5, W 53 CM	BLUEPRINT	PAPER
139-095-[COPY 1]	PLAN OF LAND BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOCATED ON THE NORTHERLY SIDE OF PAWTUCKET STREET / & THE NORTHWESTERLY SIDE OF AIKEN STREET / LOWELL, MASS.	1956/01/08	1"=50'	H 40.7, W 53.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-095-[COPY 2]	PLAN OF LAND BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOCATED ON THE NORTHERLY SIDE OF PAWTUCKET STREET / & THE NORTHWESTERLY SIDE OF AIKEN STREET / LOWELL, MASS.	1956/01/08	1"=50'	H 40, W 53.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

139-095-[COPY 3]	PLAN OF LAND BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOCATED ON THE NORTHERLY SIDE OF PAWTUCKET STREET / & THE NORTHWESTERLY SIDE OF AIKEN STREET / LOWELL, MASS.	1956/01/08	1"=50'	H 40.7, W 53.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-096	PLAN OF LOT 65-Z / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1956/08/07	1"=20'	H 43, W 80.1 CM	INK, WATER COLOR	DRAFTING CLOTH
139-097	PLAN SHOWING / LOTS 96-B & 96-D / BELONGING TO PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1957/09/06	1"=100'	H 66, W 104.2 CM	GRAPHITE, COLORED PENCIL	PAPER
139-098	PLAN OF AREA / ON P. L.& C. LOT 84, SITUATED ON THE RIVER-SIDE OF STACKPOLE STREET, WHICH THE CITY / OF LOWELL REQUESTS THE PRIVILEGE OF DUMPING / SNOW FOR THE WINTER OF 1954-55.	1954/12/02	1"=40'	H 30.2, W 68.3 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
139-099	PLAN OF LAND IN LOWELL, MASS.	1946/01/29	1"=20'& 10'	H 45.6, W 61 CM	BLUEPRINT	PAPER
139-100	PLAN SHOWING / PROPERTY BELONGING TO PEASE MOTOR CO. / & / ENCROACHMENT OF CHAIN LINK FENCES & WOODEN BUILDING / OF PROPRIETORS OF THE LOCKS & CANALS 20 FT. CANAL BORDER / LOWELL, MASS.	1955/06/21	1"=40'	H 33, W 64.2 CM	INK, COLORED PENCIL	TRACING PAPER

139-101	PLAN SHOWING / PORTION OF 1821 FARMS MAP / & SUPERIMPOSED ON IT / P. L.& C. LOT 33-C / LOWELL, MASS.	1955/03/02	1/8"=50'	H 48.4, W 28 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
139-102	PLAN OF LAND IN LOWELL, MASS. / SHOWING LOCATION OF PASSAGEWAY / BETWEEN / SACO LOWELL OFF STREET / PARKING AREA / & / MARKET STREET.	1953/08/00	1"=20'	H 40.7, W 53.5 CM	BLUE LINE PRINT	PAPER
139-103	PLAN SHOWING / YARD DRAIN AROUND GIANT STORE / PUT IN 1923 & 1924.	SEE TITLE	1"=20'	H 46.7, W 76.9 CM	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
139-104	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / GENERAL ELECTRIC COMPANY.	1950/06/02	1"=40'	H 44.4, W 59 CM	BLUEPRINT	PAPER
139-105	PLAN SHOWING / ENCROACHMENT ON P. L.& C. LOT NO. 31 / FROM RIVER BANK TO MELVIN ST. / LOWELL, MASS.	1954/08/02	1"=30'	H 21.4, W 35.9 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
139-106	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / EASTERN WOOL WAREHOUSE INC.	1947/12/16	1"=20'	H 62.6, W 86.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-107	PLAN SHOWING / MILL NO. 6 PROPERTY LINES / AT THE / BOOTT MILLS / LOWELL, MASS.	1955/05/27	1"=20'	H 51.1, W 76.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
139-107-[COPY 1]	PLAN SHOWING / MILL NO. 6 PROPERTY LINES / AT THE / BOOTT MILLS / LOWELL, MASS.	1955/05/27	1"=20'	H 51.1, W 76.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
139-107-[COPY 2]	PLAN SHOWING / MILL NO. 6 PROPERTY LINES / AT THE / BOOTT MILLS / LOWELL, MASS.	1955/05/06	1"=20'	H 50.5, W 76 CM	BLUEPRINT	PAPER
139-107-[NEG.]	PLAN SHOWING / MILL NO. 6 PROPERTY LINES / AT THE / BOOTT MILLS / LOWELL, MASS.	1955/05/27	1"=20'	H 47.4, W 60 CM	PHOTOGRAPHIC NEGATIVE	SAFETY FILM

139-108	PLAN SHOWING / LOCATION OF FOUR AREAS OVER & UPON PROPERTY OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / & USED BY THE BOOTT MILLS / ALSO / ONE AREA USED FOR MEASURING WATER IN EASTERN CANAL BY / [...SEE NOTES]	1955/06/01-07	1"=40'	H 44.4, W 70.9 CM	INK, WATER COLOR	DRAFTING CLOTH
139-108-[COPY 1]	PLAN SHOWING / LOCATION OF FOUR AREAS OVER & UPON PROPERTY OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / & USED BY THE BOOTT MILLS / ALSO / ONE AREA USED FOR MEASURING WATER IN EASTERN CANAL BY / [...SEE NOTES]	1955/06/01-07	1"=40'	H 21.8, W 35.9 CM	PHOTOGRAPHIC PRINT	PAPER
139-108-[NEG]	PLAN SHOWING / LOCATION OF FOUR AREAS OVER & UPON PROPERTY OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / & USED BY THE BOOTT MILLS / ALSO / ONE AREA USED FOR MEASURING WATER IN EASTERN CANAL BY / [...SEE NOTES]	1955/06/01-07	1"=40'	H 47.4, W 60 CM	PHOTOGRAPHIC NEGATIVE	SAFETY FILM
139-109	PLAN OF LAND / IN LOWELL, MASS. BELONGING TO / BOOTT MILLS.	1956/06/18	1"=50'	H 40, W 53.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
139-110	FIELD MEASUREMENTS.[BUILDINGS & PROPERTY TRANSFERRED TO STEAM ASSOC., INC]	1956/06/12	1"=10'	H 41.3, W 54.7 CM	INK	DRAFTING CLOTH
139-110-[COPY 1]	FIELD MEASUREMENTS.[BUILDINGS & PROPERTY TRANSFERRED TO STEAM ASSOC., INC.]	1954/06/10	1"=10'	H 41.8, W 55 CM	BLUEPRINT, WATER COLOR, INK	PAPER

139-111	PLAN OF LAND / BELONGING TO / NEW ENGLAND THEATRES, INC. / LOWELL, MASS.	1956/02/20	1"=20'	H 40.8, W 53.6 CM	INK, COLORED INK	DRAFTING CLOTH
139-112	PROPOSED MARKET ST. OFF ST. PARKING AREA / PLAN OF LAND / IN / LOWELL MASS. / SURVEYED FOR / CITY OF LOWELL.	1958/07/30	1"=50'	H 40.5, W 53.5 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER
139-113	PLAN SHOWING / COURIER CITIZEN COMPANY / BUILDINGS, BRIDGES & HAMILTON CANAL / LOWELL, MASS.	1954/06/09	1"=40'	H 30.2, W 57.9 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
139-113-[A]	COURIER CITIZEN CO. / 165 JACKSON ST. LOWELL / BRIDGE ADDITION.	UNDATED	1/4"=1'	H 46.8, W 60 CM	BLUE LINE PRINT, COLORED INK	PAPER
139-114	PLAN SHOWING / PROPERTY LINES & PROPOSED FENCE / BETWEEN / PROPS. OF THE LOCKS & CANALS & CORP. MEMBERS OF THE CATHOLIC ASSN. / LOWELL, MASS.	1951/12/07	1"=30'	H 28, W 35.5 CM	INK, COLORED INK, WATER COLOR	PAPER
140-[074-[B]	AIKEN STREET BRIDGE GAGE IS 550 FEET BELOW GAGE # 10 / ON THE NORTHERLY SIDE OF NORTHERN CANAL. / AIKEN STREET BRIDGE HAS NO NUMBER. / EARLE.	1941/05/26	NONE	H 7, W 12 CM	INK	PAPER
140-[074]-[A]	LOCATION OF GAUGES / ON NORTHERN CANAL.	SEE NOTES	NONE	H 19, W 28 CM	GRAPHITE, COLORED PENCIL	PAPER
140-001	PLAN SHOWING / PAWTUCKET CANAL BETWEEN MERRIMACK RIVER & BROADWAY. / COMPILED FROM DATA IN P. L.& C. OFFICE.	1903/01/00	1"=40'	H 48.9, W 130.8 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH

140-002	TRACING OF PLAN [OF LOWER PAWTUCKET CANAL] IN OFFICE OF PROPS. LOCKS & CANALS BEARING DATE 1885.	1885/00/00	1"=50'	H 35.3, W 109.2 CM	INK, GRAPHITE, COLORED INK, GRAPHITE	DRAFTING CLOTH
140-003	PLAN / SHOWING EFFECT OF PROPOSED CHANGES IN / BRANCH TRACKS / AT THE FOOT OF DUTTON STREET. / LOWELL, MASS.	1917/12/07	1"=10'	H 56, W 78 CM	INK, COLORED INK	DRAFTING CLOTH
140-004	[UNTITLED.] [PLAN OF LOWER PAWTUCKET CANAL SHOWING SECTIONAL LINES & PROFILE.]	1895/00/00	H1"=50',V 1"=50'	H 35.3, W 109.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
140-005	PLAN OF THE / UPPER LOCK / AT / SWAMP LOCKS [SHOWING RECONSTRUCTION OF SIDES OF LOCK CHAMBER AS BUILT IN 1892 BY L.& C.]	1892/12/00	H1"=10',V 1"=5',1"=2'	H 56.4, W 90 CM	INK, WATER COLOR	PAPER
140-006	[UNTITLED.] [DIAGRAMS SHOWING SECTIONS OF LOWER PAWTUCKET CANAL.]	1885/00/00	NONE	H 58.4, W 45.5 CM	INK	PAPER
140-007	[DIAGRAM SHOWING] LOWER PAWTUCKET / CANAL / SECTS 8-15 [APPLETON # 7 TO HAMILTON BLACKSMITH SHOP].	UNDATED	NONE	H 60.8, W 47.4 CM	INK	PAPER
140-008	SKETCH SHOWS PROPOSED SHEAR / [BOXES] & APRON AT HAMILTON WASTEWAY [ON LOWER CANAL].	1893/09/00	NONE	H 45.7, W 58.5 CM	GRAPHITE	PAPER
140-009	SKETCH SHOWING / SHEAR BOXES AT RACES / IN LOWER PAWTUCKET / CANAL.	1898/00/00	1"=10'	H 45.7, W 58.5 CM	GRAPHITE	PAPER
140-010	[SKETCH & PRINT SHOWING] FLOORING TO BE LAID / NEAR LOWER END OF PAWTUCKET CANAL [IN 1893].	1893/08/30	NONE	H 25.1, W 189.4 CM	BLUEPRINT, GRAPHITE, INK	PAPER

140-011	[UNTITLED.] [SKETCH SHOWING SHEAR BOXES TO BE BUILT AT RACEWAYS, ETC. IN LOWER PAWTUCKET CANAL.]	UNDATED	NONE	H 30.5, W 139.2 CM	GRAPHITE	PAPER
140-012	PLAN / OF A PORTION OF THE LOWER LEVEL OF THE / PAWTUCKET CANAL [BELOW SWAMP LOCKS DAM].	1893/07/00	1/2"=10'	H 56.5, W 91 CM	INK, COLORED INK, GRAPHITE	PAPER
140-013	PLAN OF A PORTION OF THE LOWER LEVEL OF THE / PAWTUCKET CANAL [EXTENDING FROM SWAMP LOCKS DAM A SHORT WAYS DOWN STREAM].	1893/07/00	1/2"=10'	H 55.5, W 158.2 CM	INK	DRAFTING CLOTH
140-014	SKETCH / SHOWING / LOCATION & GRADE BOTTOM NORTH WALL / OF / PAWTUCKET CANAL / NEAR CENTRAL STREET [BRIDGE].	1893/10/11	1"=20'	H 25.1, W 86.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
140-015	PLAN OF UPPER END OF / PAWTUCKET CANAL / SHOWING CONTOURS ABOVE L.& C. DATUM.	1897/07/03	1"=10'	H 71.2, W 131.6 CM	INK, COLORED INK, WATER COLOR	PAPER
140-016	LOWELL, MASS. [TRACING SHOWING LOCATION OF GAUGES & SECTIONS IN WESTERN, MERRIMACK & HAMILTON CANALS].	1893/05/18	1"=100'	H 45, W 97 CM	INK, COLORED INK	DRAFTING CLOTH
140-017	[DIAGRAM SHOWING] SECTIONS ACROSS / WESTERN CANAL / AT SUNDRY PLACES / FOR LOCATION OF THE SECTIONS SEE / ACCOMPANYING PLAN.	1893/05/17	NONE	H 46, W 58.5 CM	INK, WATER COLOR	PAPER
140-018	[DIAGRAM SHOWING] SECTIONS NEAR ENTRANCE TO HAMILTON CANAL.	1893/06/23	NONE	H 46, W 58.8 CM	INK, WATER COLOR	PAPER

140-019	[SKETCH] SHOWING CONDITION OF BOTTOM OF [LONGITUDINAL SECTION OF LEDGE IN] HAMILTON CANAL.	1893/06/23	NONE	H 46, W 58.8 CM	INK, WATER COLOR	PAPER
140-020-[A]	[UNTITLED PLAN. SEE NOTES.] [TRACINGS SHOWING LOCATIONS OF SECTIONS & GAUGES IN THE HAMILTON & PAWTUCKET CANALS].	1893/05/00	1"=100'	H 46.2, W 144.8 CM	INK, COLORED INK	DRAFTING CLOTH
140-020-[B]	[UNTITLED PLAN. SEE NOTES.] [TRACINGS SHOWING LOCATIONS OF SECTIONS & GAUGES IN THE HAMILTON & PAWTUCKET CANALS].	SEE NOTES	NONE	H 61.4, W 124.4 CM	INK, COLORED INK	DRAFTING CLOTH
140-021	[DIAGRAM SHOWING] SECTIONS IN PAWTUCKET CANAL & WESTERN CANAL.	SEE NOTES	NONE	H 46, W 58.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
140-022	[TRACING SHOWING] PLAN OF LAND / LEASED BY PROPS OF LOCKS & CANALS TO B. & L. R. R. [SHOWING LOCATIONS FOR NEW WALL AT HEAD OF HAMILTON CANAL.]	1893/10/27	1"=20'	H 43.3, W 109.6 CM	INK, COLORED INK	DRAFTING CLOTH
140-023	[DIAGRAM SHOWING] SECTIONS [(1-13)] AT ENTRANCE TO HAMILTON CANAL / TAKEN MAY 13, 1894.	1894/05/00	NONE	H 45.5, W 48.5 CM	INK, GRAPHITE	PAPER
140-024-[A]	PLAN OF / WESTERN CANAL / NEAR WORTHEN ST.	1893/09/19	1"=10'	H 61.9, W 89 CM	INK, COLORED INK, GRAPHITE	PAPER
140-024-[B]	PLAN OF / WESTERN CANAL / NEAR WORTHEN ST.	1893/09/19	1"=10'	H 41.2, W 62.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

140-025	PLAN OF LAND / IN VICINITY OF / W. E. LIVINGSTON'S GRIST MILL.	1894/01/00	1/2"=10'	H 60.8, W 81.6 CM	INK, COLORED INK, WATER COLOR	PAPER
140-026	[PHOTOGRAPHIC PRINT] VIEWS IN CONNECTION WITH IMPROVEMENTS [MADE] IN MOODY ST. FEEDER IN 1896 & 1897.	SEE TITLE	NONE	H 49.5, W 83.2 CM	PHOTOGRAPH, INK	PAPER
140-027	[SKETCH OF] PART OF HAMILTON CANAL WHERE L. & C. / 12" PIPE CROSSES.	1895/07/07	1"=10'	H 25.8, W 45.8 CM	INK, COLORED INK	PAPER
140-028	[PLAN OF] NELSON MORRIS FOUNDATION / AT THE WESTERLY END / OF / FLETCHER ST. BRIDGE / OVER / PAWTUCKET CANAL.	UNDATED	NONE	H 26.4, W 34.6 CM	INK	DRAFTING CLOTH
140-029	PAWTUCKET CANAL, NORTH WALL OPPOSITE DOHERTY'S FOUNDRY. / SECTIONS SHOWING BOTTOM OF [NORTH] WALL [OF PAWTUCKET CANAL OPPOSITE DOHERTY'S FOUNDRY] BUILT FOR B. & M. R. R. DURING SEASON OF 1900 / STATIONS RUN UPSTREAM FROM STATION 0, [...SEE NOTES]	UNDATED	1"=1.6'	H 46, W 58.6 CM	INK, COLORED INK	PAPER
140-030-[A]	PLAN SHOWING / EASTERN CANAL WALL ALONG [PRESCOTT] STORE HOUSE / FROM / EAST MERRIMACK ST. TO LOWER END MEASURING STATION.	1905/09/13	1"=10'	H 41, W 76.2 CM	INK, COLORED INK	PAPER
140-030-[B]	PLAN SHOWING / REPAIRS TO CANAL WALL ALONG PRESCOTT / STORE HOUSE; FROM MERRIMACK SQUARE / TO / MASSACHUSETTS FLUME.	SEE NOTES	1"=10'	H 32.4, W 76.5 CM	INK	PAPER

140-031	SKETCH SHOWING / EXACT LOCATION OF SOUTHERLY WALL OF NORTHERN CANAL / BETWEEN / CABOT & SUFFOLK STREETS.	1905/05/14	1/8"=1'	H 63.5, W 175.4 CM	INK, COLORED INK	PAPER
140-032	SECTIONS OF / NORTHERN CANAL WALL / JUST ABOVE SUFFOLK RACKS. / LEFT HAND SIDE.	1917/09/16	1"=4'	H 17.1, W 40.6 CM	INK, COLORED INK	PROFILE PAPER
140-033	DESIGN FOR LOCKS & CANALS TRANSMISSION / DISTRIBUTING FROM A POINT ON NORTHERN / CANAL TO MOTORS IN THE VARIOUS MILLS.	1893/02/25	NONE	H 26.4, W 34.6 CM	INK	DRAFTING CLOTH
140-034	[PLAN OF] 24" DRAIN / LAID IN 1910 [FROM LOWER PAWTUCKET CANAL UNDER THE UPPER GATE & UPPER LOCK CHAMBER OF LOWER LOCKS FOR THE PURPOSE OF DRAINING THE LOWER CANAL].	SEE NOTES	1"=5'	H 47.7, W 97.8 CM	INK, COLORED INK, WATER COLOR	PAPER
140-035	PLAN OF WALL OF HAMILTON CANAL / & OUTLINE OF SACO-LOWELL SHOP / FOUNDRY.	1918/00/00	NONE	H 64, W 92.2 CM	GRAPHITE, INK, COLORED INK	PAPER
140-036	[PLAN, ELEVATION AND SECTION OF] WATSON'S PIER / AT / FLETCHER ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	SEE NOTES	1/4"=1'	H 31.4, W 44.4 CM	INK, COLORED INK	DRAFTING CLOTH
140-037	DIAGRAM SHOWING [PROFILE OF] BOTTOM OF / WALL & MATERIAL [BELOW WALL IN] WESTERN CANAL [AT LOWER END].	1895/07/02	NONE	H 18.3, W 38 CM	INK, WATER COLOR	PAPER
140-038	[SKETCH OF SLUICES AT] LOWER END OF MOODY ST. FEEDER.	1896/02/00	NONE	H 47, W 61.5 CM	GRAPHITE	PAPER
140-039	[SKETCH OF SLUICES AT] UPPER END OF MOODY ST. FEEDER.	1896/02/00	NONE	H 42, W 71 CM	INK, WATER COLOR	DRAFTING CLOTH

140-040	[UNTITLED.] [PLAN OF PAWTUCKET CANAL SHOWING CONTOURS AT 1' INTERVALS OF LAND ON WEST BANK BETWEEN BROADWAY BRIDGE & OLD GUARD LOCKS.]	UNDATED	1"=30'	H 36.8, W 65.4 CM	INK, WATER COLOR	CLOTH BACKED PAPER
140-041	[SECTION OF] MERRIMACK CANAL WALL-WEST SIDE-SEPT. & OCT. 1916.	1916/09-10/00	NONE	H 45.8, W 58.3	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER
140-042	[UNTITLED.] [PLAN FOR PROPOSED POWER HOUSE IN LOWER WESTERN CANAL.]	UNDATED	1"=40'	H 36, W 94 CM	INK	DRAFTING CLOTH
140-043-[COPY 1]	[PLAN FOR] SURPLUS POWER STATION / NORTHERN CANAL AT MOODY ST. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/03/28	SEE NOTES	H 53.3, W 61.7 CM	BLUEPRINT	PAPER
140-043-[COPY 2]	[PLAN FOR] SURPLUS POWER STATION / NORTHERN CANAL AT MOODY ST. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/03/28	SEE NOTES	H 53.3, W 61.7 CM	BLUEPRINT	PAPER
140-044	[PLAN FOR PROPOSED] SURPLUS POWER STATION / AT BOOTT PENSTOCK / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1923/03/15	1/4"=1'& 1"=50'	H 54.5, W 62 CM	BLUEPRINT	PAPER
140-046	[PLAN AND ISOMETRIC DRAWING OF] AREA IN VICINITY / OF / LOWER LOCKS & FORMER PRESCOTT WEAVING MILL / SHOWING / WIRES OVER EASTERN CANAL.	1934/01/08	3/16"=10'	H 24.6, W 76.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

140-047	PLAN SHOWING / ELEVATIONS & [GRADES] DRAINAGE CONDITIONS / IN THE VICINITY OF WASHINGTON PARK & DOHERTY'S FOUNDRY.	1927/09/01	SEE NOTES	H 47.2, W 68.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
140-048	PLAN SHOWING / BOOTT MILLS & MERRIMACK WASTEWAY / [ALSO] PORTIONS OF / MERRIMACK & EASTERN CANALS [WITH SECTIONS] / LOWELL, MASS.	1928/09/25	1"=50'& 20'	H 56.1, W 89 CM	INK, COLORED INK	DRAFTING CLOTH
140-049	[SECTION OF NORTHERN CANAL AT] CURRENT METER STATION / AT LOWER SIDE OF / AIKEN STREET-NORTHERN CANAL BRIDGE.	1928/04/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-050	[SECTION OF PAWTUCKET CANAL AT] CURRENT METER STATION / AT UPPER SIDE OF / THORNDIKE ST. BRIDGE.	1928/04/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-051	[SECTION OF WESTERN CANAL AT] CURRENT METER STATION / AT LOWER SIDE / OF / MERRIMACK ST. WESTERN CANAL BRIDGE.	1928/04/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-052	[SECTION OF MERRIMACK CANAL AT] CURRENT METER STATION / AT MERRIMACK CANAL / ABOVE COLUMBIA [TEXTILE CO.'S] RACKS.	1928/04/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-053-[A]	[SECTION OF HAMILTON CANAL AT] CURRENT METER STATION / HAMILTON CANAL [ABOUT 50 FT. ABOVE EASTERLY END OF MILL NO. 4.]	1928/04/00	NONE	H 29.2, W 45.7 CM	INK, COLORED INK, GRAPHITE	PAPER

140-053-[B]	[SECTION OF HAMILTON CANAL AT] CURRENT METER STATION / IN / HAMILTON CANAL / ABOUT / 60 FEET ABOVE END OF MILL NO. 4.	1936/05/06	NONE	H 28, W 42 CM	INK, COLORED PENCIL	PAPER
140-053-A	SECTION OF HAMILTON CANAL / ABOVE CANAL BRIDGE AT / HAMILTON-APPLETON LINE.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK, COLORED INK, GRAPHITE	PAPER
140-054-A	CURRENT METER MEASUREMENT / NORTHERN CANAL BELOW AIKEN ST. BRIDGE / L. & C. PRICE METER.	1928/05/01	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-054-B	CURRENT METER MEASUREMENT / NORTHERN CANAL BELOW AIKEN ST. BRIDGE / U.S.G.S. PRICE METER.	1928/05/01	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-054-C	CURRENT METER MEASUREMENTS / NORTHERN CANAL ABOVE AIKEN ST. BRIDGE / U.S.G.S. PRICE METER.	1928/05/01	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-054-D	CURRENT METER MEASUREMENT / NORTHERN CANAL AT AIKEN ST. BRIDGE / PRICE, GURLEY, L. & C. METER.	1941/05/23	NONE	H 28, W 42 CM	INK	PAPER
140-055	CURRENT METER MEASURMENTS / [IN MERRIMACK CANAL] ABOVE RACKS OF / COLUMBIA TEXTILE CO.	1928/05/01	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
140-056	CURRENT METER MEASUREMENTS / [IN] HAMILTON CANAL [ABOUT 50' ABOVE EASTERLY END OF MILL NO. 4].	1928/05/01	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
140-057	CURRENT METER MEASUREMENT[S] / [IN] WESTERN CANAL BELOW MERRIMACK ST. BRIDGE.	1928/05/01	NONE	H 29.2, W 45.7 CM	INK	PAPER

140-058	CURRENT METER MEASUREMENT[S] / [IN] PAWTUCKET CANAL [AT THORNDIKE ST.] ABOVE BREWERY BRIDGE.	1928/05/01	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-059	PLAN SHOWING LOCATION OF TEST PITS / IN / BASEMENT OF STRAND REALTY COMPANY'S BUILDING [IN CONNECTION WITH LEAK ON BASEMENT OF OLD LOWELL NATIONAL BANK].	1929/06/00	1"=10'	H 41.6, W 43.1 CM	INK	DRAFTING CLOTH
140-060	PLAN SHOWING / LOCATION OF RACEWAYS UNDER RACE STREET / FROM HALL TO PERKINS STREETS.	1936/07/13	1"=20'	H 42, W 71 CM	INK, COLORED PENCIL	DRAFTING CLOTH
140-061	TYPICAL CROSS SECTIONS / OF CANALS / PROPRIETORS OF THE LOCKS & CANALS. SECTION OF MERRIMACK CANAL AT UPSTREAM EDGE OF LOWER FLUME PLATFORM / FOR CURRENT METER MEASUREMENTS.	1934/12/01	1"=10',5'& 20'	H 56.3, W 78.1 CM	INK	DRAFTING CLOTH
140-062		1933/10/29	NONE	H 29.2, W 45.7 CM	INK	PAPER
140-062	PLAN SHOWING / PROPERTY LINES / ALONG MERRIMACK CANAL / BETWEEN THE / PROPS. OF THE LOCKS & CANALS / & THE / PROPERTY OWNERS IN "BIGELOW YARD" / LOWELL, MASS.	1955/02/08	1"=10'	H 49.2, W 89.6 CM	INK, COLORED INK, WATER COLOR	PAPER
140-062-[COPY 1]	PLAN SHOWING / PROPERTY LINES / ALONG MERRIMACK CANAL / BETWEEN THE / PROPS. OF THE LOCKS & CANALS / & THE / PROPERTY OWNERS IN "BIGELOW YARD" / LOWELL, MASS.	1955/02/15	1"=10'	H 48.5, W 81 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

140-063	CITY OF LOWELL, MASS. / OFF-STREET PARKING PROGRAM / WESTERN CANAL / ALTERNATE PARKING PLANS.	1956/12/0 0	1"=10'	H 27.9, W 20.3 CM	INK	PAPER
140-063	SECTION OF HAMILTON CANAL / AT / LOWER EDGE OF SACO-LOWELL FOOT BRIDGE / LOOKING DOWNSTREAM.	1934/05/0 6	NONE	H 28, W 42.6 CM	INK, GRAPHITE	PAPER
140-064	SECTION OF MERRIMACK CANAL / ABOVE "SACO" BRIDGE.	1943/08/2 2	NONE	H 28, W 42.2 CM	INK	PAPER
140-066	ATLANTIC RAYON CORP. / 1, 2 & 3 RACEWAYS.	1944/07/0 6	NONE	H 29.5, W 45.5 CM	INK	PAPER
140-067	CURRENT METER STATION / ON DOWNSTREAM SIDE OF / PAWTUCKET ST. BRIDGE OVER PAWTUCKET CANAL.	1947/05/0 0	NONE	H 28, W 43.3 CM	INK	PAPER
140-068	CURRENT METER STATION / IN / HAMILTON CANAL / ABOUT / 60 FEET ABOVE END OF MILL NO. 4.	1949/05/0 4	NONE	H 28, W 43.3 CM	INK	PAPER
140-069	CURRENT METER STATION / IN / HAMILTON CANAL / ABOUT / 60 FEET ABOVE END OF MILL NO. 4.	1949/05/0 4	NONE	H 28, W 43.3 CM	INK, COLORED INK	PAPER
140-070	SECTION OF EASTERN CANAL / LOOKING DOWNSTREAM / NEAR EASTERLY END OF OFFICE BLDG.	1949/03/0 0	NONE	H 28, W 43.3 CM	INK, COLORED INK	PAPER
140-071	SECTION OF HAMILTON CANAL / BELOW "SACO" BRIDGE.	1943/08/2 2	NONE	H 28, W 42 CM	INK, GRAPHITE	PAPER
140-072	CURRENT METER STATION / AT END OF RACES FOR / 3, 4 & 5 WHEELS / BOOTT MILLS / SECTION LOOKING TOWARDS WHEELS.	1950/05/1 3	NONE	H 28, W 43.4 CM	INK	PAPER
140-073	CURRENT METER STATION / AT END OF RACES FOR / 3, 4 & 5 WHEELS / BOOTT MILLS / SECTION LOOKING TOWARDS WHEELS.	1949/05/1 6	NONE	H 28, W 43.4 CM	INK, GRAPHITE	PAPER

14-01	[ROAD A OVER WESTERN CANAL GENERAL PLAN AND ELEVATION.]	UNDATED				
14-02	[ROAD A OVER WESTERN CANAL DECK PLAN AND DETAILS.]	UNDATED				
14-03	[ROAD A OVER WESTERN CANAL STEEL DETAILS.]	UNDATED				
14-04	[ROAD A OVER WESTERN CANAL SUBSTRUCTURE DETAILS.]	UNDATED				
140-4651	LOCATION OF THE RESERVOIR PIPE IN THE YARD OF THE / LOWELL MANUFACTURING COMPANY / IN LOWELL.	1863/03/27	1"=40'	H 87.7, W 60.8 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
140-4652	LOCATION OF THE RESERVOIR PIPE IN THE YARDS OF THE / APPLETON COMPANY & THE LOWELL MACHINE SHOP / IN LOWELL.	1863/02/02	1"=40'	H 84.7, W 81.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
140-4653	LOCATION OF THE RESERVOIR PIPE IN THE YARD OF THE / MERRIMACK MANUFACTURING COMPANY.	1863/06/05	1"=40'	H 88.1, W 61.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
140-4654	LOCATION OF THE RESERVOIR PIPE IN THE YARD OF THE / HAMILTON MANUFACTURING COMPANY / IN LOWELL.	1863/02/02	1"=40'	H 38.2, W 61 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
140-4656	LOCATION OF THE RESERVOIR PIPE / IN THE YARD OF THE BOOTT COTTON MILLS / IN LOWELL.	1862/01/01	1"=40'	H 88.2, W 61.3 CM	INK, COLORED INK, GRAPHITE , WATER COLOR	PAPER

140-4657	LOCATION OF THE RESERVOIR PIPE / IN THE YARDS OF THE / SUFFOLK MANUFACTURING COMPANY / & THE / PROPRIETORS OF TREMONT MILLS / IN LOWELL.	1865/00/00	1"=40'	H 61.5, W 88.1 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
140-4659	PLAN / OF / MIDDLESEX CO'S YARD.	1850/07/26	1"=40'		H 32.1, W 69.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE
140-4659	PLAN / OF / MIDDLESEX CO'S YARD.	1850/07/26	1"=40'	H 32.1, W 69.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
140-4660	PLAN OF LOWELL MACHINE SHOP YARD.	1850/07/31	1"=40'		H 54.1, W 54.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE
140-4660	PLAN OF LOWELL MACHINE SHOP YARD.	1850/07/31	1"=40'	H 54.1, W 54.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
14-05	[UTILITIES PLATE # 10, DRAWING # 21.]	UNDATED				
14-06	UTILITIES PLATE # 09, DRAWING # 20.	1967/04/03	1" = 20'	H 77, W 106 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
14-07	[LAYOUT PLATE # 06, DRAWING # 11.]	UNDATED				
14-08	[LAYOUT PLATE # 07, DRAWING # 12.]	UNDATED				

14-09	[LAYOUT PLATE # 08, DRAWING # 13.]	UNDATED				
141-[069]	SECTIONS TAKEN IN PAWTUCKET CANAL / ABOVE GATES AT O. G. [OLD GUARD] LOCKS. / BLACK SHOWS SECTIONS IN APRIL 1919. / RED SHOWS SECTIONS IN OCTOBER 1902.	SEE TITLE	NONE	H 53.3, W 43.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-[070]	SECTIONS TAKEN IN PAWTUCKET CANAL / ABOVE GATES AT O. G. [OLD GUARD] LOCKS. / BLACK SHOWS SECTIONS IN APRIL 1919. / RED SHOWS SECTIONS IN OCTOBER 1902.	SEE TITLE	NONE	H 53.3, W 43.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-[071]	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 53.3, W 43.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-[072]	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 45.4, W 56 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-[073]	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 45.4, W 55.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-[074]	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 45.4, W 50.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-[075]	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 45.2, W 55.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
14-10	[LAYOUT PLATE # 09, DRAWING # 14.]	UNDATED				
141-001-[A]	[DIAGRAM OF] SECTIONS [1 TO 12] IN PAWTUCKET CANAL [SHOWING AREA VEL.- W.P.-R.].	1895/07/13	NONE	H 46, W 58.6 CM	INK	PAPER

141-001-[B]	[DIAGRAM OF] SECTIONS [1 TO 12] IN PAWTUCKET CANAL [SHOWING AREA VEL.- W.P.-R.].	1895/07/13	NONE	H 46, W 58.6 CM	INK	PAPER
141-002	[DIAGRAM OF] SECTIONS IN PAWTUCKET [& MERRIMACK] CANALS [15-16-17].	UNDATED	NONE	H 45.7, W 58.7 CM	BLUE LINE PRINT, WATER COLOR	PAPER
141-003	[DIAGRAM OF] LONGITUDINAL SECTIONS IN / PAWTUCKET CANAL [SHOWING SURFACE OF LEDGE WHERE IT IS HIGHER THAN GRADE 20].	1893/06/00	NONE	H 20.2, W 211.2 CM	INK, WATER COLOR	PAPER
141-004	PLAN OF PAWTUCKET CANAL / BETWEEN / THE RED BRIDGE & SCHOOL ST.	1893/09/00	1"=20'	H 40.1, W 203.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
141-005	PLAN OF PAWTUCKET CANAL / BETWEEN / RED BRIDGE & SCHOOL ST.	1893/09/00	1"=20'	H 57, W 206.2 CM	INK, COLORED INK	PAPER
141-006	PLAN OF THE / SWAMP LOCKS BASIN / IN THE / PAWTUCKET CANAL / LOWELL, MASS.	1893/07/00	NONE	H 107.4, W 113.7 CM	INK, GRAPHITE	DRAFTING CLOTH
141-007	[SKETCH] PLAN / SHOWING LOCATION / OF / PORTION [OF] SOUTH WALL, SWAMP LOCKS BASIN, / WHICH GAVE WAY [CAVED IN ON] / FRIDAY A.M. AUG. 11, 1893.	1893/00/00	1"=1'	H 37, W 32 CM	INK, COLORED INK, GRAPHITE	PAPER
141-008	SKETCH / OF / W. E. LIVINGSTON'S GRIST MILL [ON PAWTUCKET CANAL].	1893/12/00	1"=8'	H 50.5, W 67.4 CM	INK, COLORED INK, WATER COLOR	PAPER
141-009	PLAN OF LAND / IN VICINITY OF / W. E. LIVINGSTON'S GRIST MILL [ON PAWTUCKET CANAL].	1894/01/00	1"=20'	H 66.6, W 81 CM	INK, COLORED INK	DRAFTING CLOTH

141-010	CROSS SECTIONS / SHOWING IMPROVEMENTS MADE / IN THE / LOWER PAWTUCKET CANAL / 1893.	1893/00/00	3/16"=1'	H 101.2, W 67.6 CM	INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
141-011	PLAN / SHOWING / IMPROVEMENTS / MADE IN THE / LOWER PAWTUCKET CANAL.	1893/00/00	SEE NOTES	H 77.2, W 133.5 CM	INK, WATER COLOR	CLOTH BACKED PAPER
141-012	[SKETCH SHOWING METHOD OF LAYING OUT] FLOOR IN LOWER PAWTUCKET CANAL.	1893/00/00	NONE	H 34.4, W 48.3 CM	GRAPHITE	PAPER
141-013-1	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-2	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-3	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-4	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-5	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-6	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-7	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER
141-013-8	SECTIONS IN WESTERN CANAL.	SEE NOTES	NONE	H 46.1, W 58.8 CM	INK, WATER COLOR	PAPER

141-014	PLAN / OF / ENDS OF PIER UNDER PLATFORMS / NEAR / CENTRAL ST. BRIDGE / [ON] LOWER LEVEL, PAWTUCKET CANAL.	1893/12/00	1/2"=1'	H 51, W 76.9 CM	INK, COLORED INK	PAPER
141-015	PLAN / OF / PIERS & ABUTMENTS / OF THE / SUFFOLK ST. BRIDGE OVER [THE] NORTHERN CANAL.	UNDATED	NONE	H 133.5, W 89 CM	INK, COLORED INK, GRAPHITE	PAPER
141-016	[DIAGRAM SHOWING] SECTIONS OF THE WESTERN CANAL / [BETWEEN BROADWAY AND MERRIMACK ST.] MADE NOV. 7,1880.	1880/11/07	NONE	H 53.7, W 73.8 CM	INK	PAPER
141-017	PLAN & SECTION / OF PART OF / EASTERN CANAL [BETWEEN BRIDGE ST. & BOOTT DAM].	1897/04/20	1"=40'	H 29, W 82.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
141-018	[UNTITLED.] [SKETCH SHOWING POSITION OF PIERS & THEIR BASES FOR THE BOSTON & LOWELL R. R. (FLETCHER ST.) BRIDGE OVER THE PAWTUCKET CANAL AND LOWELL & NASHUA R. R. ALSO THORNDIKE ST. BRIDGE.]	UNDATED	NONE	H 114.3, W 69.6 CM	INK, COLORED INK	PAPER
141-019	[UNTITLED.] [PHOTOGRAPHS SHOWING BREAK IN NORTHERN CANAL WALL AT SLUICEWAYS CAUSED BY FRESHET OF MARCH 1896, BEFORE & AFTER REPAIRS; MASSSACHUSETTS MEASURING FLUME DURING A MEASUREMENT; WESTERN CANAL NEAR MOODY STREET WITH GATES CLOSED.]	1896/09/00	NONE	H 41, W 69.2 CM	PHOTOGRAPHS, INK, COLORED INK	PAPER

141-020	DIAGRAM OF LOWER LEVEL GAUGES TAKEN / OCT. 19,1896 [SHOWING HEIGHTS AT GAUGES OF LOWER PAWTUCKET & EASTERN CANALS].	1896/10/19	NONE	H 39.1, W 45.2 CM	INK, COLORED INK	PAPER
141-021	[SKETCH OF] STONE ORDERED FROM L. P. PALMER, / NECESSARY TO REPAIR BREAK AT SLUICEWAYS / IN NORTHERN CANAL WALL.	1896/08/13	NONE	H 48.1, W 64.4 CM	INK, GRAPHITE	PAPER
141-022	TRACING [SKETCH] SHOWING LOCATION / OF GAUGES IN LOWER PAWTUCKET & EASTERN CANALS.	1896/05/00	1"=100'	H 46.2, W 105.2 CM	INK, WATER COLOR	DRAFTING CLOTH
141-023	PLAN OF CONTEMPLATED RAMP / NEAR FOOT OF SWAMP LOCKS.	1895/12/00	1/4"=1'	H 52, W 127.7 CM	INK, COLORED INK	PAPER
141-024	[PLAN OF HAMILTON CANAL SHOWING IMPROVEMENTS MADE IN 1895.]	SEE TITLE				
141-025	[PLAN & SECTION OF] SWAMP LOCKS / LOCK CHAMBERS.	UNDATED	H1"=5',V1"=5', 1"=5'	H 66.3, W 114 CM	INK, GRAPHITE	PAPER
141-026-[A]	PLAN [& SECTIONS] OF / PAWTUCKET CANAL / FROM / MERRIMACK RIVER / TO / KYANIZING HOUSE.	1901/11/00	1"=100'	H 26.4, W 49.2 CM	BLUEPRINT, COLORED INK	PAPER
141-026-[B]	PAWTUCKET CANAL CROSS SECTIONS / TAKEN DEC. 16, 1900. / DISTANCES / MEASURED ON NORTH WALL / FROM UPPER SIDE OF SCHOOL ST.	SEE NOTES	1"=10'	H 41.3, W 53.3 CM	INK	PAPER
141-026-[C]	SECTIONS IN / PAWTUCKET CANAL PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/02	NONE	H 41.3, W 53.3 CM	INK, GRAPHITE	PAPER

141-026-[D]	SECTIONS IN / PAWTUCKET CANAL PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/02	NONE	H 41.3, W 53.3 CM	INK, COLORED INK, GRAPHITE	PAPER
141-026-[E]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/24	NONE	H 41.3, W 53.3 CM	INK, COLORED INK, GRAPHITE	PAPER
141-026-[F]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/24	NONE	H 41.3, W 53.3 CM	INK, COLORED INK, GRAPHITE	PAPER
141-026-[G]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/02	NONE	H 41.3, W 53.3 CM	INK, COLORED INK, GRAPHITE	PAPER
141-026-[H]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/24	NONE	H 41.3, W 53.3 CM	INK, GRAPHITE	PAPER
141-026-[I]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/24	NONE	H 41.4, W 53.3 CM	INK, GRAPHITE	PAPER
141-026-[J]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/24	NONE	H 41.3, W 53.3 CM	INK, GRAPHITE	PAPER

141-026-[K]	PAWTUCKET CANAL. / PLOTTED LOOKING DOWN STREAM. / STATIONS SHOW DISTANCE ABOVE SCHOOL ST. MEASURED ON NORTH WALL.	1901/11/24	NONE	H 41.3, W 53.3 CM	INK, GRAPHITE	PAPER
141-027	PLAN OF / PAWTUCKET CANAL / FROM / BROADWAY TO BELOW B.& M. R. R. / PLOTTED FROM SURVEY MADE IN 1891 & / ADDITIONAL NOTES TAKEN IN 1902 [ALSO SECTION OF WALL ON WEST SIDE OF CANAL].	1902/12/00	1"=20'	H 66.6, W 134.6 CM	INK, COLORED INK	DRAFTING CLOTH
141-028	INDEX PLAN / OF / UPPER PAWTUCKET CANAL / PAWTUCKET ST. TO GATEHOUSE / SHOWING / LOCATION OF SECTIONS USED FOR SOUNDINGS.	1919/05/15	1"=40'	H 62.5, W 122 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
141-029	PLAN / OF / UPPER PAWTUCKET CANAL / PAWTUCKET ST. TO GATEHOUSE / SHOWING / CONTOURS OF L. & C. LAND ON EITHER SIDE OF CANAL / ALSO CONTOURS OF BANKS & BED OF CANAL.	1919/05/13	1"=40'	H 71.3, W 128.4 CM	INK, COLORED INK	DRAFTING CLOTH
141-029-[A]	PLAN / OF / UPPER PAWTUCKET CANAL / PAWTUCKET ST. TO GATEHOUSE / SHOWING / CONTOURS OF L. & C. LAND ON EAST SIDE OF CANAL.	1916/06/00	1"=40'	H 53.3, W 135.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
141-030-[A]	[PLAN OF EASTERN, MERRIMACK, & WESTERN] CANALS / & / CANAL MARGINS / [SHOWING LEASED AND UNLEASED LAND] BELONGING TO / PROPS. LOCKS & CANALS.	1918/06/00	1"=50'	H 63.4, W 150 CM	BLUEPRINT, COLORED PENCIL	PAPER

141-030-[B]	[PLAN OF EASTERN, MERRIMACK, & WESTERN] CANALS / & / CANAL MARGINS / [SHOWING LEASED AND UNLEASED LAND] BELONGING TO / PROPS. LOCKS & CANALS.	1918/06/00	1"=50'	H 90.9, W 130.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-031	SECTIONS TAKEN IN EASTERN CANAL / BETWEEN BRIDGE ST. & BOOTT DAM.	1919/06/08	NONE	H 62.4, W 63.9 CM	INK	DRAFTING CLOTH
141-032-[A]	DIAGRAM SHOWING FLUCTUATIONS / IN CERTAIN GAUGES [(APPLETON LOWER & UPPER, & MASSACHUSETTS UPPER)] AT SHUTTING DOWN TIME. / 11-50 A-M TO 12-05 P-M.	1919/07/28	NONE	H 29, W 45.5 CM	INK, COLORED INK	PAPER
141-032-[B]	DIAGRAM SHOWING FLUCTUATIONS / IN CERTAIN GAUGES [(APPLETON LOWER & UPPER, & MASSACHUSETTS UPPER)] AT SHUTTING DOWN TIME - 4:50 TO 5:10 P.M.	1919/07/10	NONE	H 29, W 45.5 CM	INK, COLORED INK	PAPER
141-032-[C]	DIAGRAM SHOWING FLUCTUATIONS IN CERTAIN GAUGES / [(APPLETON LOWER & UPPER, & MASSACHUSETTS UPPER)] TIME - 4:50 TO 5:10 P.M.	1919/07/08	NONE	H 29, W 45.5 CM	INK, COLORED INK	PAPER
141-033	PLAN OF / NORTHERN CANAL / BETWEEN AIKEN & PAWTUCKET STS. / SHOWING PROGRESS OF REPAIRS ON WALLS [ALONG CHEEVER ST.].	1921/08/00	1"=50'	H 28, W 73.7 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
141-034	SKETCH / SHOWING REPAIRS TO FOUNDATION WALL / OF UNION BRASS FOUNDRY / ON WESTERN CANAL.	1922/08/00	1"=10'	H 25.3, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH

141-035	PLAN OF PAWTUCKET CANAL ABOVE / OLD GUARD LOCKS / SHOWING CONTEMPLATED REPAIRS IN 1924.	1924/10/14	1"=40'& 20'	H 35.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	PAPER
141-036	PLAN & SECTIONS SHOWING / SUGGESTED IMPROVEMENTS / IN / EASTERN CANAL / OPPOSITE / [NEAR] BOOTT MILLS.	1926/04/14	1"=20' & 10'	H 50.7, W 120.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
141-037	[PLAN OF] PROPOSED PUMP HOUSE / UNDER SCHOOL ST. BRIDGE / LOWELL GAS LIGHT CO. / LOWELL, MASS.	1926/05/27	1"=10'	H 55.6, W 87.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
141-038	PLAN OF / SUFFOLK ST. BRIDGE / OVER / NORTHERN CANAL / SHOWING PRESENT & PROPOSED GRADES.	1926/06/00	1"=5'	H 63.6, W 94 CM	INK, COLORED INK	DRAFTING CLOTH
141-039-1	PROPOSED RECONSTRUCTION / OF / SUFFOLK ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS.	1926/07/00	1"=5'	H 59.4, W 72.4 CM	INK, COLORED INK	DRAFTING CLOTH
141-039-2	PROPOSED RECONSTRUCTION / OF / SUFFOLK ST. BRIDGE / CONCRETE REINFORCEMENT.	1926/07/00	1"=2'& 5'	H 60.3, W 76 CM	INK	DRAFTING CLOTH
141-040	[TRACING SHOWING LAYOUT OF REINFORCING STEEL FOR RECONSTRUCTION OF SUFFOLK ST. BRIDGE.]	1926/07/00	1"=2'& 5'			
141-041	[DRAWING OF] CAST IRON BASE PLATES / [FOR] SUFFOLK ST. BRIDGE.	1926/09/07	1"=6'	H 44.5, W 55.3 CM	INK, COLORED INK	DRAFTING CLOTH
141-042	SKETCH SHOWING RAILING FOR SUFFOLK / ST. BRIDGE.	1926/08/30	3/4"=1'	H 26, W 26 CM	INK, COLORED INK	DRAFTING CLOTH

141-043	[SCHEDULE OF] PROPOSED RECONSTRUCTION / OF / SUFFOLK ST. BRIDGE / REINFORCING STEEL / PROPRIETORS OF LOCKS & CANALS.	1926/08/00	1"=1'	H 24.6, W 39.5 CM	INK, COLORED INK	DRAFTING CLOTH
141-044	[BLUEPRINT OF] B.& M. R. R. / SOUTHERN DIV. SO. LOWELL SIDE TRACKS / VALUATION SECTION NO.15M. / BRIDGE # 332 / OVER WESTERN CANAL NEAR DUTTON ST. / LOWELL, MASS.	1926/07/01	1/4"&1/2" =1',1"=100'	H 61.2, W 92.1 CM	BLUEPRINT	PAPER
141-045	WORTHEN STREET BRIDGE / OVER / WESTERN CANAL / SHOWING REPAIRS MADE IN 1926 / FOR SACO-LOWELL SHOPS.	1926/12/20	1"=5'	H 42, W 52.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
141-047	PROPOSED BRIDGE / [FOR CABLES] OVER / HAMILTON CANAL [FOR COURIER-CITIZEN CO.].	1928/01/16	1 1/2"=1'	H 53.1, W 73.4 CM	BLUEPRINT	PAPER
141-048	[PLAN SHOWING] PROPOSED CONDUIT WORK AT THE / EASTERN CANAL BRIDGE E. MERRIMACK ST. / FOR THE / LOWELL ELECTRIC LIGHT CORPORATION. / BY / ROBINSON & ROBINSON. CONTRACTING ENGINEERS.	1929/06/12	1/4",3"& 1/2"=1'	H 58.2, W 91.4 CM	BLUEPRINT	PAPER
141-049	PROPOSED RECONSTRUCTION / OF / SUFFOLK ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS.	1926/07/00	1"=5'	H 59.2, W 71.8 CM	BLUEPRINT	PAPER
141-050	PROPOSED UNDERGROUND [CONDUIT] / BRIDGE ST. / FROM KEARNEY SQUARE / TO CENTRAL BRIDGE / THE LOWELL ELECTRIC LIGHT CORP.	1930/03/10	H1"=20', V1/4"=1'	H 50.5, W 71.5 CM	BLUEPRINT	PAPER

141-051	LOWELL ELECTRIC LIGHT CORP. / PROPOSED CONDUIT WORK AT / THE EASTERN CANAL BRIDGE / ROBINSON & ROBINSON.	UNDATED	NONE	H 48.3, W 30.5 CM	BLUEPRINT, COLORED INK	PAPER
141-052	PLAN & SECTIONS / OF / LAWRENCE CANAL / OPPOSITE LAWRENCE MFG. CO.'S OFFICE.	1942/08/00	1/8"=1'	H 29.3, W 45.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
141-053	PLAN & ELEVATIONS OF / ENTRANCE TO / MASSACHUSETTS WASTEWAY / LOWELL, MASS.	1955/03/21	1/2",1/4" & 3/8"=1'	H 44.5, W 77 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
141-053-[COPY 1]	PLAN & ELEVATIONS OF / ENTRANCE TO / MASSACHUSETTS WASTEWAY / LOWELL, MASS.	1955/03/21	1/2",1/4" & 3/8"=1'	H 45, W 81.3 CM	BLUEPRINT	PAPER
141-061	PLAN OF PART / OF / FRYE LOT / BETWEEN LAKEVIEW AVE. & LOWELL WATER WORKS CONDUIT.	1900/10/22	1"=20'	H 72.8, W 110.6 CM	INK, COLORED INK	PAPER
141-068	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / FREDERICK AYER ET ALS.	1917/08/14	1"=20'	H 64.7, W 77.6 CM	INK	TRACING PAPER
14-11	[LAYOUT PLATE # 10, DRAWING # 15.]	UNDATED				
14-12	[LAYOUT PLATE # 11, DRAWING # 16.]	UNDATED				
14-13	[LAYOUT PLATE # 12, DRAWING # 17.]	UNDATED				
14-14	[LAYOUT PLATE # 16, DRAWING # 21.]	UNDATED				
14-15	[UTILITIES PLATE # 09, DRAWING # 30.]	UNDATED				
14-16	[UTILITIES PLATE # 10, DRAWING # 31.]	UNDATED				
14-17	[UTILITIES PLATE # 11, DRAWING # 32.]	UNDATED				
14-18	[UTILITIES PLATE # 16, DRAWING # 37.]	UNDATED				
14-19	[UTILITIES PLATE # 10, DRAWING # 21.]	UNDATED				
14-20	[UTILITIES PLATE # 11, DRAWING # 22.]	UNDATED				

142-001	DIAGRAM SHOWING SLOPES OF UPPER PAWTUCKET, LOWER PAWTUCKET, EASTERN & NORTHERN CANALS.	1893/00/00	NONE	H 45.7, W 58.6 CM	INK, COLORED INK, GRAPHITE	PAPER
142-002	SHOWING DECENT IN LOWER LEVEL OF PAWTUCKET CANAL / AT SUNDRY TIMES BEFORE & AFTER THE IMPROVEMENTS / OF 1893.	1893/09/28	NONE	H 23, W 107.4 CM	INK, COLORED INK	PAPER
142-003	[PLAN SHOWING] SLOPES- PAWTUCKET DAM TO MERRIMACK / TOWER GAGE, 1896-1922 / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	SEE TITLE	H1'=600', V1'=0.8'	H 30.5, W 48.6 CM	INK	DRAFTING CLOTH
142-004	[UNTITLED.] [DIAGRAM SHOWING SLOPES IN NORTHERN CANAL, UPPER PAWTUCKET, LOWER PAWTUCKET AND WESTERN CANALS.]	1897-1898/00/00	NONE	H 53, W 129.7 CM	INK, COLORED INK	CLOTH BACKED PAPER
142-005-A-[01]	[DIAGRAM SHOWING] SLOPES IN LOWER PAWTUCKET [& EASTERN] CANAL[S].	1913/05/12	NONE	H 45.3, W 64.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
142-005-A-[02]	[DIAGRAM SHOWING] SLOPES IN LOWER PAWTUCKET [& EASTERN] CANAL[S].	1913/05/12	NONE	H 45.3, W 64.5 CM	RED LINE PRINT, INK, COLORED INK	PAPER
142-005-A-[03]	[DIAGRAMS SHOWING] SLOPES IN LOWER PAWTUCKET [& EASTERN] CANAL[S].	1913/05/12	NONE	H 45.3, W 64.5 CM	BLUEPRINT, COLORED INK	PAPER
142-005-A-[04]	[DIAGRAM SHOWING] SLOPES IN LOWER PAWTUCKET [& EASTERN] CANAL[S].	1913/05/12	NONE	H 45.3, W 64.5 CM	BLUEPRINT, COLORED INK	PAPER

142-005-B-[01]	DIAGRAM SHOWING SLOPES IN THE DIFFERENT / CANALS ON JULY 9 & 13 & SEPT. 5, 1895 WHEN / MEASUREMENTS WERE MADE OF THE QUANTITY OF / WATER PASSING THE PAWTUCKET CANAL AT SCHOOL / ST., THE WESTERN CANAL BETWEEN MARKET & MERRIMACK STS., [...SEE NOTES]	1895/00/00	NONE	H 56.4, W 144.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
142-005-B-[02]	DIAGRAM SHOWING SLOPES IN THE DIFFERENT / CANALS ON JULY 9 & 13 & SEPT. 5, 1895 WHEN / MEASUREMENTS WERE MADE OF THE QUANTITY OF / WATER PASSING THE PAWTUCKET CANAL AT SCHOOL / ST., THE WESTERN CANAL BETWEEN MARKET & MERRIMACK STS., [...SEE NOTES]	1895/00/00	NONE	H 51.5, W 134.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
142-006	SWAMP LOCKS BASIN [AT ENTRANCE TO HAMILTON CANAL] / SURVEY FOR ICE BOOMS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/05/10	1"=10'	H 64.7, W 94 CM	INK, COLORED INK	DRAFTING CLOTH
142-007	DIAGRAM SHOWING LOSS OF HEAD / FOR DIFFERENT QUANTITIES OF WATER / IN C.F.P.S. PASSING MOODY ST. FEEDER.	UNDATED	NONE	H 58.7, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
142-008	[DETAILS OF PROPOSED ICE BOOM, SWAMP LOCKS BASIN, AT ENTRANCE TO HAMILTON CANAL.]	1922/05/22				

142-009	[PLAN OF PROPOSED] SWAMP LOCKS BASIN / FLOATING SECTION-ICE BOOM [AT ENTRANCE TO HAMILTON CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/06/30	3/4"& 1"=1'	H 46.4, W 63.2 CM	INK, COLORED INK	DRAFTING CLOTH
142-010	[DETAILS OF ICE BOOM, SWAMP LOCKS BASIN, AT ENTRANCE TO HAMILTON CANAL (PROPOSED).]	1922/07/11				
142-011	[DIAGRAM SHOWING] HEIGHTS IN EASTERN CANAL / [AT FOLLOWING STATIONS:] LOWER LOCKS DAM (PLOTTED IN BLACK), MASS. CANAL GAUGE (PLOTTED IN BLUE), BOOTT DAM (PLOTTED IN RED) [ON FEB. 27,28 & MARCH 1,11 & 12, 1895] / MAR. 1895.	1895/03/00	NONE	H 76, W 58 CM	INK, COLORED INK	PAPER
142-012	[DIAGRAM SHOWING] HEIGHT OF WATER AT / SWAMP LOCKS, APPLETON & HAMILTON / UPPER GAUGES.	1895/03/23	NONE	H 43.2, W 26.7 CM	INK, COLORED INK	PAPER
142-014	DIAGRAM OF SLOPES IN / NORTHERN, WESTERN & PAW- / TUCKET CANALS.	1895-1897/00/00	NONE	H 56.3, W 100.7 CM	INK, COLORED INK	PAPER
142-015	[DIAGRAM OF] SECTION AT HEAD OF / PAWTUCKET CANAL ON LINE / OF PROPOSED BOOM.	1897/07/13	NONE	H 45.9, W 58.5 CM	INK, WATER COLOR	PAPER
142-016	SKETCH FOR CLUSTER OF PILES TO HOLD BOOM AT / HEAD OF PAWTUCKET CANAL.	1896/07/20	NONE	H 90.9, W 61.9	GRAPHITE	PAPER
142-017	PLAN & PROFILE / OF / LOWER PAWTUCKET & EASTERN CANALS / LOWELL, MASS. / SHOWING / LOCATION OF GAUGES & SLOPE OF WATER SURFACE / FOR / DATES GIVEN [ON OCT. 20, 1919].	SEE TITLE	1/2"=50'	H 78.2, W 115 CM	BLUEPRINT, COLORED PENCIL	PAPER

142-018	[SKETCH SHOWING] SWAMP LOCKS ICE BOOM / DEVICE FOR STRENGTHENING PIER / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/10/06	3/4"=1'	H 49.6, W 60 CM	INK, COLORED INK	DRAFTING CLOTH
142-019	[SKETCH OF SECTION OF PROPOSED] MERRIMACK BOOM.	UNDATED	NONE	H 30.4, W 48.2 CM	GRAPHITE	PAPER
142-020	[SKETCH OF BOOM FOR] LOWER LOCKS [CHAMBERS].	UNDATED	1/8"=1'	H 48, W 61 CM	GRAPHITE	PAPER
142-021	[PLAN OF] PART OF [BOOM AT] BOOTT WASTEWAY DAM [RACKS].	UNDATED	1"=10' & 2'	H 63, W 90.2 CM	GRAPHITE, INK	PAPER
142-022	[SKETCH OF] BOOM IN MERRIMACK WASTEWAY.	1893/00/00	NONE	H 44.2, W 58.5 CM	GRAPHITE	PAPER
142-023	SUGGESTION FOR BOOM AT MOODY ST. FEEDER.	UNDATED	NONE	H 48.2, W 61 CM	GRAPHITE	PAPER
142-024	[SKETCH OF] BOOMS AT R. R. BRIDGE, PAWTUCKET CANAL [SWAMP LOCKS BASIN.]	UNDATED	NONE	H 48.2, W 61 CM	GRAPHITE	PAPER
142-025	SWAMP LOCKS BASIN / DETAILS OF ICE BOOM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1923/07/22	3/4"=1'	H 72.3, W 93.5 CM	INK, COLORED INK	DRAFTING CLOTH
142-026	SWAMP LOCKS BASIN / DETAILS OF ICE BOOM / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1923/07/24	3/4"=1'	H 50.8, W 86.5 CM	INK, COLORED INK	DRAFTING CLOTH
142-027	SWAMP LOCKS BASIN / DETAILS OF ICE BOOM.	1923/07/27	1/2"=1'	H 50.6, W 86 CM	INK, COLORED INK	DRAFTING CLOTH
142-028	DIAGRAM / SHOWING / SLOPES IN NORTHERN CANAL / FROM OCT. 4, 1899 / TO ( ).	SEE TITLE	NONE	H 53.8, W 158.1 CM	INK, COLORED INK	CLOTH BACKED PAPER

142-028-A	[DIAGRAM SHOWING SLOPES IN NORTHERN CANAL FROM 1896 TO 1922.]. SLOPES- PAWTUCKET / DAM TO MERRIMACK / TOWER GAGE, 1896-1922 / PROPRIETORS OF LOCKS / & CANALS, LOWELL MASS.	1922/04/25	H 1"=600',V 1"=0.8'	H 30, W 47 CM	RED LINE PRINT, INK, COLORED INK	PAPER
142-029	DIAGRAM OF SLOPES OF UPPER PAWTUCKET CANAL [(1897)].	1897/07/23	NONE	H 56.3, W 90.3 CM	INK, COLORED INK	PAPER
142-030	[UNTITLED.] [DIAGRAM SHOWING SLOPES OF NORTHERN & UPPER PAWTUCKET CANALS, WESTERN & MERRIMACK CANALS.]	1898/00/00	NONE	H 55, W 129.9 CM	INK, COLORED INK	CLOTH BACKED PAPER
142-031	DIAGRAM SHOWING SLOPES / OF / DRAIN IN PAWTUCKET CANAL / FROM / OLD GUARD LOCKS TO SWAMP LOCKS.	1902/04/00	NONE	H 56.1, W 139.4 CM	INK, COLORED INK	PAPER
142-032-[A]	[DIAGRAM SHOWING] MEASUREMENT OF WATER PASSING THROUGH THE WESTERN CANAL / BETWEEN THE NORTHERN CANAL & MOODY ST. FEEDER.	SEE NOTES	NONE	H 53.5, W 74 CM	INK, COLORED PENCIL, COLORED INK	PAPER
142-032-[B]	[DIAGRAM SHOWING] MEASUREMENT OF WATER PASSING THROUGH THE WESTERN CANAL / BETWEEN THE NORTHERN CANAL & MOODY ST. FEEDER.	SEE NOTES	NONE	H 53.5, W 74 CM	INK, COLORED PENCIL, COLORED INK	PAPER
142-033	LOWELL MASS. / PROP. OF LOCKS & CANALS / MAP [SYSTEM PLAN] SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS. BOOM LOCATIONS.	1912/07/00	1"=250'	H 77.5, W 102.6 CM	LITHOGRAPH, INK, WATER COLOR	PAPER

142-035-[A]	[WORKING PLAN OF ICE BOOM IN MERRIMACK CANAL.] MOODY ST. FEEDER.	1912/07/00	NONE	H 52.4, W 76.9 CM	INK, GRAPHITE	DRAFTING CLOTH
142-035-[B]	[WORKING PLAN OF ICE BOOM IN MERRIMACK CANAL.] MOODY ST. FEEDER BOOM.	1912/00/00	NONE	H 54, W 75 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
142-035-[C]	WORKING PLAN OF ICE BOOM IN MERRIMACK CANAL / NEAR MOODY ST. FEEDER GATE HOUSE BUILT / JUNE & JULY 1912.	SEE NOTES	1/4"=1'	H 67.3, W 85.5 CM	INK, COLORED INK	PAPER
142-036	PROPS. LOCKS & CANALS / [PLAN OF] BLUE DYE HOUSE ICE BOOM [ON LOWER PAWTUCKET CANAL, WITH LOCATION OF SAME].	1918/10/15	1"=20'	H 46.2, W 89.6 CM	BLUEPRINT, COLORED PENCIL, COLORED INK	PAPER
142-037	[PLAN OF] PROPOSED UNIT OF / FLOATING BOOM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/06/07	1"=1'	H 57.6, W 87.9 CM	INK, COLORED INK	DRAFTING CLOTH
142-038	[PLAN OF] CUT-WATERS FOR STEEL POSTS / BLUE-DYE HOUSE BOOM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/11/14	1 1/2"=1'	H 30.2, W 39.7 CM	INK, COLORED INK	PAPER
142-039	DESIGN FOR BOOM / IN [LOWER] PAWTUCKET CANAL, LOWELL, / BELOW CENTRAL ST. BRIDGE.	1893/12/00	NONE	H 30.8, W 48.3 CM	GRAPHITE, INK	PAPER
142-040	DESIGN FOR BOOM / IN PAWTUCKET CANAL, LOWELL, / BELOW CENTRAL ST. BRIDGE.	1893/12/00	1/8"& 1/4"=1'	H 63.3, W 49.5 CM	INK, COLORED INK	DRAFTING CLOTH
142-041	[DIAGRAM SHOWING] MEASUREMENT OF WATER PASSING / LOWER PAWTUCKET CANAL / AT / UPPER SIDE OF HAMILTON FOOT BRIDGE / TO BLUE DYE HOUSE.	1918/11/08	NONE	H 29, W 42.2 CM	INK	PAPER

142-042	[DIAGRAM SHOWING] MEASUREMENT OF WATER PASSING / LOWER PAWTUCKET CANAL / AT / UPPER SIDE OF HAMILTON FOOT BRIDGE / TO BLUE DYE HOUSE.	1918/11/25	NONE	H 29, W 42.2 CM	INK	PAPER
142-044	SECTION / OF PAWTUCKET CANAL / AT / UPPER SIDE OF HAMILTON FOOT BRIDGE / TO BLUE DYE HOUSE.	1918/03/18	NONE	H 33, W 56.9 CM	INK	DRAFTING CLOTH
142-044-[A]	SECTION / OF PAWTUCKET CANAL / AT / UPPER SIDE OF HAMILTON FOOT BRIDGE / TO BLUE DYE HOUSE.	1918/03/18	NONE	H 28.3, W 56.9 CM	BLUE LINE PRINT	PAPER
142-044-[COPY 1]	SECTION / OF PAWTUCKET CANAL / AT / UPPER SIDE OF HAMILTON FOOT BRIDGE / TO BLUE DYE HOUSE.	1918/03/18	NONE	H 33, W 56.9 CM	BLUE LINE PRINT	PAPER
142-045	PLAN & PROFILE / OF / LOWER PAWTUCKET & EASTERN CANALS / LOWELL, MASS. / SHOWING LOCATION OF GAUGES & SLOPE OF WATER SURFACE / FOR / DATES GIVEN [BEGINNING MAY 26, 1913].	SEE TITLE	1/2"=50'	H 78.6, W 115.6 CM	INK	DRAFTING CLOTH
142-045-[A]	PLAN & PROFILE / OF / LOWER PAWTUCKET & EASTERN CANALS / LOWELL, MASS. / SHOWING / LOCATION OF GAUGES & SLOPE OF WATER SURFACE / FOR DATES GIVEN [BEGINNING MAY 26,1913].	1913/05/26	1/2"=50'	H 73, W 109.2 CM	BLUEPRINT, COLORED INK	PAPER

142-045-[B]	PLAN & PROFILE / OF / LOWER PAWTUCKET & EASTERN CANALS / LOWELL, MASS. / SHOWING / LOCATION OF GAUGES & SLOPE OF WATER SURFACE / FOR / DATES GIVEN [BEGINNING MAY 26,1913].	1913/05/26	1/2"=50'	H 77.7, W 113.8 CM	BLUE LINE PRINT, INK, COLORED INK	CLOTH BACKED PAPER
142-045-[C]	PLAN & PROFILE / OF / LOWER PAWTUCKET & EASTERN CANALS / LOWELL, MASS. / SHOWING / LOCATION OF GAUGES & SLOPE OF WATER SURFACE / FOR / DATES GIVEN [BEGINNING MAY 26,1913].	SEE TITLE	1"=10' & 2'	H 63, W 90.2 CM	BLUE LINE PRINT, INK, COLORED INK	CLOTH BACKED PAPER
142-045-[COPY 1]	PLAN & PROFILE / OF / LOWER PAWTUCKET & EASTERN CANALS / LOWELL, MASS. / SHOWING LOCATION OF GAUGES & SLOPES OF WATER SURFACE / FOR / DATES GIVEN [BEGINNING MAY 26, 1913].	SEE TITLE	1/2"=50'	H 74, W 112 CM	BLUE LINE PRINT	TRACING PAPER
142-046	PLAN & PROFILE / OF / UPPER PAWTUCKET CANAL / LOWELL, MASS. / LOCATION OF GAUGES & SLOPE OF WATER SURFACE / FOR DATES GIVEN [BEGINNING JAN. 1920].	1920/01/00	1"=100'& 200'	H 93.4, W 142.7 CM	INK	DRAFTING CLOTH
142-047	VELOCITY CURVES / LOWER PAWTUCKET CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/12/00	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
142-047-A	CHEZY COEFFICIENTS / UPPER PAWTUCKET CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	UNDATED	NONE	H 21.6, W 30.4 CM	INK, COLORED INK	PAPER

142-047-B	[CHEZY COEFFICIENTS] NORTHERN CANAL.	1919/07/30	NONE	H 30.4, W 21.6 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
142-047-C	[CHEZY COEFFICIENTS] MOODY ST. FEEDER.	SEE NOTES	NONE	H 30.4, W 21.6 CM	INK, COLORED PENCIL	PAPER
142-047-D	[CHEZY COEFFICIENTS] WESTERN CANAL.	1919/07/12	NONE	H 30.4, W 21.6 CM	INK, COLORED PENCIL	PAPER
142-047-E	CURRENT METER MEASUREMENT[S] / [OF] PAWTUCKET CANAL / 25' ABOVE / BREWERY BRIDGE / LOWELL, MASS.	1920/10/05	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
142-047-F	CURRENT METER MEASUREMENTS / [OF] NORTHERN CANAL AT AIKEN ST. BRIDGE / (DOWNSTREAM SIDE) / METER L. & C. B. & B. # 8163 WATCH-"JOCKEY CLUB."	1920/10/05	NONE	H 29.2, W 45.7 CM	INK, COLORED INK, GRAPHITE	PAPER
142-047-G	CURRENT METER MEASUREMENTS / AT / MERRIMACK ST. BRIDGE / OVER / WESTERN CANAL.	1920/10/05	NONE	H 45.7, W 29.2 CM	INK, COLORED INK, GRAPHITE	PAPER
142-047-H	[CURRENT METER MEASUREMENTS OF] NORTHERN CANAL AT AIKEN ST.	1921/07/15	NONE	H 45.7, W 29.2 CM	INK	PAPER
142-047-I	VERTICAL VELOCITY CURVES / NORTHERN CANAL BELOW AIKEN ST. BRIDGE.	1921/07/15	NONE	H 29.2, W 45.7 CM	INK	PAPER

142-047-J	[UNTITLED.] [DIAGRAM SHOWING CROSS-SECTIONS OF UPPER PAWTUCKET CANAL BELOW SCHOOL ST., HAMILTON CANAL AT MEASURING FLUME, MERRIMACK CANAL ABOVE FLUME & NORTHERN CANAL.]	1921/12/07	NONE	H 45.7, W 29.2 CM	INK	PAPER
142-047-K	[DIAGRAM SHOWING] CHEZY COEFFICIENTS / [IN] LOWER PAWTUCKET CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	UNDATED	NONE	H 45.7, W 29.2 CM	INK, COLORED INK, COLORED PENCIL	PAPER
142-047-L-[A]	[DIAGRAM SHOWING] SLOPES DIAGRAM [IN EACH CANAL IN JUNE & DECEMBER, 1923, & NOVEMBER & DECEMBER 27,1928. (WITH TABLE) I.E. 142-047-L [B]].	1928/12/27	NONE	H 21.6, W 37 CM	INK, COLORED INK	DRAFTING CLOTH
142-047-L-[B]	PLOTTING USED FOR SLOPE DIAGRAM.	1928/12/27	NONE	H 28, W 21.5 CM	INK	PAPER
142-047-M	MERRIMACK CANAL / SLOPES & VELOCITIES / SACO-LOWELL SHOPS TO / COLUMBIA TEXTILE CO. / PROPRIETORS OF LOCKS & CANALS. LOWELL, MASS.	1922/04/28	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
142-047-N	PLAN & SECTIONS / MERRIMACK CANAL / AT SACO-LOWELL SHOPS / PROPRIETORS OF LOCKS / & CANALS. LOWELL, MASS.	1922/04/29	NONE	H 29.2, W 45.7 CM	INK, GRAPHITE	PAPER
142-047-O-[A]	CURRENT METER MEASUREMENT IN HAMILTON CANAL / AT DOWNSTREAM EDGE OF SACO-LOWELL FOOT BRIDGE.	1934/05/16	NONE	H 29.2, W 45.7 CM	INK	PAPER

142-047-O-[B]	DEPARTMENT OF INTERIOR / UNITED STATES GEOLOGICAL SURVEY / WATER RESOURCE BRANCH / DISCHARGE MEASUREMENT NOTES / HAMILTON CANAL.	1934/05/16	NONE	H 20.3, W 12.7 CM	INK, GRAPHITE	PAPER
142-048	COPY OF PLAN OF / PAWTUCKET CANAL & ADJACENT PROPERTY / SHOWING PROGRESS OF IMPROVEMENTS / FROM WESTERN CANAL TO SCHOOL ST. / COMMENCED IN 1897.	1900/02/00	1"=40'	H 91.3, W 168 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
142-048-B	LOWER LOCKS ICE BOOM / GENERAL PLAN / [&] DETAIL OF ANCHORAGES.	1921/10/00	1"=50'	H 30.5, W 66.5 CM	INK	DRAFTING CLOTH
142-049	[DETAIL PLAN OF] FLOATING SECTION / LOWER LOCKS ICE BOOM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/10/00	1/2"=1'	H 37, W 64.8 CM	INK	DRAFTING CLOTH
142-050	DIAGRAM [OF] SLOPES / [OF] WESTERN & MERRIMACK CANALS / & / MOODY ST. FEEDER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/12/17	1"=200'& 1"=.3'	H 36.5, W 95 CM	INK, GRAPHITE	PAPER
142-051	DIAGRAM OF SLOPES [OF WESTERN & MERRIMACK CANALS & MOODY ST. FEEDER] / TREMONT GATE HOUSE / TO / MERRIMACK MFG. CO. YARD.	1920/12/17	NONE	H 56.5, W 99 CM	INK, COLORED INK	PAPER
142-056	SWAMP LOCKS [BASIN NEAR HEAD OF MERRIMACK CANAL] / PRELIMINARY PLAN OF / [PROPOSED] NEW ICE BOOMS.	1922/02/15	1"=40'	H 23, W 36.1 CM	INK, GRAPHITE	DRAFTING CLOTH

142-057	SWAMP LOCKS BASIN [NEAR HEAD OF HAMILTON CANAL] / PRELIMINARY PLAN OF PROPOSED NEW / ICE BOOMS / PROP. OF LOCKS & CANALS, LOWELL, MASS.	1923/10/22	1"=20'	H 40.3, W 60.3 CM	INK	DRAFTING CLOTH
142-057-[A]	SWAMP LOCKS BASIN / PRELIMINARY PLAN OF / PROPOSED NEW / ICE BOOMS / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1922/02/11	1"=20', 3/8"=1'	H 39.8, W 60.3 CM	BLUEPRINT	PAPER
142-058	PLAN OF [UPPER] PAWTUCKET CANAL / DESIGNED TO ACCOMPANY, & SHOW LOCATIONS OF, SECTIONS [(300 TO 950)] TAKEN 1897.	SEE TITLE	1"=40'	H 96.2, W 70.2 CM	INK, GRAPHITE	DRAFTING CLOTH
142-059	[PLAN SHOWING] LOWER LOCKS / [IN FRONT OF] IPSWICH [COMPANY'S RACKS AT LOWER LOCKS] ICE BOOM / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1922/02/16	1"=25'	H 32.2, W 47.3 CM	INK, GRAPHITE	DRAFTING CLOTH
142-060	[PLAN SHOWING EFFECT OF PROPOSED CHANGES IN BRANCH TRACKS AT THE FOOT OF DUTTON STREET.]	1917/12/07	1"=10'			
142-061	[DETAILED PLAN OF] LOWER LOCKS ICE BOOM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/04	3/4"=1'	H 57.5, W 73 CM	INK, COLORED INK	DRAFTING CLOTH
142-062	SURVEY SHOWING OLD ICE BOOM / AT / MERRIMACK DAM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/08/00	1/8"=1'	H 45.8, W 63.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
142-063	DETAILS OF TRUSSES / FOR NEW STEEL / MERRIMACK [DAM] ICE BOOM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/09/00	1/2"=1'	H 68, W 97.2 CM	INK, COLORED INK	DRAFTING CLOTH

142-064	DETAILS OF POSTS & BRACKETS / FOR NEW STEEL / MERRIMACK [DAM] ICE BOOM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/09/00	3/4"=1'	H 61.3, W 112.7 CM	INK, COLORED INK	DRAFTING CLOTH
142-065	PLAN SHOWING NEW STEEL / MERRIMACK [DAM] ICE BOOM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/09/00	1/4"& 1/2"=1'	H 80.4, W 80 CM	INK, COLORED INK	DRAFTING CLOTH
142-066	DETAIL[S] OF I-BEAMS WITH SPECIAL / ANGLE IRONS FOR TRUSSES "A" & "C" / MERRIMACK [DAM] ICE BOOM / PROPS OF LOCKS & CANALS-LOWELL, MASS.	1928/09/00	3"=1'	H 40.7, W 80.6 CM	INK, COLORED INK	DRAFTING CLOTH
142-067	SURVEY & ELEVATIONS IN NORTHERN CANAL / FROM SUFFOLK RACKS TO SUFFOLK ST. BRIDGE [AT SITE OF PROPOSED NEW STEEL ICE BOOM].	1928/05/00	1/8"=1'	H 59, W 85.2 CM	INK, COLORED INK	DRAFTING CLOTH
142-068	PROPOSED PLAN FOR NEW STEEL / SUFFOLK STREET ICE BOOM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/07/00	1/8"& 1"=1'	H 32, W 75.4 CM	INK, COLORED INK	DRAFTING CLOTH
142-069	DETAILS OF POST & BRACKET / FOR NEW STEEL / SUFFOLK ST. [BRIDGE] ICE BOOM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/07/00	3/4"=1'	H 51.2, W 89.6 CM	INK, COLORED INK	DRAFTING CLOTH
142-070	DETAILS OF TRUSSES FOR NEW STEEL / SUFFOLK ST. [BRIDGE] ICE BOOM / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/07/00	3/4"=1'	H 80.4, W 103.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
142-071	SURVEY FOR ICE BOOM / AT / MERRIMACK DAM.	1938/07/00	1"=4'	H 79.4, W 74.4 CM	INK, WATER COLOR	DRAFTING CLOTH
142-072	PROPOSED BRIDGE & BOOM FOR / LAWRENCE CANAL, [UTILITIES PLATE # 09,	1941/12/00	1/4"=1' & 1/2"=1'	H 46, W 74.5 CM	GRAPHITE	DRAFTING CLOTH
14-21	DRAWING # 20.]	UNDATED				

142-102	PLAN OF LAND / CONVEYED TO / TREMONT & SUFFOLK MILLS / BY / LAWRENCE M. CO.	1896/10/01	1"=80'	H 40, W 25.7 CM	INK	DRAFTING CLOTH
143-001	SKETCH SHOWING OUTLET[S] OF RACEWAYS IN LOWER LEVEL OF PAWTUCKET CANAL.	1893/06/18	NONE	H 45.9, W 58.8 CM	INK	PAPER
143-002-A	[ELEVATION SHOWING RACES, OUTLET PIPES, DRAINS ETC., OF] LOWELL MFG. CO. [(BIGELOW HARTFORD) ON SOUTH WALL OF PAWTUCKET CANAL.]	1901/01/00	1"=10'	H 11.9, W 233 CM	INK, COLORED INK	PAPER
143-002-B	[ELEVATION OF NORTH & SOUTH WALLS OF LOWER PAWTUCKET CANAL SHOWING RACEWAY, OUTLET PIPES, DRAINS, ETC., OF] HAMILTON PRINT WORKS.	1902/01/00	1"=10'	H 17.7, W 114.3 CM	INK, COLORED INK	PAPER
143-003-[A]	PLAN [& SECTIONS] OF WESTERN CANAL / [FROM SWAMP LOCKS TO SUFFOLK ST. BRIDGE, AT 20 FEET INTERVALS] SHOWING / POSITION OF SECTIONS.	1901/04/00	1"=100'	H 36.2, W 80.9 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
143-003-[B]	SECTIONS OF WESTERN CANAL / FROM LOWER END; 20' APART.	SEE NOTES	1"=10'	H 56.4, W 86.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
143-004	SECTIONS / AT / FLUME IN WESTERN CANAL.	1898/06/19	1"=10'	H 46, W 58.8 CM	INK, COLORED INK	PAPER
143-005	SECTION IN MERRIMACK CANAL / AT MIDDLE OF / MARKET ST. BRIDGE [SHOWING 24" SEWER PIPE].	1884/06/29	NONE	H 45.8, W 68.7 CM	GRAPHITE	PAPER
143-006	[SKETCH SHOWING PROPOSED SECTIONS FOR] WESTERN CANAL.	UNDATED	NONE	H 61.1, W 48.3 CM	GRAPHITE, COLORED PENCIL	PAPER

143-007	SECTIONS OF HAMILTON CANAL / MADE DURING PROGRESS OF IMPROVEMENTS / IN 1895 [FROM THE HAMILTON-APPLETON PROPERTY LINE DOWN].	SEE TITLE	NONE	H 57.9, W 93.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
143-008-[A]	SECTIONS [TAKEN] IN PAWTUCKET CANAL / [AT GAUGES] FROM MOUTH OF WESTERN CANAL / TO OLD GUARD LOCKS.	1902/9/21	NONE	H 61.7, W 48.4 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[B]	SECTIONS IN PAWTUCKET CANAL / BELOW SCHOOL ST.	UNDATED	NONE	H 23.1, W 48.4 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[C]	SECTIONS IN PAWTUCKET CANAL / BELOW SCHOOL ST. TAKEN OCT. 19, 1902.	SEE TITLE	NONE	H 61.7, W 48.4 CM	INK, COLORED INK	PAPER
143-008-[D]	SECTIONS ON PAWTUCKET CANAL / BELOW SCHOOL ST. / TAKEN OCT. 12, 1902.	SEE TITLE	NONE	H 47.6, W 41.2 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[E]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 47.6, W 41.2 CM	INK, COLORED INK, GRPAHITE	PAPER
143-008-[F]	SECTIONS TAKEN AT FLUME / IN PAWTUCKET CANAL.	1902/10/05	NONE	H 49, W 31.8 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[G]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 54.2, W 41.2 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[H]	SECTIONS ON PAWTUCKET CANAL / ABOVE OLD GUARD LOCKS. / TAKEN SEPT. 20-27-28-1902.	SEE TITLE	NONE	H 54.2, W 41.2 CM	INK, COLORED INK, GRAPHITE	PAPER

143-008-[I]	SECTIONS ON PAWTUCKET CANAL / ABOVE OLD GUARD LOCKS. / TAKEN SEPT. 27-28-1902.	SEE TITLE	NONE	H 54.2, W 41.2 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[J]	SECTIONS IN PAWTUCKET CANAL / ABOVE GATES.	UNDATED	NONE	H 61.7, W 48.4 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[K]	SECTIONS IN PAWTUCKET CANAL / ABOVE GATES.	UNDATED	NONE	H 61.7, W 48.4 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[L]	SECTIONS IN PAWTUCKET CANAL / ABOVE GATES.	UNDATED	NONE	H 54.2, W 41.2 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[M]	SECTIONS IN PAWTUCKET CANAL / ABOVE GATES.	UNDATED	NONE	H 54.2, W 41.2 CM	INK, COLORED INK, GRAPHITE	PAPER
143-008-[N]	SECTIONS TAKEN IN PAWTUCKET CANAL / ABOVE GATES AT O. G. LOCKS.	UNDATED	NONE	H 54.2, W 41.2 CM	INK, COLORED INK	PAPER
143-008-[O]	SECTIONS TAKEN IN PAWTUCKET / CANAL ABOVE GATES AT O. G. LOCKS.	1902/10/29	NONE	H 48.2, W 36.8 CM	INK, COLORED INK	PAPER
143-009-[A]	PLAN OF / NORTHERN CANAL / SHOWING / POSITION OF SECTIONS [FROM SUFFOLK ST. BRIDGE TO GATE HOUSE AT SCHOOL ST.] TRACED FROM LARGE PLAN OF CANAL.	1901/04/00	1"=100'	H 77, W 119.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
143-009-[B]	SECTIONS IN NORTHERN CANAL. / LEVELS IN 1899.	SEE NOTES	NONE	H 56, W 92.8 CM	INK, GRAPHITE	CLOTH BACKED PAPER

143-010	DIAGRAM / SHOWING AREAS OF CROSS SECTIONS [AT DIFFERENT HEIGHTS] IN / NORTHERN CANAL.	1901/04/05	NONE	H 56.3, W 95.9 CM	INK, COLORED INK	PAPER
143-011-[A]	PLAN OF / MERRIMACK CANAL [WALLS FROM SWAMP LOCKS BASIN TO MERRIMACK WASTEWAY] / SHOWING / POSITION OF SECTIONS TRACED FROM LARGE PLAN OF CANALS.	1901/05/00	1"=100'	H 38.5, W 98.5 CM	INK, WATER COLOR	DRAFTING CLOTH
143-011-[B]	SECTIONS / IN / MERRIMACK CANAL / FROM / L. M. S. LOCKING GATES / TO / MERRIMACK TOWER / LOOKING TOWARDS MERRIMACK MFG. CO.	SEE NOTES	1"=10'	H 92.8, W 56.5 CM	INK, GRAPHITE	CLOTH BACKED PAPER
143-011-[C]	SECTIONS / IN / MERRIMACK CANAL / FROM / L. M. S. LOCKING GATES / TO / MERRIMACK MFG. CO.	SEE NOTES	NONE	H 92.8, W 56.5 CM	INK, GRAPHITE	CLOTH BACKED PAPER
143-011-[D]	SECTIONS / IN / MERRIMACK CANAL / FROM / L. M. S. LOCKING GATES / TO / MERRIMACK TOWER / LOOKING TOWARDS MERRIMACK MFG. CO.	SEE NOTES	NONE	H 92.8, W 56.5 CM	INK	CLOTH BACKED PAPER
143-012-[A]	SECTIONS IN PAWTUCKET CANAL / BETWEEN SCHOOL ST. & THE / N. & L. R. R. BRIDGE [ON LINE OF PROPOSED WALL OPPOSITE DOHERTY'S FOUNDRY, TOGETHER WITH SKETCH OF THE JOINING OF THE OLD WALL ON NORTH SIDE OF CANAL WITH THE PROPOSED NEW WALL].	1900/02/00	1"=10'	H 56.8, W 93.5 CM	INK	CLOTH BACKED PAPER

143-012-[B]	JOINING OF THE OLD NORTH SIDE OF THE PAWTUCKET CANAL & PROPOSED / NEW WALL, ABOUT 433 FEET DOWN STREAM FROM SCHOOL STREET.	1900/02/08	1"=4'	H 23, W 91.4 CM	INK, GRAPHITE	PAPER
143-013	[DIAGRAM SHOWING] GRADES OF CELLARS [OF HOUSES] ON FORD ST. / BETWEEN CABOT & SUFFOLK STREETS.	1898/00/00	NONE	H 56.2, W 149.3 CM	INK, GRAPHITE	PAPER
143-014	PLAN & SECTIONS / OF / PAWTUCKET CANAL NEAR / [JUST BELOW] OLD GUARD LOCKS.	1898/04/13	1"=10'	H 66, W 65 CM	INK, COLORED INK	DRAFTING CLOTH
143-015	SECTIONS OF LOWER PAWTUCKET [& EASTERN] CANAL[S] / FROM [JUST ABOVE] CENTRAL ST. [BRIDGE TO BOOTT FLUME] MOST OF THEM AT POINTS WHERE GAUGES HAVE BEEN PUT UP. AREAS & WETTED PERIMETERS ARE AT HEIGHTS OF THE CANAL CORRESPONDING TO A [...SEE NOTES]	1897/07/14	NONE	H 84, 56.2 CM	INK, WATER COLOR	PAPER
143-016	PAWTUCKET CANAL / SECTIONS ON RIGHT SIDE / UNDER "RED BRIDGE" FOR / PROPOSED RAMP.	1900/11/25	NONE	H 45.8, W 58.9 CM	INK, GRAPHITE	PAPER
143-017	SECTIONS IN EASTERN CANAL / [FROM 20 TO 370 FEET] BELOW / [MASSACHUSETTS NEW MILL NEAR] EAST MERRIMACK ST. / TAKEN DEC. 1,1918.	1918/12/01	1"=10'	H 38.2, W 61 CM	INK	DRAFTING CLOTH
143-018	SECTIONS IN WESTERN CANAL / BETWEEN / DUTTON ST. & KITSON'S OVERHEAD BRIDGE.	1918/03/16	1"=10'	H 50.9, W 50.9 CM	INK, COLORED INK	DRAFTING CLOTH

143-019	[PLAN SHOWING LOCATION OF] SECTIONS ON PAWTUCKET CANAL / BETWEEN PAWTUCKET ST. & OLD GUARD LOCKS.	1919/04/08	1"=150'	H 46, W 56 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
143-020-[A]	REPAIRS TO WALL, EASTERN CANAL.	1917/06/12	NONE	H 27.7, W 21.2 CM	INK	PAPER
143-020-[B]	[SKETCH SHOWING REPAIRS TO] SECTION OF WALL [ON] L. H. SIDE / [OF EASTERN CANAL] 190 FEET BELOW EAST MERRIMACK ST. [TOGETHER WITH SECTIONS OF THAT PART OF CANAL WHERE WALL IS BEING REPAIRED OPPOSITE MASSACHUSETTS RACKS.]	1917/06/12	NONE	H 20.5, W 25.4 CM	INK	DRAFTING CLOTH
143-020-[C]	[UNTITLED.[ ]PLAN SHOWING SECTION OF EASTERN CANAL WALL.]	SEE NOTES	NONE	H 32.8, W 32.2 CM	GRAPHITE	DRAFTING CLOTH
143-020-[D]	SECTIONS IN EASTERN CANAL / OPPOSITE MASSACHUSETTS UPPER RACKS.	1917/06/18	NONE	H 58.2, W 54.3 CM	INK, COLORED INK	DRAFTING CLOTH
143-020-[D]-[COPY 1]	SECTIONS IN EASTERN CANAL / OPPOSITE MASSACHUSETTS UPPER RACKS.	1917/06/18	NONE	H 57.6, W 54 CM	BLUEPRINT, COLORED PENCIL	PAPER
143-020-[D]-[COPY 2]	SECTIONS IN EASTERN CANAL / OPPOSITE MASSACHUSETTS UPPER RACKS.	1917/06/18	NONE	H 57.6, W 54 CM	BLUEPRINT, COLORED PENCIL	PAPER
143-021	SECTIONS / OF / MERRIMACK CANAL WALLS / BETWEEN / MOODY ST. FEEDER & MERRIMACK MILLS / LOOKING DOWNSTREAM.	1916/06/25	HORIZ. 4/10"=1'	H 98.2, W 55 CM	INK, GRAPHITE	DRAFTING CLOTH
143-021-[COPY 1]	SECTIONS / OF / MERRIMACK CANAL WALLS / BETWEEN / MOODY ST. FEEDER & MERRIMACK MILLS / LOOKING DOWNSTREAM.	1916/06/25	HORIZ. 4/10"=1'	H 98.2, W 55 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER

143-022	SECTION OF / PAWTUCKET CANAL WALL / UNDER ARMOUR BUILDING.	1917/09/13	NONE	H 30.5, W 21.7 CM	BLUEPRINT	PAPER
143-023	SECTIONS TAKEN IN PAWTUCKET CANAL / ABOVE GATES AT O. G. LOCKS [(LOOKING DOWNSTREAM) AS IN APRIL, 1919 (SHOWN IN BLACK) & IN OCTOBER, 1902 (SHOWN IN RED)].	SEE TITLE	NONE	H 71.3, W 63.5 CM	INK, COLORED INK	DRAFTING CLOTH
143-024	SECTIONS TAKEN IN LOWER PAWTUCKET CANAL [FROM THE LOWER END OF HAMILTON # 7 MILL (SECT. # 1) DOWNSTREAM AT 50 FEET INTERVALS TO JUST ABOVE HAMILTON WASTEWAY].	1919/05/18	NONE	H 84, W 56.2 CM	INK	PAPER
143-025	SECTIONS ON SOUTHERLY BANK OF PAWTUCKET CANAL / UPSTREAM FROM FLETCHER ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/06/30	1"=10'	H 51.5, W 101 CM	INK	DRAFTING CLOTH
143-026	SECTIONS UNDER NORTH ABUTMENT / [OF] FLETCHER ST. BRIDGE [OVER PAWTUCKET CANAL] / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1919/06/28	1"=10'	H 51, W 43.2 CM	INK, COLORED INK	DRAFTING CLOTH
143-027	SECTIONS TAKEN NOV. 9,1919 / IN / LOWER PAWTUCKET & EASTERN CANALS [FROM SACO-LOWELL SHOPS LOWER CANAL GAUGE TO UPPER SIDE OF BRIDGE ST.] / BY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/11/09	1"=10'	H 58.2, W 48.7 CM	INK	DRAFTING CLOTH
143-028	MERRIMACK CANAL / FROM / SWAMP LOCKS TO SACO-LOWELL SHOPS # 5 RACK / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/03	1"=10'	H 53.5, W 84 CM	INK, COLORED INK	DRAFTING CLOTH

143-029	[DIAGRAM SHOWING] SECTIONS / AT / FLUME IN WESTERN CANAL [BETWEEN MERRIMACK STRET AND MARKET STREET WITH AREAS AT DIFFERENT HEIGHTS TO A MEAN OF SIX SECTIONS].	1895/03/31	1"=10'	H 45.7, W 58.5 CM	INK, COLORED INK, GRAPHITE	PAPER
143-029-[A]	DIAGRAM SHOWING AREAS AT / DIFFERENT HEIGHTS OF A MEAN OF / SIX SECTIONS, 20 FT. APART, IN THE WESTERN CANAL, BETWEEN MARKET / AND MERRIMACK STREETS.	1895/07/13	NONE	H 29.5, W 38.7 CM	INK, COLORED INK	PAPER
143-030	[DIAGRAM OF] SECTIONS / IN / MERRIMACK CANAL / BETWEEN / MARKET ST. / & / LOWELL MACHINE SHOP.	1895/07/17	NONE	H 45.3, W 58.5 CM	INK, COLORED INK	PAPER
143-030-[A]	DIAGRAM SHOWING AREAS AT DIFFERENT / HEIGHTS OF A MEAN OF THREE SECTIONS TEN FT. APART, IN MERRIMACK CANAL BETWEEN THE / LOWELL MACH. SHOP & MARKET ST., USED AS A MEASURING FLUME.	1895/07/17	NONE	H 29.2, W 47 CM	INK	PAPER
143-031	DIAGRAM [& SECTIONS OF FLUME] SHOWING AREAS AT / DIFFERENT HEIGHTS OF A MEAN / OF SIX SECTIONS, 20 FT. APART, IN / PAWTUCKET CANAL NEAR SCHOOL ST. BRIDGE.	1895/07/13	NONE	H 27, W 39 CM	INK, GRAPHITE	PAPER
143-031-[A]	SECTIONS / AT / FLUME IN PAWTUCKET CANAL.	1895/03/31	NONE	H 45.8, W 58.5 CM	INK, COLORED INK	PAPER
143-032	[TRACING SHOWING] SECTIONS OF LOWER PAWTUCKET [& EASTERN] CANAL[S] / AT GAUGES.	1913/05/00	NONE	H 71.6, W 56 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

143-032-[COPY 1]	SECTIONS OF LOWER PAWTUCKET [& EASTERN] CANAL[S] / AT GAUGES.	1913/05/00	NONE	H 71.6, W 56 CM	BLUEPRINT, COLORED INK	PAPER
143-033	[SKETCH OF] CROSS SECTION OF NORTH SIDE, [UPPER] PAWTUCKET CANAL / NEAR PLUSH MILL.	UNDATED	H1"=10'	H 24.8, W 77.8 CM	INK, COLORED INK	PAPER
143-034	[SECTIONS IN EASTERN CANAL NEAR MASSACHUSETTS WASTEWAY.]	1923/08/12				
143-035	PLAN SHOWING / CONCRETE WALLS ALONG THE MERRIMACK CANAL / ON BOTH SIDES OF MARKET ST. / CONSTRUCTED IN SUMMER OF 1921.	1921/09/00	1"=20'	H 24.3, W 56.5 CM	INK	DRAFTING CLOTH
143-035-[COPY 1]	PLAN SHOWING / CONCRETE WALLS ALONG THE MERRIMACK CANAL / ON BOTH SIDES OF MARKET ST. / CONSTRUCTED IN SUMMER OF 1921.	1921/09/00	1"=20'	H 24.3, W 56.5 CM	BLUEPRINT	PAPER
143-036	SECTIONS IN EASTERN CANAL / NEAR MASSACHUSETTS WASTEWAY.	1923/08/12	NONE	H 56.5, W 76.3 CM	INK	PAPER
143-037	SECTIONS OF RIGHT HAND BANK / OF / WESTERN CANAL / BETWEEN / JEFFERSON ST. & BROADWAY BRIDGES.	1926/04/00	1"=10'	H 56.2, W 102 CM	INK, COLORED PENCIL	PAPER
143-038	SECTIONS OF RIGHT HAND BANK / OF WESTERN CANAL / BETWEEN / JEFFERSON ST. & MARKET ST. BRIDGES.	1926/06/00	1"=10'	H 56.2, W 127.2 CM	INK, COLORED INK, COLORED PENCIL	PAPER
143-039	[SKETCH SHOWING] ELEVATION OF WALL [ON WESTERLY SIDE] OF WESTERN CANAL FROM / JEFFERSON ST. TO BROADWAY.	1928/06/01	NONE	H 8, W 88.4 CM	INK, GRAPHITE	DRAFTING CLOTH

143-040	[SKETCH SHOWING] ELEVATION OF WEST WALL OF WESTERN CANAL / FROM BROADWAY TO RYAN'S FOUNDRY.	1928/06/05	NONE	H 33.3, W 93.7 CM	INK, GRAPHITE	DRAFTING CLOTH
143-041	PLAN, SECTIONS & ELEVATIONS / BETWEEN / SHEER WALL & UPPER LOCK / AT / LOWER LOCKS DAM.	1941/11/12	1"=10'	H 45.6, W 64.1 CM	INK, COLORED INK	DRAFTING CLOTH
143-041-[COPY 1]	PLAN, SECTIONS & ELEVATIONS / BETWEEN / SHEER WALL & UPPER LOCK / AT / LOWER LOCKS DAM.	1941/11/12	1"=10'	H 45, W 63.5 CM	BLUEPRINT	PAPER
143-042	MAP SHOWING / PROPRIETORS OF THE LOCKS & CANALS / CANAL SYSTEM / & PORTION OF / MERRIMACK & CONCORD RIVERS LOWELL, MASSACHUSETTS [FOR STUDIES BY A. T. SAFFORD IN CONNECTION WITH AUTOMATIC CONTROLS OF WATER IN CANALS].	1941/07/00	1/8"=50'[SEE NOTES]	H 63.4, W 77 CM	NEGATIVE PHOTOSTAT	PAPER
143-043	PLATFORM OVER CANAL / WORLD FURNITURE / CENTRAL STREET-LOWELL, MASS.	1953/09/30	1/4"=1'	H 75, W 90 CM	BLUE LINE PRINT	PAPER
144-[030]	DIAGRAM / SHOWING DISCHARGE OF GATE / AT / SWAMP LOCKS.	UNDATED	NONE	H 28, W 43.3 CM	INK, COLORED INK	PAPER
144-[031]	DISCHARGE DIAGRAM / FOR / WIDE GATE AT SWAMP LOCKS.	UNDATED	NONE	H 28, W 43.3 CM	INK	PAPER
144-[032]	HOIST FOR RIVER BARGE / LOCKS & CANALS / LOWELL, MASS. / HOISTING MECHANISM FOR RIVER BARGE.	1964/04/20	VARIOUS	H 69, W 97.2 CM	GRAPHITE	PAPER
144-001-A	DESIGN FOR SOUTH ABUTMENT / AT / SUFFOLK ST. BRIDGE [ON NORTHERN CANAL].	1898/06/03	NONE	H 21.6, W 17.8 CM	INK, COLORED INK, COLORED PENCIL	PAPER

144-001-B	LOOKING DOWNSTREAM / DESIGN FOR BANK WALLS / FOR / PAWTUCKET CANAL.	1897/08/12	NONE	H 18, W 21.6 CM	INK, COLORED INK, GRAPHITE	PAPER
144-001-C	DESIGN FOR CANAL WALL.	SEE NOTES	NONE	H 34.4, W 58.7 CM	GRAPHITE	PAPER
144-001-D	DESIGN FOR REBUILDING OUTLETS OF SUFFOLK MILLS EASTERLY RACE.	1894/04/00	1"=1'	H 60, W 100.7 CM	INK, COLORED INK, WATER COLOR	PAPER
144-001-E-[1]	[DESIGNS FOR] WALL[S] ON [NORTH &] SOUTH SIDE[S] OF HAMILTON / CANAL TO BE BUILT LIKE THIS AT / THE UPSTREAM END.	1894/00/00	NONE	H 30.3, W 21 CM	GRAPHITE	PAPER
144-001-E-[2]	WALL SOUTH SIDE OF / HAMILTON CANAL FOR / PLACES WHERE THERE IS NO LEDGE TO BUILD ON.	1894/08/28	NONE	H 26.6, W 16.6 CM	INK, GRAPHITE	PAPER
144-001-E-[3]	DESIGN FOR WALL ON / SOUTH SIDE HAMILTON CANAL.	1894/08/04	NONE	H 22.9, W 16.6 CM	INK, GRAPHITE	PAPER
144-001-E-[4]	DESIGN FOR WALL ON NORTH SIDE OF HAMILTON CANAL / LOWELL.	1894/05/24	1/2"=1'	H 26.2, W 28 CM	INK, COLORED INK, WATER COLOR	PAPER
144-001-E-[5]	WALL, SOUTH SIDE OF / HAMILTON CANAL / FOR PLACES WHERE THERE IS NO BRIDGE TO BUILD ON.	1894/08/23	NONE	H 30.5, W 29 CM	INK, WATER COLOR, GRAPHITE	PAPER
144-001-F	DESIGN OF HUNTS FALLS ON MERRIMACK RIVER BEING BUILT DURING WINTER OF 1896-97.	SEE TITLE	NONE	H 45.8, W 58.4 CM	GRAPHITE , COLORED PENCIL	PAPER
144-001-G	DESIGN FOR REBUILDING ONE OF THE OUTLETS OF SUFFOLK MILLS EASTERLY RACE.	1894/00/00	NONE	H 61, W 103 CM	GRAPHITE , COLORED INK, WATER COLOR	PAPER

144-001-H	[SKETCHES OF THE] NORTHWESTERLY OUTLETS OF SUFFOLK NOS. 3 & 4 RACEWAY INTO LAWRENCE CANAL / SOUTH EASTERLY OUTLETS OF SUFFOLK NOS.1 & 2 RACEWAY INTO LAWRENCE CANAL.	1894/03/19	1"=2'	H 60.8, W 36.2 CM	INK, COLORED INK	PAPER
144-001-I	DESIGN FOR REBUILDING SUFFOLK MILLS EASTERLY RACE.	1894/04/04	1"=2', 1/2"=1'	H 60.8, W 48.3 CM	GRAPHITE	PAPER
144-002	SECTIONS AT / SWAMP LOCKS BASIN.	1902/01/00	1"=10'	H 56.3, W 77.8 CM	INK, COLORED INK	PAPER
144-003	PLAN OF / EXPERIMENTAL FLUME / AT SWAMP LOCKS.	1897/01/23	1/2"=1'	H 75.3, W 114.4 CM	INK, COLORED INK, WATER COLOR	PAPER
144-003-[COPY 1]	PLAN OF / EXPERIMENTAL FLUME / AT SWAMP LOCKS.	1897/07/23	1/2"=1'	H 74, W 108 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
144-003-[COPY 2]	PLAN OF / EXPERIMENTAL FLUME / AT SWAMP LOCKS.	1897/07/23	1/2"=1'	H 74.7, W 108.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
144-003-A	EXPERIMENTAL FLUME / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1897/07/23	1/2"=1'	H 50.5, W 65.5 CM	INK, COLORED INK	DRAFTING CLOTH
144-004	[SKETCH OF APRON OF] SWAMP LOCKS DAM [BEFORE REPAIRS], LOWELL, MASS.	1894/01/04	1"=5'	H 56, W 65 CM	INK, COLORED INK, WATER COLOR	PAPER
144-005-[A]	[UNTITLED.] [DIAGRAMS SHOWING RESULTS OF EXPERIMENTS AT SWAMP LOCKS EXPERIMENTAL FLUME.]	UNDATED	NONE	H 56.3, W 75.6 CM	INK	PAPER

144-005-[B]	[PLAN OF] EXPERIMENTAL FLUME AT SWAMP LOCKS / DIAGRAM SHOWING OUTLINE OF BOTTOM OF FLUME / UNDER DIFFERENT CONDITIONS.	1898/03/02	1/2"=1'	H 56.3, W 75.6 CM	INK, GRAPHITE	PAPER
144-005-[C]	CONDITION A. FLUME AS BUILT. (NO FLARE AT / MOUTH OF NARROW PART OF FLUME.)	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[D]	CONDITION B. FLARING SIDES & BOTTOM AT MOUTH OF NARROW PART OF FLUME. / 5 TO 1 SLOPE.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[E]	CONDITION C. FLARING SIDES & BOTTOM AT MOUTH OF NARROW PART OF FLUME. / SIDES 10 TO 1 & BOTTOM 5 TO 1 SLOPE.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[F]	CONDITION D. FLARING SIDES (10 TO 1 SLOPE) & BOTTOM (5 TO 1 SLOPE) / & TOP OF FLUME PARTLY COVERED.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[G]	CONDITION D-1. FLARING SIDES & BOTTOM (10 TO 1 SLOPE) AT MOUTH OF / NARROW PART OF FLUME & TOP PARTLY COVERED.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[H]	CONDITION E. FLARING SIDES & BOTTOM (10 TO 1 SLOPE) AT MOUTH OF NARROW / PART OF FLUME & COVER REMOVED.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[I]	CONDITION F. FLARING SIDES & BOTTOM (10 TO 1 SLOPE) AT (5 TO 1 SLOPE) & CLEATS / NAILED ON SIDES & BOTTOM.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER
144-005-[J]	CONDITION F-1 FLARING SIDES (10 TO 1 SLOPE) & BOTTOM (5 TO 1 SLOPE) & CLEATS / NAILED ON SIDES & BOTTOM.	UNDATED	NONE	H 56.3, W 75.6 CM	INK, COLORED INK	PAPER

144-005-[K]	CONDITION G. FLUME AS FIRST BUILT (NO FLARE AT MOUTH OF NARROW FLUME) / & CLEATS NAILED ON SIDES & BOTTOM / OF NARROW FLUME.	1898/03/02	NONE	H 56, W 75.6 CM	INK, GRAPHITE	PAPER
144-006-01	PLAN OF / PAWTUCKET CANAL / FROM / KYANIZING HOUSE / TO / THORNDIKE ST.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-006-02	PLAN OF / PAWTUCKET CANAL / FROM / MERRIMACK RIVER / TO / KYANIZING HOUSE.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-006-03	PLAN OF / NORTHERN CANAL / FROM / SCHOOL ST. / TO / MOODY ST.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-006-04	PLAN OF / NORTHERN & WESTERN CANALS / FROM / MOODY ST. / TO / MARKET ST.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-006-05	PLAN OF / WESTERN CANAL / FROM / MARKET ST. TO / SWAMP LOCKS.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-006-06	PLAN OF LOWER / PAWTUCKET CANAL / FROM / SWAMP LOCKS / TO / BRIDGE ST.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-006-07	PLAN OF / MERRIMACK CANAL / FROM / LOWELL MACHINE SHOP TO END / AND / EASTERN CANAL / FROM / BRIDGE ST. TO END.	1901/05/00	1"=100'	H 33.4, W 83 CM	INK, WATER COLOR	DRAFTING CLOTH
144-007	PLAN OF THE / SWAMP LOCKS BASIN / IN THE / PAWTUCKET CANAL [SHOWING CONTOURS & ADJOINING PROPERTY].	1889/01/26	1"=20'	H 106.1, W 57 CM	INK, WATER COLOR	PAPER
144-008	MERRIMACK MEASURING FLUME / LOWELL, MASS. [WITH AN AVERAGE SECTION OF SAME].	1915/05/24	1/8"=1'	H 43.4, W 58.5 CM	INK	DRAFTING CLOTH

144-009-[H]	DIAGRAM SHOWING HORSE POWER / WITH 13' FALL & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATE OF 12" L.H. SMITH McCORMICK WHEEL / BELONGING TO HARVARD UNIVERSITY / TESTED AT SWAMP LOCKS, LOWELL, MASS, MAY 18, JUNE 4,1915.	SEE TITLE	NONE	H 45.8, W 29 CM	INK, COLORED INK	PAPER
144-009-[I]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED / WITH 13' FALL, & DIFFERENT SPEEDS & OPENINGS OF THE SPEEDGATE OF 12" L.H. SMITH McCORMICK WHEEL / (BELONGING TO HARVARD UNIVERSITY) / TESTED AT SWAMP LOCKS MAY 18, JUNE 4,1915.	SEE TITLE	NONE	H 45.8, W 29 CM	INK, COLORED INK	PAPER
144-009-[J]	[UNTITLED, UNFINISHED PLAN.]	UNDATED	NONE	H 29, W 45.8 CM	INK, GRAPHITE	PAPER
144-009-[K]	[UNTITLED, UNFINISHED PLAN.]	UNDATED	NONE	H 45.8, W 29 CM	INK, GRAPHITE	PAPER
144-009-[L]	DIAGRAM SHOWING PER CENT / OF EFFICIENCY / WITH 13' FALL, & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATE OF 12" L.H. SMITH McCORMICK WHEEL / (BELONGING TO HARVARD UNIVERSITY) / TESTED AT SWAMP LOCKS MAY 18, JUNE 4, 1915.	SEE TITLE	NONE	H 45.8, W 29 CM	INK, COLORED INK	PAPER

144-009-[M]	COMPLETE SCROLL / DIAGRAM / SHOWING THE EFFICIENCY FOR 13 FT. FALL OF / 12 IN. L.H. SMITH-McCORMICK WHEEL / BELONGING TO HARVARD UNIVERSITY) / FOR DIFFERENT SPEEDS & GATE OPENINGS.	UNDATED	NONE	H 45.8, W 29 CM	INK	PAPER
144-009-[N]	12" WHEEL TESTS AT SWAMP LOCKS. / LOWELL, MASS.	UNDATED	NONE	H 25.1, W 20.2 CM	INK	PAPER
144-009-[O]	TEST NUMBER / SHOWING FLUCTUATIONS IN W.L.	1915/06/24	NONE	H 30.5, W 21.5 CM	GRAPHITE	PAPER
144-009-[P]	DIAGRAM / SHOWING THE EFFICIENCY AT 13 FT. FALL / OF 12 IN. L.H. SMITH-McCORMICK / WATER-WHEEL / (BELONGING TO HARVARD UNIVERSITY) / FOR DIFFERENT SPEEDS & GATE OPENINGS. / TEST AT SWAMP LOCKS JUNE 16, 1915.	1915/08/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[Q]	DIAGRAM / SHOWING THE EFFICIENCY AT 13 FT. FALL / OF 12 IN. L.H. SMITH-McCORMICK / WATER-WHEEL / (BELONGING TO HARVARD UNIVERSITY). / FOR DIFFERENT SPEEDS & GATE OPENINGS. / TEST AT SWAMP LOCKS AUG. 13, 1915.	1915/08/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[R]	DIAGRAM / SHOWING THE EFFICIENCY AT 13 FT. FALL / OF 12 IN. L.H. SMITH-McCORMICK / WATER-WHEEL / (BELONGING TO HARVARD UNIVERSITY). / FOR DIFFERENT SPEEDS & GATE OPENINGS. / TEST AT SWAMP LOCKS AUG. 13, 1915.	1915/08/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER

144-009-[S]	DIAGRAM / SHOWING THE EFFICIENCY AT 13 FT. FALL / OF 12 IN. L.H. SMITH-McCORMICK / WATER-WHEEL / (BELONGING TO HARVARD UNIVERSITY). / FOR DIFFERENT SPEEDS & GATE OPENINGS. / TEST AT SWAMP LOCKS JUNE 30, 1915.	1915/08/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[T]	DIAGRAM / SHOWING THE EFFICIENCY AT 13 FT. FALL / OF 12 IN. L.H. SMITH-McCORMICK / WATER-WHEEL / (BELONGING TO HARVARD UNIVERSITY) FOR DIFFERENT SPEEDS & GATE OPENINGS. / TEST AT SWAMP LOCKS JUNE 9,1915.	1915/08/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[U]	DIAGRAM / SHOWING THE EFFICIENCY AT 13 FT. FALL / OF 12 IN. L.H. SMITH-McCORMICK / WATER-WHEEL / (BELONGING TO HARVARD UNIVERSITY) FOR DIFFERENT SPEEDS & GATE OPENINGS. / TEST AT SWAMP LOCKS JULY 12,1915.	1915/08/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[V]	FULL DEPTH SCROLL / JUNE 24 / SHOWING PIEZOMETER & GAUGE READINGS / IN / WATERWAY & SCROLL.	UNDATED	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[W]	TACOMETER RATING. COMPARISON / OF / PIEZOMETER & GAUGE READINGS / IN / WATERWAY / 12" SMITH McCORMICK WHEEL TESTS AT SWAMP LOCKS.	UNDATED	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
144-009-[X]		1915/06/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER

144-009-[Y]	APPROXIMATE LAYOUT OF SCROLL / FOR 12" "SMITH" WATER-WHEEL AT / SWAMP LOCKS.	1915/06/16	1/2"=1'	H 28, W 39.7 CM	INK, COLORED INK	TRACING PAPER
144-009-[Y]-[COPY 1]	APPROXIMATE LAYOUT OF SCROLL / FOR 12" "SMITH" WATER-WHEEL AT / SWAMP LOCKS.	1915/06/16	1/2"=1'	H 28, W 39.7 CM	BLUEPRINT	PAPER
144-009-[Z]	SKETCH SHOWING / APPROXIMATE LOCATION OF PIEZOMETERS / IN WATERWAY FOR 12" "SMITH" WATER-WHEEL / AT SWAMP LOCKS.	1915/06/24	NONE	H 28, W 39.7 CM	INK	TRACING PAPER
144-009-[Z]-[COPY 1]	SKETCH SHOWING / APPROXIMATE LOCATION OF PIEZOMETERS / IN WATERWAY FOR 12" "SMITH" WATER-WHEEL / AT SWAMP LOCKS.	1915/06/24	NONE	H 28, W 39.7 CM	BLUEPRINT	PAPER
144-009-[Z]-[COPY 2]	SKETCH SHOWING / APPROXIMATE LOCATION OF PIEZOMETERS / IN WATERWAY FOR 12" "SMITH" WATER-WHEEL / AT SWAMP LOCKS.	1915/06/24	NONE	H 28, W 39.7 CM	BLUEPRINT	PAPER
144-009-[ZA]	APPROXIMATE LAYOUT OF SCROLL / FOR 12" "SMITH" WATER-WHEEL AT / SWAMP LOCKS.	1915/06/28	1/2"=1'	H 27.5, W 40	INK	TRACING PAPER
144-009-[ZA]-[COPY 1]	APPROXIMATE LAYOUT OF SCROLL / FOR 12" "SMITH" WATER-WHEEL AT / SWAMP LOCKS.	1915/06/28	1/2"=1'	H 27.5, W 40	BLUEPRINT	PAPER
144-009-[ZB]	RATING / OF / LOCKS & CANALS / BUFF & BUFF CURRENT METER # 8163.	1914/05/01	NONE	H 33.3, W 33.3 CM	BLUEPRINT	PAPER
144-009-[ZC]	VACUUM GAUGES AT / SWAMP LOCKS WHEELS.	UNDATED	NONE	H 14, W 8.9 CM	GRAPHITE	PAPER
144-009-A-[01]	TEST OF A 12 INCH L.H. SMITH-McCORMICK TURBINE WHEEL AT THE SWAMP LOCKS, LOWELL MASS.	UNDATED	NONE	H 45.8, W 29 CM	INK, COLORED INK	PAPER

144-009-A-[02]	TEST OF A 12 INCH L.H. SMITH-McCORMICK TURBINE WHEEL, AT THE SWAMP LOCKS, LOWELL, MASS. / ON JULY 12, 1915 FROM 2:44 P.M. TO 5:00 P.M.	1915/07/12	NONE	H 45.8, W 29 CM	BLUE LINE PRINT, INK	PAPER
144-009-A-[03]	TEST OF A 12 INCH L.H. SMITH-McCORMICK TURBINE WHEEL, AT THE SWAMP LOCKS, LOWELL, MASS. / ON JUNE 9, 1915 FROM 10:07 TO 2:39.	SEE TITLE	NONE	H 45.8, W 29 CM	BLUE LINE PRINT, INK, COLORED INK	PAPER
144-009-A-[04]	TEST OF A 12 INCH L.H. L.H. SMITH-McCORMICK TURBINE WHEEL AT THE SWAMP LOCKS, LOWELL, MASS. / ON__19__FROM__TO__.	UNDATED	NONE	H 45.8, W 29 CM	INK, COLORED INK	PAPER
144-009-A-[04]-[COPY 1]	TEST OF A 12 INCH L.H. SMITH-McCORMICK TURBINE WHEEL, AT THE SWAMP LOCKS, LOWELL, MASS. / ON__19__FROM__TO__.	UNDATED	NONE	H 45.8, W 29 CM	PHOTOCOPY	PAPER
144-009-A-[04]-[COPY 2]	TEST OF A 12 INCH L.H. SMITH-McCORMICK TURBINE WHEEL, AT THE SWAMP LOCKS, LOWELL, MASS. / ON__19__FROM__TO__.	UNDATED	NONE	H 45.8, W 29 CM	PHOTOCOPY	PAPER
144-009-A-[05]	SCROLL FULL DEPTH OF FLUME / DIAGRAM / SHOWING THE EFFICIENCY FOR 13 FEET FALL OF / 12 INCH L.H. SMITH-McCORMICK WHEEL / (BELONGING TO HARVARD UNIVERSITY) / FOR DIFFERENT SPEEDS & GATE OPENINGS / TEST AT SWAMP LOCKS, JUNE 9 & 16,1915.	SEE TITLE	NONE	H 45.8, W 29 CM	INK	PAPER

144-009-A-[06]	OPEN FLUME / DIAGRAM / SHOWING THE EFFICIENCY FOR 13 FEET FALL OF / 12 INCH L.H. SMITH-McCORMICK WHEEL / BELONGING TO HARVARD UNIVERSITY) / FOR DIFFERENT SPEEDS & GATE OPENINGS / TEST AT SWAMP LOCKS, JUNE 9 & 16,1915.	SEE TITLE	NONE	H 45.8, W 29 CM	INK	PAPER
144-009-B	[DIAGRAM SHOWING] SWAMP LOCKS / CURRENT METER MEASUREMENT / STA. 50 UPPER LOCK / DISCHARGE THRU MIDDLE PADDLE GATES / GATE OPEN FULL.	1921/03/31	NONE	H 21.5, W 28 CM	INK	PAPER
144-009-C	[DIAGRAM SHOWING] SWAMP LOCKS PADDLE GATES / ROD FLOAT MEASUREMENTS.	1921/04/04	UNDATED	H 46, W 29 CM	INK	PAPER
144-009-D	[DIAGRAM SHOWING] VELOCITY VARIATIONS / [AT] SWAMP LOCKS UPPER CHAMBER / DISCHARGE THRU BOTH [MIDDLE] PADDLE GATES [GATE FULL OPEN] / METER NO. 8163 AT STATION 50.	1921/04/04	NONE	H 29, W 46 CM	INK	PAPER
144-009-E	VELOCITY VARIATIONS / MASS. DIAGRAM OF / TIME FOR FIVE REVOLUTIONS / OF CURRENT METER / [AT] SWAMP LOCKS UPPER CHAMBER-DISCHARGE THRU BOTH PADDLE GATES / METER NO.8163 AT STA. 50 / KENT & HAMILTON.	1921/04/04	NONE	H 29, W 46 CM	INK, COLORED INK, GRAPHITE	PAPER
144-009-F	PROPOSED DRAFT TUBES / FOR TESTING AT / SWAMP LOCKS.	1921/08/11	NONE	H 29, W 46 CM	INK, COLORED INK	PAPER

144-009-G	DIAGRAM SHOWING IN HALF DAYS THE / RELATION BETWEEN WASTE AT SWAMP / LOCKS & MERRIMACK DAM FROM MAY 1921 / TO SEPT. 15, 1922. GENERAL SURPLUS POWER / LIMITATION 200 (300)%.	SEE TITLE	NONE	H 29, W 46 CM	INK	PAPER
144-010-[A]	EXPERIMENTS AT SWAMP LOCKS / CAPACITY CURVE OF LOCK CHAMBERS / IN U.S. GALLONS.	1913/00/00	NONE	H 53.6, W 83.2 CM	GRAPHITE	PAPER
144-010-[B]	EXPERIMENTS AT SWAMP LOCKS, LOWELL, MASS. / -1914- / CAPACITY DIAGRAM / FOR / SMALL SECTION OF LOCK-CHAMBER.	1914/05/28	NONE	H 53.6, W 83.2 CM	INK	PAPER
144-010-[C]	[UNTITLED.] [SWAMP LOCKS EXPERIMENTS OF 1913 & 1914; CAPACITY DIAGRAMS & PLAN OF LOCK CHAMBER SHOWING EXPERIMENTAL APPARARTUS.]	SEE TITLE	NONE	H 57.2, W 61.6 CM	INK	PAPER
144-010-[D]	PLAN / OF / LOCK-CHAMBER AT SWAMP LOCKS. / LOWELL, MASS. / SHOWING / EXPERIMENTAL APPARATUS.	1914/04/09	1"=10'	H 67.2, W 85.3 CM	INK, COLORED INK	DRAFTING CLOTH
144-011-[A]	[PLAN & DIAGRAM SHOWING EXPERIMENTS AT] SWAMP LOCKS / LOCK CHAMBER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/21	1"=10'	H 36.7, W 57.5 CM	INK	DRAFTING CLOTH
144-011-[B]	SWAMP LOCKS / LOWER CHAMBER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/21	1"=10'	H 36.4, W 57 CM	BLUEPRINT, COLORED INK	PAPER
144-012-[A]	PLAN / SHOWING LOCATION OF SECTIONS / IN / PAWTUCKET CANAL / TAKEN / APRIL & MAY 1896.	SEE TITLE	1"=20'	H 60, W 90.2 CM	INK, COLORED INK	DRAFTING CLOTH

144-012-[B]	SECTIONS IN SWAMP LOCKS BASIN & PAWTUCKET CANAL.	1896/04/00	NONE	H 46, W 58.6 CM	INK	PAPER
144-012-[C]	SECTIONS IN SWAMP LOCKS BASIN & PAWTUCKET CANAL.	1896/04/00	NONE	H 46, W 58.6 CM	INK	PAPER
144-012-[D]	[UNTITLED.] [SECTIONS IN SWAMP LOCKS BASIN & PAWTUCKET CANAL.]	SEE NOTES	NONE	H 53.1, W 58.6 CM	INK	PAPER
144-013	[SKETCH SHOWING] SECTIONS OF LOCK CHAMBERS AT SWAMP LOCKS DAM [BASIN WITH PROPOSED CHANGES INDICATED IN RED].	1890/04/00	1/2"=1'	H 31.2, W 89.5 CM	INK, COLORED INK, GRAPHITE	PAPER
144-014	[DIAGRAM SHOWING] DRAIN THROUGH SWAMP LOCKS BASIN / SHOWING PROGRESS ON SAME IN 1895.	1895/00/00	NONE	H 45.8, W 58.5 CM	INK, COLORED INK	PAPER
144-015-[A]	SWAMP LOCKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/02/08	1"=10'	H 51.5, W 89 CM	INK, COLORED INK	DRAFTING CLOTH
144-015-[B]	[PLAN OF] SWAMP LOCKS / ROCK CONTOURS BELOW DAM.	1922/02/08	1"=10'	H 29.4, W 38.2 CM	GRAPHITE	PAPER
144-015-[C]	LOWER PAWTUCKET CANAL / JUST BELOW SWAMP LOCKS.	SEE NOTES	NONE	H 42.2, W 52.1 CM	GRAPHITE	PAPER
144-016	SWAMP LOCKS / [PLAN OF] PROPOSED GATES & STATION / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/04/21	1/4"=1'	H 54.4, W 62.3 CM	INK	DRAFTING CLOTH
144-016-[COPY 1]	SWAMP LOCKS / PROPOSED GATES & STATION / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/04/21	1/4"=1'& 1"=10'	H 54.4, W 62.3 CM	BLUEPRINT	PAPER
144-017	[UNTITLED.] [SCHEME FOR INSTALLATION OF TURBINES AT SWAMP LOCKS DAM. TWO UNITS LEFFEL TYPE Z OR I. P. MORRIS PROPELLER WHEELS.]	UNDATED	NONE	H 26, W 48.3 CM	BLUEPRINT, GRAPHITE	PAPER

144-018	[PLAN OF] PROPOSED DEVELOPMENT / AT / SWAMP LOCKS / FOR THE / APPLETON CO. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/03/00	1"=20'	H 36.3, W 56.5 CM	INK, COLORED INK, WATER COLOR	PAPER
144-019	[PLAN OF] SWAMP LOCKS FLUME / [AS USED IN] SUMMER 1922.	1924/03/28	1/2"=1'	H 52.2, W 64 CM	BLUEPRINT	PAPER
144-020	PLAN OF / SWAMP LOCKS DAM / SHOWING / CONTOURS IN FRONT OF DAM.	1927/10/00	1"=10'	H 45, W 55 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
144-021	PLAN & SECTIONS / OF / EASTERN CANAL / NEAR KEARNEY SQUARE & POST OFFICE [SHOWING 5' PASSAGEWAY, RACKS AND OVERHANGING CONCRETE WALL].	1931/10/16	1"=10'& 20'	H 66.1, W 92.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
144-022	PLAN & SECTIONS / FOR / PROPOSED CONCRETE FACE / ON WESTERLY WALL BELOW SWAMP LOCKS DAM.	1942/08/00	1"=5'	H 54.8, W 81.4 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
144-022-[A]	PLAN & SECTIONS / FOR / PROPOSED CONCRETE FACE / ON WESTERLY WALL BELOW SWAMP LOCKS DAM.	1942/08/00	1"=5'	H 54, W 81 CM	BLUEPRINT, COLORED PENCIL	PAPER
144-023	PLAN & SECTIONS / SHOWING / WASHOUT AT SWAMP LOCKS DAM / ALSO / NEW CONCRETE APRON.	1945/03/24	1/4"=1'	H 49.4, W 66.4 CM	INK, COLORED INK	DRAFTING CLOTH
144-024	TYPICAL SECTION OF / SWAMP LOCKS DAM / SHOWING / CONCRETE APRON.	1945/05/00	1/2"=1'	H 30.4, W 43.2 CM	INK, COLORED INK, COLORED PENCIL	PAPER

144-025	PLAN SHOWING / RIVER WALL IN REAR OF NO.415 PAWTUCKET ST. / OWNED BY V. J. VLAHOS OF LOWELL, MASS.	1955/04/14	1/8"& 1/4"=1'	H 28, W 37 CM	INK, COLORED PENCIL, COLORED INK	PAPER
144-025-[COPY 1]	PLAN SHOWING / RIVER WALL IN REAR OF / NO.415 PAWTUCKET ST. / OWNED BY V. J. VLAHOS OF LOWELL, MASS.	1955/04/14	1/8"& 1/4"=1'	H 26.1, W 36.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
144-026	SWAMP-LOCKS GATE.	SEE NOTES	1"=1'	H 61.4, W 48.6 CM	GRAPHITE	PAPER
144-026-[COPY 1]	SWAMP LOCKS GATE. / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1952/11/25	1"=1'	H 69.6, W 38.4 CM	BLUEPRINT	PAPER
144-027-[A]	SWAMP LOCKS DEEP GATE / ORIGINAL SET-UP / AS OF 6-5-64.	1964/06/05	NONE	H 87.8, W 76.2 CM	GRAPHITE	TRACING PAPER
144-027-[B]	[UNTITLED.] [SWAMP LOCKS DEEP GATE ORIGINAL SET-UP AS OF 6-5-64.]	UNDATED	NONE	H 44 W 60.7 CM	GRAPHITE	TRACING PAPER
144-027-[C]	[UNTITLED.] [SWAMP LOCKS DEEP GATE ORIGINAL SET-UP AS OF 6-5-64.]	UNDATED	NONE	H 45.7, W 56 CM	GRAPHITE	PAPER
144-028	SWAMP LOCKS / PUMP INLET SCREEN BOX.	1964/00/00	NONE	H 55.5, W 76.4 CM	GRAPHITE	PAPER
144-029	DRAWING OF / RACK GEAR / ON / SWAMP LOCKS WIDE GATE.	1959/02/12	FULL SIZE	H 44.4, W 60.4 CM	INK, COLORED INK	PAPER
144-029-[COPY 1]	DRAWING OF / RACK GEAR / ON / SWAMP LOCKS WIDE GATE.	1959/02/12	FULL SIZE	H 44.4, W 59.5 CM	BLUEPRINT	PAPER
145-[028]	PRELININARY CURVE SHOWING FREQUENCY / OF MERRIMACK RIVER FLOODS / BOOTT GAGE HEIGHTS VS. YEARS.	1936/05/18	NONE	H 21.5, W 28 CM	BLUEPRINT, GRAPHITE	PAPER

145-[029]	CITY OF / LOWELL / MASS.	1943/01/00	1"=500'	H 106.5, W 166.3 CM	BLUELINE PRINT, COLORED PENCIL	PAPER
145-[030]-[A]	MERRIMACK RIVER BELOW LOWELL / CHARACTERISTIC CURVES - 1936 FLOOD.	1941/11/19	NONE	H 20.4, W 31.6 CM	GRAPHITE	PAPER
145-[030]-[B]	MERRIMACK RIVER BELOW LOWELL / CHARACTERISTIC CURVES - 1938 FLOOD.	1941/11/19	NONE	H 20.4, W 31.6 CM	GRAPHITE	PAPER
145-[031]	[UNTITLED.] [CURVES SHOWING DISCHARGE IN CUBIC FEET PER SECOND OF VARIOUS RIVERS IN NEW HAMPSHIRE AND THE MERRIMACK RIVER.]	UNDATED	NONE	H 53.3, W 76.2 CM	INK	PAPER
145-[032]	HEIGHT OF MERRIMACK RIVER / BELOW CONCORD RIVER AT LOWELL, MASS. / FOR / FLOOD OF SEPTEMBER 18 TO OCT. 1, 1938.	UNDATED	NONE	H 53.3, W 78.7 CM	INK	PAPER
145-001	PLAN & PROFILE OF / MERRIMACK RIVER / FROM NASHUA TO LOWELL / SHOWING / FRESHETS OF 1785, 1852, 1896, 1936, 1938.	1936/04/01	1"=5',1500'& 3000'	H 58.4, W 118.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
145-001-[A]	PLAN & PROFILE OF / MERRIMACK RIVER / FROM NASHUA TO LOWELL / SHOWING / FRESHETS OF 1785, 1852, 1896, 1936.	1936/04/01	1"=5',1500'& 3000'	H 58.4, W 73.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
145-001-[B]	PLAN & PROFILE OF / MERRIMACK RIVER / FROM NASHUA TO LOWELL / SHOWING / FRESHETS OF 1785, 1852, 1896, 1936.	1936/04/01	1'=5',1500'& 3000'	H 58.4, W 118.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
145-002	DIAGRAM SHOWING / FLOOD HEIGHTS OF MERRIMACK RIVER / AT MERRIMACK MFG. CO.	1936/03/19-24	UNDATED	H 56, W 180 CM	INK	PAPER
145-002-A	DIAGRAM SHOWING / FLOOD HEIGHTS OF MERRIMACK RIVER / AT / MERRIMACK MFG. CO.	1936/03/19-24	NONE	H 53.4, W 40.6 CM	INK	PAPER

145-003	MERRIMACK RIVER / 1936 FLOOD HEIGHTS.	SEE NOTES	NONE	H 104.1, W 40.7 CM	INK	PAPER
145-004	FLOOD HEIGHTS / ON / PAWTUCKET DAM.	UNDATED	NONE	H 72.6, W 40 CM	INK	PAPER
145-004-[COPY 1]	FLOOD HEIGHTS / ON / PAWTUCKET DAM.	UNDATED	NONE	H 59.4, W 41.9 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
145-004-[COPY 2]	FLOOD HEIGHTS / ON / PAWTUCKET DAM.	SEE NOTES	NONE	H 76.2, W 46 CM	UNKNOWN PHOTOGRAPHIC PROCESS, COLORED PENCIL	PAPER
145-004-[COPY 3]	FLOOD HEIGHTS / ON / PAWTUCKET DAM.	UNDATED	NONE	H 76.2, W 45.8 CM	UNKNOWN PHOTOGRAPHIC PROCESS, COLORED PENCIL	PAPER
145-004-[COPY 4]	FLOOD HEIGHTS / ON / PAWTUCKET DAM.	UNDATED	NONE	H 50.8, W 28.1 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
145-005	FLOOD HEIGHTS / PAWTUCKET DAM, MERRIMACK RIVER / LOWELL, MASS.	1937/02/00	NONE	H 73.7, W 40.6 CM	INK	PAPER
145-005-[COPY 1]	FLOOD HEIGHTS / PAWTUCKET DAM, MERRIMACK RIVER / LOWELL, MASS.	1937/02/00	NONE	H 83.9, W 47.7 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
145-005-[COPY 2]	FLOOD HEIGHTS / PAWTUCKET DAM, MERRIMACK RIVER / LOWELL, MASS.	1937/02/00	NONE	H 79.4, W 47 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER

145-006	FLOOD HEIGHTS / AT / BOOTT MILLS RIVER GAUGE [FROM 1852 TO 1936].	SEE TITLE	NONE	H 73.1, W 40.6 CM	INK, PAPER	PAPER
145-006-[COPY 1]	FLOOD HEIGHTS / AT / BOOTT MILLS RIVER GAUGE [FROM 1852 TO 1936].	UNDATED	NONE	H 40, W 73 CM	BLUEPRINT, COLORED PENCIL	PAPER
145-006-[COPY 2]	FLOOD HEIGHTS / AT / BOOTT MILLS RIVER GAUGE [FROM 1852 TO 1936].	UNDATED	NONE	H 40.2, W 72.2 CM	BLUEPRINT	PAPER
145-007	[UNTITLED.] [DISCHARGE DIAGRAM OF MERRIMACK RIVER SHOWING COMPARISONS FROM BOOTT GAUGE-PAWTUCKET DAM; TOTAL FLOW INCLUDING CONCORD RIVER AND BEAVER BROOK AND AT THE U.S. GEOLOGICAL SURVEY STATION NEAR HUNT'S FALLS.]	1936/00/00	NONE	H 55.5, W 58.4 CM	INK, COLORED INK	PAPER
145-008	MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. [SHOWING FLOODED AREAS DURING FLOOD OF MARCH 19 TO 24, 1936].	1936/00/00	1"=1000'	H 55, W 75.6 CM	LITHOGRAPH, WATER COLOR, COLORED PENCIL	PAPER
145-008-[COPY 1]	MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. [SHOWING FLOODED AREAS DURING FLOOD OF MARCH 19 TO 24, 1936].	1936/00/00	1"=1000'	H 38.4, W 52.7 CM	PHOTOSTAT NEGATIVE	PAPER
145-008-[COPY 2]	MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. [SHOWING FLOODED AREAS DURING FLOOD OF MARCH 19 TO 24, 1936].	1936/00/00	1"=1000'	H 38.5, W 50.3 CM	PHOTOSTAT POSITIVE	PAPER

145-008-[COPY 3]	MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. [SHOWING FLOODED AREAS DURING FLOOD OF MARCH 19 TO 24, 1936].	1936/00/00	1"=1000'	H 55, W 75 CM	BLUE LINE PRINT	PAPER
145-008-[COPY 4]	MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. [SHOWING FLOODED AREAS DURING FLOOD OF MARCH 19 TO 24, 1936].	1936/00/00	1"=1000'	H 55, W 75.6 CM	BLUE LINE PRINT, WATER COLOR, COLORED INK	PAPER
145-009	MAP OF THE / CITY OF / LOWELL. [SHOWING FLOODED AREAS DURING FLOOD OF MARCH 19 TO 24, 1936. FROM CITY ENGINEER'S OFFICE].	1936/03/20	1"=1000'	H 54.5, W 73 CM	LITHOGRAPH	PAPER
145-010	[UNTITLED.] [DIAGRAM SHOWING FLOOD HEIGHTS OF MERRIMACK RIVER AT PAWTUCKET DAM 1852, 1896, 1927 AND 1936.]	SEE TITLE	SEE NOTES	H 53.3, W 78.7 CM	INK	PAPER
145-011	LOWELL EVENING LEADER 1936 FLOOD PICTURES.	1936/00/00	NONE	H 44, W 122 CM	INK	PAPER
145-012	BOSTON SUNDAY POST / STORY OF FLOOD IN PHOTOS.	1936/03/29	NONE	H 45.5, W 29.5 CM	INK	PAPER
145-013-[A]	[UNTITLED.] [CHARACTERISTIC FLOOD CURVES MERRIMACK RIVER AT LOWELL, MASS. 1852-1938.]	SEE NOTES	NONE	H 24.8, W 35.3 CM	INK	DRAFTING CLOTH
145-013-[B]-[COPY 1]	SOME OF MERRIMACK RIVER HIGHEST FRESHETS.	1938/10/07	NONE	H 28, W 48.3 CM	INK	PAPER
145-013-[B]-[COPY 2]	SOME OF MERRIMACK RIVER HIGHEST FRESHETS.	1938/10/07	NONE	H 28, W 48.5 CM	INK	PAPER
145-013-[B]-[COPY 3]	SOME OF MERRIMACK RIVER HIGHEST FRESHETS.	1938/10/07	NONE	H 28, W 48.5 CM	INK	PAPER
145-013-[B]-[COPY 4]	SOME OF MERRIMACK RIVER HIGHEST FRESHETS.	1938/10/07	NONE	H 28, W 48.5 CM	INK	PAPER

145-013-[B]-[COPY 5]	SOME OF MERRIMACK RIVER HIGHEST FRESHETS.	1938/10/07	NONE	H 28, W 48.5 CM	INK	PAPER
145-014	CHARACTERISTIC FLOOD CURVES / FOR ONE TO FIVE DAY STORMS / MERRIMACK RIVER AT LOWELL, MASS.	UNDATED	SEE NOTES	H 28.4, W 32 CM	INK	PAPER
145-015	CHARACTERISTIC FLOOD CURVES / FOR ONE TO FIVE DAY STORMS / MERRIMACK RIVER AT LOWELL, MASS.	UNDATED	SEE NOTES	H 22, W 31.1 CM	INK	PAPER
145-016	FLOOD HEIGHTS / ON / PAWTUCKET DAM [1852-1936] / FLOOD HEIGHTS OF MERRIMACK RIVER AT PAWTUCKET DAM / AT / LOWELL, MASS.	SEE TITLE	NONE	H 23.2, W 15 CM	INK	DRAFTING CLOTH
145-017	FLOOD HEIGHTS / AT / BOOTT MILLS RIVER GAUGE [1852-1936] / FLOOD HEIGHTS OF MERRIMACK RIVER AT BOOTT / MILLS AT LOWELL, MASS.	SEE TITLE	NONE	H 23.2, W 15 CM	INK	DRAFTING CLOTH
145-017-[COPY 1]	FLOOD HEIGHTS / AT / BOOTT MILLS RIVER GAUGE [1852-1936] / FLOOD HEIGHTS OF MERRIMACK RIVER AT BOOTT / MILLS AT LOWELL, MASS.	SEE TITLE	NONE	H 23.2, W 15 CM	BLUEPRINT, GRAPHITE	PAPER
145-018	MERRIMACK RIVER BASIN / MASSACHUSETTS & NEW HAMPSHIRE [SHOWING COMPLETED AND CONTEMPLATED IMPROVEMENTS FOR FLOOD CONTROL]..	SEE NOTES	3/8"=5 MILES	H 27.4, W 21 CM	BLUE LINE PRINT	PAPER
145-019	MERRIMACK VALLEY FLOOD CONTROL / LOWELL, MASS.- LOCAL PROTECTION / GENERAL PLAN & PROFILE.	SEE NOTES	3/8"=5 MILES	H 27.4, W 21 CM	BLUE LINE PRINT	PAPER

145-020	PROFILE OF MERRIMACK RIVER / FROM BEAVER BROOK TO BRIDGE ST. / SHOWING / 1936 FLOOD HEIGHT, CONTROLLED HEIGHTS / & HEIGHT OF DIKE.	1940/11/00	NONE	H 28, W 42.3 CM	INK	PAPER
145-021	MERRIMACK RIVER MILES 35.0 TO 45.0 / MASSACHUSETTS / PLAN & PROFILE [FROM DEEP BROOK IN NORTH CHELMSFORD TO TRULL BROOK IN TEWKSBURY].	1936/07/00	1 TO 25,344	H 54, W 81.9 CM		PAPER
145-022-001-[A]	MERRIMACK RIVER CHANNEL IMPROVEMENTS [FROM PAWTUCKET DAM TO BELOW HUNTS FALLS] / LOWELL, MASS. / INDEX MAP.	1937/02/00	1"=500'	H 71.9, W 104.5 CM	BLUE LINE PRINT, COLORED INK	PAPER
145-022-001-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS [FROM PAWTUCKET DAM TO BELOW HUNTS FALLS] / LOWELL, MASS. / INDEX MAP.	1937/02/00	1"=500'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-001-[C]	MERRIMACK RIVER CHANNEL IMPROVEMENTS [FROM PAWTUCKET DAM TO BELOW HUNTS FALLS] / LOWELL, MASS. / INDEX MAP.	1937/02/00	1"=500'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-002	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN OF EXCAVATION IN AREA A [HUNTS FALLS].	1936/12/00	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-003	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN OF EXCAVATION IN AREA A [HUNTS FALLS].	1937/04/09	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-004-[A]-[COPY 1]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN & SECTION / EXCAVATION IN AREA B-HUNTS FALLS.	1937/01/25	H1"=50',V 1"=1',1"=50	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER

145-022-004-[A]-[COPY 2]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN & SECTION / EXCAVATION IN AREA B-HUNTS FALLS.	1937/01/25	H1"=50',V 1"=1',1"=50	H 71.9, W 96.6 CM	BLUE LINE PRINT	PAPER
145-022-004-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN & SECTION / EXCAVATION IN AREA B-HUNTS FALLS.	1937/04/09	H1"=50',V 1"=1',1"=20	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-004-[C]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN & SECTION / EXCAVATION IN AREA B-HUNT'S FALLS.	1937/04/09	H1"=50',V 1"=1',1"=20	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-007-[A]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA "D" / PLAN OF PROPOSED EXCAVATION / BELOW AIKEN STREET.	1937/01/25	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-007-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA "D" / PLAN OF PROPOSED EXCAVATION / BELOW AIKEN STREET.	1937/03/18	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-007-[C]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA D1 / PLAN OF PROPOSED EXCAVATION / BELOW AIKEN STREET.	1937/07/02	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-008-[A]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA "D" / PLAN OF PROPOSED EXCAVATION / BELOW AIKEN STREET.	1937/03/18	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-008-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA "D" / PLAN OF PROPOSED EXCAVATION / BELOW AIKEN STREET.	1937/03/18	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER

145-022-008-[C]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA "D" / PLAN OF PROPOSED EXCAVATION / BELOW AIKEN STREET.	1937/03/18	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-009-[A]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA F1 / PLAN & SECTIONS / EXCAVATION IN VICINITY OF SCHOOL STREET BRIDGE.	1937/07/14	1"=20',10' & 40'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-009-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA F1 / PLAN & SECTIONS / EXCAVATION IN VICINITY OF SCHOOL STREET BRIDGE.	1937/07/14	1"=20',10' & 40'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-009-[C]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA F1 / PLAN & SECTIONS / EXCAVATION IN VICINITY OF SCHOOL STREET BRIDGE.	1937/07/14	1"=10'& 20'& 40'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-011-[A]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. [AREA F-1] / PROTECTION SLAB-SCHOOL STREET PIER / STEEL & CONCRETE DETAILS.	1937/03/00	1/4",3/8" & 1 1/2"=1'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-011-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. [AREA F-1] / PROTECTION SLAB-SCHOOL STREET PIER / STEEL & CONCRETE DETAILS.	1937/07/15	1/4",3/8" & 1/8"=1'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER

145-022-012	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN, PROFILE & SECTION / PART OF PROPOSED SPOIL EMBANKMENT [AT AREA D-1] / BELOW AIKEN STREET.	1937/04/15	SEE NOTES	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-013-[A]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN, PROFILE & SECTION [PART OF PROPOSED SPOIL EMBANKMENT AT AREA D-1 BELOW AIKEN STREET].	1937/03/12	SEE NOTES	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-013-[B]	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN, PROFILE & SECTION / PART OF PROPOSED SPOIL EMBANKMENT [AT AREA D-1] / BELOW AIKEN STREET.	1937/03/12	SEE NOTES	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-014	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN & SECTION / PART OF PROPOSED SPOIL EMBANKMENT [AT AREA D-1] / ABOVE AIKEN STREET.	1936/12/00	1"=50'	H 71.9, W 104.5 CM	BLUE LINE PRINT	PAPER
145-022-024	ENGINEERING DEPT. / CITY OF LOWELL / SEWER DIVISION.	1941/04/00	1"=50'& 5'	H 77.2, W 109.2 CM	BLUE LINE PRINT	PAPER
145-022-024-01	MERRIMACK VALLEY FLOOD CONTROL / FRANKLIN FALLS RESERVOIR / CONDUIT, TURBINE & FLOODGATE DISCHARGE.	1943/03/08	NONE	H 20.4, W 27 CM	INK	PAPER
145-022-024-02	MERRIMACK VALLEY FLOOD CONTROL / MARCH 1936 FLOOD HYDROGRAPHS / AT / FRANKLIN FALLS RESERVOIR [SHOWING EFFECT OF OUTFLOW DUE TO SUGGESTED POWER PLANT].	1943/03/03	NONE	H 26.4, W 41.3 CM	INK	PAPER

145-022-024-03	MERRIMACK VALLEY FLOOD CONTROL / MARCH 1936 FLOOD HYDROGRAPHS / AT / MANCHESTER, N.H. [SHOWING EFFECT OF OUTFLOW DUE TO SUGGESTED POWER PLANT].	1943/03/03	NONE	H 26.4, W 41.4 CM	INK	PAPER
145-022-024-04	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PEAK REDUCTIONS / AT / DOWNSTREAM DAMAGE CENTERS / 1936 FLOOD [WITH AND WITHOUT POWER POOL].	1943/03/08	NONE	H 26.7, W 41.4 CM	INK	PAPER
145-022-024-05	MERRIMACK VALLEY FLOOD CONTROL / FRANKLIN FALLS RESERVOIR / AREA & CAPACITY CURVES.	1943/03/08	NONE	H 26.6, W 41.3 CM	INK	PAPER
145-022-024-06	MERRIMACK VALLEY FLOOD CONTROL / FRANKLIN FALLS DAM / PEMIGEWASSET RIVER / [SUGGESTED] POWER INSTALLATION STUDY / LONGITUDINAL SECTION.	1943/03/08	1"=30'	H 27.3, W 50.8 CM	INK, COLORED INK	DRAFTING CLOTH
145-022-025	PLAN & PROFILE / FRONT STREET INTERCEPTING SEWER / LOWELL, MASS.	1941/04/00	H1"=50', V1"=5'	H 73.3, W 121.5 CM	BLUE LINE PRINT	PAPER
145-022-026	PLAN OF / MERRIMACK RIVER / THROUGH / LOWELL, MASS. / SHOWING / PROPOSED PROTECTION SCHEME / FOR / FLOODS OF MARCH 1936 MAGNITUDE.	SEE TITLE	1"=250'& 10'	H 81, W 137.2 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
145-022-027-[A]	[DIAGRAM SHOWING] FLOOD HEIGHTS [OF MERRIMACK RIVER] / ON / PAWTUCKET DAM [FROM 1852 TO 1936. ASSEMBLED BY MASS. DEPT. OF PUBLIC HEALTH W. P. A. # 2].	1936/03/26	NONE	H 55.9, W 89.6 CM	BLUE LINE PRINT	PAPER

145-022-027-[B]	[DIAGRAM SHOWING] FLOOD HEIGHTS [OF MERRIMACK RIVER] / ON / PAWTUCKET DAM [FROM 1852 TO 1936. ASSEMBLED BY MASS. DEPT. OF PUBLIC HEALTH W. P. A. # 2].	1936/03/26	NONE	H 55.9, W 89.6 CM	BLUE LINE PRINT	PAPER
145-022-028	APPROXIMATE FLOOD PROFILE OF [PEMIGEWASSET AND MERRIMACK RIVERS FOR] MARCH 1936 / COMPARED WITH APPROXIMATE NORMAL FLOW.	1942/00/00	NONE	H 71.2, W 125.4 CM	INK, WATER COLOR	DRAFTING CLOTH
145-023-001	MERRIMACK VALLEY FLOOD CONTROL / MERRIMACK RIVER [FROM MIDDLESEX VILLAGE TO PAWTUCKET DAM] / LOWELL, MASS. / LOCAL PROTECTION.	1939/03/00	1"=300'	H 68.5, W 101.7 CM	BLUE LINE PRINT	COLORED INK
145-023-002	MERRIMACK VALLEY FLOOD CONTROL / MERRIMACK RIVER [FROM PAWTUCKET DAM TO UPPER HUNTS FALLS] / LOWELL, MASS. / LOCAL PROTECTION.	1939/03/00	1"=300'	H 68.5, W 101.7 CM	BLUE LINE PRINT, COLORED INK	PAPER
145-023-003-[A]	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION LOWELL, MASS. / LAKEVIEW SECTION [FROM BRIDGE ST. TO BETWEEN WEST AND STANLEY STREETS] / PLAN, PROFILE & SECTIONS NO. 1.	1941/06/00	SEE NOTES	H 68.5, W 101.7 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
145-023-003-[B]	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION LOWELL, MASS. / LAKEVIEW SECTION [FROM BRIDGE ST. TO BETWEEN WEST AND STANLEY STREETS] / PLAN, PROFILE & SECTIONS NO. 1.	1941/06/00	SEE NOTES	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER

145-023-004-[A]	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION LOWELL, MASS. / LAKEVIEW SECTION [FROM BETWEEN WEST AND STANLEY STREETS TO AIKEN ST.] / PLAN, PROFILE & SECTIONS NO. 2.	1941/06/00	1"=50'	H 68.5, W 101.7 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
145-023-004-[B]	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION LOWELL, MASS. / LAKEVIEW SECTION [FROM BETWEEN WEST AND STANLEY STREETS TO AIKEN ST.] / PLAN, PROFILE & SECTIONS NO. 2.	1941/06/00	1"=50'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-005	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION LOWELL, MASS. / LAKEVIEW SECTION / DETAIL OF FLOOD WALL.	1941/06/00	1/2"& 1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-006	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / WEST STREET PUMPING STATION / GENERAL PLAN & DIVERSION CONDUIT [BETWEEN MERRIMACK RIVER AND LAKEVIEW AVENUE]..	1914/06/00	1"=10',1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-007	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / WEST STREET PUMPING STATION, LAYOUT PLAN & OUTLET DETAILS.	1941/06/00	1/8"& 1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER

145-023-009	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / WEST STREET PUMPING STATION / ARCHITECTURAL-ELEVATIONS & DETAILS.	1941/06/00	SEE NOTES	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-015	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / AREA C1 / PLAN OF PROPOSED EXCAVATION / LEFT BANK.	1938/03/31	1"=100'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-016	MERRIMACK RIVER CHANNEL IMPROVEMENTS / LOWELL, MASS. / PLAN / BETWEEN MOODY & SCHOOL ST. BRIDGE.	1938/03/00	1"=40'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-031	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / WEST STREET PUMPING STATION / GENERAL ARRANGEMENT OF EQUIPMENT NO. 1.	1941/06/00	1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-032	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROJECT-LOWELL, MASS. / WEST STREET PUMPING STATION / GENERAL ARRANGEMENT OF EQUIPMENT NO. 2.	1941/06/00	1'4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-033-[A]	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / ROSEMONT SECTION / PLAN, PROFILE & SECTIONS.	1941/06/00	SEE NOTES	H 68.5, W 101.7 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
145-023-033-[B]	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / ROSEMONT SECTION / PLAN, PROFILE & SECTIONS.	1941/06/00	SEE NOTES	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER

145-023-037	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / BEAVER STREET PUMPING STATION / GENERAL PLAN & OUTLET DETAILS.	1941/06/00	1"=10',1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-038	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / BEAVER STREET PUMPING STATION / ARCHITECTURAL-PLANS & ELEVATIONS.	1941/06/00	1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-023-052	MERRIMACK VALLEY FLOOD CONTROL / FLOOD PROTECTION-LOWELL, MASS. / BEAVER STREET PUMPING STATION / GENERAL ARRANGEMENT OF EQUIPMENT.	1941/06/00	1"=10',1/4"=1'	H 68.5, W 101.7 CM	BLUE LINE PRINT	PAPER
145-026	PROFILE OF MERRIMACK RIVER.	UNDATED	NONE	H 59.5, W 74.9 CM	BLUEPRINT	PAPER
145-027	MERRIMACK VALLEY FLOOD CONTROL / PLANS / FOR CONSTRUCTION OF / FLOODWALLS, DIKES & PUMPING STATIONS / MERRIMACK RIVER, LOWELL, MASS.	1941/06/26	SEE NOTES	H 35.3, W 55.7 CM	BLUE LINE PRINT	PAPER
146-[071]	MERRIMACK MFG. CO. / LOWELL, MASS.	1910/10/26	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
146-[072]	MERRIMACK MFG. CO. / (COTTON MILL AND PRINT WORKS) / LOWELL, MASS.	1910/10/26	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
146-[073]	MERRIMACK MFG. CO. / (COTTON MILL) / LOWELL, MASS.	1922/10/18	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER

146-[074]	MERRIMACK MFG. CO. / (COTTON MILL AND PRINT WORKS) / LOWELL, MASS.	1922/10/18	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
146-[075]	MERRIMACK MFG. CO. / (COTTON MILL) / LOWELL, MASS.	1922/10/18	1"=60'	H 53, W 66 CM	INK, COLORED INK	PAPER
146-[076]	MERRIMACK MFG. CO. / (COTTON MILL) / LOWELL, MASS.	1933/08/11	1"=60'	H 53, W 66 CM	INK, COLORED INK	PAPER
146-[077]	MERRIMACK MFG. CO. / "LAWRENCE & TREMONT SECTIONS" / (COTTON MILL) / LOWELL, MASS.	1927/01/10	1"=60'	H 53, W 66 CM	INK, COLORED INK	PAPER
146-[078]	MERRIMACK MFG. CO. / (COLORED COTTON MILL) / LOWELL, MASS.	1940/08/20	1"=60'	H 66, W 106 CM	INK, COLORED INK	PAPER
146-[079]	MERRIMACK MFG. CO. / TREMONT MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 44, W 61 CM	NEGATIVE PHOTOGRAPHIC PRINT	PAPER
146-[080]	MERRIMACK MFG. CO. / TREMONT MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 46, W 61 CM	PHOTOGRAPHIC PRINT	PAPER
146-[081]	MERRIMACK MFG. CO. / [ABOVE TREMONT & SUFFOLK MILLS, CROSSED OUT] / LOWELL, MASS. / (LAWRENCE SECTION).	1926/05/04	1"=50'	H 71, W 51 CM	LITHOGRAPH, WATER COLOR, COLORED PENCIL	PAPER
146-[082]	PLAN OF THE / "MAIN YARD" / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1940/08/00	1"=40'	H 76, W 98 CM	INK, WATER COLOR. COLORED INK	DRAFTING CLOTH

146-[082]-[COPY 1]	PLAN OF THE / "MAIN YARD" / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1940/08/00	1"=40'	H 76, W 98 CM	RED LINE PRINT	PAPER
146-[082]-[COPY 2]	PLAN OF THE / "MAIN YARD" / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1940/08/00	1"=40'	H 76, W 98 CM	BLUE LINE PRINT	PAPER
146-[082]-[COPY 3]	PLAN OF THE / "MAIN YARD" / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1940/08/00	1"=40'	H 76, W 98 CM	BLUE LINE PRINT	PAPER
146-[082]-[COPY 4]	PLAN OF THE / "MAIN YARD" / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1940/08/00	1"=40'	H 76, W 98 CM	BLUE LINE PRINT	PAPER
146-[083]	PLAN OF THE / "MAIN YARD" / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / FIRE PROTECTION PIPES AND WATERWAYS.	1957/09/00	1"=40'	H 76, W 98 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
146-[084]	PLAN OF THE / TREMONT AND LAWRENCE SECTION YARDS / OF THE / MERRIMACK MANUFACTURING COMPANY / ALSO / COURIER CITIZEN CO. / FOR PROTECTION PIPES AND WATERWAYS.	1957/08/00	1"=40'	H 77, W 114.5 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER

146-001	PLAN OF / RACES OF MERRIMACK NOS. 10 & 11 WHEELS / MADE IN CONNECTION WITH THE / PROPOSED EXTENSION OF DRAFT-TUBES.	1897/10/27	1"=8'	H 55.4, W 105.8 CM	INK, COLORED INK	DRAFTING CLOTH
146-002	SKETCH SHOWING / MERRIMACK MFG. CO'S. PRINT WORKS WEIR, / MEASURED & SKETCHED, MAY 1905.	1905/05/00	1"=4'	H 50.1, W 58.5 CM	INK, COLORED INK, WATER COLOR	PAPER
146-003	MILLS & PRINTWORKS [SHOWING MAIN LINES OF SHAFTING & PRESENT & PROPOSED HIGH & LOW PRESSURE STEAM] / MERRIMACK MANUFACTURING CO. / LOWELL, MASS.	1887/01/10	1"=60'	H 51.6, W 58.5 CM	BLUEPRINT, COLORED INK	PAPER
146-004	SKETCH SHOWING CAST IRON PIER USED IN / EXTENDING DRAFT TUBE AT MERRIMACK NOS. / 10 & 11 WHEELS.	1897/10/14	1"=1'	H 25.6, W 32.2 CM	BLUEPRINT	PAPER
146-005-[COPY 1]	SKETCH / SHOWING PRESENT LOCATION DRAFT-TUBES / OF / MERRIMACK NOS.10 & 11 WHEELS / WITH / PROPOSED CHANGES TO BRING THE TOP OF THE OUTLET / DOWN 1 1/2 FEET BELOW THE PRESENT LEVEL.	1897/10/04	1/2"=1'	H 84.2, W 115.5 CM	BLUEPRINT, COLORED INK	PAPER
146-005-[COPY 2]	SKETCH / SHOWING PRESENT LOCATION DRAFT-TUBES / OF / MERRIMACK NOS.10 & 11 WHEELS / WITH / PROPOSED CHANGES TO BRING THE TOP OF THE OUTLET / DOWN 1 1/2 FEET BELOW THE PRESENT LEVEL.	1897/10/04	1/2"=1'	H 84.2, W 115.5 CM	BLUEPRINT, COLORED INK	PAPER
146-006	SKETCH / SHOWING PROPOSED CHANGES / IN / MERRIMACK NOS. 10 & 11 DRAFT TUBES.	1897/10/14	1"=1'	H 103, W 90.9 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

146-006-[COPY 1]	SKETCH / SHOWING PROPOSED CHANGES / IN / MERRIMACK NOS. 10 & 11 DRAFT TUBES.	1897/10/14	1"=1'	H 102, W 84 CM	BLUEPRINT, COLORED INK	PAPER
146-006-[COPY 2]	SKETCH / SHOWING PROPOSED CHANGES / IN / MERRIMACK NOS. 10 & 11 DRAFT TUBES.	1897/10/14	1"=1'	H 102, W 84 CM	BLUEPRINT, COLORED INK	PAPER
146-007	SKETCH SHOWING ALTERATIONS IN EXTENSION OF DRAFT TUBES. / MERRIMACK M'F'G. CO. / LOWELL, MASS. / HOLYOKE MACHINE CO. / WORCESTER, MASS.	1894/02/27	3/4"=1'	H 58.1, W 87 CM	BLUEPRINT	PAPER
146-008	[UNTITLED.] [SKETCH SHOWING SECTIONS OF DRAFT TUBES OF MERRIMACK MFG. CO. NOS. 10 & 11, UNDERGOING REPAIRS].	UNDATED	NONE	H 76.5, W 48.5 CM	GRAPHITE	PAPER
146-009	MERRIMACK [MFG. CO'S NOS.] 3 & 4 / McCORMICK WHEELS / PLAN OF SPEED GATE ROD.	1896/07/03	NONE	H 89.9, W 56.2 CM	INK, GRAPHITE	PAPER
146-010	[DIAGRAM SHOWING] TESTS FOR BOTTOM OF WALLS UNDER / MERRIMACK [MFG. CO'S] MILL NO. 3-NORTHEAST / ARCHWAY OF MERRIMACK CANAL.	1895/09/01	NONE	H 45.8, W 58.5 CM	GRAPHITE	PAPER
146-010-[A]	SECTION OF THE ARCHES UNDER MERRIMACK M. COS MILL NO.3 / COPIED APRIL 4, 1895 FROM A TRACING BELONGING TO THE MERRIMACK M. CO. HAVING THIS TITLE, VIZ: "PLAN & SECTION OF THE PIERS TO BE BUILT IN THE MERRIMACK CANAL UNDER THE PROPOSED DRESSING MILL."	1895/04/04	1/4"=1'	H 16.6, W 34.3 CM	BLUEPRINT	COLORED INK

146-011-[A]	MERRIMACK M'F'G. CO. / QUANTITY PASSING / PRINT WORKS WEIR [AT MERRIMACK MFG. CO'S. PLANT FOR THE PERIOD SEPT. 1 TO 5 INCLUSIVE].	1894/09/07	NONE	H 31, W 58.4 CM	INK	PAPER
146-011-[B]	OBSERVATIONS AT MERRIMACK WEIR [VERSO] / SHOWS THE QUANTITY OF WATER ON THE MERRIMACK M. CO.'S PRINT WORKS WEIR FROM SEPT. 1 TO SEPT. 5 INCLUSIVE-1894- / THE APPROXIMATE ELEVATION OF THE WATER IN THE CANAL IS ALSO SHOWN FOR A PART OF THE TIME.	1894/09/01	NONE	H 35.9, W 85.2 CM	INK, COLORED INK	PAPER
146-012	DETAILS OF MERRIMACK [MFG. CO'S.] ICE BOOM.	1895/08/00	1/2"=1',1"=50'	H 56.2, W 111.2 CM	INK, COLORED INK	PAPER
146-013	CROSS SECTION OF PART OF MERRIMACK RIVER / BACK OF MERRIMACK M. CO.'S # 10 & 11 WHEELPITS.	1897/09/26	NONE	H 58.7, W 45.9 CM	GRAPHITE	PAPER
146-014	PLAN OF THE / MILLS & PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY [WITH CERTAIN GRADES] / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1886/11/30	1/4"=10'	H 73.7, W 99.1 CM	LITHOGRAPH, WATER COLOR, COLORED INK, GRAPHITE	PAPER
146-015-[A]	SECTIONS / IN THE / MILL YARD / OF THE / MERRIMACK M. CO.	1893/04/00	H1"=30', V1"=5'	H 53.2, W 98 CM	INK, COLORED INK, WATER COLOR	PAPER
146-015-[B]	PLAN OF THE / MILLS & PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY.	SEE NOTES	NONE	H 53, W 98 CM	UNKNOWN PRINTING PROCESS, COLORED INK	PAPER

146-016	SKETCH OF BOILER WORK FOR [# 10 & 11 WHEELS OF] MERRIMACK M'F'G. CO. / WORCESTER, MASS.	1894/00/00	1/2"=1'	H 85.5, W 121 CM	BLUEPRINT, COLORED INK	PAPER
146-017-[A]	PLAN / [OF PROPOSED] CONCRETE WALK REMOVED OR / ROOF OF RACK [IN ALL DETAILS FOR MERRIMACK MFG. CO. # 10 & 11 WHEELS]	1906/11/15	1"=1'	H 53.9, W 101.5 CM	BLUEPRINT	PAPER
146-017-[B]	PLAN SHOWING POSITION OF ALL BEAMS USED / FOR BAYS OR UPRIGHTS (COLUMNS) / MERRIMACK MFG. CO. LOWELL, MASS. [# 10 & 11 WHEELS].	1906/11/15	1/8"& 1/4"=1'	H 50.9, W 101 CM	BLUEPRINT	PAPER
146-017-[C]	END ELEVATION / OF / PROPOSED RACK IN CANAL / MERRIMACK MFG. CO. LOWELL, MASS. [# 10 & 11 WHEELS].	190611/14	1"=1'	H 51.2, W 98.6 CM	BLUEPRINT	PAPER
146-017-[D]	DETAILS OF CONNECTIONS & DRILLING AT HEAD OF RACK, / MERRIMACK MFG. CO. LOWELL, MASS. [# 10 & 11 WHEELS].	190611/14	3"& 1"=1'	H 57.5, W 103 CM	BLUEPRINT	PAPER
146-018	[DIAGRAM SHOWING] OBSERVATIONS ON DRAFT TUBES OF MERRIMACK MFG. CO'S # 10 & 11 (HERCULES) WHEELS.	1894/10/06-18	NONE	H 26.8, W 76.3 CM	INK, COLORED INK	PAPER
146-019-[A]	[UNTITLED.] [PLAN OF TWO 45" RODNEY-HUNT TURBINES WITH DRAFT TUBES FOR MERRIMACK MFG. CO.]	1896/00/00	NONE	H 52, W 60 CM	BLUEPRINT	PAPER
146-019-[B]	BOILER MAKERS PLAN / FOR / MERRIMACK MANUF'G CO. / ORANGE, MASS. / RODNEY HUNT MACHINE CO.	1896/04/11	1/2"=12"	H 51.2, W 73 CM	BLUEPRINT	PAPER
146-019-[C]	MERRIMACK MANUFACTURING CO., LOWELL, MASS.	1896/04/27	1/2"=12"	H 66, W 77.6 CM	BLUEPRINT	PAPER

146-020-[A]	GENERAL ARRANGEMENT [& DETAILS OF] TWO 39" C. HORIZONTAL HERCULES TURBINES / [FOR] MERRIMACK MFG. CO. [(WHEELS # 5 & 6)] LOWELL, MASS.	1911/02/02	1/4"=1'	H 88.4, W 75.3 CM	BLUEPRINT	PAPER
146-020-[B]	RE-ARRANGEMENT OF BALANCE WEIGHTS FOR 39" C-HERCULES TURBINES / FOR THE / MERRIMACK MFG. CO. LOWELL, MASS. / HOLYOKE MACHINE CO. WORCESTER, MASS.	SEE NOTES	1/2"=1'	H 84.9, W 62 CM	BLUEPRINT	PAPER
146-020-[C]	DETAILS OF TWO 39"-C-HORIZONTAL HERCULES TURBINES. / FOR THE / MERRIMACK MFG. CO. WORCESTER, MASS.	1911/03/16	3/4"=1'	H 87.9, W 103.5 CM	BLUEPRINT	PAPER
146-021	[UNTITLED.] [SKETCH OF POWER SCHEME FOR GRIST MILL.]	UNDATED	NONE	H 48.3, W 61 CM	GRAPHITE	PAPER
146-022-[A]	SURPLUS / MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK M'F'G. CO.	1918/01/00	NONE	H 45.8, W 54 CM	INK, COLORED INK	DRAFTING CLOTH
146-022-[B]	PERMANENT / MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK M'F'G. CO.	1912/01/08	NONE	H 45.8, W 54 CM	INK, COLORED INK	DRAFTING CLOTH
146-022-[C]	SURPLUS / MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK M'F'G. CO.	1912/01/08	NONE	H 45.8, W 54 CM	INK, COLORED INK	DRAFTING CLOTH
146-022-[D]	PERMANENT & SUPLUS / MILL POWERS / DRAWN BY NEW / WHEELS NOS.5 & 6 / OF / MERRIMACK MFG.	1912/01/08	NONE	H 57.8, W 70.3 CM	INK, COLORED INK	DRAFTING CLOTH
146-022-[D]-[COPY 1]	PERMANENT & SUPLUS / MILL POWERS / DRAWN BY NEW / WHEELS NOS.5 & 6 / OF / MERRIMACK MFG.	1912/01/08	NONE	H 55.8, W 69 CM	BLUEPRINT	PAPER
146-023	PLAN / DEFINING THE BOUNDARY LINE BETWEEN / MERRIMACK M. CO. / AND / BOOTT COTTON MILLS.	1889/08/00	1"=20'	H 69, W 96.2 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

146-024	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATIONS / FOR / MERRIMACK MFG. CO. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/01/31	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
146-025	ALDEN ABSORPTION DYNAMOMETER TESTS [OF A PAIR OF 45" McCORMICK WHEELS MADE BY RODNEY HUNT MFG. CO. AT PLANT OF MERRIMACK MFG. CO.].	1918/05/05	NONE	H 25.5, W 28.3 CM	INK	DRAFTING CLOTH
146-026-[A]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEEL NO. 9 / 50 INCH R.H. ALLIS CHALMERS TYPE `15'.	UNDATED	NONE	H 63.8, W 78.9 CM	INK, COLORED INK	DRAFTING CLOTH
146-026-[B]	MERRIMACK MFG. CO. / PRELIMINARY DISCHARGE DIAGRAM / NO.9 WHEEL, 50 INCH R.H. TYPE 15-ALLIS CHALMERS WHEEL / SWING GATE.	SEE NOTES	NONE	H 62.5, W 81.6 CM	INK, COLORED INK	DRAFTING CLOTH
146-026-[B]-[COPY 1]	[DIAGRAM SHOWING] MERRIMACK MFG. CO. / PRELIMINARY DISCHARGE DIAGRAM / NO.9 WHEEL / 50" R.H. TYPE 15 ALLIS CHALMERS WHEELS / SWING GATE.	1919/09/22	NONE	H 61.3, W 80.4 CM	BLUEPRINT	PAPER
146-027-027	MERRIMACK MFG. COMPANY / WATER POWER # 3 & 4, # 5 & 6, # 9, # 10, # 11, WHEELS.	SEE NOTES	NONE	H 21.7, W 28 CM	BLUEPRINT	PAPER
146-027-028	MERRIMACK MFG. CO. / USE OF WATER IN PERCENTS OF / PERMANENT MILL POWERS / AS OF DIFFERENT DATES.	1945/08/03	NONE	H 28.1, W 42 CM	INK	PAPER
146-027-029	DIAGRAM SHOWING THE OUTSIDE FALL AT THE / MERRIMACK MFG. CO. VS. THE LIMITATION OF MASS. COTTON MILLS.	1922/09/19	NONE	H 29.3, W 46 CM	INK, COLORED INK	PAPER

146-027-A	[DIAGRAM SHOWING] MERRIMACK MFG. CO. / RELATION OUTSIDE TO INSIDE FALL [OF WHEELS 3 & 4 AND 5 & 6] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/09	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
146-027-B	MERRIMACK MFG. CO. / [DIAGRAM SHOWING] RELATION OUTSIDE TO INSIDE FALL / [OF MERRIMACK MFG. COS. WHEEL NO. 8] PROPRIETORS OF LOCKS & CANALS.	1920/04/14	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
146-027-C	MERRIMACK MFG. CO. / [DIAGRAM SHOWING] RELATION OUTSIDE TO INSIDE FALL / [OF MERRIMACK MFG. COS. WHEELS # 9 & 10 & 11] PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/23	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
146-027-D	BOTTOM COEFFICIENT / MERRIMACK # 9 [WHEEL].	1919/10/16	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
146-027-E	MERRIMACK WEIR DIAGRAMS [(1, 2, 3 & 4)] / FOR MEASUREMENT OF / PROCESS WATER [AT MERRIMACK MFG. CO.] / PROPRIETORS OF LOCKS & CANALS.	1920/09/07	NONE	H 21.5, W 28 CM	INK	PAPER
146-027-F	[DIAGRAM SHOWING] USE OF PROCESS WATER / BY / MERRIMACK MFG. CO. / TOTAL OF WEIRS 1, 2, 3 & 4 / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/09/17	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
146-027-G	[DIAGRAM SHOWING] MERRIMACK MANUFACTURING COMPANY, / LOWELL, MASS. / HEIGHT OF BOOTT RIVER GAUGE VS. MERRIMACK LIMITATION.	1918/02/06	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER

146-027-H	[DIAGRAM SHOWING] PERMANENT / MILL POWERS / DRAWN BY WHEELS OF [3 & 4, 10 & 11] / MERRIMACK MFG. CO.	1920/03/00	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-I	[DIAGRAM SHOWING] SURPLUS / MILL POWERS / DRAWN BY WHEELS OF / [3 & 4, 10 & 11] MERRIMACK MFG. CO.	1920/03/00	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-J	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATION / FOR / MERRIMACK [MFG.] CO. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/02/10	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-K	[DIAGRAM SHOWING] MERRIMACK [MFG. CO.] PROCESS WATER HYDROGRAPHS [AUGUST 17,1920, & NOON HOUR OF AUG. 19, AT DIFFERENT WEIRS].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-L	[MEAN WIDTH AND GRADE OF BOTTOM SECTIONS OF] MERRIMACK MFG. CO. / [NO.] 9, 10,& 11 RACES / KENT & DURFEE.	1921/06/12	1"=2'	H 29.2, W 45.7 CM	INK	PAPER
146-027-M	MERRIMACK MFG. CO. / PRELIMINARY DISCHARGE DIAGRAM / NO. 9 WHEEL / 50" R. H. TYPE 15 ALLIS CHALMERS WHEEL / SWING GATE.	1919/09/22	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-M-[COPY 1]	MERRIMACK MFG. CO. / PRELIMINARY DISCHARGE DIAGRAM / NO. 9 WHEEL / 50" R. H. TYPE 15 ALLIS CHALMERS WHEEL / SWING GATE.	1919/09/22	NONE	H 11 1/2", W 17 1/4"	BLUEPRINT	PAPER

146-027-N	[DIAGRAM SHOWING] MERRIMACK NO. 9 WHEEL / 50" TYPE 15 ALLIS-CHALMERS / DISCHARGE CURVE FOR 36" HEAD / USED AS A BASIS OF NEW / DISCHARGE DIAGRAM.	1921/08/09	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-O	[DIAGRAM SHOWING] TEST RESULTS / POWER DISCHARGE & EFFICIENCY CURVES [& HORSE POWER] / NO. 9 WHEEL-MERRIMACK MFG. CO.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-P	[COMPARISON OF] TEST RESULTS / [WITH] POWER, DISCHARGE & EFFICIENCY CURVES [FROM ALLIS CHALMERS DRAWING # T-16-1 ASSUMING FULL GATE ON MERRIMACK] / NO. 9 WHEEL-[SET AT 0.9 GATE ON DRAWING] MERRIMACK MFG. CO.	UNDATED	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
146-027-Q	[PLOT OF COMPUTED HORSE] POWER CURVES / NO. 9 WHEEL MERRIMACK MFG. CO. / [FROM] HOLYOKE TEST # 2202 / NO. 9 WHEEL MERRIMACK MFG. CO. [& TEST OF WHEEL IN PLACE SEPT. 11, 1919.]	SEE TITLE	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
146-027-R	COMPARISON OF [COMPUTED] DISCHARGE CURVES [FROM REDUCTION OF HOLYOKE TEST # 2202 BY (A) SQUARES OF DIAMETERS, (B) RATIO OF BUCKET AREAS, (C) AS DRAWN BY ALLIS CHALMERS (DRG. # T-16-1)] MERRIMACK NO. 8. WHEEL 50" TYPE "15" ALLIS-CHALMERS.	UNDATED	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER

146-027-S	[SKETCH SHOWING ELEVATION, MEAN WIDTH, AND GRADE OF] CURRENT METER FLUME / IN / MERRIMACK INNER CANAL.	1921/07/29	NONE	H 21.7, W 30.6 CM	INK	PAPER
146-027-T	SKETCH OF PENSTOCK ENTRANCES / MERRIMACK MFG. CO. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/11/16	1"=10'	H 24, W 30 CM	INK, COLORED INK	DRAFTING CLOTH
146-027-U	SCHEME II. / BOOTT MILLS, LOWELL, MASS. / [FOR] USE OF [OLD # 5 & 6] MERRIMACK MFG. CO. FLUMES. / NECESSARY CHANGES SHOWN DOTTED. / SINGLE WHEEL.	1917/02/16	1"=40'	H 28, W 32.9 CM	BLUEPRINT	PAPER
146-027-V	SCHEME I. / BOOTT MILLS, LOWELL, MASS. / [FOR] USE OF [OLD # 5 & 6] MERRIMACK MFG. CO. FLUMES. / NECESSARY CHANGES SHOWN DOTTED. / [WITH] TWO WHEELS [INSTEAD OF ONE].	1917/02/21	1"=40'	H 27.5, W 33 CM	BLUEPRINT	PAPER
146-027-W	[PLAN SHOWING] WEAVE SHED [ON TREMONT ST.] / MERRIMACK MANUFACTURING COMPANY / LOWELL, MASS.	1938/07/15	1"=40'	H 23.3, W 43.4 CM	INK, COLORED INK	DRAFTING CLOTH
146-027-X	SKETCH SHOWING / TREMONT MILL NO. 2 / OF THE / MERRIMACK MFG. COMPANY / TO BE / LEASED TO THE NASHUA MFG. COMPANY / FROM MARCH 1,1934. FOR SEVEN MONTHS.	SEE NOTES	1"=40'	H 21.5, W 35.6 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
146-027-Y	PORTION OF / MERRIMACK & INNER CANALS / AT THE / MERRIMACK MFG. COMPANY.	1940/11/00	1"=40'	H 30.2, W 57.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH

146-027-Y-[COPY 1]	PORTION OF / MERRIMACK & INNER CANALS / AT THE / MERRIMACK MFG. COMPANY.	1940/11/00	1"=40'	H 29.9, W 57.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
146-027-Z	DETAILS OF / BOILER HOUSE ROOF & ROOF TRUSS [SHOWING DEFLECTION, MAXIMUM BENDING MOMENTS ETC.] / MERRIMACK MANUFACTURING CO. / LOWELL, MASS.	1941/04/07	NONE	H 28, W 41.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
146-027-Z-[COPY 1]	DETAILS OF / BOILER HOUSE ROOF & ROOF TRUSS / MERRIMACK MANUFACTURING CO. / LOWELL, MASS.	1941/04/07	NONE	H 29.8, W 41 CM	BLUEPRINT	PAPER
146-028	[DIAGRAM SHOWING] PERMANENT & SURPLUS / MILL POWERS / DRAWN BY NEW / NO. 9 WHEEL / OF / MERRIMACK MFG. CO.	SEE NOTES	NONE	H 65.2, W 79.1 CM	INK	DRAFTING CLOTH
146-029	[DIAGRAM SHOWING] MERRIMACK MFG. CO. WHEELS 10 & 11 / EFFECTIVE GUIDE AREA ON OCT. 17,1920 / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/10/17	NONE	H 85, W 52.4 CM	INK	DRAFTING CLOTH
146-030	[PLAN OF] BULKHEAD RING / USED ON / HYDRAULIC TURBINE [FOR MERRIMACK MFG. CO'S. ALLIS CHALMERS NO. 9 WHEEL].	SEE NOTES	1 1/2"=12"	H 86.7, W 55.7 CM	BLUEPRINT	PAPER
146-031	[PLAN OF] BULKHEAD COVER & STUFFING BOX / USED ON / HYDRAULIC TURBINE [FOR MERRIMACK MFG. CO'S. WHEEL NO. 9 AN ALLIS CHALMERS, 50" TYPE 15].	SEE NOTES	1 1/2"=12"	H 86.7, W 55.7 CM	BLUEPRINT	PAPER
146-032	HOLYOKE TEST / TYPE # 15 / NO. 2202 / 30" R. H. RUNNER.	1913/02/00	NONE	H 57, W 67.4 CM	BLUEPRINT	PAPER

146-033	[PLAN FOR] POWER HOUSE ARRANGEMENT / & / FOUNDATION PLAN / FOR / MERRIMACK MFG. CO. [(ALLIS-CHALMERS CO.)].	1918/08/01	1/2"& 1 1/2"=12"	H 75.7, W 106.3 CM	BLUEPRINT	PAPER
146-034	[DIAGRAM SHOWING] PERMANENT & SURPLUS MILL-POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. CO.	SEE NOTES	NONE	H 65.2, W 79.1 CM	INK	DRAFTING CLOTH
146-035	[PLAN FOR] MERRIMACK MFG. CO. / ALLIS-CHALMERS HYDRO-ELECTRIC UNIT / STEEL RODS-GIRDERS COL'S.	1918/08/29	1/2"=1'	H 74.6, W 127.9 CM	BLUEPRINT	PAPER
146-036	[PLAN FOR] MERRIMACK MFG. CO. / ALLIS-CHALMERS 1150 H. P. / HYDRO-ELECTRIC UNIT [FOR THE MERRIMACK MFG. CO.]	1918/08/26	1/2"& 1 1/2"=3"	H 74.6, W 127.9 CM	BLUEPRINT	PAPER
146-037	[PLAN FOR] PRELIMINARY POWER HOUSE ARRANGEMENT / FOR / [ALLIS-CHALMERS HYDRO-ELECTRIC UNIT] MERRIMACK MFG. CO.	1917/05/23	3/8"=12"	H 86, W 59.8 CM	BLUEPRINT	PAPER
146-038	[PLAN OF] MERRIMACK MFG. CO. / ALLIS-CHALMERS HYDRO-ELECTRIC UNIT / PENSTOCK & FLUME [FOR THE MERRIMACK MFG. CO.].	1918/09/17	3/4"=1'	H 83.1, W 75.3 CM	BLUEPRINT	PAPER
146-039	[PLAN FOR ALLIS-CHALMERS HYDRO-ELECTRIC UNIT, TYPE 15, 50", NO. 9 WHEEL FOR THE MERRIMACK MFG. CO.]	1921/07/00			BP	
146-040	[DIAGRAM SHOWING] PERMANENT & SURPLUS MILL POWERS / DRAWN BY THE WHEELS OF / MERRIMACK MFG. CO.	1921/11/18	NONE	H 54.6, W 69.6 CM	INK	DRAFTING CLOTH

146-040-[COPY 1]	PERMANENT & SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. COMPANY.	1921/11/18	NONE	H 54.6, W 69.6 CM	BLUEPRINT	PAPER
146-040-[COPY 2]	PERMANENT & SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. COMPANY.	1921/11/18	NONE	H 54.6, W 69.6 CM	BLUEPRINT	PAPER
146-041	[DRAWING SHOWING] MERRIMACK MFG. CO. / [PROPOSED] ELECTRIFICATION OF # 10 & 11 WHEELS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/02/10	1/4"=1'	H 54.6, W 62.3 CM	INK, GRAPHITE	DRAFTING CLOTH
146-042	[PLAN FOR] GRIST MILL / PROPOSED REDEVELOPMENT / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/03/21	1/2"=1'	H 61.9, W 54 CM	INK, GRAPHITE	DRAFTING CLOTH
146-043	[DIAGRAM SHOWING] PERMANENT MILL POWERS / DRAWN BY WHEELS OF / [THE] MERRIMACK MFG. CO.	1924/02/27	NONE	H 56.3, W 86.5 CM	INK	PAPER
146-043-[COPY 1]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. CO.	1924/02/27	NONE	H 52, W 84 CM	BLUEPRINT	CLOTH BACKED PAPER
146-044	[DIAGRAM SHOWING] SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. CO.	1924/02/23	NONE	H 56.3, W 103 CM	INK	PAPER
146-044-[COPY 1]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. CO.	1924/02/23	NONE	H 52, W 84 CM	BLUEPRINT	CLOTH BACKED PAPER

146-045	TRACING [PAPER DRAWINGS] OF RED PENCIL ADDITIONS / TO A BLUE PRINT OF MERRIMACK MILL PLAN MADE / [SHOWING PROPOSED EXTRA FEEDERS IN MERRIMACK MFG. CO. MILL YARD] FOR MR. WADELEIGH AUG. 10, '26.	1926/08/10	1"=10'	H 41.2, W 62.9 CM	GRAPHITE	TRACING PAPER
146-046	[PLAN SHOWING] RELOCATION OF 12" & 16" L.& C. WATER MAINS / ALSO / NEW 6" LINE TO ELEVATOR / MERRIMACK MFG. CO.	1927/03/31	1"=20'	H 29.4, W 45.8 CM	INK, COLORED INK, COLORED PENCIL	PAPER
146-047	MILL POWERS / DRAWN BY WHEELS OF / MERRIMACK MFG. CO. / TREMONT MILLS.	1927/05/17	NONE	H 33.3, W 76 CM	INK, COLORED INK	DRAFTING CLOTH
146-048	PLAN SHOWING LOCATION OF / SPRINKLER RISERS FOR WEAVE SHED ADDITION.	1928/12/28	1/8"=1'	H 29.6, W 93 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
146-049	PLAN & ELEVATIONS / OF / MERRIMACK [INNER CANAL & UPPER END OF ICEWAY IN CONNECTION WITH] SLUICE GATE / PROP'S OF LOCKS & CANALS-LOWELL, MASS.	1928/07/00	1/4"=1'	H 45.5, W 114 CM	INK, COLORED INK	DRAFTING CLOTH
146-050	[BLUEPRINT SHOWING] PROPOSED ARRANGEMENT OF MERRIMACK SLUICE GATE & HOIST [WITH DOUBLE LEAF GATE] / PROPRIETORS LOCKS & CANALS CO. LOWELL, MASS. / HOLYOKE MACHINE CO. / WORCESTER, MASS.	1928/08/20	3/4"=1'	H 86.4, W 107.4 CM	BLUEPRINT	PAPER

146-051	PROP. LOCKS & CANALS CO. / [PROPOSED ARRANGEMENT OF] SLUICE GATE [& HOIST, WITH DOUBLE LEAF GATE] / HOLYOKE MACHINE CO.	1928/10/05	3/4"=1'	H 40, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
146-052	PLAN SHOWING / LOCATION OF ESTABLISHED MERRIMACK RIVER LINE [IN REAR OF] OPPOSITE / MERRIMACK MFG. CO. / PROPS. LOCKS & CANALS ON MERRIMACK RIVER.	1929/07/02	1"=40'	H 35.4, W 78.7 CM	INK, COLORED INK	DRAFTING CLOTH
146-053	PLAN OF LAND / BELONGING TO / MERRIMACK MFG. CO. / ON NORTH SIDE OF MERRIMACK RIVER.	1929/10/15	1"=40' & 1000'	H 39, W 85.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
146-054	[PLAN SHOWING THE] ARRANGEMENT OF MERRIMACK SLUICE GATE AND HOIST / PROPRIETORS LOCKS AND CANALS CO. LOWELL, MASS. / HOLYOKE MACHINE CO. / WORCESTER, MASS.	1928/10/04	3/4"=1'	H 87, W 120 CM	BLUEPRINT, COLORED PENCIL	PAPER
146-055	PORTION OF MERRIMACK MFG. CO. YARD / NECESSARY FOR WATER POWER / AREA NECESSARY FOR WATER POWER.	1933/02/21	NONE	H 21.7, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
146-056	TREMONT & LAWRENCE SECTION YARDS / OF THE / MERRIMACK MFG. COMPANY / AREA NECESSARY FOR WATER POWER 430,000 SQ. FT.	1933/02/23	1"=125'	H 21.9, W 40 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH
146-057	PROPOSED INDICATOR POSTS / FOR MILL NO.1 & 2 LAWRENCE SECTION OF / MERRIMACK MFG. CO.	1927/07/00	1"=10'	H 41.8, W 105.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH

146-058	PERFORATED STRAINER FOR PROPOSED / FIRE PUMP AT # 5 & 6 WHEEL HOUSE / HYDRO-ELECTRIC STATION.	1921/09/20	1 1/2"=1'	H 33.1, W 68.6 CM	BLUEPRINT	PAPER
146-059	LAYOUT OF PRIMING SYSTEM / FOR NEW FIRE PUMP AT # 5 / & # 6 WHEEL HOUSE HYDRO-ELECT. STA.	1921/10/18	1/2"=1'	H 56, W 64.1 CM	BLUEPRINT	PAPER
146-060	[PLAN SHOWING LAND AND BUILDINGS IN MERRIMACK, TREMONT AND LAWRENCE SECTION OF] MERRIMACK MFG. COMPANY [AND PROPERTY ON LAKEVIEW AVE. AND SNDOVER ST.].	1932/02/15	1"=60'& 150'	H 77.4, W 89 CM	INK, GRAPHITE	DRAFTING CLOTH
146-060-[COPY 1]	MERRIMACK MFG. COMPANY.	1932/02/15	1"=60'& 150'	H 77.2, W 89 CM	BLUE LINE PRINT	PAPER
146-061	REAL ESTATE PLAN / OF / MERRIMACK MFG. COMPANY / SHOWING / AREAS SUBJECT TO TAXATION.	1931/04/01	1"=60"& 150"	H 77.2, W 89 CM	BLUE LINE PRINT, WATER COLOR	PAPER
146-062	PLAN SHOWING / TENEMENT PROPERTY / OF THE / MERRIMACK MFG. COMPANY.	1932/10/14	1"=50'	H 47.3, W 67 CM	INK, COLORED PENCIL	DRAFTING CLOTH
146-063	SKETCH OF / TREMONT SECTION OF MERRIMACK MFG. COMPANY / SHOWING / LAND AREAS, BUILDINGS, FLOOR AREAS, WATERWAYS, / AREAS LEASED FROM PROPRIETORS OF THE LOCKS & CANALS / & OTHER INFORMATION.	1932/08/08	1"=50'	H 47, W 91 CM	INK	DRAFTING CLOTH
146-064	PLAN OF LAND IN LOWELL, MASSACHUSETTS / BELONGING TO / MERRIMACK MANUFACTURING COMPANY.	SEE NOTES	1"=60'	H 54.3, W 68 CM	BLUEPRINT, COLORED PENCIL	PAPER

146-065	PLAN & SECTIONS OF / INNER CANAL REPAIRS / MERRIMACK MANUFACTURING COMPANY / LOWELL, MASS.	1940/04/08	1/8"=1',1"=10'	H 42.2, W 109.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
146-066	PLAN & ELEVATIONS / SHOWING / OLD NOS. 5 & 6 PENSTOCKS, / WHEEL PITS & TAILRACE / MERRIMACK MANUFACTURING CO.	1940/10/25	1"=1'	H 49, W 89.6 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	DRAFTING CLOTH
146-067	SKETCH OF MAIN STEAM PIPES / MERRIMACK MFG. CO. LOWELL, MASS.	1940/02/05	1"=60'	H 52.2, W 58.5 CM	INK, COLORED INK	DRAFTING CLOTH
146-068	[MERRIMACK MFG. CO. LOWELL, MASS.] BOILER ROOM TRUSSES.	1903/09/22	NONE	H 56.8, W 68.2 CM	BLUEPRINT	PAPER
146-068-[COPY 1]	MERRIMACK MFG. CO. / LOWELL, MASS. / (TRACED FROM BLUE PRINT) / BOILER ROOM TRUSSES.	1903/09/22	NONE	H 40.6, W 89.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
146-069	PLAN IN SUB-DIVISION OF / CERTAIN PROPERTY OF MERRIMACK MANUFACTURING COMPANY / LOWELL, MASS.	1938/08/00	NONE	H 56.9, W 68.2 CM	BLUEPRINT	PAPER
146-070	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / MERRIMACK MANUFACTURING CO. (1946).	SEE NOTES	1"=40'	H 51.7, W 90.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-[083]-[A]	HAMILTON MANUFACTURING CO., / LOWELL, MASS.	1921/01/15	1"=50'	H 71, W 51 CM	INK, COLORED INK, GRAPHITE	PAPER
147-[083]-[A]-[COPY 1]	HAMILTON MANUFACTURING CO., / LOWELL, MASS.	1921/01/15	1"=50'	H 71, W 51 CM	PHOTOGRAPHIC NEGATIVE PRINT	PAPER

147-[083]-[B]	HAMILTON MANUFACTURING CO., / LOWELL, MASS.	1921/01/15	1"=50'	H 71, W 51 CM	INK, COLORED INK	PAPER
147-[083]-[C]	HAMILTON MANUFACTURING CO., / LOWELL, MASS.	1921/01/15	1"=50'	H 51, W 71 CM	INK, COLORED INK, GRAPHITE	PAPER
147-[084]-[A]	HAMILTON MANUFACTURING CO., / LOWELL, MASS.	1918/10/23	1"=50'	H 43, W 71 CM	BLUE LINE PRINT, WATER COLOR	PAPER
147-[084]-[B]	HAMILTON MANUFACTURING CO., / LOWELL, MASS.	1918/10/23	1"=50'	H 43, W 71 CM	BLUE LINE PRINT	PAPER
147-[085]	MADREN & MURPHY INC. / BLDG. NO. 7 / LOWELL, MASS. PROPOSED SUPPORT FOR 3 CABLES / FOR C. F.	1935/07/31	1"=50'	H 42, W 44 CM	INK, WATER COLOR	PAPER
147-[086]	HATHAWAY CO., INC. / 4TH FLOOR, MILL NO. 7, "HAMILTON YARD".	1954/11/19	1/4"=1' & 1"=1'	H 33, W 83 CM	COLORED INK, GRAPHITE	PAPER
147-001	DIAGRAM SHOWING ESTIMATED EFFICIENCY / OF HAMILTON WHEELS.	1908/11/23	NONE	H 73.7, W 53.5 CM	INK	PAPER CLOTH BACKED PAPER
147-001-[COPY 1]	DIAGRAM SHOWING ESTIMATED EFFICIENCY / OF HAMILTON WHEELS.	1908/11/23	NONE	H 77, W 59.5 CM	BLUEPRINT	
147-002	PLAN OF / CONCRETE FOUNDATION / BUILT FOR THE / HAMILTON MFG. CO. / BY PROPS. LOCKS & CANALS / FINISHED DEC. 1, 1896.	1897/01/01	1"=10'	H 76.5, W 142 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
147-003	PLAN OF PART OF / CONCRETE FOUNADTION / PUT IN FOR / HAMILTON MFG. CO. / BY / PROPS OF LOCKS & CANALS / (FINISHED DEC.1, 1896).	1897/01/01	1"=2'	H 66.4, W 101 CM	INK, COLORED INK	DRAFTING CLOTH

147-003-[COPY 1]	PLAN OF PART OF / CONCRETE FOUNDATION / PUT IN FOR / HAMILTON MFG. CO. / BY / PROPS. OF LOCKS & CANALS / (FINISHED DEC. 1, 1896).	1897/01/01	1"=2'	H 66.4, W 101 CM	INK, COLORED INK	TRACING PAPER
147-004	HEAD 13 FEET. / DETAILS OF PAIR OF 36", HORIZONTAL, HERCULES [WHEELS TYPE] "C" TURBINES. / [FOR] HAMILTON MFG. CO. / LOWELL, MASS.	1907/03/21	3/4"=1'	H 92.4, W 123.2 CM	BLUEPRINT	CLOTH BACKED PAPER
147-005-[A]	[GENERAL] ARRANGEMENT OF ONE PAIR OF [36"] HORIZONTAL HERCULES [TYPE C] TURBINES. / FOR THE / HAMILTON MFG. CO. / LOWELL, MASS.	1907/02/19	1/4"=1'	H 83.8, W 77.5 CM	BLUEPRINT	CLOTH BACKED PAPER
147-005-[B]	[GENERAL] ARRANGEMENT OF ONE PAIR OF [36"] HORIZONTAL HERCULES [TYPE C] TURBINES. / FOR THE / HAMILTON MFG. CO. / LOWELL, MASS.	1907/02/19	1/4"=1'	H 81.3, W 73.5 CM	BLUEPRINT	PAPER
147-006	HAMILTON MFG. CO. / [PLAN OF] PAIR OF / 54" SWAIN WHEELS.	1900/07/16	1/2"=1',3"=1'	H 103.5, W 70.9 CM	BLUEPRINT	PAPER
147-007	[DETAILS OF] NO. 1 WHEEL. PAIR [OF] 36" HORIZONTAL HERCULES [WHEELS TYPE C] / BUILT BY / HOLYOKE MCH. CO. FOR HAMILTON MFG. CO.	1907/03/21	NONE	H 68.6, W 123 CM	BLUEPRINT	PAPER
147-008	PLAN & ELEVATION OF NOS. 6 & 7 WHEEL PITS / SHOWING / TWO NEW SMITH [McCORMICK 51"] SPECIAL VERTICAL WHEELS / INSTALLED BY S. MORGAN SMITH CO. / FOR / HAMILTON MFG. CO. / LOWELL, MASS.	1905/06/21	1/4"=10'	H 60.2, W 109 CM	BLUEPRINT	PAPER

147-009	HAMILTON MFG. CO. / LOWELL, MASS. / PLAN SHOWING GRADES ON JACKSON ST. / & SIDE STREETS & ELEVATION OF CLOTH ROOM BUILDING.	UNDATED	1"=40' & 1"=10'	H 53, W 82.8 CM	BLUEPRINT	PAPER
147-010	SCALE DRAWING OF WATER-WAYS / 1, 2, 3, 4 & 5 WHEELS OF HAMILTON M'F'G. CO.	1900/05/01	1"=10'	H 73.6, W 47.3 CM	BLUEPRINT	PAPER
147-011	[UNTITLED.] [DRAWING OF HAMILTON RACEWAYS SHOWING SECTIONS OF SAME. RACEWAYS OF NOS. 6-7-8-9 AND 10 WHEELS.]	1899/11/21	1"=10'	H 36.2, W 66.2 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
147-011-[A]	TRACING FROM / "DRAWING OF HAMILTON RACEWAYS" / AT "LOCKS AND CANALS" OFFICE.	1899/11/21	1"=10'	H 58.5, W 124 CM	INK, COLORED INK	DRAFTING CLOTH
147-012	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY. / SHOWING THE MAIN SHAFTING & ITS CONNECTIONS.	1898/05/20	1/4"=10'	H 65, W 88.9 CM	HELIOTYPE, WATER COLOR	CLOTH BACKED PAPER
147-012-[A]	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY. / SHOWING THE MAIN SHAFTING & ITS CONNECTIONS.	SEE NOTES	1/4"=10'	H 65, W 88.9 CM	INK, COLORED INK	DRAFTING CLOTH
147-012-[A]-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY. / SHOWING THE MAIN SHAFTING & ITS CONNECTIONS.	SEE NOTES	1/4"=10'	H 64.4, W 87 CM	BLUEPRINT	PAPER
147-013	[SKETCH OF] MADDER DYE HOUSE / BELONGING TO / HAMILTON MFG. CO. / SHOWING (IN RED) / PROPOSED ADDITION OF ONE STORY.	1892/02/00	1/4"=1'	H 46.4, W 68 CM	INK, COLORED INK	PAPER

147-014-[A]	PROPOSED STRENGTHENING OF FOUNDATION / OF PILLARS IN / HAMILTON M. CO'S MILL NO.4.	1892/03/29	1"=1'	H 33, W 30.2 CM	INK	DRAFTING CLOTH
147-014-[B]	SECTION OF / PILLAR FOUNDATIONS / OF / HAMILTON M. CO'S MILL NO.4.	1892/03/21	1/2"=1'	H 23.4, W 43.5 CM	INK	DRAFTING CLOTH
147-014-[C]	PILLAR FOUNDATIONS / OF / HAMILTON M. CO'S MILL NO. 4.	1892/08/04	1"=1'	H 42.6, W 31.5 CM	INK, COLORED INK	DRAFTING CLOTH
147-015	SKETCH SHOWING SOME GRADES / AT HAMILTON M. CO'S MILLS.	1895/05/00	1"=40' & 1"=2'	H 42.6, W 67.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-016	SECTIONS IN THE / MILL YARD / OF THE / HAMILTON MFG. CO.	1893/04/00	H1"=30',V 1"=5'	H 51.5, W 87.6 CM	INK, COLORED INK	DRAFTING CLOTH
147-017	PART ELEVATION / OF / HAMILTON [MFG. CO'S.] MILL NO. 4 / SHOWING / PROPOSED ADDITION OF TWO STORIES.	1892/02/00	1/8"=1'	H 36.5, W 52.2 CM	INK, COLORED INK	PAPER
147-018	PLAN / SHOWING LOCATIONS OF THE / FEEDERS, WHEELPITS, & RACEWAYS / OF THE HAMILTON MFG. CO'S PROPOSED / "NEW MILL" [NO. 6. COMPILED IN THE OFFICE OF THE L.& C.].	1881/02/00	1"=20'	H 59.6, W 72.1 CM	INK	CLOTH BACKED PAPER
147-019	[PLAN SHOWING LOCATION OF] HAMILTON COMPANY'S WHEEL PITS [NOS. 9 & 10] / FOR WEST END OF NEW MILL [NO. 6].	1879/09/00	1/8"=1'	H 72, W 89 CM	INK, COLORED INK	DRAFTING CLOTH
147-020	HAMILTON MFG. CO. / SKETCH SHOWING SUGGESTED LOCATION OF / 2 PAIR OF 48" HOR[IZONTAL] WHEELS TO REPLACE NO'S. 9 & 10.	1913/02/05	1"=10'	H 44.3, W 48.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

147-021	HAMILTON MFG. CO. / SKETCH [PLAN AND ELEVATION] SHOWING SUGGESTED LOCATION OF / A PAIR OF 42" HOR. WHEELS TO REPLACE NO. 8 WHEEL.	1913/02/06	1"=10'	H 45, W 38.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
147-022	[UNTITLED.] [SKETCH SHOWING PIERS IN NO. 8 RACEWAY OF HAMILTON MFG. CO.]	1911/09/12	NONE	H 47, W 66 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
147-023-[A]	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS OF / HAMILTON MFG. CO.	1908/02/00	NONE	H 53.5, W 48 CM	INK, COLORED INK	DRAFTING CLOTH
147-023-[A]-[COPY 1]	MILL POWERS / DRAWN BY WHEELS OF / HAMILTON MFG. CO.	1908/02/00	NONE	H 53.2, W 48 CM	BLUEPRINT	PAPER
147-023-[B]	[UNTITLED.] [MILL POWERS DRAWN BY WHEELS OF HAMILTON MFG. CO.]	1908/02/00	NONE	H 53.5, W 48 CM	INK, COLORED INK	DRAFTING CLOTH
147-023-[B]-[COPY 1]	[UNTITLED.] [MILL POWERS DRAWN BY WHEELS OF HAMILTON MFG. CO.]	1908/02/00	NONE	H 53.2, W 48 CM	BLUEPRINT	PAPER
147-024	[SPEEDGATE GAUGE FOR WHEELS OF] HAMILTON MFG. CO.-NO.1 PAIR.	UNDATED	NONE	H 33.8, W 76.3 CM	INK	DRAFTING CLOTH
147-025-[A]	DIAGRAM SHOWING HORSE POWER / WITH 13 FEET FALL & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATES OF TWO 51" SMITH McCORMICK / WHEELS FOR THE HAMILTON MFG.' CO. OF LOWELL.	1906/01/16	NONE	H 21.7, W 30.5 CM	INK, COLORED INK	PAPER

147-025-[B]	DIAGRAM SHOWING QUANTITY OF WATER DISCHARGED / WITH 13' FEET FALL, & DIFFERENT SPEEDS & OPENINGS / OF THE SPEEDGATES OF TWO 51" SMITH McCORMICK / WHEELS FOR THE HAMILTON MFG.' CO. OF LOWELL.	1906/01/16	NONE	H 21.7, W 30.5 CM	INK, COLORED INK	PAPER
147-025-[C]	DIAGRAM SHOWING EFFICIENCY IN PER CENT, / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 13' FALL / REL. VEL. OF 803 WITH 106 REV. PER MIN. OF TWO / 51" SMITH McCORMICK / WHEELS FOR THE HAM- / ILTON MFG.' CO. OF LOWELL, MASS.	1906/01/22	NONE	H 21.7, W 30.5 CM	INK, COLORED INK	PAPER
147-025-[D]	DIAGRAM SHOWING PER CENT OF EFFICIENCY / WITH 13 FEET FALL, AND DIFFERENT SPEEDS AND OPENINGS / OF THE SPEEDGATES OF TWO 51" SMITH McCORMICK / WHEELS FOR THE HAMILTON CO. OF LOWELL.	1906/01/16	NONE	H 21.7, W 30.5 CM		PAPER
147-026	[PLAN & ELEVATION SHOWING] HAMILTON MFG. CO. / LOWELL, MASS. / FOUNDATION & FOOTINGS FOR NO. 7 MILL / IN / PAWTUCKET CANAL.	1919/05/23	1/8"=1', 1"=40'	H 62.6, W 165.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
147-027	HAMILTON MFG. CO. / PLAN & SECTION[S] OF [WHEELS] # 1, 2, 3, 4,& 5 PENSTOCK [PLOTTED FROM NOTES IN OFFICE OF PROP. OF L.& C.]	1901/09/25	1"=10'& 1"=4'	H 51.3, W 44.5 CM	INK, COLORED INK	DRAFTING CLOTH
147-028	[CROSS SECTION OF NEW MILL FOR HAMILTON MFG. CO. FROM MAKEPEACE & CO.]	1911/05/09	1/4"=1'		BP	

147-029-[01]	COPY OF ORIGINAL PLAN TO ACCOMPANY / DEED FOR THE SALE OF LAND FROM / P. L.& C. TO BOOTT MILLS NOV. 16, 1835.	SEE TITLE	NONE	H 24, W 44.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-[01]-[COPY 1]	COPY OF ORIGINAL PLAN TO ACCOMPANY / DEED FOR THE SALE OF LAND FROM / P. L.& C. TO BOOTT MILLS NOV. 16, 1835.	SEE TITLE	NONE	H 24, W 44.5 CM	BLACK LINE PRINT, COLORED PENCIL	PAPER
147-029-[02]	COPY OF PLAN TO ACCOMPANY / DEED FOR THE SALE OF LAND FROM / P. L.& C. TO MASS. COTTON MILLS, MAR.1, 1839.	SEE TITLE	1/4"=100'	H 44, W 32 CM	INK	DRAFTING CLOTH
147-029-[03]	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE OF LAND / FROM P.L.& C. TO PRESCOTT MFG. CO. AUGUST 29, 1845.	SEE TITLE	5/8"=100'	H 41.5, W 24.5 CM	INK	DRAFTING CLOTH
147-029-[04]	PLAN OF LOTS NO. 3 & 4 / SHADED RED AND DEEDED THIS / DAY TO THE APPLETON MAN:G / COMPANY.	SEE NOTES	10'=1' MARQUOIS	H 40, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-[05]	PLAN OF LOTS NO. 7 & 8 / SHADED RED AND DEEDED THIS DAY / TO THE HAMILTON MANUFG / COMPANY.	SEE NOTES	10'=1' MARQUOIS	H 39, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-[06]	PLAN OF LAND NEAR SAW MILL / SHADED RED AND DEEDED THIS DAY / TO THE [LOWELL MFG. CO.]	SEE NOTES	35'=1' MARQUOIS	H 40, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-[07]	PLAN OF LAND SHADED BLUE / DEEDED TO THOMAS HURD-OCTO. 1ST-1828.	SEE NOTES	50'=1'	H 42.5, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-[08]	COPY OF ORIGINAL PLAN TO ACCOMPANY / DEED FOR THE SALE OF LAND FROM / P. L.& C. TO SUFFOLK MFG. CO. JAN. 1, 1832.	SEE TITLE	NONE	H 45, W 36.5 CM	INK, COLORED INK	DRAFTING CLOTH

147-029-[09]	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE / OF LAND FROM P. L.& C. TO TREMONT MILLS JULY 1, 1832.	SEE TITLE	NONE	H 41.5, W 31.5 CM	INK, COLORED INK	DRAFTING CLOTH
147-029-[10]	COPY OF PLAN TO ACCOMPANY DEED FOR THE / SALE OF LAND FROM P. L.& C. TO THE LOWELL / MANUFACTURING CO. SEPT. 14, 1832.	SEE TITLE	70'=1"	H 29.75, W 23 CM	INK, COLORED INK	DRAFTING CLOTH
147-029-[11]	COPY OF ORIGINAL PLAN TO ACCOMPANY / DEED FOR THE SALE OF LAND FROM / P. L.& C. TO LAWRENCE MFG. CO. APR.13, 1833.	SEE TITLE	80'=1"	H 46, W 36.5 CM	INK, COLORED INK	DRAFTING CLOTH
147-029-[12]	COPY OF ORIGINAL GRANT OF LAND FROM / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER TO / MERRIMACK MANUFACTURING COMPANY MAY 3, 1826.	SEE TITLE	NONE	H 42.5, W 28 CM	INK	PAPER
147-029-[13]	SURVEYED BY J. NEWHALL / MAY 1855.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER
147-029-A	CURRENT METER MEASUREMENT / AT / HAMILTON NO.10 RACE.	1919/05/19	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
147-029-B	CURRENT METER MEASUREMENT / AT / HAMILTON NO.10 RACE [A.T.S. METER 4176].	1919/09/22	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
147-029-C-[1]	[DIAGRAM SHOWING] CURRENT METER MEASUREMENT / [OF] HAMILTON # 6 & # 7 WHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/09/05	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER

147-029-C-[2]	[DIAGRAM SHOWING] CURRENT METER MEASUREMENT / [OF] HAMILTON # 6 & # 7 WHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/09/05	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
147-029-D	[DIAGRAM SHOWING] POINT MEASUREMENT BY CURRENT METER / [AT] HAMILTON # 6 & # 7 WHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/09/05	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
147-029-E	[DIAGRAM SHOWING] MEASUREMENTS OF WATER PASSING / CURRENT METER STATION FOR HAMILTON / 1-2-3-4-4A WHEELS.	1919/08/13	NONE	H 29.3, W 45.7 CM	INK	PAPER
147-029-F	[DIAGRAM SHOWING] MEASUREMENT OF WATER PASSING / CURRENT METER STATION FOR HAMILTON [MFG. CO'S] / [NOS.] 1-2-3-4-4A WHEELS.	1919/08/07	NONE	H 29.3, W 45.7 CM	INK	PAPER
147-029-G	HAMILTON MFG. CO. / POINT MEASUREMENT BY CURRENT METER / OF / WHEELS 1-2-3-4-4A.	1919/08/13	NONE	H 21.3, W 30.5 CM	INK, COLORED INK, GRAPHITE	PAPER
147-029-H	HAMILTON M'F'G' CO. / DISCHARGE OF / WHEELS NOS. 8 & 9 / 36 & 39 INCH LEFFEL WHEELS.	SEE NOTES	NONE	H 45.7, W 29.3 CM	INK, COLORED INK	PAPER
147-029-H-[COPY 1]	[DIAGRAM SHOWING] HAMILTON M'F'G' CO. / DISCHARGE OF / WHEELS NOS. 8 & 9 / 36 & 39 INCH LEFFEL WHEELS.	SEE NOTES	NONE	H 45.6, W 29 CM	BLUEPRINT	PAPER
147-029-I	[DIAGRAM SHOWING] COMPARISON OF / DISCHARGE CURVES / [OF] HAMILTON NO.8 [(36" TYPE, LEFFEL)] & NO. 9 [(39" TYPE Z, LEFFEL)] WHEELS.	1919/10/28	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER

147-029-J	[DIAGRAM SHOWING] HAMILTON # 9 UNIT / 39" R.H. TYPE Z. LEFFEL WHEEL / AREAS & VELOCITIES THROUGH WATERWAYS / 283 C.F.P.S.	UNDATED	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
147-029-K	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATIONS / FOR / HAMILTON MFG. CO. / LOWELL, MASS.	1920/02/09	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
147-029-L	[DIAGRAM SHOWING] POWER DURATION DIAGRAM / FOR / HAMILTON MFG. CO. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/03/09	NONE	H 30.2, W 21.4 CM	INK, GRAPHITE, COLORED INK	PAPER
147-029-M	[COPY OF] PLAN OF LOT NO. 6 / SHADED RED AND DEEDED THIS DAY / TO THE HAM: [HAMILTON] MANFG. COPY / WITH THE ADJOINING LOTS.	SEE NOTES	10'=1' MARQUOIS	H 40, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-N	BOSTON & MAINE RAILROAD / NEW HAMPSHIRE DIV.- LOWELL YARD / LAND, TRACKS & BUILDINGS IN JACKSON ST. / LOWELL, MASS. [SPUR TRACK TO NO. 7 MILL].	1937/09/14	1"=40'	H 27.7, W 54.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-029-O	PLAN OF LAND [AND PASSAGEAWY AROUND SAME LOCATED ON CENTRAL STREET] IN LOWELL, MASS., / [AND] BELONGING TO HAMILTON MFG. COMPANY.	1911/08/29	1"=20'	H 23, W 55.4 CM	BLUEPRINT	PAPER
147-029-P	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO THE / HAMILTON MANUFACTURING COMPANY.	UNDATED	1"=20'	H 38.5, W 37 CM	BLUEPRINT	PAPER
147-029-Q	PLAN OF LAND IN LOWELL, MASS. / COMPILED FOR / MARDEN & MURPHY INC.	1942/01/14	1"=20'	H 45.3, W 30.7 CM	INK	DRAFTING CLOTH

147-029-R	MILL NO.7-2ND FLOOR / "HAMILTON YARD" / MARDEN & MURPHY INC.	1937/02/03	1"=40'	H 22.7, W 48 CM	INK, COLORED INK	DRAFTING CLOTH
147-029-S-[1]	PLAN OF LOT NO. 5 / SHADED BLUE DEEDED THIS DAY / TO THE HAM: MANFG. COMPY / AND OF THE LOTS TO THE EAST.	SEE NOTES	10'=1' MARQUOIS	H 40, W 28 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-029-S-[2]	PLAN OF LOT NO. 6 / SHADED RED AND DEEDED THIS DAY / TO THE HAM: MANFG. COMPY. / WITH THE ADJOINING LOTS.	SEE NOTES	10'=1' MARQUOIS	H 38.5, W 27.5 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
147-029-T	HAMILTON YARD / MARDEN & MURPHY, INC. [TWO SKETCHES OF SCHEMES # 1 AND #2 SHOWING METHOD OF FILLING UP OLD WHEEL HOUSE EAST OF 4 AND 5 WHEELHOUSE AND AMOUNT OF MATERIAL NEEDED.]	1945/10/24	NONE	H 35.7, W 28 CM	INK	PAPER
147-029-U	PAIR OF 54" HORIZONTAL / SWAIN WHEELS (NOW IN HAMILTON YARD) PAIR OF 36" HORIZONTAL HERCULES TYPE "C" WHEELS (NOW IN HAMILTON YARD).	1945/06/14	1/8"=1'	H 31.9, W 20.4 CM	PHOTOGRAPH, GRAPHITE	PAPER
147-029-V	PLAN & SECTIONS / SHOWING / PRESENT & SUGGESTED CONCRETE FACED WALLS / FOR A PORTION OF NORTH SIDE OF HAMILTON CANAL.	UNDATED	1/4"=1',1"=10'	H 35.9, W 59 CM	INK	DRAFTING CLOTH
147-029-W	TYPICAL SECTIONS SHOWING / PILING USED IN FRONT OF RACKS, ALSO / IN FRONT OF & UNDER CANAL WALLS.	1950/08/00	1/4"=1',1"=6'	H 33.7, W 41.3 CM	INK	DRAFTING CLOTH
147-029-X	PROPOSED CUT-OFF WALL SOUTH / SIDE OF HAMILTON CANAL / IN FRONT OF PENSTOCKS UNDER MILL NO.4.	1949/10/07	1/4"=1', 1"=10'	H 54, W 92 CM	BLUEPRINT	PAPER

147-029-Y	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO COURIER-CITIZEN COMPANY.	1946/11/21	1"=40'	H 30, W 45.8 CM	BLUEPRINT	PAPER
147-030	[DIAGRAM SHOWING] HAMILTON [MFG.] CO'S / DISCHARGE OF / WHEELS NOS. 8 [36" R.H. TYPE Z] & 9 [39" L.H. TYPE Z] / 36 & 39 INCH LEFFEL WHEELS.	SEE NOTES	NONE	H 64.8, W 78.2 CM	INK, COLORED INK	DRAFTING CLOTH
147-031-[A]	[DIAGRAM SHOWING] SURPLUS MILL POWERS / DRAWN BY WHEELS OF / HAMILTON MFG. CO.	1919/04/21	NONE	H 53.7, W 63.5 CM	INK, COLORED INK	DRAFTING CLOTH
147-031-[B]	[DIAGRAM SHOWING] PERMANENT MILL POWERS / DRAWN BY WHEELS OF / HAMILTON MFG. CO.	1919/05/03	NONE	H 54, W 59.8 CM	INK, COLORED INK	DRAFTING CLOTH
147-032	[PLAN OF LOWER PAWTUCKET CANAL] EXTENSION [OF] HAMILTON NO. 7 MILL / AND / RE-ALIGNMENT HAMILTON WASTEWAY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/13	1"=40'	H 34, W 68 CM	INK, COLORED INK	DRAFTING CLOTH
147-033	HAMILTON MFG. CO. / GENERAL PLAN / UNITS # 4-# 5 45" [TYPE] Z [VERTICAL LEFFEL TURBINES].	1920/04/07	1/4"=1'	H 54.3, W 90.7 CM	BLUEPRINT	PAPER
147-034	UNITS # 4-# 5 / TWO-45" TYPE Z VERTICAL SHAFT TURBINES [FROM THE JAMES LEFFEL CO.] / FOR HAMILTON MFG. CO. / LOWELL MASS. / SCROLL & DRAFT TUBE DETAILS.	1920/05/10	1/2"=1'	H 79.5, W 76.8 CM	BLUEPRINT	PAPER
147-035	[CROSS SECTION THRU NO. 5 UNIT OF HAMILTON MFG. CO.'S HYDRO-ELECTRIC POWER HOUSE.]	1920/00/00			BP BLUEPRINT,	
147-036	HAMILTON MFG. CO. / LOWELL, MASS. / [PLAN VEIW OF] HYDRO-ELECTRIC POWER HOUSE.	1920/09/00	1/4"=1'	H 45.6, W 118.1 CM	COLORED PENCIL	PAPER

147-037	PLAN OF THE / MILL YARD / OF THE / HAMILTON MFG. CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1920/02/12	1/4"=10'	H 74, W 113.8 CM	BLUEPRINT, INK, COLORED INK	PAPER
147-038	[PLAN VIEW OF HAMILTON MFG. CO.'S HYDRO-ELECTRIC POWER HOUSE.]	1920/09/00	1/4"=1'			
147-039	[PLAN OF] HAMILTON MFG. CO. / LOWELL, MASS. / HYDRO-ELECTRIC POWER HOUSE. / CROSS SECTION THRU. NO. 5 UNIT.	1920/09/00	1/4"=4'	H 41.2, W 55.5 CM	BLUEPRINT, GRAPHITE	PAPER
147-040	HAMILTON MFG. CO. / LOWELL, MASS. [SHOWING] MEANS FOR PUMPING OUT DRAFT TUBES.	1922/03/16	1/4"=1'	H 48.3, W 61.3 CM	BLUEPRINT	PAPER
147-041	[BLUEPRINT SHOWING FOUNDATION & FIRST FLOOR PLAN OF NEW MILL FOR THE HAMILTON MFG. CO. C. R. MAKEPEACE & CO.]	UNDATED	1/8"=1'			
147-041-[027]	SPECIFICATIONS / FOR / HAMILTON MFG. CO. LOWELL MASS. / C. R. MAKEPEACE & CO. / ARCHITECTS AND MILL ENGINEERS / PROVIDENCE, R. I. / NEW NO. 4 MILL.	1921/10/31	NONE	H 34.3, W 22.2 CM	INK	PAPER
147-042	UNIT NO. 8 / SECTION-SETTING 45" Z-VERT. TURBINE L. H. / FOR / HAMILTON MANUFACTURING CO. / LOWELL, MASS.	1922/09/08	3/8"=1'	H 43, W 85.2 CM	BLUEPRINT	PAPER
147-043	UNIT NO. 8 / DETAILS OF GENERATOR CURB 45" Z-VERT. TURBINE L. H. / FOR / HAMILTON MFG. CO. / LOWELL, MASS.	1922/09/11	3/4"=1'	H 45.8, W 65.5 CM	BLUEPRINT	PAPER
147-044	UNIT # 8. / HAMILTON MFG. CO. / LOWELL, MASS.	1922/09/11	3/8"=1'	H 62.1, W 97.5 CM	BLUEPRINT	PAPER
147-045	UNIT # 8 / HAMILTON MFG. CO. / LOWELL, MASS.	1922/09/11	3/8"=1'	H 64.2, W 96.5 CM	BLUEPRINT	PAPER

147-046	UNIT NO. 8 / PLAN OF SETTING 45" Z-VERT. TURBINE L. H. / FOR / HAMILTON MANUFACTURING CO. / LOWELL, MASS.	1922/09/16	3/8"=1'	H 40.5, W 83.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-047	UNIT NO. 8 / DETAIL OF DRAFT TUBE-45" Z-VERT. TURBINE L. H. / FOR / HAMILTON MANUFACTURING CO. / LOWELL, MASS.	1922/08/23	1"=1'	H 58.4, W 91.4 CM	BLUEPRINT	PAPER
147-048	HAMILTON MFG. CO. / LOWELL, MASS. / [DRAWING SHOWING] LAYOUT FOR INSTALLATION / OF NO. 8 [CROSSED OUT AND NO. 3, ADDED] UNIT, 36" LEFFEL WHEEL, 200 K.V.A. / ELECTRIC MACHINERY CO.	1923/02/00	1/4"=1'	H 55.5, W 69.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
147-049	[DRAWING SHOWING] POWER LAYOUT IN 1900 / AT THE / HAMILTON MFG. CO.	1923/03/15	1"=40'	H 63.4, W 86 CM	INK, WATER COLOR	DRAFTING CLOTH
147-050	[DRAWING SHOWING] PRESENT POWER [LAYOUT] / AT THE / HAMILTON MFG. CO.	1923/03/26	1"=40'	H 59.4, W 81 CM	INK, WATER COLOR	DRAFTING CLOTH
147-051	[PLAN SHOWING] HAMILTON MFG. CO. / PROPOSED LAYOUT / [FOR] NEW # 1, 2 & 3 UNITS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/05/12	1/4"=1'	H 54.5, W 67.6 CM	INK	DRAFTING CLOTH
147-052	[DRAWING SHOWING] HAMILTON MFG. CO. / LOWELL, MASS. / SETTING FOR NEW NO. 2 UNIT.	1924/01/00	1/4"=1'	H 47, W 93.4 CM	BLUEPRINT	PAPER

147-053	[DRAWING SHOWING GENERAL ARRANGEMENT OF] PLANT NO. 3 / ONE TYPE [36" LEFFEL WHEEL. NO. 8 UNIT] Z VERTICAL SHAFT TURBINE / FOR / HAMILTON MFG. CO., / LOWELL, MASS. / FROM / THE JAMES LEFFEL & CO. / SPRINGFIELD, OHIO.	1918/04/15	1/2"=1'	H 56, W 87.4 CM	BLUEPRINT	PAPER
147-054	FIRST FLOOR PLANS [HAMILTON MFG. SHOWING CHANGES] / FOR COURIER-CITIZEN CO.	1927/06/30	1/16"=1'	H 53.4, W 136.3 CM	BLUEPRINT	PAPER
147-055-[COPY 1]	PLAN SHOWING PART OF THE PROPERTY OF THE / HAMILTON MANUFACTURING COMPANY [YARD] / LOWELL, MASS., / SURVEYED FOR [AND SOLD TO] THE / COURIER-CITIZEN COMPANY.	SEE NOTES	1"=40'	H 45, W 62.9 CM	BLUEPRINT	PAPER
147-055-[COPY 2]	PLAN SHOWING PART OF THE PROPERTY OF THE / HAMILTON MANUFACTURING COMPANY [YARD] / LOWELL, MASS., / SURVEYED FOR [AND SOLD TO] THE / COURIER-CITIZEN COMPANY.	SEE NOTES	1"=40'	H 45, W 62.9 CM	BLUEPRINT	PAPER
147-055-[COPY 3]	PLAN SHOWING PART OF THE PROPERTY OF THE / HAMILTON MANUFACTURING COMPANY [YARD] / LOWELL, MASS., / SURVEYED FOR [AND SOLD TO] THE / COURIER-CITIZEN COMPANY.	SEE NOTES	1"=40'	H 45, W 63.5 CM	BLUEPRINT	PAPER

147-056	PORTION OF 1868 PLAN / OF / LAND IN LOWELL / BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER [SHOWING ORIGINAL LOT LINES OF HAMILTON MILL YARD WITH L. E. L. TRANSFORMER LOCATION ADDED].	1932/12/20	1"=100'	H 34.2, W 47.3 CM	INK, WATER COLOR	DRAFTING CLOTH
147-057	PLAN OF PORTION OF HAMILTON YARD / OF MARDEN & MURPHY, INC. / SHOWING / LAND & EASEMENTS / DESCRIBED IN DEED / FROM / MARDEN & MURPHY INC. / TO / HAMILTON COMPANY.	1933/02/14	1"=40'	H 45.7, W 86 CM	INK, WATER COLOR	DRAFTING CLOTH
147-057-[COPY 1]	PLAN OF PORTION OF HAMILTON YARD / OF MARDEN & MURPHY, INC. / SHOWING / LAND & EASEMENTS / DESCRIBED IN DEED / FROM / MARDEN & MURPHY INC. / TO / HAMILTON COMPANY.	1933/02/14	1"=40'	H 23, W 43.2 CM	PHOTOGRAPH	PAPER
147-058	PROPOSED GENERATOR / FOR PAIR OF / 36" HERCULES WHEELS / IN / HAMILTON YARD [WHEEL HOUSE].	1935/03/27	1"=10'	H 30.4, W 66 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
147-059	PLAN & SECTIONS / "HAMILTON YARD" / SHOWING / CERTAIN ELEVATIONS.	1935/09/19	1"=20'	H 59.5, W 108.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

147-060	SKETCH SHOWING / LOCATION OF LEAKS AND REPAIRS / IN "HAMILTON YARD" WHEEL HOUSE / ALSO / REPAIRS TO SPRINKLER PIPE FOR / COURIER CITIZEN PRINTING CO'S. MILL NO. 4.	1936/09/00	1"=10'	H 47, W 76.5 CM	INK, COLORED INK, COLORED PENCIL, COLORED PENCIL	DRAFTING CLOTH
147-062	PRESENT HAMILTON CO'S. / NOS. 4 & 5 HYDRO-ELECTRIC UNITS / ALSO PROPOSED NO.6 UNIT / 45" TYPE "Z" LEFFEL WHEELS / LOWELL, MASSACHUSETTS.	1938/04/00	1/4"=1', 1"=50'	H 64.9, W 92.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
147-063	HAMILTON YARD / SHOWING / WATERWAYS AND CUT-OFF WALLS / IN PENSTOCKS TO OLD WHEEL HOUSE / LOWELL, MASS. [GRADES AND CONTOURS IN LOWER END OF YARD TO DETERMINE FILL NEEDED FOR PARKING AREA].	1938/03/28	1"=40'& 10'	H 43.5, W 78.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
147-064	PLAN & SECTIONS / OF / HAMILTON WASTEWAY / AT EASTERLY END OF / MILL NO.7- "HAMILTON YARD."	1939/04/21	1"=10'	H 38.5, W 61.5 CM	INK, COLORED INK, WATER COLORED	DRAFTING CLOTH
147-065	PLAN AND SECTIONS SHOWING / WASHOUT NEAR TUNNEL AT / EASTERLY END OF NEW [4 & 5] WHEEL HOUSE / IN / "HAMILTON YARD".	1940/06/10	1/4"=1'	H 48, W 81 CM	INK. COLORED PENCIL	DRAFTING CLOTH
147-066	[PLAN OF] BUILDING [BETWEEN BOLIER ROOM AND NO. 8 ILL] MEASURED FOR MARDEN & MURPHY.	SEE NOTES	1"=16'	H 43.4, W 60.3 CM	BLUEPRINT	PAPER

147-067	PLAN SHOWING ELEVATIONS TAKEN AT PROPERTY OF / MARDEN & MURPHY INC.[AND OTHERS BETWEEN MIDDLESEX, JACKSON, ELLIOTT AND MARSTON STREETS] / LOWELL, MASS.	SEE NOTES	1"=20'	H 45.7, W 62 CM	BLUEPRINT	PAPER
147-068	PLAN OF PORTION OF HAMILTON YARD / OF MARDEN & MURPHY, INC. / SHOWING / LAND & WATERWAYS & EASEMENTS / DESCRIBED IN DEED / FROM / MARDEN & MURPHY INC. / TO / HAMILTON COMPANY.	SEE NOTES	1"=40'	H 45.1, W 84.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-069	PLAN SHOWING / PROPERTY WEST OF CENTRAL ST. / NEAR / END OF MIDDLESEX & JACKSON STS.	1940/09/19	1"=40'	H 55.7, W 71.4 CM	INK, WATER COLOR	DRAFTING CLOTH
147-070	PLAN OF PROPERTIES / BELONGING TO / HAMILTON COMPANY / AND / MARDEN AND MURPHY INC.	1942/09/00	1"=40'	H 54.5, W 86.5	INK, COLORED PENCIL	DRAFTING CLOTH
147-071	SKETCH SHOWING / LOCATION OF BREAK & REPAIRS / IN "HAMILTON YARD TUNNEL" BETWEEN / MARDEN & MURPHY'S WHEEL HOUSE / & / COURIER CITIZEN PRINTING CO'S MILL NO.4. / CONCRETE CUT-OFF WALLS / TO OLD NO. 3 & 5 HAMILTON WHEELS.	1936/10/01	1"=10'	H 46.4, W 75.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-072	PLAN SHOWING PART OF THE PROPERTY OF THE / HAMILTON MANUFACTURING COMPANY / LOWELL, MASS., SURVEYED FOR THE / COURIER CITIZEN COMPANY.	SEE NOTES	1"=40'	H 45.7, W 63.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

147-073	PLAN OF THE / MILL YARD / OF THE / HAMILTON COMPANY / SHOWING / WATERWAYS FOR WATER POWER. / "HAMILTON" MILL YARD / & VICINITY / SHOWING PROPERTY OF / MARDEN & MURPHY INC. / & OTHERS.	1942/01/17	1"=40'	H 75.7, W 110.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-074	HAMILTON MILL YARD / & VICINITY / SHOWING PROPERTY OF MARDEN & MURPHY INC. / & OTHERS.	1945/07/00	1"=40'	H 76, W 109.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
147-075	PLAN OF LAND IN LOWELL, MASS. / OWNED BY / MARDEN & MURPHY INC. / & / HAMILTON COMPANY.	1945/12/01	1'=40'	H 46, W 76.6 CM	INK, WATER COLOR	DRAFTING CLOTH
147-076	PLAN OF LAND [ON SOUTH SIDE OF JACKSON STREET] IN LOWELL, MASS. / BELONGING TO / MARDEN & MURPHY INC.	1946/01/28	1"=20'	H 28.2, W 68 CM	INK, WATER COLOR	DRAFTING CLOTH
147-077	PLAN & SECTIONS / OF / OLD HAMILTON YARD WHEELHOUSE / PENSTOCK, FOREBAY, PITS & TAILRACE / LOWELL, MASS.	1946/06/12	1"=10'	H 46.1, W 78.2 CM	INK, COLORED INK	DRAFTING CLOTH
147-078	PLAN OF THE MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY / SHOWING AREA DEEDED, ON THE SOUTHERLY SIDE OF / HAMILTON CANAL APR. 1,1893, TO THE HAMILTON MFG. CO. / WITH AGREEMENT FOR MAINTAINENCE OF HAMILTON CANAL / LOWELL, MASS.	1946/09/00	1"=40'	H 54.3, W 78.2 CM	INK, WATER COLOR	DRAFTING CLOTH

147-078-[COPY 1]	PLAN OF THE MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY / SHOWING AREA DEEDED, ON THE SOUTHERLY SIDE OF / HAMILTON CANAL APR. 1,1893, TO THE HAMILTON MFG. CO. / WITH AGREEMENT FOR MAINTAINENCE OF HAMILTON CANAL / LOWELL, MASS.	1946/09/00	1"=40'	H 54, W 75 CM	BLUEPRINT, WATER COLOR	PAPER
147-079	PROPERTY PLAN / OF THE / HAMILTON MANUFACTURING CO. / AS DEEDED MARCH 15,1927 / TO / MARDEN & MURPHY INC. / BY RECEIVERS CHAS. F. ROWLEY & REUBEN DUNSFORD / LOWELL, MASS.	1946/09/00	1"=40'	H 57.5, W 78.5 CM	INK	DRAFTING CLOTH
147-080	PORTION OF MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY / SHOWING AREAS LEASED, ON THE SOUTHERLY SIDE OF HAMILTON CANAL IN 1853 & 1873, FOR 999 YEARS, TO THE HAMILTON MFG. CO. WITH AGREEMENT FOR MAINTENANCE OF HAMILTON CANAL. / LOWELL, MASS.	1946/09/00	1"=40'	H 45.3, W 77.2 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
147-081	PROPERTY PLAN / SHOWING / PROPERTY DEEDED BY / MARDEN & MURPHY INC. & HAMILTON COMPANY / TO SYDNEY CORPORATIONS DEC. 28, 1945. / LOWELL, MASS.	1946/09/00	1"=40'	H 48.7, W 76.8 CM	INK, COLORED PENCIL, WATER COLOR	DRAFTING CLOTH

147-082	PLAN & ELEVATION / PORTION OF MILL NO.1 / BELONGING TO / JACKSON PROPERTIES INC. / LOWELL, MASS.	1954/12/14	1"=10'	H 28, W 46 CM	GRAPHITE PHOTOGRAPHIC NEGATIVE PRINT,	TRACING PAPER
148-[053]-[A]	APPLETON COMPANY, / LOWELL, MASS.	1920/11/17	1"=50'	H 52, W 37.5 CM	COLORED PENCIL	PHOTOGRAPHIC NEGATIVE PRINT, PAPER
148-[053]-[C]	JACKSON PROPERTIES [ABOVE APPLETON COMPANY, INKED OUT] / LOWELL, MASS.	1920/11/17	1"=50'	H 37.5, W 52 CM	INK	INK, PAPER
148-[054]	APPLETON CO., ET AL. / LOWELL, MASS.	1940/06/28	1"=50'	H 73.5, W 45 CM	COLORED INK	PAPER
148-[055]-[COPY 1]	APPLETON COMPANY / (COTTON MILL) / LOWELL, MASS.	1919/06/02	1"=50'	H 66, W 53 CM	INK, COLORED INK	PAPER
148-[055]-[COPY 2]	APPLETON COMPANY / (COTTON MILL) / LOWELL, MASS.	1919/06/02	1"=50'	H 66, W 53 CM	INK, COLORED INK	PAPER
148-[056]	APPLETON COMPANY (BLDG.) / GENERAL FOODS CORPORATION AND / OR / GENERAL FOODS SALES COMPANY, INC., TEN. / LOWELL, MASS.	1939/12/13-14	1"=50'	H 68.5, W 53.5 CM	BLUEPRINT	PAPER
148-[057]	PROPRIETORS OF THE / LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1929/11/00	1"=60'	H 28.6, W 21.7 CM	INK, COLORED PENCIL	PAPER
148-[058]-[A]	FOR THE APPLETON COMPANY / LOWELL. MASS. / RODNEY HUNT MACHINE CO.	1891/02/16	3/4"=1', 1/4"=1'	H 52.6, W 72.5 CM	BLUEPRINT	PAPER
148-[058]-[B]	FOR THE APPLETON COMPANY / LOWELL. MASS. / RODNEY HUNT MACHINE CO.	1891/02/16	3/4"=1', 1/4"=1'	H 52.6, W 72.5 CM	BLUEPRINT, INK	PAPER

148-001-[1]	APPLETON CO. / LOWELL, MASS. / [PLAN SHOWING] ONE PAIR OF 54 INCH McCORMICK WHEELS [NOS. 1 & 1A].	1900/06/12	1/2"=1'	H 57.2, W 114.4 CM	BLUEPRINT	PAPER
148-001-[1]-[COPY 1]	APPLETON CO. / LOWELL, MASS. / [PLAN SHOWING] ONE PAIR OF 54 INCH McCORMICK WHEELS [NOS. 1 & 1A].	1900/06/12	1/2"=1'	H 29.7, W 61.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
148-001-[2]	APPLETON CO. / LOWELL, MASS. / [PLAN SHOWING] ONE PAIR OF 54 INCH McCORMICK WHEELS [NOS. 1 & 1A].	1900/06/12	1/2"=1'	H 72.6, W 92.3 CM	BLUEPRINT	PAPER
148-001-[2]-[COPY 1]	APPLETON CO. / LOWELL, MASS. / [PLAN SHOWING] ONE PAIR OF 54 INCH McCORMICK WHEELS [NOS. 1 & 1A].	1900/06/12	1/2"=1'	H 39.5, W 46 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
148-001-[A]	APPLETON COS NO. 4 PAIR RODNEY HUNT WHEELS.	1894/11/00	NONE	H 71, W 32.6 CM	PHOTOGRAHIC PRINT, INK	PAPER
148-002	FROM THE RODNEY HUNT COMPANY / SHOWS CHANGE IN DRAFT TUBE FOR # 4 PAIR [OF RODNEY-HUNT WHEELS] AT APPLETON CO.	1894/11/01	NONE	H 30.7, W 65.4 CM	BLUEPRINT	PAPER
148-003	[DIAGRAM SHOWING] APPLETON [CO.] NO. 1A. / DIAGRAM SHOWING VACUUM AT DIFFERENT / POINTS ON DRAFT TUBE.	1901/06/00	NONE	H 53.7, W 73.1 CM	INK, COLORED INK	CLOTH BACKED PAPER
148-004	DRAWING SHOWING / PROPERTY [BOUNDARY] LINE BETWEEN APPLETON CO. / & / [SACO-] LOWELL MACHINE SHOP[S].	1902/09/03	1"=8'	H 9.5, W 104.9 CM	INK, COLORED INK, WATER COLOR	PAPER
148-005	PLAN OF THE MILL YARD / OF THE / APPLETON CO. [SHOWING SHAFTING AND ESTIMATED HORSE-POWER OF EACH WHEEL.]	1896/05/00	1/4"=10'	H 67.4, W 100.8 CM	INK, WATER COLOR	DRAFTING CLOTH

148-006	SKETCH SHOWING SOME GRADES AT / APPLETON CO.'S MILLS.	1896/01/27	H1"=40',V 1"=2'	H 58.5, W 48.4 CM	BLUEPRINT	PAPER
148-007	[ELEVATION, PLAN AND CROSS SECTION OF] APPLETON CO. / FEEDER FOR PICKER MILL.	1868/08/24	1/6" & 1/3"=1'	H 69.3, W 110.5 CM	INK, WATER COLOR	DRAFTING CLOTH
148-008-[A]	SECTION / IN THE / MILL YARD / OF THE / APPLETON COMPANY.	1893/04/00	H1"=30', V1"=5'	H 53, W 63.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
148-008-[B]	PLAN OF THE / MILL YARDS / OF THE / APPLETON COMPANY. / LOWELL, MASS.	1893/04/00	1/4"=10'	H 57.8, W 64.2 CM	LITHOGRAPH, COLORED INK	PAPER
148-009	[DRAWING OF] THE APPLETON COMPANY'S MOST EASTERLY TURBINE [(BOYDEN)].	1846/09/00	4 TO 1	H 255, W 75 CM	INK, WATERCOLOR	PAPER
148-010	[DIAGRAM SHOWING PERMANENT AND SURPLUS] MILL POWERS / DRAWN BY / APPLETON CO'S WHEELS.	1908/02/21	NONE	H 57.5, W 60.9 CM	INK	DRAFTING CLOTH
148-011	[SKETCH SHOWING] MEAN AREA OF / BUCKET OUTLETS FOR 39" L. H. / McCORMICK WHEEL / FOR / APPLETON CO.	1917/11/07	NONE	H 51.1, W 75 CM	INK, COLORED INK	DRAFTING CLOTH
148-012	[SKETCH SHOWING] AREA OF BUCKET OUTLETS FOR TWO 54" / McCORMICK WHEELS / AT / APPLETON COMPANY. [INSTALLED FEB. 1917.]	SEE NOTES	NONE	H 79.2, W 71.6 CM	INK, COLORED INK	PAPER
148-013	PLAN AND LOCATION OF CANAL WALL / FOR / EXTENSION TO APPLETON CO. DYE HOUSE.	1916/02/01	1"=20'	H 28.6, W 49.9 CM	INK, COLORED INK	DRAFTING CLOTH
148-014	SECTIONS & ELEVATION OF CANAL WALL / FOR / EXTENSION TO APPLETON CO.'S DYE HOUSE.	1916/02/01	1"=10'	H 35.8, W 57 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH

148-015	FOUNDATION PLAN / [FOR] NEW PICKER BUILDING FOR APPLETON CO., LOWELL, MASS.	1905/03/30	1/4"=1'	H 81.6, W 143.3 CM	BLUEPRINT	PAPER
148-016	PLAN SHOWING / PARCEL OF LAND / CONVEYED TO / APPLETON COMPANY / BY / PROPS. OF THE LOCKS & CANALS ON / MERRIMACK RIVER / BY DEED DATED SEPTEMBER 30,1904. / LOWELL, MASS.	1904/09/30	1"=40'	H 21.7, W 51 CM	INK, WATER COLOR	PAPER
148-016-[COPY 1]	PLAN SHOWING / PARCEL OF LAND / CONVEYED TO / APPLETON COMPANY / BY / PROPS. OF THE LOCKS & CANALS ON / MERRIMACK RIVER / BY DEED DATED SEPTEMBER 30,1904. / LOWELL, MASS.	1904/09/30	1"=40'	H 21.7, W 51 CM	BLUEPRINT	PAPER
148-017	PLAN SHOWING / PARCEL OF LAND / CONVEYED TO / APPLETON COMPANY / BY / PROPS. OF THE LOCKS & CANALS ON / MERRIMACK RIVER / BY DEED DATED SEPTEMBER 30,1904. / LOWELL, MASS.	1908/11/27	1"=40'	H 21.4, W 51 CM	BLUEPRINT	PAPER
148-018	SKETCH OF / RETAINING WALL / AT COAL SHED / [OF] APPLETON CO. / LOWELL.	1918/05/01	NONE	H 26.2, W 22.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
148-019	PLAN OF THE / MILL YARD / OF THE / APPLETON COMPANY / SHOWING / WATERWAYS FOR WATER POWER. [SHOWING WATERWAY WITH PLANT EFFICIENCY].	1919/01/00	1"=40'	H 75.9, W 109.4 CM	BLUEPRINT, COLORED INK	PAPER
148-020	[PLAN OF] MILL YARD OF APPLETON CO. / SHOWING / USE OF CANAL WATER FOR NON-POWER PURPOSES / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1921/01/17	1"=40'	H 60.6, W 55.5 CM	BLUEPRINT, COLORED INK	PAPER

148-021	[PLAN & ELEVATION FOR] APPLETON CO. / 5 & 5A HEADGATE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/20	1/2"=1'	H 62.7, W 39.4 CM	INK	DRAFTING CLOTH
148-022	APPLETON CO. / PROPOSED 5 & 5A HEADGATES / TENTATIVE DESIGN / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. [PLAN & ELEVATION].	1921/06/03	1"=1'	H 73.7, W 88.3 CM	INK	DRAFTING CLOTH
148-022-[A]	APPLETON CO. / PROPOSED 5 & 5A HEADGATE / TENTATIVE DESIGN / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/06/03	1"=1'	H 76.3, W 101.7 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
148-023	APPLETON CO. [DETAILS OF GATE LEAF FOR] 5 & 5A HEADGATE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/07	1" & 3"=1'	H 44.4, W 60.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
148-023-[A]	APPLETON CO. / 5 & 5A HEADGATE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/07	1"& 3"=1'	H 60.8, W 74 CM	INK, COLORED INK	DRAFTING CLOTH
148-024	[DETAILS FOR] HOIST FOR # 5 [& 5A] HEADGATE / FOR / THE PROPRIETORS OF THE LOCKS / & CANALS ON MERRIMACK RIVER [APPLETON COMPANY].	1921/08/15	1 1/2"=1'	H 55, W 91.4 CM	BLUEPRINT	PAPER
148-025	[PLAN OF] APPLETON CO. / NO. 2, 3 & 4 WATERWAYS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/02/07	1"=10'	H 39.3, W 78.6 CM	INK	DRAFTING CLOTH
148-026	APPLETON CO. [GATE HOIST LAYOUT FOR] NO.5 [& 5A] HEADGATE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/08/26	1/2"=1'	H 38.2, W 57 CM	INK, COLORED INK	DRAFTING CLOTH

148-027	APPLETON CO. / NO. 2, 3 & 4 WATERWAYS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. [SCHEME "A" FOR TWO 48" LEFFEL TYPE Z WHEELS].	1922/02/07	1"=10'	H 39.5, W 77.8 CM	BLUEPRINT, COLORED INK	PAPER
148-028	[UNTITLED.] [SCHEME FOR INSTALLATION OF ONE PAIR OF 45" LEFFEL Z OR ONE PAIR OF LEFFEL F 68" WHEELS IN # 2, 3, 4 WATERWAYS.]	UNDATED	NONE	H 26, W 37.2 CM	BLUEPRINT, GRAPHITE	PAPER
148-029	[SKETCH SHOWING] APPLETON COMPANY / POSSIBLE WHEEL INSTALLATIONS.	1922/05/25	1"=40'	H 31.8, W 49.8 CM	INK, WATER COLOR	CLOTH BACKED PAPER
148-030	[BLUE PRINT SHOWING DETAILS OF RUNNER, ETC., 39" B HORIZ. HERCULES TURBINES, HOLYOKE MACHINE CO.]	1925/09/30	3/4"=1'			
148-031-[A]	13 FT. HEAD. / DETAILS OF 39" B HORIZONTAL HERCULES TURBINES FOR THE / APPLETON CO. LOWELL, MASS. / HOLYOKE MACHINE CO. WORCESTER, MASS. / TRACING "A".	1925/09/30	3/4"=1'	H 84.4, W 135.3 CM	BLUEPRINT	PAPER
148-031-[B]	TRACING "B". / DETAILS OF GATEWORK ETC. FOR 39" B HORIZ. HERCULES TURBINES FOR THE / APPLETON CO. LOWELL, MASS. / HOLYOKE MACHINE CO. WORCESTER, MASS.	1925/10/08	1 1/2"=1'	H 84.4, W 135.3 CM	BLUEPRINT	PAPER
148-032	APPLETON COMPANY / PROPOSED WHEEL INSTALLATION / FOR / REPLACEMENT OF NOS. 2, 3,& 4 UNITS [WHEELS].	1925/08/06	1"=10'	H 35.4, W 53.5 CM	INK, COLORED INK, WATERCOLOR	PAPER
148-033	PLAN OF / [LOCATION OF] WATER WHEELS AND GENERATORS / APPLETON CO. NOS. 2, 3, 4 WHEELS.	1925/07/29	1"=10'	H 34.4, W 27.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH

148-034	[RELATIVE VELOCITY] DIAGRAM [USED IN COMPUTING DISCHARGE] SHOWING QUANTITY OF WATER / DISCHARGED WITH 13' FALL & DIFFERENT / SPEEDS & OPENINGS OF THE SPEEDGATE OF TWO [# 2 AND # 3 PAIRS] / 39" L. H. & R. H. HERCULES WHEELS.	1925/10/16	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
148-035	[DIAGRAM OF] APPLETON CO. / POWER TESTS / OF / WATERWHEELS [UNITS NOS. 2, 3, AND 4].	1926/07/00	NONE	H 21.5, W 30.9 CM	INK	PAPER
148-036	APPLETON CO. LOWELL, MASS. / [PROPOSED] TRANSMISSION LINE TO THE / LOWELL SILK MILLS. / GENERAL ARRANGEMENT / & STEEL DETAILS.	1928/10/20	1"=60', 1/2"=1'	H 73.4, W 101 CM	BLUEPRINT, COLORED PENCIL	PAPER
148-037	APPLETON CO., LOWELL. / [PROPOSED] TRANSMISSION LINE TO THE LOPWELL / SILK MILLS. / DETAILS OF / TRANSFORMER STATION AND SECONDARY / CONNECTIONS- [AT] APPLETON CO. [END].	1928/10/19	1/2"=12"	H 74.3, W 100.7 CM	BLUEPRINT	PAPER
148-038	APPLETON COMPANY / [PROPOSED] TRANSMISSION LINE TO / LOWELL SILK MILLS / [SHOWING] DETAILS / [OF] TRANSFORMER STATION AT POWER HOUSE [OF] ASSETS REALIZATION CO.	1928/10/20	1/4"& 1/8"=1'	H 72.8, W 100.4 CM	BLUEPRINT	PAPER
148-039-[01]	APPLETON CO. / LOWELL, MASS. / [PROPOSED] TRANSMISSION LINE TO THE / LOWELL SILK MILLS. / [SHOWING] DETAILS OF / TRANSFORMER STATION / AT THE LOWELL SILK CO. [MILLS END].	1928/10/19	1/4" & 1/8"=1'	H 72.7, W 101 CM	BLUEPRINT	PAPER

148-039-[02]	APPLETON COMPANY / LOWELL, MASS. / THE LINE TO ASSETS REALIZATION CO. / GENERAL PLAN & / DETAILS OF STEEL SUPPORTS.	1929/10/29	1"=60' & 1/2"=12'	H 73.5, W 99.5 CM	BLUEPRINT	PAPER
148-039-[03]	APPLETON COMPANY / LOWELL, MASS. / THE LINE TO ASSETS REALIZATION CO. / DETAILS AT / APPLETON CO. & STEEL SUPPORTS.	1929/10/29	1/2"=1'	H 73.5, W 99.5 CM	BLUEPRINT	PAPER
148-040	[DIAGRAM SHOWING PERMANENT AND SURPLUS] MILL POWERS / DRAWN BY / APPLETON COMPANY'S WHEELS [WITH KITSON POWERS ADDED].	1933/09/08	NONE	H 51.1, W 75 CM	INK, COLORED INK	DRAFTING CLOTH
148-041	BASEMENT PLAN / SHOWING / CITY WATER SUPPLY / OF THE / APPLETON COMPANY.	1931/01/19	1"=40'	H 56.4, W 70.4 CM	INK, COLORED INK	DRAFTING CLOTH
148-042	FIRST FLOOR PLAN / SHOWING / CITY WATER SUPPLY / OF THE / APPLETON COMPANY.	1931/01/19	1"=40'	H 56.3, W 70.4 CM	INK, COLORED INK	DRAFTING CLOTH
148-043	SECOND FLOOR PLAN / SHOWING / CITY WATER SUPPLY / OF THE / APPLETON COMPANY.	1931/01/19	1"=40'	H 56.4, W 70.5 CM	INK, COLORED INK	DRAFTING CLOTH
148-044	THIRD FLOOR PLAN / SHOWING / CITY WATER SUPPLY / OF THE / APPLETON COMPANY.	1931/01/19	1"=40'	H 56.5, W 70.5 CM	INK, COLORED INK	DRAFTING CLOTH
148-045	PLAN & SECTIONS SHOWING / [REPAIRS TO] BRICKWORK WHICH HAS FALLEN OUT & LOOSENED IN THE APPLETON CO'S. / NO.5 [& 5A] PENSTOCK.	1933/08/19	1/2"=1'	H 40, W 74.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
148-046	[SKETCH SHOWING] APPLETON COMPANY / 8" PIPE OVER RACEWAY OF NO. 2-3-4 WHEELS [& ELEVATION OF SAME].	1918/06/21	1 1/2"& 1/4"=1'	H 28, W 21.5 CM	INK	DRAFTING CLOTH

148-047	PLAN & ELEVATIONS / SHOWING / PROPOSED STAIRWAY EXTENSION / APPLETON COMPANY.	1937/04/28	1/2"& 1/4"=1',1"=50'	H 49.5, W 70.6 CM	INK, WATER COLOR	DRAFTING CLOTH
148-048	GENERAL ASSEMBLY OF [RODNEY HUNT NO. 4] TURBINES / FOR APPLETON CO. / LOWELL, MASS.	1939/06/12	3/4"=1'	H 56.1, W 85.7 CM	BLUEPRINT	PAPER
148-048-[COPY 1]	GENERAL ASSEMBLY OF [RODNEY HUNT NO. 4] TURBINES / FOR APPLETON CO. / LOWELL, MASS.	1939/06/12	3/4"=1'	H 56.3, W 85.8 CM	BLUEPRINT	PAPER
148-049	GATE POSITION & LINK MOTION [FOR RODNEY HUNT NO. 4 TURBINE FOR] / APPLETON CO. / LOWELL, MASS.	1939/06/06	6"=1'	H 43.2, W 56 CM	BLUEPRINT	PAPER
148-050	[DETAIL OF BRONZE BUSHINGS FOR] APPLETON / [RODNEY HUNT] NO.4 PAIR.	1939/06/00	NONE	H 43.3, W 86 CM	BLUEPRINT, COLORED PENCIL	PAPER
148-051	SKETCH SHOWING / LOCATION OF BRIDGE / CONNECTING MILL NO.1 & NO.6 / OF THE / APPLETON COMPANY / LOWELL, MASS.	1920/05/17	1"=40'	H 21, W 33.7 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
148-052	[UNTITLED PLAN. SEE NOTES.]	1923/08/07	1"=40'	H 22, W 28.3 CM	INK, COLORED INK, WATER COLOR	PAPER
148-052	PERMANENT & SURPLUS MILL POWERS / DRAWN BY / NUMBER 4 PAIR WHEELS / JACKSON PROPERTIES INC.	1953/06/17	NONE	H 38.3, W 33 CM	INK, COLORED INK	DRAFTING CLOTH
148-052	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / APPLETON COMPANY INC.	1943/05/04	1"=40'	H 30.5, W 45.4 CM	BLUEPRINT	PAPER
149-[079]	SECTIONAL ELEVATION LOOKING NORTHEAST / THRU COLUMBIA TEXTILE POWER HO[USE] / AT BIGELOW YARD.	UNDATED	1"=20'	H 38, W 55 CM	INK, COLORED PENCIL	DRAFTING CLOTH

149-[080]	BIGELOW MILL YARD [WRITTEN OVER ERASED WORDING WHICH READS "CARPET CO."] / LOWELL, MASS.	1953/08/00	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
149-[080]-[COPY 1]	BIGELOW CARPET CO. / LOWELL, MASS.	1911/05/05	1"=60'	H 48.5, W 39 CM	PHOTOGRAPIC NEGATIVE PRINT	PAPER
149-[081]	BIGELOW CARPET CO. / LOWELL DEPT. / LOWELL, MASS.	1911/05/05	1"=60'	H 53, W 66 CM	INK, COLORED INK	PAPER
149-[081]-[COPY 1]	BIGELOW CARPET CO. / LOWELL DEPT. / LOWELL, MASS.	1911/05/05	1"=60'	H 53, W 66 CM	PHOTOGRAPHIC NEGATIVE PRINT	PAPER
149-[082]	COMPILED PLAN / OF / "BIGELOW YARD" / SHOWING / PROPERTY LINES, BUILDINGS & OWNERS.	1950/09/26	1"=60'	H 37, H 62 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-[083]	NEWMARKET MANUFACTURING COMPANY / (RAYON WEAVING) / LOWELL, MASS.	1932/12/22	1"=50'	H 67, W 53 CM	INK, COLORED INK	PAPER
149-[084]-[COPY 1]	UXBRIDGE WORSTED CO., INC. (TEN.) / ABBOT WORSTED COMPANY (BLDGS.) / (COTTON & WOOLEN WEAVING) / LOWELL, MASS.	1934/05/09	1"=50'	H 76, W 52.5 CM	INK, COLORED INK	PAPER
149-[084]-[COPY 2]	UXBRIDGE WORSTED CO., INC. (TEN.) / ABBOT WORSTED COMPANY (BLDGS.) / (COTTON & WOOLEN WEAVING) / LOWELL, MASS.	1934/05/09	1"=50'	H 76, W 52.5 CM	INK, COLORED INK	PAPER
149-[085]	UNITED ELASTIC CORPORATION / "CONANT-HOUGHTON DIVISION" / (ELASTIC WEBBING) / LOWELL, MASS.	1940/12/18	1"=50'	H 67, W 53 CM	INK, COLORED INK	PAPER

149-[086]	ASSETS, UNITED ELASTIC CORP. AND / NEWMARKET MANUFACTURING COMPANY / A MASSACHUSETTS CORPORATION / LOWELL, MASS.	1944/06/06	1"=50'	H 52.5, W 67 CM	INK, COLORED INK	PAPER
149-[087]	ABBOT WORSTED COMPANY (BLDGS.) / UXBRIDGE WORSTED CO., INCORPORATED TENANT / LOWELL, MASS.	1944/05/21	1"=50'	H 76, W 52.5 CM	INK, COLORED INK	PAPER
149-[088]	ABBOT WORSTED COMPANY (BLDGS.) / UXBRIDGE WORSTED CO., INCORPORATED TENANT / LOWELL, MASS.	1944/10/03	1"=50'	H 76, W 52.5 CM	INK, COLORED INK	PAPER
149-[089]	NEWMARKET MANUFACTURING COMPANY / A MASSACHUSETTS CORPORATION / LOWELL, MASS.	1945/10/03	1"=50'	H 52.5, W 72 CM	INK, COLORED INK	PAPER
149-[090]	PLAN OF / "BIGELOW YARD" / ASSETS DIVISION OF THE / BOOTT MILLS / NEWMARKET MFG. CO., UNITED ELASTIC CORP. / AND OTHERS SHOWING / PIPES LAID FOR EXTINGUSIHING FIRE.	1951/02/00	1"=40'	H 54.9, W 88.6 CM	BLACK LINE PRINT, INK, WATER COLOR	CLOTH BACKED PAPER
149-[091]	1937 / NEWMARKET / ELECTRICAL CONNECTIONS.	1937/06/28	1"=1'	H 70.3, W 106.6 CM	BLUEPRINT	PAPER
149-[092]-[A]	1937 / NEWMARKET / SWITCH HOUSE BUILDING.	1937/06/11	1/4 & 1/2 "=1'	H 52.5, W 75.5 CM	BLUEPRINT, GRAPHITE	PAPER
149-[092]-[B]	1937 / NEWMARKET / SWITCH HOUSE BUILDING. REVISED.	1937/06/11	1/4 & 1/2 "=1'	H 52.5, W 75.5 CM	BLUEPRINT, GRAPHITE	PAPER
149-[093]-[A]	1937 / NEWMARKET / STEEL SUPPORT FOR WIRES / ON SWITCH HOUSE ROOF.	1937/06/21	1"=1'	H 53, W 75 CM	BLUEPRINT, GRAHITE	PAPER

149-[093]-[B]	1937 / NEWMARKET / STEEL SUPPORT FOR WIRES / ON SWITCH HOUSE ROOF.	1937/06/21	1"=1'	H 53, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-001-[A]	SECTIONS / IN THE / MILL YARD / OF THE / LOWELL MFG. CO. [BIGELOW CARPET CO.] [COLUMBIA TEXTILE CO.]	1893/04/00	H 1/2"=30', V 1/2"=5'	H 40.6, W 62.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
149-001-[B]	PLAN OF THE / MILL YARD / OF THE / LOWELL MANUFACTURING COMPANY [BIGELOW CARPET CO.] [COLUMBIA TEXTILE CO.] / SHOWING THE PIPES LAID FOR EXTINGUISHING FIRES.	1893/04/00	1/4"=10'	H 57.2, W 69.2 CM	UNKNOWN PRINTING PROCESS	PAPER
149-002-[A]	MEAN AREAS OF / BUCKET OUTLETS FOR SIX 33" R. H. STYLE "C" / HERCULES WHEELS / FOR / BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.].	1911/01/00	NONE	H 61.4, W 57.3 CM	INK, COLORED INK	PAPER
149-002-[B]	MEAN AREAS OF / BUCKET OUTLETS FOR SIX 33" L. H. STYLE "C" / HERCULES WHEELS / FOR / BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.].	1911/01/00	NONE	H 61.4, W 57.3 CM	INK, COLORED INK	PAPER
149-002-[C]	MEAN BUCKET / OF / SIX 33" L. H. STYLE "C" HERCULES WHEELS / FOR / BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.].	1911/01/00	NONE	H 61.4, W 57.3 CM	INK	PAPER
149-002-[D]	MEAN BUCKET / AREA OF SIX RIGHT / HAND WHEELS [COLUMBIA TEXTILE CO.].	UNDATED	NONE	H 61.4, W 57.3 CM	INK	PAPER
149-002-[E]	MEAN AREAS OF / BUCKET OUTLETS FOR SIX 31" L. H. STYLE "D" / HERCULES WHEELS / FOR / BIGELOW HARTFORD CARPET COMPANY [COLUMBIA TEXTILE CO.].	1917/03/19	NONE	H 61.4, W 57.3 CM	INK	PAPER

149-002-[F]	[DRAWING SHOWING] MEAN AREAS OF / BUCKET OUTLETS FOR 6 33" R.H., STYLE "C" / HERCULES [(JAN. 1911) 6 L.H. 33" TYPE C, HERCULES (JAN. 1911), 6 L. H. 31" TYPE D, HERCULES (MARCH 19, 1917)] / FOR / BIGELOW CARPET CO. [COLUMBIA TEXTILE CO.].	1911/01/00	NONE	H 58.5, W 55.3 CM	INK	DRAFTING CLOTH
149-003	PLAN / SHOWING / PENSTOCKS & RACES / UNDER AND NEAR / [BIGELOW CARPET CO.] [COLUMBIA TEXTILE CO.] LOWELL MANF'G. CO'S NEW MILL [NOS. 2 & 3 WHEELS] / FROM ORIGINAL SURVEY MADE 1896.	1896/07/00	1"=10'	H 82, W 121.5 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER
149-004	SKETCH OF ICE BOOM / FOR [AT HEAD OF] FEEDER[S] / AT / BIGELOW CARPET [COLUMBIA TEXTILE] CO.	1910/09/13	3/8"=1'	H 49.2, W 124.8 CM	BLUEPRINT	PAPER
149-005	SCALE DRAWING / FOR / RACKS AT HEAD OF CONCRETE FEEDER / AT / BIGELOW [HARTFORD] CARPET CO. [COLUMBIA TEXTILE CO.].	1907/10/18	1/2"=1'	H 57.2, W 139 CM	INK, COLORED INK	DRAFTING CLOTH
149-006	PLAN OF THE / MILL YARD / OF THE / LOWELL MANUFACTURING COMPANY [COLUMBIA TEXTILE CO] / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 60.2, W 74.5 CM	HELIOTYPE, WATER COLOR	CLOTH BACKED PAPER
149-007-[A]	[DETAIL OF 3 UNITS, EACH WITH TWO PAIRS OF WHEELS AT BIGELOW CARPET CO.]	1910/00/00			BP	

149-007-[B]	DETAIL OF HEAD GATE ARRANGEMENT [& OF HEAD GATE OF 33" TYPE C, HORIZONTAL HERCULES] FOR THE / BIGELOW [COLUMBIA TEXTILE] CO. / LOWELL, MASS.	1910/05/25	1"=1'	H 90.2, W 77 CM	BLUEPRINT	PAPER
149-007-[C]	[DETAILS OF GENERATOR TYPE THRUST BEARING FOR 6 1/2" SHAFT FOR 33" TYPE C, HORIZONTAL HERCULES TURBINES, INSTALLED IN COLUMBIA TEXTILE CO.]	1910/00/00			BP	
149-007-[D]	[PROPOSED ARRANGEMENT OF DRAFT TUBES OF 33" TYPE C, HERCULES TURBINES FOR COLUMBIA TEXTILE CO.]	1910/00/00			BP	
149-007-[E]	[DETAILS OF I BEAMS UNDER BULK HEAD RINGS.]	1910/00/00			BP	
149-008-[A]	TRACING OF PART OF [COLUMBIA PLANT] MARKET STREET / AND LOWELL MFG. CO'S. BUILDINGS SHOWING / LOCATION OF LEAKS INTO HOUSE OF PLAYMASTER / LOWELL CO. [& REPAIRS TO OLD DRAIN OFF MERRIMACK CANAL NEAR MARKET ST.].	1897/12/08	1"=50'	H 28, W 61.3 CM	INK, WATER COLOR	DRAFTING CLOTH
149-008-[B]	BIGELOW YARD / FIRE PROTECTION SYSTEM.	1921/04/08	1"=100'	H 22.9, W 28.9 CM	BLUEPRINT, COLORED INK	PAPER
149-009	DIAGRAM SHOWING GRADE OF BOTTOM / IN FLUME IN MIDDLESEX CO'S RACE.	1898/11/00	NONE	H 56, W 81.5 CM	INK, GRAPHITE	PAPER
149-010	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / SHOWING / [WATERWAYS] PIPES LAID FOR EXTINGUISHING FIRE.	1890/11/00	1/4"=10'	H 68.5, W 101.4 CM	HELIOTYPE, WATER COLOR	PAPER

149-011-[A]	[PLAN OF] MIDDLESEX CO'S DAM / ON / CONCORD RIVER [FROM MEASUREMENTS MADE JULY 1, 1878].	1912/01/17	1"=20'	H 25.3, W 36.5 CM	INK	DRAFTING CLOTH
149-011-[B]	[PLAN OF] MIDDLESEX CO'S DAM / ON / CONCORD RIVER [FROM MEASUREMENTS MADE JULY 1, 1878].	1878/07/02	SEE NOTES	H 38.6, W 54.3 CM	INK	DRAFTING CLOTH
149-012	MIDDLESEX COMPANY / SKETCH SHOWING METHOD OF / SUPPORTING WALL OF NO. 3 MILL ON / CONCORD RIVER [(IPSWICH MILLS)].	1896/10/00	NONE	H 48.3, W 61 CM	INK	DRAFTING CLOTH
149-013-[A]	TRACING / OF / PART OF PLAN # 1321 / L. & C. OFFICE / SHOWING / IMPROVEMENTS OF MIDDLESEX [IPSWICH MILLS] CO'S. / NO. 1 & 2 RACE [MADE NOV. 21 TO 28, 1897].	SEE TITLE	1"=10'	H 36.8, W 51.5 CM	BLUEPRINT	PAPER
149-013-[B]	TRACING / OF / PART OF PLAN NO. 1321 / IN LOCKS & CANALS OFFICE / SHOWING / IMPROVEMENTS OF MIDDLESEX CO.'S / NO.1 & 2 RACE.	1897/12/01	1"=10'	H 36.9, W 89.3 CM	BLUEPRINT, COLORED INK	PAPER
149-013-[C]	TRACING / OF / PART OF PLAN NO. 1321 / IN LOCKS & CANALS OFFICE / SHOWING / IMPROVEMENTS OF MIDDLESEX CO.'S / NO.1 & 2 RACE.	1898/09/15	1"=10'	H 36.9, W 89.3 CM	BLUEPRINT, COLORED INK	PAPER
149-014-[A]	SKETCH [SCALE DRAWING] SHOWING / PROPOSED NEW IRON RACK [IMPROVED PENSTOCK] & FOUNDATIONS FOR / [IPSWICH] MIDDLESEX CO'S NOS. 1 & 2 WHEELS.	1899/08/07	1/2"=1'	H 42.6, W 86.7 CM	BLUEPRINT	PAPER

149-014-[B]	SKETCH [SCALE DRAWING] SHOWING / PROPOSED NEW IRON RACK [IMPROVED PENSTOCK] & FOUNDATIONS FOR / [IPSWICH] MIDDLESEX CO'S. NO. 1 & 2 WHEELS.	1899/08/24	NONE	H 40, W 51 CM	BLUEPRINT	PAPER
149-014-[C]	SKETCH [SCALE DRAWING] SHOWING / NEW IRON RACK [IMPROVED PENSTOCK] & FOUNDATIONS FOR / MIDDLESEX CO'S NO.1 & NO.2 WHEELS.	1899/08/07	1/2"=1'	H 38.7, W 50.5 CM	BLUEPRINT	PAPER
149-014-[D]	SCALE DRAWING OF / MIDDLESEX CO'S 1 & 2 PENSTOCK.	1886/11/30	1"=10'	H 44, W 83.3 CM	BLUEPRINT	PAPER
149-014-[E]	SCALE DRAWING OF MIDDLESEX CO'S. NEW RACKS & IMPROVED PENSTOCK / FOR NO.1 & 2 WHEELS.	1899/10/27	1"=10'	H 46.7, W 84.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-014-[F]	SCALE DRAWING OF / MIDDLESEX CO'S. NEW RACKS & IMPROVED PENSTOCK / FOR NO.1 & 2 WHEEL.	1899/10/27	1"=10'	H 42.6, W 84.5 CM	BLUEPRINT	PAPER
149-015	PLAN OF THE MILL YARD / OF THE / [IPSWICH MILLS] MIDDLESEX COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE. [AND THE APPROXIMATE LOCATION OF PIPES FOR THE PURPOSE OF SUPPLYING WATER FOR WOOL WASHING, SCOURING ETC.].	1898/03/15	1/4"=10'	H 65.8, W 101.7 CM	HELIOTYPE, WATER COLOR, COLORED INK	PAPER
149-016	DIAGRAM SHOWING / LOSS OF HEAD IN PENSTOCK OF / [IPSWICH] MIDDLESEX CO'S NO. 1 & 2 WHEELS / BEFORE & AFTER / IMPROVEMENTS OF 1899.	1900/01/00	NONE	H 38.9, W 68.5 CM	INK, COLORED INK	PAPER

149-017	SKETCH OF LOWER PART OF DRAFT TUBE / OF 72" SWAIN WHEEL IN MIDDLESEX [IPSWICH] / COMPANY'S NO. 1 [WHEEL] PIT.	1898/09/20	1"=1'	H 53.4, W 34.5 CM	INK, COLORED INK	DRAFTING CLOTH
149-018	[PLAN OF] PART OF [IPSWICH] MIDDLESEX CO.'S LAND & BUILDINGS / NEAR LOWER LOCKS [PRPPOSED FEEDER].	1898/05/08	1"=20'	H 65.6, W 94.7 CM	INK, WATER COLOR	PAPER
149-019	DIAGRAM OF SLOPES IN / [IPSWICH] MIDDLESEX CO'S NO[S] 1 & 2 RACE.	1897/12/09	NONE	H 34.4, W 95.4 CM	INK, GRAPHITE	PAPER
149-020-[A]-[COPY 1]	PLAN SHOWING REARRANGEMENT OF FEEDERS / HEADGATES & WATER RACKS / FOR THE / MIDDLESEX CO.'S CONCORD RIVER MILL # 3 / LOWELL, MASS.	1896/10/07	1/2"=1'	H 83.9, W 120.5 CM	BLUEPRINT	PAPER
149-020-[A]-[COPY 2]	PLAN SHOWING REARRANGEMENT OF FEEDERS / HEADGATES & WATER RACKS / FOR THE / MIDDLESEX CO.'S CONCORD RIVER MILL # 3 / LOWELL, MASS.	1896/10/07	1/2"=1'	H 86.7, W 123.2 CM	BLUEPRINT	PAPER
149-020-[B]	PLAN / SHOWING [DETAILS OF] / MIDDLESEX [IPSWICH] CO'S NO. 3 MILL / ON CONCORD RIVER, WITH CHANGES MADE IN / CONNECTION WITH SUBSTITUTING FOR THE BREAST WHEELS, 2 PAIRS / OF 30 INCH SPECIAL / [R.H. & L.H.] HERCULES WHEELS.	SEE NOTES	1"=10'	H 68.5, W 72.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-020-[C]	PLAN / OF / MIDDLESEX [IPSWICH] CO.'S NO. 3 MILL / SHOWING / BREAST WHEELS & CONDITIONS PRE- / VIOUS TO TAKING THEM OUT.	1896/12/00	NONE	H 66.1, W 76.8 CM	BLUEPRINT	PAPER

149-021	PLAN / OF / [IPSWICH] MIDDLESEX CO'S NO. 3 MILL / SHOWING / BREAST WHEELS & CONDITIONS PRE- / VIOUS TO TAKING THEM OUT.	1896/12/00	1"=10'	H 66.4, W 76.3 CM	BLUEPRINT	PAPER
149-022	SKETCH SHOWING / PART OF / MIDDLESEX [IPSWICH MILLS] CO'S. / [RACES & WHEELPITS] CONCORD RIVER WHEELS.	1896/05/25	NONE	H 23.7, W 58.4 CM	INK, COLORED INK	PAPER
149-023	SCALE DRAWING / SHOWING / OUTLET OF SOUTHERLY DRAFT-TUBE / OF / MIDDLESEX CO'S. CONCORD RIVER WHEELS.	1905/10/00	1"=1'	H 59.8, W 73.7 CM	BLUEPRINT	PAPER
149-024	PLAN OF PART / OF THE / MIDDLESEX COMPANY'S YARD / SHOWING / PROPOSED CHANGES IN LOCATION OF RAIL ROAD TRACKS.	1901/03/27	1"=40'	H 42, W 61 CM	BLUEPRINT, COLORED INK	PAPER
149-025	PLAN SHOWING MEAN BUCKET OUTLET FOR 4 30" / SPECIAL HERCULES WHEELS AT [IPSWICH] MIDDLESEX CO'S MILL [NO. 3].	1897/02/00	FULL SIZE	H 29.5, W 53 CM	BLUEPRINT	PAPER
149-025-[A]	PLAN SHOWING MEAN BUCKET OUTLET FOR 30" / SPECIAL HERCULES WHEELS AT [IPSWICH] MIDDLESEX CO'S A MILL [NO. 3].	1897/02/00	FULL SIZE	H 30.5, W 53 CM	BLUEPRINT, COLORED INK	PAPER
149-026	SECTION / SHOWING / SHAPE OF BUCKETS / IN / [IPSWICH] MIDDLESEX CO'S BREAST WHEELS.	1895/01/14	FULL SIZE	H 104.5, W 64.8 CM	GRAPHITE	PAPER
149-027	SKETCH OF PENSTOCK, WHEELPITS & RACEWAYS / OF THE SWAIN WHEELS IN / MIDDLESEX CO'S MILL NO.1.	1883/01/00	1"=1'	H 61.4, W 101.3 CM	INK, COLORED INK, WATER COLOR	PAPER
149-028	[SKETCH OF] MIDDLESEX CO'S TURBINES, NOS.1 & 2 / DATE RELATING TO PENSTOCKS, ETC.	1894/12/00	1"=4'	H 72.4, W 114.4 CM	INK, COLORED INK	PAPER

149-029-[A]	MILL POWERS / DRAWN BY WHEELS OF / BIGELOW CARPET CO.	1911/04/01	NONE	H 52.1,W 56.5 CM	INK	DRAFTING CLOTH
149-029-[B]	[DIAGRAM SHOWING] BIGELOW [HARTFORD] CARPET CO. / PERMANENT & SURPLUS / MILL POWERS [OF THE WHEELS OF THE COLUMBIA TEXTILE CO.].	1914/01/19	NONE	H 52.1, W 56.5 CM	INK	DRAFTING CLOTH
149-030-[A]	SCALE DRAWING / SHOWING / OUTLET OF NORTHERLY DRAFT-TUBE / OF / MIDDLESEX CO'S, CONCORD RIVER WHEELS.	1905/10/00	1"=1'	H 60, W 68.6 CM	INK, COLORED INK	DRAFTING CLOTH
149-030-[B]	SCALE DRAWING / SHOWING / OUTLET OF SOUTHERLY DRAFT-TUBE / OF / MIDDLESEX CO'S. CONCORD RIVER WHEELS.	1905/10/00	1"=1'	H 60, W 68.6 CM	INK, COLORED INK	DRAFTING CLOTH
149-031-[A]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENTS / AT / [COLUMBIA TEXTILE] BIGELOW CARPET COMPANY / LOWELL, MASS.	1911/05/22	NONE	H 53.7, W 84 CM	INK	PAPER
149-031-[B]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENTS / AT / [COLUMBIA TEXTILE] BIGELOW CARPET COMPANY / LOWELL, MASS.	1911/05/22	NONE	H 53.7, W 84 CM	INK	PAPER
149-031-[C]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENTS / AT / [COLUMBIA TEXTILE] BIGELOW CARPET COMPANY / LOWELL, MASS.	1911/05/22	NONE	H 53.7, W 84 CM	INK	PAPER
149-031-[D]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENTS / AT / [COLUMBIA TEXTILE] BIGELOW CARPET COMPANY / LOWELL, MASS.	1911/05/24	NONE	H 53.7, W 84 CM	INK	PAPER

149-032-[A]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENT[S] / AT / [COLUMBIA TEXTILE] BIGELOW [HARTFORD MILLS] CARPET CO. / LOWELL, MASS.	1911/06/19	NONE	H 53.5, W 88.8 CM	INK, COLORED INK	PAPER
149-032-[B]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENT[S] / AT / [COLUMBIA TEXTILE] BIGELOW [HARTFORD MILLS] CARPET CO. / LOWELL, MASS	1911/06/19	NONE	H 53.5, W 88.8 CM	INK, COLORED INK	PAPER
149-033-[A]	[DIAGRAM SHOWING COLUMBIA TEXTILE] BIGELOW [HARTFORD MILLS] CARPET COMPANY / CURRENT METER MEASUREMENTS / AT MOUTH OF RACES [& ENTRANCE TO FEEDERS] / A.T.S. BUFF AND BUFF.	1911/10/05	NONE	H 53.7, W 84 CM	INK	PAPER
149-033-[B]	[DIAGRAM SHOWING COLUMBIA TEXTILE] BIGELOW [HARTFORD MILLS] CARPET COMPANY / CURRENT METER MEASUREMENT / [AT MOUTH OF RACES &] ENTRANCE TO FEEDERS] / GURLEY METER / 1ST MEAST.	1911/10/05	NONE	H 53.7, W 84 CM	INK	PAPER
149-033-[C]	[DIAGRAM SHOWING COLUMBIA TEXTILE] BIGELOW [HARTFORD MILLS] CARPET COMPANY / CURRENT METER MEASUREMENT / [AT MOUTH OF RACES &] ENTRANCE TO FEEDERS] / GURLEY METER / 2ND MEAST.	1911/10/05	NONE	H 53.7, W 84 CM	INK	PAPER

149-034-[A]	[POINT CURRENT METER MEASUREMENT AT COLUMBIA TEXTILE CO.] BIGELOW CARPET CO. / METER: A.T.S. BUFF & BUFF.	1911/08/22	NONE	H 29, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
149-034-[B]	[POINT CURRENT METER MEASUREMENT AT COLUMBIA TEXTILE CO.] BIGELOW CARPET CO. / METER: A.T.S. BUFF & BUFF.	1911/08/22	NONE	H 29, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
149-035-A	CURRENT METER MEASUREMENT / [COLUMBIA TEXTILE] BIGELOW HARTFORD CARPET CO. / [AT] UPPER SIDE MARKET ST. BRIDGE.	1919/12/08	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-B	CURRENT METER MEASUREMENT / BIGELOW HARTFORD [COLUMBIA TEXTILE] CO. / METER ABOVE CARPET CO.'S RACKS.	1919/12/08	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-C	CURRENT METER MEASUREMENT / COLUMBIA TEXTILE CO. / METER STATION ABOVE COLUMBIA TEXTILE CO'S RACKS.	1920/07/07	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-D	CURRENT METER MEASUREMENTS / [STATION ABOVE STATION IN MERRIMACK CANAL ABOVE RACKS FOR] COLUMBIA TEXTILE CO.	1920/07/12	NONE	H 29.3, W 45.8 CM	INK, COLORED INK	PAPER
149-035-E	COLUMBIA TEXTILE CO / CURRENT METER MEASUREMENT.	1921/03/28	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[01]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/12	NONE	H 29.3, W 45.8 CM	INK	PAPER

149-035-F-[01]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/12	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[01]-[COPY 2]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/12	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[02]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/18	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[02]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/18	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[03]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[03]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[03]-[COPY 2]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[04]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[04]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER

149-035-F-[04]-[COPY 2]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[05]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[05]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[06]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[06]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[07]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[07]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[08]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[08]-[COPY 1]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER

149-035-F-[08]-[COPY 2]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1913/11/20	NONE	H 29.3, W 45.8 CM	BLUEPRINT	PAPER
149-035-F-[09]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1916/09/08	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[10]	[DIAGRAM SHOWING] MEASUREMENT[S] OF WATER / USED BY [THE COLUMBIA TEXTILE] BIGELOW CARPET CO.	1916/09/13	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-F-[11]	[DIAGRAM SHOWING THE COLUMBIA TEXTILE] BIGELOW CARPET CO'S / CURRENT METER MEASURING STATION / IN / MERRIMACK CANAL.	1916/11/16	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-G	[CURRENT] METER STATIONS / BIGELOW-HARTFORD CARPET CO. / PROP. LOCKS & CANALS / LOWELL, MASS.	1919/11/00	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-H	DAY USE POWER DURATION DIAGRAM / [OF COLUMBIA TEXTILE CO.] BIGELOW HARTFORD CARPET CO. / PROP. LOCKS & CANALS / LOWELL, MASS.	1920/04/27	NONE	28, W 21.5 CM	INK, COLORE INK	PAPER
149-035-I	CURRENT METER MEASUREMENT [STATION UPPER SIDE OF SACO-LOWELL SHOPS BRIDGE OVER MERRIMACK CANAL / [FOR] SACO-LOWELL SHOPS.	1920/07/07	NONE	H 29.3, W 45.8 CM	INK	PAPER
149-035-J	[SKETCH SHOWING] PROPOSED / CHANGES IN FIRE PROTECTION MAINS / IN THE / BIGELOW YARD.	1933/03/00	1"=100'	H 22, W 28.5 CM	INK, COLORED INK	DRAFTING CLOTH

149-035-N	[PLAN OF] PORTION OF / BIGELOW HARTFORD MILL YARD / SHOWING / BUILDINGS NUMBERED 8, 19, 20.	1934/07/10	1"=40'	H 22.2, W 44.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
149-035-O	PLAN OF LAND [AND BUILDINGS] IN ["BIGELOW YARD"] LOWELL, MASS. / SURVEYED FOR [AND BELONGING TO] THE / ABBOT WORSTED COMPANY	1935/10/01	1"=20'	H 45.5, W 30.4 CM	BLUEPRINT	PAPER
149-035-P	PLAN SHOWING / PROPERTY OWNERS / ON THE / NORTHERLY SIDE OF PAWTUCKET / CANAL, WEST OF CENTRAL ST. / LOWELL, MASS.	1942/11/30	1"=50'	H 27.4, W 51.5 CM	INK, WATER COLOR	DRAFTING CLOTH
149-035-Q	[REDUCED COPY OF PLAN AND SURVEY IN THE VICINITY OF BUILDINGS 19 & 20 IN BIGELOW YARD BY] BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS.	SEE NOTES	NONE	H 21.3, W 35.5 CM	BLUE LINE PRINT	PAPER
149-036	BIGELOW CARPET CO. / DIAGRAM & TABLE / SHOWING / OPENINGS OF SPEEDGATES / FOR / DIFFERENT PER CENT OF LIMITATION.	1913/12/00	NONE	H 45.8, W 29.3 CM	INK	PAPER
149-037	[UNTITLED.] [OLD PLAN OF MIDDLESEX NO.1 & LOWER LOCKS SHOWING PROPERTY LINE BETWEEN MIDDLESEX (IPSWICH) CO. & L.& C.]	1879/12/31	NONE	H 63.4, W 101.7 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
149-038	[PROPOSED RELOCATION OF UNITS 1 & 2 AT IPSWICH MILLS.]	1921/10/11			BLUEPRINT	
149-039	PLAN SHOWING [RACEWAY & WHEELPITS OF] MIDDLESEX CO'S / CONCORD R. MILL (NO.3).	SEE NOTES	NONE	H 69, W 71.3 CM	INK, COLORED INK	PAPER

149-040	PLAN FOR ERECTING 1-20,000 FT. LB. GOVERNOR / FOR / [IPSWICH] MIDDLESEX CO. [MILLS BY LOMBARD GOVERNOR CO., ASHLAND, MASS.].	1915/04/24	1"=1'	H 49, W 65.2, CM	BLUEPRINT	PAPER
149-041-[A]-[COPY 1]	PLAN OF TWO PAIRS 30" R. & L. H. HERCULES TURBINES / FOR THE / MIDDLESEX CO'S, CONCORD RIVER MILL NO. 3. / LOWELL, MASS.	1896/09/22	3/4"=1'	H 87.8, W 123.2 CM	BLUEPRINT	PAPER
149-041-[A]-[COPY 2]	PLAN OF TWO PAIRS 30" R. & L. H. HERCULES TURBINES / FOR THE / MIDDLESEX CO'S, CONCORD RIVER MILL NO. 3. / LOWELL, MASS.	1896/09/22	3/4"=1'	H 87.8, W 123.2 CM	BLUEPRINT	PAPER
149-042	[DRAWING OF] BREAST WHEELS AT [IPSWICH] MIDDLESEX / MILLS 1895.	1915/04/22	1/4"& 3"=1'	H 37.5, W 58.5 CM	INK, COLORED INK	PAPER
149-042-[COPY 1]	BREAST WHEELS AT MIDDLESEX / MILLS 1895.	1915/04/22	NONE	H 37, W 57.9 CM	BLUEPRINT	PAPER
149-043	PROPOSED ARRANGEMENT OF / 45" D x 35" D VERTICAL HERCULES TURBINES / FOR / [IPSWICH] MIDDLESEX CO. / LOWELL, MASS.	1917/09/29	1/8"=1'	H 71.9, W 119.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-044	[DIAGRAM SHOWING DISCHARGE OF WHEELS NOS. 1 (72" SWAIN) & 2 (66" SWAIN) OF IPSWICH (MIDDLESEX) CO. ALSO SKETCH SHOWING ARRANGEMENT OF WHEELS.]	1916/04/01				

149-045	[SECTION OF] MIDDLESEX CO'S 30" SPECIAL HERCULES WHEELS. / SECTION THROUGH WHEELS & DOUBLE QUARTER TURN [SHOWING POSITION OF WHEELS AS ORIG. PLANNED & TESTED DEC.19, 1896 & POSITION AS TESTED JAN.11 & 12, 1897, WHEN MOVED 16" FARTHER APART ON SHAFT.	SEE TITLE	NONE	H 20.9, W 28.7 CM	BLUEPRINT	PAPER
149-046	GENERAL PLAN & DATA / [OF IPSWICH] MIDDLESEX CO. NOS. 1 [72"] & 2 [66" SWAIN] WHEELS. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/00	1"=200'& 10'	H 75, W 106.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
149-046-[COPY 1]	GENERAL PLAN & DATA / MIDDLESEX CO. NOS. 1 (72") & 2 (66") SWAIN WHEELS. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/00	1"=200'& 10'	H 75, W 106 CM	BLUEPRINT	PAPER
149-046-[COPY 2]	GENERAL PLAN & DATA / MIDDLESEX CO. NOS. 1 (72") & 2 (66") SWAIN WHEELS. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/00	1"=200'& 10'	H 75, W 106 CM	BLUEPRINT	PAPER
149-047	PROPOSED ARRANGEMENT OF PAIR OF 36" D, HORIZONTAL HERCULES TURBINES / [FOR IPSWICH] MIDDLESEX CO. / LOWELL, MASS.	1916/03/14	1/8'=1'	H 59.9, W 73.8 CM	BLUEPRINT	PAPER
149-048	PROPOSED ARRANGEMENT OF 4-30" D, HORIZONTAL HERCULES TURBINES. / [FOR] [IPSWICH] MIDDLESEX CO. / LOWELL, MASS. / HOLYOKE MACHINE CO. WORCESTER, MASS.	1916/03/08	1/4"=1'	H 61, W 96 CM	BLUEPRINT	PAPER

149-049	PLAN OF THE MILL YARD / OF THE / [COLUMBIA TEXTILE CO.] BIGELOW HARTFORD COMPANY / SHOWING / BUILDINGS OCCUPIED BY THE UNITED STATES CARTRIDGE COMPANY.	1917/12/12	1"=60'	H 39.4, W 49.6 CM	INK	DRAFTING CLOTH
149-050-A	[IPSWICH] MIDDLESEX CO. / CURRENT METER MEASUREMENTS / FOR / WHEEL NO. 1.	1919/07/25	NONE	H 30.2, W 21.3 CM	INK	PAPER
149-050-B	[CURRENT METER MEASUREMENT. MIDDLESEX CO.]	1921/05/10				
149-050-C	IPSWICH MILLS (MIDDLESEX CO.) / CURRENT METER MEASUREMENTS / FOR / WHEEL NO. 1.	1920/06/11	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
149-050-D	MEASUREMENTS OF WATER PASSING / [IPSWICH] MIDDLESEX CURRENT METER STATION.	1919/06/06	NONE	H 29.2, W 45.8 CM	INK	PAPER
149-050-E	MEASUREMENTS OF WATER PASSING / [IPSWICH] MIDDLESEX CURRENT METER STATION.	1919/06/20	NONE	H 29.2, W 45.8 CM	INK	PAPER
149-050-F	MEASUREMENTS OF WATER PASSING / [IPSWICH] MIDDLESEX CURRENT METER STATION.	1919/07/07	NONE	H 29.2, W 45.8 CM	INK	PAPER
149-050-G	MEASUREMENTS OF WATER PASSING / MIDDLESEX CURRENT METER STATION.	1919/07/14	NONE	H 29.2, W 45.8 CM	INK	PAPER
149-050-H	MEASUREMENTS OF WATER PASSING / [IPSWICH] MIDDLESEX CURRENT METER STATION.	1919/07/23	NONE	H 29.2, W 45.8 CM	INK	PAPER
149-050-I	[IPSWICH] MIDDLESEX COMPANY / CURRENT METER MEASUREMENT / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/18	NONE	H 29.2, W 45.8 CM	INK	PAPER

149-050-J	CURRENT METER MEASUREMENT / [FOR IPSWICH] MIDDLESEX CO.	1919/12/09	NONE	H 29.2, W 45.8 CM	INK	PAPER
149-050-J	[DIAGRAM SHOWING] MILL POWERS / DRAWN BY WHEELS OF / IPSWICH MILLS.	1920/06/05	NONE	H 32.8, W 48.4 CM	INK, COLORED INK	DRAFTING CLOTH
149-050-K	[DIAGRAM SHOWING] MIDDLEXSEX CO. / RELATION [OF] OUTSIDE TO INSIDE FALL [OF NO. 1 & 2 WHEELS OF IPSWICH MILLS] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1920/03/19	NONE	H 21.6, W 28 CM	INK	PAPER
149-050-L	[DIAGRAM SHOWING] DAY USE POWER-DURATION DIAGRAM / [FOR IPSWICH] MIDDLESEX CO. / PROPRIETORS OF LOCKS & CANALS.	1920/03/22	NONE	H 30.4, W 21.5 CM	INK, COLORED INK	PAPER
149-050-M	[DIAGRAM SHOWING HEIGHT OF BOOTT RIVER GAUGE VS. IPSWICH (MIDDLESEX) LIMITATION] MIDDLESEX COMPANY, LOWELL, MASS.	1918/02/07	NONE	H 21.5, W 28.2 CM	INK, COLORED INK	PAPER
149-050-N	30" R.H. TYPE C / CYL. GATE / 16 FT. HEAD.	1909/10/10	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-O	30" L.H., TYPE C, CYL. GATE / 16 FT. HEAD.	1911/04/01	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-P	1-PR 30" TYPE "C". R.& L.H. CYL' GATE.	UNDATED	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-Q	30" L.H. TYPE "C" CYL' GATE.	UNDATED	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-R	30" R.H. TYPE "C" CYL. GATE.	UNDATED	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-S	30" R.H. TYPE B / 16 FT. HEAD.	1911/06/11	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-T	30" L.H. TYPE B / 16 FT. HEAD.	1909/04/15	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-U	30" B.R.H. CYL' GATE.	1931/10/03	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-V	30" B.L.H. CYL.' GATE.	1931/10/03	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER
149-050-W	1-PR. 30" TYPE B. R. & L. H. CYL. GATE.	1931/10/03	NONE	H 30.5, W 21.5 CM	BLUEPRINT	PAPER

149-050-X	MIDDLESEX CO'S 30" SPECIAL HERCULES WHEELS. / SECTION THROUGH WHEELS & DOUBLE QUARTER TURN.	SEE NOTES	NONE	H 18.6, W 23.6 CM	INK, COLORED INK	DRAFTING CLOTH
149-051	PLAN OF THE MILL YARD / OF THE / MIDDLESEX COMPANY / LOWELL, MASS.	1920/03/31	1"=40'	H 60.4, W 97.5 CM	INK, WATER COLOR	DRAFTING CLOTH
149-051-[A]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / LOWELL, MASS.	1920/03/31	1"=40'	H 59.5, W 97 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-051-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / LOWELL, MASS.	1920/03/31	1"=40'	H 59.5, W 97 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-052	IPSWICH MILLS / POWER REDEVELOPMENT [AT IPSWICH MILLS CONCORD RIVER UNIT] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/02/08	1/8"& 1/4"=1'	H 62.5, W 100.4 CM	INK, GRAPHITE	DRAFTING CLOTH
149-053	IPSWICH MILLS / POWER REDEVELOPMENT [AT IPSWICH MILLS. TWO STEEL CASED UNITS IN PRESENT WHEELPITS] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/02/01	1/4"=1'	H 54.6, W 62.9 CM	INK, GRAPHITE	DRAFTING CLOTH
149-054	IPSWICH MILLS, LOWELL, MASS. / [PLAN SHOWING] PROPOSED RELOCATION [OF] NOS. 1 & 2 UNITS [WHEELS].	1921/10/11	1/8"=1'	H 70.5, W 108 CM	INK, COLORED INK, GRAPHITE	PAPER
149-055	IPSWICH MILLS / [PLAN SHOWING LAYOUT OF] LINE SHAFTING / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/08/30	1"=40'	H 54.6, W 62.3 CM	INK	DRAFTING CLOTH

149-056	[DRAWING SHOWING DETAIL OF HEAD GATES ARRANGEMENT FOR BIGELOW CARPET CO., LOWELL, MASS.]	1910/05/06	1"=1'		BP	
149-057	PROPOSED ARRANGEMENT OF ONE 45" D- & ONE 33" D-CYLINDER GATE VERTICAL HERCULES TURBINES / [FOR] IPSWICH MILLS / LOWELL, MASS.	1923/01/17	1/8"=1'	H 80.6, W 124.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-058	[PLAN & SECTION OF] CURRENT METER MEASURING STATION. (AT ENTRANCE OF FEEDERS) / [BIGELOW CARPET STATION AT] BIGELOW CARPET CO. / LOOKING IN.	1911/05/19	1/4"=1'	H 17.8, W 31.1 CM	INK, COLORED INK	DRAFTING CLOTH
149-059	[PLAN OF BIGELOW YARD SHOWING COLUMBIA TEXTILE CO. POWER PLANT.]	1925/06/24	1"=40'			
149-059.1	[GENERAL PLAN OF MIDDLESEX CO. SHOWING REPAIRS TO FOREBAY.]	1921/06/00				
149-060	GENERAL PLAN & DATA / MIDDLESEX CO. NOS.1 & 2 WHEELS. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	SEE NOTES	1"=10'	H 40.7, W 44.2 CM	BLUEPRINT	PAPER
149-060	PLAN SHOWING / WATERWAYS & WHEELS / UNDER / COLUMBIA TEXTILE POWER HOUSE.	1927/04/27	1/8"=1'	H 42, W 61 CM	INK, WATER COLOR	DRAFTING CLOTH
149-061	TURBINE STATION / & / PICKER HOUSE / BIGELOW CARPET CO. / LOWELL, MASS. [(LOOKING NORTH)]. [A.K.A. ASSETS POWER HOUSE].	1911/09/17	1/2"=1'	H 56, W 41.5 CM	PHOTOSTAT	PAPER
149-062	TURBINE STATION / AND / PICKER HOUSE / BIGELOW CARPET CO. / LOWELL MASS. [(LOOKING EAST)]. [A.K.A. ASSETS POWER HOUSE]	1911/04/17	1/2"=1'	H 56, W 41.5 CM	PHOTOSTAT	PAPER

149-063	COLUMBIA TEXTILE CO. / [MILL YARD] PARCELS I TO V WITH / ADDITIONAL INFORMATION.	1927/05/11	1"=10',20' & 40'	H 55.5, W 94 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
149-064	[BLUEPRINT OF BIGELOW MILL YARD PLAN SHOWING SUBDIVISIONS DUE TO SALES.]	1927/10/00				
149-065	[MILL YARD] PLAN [OF IPSWICH & MIDDLESEX CO.] SHOWING LOCKS & CANALS, CITY OF LOWELL / AND MILL PROCESS WATER SYSTEMS / OF THE / MIDDLESEX COMPANY / AND / MODEL SHOE COMPANY.	1929/01/00	1 1/2"=50'	H 55, W 90 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
149-066	SKETCH SHOWING / PROPOSED CUT-OFF WALL / AT HEAD OF IPSWICH MILLS PENSTOCK / ALSO / PROPOSED 12" C.I. PIPE / FOR PROCESS WATER.	1928/08/14	1"=4' & 1"=10'	H 29.2, W 86.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
149-067	ARRANGEMENT OF 2-30" C. R. & L. H. TO REPLACE 2-308 HORIZONTAL HERCULES TURBINES. / FOR THE / MIDDLESEX COMPANY, LOWELL, MASS. / HOLYOKE MACHINE COMPANY. / WORCESTER, MASS.	1931/10/23	3/4"& 1 1/2"=1'	H 85.7, W 120.6 CM	BLUEPRINT	PAPER
149-068	PROPERTY OF / MIDDLESEX COMPANY.	1929/04/01	1"=40'	H 64.2, W 116 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
149-069	PLAN SHOWING / MIDDLE GATE & DRIVEWAY / TO / MIDDLESEX COMPANY'S YARD.	1934/10/06	1"=10'& 1/4"=1'	H 55.7, W 89.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
149-070	PLAN OF WHEEL PIT, FOR THE / MIDDLESEX CO'S, CONCORD R., MILL # 3.	1896/09/02	1/4"=1'	H 64.2, W 113.2 CM	BLUEPRINT, COLORED PENCIL	PAPER

149-071	PLAN SHOWING REARRANGEMENT OF FEEDERS / HEAD GATES & WATER RACKS / FOR THE / MIDDLESEX CO'S. CONCORD RIVER MILL # 3 / LOWELL, MASS.	1896/10/07	1/2"=1'	H 81.3, W 112.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
149-072	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / LOWELL INSTITUTION FOR SAVINGS.	1942/04/30	1"=20'	H 45.4, W 61.3 CM	BLUEPRINT	PAPER
149-073	PLAN SHOWING / AREAS LEASED TO / MIDDLESEX COMPANY / BY / PROPRIETORS OF THE LOCKS & CANALS / ALSO / ADJOINING PROPERTIES / LOWELL, MASS.	1945/10/11	1/2"=10'	H 52.6, W 76 CM	INK, WATER COLOR	DRAFTING CLOTH
149-074	PLAN OF / MILL NO. 7 / OF THE FORMER BIGELOW YARD / LOWELL, MASS.	1948/07/01	1"=20'	H 51.2, W 61.6 CM	INK	DRAFTING CLOTH
149-075	TURBINE STATION / & / PICKER HOUSE / BIGELOW CARPET CO. / LOWELL, MASS.	1911/04/17	1/4"=1'	H 103.3, W 76.5 CM	BLUEPRINT	PAPER
149-076	PORTION OF "BIGELOW YARD."	1955/09/14	1"=60'	H 21.5, W 28 CM	INK, COLORED INK	PAPER
149-077	PLAN SHOWING / PERMANENT RIGHTS OF WAY / IN "BIGELOW YARD" / 200 MARKET ST. / LOWELL, MASS.	1959/05/27	1"=60'	H 40.9, W 53 CM	BLUEPRINT	PAPER
149-078	MILLS 19 & 20 / 80 MARKET ST. / LOWELL, MASS.	1958/05/15	NONE	H 79, W 118.4 CM	BLUEPRINT	PAPER
150-[144]	PLAN OF THE / YARD / OF THE / SACO LOWELL SHOPS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1932/00/00	1"=40'	H 63, W 76 CM	BLACK LINE PRINT, INK, COLORED INK WATER COLOR	CLOTH BACKED PAPER

150-[145]	PLAN OF THE / YARD / OF THE / FORMER / SACO-LOWELL SHOPS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1"=40'	H 67.5, W 100.5 CM	BLACK LINE PRINT, WATER COLOR, INK, COLORED INK	CLOTH BACKED PAPER
150-001	PLAN & ELEVATIONS / OF / MOUTH OF NO. SIX RACEWAY / AT / [SACO-] LOWELL MACH. SHOP[S].	1898/09/16	1"=2'	H 62, W 88.3 CM	INK, WATER COLOR	PAPER
150-001-[COPY 1]	PLAN & ELEVATION / OF / MOUTH OF NO. SIX RACEWAY.	1898/09/16	1"=2'	H 65.1, W 94.8 CM	PHOTONEGATIVE	PAPER
150-002	PLAN OF HEAD GATES & RACK TO / NO. 6 TURBINE / AT / [SACO-] LOWELL MACHINE SHOP[S].	1895/05/00	1"=1'	H 57.9, W 107 CM	INK, COLORED INK	PAPER
150-003	PLAN OF 6" OVERFLOW PIPE / EMPTYING INTO [HAMILTON] CANAL. / [FROM FOUNDRY SACO] LOWELL [MACHINE] SHOPS.	1906/10/13	1/2"=1'	H 62, W 62 CM	BLUEPRINT	PAPER
150-004	PROPOSED PLAN FOR NEW FLUME FOR 42' SWAIN WHEEL / IN L.M.S. [SACO LOWELL] FOUNDRY FLASK HOUSE.	1894/05/31	1/4"=1'	H 71.8, W 129.7 CM	INK, COLORED INK	DRAFTING CLOTH
150-005	PLAN OF THE / YARD / OF THE / LOWELL MACHINE SHOP / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE [AND SUGGESTION FOR NEW WATER POWER].	1891/01/00	NONE	H 68.7, W 102 CM	HELIOTYPE, WATER COLOR	PAPER
150-006	SECTION / IN THE / MILL YARD / OF THE / [SACO-] LOWELL MACHINE SHOP[S].	1893/04/00	H1"=30', V1"=5'	H 48, W 94 CM	INK, WATER COLOR	DRAFTING CLOTH
150-007	PLAN OF THE / YARD / OF THE / LOWELL MACHINE SHOP / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1891/01/00	NONE	H 68.7, W 101 CM	HELIOTYPE, WATER COLOR	PAPER

150-008	PLAN & SECTIONS / OF / SACO-LOWELL MACHINE SHOP WHEELS [DATED FEB. 12, 1913. NOS. 1, 2 & 3, 82 1/2" BOYDENS. NOS. 4 & 5, 48" SWAINS. NO. 6 42" SWAIN].	1913/02/12	1"=10'	H 65.7, W 58.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-009	PLAN / SHOWING CABOT STREET / COTTON HOUSE [OF THE TREMONT & SUFFOLK MILLS].	1888/01/10	1/8"=1'	H 104, W 88.2 CM	INK, COLORED INK	DRAFTING CLOTH
150-010	PLAN & SECTIONS OF MASONRY ECT. / AT & NEAR THE SOUTHERLY PART OF THE PREMISES FORMERLY BELONGING TO THE / [TREMONT &] SUFFOLK MANUFACTURING COMPANY [SUFFOLK SIDE].	1879/01/00	1"=20'	H 69.4, W 95.6 CM	INK, WATER COLOR	CLOTH BACKED PAPER
150-011	PLAN SHOWING GROINED ARCHES / SUFFOLK WHEEL-PITS / TREMONT & SUFFOLK MILLS.	1894/10/00	1/8"=1'	H 70, W 26.2 CM	INK	DRAFTING CLOTH
150-012	DIAGRAM OF SLOPE IN SUFFOLK RACEWAYS.	1896-1897/00/00	NONE	H 27.9, W 77.5 CM	INK, COLORED INK	PAPER
150-013	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS [SHOWING WATERWAYS FOR WATERPOWER].	1893/01/00	1/4"=10'	H 76.5, W 133.4 CM	INK, WATER COLOR	DRAFTING CLOTH
150-014	DIAGRAM SHOWING SLOPES IN LAWRENCE SECTION PENSTOCKS.	SEE NOTES	NONE	H 40, W 59.4 CM	INK, COLORED INK	PAPER
150-015	[PLAN OF PENSTOCKS & FOREBAY FOR LAWRENCE SECTION WHEELS.]	1901/04/24	1"=10'			TP
150-016-[A]	SECTIONS SHOWING FOUNDATION WALLS / OF TREMONT MILL NO. 3 & MIDDLE LEVEL OF / WESTERN CANAL.	1900/03/00	1"=10'	H 58.8, W 45.8 CM	INK, WATER COLOR	PAPER

150-016-[A]-[COPY 1]	TRACING OF SECTIONS THROUGH / FOUNDATION WALLS / OF TREMONT NO. 3 MILL / AND TREMONT RACE, IN CONNECTION WITH / RAISING NO. 3 MILL ONE STORY.	1900/03/00	1"=10'	H 58.8, W 45.8 CM	INK, COLORED INK	DRAFTING CLOTH
150-016-[B]	SECTIONS OF WESTERN CANAL WALL FOUNDATION / UNDER TREMONT MILL NO.3.	UNDATED	1"=10'	H 58.8, W 45.8 CM	INK, WATER COLOR	PAPER
150-016-[B]-[COPY 1]	SECTIONS OF WESTERN CANAL WALL FOUNDATION / UNDER TREMONT MILL NO.3.	UNDATED	1"=10'	H 58.8, W 45.8 CM	INK, COLORED INK	DRAFTING CLOTH
150-017-1	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] LAWRENCE MILLS. / NEW 72"x 84" QUARTER TURN.	1895/10/24	1"& 1/4"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-2	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] CLAMP HEADS & DETAILS / LAWRENCE MFG. CO. / LOWELL, MASS.	1895/10/29	1"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-3	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] LAWRENCE M'F'G CO. / ROPE SHIVE.	1895/11/01	3/4"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-4	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] M'F'G CO. DETAILS. / HOLYOKE MACHINE CO. / WORCESTER MASS.	1895/11/04	1"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-5	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] LAWRENCE M'F'G CO. / DRAFT TUBES.	1895/11/07	1/4"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER

150-017-6	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] 9 IN. CLAMP BEARING IN 12'-6" DIAM. CASE, / & BRACKET UNDER FEEDER. / LAWRENCE M'F'G CO. / LOWELL, MASS.	1895/11/09	1"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-7	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] GIRDERS TO SUPPORT BOXES & QUARTER TURNS. / LAWRENCE M'F'G CO. / LOWELL, MASS.	1895/11/12	1/2"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-8	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] LAWRENCE M'F'G. CO. / GATE WORK DETAILS, SHOWING ARRANGEMENT OF GOVERNOR FOR NO. 4 TURBINE.	1895/11/27	1"=1'	H 42.2, W 60.5 CM	BLUEPRINT	PAPER
150-017-9	[DETAILS & GENERAL ARRANGEMENTS OF FOUR 54" HORIZONTAL TURBINES FOR] LAWRENCE M'F'G. / LOWELL, MASS. / ARRANGEMENT OF FOUR 54 IN. HORIZONTAL HERCULES TURBINES.	1895/12/03	1/4"=1'	H 44.5, W 119.5 CM	BLUEPRINT	PAPER
150-018	[PLAN OF LAWRENCE SECTION SHOWING CONDENSER PIPE TOGETHER WITH OTHER] PIPES LAID FOR EXTINGUISHING FIRE.	1888/10/00	1/4"=1'	H 58.5, W 30.9 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER

150-019	[SKETCH OF NORTH WALL OF MILL NO. 2 (OLD SLASHER # 5) OF TREMONT & SUFFOLK LAWRENCE SECTION SHOWING FEEDER PIPES FOR TURBINES.] SOUTH WALL NO. 5 SLASHER.	1895/00/00	NONE	H 46, W 58.5 CM	GRAPHITE	PAPER
150-020	[SKETCH OF ARCHES, ETC. FOR] NORTH WALL LAWRENCE MFG. CO'S [MILL NO. 2] MILL [OLD SLASHER] NO. 5 / LAWRENCE SECTION.	1895/00/00	NONE	H 48.2, W 61 CM	GRAPHITE	PAPER
150-021	PLAN OF COFFER DAM BACK OF / LAWRENCE MFG. CO'S [MILL NO. 2 OLD] NO.5 SLASHER / MILL. LAID OUT JUNE 23,1895 / LAWRENCE SECTION.	1895/06/23	NONE	H 57.2, W 123.1 CM	GRAPHITE	PAPER
150-021-[A]	BILL OF MATERIAL REQUIRED TO BUILD THE COFFER-DAM BACK OF LAWRENCE MFG. CO'S / NO. 5 SLASHER.	UNDATED	NONE	H 35.7, W 21.6 CM	INK	PAPER
150-022	SKETCH SHOWING / LAWRENCE SECTION NEW ENGINE / & / CONDENSER-WATER PIPES, & OTHER PIPES.	1904/02/00	1/4"=1'	H 37, W 68.9 CM	DRAFTING CLOTH	PLAN
150-023	SKETCH OF / PROPOSED DRAIN / FROM / DYE HOUSE AT TREMONT & SUFFOLK MILLS / TO THE / SEWER ON TILDEN STREET.	1887/01/03	1"=20'	H 48, W 72.5 CM	INK, WATER COLOR, COLORED INK INK, COLORED INK,	PAPER
150-024	[TRAVERSE TABLE OF THE] TREMONT & SUFFOLK MILLS / NOTE PLAN.	SEE NOTES	NONE	H 78.9, W 110 CM	WATER COLOR	DRAFTING CLOTH
150-026	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS OF / THE [SACO-] LOWELL MACINE SHOP.	UNDATED	NONE	H 35.5, W 43.5 CM	INK, COLORED INK	DRAFTING CLOTH

150-027	PLAN OF THE / MILL YARD / OF THE / TREMONT AND SUFFOLK MILLS / ALSO / LAWRENCE SECTION / SHOWING PIPES LAID FOR EXTINGUISHING FIRE / ALSO SHOWING / PIPES AND PUMPS FOR PROCESS AND SANITARY / WATER DRAWN FROM CANALS.	1917/02/00	1"=40'	H 73, W 133 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
150-028-[A]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. EXTREME LEFT WHEEL.	UNDATED	NONE	H 45.1, W 45.1 CM	INK	DRAFTING CLOTH
150-028-[A]-[COPY 1]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. EXTREME LEFT WHEEL.	UNDATED	NONE	H 43.8, W 42.2 CM	BLUEPRINT	PAPER
150-028-[B]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. NO. 1 WHEEL.	UNDATED	NONE	H 50.5, W 49 CM	INK	DRAFTING CLOTH
150-028-[C]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. NO. 2 WHEEL.	UNDATED	NONE	H 59, W 60.3 CM	INK	DRAFTING CLOTH
150-028-[D]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. CENTRE WHEEL-LEFT.	UNDATED	NONE	H 59, W 60.3 CM	INK	DRAFTING CLOTH
150-028-[D]-[COPY 1]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. CENTRE WHEEL-LEFT.	UNDATED	NONE	H 59.3, W 58.2 CM	BLUEPRINT	PAPER
150-028-[E]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION NO. 3 WHEEL.	UNDATED	NONE	H 49.9, W 52 CM	INK	DRAFTING CLOTH
150-028-[F]	[THE SPEEDGATE GAUGES] LAWRENCE SECTION. / CENTRE WHEEL-RIGHT.	UNDATED	NONE	H 62.3, W 61 CM	INK	DRAFTING CLOTH
150-028-[G]	[THE SPEEDGATE GAUGES] LAWRENCE / SECTION / EXTREME RIGHT WHEEL.	UNDATED	NONE	H 61.6, W 61.3 CM	INK	DRAFTING CLOTH
150-028-[G]-[COPY 1]	[THE SPEEDGATE GAUGES] LAWRENCE / SECTION. / EXTREME RIGHT WHEEL.	UNDATED	NONE	H 61, W 61.2 CM	BLUEPRINT	PAPER
150-029-[A]	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS AT / LAWRENCE SECTION / OF MERRIMACK MFG. COMPANY.	1927/05/00	NONE	H 49.8, W 55.3 CM	INK, COLORED INK	DRAFTING CLOTH

150-029-[B]	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS AT / LAWRENCE SECTION / OF [THE] TREMONT & SUFFOLK MILLS.	1914/01/15	NONE	H 53.7, W 53.3 CM	INK, COLORED INK	DRAFTING CLOTH
150-029-[B]-[COPY 1]	MILL POWERS / DRAWN BY WHEELS OF / TREMONT & SUFFOLK MILLS.	1914/01/15	NONE	H 53.2, W 53.2 CM	BLUEPRINT	PAPER
150-029-[C]	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS OF / TREMONT & SUFFOLK MILLS.	SEE NOTES	NONE	H 53.7, W 53.3 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
150-030	TREMONT & SUFFOLK MILLS / LOWELL, MASS. / SKETCH SHOWING PLAN & SECTION / OF / GATE OF VICTOR WHEEL / SHOWING / WHERE LEAKS MAY OCCUR IF GATE IS BROKEN.	SEE NOTES	NONE	H 29.7, W 23.2 CM	INK, COLORED INK	DRAFTING CLOTH
150-031	SACO-LOWELL SHOP-LOWELL, MASS. / COPY OF PLAN SHOWING "WATERWAYS FOR WATER POWER" / WITH SUGGESTED CHANGES IN WATER WHEELS.	1913/05/00	1"=1'	H 55.7, W 99.4 CM	INK, COLORED INK	DRAFTING CLOTH
150-032	BRIDGE BETWEEN PRESENT PLANT / & NEW MANF'G BUILDING / FOR THE / SACO-LOWELL SHOPS / LOWELL, MASS.	1923/06/20	SEE NOTES	H 73.6, W 120.4 CM	BLUEPRINT	PAPER
150-033	[DIAGRAM SHOWING CONTINUOUS READINGS AT] VACUUM GAUGES [VERSO] LAWRENCE SECTION T.& S. WHEELS.	1898/00/00	NONE	H 56.4, W 151.3 CM	INK	PAPER
150-034-[A]	BILL OF MATERIAL. THE D.S .P.C.O.	1914/10/16	NONE	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[B]	FOUNDATION / 13 x 12 VERT. TX. S.A. / 12-4 POWER END.	1914/10/16	1"=10'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[C]	SETTING DIAGRAM / 13 x 12 VERT. TX. S.A.	1914/10/16	1"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER

150-034-[D]	STANDARD UPRIGHT / 12-4 POWER END S.A.	1913/09/22	1 1/2"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[E]	VALVE CHEST / FOR / 12 TO 14 x 12 VERT. TX. S.A.	1913/11/07	3"=12"	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[F]	VALVE CHEST FOR 12 x 12 TRIX. D.A.	1902/07/21	3"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[G]	OUTSIDE CONNECTING ROD 6 x 12 TRIPLEX POWER.	1902/02/25	HALF SIZE	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[H]	INS. CONN. ROD 6 x 12 TX. POWER S.A.	1907/01/01	HALF SIZE	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[I]	PUMP BASE / FOR 12-4 POWER END / CROSSHEAD GUIDE / FOR / 12 x 12 D.A.V.T.X.	SEE NOTES	1 1/2"& 3"=1'	H 62.9, W 42.4 CM	BLUEPRINT	PAPER
150-034-[J]	CAPS FOR CRANK & / PINION SHAFTS. / 8 TO 10 x 12 TX. / CRANK SHAFT-ST. CASTING / FOR / # 12-4 VERT. S.A. TRIPLEX POWER END. / FIG.891.	SEE NOTES	3"& 2"=1'	H 62.9, W 42.4 CM	BLUEPRINT	PAPER
150-034-[K]	PINION-SHAFT BEARINGS-CAST IRON-1 / WITH QUILL / CHANGED FROM B.P. 45 1/4 23367. / WATER CYLINDER FOR 14 x 12 TRIX S.A.	1903/03/23	3"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[L]	PINION SHAFT BRACKETS FOR 8 x 12 SA TRIX 350 # PRESS. / PINION SHAFT CAP FOR 8 x 12 SA TRIX. / 3 1/4 CROSSHEAD PIN / NO. 37 LISTR. / CRANK DISC. FOR 8 x 12 TX S.A.	SEE NOTES	3"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[M]	PEDESTAL BOX FOR 12 x 12 D.A. TX. / SPLIT GEAR / FOR / 3 1/2 x 12 S.A. VERT. TRIX.	SEE NOTES	1/2 SIZE, 1 1/2"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[N]	RIGHT HAND PINION / SHAFT FOR POW. END # 12-4 / PLUNGER / 13 x 12 V.T.S.A. / 12 1/4 DIA. CROSSHEAD-FOR-12 x 12 VERT. TRIP. POWER S.A.	SEE NOTES	NONE	H 42.4, W 62.9 CM	BLUEPRINT	PAPER

150-034-[O]	DEAN STANDARD VALVES / FOR / STEAM POWER PUMPS / 14 1/4" CROSS HEAD / DRAWING OFFICE MEMORANDUM / FROM / THE DEANE STEAM PUMP CO.	SEE NOTES	NONE	H 42.4, W 62.9 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
150-034-[P]	SPECIAL TIGHT PULLEY / FOR / 13 x 12 S.A.V. VERT. TX. / DRAWING OFFICE GEAR MEMORANDUM / THE DEAN STEAM PUMP CO. / DISTANCE PIECE & BOLT / FOR 5 x 12 VERT. TRIX. POT VALVE / INS. CONN. ROD BOX / FOR / 11 x 12 D.A.V.T.X.	SEE NOTES	3"=1'	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-034-[Q]	VALVE CHEST HAND HOLE PLATE / FOR / 12 x 12 S.A.V.E. TX.	1914/07/23	NONE	H 62.9, W 42.4 CM	BLUEPRINT	PAPER
150-034-[R]	DRAWING OFFICE MEMORANDUM / FROM / THE DEANE STEAM PUMP CO.	SEE NOTES	NONE	H 42.4, W 62.9 CM	BLUEPRINT	PAPER
150-035-[A]	[DIAGRAMS SHOWING SLOPES & VELOCITIES OF] NO. 1 & 2 WATER WHEEL UNIT, [OF THE] SACO-LOWELL SHOPS.	1915/09/21	NONE	H 21.8, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH
150-035-[B]	[DIAGRAMS SHOWING SLOPES & VELOCITIES OF] NO. 3 & 4 WATER WHEEL UNIT, [OF THE] SACO-LOWELL SHOPS.	1915/09/21	NONE	H 21.8, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH
150-035-[C]	[DIAGRAMS SHOWING SLOPES & VELOCITIES OF] NO. 5 WATER WHEEL UNIT, [OF THE] SACO-LOWELL SHOPS.	1915/09/21	NONE	H 21.8, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH
150-035-[D]	[DIAGRAMS SHOWING SLOPES & VELOCITIES OF] NO. 6 WATER WHEEL UNIT, [OF THE] SACO-LOWELL SHOPS.	1915/09/21	NONE	H 21.8, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH

150-036	[DIAGRAMS SHOWING CURRENT METER MEAUSREMENTS OF SACO-LOWELL # 1 & 2 RACES; ALSO RESULTS OF TESTS MADE WITH NEW TRIPLEX PLUNGER PUMPS AT SACO-LOWELL SHOPS.]	1915/05/06				
150-037-[A]	DIAGRAM SHOWING / THE / EFFICIENCY OF SWAIN WHEELS / FOR / DIFFERENT GATE OPENINGS. [ALSO COMPARISON WITH BOYDEN WHEEL AT SACO-LOWELL SHOPS.]	1914/01/12	NONE	H 21.6, W 30.5 CM	INK	PAPER
150-037-[B]	DIAGRAM [SHOWING COMPARISON] OF EFFICIENCY / OF / BOYDEN & SWAIN WHEELS / AT / SACO-LOWELL SHOPS.	1915/04/08	NONE	H 29.1, W 45.9 CM	INK	PAPER
150-038	DIAGRAM SHOWING HORSE POWER / FOR ONE FOOT DISCHARGE AT / DIFFERENT FALLS OF SACO-LOWELL / SHOPS WHEELS.	1915/04/09	NONE	H 29.2, W 45.8 CM	INK	PAPER
150-039	[PLAN & SECTIONS OF WHEEL-PITS AT TREMONT & SUFFOLK MILLS (SUFFOLK SIDE). ALSO SHOWING TYPICAL ARRANGEMENT OF VERTICAL SPIRAL CASE WATER-WHEEL & VERTICAL ELECTRIC GENERATOR.]	1915/01/00				
150-040-[B]	[PLANS SHOWING TWO SCHEMES FOR POWER DEVELOPMENT AT SACO-LOWELL SHOPS.] SACO LOWELL / SCHEME 2.	SEE NOTES	SEE NOTES	H 53, W 79.5 CM	INK, GRAPHITE	DRAFTING CLOTH

150-040-A	[PLANS SHOWING TWO SCHEMES FOR POWER DEVELOPMENT AT SACO-LOWELL SHOPS.] SKETCH SHOWING / PROPOSED POWER DEVELOPMENT COMBINED / SACO-LOWELL SHOPS.	1929/11/0 0	1"=10'	H 53, W 79.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
150-041-01-[A]	[FLOOR PLANS OF LAWRENCE SECTION SECOND & FIFTH FLOORS OF MILL NO. 1 FIRST AND SECOND FLOORS OF MILL NO. 4] MILL NO. 2-1ST. FLOOR / "TREMONT YARD" / MERRIMACK MANUFACTURING COMPANY.	UNDATED	1"=40'	H 24.2, W 31.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-041-01-[B]	[FLOOR PLANS OF LAWRENCE SECTION SECOND & FIFTH FLOORS OF MILL NO. 1 FIRST AND SECOND FLOORS OF MILL NO. 4] MILL NO. 2-2ND FLOOR / "TREMONT YARD" / MERRIMACK MANUFACTURING COMPANY.	UNDATED	1"=40'	H 24.2, W 31.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-041-01-[C]	[FLOOR PLANS OF LAWRENCE SECTION SECOND & FIFTH FLOORS OF MILL NO. 1 FIRST AND SECOND FLOORS OF MILL NO. 4] MILL NO. 1-5TH FLOOR / LAWRENCE SECTION / MERRIMACK MANUFACTURING COMPANY.	UNDATED	1"=40'	H 24.2, W 31.9 CM	INK, COLORED INK	DRAFTING CLOTH

150-041-01-[D]	[FLOOR PLANS OF LAWRENCE SECTION SECOND & FIFTH FLOORS OF MILL NO. 1 FIRST AND SECOND FLOORS OF MILL NO. 4] MILL NO. 1-2ND FLOOR / "LAWRENCE SECTION" / MERRIMACK MANUFACTURING COMPANY.	UNDATED	1"=40'	H 24.2, W 31.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-041-01-[E]	[FLOOR PLANS OF LAWRENCE SECTION SECOND & FIFTH FLOORS OF MILL NO. 1 FIRST AND SECOND FLOORS OF MILL NO. 4.] BUILDING NO. 4 / 2ND FLOOR / "LAWRENCE SECTION" / MERRIMACK MANUFACTURING COMPANY.	UNDATED	1'=40'	H 24.2, W 31.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-041-02	EFFICIENCY OF NASHUA MFG. CO'S. / WATERWHEELS AT SWITCH BOARD / AT VARIOUS TIMES DURING YEARS / OF 1932, 1933, 1934 & 1935.	1945/07/00	NONE	H 30.5, W 21.5 CM	INK	PAPER
150-041-A	WATERWHEEL OUTPUT / TREMONT MILL / POWER TEST OF JULY 9,1920 / GENERATOR OUTPUT / VS. / DISCHARGE / WHEEL # 3, # 4 / RACK, PENSTOCK & ENTRANCE LOSSES / TREMONT WHEELS # 3 & # 4.	SEE TITLE	NONE	H 29.3, W 45.8 CM	INK	PAPER
150-041-B	[DIAGRAM SHOWING TREMONT WHEEL # 3, 40.8" S. MORGAN SMITH TYPE S & TREMONT WHEEL # 4, 46.5" S. MORGAN SMITH TYPE S, SHAFT H.P. VS. GATE. HOLYOKE TEST # 2663, 28.5" S. MORGAN SMITH TYPE S, EFFICIENCY VS. GATE. HOLYOKE TEST].	UNDATED	NONE	H 29.3, W 46 CM	INK, COLORED INK	PAPER

150-041-C	TREMONT MILLS / WHEEL NO. 2 / PRELIMINARY DISCHARGE DIAGRAM / 46 1/2" TYPE "S"- S. MORGAN SMITH.	UNDATED	NONE	H 29.3, W 45.8 CM	INK, COLORED INK	PAPER
150-041-D	TREMONT MILLS / DISCHARGE OF / WHEEL NO. 3. [A 40.8" R. H., S. MORGAN SMITH, TYPE S.]	1919/06/13	NONE	H 29.3, W 45.8 CM	INK, COLORED INK	PAPER
150-041-D-[COPY 1]	TREMONT MILLS / DISCHARGE OF / WHEEL NO. 3. [A 40.8" R. H., S. MORGAN SMITH, TYPE S.]	1919/06/13	NONE	H 29, W 45.6 CM	BLUEPRINT	PAPER
150-041-E	TREMONT NO. 3 WHEEL / 40". 8 TYPE "S" S. MORGAN SMITH. / COMPARISON OF DISCHARGE CURVES / OBTAINED BY RAISING HOLYOKE TEST / BUCKET AREA METHOD & BY SQUARES OF DIAMETERS.	UNDATED	NONE	H 21.2, W 30.4 CM	INK, COLORED INK	PAPER
150-041-F	TREMONT MILLS / DISCHARGE OF / WHEELS NO. 4 [46 1/2" TYPE S, S. MORGAN SMITH] & 2.	SEE NOTES	NONE	H 29.3, W 45 CM	INK	PAPER
150-041-F-[COPY 1]	TREMONT MILLS / DISCHARGE OF / WHEELS NO. 4 & 2.	SEE NOTES	NONE	H 11 1/2", W 16"	BLUEPRINT	PAPER
150-041-G	DURATION CURVE / OF / SURPLUS [POWER] LIMITATION / FOR / TREMONT & SUFFOLK MILLS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/02/10	NONE	H 29.3, W 45.8 CM	INK, COLORED INK	PAPER
150-041-H	DAY USE POWER-DURATION DIAGRAM / SUFFOLK SIDE / TREMONT AND SUFFOLK MILLS.	1920/03/17	NONE	H 30.5, W 21.4 CM	INK, COLORED INK	PAPER
150-041-I	DAY USE POWER-DURATION DIAGRAM / TREMONT SIDE / TREMONT & SUFFOLK MILLS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/03/17	NONE	H 30.5, W 21.4 CM	INK, COLORED INK	PAPER

150-041-J	DAY USE POWER-DURATION DIAGRAM / LAWRENCE SECTION / TREMONT & SUFFOLK MILLS / PROPRIETORS OF LOCKS & CANALS.	1920/03/19	NONE	H 30.5, W 21.4 CM	INK, COLORED INK	PAPER
150-041-K	LAWRENCE SECTION OF T.& S. MILLS / RELATION OUTSIDE TO INSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/05	NONE	H 30.5, W 21.4 CM	INK, COLORED INK	PAPER
150-041-L	TREMONT & SUFFOLK MILLS, / LAWRENCE SECTION, / LOWELL, MASS. / HEIGHT OF BOOTT RIVER GAUGE VS. LAWRENCE SECTION LIMITATION.	1918/02/07	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
150-041-M	TREMONT MILLS. / PROPOSED NO.4 UNIT. 46 1/2" TYPE "S" S. MORGAN SMITH 13' FALL-410 H.P.-120 R.P.M.-327 C.F.P.S. / AREAS & VELOCITIES THRU WATERWAYS.	UNDATED	NONE	H 29.3, W 45.8 CM	INK	PAPER
150-041-N	LAWRENCE SECTION WALL / PROPRIETORS LOCKS & CANALS / LOWELL, MASS.	1921/04/04	1"=40'& 10'	H 21.6, W 27.9 CM	INK, WATER COLOR	DRAFTING CLOTH
150-041-O	PORTION OF TREMONT MILL / SHOWING NEW LOCATION OF / PIT GAUGES & TRAP DOORS. [DIAGRAM SHOWING]	1920/09/0 0	NONE	H 54, W 34 CM	INK	DRAFTING CLOTH
150-041-P	TREMONT MILLS / DISCHARGE OF / WHEEL NO.4. [46 1/2" R.H. TYPE S, S. MORGAN SMITH.]	SEE NOTES	NONE	H 29.3, W 45.8 CM	INK	PAPER
150-041-Q	PERMANENT & SURPLUS / MILL POWERS / DRAWN BY NEW / WHEEL NO.4 / OF / TREMONT MILLS. [46 1/2" TYPE S, S. MORGAN SMITH.]	192/06/24	NONE	H 38.2, W 56 CM	INK, COLORED INK	DRAFTING CLOTH

150-041-R	[DIAGRAM SHOWING] TREMONT & SUFFOLK MILLS / EFFICIENCY CURVES / OF / WATER WHEELS [# 3, (40.8") & # 2 & 4 (46.5") TYPE S, S. MORGAN SMITH] / BASED ON HOLYOKE TEST # 2663.	UNDATED	NONE	H 29.2, W 45.8 CM	INK	PAPER
150-041-S	[DIAGRAM SHOWING EFFICIENCY OF] SUFFOLK WHEELS 1, 1A, 3, 3A, & 4 / TREMONT WHEELS 1 & 1A / DIAMETER 48" [TYPE STANDARD VICTOR] 90 [R.P.M.] L H. (SUFFOLK 4A IS 48" R.H. & EFFICIENCY CORRESPONDS CLOSELY TO ABOVE).	UNDATED	NONE	H 29, W 46 CM	INK	PAPER
150-041-T	TREMONT & SUFFOLK MILLS / EFFICIENCY CURVE FOR / SUFFOLK WHEEL # 4A / DIAMETER 48" R.P.M. 90 R. H. / BASED ON HOLYOKE TEST # 940 / TYPE STANDARD VICTOR.	UNDATED	NONE	H 45.8, W 29.3 CM	INK	PAPER
150-041-U	CURRENT METER / STATIONS / TREMONT RACES / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1922/04/30	NONE	H 29.3, W 45.8 CM	INK	PAPER
150-041-V	SKETCH SHOWING / BUILDINGS OF TREMONT & SUFFOLK AS OF 1926 / LOWELL, MASSACHUSETTS.	1928/12/05	NONE	H 27.3, W 27.7 CM	INK, WATER COLOR	DRAFTING CLOTH
150-041-W	TRACED FROM BOOK OF ORIGINAL INDENTURES, A-15 # 745. [COPY OF PLAN ACCOMPANYING INDENTURE OF JAN. 1, 1832 BETWEEN LOCKS & CANALS & SUFFOLK MFG. COMPANY.]	1929/00/00	NONE	H 46, W 37.6 CM	INK, COLORED INK	DRAFTING CLOTH

150-041-X	HOLYOKE MACHINE CO. / WORCESTER-MASS. / PROPOSED [SETTING OF 48"TYPE D HERCULES] FOR A. T. SAFFORD-ENGR. / (FOR NASHUA MFG. CO.) LOWELL, MASS.	1931/06/19	1/2"=1'	H 22.8, W 13.4 CM	BLUEPRINT	PAPER
150-041-Y	CURVES SHOWING HORSE POWER, DISCHARGE & EFFICIENCY / OF THE / 48" R. H. TYPE D CYL. GATE HERCULES TURBINE / UNDER 13 FT. HEAD RUNNING 97 REV. PER MIN.	SEE NOTES	NONE	H 21.5, W 30.5 CM	BLUEPRINT	PAPER
150-041-Z	CURVES SHOWING HORSE POWER DISCHARGE AND EFFICIENCY / OF ONE / 48" R. H. TYPE D CYL GATE HERCULES TURBINE / UNDER / 16 FT. HEAD, RUNNING 100 REV. PER MIN.	1921/05/12	NONE	H 21.5, W 31 CM	BLUEPRINT, GRAPHITE	PAPER
150-042-A	FLOAT MEASUREMNTS / AT / LOWELL MACHINE SHOP / NO'S 1 & 2 WHEELS [AT FIVE DIFFERENT TIMES].	1903/05/12	NONE	H 21.6, W 30.5 CM	INK, COLORED INK	PAPER
150-042-B	BOTTOM COEFFICIENT / SACO-LOWELL # 5.	1919/11/24	NONE	H 21.5, W 28 CM	INK	PAPER
150-042-C	BOTTOM COEFFICIENT / SACO-LOWELL NO.6 WHEEL / METER # 8163.	1919/10/03	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
150-042-D	MEASUREMENT AT LOWELL MACHINE SHOP / WHEEL NO. 5 / H. S. FERGUSON'S GURLEY METER NO. 374.	1906/04/14	NONE	H 21.6, W 30.5 CM	INK, COLORED INK	PAPER
150-042-E-[A]	CURRENT METER STATION / SACO-LOWELL SHOPS / NO. 6 RACEWAY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/10	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER

150-042-E-[B]	MEASUREMENT AT LOWELL MACHINE SHOP / WHEEL NO. 5 / H. S. FERGUSON'S GURLEY METER NO. 374.	1906/04/17	NONE	H 21.6, W 30.5 CM	INK, COLORED INK	PAPER
150-042-F	CURRENT METER STATION / AT / SACO-LOWELL SHOPS. / NO.1 & 2 WHEELS.	1914/10/02	NONE	H 28.9, W 45.8 CM	INK, GRAPHITE	PAPER
150-042-G	SACO-LOWELL SHOPS / [VELOCITIES THRU WATERWAYS OF] PROPOSED NOS. 3 & 4 UNITS [(26" & 28 1/2" S. MORGAN SMITH)].	UNDATED	NONE	H 29.2, W 45.8 CM	INK	PAPER
150-042-H	SACO-LOWELL SHOPS NO. 6 UNIT. / 26" R. H. TYPE "S" S. MORGAN SMITH. / SWING GATE. 13' FALL. 225 R.P.M. 118 C.F.P.S. / AREAS & VELOCITIES THROUGH WATERWAYS.	UNDATED	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
150-042-H-[COPY 1]	SACO-LOWELL SHOPS NO. 6 UNIT. / 26" R. H. TYPE "S" S. MORGAN SMITH. / SWING GATE. 13' FALL. 225 R.P.M. 118 C.F.P.S. / AREAS & VELOCITIES THROUGH WATERWAYS.	UNDATED	NONE	H 29.2, W 45.8 CM	BLUEPRINT, COLORED INK	PAPER
150-042-I	POWER & DISCHARGE CURVES / NO. 6 WHEEL-SACO-LOWELL SHOPS [A 26" TYPE "S" S. MORGAN SMITH].	SEE NOTES	NONE	H 45.8, W 29.2 CM	INK, COLORED INK	PAPER
150-042-J	DISCHARGE OF / SACO-LOWELL SHOPS / WATERWHEELS [NOS. 1 & 2, 82 1/2" BOYDEN. NO. 3, 28 1/2" S. MORGAN SMITH. NOS. 4, 5, 6, 26 " S. MORGAN SMITH].	UNDATED	NONE	H 28.9, W 45.8 CM	INK, COLORED INK	PAPER

150-042-J-[COPY 1]	DISCHARGE OF / SACO-LOWELL SHOPS / WATERWHEELS [NOS. 1 & 2, 82 1/2" BOYDEN. NO. 3, 28 1/2" S. MORGAN SMITH. NOS. 4, 5, 6, 26 " S. MORGAN SMITH].	UNDATED	NONE	H 11 1/2", W 16"	BLUEPRINT	PAPER
150-042-K	MILL POWER DIAGRAM / FOR / SACO LOWELL NO. 3 WHEEL.	1920/08/12	NONE	H 20.7, W 34 CM	INK, COLORED INK	DRAFTING CLOTH
150-042-L	SACO-LOWELL SHOPS. / PROPOSED NOS.3 & 4 UNITS / SKETCH SHOWING PLAN OF LAYOUT [(NO. 3 A 28 1/2" R.H. & NO. 4 A 26" R.H. TYPE "S", S. MORGAN SMITH)].	SEE NOTES	1"=10'	H 28.3, W 49.3 CM	BLUEPRINT	PAPER
150-042-M	SACO-LOWELL SHOPS / LOWELL PLANT. [SKETCH OF PORTION OF SACO-LOWELL SHOP YARD SHOWING PROPOSED WALL BETWEEN LOCK CHAMBER & NEW STOREHOUSE.]	1920/12/00	1"=40'	H 38.3, W 47.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
150-042-N	SKETCH SHOWING PART OF THE YARD OF THE / SACO-LOWELL SHOPS. [SKETCH OF PORTION OF SACO-LOWELL SHOP YARD SHOWING PROPOSED WALL BETWEEN LOCK CHAMBERS AND NEW STOREHOUSE.]	1920/12/03	1"=40'	H 21.3, W 28 CM	INK	DRAFTING CLOTH
150-042-O	SACO LOWELL SHOPS / JACKSON ST. R. R. BRIDGE [LOCATION OF FLOOR BEAMS] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/11	1/4"=1'	H 28.9, W 56.5 CM	INK, COLORED INK	DRAFTING CLOTH
150-042-Q	SACO-LOWELL # 1 & 2 PITS.	1922/06/20	1"=10'	H 29, W 41.3 CM	INK	DRAFTING CLOTH

150-042-R	PLAN OF PORTION OF LOWELL SHOPS, SACO-LOWELL / SHOWING / NOS. 1 & 2 WATERWHEELS / & LOCKS & CANALS PUMPS.	1928/10/25	1"=40'	H 24.5, W 43.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-042-S	ISOMETRIC VIEW SHOWING / PORTION OF SACO-LOWELL SHOPS [CONTAINING L. & C. PUMPS].	1929/10/29	1"=60'	H 24.5, W 43.8 CM	INK, WATER COLOR	DRAFTING CLOTH
150-042-T	PLAN & SECTION / OF NO. 6 UNIT / 26" S. MORGAN SMITH TYPE "S" / 225 R.P.M. 13 FOOT FALL / SACO-LOWELL SHOPS LOWELL, MASS.	1931/03/20	NONE	H 32.4, W 24.8 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
150-042-U	PLAN / LAND & BUILDINGS / BELONGING TO / SACO-LOWELL SHOPS / LOWELL, MASSACHUSETTS.	1940/05/22	1"=100'	H 29.6, W 51.4 CM	INK, WATER COLOR	DRAFTING CLOTH
150-042-V-[COPY 1]	PLAN SHOWING / LAND TO BE CONVEYED TO THE / SACO-LOWELL SHOPS / BY THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER, LOWELL, MASS.	1942/10/00	1"=10'	H 21.8, W 49.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
150-042-V-[COPY 2]	PLAN SHOWING / LAND TO BE CONVEYED TO THE / SACO-LOWELL SHOPS / BY THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER, LOWELL, MASS.	1942/10/00	1"=10'	H 21.8, W 49.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
150-043	PLAN SHOWING ADDITION TO FOUNDRY, / TO GIVE APPROX. 11,000 SQ. FEET FLOOR SPACE.	1916/12/12	1/4"=1'	H 82, W 133.8 CM	BLUEPRINT	PAPER
150-044	PLAN OF WORK / DONE BY P. L.& C. [(WITH PHOTO)] IN FRONT OF / SACO-LOWELL SHOPS / [ALONG] WALL IN [NORTH SIDE OF] LOWER PAWTUCKET CANAL / DURING 1913 & 1914.	1914/11/00	1"=20'	H 51.9, W 82 CM	INK, COLORED INK, WATER COLOR, PHOTOGRAPH	PAPER

150-045	PLAN OF LAND / CONVEYED TO THE / LOWELL MACHINE [SACO-LOWELL] SHOP.	1895/10/25	1"=40'	H 32.9, W 39.5 CM	BLUEPRINT	PAPER
150-046-[A]	TREMONT & SUFFOLK MILLS / [PLAN OF] ELEVATED ROAD TO LAWRENCE SECTION.	1899/11/29	1/4"=1'	H 21.5, W 76.5 CM	INK	DRAFTING CLOTH
150-046-[B]	TREMONT & SUFFOLK MILLS / [PLAN OF] ELEVATED ROAD TO LAWRENCE SECTION.	1899/11/29	1/4"=1'	H 49.8, W 75.5 CM	INK	DRAFTING CLOTH
150-047	[GENERAL PLAN OF] 28 1/2" [S. MORGAN SMITH] TYPE S HOLYOKE TEST, / SACO-LOWELL SHOPS.	1918/10/09	NONE	H 37.5, W 33 CM	BLUEPRINT	PAPER
150-048	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATIONS / FOR TREMONT MILLS, / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/01	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
150-049	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATIONS / FOR / LAWRENCE SECTION, T. & S. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/06	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
150-050	DRAUGHT TUBE / FOR / NO.3 WATER WHEEL / TREMONT & SUFFOLK MILLS.	1918/11/21	1/2"=1'	H 24.5, W 27.6 CM	INK, COLORED INK	DRAFTING CLOTH
150-051	NO.3 DRAFT TUBE / FOR / TREMONT MILLS.	1918/11/21	1"=1'	H 53, W 54.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
150-052	[SKETCH SHOWING] COMPARISON OF DRAFT TUBES / 40.8" "S"-TREMONT MILL # 3 / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/11/22	1"=1'	H 39.4, W 91.5 CM	INK, COLORED INK	DRAFTING CLOTH

150-053	[SECTION OF PENSTOCKS &] DATA ON SACO-LOWELL SHOPS' WATERWHEELS / WHEEL NO. 3 38 1/2" BOYDEN R. H. / WHEEL NO. 4 (48" SWAIN L. H.).	UNDATED	NONE	H 78.1, W 75.3 CM	INK, COLORED INK	DRAFTING CLOTH
150-054	GENERAL PLAN & DATA / SACO-LOWELL NOS. 3 & 4 WHEELS. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/00	NONE	H 73.4, W 114 CM	BLUEPRINT, INK	PAPER
150-055	[SKETCH SHOWING] PROPOSED SCHEME / FOR / NEW PAIR OF WHEELS / FOR THE / LAWRENCE SECTION / OF THE / TREMONT & SUFFOLK MILLS.	UNDATED	1"=40'& 20'	H 38.5, W 52.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
150-056	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS OF / TREMONT & SUFFOLK MILLS.	SEE NOTES	NONE	H 53.4, W 68.5 CM	INK, COLORED INK	DRAFTING CLOTH
150-059-[A]	[DIAGRAM SHOWING] MILL POWERS / DRAWN BY THE WHEELS NOS. 3, 4, 5 OR 6 / SAC0-LOWELL SHOPS [PERMANENT & SURPLUS].	1928/06/21	NONE	H 45.5, W 45.5 CM	INK, COLORED INK	PAPER
150-059-[B]	MILL POWERS / DRAWN BY WHEELS NOS. 3, 4, 5 OR 6 / SACO-LOWELL SHOPS.	1938/06/21	NONE	H 45.5, W 45.5 CM	INK, COLORED INK	PAPER
150-060	[PLAN & SECTIONS OF] EASTERLY WALL-LAWRENCE WASTEWAY [SHOWING IMPROVEMENTS TO BE MADE ON SAME] / PROP'S OF LOCKS & CANALS.	1917/12/06	1/4"=1',1"=10'	H 40.4, W 61 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-061	TEST OF NO. 6 WHEEL / OF / SACO-LOWELL SHOPS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/10/01	NONE	H 63.5, W 124.9 CM	INK, COLORED INK	DRAFTING CLOTH

150-062	SKETCH SHOWING GENERAL / LOCATION OF PROPOSED DEAN / VERTICAL TRIPLEX SINGLE ACTING / PUMPS NO. 891 FOR SACO-LOWELL SHOPS.	1914/10/31	1/4"=1'	H 41.3, W 108.7 CM	BLUEPRINT	PAPER
150-063	DETAILS SCHEME NO. 3 / [FOR] CONCRETE SETTING [FOR] UNIT NO. 6 / [OF] SACO-LOWELL SHOPS. [26" S. MORGAN SMITH.]	1919/02/12	1/2"=1'	H 58.8, W 79 CM	GRAPHITE	TRACING PAPER
150-064	[DETAIL OF SCHEME NO. 3, FOR TENTATIVE CONCRETE SETTING FOR UNIT NO. 6 OF SACO-LOWELL SHOPS. (26" S. MORGAN SMITH).]	1919/01/31	1/2"=1'			
150-065	[PLAN OF SACO-LOWELL SHOPS SHOWING BUILDINGS & LAND DESIRED TO LEASE BY THEM.] LOWELL, MASS.	1920/03/01	1"=50'	H 73.5, W 90.5 CM	BLUEPRINT	PAPER
150-066	PLAN OF THE / MILL YARD / OF THE / SACO LOWELL SHOPS / SHOWING / [APPROXIMATE LOCATION OF SERVICE PUMPS] PIPES LAID FOR EXTINGUISHING FIRE.	1917/06/00	1"=40'	H 75.6, W 108.7 CM	BLUEPRINT, INK, COLORED INK	PAPER
150-067	[DIAGRAM SHOWING DISCHARGE OF TREMONT MILLS NO. 2 WHEEL 46 1/2" TYPE S., S. MORGAN SMITH.]	SEE NOTES				
150-068	[GENERAL PLAN & DETAILS OF] BOSTON & LOWELL RAILROAD-PROPOSED BRIDGE [(# 335) OVER HAMILTON CANAL FROM JACKSON ST. TO SACO-LOWELL SHOPS] AT THE LOWELL MACHINE SHOP.	1884/08/00	1/8"=1'	H 52.9, W 68.7 CM	BLUEPRINT	PAPER

150-069	[GENERAL PLAN & DETAILS OF] BOSTON & LOWELL RAILROAD-BRIDGE [(# 335) OVER HAMILTON CANAL] INTO THE [SACO-] LOWELL MACHINE SHOP FROM JACKSON STREET, LOWELL, MASS.	1884/10/00	1 1/2"=1'	H 54, W 69 CM	BLUEPRINT	PAPER
150-070	[GENERAL PLAN & DETAILS OF] BOSTON & LOWELL RAILROAD-BRIDGE [(# 335) OVER HAMILTON CANAL] INTO THE [SACO-] LOWELL MACHINE SHOP FROM JACKSON STREET, LOWELL, MASS.	1884/10/00	1/2"& 1 1/2"=1'	H 54, W 69 CM	BLUEPRINT	PAPER
150-071	[GENERAL PLAN & DETAILS OF] BOSTON & LOWELL RAILROAD-BRIDGE [(# 335) OVER HAMILTON CANAL] INTO THE [SACO-] LOWELL MACHINE SHOP FROM JACKSON STREET, LOWELL, MASS.	1884/10/00	1 1/2"=1'	H 54, W 69 CM	BLUEPRINT	PAPER
150-072	[GENERAL PLAN & DETAILS OF] BOSTON & LOWELL RAILROAD-BRIDGE [(# 335) OVER HAMILTON CANAL] INTO THE [SACO-] LOWELL MACHINE SHOP FROM JACKSON STREET, LOWELL, MASS.	1884/10/00	1/4"=1'	H 53, W 68.9 CM	BLUEPRINT	PAPER
150-073	[SKETCH SHOWING LAYOUT AND] DIMENSIONS OF WATERWAYS / NO. 6 UNIT SACO-LOWELL SHOPS [26" S. MORGAN SMITH. ALSO TESTS OF WHEEL].	1919/01/31	1/2"=1'	H 57.3, W 74.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
150-074	B.& M. R. R. / SOUTHERN DIV. CORPORATION TRACKS / [BRANCH] TRACK CHANGES IN TILDEN ST. EXTENSION / FOR TREMONT & SUFFOLK MILLS / LOWELL, MASS.	1917/07/31	1"=20'	H 33, W 44.5 CM	INK	DRAFTING CLOTH

150-075	[PLAN OF WATER CHAMBER & GENERATOR FLOOR] TREMONT & SUFFOLK MILLS / [SECTION] NO. 1 UNIT TREMONT SIDE.	1923/07/00	1/4"=1'	H 51, W 52 CM	INK, COLORED PENCIL, WATER COLOR	TRACING PAPER
150-076	[DRAWING SHOWING] STRUCTURAL STEEL / TREMONT [MILLS] NO. 1 / WHEEL / PROP. OF LOCKS & CANALS / LOWELL, MASS.	1923/08/10	1/4"=1'	H 26.6, W 37.5 CM	GRAPHITE	TRACING PAPER
150-077	DRAFT TUBE / [FOR] TREMONT & SUFFOLK MILLS / [NEW] NO. 1 UNIT TREMONT SIDE.	1923/08/00	1"=1'	H 31.7, W 46.8 CM	INK, COLORED INK	DRAFTING CLOTH
150-078	[DRAWING SHOWING DETAILS OF REINFORCING STEEL.] TREMONT MILLS / NO.1 UNIT-REINFORCING STEEL / PROPRIETORS OF LOCKS & CANALS-LOWELL, MASS.	1923/08/20	1/4"=1'	H 54.3, W 64.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-079	PLAN SHOWING / CONDITION OF PENSTOCK / [FOR] NOS 3 & 4 WHEELS / [AT] SACO-LOWELL SHOPS.	1923/09/24	1"=10'	H 39.4, W 91.5 CM	INK, COLORED INK	DRAFTING CLOTH
150-080	TREMONT # 1 UNIT. [DRAWING SHOWING WHEEL CHAMBER FLOOR, SHOWING LAYOUT OF REINFORCING STEEL.]	1923/11/00	NONE	H 32.2, W 30 CM	GRAPHITE	TRACING PAPER
150-081	TREMONT # 1 UNIT. [DRAWING SHOWING GENERATOR FLOOR & ELEVATION IN FRONT OF WALL.]	1923/11/00	NONE	H 44.9, W 53.5 CM	GRAPHITE	TRACING PAPER
150-082	PLAN SHOWING / DRAINS OF [THE] SACO-LOWELL SHOPS / LOWELL, MASS.	1924/10/07	SEE NOTES	H 59, W 78.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-083	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO / TREMONT & SUFFOLK MILLS.	1926/03/24	1"=30'	H 44, W 59.7 CM	BLUEPRINT, COLORED PENCIL	PAPER

150-084	SCHEME NO. 2 INSIDE ELEVATOR SHAFT / PLAN & SECTIONS / SHOWING / CONSTRUCTION OF PROPOSED ELEVATOR / AT / NASHUA MFG. COMPANY / SUFFOLK MILLS.	1927/01/13	1/8",1/4" & 1/2"=1'	H 76.7, W 75.3 CM	INK, COLORED INK	DRAFTING CLOTH
150-085	PLAN & SECTIONS / SHOWING / CONSTRUCTION OF ELEVATOR SHAFT / AT / NASHUA MFG. COMPANY / SUFFOLK MILLS / BY / THE PROPRIETORS OF LOCKS & CANALS.	1927/02/11	1/4"=1'	H 78.1, W 110.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-086	PLAN & SECTIONS / SHOWING / LOCATION FOR PROPOSED ELEVATOR / FOR / NASHUA MFG. COMPANY / SUFFOLK MILLS.	1927/01/05	1/4"=1'	H 69.4, W 85.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-087	SCHEME NO. 1 OUTSIDE ELEVATOR SHAFT / PLAN & SECTIONS / SHOWING / FOUNDATION FOR PROPOSED ELEVATOR / AT / NASHUA MFG. COMPANY / SUFFOLK MILLS.	1927/01/11	1/4",1/8" =1'	H 77, W 75.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-088	[TRACING] SKETCH SHOWING / PROPOSED METHOD OF REMOVING [BRICK WALL BETWEEN] MILLS NOS. 6 & 8 / NASHUA MFG. CO. [SUFFOLK MILLS].	1927/03/03	1/8"=1'	H 49.2, W 49.2 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
150-089	20"x 14" / DUPLEX DIRECT CONN. F.V. COMP'R. / FOUNDATION PLAN [SUFFOLK MILLS, NASHUA MFG. CO.].	1927/03/05	3/4"=1'	H 61.3, W 89.6 CM	BLUEPRINT	PAPER
150-090	PLAN SHOWING / PROPOSED LOCATIONS FOR AN ELEVATOR / AT / NASHUA MFG. COMPANY / SUFFOLK MILLS.	1927/01/05	1"=10'	H 46.5, W 42.7 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH

150-091	TREMONT & SUFFOLK MILLS, LOWELL, MASS. / [SHOWING] RACEWAYS & CANALS.	UNDATED	1"=60'	H 63, W 72.5 CM	BLUEPRINT	PAPER
150-092	SUFFOLK MILLS / NO. 5 & 6 MILLS ELEVATOR / STEEL FRAMEWORK / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/02/09	1"& 1/4"=1'	H 46.5, W 42.7 CM	INK	DRAFTING CLOTH
150-093	[BLUEPRINT FROM RUBIN-BURKE CO.] SHOWING "SECO" DOOR[S] [& JAMBS] DETAILS / [FOR] SUFFOLK MILLS [ELEVATOR] / LOWELL, MASS.	1927/02/15	NONE	H 45.8, W 58.3 CM	BLUEPRINT	PAPER
150-094	CROSS SECTION / [OF] # 2 MILL / & / # 2 MILL ADDITION / TREMONT & SUFFOLK MILLS, LOWELL, MASS.	1916/05/00	1/4"=1'	H 70.9, W 73 CM	BLUEPRINT	PAPER
150-095	PLAN AND PROFILE / OF / RAILROAD TRACK / AT / TREMONT GATES.	1927/06/28	1"=40', 1"=1'	H 36.3, W 55.2 CM	INK, GRAPHITE	PAPER
150-096-A	[SCHEDULE OF] STEEL FOR PARTITION / BETWEEN MILLS NO. 6 & 8 TOP FLOORS / NASHUA MFG. CO. / PROPREITORS OF THE LOCKS ON THE MERRIMACK RIVER.	1927/10/27	1"=1'	H 29.6, W 73.7 CM	INK, COLORED INK	DRAFTING CLOTH
150-096-B	[SCHEDULE OF] STEEL FOR PARTITION / BETWEEN MILLS NO. 6 & 8 TOP FLOORS / NASHUA MFG. CO.	1927/10/27	1"=1',FULL SIZE	H 43, W 74 CM	INK, COLORED INK	DRAFTING CLOTH
150-097	PLAN & SECTIONS / SHOWING WIRE LATH PARTITION / ON TOP FLOOR BETWEEN MILLS NO. 6 & 8 / NASHUA MFG. CO.	1927/10/21	1/8"=1'	H 46.9, W 58 CM	INK, COLORED PENCIL	DRAFTING CLOTH
150-098-A	NASHUA MFG. CO. / SUFFOLK MILL / LOWELL, MASS. / PROPOSED / ARRANGEMENT OF FANS.	1927/11/26	3/8"=1'	H 59.5, W 69 CM	BLUEPRINT, COLORED INK	PAPER

150-098-B	[UNTITLED PLAN.] [NASHUA MFG. CO., SUFFOLK MILL, LOWELL, MASS., PROPOSED ARRANGEMENT OF FANS.]	SEE NOTES	NONE	H 37.7, W 54.2 CM	BLUEPRINT	PAPER
150-099	PLAN & SECTION / [OF] FAN HOUSE & STAIR TOWER / NASHUA MFG. CO., MILL NO.10.	1928/01/16	1/4"=1'	H 65.6, W 74 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
15-01	[LOWELL SUNDAY SUN - 4-23-62- "LOWELL: ALL-AMERICA CITY."]	1962/04/23				
150-100-[A]	STEEL DETAILS / NASHUA MFG. CO. FAN HOUSE / SHEET NO. 1 POSTS.	1927/12/16	1"=1'	H 73.2, W 91.8 CM	INK, COLORED INK	DRAFTING CLOTH
150-100-B	STEEL DETAILS / NASHUA MFG. CO. FAN HOUSE / SHEET NO. 2 / PROPRIETORS OF THE LOCKS & CANALS.	1927/12/20	H 1/2"=1',V 1"=1'	H 47.4, W 77 CM	INK, COLORED INK	DRAFTING CLOTH
150-100-C	STEEL DETAILS / NASHUA MFG. CO. FAN HOUSE / SHEET NO. 3 / PROPRIETORS OF THE LOCKS & CANALS.	1927/12/21	1"=1'	H 47.9, W 76.3 CM	INK, COLORED INK	DRAFTING CLOTH
150-100-D	STEEL DETAILS / NASHUA MFG. CO. FAN HOUSE / SHEET NO. 4 / PROPRIETORS OF THE LOCKS & CANALS.	1927/12/22	1"=1'	H 75.6, W 94 CM	INK, COLORED INK	DRAFTING CLOTH
150-101	ASSEMBLY PLAN / [FOR] NASHUA MFG. CO. FAN HOUSE / PROPRIETORS OF THE LOCKS & CANALS.	1927/12/31	1"=50'& 3/8"=1'	H 74, W 106.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-102	ADDITION FOR STAIRWAY / NASHUA MFG. CO. FANHOUSE / PROPRIETORS OF THE LOCKS & CANALS.	1928/01/24	1/2"=1'	H 58.5, W 77.4 CM	INK, COLORED INK	DRAFTING CLOTH
150-103	[SKETCH SHOWING] TRACK CLEARANCE / IN LAWRENCE SECTION STOREHOUSE / OF / MERRIMACK MFG. CO.	1927/09/22	3/8"=1'	H 26.9, W 21.7 CM	INK, COLORED INK	DRAFTING CLOTH

150-104	[PLAN AND LONGITUDINAL SECTION SHOWING] PRESENT CONSTRUCTION / OF / NO. 7 [MILL] / [AT] NASHUA MFG. CO. / LOWELL, MASS.	1928/04/00	1/8"=1'	H 72.2, W 136 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
150-105	[PLAN SHOWING] PRESENT CONSTRUCTION / OF / MILL NO.7 / [AT] NASHUA MFG. CO. / LOWELL, MASS.	1928/04/00	1/8"=1'	H 49.5, W 13.2 CM	INK, COLORED INK, WATERCOLOR	DRAFTING CLOTH
150-106	[FRONT & SIDE ELEVATIONS OF PRESENT] LOCATION OF ELEVATOR SHAFT / NASHUA MFG. CO., NO.7 MILL.	1928/03/00	1/4"=1'	H 91.2, W 71 CM	INK, COLORED INK	DRAFTING CLOTH
150-107	OLD LOCATION / OF / FIRE ESCAPE ON NO.10 ANNEX / NASHUA MFG. CO.	1928/03/01	1/4"=1'	H 63.8, W 42.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-108	PROPOSED RELOCATION / OF / FIRE ESCAPE ON NO. 10 ANNEX / NASHUA MFG. CO.	1928/04/03	1/4"=1'	H 64, W 53 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
150-109	[PLAN & ELEVATION SHOWING] PRESENT CONSTRUCTION / OF / TREMONT MILLS NOS. 3 & 4 / FOR THE / NASHUA MFG. CO. / LOWELL, MASS.	1928/04/27	1"=10'	H 59.5, W 135.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-110	PLAN OF KITSON STORE HOUSE NO.1 / SHOWING GRADES OF [BASEMENT] FLOOR.	1928/05/21	1/8"=1'	H 20.2, W 45.4 CM	INK, COLORED INK	DRAFTING CLOTH
150-111	SKETCH SHOWING / PROPOSED LOCATION OF / AEROFIN HEATERS IN / NAPPING ROOMS OF NASHUA MFG. CO. / SUFFOLK MILLS / LOWELL, MASS.	1928/10/19	1"=40'	H 23.8, W 43.2 CM	INK, WATER COLOR	DRAFTING CLOTH

150-112	SURVEY OF STOREHOUSE "A" / [& LAND] SOLD TO NASHUA MANUFACTURING COMPANY / BY / MERRIMACK MANUFACTURING COMPANY.	1929/08/08	1"=20'	H 52, W 65 CM	INK, COLORED PENCIL	DRAFTING CLOTH
150-113	[PLAN & ELEVATION OF] PRESENT CONSTRUCTION / OF / MILL NO. 7 / NASHUA MFG. CO. [SHOWING ALLOWABLE LIVE LOAD PER SQ. FT.]	1928/04/00	1/8"=1'	H 71.8, W 135.2 CM	BLUEPRINT	PAPER
150-114	[SKETCH SHOWING POSSIBLE VERTICAL UNITS I PRESENT WHEELPITS AT NASHUA MFG. CO., SUFFOLK MILLS.]	1929/11/00				
150-115	SKETCH SHOWING / PROPOSED FUEL OIL LAYOUT / FOR THE / NASHUA MFG. CO.	1930/04/03	1"=40'	H 35.8, W 43 CM	INK, WATER COLOR	DRAFTING CLOTH
150-115	SCHEME 1 / PLAN AND SECTIONS SHOWING / POSSIBLE VERTICAL HYDRO ELECTRIC SETTING / IN ENGINE ROOM / AT THE / NASHUA MFG COMPANY / "SUFFOLK MILLS".	1930/08/07	1"=10'	H 58.4, W 87.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-116	[SCHEME 2 OF PLAN SHOWING POSSIBLE VERTICAL HYDRO-ELECTRIC SETTING IN ENGINE ROOM AT NASHUA MFG. COMPANY "SUFFOLK MILLS"].	1930/08/00				
150-117	LEFFEL VERTICAL TURBINE / FOR / NASHUA MFG. COMPANY / "SUFFOLK MILLS" LOWELL, MASS. / FROM / THE JAMES LEFFEL & CO.	1931/06/06	1/4"=1'	H 64.5, W 54.4 CM	BLUEPRINT	PAPER

150-118	VERTICAL LEFFEL TURBINE / FOR / NASHUA MFG. COMPANY / "SUFFOLK" LOWELL, MASS. / FROM / THE JAMES LEFFEL & CO.	1931/06/11	1/4"=1'	H 68, W 48.5 CM	BLUEPRINT	PAPER
150-119	VERTICAL LEFFEL TURBINE / FOR / NASHUA MFG. COMPANY / "SUFFOLK MILLS" LOWELL, MASS. / FROM / THE JAMES LEFFEL & CO.	1931/06/11	1/4"=1'	H 67.6, W 46.7 CM	BLUEPRINT	PAPER
150-120	[BLUEPRINT SHOWING PROPOSED S.M. SMITH 415 H.P. WHEEL FOR] NASHUA MANUFACTURING COMP. / SUFFOLK MILLS PLANT, LOWELL, MASS.	1931/05/15	1/4"=1'	H 52.2, W 76.6 CM	BLUEPRINT	PAPER
150-121	GENERAL ARRANGEMENT OF 2-48" TYPE "D" CYLINDER GATE VERTICAL HERCULES & DIRECT CONNECTED GENERATORS / FOR / DERBY GAS CO. / DERBY CONN.	1921/01/26	1/2"=1'	H 90.2, W 31.5 CM	BLUEPRINT	PAPER
150-122	PROPERTY OF / NASHUA MFG. COMPANY / NASHUA, N. H. [INCLUDING WELL FIELD].	1911/12/00	1/8"=10'	H 84.8, W 125.8 CM	BLUEPRINT	PAPER
150-123	PLAN OF / NASHUA, NEW HAMPSHIRE.	1930/10/31	1"=20',10' & 60'	H 57.2, W 61 CM	INK, COLORED INK	DRAFTING CLOTH
150-124	PLAN SHOWING / LOCKS & CANALS REAL ESTATE / AROUND PART OF / SACO-LOWELL SHOPS.	1931/08/01	1"=50'	H 52.4, W 53.7 CM	INK, WATER COLOR	DRAFTING CLOTH
150-125	PROPOSED HOUSING / OF / SACO PUMPS & NOS. 1 & 2 WHEELS.	1933/01/12	1/8"=1',1"=20'	H 41.3, W 80.3 CM	INK, COLORED INK	DRAFTING CLOTH
150-126	KITSON MACHINE SHOP / LOWELL, MASS. [LAND AND BUILDINGS].	1933/01/05	1"=60'	H 50.8, W 65.5 CM	INK	DRAFTING CLOTH
150-127	PORTION OF "SACO YARD" / SHOWING TWO / WATERWHEEL SCHEMES [IN PLACE OF PRESENT NO. 1 & 2 WHEELS].	1935/03/29	1"=40'	H 32, W 70.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

150-128	SUGGESTED INTERCONNECTION / BETWEEN / "SACO" & "BIGELOW" YARDS / LOWELL, MASS.	1936/02/08	1"=40'	H 22.5, W 76.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
150-129	PLAN OF UPPER LEVEL / SHOWING / SUGGESTED INTERCONNECTION FROM "SACO YARD" / ALSO / OTHER INFORMATION / LOWELL, MASS.	1936/01/20	1"=200'	H 22.4, W 52.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-130	SKETCH SHOWING / NO. 1 & 2 WHEELS, PUMPS, PUMP & WHEEL ROOMS & WATERWAYS / OF THE KITSON MACHINE SHOP ["SACO YARD"].	1934/04/06	1"=40'& 10'	H 32.3, W 86.4 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
150-131	SUFFOLK MILLS OF THE NASHUA M.F.G. CO. / LOWELL, MASS. / CONDENSER PIPING CHANGES.	1933/10/06	1/2"=1'	H 74.3, W 106.8 CM	BLUEPRINT	PAPER
150-132	SUFFOLK MILLS OF THE NASHUA MFG. CO. / LOWELL, MASS. / SKETCH OF CONDENSER HOT WELL. / JOHN A. STEVENS, INC. / LOWELL, MASS.	1933/10/11	1/2"=1'	H 26.6, W 41 CM	BLUEPRINT, COLORED PENCIL	PAPER
150-133	SKETCH SHOWING / WATERWHEELS & WATERWAYS / UNDER MILLS 1, 2, 4 & 9 / ALSO / ORIGINAL TREMONT LOT.	1932/09/12	1"=50'	H 36.3, W 52.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
150-134	PLAN OF LAND IN LOWELL, MASS. [SHOWING 10' AND 20' CANAL BORDERS AROUND MERRIMACK AND PAWTUCKET CANALS IN SACO-LOWELL SHOP YARD] / SURVEYED FOR / SACO-LOWELL SHOPS.	1942/08/13	1"=40'	H 45.7, W 60.8 CM	BLUEPRINT	PAPER
150-135	[PLAN SHOWING PORTION OF FOUNDRY YARD OF SACO-LOWELL SHOPS SURVEYED BY BROOKS JORDAN & GRAVES.]	1942/08/07	1"=40'		BLUEPRINT	

150-136	PLAN SHOWING / PROPERTY LINES & AREAS LEASED FROM P. L.& C. / IN THE / "TREMONT YARD" / MERRIMACK MFG. CO. / LOWELL, MASS.	1947/07/10	1"=50'	H 37, W 62 CM	INK, WATER COLOR	DRAFTING CLOTH
150-137	[PLAN OF NASHUA MFG. CO, (SUFFOLK MFG. CO.) COMPILED FOR] MARDEN & MURPHY / 40 CENTRAL ST. LOWELL, MASS.	1945/07/12	1"=40'	H 44.4, W 53 CM	INK, WATER COLOR	DRAFTING CLOTH
150-138	PLAN IN VICINITY OF / GENERAL ELECTRIC BUILDING / SHOWING / ELEVATIONS OF WATER IN & AROUND BUILDING.	1944/04/00	1"=10', 3/8"=1'	H 37.4, W 77.5 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
150-138-[COPY 1]	PLAN IN VICINITY OF / GENERAL ELECTRIC BUILDING / SHOWING / ELEVATIONS OF WATER IN & AROUND BUILDING.	1944/04/00	1"=40'& 10'	H 37.2, W 76.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
150-139	THE LOWELL ELECTRIC LIGHT CORPORATION / 18 KV SERVICE TO GENERAL ELECTRIC CO. / (OFF JACKSON STREET-LOWELL, MASS.) / MANHOLES & DUCT LINES.	1946/08/29	1/2"=1'	H 62.9, W 99.1 CM	BLUE LINE PRINT	PAPER
150-140	[WATER SHUT-OFF] SACO-LOWELL SHOPS / & / LOCKS & CANALS YARD.	UNDATED	NONE	H 18.8, W 20.4 CM	BLUEPRINT, COLORED INK	PAPER
150-141	PLAN SHOWING / DIVISION OF PROPERTY / IN / "SUFFOLK MILL YARD" / LOWELL, MASS.	1949/02/00	1"=40'	H 55, W 78.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
150-142	PLAN SHOWING / SPRINKLED AREAS & PROPERTY LINES / IN / "SUFFOLK MILL YARD" / LOWELL, MASS.	1948/08/00	1"=40'	H 49.4, 57.9 CM	INK, COLORED INK	DRAFTING CLOTH
150-143-[A]	PLAN SHOWING / PRESENT FENCES / IN & AROUND THE / "SACO YARD" / LOWELL, MASS.	1958/02/00	1"=50'	H 62.5, W 79 CM	INK, COLORED INK	DRAFTING CLOTH

150-143-[B]	PLAN SHOWING / PRESENT FENCES / IN & AROUND THE / "SACO YARD" / LOWELL, MASS.	1951/01/08	1"=50'	H 61.5, W 76.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
15-02	[LOWELL SUN ARTICLE: "OLD MILL CANNOT BE GIVEN AWAY."]	UNDATED				
15-03	[BOSTON SUNDAY GLOBE - 4/23/72 - ARTICLE: "THE INCREDIBLE DITCH" - THE OLD MIDDLESEX CANAL".]	1972/04/23				
15-04	[BOSTON HERALD - 2/14/72 - "LOWELL AND KING COTTON."]	1972/02/14				
15-05	[LOWELL SUNDAY SUN - 8/20/72 - "URBAN NATIONAL PARK".]	1972/08/20				
15-06	[BROCHURE: URBAN NATIONAL CULTURAL PARK.]	UNDATED				
15-07	[COMPILATION OF DRAWINGS ENTITLED "WESTERN CANAL BEAUTIFICATION."]	UNDATED				
15-08	[PLAN OF NORTHERN AND WESTERN CANALS.]	UNDATED				
15-09	[PLAN OF WESTERN CANAL MARGINS - BROADWAY TO MOODY STREET.]	UNDATED				
151-[061]	PLAN SHOWING / PROPERTY LINES AND OWNERS / IN FORMER / LAWRENCE MILL YARD.	1956/01/01	1"=50'	H 61.5, W 76 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
151-[062]	TREMONT & SUFFOLK MILLS / "LAWRENCE DIVISION" / (COTTON MILL) / LOWELL, MASS.	1910/10/01	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
151-[063]	LAWRENCE MFG. CO. / (KNITTING FACTORY) / LOWELL, MASS.	1910/09/13	1"=80'	H 53, W 66 CM	INK, COLORED INK	PAPER
151-[064]	LAWRENCE MFG. CO. / (COTTON UNDERWEAR, HOSIERY & HOSIERY YARNS) / LOWELL, MASS.	1910/09/13	1"=50'	H 66, W 106 CM	INK, COLORED INK	PAPER

151-[065]-[A]	ATLANTIC RAYON CORP., / LAWRENCE MFG. CO., / RIGGS & LOMBARD, INC., / ROYAL WORSTED MILL, / LOWELL, MASS.	1922/06/04	1"=50'	H 61.5, W 80 CM	INK, COLORED INK, COLORED PENCIL	PAPER
151-[065]-[B]	ATLANTIC RAYON CORP., / LAWRENCE MFG. CO., / RIGGS & LOMBARD, INC., / ROYAL WORSTED MILL, / LOWELL, MASS	1922/06/04	1"=50'	H 52, W 79 CM	INK	PAPER
151-[066]-[A]	LAWRENCE MFG. CO., / LOWELL, MASS.	1927/04/15	1"=50'	H 71, W 99 CM	INK, COLORED INK, COLORED PENCIL	PAPER
151-[066]-[B]	LAWRENCE MFG. CO., / LOWELL, MASS.	1927/04/15	1"=50'	H 71, W 49.5 CM	INK, COLORED INK, COLORED PENCIL	PAPER
151-[066]-[C]	LAWRENCE MFG. CO., / LOWELL, MASS.	1927/04/15	1"=60'	H 51, W 71 CM	INK, COLORED INK, COLORED PENCIL	PAPER
15-10	[COMPILATION OF DRAWINGS ENTITLED "ECUMENICAL PLAZA".]	UNDATED				
151-001-[A]-[COPY 1]	DETAILS [& GENERAL ARRANGEMENT] OF THREE 51" HORIZONTAL HERCULES TURBINES. / [FOR] LAWRENCE MFG. CO. / LOWELL, MASS.	1908/06/30	1/2"=1'	H 90.8, W 129.5 CM	BLUEPRINT	CLOTH BACKED PAPER
151-001-[A]-[COPY 2]	DETAILS [& GENERAL ARRANGEMENT] OF THREE 51" HORIZONTAL HERCULES TURBINES. / [FOR] LAWRENCE MFG. CO. / LOWELL, MASS.	1908/06/30	1/2"=1'	H 90.2, W 137.1 CM	BLUEPRINT	CLOTH BACKED PAPER
151-001-[B]-[COPY 1]	[DETAILS &] GENERAL ARRANGEMENT OF THREE, 51" HORIZONTAL HERCULES TURBINES / LAWRENCE MFG. CO. / LOWELL, MASS.	1908/06/19	1/4"=1'	H 89, W 130.8 CM	BLUEPRINT	CLOTH BACKED PAPER

151-001-[B]-[COPY 2]	[DETAILS &] GENERAL ARRANGEMENT OF THREE, 51" HORIZONTAL HERCULES TURBINES / LAWRENCE MFG. CO. / LOWELL, MASS.	1908/06/19	1/4"=1'	H 89, W 132.8 CM	BLUEPRINT	CLOTH BACKED PAPER
151-002-[A]	[NOTE & TRANSVERSE PLAN OF] LAWRENCE MFG. CO. [YARDS SHOWING SURVEY MEASUREMENTS OF BUILDINGS, LOCATIONS OF PIPE LINES, HYDRANTS, ETC.].	1888/10/00	NONE	H 70.4, W 119.5 CM	INK, COLORED INK	DRAFTING CLOTH
151-002-[B]	[NOTE & TRANSVERSE PLAN OF] LAWRENCE MANUFACTURING COMPANY [YARDS SHOWING SURVEY MEASUREMENTS OF BUILDINGS, LOCATIONS OF PIPE LINES, HYDRANTS, ETC.].	1888/10/00	NONE	H 75, W 119.5 CM	INK, COLORED INK	DRAFTING CLOTH
151-002-[C]	[NOTE & TRANSVERSE PLAN OF] LAWRENCE M. CO. [YARDS SHOWING SURVEY MEASUREMENTS OF BUILDINGS, LOCATIONS OF PIPE LINES, HYDRANTS, ETC.].	1888/10/00	NONE	H 75.7, W 120.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
151-003	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE [AND GRADES AND LEAKS FROM CANAL INTO LAWRENCE YARD].	SEE NOTES	1/4"=10'	H 78.3, W 116.3 CM	HELIOTYPE, COLORED INK	PAPER

151-004	SECTION OF CLOTH BUILDING OF LAWRENCE MFG. CO. WITH TWO ADDITIONAL ROWS OF / PILLARS THAT IT MAY BE USED FOR STORE / HOUSE WITH LOADS; INCLUDING WEIGHT OF / FLOOR; NOT EXCEEDING 110 LBS. PER SQUARE / FOOT OF FLOOR;... [SEE NOTES]	1896/12/29	1"=4'	H 66.4, W 86.2 CM	GRAPHITE	PAPER CLOTH BACKED PAPER
151-005	CROSS SECTION OF LAWRENCE CANAL.	1903/07/00	NONE	H 60, W 42.5 CM	INK	
151-006	PLAN OF MILL YARDS / OF THE / LAWRENCE MFG. CO. & LAWRENCE SECTION / OF THE / TREMONT & SUFFOLK MILLS. / SHOWING / PENSTOCKS & RACES; ALSO CONTOURS OF RIVER BED.	1898/00/00	1"=40'	H 90.8, W 116.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
151-007	[PLAN OF PENSTOCKS OF] LAWRENCE MFG. CO., NOS. 1, 2, & 3. / [WITH] DATA RELATING TO PENSTOCKS, ETC.	UNDATED	1"=4'	H 76.5, W 128.3 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
151-008	[PLAN OF PENSTOCKS OF] FEEDER NO. 6 MILL / [OF] LAWRENCE MANF'G. CO. [NOS. 1, 2, & 3 WITH DATA PERTAINING THERETO] 1855.	SEE NOTES	1"=4'	H 48.5, W 102.2 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
151-009	[DIAGRAM SHOWING FRICTION LOSSES / IN / LAWRENCE [MFG. CO'S NOS.] 4, 5, & 6 RACEWAYS.	1908/07/00	NONE	H 78.8, W 53.4 CM	INK, COLORED INK, GRAPHITE	PAPER
151-010	[PLAN SHOWING] ARRANGEMENT OF IMPROVED GOVERNOR TYPE "A" FOR 3-51" HORIZ. HERCULES TURBINES, FOR THE / LAWRENCE M'F'G. CO. / LOWELL, MASS.	1908/07/23	1/2" & 1 1/2"=1'	H 84, W 132.2 CM	BLUEPRINT	PAPER

151-011	DIAGRAM / SHOWING GRADE OF WHEEL-PIT READINGS / FOR [NOS.] 1, 2, & 3 WHEELS, LAWRENCE, [MFG. CO'S] / USING VACUUM GAUGE READINGS. [SPEEDGATE GAUGES FOR WHEELS NOS. 1, 2, & 3]	1909/08/00	NONE	H 26.6, W 21.7 CM	INK	PAPER
151-012-[A]	LAWRENCE MFG. CO. / NO. 1 WHEEL. [SPEEDGATE GAUGES FOR WHEELS NOS. 1, 2, & 3]	1909/03/08	NONE	H 51, W 51.6 CM	INK, DRAFTING CLOTH	DRAFTING CLOTH
151-012-[A]-[COPY 1]	LAWRENCE MFG. CO. / NO. 1 WHEEL. [SPEEDGATE GAUGES FOR WHEELS NOS. 1, 2, & 3]	1909/03/08	NONE	H 51.4, W 51.4 CM	BLUEPRINT	PAPER
151-012-[B]	LAWRENCE MFG. CO. NO. 2 & 3 WHEELS. [DIAGRAM SHOWING] MILL POWERS DRAWN BY /	1909/03/08	NONE	H 53.8, W 53.7 CM	INK	DRAFTING CLOTH
151-013	WHEELS OF / LAWRENCE MFG. CO. [DIAGRAMS SHOWING] LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NOS. 1, 2 & 3 / 51 INCH TYPE	1909/08/09	NONE	H 49.8, W 56 CM	INK, COLORED INK	CLOTH BACKED PAPER
151-014-[A]	`B' HERCULES WHEELS / NOS. 1 & 2 L.H. NO. 3 R.H. [DIAGRAMS SHOWING] LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NOS. 1, 2 & 3 / 51 INCH TYPE	1909/03/08	NONE	H 54.6, W 74.6 CM	INK	DRAFTING CLOTH
151-014-[B]	`B' HERCULES WHEELS / NOS. 1 & 2 L.H. NO. 3 R.H. [DIAGRAMS SHOWING] MEAN OF 15 TRAVERSES IN 20" PIPE	1909/03/08	NONE	H 54.6, W 74.6 CM	INK	DRAFTING CLOTH
151-015-[A]	/ MADE AT / LAWRENCE M'F'G. CO.	1910/08/22	NONE	H 41.1, W 29.3 CM	INK	PAPER
151-015-[A]-[COPY 1]	MEAN OF 15 TRAVERSES IN "20" INCH PIPE / MADE AT / LAWRENCE M'F'G. CO.	1910/08/22	NONE	H 42.5, W 29.2 CM	BLUEPRINT	PAPER
151-015-[A]-[COPY 2]	MEAN OF 15 TRAVERSES IN "20" INCH PIPE / MADE AT / LAWRENCE M'F'G. CO.	1910/08/22	NONE	H 42.5, W 29.2 CM	BLUEPRINT	PAPER

151-015-[A]-[COPY 3]	MEAN OF 15 TRAVERSES IN "20" INCH PIPE / MADE AT / LAWRENCE M'F'G. CO.	1910/08/22	NONE	H 42.5, W 29.2 CM	BLUEPRINT	PAPER
151-015-[A]-[COPY 4]	MEAN OF 15 TRAVERSES IN "20" INCH PIPE / MADE AT / LAWRENCE M'F'G. CO.	1910/08/22	NONE	H 42.5, W 29.2 CM	BLUEPRINT	PAPER
151-015-[B]	TRAVERSES IN 20 IN. PIPE AT LAWRENCE MFG. CO.	1910/08/22	NONE	H 42.5, W 45.8 CM	GRAPHITE, COLORED PENCIL	PAPER
151-015-[C]	TRAVERSES IN 20 IN. PIPE AT LAWRENCE MFG. CO.	1910/08/22	NONE	H 42.5, W 45.8 CM	GRAPHITE	PAPER
151-016-[A]	[DIAGRAM SHOWING] VELOCITY CURVES AT DIFFERENT STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION / RACES 4, 5, 6. R. H. RACES.	1910/07/26	NONE	H 83.2, W 53.2 CM	INK, COLORED INK	PAPER
151-016-[A]-[COPY 1]	VELOCITY CURVES AT DIFFERENT STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION / RACES 4, 5, 6. R. H. RACES.	1910/07/26	NONE	H 83.2, W 53.2 CM	BLUEPRINT	PAPER
151-016-[B]	[DIAGRAM SHOWING] VELOCITY CURVES AT DIFFERENT STATIONS / AT / LAWRENCE MFG. CO. CURRENT METER STATIONS / RACES 4, 5, 6. L. H. RACES.	1910/07/26-08/05	NONE	H 83.2, W 53.2 CM	INK, COLORED INK	PAPER
151-017-[A]	VELOCITY CURVES AT DIFFERENT STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION.	1910/08/05	NONE	H 53.3, W 79 CM	BLUE LINE PRINT, COLORED INK	PAPER
151-017-[B]	VELOCITY CURVES AT VARIOUS STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION.	1910/08/05	NONE	H 53.3, W 79 CM	BLUE LINE PRINT, COLORED INK	PAPER

151-017-[B]-[COPY 1]	VELOCITY CURVES AT VARIOUS STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION. [DIAGRAM SHOWING]	1910/08/05	NONE	H 53.3, W 79 CM	BLUEPRINT, COLORED INK	PAPER
151-018	VELOCITY CURVES AT DIFFERENT STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION / 4, 5, 6 RACES. L. H. RACE.	1910/08/05	NONE	H 79, W 53.3 CM	INK, COLORED INK	PAPER
151-018-[COPY 1]	VELOCITY CURVES AT DIFFERENT STATIONS / AT / LAWRENCE MANUFACTURING CO. CURRENT METER STATION / 4, 5, 6 RACES. L. H. RACE.	1910/08/05	NONE	H 79, W 53.3 CM	BLUEPRINT	PAPER
151-019-A	DIAGRAM SHOWING QUANTITY OF WATER [EFFICIENCY, HORSE POWER] DISCHARGE WITH 21' FALL & DIFFERENT / SPEEDS & OPENINGS OF THE / SPEEDGATES OF TWO 24" TYPE D, HERCULES WHEELS FOR THE / LAWRENCE MFG. CO. OF LOWELL, MASS.	1916/03/00	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
151-019-B	DIAGRAM SHOWING HORSE POWER [[EFFICIENCY, DISCHARGE] WITH 21' FALL / & DIFFERENT SPEEDS & OPENINGS OF THE / SPEEDGATES OF TWO 24" TYPE "D" HERCULES / WHEELS FOR LAWRENCE MFG. OF / LOWELL, MASS.	SEE NOTES	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER

151-019-C	DIAGRAM SHOWING PER CENT OF / EFFICIENCY [HORSE POWER, DISCHARGE] WITH 21' FALL, & DIFFERENT SPEEDS & OPENINGS OF / THE SPEEDGATES OF TWO 24" TYPE "D" / HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF LOWELL, MASS.	1916/03/00	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
151-019-D	DIAGRAM SHOWING EFFICIENCY IN PER CENT, / HORSE POWER & DISCHARGE IN C.F.P.S. / WITH 21' FALL (REL. VEL. OF 698 WITH 245 REV. PER. MIN) / OF TWO TYPE "D" HERCULES WHEELS FOR THE / LAWRENCE MFG. CO. LOWELL, MASS.	SEE NOTES	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
151-019-E	DIAGRAM SHOWING EFFICIENCY IN PER CENT., / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 21' FALL / (REL. VEL. .698 WITH 245 REV.PER MIN.) OF A PAIR / OF 24" TYPE "D" HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF LOWELL, MASS.	1915/02/21	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
151-019-F	DIGRAM SHOWNIG [EFFICIENCY] HORSE POWER / WITH 17' FALL, & DIFFERENT SPEEDS & OPENINGS OF THE SPEEDGATES OF / TWO 24" TYPE "D" HERCULES WHEELS FOR / THE LAWRENCE MFG. CO. OF LOWELL, MASS.	1915/02/21	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER

151-019-F-[COPY 1]	DIAGRAM SHOWING HORSE POWER / WITH 17' FALL & DIFFERENT SPEEDS / & OPENINGS OF THE SPEEDGATES OF TWO 24" TYPE "D" HERCULES WHEELS FOR / THE LAWRENCE MFG. CO. OF LOWELL, MASS.	1915/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER
151-019-G	DIAGRAM SHOWING PER CENT OF / EFFICIENCY [HORSE POWER] WITH 17' FALL, & / DIFFERENT SPEEDS & OPENINGS OF / THE SPEEDGATES OF TWO 24" TYPE "D" / HERCULES WHEELS FOR THE LAWRENCE MFG. CO. LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
151-019-G-[COPY 1]	DIAGRAM SHOWING PER CENT OF / EFFICIENCY WITH 17' FALL, & / DIFFERENT SPEEDS & OPENINGS OF / THE SPEEDGATES OF TWO 24" TYPE "D" HERCULES WHEELS FOR THE LAWRENCE / MFG. CO. OF LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER
151-019-H	DIAGRAM SHOWING QUANTITY OF WATER [EFFICIENCY, HORSE POWER] DISCHARGED WITH 17'FALL / (REL. VEL. OF .776 WITH 245 REV. PER MIN.) OF TWO 24" TYPE / "D" HERCULES WHEELS [WITH DIFFERENT SPEEDS & OPENINGS] FOR LAWRENCE MFG. CO.OF / LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER

151-019-H-[COPY 1]	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED 17' FALL, & DIFFERENT / SPEEDS & OPENINGS OF THE SPEEDGATES OF / TWO 24" TYPE "D" HERCULES WHEELS FOR THE / LAWRENCE MFG. CO. OF LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER
151-019-I	DIAGRAM SHOWING EFFICIENCY IN PER CENT. / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 17' FALL / (REL.VEL. OF .776 WITH 245 REV. PER MIN.) OF TWO 24" TYPE / "D" HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF / LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	INK, COLORED INK	PAPER
151-019-I-[COPY 1]	DIAGRAM SHOWING EFFICIENCY IN PER CENT. / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 17' FALL / (REL.VEL. OF .776 WITH 245 REV. PER MIN.) OF TWO 24" TYPE / "D" HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF / LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER
151-019-I-[COPY 2]	DIAGRAM SHOWING EFFICIENCY IN PER CENT. / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 17' FALL / (REL.VEL. OF .776 WITH 245 REV. PER MIN.) OF TWO 24" TYPE / "D" HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF / LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER

151-019-I-[COPY 3]	DIAGRAM SHOWING EFFICIENCY IN PER CENT. / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 17' FALL / (REL.VEL. OF .776 WITH 245 REV. PER MIN.) OF TWO 24" TYPE / "D" HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF / LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER
151-019-I-[COPY 4]	DIAGRAM SHOWING EFFICIENCY IN PER CENT. / HORSE POWER & DISCHARGE IN C.F.P.S. WITH 17' FALL / (REL.VEL. OF .776 WITH 245 REV. PER MIN.) OF TWO 24" TYPE / "D" HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF / LOWELL, MASS.	1916/02/21	NONE	H 46, W 29.2 CM	BLUEPRINT	PAPER
151-019-J	LAWRENCE MFG. CO. / DIAGRAM OF DISCHARGE / OF 24 INCH TYPE "D" HERCULES WHEEL.	1915/02/00	NONE	H 29.2, W 46 CM	INK	PAPER
151-020	DIAGRAM SHOWING QUANTITY OF, WATER / DISCHARGED WITH 17' FEET FALL, & DIFFERENT SPEEDS / & OPENINGS OF THE SPEEDGATES OF TWO 24" TYPE "D" / HERCULES WHEELS FOR THE LAWRENCE MFG. CO. OF / LOWELL, MASS.	1916/02/25	NONE	H 56, W 76.4 CM	INK	PAPER
151-021	[DIAGRAM SHOWING] MILL POWERS / DRAWN BY WHEELS OF / LAWRENCE MFG. CO.	1916/03/14	NONE	H 49.8, W 56 CM	INK, COLORED INK	DRAFTING CLOTH
151-023-A	[DIAGRAM SHOWING] LAWRENCE MANUFACTURING CO., / LOWELL, MASS. / HEIGHT OF BOOTT RIVER GAUGE VS. LAWRENCE LIMITATION.	1918/02/07	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER

151-023-B	DAY USE POWER-DURATION DIAGRAM / LAWRENCE MFG. CO. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/09/10	NONE	H 28, W 21.5 CM	INK, COLORED INK	PAPER
151-023-C	[DIAGRAM SHOWING] LAWRENCE MFG. CO. / RELATION OUTSIDE TO INSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/03/27	NONE	H 21.5, W 30.5 CM	INK, COLORED INK, GRAPHITE	PAPER
151-023-D	[DIAGRAMS SHOWING] LAWRENCE MFG. CO. / AREAS & VELOCITIES THRU WATERWAYS / SCHEMES 1-4 / # 1, 2, 3 [1 TO 6] UNITS.	UNDATED	NONE	H 29.2, W 45.6 CM	INK, COLORED INK	PAPER
151-023-D-[COPY 1]	LAWRENCE MFG. CO. / AREAS & VELOCITIES THRU WATERWAYS / SCHEMES 1-4 / # 1, 2, 3 UNITS.	UNDATED	NONE	H 29.2, W 45.6 CM	BLUEPRINT, COLORED INK	PAPER
151-023-E	[DIAGRAMS SHOWING] LAWRENCE MFG. CO. / AREAS & VELOCITIES THRU WATERWAYS / SCHEMES 1-4 / # 4, 5, 6 UNITS.	SEE NOTES	NONE	H 29.5, W 46 CM	INK, COLORED INK	PAPER
151-023-E-[COPY 1]	LAWRENCE MFG. CO. / AREAS & VELOCITIES THRU WATERWAYS / SCHEMES 1-4 / # 4, 5, 6 UNITS.	SEE NOTES	NONE	H 29.5, W 46 CM	BLUEPRINT, COLORED INK	PAPER
151-023-F	SKETCH SHOWING / AREAS AT END OF LAWRENCE CANAL / [LEASED TO LAWRENCE MFG. CO.] AREAS IN GREEN-FEE IN PROPRIETORS OF THE LOCKS & CANALS.	1936/10/10	1"=40'	H 20.2, W 34.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
151-023-G	SKETCH SHOWING / LAND, BUILDINGS / OIL TANK & PIPES / AT END OF LAWRENCE CANAL.	SEE NOTES	1"=40'	H 21.5, W 34.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
151-023-H	COPY OF / LAWRENCE MFG. COMPANY'S ORIGINAL INDENTURE PLAN / WHICH ACCOMPANIES DEED OF LAND & 6 MILL POWERS / LOWELL, MASS.	1833/04/13	1"=80'	H 38, W 45.9 CM	INK	DRAFTING CLOTH

151-023-I	DIAGRAM SHOWING EFFICIENCY IN PER CENT / WITH VARIOUS FALLS & DIFFERENT SPEEDS / & OPENINGS OF THE SPEEDGATE OF 51" R. H. / SPECIAL HERCULES WHEEL. / TESTED AT HOLYOKE NOV. 1,1897 / TEST NO. 1050.	1938/02/00	NONE	H 42, W 28 CM	INK	PAPER
151-023-J	KW ON SWITCHBOARD VS. GATE OPENING / NOS. 4, 5 & 6 WHEELS / LAWRENCE MFG. CO. / 21 FT. HEAD.	SEE NOTES	NONE	H 42, W 28 CM	INK	PAPER
151-023-K	PLAN SHOWING / LAND AREAS / AT THE / END OF LAWRENCE CANAL.	1937/09/14	1"=20'	H 21.5, W 52 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
151-023-L	DIAGRAM SHOWING HORSE POWER / WITH 15 FEET FALL & DIFFERENT / SPEEDS & OPENINGS OF THE / SPEEDGATE OF 51" R. H. SPECIAL HERCULES / WHEEL TYPE "B". / TESTED AT HOLYOKE NOV. 1, 1897. / TEST NO. 1050.	1929/05/08	NONE	H 45.8, W 29.2 CM	INK, GRAPHITE	PAPER
151-023-M	PLAN OF LAND IN LOWELL, MASS. / SHOWING PART OF PARCEL "E" SHOWN ON A PLAN ENTITLED / PLAN OF YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / DATED-JUNE 19, 1939 BY BROOKS, JORDAN & GRAVES.	1942/12/29	1"=40'	H 30.6, W 35 CM	BLUEPRINT, COLORED INK	PAPER
151-023-N-[7]	ATLANTIC RAYON CORPORATION.	1940/02/02	NONE	H 28, W 21.5 CM	INK	PAPER

151-023-N-1	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FIRST FLOOR OF MILLS NOS. 3, 4, & 7. TABLE GIVING AREAS OF FLOORS NOS. 1 TO 6, AND CONSTRUCTION OF MILLS].	1940/02/00	1"=40'	H 24.8, W 33 CM	INK, COLORED INK	DRAFTING CLOTH
151-023-N-2	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FOURTH FLOOR OF MILLS NOS. 3, 4, & 7; CROSS SECTIONS OF NOS. 3, 4, & 7 AND LONGITUDINAL ELEVATION OF MILL NO. 7].	1940/02/00	1"=40'	H 24.8, W 33 CM	INK, COLORED INK	DRAFTING CLOTH
151-023-N-3	ATLANTIC RAYON CORPORATION / LOWELL, MASS. [PLAN OF SECOND FLOOR OF MILLS 10 & 11; ELEVATION OF MILLS NO, 10 & 11. TABLE GIVING AREAS OF FLOORS NOS. 1 TO 6; AND CONSTRUCTION OF MILLS].	1940/02/00	1"=40'	H 24.8, W 43.2 CM	INK, COLORED INK	DRAFTING CLOTH
151-023-N-4	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF THIRD FLOOR OF STOREHOUSE NO. 10 AND ELEVATION OF ALL FLOORS. TABLE GIVING AREAS OF FLOORS NOS. 1 TO 5, AND CONSTRUCTION OF STOREHOUSE].	1940/02/00	1"=30'	H 24.8, W 33 CM	INK, COLORED INK	DRAFTING CLOTH
151-023-N-4-[COPY 1]	ATLANTIC RAYON CORP. / LOWELL, MASS.	1940/02/00	1"=30'	H 24.8, W 33 CM	BLUEPRINT	PAPER
151-023-N-5	ATLANTIC RAYON CORP. / [PLAN OF] BOILER HOUSE.	1940/02/00	1"=40'	H 24.8, W 33 CM	INK, GRAPHITE	DRAFTING CLOTH
151-023-N-6	LAWRENCE MANUFACTURING CO. / LOWELL, MASS. [PLAN AND ELEVATION OF NO. 2 ANNEX GIVING AREA AND CONSTRUCTION].	1942/10/00	1"=20'	H 20.5, W 38.5 CM	INK, COLORED INK	DRAFTING CLOTH

151-023-O	STORE HOUSE FOR SONOCO PRODUCTS CO. / ROBINSON & ROBINSON STRUCTURAL ENGINEERS LOWELL, MASS.	UNDATED	NONE	H 30.5, W 38.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
151-023-P	BOSTON & MAINE RAILROAD / NEW HAMPS. DIV.- CORPORATION TRKS. / VICINITY OF SUFFOLK & PERKINS STS. / [SHOWING SIDETRACK FOR SONOCO PRODUCTS COMPANY] LOWELL, MASS.	SEE NOTES	NONE	H 20.3, W 33 CM	BLUEPRINT, COLORED PENCIL	PAPER
151-024-[A]	A PR. OF TYPE "A" IMPROVED GOVERNOR FOR 3 PAIRS OF 24" "D" CYL. GATE HORIZONTAL HERCULES TURBINES / FOR THE / LAWRENCE MFG. CO. / LOWELL, MASS.	1915/11/30	3/4"=1'	H 90.2, W 139.2 CM	BLUEPRINT	PAPER
151-024-[B]	DETAILS OF 24" D CYLINDER GATE HORIZONTAL HERCULES TURBINES / FOR THE / LAWRENCE MANUFACTURING CO. / LOWELL, MASS.	1915/08/31	1/2"& 1 1/2"=1'	H 88.4, W 134.2 CM	BLUEPRINT	PAPER
151-024-[C]	[DETAILS &] GENERAL ARRANGEMENT OF 3 PAIRS OF 24" D CYLINDER GATE HORIZONTAL HERCULES TURBINES [4, 5,& 6] / FOR THE / LAWRENCE MFG. CO. / LOWELL, MASS.	1915/08/09	1/4"=1'	H 85.8, W 114.3 CM	BLUEPRINT	PAPER
151-025	[PLAN OF THE] BUCKET [OUTLET] OPENINGS / FOR / LAWRENCE MFG. COMPANY'S / RIGHT & LEFT HAND TYPE "D" 24" HERCULES WHEELS / NO. 4 & 6 UNITS.	1917/01/27	NONE	H 44.4, W 51.8 CM	INK	DRAFTING CLOTH

151-025-[COPY 1]	BUCKET OPENINGS / FOR / LAWRENCE MANUFACTURING COMPANY'S / RIGHT & LEFT HAND TYPE "D" 24" HERCULES WHEELS / NO. 4 & 6 UNITS.	1917/01/27	NONE	H 44.4, W 51.8 CM	BLUEPRINT	PAPER
151-026-[C]	TESTING FLUME OF THE HOLYOKE WATER POWER CO., HOLYOKE MASS. / REPORT OF TESTS OF A 24" RIGHT HAND HERCULES TURBINE WHEEL, NO. 2136, MADE MAY 15-16, 1912. CASE # 2054.	SEE TITLE	NONE	H 28, W 35.6 CM	INK, COLORED INK	PAPER
151-026-A	DISCHARGE / DIAGRAM & COMPUTATIONS / FOR WORKING UP TESTS OF A 24" R. H. / HERCULES TURBINE WHEEL NO. 2136 MADE 15-16, 1912.	1916/01/13	NONE	H 76.4, W 56 CM	INK, COLORED INK	PAPER
151-026-B	CURVES SHOWING HORSE POWER, DISCHARGE & EFFICIENCY / OF ONE / 24"R. H. TYPE D, HERCULES TURBINE / UNDER / 21 FT. HEAD, RUNNING 245 R.P.M.	SEE NOTES	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
151-027	GENERAL PLAN & DATA / [OF] LAWRENCE MFG. CO. [NOS. 4, 5, & 6 WHEELS] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/00	1"=200' & 10'	H 71.2, W 110 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
151-027-[COPY 1]	GENERAL PLAN & DATA / LAWRENCE MFG. CO. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/00	1"=200' & 10'	H 71.2, W 109.3 CM	BLUEPRINT	PAPER
151-028	[GENERAL PLAN AND DATA OF LAWRENCE MFG. CO. 1, 2 & 3 WHEELS.]	1919/02/00				
151-029	[GENERAL PLAN &] DATA ON LAWRENCE CO'S WHEELS NOS. 1, 2, & 3 / NO. 1 & 2 L. H. NO. 3 R. H 51" "B" HERCULES.	UNDATED	1"=10'	H 75, W 110.5 CM	INC, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

151-030	VELOCITY DIAGRAM / FOR / LAWRENCE MFG. CO. / NOS 1, 2, & 3-WHEELS. / DISCHARGE 259 C.F.P.S. (EACH UNIT) / HEAD 22.5 FT.	UNDATED	NONE	H 29.1, W 45.8 CM	INK, COLORED INK	PAPER
151-031	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1926/00/00	1"=40'	H 74.2, W 110 CM	BLUEPRINT, COLORED INK	PAPER
151-032	PLAN SHOWING LAND / CONVEYED TO / ROYAL WORSTED MILL / BY / LAWRENCE MANUFACTURING CO.	1928/01/00	1"-20'	H 34.1, W 86.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
151-033-[COPY 1]	[TWO PHOTOSTATS OF] PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / POWER DISTRIBUTION SYSTEM.	1927/12/00	1"=40'[SEE NOTES]	H 35.2, W 51.2 CM	PHOTOGRAPH, COLORED INK	PAPER
151-033-[COPY 2]	[TWO PHOTOSTATS OF] PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / POWER DISTRIBUTION SYSTEM.	1927/12/00	1"=40'	H 35.2, W 51.2 CM	PHOTOGRAPH	PAPER
151-034	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / POWER REQUIRED BY MACHINERY ON EACH FLOOR.	1927/12/00	1"=40'	H 75, W 110 CM	LITHOGRAPH, WATER COLOR	PAPER
151-035	COPY OF / FACTORY INSURANCE ASSOCIATION PLAN / SHOWING / LAWRENCE MFG. COMPANY'S / BOX SHOP.	1927/09/02	1"=60'& 50'	H 30, W 50.5 CM	INK, WATER COLOR	DRAFTING CLOTH

151-036	[TRACING SHOWING BUILDINGS ONLY] PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING.	1927/12/00	1"=40'	H 75, W 109 CM	INK	DRAFTING CLOTH
151-037	PLAN SHOWING NO.12 & NO.14 MILLS / OF THE / LAWRENCE MFG. CO. / SOLD TO THE / HUB HOSIERY MILLS.	1929/06/06	1"=20'	H 43.2, W 91.6 CM	INK, COLORED INK	DRAFTING CLOTH
151-038	[PLAN OF THE LAWRENCE MFG. CO. MILL YARD SHOWING THE POWER DISTRIBUTION SYSTEM.]	UNDATED				
151-039-[A]	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO / LAWRENCE MANUFACTURING COMPANY.	1927/03/22	1"=40'	H 43.2, W 78.7 CM	INK, COLORED INK	DRAFTING CLOTH
151-039-[B]	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO / LAWRENCE MANUFACTURING COMPANY.	1927/03/22	1"=40'	H 43.2, W 76.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
151-040	PLAN OF SIDE TRACK / TO / LAWRENCE MFG. CO'S NO.10 STORE HOUSE.	1935/08/14	1"=20'	H 53.4, W 41.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
151-040-A	SECTIONS OF GROUND / NEAR STORE HOUSE NO. 10 / & COAL TRESTLE / LAWRENCE MANUFACTURING CO.	1937/05/17	1"=5'	H 42.5, W 77.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
151-041	MILL POWERS / DRAWN BY WHEELS OF / LAWRENCE MANUFACTURING CO.	1934/02/13	NONE	H 49.8, W 67.5 CM	INK, COLORED INK	DRAFTING CLOTH
151-042	PLAN & SECTIONS / OF DUST FLUE / BETWEEN MILLS 10 & 11 / LAWRENCE MANUFACTURING CO. / LOWELL, MASS.	1935/09/30	3/8"=1'	H 62.6, W 93.4 CM	INK, GRAPHITE, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

151-043	ELEVATION OF MILL BUILDINGS / LAWRENCE MANUFACTURING CO.	1936/05/00	1"=30'+/-	H 52.1, W 90 CM	INK	DRAFTING CLOTH
151-044	PLAN OF SECOND FLOOR / & ELEVATION OF MILL NO. 4 / ATLANTIC RAYON CORP. / LOWELL, MASS.	1938/05/05	1/8"=1'	H 38.2, W 77.4 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
151-045	NO. 6 MILL FORE-BAY. [LAWRENCE MFG. CO. HEADGATES FOR 1, 2, & 3 WHEELS].	1896/08/00	1/2"=1'	H 88.4, W 113 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
151-046-[COPY 1]	PLAN OF YARD / OF THE / LAWRENCE MANUFACTURING COMPANY.	1939/06/19	1"=40'	H 71.4, W 91.5 CM	BLUEPRINT, COLORED PENCIL	CLOTH BACKED PAPER
151-046-[COPY 2]	PLAN OF YARD / OF THE / LAWRENCE MANUFACTURING COMPANY	1939/06/19	1"=40'	H 71.4, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
151-046-[COPY 3]	PLAN OF YARD / OF THE / LAWRENCE MANUFACTURING COMPANY	1939/06/19	1"=40'	H 71.4, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
151-047	PLAN SHOWING / AREA OWNED BY HUB HOSIERY MILLS / & / AREA LEASED FROM PROPS. LOCKS & CANALS / LOWELL, MASS.	1939/07/00	1"=40'	H 28, W 60.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
151-048	[PLAN SHOWING ASSESSED AREA OF] LAND & [FLOOR AREAS OF] BUILDINGS / BELONGING TO / LAWRENCE MANUFACTURING COMPANY.	1932/04/01	1"=40'	H 61.5, W 94 CM	INK, COLORED PENCIL	DRAFTING CLOTH
151-049	ATLANTIC RAYON CO'S / NOS.1, 2 & 3 WHEELS / FOREBAY, PENSTOCKS & TAILRACES.	1941/05/21	1"=10'	H 45.2, W 64.2 CM	GRAPHITE	TRACING PAPER
151-049-[A]	ATLANTIC RAYON CO'S / NOS.1, 2 & 3 WHEELS / FOREBAY, PENSTOCKS & TAILRACES.	1941/05/21	1"=10'	H 44.8, W 63.8 CM	BLUEPRINT, COLORED PENCIL	PAPER

151-049-[COPY 1]	ATLANTIC RAYON CO'S / NOS.1, 2 & 3 WHEELS / FOREBAY, PENSTOCKS & TAILRACES.	1941/05/21	1"=10'	H 44.8, W 63.8 CM	BLUEPRINT	PAPER
151-050	[PLAN OF SECOND FLOORS OF] ATLANTIC RAYON CORP. [MILLS 10 & 11, SECTION & ELEVATION OF FLOORS, 1ST TO 4TH OF MILL NO. 10; SECTION AND ELEVATION OF FLOORS, 1ST TO 3RD OF MILL NO. 11].	1941/12/09	1/8"=1'	H 66.7, W 101 CM	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
151-051	ATLANTIC RAYON CORP. [PLAN OF THIRD FLOOR, MILL NO. 10].	1941/12/09	1/8"=1'	H 66.4, W 47 CM	GRAPHITE	TRACING PAPER
151-052	PLAN OF / HUB HOSIERY / & OTHER PROPERTIES BETWEEN / PERKINS & HALL STS.	1942/05/28	1"=40'	H 45.7, W 94 CM	INK, WATER COLOR	DRAFTING CLOTH
151-053-A	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FIRST FLOOR, MILL NO. 10].	1942/12/00	1/4"=1'	H 76.2, W 108 CM	GRAPHITE	TRACING PAPER
151-053-B	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF SECOND FLOOR, MILL NO. 10].	1942/12/00	1/4"=1'	H 76.2, W 108 CM	GRAPHITE	TRACING PAPER
151-053-C	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF THIRD FLOOR, MILL NO. 10].	1942/12/00	1/4"=1'	H 76.2, W 108 CM	GRAPHITE	TRACING PAPER
151-053-D	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FOURTH FLOOR, MILL NO. 10].	1942/12/00	1/4"=1'	H 76.2, W 108 CM	GRAPHITE	TRACING PAPER
151-053-E	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FIFTH FLOOR, MILL NO. 10].	1942/12/00	1/4"=1'	H 76.6, W 108 CM	GRAPHITE	DRAFTING CLOTH
151-053-F	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF SIXTH FLOOR, MILL NO. 10].	1942/12/00	1/4"=1'	H 76.2, W 108 CM	GRAPHITE	TRACING PAPER

151-054-A	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FIRST FLOOR, MILL NO. 11].	1943/01/00	1/4"=1'	H 59.6, W 92.7 CM	GRAPHITE	TRACING PAPER
151-054-B	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF THIRD FLOOR, MILL NO. 11].	1943/01/00	1/4"=1'	H 59.1, W 92.8 CM	GRAPHITE	TRACING PAPER
151-054-C	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF SIXTH FLOOR, MILL NO. 11].	1943/01/00	1/4"=1'	H 59, W 92.7 CM	GRAPHITE	TRACING PAPER
151-055	ATLANTIC RAYON CORP. / LOWELL, MASS. [PLAN OF FOURTH FLOOR, MILL NO. 11].	1943/05/10	1/4"=1'	H 58.2, W 91.5 CM	GRAPHITE	TRACING PAPER
151-056	PLAN OF / DYE HOUSE / TEXTRON INC. ATLANTIC RAYON DIV. / LOWELL, MASS. [MILL NO. 11].	1944/05/17	1/4"=1'	H 53.8, W 69.9 CM	GRAPHITE	DRAFTING CLOTH
151-057	PLAN SHOWING / PROPOSED STREET METAL SHOP ADDITION / FOR / RIGGS & LOMBARD / LOWELL, MASS.	1946/01/06	1"=10'	H 39.5, W 76.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
151-058	COURIER-CITIZEN CO. / HALL ST. LOWELL, MASS. PROPOSED DRY SPRINKLER SYSTEMS / COURIER CITIZEN COMPANY / HALL ST. WAREHOUSE ADDITION / HALL STREET LOWELL, MASS.	1952/01/26	1/8"=1'	H 91.8, W 95 CM	BLUE LINE PRINT	PAPER
151-059	PLAN OF LAND IN LOWELL, MASS. / SHOWING PART OF PARCEL "E" SHOWN ON A PLAN ENTITLED / PLAN OF YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / DATED-JUNE 19, 1939 BY BROOKS, JORDAN & GRAVES / SCALE / SCALE 40 FEET TO AN INCH LOWELL, MASS. E. L. HUSE DEL.	1942/12/29	1"=20'	H 30.4, W 35.2 CM	BLUEPRINT, COLORED INK	PAPER

151-060	PLAN YARD / LAWRENCE MFG. CO.	1939/06/17	1"=40'	H 76.8, W 125.2 CM	GRAPHITE	PAPER
15-11-A	[BROCHURE: TRANSIT SYSTEM PLAN FOR THE CITY OF LOWELL.]	1973/07/00				
15-11-B	[PICTURE AND ARTICLE FROM THE NEW ENGLANDER, FEBRUARY, 1973.]	1973/02/00				
15-11-C	[ARTICLE FROM LOWELL SUN OF JULY 20, 1973 ENTITLED: "RAYTHEON GETS O.K. TO SEEK MONORAIL PLANNING FUNDS.]	1973/07/20				
15-11-D	[ARTICLE FROM LOWELL SUN - 6/11/73 - ENTITLED "VISTA WORKERS TO JOIN URBAN PARK CREW".]	1973/06/11				
15-11-E	[ARTICLE FROM LOWELL SUN - 6/2/74 - ENTITLED "DECISION ON MONORAIL STUDY DUE".]	1974/06/02				
15-11-F	[BLUEPRINT: LOWELL PRT PROJECT - PROVISIONAL BASE ROUTE.]	UNDATED				
15-11-G	[TWO PHOTOGRAPHS OF MILL BUILDINGS AND CANAL.]	UNDATED				
15-12	[BROCHURE: HISTORIC DISTRICTS CITY COMMITTEE - FINAL REPORT.]	1973/00/00				
15-13	[NOTES MADE BY M.G. LEZBERG - 9/12/73 RE: ANTICIPATED ELECTRIC REQUIREMENT FOR MONORAIL.]	1973/09/12				
15-14	[BROCHURE: "BOOTT MILL CULTURAL CENTER COMMUNITY".]	UNDATED				
15-15	[COMPILATION FROM BRUCE CAMPBELL, COMMISSIONER RE: PUBLIC INFORMATION MEETING IN THE CITY OF LOWELL - 11/01/73.]	1973/11/01				

15-16	[BROCHURE: "THE POWER CANALS OF LOWELL, MASSACHUSETTS - 1822 - 1860 - BY LARRY D. LANKTON.]	UNDATED				
15-17	[FORMS FOR SUB-BID.]	UNDATED				
15-18	CITY OF LOWELL, MASS. / OFF-STREET PARKING PROGRAM / WESTERN CANAL / ALTERNATE PARKING PLANS.	1956/12/00	1"=10'	H 28, W 20.5 CM	INK	PAPER
15-18-COPY 1	CITY OF LOWELL, MASS. / OFF-STREET PARKING PROGRAM / WESTERN CANAL / ALTERNATE PARKING PLANS.	1956/12/00	1"=10'	H 28, W 20.5 CM	PHOTOCOPY	PAPER
15-19	WESTERN CANAL BEAUTIFICATION / LOWELL MODEL CITIES / ACRE NEIGHBORHOOD / LOWELL, MASSACHUSETTS / SPECIFICATIONS.	1972/09/00	NONE	H 29, W 23, D 2 CM	INK	PAPER
152-[111]	L. I. D. CO. - MILL # 3 - 4TH FLOOR.	1947/11/00	1"=10'	H 35, W 51.5 CM	GRAPHITE	DRAFTING CLOTH
152-[112]	DIAGRAM OF CONNECTIONS / FIRST MADE FOR GEN-RC-17 (6-100-1200)-A-125 V.	1916/01/21	NONE	H 30.5, W 45.9 CM	BLUEPRINT, COLORED INK	PAPER
152-[113]	ALLEN MACHINE CO. / ERIE, PENNA., U.S.A. / FOUNDATION PLAN / FOR 15" X 24" MILL MACHINE / FOR LOUIS FINE CO..	1919/10/24	1"=1'	H 60.3, W 91.4 CM	BLUEPRINT	PAPER
15-20	[BROCHURE: A STUDY OF THE LOWELL CANAL SYSTEM.]	UNDATED				
152-001	MASSACHUSETTS TURBINES [SECTIONS OF EAST & WEST] / WHEEL PITS.	1852/02/21	1/2" FULL SIZE	H 45.2, W 103 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER

152-002	MASSACHUSETTS COTTON MILLS / SKETCH [PLAN & SECTION] OF PROPOSED IMPROVEMENTS [IN WATERWAYS] AT NO. 1 & NO. 2 MILLS.	1856/01/18	1/8"=1'	H 71, W96.5 CM	INK, COLORED INK	PAPER
152-003-[A]	ARRANGEMENT OF RACK SLIDES FOR THE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / HOLYOKE MACHINE CO. / WORCESTER, MASS. / FOR 48" C HORIZONTAL HERCULES TURBINES [NOS. 2A, 2B, & 2C WHEELS].	1912/03/13	1 1/2"=1'	H 60, W 87.6 CM	BLUEPRINT	PAPER
152-003-[B]	DETAILS OF HEAD GATES. / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. [NOS. 2A, 2B, & 2C WHEELS].	1909/06/22	3/4"=12"	H 72.3, W 100.4 CM	BLUEPRINT	PAPER
152-003-[C]	SURGE TANK & REINFORCEMENT ON FEEDERS FOR 48" C WHEELS. / MASSACHUSETTS COTTON MILLS, LOWELL MASS. [NOS. 2A, 2B, & 2C WHEELS] / HOLYOKE MACHINE CO. WORCESTER, MASS.	1911/03/07	1/4"=1'	H 88.9, W 91.2 CM	BLUEPRINT	PAPER
152-003-[D]	DETAIL OF SLIDING HEAD GATE "C" / MASSACHUSETTS COTTON MILLS. [NOS. 2A, 2B, & 2C WHEELS] / LOWELL, MASS.	1909/12/18	3/4"=1'	H 86.9, W 115.4 CM	BLUEPRINT	PAPER
152-003-[E]	DETAILS [& GENERAL LAYOUT] OF THREE PAIRS OF 48" [TYPE] C / [HORIZONTAL] CYL. GATE HERCULES TURBINES / [FOR THE] MASS. COTTON MILLS [NOS. 2A, 2B, & 2C WHEELS] LOWELL, MASS.	1909/06/30	1/2"& 1"=1'	H 87.4, W 120.6 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER

152-003-[F]	ARRANGEMENT OF FEEDERS AND CASES / FOR THE / MASSACHUSETTS COTTON MILLS [NOS. 2A, 2B, & 2C WHEELS] / LOWELL, MASS.	1909/12/21	1/8" & 1/16"=1'	H 86, W 120 CM	BLUEPRINT	PAPER
152-004	MASSACHUSETTS COTTON MILLS / PLAN [& SECTION] OF ARCHES OVER PENSTOCK.	1852/03/01	1/2"=1'	H 68.5, W 84.4 CM	INK, COLORED INK, GRAPHITE, WATER CLOOR	PAPER
152-005	MASSACHUSETTS TURBINES [SECTIONS OF EAST & WEST] / WHEEL PITS.	1852/02/25	1/2"=1'	H 55.9, W 100.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
152-006	DESIGN FOR A TURBINE [WHEEL] PIT FOR THE PRESCOTT MILL.	1845/05/08	1/2"=1'	H 64.4, W 71.3 CM	INK, GRAPHITE, WATER COLOR	PAPER
152-007	MASSACHUSETTS COTTON MILLS / [PLAN & SECTIONS OF] / WHEEL PITS -FOR TURBINES NOS. 1 & 2 MILLS.	1856/03/24	1/4"=1'	H 76.9, W 130.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
152-008	[PLAN & SECTIONS OF] FOUNDATION FOR ADDITION TO / PRESCOTT SPINNING MILL AT / SOUTHERLY RACE.	1880/05/20	1/2"=1'	H 70.3, W 87.8 CM	INK, WATER COLOR	CLOTH BACKED PAPER
152-009	[PLAN & SECTIONS OF] PRESCOTT SPINNING MILL / FOUNDATION WALLS &C, FOR THE ADDITION [AT SOUTHERLY RACE].	1880/05/20	1/2"=1'	H 66.7, W 73.4 CM	INK, WATER COLOR	DRAFTING CLOTH

152-010	[PLAN & SECTIONS OF] PRESCOTT SPINNING MILL / FOUNDATION WALLS &C FOR THE ADDITION [TO PRESCOTT SPINNING MILL AT SOUTHERLY RACE].	1880/05/20	1/2"=1'	H 76.2, W 95.3 CM	INK, WATER COLOR	DRAFTING CLOTH
152-011-[A]	[PLAN SHOWING GEARING FOR] MASSACHUSETTS COTTON MILLS / 80 INCH TURBINE.	1876/11/00	3/4"=1'	H 79.4, W 59 CM	BLUEPRINT, COLORED INK	PAPER
152-011-[B]	[PLAN SHOWING GEARING FOR] MASSACHUSETTS COTTON MILLS / 80 INCH TURBINE.	1904/10/12	3/4"=1'	H 79.4, W 59 CM	BLUEPRINT	CLOTH BACKED PAPER
152-012	MASSACHUSETTS COTTON MILLS. / WHEELHOUSE FOR THE TEN FOOT TURBINES [NOS. 3, 4, & 5].	1898/02/18	1/4"=1'	H 84.8, W 138.3 CM	INK, WATER COLOR	DRAFTING CLOTH
152-013-[A]	PLAN OF ABUTMENTS FOR NEW / RAILROAD BRIDGE [# 346] OVER EASTERN CANAL / NEAR BRIDGE ST. FOR MASS. COTTON MILLS.	1902/09/06	1/4"=1'	H 66, W 75 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
152-013-[B]	PLAN OF ABUTMENTS FOR NEW RAILROAD / BRIDGE [# 346] OVER EASTERN CANAL NEAR BRIDGE ST. / FOR MASSACHUSETTS COTTON MILLS.	1902/09/06	1/4"=1'	H 65, W 114.6 CM	INK, COLORED INK, GRAPHITE	PAPER
152-014-[A]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1889/05/00	1"=40'	H 78.6, W 112 CM	LITHO, COLORED INK	PAPER
152-014-[B]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1889/05/00	1"=40'	H 73.5, W 106.5 CM	LITHO, COLORED INK	PAPER
152-015	[PLAN SHOWING] MEAN AREAS OF / BUCKET OUTLETS FOR SIX 48" STYLE C / HERCULES WHEELS / FOR / MASSACHUSETTS COTTON MILLS.	1910/03/08	NONE	H 88.1, W 69.3 CM	INK, COLORED INK, GRAPHITE	PAPER

152-016	DIAGRAM SHOWING ESTIMATED / HORSE POWER OF THREE PAIRS OF TYPE "C" HERCULES WHEELS AT / DIFFERENT HEIGHTS OF MERRIMACK RIVER.	1908/03/07	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
152-017	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS [PROPOSED SCHEMES FOR WATER POWER DEVELOPMENT AT MASSACHUSETTS].	SEE NOTES	1"=40'	H 53, W 111.9 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
152-017-[A]	OUTLINE / OF / PROPOSED SCHEME / FOR NEW [POWER DEVELOPMENT] WATER WHEELS FOR / MASSACHUSETTS COTTON MILLS.	1903/01/20	1"=10'	H 68.6, W 72.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-017-[B]	OUTLINE / OF / PROPOSED SCHEME / FOR / NEW [POWER DEVELOPMENT] WATER WHEELS FOR / MASS. COTTON MILLS.	1903/01/24	1"=10'	H 66.7, W 65.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-017-[C]	OUTLINE / OF / PROPOSED SCHEME / FOR / NEW [POWER DEVELOPMENT] WATER WHEELS FOR / MASS. COTTON MILLS.	1907/02/16	1"=10'	H 78, W 97 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-017-[D]	12 FOOT TUBE THROUGH YARD / TO POWER HOUSE, / MASS. COTTON MILLS. LOWELL, MASS.	1909/10/13	1/16"=1'	H 50.6, W 93 CM	BLUEPRINT	PAPER
152-017-[E]	DISTRIBUTION OF POWER / REQUIRED TO DRIVE THE MASSACHUSETTS COTTON MILLS.	1907/03/00	NONE	H 49.8, W 129 CM	BLUEPRINT, COLORED PENCIL	PAPER
152-018-[A]	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS / DRAWN BY WHEELS OF / [THE] MASSACHUSETTS COTTON MILLS / [BOTH MASS. &] PRESCOTT SIDES.	1915/01/25	NONE	H 45.8, W 53.8 CM	INK, COLORED INK	DRAFTING CLOTH

152-018-[A]-[COPY 1]	MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / PRESCOTT SIDE.	1915/01/25	NONE	H 53.4, W 58.5 CM	BLUEPRINT	PAPER
152-018-[A]-[COPY 2]	MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / PRESCOTT SIDE.	1915/01/25	NONE	H 53.4, W 58.5 CM	BLUEPRINT	PAPER
152-018-[A]-[COPY 3]	MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / PRESCOTT SIDE.	1915/01/25	NONE	H 53.4, W 58.5 CM	BLUEPRINT	PAPER
152-018-[A]-[COPY 4]	MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / PRESCOTT SIDE.	1915/01/25	NONE	H 53.4, W 58.5 CM	BLUEPRINT	PAPER
152-018-[A]-[COPY 5]	MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / PRESCOTT SIDE.	1915/01/25	NONE	H 53.4, W 58.5 CM	BLUEPRINT	PAPER
152-018-[B]	MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / PRESCOTT SIDE.	SEE NOTES	NONE	H 45.8, W 53.8 CM	INK, COLORED INK	DRAFTING CLOTH
152-019-[A]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / (MASSACHUSETTS SIDE).	1911/06/01	NONE	H 56.5, W 58.2 CM	INK, COLORED INK	DRAFTING CLOTH
152-019-[A]-[COPY 1]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / (MASSACHUSETTS SIDE).	1915/01/22	NONE	H 56.2, W 58.3 CM	BLUEPRINT	PAPER
152-019-[A]-[COPY 2]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / (MASSACHUSETTS SIDE).	1915/01/22	NONE	H 56.2, W 58.8 CM	BLUEPRINT	PAPER
152-019-[B]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MASS. COTTON MILLS / (MASSACHUSETTS SIDE).	1915/01/22	NONE	H 56.5, W 58.2 CM	INK, COLORED INK	DRAFTING CLOTH

152-019-[B]-[COPY 1]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MASS. COTTON MILLS / (MASSACHUSETTS SIDE).	1915/01/22	NONE	H 56, W 57.2 CM	BLUEPRINT	PAPER
152-019-[B]-[COPY 2]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MASS. COTTON MILLS / (MASSACHUSETTS SIDE).	1915/01/22	NONE	H 56.2, W 58.8 CM	BLUEPRINT	PAPER
152-019-[B]-[COPY 3]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MASS. COTTON MILLS / (MASSACHUSETTS SIDE).	1915/01/22	NONE	H 56, W 58.8 CM	BLUEPRINT	PAPER
152-019-[C]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / (MASSACHUSETTS SIDE).	1911/06/01	NONE	H 56, W 57.2 CM	INK, COLORED INK	DRAFTING CLOTH
152-019-[C]-[COPY 1]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / (MASSACHUSETTS SIDE).	1911/06/01	NONE	H 56, W 57.2 CM	BLUEPRINT	PAPER
152-019-[D]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / (MASSACHUSETTS SIDE).	1911/06/01	NONE	H 56.5, W 58.2 CM	INK, COLORED INK	DRAFTING CLOTH
152-020-[A]	ARRANGEMENT OF / PORTABLE TEST PITOMETER / AT / NO. 2A WHEEL PENSTOCK. / MASSACHUSETTS COTTON MILLS.	1911/08/00	NONE	H 20.4, W 24 CM	INK	DRAFTING CLOTH
152-020-[B]	MASSACHUSETTS COTTON MILLS [NO. 2A WHEEL PENSTOCK] / [DIAGRAMS SHOWING POSITION &] DETERMINATION OF PIPE COEFFICIENT FOR PORTABLE PITOMETER.	1911/09/05	NONE	H 29.3, W 45.3 CM	INK	PAPER
152-020-[C]	MASSACHUSETTS COTTON MILLS / DETERMINATION OF PIPE COEFFICIENT FOR SPECIAL PITOMETER [FOR # 2A-B-C WHEELS].	1911/08/15	NONE	H 29.3, W 45.3 CM	INK	PAPER

152-020-[D]	MASSACHUSETTS COTTON MILLS / DETERMINATION OF PIPE COEFFICIENT FOR SPECIAL PITOMETER [FOR # 2A-B-C WHEELS].	1911/09/13	NONE	H 29.3, W 45.3 CM	INK	PAPER
152-020-[E]	MASSACHUSETTS COTTON MILLS / DETERMINATION OF PIPE COEFFICIENT FOR PORTABLE PITOMETER [FOR # 2A-B-C WHEELS].	1911/09/18	NONE	H 29.3, W 45.3 CM	INK	PAPER
152-020-[F]	SPECIAL / PORTABLE TEST PITOMETER MEASUREMENT AT / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.,TO / DETERMINE PIPE COEFFICIENT IN NO. 2A WHEEL PENSTOCK.	SEE NOTES	NONE	H 39.4, W 57.8 CM	INK, COLORED INK	DRAFTING CLOTH
152-021	[DIAGRAM SHOWING] / MASSACHUSETTS COTTON MILLS / SLOPES IN 2A, 2B & 2C WATERWAYS, FROM UPPER CANAL TO MERRIMACK RIVER.	1911/06/14	NONE	H 53.3, W 84 CM	INK	PAPER
152-022	[PLAN SHOWING] LOCATION OF PROPOSED RACKS / MASS COTTON MILLS LOWELL, MASS.	1913/03/24	3/8"=1'	H 84.9, W 82 CM	BLUEPRINT, GRAPHITE, COLORED PENCIL	PAPER
152-023-[A]-[COPY 1]	OUTLINE / OF / PROPOSED SCHEME FOR / NEW WATER WHEELS FOR MASS. COTTON MILLS / SCHEME A.	1903/01/20	1"=10'	H 68, W 72 CM	BLUEPRINT, WATER COLOR	PAPER
152-023-[A]-[COPY 2]	OUTLINE / OF / PROPOSED SCHEME FOR / NEW WATER WHEELS FOR MASS. COTTON MILLS / SCHEME A.	1903/01/20	1"=10'	H 68, W 72 CM	BLUEPRINT, WATER COLOR	PAPER
152-023-[B]-[COPY 1]	OUTLINE / OF / PROPOSED SCHEME FOR / NEW WATER WHEELS FOR MASS. COTTON MILLS / SCHEME B.	1903/01/24	1"=10'	H 68, W 72 CM	BLUEPRINT, WATER COLOR	PAPER

152-023-[B]-[COPY 2]	OUTLINE / OF / PROPOSED SCHEME FOR / NEW WATER WHEELS FOR MASS. COTTON MILLS / SCHEME B.	1903/01/24	1"=10'	H 66, W 63.5 CM	BLUEPRINT, WATER COLOR	PAPER
152-024	MASSACHUSETTS COTTON MILLS / WHEEL PITS / FOR TURBINES FOR NOS. 1 & 2.	1856/03/28	1/4"=1'	H 66.3, W 62.2 CM	INK	DRAFTING CLOTH
152-025-[A]	MASSACHUSETTTS COTTON MILLS. / SKETCH SHOWING POSSIBLE LOCATION OF / DRAFT TUBE IN CONCORD RIVER FOR / HYDRO-ELECTRIC UNIT IN SECTION NO. 8.	1917/03/08	1/4"=1'	H 31.6, W 60.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
152-025-[B]	PRESCOTT SIDE / MASSACHUSETTS COTTON MILLS / SKETCH SHOWING POSSIBLE LOCATION OF DRAFT TUBE IN CONCORD RIVER FOR / HYDRO-ELECTRIC UNIT-REAR OF SPINNING MILL.	1917/03/06	1/4"=1'	H 35.8, W 73.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
152-025-[C]	SKETCH SHOWING PRESENT CONDITIONS / & PROPOSED NEW VERTICAL 42" TYPE "D" HERCULES WHEEL / IN / SECTION-8 OF MASSACHUSETTS COTTON MILLS.	1917/08/27	1"=10'	H 59.6, W 63 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-026	DIAGRAM / SHOWING LOSSES AT MASS. [COTTON MILLS] NOS. 4, 5, 6 WHEELS / FROM / EASTERN CANAL TO CONCORD RIVER.	1918/12/31	NONE	H 40.8, W 60.4 CM	INK	DRAFTING CLOTH
152-026-[COPY 1]	DIAGRAM / SHOWING LOSSES AT MASS. [COTTON MILLS] NOS. 4, 5, 6 WHEELS / FROM / EASTERN CANAL TO CONCORD RIVER.	1918/12/31	NONE	H 40.6, W 60 CM	BLUEPRINT, COLORED INK	PAPER

152-027	GENERAL PLAN & DATA / [FOR] PRESCOTT [SIDE, MASSACHUSETTS] MILLS NOS. 1, 2, & 3 WHEELS [33" TYPE D, HERCULES] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/00	1"=40',1"=10'	H 71.7, W 106 CM	INK, COLORED INK, COLORED PENCIL	TRACING PAPER
152-028	GENERAL PLAN & DATA / MASSACHUSETTS MILLS NOS. 4, 5, & 6 WATERWHEELS [42" TYPE D, HERCULES] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/01/00	1"=10'& 40'	H 73.2, W 108.1 CM	GRAPHITE	PAPER
152-028-[COPY 1]	GENERAL PLAN & DATA / MASSACHUSETTS MILLS NOS. 4, 5, & 6 WATERWHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/01/00	1"=10'& 40'	H 71.7, W 106 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
152-029	MASSACHUSETTS COTTON MILLS / WHEELPITS / FOR TURBINES FOR NOS. 1 & 2.	1917/03/23	1/4"=1'	H 61.9, W 62 CM	BLUEPRINT	PAPER
152-030	[DIAGRAM SHOWING] CURRENT METER MEASUREMENTS / AT / MASSACHUSETTS [COTTON MILLS] 4, 5, & 6 RACES.	1919/01/23	NONE	H 29.2, W 45.8 CM	INK	PAPER
152-031	[PLAN SHOWING] WHEEL SETTING-[FOR] 42"-D-HERCULES / MASSACHUSETTS COTTON MILLS / PROP'S OF LOCKS & CANALS / LOWELL, MASS.	1918/03/28	1/4"=1'	H 64.9, W 79.4 CM	INK, COLORED INK	DRAFTING CLOTH
152-032	GENERAL LAYOUT / PRESCOTT WATERWAYS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/07/27	1"=10'	H 73.2, W 79.4 CM	INK, COLORED INK	DRAFTING CLOTH
152-033-[A]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENTS / AT / 4, 5, & 6 RACES [OF MASSACHUSETTS COTTON MILLS].	1919/01/16	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER

152-033-[B]	[DIAGRAMS SHOWING] CURRENT METER MEASUREMENTS / AT / 4, 5, & 6 RACES [OF MASSACHUSETTS COTTON MILLS].	1919/01/16	NONE	H 29.2, W 45.8 CM	INK	PAPER
152-033-[B]-[COPY 1]	CURRENT METER MEASUREMENTS / AT / MASSACHUSETTS 5 & 6 RACES.	1919/01/16	NONE	H 29.2, W 45.8 CM	BLUEPRINT	PAPER
152-034	MASSACHUSETTS COTTON MILLS. / [PLAN & SECTION OF] WHEEL HOUSE FOR THE 10' TURBINES. [NOS. 3, 4,& 5.]	SEE NOTES	1/4"=1'	H 76.3, W 137.3 CM	BLUEPRINT	PAPER
152-035	[DIAGRAM SHOWING PERMANENT &] SURPLUS MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS COTTON MILLS / AND / PRESCOTT MILLS.	1919/05/09	NONE	H 53.4, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
152-036	[DIAGRAM SHOWING] PERMANENT [& SURPLUS] MILL POWERS / DRAWN BY WHEELS OF / MASSACHUSETTS [AND PRESCOTT] COTTON MILLS.	1919/05/09	NONE	H 53.4, W 58.2 CM	INK, COLORED INK	DRAFTING CLOTH
152-039-A	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS, / LOWELL, MASS. / HEIGHT OF BOOTT RIVER GAUGE VS. MASSCAHUSETTS LIMITATION.	1918/02/07	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
152-039-B	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS, / LOWELL, MASS. / HEIGHT OF BOOTT RIVER GAUGE VS. MASSACHUSETTS LIMITATION.	1917/03/02	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER

152-039-C	MASSACHUSETTS COTTON MILLS / [DIAGRAM SHOWING] BALANCED OUTSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/06/16	NONE	H 21.5, W 28 CM	INK, COLORED INK, GRAPHITE	PAPER
152-039-D	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATION / FOR / MASSACHUSETTS COMPANY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/03/10	NONE	H 29.2, W 46 CM	INK, COLORED INK	PAPER
152-039-E	MASSACHUSETTS COTTON MILLS / [DIAGRAM SHOWING] RELATION [OF] OUTSIDE TO INSIDE FALL [OF WHEELS OF MASSACHUSETTS COTTON MILLS (E-7, 8, 9, 10,& 11), (F-1, 2, & 3), (C-4, 5, & 6)] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1920/06/07	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
152-039-F	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / RELATION OF OUTSIDE TO INSIDE FALL [OF WHEELS (E-7, 8, 9, 10, & 11), (F-1, 2, & 3), (C-4, 5, & 6)] / PROPRIETORS OF LOCKS & CANALS.	1920/05/20	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
152-039-G	MASSACHUSETTS COTTON MILLS / [DIAGRAM SHOWING] RELATION OF OUTSIDE TO INSIDE FALL [OF WHEELS (E-7, 8, 9, 10, & 11), (F-1, 2,& 3), (C-4, 5,& 6)] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/21	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER

152-039-H	[DIAGRAM SHOWING] DAY USE POWER-DURATION DIAGRAM / [OF] MASSACHUSETTS COTTON MILLS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/12	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
152-039-I	MASSACHUSETTS COTTON MILLS / [DIAGRAM SHOWING] EFFICIENCY CURVES / OF / WATER WHEELS [NOS. 1 TO 11 OF MASS. COTTON MILLS].	1920/06/00	NONE	H 29.2, W 46 CM	INK	PAPER
152-039-J	MASSACHUSETTS COTTON MILLS / [DIAGRAM SHOWING] EFFICIENCY CURVES / OF / NO. 12 WATERWHEEL / [OF MASSACHUSETTS COTTON MILLS, A] 46 1/2" TYPE "S"-S. MORGAN SMITH.	UNDATED	NONE	H 29.2, W 46 CM	INK	PAPER
152-039-K	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEEL NO.12 / 46 1/2" "TYPE "S" [S. MORGAN SMITH.]	1921/04/00	NONE	H 11 1/2", W 17 7/8"	INK, COLORED INK	PAPER
152-039-K-[COPY 1]	MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEEL NO.12 / 46 1/2" "TYPE "S".	1921/04/00	NONE	H 11 1/2", W 17 7/8"	BLUEPRINT	PAPER
152-039-L	[DIAGRAM SHOWING] MASS. COTTON MILLS / DISCHARGE OF / WHEELS NOS. 4, 5, & 6 / R. H. 42" TYPE D, HERCULES WHEELS [INSTALLED 1918-1919].	SEE NOTES	NONE	H 11 1/2",W 16"	COLORED INK	PAPER
152-039-L-[COPY 1]	MASS. COTTON MILLS / DISCHARGE OF / WHEELS NOS. 4, 5, & 6 / RH 42" TYPE D, HERCULES WHEELS.	SEE NOTES	NONE	H 11 1/2",W 16"	BLUEPRINT	PAPER

152-039-M	[DIAGRAM SHOWING MASS. COTTON MILLS] PRESCOTT MILLS / DISCHARGE OF / WHEELS NO. 1, 2 OR 3 [CROSSED OUT AND REPLACED BY] 7, 8, 9, 10, 11 / 33 INCH R. H. TYPE "D" HERCULES.	SEE NOTES	NONE	H 11 1/2", W 18"	COLORED INK	PAPER
152-039-M-[COPY 1]	PRESCOTT MILLS / DISCHARGE OF / WHEELS NO. 1, 2 OR 3 [CROSSED OUT AND REPLACED BY] 7, 8, 9, 10, 11 / 33 INCH R. H. TYPE "D" HERCULES.	SEE NOTES	NONE	H 11 1/2", W 17"	BLUEPRINT	PAPER
152-039-N	[DIAGRAM SHOWING] POWER CURVES / [OF] PRESCOTT WHEELS 7, 8, & 9 / 33" TYPE "D" HERCULES / HOLYOKE TEST VS. ACTUAL OUTPUT.	1920/01/02	NONE	H 30.5, W 21.5 CM	INK	PAPER
152-039-O	[DIAGRAM SHOWING DISCHARGE OF] NO. 6, 7 & 8 WHEELS / PRESCOTT MILLS / 33" R.H. TYPE D-HERCULES WHEELS.	1919/10/27	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
152-039-P	[DIAGRAM SHOWING] WATER WHEEL OUTPUT / [OF] MASSACHUSETTS COTTON MILLS / WATER WHEELS / POWER TEST OF JUNE 15,1920.	1920/06/00	NONE	H 29.2, W 46 CM	INK	PAPER
152-039-Q	COMPARISON OF OUTPUT MASS. # 1,# 2 & # 3, SECTION 8, & PRESCOTT / WATER WHEELS / POWER TEST OF JUNE 15,1920.	1920/06/00	NONE	H 29.2, W 46 CM	INK	PAPER
152-039-R	[NOT SPECIFICALLY TITLED.] [SLOPES IN WATERWAYS OF MASSACHUSETTS COTTON MILLS.]	1921/06/03	NONE	H 29.2, W 46 CM	INK	PAPER
152-039-S	MILLPOWER[S] DIAGRAM / FOR / MASS. COTTON MILLS [DRAWN BY] NO.12 WHEEL (46 1/2" TYPE S, S. MORGAN SMITH).	1921/05/28	NONE	H 33, W 51 CM	INK, COLORED INK	DRAFTING CLOTH

152-039-T	MASS. COTTON MILLS / [DIAGRAMS OF] CURVES SHOWING / K. W. PER SURPLUS MILL-POWER / VS. / MERRIMACK RIVER GAUGE.	1912/12/14	NONE	H 29.2, W 46 CM	INK	PAPER
152-039-U	PLAN SHOWING / SOUTHERLY BOUNDARY / OF / MERRIMACK RIVER / ADJACENT TO MASSACHUSETTS COTTON MILLS.	1928/10/02	1"=100'	H 24.8, W 36.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-039-V	SKETCH SHOWING / PORTION OF PEPPERELL MFG. CO. / ALONG MERRIMACK RIVER BETWEEN / BRIDGE ST. & CONCORD RIVER.	1928/08/28	1/4"=10'	H 27.7, W 67 CM	INK, WATER COLOR	DRAFTING CLOTH
152-039-W	COPY OF PLAN WHICH ACCOMPANIES INDENTURE OF MARCH 1,1839 / BETWEEN THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / & MASS. COTTON MILLS.	1928/11/07	1/8"=10'	H 33.5, W 44.5 CM	INK, WATER COLOR	DRAFTING CLOTH
152-040	FRAMING PLAN OF FLUME FOR MASS. [COTTON MILLS] 72" TURBINE / WHEEL NO. 7.	1898/09/24	1/2"=1'	H 53.4, W 58.5 CM	BLUEPRINT	PAPER
152-042	MASS. COTTON MILLS / PLAN [& SECTION] OF WATERWAYS / IN VICINITY OF NO. 12 / WHEEL / SHOWING DRAINAGE FROM OVERFLOW.	1921/05/25	1"=10'	H 36.8, W 76.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-042-[COPY 1]	MASS. COTTON MILLS / PLAN OF WATERWAYS / IN VICINITY OF NO. 12 WHEEL / SHOWING DRAINAGE FROM OVERFLOW. SECTION ON LINE A-B / SHOWING METHOD OF TAKING CARE OF SURGE OVERFLOW / FROM NO.12	1921/05/25	1"=10'	H 36.8, W 76.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
152-043	UNIT, MASSACHUSETTS COTTON MILLS.	1921/06/01	1"=10'	H 17.4, W 57.2 CM	INK, COLORED INK	DRAFTING CLOTH

152-043-[COPY 1]	SECTION ON LINE A-B / SHOWING METHOD OF TAKING CARE OF SURGE OVERFLOW / FROM NO.12 UNIT, MASSACHUSETTS COTTON MILLS.	1921/06/01	1"=10'	H 17.4, W 57 CM	BLUEPRINT, COLORED PENCIL	PAPER
152-044-[COPY 1]	[PLAN SHOWING] MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / LOCATION [OF THE] UNDERGROUND FEEDERS [IN MASSACHUSETTS COTTON MILLS].	1921/02/05	1"=200'	H 50.5, W 73.8 CM	BLUEPRINT	PAPER
152-044-[COPY 2]	[PLAN SHOWING] MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / LOCATION [OF THE] UNDERGROUND FEEDERS [IN MASSACHUSETTS COTTON MILLS].	1921/02/05	1"=200'	H 53.5, W 76.2 CM	BLUEPRINT	PAPER
152-045	[PERMANENT & SURPLUS] MILL POWER DIAGRAM / FOR / MASS. COTTON MILLS [DRAWN BY] NO.12 WHEEL [OF MASSACHUSETTS COTTON MILLS].	1921/12/05	NONE	H 35.6, W 51.2 CM	INK, COLORED INK	DRAFTING CLOTH
152-046	HYDRO-ELECTRIC UNIT [# 12 46 1/2" TYPE S. S. MORGAN SMITH] MASSACHUSETTS COTTON MILLS.	1922/02/00	1/10"=1'	H 49.3, W 71.2 CM	INK, WATER COLOR	PAPER
152-047	[PLAN SHOWING] PROPOSED CHANGES / IN CONCORD RIVER / BELOW E. MERRIMACK ST.	1922/03/17	1"=40'	H 51, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
152-048	[PLAN SHOWING] PROPOSED CHANGES / IN CONCORD RIVER / BELOW E. MERRIMACK ST.	1922/03/17	1"=40'	H 51, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
152-049	[PLAN SHOWING] PROPOSED CHANGES / IN CONCORD RIVER / BELOW E. MERRIMACK ST.	1922/03/17	1"=40'	H 51, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
152-050	MASSACHUSETTS MILLS / PRESCOTT PENSTOCK REPAIRS.	1921/03/16	1"=10'& 1"=4'	H 53, W 83 CM	BLUEPRINT	PAPER

152-051	[DRAWING SHOWING] PRESENT POWER LAYOUT / AT THE / MASSACHUSETTS COTTON MILLS.	1923/03/08	1"=60'	H 48.4, W 78.2 CM	INK, WATER COLOR	DRAFTING CLOTH
152-052	[DRAWING SHOWING] POWER LAYOUT IN 1889 / AT THE / MASSACHUSETTS COTTON MILLS.	1923/03/12	1"=40'	H 63.5, W 97.9 CM	INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
152-053	SKETCH OF RIVER WALL / PRESCOTT POWER HOUSE / SHOWING WASHOUT UNDER [RIVER] WALL [-PRESCOTT POWER HOUSE].	1923/09/04	1"=10'& 4'	H 47, W 65.5 CM	TRACING PAPER	TRACING PAPER
152-054	PLAN & SECTION / SHOWING / NEW FOREBAY & FEEDERS / MASS. COTTON MILLS / LOWELL, MASS.	1909/09/09	1/8",1/4" & 3/8"=1'	H 91.8, W 129.6 CM	BLUEPRINT	PAPER
152-055	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER [AND POSSIBLE LOCATION OF POWER PLANTS].	1919/01/00	1"=40'	H 79, W 112 CM	RED LINE PRINT, COLORED INK, COLORED PENCIL	CLOTH BACKED PAPER
152-056	[PLAN SHOWING PRESCOTT MILL & CANAL LINE PREVIOUS TO 1844.]	1925/08/03	1"=50'			
152-057	[TRACING OF] PLAN ACCOMPANYING DEED / FROM L. & C. / TO PRESCOTT MFG. CO.	1845/08/29	1"=60'	H 43.3, W 27 CM	INK	DRAFTING CLOTH
152-058-[COPY 1]	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO / MASSACHUSETTS COTTON MILLS.	SEE NOTES	NONE	H 46.3, W 61 CM	BLUEPRINT	PAPER
152-058-[COPY 2]	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO / MASSACHUSETTS COTTON MILLS.	SEE NOTES	1"=20'	H 46.3, W 61 CM	BLUEPRINT	PAPER

152-059	PLAN OF LAND / DEEDED TO PROPS. LOCKS & CANALS / BY / MASSACHUSETTS COTTON MILLS INC.	1927/01/25	1"=20'	H 26.8, W 41.7 CM	INK, WATER COLOR	DRAFTING CLOTH
152-060	SCHEMES FOR / PROPOSED STREET / THROUGH / PRESCOTT, IPSWICH & MIDDLESEX / MILL YARDS.	1926/03/16	1"=100'	H 49.6, W 60.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-061	[PROPOSED STREET THROUGH PRESCOTT & IPSWICH YARDS.]	1926/02/25	1"=40'	H 42.3, W 65.8	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
152-062	PROPOSED STREET / THROUGH / PRESCOTT & IPSWICH / MILL YARDS.	1926/03/06	1"=40'	H 57.3, W 67.4 CM	INK, COLORED INK	DRAFTING CLOTH
152-063	LOWELL GAS LIGHT CO. / LOWELL, MASS. / PROPOSED PLATFORM OVER [EASTERN] CANAL, LOCATED AT PRESCOTT MILL WEAVING BUILDING.	1927/01/21	1/4"=1'	H 21, W 27 CM	BLUEPRINT	PAPER
152-064	PLAN OF LAND IN LOWELL, MASS. / SURVEYED [BY BROOKS, JORDAN & GRAVES OF PRESCOTT YARD] FOR THE / LOWELL GAS LIGHT COMPANY [SHOWING 10' STRIP OVER CANAL].	1927/01/11	1"=20'	H 45.7, W 61 CM	BLUEPRINT	PAPER
152-065	[COMPOSITE BLUEPRINT SHOWING] PLAN OF LAND [& OTHER INFORMATION] IN LOWELL [SURVEY OF ENTIRE PRESCOTT MILL YARD] SURVEYED [BY BROOKS, JORDAN & GRAVES] FOR THE / LOWELL GAS LIGHT COMPANY.	1927/05/00	1"=20'	H 57.8, W 76.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

152-066	PLAN SHOWING / LOCATION OF [WORK DONE ON] LEAKS / IN / CELLAR OF CLOTH ROOM BLDG. / MASS. COTTON MILLS [INC.].	1927/05/28	1"=10'	H 66, W 73.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-067	PLAN SHOWING / ELEVATIONS AROUND FORMER WASTE HOUSE / IN PRESCOTT YARD.	1927/06/00	1"=20'	H 48.6, W 42.4 CM	INK	DRAFTING CLOTH
152-068	LOWELL GAS LIGHT CO. / LOWELL, MASS. / PROPOSED PLATFORM EXTENDING OVER CANAL, LOCATED AT [OLD] PRESCOTT MILL WEAVING BUILDING.	1927/01/21	1/4"=1'	H 21, W 27 CM	BLUEPRINT	PAPER
152-069	[PLAN SHOWING SUB-SURFACE CONDITIONS AT PROPOSED HOTEL SITE IN PRESCOTT YARD. BROOKS, JORDAN, & GRAVES.]	1928/05/00	1/8"=1'			
152-070	[COPY OF PLAN SHOWING] TREASURY DEPARTMENT / OFFICE OF SUPERVISING ARCHITECT / TENTATIVE DRAWINGS / [LOCATION OF NEW] UNITED STATES POST OFFICE [BUILDING ON E. MERRIMACK ST.] / LOWELL, MASS.	1929/06/12	1/16"=1'	H 50.9, W 75 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-071	PLAN OF LAND IN LOWELL, MASS., BELONGING TO THE / PEPPERELL MANUFACTURING COMPANY [SHOWING SURVEY OF POST OFFICE SITE BY BROOKS, JORDAN & GRAVES, NOV. 1928, WITH ADDITIONS SHOWING L. & C. FIVE-FOOT STRIP ON EASTERN CANAL].	1928/12/00	1"=20'	H 46, W 61 CM	INK	DRAFTING CLOTH

152-072	[COPY OF] PLAN [AT REGISTRY] OF LAND IN LOWELL, MASS., / BELONGING TO THE / MASSACHUSETTS COTTON MILLS [IN 1890].	SEE NOTES	1"=40'	H 36.3, W 49.5 CM	INK	DRAFTING CLOTH
152-073	[PLAN SHOWING LAND OF] MASSACHUSETTS COTTON MILLS [ON EAST MERRIMACK ST. FROM CANAL STREET TO CONCORD RIVER] LOWELL, MASS.	1910/02/18	1"=8'	H 78, W 13.1 CM	INK, COLORED INK	DRAFTING CLOTH
152-074	PLAN SHOWING LOCATION / OF / LEAKS NEAR SECTION 8 PENSTOCKS.	1929/09/09	1"=10'	H 35.3, W 48.4 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
152-075	DIAGRAMATIC SKETCH OF ELECTRICAL LAYOUT / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1930/02/27	NONE	H 20.5, W 28 CM	INK	DRAFTING CLOTH
152-076	MASS. MILLS / LOWELL INDUSTRIAL DEV. CO. / PROPOSED COAL TRACK / 2 SCHEMES.	1930/00/00	1"=20'	H 50, W 69.9 CM	BLUEPRINT	PAPER
152-077	WIRING IN MAIN POWER HOUSE / LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING LOCATION OF FUSES & SWITCHES OTHER THAN THOSE IN INSTRUMENT & CONTROL CIRCUITS.	1930/06/25	NONE	H 51.8, W 70.5 CM	INK	DRAFTING CLOTH
152-077-[COPY 1]	WIRING IN MAIN POWER HOUSE / LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING LOCATION OF FUSES & SWITCHES OTHER THAN THOSE IN INSTRUMENT & CONTROL CIRCUITS.	1930/06/25	NONE	H 51.8, W 70 CM	BLUEPRINT	PAPER

152-078	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS. [PROPOSED ELECTRICAL TIE FROM MASS. TO BOOTT MILLS.]	1912/07/00	1"=250'	H 86.7, W 105.8 CM	LITHOGRAPH, COLORED INK, WATER COLOR, GRAPHITE	PAPER
152-079	PORTIONS OF / MASS. MILLS RIVER PO[WER HOUSE] / OF THE LOWELL INDUSTR[IAL DEVELOPMENT CO.]	UNDATED	1/2"=1'	H 68 CM, W 172.2 CM	INK, COLORED INK, GRAPHITE	PAPER
152-080	LOWELL INDUSTRIAL DEVELOPMENT / CO. / LOWELL, MASS. / POWER TIE LINE[S] TO BOOTT MILLS / CONNECTIONS BETWEEN / OPEN CABLES & 3 CONDUCTOR CABLES.	1930/04/10	1"=12"	H 73, W 100.4 CM	BLUEPRINT	PAPER
152-081	LOWELL INDUSTRIAL DEVELOPMENT / COMPANY / LOWELL, MASS. / POWER TIE LINE FROM MASS. / MILLS-CONNECTION TO BUS AT BOOTT MILLS.	1930/04/26	1/8"& 1/16"=1'	H 85.5, W 119.8 CM	BLUEPRINT	PAPER
152-082	PROPOSED SCHEME FOR CONNECTING / MERRIMACK, BOOTT & LOWELL IND. DEV. CO.	UNDATED	NONE	H 40.6, W 51.3 CM	LITHOGRAPH, WATER COLOR	PAPER
152-083	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS. [PROPOSED SCHEME WITH VOLTAGE LINES FOR CONNECTING MERRIMACK & BOOTT MILLS TO L.I.D. CO.]	1912/07/00	1"=250'	H 86.7, W 105.8 CM	LITHOGRAPH, COLORED INK, WATER COLOR	PAPER

152-084	[LIGHTNING CABLES & INCIDENTAL POWER LINES] PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1928/09/00	1"=40'	H 76, W 110 CM	BLUEPRINT, COLORED INK	PAPER
152-085	SWITCHBOARD PANELING / INDICATING CONNECTION OF SWITCHES [IN MAIN POWER HOUSE] / LOWELL INDUSTRIAL DEVELOPMENT CO. / MAIN POWER HOUSE.	1930/06/30	NONE	H 51, W 80 CM	INK	DRAFTING CLOTH
152-086	PLAN OF / BRIDGE ST. SHOWING / PROPOSED TUNNEL / BETWEEN / L. I. D. CO. / & BOOTT MILLS.	1930/06/00	1"=10',1/4"=1'	H 74.3, W 105.5 CM	INK, COLORED PENCIL, GRAPHITE, COLORED INK	DRAFTING CLOTH
152-087	PLAN & SECTIONAL ELEVATIONS / OF / SLASHER BUILDING[S] / OF / SLASHER BUILDING[S] / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/04/29	1"=10'	H 54, W 73.8 CM	INK, COLORED PENCIL	PLAN, SECTION PLAN
152-088-A	SKETCH SHOWING / CHANGES ON FIRST FLOOR OF / CLOTH ROOM ADDITION / AT THE / MASSACHUSETTS MILL OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / FOR CHARLES A. HOMER.	1930/05/08	1"=20'	H 18.4, W 27.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-088-B	SKETCH SHOWING / CONSTRUCTION WORK FOR M. G. WRIGHT & CO. / ON SECOND FLOOR OF CLOTH ROOM BUILDING MASSACHUSETTS.	1930/04/14	1"=40'	H 21.5, W 27.7 CM	INK, WATER COLOR	DRAFTING CLOTH

152-088-C	SKETCH SHOWING / CONSTRUCTION WORK FOR TENANTS / AT / MASSACHUSETTS MILLS / OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/04/10	1"=40'	H 21.7, W 28 CM	INK	DRAFTING CLOTH
152-088-D	PLAN SHOWING / CERTAIN BUILDINGS OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/03/21	1"=40'	H 21.5, W 26.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-088-E	PLAN [&] ELEVATION OF BRIDGE ST.	UNDATED	1"=20'& 40'	H 27.6, W 22 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-088-F	[PLAN SHOWING CROSS] SECTION THROUGH PROPOSED TUNNEL [BETWEEN SLASHER BLDG. & BOOTT MILLS].	UNDATED	1"=10'	H 28, W 22 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-088-G	SKETCH SHOWING / CHANGES IN FIRST FLOOR OF / WASTE HOUSE / AT THE / MASSACHUSETTS MILLS / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / FOR WALLACE V. ADAMS.	1930/04/30	1"=20'	H 19.4, W 28.5 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
152-088-H	PLAN SHOWING / ALTERATIONS [OF REPAIR SHOP MADE] FOR JOHN G. DONAHUE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/07/00	1"=10'	H 25.3, W 26.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-089	[PLAN SHOWING] LOCATION OF DRAINAGE SYSTEM / IN CLOTH ROOM ADDITION / MASSACHUSETTS MILLS, LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/05/09	1/8"=1'	H 31.8, W 71 CM	INK, COLORED INK	DRAFTING CLOTH
152-090	PLAN SHOWING PROPOSED ELECTRICAL TIE / FROM / MASSACHUSETTS TO BOOTT MILLS.	1930/03/17	1"=40'	H 25.6, W 60 CM	INK, COLORED PENCIL	DRAFTING CLOTH

152-091	[PLAN SHOWING THE] DISTRIBUTION OF POWER. / BASED ON H. P. RATINGS OF MOTORS INSTALLED. / MASSACHUSETTS COTTON MILLS / LOWELL-MASS.	1922/09/01	NONE	H 33, W 67 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
152-092	[PLAN SHOWING A] PORTION OF "MASSACHUSETTS MILLS" / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/03/04	1"=20'	H 50.9, W 71.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
152-093	[PLAN SHOWING THE] LOCATION OF THE STEAM PIPES / IN CLOTH ROOM ADDITION / MASSACHUSETTS MILLS, LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/05/09	1/8"=1'	H 31.8, W 70.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
152-094-[A]-[COPY 1]	SWITCHBOARD / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS. [BLUEPRINT SHOWING SWITCHBOARD WIRING, BOOTT TO "MASSACHUSETTS MILLS" TIE.]	1930/04/18	NONE	H 30.8, W 45.1 CM	BLUEPRINT	PAPER
152-094-[A]-[COPY 2]	SWITCHBOARD / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS. [BLUEPRINT SHOWING SWITCHBOARD WIRING, BOOTT TO "MASSACHUSETTS MILLS" TIE.]	1930/04/18	NONE	H 30.8, W 45.1 CM	BLUEPRINT	PAPER
152-094-[B]	SWITCHBOARD WIRING.	1930/04/15	NONE	H 30.8, W 45.1 CM	BLUEPRINT	PAPER
152-096	[PLAN SHOWING PROPERTY LINE ON CANAL ST. BETWEEN PEPPERELL MFG. CO. STOREHOUSE & L.& C. PROPERTY.]	1930/03/00				

152-097	ALTERATIONS TO NAPPING BLDG. [& SECTION 8 WHEN SECTION 12 WAS TORN DOWN] / PEPPERELL MFG. CO. / LOWELL, MASS. / JOHN A. STEVENS, ENGR. / LOWELL, MASS.	1929/04/04	1/4"=1'	H 75.3, W 42 CM	BLUEPRINT	PAPER
152-098	ALTERATIONS TO [NAPPING BLDG. &] SEC. 8 [WHEN SECTION 12 WAS TORN DOWN] / PEPPERELL, MFG. CO. / PROPOSED COAL TRACK / 2 SCHEMES.	1929/04/04	1/8"=1'	H 61.4, W 76.2 CM	BLUEPRINT	PAPER
152-099	[SKETCH SHOWING] PEPPERELL MFG. CO. / LOWELL, MASS. / PROPOSED CHANGES [INVOLVED IN L. I. D. YARD] FOR BRIDGE ST. WIDENING.	1929/09/18	1"=20'	H 43, W 76.2 CM	BLUEPRINT	PAPER
15-21	[ARTICLE FROM THE LOWELL SUN - 1/22/74 - "URBAN PARK PROJECT WINS PRIZE FOR DESIGN'.]	1974/01/22				
152-100	[SKETCH SHOWING] PEPPERELL MFG. CO. / LOWELL, MASS. / PROPOSED CHANGES [INVOLVED IN L. I. D. YARD] FOR BRIDGE ST. WIDENING.	1929/09/18	1"=20'	H 43, W 76.2 CM	BLUEPRINT	PAPER
152-101	[PLAN AND PROFILE SHOWING] SOUNDINGS BY W. H. WARD ON NEW MERRIMACK RIVER LINE OF MASSACHUSETTS COTTON MILLS.	1883/01/31	1CM=10'	H 34, W 75 CM	INK, COLORED INK	PAPER
152-102	PLAN OF / BRIDGE STREET / BETWEEN / KEARNEY SQUARE & MERRIMACK RIVER / LOWELL, MASS.	1934/06/25	1"=50'	H 36.7, W 71.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH

152-103	PLAN & SECTIONS / OF / BUILDINGS AT REX CENTRE ["PRESCOTT YARD"] / SHOWING / LEAKAGE FROM CANAL.	1935/10/10	1"=10'	H 54, W 73.8 CM	INK, WATER COLOR	DRAFTING CLOTH
152-104	REX, INC. ["PRESCOTT YARD"] / PLAN OF FOOTINGS.	1933/11/06	1"=10', 3/4"=1'	H 39.2, W 56.5 CM	BLUEPRINT, COLORED INK	PAPER
152-105	PLAN SHOWING / SUGGESTED L. & C. PIPE CHANGES / IN / "PRESCOTT YARD".	1938/06/02	1"=10'	H 62.5, W 90.5 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
152-106	PLAN OF THE / "PRESCOTT YARD" COMPILED FROM SURVEYS BY BROOKS JORDAN & GRAVES / & PROPRIETORS OF LOCKS & CANALS.	1934/04/20	1"=20'	H 47.1, W 78.2 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
152-107	SECOND FLOOR PLAN / OF THE / ALEXANDER WOOL COMBING CO. / 2ND FLOOR, MILL NO.3 LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1948/03/22	1"=10'	H 39.4, W 109.4 CM	INK	DRAFTING CLOTH
152-108	THIRD FLOOR PLAN / OF THE / ALEXANDER WOOL COMBING CO. / 3RD FLOOR, MILL NO. 3. LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1948/03/22	1"=10'	H 39.4, W 109.4 CM	INK	DRAFTING CLOTH
152-109	SECOND FLOOR PLAN / OF THE / ALEXANDER WOOL COMBING CO. / 2ND FLOOR, MILL NO. 3, LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1947/04/29	1"=10'	H 39.4, W 109.4 CM	GRAPHITE	DRAFTING CLOTH

152-110	FIRST FLOOR PLAN / OF THE / ALEXANDER WOOL COMBING CO. / 1ST FLOOR, MILL NO. 3 LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS. [AND] SCOURING PLANT FLOOR PLAN / OF THE / ALEXANDER WOOL COMBING CO. / BOILER HOUSE...[SEE NOTES]	1948/03/22	1"=10'	H 39.4, W 109.4 CM	INK	DRAFTING CLOTH
15-22	[BROCHURE: LOWELL NATIONAL CULTURAL PARK DEVELOPMENT - PROPOSAL AND COST ANALYSIS.]	UNDATED				
15-23	ECUMENICAL PLAZA / LOWELL MODEL CITIES / ACRE MODEL NEIGHBORHOOD / LOWELL, MASSACHUSETTS / SPECIFICATIONS.	UNDATED	NONE	H 29, W 23, D 2 CM	INK	PAPER
15-24	[DRAWING OF WESTERN CANAL BEAUTIFICATION PROJECT.]	UNDATED				
15-25-01	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/06/08				
15-25-02	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/07/20				
15-25-03	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/07/30				
15-25-04	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/08/26				
15-25-05	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/08/31				
15-25-06	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/09/04				
15-25-07	[PHOTO: DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MA.]	1875/09/20				

15-26	WESTERN CANAL / BEAUTIFICATION / EXTENSION / MODEL CITIES PROJECT / LOWELL MODEL CITIES / ACRE MODEL NEIGHBORHOOD / LOWELL, MASSACHUSETTS / SPECIFICATIONS.	1975/07/00	NONE	H 29, W 23, D 2 CM	INK	PAPER
153-[173]	PLAN / OF THE PENSTOCKS AND / RACEWAYS / FOR WHEELS NOS. 1, 2, 3, 4, 5, 6, 7, 8 & 9 / OF THE BOOTT MILLS.	1906/01/00	1"=20', 1"=10'	H 51, W 68.5 CM	PHOTOGRAPH	PAPER
153-[174]	BOOTT MILLS. / [AND] PLAN & ELEVATIONS / OF / AREA BETWEEN MILL NO. 1 & MILL NO. 7 / AT THE / BOOTT MILLS / LOWELL, MASS.	1938/10/22-27	1/4"=1'	H 57.6, 134 CM	BLUEPRINT, COLORED PENCIL	PAPER
153-[175]	BOOTT COTTON MILLS / (COTTON FACTORY) / LOWELL, MASS.	1891/08/13	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
153-[176]	BOOTT MILLS / (COTTON MILL) / LOWELL, MASS.	1911/01/03	1"=60'	H 48.5, W 39 CM	PHOTOGRAPHIC NEGATIVE PRINT	PAPER
153-[177]	BOOTT MILLS / (COTTON MILL) / LOWELL, MASS.	1932/05/23	1"=60'	H 57, W 44.5 CM	PHOTOGRAPHIC NEGATIVE PRINT	PAPER
153-[178]	BOOTT MILLS / (COTTON CLOTH) / LOWELL, MASS.	1940/10/11	1"=60'	H 53, W 66.5 CM	INK, COLORED INK	PAPER
153-[179]	BOOTT MILLS / (COTTON CLOTH) / LOWELL, MASS.	1940/10/11	1"=60'	H 50, W 62 CM	BLUE LINE PRINT	PAPER
153-[180]	HUB HOSIERY MILLS, INC. / LOWELL, MASS.	1952/02/29	1"=50'	H 31.5, W 50 CM	INK, COLORED INK	PAPER
153-[181]	MASSACHUSETTS MOHAIR PLUSH CO., INC. / PREMISES: BOOTT MILLS / LOWELL, MASS.	1956/10/11	1"=50'	H 65, W 84 CM	INK, COLORED INK	PAPER

153-[182]	LEFFEL / HYDRAULIC / TURBINES / THE JAMES LEFFEL & CO. / SPRINGFIELD, O., U.S.A.	1944/11/22	NONE	H 29.3, W 22.7 CM	INK, BLUELINE PRINT	PAPER
153-[183]-[A]	CURVES FOR A 30" R.H. TYPE Z, LEFFEL WHEEL SHOWING / HORSE POWER DEVELOPMENT AT 1 FOOT FALL, / WITH RELATIVE VELOCITIES FROM 12' TO 26' FALL.	SEE NOTES	NONE	H 42.6, W 28 CM	INK	PAPER
153-[183]-[B]	DIAGRAM SHOWING QUANTITY DISCHARGED / WITH 1 FOOT FALL AND DIFFERENT SPEEDS AND OPENINGS OF THE SPEEDGATE OF A 30" / TYPE "Z" R.H. LEFFEL WHEEL; ALSO RELATIVE VELOCITY.	SEE NOTES	NONE	H 55.9, W 28 CM	INK	PAPER
153-[183]-[C]	CURVES SHOWING QUANTITY OF WATER / DISCHARGED WITH 1 FOOT FALL AND DIFFERENT / SPEEDS AND OPENINGS OF THE SPEEDGATE OF / A 30" R.H. LEFFEL TYPE "Z" WHEEL	1946/11/00	NONE	H 55.9, W 28 CM	INK	PAPER
153-[184]	BOOTT MILLS / ESTIMATED VELOCITY DIAGRAM / FOR NOS. 3, 5 AND 5 -- 33" LEFFEL, / TYPE Z, WATERWHEELS.	1949/01/00	NONE	H 28, W 55.9 CM	INK	PAPER
153-[185]	BOOTT MILLS / KILOWATT OUTPUT GUARANTEED / FOR 17', 21' AND 23 ' HEADS / OF / NOS. 3, 4, OR 5 / 33" TYPE Z, LEFFEL WHEELS.	1949/02/00	NONE	H 28, W 55.5 CM	INK	PAPER
153-[186]	BOOTT MILLS / EFFICIENCY GUARANTEED / FOR 17', 21' AND 23' HEADS / OF / NOS. 3, 4 OR 5 / 33" TYPE Z WHEELS.	1949/02/00	NONE	W 55.5, H 28 CM	INK	PAPER

153-[187]	BOOTT MILLS / C.F.P.S. DISCHARGE GARANTEED / FOR 17', 21' AND 23' HEADS / OF / NOS. 3, 4 OR 5 / 33" TYPE Z, LEFFEL WHEELS.	1949/02/00	NONE	H 28, W 55.5 CM	INK, GRAPHITE	PAPER
153-[188]	COMPUTATIONS USED IN WORKING UP QUANTITIES FOR TEMPORARY DISCHARGE DIAGRAM / OF BOOTT MILLS NOS. 3, 4 & 5, 33" TYPE Z LEFFEL WHEELS.	1949/02/09	NONE	H 35.7, W 27.9 CM	INK, COLORED PENCIL	PAPER
153-[189]	PORTION OF LOWER YARD / BETWEEN / # 5E & # 2 MILLS.	1917/12/10	NONE	H 27.9, W 35.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-[190]	DIAGRAMMATIC SKETCH SHOWING / SUPPLY AND USE OF CANAL WATER / IN / BOOTT MILLS / ENGINE ROOM.	1929/12/00	1"=12'	H 23.9, W 37.5 CM	INK. COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-[191]	PROPOSED STEEL RACKS FOR / 3, 4 & 5 WHEELS MILL NO. 6 / BOOTT MILLS / LOWELL, MASS.	1947/08/07	3"=12'	H 52.3, W 92.2 CM	GRAPHITE	DRAFTING CLOTH
153-[192]	PROPOSED / PLAN AND SECTIONS / OF / BULKHEAD FOR 3, 4 & 5 WHEELS / BOOTT MILLS.	1948/05/17	1/2"=1'	H 41.4, W 71.6 CM	INK	DRAFTING CLOTH
153-001	SECTION [AND] ELEVATION OF RIVER WALL OF BOOTT MILL OVER MOUTH OF / RACES OF NO. 3, 4 & 5 WHEELS.	1898/07/28	1/2"=1'	H 70.1, W 53.3 CM	WATER COLOR, INK	PAPER
153-002	PLAN OF BUCKET OUTLET / OF NEW 72" SWAIN WHEEL / AT BOOTT MILLS [TO REPLACE OLD 72" SWAIN # 8 WHEEL].	1905/12/00	12"=1'	H 66.7, W 86.4 CM	INK	PAPER
153-003	BOOTT MILLS / PATTERN OF BUCKET OUTLET OF 72" SWAIN WHEEL # 6 / BEING REPAIRED JANUARY, 1906.	1906/01/00	NONE	H 58.8, W 58.3 CM	INK	PAPER
153-004	[PLAN SHOWING CONDITION OF BUCKETS AT INLET OF 72" SWAIN AT BOOTT MILLS.]	1905/07/00	1 1/2"=1'			

153-005-[01]	[PLAN OF] BOOTT COTTON MILLS. [SHOWING SURVEY NOTES & TIES, LOCATION OF PIPES, HYDRANTS, SPRINKLERS, ETC.]	1889/02/00	1"=40'	H 68.8, W 108 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-005-[01]-[COPY 1]	BOOTT COTTON MILLS.	1889/02/00	1"=40'	H 60.8, W 85.8 CM	BLUEPRINT	PAPER
153-005-[02]	[PLAN OF] BOOTT COTTON MILLS. [SHOWING SURVEY NOTES & TIES, LOCATION OF PIPES, HYDRANTS, SPRINKLERS, ETC.]	UNDATED	NONE	H 59, W 103.1 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-005-[02]-[COPY 1]	BOOTT COTTON MILLS.	UNDATED	NONE	H 59, W 103.1 CM	BLUE LINE PRINT	PAPER
153-005-[02]-[COPY 2]	BOOTT COTTON MILLS.	UNDATED	NONE	H 59, W 103.1 CM	BLUE LINE PRINT	PAPER
153-005-[02]-[COPY 3]	BOOTT COTTON MILLS.	UNDATED	NONE	H 59, W 103.1 CM	BLUE LINE PRINT	PAPER
153-005-[02]-[COPY 4]	BOOTT COTTON MILLS.	UNDATED	NONE	H 59, W 103.1 CM	BLUE LINE PRINT	PAPER
153-006	BOOTT COTTON MILLS. [PLAN SHOWING PROPOSED CHANGE IN LOCATION OF] BRIDGE FROM CLOTH ROOM / [TO A POINT FARTHER DOWN STREAM OF CANAL]	1898/06/20	1/4"=1'	H 60, W 53 CM	BLUEPRINT	PAPER
153-007	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS [SHOWING WATERWAYS AND WHEELS].	1896/04/00	1/4"=10'	H 69.8, W 101 CM	INK, WATER COLOR	DRAFTING CLOTH
153-008	[SKETCH SHOWING] SECTION [AND ELEVATION] IN FRONT OF BOOTT RACKS.	1910/00/00	1"=10'	H 42.7, W 109.9 CM	INK, COLORED INK	DRAFTING CLOTH
153-009	BOOTT MILLS-LOWELL, MASS. / SKETCH [PLAN & ELEVATION] SHOWING DRAFT TUBE / EXTENSION FOR NO. 4 WHEEL [SWAIN 72"].	1910/08/05	1/4"=1'	H 33.6, W 29.7 CM	INK, COLORED INK	DRAFTING CLOTH

153-009-[COPY 1]	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING DRAFT TUBE / EXTENSION FOR NO. 4 WHEEL.	1910/08/05	1/4"=1'	H 33.6, W 29.7 CM	BLUEPRINT, INK	PAPER
153-010	DIAGRAM SHOWING HEIGHT OF / WATER AT DIFFERENT L. & C. GAUGES / AT NO. 2 WHEEL-BOOTT MILLS.	SEE NOTES	NONE	H 83.2, W 53.3 CM	INK, COLORED INK	PAPER
153-011	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING / IMPROVEMENTS OF WATER-WAYS / MADE FROM AUG. 1910 TO JAN. 1911.	1911/01/10	1"=20'& 10'	H 72.5, W 124 CM	INK, COLORED INK	DRAFTING CLOTH
153-011-A-[A]	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING EXTENSION FOR / NO'S. 1 & 2 DRAFT TUBES.	1910/10/21	1"=1'	H 22.9, W 48.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-011-A-[B]	BOOTT MILLS-LOWELL, MASS. / STANDARD SECTION FOR 6, 7 & 8 RACES.	1910/10/22	1/2"=1'	H 14, W 35.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-011-A-[C]	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING DRAFT TUBE.	1910/07/26	1"=20'	H 31.7, W 35.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-011-A-[D]	[UNTITLED.] [SKETCH SHOWING DRAFT TUBE.]	UNDATED	NONE	H 24, W 35.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-011-A-[E]	BOOTT MILLS / SKETCH SHOWING PLAN & SECTIONS FOR CLEARING OUT 3, 4 & 5 RACEWAY.	1910/07/30	NONE	H 42, W 59.7 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
153-012	SECTION OF BOOTT 3, 4 & 5 LEFT HAND RACE [TAKEN IN 1898 AND IN 1907].	SEE TITLE	NONE	H 25.3, W 59 CM	INK, COLORED INK	PAPER

153-013	[UNTITLED.] [PLAN SHOWING CONTOURS OF MERRMIACK RIVER BACK OF BOOTT MILLS.]	UNDATED	1"=100'	H 28, W 34.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-013-[COPY 1]	[UNTITLED.] [PLAN SHOWING CONTOURS OF MERRIMACK RIVER BACK OF BOOTT MILLS.]	UNDATED	1"=100'	H 27.6, W 34.6 CM	BLUEPRINT	PAPER
153-014	[DIAGRAM SHOWING HEIGHTS OF GAUGES FOR 3, 4, & 5 WATER WHEELS AT DIFFERENT TIMES OF DAY AT BOOTT COTTON MILLS.]	1910/10/29				TP
153-015	[PLAN AND SECTIONS OF] BOOTT MILLS-LOWELL, MASS. / NO. 9 WHEEL-80 IN. R. H. SWAIN [SHOWING IMPROVEMENTS TO PIT].	1911/01/31	1/4"=1'	H 70, W 82 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
153-016	[SKETCH SHOWING POSITION OF NEW CURTIS ENGINE IN] BOOTT MILLS [WITH RESPECT TO RACEWAY].	UNDATED	1/4"=1'	H 86.3, W 97.3 CM	INK, COLORED INK	DRAFTING CLOTH
153-017-[A]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / BOOTT MILLS.	1912/04/04	NONE	H 63.2, W 64.2 CM	GRAPHITE	PAPER
153-017-[A]-[COPY 1]	SURPLUS MILL POWERS / DRAWN BY WHEELS OF / BOOTT MILLS.	1912/04/04	NONE	H 54.3, W 60.4 CM	BLUEPRINT	PAPER
153-017-[B]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / BOOTT MILLS.	1912/04/04	NONE	H 54.3, W 60.4 CM	INK, COLORED INK	DRAFTING CLOTH
153-017-[B]-[COPY 1]	PERMANENT MILL POWERS / DRAWN BY WHEELS OF / BOOTT MILLS.	1912/04/04	NONE	H 53, W 81 CM	BLUEPRINT	PAPER
153-017-[C]	SURPLUS / MILL POWERS / DRAWN BY WHEEL OF / BOOTT MILLS.	1919/05/27	NONE	H 51.5, W 71 CM	INK, COLORED INK	DRAFTING CLOTH

153-017-[D]	[DIAGRAMS SHOWING] PERMANENT [AND SURPLUS MILL] POWERS / DRAWN BY [THE] WHEELS AT / BOOTT MILLS [FALL FROM COUNTING ROOM GAUGE TO RIVER GAUGE].	1919/05/27	NONE	H 51.2, W 71.1 CM	INK, COLORED INK	DRAFTING CLOTH
153-018-[A]	BOOTT MILLS / [DIAGRAM SHOWING] DISCHARGE OF / WHEELS NOS. 1, 2, 3 OR 4 / 72 IN SWAIN WHEELS.	1912/02/00	NONE	H 61.5, W 79.4 CM	INK, COLORED INK	DRAFTING CLOTH
153-018-[B]	BOOTT MILLS / [DIAGRAM SHOWING] DISCHARGE OF / WHEELS NOS. 5, 6, 7, 8 OR 9 72 & 80 INCH SWAIN WHEELS.	1912/02/00	NONE	H 62, W 78.8 CM	INK, COLORED INK	DRAFTING CLOTH
153-019-[A]	DIAGRAM SHOWING / HORSE POWER / IN ALL OF THE / PERMANENT MILL POWERS / FOR DIFFERENT FALLS / FOR THE / BOOTT MILLS.	SEE NOTES	NONE	H 66.7, W 86.4 CM	INK	PAPER
153-019-[A]-[COPY 1]	DIAGRAM SHOWING / HORSE POWER / IN ALL OF THE / PERMANENT MILL POWERS / FOR DIFFERENT FALLS / FOR THE / BOOTT MILLS.	SEE NOTES	NONE	H 66.7, W 86.4 CM	BLUEPRINT	PAPER
153-019-[B]	DIAGRAM SHOWING / HORSE POWER / SURPLUS MILL POWERS / FOR ANY FALL / & FOR ANY CORPORATION.	SEE NOTES	NONE	H 33.5, W 83.3 CM	INK	PAPER
153-019-[B]-[COPY 1]	DIAGRAM SHOWING / HORSE POWER / SURPLUS MILL POWERS / FOR ANY FALL / & FOR ANY CORPORATION.	SEE NOTES	NONE	H 33.5, W 83.3 CM	BLUEPRINT	PAPER

153-019-[C]	DIAGRAM SHOWING / HORSE POWER / IN ALL THE / PERMANENT MILL POWERS / FOR DIFFERENT FALLS / BOOTT MILLS. / DIAGRAM SHOWING / HORSE POWER / IN / SURPLUS MILL POWERS FOR ANY FALL / & FOR ANY CORPORATION.	UNDATED	NONE	H 76.4, W 56 CM	INK, COLORED INK	PAPER
153-020	SKETCH OF / [BOOTT MILLS] NO. 9 [SWAIN 80"] WHEEL-BOOTT MILLS. / SHOWING / POWER TRANSMISSION.	1911/03/03	NONE	H 31.9, W 30.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-021	DIAGRAM SHOWING / HEIGHT OF BOOTT 1 & 2 RIVER GAUGE / & / NO. 1 WHEEL PIT GAUGE [CURVE-GATE VS. DISCHARGE. TEST ON NO.6 BOOTT WHEEL. JUNE 27 & 28, 1913].	1913/08/20	NONE	H 21.5, W 30.5 CM	INK	PAPER
153-022	[INDEX SHEET OF NOS. 1 & 2 WHEEL INSTALLATIONS SHOWING PLAN, DATA, ELEVATION AND REFERENCE TO ADDITIONAL DATA OF BOOTT MILLS.]	1915/06/00				TP
153-022-[COPY 1]	INDEX SHEET / OF / NO.1 & 2 WATER-WHEEL INSTALLATIONS / SHOWING / PLAN, ELEVATION, DATA / AND / REFERENCES TO ADDITIONAL DATA.	1915/06/00	1"=4'	H 55.6, W 58.8 CM	BLUEPRINT	PAPER
153-023	[DETAILS OF] BOOTT [MILLS] / 72" / SWAIN TURBINE[S].	1888/06/11	3"=1'	H 74, W 48.4 CM	BLUEPRINT	PAPER
153-024	[SECTIONAL ELEVATION OF] BOOTT MILLS / NO. 2 WHEEL [MADE JUNE 1915].	1915/06/00	NONE	H 63.2, W 64.2 CM	GRAPHITE	PAPER

153-025-[032]	BOOTT MILLS / DISCHARGE DIAGRAM / FOR / NOS. 3, 4 OR 5 WHEELS / 33" TYPE "Z" R.H. LEFFEL WHEELS.	1949/06/00	NONE	H 28, W 43.5 CM	BLUE LINE PRINT, GRAPHITE, COLORED PENCIL	PAPER
153-025-001	BOOTT MILLS / [DIAGRAM SHOWING] SECTION / AT / NO. 6 WHEEL CURRENT METER STATION.	1923/10/13	NONE	H 30.5, W 21.5 CM	INK	PAPER
153-025-002	SWITCH BOARD EFFICIENCY / FOR VARIOUS FALLS / BOOTT [SWAIN 72"] WHEELS # 6- # 7- # 8.	1921/07/07	NONE	H 21.5, W 28 CM	INK	PAPER
153-025-003	BOOTT MILLS, / LOWELL, MASS. / [SWAIN 72"] WHEELS 6- 7- 8 / CURVE OF EFFICIENCY VS. HEAD.	1921/05/27	NONE	H 21.5, W 28 CM	INK	PAPER
153-025-004	BOOTT MILLS / GUARANTEED WHEEL EFFICIENCIES.	UNDATED	NONE	H 28, W 21.5 CM	INK, COLORED INK	PAPER
153-025-005	[DIAGRAM SHOWING] DURATION CURVE / COMPILED FROM RECORDS / OF LOCKS & CANALS / OF / AVERAGE MONTHLY OUTSIDE FALL / 1911-1920 INCLUSIVE.	1921/05/11	NONE	H 21.5, W 28 CM	INK	PAPER
153-025-006	[DIAGRAM SHOWING] CURVES OF HEAD VS. EFFICIENCY.	1921/07/12	NONE	H 30.5, W 21.5 CM	INK	PAPER
153-025-006-[A]	PERMANENT / MILL POWERS / DRAWN BY WHEELS OF / BOOTT MILLS.	1919/05/27	NONE	H 51.2, W 70.7 CM	BLUEPRINT	PAPER
153-025-007	MILL POWER DIAGRAM / BOOTT MILLS, NO. 6 WHEEL.	1924/01/18	NONE	H 29, W 45.5 CM	INK	PAPER
153-025-007-[COPY 1]	MILL POWER DIAGRAM / BOOTT MILLS, NO. 6 WHEEL.	1924/01/18	NONE	H 29.2, W 45.7 CM	BLUEPRINT	PAPER
153-025-007-[COPY 2]	MILL POWER DIAGRAM / BOOTT MILLS, NO. 6 WHEEL.	1924/01/18	NONE	H 29.2, W 45.7 CM	BLUEPRINT	PAPER

153-025-008	SPIDER FOR # 9 WHEEL / BOOTT MILLS / LOWELL, MASS.	1924/03/12	1/2"=1'	H 20, W 21.6 CM	INK, COLORED INK	DRAFTING CLOTH
153-025-009	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING DRAFT TUBE / EXTENSION FOR NO. 4 WHEEL.	1910/08/05	1/4"=1'	H 33.4, W 29.8 CM	BLUEPRINT	PAPER
153-025-009-A	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING EXTENSION FOR / NO'S. 1 & 2 DRAFT TUBES.	1910/10/21	1"=1'	H 22.3, W 45.1	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
153-025-010	BOOTT MILLS / [PLAN SHOWING METHODS TO BE USED] STRENGTHENING COUNTING ROOM BRIDGE / I BEAMS & BRACING.	1924/10/01	1/4"& 3/4"=1'	H 29.3, W 36 CM	BLUEPRINT	PAPER
153-025-011	PLAN SHOWING / BOOTT MILLS PROPERTY / AS OF 1928.	1928/10/00	1"=100'	H 29.7, W 37.5 CM	INK, WATER COLOR	DRAFTING CLOTH
153-025-011-[COPY 1]	PLAN SHOWING / BOOTT MILLS PROPERTY / AS OF 1928.	1928/10/00	1"=100'	H 29.5, W 37.5 CM	BLUE LINE PRINT	PAPER
153-025-011-[COPY 2]	PLAN SHOWING / BOOTT MILLS PROPERTY / AS OF 1928.	1928/10/00	1"=100'	H 29.5, W 37.5 CM	BLUE LINE PRINT	PAPER
153-025-012	[PLAN SHOWING PROPERTY OF BOOTT MILLS AS OF 1905.]	1928/10/00	1"=100'			
153-025-013	PLAN SHOWING / BOOTT COTTON MILLS PROPERTY / AS OF 1835.	1928/10/00	1'=100'	H 29.9, W 37.2 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH
153-025-013-[COPY 1]	PLAN SHOWING / BOOTT COTTON MILLS PROPERTY / AS OF 1835.	1928/10/00	1"=100'	H 30, W 37 CM	BLUE LINE PRINT	PAPER
153-025-014	COPY OF PLAN WHICH ACCOMPANIES DEED / FROM PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / TO BOOTT COTTON MILLS, NOVEMBER 16, 1835.	1938/10/10	1"=80'	H 29.3, W 48.3 CM	INK, WATER COLOR	DRAFTING CLOTH

153-025-014-[COPY 1]	COPY OF PLAN WHICH ACCOMPANIES DEED / FROM PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / TO BOOTT COTTON MILLS, NOVEMBER 16, 1835.	1928/10/10	1"=80'	H 29, W 48 CM	BLUE LINE PRINT	PAPER
153-025-014-[COPY 2]	COPY OF PLAN WHICH ACCOMPANIES DEED / FROM PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / TO BOOTT COTTON MILLS, NOVEMBER 16, 1835.	1928/10/10	1"=80'	H 29, W 48 CM	BLUE LINE PRINT	PAPER
153-025-015	ESTIMATED FALL AT BOOTT MILLS / AS OF 1928 & BEFORE MILLS SHUT DOWN [AND IN 1929, WITH 55 8/30 MILL POWERS TAKEN OUT].	1929/00/00	NONE	H 21.5, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
153-025-016	BOOTT MILLS / LOWELL, MASS. / [BLUEPRINT SHOWING] PLAN & ELEVATION OF # 1 & # 2 / GENERATOR ROOM (SCHEME # 2).	1916/06/13	1/4"=12"	H 54, W 90.8 CM	BLUEPRINT	PAPER
153-025-017	BOOTT MILLS / LOWELL,--MASS. / [BLUEPRINT SHOWING] LAYOUT OF GENERATORS / [IN] # 3- 4- 5 WHEEL HOUSE.	1916/06/00	1/4"=1'	H 49, W 75 CM	BLUEPRINT	PAPER
153-025-018	BOOTT MILLS -LOWELL, MASS. / [BLUEPRINT SHOWING] VELOCITIES THRU PRESENT WATER-WAYS WITH 50% MORE WATER.	1917/01/17	NONE	H 29, W 43.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
153-025-019	WIRING DIAGRAM-TEST OF BOOTT NO. 6, 72" ALLIS CHALMERS WHEEL.	1923/10/09	NONE	H 21.2, W 27.7 CM	INK	PAPER
153-025-020	BOOTT NO. 6 WHEEL / KILOWATTS ON SWITCHBOARD VS. GATE OPENING / REDUCED TO 21 FT. HEAD / OBSERVATIONS TAKEN JUNE 27 & 28,1923 & DEC. 20,1937.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER

153-025-022	BOOTT NO. 6 WHEEL / GATE OPENING VS. GUIDE OPENING / FROM MEASUREMENTS TAKEN DEC. 19,1937.	SEE TITLE	NONE	H 21.5, W 28 CM	INK	PAPER
153-025-023	BLEACH HOUSE / BOOTT MILLS.	1938/10/18	1/4"=1'	H 40, W 53.3 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
153-025-024	BOOTT MILLS [ELEVATION OF PORTION OF NORTHERLY FACE OF MILL NO. 1].	1938/10/27	1/4"=1'	H 41.4, W 47.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-025-025	BOOTT MILLS / BLEACH HOUSE [FRONT ELEVATION AND ROOF DETAILS].	1938/12/00	1/4"& 1/2"=1'	H 33.5, W 49.5 CM	INK	DRAFTING CLOTH
153-025-026	KILOWATT VS. SECOND FEET / AT / BOOTT MILLS.	1944/03/03	NONE	H 21.5, W 30.5 CM	INK	PAPER
153-025-027	KILOWATT VS. RIVER HEIGHTS / AT / BOOTT MILLS.	SEE NOTES	NONE	H 30.5, W 21.5 CM	INK	PAPER
153-025-028	BOOTT MILLS / PERMANENT DISCHARGE DIAGRAM / OF / NOS. 3, 4 OR 5 WHEELS / 3" TYPE "Z" R. H. LEFFEL WHEELS.	1946/11/00	NONE	H 27.7, W 43.2 CM	INK, COLORED INK	PAPER
153-025-028-[COPY 1]	BOOTT MILLS / PRELIMINARY DISCHARGE DIAGRAM / OF / NOS. 3, 4 OR 5 WHEELS / 3" TYPE "Z" R. H. LEFFEL WHEELS.	UNDATED	NONE	H 28, W 42.5 CM	BLUEPRINT	PAPER
153-025-029	EFFICIENCY OF BOOTT WHEELS / AT DIFFERENT TIMES.	1947/07/31	NONE	H 30.5, W 21.5 CM	INK	PAPER
153-025-030	WATERWHEELS EFFICIENCIES / TO ACCOMPANY ARTHUR T. SAFFORD'S MEMORANDUM OF JULY 31,1947.	SEE TITLE	NONE	H 30.5, W 21.5 CM	INK	PAPER
153-025-031	HOLYOKE EFFICIENCY TEST / OF LEFFEL "Z" WHEEL.	SEE NOTES	NONE	H 21.5, W 30.5 CM	INK	PAPER
153-025-091	PROGRESS CHART / NEW TRACK TO BOOTT COAL POCKET.	1927/01/04	NONE	H 21.5, W 28 CM	INK	PAPER

153-025-092	[SCHEDULE OF] REINFORCING STEEL SCHEDULE FOR / BOOTT COAL POCKET FOUNDATION.	1927/04/11	1/4"=1'	H 27, W 21 CM	INK	DRAFTING CLOTH
153-025-A	[DIAGRAM SHOWING] BOOTT MILLS' NOS. 6, 7 & 8 WHEELS / SECTION AT METER STATION.	1919/10/12	NONE	H 30.5, W 21.3 CM	INK	PAPER
153-025-B	BOOTT MILLS # 1 WHEEL [INTEGRATING MEASUREMENT].	1919/07/29	NONE	H 21.3, W 30.2 CM	INK	PAPER
153-025-C	[DIAGRAM SHOWING] RACEWAY OF BOOTT MILLS # 1 WHEEL / CROSS-SECTION AT CURRENT METER STATION / WITH VELOCITY CONTOURS / POINT MEASUREMENT MADE JULY 29,1919 / GATE 0.5 FALL.	SEE TITLE	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
153-025-D	[DIAGRAM SHOWING] BOOTT MILLS [WHEEL # 1] / RELATION OUTSIDE TO INSIDE FALL. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/27	NONE	H 27, W 21 CM	INK	DRAFTING CLOTH
153-025-E	[DIAGRAM SHOWING] BOOTT MILLS [WHEEL # 2] / RELATION OUTSIDE TO INSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/28	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
153-025-F	[DIAGRAM SHOWING] BOOTT MILLS [WHEELS 3-4-5] / RELATION OUTSIDE TO INSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/17	NONE	H 21.2, W 30.4 CM	INK, COLORED INK	PAPER
153-025-G	[DIAGRAM SHOWING] BOOTT MILLS [WHEELS 6-7-8] / RELATION OUTSIDE TO INSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/17	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER

153-025-H	[DIAGRAM SHOWING] BOOTT MILLS [WHEEL 9] / RELATION OUTSIDE TO INSIDE FALL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/05/19	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
153-025-I	BOOTT MILLS, / LOWELL, MASS. [DIAGRAM SHOWING] HEIGHT OF BOOTT RIVER GAUGE VS. BOOTT LIMITATION.	1918/02/07	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
153-025-J	[DIAGRAM SHOWING DISCHARGE OF] BOOTT MILLS NO.1 WHEEL / [A] 45" TYPE 12 R.H. ALLIS-CHALMERS / 150 R.P.M. 21A FALL / DISCHARGE BY CURRENT-METER / REDUCED TO 21.4 FALL REGARDLESS / OF SPEED FACTOR.	1919/08/00	NONE	H 29.2, W 45.7 CM	BLUEPRINT,INK, COLORED INK	PAPER
153-025-K	BOOTT MILLS / TEMPORARY DIAGRAM / DISCHARGE OF WHEEL # 1.	UNDATED	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
153-025-L	BOOTT MILLS / DISCHARGE DIAGRAM / NO. 1 WHEEL / 45" R. H. ALLIS CHALMERS WHEEL / SWING GATE.	UNDATED	NONE	H 11", W 16"	INK	PAPER
153-025-L-[COPY 1]	BOOTT MILLS / DISCHARGE DIAGRAM / NO. 1 WHEEL / 45" R. H. ALLIS CHALMERS WHEEL / SWING GATE.	UNDATED	NONE	H 11", W 16"	BLUEPRINT	PAPER
153-025-M	[DIAGRAM SHOWING] COMPARISON OF / DISCHARGE AND POWER CURVES / OF BOOTT MILLS NO. 1 WHEEL [A 45" ALLIS-CHALMERS].	UNDATED	NONE	H 29, W 40.5 CM	INK, COLORED INK	PAPER
153-025-N	[DIAGRAM OF POWER OUTPUT MEASURED AT JACK SHAFT BY C.M. ALLEN OF WORCESTER, DISCHARGE MEASURED BY L. & C. CURRENT METER FOR] TEST OF BOOTT # 2 WHEEL / 72" SWAIN / NOV. 21-23,1908.	1921/04/00	NONE	H 45.7, W 29.2 CM	INK	PAPER

153-025-O	[DIAGRAM SHOWING SECTIONS AT CURRENT METER STATION] BOOTT [MILLS] # 1 METER STATION.	1919/07/00	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
153-025-P	BOOTT MILLS / NO.2 WHEEL-72" SWAIN / [DIAGRAM OF] COMPARISON OF CURRENT METER / TEST[S] OF JULY 25-1921 WITH WEIR TEST BY J. B. FRANCIS / IN 1874.	1921/08/01	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
153-025-Q	[SECTION OF MOUTH OF NO. 9 RACEWAY OF BOOTT MILLS.]	UNDATED				
153-025-R	[DIAGRAM SHOWING] BOOTT MILLS-LEAKAGE / 5:30 TO 6:30 P.M.-SEPT.14, 1921.	1921/09/14	NONE	H 29.2, W 45.7 CM	INK	PAPER
153-025-S	[DIAGRAM SHOWING ELEVATION OF] RACEWAY OF BOOTT MILLS # 1 & # 2 WHEELCROSS SECTION AT CURRENT METER STATION.	1921/07/25	NONE	H 45.7, W 29.2 CM	INK	PAPER
153-025-T	BOOTT # 2 WHEEL. / TEST OF JULY 25,1921 / METER 8163-WATCH # 5.	SEE TITLE	NONE	H 45.7, W 29.2 CM	INK, COLORED INK	PAPER
153-025-U	PROGRESS CHART / [FOR] BOOTT [ALLIS-CHALMERS] 1700 H.P. UNIT. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/08/28	NONE	H 21.2, W 30.4 CM	INK, COLORED INK	PAPER
153-025-V	PRELIMINARY / MILL POWER / DIAGRAM / BOOTT MILLS / NEW [ALLIS-CHALMERS] 1700 H.P. UNIT.	1923/05/29	NONE	H 21.7, W 30.9 CM	INK	PAPER
153-025-W	DIAGRAM SHOWING [VELOCITY VS.] HORSE POWER / WITH 16 FEET FALL & DIFFERENT SPEEDS / & OPENINGS OF SPEEDGATE OF A 30" R. H. / ALLIS-CHALMERS WHEEL, TYPE # 13.	1923/07/13	NONE	H 33.4, W 29.2 CM	INK	PAPER

153-025-X	DIAGRAM SHOWING PER CENT EFFICIENCY [VS. VELOCITY] / WITH 16 FEET FALL AND DIFFERENT SPEEDS AND / OPENINGS OF SPEEDGATE OF A 30" R. H. ALLIS- / CHALMERS WHEEL TYPE # 13. / TESTED AT HOLYOKE MARCH 19 & 20, 1912. / TEST NO. 2122.	1923/07/13	NONE	H 45.5, W 29 CM	INK, GRAPHITE	PAPER
153-025-Y	DIAGRAM SHOWING QUANTITY OF WATER / DISCHARGED WITH 16 FEET FALL AND DIFFERENT / SPEEDS AND OPENINGS OF THE SPEEDGATE OF / A 30" R. H. ALLIS-CHALMERS WHEEL, TYPE # 13. / TESTED AT HOLYOKE MARCH 19 & 20, 1912. / TEST NO. 2122.	1923/05/15	NONE	H 45.5, W 29 CM	INK	PAPER
153-025-Z-[04]	BOOTT MILLS / CURRENT METER STATION FOR NO. 1 WHEEL / AT MOUTH OF RACE.	1919/06/16	NONE	H 21.5, W 30.5 CM	INK	PAPER
153-025-Z-01	BOOTT MILLS / TEST ON WHEEL NO. 6 / GATE VS. DISCHARGE / PROPRIETORS OF LOCKS & CANALS.	1923/06/27-28	NONE	H 27, W 55 CM	INK, DRAFTING CLOTH	DRAFTING CLOTH
153-025-Z-02	BOOTT MILLS / TEST ON WHEEL NO. 6 / EFFICIENCY VS. HORSEPOWER.	1923/06/27-28	NONE	H 26.7, W 54.7 CM	INK	DRAFTING CLOTH
153-025-Z-03	BOOTT MILLS / TEST ON WHEEL NO.6 / GATE VS. HORSEPOWER / PROPRIETORS OF LOCKS & CANALS.	1923/06/27-28	NONE	H 27, W 55 CM	INK	DRAFTING CLOTH
153-026	GENERAL [LOCATION] PLAN & DATA / [OF] BOOTT MILLS NO.1 WATER WHEEL [(42 1/2" ALLIS-CHALMERS) SHOWING DATA, REFERENCES, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL MASS.	1919/02/00	1"=100'& 10'	H 71.8, W 99.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

153-027	GENERAL PLAN & DATA / [FOR] BOOTT MILLS NO. 9 WATER WHEEL [AN 80" SWAIN, SHOWING LOCATION, REFERENCES, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/06/21	1"=20',10',100',& 1'	H 55.9, W 89.3 CM	INK, COLORED INK	DRAFTING CLOTH
153-028	PROPOSED STEEL FRAMING / BOOTT MILLS STORE HOUSE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/05/21	1/8"=1'	H 42.7, W 85.2 CM	INK, COLORED INK	DRAFTING CLOTH
153-029	[SKETCH SHOWING] DRAFT TUBE EXTENSION / [OF] BOOTT MILLS NO. 1 WHEEL [(ALLIS-CHALMERS MFG. CO.)] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/10/01	3/4"=1'	H 40.4, W 67.7 CM	INK, COLORED INK	DRAFTING CLOTH
153-030	GENERAL PLAN & DATA / BOOTT MILLS 3, 4 & 5 WATERWHEEL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/00	1"=100'& 10'	H 69.8, W 103 CM	BLUEPRINT	PAPER
153-031	[SKETCH SHOWING] SUGGESTED LAYOUT / [OF] BOOTT MILLS R. R. TRACKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/06/28	1"=20'	H 36.2, W 54.6 CM	INK, COLORED INK	PAPER
153-032	PROPOSED SETTING / BOOTT MILLS NO.1 WATERWHEEL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/07/27	1/4"=1'	H 71.2, W 97.2 CM	INK, COLORED INK	TRACNG PAPER
153-033	GENERAL PLAN & DATA / [OF 72" SWAIN WHEELS] BOOTT MILLS 6, 7 & 8 WATERWHEELS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/00	1"=100',1"=20'	H 64.5, W 101.5 CM	BLUEPRINT	PAPER

153-034	[DIAGRAM SHOWING] DURATION CURVE / OF / SURPLUS POWER LIMITATIONS / FOR / BOOTT MILLS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/06	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
153-035-[A]	BOOTT MILLS / VELOCITY DIAGRAM [OF WATERWAYS OF WHEELS NOS. 3, 4 & 5, 6, 7 & 8].	1919/03/00	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
153-035-[B]	VELOCITY DIAGRAM / FOR / BOOTT MILLS.	1919/04/00	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
153-036	DIAGRAM SHOWING VELOCITY IN FEET PER SECOND AT / DIFFERENT POINTS IN DRAFT TUBE EXTENSION-BOOTT / MILLS # 1 MILL WHEEL. [(ALLIS-CHALMERS MFG. CO.)].	1919/00/00	NONE	H 28, W 21.5 CM	INK	PAPER
153-037	DIAGRAM SHOWING DISCHARGE OF BOOTT MILLS NO. 1 WHEEL, A 45" R. H. ALLIS-CHALMERS TYPE 12.	SEE NOTES	NONE	H 64, W 86 CM	INK, COLORED INK	DRAFTING CLOTH
153-038-01	PRELIMINARY ARRANGEMENT / OF / 57" VERTICAL [& HORIZ.] TURBINES / FOR / BOOTT MILLS-LOWELL, MASS.	1911/10/26	NONE	H 76.5, W 84 CM	BLUEPRINT	PAPER
153-038-02	PRELIMINARY ARRANGEMENT / OF / PAIR OF 39" VERTICAL TURBINES / FOR / BOOTT MILLS-LOWELL, MASS.	1911/10/26	NONE	H 76.1, W 82.6 CM	BLUEPRINT	PAPER
153-038-03	PRELIMINARY ARRANGEMENT / OF / PAIR OF 39" HORIZONTAL TURBINES / FOR / BOOTT MILLS-LOWELL, MASS.	1911/10/26	NONE	H 76.2, W 107.4 CM	BLUEPRINT	PAPER

153-038-04	[UNTITLED PLAN.] [PRELIMINARY ARRANGEMENT OF PAIR OF 39" HORIZONTAL TURBINES FOR BOOTT MILLS TO ACCOMPANY REPORT OF MR. SAFFORD.]	UNDATED	NONE	H 68, W 114.4 CM	BLUEPRINT	PAPER
153-039	BOOTT MILLS-LOWELL, MASS. / GENERAL PLAN-PROPOSED HYDROELECTRIC DEVELOPMENT.	1920/04/12	1"=40'	H 56, W 77.5 CM	INK	DRAFTING CLOTH
153-039-[COPY 1]	BOOTT MILLS-LOWELL, MASS. / GENERAL PLAN-PROPOSED HYDROELECTRIC DEVELOPMENT.	1920/04/12	1"=40'	H 56, W 76.9 CM	BLUEPRINT	PAPER
153-040	BOOTT MILLS, LOWELL, MASS. / PROPOSED REDEVELOPMENT NO. 2 WHEEL.	1920/04/13	1"=20'& 10'	H 56.3, W 76.9 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
153-040-[COPY 1]	BOOTT MILLS, LOWELL, MASS. / PROPOSED REDEVELOPMENT NO. 2 WHEEL.	1920/04/13	1"=20'& 10'	H 56.7, W 77.2 CM	BLUEPRINT	PAPER
153-041	BOOTT MILLS-LOWELL, MASS. / [GENERAL PLAN OF] PROPOSED DEVELOPMENT-PRESENT WHEELS NO.3, 4, & 5.	1920/04/12	1"=20'& 10'	H 56.4, W 77.4 CM	INK, COLORED INK, GRPAHITE	DRAFTING CLOTH
153-041-[COPY 1]	BOOTT MILLS-LOWELL, MASS. / [GENERAL PLAN OF] PROPOSED DEVELOPMENT-PRESENT WHEELS NO. 3, 4 & 5.	1920/04/12	1"=20'& 10'	H 56.7, W 77.2 CM	BLUEPRINT	PAPER
153-042	[GENERAL PLAN OF PROPOSED HYDRO-ELECTRIC UNIT OF BOOTT MILLS.] BOOTT MILLS-LOWELL, MASS. / PROPOSED DEVELOPMENT-PRESENT WHEELS NO. 6, 7 & 8.	1920/04/12	1"=20'& 10'	H 56, W 77.5 CM	INK, COLORED INK	DRAFTING CLOTH

153-042-[COPY 1]	BOOTT MILLS-LOWELL, MASS. / PROPOSED DEVELOPMENT-PRESENT WHEELS NO. 6, 7 & 8.	1920/04/12	1"=20'& 10'	H 56.7, W 77.2 CM	BLUEPRINT	PAPER
153-043	[GENERAL PLAN OF PROPOSED HYDRO-ELECTRIC UNIT OF BOOTT MILLS.] BOOTT MILLS-LOWELL, MASS. / PROPOSED DEVELOPMENT-PRESENT WHEEL NO. 9.	1920/04/12	1"=20'& 10'	H 56.2, W 77.2 CM	INK, COLORED INK	DRAFTING CLOTH
153-043-[COPY 1]	BOOTT MILLS-LOWELL, MASS. / PROPOSED DEVELOPMENT-PRESENT WHEEL NO. 9.	1920/04/12	1"=20'& 10'	H 56.7, W 77.2 CM	BLUEPRINT	PAPER
153-044	[PLAN FOR] BOOTT MILLS / # 6, 7, 8 [SWAIN 72" WHEELS] DRAFT TUBES / DROPPERS & HAMILTON .	1921/09/24	1/4"=1'	H 30.5, W 21.5 CM	INK, GRAPHITE	PAPER
153-045	PLAN TO ACCOMPANY PETITION OF / BOOTT MILL / TO BUILD A HYDROELECTRIC PLANT IN THE / MERRIMACK RIVER / LOWELL, MASS. / PLAN OF PROPOSED HYDROELECTRIC DEVELOPMENT / REPLACING UNITS NO. 6, 7 & 8.	1921/10/00	1"=8', 1"=250'	H 68.2, W 106.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
153-046	[UNTITLED.] [PLAN FOR HYDRO-ELECTRIC UNIT FOR BOOTT MILLS BY S. MORGAN SMITH CO.]	1921/12/17	1/4"=1'	H 87.3, W 90.2 CM	BLUEPRINT	PAPER
153-047	PLAN FOR HYDRO ELECTRIC UNIT FOR BOOTT MILLS BY S. MORGAN SMITH CO. [VERTICAL SECTION.]	1919/08/16	1/2"=1'	H 91.5, W 136 CM	BLUEPRINT	PAPER
153-048	LOCATION OF # 9 WHEEL / BOOTT MILLS, LOWELL, MASS.	1917/09/19	1"=20'	H 45.8, W 52 CM	INK, COLORED INK	DRAFTING CLOTH
153-050	[PLAN AND ELEVATION OF STEEL PENSTOCKS FOR PROPOSED 1700 H.P. HYDRO-ELECTRIC UNIT.]	1922/03/08				

153-056	PROPOSED / DRAFT TUBE / FOR / [ALLIS CHALMERS, 45", 1700 H.P. UNIT] BOOTT MILLS.	1922/07/15	1/2"=1'	H 88.9, W 56 CM	BLUEPRINT	PAPER
153-057	[PROPOSED HORIZONTAL SETTING WITH HYDRAUCONE FOR BOOT # 1 WHEEL. ALLIS-CHALMERS MFG. CO.]	UNDATED			BLUEPRINT	
153-058	PLAN AND SECTION / [OF] NOS. 6, 7 & 8 WHEELS / [AT] BOOTT MILLS.	1922/08/04	1/4"=1'	H 63.6, W 94 CM	INK	DRAFTING CLOTH
153-059	[PLAN OF] BOOTT MILLS 1700 HP UNIT / PENSTOCKS [ALLIS-CHALMERS 1700 H.P. UNIT.] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. [SCANNEL BOILER WORKS.]	1922/04/04	1/4"=1'	H 61, W 81.3 CM	BLUEPRINT	PAPER
153-060	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING EXTENSION TO / NOS. 1 & 2 DRAFT TUBES [BOOTT MILLS. SWAIN 72"].	UNDATED	1"=1'	H 30.5, W 80.7 CM	GRAPHITE	PAPER
153-060-[COPY 1]	BOOTT MILLS-LOWELL, MASS. / SKETCH SHOWING EXTENSION TO / NOS. 1 & 2 DRAFT TUBES [BOOTT MILLS. SWAIN 72"].	1924/04/09	1"=1'	H 30.6, W 46.1 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
153-061	BOOTT MILLS-1700 H.P. UNIT / POWER HOUSE REINFORCING-I / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/07/14	1/4"=1'	H 64.5, W 92.5 CM	INK	DARFTING CLOTH
153-062	[PROFILE AND CROSS SECTION OF BOOTT MILLS] CANAL BRIDGE / BOOTT MILLS / LOWELL, MASS.	1924/01/22	1/2"=1'	H 24, W 78.2 CM	BLUEPRINT, COLORED PENCIL	PAPER

153-063	[PLAN SHOWING] LOCATION AND CONDITION OF TRUSSES / [OF THE] BOOTT COUNTING ROOM BRIDGE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1924/08/23	1"=2'& 4'	H 55, W 63.8 CM	INK, COLORED INK	DRAFTING CLOTH
153-064	[PLAN OF] CANAL BRIDGE / AT FOOT OF JOHN STREET / BOOTT MILLS / LOWELL, MASS.	1924/10/15	1/4"=1'	H 43, W 52.5 CM	BLUEPRINT	PAPER
153-065	BOOTT MILLS COAL POCKET / RELOCATION OF R. R. TRACK [SHOWING SECTIONS] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/12/02	1"=20'	H 27, W 47 CM	INK, GRAPHITE	DRAFTING CLOTH
153-066	BOOTT MILLS COAL POCKET / RELOCATION OF R. R. TRACK [SHOWING GRADES] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/12/13	NONE	H 24.1, W 34.9 CM	INK, COLORED INK	DRAFTING CLOTH
153-067	[BROWN PAPER DRAWING OF] BOOTT MILLS / COAL POCKET FOUNDATIONS [SHOWING SOUNDINGS].	1926/12/21	1"=10'	H 53.8, W 49.7 CM	GRAPHITE, PAPER	PLAN, SECTION PLAN
153-068	[BROWN PAPER DRAWING OF] AREA OF TRUSS MEMBERS / WROUGHT IRON / RAILROAD BRIDGE ACROSS / BOOTT CANAL [TO COAL POCKET].	1926/08/00	NONE	H 34.6, W 42.3 CM	GRAPHITE	PAPER
153-069	BOOTT MILLS / LOWELL, MASS. / [CHAS. T. MAIN'S DRAWING OF] FOUNDATIONS IN INTAKE CANAL / MILL NO. 6.	1926/06/15	1/8"&1/4"=1'	H 74, W 103.5 CM	BLUEPRINT	PAPER
153-070	PLAN & SECTIONS OF / SIDE TRACK & BRIDGE TO / COAL POCKET / BOOTT MILLS.	1926/09/09	1/8"=1'	H 61.7, W 90.2 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH

153-071	[TRACING OF] PLAN AND SECTIONS / [OF] SIDE TRACK AND BRIDGE / TO COAL POCKET / BOOTT MILLS.	1926/10/20	1/16"=1'	H 64.7, W 74.3 CM	INK, COLORED INK	DRAFTING CLOTH
153-072	STEEL DETAILS / COAL POCKET BEAMS / BOOTT MILLS / LOWELL, MASS. / PROPRIETORS OF THE LOCKS & CANALS.	1927/03/11	1/2"=1'	H 51.4, W 80 CM	INK, COLORED INK	DRAFTING CLOTH
153-073	BOOTT MILLS / [PROPOSED NEW] NEW NO. 6 RACKS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1926/09/11	3/4"=1'	H 35.7, W 46.7 CM	INK	DRAFTING CLOTH
153-074	[TRACING] SKETCH SHOWING / CLEARANCES FOR SIDE TRACK / TO BOOTT MILLS COAL POCKET.	1926/09/13	1/4"=1'	H 30.9, W 23 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-075	[TRACING SHOWING STEEL BEAMS FOR NOS. 6 & 7 MILLS AT BOOTT MILLS.]	1927/01/15				TP
153-076	PLAN SHOWING / PIERS & COLUMNS PLACED IN FOUNDATION / OF BOOTT NO. 6 MILL JULY & AUG. 1926.	1926/08/10	1/8"=1'	H 37.5, W 58.5 CM	INK, COLORED INK	DRAFTING CLOTH
153-077	PLAN & SECTIONS OF / SIDE TRACK & BRIDGE TO / COAL POCKET / BOOTT MILLS [SHOWING SCHEME NO.1 OF PROPOSED CHANGES].	1926/09/09	1/8"=1'	H 61.3, W 89 CM	BLUEPRINT, COLORED PENCIL	PAPER
153-078	[TRACING] COPIED FROM PLAN OF COAL POCKET / # 552, DRG. # 5 / BOOTT MILLS.	1926/10/00	3/32"=1'	H 42.6, W 54.6 CM	GRAPHITE	DRAFTING CLOTH
153-079	CONCRETE FOUNDATIONS / BOOTT COAL POCKET / BOOTT MILLS / LOWELL, MASS.	1927/03/15	1/8"& 3/8"=1'	H 58.5, W 81.3 CM	INK	DRAFTING CLOTH
153-080	PLAN & SECTIONS / STEEL BEAMS FOR / COAL POCKET TRACK / BOOTT MILLS / LOWELL, MASS.	1927/02/18	1/8"& 1"=1'	H 61, W 87 CM	INK, COLORED INK	DRAFTING CLOTH

153-081	[BLUEPRINT SHOWING] CONCRETE FOUNDATIONS / [FOR] BOOTT [COTTON MILLS] COAL POCKET / BOOTT MILLS / [APPROVED BY B.& M.R. R.] LOWELL, MASS.	1927/03/15	1/8"& 3/8"=1'	H 58.5, W 76.2 CM	BLUEPRINT	PAPER
153-082	PLAN & SECTIONS / STEEL BEAMS FOR / COAL POCKET TRACK / BOOTT MILLS / LOWELL, MASS. [APPROVED B.& M.R. R.]	1927/02/18	1/2",1",& 1/8"=1'	H 60.8, W 85.8 CM	BLUEPRINT	PAPER
153-083	BOOTT MILLS COAL POCKET / NO. 6 & 7 MILLS FOOT BRIDGE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/01/19	1/4"=1'	H 48.3, W 72 CM	INK	DRAFTING CLOTH
153-084	[TRACING SHOWING] BOOTT NO.7 MILL / PIPE ENCLOSURE BEAM SUPPORTS.	1927/04/08	1"=1'	H 20.4, W 33.4 CM	INK	DRAFTING CLOTH
153-085	[TRACING SHOWING OLD B.& M. R. R. GIRDER FOR BOOTT COAL POCKET BRIDGE.]	1926/12/27	1/4"=1'			TP
153-086	DETAILS OF PROPOSED / R. R. BRIDGE OVER EASTERN CANAL / FOR / BOOTT MILLS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/04/30	3/8"& 3/4"=1'	H 69.8, W 104.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-087	DETAILS OF / PLATE GIRDER FOR BOOTT MILLS / R. R. BRIDGE OVER EASTERN CANAL.	1927/04/26	1/2"& 1"=1'	H 76.8, W 107.4 CM	INK, COLORED INK	DRAFTING CLOTH
153-088	PLAN AND PROFILE / OF / R. R. TRACKS ON AMORY ST. / TO / BOOTT COAL POCKET.	1927/04/00	PL & H 1"=10',V1"=1'	H 56.5, W 84.5 CM	INK	PAPER

153-089	DETAILS OF PROPOSED / R. R. BRIDGE OVER EASTERN CANAL / [APPROVED BY B.& M.] R. R. BRIDGE OVER EASTERN CANAL / FOR [BOOTT MILLS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.].	1927/04/30	3/8"& 3/4"=1'	H 69.4, W 103.5 CM	BLUEPRINT	PAPER
153-090	DETAILS OF / PLATE GIRDER / [FOR] R. R. BRIDGE OVER EASTERN CANAL [APPROVED BY B.& M. R. R.] / PROPRIETORS OF THE LOCKS CANALS / LOWELL, MASS.	1927/04/26	1/2"& 1"=1'	H 75.9, W 106.6 CM	BLUEPRINT	PAPER
153-093	DETAILS OF / STEEL FABRICATION / OF BOOTT MILLS R. R. [FOR COAL POCKET] BRIDGE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1927/06/08	1"=1'	H 59.7, W 87 CM	INK, COLORED INK	DRAFTING CLOTH
153-094	ORIGINAL SHOP DRAWING / OF BOOTT MILLS / COAL POCKET BRIDGE / GIRDER.	1927/06/00	NONE	H 68, W 91.3 CM	BLUEPRINT	PAPER
153-095	BOOTT MILLS / LOWELL, MASS. / MILL NO. 8 & MILL NO. 9 [CHAS. T. MAIN BLUEPRINT SHOWING PROPOSED] / RAMP CONNECTING 3RD & 4TH FLOORS.	1927/09/16	1/3",1/2", & 3"=1'	H 73, W 106.8 CM	BLUEPRINT	PAPER
153-096	PLAN AND SECTIONS / SHOWING PROPOSED EXTENSION OF / COAL POCKET / AT / BOOTT MILLS / PROPRIETORS OF THE LOCKS AND CANALS.	1928/02/00	1/8"=1'	H 72.4, W 90.9 CM	INK, COLORED INK	DRAFTING CLOTH
153-096-[A]	[UNTITLED PLAN.] [PLAN AND SECTIONS SHOWING PROPOSED EXTENSION OF COAL POCKET AT BOOTT MILLS PROPRIETORS OF THE LOCKS AND CANALS.]	SEE NOTES	1/8"=1'	H 71.5, W 89 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
153-097	STAIR TOWER / [FOR BOOTT] # 3 MILL / BOOTT MILLS / LOWELL, MASS.	1929/03/05	1/4", 1"=1'	H 76.3, W 95.6 CM	BLUEPRINT	PAPER

153-098	PLAN SHOWING / REAL ESTATE [OF BOOTT MILLS, BOTH INSIDE AND OUTSIDE MILLYARD, WITH AREAS AND DIMENSIONS] AS FAR AS KNOWN / TO DATE, BELONGING TO THE / BOOTT MILLS.	1929/05/28	1"=50'	H 45.1, W 66.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-098-[A]	PLAN SHOWING / REAL ESTATE AS FAR AS KNOWN / TO DATE, BELONGING TO THE / BOOTT MILLS.	1955/05/19	1"=50'	H 44.4, W 66.8 CM	INK, WATER COLOR	DRAFTING CLOTH
153-099	[PLAN OF FIFTH FLOOR OF BOOTT NO. 6 MILL SHOWING RELOCATION OF SPINNING FRAMES.]	1929/04/25	3/16"=1'			
153-100	[PLAN OF LOADING PLATFORM AND RAILROAD TRACK AT STOREHOUSE.]	1929/07/09	1"=4'			
153-101	PLAN AND ELEVATION / OF / FIRST AND SECOND FLOORS / OF / NO. 1 AND 2 CONNECTION / AT / BOOTT MILLS.	1929/12/00	1/8"=1'	H 42, W 76.2 CM	GRAPHITE, COLORED PENCIL	PAPER
153-102	BOOTT MILLS / LOWELL, MASS. / STEEL WORK OF OLD [OIL] SWITCH PLATFORM.	0000/02/07	1"=1'	H 51, W 73.5 CM	BLUEPRINT	PAPER
153-103	BOOTT MILLS / LOWELL, MASS. / [BLUEPRINT SHOWING] BUS-BAR SUPPORT[S].	0000/11/08	1/2"=1'	H 51.2, W 76.8 CM	BLUEPRINT	PAPER
153-104	PLAN & SECTION [ELEVATION] / [OF] EASTERLY END OF / MILL NO. 1 & 6 & 7 CONNECTION / AT THE / BOOTT MILLS.	1930/08/00	1/8"=1', 1"=40'	H 50, W 91.5 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
153-105	PLAN & SECTIONS / FOR / PROPOSED PASSAGEWAY / FROM / BOILER HOUSE TO MILL NO. 5 EAST / BOOTT MILLS.	1933/08/30	1/4"=1'	H 41, W 70.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

153-106	PLAN & SECTION / OF NO. 2 WHEEL / BOOTT MILLS.	1933/08/22	1/4"=1'	H 41, W 70.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-107	CROSS SECTIONS / OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY & PROCESSES.	1931/03/27	1"=40'& 200'	H 40, W 90.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
153-108	PLAN SHOWING / PROPOSED 12" CONDENSER SUPPLY / FROM L. & C. FIRE PROTECTION SYSTEM / FOR / BOOTT MILLS.	1932/09/10	1"=10'	H 52.2, W 77.6 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
153-108-A	PLAN SHOWING / PROPOSED 12" CONDENSER SUPPLY / FROM FIRE PUMP DISCHARGE LINE / FOR BOOTT MILLS.	1941/11/07	1"=10'	H 52.5, W 94.7 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
153-109	PLAN SHOWING PROPERTY / BETWEEN / BRIDGE, BROOKINGS, FRENCH & AMORY STREETS [BELONGING TO ROBERT POTTER AND SAMUEL KATZ].	1931/05/22	1"=20'	H 52.2, W 50.7 CM	INK	DRAFTING CLOTH
153-110	SKETCH OF PROPERTY / BETWEEN / FRENCH & AMORY STREETS / TAKEN FROM VARIOUS SOURCES / LOWELL, MASS.	1931/11/16	1"=30'	H 41.3, W 74.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-111	LAYOUT / PENSTOCK / FOR / # 1 WATERWHEEL.	1918/09/16	1/4"=1'	H 55.3, W 90.8 CM	BLUEPRINT	PAPER
153-112	STAIRWAY TOWER / # 3 MILL / BOOTT MILLS / LOWELL, MASS.	1929/03/05	1/4"=1',1"=6"	H 77.2, W 96.5 CM	GRAPHITE	TRACING PAPER

153-113	PLAN & SECTIONS SHOWING / SETTINGS OF [L. I. D.] "MASSACHUSETTS" SECTION 8 WHEELS / IN / 3, 4 & 5 WHEEL PITS AT BOOTT MILLS.	1931/03/12	1"=20'& 10'	H 52.3, W 65.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
153-114	PLAN OF / FIRST AND SECOND FLOORS / BOOTT MILLS OFFICE.	1936/02/21	1/4"=1'	H 76, W 92.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-114-[COPY 1]	PLAN OF / FIRST AND SECOND FLOORS / BOOTT MILLS OFFICE.	1936/02/21	1/4"=1'	H 29 1/2" W 36 2/8"	BLUEPRINT	PAPER
153-115	[PLAN SHOWING PROPERTY OF BOOTT MILLS AT CORNERS OF FRENCH AND JOHN STS. LEASED TO PARCHERT TIRE SERVICE.]	1932/07/29	1"=20'			
153-116	[ARCHITECT'S SKETCH SHOWING ELEVATIONS OF PROPOSED GREASING STATION AT JOHN & FRENCH STS.] FROM THE OFFICE OF / HARRY PRESCOTT GRAVES / ARCHITECT / LOWELL MASS.	1931/07/28	1/4"=1'	H 43, W 20.5 CM	GRAPHITE	PAPER
153-117	[PLAN OF PARCHERT'S GREASING STATION SHOWING TANKS, PIPING AND ROTARY LIFTS.]	1931/08/00	1/4"=1'			
153-118	[PLAN, ELEVATIONS AND SECTIONS OF PROPOSED GREASING STATION AT JOHN & FRENCH STS.]	1931/06/25	AS NOTED			
153-119	PLAN & SECTIONS / OF / BOOTT MILLS PROPERTY / CORNER OF JOHN & FRENCH STREETS.	1931/05/25	1"=20'	H 40.4, W 49 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-120	COPY OF PORTION OF ORIGINAL NOV. 16, 1835 INDENTURE PLAN / BETWEEN / PROP. LOCKS & CANALS & BOOTT COTTON MILLS.	1931/12/24	1"=80'	H 28.3, W 24.5 CM	INK, WATER COLOR	DRAFTING CLOTH

153-121	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / BOOTT COTTON MILLS.	1898/04/00	1"=30'	H 41.7, W 85 CM	BLUEPRINT	PAPER
153-122	CROSS SECTIONS / OF / BOOTT MILLS / SHOWING / ARRANGEMENT OF MACHINERY & PROCESSES.	1931/09/00	1"=40'	H 40, W 90.2 CM	INK	DRAFTING CLOTH
153-123	PLAN OF PROPERTY / AT / CORNER OF FRENCH & BROOKINGS STREETS / BELONGING TO / BOOTT MILLS.	1931/07/07	1/4"=1'	H 39.9, W 64.9 CM	INK, WATER COLOR	DRAFTING CLOTH
153-124	[PLAN AND ELEVATIONS OF] PROPOSED / PARCHERT SERVICE STATION [AT FRENCH AND BROOKINGS ST.]	1932/08/10	1"=20' & 1/4"=1'	H 73, W 95 CM	GRAPHITE	TRACING PAPER
153-125	[PLAN, ELEVATIONS AND SECTIONS OF PROPOSED PARCHET'S SERVICE STATION BETWEEN FRENCH, JOHN AND AMORY STREETS.]	1934/05/18	1/8"= 1'		INK, COLORED	TRACING PAPER
153-126	PLAN & SECTIONS / OF / [MILL NO.] 3 & 4 CONNECTION / BOOTT MILLS.	1935/05/09	1/8"=1'	H 60.4, W 111 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-127	PROPOSED ALTERATIONS / OF / PARTITION WALLS ON FIRST FLOOR / OF [MILL NO.] 3 & 4 CONNECTION / BOOTT MILLS / LOWELL, MASS.	1935/05/28	3/8",1"& 2"=1'	H 72.5, W 110.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-128	BOOTT MILLS / LOWELL, MASS. [PLAN AND SECTION OF PORTION OF MILL NO. 4 AND 5 SHOWING DEFLECTION OF MILL WALLS].	1935/07/22	1/8"& 1/16"=1'	H 40.5, W 75.9 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH

153-129	SECTION SHOWING / DEFLECTIONS OF MILL WALLS / FROM THE VERTICAL / BOOTT MILLS [NOS. 1, 4 AND 6] / LOWELL, MASS.	1935/08/21	SEE NOTES	H 59.5, W 94.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-130	PLAN AND SECTION / BETWEEN / MILL NO. 9 AND PICKER BLDG. / BOOTT MILLS.	1935/10/16	1/4"-1', 1/8"=1'	H 43.5, W 89 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-131	[PLAN AND ELEVATION SHOWING PROPOSED DOOR (TRACING) PARCHER[T]'S GREASING STATION.]	1935/12/11	1/4"=1"			DRAFTING CLOTH
153-132	SIDE ELEVATIONS / OF / OFFICE BUILDING / BOOTT MILLS.	1936/02/24	1/4"=1'	H 76.5, W 92.8 CM	INK	DRAFTING CLOTH
153-132-[COPY 1]	SIDE ELEVATIONS / OF / OFFICE BUILDING / BOOTT MILLS.	1936/02/24	1/4"=1'	H 75, W 92 CM	BLUEPRINT	PAPER
153-133	PLAN & SECTIONS / OF / OFFICE BUILDING / BOOTT MILLS.	1936/02/26	1/4"& 1/2"=1'	H 76, W 92.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-133-[COPY 1]	PLAN & SECTIONS / OF / OFFICE BUILDING / BOOTT MILLS.	1936/02/26	1/4"& 1/2"=1'	H 75, W 92 CM	BLUEPRINT	PAPER
153-134	PLAN & ELEVATION / SHOWING PORTION OF / BOOTT MILLS-TURBINE BLDG.	1936/05/22	3/8"=1'	H 44.9, W 77.8 CM	INK, COLORED INK	DRAFTING CLOTH
153-135	PLAN SHOWING / PROPERTY OF BOOTT MILLS / LEASED TO / PARCHERT TIRE SERVICE / FOR / AUTOMOBILE SERVICE STATIONS.	1934/07/26	1"=20'	H 56, W 68 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-136	NEW FLOOR / IN / 6- 7- 8 WHEELHOUSE / BOOTT MILLS / LOWELL, MASS.	1923/03/28	1/2"=1'	H 70.1, W 53.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-137	BOOTT MILLS / BLEACH HOUSE [PLAN AND ELEVATIONS].	1938/12/00	1/2"=1'	H 61.7, W 72.4 CM	GRAPHITE	PAPER
153-138	[ELEVATION OF] BOOTT MILLS / BLEACH HOUSE / FRAME WORK TO / PUT STEEL SASH ON.	1938/12/00	1/2"=1'	H 70.8, W 84.5 CM	GRAPHITE	PAPER

153-139	BOOTT MILLS / BLEACH HOUSE / STEEL DETAILS.	1938/12/00	1"=1", 3"=1'	H 71.8, W 92 CM	GRAPHITE	PAPER
153-140	[STEEL DETAIL FOR BLEACH HOUSE FLUE NO. 1 AT BOOTT MILLS.]	1938/12/09				
153-141	[STEEL DETAIL FOR BLEACH HOUSE FLUE NO. 2 AT BOOTT MILLS.]	1938/12/16				
153-142	PLAN & ELEVATION / SHOWING / PROPOSED STAIRWAY / OFFICE BUILDING / BOOTT MILLS / LOWELL, MASS.	1937/05/05	1/4"=1'	H 52.3, W 77 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-143	BOOTT MILLS OFFICE [PLAN OF FIRST AND SECOND FLOORS].	1937/07/26	1/4"=1'	H 77.6, W 95.3 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
153-144-[B]	PROPOSED BRIDGE / OVER EASTERN CANAL / TO / BOOTT MILLS / LOWELL, MASS. / SCHEME B. (USED).	1938/05/04	1/4"=1'	H 42.1, W 73.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
153-144-[B]-[COPY 1]	PROPOSED BRIDGE / OVER EASTERN CANAL / TO / BOOTT MILLS / LOWELL, MASS. / SCHEME B. (USED).	1938/05/04	1/4"=1'	H 41.7, W 73.5 CM	BLUEPRINT	PAPER
153-144-A	PROPOSED BRIDGE / OVER EASTERN CANAL / TO / BOOTT MILLS / LOWELL, MASS. / SCHEME A. (NOT USED).	1938/05/02	1/4"=1'	H 42.6, W 69.9 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
153-145	STEEL DETAILS / FOR / BOOTT MILLS BRIDGE [OVER EASTERN CANAL].	1938/05/24	NONE	H 41.4, W 74.2 CM	INK, COLORED INK	DRAFTING CLOTH
153-146	[STEEL FOR BLEACH HOUSE AT BOOTT MILLS.]	1938/11/18				
153-147	[PLAN AND ELEVATION OF BINS FOR BLEACH HOUSE AT BOOTT MILLS BY H. W. BUTTERWORTH & SONS CO. PHILADELPHIA, PA.]	1938/12/04	1/2"=1'			

153-148	PLAN & ELEVATIONS / OF / AREA BETWEEN MILL NO.1 & MILL NO. 7 / AT THE / BOOTT MILLS / LOWELL, MASS.	1938/10/22	1/4"=1'	H 58, W 90.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-148-[COPY 1]	PLAN & ELEVATIONS / OF / AREA BETWEEN MILL NO.1 & MILL NO. 7 / AT THE / BOOTT MILLS / LOWELL, MASS.	1938/10/22	1/4"=1'	H 57.5, W 133.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
153-148-[COPY 2]	PLAN & ELEVATIONS / OF / AREA BETWEEN MILL NO.1 & MILL NO. 7 / AT THE / BOOTT MILLS / LOWELL, MASS..	1938/10/22	1/4"=1'	H 57.5, W 133.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
153-149	[PLAN OF MILL NO.5 WEST - 2D FLOOR OF BOOTT MILLS SHOWING LOCATION FOR DRAPER LOOMS.]	1939/02/00	1/4"=1'			
153-150	PROPERTY BELONGING / TO / BOOTT MILLS / ON JOHN & FRENCH STREETS.	1939/06/00	1"=30'	H 48.4, W 65.8 CM	INK	DRAFTING CLOTH
153-150-[COPY 1]	PROPERTY BELONGING / TO / BOOTT MILLS / ON JOHN & FRENCH STREETS.	1939/06/00	1"=30'	H 48.4, W 65.8 CM	BLUE LINE PRINT	PAPER
153-151	PLAN AND ELEVATION / OF / PROPOSED FOOT BRIDGE / AT / BOOTT MILLS / BETWEEN / MILL NO. 8 AND OFFICE BUILDING.	1939/06/15	1/4"=1'	H 46.5, W 97.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
153-152	PLAN AND SECTION / OF / TRANSFORMER VAULT / BOOTT MILLS.	1939/12/08	1/4"=1'	H 39.5, W 75 CM	INK, COLORED INK	DRAFTING CLOTH
153-153	PORTION OF MILL YARD / OF THE / BOOTT MILLS [SHOWING MILLS NOS. 1, 2 AND 7, NEW BLEACH HOUSE AND ELEVATION OF BLEACH HOUSE].	1940/03/00	1/8"=1'	H 66, W 133.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
153-154	[ELEVATION OF KIER AND BIN ROOM AT BOOTT MILLS BY H. W. BUTTERWORTH & SONS CO. PHILDELPHIA, PA.]	1938/11/04	1/2"=1'		BLUEPRINT	

153-155	[PLAN AND ELEVATION OF CONCRETE BASE AND BINS AT BOOTT MILLS BY H. W. BUTTERWORTH & SONS CO. PHILADELPHIA, PA.]	1938/11/15	1/2"=1'		BLUEPRINT	
153-156	[PLAN AND ELEVATION OF CONCRETE BASE AND BINS AT BOOTT MILLS BY H. W. BUTTERWORTH & SONS CO. PHILADELPHIA, PA.]	1938/11/04	1/2"=1'		BLUEPRINT	
153-157	[COPY OF] PLAN OF LAND IN LOWELL, MASS. / BELONGING TO BOOTT COTTON MILLS.	1898/04/00	1"=30'	H 42.5, W 77.5 CM	INK, COLORED INK	DRAFTING CLOTH
153-158	PLAN OF / MILL NO. 5 EAST 2ND FLOOR / BOOTT MILLS.	1940/08/28	1/8"=1'	H 43.2, W 101.7 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
153-159	DETAILS OF PICKER STICK / BOOTT MILLS.	1940/09/12	FULL SIZE	H 46.9, W 94 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
153-160	REPAIRS IN / FOREBAY & PENSTOCKS / OF NO. 6 WHEEL / BOOTT MILLS [SHOWING REPAIRS MADE IN JULY, 1941].	1941/07/20	1/4"=1'	H 66, W 117 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
153-161	PARTIAL LAYOUT OF / NO. 6 WHEEL / BOOTT MILLS.	1943/01/00	3/4"=1'	H 70.9, W 81.3 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
153-162	PLAN & SECTION / SCOURING TANK ROOM / BOOTT MILLS / LOWELL, MASS.	1944/04/00	1/2"=1'	H 44.3, W 81.3 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
153-163	PLAN & ELEVATIONS / OF PROPOSED / BULKHEAD NO. 9 WHEEL / BOOTT MILLS / LOWELL, MASS.	1944/04/00	1/2"& 1"=40'	H 43.2, W 63.9 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
153-164	PLAN & ELEVATION / OF / NO. 1 PENSTOCK & HEADGATE / BOOTT MILLS / LOWELL, MASS.	1945/04/27	1/2"=1'	H 55.9, W 76.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

153-165	PLAN OF EAST END OF 2ND FLOOR / MILL NO. 1 / BOOTT MILLS.	1946/02/04	1/2"=1'	H 51.8, W 76.8 CM	GRAPHITE	DRAFTING CLOTH
153-166	[SKETCH OF TENDER FRAME GEAR FOR BOOTT MILLS.]	1946/02/22	HALF SIZE			TRACING PAPER
153-167	[SOME OF THE GEARS ON THE BUTTERWORTH MERCERIZE MACHINE AT THE BOOTT MILLS.]	1947/02/14				TRACING PAPER
153-168	DIAGRAM NO. 2 / PERMANENT & SURPLUS / MILL POWERS / DRAWN BY 3, 4 OR 5 WHEELS.	1949/09/00	NONE	H 58.4, W 45.4 CM	INK	PAPER
153-168	BOOTT MILL [YARD] / LOWELL, MASS.	1955/11/22	1"=30'	H 21.6, W 40 CM	BLUEPRINT	PAPER
153-169	FIRST FLOOR PLAN AND ELEVATION OF / MILL # 6 WITH SURROUNDING PROPERTY / AT THE / BOOTT MILLS.	1955/04/26	1"=20'	H 51, W 76.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
153-170	PLAN SHOWING / LOCATION OF THREE AREAS / OVER LOCKS & CANALS PROPERTY / FOR ENTRANCE TO BOOTT MILLS / LOWELL, MASS.	1955/05/24	1"=20'	H 35, W 75.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
153-171	[PLAN SHOWING PORTION OF LAND AND BLDGS. BELONGING TO BOOTT MILLS AT 95 BRIDGE STREET IN LOWELL, MA.]	1958/11/19				
153-172	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 53, W 78 CM	INK, COLORED INK	PAPER
153-172-[COPY 1]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 26.5, W 38.5 CM	PHOTOPRINT	FILM

153-172-[COPY 2]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 32, W 51 CM	PHOTOPRINT	PAPER
153-172-[COPY 3]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 53, W 78 CM	BLUEPRINT	PAPER
153-172-[COPY 4]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 53, W 78 CM	RED LINE PRINT	PAPER
153-172-[COPY 5]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 28, W 43 CM	PHOTOPRINT	PAPER
153-172-[COPY 6]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 32, W 51 CM	PHOTOPRINT	PAPER
153-172-[COPY 7]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R. H. ALLIS CHALMERS / IN USE FROM MAY 1923.	1923/11/26	NONE	H 50.2, W 63.9 CM	BLUEPRINT	PAPER
154-001	[DIAGRAM SHOWING] MEAN DAILY GAUGE HEIGHTS / [OF THE] PEMIGEWASSET RIVER AT PLYMOUTH [N.H.]	SEE NOTES	NONE	H 53.1, W 40.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-002	[PLAN OF] MERRIMACK RIVER / SHOWING SECTIONS BELOW MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/00	1"=50'	H 69.2, W 97.9 CM	INK, GRAPHITE	DRAFTING CLOTH

154-003	[PLAN SHOWING] CONTOURS [OF MERRIMACK RIVER FROM] / MOODY ST. TO FREE LANDING / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/23	1"=20'	H 87.7, W 160.2 CM	INK, COLORED INK	DRAFTING CLOTH
154-005	[PLAN & SECTION OF] POWER STATION-2500 K.W. / BELOW MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/19	1/4"=1'	H 63.6, W 94.4 CM	BLUEPRINT	PAPER
154-005-[A]	[PLAN & SECTION OF] POWER STATION 2500 K.W. / BELOW MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/19	1/4"=1'	H 63.6, W 94.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-009	[DRAWING SHOWING] PLAN, ELEVATIONS & SECTION / FOR WEIR BELOW / MERRYMEETING LAKE DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/09/25	1"=10',1'& 2'	H 56, W 78.5 CM	INK	DRAFTING CLOTH
154-010	PLAN & ELEVATION / [OF] MERRYMEETING LAKE DAM / FROM SURVEY OF JUNE, 1922. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/09/25	1"=10'	H 59.7, W 81.5 CM	INK, COLORED INK	DRAFTING CLOTH
154-010-A	PLAN & ELEVATION / [OF] MERRYMEETING LAKE DAM / FROM SURVEY OF JUNE, 1922. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. [SHOWING STATUS OF WORK ON FEB.1, 1923.]	1922/09/21	1"=10'	H 59.4, W 81 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-011	[PLAN OF] SECTIONS OF DAM & SPILLWAY / [AT] PROPOSED MERRYMEETING LAKE DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/06/28	1"=5'& 10'	H 51.2, W 93.5 CM	INK	DRAFTING CLOTH

154-011-A	SECTION[S] OF DAM & SPILLWAY / [OF] PROPOSED MERRYMEETING LAKE DAM / [SHOWING THE STATUS OF WORK ON FEB.1, 1923] PROPRIETORS OF THE LOCKS & CANALS / LOWELL,MASS.	1922/06/28	1"=5'& 10'	H 51.2, W 93.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-012	[DRAWING SHOWING] MERRYMEETING LAKE / CULVERT [BELOW DAM] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/09/25	1"=1/4'& 1'	H 30.6, W 52.2 CM	INK, GRAPHITE	DRAFTING CLOTH
154-013	[BLACKWATER RIVER POWER DEVELOPMENT. PLAN OF RESERVOIR SITE IN TOWNS OF WEBSTER & SALISBURY, N.H.]	1910/10/15				
154-014	[DRAWING SHOWING] HEADGATE MASONRY / [AT] MERRYMEETING LAKE DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/11/17	3/8"=1'	H 55, W 63.3 CM	GRAPHITE	TRACING PAPER
154-015	[DRAWING SHOWING] ARRANGEMENT OF GATE & HOISTING MECHANISM / FOR / AMES CONSTRUCTION CO. SOMERSWORTH, N.H. / HOLYOKE MACHINE CO. / WORCESTER, MASS. / G.I.C. / FOR MERRYMEETING LAKE DAM-NEW DURHAM, N.H.	1922/10/19	3/4"=1'	H 65.4, W 69.8 CM	BLUEPRINT	PAPER
154-016	LOCKS & CANALS / DETAILS OF WASTE GATE & HOISTING MECHANISM / [FOR] SUNCOOK MILLS [REVISED FOR MERRYMEETING LAKE DAM].	1922/05/31	1 1/2"=1'	H 84.1, W 69.9 CM	BLUEPRINT, COLORED PENCIL	PAPER

154-017	FLOOD PROFILES / OF THE / MERRIMACK RIVER / [FROM] HOOKSETT, N.H. / TO / LAWRENCE, MASS.	1922/03/04	H1"=1MILE, V1"=12'	H 54.2, W 143.5 CM	INK, COLORED INK	PAPER
154-017-A	FLOOD PROFILES / OF THE / MERRIMACK RIVER / HOOKSETT, N.H. TO LAWRENCE, MASS.	1937/00/00	H1"=1MILE, V1"=12'	H 59.4, W 155 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
154-017-A-[COPY 1]	FLOOD PROFILES / OF THE / MERRIMACK RIVER / HOOKSETT, N.H. TO LAWRENCE, MASS.	1937/00/00	H1"=1 MILE, 1"=12'	H 59.4, W 153.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-017-A-[COPY 2]	FLOOD PROFILES / OF THE / MERRIMACK RIVER / HOOKSETT, N.H. TO LAWRENCE, MASS.	1937/00/00	H1"=1MILE, V1"=12'	H 59.1, W 153.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-017-A-[COPY 3]	FLOOD PROFILES / OF THE / MERRIMACK RIVER / HOOKSETT, N.H. TO LAWRENCE, MASS.	1937/00/00	H1"=1MILE, 1"=12'	H 59, W 145.4 CM	BLUEPRINT	PAPER
154-018	PLAN & ELEVATION / [OF] MERRYMEETING LAKE DAM / FROM SURVEY OF JUNE, 1922 / PROPRIETORS OF LOCKS & CANALS / LOWELL MASS.	1922/06/26	1"=10'	H 64.9, W 81.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-019	PROFILE OF UNION POWDER WORKS CANAL FROM BEAR POND BROOK [MERRYMEETING LAKE, N.H.].	1922/10/13	NONE	H 15.3, W 55.9 CM	INK	PAPER
154-020	PRELIMINARY SURVEY OF / MERRYMEETING LAKE DAM / COPIED FROM PENCIL DRAWING BY E. A. G. / AUG.18, 1921. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/06/19	1"=20', 1"=5'	H 55.9, W 75.6 CM	INK, COLORED INK	DRAFTING CLOTH
154-021	[MAP OF] CROMWELL'S FALLS.	1922/11/00	1"=200'	H 40.1, W 54.3 CM	GRAPHITE	CLOTH BACKED PAPER

154-022	AMOSKEAG MFG. CO. MANCHESTER, N.H. / [MAP OF] MERRIMACK RIVER BETWEEN CROMWELL'S & MOORE'S FALLS, N.H.	1921/01/03	1"=1000'	H 30, W 69.5 CM	BLUEPRINT	PAPER
154-023	[DIAGRAM SHOWING "SCHEDULE & ACTUAL HEIGHTS" AT LAKE WINNIPISEOGEE, N.H.]	UNDATED				
154-024	[DRAWING OF] PLAN & SECTIONS / [OF] PERKINS BROOK FLUME / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/11/21	1"=10', 1/2"=1'	H 65.1, W 94.7 CM	INK	DRAFTING CLOTH
154-025	[DIAGRAM OF] RATING CURVE FOR [MERRIMACK RIVER AT] REED'S FERRY [N.H.] OBTAINED BY COMPARISON.	1921/11/00	NONE	H 56, W 120.1 CM	INK, GRAPHITE	PAPER
154-026	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS OF MERRIMACK RIVER [FROM LOWELL TO CROMWELL'S FALLS] / AT DIFFERENT PLACES AT SAME TIME.	1908/08/28	NONE	H 56.5, W 78.9 CM	INK, COLORED INK	CLOTH BACKED PAPER
154-027	[DIAGRAM OF FLOW TAKEN MAY 13, 1905 & OCT. 1906, SHOWING] CROSS SECTION [& FLOW] OF / PEMIGEWASSET RIVER AT PLYMOUTH, N.H.	1905/05/13	NONE	H 45.8, W 58.7 CM	INK, COLORED INK	PAPER
154-027-A	FLOW OF PEMIGEWASSET RIVER / AT PLYMOUTH, N.H.	1905/05/13	NONE	H 21.6, W 30.5 CM	INK, COLORED INK	PAPER
154-028-[A]	[DIAGRAM SHOWING] FLOW OF / PEMIGEWASSET RIVER / AT / PLYMOUTH, N.H.	SEE NOTES	NONE	H 40.1, W 51.2 CM	INK, COLORED INK	PAPER
154-028-[B]	RATING CURVE FOR PEMIGEWASSET RIVER / AT PLYMOUTH, N.H.	UNDATED	NONE	H 28.1, W 44 CM	BLUEPRINT	PAPER

154-029	[MAP OF SUNCOOK PONDS (SKETCH) SHOWING OWNERS OF PROPERTY IN VICINITY OF PONDS, AS SHOWIN ON "MAP OF BELKNAP COUNTY, N. H., BY E. M. WOODFORD, 1860."]	1923/03/13	1.6"=1 MILE			
154-030	[DESIGN FOR] PROPOSED SUNCOOK DAM / HOLLOW CONCRETE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/05/24	1"=10' & 20'	H 46.7, W 67.3 CM	GRAPHITE	TRACING PAPER
154-031	[PLAN OF WICASSEE DAM NEAR TYNGS ISLAND ON THE MERRIMACK RIVER SHOWING SOUNDINGS & CONTOURS, 1908.]	1908/00/00	1"=40'			
154-032-[A]	SECTION OF CAPSTONE OF PAWTUCKET DAM / SHOWING LOCATION & DIMENSIONS / OF STEEL PINS & PIN HOLES.	1909/05/07	FULL SIZE	H 34.6, W 35.9 CM	INK, COLORED INK	DRAFTING CLOTH
154-032-[B]	SKETCH SHOWING ARRANGEMENT OF PINS / & FLASHBOARDS ON PAWTUCKET DAM AS / THEY ARE MAINTAINED IN 1908.	1908/06/01	1/2 SIZE, 1"=1'	H 38.5, W 51.8 CM	INK, COLORED INK	DRAFTING CLOTH
154-032-[COPY 1]	SKETCH SHOWING ARRANGEMENT OF PINS / & FLASHBOARDS ON PAWTUCKET DAM AS / THEY ARE MAINTAINED IN 1908.	1908/06/01	1/2 SIZE,1"=1'	H 37.5, W 51.5 CM	BLUEPRINT	PAPER
154-033-[A]	DISCHARGE DIAGRAM / FOR MERRIMACK RIVER AT FRANKLIN JUNCTION N. H. / FROM RECORDS OF U.S. GEOLOGICAL SURVEY.	1912/11/01	NONE	H 51.1, W 79.2 CM	INK	DRAFTING CLOTH
154-033-[B]	DISCHARGE DIAGRAM / FOR MERRIMACK RIVER AT FRANKLIN JUNCTION N. H. / FROM RECORDS OF U.S. GEOLOGICAL SURVEY.	1916/05/11	NONE	H 51.4, W 91.4 CM	INK	DRAFTING CLOTH

154-033-[C]	RATING CURVE FOR MERRIMACK RIVER, FRANKLIN JCT. N.H.	SEE NOTES	NONE	H 43.6, W 56.8 CM	BLUEPRINT, INK	DRAFTING CLOTH
154-033-[D]	DISCHARGE DIAGRAM / FOR MERRIMACK RIVER AT FRANKLIN JUNCTION N. H. / FROM RECORDS OF U.S. GEOLOGICAL SURVEY.	1916/05/11	NONE	H 43.6, W 56.8 CM	BLUEPRINT	PAPER
154-035	RATING DIAGRAM FOR MERRIMACK RIVER / AT FRANKLIN JUNCTION N. H. FROM RECORDS / OF U.S. GOELOGICAL SURVEY.	1905/06/26	NONE	H 53.7, W 83.3 CM	INK	PAPER
154-036	[TRACING] PLAN SHOWING / PROFILE OF FISHWAY / AT / PAWTUCKET DAM / FOR / LOCKS & CANALS [LOWELL, MASS.].	1921/08/00	1"=4'	H 19.1, W 68.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
154-037	PLAN / SHOWING FISHWAY / AT PAWTUCKET DAM / FOR / LOCKS & CANALS.	1921/08/00	1"=4'	H 47.3, W 49.9 CM	INK, COLORED INK	DRAFTING CLOTH
154-038	[DESIGN FOR] PROPOSED SUNCOOK DAM / EARTH FILL / [PROPRIETOR]S OF THE LOCKS AND CANALS / LOWELL MASS.	1923/05/28	1"=10' & 20'	H 47.3, W 67.4 CM	GRAPHITE	TRACING PAPER
154-040	[DIAGRAM SHOWING] MERRIMACK RIVER / GAUGE HEIGHTS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/04/26	1"=10'	H 57.9, W 75.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-041	[DIAL FOR] GAUGE AT THORNTON'S FERRY.	UNDATED	NONE	H 32.4, W 32.4 CM	INK	DRAFTING CLOTH
154-043	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS OF MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO SHORT FALLS.	1923/04/07	NONE	H 45.8, W 29.3 CM	INK	PAPER
154-044-A-[COPY 1]	MERRIMACK RIVER / PLAN SHOWING DRAINAGE BASIN ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS & / LENGTH OF PRECIPITATION RECORDS.	UNDATED	1/2"=10 MILES	H 44.1, W 25.5 CM	BLUEPRINT	PAPER

154-044-A-[COPY 2]	MERRIMACK RIVER / PLAN SHOWING DRAINAGE BASIN ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS & / LENGTH OF PRECIPITATION RECORDS.	UNDATED	1/2"=10 MILES	H 43.9, W 26.4 CM	BLUE LINE PRINT	PAPER
154-046	[PLANS OF] CENTRAL POWER STATION [ON MERRIMACK RIVER AT LOWELL] / SCHEME A / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/24	1"=10'& 20'	H 75.6, W 113.3 CM	INK, COLORED INK	DRAFTING CLOTH
154-047	SECTIONS IN MERRIMACK RIVER / ABOVE / PAWTUCKET DAM AT REGULAR GAUGES.	1915/07-08/00	1"=50'	H 69.2, W 97.9 CM	INK, GRAPHITE	DRAFTING CLOTH
154-048	AMOSKEAG MFG. CO. MANCHESTER, N.H. / [PLAN OF] MERRIMACK RIVER BETWEEN MOORE'S FALLS & MANCHESTER, N.H. [SHOWING PROPOSED POWER HOUSE & DAM AT THE FALLS BY THE AMOSKEAG MFG. CO.]	1921/03/01	1"=1000'	H 38.2, W 135.6 CM	BLUEPRINT	PAPER
154-049-[A]	DIAGRAM / OF / NET-HORSE POWER OF WATER-WHEELS / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1916-1929 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1919/03/00	NONE	H 28.1, W 43.3 CM	INK	DRAFTING CLOTH
154-049-[A]-[COPY 1]	DIAGRAM / OF / NET-HORSE POWER OF WATER-WHEELS / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1916-1929 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1919/03/00	NONE	H 27.5, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER

154-049-[B]	DIAGRAM / OF / NET-HORSE POWER OF WATER-WHEELS / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1930-1943 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1930/11/00	NONE	H 28.1, W 43.3 CM	INK, GRAPHITE	DRAFTING CLOTH
154-050	DIAGRAM / OF / NET HORSE-POWER OF WATER-WHEELS / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1902-1915 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-051-[A]	DIAGRAM / OF / 24 HOUR FLOW IN C.F.P.S. OF MERRIMACK RIVER AT LOWELL, MASS. / (NET DRAINAGE AREA=3967 SQ. MILES) / BY MONTHS FOR YEARS 1902-1929 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1919/03/00	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-051-[B]	DIAGRAM / OF / 24 HOUR FLOW IN C.F.P.S. OF MERRIMACK RIVER AT LOWELL, MASS. / (NET DRAINAGE AREA=3967 SQ. MILES) / BY MONTHS FOR YEARS [1930-1943] / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1930/11/00	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH

154-052	DIAGRAM / OF / 24 HOUR FLOW IN C.F.P.S. OF MERRIMACK RIVER AT LOWELL, MASS. / (NET DRAINAGE AREA=3967 SQ. MILES) / BY MONTHS FOR YEARS 1902-1915 / FOR / HYDRO ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-053	DIAGRAM / OF / KILOWATT HOURS DELIVERED AT SWITCHBOARD / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) BY MONTHS FOR YEARS 1930-1943 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1930/11/00	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-053-[A]	DIAGRAM / OF / KILOWATT HOURS DELIVERED AT SWITCHBOARD / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1916-1929 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	SEE NOTES	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-053-[A]-[COPY 1]	DIAGRAM / OF / KILOWATT HOURS DELIVERED AT SWITCHBOARD / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1916-1929 / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	NONE	H 27.5, W 36 CM	BLUEPRINT, COLORED PENCIL	PAPER

154-054	DIAGRAM / OF / KILOWATT HOURS DELIVERED AT SWITCHBOARD / (FROM 10 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1902-1915. / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	NONE	H 28.1, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-055-[A]	HYDROGARPH DIAGRAM OF MERRIMACK RIVER / AT / LOWELL & CROMWELL'S FALLS [FOR CALENDAR MONTHS & CU. FT. PER SEC. PER SQ. MILE. (1914 TO 1918)].	1919/03/20	NONE	H 53.3, W 40.8 CM	INK, COLORED INK	PAPER
154-055-[B]	HYDROGRAPH OF MERRIMACK RIVER / AT / LOWELL & CROMWELL'S FALLS.	1919/03/20	NONE	H 53.3, W 40.8 CM	INK, COLORED INK	PAPER
154-056	[DIAGRAM SHOWING] CONCENTRATION / OF / 24-HOUR FLOW IN 10 HOUR DRAFT / AT / [MERRIMACK RIVER AT] LOWELL DURING 1918 / LOWELL,MASS.	1919/03/22	NONE	H 64.7, W 79.4 CM	INK	DRAFTING CLOTH
154-061-[COPY 1]	AMOSKEAG MFG. CO. / MERRIMACK RIVER SLOPES / FROM / CROMWELL'S FALLS TO MANCHESTER.	1921/01/06	NONE	H 62.9, W 172.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-061-[COPY 2]	AMOSKEAG MFG. CO. / MERRIMACK RIVER SLOPES / FROM / CROMWELL'S FALLS TO MANCHESTER.	1921/01/06	NONE	H 62.8, W 172.2 CM	BLUEPRINT	PAPER
154-063	ASSEMBLED DIAGRAM OF ASSUMED / RELATIONS USED BY MR. C. R. / LIBBY IN CALCULATING THE / CHARTS OF NET HORSEPOWER OF / WATER WHEELS & KILOWATT / HOURS AT SWITCHBOARD FOR THE HYDRO-ELECTRIC DEVELOPMENT AT / LOWELL, [...SEE NOTES]	SEE NOTES	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER

154-063-[COPY 1]	ASSEMBLED DIAGRAM OF ASSUMED / RELATIONS USED BY MR. C. R. / LIBBY IN CALCULATING THE / CHARTS OF NET HORSEPOWER OF / WATER WHEELS & KILOWATT / HOURS AT SWITCHBOARD FOR THE HYDRO-ELECTRIC DEVELOPMENT AT / LOWELL, [...SEE NOTES]	SEE NOTES	NONE	H 28, W 42 CM	BLUEPRINT	PAPER
154-063-[COPY 2]	ASSEMBLED DIAGRAM OF ASSUMED / RELATIONS USED BY MR. C. R. / LIBBY IN CALCULATING THE / CHARTS OF NET HORSEPOWER OF / WATER WHEELS & KILOWATT / HOURS AT SWITCHBOARD FOR THE HYDRO-ELECTRIC DEVELOPMENT AT / LOWELL, [...SEE NOTES]	SEE NOTES	NONE	H 28, W 42 CM	BLUEPRINT	PAPER
154-063-A	ASSEMBLED DIAGRAM OF ASSUMED / RELATIONS USED BY MR. C. R. LIBBY / IN CALCULATING THE CHARTS OF NET HORSE POWER OF WATERWHEELS & / KILOWATT HOURS AT SWITCH BOARD FOR HYDRO-ELECTRIC DEVELOPMENT AT / LOWELL, [...SEE NOTES]	SEE NOTES	NONE	H 27.9, W 41.3 CM	INK, COLORED INK	PAPER
154-063-A-[COPY 1]	ASSEMBLED DIAGRAM OF ASSUMED / RELATIONS USED BY MR. C. R. LIBBY / IN CALCULATING THE CHARTS OF NET HORSE POWER OF WATERWHEELS & / KILOWATT HOURS AT SWITCH BOARD FOR HYDRO-ELECTRIC DEVELOPMENT AT / LOWELL, [...SEE NOTES]	SEE NOTES	NONE	H 28, W 42 CM	BLUEPRINT	PAPER

154-064-[A]	[HYDROGRAPH] DIAGRAM OF PERCENTAGE DIFFERENCE / IN / DISCHARGE AT [MERRIMACK RIVER AT] LOWELL & CROMWELL'S FALLS [1914 TO 1918, SHOWING PERCENTAGE DIFFERENCE IN DISCHARGES AT BOTH PLACES].	1919/04/12	NONE	H 53.4, W 40.6 CM	INK, COLORED INK	PAPER
154-064-[B]	[HYDROGRAPH] DIAGRAM OF PERCENTAGE DIFFERENCE / IN / DISCHARGE AT [MERRIMACK RIVER AT] LOWELL & CROMWELL'S FALLS [1914 TO 1918, SHOWING PERCENTAGE DIFFERENCE IN DISCHARGES AT BOTH PLACES].	1919/04/12	NONE	H 53.4, W 40.6 CM	INK, COLORED INK	PAPER
154-065	[OUTLINE PLAN OF] MERRIMACK RIVER / BETWEEN / AIKEN & BRIDGE STS. / [SHOWING CONTOURS OF RIVER NEAR AIKEN ST.] PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1917/00/00	NONE	H 63.5, W 122 CM	GRAPHITE, INK	DRAFTING CLOTH
154-066	SKETCH OF / MILL POND / FOR / HYDRO-ELECTRIC DEVELOPMENT OF LOWELL, MASS.	1914/03/00	1/62500	H 39.5, W 30.7 CM	BLUEPRINT	PAPER

154-066-[112]	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS & DURATION CURVES OF NEW ENGLAND RIVERS FOR DIFFERENT PERIODS OF TIME.] RELATION OF RUN-OFF TO DRAINAGE AREA / HYDRAULIC STUDIES OF CONNECTICUT RIVER / ORFORD TO SUNDERLAND / 18 YEAR AV.,1900 TO 1919).	1921/03/12	NONE	H 32, W 25 CM	INK, GRAPHITE	DRAFTING CLOTH
154-066-[113]-[A]	TYNGSBORO BRIDGE / APRIL 8, 1924 / PRICE METER: HAMILTON / WATCH # 5 HAMILTON / NOTES HOLT.	1924/04/08	NONE	H 29.5, W 46 CM	INK	PAPER
154-066-[113]-[B]	TYNGSBORO BRIDGE / APRIL 8, 1924.	1924/04/08	NONE	H 29.5, W 46 CM	INK	PAPER
154-066-[113]-[C]	TYNGSBORO BRIDGE / APRIL 8, 1924.	1924/04/08	NONE	H 29.5, W 46 CM	INK	PAPER
154-066-[114]	MEASUREMENTS OF WATER PASSING / MIDDLESEX CURRENT METER STATION.	1916/05/05	NONE	H 29, W 34 CM	BLUEPRINT	PAPER
154-066-[115]	POINT MEASUREMENTS OF WATER / PASSING MIDDLESEX CURRENT METER STATION / METER - L.& C. BUFF & BUFF # 8163.	1916/04/17	NONE	H 29, W 45.5 CM	BLUEPRINT	PAPER
154-066-[116]	[A THREE SHEET DOCUMENT ANAYLZING CONSISTENCY OF DATA COLLECTED BETWEEN 1903 AND 1920.]	UNDATED	NONE	H 25.5, W 20 CM	GRAPHITE	PAPER
154-066-001	[MAXIMUM HEIGHT OF MILL POND AT] THORNTON'S FERRY 1919-20. [ALSO: MAXIMUM HEIGHT OF MILL POND. BACKWATER EFFECT IN FEET. THICKNESS OF ICE.]	1921/01/00	NONE	H 41, W 32.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-002	[SKETCH SHOWING] LOCKS & CANALS MILL POND [WITH LOCATION OF STAKES SET NOV.1920].	1920/11/05	NONE	H 48, W 27 CM	INK, COLORED INK	DRAFTING CLOTH

154-066-003-[COPY 1]	[MAP SHOWING] MERRIMACK RIVER / DRAINAGE BASIN ABOVE LOWELL.	1921/01/00	3/8"=5 MILES	H 40.6, W 26 CM	BLUEPRINT	PAPER
154-066-003-[COPY 2]	[MAP SHOWING] MERRIMACK RIVER / DRAINAGE BASIN ABOVE LOWELL.	1921/01/00	3/8"=5 MILES	H 40.6, W 26 CM	BLUEPRINT, GRAPHITE	PAPER
154-066-003-[COPY 2]	[MAP SHOWING] MERRIMACK RIVER / DRAINAGE BASIN ABOVE LOWELL.	1921/01/00	3/4"=10 MI.	H 40, W 27 CM	BLUEPRINT, GRAPHITE	PAPER
154-066-004	CURRENT METER MEASUREMENT / [OF] MERRIMACK RIVER / AT / TYNGSBORO.	1921/03/23	NONE	H 29.3, W 45.8 CM	INK, GRAPHITE	PAPER
154-066-005	CURRENT METER MEASUREMENT / [OF] MERRIMACK RIVER / AT TYNGSBORO.	1920/12/16	NONE	H 29.3, W 45.8 CM	INK	PAPER
154-066-006	CURRENT METER MEASUREMENT / [OF] MERRIMACK RIVER / AT TYNGSBORO.	1920/12/16	NONE	H 29.3, W 45.7 CM	INK, PAPER	PAPER
154-066-007	MERRIMACK RIVER / CURRENT METER / MEASUREMENT / BELOW / TYNGSBORO BRIDGE.	1921/03/23	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
154-066-008	[DIAGRAM SHOWING SECTIONS OF MERRIMACK RIVER AT] TYNGSBORO BRIDGE.	1921/03/23	NONE	H 28, W 43.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-009	[DIAGRAM SHOWING] MERRIMACK RIVER / SECTIONS AT TYNGSBORO BRIDGE / FROM GOVT. SURVEY OF 1897.	1920/12/00	1"=50'	H 27.3, W 43.6 CM	INK	DRAFTING CLOTH
154-066-010	SECTIONS ACROSS MERRIMACK RIVER / LOWELL TO STATE LINE / FROM GOVT. SURVEY OF 1897	1920/11/00	1"=50'	H 50.5, W 51.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH

154-066-011	BOOTT RIVER GAUGE DURATION DIAGRAM [SHOWING HEIGHT IN FEET ABOVE L & C DATUM OF THE MERRIMACK RIVER BACK OF THE BOOTT MILLS, SUNDAYS & HOLIDAYS OMITTED] FOR 1911 & 1916.	1917/02/26	NONE	H 21.6, W 28 CM	INK, COLORED INK	PAPER
154-066-012	[DIAGRAM SHOWING] SURPLUS LIMITATION DURATION DIAGRAMS FOR 1911, 1916, 1917. [SUNDAYS & HOLIDAYS OMITTED, FOR THE MERRIMACK RIVER.]	1918/02/08	NONE	H 21.6, W 28 CM	INK, COLORED INK	PAPER
154-066-013	[DIAGRAM SHOWING] HEIGHT OF [MERRIMACK RIVER AT] BOOTT RIVER GAUGE AT 6:20 A.M. [VS. SAME AT 11 A.M.]	1917/02/27	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
154-066-014	BOOTT RIVER GAUGE [DIAGRAM SHOWING HEIGHTS OF AT STARTING OF THE MILLS].	1920/08/09	NONE	H 21.6, W 28 CM	INK	PAPER
154-066-015	[DIAGRAM SHOWING] BOOTT GAUGE RATING CURVE / COMPARED WITH / SOME ACTUAL FLOWS IN 1919.	UNDATED	NONE	H 31.1, W 45.8 CM	INK, COLORED INK	PAPER
154-066-016	[DIAGRAM SHOWING] DURATION CURVES / [OF] MERRIMACK RIVER / AT / LOWELL & LAWRENCE / FOR 1918.	1920/01/22	NONE	H 29.1, W 45.8 CM	INK	PAPER
154-066-017	[MERRIMACK RIVER AT LAWRENCE, AVERAGE & ENVELOPING CURVES 40 YEAR PERIOD (OCT. 1, 1879 TO SEPT. 30, 1919).]	SEE TITLE				
154-066-018	DURATION CURVES / MERRIMACK RIVER AT LAWRENCE / [FOR] 10 YEAR PERIODS.	UNDATED	NONE	H 45.8, W 29.3 CM	INK	PAPER

154-066-019	DURATION CURVE / FOR / MERRIMACK RIVER AT LOWELL / ALSO / RELATION BETWEEN DRAINAGE AREA / AND / DISCHARGE PER SQUARE MILE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/11/28	NONE	H 29.3, W 45.8 CM	INK	PAPER
154-066-020	[DIAGRAM SHOWING PROGRESSIVE AVERAGE RAINFALL IN EASTERN MASSACHUSETTS 1749 TO 1920. ANNUAL RUNOFF & PRECIPITATION FOR MERRIMACK RIVER DRAINAGE AREA. 1875 TO 1920.]	SEE TITLE				
154-066-021	[UNTITLED.] [DIAGRAM SHOWING ANNUAL RAINFALL & PER-CENT RUN-OFF FOR SUDBURY DRAINAGE & WACHUSETT DRAINAGE AREA.]	1870-1920/00/00	NONE	H 28, W 21.5 CM	INK, GRAPHITE	DRAFTING CLOTH
154-066-022	[RAINFALL (HANOVER, N.H.) DIAGRAM] HYDROGRAPH FOR CONN. RIVER AT ORFORD, N.H. / WINTER OF 1915-16 [SHOWING TEMPERATURE & PRECIPITATION AT HANOVER, N.H.].	SEE TITLE	NONE	H 51.5, W 50.5 CM	INK	PAPER
154-066-023-[A]	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS & DURATION CURVES OF NEW ENGLAND RIVERS FOR DIFFERENT PERIODS OF TIME.] COMPARISON OF RUN-OFF / CONNECTICUT AND MERRIMACK RIVERS / AT HOLYOKE AND LAWRENCE / PERIOD-OCT. 1880 TO SEPT. 1899.	1921/03/12	NONE	H 51.2, W 36 CM	INK, GRAPHITE	DRAFTING CLOTH

154-066-023-[B]	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS & DURATION CURVES OF NEW ENGLAND RIVERS FOR DIFFERENT PERIODS OF TIME.] COMPARISON OF RUN-OFF / CONNECTICUT AND MERRIMACK RIVERS / AT ORFORD AND LAWRENCE / PERIOD-OCT. 1900 TO SEPT. 1920.	1921/03/12	NONE	H 51.4, W 36.1 CM	INK, GRAPHITE	DRAFTING CLOTH
154-066-024	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS &] DURATION CURVES / [OF NEW ENGLAND RIVERS FOR DIFFERENT PERIODS OF TIME] COMPARISON OF DAILY & MONTHLY BASIS / TEN YEAR PERIOD 1911-1920.	1921/01/00	NONE	H 52.8, W 35 CM	INK, GRAPHITE	DRAFTING CLOTH
154-066-025	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS &] DURATION CURVES / [OF NEW ENGLAND RIVERS FOR DIFFERENT PERIODS OF TIME] FORTY-YEAR AVERAGE, ENVELOPING CURVES, / AND MAXIMUM AND MINIMUM YEARS / MERRIMACK RIVER AT LAWRENCE, MASS.	1921/01/00	NONE	H 50.1, W 34.3 CM	INK	DRAFTING CLOTH
154-066-026	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS &] DURATION CURVES / [OF CONNECTICUT RIVER] TEN YEAR PERIOD 1911-1920.	1920/01/00	NONE	H 50, W 34.2 CM	INK	DRAFTING CLOTH
154-066-027	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS &] DURATION CURVES / [OF MAINE RIVERS] EIGHT-YEAR PERIOD, 1913-1920.	1921/01/00	NONE	H 49.9, W 35 CM	INK	DRAFTING CLOTH

154-066-028	[DIAGRAM SHOWING NEW ENGLAND STREAM GAGING STATIONS &] DURATION CURVES / [OF NEW ENGLAND RIVERS FOR DIFFERENT PERIODS OF TIME] COMPARISON OF TEN YEAR PERIODS / MERRIMACK RIVER AT LAWRENCE, MASS.	1921/01/00	NONE	H 49.8, W 34.7 CM	INK	DRAFTING CLOTH
154-066-029	SKETCH OF / MILL POND / FOR / HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.	1914/03/00	1/62500	H 40, W 32.8 CM	INK, COLORED PENCIL	TRACING PAPER
154-066-030	DIAGRAM / OF / NET KILOWATTS DELIVERED / (FROM 8 3/4 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1916-1929 / FOR / PROPOSED HYDRO-ELECTRIC DEVELOPMENT / & / EXISTING SYSTEM.	1920/07/00	NONE	H 28, W 49.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-031	DIAGRAM SHOWING KW VS. 24 HOUR FLOW / PROPOSED HYDRO-ELECTRIC DEVELOPMENT & EXISTING CANAL SYSTEM.	1920/07/19	NONE	H 28, W 46.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-032	DIAGRAM / OF / NET KILOWATTS DELIVERED / (FROM 8 3/4 HOUR FLOW OF MERRIMACK RIVER AT LOWELL, MASS.) / BY MONTHS FOR YEARS 1902-1915 / FOR / PROPOSED HYDRO-ELECTRIC DEVELOPMENT / & / EXISTING SYSTEM.	1920/07/00	NONE	H 28, W 49.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-033	COMPARATIVE HEIGHTS OF MERRIMACK RIVER / PAWTUCKET DAM TO SHORT FALLS.	1922/04/13	NONE	H 45.6, W 29.2 CM	INK	PAPER
154-066-034	CURRENT METER / MEASUREMENT / OF / MERRIMACK RIVER / AT / TYNGSBORO BRIDGE.	1922/04/12	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER

154-066-035	DIAGRAM SHOWING / FLOW OF SUNCOOK RIVER / AT PITTSFIELD N.H. / SHOWING EFFECT OF STORAGE / AT SUNCOOK PONDS.	1923/02/08	NONE	H 29.3, W 45.8 CM	INK, COLORED INK	PAPER
154-066-036	VERTICAL VELOCITY / CURVES / CURRENT METER MEASUREMENTS / OF MERRIMACK RIVER / AT / TYNGSBORO BRIDGE.	1922/04/13	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-037	[DIAGRAM SHOWING BEHAVIOR OF PROPOSED SUNCOOK PONDS RESERVOIR.]	UNDATED				
154-066-038	DIAGRAM SHOWING BEHAVIOR OF / PROPOSED / SUNCOOK PONDS RESERVOIR.	UNDATED	NONE	H 29.2, W 45.8 CM	INK, COLORED PENCIL	PAPER
154-066-039	DIAGRAM SHOWING BEHAVIOR OF / MERRYMEETING LAKE [WITH 24-HR. DRAFT OF 8 SEC. FT. WHEN LAKE IS BELOW 102, 15 SEC. FT. WHEN ABOVE 102, & REMAINDER OF STORAGE OPERATED AS RESERVE FOR LAKE WINNIPISEOGEE].	UNDATED	NONE	H 29.2, W 45.8 CM	INK, COLORED PENCIL	PAPER
154-066-040	DIAGRAM SHOWING BEHAVIOR OF / MERRYMEETING LAKE [WITH 24-HR. DRAFT OF 8 SEC. FT. WHEN LAKE IS BELOW 102 & 20 SEC. FT. WHEN LAKE IS ABOVE 102].	UNDATED	NONE	H 29.2, W 45.8 CM	INK, COLORED PENCIL, COLORED INK	PAPER
154-066-041	CURVES SHOWING STORAGE CAPACITY / OF MERRYMEETING LAKE.	1922/10/02	NONE	H 21.7, W 30.5 CM	INK	PAPER

154-066-042-[A]	SCHEDULE "A" / DIAGRAM SHOWING BEHAVIOR OF MERRYMEETING LAKE [WITH A 24-HR. DRAFT OF 60 SEC. FT. WHEN STORAGE IS REQUIRED FOR LAKE WINNEPESAUKEE & A 24-HR. DRAFT OF 8 SEC. FT. AT OTHER TIMES].	UNDATED	NONE	H 29.2, W 45.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-066-042-[B]	DIAGRAM SHOWING BEHAVIOR OF / MERRYMEETING LAKE.	UNDATED	NONE	H 28.7, W 45,7 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-066-043	[DIAGRAM SHOWING BEHAVIOR OF MERRYMEETING LAKE WITH THE DRAFT SHUT OFF ENTIRELY DURING THE MONTHS OF HIGH RUN-OFF (OVER 1.6 SEC. FT. PER SQUARE MILE).]	UNDATED				
154-066-044	CURVE SHOWS WHEN FLOW [OF SUNCOOK RIV.] AT PITTSFIELD / WOULD FALL BELOW 125 SECOND-FEET ASSUMING / 1200 M.C.F. OF STORAGE IN SUNCOOK PONDS / REGULATED TO MAINTAIN 125 SECOND FEET AT PITTSFIELD / WHEN EVER POSSIBLE. / PROP. LOCKS & CANALS / LOWELL, MASS.	1923/07/11	NONE	H 21.6, W 30.8 CM	INK	PAPER
154-066-045	CURVE SHOWS WHEN FLOW AT PITTSFIELD / WOULD FALL BELOW 150 SECOND-FEET ASSUMING / 1200 M.C.F. OF STORAGE IN SUNCOOK PONDS / REGULATED TO MAINTAIN 150 SECOND-FEET AT / PITTSFIELD WHEN EVER POSSIBLE. / PROP. LOCKS & CANALS / LOWELL, MASS.	1923/07/11	NONE	H 21.6, W 30.6 CM	INK	PAPER

154-066-046-A	TYNGSBORO BRIDGE / APRIL 10, 1923 / PRICE METER-HAMILTON / WATCH # 5 HAMILTON / NOTES HOLT.	1923/04/10	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-046-B	TYNGSBORO BRIDGE [CURRENT METER MEASUREMENT].	1923/04/10	NONE	H 29.3, W 45.8 CM	GRAPHITE	PAPER
154-066-047-A	TYNGSBORO BRIDGE [CURRENT METER MEASUREMENT].	1923/04/23	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-047-B	[UNTITLED.] [CURRENT METER MEASUREMENTS OF MERRIMACK RIVER AT TYNGSBORO BRIDGE.]	1923/04/23	NONE	H 29.2, W 45.8 CM	GRAPHITE	PAPER
154-066-048-A	TYNGSBORO BRIDGE / MAY 1, 1923 / PRICE METER-HAMILTON / WATCH # 5 HAMILTON / NOTES HOLT. [CURRENT METER MEASUREMENTS OF MERRIMACK RIVER AT TYNGSBORO BRIDGE.]	1923/05/01	NONE	H 29.3, W 45.8 CM	INK	PAPER
154-066-048-B	TYNGSBORO BRIDGE [CURRENT METER MEASUREMENT].	1923/05/01	NONE	H 29.3, W 45.8 CM	GRAPHITE	PAPER
154-066-048-C	[CURRENT METER MEASUREMENT OF MERRIMACK RIVER AT] TYNGSBORO BRIDGE.	1923/05/01	NONE	H 29.3, W 45.8 CM	GRAPHITE	PAPER
154-066-049	DURATION CURVE-BOOTT GAUGE / 11 A.M. READINGS 1908 TO 1923 / SUNDAYS & HOLIDAYS NOT INCLUDED / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1923/06/14	NONE	H 30.5, W 21.5 CM	INK	PAPER
154-066-050-A	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER

154-066-050-B	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-050-C	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-050-D	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-050-E	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-050-F	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-050-G	[UNTITLED PLAN. SEE NOTES.] [CURRENT METER MEASUREMENTS SHOWING DISCHARGE OF GATE AT MERRYMEETING LAKE DAM.]	1923/10/23-24	NONE	H 29.2, W 45.8 CM	INK	PAPER
154-066-051	DURATION CURVE / OF / MERRIMACK RIVER AT LAWRENCE, MASS. / OCT. 1, 1880 TO SEPT. 30, 1920.	SEE TITLE	NONE	H 28, W 21.4 CM	INK	DRAFTING CLOTH
154-066-052	DURATION CURVE / OF / CONNECTICUT RIVER AT SUNDERLAND, MASS. / OCT.1,1911 TO SEPT.30,1920.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH

154-066-053-[I]	FRESHET OF MARCH 1925.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, GRAPHITE	PAPER
154-066-053-A	FRESHET OF APRIL 1852 / PAWTUCKET DAM-LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-B	FRESHET OF MARCH 1859 / PAWTUCKET DAM-LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-C	FRESHET OF APRIL 1862 / PAWTUCKET DAM-LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-D	FRESHET OF APRIL 1870 / PAWTUCKET DAM, LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-E	FRESHET OF APRIL, 1895 / PAWTUCKET DAM, LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-F	FRESHET OF FEBRUARY & MARCH 1896 / PAWTUCKET DAM-LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-G	FRESHET OF DECEMBER 1920 / PAWTUCKET DAM, LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-053-H	FRESHET OF APRIL-MAY, 1923 / PAWTUCKET DAM, LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER

154-066-053-J	FRESHET OF NOVEMBER 1927 / MERRIMACK RIVER-LOWELL, MASS.	SEE TITLE	NONE	H 30.8, W 21.7 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-054	[UPPER SUNCOOK STORAGE. MERRIMACK BASIN MAP.]	1923/08/23	1"=13 MILES			
154-066-055	[UPPER SUNCOOK STORAGE. ROUGH SKETCH OF SANBORN POND DAM SITE.]	1932/08/03	1"=50'			
154-066-056	[UPPER SUNCOOK STORAGE. SUNCOOK PONDS DAM.]	1923/08/16	1"=10'			
154-066-057	[UPPER SUNCOOK STORAGE. SUNCOOK PONDS DAM.]	1923/08/17	1"=10'			
154-066-058	[UPPER SUNCOOK STORAGE. GUINEA POND DAM SITE.]	1923/08/01	1"=40'			
154-066-059	[UPPER SUNCOOK STORAGE. PLACE'S POND DAM SITE.]	1923/07/31	1"=25'			
154-066-060	[UPPER SUNCOOK STORAGE. BRINDLE POND DAM SITE.]	1923/08/02	1"=40'			
154-066-061	[DIAGRAM SHOWING BEHAVIOR OF PROPOSED SUNCOOK PONDS RESERVOIR.]	1923/09/08				
154-066-062	[HYDROGRAPH OF SUNCOOK RIVER AT PITTSFIELD, N.H.]	1923/08/29				
154-066-063	[HYDROGRAPH OF MERRIMACK RIVER AT LOWELL, MASS.]	1923/08/30				
154-066-063-A	[UNTITLED.] [HYDROGRAPH OF MERRIMACK RIVER AT LOWELL, MASS.]	1923/08/30	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
154-066-064	[HYDROGRAPH OF SUNCOOK RIVER AT NORTH CHICHESTER GAGING STATION.]	1923/08/29				

154-066-065	[HYDROGRAPH OF MERRIMACK RIVER AT MANCHESTER, N.H.]	1923/08/31				
154-066-066	[HYDROGRAPH OF SUNCOOK RIVER AT SUNCOOK, N.H.]	1923/08/29				
154-066-067	HYDROGRAPH OF MERRIMACK RIVER / AT LAWRENCE, MASS. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1923/08/30	NONE	H 25.1, W 41 CM	INK	DRAFTING CLOTH
154-066-068	[UPPER SUNCOOK STORAGE. PROFILE OF CEMETERY ROAD.]	1923/08/13				
154-066-069	[UPPER SUNCOOK STORAGE. PROFILE OF ROAD EAST SIDE OF UPPER POND.]	1923/08/13				
154-066-070	[UPPER SUNCOOK STORAGE. PROFILE OF NARROWS ROAD.]	1923/08/13				
154-066-071	U.S.G.S. RATING CURVE / SUNCOOK RIVER / AT / [NORTH] CHICHESTER.	1923/05/09	NONE	H 21.7, W 42.6 CM	INK	PAPER
154-066-072	DURATION CURVE / SUNCOOK RIVER / AT NORTH CHICHESTER / OCT. 1918-SEPT. 1922.	SEE TITLE	NONE	H 31.5, W 24.2 CM	INK	DRAFTING CLOTH
154-066-073	LOCATION OF / MONUMENT / AT FOOT OF / HUNTS FALLS.	1924/07/29	1"=20'	H 20.4, W 25.4 CM	GRAPHITE	PAPER
154-066-074	A / SKETCH OF THE POSITION / OF THE / MONUMENTS / AT THE FOOT OF / HUNT'S FALLS.	1924/07/29	1/8"=10'	H 52.1, W 54.6 CM	BLUEPRINT	PAPER
154-066-075	MAP OF NEW HAMPSHIRE SHOWING / RAINFALL, STREAM GAGING & / FIRE OBSERVATION STATIONS.	1924/04/14	1"=8 MILES	H 52.1, W 40.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-076	TYNGSBORO BRIDGE / MARCH 31,`25 / PRICE METER HAMILTON / WATCH # 5 / NOTES HOLT.	1925/03/31	NONE	H 29.2, W 45.9 CM	INK	PAPER

154-066-077	UNIT RUN-OFF / OF / MERRIMACK RIVER & TRIBUTARIES / FLOOD OF MARCH 29-31, 1925. / PROP. LOCKS & CANALS / LOWELL, MASS.	1925/04/17	NONE	H 30.8, W 21.7 CM	INK	PAPER
154-066-078	DURATION CURVES / FOR / MERRIMACK RIVER AT LOWELL [1920-1926] / PROPRIETORS OF THE LOCKS & CANALS.	1927/05/00	NONE	H 21.7, W 30.7 CM	INK, GRAPHITE	PAPER
154-066-079	[DIAGRAM SHOWING MAXIMUM ANNUAL FLOWS OF] MERRIMACK RIVER / AT LOWELL / FROM 1848 TO 1928.	SEE TITLE	NONE	H 21.6, W 30.5 CM	INK	PAPER
154-066-080	[UNTITLED.] [DIAGRAM SHOWING YEARLY OUTPUT IN MILLIONS KW HOURS AND YEARLY CHARGES FOR WATER USED BY MERRIMACK RIVER AT LOWELL FROM 1923 TO 1936.]	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER
154-066-081	[UNTITLED.] [CHART WHICH DEPICTS KILOWATT HOURS FROM MERRIMACK RIVER AT LOWELL FROM 1923 TO 1935.]	SEE TITLE	NONE	H 28, W 21.6 CM	INK, WATER COLOR	PAPER
154-066-082	MONTHLY KILOWATT HOURS OUTPUT / FROM WATER POWER AT LOWELL / VS. / 24 HOUR FLOW OF MERRIMACK RIVER AT LOWELL.	1936/03/00	NONE	H 42, W 28 CM	INK	PAPER
154-066-082-[A]	MONTHLY KILOWATT HOUR OUTPUT VS. 34 HOUR FLOW OF MERRIMACK RIVER / BELOW 4000 CUBIC FEET PER SECOND.	1940/05/27	NONE	H 28, W 21.7 CM	INK	PAPER
154-066-083	PROFILE OF THE WINNIPISEOGEE RIVER.	UNDATED	SEE NOTES	H 22.9, W 29.6 CM	INK	DRAFTING CLOTH
154-066-083-[COPY 1]	PROFILE OF THE WINNIPISEOGEE RIVER	UNDATED	SEE NOTES	H 9", W 11 5/8"	BLUEPRINT	PAPER

154-066-084	PROFILE OF THE CONTOOCOOK RIVER.	UNDATED	SEE NOTES	H 23.2, W 39.8 CM	INK	DRAFTING CLOTH
154-066-084-[COPY 1]	PROFILE OF THE CONTOOCOOK RIVER.	UNDATED	SEE NOTES	H 9", W 15 6/8"	BLUEPRINT	PAPER
154-066-085	PROFILE OF THE PEMIGEWASSET RIVER.	UNDATED	SEE NOTES	H 50.5, W 51.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-085-[COPY 1]	PROFILE OF THE PEMIGEWASSET RIVER	UNDATED	SEE NOTES	H 9", W 29 1/4"	BLUEPRINT	PAPER
154-066-086	PROFILE OF THE MERRIMACK RIVER.	UNDATED	7/8"=10 MILES	H 22.9, W 29.5 CM	INK	DRAFTING CLOTH
154-066-086-[COPY 1]	PROFILE OF THE MERRIMACK RIVER	UNDATED	SEE NOTES	H 9", W 11"	BLUEPRINT	PAPER
154-066-087	DURATION CURVES / MERRIMACK RIVER AT LOWELL / YEARLY & AVERAGE CURVES / 1927 TO 1935 / BASED ON NET DRAINAGE AREA / OF 3979 SQUARE MILES.	1936/02/13	NONE	H 41.9, W 28 CM	INK, COLORED INK	PAPER
154-066-088	MONTHLY DURATION CURVES / MERRIMACK RIVER AT LOWELL / 1927 TO 1935 / BASED ON NET DRAINAGE AREA / OF 3979 SQUARE MILES.	1936/03/10	NONE	H 41.9, W 28 CM	INK, COLORED INK	PAPER
154-066-089	RATING CURVE / AT BOOTT GAUGE / FOR / FLOW OF MERRIMACK RIVER / AT PAWTUCKET DAM.	UNDATED	NONE	H 21.7, W 28 CM	INK	PAPER
154-066-090	PORTION OF PLAN / SHOWING / "PROPOSED PROTECTION SCHEME / FOR / FLOODS OF MARCH 1936 MAGNITUDE."	1937/11/10	1"=250'	H 30, W 41 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-066-091	PEMIGEWASSET RIVER / AT / FRANKLIN FALLS, N.H. [MEAN C.F.S. PER DAY. PRORATED FROM PLYMOUTH DRAINAGE AREA OF 622 SQ. MI.]. D.A.=1000 SQ. MILES.	SEE NOTES	NONE	H 21.6, W 31.1 CM	INK	PAPER

154-066-092	HYDROGRAPH OF MERRIMACK RIVER AT LOWELL / SHOWING EFFECT OF / PROPOSED BLACKWATER RESERVOIR.	1923/01/00	NONE	H 31, W 39.4 CM	INK	DRAFTING CLOTH
154-066-093	PEMIGEWASSET RIVER / AT / FRANKLIN FALLS, N.H. [PROPRATED FROM FRANKLIN JCT. DRAINAGE AREA OF 1460 SQ. MI.]. D.A.=1000 SQ. MILES.	SEE NOTES	NONE	H 21.6, W 31.2 CM	INK	PAPER
154-066-094	RATING CURVE FOR MERRIMACK RIVER BELOW CONCORD RIVER AT / LOWELL, MASS.	UNDATED	NONE	H 43.2, W 28 CM	BLUE LINE PRINT	PAPER
154-066-095	MERRIMACK RIVER BELOW CONCORD / RIVER & MERRIMACK RIVER AT BOOTT / MILLS ABOVE CONCORD RIVER AT LOWELL, / MASS.	SEE NOTES	NONE	H 41.3, W 55.6 CM	BLUE LINE PRINT	PAPER
154-066-096	RATING CURVE FOR MERRIMACK RIVER BELOW CONCORD RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 27.7, W 43.2 CM	BLUE LINE PRINT	PAPER
154-066-097	MERRIMACK RIVER BELOW CONCORD RIVER AT LOWELL, MASS.	UNDATED	NONE	H 20.7, W 27 CM	BLUE LINE PRINT	PAPER
154-066-098	RATING CURVE USED / FOR / PEMIGEWASSET RIVER / AT / PLYMOUTH, N.H. [FOR VARIOUS YEARS 1903 TO 1920].	SEE TITLE	NONE	H 29.2, W 45.9 CM	INK, COLORED PENCIL	PAPER
154-066-099	RATING CURVES USED / FOR / PEMIGEWASSET R. AT PLYMOUTH [FOR VARIOUS YEARS 1903 TO 1920].	SEE TITLE	NONE	H 29.2, W 45.8 CM	GRAPHITE, COLORED PENCIL	PAPER
154-066-100	[UNTITLED.] [RATING CURVES FOR MERRIMACK RIVER AT BOOTT MILLS AND DRAFT THROUGH CANAL PLUS FLOW OF CONCORD RIVER.]	UNDATED	NONE	H 29.2, W 45.8 CM	GRAPHITE, COLORED PENCIL	PAPER

154-066-101	SLOPES AT HUNT'S FALLS (PRELIMINARY) [FROM BOOTT RIVER GAUGE TO LOWER MONUMENT].	1921/11/00	NONE	H 29.2, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
154-066-102	QUANTITIES USED BY CORPORATIONS / & PASSING / BOOTT RIVER GAUGE [WITH ZERO LIMITATIONS].	1943/07/26	NONE	H 21.6, W 31.2 CM	INK	PAPER
154-066-103	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION ACROSS MERRIMACK RIVER / 325' ABOVE AIKEN ST. BRIDGE.	UNDATED	NONE	H 29.5, W 64 CM	GRAPHITE	PAPER
154-066-104	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION ACROSS MERRIMACK RIVER / AT CL LAWRENCE / 4, 5, 6 RACEWAY.	UNDATED	NONE	H 29.2, W 45.7 CM	GRAPHITE	PAPER
154-066-105	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION ACROSS MERRIMACK RIVER A T LAWRENCE WASTEWAY CL / SHORTEST DISTANCE / RW. TO RW. 606'	UNDATED	NONE	H 29.2, W 45.7 CM	GRAPHITE	PAPER

154-066-106	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION 365' ABOVE CL 30" WATER MAIN.	UNDATED	NONE	H 29, W 45.8 CM	GRAPHITE	PAPER
154-066-107	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION 150 FT. BELOW WATER PIPE.	UNDATED	NONE	H 29, W 45.8 CM	GRAPHITE	PAPER
154-066-108	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION 40'BELOW CORNER AT GRID IN STACKPOLE ST.	UNDATED	NONE	H 29.2, W 45.8 CM	GRAPHITE	PAPER
154-066-109	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. [UNTITLED PLANS. SEE NOTES.]	UNDATED	NONE	H 29.3, W 45.8 CM	GRAPHITE	PAPER
154-066-110	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. [UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 29.2, W 45.8 CM	GRAPHITE	PAPER

154-066-111	[SECTIONS IN MERRIMACK RIVER FROM POINT 325' ABOVE AIKEN ST. THROUGH HUNTS FALLS TO SHOW EFFECT OF DEEPENING CHANNEL BY ARMY ENGINEERS]. SECTION AT LOWER PART OF HUNTS FALLS.	UNDATED	NONE	H 29.3, W 45.8 CM	GRAPHITE	PAPER
154-068	[PLAN OF POWER HOUSE, CANAL & TAIL RACE.]	1920/07/00				
154-069	[PROPOSED CENTRAL POWER PLANT.]	1920/07/00				
154-070	PROPRIETORS OF LOCKS & CANALS-LOWELL, MASS. / GENERAL PLAN OF DEVELOPMENT / ARTHUR T. SAFFORD CONSULTING [ENGINEER].	1920/07/16	MISSING FRAGMENT	H 68.7, W 108.5 CM	BLUEPRINT	PAPER
154-071	[PROPOSED INTERCONNECTION OF MILLS. DEVELOPMENT & DISTRIBUTION.]	1925/02/00				
154-072	PROPRIETORS OF LOCKS & CANALS-LOWELL, MASS. / PLAN OF POWER HOUSE, CANAL & TAIL RACE.	1920/08/07	1"=50'	H 27", W 42"	BLUEPRINT	PAPER
154-073	[UNTITLED.] [HYDROGRAPHS OF SOUHAGEN RIVER AT MERRIMACK N.H. & MERRIMACK RIVER AT LAWRENCE, MASS.]	1921/01/00	NONE	H 46.6, W 71.7 CM	INK	DRAFTING CLOTH
154-074	PROFILE [OF] MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO THORNTON'S FERRY.	SEE NOTES	NONE	H 44.3, W 76.5 CM	INK	DRAFTING CLOTH
154-075	[UNTITLED.] [HYDROGRAPH OF WEST BRANCH OF PENOBSCOT RIVER AT MILLINOCKET, ME. PENOBSCOT RIVER AT W. ENFIELD, ME.]	1921/01/00	NONE	H 46.7, W 71.8 CM	INK	DRAFTING CLOTH

154-076	HYDROGRAPH OF DEERFIELD RIVER AT CHARLEMONT & SHELBURNE FALLS / HYDROGRAPH OF CONNECTICUT RIVER AT OXFORD.	1921/01/00	NONE	H 46, W 68.6 CM	INK	DRAFTING CLOTH
154-077	[PLAN OF] MILL POND ABOVE LOWELL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/19	1"=62,500"	H 63.9, W 27.1 CM	INK	DRAFTING CLOTH
154-077-[COPY 1]	MILL POND ABOVE LOWELL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/19	1"=62,500"	H 63.9, W 27.3 CM	BLUEPRINT, GRAPHITE	PAPER
154-078	HYDROGRAPH OF ST. JOHN RIVER AT [VAN BUREN MAINE]. HYDROGRAPH OF ANDROSCOGGIN RIVER [AT] RUMFORD FALLS, ME.	1921/01/00	NONE	H 47, W 71.5 CM	INK	DRAFTING CLOTH
154-079	HYDROGRAPH OF KENNEBEC RIVER AT WATERVILLE, ME.	1921/02/21	NONE	H 47, W 71.5 CM	INK	DRAFTING CLOTH
154-080	[GAUGE READINGS BY AMOSKEAG MFG. CO. OF MERRIMACK RIVER ABOVE THORNTONS FERRY ON SEPTEMBER 16, 1921.]	1921/09/16				
154-081	MERRIMACK RIVER SECTIONS / MERRIMACK MFG. CO. TO MASS. COTTON MILLS.	1921/10/00	H1"=50', V1"=5'	H 54, W 68 CM	INK	DRAFTING CLOTH
154-082	[PROFILE OF MERRIMACK RIVER FROM MOUTH TO SOURCE BY AMOSKEAG MFG. CO.]	1920/12/11			BP	
154-083	PROFILE OF MERRIMACK RIVER / SHOWING SLOPES DURING FRESHETS / PAWTUCKET DAM TO BELOW HUNTS FALLS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. [1896, 1895, 1901.]	1921/10/00	H1"=500', V1"=2'	H 56, W 90.2 CM	INK, COLORED INK	PAPER

154-084	PROFILE OF THE MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO SHORT FALLS.	SEE NOTES	NONE	H 56.6, W 101.7 CM	INK, COLORED INK	PAPER
154-085	PROFILE OF THE MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO SHORT FALLS.	SEE NOTES	NONE	H 56.5, W 113.8 CM	INK, COLORED INK	PAPER
154-086-A	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS / OF THE / MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO SHORT FALLS.	1921/09/16	NONE	H 55.9, W 78.9 CM	INK, COLORED INK	PAPER
154-086-B	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS / OF THE / MERRIMACK RIVER / FROM PAWTUCKET DAM TO SHORT FALLS.	1921/09/16	NONE	H 55.9, W 78.9 CM	INK, COLORED INK	PAPER
154-086-C	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS / OF THE / MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO SHORT FALLS.	1921/09/16	NONE	H 55.9, W 78.9 CM	INK, COLORED INK	PAPER
154-087	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS / OF THE / MERRIMACK RIVER / [FROM] PAWTUCKET DAM TO MOORE'S FALLS.	1922/01/19	NONE	H 56.2, W 79.1 CM	INK	PAPER
154-088	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS / OF THE / MERRIMACK RIVER / [FROM] PAWTUCKET DAM / TO / THORNTON'S FERRY.	1922/02/02	NONE	H 55.8, W 78.9 CM	INK, COLORED INK	PAPER
154-089	PROFILE OF MERRIMACK RIVER / FROM HOOKSETT TO AMOSKEAG DAM.	1922/03/01	NONE	H 55.8, W 78.9 CM	BLUEPRINT	PAPER
154-089-A	PROFILE OF MERRIMACK RIVER / FROM HOOKSETT TO AMOSKEAG DAM.	1922/03/01	NONE	H 32.1, W 136 CM	BLUEPRINT	PAPER

154-090	[DIAGRAM SHOWING] SLOPE OF SURFACE / OF / MERRIMACK RIVER / [FROM] AMOSKEAG DAM-MANCHESTER-N.H. TO POWOW RIVER-AMESBURY-MASS. [ON THE FOLLOWING DATES: APRIL 25, 1921. APRIL 11, 1922. APRIL 13, 1922.]	1881/12/16	NONE	H 55.2, W 195.1 CM	BLUEPRINT	PAPER
154-091	[DIAGRAM SHOWING] COMPARATIVE HEIGHTS / OF THE / MERRIMACK RIVER / [FROM] PAWTUCKET DAM / TO / [THORNTON'S] REED'S FERRY.	1922/04/11	NONE	H 56, W 78.8 CM	INK, COLORED INK	PAPER
154-094	AMOSKEAG MFG. CO. MANCHESTER, N. H. / [MAP OF] MERRIMACK RIVER BETWEEN MANCHESTER & HOOKSET, N.H.	1920/12/20	1"=1000'	H 38.8, W 107.6 CM	BLUEPRINT	PAPER
154-095	AMOSKEAG MFG. CO. MANCHESTER , N. H. / [MAP OF] MERRIMACK RIVER BETWEEN HOOKSETT & GARVIN'S FALLS, N.H.	1921/02/04	1"=1000'	H 46.8, W 66.1 CM	BLUEPRINT	PAPER
154-096	[ENVELOPE CONTAINING AUTOMATIC GAUGE CHARTS FOR THE MERRIMACK RIVER AT FRANKLIN JUNCTION, N.H.]	UNDATED				
154-097	SUNCOOK RIVER BASIN / FROM ADVANCE SHEETS OF / U.S.G.S. TOPOGRAPHIC MAPS / SURVEYED IN 1917.	SEE TITLE	1 3/8"=1 MILE	H 103.5, W 75.5 CM	BLUEPRINT	PAPER
154-098	UPPER SUNCOOK STORAGE / MAP OF OUTLET OF SUNCOOK PONDS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASSACHUSETTS.	1923/08/07	1"=50'	H 63.2, W 124 CM	INK	DRAFTING

154-099	AMOSKEAG MFG. CO., MANCHESTER, N.H. / NO. 5 GAUGE / RATING CURVE FOR MERRIMACK RIVER / A. T. SAFFORD-CONSULTING ENGINEER.	1923/06/00	NONE	H 54.3, W 76.3 CM	BLUEPRINT	PAPER
154-100	[MAP OF PROPOSED SUNCOOK POND RESERVOIR.]	1923/09/07	1"=1/3 MILE			
154-101	[PLAN SHOWING] PITTSFIELD MFG. CO. [PITTSFIELD, N.H.] / [PROPOSED] WHITE DAM POWER SITE.	1923/09/28	1/4"=1'	H 38.1, W 43.6 CM	INK, GRAPHITE	DRAFTING CLOTH
154-102	MERRIMACK RIVER / SECTION AT TYNGSBORO BRIDGE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/09/30	1"=20'	H 31.5, W 75 CM	INK	DRAFTING CLOTH
154-102-[COPY 1]	MERRIMACK RIVER / SECTION AT TYNGSBORO BRIDGE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/09/30	1"=20'	H 33.6, W 74 CM	BLUEPRINT, GRAPHITE	PAPER
154-103	DIAGRAM SHOWING / QUANTITY OF WATER DISCHARGED / BY HEADGATE AT / MERRYMEETING LAKE DAM / NEW DURHAM, N.H.	1923/11/08	NONE	H 52.7, W 66 CM	INK	PAPER
154-104	PLAN & SECTIONS / MERRYMEETING LAKE DAM.	1923/12/13	1"=10',30' & 1/2 MILE	H 55.2, W 43 CM	INK	DRAFTING CLOTH
154-105	[MAP SHOWING] MERRIMACK RIVER DRAINAGE AREA / ABOVE FRANKLIN JCT. [N.H.].	1924/01/26	1"=4 MILE	H 42.6, W 55.9 CM	INK, GRAPHITE	DRAFTING CLOTH
154-106	[DIAGRAM SHOWING] HEIGHTS & MONTHLY DRAFT / [OF] LAKE WINNEPESAUKEE / [FROM] 1914 TO 1923.	1924/01/31	NONE	H 42.6, W 55.9 CM	INK, GRAPHITE	DRAFTING CLOTH

154-109	RATING CURVE OF / MERRIMACK RIVER AT BOOTT MILLS / PROPRIETORS OF THE LOCKS & CANAL / LOWELL, MASS.	1924/02/14	NONE	H 34.9, W 93.7 CM	INK,	DRAFTING CLOTH
154-109-[COPY 1]	RATING CURVE OF / MERRIMACK RIVER AT BOOTT MILLS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1924/02/14	NONE	H 34.7, W 91.5 CM	BLUEPRINT	PAPER
154-110	[DIAGRAM SHOWING] DISCHARGE OF / MERRIMACK RIVER AT BOOTT / MILLS / LOWELL, MASS.	UNDATED	NONE	H 39.8, W 96.6 CM	BLUEPRINT	PAPER
154-112-[COPY 1]	BI-PLANE VIEW / OF / PROPOSED CENTRAL POWER PLANT / FOR / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/08-09/00	NONE	H 41, W 65.5 CM	BLUEPRINT	PAPER
154-113	AMOSKEAG MFG. CO. [MANCHESTER, N.H.] / NO. 5 GAUGE / RATING CURVE FOR MERRIMACK RIVER / A. T. SAFFORD-CONSULTING ENGINEER.	1924/03/18	NONE	H 53.7, W 76.3 CM	BLUEPRINT	PAPER
154-114	[UNTITLED.] [BLUEPRINT SHOWING TRUNK SEWER FROM LOWELL TO THE SEA.]	1924/04/00	1"=2500'	H 82.3, W 199.3 CM	BLUEPRINT	PAPER
154-115	[UNTITLED.] [DIAGRAM SHOWING HEIGHT OF & DRAFT FROM MERRYMEETING LAKE, N.H. FROM 1923.]	SEE TITLE	NONE	H 32.7, W 54.6 CM	INK	DRAFTING CLOTH
154-116	[ENVELOPE CONTAINING PEMIGEWASSET RIVER GAGE CHARTS.]	UNDATED				
154-117	[MAP SHOWING] TRANSMISSION LINES / OF THE / LOWER MERRIMACK VALLEY.	1927/05/00	NONE	H 39.4, W 45.4 CM	INK, GRAPHITE	DRAFTING CLOTH
154-118	OTTER BROOK STORAGE / PROPOSED DAM SITE.	1926/03/00	1"=50'	H 66, W 91.5 CM	BLUEPRINT	PAPER

154-119	MONADNOCK PAPER MILLS / BENNINGTON N.H. / OTTER BROOK STORAGE / PETERBORO-GREENFIELD, N.H.	1926/03/00	1"=500'	H 83.8, W 68 CM	BLUEPRINT	PAPER
154-120	[SECTION] PROFILE OF MERRIMACK RIVER AT / AIKEN STREET BRIDGE / (DOWNSTREAM SIDE).	1928/07/00	NONE	H 65, W 114 CM	INK	PAPER
154-121	AMOSKEAG MFG. CO., MANCHESTER, N.H. / [BLUEPRINT SHOWING] SLOPES [IN MERRIMACK RIVER] FROM LOWER WEIR TO AMOSKEAG DAM.	1921/01/07	1"=200'	H 62, W 106.7 CM	BLUEPRINT	PAPER
154-122	SKETCH OF PEMIGEWASSET RIVER / FROM / PLYMOUTH TO WEST THORNTON / SHOWING APPROXIMATE FLOWAGE OF PROPOSED / DAM AT LIVERMORE FALLS.	1928/08/00	1"=1 MILE	H 45.7, W 52.7 CM	INK GRAPHITE	DRAFTING CLOTH
154-123	CONTOUR PLAN / OF / MERRIMACK RIVER / BETWEEN / MOODY & SCHOOL ST. BRIDGES / PROPRIETORS OF THE LOCKS & CANALS LOWELL, MASS.	1936/09/00	1"=40'	H 81.2, W 140.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
154-124	CONTOUR PLAN / OF / MERRIMACK RIVER / BETWEEN / SCHOOL STREET BRIDGE & PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS LOWELL, MASS.	1936/09/00	1"=40'	H 80.4, W 86.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
154-125	CONTOUR PLAN / OF / MERRIMACK RIVER / BELOW / MOODY STREET BRIDGE / PROPRIETORS OF THE LOCKS & CANALS, LOWELL, MASS.	1936/10/00	1"=40'	H 82, W 89 CM	INK, WATER COLOR	DRAFTING CLOTH

154-126	PLAN OF / MERRIMACK RIVER / FROM / BRIDGE STREET TO HUNTS FALLS [SHOWING LOCKS & CANALS LAND AND LOWELL, LAWRENCE BOULEVARD].	1936/12/08	1"=100'	H 57.8, W 121.6 CM	INK, WATER COLOR	DRAFTING CLOTH
154-127	SECTIONS / OF / MERRIMACK RIVER BED / SHOWING CROSS SECTIONAL AREAS OF / FLOOD OF MARCH 20,1936.	1936/08/31	H1"=20', V1"=20'	H 56.7, W 147.3 CM	INK, COLORED INK	PAPER
154-128	SECTIONS ACROSS MERRIMACK RIVER / BETWEEN / SCHOOL & MOODY STREET BRIDGES.	1928/03/00	NONE	H 56.2, W 137.8 CM	INK	PAPER
154-129	COSTS OF MILS PER KWH TO THE LOWELL MILLS / FOR VARIOUS KINDS OF POWER / YEAR 1933.	SEE TITLE	NONE	H 110, W 55.9 CM	INK, COLORED PENCIL	PAPER
154-130-[A]	MONTHLY FLOW OF MERRIMACK RIVER / AT LOWELL, MASS.-CUBIC FEET PER SECOND.	SEE NOTES	NONE	H 29.6, W 75 CM	INK, WATER COLOR	DRAFTING CLOTH
154-130-[A]-[COPY 1]	MONTHLY FLOW OF MERRIMACK RIVER / AT LOWELL, MASS.-CUBIC FEET PER SECOND.	SEE NOTES	NONE	H 29.2, W 73.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-130-[B]	MONTHLY FLOW OF MERRIMACK RIVER / AT LOWELL, MASS.-CUBIC FEET PER SECOND.	SEE NOTES	NONE	H 30, W 55.3 CM	INK, WATER COLOR	DRAFTING CLOTH
154-130-[C]	MONTHLY FLOW OF MERRIMACK RIVER / AT LOWELL, MASS.-CUBIC FEET PER SECOND.	SEE NOTES	NONE	H 30.3, W 58.4 CM	INK, WATER COLOR	DRAFTING CLOTH
154-130-[D]	MONTHLY FLOW OF MERRIMACK RIVER / AT LOWELL, MASS.-CUBIC FEET PER SECOND.	SEE NOTES	NONE	H 30.3, W 168 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-131-[3]	ACTUAL KILOWATT HOURS / PRODUCED BY SURPLUS WATER POWER / MERRIMACK RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 29.9, W 55.4 CM	INK, WATER COLOR	DRAFTING CLOTH

154-131-[4]	ACTUAL KILOWATT HOURS / PRODUCED BY WATER POWER-MERRIMACK RIVER / AT LOWELL, MASS.	SEE NOTES	NONE	H 31.1, W 67.4 CM	INK, WATER COLOR	DRAFTING CLOTH
154-131-1	ACTUAL KILOWATT HOURS / PRODUCED BY WATER POWER-MERRIMACK RIVER / AT LOWELL, MASS.	SEE NOTES	NONE	H 29.6, W 75 CM	INK, WATER COLOR	DRAFTING CLOTH
154-131-1-[COPY 1]	ACTUAL KILOWATT HOURS / PRODUCED BY WATER POWER-MERRIMACK RIVER / AT LOWELL, MASS.	SEE NOTES	NONE	H 29.2, W 73.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-131-2	ACTUAL KILOWATT HOURS / PRODUCED BY WATER POWER-MERRIMACK RIVER / AT LOWELL, MASS.	SEE NOTES	NONE	H 29.6, W 55.6 CM	INK, WATER COLOR	DRAFTING CLOTH
154-132	ACTUAL KILOWATT HOURS / PRODUCED BY SURPLUS WATER POWER / MERRIMACK RIVER AT LOWELL, MASS.	UNDATED	NONE	H 29.8, W 75 CM	INK, WATER COLOR	DRAFTING CLOTH
154-132-[A]	ACTUAL KILOWATT HOURS / PRODUCED BY SURPLUS WATER POWER / MERRIMACK RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 29.2, W 73.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-132-[B]	ACTUAL KILOWATT HOURS / PRODUCED BY SURPLUS WATER POWER / MERRIMACK RIVER AT LOWELL, MASS.	UNDATED	NONE	H 29.4, W 82.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-133	[UNTITLED PLAN.] [PROFILE OF VARNUM AVENUE FROM FLAGGY BROOK TO SCHOOL STREET, SHOWING HIGH WATER OF MARCH 20, 1936 AND ALSO CONTOURS.]	1937/11/00	H1"=50', V1"=5'	H 68.9, W 142.3 CM	INK, COLORED INK	DRAFTING CLOTH
154-133-[COPY 1]	[UNTITLED PLAN.] [PROFILE OF VARNUM AVENUE FROM FLAGGY BROOK TO SCHOOL STREET, SHOWING HIGH WATER OF MARCH 20, 1936 AND ALSO CONTOURS.]	1937/11/00	H1"=50', V1"=5'	H 66.1, W 141 CM	BLUEPRINT	PAPER

154-134-[A]	NORMAL & ACTUAL FLOW / OF / MERRIMACK RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 31.1, W 62.2 CM	INK, WATER COLOR	DRAFTING CLOTH
154-134-[B]	NORMAL & ACTUAL FLOW / OF / MERRIMACK RIVER AT LOWELL, MASS..	SEE NOTES	NONE	H 31.8, W 61.9 CM	INK, WATER COLOR	DRAFTING CLOTH
154-134-[C]	NORMAL & ACTUAL FLOW / OF / MERRIMACK RIVER AT LOWELL, MASS.	SEE NOTES	NONE	H 31.8, W 55.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
154-135	MAP OF / MERRIMACK RIVER DRAINAGE AREA / SHOWING / RAINFALL & STREAM GAGING STATIONS.	1940/10/00	1"=8 MILES	H 68, W 42.5 CM	INK, WATER COLOR	DRAFTING CLOTH
154-136	AMOSKEAG MFG. CO. / PROFILE OF [WINNIPISEOGEE AND] MERRIMACK RIVER [LAKE WINNIPISSOGEE TO NEWBURYPORT LIGHT, MASS. SHOWING VARIOUS FLOODS.]	UNDATED	NONE	H 60.8, W 80 CM	INK	DRAFTING CLOTH
154-137	MERRIMACK RIVER BELOW CONCORD RIVER AT LOWELL MASS. / STAGE & DISCHARGE HYDROGRAPH.	1936/03/00	NONE	H 26.5, W 69.4 CM	BLUEPRINT	PAPER
154-138	RATING CURVE FOR MERRIMACK RIVER BELOW CONCORD RIVER / AT LOWELL, MASS.	UNDATED	NONE	H 41.1, W 56.5 CM	BLUEPRINT	PAPER
154-139	PORTION OF / MERRIMACK & CONCORD RIVERS / SHOWING LOCATION OF / RATING GAUGES.	1921/08/00	1"=4'	H 47.3, W 49.9 CM	INK, COLORED INK	DRAFTING CLOTH
154-140	STUDIES OF / FORMER & NEW RATINGS OF / MERRIMACK RIVER FLOWS IN C.F.P.S. / AT BOOTT GAGE WITH & WITHOUT / CONCORD RIVER FLOWS.	1943/08/00	NONE	H 53.4, W 78.8 CM	INK	PAPER
154-141	RATING CURVE OF / MERRIMACK RIVER BOOTT GAGE / FOR / FLOWS ABOVE 25,000 C.F.P.S.	1943/10/10	NONE	H 55.9, W 141 CM	INK	PAPER

154-142	MAP OF / MERRIMACK RIVER / IN MASSACHUSETTS / PREPARED UNDER DIRECTION OF THE / MERRIMACK VALLEY WATERWAY BOARD.	1914/01/00	1/2"=1000'	H 50.2, W 69.9 CM	BLUEPRINT	PAPER
154-143	MAP OF THE RIVER "MERRIMACK" FROM THE / ATLANTICK [SIC] OCEAN TO PANTUCKETT [SIC] FALLS DESCRIBING BOUNDS BETWEEN HIS MAJST / PROVINCE OF NEW HAMPSHIRE & / THE BAY AGREEABLE TO HIS MAJST ORDER IN COUNCIL, 1741.	1741/00/00	1"=1 MILE	H 55.3, W 75.4 CM	BLUEPRINT	PAPER
154-144	[UNTITLED.] [HYDROGRAPH OF MERRIMACK RIVER AT FRANKLIN N.H. PEMIGEWASSET AND ITS EAST BRANCH, BAKERS, SUNCOOK AND SOUHEGAN RIVERS.]	UNDATED	NONE	H 45.8, W 58.7 CM	GRAPHITE	PAPER
154-145	COMPARATIVE HYDROGRAPHS FOR FLOWS DUE TO STORM OF APRIL 7-8,1930. [MERRIMACK RIVER AT FRANKLIN JCT., N.H., BAKERS RIVER AT RUMNEY, PEMIGEWASSET RIVER AT PLYMOUTH, E. BRANCH OF PEMIGEWASSET AT LINCLON, SUNCOOK RIVER AT N. CHICHESTER AND SOUHEGAN RIVER.]	SEE TITLE	NONE	H 58.8, W 46.1 CM	GRAPHITE, COLORED PENCIL	PAPER

154-146	COMPARATIVE HYDROGRAPHS FOR FLOWS DUE TO STORM OF JUNE 7-10,1931. [MERRIMACK RIVER AT FRANKLIN JCT., N.H., BAKERS RIVER AT RUMNEY, PEMIGEWASSET RIVER AT PLYMOUTH, E. BRANCH OF PEMIGEWASSET AT LINCLON, SUNCOOK RIVER AT N. CHICHESTER AND SOUHEGAN RIVER.]	SEE TITLE	NONE	H 58.8, W 46.1 CM	GRAPHITE	PAPER
154-147	COMPARATIVE HYDROGRAPHS FOR FLOWS DUE TO STORM OF SEPT. 16-17,1932. [MERRIMACK RIVER AT FRANKLIN JCT., N.H., BAKERS RIVER AT RUMNEY, PEMIGEWASSET RIVER AT PLYMOUTH, E. BRANCH OF PEMIGEWASSET AT LINCLON, SUNCOOK RIVER AT N. CHICHESTER AND SOUHEGAN RIVER.]	SEE TITLE	NONE	H 58.8, W 46.1 CM	GRAPHITE	PAPER
154-148	COMPARATIVE HYDROGRAPHS FOR FLOWS DUE TO STORM OF JULY 21-24,1931. [MERRIMACK RIVER AT FRANKLIN JCT., N.H., BAKERS RIVER AT RUMNEY, PEMIGEWASSET RIVER AT PLYMOUTH, E. BRANCH OF PEMIGEWASSET AT LINCLON, SUNCOOK RIVER AT N. CHICHESTER AND SOUHEGAN RIVER.]	SEE TITLE	NONE	H 58.8, W 46.1 CM	GRAPHITE	PAPER

154-149	COMPARATIVE HYDROGRAPHS FOR FLOWS DUE TO RAINS OF MAR.29-APR.1,1932. [MERRIMACK RIVER AT FRANKLIN JCT. N.H., BAKERS RIVER AT RUMNEY, PEMIGEWASSET RIVER AT PLYMOUTH, E. BRANCH OF PEMIGEWASSET AT LINCOLN, SUNCOOK RIVER AT N. CHICHESTER AND SOUHEGAN RIVER.]	SEE TITLE	NONE	H 58.8, W 46.1 CM	GRAPHITE	PAPER
154-150	CROSS SECTION / OF / MERRIMACK RIVER UNDER / PROPOSED HUNTS FALLS BRIDGE / SHOWING / SECTIONAL AREA OF RIVER BED TAKEN / OUT BY EXCAVATION (CROSS HATCHED) & PROPOSED NEW CONCRETE BRIDGE PIERS.	1952/07/23	H1"=40' & V1"=8'	H 45.8, W 58.6 CM	INK, COLORED INK	PAPER
154-150-[A]	PROPOSED RIVER LINES [PLUS WORKSHEET OF SAME].	SEE NOTES	NONE	H 69.2, W 173.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
154-150-[B]	PROPOSED RIVER LINES / THIS PLAN USED FOR WORKSHEET / SEE FINISHED PLAN FOR AUGUST 1950.	1950/08/00	1"=100'	H 80, W 168 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
154-150-[B]-[COPY 1]	PROPOSED RIVER LINES / THIS PLAN USED FOR WORKSHEET / SEE FINISHED PLAN FOR AUGUST 1950.	1950/08/00	1"=100'	H 80, W 168 CM	BLUEPRINT, COLORED PENCIL	PAPER
154-151	PLAN & PROFILE / OF / MERRIMACK RIVER AT HUNT FALLS / SHOWING / EXCAVATION OF MATERIAL TAKEN OUT BY / PROP. OF THE LOCKS & CANALS FROM 1894 TO 1912.	1952/08/23	H3"=500', V.02'=1'	H 49.6, W 87.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

155-[161]	[UNTITLED.] [PLAN SHOWING NEW SIDEWALK ON MOODY STREET AT MERRIMACK RIVER.]	1926/00/00	NONE	H 27.5, W 21 CM	INK, GRAPHITE	TRACING PAPER
155-[162]	[UNTITLED.] [PLAN SHOWING NEW SIDEWALK ON MARKET STREET BRIDGE OVER WESTERN CANAL.]	1926/00/00	NONE	H 27.5, W 21 CM	INK, GRAPHITE	TRACING PAPER
155-001	OFFICE OF THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER [DIAGRAM SHOWING VENTURI METER] RATING MADE [AT SWAMP LOCKS] FOR HARVARD UNIVERSITY [AND "CF" WHEN G & H ARE KNOWN FOR 6" x 3" HARVARD VENTURI METER].	1914/01/09	NONE	H 27.5, W 21 CM	INK, COLORED INK	PAPER
155-002	OFFICE OF THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / SUBJECT DISCHARGE VS. VENTURI FRICTION COEFFICIENT SHOWING VENTURI METER READING AT SWAMP LOCKS FOR HARVARD UNIVERSITY, AND "CF" WHEN G & H ARE KNOWN FOR 6"x 3" HARVARD VENTURI METER.]	SEE NOTES	NONE	H 27.5, W 21 CM	INK, COLORED INK	PAPER

155-003	OFFICE OF THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / SUBJECT DISCHARGE VS. VENTURI FRICTION COEFFICIENT SHOWING VENTURI METER READING AT SWAMP LOCKS FOR HARVARD UNIVERSITY, AND "CF" WHEN G & H ARE KNOWN FOR 6"x 3" HARVARD VENTURI METER.]	SEE NOTES	NONE	H 27.5, W 21 CM	INK, COLORED INK	PAPER
155-004	DIAGRAM / GIVING / "CF," WHEN "G" & "H" ARE KNOWN, / FOR / 6"x3" "HARVARD VENTURI METER."	1914/05/23	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-005	DIAGRAM SHOWING / AMOUNT OF COAL IN THE HANDS / OF / MILLS DRAWING WATER / FROM / PROP'S OF LOCKS & CANALS / LOWELL, MASS.	1918/06/25	NONE	H 28, W 21.4 CM	INK	PAPER
155-006	STUDY OF THE H.P. [AND] COAL USED BY LOWELL MILLS COMPARED TO WHITE COAL.	1918/01/30	NONE	H 28, W 21.5 CM	INK	PAPER
155-007	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / [DIAGRAM SHOWING] AREAS THRU WATERWAYS [OF MASS. MILLS WITH HOLYOKE MACHINE CO. SETTING, JAMES LEFFEL & CO. SETTING, S. MORGAN SMITH CO. SETTING].	1924/02/17	NONE	H 21.5, W 28 CM	INK	PAPER

155-008	MASS. COTTON MILLS / LOWELL, MASS. / VELOCITIES THRU WATERWAYS [WITH FOLLOWING TYPE WHEELS: 42" HERCULES 263 C.F.P.S., 50" LEFFEL WHEELS 251 C.F.P.S., S. MORGAN SMITH WHEELS 523 C.F.P.S.]	1917/02/24	NONE	H 43.2, W 55.6 CM	INK	PAPER
155-009	VELOCITY DIAGRAM / [OF WATERWAYS OF] NO. 6 UNIT / [OF] SACO-LOWELL SHOPS / 26" R.H. TYPE S, SMITH WHEEL.	1919/01/28	NONE	H 21.5, W 30.5 CM	INK, COLORED INK, GRAPHITE	PAPER
155-010	VELOCITY DIAGRAM FOR [THRU WATERWAYS OF] HAMILTON WHEELS: NO.1 (PR.), NO.2, NO.3, NO.4 (PAIR), & NOS. 5 (SHUT DOWN).	1919/05/01	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-011	[DIAGRAM SHOWING] THEORETICAL RELATION / BETWEEN / LIMITATION & DRAFT / ON / UPPER & LOWER LEVELS / [OF] NORTHERN CANAL.	1918/01/00	NONE	H 30.5, W 21.3 CM	INK	PAPER
155-012	[UNTITLED.] [DIAGRAM SHOWING THEORETICAL RELATION BETWEEN LIMITATION & DRAFT ON UPPER & LOWER LEVELS OF PAWTUCKET CANAL.]	1918/01/00	NONE	H 30.5, W 21.3 CM	GRAPHITE	PAPER
155-013	[DIAGRAM SHOWING] RELATION BETWEEN / LIMITATION & ACTUAL USE / OF / SURPLUS MILL-POWERS & C.F.P.S. FOR MILLS ON / UPPER LEVEL CANALS.	1918/01/23	NONE	H 25.5, W 21 CM	INK	PAPER
155-014	[UNTITLED.] [DIAGRAMS SHOWING THEORETICAL RELATION BETWEEN LIMITATION & DRAFT ON UPPER & LOWER LEVELS OF PAWTUCKET CANAL.]	SEE NOTES	NONE	H 30.5, W 21.3 CM	GRAPHITE	PAPER

155-015	[DIAGRAM SHOWING] THEORETICAL RELATION / BETWEEN / LIMITATION & DRAFT / ON / UPPER & LOWER LEVELS / [OF] PAWTUCKET CANAL.	1918/01/00	NONE	H 25.5, W 30.5 CM	INK	PAPER
155-016	MILL-POWER CORRECTION DIAGRAM / MASSACHUSETTS COTTON MILLS / MADE BY / PROPRIETORS OF LOCKS & CANALS.	1919/08/12	NONE	H 21.3, W 30.5 CM	INK, COLORED INK	PAPER
155-017	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOTT GAUGE / AT HOURS INDICATED / FOR WEEK OF JULY 19-24 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORED INK	PAPER
155-018	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOTT GAUGE / AT HORS INDICATED / FOR WEEK OF AUGUST 30-SEPTEMBER 4 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORED INK	PAPER
155-019	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOTT GAUGE / AT HOURS INDICATED / FOR WEEK OF AUGUST 16-21 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORE INK	PAPER
155-020	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOTT GAUGE / AT HOURS INDICATED / FOR WEEK OF JULY 5-10 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORED INK	PAPER
155-021	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOTT GAUGE / AT HOURS INDICATED / FOR WEEK OF JULY 12-17 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORED INK	PAPER

155-022	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOT GAUGE / AT HOURS INDICATED / FOR WEEK OF AUGUST 9-14 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORED INK	PAPER
155-023	[DIAGRAM SHOWING] QUANTITY OF WATER PASSING BOOT GAUGE / AT HOURS INDICATED / FOR WEEK OF AUGUST 2-7 / 1915.	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, COLORED INK	PAPER
155-023-[COPY 1]	[FINANCIAL] DIAGRAM SHOWING / RECEIPTS & EXPENDITURES / OF / PROP'S. OF LOCKS & CANALS MERRIMACK RIVER / FROM 1908 TO DATE [1916].	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, WATER COLOR	PAPER
155-023-[COPY 2]	[FINANCIAL] DIAGRAM SHOWING / RECEIPTS & EXPENDITURES / OF / PROP'S. OF LOCKS & CANALS MERRIMACK RIVER / FROM 1908 TO DATE [1916].	SEE TITLE	NONE	H 29.2, W 45.3 CM	INK, WATER COLOR	PAPER
155-024	[SHEETS SHOWING] DATA [AND REFERENCES] ON BOOTT [MILL WHEELS] NOS. 6, 7 & 8, 72" SWAIN WHEELS.	UNDATED	NONE	H 18.9, W 48.6 CM	INK	DRAFTING CLOTH
155-025	[SHEETS SHOWING] DATA [AND REFERENCES] ON BOOTT [MILL WHEELS] NOS. 3, 4, 5, 72" SWAINS L.H. WHEELS.	UNDATED	NONE	H 27.1, W 22.5 CM	INK	DRAFTING CLOTH
155-026	TABLE OF 3/2 POWERS FOR / USE IN REDUCING HOLYOKE / TESTS TO A UNIFORM HEAD.	UNDATED	NONE	H 23.8, W 11 CM	INK	DRAFTING CLOTH
155-027	[DIAGRAM SHOWING] 42" R. H. SPECIAL HERCULES WHEEL / FOR MASS. COTTON MILLS, LOWELL. HOLYOKE TEST NO. 2611 JUNE 26, 27,1918.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER

155-028	DIAGRAM SHOWING / POWER DEVELOPED / BY / 36" LEFFEL WHEEL, NO. 8 / OF / HAMILTON MFG.[CO.]	1918/11/06	NONE	H 21.5, W 28 CM	INK, COLORED INK, GRAPHITE	PAPER
155-029	[DIAGRAM SHOWING] EFFICIENCY, WATER, AND POWER CURVES / OF A / 36" TYPE Z LEFFEL VERTICAL TURBINE CONSTANT SPEED 150 R.P.M. / FOR HAMILTON MANUFACTURING CO. / LOWELL, MASS.	1918/02/21	NONE	H 21, W 30 CM	INK, COLORED INK	PAPER
155-030	SKETCH OF / SACO LOWELL UNIT NO.6-[SHOWING] NEW SETTING [(S. MORGAN SMITH) OF SACO-LOWELL SHOPS.]	UNDATED	NONE	H 27.9, W 21.5 CM	INK, COLORED INK, GRAPHITE	PAPER
155-031	SKETCH SHOWING TEST PITS & / SOUNDINGS FOR NEW POWER HOUSE / AT MIDDLESEX CO.	1917/09/01	1"=10'	H 28, W 21.4 CM	INK, COLORED INK	PAPER
155-032	SKETCH OF FENCES OF DIFFERENT TYPES. / LOCKS & CANALS / LOWELL, MASS.	1917/04/09	1/4"=1'	H 39, W 20.3 CM	INK	DRAFTING CLOTH
155-032-[COPY 1]	SKETCH OF FENCES OF DIFFERENT TYPES. / LOCKS & CANALS / LOWELL, MASS.	1917/04/09	1/4"=1'	H 39, W 20.3 CM	BLUEPRINT	PAPER
155-032-[COPY 2]	SKETCH OF FENCES OF DIFFERENT TYPES. / LOCKS & CANALS / LOWELL, MASS.	1917/04/09	1/4"=1'	H 38.7, W 20.3 CM	BLUEPRINT	PAPER
155-032-[COPY 3]	SKETCH OF FENCES OF DIFFERENT TYPES. / LOCKS & CANALS / LOWELL, MASS.	1917/04/09	1/4"=1'	H 38.7, W 20.3 CM	BLUEPRINT	PAPER
155-033	SKETCH OF / FENCE AT HEAD OF HAMILTON CANAL / OFF JACKSON ST. / LOCKS & CANALS / LOWELL, MASS.	1917/00/00	1"=1'	H 29.3, W 22.6 CM	INK	DRAFTING CLOTH

155-034	ELEVATION OF OLD IRON FENCE / SCHOOL ST. BRIDGE OVER MERRIMACK RIVER.	1917/05/08	1"=1'	H 14.6, W 37.2 CM	INK, COLORED INK	DRAFTING CLOTH
155-034-X	FLASHBOARD PINS [ON PAWTUCKET DAM] / GRAPH OF TEST RESULTS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/28	NONE	H 29.6, W 21.5 CM	BLUEPRINT	PAPER
155-035	SKETCH OF FRONT STREET FENCE / LOCKS & CANALS / LOWELL, MASS.	UNDATED	1"=1'	H 29.3, W 23 CM	INK	DRAFTING CLOTH
155-035-[COPY 1]	SKETCH OF / FRONT STREET FENCE / LOCKS & CANALS / LOWELL, MASS.	UNDATED	NONE	H 28, W 22.6 CM	BLUEPRINT	PAPER
155-035-X	FLASHBOARD PINS [ON PAWTUCKET DAM] / GRAPH OF TEST RESULTS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/28	NONE	H 29.6, W 21.5 CM	BLUEPRINT	PAPER
155-036	SKETCH SHOWING / PROPOSED FENCE ON BROADWAY / NORTHERLY SIDE JUST EAST OF BRIDGE OVER PAWTUCKET CANAL.	1917/05/00	1/4"=1'	H 16.5, W 51.2 CM	INK	DRAFTING CLOTH
155-036-X	FLASHBOARD PINS [ON PAWTUCKET DAM] / GRAPH OF TEST RESULTS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/04/21	NONE	H 45.2, W 104.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
155-037	PLAN SHOWING / PROPOSED FENCE ON CANAL WALL ALONG PRESCOTT / STORE HOUSE [WALL] FROM MERRIMACK SQUARE / TO / MASSACHUSETTS FLUME.	1917/05/15	1"=1'	H 25.5, W 75 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-037-X	SKETCH SHOWING SOME DATA RELATIVE TO THE / MARY F. DILLON WALL WHICH COLLAPSED NOV. 27, 1918.	1919/01/00	1"=10'	H 25.1, W 44.8 CM	INK, COLORED INK	DRAFTING CLOTH

155-038	THERMOGRAPH / OF / YEARLY AND WINTER MONTHS AVERAGE TEMPERATURES / AT PAWTUCKET DAM / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS. [1830 TO 1920].	1919/05/22	NONE	H 31, W 72 CM	INK, COLORED INK	DRAFTING CLOTH
155-038-X	PLAN SHOWING / SOME CONDITIONS IN / CONCORD RIVER / LOWELL, MASS.	1919/01/00	1"=50'	H 43.6, W 55.3 CM	BLUEPRINT	PAPER
155-039	[SKETCH SHOWING LOCATION AND GRADE OF NAILS IN PLANKING OF SUFFOLK ST. BRIDGE.]	1917/07/25				
155-040	[UNTITLED.] [SKETCH OF EASTERN CANAL SHOWING LOCATION OF WASHOUT AT WALL NEAR BRIDGE ENTERING MASS. YARD AT BRIDGE ST.]	1918/11/14	1"=40'	H 28.2, W 21.4 CM	INK, GRAPHITE	DRAFTING CLOTH
155-041	[UNTITLED.] [SKETCH SHOWING PIECE OF LAND NEAR RED BRIDGE ON PAWTUCKET CANAL DESIRED BY SACO-LOWELL SHOPS FOR STORAGE OF LUMBER.]	1918/04/12	1"=40'	H 23.5, W 33.6 CM	INK	DRAFTING CLOTH
155-042	LOCATION SKETCH / FOR / PROPOSED LIFT GATES / IN / MERRIMACK CANAL [BETWEEN Y.M.C.A. & MARKET ST.].	1919/07/28	1"=50'	H 28, W 21.4 CM	INK, COLORED INK	TRACING PAPER
155-043	SKETCH INDICATING WORK DONE [ON BED OF MERRIMACK RIVER] / SUNDAY SEPT.8, 1918 / FOR THE PURPOSE OF DIVERTING WATER / FROM MERRIMACK RIVER TO LAWRENCE MFG. CO'S / 4, 5, & 6 RACEWAYS TO / SUPPLY FIRE PUMPS, WHEN / RIVER IS LOW.	1918/09/00	1"=100'	H 25, W 24.2 CM	INK	DRAFTING CLOTH

155-044	[SKETCH SHOWING] CONTEMPLATED CHANGES / TO PROPERTY ON / DUTTON STREET / ON ACCOUNT OF / CHANGE IN TRACKS.	1917/10/22	1"=20'	H 16.7, W 51.4 CM	INK	DRAFTING CLOTH
155-045	MEMORANDUM PLAN / LOWELL, MASS. [OF LAND IN VICINITY OF MOODY ST. & PAWTUCKET ST. DESIRED TO BE LEASED BY OMER DEZIEL].	1921/07/19	1"=40'	H 21.6, W 38.9 CM	INK, COLORED INK	DRAFTING CLOTH
155-046	PLAN OF THE / KITSON PLANT / SACO LOWELL SHOPS.	UNDATED	1"=40'	H 47.2, W 53 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-047	PLAN OF THE / MILL YARD / OF THE / APPLETON CO. [SHOWING BUILDINGS].	UNDATED	1"=40'	H 60, W 64 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-047-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / APPLETON CO.	UNDATED	1"=40'	H 60, W 64 CM	BLUEPRINT, COLORED PENCIL, COLORED INK	PAPER
155-048	PLAN OF THE / MILL YARD / OF THE HAMILTON MFG. CO. [SHOWING WATERWAYS].	1912/00/00	1"=40'	H 54.8, W 98.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
155-049	11 A.M. FLOW [OF RIVER] AT LOWELL / PLOTTED AGAINST / 24-HOUR FLOW AT LAWRENCE	1921/10/21	NONE	H 29, W 46 CM	INK, COLORED INK	PAPER
155-050	MERRIMACK RIVER SLOPES / [FROM] AIKEN STREET POOL TO BELOW / HUNTS FALLS.	1921/11/00	H1"=1000', V1"=4'	H 28, W 38 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
155-050-[COPY 1]	MERRIMACK RIVER SLOPES / AIKEN ST. POOL TO BELOW / HUNT'S FALLS.	1921/11/00	H1"=1000', V1"=4'	H 28, W 38 CM	RED LINE PRINT, COLORED INK	PAPER

155-051	[DIAGRAM SHOWING] SLOPES IN CANALS AT LOWELL / FOR DATES GIVEN [(DEC.15, 19, 28, 1921)] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/12/29	1"=1000' & 2'	H 27.6, W 33.7 CM	INK	DRAFTING CLOTH
155-052	MAP OF MERRIMACK RIVER / AND / LOWELL CANAL SYSTEM / PAWTUCKET DAM TO BELOW HUNT'S FALLS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/11/00	1"=1000'	H 25.5, W 33.5 CM	RED LINE PRINT	PAPER
155-053-A	PAWTUCKET DAM / PROFILE OF FISHWAY / [SHOWING] FIRST FIVE BAYS UNDER VARIOUS / CONDITIONS OF FLASHBOARDS.	1921/12/08	1"=2'	H 28, W 45.8 CM	INK, COLORED INK	PAPER
155-053-B	PAWTUCKET DAM / PROFILE OF FISHWAY / [SHOWING] FIRST FIVE BAYS UNDER VARIOUS / CONDITIONS OF FLASHBOARDS	1921/12/08	1"=2'	H 28, W 45.8 CM	INK, COLORED INK	PAPER
155-054	PLAN & SECTIONS / [OF] MERRIMACK RIVER / BETWEEN / AIKEN & BRIDGE STS.	1921/11/00	H 1"=250' V 1"=50'	H 28, W 42.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
155-055	[PLAN AND ELEVATION OF] DRAFT TUBE / FOR / [BOOTT NO. 7 REDUCED] FOR / HOLYOKE TEST / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/09/22	1/2"=1'	H 21.7, W 38.6 CM	INK	DRAFTING CLOTH
155-056	PLAN & SECTIONS / [OF] MERRIMACK RIVER / AT / HUNTS FALLS [SHOWING CONTOURS OF RIVER & BANKS].	1921/11/00	H 1"=250'V 1"=50'&8'	H 28, W 38.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

155-057	MAP OF MERRIMACK RIVER / & / LOWELL CANAL SYSTEM / FROM PAWTUCKET DAM TO BELOW HUNTS FALLS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/11/00	1"=1000'	H 28, W 40 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
155-058	PLAN & SECTIONS / [OF] MERRIMACK RIVER / AT / [FROM CONCORD RIVER TO BELOW] HUNTS FALLS [SHOWING PROPOSED BOULEVARD ALONG FIRST ST. & PROPOSED EXTENSION].	1921/11/00	H1"=250', V1"=50'& 8'	H 26.8, W 36 CM	RED LINE PRINT, COLORED INK, COLORED PENCIL	PAPER
155-059	PLAN & SECTIONS / [OF] MERRIMACK RIVER / BETWEEN / AIKEN & BRIDGE STS. [SHOWING PROPOSED RIVER LINES] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL,MASS.	1921/11/00	H1"=250', V1"=50'	H 28, W 40 CM	RED LINE PRINT, INK, COLORED INK, COLORED PENCIL	PAPER
155-060	[UNTITLED.] [PLAN SHOWING LAND BETWEEN MERRIMACK CANAL & MACK BLDG. LOT # 71-A.]	1922/04/07	1"=20'	H 29.8, W 20.4 CM	INK, WATER COLOR	DRAFTING CLOTH
155-060-[COPY 1]	[PLAN SHOWING] LAND BETWEEN MERRIMACK CANAL & MACK BLDG. [LOT # 71-A.]	1922/04/07	1"=20'	H 29.8, W 20.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
155-060-[COPY 2]	[UNTITLED.] [PLAN SHOWING LAND BETWEEN MERRIMACK CANAL & MACK BLDG. LOT # 71-A.]	1922/04/07	1"=20'	H 32.3, W 23.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
155-062	[DIAGRAM SHOWING PROBABLE VELOCITIES THROUGH WATERWAYS OF APPLETON CO.]	1922/03/22				
155-063	[DIAGRAM SHOWING] SLOPE THROUGH APPLETON [CO.] WHEELS FEB. 3,'22.	1922/02/03	NONE	H 45.3, W 29.2 CM	INK, COLORED INK	PAPER

155-064-[A]	SKETCH SHOWING PROPOSED / FOUNDATION FOR COLUMN / [AT THE] MASSACHUSETTS [COTTON MILLS] DYE HOUSE / PROP. OF LOCKS & CANALS.	1923/06/28	1"=4'& 10'	H 28.2, W 38.5 CM	GRAPHITE	TRACING PAPER
155-064-[B]	[UNTITLED.] [SKETCH SHOWING PROPOSED / FOUNDATION FOR COLUMN / MASSACHUSETTS DYE HOUSE / PROP. OF LOCKS & CANALS.]	UNDATED	NONE	H 40.9, W 66.6 CM	BLUEPRINT	PAPER
155-065	[DRAWING SHOWING] PROGRESS ON DAVIS & SARGENT WALL.	1923/05/00	NONE	H 13.6, W 64.2 CM	INK, COLORED PENCIL	PAPER
155-066	[DRAWING SHOWING] ELEVATION OF WESTERN SIDE OF EASTERN CANAL IN VICINITY OF PRESCOTT FLUME / TO SHOW PROGRESS OF WORK ON NEW CONCRETE FACE TO OLD WALL.	1923/09/00	NONE	H 17.8, W 73.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-067	SKETCH SHOWING LOCATION OF / PROPOSED SPUR TRACKS / IN VICINITY OF R. R. BRIDGE OVER PAWTUCKET CANAL / BETWEEN WALKER & SCHOOL STS.	1921/09/00	1"=40'	H 25.6, W 38.7 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
155-068	SKETCH SHOWING NEW DRAIN CONNECTION / TO OLD SURFACE DRAIN OF BIGELOW-HARTFORD CARPET CO.	1920/11/24	1"=40'	H 21.5, W 42 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
155-069	SKETCH OF / LOWELL HOSIERY YARD / SHOWING DISTANCE OF PROPOSED SUCTION / PIPE TO PAWTUCKET CANAL.	1922/03/22	1"=150'	H 17.5, W 36.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH

155-070	SKETCH SHOWING LOCATION / OF / STEEL FOOT BRIDGE / OVER / LOWER PAWTUCKET CANAL / FOR HAMILTON MFG. CO. / LOWELL, MASS.	1920/05/22	1"=40'	H 23.8, W 46.6 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
155-071	PLAN SHOWING / SUGGESTED IMPROVEMENTS / IN / BOOTT CANAL.	1924/01/30	1"=20'	H 30.4, W 71.4 CM	INK, COLORED INK, COLORED PENCIL	TRACING PAPER
155-071-[COPY 1]	PLAN SHOWING / SUGGESTED IMPROVEMENTS / IN / BOOTT CANAL.	1924/01/30	1"=20'	H 30.3, W 72 CM	BLUEPRINT	PAPER
155-072	[PLAN OF] BRIDGE (1917) OVER EASTERN CANAL ON / EAST MERRIMACK STREET. / LOWELL, MASS.	1917/09/26	1"=10'	H 37.3, W 40 CM	INK, COLORED INK	DRAFTING CLOTH
155-073	PLAN OF / SUFFOLK ST. / BETWEEN LIBERTY SQ. & BROADWAY / SHOWING SUGGESTED WIDENING OF STREET / & NEW CANAL WALL.	1923/06/00	H 1"=50', V 1"=20'	H 37, W 68.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
155-075	SKETCH SHOWING / PROPOSED LOCATION OF / LUNCH CART / ON CANAL ST., / WITH ENTRANCE FROM PLATFORM OVER CANAL.	1921/05/31	1"=40'	H 27.9, W 21.6 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
155-076	[PLAN SHOWING CONCRETE WALLS ALONG MERRIMACK RIVER ON BOTH SIDES OF MARKET STREET CONSTRUCTED IN SUMMER OF 1921.]	1921/09/00				
155-077	SKETCH SHOWING / LOCATION OF BRIDGE / CONNECTING MILL NO. 1 / AND NO. 6 / OF THE / APPLETON CO.	1920/05/17	1"=40'	H 21.2, W 34 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
155-078	SKETCH SHOWING / LOCATION OF ELECTRIC POWER WIRES / FROM / COLUMBIA TEXTILE CO. / TO / HAMILTON MFG. CO.	1920/10/00	1"=40'	H 20, W 25.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH

155-079	[DRAWING SHOWING] ELEVATION OF PAWTUCKET CANAL WALL / FROM BROADWAY TO "RED BRIDGE" / ON WESTERN SIDE OF CANAL.	SEE NOTES	NONE	H 19.9, W 146.6 CM	INK, WATER COLOR	DRAFTING CLOTH
155-080	[DRAWING SHOWING] ELEVATION OF / RETAINING WALL ON WEST BANK / OF PAWTUCKET CANAL / JUST ABOVE RED BRIDGE.	1922/03/00	NONE	H 20.4, W 41.3 CM	INK, WATER COLOR	DRAFTING CLOTH
155-081	[DRAWING SHOWING] ELEVATION OF WALL ON / SOUTHERLY SIDE OF PAWTUCKET CANAL / FROM 290 FEET BELOW RED BRIDGE TO / 311 FEET ABOVE SCHOOL ST. / A DISTANCE OF 500 FEET.	1922/04/00	NONE	H 32.3, W 134.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-082	PLAN OF LOT SOLD TO / HAMILTON MFG. CO. / LOWELL, MASS.	1920/06/00	1"=40'	H 24, W 46 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-083	PLAN OF CHELMSFORD.	1794/11/00	1"=20 RODS	H 22.3, W 22.8 CM	INK, GRAPHITE	DRAFTING CLOTH
155-084	DIAGRAM SHOWING VELOCITY / AT POINTS IN THE DISCHARGE FROM / ALLIS-CHALMERS [BOOTT # 1] WHEEL / AT / BOOTT MILLS.	1918/09/18	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
155-085	DIAGRAM SHOWING VELOCITY / AT POINTS IN THE DISCHARGE FROM / THE 36" LEFFEL WHEEL / AT / HAMILTON MFG. CO.	1918/09/18	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
155-086	DIAGRAM SHOWING VELOCITY / AT POINTS IN THE DISCHARGE FROM 42" "D" HERCULES WHEEL / AT / MASSACHUSETTS COTTON MILLS.	1918/09/18	NONE	H 21.5, W 30.5 CM	INK, COLORED INK	PAPER
155-087	[SKETCH SHOWING] DETAIL OF PITOMETER TIPS.	1925/06/00	1"=3"	H 28, W 34.3 CM	INK	DRAFTING CLOTH

155-088	[SKETCH OF] PROPOSED WOODEN FENCE / FOR / WESTERN CANAL / ALONG / SUFFOLK ST.	1921/11/23	1/2"=1'	H 24.1, W 37.8 CM	INK, WATER COLOR	DRAFTING CLOTH
155-089	DRAWINGS FOR / L. & C. PONTOON [OR SCOW].	1915/07/17	1"=4'	H 30.4, W 47 CM	INK, COLORED INK, COLORED PENCIL	PAPER
155-090	SKETCH OF / FLAT BOTTOMED BOAT.	SEE NOTES	1/2"=1'	H 27.6, W 43.9 CM	INK, COLORED INK	DRAFTING CLOTH
155-091	[TRACING] ELEVATION OF WALL / EAST SIDE OF WESTERN CANAL / BELOW BROADWAY.	1925/00/00	NONE	H 19.4, W 66.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
155-092	[TRACING OF] PORTION OF CATALOGUE / OF LAND / SOLD AT AUCTION, / TUESDAY, APRIL 15, 1845 / LOWELL, MASS. [SHOWING TREMONT STREET].	1927/03/00	1"=1 ROD	H 23.4, W 24 CM	INK	DRAFTING CLOTH
155-093	[TRACING] COPIED FROM L.& C. LAND PLAN [SHOWING TREMONT STREET].	1927/03/02	1"=50'	H 29.2, W 34.4 CM	INK, WATER COLOR	DRAFTING CLOTH
155-094	COPIED FROM / 1896 LOWELL ATLAS [PORTION OF L.& C. LAND PLAN SHOWING TREMONT STREET].	1927/03/02	1"=100'	H 15.5, W 16.5 CM	INK, WATER COLOR	DRAFTING CLOTH
155-095	[TRACING OF PORTION] COPIED FROM / 1879 LOWELL ATLAS [SHOWING TREMONT STREET].	1927/03/01	1"=150'	H 18, W 14.3 CM	INK, COLORED INK	PAPER
155-096	[TRACING] PLAN SHOWING / LOCATION OF STONE BOUND / REMOVED [IN OCTOBER, 1926] ON PERKINS ST.	1926/10/00	1"=50'	H 29.6, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH
155-097	PROPOSED / DISCHARGE AIR CHAMBERS / FOR / TRIPLEX PUMPS AT SACO-LOWELL SHOPS [ON DISCHARGE LINES OF SACO-LOWELL PUMPS].	1927/09/06	1"=1'	H 30, W 47 CM	INK	DRAFTING CLOTH

155-098-A	[UNTITLED.] [PENCIL SKETCH SHOWING PROPOSED STREETS OVER EASTERN CANAL & FROM GEORGE ST. OVER CONCORD RIVER.]	1923/11/00	1"=100'	H 45, W 45.8 CM	GRAPHITE, COLORED PENCIL	PAPER
155-098-B	[UNTITLED.] [PENCIL SKETCH SHOWING PROPOSED STREETS OVER EASTERN CANAL & FROM GEORGE ST. OVER CONCORD RIVER.]	1923/11/00	1"=100'	H 45.8, W 42.8 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
155-098-C	PLAN SHOWING / SUGGESTED STREET FROM EAST MERRIMACK / TO WARREN. [PENCIL SKETCH SHOWING PROPOSED STREETS OVER EASTERN CANAL & FROM GEORGE ST. OVER CONCORD RIVER.]	1923/11/00	1"=100'	H 53.5, W 54.3 CM	GRAPHITE, COLORED PENCIL	PAPER
155-099-A	SKETCH SHOWING / PROPOSED PARKING SPACE / FOR THE / CITY OF LOWELL.	1927/09/28	1"=150'	H 27.4, W 19.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-099-B	SKETCH SHOWING / PROPOSED PARKING SPACE / FOR THE / CITY OF LOWELL.	1927/09/28	1"=150'	H 27.3, W 19.5 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH
155-100	MAP OF LOWELL / SHOWING / MERRIMACK RIVER / CANALS & MILLS.	1928/08/00	1/2"=700'	H 40, W 52.9 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
155-101	[SKETCH SHOWING ELEVATIONS & DIMENSIONS OF] MASSACHUSETTS MEASURING FLUME / MEASURED & LEVELED APRIL 1, 1928.	1928/04/01	NONE	H 29.3, W 22 CM	INK	DRAFTING CLOTH
155-102	[SKETCH SHOWING] CROSS SECTION / OF / MASSACHUSETTS FLUME.	1928/04/01	NONE	H 21.5, W 30.5 CM	INK, GRAPHITE	PAPER

155-103	SKETCH SHOWING / OVERALL DIMENSIONS / OF / L. & C. GIRDERS.	1928/05/00	1"=10'	H 35, W 49.9 CM	INK, COLORED INK	DRAFTING CLOTH
155-104-[A]	[DIAGRAM SHOWING] MAXIMUM, MINIMUM [DAILY] & AVERAGE [MONTHLY] / TEMPERATURES / LOWELL, MASS. / 1885-1928.	SEE TITLE	NONE	H 26.6, W 41.2 CM	INK, COLORED INK	PAPER
155-104-[B]	[DIAGRAM SHOWING] MAXIMUM, MINIMUM [DAILY] & AVERAGE [MONTHLY] / TEMPERATURES / LOWELL, MASS. / 1885-1937.	SEE TITLE	NONE	H 26.6, W 41.2 CM	INK, COLORED INK	PAPER
155-104-[C]	[DIAGRAM SHOWING MAXIMUM, MINIMUM [DAILY] & AVERAGE [MONTHLY] / TEMPERATURES / LOWELL, MASS. / 1885-1942.	SEE TITLE	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
155-105	[DIAGRAM SHOWING PERMANENT & SURPLUS] MILL POWERS WHICH THE SEVERAL COMPANIES MAY DRAW.	1928/10/00	NONE	H 16.6, W 24.7 CM	INK, COLORED INK	PAPER
155-106-A	MERRIMACK MANUFACTURING COMPANY / LOWELL, MASS. [SKETCH OF MILLYARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES].	1929/01/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-B	LAWRENCE MFG. CO. / LOWELL, MASS. [SKETCH OF MILLYARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES].	1929/04/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-C	PROPERTY OWNERS / IN / HAMILTON YARD [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESEVOIR CHARGES].	1929/04/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH

155-106-D	SACO-LOWELL SHOPS / LOWELL, MASS. [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES].	1929/03/00	1"=200'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-E	APPLETON COMPANY / LOWELL, MASS. [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES].	1929/03/00	NONE	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-F	NASHUA MANUFACTURING COMPANY / "SUFFOLK MILLS" LOWELL, MASS. [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES].	1928/12/31	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-G	PROPERTY OWNERS / IN / BIGELOW YARD [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES].	1929/03/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-H	MIDDLESEX COMPANY / AND / MODEL SHOE COMPANY / LOWELL, MASS. [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESEVOIR CHARGES].	1929/02/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-J	BOOTT MILLS / LOWELL, MASSACHUSETTS. [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES.]	1929/02/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
155-106-K	PEPPERELL MANUFACTURING COMPANY / LOWELL, MASS. [SKETCH OF MILL YARD IN ENVELOPE USED AS BASIS FOR FIXING RESERVOIR CHARGES.]	1929/02/00	1"=100'	H 22, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH

155-107	TABLE SHOWING / CUBIC FEET PER SECOND, HORSE POWER, KILOWATTS ON SWITCHBOARD & CAPACITY OF GENERATORS .8O POWER FACTOR / OF / LOWELL MILLS / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1931/02/21	NONE	H 20.4, W 111.7 CM	INK	DRAFTING CLOTH
155-108	LOWELL DEC. 1,1913 / APPROXIMATE LENGTHS OF WORK DONE / SEASON OF 1913 [IN LOWER PAWTUCKET CANAL AROUND FOUNDATIONS OF SACO-LOWELL SHOPS AND APPLETON CO.].	SEE TITLE	1"=20'	H 21.6, W 33.1 CM	INK, WATER COLOR, GRAPHITE	PAPER
155-109	[UNTITLED.] [SKETCH SHOWING LAND ALONG WESTERN CANAL LEASED TO KITSON MACHINE SHOPS.]	UNDATED	1"=40'	H 33, W 20.4 CM	INK, WATER COLOR	DRAFTING CLOTH
155-110	CITY OF LOWELL / VALUATION, EXPENDITURES, POPULATION & TAX RATE [1860-1930].	SEE TITLE	NONE	H 48.6, W 48.6 CM	INK	DRAFTING CLOTH
155-111	LOWELL ELCTRIC LIGHT CORPORATION / INCOME & EXPENSE COSTS FOR KILOWATT HOURS.	SEE NOTES	NONE	H 42, W 28 CM	INK, COLORED INK, COLORED PENCIL	PAPER
155-112	LOWELL ELECTRIC LIGHT CORPORATION / OPERATING & REVENUE EXPENSES.	SEE NOTES	NONE	H 42, W 28 CM	INK, COLORED INK, COLORED PENCIL	PAPER
155-113	LOWELL ELECTRIC LIGHT CORPORATION / POWER OUTPUT [GENERATED, PURCHASED, AND SOLD FROM 1918 TO 1931].	SEE TITLE	NONE	H 42, W 27.8 CM	INK, COLORED INK, COLORED PENCIL	PAPER

155-114	FIRE LOSSES IN LOWELL MILLS / THAT ARE CONTROLLED BY LOCKS & CANALS FIRE PROTECTION SYSTEM / FROM 1908-1942.	1920/02/00	NONE	H 53.3, W 77.5 CM	INK, COLORED INK	PAPER
155-115	[DIAGRAM SHOWING MERRIMACK MFG. CO.] KILOWATT HOURS- PERMANENT WATER [AND STEAM POWER RELAY FOR 1930] / (15 HOURS PER DAY, 455 HOURS PER MONTH) [25 DAYS A MONTH, UP TO 5000 KW].	SEE TITLE	NONE	H 21.5, W 31.4 CM	INK, GRAPHITE	PAPER
155-116	[DIAGRAM SHOWING MERRIMACK MFG. CO.] POSSIBLE STEAM DRIVEN ELECTRIC POWER RELAY UP TO 7000 KW / (15 HOURS PER DAY 25 DAYS PER MONTH) [FOR 1930].	SEE TITLE	NONE	H 21.5, W 31.4 CM	INK, GRAPHITE	PAPER
155-117	[DIAGRAM SHOWING MERRIMACK MFG. CO.] KILOWATT HOURS- PERMANENT WATER [AND STEAM POWER RELAY FOR 1932] / (15 HOURS PER DAY, 455 HOURS PER MONTH) [25 DAYS A MONTH, UP TO 5000 KW].	1932/00/00	NONE	H 21.5, W 31 CM	INK, GRAPHITE	PAPER
155-118	POSSIBLE STEAM DRIVEN / ELECTRIC POWER RELAY UP TO 7000 KW / (15 HOUR DAY 25 DAYS PER MONTH) [FOR 1932].	1932/00/00	NONE	H 31.2, W 21.6 CM	INK, GRAPHITE	PAPER
155-119	SKETCH SHOWING LOCATION OF GAS [4"] MAIN / ON LOCKS & CANALS' BRIDGE ON BROADWAY [OVER PAWTUCKET CANAL] / LOWELL GAS LIGHT CO.	1930/12/22	NONE	H 21.3, W 27.6 CM	GRAPHITE	PAPER
155-120	CAST IRON PIPE PRICES / PER TON OF 2000 POUNDS [1868 TO 1922].	1921/05/00	NONE	H 36.3, W 68.8 CM	INK, COLORED INK	PAPER

155-121	GENERAL PLAN OF / COOK WELLS PUMP TEST / CITY OF LOWELL.	1925/02/25	1"=500'	H 28.2, W 21.6 CM	INK, GRAPHITE	DRAFTING CLOTH
155-122	SLIPPAGE OF DUPLEX PUMP / AT COOK WELLS PUMPING STATION / CITY OF LOWELL.	1925/02/25	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-123	CALLIBRATION OF / LOCKS & CANALS PRESSURE GAGE. 3 IN. / FOR / COOK WELLS PUMP TEST. FEB. 25, 1925. / CITY OF LOWELL.	SEE TITLE	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-124	CALLIBRATION OF / CITY PRESSURE GAGE # 69484 / FOR / COOK WELLS PUMP TEST. FEB. 25, 1925 / CITY OF LOWELL.	SEE TITLE	NONE	H 21., W 30.5 CM	INK	PAPER
155-125	CALLIBRATION OF / LOCKS & CANALS PRESSURE GAGE "F" FOR / COOK WELL'S PUMP TEST, FEB. 25, 1925. / CITY OF LOWELL.	SEE TITLE	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-126	CALIBRATION OF / COOK WELLS PUMP GAGE FOR TEST ON DUPLEX PUMPS / CITY OF LOWELL.	1925/02/25	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-127	CALLIBRATION OF / L. & C. PRESSURE GAGE "P" / FOR / COOK WELLS PUMP TEST. FEB. 25, 1925. / CITY OF LOWELL.	SEE TITLE	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-128	LOCKS & CANALS / PROFIT & LOSS [FROM 1922 TO 1933].	SEE NOTES	NONE	H 28, W 42 CM	INK	PAPER
155-129	LOCKS & CANALS / EXPENDITURES [FOR FIRE PROTECTION, REAL ESTATE, WATER POWER AND TOTAL RECEIPTS FROM 1922 TO 1932].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
155-130	LOCKS & CANALS / RECEIPTS [FROM PERMANENT AND SURPLUS POWER AND TOTAL RECEIPTS FROM 1922 TO 1932].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER

155-131	SIGNS POSTED BY LOCKS & CANALS [LOT # 8] / ALSO / HOLES UNDER L.& C. WIRE FENCE / IN REAR OF BARTLETT SCHOOL [WHERE DROWNINGS HAVE OCCURRED].	1933/06/00	1"=100'	H 30.9, W 52.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
155-132	KILOWATT HOUR / OF MERRIMACK RIVER AT LOWELL / UNDER DIFFERENT CONDITIONS AS SHOWN.	1933/06/00	NONE	H 28, W 42 CM	INK, COLORED PENCIL, COLORED INK	PAPER
155-133	[HYDROGRAPH OF] CUBIC FEET PER SECOND / OF MERRIMACK RIVER AT LOWELL / 24 HOUR FLOW, 3967 SQ. MILES DRAINAGE AREA / PROPRIETORS OF THE LOCKS & CANALS.	1933/06/00	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
155-134	DAVIS & SARGENT LUMBER CO. / LOWELL, MASS.	1932/07/12	1"=50'	H 27.7, W 38.1 CM	INK, COLORED PENCIL	TRACING PAPER
155-135	PLAN OF BURNED AREA [AT FEDERAL SHOE CO.].	1933/06/25	NONE	H 24.2, W 19.1 CM	INK	DRAFTING CLOTH
155-135-[COPY 1]	PLAN OF BURNED AREA.	1933/06/25	NONE	H 24, W 19.5 CM	BLEUPRINT	PAPER
155-136	PORTION OF BIGELOW YARD [SHOWING BLDGS. TORN DOWN BY HUSSON, AND L. & C. MAINS].	1933/07/11	1"=40'	H 21.5, W 33 CM	INK, COLORED INK	DRAFTING CLOTH
155-137	PROPRIETORS OF THE LOCKS & CANALS / OPERATING EXPENSES / AVERAGE FOR 10 YEARS / 1924-1933.	SEE TITLE	NONE	H 28, W 21.5 CM	INK, WATER COLOR	PAPER
155-138	WORCESTER ELECTRIC LIGHT CO.-LOAD CURVES-1933.	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
155-139	LOWELL ELECTRIC LIGHT CORPORATION-LOAD CURVES 1933.	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
155-140	LOWELL ELECTRIC LIGHT CORPORATION-LOAD CURVES 1932.	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER

155-141	LOWELL ELECTRIC LIGHT CORPORATION-LOAD CURVES 1931.	SEE NOTES	NONE	H 28, W 42 CM	INK	PAPER
155-142-[COPY 1]	FLUCTUATION IN COMMODITY PRICES / IN PERCENT OF 1910 PRICES / AS DETERMINED BY BRADSTREETS INDEX NUMBERS [BY METCALF & EDDY].	1921/01/14	NONE	H 28, W 26.5 CM	BLUEPRINT	PAPER
155-142-[COPY 2]	FLUCTUATION IN COMMODITY PRICES / IN PERCENT OF 1910 PRICES / AS DETERMINED BY BRADSTREETS INDEX NUMBERS [BY METCALF & EDDY].	1921/01/14	NONE	H 28, W 26.5 CM	BLUEPRINT	PAPER
155-143-[COPY 1]	FLUCTUATION IN COMMODITY PRICES / IN PER CENT. OF 1910 PRICES / AS DETERMINED BY DUN'S INDEX NUMBERS.	1921/01/14	NONE	H 28, W 26.5 CM	BLUEPRINT	PAPER
155-143-[COPY 2]	FLUCTUATION IN COMMODITY PRICES / IN PER CENT. OF 1910 PRICES / AS DETERMINED BY DUN'S INDEX NUMBERS.	1921/01/14	NONE	H 28, W 26.5 CM	BLUEPRINT	PAPER
155-144	MAP OF LOWELL. [PART OF THE CITY OF LOWELL BETWEEN MERRIMACK, DUTTON, MT. VERNON. CROSS AND COMMON STREETS SHOWING STATE OF OCCUPANCY OF REAL ESTATE.]	1935/09/10	1"=150'	H 39.4, W 73.2 CM	INK, WATER COLOR	DRAFTING CLOTH
155-145	MERRIMACK MANUFACTURING COMPANY / WEEKLY CONDITION / OF COAL RESERVES [1915 TO 1919].	SEE TITLE	NONE	H 43.2, W 55.6 CM	GRAPHITE, COLORED PENCIL	PAPER
155-146	PLATE XXI OF / FRANCIS'-LOWELL HYDRAULIC EXPERIMENTS-1883.	UNDATED	2"=1'	H 25, W 32.4 CM	INK, GRAPHITE	DRAFTING CLOTH

155-147	MAXIMUM AND MINIMUM / TEMPERATURES AT LOWELL, MASS. / MARCH 1939.	1939/03/00	NONE	H 21, W 28 CM	INK, COLORED INK	PAPER
155-148-A	UPPER PART OF SWAMP LOCKS WASTE DIAGRAM / 1942.	SEE TITLE	NONE	H 21.5, W 31.2 CM	INK	PAPER
155-148-B	LOWER LOCKS / WASTE DIAGRAM / 1942.	SEE TITLE	NONE	H 21.5, W 31.2 CM	INK	PAPER
155-148-C	DIAGRAM FOR / NO. 6 BAY-BOOTT DAM.	UNDATED	NONE	H 21.5, W 31.2 CM	INK	PAPER
155-148-D	DISCHARGE DIAGRAM / FOR / MERRIMACK DAM-LONG BAYS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1942/05/08	NONE	H 21.5, W 31.2 CM	INK	PAPER
155-149	LINE LOCATION DESIRED BY THE / LOWELL ELECTRIC LIGHT CORP. ON / LAND OF THE PROPRIETORS OF THE / LOCKS & CANALS ON MERRIMACK RIVER, / DUTTON STREET, LOWELL, MASS.	1952/06/20	1"=50'	H 34.6, W 23.5 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
155-149	POPULATION IN LOWER MERRIMACK RIVER WATERSHED / WHICH MIGHT BE SUPPLIED FROM CLINTON RESERVOIR / & INCLUDES / CLINTON / CHELMSFORD / AYER / LOWELL / TEWKSBURY / METHUEN / LAWRENCE / ANDOVER / HAVERILL / NEWBURYPORT.	SEE NOTES	NONE	H 43.3, W 28 CM	INK	PAPER
155-150	DISCHARGE DIAGRAM / FOR WASTE BAYS / AT / BOOTT DAM.	UNDATED	NONE	H 21.6, W 30.5 CM	INK	PAPER
155-151	DISCHARGE DIAGRAM / FOR / BOOTT DAM WASTE GATES.	UNDATED	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-152	DISCHARGE DIAGRAM / FOR / MERRIMACK DAM-LONG BAYS / LOWELL, MASS.	1910/05/03	NONE	H 21.5, W 30.5 CM	INK	PAPER

155-153	DISCHARGE DIAGRAM / FOR ONE OF / TREMONT GATES.	UNDATED	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-154	TOTAL HORSE POWER DEVELOPED / BY BOOTT WHEELS AT DIFFERENT TIMES.	1947/07/31	NONE	H 30.5, W 21.5 CM	INK	PAPER
155-155-[01]	SHEET NO.1 / DISCHARGE DIAGRAM / FOR WASTE BAYS / AT / SWAMP LOCKS DAM.	UNDATED	NONE	H 21.5, W 30.5 CM	INK	PAPER
155-155-[02]	SHEET NO.2 / DISCHARGE DIAGRAM CONTINUED / FOR WASTE BAYS / AT SWAMP LOCKS DAM.	UNDATED	NONE	H 21.6, W 30.5 CM	INK	PAPER
155-156	DISCHARGE DIAGRAM / FOR WASTE BAYS / AT / LOWER LOCKS DAM.	UNDATED	NONE	H 21.6, W 30.5 CM	INK	PAPER
155-157	DISCHARGE DIAGRAM / OF SWAMP LOCKS PADDLE GATES / 2 GATES OPEN / MAY 1928.	1928/05/00	NONE	H 21.6, W 30.5 CM	INK	PAPER
155-158	DISCHARGE DIAGRAM / OF / LAWRENCE DAM GATE.	UNDATED	NONE	H 28, W 43.3 CM	INK	PAPER
155-159	LEASES OF PERMANENT MILL POWERS / FROM PROPRIETORS BY BOOTT MILLS.	1947/07/31	NONE	H 30.5, W 21.5 CM	INK	PAPER
155-160	CURRENT METER [# 8163] RATING. / BUFF & BUFF.	1946/04/23	NONE	H 30.5, W 27.2 CM	INK	PAPER
156-[157]	FLOOR PLANS SHOWING RELOCATION OF TOILETS ETC. / SECT. 3 ELEVATOR & TOILET TOWER / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / MASSACHUSETTS DIVISION / LOWELL, MASS.	1952/04/28	1/2"=1'	H 61, W 69 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-[158]-[A]	SACO LOWELL SHOPS / "MAIN AND FOUNDRY YARDS" / (COTTON & WORSTED MACHINERY) / LOWELL, MASS.	1921/03/00	1"=50'	H 53, W 66 CM	INK, COLORED INK	PAPER

156-[158]-[B]	SACO-LOWELL SHOPS / "LOWELL SHOPS" / (MACHINE SHOP & FOUNDRY) / LOWELL, MASS.	1921/05/13	1"=60'	H 66, W 53.3 CM	LITHOGRAPH, INK, COLORED INK	PAPER
156-[159]	LOWELL MACHINE SHOP. / MAIN YARD & FOUNDRY YARD. / (COTTON MACHINERY) / LOWELL, MASS.	1894/05/25	1"=50'	H 66, W 53 CM	INK, COLORED INK	PAPER
156-[160]-[A]	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / (TENANTED) / LOWELL, MASS.	1933/08/16	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
156-[160]-[B]	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / (TENANTED) / LOWELL, MASS.	1933/08/16	1"=60'	H 53, W 66 CM	INK, COLORED INK	PAPER
156-[161]-[A]	SACO-LOWELL SHOPS, (BLDGS.) / (TENANTED) / LOWELL, MASS.	1934/05/21	1"=50'	H 66, W 53 CM	INK, COLORED INK	PAPER
156-[161]-[B]	KITSON MACHINE SHOP / (TENANTED) / LOWELL, MASS.	1934/05/21	1"=50'	H 66, W 53 CM	INK, COLORED INK, GRAPHITE	PAPER
156-[161]-[C]	ESTHER WASSERMAN / LOWELL, MASS. [SHOWING BUILDING CURRENTLY OCCUPIED BY DUTTON ST. YARNS.]	1942/04/30	1"=50'	H 33.5, W 43.5 CM	INK, WATER COLOR	PAPER
156-[162]	J. A. E. REALTY TRUST / MIDDLESEX COMPANY AND [CROSSED OUT AND OVERWRITTEN WITH FIRST LINE] / GILET CARBONIZING CO. INC. (BLDGS.) / (TENANTED) / LOWELL, MASS.	1944/03/04	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER
156-[163]	MIDDLESEX YARD / GILET CARBONIZING CO. & OTHERS / LOWELL, MASS.	1953/09/01	1"=60'	H 66, W 53 CM	INK, COLORED INK	PAPER

156-[164]	W. H. BAGSHAW CO. (TEN.) / MIDDLESEX COMPANY (BLDGS.) / (METAL & WOODWORKING) / LOWELL, MASS.	1932/01/04	1"=50'	H 66, W 53 CM	INK, COLORED INK	PAPER
156-[165]	LOWELL INDUSTRIAL DEVELOPMENT CO. / "MASSACHUSETTS YARD" / LOWELL, MASS.	1930/03/18	1"=50'	H 53, W 66 CM	INK, COLORED INK	PAPER
156-[165]-[COPY 1]	LOWELL INDUSTRIAL DEVELOPMENT CO. / "MASSACHUSETTS YARD" / LOWELL, MASS.	1930/03/18	1"=50'	H 46, W 56 CM	PHOTOGRAPHIC NEGATIVE PRINT	PAPER
156-[166]	PLAN OF LAND / IN / LOWELL, MASS.	1964/01/10	1"=50'	H 47, W 60.5 CM	BLUE LINE PRINT	PAPER
156-[167]-[A]	PLAN OF LAND / IN LOWELL, MASS.	1964/04/28	1"=40'	H 77, W 121 CM	INK, APPLIED ELEMENTS	PAPER
156-[167]-[A]-[COPY 1]	PLAN OF LAND / IN LOWELL, MASS.	1964/04/28	1"=40'	H 77.5, W 133 CM	BLUE LINE PRINT	PAPER
156-[167]-[A]-[COPY 2]	PLAN OF LAND / IN LOWELL, MASS.	1964/04/28	1"=40'	H 77.5, W 133 CM	BLUE LINE PRINT	PAPER
156-[167]-[A]-[COPY 3]	PLAN OF LAND / IN LOWELL, MASS.	1964/04/28	1"=40'	H 77.5, W 133 CM	BLUE LINE PRINT	PAPER
156-[167]-[A]-[COPY 4]	PLAN OF LAND / IN LOWELL, MASS.	1964/04/28	1"=40'	H 77.5, W 133 CM	BLUE LINE PRINT	PAPER
156-[167]-[B]	PLAN OF LAND / IN / LOWELL, MASS.	1964/04/30	1"=40'	H 62.5, W 77.5 CM	INK, WATER COLOR, APPLIED ELEMENTS	PAPER

156-[168]	OIL TANK CAPACITIES / IN GALLONS.	1950/00/00	NONE	H 28, W 49.5 CM	INK, GRAPHITE	PAPER
156-[169]	LOWELL INDUSTRIAL DEVELOPMENT CO. / 95 BRIDGE STREET. / LOWELL, MASS. / FURNACE CHANGES FOR OIL BURNING / NO. 2 BOILER.	1950/02/10	1/2"=1'	H 73.4, W 100.5 CM	BLUEPRINT, GRAPHITE	PAPER
156-[170]-[01]	MASSACHUSETS DIVISION / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / CONTINUOUS BLOWDOWN SYSTEM / GENERAL ARRANGEMENT.	1951/07/07	1/4"=1'	H 74, W 104 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-[170]-[02]	CLASS I C.B.O. SYSTEM / EXTERNAL FLOAT VALVE TYPE.	1946/07/24	NONE	H 31, W 23 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-[170]-[03]	TYPICAL ARRANGEMENT OF COCHRANE BLOWDOWN / EQUIPMENT SHOWING CONTROL VALVES / BLOWDOWN MANIFOLD & SAMPLING COOLER.	UNDATED	NONE	H 44, W 30 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-[170]-[04]	ASSEMBLY OF / WATER SAMPLE HEAT EXCHANGER.	1929/03/29	3"=1'	H 30, W 23 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-[171]	DRAWING SHOWING / ELEVATION OF 60 FEET / AT TOP OF / BOILER HOUSE CHIMNEY / LOWELL INDUSTRIAL DEVELOPMENT CO.	1948/12/11	1/2"=1'	H 101.7, W 39.4 CM	INK, COLORED INK	DRAFTING CLOTH
156-[171]-[COPY 1]	DRAWING SHOWING / ELEVATION OF 60 FEET / AT TOP OF / BOILER HOUSE CHIMNEY / LOWELL INDUSTRIAL DEVELOPMENT CO.	1948/12/11	1/2"=1'	H 101.7, W 39.4 CM	BLUEPRINT	PAPER

156-[172]	DRIVE SECTION FOR 18" FLIGHT CONVEYOR / AT / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1941/09/15	1"=1'	H 73.6, W 129.5 CM	BLUEPRINT	PAPER
156-[173]	BUCKET ELEVATOR CONVEYOR / TOP SECTION IN BUILDING / AT / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/110/10	3/4"=1'	H 73.6, W 129.5 CM	BLUEPRINT	PAPER
156-[174]	TAKE-UP END OF FLIGHT CONVEYOR / LOWELL INDUSTRIAL DEV. CO.	1941/00/00	1"=1'	H 26, W 39.5 CM	BLUEPRINT	PAPER
156-[175]	[UNTITLED.]	UNDATED	NONE	H 35.5, W 48.4 CM	INK, WATER COLOR	DRAFTING CLOTH
156-[176]	2 S.N.C. STEAM TURBINE / ROTOR & GLAND ASSEM. & BILL.	1920/11/02	NONE	H 60.8, W 91.5 CM	BLUEPRINT	PAPER
156-[177]	ROTOR SHAFT. / FRAME FIRST USED ON 2 S.N.C., STEAM TURBINE.	1920/11/02	6"=1'	H 30.7, W 43.2 CM	BLUEPRINT	PAPER
156-[178]	CYL. BASE MACH. CHANGE / FRAME FIRST USED ON 2 S.N.C., STEAM TURBINE.	1920/11/02	3"=1'	H 30.7, W 43.2 CM	BLUEPRINT	PAPER
156-[179]	CYL. COVER MACHING CHANGE / FRAME FIRST USED ON 2 S.N.C., STEAM TURBINE.	1920/11/02	3"=1'	H 30.7, W 43.2 CM	BLUEPRINT	PAPER
156-[180]	WIRING DIAGRAM / FOR I.D.M.Z. SKIP HOIST WINDING MACHINE FOR / 3 PHASE, 3 WIRE - AC MOTOR.	1917/08/08	NONE	H 30.5, W 29.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-[181]	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / SUGGESTED SPRINKLER REVISIONS FOR / HEEL COVERING ROOM IN 6TH STO. OF BLDG. NO. 3.	1952/10/29	1/8"=1'	H 27.3, W 40 CM	BLUEPRINT	PAPER
156-[182]	CABLES FOR ELEVATORS / MASSACHUSETTS COTON MILLS. / LOWELL - MASS.	1923/01/30	NONE	H 31, W 25.5 CM	BLUEPRINT	PAPER

156-[183]	CONNECTIONS FOR A.C. SEMI MAGNET ELEVATOR / CONTROLLER WITH ALBRO CLEM REVERSE SWITCH.	UNDATED	NONE	H 29.6, W 23.5 CM	BLUEPRINT	PAPER
156-[184]	OUTLINE / FIRST MADE FOR CURTIS TURBINE STA -750 KW - 3600. STEAM.	1917/10/22	NONE	H 60.3, W 92.7 CM	BLUEPRINT	PAPER
156-[185]	PROPOSED COAL HANDLING SYSTEM / AT / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/28/15	1/4"=1'	H 56, W 73.5 CM	BLUEPRINT, GRAPHITE	PAPER
156-[186]	ARRANGEMENT IN PIT / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/10/01	1/2 & 3/4""=1'	H 56, W 77 CM	BLUEPRINT	PAPER
156-001	PLAN SHOWING / LAND OF THE PEPPERELL MFG. CO. / SOLD TO THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / BY DEED OF JAN. 21, 1930.	SEE TITLE	1"=40'	H 72, W 111 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-002	PLAN [OF L.I.D. YARD AND ELEVATION ALONG MERRIMACK RIVER] SHOWING / PRESENT AND PROPOSED 8" OIL LINES / ALSO COAL HANDLING AND RAILROAD FACILITIES / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/11/18	AS NOTED	H 61.5, W 94.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-003	PLAN [WITH PHOTOSTATS ATTACHED] OF / [L.I.D. AND] POST OFFICE, [AND] PART OF BOOTT MILLS / SHOWING / MAIN STEAM LINES AND / PROPOSED STEAM CONNECTIONS.	1930/10/30	1"=100"	H 43, W 77.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-004	PLAN OF / REPAIR SHOP, THIRD FLOOR / SHOWING REPAIRS AND ADDITIONS [ALTERATIONS] FOR / ROYAL MOP COMPANY.	1930/12/17	1/4"=1'	H 58, W 75.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

156-005	PLAN SHOWING / [ARRANGEMENT OF SHAFTING, MOTORS, AND PARTITIONS FOR N. E.] COUNTER COMPANY / BROWN & KESSLEN / FIRST FLOOR SECTION 3, MILL # 2 [IN BASEMENT OF MILL NO. 2] / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/01/20	1/8"=1'	H 36, W 71 CM	INK, COLORED INK	DRAFTING CLOTH
156-006	PLAN SHOWING / [LOCATION OF] OIL TANKS AND VICINITY / AT / LOWELL INDUSTRIAL DEVELOPMENT CO. [YARD].	1930/11/15	1/8"=1'	H 76, 94 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-007	FIRST AND SECOND [FLOOR] PLANS / SHOWING / STEAM HEATING SYSTEM / IN THE / DYE HOUSE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/01/13	1"=20'	H 60.5, W 80 CM	INK, COLORED INK, COLORED PENCIL	DRAFTINF CLOTH
156-008	PLAN SHOWING / PORTION OF SECTION 11, FIRST FLOOR [L.I.D.] / LEASED TO / V. F. MENDLIK.	1930/11/10	1/4"=1'	H 58, W 74 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-009	[PLAN SHOWING ARRANGEMENT OF SPRINKLERS IN WASTE HOUSE AT L. I. D.]	1904/06/01	1/4"=1'			
156-010-[A]	[PERSPECTIVE DRAWING OF] PROPOSED POST OFFICE AND / SHOW ROOM / IN PRESENT NAPPING BUILDING / OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1930/05/00	1"=40'	H 23, W 66 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-010-[B]	[PERSPECTIVE DRAWING OF] PROPOSED POST OFFICE AND / SHOW ROOM / IN PRESENT NAPPING BUILDING / OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	UNDATED	1"=40'	H 41, W 60 CM	GRAPHITE	PAPER

156-011	[PLAN SHOWING] SIXTH FLOOR OF MILL NO. 2 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1933/09/07	1/8"=1'	H 54.5, W 76 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-012	[PLAN SHOWING] SUGGESTED LAYOUT FOR SHOE SHOP / 100 CASES OF UNITED SHOW MACHINERY CORP. COMPO PROCESS / FOURTH FLOOR OF MILL NO. 2 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1933/09/08	1/8"=1'	H 55.5, W 125 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-012-[COPY 1]	SUGGESTED LAYOUT FOR SHOE SHOP / 100 CASES OF UNITED SHOW MACHINERY CORP. COMPO PROCESS / FOURTH FLOOR OF MILL NO. 2 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1933/09/08	1/8"=1'	H 26.5, W 58.5 CM	PHOTOGRAPHIC NEGATIVE IMAGE	PAPER
156-013	[PLAN SHOWING] THIRD FLOOR OF MILL NO. 2 / AT THE / LOWELl INDUSTRIAL DEVELOPMENT COMPANY [AND PROPOSED SHOW ROOM IN NAPPING BLDG. AT L.I.D.].	1933/09/08	1/8"=1'	H 55.5, W 126 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-014	[PLAN SHOWING] SUGGESTED LAYOUT FOR SHOE SHOP / 100 CASES OF UNITED SHOE MACHINERY CORP. COMPO PROCESS / FIFTH FLOOR OF MILL NO. 2 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1933/09/07	1/8"=1'	H 55.5, W 125 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

156-015	PLAN SHOWING / [FINAL] ARRANGEMENT OF / SHAFTING, MOTORS AND PARTITIONS, ETC. / IN / BECKER BROS. SHOE CO. / MILL NO. 2 FOURTH FLOOR / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/02/00	1/8"=1'	H 55, W 125 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-016	PLAN SHOWING / ARRANGEMENT OF / SHAFTING, MOTORS, PARTITIONS, ETC. / IN / BECKER BROS. SHOE CO. / MILL NO. 2 FIFTH FLOOR / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/02/00	1/8"=1'	H 55, W 125 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-017	[PLAN SHOWING] PROPOSED CHANGES / IN / STEAM SYSTEM / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1933/01/18	1"=40'	H 39, W 70.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-018	PROPOSED L.& C. LAYOUT / FOR / FIRST FLOOR, [OF L.I.D.] REPAIR SHOP.	1931/08/00	1/4"=1'	H 62.5, W 100 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-019	[PERSPECTIVE DRAWING OF] LOWELL INDUSTRIAL DEVELOPMENT CO.[YARD AND BLDGS.] / LOWELL, MASS. / SCHEME # 1.	1932/11/00	1"=60'	H 48, W 68.5 CM	INK, COLORED INK	DRAFTING CLOTH
156-020	PLAN AND SECTIONS / OF / PRESCOTT YARD / SHOWING / WATERWAYS AND WATER WHEELS.	1932/01/00	AS NOTED	H 38.5, W 87 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-021	PLAN SHOWING / 1RST FLOOR-NAPPING BUILDING / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/06/24	1/8"=1'	H 36, W 93 CM	INK, COLORED INK	DRAFTING CLOTH

156-022	PLAN OF / SECTION 10, FIRST FLOOR [L.I.D.] / LEASED TO / FRED MAIER.	1930/11/03	1/8"=1'	H 41.5, W 62 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-023	[PLAN SHOWING] GARAGE IN PICKER BLDG. / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1932/07/15	1/8"=1'	H 41.5, W 69.5 CM	INK, COLORED INK	DRAFTING CLOTH
156-024	PLAN OF / CLOTH ROOM BLDG.-FIRST FLOOR / LOWELL INDUSTRIAL DEVELPOMENT CO. / "MASSACHUSETTS MILLS".	1930/09/18	1/8"=1'	H 63.5, W 80 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-025	PLAN SHOWING / 2ND FLOOR-NAPPING BUILDING / LOWELL INDUSTRIAL DEVELOPMENT CO.[SHOWING WORK REQUESTED BY PHYLLIS SHOE CO.].	1931/11/03	1/8"=1'	H 33, W 93.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-026-[A]	PLAN OF / CLOTH ROOM BLDG. SECOND FLOOR / LOWELL INDUSTRIAL DEVELOPMENT CO. / MASSACHUSETTS MILLS [SHOWING PROPOSED CHANGES IN STAIRS].	1931/04/00	1/8"& 1/4"=1'	H 26 3/4",W 28"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
156-026-[B]	PLAN OF / CLOTH ROOM BLDG. SECOND FLOOR / LOWELL INDUSTRIAL DEVELOPMENT CO. / MASSACHUSETTS MILLS [SHOWING PROPOSED CHANGES IN STAIRS].	1931/04/00	1/8"& 1/4"=1'	H 26 3/4",W 28"	BLUEPRINT, COLORED PENCIL	PAPER
156-027	[PLAN OF] FIRST FLOOR, SECTION 1, MILL NO. 1 / LOWELL INDUSTRIAL DEVELOPMENT CO. [YARD].	1930/10/02	1/8"=1'	H 36.5, W 75 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

156-028	PLAN SHOWING / ARRANGEMENT OF / SHAFTING, MOTORS, PARTITIONS ETC. / FOR / BECKER BROS. SHOE CO. / MILL NO. 2 THIRD FLOOR / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/04/00	1/8"=1'	H 55, W 124.9 CM	INK, COLORED INK	DRAFTING CLOTH
156-029	PLAN OF / FIRST FLOOR-MILL NO. 2 / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO. [SHOWING WORK REQUESTED BY GOFKAUF'S STORES].	1931/05/00	1/16"=1'	H 37, W 77 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-030	PLAN AND SECTIONS / SHOWING PORTIONS OF / FOREBAY TO SECTION 8 WHEELS / LOWELL INDUSTRIAL DEVELOPMENT CO. [YARD].	1931/06/15	1"=10'	H 39, W 64 CM	INK, COLORED INK	DRAFTING CLOTH
156-031	PLAN SHOWING / CHANGES MADE FOR / LOWELL RECREATION CO. / IN / MILL NO. 2, SECTION 4 & 5, FIRST FLOOR / LOWELL INDUSTRIAL DEVELOPMENT CO. [YARD].	1930/10/00	1/8"=1'	H 61, W 99 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-032	[PLAN SHOWING] SCHEME NO. 8 / PROPOSED STREET [THROUGH L. I. D. YARD].	1930/10/22	1"=60'	H 54, W 88 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-033	BASEMENT PLAN / [OF] LOWELL POST OFFICE / HEATING SYSTEM / ALSO PROPOSED 6" STEAM MAIN / SUPPLIED FROM LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/01/05	1/8"=1'	H 72, W 89 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

156-034	PLAN [AND ELEVATION] SHOWING / AGES OF [L. I. D.] BUILDINGS / UP TO 1932 [SHOWING AGES OF EACH] / LOWELL INDUSTRIAL DEVELOPMENT CO.	1932/03/10	1"=60'	H 53, W 74 CM	BLUE LINE PRINT, WATER COLOR	PAPER
156-035	PLAN [AND ELEVATION] SHOWING / PROPOSED ENTRANCE ON BRIDGE STREET / TO / LOWELL INDUSTRIAL DEVELOPMENT CO'S. YARD.	1931/03/04	1"=20'	H 53, W 71 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-036	[PLAN AND ELEVATION OF] LOWELL INDUSTRIAL DEVELOPMENT CO. / STOREHOUSE "A" AND "B".	1932/06/06	1"=20'	H 45, W 55 CM	INK, COLRED PENCIL, GRAPHITE	DRAFTING CLOTH
156-037	PLAN [AND SECTIONS] SHOWING / SUGGESTED [PROPOSED] SCHEMES / FOR / RELOCATION OF [L. I. D.] FUEL TRACK.	1920/03/06	1"=20'	H 52.5, W 73 CM	INK, COLORED INK, GRAPHITE	PAPER
156-038	PLAN SHOWING / PROPOSED BRIDGE ST. ENTRANCE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1931/10/29	1"=10'	H 38.2, W 106.1 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-039	[PLAN SHOWING PROPOSED GARAGE IN FORMER STAIR TOWER NEAR L. I. D. SECTION 8.]	1931/09/00	1/4"=1'			
156-040	[BLUEPRINTS SHOWING RESTRICTIONS ON FUTURE CONSTRUCTION IMPOSED BY EASEMENTS IN PRESCOTT YARD.]	UNDATED				

156-041	PLAN OF LAND IN TEWKSBURY, MASS. / BELONGING TO / MASSACHUSETTS COTTON MILLS / BEACON OIL COMPANY / EVERETT, MASS. / PROPOSED REVISION OF / MASS. COTTON MILLS / OIL STORAGE & FACTORY PROPERTIES / ALMONT PLANT [TEWKSBURY].	1919/12/15	1"=100'	H 55.5, W 89 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-042-[070]	ESTERLINE ANGUS POWER FACTOR METER / J. A. E. REALTY CO.	1950/12/16	NONE	H 22, W 28 CM	INK, COLORED INK	PAPER
156-042-[071]	OUTLINE AND MOUNTING / DIMENSIONS / OF / SWITCHBOARD OR WALL TYPE / MULTIPLIER BOXES.	1932/01/11	NONE	H 30, W 45.2 CM	BLUEPRINT	PAPER
156-042-001	SKETCH SHOWING / BLOWER OF PHYLLIS SHOE CO. / AT THE / APPLETON COMPANY.	1931/11/23	1"=1'	H 17.9, W 23.9 CM	INK	DRAFTING CLOTH
156-042-002	AREAS LEASED / TO / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1936/10/20	1"=50'	H 17.8, W 41.3 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-003	SKETCH SHOWING LOCATION OF / YARD DRAINS, NEW 6" SEWER & LOCKS & CANALS / WATER MAINS IN NEIGHBORHOOD OF NAPPING BUILDING / & WASTE HOUSE / MASS. MILLS, LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/05/14	1"=20'	H 23, W 44.9 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-004	LAND LEASED TO GOFKAUF'S STORES INC.	1934/03/01	1"=40'	H 20.1, W 25.5 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-005	PROPERTY OF / LOWELL INDUSTRIAL DEVELOPMENT CO. / IN LOWELL & ALMONT [TEWKSBURY] MASS.	1931/11/27	1"=3400'	H 19.5, W 29.2 CM	INK, WATER COLOR	DRAFTING CLOTH

156-042-006	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO THE / MASSACHUSETTS COTTON MILLS [SOLD TO RUNELS AND FLINT].	1890/00/00	1"=64'	H 28, W 25 CM	INK	DRAFTING CLOTH
156-042-007	PLAN OF LAND [BETWEEN BRIDGE AND CANAL STS.] IN LOWELL, MASS. / BELONGING TO / MASSACHUSETTS COTTON MILLS [SOLD TO ATWOOD].	1905/11/00	1"=20'	H 37.8, W 28.3 CM	INK	DRAFTING CLOTH
156-042-008	PLAN OF LAND IN LOWELL, MASS. [BETWEEN BRIDGE AND CANAL STS.] / BELONGING TO / MASSACHUSETTS COTTON MILLS.	1906/04/02	1"=40'	H 37.5, 24.2 CM	INK	DRAFTING CLOTH
156-042-009	HEATING COSTS / LOWELL INDUSTRIAL DEVELOPMENT CO. / WINTER OF 1930-31 / COST OF STEAM PER DAY VS. MEAN TEMP. [USING BOOTT STEAM, L. I. D. COAL AND L. I. D. OIL].	SEE TITLE	NONE	H 21.7, W 28 CM	INK	PAPER
156-042-010	DRAINAGE SYSTEM / OF / MIDDLESEX STEAM LAUNDRY [IN L. I. D. NAPPING BLDG.].	1932/04/00	1"=20'	H 21.3, W 42.5 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-011	GOFKAUF'S STORES INC. / ADVERTISING BANNER [OVER BRIDGE ST.].	1934/01/00	1"=40'	H 25.5, W 18.5 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-012	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / EXPENDITURES.	SEE NOTES	NONE	H 42, W 28 CM	INK, COLORED INK	PAPER
156-042-013	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / REVENUE.	SEE NOTES	NONE	H 42.2, W 28 CM	INK	PAPER
156-042-014	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / TOTAL REVENUE & EXPENDITURES.	SEE NOTES	NONE	H 30.5, W 21.7 CM	INK	PAPER
156-042-015	YEARLY EXPENDITURS / LOWELL INDUSTRIAL DEVELOPMENT CO.	1934/05/29	NONE	H 46, W 29.3 CM	INK	PAPER

156-042-016	YEARLY INCOME / LOWELL INDUSTRIAL DEVELOPMENT CO.	1934/05/29	NONE	H 45.8, W 29.3 CM	INK	PAPER
156-042-017	LEASED AREAS / ON FIRST FLOOR OF / CLOTH ROOM BUILDING / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1938/08/06	1"=40'	H 35.3, W 21.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-042-018	MONTHLY TOTALS OF STEAM / MADE & PURCHASED / ALSO / MONTHLY TOTALS OF STEAM / SOLD TO TENANTS / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 28, W 42 CM	INK, GRAPHITE	PAPER
156-042-019	MONTHLY TOTALS OF STEAM / REQUIRED FOR / HEATING & LOSSES / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 28.1, W 42.3 CM	INK, GRAPHITE	PAPER
156-042-020	LOWELL INDUSTRIAL CO. / USE WHERE 3 WIRE CABLE & SEPARATE LEADS / FOR HEAVY SWITCHES.	UNDATED	NONE	H 32, W 28.6 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-021	[UNTITLED.] [LOWELL INDUSTRIAL DEVELOPMENT COMPANY'S MONTHLY SALES STATISTICS OF INDIVIDUAL SERVICES & TOTALS.]	SEE NOTES	NONE	H 28, W 42 CM	INK	PAPER
156-042-022	[DIAGRAM SHOWING PRINCIPAL SOURCES OF YEARLY INCOME AT L. I. D.]	1930/00/00				
156-042-023	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1939/03/00	1/2"=50'	H 35.6, W 42 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-024	SKETCH SHOWING CONCRETE FOOTING / PUT IN CELLAR OF REX GARAGE / BY LOCKS & CANALS.	1922/06/04	1"=10'& 1/4"=1'	H 31.1, W 43.8 CM	INK, WATER COLOR	DRAFTING CLOTH

156-042-025	SKETCH SHOWING / PORTION OF LOWELL INDUSTRIAL DEVELOPMENT CO. / SUGGESTED REMOVAL OF SECTION 4-MILL NO. 2 / WITH REMAINING OPEN AREA ON BRIDGE ST.	1938/08/26	1"=40'	H 34.4, W 52.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
156-042-026	SKETCH SHOWING / AREAS FOR RENT / ON THE FIRST FLOORS OF THE / CLOTH ROOM BLDG. & MILL NO. 2 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1938/10/10	1"=40'	H 34.6, W 51.5 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-027	LOWELL INDUSTRIAL DEVELOPMENT CO. / POWER & LIGHT / FEEDERS.	SEE NOTES	NONE	H 26.6, W 37.9 CM	INK	PAPER
156-042-028	ALTERATIONS TO BUILDING / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1936/00/00	1/8"=1'	H 44.4, W 45.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-042-029	LOCATION OF SEWERS & DRAINS / UNDER / SECTION 5, MILL NO. 2 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1940/05/12	1"=10'	H 31.8, W 43.3 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-029-[COPY 1]	LOCATION OF SEWERS & DRAINS / UNDER / SECTION 5, MILL NO. 2 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1940/05/12	1"=10'	H 28, W 43.5 CM	BLUE LINE PRINT	PAPER
156-042-030	TAXES & INSURANCE BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-031	TOTAL EXPENSES & INCOME BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-032	INCOME FROM RENTS & POWER BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER

156-042-033	COST OF STEAM & WATER POWER BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-034	COST OF REPAIRS & GENERAL EXPENSE BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-035	COST OF IMPROVEMENTS BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVLEPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-036	INCOME FROM LIGHT, WATER & MISCELLANEOUS / BOOK-KEEPING ITEMS BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-037	DEPRECIATION & INTEREST BY YEARS SINCE 1930 / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-038	1937 DEPRECIATION & BAD DEBTS / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE TITLE	NONE	H 21.6, W 31.2 CM	INK	PAPER
156-042-039	1937 INCOME FROM LIGHT, WATER & MISCELLANEOUS ITEMS / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE TITLE	NONE	H 21.6, W 31.2 CM	INK	PAPER
156-042-040	1937 TAXES, INTEREST & INSURANCE / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE TITLE	NONE	H 21.6, W 31.2 CM	INK	PAPER
156-042-041	1937 REPAIRS & GENERAL EXPENSE / LOWELL INDUSTRIAL DEV. CO.	SEE TITLE	NONE	H 21.6, W 31.2 CM	INK	PAPER
156-042-042	1937 STEAM & WATER POWER EXPENSES / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE TITLE	NONE	H 21.6, W 31.2 CM	INK	PAPER
156-042-043	1937 INCOME FROM POWER & RENTS / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE TITLE	NONE	H 21.6, W 31.2 CM	INK	PAPER

156-042-044	1937 TOTAL EXPENSES & INCOME / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE TITLE	NONE	H 31.2, W 21.6 CM	INK	PAPER
156-042-045	DIAGRAM SHOWING / AGE OF BUILDINGS / LOWELL INDUSTRIAL DEVELOPMENT CO.	1932/03/11	NONE	H 41.8, W 27.9 CM	INK	PAPER
156-042-046	DIAGRAM SHOWING / ACCUMULATED FLOOR AREAS AS BUILT / AT / LOWELL INDUSTRIAL DEVELOPMENT CO.	1932/03/11	NONE	H 28, W 42 CM	INK, GRAPHITE	PAPER
156-042-047	PROPOSED RUBBISH BOX / FOR THE / PHYLLIS SHOE CO. [AT THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY].	1941/02/01	1/4"=1'	H 27.4, W 34.1 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-048	PROPOSED TOILET FOR FIRST FLOOR / OF CLOTH ROOM / BLDG. / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1941/04/04	NONE	H 32.2, W 48 CM	GRAPHITE	TRACING PAPER
156-042-049	PROPOSED GATE LOCATION / FOR / BRIDGE STREET ENTRANCE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/04/10	1/4"=1'	H 35, W 58.5 CM	GRAPHITE	TRACING PAPER
156-042-050	MILL NO. 2 / SECTION 4, [AT THE LOWELL INDUSTRIAL DEVELOPMENT SHOWING TOILETS, WASHROOM AND OFFICE ON THE] 4TH FLOOR.	1941/05/13	1/4"=1'	H 33.7, W 53.5 CM	GRAPHITE	TRACING PAPER
156-042-051	NIPPLE FOR / VULCAN SOOT BLOWER [AT THE LOWELL INDUSTRIAL DEVELOPMENT CO.].	1942/06/01	FULL SIZE	H 19.5, W 38.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-042-052	SECTION 8 TERMINAL / ESTERLINE ANGUS RECORDING / -METER-.	UNDATED	NONE	H 21.8, W 27 CM	INK	DRAFTING CLOTH

156-042-053-[07]	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] L.I.D. CO. / PICKER BUILDING / BASEMENT PLAN.	1952/08/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-053-01	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] PICKER BUILDING / BASEMENT PLAN.	1941/03/00	1"=20'	H 23, W 58 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-042-053-02	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] PICKER BUILDING / FIRST FLOOR PLAN.	1941/03/00	1"=20'	H 23, W 58 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-042-053-03	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] PICKER BUILDING / SECOND FLOOR PLAN.	1941/03/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-053-04	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] PICKER BUILDING / THIRD FLOOR PLAN.	1941/03/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-053-05	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] PICKER BUILDING / FOURTH FLOOR PLAN.	1941/03/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH

156-042-053-06	[FLOOR PLANS OF PICKER BUILDING AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING ELECTRIC LINES.] PICKER BUILDING / FIFTH FLOOR PLAN.	1941/03/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-054-[07]	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] L.I.D. CO. / BASEMENT PLAN.	1952/08/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-054-[08]	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] L.I.D. CO. / FIRST FLOOR PLAN.	1952/08/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-054-01	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] BASEMENT PLAN.	1941/02/00	1"=20'	H 23, W 58 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-042-054-01-[COPY 1]	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] BASEMENT PLAN.	1941/02/00	1"=20'	H 22.8, W 34 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-042-054-02	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] FIRST FLOOR PLAN.	1941/02/00	1"=20'	H 23, W 58 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

156-042-054-02	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] FIRST FLOOR PLAN.	1941/02/00	1"=20'	H 22.8, W 35 CM	BLUEPRINT	PAPER
156-042-054-03	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] SECOND FLOOR PLAN.	1941/02/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-054-04	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] THIRD FLOOR PLAN.	1941/02/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-054-05	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] FOURTH FLOOR PLAN.	1941/02/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-054-06	[FLOOR PLANS OF MILL NO. 2, SECTIONS 3, 4 & 5 AT LOWELL INDUSTRIAL DEVELOPMENT CO. SHOWING ELECTRIC POWER LINES.] FIFTH FLOOR PLAN.	1941/02/00	1"=20'	H 23, W 58 CM	INK, COLORED INK	DRAFTING CLOTH
156-042-055	[TWO VIEWS OF CABLE TERMINAL ON 1500 KW. STEAM TURBINE AT] MAIN POWER HOUSE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1943/04/07	FULL SIZE	H 27.4, W 38.3 CM	INK, WATER COLOR	DRAFTING CLOTH
156-042-056	PARTITIONS FOR / OFFICES & TOILETS / FRANKLIN-CONNARE INC. [AT LOWELL INDUUSTRIAL DEVELOPMENT CO.].	1944/01/09	1"=10'	H 25.4, W 33 CM	INK, COLORED INK	DRAFTING CLOTH

156-042-057	[PLAN OF] MAIN POWER HOUSE CABLES / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1943/11/00	1"=20'	H 34, W 58.8 CM	INK, COLORED INK	PAPER
156-042-058	[PLAN OF OFFICE TOILETS ETC. FOR WOLFF MFG. CO. INC. AND TOILETS FOR F. C. REDMAN IN] MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1944/03/21	1"=10'	H 36.5, W 50.2 CM	GRAPHITE	TRACING PAPER
156-042-058-A	[PLAN OF TOILETS FOR F. C. REDMAN IN] MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1944/03/24	1/4"=1'	H 20.2, W 25.4 CM	INK, COLORED PENCIL	PAPER
156-042-059	PLAN & SECTIONS / OF / DRY REFUSE INCINERATOR / LOWELL INDUSTRIAL DEVELOPMENT CO.	1944/04/21	1/2"=1'	H 36.5, W 51.8 CM	GRAPHITE	TRACING PAPER
156-042-059-[COPY 1]	PLAN & SECTIONS / OF / DRY REFUSE INCINERATOR / LOWELL INDUSTRIAL DEVELOPMENT CO.	1944/04/21	1/2"=1'	H 36.7, W 51 CM	BLUEPRINT	PAPER
156-042-060	[PLAN SHOWING] PARTITIONS FOR / BERKSHIRE FROCKS INC. / MILL NO. 1 SECTION 6 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1944/05/02	1/8"=1'	H 36.3, W 44.9 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-042-061	[PLAN OF] TOILET ARRANGEMENT / 5TH FLOOR, SECTION 6, MILL NO. 1 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1944/05/08	1/2"=1'	H 38.5, W 44.2 CM	GRAPHITE	TRACING PAPER
156-042-062	SECTION 7 / 4TH FLOOR MILL NO. 1 / LOWELL INDUSTRIAL DEV. CO. / OFFICE PARTITIONS / FOR / VEE CEE YARNS INCORPORATED.	1944/07/25	1/4"=1'	H 34.2, W 50.5 CM	GRAPHITE	TRACING PAPER
156-042-063	PLAN & SECTIONS / SHOWING / PRESCOTT PENSTOCKS, GATE SILLS & CUT OFF WALLS.	1944/08/01	1"=10'	H 33, W 57.5 CM	INK, WATER COLOR	DRAFTING CLOTH

156-042-065	SALVAGE-MOLLOY SHOE CO. / 5 TH FLOOR-BUILDING NO. 1 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1945/02/23	1"=10'	H 38.8, W 42 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-042-066	BOOTT MILLS - 95 BRIDGE ST. / LOWELL, MASS. [PLAN OF AREA LEASED TO ALBERT B. CURRIER ALONG BRIDGE STREET AT LOWELL INDUSTRIAL DEVELOPMENT CO.]	1946/00/00	1"=20'	H 43, W 23.5 CM	INK, COLORED INK. GRAPHITE	DRAFTING CLOTH
156-042-067-[A]	TOTAL YEARLY SALES / OF RENTS, POWER, LIGHT & STEAM / BY THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	SEE NOTES	NONE	H 43.2, W 28 CM	INK, WATER COLOR	PAPER
156-042-067-[B]	TOTAL YEARLY SALES / ELECTRICITY, RENTS AND STEAM / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	SEE NOTES	NONE	H 28, W 42.6 CM	INK	PAPER
156-042-068	[DIAGRAM OF] EFFICIENCY / VS. / HEAD & RIVER HEIGHTS / LOWELL INDUSTRIAL DEVELOPMENT CO.	1946/12/00	NONE	H 30.5, W 21.7 CM	INK	PAPER
156-042-069	[DIAGRAM OF] ESTIMATED HORSEPOWER / & C.F.P.S. LAWFUL QUANTITY / VS. / HEAD & RIVER HEIGHTS / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1946/12/00	NONE	H 30.5, W 21.7 CM	INK	PAPER
156-043	SUGGESTED LAYOUT FOR SHOE SHOP / 100 CASES UNITED SHOE MACHINERY CORP. COMPO PROCESS / FOURTH FLOOR OF MILL NO. 2 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	UNDATED	1/8"=1'	H 58.6, W 124.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-044-A	[PROPOSED SERVICE STATION ON BRIDGE ST. AT L. I. D.]	1933/03/21				
156-044-B	[PROPOSED SERVICE STATION ON BRIDGE ST. AT L. I. D.]	1933/09/19	1"=60'			

156-045	PLAN OF / MILL NO. 1 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1933/10/03	1/8"=1'	H 51.4, W 146.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-046	REPAIRS MADE IN PRESCOTT FOREBAY / & PENSTOCKS OCT. 8 & NOV. 12, 1933.	SEE TITLE	1"=10'	H 47, W 62.9 CM	INK, COLORED INK	DRAFTING CLOTH
156-046-[COPY 1]	REPAIRS MADE IN PRESCOTT FOREBAY / & PENSTOCKS OCT. 8.	SEE TITLE	1"=10'	H 46.9, W 62.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-047	GARAGE IN SECTION 10 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1934/01/10	1/8"=1'	H 41.4, W 47.6 CM	INK	DRAFTING CLOTH
156-048	[SUGGESTED LAYOUT FOR SHOE SHOP 1ST FLOOR MILL NO. 1. L. I. D.]	1934/02/10	1/8"=1'			
156-049	PLAN & ELEVATIONS / OF / PROPOSED FIRE ESCAPE / FOR THE / NAPPING BUIDING / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1934/03/27	1/2"=1'	H 63.4, W 85.1 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-050	LOWELL INDUSTRIAL DEVELOPMENT CO. / PROPOSED 12" AKRON PIPE / FOR NO. 12 WHEEL SURGE OVERFLOW.	1934/04/17	1"=10'	H 48.3, W 66.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
156-051	[PLAN OF CLAYTON HOSIERY MILL NO. 1 SECT. 2. L. I. D.]	1934/05/01	1/8"=1'			
156-052	[PLAN OF CLAYTON HOSIERY MILLS INC. MILL NO. 1 SECT. 2. L. I. D. SCHEME # 2.]	1934/05/04	1/4"=1'			
156-053	PLAN SHOWING AREA / LEASED TO GOFKAUF'S STORES INC. / FORMER SITE OF STORE HOUSES A+B / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1934/07/06	1"=10'	H 61, W 90.4 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	DRAFTING CLOTH

156-054	[PLAN AND ELEVATION OF POSSIBLE AUTOMOBILE SALESROOM AND GARAGE AT L. I. D.]	1934/09/07	1"=10', 1"=40'			
156-055	[SKETCH SHOWING SUGGESTED STORE FRONT, CLOTHROOM BLDG. L. I. D.]	1934/09/15	1/4"=1'			
156-056	[SKETCH SHOWING POSSIBLE STORE FRONTS ON BRIDGE ST. L. I. D.]	1934/09/18	1"=20'			
156-057	[SUGGESTED LAYOUT FOR PHYLLIS SHOE CO. 2ND FLOOR MILL NO. 1 L. I. D.]	1934/10/03	1/8"=1'			
156-058	PLAN OF / CLOTH ROOM BLDG. THIRD FLOOR / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1934/10/23	1/8"=1'	H 62.8, W 71.8 CM	INK	DRAFTING CLOTH
156-059	SKETCH SHOWING / POSSIBLE AUTOMOBILE SALESROOM / AND REPAIR SHOP / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS. / SCHEME NO. 3.	1935/10/09	1"=10'	H 52.5, W 91 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-060	LOWELL INDUSTRIAL DEVELOPMENT CO. / PICKER BUILDING / LOWELL, MASS.	1935/10/21	1"=10'	H 39.9, W 114 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-061	PLAN SHOWING / PROPOSED GARAGE [ALONG THE CONCORD RIVER] / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1935/11/02	1/4"& 1/2"=1'	H 47, W 73.7 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
156-062	PLAN & SECTIONS / FOR / POSSIBLE GARAGES / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1935/11/02	1/4"& 1/2"=1'	H 47, W 73.7 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

156-063	PLAN OF / CLOTH ROOM BLDG. SECOND FLOOR / SHOWING / PROPOSED LAYOUT FOR SULLIVAN BROS. PRINTERS / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1935/11/05	1/8"=1'	H 62.3, W 73 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-064	SKETCH SHOWING / POSSIBLE AUTOMOBILE SALESROOM / & GARAGE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS. / SCHEME NO. 2.	1934/09/07	1"=10'& 40'	H 63.2, W 89.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-065	PORTION OF / SECOND FLOOR OF CLOTH ROOM BUILDING / AT THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1936/01/22	1"=10'	H 42.8, W 78.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-066	PROPOSED STAIRWAY / FOR / CLOTH ROOM BUILDING / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1936/02/28	1/4"=1'	H 30.9, W 78.9 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-067	ELEVATION OF CLOTH ROOM BUILDING / SHOWING / PROPOSED FRONT [L. I. D.].	1936/03/05	1/8"=1'	H 25.2, W 72.7 CM	INK, WATER COLOR	DRAFTING CLOTH
156-068	PLAN & ELEVATION / SHOWING / PROPOSED ENTRANCE / TO / GOFKAUF'S STORES IN MILL NO. 2 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1936/01/16	1/4"=1',1" =40'	H 38.7, W 58.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-069	PROPOSED STAIRWAY / FOR / CLOTH ROOM BUILDING / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1936/03/03	1/4"=1',1" =40'	H 31, W 74.4 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH

156-070	SUGGESTED ALTERATIONS / TO / SLASHER BUILDING / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1936/05/26	1"=10'	H 61, W 77.5 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
156-071	PORTION OF / LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING / CONDENSER LINES & DRAINS FROM MILL NO.1.	1936/09/28	1"=40'	H 43.2, W 58.5 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
156-072	SHOE SHOP LAYOUT / FOR / BECKER BROTHERS / 3RD FLOOR OF PICKER BUILDING / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1936/11/12	1"=10'	H 42.3, W 113 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-073	PLAN & SECTIONS / ON SITE OF STORE HOUSE A & B / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1937/04/26	1"=10',5'& 20'	H 54.7, W 76.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-074	PLAN & SECTIONS / SHOWING FILL FOR / SLASHER B'LD'G. AREA.	1938/06/14	1"=10'	H 64.1, W 91.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-075	PLAN & SECTION / OF / PROPOSED GARAGE & REPAIR SHOP / IN THE / SLASHER BLDG., LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SCHEME # 4.	1935/11/04	1"=10',1/8"=1'	H 38.2, W 107 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-075-[COPY 1]	PLAN & SECTION / OF / PROPOSED GARAGE & REPAIR SHOP / IN THE / SLASHER BLDG., LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SCHEME # 4.	1935/11/04	1"=10',1/8"=1'	H 37, W 105.5 CM	BLUEPRINT	PAPER

156-076	[SKETCH SHOWING PROPOSED PLANTING OF EVERGREEN TREES ALONG CLOTHROOM BLDG. AT L. I. D. AS LAID OUT BY A. E. DYAR.]	UNDATED				
156-077	ONE STORY ADDITION TO REX BUILDING / FOR CHAS. DANCAUSE INC.	UNDATED	1/4"& 1/8"=1'	H 49.6, W 53 CM	BLUEPRINT	PAPER
156-078	PRESCOTT FOREBAY / SHOWING / NEW FLOOR & SUPPORTS OVER FOREBAY / LOWELL, MASS.	1938/10/00	1/4"=1'	H 58, W 70 CM	INK, COLORED INK	DRAFTING CLOTH
156-078-[COPY 1]	PRESCOTT FOREBAY / SHOWING / NEW FLOOR & SUPPORTS OVER FOREBAY / LOWELL, MASS.	1938/10/00	1/4"=1'	H 57.5, W 69.3 CM	BLUEPRINT	PAPER
156-079	SKETCH SHOWING / PROPOSED 4"& 6" STEAM LINE / FROM / BOOTT MILLS TO LOWELL INDUSTRIAL DEVELOPMENT CO.	1939/07/00	1"=40'	H 42, W 76.9 CM	INK, WATER COLOR	DRAFTING CLOTH
156-080	PLAN & ELEVATION / OF / ELEVATOR SHAFT / IN / MILL NO. 1 / SECTION 2 / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1938/12/31	1/2"=1'	H 56.2, W 79.7 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
156-081	SKETCH SHOWING AREA BETWEEN / EASTERN CANAL, BRIDGE ST. & MILL NO. 5 / AT THE LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1939/07/00	1"=10'	H 46, W 60 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-081-[COPY 1]	SKETCH SHOWING AREA BETWEEN / EASTERN CANAL, BRIDGE ST. & MILL NO. 5 / AT THE LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1939/07/00	1"=10'	H 45.5, 60 CM	BLUEPRINT, COLORED PENCIL	PAPER

156-081-[COPY 2]	SKETCH SHOWING AREA BETWEEN / EASTERN CANAL, BRIDGE ST. & MILL NO. 5 / AT THE LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1939/07/00	1"=10'	H 45.5, 60 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-081-[COPY 3]	SKETCH SHOWING AREA BETWEEN / EASTERN CANAL, BRIDGE ST. & MILL NO. 5 / AT THE LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1939/07/00	1"=10'	H 45.5, 60 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-082	PLAN OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SHOWING WATCHMEN STATIONS.	1936/01/25	1"=60'	H 56, W 76.1 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH
156-083	PLAN MADE FROM VARIOUS SOURCES / OF PRESCOTT YARD / SHOWING / EXISTING BUILDINGS, "PRESCOTT" POWER HOUSE & CONTRIBUTING WATERWAYS ALSO EXISTING / CONDITIONS & CHANGES MADE PRIOR TO AUG. 1,1939.	1940/01/16	SEE NOTES	H 61, W 95.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
156-084	SUGGESTED CHANGES / OF FLOOR SPACE IN REPAIR SHOP / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1939/06/14	1"=20'	H 33.6, W 61 CM	INK, COLORED INK	DRAFTING CLOTH
156-085	LOWELL INDUSTRIAL DEVELOPMENT CO. / FIRST & SECOND FLOORS OF NO. 6 MILL.	1939/11/10	1"=10'	H 33, W 69.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
156-086	PLAN / SHOWING BOTTOM OF PRESCOTT FOREBAY / CONSTRUCTION AT KEARNEY SQUARE END.	1940/07/17	3/4"=1'	H 38.8, W 92.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

156-087	PLAN OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SHOWING NO AREAS LEASED TO APRIL 1,1930.	SEE TITLE	1"=60'	H 55.8, W 75 CM	INK, WATER COLOR	DRAFTING CLOTH
156-088	PLAN OF / "MASSACHUSETTS & PRESCOTT YARDS" / SHOWING PROPERTY OF / LOWELL INDUSTRIAL DEVELOPMENT.	1930/04/01	1"=40',2/8"=100'	H 70.3, W 110.4 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
156-089	PLAN OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SHOWING AREAS LEASED TO APRIL 1,1931 / LOWELL, MASS.	SEE TITLE	1"=60'	H 55.4, W 75.7 CM	INK, WATER COLOR	DRAFTING CLOTH
156-090	PLAN OF / "MASSACHUSETTS & PRESCOTT YARDS" / SHOWING PROPERTY OF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1931/04/01	1"=40'	H 70.5, W 75.7 CM	INK, WATER COLOR	DRAFTING CLOTH
156-090-[A]	PLAN OF / "MASSACHUSETTS & PRESCOTT YARDS" / SHOWING PROPERTY OF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1942/04/01	1"=40'	H 72, W 110 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
156-090-[COPY 1]	PLAN OF / "MASSACHUSETTS & PRESCOTT YARDS" / SHOWING PROPERTY OF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1931/04/01	1"=40'	H 71, W 109.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-091	PLAN OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SHOWING AREAS LEASED TO APRIL 1, 1932.	SEE TITLE	1"=60'	H 56.6, W 75.8 CM	INK, WATER COLOR	DRAFTING CLOTH
156-092	[UNTITLED.] [PLAN OF THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY SHOWING AREAS LEASED TO APRIL 1, 1932.]	SEE TITLE	1"=60'	H 56.6, W 75.8 CM	INK, WATER COLOR	DRAFTING CLOTH

156-093	[PRELIMINARY SKETCH OF BRIDGE ST. DEVELOPMENT FOR GOFKAUF'S STORES BY HARRY PRESCOTT GRAVES.]	1937/00/00			BLUEPRINT	
156-094-[A]	PLAN OF SOUTH ADDITION / ADDITION TO BUILDING AT LOWELL MASS. / FOR THE LOWELL INDUSTRIAL DEVELOPMENT CO. [GOFKAUF'S STORE].	SEE NOTES	1/4"=1'	H 38.5, W 56.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-094-[B]	ADDITION TO BUILDING AT LOWELL MASS. / FOR THE LOWELL INDUSTRIAL DEVELOPMENT CO. [GOFKAUF'S STORE].	SEE NOTES	1/4"=1'	H 37.6, W 56.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-094-[C]	[PLAN OF SOUTH ADDITION TO BUILDING AT LOWELL MASS. FOR THE LOWELL INDUSTRIAL DEVELOPMENT CO. GOFKAUF'S STORE.]	SEE NOTES	1/4"=1'	H 35.7, W 51.2 CM	BLUEPRINT	PAPER
156-094-[D]	FIRST FLOOR CONSTRUCTION ADDITION AT SOUTH SIDE OF PRESENT BLDG. [GOFKAUF'S STORE].	SEE NOTES	1/2" SCALE	H 38.4, W 57.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-094-[E]-[01]	ALTERATIONS TO BUILDIINGS AT / LOWELL - MASS. / FOR THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL - MASS. [GOFKAUF'S STORE].	SEE NOTES	NONE	H 36, W 22 CM	INK	PAPER
156-094-[E]-[02]	KARAS & KARAS GLASS COMPANY, INC.	SEE NOTES	NONE	H 28, W 21.5 CM	INK	PAPER
156-094-[E]-[03]	GAY & PROCTOR, ARCHITECTS.	SEE NOTES	NONE	H 28, W 21.5 CM	INK	PAPER
156-094-[F]	GOFKAUF'S [RECTO]. SKETCH OF CONTEMPLATED / RECEIVING ROOM DOORS [VERSO].	1937/02/24	1/4"=1'	H 30, W 56 CM	GRAPHITE	PAPER

156-095-[01]	[PLAN AND ELEVATION OF GOFKAUF'S STORE AT LOWELL INDUSTRIAL DEVELOPMENT CO. BY MANNING WATERS.] ALTERATION OF STORE / GOFKAUF STORES INC. / LOWELL, MASS.	SEE NOTES	1/4"=1'	H 45.5, W 81 CM	BLUEPRINT	PAPER
156-095-[02]	[UNTITLED.] [PLAN AND ELEVATION OF GOFKAUF'S STORE AT LOWELL INDUSTRIAL DEVELOPMENT CO. BY MANNING WATERS.]	SEE NOTES	1/4"=1'	H 45.5, W 81 CM	BLUEPRINT	PAPER
156-095-[03]	[UNTITLED.] [PLAN AND ELEVATION OF GOFKAUF'S STORE AT LOWELL INDUSTRIAL DEVELOPMENT CO. BY MANNING WATERS.]	SEE NOTES	1/4"=1'	H 45.5, W 81 CM	BLUEPRINT	PAPER
156-095-[04]	MANNING WATERS / ARCHITECTURAL ENGINEER / ALTERATION OF / GOFKAUF STORES INC. / BRIDGE STREET / LOWELL, MASS.	1937/07/27	NONE	H 28, W 22 CM	INK	PAPER
156-096	LOWELL INDUSTRIAL DEVELOPMENT CO. / VALUATION DIAGRAM.	SEE NOTES	NONE	H 53.3, W 77.2 CM	INK, GRAPHITE	PAPER
156-097	DISCONNECTING SWITCH FOR / LOWELL INDUSTRIAL DEVELOPMENT CO. / 300 AMPS. 3500 VOLTS.	UNDATED	1/2"=1'	H 47.1, W 76.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-098	UNTITLED.] [PLAN OF MILL NO.1, SECTIONS 1, 2, 6 AND 7 AT LOWELL INDUST. DEV. CO. SHOWING PROPOSED ALTERATIONS FOR PHYLLIS SHOE CO.]	SEE NOTES	1/8"=1'	H 50.3, W 165.1 CM	INK	DRAFTING CLOTH
156-099	PLAN SHOWING / LEAKS FROM PENSTOCK / IN CLOTH ROOM BASEMENT / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1940/07/10	1"=10'& 1/8"=1'	H 65.5, W 82.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

156-099-[COPY 1]	PLAN SHOWING / LEAKS FROM PENSTOCK / IN CLOTH ROOM BASEMENT / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1940/07/10	1"=10'& 1/8"=1'	H 65, W 81.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-100	PLAN OF THE / MILL YARD / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING PIPES LAID FOR EXTINGUISHING FIRE / USE OF L.& C. RESERVOIR WATER.	1940/05/00	1"=40'	H 72, W 105 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-101	LOWELL INDUSTRIAL DEVELOPMENT CO. [PLAN OF GASOLINE AND OIL TANKS BETWEEN PICKER BUILDING AND BOILER HOUSE.]	UNDATED	1"=10'	H 35.3, W 65 CM	GRAPHITE	TRACING PAPER
156-102	PLAN & SECTIONS / SHOWING / PORTION OF LOWELL INDUSTRIAL DEVELOPMENT CO. / FROM POWER HOUSE BUS VAULT TO MILL NO. 2.	1941/02/08	1/8"=1',1"=60'	H 34.2, W 62.6 CM	INK, COLORED INK	DRAFTING CLOTH
156-103	[PLAN OF SECTION 1, FOURTH FLOOR OF MILL NO. 1 LOWELL INDUSTRIAL DEVELOPMENT COMPANY FOR FRITZ HECKER.]	1941/02/10	1/8"=1'			
156-104	PROPOSED OPEN WIRING / BETWEEN / POWER HOUSE & PICKER BLDG. / LOWELL INDUSTRIAL DEVLOPMENT CO.	1941/02/18	1/2"& 2"=1'	H 43.9, W 75.9 CM	GRAPHITE	TRACING PAPER
156-105	[UNTITLED PLAN.] [PLAN OF CONDUIT BETWEEN MILL NO. 2 AND PICKER BUILDING, LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	SEE NOTES	1/2"& 1/8"=1'	H 47.5, W 76.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

156-106	LOWELL IND. DEVELOPMENT CO. [PLAN OF STEAM LINE BETWEEN LOWELL INDUSTRIAL DEVELOPMENT COMPANY AND BOOTT MILLS BOILER HOUSE].	1941/03/05	NONE	H 37.1, W 101.5 CM	GRAPHITE	TRACING PAPER
156-107	[PLAN AND ELEVATION OF] CABLES IN VAULT OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/03/19	1/4"=1'	H 43.9, W 73 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-108	[PLAN AND ELEVATION OF PROPOSED CHAIN LINK FENCE FROM BRIDGE STREET TO MILL NO. 5, LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1941/04/09	1/4"=1'			
156-109	PLAN OF / SECTION 11-NO.3 MILL / OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SECOND FLOOR.	1941/05/15	1"=10'	H 38.6, W 67.1 CM	GRAPHITE	TRACING PAPER
156-110	[PLAN AND ELEVATION OF PROPOSED FAN IN MILL NO. 5 AT THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1941/06/05	1/4"=1'			
156-111-[A]	SCHEME # 1 / STAIR TOWER / MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/06/25	1/4"=1', 1"=40'	H 53.8, W 76.2 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-111-[B]	SCHEME # 2 / STAIR TOWER / MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1945/06/22	1/4"=1'	H 52.5, W 76.3 CM	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
156-112	[PLAN OF BOILER HOUSE AT THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1941/06/00	AS NOTED			

156-113	LOCATION OF PROPOSED PASSAGEWAY BETWEEN BOILER HOUSE & MILL NO. 3 / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1941/11/17	1/4"=1'	H 40.5, W 76 CM	GRAPHITE	TRACING PAPER
156-114	PROPOSED TOILETS & FIRST AID / FOR / LOWELL UNIFORM COMPANY.	1941/11/22	1/4"=1'	H 54.6, W 71.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-115	[PLAN AND SECTION OF SIDEWALK APPROACH AND 12 FOOT GATE AT THE LOWELL INDUSTRIAL DEVELOPMENT CO.]	1942/06/10	AS NOTED			
156-116	MAIN POWER HOUSE CABLES / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1942/07/00	1"=20'	H 33.8, W 59 CM	INK, COLORED INK	DRAFTING CLOTH
156-116-[COPY 1]	MAIN POWER HOUSE CABLES / LOWELL INDUSTRIAL DEVELOPMENT COMPANY	1942/07/00	1"=20'	H 34, W 58.7 CM	BLUEPRINT	PAPER
156-117	[FRONT ELEVATION OF] L. I. D. CO. GENERATOR PANELS MAIN POWER [HOUSE AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY].	1942/07/15	2"=1'	H 50.3, W 121.9 CM	INK, COLORED PENCIL	DRAFTING CLOTH
156-117-[COPY 1]	L. I. D. CO. GENERATOR PANELS MAIN POWER.	1942/07/15	2"=1'	H 50, W 117 CM	BLUEPRINT	PAPER
156-118	[FRONT ELEVATION OF] L. I. D. CO. FEEDER PANELS MAIN POWER [HOUSE AT LOWELL INDUSTRIAL DEVELOPMENT COMPANY].	1942/03/28	2"=1'	H 48.6, W 84.5 CM	INK, WATER COLOR	DRAFTING CLOTH
156-118-[COPY 1]	L. I. D. CO. FEEDER PANELS MAIN POWER.	1942/03/28	2"=1'	H 48.6, W 84.5 CM	BLUEPRINT	PAPER

156-119	ROOF PLAN OF / STEEL FRAMING / OF THE / PENT HOUSE ON BOILER HOUSE ROOF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1942/08/03	1/2"=1'	H 78.6, W 76.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
156-119-[COPY 1]	ROOF PLAN OF / STEEL FRAMING / OF THE / PENT HOUSE ON BOILER HOUSE ROOF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1942/08/03	1/2"=1'	H 78.6, W 75.5 CM	BLUEPRINT	PAPER
156-120	[BASEMENT FLOOR PLAN OF THE ALEXANDER WOOL COMBING CO. IN MILL NO. 3 OF THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1942/08/26	1"=10'			
156-121	SCOURING PLANT FLOOR PLAN / OF THE / [FIRST FLOOR PLAN OF THE] ALEXANDER WOOL COMBING CO. / LOWELL, MASS. [IN THE BOILER HOUSE OF THE LOWELL INDUSTRIAL DEVELOPMENT COMPANY].	1941/12/15	1"=10'	H 39, W 112.1 CM	GRAPHITE	TRACING PAPER
156-122	SECOND FLOOR PLAN / OF THE / ALEXANDER WOOL COMBING CO. / 2ND FLOOR, MILL NO.3, LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1941/12/15	1"=10'	H 38.7, W 112.4 CM	GRPAHITE	TRACING PAPER
156-122-A	BOOTT MILLS, LOWELL, MASS. / BUILDING # 3, SECOND FLOOR PLAN, 95 BRIDGE ST.	1964/09/28	1"=10'	H 37.2, W 111.8 CM	GRAPHITE	PAPER
156-123	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION OF CABLES IN DUCT SYSTEM.	1936/05/26	NONE	H 74.6, W 94.4 CM	INK, WATER COLOR	DRAFTING CLOTH

156-123-[COPY 1]	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION OF CABLES IN DUCT SYSTEM.	1936/05/26	NONE	H 73.5, W 90.2 CM	BLUEPRINT	PAPER
156-124-[A]	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION OF CABLES IN DUCT SYSTEM.	1942/12/00	1"=60'	H 77.5, W 95.6 CM	INK, COLORED INK	DRAFTING CLOTH
156-124-[A]-[COPY 1]	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION OF CABLES IN DUCT SYSTEM.	1942/12/00	1"=60'	H 30", W 37 1/4"	BLUEPRINT, COLORED PENCIL	PAPER
156-124-[A]-[COPY 2]	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION OF CABLES IN DUCT SYSTEM.	1942/12/00	1"=60'	H 30", W 37 1/4"	BLUEPRINT, COLORED PENCIL	PAPER
156-124-[B]	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION OF CABLES IN DUCT SYSTEM.	1952/09/00	1"=60'	H 77.5, W 95.6 CM	INK, COLORED INK	DRAFTING CLOTH
156-125	SECTION 5 UNDER BASEMENT [OF MILL NO. 2] / LOWELL INDUSTRIAL DEVELOPMENT CO. [PLAN AND SECTION].	1943/02/00	1'=10'	H 38.5, W 66.4 CM	GRAPHITE, COLORED PENCIL	PAPER
156-126	PLAN OF ENGINE IN SECTION 7 / FOR / MASSACHUSETTS COTTON MILLS., LOWELL, MASS.	1943/03/00	3/8"=1'	H 32 1/2", W 46"	INK, WATER COLOR	CLOTH BACKED PAPER
156-126-A	[PLAN OF] FOUNDATIONS IN CELLAR / OF SECTION 7 / [AT] LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1943/03/00	3/8"=1'	H 92.6, W 114.3 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-126-A-[COPY 1]	FOUNDATIONS IN CELLAR / OF SECTION 7 / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1943/03/00	3/8"=1'	H 89, W 114 CM	BLUEPRINT, COLORED PENCIL	PAPER

156-127-A	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / (TENANTED) / LOWELL, MASS. [INSURANCE PLAN SHOWING GRADES OF BASEMENT, 1ST AND 2ND FLOORS OF VARIOUS MILLS AND HIGH WATER OF MARCH 3, 1896 AND MARCH 20, 1936 AT SEVERAL POINTS ON CONCORD AND MERRIMACK RIVERS.]	1933/08/16	1"=60'	H 53, W 67 CM	INK, COLORED INK	PAPER
156-127-B	[ISOMETRIC INSURANCE PLAN OF] LOWELL INDUSTRIAL DEVELOPMENT COMPANY / (TENANTED) / LOWELL, MASS.	1933/08/16	1"=60'	H 53, W 67 CM	INK, COLORED INK	PAPER
156-127-C-01	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / SCHEME # 1.	1932/11/00	1"=60'	H 46.3, W 68.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
156-127-C-02	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / SCHEME # 2.	1932/11/00	1"=60'	H 46.3, W 68.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
156-127-C-03	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / SCHEME # 3.	1932/11/00	1"=60'	H 46.3, W 68.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
156-127-C-04	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / SCHEME # 4.	1932/11/00	1"=60'	H 46.3, W 68.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
156-127-C-05	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / SCHEME # 5.	1932/11/00	1"=60'	H 46.3, W 68.6 CM	BLUE LINE PRINT	PAPER

156-127-D-01	SCHEME # 1 / BUILDINGS FOR SALE OR RENT. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1930/01/00	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-D-02	SCHEME # 2 / BUILDINGS & PARKING. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1938/05/00	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-D-03	SCHEME # 3 / BUILDINGS FOR SALE OR TO RENT WITH R. R. TRACKS. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1930/01/00	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-D-04	SCHEME # 4 / BUILDINGS & PARKING SPACE / WITH LANE TO KEARNEY SQ. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1930/01/00	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-D-05	SCHEME # 5. [TRACING OF LOWELL INDUSTRIAL DEVELOPMENT CO.]	1930/01/00	1"=60'	H 51.7, W 86.4 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	TRACING PAPER
156-127-D-06	SCHEME # 6 / PROPOSED STREET & PARKING SPACE FOR 600 CARS. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1938/05/00	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-D-07	SCHEME # 7 / PROPOSED STREET & / PARKING SPACE FOR 800 CARS. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1930/02/00	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-D-08	SCHEME # 8 / PROPOSED STREET. [LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1930/10/22	1"=60'	H 51.7, W 86.4 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

156-127-E	PROPOSED CHANGES / IN / STEAM SYSTEM / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1933/01/18	1"=40'	H 39.3, W 70.5 CM	BLUE LINE PRINT	PAPER
156-127-F	PROPOSED / SERVICE STATION [ALONG BRIDGE STREET IN LOWELL INDUSTRIAL DEVELOPMENT CO'S YARD]..	1933/03/21	1/8"=1',1"=40'	H 45.5, W 80.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-127-G	BRIDGE STREET DEVELOPMENT FOR / LOWELL INDUSTRIAL DEVELOPMENT CO.	UNDATED	1"=40'	H 37.2, W 74 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-127-H	PLAN & SECTION / OF / PROPOSED GARAGE & REPAIR SHOP / IN THE / SLASHER BLDG., LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SCHEME # 4.	1935/11/04	1"=10'	H 38, W 105.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-127-I-[COPY 1]	PLAN SHOWING / PROPOSED GARAGE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO. [ALONG CONCORD RIVER].	1935/10/24	1"=20'&60'	H 53.2, W 87.7 CM	BLUEPRINT	PAPER
156-127-I-[COPY 2]	PLAN SHOWING / PROPOSED GARAGE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO. [ALONG CONCORD RIVER].	1935/10/24	1"=20'&60'	H 53.2, W 87.7 CM	BLUEPRINT	PAPER
156-128	MASS. COTTON MILLS. [PLAN OF STORE HOUSES A AND B AT LOWELL INDUSTRIAL DEVELOPMENT CO.]	1882/05/24	1/4"=1'	H 62.2, W 89.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
156-129	[PLAN AND ELEVATION OF] PROPOSED STAIRWAY / FOR / PICKER BUILDING [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1942/12/00	1/4"=1'	H 53.6, W 73.4 CM	INK	TRACING PAPER

156-130	[PLAN AND ELEVATION OF] PROPOSED FIRE ESCAPE / FOR THE / REPAIR SHOP BUILDING / LOWELL INDUSTRIAL DEVELOPMENT CO.	1943/01/00	3/8"=1'	H 65.9, W 73.7 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-131	LIGHTING SYSTEM PLAN / GOFKAUF'S STORES / MILL NO. 2 1ST FLOOR / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1943/02/02	1/8"=1'	H 40, W 70.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-132	LIGHTING SYSTEM PLAN FOR / GOFKAUF'S STORES / MILL NO. 2 BASEMENT / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1943/02/02	1/8"=1'	H 40, W 70.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-133	SCHEME # 1 / SECTION 5 UNDER BASEMENT / LOWELL INDUSTRIAL DEVELOPMENT CO. [PLAN AND ELEVATION OF PROPOSED FLOOR].	1943/02/00	1"=10'	H 38.1, W 64.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-134	SCHEME # 2 / [PLAN OF] PROPOSED OFFICE CHANGES / FOR / CLAYTON HOSIERY [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1943/04/05	3/8"=1'	H 45.6, W 79.3 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-134-A	SCHEME # 3 / [PLAN OF] PROPOSED OFFICE CHANGES / FOR CLAYTON HOSIERY [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1943/08/19	1/8"=1'	H 33.5, W 59.5 CM	COLORED PENCIL, GRAPHITE	TRACING PAPER
156-135	[PLAN OF OFFICES ON] 2ND FLOOR MILL NO.7 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1943/06/08	1/8"=1'	H 30.7, W 89.9 CM	GRAPHITE	PAPER
156-136	[PLAN AND ELEVATGION OF] PROPOSED 10" C. I. DRAIN / FOR / PEARL PROCESSING CO. [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1943/06/30	1/4"=1'	H 44, W 79.4 CM	INK	TRACING PAPER

156-137	[PLAN, ELEVATION AND CROSS-SECTION OF] PROPOSED / FIRE ESCAPE EXTENSION / MILL NO. 2, LOWELL INDUSTRIAL DEVELOPMENT CO.	1943/07/00	1/2",2"&3"=1'	H 59, W 80 CM	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
156-138	AREAS COLORED SHOW / APPROXIMATELY 1900 SQ. FT. LEASED TO / HAROLD H. COTTON INC. [IN LOWELL INDUSTRIAL DEVELOPMENT POWER HOUSE ALONG MERRIMACK RIVER].	1944/04/00	1/4"=1'	H 35.5, W 108 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-139	4TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO. [PLAN SHOWING PARTITIONS AND TOILETS FOR THE DELBY SHOE CO.].	1944/05/08	1"=10'	H 41, W 109.3 CM	GRAPHITE	DRAFTING CLOTH
156-140	[PLAN SHOWING] PORTION OF / SECTION 6-MILL NO. 1 / LOWELL INDUSTRIAL DEVELOPMENT CO. [OCCUPIED BY BERKSHIRE FROCKS, INC.].	1944/05/12	1/4"=1'	H 53.4, W 7.2 CM	GRAPHITE	DRAFTING CLOTH
156-141	[PLAN AND SECTIONS OF] SIDEWALK & DRIVEWAY / BETWEEN / NO. 6 & NO. 7 BUILDINGS [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1944/07/26	1"&1/2"=1'	H 50.1, W 91.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-141-[COPY 1]	SIDEWALK & DRIVEWAY / BETWEEN / NO. 6 & NO. 7 BUILDINGS.	1944/07/26	1"&1/2"=1'	H 50.1, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
156-142	PLAN AND SECTIONS / OF / PROPOSED MEZZANINE FLOOR IN BOILER HOUSE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1945/02/12	AS NOTED	H 79, W 117 CM	INK, COLORED INK	DRAFTING CLOTH
156-143	PLAN SHOWING / BRIDGE ST. PARKING AREA / LOWELL INDUSTRIAL DEVELOPMENT CO.	1945/05/26	1"=20'	H 36.2, W 68 CM	INK, WATER COLOR	DRAFTING CLOTH

156-143-[A]	PLAN SHOWING / BRIDGE ST. PARKING AREA / LOWELL INDUSTRIAL DEVELOPMENT CO.	1945/05/26	1"=20'	H 36, W 67.5 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
156-144	[PLAN OF] PROPOSED CONCRETE PENSTOCK / REPLACING MIDDLE WOODEN PENSTOCK / IN "PRESCOTT YARD."	1945/06/19	1/4"& 3/8"=1',1"=10'	H 59.5, W 75.6 CM	INK, WATER COLOR	DRAFTING CLOTH
156-145	[PLAN OF] DELBY SHOE CO'S / PROPOSED OFFICE / 4TH FLOOR, MILL NO.3-LOWELL INDUSTRIAL DEVEL. CO. / LOWELL, MASS.	1945/11/00	3/8"=1'	H 40.2, W 84.5 CM	GRAPHITE	PAPER
156-146	PROPOSED PLAN OF DINER / SHOWING / LOCATION, CONCRETE PIERS & FOOTING / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1946/03/28	1"=10'	H 44, W 72.8 CM	INK, COLORED INK	DRAFTING CLOTH
156-147	FIRST FLOOR PLAN / OF / BUILDING NO. 5 / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1947/01/23	1/8"=1'	H 60.1, W 78.5 CM	GRAPHITE, TRACING PAPER	TRACING PAPER
156-148	SECOND FLOOR PLAN / OF / BUILDING NO. 5 / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1947/01/24	1/8"=1'	H 59.6, W 78.8 CM	GRAPHITE	TRACING PAPER
156-149	[PLAN OF] TOILETS & OFFICES / FOR / SHU-FLEX PRODUCTS CO. [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1944/04/04	1/4"=1'	H 52.3, W 57.9 CM	GRAPHITE	COLORED PENCIL
156-150	PLAN & ELEVATION / OF / PROPOSED 4000 GAL.TANK / FOR ALLARD & CO. / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1943/05/00	1"=10'	H 55.5, W 72.8 CM	GRAPHITE	PAPER

156-151	PLAN & SECTION / OF / CONCRETE PENSTOCK / IN FRONT OF & UNDER / REX TAP ROOM, "PRESCOTT YARD."	1947/08/00	1/4"& 3/8"=1'	H 57.1, W 76.5 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
156-152	[CROSS SECTION OF STORE HOUSE A AND B AT LOWELL INDUSTRIAL DEVELOPMENT CO.] MASS. COTTON MILLS.	1882/03/29	1/4"=1'	H 45.6, W 94.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
156-152-A	L. I. D. CO. / CROSS SECTION / OF / STORE HOUSES A & B [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1945/08/30	1/4"=1'	H 44.9, W 82.9 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
156-152-B	[PLAN SHOWING] BUILDING WALLS / OF / STORE HOUSES A & B [AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1945/08/30	1/4"=1'	H 75, W 82.5 CM	GRAPHITE	TRACING PAPER
156-153	PLAN SHOWING / WALLS & I-BEAMS / UNDER PORTION OF / STRAND THEATRE LOBBY.	1956/01/10	1"=4'	H 40.8, W 53.4 CM	INK	DRAFTING CLOTH
156-154	PLAN SHOWING / POWER & LIGHT / SUPPLY & DISTRIBUTION / AT THE / REX CENTER.	1953/04/17	1"=10'	H 75.8, W 92.4 CM	GRAPHITE, COLORED PENCIL, COLORED INK	TRACING PAPER
156-155	[LOWELL INDUSTRIAL DEVELOPMENT CO.] 1600 AMP & ABOVE TYPE HD / ENCLOSURE 3.POLE.SOLENOID OPERATED / AIR CURRENT BREAKER.	1943/08/06	NONE	H 21.7, W 28 CM	BLUE LINE PRINT	PAPER
156-156	PLAN OF / STEEL BASE OF 750 KW STEAM TURBINE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1954/02/23	3/4"=1'	H 24.8, W 40 CM	INK, COLORED INK	DRAFTING CLOTH

157-[001]	CHANGES FOR NEW ELEVATOR SHAFT / LOWELL INDUSTRIAL DEVELOPMENT CO. MASS. DIV. / MILL NO. 1, SECTION 1	1953/07/06	NONE	H 30.5, W 22.2 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
157-[002]	PLAN OF OFFICE FOR / KUTE KIDDIES SHOW CO. / MILL NO. 2 - 6TH FLOOR / LOWELL INDUSTRIAL DEVELOPMENT CO.	1953/08/07	1"=10'	H 21, W 43.2 CM	GRAPHITE. COLORED PENCIL	TRACING PAPER
157-[003]-[A]	PROPOSED OFFICES / SECTION 9 - 5TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVEL. CO. MASS. DIV.	1953/08/07	1"=10'	H 22, W 43.7 CM	GRAPHITE	TRACING PAPER
157[003]-[B]	PROPOSED OFFICES / SECTION 9 - 5TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVEL. CO. MASS. DIV.	1953/08/07	1"=10'	H 22, W 43.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
157-[004]	PROPOSED OFFICES / SECTION 9 - 5TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVEL. CO. MASS. DIV.	1953/08/07	1"=10'	H 21, W 43.2 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
157-[005]	PROPOSED TOILET CHANGES / 5TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1955/04/06	3/8"=1'	H 28, W 42.6 CM	INK, WATER COLOR	PAPER
157-[006]	PLAN AND TOP VIEW / OF / PHASING - IN PLUG / "MACHINE RUNNING" / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1948/06/02	FULL SIZE	H 28, W 48.3 CM	INK	PAPER
157-[007]	VOLTAGE CHARACTERISTICS / FOR / WAGNER 2000 KVA 13800 V / 600 V / TRANSFORMERS WITH 5 - 4 1/3% TAPS - SECTION 8 / TRANSFORMERS WITH 5 - 2 1/6 TAPS - ASSETS.	1949/03/31	NONE	H 58.5, W 45.4 CM	INK, COLORED INK	TRACING PAPER

157-[008]	ASSETS DIVISION - LOWELL INDUSTRIAL DEVELOPMENT CO. / SWITCHBOARD DATA / LOWELL, MASS.	1948/06/08	NONE	H. 50.8, W 119.5 CM	INK	PAPER
157-[009]	PLAN AND SECTION OF / BOILER HOUSE / AT THE / LOWELL INDUSTRIAL DEVELOPMENT CO. MASS. DIVISION / LOWELL, MASS.	1952/09/02	AS NOTED	H 61.2, W 79.6 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
157-[010]	PLAN AND PROFILE / SHOWING / ELEVATIONS IN VICINITY OF / DILLON DYE WORKS AND BUICK GARAGE / FOR / L.I.D. COS. PROPOSED STEAM LINE.	UNDATED	1"=20'	H 59.7, W 56.3 CM	INK, COLORED INK	PAPER
157-[011]	FLOOR PLANS OF / SECTION 3 ELEVATOR TOWER / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / MASSACHUSETTS DIVISION / LOWELL, MASS.	1952/04/18	1/2"=1'	H 78.1, W 64.4 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
157-[012]-[A]	PLAN SHOWING / U.S. POST OFFICE, REX INCORPORATED / AND PORTION OF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1953/05/22	1"=40'	H 49.6, W 49.9 CM	GRAPHITE. COLORED PENCIL	TRACING PAPER
157-[012]-[B]	[UNTITLED.] [PLAN SHOWING / U.S. POST OFFICE, REX INCORPORATED / AND PORTION OF / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.]	1953/00/00	1"=40'	H 24.8, W 49.8 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
157-[013]	PLAN SHOWING / PORTION OF MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1952/11/19	1"=10'	H 41.9, W 58.5 CM	GRAPHITE	TRACING PAPER
157-[014]	5TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1955/04/05	1"=10'	H 45.3, W 74.9 CM	GRAPHITE	TRACING PAPER

157-[015]	FLOOR SPACE / FOR THE / LACONIA SHOE CO. / 4TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1947/10/09	1"=10'	H 35.5, W 75.5 CM	GRAPHITE	DRAFTING CLOTH
157-[016]	5TH FLOOR MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1953/01/00	1"=10'	H 43.7, W 114.3 CM	GRAPHITE	DRAFTING CLOTH
157-[017]	TOTAL USE OF STEAM / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1946/01/07-27	NONE	H 28, W 113 CM	INK, COLORED PENCIL	PAPER
157-[018]	TOTAL USE OF STEAM / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1946/07/08-28	NONE	H 28, W 113 CM	INK, COLORED PENCIL	PAPER
157-[019]	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASSACHUSETTS / SUBJECT: ELEVATOR SHAFT.	1953/07/31	NONE	H 28, W 21.3 CM	INK	PAPER
157-[020]	CHANGES FOR NEW ELEVATOR SHAFT / LOWELL INDUSTRIAL DEVELOPMENT CO. MASS. DIV. / MILL NO. 1, SECTION 1.	1953/07/06	NONE	H 30.2, W 22 CM	BLUEPRINT, COLORED PENCIL	PAPER
157-[021]	ONE ELECTRIC FREIGHT ELEVATOR / SECTION 1, BLDG. 1, LOWELL, MASS. / LOWELL INDUSTRIAL DEVELOPMENT CO.	1953/07/17	1/2"=1', 1/4"=1'	H 68.3, W 86.5 CM	BLUE LINE PRINT	PAPER
157-[022]	PLAN AND ELEVATION OF / PROPOSED ELEVATOR SHAFT / LOWELL INDUSTRIAL DEVELOPMENT COMPANY MASS. DIV. / LOWELL, MASS.	1953/05/25	1/4"=1', 1/8"=1'	H 73, W 54 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
157-[023]	PLAN NO. 1 / PROPOSED ELEVATOR PLAN / SECTION 1, MILL NO. 1 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1953/06/10	1/3"=1', 1/4"=1'	H 68.3, W 91.5 CM	GRAPHITE	TRACING PAPER

157-[024]	PLAN NO. 2 / DETAILS OF / BASEMENT ELEVATOR DOOR FRAMES / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SECTION 1 - MILL NO. 1 / LOWELL, MASS.	1953/07/25	1"=1'	H 51.2, W 90.8 CM	GRAPHITE	TRACING PAPER
157-[025]	PLAN NO. 3 / DETAILS OF PENT HOUSE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY SECTION 1 - MILL NO. 1 / LOWELL, MASS.	1953/07/30	1"=1', 3/4"=1'	H 49.6, W 88 CM	GRAPHITE	TRACING PAPER
157-[026]	FOURTH FLOOR, MILL NO. 2 / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1954/08/20	1/8"=1'	H 53, W 122 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
157-[027]	6TH FLOOR PLAN / MILL NO. 2 SECTION 5 / LOWELL INDUSTRIAL DEVELOPMENT CO. MASS. DIVISION.	1953/01/06	1/4"=12"	H 75.6, W 103.5 CM	GRAPHITE	TRACING PAPER
157-[028]	LOWELL INDUSTRIAL DEVELOPMENT CO. / MILL NO. 2 / 5TH FLOOR.	1952/11/12	1/8"=1'	H 55.4, W 124.5 CM	GRAPHITE	TRACING PAPER
157-[029]	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / RENTED AND VACANT FLOOR SPACE / 1930-1945.	UNDATED	NONE	H 50, W 28 CM	INK, WATER COLOR	TRACING PAPER
157-[030]	PLAN OF / TOILET AND HALL / ON FIRST FLOOR OF OFFICE BLDG. / ASSETS DIVISION - LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1952/03/31	1/2"=1'	H 30.6, W 48.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
157-[031]	PLAN SHOWING / PROPOSED REMODLED OFFICE / FOR PARIS SHOE CO. / BUILDING NO. 3 - SECTION 9, - 4TH FLOOR / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1953/07/23	3/8"=1'	H 39.4, W 61.6 CM	GRAPHITE	TRACING PAPER

157-[032]	PLAN OF / PROPOSED ENTRANCE TO QUONSET HUT / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.	1954/02/01	1"=10'	H 22.5, W 36.9 CM	INK, COLORED INK	DRAFTING CLOTH
157-[033]	PLAN SHOWING / VACANT AREAS / AT THE / BOOTT MILLS, MASSACHUSETTS DIVISION / LOWELL, MASS.	1956/05/28	1"=20'	H 41, W 53.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
157-[034]	LOWELL INDUSTRIAL DEVELOPMENT COMPANY / GRAPH FOR DETERMINATION / OF MONTHLY BASE RATE PER KW HOUR / BASED ON TOTAL KILOWATT HOURS USED / EACH MONTH. FUEL OIL AT $3.437 PER BBL. / DELIVERED AT L.I.D. CO'S. ASSETS DIVISION.	1955/00/00	NONE	H 43.3, W 71.5 CM	INK	PAPER
157-[035]	CANOPY FOR WAREHOUSE / SHIPPING PLATFORM / BOOTT MILLS / LOWELL, MASS.	1955/12/05	1/4"=1'	H 51, W 114 CM	BLUEPRINT	PAPER
157-[036]	BRACING FOR 8" STEAM LINE / BETWEEN / BOOTT MILLS AND L.I.D. CO.	1941/11/06	1/2"=1', 3"=1'	H 58.4, W 76.6 CM	GRAPHITE, COLORD PENCIL	TRACING PAPER
157-[037]	PLAN SHOWING / STAIR TOWER / MILL NO. 1 - SECTION 2 - 1ST FLOOR / LOWELL INDUSTRIAL DEVELOPMENT CO. MASS DIV. / LOWELL, MASS.	1953/05/01	1/2"=1'	H 66.5, W 91.2 CM	INK, WATER COLOR	PAPER
157-[038]	L.I.D. TRANSFORMERS / 2000 KVA - WAGNER TRANS. / 13200 V TO 600 V.	1948/12/00	NONE	H 50.5, W 66.5 CM	GRAPHITE	PAPER
157-[039]	5TH FLOOR PLAN OF / MILL NO. 3 / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1953/02/27	1"=10'	H 43.7, W 114.3 CM	GRAPHITE	PAPER

157-[040]	PROPOSED LELEVATOR PLAN / SECTION 1, MILL NO, 1 / LOWELL INDUSTRIAL DEVELOPMENT CO.	1953/07/16	1/4" & 1/2"=1'	H 63, W 90 CM	GRAPHITE	TRACING PAPER
157-[041]-[A]	FUEL OIL HEATER SUPPORT / ASSETS DIVISION / LOWELL INDUSTRIALDEVELOPMENT CO. / JOHN A. STEVENS INC. / LOWELL, MASS.	1951/11/28	3/4"=1'	H 41, W 43 CM	BLUEPRINT	PAPER
157-[041]-[B]	FUEL OIL HEATER SUPPORT / ASSETS DIVISION / LOWELL INDUSTRIAL DEVELOPMENT CO. / JOHN A. STEVENS INC. / LOWELL, MASS.	1951/12/07	3/4"=1'	H 41, W 43 CM	BLUEPRINT	PAPER
157-[042]	ASSETS DIVISION / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / FIRST STEP IN HEATER INSTALLATION.	1950/08/01	1/4"=1'	H 61.6, W 74.5 CM	BLUEPRINT	PAPER
157-[043]	ASSETS DIVISION / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / STEAM, WATER, OIL AND . BLOWOFF PIPING / 55,000# / HR. BOILER INSTALLATION.	1950/06/18	1/4"=1'	H 73, W 100 CM	BLUEPRINT, GRAPHITE	PAPER
157-[044]	ASSETS DIVISION / LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS. / LOCATION AND ARRANGEMENT / OF NEW FUEL OIL HEATERS.	1951/12/14	1"=1'	H 73, W 100 CM	BLUEPRINT, COLORED PENCIL	PAPER
157-[045]	TURBINE GENERATOR UNIT / OUTLINE.	1937/07/20	NONE	H 77.4, W 124.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
157-[046]	MASSACHUSETTS COTTON MILLS / LOWELL MASS. / SECTION OF OIL BURNING B & W BOILERS. / JOHN A. STEVENS, ENGINEER.	1921/04/25	1/4"=1'	H 86, W 124.5 CM	BLUEPRINT	PAPER

158-[221]-[A]	NEW PANEL / FOR TIE LINE / ASSETS DIVISION / LOWELL INDUSTRIAL DEVELOPMENT CO.	1949/04/00	NONE	H 38.7, W 27.5 CM	INK, COLORED PENCIL	DRAFTING DLOTH
158-[221]-[B]	NEW PANEL / FOR TIE LINE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1949/04/00	NONE	H 38.7, W 27.5 CM	BLUEPRINT	PAPER
158-[222]	PLAN OF PROPOSED / BOOTT MILLS STEAM LINE / TO SUPPLY R. K. O. KEITHS THEATRE / ALSO PROPOSED / PROPERTY LINES / FOR CURRAN-MORTON'S STORE HOUSE ON CANAL STREET.	1956/09/21	1"=20'	H 41.9, W 87 CM	INK, COLORED INK, WATER COLOR	DRAWING CLOTH
158-[222]-[COPY 1]	PLAN OF PROPOSED / BOOTT MILLS STEAM LINE / TO SUPPLY R. K. O. KEITHS THEATRE / ALSO PROPOSED / PROPERTY LINES / FOR CURRAN-MORTON'S STORE HOUSE ON CANAL STREET.	1956/09/21	1"=20'	H 41.5, W 86.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-[223]	4" CLASS "A" DOUBLE ACTION SUCTION PUMP / BELT DRIVEN.	1915/06/10	1"=1'	H 25, W 28 CM	BLUEPRINT	PAPER
158-[224]	DISCHARGE OF SMOOTH METER NOZZLES.	1914/01/01	NONE	H 56, W 58.5 CM	BLUEPRINT	PAPER
158-[225]	DISCHARGE OF / THREE WAY / SIAMESE METER NOZZLE.	1920/11/00	NONE	H 56, W 58.5 CM	BLUEPRINT	PAPER
158-[226]	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERIMACK MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	UNDATED	1"=40'	H 71.9, W 101.7 CM	BLACK LINE PRINT, COLORED INK, WATER COLOR	CLOTH-BACKED PAPER

158-[227]	PLAN OF THE / MILLYARD / OF THE MASSACHUSETTS MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	UNDATED	1"=40'	H 71.1, W 105.3 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH-BACKED PAPER
158-[228]	PLAN OF THE / MILLYARD / OF THE / JACKSON PROPERTIES, INC. / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1950/00/00	1/4"=10'	H 52, W 90.9 CM	BLACK LINE PRINT, INK, COLORED INK, WAER COLOR	CLOTH-BACKED PAPER
158-[229]	STANDARD 5" CLASS A DOUBLE SUCTION / PUMP. BELT DRIVEN.	1902/10/27	1"=1'	H 22.8, W 30.4 CM	BLUEPRINT	PAPER
158-003	[UNTITLED.] [SKETCH SHOWING LOCATION OF STEAM PUMP AT LOWER LOCKS.]	UNDATED	NONE	H 35.5, W 70.5 CM	INK, GRAPHITE, COLORED INK	DRAFTING CLOTH
158-004	[DIAGRAM SHOWING] DISCHARGE OF METER NOZZLES [WITH PRESSURE MEASURED AT A 6" PIEZOMETER].	1912/00/00	NONE	H 62, W 164.5 CM	INK	DRAFTING CLOTH
158-005	[DIAGRAM SHOWING] DISCHARGE OF METER NOZZLES / WITH PRESSURES MEASURED AT A 6" PIEZOMETER.	1913/01/00	NONE	H 60.6, W 51 CM	INK	DRAFTING CLOTH
158-005-[A]	[DIAGRAM SHOWING] DISCHARGE OF METER NOZZLES / WITH PRESSURES MEASURED AT A 6" PIEZOMETER.	1913/01/00	NONE	H 60, W 30.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-005-[COPY 1]	DISCHARGE OF METER NOZZLES / WITH PRESSURES MEASURED AT A 6" PIEZOMETER.	1913/01/00	NONE	H 60.6, W 51 CM	BLUEPRINT	PAPER

158-005-[COPY 2]	DISCHARGE OF METER NOZZLES / WITH PRESSURES MEASURED AT A 6" PIEZOMETER.	1913/01/00	NONE	H 62.9, W 53.6 CM	BLUEPRINT	CLOTH BACKED PAPER
158-005-[COPY 2]-[A]	DISCHARGE OF METER NOZZLES.	1952/10/29	NONE	H 28, W 21.6 CM	INK	PAPER
158-006-A	DISCHARGE OF METER NOZZLES [1894 & 1897. LOG. SCALE].	1897/06/00	NONE	H 56.6, W 56.6 CM	BLUEPRINT	CLOTH BACKED PAPER
158-006-B	[DIAGRAM OF METER NOZZLES, WITH PRESSURES MEASURED AT A 2 1/2", 3", 4", & 5" PIEZOMETER, COMPUTED BY C. W. MOWRY. 1894 & 1897. LOG. SCALE.]	1908/06/00				
158-006-C	DISCHARGE OF / SMOOTH NOZZLES / COMPUTED TO CORRECT FOR VELOCITY PAST A / 6" PIEZOMETER [1894 & 1897. LOG. SCALE].	1903/09/30	NONE	H 59, W 65.5 CM	BLUEPRINT	CLOTH BACKED PAPER
158-006-D	DISCHARGE OF METER NOZZLES IN GALS. PER MIN. [1894 & 1897. LOG. SCALE].	1894/03/00	NONE	H 56.5, W 61.3 CM	BLUEPRINT	PAPER
158-007-[A]	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 24" CAST IRON PIPES.	1905/09/22	NONE	H 53.4, W 75 CM	INK, COLORED INK	PAPER
158-007-[A]-[COPY 1]	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 24" CAST IRON PIPES.	1905/09/22	NONE	H 52.8, W 76.2 CM	BLUEPRINT, COLORED INK	PAPER
158-007-[B]	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 24" CAST IRON PIPES.	1911/02/00	NONE	H 53.4, W 75 CM	INK, COLORED INK	PAPER
158-008-[A]	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 12" & 24" CAST IRON PIPES.	1904/00/00	NONE	H 53.7, W 75.3 CM	INK, COLORED INK	PAPER
158-008-[B]	RECORDS OF FRICTION LOSS TESTS ON 12 INCH PIPE.	1868/00/00	NONE	H 53.4, W 75 CM	GRAPHITE	PAPER

158-009-[A]	DIAGRAM SHOWING / FRICTION LOSS [PER 1000 FT. IN] 12" [& 24" CAST IRON] PIPE FROM / L. & C. RESERVOIR TO PRESCOTT.	1904/00/00	NONE	H 55.9, W 43.2 CM	INK	PAPER
158-009-[B]	DIAGRAM SHOWING / FRICTION LOSS IN 12" PIPE FROM / L. & C. RESERVOIR TO PRESCOTT.	UNDATED	NONE	H 55.9, W 43.2 CM	INK	PAPER
158-010	[UNTITLED.] [DIAGRAM SHOWING FRICTION LOSS PER 1000 FT. IN A 12" CAST IRON PIPE.]	1904/00/00	NONE	H 56.2, W 71.8 CM	COLORED INK, GRAPHITE	PAPER
158-011	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 24" CAST IRON PIPES.	1904/00/00	NONE	H 56.2, W 81.4 CM	INK	PAPER
158-011-A	DIAGRAM / SHOWING FRICTION LOSSES [FROM THE RESERVOIR TO PRESCOTT PER 1000 FT.] IN L.& C. [12 &] 24 INCH [CAST IRON] PIPE / FOR DIFFERENT [VELOCITIES] YEARS / ALSO / PERCENT OF LOSS FOR DIFFERENT PERIODS / SINCE 1904.	1914/00/00	NONE	H 62.9, W 172.7 CM	INK, COLORED INK	DRAFTING CLOTH
158-012-[A]	[TABLE OF] EXPERIMENTS FOR FRICTION LOSS IN OLD 1868, 12" PIPE FROM RESERVOIR TO MIDDLESEX CO'S. NO. 3 MILL. JULY 31, AUG. 1 & 2, 1905.	1905/00/00	NONE	H 48.7, W 74.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-012-[B]	TABLE OF EXPERIMENTS FOR FRICTION LOSS IN OLD 12" PIPE. FROM RESERVOIR TO PRESCOTT MILL-SEPT. 28, 1903.	1903/00/00	NONE	H 47.9, W 75.5 CM	INK	DRAFTING CLOTH
158-012-[C]	EXPERIMENTS FOR FRICTION LOSS IN 12" PIPE FROM RESERVOIR TO MIDDLESEX MILL SEPT. 21 & 28, 1922.	1922/00/00	NONE	H 46.3, W 78 CM	INK, COLORED INK	DRAFTING CLOTH

158-012-[D]	EXPERIMENTS FOR FRICTION LOSS IN 12" PIPE FROM RESERVOIR TO MIDDLESEX MILL AUG. 1, 1905. (11.42 TO 11.50 A.M.).	1905/00/00	NONE	H 44.5, W 51.4 CM	INK	DRAFTING CLOTH
158-013-[A]	[TABLE OF] EXPERIMENTS FOR FRICTION LOSS IN 24" PIPE FROM RESERVOIR TO PRESCOTT MILL MAY 15, 16, 1906 [1904 TO DATE (YEARLY)].	1906/00/00	NONE	H 51, W 74.9 CM	INK	DRAFTING CLOTH
158-013-[B]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT. / MAY 16, 1906.	1906/00/00	NONE	H 35.8, W 43.3 CM	INK	PAPER
158-013-[C]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR / TO PRESCOTT MILL MAY 18, 1906.	1906/00/00	NONE	H 35.6, W 43.5 CM	INK	PAPER
158-013-[D]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL MAY 18 & 19, 1906.	1906/00/00	NONE	H 49, 76 CM	INK	DRAFTING CLOTH
158-014-[A]	[TABLE OF] EXPERIMENTS FOR FRICTION LOSS IN 24" PIPE FROM RESERVOIR TO PRESCOTT MILL AUG. 5 & OCT. 14 & 15, 1904. [TO DATE (YEARLY)].	1904/00/00	NONE	H 51.2, W 75 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[B]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, OCT. 18 & 19, 1904.	1904/00/00	NONE	H 51.2, W 75 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[C]	EXPERIMENTS FOR FRICTION LOSS IN 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, JULY 11, 1905. / EXPERIMENT # 9 WITH 3" NOZZLE.	1905/00/00	NONE	H 44.5, W 49 CM	INK, COLORED INK	DRAFTING CLOTH

158-014-[D]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, JULY 10, 11, 12 & 13, 1905.	1905/00/00	NONE	H 49, W 74 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[E]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, MAY 18 & JUNE 16, 1909.	1909/00/00	NONE	H 50.9, W 75.2 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[F]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, MAY 3 & 6 & OCT. 11 & 12, 1910.	1910/00/00	NONE	H 51, W 75.6 CM	INK	DRAFTING CLOTH
158-014-[G]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, OCT. 31 & NOV. 6, 1911.	1911/00/00	NONE	H 51, W 75.6 CM	INK	DRAFTING CLOTH
158-014-[H]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, OCT. 15-16 & 17, 1912.	1912/00/00	NONE	H 50.9. W 75.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[I]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, AUG. 18 & 19, 1914.	1914/00/00	NONE	H 50.9, W 75.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[J]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FRON RESERVOIR TO PRESCOTT MILL, MAY 29, 1915.	1915/00/00	NONE	H 50.9, W 75.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[K]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE FROM RESERVOIR TO PRESCOTT MILL, JUNE 8 & 14, 1920.	1920/00/00	NONE	H 50.9, W 75.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-014-[L]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE RESERVOIR TO PRESCOTT MILL, JULY 19, 1921.	1921/00/00	NONE	H 50.2, W 78.1 CM	INK	DRAFTING CLOTH

158-014-[M]	EXPERIMENTS FOR FRICTION LOSS IN NEW 24" PIPE RESERVOIR TO PRESCOTT MILL, SEPT. 7, 1922.	1922/00/00	NONE	H 50.2, W 78.1 CM	INK	DRAFTING CLOTH
158-015-[A]	METER TESTING NOZZLES / HERSEY MANUFACTURING CO. / SOUTH BOSTON, MASS.	UNDATED	NONE	H 49.5, W 83.9 CM	BLUEPRINT	PAPER
158-015-[B]	METER TESTING NOZZLES. / HERSEY MANUFACTURING CO., BOSTON, MASS.	1911/08/05	ACTUAL SIZE	H 50.2, W 68.7 CM	BLUEPRINT	PAPER
158-017-[A]	DIAGRAM SHOWING / THE / QUANTITY OF WATER (U.S. GALLONS) / IN / LOCKS & CANALS RESERVOIR ON LYNDE'S HILL / FOR / DIFFERENT DEPTHS [GAUGE READINGS] IN RESERVOIR [ON LYNDE'S HILL].	1912/02/29	NONE	H 52.2, W 69.2 CM	INK, COLORED INK	DRAFTING CLOTH
158-017-[B]	DIAGRAM SHOWING / THE / QUANTITY OF WATER (U.S. GALLONS) IN / LOCKS & CANALS RESERVOIR ON LYNDE'S HILL / FOR / DIFFERENT GAUGE READINGS IN THE RESERVOIR.	1912/02/28	NONE	H 52.2, W 69.2 CM	INK	DRAFTING CLOTH
158-018-[A]	MAP SHOWING PROTECTION AFFORDED / BY THE / LOCKS & CANALS & CITY / WATER WORKS SYSTEMS / LOWELL, MASS.	1897/05/12	1"=400'	H 66.3, W 53.2 CM	UNKNOWN PRINTING PROCESS	PAPER
158-018-[B]	MAP SHOWING PROTECTION AFFORDED / BY THE / LOCKS & CANALS & CITY / WATER WORKS SYSTEMS / LOWELL, MASS.	1897/05/12	1"=400'	H 66.3, W 53.2 CM	UNKNOWN PRINTING PROCESS	PAPER
158-020	PLAN SHOWING LAYOUT OF / BLAKE UNDER WRITER'S SUCTION PUMP / & CONNECTIONS AT / MASSACHUSETTS COTTON MILLS.	1904/00/00	NONE	H 77.5, W 140.9 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

158-022-[B]	TRACING OF PORTION OF 24" PIPE PLAN SHOWING / L.& C. RESERVOIR & MEASURING SPIKES.	1907/06/25	1"=25'	H 54.7, W 44.5 CM	INK, COLORED INK	DRAFTING CLOTH
158-022-[C]	[PLANS SHOWING PROPOSED ADDITION TO] LOCKS & CANALS RESERVOIR.	1907/00/00	1"=25'	H 57.8, W 44.3 CM	INK, COLORED INK	DRAFTING CLOTH
158-022-A	PLAN / SHOWING PROPOSED ADDITION TO L.& C. RESERVOIR.	1919/01/16	1"=25'	H 63.2, W 47.7 CM	INK, COLORED INK	DRAFTING CLOTH
158-023	[PLAN & SECTIONS SHOWING CHANGES IN PIPE LINE UNDER NO. 3 MILL OF COLUMBIA TEXTILE MFG. CO.] ELEVATION OF LOCKS AND CANALS 12" PIPE / UNDER NEW DYE HOUSE / OF BIGELOW CARPET CO.	1909/09/24	1/4"=1'	H 40, W 69 CM	INK, COLORED INK	DRAFTING CLOTH
158-024	[PLAN & SECTION SHOWING CHANGES IN WATER PIPE LINE UNDER NO. 3 MILL OF COLUMBIA TEXTILE MFG. CO.] SKETCH SHOWING PROPOSED CHANGE / OF L & C 12" WATER PIPE UNDER NO. 1 / MILL IN BIGELOW CARPET CO.'S YARD.	1909/09/03	1/4"=1'	H 59, W 60 CM	INK, COLORED INK	DRAFTING CLOTH
158-025	SKETCH SHOWING / [PRESENT &] PROPOSED NEW PUMP / AT / MIDDLESEX CO.	1910/06/11	1/4"=1',1"=10'& 40'	H 90.9, W 92.2 CM	INK, COLORED INK	DRAFTING CLOTH
158-026-[C]	MAP / SHOWING WATER MAINS / OF LOCKS AND CANALS / LOWELL, MASS.	1913/04/15	1"=200'	H 51.9, W 110.3 CM	UNKNOWN PRINTING PROCESS, WATER COLOR	CLOTH BACKED PAPER
158-026-[D]	MAP / SHOWING WATER MAINS / OF LOCKS AND CANALS / LOWELL, MASS.	1940/01/00	1"=200'	H 62, W 120 CM	INK, WATER COLOR	CLOTH BACKED PAPER
158-026-[E]-[COPY 1]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1959/05/00	1"=200'	H 59.4, W 117.2 CM	INK, WATER COLOR	CLOTH BACKED PAPER

158-026-[E]-[COPY 2]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1959/05/00	1"=200'	H 59.4, W 117.2 CM	INK, WATER COLOR	CLOTH BACKED PAPER
158-026-[F]	MAP / SHOWING WATER MAINS / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1959/00/00	1"=200'	H 59.5, W 119.7 CM	INK, WATER COLOR	DRAFTING CLOTH
158-026-[G]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1959/00/00	1"=200'	H 59.5, W 119 CM	INK, COLORED INK	DRAFTING CLOTH
158-026-[H]	PLAN OF / WATER MAINS, MILLS ETC. / IN THE / PROPS. OF THE LOCKS AND CANALS / FIRE PROTECTION SYSTEM / LOWELL, MASS.	1956/01/02	1"=200'	H 61.2, W 120 CM	INK, WATER COLOR	DRAFTING CLOTH
158-026-[I]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1934/01/03	1"=200'	H 59, W 116.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-026-[J]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	UNDATED	1"=200'	H 59, W 116.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-026-[K]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1934/02/06	1"=200'	H 59, W 116.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-026-[L]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	UNDATED	1"=200'	H 59, W 116.5 CM	BLUE LINE PRINT, COLORED PENCIL, WATER COLOR	PAPER
158-026-[M]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1937/02/01	1"=200'	H 56, W 114.3 CM	BLUE LINE PRINT, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

158-026-[N]	MAP / SHOWING WATER MAINS / OF / LOCKS AND CANALS / LOWELL, MASS.	1921/01/01	1"=200'	H 57.1, W 115 CM	BLUE LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
158-026-[O]	PLAN SHOWING / WATER MAINS, ETC. / OF THE / LOCKS AND CANALS / FIRE PROTECTION SYSTEM.	1951/09/25	1/2"=100', 1/2"=300'	H 57.4, W 77 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-026-A	MAP / SHOWING WATER MAINS / OF LOCKS AND CANALS / LOWELL, MASS.	1906/01/24	1"=200'	H 58.2, W 115 CM	UNKNOWN PRINTING PROCESS, WATER COLOR	CLOTH BACKED PAPER
158-026-B	MAP / [OF MILL DISTRICT] SHOWING [CITY CONNECTIONS OF] WATER MAINS / OF LOCKS AND CANALS / LOWELL, MASS. / 1897.	1917/11/00	1"=200'	H 61.3, W 125.5 CM	INK, COLORED INK	DRAFTING CLOTH
158-027	MAP / SHOWING WATER MAINS / OF LOCKS AND CANALS / LOWELL, MASS. [FROM RESERVOIR TO VARIOUS CORPORATIONS & SHOWING APPROXIMATE AGES OF PIPE OBTAINED FROM MR. YOUNG & BASED ON RECOLLECTION.]	1906/01/24	1"=200'	H 57, W 112 CM	BLUE LINE PRINT, COLORED PENCIL	CLOTH-BACKED PAPER
158-029	GATE PLAN / [OF] LOWELL W. W. [WATER WORKS] / MASSACHUSETTS [SHOWING LOCATION OF GATES ON CITY SYSTEM].	1899/00/00	NONE	H 49.2, W 66 CM	BLUEPRINT	PAPER
158-030	CHECK VALVE / FOR / PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER / LOWELL, MASS.	1891/02/17	HALF SIZE	H 72.4, W 53.4 CM	INK	DRAFTING CLOTH

158-032	PLAN [& SECTION] SHOWING CHANGE IN 12" / PIPE LINE IN FRONT OF WORSTED MILL / [COLUMBIA TEXTILE] BIGELOW HARTFORD CARPET COMPANY.	UNDATED	NONE	H 46.1, W 82.8 CM	INK, COLORED INK	PAPER
158-033	PLAN OF / LOCKS & CANALS YARD [SHOWING LOCATION OF 10" PIPE].	SEE NOTES	1"=40'	H 27.5, W 30.2 CM	INK, COLORED INK	TRACING PAPER
158-033-A	PLAN OF / LOCKS & CANALS YARD.	1903/11/25	1"=10'& 40'	H 27.6, W 30.4 CM	INK, COLORED INK	TRACING PAPER
158-034	PROFILE / SHOWING GRADE OF / CENTER LINE OF STREET[S] / FROM / [CONCORD RIVER] EASTERN CANAL / TO L. & C. RESERVOIR LOT / THROUGH / MERRIMACK SQUARE, EAST MERRIMACK ST., NESMITH ST., MANSUR ST., FAIRMOUNT ST.	1903/10/00	1"=200'	H 45.8, W 109.3 CM	INK, COLORED INK	PAPER
158-035	PLAN OF LOCKS & CANALS YARD / SHOWING PIPE LINES.	SEE NOTES	1"=20'	H 53.2, W 72.8 CM	INK, COLORED INK	DRAFTING CLOTH
158-036	SKETCH PLAN / SHOWING / PROPOSED LOCATION FOR [PROPOSED] ELECTRIC REGISTER LINE / FROM / LOCKS & CANALS RESERVOIR / TO / MIDDLESEX [MFG.] CO.'S [MILLS] YARD.	1907/10/17	1"=100'	H 44.5, W 137.3 CM	INK	DRAFTING CLOTH
158-037	[PLAN & SECTION SHOWING] HYDRANT CONNECTION THRU PIPE TUNNEL. / [AT] HAMILTON [MFG. CO.].	1907/11/09	1/2=1'	H 44.5, W 137.3 CM	BLUEPRINT	PAPER
158-038	[SKETCH SHOWING LOCKS & CANALS, FIRE PROTECTION PIPE LINES IN NEIGHBORHOOD OF NEW STRAND THEATER BLDG. WITH PROPOSED CHANGES IN RED.]	1916/07/24	1"=40'			

158-039	SKETCH SHOWING LOCATION OF / PROPOSED FIRE PUMP AT LAWRENCE / SECTION OF THE TREMONT & SUFFOLK MILLS.	1909/08/27	1"=10'	H 30, W 46.8 CM	INK, COLORED INK	DRAFTING CLOTH
158-040	SKETCH SHOWING PROPOSED LOCATION / OF / L. & C. RESERVOIR PUMP / AT / LOWER [SWAMP] LOCKS DAM.	1910/02/28	1"=10'	H 32.5, W 54 CM	INK, COLORED INK	DRAFTING CLOTH
158-041	[UNTITLED.] [LIST OF FACTORY MUTUAL SYMBOLS FOR PLANS & DRAWINGS BY PLAN DEPARTMENT OF ASSOCIATED MUTUAL INSURANCE CO.]	UNDATED	NONE	H 9, W 53.3 CM	INK	PAPER
158-042	SKETCH SHOWING COVERING OVER 20" / PIPE ACROSS MERRIMACK WASTEWAY.	1905/02/00	1 1/2"=1'	H 26.4, W 18 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
158-043-[A]	SCALE DRAWING / SHOWING / CURVES & SPECIALS / 24 IN. PIPE.	1908/03/16	1/2"=1', 1"=1'	H 48, W 27 CM	INK, COLORED INK	DRAFTING CLOTH
158-043-[B]	SCALE DRAWING / SHOWING / CURVES & SPECIALS / 16 IN. PIPE.	UNDATED	NONE	H 51.4, W 29.9 CM	INK, COLORED INK	DRAFTING CLOTH
158-043-[C]	SCALE DRAWING / SHOWING / CURVES & SPECIALS / 20 IN. PIPE.	1908/03/11	1/4"=1', 1/2"=1'	H 47.6, W 24.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-043-[D]	TYPICAL SECTIONS OF 20" PIPE & / CURVES CAST FOR THE PROPRIETORS / OF LOCKS & CANALS BY WARREN / FOUNDRY & MACHINE CO. DURING / THE YEAR 1903.	1904/02/00	1/2"=1', 1/4"=1'	H 35, W 21.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-043-[D]-[COPY 1]	TYPICAL SECTIONS OF 20" PIPE & / CURVES CAST FOR THE PROPRIETORS / OF LOCKS & CANALS BY WARREN / FOUNDRY & MACHINE CO. DURING / THE YEAR 1903.	1904/02/00	1/2"=1', 1/4"=1'	H 34.4, W 21.5 CM	BLUEPRINT	PAPER

158-043-[E]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 26.7, W 21.3 CM	INK, COLORED INK	DRAFTING CLOTH
158-044-[A]	[PLAN GIVING] DIMENSIONS OF D GATE / MADE BY / COFFIN VALVE CO. / BOSTON [MASS.]	UNDATED	NONE	H 25.6, W 22.5 CM	BLUEPRINT	PAPER
158-044-[B]	HEIGHTS & FACE TO FACE OF FLANGE.	UNDATED	NONE	H 12.2, W 21.5 CM	INK, GRAPHITE	PAPER
158-045	MEASUREMENTS MADE AROUND [AREA OF] RESERVOIR / AT START & FINISH OF PUMP TEST-JULY 14,1906. [WITH MASS. CO'S 1500 GAL. FIRE PUMP FROM 9 A.M. TO 11.45 A.M.]	1906/07/14	1"=20'	H 35.4, W 53.5 CM	INK, COLORED INK	PAPER
158-046	[UNTITLED.] [DIAGRAM SHOWING LOSS OF HEAD PER FOOT OF 24" PIPE.]	UNDATED	NONE	H 53.7, W 41.2 CM	GRAPHITE	PAPER
158-047-[A]	[DIAGRAM SHOWING] COMPARISON BETWEEN VOLUMETRIC / & / VENTURI METER MEASUREMENTS / AT SWAMP LOCKS, LOWELL, MASS. / OCT. & NOV.1912.	1913/05/13	NONE	H 29.3, W 45.7 CM	INK	PAPER
158-047-[B]	COMPARISON BETWEEN / VENTURI METER / AND / CAPACITY (LOCK CHAMBER).	1912/11/00	NONE	H 29.3, W 45.7 CM	INK, COLORED INK	PAPER
158-048	[SKETCH OF] 6"x 3" VENTURI METER, NO. 2790.	UNDATED	NONE	H 42.6, W 60.4 CM	GRAPHITE	PAPER
158-049	SCHEDULE OF NUMBER & WEIGHTS OF DIFFERENT SIZES OF PIPE BOUGHT BY PROPRIETORS OF L.& C. IN 1903 & 1904.	1904/01/01	NONE	H 56.2, W 42 CM	INK, COLORED INK	DRAFTING CLOTH
158-050	SKETCH SHOWING APPROXIMATE / LOCATION OF / RESERVOIR PUMPS / AT / [SACO-]LOWELL MACHINE SHOPS.	1902/04/03	1"=10'	H 41.4, W 31.5 CM	INK, COLORED PENCIL	PAPER

158-051	PLAN SHOWING / LOCATION PIPE CONNECTIONS-&-DRIVE, / OF / RESERVOIR PUMPS, AT SACO-LOWELL SHOPS.	1913/02/08	1"=10'	H 31.6, W 36.2 CM	INK, WATER COLOR	DRAFTING CLOTH
158-052	SKETCH [PLAN] SHOWING LOCATION OF / 17 x 15 SINGLE ACTING TRIPLEX PUMP / CAPACITY 1000 GALS PER MINUTE MADE / BY PLATT IRON WORKS [AT PRESCOTT].	1913/01/30	1/4"=1'	H 43.9, W 63 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
158-053	RECORD OF WATER POWER USED / DURING TEST OF ROTARY FIRE PUMP IN MIDDLESEX CO'S NO. 3 MILL, AUG. 18 P.M.'05.	1905/08/18	NONE	H 19.2, W 46.7 CM	INK, COLORED INK	PAPER
158-054	LIST OF METERS ON L.& C. SYSTEM [LOCATED IN VARIOUS CORPORATIONS].	1924/05/06	NONE	H 64.2, W 33.3 CM	INK	DRAFTING CLOTH
158-055	[TRACING FROM CITY PLANS SHOWING] SIDE WALK BRACKET / [FOR PIPE LINES UNDER] EAST MERRIMACK ST. BRIDGE.	1904/01/28	1"=1'	H 31.5, W 36.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-056	[MAP OF LOWELL SHOWING] GATE PLAN / LOWELL W. W. [WATER WORKS] / MASSACHUSETTS [AS COMPLIED BY CITY ENGINEER].	1897/00/00	NONE	H 49.5, W 66.3 CM	BLUEPRINT, COLORED PENCIL	CLOTH BACKED PAPER
158-057	[FOLIO OF SCHEDULE OF GATES IN P.L.& C. PIPE SYSTEM.]	1906/06/00				

158-058	[UNTITLED.] [SKETCHES SHOWING PIPE COVERING FOR PIPE CROSSINGS UNDER EAST MERRIMECK ST. (CONCORD RIVER BRIDGE) FEEDERS OF MASS. COTTON MILLS. PAWTUCKET CANAL (CENTRAL ST. BRIDGE.)]	UNDATED	NONE	H 27.3, W 21 CM	INK, COLORED INK	DRAFTING CLOTH
158-059	SKETCH SHOWING / ARRANGEMENT OF VENTURI / METER / & / PIEZOMETER GAUGES / TO DETERMINE NOZZLE DISCHARGE / [AT] SWAMP LOCKS.	1912/11/00	NONE	H 24.8, W 31.7 CM	INK, COLORED INK	DRAFTING CLOTH
158-060	[DIAGRAM] SHOWS LOSS OF HEAD IN POUNDS / THROUGH DIFFERENT METERS / FROM FIRESTATION TABLES.	1903/00/00	NONE	H 30.5, W 21.5 CM	INK, GRAPHITE	TRACING PAPER
158-061	[SKETCH SHOWING] STREET SECTION OF CONCORD RIVER BRIDGE / ON ANDOVER ST. / LOOKING TOWARD CONCORD ST. [SHOWING COVERING FOR 12" PIPE OF L.& C.]	1912/08/06	1/4"=1'	H 19.1, W 41 CM	INK, WATER COLOR, COLORED INK	PAPER
158-062	SKETCH SHOWING LOCATION & / ELEVATION OF MASS. CO'S 16" PIPE / CROSSING EAST MERRIMACK ST. LAID / IN MAY 1907.	1907/06/12	1"=10'	H 22, W 43.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
158-063	SKETCH SHOWING STANDARD WRENCH / FOR WALKER INDEPENDENT HYDRANT [MADE OF MALLEABLE IRON].	1906/02/13	1/2 SIZE	H 17.9, W 30 CM	INK, COLORED INK	DRAFTING CLOTH
158-064	[SKETCH OF] RESERVOIR GAUGE / AT LOWER LOCKS.	1906/05/23	NONE	H 29, W 16 CM	INK, COLORED INK	DRAFTING CLOTH
158-065	PLAN / SHOWING / LOCATION OF RESERVOIR.	UNDATED	1"=150'	H 27.2, W 28.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH

158-066	[TABLE OF] NOZZLE [DISCHARGES] TESTS OF J. R. FREEMAN'S.	1912/11/18	NONE	H 27.7, W 21 CM	INK, COLORED INK	PAPER
158-067-[A]	PRESCOTT MILLS / SCHEME FOR PROPOSED PUMP / DIRECT DRIVE.	1913/01/00	NONE	H 29.3, W 67.3 CM	INK, WATER COLOR	DRAFTING CLOTH
158-067-[B]	PROPOSED DESCRIPTIVE PLAN / [OF] 17 x 15 SINGLE ACTING TRIPLEX PUMP [CAPACITY 1000 GALS PER MINUTE MADE BY PLATT IRON WORKS] / IN PRESCOTT SPINNING MILL, BASEMENT. / PROP. LOCKS & CANALS.	1913/01/17	1/4"=1'	H 57.8, W 78.1 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
158-068	SKETCH [PLAN] SHOWING LOCATION OF / 14 x 12 SINGLE ACTING TRIPLEX PUMP CAPACITY 1000 GALS. PER. MIN. [MADE BY DEANE STEAM PUMP CO.]	1913/02/03	1/2"=1'	H 45.7, W 76.9 CM	INK, WATER COLOR	DRAFTING CLOTH
158-069	[BLUEPRINT SHOWING PRELIMINARY LAYOUT FOR 2-400 K.W. GENERATORS FOR PRESCOTT WHEELS.]	1912/02/02	1/4"=1'			
158-075	SKETCH SHOWING PROPOSED NOZZLE / FOR L.& C. PUMP- MIDDLESSEX / COMPANY NO. 3 MILL.	1910/08/02	1"=1'	H 24.4, W 19.9 CM	INK, COLORED INK	DRAFTING CLOTH
158-076	[TABLES OF] BOSTON / WATER- / WORKS / DATA [FOR YEAR 1889].	1889/00/00	NONE	H 36.5, W 39 CM	INK	DRAFTING CLOTH
158-077	[BLUE PRINT SHOWING LOCATION OF 16" PIPE UNDER COAL POCKET.]	1909/09/10				
158-078	1/8 [SHORT] BEND 16" PIPES & 12" PIPE [WITH NAMES & MAKERS].	UNDATED	1"=1'	H 20.9, W 48.6 CM	GRAPHITE	PAPER

158-079	LOCATION OF OF THE 6 INCH WATER PIPE FROM MECHANIC STREET [WORTHEN ST.] / TO THE GUARD SLUICES OF PAWTUCKET CANAL, LAID IN / 1870, TO SUPPLY WATER FROM THE RESERVOIR ON LYNDE'S / HILL, TO MOVE [HOISTING HYDRAULIC] GATES.	1871/06/0 0	1"=120'	H 58.5, W 86 CM	INK, COLORED INK, WATER COLOR	PAPER
158-080	RESERVOIR DEPT. TABLE-I-. [SHOWING HEIGHTS OF WATER ABOVE BOTTOM OF RESERVOIR & CORRESPONDING HEIGHTS ON L.& C. GENERAL SCALE WITH CORRESPONDING NUMBER OF U.S. GALLONS FOR EACH HEIGHT.]	1912/10/1 3	NONE	H 27.7, W 21 CM	INK	PAPER
158-081	MASS. BOILER HOUSE-MASS. COTTON MILLS / SKETCH SHOWING LOCATION OF PIPES WHERE USE / OF RESERVOIR WATER & LEAKAGE MAY OCCUR.	1913/04/1 0	1/16"=1'	H 25.2, W 65.5 CM	INK, COLORED INK	DRAFTING CLOTH
158-082	PLAN SHOWING / LOCATION-PIPE CONNECTIONS-&-DRIVE / OF / NEW 1000 GAL PUMP AS LAID OUT BY J. A. STEVENS.	1913/03/1 4	1"=10'	H 35, W 37.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
158-083-[A]	SUGGESTIONS FOR VENTURI METER EXPERIMENTS / AT LOWELL MASS. / (10"x 5" TUBE # 3077-U TUBE MANOMETER).	1913/05/2 8	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
158-083-[B]	SUGGESTIONS FOR VENTURI METER EXPERIMENTS / AT LOWELL MASS. / (10"x 5" TUBE # 3077-U TUBE MANOMETER).	1913/05/2 8	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH

158-083-[C]	SUGGESTIONS FOR VENTURI METER EXPERIMENTS / AT LOWELL MASS. / (10"x 5" TUBE # 3077-U TUBE MANOMETER).	1913/05/28	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
158-084-[A]	SKETCH SHOWING LOCATION [AND ELEVATION] OF / L. & C. 12" PIPE [LINE AND PROPOSED CHANGES] FROM SACO-LOWELL SHOP[S] / NO.7 TO APPLETON CO'S. NO. 2 MILL.	1913/06/23	1"=40'	H 21.6, W 46.8 CM	INK, COLORED INK	DRAFTING CLOTH
158-084-[B]	SKETCH SHOWING LOCATION [AND ELEVATION] OF / L. & C. 12" PIPE [LINE AND PROPOSED CHANGES] FROM SACO-LOWELL SHOP[S] / NO.7 TO APPLETON CO'S. NO. 2 MILL	1913/06/25	NONE	H 12.7, W 47 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
158-085	PROPRIETORS OF LOCKS & CANALS. / SKETCH SHOWING / INSTALLATION OF TWO 8"x 4" VENTURI METERS / IN DELIVERY PIPES FROM FIRE PUMPS / AT THE LAWRENCE MFG. CO.	1913/08/16	1/2"=1'	H 31, W 43 CM	INK, COLORED INK	DRAFTING CLOTH
158-086	PROP'S OF LOCKS AND CANALS / PLAN SHOWING / INSTALLATION OF 10"x 5" VENTURI METER / IN DELIVERY PIPE FROM FIRE PUMPS / AT THE LAWRENCE MFG. CO.	1913/08/04	1/2"=1'	H 33.5, W 61.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

158-087	OFFICE OF THE PROPRIETORS OF LOCKS & CANALS ON / MERRIMACK RIVER / 66 BROADWAY-LOWELL, MASS. / [DIAGRAM & SKETCH SHOWING] RATING OF HARVARD UNIVERSITY, METER NOZZLES / MADE BY HERSEY MFG. CO.	1913/08/00	NONE	H 53.5, W 83.2 CM	INK	PAPER
158-089	[UNTITLED.] [4" PIPE IN MERRIMACK STREET LAID BY PROPRIETORS OF THE LOCKS & CANALS FROM WORTHEN STREET TO CITY HALL.]	1893/07/00	1"=20'	H 50, W 76 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
158-090	CHECK VALVE / FOR / PROPRIETORS OF LOCKS & CANALS / ON MERRIMAC RIVER / LOWELL, MASS.	1891/02/17	HALF SIZE	H 67, W 52	INK	DRAFTING CLOTH
158-092	MIDDLESEX COMPANY [PROPOSED AND ACTUAL CHANGES IN THE PIPE LINE FROM WARREN STREET TO NEW BUILDING].	1914/09/30	1"=60'	H 28.8, W 18.7 CM	INK, WATER COLOR	DRAFTING CLOTH
158-093-[A]	DIAGRAM OF / VENTURI FRICTION COEFFICIENT, CF / FOR DIFFERENT / "VENTURI HEADS" / AND / MEASURED IN GALLONS PER MINUTE / OF 6"x3" VENTURI METER NO. 2790 / (HARVARD UNIVERISTY METER).	1914/06/00	NONE	H 57.5, W 61.5 CM	INK	PAPER
158-093-[B]	DIAGRAM / OF / "VENTURI HEAD" / FOR DIFFERENT / READINGS OF MANOMETER IN GALLONS PER MINUTE / & SPECIFIC GRAVITIES OF MERCURY / OF MANOMETER NO. 421 / FOR / 6"x3" VENTURI METER NO. 2790 / (HARVARD UNIVERSITY METER).	1914/06/00	NONE	H 57.5, W 61.5 CM	INK	PAPER

158-094	[DIAGRAM SHOWING CAPACITY IN U.S. GAL. OF UPPER CHAMBER AT SWAMP LOCKS.]	1913/00/00				
158-095-A	PLAN SHOWING SUGGESTED CONNECTIONS BETWEEN THE L.& C. WATER PIPE SYSTEM & THE CITY OF LOWELL SYSTEM AT JACKSON ST. & EAST MERRIMACK ST.	1914/12/00	NONE	H 34.3, W 91.3 CM	INK, COLORED INK	DRAFTING CLOTH
158-095-B	[PLAN SHOWING] SUGGESTED CONNECTIONS BETWEEN / [THE] L.& C. 12" & 16" PIPE [WATER PIPE SYSTEM & THE CITY OF LOWELL SYSTEM AT JACKSON ST. & EAST MERRIMACK ST].	1914/12/22	1/4"&1"=1'	H 61.5, W 74.7 CM	INK, GRAPHITE	DRAFTING CLOTH
158-095-C	[PLAN SHOWING SUGGESTED CONNECTIONS BETWEEN THE L.& C. WATER PIPE SYSTEM & THE CITY OF LOWELL SYSTEM AT JACKSON STREET & EAST MERRIMACK STREET]. SUGGESTED CONNECTION BETWEEN / L. & C. 20" PIPE & CITY OF LOWELL 24" PIPE.	UNDATED	1/4"&1"=1'	H 48.9, W 77.9 CM	INK, COLORED INK	DRAFTING CLOTH
158-095-D	[PLAN SHOWING] SUGGESTED CONNECTION[S] BETWEEN / [THE] L.& C. 16" & CITY OF LOWELL 20" PIPE [WATER PIPE SYSTEM & THE CITY OF LOWELL SYSTEM AT JACKSON STREET & EAST MERRIMACK STREET].	1914/12/24	1/4"&1"=1'	H 51.7, W 76.2 CM	INK	DRAFTING CLOTH

158-096	SKETCH SHOWING GENERAL / LOCATION OF PROPOSED DEAN / VERTICAL TRIPLEX SINGLE ACTING PUMPS NO. 891 FOR SACO-LOWELL SHOPS.	1914/10/31	1/4"=1'	H 47.8, W 76.9 CM	INK, COLORED INK	DRAFTING CLOTH
158-097	END VIEW / OF / 12" O. S. & Y GATE VALVE / SHOWING / 1/2, 1/4, & 3/4 FULL GATE & CLOSED GATE & CORRESPONDING AREAS FOR SAME IN SQ. IN.	1915/11/19	1/2"=1'	H 67.4, W 46.4 CM	INK, COLORED INK	DRAFTING CLOTH
158-098	CROSS SECTIONS / OF / LOCKS & CANALS RESERVOIR / SHOWING / DEPTH OF MUD IN THE RESERVOIR.	1915/07/00	NONE	H 48.9, W 77.9 CM	INK, COLORED INK	DRAFTING CLOTH
158-099	PLAN SHOWING LOCATIONS OF / CROSS SECTIONS OF LOCKS & CANALS RESERVOIR [TAKEN JULY, 1915].	1915/08/03	1"=20'	H 61.6, W 46 CM	INK	DRAFTING CLOTH
158-099-[COPY 1]	[LOCATION OF CROSS SECTIONS OF L.& C. RESERVOIR. TAKEN JULY, 1915].	SEE TITLE			BP	
158-100	DIAGRAM SHOWING WEEKLY COMPARISON OF THE HOURLY RISE & FALL OF THE LOCKS & CANALS RESERVOIR FOR THR FOUR WEEKS ENDING AUGUST 29, 1915.	1915/10/08	NONE	H 40.7, W 49.1 CM	INK, COLORED INK	PAPER
158-101-[A]	METER RATING NOZZLE RATING / HARVARD SET MFG. BY HERSEY MFG. CO.	1913/08/21	NONE	H 28.7, W 22 CM	INK	PAPER
158-101-[B]	EXPERIMENTS AT SWAMP LOCKS.	1913/05/26	NONE	H 29.3, W 22.4 CM	INK	DRAFTING CLOTH
158-101-[C]	OFFICE OF THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER, / DISCHARGE VS. NOZZLE COEFFICIENT.	UNDATED	NONE	H 30, W 23.4 CM	INK	DRAFTING CLOTH
158-101-[D]	VENTURI METER RATING.	UNDATED	NONE	H 30.2, W 23.7 CM	INK	DRAFTING CLOTH

158-101-[E]	METER NOZZLE RATING.	UNDATED	NONE	H 30.6, W 24 CM	INK	DRAFTING CLOTH
158-101-[F]	METER NOZZLE RATING / HARVARD UNIVERSITY.	1913/08/21	NONE	H 28.6, W 22 CM	INK	PAPER
158-101-[G]	METER NOZZLE RATING / HARVARD UNIVERSITY.	1913/08/21	NONE	H 28.6, W 22 CM	INK	PAPER
158-101-[H]	METER NOZZLE RATING / HARVARD UNIVERSITY.	1913/08/21	NONE	H 28.7, W 22 CM	INK	PAPER
158-101-[I]	METER NOZZLE RATING.	UNDATED	NONE	H 29, W 21.5 CM	INK	PAPER
158-101-[J]	DISCHARGE VS. NOZZLE COEFFICIENT.	UNDATED	NONE	H 29.2, W 22.3 CM	INK	PAPER
158-101-[K]	METER NOZZLE RATING / HARVARD UNIVERSITY.	1913/08/21	NONE	H 28.5, W 22.3 CM	INK	PAPER
158-101-[L]	DISCHARGE VS. VENTURI FRICTION COEFFICIENT.	UNDATED	NONE	H 28.5, W 22.3 CM	INK	DRAFTING CLOTH
158-102-[A]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1904/10/14-15	NONE	H 64, W 71 CM	INK	DRAFTING CLOTH
158-102-[B]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1904/10/19	NONE	H 64, W 66 CM	INK	DRAFTING CLOTH
158-102-[C]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1904/08/05	NONE	H 64, W 66 CM	INK	DRAFTING CLOTH
158-102-[D]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1904/10/31-11/05	NONE	H 64, W 71.8 CM	INK	DRAFTING CLOTH
158-102-[E]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1909/07/16	NONE	H 64, W 66 CM	INK	DRAFTING CLOTH

158-102-[F]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1914/08/18-19	NONE	H 64, W 66 CM	INK	DRAFTING CLOTH
158-102-[G]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1915/05/25	NONE	H 64, W 66 CM	INK	DRAFTING CLOTH
158-102-[H]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1905/07/11-12-13	NONE	H 64, W 71.8 CM	INK	DRAFTING CLOTH
158-102-[I]	DIAGRAM[S] / SHOWING FRICTION LOSSES FOR DIFFERENT VELOCITIES / IN 24" PIPE FROM THE RESERVOIR TO PRESCOTT MILL[S]. [1904 TO 1915.]	1906/05/18	NONE	H 64, W 71.8 CM	INK	DRAFTING CLOTH
158-103	SCHEDULE OF PIPE, FITTINGS, VALVES, ETC., TO BE USED FOR CONNECTIONS BETWEEN CITY & LOCKS & CANALS WATER MAINS. [(HALL & RACE STS.)]	1915/10/27	NONE	H 16.2, W 66.5 CM	INK	DRAFTING CLOTH
158-104-[A]	DIAGRAM SHOWING / RESULT OF TEST OF 1 1/2" WORTHINGTON METER # 8390 / TAKEN FROM / STOCK OF LOCKS & CANALS.	1917/06/04	NONE	H 35, W 25.5 CM	INK	DRAFTING CLOTH
158-104-[B]	DIAGRAM SHOWING / RESULTS OF TEST OF 3/4" CROWN METER # 62963.	1916/04/05	NONE	H 23, W 23 CM	INK	DRAFTING CLOTH
158-104-[C]	DIAGRAM SHOWING / RESULT OF TEST OF 1 1/2" WORTHINGTON METER # 8411.	1917/03/22	NONE	H 31.1, W 25.4 CM	INK	DRAFTING CLOTH

158-104-[D]	DIAGRAM SHOWING / RESULTS OF TEST OF 3/4" WORTHINGTON METER # 3400.	1917/03/20	NONE	H 28.1, W 21 CM	INK	DRAFTING CLOTH
158-104-[E]	DIAGRAM SHOWING / RESULTS OF TEST OF 1" NASH METER # 420482.	1917/03/08	NONE	H 33.2, W 33.2 CM	INK	DRAFTING CLOTH
158-104-[F]	DIAGRAM SHOWING / RESULTS OF TEST OF 5/8" HERSEY METER # 686139.	1917/03/12	NONE	H 28, W 21 CM	INK	DRAFTING CLOTH
158-104-[G]	DIAGRAM SHOWING / RESULTS OF TEST OF 1" WORTHINGTON METER # 22434.	1916/03/27	NONE	H 26.8, W 28 CM	INK	DRAFTING CLOTH
158-104-[H]	DIAGRAM SHOWING / RESULTS OF TEST OF 5/8" CROWN METER # 77486.	1916/03/17	NONE	H 29.4, W 29.8 CM	INK	DRAFTING CLOTH
158-104-[I]	DIAGRAM SHOWING / RESULTS OF TEST OF 4" GEM METER # 386516.	1916/03/24	NONE	H 31.6, W 33.2 CM	INK	DRAFTING CLOTH
158-104-[J]	DIAGRAM SHOWING / RESULTS OF TEST OF 1 1/2" WORTHINGTON METER # 28760.	1916/03/29	NONE	H 33.2, W 31.8 CM	INK	DRAFTING CLOTH
158-104-[K]	DIAGRAM SHOWING / RESULTS OF TEST OF 4" WORTHINGTON METER # 307213.	1916/03/21	NONE	H 31.8, W 33 CM	INK	DRAFTING CLOTH
158-104-[L]	DIAGRAM SHOWING / RESULTS OF TEST OF 2" GEM METER # 623376.	1916/03/15	NONE	H 34.6, W 34.6 CM	INK	DRAFTING CLOTH
158-105	[SKETCH SHOWING] AUTOMATIC SPRINKLER SUPPLY / FOR / BAGSHAW ADDITION.	1917/01/15	1"=40'	H 21.8, W 8 CM	INK, COLORED PENCIL	TRACING PAPER
158-106	SKETCH SHOWING LOCATION OF GAUGES WITH / PIPE & SPECIALS USED IN EXPERIMENTS PREVIOUS TO JAN. 3, 1915 [IN L.& C. YARDS].	1916/01/17	1/2"=1'	H 42.3, W 56.2 CM	INK, COLORED INK, COLORED PENCIL	TRACING PAPER
158-107	PLAN SHOWING / CITY 4" WATER PIPE ON / [RUNNING TO] AIKEN ST. DUMP / USED [BY THE CITY OF LOWELL] FOR EXTINGUISHING FIRES.	1917/02/15	1"=50'	H 35.5, W 62 CM	INK	DRAFTING CLOTH

158-107-[COPY 1]	SKETCH SHOWING 4" WATER PIPE RUNNING TO " AIKEN ST. DUMP" TO BE USED BY THE / CITY OF LOWELL FOR EXTINGUISHING FIRES.	1917/02/15	NONE	H 18, W 49.5 CM	INK, PENCIL	TRACING PAPER
158-107-[COPY 2]	PLAN SHOWING / CITY 4" WATER PIPE ON / AIKEN ST. DUMP / USED FOR EXTINGUISHING FIRES.	1925/05/25	1"=50'	H 35.5, W 61.6 CM	BLUEPRINT	PAPER
158-108	SKETCH [SHOWING] OF PIPES ON DUMMER ST.	1916/08/16	1"=10'	H 23.4, W 33 CM	INK, COLORED INK	DRAFTING CLOTH
158-109	SACO LOWELL SHOPS-LOWELL, MASS. / SKETCH SHOWING PRESENT LOCATION / OF A 12" CONNECTION BETWEEN NEW PUMPS & LOCKS & CANALS 16" MAIN.	1915/04/00	1"=10'	H 38.2, W 66.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
158-110	SKETCH SHOWING LOCATION OF PIPES & GAUGES / USED FOR MEASURING LOSS OF PRESSURE IN 8" / GATE VALVES LIKE 12" PROPOSED / FOR CONNECTIONS WITH CITY OF LOWELL SYSTEM.	1916/01/06-07	1/2"=1'	H 43.4, W 64.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-110-A	SKETCH TO ACCOMPANY SHEETS ENTITLED "LOSS OF / PRESSURE THRU 8" PIPE WITH 2-POSITIVE GATES & / 2-CHECK VALVES."	1916/01/06-07	1/2"=1'	H 43.4, W 64.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-111	SKETCH SHOWING / PLAN OF PIPE & FITTINGS TO BE USED [FOR MEASURING LOSS OF PRESSURE IN 8" GATE VALVES LIKE 12" PROPOSED FOR CONNECTIONS WITH CITY OF LOWELL SYSTEM. ALSO PLAN OF PIPE & FITTINGS TO BE USED] IN / EXPERIMENTS AT FACTORY MUTUAL LAB.	1915/12/04	1/4"=1'	H 42, W 47 CM	GRAPHITE	TRACING PAPER

158-112-[A]	DIAGRAM SHOWING LOCATION / OF / PRESSURE GAUGES ON 8" PIPE / IN / FACTORY MUTUAL LABORATORY.	1916/01/00	NONE	H 29.2, W 45.8 CM	INK	PAPER
158-112-[B]	DIAGRAM SHOWING LOCATION / OF / PRESSURE GAUGES ON 8" PIPE / IN / FACTORY MUTUAL LABORATORY.	1916/01/03	NONE	H 29, W 43.8 CM		PAPER
158-112-[C]	DIAGRAM SHOWING LOCATION / OF / PRESSURE GAUGES ON 8" PIPE / IN / FACTORY MUTUAL LABORATORY.	1916/01/04	NONE	H 29, W 43.8 CM		PAPER
158-112-[D]	DIAGRAM SHOWING LOCATION / OF / PRESSURE GAUGES ON 8" PIPE / IN FACTORY MUTUAL LABORATORY.	1916/01/06-07	NONE	H 29, W 43.8 CM		PAPER
158-113-[A]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/15	NONE	H 29.2, W 45.8 CM	INK	PAPER
158-113-[A]-[COPY 1]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/15	NONE	H 29.2, W 45 CM	BLUE LINE PRINT	PAPER
158-113-[A]-[COPY 2]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/15	NONE	H 29.2, W 44 CM	BLUE LINE PRINT	PAPER
158-113-[B]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/15	NONE	H 29.2, W 44 CM	BLUE LINE PRINT, INK, COLORED INK	PAPER
158-113-[C]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/19	NONE	H 29.2, W 44 CM	BLUE LINE PRINT, INK, COLORED INK	PAPER

158-113-[D]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/22	NONE	H 29.2, W 44 CM	BLUE LINE PRINT, INK, COLORED INK	PAPER
158-113-[E]	DIAGRAM SHOWING LOCATION OF / PRESSURE GAUGES ON 10" PIPE / IN P.L.& C. YARD.	1915/12/24	NONE	H 29.2, W 44 CM	BLUE LINE PRINT, INK, COLORED INK	PAPER
158-114	SKETCH SHOWING / PROPOSED 6" & 8" PIPES / IN JACKSON AND REVERE STREETS / FOR APPLETON COMPANY.	1918/10/23	1"=40'	H 35.9, W 25.7 CM	INK, COLORED INK	DRAFTING CLOTH
158-115-[A]	SCHEDULE OF GATES IN LOCKS & CANALS PIPE SYSTEM. / NOTE TO ACCOMPANY MAP SHOWING WATER MAINS OF LOCKS & CANALS OF JAN. 24, 1906. / REVISED TO JAN. 24, 1910.	1910/01/24	NONE	H 39, W 69.2 CM	RED LINE PRINT	CLOTH BACKED PAPER
158-115-[B]	SCHEDULE OF GATES / IN LOCKS & CANALS PIPE SYSTEM. / FEBRUARY 8, 1920. REVISED JULY 1934.	1934/07/00	NONE	H 39.7, W 70 CM	INK	DRAFTING CLOTH
158-115-[C]	SCHEDULE OF GATES IN LOCKS & CANALS PIPE SYSTEM. / NOTE TO ACCOMPANY MAP SHOWING WATER MAINS OF LOCKS & CANALS OF JAN. 24, 1906. / REVISED TO JAN. 24, 1910.	1910/01/24	NONE	H 39, W 69.2 CM	RED LINE PRINT	CLOTH BACKED PAPER
158-115-[D]	SCHEDULE OF GATES IN LOCKS & CANALS PIPE SYSTEM. / FEBRUARY 8, 1920.	1920/02/08	NONE	H 39, W 68.7 CM	BLUEPRINT	PAPER
158-116	[SCHEDULE OF GATES AND LOCATION OF SAME SHOWN ON MAP OF WATER MAIN SYSTEM. REVISED TO 1919.]	1919/00/00				

158-117	SKETCH SHOWING / PROPOSED CONNECTION BETWEEN CITY OF LOWELL / & L.& C. WATER MAINS AT THE / CORNER OF HALL & RACE STREETS.	1917/08/27	1"=1', 1/4"=1'	H 59.1, W 112.7 CM	INK	DRAFTING CLOTH
158-118	PLAN [& PROFILE] SHOWING LOCATION / OF / L.& C. 12" MAIN ON WORTHEN ST. / SUPPLYING FIRE APPARATUS FOR KITSON PLANT / OF / SACO LOWELL SHOPS.	1917/05/29	H1"=40',V 1"=10'	H 31.2, W 75.2 CM	INK, COLORED INK	DRAFTING CLOTH
158-119	SKETCH SHOWING / PIPES LAID FOR AUTOMATIC SPRINKLERS FOR / NEW WEAVE SHED / FOR / TREMONT & SUFFOLK MILLS.	1918/05/23	1"=40'	H 28.3, W 59.7 CM	INK, COLORED INK	DRAFTING CLOTH
158-120	APPLETON COMPANY / 8" PIPE OVER RACEWAY OF NO. 2-3-4 WHEELS.	1918/08/30	1 1/2" & 1/4"=1'	H 31.1, W 24.8 CM	INK	DRAFTING CLOTH
158-121	SKETCH SHOWING I BEAMS / SUPPORTING L.& C. 12" PIPE / OVER MIDDLESEX FEEDER.	1918/09/27	3/8"=1'	H 21.7, W 28 CM	INK, WATER COLOR	DRAFTING CLOTH
158-122	SKETCH SHOWING / PROPOSED LOCATION OF 16" MAIN FROM / SACO-LOWELL SHOPS TO OLD GUARD LOCKS. / NOTE 16" MAIN TO BE USED AS PUMP / SUCTION WHEN CANAL IS EMPTY.	1917/06/07	1"=250'	H 24.1, W 76.8 CM	INK, COLORED INK, COLORED PENCIL	PAPER
158-123	SKETCH SHOWING / PROPOSED LOCATION OF FIRE PUMPS / IN TREMONT & SUFFOLK MILL YARD.	1917/06/11	1"=40'	H 24.5, W 76.5 CM	INK, COLORED PENCIL	PAPER
158-124	SKETCH SHOWING PROPOSED CHANGE IN / HYDRANTS NEAR BLUE DYE HOUSE OF HAMILTON MFG. CO.	1917/08/08	1"=40'	H 17.8, W 26.4 CM	INK, COLORED INK	DRAFTING CLOTH
158-125	[TRACING OF] FAIRBANKS CHECK VALVE.	1915/11/23	NONE	H 71.1, W 50.1 CM	GRAPHITE	DRAFTING CLOTH

158-126	[PLAN &] SECTIONS IN EASTERN CANAL / NEAR MASS. WASTEWAY [COTTON MILLS] / SHOWING ELEVATIONS ON L.& C. / 12" PIPE [LINE].	1919/05/27	1"=10'	H 62.9, W 38.2 CM	INK, COLORED INK	DRAFTING CLOTH
158-126-A	SECTIONS IN EASTERN CANAL / NEAR MASSACHUSETTS WASTEWAY / SHOWING ELEVATIONS ON L.& C. 12" PIPE [PROPOSED NEW GRADES IN BOTTOM OF CANAL]..	1919/05/27	1"=10'	H 62.6, W 38.2 CM	BLUEPRINT	PAPER
158-127	HAMILTON MFG. CO. / SKETCH SHOWING LOCATION OF NEW HYDRANT ON THE CORNER OF JACKSON & WEBSTER STS.	1919/03/24	1"=40'	H 19.4, W 40.3 CM	INK	DRAFTING CLOTH
158-128	[DIAGRAM SHOWING] FIRE LOSSES IN LOWELL MILLS 1908 TO 1920.	1917/11/00	NONE	H 28.7, W 21.6 CM	INK	PAPER
158-129	SKETCH SHOWING PORTION OF / PRESCOTT YARD / WHERE 8" PIPE BURST FEB. 15, 1918.	1918/02/23	1"=40'	H 28, W 21.6 CM	INK	TRACING PAPER
158-130	LAWRENCE MFG. CO. / SKETCH SHOWING CHANGES IN PIPE LINES / AT THE ENGINE ROOM ANNEX.	1918/04/06	1/4"=1'	H 28, W 21.5 CM	INK	TRACING PAPER
158-131	[SKETCH SHOWING] APPLETON CO. / [LOCATION OF] 6" PIPE TURBINE ROOM BASEMENT.	1919/06/10	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-132	ARRANGEMENT OF PRESSURE PIPING / FOR 30" REVERSIBLE FLOW METERS / BALTIMORE CITY WATER WORKS. / BUILDERS IRON FOUNDRY, / PROVIDENCE, R.I.	1902/12/03	NONE	H 89, W 60 CM	BLUEPRINT	PAPER

158-133	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FEET / IN 12" CAST IRON PIPES.	1921/01/15	NONE	H 35.9, W 28 CM	INK	DRAFTING CLOTH
158-134	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 12" CAST IRON PIPES.	1931/01/13	NONE	H 43, W 36 CM	INK, GRAPHITE	PAPER
158-135	PLAN SHOWING LAND [IN VICINITY] OF / LOCKS & CANALS AT [OLD] GUARD LOCKS [SHOWING PROPOSED EXTENSION OF R. R. TRACKS].	1920/05/13	1"=40'	H 30.2, W 48.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
158-136	PLAN SHOWING / PROPOSED 16" PUMP [& PIPE] LINE[S] / [FROM WORTHEN ST.] TO OLD GUARD LOCKS.	1920/05/07	1"=100'	H 57.2, W 109.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
158-137	CHART SHOWING BEHAVIOR OF RESERVOIR [IN INCHES] / FOR ONE WEEK OF JANUARY 1917 TO 1920 / ALSO / NIGHT USE & LEAKAGE.	1920/02/25	NONE	H 53.8, W 41 CM	INK, COLORED INK	PAPER
158-138	[DIAGRAMS SHOWING] PROPRIETORS OF THE LOCKS & CANALS / PLOTTING OF AUTOMATIC GAUGES AT / L.& C. RESERVOIR [ON] "LYNDES HILL" [FOR 6 MOS. PEROD IN 1914].	SEE NOTES	NONE	H 35.6, W 40.8 CM	INK, COLORED INK	PAPER
158-139	MERRIMACK MFG. CO. / [PLAN SHOWING] SOUNDING IN # 7 TAILRACE [OF MERRIMACK MFG. CO. FOR THE PURPOSE OF INSTALLING CENTRIFUGAL PUMP.]	1920/09/00	1"=10'	H 50.3, W 60.4 CM	INK, COLORED INK	DRAFTING CLOTH
158-140	DATA ON [DIAGRAM SHOWING FRICTION LOSS IN 24"] PIPE LINE [FROM 1904-1920].	1920/09/02	NONE	H 28.3, W 32.2 CM	INK	DRAFTING CLOTH

158-141	SKETCH SHOWING WALL / BETWEEN L.& C. RESERVOIR / LOT & BELMONT AVENUE.	1914/04/23	NONE	H 20.1, W 79.8 CM	INK, COLORED INK	DRAFTING CLOTH
158-142	DIAGRAM SHOWING / AVERAGE WEEKLY PUMPING AND / AMOUNT ACCOUNTED FOR FROM 1915 TO 1928 / PROPRIETORS OF THE LOCKS & CANALS.	1924/01/08	NONE	H 20, W 40.5 CM	INK	PAPER
158-143	CHART SHOWNG / READINGS OF 12"x 4" / VENTURI METER / ON L.& C. SYSTEM [FROM THE TEST ON NOV. 13 & 14 & NOV. 16 & 17, 1922.]	SEE TITLE	NONE	H 26, W 71.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-143-A	CHART SHOWING / READINGS OF 12"x 4" / VENTURI METER / ON L.& C. SYSTEM.	SEE NOTES	NONE	H 26, W 71.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-144-[A]	SKETCH SHOWING PROPOSED LOCATION OF / L.& C. 12" WATER MAIN BETWEEN / SACO-LOWELL SHOPS NO. 7 & APPLETON CO.'S / MILL NO. 2.	1914/08/00	NONE	H 27, W 45.8 CM	INK, COLORED INK	PAPER
158-144-[B]	SKETCH SHOWING PROPOSED CHANGE / IN L.& C. 12" PIPE FROM SACO-LOWELL / SHOP NO. 7 TO APPLETON CO.'S NO. 2 MILL.	1913/06/25	NONE	H 12.7, W 46.6 CM	BLUEPRINT	PAPER
158-145	MASS. COTTON MILLS / 12" DISCHARGE LINE FOR STEAM PUMP AND / SPRINKLER LINE FOR SECTION NO. 11.	1921/04/26	1"=10'	H 24, W 34.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
158-145	[DIAGRAM SHOWING CALIBRATION OF PRESSURE GAUGE D.]	1921/07/14				
158-146	[DIAGRAM SHOWING CALIBRATION OF PRESSURE GAUGE G.]	1921/07/14				

158-146-[COPY 1]	PHOTOGRAPHS / OF / MILL YARD PLANS / AS COMPILED BY INSURANCE COMPANIES / LOWELL, MASS.	1921/04/00	NONE	H 16.5, W 31.5 CM	PHOTOGRAPHIC PRINT	PAPER
158-146-[COPY 2]	PHOTOGRAPHS / OF / MILL YARD PLANS / AS COMPILED BY INSURANCE COMPANIES / LOWELL, MASS.	1921/04/00	NONE	H 26, W 31.5 CM	PHOTOGRAPHIC PRINT	PAPER
158-147	PLAN SHOWING PROPOSED / PIPE LINE BETWEEN / GUARD LOCKS & KITSON FOUNDRY.	1922/04/24	1"=40'	H 75.6, W 96.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
158-148	OLD GUARD LOCKS / USE & LEAKAGE OF WATER USED FOR OPERATING HYDRAULIC GATES.	1922/06/00	NONE	H 45.9, W 29.2 CM	INK, COLORED PENCIL	PAPER
158-149-[A]	[UNTITLED.] [CAST IRON PIPE PRICES PER TON OF 2000 LBS.]	SEE NOTES	NONE	H 18.1, W 78.8 CM	INK	PAPER
158-149-[B]	CAST IRON PIPE PRICES / PER TON OF 2000 LBS.	SEE NOTES	NONE	H 18.2, W 75.7 CM	INK	PAPER
158-150	[UNTITLED.] [DIAGRAM SHOWING AMOUNT OF WATER PUMPED, PER CENT METERED & AMOUNT METERED. JAN. TO JUNE, 1922].	1922/00/00	NONE	H 32, W 29 CM	INK, COLORED INK	PAPER
158-151	CHART SHOWING / NIGHT DROP OF RESERVOIR IN INCHES / FOR DATES GIVEN [IN 1922].	1922/00/00	NONE	H 29.2, W 55.9 CM	INK, WATER COLOR	PAPER
158-152-[A]	BOOTT MILLS. / PLAN SHOWING [PROPOSED SCHEME FOR LOWERING] RIVER SUCTION OF 2000 GALLON CENTRIFUGAL PUMP.	1922/08/22	1"=10'	H 34.4, W 54.9 CM	INK, COLORED INK	DRAFTING CLOTH

158-152-[B]	BOOTT MILLS. / PLAN SHOWING PROPOSED SCHEME / FOR LOWERING RIVER SUCTION OF / 2000 GALLON CENTRIFUGAL PUMP. SCHEME 1.	1922/08/22	1"=10'	H 33, W 53.8 CM	RED LINE PRINT	PAPER
158-152-[C]	BOOTT MILLS. / PLAN SHOWING PROPOSED SCHEME / FOR LOWERING RIVER SUCTION OF / 2000 GALLON CENTRIFUGAL PUMP. SCHEME 2.	1923/10/24	1"=10'	H 33.1, W 54.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-152-[D]	BOOTT MILLS. / PLAN SHOWING PROPOSED SCHEME / FOR LOWERING RIVER SUCTION OF / 2000 GALLON CENTRIFUGAL PUMP. SCHEME 3.	1923/10/24	1"=10'	H 33.1, W 54.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-153	[DIAGRAM SHOWING] CALIBRATION OF PRESSURE GAUGE G.	1922/09/08	NONE	H 29.3, W 45.8 CM	INK	PAPER
158-154	PLAN SHOWING / OLD 8" PIPE ON WORTHEN ST.	1922/11/24	1"=100'	H 77.8, W 32.5 CM	INK	DRAFTING CLOTH
158-155	RESERVOIR CHECK VALVES.	1923/01/13	1/4"=1'	H 37.8, W 22.9 CM	INK	DRAFTING CLOTH
158-156	PLAN / SHOWING LOCATION / OF HYDRANTS ON FAIRMOUNT STREET / & VICINITY / PROPOSED 2 L.& C. HYDRANTS IN RED.	1923/04/25	1"=100'	H 27.4, W 56.5 CM	INK	DRAFTING CLOTH
158-157	PLAN SHOWING PORTION OF / IPSWICH & MIDDLESEX YARDS.	1923/07/05	1"=40'	H 21, W 36.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-158	PLAN SHOWING LOCATION / OF CITY 8" LINE UNDER / EASTERN CANAL.	1923/10/19	NONE	H 44.8, W 35.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
158-159	PLAN SHOWING / 6" & 10" SEWER OF SACO-LOWELL SHOPS / FROM FORGE SHOP TO DUTTON STREET.	1923/11/21	SEE NOTES	H 55, W 48 CM	INK, COLORED INK	DRAFTING CLOTH

158-161	DIAGRAM SHOWING / AMOUNT OF WATER ACCOUNTED FOR & UNACCOUNTED FOR / [FROM] 1915 TO 1928. / PROPRIETORS OF THE LOCKS & CANALS.	1924/10/12	NONE	H 45.7, W 40.7 CM	INK	PAPER
158-162	DIAGRAM SHOWING / FIRE LOSSES IN / CITY OF LOWELL / & THE / L. & C. CORPORATIONS [FROM 1907 TO MARCH, 1923].	1923/03/00	NONE	H 53.7, W 58 CM	INK	PAPER
158-163	[FACTORY MUTUAL INSURANCE COS.] PLAN OF WATER PIPING / OF / LOCKS & CANALS SYSTEM. / LOWELL, MASS.	1917/09/15	1"=200'	H 69, W 56.2 CM	LITHOGRAPH, WATER COLOR	PAPER
158-164	SLIPPAGE OF DUPLEX PUMPS / AT COOKS WELLS PUMPING STATION / CITY OF LOWELL.	1925/02/25	NONE	H 21.6, W 30.2 CM	BLUEPRINT	PAPER
158-165	[MAP SHOWING] GENERAL PLAN OF / COOK WELLS PUMP TEST / CITY OF LOWELL.	1925/02/25	1"=500'	H 28, W 21.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-166	LOWELL WATER WORKS / BOULEVARD PURIFICATION PLANT / DETAILS OF / SETTLING BASINS, SAND FILTERS & / FILTERED WATER RESERVOIR CONCRETE.	1914/07/00	1"=2'	H 66.1, W 91.2 CM	BLUEPRINT	PAPER
158-167	PLAN SHOWING / [MAP OF LOWELL & DRACUT] PROPOSED HIGH SERVICE RESERVOIR / ON / WHORTLEBERRY HILL DRACUT / FOR / LOWELL, MASS.	1924/12/00	1/8"=200'	H 42.6, W 57.2 CM	INK	DRAFTING CLOTH
158-168	[SKETCH SHOWING] STEEL [REQUIRED] FOR 24-INCH PIPE BRIDGE / [ON EAST MERRIMACK ST.] L.& C.	1929/09/16	1 1/2"=1'	H 40.4, W 48.6 CM	GRAPHITE	PAPER

158-169	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FEET / IN 6" & 8" PIPES OF / LOCKS & CANALS SYSTEM.	1924/04/00	NONE	H 43.9, W 56.9 CM	INK	PAPER
158-170	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN VARIOUS SIZES OF CAST IRON PIPES.	1924/02/18	NONE	H 44.8, W 29.2 CM	INK	PAPER
158-171	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 6" & 8" PIPES OF LOCKS & CANALS SYSTEM.	1924/04/00	NONE	H 45.8, W 29.2 CM	INK	PAPER
158-172	[DIAGRAM SHOWING] FRICTION LOSS / IN 24" PIPE LINE.	SEE NOTES	NONE	H 29.3, W 25.8 CM	INK	PAPER
158-173-[A]	VENTURI METER EXPERIMENTS / BY / PROPRIETORS OF LOCKS & CANALS / AT THE SWAMP LOCKS & CANALS / LOWELL, MASS.	SEE NOTES	NONE	H 21.7, W 30.6 CM	INK	PAPER
158-173-[B]	VENTURI METER EXPERIMENTS / BY / PROPRIETORS OF LOCKS & CANALS / AT THE SWAMP LOCKS / LOWELL, MASS.	SEE NOTES	NONE	H 21.7, W 30.6 CM	INK	PAPER
158-173-[C]	SETTING FOR / VENTURI METER EXPERIMENTS / BY / PROPRIETORS OF LOCKS & CANALS / AT THE SWAMP LOCKS / LOWELL, MASS.	SEE NOTES	1"=20'	H 21.7, W 30.6 CM	INK	PAPER
158-174	LOCKS & CANALS / 24" PIPE / COEFFICIENT "C" / IN FORMULA V=C SQAURE ROOT OF RS.	1922/02-03/00	NONE	H 54, W 64.5 CM	INK, GRAPHITE	PAPER, TRACING PAPER
158-175	PROFILE ALONG # 1 & 2 PENSTOCKS & SUCTION PIPES OF TRIPLEX PUMPS [AT SACO-LOWELL SHOPS].	1920/01/20	H1"=20', V1"=10'	H 14.7, W 77.9 CM	INK	DRAFTING CLOTH
158-176	CHART SHOWING BEHAVIOR OF RESERVOIR / FOR TWO WEEKS IN 1920, & COMPARISON IN / NIGHT USE & LEAKAGE.	UNDATED	NONE	H 54, W 41.2 CM	INK, COLORED INK	DRAFTING CLOTH

158-177	PLAN SHOWING CONTOURS / OF / LOCKS & CANALS / RESERVOIR LOT.	1920/11/14	1'=20'	H 66.4, W 59.1 CM	INK, COLORED INK	DRAFTING CLOTH
158-178	CHART SHOWING / RESERVOIR READINGS FOR MARCH 1920 & 1921.	SEE TITLE	NONE	H 38.2, W 50.9 CM	INK, COLORED INK	PAPER
158-179	[ELEVATION SHOWING SUCTION PIPES FOR] SACO-LOWELL YARD [1 & 2 PUMPS].	UNDATED	NONE	H 21.7, W 75 CM	INK, WATER COLOR	DRAFTING CLOTH
158-180	PLAN OF PART / OF / GILLESPIE MANUFACTURING CO. / SHOWING LOCATION OF PIPES, / TANK & PUMP.	1919/06/13	1"=20'	H 34, W 45.5 CM	INK, COLORED INK	DRAFTING CLOTH
158-181	PLAN SHOWING / MAIN PIPE LINES / OF THE / FIRE PROTECTION SYSTEM / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1939/12/18	1/2"=100'	H 58.7, W 94 CM	INK	DRAFTING CLOTH
158-181-[COPY 1]	PLAN SHOWING / MAIN PIPE LINES / OF THE / FIRE PROTECTION SYSTEM / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1939/12/18	1/2"=100'	H 60.7, W 92 CM	BLUE LINE PRINT	PAPER
158-182-[A]	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS.	SEE NOTES	1/4"=50'	H 72.4, W 96.5 CM	INK, COLORED PENCIL	PAPER
158-182-[B]	PIPES; UNDER BRIDGES AND IN BOTTOM OF CANALS, / BELONGING TO LOCKS AND CANALS. LOCATION OF PIPES, ETC.	1920/08/10	NONE	H 21.5, W 28 CM	INK	PAPER

158-183	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS. [SYSTEM PLAN SHOWING HYDRANTS OUTSIDE CORPORATION YARDS.]	1912/07/00	3/16"=50'	H 65.1, W 92.8 CM	LITHOGRAPH, WATER COLOR	PAPER
158-184	[PLAN SHOWING LOCKS AND CANALS RESERVOIR AND TAKINGS BY CITY OF LOWELL FOR WATER WORKS PURPOSES AS OF SEPT. 1, 1934.]	1937/04/12	1"=25'		BLUEPRINT	
158-185	PIPE CHANGES / ON / CANAL STREET.	1928/04/01	1"=40'	H 21.6, W 35.7 CM	INK	DRAFTING CLOTH
158-186	SKETCH SHOWING / USE OF LOCKS & CANALS / RESERVOIR WATER / IN / RIGGS & LOMBARD'S SHOP / "LAWRENCE YARD."	1939/01/12	1"=20'	H 24.1, W 43.3 CM	INK	DRAFTING CLOTH
158-187	SKETCH SHOWING / LOCATION OF METERS / USING LOCKS & CANALS WATER / AT THE / NEWMARKET MANUFACTURING CO.	1939/10/28	1"=40'	H 26, W 52.7 CM	INK, WATER COLOR	DRAFTING CLOTH
158-188	[CITY OF LOWELL] 1937-1938 / MAP OF / WATER DISTRIBUTION SYSTEM.	1938/00/00	1"=1000'	H 59, W 89.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-189	PLAN / SHOWING PROPOSED LOCATION OF / CITY OF LOWELL WATER PIPE / ON BRIDGE OVER PAWTUCKET CANAL / PAWTUCKET STREET, LOWELL, MASS.	1931/07/00	1"=4'	H 31.6, W 89 CM	BLUEPRINT	PAPER
158-190	SKETCH SHOWING / 8" PIPE LINE IN OPEN AREA / BETWEEN / MILL NO. 4 & MILL NO. 5 WEST / BOOTT MILLS.	1940/09/06	1"=20'	H 30.8, W 54.3 CM	INK, WATER COLOR	DRAFTING CLOTH

158-191	[UNTITLED.] [MAP OF PART OF CITY OF LOWELL WATER DISTRIBUTION. LOWELL SERVICE RESERVOIR TO BELVEDERE.]	UNDATED	1"=1000'	H 25.4, W 19.5 CM	INK, COLORED INK	DRAFTING CLOTH
158-192	PLAN SHOWING / PROPOSED PIPE CHANGES / ON FIRE PROTECTION SYSTEM / SACO-LOWELL SHOPS.	1942/09/00	1"=40'	H 45.5, W 72.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
158-192-[COPY 1]	PLAN SHOWING / PROPOSED PIPE CHANGES / ON FIRE PROTECTION SYSTEM / SACO-LOWELL SHOPS.	1942/09/00	1"=40'	H 44.5, W 71 CM	BLUEPRINT, COLORED INK	PAPER
158-193	[PLAN OF] SACO-LOWELL SHOPS [AND KITSON PLANT] / PUMPS [SHOWING SOURCES OF POWER FOR OPERATING SAME].	1940/04/15	1"=125+-	H 29.6, W 63.2 CM	BLUEPRINT	PAPER
158-194	PROPOSED / SPILLWAY & 12" PIPE OVERFLOW / FOR / LOCKS & CANALS RESERVOIR.	1942/03/31	1"=40'& 20'	H 43.2, W 67.4 CM	INK, COLORED INK	DRAFTING CLOTH
158-195	PROPOSED / DETAILS FOR CHAIN LINK FENCE / AT / LOCKS & CANAL RESERVOIR.	1941/03/00	1"& 1/8"=1'	H 70.2, W 75 CM	GRAPHITE	PAPER
158-196	PLAN & ELEVATIONS / OF / PIPING TO AUTOMATIC GAUGE TRANSMITTED / AT L.& C. RESERVOIR.	1942/04/00	SEE NOTES	H 55.3, W 71.2 CM	INK, WATER COLOR	DRAFTING CLOTH
158-197	PLAN & ELEVATION / OF / PROPOSED 12" OVERFLOW PIPE / FROM / LOCKS & CANALS RESERVOIR SPILLWAY.	1946/01/00	1"=12 2/3'& 5.O7'	H 53.4, W 117 CM	INK	PAPER
158-197-[COPY 1]	PLAN & ELEVATION / OF / PROPOSED 12" OVERFLOW PIPE / FROM / LOCKS & CANALS RESERVOIR SPILLWAY.	1946/01/00	1"=12 2/3'& 5.07'	H 27, W 58.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER

158-198	PLAN SHOWING / PORTION OF LOCKS & CANALS / FIRE PROTECTION SYSTEM / JACKSON PROPERTIES.	1946/04/00	1"=40'	H 40, W 61.7 CM	INK, WATER COLOR	DRAFTING CLOTH
158-199	PLAN & SECTIONS / OF / SPILLWAY, CURB & FENCE / AT L.& C. RESERVOIR.	1943/03/00	1/4"=1'	H 59.2, W 81 CM	INK	DRAFTING CLOTH
158-200	PLAN OF / TOWN OF LOWELL / SHOWING / LOWELL MILLS / IN / 1832.	1947/03/00	1"=500'	H 54.7, W 69.4 CM	INK, WATER COLOR	DRAFTING CLOTH
158-201	PLAN SHOWING / FIRE PROTECTION / FOR / LOWELL MILLS ABOUT 1850.	1947/06/00	1"=200'	H 58.8, W 93.4 CM	INK, WATER COLOR	DRAFTING CLOTH
158-202	PLAN SHOWING / FIRE PROTECTION / FOR LOWELL MILLS ABOUT 1878.	1947/04/00	1"=200'	H 64.8, W 89.6 CM	INK, WATER COLOR	DRAFTING CLOTH
158-203	PLAN SHOWING / FIRE PROTECTION / FOR / LOWELL MILLS ABOUT 1904.	1947/06/00	1"=200'	H 58.8, W 93.4 CM	INK, WATER COLOR	DRAFTING CLOTH
158-204	PLAN SHOWING / WATER MAINS ETC. / OF THE LOCKS & CANALS / FIRE PROTECTION SYSTEM.	1952/01/02	1'=20'	H 40, W 53.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-205	PLAN & SECTIONS / SHOWING / 14" SUCTION PIPE OF FIRE PUMP / BELONGING TO JACKSON PROPERTIES.	1947/06/16	1"=40'& 10'	H 39.7, W 35 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
158-206	PLAN & ELEVATION / CONCRETE SPILLWAY & 12" OVERFLOW PIPE.	1949/06/27	1"=10'& 5'	H 58.8, W 129 CM	INK	DRAFTING CLOTH
158-207	PLAN AND SECTIONS / OF THE / 1000 G.P.M. CENTRIFUGAL PUMP / BELONGING TO / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS..	1957/04/15	1/4"=1'M 1/8"=1'	H 58, W 80 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

158-208	PLAN SHOWING / PROPOSED CHANGES IN PIPE LINES / OF FIRE PROTECTION SYSTEM, FOR / PELLON CORP.	1959/04/21	1"=10'	H 51.8, W 72.2 CM	INK, WATER COLOR	DRAFTING CLOTH
158-209	PLAN SHOWING / PROPOSED NEW 6" SPRINKLER LINE / FOR PELLON CORP.	1954/08/02	1"=10'	H 41, W 63.4 CM	INK, COLORED INK	DRAFTING CLOTH
158-210	PROCESS WATER PIPE LINE / FOR / SYDNEY CORPORATION.	1958/04/14	1/4"=1'	H 28, W 43.5 CM	INK	PAPER
158-210-[COPY 1]	PROCESS WATER PIPE LINE / FOR / SYDNEY CORPORATION.	1958/04/14	1/4"=1'	H 28, W 42 CM	BLUEPRINT, COLORED PENCIL	PAPER
158-211	PLAN SHOWING / 6" STEAM PIPE AS INSTALLED / FOR PELLON CORP.	1954/08/20	1"=40'	H 31.4, W 79.4 CM	INK, COLORED INK	DRAFTING CLOTH
158-212	PROPOSED CHANGES / IN / FIRE PROTECTION SUPPLY LINES / FOR / COURIER CITIZEN CO.	1956/03/18	1"=40'	H 28.3, W 42.6 CM	INK, COLORED INK	PAPER
158-213	PROPOSED STEAM LINE / FOR / STRAND BUILDING.	1956/09/06	1"=20'	H 40, W 53.6 CM	INK, COLORED INK	DRAFTING CLOTH
158-214	SCHEME # 1 / PLAN SHOWING / PROPOSED DISCONTINUANCE OF / LOCKS & CANALS FIRE PROTECTION PIPES IN / MARKET STREET PARKING AREA.	1959/01/19	1"=40'	H 38.1, W 66 CM	GRAPHITE, COLORED PENCIL	PAPER
158-215	PLAN SHOWING / PROPOSED STEAM LINE / FOR PELLON CORP.	1954/04/26	1"=40'	H 31.9, W 79.8 CM	INK, COLORED INK	DRAFTING CLOTH
158-216	LAWRENCE PUMP & ENGINE CO., LAWRENCE, MASS. [DOUBLE SUCTION HORIZONTAL SPLIT SHELL PUMP].	1956/11/20	NONE	H 36.3, W 42.9 CM	BLUE LINE PRINT	PAPER
158-217	ARRANGEMENT / LARGE-HD-A.C.B. / TERMINAL LUG. [L. I. D. CO. TIE LINE BREAKERS.]	1948/01/23	1/8"=1'	H 21.9, W 28 CM	BLUE LINE PRINT	PAPER

158-218	UPPER & LOWER TERMINALS / FOR LARGE TYPE HD / 1600-8000 AMPS 3-POLE. [L. I. D. CO. TIE LINE BREAKERS.]	1944/10/04	NONE	H 21.6, W 28 CM	BLUE LINE PRINT	PAPER
158-219	RELOCATION OF 20" WATER MAIN / FOR WANSKUCK CO.	1866/09/17	1"=40'	H 32.2, W 52.7 CM	GRAPHITE	PAPER
158-220	PLAN SHOWING / PIPE LINES BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / IN THE / CITY OF LOWELL MARKET STREET PARKING AREA.	1959/07/07	1"=40'	H 40.6, W 52 CM	INK	DRAFTING CLOTH
158-220-[COPY 1]	PLAN SHOWING / PIPE LINES BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / IN THE / CITY OF LOWELL MARKET STREET PARKING AREA.	1959/07/07	1"=40'	H 40.6, W 52 CM	BLUEPRINT	PAPER
158-E-[069]	DIAGRAM SHOWING / NUMBER OF ADDITIONAL SURPLUS / MILL POWERS ALLOWED WHEN THE / PRESCOTT PUMP IS RUNNING. / PROPS. OF LOCKS & CANALS / LOWELL, MASS,	1922/10/09	NONE	H 22, W 30.5 CM	INK	PAPER
158-E-001	[SKETCH DRAWING OF] SPLIT SLEEVE & GATE / FOR INSERTING BRANCH LINES / UNDER PRESSURE.	1919/00/00	NONE	H 28, W 21.6 CM	INK	TRACING PAPER
158-E-002	PRESCOTT PUMP / DETAILS OF SCREEN FOR CANAL SUCTION.	1919/10/01	NONE	H 28, W 21.6 CM	INK	WATER COLOR
158-E-003	LAWRENCE MFG. COMPANY / TEST [RATING CURVE] OF 10" CENTRIFUGAL PUMP DEC. 9, 1919.	1919/12/23	NONE	H 21.5, W 28.8 CM	INK	PAPER

158-E-004	PROPOSED CHARACTERISTIC CURVE / OF 10" CENTRIFUGAL PUMP FOR / LAWRENCE MFG. CO. [AT PRESCOTT].	SEE NOTES	NONE	H 21.6, W 28.9 CM	INK, GRAPHITE	PAPER
158-E-005	PROPOSED CHARACTERISTIC CURVE / OF PRESCOTT 10" CENTRIFUGAL PUMP.	SEE NOTES	NONE	H 21.6, W 28.9 CM	INK	PAPER
158-E-006	[DIAGRAM SHOWING] DISCHARGE OF AUTOMATIC SPRINKLERS / AT DIFFERENT PRESSURES.	1920/03/17	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-007	IPSWICH MILLS / [THREE] PROPOSED [SCHEMES FOR A] 12" MAIN TO CONNECT WITH L.& C. SYSTEM.	1920/04/07	NONE	H 28, W 21.6 CM	INK	TRACING PAPER
158-E-008	PLAN SHOWING / 6" CONNECTION FROM CITY 16" MAIN / FOR HOISTING LOCKING GATES AT / GUARD LOCKS.	1920/11/04	1"=40'	H 28, W 21.6 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
158-E-009	[PLAN SHOWING] LOCATION OF VENTURI METER / ON WARREN ST.	1920/12/16	1"=40'	H 22, W 30.8 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
158-E-010	BOOTT MILLS / [RATING CURVE] TEST OF 10" CENTRIFUGAL PUMP [BY E. E. CLARK OF A. F. M. F. I. CO. AT BOOTT MILLS].	1920/12/23-24	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-011	LOCKS & CANALS / RESERVOIR SYSTEM / LOWELL, MASS. [TO ACCOMPANY COSTS OF BIGELOW YARD (COLUMBIA TEXTILE CO.), SHOWING DIVISION OF BIGELOW YARD TENANTS].	1920/12/17	1/2"=500'	H 21.9, W 28 CM	INK, COLORED INK	DRAFTING CLOTH
158-E-012	SKETCH SHOWING / CROSS SECTION OF 16" PIPE UNDER FOUNDRY BRIDGE AT / SACO LOWELL SHOPS.	1918/07/00	1/8"=1'	H 28, W 21.6 CM	INK	TRACING PAPER

158-E-013	[OLD] GUARD LOCKS. / INSIDE CONNECTION FOR HOSE.	1920/12/30	1/2"=1'	H 28, W 21.6 CM	INK	TRACING PAPER
158-E-014	MERRIMACK MFG. CO. / TEST OF 10" CENTRIFUGAL PUMP.	1922/05/04	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-015	KITSON PLANT / TEST OF 8" CENTRIFUGAL PUMP.	1921/05/26	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-016	ANDOVER ST. BRIDGE / SKETCH SHOWING / GRADES FOR L.& C. LINTELS / CITY ENGINEER'S OFFICE.	1912/11/15	1"=5'	H 51, W 22.5 CM	INK	TRACING PAPER
158-E-017	MERRIMACK PUMP [DELAVAL 2 STAGE CENTRIIFUGAL].	1922/04/27	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-018	KITSON PUMP [DELAVAL SINGLE STAGE CENTRIIFUGAL].	1922/05/08	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-019	TREMONT & SUFFOLK PUMP [DELAVAL SINGLE STAGE CENTRIIFUGAL].	1922/05/09	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-020	LAWRENCE PUMP [DELAVAL SINGLE STAGE CENTRIIFUGAL].	1922/05/03	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-021	WATER USED THRU METERS / BY ALL CORPORATIONS / FOR YEAR 1920.	1921/03/01	NONE	H 30.2, W 21.5 CM	INK, COLORED INK	PAPER
158-E-022-(01)	METER USE & RECEIPTS / FROM L.& C. SYSTEM / FOR TEN YEAR PERIOD.	1921/02/25	NONE	H 28.6, W 21.5 CM	INK, GRAPHITE	PAPER
158-E-022-(02)	CHART SHOWING RECORD OF METERS / AT THE / APPLETON COMPANY [1918, 1919, AND 1920].	1921/02/17	NONE	H 28.6, W 21.5 CM	INK, COLORED INK	PAPER
158-E-022-(03)	METER USE / AT THE / BOOTT MILLS [1920].	1921/02/00	NONE	H 28.6, W 21.5 CM	INK, COLORED INK	PAPER
158-E-022-(04)	METER USE / AT THE / MERRIMACK CO. [1920]	1921/02/00	NONE	H 28.6, W 21.5 CM	INK	PAPER
158-E-022-(05)	METER USE / AT THE / HAMILTON MILLS [1918 & 1919].	1921/02/00	NONE	H 28.6, W 21.5 CM	INK	PAPER
158-E-022-(06)	METER USE / AT THE / BIGELOW YARD [1920].	1921/02/00	NONE	H 28.6, W 21.5 CM	INK	PAPER

158-E-022-(07)	METER USE / AT THE / TREMONT & SUFFOLK [1920].	1921/02/00	NONE	H 28.6, W 21.5 CM	INK	PAPER
158-E-022-(08)	METER USE / AT THE / LAWRENCE CO. [1920]	1921/02/00	NONE	H 28.6, W 21.5 CM	INK	PAPER
158-E-022-(09)	METER USE / AT THE / SACO-LOWELL SHOPS [1918, 1919].	1921/02/00	NONE	H 28.6, W 21.5 CM	INK, COLORED INK	PAPER
158-E-022-(10)	METER USE / AT THE / MIDDLESEX CO. [1920]	1921/02/00	NONE	H 28.6, W 21.5 CM	INK	PAPER
158-E-022-(11)	METER USE / AT THE / MASSACHUSETTS MILLS.	1921/02/00	NONE	H 28.6, W 21.5 CM	INK, COLORED INK	PAPER
158-E-023	[DRAWING SHOWING] BOOTT PUMP [DELAVAL SINGLE STAGE CENTRIFUGAL].	1922/05/08	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-024	TREMONT & SUFFOLK MILLS / TEST OF 10" DELAVAL CENTRIFUGAL PUMP.	1921/05/26	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-025	MASS. COTTON MILLS / TEST OF 10" DELAVAL CENTRIFUGAL PUMP.	1921/07/13	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-026	FRICTION LOSS / IN 24" C. I. PIPE / WESTEN'S TABLES.	1922/01/00	NONE	H 29.3, W 36.8 CM	INK	PAPER
158-E-027	FRICTION LOSS / IN 24" PIPE LINE / LOWELL, MASS.	1921/07/19	NONE	H 29.3, W 45.7 CM	INK	PAPER
158-E-028	DIAGRAM SHOWING / GRAPHICAL DETERMINATION OF C, n, R & S / IN KUTTER FORMULA.	UNDATED	NONE	H 29, W 50.5 CM	INK	PAPER
158-E-029	COEFFICIENT C / HAZEN-WILLIAMS FORMULA.	1922/02/00	NONE	H 29, W 87 CM	INK	PAPER
158-E-030	DIAGRAM SHOWING / CLASSIFICATION OF PAYROLL FOR / INSURANCE ADJUSTMENTS [FROM 1917 TO 1921].	SEE TITLE	NONE	H 28, W 21.6 CM	INK	PAPER
158-E-031	DIAGRAM SHOWING / PERCENTAGE OF PAYROLLS / AS APPLIED TO CLASSIFICATIONS [(VARIOUS) FROM 1917 TO 1921].	SEE TITLE	NONE	H 21.6, W 28 CM	INK, COLORED INK	PAPER

158-E-032	DIAGRAM SHOWING / INSURANCE ADJUSTMENTS / AS APPLIED TO CLASSIFICATIONS [FROM 1917 TO 1920].	SEE TITLE	NONE	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-033-[A]	DIAGRAM SHOWING / COST OF GATE VALVES.	1921/02/19	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-033-[B]	PRESCOTT PUMP [DELAVAL SINGLE STAGE CENTRIFUGAL].	1922/05/08	1/4"=1'	H 28, W 21.6 CM	INK, COLORED INK	PAPER
158-E-034	SKETCH SHOWING PORTION / OF 20" PIPE NEAR LOWER LOCKS DAM / & NEW [# 65] GATE.	1919/06/05	1"=10'	H 28, W 21.5 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
158-E-035	SKETCH SHOWING / PRIMING SYSTEM ON THE / 8" CENTRIFUGAL PUMP AT / KITSON PLANT.	1920/04/05	1"=10'	H 21.7, W 28.2 CM	GRAPHITE	TRACING PAPER
158-E-036	VALUES OF / COEFFICIENT "C" IN / L.& C. 24" PIPE LINE.	1921/02/08	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-037	[PLAN OF] L.& C. RESERVOIR [WITH DEED INFORMATION].	1921/03/23	1"=50'	H 21.6, W 28 CM	INK, COLORED PENCIL	TRACING PAPER
158-E-038	BIGELOW YARD / FIRE PROTECTION SYSTEM.	1921/04/08	1"=100'	H 21.6, W 28 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
158-E-039-A	BIGELOW YARD / FIRE PROTECTION OF / NORTHERN WASTE CO.	1921/04/08	1"=40'	H 21.6, W 28 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
158-E-039-B	BIGELOW YARD / FIRE PROTECTION OF / MT. HOPE SPINNING CO.	1921/04/09	1"=40'	H 21.6, W 28 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
158-E-039-C	BIGELOW YARD / FIRE PROTECTION OF / COURIER CITIZEN CO.	1921/04/09	1"=40'	H 21.6, W 28 CM	INK, WATER COLOR	PAPER
158-E-039-D	BIGELOW YARD / FIRE PROTECTION OF / COLUMBIA TEXTILE CO.	1921/04/11	1"=60'	H 21.6, W 28 CM	INK, WATER COLOR	PAPER

158-E-039-E	BIGELOW YARD / FIRE PROTECTION OF / CARLETON & HOVEY CO.	1921/04/12	1"=40'	H 21.6, W 28 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
158-E-039-F	BIGELOW YARD / FIRE PROTECTION OF / J. M. HOWE.	1921/04/12	1"=60'	H 21.6, W 28 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
158-E-039-G	BIGELOW YARD / FIRE PROTECTION OF / J. M. HOWE.	1921/04/12	1"=60'	H 21.6, W 28 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
158-E-040	RATING CURVE / OF MOTOR TO / PRESCOTT CENTRIFUGAL PUMP.	1921/07/00	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-041	COEFFICIENTS OF HARVARD UNIVERSITY / 3", 4" & 5" METER NOZZLES [FROM TESTS OF AUG. 21,1913].	1921/07/12	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-042	APPLETON CO. / PROPOSED 2" PIPE / BESIDE HAMILTON CANAL / FOR CONNECTION TO PRIVATE / FIRE BOX.	1921/08/09	1"=40'	H 21.6, W 28 CM	INK	TRACING PAPER
158-E-043	SKETCH SHOWING THE / REMAINS OF WORKS DONE SEPT. 8, 1918. FOR THE PURPOSE OF DIVERTING WATER / FROM MERRIMACK RIVER TO LAWRENCE MFG'S CO'S / 4, 5 & 6 RACEWAYS TO / SUPPLY FIRE PUMPS WHEN RIVER IS VERY LOW.	1921/09/11	1"=100'	H 21.6, W 28 CM	INK, COLORED INK	TRACING PAPER
158-E-044	CONNECTIONS FROM / 2" GEM METER # 636087 AT / BOOTT MILLS.	1921/09/14	NONE	H 28, W 21.5 CM	INK, GRAPHITE	TRACING PAPER
158-E-045	CONNECTIONS FROM / 2" METER # 623376 AT BOOTT MILLS.	1921/09/15	1"=20'	H 29, W 62.9 CM	INK, GRAPHITE	TRACING PAPER

158-E-046	[SKETCH SHOWING] PROPOSED SUCTION PIT / & CHECK VALVE FOR THE 8" CENTRIFUGAL PUMP AT / KITSON PLANT.	1921/09/26	1/2"=1'	H 28, W 21.6 CM	INK, COLORED INK	TRACING PAPER
158-E-047	MASS. COTTON MILLS / TEST OF 10" DELAVAL CENTRIFUGAL PUMP.	1922/08/19	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-048	TEST OF / 3" WATCH DOG COMPOUND METER # 638821.	1922/08/24	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-049	PRESCOTT PUMP / PROPOSED CHANGE IN RIVER SUCTION.	1922/08/29	1/4"=1'	H 28, W 21.6 CM	INK, GRAPHITE	TRACING PAPER
158-E-050	PROPOSED LAYOUT FOR SMALL PIPE / CONNECTIONS ON 12" PIPE ON WARREN ST. / TO BE USED FOR FRICTION TESTS.	1922/08/30	2"=1'	H 28, W 21.6 CM	INK	TRACING PAPER
158-E-051	TEST OF 1 1/2" WATCH DOG METER # 744342.	1922/10/04	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-052	PROPOSED SUCTION STRAINER / FOR PRESCOTT PUMP.	1920/10/06	3/4"=1'	H 21.6, W 28 CM	INK	TRACING PAPER
158-E-053	MERRIMACK MFG. CO. / TEST OF 10" DELAVAL CENTRIFUGAL PUMP.	1922/10/13	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-054	PRESECOTT PUMP / PROPOSED CHANGE IN RIVER SUCTION.	1923/08/02	1/4"=1'	H 21.6, W 27.6 CM	INK, GRAPHITE	TRACING PAPER
158-E-055	MASS. COTTON MILLS / TEST OF 10" CENTRIFUGAL PUMP / BY LOCKS & CANALS.	1923/09/25	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-056	MASS. COTTON MILLS / TEST OF 10" CENTRIFUGAL PUMP.	1923/10/11	NONE	H 21.6, W 28 CM	INK	TRACING PAPER
158-E-057	SKETCH SHOWING / 6" & 10" SEWER OF SACO-LOWELL SHOPS / FROM FORGE SHOP TO DUTTON STREET.	1923/11/15	1"=40'	H 28, W 21.6 CM	INK	TRACING PAPER

158-E-058	DIAGRAM SHOWING HEIGHTS OF RESERVOIR / FOR DIFFERENT PERIODS OF YEAR 1920. [WEEKS OF JAN. 18, AUG. 15, & DEC. 5.]	1921/01/18	NONE	H 28.3, W 21.5 CM	INK, COLORED INK	PAPER
158-E-059	RESERVOIR RECORDS / SHOWING AMOUNTS / [OF WATER] PUMPED, METERED & PERCENT.	1921/07/00	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-060	FIRE LOSSES IN LOWELL MILLS / THAT ARE CONTROLLED BY L.& C. FIRE PROTECTION SYSTEM / 1908 TO 1921.	1921/02/00	NONE	H 28.3, W 21.5 CM	INK, COLORED INK	PAPER
158-E-061	1 1/8" SMOOTH NOZZLE / PRESSURES FOR VARIOUS LENGTHS / OF BEST C. R. L. HOSE / FREEMAN'S TABLES.	1922/05/00	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-061-[COPY 1]	1 1/8" SMOOTH NOZZLE / PRESSURES FOR VARIOUS LENGTHS / OF BEST C. R. L. HOSE / FREEMAN'S TABLES.	1922/05/00	NONE	H 21.2, W 27.3 CM	BLUEPRINT	PAPER
158-E-062	PRESCOTT PUMP / SKETCH SHOWING SUCTION PIT & / SECTIONS OF OCT. 1, 1922.	1923/08/08	1/4"=1'	H 21.8, W 28 CM	INK, GRAPHITE	TRACING PAPER
158-E-063	DIAGRAM SHOWING / FRICTION LOSS PER 1000 FT. / IN 6" PIPE TO OLD GUARD LOCKS.	1924/05/28	NONE	H 21.6, W 28 CM	INK	PAPER
158-E-066	PLAN SHOWING / GRADES OF SEWERS / IN CENTRAL STREET / LOWELL, MASS.	1911/08/00	1"=100'	H 38.8, W 34.2 CM	INK, COLORED PENCIL	PAPER
158-E-067	[DIAGRAM OF DISCHARGE VS. PRESSURE] LOWELL ELECTRIC LIGHT CORP. / TEST OF 500 GAL. SCREEN PUMP / DISCHARGE VS. PRESSURE.	1926/01/05	NONE	H 21.6, W 28 CM	INK	PAPER

158-E-068	SKETCH SHOWING / LOCATION OF 8" PIPE / WHERE LEAK OCCURRED / AT THE / BOOTT MILLS.	1952/10/29	1"=10'	H 22, W 28 CM	INK, COLORED INK, COLORED PENCIL	PAPER
159-[054]	PLAN OF / CANAL SYSTEM / PROPRIETORS OF THE LOCKS AND CANALS.	1941/05/27	1"=1000'	H 20.5, W 31.5 CM	INK. COLORED INK	DRAFTING CLOTH
159-[055]-[COPY 1]	PLAN OF / CANAL SYSTEM / PROPRIETORS OF THE LOCKS AND CANALS.	1953/05/29	1"=700'	H 26, W 42 CM	INK	PAPER
159-[055]-[COPY 2]	PLAN OF / CANAL SYSTEM / PROPRIETORS OF THE LOCKS AND CANALS.	1953/05/29	1"=700'	H 23, W 38 CM	INK	DRAFTING CLOTH
159-000	INDEX PLAN / OF / LOCKS & CANALS SYSTEM & PROPERTIES.	1921/00/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-001	PLAN OF / CANAL SYSTEM / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS / & A PART OF / MERRIMACK & CONCORD RIVERS.	1921/00/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-002	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF THE LOCKS & CANALS MERRIMACK [...ILLEG.] RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-003	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF THE LOCKS & CANALS MERRIMACK [...ILLEG.] RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-003-[COPY 1]	[UNTITLED.] [PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK (…ILLEG.) RIVERS.]	1921/05/00	1"=100'	H 78, W 96.5 CM	BLUEPRINT	PAPER

159-004	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK [...ILLEG.] RIVERS.	1921/05/00	1"=100'	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-005	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK RIVER.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-006	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-007	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-008	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS / MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-009	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS / MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-010	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS / MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-011	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK, WATER COLOR	DRAFTING CLOTH
159-012	PLAN OF CANAL SYSTEM BELONGING TO PROPRIETORS OF LOCKS & CANALS MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK	DRAFTING CLOTH

159-013	PLAN OF CANAL SYSTEM BELONGING TO PROPORIETORS OF LOCKS & CANALS MERRIMACK RIVERS.	1921/05/00	NONE	H 78.8, W 98.2 CM	INK	DRAFTING CLOTH
159-014	[PLAN & SECTIONS OF] HAMILTON CANAL [SHOWING MISC. DATA INCLUDING ESTIMATED QUANTITIES OF EXCAVATION, MASONRY WALLS, LUMBER, BRICK, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/04	1"=100', 4', 10'	H 54.3, W 64.1 CM	INK	DRAFTING CLOTH
159-014-[COPY 1]	HAMILTON CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/04	1"=10', 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-014-[COPY 2]	HAMILTON CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/04	1"=100'& 10'	H 54.3, W 63.8 CM	BLUEPRINT, GRAPHITE	PAPER
159-015	[PLAN & SECTIONS OF] LOWER PAWTUCKET CANAL [SHOWING MISC. DATA INCLUDING ESTIMATED EXCAVATION, MASONRY WALLS, LUMBER IN FLOORING, ETC.] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/02/08	1"=100'& 10'	H 54.4, W 64.1 CM	INK	DRAFTING CLOTH
159-015-[COPY 1]	LOWER PAWTUCKET CANAL / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/02/08	1"=100', 10'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-015-[COPY 2]	LOWER PAWTUCKET CANAL / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/02/08	1"=100'& 10'	H 54.5, W 63.6 CM	BLUEPRINT	PAPER

159-016	[PLAN & SECTIONS OF UPPER] PAWTUCKET CANAL / RIVER TO GUARD LOCKS / [SHOWING MISC. DATA INCLUDING ESTIMATED EXCAVATON, WALLS, ETC.] PROPRIETORS OF LOCKS & CANALS.	1921/01/27	1"=20'& 100'	H 54.2, W 63.5 CM	INK	DRAFTING CLOTH
159-016-[COPY 1]	PAWTUCKET CANAL / RIVER TO GUARD LOCKS / PROPRIETORS OF LOCKS & CANALS.	1921/01/27	1"=20'& 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-016-[COPY 2]	PAWTUCKET CANAL / RIVER TO GUARD LOCKS / PROPRIETORS OF LOCKS & CANALS.	1921/01/27	1"=20'& 100'	H 54, W 63.5 CM	BLUEPRINT	PAPER
159-017	[PLAN & SECTIONS OF] PAWTUCKET CANAL / BELOW BROADWAY [SHOWING MISC. DATA INCLUDING ESTIMATED EXCAVATION, MASONRY WALLS, LOOSE GRANITE WALLS ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/31	1"=10'& 200'	H 54.3, W 64 CM	INK	DRAFTING CLOTH
159-017-[COPY 1]	PAWTUCKET CANAL / BELOW BROADWAY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/31	1"=10'& 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-017-[COPY 2]	PAWTUCKET CANAL / BELOW BROADWAY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/31	3/16"=50' & 1"=10'	H 54.9, W 63.5 CM	BLUEPRINT	PAPER
159-018	[PLAN & SECTIONS OF] WESTERN CANAL [SHOWING MISCELLANEOUS DATA INCLUDING EXCAVATION, MASONRY WALLS, LUMBER ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/09	1"=100'& 10'	H 54.6, W 64 CM	INK	DRAFTING CLOTH
159-018-[COPY 1]	WESTERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/09	1"=10', 100'	H 21 1/2",W 25"	BLUEPRPINT	PAPER

159-018-[COPY 2]	WESTERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/09	1"=100'& 10'	H 54.6, W 63.6 CM	BLUEPRINT	PAPER
159-019	[PLAN OF] MOODY STREET FEEDER [SHOWING MISC. DATA INCLUDING EXCAVATION, MASONRY WALLS, BRICKS, LUMBER, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/04	1"=5',10'& 100'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-019-[COPY 1]	MOODY STREET FEEDER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/04	1"=5',10', 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-019-[COPY 2]	MOODY STREET FEEDER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/04	1"=5',10'& 100'	H 54.6, W 63.7 CM	BLUEPRINT, GRAPHITE	PAPER
159-020	[PLAN & SECTIONS OF] MERRIMACK CANAL [SHOWING MISC. DATA INCLUDING EXCAVATION, MASONRY WALLS, GATES, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/02	1"=10'& 100'	H 54.5, W 63.6 CM	INK	DRAFTING CLOTH
159-020-[COPY 1]	MERRIMACK CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/02	1"=10' & 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-020-[COPY 2]	MERRIMACK CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/02	1"=10'& 100'	H 54.6, W 63.9 CM	BLUEPRINT	PAPER
159-021	[PLAN & SECTIONS OF] EASTERN CANAL [SHOWING MISC. DATA INCLUDING ESTIMATED EXCAVATION MASONRY WALLS, CONCRETE, LUMBER, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/08	1"=10'& 100'	H 54.6, W 64 CM	INK	DRAFTING CLOTH
159-021-[COPY 1]	EASTERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/08	1"=10' & 100'	21 1/2", W 25'	BLUEPRINT	PAPER
159-021-[COPY 2]	EASTERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/08	1"=10'& 100'	H 55, W 63.2 CM	BLUEPRINT	PAPER

159-022	[PLAN & ELEVATION OF EXCAVATION, WALLS, LUMBER, ETC.] LOWER LOCKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/11	1"=10'& 25'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-022-[COPY 1]	LOWER LOCKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/11	1"=10'& 25"	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-022-[COPY 2]	LOWER LOCKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/11	1"=10'& 25'	H 54.9, W 63.7 CM	BLUEPRINT	PAPER
159-023	[PLAN & SECTIONS OF] LAWRENCE CANAL [SHOWING EXCAVATION, WALLS, LUMBER, IRON WORK, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/21	1"=4',10'& 50'	H 54.5, W 63.6 CM	INK	DRAFTING CLOTH
159-023-[COPY 1]	LAWRENCE CANAL / PROPEITORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/21	1"=4',10', 50'	H 21 1/2", W 25'	BLUEPRINT	PAPER
159-023-[COPY 2]	LAWRENCE CANAL / PROPEITORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/21	1"=4',10', 50'	H 54.3, W 63.8 CM	BLUEPRINT	PAPER
159-024	[PLAN & SECTIONS OF] NORTHERN CANAL / TO MOODY ST. [SHOWING EXCAVATION, CONSTRUCTION & OTHER MISC. DATA.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/24	1"=20'& 100'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-024-[COPY 1]	NORTHERN CANAL / TO MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/24	1"=20'& 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-024-[COPY 2]	NORTHERN CANAL / TO MOODY ST. / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/24	1"=20'& 100'	H 54.6, W 63.5 CM	BLUEPRINT	PAPER

159-025	[PLAN, ELEVATION & SECTIONS OF] NORTHERN CANAL HEADGATES [SHOWING MISC. DATA PERTAINING THERETO, INCLUDING EXCAVATION, MASONRY, CONCRETE, ETC.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/24	1"=16'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-025-[COPY 1]	NORTHERN CANAL HEADGATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/24	1"=16'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-025-[COPY 2]	NORTHERN CANAL HEADGATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/24	1"=16'	H 27, W 31.2 CM	PHOTOGRAPH	PAPER
159-025-[COPY 3]	NORTHERN CANAL HEADGATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS..	1921/01/24	1"=16'	H 54.6, W 63.6 CM	BLUEPRINT, GRAPHITE	PAPER
159-026	[PLAN & SECTIONS OF] MERRIMACK [DAM] WASTEWAY / & BOOTT DAM [& ROLLING DAM, ALSO PLAN OF GRIST MILL, SHOWING ESTIMATED EXCAVATION, MASONRY, LUMBER, STEEL, ETC. WITH BUILDINGS & EQUIPMENT.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/11	1"=50'& 10'	H 54.3, W 64.2 CM	INK	DRAFTING CLOTH
159-026-[COPY 1]	MERRIMACK WASTEWAY & BOOTT DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/11	1"=50 & 10'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-026-[COPY 2]	MERRIMACK WASTEWAY & BOOTT DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/11	1"=50 & 10'	H 21 1/2", W 25"	BLUEPRINT	PAPER

159-027	[PLAN, ELEVATION & SECTIONS OF] OLD GUARD LOCKS [& GATE HOUSE SHOWING EXCAVATION, MASONRY, & OTHER MISCELLANEOUS DATA PERTAINING THERETO.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/31	1"=10'& 20'	H 54.3, W 64 CM	INK	DRAFTING CLOTH
159-027-[COPY 1]	OLD GUARD LOCKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/29	1"=10'& 20'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-027-[COPY 2]	OLD GUARD LOCKS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/29	1"=10'& 20'	H 54.5, W 63.8 CM	BLUEPRINT	PAPER
159-028	PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/21	1"=40'& 4'	H 53.5, W 63.5 CM	INK, COLORED INK	DRAFTING CLOTH
159-028-[COPY 1]	PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/21	1"=40'& 4'	H 53.5, W 63.5 CM	BLUEPRINT	PAPER
159-028-[COPY 2]	PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/21	1"=40'& 4'	H 53.5, W 63.5 CM	BLUEPRINT, GRAPHITE	PAPER
159-028-[COPY 3]	PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/21	1"=40'& 4'	H 53.5, W 63.5 CM	BLUE LINE PRINT	PAPER
159-029	[PLAN & SECTIONS OF] SWAMP LOCKS AND DAM [SHOWING EXCAVATION, CONSTRUCTION, MASONRY, IRON WORK, ETC.] / PROPRIETORS OF LOCKS & CANALS.	1921/02/14	1"=10'& 20'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-029-[COPY 1]	SWAMP LOCKS AND DAM / PROPRIETORS OF LOCKS & CANALS.	1921/02/14	1"=10'& 20'	H 54, W 63.5 CM	BLUEPRINT	PAPER
159-029-[COPY 2]	SWAMP LOCKS AND DAM / PROPRIETORS OF LOCKS & CANALS.	1921/02/14	1"=10'& 20'	H 54.6, W 62 CM	BLUEPRINT	PAPER

159-030	[PLAN & SECTIONS OF LAWRENCE DAM &] TREMONT WASTEWAY [SHOWING EXCAVATION, WALLS, LUMBER & OTHER MISCELLANEOUS PERTAINING THERETO.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/15	1"=5',10'& 50'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-030-[COPY 1]	TREMONT WASTEWAY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/15	1"=5',10'& 50'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-030-[COPY 2]	TREMONT WASTEWAY / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/15	1"=5',10'& 50'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-031	[ELEVATIONS & SECTIONS OF ALL L.& C.] CANAL BRIDGES [SHOWING MISCELLANEOUS DATA PERTAINING THERETO, INCLUDING EXCAVATION, CONSTRUCTION] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	1"=10'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-031-[COPY 1]	CANAL BRIDGES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	1"=10'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-031-[COPY 2]	CANAL BRIDGES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/17	1"=10'	H 54.9, W 62.5 CM	BLUEPRINT	PAPER
159-032	[ELEVATIONS & SECTIONS OF ALL L.& C.] CANAL BRIDGES [SHOWING MISCELLANEOUS DATA PERTAINING THERETO, INCLUDING EXCAVATION, CONSTRUCTION] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	1"=10'	H 54.6, W 64.2 CM	INK, COLORED INK	DRAFTING CLOTH
159-032-[COPY 1]	CANAL BRIDGES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	1"=10'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-032-[COPY 2]	CANAL BRIDGES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/00	1"=10'	H 54.6, W 62.8 CM	BLUEPRINT	PAPER

159-033	[ELEVATIONS & SECTIONS OF ALL L.& C.] CANAL BRIDGES [SHOWING MISCELLANEOUS DATA PERTAINING THERETO, INCLUDING EXCAVATION, CONSTRUCTION] / PROPREITORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/17	1"=10'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-033-[A]	CANAL BRIDGES / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1929/08/00	1"=10'	H 55, W 64 CM	INK, COLORED PENCIL	DRAFTING CLOTH
159-033-[COPY 1]	CANAL BRIDGES / PROPREITORS OF LOCKS & CANALS / LOWELL, MASS.	1921/02/17	1"=10'	H 21 1/2" W 25"	BLUEPRINT	PAPER
159-033-[COPY 1]	CANAL BRIDGES / PROPREITORS OF LOCKS & CANALS / LOWELL, MASS	1921/02/17	1"=10'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-034	[PLAN & SECTIONS OF] RIVER WALLS [AT DILLON DYE WORKS ON CONCORD & STACKPOLE STREET WALL ALONG MERRIMACK RIVER] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/07	1"=4'& 100'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-034-[COPY 1]	RIVER WALLS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/07	1"=4'& 100'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-034-[COPY 2]	RIVER WALLS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/07	1"=4'& 100'	H 54.6, W 63.5 CM	BLUEPRINT	PAPER
159-035	[PLAN & SECTIONS OF] NORTHERN CANAL / [FROM] MOODY ST. / TO SUFFOLK ST. TO SUFFOLK STREET [SHOWING EXCAVATIONS MADE IN DIGGING CANAL] / PROPRIETORS OF LOCKS & CANALS.	1921/01/26	1"=100'& 20'	H 54.6, W 64.2 CM	INK	DRAFTING CLOTH
159-035-[COPY 1]	NORTHERN CANAL / MOODY TO SUFFOLK STREET / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/26	1"=100' & 20'	H 54.6, W 63.5 CM	BLUEPRINT	PAPER

159-035-[COPY 2]	NORTHERN CANAL / MOODY TO SUFFOLK STREET / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/26	1"=100'& 20'	H 21 1/2", W 25"	BLUEPRINT	PAPER
159-036	STRUCTURAL STEEL FENCE [FOR SUFFOLK ST.].	1926/05/13	NONE	H 32.2, W 42.6 CM	INK	DRAFTING CLOTH
159-037	[AIRPLANE VEIW OF THE] AMOSKEAG MFG. COMPANY [PLANT SHOWING LOCATION OF THE NEW HYDRO-ELECTRIC STATION & DAM] / AND / MERRIMACK RIVER.	UNDATED	NONE	H 43.8, W 34.4 CM	PHOTOGRAPH	PAPER
159-038	POWER POSSIBILITIES IN CANADA / ON THE ST. LAWRENCE / & TRIBUTARY RIVERS.	UNDATED	NONE	H 26.2, W 25.3 CM	INK, COLORED INK	DRAFTING CLOTH
159-039	[PLAN SHOWING] SCHEME-N / [FOR THE] AMOSKEAG MFG. CO. MANCHESTER, N.H. / PROPOSED HYDRO-ELECTRIC PLANT [AT]- MOORES FALLS, N.H.	1927/08/00	1"=100'	H 28, W 44.9 CM	INK, WATER COLOR	DRAFTING CLOTH
159-040	PROFILE OF THE MERR'K RIVER SHOWING / MILLPONDS [FROM] LAWRENCE TO FRANKLIN [IN TERMS OF THE ELEVATION & DISTANCE FROM HAVERHILL IN MILES. STATES HEIGHTS OF THE TOP BOARDS, DRAW DOWN & CAPACITIES].	1927/05/15	NONE	H 45, W 29.4 CM	INK	PAPER
159-041	WATER POWER HYDROGRAPH / PROPRIETORS OF LOCKS & CANALS [FOR THE YEARS 1923-6 GIVING THE ACTUAL OUTPUT, OUTPUT WITH UNLIMITED MARKET, & TOTAL IN THE MERR'K RIVER].	1927/01/00	NONE	H 36.6, W 58 CM	INK, WATER COLOR	DRAFTING CLOTH

159-042	WATER POWER HYDROGRAPH / AMOSKEAG MFG. COMPANY, MANCHESTER, N.H. [GIVING THE ACTUAL OUTPUT, OUTPUT WITH UNLIMITED MARKET, & TOTAL IN THE MERR'K RIVER].	1927/07/00	NONE	H 36.9, W 58.1 CM	INK, WATER COLOR	DRAFTING CLOTH
159-043	[PLAN SHOWING] CENTRAL STATIONS / & INDUSTRIAL PLANTS / IN ALL NEW ENGLAND [ACCORDING TO THE REPORT OF THE ASSOCIATED INDUSTRIES OF MASS. POWER INVESTIGATING COMMITTEE].	1924/01/00	NONE	H 43.8, W 34.3 CM	INK, COLORED INK	PAPER
159-044	[PHOTOSTAT NEGATIVE OF PLATE #11. PLAN SHOWING TRANSMISSION LINES OF OVER 33,000 VOLTS, FUEL BURNING & WATER POWER INDUSTRIAL PLANTS, & CENTRAL STATIONS.] IN ALL NEW ENGLAND.	1924/01/00	NONE	H 43.8, W 34.4 CM	PHOTOGRAPH	PAPER
159-045	[PLAN SHOWING] NEW ENGLAND / ANNUAL PRECIPITATION IN INCHES [WITH FIGURES OF H. K. BAROWS TAKEN FROM MAP IN THE JAN. 1921 JOURNAL OF THE BOSTON SOCIETY OF CIVIL ENGINEERS COMPILED BY THE P.L.& C.].	1927/08/00	NONE	H 49, W 39.3 CM	INK, COLORED INK	DRAFTING CLOTH
159-046	[COMPARISON BETWEEN MONTHLY RAINFALL AT LOWELL & FLOW OF THE] MERRIMACK RIVER AT LAWRENCE, MASS. [C.F.P.S.].	SEE NOTES	NONE	H 38.2, W 41 CM	INK, GRAPHITE	PAPER

159-047	C.F.P.S. OF MERRIMACK RIVER AT LAWRENCE MASS. / INCHES OF RAINFALL AT LOWELL.	SEE NOTES	NONE	H 38.2, W 41 CM	INK, GRAPHITE	PAPER
159-048	INCHES OF RAINFALL / AT LOWELL, MASS. / AND C.F.P.S. OF MERRIMACK RIVER / AT LAWRENCE, MASS. [BLUEPRINT OF PLAN 159-46].	1927/08/00	NONE	H 37.7, W 155 CM	BLUEPRINT	PAPER
159-049	[PLAN SHOWING THE LOCATION OF PROPOSED NEW POWER PLANT BETWEEN NORTHERN CANAL & THE MERR'K RIVER] LOWELL, MASS. / PROP. OF LOCKS AND CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS.	1927/07/00	1"=100'	H 67, W 104 CM	LITHOGRAPH, COLORED INK, INK	PAPER
159-051	[PHOTOSTAT NEGATIVE OF PLAN 159-49 SHOWING THE LOCATION OF PROPOSED POWER PLANT BETWEEN NORTHERN CANAL & THE MERR'K RIVER WITH THE GENERAL PLAN CUT DOWN TO THE AREA BOUNDED BY DUTTON AND PAWTUCKET ST.]	UNDATED				
159-052	POWER MAP / MERRIMACK RIVER DRAINAGE AREA / & OUTSIDE CONNECTIONS [ILLUSTRATING RESPECTIVE POWER CAPACITIES IN TERMS OF THE SIZE OF BUILDINGS & SHOWING ALSO EXISTING STORAGE RESERVOIRS].	1926/05/00	1/500,000	H 88.3, W 53.3 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER

159-053	REPORT OF THE COMMITTEE ON RUN-OFF [DURATION CURVES FROM THE RUN-OFF COMMITTEE REPORT SHOWING FORTY YEAR AVERAGE, ENVELOPING CURVES, MAXIMUM & MINIMUM FOR THE MERR'K RIVER AT LAWRENCE & THE CONNECTICUT RIVER AT SUNDERLAND].	UNDATED	NONE	H 25.4, W 16 CM	INK	DRAFTING CLOTH
160-[073]	[UNTITLED.] [ELECTRIC WIRING DIAGRAM FOR SWAMP LOCKS GATEHOUSE.]	1953/08/07	NONE	H 62.6, W 101 CM	BLUELINE PRINT	PAPER
160-[074]	[UNTITLED.] [ELECTRIC WIRING DIAGRAM FOR PAWTUCKET DAM, TREMONT, AND GUARD LOCKS GATEHOUSES.]	1953/08/07	NONE	H 62.6, W 102M	BLUELINE PRINT	PAPER
160-[075]	GUARD LOCKS ELEVATION.	UNDATED	1/8"=1'	H 28, 2 28 CM	GRAPHITE	PAPER
160-001	PLAN / OF / BOOTT DAM & WASTEWAY / SHOWING / MUD GATE.	1897/03/23	1"=4'	H 43, W 68 CM	GRAPHITE	PAPER
160-002-[A]	SKETCH SHOWING TOP OF WESTERN / CANAL LOCKING GATES AND HEIGHT / OF WATER FLOWING OVER THEM DEC. 17, 1897.	SEE TITLE	1"=4'	H 21, W 56.2 CM	GRAPHITE	PAPER
160-002-[B]	LOCKING GATES / PARTIAL PLAN OF LOCKING GATES IN / WESTERN CANAL [ALSO ELEVATION SHOWING TOP OF GATE & QUANTITY OF WATER FLOWING OVER THEM DEC. 17, 1897].	1895/12/30	1"=2'	H 16.2, W 56.2 CM	GRAPHITE	PAPER
160-003	[PENCIL SKETCH PLAN OF] ROLLING DAM / [AT] MERRIMACK WASTEWAY.	UNDATED	NONE	H 31.7, W 56.3 CM	GRAPHITE	PAPER
160-004-[A]	PLAN OF / SLUICES AT OLD GUARD LOCKS.	1902/02/00	1/2"=1'	H 158 W 93 CM	INK, COLORED INK	PAPER

160-004-[B]	FULL SIZE DETAIL [PLAN OF] SLUICE POINT / FOR OLD GUARD LOCKS.	1902/02/00	FULL SIZE	H 57.5, W 159.5 CM	COLORED PENCIL	PAPER
160-004-[C]	PAWTUCKET CANAL SLUICES.	1896/01/00	NONE	H 61, W 46.8 CM	GRAPHITE	PAPER
160-005-[A]	PLAN & ELEVATION / OF GATES IN HAMILTON CANAL / SHOWING IMPROVEMENTS MADE IN 1895.	1895/00/00	1"=2'& 3'	H 67.7, W 62.6 CM	INK	CLOTH BACKED PAPER
160-005-[B]	CONSTRUCTION PLAN OF THE / HAMILTON LOCKING GATES.	1895/00/00	NONE	H 61, W 57 CM	COLORED INK, GRAPHITE	PAPER
160-006	[UNTITLED.] [PLAN OF HEAD GATE FOR 7" DIAMETER PENSTOCK OF WOOD WORSTED MILL, LAWRENCE, MASS.]	UNDATED	1"=1'	H 92, W 122.7 CM	INK, COLORED INK	PAPER
160-007	PLAN OF HEAD GATE / FOR 7'-0" DIAM. FEEDER [PENSTOCK OF WOOD] / ESSEX CO. [WORSTED MILL] / LAWRENCE, MASS.	1905/09/29	3/4"=1'	H 61, W 71.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
160-008	SKETCH SHOWING [PLAN & ELEVATION OF] NO. 2 BAY AT / SWAMP LOCKS DAM, SOUTHERLY END.	1909/04/01	7/16"=1/2'	H 29.7, W 37.2 CM	INK, COLORED INK	DRAFTING CLOTH
160-009-A	LAWRENCE DAM. [PLAN & ELEVATION OF LAWRENCE DAM & DIAGRAMS OF DISCHARGE OF FOREBAYS.]	1914/05/00	1 CM=2'	H 52.4, W 72 CM	INK	PAPER
160-009-A-[COPY 1]	LAWRENCE DAM.	1914/05/00	1 CM=2'	H 52.4, W 72 CM	BLUEPRINT	PAPER
160-010-[U]	[UNTITLED.]	UNDATED	NONE	H 24.9, W 20 CM	GRAPHITE	PAPER
160-010-A	[DIAGRAMS SHOWING EFFECTIVE HEIGHT OF FLASHBOARDS AT] PAWTUCKET DAM.	1915/09/00	NONE	H 28.2, W 21.3 CM	INK	PAPER
160-010-A-[COPY 1]	PAWTUCKET DAM.	1915/09/00	NONE	H 28.2, W 21.3 CM	BLUEPRINT	PAPER

160-010-B	[SKETCHES OF] SUGGESTED COFFER DAM # 1 [WITH ESTIMATED COSTS OF SAME].	1915/07/16	1/4"=1'	H 30.6, W 21.4 CM	INK	PAPER
160-010-C	[SKETCHES OF] SUGGESTED COFFER DAM # 2 [WITH ESTIMATED COSTS OF SAME].	1915/07/00	NONE	H 30.4, W 21.4 CM	INK	PAPER
160-010-D	[SKETCHES OF] SUGGESTED COFFER DAM # 2-A [WITH ESTIMATED COSTS OF SAME].	1915/07/16	1/2"=1'	H 21.5, W 30.6 CM	INK	PAPER
160-010-E	SKETCH [& CROSS SECTIONS OF] PAWTUCKET DAM [TAKEN IN 1915 AFTER BREAK.]	1915/00/00	1"=40'	H 29, W 75 CM	INK, COLORED INK	DRAFTING CLOTH
160-010-E-[A]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[B]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[C]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[D]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[E]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[F]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[G]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[H]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[I]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[J]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-E-[K]	PAWTUCKET DAM.	1915/07/00	NONE	H 29.4, W 45.7 CM	INK	PAPER
160-010-F	[SECTION & ELEVATION OF PAWTUCKET] DAM [WHERE 14' HIGH ON FENCE] ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.7, W 53.5 CM	HELIOTYPE	PAPER

160-010-F-[COPY 1]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 39.7, W 53.4 CM	BLUEPRINT	PAPER
160-010-F-[COPY 1]-[A]	FAILURE OF SMALL DAM CAUSED BY RISE IN FLASHBOARD HEIGHT.	1928/12/20	NONE	H 27.6, W 21 CM	INK	PAPER
160-010-G	[UNTITLED.] [SKETCHES OF FLASHBOARD BRACES.]	UNDATED	NONE	H 48.4, W 65.2 CM	GRAPHITE	DRAFTING CLOTH
160-010-H	[UNTITLED.] [SKETCHES OF FLASHBOARD BRACES.]	UNDATED	NONE	H 44.5, W 59 CM	INK, GRAPHITE	DRAFTING CLOTH
160-010-I	[SKETCH OF] CONDITION OF FLASHBOARDS / PAWTUCKET DAM [IN POSITION] / LOWELL, MASS.	UNDATED	NONE	H 29.3, W 48.6 CM	INK	DRAFTING CLOTH
160-010-J	SKETCH SHOWING DEFLECTION FROM / HORIZONTAL LINE OF FLASHBOARD / PINS OF DIAMETERS AS GIVEN.	1908/06/23	NONE	H 21.6, W 30.5 CM	INK, COLORED INK	PAPER
160-010-K	[DIAGRAM SHOWING] FLASHBOARD PINS / DEFLECTION VS. STRESS [IN TESTS MADE MARCH & APRIL, 1919.] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	SEE TITLE	NONE	H 28.9, W 47.8 CM	INK	DRAFTING CLOTH
160-010-L	MEMO RELATING TO / REPAIRING PAWTUCKET DAM [IN 1916 (JULY TO OCT) DUE TO BREAK ON JULY 9, 1915 ON ACCOUNT OF HIGH WATER, SHOWING DOWEL PINS IN CAPSTONES].	SEE TITLE	1"=10', 1'	H 46.4, W 85.8 CM	BLUEPRINT	PAPER
160-010-M	[UNTITLED.] [UNFINISHED SKETCH OF PAWTUCKET DAM SHOWING CAP STONES REPLACED AFTER BREAK IN 1915.]	SEE TITLE	1/4"=1'	H 64.2, W 222.4 CM	INK, GRAPHITE	DRAFTING CLOTH

160-010-O	UPPER BEARING / SWAMP LOCKS MIDDLE GATES / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. [SECTION THROUGH HEEL POST SHOWING CUT NECESSARY TO RECEIVE THE ROLLER BRACKETS.]	1921/04/13	1/4 & 1/2 SIZE	H 31.9, W 39.7 CM	INK	DRAFTING CLOTH
160-010-O-[COPY 1]	UPPER BEARING / SWAMP LOCKS MIDDLE GATES / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/04/14	FULL SIZE	H 31.8, W 39.4 CM	BLUEPRINT	PAPER
160-010-P	[SKETCH SHOWING] UPPER BEARING STRAPS / [OF] SWAMP LOCKS MIDDLE GATES.	1921/05/10	FULL SIZE	H 32, W 47.4 CM	INK	DRAFTING CLOTH
160-010-Q	LOWER BEARING / SWAMP LOCKS MIDDLE GATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/04/13	1/4 & 1/2 SIZE	H 39.5, W 47.4 CM	INK	DRAFTING CLOTH
160-010-R	[PLAN AND PROFILE OF] SWAMP LOCKS / UPPER CHAMBER [SHOWING PADDLE GATES] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/04/29	1"=10'	H 26.7, W 47.2 CM	INK, COLORED INK	DRAFTING CLOTH
160-010-S	SWAMP LOCKS, MIDDLE GATES / OUTLINE OF QUOINS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/04/12	1/2 SIZE	H 32, W 40 CM	INK, COLORED INK	DRAFTING CLOTH
160-010-T	BEARING DETAILS / [FOR] SWAMP LOCKS MIDDLE GATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/17	1"=1'	H 32.1, W 29.2 CM	INK	DRAFTING CLOTH
160-011-[1]	[ENVELOPE CONTAINING PLAN OF BOOTT DAM &] DIAGRAMS SHOWING COEFFICIENTS FOR WASTE WAYS.	1915/00/00	NONE	H 46, W 29.2 CM	INK	PAPER

160-011-[2]	[ENVELOPE CONTAINING PLAN OF] BOOTT DAM / LOWELL, MASS. [& DIAGRAMS SHOWING COEFFICIENTS FOR WASTEWAYS.]	1915/07/08	1"=5'	H 29.5, W 45 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
160-011-[A]	[UNTITLED COMPOSITE PHOTOGRAPH OF BOOTT DAM SHOWING ALL GATE BAYS IN DRAIN DOWN CONDITION.]	SEE NOTES	NONE	H 11.4, W 27.7 CM	PHOTOGRAPH	PAPER
160-011-[B]	DISCHARGE MEASUREMENTS AT BOOTT DAM.	UNDATED	NONE	H 29.1, W 45.7 CM	INK, COLORED INK	DRAFTING CLOTH
160-011-[C]	DISCHARGE MEASUREMENTS AT BOOTT DAM.	UNDATED	NONE	H 29.1, W 45.7 CM	INK, COLORED INK	DRAFTING CLOTH
160-011-[D]	DISCHARGE MEASUREMENTS AT BOOTT DAM.	UNDATED	NONE	H 29.1, W 45.7 CM	INK, COLORED INK	DRAFTING CLOTH
160-011-[E]	VELOCITY OF APPROACH AT BOOTT DAM.	UNDATED	NONE	H 29.1, W 45.7 CM	INK, COLORED INK	DRAFTING CLOTH
160-011-[F]	BOOTT DAM / DIAGRAM SHOWING DISCHARGE OF BAYS NO.1 TO 6.	UNDATED	NONE	H 29.1, W 45.7 CM	BLUEPRINT	PAPER
160-011-[G]	NO. 3 BAY.	UNDATED	NONE	H 29, W 45.3 CM	BLUEPRINT	PAPER
160-011-[H]	DISCHARGE OF BAYS AT BOOTT DAM.	1915/05/21	NONE	H 28, W 21 CM	INK	PAPER
160-011-[I]	DIAGRAM / SHOWING DISCHARGE / OF / BAYS AT BOOTT DAM.	1915/04/21	NONE	H 29.2, W 45.7 CM	BLUEPRINT	PAPER
160-011-[J]	BOOTT DAM.	1915/05/09	NONE	H 28, W 21 CM	INK	PAPER
160-011-[K]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 21.8, W 30.5 CM	GRAPHITE	PAPER
160-011-[L]	DISCHARGE MEASUREMENTS AT BOOTT DAM.	1915/07/08	NONE	H 28, W 21	INK	PAPER

160-012-[A]	MEMO [PLAN] RELATING TO / REPAIRING PAWTUCKET DAM / [IN 1916 (JULY TO OCT) DUE TO BREAK ON JULY 9, 1915 ON ACCOUNT OF HIGH WATER, SHOWING DOWEL PINS IN CAPSTONES.]	1915/00/00	1"=10'& 1'	H 46.3, W 86.7 CM	INK	PAPER
160-012-[B]	MEMO [PLAN] RELATING TO / REPAIRING PAWTUCKET DAM / [IN 1916 (JULY TO OCT) DUE TO BREAK ON JULY 9, 1915 ON ACCOUNT OF HIGH WATER, SHOWING DOWEL PINS IN CAPSTONES.]	1915/00/00	1"=10'& 1'	H 46.3, W 86.7 CM	INK	PAPER
160-013-[A]	[DIAGRAM SHOWING] CURRENT METER MEASUREMENTS / [AT] HAMILTON WASTE GATES.	1915/08/23	NONE	H 29.1, W 45.8 CM	INK	PAPER
160-013-[B]	COMPUTATIONS OF DISCHARGE OF HAMILTON GATES.	1915/08/23	NONE	H 20.3, W 20.3 CM	GRAPHITE	PAPER
160-013-[C]	COMPUTATIONS OF DISCHARGE IN HAMILTON CANAL.	1915/08/10-11	NONE	H 25, W 20.3 CM	GRAPHITE	PAPER
160-013-[D]	HAMILTON GATE / RATING.	1915/08/10	NONE	H 30.5, W 21.5 CM	GRAPHITE	PAPER
160-013-[E]	HAMILTON GATE / RATING.	1915/08/10	NONE	H 30.5, W 21.5 CM	GRAPHITE	PAPER
160-013-[F]	POINT MEASUREMENTS / AT HAMILTON CURRENT METER STATION.	1915/08/23	NONE	H 29.1, W 45.8 CM	INK	PAPER
160-013-[G]	POINT MEASUREMENT / OF DISCHARGE AT / HAMILTON CURRENT METER STATION / RIGHT HAND WASTE GATE OPEN 1'.	1915/08/23	NONE	H 29.1, W 45.8 CM	INK, COLORED INK	PAPER
160-013-[H]	POINT MEASUREMENT / OF DISCHARGE AT / HAMILTON CURRENT METER STATION / BOTH WASTE GATES OPEN 0.5'.	1915/08/23	NONE	H 29.1, W 45.8 CM	INK	PAPER
160-013-[I]	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	NONE	H 29.1, W 45.8 CM	GRAPHITE	PAPER

160-014	PROPOSED / WASTEGATE AT MERRIMACK DAM FOR THE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. / HOLYOKE MACHINE CO. / WORCESTER, MASS.	1918/10/21	1"=1'	H 87, W 62.4 CM	BLUEPRINT	PAPER
160-015	[PLAN SHOWING] PROPOSED CHANGES / [DETAILS OF ALTERATIONS FOR B.& M. BRIDGES A342 & 343 AT FOOT OF DUTTON ST. &] MERRIMACK DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/09/18	1/10'=1'	H 56.3, W 79.4 CM	INK, COLORED INK	DRAFTING CLOTH
160-016	[PLAN & ELEVATION OF] PROPOSED GATE STRUCTURE / [FOR] MERRIMACK DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/08/28	1/2"=1'	H 60.2, W 87.5 CM	INK, COLORED INK	DRAFTING CLOTH
160-017	[PLAN & ELEVATION OF PROPOSED GATE STRUCTURE FOR] MERRIMACK DAM / STUDY FOR RECONSTRUCTION / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/08/28	NONE	H 55.5, W 75.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
160-018	[PLAN & ELEVATION SHOWING DETAIL OF] CONCRETE WALL FACING / [OF] SWAMP LOCKS BASIN / PROPRIETORS OF LOCKS & CANALS / LOWELL,MASS.	1918/06/10	1"=10'& 1'	H 46.6, W 69.8 CM	INK, COLORED INK	DRAFTING CLOTH
160-019	[LINE] SKETCH OF PAWTUCKET DAM / [SHOWING SECTION OF FISHWAY] 1918.	1918/00/00	1"=40',1/2"=1'	H 30.2, W 82.6 CM	INK	DRAFTING CLOTH
160-020	[PLAN NO. 2 FOR PROPOSED CHANGES IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1918/01/00				

160-021	[PLAN SHOWING PROPOSED] MERRIMACK DAM HOUSE / SHOWING PROPOSED CL FOR NEW R. R. TRACK & ALSO CLEARANCE LINE.	1918/06/21	1/2"=1'	H 59.7, W 89.6 CM	INK	PAPER
160-022	[PENCIL SKETCH PLAN OF] LOWER LOCKS WASTEWAY. FLASHBOARD PINS [ON PAWTUCKET DAM] / GRAPH OF TEST RESULTS /	1893/00/00	NONE	H 48.3, W 61 CM	GRAPHITE INK, COLORED INK,	PAPER
160-023-[A]	PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/28	NONE	H 29.5, W 45.7 CM	COLORED PENCIL	PAPER
160-023-[B]	FLASHBOARD PINS / GRAPH OF TEST RESULTS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/03/28	NONE	H 30.3, W 21.5 CM	INK, COLORED INK	PAPER
160-024	FLASHBOARD PINS / GRAPH OF TEST RESULTS [OF FLASHBOARD PINS ON PAWTUCKET DAM] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/04/21	NONE	H 46, W 105.5 CM	INK, COLORED INK	PAPER
160-025-[A]	[DETAIL OF] NUT FOR PAWTUCKET GATES.	1919/06/23	1/2 SIZE	H 60.3, W 38.1 CM	INK, GRAPHITE	PAPER
160-025-[B]	DETAIL OF NUT / FOR / PAWTUCKET GATES.	1919/06/23	1/2"=1"	H 40.4, W 28 CM	INK	DRAFTING CLOTH
160-025-[B]-[COPY 1]	DETAIL OF NUT / FOR / PAWTUCKET GATES.	1919/06/23	1/2"=1"	H 40.4, W 28 CM	BLUEPRINT	PAPER
160-026	[DETAIL OF] WASTE GATE AT LAWRENCE DAM.	1912/10/09	1 1/2",& 3"=1'	H 45.4, W 62.6 CM	BLUEPRINT	PAPER
160-027	PART PLAN (NORTH SIDE) / OF / MERRIMACK DAM / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1915/00/00	1"=1'	H 61.7, W 104.2 CM	GRAPHITE	DRAFTING CLOTH
160-028-A	CONTOURS OF / MERRIMACK RIVER BED / IN VICINITY OF FISHWAY.[BELOW] PAWTUCKET DAM. LOWELL, MASS.	1920/01/00	1/4"=1'	H 67.6, W 78.3 CM	GRAPHITE, COLORED PENCIL	PAPER

160-028-B	ELEVATIONS OF BED / OF / MERRIMACK RIVER / BELOW / PAWTUCKET DAM / NEAR / FISHWAY.	1919/09/00	1"=4'	H 68.4, W 73 CM	INK, COLORED INK	DRAFTING CLOTH
160-028-C	ELEVATIONS OF BED / OF MERRIMACK RIVER / BELOW / PAWTUCKET DAM / NEAR / FISHWAY.	1919/10/23	1"=4'	H 68.3, W 71.5 CM	BLUEPRINT	PAPER
160-028-D	[PLAN SHOWING CONTOURS OF] RIVER BED BETWEEN / [MERRIMACK RIVER BELOW] PAWTUCKET DAM & / SCHOOL ST.	1915/06/30	1"=50'	H 63.2, W 74.6 CM	INK, WATER COLOR, COLORED PENCIL	PAPER
160-028-E	[PLAN SHOWING] ELEVATIONS OF BED / OF / MERRIMACK RIVER / BELOW / PAWTUCKET DAM / NEAR / FISHWAY.	1919/09/00	1"=10'	H 34.6, W 41 CM	INK, COLORED INK	DRAFTING CLOTH
160-029	COMMONWEALTH OF MASSACHUSETTS / COMMISSION ON FISHERIES & GAME / GENERAL PLAN OF PROPOSED FISHWAY / AT PAWTUCKET DAM, LOWELL, MASS. / PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER.	1919/11/15	1"=4', 1/2"=1'	H 60.6, W 121.4 CM	BLUEPRINT	PAPER
160-030	[PLAN OF] SCREW FOR GATE HOIST / [OF] NORTHERN CANAL. HEAD GATES / AS MEASURED OCT. 1920 / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	SEE TITLE	1"=1'	H 21, W 56.5 CM	INK, COLORED INK	DRAFTING CLOTH
160-030-[COPY 1]	SCREW FOR GATE HOIST / NORTHERN CANAL HEAD GATES.	1920/10/00	1"=1'	H 21, W 56.4 CM	BLUEPRINT	PAPER

160-031	[PLAN & DETAILS OF] HYDRAULIC CYLINDER / OLD GUARD LOCKS GATE HOIST / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS. [SHOWING REPAIRS MADE IN NOV. 1920].	1920/11/15	3"=1', FULL SIZE	H 103.3, W 74.6 CM	INK, COLORED INK	DRAFTING CLOTH
160-031-[COPY 1]	HYDRAULIC CYLINDER / OLD GUARD LOCKS GATE HOIST / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/11/15	3"=1', FULL SIZE	H 103.3, W 74.6 CM	BLUEPRINT	PAPER
160-031-[COPY 2]	HYDRAULIC CYLINDER / OLD GUARD LOCKS GATE HOIST / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/11/15	3"=1', FULL SIZE	H 103.3, W 74.6 CM	BLUE LINE PRINT	PAPER
160-032	Y.M.C.A. GATES / MASONRY DRAWING. PROPRIETORS OF LOCKS & CANALS. / LOWELL, MASS.	1922/07/14	1/4"& 1/2"=1'	H 54.5, W 64 CM	INK	DRAFTING CLOTH
160-033	[BLUEPRINT SHOWING] DETAILS OF OPERATING MECHANISM FOR Y.M.C.A. GATES-MERRIMAC [SIC] CANAL / FOR THE / PROPRIETORS OF THE LOCKS AND CANALS. / LOWELL, MASS.	1922/07/26	3/4"=1'	H 70, W 121 CM	BLUEPRINT	PAPER
160-034	[PLAN & SECTION OF] PROPOSED SCHEMES / FOR / SLUICE GATES [ON NORTHERN CANAL TOGETHER WITH TWO OTHER SCHEMES].	1921/01/21	1"=50' & 4'	H 90, W 86.5 CM	INK	DRAFTING CLOTH
160-035	YMCA GATES / MASONRY / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/08/24	NONE	H 54.2, W 62.2 CM	INK	DRAFTING CLOTH
160-035-[COPY 1]	YMCA GATES / MASONRY / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/08/24	NONE	H 54.2, W 62.2 CM	BLUEPRINT	PAPER

160-036	[PLAN OF] MERRIMACK CANAL / PROPOSED Y.M.C.A. GATES / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/04/14	1/2"=1'	H 55, W 62.3 CM	INK	DRAFTING CLOTH
160-038	FLASH BOARDS / PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/02/04	1"=1'	H 28, W 40.6 CM	INK, COLORED INK	DRAFTING CLOTH
160-038-[COPY 1]	FLASH BOARDS / PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/02/04	1"=1'	H 28, W 40 CM	BLUEPRINT	PAPER
160-038-[COPY 2]	FLASH BOARDS / PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/02/04	1"=1'	H 28, W 40 CM	BLUEPRINT, GRAPHITE	PAPER
160-039	SHEET 1 / PROPOSED HYDRO-ELECTRIC UNITS / AT END OF MERRIMACK WASTEWAY & BOOTT PENSTOCK / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/00	1"=19'	H 76.3, W 96.4 CM	INK, COLORED INK	DRAFTING CLOTH
160-040	SHEET 2 / PROPOSED HYDRO-ELECTRIC UNITS / AT END OF MERRIMACK WASTEWAY & BOOTT PENSTOCK / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/01/00	1"=19'	H 74, W 93 CM	INK, COLORED INK	DRAFTING CLOTH
160-041	[PROPOSED SCHEME FOR] PAWTUCKET DAM WASTE GATES.	1923/04/21	1"=10'	H 39.7, W 53.7 CM	GRAPHITE	PAPER
160-042	[DESIGN FOR] PROPOSED WASTE GATES / AT / PAWTUCKET DAM / NEAR / THE FISHWAY.	1923/04/18	1/4"=1'	H 54.6, W 61.5 CM	GRAPHITE	PAPER
160-043	[DIAGRAM SHOWING] QUANTITIES OF WATER / PASSING / PAWTUCKET & MIDDLESEX CO'S. DAMS / FOR DIFFERENT HEIGHTS ON THE CRESTS.	1897/02/24	NONE	H 58.2, W 76.6 CM	INK, COLORED INK	CLOTH BACKED PAPER

160-044	[DETAILS OF] UPPER BEARING / FOR / SWAMP LOCKS LOCKING GATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/25	SEE NOTES	H 52, W 62.8 CM	INK	DRAFTING CLOTH
160-045	[DETAIL PLAN OF] PADDLE GATES / SWAMP LOCKS MIDDLE GATE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/28	1 1/2"=1'	H 61.2, W 75.7 CM	INK, COLORED INK	DRAFTING CLOTH
160-045-[COPY 1]	PADDLE GATES / SWAMP LOCKS MIDDLE GATE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/04/20	1 1/2"=1'	H 61, W 75.4 CM	BLUEPRINT	PAPER
160-046	[DETAIL PLAN OF] LOCKING GATE / SWAMP LOCKS MIDDLE SET / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/30	1"=1'	H 71.6, W 84.8 CM	INK	DRAFTING CLOTH
160-046-[COPY 1]	LOCKING GATE / SWAMP LOCKS MIDDLE SET / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/03/30	1"=1'	H 71.6, W 84.8 CM	BLUEPRINT	PAPER
160-047	[DETAILS OF] WORM & GEAR / [OF] SWAMP LOCKS MIDDLE GATES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/04/21	1/4 & 1/2 SIZE	H 54.7, W 62.6 CM	INK	DRAFTING CLOTH
160-047-[COPY 1]	WORM AND GEAR / SWAMP LOCKS MIDDLE GATES / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1921/04/21	1/4 & 1/2 SIZE	H 54.6, W 62.4 CM	BLUEPRINT, COLORD INK	PAPER
160-048	[PLAN & ELEVATION OF] SWAMP LOCKS PADDLE GATES / MIDDLE LOCKING GATES / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/04/11	2 1/2"=1', 1"=5'	H 55, W 62.4 CM	INK	DRAFTING CLOTH
160-048-[COPY 1]	SWAMP LOCKS PADDLE GATES / MIDDLE LOCKING GATES / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/04/11	2 1/2"=1',1"=5'	H 54.4, W 62.4 CM	BLUEPRINT	PAPER

160-049	[PLAN OF PROPOSED] STOP-LOG PIERS / [FOR] PAWTUCKET DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/07/20	1/2"=1'	H 47.5, W 75 CM	INK	DRAFTING CLOTH
160-050	[PRELIMINARY SKETCH OF ADJUSTABLE] FLASHBOARDS [FOR PAWTUCKET DAM].	UNDATED	1/2"=1'	H 59.5, W 74.9 CM	INK	PAPER
160-051	[SKETCH SHOWING] PROPOSED CHANGE / IN / CANAL WALL / AT ENTRANCE TO / MERRIMACK WASTEWAY.	1895/08/00	1"=1'	H 64.4, W 58 CM	INK, COLORED INK	PAPER
160-052	[PLAN AND ELEVATIONS OF] LAWRENCE [WASTE] DAM [WITH NOTATIONS BY H. F. MILLS].	1894/12/29	NONE	H 53.3, W 148.7 CM	INK	PAPER
160-053	[DRAWING OF] PAWTUCKET HEADGATES / MOTOR DRIVE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1923/04/05	1"=1'	H 35, W 36.8 CM	GRAPHITE	PAPER
160-054	PLAN & PROFILE / [OF] ROLLING DAM.	1923/12/11	1"=3'	H 54.6, W 63.2 CM	INK	DRAFTING CLOTH
160-055	DETAILS OF HEAD GATES FOR THE / MALLISON POWER CO. / SOUTH WINDHAM, MAINE. [HOLYOKE MACHINE CO., WORCESTER, MASS.]	1923/01/04	1 1/2" & 3/4"=1'	H 85.9, W 108.9 CM	BLUEPRINT	PAPER
160-056	ASSEMBLY & DETAILS / [OF] LEFT HAND LOCKING GATE / [AT] OLD GUARD LOCKS.	1924/10/23	1/2",1 1/2"& 1"=1'	H 58.7, W 95 CM	INK, COLORED INK	DRAFTING CLOTH
160-057	AUTOMOTIVE SLUICE GATE [OF H. B. PRATT, ANTRIM, N.H.].	1925/02/16	NONE	H 23.6, W 30.5 CM	BLUEPRINT	PAPER
160-058-[A]	[PLAN OF PROPOSED] NORTHERN CANAL / SLUICE GATES [WITH ESTIMATE].	1924/02/18	1/4"=1'	H 59.7, W 40.3 CM	GRAPHITE	TRACING PAPER
160-058-[B]	NORTHERN CANAL WASTE GATES.	1924/02/18	NONE	H 28.2, W 21 CM	INK	PAPER

160-059	GENERAL SCHEME # 1 / FOR A / PROPOSED SLUICEWAY / AT THE / LOWER LOCKS.	1941/08/00	1/4"=1',1"=10'	H 25 3/8", W 37 2/8"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
160-059-[COPY 1]	GENERAL SCHEME # 1 / FOR A / PROPOSED SLUICEWAY / AT THE / LOWER LOCKS.	1941/08/00	1/4"=1',1"=10'	H 63.5, W 91 CM	BLUEPRINT	PAPER
160-060	GENERAL SCHEME OF # 2 / FOR A / PROPOSED SLUICEWAY / AT THE / LOWER LOCKS.	1941/10/00	1/4",1"& 1/8"=1'	H 22", W 36"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
160-060-[COPY 1]	GENERAL SCHEME OF # 2 / FOR A / PROPOSED SLUICEWAY / AT THE / LOWER LOCKS.	1941/10/00	1/4",1"& 1/8"=1'	H 55.5, W 90 CM	BLUEPRINT	PAPER
160-061	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS [AND CANAL SYSTEM; HEAD GATES, WASTE GATES AND DAM WITH APPROXIMATE DISCHARGE OF SAME].	1939/06/12	1/8"=50'	H 78.6, W 53.4 CM	GRAPHITE	TRACING PAPER
160-062-[COPY 1]	TREMONT RACES / UNDER HALL ST.	1948/08/10	1/4"& 1/8"=1'	H 46.2, W 72.7 CM	BLUEPRINT	PAPER
160-062-[COPY 2]	TREMONT RACES / UNDER HALL ST.	1948/08/10	1/4"& 1/8"=1'	H 46.2, W 72.7 CM	BLUEPRINT	PAPER
160-063	PLAN OF / REMOTE CONTROL GATE HOUSE / AT THE / SWAMP LOCKS DAM / PROPRIETORS OF THE LOCKS AND CANALS.	1954/01/06	1"=1'	H 37.5, W 65 CM	INK	DRAFTING CLOTH
160-063	SCHEME # 2 / BOOTT DAM SIPHON.	UNDATED	1/8 ACTUAL SIZE	H 58.5, W 89 CM	INK, COLORED INK	PAPER
160-064	WASTE GATES, ELEV. / LOWER LOCKS DAM.	UNDATED	1"=2'	H 41.6, W 29.2 CM	GRAPHITE, COLORED PENCIL	PAPER

160-064	PLAN & SECTION / SOUTHERLY END OF / BOOTT DAM.	1947/10/11	1/2"=1'	H 38.8, W 76 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
160-064-[COPY 1]	WASTE GATES, ELEV. / LOWER LOCKS DAM.	UNDATED	1"=2'	H 41.1, W 29.2 CM	BLUEPRINT	PAPER
160-065	PLAN & SECTION / OF / HEAD GATES FOR 1 & 1A WHEELS / AT THE / JACKSON PROPERTIES INC.	1955/09/21	1/4"=1'	H 44, W 52.8 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
160-065	SCHEME NO.1 / PLAN OF PROPOSED / SLUICE GATE AND ICE GATE.	1952/07/00	1/2"=1'	H 26 1/2",W 30 6/8"	GRAPHITE, INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
160-065-[COPY 1]	PLAN & SECTION / OF / HEAD GATES FOR 1 & 1A WHEELS / AT THE / JACKSON PROPERTIES INC.	1955/09/21	1/4"=1'	H 44, W 52.8 CM	BLUEPRINT	DRAFTING CLOTH
160-066	SCHEME NO.2 / PLAN OF PROPOSED SLUICE GATES & ICE GATE / AT LOWER LOCKS DAM / LOWELL, MASS.	1955/04/18	1/2"=1'	H 22 2/8",W 31 1/2"	INK, WATER COLOR	DRAFTING CLOTH
160-066	GUARD LOCKS & / BOOTT DAM VALVE.	1941/11/12	NONE	H 50.2, W 73.5 CM	BLUEPRINT	PAPER
160-067	PLAN & ELEVATION / OF / LAWRENCE DAM HOUSE.	1951/12/15	3/4"=1'	H 59, W 76.5 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
160-067	TREMONT RACES / UNDER HALL & TREMONT STREETS.	1947/05/00	1/4"=1'	H 31, W 76.5 CM	INK	DRAFTING CLOTH
160-068	PLAN AND SIDE VIEW / OF RACK GEAR FOR / P. L.& C. HOISTING GATES AT / LOWER LOCKS DAM.	1958/06/04	1"=1"	H 31.7, W 69 CM	BLUEPRINT	PAPER
160-069	[SKETCH OF] GATE FOR NO. TWO WHEEL / TREMONT STATION.	1965/02/10	1"=1'	H 78.6, W 53.4 CM	GRAPHITE	TRACING PAPER
160-070	[DRAWING OF] FRAME-SWAMP LOCKS DAM / WELDED CONSTR.	1971/05/06	1"=1'	H 43.2, W 28 CM	GRAPHITE	PAPER

160-071	[SKETCH OF] PATCH-SWAMP LOCKS GATE.	1972/05/25	NONE	H 28, W 43.3 CM	GRAPHITE	PAPER
160-072	PROPOSED NO. 3 STEEL FRAME LOCKING GATES / AT / LOWER LOCKS DAM. / PROPRIETORS OF THE LOCKS & CANALS. LOWELL, MASS.	1953/03/00	1",1/2" & 3"=1'	H 74.9, W 94 CM	INK, WATER COLOR	PAPER
162-[126]	A TABLE SHOWING THE LAWFUL QUANTITIES FOR THE CORPORATIONS NAMED BELOW / WHEN THE FALL IS BELOW THE LAWFUL FALL.	UNDATED	NONE	H 28, W 21.5 CM	INK	PAPER
162-[127]	VALUATION OF WATER POWER DEVELOPMENT OF PROPRIETORS / OF LOCKS & CANALS, LOWELL, MASS.	1921/00/00	VARIOUS	H 21.5", W 25"	BLUPPRINT	SUPPORT
162-[128]	LOWELL, MASS. / PROP. OF LOCKS AND CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER, AND CANALS. / RED LINES - L.& C. PRIVATE TELEPHONE SYSTEM.	1921/03/04	1/2" = 100'	H 73, W 100 CM	LITHOGRAPH. INK	CLOTH BACKED PAPER
162-[129]	LINES OF ELEVATIONS OF WATER SURFACE / IN L.W.W. [LOWELL WATER WORKS] BOULEVARD WELLS.	SEE NOTES	NONE	H 56, W 102 CM	COLORED INK	PAPER
162-[130]	PLAN / SHOWING LOCATION OF / BOULEVARD WELLS / LOWELL, MASS.	1919/06/00	1"=100'	H 56, W 106 CM	BLUEPRINT, GRAPHITE	PAPER
162-[131]	LOWELL, MASS. / BOULEVARD SUPPLY WORKS / PLAN AND PROFILE SHOWING / EXTENSION OF WELL SYSTEM	1930/06/00	H 1"=50', V 1"=5'	H 76, W 93 CM	BLUEPRINT, COLORED PENCIL	PAPER

162-001-[1]	DIAGRAM / SHOWING HEIGHTS OF LAKE WINNIPISSIOGEE / AT / LAKEPORT N.H. FROM 1858 TO 1905 / FROM 50 YEARS RECORD OF LAKE COMPANY.	1910/01/20	NONE	H 61.3, W 177.4 CM	INK, COLORED INK	DRAFTING CLOTH
162-001-[2]	[DIAGRAM SHOWING HEIGHTS OF LAKE WINNIPISSIOGEE AT LAKEPORT N.H. FROM] 1911 TO 1914 [FROM 50 YEARS RECORD OF LAKE COMPANY].	SEE TITLE	NONE	H 60, W 98 CM	INK, COLORED INK	DRAFTING CLOTH
162-002	[DIAGRAMS SHOWING] FLOW OF WATER IN SMALL CHANNELS / DIAGRAM, (AFTER KUTTER) / FOR OBTAINING THE RELATIONS IN ENGLISH MEASURE BETEEN MEAN VELOCITY (V) / KUTTER'S COEFFICIENTS (C) / MEAN HYDRAULIC RADIUS (R) / [...SEE NOTES]	UNDATED	NONE	H 78.5, W 71 CM	INK	CLOTH BACKED PAPER
162-003	DIAGRAM / SHOWING / "R 4/3".	1903/01/00	NONE	H 34, W 86.4 CM	INK, COLORED INK	PAPER
162-004-[A]	PLAN OF / PROPOSED EXTENSION OF AIKEN ST. SEWER / INTO MERRIMACK RIVER.	1905/10/04	1"=10',4', 40'& 2'	H 47, W 71 CM	INK, COLORED INK	DRAFTING CLOTH
162-004-[A]-[COPY 1]	PLAN OF / PROPOSED EXTENSION OF AIKEN ST. SEWER / INTO MERRIMACK RIVER.	1905/10/04	NONE	H 46.4, W 70.3 CM	BLUEPRINT	PAPER
162-004-[A]-[COPY 2]	PLAN OF / PROPOSED EXTENSION OF AIKEN ST. SEWER / INTO MERRIMACK RIVER.	1905/10/04	NONE	H 46.4, W 70.3 CM	BLUEPRINT	PAPER
162-004-[B]	AIKEN ST. BRIDGE. / ABUTMENT ON SOUTHERLY SIDE OF / MERRIMACK RIVER / OFFICE OF THE CITY ENG'R. LOWELL MASS.	1882/03/00	1/4"=1'	H 59, W 74.6 CM	BLUEPRINT	PAPER

162-004-[C]	[UNTITLED. SEE NOTES.]	1905/09/14	NONE	H 28, W 21.8 CM	INK	PAPER
162-005-[A]	ELEVATION OF BANK AT BOOTT PENSTOCK EXTENSION / PLAN USED IN CASE OF ROSE SHINNERS VS. P.L.& C. / ON TRIAL APRIL 11 & 14, 1890.	SEE TITLE	NONE	H 56, W 77.2 CM	INK	PAPER
162-005-[B]	ELEVATION OF BANK AT BOOTT PENSTOCK EXTENSION / PLAN USED IN CASE OF ROSE SHINNERS VS. P.L.& C. / ON TRIAL APRIL 11 & 14, 1890.	SEE TITLE	NONE	H 48.3, W 77.2 CM	INK	PAPER
162-006	PLAN / SHOWING / THE LOCATION OF WHEELS / ON THE SEVERAL CORPORATIONS / AT MANCHESTER N.H [AND THE MILL POWERS FURNISHED EACH CORPORATION].	1895/11/00	1"=200'	H 33.5, W 96.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
162-007-[A]	[UNTITLED.] [DIAGRAM SHOWING TENSILE STRENGTH OF DIFFERENT CEMENTS FOR DIFFERENT PERIODS.]	1896/00/00	NONE	H 48.5, W 65 CM	BLUEPRINT	PAPER
162-007-[B]	[UNTITLED. SEE NOTES.]	UNDATED	NONE	H 58.7, W 75.9 CM	BLUEPRINT	PAPER
162-007-[C]-[1] & [2]	[UNTITLED. SEE NOTES.]	1896/11/03	NONE	H 26.5, W 20 CM	INK	PAPER
162-007-[D]	[UNTITLED. SEE NOTES.]	1896/10/27	NONE	H 14, W 23.5 CM	INK	PAPER
162-008	STADIA DIAGRAM / SHOWING CORRECTION TO / ELEVATION FOR INCLINED / STADIA MEASUREMENTS.	1900/01/00	NONE	H 56.2, W 94.8 CM	INK, COLORED INK	PAPER

162-009	[BLUEPRINT SHOWING BOSTON & MAINE R. R. WATER SUPPLY AT MIDDLESEX VILLAGE.]	UNDATED				
162-010-[A]	TABLE OF THE SQUARE ROOT OF 2GH / 0.001-0.165.	UNDATED	NONE	H 35, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[B]	TABLE OF THE SQUARE ROOT OF 2GH / 0.166-0.330.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[C]	TABLE OF THE SQUARE ROOT OF 2GH / 0.331-O.495.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[D]	TABLE OF THE SQUARE ROOT OF 2GH / 0.496-660.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[E]	TABLE OF THE SQUARE ROOT OF 2GH / 0.661-.825.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[F]	TABLE OF THE SQUARE ROOT OF 2GH / 0.826-0.990.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[G]	TABLE OF THE SQUARE ROOT OF 2GH / 0.991-1.155.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[H]	TABLE OF THE SUARE ROOT OF 2GH / 1.321-1.485.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[I]	TABLE OF THE SQUARE ROOT OF 2GH / 1.156-1.320.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[J]	TABLE OF THE SQUARE ROOT OF 2GH / 1.486-1.650.	UNDATED	NONE	H 34.7 ,W 22.3 CM	INK	DRAFTING CLOTH
162-010-[K]	TABLE OF THE SQUARE ROOT OF 2GH / 1.652-1.815.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[L]	TABLE OF THE SQUARE ROOT OF 2GH / 1.86-1.980.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[M]	TABLE OF THE SQUARE ROOT OF 2GH / 1.981-2.145.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[N]	TABLE OF THE SQUARE ROOT OF 2GH / 2.146-2.310.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH

162-010-[O]	TABLE OF THE SQUARE ROOT OF 2GH / 2.311-2.475.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[P]	TABLE OF THE SQUARE ROOT OF 2GH.	UNDATED	NONE	H 34.7, W 22.3 CM	INK	DRAFTING CLOTH
162-010-[Q]	C=1-0.116 (THE SQUARE ROOT OF D-0.1).	UNDATED	NONE	H 37.2, W 26 CM	INK	DRAFTING CLOTH
162-011	[DIAGRAM SHOWING] QUANTITY OF WATER / PASSING / MIDDLESEX CO'S DAM / FOR DIFFERENT HEIGHTS ON CREST.	1899/02/00	NONE	H 29.8, W 34.3 CM	INK	PAPER
162-012-[A]	QUANTITY OF WATER / PASSING / PAWTUCKET DAM / FOR DIFFERENT HEIGHTS ON CREST / Q=3.33 L.H. 3/2, L=1092.5 FT.	1899/02/00	NONE	H 23.6, W 34.6 CM	INK	PAPER
162-012-[B]	QUANTITY OF WATER / PASSING / PAWTUCKET DAM / FOR DIFFERENT HEIGHTS ON CREST / Q=3.33 L.H. 3/2, L=1092.5 FT.	1899/02/00	NONE	H 28, W 43.3 CM	INK	PAPER
162-012-[B]-[COPY 1]	QUANTITY OF WATER / PASSING / PAWTUCKET DAM / FOR DIFFERENT HEIGHTS ON CREST / Q=3.33 L.H. 3/2, L=1092.5 FT.	1899/02/00	NONE	H 28, W 43.5 CM	BLUEPRINT	PAPER
162-013-[A]	DIAGRAM / SHOWING / RELATION BETWEEN PERCENTAGES / OF / SURPLUS POWER ALLOWED / AND DRAWN [DATA TAKEN FROM 1901 & 1906].	1901/05/01	NONE	H 31.5, W 31.5 CM	INK	PAPER
162-013-[B]	DIAGRAM / SHOWING / RELATION BETWEEN PERCENTAGES / OF / SURPLUS POWER ALLOWED / AND DRAWN [DATA TAKEN FROM 1901 & 1906].	1906/00/00	NONE	H 27.3, W 27.3 CM	INK	PAPER

162-014-[A]	DIAGRAM / SHOWING / RELATION BETWEEN PERCENTAGES / OF SURPLUS POWER ALLOWED / AND DRAWN [1901-1906].	1901/05/01	NONE	H 31.5, W 31.5 CM	INK	PAPER
162-014-[B]	DIAGRAM / SHOWING / RELATION BETWEEN PERCENTAGES / OF / SURPLUS POWER ALLOWED / AND DRAWN [1901-1906].	1906/00/00	NONE	H 27.3, W 27.3 CM	INK	PAPER
162-015	[DIAGRAM SHOWING] COMPARISON BETWEEN MERRIMACK & BOOTT / MERRIMACK RIVER GAUGE READINGS, TAKEN ABOUT 11:00 A.M., / FROM LOWEST TO HIGHEST BY YEARS.	1912/06/23	NONE	H 29.2, W 45.8 CM	INK	PAPER
162-016	[TABLE OF] LAWFUL QUANTITIES & CERTAIN PERCENTAGES [BY THE DIFFERENT CORPORATIONS].	UNDATED	NONE	H 24.5, W 27.4 CM	INK	DRAFTING CLOTH
162-017	[TABLE OF] PERCENTAGES OF MILL POWERS [BY THE DIFFERENT CORPORATIONS.]	UNDATED	NONE	H 26, W 27.7 CM	INK	DRAFTING CLOTH
162-018-[A]	OFFICE OF THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER. / 66 BROADWAY, LOWELL, MASS. [DIAGRAM SHOWING] CURRENT METER RATING	UNDATED	NONE	H 31, W 24.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
162-018-[A]-[COPY 1]	OFFICE OF THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER. / 66 BROADWAY, LOWELL, MASS.	UNDATED	NONE	H 31, W 24.5 CM	INK	PAPER

162-018-[A]-[COPY 2]	OFFICE OF THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER. / 66 BROADWAY, LOWELL, MASS	UNDATED	NONE	H 31, W 24.5 CM	INK	PAPER
162-018-[A]-[COPY 3]	OFFICE OF THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER. / 66 BROADWAY, LOWELL, MASS	UNDATED	NONE	H 31, W 24.5 CM	INK	PAPER
162-018-[AA]	CURRENT METER RATING / A.T.S. BUFF & BUFF.	1916/12/11	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AB]	CURRENT METER RATING / BUFF & BUFF (A.T.S.).	1918/07/18	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AC]	CURRENT METER RATING / BUFF & BUFF (A.T.S.).	1919/06/04	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AD]	CURRENT METER RATING / A.T.S. BUFF & BUFF.	1919/09/29-30	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AE]	CURRENT METER RATING / ARTHUR T. SAFFORD'S BUFF & BUFF.	1920/02/24	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AF]	CURRENT METER RATING / BUFF & BUFF A.T. SAFFORD.	1934/09/10	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AG]	CURRENT METER RATING / BUFF & BUFF L.& C.	1916/05/25	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AH]	CURRENT METER RATING / BUFF & BUFF L.& C.	1916/09/14	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AI]	CURRENT METER RATING / BUFF & BUFF L.& C.	1916/12/08	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AJ]	CURRENT METER RATING / L.& C. BUFF & BUFF.	1919/09/30	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AK]	CURRENT METER RATING / L.& C. BUFF & BUFF.	1921/04/01	NONE	H 30.5, W 22.2 CM	INK	PAPER
162-018-[AL]	CURRENT METER RATING / BUFF & BERGER, LOCKS & CANALS.	1916/05/27	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AM]	CURRENT METER RATING / BUFF & BERGER.	1919/06/10	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AN]	CURRENT METER RATING / BUFF & BERGER FTELEY METER / CENTRAL ENGINEERING & CONSTRUCTION CO..	1920/09/22	NONE	H 30.5, W 27.2 CM	INK	PAPER

162-018-[AO]	CURRENT METER RATING / BUFF & BERGER LOCKS & CANALS / PROP. LOCKS & CANALS.	1920/10/02	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AP]	CURRENT METER RATING / BUFF & BERGER FTELEY METER / CENTRAL ENGINEERING & CONSTRUCTION CO..	1920/10/08	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AQ]	CURRENT METER RATING / BUFF & BERGER / STATE BOARD OF HEALTH.	1923/10/26	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AR]	CURRENT METER RATING / BUFF & BERGER / BUFF AND BUFF.	1931/08/14	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AS]	CURRENT METER RATING / BUFF & BERGER / PROP. LOCKS AND CANALS.	1946/04/23	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AT]	CURRENT METER RATING / C. L. BERGER & SONS / W. P. GYATT / LOCKPORT, N.Y.	1918/12/05	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AU]	CURRENT METER RATING / C. L. BERGER & SONS / HOWARD M. TURNER.	1923/09/27	NONE	H 30.5, W 22 CM	INK	PAPER
162-018-[AV]	CURRENT METER RATING / C. L. BERGER & SONS / DEPT. OF PUBLIC HEALTH.	1923/10/17	NONE	H 30.5, W 22 CM	INK	PAPER
162-018-[AW]	CURRENT METER RATING / C. L. BERGER & SONS.	1923/11/27	NONE	H 30.5, W 22 CM	INK	PAPER
162-018-[AX]	CURRENT METER RATING / C. L. BERGER & SONS / C. L. BERGER & SONS.	1938/04/06-07	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AY]	CURRENT METER RATING / C. L. BERGER & SONS / PROPS. LOCKS & CANALS.	1946/05/13	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[AZ]	CURRENT METER RATING / GURLEY, LOCKS & CANALS / PROPS. OF LOCKS & CANALS.	1916/05/25	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[B]	CURRENT METER RATING / BUFF & BUFF / LOCKS AND CANALS CO.	1915/08/12	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[BA]	RATING TABLE & DIAGRAM / OF / BUFF & BERGER.	1904/05/06	NONE	H 29.7, W 26.7 CM	INK	DRAFTING CLOTH

162-018-[BB]	RATING TABLE & DIAGRAM / OF / BUFF & BUFF CURRENT METER # 5495 / FOR LEDDER & PROBST.	1908/03/03	NONE	H 39.5, W 32.5 CM	INK	DRAFTING CLOTH
162-018-[BC]	RATING TABLE & DIAGRAM / OF / BUFF & BERGER METER # 2404 / BELONGING TO CITY OF FALL RIVER.	1909/10/18	NONE	H 34.3, W 31.5 CM	INK	DRAFTING CLOTH
162-018-[BD]	RATING TABLE & DIAGRAM / OF / L. S. S. BUFF & BERGER METER.	1904/07/06	NONE	H 39.4, W 35.5 CM	INK	DRAFTING CLOTH
162-018-[BE]	RATING TABLE & DIAGRAM / OF / BUFF & BUFF CURRENT METER # 8162 / RATED FOR HYDRAULIC RACE CO. LOCKPORT, N.Y.	1912/10/04	NONE	H 35, W 33 CM	INK	DRAFTING CLOTH
162-018-[BF]	DIAGRAM AND RATING TABLE / OF SMITH & BROOKS' C. L. BERGER / & SONS / CURRENT METER NO. 3858.	1913/09/25	NONE	H 38.4, W 35.4 CM	INK	DRAFTING CLOTH
162-018-[BG]	RATING TABLE & DIAGRAM / OF LOCKS & CANALS BUFF & BERGER CURRENT METER.	1911/12/06	NONE	H 38, W 33 CM	INK	DRAFTING CLOTH
162-018-[BH]	RATING TABLE / OF LOCKS & CANALS / BUFF & BUFF CURRENT METER # 8163.	1914/03/20	NONE	H 33, W 33 CM	INK	DRAFTING CLOTH
162-018-[BI]	RATING TABLE AND DIAGRAM / OF / L.& C. BUFF AND BERGER METER.	1915/05/04-06	NONE	H 40, W 38 CM	INK	DRAFTING CLOTH
162-018-[BJ]	RATING CURVE / ARTHUR T. SAFFORD'S METER. / BUFF & BUFF.	UNDATED	NONE	H 21.5, W 31.4 CM	INK	PAPER
162-018-[BK]	RATING TABLE AND DIAGRAM / OF / BUFF & BUFF CURRENT METER # 3842. / RATED FOR S. D. WARREN & CO.	1905/07/14	NONE	H 30.6, W 28 CM	INK, COLORED INK	DRAFTING CLOTH
162-018-[BL]	RATING TABLE AND DIAGRAM / OF / INTERNATIONAL PAPER CO. BUFF & BUFF CURRENT METER # 5494 / FOR LEDDER & PROBST.	1907/12/26	NONE	H 41.4, W 28.6 CM	INK	DRAFTING CLOTH

162-018-[BM]	RATING TABLE AND DIAGRAM / OF / INTERNATIONAL PAPER CO. BUFF & BUFF CURRENT METER # 5325.	1907/06/08	NONE	H 36.5, W 33.5 CM	INK	DRAFTING CLOTH
162-018-[BN]	RATING TABLE / OF / H. S. FERGUSON'S / BUFF & BUFF CURRENT METER.	1912/08/09	NONE	H 30.5, W 30.5 CM	INK	DRAFTING CLOTH
162-018-[BO]	RATING TABLE & DIAGRAM / OF / BUFF & BUFF CURRENT METER NO. 3851 / FOR THOMAS W. ORBISON, CONS. ENGR.	1913/11/03	NONE	H 34.7, W 33 CM	INK	DRAFTING CLOTH
162-018-[BP]	RATING TABLE / OF / A. T. SAFFORD'S / BUFF & BUFF CURRENT METER # 4176.	1913/06/00	NONE	H 33.4, W 33.4 CM	INK	DRAFTING CLOTH
162-018-[BQ]	RATING TABLE / OF / TURNERS FALLS CO'S. / BUFF & BUFF CURRENT METER # 5068.	1914/07/09	NONE	H 33, W 33 CM	INK	DRAFTING CLOTH
162-018-[BR]	RATING / OF / LOCKS & CANALS / BUFF & BUFF CURRENT METER # 8163.	1914/05/01	NONE	H 33.6, W 33.6 CM	INK	DRAFTING CLOTH
162-018-[BS]	RATING / OF / MR. A.T. SAFFORD'S / BUFF & BUFF CURRENT METER # 4176.	1916/09/14	NONE	H 34.4, W 33 CM	INK	DRAFTING CLOTH
162-018-[BT]	RATING / OF / A.T.S.-BUFF & BUFF CURRENT METER # 4176.	1916/06/10-16	NONE	H 28, W 22 CM	INK	DRAFTING CLOTH
162-018-[BU]	RATING / OF / L. & C. BUFF CURRENT METER # 8163.	1916/06/10-16	NONE	H 30, W 28 CM	INK	DRAFTING CLOTH
162-018-[BV]	RATING / OF / LOCKS & CANALS / BUFF & BUFF CURRENT METER # 8163.	1916/09/14	NONE	H 33.3, W 33 CM	INK	DRAFTING CLOTH
162-018-[BW]	RATING CURVE OF / A.T. SAFFORDS B & B METER NO.4176.	1916/12/13	NONE	H 30.8, W 24.7 CM	INK	DRAFTING CLOTH
162-018-[C]	CURRENT METER RATING / BUFF & BUFF / TURNERS FALLS POWER CO.	1917/01/15-16	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[CA]	RATING OF / LOCKS & CANALS / PRICE CURRENT METER.	1923/06/06	NONE	H 29.5, W 45.7 CM	INK, COLORED PENCIL	PAPER
162-018-[CC]	RATING TABLE & DIAGRAM / OF / GURLEY CURRENT METER # 286. / BELONGING TO UNIVERSITY OF MAINE.	1905/09/20	NONE	H 24.6, W 24.8 CM	INK	DRAFTING CLOTH

162-018-[CD]	RATING TABLE & DIAGRAM / OF / INTERNATIONAL PAPER CO'S LARGE GURLEY METER.	1906/10/21	NONE	H 26, W 27.4 CM	INK	DRAFTING CLOTH
162-018-[CE]	RATING TABLE & DIAGRAM / OF / PRICE-GURLEY CURRENT METER NO.121. / RATED FOR INTERNATIONAL PAPER CO.	1908/07/29	NONE	H 28, W 33 CM	INK	DRAFTING CLOTH
162-018-[CF]	RATING TABLE & DIAGRAM / OF / METROPOLITAN SEWERAGE GURLEY METER / FOR A.F.F. HASKELL.	1910/07/19	NONE	H 23, W 33.4 CM	INK	DRAFTING CLOTH
162-018-[CG]	RATING TABLE & DIAGRAM / OF / METROPOLITAN SEWERAGE GURLEY METER FOR A.F.F. HASKELL.	1910/09/13	NONE	H 23, W 30.5 CM	INK	DRAFTING CLOTH
162-018-[CH]	RATING TABLE & DIAGRAM / OF / LOCKS & CANALS GURLEY CURRENT METER # 2.	1913/07/09	NONE	H 25.5, W 30.6 CM	INK	DRAFTING CLOTH
162-018-[CI]	RATING CURVE / OF / L.& C. SMALL PRICE METER (GURLEY).	1924/04/16	NONE	H 29, W 45.8 CM	INK	PAPER
162-018-[CJ]	RATING TABLE & DIAGRAM / OF / LOCKS & CANALS "SECRETAN" CURRENT METER # 69.	1905/04/13	NONE	H 26.8, W 25.8 CM	INK	DRAFTING CLOTH
162-018-[CK]	RATING CURVE / OF / LOCKS & CANALS HELICOIDAL MOULINET / CURRENT METER # 3.	1913/06/16	NONE	H 58, W 38.5 CM	INK	DRAFTING CLOTH
162-018-[CL]-[1]	RATING TABLE & DIAGRAM / OF / H. S. FERGUSON'S GURLEY CURRENT / METER NO. 374.	1908/05/09	NONE	H 26, W 24.2 CM	INK	DRAFTING CLOTH
162-018-[CL]-[2]	RATING TABLE & DIAGRAM / OF / H. S. FERGUSON'S GURLEY CURRENT / METER NO. 374.	1913/07/03	NONE	H 25.4, 28.3 CM	INK	DRAFTING CLOTH
162-018-[D]	CURRENT METER RATING / BUFF & BUFF / TURNERS FALLS POWER CO.	1917/01/16	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[E]	CURRENT METER RATING / BUFF & BUFF / HYDRAULIC RACE CO., LOCKPORT, N.Y.	1917/10/03	NONE	H 30.5, W 27.2 CM	INK	PAPER

162-018-[F]	CURRENT METER RATING / BUFF & BUFF.	1918/07/11	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[G]	CURRENT METER RATING / BUFF & BUFF.	1919/05/16	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[H]	CURRENT METER RATING / A.T.S. BUFF & BUFF.	1919/10/10	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[I]	CURRENT METER RATING / BUFF & BUFF.	1919/06/03	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[J]	CURRENT METER RATING / BUFF & BUFF.	1920/02/00	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[K]	CURRENT METER RATING / BUFF & BUFF.	1920/04/15	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[L]	CURRENT METER RATING / BUFF & BUFF.	1921/06/27	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[M]	CURRENT METER RATING / BUFF & BUFF.	1920/06/10	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[N]	CURRENT METER RATING / BUFF & BUFF / HYDRAULIC RACE CO., LOCKPORT, N.Y.	1923/07/05	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[O]	CURRENT METER RATING / BUFF & BUFF / STATE BD. OF HEALTH, NEWTON, MASS,	1923/08/31	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[P]	CURRENT METER RATING / BUFF & BUFF / STATE BOARD OF HEALTH, NEWTON MASS.	1923/08/31	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[Q]	CURRENT METER RATING / BUFF & BUFF MFG. CO.	1923/10/22	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[R]	CURRENT METER RATING / BUFF & BUFF.	1924/04/17	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[S]	CURRENT METER RATING / BUFF & BUFF.	1924/04/17	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[T]	CURRENT METER RATING / BUFF & BUFF / HOLLINGSWORTH & WHITNEY.	1924/09/18	NONE	H 30.5, W 22 CM	INK	PAPER
162-018-[U]	CURRENT METER RATING / BUFF & BUFF.	1927/09/07	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[V]	CURRENT METER RATING / BUFF & BUFF / HOLLINGSWORTH & WHITNEY.	1932/09/06	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[W]	CURRENT METER RATING / BUFF & BUFF / BUFF $ BUFF MFG. CO.	1938/08/07	NONE	H 30.5, W 27.2 CM	INK	PAPER

162-018-[X]	CURRENT METER RATING / BUFF & BUFF / LOCKS AND CANALS.	1943/09/21	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[Y]	CURRENT METER RATING / BUFF & BUFF A.T.S.	1916/05/22	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-[Z]	CURRENT METER RATING / A.T.S. BUFF & BUFF.	1916/09/14	NONE	H 30.5, W 27.2 CM	INK	PAPER
162-018-A-[01]-[COPY 1]	SECTIONS OF / CURRENT METER MEASURING / STATIONS / AT THE / SACO-LOWELL SHOPS.	1913/00/00	NONE	H 20.2, W 26.7 CM	BLUEPRINT, GRAPHITE	PAPER
162-018-A-[01]-[COPY 2]	SECTIONS OF / CURRENT METER MEASURING / STATIONS / AT THE / SACO-LOWELL SHOPS.	1913/00/00	NONE	H 20.2, W 26.7 CM	BLUEPRINT	PAPER
162-018-A-[01]-[COPY 3]	SECTIONS OF / CURRENT METER MEASURING / STATIONS / AT THE / SACO-LOWELL SHOPS.	1913/00/00	NONE	H 20.2, W 26.2 CM	BLUEPRINT	PAPER
162-018-A-[02]-[COPY 1]	RATING TABLE & DIAGRAM / OF / LOCKS & CANALS BUFF & BERGER CURRENT METER.	1913/06/00	NONE	H 38, W 33 CM	BLUEPRINT	PAPER
162-018-A-[02]-[COPY 2]	RATING TABLE & DIAGRAM / OF / LOCKS & CANALS BUFF & BERGER CURRENT METER.	1913/06/00	NONE	H 37.8, W 33 CM	BLUEPRINT	PAPER
162-018-A-[02]-[COPY 3]	RATING TABLE & DIAGRAM / OF / LOCKS & CANALS BUFF & BERGER CURRENT METER.	1913/06/00	NONE	H 37.8, W 33 CM	BLUEPRINT	PAPER
162-018-A-[03]	CURRENT METER RATING / PRICE GURLEY.	1916/03/30	NONE	H 30.2, W 27 CM	BLUEPRINT	PAPER
162-018-A-[04]	CURRENT METER RATING / BUFF & BUFF A.T.S.	1916/05/22	NONE	H 30.2, W 27 CM	BLUEPRINT	PAPER
162-018-A-[05]	CURRENT METER RATING / BUFF & BUFF L.& C.	1916/05/25	NONE	H 30.5, W 27 CM	BLUEPRINT	PAPER
162-018-A-[06]	CURRENT METER RATING / BUFF & BERGER, LOCKS & CANALS.	1916/05/27	NONE	H 30.2, W 27 CM	BLUEPRINT	PAPER
162-018-A-[07]	CURRENT METER RATING / BUFF & BUFF L.& C.	1916/09/14	NONE	H 30.1, W 27.2 CM	BLUEPRINT	PAPER
162-018-A-[08]	CURRENT METER RATING / GURLEY (PRICE).	1922/12/14	NONE	H 30.5, W 26.6 CM	BLUEPRINT	PAPER
162-018-A-[09]	CURRENT METER RATING / BUFF & BUFF (A.T.S.).	1918/07/18	NONE	H 30.5, W 27 CM	BLUEPRINT	PAPER

162-018-A-[10]	CURRENT METER RATING / GURLEY (PRICE) [METER FOR METCALF & EDDY].	1922/12/18	NONE	H 30.8, W 26.5 CM	BLUEPRINT	PAPER
162-018-A-[11]	CURRENT METER READING / BUFF & BUFF, L.& C.	1916/09/14	NONE	H 30.8, W 26.5 CM	BLUEPRINT	PAPER
162-018-A-[12]	RATING TABLE FOR COMBINATION METER NO. 695.	1920/04/19	NONE	H 21, W 13 CM	BLUEPRINT	PAPER
162-018-A-[13]	RATING / OF / A.T.S.-BUFF & BUFF CURRENT METER # 4176.	SEE NOTES	NONE	H 28, W 21.5 CM	BLUEPRINT	PAPER
162-018-A-[14]	RATING / OF / L.& C. BUFF & BUFF CURRENT METER # 8163.	SEE NOTES	NONE	H 28, W 21.5 CM	BLUEPRINT	PAPER
162-018-A-[15]-[COPY 1]	RATING TABLE / OF / A. T. SAFFORD'S / BUFF & BUFF CURENT METER # 4176.	1913/06/00	NONE	H 33, W 33 CM	BLUEPRINT	PAPER
162-018-A-[15]-[COPY 2]	RATING TABLE / OF / A. T. SAFFORD'S / BUFF & BUFF CURENT METER # 4176.	1913/06/00	NONE	H 33, W 33 CM	BLUEPRINT	PAPER
162-018-A-[16]	RATING / OF / MR. A. T. SAFFORD'S BUFF & BUFF CURRENT METER # 4176.	1916/09/14	NONE	H 34.3, W 33 CM	BLUEPRINT	PAPER
162-018-A-[17]	RATING / OF / LOCKS & CANALS / BUFF & BUFF CURRENT METER # 8163.	1916/09/14	NONE	H 33, W 33 CM	BLUEPRINT	PAPER
162-018-A-[18]	RATING TABLE / OF / LOCKS & CANALS / BUFF & BUFF CURRENT METER # 8163.	1914/03/20	NONE	H 33, W 33 CM	BLUEPRINT	PAPER
162-018-A-[19]	RATING TABLE & DIAGRAM / OF / L. S. S. BUFF & BERGER METER.	1913/06/16	NONE	H 40.2, W 36 CM	BLUEPRINT	PAPER
162-018-A-[20]-[COPY 1]	RATING TABLE & DIAGRAM / OF / L. S. S. BUFF & BERGER METER.	1914/06/18	NONE	H 40, W 36 CM	BLUEPRINT	PAPER
162-018-A-[20]-[COPY 2]	RATING TABLE & DIAGRAM / OF / L. S. S. BUFF & BERGER METER..	1914/06/18	NONE	H 40.2, W 36 CM	BLUEPRINT	PAPER
162-018-A-[20]-[COPY 3]	RATING TABLE & DIAGRAM / OF / L. S. S. BUFF & BERGER METER..	1914/06/18	NONE	H 40, W 36 CM	BLUEPRINT	PAPER
162-018-A-[20]-[COPY 3]-[A]	U.S. GEOLOGICAL SURVEY-WATER RESOURCES BRANCH / RATING TABLE FOR TYPE A CURRENT METER NO.1711.	1942/11/07	NONE	H 25.4, W 29.6 CM	INK	PAPER

162-018-A-[20]-[COPY 3]-[B]	[UNTITLED. SEE NOTES.]	1944/07/27	NONE	H 28, W 21.5 CM	INK	PAPER
162-018-A-[21]-[COPY 1]	RATING CURVE / OF / LOCKS & CANALS HELIOCOIDAL MOULINET / CURRENT METER # 3.	1913/06/16	NONE	H 58.5, W 38 CM	BLUEPRINT	PAPER
162-018-A-[21]-[COPY 2]	RATING CURVE / OF / LOCKS & CANALS HELIOCOIDAL MOULINET / CURRENT METER # 3	1913/06/16	NONE	H 58.5, W 38 CM	BLUEPRINT	PAPER
162-018-A-[22]	CURRENT METER RATING / BUFF & BUFF (A.T.S.).	1919/06/04	NONE	H 30.4, W 27 CM	BLUEPRINT	PAPER
162-018-A-[23]	CURRENT METER RATING / BUFF & BUFF.	1920/02/00	NONE	H 30.4, W 27 CM	BLUEPRINT	PAPER
162-018-A-[24]	CURRENT METER RATING / A. T. SAFFORD'S BUFF & BUFF.	1920/02/24	NONE	H 30.4, W 27 CM	BLUEPRINT	PAPER
162-018-A-[25]	CURRENT METER RATING / BUFF & BUFF.	1943/09/21	NONE	H 30.2, W 27 CM	BLUEPRINT	PAPER
162-018-A-[26]	CURRENT METER RATING / C. L. BERGER & SONS.	1946/05/13	NONE	H 30.2, W 27 CM	BLUEPRINT	PAPER
162-018-A-[27]	CURRENT METER RATING / BUFF & BERGER.	1946/04/23	NONE	H 30.2, W 27 CM	BLUEPRINT	PAPER
162-019-001	[DIAGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF / NO. 1 PAIR [HAMILTON MFG. CO. WHEELS 36" STYLE C, HERCULES INSTALLED IN 1907].	1913/10/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-001-[COPY 1]	HAMILTON MFG. CO. / DISCHARGE OF / NO. 1 PAIR.	1913/10/00	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-002	[DIAGRAM SHOWING] BIGELOW CARPET CO. / DISCHARGE OF / WHEELS NOS. 1, 2 OR 3 / UNITS OF FOUR.	1913/10/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-003	[DIAGRAM SHOWING] BIGELOW CARPET CO. / DISCHARGE OF / WHEELS NOS. 1, 2 OR 3 / UNITS OF FOUR.	1913/12/00	NONE	H 27, W 40 CM	INK, COLORED INK	PAPER

162-019-003-[COPY 1]	BIGELOW CARPET CO. / DISCHARGE OF / WHEELS NOS. 1, 2 OR 3 / UNITS OF FOUR.	1913/12/00	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-003-[COPY 2]	BIGELOW CARPET CO. / DISCHARGE OF / WHEELS NOS. 1, 2 OR 3 / UNITS OF FOUR.	1913/12/00	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-004-[COPY 1]	LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NO.1, 2 & 3/51 INCH TYPE "D" HERCULES WHEELS / NO 1 & 2 (R.H.) & 3 (L.H.) / IN USE FROM MARCH 8, 1909.	SEE TITLE	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-004-[COPY 2]	LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NO.1, 2 & 3/51 INCH TYPE "D" HERCULES WHEELS / NO 1 & 2 (R.H.) & 3 (L.H.) / IN USE FROM MARCH 8, 1909.	SEE TITLE	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-005-[COPY 1]	[DIAGRAM SHOWING] LAWRENCE MFG.CO. / DISCHARGE OF / WHEELS NOS. 4, 5, OR 6 / UNITS OF TWO / 24" TYPE D, HERCULES WHEELS / INSTALLED IN 1915 & 1916.	SEE TITLE	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-005-[COPY 2]	[DIAGRAM SHOWING] LAWRENCE MFG.CO. / DISCHARGE OF / WHEELS NOS. 4, 5, OR 6 / UNITS OF TWO / 24" TYPE D, HERCULES WHEELS / INSTALLED IN 1915 & 1916.	SEE TITLE	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-006	[DIAGRAM SHOWING] LAWRENCE SECTION / OF / TREMONT & SUFFOLK MILLS / DISCHARGE OF / W HEELS NOS. 3 & 4 / R.H. 54 INCH HERCULES [WHEELS].	1913/12/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-006-[COPY 1]	LAWRENCE SECTION / OF / TREMONT & SUFFOLK MILLS / DISCHARGE OF / WHEELS NOS 3 & 4 / R.H. 54 INCH HERCULES.	1913/12/00	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER

162-019-006-[COPY 2]	LAWRENCE SECTION / OF / TREMONT & SUFFOLK MILLS / DISCHARGE OF / WHEELS NOS 3 & 4 / R.H. 54 INCH HERCULES.	1913/12/00	NONE	H 28.5, W 43 CM	BLUEPRINT	PAPER
162-019-007	[DIAGRAM SHOWING] TREMONT & SUFFOLK MILLS / LAWRENCE SECTION / DISCHARGE OF / WHEELS NOS. 1 & 2 / L.H. 54" HERCULES / IN USE FROM NOV. 13, 1896.	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-007-[COPY 1]	TREMONT & SUFFOLK MILLS / LAWRENCE SECTION / DISCHARGE OF / WHEELS NOS. 1 & 2 / L.H. 54 INCH HERCULES / IN USE FROM NOV. 13, 1896.	SEE TITLE	NONE	H 11 1/2", W W 16"	BLUEPRINT	PAPER
162-019-007-[COPY 2]	TREMONT & SUFFOLK MILLS / LAWRENCE SECTION / DISCHARGE OF / WHEELS NOS. 1 & 2 / L.H. 54 INCH HERCULES / IN USE FROM NOV. 13, 1896.	SEE TITLE	NONE	H 11 1/2", W W 16"	BLUEPRINT	PAPER
162-019-008	[DIAGRAM SHOWING] L. I. D. / MASS. COTTON MILLS / DISCHARGE OF / WHEELS NOS. 2A, 2B, & 2C [CROSSED OUT AND WRITTEN OVER] 1, 2 & 3 / PAIRS OF 48" TYPE C HERCULES WHEELS / INSTALLED IN 1910.	1910/00/00	NONE	H 28, W 40 CM	INK, COLORED INK	PAPER
162-019-008-[COPY 1]	L. I. D. / MASS. COTTON MILLS / DISCHARGE OF / WHEELS NOS. 2A, 2B, & 2C [CROSSED OUT AND WRITTEN OVER] 1, 2 & 3 / PAIRS OF 48" TYPE C HERCULES WHEELS / INSTALLED IN 1910.	1910/00/00	NONE	H 28, W 40 CM	BLUEPRINT	PAPER

162-019-008-[COPY 2]	L. I. D. / MASS. COTTON MILLS / DISCHARGE OF / WHEELS NOS. 2A, 2B, & 2C [CROSSED OUT AND WRITTEN OVER] 1, 2 & 3 / PAIRS OF 48" TYPE C HERCULES WHEELS / INSTALLED IN 1910.	1910/00/00	NONE	H 28, W 40 CM	BLUEPRINT	PAPER
162-019-009	[DIAGRAM SHOWING] MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NOS.5 & 6 PAIR / 36" TYPE "C" HERCULES [INSTALLED 1911].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-009-[COPY 1]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NOS. 5 & 6 PAIR / 39 INCH TYPE "C" HERCULES / TEST R.H.1639 TEST L.H.1644	SEE NOTES	NONE	H 11 1/2", W 16 3/4"	BLUEPRINT	PAPER
162-019-009-[COPY 2]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NOS. 5 & 6 PAIR / 39 INCH TYPE "C" HERCULES / TEST R.H.1639 TEST L.H.1644	SEE NOTES	NONE	H 11 1/2", W 16 3/4"	BLUEPRINT	PAPER
162-019-010	[DIAGRAM SHOWING] MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NO'S.10 & 11 / 42 INCH HERCULES / IN USE FROM OCT.1, 1894.	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-010-[COPY 1]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NO'S.10 & 11 / 42 INCH HERCULES / IN USE FROM OCT.1, 1894.	SEE TITLE	NONE	H 11 1/2", W 17 1/4"	BLUEPRINT	PAPER
162-019-010-[COPY 2]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NO'S.10 & 11 / 42 INCH HERCULES / IN USE FROM OCT.1, 1894.	SEE TITLE	NONE	H 28.9, W 45.5 CM	BLUEPRINT	PAPER

162-019-011	[DIAGRAM SHOWING] TREMONT & SUFFOLK MILLS / DISCHARGE OF / WHEELS NOS. 1, 1A [& 2, 2A] TREMONT / 1, 1A; 3, 3A & 4 SUFFOLK / L.H. 48 INCH STANDARD VICTORS / IN USE FROM APRIL 1, 1897.	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-011-[COPY 1]	TREMONT & SUFFOLK MILLS / DISCHARGE OF / WHEELS NOS. 1, 1A TREMONT / 1, 1A; 3, 3A & 4 SUFFOLK / L.H. 48 INCH STANDARD VICTORS / IN USE FROM APRIL 1, 1897.	SEE TITLE	NONE	H 11 3/8", W 17 3/4"	BLUEPRINT	PAPER
162-019-011-[COPY 2]	TREMONT & SUFFOLK MILLS / DISCHARGE OF / WHEELS NOS. 1, 1A TREMONT / 1, 1A; 3, 3A & 4 SUFFOLK / L.H. 48 INCH STANDARD VICTORS / IN USE FROM APRIL 1, 1897.	SEE TITLE	NONE	H 11 3/8", W 17 3/4"	BLUEPRINT	PAPER
162-019-012	[DIAGRAM SHOWING] SUFFOLK MILLS / DISCHARGE OF / WHEEL NO. 2 / [A] 54 INCH VICTOR / IN USE FROM NOV. 12, 1895.	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-012-[COPY 1]	SUFFOLK MILLS / DISCHARGE OF / WHEEL NO. 2 / 54 INCH VICTOR / IN USE FROM NOV. 12, 1895.	SEE TITLE	NONE	H 29.2, W 45.7 CM	BLUEPRINT	PAPER
162-019-012-[COPY 2]	SUFFOLK MILLS / DISCHARGE OF / WHEEL NO. 2 / 54 INCH VICTOR / IN USE FROM NOV. 12, 1895.	SEE TITLE	NONE	H 29.2, W 45.7 CM	BLUEPRINT	PAPER
162-019-013	[DIAGRAM SHOWING] TREMONT & SUFFOLK MILLS / DISCHARGE OF WHEEL[S] NO[S]. [4 & 4A TREMONT AND] 4A SUFFOLK / R.H. 48" STANDARD VICTOR[S]. IN USE FROM APR.1, 1897.	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER

162-019-013-[COPY 1]	TREMONT & SUFFOLK MILLS / DISCHARGE OF WHEEL NO. 4A SUFFOLK / R.H. 48" STANDARD VICTOR. IN USE FROM APR.1, 1897.	SEE TITLE	NONE	H 11 1/2", W 16"	BLUEPRINT	PAPER
162-019-013-[COPY 2]	TREMONT & SUFFOLK MILLS / DISCHARGE OF WHEEL NO. 4A SUFFOLK / R.H. 48" STANDARD VICTOR. IN USE FROM APR.1, 1897.	SEE TITLE	NONE	H 11 1/2", W 16"	BLUEPRINT	PAPER
162-019-014-[COPY 1]	[DIAGRAM SHOWING] APPLETON CO. / DISCHARGE / OF / NO. 1 L.H. OR 1A R.H. / 54 INCH McCORMICKS / IN USE FROM MARCH 1, 1901.	SEE TITLE	NONE	H 11 1/2", W 18"	BLUEPRINT, COLORED INK	PAPER
162-019-014-[COPY 2]	APPLETON CO. / DISCHARGE / OF / NO. 1 L.H. OR 1A R.H. / 54 INCH McCORMICKS / IN USE FROM MARCH 1, 1901.	SEE TITLE	NONE	H 11", W 17"	BLUEPRINT	PAPER
162-019-014-[COPY 3]	APPLETON CO. / DISCHARGE / OF / NO. 1 L.H. OR 1A R.H. / 54 INCH McCORMICKS / IN USE FROM MARCH 1, 1901.	SEE TITLE	NONE	H 11", W 17"	BLUEPRINT	PAPER
162-019-015	[DIAGRAM SHOWING] APPLETON CO. / DISCHARGE OF / NOS. 2, 3, & 4 PAIRS OF / 39 INCH McCORMICKS [IN USE FROM JULY 1, 1895].	SEE TITLE	NONE	H 29, W 45.7 CM	INK	PAPER
162-019-015-[COPY 1]	APPLETON CO. / DISCHARGE OF / NOS. 2, 3, & 4 PAIRS OF / 39 INCH McCORMICKS.	SEE NOTES	NONE	H 29, W 45.7 CM	BLUEPRINT	PAPER
162-019-016-[COPY 1]	[DIAGRAM SHOWING] JACKSON / APPLETON CO. / DISCHARGE OF WHEELS NOS. 5 & 5A / 48 INCH McCORMICKS.	1905/04/08-10	NONE	H 27.5, W 38.5 CM	BLUEPRINT, GRAPHITE	PAPER

162-019-016-[COPY 2]	JACKSON / APPLETON CO. / DISCHARGE OF WHEELS NOS. 5 & 5A / 48 INCH McCORMICKS.	1905/04/08-10	NONE	H 21, W 49.5 CM	BLUEPRINT	PAPER
162-019-016-[COPY 3]	JACKSON / APPLETON CO. / DISCHARGE OF WHEELS NOS. 5 & 5A / 48 INCH McCORMICKS.	1905/04/08-10	NONE	H 21, W 49.5 CM	BLUEPRINT	PAPER
162-019-017	[DIAGRAM SHOWING] MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NO. 3 OR NO. 4 / 45" SPECIAL McCORMICKS.	UNDATED	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-017-[COPY 1]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NO. 3 OR NO. 4 / 45 INCH SPECIAL McCORMICKS	UNDATED	NONE	H 11 1/2", W 17"	BLUEPRINT	PAPER
162-019-017-[COPY 2]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEELS NO. 3 OR NO. 4 / 45 INCH SPECIAL McCORMICKS	UNDATED	NONE	H 11 1/2", W 17"	BLUEPRINT	PAPER
162-019-018	[DIAGRAM SHOWING] TREMONT MILLS / DISCHARGE OF / WHEEL NO. 3 / [A] 100" HUMPHREY IXL [IN USE FROM APRIL 1, 1894].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-019	[DIAGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF / WHEEL NO. 5 / 88" BOYDEN. [9,-120" BOYDEN. 10,-121" BOYDEN.]	1913/11/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-020	HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 9 & 10 / NO. 9 120 INCH BOYDEN / NO. 10 120 INCH BOYDEN.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-021	[DIAGRAM SHOWING] LAWRENCE MFG. CO. / WHEEL NO. [4] 5 [& 6] / 106" BOYDEN[S] [IN USE FROM APRIL 1,1894].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER

162-019-022	[DIAGRAM SHOWING] LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NOS. 4 [5] & 6 106" BOYDEN[S] [IN USE FROM APRIL 1,1894].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-023	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEEL NO.1 / 108 5/8" BOYDEN [IN USE FROM JAN 1,1900].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-024	[DIAGRAM SHOWING] MASS. COTTON MILLS / DISCHARGE OF / WHEELS NOS. 3, 4, & 5 / 121" BOYDEN'S. [IN USE FROM APRIL 1,1894].	SEE TITLE	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-025	[DIAGRAM SHOWING] MERRIMACK MFG. CO. / DISCHARGE OF WHEEL NO. 8 / 105 INCH BOYDEN.	UNDATED	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-025-[COPY 1]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEEL NO. 8 / 105 INCH BOYDEN.	UNDATED	NONE	H 11 1/2", W 17"	BLUEPRINT	PAPER
162-019-026	BOOTT MILLS / DISCHARGE OF / WHEEL [S, CROSSED OUT] NO. [S, CROSSED OUT] [1 &, CROSSED OUT] 2 / 72 INCH SWAIN WHEEL [S, CROSSED OUT].	1874/08/00	NONE	H 29, W 45.7 CM	INK	PAPER
162-019-026-[COPY 1]	BOOTT MILLS / DISCHARGE OF / WHEEL [S, CROSSED OUT] NO. [S, CROSSED OUT] [1 &, CROSSED OUT] 2 / 72 INCH SWAIN WHEEL [S, CROSSED OUT].	1874/08/00	NONE	H 11", W 16"	BLUEPRINT	PAPER
162-019-026-[COPY 2]	BOOTT MILLS / DISCHARGE OF / WHEEL [S, CROSSED OUT] NO. [S, CROSSED OUT] [1 &, CROSSED OUT] 2 / 72 INCH SWAIN WHEEL [S, CROSSED OUT].	1874/08/00	NONE	H 11", W 16"	BLUEPRINT, INK	PAPER
162-019-027	BOOTT MILLS / DISCHARGE OF / WHEELS NOS. 3 & 4 / 72 INCH SWAIN WHEELS.	1874/08/00	NONE	H 29.2, W 45.7 CM	INK	PAPER

162-019-027-[COPY 1]	BOOTT MILLS / DISCHARGE OF / WHEELS NOS. 3 & 4 / 72 INCH SWAIN WHEELS.	1874/08/00	NONE	H 11", W 16"	BLUEPRINT	PAPER
162-019-027-[COPY 2]	BOOTT MILLS / DISCHARGE OF / WHEELS NOS. 3 & 4 / 72 INCH SWAIN WHEELS.	1874/08/00	NONE	H 11", W 16"	BLUEPRINT	PAPER
162-019-028	BOOTT MILLS / DISCHARGE OF / WHEEL [S, CROSSED OUT] NO. [S, CROSSED OUT] 5 [6, 7 & 8, CROSSED OUT] / 72 INCH SWAIN WHEEL [S, CROSSED OUT].	1874/08/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-028-[COPY 1]	BOOTT MILLS / DISCHARGE OF / WHEELS 5, 6, 7 & 8, / 72 INCH SWAIN WHEELS..	1874/08/00	NONE	H 11", W 16"	BLUEPRINT	PAPER
162-019-028-[COPY 2]	BOOTT MILLS / DISCHARGE OF / WHEEL [S, CROSSED OUT] NO. [S, CROSSED OUT] 5 [6, 7 & 8, CROSSED OUT] / 72 INCH SWAIN WHEEL [S, CROSSED OUT].	1874/08/00	NONE	H 29.2, W 45.3 CM	BLUEPRINT, INK	PAPER
162-019-029	[DIAGRAM SHOWING] BOOTT MILLS / DISCHARGE OF / WHEEL NO. 9 / [AN] 80 INCH SWAIN WHEEL.	1874/08/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-029-[COPY 1]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 9 / 80 INCH SWAIN WHEEL.	1874/08/00	NONE	H 11", W 16"	BLUEPRINT	PAPER
162-019-029-[COPY 2]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 9 / 80 INCH SWAIN WHEEL.	1874/08/00	NONE	H 29.5, W 45.4 CM	BLUEPRINT	PAPER
162-019-030	[DIAGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF / WHEEL NO. 2 / 72" SWAIN.	1913/10/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-030-[COPY 1]	HAMILTON MFG. CO. / DISCHARGE OF / WHEEL NO. 2 / 72" SWAIN.	1913/10/00	NONE	H 11 1/2", W 17"	BLUEPRINT	PAPER
162-019-031	[DIAGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF WHEEL NO. 3 / 72" SWAIN.	1913/10/00	NONE	H 29, W 45.8 CM	INK	PAPER
162-019-031-[COPY 1]	HAMILTON MFG. CO. / DISCHARGE OF WHEEL NO. 3 / 72" SWAIN.	1913/10/00	NONE	H 29, W 45.8 CM	BLUEPRINT	PAPER

162-019-032	[DAIGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 4 L.H. & 4A. R.H. 54" SWAIN WHEELS [INSTALLED 1901].	1913/10/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-032-[COPY 1]	HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 4 L.H. & 4A. R.H. 54" SWAIN WHEELS.	1913/10/00	NONE	H 29.2, W 45.7 CM	BLUEPRINT	PAPER
162-019-033	[DIAGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF WHEEL OF / WHEEL NO. 8 / [AND] 80" SWAIN.	1913/11/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-034	[DIAGRAM SHOWING] MIDDLESEX CO. / DISCHARGE OF / WHEEL NO. 1 / 72" SWAIN.	1913/12/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-035	MIDDLESEX CO. / [DIAGRAM SHOWING] DISCHARGE OF / WHEEL NO 1 / 72" SWAIN.	1916/04/01	NONE	H 11 1/2", W 18"	BLUEPRINT	PAPER
162-019-035-[COPY 1]	MIDDLESEX CO. / DISCHARGE OF / WHEEL NO 1 / 72" SWAIN.	1916/04/01	NONE	H 11 1/2", W 18"	BLUEPRINT	PAPER
162-019-036	[DIAGRAM SHOWING] MIDDLESEX CO. / DISCHARGE OF WHEEL NO. 2 / 66" SWAIN.	1913/12/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-037	MIDDLESEX CO. / DISCHARGE OF / WHEEL NO. 2 / 66" SWAIN.	1916/04/01	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-037-[COPY 1]	MIDDLESEX CO. / DISCHARGE OF / WHEEL NO. 2 / 66 INCH SWAIN	1916/04/01	NONE	H 11 1/2", W 18"	BLUEPRINT	PAPER
162-019-038	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / 80 INCH SWAIN / WHEEL NO. 8.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-039	[DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEEL NO. 7 / 72" SWAIN.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER

162-019-040	[DIAGRAM SHOWING] PRESCOTT MILLS / DISCHARGE OF / [NOS. 4 &] 1, 3, & 6 WHEELS / 60 INCH SWAIN..	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-041	[DIAGRAM SHOWING] PRESCOTT MILLS / DISCHARGE OF / WHEEL NO. 2 / 72" SWAIN.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-042	[DIAGRAM SHOWING] PRESCOTT MILLS / DISCHARGE OF WHEEL NO[S]. 4 [& 1, 3 & 6] / 60 INCH SWAIN.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-043	[DIAGRAM SHOWING] PRESCOTT MILLS / DISCHARGE OF / WHEEL NO.5 / 72" SWAIN.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-044	[DIAGRAM SHOWING] HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 6 & 7 / L.H. 51" SMITH McCORMICKS.	1913/10/00	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-045	[DIAGRAM SHOWING DISCHARGE OF] GRIST MILL WHEEL.	SEE NOTES	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-046	[DIAGRAM SHOWING] DISCHARGE OF / SACO-LOWELL SHOPS / WHEELS NOS. 1-2-3-4-5-6.	UNDATED	NONE	H 29.2, W 45.7 CM	INK	PAPER
162-019-047	[DIAGRAM OF] HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 1, 4 OR 5 / 45 INCH TYPE Z LEFFEL / IN USE FROM APRIL, 1922.	1922/05/00	NONE	H 26.5, W 40 CM	INK, COLORED INK	PAPER
162-019-047-[COPY 1]	HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 1, 4 OR 5 / 45 INCH TYPE Z LEFFEL / IN USE FROM APRIL, 1922..	1922/05/00	NONE	H 29, W 45.6 CM	BLUEPRINT	PAPER
162-019-047-[COPY 2]	HAMILTON MFG. CO. / DISCHARGE OF / WHEELS NOS. 1, 4 OR 5 / 45 INCH TYPE Z LEFFEL / IN USE FROM APRIL, 1922..	1922/05/00	NONE	H 29, W 45.6 CM	BLUEPRINT	PAPER

162-019-048-[COPY 1]	APPLETON COMPANY / DISCHARGE OF / WHEELS NOS. 2 OR 3 / 39 INCH SPECIAL HERCULES / IN USE FROM FEB. 3, 1926.	1938/04/00	NONE	H 28, W 39.5 CM	BLUEPRINT, COLORED INK	PAPER
162-019-048-[COPY 2]	APPLETON COMPANY / DISCHARGE OF / WHEELS NOS. 2 OR 3 / 39 INCH SPECIAL HERCULES / IN USE FROM FEB. 3, 1926.	1938/04/00	NONE	H 28, W 39.5 CM	BLUEPRINT	PAPER
162-019-049	PRESCOTT MILLS / DISCHARGE OF / WHEELS NOS 7-11 / 33 INCH R.H. TYE "D" HERCULES / IN USE FROM SEPT. 6,1919.	1938/04/00	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
162-019-049-[COPY 1]	PRESCOTT MILLS / DISCHARGE OF / WHEELS NOS 7-11 / 33 INCH R.H. TYE "D" HERCULES / IN USE FROM SEPT. 6,1919.	1938/04/00	NONE	H 28, W 42 CM	BLUEPRINT	PAPER
162-019-050-[COPY 1]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 1 / 45 INCH R.H. ALLIS CHALMERS / IN USE FROM NOV. 1, 1919.	1938/04/00	NONE	H 28, W 44.5 CM	BLUEPRINT, COLORED INK	PAPER
162-019-050-[COPY 2]	BOOTT MILLS / DISCHARGE OF / WHEEL NO. 1 / 45 INCH R.H. ALLIS CHALMERS / IN USE FROM NOV. 1, 1919.	1938/04/00	NONE	H 28, W 44.5 CM	BLUEPRINT	PAPER
162-019-051	TREMONT MILLS / DISCHARGE OF / WHEEL NO. 3 / 40.8 INCH R. H. MORGAN SMITH, TYPE "S".	1938/05/00	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER
162-019-051-[COPY 1]	TREMONT MILLS / DISCHARGE OF / WHEEL NO. 3 / 40.8 INCH R. H. MORGAN SMITH, TYPE "S".	1938/05/00	NONE	H 28, W 42 CM	BLUEPRINT, COLORED INK	PAPER
162-019-052	LOWELL INDUSTRIAL DEVELOPMENT CO. / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6 / R.H. 42 INCH TYPE "D" HERCULES WHEELS / INSTALLED 1918 & 1919.	1938/09/00	NONE	H 28, W 42 CM	INK, COLORED INK	PAPER

162-019-052-[COPY 1]	LOWELL INDUSTRIAL DEVELOPMENT CO. / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6 / R.H. 42 INCH TYPE "D" HERCULES WHEELS / INSTALLED 1918 & 1919.	1938/09/00	NONE	H 28, W 41.3CM	BLUEPRINT	PAPER
162-019-053-[COPY 1]	TREMONT MILLS / DISCHARGE OF / WHEELS NOS 1, 2 OR 4 / 46.5 INCH MORGAN SMITH, TYPE "S" / IN USE FROM MARCH 1,1921	1939/09/00	NONE	H 11", W 16 1/2"	BLUEPRINT, COLORED INK	PAPER
162-019-053-[COPY 2]	TREMONT MILLS / DISCHARGE OF / WHEELS NOS 1, 2 OR 4 / 46.5 INCH MORGAN SMITH, TYPE "S" / IN USE FROM MARCH 1,1921	1939/09/00	NONE	H 11", W 16 1/2"	BLUEPRINT, COLORED INK	PAPER
162-019-054	HAMILTON MFG. CO. / DISCHARGE OF / WHEEL NO. 2 / 39 INCH L.H. LEFFEL, TYPE "Z" / IN USE FROM APRIL 25, 1919.	1919/09/00	NONE	H 28, W 40 CM	INK, COLORED INK	PAPER
162-019-054-[COPY 1]	HAMILTON MFG. CO. / DISCHARGE OF / WHEEL NO. 2 / 39 INCH L.H. LEFFEL, TYPE "Z" / IN USE FROM APRIL 25, 1919.	1919/09/00	NONE	H 28, W 40 CM	BLUEPRINT	PAPER
162-019-055-[COPY 1]	MARDEN & MURPHY [HAMILTON] / DISCHARGE OF WHEEL NO. 3 / 36 INCH R.H. LEFFEL TYPE "Z" / IN USE FROM OCT. 15, 1918.	1939/12/00	NONE	H 27, W 39.5 CM	BLUE LINE PRINT, COLORED INK	PAPER
162-019-055-[COPY 2]	MARDEN & MURPHY / DISCHARGE OF WHEEL NO. 3 / 36 INCH R.H. LEFFEL TYPE "Z" / IN USE FROM OCT. 15, 1918.	1939/12/00	NONE	H 27, W 39.5 CM	BLUE LINE PRINT, COLORED INK	PAPER
162-019-056	MERRIMACK MFG. CO. / DISCHARGE OF / WHEEL NO. 9 [50" R.H. A. CHALMERS TYPE "15"].	1940/01/00	NONE	H 29.2, W 45.7 CM	INK, COLORED PENCIL	PAPER
162-019-056-[COPY 1]	MERRIMACK MFG. CO. / DISCHARGE OF / WHEEL NO. 9.	1940/01/00	NONE	H 29.2, W 45.7 CM	INK, COLORED PENCIL	PAPER

162-019-057-[COPY 1]	APPLETON COMPANY / DISCHARGE OF WHEEL NO. 4 PAIR / 38 INCH RODNEY HUNT / DIAGRAM IN USE FROM SEPT. 14, 1921.	1940/12/00	NONE	H 28, W 39.5 CM	BLUEPRINT, COLORED INK	PAPER
162-019-057-[COPY 2]	APPLETON COMPANY / DISCHARGE OF WHEEL NO. 4 PAIR / 38 INCH RODNEY HUNT / DIAGRAM IN USE FROM SEPT. 14, 1921.	1940/12/00	NONE	H 28, W 39.5 CM	BLUEPRINT	PAPER
162-019-058	LOWELL INDUSTRIAL DEVELOPMENT CO. / DISCHARGE OF / WHEEL NO. 12 / IN USE FROM APRIL, 1921.	SEE TITLE	NONE	H 27.8, W 43.2 CM	INK, COLORED INK	PAPER
162-019-058-[COPY 1]	LOWELL INDUSTRIAL DEVELOPMENT CO. / DISCHARGE OF / WHEEL NO. 12 / IN USE FROM APRIL, 1921.	SEE TITLE	NONE	H 28, W 42.9 CM	BLUEPRINT	PAPER
162-019-A-[A]	DISCHARGE DIAGRAMS / FOR / DIFFERENT CORPORATIONS.	UNDATED	NONE	H 14.3, W 21.8 CM	INK, COLORED INK	PAPER
162-019-A-[B]	DISCHARGE DIAGRAMS / IN CUBIC FEET PER SECOND / FOR ALL WATERWHEELS / IN ALL THE CORPORATIONS.	UNDATED	NONE	H 11.5, W 23.5 CM	INK	DRAFTING CLOTH
162-019-A-[C]	MERRIMACK MFG. CO. / # 5 & # 6 WHEELS / 39" TYPE "C" HERCULES.	UNDATED	NONE	H 14.3, W 21.8 CM	INK, COLORED INK	PAPER
162-019-A-[D]	MERRIMACK MFG. CO. / # 5 & # 6 WHEELS / 39" TYPE "C" HERCULES.	UNDATED	NONE	H 14.3, W 21.8 CM	INK, COLORED INK	PAPER
162-019-A-[E]	MERRIMACK MFG. CO. / # 8 WHEEL / 105" BOYDEN.	UNDATED	NONE	H 14.3, W 21.8 CM	INK, COLORED INK	PAPER
162-020-000-[A]	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL, WITH] INDEX.	SEE NOTES	NONE	H 20, W 14.5 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-000-[B]	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL, WITH] INDEX.	SEE NOTES	NONE	H 20, W 14.5 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-001	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] DATUM PLANES / IN RELATION TO / MEAN SEA LEVEL	1943/10/27	NONE	H 28, W 20 CM	INK	DRAFTING CLOTH
162-020-001-A	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] ELEVATION OF P.L.& C. / STANDARD BENCH.	SEE NOTES	NONE	H 19.5, W 15 CM	INK	DRAFTING CLOTH
162-020-002 THRU 010	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] PROMINENT BENCH MARKS [ON CANALS & RIVERS WITH HEIGHTS ON GENERAL SCALE].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-011	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL SHOWING: DATE BUILT, LENGTH OF SPAN (FEET), WIDTH, BY WHOM MAINTAINED, ON] CANAL BRIDGES [OF L.& C. SYSTEM].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-012 THRU 016	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] AREAS OF DIFFERENT CANALS / INCLUDING PENSTOCKS AND RACES. [ALSO LENGTHS & WIDTHS].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-017 THRU 019	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] LENGTH AND WIDTH OF CANALS.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-020	[DATA PERTAINING TO] PAWTUCKET DAM [FOR BOOK OF USEFUL INFORMATION AS FOLLOWS: LENGTH OF DAM. TOP OF DAM BY GENERAL SCALE. FLASHBOARDS JULY TO FEB & MARCH TO JUNE. QUANTITY PASSING WITH ONE FOOT & TWO FEET DEPTH. AVERAGE HEIGHT OF DAM].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-021	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] HEADGATES.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-022	[COMPILATION FROM BOOK OF USEFUL INFORMATION SHOWING DIFFERENT] WASTE DAMS [WITH: DISCHARGE FIGURED AT GRADE, HEIGHT OF SILL AT GRADE, HEIGHT OF SILL OF DAM, NUMBER OF BAYS, SIZE OF GATE, DISCHARGE OF GATE, HEIGHT OF SILL OF GATE].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-023	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] FLUMES [WITH LENGTHS, WIDTHS, AREA OF CROSS SECTION OF GRADES].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-024	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] PERCENT OF / EFFICIENCY OF WHEELS OF CORPORATIONS AT FULL GATE [BY NUMBER OF WHEELS].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-025	[LIST OF] WATER WHEELS / MERRIMACK MFG. CO. MAIN YARD. [FROM BOOK OF USEFUL INFORMATION SHOWING: NO., KIND, DATE INSTALLED, AVERAGE FALL, DISCHARGE, FULL OPENINGS OF SPEED GATE, ESTIMATED HORSE POWER].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-026	[LIST OF] WATER WHEELS / LAWRENCE SECTION. / MERRIMACK MFG. CO. [FROM BOOK OF USEFUL INFORMATION SHOWING: NO. KIND. DATE INSTALLED. AVERAGE FALL. DISCHARGE IN C.F.P.S. FULL OPENING OF SPEED-GATE IN INCHES. ESTIMATED HORSE POWER].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-027	[LIST OF] WATER WHEELS / TREMONT SIDE / MERRIMACK MFG. CO. [FROM BOOK OF USEFUL INFORMATION SHOWING: NO., KIND, DATE INSTALLED. DISCHARGE IN C.F.P.S. FULL OPENING OF SPEED-GATE IN INCHES. ESTIMATED HORSE POWER].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-028	WATERWHEEL GENERATORS / MERRIMACK MFG. CO. / MAIN YARD-LAWRENCE SECTION-TREMONT YARD.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-029	WATER WHEELS / TEXTRON AMERICAN, INC.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-030	WATERWHEEL GENERATORS / TEXTRON AMERICAN, INC.- "HAMILTON YARD".	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-031	[LIST OF] WATER WHEELS / BOOTT MILLS-AMORY ST. [FROM BOOK OF USEFUL INFORMATION SHOWING: NO., KIND, DATE INSTALLED, AVERAGE FALL, DISCHARGE IN C.F.P.S., FULL OPENING OF SPEEDGATE IN INCHES, ESTIMATED HORSEPOWER].	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-032	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATERWHEEL GENERATORS / BOOTT MILLS-AMORY ST.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-033	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATERWHEELS / BOOTT MILLS-"MASSACHUSETTS YARD" / MAIN POWER, SECTION 8 AND NO. 12.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-034	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATER WHEELS / BOOTT MILLS-"PRESCOTT WHEELS".	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-035	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATERWHEEL GENERATORS / BOOTT MILLS-"MASSACHUSETTS YARD" / MAIN POWER, SECTION 8, PRESCOTT WHEELS AND NO. 12.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-036	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL. LIST OF WHEELS OF COLUMBIA TEXTILE (BIGELOW HARTFORD CO.) FROM BOOK OF USEFUL INFORMATION.] BOOTT MILLS-"BIGELOW YARD".	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-037	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATERWHEEL GENERATORS / BOOTT MILLS-"BIGELOW YARD".	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-038	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATER WHEELS / JACKSON PROPERTIES INC.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-039	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATERWHEEL GENERATORS / JACKSON PROPERTIES, INC.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-040	DOHERTY REALTY CO., INC. [LIST OF WHEELS OF MASS. MILL FROM BOOK OF USEFUL INFORMATION SHOWING: KIND, NO., DATE INSTALLED, AVERAGE FALL, DISCHARGE IN C.F.PLS., FULL OPENING OF SPEED-GATE IN INCHES, ESTIMATED HORSE POWER, REVS. PER MIN.]	SEE NOTES	NONE	H 20, W 15 CM	ONK, COLORED INK	DRAFTING CLOTH
162-020-041	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] WATERWHEEL GENERATORS / DOHERTY REALTY CO., INC.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH

162-020-042	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] TYPE OF WHEEL / HORIZONTAL OR VERTICAL.	SEE NOTES	NONE	H 20, W 15 CM	INK, COLORED INK	DRAFTING CLOTH
162-020-043	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] MERRIMACK MFG. CO. / AND / COURIER CITIZEN CO.	SEE NOTES	NONE	H 18.5, W 23 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-044	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] HAMILTON YARD.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-045	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] JACKSON PROPERTIES INC. / "APPLETON YARD".	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-046	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] MIDDLESEX YARD.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-047	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] BIGELOW YARD.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-048	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] SUFFOLK YARD" / AND / "TREMONT YARD.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH

162-020-049	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] LAWRENCE YARD.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-050	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] BOOTT MILLS / AMORY STREET.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-051	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] BOOTT MILLS / 95 BRIDGE STREET.	SEE NOTES	NONE	H 18, W 12 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-052	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] SACO YARD, L.& C. YARD, / GIANT STORE, J. A. E. REALTY TRUST / AND OTHERS.	SEE NOTES	NONE	H 18.5, W 23.5 CM	INK, WATER COLOR	DRAFTING CLOTH
162-020-053	[TRACINGS SHOWING USEFUL COMPILATIONS OF INFORMATION PERTAINING TO THE L.& C. SYSTEM IN GENERAL.] P.L.& C. RESERVOIR	SEE NOTES	1"=200' APPROX.	H 18, W 12 CM	INK, COLORED PENCIL	DRAFTING CLOTH
162-021	[SKETCH OF THE] STEAMBOAT GOV. ALLEN, [WITH] MEASUREMENTS MADE AT BOAT LANDING AT HEAD OF PAWTUCKET CANAL [COMPARED WITH HEIGHT OF TYNGSBORO BRIDGE].	1907/04/25	NONE	H 20.5, W 52.1 CM	INK, COLORED INK	DRAFTING CLOTH

162-022	[PLAN & PROFILE OF HUDSON RIVER AT STORM KING CROSSING OF CATSKILL AQUEDUCT SHOWING] SOIL REPRESENTATION.	1907/12/17	NONE	H 22.2, W 28.9 CM	INK, COLORED INK	DRAFTING CLOTH
162-023-[A]	[DIALS FOR] NUMBER OF BAYS WASTE / AT / SWAMP LOCKS [WASTE DAM].	1913/10/00	NONE	H 38.5, W 31.5 CM	INK	PAPER
162-023-[B]	[DIALS FOR] NUMBER OF BAYS WASTE / AT / SWAMP LOCKS [WASTE DAM].	1913/10/00	NONE	H 52.1, W 39 CM	INK	DRAFTING CLOTH
162-024	PLAN OF / JEAN'S LAUNDRY BUILDING BASEMENT. / SHOWING APPROXIMATE LOCATION / OF / CONCRETE TANK, PUMPS, SUCTION PIPES, ETC.	1915/05/15	1"=10'	H 47.3, W 57.2 CM	INK, WATER COLOR	DRAFTING CLOTH
162-025	[UNTITLED.] [CLOCK GAUGE DIAL (7 DAYS)].	UNDATED	NONE	H 35.1, W 36.2 CM	INK, COLORED INK	DRAFTING CLOTH
162-027	[INSPECTION SHEET FOR WATERWAYS.]	UNDATED				
162-028	OFFICE OF THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER. / 66 BROADWAY, LOWELL MASS. [DIAGRAM SHOWING] CURRENT METER RATING [L.& C. BUFF & BUFF NOS. 4176 & 8163, AT LOWELL, MASS., IN STILL WATER AT 32 DEGREES FAHR.].	UNDATED	NONE	H 30.5, W 24 CM	INK, COLORED INK	DRAFTING CLOTH
162-029	DIAGRAM / SHOWING / COMPARISON OF DISCHARGE CURVES [OF THIN EDGED WEIRS].	UNDATED	NONE	H 29.3, W 23 CM	INK	DRAFTING CLOTH

162-030-[A]	[UNTITLED] [BLANK FOR MEASURED RESULTS GIVING VALUE OF "C" IN CHEZY FORMULA V EQUALS C TIMES THE SQUARE ROOT OF R.S.]	1914/04/00	NONE	H 29, W 41.3 CM	INK	DRAFTING CLOTH
162-030-[B]	LOWER PAWTUCKET & EASTERN CANALS.	1914/04/00	NONE	H 29, W 41.3 CM	INK	PAPER
162-030-[C]	LOWER PAWTUCKET & EASTERN CANALS.	1914/04/00	NONE	H 29, W 41.3 CM	INK	PAPER
162-031	[SKETCH OF] APPARATUS FOR TESTING THE BOND BETWEEN CONCRETE / AND STEEL. / NOTE: COPIED FROM ENGINEERING NEWS OF DEC. 20, 1906 PAGE 658.	1915/07/28	NONE	H 23, W 15.5 CM	INK	TRACING PAPER
162-032	MAP OF LOWELL / IN VICINITY OF / FLETCHER, DUTTON SUFFOLK, & MERRIMACK STS. [IN CONNECTION WITH PROPOSED SCHEME TO WIDEN SUFFOLK & DUMMER STREETS.]	1917/05/23	1"=100'	H 32.2, W 78.6 CM	INK, GRAPHITE	DRAFTING CLOTH
162-033	DESIGN FOR / ICE BOOM & RACKS / EVERETT MAIN MILL FEEDER [LAWRENCE, MASS., BY H. F. MILLS].	1882/08/00	1/2"=1'	H 69.5, W 96.6 CM	BLUEPRINT	PAPER
162-034	THEATRE STORE & OFFICE BUILDINGS / CENTRAL ST. LOWELL, MASS. / THE STRAND REALTY COMPANY OF LOWELL [PLAN OF AUDITORIUM OF STRAND THEATRE].	UNDATED	1/8"=1'	H 53.2, W 102.9 CM	BLUEPRINT	PAPER
162-035	SOUNDINGS OF NASHUA RIVER / OPPOSITE THE MILLS OF / JACKSON CO. NASHUA / FOR PROPOSED STOREHOUSE.	1917/02/23	H1"=20', V1"=10'	H 61.5, W 35.5 CM	INK, WATER COLOR	DRAFTING CLOTH
162-036	[UNTITLED.] [INDEX TO MAPS IN THE LOCKS & CANALS OFFICE.]	UNDATED	NONE	H 50.2, W 38.5 CM	INK	DRAFTING CLOTH
162-037	[GIRDERS.]	UNDATED				

162-038	ASSEMBLY & DETAILS / [OF IRON PICKET] FENCES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/02/28	1"& 3"=1'	H 52.8, W 63 CM	INK, COLORED INK	DRAFTING CLOTH
162-039	[PLAN OF] BOSTON & MAINE RAILROAD / SOUTHERN DIVISION MAIN LINE / VALUATION SECTION 15 M. / PUMPING PLANT / [AT] MIDDLESEX [VILLAGE] MASS.	1918/02/25	1"=10'& 50'	H 71.4, W 77 CM	INK, COLORED INK	DRAFTING CLOTH
162-040	DIAGRAM SHOWING COST OF WATER-POWER / TO THE / MILLS ON THE L.& C. SYSTEM / [INCLUDING BOTH PERMANENT & SURPLUS POWER, ON THE BASIS OF 70 H.P. PER PERMANENT MILL POWER & 60 H.P. PER SURPLUS MILL POWER.] PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/08/26	NONE	H 21.5, W 30.5 CM	INK, GRAPHITE	PAPER
162-041	DIAGRAM SHOWING / AMOUNT OF COAL ON HAND / FOR / MILLS DRAWING WATER / FROM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/08/06	NONE	H 29.2, W 29.5 CM	INK	PAPER
162-042	[SKETCH OF] THE GRAHAM SLEEVE BOLT.	1918/07/00	1"=1"	H 28.6, W 23 CM	INK, GRAPHITE	DRAFTING CLOTH
162-043-092	LOCKS & CANALS / STADIA CORRECTIONS / FOR TRANSIT.	1926/08/07	NONE	H 19, W 42.3 CM	INK	PAPER
162-043-093	CURVES SHOWING DATA / RELATIVE TO / MANUFACTURERS IN THE CITY OF LOWELL.	SEE NOTES	NONE	H 28.6, W 22 CM	INK	DRAFTING CLOTH
162-043-094	[PLAN SHOWING] LOCATION OF MANHOLE / WHERE INJURY WAS CLAIMED / BY DAISY NILES.	1938/02/21	1"=40'	H 22, W 35.3 CM	INK, COLORED INK, CRAYON	DRAFTING CLOTH

162-043-095	SKETCH SHOWING / LOCATION OF ACCIDENT ON THORNDIKE ST. / TO / GERTRUDE GARSIDE / ON MARCH 31,1939.	1939/04/18	1"=20'	H 25.2, W 37.2 CM	INK	PAPER
162-043-096	SKETCH SHOWING / LAND VALUES / PER SQUARE FOOT NEAR KEARNEY SQUARE.	1939/10/01	1"=100'	H 35.7, W 48.3 CM	INK, WATER COLOR	DRAFTING CLOTH
162-043-099	WEEKLY WITHHOLDING TAX TABLE-1945.	SEE TITLE	NONE	H 56, W 40.7 CM	INK	DRAFTING CLOTH
162-043-100	TURBINE DETAILS [OF LEFFEL WHEELS].	1924/05/02	1 1/2"=12"	H 102.8, W 79.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
162-043-108	CHART SHOWING FLUCTUATIONS IN BUSINESS ACTIVITY SINCE 1790.	1931/09/15	NONE	H 27, W 85.7 CM	BLUE LINE PRINT	PAPER
162-043-109	LOCATION PLAN OF / ORIGINAL L. & C. STANDARD BENCH.	1943/10/14	1"=10'	H 21, W 27.3 CM	INK, WATER COLOR	DRAFTING CLOTH
162-043-110	TABLE [OF WITHHOLDING TAX SCHEDULE] A-1.	UNDATED	NONE	H 32, W 47.7 CM	INK, COLORED INK	DRAFTING CLOTH
162-043-111	OPERATIONS OF LOCKS & CANALS [FROM 1926 ON].	SEE TITLE	NONE	H 40.7, W 42 CM	INK	PAPER
162-043-112	GATE SIGN / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1947/05/02	FULL SIZE	H 32.7, W 53.4 CM	INK	DRAFTING CLOTH
162-043-113	BOOK VALUE OF WATER POWER / & / AVERAGE CHARGES FOR WATER POWER / LOCKS & CANALS 1926 TO 1939.	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
162-043-114	DIAGRAM SHOWING / KILOWATTS DEVELOPED / BY THE CORPORATIONS / FROM PERCENT OF PERMANENT WATER.	1941/01/00	NONE	H 28, W 42 CM	INK	PAPER

162-043-115	PERRY IRON COMPANY / GUARD RAIL 10'-0" LONG.NUMBER OF BAYS WASTE / AT / SWAMP LOCKS [BETHLEHEM STEEL COMPANY, STEELTON, PA..].	1927/02/11	1 1/2"=1'	H 37.8, W 50.5 CM	BLUEPRINT	PAPER
162-043-A	[PLAN OF] ELECTRIC CONTACT ATTACHMENT FOR / BUFF & BUFF IMPROVED FTELEY METER.	UNDATED	SEE NOTES	H 33, W 40 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
162-043-B	[CHART SHOWING] CITY OF LOWELL / VALUATION, EXPENDITURES, POPULATION & TAX RATE / FROM 1860 TO 1920.	1920/09/21	NONE	H 45.4, W 41.2 CM	INK	DRAFTING CLOTH
162-043-B-[COPY 1]	CITY OF LOWELL / VALUATION, EXPENDITURES, POPULATION, & TAX RATE / FROM 1860 TO 1920.	1920/09/21	NONE	H 44, W 41.2 CM	BLUEPRINT	PAPER
162-043-C	[DIAGRAM SHOWING] AVERAGE SPRING PRICES 1913- / PROPRIETORS OF LOCKS & CANALS.	1921/03/03	NONE	H 28, W 21.5 CM	INK, COLORED INK	PAPER
162-043-D-[COPY 1]-[A]	[DIAGRAM SHOWING AVERAGE PRICES IN ENGINEERING SUPPLIES FROM 1910 TO 1921] PRICE CHART / 1910-1921 / BRICK & CEMENT.	SEE TITLE	NONE	H 53.3, W 40.4 CM	BLUEPRINT	PAPER
162-043-D-[COPY 1]-[B]	[DIAGRAM SHOWING AVERAGE PRICES IN ENGINEERING SUPPLIES FROM 1910 TO 1921] PRICE CHART / 1910-1921 / IRON & STEEL.	SEE TITLE	NONE	H 53.3, W 40.4 CM	BLUEPRINT	PAPER
162-043-D-[COPY 1]-[C]	[DIAGRAM SHOWING AVERAGE PRICES IN ENGINEERING SUPPLIES FROM 1910 TO 1921] PRICE CHART / 1910-1921 / BRICK & DYNAMITE.	SEE TITLE	NONE	H 53.3, W 40.4 CM	BLUEPRINT	PAPER

162-043-D-[COPY 1]-[D]	[DIAGRAM SHOWING AVERAGE PRICES IN ENGINEERING SUPPLIES FROM 1910 TO 1921] PRICE CHART / 1910-1921 / STONE & TITLE PIPE.	SEE TITLE	NONE	H 53.3, W 40.4 CM	BLUEPRINT	PAPER
162-043-E	PRELIMINARY SKETCH FOR PROPOSED HYDRO-ELECTRIC UNIT / [AT END OF MERRIMACK WASTEWAY & BOOTT PENSTOCK] TO USE WASTE FROM MERRIMACK TO EASTERN CANALS / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1920/12/22	1"=40'	H 32.5, W 55.5 CM	INK, COLORED INK	DRAFTING CLOTH
162-043-F	MONTHLY PRICE DIAGRAM [FOR 1920 & 1921] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	SEE TITLE	NONE	H 30, W 40.6 CM	INK, COLORED INK	PAPER
162-043-F-[COPY 1]	MONTHLY PRICE DIAGRAM / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	UNDATED	NONE	H 30.5, W 40 CM	BLUEPRINT	PAPER
162-043-H	GENERAL COMMODITY PRICES / (WHOLESALE) [DIAGRAM] / 1840 TO 1920. [U.S. DEPT. OF LABOR STATISTICS.]	1920/12/00	NONE	H 21.5, W 28 CM	INK	PAPER
162-043-I	[DIAGRAM SHOWING] POWER UNIT COSTS / WATER-WHEELS & GENERATORS.	SEE NOTES	NONE	H 29.3, W 45.8 CM	INK, COLORED PENCIL	PAPER
162-043-J	DIAGRAM SHOWING / FIGURES OF LOCKS & CANALS ACCOUNTS / FROM 1900 TO 1919.	SEE TITLE	NONE	H 30.2, W 30.5 CM	INK, COLORED INK	PAPER
162-043-K	[DIAGRAM] CURVE SHOWING THE RELATION / BETWEEN / 24-HR. FLOW OF THE MERRIMACK RIVER / AND / NET HORSE-POWER AT WHEEL-SHAFT / AT / LOWELL, MASS.	UNDATED	NONE	H 28.5, W 45 CM	INK, GRAPHITE	PAPER

162-043-K-[COPY 1]	CURVE SHOWING THE RELATION / BETWEEN / 24-HR. FLOW OF THE MERRIMACK RIVER / AND / NET HORSE-POWER AT WHEEL-SHAFT / AT / LOWELL, MASS..	UNDATED	NONE	H 29, W 45.5 CM	BLUEPRINT	PAPER
162-043-K-[COPY 2]	CURVE SHOWING THE RELATION / BETWEEN / 24-HR. FLOW OF THE MERRIMACK RIVER / AND / NET HORSE-POWER AT WHEEL-SHAFT / AT / LOWELL, MASS.	UNDATED	NONE	H 28, W 41.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
162-043-L	LOCKS & CANALS INCOME FROM WATER POWER [FROM 1917 TO -].	1924/07/19	NONE	H 30.5, W 21.6 CM	INK, GRAPHITE	PAPER
162-043-M	[DIAGRAM SHOWING] LOCKS & CANALS INCOME / FROM / RENT[S, RESERVOIR & CANAL WATER FOR PURPOSES OTHER THAN POWER].	1924/07/19	NONE	H 30.5, W 21.7 CM	INK, WATER COLOR	PAPER
162-044	DIAGRAM SHOWING PER CENT OF SURPLUS POWER / DRAWN DURING BACKWATER & " NO BACKWATER" / SINCE 1859 [TO 1909] WHEN SURPLUS POWER WAS FIRST USED; / ALSO THE REVENUE FOR EACH YEAR.	SEE TITLE	NONE	H 56, W 75.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
162-045	[DAIGRAM SHOWING] SOME ITEMS / OF / ANNUAL EXPENSE & INCOME / FROM 1900 TO 1920 [OF THE L.& C.] / LOWELL, MASS.	SEE TITLE	NONE	H 110.5, W 84 CM	INK, COLORED INK	CLOTH BACKED PAPER
162-046	SKETCH [SHOWING LOCATION] / OF CURBING & FENCE / AT / SOUTH CORNER OF SUFFOLK & MARKET STS.	1917/06/08	1/4"=1'	H 47.2, W 57 CM	BLUEPRINT	PAPER

162-047	PLAN SHOWING / WIRE ATTACHMENTS / NECESSARY TO PERFECT / L.& C. PRIVATE / TELEPHONE LINE / TO LAWRENCE DAM.	1921/01/31	1"=50'	H 26.7, W 104.8 CM	INK	DRAFTING CLOTH
162-047-[COPY 1]	PLAN SHOWING / WIRE ATTACHMENTS / NECESSARY TO PERFECT / L.& C. PRIVATE / TELEPHONE LINE / TO LAWRENCE DAM.	1921/01/31	1"=50'	H 26.6, W 106.2 CM	BLUEPRINT	PAPER
162-048	[DIAGRAM SHOWING] MAXIMUM & MINIMUM TEMPERATURE / AT CONCORD, N.H. / [FOR] / WINTERS OF 1911 TO 1919.	SEE TITLE	NONE	H 53.3, W 40.6 CM	INK, COLORED INK	PAPER
162-049	[PLANS & SPECIFICATIONS FOR] EXPERIMENTAL TUBE FORMS / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/01/12	1/2 SIZE	H 33.5, W 43.2 CM	INK, GRAPHITE	DRAFTING CLOTH
162-050	[CHART SHOWING] / VALUATION, EXPENDITURES, POPULATION & TAX RATE / [FROM] 1860 TO 1920.	SEE TITLE	NONE	H 97.4, W 91.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
162-050	BASEMENT PLAN / C.M.A.C. BUILDING / PAWTUCKET ST., LOWELL, MASS.	1922/09/00	1/8"=1'	H 31.7, W 51 CM	INK	DRAFTING CLOTH
162-051	[PLAN SHOWING LAYOUT OF FIRST FLOOR OF THE] C.M.A.C. BUILDING / PAWTUCKET ST., LOWELL, MASS.	1922/09/00	1/8"=1'	H 31.7, W 51 CM	INK	DRAFTING CLOTH
162-052	[PLAN SHOWING LAYOUT OF SECOND FLOOR OF THE] C.M.A.C. BUILDING / PAWTUCKET ST., LOWELL, MASS.	1922/09/00	1/8"=1'	H 31.7, W 51 CM	INK	DRAFTING CLOTH
162-053	PLAN SHOWING / SEWER CONNECTION / FROM / NURSES' DORMITORY / LOWELL CORPORATION HOSPITAL.	1923/07/00	1"=20'	H 39.3, W 40 CM	INK	DRAFTING CLOTH

162-054	THE A. I. & S. E. E.-MILL, MINE & MANUFACTURERS / POWER CHART [CARNEGIE STEEL CO.].	SEE NOTES	NONE	H 46.3, W 67.3 CM	INK	CLOTH BACKED PAPER
162-055	SKETCH SHOWING / PART OF CITY OF LOWELL / IN VICINITY OF ST. JOHN'S HOSPITAL.	1923/08/29	1"=100'	H 33, W 52 CM	INK, COLORED PENCIL	DRAFTING CLOTH
162-056	[DIAGRAM SHOWING DEPARTMENTAL EXPENDITURES OF CITY OF LOWELL FROM 1907 TO 1922.]	SEE TITLE				
162-057	DIAGRAM SHOWING FIRE LOSSES / OF CITY & L. & C. CORPORATIONS / ON BASIS OF EQUAL VALUATIONS / CITY [1907 TO 1922].	SEE TITLE	NONE	H 45.7, W 29.2 CM	INK	PAPER
162-058	DIAGRAM SHOWING / ASSESSED VALUATION OF / CITY OF LOWELL / & THE / LOCKS & CANALS' CORPORATIONS [1907 TO 1922.].	1923/03/00	NONE	H 53.3, W 42 CM	INK	PAPER
162-059	CITY OF LOWELL / [TABLE SHOWING] RECOMMENDATIONS FOR IMPROVEMENT SUGGESTED BY / NATIONAL BOARD OF FIRE UNDERWRITERS FOR YEARS [1908, 1914 & 1922].	1923/05/04	NONE	H 44.5, W 52.9 CM	INK	DRAFTING CLOTH
162-060	LOWELL, MASS. / COMMITTEE ON FIRE PROTECTION.	SEE NOTES	NONE	H 43.2, W 27.5 CM	INK	DRAFTING CLOTH
162-061	[DIAGRAM SHOWING FIRE LOSSES IN CITY OF LOWELL & THE LOCKS & CANALS CORPORATIONS. 1907 TO 1923.]	1923/03/00				
162-062	[BLUEPRINT SHOWING] FOUNDATION & / POWER HOUSE ARRANGEMENT / FOR / BERLIN MILLS CO. SHELBURNE PLANT [ALLIS CHALMERS MFG. CO].	UNDATED	1/4"& 1/2"=1'	H 76.5, W 105.4 CM	BLUEPRINT	PAPER

162-063	[NATIONAL SURVEY CO. MAP SHOWING RESERVOIR PIPE LINES & HYDRANT PRESSURES.]	1914/00/00				
162-064	VERMONT & QUEBEC POWER CO. / STEVENS MILLS VT. / POWER HOUSE / GENERAL ARRANGEMENT.	1925/05/12	1"=4'	H 35, W 51 CM	INK	DRAFTING CLOTH
162-065	ATLANTIC RAYON CORPORATION / 4, 5 & 6 RACES.	1944/07/00	NONE	H 21.6, W 30.5 CM	INK	PAPER
162-065	PLAN / SHOWING LOCATION OF / TUBULAR WELLS / LOWELL, MASS.	1918/00/00	1"=200'	H 68.7, W 110.5 CM	BLUEPRINT	PAPER
162-066	A [PLANE TABLE] SURVEY OF PART OF / TRULL'S BROOK / TEWKSBURY, MASSACHUSETTS.	1927/04/22	1"=1000' & 20'	H 46.7, W 63.6 CM	INK	DRAFTING CLOTH
162-067	PLAN OF THOMAS STREET / SHOWING GRADES.	1926/06/00	1"=20'	H 51.5, W 76.2 CM	INK	PAPER
162-068	[TRACING, DIAGRAM GIVING] BITUMINOUS COAL / AVERAGE PRICE PER YEAR [AT MINES & VARIOUS WATER WORKS].	1935/01/02	NONE	H 42.8, W 144.8 CM	INK, COLORED INK	DRAFTING CLOTH
162-068-[COPY 1]	BITUMINOUS COAL / AVERAGE PRICE PER YEAR.	1935/01/02	NONE	H 42.6, W 144.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
162-069	[TRACING, DIAGRAM SHOWING] FLUCTUATIONS IN PRICE / OF BITUMINOUS COAL [AT VARIOUS PLACES, 1891-1922].	SEE TITLE	NONE	H 56, W 89 CM	INK, COLORED INK	DRAFTING CLOTH
162-070-[A]	A RECONNAISSANCE SURVEY / OF / CENTER BARNSTEAD, N.H. RESERVOIR SITE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1927/05/26	1"=400'	H 61.7, W 45.7 CM	INK	DRAFTING CLOTH
162-070-[B]	RESERVOIR SITE CENTER BARNSTEAD.	1927/05/26	1"=400'	H 62.6, W 50.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH

162-070-[C]	CENTER BARNSTEAD / [RECONNAISSANCE SURVEY OF] RESERVOIR SITE.	1927/05/26	1"=400'	H 58.7, W 46.4 CM	INK, GRAPHITE	PAPER
162-071	[PLAN & SECTION OF] CENTER BARNSTEAD, N.H. / PROPOSED DAM SITE.	1927/05/26	1"=50'	H 28, W 48.4 CM	INK	PAPER
162-072	TRULL'S BROOK [TEWKSBURY, MASS. PLANE TABLE SURVEY, ON DRAWING PAPER].	1927/04/00	1"=100'	H 58.4, W 76.2 CM	INK, GRAPHITE	CLOTH BACKED PAPER
162-073	PROPOSED AMBURSEN DAM / [ON SUNCOOK RIVER AT] CENTER BARNSTEAD, N.H.	1927/11/01	1"=20'& 4'	H 61, W 91.2 CM	BLUEPRINT	PAPER
162-074	DIAGRAM SHOWING / ASSESSED VALUATION OF / CITY OF LOWELL / & THE / LOCKS & CANALS' CORPORATIONS. [1907 TO 1924.]	1923/03/00	NONE	H 53.3, W 30.5 CM	INK	PAPER
162-075-[A]	FINANCIAL DIAGRAM / OF THE / LOCKS & CANALS [FROM 1922 TO 1931].	SEE TITLE	NONE	H 36.5, W 49 CM	INK	DRAFTING CLOTH
162-075-[B]	FINANCIAL DIAGRAM / OF THE / LOCKS & CANALS [FROM 1932 TO 1933].	SEE TITLE	NONE	H 40.7, W 57.2 CM	INK	DRAFTING CLOTH
162-077	[MAP OF] PARK SYSTEM / LOWELL, MASS.	UNDATED	1"=200'	H 30.4, W 39.3 CM	INK	PAPER
162-078	[UNTITLED.] [MAP SHOWING DRAINAGE AREA OF SUNCOOK RIVER AT CENTER BARNSTEAD.]	UNDATED	1"=1 MILE	H 41.6, W 39.4 CM	INK	DRAFTING CLOTH
162-079	INDUSTRIAL / MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. / 377 BROADWAY BOSTON [WITH ADDITIONAL INFORMATION].	1927/00/00	1"=1000'	H 58.4, W 76.2 CM	LITHOGRAPH, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
162-079-[COPY 1]	INDUSTRIAL / MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. / 377 BROADWAY BOSTON [WITH ADDITIONAL INFORMATION].	1927/00/00	1"=1000'	H 54, W 75.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER

162-080	CITY OF LOWELL / PROPOSED ZONING MAP / [& COPY OF ZONING ORDINANCE] PLAN PREPARED FOR THE PLANNING BOARD.	1924/11/00	1"=500'	H 49, W 72.4 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
162-081	PLAN SHOWING / USES OF CITY WATER / IN / FAIRBURN BUILDING / WITH SUGGESTED CHANGES.	1930/06/05	1"=100'	H 45.4, W 57 CM	INK, COLORED PENCIL	DRAFTING CLOTH
162-081-[COPY 1]	PLAN SHOWING / USES OF CITY WATER / IN / FAIRBURN BUILDING / WITH SUGGESTED CHANGES.	1930/06/05	1/8"=1'	H 45, W 56.5 CM	BLUEPRINT, COLORED INK	PAPER
162-082	SKETCH SHOWING / RELATION OF EASTERN CANAL / AND L & C 20" WATER MAIN / TO / FAIRBURN BUILDING CORPORATION.	1930/04/14	1"=40'	H 22.3, W 28.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
162-083	PRELIMINARY DIAGRAM OF THE / PROPOSED BUILDING [ADDITION] FOR THE / C.M.A.C. CLUB HOUSE LOWELL, MASS.	1928/07/09	1/8"=1'	H 63, W 96.6 CM	BLUEPRINT	PAPER
162-084	SKETCH SHOWING FLOOR LAYOUT / & ACCOMODATIONS FOR PATIENTS / [AT] LOWELL CORPORATION HOSPITAL.	1930/06/07	1"=50'	H 22.4, W 30.5 CM	INK	DRAFTING CLOTH
162-085	PLAN AND SECTIONS / OF / RACK PLATFORM AND PENSTOCKS / BELONGING TO / UNITED STATES WORSTED CO. / MUSKETAQUID MILLS, / N.E. BUNTING CO. HIGHLAND MILLS, / AMES WORSTED COMPANY.	1931/07/28	1/4"=1'	H 44, W 89 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
162-086	[LOWELL WATER WORKS] BRADEN MAIN [FROM COOK WELLS TO BOULEVARD WELLS].	1931/01/00	1"=50'	H 30.5, W 99 CM	BLUEPRINT	PAPER

162-087	CITY OF LOWELL, MASS. / WATER DEPARTMENT / BELVIDERE STANDPIPE / FOUNDATION DETAILS.	1934/08/00	SEE NOTES	H 60.8, W 91 CM	BLUEPRINT	PAPER
162-088	CITY OF LOWELL, MASS. WATER DEPARTMENT / PIPES FROM CHRISTIAN HILL STANDPIPE / TO MOUNT PLEASANT ST. / & BETWEEN FAIRMONT ST. & BELMONT AVE. WITH CONNECTIONS NEAR / BOULEVARD PUMPING STATION.	1935/03/00	SEE NOTES	H 60.4, W 91.5 CM	BLUEPRINT	PAPER
162-089	PLANS SHOWING / PIPING AT LOW RESERVOIR / & WEST SIXTH ST. PUMPING STATION / ALSO / PORTION OF CITY & SOME MAIN LINES.	1931/04/00	1"=20'& 500'	H 71, W 92.6 CM	INK, WATER COLOR	DRAFTING CLOTH
162-090-[A]	PLAN SHOWING / CENTER LINE OF CITY 20 INCH WATER MAIN / AND / 12 FOOT RIGHT OF WAY.	1931/07/00	1"=40'	H 39.8, W 191.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
162-090-[B]	PLAN SHOWING / PROPOSED 12 FOOT RIGHT OF WAY / & / CL OF CITY 20" WATER MAIN / WEST SIDE OF PAWTUCKET CANAL / BETWEEN PAWTUCKET ST. & RED BRIDGE.	1931/07/00	1"=40'	H 38, W 175.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
162-090-A	PROPOSED RIGHT OF WAY / FOR / WATER PIPE LINE [FROM PEVEY ST. TO PAWTUCKET ST.]..	1931/04/00	1"=50'	H 25.4, W 144.9 CM	BLUEPRINT	PAPER
162-091	SKETCH PLAN / SHOWING THE LOCATION & / ELEVATION OF THE PIPE DRAIN / FROM THE HOUSE OF WILFRED BENOIT / TO BEAVER BROOK IN DRACUT, MASS.	1935/10/00	1"=20'	H 45.4, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER

162-097-[COPY 1]	DIAGRAM IN PLAN & SECTION. / PROPOSED METHOD OF INSTALLING CONDUITS / OVER EASTERN CANAL AT BRIDGE ST.	1930/08/14	1/8"& 3/4"=1'	H 54, W 74 CM	BLUEPRINT	PAPER
162-097-[COPY 2]	DIAGRAM IN PLAN & SECTION. / PROPOSED METHOD OF INSTALLING CONDUITS / OVER EASTERN CANAL AT BRIDGE ST.	1930/08/14	1/8"& 3/4"=1'	H 54, W 74 CM	BLUEPRINT	PAPER
162-098-[A]	PROPRIETORS OF THE LOCKS & CANALS / RECEIPTS & EXPENDITURES.	1932/09/26	NONE	H 58.4, W 45.8 CM	INK, COLORED INK	PAPER
162-098-[B]	PROPRIETORS OF THE LOCKS & CANALS / RECEIPTS & EXPENDITURES.	1932/09/26	NONE	H 28, W 35 CM	INK	PAPER
162-101	CURVE SHOWING FLUCTUATIONS / IN / WHOLESALE PRICES OF COMMODITIES.	1921/08/15	NONE	H 24, W 133 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
162-102	BETHLEHEM STEEL COMPANY / FROG & SWITCH DEPARTMENT / STEELTON, PENN'A / NO. 6 STIFF BOLTED PLATE FROG / DESIGN 16.	SEE NOTES	SEE NOTES	H 33, W 76.3 CM	BLUEPRINT	PAPER
162-103	[DEED SHOWING SALE OF LAND, MADE BY INDIANS TO JOHN WHEELWRIGHT OF MASSACHUSETTS BAY COLONY, BETWEEN PISCATAGNE RIVER IN MAINE AND MERRIMACK RIVER IN MASSACHUSETTS.]	1729/10/31			BLUEPRINT	
162-104	PLANS & ELEVATIONS / OF A / WOOD FLOUR MILL.	1945/01/00	3/8" & 1/4"=1'	H 61, W 74 CM	BLUEPRINT	PAPER
162-105	PLANS, ELEVATIONS & SECTIONS OF CASTINGS / FOR / PROPOSED DERRICK.	1943/11/00	3"=1'	H 52.7, W 80.4 CM	GRAPHITE	TRACING PAPER

162-106	BOILER TUBE STRAIGHTENER [PLAN AND DETAIL DRAWINGS].	1946/06/00	FULL SIZE	H 65, W 88 CM	INK, WATER COLOR, COLORED INK	PAPER
162-107	BETHLEHEM STEEL COMPANY / STEELTON PLANT. / FROG & SWITCH DIV., -STEELTON, PA.	1932/05/20	1 1/2"& 3"=1'	H 34.7, W 76.4 CM	BLUEPRINT	PAPER
162-116	[UNTITLED PLAN. SEE NOTES.] [FLOOR PLAN OF VAULT.]	UNDATED	1 1/2"=1'	H 45.6, W 56 CM	GRAPHITE	PAPER
162-117	CITY OF LOWELL VALUATION, EXPENDITURES, POPULATION & TAX RATE. 1860-1940.	SEE TITLE	NONE	H 48.2, W 69 CM	INK, COLORED INK	DRAFTING CLOTH
162-118	CITY OF LOWELL / VALUATION, EXPENDITURES, POPULATION & TAX RATE.	SEE NOTES	NONE	H 50.5, W 78.3 CM	INK, COLORED INK	DRAFTING CLOTH
162-119	PORTABLE OFFICE BUILDING / COMMONWEALTH OF MASSACHUSETTS / DEPT. OF PUBLIC WORKS.	1952/00/00	NONE	H 55.8, W 107.3 CM	BLUEPRINT	PAPER
162-120	PROPOSED WALK / FROM MARKET STREET / TO CITY PARKING AREA.	1953/06/12	1"=40'	H 32.6, W 20.2 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
162-121	CITY OF LOWELL, MASS. / OFF-STREET PARKING PROGRAM.	1956/12/00	1"=40'	H 28, W 39 CM	GRAPHITE	PAPER
162-122	SKETCH SHOWING / SEWAGE DISPOSAL / FOR / PELLON CORP.	1957/01/03	1"=40'	H 24.5, W 43.2 CM	INK, COLORED INK	PAPER
162-123-[06]	SKETCH OF WARDROBE FOR HOUSE DESIGNED FOR SUPT. OF LOWELL MACHINE SHOP.	1856/07/03	3"=1'		H 51.7, W 73.6 CM	INK
162-123-[06]	SKETCH OF WARDROBE FOR HOUSE DESIGNED FOR SUPT. OF LOWELL MACHINE SHOP.	1856/07/03	3"=1'	H 51.7, W 73.6 CM	INK	PAPER

162-123-[08]	SKETCH [ILLEG.] FOR HOUSE DESIGNED FOR SUPT. OF LOWELL [MACHINE SHOP.]	1856/07/03	1/4 SIZE		H 52.7, W 75.6 CM	INK
162-123-[08]	SKETCH [ILLEG.] FOR HOUSE DESIGNED FOR SUPT. OF LOWELL [MACHINE SHOP.]	1856/07/03	1/4 SIZE	H 52.7, W 75.6 CM	INK	PAPER
162-123-[09]	PROPOSED ALTERATIONS, IN FRONT STEPS OF HOUSE FOR / SUPT. OF LOWELL MACHINE SHOP.	1856/08/23	1"=1'		H 52, W 70 CM	INK
162-123-[09]	PROPOSED ALTERATIONS, IN FRONT STEPS OF HOUSE FOR / SUPT. OF LOWELL MACHINE SHOP.	1856/08/23	1"=1'	H 52, W 70 CM	INK	PAPER
162-123-[10]	[UNTITLED PLAN. SEE NOTES.] [SKETCHES OF ELEVATIONS OF HOUSE FOR SUPT. OF LOWELL MACHINE SHOP.]	1856/08/23	1 1/2"=1'		H 52, W 73 CM	INK
162-123-[10]	[UNTITLED PLAN. SEE NOTES.] [SKETCHES OF ELEVATIONS OF HOUSE FOR SUPT. OF LOWELL MACHINE SHOP.]	1856/08/23	1 1/2"=1'	H 52, W 73 CM	INK	PAPER
162-123-1	ELEVATIONS OF HOUSE FOR SUP'T / OF LOWELL MACHINE SHOP.	1856/01/25	NONE		H 51.8, W 74.6 CM	INK
162-123-1	ELEVATIONS OF HOUSE FOR SUP'T / OF LOWELL MACHINE SHOP.	1856/01/25	NONE	H 51.8, W 74.6 CM	INK	PAPER
162-123-2	PLAN OF HOUSE FOR SUP'T. / OF LOWELL MACHINE SHOP.	1856/01/15	2 1/2"=10'		H 53, W 74.6 CM	INK
162-123-2	PLAN OF HOUSE FOR SUP'T. / OF LOWELL MACHINE SHOP.	1856/01/15	2 1/2"=10'	H 53, W 74.6 CM	INK	PAPER
162-123-3	ELEVATIONS OF HOUSE FOR SUP'T. / OF LOWELL MACHINE SHOP, AS PROPOSED TO BE ALTERED.	1856/02/07	NONE		H 73.6, W 52.7 CM	INK

162-123-3	ELEVATIONS OF HOUSE FOR SUP'T. / OF LOWELL MACHINE SHOP, AS PROPOSED TO BE ALTERED.	1856/02/07	NONE	H 73.6, W 52.7 CM	INK	PAPER
162-123-4	PLAN OF HOUSE FOR SUP'T. OF LOWELL / MACHINE SHOP AS PROPOSED TO BE ALTERED.	1856/01/29	2 1/2"=10'		H 52.2, W 74.4 CM	INK
162-123-4	PLAN OF HOUSE FOR SUP'T. OF LOWELL / MACHINE SHOP AS PROPOSED TO BE ALTERED.	1856/01/29	2 1/2"=10'	H 52.2, W 74.4 CM	INK	PAPER
162-123-5	ELEVATIONS OF HOUSE FOR SUP'T. / OF LOWELL MACHINE SHOP, AS PROPOSED TO BE ALTERED.	1856/02/15	NONE		H 74, W 53 CM	INK
162-123-5	ELEVATIONS OF HOUSE FOR SUP'T. / OF LOWELL MACHINE SHOP, AS PROPOSED TO BE ALTERED.	1856/02/15	NONE	H 74, W 53 CM	INK	PAPER
162-123-7	PLANS OF HOUSE FOR SUPT. OF LOWELL / MACHINE SHOP, AS PROPOSED TO BE / ALTERED.	1856/02/19	2 1/2"=10'		H 53, W 74.2 CM	INK
162-123-7	PLANS OF HOUSE FOR SUPT. OF LOWELL / MACHINE SHOP, AS PROPOSED TO BE / ALTERED.	1856/02/19	2 1/2"=10'	H 53, W 74.2 CM	INK	PAPER
162-124	COPY OF / PLAN TO ACCOMPANY PETITION OF / THE LOWELL ELECTRIC LIGHT CORPORATION / FOR: STREET LIGHT POLE LOCATION.	1948/09/28	1"=50'	H 27.8, W 48.3 CM	GRAPHITE, COLORED PENCIL	PAPER
162-125	SUGGESTED REVISION OF THE DRAINAGE SYSTEM / IN & AROUND THE BARTLETT SCHOOL.	1952/07/16	1"=100'	H 37, W 49.7 CM	INK, WATER COLOR	DRAFTING CLOTH

163-[031]	[UNTITLED.] [GRAPH SHOWING POPULATION OF LOWELL, AVERAGE DAILY FLOW OF MERRIMACK RIVER,, ESTIMATED PROCESS WATER USED, AND LOWELL WATER WORKS AVERAGE DAILY PUMPAGE, 1880-1947.]	1948/07/02	NONE	H 73.1, W 56.3 CM	BLUEPRINT	PAPER
163-[032]	ELEVATION OF / LOWELL CAS LIGHT COMPANY / PROCESS WATER RESERVOIR.	1947/05/29	NONE	H 30.5, W 21.5 CM	INK, COLORED PENCIL	PAPER
163-001	DIAGRAM / SHOWING / COEFFICIENT -C / IN THE FORMULA / Q-CLH' V2gH'-H" / FOR / SUBMERGED WEIRS.	1885/04/04	NONE	H 56.2, W 105.3 CM	INK, COLORED INK, GRAPHITE	SEE NOTES
163-002	[SKETCH SHOWING] CURVE OF STREAM OVER MERRIMACK WEIR.	1885/04/04	3.33"=1'	H 61, W 102.1 CM	GRAPHITE	CLOTH BACKED PAPER
163-003	SHEET NO. 3 / DIAGRAM FOR COMPUTING THE QUANTITY OF / WATER PASSING THE WEIR AT MERRIMACK DAM.	1879/10/31	NONE	H 53.8, W 73.8 CM	INK, GRAPHITE	PAPER
163-004	PITOMETER TESTS / ON / 10 INCH PIPE IN YARD OF LOCKS & CANALS.	1910/10/04	NONE	H 51.2, W 112 CM	INK	DRAFTING CLOTH
163-004-[COPY 1]	PITOMETER TESTS / ON / 10 INCH PIPE IN YARD OF LOCKS & CANALS.	1910/10/04	NONE	H 51, W 109.6 CM	BLUEPRINT	PAPER
163-004-[COPY 2]	PITOMETER TESTS / ON / 10 INCH PIPE IN YARD OF LOCKS & CANALS.	1910/10/04	NONE	H 51, W 109.6 CM	BLUEPRINT	PAPER
163-005-[A]	PITOMETER TESTS / ON / 10" PIPE IN YARD OF LOCKS & CANALS.	1910/06/22-23	NONE	H 51, W 107.4 CM	INK	DRAFTING CLOTH
163-005-[B]	TABLE SHOWING NOZZLE DISCHARGE FROM 10" PIPE IN LOCKS & CANALS YARD DURING "PORTABLE PITOMETER" TEST.	1910/06/22-23	NONE	H 12.7, W 26.7 CM	INK	DRAFTING CLOTH
163-006	PITOMETER TESTS / ON / 24" RESERVOIR PIPE AT PRESCOTT MILLS.	1910/10/11-12	NONE	H 51, W 91.5 CM	INK	DRAFTING CLOTH

163-007	PITOMETER TESTS / ON / 24" PIPE AT PRESCOTT MILLS.	1911/10/31	NONE	H 51.1, W 76.2 CM	INK	DRAFTING CLOTH
163-008	PITOMETER TESTS / ON / 24" RESERVOIR PIPE AT PRESCOTT MILLS.	1911/11/06	NONE	H 50.8, W 87.6 CM	INK	DRAFTING CLOTH
163-009	[DIAGRAM SHOWING] PITOMETER / DEFLECTION VELOCITY / CURVE.	SEE NOTES	NONE	H 52.8, W 73.6 CM	INK	PAPER
163-010	DEFLECTION & VELOCITY CURVES / (AS SHOWN BY PORTABLE TEST PITOMETER) / FROM / 30" SUPPLY MAIN / AT / LOWELL BLEACHERY, LOWELL, MASS.	1910/05/00	NONE	H 51.2, W 79.4 CM	INK	DRAFTING CLOTH
163-010-[COPY 1]	DEFLECTION & VELOCITY CURVES / (AS SHOWN BY PORTABLE TEST PITOMETER) / FROM / 30" SUPPLY MAIN / AT / LOWELL BLEACHERY, LOWELL, MASS.	1910/05/00	NONE	H 54, W 81.4 CM	BLUEPRINT	PAPER
163-011	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES / PLAN OF WEIR & DISCHARGE CURVES.	1913/01/08	3/8"=10'	H 53.6, W 83 CM	GRAPHITE	PAPER
163-012	CURRENT METER MEASURING STATION / AT FRANKLIN FALLS N.H. / FOR / INTERNATIONAL PAPER CO. [WITH TWO MEASUREMENTS TAKEN MAY 15,1905].	SEE TITLE	NONE	H 21.6, W 30.4 CM	INK, COLORED INK	PAPER
163-013	CURRENT METER MEASUREMNT / AT FRANKLIN FALLS, N.H. / FOR "L.& C."	1905/11/13	NONE	H 21.5, W 30.5 CM	INK	PAPER
163-014	[DIAGRAM SHOWING CURRENT METER] MEASUREMENT[S] TAKEN AT LOCHMERE, N.H. AUG. 22, 1912. BUFF & BUFF (A.T.S.) METER.	SEE TITLE	NONE	H 21.6, W 30.4 CM	INK	PAPER

163-015	CURRENT METER MEASURING / STATION AT FRANKLIN FALLS, N.H. [WITH TWO MEASUREMENTS TAKEN AUG. 21,1912].	SEE TITLE	NONE	H 21.7, W 30.5 CM	INK, COLORED INK	PAPER
163-016	MEASUREMENT OF WATER / FLOWING IN WINNIPISEOGEE RIVER / AT FRANKLIN FALLS, N.H.	1910/09/26	NONE	H 29.2, W 45.6 CM	INK, COLORED INK	PAPER
163-017	[WEIR MEASUREMENT] EXPERIMENT'S AT SWAMP LOCKS [OCT.1912 WITH SQUARE, CIRCULAR, & TRIANGULAR ORFICES. ALSO MEASUREMENT FOR TREMONT DAM.]	UNDATED	NONE	H 30.3, W 42.6 CM	INK	PAPER, DRAFTING CLOTH
163-018-[B]	RATING CURVE / FOR / FLOW OF MERRIMACK RIVER / JUST ABOVE / CROMWELLS FALLS.	1913/11/00	NONE	H 53.3, W 82.9 CM	BLUEPRINT	PAPER
163-018-[C]	CROMWELL'S FALLS / RECORDING GAUGE.	SEE NOTES	NONE	H 53.5, W 82.9 CM	GRAPHITE	PAPER
163-018-[D]	HEIGHTS OF / MERRIMACK WIER / AT / THORNTON'S FERRY N.H.	1914/09/00	NONE	H 53.4, W 40.6 CM	INK	PAPER
163-018-[E]	RATING CURVE / FOR / FLOW OF MERRIMACK RIVER / JUST ABOVE / CROMWELL'S FALLS.	1913/11/00	NONE	H 53.4, W 83 CM	INK	PAPER
163-018-[F]	DISCHARGE, AREA & MEAN VELOCITY CURVES.	SEE NOTES	NONE	H 53.4, W 83.3 CM	INK, GRAPHITE	DRAFTING CLOTH, PAPER
163-018-[G]	CROMWELLS FALLS.	SEE NOTES	NONE	H 30, W 22.1 CM	GRAPHITE	PAPER
163-018-[H]	COMPARISON / OF / CONNECTICUT & MERRIMACK RIVERS / PERCENT OF OPEN WATER FLOW / OBTAINED WITH ICE COVER FOR / SAME GAUGE HEIGHT.	SEE NOTES	NONE	H 21.3, W 27.7 CM	BLUEPRINT	PAPER

163-018-A	DIAGRAM / OF DISCHARGE / OF / MERRIMACK RIVER / AT / THORNTONS FERRY / N.H.	1914/00/00	NONE	H 53.5, W 40.8 CM	INK	DRAFTING CLOTH
163-019	CURRENT METER MEASUREMENT / OF / WATER FLOWING IN THE NASHUA RIVER JUST / BELOW B. & M. R. R. BRIDGE, NASHUA JUNCTION.	1913/10/10	NONE	H 29.3, W 45.6 CM	INK	PAPER
163-020	[COMPARISON OF DISCHARGE OF TREMONT GATES WITH DIACHARGE OVER] HALL ST. WEIR.	1912/11/12	NONE	H 28, W 21.5 CM	GRAPHITE, INK, COLORED INK	PAPER
163-021-[A]	DIAGRAM / SHOWING / QUANTITY OF WATER / DISCHARGED BY / TREMONT GATES.	1915/10/00	NONE	H 63.6, W 117 CM	INK	DRAFTING CLOTH
163-021-[B]	TREMONT GATES.	1912/11/00	UNDATED	H 55, W 108.6 CM	GRAPHITE	DRAFTING CLOTH
163-022	CROSS SECTION [AND CURRENT METER MEASUREMENT] OF / PEMIGEWASSET RIVER AT / PLYMOUTH, N.H. [DIAGRAM SHOWING FLOW].	1913/08/20	NONE	H 29.2, W 30.5 CM	INK, COLORED INK	PAPER
163-023	[CURRENT METER] MEASUREMENT OF WATER / FLOWING FROM LAKE WINNIPESAUKEE / AT LAKEPORT N.H.	1913/08/21	NONE	H 21.5, W 31 CM	INK	PAPER
163-024	DIAGRAM SHOWING / RESULTS OF EXPERIMENTS MADE WITH / NEW 1 1/2" NASH WATER METER NO. 945394 / AT / SWAMP LOCKS DAM-JULY 22 TO 25,1913.	SEE TITLE	NONE	H 21.6, W 30.4 CM	INK	PAPER
163-025-[A]	PITOMETER TESTS / ON / 24 INCH RESERVOIR PIPE PRESCOTT MILLS.	1912/10/15	NONE	H 51, W 81.3 CM	INK	DRAFTING CLOTH
163-025-[B]	PITOMETER TESTS / ON / 24 INCH RESERVOIR PIPE PRESCOTT MILLS.	1912/10/16-17	NONE	H 51, W 81.3 CM	INK	DRAFTING CLOTH

163-025-[C]	PITOMETER TESTS / ON / 24 INCH RESERVOIR PIPE PRESCOTT MILLS.	1914/08/18-19	NONE	H 51, W 83.8 CM	INK	DRAFTING CLOTH
163-025-[D]	PITOMETER TESTS / ON / 24 INCH RESERVOIR PIPE PRESCOTT MILLS.	1915/05/25	NONE	H 89, W 51.1 CM	INK, COLORED INK	DRAFTING CLOTH
163-026	MEASUREMENT OF THE QUANTITY OF EXTRA WATER DRAWN BY THE SEVERAL MANUFACTURING / COMPANIES AT LOWELL, MASS., ON THE NOON & NIGHT OF.	UNDATED	NONE	H 22.8, W 21.6 CM	INK, COLORED INK	DRAFTING CLOTH
163-027-A	DIAGRAM SHOWING HEIGHTS / [AT] LAKEPORT, N.H. / ON / [THE] 1ST DAY OF EVERY MONTH FROM 1858 TO 1908.	SEE TITLE	NONE	H 40.5, W 53.2 CM	INK, COLORED INK	PAPER
163-027-B	[UNTITLED.] [DIAGRAM SHOWING CURRENT METER MEASUREMENT OF PEMIGEWASSET RIVER AT PLYMOUTH, N.H.]	1920/01/26	NONE	H 29.2, W 45.8 CM	INK, COLORED INK	PAPER
163-027-C	[DIAGRAM SHOWING] MINES FALLS DAM / DISCHARGE OVER CREST / BY FORMULA / Q=3.1 LH 2/3.	1921/04/29	NONE	H 21.6, W 30.5 CM	INK	PAPER
163-027-D	[UNTITLED.] [CHART SHOWING COST OF NON-POWER WATER USED BY VARIOUS COMPANIES FROM RATINGS MADE ON PUMPS WITH SKETCHES SHOWING LOCATION OF PIPES.]	1920/05/29	1"=50',40',& 100'	H 30.1, W 21.5 CM	INK, COLORED PENCIL	PAPER, TRACING PAPER
163-027-E	[DIAGRAM SHOWING] WEIR DISCHARGE.	UNDATED	NONE	H 29.3, W 45.7 CM	INK	PAPER
163-027-F	[DIAGRAM OF] CURRENT METER STUDIES / POINT & INTEGRATING METHODS / MERRIMACK FLUME.	1924/04/24	NONE	H 21.5, W 30.4 CM	INK	PAPER

163-027-G	[DIAGRAM OF] CURRENT METER STUDIES / VELOCITY SURGES / MERRIMACK FLUME.	1924/04/24	NONE	H 21.5, W 30.4 CM	INK	PAPER
163-028-[A]	[DIAGRAMS SHOWING] RATING / OF / L.& C. BUFF & BUFF CURRENT METER NO. 8163 / AT LOWELL, MASS. IN STILL WATER AT 32 DEGREES FAHR.	1916/03/07	NONE	H 53.5, W 83.5 CM	INK	PAPER
163-028-[B]	RATING / OF / L.& C. BUFF & BUFF CURRENT METER NO. 4179 / AT LOWELL, MASS. IN STILL WATER AT 32 DEGREES FAHR.	1916/12/11	NONE	H 53.5, W 83.5 CM	INK	PAPER
163-029-[A]	MERRYMEETING LAKE STATION NO. 1 / [DISCHARGE CURVES, EFFICIENCY TEST, PITOMETER OBSERVATIONS &] CURRENT METER MEASUREMENTS.	1925/07/13-14	NONE	H 29.2, W 45.8 CM	GRAPHITE	PAPER
163-029-[B]	MERRYMEETING LAKE STATION NO. 1 / [DISCHARGE CURVES,] EFFICIENCY TEST [PITOMETER OBSERVATIONS & CURRENT METER MEASUREMENTS].	1925/07/13-14	NONE	H 21.6, W 30.5 CM	INK	PAPER
163-029-[C]	MERRYMEETING LAKE STATION NO. 1 / DISCHARGE CURVES [EFFICIENCY TEST, PITOMETER OBSERVATIONS & CURRENT METER MEASUREMENTS].	1925/09/26	NONE	H 21.6, W 30.5 CM	INK	PAPER
163-029-[D]	MERRYMEETING STA. # 2 / PITOMETER OBSERVATIONS.	1925/07/13-14	NONE	H 21.6, W 30.5 CM	GRAPHITE	PAPER
163-029-[E]	MERRYMEETING LAKE # 2 STATION / PITOMETER OBSERVATIONS.	1925/07/13-14	NONE	H 21.6, W 30.5 CM	GRAPHITE	PAPER

163-029-[F]	MERRYMEETING LAKE # 2 STA. / PITOMETER OBSERVATIONS.	1925/07/13-14	NONE	H 21.6, W 30.5 CM	GRAPHITE	PAPER
163-030	RATING OF / LOCKS & CANALS / PRICE CURRENT METER.	1946/04/00	NONE	H 28, W 56 CM	INK	PAPER
164-[112]	PLAN OF / PLANKING / ON L. I. D. CO'S BRIDGE / LOWELL, MASS.	1949/06/23	1/4"=1'	H 70, W 44 CM	INK, COLORED INK	DRAFTING CLOTH
164-[113]	PLAN OF / SUPPORTING BEAMS / FOR / L. I. D. CO'S BRIDGE / OVER EASTERN CANAL / LOWELL, MASS.	1949/06/23	1/4"=1'	H 44.5, W 75.5 CM	INK, GRAPHITE	DRAFTING CLOTH
164-[114]	BROADWAY BRIDGE / ALL WOOD REPLACED FALL OF 1964.	SEE TITLE	1/4" & 1/2" = 1'	W 73.8, H 60.9 CM	GRAPHITE, COLORED INK	PAPER
164-001-[A]	SECTIONS OF NORTHERN CANAL AT / SUFFOLK ST. BRIDGE, TAKEN LOOKING DOWN STREAM.	1897/07/25	NONE	H 45.7, W 58.5 CM	INK	PAPER
164-001-[B]	SECTIONS OF CABOT ST. BRIDGE / ACROSS NORTHERN CANAL, TAKEN / LOOKING DOWNSTREAM.	1897/07/25	NONE	H 45.7, W 58.5 CM	INK	PAPER
164-002	SKETCH / SHOWING LAND IN VICINITY OF / EAST MERRIMACK ST. BRIDGE OVER / CONCORD RIVER.	1894/01/00	1"=20'	H 56.7, W 75.3 CM	INK, WATER COLOR	PAPER
164-003	PLAN SHOWING / CONCORD RIVER / [FROM E.] MERRIMACK ST. TO MIDDLESEX PROPERTY [(UNFINISHED) WITH CONTOURS, ETC. MADE FROM ORIGINAL SURVEY BY M. S. AMY & PLOTTED BY W. W. PEABODY].	1898/02/25	1"=10'	H 68.2, W 181.5 CM	GRAPHITE INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER

164-004	SECTIONS IN CONCORD RIVER / BELOW EAST MERRIMACK ST., ALSO / SLOPE FROM E. MERRIMACK ST. TO END OF / WHITTIERS' FENCE WITH A FEW SURFACE VELOCITIES [TAKEN JAN. 11, 1901].	SEE TITLE	NONE	H 45.8, W 58.6 CM	INK, COLORED INK	PAPER
164-005	DIAGRAM / SHOWING HEIGHT OF WATER AT DIFFERENT GAUGES IN CONCORD RIVER [SLOPES FROM LOWER LOCKS GAUGE TO SECTION 8 GAUGE] IN 1900 TO 1909 WITH DIFFERENT QUANTITIES OF WATER USED BY MASS. COTTON MILLS.	1909/09/00	NONE	H 59.7, W 109.2 CM	INK, GRAPHITE	DRAFTING CLOTH
164-006	PLAN [& SECTIONS] OF WALL [NOW THE DILLON WALL SOUTH & EAST OF EAST MERRIMACK ST. BRIDGE].	1904/07/03	NONE	H 18.7, W 30.5 CM	INK, COLORED INK	PAPER
164-007-[A]	PLAN OF / PROPOSED CHANNEL / AT / MOUTH OF CONCORD RIVER.	1890/08/06	H1/4"=10', V1/4"=1'	H 63.3, W 90.2 CM	INK, COLORED INK	DRAFTING CLOTH
164-007-[B]	PLAN / SHOWING SECTIONS IN CONCORD RIVER.	1892/03/01	H1/4"=10', V1/4"=1'	H 34.4, W 71.2 CM	INK, COLORED INK	DRAFTING CLOTH
164-007-[C]	PLAN OF / PROPOSED CHANNEL / AT / MOUTH OF CONCORD RIVER.	1890/08/06	H1/4"=10',V1/4"=1'	H 47.6, W 76.2 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	PAPER
164-007-[D]	PLAN SHOWING / LOCATION OF CHANNEL / AT / MOUTH OF CONCORD RIVER / PROPOSED TO BE EXCAVATED.	1891/09/00	1/4"=10'	H 49, W 89.6 CM	INK, WATER COLOR, COLORED PENCIL, COLORED INK	PAPER

164-008	BOSTON & NORTHERN ST. RY. CO. / CHANGES IN BRIDGE OVER CANAL, / CENTRAL ST., LOWELL, MASS.	1907/03/18	1/8",1/4" & 3/4"=1'	H 41.1, W 88.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-009	PLAN SHOWING PROPOSED CHANGES IN B. & M. R. R. / BRIDGE # 340 OVER MERRIMACK CANAL / DESIRED BY PROPS. LOCKS & CANALS IN ORDER / TO PERMIT THE CONSTRUCTION & OPERATION / OF CUT-OFF GATES IN MERRIMACK CANAL.	1922/07/00	1"=1'	H 53.7, W 79.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-010	PROPOSED DESIGN WITH OLD GIRDERS / [FOR] HIGH BRIDGE [OVER NORTHERN CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/10/27	1/8"& 1/2"=1'	H 45, W 90.3 CM	INK, COLORED INK	PAPER
164-011	PROPOSED GIRDERS / [FOR] PAWTUCKET ST. [HIGH] BRIDGE / OVER / NORTHERN CANAL [OBTAINED FROM B. & M. SHOPS] / PROPRIETORS OF LOCKS & CANALS.	1919/09/12	1/8"=1'	H 50.7, W 86.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-012	PLAN OF PAWTUCKET ST. BRIDGE [ALSO ELEVATION AND SECTION OF HIGH BRIDGE] / OVER / NORTHERN CANAL.	1908/02/00	1"=10'	H 53.4, W 73.4 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
164-013	[PLAN OF] BRIDGE OVER / EASTERN CANAL / ON / EAST MERRIMACK STREET / AS REBUILT IN 1908 & 1909 / LOWELL, MASS.	SEE TITLE	1"=2'	H 84.3, W 120 CM	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
164-014	PLAN OF / CENTRAL ST. BRIDGE / OVER / LOWER PAWTUCKET CANAL [AT CENTRAL STREET WITH SECTIONS AND ELEVATIONS OF SAME].	1907/09/00	1/4"=1', 1"=10'	H 53.4, W 73.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

164-014-[A]	PLAN OF / CENTRAL ST. BRIDGE / OVER / LOWER PAWTUCKET CANAL.	1919/12/18	1"=10',1/4"=1'	H 56.2, W 75 CM	BLUEPRINT, COLORED INK	PAPER
164-014-[COPY 1]	PLAN OF / CENTRAL ST. BRIDGE / OVER / LOWER PAWTUCKET CANAL.	1907/09/00	1/4"=1', 1"=10'	H 56.2, W 75 CM	BLUEPRINT	PAPER
164-015	GENERAL PLAN / [OF] FLETCHER ST. BRIDGE [OVER PAWTUCKET CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/10/22	1/2" & 1/8"=1'	H 69.8, W 98.5 CM	INK, COLORED INK	DRAFTING CLOTH
164-016	PLAN OF / BRIDGE STREET BRIDGE / OVER / EASTERN CANAL.	1908/02/00	1"=5'	H 71.6, W 91.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-016-[A]	PLAN OF / BRIDGE STREET BRIDGE / OVER / EASTERN CANAL.	1921/08/25	1"=5'	H 69.9, W 90.4 CM	BLUEPRINT, COLORED INK	PAPER
164-017	PLAN OF / PAWTUCKET ST. BRIDGE / OVER / UPPER PAWTUCKET CANAL.	1914/03/00	1"=10'	H 52, W 72.4 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
164-017-[A]	PLAN OF / PAWTUCKET ST. BRIDGE / OVER / UPPER PAWTUCKET CANAL.	1914/07/00	1"=10'	H 48.2, W 67.4 CM	BLUEPRINT, PHOTOGRAPH	PAPER
164-017-[COPY 1]	PLAN OF / PAWTUCKET ST. BRIDGE / OVER / UPPER PAWTUCKET CANAL.	1914/03/00	1"=10'	H 51, W 71.1 CM	BLUEPRINT	PAPER
164-018	CENTRAL ST. BRIDGE / DETAIL NEAR WEST CAR TRACK / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/04/07	2"=1'	H 29.2, W 33 CM	INK, GRAPHITE	DRAFTING CLOTH
164-018-D	CENTRAL ST. BRIDGE / CONCRETE SLAB REPAIR.	1980/01/25	1"& 1 1/2"=1'	H 45.7, W 61 CM	BLUE LINE PRINT, COLORED INK	PAPER

164-019	PLAN OF / BROADWAY ST. BRIDGE / OVER / UPPER PAWTUCKET CANAL [AT BROADWAY STREET].	1908/02/00	1"=10'	H 51, W 70.5 CM	INK, COLORED INK	DRAFTING CLOTH
164-020	CONSTRUCTION PLAN / [FOR] FLETCHER ST. BRIDGE [OVER PAWTUCKET CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/06/12	1/2"& 1"=1',1"=250'	H 54, W 89.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-020-[COPY 1]	CONSTRUCTION PLAN / FLETCHER ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/06/12	1/2"& 1"=1',1"=250'	H 54, W 89.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-021-A	[PLAN OF] CANAL BRIDGE [OVER MERRIMACK CANAL 1911-1912, & FENCE FOR SAME] / MARKET ST.	1917/10/17	NONE	H 68, W 92.7 CM	INK	DRAFTING CLOTH
164-021-B	PLAN OF MARKET ST. BRIDGE / OVER MERRIMACK CANAL [1911-1912, & FENCE FOR SAME].	1917/10/22	1"=4'& 1'	H 69, W 102 CM	INK	DRAFTING CLOTH
164-021-C	PLAN & ELEVATION / SHOWING ARRANGEMENT FOR SETTING FENCE POSTS [FOR MARKET ST. BRIDGE OVER MERRIMACK CANAL & THE CAMBRIDGE ST. BRIDGE].	1917/10/29	1"=1"& 1',1/2"=1'	H 67.4, W 99.2 CM	INK	DRAFTING CLOTH
164-021-D	[PLAN OF] RAILING FOR MARKET & CAMBRIDGE ST. BRIDGES [OVER MERRIMACK CANAL & THE CAMBRIDGE ST. BRIDGE].	1917/10/00	SEE NOTES	H 35, W 73.7 CM	INK	DRAFTING CLOTH
164-021-D-[COPY 1]	RAILING FOR MARKET & CAMBRIDGE STREET BRIDGES.	1917/10/24	SEE NOTES	H 34.5, W 73.2 CM	BLUEPRINT	PAPER
164-021-D-[COPY 2]	RAILING FOR MARKET & CAMBRIDGE ST. BRIDGES.	1917/10/24	SEE NOTES	H 34.5, W 73.2 CM	BLUEPRINT	PAPER
164-022	PLAN OF / CAMBRIDGE ST. BRIDGE OVER RIVER MEADOW BROOK.	1917/10/00	1"=4',1"=1'	H 68, W 92.7 CM	INK	DRAFTING CLOTH

164-023-[Q]	CITY OF LOWELL / MIDDLESEX COUNTY / MASSACHUSETTS / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER [ORGANIZATION CHART].	1930/07/30	NONE	H 25.5, W 20.5 CM	INK	DRAFTING CLOTH
164-023-030	SKETCH OF MERRIMACK ST. BRIDGE / OVER WESTERN CANAL / SHOWING LOCATION OF GRADES / OF FINISHED CONCRETE ROADWAY.	1919/02/00	NONE	H 33, W 22 CM	INK, COLORED INK	DRAFTING CLOTH
164-023-041	SKETCH OF / THORNDIKE STREET BRIDGE / OVER PAWTUCKET CANAL / SHOWING LOCATION / OF GRADES / OF FINISHED CONCRETE ROADWAY.	1919/08/00	NONE	H 32.7, W 27.3 CM	INK, COLORED INK	DRAFTING CLOTH
164-023-043	PROPOSED EXTENSION TO GIRDERS / HIGH BRIDGE-NORTHERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/08/14	NONE	H 21.3, W 27.9 CM	INK, COLORED INK	TRACING PAPER
164-023-108	ADDITION TO SIDEWALK / FROM / BRIDGE SIDEWALK TO REX AMUSEMENT CORP. / KEARNEY SQUARE, LOWELL, MASS.	1949/05/23	1/4"=1'	H 21.5, W 28 CM	INK	PAPER
164-023-A	[SKETCH SHOWING] SOURCES OF MUD SPATTERING / NEAR BRIDGE STREET BRIDGE OVER / EASTERN CANAL.	1921/06/14	1"=40'	H 28.5, W 21.5 CM	INK	DRAFTING CLOTH
164-023-B	PROPOSED KNEE-BRACE / FOR / GIRDERS ON HIGH BRIDGE / [OVER NORTHERN CANAL] PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/10/11	1/2"=1'	H 27, W 31.2 CM	INK, COLORED INK	PAPER
164-023-C	HIGH BRIDGE [OVER NORTHERN CANAL] DECK / REINFORCING SCHEDULE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/08/12	NONE	H 43.5, W 43.2 CM	INK, COLORED INK	DRAFTING CLOTH

164-023-D	CASTINGS FOR GIRDER PLATES / [FOR] HIGH BRIDGE [OVER NORTHERN CANAL] / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1920/05/28	1/8"=1'	H 35, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH
164-023-E	SIDEWALK FORMS / [FOR] HIGH BRIDGE [OVER NORTHERN CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/06/23	1"=1'	H 29, W 52.7 CM	INK, COLORED INK	DRAFTING CLOTH
164-023-F	PROFILE OF THORNDIKE & STS., / AT PAWTUCKET CANAL BRIDGE / SHOWING / NEW GRADES MADE NECESSARY BY BLOCK / PAVING OF APPROACHING STREETS.	1915/01/17	20'& 2'	H 29.3, W 53.4 CM	BLUEPRINT	PAPER
164-023-G	CENTRAL ST. BRIDGE / DETAIL NEAR CAR TRACK / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/05/05	2"=1'	H 17.9, W 26.6 CM	INK	DRAFTING CLOTH
164-023-H	TENTATIVE DESIGN / FOR REBUILDING / MARY F. DILLON WALL / ON / CONCORD RIVER.	1919/05/00	NONE	H 28, W 31.2 CM	INK, COLORED INK	PAPER
164-023-I	TENTATIVE DESIGN / FOR REBUILDING / MARY F. DILLON WALL / ON / CONCORD RIVER.	1919/05/00	NONE	H 21.6, W 30.5 CM	INK, WATER COLOR	PAPER
164-023-J	MERRIMACK ST. OVER WESTERN CANAL / [DIAGRAM SHOWING] RATE OF SURFACE WEAR [FOR A PERIOD OF 735 DAYS].	1921/03/09	NONE	H 21.5, W 28 CM	INK, COLORED INK	PAPER
164-023-K	SKETCH SHOWING DISCHARGE / OF MERRIMACK & CONCORD RIVERS / AT / VARIOUS POINTS / & / LOCATION OF GAUGES, ETC.	1918/12/17	1"=250'	H 45.6, W 29.3 CM	INK, WATER COLOR	PAPER

164-023-L	[UNTITLED.] [DIAGRAM SHOWING GAUGE HEIGHTS AT LOWER LOCKS GAUGE & BOOTT GAUGE WITH TEMPERATURES DURING PARTS OF NOV. 1918.]	1918/12/17	NONE	H 45.7, W 29.2 CM	INK	PAPER
164-023-M	PLAN OF CENTRAL ST. BRIDGE / SHOWING SPECIFIED GRADES / FOR RECONSTRUCTION. / PROP. LOCKS & CANALS, / LOWELL, MASS.	1922/05/08	1"=10'	H 27.5, W 56 CM	INK, COLORED INK	DRAFTING CLOTH
164-023-M-[COPY 1]	PLAN OF CENTRAL ST. BRIDGE / SHOWING SPECIFIED GRADES / FOR RECONSTRUCTION. / PROP. LOCKS & CANALS, / LOWELL, MASS.	1922/05/08	1"=10'	H 54, W 89.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-023-N	SKETCH TO ACCOMPANY LETTER DATED JULY 24 / 1922 TO A. C. STICKNEY, DIV. SUPT. OF B.& M. R. R. / RELATIVE TO CHANGE IN BRIDGE 340 ASKED FOR BY PROPS. LOCKS & CANALS.	1922/07/24	1"=50'	H 21.6, W 40 CM	INK, COLORED INK	DRAFTING CLOTH
164-023-O	FLOOR PLAN SHOWING HOLES / IN / CENTRAL STREET BRIDGE / OVER / LOWER PAWTUCKET CANAL.	1936/04/29	1"=10'	H 30.5, W 43.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
164-023-P	PLAN & SECTION SHOWING / PROPOSED ADDITION TO UPSTREAM SIDE OF / EASTERN CANAL BRIDGE.	1952/12/08	NONE	H 21.5, W 28.3 CM	INK, COLORED INK	PAPER
164-024	[CONCRETE FENCE (ELEVATION) FOR] MERRIMACK ST. BRIDGE / OVER / WESTERN CANAL.	1919/03/06	1/2"=1'	H 58, W 65	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-025-[A]	PLAN OF / SCHOOL ST. / LOWELL, MASS. / WHERE IT IS PROPOSED TO ELEVATE THE GRADE / OVER [PAWTUCKET CANAL] THE RAILROAD TRACKS.	1907/05/20	1"=40'	H 70.4, W 116.3 CM	INK, COLORED INK, WATER COLOR	PAPER

164-025-[B]	[UNTITLED. SEE NOTES.]	1907/06/00	1"=80'	H 21.5, W 35 CM	INK, COLORED INK, WATER COLOR	PAPER
164-026	ELEVATION OF / CONCRETE FENCE [FOR] MERRIMACK STREET BRIDGE / OVER WESTERN CANAL.	1918/11/00	1"=2'	H 25.7, W 54.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-027	PLAN OF / MERRIMACK STREET OVER WESTERN CANAL / SHOWING STREET LAYOUT & GRADES / ESTABLISHED BY THE CITY.	1919/01/02	1"=5'	H 47, W 44.5 CM	INK, COLORED INK, GRAPHITE	PAPER
164-028	GENERAL PLAN OF BRIDGE / MERRIMACK ST. OVER WESTERN CANAL [WITH ELEVATION AND SECTIONS OF SAME] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/04/07	1/4"& 1/2"=1'	H 71.2, W 90.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-029	SOUTH PIER EXTENSION / [OF] FLETCHER ST. BRIDGE [OVER PAWTUCKET CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/03/24	1/4"=1'	H 38.2, W 44.9 CM	INK, COLORED INK, GRAPHITE	PAPER
164-031	[SKETCH SHOWING] REPAIRS TO BROADWAY BRIDGE / OCT. 15 TO NOV. 16, 1918.	1918/11/06	NONE	H 20.4, W 28.3 CM	INK, COLORED INK	DRAFTING CLOTH
164-032	STEEL DETAILS / [OF] THORNDIKE ST. BRIDGE [OVER PAWTUCKET CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1917/12/31	1"=1'	H 57.1, W 76.9 CM	INK, COLORED INK	DRAFTING CLOTH
164-033	LAYOUT OF GIRDERS / [OF] HIGH BRIDGE [OVER NORTHERN CANAL] / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1920/04/26	1/10"=1'	H 54.3, W 78.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
164-034-A	[UNTITLED.] [DETAILS OF HIGH BRIDGE OVER NORTHERN CANAL BY N.E. STRUCTURAL CO.]	1920/01/06	NONE	H 52.8, W 209 CM	BLUEPRINT, COLORED INK	PAPER

164-034-B	N. E. STRUCTURAL CO. / EVERETT, MASS. / FOR HIGH BRIDGE [OVER NORTHERN CANAL] LOWELL, MASS. / PROPRIETORS OF LOCKS & CANALS.	1920/01/06	NONE	H 60.2, W 92 CM	BLUEPRINT	PAPER
164-034-C	NORTHEAST STRUCTURAL CO. / EVERETT, MASS. / [DETAILS] FOR HIGH BRIDGE [OVER NORTHERN CANAL] LOWELL, MASS. / PROPRIETORS OF LOCKS & CANALS.	1920/01/06	NONE	H 60.2, W 92 CM	BLUEPRINT	PAPER
164-034-D	[DETAILS OF] HIGH BRIDGE [OVER NORTHERN CANAL BY N.E. STRUCTURAL CO.] LOWELL, MASS.	1920/01/06	NONE	H 47, W 29 CM	BLUEPRINT, GRAPHITE	PAPER
164-035-A	[DETAILS OF HIGH BRIDGE OVER NORTHERN CANAL BY N. E. STRUCTURAL CO.]	1920/01/06			BP	
164-035-B	[DETAILS OF HIGH BRIDGE OVER NORTHERN CANAL BY N.E. STRUCTURAL CO.]	1920/01/06			BP	
164-035-C	[DETAILS OF HIGH BRIDGE OVER NORTHERN CANAL BY N.E. STRUCTURAL CO.]	1920/01/06			BP	
164-035-D	[DETAILS OF HIGH BRIDGE OVER NORTHERN CANAL BY N.E. STRUCTURAL CO.]	1920/01/06			BP	
164-036	DETAILS OF BRIDGE / OVER / PAWTUCKET CANAL / AT / CENTRAL STREET.	1918/03/27	1/4"=1'	H 34.7, W 54.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-037	[PLANS SHOWING] PROPOSED CHANGES / [IN] MERRIMACK DAM [& R. R. BRIDGE AT FOOT OF DUTTON STREET] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/09/18	1/10"=1'	H 56.3, W 78.7 CM	BLUEPRINT	PAPER

164-037-[A]	[PLANS SHOWING DETAILS & ALTERATIONS] BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION / VALUATION SECTION 13.9 / BRIDGE NO. A-342 (MERRIMACK CANAL) / AT FOOT OF DUTTON ST. / LOWELL, MASS. [& THE NECESSARY CHANGES TO MERRIMACK DAM] / GENERAL PLAN & DETAILS.	1918/09/07	3/4"=1'	H 61.2, W 91.7 CM	BLUEPRINT, COLORED INK, COLORED PENCIL	PAPER
164-038	[PLANS SHOWING] PROPOSED GATE STRUCTURE / MERRIMACK DAM [& R. R. BRIDGE AT FOOT OF DUTTON STREET] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/08/28	1/4"=1'	H 59.7, W 87.5 CM	BLUEPRINT	PAPER
164-038-[A]	[PLANS SHOWING DETAILS & ALTERATIONS] BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION / VALUATION SECTION 13.9 / BRIDGE NO. 343 (MERRIMACK CANAL) / AT FOOT OF DUTTON ST..LOWELL, MASS. [& THE NECESSARY CHANGES TO MERRIMACK DAM] / GENERAL PLAN & DETAILS.	1918/09/07	3/4"=1'	H 61.2, W 91.7 CM	BLUEPRINT	PAPER
164-039	DETAILS OF / 36" PLATE GIRDER BRIDGE OVER WESTERN CANAL / FOR / LAWRENCE MFG. CO. LOWELL, MASS.	1917/01/06	3/8"& 3/4"=1'	H 82.5, W 75 CM	BLUEPRINT	PAPER
164-040	SKETCH OF / PAWTUCKET STREET BRIDGE / OVER NORTHERN CANAL / SHOWING LOCATION OF GRADES OF / FINISHED CONCRETE ROADWAY.	1922/06/00	NONE	H 26.6, W 54.5 CM	INK, COLORED INK	DRAFTING CLOTH

164-042	ABUTMENT RECONSTRUCTION / [FOR] HIGH BRIDGE [OVER NORTHERN CANAL] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/08/10	1/10"& 1/2"=1'	H 53.2, W 86.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-044	PLAN OF [REPAIRS TO] SUFFOLK STREET BRIDGE / OVER / NORTHERN CANAL.	1917/07/00	1"=5'	H 67.2, W 101 CM	INK, COLORED PENCIL	DRAFTING CLOTH
164-045	[PLAN OF] BRIDGE OVER / EASTERN CANAL / ON / EAST MERRIMACK STREET / LOWELL, MASS. / AS REBUILT IN 1908 AND 1909.	1955/09/00	1"=2'	H 85.7, W 119.6 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-045-[COPY 1]	BRIDGE OVER / EASTERN CANAL / ON / EAST MERRIMACK STREET / LOWELL, MASS. / AS REBUILT IN 1908 AND 1909.	1955/09/00	1"=2'	H 85.7, W 119.6 CM	BLUE LINE PRINT	PAPER
164-046	PLAN OF / CENTRAL ST. BRIDGE / OVER / LOWER PAWTUCKET CANAL / [AT CENTRAL STREET] SHOWING ROADWAY CONSTRUCTION.	1920/05/12	1"=5'	H 51.8, W 65.5 CM	INK, COLORED INK	DRAFTING CLOTH
164-047-[COPY 1]	PROPOSED BRONZE TABLET [AS FOLLOWS: BREWERY BRIDGE BUILT BY PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER 1919].	1919/12/18	NONE	H 61, W 94.7 CM	BLUEPRINT	PAPER
164-047-[COPY 2]	PROPOSED BRONZE TABLET [AS FOLLOWS: BREWERY BRIDGE BUILT BY PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER 1919].	1919/12/18	NONE	H 61, W 94.7 CM	BLUEPRINT	PAPER
164-048	PROPOSED RECONSTRUCTION / OF / SUFFOLK STREET BRIDGE [OVER NORTHERN CANAL PLAN AND SECTIONS FOR] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/09/15	1/5"& 3/4"=1'	H 59, W 97.2 CM	INK, COLORED INK	PAPER

164-049	[PLAN AND SECTIONS OF] HIGH BRIDGE / PAWTUCKET ST. OVER NORTHERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/08/10	1"=10'& 1'	H 71.4, W 95.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
164-050	SKETCH SHOWING TIMBERS / IN CENTRAL PART OF / DUTTON ST. BRIDGE OVER WESTERN CANAL.	1902/06/30	1"=50'	H 20, W 48.2 CM	BLUEPRINT	PAPER
164-051	PROPOSED SCHEME FOR FORM WORK / [ON] BRIDGE STREET BRIDGE OVER EASTERN CANAL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1920/12/24	1/2"=1'	H 39, W 71.9 CM	INK, COLORED INK	DRAFTING CLOTH
164-052	PROPOSED LAYOUT / OF / BRIDGE STREET BRIDGE / OVER / EASTERN CANAL / PROPRIETORS LOCKS & CANALS.	1921/01/19	1"=10'& 5',3/4"=1'	H 52, W 75 CM	INK, COLORED PENCIL	DRAFTING CLOTH
164-052-[COPY 1]	PROPOSED LAYOUT / OF / BRIDGE STREET BRIDGE / OVER / EASTERN CANAL / PROPRIETORS LOCKS & CANALS.	1921/01/19	1"=10'& 5',3/4"=1'	H 51.8, W 75 CM	BLUEPRINT	PAPER
164-053	[PLAN SHOWING] BRIDGE STREET BRIDGE / OVER / EASTERN CANAL / PROPRIETORS LOCKS & CANALS / SHOWING LOCATION OF TRUSSES & GIRDERS.	1921/01/16	1"=2'	H 74, W 82.7 CM	INK	DRAFTING CLOTH
164-054	[PLAN OF BOSTON & MAINE RAILROAD BRIDGE OVER PAWTUCKET CANAL LOWELL, MASS.] [AT SWAMP LOCKS BASIN, SHOWING OUTLINE OF BRIDGE & PIERS, ALSO OUTLINE OF BASIN FROM FLETCHER ST. BRIDGE (INCLUSIVE) TO ENTRANCE OF HAMILTON CANAL, ARMOUR & NELSON MORRIS PROPS].	1905/03/00	1"=20'			

164-054-[COPY 1]	PLAN OF BOSTON & MAINE RAILROAD BRIDGE / OVER / PAWTUCKET CANAL / LOWELL, MASS.	1905/03/00	1"=20'	H 44.4, W 75.2 CM	BLUEPRINT	PAPER
164-055-[A]	BRIDGE ST. OVER EASTERN CANAL / PROPOSED RECONSTRUCTION / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1920/12/13	1/2"=1', 1"=5'	H 35.4, W 74.4 CM	BLUEPRINT, COLORED INK	PAPER
164-055-[B]	BRIDGE ST. OVER EASTERN CANAL / PROPOSED RECONSTRUCTION / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1920/12/13	1/2"=1', 1"=5'	H 39.3, W 77.5 CM	INK, COLORED INK	DRAFTING CLOTH
164-056	PLAN OF / MERRIMACK STREET BRIDGE / OVER / WESTERN CANAL / SHOWING ROADWAY CONSTRUCTION.	1922/06/12	1"=4'	H 40.5, W 57.9 CM	INK, COLORED INK	DRAFTING CLOTH
164-057	CROSS SECTION SHOWING ORIGINAL TRUSSED BEAMS / & NEW STRENGTHENING STEEL BEAMS PLACED / UNDER PLATFORM ON EAST SIDE OF / CENTRAL STREET [BRIDGE], NOVEMBER 1914.	1916/07/08	1"=1'	H 26.8, W 43.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
164-058	CENTRAL ST. BRIDGE / GIRDER LAYOUT.	1921/05/13	1/4"=1'	H 60.2, W 75 CM	INK	DRAFTING CLOTH
164-059	PLAN OF CONCORD RIVER / [FROM] IPSWICH MILLS TO MASS. / DYE HOUSE [SHOWING CONTOURS OF RIVER BED] / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/11/12	NONE	H 64.3, W 107.7 CM	INK, COLORED INK	DRAFTING CLOTH
164-060	PLAN OF / CENTRAL STREET BRIDGE / OVER PAWTUCKET CANAL / SHOWING SIDEWALK, EDGESTONE, GUTTER / & MUD SILL SURFACE GRADES.	1922/03/00	1"=10'	H 38.6, W 55.6 CM	INK	DRAFTING CLOTH

164-062	[PLAN SHOWING] PROPOSED CHANGES IN / CONCORD RIVER / BELOW E. MERRIMACK ST. / PROPRIETORS OF LOCKS & CANALS, LOWELL, MASS.	1922/03/17	1"=40'	H 54.3, W 78.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
164-063	THEATRE, STORE & OFFICE BUILDINGS / CENTRAL ST. LOWELL, MASS. [SOUTH ELEVATION] / FOR / THE STRAND REALTY CO. / OF LOWELL.	UNDATED	NONE	H 53.4, W 104.3 CM	BLUEPRINT, GRAPHITE	PAPER
164-064	STORE & OFFICE BUILDING / AT / LOWELL, MASS. / FOR [...BLANK]. [BLUE PRINT PLAN OF FIRST FLOOR OF STRAND THEATRE BLDG. WITH CROSS SECTIONS OF THE PLATFORM.]	UNDATED	1/8"=1'	H 41.4, W 64.2 CM	BLUEPRINT, INK	PAPER
164-065	PLAN OF / CENTRAL STREET BRIDGE / OVER PAWTUCKET CANAL / SHOWING SIDEWALK, EDGESTONE, GUTTER / & RAIL, SURFACE GRADES.	1922/02/00	1"=10'	H 31.5, W 46 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
164-065	THEATRE, STORE & OFFICE BUILDINGS / CENTRAL STREET LOWELL, MASS. / FOR / THE STRAND REALTY COMPANY / OF LOWELL. [BLUE PRINT PLAN OF FIRST FLOOR OF STRAND THEATRE BLDG.]	UNDATED	1/8"& 1/4"=1'	H 53.4, W 104.8 CM	BLUEPRINT	PAPER
164-066	PLAN OF CONCORD RIVER / [FROM] MASS. DYE HOUSE TO / MERRIMACK RIVER / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1921/11/28	1"=20'	H 49.5, W 101.8 CM	INK	DRAFTING CLOTH
164-067	[UNTITLED.] [TRACINGS SHOWING FRONT ELEVATION & SECTIONS THRU LOBBY OF STRAND THEATRE & STORES; ALSO PLAN SHOWING HANGERS & TRUSSES OF PLATFORM.]	UNDATED	1/8"=1'	H 62.5, W 49.5 CM	INK	DRAFTING CLOTH

164-068	[UNTITLED.] [SKETCH SHOWING GIRDERS & TRUSSES UNDER PLATFORM OF CENTRAL ST. BRIDGE.]	1915/10/00	1"=4'	H 43.2, W 79.7 CM	INK, COLORED INK, WATER COLOR	PAPER
164-069	[SKETCH SHOWING ELEVATION OF] PIER UNDER PLATFORM OVER PAWTUCKET CANAL-WEST SIDE OF CENTRAL STREET [BRIDGE].	1915/06/12	1"=3'	H 35.6, W 68.5 CM	INK, COLORED INK, WATER COLOR	PAPER
164-070	DIAGRAM OF PAWTUCKET CANAL AT CENTRAL STREET LOWELL, MASS. / SHOWING / TRUSSES & PIPES THEREIN & STEEL / GIRDERS BEING INSTALLED UNDER PLAT- / FORM ON EAST SIDE OF CENTRAL STREET [BRIDGE].	1916/09/27	1"=40'	H 32.2, W 76.8 CM	BLUEPRINT	PAPER
164-070	PLAN OF / SCHOOL STREET BRIDGE / OVER / PAWTUCKET CANAL & B. & M. RAILROAD.	1922/07/00	1"=40'	H 37.9, W 73.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
164-071	[PLAN OF] PAWTUCKET STREET BRIDGE / OVER PAWTUCKET CANAL.	1924/07/16	1"=10'	H 26.6, W 45.8 CM	INK	DRAFTING CLOTH
164-072	[DIAGRAM SHOWING] FRESHET HEIGHTS / MIDDLESEX DAM & CONCORD / RIVER. / PROPRIETORS LOCKS & CANALS / LOWELL, MASS.	1924/07/11	SEE NOTES	H 46, W 60.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-073	[PLAN OF] MIDDLESEX DAM / ON CONCORD RIVER [SHOWING LOCATIONS, SECTIONS ETC.] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1925/07/11	1"=20',1/4"=1'	H 49.3, W 64.8 CM	BLUEPRINT, GRAPHITE	PAPER
164-074	[TRACING SHOWING SECTIONS OF] MIDDLESEX DAM ON CONCORD RIVER / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1925/08/10	1"=2'	H 63, W 70.5 CM	INK	DRAFTING CLOTH

164-075	[TRACING SHOWING] MIDDLESEX DAM / STEEL FLASHBOARD SUPPORTS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1925/08/22	1 1/2"=1'	H 27.5, W 56 CM	INK, COLORED INK	DRAFTING CLOTH
164-076	[TRACING SHOWING MIDDLESEX DAM AS RECONSTRUCTED.]	1925/10/20	1"=20'			TP
164-077	[BLUEPRINT SHOWING PROPOSED] PLAN OF BRIDGE OVER CONCORD / & MERRIMACK RIVERS PREPARED / BY PLANNING BOARD IN SPRING / OF 1925.	1925/00/00	1"=40',12' & 1'	H 47, W 60.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-078-[A]	BRIDGE ST. BRIDGE NO. 3 / OVER MERRIMACK RIVER. / [PLANS & SPECIFICATIONS FOR] ALTERATIONS TO DECK [OF CENTRAL BRIDGE]. / CITY ENGINEER'S OFFICE, LOWELL, MASS. / BRIDGE DEPT.	1925/06/00	1"=1'	H 38, W 93.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-078-[B]	SPECIFICATIONS FOR PAINTING BRIDGES.	1925/06/22	NONE	H 28, W 21.5 CM	INK	PAER
164-080	PLAN & PROFILE OF CONDUIT ST. / SHOWING / PROPOSED $125,000 BEAVER BROOK BRIDGE.	1924/12/11	1"=200'	H 59.3, W 56 CM	INK, COLORED PENCIL	DRAFTING CLOTH
164-081-[1]	BEAVER ST. BRIDGE / OVER BEAVER BROOK. / GENERAL PLAN. / CITY ENGINEER'S OFFICE, LOWELL, MASS.	1926/06/00	1/20, 3/16"=1'	H 58, W 102.8 CM	BLUEPRINT	PAPER
164-081-[2]	BEAVER ST. BRIDGE / OVER BEAVER BROOK. / DETAILS. / CITY ENG'R'S OFFICE, LOWELL, MASS.	1926/06/00	1/2"=1'	H 58, W 102.8 CM	BLUEPRINT	PAPER
164-082	[PRELIMINARY PLAN OF REPAIRS TO MIDDLESEX DAM ON CONCORD RIVER.]	1925/07/11	1"=20'			

164-083	[PLAN SHOWING THE PROPERTY OF MIDDLESEX CO. SITE OF (L.E.L.) PLANT ON CONCORD RIVER.]	1901/06/00	1"=20'			
164-084	[CITY ENGINEER'S DRAWING OF] SOUTH ABUTMENT [OF] CENTRAL BRIDGE.	1926/12/20	1"=6', 1/36	H 58.4, W 73.7 CM	GRAPHITE	TRACING PAPER
164-084-[COPY 1]	SOUTH ABUTMENT CENTRAL BRIDGE.	1926/12/20	1"=6'	H 58.4, W 77.5 CM	BLUEPRINT	PAPER
164-085	[TRACING SHOWING] WAMESIT POWER CO. / PROPOSED DEVELOPMENT / AMERICAN BOLT CO. SITE.	1926/08/13	1"=10'	H 43, W 52 CM	INK	DRAFTING CLOTH
164-086	[TRACING SHOWING WATERWAYS, FLUMES, WATERWHEELS WATER RIGHTS AT MIDDLESEX DAM ON CONCORD RIVER.]	1917/02/01	1"=50'			
164-087	[PLAN SHOWING] PROPOSED UNDERGROUND / BRIDGE ST. [CONDUIT] / FROM KEARNEY SQUARE / TO CENTRAL BRIDGE / THE LOWELL ELECTRIC LIGHT CORP.	1930/03/10	H1"=20', 1/4"=1'	H 50.8, W 72 CM	RED LINE PRINT, GRAPHITE	PAPER
164-088	PROPOSED UNDERGROUND [CONDUIT] / CONSTRUCTION [FROM KEARNEY SQUARE TO CENTRAL BRIDGE] / BRIDGE ST. / THE LOWELL ELECTRIC LIGHT CORPORATION.	1930/03/10	NONE	H 50.8, W 72 CM	RED LINE PRINT	PAPER

164-089	LEWIS E. MOORE- CONSULTING ENGINEER / BOSTON & NORTHERN ST. RY. CO. / CENTRAL ST., LOWELL, MASSACHUSETTS. [PLAN OF GIRDERS UNDER CAR TRACKS OVER LOWER PAWTUCKET CANAL AT CENTRAL ST.]	1938/03/15	3/4"& 1/8"=1'	H 45.5, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
164-090	DRAWING TRACED / FROM BLUEPRINT MADE BY / N. E. STRUCTURAL CO. / EVERETT, MASS. DATE 3-7-22 / SHOWING / CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/03/23	1/4"& 1/2"=1'	H 61, W 92.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-090-[COPY 1]	DRAWING TRACED / FROM BLUEPRINT MADE BY / N. E. STRUCTURAL CO. / EVERETT, MASS. DATE 3-7-22 / SHOWING / CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/03/23	1/4"& 1/2"=1'	H 61, W 92.8 CM	BLUEPRINT, GRAPHITE	PAPER
164-091	PLAN & SECTION / OF / CENTRAL STREET BRIDGE / SHOWING / RELATION OF GIRDERS UNDER / STREET RAILWAY CAR TRACKS / TO / ADJOINING CONSTRUCTION / LOWELL, MASS.	1938/03/07	1",1/2"& 1/8"=1'	H 41.6, W 57.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-092	[DETAIL FOR 10" I BEAMS AND CONNECTION ANGLES FOR] CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/04/12	1 1/2"=1'	H 23.6, W 69.2 CM	INK, COLORED INK	DRAFTING CLOTH
164-093	LOCATION OF HOLES IN 30" I BEAMS / FOR / CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/04/20	H1/2"=1', V1/4"=1'	H 35.4, W 70 CM	INK, COLORED INK	DRAFTING CLOTH
164-093-[COPY 1]	LOCATION OF HOLES IN 30" I BEAMS / FOR / CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/04/20	1/4"& 1/2"=1"	H 55.5, W 77.4 CM	BLUEPRINT	PAPER
164-094	CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/04/25	NONE	H 23.6, W 52 CM	INK, COLORED INK	DRAFTING CLOTH

164-094-[COPY 1]	CENTRAL STREET BRIDGE / LOWELL, MASS.	1938/04/25	NONE	H 56.6, W 71.8 CM	BLUEPRINT	PAPER
164-095	FOUR 30" I BEAMS / PUT IN / CENTRAL STREET BRIDGE / REPLACING / FOUR 36" GIRDERS FORMERLY / UNDER STREET RAILWAY CAR TRACKS / LOWELL, MASS.	1938/05/16	1/4"& 1/2"=1'	H 54.5, W 75.9 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-095-[COPY 1]	FOUR 30" I BEAMS / PUT IN / CENTRAL STREET BRIDGE / REPLACING / FOUR 36" GIRDERS FORMERLY / UNDER STREET RAILWAY CAR TRACKS / LOWELL, MASS.	1938/05/16	1/4"& 1/2"=1"	H 55.5, W 77.4 CM	BLUEPRINT	PAPER
164-096	PLAN & SECTION OF / MERRIMACK ST. BRIDGE / OVER / WESTERN CANAL / SHOWING / CONSTRUCTION OF FORMS / FOR CENTER SECTION.	1938/08/23	1/2"& 1"=1'	H 63.6, W 79.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
164-096-[COPY 1]	PLAN & SECTION OF / MERRIMACK ST. BRIDGE / OVER / WESTERN CANAL / SHOWING / CONSTRUCTION OF FORMS / FOR CENTER SECTION.	1938/08/23	1/2"& 1"=1'	H 55.9, W 86.5 CM	BLACK LINE PRINT	PAPER
164-097	PLAN & SECTIONS OF / MERRIMACK ST. BRIDGE / OVER / WESTERN CANAL / SHOWING / CENTER SECTION REBUILT.	1938/08/25	1/2"& 1"=1'	H 64.3, W 84.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-098	SURFACE PLAN / OF / PAWTUCKET STREET BRIDGE / OVER / NORTHERN CANAL [SHOWING RELATION OF CONCRETE ROADWAY WITH DIRT APPROACHES].	1930/11/23	1"=10'	H 35, W 78.7 CM	INK, GRAPHITE	DRAFTING CLOTH

164-099	SURFACE PLAN / OF / BROADWAY BRIDGE / OVER / PAWTUCKET CANAL [SHOWING RELATION OF MUD SILL WITH TAR CONCRETE SIDEWALKS].	1938/11/23	1"=10'	H 38.8, W 81.4 CM	INK, GRAPHITE	DRAFTING CLOTH
164-100	SURFACE PLAN / OF / FLETCHER ST. BRIDGE / OVER / PAWTUCKET CANAL. / [ALSO] SURFACE PLAN / OF / EAST MERRIMACK ST. BRIDGE / OVER / EASTERN CANAL. / [ALSO] SURFACE PLAN / OF / PAWTUCKET ST. BRIDGE / OVER / PAWTUCKET CANAL. / [SEE NOTES]	1938/11/23	1"=10'	H 76.1, W 81.5 CM	INK, GRAPHITE	DRAFTING CLOTH
164-101	PLAN SHOWING / SUGGESTED BRIDGE FROM DUTTON TO FRENCH STS.	1924/01/00	1"=50'	H 59, W 83 CM	BLUEPRINT, GRAPHITE	PAPER
164-102	PROPOSED UTILITIES BRIDGE / ON PROPERTY OF / THE PROPRIETORS OF LOCKS & CANALS / FOR / LOWELL HOUSING AUTHORITY / NORTH COMMON VILLAGE / PROJECT MASS-1-1. / [ALSO] DETAILS OF UTILITY BRIDGE.	SEE NOTES	1/8"=1',1"=20'	H 49.4, W 67.3 CM	BLUE LINE PRINT	PAPER
164-103	PLAN & SECTIONS / OF / SIDEWALK & FENCE / BREWERY BRIDGE-DOWNSTREAM SIDE / LOWELL, MASS. [BEFORE IMPROVEMENTS].	1942/10/23	1/4"& 1/2"=1'	H 43.3, W 80 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
164-104	PLAN & SECTIONS / OF / SIDEWALK EXTENSION & FENCE / BREWERY BRIDGE-DOWNSTREAM SIDE / LOWELL, MASS. [AFTER IMPROVEMENTS].	1942/11/21	1/4"& 1/2"=1'	H 40.6, W 90.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH

164-105	BRIDGE & FENCE / OVER / LOWER PAWTUCKET CANAL / SACO-LOWELL SHOPS YARD / LOWELL, MASS.	1943/05/00	1/2"& 1/4"=1'	H 61.6, W 106.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
164-106	PROPOSED 5" REINFORCED CONCRETE / SLAB FOR THE SOUTHERLY SIDEWALK / OF THE / EASTERN CANAL BRIDGE [EAST MERRIMACK STREET] / KEARNEY SQUARE, LOWELL, MASS.	1943/09/18	1/2"=1'	H 40.9, W 98.4 CM	INK, COLORED INK	DRAFTING CLOTH
164-107	THE LOWELL ELECTRIC LIGHT CORPORATION / UNDERGROUND SYSTEM / 13 KV. FOR-BLOSSOM-WORTHEN ST. LINE / FLETCHER ST. BRIDGE / PIPE CROSSING & STEEL DETAILS.	1947/04/29	1/8"& 1"=1'	H 63.3, W 100.3 CM	BLACK LINE PRINT	PAPER
164-108	PLAN SHOWING / AREA OVER LOWER LEVEL OF WESTERN CANAL / FOR BRIDGE & RAILWAY / LOWELL, MASS.	1955/02/19	1"=50'	H 30, W 45.1 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
164-109	FENCE POSTS ETC. OF / HIGH BRIDGE FENCE ON PAWTUCKET STREET / OVER NORTHERN CANAL & BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1953/07/01	1",1 1/2"& 3"=1'	H 48.5, W 77.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
164-109-[01]	CITY OF LOWELL, MASS. / GILET PARKING LOT / FOOT BRIDGE LOCATION PLAN.	1957/08/00	VARIOUS	H 61.1, W 91.5 CM	BLUEPRINT	PAPER
164-109-[02]	CITY OF LOWELL, MASS. / GILET PARKING LOT / FOOT BRIDGE LOCATION PLAN.	1957/08/00	VARIOUS	H 61.1, W 91.5 CM	BLUEPRINT	PAPER
164-110	ELEVATION OF / BRIDGE ST. BRIDGE / SHOWING / ELEVATIONS OF BRIDGE WITH RELATION / TO 1936 MERRIMACK RIVER FLOOD / LOWELL, MASS.	1952/10/10	1"=20'& 10'	H 30.2, W 73.9 CM	GRAPHITE, INK, COLORED INK, COLORED PENCIL	TRACING PAPER

164-110	RAILROAD BRIDGE / FROM / JACKSON STREET / TO / SACO-LOWELL SHOPS / SHOWING / CONDITION OF TIES & WOODEN BEAMS.	1941/07/08	3/8"=1'	H 45.7, W 79.7 CM	GRAPHITE, COLORED PENCIL	PAPER
164-111	PLAN SHOWING LOCATION / OF / PROPOSED HUNTS FALLS BRIDGE / OVER MERRIMACK RIVER.	1952/02/00	1"=100'	H 56.5, W 76.2 CM	INK, COLORED INK	DRAFTING CLOTH
165-[069]	WATER WORKS / MAP OF THE / CITY OF / LOWELL.	1926/00/00	1"=1000'	h 24.4, W 33.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
165-001	[MAP OF THE TOWN OF] DRACUT.	1901/03/01	2 1/2"=1 MILE	H 38.2, W 58.1 CM	INK	DRAFTING CLOTH
165-002-[A]	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / MERRIMACK RIVER, CONCORD RIVER, & CANALS.	1912/07/00	1"=200'	H 77.7, W 105.5 CM	INK	DRAFTING CLOTH
165-002-[B]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1956/10/00	1"=250'& 1000'	H 87.5, W 112.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
165-002-[C]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1956/10/00	1"=250'& 1000'	H 88, W 112 CM	INK, WATER COLOR, BLUE LINE PRINT	CLOTHBACKED PAPER

165-003	A / PLAN & PROFILE / OF THE / [OLD MIDDLESEX CANAL &] BOSTON & LOWELL / R. R. / TRACED, DEC. 1902, FROM ORIGINAL PLAN IN POSSESSION / OF C. T. JACKSON, GREAT-GRANDSON OF P. T. JACKSON, TREASURER OF / L. &. C. FROM 1834 TO 1845 AND BUILDER OF B. & L. R.R.	1902/12/00	SEE NOTES	H 25.1, W 106.8 CM	INK	DRAFTING CLOTH
165-003-[COPY 1]	A / PLAN & PROFILE / OF THE / BOSTON & LOWELL / R. R. / TRACED, DEC. 1902, FROM ORIGINAL PLAN IN POSSESSION / OF C. T. JACKSON, GREAT-GRANDSON OF P. T. JACKSON, TREASURER OF / L. &. C. FROM 1834 TO 1845 AND BUILDER OF B. & L. R. R.	1902/12/00	SEE NOTES	H 25.4, W 105.4 CM	BLUEPRINT	PAPER
165-004	PLAN / OF / RICHMOND / (HENRICO COUNTY) / MANCHESTER & SPRINGHILL / VA.	1848/00/00	1"=550'		H 83.5, W 108.7 CM	LITHOGRAPH
165-004	PLAN / OF / RICHMOND / (HENRICO COUNTY) / MANCHESTER & SPRINGHILL / VA.	1848/00/00	1"=550'	H 83.5, W 108.7 CM	LITHOGRAPH	PAPER
165-005	[MAP OF] DRACUT.	1881/00/00	2 1/2"=1 MILE	H 37.8, W 58.5 CM	INK, COLORED PENCIL	CLOTH BACKED PAPER
165-006	PLAN OF PART OF HOLYOKE [MASS.] / PRESENTED BY CAPT. S. K. HUTCHINSON.	1849/00/00	NONE		H 70.9, W 83.6 CM	INK, COLORED INK
165-006	PLAN OF PART OF HOLYOKE [MASS.] / PRESENTED BY CAPT. S. K. HUTCHINSON.	1849/00/00	NONE	H 70.9, W 83.6 CM	INK, COLORED INK	CLOTH BACKED PAPER
165-007	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	6/16"=100'	H 64.2, W 80.7 CM	BLUE LINE PRINT	CLOTH BACKED PAPER

165-008	DRAFT [MAP] OF THE ISLANDS IN,- / LAKE WINNIPISEOGEE AS / NUMBERED AND COUPLED IN THE FIRST PLAN.	1786/12/24	NONE	H 63.2, W 83.2 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
165-009	MAP / OF THE / WASHINGTON [D.C.] AQUEDUCT.	1859/03/17	NOT LEGIBLE	H 24, W 77 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
165-010	[MAP OF] NORTH ATLANTIC OCEAN [SHOWING SOUNDINGS].	SEE NOTES	NONE	H 65.7, W 99.3 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
165-011	MAP / OF / LAKE WINNIPISSEOGEE / LONG BAY & SMITH'S POND.	1858/00/00	NONE	H 45.8, W 66.1 CM	PHOTOGRAPH, WATER COLOR	PAPER
165-012	APPROXIMATE DRAINAGE AREA OF BEAVER BROOK.	1920/09/00	1/62,500	H 66, W 26 CM	INK	DRAFTING CLOTH
165-013	[MAP OF THE] WATERSHED & FLOWAGE / OF / PROPOSED BLACKWATER RESERVOIR / AT / WEBSTER, N.H.	1920/08/06	6/16"=1/4 MILE	H 76.8, W 86.1 CM	INK	DRAFTING CLOTH
165-014	MAP OF LAKE WINNIPESAUKEE SHOWING- / PART OF LAKE COVERED & LOCATION OF PHOTOGRAPHS TAKEN BY [MR.] S.S. KENT.	1921/07/25	NONE	H 59.7, W 54 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
165-015	PLAT / OF THE / MERRYMEETING WATER-POWER / BELONGING TO THE / UNION PODWER-WORKS ESTATE / SITUATED IN / NEW DURHAM, N.H.	1866/00/00	1"=400'	H 62.9, W 131.4 CM	BLUEPRINT	PAPER
165-015-[COPY 1]	PLAT / OF THE / MERRYMEETING WATER-POWER / BELONGING TO THE / UNION PODWER-WORKS ESTATE / SITUATED IN / NEW DURHAM, N.H.	1922/00/00	1"=400'	H 59.4, W 128.3 CM	INK, WATERCOLOR	DRAFTING CLOTH

165-016-A	PRELIMINARY PLAN / MERRYMEETING LAKE DAM / SHOWING / PROPOSED CHANGES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/02/09	1"=40',5'& 20'	H 57.8, W 110.5 CM	INK, COLORED INK	DRAFTING CLOTH
165-016-A-[COPY 1]	PRELIMINARY PLAN / MERRYMEETING LAKE DAM / SHOWING / PROPOSED CHANGES / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1922/02/09			BP	
165-017	[ROUGH PENCIL SKETCH OF DAM & VICINITY AT] MERRYMEETING POND.	1921/08/18	1"=100', 1"=40'	H 65.7, W 105.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
165-018	[PROFILE SHOWING RELATIVE HEIGHTS OF WHEELS & DAMS ON MERRYMEETING RIVER.]	1910/09/00			BLUEPRINT	
165-018-[COPY 1]	PROFILE SHOWING RELATIVE HEIGHTS OF / WHEELS & DAMS ON MERRYMEETING RIVER.	1922/03/23	H1"=600', V1"=60'	H 79.7, W 112.2 CM	INK, COLORED INK	DRAFTING CLOTH
165-019	MAP / OF THE / UNION POWDER WORKS ESTATE, / SITUATED IN / NEW DURHAM & ALTON, / NEW HAMPSHIRE.	1861/00/00	1"=20 RODS	H 64, W 91 CM	BLUEPRINT	PAPER
165-020	[MAP OF] NEW HAMPSHIRE & VERMONT [MASSACHUSETTS, RHODE ISLAND, & CONNECTICUT SHOWING FORESTED AREAS IN MASS. & N.H.]	1923/01/00	5/8"=10 MILES	H 63.5, W 44 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
165-021	MAP SHOWING / ROADS BETWEEN MAIN ROAD & DURGIN'S POINT, MERRYMEETING LAKE, N.H.	1923/08/29	1"=80'	H 43.5, W 66.7 CM	INK, COLORED INK	DRAFTING CLOTH
165-022	MAP OF NEW ENGLAND / SHOWING / AREAS OF UNDERDEVELOPED WATER POWER / ALSO TOTAL DEVELOPED WATER POWER & TOTAL POWER LOAD IN EACH STATE.	1919/02/05	1/2"=25 MILES	H 29.9, W 33 CM	INK, WATER COLOR	DRAFTING CLOTH

165-023	HOW RIVERS, UNDER ZONE PLAN, COULD RUN NATION'S INDUSTRIES. [RELIEF MAP ILLUSTRATING GIGANTIC PLAN TO ELECTRIFY UNITED STATES FROM COAST TO COAST BY POWER DERIVED FROM SYSTEMSTIC HARNESSING OF PRINCIPAL RIVERS.]	1916/00/00	NONE	H 28.6, W 46.4 CM	INK	DRAFTING CLOTH
165-024	[MAP OF] UNITED STATES [SHOWING STATE BOUDARIES AND RIVERS].	1916/00/00	1/2"=100'	H 32.7, W 45.9 CM	LITHOGRAPH	PAPER
165-025	MAP OF NEW ENGLAND / SHOWING LARGE DEVELOPED & UNDEVELOPED WATER POWERS / & MAIN TRANSMISSION SYSTEMS.	1919/02/15	1"=12 1/2 MILES	H 110.9, W 85.3 CM	INK	DRAFTING CLOTH
165-026	MAP OF NEW ENGLAND / SHOWING / EXISTING TRANSMISSION LINES / & LARGE UNDERDEVELOPED WATER POWERS / IN CENTRAL NEW ENGLAND.	1920/09/29	3"=25 MILES	H 108, W 78.2 CM	INK	DRAFTING CLOTH
165-027	[MAP OF MASS. CONN. R.I. SHOWING PUBLIC POWER] STATIONS & TRANSMISSION LINES IN PUBLIC SERVICE.	1921/00/00	SEE NOTES	H 65.6, W 96.5 CM	LITHOGRAPH, COLORED INK	PAPER
165-028	[MAP OF MERRIMACK RIVER DRAINAGE AREA SHOWING POWER STATIONS & OUTSIDE CONNECTIONS AND TRANSMISSION LINES.]	1926/05/00				CLOTH MOUNTED
165-029	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS. / SHOWING STOP GATES / L.W.W. [SYSTEM].	1923/00/00	1/2"=500'	H 57.2, W 82 CM	BLUEPRINT	PAPER
165-030	[UNTITLED.] [MAP OF A PORTION OF LOWELL.]	UNDATED	1"=250'	H 66.7, W 92 CM	INK, WATER COLOR	DRAFTING CLOTH

165-031	MAP SHOWING / PROPS. LOCKS & CANALS / CANAL SYSTEM / PORTION OF CITY / MILLS, MERRIMACK & CONCORD RIVERS / LOWELL, MASS.	1939/03/00	1"=250'	H 68.5, W 92.8 CM	INK, COLORED INK	DRAFTING CLOTH
165-032-[A]	PART OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS.	1933/02/00	1/4"=25'	H 100.3, W 87.7 CM	INK, WATER COLOR	DRAFTING CLOTH
165-032-[B]	PART OF CITY / SHOWING / MILLS & CANALS / LOWELL, MASS. PROPRIETORS OF LOCKS & CANALS.	1933/04/00	1/4"=25'	H 99.6, W 80.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
165-033	INDUSTRIAL / MAP OF THE / CITY OF / LOWELL PUBLISHED BY / SAMPSON & MURDOCK CO. / 377 BROADWAY BOSTON.	1927/00/00	1"=1000'	H 53, W 70.5 CM	LITHOGRAPH	PAPER
165-033-[COPY 1]	INDUSTRIAL / MAP OF THE / CITY OF / LOWELL PUBLISHED BY / SAMPSON & MURDOCK CO. / 377 BROADWAY BOSTON.	1927/00/00	1"=1000'	H 53.3, W 71.2 CM	PHOTOGRAPHIC NEGATIVE ON PAPER	PAPER
165-033-[COPY 2]	MAP OF THE / CITY OF / LOWELL / PUBLISHED BY / SAMPSON & MURDOCK CO. / 377 BROADWAY BOSTON.	1927/00/00	1"=1000'	H 37.5, W 51.5 CM	PHOTOGRAPHIC NEGATIVE ON PAPER	PAPER
165-033-[COPY 3]	INDUSTRIAL / MAP OF THE / CITY OF / LOWELL PUBLISHED BY / SAMPSON & MURDOCK CO. / 377 BROADWAY BOSTON.	1927/00/00	1"=1000'	H 41.2, W 53.3 CM	LITHOGRAPH, COLORED INK	PAPER
165-034	[HIGHWAY] ROUTE MAP / OF / MASSACHUSETTS.	1927/00/00	1/8"=1 MILE	H 56.3, W 86.8 CM	UNKNOWN PRINTING PROCESS	PAPER
165-035	THE WHITE MOUNTAINS / OF NEW HAMPSHIRE / THE NATIONAL GEOGRAPHIC MAGAZINE.	1937/07/00	1/4"=1 MILE	H 46, W 54.4 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH

165-036	PLAN / OF THE TOWN OF / LOWELL / & / BELVIDERE VILLAGE [BY BENJAMIN MATHER].	1945/09/19	NONE	H 55, W 69.3 CM	INK, WATER COLOR	DRAFTING CLOTH
165-037	RIVER SYSTEM OF UNITED STATES / HEAVY PORTIONS OF RIVERS SHOW / HYDRO POWER SECTIONS YEAR 1930.	SEE TITLE	NONE	H 67.4, W 106.4 CM	INK	DRAFTING CLOTH
165-038	MAP OF THE / MERRIMACK VALLEY AREA / MASSACHUSETTS.	UNDATED	3 3/8"=1 MILE	H 149.2, W 104.2 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
165-039	MAP OF / NEW ENGLAND.	UNDATED	1/16"=1 MILE	H 83.3, W 71.9 CM	INK	DRAFTING CLOTH
165-039-A	MAP OF / NEW ENGLAND. [TITLE IS VERY FAINT.]	UNDATED	1/16"=1 MILE	H 89, W 80 CM	RED LINE PRINT	PAPER
165-039-B	MAP OF / NEW ENGLAND.	UNDATED	NONE	H 88.9, W 78.1 CM	RED LINE PRINT	PAPER
165-040-[A]	PLAN OF "SPEEN'S BROOK," IN CHELMSFORD / 1792.	1792/05/25	1"=500'	H 36, W 31.1 CM	INK	DRAFTING CLOTH
165-040-[B]	PLAN OF "SPEEN'S BROOK," IN CHELMSFORD / 1792.	1792/05/25	1"=500'	H 36, W 31.1 CM	PHOTOSTAT	PAPER
165-041	A PLAN SHOWING SPEEN'S BROOK / AT PAWTUCKET / IN THE TOWN OF CHELMSFORD.	1951/08/00	1/8"=100'	H 24.2, W 31.8 CM	INK, WATER COLOR	PAPER
165-042	[UNTITLED.] [BLANK PLAN OF DRAINAGE AREA OF MERRIMACK RIVER WITH CITIES AND TOWNS SHOWN.]	UNDATED	NONE	H 90, W 46.4 CM	INK, WATER COLOR	DRAFTING CLOTH
165-043	A PLAN OF CHELMSFORD.	1794/11/00	1"=200 NODS	H 24.5, W 22 CM	INK	DRAFTING CLOTH

165-044	PLAN SHOWING / WATER WHEELS IN THE CORPORATIONS / FROM CANAL SYSTEM OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASSACHUSETTS.	1948/12/00	1/8"=50'	H 48, W 49.5 CM	INK, WATER COLOR	DRAFTING CLOTH
165-068-[COPY 1]	POWER MAP / MERRIMACK RIVER DRAINAGE AREA / AND OUTSIDE CONNECTIONS.	1926/05/00	1"=10 MILES	H 56.2, W 43 CM	PHOTOGRAPH	PAPER
165-068-[COPY 2]	POWER MAP / MERRIMACK RIVER DRAINAGE AREA / AND OUTSIDE CONNECTIONS.	1926/05/00	1"=10 MILES	H 56.2, W 43 CM	PHOTOGRAPH	PAPER
165-068-[COPY 3]	POWER MAP / MERRIMACK RIVER DRAINAGE AREA / AND OUTSIDE CONNECTIONS.	1926/05/00	1"=10 MILES	H 56.3, W 43 CM	PHOTOGRAPHIC NEGATIVE ON PAPER	PAPER
166-001	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [NASHUA, N.H. (1891-1894), (1897-1905) PAGE 132. PETERSBOROUGH, N.H. (1897-1902) PAGE 134. FITCHBURG, MASS. (1897-1905) PAGE 130. GROTON, MASS. (1888-1895) PAGE 131.]	1908/01/13	NONE	H 60.5, W 146 CM	INK, COLORED INK	CLOTH BACKED PAPER

166-002	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [WATERBURY, CONN. (1891-1903) (1905) PAGE 126. SOUTHINGTON, CONN. (1871-1904) PAGE 115. MIDDLETON, CONN.(1891), (1893-1897), (1900-1901). CHOLCHESTER, [...SEE NOTES]	1908/01/13	NONE	H 61, W 145.6 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-003	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [AS FOLLOWS: UPPER DAM, OXFORD CO. ME., FARMINGTON, ME. MAYFIELD, ME. MILLINROCK, ME. RUMFOR FALLS, ME.]	1907/12/28	NONE	H 60.4, W 115.6 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-004	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [CORNISH, ME. HANOVER, N.H. WOODSTOCK, N.H. NORTH CONWAY, N.H. ASHLAND, N.H.]	1908/01/04	NONE	H 61, W 127 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-005	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [BAR HARBOR, ME. BELFAST, ME. EASTPORT, ME. ORANO, ME. GARDINER, ME.]	1907/12/23	NONE	H 60.6, W 108 CM	INK, COLORED INK	CLOTH BACKED PAPER

166-006	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [UPPER DAM, OXFORD, ME. LEWISTON, ME. CORNISH, ME. NORTH BRIDGTON, ME. PORTLAND, ME.]	1907/12/26	NONE	H 60.4, W 105.4 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-007	[CHART SHOWING] AVERAGE MONTHLY / PRECIPITATION / FOR / SEVERAL [POWER] STATIONS IN NEW ENGLAND [: HARTLAND, VT. ALSTEAD, N.H. WOODSTOCK, VT. KEENE, N.H. BRATTLEBORO, VT.]	1908/01/08	NONE	H 61, W 127 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-008	CHART SHOWING AVERAGE MONTHLY PRECIPITATION FOR THE FOLLOWING STATIONS IN NEW ENGLAND: WEIRS, N.H. LAKEPORT, N.H. BRISTOL, N.H. BELMONT, N.H. CONCORD, N.H.	1908/01/02	NONE	H 60.5, W 127 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-009	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / [THE FOLLOWING] SEVERAL STATIONS IN NEW ENGLAND [SUDBURY RIVER WATERSHED. FRAMINGHAM, MASS. WALTHAM, MASS. CONCORD, MASS. CHESTNUT HILL, MASS.].	1908/01/16	NONE	H 61.5, W 127 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-010	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [LEEDS, MASS. SPRINGFIELD, MASS. CANTON, CONN. WEST SIMSBURY, CONN.]	1908/01/10	NONE	H 61.6, W 127 CM	INK, COLORED INK	CLOTH BACKED PAPER

166-011	[CHART SHOWING] AVERAGE MONTHLY PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [STRATSFORD, N.H. HANOVER, N.H. CHELSEA, VT. ST. JOHNSBURY VT. WELLS, VT. BETHLEHEM, N.H.]	1907/12/31	NONE	H 60.9, W 130.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
166-012	[CHART SHOWING] ANNUAL PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND [FOR THE YEARS, 1832 TO 1905: UPPER DAM, OXFORD, ME. LEWISTON, ME. BAR HARBOR, ME. NEW BEDFORD, MASS. PROVIDENCE, R.I. HANOVER, N.H. GARDINER, ME.]	1907/12/20	NONE	H 57.3, W 119.2 CM	INK, COLORED INK	DRAFTING CLOTH
166-012-[COPY 1]	ANNUAL PRECIPITATION / FOR / SEVERAL STATIONS IN NEW ENGLAND.	1907/12/20	NONE	H 54.5, W 105.9 CM	BLUEPRINT	PAPER
166-013	[SMALL RAINFALL DIAGRAMS FOR THE NEW ENGLAND STATES & NEW YORK STATE.]	UNDATED				PAPER
166-014	[TABLE SHOWING YEARS THAT RAINFALL RECORDS OF VARIOUS STATIONS ARE FILED IN LOCKS & CANALS OFFICE.]	1911/04/11				PAPER
166-015	[RAIN GAUGE RECORDS FROM JULY 20, 1908, DAILY TO NOV. 23, 1911, AT LOWELL.]	SEE TITLE				
166-016	[PROPS. OF LOCKS AND CANALS. RECORDS OF RAIN GAUGE AND SEWER OUTFLOW AT LOWER LOCKS DAM, 1910.]	1910/00/00				PAPER

166-017	[DIAGRAM OF PRECIPITATION FOR 10 YEAR PERIODS FROM 1826 TO 1914 AT MERRIMACK MFG. CO. (1826 TO 1855 INCLUSIVE) AND AT PAWTUCKET DAM (1855 TO 1914 INCLUSIVE).]	SEE TITLE				PAPER
166-017	CHART FOR AUTOMATIC RAIN GAUGE.	1908/07/14	NONE	H 62.3, W 56.1 CM	INK, COLORED PENCIL	PAPER
166-017-A	CHART FOR AUTOMATIC RAIN GAUGE.	UNDATED	NONE	H 72.2, W 65.5 CM	INK	PAPER
166-018	[MASS DIAGRAM OF RAINFALL AT PAWTUCKET DAM SHOWING RAINFALL FOR YEAR 1918 COMPARED WITH AVERAGE RAINFALL FOR 64 YEARS.]	1918/08/00				PAPER
166-019	[DIAGRAM SHOWING RAINFALL IN INCHES, 1900 TO 1919 & REVENUE FROM SURPLUS POWER, 1900 TO 1919.]	1917/11/22				PAPER
166-020	DIAGRAM / OF / YEARLY RAINFALL [AT NEW HAMPSHIRE RESERVOIRS. WEIRS, BRISTOL, ASHLAND, WOODSROCK].	UNDATED	NONE	H 55, W 75.7 CM	INK, COLORED INK	PAPER
166-021	[CHART SHOWING SNOWFALL OF 1922/1923 VS. NORMAL SNOWFALL, TAKEN FROM RECORDS OF PROPS. OF LOCKS & CANALS.]	1926/00/00				PAPER
166-021	[PROPS. OF LOCKS AND CANALS. RAINFALL, 1900-1919.]	SEE TITLE				PAPER
166-022	[CHART OF RAINFALL DURING STORM OF OCT. 3 & 4, 1869 CENTERING IN CANTON, CONN.]	SEE TITLE				

166-023	HYDROGRAPH SHOWING / MONTHLY RAINFALL / AT LOWELL, MASS. / 1910 TO 1923 / PROPRIETORS OF LOCKS & CANALS.	1923/09/19	NONE	H 30.5, W 76.6 CM	INK, GRAPHITE	DRAFTING CLOTH
166-023-A	HYDROGRAPH SHOWING / MONTHLY RAINFALL / AT LOWELL, MASS. / 1910 TO 1929 / PROPRIETORS OF LOCKS & CANALS.	1923/09/19	NONE	H 30.2, W 76.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
166-024-[A]	[DIAGRAM SHOWING PROGRESSIVE AVERAGE RAINFALL IN EASTERN MASS., FROM 1749 TO 1922.]	1923/03/00				
166-024-[B]	[DIAGRAM SHOWING ANNUAL RUN-OFF & PRECIPITATION FOR MERRIMACK RIVER DRAINAGE AREA, FROM 1875 TO 1923.]	1923/03/00				
166-024-001	[DIAGRAM SHOWING YEARLY AND FIVE YEAR AVERAGES OF] PRECIPITATION FOR / N. E. & LOWELL, MASS. [FROM 1881 TO 1932].	SEE TITLE	NONE	H 40.8, W 35.6 CM	INK	DRAFTING CLOTH
166-024-002	PRECIPITATION / FOR / NEW ENGLAND, NEW HAMPSHIRE / & LOWELL, MASSACHUSETTS, / ANNUAL & FIVE YEAR AVERAGES [FROM 1881 TO 1932].	SEE TITLE	NONE	H 35.5, W 45.1 CM	INK, COLORED PENCIL	TRACING PAPER
166-025	DIAGRAM SHOWING / PRECIPITATION [AVERAGE ACCUMULATIVE, 1855 TO 1924, AND ACTUAL ACCUMULATIVE, 1925 TO 1934] AT PAWTUCKET DAM / LOWELL, MASS.	SEE TITLE	NONE	H 66.2, W 84.5 CM	INK, COLORED INK	PAPER
166-026-[063]	RELATION OF RUN-OFF / TO / DRAINAGE AREA / IN / CONNECTICUT RIVER BASIN.	UNDATED	NONE	H 39.4, W 24.5 CM	INK	DRAFTING CLOTH

166-026-001	PORTION OF NEW HAMPSHIRE / SHOWING / HEADWATERS OF CONNECTICUT, MERRIMACK, ANDROSCOGGIN & SACO RIVERS / ALSO / WHITE MOUNTAINS, DRAINAGE AREAS, PRINCIPAL MOUNTAIN PEAKS, PRECIPITATION / STATION & SOME ELEVATIONS.	SEE NOTES	1"=3 MILES	H 60, W 65.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
166-026-002	MAP OF / NEW ENGLAND / SHOWING / COMPARISON OF RAINFALL LINES / FOR 25 & 50 YEARS.	1937/10/00	NONE	H 60, W 43.2 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
166-026-003	MAP OF / NEW ENGLAND & EASTERN NEW YORK / SHOWING / PRINCIPAL MOUNTAINS, RIVERS / & ELEVEN SELECTED RAINFALL STATIONS / ALSO / EXAGGERATED PROFILE OF MAINE [SHOWING RAINFALL LINES FOR 25 YEARS, 1886 TO 1910].	SEE TITLE	1"=30 MILES	H 60.4, W 43.2 CM	PHOTOGRAPH, COLORED INK	PAPER
166-026-004	MAP OF / NEW ENGLAND & EASTERN NEW YORK / SHOWING / PRINCIPAL MOUNTAINS, RIVERS / & ELEVEN SELECTED RAINFALL STATIONS / ALSO / EXAGGEREATED PROFILE OF MAINE / NEW HAMPSHIRE, VERMONT & EASTERN NEW YORK [SHOWING RAINFALL LINES FOR 50 YEARS, 1886 TO 1935].	SEE TITLE	1"=30 MILES	H 60.4, W 43.2 CM	PHOTOGRAPH, COLORED INK	PAPER

166-026-005	MAP OF / NEW YORK / SHOWING / PRINCIPAL MOUNTAINS, RIVERS / & ELEVEN SELECTED RAINFALL STATIONS / ALSO / EXAGGERATED PROFILE OF MAINE / NEW HAMPSHIRE, VERMONT & EASTERN NEW YORK [SHOWING RAINFALL LINES FOR 25 YEARS, 1911 TO 1935].	SEE TITLE	1"=30 MILES	H 60.4, W 43.2 CM	PHOTOGRAPH, COLORED INK	PAPER
166-026-006	MAP OF / NEW ENGLAND & EASTERN NEW YORK / SHOWING / PRINCIPAL MOUNTAINS, RIVERS / & ELEVEN SELECTED RAINFALL STATIONS / ALSO / EXAGGERATED PROFILE OF MAINE / NEW HAMPSHIRE, VERMONT & EASTERN NEW YORK [SHOWING RAINFALL LINES FOR 1928].	SEE TITLE	NONE	H 60.4, W 43.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
166-026-007	AVERAGE PRECIPITATION FOR 4 STATIONS [LOWELL, MA., LAKEPORT N.H., CONCORD N.H., NASHUA N.H. 1902-1935].	SEE TITLE	NONE	H 28, W 42 CM	GRAPHITE, COLORED PENCIL	PAPER
166-026-008	PRECIPITATION / TEN YEAR AVERAGES / FOR 100 YEARS / AT / FOUR SELECTED STATIONS [1832-1930].	SEE TITLE	NONE	H 41.4, W 31.7 CM	INK, GRAPHITE	DRAFTING CLOTH
166-026-009	PRECIPITATION / AT / LAKEPORT NEW HAMPSHIRE [1880-1932].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-010	PRECIPITATION / LAKEPORT, N.H. [1900-1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER

166-026-011	PRECIPITATION [AVERAGE] IN INCHES [LAKEPORT, CONCORD, NASHUA AND LOWELL: PRECIPITATION ESSEX CO., LAWRENCE, MASS., AND ESTIMATED KW HOURS FOR YEARS 1902 TO 1935].	SEE TITLE	NONE	H 28, W 42 CM	GRAPHITE, COLORED PENCIL	PAPER
166-026-012	PRECIPITATION / CONCORD, N.H. [FROM 1900 TO 1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-013	PRECIPITATION / NASHUA, N.H. [FROM 1900 TO 1935].	SEE TITLE	NONE	H 28, W 42 CM	BLUEPRINT	PAPER
166-026-013-[COPY 1]	PRECIPITATION / NASHUA, N.H. [FROM 1900 TO 1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-014	RAINFALL & KILOWATT HOURS / AT / LOWELL, MASS. [FROM 1900 TO 1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-015	AVERAGE PRECIPITATION FOR 4 STATIONS [LOWELL, MASS., LAKEPORT N.H., CONCORD N.H., NASHUA N.H. VS 1,000,000 KW HOURS AT LOWELL, 1902-1935].	SEE TITLE	NONE	H 28, W 42 CM	GRAPHITE	PAPER
166-026-016	PRECIPITATION IN INCHES [AT HANOVER N.H., BURLINGTON VT. AND GARDNER, ME 1835-1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-017	RUNOFF COMMITTEE REPORT / [INCHES OF PRECIPITATION COLLECTED FOR] SWIFT RIVER / AT / WEST WARE, MASS. FROM 1922 TO 1933].	1934/10/17	NONE	H 21.5, W 31 CM	INK, GRAPHITE	PAPER

166-026-018	PRECIPITATION IN INCHES [FOR LOWELL, MASS., BOSTON, MASS., AMHERST, MASS., AND WALTHAM, MASS. FROM 1835 TO 1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-019	PRECIPITATION IN INCHES [FOR NEW BEDFORD, MASS. AND PROVIDENCE, R.I. FROM 1835-1935].	SEE TITLE	NONE	H 28, W 42 CM	INK	PAPER
166-026-020	PRECIPITATION IN INCHES [FOR NEW YORK AND ALBANY, N.Y. FROM 1835-1935].	SEE TITLE	UNDATED	H 28, W 42 CM	INK	PAPER
166-026-021	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] CONNECTICUT RIVER 1906-1935 / AT / SUNDERLAND, MASS. 8000 SQ. MILES / MONTAGUE, MASS. 7840 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF OCT.1922.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-022	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] DEERFIELD RIVER 1910-1935 / AT / CHARLEMONT, MASS. 362 + 501 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF OCTOBER 1922.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-023	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] CROTON RIVER N.Y. 1871-1935 / RUN-OFF STREAMS IN APPENDIX A / REPORT OF OCTOBER 1922.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER

166-026-024	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] CONNECTICUT RIVER 1901-1935 / AT / ORFORD N.H. 3100 SQ. MILES / SOUTH NEWBURY VT. 2830 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-025	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] PRESUMPSCOT RIVER 1888-1935 / AT / SEBAGO LAKE, MAINE / DRAINAGE AREA 4452 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	1936/12/24	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-026	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] MERRIMACK RIVER 1880-1935 / AT / LAWRENCE, MASS. / DRAINAGE AREA 4452 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-027	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] LAKE COCHITUATE BASIN 1871-1935 / DRAINAGE AREA 17.58 SQ.MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	SEE TITLE	NONE	H 28, W 21.5 CM	INK	PAPER

166-026-028	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] SUDBURY RIVER 1876-1935 / MET. WATER WORKS / DRAINAGE AREA 85.2 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	1936/12/24	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-029	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] NASHUA RIVER 1897-1935 / WACHUSETT MET. WATER WORKS / DRAINAGE AREA 108.84 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	1936/12/24	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-030	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] ANDROSCOGGIN RIVER 1897-1935 / AT RUMFORD FALLS, MAINE / DRAINAGE AREA 2090 SQ. MILES / RUN-OFF STREAMS IN APPENDIX A / REPORT OF 1922.	1936/12/24	NONE	H 28, W 21.5 CM	INK	PAPER
166-026-031	[SECOND FEET PER SQUARE MILE VS. PERIODS IN ORDER OF DRYNESS FOR] KENNEBEC RIVER 1894-1935 / AT / WATERVILLE, MAINE.	1936/12/24	NONE	H 28, W 21.5 CM	INK, GRAPHITE	PAPER
166-026-032	INCHES OF RAINFALL / IN / NASHUA RIVER BASIN / BY / CALENDAR & CLIMATIC YEARS.	1936/12/20	NONE	H 28, W 21 CM	INK, GRAPHITE	PAPER
166-026-033	RELATION OF RUN-OFF / TO / DRAINAGE AREA / IN / HUDSON RIVER BASIN.	SEE NOTES	NONE	H 33.2, W 24.2 CM	INK	DRAFTING CLOTH

166-026-034	MERRIMACK RIVER / AT / LOWELL, MASS. / PRECIPITATION VS. RUN-OFF.	1937/02/08	NONE	H 21.5, W 31 CM	GRAPHITE	PAPER
166-026-035	MERRIMACK RIVER / AT / LOWELL, MASS. / PRECIPITATION VS. ESTIMATED / KILOWATT HOURS.	1937/02/08	NONE	H 21.5, W 31 CM	GRAPHITE	PAPER
166-026-036	PRECIPITATION / AT / LAKEPORT NEW HAMPSHIRE [FOR JUNE, JULY, AUG. & SEPT. FOR GOOD $ BAD YEARS].	SEE NOTES	NONE	H 21.5, W 31 CM	INK, COLORED PENCIL	PAPER
166-026-037	RAINFALL / RECEIVED & COLLECTED / ON THE NASHUA RIVER DRAINAGE AREA / 1897-1931.	SEE TITLE	NONE	H 21.5, W 30.4 CM	INK	PAPER
166-026-038	INCHES OF RAINFALL / IN / NORTH BRANCH OF PAWTUXET RIVER / BY / CALENDAR & CLIMATIC YEARS. / 1917-1935.	1936/12/20	NONE	H 28, W 21 CM	INK, GRAPHITE	PAPER
166-026-039-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS JAN. 1876-1935] .	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-039-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS JAN. 1876-1935] .	SEE TITLE	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
166-026-040-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS FEB. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-040-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS FEB. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER

166-026-041-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS MARCH 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-041-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS MARCH 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
166-026-042-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS APRIL 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-042-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS APRIL 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-043-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS MAY 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-043-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS MAY 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-044-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS JUNE 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-044-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS JUNE 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-045-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS JULY 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH

166-026-045-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS JULY 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
166-026-046-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS AUG. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-046-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS AUG. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-047-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS SEPT. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-047-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS SEPT. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-048-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS OCT. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-048-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS OCT. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-049-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS NOV. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-049-[02]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS NOV. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER

166-026-050-[01]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS DEC. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	INK	DRAFTING CLOTH
166-026-050-[2]	SUDBURY RIVER / RAINFALL RECEIVED & COLLECTED [AVERAGES FOR FIVE YEARS DEC. 1876-1935].	SEE TITLE	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
166-026-051	[UNTITLED.] [DIAGRAM TAKEN FROM JOURNAL OF N.E. WATER WORKS ASSOC. VOL. 28, PAGE 14.]	UNDATED	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
166-026-052	MAP / OF NEW ENGLAND / SHOWING / LINES OF EQUAL RAINFALL / AND / RAINFALL STATIONS.	1914/01/00	1"=40 MILES	H 31.5, W 24 CM	PHOTOCOPY	PAPER
166-026-053	ISOHYETAL MAP OF THE HUDSON RIVER DRAINAGE BASIN, SHOWING THE TOTAL PRECIPITATION IN INCHES MARCH 9-22, 1936.	SEE TITLE	1"=30 MILES	H 23.2, W 15 CM	INK, COLORED PENCIL	DRAFTING CLOTH
166-026-054	ISOHYETAL MAP OF THE DRAINAGE BASINS OF THE MERRIMACK RIVER & INTERVENING / RIVERS TO THE THAMES RIVER, SHOWING THE TOTAL PRECIPITATION, IN INCHES, MARCH 16-19,1936.	SEE TITLE	5/16"=10 MILES	H 23.2, W 15 CM	INK, COLORED PENCIL	DRAFTING CLOTH
166-026-055	MAP OF THE DRAINAGE BASINS OF THE MERRIMACK RIVER & INTERVENING / RIVERS TO THE THAMES RIVER, SHOWING THE DEPTH, IN INCHES, OF / THE WATER CONTENT OF SNOW ON THE GROUND MARCH 9,1936.	SEE TITLE	5/16"=10 MILES	H 23.2, W 15 CM	INK, COLORED PENCIL	DRAFTING CLOTH

166-026-056	ISOHYETAL MAP OF THE DRAINAGE BASINS OF THE MERRIMACK RIVER & INTERVENING / RIVERS TO THE THAMES RIVER, SHOWING / THE TOTAL PRECIPITATION, IN INCHES, MARCH 9-22,1936.	SEE TITLE	5/16"=10 MILES	H 23.2, W 15 CM	INK, COLORED PENCIL	DRAFTING CLOTH
166-026-057	MAP OF UNITED STATES / SHOWING PRECIPITATION [1890-1934].	1937/01/00	NONE	H 20, W 30.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
166-026-058	RELATION OF RUN-OFF / TO / DRAINAGE AREA / IN / PENOBSCOT RIVER BASIN.	SEE NOTES	NONE	H 33, W 24 CM	INK	DRAFTING CLOTH
166-026-059	RELATION OF RUN-OFF / TO / DRAINAGE AREA / KENNEBEC RIVER BASIN.	SEE NOTES	NONE	H 33, W 24 CM	INK	DRAFTING CLOTH
166-026-060	RELATION OF RUN-OFF / TO / DRAINAGE AREA / ANDROSCOGGIN RIVER BASIN.	SEE NOTES	NONE	H 33, W 24 CM	INK	DRAFTING CLOTH
166-026-061	RELATION OF RUN-OFF / TO DRAINAGE AREA / IN SACO RIVER BASIN.	SEE NOTES	NONE	H 33, W 24 CM	INK	DRAFTING CLOTH
166-026-062	RELATION OF RUN-OFF / TO / DRAINAGE AREA / IN / HOUSATONIC RIVER BASIN.	SEE NOTES	NONE	H 39.4, W 24.5 CM	INK	DRAFTING CLOTH
C-105-402	[PLAN SHOWING PARTS BELOW THE TOP OF LOWER CURB.] [PLAN OF MERRIMACK MFG. TURBINES NOS. 9 & 10.]	1857/01/26	1/16"=1"			

C-105-403	[PLAN OF LOWER CURB, SPEED GATE, SEGMENT OF PACKING RING.] [MERRIMACK MANUFACTURING COMPANY. SOME PARTS FOR TURBINES NO'S 9 AND 10.]	1857/01/22
C-105-405	[PLAN OF FLOATS & GUIDES.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK TURBINES NO.'S 9 AND 10, FORM OF FLOATS AN GUIDES.]	1857/01/30
C-105-406	[BRACE SUPPORTING LOWER CURB & PART OF DIFFUSER.] [MERIMACK MANUFACTURING COMPANY. MERRIMACK TURBINES, NO,'S 9 AND 10, BRAKE SUPPORTING LOWER CURB WITH COLUMN, PART OF DIFFUSER.]	1857/02/18
C-105-410 OVERSIZE	[WHEEL PITS FOR TURBINES 9 & 10.] [MERRIMACK MANUFACTURING COMPANY. WHEEL PITS FOR TURBINES NO.'S 9 AND 10.]	1857/02/09
C-105-413 OVERSIZE	[PARTS OF REGULATING APPARATUS.] [MERRIMACK MANUFACTURING COMPANY. PARTS FOR REGULATING APPARATUS.]	1857/03/16

C-105-415 OVERSIZE	[GENERAL PLAN OF HOISTING & REGULATING APPARATUS.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK TURBINES NO.'S 9 AND 10, GENERAL PLAN OF HOISTING AND REGULATING APPARATUS.]	1857/03/30
C-105-416 OVERSIZE	[SPIDER TO SUPPORT HOISTING & REGULATING APPARATUS.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK TURBINES NO.'S 9 AMD 10, SPIDER TO SUPPORT HOISTING AND REGULATING APPARATUS.]	1857/03/19
C-105-420 OVERSIZE	[ELEVATION OF HOISTING & REGULATING APPARATUS.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK TURBINES NO.'S 9 AND 10, ELEVATION OF HOISTING AND REGULATING APPARATUS.]	1857/04/10
C-105-422	[AIR PIPES FOR TURBINES IN MILL #2.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK MILL NO. 2, AIRPIPES FOR TURBINES NO.'S 9 AND 10 (PARTS TO BE BUILT INTO THE WALL).	1857/05/12
C-105-426	[SHAFTING FOR MILL #2.] [MERRIMACK AMNUFACTURING COMPANY. SHAFTING FOR MERRIMACK MILL NO. 2, GENERAL PLAN.]	1857/06/08

C-105-429 OVERSIZE	[APPARATUS FOR BACK GATES MILL #2.] [MERRIMACK MANUFACTURING COMPANY. APPARATUS FOR BACK GATES, MERRIMACK MILL NO. 2.]	1857/07/02
C-105-432	[LOCATION OF TURBINES 9 & 10.] [MERRIMACK MANUFACTURING COMPANY. SKETCH SHOWING THE DISPOSITION OF PROPOSED TURBINES NO.'S 9 AND 10 BETWEEN MILLS NOS.'S 2 AND 3.]	1856/10/03
C-105-434	[CAST IRON FLANGE TO BE RIVETED TO HEAD OF PIPES A & B.] [CAST IRON FLANGE TO BE RIVETED TO THE HEAD OF PIPES A AND B, NUMBERS 9 AND 10, SHEET D, COPY.	1856/12/24
C-105-437 OVERSIZE	[LONGITUDINAL SECTION OF STRAIGHT & CURVED PARTS OF PIPES FOR THE TURBINES IN MILL #1.] [MERRIMACK MANUFACTURING COMPANY. LONGITUDINAL SECTION OF ONE STRAIGHT JOINT AND OF THE SEVERAL CURVED PARTS OF THEPIPES FOR TURBINES IN MERRIMACK MILL NO. 1.]	1853/08/00
C-105-438 OVERSIZE	[PLAN OF THROTTLE GATE.] [MERRIMACK MANUFACTRUING COMPANY. THROTTLE OF GATE FOR TURBINES OF MERRIMACK COMPANY'S MILL NO. 1.]	1853/08/15

C-105-442 OVERSIZE	[PLAN OF STEP.] [MERRIMACK MANUFACTURING COMAPNY. TURBINES FOR MERRIMACK MILL NO. 1, PLAN OF STEP.]	1853/08/06	
C-105-447	[PLAN OF TURBINE.] [MERRIMACK MANUFACTURING COMPANY. TURBINES FOR MERRIMACK MILL NO.1.]	1853/09/01	
C-105-448 OVERSIZE	[PLAN OF WHEEL & DISC.] [MERRIMACK MANUFACTURING COMPANY. WHEEL AND DISC FOR TURBINES OF MERRIMACK COMPANY'S MILL NO. 1.]	1853/09/13	
C-105-450	[LOWER BRACES, COLUMN, & PARTS OF DIFFUSER.] [MERRIMACK MANUFACTURING COMPANY. TURBINES FOR MILL NO. 1, LOWER BRACES, COLUMN, AND PARTS FOR DIFFUSER.]	1853/09/12	
C-105-452 OVERSIZE	[SECTION OF SIDE OF TURBINE.] [MERRIMACK MANUFACTURING COMPANY. TURBINES FOR MERRIMACK MILL NO. 1, FULL SIZE.]	1853/09/09	FULL SIZE
C-105-454	[TOP VIEW OF THE LOWER PARTS.] [MERRIMACK MANUFACTURING COMPANY. TOP VIEW OF THE LOWER PARTS OF THR TURBINES FOR MERRIMACK MILL NO. 1.]	1853/09/19	
C-105-461 OVERSIZE	[FULL SIZE DETAILS OF LOWER PARTS.] [MERRIMACK MANUFACTURING COMPANY. TURBINES NOS. 9 AMD 10, FULL SIZE DETAILS OF LOWER PARTS.]	1857/01/15	FULL SIZE

C-105-462 OVERSIZE	[SECTION OF TURBINE FOR MILL #1.] [MERRIMACK MANUFACTURING COMPANY. SECTION OF MERRIMACK TURBINE FOR MILL NO. 1.]	1853/11/00	1/8 FULL SIZE
C-105-465 OVERSIZE	[PLAN OF TURBINE.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF TURBINE OF MERRIMACK MILL NO. 1.]	1853/11/00	1/8 FULL SIZE
C-105-466 OVERSIZE	[DESIGN FOR WHEEL PITS.] [MERRIMACK MANUFACTURING COMPANY. DESIGN FOR WHEELPITS, ETC., OF THE MERRIMACK TURBINES 9 AND 10.]	1856/09/00	
C-105-467 OVERSIZE	[MERRIMACK MANUFACTURING COMPANY. SMALL TURBINE AT MERRIMACK PRINT WORKS.]	1845/00/00	
C-105-468 OVERSIZE	[MERRIMACK MANUFACTURING COMPANY. CENTRIFUGAL PUMP DESIGNED FOR THE MERRIMACK MANG. COMPANY.]	1855/00/00	
C-105-471 OVERSIZE	[APPARATUS FOR BACK GATES.] [MERRIMACK MANUFACTURING COMPANY. APPARATUS FOR BACK GATES, MERRIMACK MILL NO. 1.]	1854/02/00	
C-105-472 OVERSIZE	[HOISTING & REGULATING APPARATUS SECTION.] [MERRIMACK MANUFACTURING COMPANY. TURBINES FOR MERRIMACK MILL NO. 1, HOISTING AND REGULATING APPARATUS.]	1854/03/00	

C-105-473	[HOISTING & REGULATING APPARATUS ELEVATION FOR TURBINES IN NO. 1 MILL.]	1854/03/00	
C-105-474 OVERSIZE	[HOISTING & REGULATING APPARATUS PLAN.] [MERRIMACK MANUFACTURING COMPANY. TURBINES FOR MERRIMACK MILL NO. 1, PLAN OF HOISTING AND REGULATING APPARATUS.]	1854/03/00	
C-105-477	[ELEVATION OF PROPOSED FEEDER FOR MERRIMACK MILLS.] [MERRIMACK MANUFACTURING COMPANY. PROPOSED FEEDER FOR MERRIMACK MILLS.]	1855/11/00	
C-105-483 OVERSIZE	[DISCHARGE DIAGRAMS OF #8, MILL #1.] [DIAGRAM PF THE EXPERIMENTS MASE IN 1857 ON THE DISCHARGE OF TURBINE NO. 8 IN MERRIMACK MILL NO. 1.]	1859/01/00	
C-105-484	[MERRIMACK MANUFACTURING COMPANY. DIAGRAM OF THE EXPERIMENTS MADE IN 1857 ON THE DISCHARGE OF TURBINE NO. 8 IN MERRIMACK MILL NO. 1.]	1859/01/00	PAPER
C-105-485	[MERRIMACK MANUFACTURING COMPANY. DIAGRAM OF THE EXPERIMENTS MADE IN 1857 ON THE DISCHARGE OF TURBINE NO. 8 IN MERRIMACK MILL NO. 1.]	1859/01/00	PAPER

C-105-486	[MERRIMACK MANUFACTURING COMPANY. TURBINE NO. 8 IN MILL NO. 1. DIAGRAM OF THE QUANTITIES OF WATER DISCHARGED WITH DIFFERENT HEIGHTS OF THE SPEED GATE. SHEET A.]	1859/01/04	PAPER
C-105-487	[TURBINE NO. 8 IN MILL NO. 1. DIAGRAM OF THE QUANTITIES OF WATER DISCHARGED WITH DIFFERENT HEIGHTS OF THE SPEED GATE, SHEET B]	1859/01/24	PAPER
C-105-488	[MERRIMACK MANUFACTURING COMPANY. TURBINE NO. 8 IN MILL NO. 1. DIAGRAM OF THE QUANTITIES OF WATER DISCHARGED WITH DIFFERENT HEIGHTS OF THE SPEED GATE. SHEET C.]	1859/01/24	PAPER
C-105-489 OVERSIZE	[PLAN OF PIPE FOR CONVEYING WATER TO TURBINE.] [MERRIMACK MANUFACTURING COMPANY. PIPE FOR CONVEYING WATER TO TURBINE, MERRIMACK PRINT YARD.	1845/08/00	
C-105-490	[PLAN OF GATE IN IRON PENSTOCK.] [PLAN FOR THE GATE IN THE IRON PENSTOCK FOR THE TURBINE AT THE MERRIMACK PRINT WORKS.]	1845/08/11	
C-105-492	[SECTION OF PLAN OF TURBINE PIT.] [MERRIMACK MANUFACTURING COMPANY. SECTION AND PLAN OF TURBINE PIT IN MERRIMACK PRINT YARD.]	1845/07/00	

C-105-494	[PLAN OF PIPE FOR CONVEYING WATER TO TURBINE.] [PLAN FOR CONVEYING WATER TO TURBINE, MERRIMACK PRINT YARD.]	1845/08/00	
C-105-495	[SKETCH OF GATE IN PENSTOCK.] [MERRIMACK MANUFACTURING COMPANY.]	1845/08/00	
C-105-496	[FULL SIZE PLAN OF TURBINE.] [MERRIMACK MANUFACTURING COMPANY. TURBINE FOR MERRIMACK PRINT YARD.]	1845/08/00	FULL SIZE
C-105-499	[SECTION OF CAST IRON MOUTH-PIECE.] [MERRIMACK MANUFACTURING COMPANY. SECTION OF CAST IRON MOUTHPIECE FOR TURBINE PIPE IN PRINT YARD.]	1845/08/01	
C-105-504	[SCHEME (#2) FOR 4 TURBINES TO DRIVE THE 4 OLD MILLS.] [MERRIMACK AMNUFACTURING COMPANY. SCHEME 2. 4 TURBINES OF 341 H.P. EACH TO DRIVE THE FIVE OLD MILLS WHEN THERE IS NO BACKWATER.]	1853/05/00	
C-105-505	[SCHEME (#3) FOR 3 TURBINES TO DRIVE THE 5 OLD MILLS.] [MERRIMACK MANUFACTURING COMPANY. SCHEME 3. ONE TURBINE 546 H.P. TO DRIVE NO.'S 2 AND 3, ONE TURBINE 273 H.P. TO DRIVE NO. 5.]	1853/05/00	

C-105-506	[PLAN OF CAST IRON STAYS TO FASTEN PIPE TO TURBINE PIT WALL.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF CAST IRON STAYS TO FASTEN PIPE TO TURBINE PIT WALL.]	1846/04/00
C-105-508	[PLAN OF GATE FOR TURBINE PIPE.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF GATE FOR MERRIMACK TURBINE PIPE.]	1846/03/28
C-105-515	[IRON FLUME FOR PICKER HOUSE.] [MERRIMACK MANUFACTURING COMPANY. IRON FLUME FOR THE NEW PICKER HOUSE.]	1847/02/24
C-105-519	[IRON FLUME FOR PICKER HOUSE (EXPANSION JOINT).] [MERRIMACK MANUFACTURING COMPANY. IRON FLUME AT MERRIMACK COMPANY'S NEW PICKER HOUSE.]	1847/02/02
C-105-522	[PLAN OF EXPANSION JOINT FOR TURBINE PIPE.] [MERRIMACK MANUFACTURING COMAPNY. EXPANSION JOINT FOR MERRIMACK TURBINE PIPE.]	1846/03/24
C-105-529	[FLOATS FOR TURBINES IN NO. 6 MILL.] [38 FLOATS FOR EACH TURBINE OF PICKER HOUSE AND 42 FLOATS FOR EACH TURBINE OF MILL NO. 6.]	UNDATED

C-105-531	[TABLE OF QUANTITY DISCHARGED BY NOS. 1,3,& 4.] [TABLE OF THE QUANTITY OF WATER DIACHARGED BY THE MERRIMACK TURBINE NO. 1, 3, AND 4, COMPUTED BY GOWAN AND ENO.]	UNDATED
C-105-532	[MERRIMACK MANUFACTURING COMPANY. TABLE OF THE QUANTITY OF WATER DISCHARGED BY THE MERRIMACK TURBINE NO. 2 UNDER WATERFALL OF 62 FEET. COMPUTED BY GOWEN AND ENO.]	UNDATED
C-105-533	[MERRIMACK MANUFACTURING COMPANY. TABLE OF THE QUANTITY OF WATER DISCHARGED BY MERRIMACK TURBINES NO.'S 5 AND 6 UNDER WATERFALL OF 32 FEET. COMPUTED BY GOWEN AND ENO.	UNDATED
C-105-534	[COMPARISON OF Q. DISCHARGED BY #8 WITH Q DISCHARGED BY FORMULA.] [MERRIMACK MANUFACTURING COMPANY. COMPARISON OF THE QUANTITY OF WATER DISCHARGED BY THE MERRIMACK TURBINE NO. 8 IN MILL 4 BY EXPERIMENTS MADE IN JULY AND AUGUST 1857.]	1857/08-09/00

C-105-535	[COEFFICIENTS OF DISCHARGE.] [MERRIMACK MANUFACTURINF COMPANY. COEFFICIENTS OF DISCHARGE THROUGH TURBINES DEDUCED FROM EXPERIMENTS ON MERRIMACK TURBINE NO. 8 AND APPLETON PICKER TURBINE.]	1877/03/22
C-106-581	[SECTION OF ONE OF MILLS DRAWN AT TIME OF ERECTION.] [MERRIMACK MANUFACTURING COMAPNY. DRAWING OF ONE OF THE MERRIMACK MILLS, BY P. J. JACKSON, AT TIME OF THEIR ERECTION, ABOUT 1822.]	1822/00/00
C-106-582	[SECTION OF ONE OF MILLS DRAWN AT TIME OF ERECTION.] [MERRIMACK MANUFACTURING COMPANY. DRAWING OF ONE OF THE MERRIMACK MILLS, LOWELL, MADE BY P. J. JACKSON, AT THE TIME OF THEIR ERECTION, ABOUT 1822.]	1822/00/00
C-106-583	[SUPPOSED TO BE SECTION OF MILL SHOWING OUTLINE OF OLD BREAST WHEEL.] [MERRIMACK MANUFACTURING COMPANY. CROSS SECTION OF MILL.]	UNDATED
C-106-584	[SKETCH OF FEEDER PIPES FOR MERR'K MFG. CO. #1 MILL.] [MERRIMACK MANUFACTURING COMPANY. SKETCH FOR FEEDER PIPES FOR MERRIMACK MILL NO. 1.]	1853/07/22

C-106-585 OVERSIZE	[CAST IRON FLUME CONNECTION THROTTLE GATE & LOWER CURB. MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. TURBINES FOR MERRIMACK MILL NO. 1. CAST IRON FLUME, CONNECTING THROTTLE GATE AND LOWER CURB.	1853/09/01
C-106-586 OVERSIZE	[PLAN OF PREMISES THROUGH WHICH PROPOSED FEEDER WILL PASS IN CONSTRUCTED.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF THE PREMISES THROUGH WHICH THE MERRIMACK FEEDER WILL PASS IF CONSTRUCTED AS PROPOSED,]	1855/12/00
C-106-587 OVERSIZE	[PLAN OF FOUNDATIONS OF NEW MILL.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF FOUNDATIONS OF MERRIMACK NEW MILL.]	1846/07/00
C-106-588	[SKETCH OF ONE OF THE CHIMNEYS.] [MERRIMACK MANUFACTURING COMPANY. SKETCH OF BOILER HOUSE AND ENGINE HOUSE.]	UNDATED
C-106-589 OVERSIZE	[SKETCH SHOWING DISPOSITION OF WHEEL PITS FOR TURBINES NOS. 9 & 10.] [MERRIMACK MANUFACTURING COMPANY. SKETCH SHOWING THE DISPOSITION OFTHE WHEEL PITS, PIPES, ETC., FOR THE TURBINES NUMBERS 9 AND 10.]	1857/01/31

C-106-590 OVERSIZE	[SECTIONS OF WHEEL PITS FOR NOS. 9 & 10.] [MERRIMACK MANUFACTURING COMPANY. WHEEL PITS FOR TURBINES NUMBERS 9 AND 10.]	1857/02/13
C-106-591	[SECTION OF FOUNDATIONS OF NEW MILL.] [MERRIMACK MANUFACTURING COMPANY. SECTION OF FOUNDATIONS FOR MERRIMACK NEW MILL, THROUGH ARCHES FOR RACEWAYS OF OLD MILLS.]	1845/08/04
C-106-592 OVERSIZE	[PLAN OF FOUNDATIONS OF WESTERLY END OF NEW MILL.] [MERRIMACK MANUFACTURING COMNPANY. PLAN OF THE FOUNDATIONS OF THE WESTERLY END OF THE MERRIMACK NEW MILL.]	1845/08/25
C-106-593	[SECTION THROUGH CENTRE OF PIT OF NEW MILL.] [MERRIMACK MANUFACTURING COMPANY. SECTION THROUGH CENTRE OF PIT, MERRIMACK NEW MILL NO. 6.]	1845/09/18
C-106-594	[ARCHES FOR SUPPLY PIPES FOR NOS. 9 & 10.] [MERRIMACK MANUFACTURING COMAPNY. MERRIMACK MILL NO. 2, ARCHES FOR SUPPLY PIPES OF TURBINES, NO. 9 AND 10.]	1857/04/11
C-106-595 OVERSIZE	[SKETCH FOR LOCATION OF RACEWAYS FOR NOS. 9 & 10.] [SKETCH FOR THE LOCATION OF RECEWAYS FOR M.M.C. TURBINES NO.'D 9 AND 10.]	1857/05/28

C-106-596	[SECTION OF FOUNDATIONS & BASEMENT OF NEW MILL.] [SECTION OF FOUNDATIONS AND BASEMENT, MERRIMACK NEW MILL.]	1845/10/01		
C-106-597 OVERSIZE	[PLAN OF WROUGHT IRON FLUME FOR NEW MILL TURBINES.] [WROUGHT IRON FLUME FOR TURBINES AT MERRIMACK NEW MILL.]	1846/11/00		
C-106-598-[1 & 2] OVERSIZE	[NOTE PLAN OF MILL YARD IN TWO PARTS.] [MERRIMACK MANUFACTURING COMPANY. NOTE PLAN IN TWO PARTS OF MERRIMACK M. CO.'S MILLYARD, SHOWING NOTES OF SURVEY BY A. W. HUNKING, FEB. 1886, AND MEASUREMENTS OF BUILDINGS AND TIELINES BY F. I. HART, FEB. 13, 1886.]	1886/02/13		DRAFTING CLOTH
C-106-599	[PLAN OF LAND ON SOUTH SIDE OF LOWER PAWTUCKET CANAL BELONGING TO MERR'K MFG. CO. (NOW APPLETON & HAMILTON MILLS).] [A PLAN OF THE LAND ON THE SOUTH SIDE OF PAWTUCKET CANAL, BELONGING TO THE MERRIMACK MANUFACTURING COMPANY, CHELMSFORD.]	1824/01/00		

C-106-600	[PLAN OF LAND ON SOUTH SIDE OF LOWER PAWTUCKET CANAL BELONGING TO MERR'K MFG. CO. (NOW APPLETON & HAMILTON MILLS).] [A PLAN OF THE LAND ON THE SOUTH SIDE OF PAWTUCKET CANAL BELONGING TO THE MERRIMACK MANUFACTURING COMPANY, CHELMSFORD.]	1824/01/00
C-106-601	[SECTION OF ROOF OF COVING OF NEW MILL.] [MERRIMACK MANUFACTURING COMPANY. SECTION OF ROOF AND COVERING FOR MERRIMACK NEW MILL.]	1846/01/23
C-106-602 OVERSIZE	[SECTION OF NEW MILL.] [MERRIMACK MANUFACTURING COMPANY. SECTIONS OF THE MERRIMACK COMPANY'S NEW MILL.]	1846/01/00
C-106-612	[SECTION OF ROOF & COVING.] [MERRIMACK MAUNFACATURING COMPANY. SECTION OF ROOF AND COVERING FOR MERRIMACK NEW MILL.]	1846/04/29
C-106-618	[PLAN OF RACKS & GATE AT HEAD OF IRON FLUME.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF RACKS AND GATE AT HEAD OF IRON FLUME.]	1846/05/21
C-106-619	[PLAN OF RACKS & GATE AT HEAD OF IRON FLUME.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF RACKS AND GATE AT HEAD OF THE IRON FLUME.]	1846/06/05

C-106-622	[CENTRES OF MOUTHPIECE OF IRON FLUME.] [MERRIMACK MANUFACTURING COMAPNY. CENTRES FOR MOUTHPIECE OF IRON FLUME.]	1846/07/0 0
C-106-623	[TURBINE PITS OF PICKING HOUSE.] [MERRIMACK MANUFACTURING COMPANY. DESIGN FOR TURBINE PITS OF THE MERRIMACK MANG. CO.'S PICKING HOUSE, CHIEFLY FOR REPRESENTING THE BELTS OR CARBELS AND SOME OF THE DIMENSIONS OF PART OF THE COPING STONES.	1846/07/0 2
C-106-628	[HEAD OF IRON FLUME, NEW PICKER HOUSE.] [MERRIMACK MANUFACTURING COMPANY. HEAD OF IRON FLUME, NEW PICKER HOUSE.]	1847/01/0 8
C-106-629	[TWO CAST IRON BEAMS FOR PITS OF NEW PICKER HOUSE.] [MERRIMACK MANUFACTURING COMPANY. TWO CAST IRON BEAMS FOR TURBINE PITS OF THE MERRIMACK MANUF'G COMPANY'S NEW PICKER HOUSE.]	1847/03/0 0
C-106-632	[SECTION OF BRIDGE TO NEW PICKER HOUSE.] [SECTION OF A BRIDGE FOR THE RAIL ROAD TO THE PICKER HOUSE.]	1847/07/1 7

C-106-633 OVERSIZE	[DESIGN FOR HEAD OF PENSTOCKS MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK MILL NO. 1, DESIGN FOR THE HEAD OF THE PENSTOCKS.]	1853/00/00
C-106-635	[POSITION OF BEAMS OVER WHEEL PITS NO.1 & 4.] [MERRIMACK MANUFACTURING COMPANY, POSITION OF BEAMS OVER WHEELPITS NO.'S 1 AND 4 IN MERRIMACK NO. 6.]	1863/05/07
C-106-636 OVERSIZE	[SKETCH OF ARCH, PROBABLY FOR ONE OF THE MILLS, SUPPORTED BY HANGERS.] [MERRIMACK MANUFACTURING COMPANY. ARCH, DRAWN ABOUT 1853.]	1853/00/00
C-106-637 OVERSIZE	[PLAN FOR MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. SKETCH FOR MERRIMACK MILL NO. 1.]	1853/06/22
C-106-638	[PLAN OF 1ST FLOOR, NEW MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK NEW MILL NO. 1.]	1853/07/09
C-106-639 OVERSIZE	[WOODWORK AT HEAD OF PENSTOCKS NEW MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK MILL NO. 1, WOODWORK AT THE HEAD OF THE PENSTOCKS.]	1853/08/00
C-106-649 OVERSIZE	[ELEVATIONS OF NEW MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK MAN'G CO.'S MILL NO.1.]	1853/10/19

C-106-650 OVERSIZE	[SHAFTING FOR MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. SHAFTING FOR MERRIMACK MILL NO. 1.]	1853/11/30
C-106-651	[BEAMS FOR SUPPORT OF IRON COLUMNS AT PENSTOCKS, NEW MILL NO.1.] [MERRIMACK MANUFACTURING COMPANY. MERRIMACK MILL NO, 1, BEAMS FOR THE SUPPORT OF THE IRON COLUMNS AT THE PENSTOCKS.]	1854/01/05
C-106-655 OVERSIZE	[FIRST JOINT OF PIPE FOR CENTRIFUGAL PUMP.] [MERRIMACK MANUFACTURING COMPANY. FIRST JOINT OF PIPE FOR CENTRIFUGAL PUMP.]	1854/06/01
C-106-658	[FOUNDATION OF CHIMNEY OF MERR'K. MFG. CO.] [MERRIMACK MANUFACTURING COMPANY. FOUNDATION OF MERRIMACK CHIMNEY.]	1854/08/07
C-106-661	[SHAFTING FOR MERRIMACK MILL NO.4.] [MERRIMACK MANUFACTURING COMPANY. SHAFTING FOR MERRIMACK MILL NO. 4.]	1855/06/15
C-106-663 OVERSIZE	[GENERAL PLAN OF SHAFTING IN BASEMENT OF NO.1.] [MERRIMACK MANUFACTURING COMPANY. GENERAL PLAN OF SHAFTING IN BASEMENT OF MERRIMACK MILL NO. 1.]	UNDATED

C-106-685	[PLAN OF PIPES TO BE MADE FOR NO. 9 & 10 TURBINE.] [PIPES TO BE MADE OF 1/2 INCH BOILER IRON FOR TURBINES NUMBERS 9 AND 10.]	1856/12/20	
C-106-686	[PLAN SHOWING DISPOSITION OF WHEEL PIT PIPES FOR NO. 9 & 10 TURBINES.] [MERRIMACK MANUFACTURING COMPANY. SKETCH SHOWING THE DISPOSITION OF THE WHEELPITS, PIPES FOR TURBINES 9 AND 10.]	1856/11/12	
C-106-687	[WHEEL PITS FOR TURBINES NOS. 9 & 10.] [MERRIMACK MANUFACTURING COMPANY. WHEELPITS FOR TURBINES NO. 9 AND 10.]	1857/01/14	
C-106-688	[WHEEL PITS FOR TURBINES NOS.9 & 10.] [MERRIMACK MANUFACTURING COMPANY. WHEELPIT FOR TURBINES NOS. 9-10.]	1857/01/14	1/4" = 1'
C-106-689	[SKETCH OF FEEDER HEAD FOR TURBINES NOS. 9 & 10.] [MERRIMACK MANUFACTURING COMAPNY. MERRIMACK MILL NO. 2. SKETCH OF FEEDER HEAD FOR TURBINES, NUMBERS 9 & 10.]	1857/07/16	
C-106-697	[SMALL WHEEL PIT OF MERRIMACK MFG. CO.] [MERRIMACK MANUFACTURING COMAPNY. SMALL WHEEL PIT FOR MILL NO. 2.]	1857/08/11	

C-106-698	[CONTINUATION OF SHAFTING FROM NO.2 TO NO.3 MILL.] [MERRIMACK MANUFACTURING COMPANY. CONTINUATION OF SHAFTING FROM MILL NO. 2 TO MILL NO. 3.]	1857/08/17
C-106-700	[MAP OF PART OF MILL YARD FROM SURVEY MADE IN 1866 SHOWING NO. OF BUILDINGS.]	1866/00/00
C-106-701 OVERSIZE	[PLAN & ELEVATION OF PROPOSED EXTENSION TO NO.2 MILL INTENDED TO SHOW STONEWORK.] [MERRIMACK MANUFACTURING COMPANY. PLAN OF THE PROPOSED EXTENSION OF THE MERRIMACK MILL NO. 2 INTENDED MAINLY TO SHOW THE STONEWORK CONNECTED WITH THE ENGINE ROOM.]	1867/02/27
C-106-702	[ELEVATION OF FOUNDATION WALL OF MERRIMACK NEW MILL.] [MERRIMACK MANUFACTURING COMPANY. FOUNDATIONS OF THE MERRIMCAK CO.'S NEW MILL, SECTION THROUGH A TURBINE PIT.]	1846/06/30
C-107-703	[PLAN OF FOUNDATION OF MILL NO. 3, HAMILTON CO.] [HAMILTON MANUFACTURING COMPANY. PLAN OF THE FOUNDATION OF MILL NO. 3.]	1828/05/00

C-107-704	[DESIGN FOR TURBINES FOR HAMILTON MFG. CO.] [HAMILTON MANUFACTURING COMPANY. DESIGN FOR TURBINES OF HAMILTON MANG. CO.]	UNDATED
C-107-705 OVERSIZE	[HAMILTON MANUFACTURING COMPANY. DESIGN FOR TURBINES.]	UNDATED
C-107-707	[DESIGN FOR PARTS FOR MOVING THE GATE OF TURBINES FOR MILLS NO.1 & 4.] [HAMILTON MANUFACTURING COMPANY. DESIGN FOR PARTS FOR MOVING GATE OF THE TURBINE FOR THE HAMILTON MANG. COMPANIES NO. 1.]	UNDATED
C-107-709 OVERSIZE	[SECTIONS OF WROUGHT IRON FLUME.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, SECTIONS OF WROUGHT IRON FLUME.]	UNDATED
C-107-710 OVERSIZE	[PLAN OF WROUGHT IRON FLUME.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, PLAN OF WROUGHT IRON FLUME.]	UNDATED
C-107-711 OVERSIZE	[RACK & PINION FOR RAISING GATE.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, RACK AND PINION FOR RAISING GATE.]	1850/01/26
C-107-714 OVERSIZE	[WHEEL PITS FOR HAMILTON WHEELS.] [HAMILTON MANUFACTURING COMPANY. HAMILTON WHEEL PITS.]	1850/05/27

C-107-715 OVERSIZE	[SKETCHES SHOWING STONE FOR WHEEL PITS.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINES, STONE FOR WHEEL PIT.]	1850/06/15
C-107-719 OVERSIZE	[TOP HANGING FOR HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE.]	1850/08/19
C-107-721 OVERSIZE	[PLAN OF CAST IRON FLUME, HAMILTON TURB.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, PLAN OF CAST IRON FLUME.]	1850/08/28
C-107-722 OVERSIZE	[FIRST BEVELED GEARS, HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, FIRST BEVELED GEARS.]	1850/08/13
C-107-723 OVERSIZE	[PLAN OF FOUNDATION FOR PARTITION WALL BETWEEN MILL NO. 2 & APPLETON CO'S LAND.] [APPLETON COMPANY. FOUNDATION FOR PARTITION WALL BETWEEN MILL NO. 2 AND APPLETON CO.'S LAND, 75 FT. SOUTHERLY FROM SOUTHERLY WALL OF PAWTUCKET CANAL.]	1880/08/21
C-107-724 OVERSIZE	[PLAN OF DIFFUSER, HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, DIFFUSER.]	1850/09/27

C-107-725	[WALL FOR NEW FEEDER.] [HAMILTON MANUFACTURING COMPANY, NEW FEEDER, COPY OF THE ORIGINAL DESIGN FOR CANAL WALL.]	1845/07/00	
C-107-726	[SKETCH SHOWING FOUNDATION FOR RACEWAY ARCHES.] [HAMILTON MANUFACTURING COMPANY. SKETCH SHOWING FOUNDATIONS, ETC. FOR RACEWAY ARCHES IN PAWTUCKET CANAL WALL NEAR NORTH-WEST CORNER OF HMAILTON MANG. CO.'S YARD.	1880/10/00	
C-107-727 OVERSIZE	[PLAN SHOWING COMPLETED & UNCOMPLETED PORTIONS OF FOUNDATIONS, FEEDERS, ETC. FOR NEW MILL.] [HAMILTON MANUFACTURING COMPANY. PLAN REPRESENTING THE COMPLETED AND UMCOMPLETED PORTIONS OF THE FOUNDATIONS, FEEDERS, ETC. FOR THE NEW MILL.]	1877/11/00	DRAFTING CLOTH

C-107-728	[PLAN OF JACKSON ST. FROM CENTRAL TO APPLETON CO. SHOWING LAND ANNEXED TO INDENTURE BETWEEN THE B.& L.R.R. & THE HAMILTON MFG. CO.] [HAMILTON MANUFACTURING COMPANY. PLAN OF LAND IN LOWELL ANNEXED TO INDENTURE BETWEEN THE B.& L.R.R. AND HAMILTON MFG. CO.]	1888/06/29
C-107-729 OVRESIZE	[PLAN OF GUIDES FOR FRONT GATE OF TURBINE.] [HAMILTON MANUFACTURING COMPANY. GUIDES FOR FRONT GATES.]	1850/11/13
C-107-730 OVERSIZE	[PLAN OF RING & WHEEL OF HAM. TURB.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE.]	1850/11/29
C-107-731	[PLAN OF PARTS OF WHEEL.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINES.]	1850/11/05
C-107-732 OVERSIZE	[HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE. PLAN AND SECTION OF CURB, PLAN AND SECTION OF GATE, PLAN AND SECTION OF PACKING.]	1850/11/00
C-107-734 OVERSIZE	[PLAN OF CAST IRON FLUME.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE CAST-IRON FLUME.]	1850/11/21

C-107-735	[GEARING TO DRIVE REGULATOR.] [HAMILTON MANUFACTURING COMPANY. GEARING TO DRIVE REGULATOR.]	1850/11/05
C-107-737 OVERSIZE	[PLAN OF STEP FOR HAMILTON TURB.] [HAMILTON MANUFACTURING COMPANY. STEP FOR HAMILTON TURBINE NO. 17.]	1850/12/26
C-107-740 OVERSIZE	[BACK GATE FOR HAMILTON TURBINE.] [HAMILTOM MANUFACTURING COMAPNY. BACK GATE FOR HAMILTON TURBINE.]	1850/12/00
C-107-741 OVERSIZE	[PLAN OF BACK GATE.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE-BACK GATE.]	1850/12/10
C-107-743	[STEP OF HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMAPNY. STEP FOR HAMILTON TURBINE.	185012/23
C-107-744	[GEARING FOR TRANSMISSION OF POWER.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE GEARING FOR TRANSMISSION OF POWER.]	1850/12/29
C-107-745 OVERSIZE	[CURVED BEAMS FOR DIFFUSER.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, CURVED BEAM FOR DIFFUSER.]	1850/12/31
C-107-748 OVERSIZE	[GENERAL PLAN OF ONE OF THE WHEELS.] [HAMILTON MANUFACTURING COMPANY. TURBINE.]	UNDATED

C-107-757 OVERSIZE	[REGULATOR FOR HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. REGULATOR FOR HAMILTON TURBINE.]	1851/01/14
C-107-762 OVERSIZE	[RATCHET WHEEL & SHIELD OF REGULATOR.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, RATCHET WHEEL AND SHIELD FOR REGULATOR.]	1851/00/00
C-107-764 OVERSIZE	[COLUMNS TO SUPPORT SHAFTING FOR TRANSMISSION OF POWER.] [HAMILTON MANUFACTURING COMAPNY. HAMILTON TURBINE- COLUMNS TO SUPPORT SHAFTING FOR TRANSMISSION OF POWER.]	1851/01/00
C-107-765 OVERSIZE	[REGULATING APARATUS FOR ONE OF THE WHEELS.] [HAMILTON MANUFACTURING COMPANY. TURBINE.]	1851/01/00
C-107-767	[SPUR GEAR FOR TRANSMISSION OF POWER.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, SPUR GEAR FOR TRANSMISSION OF POWER.]	1851/06/21
C-107-770	[FIRST BEVELED GEARS TO DRIVE REGULATOR.] [HAMILTON MANUFACTURING COMPANY. FIRST BEVELED GEARS TO DRIVE REGULATOR.]	1851/02/18

C-107-773 OVERSIZE	[GEARING FOR OPENING HEAD GATE & BRACE FORD.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, GEARING FOR OPENING HEAD GATE AND BRACEFORD.]	1851/03/00
C-107-778 OVERSIZE	[IRON TRUSS TO SUPPORT CARD ROOM FLOOR OVER WHEEL PIT.] [HAMILTON MANUFACTURING COMPANY. IRON TRUSS TO SUPPORT CARDROOM FLOOR OVER THE HAMILTON TURBINE WHEEL PIT.]	1851/04/00
C-107-782 OVERSIZE	[HEAD GATE FOR HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. HEADGATES FOR HAMILTON TURBINES.]	1851/04/00
C-107-787 OVERSIZE	[HAMILTON TURBINE WHEELPIT.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE WHEEL PIT.]	1851/04/00
C-107-789 OVERSIZE	[SHAFTING FOR TRANSMISSION OF POWER FOR HAMILTON TURBINES.] [HAMILTON MANUFACTURING COMPANY. SHAFTING FOR TRANSMISSION OF POWER FOR HAMILTON TURBINE.]	1851/07/00
C-107-792 OVERSIZE	[PARTS OF GATES IN THE UPPER CANAL.] [HAMILTON MANUFACTURING COMPANY. IRON PARTS FOR THE 4 GATES IN THE UPPER CANAL.]	1851/12/25

C-107-793	[PADDLE GATE FOR THE HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. PADDLE GATE FOR THE HAMILTON TURBINE, TO BE CHARGED TO THE PROPRIETORS OF LOCKS AND CANALS.]	1851/10/21
C-107-796 OVERSIZE	[PADDLE GATE FOR HAMILTON WHEELPIT.] [HAMILTON MANUFACTURING COMPANY. PADDLE GATE FOR HAMILTON WHEELPIT.]	1851/11/26
C-107-798	[SECTION OF ONE OF THE BREAST WHEELS MILL NO.2.] [HAMILTON MAMUFACTURING COMPANY. SECTION OF ONE OF THE BREAST WHEELS IN THE HAMILTON MILL NO. 2, NEW PART.]	1852/02/00
C-107-799	[SKETCH OF PROPOSED IMPROVEMENTS IN WATERWAYS AT HAMILTON & APPLETON MILLS.] [HMAILTON AND APPLETON MILLS. SKETCH OF THE PROPOSED IMPROVEMENTS AT THE HAMILTON AND APPLETON MILLS.]	1853/12/05
C-107-800	[SKETCH OF PROPOSED IMPROVEMENTS AT HAMILTON & APPLETON MILLS IN WATERWAYS.] [HAMILTON AND APPLETON MILLS. SKETCH OF THE PROPOSED IMPROVEMENTS AT THE HAMILTON AND APPLETON MILLS.]	1853/12/05

C-107-802 OVERSIZE	[FOUNDATION TIMBERS FOR WHEEL PIT.] [HAMILTON MANUFACTURING COMPANY. FOUNDATION TIMBERS FOR HAMILTON WHEEL PIT.]	1854/02/24	
C-107-803	[DESIGN FOR TURBINE FOR HAMILTON PICKING HOUSE.] [HAMILTON MANUFACTURING COMPANY. DESIGN FOR TURBINE FOR HAMILTON MANUFACTURING COMPANY'S PICKING HOUSE, BY U.A. BOYDEN.]	1866/08/00	
C-107-804	[SCHEME FOR STANDARDS FOR BELT PULLIES IN PRINTING BUILDING, HAMILTON MFG. CO.] [HAMILTON MANUFACTURING COMPANY. SCHEME FOR BELT PULLIES, PRINTING BUILDING, HAMILTON M. CO.]	1892/09/29	
C-107-805 OVERSIZE	[ENLARGED COPY OF OLD PLAN OF HAMILTON TURBINE.] [HAMILTON MANUFACTURING COMPANY. HAMILTON TURBINE, ENLARGED COPY OF OLD PLAN.]	1872/12/00	
C-107-806 OVERSIZE	[COPY OF PLAN OF TURBINE BEING BUILT BY LOWELL MACHINE SHOP FOR HAMILTON MFG. CO.] [HAMILTON MANUFACTURING COMPANY. TURBINE FOR THE HAMILTON M. CO., LOWELL. NEW BUILDING IN THE LOWELL MACHINE SHOP, FORM OF BUCKETS AND GUIDES.]	1872/12/23	DRAFTING CLOTH

C-107-816	[PLAN A. CO. 156.]	1846/09/00	1/4 SIZE
C-108-810	[DESIGN FOR SOME PARTS OF A TURBINE BY U.A. BOYDEN.] [APPLETON COMPANY. DESIGN FOR SOME PARTS OF A TURBINE FOR THE APPLETON COMPANY, BY U.A. BOYDEN.]	1844/09/12	
C-108-811 OVERSIZE	[PLAN OF JACKSON ST. FROM APPLETON CO. EAST LINE TO KING ST.] [APPLETON COMPANY. PLAN OF JACKSON STREET FROM APPLETON COMPANY'S EAST LINE TO KING STREET.]	1891/11/00	
C-108-814	[ARCH OF APPLETON CO. MILL RACE.] [APPLETON COMPANY. ARCH FOR APPLETON MILL RACE.]	1844/09/18	
C-108-816 OVERSIZE	[SKETCH OF TURBINE "NOW BEING INSTALLED" IN APPLETON CO. PICKER HOUSE.] [APPLETON COMPANY. SKETCH OF A TURBINE NOW PUTTING INTO THE APPLETON COMPANY'S PICKER HOUSE.]	1844/12/29	
C-108-820	[PLAN AND SECTION OF BEVELED GEAR OF APPLETON CO'S TURBINE.]	1846/09/00	
C-108-821 OVERSIZE	[PLAN AND SECTION OF BEVELED GEAR OF APPLETON CO.] [APPLETON COMPANY. PLAN OF GEARS, A.C. NO. 159.]	1846/09/00	

C-108-827 OVERSIZE	[DISCHARGE DIAGRAM OF PICKER HOUSE TURBINE.] [APPLETON COMAPNY. APPLETON PICKER HOUSE TURBINE.]	UNDATED	PAPER
C-108-828	[DISCHARGE DIAGRAM OF NORTH EASTERLY LARGE TURBINE.] [APPLETON COMPANY. APPLETON NORTH EASTERLY LARGE TURBINE.]	UNDATED	PAPER
C-108-829	[DISCHARGE DIAGRAM OF MIDDLE LARGE TURBINE.] [APPLETON COMPANY. APPLETON MIDDLE LARGE TURBINE.]	UNDATED	PAPER
C-108-830	[DISCHARGE DIAGRAM OF SOUTH WESTERLY LARGE TURBINE.] [APPLETON COMPANY. APPLETON SOUTH WESTERLY LARGE TURBINE.]	1847/00/00	PAPER
C-108-831 OVERSIZE	[PLAN AND SECTION OF FLOATS OF MOST EASTERLY TURBINE.] [APPLETON COMPANY. THE APPLETON COMPANY'S MOST EASTERLY TURBINE.]	1847/01/20	
C-108-833 OVERSIZE	[PLAN AND SECTION OF FLOATS OF NORTH-EASTERLY TURBINE.] [APPLETON COMPANY. PLAN & SECTION OF FLOATS & PART OF GUIDES OF APPLETON CO.'S FIRST OR NORTH EASTERLY LARGE TURBINE. PATH OF WATER IS FOR EXPERIMENT A8 ON THIS WHEEL BY MR. BOYDEN, OCTOBER 8, 1846]	1850/01/21	

C-108-836 OVERSIZE	[PLAN AND SECTION OF WHEEL FOR APPLETON CO. TURBINE.] [APPLETON COMPANY. WHEEL FOR APPLETON COMPANY'S TURBINE.]	1854/05/07
C-108-837 OVERSIZE	[PLAN AND SECTION OF DISC AND PIPE FOR APPLETON CO. TURBINE.] [APPLETON COMPANY. DISC AND PIPE FOR APPLETON COMPANY'S TURBINE.]	1854/11/20
C-108-838	[PLAN AND SECTION OF GATE FOR APPELTON CO. TURBINE.] [APPLETON COMPANY. GATE FOR APPLETON CO.'S TURBINE, COPY.]	1854/12/01
C-108-839	[SKETCH OF LOWER PART OF ONE APPLETON CO. TURBINE.] [APPLETON COMPANY. SKETCH OF APPLETON CO.'S TURBINE, LOWER PART.]	1856/10/25
C-108-840	[DISCHARGE DIAGRAM OF PICKER HOUSE TURBINE.] [APPLETON COMPANY. APPLETON PICKER-HOUSE TURBINE, QUANTITIES OF WATER DISCHARGED.	1856/04/00
C-108-845	[DIFFUSER, QUADRANT BEAM AND COLUMNS FOR TURBINE.] [APPLETON COMPANY. DIFFUSER. QUADRANT BEAM AND COLUMNS FOR APPLETON CO'S TURBINE.]	1855/03/21
C-108-848	[PLAN, ELEVATION & SECTION OF LOWER CURB OF APPLETON TURBINE.] [APPLETON COMPANY. APPLETON CO'S TURBINE, LOWER CURB.]	1855/02/00

C-108-852	[FIRST PAIR OF BEVEL GEARS, APPLETON CO. TURBINE.] [APPLETON COMPANY. APPLETON CO'S TURBINE, FIRST PAIR OF BEVEL GEARS.]	1855/02/16
C-108-861	[HORIZONTAL SHAFT FOR REGULATING APPARATUS.] [APPLETON COMPANY. HORIZONTAL SHAFT FOR REGULATING APPARATUS FOR APPLETON CO'S TURBINE.]	1855/07/15
C-108-862 OVERSIZE	[TRANSVERSE SECTION ABOVE DISC OF APPLETON TURBINE.] [APPLETON COMPANY. APPLETON COMPANY'S TURBINE.]	1855/07/27
C-108-866 OVERSIZE	[PLAN AND ELEVATION OF REGULATING APPARATUS.] [APPLETON COMPANY. PLAN AND ELEVATION OF REGULATING APPARATUS FOR APPLETON COMPANY'S TURBINE.]	1855/07/13
C-108-868 OVERSIZE	[PLAN, ELEVATION AND SECTION OF STEP OF TURBINE.] [APPLETON COMPANY. STEP FOR APPLETON COMPANY'S TURBINE.]	1855/04/02
C-108-872 OVERSIZE	[COLUMN, PART OF DIFFUSER AND BEAM FOR TURBINE.] [APPLETON COMPANY. APPLETON CO'S TURBINE. COLUMN, PART OF DIFFUSER AND BEAM.]	1855/02/00
C-108-873	[DISCHARGE DIAGRAMS SOUTH-WESTERLY LARGE TURBINE.] [APPLETON COMPANY. APPLETON CO.'S SOUTH-WESTERELY LARGE TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/08/00

C-108-875	[DISCHARGE DIAGRAMS NORTHEASTERLY LARGE TURBINE.] [APPLETON COMPANY. APPLETON CO.'S NORTH-EASTERLY LARGE TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/02/00	
C-108-876	[DISCHARGE DIAGRAMS MIDDLE OR SECOND LARGE TURBINE.] [APPLETON COMPANY. APPLETON MIDDLE OR SECOND LARGE TURBINE. QUNATITIES OF WATER DISCHARGED.]	1856/02/00	
C-108-878	[DISCHARGE DIAGRAMS MIDDLE OR SECOND LARGE TURBINE.] [APPLETON COMPANY. APPLETON MIDDLE OR SECOND LARGE TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/08/19	PAPER
C-108-879	[DISCHARGE DIAGRAMS NORTHEASTERLY LARGE TURBINE.]	1856-1857/00/00	
C-108-880	[DISCHARGE DIAGRAMS SOUTH-WESTERLY LARGE TURBINE.] [APPLETON COMPANY. APPLETON CO.'C SOUTH-WESTERLY LARGE TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/08/00	PAPER
C-108-881	[DISCHARGE DIAGRAMS PICKER HOUSE TURBINE.] [APPLETON COMPANY. APPLETON PICKER HOUSE TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/04/00	PAPER
C-108-882	[DISCHARGE DIAGRAMS PICKER HOUSE TURBINE.] [APPLETON COMPANY. APPLETON PICKER HOUSE TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/04/00	PAPER

C-108-883-[1]	[DISCHARGE DIAGRAMS, APPLETON CO. 11' TURBINE.] [APPLETON COMPANY. APPLETON CO'S ELEVEN FOOT TURBINE, SHEET NO. 2. QUANTITIES OF WATER DISCHARGED.]	1856/08/00	PAPER
C-108-883-[2]	[APPLETON COMPANY. PLAN AND SECTION OF THE FLOATS AND PART OF THE GUIDES OF THE APPLETON COMPANY'S FIRST OR NORTH-EASTERLY LARGE TURBINE.]	1850/01/21	
C-108-884	[DISCHARGE DIAGRAMS, APPLETON CO. 11' TURBINE.]	1856-1857/00/00	
C-108-885	[DISCHARGE DIAGRAMS, APPLETON CO. 11' TURBINE.] [APPLETON COMAPNY. APPLETON CO'S ELEVEN FOOT TURBINE, SHEET NO. 1. QUANTITIES OF WATER DISCHARGED.]	1856/08/00	PAPER
C-108-886 OVERSIZE	[DISCHARGE DIAGRAMS, APPLETON CO. 11' TURBINE.] [APPLETON COMPANY. APPLETON CO'S ELEVEN FOOT TURBINE. QUANTITIES OF WATER DISCHARGED.]	1856/03/00	
C-108-887	[DISCHARGE DIAGRAMS, APPLETON CO. 11' TURBINE.]	1856-1857/00/00	
C-108-888 OVERSIZE	[DISCHARGE DIAGRAMS, APPLETON CO. 11' TURBINE.] [APPLETON COMPANY. APPLETON ELEVEN FOOT TURBINE.]	1856-1857/00/00	PAPER

C-108-889	[DISCHARGE DIAGRAMS NORTHEASTERLY LARGE TURBINE.] [APPLETON COMPANY. NORTH EASTERLY LARGE TURBINE.]	1857/08/00	PAPER
C-108-890	[DISCHARGE DIAGRAMS MIDDLE OR SECOND LARGE TURBINE.] [APPLETON COMPANY. MIDDLE OR SECOND LARGE TURBINE.]	1857/10/00	PAPER
C-108-891	[DISCHARGE DIAGRAMS SOUTH-WESTERLY LARGE TURBINE.] [APPLETON COMPANY. APPLETON CO.'S THIRD OR SOUTH WESTERLY LARGE TURBINE. DIAGRAM REPRESENTING COEFFICIENTS OF EFFECT.]	1857/10/00	
C-108-892	[DISCHARGE DIAGRAMS NORTHEASTERLY LARGE TURBINE.] [APPLETON COMPANY. NORTH-EASTERLY LARGE TURBINE, DIAGRAM REPRESENTINF COEFFICIENTS OF EFFECT.]	1857/08/00	PAPER
C-108-893	[DISCHARGE DIAGRAMS PICKER HOUSE TURBINE.] [APPLETON COMPANY. PICKER HOUSE TURBINE.]	1857/10/00	PAPER
C-108-894	[DISCHARGE DIAGRAMS MIDDLE OR SECOND LARGE TURBINE.] [APPLETON COMPANY. MIDDLE OR SECOND LARGE TURBINE.]	1857/10/00	PAPER
C-108-895	[DISCHARGE DIAGRAMS SOUTH-WESTERLY LARGE TURBINE.] [APPLETON COMPANY. THIRD OR SOUTH WESTERLY LARGE TURBINE.]	1857/10/00	PAPER
C-108-896	[DISCHARGE DIAGRAMS NORTHEASTERLY LARGE TURBINE.] [APPLETON COMPANY. NORTH EASTERLY ALRGE TURBINE.]	1857/08/00	PAPER

C-108-897	[DISCHARGE DIAGRAMS PICKER HOUSE TURBINE.] [APPLETON COMPANY. APPLETON PICKER TURBINE. SHEET NO. 1.]	1870/01/06	PAPER
C-108-898	[DISCHARGE DIAGRAMS PICKER HOUSE TURBINE.] [APPLETON COMPANY. APPLETON PICKER TURBINE. SHEET NO. 2.]	1870/01/06	PAPER
C-108-899	[DISCHARGE DIAGRAMS PICKER HOUSE TURBINE.] [APPLETON COMPANY, APPLETON PICKER TURBINE. SHEET NO. 3.]	1870/01/06	PAPER
C-108-902 OVERSIZE	[UNTITLED, PROBABLY A GENERAL PLAN OF AN APPLETON CO. TURBINE.] [APPLETON COMPANY. TURBINE.]	UNDATED	
C-108-908	[FRONT & END ELEVATION OF ONE GATE AT HEAD OF ONE WHEEL OF APPLETON CO.] [APPLETON COMPANY. TURBINE.]	UNDATED	
C-108-909	[TABLE OF EXPERIMENTS ON WESTERLY PAIR OF 42" RODNEY-HUNT TURBINES AT APPLETON CO.] [APPLETON COMPANY. EXPERIMENTS ON THE WESTERLY PAIR OF 42 INCH RODNEY HUNT TURBINES AS THE APPLETON COMPANY'S MILLS. SERIES B.]	1892/00/00	
C-108-910	[TABLE OF EXPERIMENTS, NEW PICKER TURBINE AT APPLETON CO.] [APPLETON COMPANY. EXPERIMENTS UPON THE NEW PICKER TURBINE AT THE APPLETON COMPANY'S MILLS IN LOWELL.]	1869/00/00	

C-109-911	[PLAN & SECTION OF THE STONE WALL'S OF L.M. CO'S MILL # 4.] [LOWELL MANUFACTURING COMPANY. A PLAN AND SECTION OF THE STONE WALLS OF THE L. M. CO'S MILL NO. 4.]	1831/00/00
C-109-912 OVERSIZE	[PLAN & SECTIONS OF LOWELL MFG. CO'S. EASTERLY WHEELHOUSE.] [LOWELL MANUFACTURING COMPANY. PLAN AND SECTIONS OF THE EASTERLY WHEELHOUSE.]	1850/11/14
C-109-914 OVERSIZE	[PLAN OF TURBINE SHOWING SPEEDGATE DIFFUSER ETC.] [LOWELL MANUFACTURING COMPANY. lOWELL CO.'S TURBINE.]	1850/12/00
C-109-916 OVERSIZE	[PLAN & ELEVATION OF REGULATOR APPARATUS.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE PLAN OF REGULATOR APPARATUS.]	1851/02/12
C-109-917 OVERSIZE	[DIFFUSER, BEAMS & COLUMNS FOR TURBINE.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE.]	1851/02/00
C-109-927 OVERSIZE	[GENERAL PLAN OF TURBINE.] [LOWELL MANUFACTURING COMPANY. PLAN OF LOWELL MANF'G CO'S TURBINE.]	1851/04/00

C-109-929 OVERSIZE	[PLAN OF CAST IRON FLUME FOR TURBINE.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. PLAN OF CAST IRON FLUME.	1851/02/00
C-109-930 OVERSIZE	[BEAMS & STANDS TO SUPPORT HOISTING & REGULATING APPARATUS.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. BEAMS AND STANDS TO SUPPORT A PART OF HOISTING AND REGULATING APPARATUS.]	1851/02/00
C-109-931 OVERSIZE	[PARTS FOR HOISTING & REGULATING APPARATUS.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. PARTS FOR HOISTING AND REGULATING APPARATUS.]	1851/07/00
C-109-932 OVERSIZE	[BEARINGS & GEARINGS FOR TURBINE.] [LOWELL MANUFACTURING COMPANY, LOWELL CO.S' TURBINE.]	1851/07/00
C-109-933 OVERSIZE	[PLAN OF HEADGATE OF TURBINE.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. PLAN OF HEAD GATE.]	1851/07/00
C-109-934	[PLAN OF BEVEL GEARS TO DRIVE GOVERNOR.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. BEVEL GEARS TO DRIVE THE GOVERNOR.]	1851/08/00

C-109-935-[1] OVERSIZE	[SKETCH OF OLD BREAST WHEEL USED AT MACHINE SHOP, 1842-5.] [LOWELL MACHINE SHOP. OLD MACHINE SHOP WATER WHEEL WITH DYNAMOMETER, 1842 TO 1845.]	SEE NOTES
C-109-935-[2]	[LOWELL MACHINE SHOP COMPANY. OLD MACHINE SHOP WATER WHEEL WITH DYNAMOMETER USED IN TESTING IT IN 1844.]	SEE NOTES
C-109-935-[3]	[LOWELL MACHINE SHOP COMPANY. MACHINE SHOP WATERWHEEL.]	1852/08/21
C-109-937	[ELEVATION OF OLD LOWELL CO'S WHEELHOUSE.] [LOWELL MANUFACTURING COMPANY. LOWELL CO'S WHEELHOUSE.]	1851/08/00
C-109-938 OVERSIZE	[PLAN OF REGULATING APPARATAUS.] [LOWELL MACHING SHOP. LOWELL CO'S TURBINE. PLAN OF REGULATING APPARATUS.]	1851/09/01
C-109-939 OVERSIZE	[PART OF REGULATING APPARATUS.] [LOWELL MANUFACTURING COMPANY. LOWELL CO'S TURBINE. PARTS OF REGULATING APPARATUS, ELEVATION AND SIDE VIEW.]	1851/09/00
C-109-940 OVERSIZE	[PART OF REGULATING APPARATUS.] [LOWELL MANUFACTURING COMPANY. LOWELL VO.'D TURBINE. PARTS FOR REGULATING APPARATUS, STOP MOTION.]	1851/09/00

C-109-942	[BEVEL GEAR & PINION.] [LOWELL MANUFACTURING COMPANY. BEVEL GEAR AND PINION FOR LOWELL CO'S SHAFTING TO DRIVE THE CARPET WEAVING MILL.]	1851/10/17
C-109-947 OVERSIZE	[PLAN SHOWING SHAPE OF GUIDES.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE, SHAPE OF GUIDES.]	1851/10/21
C-109-949	[SECTION OF GATE.] [LOWELL MANUFACTURING COMPANY. LOWELL CO'S TURBINE. SECTION OF GATES, TO BE FINISHED ACCORDING THE WRITTEN DIMENSIONS.]	1851/10/13
C-109-950 OVERSIZE	[SKETCH OF LEAK BOX, MANHOLE & PIPE.] [LOWELL MANUFCATURING COMPANY. LOWELL CO.'S TURBINE.]	1851/08/00
C-109-951 OVERSIZE	[PARTS OF NEW SHAFTING CONNECTING NEW TURBINE WITH MAIN SHAFT TO BIGELOW CO.] [LOWELL MANUFACTURING COMPANY. PARTS OF SHAFTING CONNECTING THE NEW TURBINE WITH THE MAIN SHAFT OF CARPET WEAVING MILL.]	1851/11/10
C-109-952	[BEARING & PLATE FOR OLD MAIN SHAFTING.] [LOWELL MANUFACTURING COMPANY. BEARING AND PLATE FOR THE OLD MAIN SHAFTING IN LOWELL CO.'S WHEELHOUSE.]	1851/11/03

C-109-956 OVERSIZE	[APPARATUS FOR WORKING VALVE OF HEADGATE.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. APPARATUS FOR WORKING THE VALVE OF HEAD GATE.]	1851/11/25
C-109-957 OVERSIZE	[BACK GATE FOR LOWELL CO'S TURBINE.] [LOWELL MANUFACTURING COMPANY. BACK GATE FOR LOWELL CO.'S TURBINE.]	1851/12/00
C-109-960 OVERSIZE	[GENERAL PLAN OF LOWELL MFG. CO'S TURBINE.] [LOWELL MANUFACTURING COMPANY. PLAN OF LOWELL MANUFACTURING CO'S TURBINE.]	1851/05/00
C-109-964 OVERSIZE	[PLAN OF HOISTING APPARATUS PARTS & UPRIGHT SHAFT.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE. PLAN OF UPRIGHT SHAFT.]	UNDATED
C-109-965 OVERSIZE	[CROSS BRACES FOR LOWER BEARING FOR UPRIGHT SHAFT & BRACE FOR TOP HANGER FOR LOWELL MFG. CO. NO.] [LOWELL MANUFACTURING COMPANY. LOWELL CO.'S TURBINE.]	UNDATED
C-109-971	[DESIGN FOR APPARATUS FOR MOVING THE GATES OF TURBINES BY HANDCRAFT.] [LOWELL MANUFACTURING COMPANY. DESIGN FOR MOVING THE GATES OF THE LOWELL MANG. CO'S TURBINES BY HANDCRAFT.]	UNDATED

C-109-978 OVERSIZE	[SECTION OF FLUME & WHEELPIT, DATED DEC.16, 1850, OF LOWELL MFG. CO.] [LOWELL MANUFACTURING COMPANY. LOWELL CO'S TURBINE. SECTION OF FLUME AND WHEELPIT.]	1850/12/16
C-109-980	[DATA RELATING TO LOWELL MFG. CO'C PROPOSED DYE HOUSE. WITH REFERENCE TO CANAL WALL.] [LOWELL MANUFACTURING COMPANY. DATA RELATING TO LOWELL M. CO'S PROPOSED DYE HOUSE.]	1885/03/18
C-109-981	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LOCOMOTIVE SHOP AT THE LOWELL MACHINE SHOP. QUNATITIES OF WATER DISCHARGED.]	1856/01/00
C-109-982	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LOCOMOTIVE SHOP AT THE LOWELL MACHINE SHOP. QUANTITIES OF WATER DISCHARGED.]	1856/01/00
C-109-983-[1] OVERSIZE	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LOCOMOTIVE SHOP AT THE LOWELL MACHINE SHOP. DIAGRAM SHOWING QUANTITIES OF WATER DISCHARGED.]	1859/06/00

C-109-983-[2] OVERSIZE	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LOCOMOTIVE SHOP. QUANTITIES OF WATER DISCHARGED.]	1856/01/00
C-109-985	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. LARGE SHOP TURBINE. QUANTITIES OF WATER DISCHARGED.]	1859/06/00
C-109-986 OVERSIZE	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. DIAGRAM OF EXPERIMENTS UPON THE LOWELL MACHINE SHOP CO'S TURBINE IN THE LARGE SHOP, OCTOBER, 1859. PLOTTED MARCH 16, 1860.]	1860/03/16
C-109-987	[DISCHARGE DIAGRAMS OF WHEEL IN LOCOMOTIVE SHOP. 1856-7.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LARGE MACHINE SHOP, OCTOBER, 1859. PLOTTED MARCH 17, 1860.]	1860/03/17
C-109-988-01	[DIAGRAM SHOWING COEFFICIENTS OF DISCHARGE OF A 42" SWAIN WHEEL TESTED BY HIRAM F. MILLS IN MARCH, 1870.]	1870/03/00

C-109-988-02	[SWAIN TURBINE COMPANY. COEFFICIENTS OF DISCHARGE OF A 42 INCH SWAIN WHEEL (NO. 3) TESTED BY HIRAM F. MILLS IN MARCH, 1870. SHEET 2-DECEMBER, 1872.]	1872/12/00
C-109-989	[DISCHARGE TABLE FOR 100"TURBINE NO. 3 OF L. M.F.G. CO.] [LOWELL MANUFACTURING COMPANY. QUANTITY OF WATER DISCHARGED BY THE LOWELL MANUFACTURING. COMPANY'S 100 INCH TURBINE, BUILT BY THE LOWELL MACHINE SHOP IN 1851.]	1851/00/00
C-109-990 OVERSIZE	[EXPERIMENTS ON THE DISCHARGE OF FOUNDRY BREAST WHEEL.] [LOWELL MACHINE SHOP COMPANY. EXPERIMENTS IN THE DISCHARGE OF THE FOUNDRY BREAST WHEEL, AT THE LOWELL MACHINE SHOP, IN APRIL, 1871.]	1871/04/00
C-109-991	[DISCHARGE DIAGRAM FOR TURBINE IN LARGE SHOP.] [LOWELL MACHINE SHOP COMPANY. EXPERIMENTS IN THE DISCHARGE OF THE TYLVE WHEEL, AT THE LOWELL MACHINE SHOP, APRIL 1871.]	1871/05/00
C-109-992	[DISCHARGE DIAGRAM FOR TURBINE IN LARGE SHOP.] [LOWELL MACHINE SHOP. TURBINE IN THE LARGE SHOP.]	1871/05/09

C-109-993	[DISCHARGE DIAGRAMS FOR TURBINE IN LARGE SHOP.] [LOWELL MACHINE SHOP. TURBINE IN THE LOCOMOTIVE SHOP AT THE LOWELL MACHINE SHOP. QUANTITIES OF WATER DISCHARGED.]	1871/04/28		PAPER
C-109-994	[DISCHARGE DIAGRAMS FOR TURBINE IN LARGE SHOP.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LARGE MACHINE SHOP, SHEET NO. 2.]	1871/05/09		
C-109-995	[DISCHARGE DIAGRAMS FOR TURBINE IN LARGE SHOP.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LOWELL MACHINE SHOP. QUANTITIES OF WATER DISCHARGED, SHEET NO. 1.]	1871/04/29		
C-109-996	[DISCHARGE DIAGRAMS FOR TURBINE IN LARGE SHOP.] [LOWELL MACHINE SHOP COMPANY. TURBINE IN THE LOCOMOTIVE SHOP, SHEET. NO. 2.]	1871/04/29		
C-110-2001	[PLAN & SECTION OF FRONT GATES, NORTH SUFFOLK MILL.] [SUFFOLK MANUFACTURING COMPANY. PLAN AND SECTION OF FRONT GATES, NORTH SUFFOLK MILL.]	1842/05/00		
C-110-2002	[LAND BORDERING ON NORTHERN & WESTERN CANALS AT TREMONT & SUFFOLK MILLS.] [TREMONT & SUFFOLK MILLS. SOUTHERLY BOUNDARY OF PREMISES OF PROPRIETORS OF TREMONT MILLS AND SUFFOLK M. CO. BY DEEDS DATED 1832.]	1889/01/15	1"=20'	TRACING PAPER

C-110-2005	[SKETCH OF A REGULATOR FOR SUFFOLK TURBINE.] [SUFFLOK MANUFACTURING COMPANY. SUFFOLK TURBINES-SKETCH OF A REGULATOR.]	1849/12/22	1 1/4"=1'
C-110-2015 OVERSIZE	[BEVEL GEARING OF SUFFOLK TURBINE.] [SUFFLOK MANUFACTURING COMPANY. SUFFOLK TURBINES, BEVEL GEARING.]	1850/04/24	
C-110-2021 OVERSIZE	[PLAN & SECTION OF SUFFOLK TURBINE.] [SUFFOLK MANUFACTURING COMPANY. SUFFOLK TURBINES, STEP.]	1850/04/15	
C-110-2024	[PLAN & SECTION OF MAN HOLE FOR SUFFOLK TURBINE.] [SUFFOLK MANUFACTURING COMPANY. SUFFOLK TURBINES-MAN HOLE NO. 17.]	1850/05/16	
C-110-2025	[PLAN OF ARCHES FOR SUFFOLK TURBINE PITS.] [SUFFOLK MANUFACTURING COMPANY. ARCHES FOR SUFFOLK WHEELPITS.]	1850/05/14	
C-110-2026	[PLAN OF ARCHES FOR SUFFOLK TURBINE PITS.] [SUFFOLK MANUFACTURING COMPANY. ARCHES FOR SUFFOLK WHEELPITS.]	1850/05/14	
C-110-2028	[PLAN OF ARCHES FOR SUFFOLK TURBINE PITS.] [SUFFOLK MANUFACTURING COMPANY. ARCHES FOR WHEELPITS.]	1850/06/25	

C-110-2029	[ELEVATION OF SUNDRY POINTS OF SUFFOLK MILLS.] [SUFFOLK MANUFACTURING COMPANY. ELEVATION OF SUNDRY POINTS OF SUFFOLK WHEELPITS.]	1850/06/24
C-110-2032	[PLAN OF ONE OF THE SUFFOLK BLOCKS OF HOUSES.] [SUFFOLK MANUFACTURING COMPANY. PLAN OF ONE OF THE SUFFOLK BLOCKS OF HOUSES.]	UNDATED
C-110-2033	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. SUFFOLK AND TREMONT TURBINES.]	UNDATED
C-110-2034	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TABLE OF THE QUANTITY OF WATER DISCHARGED, COEFFICIENT OF USEFUL EFFECT, AND POWER OF THE TURBINE IN THE SUFFOLK AND TREMONT MILLS, SHEET NO. 1.]	UNDATED
C-110-2035	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TABLE OF THE QUANTITY OF WATER DISCHARGED, COEFFICIENT OF USEFUL EFFECT, AND POWER OF THE TURBINES IN THE SUFFOLK AND TREMONT MILLS, SHEET NO. 2.]	UNDATED

C-110-2036	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TABLE OF THE QUANTITY OF WATER DISCHARGED, COEFFICIENT OF USEFUL EFFECT, AND POWER OF THE TURBINE IN THE SUFFOLK AND TREMONT MILLS, SHEET NO. 1.]	UNDATED	
C-110-2037	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TABLE OF THE QUANTITY OF WATER DISCHARGED, COEFFICIENT OF USEFUL EFFECT AND POWER OF THE TURBINES OF THE SUFFOLK AND TREMONT MILLS, SHEET NO. 2.]	UNDATED	
C-110-2038	[COLUMNS & BEAMS FOR T.& S. TURBINES (NO.3).] [PLAN FOR THE OFFICE OF LOCKS AND CANALS. PARTS FOR SUFFOLK AND TREMONT TURBINES NO. 3.]	1852/10/07	1/2 FULL SIZE
C-110-2039	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TREMONT AND SUFFOLK TURBINES.]	UNDATED	
C-110-2040	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TREMONT AND SUFFOLK TURBINES.]	UNDATED	

C-110-2041	[DIAGRAM & TABLE SHOWING DISCHARGE OF T.& S. TURBINES.] [SUFFOLK AND TREMONT MILLS. TREMONT AND SUFFOLK TURBINES.]	UNDATED	
C-110-2045 OVERSIZE	[SKETCH OF TURBINE FOR TREMONT CORP.] [TREMONT MILLS. TURBINE FOR TREMONT CORPORATION.]	1845/08/01	
C-110-2046 OVERSIZE	[PLAN OF CUSHIONS FOR TREMONT TURBINE.] [TREMONT MILLS. PLAN OF CUSHIONS FOR TREMONT TURBINE.]	1846/01/15	
C-110-2047-[1]	[PLAN & SECTION OF TURBINE FOR TREMONT MILLS.] [TREMONT MILLS. PLAN AND SECTION OF THE TURBINE AT THE TREMONT MILLS.]	1846/02/00	
C-110-2047-[2] OVERSIZE	[TREMONT MILLS. PLAN & SECTION OF THE TURBINE AT TREMONT MILLS.]	1846/02/00	
C-110-2048	[SECTION & ELEVATION OF] TREMONT TURBINE. [SUFFOLK AND TREMONT MILLS. TREMONT TURBINE.]	1846/06/00	1"=10"
C-110-2049	[SKETCH OF GEARS IN MESH ON TREMONT TURBINE.] [TREMONT MILLS. TREMONT TURBINES.]	1846/06/00	
C-110-2050	[PLAN & SECTION OF FLUME & APRON OF TURBINE.] [TREMONT MILLS. TURBINE AT THE TREMONT. PLAN OF FLUME AND APRON, SECTION AT AB.]	1846/06/00	

C-110-2052	[FRAME FOR GATES OF FLUME, TREMONT WHEEL HOUSE.] [TREMONT MILLS, FRAME OF GATES OF FLUME, TREMONT WHEEL HOUSE.]	1848/04/14	1/2"=1'	
C-110-2057	[PLAN & SECTION OF TURBINE.] [TREMONT MILLS. TURBINE AT TREMONT, ABOUT 1848.]	SEE NOTES		
C-110-2059	[SUFFOLK MFG. CO'S. WHEEL PITS.] [SUFFOLK MANUFACTURING COMPANY. TURBINE-WHEEL PITS.	1849/11/16		
C-110-2063 OVERSIZE	[SKETCH SHOWING TRANSMISSION OF POWER.] [TREMONT MILLS. TREMONT TURBINES, TRANSMISSION OF POWER.]	1850/05/22		
C-110-2068 OVERSIZE	[PLAN & SECTION OF RACK & PINION GEARS.] [TREMONT MILLS. TREMONT TURBINES.]	1850/06/12		
C-110-2073 OVERSIZE	[SKETCH SHOWING SHAFTING OF TREMONT MILLS.] [TREMONT MILLS. SHAFTING.]	1850/08/08		
C-110-2093-1 OVERSIZE	[DIAGRAMS SHOWING RESULTS OF EXPERIMENTS UPON A TURBINE TILESTON & HOLLINGSWORTH'S UPPER MILL AT DORCHESTER, MASS. IN MAY 1850 WITH THOSE UPON TREMONT TURBINE IN FEBRUARY 1851.] [EXPERIMENTS UPON THE TURBINE IN TILESTON AND HOLLINGSWORTH (CONT. IN NOTES)	1860/01/00		PAPER

	[DIAGRAMS SHOWING RESULTS OF EXPERIMENTS UPON A TURBINE IN TILESTON & HOLLINGSWORTH'S UPPER MILL AT DORCHESTER, MASS. IN MAY 1850 WITH THOSE UPON TREMONT TURBINE IN FEBRUARY, 1851.] [COMPARISON OF THE		
C-110-2093-2 OVERSIZE	COEFFICIENTS OF EFFECT OBTAINED BY (CONT. IN NOTES)	1860/01/00	PAPER
	[PLAN OF FLOATS & GUIDES OF TREMONT TURBINE.] [TREMONT MILLS. PLAN OF		
C-110-2096 OVERSIZE	THE FLOATS AND GUIDES OF THE TREMONT CO.'S TURBINE, BY MR. J. AVERY.]	1851/11/15	
	[FORM OF GUIDES & FLOATS FOR TREMONT TURBINES.]		
C-110-2097 OVERSIZE	[TREMONT MILLS. FORM OF FLOATS AND GUIDES FOR THE TREMONT TURBINES.]	1852/04/00	
	[DIAGRAM SHOWING DISCHARGE OF TREMONT TURBINES.] [TREMONT MILLS. DIAGRAM REPRESENTING SOME OF THE RESULTS OF THE EXPERIMENTS ON THE		
C-110-2098	TREMONT AND LOWELL MACHINE SHOP TURBINES.]	1852/11/28	
	[DIAGRAM SHOWING DISCHARGE OF TREMONT TURBINES.] [TREMONT MILLS. TREMONT TURBINE. QUANTITIES OF WATER DISCHARGED WITH VARIOUS		
C-110-2099	HEIGHTS OF THE SPEED-GATE.]	1856/04/00	

C-110-2100	[DIAGRAM SHOWING DISCHARGE OF TREMONT TURBINES.] [TREMONT MILLS. TREMONT TURBINE. QUANTITIES OF WATER DISCHARGED (COPY JULY 14, 1856), APRIL 1856. TESTED BY E.W. YOUNG, AUGUST 20, 1856.]	1856/07/14	
C-110-2100-1	[PLOT OF PRELIMINARY SURVEY FOR PROPOSED TREMONT RACE FOR PURPOSE OF ESTIMATING COST H.F.M.] [TREMONT MILLS. PLOT OF PRELIMINARY SURVEY FOR LOCATION AND PROFILE OF CENTRE LINE OF PROPOSED TREMONT RACE, MADE FOR PURPOSE OF APPROXIMATE ESTIMATE OF COST...]	1862/10/06-07	
C-110-2101 OVERSIZE	[PLAN & SECTION OF WARREN CENTRE VENT WHEEL AT TREMONT MILLS.] [TREMONT MILLS. WARREN CENTRE VENT WHEEL, AT TREMONT MILLS. LOWELL.]	1866/10/09	
C-110-2102	[EXPERIMENTS ON THE TREMONT TURBINES AS GIVEN IN LOWELL HYDRAULIC EXPERIMENTS.] [TREMONT MILLS. EXPERIMENTS ON THE TREMONT TURBINE AS GIVEN IN LOWELL HYDRAULIC EXPERIMENTS, PLOTTED NOVEMBER 28, 1868.]	1868/11/28	PAPER

C-110-2103 OVERSIZE	[EXPERIMENTS ON THE TREMONT TURBINE AS GIVEN IN LOWELL HYDRAULIC EXPERIMENTS.] [TREMONT MILLS. EXPERIMENTS ON THE TREMONT TURBINE AS GIVEN IN LOWELL HYDRAULIC EXPERIMENTS, PAGE 32-34.]	1868/11/28	PAPER
C-110-2104	[COEFFICIENTS OF DISCHARGE DEDUCED FROM EXPERIMENTS ON TREMONT TURBINES, & APPLETON CO'S 11' TURBINE.] [TREMONT MILLS. COEFFICIENTS OF DISCHARGE THROUGH TURBINES, DEDUCED FROM EXPERIMENTS ON TREMONT TURBINE AND APPLETON CO.'S 11 FT. TURBINE.]	1877/03/22	
C-110-2105	[WEIR EXPERIMENTS AT THE WESTERLY TREMONT TURB.] [TREMONT MILLS. WEIR EXPERIMENTS WESTERLY TREMONT TURBINE, BY JAMES B. FRANCIS.]	1851/01-02/00	
C-110-2105-A	[TREMONT MILLS. GRAPH ON OPERATION OF TREMONT TURBINE.]	1852/01/12	
C-110-2106A OVERSIZE	[TREMONT CANAL. FLUME AND WEIRS IN THE TREMONT CANAL, USED IN A COMPARISON OF FLUME MEASUREMENT WITH WEIR MEASUREMENT IN SEPTEMBER AND OCTOBER, 1856.]	1856/09-10/00	

C-110-2106B OVERSIZE	[TREMONT CANAL. PLAN OF PART OF THE EAST WEIR AS USED IN THE COMPARISON OF FLUME WITH WEIR MEASUREMENTS IN THE TREMONT CANAL.]	1856/10-11/00	
C-111-2108 OVERSIZE	[PLAN & SECTION OF LARGE GEAR OF TURBINE WHEEL.] [LAWRENCEMANUFACTURING COMPANY. WHEEL.]	UNDATED	
C-111-2109	[PLAN & SECTION OF LARGE GEAR OF TURBINE WHEEL.] [LAWRENCE MANUFACTURING COMPANY. NO. 38 GEAR.]	1846/09/10	FULL SIZE
C-111-2111	[WINDLASS FOR MOVING THE HEAD GATES OF TURBINES 6 & 7 OF LAWRENCE MFG. CO.] [LAWRENCE MANUFACTURING COMPANY. WINDLASS FOR MOVING THE EHAD GATES OF THE TURBINES IN MILLS NO.S 6 AND 7.]	UNDATED	
C-111-2112 OVERSIZE	[LAWRENCE MANUFACTURING COMPANY. INTAKE SYSTEM.]	UNDATED	
C-111-2113 OVERSIZE	[PLAN ELEV. & SECTION OF LAWRENCE WATERWAYS.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE ENLARGEMENT.]	1853/12/31	

C-111-2114 OVERSIZE	[PLAN OF BUILDINGS IN YARD OF LAWRENCE MFG. CO.] [LAWRENCE MANUFACTURING COMPANY. PLAN OF THE BUILDINGS IN THE YARD OF THE LAWRENCE MANUFACTURING COMPANY, LOWELL, MASS.]	1868/08/22
C-111-2116	[UNFINISHED SKETCH OF WORM & GEAR.] [LAWRENCE MANUFACTURING COMPANY. UNFINISHED DIAGRAM OF MACHINERY.]	UNDATED
C-111-2117-1	[PLAN OF LAWRENCE BLOCK.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE BLOCK.]	1845/01/24
C-111-2117-4	[PLAN & ELEVATION OF PICKER HOUSE SHOWING ARCHES.] [LAWRENCE MANUFACTURING COMPANY. FOUNDATION OF PICKER HOUSE.]	SEE NOTES
C-111-2117-5	[PLAN OF OVERSEERS BLOCK.] [OVERSEERS' BLOCK-LAWRENCE MILLS.]	1845/03/00
C-111-2124	[PLAN & ELEVATION OF HEADGATES FOR 6 & 7.] [LAWRENCE MANUFACTURING COMPANY. HEAD GATES FOR THE TURBINES IN THE LAWRENCE MANUFACTURING CO'S MILLS, NO'S 6 AND 7.]	1854/01/31
C-111-2125	[PLAN OF LAWRENCE CO'S TURBINE.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'S TURBINES. MADE FOR THE OFFICE OF LOCKS AND CANALS.]	1854/02/00

C-111-2126	[PIPES & VALVES FOR DRAINING WHEEL PITS FOR LAWRENCE MFG. CO'S. NOS. 6 & 7.] [LAWRENCE MANUFACTURING COMPANY. PIPES AND VALVES FOR DRAINING THE WHEEL PITS IN LAWRENCE MANUFACTURING CO'S MILLS NO'S 6 & 7.]	1854/02/06
C-111-2127	[FIRST JOINT OF IRON FLUME FOR NO. 6 & 7.] [LAWRENCE MANUFACTURING COMPANY. FIRST JOINT OF THE IRON FLUME FOR THE LAWRENCE MANUFACTURING CO'S MILLS NO'S 6 AND 7.]	1854/02/09
C-111-2129	[PLAN & SECTION OF STEP & BEARING PLATE & STAND.] [LAWRENCE MANUFACTURING COMPANY. TURBINES--STEP.]	1854/03/28
C-111-2136	[PARTS OF REGULATING APPARATUS.] [LAWRENCE MANUFACATURING COMPANY. TURBINE-PARTS FOR REGULATING APPARATUS.]	1854/03/07
C-111-2151	[PLAN OF PROPOSED RACE WAY FOR NO. 6 MILL.] [LAWRENCE MANUFACTURING COMPANY. PROPOSED RACE WAY FOR LAWRENCE MILL NO. 6.]	1854/05/22
C-111-2152	[PLAN & SECTION OF WHEEL & DISC.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'S TURBINES. WHEEL AND DISC, COPY.]	1854/05/00

C-111-2153	[FIRST BEVELED GEARS.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'C TURBINES. FIRST BEVELED GEARS.]	1854/05/00
C-111-2158	[FOUNDATIONS FOR LAWRENCE CO'S MILL# 6.] [LAWRENCE MANUFACTURING COMPANY. FOUNDATIONS FOR LAWRENCE CO'S MILL NO. 6.]	1854/06/00
C-111-2161	[PLAN & SECTION CAST IRON PART OF FLUME.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'S TURBINES, CAST IRON PART OF FLUME.]	1854/06/00
C-111-2162	[BEAMS SUPPORTING LOWER CURB, COLUMN, PART OF DIFFUSER, & BOTTOM BEAM.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'S TURBINES. BEAMS SUPPORTING LOWER CURB, COLUMN, PART OF DIFFUSER, AND BOTTOM BASE. COPY.]	1854/06/00
C-111-2166	[PARTS OF REGULATING APPARATUS.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'S TURBINES, PARTS FOR REGULATING APPARATUS.]	1854/07/06
C-111-2168 OVERSIZE	[PARTS OF TURBINE, SHOWING GARNITURE, ETC.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO'S TURBINES.]	1854/07/05

C-111-2170 OVERSIZE	[ELEVATION OF REGULATING APPARATUS OF TURBINE.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO.'S TURBINES, ELEVATION AT B.]	1854/08/00
C-111-2182 OVERSIZE	[ELEVATION OF HOISTING & REG. APPARATUS.(WORKING PLAN)] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE TURBINE. HOISTING AND REGULATING APPARATUS-WORKING PLAN.]	1854/08/00
C-111-2192 OVERSIZE	[ELEVATION OF SHAFTING FOR MILLS 1, 2 & 6.] [LAWRENCE MANUFACTURING COMPANY. ELEVATIONS OF LAWRENCE CO.'S SHAFTING FOR MILLS NO. 1, NO. 2 AND NO. 6.]	1854/10/12
C-111-2194 OVERSIZE	[APPARATUS FOR BACK GATES.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE MANG. CO.'S MILLS APPARATUS FOR BACK GATES. COPY.]	1854/10/05
C-111-2202	[PLAN OF BACK GATES.] [LAWRENCE MANUFACTURING COMPANY. BACK GATE, TO BE SIX COMPLETE GATES LIKE THIS.]	1854/10/09
C-111-2203	[APPARATUS FOR BACK GATES.] [LAWRENCE MANUFACTURING COMPANY. APPARATUS FOR BACK GATES.]	1854/10/05

C-111-2206 OVERSIZE	[LAWRENCE MANUFACTURING COMPANY. LAWRENCE CO.'S TURBINE. GENERAL PLAN OF REGULATING APPARATUS FOR EASTERLY WHEEL IN NO. 6 MILL.]	SEE NOTES
C-111-2210	[FEEDER-HEAD FOR LAWRENCE MFG. CO. MILL # 7.] [LAWRENCE MANUFACTURING COMPANY. FEEDER HEAD.]	1855/01/30
C-111-2211	[SKETCH FOR FLUME OF MILL NO. 6.] [LAWRENCE MANUFACTURING COMPANY. SKETCH FOR THE FLUME OF LAWRENCE CO'S MILL NO. 6.]	1855/02/06
C-111-2212	[PLANS OF ARCHES FOR FEEDER-HEADS FOR LAWRENCE MFG. CO. MILLS 6 & 7.] [LAWRENCE MANUFACTURING COMPANY. MILL NO. 6, PLAN OF SOFFIT.]	1855/02/01
C-111-2214	[SKETCH SHOWING THE WAY THE TURBINES REVOLVE.] [LAWRENCE MANUFACTURING COMPANY. SKETCH SHOWING THE WAY THE TURBINES REVOLVE AT THE LAWRENCE MILLS NO'S 6 & 7.]	1855/03/22
C-111-2216	[LAWRENCE MANUFACTURING COMPANY. LAWRENCE COMPANY'S TURBINES, EASTERLY PIT, NO. 6, PLAN OF REGULATING APPARATUS.]	1854/11/00

C-111-2220 OVERSIZE	[WINDLASS FOR MOVING THE HEAD GATES IN 6 & 7.] [LAWRENCE MANUFACTURING COMPANY. WINDLASS FOR MOVING THE HEADGATES OF THE TURBINES IN THE LAWRENCE CO'S MILLS NO'S 6 AND 7. COPY.]	1855/06/08
C-111-2230	[PLAN OF OFFICE BUILDINGS.] [LAWRENCE MANUFACTURING COMPANY. FLOOR PLAN OF COTTON STOREHOUSES AND OFFICE BUILDINGS.]	1835/00/00
C-111-2231 OVERSIZE	[SKETCH OF BREAST WHEEL, 17' DIAMETER.] [LAWRENCE MANUFACTURING COMPANY. BREAST WHEEL, 17 FT. DIAMETER.]	1835/00/00
C-111-2237 OVERSIZE	[PLAN OF FLOATS & GUIDES FOR TURBINES.] [LAWRENCE MANUFACTURING COMPANY. TURBINES FOR THE LAWRENCE MANG. CO. FLOATS AND GUIDES.]	1855/01/31
C-111-2238	[TABLES SHOWING DISCHARGE OF LAWRENCE MFG. CO. WHEELS.] [LAWRENCE MANUFACTURING COMPANY. QUANTITY OF WATER DISCHARGED BY TURBINE NO. 11 AT THE MILLS OF THE LAWRENCE MANUFACTURING COMPANY, COMPUTED FROM DIMENSIONS GIVEN IN BK I, PAGES 103 AND 104.]	1871/04/00

C-111-2239	[TABLES SHOWING DISCHARGE OF LAWRENCE MFG. CO. WHEELS.] [LAWRENCE MANUFACTURING CO. QUANTITY OF WATER DISCHARGED BY ONE OF THE 106 " TURBINES AT THE MILLS OF THE LAWRENCE MANUFACTURING COMPANY, BUILT IN 1854, COMPUTED BY MISS EMERSON AND MR. WENTWORTH.]	1871/01/00	
C-111-2240 OVERSIZE	[FLOATS & GUIDES & A SECTION THRU GARNITURE BUCKETS, ETC.] [LOWELL MACHINE SHOP COMPANY. TURBINE FOR THE LAWRENCE MANUFACTURING COMPANY, NOW BUILDING BY THE LOWELL MACHINE SHOP. FORM OF THE BUCKETS AND GUIDES. COPY.]	1870/08/31	DRAFTING CLOTH
C-111-2241	[LAWRENCE COMPANY'S CHIMNEY BUILT ABOUT 1872.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE MANUFACTURING COMPANY'S TALL CHIMNEY, BUILT IN 1872.]	SEE TITLE	
C-111-2242	[PLAN OF BACK GATES.] [LAWRENCE MANUFACTURING COMPANY. LAWRENCE COS. MILLS. BACKGATE, TO BE 6 COMPLETE GATES LIKE THIS.]	1854/10/09	

C-112-2242	[PACKAGE OF PLANS OF DWELLING HOUSE OF BOOTT CORP.] [BOOTT COTTON MILLS. A PACKAGE OF PLANS OF THE DWELLING HOUSES OF THE BOOTT COTTON MILLS.]	1836/08/00
C-112-2243	[PLAN, ELEVATION & SECTION OF A CENTER VENT WHEEL AT BOOTT MILLS.]	UNDATED
C-112-2245	[OLD MILL PLAN-PROBABLY BOOTT MILLS.] [BOOTT COTTON MILLS. SIDE ELEVATION OF MILL BUILDING.]	UNDATED
C-112-2246	[PLAN AND ELEVATION OF ONE OF THE BOOTT COTTON MILLS.] [PLAN OF ONE OF THE BOOTT COTTON MILLS.]	UNDATED
C-112-2248	[PLAN OF PENSTOCK, PROBABLY BOOTT 1 & 2. NOT TITLED.] [BOOTT COTTON MILLS. PROBABLY PLAN OF PENSTOCKS TO BOOTT NO. 1 & 2 WHEELS.]	UNDATED
C-112-2249 OVERSIZE	[SECTION THROUGH FEEDER WHEEL & PIT PROBABLY BOOTT.] [BOOTT COTTON MILLS. SKETCH OF WHEEL PITS, BOOTT 90" TURBINES.]	UNDATED
C-112-2256	[PLAN SHOWING HEIGHT OF LEDGE UNDER BOOTT MILL NO.1.] [BOOTT COTTON MILLS. PLAN SHOWING THE HEIGHTS OF LEDGE UNDER BOOTT MILL NO.1.]	1835/06-07/00
C-112-2257	[PLAN SHOWING CONTOURS OF LAND WHERE BOOTT MILLS IS NOW SITUATED.] [SITE PLAN OF THE BOARDING HOUSES.]	UNDATED

C-112-2259	[SECTION THROUGH THE FURNACE OF ONE OF THE BOOTT COTTON MILLS.] [CROSSECTION THROUGH FURNACE OF ONE OF THE BOOTT COTTON MILLS.]	1835/10/14	
C-112-2260	[ELEVATION OF ONE OF BOOTT BLOCKS OF BOARDING HOUSES.] [BOOTT COTTON MILLS. FRONT AND END ELEVATIONS OF THE BOOTT BLOCKS OF BOARDING HOUSES.]	1836/08/00	1"=1'
C-112-2266 OVERSIZE	[PLAN OF NEW WEAVING MILL WITH SECTION OF FOUNDATION WALLS.] [BOOTT COTTON MILLS. NEW WEAVING MILL.]	1847/06/21	
C-112-2270	[SECTION OF BOOTT COTTON MILLS LOWELL SHOWING FEEDER PIPE FOR NOS. 1 & 2 WHEELS.] [BOOTT COTTON MILLS, LOWELL.]	1847/08/00	
C-112-2275 OVERSIZE	[PLAN & SECTION OF PENSTOCK PIPE, BOOTT WEAVING MILL NO. 1 & 2 WHEELS.] [BOOTT COTTON MILLS. PIPE FOR BOOTT WEAVING MILL.]	1848/01/06	
C-112-2281 OVERSIZE	[COUPLING # 5 OF MAIN DRIVING SHAFT OF NEW MILL.] [BOOTT COTTON MILLS. COUPLING NO. 5 FOR MAIN DRIVING SHAFT IN THE BOOTT MANUFACTURING CO.'S NEEW MILL. SHEET NO. 4.]	1848/01/21	
C-112-2283 OVERSIZE	[FLOATS AND GUIDES FOR NEW WEAVING MILL.] [BOOTT COTTON MILLS. DIAGRAM. BOOTT WEAVING MILL.]	1848/01/03	

C-112-2284 OVERSIZE	[TEETH OF BEVEL WHEELS OF WEAVING MILL IN DIFFERENT POSITIONS DEVELOPED TO SHOW THEY DO NOT INTERFERE WITH ONE ANOTHER.] [BOOTT COTTON MILLS.] [TEETH OF THE BEVEL WHEEL FOR THE BOOTT WEAVING MILL..ADDTIONAL WORDING AS ABOVE.]	1848/02/17
C-112-2285 OVERSIZE	[TEETH OF BEVEL WHEELS OF WEAVING MILL IN DIFFERENT POSITIONS DEVELOPED TO SHOW THEY DO NOT INTERFERE WITH ONE ANOTHER.] [TEETH PF THE BEVEL WHEEL.]	1848/02/17
C-112-2286 OVERSIZE	[SECTION THROUGH CENTER OF HORIZ. SHAFT OF WEAVING MILL WHEEL SHOWING PARTS BELOW.] [BOOTT COTTON MILLS. BOOTT WEAVING MILL WHEEL. SECTION THROUGH CENTRE OF HORIZONTAL SHAFT SHOWING PARTS BELOW.]	1848/02/23
C-112-2318 OVERSIZE	[GREAT REGULATING GEAR AND GATE ROD PINION.] [BOOTT COTTON MILLS. BOOTT WEAVING MILL WHEEL. GREAT REGULATING GEAR AND GATE ROD PINION.]	1848/04/15
C-112-2346 OVERSIZE	[HOISTING WHEEL OF WEAVING MILL-SECTION THROUGH.] [BOOTT COTTON MILLS. HOISTING WHEEL FOR BOOTT WEAVING MILL.]	1848/08/08

C-112-2350 OVERSIZE	[GUIDES & FLOATS OF EASTERLY WHEEL.] [BOOTT COTTON MILLS. WHEEL FOR BOOTT WEAVING MILL.]	1848/08/18
C-112-2355 OVERSIZE	[HOISTING WHEEL OF WEAVING MILL.] [BOOTT COTTON MILLS. HOISTING WHEEL FOR BOOTT WEAVING MILL.]	1848/08/03
C-112-2356 OVERSIZE	[HOISTING WHEEL OF WEAVING MILL.] [BOOTT COTTON MILLS. BOOTT WEAVING MILL HOISTING WHEEL.]	1848/08/16
C-112-2361 OVERSIZE	[HOISTING WHEEL-GATE FOR.] [BOOTT COTTON MILLS. GATE FOR HOISTING WHEEL AS BOOTT WEAVING MILL.]	1848/08/05
C-112-2372 OVERSIZE	[HOISTING WHEEL-GENERAL PLAN.] [BOOTT COTTON MILLS. BOOTT WEAVING MILL HOISTING WHEEL.]	1848/11/23
C-112-2373	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/15
C-112-2374	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/14
C-112-2375	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/14
C-112-2376	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/14
C-112-2377	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/14

C-112-2378	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/14	
C-112-2379	[HOISTING WHEEL-GENERAL PLAN.]	1848//11/23-12/14	
C-112-2380 OVERSIZE	[HOISTING WHEEL-GENERAL PLAN.] [BOOTT COTTON MILLS. BOOTT WEAVING MILL WHEEL FOR HOISTING SPEED GATES AND FOR PUMPING.]	1848/12/14	
C-112-2387 OVERSIZE	[WHEEL PITS OF WEAVING MILL SHOWING PARTS ABOVE.] [BOOTT COTTON MILLS. SKETCH OF WHEELPITS.]	UNDATED	
C-112-2391 OVERSIZE	[DISCHARGE DIAGRAM OF BOOTT CENTER VENT WHEELS MADE IN 1868 FROM EXPERIMENTS MADE MARCH, 1849.] [BOOTT COTTON MILLS. EXPERIMENTS UPON THE DISCHARGE OF WATER FROM THE CENTRE VENT WHEELS.]	1868/00/00	PAPER
C-112-2392 OVERSIZE	[EASTERLY WHEEL OF BOOTT WEAVING MILL SHOWING HORIZ., VERT. SECTIONS AND TOP VIEW.] [BOOTT COTTON MILLS. NO. 1 EASTERLY WATER WHEEL IN THE BOOTT WEAVING MILL.]	1849/10/00	
C-112-2393 OVERSIZE	[EASTERLY WHEEL OF BOOTT WEAVING MILL SHOWING HORIZ., VERT. SECTIONS AND TOP VIEW.] [BOOTT COTTON MILLS. EASTERLY WATER WHEEL IN THE BOOTT WEAVING MILL.]	1849/10/00	

C-112-2394 OVERSIZE	[EASTERLY WHEEL OF BOOTT WEAVING MILL SHOWING HORIZ., VERT. SECTIONS AND TOP VIEW.] [BOOTT COTTON MILLS. EASTERLY WATER WHEEL IN THE BOOTT WEAVING MILL.]	1849/10/00	
C-112-2395 OVERSIZE	[PLAN SHOWING APPARATUS USED IN EXPERIMENTS UPON WESTERLY WHEEL IN BOOTT WEAVING MILL.] [BOOTT COTTON MILLS. PLAN SHOWING THE APPARATUS USED IN EXPERIMENTS UPON THE WESTERLY WHEEL IN THE BOOTT WEAVING MILL.]	1849/12/06	
C-112-2396 OVERSIZE	[PLAN SHOWING APPARATUS USED IN EXPERIMENTS UPON WESTERLY WHEEL IN BOOTT WEAVING MILL.] [BOOTT COTTON MILLS. PLAN SHOWING THE APPARATUS USED IN EXPERIMENTS UPON THE WESTERLY WHEEL IN THE BOOTT WEAVING MILL.]	1849/11/05	
C-112-2398	[FORM OF FLOATS & GUIDES OF BOOTT TURBINES.] [BOOTT COTTON MILLS. FORM OF FLOATS AND GUIDES, DRAWN FULL SIZE.]	1856/11/10	FULL SIZE
C-112-2401	[SKETCH OF PROPOSED FIRE PROOF FLOOR OVER BOILERS AT THE BOOTT COTTON MILLS, WITH ESTIMATED COSTS.] [BOOTT COTTON MILLS. SKETCH OF PROPOSED FIRE PROOF FLOOR OVER BOILERS AS THE BOOTT COTTON MILLS, LOWELL.]	1882/12/07	

C-112-2402	[ELEVATION OF BOOTT RAILROAD TRESTLE.] [BOOTT COTTON MILLS. R. ROAD.]	1853/02/03				
C-113-[001]	PLATFORM & SPILING FOR THE MIDDLESEX RACEWAYS.	1844/07/00	1/4"=1'		H 22.3, W 53.5 CM	INK
C-113-[001]	PLATFORM & SPILING FOR THE MIDDLESEX RACEWAYS.	1844/07/00	1/4"=1'	H 22.3, W 53.5 CM	INK	PAPER
C-113-[002]	GAUGE WHEEL FOR MIDDLESEX MILLS.	1842/06/00	5/8"=1'		H 45.8, W 64.2 CM	INK, WATER COLOR, GRAPHITE
C-113-[002]	GAUGE WHEEL FOR MIDDLESEX MILLS.	1842/06/00	5/8"=1'	H 45.8, W 64.2 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-113-[003]	[UNTITLED.] [ELEVATION OF GAUGE WHEEL FOR MIDDLESEX MILLS.]	SEE NOTES			H 67.2, W 50.3 CM	INK, GRAPHITE
C-113-[003]	[UNTITLED.] [ELEVATION OF GAUGE WHEEL FOR MIDDLESEX MILLS.]	SEE NOTES	NONE	H 67.2, W 50.3 CM	INK, GRAPHITE	PAPER

C-113-[004]	PLAN AND ELEVATION / OF / MEASURING WHEELS / USED AT MIDDLESEX MILLS [AND] VIEW OF UPPER END OF FLUME [AND] SECTION OF FLUME.	1842/00/00	3/8"=1', 1/2"=50'		H 63, W 74.3 CM	INK, WATER COLOR
C-113-[004]	PLAN AND ELEVATION / OF / MEASURING WHEELS / USED AT MIDDLESEX MILLS [AND] VIEW OF UPPER END OF FLUME [AND] SECTION OF FLUME.	1842/00/00	3/8"=1', 1/2"=50'	H 63, W 74.3 CM	INK, WATER COLOR	PAPER
C-113-2414	[PLAN OF FOUNDATION OF NEW MILL BETWEEN NOS.3 & 4 OF MASSACHUSETTS CORPORATION.]	1851/00/00				
C-113-2415	PLAN OF TIMBER & PILES / REQUIRED FOR THE FOUNDATION OF THE MASSACHUSETTS / TURBINE WHEELPITS & NEW MILL	1851/04/00	NONE		H 23 3/4", W 34 1/2"	INK, COLORED INK
C-113-2415	PLAN OF TIMBER & PILES / REQUIRED FOR THE FOUNDATION OF THE MASSACHUSETTS / TURBINE WHEELPITS & NEW MILL	1851/04/00	NONE	H 23 3/4", W 34 1/2"	INK, COLORED INK	PAPER
C-113-2416	[SHAFTING OF MASS. MILLS 1 & 2.] [MASSACHUSETTS COTTON MILLS. SHAFTING FOR MASSACHUSETTS COTTON MILLS NO'S 1 AND 2, SHAFTING PLAN.]	1856/08/15				
C-113-2417	[BOYDEN TURBINE-VERTICAL SECTION.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES.]	1851/11/00				

C-113-2418	[BOYDEN TURBINE,-FEEDER & WHEEL PIT, VERT. SEC.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES.]	1851/12/05	
C-113-2419 OVERSIZE	[BOYDEN TURBINE-VERT. SECT. ALSO SHAFTING GEARS ETC. OVER 1 & 2 MILLS.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES.]	1851/12/30	
C-113-2420 OVERSIZE	[SKETCH SHOWING PROPOSED IMPROVEMENTS IN MASS. WATERWAYS FOR NOS. 1 & 2 MILLS, (PITS 3,4,5).] [MASSSACHUSETTS COTTON MILLS. SKETCH NO. 2 OF THE PROPOSED IMPROVEMENTS AS THE MASSACHUSETTS COTTON MILLS.]	1856/01/28	
C-113-2421 OVERSIZE	[SECTION OF ONE SIDE OF TURBINE.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES. FULL SIZE.]	1852/01/23	FULL SIZE
C-113-2425A OVERSIZE	[MASSACHUSETTS COTTON MILLS. HEAD GATE FOR MASSACHUSETTS TURBINE.]	1852/01/00	
C-113-2429 OVERSIZE	[SHAFT CASE & DISC-PLAN & SECT. RUNNER.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES.]	1852/01/26	
C-113-2430	[PLAN & ELEVATION OF HEADGATE FOR MASS. TURB.]	1852/01/00	

	[SEGMENT OF DIFFUSER.]	
C-113-2438 OVERSIZE	[MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES, DIFFUSER.]	1852/02/04
	[SECTION OF LOWER PARTS OF TURBINE.]	
C-113-2443 OVERSIZE	[MASSACHUSETTS COTTON MILLS. SECTION OF THE LOWER PARTS OF THE MASSACHUSETTS TURBINES.]	1852/03/31
	[SECTION OF CAST IRON FLUME, FLANGES, CURB, & UPPER PIPE OF DISC.]	
C-113-2448 OVERSIZE	[MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TURBINES.]	1852/03/22
	[SECTION & ELEV. OF EASTERLY TURBINE & PIT TOWARDS NO.3 MILL.]	
C-113-2450 OVERSIZE	[MASSACHUSETTS COMPANY. SECTION AND ELEVATION OF MASSACHUSETTS CO.S' TURBINE FOR THE EASTERLY PIT TOWARDS MILL NO. 3.]	1852/04/00
	[MASSACHUSETTS COTTON MILLS. MASSACHUSETTS	
C-113-2454A OVERSIZE	TURBINES. APPARATUS FOR MOVING HEAD GATES FOR GATE OF EASTERLY WHEEL.]	1852/05/05
	[TOP VIEW OF EASTERLY TURB. & PIT.]	
C-113-2456 OVERSIZE	[MASSACHUSETTS COTTON MILLS. TOP VIEW OF MASSACHUSETTS CO.'S TURBINE FOR THE EASTERLY PIT TOWARDS MILL NO. 3.]	1852/05/00
C-113-2459	[APPARATUS FOR MOVING HEADGATE FOR MASS. TURB.]	1852/05/00

C-113-2465	[SKETCH SHOWING PROPOSED WHEEL PITS FOR 1 & 2, SHOWING LOCATION OF PILES.] [MASSACHUSETTS COTTON MILLS. PROPOSED WHEELPITS BETWEEN OR IN REAR OF MAIN MILLS.]	1856/00/00
C-113-2466	[SKETCH OF LOWER PARTS OF 10' TURBINES.] [MASSACHUSETTS COTTON MILLS. SKETCH-MASSACHUSETTS 1O FOOT TURBINE, LOWER PARTS.]	1856/03/12
C-113-2472	[PLAN & ELEVATION OF WHEEL PITS FOR 1 & 2.] [MASSSACHUSETTS COTTON MILLS. WHEELPITS FOR TURBINES NO. 1 AND 2.]	1856/03/28
C-113-2483	[ELEVATION & SECTION OF GUIDE FOR HEAD GATE & PADDLE GATE FOR DRAINING PENSTOCK.] [MASSACHUSETTS COTTON MILLS. GUIDE FOR HEAD GATE FOR SMALL TURBINE.]	1856/04/23
C-113-2485	[DISPOSITION OF SMALL TURBINE & CENTRIFUGAL PUMP IN NEW WHEEL HOUSE.] [MASSACHUSETTS COTTON MILLS. DISPOSITION OF SMALL TURBINE AND CENTRIFUGAL PUMP IN THE NEW WHEELHOUSE.]	1856/05/26
C-113-2491	[PLAN OF FLOATS & GUIDES OF 10' TURBINES.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TEN FOOT TURBINES. PLAN OF FLOATS AND GUIDES FOR NORTH EASTERLY TURBINE, COPY.]	1856/06/05

C-113-2492	[PARTS OF HEADGATES OF 10' TURBINES.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TEN FOOT TURBINES. PARTS FOR HEAD GATES.]	1856/06/24
C-113-2494	[PARTS OF REGULATING APPARATUS OF 10' TURB.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TEN FOOT TURBINES. PARTS FOR REGULATING APPARATUS.]	1856/07/07
C-113-2527 OVERSIZE	[COUPLING BEARINGS & COLUMN WITH HANGER ATTACHED FOR MASSACHUSETTS MILLS.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS CO.'S SHAFTING.]	SEE NOTES
C-113-2528	[PLAN OF ARCHES OF FLUME OF SPINNING MILL.] [MASSACHUSETTS COTTON MILLS. PLANS FOR SPINNING MILL FLUMES.]	1844/01/04
C-113-2531 OVERSIZE	[PLAN & FOUNDATION OF NEW MILL BETWEEN NOS.3 & 4 OF MASSACHUSETTS CORPORATION.] [MASSACHUSETTS COTTON MILLS. FOUNDATION FOR MASSACHUSETTS NEW MILL BETWEEN NO. 3 AND 4.	1851/00/00

C-113-2532	[PLAN OF FOUNDATION OF NEW MILL BETWEEN NOS.3 & 4 OF MASSACHUSETTS CORPORATION.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS NEW MILL BETWEEN NO.S 3 AND 4.	1851/00/00
C-113-2539	[SKETCH OF IRON TRUSSES SUPPORTING UPPER FLOOR IN NEW WHEEL HOUSE.] [MASSACHUSETTS COTTON MILLS. SKETCH OF IRON TRUSSES SUPPORTING UPPER FLOOR IN MASSACHUSETTS CO.S' NEW WHEELHOUSE.]	1852/07/22
C-113-2543 OVERSIZE	[PLAN OF SHAFTING IN MASS. NEW MILL BETWEEN 3 & 4.] [MASSACHUSETTS COTTON MILLS. PLAN OF SHAFTING IN MASSACHUSETTS CO.'S NEW MILL BETWEEN NO. 3 AND 4. COPIED AUGUST 28, 1852.]	1852/08/28
C-113-2545	[PARTS OF SHAFTING TO DRIVE MILLS 1 & 2.] [MASSACHUSETTS COTTON MILLS. PARTS OF SHAFTING TO DRIVE NO. 1 AND NO. 2 MILLS.]	1856/03/29
C-113-2546 OVERSIZE	[SKETCH SHOWING ALTERATIONS MADE IN NOS. 3,4, & 5 TURBINE PITS, (NO. 1 & 2 MILLS)] [MASSACHUSETTS COTTON MILLS. SKETCH OF MASSACHUSETTS TURBINE PITS.]	1856/03/21
C-113-2547	[PLAN OF CAPPING STONES FOR PITS 3, 4, & 5.]	1856/03/29

C-113-2553	[PLAN OF ELEVATION OF LINE OF SHAFTING CONNECTED WITH WHEELS# 1 & 2 FOR MILLS 1 & 2.] [MASSACHUSETTS COTTON MILLS. PART OF THE SHAFTING TO DRIVE NO. 1 AND 2 MILLS.]	1856/08/20		
C-113-2573	[LARGE CROSS SECTION OF FOUNDATION WALL OF MASS. COTTON HOUSE.] [MASSACHUSETTS COTTON MILLS. MASS. COTTON HOUSE.]	1882/06/08		PAPER
C-113-2575	[FULL SIZE PLAN OF MASS. 10' TURBINE.] [MASSACHUSETTS COTTON MILLS. PLAN OF MASSACHUSETTS TEN FOOT TURBINE.]	1856/10/23	FULL SIZE	
C-113-2576 OVERSIZE	[LARGE SIZE SECTION OF MASS. 10' TURBINE.] [MASSACHUSETTS COMPANY. SECTION OF MASS. TEN FOOT TURBINE.]	1856/10/06		
C-113-2577	[FULL SIZE PLAN OF LOWER PARTS OF TURBINE.] [MASSACHUSETTS COTTON MILLS. MASSACHUSETTS TEN FOOT TURBINE, GENERAL SECTION.]	1856/04/25	FULL SIZE	
C-113-2578	[DESIGN FOR IRON BREAST WHEEL FOR THE PRESCOTT MILLS.]	1844/00/00	1"=1'	
C-113-2594	[FOUNDATION WALLS OF PRESCOTT MILLS.] [PRESCOTT MILL. PLAN OF THE FOUNDATION WALLS OF THE PRESCOTT MILL.]	1844/05/10		

C-113-2595 OVERSIZE	[PLAN OF EXCAVATION DONE FOR PRESCOTT WALL.] [PRESCOTT MILLS. PLAN OF THE EXCAVATION DONE FOR THE PRESCOTT MILL'S RIVER WALL.]	1844/08/21		
C-113-2596	[SECTION OF PICKER FOR PRESCOTT MILLS.] [PRESCOTT MILL. SECTION OF THE PICKER FOR THE PRESCOTT MILL.]	1844/09/03		
C-113-2603	[SECTION OF THE RACEWAY ARCHES OF PRESCOTT.] [PRESCOTT MILL. SECTION OFTHE RACEWAY ARCH AT THE PRESCOTT MILL.]	1844/12/18		
C-113-2609	[PLAN & PROFILE OF MERRIMACK ST. NEAR CONCORD RIVER SHOWING PRESCOTT MILLS & LAND ON BELVIDERE SIDE.] [PRESCOTT MILL. PLAN AND PROFILE OF PART OF MERRIMACK STREET NEAR CONCORD RIVER, BY MEAD AND BUTTERFIELD.]	1847/03/01		
C-113-2611	[DESIGN OF PARTS CONNECTED WITH TURBINE WHEEL OF PRESCOTT MILL.] [PRESCOTT MILL. DESIGN OF PARTS CONNECTED WITH TURBINE WHEEL FOR THE PRESCOTT MILL, J. GRAVES DESIGNER.]	1847/03/15		
C-113-2639 OVERSIZE	[FORM OF BUCKETS & GUIDES OF 90" TURBINE OF PRESCOTT MILLS.] [PRESCOTT MILLS. FORM OF THE BUCKETS AND GUIDES FOR THE 90 INCH TURBINES FOR THE PRESCOTT MILL.]	1869/09/29	FULL SIZE	DRAFTING CLOTH

C-113-2640 OVERSIZE	[FULL SIZE SECTION OF LOWER PART OF 90" TURBINE FOR PRESCOTT MILLS.][PRESCOTT MILL. NINETY INCH TURBINE FOR THE PRESCOTT SPINNING MILL.]	1860/10/02	FULL SIZE	DRAFTING CLOTH
C-113-2641	[PLAN & ELEVATION OF THE FLUME PASSAGES THROUGH THE FRONT WALL OF THE PRESCOTT MILL.] [PRESCOTT MILL. PLAN OF THE FLUME PASSAGE THROUGH THE FRONT WALL OF THE PRESCOTT MILL.]	1844/04/00		
C-113-2642	[PLAN & ELEVATION OF FOUNDATION WALLS OF THE PRESCOTT MILL.] [PRESCOTT MILL. PLAN OF THE FOUNDATION WALLS OF THE PRESCOTT MILL.]	1844/05/10		
C-113-3417-04	[PRESCOTT MILL. SKETCH OF TWO WHEELS, ADAPTED FOR A 17 FOOT FALL.]	1844/04/26		
C-113-3417-05	[PRESCOTT MILL. DESIGN OF WATER WHEEL FOR THE PRESCOTT MILL.]	1844/04/00		
C-113-3417-06	[PRESCOTT MILL. DESIGN FOR AN IRON WATER WHEEL FOR THE PRESCOTT MILL-SIDE VIEW FOF MIDDLE RIM.]	1844/06/19		
C-113-3417-08	[PRESCOTT MILL. DESIGN FOR AN IRON WATER WHEEL FOR THE PRESCOTT MILL.	1844/06/19		
C-113-3417-10	[PRESCOTT MILL. DESIGN FOR AN IRON WATER WHEEL FOR THE PRESCOTT MILL.]	1844/11/06		

C-114-001	PLAN OF PROPOSED [NORTHERN] CANAL / FROM / PAWTUCKET DAM TO THE WESTERN CANAL. [BY J. F. BALDWIN SHOWING PROPOSED LOWER LEVELS].	1839/10/00	1"=100'	H 59.9, W 95 CM	INK, WATER COLOR	PAPER
C-114-002	PLAN OF NORTHERN CANAL.	1846/08/10	1"=100'	H 71.1, W 132 CM	GRAPHITE, COLORED PENCIL	PAPER
C-114-003	SKETCH / OF THE PROPOSED CANAL / FROM PAWTUCKET DAM / TO WESTERN CANAL [WITH PROFILE OF CENTER LINE].	1846/01/00	1"=100'	H 71.1, W 129 CM	INK, WATER COLOR	PAPER
C-114-004	[UNTITLED.] [SOUTH WESTERLY ELEVATION OF GATE HOUSE.]	1847/03/00	1/2"=1'	H 67.4, W 169.2 CM	INK, WATER COLOR	PAPER
C-114-005	[UNTITLED.] [NORTH EASTERLY ELEVATION OF GATE HOUSE.]	1847/03/00	NONE	H 67.3, W 168.2 CM	INK, WATER COLOR	PAPER
C-114-005-01	VIEW OF SOUTHERLY [WESTERLY] SIDE OF GUARD LOCKS.	UNDATED	1"=8'	H 49.3, W 70 CM	INK, WATER COLOR	PAPER
C-114-005-02	[PLAN & ELEVATION OF] GUARD GATES [& LOCKS] / NORTHERN CANAL.	1847/05/00	1/8"=1'	H 78.1, W 134.2 CM	INK, WATER COLOR	PAPER
C-114-006	[UNTITLED.] [ELEVATION & SECTION OF SOUTH END OF GATE HOUSE.]	1847/03/00	NONE	H 59.7, W 95 CM	INK, WATER COLOR	PAPER
C-114-007	[UNTITLED.] [PLAN OF GATE HOUSE PIERS].	UNDATED	NONE	H 43.6, W 137.5 CM	INK	PAPER
C-114-008	[PLAN & ELEVATION OF] UNDERPINNINGS FOR / GUARD GATE HOUSE AT THE / NORTHERN CANAL.	1847/09/13	1/4"=1'	H 43.8, W 126.6 CM	INK	PAPER
C-114-009	PLAN [& ELEVATION] OF UNDERPINNING / FOR / GUARD GATE HOUSE / NORTHERN CANAL.	1847/03/00	1/4"=1'	H 43.6, W 137.5 CM	INK	PAPER
C-114-010	[PLAN OF] CAPPING / FOR PROTECTION WALL / OVER THE GUARD GATES / NORTHERN CANAL.	1847/03/18	1/2"=1'	H 34.3, W 86 CM	INK, GRAPHITE	PAPER

C-114-011	[HORIZONTAL & VERTICAL SECTIONS OF] NEW GUARD LOCKS. / NORTHERN CANAL.	1847/01/04-05	1/2"=1'	H 55.3, W 76.3 CM	INK, WATER COLOR	PAPER
C-114-012	[HORIZONTAL & VERTICAL SECTIONS OF] NEW GUARD LOCKS. / NORTHERN CANAL.	1847/02/15	1/2"=1'	H 63, W 138.5 CM	INK, WATER COLOR	PAPER
C-114-013	PATTERNS FOR / HAMMERING GROOVES. / NEW GUARD LOCKS. / NORTHERN CANAL.	1847/01/04	1"=4"	H 19.7, W 32.8 CM	INK, GRAPHITE	PAPER
C-114-014	PLAN OF COURSES / OF / HEADS / OF / PIERS AND ABUTMENTS / OF THE GUARD LOCKS OF THE / NORTHERN CANAL.	1847/01/05	1/2"=1'	H 29.6, W 46.7 CM	INK, COLORED INK, GRAPHITE	PAPER
C-114-015	PLAN OF COURSES / FOR HEADS OF / ABUTMENTS AND PIERS / OF THE GUARD LOCKS / OF THE / NORTHERN CANAL.	1847/01/00	1/2"=1'	H 29.9, W 46.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-114-016	PLAN OF COURSES / FOR ABUTMENTS & PIERS OF THE / GUARD LOCKS / OF THE / NORTHERN CANAL.	1846/08/31	1/2"=1'	H 29.9, W 46 CM	INK, COLORED INK	PAPER
C-114-017	PLAN OF STONE[WORK] FOR / WHEEL PIT / [AT GATE HOUSE] NORTHERN CANAL.	1847/06/11	1/4"=1'	H 67.5, W 50.75 CM	INK, WATERCOLOR	PAPER
C-114-018	PLAN OF SECTIONS / OF PART OF PIER, / PATUCKET BRIDGE / GUARD GATES [AT GATE HOUSE]. NORTHERN CANAL.	1847/06/07	1/4"=1'	H 56.4, W 77.8 CM	INK, WATER COLOR	PAPER
C-114-019	[UNTITLED.] [PLAN & SECTION OF WHEEL PIT AT GATE HOUSE].	UNDATED	NONE	H 101.1, W 76.2 CM	INK, WATER COLOR	PAPER
C-114-020	PLAN & SECTIONS / OF PART OF PIER / [AT GATE HOUSE] PAWTUCKET BRIDGE / GUARD GATES / NORTHERN CANAL.	1847/06/03	1/4"=1'	H 35,4, W 50.1 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER

C-114-021	[UNTITLED.] [HORIZONTAL SECTION THRU WHEEL PIT AT GATE HOUSE].	UNDATED	NONE	H 61, W 59.7 CM	INK, WATER COLOR	PAPER
C-114-022	PLAN OF GATE HOUSE & CHAMBERS. / GUARD GATES / NORTHERN CANAL.	1847/08/13	1/4"=1"	H 63.7, W 92.3 CM	INK, WATER COLOR	PAPER
C-114-023	PLAN OF ABUTMENT & TWO PIERS OF / PAWTUCKET BRIDGE / WITH PLAN FOR / TEMPORARY BRIDGE.	1846/10/00	1/8"=1'	H 65.3, W 98.5 CM	INK, WATER COLOR	PAPER
C-114-024	[PLAN OF] STONE FOR ADDITION TO ABUTMENT OF / PAWTUCKET BRIDGE.	1871/06/13	1/2"=1'	H 60.2, W 72.1 CM	GRAPHITE	PAPER
C-114-025	[PLAN OF] STONE FOR ADDITION TO ABUTMENT OF PAWTUCKET BRIDGE.	1871/06/20	1/2"=1'	H 61.5, W 59.8 CM	INK, GRAPHITE	PAPER
C-114-026	[UNTITLED.] [ONE OF COURSES OF ABUTMENTS TO PAWTUCKET BRIDGE NEAR GATE HOUSE.]	SEE NOTES	NONE	H 53.7, W 71.7 CM	INK, GRAPHITE	PAPER
C-114-027	[UNTITLED. SEE NOTES.]	1871/07/19	NONE	H 37.7, W 61.3 CM	GRAPHITE, WATER COLOR	PAPER
C-114-028	PLAN & ELEVATION OF BRIDGE / TO OUTSIDE FIRST PIER.	1846/07/10	1/8"=1'	H 55.4, W 58.4 CM	INK, WATER COLOR	PAPER
C-114-029	PLAN OF FOUR COURSES / FOR THE ADDITION TO SOUTH EASTERLY / ABUTMENT OF PAWTUCKET BRIDGE.	1871/06/17	1/2"=1'	H 60.1, W 97.9 CM	INK, GRAPHITE	PAPER
C-114-030	[ABANDONED] PLAN OF COURSES / FOR ABUTMENTS AND PIERS OF / GUARD LOCKS OF / THE NORTHERN CANAL.	1846/09/00	1/2"=1'	H 29.9, W 46 CM	INK, GRAPHITE	PAPER
C-114-031	[PLAN OF] SKEW-BACKS OF WHEEL PIT. NORTHERN CANAL. PAVING OF WHEEL PIT / NORTHERN CANAL.	1847/06/04	1/2"=1'	H 25.3, W 35.2 CM	INK, GRAPHITE	PAPER
C-114-032	PLAN OF CAPPING / FOR / WALLS OF BOAT LOCK, / NORTHERN CANAL.	1847/06/08	1/4"=1'	H 44.2, W 58.6 CM	INK	PAPER

C-114-033	[UNTITLED.] [PLAN OF BOAT LOCK SHOWING HEIGHT OF WALLS.]	UNDATED	NONE	H 31.7, W 52 CM	INK, GRAPHITE	PAPER
C-114-034	ELEVATION OF NORTH PIER OF LOCK.	UNDATED	1"=4'	H 27.9, W 64 CM	INK, GRAPHITE	PAPER
C-114-035	PLAN OF TWO COURSES OF / HOLLOW QUOIN HEADERS.	UNDATED	1"=2'	H 29.2, W 43.6 CM	INK, GRAPHITE	PAPER
C-114-036	ELEVATION OF HOLLOW QUOINS / & CORRESPONDING COURSES OF STONE / LOWER END, EASTERLY SIDE / OF THE BOAT LOCK.	1847/03/00	NONE	H 29.2, W 43.5 CM	INK, GRAPHITE	PAPER
C-114-037	MITRE SILLS, HOLLOW QUOINS &C / FOR THE / [CORRESPONDING COURSES OF STONE AT] LOWER ENDS OF BOAT LOCK / AT THE GUARD GATES / NORTHERN CANAL.	1847/03/20	NONE	H 30.1, W 45 CM	INK, GRAPHITE	PAPER
C-114-038	MITRE SILLS / FOR THE BOAT LOCK AT THE / GUARD GATES. / NORTHERN CANAL.	1847/03/00	NONE	H 30.8, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
C-114-039	TWO SETS OF ARCH STONES / FOR VAULT OVER BOAT LOCK / NORTHERN CANAL.	1847/08/19	1/2"=1'	H 28, W 38 CM	INK	PAPER
C-114-040	MITRE SILLS / FOR THE BOAT LOCK AT THE / GUARD GATES / NORTHERN CANAL.	1847/03/00	NONE	H 29.8, W 44.5 CM	INK, GRAPHITE, COLORED INK	PAPER
C-114-041	ELEVATION OF PIER.	1847/09/10	1/4"=1'	H 29.2, W 45.7 CM	INK, GRAPHITE	PAPER
C-114-042-[A]	HOLLOW QUOINS / FOR THE HEEL POSTS OF / THE BOAT LOCK AT PATUCKET BRIDGE / NORTHERN CANAL.	1847/01/16	1/2 SIZE	H 75.8, W 101.1 CM	INK, COLORED INK	PAPER
C-114-042-[B]	SKETCH FOR WHEEL / AT / GUARD LOCKS.	1847/02/00	1"=1'	H 101.1, W 75.8 CM	INK	PAPER

C-114-043	HOLLOW QUOINS / FOR HEEL POSTS OF THE / BOAT LOCK AT PAWTUCKET BRIDGE / NORTHERN CANAL.	1847/03/25	1/4 SIZE	H 88.2, W 58.8 CM	INK, COLORED INK	PAPER
C-114-044	PLAN FOR / GUARD GATES [SHOWING STONEWORK].	1846/04/28	1/2"=1'	H 55.4, W 76.9 CM	IN	PAPER
C-114-045-[A]	PLAN OF STONE / FOR / GUARD GATES.	1846/05/05	1/2"=1'	H 55, W 76.1 CM	INK	PAPER
C-114-045-[B]	[UNTITLED PLAN.] [PLAN OF STONE / FOR / GUARD GATES.]	1846/05/05	1/2"=1'	H 55, W 76.1 CM	INK	PAPER
C-114-046	[UNTITLED PLAN.] [PLAN OF STONE / FOR / GUARD GATES.]	1846/05/00	NONE	H 39.4, W 51.7 CM	INK, GRAPHITE	PAPER
C-114-047	[UNTITLED PLAN.] [PLAN OF STONE / FOR / GUARD GATES.]	UNDATED	NONE	H 52, W 31.4 CM	INK, GRAPHITE	PAPER
C-114-048	BOAT LOCK / AT / GUARD LOCKS / NORTHERN CANAL.	1847/02/00	1/4"=1'	H 70, W 133 CM	INK, WATER COLOR	PAPER
C-114-049	PLAN, WITH ELEVATION & SECTIONS / OF / BOAT LOCK / AT THE / GUARD GATES / OF / NORTHERN CANAL.	1847/05/01	1/4"=1'	H 70, W 132.4 CM	INK, WATER COLOR	PLAN, SECTION PLAN
C-114-050	PLAN OF PIERS OF THE GUARD LOCKS.	UNDATED	1"=8'	H 49.2, W 69.9 CM	WATERCOLOR, INK	PAPER
C-114-051	PLAN OF CANAL / FROM PAWTUCKET BRIDGE [TO COMMENCEMENT OF SECTION 1].	1846/09/16	1/8"=1'	H 76, W 69 CM	INK, WATER COLOR	PAPER
C-114-052	PLAN WITH / SECTIONS OF WALLS / NEAR STAKE 1, SECT. 2.	UNDATED	1/2"=1'	H 55.4, W 76.9 CM	INK	PAPER
C-114-053	PLAN OF CANAL / FROM PAWTUCKET BRIDGE TO / COMMENCEMENT OF SECTION 1.	1846/09/16	1/8"=1'	H 67, W 78 CM	INK	PAPER

C-114-054-[A]	[GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.] HEAD GATES, NORTHERN CANAL.	1913/07/00	1"=2'	H 61.6, W 69.7 CM	GRAPHITE, INK	PAPER
C-114-054-[A]-[COPY 1]	[GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.] HEAD GATES, NORTHERN CANAL.	UNDATED	1"=2'	H 47.2, W 49.3 CM	INK, GRAPHITE	DRAFTING CLOTH
C-114-054-[A]-[COPY 2]	[GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.] HEAD GATES, NORTHERN CANAL.	UNDATED	1"=2'	H 46.9, W 49.1 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-114-054-[A]-[COPY 3]	[GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.] HEAD GATES, NORTHERN CANAL.	UNDATED	1"=2'	H 48.3, W 49.5 CM	BLUEPRINT, GRAPHITE	PAPER
C-114-054-[B]	[GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.] HEAD GATES, NORTHERN CANAL.	1913/07/00	1"=4'	H 62, W 78.3 CM	GRAPHITE, INK	PAPER
C-114-054-[C]	[GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.] QUARTER TURN TWIST DRIVE / FROM PULLEY ON WHEEL SHAFT / TO PULLEY ON MAIN SHAFT.	UNDATED	NONE	H 63, W 93.5 CM	GRAPHITE	PAPER
C-114-054-[D]	[UNTITLED PLAN.] [GATE HOUSE SHOWING ARRANGEMENT OF PULLEYS AND METHOD OF TRANSMISSION OF POWER.]	SEE NOTES	1/4"=1'	H 79, W 91 CM	INK, GRAPHITE	PAPER

C-114-055	[UNTITLED.] [ARCHES BACK OF GATE HOUSE- ELEVATION OF.]	UNDATED	NONE	H 79.3, W 135 CM	INK, GRAPHITE	PAPER
C-114-056	PLAN OF / LAND & BUILDINGS / AT / HEAD OF NORTHERN CANAL / BELONGING TO / PROPS. OF LOCKS & CANAL.	1890/06/27	1"=10'	H 81.8, W 148.6 CM	INK, WATER COLOR	PAPER
C-114-057	[PLAN OF] CAST IRON GAUGES / FOR NORTHERN CANAL.	1847/08/03	1/8"=1"	H 67.2, W 24.7 CM	INK, GRAPHITE	PAPER
C-114-058	PLAN OF A [DWELLING] HOUSE [AT HEAD OF CANAL] FOR THE / LOCKS AND CANAL CO. / LOWELL.	1847/09/06	1/4"=1'	H 45.4, W 60.8 CM	INK, GRAPHITE	PAPER
C-114-059	OUTLINES OF A DESIGN / FOR DWELLING HOUSE NEAR GUARD GATES / NORTHERN CANAL.	1847/10/19	1/4"=1'	H 66.6, W 50.7 CM	INK, GRAPHITE	PAPER
C-114-060	[PLAN OF] SECTION 1 [OF NORTHERN CANAL].	1846/00/00	SEE NOTES	H 28, W 74.9 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-114-061	PLAN OF SECTION 1 OF [NORTHERN] CANAL.	1846/00/00	1"=20'	H 72.5, W 135 CM	INK, GRAPHITE, WATERCOLOR	PAPER
C-114-062	PLAN & ELEVATION OF EXTENSION OF GATE HOUSE / FOR / LOCKS & CANALS CO. LOWELL, MASS.	1890/08/07	1/4"=1'	H 45.5, W 113.3 CM	BLUEPRINT, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER

C-115-062	PLAN OF GREAT RIVER WALL / AT COMMENCEMENT OF CURVE OF SECTION 3 / INCLUDING PLAN OF THE / FOUR SLUICE WAYS &c. / ALSO / AN ELAVATION / SHOWING MOUTHS OF SLUICES & THE WASTE WEIR.	1847/03/00	1/2"=1', 1/4"=1'	H 70, W 133 CM	INK, GRAPHITE, WATERCOLOR	PAPER
C-115-063	PLAN & ELEVATION / OF / GREAT RIVER WALL [AT COMMENCEMENT OF CURVE OF SECTION 3] SHOWING [THE 4] SLUICE / WAYS [MOUTHS OF SLUICES] & WASTE WIER.	1847/03/00	1/4"=1'	H 66.4, W 134.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-115-064	[UNTITLED.] [PLAN & ELEVATION OF GREAT WALL AT COMMENCEMENT OF CURVE OF SECTION 3, INCLUDING THE 4 SLUICE WAYS SHOWING MOUTHS OF SLUICES & WASTE WIER.]	UNDATED	NONE	H 78.1, W 199.9 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-065	PLAN OF GREAT WALL AT SLUICE WAYS & SCOURING HOLES.	UNDATED	1/4"=1'	H 49, W 69.8 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
C-115-066	CAPPING OF THE WASTE WEIR / NORTHERN CANAL.	1847/09/11	1"=1'	H 39.8, W 49.2 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-067	INSIDE ELEVATION OF GREAT WALL AT SLUICEWAY & SCOURING HOLES.	UNDATED	1/4"=1'	H 48.9, W 69.8 CM	INK, WATER COLOR	PAPER
C-115-068-[A]	PLAN OF STONE WORK FOR THE FOUR SLUICES OF GREAT WALL.	1847/04/00	1/2"=1'	H 35, W 86.4 CM	INK, WATER COLOR	PAPER

C-115-068-[B]	[UNTITLED.] [PLAN OF STONE WORK FOR THE FOUR SLUICES OF THE GREAT RIVER WALL.]	1847/04/00	NONE	H 35, W 86.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-068-[C]	[UNTITLED.] [PLAN OF STONE WORK FOR THE FOUR SLUICES OF THE GREAT RIVER WALL.]	1847/04/00	NONE	H 35, W 86.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-068-[D]	[UNTITLED.] [PLAN OF STONE WORK FOR THE FOUR SLUICES OF THE GREAT RIVER WALL.]	1847/04/00	NONE	H 35, W 86.4 CM	INK, WATER COLOR	PAPER
C-115-068-[E]	[UNTITLED.] [PLAN OF STONE WORK FOR THE FOUR SLUICES OF THE GREAT RIVER WALL.]	1847/04/00	NONE	H 35, W 86.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-069	CAPPING OF THE GREAT WALL NEAR THE SLUICE WAYS / NORTHERN CANAL.	1847/09/11	1"=1'	H 34.2, W 98.5 CM	INK	PAPER
C-115-070	ABUTMENT OF THE BRIDGE OVER THE WASTE WEIR / NORTHERN CANAL.	1847/09/30	1/2"=1'	H 30.5, W 47 CM	INK	PAPER
C-115-071	[UNTITLED PLAN.] [SILLS FOR SLUICES.]	1842/04/12	NONE	H 29, W 45.7 CM	INK, WATER COLOR	PAPER
C-115-072	CAPPING STONES FOR THE WASTE WEIR. / NORTHERN CANAL.	1847/09/01	1"=1'	H 20.3, W 36.1 CM	INK	PAPER
C-115-073	[UNTITLED PLAN.] [COURSES OF THE SLUICEWAYS IN RIVER WALL.]	1847/00/00	1/2"=1'	H 103, W 78.3 CM	INK	PAPER
C-115-074-A	PARTIAL PLAN OF THE WASTEWAY ON THE / GREAT WALL OF NORTHERN CANAL INTENDING / TO SHOW PRINCIPALLY THE TRUSSES OF THE FOOT BRIDGE / OVER THE WASTEWAY (WHICH ARE TO BE RENEWED).	1895/08/00	1"=2'	H 38.7, W 131.5 CM	INK, WATER COLOR	PAPER

C-115-074-B	[PLAN OF] ONE OF THE / WASTE GATES / NORTHERN CANAL.	1847/05/19	1/8"=1"	H 133, W 72 CM	INK, WATERCOLOR	PAPER
C-115-074-C	[PLAN OF] NUTS FOR WASTE GATES / NORTHERN CANAL.	1848/08/07	FULL SIZE	H 49, W 34.6 CM	INK	PAPER
C-115-075-[A]	HOISTING WHEEL / FOR GUARD GATES / NORTHERN CANAL.	1848/09/01	1/4 SIZE	H 49, W 70 CM	INK	PAPER
C-115-075-[B]	HOISTING WHEEL / AT THE GUARD LOCKS / NORTHERN CANAL.	1848/12/30	1/4 FULL SIZE	H 76.4, W 133.5 CM	INK	PAPER
C-115-076	HOISTING WHEEL / OF THE GUARD LOCKS. / NORTHERN CANAL [(FLOATS & GUIDES)].	1849/01/00	NONE	H 78.5, W 134.6 CM	INK, COLORED INK	PAPER
C-115-077	PLAN OF GATE KEEPER'S HOUSE & LOT / LOCKS & CANALS GATE HOUSE / AT HEAD OF NORTHERN CANAL.	1916/08/15	1"=20'	H 53.4, W 69.8 CM	INK, COLORED INK	DRAFTING CLOTH
C-115-077-[COPY 1]	[UNTITLED PLAN.] [PLAN OF GATE KEEPERS HOUSE & LOT LOCKS & CANALS GATE HOUSE AT HEAD OF NORTHERN CANAL.]	1916/08/15	1"=20'	H 48, W 61.8 CM	GRAPHITE	TRACING PAPER
C-115-079	PLAN / SCALE DRAWING OF WASTE GATES / SCALE DRAWINGS OF WASTE GATES / ON NORTHERN CANAL.	1897/08/31	1/2"=1'	H 96.1, W 110.6 CM	GRAPHITE	PAPER
C-115-080	SKETCH OF PROPOSED WIDENING OF THE APPROACH TO / PAWTUCKET BRIDGE [SHOWING ARCHES IN REAR OF GATE HOUSE].	1871/05/05	1"=10'	H 35.7, W 59 CM	INK, GRAPHITE	PAPER
C-115-081	[UNTITLED PLAN.] [PROFILE ALONG THE NORTH & SOUTH SIDES OF THE CANAL.]	UNDATED	NONE	H 29.5, W 75.6 CM	INK, WATER COLOR	PAPER
C-115-082	PROFILE OF / GREAT RIVER WALL.	1846/09/23	H1"=20', V1"=5'	H 26.5, W 58.8 CM	INK, GRAPHITE	PAPER

C-115-083	[UNTITLED PLAN.] [SECTIONS OF SCHOOL ST. SHOWING GATE & KEEPERS' HOUSE.]	UNDATED	1"=10'	H 32.7, W 132.3 CM	INK, WATER COLOR	PAPER
C-115-084-[A]	PLAN OF / WASTEWAY [& WASTE GATES IN GREAT WALL] IN NORTHERN CANAL WALL / SHOWING CHANGES & ADDITIONS MADE IN 1897-1900.	1901/02/00	1"=2', 1"=1'	H 68.5, W 153 CM	WATER COLOR, INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-115-084-[B]	PLAN OF / WASTEWAY [& WASTE GATES IN GREAT WALL] IN NORTHERN CANAL WALL / SHOWING CHANGES & ADDITIONS MADE IN 1897-1900.	1901/02/00	1"=2', 1"=1'	H 68.8, W 119.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	TRACING PAPER
C-115-085	SECTION OF BASIN [SOUTH OF BRIDGE, & THROUGH CENTER OF BOAT LOCKS] ON CONTINUATION OF CENTRE LINE OF CANAL.	UNDATED	1"=20'	H 49.5, W 69.9 CM	INK, WATER COLOR	PAPER
C-115-085-01	LONGITUDINAL SECTION THROUGH CENTRE OF BOAT LOCK / SHOWING THE PARTS BEYOND.	UNDATED	1"=8'	H 49.5, W 69.9 CM	INK, WATER COLOR	PAPER
C-115-085-02	SECTION OF BASIN 250 FT. SOUTH OF BRIDGE.	UNDATED	1"=10'	H 49.5, W 69.9 CM	INK	PAPER
C-115-085-03	SECTION OF BASIN 200 FT. SOUTH OF BRIDGE. / [ALSO] SECTION OF BASIN 150 FT. SOUTH OF BRIDGE.	UNDATED	1"=10'	H 48.9, W 70 CM	INK	PAPER
C-115-085-04	SECTION OF BASIN 100 FT. SOUTH OF BRIDGE. / [ALSO] SECTION OF BASIN 50 FT. SOUTH OF BRIDGE.	UNDATED	1"=10'	H 48.9, W 70 CM	INK, WATER COLOR	PAPER
C-115-086	SECTION NO.1 / NORTHERN CANAL [SHOWING SECTIONS OF SLUICEWAYS & GATES.]	1876/05/20	1/8"=1'	H 57, W 78.7 CM	INK	PAPER

C-115-086-01	CROSS SECTION [NO. 1 OF NORTHERN CANAL, SHOWING SECTIONS] ON LINE OF CANAL [& WALLS AT DIFFERENT POINTS OF CANAL & AT GATE HOUSE] / PROPOSED TO BE BUILT BY THE PROPS. OF LOCKS & CANALS.	1846/05/20	1/8"=1'	H 55.8, W 77.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-086-02	CROSS SECTION / OF THE NORTHERN CANAL / AT CENTRE OF CURVE IN / SECTION NO.1 / [ALSO] CROSS SECTION / OF THE NORTHERN CANAL / AT CENTRE OF CURVE IN / SECTION NO.2.	1846/08/00	1"=10'	H 55, W 76.2 CM	INK, WATER COLOR	PAPER
C-115-086-03	GREAT RIVER WALL OF THE / NORTHERN CANAL.	1846/11/17	1/4"=1'	H 77.5, W 57.1 CM	INK, WATER COLOR	PAPER
C-115-086-04	GREAT RIVER WALL OF THE / NORTHERN CANAL.	1846/09/16	1/4"=1'	H 77.5, W 57 CM	INK, WATER COLOR	PAPER
C-115-086-05	VIEW OF SOUTH EASTERLY PART OF PAWTUCKET BRIDGE / PREVIOUS TO CONSTRUCTION OF THE NORTHERN CANAL. ALSO A VIEW OF THE NORTHERLY / SIDE OF GUARD LOCKS.	SEE NOTES	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-086-06	THE ABOVE SECTIONS REFER TO AN ACCOMPANYING SECTION / THROUGH CENTRE OF SKEW BACKS.	SEE NOTES	1/4"=1'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-086-07	HORIZONTAL SECTION THROUGH CENTRE OF SKEW BACKS SHOWING PARTS BELOW.	SEE NOTES	1/4"=1'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-086-08	TRANSVERSE SECTION OF GREAT RIVER WALL THROUGH CENTRE OF SLUICE WAY.	SEE NOTES	1/2"=1'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-086-09	LONGITUDINAL SECTION OF GREAT RIVER WALL AT FIRST SLUICE WAY.	SEE NOTES	1/2"=1'	H 49, W 70 CM	INK, WATER COLOR	PAPER

C-115-086-10	SECTION THROUGH CENTRE OF SLUICE WAY / IN THE GREAT RIVER WALL / NORTHERN CANAL / [ALSO] SECTION AT RIGHT ANGLES TO / THE ADJOINING SECTION THROUGH CENTRE / SHOWING SIZE OF SLUICE.	1847/03/12	1/4"=1'	H 37.5, W 59.7 CM	INK, WATER COLOR	PAPER
C-115-086-11	SECTION OF GREAT RIVER WALL.	1846/09/10	1/2"=1'	H 58.7, W 45.7 CM	INK	PAPER
C-115-086-12	[UNTITLED PLAN. SEE NOTES.]	1896/04/11	NONE	H 48, W 61.2 CM	GRAPHITE	PAPER
C-115-087	SECTION OF GREAT RIVER WALL / 782 FT. FROM N. SIDE OF PAWTUCKET BRIDGE. / [ALSO] SECTION OF GREAT WALL / 1477 FT. FROM N. SIDE OF PAWTUCKET BRIDGE. / [ALSO] SECTION OF GREAT RIVER WALL / 1326 FT. FROM N. SIDE OF PAWTUCKET BRIDGE.	UNDATED	1/4"=1'	H 49.3, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-01	SECTION OF PAWTUCKET WALL / AT BRIDGE / 43 FT. N. OF BRIDGE / 80 FT. NORTH OF BRIDGE.	UNDATED	1"=10'	H 49.3, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-02	SECTION OF CANAL / 80 FT. NORTH OF BRIDGE.	UNDATED	1"=10'	H 49.3, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-03	SECTION OF CANAL 180 FT. N. / OF BRIDGE / [ALSO] SECTION OF CANAL 117.34-FT. / NORTH OF BRIDGE.	UNDATED	1"=10'	H 49.3, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-04	SECTION OF CANAL 224.68 FT. N. OF BRIDGE. / [ALSO] SECTION OF CANAL 272 FT. N. OF BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-05	SECTION OF CANAL 319 FT. N. OF BRIDGE. / [ALSO] SECTION OF CANAL 366.70 FT. / NORTH OF BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-06	SECTION OF CANAL 414 FT. N. / OF BRIDGE. / [ALSO] SECTION OF CANAL 461.38 FT. / NORTH OF BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER

C-115-087-07	SECTION OF CANAL 508.72 FT. / NORTH OF BRIDGE. / [ALSO] SECTION OF CANAL 556 FT. / NORTH OF BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-115-087-08	SECTION OF CANAL 603.40 FT. / NORTH OF BRIDGE. / SECTION OF CANAL 650.74 FT. / NORTH OF BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-09	SECTION OF CANAL 698 FT. / NORTH OF BRIDGE. / [ALSO] SECTION OF CANAL 748 FT. / NORTH OF BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-10	SECTION OF CANAL 798 FT. NORTHERLY / FROM BRIDGE. / [ALSO] SECTION OF CANAL 848 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-11	SECTION OF CANAL 898 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 948 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-12	SECTION OF CANAL 998 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1843 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-13	SECTION OF CANAL 1091.58 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1140 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-14	SECTION OF CANAL 1188.58 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1237 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-15	SECTION OF CANAL 1285.58 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1334 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-16	SECTION OF CANAL 1382.58 FT FROM BRIDGE. / [ALSO] SECTION OF CANAL 1431 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER

C-115-087-17	SECTION OF CANAL 1481 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1531 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-18	SECTION OF CANAL 1581 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1531 FT FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-19	SECTION OF CANAL 1681 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1716 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-20	SECTION OF CANAL 1766 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1816 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-21	SECTION OF CANAL 1866 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 1916 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-22	SECTION OF CANAL 1986 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 2066 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-087-23	SECTION OF CANAL 2086 FT. FROM BRIDGE. / [ALSO] SECTION OF CANAL 2136 FT. FROM BRIDGE.	UNDATED	1"=10'	H 49, W 70 CM	INK, WATER COLOR	PAPER
C-115-088	ELEVATION / OF / GREAT RIVER WALL [(FULL LENGTH)].	1847/03/07	NONE	H 26.7, W 100.3 CM	INK, WATER COLOR, COLORED INK	PAPER
C-115-089	CEMENT FILLING / SECTION NO. 2, NORTHERN CANAL / EXTENDING FROM A POINT / 130 FT. NORTH OF PAWTUCKET BRIDGE TO / THE GREAT WALL.	1846/10/00	1/4"=1'	H 74, W 131 CM	INK, WATER COLOR	PAPER
C-115-090	PROBABLE PROFILE OF / GREAT WALL.	UNDATED	NONE	H 68, W 127.6 CM	INK, WATER COLOR	PAPER
C-115-091	CROSS SECTION / ON LINE OF / [OUTLINE OF] NEW CANAL.	1846/05/14	1/8"=1'	H 88.2, W 71.1 CM	INK	PAPER

C-115-092	PROFILE OF FOUNDATION / OF FRONT OF / GREAT RIVER WALL / EXTENDING 358 FEET FROM COMMENCEMENT / OF SECT. NO. 2, NORTHERN CANAL.	1846/08/18	1/4"=1'	H 39, W 131.5 CM	INK, COLORED INK, WATER COLOR	PAPER
C-115-093	SECTION 1ST. / PROFILE OF PROPOSED CANAL, / COMMENCING 130 FEET NORTH OF / PAWTUCKET BRIDGE / AND EXTENDING 618 FEET.	1846/05/23	V1"=5', H1"=50'	H 38.7, W 131.5 CM	INK, WATER COLOR	PAPER
C-115-094	PLAN OF WESTERLY END / OF / NORTHERN CANAL-GREAT WALL / & EASTERLY END OF CUTOFF WALL / WITH SECTIONS.	1936/08/00	1"=10'	H 59.7, W 42.2 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-115-095	[PROFILE ALONG] NORTHERN CANAL [WALL AND RIDGE FROM SCHOOL ST, BRIDGE TO UPPER END OF GREAT WALL.]	1928/12/18	H1"=2', V1"=2'	H 29.3, W 45.8 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-115-096	PLAN & SECTIONS / OF / NORTHERN CANAL WALL / SHOWING / SHIFTING / OF / MASONRY CAUSED BY FLOOD OF MARCH 20, 1936.	1936/08/14	1"=10', 1"=2'	H 61.3, W 107.6 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-115-097	PROGRESS OF REPAIRS / FROM JUNE 28, 1936, TO / ON / [SIC] BREAK IN NORTHERN CANAL WALL / 1320 FEET BELOW SCHOOL ST. BRIDGE / CAUSED BY FLOOD OF MARCH 20, 1936.	SEE NOTES	1"=10'& 20'	H 36.8, W 93.8 CM	INK, GRAPHITE	DRAFTING CLOTH

C-115-098	APPROXIMATE CONDITION / AS DETERMINED BY SOUNDINGS / SHOWING / BREAK IN NORTHERN CANAL WALL / 1320 FEET BELOW SCHOOL ST. BRIDGE / CAUSED BY FLOOD OF MARCH 20, 1936.	1936/06/11	1"=20'& 10'	H 36.6, W 94.6 CM	INK, GRAPHITE	DRAFTING CLOTH
C-115-099	WASHOUT BY FLOOD / OF / STONE IN GREAT WALL / UNDER / WASTE GATE HOUSE.	1936/05/05	NONE	H 70.2, W 25.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-115-100	REBUILDING GRANITE WALL / DOWN-STREAM SIDE- NORTHERN CANAL WALL / EAST END OF MOODY STREET BRIDGE / LOWELL, MASS. / LOCKS & CANALS OWNERS.	1936/06/00	1"=2'	H 75.6, W 163.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-115-101	[UNTITLED PLAN.] [DEPTH OF HEADERS AND STRETCHES FOR NORTHERN CANAL WALL BELOW MOODY STREET.]	1936/06/00	3/8"=1'	H 40.7, W 79 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-115-102	PLAN & ELEVATION / OF / LONG CURVE IN NORTHERN CANAL WALL / SHOWING / GRADES ON FLAG STONES.	1936/07/20	1"=10'& 2'	H 56.3, W [?] CM	INK, GRAPHITE	TRACING PAPER
C-115-103	PLAN & PROFILE / OF / NORTHERN CANAL WALL / SHOWING / OVERFLOW DURING FLOOD / OF / MARCH 20, 1936.	1936/08/10	1"=40'& 3'	H 52.7, W 82.4 CM	INK, GRAPHITE	DRAFTING CLOTH
C-115-104	PROPOSED WALL ADDITIONS / TO / MERRIMACK RIVER & NORTHERN CANAL WALLS / BELOW / SCHOOL ST. BRIDGE.	1937/06/30	1"=10'& 1/4"=1'	H 62.2, W 75.2 CM	INK, COLORED INK	DRAFTING CLOTH

C-115-105	[PLAN AND SECTION OF] CONCRETE BULKHEAD / FOR UPPER LOCK AT / NORTHERN CANAL LOCK CHAMBER.	1939/07/18	1/4"=1'	H 44, W 62.5 CM	INK, COLORED INK	DRAFTING CLOTH
C-116-094	SECTION THIRD [(MOODY TO SUFFOLK ST.)] / [OF] NORTHERN CANAL [SHOWING TWO CROSS SECTIONS WITH CAST IRON PIPE PASSING UNDERNEATH CANAL; ALSO ELEVATION OF WALL SHOWING SPILING IN VICINITY OF SUFFOLK MFG. CO.].	1848/01/00	SEE NOTES	H 110.3, W 78.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-116-095-1	[SECTION OF CANAL AT FORD STREET SHOWING] CAST IRON SEWER [ALSO SECTION OF ONE LENGTH OF SEWER] UNDER NORTHERN CANAL AT FORD STREET.	1846/11/23	1"=8', 1/8"=1"	H 55, W 75.8 CM	INK, GRAPHITE, WATER COLOR	PAPER
C-116-098	NORTHERN CANAL [CROSS SECTION OF CANAL 500 & 738 3/4 FEET FROM FORD ST.].	UNDATED	1 1/4"=10'	H 77.2, W 55.9 CM	INK, GRAPHITE	PAPER
C-116-099	PROFILE OF A MAIN SEWER FROM CROSS ST. TO THE NORTHERN CANAL / WITH BRANCHES IN MOODY & DODGE STREETS.	1847/04/28	H1"=50', V1"=4'	H 48.5, W 97.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-116-100	[UNTITLED PLAN.] [FOUR SECTIONS OF CANAL AT DIFFERENT POINTS.]	1839/07/30	1 1/4"=10'	H 37.2, W 32.2 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-101	SECTION 3D / [FROM 3 SECTIONS OF CANAL & WALL] CROSS SECTIONS.	1846/05/23	1"=8'	H 68.5, W 52.3 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-116-102	SECTION 3D / PROFILE OF PROPOSED CANAL / FROM MERRIMACK RIVER TO THE / WESTERN CANAL [SHOWING LEDGE & EARTH LINES].	1846/05/22	H1"=50', V1"=5'	H 39, W 33 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-116-103	[UNTITLED PLAN. SEE NOTES.]	1848/01/04	H1"=16',V 1"=4'	H 66.6, W 110 CM	INK, COLORED INK, GRAPHITE	PAPER
C-116-106	PROFILE OF CENTRE LINE / OF PROPOSED CANAL.	1839/07/12	H1"=100', V1"=20'	H 29.3, W 74 CM	INK, GRAPHITE	PAPER
C-116-111	PLAN OF CASTING TO HOLD THE PIVOT OF THE S. W. LOWER GATE OF GUARD LOCKS.	1843/09/04	1"=1"	H 53.3, W 55.9 CM	INK, GRAPHITE , COLORED INK	PAPER
C-116-112	[UNTITLED PLAN.] [SECTION OF HOISTING APPARATUS OF ONE OF THE GATES.]	UNDATED	1"=1'	H 100.5, W 68.3 CM	INK, GRAPHITE	PAPER
C-116-113	SECTION OF GUARD GATES [ON] NORTHERN [CANAL].	1847/05/25	3/4"=1'	H 157, W 68.2 CM	INK, WATER COLOR	PAPER
C-116-114	[SECTION THRU CENTER OF] GUARD GATES [SHOWING PIER & BEYOND] / FOR NORTHERN CANAL.	1846/12/10	1/4"=1'	H 85.7, W 75.3 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-115	DESIGN FOR A / MAIN PULLEY / ON THE WATER WHEEL / AT THE GUARD LOCKS / NORTHERN CANAL.	1847/02/24	NONE	H 59.7, W 69.1 CM	INK, GRAPHITE , WATER COLOR	PAPER
C-116-116	[PLAN & SECTION OF] STEP FOR SHAFT / OF WATER WHEEL, AT GUARD LOCKS. / NORTHERN CANAL.	1847/02/18	1/4"=1"	H 76.2, W 32.6 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-117	CAST IRON BEAMS / FOR THE HOISTING WHEEL / GUARD GATES / NORTHERN CANAL.	1847/02/00	1/8"=1"	H 85.9, W 68.8 CM	INK WATER COLOR, GRAPHITE	PAPER

C-116-118	GATE FOR FLUME OF GUARD LOCKS AT NORTHERN CANAL.	1847/02/16	2"=1'	H 50.3, W 76 CM	INK, GRAPHITE	PAPER
C-116-119	SECTION THRU CENTRE OF FLUME / AT LEVEL 29.50.	UNDATED	1/4"=1'	H 48.9, W 69.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-120	PLAN [& SECTION] OF CAST IRON WEIR GROOVE / GUARD GATES [NORTHERN CANAL].	1847/03/09	1/8"=1"	H 35.3, W 50.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-121	RACK AT HEAD OF NEW GUARD LOCKS FLUME.	1847/03/18	1/8"=6"	H 63, W 67.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-121-01	RACK FOR WHEEL IN GATE HOUSE / GUARD GATES NORTHERN CANAL.	1891/04/25	1/8 SIZE	H 68.6, W 62 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-121-02	RACK AT HEAD OF / NEW GUARD LOCKS FLUME / NORTHERN CANAL.	1847/03/23	1/8"=1'	H 64.1, W 69.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-122	GEARING, SCREWS &C. / FOR HOISTING THE / GUARD GATES / OF THE / NORTHERN CANAL.	1847/04/00	1/8"=1"	H 78.2, W 90.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-116-123	[PLAN & SECTION OF] PADDLE GATE / FOR / HOISTING WHEEL, / AT THE / GUARD GATES. / NORTHERN CANAL.	1847/05/21	1/8"=1"	H 133.5, W 77.6 CM	INK, WATER COLOR	PAPER
C-116-124	GEARING / SCREWS ETC. / FOR HOISTING GATES / NORTHERN CANAL.	1847/05/00	1"=1'	H 72, W 68 CM	INK	PAPER
C-116-124-01	HEAD GATES AT PAWTUCKET DAM.	1883/09/01	1 1/2"=1'	H 61, W 91 CM	INK, COLORED INK, GRAPHITE	PAPER

C-116-125	[PLAN OF] HOISTING WHEEL / FOR GUARD GATES / NORTHERN CANAL.	1847/06/29	1/8"=1"	H 60.7, W 87 CM	INK, GRAPHITE, WATER COLOR	PAPER
C-116-126	[PLAN OF] HOISTING WHEEL [& DISC & SECTION OF SHAFT] FOR GUARD GATES / NORTHERN CANAL.	1847/06/29	1/8"=1"	H 61, W 86.7 M	INK, GRAPHITE, WATER COLOR	PAPER
C-116-127	SECTION / OF / HOISTING WHEEL / GUARD GATES, / NORTHERN CANAL.	1847/06/17	1/8"=1"	H 34, W 72.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-116-128	CASTINGS TO BE BUILT INTO THE WALLS FOR THE / HOISTING WHEEL, GUARD GATES, NORTHERN CANAL.	1847/06/04	1/4"=1"	H 100.5, W 71.5 CM	INK, GRAPHITE	PAPER
C-116-129	[SECTION OF] HOISTING WHEEL / OF THE GUARD LOCKS / NORTHERN CANAL.	1847/07/02	1/8"=1"	H 131, W 69.9 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-116-130	HOISTING WHEEL HANGING / NEW GUARD GATES / NORTHERN CANAL.	1847/07/02	1/4"=1"	H 60.4, W 88.4 CM	INK, GRAPHITE	PAPER
C-116-131	PLAN OF WROUGHT IRON FENCE / NEAR THE GUARD GATES / [AT] NORTHERN CANAL.	1847/10/19	1/8"=1"	H 32.8, W 38.1 CM	INK, GRAPHITE	PAPER
C-116-132	[PLAN OF] WROUGHT IRON FENCE / NEAR THE GUARD GATES / [AT] NORTHERN CANAL.	1847/10/19	1/8"=1"	H 33.2, W 44.2 CM	INK, GRAPHITE, WATER COLOR	PAPER
C-116-133	CAST IRON PLATE / UNDER STANDS FOR GUARD GATES / NORTHERN CANAL.	1847/10/14	1/4"=1"	H 66.3, W 24.1 CM	INK, GRAPHITE	PAPER

C-116-134	POSITION OF / SYPHON SNOUT & WEIR GROOVE / IN WHEEL PIT OF GUARD GATE HOUSE / NORTHERN CANAL.	1847/10/07	1/4"=1'	H 25.6, W 60.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-135	GEARING FOR GUARD GATES / NORTHERN CANAL.	1847/10/12	1/4"=1"	H 67.5, W 98.6 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-136	PARTS OF FRAMEWORK FOR THE GEARING OF GUARD GATES. / NORTHERN CANAL.	1847/10/27	1/4"=1"	H 91.1, W 72.3 CM	INK, WATER COLOR	PAPER
C-116-137	HOISTING APPARATUS / FOR GUARD GATES, / NORTHERN CANAL.	1847/11/18	1/4"=1"	H 67.5, W 86.1 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-138	HOISTING WHEEL / FOR GUARD GATES; NORTHERN CANAL / SECTION THRU CENTER OF SHAFT.	1847/12/00	1/8"=1", 1/4"=1"	H 100.6, W 66.3 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-139	HOISTING WHEEL / [SHOWING GUIDES & BUCKETS] GUARD GATES; NORTHERN CANAL.	1847/12/00	FULL SIZE, 1/4"=1"	H 78.1, W 133.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-140	HOISTING APPARATUS / FOR GUARD GATES / NORTHERN CANAL.	1848/01/06	1/4"-1"	H 75.5, W 54.5 CM	INK, COLORED INK	PAPER
C-116-140-01	PULLEY FOR COUNTER BALANCE / PROBABLY NORTHERN CANAL GUARD HOUSE / GUARD GATES.	1855/00/00	3"=1'	H 42.5, W 48 CM	INK, COLORED INK, WATER COLOR	PAPER
C-116-141	[GUIDES & FLOATS OF] HOISTING WHEEL / AT THE [GATE HOUSE] GUARD LOCKS N. CANAL.	1847/09/08	FULL SIZE	H 94.8, W 92.8 CM	INK, COLORED INK, GRAPHITE	PAPER
C-116-142	[GEARING FOR] HOISTING APPARATUS / AT THE GUARD GATES, NORTHERN / CANAL.	1849/12/18	1/4"=1"	H 68, W 86.3 CM	INK	PAPER

C-116-143	PLAN OF RACK FOR HEADRACE OF TURBINE AT THE / GUARD GATES OF NORTHERN CANAL AT / LOWELL, MASS.	1891/05/04	1/8"=1'& 1"=1"	H 80.5, W 52.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-116-144	[SECTIONS OF] ONE OF THE / WASTE GATES / NORTHERN CANAL.	1847/05/25	3/4"=1'	H 78.2, W 133.6 CM	INK, WATER COLOR	PAPER
C-116-145	DESIGN FOR HOISTING APPARATUS, FOR THE WASTE GATES / OF THE NORTHERN CANAL.	1871/05/26	2"=1'	H 66, W 100.7 CM	INK, WATER COLOR	PAPER
C-116-146	DETAILS OF HOISTING APPARATUS FOR WASTE GATES IN / GREAT RIVER WALL, OF THE NORTHERN CANAL.	1872/03/19	3"=1'	H 98.9, W 65.5 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER
C-116-147	HOISTING APPARATUS FOR WASTE GATES IN / GREAT RIVER WALL OF THE NORTHERN CANAL.	1872/03/12	1/2"& 1"=1'	H 100, W 66.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-116-148	HOISTING WHEEL, / FOR WASTE GATES IN GREAT RIVER WALL, OF THE NORTHERN CANAL.	1872/03/29	3"=1'	H 72, W 68 CM	INK, WATER COLOR	PAPER
C-116-149	DETAILS OF HOISTING APPARATUS / FOR WASTE GATES IN / GREAT RIVER WALL OF THE NORTHERN CANAL.	1872/04/05	3"=1'	H 65.4, W 99.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-116-150	THE CAST OF IRON STANDS / FOR FLASHBOARDS / AT THE WASTE WEIR / NORTHERN CANAL.	1847/09/27	1/8"=1"	H 35.3, W 50.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-151	SKETCH OF HOISTING WHEEL / FOR WASTE GATES IN GREAT RIVER.	1872/02/03	NONE	H 61.2, W 47.7 CM	GRAPHITE, INK	PAPER

C-116-152	SKETCH FOR HOISTING APPARATUS AT WASTE GATES IN GREAT RIVER WALL / OF THE NORTHERN CANAL, LOWELL.	1872/01/25	1"=2/3'	H 61.2, W 47.6 CM	GRAPHITE, INK	PAPER
C-116-153	[UNTITLED PLAN.] [GEARING FOR HOISTING OF WASTE GATES].	1872/00/00	NONE	H 56.3, W 47.7 CM	INK, GRAPHITE	PAPER
C-116-153-01	DESIGN / FOR / CAST IRON STANDARD / FOR / WASTE WEIR / NORTHERN CANAL.	1847/05/07	1/8"=1"	H 46.6, W 60.7 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-116-153-02	GUARD GATES / NORTHERN CANAL [NOTATIONS ON GUARD GATES BY J. B. F.].	1846/11/03	NONE	H 31.4, W 19.4 CM	INK, WATER COLOR	PAPER
C-117-[343]	[UNTITLED.] [PLAN OF GUARD LOCKS COMPLEX.]	SEE NOTES	1"=40'	H 47, W 56 CM	INK, GRAPHITE	DRAFTING CLOTH
C-117-[343]-[COPY 1]	[UNTITLED.] [PLAN OF GUARD LOCKS COMPLEX.]	SEE NOTES	1"=40'	H 58, W 57 CM	GRAPHITE	PAPER
C-117-154	PROFILE OF THE GROUND / WHERE THE MERRIMACK COMPANY / PROPOSES TO CONSTRUCT A DRAIN.	1846/03/28	NONE	H 24.1, W 410 CM	INK, GRAPHITE	PAPER
C-117-155	SECTION OF / MOODY STREET FEEDER [NEAR TILDEN ST.]	1847/12/30	1/4"=1'	H 49, W 70 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-156	PLAN OF LAND / AT CORNER OF MOODY & DUTTON STREETS [SHOWING FEEDER].	1847/10/21	1"=10'	H 58.2, W 88.3 CM	INK, GRAPHITE, WATER COLOR, COLORED INK	PAPER
C-117-157	FRONT OF SKEW ARCHES ON THE MOODY ST. FEEDER AT MERRIMACK CANAL.	1847/12/31	1/8'=1'	H 68, W 98.1 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	PAPER

C-117-158	ARCH STONES / FOR THE MOODY ST. FEEDER.	1847/12/30	1"=1'	H 23.9, W 45.1 CM	INK, GRAPHITE	PAPER
C-117-159	WHEEL & SHAFTS FOR HOISTING GATES. / MOODY ST. FEEDER.	1847/12/21	1/4"=1'	H 53, W 76 CM	INK, GRAPHITE	PAPER
C-117-160	SKETCH OF HOISTING APPARATUS / FOR GATES IN THE MOODY STREET FEEDER.	1847/12/10	1/8"& 1/4"=1'	H 77.3, W 133.1 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-161	CAST-IRON GROOVES, ETC. / FOR THE GATES OF THE MOODY ST. FEEDER.	1847/12/16	1/4"=1'	H 53, W 76 CM	INK, GRAPHITE	PAPER
C-117-162	RODS FOR GATE GROOVES, / MOODY ST. FEEDER.	1848/06/09	1/4 SIZE	H 15.8, W 45.6 CM	INK, GRAPHITE	PAPER
C-117-163	PIPE FOR MOODY ST. FEEDER	1848/05/02	1/2 FULL SIZE	H 23.6, W 58.3 CM	INK, GRAPHITE	PAPER
C-117-164	PLAN OF MOODY ST. FEEDER / AT ITS COMMENCEMENT / AT THE WESTERN CANAL.	1848/03/21	1"=10'	H 67.6, W 96.4 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-165	STONES FOR CAPPING THE FIRE PLUGS / MOODY ST. FEEDER.	1848/05/03	2"=1'	H 58.5, W 27.4 CM	INK, GRAPHITE	PAPER
C-117-166	PLAN OF MOODY STREET FEEDER AT THE / EASTERLY END [CORNER OF MOODY & DUTTON].	1848/04/20	1"=4'	H 76, W 138 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-117-167	RACK FOR HOISTING GATE IN FEEDER.	SEE NOTES	NONE	H 20.2, W 66 CM	INK, GRAPHITE	PAPER
C-117-168	PROBABLE ELEVATION OF FORM FOR TURNING THE ARCH OF THE MOODY ST. FEEDER.	UNDATED	NONE	H 69.8, W 48.9 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-117-169	UNDERPINNING ETC. / AT GATE HOUSE / MOODY STREET FEEDER.	1848/05/09	1/4"=1'	H 39, W 69.5 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-170	UNDERPINNING ETC. / AT GATE HOUSE / MOODY STREET FEEDER.	1848/05/09	1/4"=1'	H 55.3, W 70.7 CM	INK, GRAPHITE	PAPER
C-117-171	ABUTMENTS & PIERS AT THE EAST END OF THE / MOODY ST. FEEDER.	1848/03/21	1/12 SIZE	H 33.7, W 93 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-172	[SECTIONS THROUGH] MOODY ST. / FEED GATES.	1848/01/00	1/8"=1'	H 84.5, W 42.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-172-[COPY 1]	MOODY ST. / FEED GATES.	1848/01/00	1/8"=1"	H 58.2, W 78.2 CM	INK, WATER COLOR	DRAFTING CLOTH
C-117-173	[PLAN & SECTION OF] MOODY ST. / FEED GATES.	1848/01/00	1/8"=1"	H 70.1, W 98.9 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-173-[COPY 1]	MOODY ST. / FEED GATES.	1848/01/00	1/8"=1"	H 76.2, W 82.3 CM	INK, WATER COLOR	DRAFTING CLOTH
C-117-173-[COPY 2]	MOODY ST. / FEED GATES.	1848/01/00	1/8"=1"	H 76, W 81.7 CM	BLUEPRINT	PAPER
C-117-174	RODS FOR GATE GROOVES, / MOODY ST. FEEDER.	1848/06/09	1/2"=1'	H 15.8, W 45.6 CM	INK, GRAPHITE	PAPER
C-117-175	SKETCH OF FACE OF ARCHES AT WEST END OF MOODY ST. FEEDER.	1848/06/10	1/12 SIZE	H 28.5, W 100 CM	INK, GRAPHITE	PAPER
C-117-176	ABUTMENTS & PIERS. / AT THE WEST END OF THE / MOODY STREET FEEDER.	1848/03/21	1/2"=1'	H 30, W 60.5 CM	INK, COLORED INK, GRAPHITE	PAPER

C-117-177	[SKETCH OF] CENTER FOR FIRE PLUGS / MOODY ST. FEEDER.	UNDATED	NONE	H 48.9, W 26.8 CM	INK, GRAPHITE	PAPER
C-117-178	[PLAN & SECTION OF] GATE HOUSE AT EASTERLY END OF / MOODY STREET FEEDER.	1848/06/08	1/2"=1'	H 94.3, W 66.4 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	PAPER
C-117-179	GATE HOUSE / OVER / EASTERN END OF / MOODY ST. FEEDER.	1848/09/12	1/2"=1'	H 70, W 97.6 CM	WATER COLOR, INK, GRAPHITE	PAPER
C-117-180	[END & WESTERLY ELEVATION OF] GATE HOUSE / OVER EASTERLY END OF / MOODY ST. FEEDER.	1848/09/07	1/2"=1'	H 66, W 94.5 CM	WATER COLOR, INK, GRAPHITE	PAPER
C-117-181	SECTION OF / MOODY ST. FEEDER [SHOWING FIRE PLUG CUT-IN].	1848/04/19	1/2"=1'	H 48.8, W 69.9 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-117-182 A & B	[COMPLETE] PLAN WITH PROFILE OF PART OF MOODY ST. [FEEDER SHOWING IMPROVEMENTS MADE UP TO 1896; ADJOINING LAND; PROFILE OF LAND].	1848/05/11	3/4"=10'	H 39, W 265 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-117-183	RACK & PINION / OF GATES OF MOODY ST. FEEDER.	1854/09/14	FULL SIZE	H 61.1, W 43.7 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-184	PLAN OF / MOODY STREET FEEDER GATES.	1884/04/00	1/8"=1"	H 33.4, W 33.3 CM	INK, GRAPHITE, COLORED INK [VERSO]	PAPER

C-117-184-[COPY 1]	PLAN OF / MOODY STREET FEEDER GATES.	1884/04/00	1/8"=1"	H 58.2, W 78.2 CM	INK, WATER COLOR	DRAFTING CLOTH
C-117-185	SKETCH SHOWING AREA OF CROSS SECTION, AFTER IMPROVEMENTS [TO FEEDER] OF 1896 & 1897, TAKEN LOOKING UPSTREAM.	1897/07/30	1/2"=1'	H 34.9, W 66.4 CM	INK, COLORED INK, WATER COLOR	PAPER
C-117-187	SKETCH OF PROPERTY BELONGING TO / MERRIMACK MFG. CO., AT CORNER OF MOODY & DUTTON STS. / SHOWING CONNECTION WITH MOODY ST. FEEDER.	1899/05/01	1'=10'	H 43.2, W 62.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-117-188	[OLD PLAN SHOWING PROFILE OF DRAIN IN PRINCE ST. LEADING TO] MOODY ST. FEEDER.	UNDATED	NONE	H 20.7, W 90.9 CM	GRAPHITE, WATER COLOR	PAPER
C-117-282	[PLAN & SECTION OF] GUARD GATES-[& LOCKS] PAWTUCKET CANAL.	1846/10/20	1"=30'	H 50, W 75.4 CM	WATER COLOR, INK, GRAPHITE	PAPER
C-117-283	[PLAN & SECTION OF] GUARD [GATES &] LOCKS-PAWTUCKET CANAL.	1846/10/15	1"=10'	H 120.7, W 73.9 CM	WATER COLOR, INK, GRAPHITE	PAPER
C-117-284	PLAN [& SECTION] OF GUARD LOCKS, LOCKING CHAMBER &C. AT THE HEAD OF PAWTUCKET CANAL SHOWING NEW SPILING PUT IN ABOUT 1848.	SEE NOTES	1"=10'	H 77.5, W 126.7 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-285-[A]	PLAN OF / LEFT HAND UPPER LOCKING GATE / AT / OLD GUARD LOCKS.	1912/12/00	1/2"=1'	H 61.3, W 65.1 CM	INK, COLORED INK	PAPER
C-117-285-[A]-[COPY 1]	PLAN OF / LEFT HAND UPPER LOCKING GATE / OF / OLD GUARD LOCKS.	1912/12/00	1/2"=1'	H 61.7, W 66.8 CM	RED LINE PRINT	PAPER
C-117-285-[B]	PLAN OF / LEFT HAND UPPER LOCKING GATE / OF / OLD GUARD LOCKS.	1912/12/00	1/2"=1'	H 62, W 67 CM	INK	DRAFTING CLOTH

C-117-286	SKETCH OF PROPOSED NEW GUARD GATES / ON PAWTUCKET CANAL.	1856/02/00	1"=10'	H 83, W 58 CM	INK, COLORED INK, WATER COLOR	PAPER
C-117-287-[A]	[PLAN OF] SHEERS FOR HOLDING UP [PAWTUCKET GUARD LOCKS] GATE.	1850/07/23	3/4"=1'	H 52.1, W 70.4 CM	INK, GRAPHITE	PAPER
C-117-287-[B]	[PLAN OF] GATE FOR PAWTUCKET GUARD LOCKS.	1850/07/23	3/4"=1'	H 51.6, W 70.5 CM	INK, GRAPHITE	PAPER
C-117-288	BOLTS FOR GREAT GATE, / FOR PAWTUCKET GUARD LOCKS.	1850/07/17	1/8 FULL SIZE	H 70, W 103.5 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-289	GUARD GATES / ON THE PAWTUCKET CANAL [PLAN & ELEVATIONS OF GREAT GATE].	1856/03/13	1"=1'	H 88.6, W 61.3 CM	INK, GRAPHITE	PAPER
C-117-290	SHEERS FOR HOLDING UP PAWTUCKET GUARD GATES.	1850/07/24	3/4"=1'	H 103.5, W 69.7 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-291	GATE FOR PAWTUCKET GUARD LOCKS. [PLAN OF GATES WITH DETAILS OF BOLTS].	1850/07/16	1/2"=1'	H 104, W 70.5 CM	INK, COLORED INK	PAPER
C-117-292	SKETCH OF PROPOSED NEW GATES / ON PAWTUCKET CANAL.	1856/02/18	1' SCALE=1/12"	H 64.4, W 39.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-117-293	GUARD LOCK PATTERNS.	1846/09/00	HALF SIZE	H 89.3, W 68.5 CM	INK, GRAPHITE	PAPER
C-117-294	[SKETCH OF] PINIONS PROPOSED FOR THE NEW GUARD GATES ON PAWTUCKET CANAL FEB. 1856.	1856/02/00	FULL SIZE	H 70.5, W 110 CM	INK, COLORED INK, GRAPHITE	PAPER

C-117-295	HOISTING GATE FOR PROPOSED NEW GATE AT / GUARD SLUICES. PAWTUCKET CANAL.	1869/08/18	<1'>	H 63.5, W 49 CM	GRAPHITE	PAPER
C-117-296	[UNTITLED PLAN.] [PLAN SHOWING TWO PROPOSED FEEDERS FROM NORTHERN & WESTERN CANAL TO MERRIMACK CANAL.]	1847/05/06	1"=40'	H 101, W 136.2 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-296	TRACING OF PLAN OF PART OF MOODY ST. / SHOWING LOCATION OF MOODY ST. FEEDER.	1916/05/17	3/8"=5'	H 41.6, W 271.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-117-297	SKETCH OF NEW GUARD GATES PAWTUCKET CANAL / WITH HYDRAULIC LIFT.	1870/02/09	NONE	H 64.2, W 49 CM	GRAPHITE	PAPER
C-117-299	DESIGN FOR PISTON OF HYDRAULIC LIFT / & UPPER PART OF CYLINDER FOR RAISING / THE GUARD GATES OF PAWTICKET CANAL. / LOWELL, MASS.	1870/03/15	1/2 SIZE	H 37.5, W 50.1 CM	INK	PAPER
C-117-300	DESIGN FOR PISTON OF HYDRAULIC LIFT / FOR THE GUARD GATES IN PAWTUCKET CANAL, / LOWELL, MASS.	1870/03/15	1/2 SIZE	H 61, W 49.6 CM	INK	PAPER
C-117-301	PLAN OF GUARD GATES / WESTERN CANAL.	1848/04/15	1 1/2"=3'	H 49, W 69.8 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-302	MITRE SILLS AND HOLLOW QUOINS / FOR THE / GUARD GATES / OF THE / WESTERN CANAL.	1847/12/03	1/2"=1'	H 85.2, W 66 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-303	[PLAN & SECTIONS OF] GUARD GATES AT THE WESTERN CANAL.	1847/01/21	1/8"=1'	H 100.5, W 67.9 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-117-303-[A]	[UNTITLED. SEE NOTES]	UNDATED	1/2"=1'	H 28.5, W 40 CM	INK	DRAFTING CLOTH
C-117-304	IRONS FOR HANGING / THE GUARD GATES OF THE WESTERN CANAL.	1849/03/02	1/4 FULL SIZE	H 48.6, W 69.8 CM	INK, GRAPHITE	PAPER
C-117-305	BOLTS BELONGING TO THE IRONS / FOR HANGING THE GUARD GATES OF THE / WESTERN CANAL.	1848/06/20	1/4 SIZE	H 17.8, W 37.7 CM	INK, GRAPHITE	PAPER
C-117-306	BOLTS BELONGING TO THE IRONS / FOR HANGING THE GUARD GATES OF THE / WESTERN CANAL.	1848/06/20	1/4 SIZE	H 35.6, W 50.6 CM	INK, GRAPHITE	PAPER
C-117-307	[BOLTS FOR] IRONS FOR HANGING / THE GUARD GATES OF THE WESTERN CANAL.	1848/02/29	1/4 FULL SIZE	H 48.5, W 69.6 CM	INK, COLORED INK, GRAPHITE	PAPER
C-117-308	SKETCH OF SHAFTS FOR SUFFOLK GATES.	UNDATED	NONE	H 43.1, W 61.2 CM	INK, GRAPHITE	PAPER
C-117-309	DETAILS OF SUFFOLK GATES.	1847/06/23	1/4"= 1'	H 49.8, W 68.7 CM	INK, GRAPHITE	PAPER
C-117-310	PLAN OF CAPPING / AT THE GUARD GATES OF THE / WESTERN CANAL.	1848/03/23	1/2"=1'	H 50.8, W 88.5 CM	INK, GRAPHITE	PAPER
C-117-311	[PLAN OF] GUARD GATES / MERRIMACK CANAL.	1846/10/05	1/4"=1'	H 55.2, W 77.4 CM	INK, GRAPHITE	PAPER
C-117-312	PLAN OF HOLLOW QUOIN FOR THE GUARD GATES AT / MERRIMACK AND HAMILTON CANALS.	1846/05/16	1/8"=1'	H 24.6, W 48 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-313	PLAN OF HOLLOW QUOIN FOR THE GUARD GATES / AT THE MERRIMACK AND HAMILTON CANALS.	1846/06/05	1/8"=1'	H 31.2, W 50 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-314	PLAN OF CAPPING STONE / FOR WEST SIDE OF / GUARD GATES. / MERRIMACK CANAL.	1846/05/27	1/4"=1'	H 27, W 45.5 CM	INK, GRAPHITE	PAPER

C-117-315	PLAN OF CAPPING STONE / FOR EAST SIDE OF THE / GUARD GATES / [MERRIMACK CANAL] NEAR LOWELL MACHINE SHOP.	1846/08/08	1"=4'	H 29.3, W 45.7 CM	INK, GRAPHITE	PAPER
C-117-316	PLAN OF COFFER DAM NEAR MACHINE SHOP / WITH EASTERLY SIDE OF GUARD CATES.	1846/07/01	1/4"=1'	H 55.6, W 76.3 CM	INK, GRAPHITE	PAPER
C-117-317	[PLAN OF] GUARD GATES IN MERRIMACK & HAMILTON CANALS.	1846/05/16	1/2"=1'	H 21.9, W 87.1 CM	INK, GRAPHITE	PAPER
C-117-318	PLAN OF COLLAR AT THE / GUARD GATES OF THE MERRIMACK / CANAL.	1869/06/30	1/8"=1"	H 54, W 41.1 CM	GRAPHITE, INK	PAPER
C-117-319	PLAN OF WALLS AND COFFER DAM / OF THE GUARD GATES / HAMILTON CANAL.	1846/06/06	1/4"=1'	H 55.6, W 77 CM	GRAPHITE	PAPER
C-117-320	PLAN OF SOUTHERLY SIDE OF THE GUARD GATES / HAMILTON CANAL.	1846/06/04	1/4"=1'	H 50.2, 68.6 CM	INK, GRAPHITE	PAPER
C-117-321	PLAN OF COFFER DAM / ON NORTH SIDE OF HAMILTON CANAL / FOR THE GUARD GATES.	1846/07/15	1/4"=1'	H 55.6, W 76.7 CM	INK, GRAPHITE	PAPER
C-117-322	[PLAN OF] GUARD GATES / HAMILTON CANAL.	1846/10/01	1/4"=1'	H 55, W 76 CM	INK, GRAPHITE, COLORED INK	PAPER
C-117-323	[SKETCH PLAN OF] GUARD GATES / IN HAMILTON CANAL.	1852/11/12	1/2"=1'	H 51, W 89.5 CM	COLORED INK, INK, GRAPHITE	PAPER
C-117-324	[PLAN SHOWING] STONEWORK FOR LOWER CHAMBERS AT LOWER LOCKS.	1841/03/21	NONE	H 30.7, W 74.9 CM	INK, WATER COLOR, COLORED INK	PAPER
C-117-325	PLAN OF SPILING STONE FOR UPPER GATES AT LOWER LOCKS.	1841/03/21	1"=4'	H 23.9, W 45.1 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-117-326	CAPPING OF WALL UNDER MITRE SILL FOR UPPER GATES.	1841/03/04	1"=1'	H 27.1, W 75 CM	INK, GRAPHITE	PAPER
C-117-327	CAPPING FOR WALL UNDER MITRE SILL FOR MIDDLE GATES.	1841/03/04	1"=1'	H 27.4, W 75.5 CM	INK, GRAPHITE	PAPER
C-117-328	CAPPING OF WALL UNDER MITRE SILL FOR LOWER GATES.	1841/03/04	1"=1'	H 27.4, W 75.5 CM	INK, GRAPHITE	PAPER
C-117-329	CAPPING OF WALL UNDER MITRE SILL FOR LOWER GATES.	1840/12/31	1"=1'	H 24.8, W 61.9 CM	INK, GRAPHITE	PAPER
C-117-330	PLAN & SECTIONS / OF / LOWER LOCKS, LOCK CHAMBERS.	UNDATED	NONE	H 29.3, W 71.5 CM	GRAPHITE	PAPER
C-117-331	[UNTITLED PLAN.] [PLAN AND HALF SECTION OF LARGE GEAR].	1846/09/00	1/2 SIZE	H 77.5, W 67.5 CM	INK	PAPER
C-117-332	SKETCH OF UPPER GATES / OF LOWER LOCKS.	1900/03/10	1/2"=1'	H 28, W 28 CM	INK	PAPER
C-117-333	[UNTITLED PLAN.] [PLAN OF LOOKING GATE WITH NO TITLE OR DATE.]	UNDATED	1"=1'	H 48.8, W 69.8 CM	INK, GRAPHITE, COLORED INK	PAPER
C-117-334	[UNTITLED PLAN.] [PROBABLE PLAN, SECTION & ELEVATION OF HICKEY HALL LOCKS.]	UNDATED	1 3/4"=20', 1"=20'	H 44.6, W 66.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-117-335-[A]	PRESSURE INDICATED BY GAUGE / WHEN RAISING & LOWERING / GATES AT HEAD OF / PAWTUCKET CANAL.	1880/03/20	NONE	H 109.9, W 82.4 CM	INK, COLORED INK	PAPER
C-117-335-[B]	PRESSURE INDICATED BY GAUGE WHEN RAISING & LOWERING GATES AT HEAD OF PAWTUCKET CANAL.	1880/03/20	NONE	H 54, W 104 CM	COLORED INK	PAPER
C-117-336	PATTERN FOR HOLLOW QUOIN / FOR UPPER GATES AT THE GUARD GATES OF THE / PAWTUCKET CANAL.	1881/07/28	FULL SIZE	H 78, W 116.6 CM	INK	PAPER

C-117-337	CAPPING FOR THE WALLS AT THE UPPER GATE / AT THE GUARD GATES OF PAWTUCKET CANAL.	1881/09/19	NONE	H 47, W 47.6 CM	INK	PAPER
C-117-338	GUARD GATES OF / PAWTUCKET CANAL. / CAPPING & IRON WORK FOR UPPER LOCK GATES.	1881/00/00	NONE	H 71.4, W 50.5 CM	INK	PAPER
C-117-340	PLAN & SECTIONS / SHOWING / PROPOSED RECONSTRUCTION / OF / "FRANCIS GATE."	1937/05/20	1/4"=1'	H 77.4, W 83.7 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-117-340-[COPY 1]	PLAN & SECTIONS / SHOWING / PROPOSED RECONSTRUCTION / OF / "FRANCIS GATE"	1937/05/20	1/4"=1'	H 30 1/4", W 32 3/4"	BLUEPRINT, COLORED PENCIL	PAPER
C-117-341	PLAN & ELEVATION / SHOWING / PIPING TO RAISE & LOWER / GUARD LOCKS HYDRAULIC GATES.	1947/02/00	1 1/2" & 1/4"=1'	H 76.3, W 69.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-117-342	PROPRIETORS OF THE LOCKS & CANALS / BRONZE PISTON RINGS / FOR / HYDRAULIC GATES.	1947/06/17	3"=1'	H 23.6, W 33.2 CM	INK, COLORED INK	DRAFTING CLOTH
C-117-342-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS / BRONZE PISTON RINGS / FOR / HYDRAULIC GATES.	1947/06/17	3"=1'	H 21, W 35.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-118-[345]	PLAN & SECTION / OF / FLUME OF MER[RIMACK] CANAL LOWELL 150 FT. LONG.	1841/05/21	1"=4'		H 49.7, W 38.2 CM	INK, GRAPHITE, WATER COLOR
C-118-[345]	PLAN & SECTION / OF / FLUME OF MER[RIMACK] CANAL LOWELL 150 FT. LONG.	1841/05/21	1"=4'	H 49.7, W 38.2 CM	INK, GRAPHITE, WATER COLOR	PAPER

C-118-[346]	PLAN & SECTIONS / OF /GAUGE WHEELS / FOR MEASURING THE WATER IN / THE / MERRIMACK & OTHER CANALS.	1841/05/21	1"=5'		H 44.3, W 55 CM	INK, GRAPHITE, WATER COLOR
C-118-[346]	PLAN & SECTIONS / OF /GAUGE WHEELS / FOR MEASURING THE WATER IN / THE / MERRIMACK & OTHER CANALS.	1841/05/21	1"=5'	H 44.3, W 55 CM	INK, GRAPHITE, WATER COLOR	PAPER
C-118-[347]	GAUGE WHEELS FOR MEASURING THE QUANTITY OF WATER PASSING IN THE MERRIMACK CANALS AT LOWELL.	1841/05/21	SEE NOTES		H 38.2, W 55 CM	INK, GRAPHITE, WATER COLOR
C-118-[347]	GAUGE WHEELS FOR MEASURING THE QUANTITY OF WATER PASSING IN THE MERRIMACK CANALS AT LOWELL.	1841/05/21	SEE NOTES	H 38.2, W 55 CM	INK, GRAPHITE, WATER COLOR	PAPER
C-118-[348]	SECTION OF UPPER END, EASTERN CANAL.	1842/07/21	7/16"=1'		H 45.8, W 64.2 CM	INK
C-118-[348]	SECTION OF UPPER END, EASTERN CANAL.	1842/07/21	7/16"=1'	H 45.8, W 64.2 CM	INK	PAPER
C-118-[349]	[UNTITLED.] [FULL ISOMETRIC DRAWING AND HALF OF AN END ELEVATION OF AN UNIDENTIFIED GAUGE WHEEL.]	UNDATED			H 57.2, W 75.3 CM	INK, GRAPHITE
C-118-[349]	[UNTITLED.] [FULL ISOMETRIC DRAWING AND HALF OF AN END ELEVATION OF AN UNIDENTIFIED GAUGE WHEEL.]	UNDATED	NONE	H 57.2, W 75.3 CM	INK, GRAPHITE	PAPER

C-118-[350]	[UNTITLED.] [LATITUDINAL ELEVATION OF AN UNIDENTIFIED GAUGE WHEEL.]	UNDATED			H 57.2, W 75	INK
C-118-[350]	[UNTITLED.] [LATITUDINAL ELEVATION OF AN UNIDENTIFIED GAUGE WHEEL.]	UNDATED	NONE	H 57.2, W 75	INK	PAPER
C-118-[351]	[UNTITLED.] [END ELEVATION OF UNNAMED GAUGE WHEEL.]	UNDATED			H 57.2, W 75	INK, GRAPHITE
C-118-[351]	[UNTITLED.] [END ELEVATION OF UNNAMED GAUGE WHEEL.]	UNDATED	1"=1'	H 57.2, W 75 CM	INK, GRAPHITE	PAPER
C-118-[352]	PLAN / OF THE / SUFFOLK, TREMONT & LAWRENCE MILS / SHOWING THE POSITION OF THE FLUME [IN THE WESTERN CANAL].	SEE NOTES			H 64.8, W 75.6 CM	INK, WATER COLOR
C-118-[352]	PLAN / OF THE / SUFFOLK, TREMONT & LAWRENCE MILS / SHOWING THE POSITION OF THE FLUME [IN THE WESTERN CANAL].	SEE NOTES	1"=100', 1/2"=1'	H 64.8, W 75.6 CM	INK, WATER COLOR	PAPER
C-118-[353]	PLAN OF / HAMILTON AND APPLETON MILLS SHOWING THE POSITION OF THE FLUME [ON THE HAMILTON CANAL].	1842/11/00	1/8"=1', 1/2"=1'		H 62.7, W 74.3 CM	INK, WATER COLOR, GRAPHITE

C-118-[353]	PLAN OF / HAMILTON AND APPLETON MILLS SHOWING THE POSITION OF THE FLUME [ON THE HAMILTON CANAL].	1842/11/00	1/8"=1', 1/2"=1'	H 62.7, W 74.3 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-[354]	PLAN & SECTIONS / OF / MEASURING WHEELS / USED IN / MERRIMACK CANAL [AND] PLAN OF MERRIMACK CANAL / SHOWING THE POSITION OF MEASURING WHEELS, FLUME, ETC.	1842/00/00	1'=3', 1/4"=10'		H 67.2, W 74.3 CM	INK, WATER COLOR
C-118-[354]	PLAN & SECTIONS / OF / MEASURING WHEELS / USED IN / MERRIMACK CANAL [AND] PLAN OF MERRIMACK CANAL / SHOWING THE POSITION OF MEASURING WHEELS, FLUME, ETC.	1842/00/00	1'=3', 1/4"=10'	H 67.2, W 74.3 CM	INK, WATER COLOR	PAPER
C-118-[355]	PLAN OF MERRIMAC [SIC] FLUME [AND] VIEW OF UPPER END OF FLUME [AND] SECTION OF FLUME.	UNDATED			H 64.2, W 75.6 CM	INK, WATER COLOR
C-118-[355]	PLAN OF MERRIMAC [SIC] FLUME [AND] VIEW OF UPPER END OF FLUME [AND] SECTION OF FLUME.	UNDATED	1/2"=1', 1"=8'	H 64.2, W 75.6 CM	INK, WATER COLOR	PAPER
C-118-[356]	PLAN / OF / BOOTT & MASSACHUSETTS MILLS / SHOWING THE POSITION OF THE / FLUME.	1842/00/00	1/8"=10" & 1'		H 62.2, W 74.4 CM	INK, WATER COLOR

C-118-[356]	PLAN / OF / BOOTT & MASSACHUSETTS MILLS / SHOWING THE POSITION OF THE / FLUME.	1842/00/00	1/8"=10" & 1'	W 74.4, H 62.2 CM	INK, WATER COLOR	PAPER
C-118-[357]	PLAN / OF / LOWELL MILL AND CANAL / SHOWING THE POSITION OF THE / FLUME.	1841/00/00	1/8"& 1/2"=1'		H 62.3, W 74.3 CM	INK, COLORED INK, WATER COLOR
C-118-[357]	PLAN / OF / LOWELL MILL AND CANAL / SHOWING THE POSITION OF THE / FLUME.	1841/00/00	1/8"& 1/2"=1'	W 74.3, H 62.3 CM	INK, COLORED INK, WATER COLOR	PAPER
C-118-186	[SECTION OF] DAM IN THE MERRIMACK CANAL HAS STOOD WELL. BUILT IN 1835.	SEE TITLE			H 47.1, W 62.2 CM	INK, GRAPHITE
C-118-186	[SECTION OF] DAM IN THE MERRIMACK CANAL HAS STOOD WELL. BUILT IN 1835.	SEE TITLE	3/4"=1'	H 47.1, W 62.2 CM	INK, GRAPHITE	CLOTHBACKED PAPER
C-118-187	[SECTION OF] DAM IN RACE FROM MERRIMACK CANAL - BUILT IN 1835. HAS SINCE BEEN REBUILT - FAILURE OF PAVING FROM A TO B.	SEE TITLE			H 75.2, W 54.5 CM	INK, GRAPHITE
C-118-187	[SECTION OF] DAM IN RACE FROM MERRIMACK CANAL - BUILT IN 1835. HAS SINCE BEEN REBUILT - FAILURE OF PAVING FROM A TO B.	SEE TITLE	3/8"=1'	H 75.2, W 54.5 CM	INK, GRAPHITE	CLOTHBACKED PAPER
C-118-188	PLAN & SECTION OF MERRIMACK RACE.	1835/09/17	H1"=40', V1"=10'		H 44.6, W 57 CM	INK, COLORED INK, WATER COLOR, GRAPHITE

C-118-188	PLAN & SECTION OF MERRIMACK RACE.	1835/09/17	H1"=40', V1"=10'	H 44.6, W 57 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-189	PLAN OF DAM FROM THE MERRIMACK CANAL / NEAR THE MERRIMACK MILLS / LOWELL MASS.	1836/05/10	1"=4'	H 44, W 59.4 CM	INK, GRAPHITE	PAPER
C-118-190	PLAN [& SECTION] OF THE / HAMILTON GATEHOUSE / SHOWING HOISTING APPARATUS [FOR GATES].	1903/01/00	1/2"=1'	H 23.2, W 65.6 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	CLOTHBACKED PAPER
C-118-191	PLAN / OF / LOWER LOCKS / [& ADJACENT LAND] SHOWING GATE HOUSE AND DETAILS OF HOISTING APPARATUS.	1903/00/00	1"=10'	H 90.1, W 54.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-192	PLAN / OF / PROPOSED BRANCH CANAL / FROM THE / NORTHERN TO THE MERRIMACK CANAL.	1847/02/04	1"=20'	H 60.9, W 79.2 CM	INK, COLORED INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-118-193	SECTION OF / HALL ST. DAM.	1912/09/29	1/2"=1'	H 28.8, W 45.6 CM	INK, GRAPHITE	PAPER
C-118-194	CROSS SECTION OF MERRIMACK CANAL / ON LINE OF SOUTH SIDE OF BUOCHERS HOUSE. CROSS SECTION OF MERRIMACK CANAL / ON LINE OF NORTH SIDE OF BOUCHERS HOUSE. / 40 FT FROM LAST.	1848/05/19	1"=10'	H 48.8, W 65.1 CM	INK, GRAPHITE	PAPER

C-118-195	DETAIL OF CHAIR FOR UPRIGHT POSTS / FOR MERRIMACK WEIR AT MERRIMACK DAM.	1902/12/00	FULL SIZE	H 47.6, W 69.8 CM	COLORED INK, INK, GRAPHITE	PAPER
C-118-196	PLAN OF PROPOSED BRANCH CANAL / FROM THE NORTHERN TO THE MERRIMACK CANAL.	1854/09/17	1"=30'	H 62, W 90 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-197	DRAWING / SHOWING ARRANGEMENT / TO HOIST TREMONT GATES / BY MOTOR.	1912/02/09	1/2"=1'	H 43.1, W 55.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-118-197-[A]	DRAWING / SHOWING ARRANGEMENT / TO HOIST TREMONT GATES / BY MOTOR.	1911/12/12	1/2"=1'	H 43.1, W 55.1 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-118-197-[B]	SKETCH / SHOWING HOISTING ARRANGEMENT FOR THE EAST GATE / OF TREMONT GATES.	1911/11/04	NONE	H 33.1, W 25.6 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-118-197-[B]-[COPY 1]	SKETCH / SHOWING HOISTING ARRANGEMENT FOR THE EAST GATE / OF TREMONT GATES.	1911/11/04	NONE	H 32, W 24.5 CM	BLUE LINE PRINT, GRAPHITE	PAPER
C-118-197-[C]	SKETCH / SHOWING ARRANGEMENT OF / GEARING / TO HOIST TREMONT GATES.	1912/01/31	1 1/2"=1'	H 27, W 33.1 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

C-118-198	SKETCH / [PLAN] OF THE / PROPOSED FEEDER / [BRANCH CANAL] FROM THE / NORTHERN CANAL TO THE YARD OF THE / MERRIMACK MANUFACTURING COMPANY.	1855/09/00	NONE	H 80.5, W 60.5 CM	INK, WATERCOLOR	PAPER
C-118-199	[PLAN OF PROPOSED BRANCH CANAL FROM THE NORTHERN TO MERRIMACK CANAL.] PROPOSED WIDENING.	1855/00/00	NONE		H 39, W 48.5 CM	GRAPHITE
C-118-199	[PLAN OF PROPOSED BRANCH CANAL FROM THE NORTHERN TO MERRIMACK CANAL.] PROPOSED WIDENING.	1855/00/00	NONE	H 39, W 48.5 CM	GRAPHITE	PAPER
C-118-200	[UNTITLED PLAN.] [PLAN OF PROPOSED BRANCH CANAL FROM THE NORTHERN TO MERRIMACK CANAL.]	1847/02/04	NONE	H 26.4, W 59.6 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-201	[PLAN OF PROPOSED BRANCH CANAL FROM THE NORTHERN TO MERRIMACK CANAL] FEEDER / MERRIMACK PENSTOCK; ARCHED UNDER THE BUILDINGS / THE WEST OF THE PENSTOCK BEING / OF WOOD.	1855/06/00	NONE		H 31, W 40.75 CM	INK, GRAPHITE
C-118-201	[PLAN OF PROPOSED BRANCH CANAL FROM THE NORTHERN TO MERRIMACK CANAL] FEEDER / MERRIMACK PENSTOCK; ARCHED UNDER THE BUILDINGS / THE WEST OF THE PENSTOCK BEING / OF WOOD.	1855/06/00	NONE	H 31, W 40.75 CM	INK, GRAPHITE	PAPER

C-118-202	PLAN SHOWING WHERE CROSS SECTIONS HAVE BEEN TAKEN OF MERRIMACK CANAL [BETWEEN MERRIMACK ST. & MERRIMACK WASTEWAY SHOWING PROPOSED IMPROVEMENTS.]	1862/06/26	1"=30'	H 30.8, W 106.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-203	PROPOSED IMPROVEMENTS OF THE MERRIMACK CANAL / BETWEEN MERRIMACK STREET AND THE MERRIMACK WASTEWAY [PLAN & SECTION].	1862/06/26	1CM=5'	H 48.6, W 63.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-204	[SECTION OF] MERRIMACK DAM [(SKETCH)].	1877/04/09	NONE	H 45.5, W 61.5 CM	INK, GRAPHITE	PAPER
C-118-205	PLAN AND SECTION OF / MERRIMACK DAM [WEIR].	1877/00/00	1/4"=1', 1/2"=1'	H 55.1, W 70.4 CM	INK, GRAPHITE	CLOTHBACKED PAPER
C-118-206	[PLAN & SECTION OF] TRUSS FOR WEIR / AT / MERRIMACK DAM.	1885/04/25	1"=1'	H 30.4, W 130.5 CM	INK, WATER COLOR, GRAPHITE	CLOTHBACKED PAPER
C-118-207	PROFILE OF BOOTT DAM AT END OF BOOTT CANAL / HAS STOOD WELL - BUILT IN 1835.	SEE TITLE	5/8"=1'	H 40.9, W 60.4 CM	INK, GRAPHITE	PAPER
C-118-208	EASTERN CANAL 1835 / PROFILE OF CANAL.	1835/00/00	NONE		H 34.4, W 81.5 CM	INK, GRAPHITE

C-118-208	EASTERN CANAL 1835 / PROFILE OF CANAL.	1835/00/00	NONE	H 34.4, W 81.5 CM	INK, GRAPHITE	PAPER
C-118-209	PLAN OF / PAWTUCKET CANAL / BETWEEN THE / GUARD LOCKS [(INCLUDING THE LOCKS)] AND SCHOOL STREET BRIDGE [SHOWING GATE HOUSE, GATES, ADJACENT LAND, R. R. TRACKS & STONE BOUNDS].	1883/00/00	1"=40'	H 93.5, W 30.5 CM	INK, WATER COLOR, GRAPHITE	CLOTHBACKED PAPER
C-118-210	[UNTITLED.] [SKETCH OF MERRIMACK ROLLING DAM & THE BOOTT WASTEWAY.]	UNDATED			H 24.3, W 121.3 CM	INK, GRAPHITE
C-118-210	[UNTITLED.] [SKETCH OF MERRIMACK ROLLING DAM & THE BOOTT WASTEWAY.]	UNDATED	1"=8'	H 24.3, W 121.3 CM	INK, GRAPHITE	PAPER
C-118-213	[SKETCH OF] GEARING FOR HOISTING THE GATES / OF THE BOOTT PENSTOCK.	1848/05/27	VARIOUS	H 67.5 W 47	INK, WATER COLOR, GRAPHITE	PAPER
C-118-215	[UNTITLED PLAN.] [SKETCH OF PROPOSED WASTEWAY BETWEEN THE BOOTT & MASSACHUSETTS MILLS.]	1852/09/17	1"=20'	H 34, W 58.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-217	PLAN OF BUILDINGS &C. / AT THE / BOOTT DAM.	1891/05/05	1"=4'	H 55, W 57.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-218	PLAN & [SECTIONS] ELEVATIONS / OF / HYDRAULIC GATE PIPING / BOOTT DAM.	1892/11/00	1/2"=1'	H 25 1/2", W 14 1/4"	INK	PAPER

C-118-219	[PLAN & SECTIONS OF] HYDRAULIC LIFT 16" DIA. 6 FT.ST. / FOR GUARD GATE[S AT BOOTT DAM].	1892/05/10	3"=1'	H 19 1/2",W 29 1/2"	BLUEPRINT	PAPER
C-118-220	[PLAN & SECTIONS OF] HYDRAULIC [LIFT FOR] GATE[S] / AT / BOOTT DAM / AS BUILT JUL-NOV., 1892.	1892/00/00	2"& 1"=1'	H 37 1/2", W 24"	INK, COLORED INK	PAPER
C-118-221	LOCKS & CANALS / BEAM [AND COLUMN] TO SUPPORT CYLINDER FOR HYDRAULIC LIFT / AT BOOTT DAM.	1892/05/25	1 1/2"=1'	H 61, W 68.5 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-222	[SKETCH SHOWING] SECTION / OF / LAWRENCE DAM.	1913/06/00	1/2"=1'	H 42.4, W 56.6 CM	INK, COLORED INK	PAPER
C-118-222-[COPY 1]	[SKETCH SHOWING] SECTION / OF / LAWRENCE DAM.	1913/06/00	1/2"=1'	H 46.8, W 54.9 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-118-222-[COPY 2]	[SKETCH SHOWING] SECTION / OF / LAWRENCE DAM.	1913/06/00	1/2"=1'	H 38.9, W 45 CM	UNKNOWN PHOTOGRAPHIC PROCESS GRAPHITE	PAPER
C-118-223	SKETCH / OF / [PRESENT & PROPOSED] LAWRENCE DAM.	1913/07/00	1/4"=1'	H 33, W 73 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-223-[COPY 1]	SKETCH / OF / LAWRENCE DAM / AS PROPOSED.	1913/07/00	1/4"=1'	H 33.6, W 74 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-118-224	[SKETCH SHOWING] SECTION / OF LAWRENCE DAM / AS REBUILT IN 1913.	1913/09/00	1"=1'	H 43.8, W 56.2 CM	INK, COLORED INK, GRAPHITE	PAPER

C-118-225	SKETCH OF THE PROPOSED / WASTEWAY FOR THE DISCHARGE / OF ICE FROM THE EASTERN CANAL [BETWEEN THE BOOTT & MASSACHUSETTS MILLS].	1862/04/29	1"=10'	H 36.9, W 88.8 CM	WATER COLOR, INK, GRAPHITE	DRAFTING CLOTH
C-118-226	DESIGN FOR LOWER END OF MASSACHUSETTS WASTEWAY.	1862/00/00	NONE	H 15.8, W	INK, GRAPHITE	PAPER
C-118-227	PLAN OF PROPOSED ICE WASTEWAY FROM / THE EASTERN CANAL IN LOWELL [BETWEEN BOOTT & MASS.].	1862/04/17	1"=10'	H 59.4, W 86.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-228	PLAN & SECTION OF THE PAVING & SKEWBACKS OF THE / UPPER CURVE OF THE MASSACHUSETTS WASTEWAY.	1862/05/20	1"=2'	H 61.9, W 107.1 CM	INK, GRAPHITE	PAPER
C-118-229	PLAN AND SECTION OF THE PAVING AND SKEW BACKS OF THE / LOWER CURVE OF THE MASSACHUSETTS WASTEWAY. SECTION OF ARCH CULVERT FOR THE MASSACHUSETTS WASTEWAY.	1862/05/22	1"=2'	H 57.9, W 85.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-230	[PLAN OF FLOOR & SIDE WALLS OF THE STRAIGHT PART ALSO OF THE] LOWER END [& THE ARCHES] OF MASSACHUSETTS WASTEWAY.	1862/07/23	1/2"=1'	H 84.7, W 55.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-231-[1]	PLAN [& ELEVATION] OF THE / PROPOSED EXTENSION / OF THE / MASSACHUSETTS WASTEWAY.	1883/04/09	1"=4'	H 73, W 86 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-118-231-[2]	COFFER DAM [PLAN SHOWING PILES AS DRIVEN IN WASTEWAY EXTENSION].	1883/09/00	1"=2'	H 60.6, W 80.3 CM	GRAPHITE	PAPER

C-118-232	ELEVATION OF MASSACHUSETTS WASTEWAY AND / FENCE WALL ON BRIDGE STREET, TO AID IN COMPUTING / THE QUANTITIES OF WALL WHICH WOULD HAVE BEEN REQUIRED TO RESTORE THE SAME.	1862/08/20	NONE	H 32.4, W 150.1 CM	INK, GRAPHITE	PAPER
C-118-233	PLAN OF PILING AT THE MOUTH OF THE / MASSACHUSETTS WASTEWAY.	1862/09/02	1"=4'	H 41.8, W 58.2 CM	INK, GRAPHITE	PAPER
C-118-234	MASSACHUSETTS WASTEWAY / [PLAN SHOWING] TOP OF PAVING TAKEN FROM THE MODEL.	1862/06/13	1"=4'	H 30.4, W 60.6 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-235	PLAN AND PROFILE OF THE / MASSACHUSETTS WASTEWAY / IN LOWELL [AS BUILT BY THE L. & C.].	1862/12/01	1/4"=1'	H 92.1, W 25.3 CM	INK, COLORED INK, GRAPHITE	CLOTHBACKED PAPER
C-118-236	[PLAN OF] MIDDLESEX CO'S. DAM / ACROSS CONCORD RIVER.	1871/07/08	1/4"=1'	H 92.1, W 25.3 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-237	[UNTITLED PLAN.] [PLAN OF MIDDLESEX CO'S FLUME.]	1841/06/14	1/2"=1'	H 51.7, W 89.6 CM	INK, GRAPHITE	PAPER
C-118-238	SECTION OF CONCORD RIVER DAM [BEFORE & AFTER ALTERATIONS].	1841/08/11	1/4"=1'	H 41.4, W 55.7 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-241-[A]	SKETCH / SHOWING PLAN, ELEVATION AND / LONGITUDINAL SECTION OF THE WASTE GATES AND SLUICES AT THE LOWER LOCKS DAM.	1887/06/13	1/4"=1'	H 57.6, W 65.2 CM	INK, GRAPHITE	CLOTHBACKED PAPER
C-118-241-[B]	PLAN OF / SLUICE-WAYS / [(ALSO ELEVATION & SECTIONS)] AT / LOWER LOCKS DAM / AS RECONSTRUCTED IN 1887.	1888/02/00	1"=1'	H 67, W 82.2 CM	INK, WATER COLOR, GRAPHITE	CLOTHBACKED PAPER

C-118-242	SKETCH / OF A / PROPOSED IMPROVEMENT ON THE LOWER LEVEL / OF / PAWTUCKET CANAL / AND OF THE / EASTERN CANAL.	1855/09/00	3/4"=100'	H 60.7, W 80.2 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	PAPER
C-118-245	[ELEVATION & PLAN OF] WASTEWAY AT THE LOWELL MANUFG. CO. MILLS.	1853/05/16	1/8"=1'	H 64.7, W 92.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-248	[PLAN OF] ROLLER / [& PARTS] FOR HAMILTON WASTE WAY.	1850/08/25	1/2"=1"	H 49.4, W 36.9 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-261	PLAN & SECTION / OF THE SWAMP LOCKS. [SHOWING THE UPPER & LOWER CHAMBERS & LINE OF SUPPOSED LEDGE.]	1840/01/00	1"=10'	H 51.2, W 75 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-262	[PLAN & SECTIONS OF] SWAMP LOCKS DAM.	1859/00/00	1"=1'		H 57.4, W 84.8 CM	INK, WATER COLOR, GRAPHITE
C-118-262	[PLAN & SECTIONS OF] SWAMP LOCKS DAM.	1859/00/00	1"=1'	H 57.4, W 84.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-263	SKETCH OF / A SUGGESTED IMPROVEMENT / OF THE / UPPER LEVEL OF PAWTUCKET CANAL.	1855/09/00	3/4"=100'	H 60.7, W 79.3 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-118-264	PROFILE OF MECHANICS STREET [(LOWER BROADWAY) SHOWING SUPPOSED SURFACE OF ROCK IN CONNECTION WITH SUGGESTED FEEDER FROM WESTERN TO MERRIMACK CANAL].	1855/09/06	H1"=50', V1"=10'		H 40.4, W 53.5 CM	INK, GRAPHITE

C-118-264	PROFILE OF MECHANICS STREET [(LOWER BROADWAY) SHOWING SUPPOSED SURFACE OF ROCK IN CONNECTION WITH SUGGESTED FEEDER FROM WESTERN TO MERRIMACK CANAL].	1855/09/06	H1"=50', V1"=10'	H 40.4, W 53.5 CM	INK, GRAPHITE	PAPER
C-118-265	SKETCH OF THE / WESTERN CANAL / WIDENED TO 60 FEET AS SUGGESTED / TOGETHER WITH THE / FEEDER SUGGESTED / IN / MECHANICS ST. [(LOWER BROADWAY) FROM THE WESTERN TO THE MERRIMACK CANAL]	1855/09/00	1 1/2"=200'	H 60.7, W 80.5 CM	INK, WATER COLOR, COLORED INK	PAPER
C-118-267	SECTION OF TREMONT DAM WITH THE PROPOSED ALTERATION.	1845/04/01	1/4"=1'	H 37.5, W 49.9 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER
C-118-269-01	[PLAN OF TREMONT] GATES FOR WESTERN CANAL.	1855/05/22	1/4 SIZE	H 77, W 107.2 CM	INK, WATER COLOR	PAPER
C-118-269-02-[A]	[PLAN OF TREMONT] GATES FOR WESTERN CANAL [SHOWING HOISTING APPARATUS].	1855/05/05	1/8"=FULL SIZE	H 62.5, W 83 CM	INK, GRAPHITE, COLORED INK	PAPER
C-118-269-02-[B]	[UNTITLED PLAN.] [PLAN OF TREMONT GATES WITH SECTION ANS ELEVATION SHOWING HOISTING APPARTUS].	SEE NOTES	NONE	H 64, W 84.8 CM	INK, GRAPHITE, WATER COLOR, COLORED INK	PAPER
C-118-269-03	PLAN OF TREMONT GATES.	1855/04/00	3/8"=1'	H 94, W 60 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	PAPER

C-118-270	[PLAN OF TREMONT] GATES FOR WESTERN CANAL. [UNTITLED PLAN.]	1855/06/00	1/3"=1'	H 90.3, W 36 CM	INK, GRAPHITE, COLORED INK	PAPER
C-118-270-01	[ELEVATION OF ARCHES OF GATE HOUSE.]	1855/00/00	NONE	H 68, W 92.8 CM	INK, GRAPHITE	PAPER
C-118-270-02	[PLAN OF COURSES OF STONE OF ARCHES] GATES FOR WESTERN CANAL.	1855/05/26	1/2"=1'	H 30.4, W 83.4 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-271	[OLD PLANS OF LOWER PAWTUCKET & EASTERN CANALS, ALSO SHOWING CONCORD & MERRIMACK RIVER.]	UNDATED				
C-118-272	[UNTITLED PLAN.] [OLD PLANS OF LOWER PAWTUCKET & EASTERN CANALS, ALSO SHOWING CONCORD & MERRIMACK RIVER.]	1832/03/21	3/4"=50'	H 54, W 74.1 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-118-273	TREMONT GATES [SECTIONS OF GATE HOUSE SHOWING PART OF HOISTING APPARATUS.]	1855/00/00	NONE		H 40.4, W 53 CM	INK, GRAPHITE
C-118-273	TREMONT GATES [SECTIONS OF GATE HOUSE SHOWING PART OF HOISTING APPARATUS.]	1855/00/00	NONE	H 40.4, W 53 CM	INK, GRAPHITE	PAPER
C-118-275	[UNTITLED PLAN.] [SKETCH PLAN SHOWING HICKEY HALL LOCKS, DAM & VICINITY.]	UNDATED	1"=60'	H 44.3, W 54.9 CM	INK, GRAPHITE	PAPER
C-118-276	SECTION / OF / DAM AND BRIDGE / AT THE / LAWRENCE MFG. CO'S WASTEWAY.	1856/05/08	1"=2'		H 39.4, W 87.1 CM	INK, GRAPHITE, WATER COLOR
C-118-276	SECTION / OF / DAM AND BRIDGE / AT THE / LAWRENCE MFG. CO'S WASTEWAY.	1856/05/08	1"=2'	H 39.4, W 87.1 CM	INK, GRAPHITE, WATER COLOR	PAPER

C-118-277	SECTION OF THE WESTERN CANAL LOWER LEVEL [AND] SECTION OF THE SUFFOLK RACEWAY / AT THE LOWER END.	UNDATED	1"=4'	H 19.4, W 56.6 CM	INK, GRAPHITE	PAPER
C-118-278	[UNTITLED PLAN.] [ORIGINAL SURVEY OF WESTERN CANAL.]	UNDATED	NONE	H 44.9, W 28.2 CM	INK, GRAPHITE, COLORED INK	PAPER
C-118-279	SECTION OF PROPOSED ENLARGEMENT OF PART OF THE WESTERN CANAL.	1877/06/26	1"=5'	H 33.9, W 66 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-280	[DRAWING OF] WHEEL FOR GATE AT SWAMP LOCKS DAM, SHOWING FINISHED DIMENSIONS.	1919/10/06	6"=1'	H 41.1, W 43.7 CM	INK, COLORED INK, GRAOHITE	DRAFTING CLOTH
C-118-287	PROPOSED LAYOUT FOR CONTROL OF THE TREMONT GATES / FROM THE LAWRENCE DAM.	1934/12/12	1"=60', 1/2"=12"	H 30.7, W 83.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-118-287-[A]	REMOTE CONTROL OF TREMONT GATES.	1934/12/12	NONE	H 27.4, W 21.2 CM	INK, GRAPHITE	PAPER
C-118-287-[COPY 1]	PROPOSED LAYOUT FOR CONTROL OF THE TREMONT GATES / FROM THE LAWRENCE DAM.	1934/12/12	1/2"=12", 1"=60'	H 31.1, W 82.6 CM	BLUEPRINT, COLORED PENCIL, COLORED INK, GRAPHITE	PAPER
C-118-288	[PLAN AND SECTIONS OF TREMONT GATES AND WELL SHOWING PIPING TO GUAGE IN WELL TO DETERMINE HEIGHT OF WATER ON GATE SILL, JUNE, 1868.] COPY OF / PAGES 6 & 7 FROM LOCKS & CANALS / RECORD BOOK "TURBINE TESTS ETC. 1868-77."	19341924/01/02	NONE	H 31.1, W 50.6 CM	INK	DRAFTING CLOTH

C-118-289	PRESENT LOWER LOCKING GATES / AT / LOWER LOCKS DAM.	1951/00/00	1"=1', 1/2"=1'	H 59.7, W 80.1 CM	INK. COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-118-290	PROPOSED PLAN SHOWING / STEEL FRAME FOR NO.3 LOCKING GATES / AT THE / LOWER LOCKS DAM.	1953/03/00	1"=1', 3"=1',1/2"=1'	H 78.3, W 83.7 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-118-290-[COPY 1]	PROPOSED PLAN SHOWING / STEEL FRAME FOR NO. 3 LOCKING GATES / AT THE / LOWER LOCKS DAM.	1953/03/00	1",1/2" & 3"=1'	H 77.5, W 82.8 CM	BLUE LINE PRINT	PAPER
C-118-339	SECTION OF THE [OLD] TREMONT DAM.	1845/04/01	1/4"=1'	H 35.3, W 50.7 CM	INK, GRAPHITE	PAPER
C-118-340	[PLAN SHOWING] SECTION OF CONCORD RIVER DAM [OLD DAM AT LOWER LOCKS WITH LINE OF NEW DAM SHOWN IN RED.]	1841/08/11	1/4"=1'	H 35.7, W 50.6 CM	INK, COLORED INK, GRAPHITE	PAPER
C-118-341	PLAN OF DAM AT END OF BOOTT CANAL.	1836/00/00	1"=4'		H 49, W 62.5 CM	INK, COLORED INK
C-118-341	PLAN OF DAM AT END OF BOOTT CANAL.	1836/00/00	1"=4'	H 49, W 62.5 CM	INK, COLORED INK	PAPER
C-118-342	PLAN OF DAM FROM THE [END OF] MERRIMACK CANAL / NEAR THE MERRIMACK MILLS / LOWELL MASS.	1836/05/10	NONE	H 49.2, W 62.4 CM	INK, GRAPHITE, COLORED INK	PAPER

C-118-343	[SECTION OF] DAM IN [END OF] MERRIMACK CANAL-HAS STOOD WELL- / BUILT IN 1835.	SEE TITLE	3/4"=1'	H 35.5, W 51 CM	INK	PAPER
C-118-344	PROFILE OF DAM AT THE END OF BOOTT CANAL / HAS STOOD WELL- / BUILT IN 1835.	SEE TITLE	5/8"=1'	H 50.7, W 71.1 CM	INK	PAPER
C-119-012	[PROPS. OF LOCKS AND CANALS. GRIST MILL. FILE NO. 100. GENERAL PLAN OF WATERWAYS.]	1915/07/25			BLUEPRINT	PAPER
C-119-013	[PROPS. OF LOCKS AND CANALS. GRIST MILL-FILE NO. 100. TRANSVERSE SECTIONAL ELEVATION-SCHEME NO. 2.]	1915/07/00			BLUEPRINT	PAPER
C-119-336	[EXAMINATION OF FORE BAY OF GRIST MILL BY W. E. BADGER].	1907/06/12				
C-119-337	[PLAN OF GRIST MILL WHEEL SHOWING REPAIRS MADE DURING JULY & AUGUST].	1907/00/00				
C-119-338	[PLAN OF FOUNDATION OF GRIST MILL].	1857/04/26	1/2"=1'			
C-119-339	[PLAN & ELEVATION OF CENTER VENT WHEEL FOR GRIST MILL.][PROPS. OF LOCKS AND CANALS. CENTER VENT WHEEL FOR GRIST MILL.]	1857/04/28	1/8 FULL SIZE			PAPER
C-119-340	[PLAN & ELEVATION OF CENTER VENT WHEEL FOR GRIST MILL.(FIRST SKETCH).][PROPS. OF LOCKS AND CANALS. CENTER VENT WHEEL FOR GRIST MILL.]	1857/04/18	1/8 FULL SIZE			PAPER

C-119-341	[FORM OF FLOATS FOR CENTER VENT WHEEL.][PROPS. OF LOCKS AND CANALS. FORM OF FLOATS FOR CENTRE VENT WHEEL FOR GRISTMILL.]	1857/04/28	FULL SIZE		PAPER
C-119-342	[PLAN OF CENTER VENT WHEEL (SCROLL) & SECTIONS OF THE PENSTOCK.][PROPS. OF LOCKS AND CANALS. CENTER VENT WHEEL FOR GRIST MILL (SCROLL).]	1857/04/28			PAPER
C-119-343	[ELEVATION & SECTION OF WINDOWS OF GRIST MILL.] [PROPS. OF LOCKS AND CANALS. GRISTMILL-WINDOWS.]	1857/05/08			PAPER
C-119-344	[SKETCH OF GRIST MILL (ELEVATION).] [PROPS. OF LOCKS AND CANALS. GRIST MILL-SIDE VIEW AND FOUNDATION.]	UNDATED			PAPER
C-119-345	[GROUND PLAN OF GRIST MILL.] [PROPS. OF LOCKS AND CANALS. GRIST MILL GROUND PLAN.]	1857/05/02			PAPER
C-119-346	[GROUND PLAN OF GRIST MILL.] [PROPS. OF LOCKS AND CANALS. GRIST MILL.]	1857/05/05			DRAFTING CLOTH
C-119-347	[FRONT ELEVATION SKETCH OF GRIST MILL] [PROPS. OF LOCKS AND CANALS. GRIST MILL.]	UNDATED			PAPER
C-119-348	[FRONT ELEVATION SKETCH OF GRIST MILL] [PROPS. OF LOCKS & CANALS. GRIST MILL. WATER COLOR OF FRONT OF BUILDINGS.]	1857/06/09		WATER COLOR	PAPER
C-119-349	[UPRIGHT SHAFT FOR WATERWHEEL FOR GRIST MILL.] [PROPS. OF LOCKS AND CANALS. UPRIGHT SHAFT FOR WATERWHEEL OF GRIST MILL.]	1857/06/00			PAPER

C-119-350	[PLAN OF ROOF FOR GRIST MILL.] [PROPS. OF LOCKS AND CANALS. ROOF FOR GRIST MILL.]	1857/07/06	PAPER
C-119-351	[SECTION THRU GABLE OF ROOF, SHOWING MIDDLE & HIGHEST BRACKETS.] [PROPS. OF LOCKS AND CANALS. SECTION THROUGH GABLE SHOWING THE MIDDLE AND HIGHEST BRACKET.]	UNDATED	PAPER
C-119-352	[PLAN OF BASEMENT, SHOWING POSITION OF WHEEL, MILL STONE, & GEARING OF WHEEL WITH BRACES.] [PROPS. OF LOCKS AND CANALS. GRIST MILL-PLANS OF BASEMENT.]	1857/09/00	PAPER
C-119-353	[HORIZONTAL SECTION OF WHEEL & PENSTOCK OF GRIST MILL WHEEL.] [PROPS. OF LOCKS AND CANALS. GRIST MILL-HORIZONTAL SECTION OF WHEEL AND PENSTOCK AT CD.]	1857/09/00	PAPER
C-119-354	[PLAN & SECTION OF BASEMENT SHOWING POSITION OF WHEEL IN PLACE.] [PROPS. OF LOCKS & CANALS. GRIST MILL. SECTION OF BASEMENT AT AB.]	1857/09/00	PAPER
C-119-355	[SCALE FOR THE INDEX OF THE DIRECTION OF THE WATER LEAVING THE GRIST MILL WHEEL.] [PROPS. OF LOCKS AND CANALS. SCALE FOR THE INDEX OF THE DIRECTION OF THE WATER LEAVING THE GRIST MILL WHEEL.]	1857/10/05	PAPER

C-119-356	[FRONT ELEVATION OF ROOF OF GRIST MILL.] [PROPS. OF LOCKS AND CANALS. CROSS SECTION OF GRIST MILL ATTIC.]	UNDATED	PAPER
C-119-357	[INDEX TO BE ATTACHED TO THE VANE FOR INDICATING THE DIRECTION OF THE WATER LEAVING THE WHEEL.] [PROPS. OF LOCKS AND CANALS. INDEX TO BE ATTACHED TO THE VANE FOR INDICATING THE DIRECTION IN WHICH THE WATER LEAVES THE GRIST MILL WHEEL.]	1857/10/05	PAPER
C-119-358	[PLAN OF THE VANE TO BE USED IN EXPERIMENTS WITH WHEEL.] [PROPS. OF LOCKS AND CANALS. PLAN OF THE VANE TO BE USED IN EXPERIMENTS WITH THE GRIST MILL WHEEL, SHOWING THE ANGLE TO BE MADE BY THE VANE WITH THE ARM NEAR THE STEP.]	1857/10/08	PAPER
C-119-359	[PLAN & SECTION THRU GRIST MILL.] [PROPS. OF LOCKS AND CANALS. SKETCHES AND DETAILS FOR THE GRIST MILL.]	UNDATED	PAPER
C-119-360	[PROPS. OF LOCKS AND CANALS. GRIST MILL VANE.]	UNDATED	PAPER

C-119-360-A	[PLAN OF VANE TO INDICATE THE DIRECTION OF THE WATER LEAVING THE GRIST MILL WHEEL.][PROPS. OF LOCKS AND CANALS. VANE TO INDICATE THE DIRECTION OF THE WATER LEAVING THE GRIST MILL WHEEL (COPY).]	1857/10/02	PAPER
C-119-361	[PLAN OF VANE TO INDICATE THE DIRECTION OF THE WATER LEAVING THE GRIST MILL WHEEL.][PROPS. OF LOCKS AND CANALS. VANE TO INDICATE THE DIRECTION OF THE WATER LEAVING THE GRIST MILL WHEEL.]	1857/10/02	PAPER
C-119-362	[PLAN SHOWING TRUSS FOR HOLDING UP ADDITION TO GRIST MILL.]	UNDATED	
C-119-363	[SIDE ELEVATION OF GRIST MILL.(SOUTH).] [PROPS. OF LOCKS AND CANALS. GRIST MILL, SIDE VIEW.]	UNDATED	PAPER
C-119-364	[FRONT ELEVATION OF GRIST MILL.] [PROPS. OF LOCKS AND CANALS. GRIST MILL.]	UNDATED	PAPER
C-119-365	[NORTH SIDE ELEVATION OF GRIST MILL.] [PROPS. OF LOCKS AND CANALS. GRIST MILL. E.C. CABOT, ARCHITECT, BOSTON, MASS.]	0000/06/09	PAPER
C-119-366	[SKETCH OF WINDOW SASH SUPPOSED TO BE FOR GRIST MILL.] [PROPS. OF LOCKS AND CANALS. GRIST MILL-ONE SASH.]	UNDATED	PAPER
C-119-368	[PLAN OF CURB PUT IN GRIST MILL WHEEL IN 1884.] [PROPS. OF LOCKS AND CANALS. CURB FOR GRSIT MILL WHEEL, PUT IN 1884.]	SEE TITLE	DRAFTING CLOTH

C-119-369	[GATE FOR GRIST MILL WHEEL PUT IN 1884.] [PROPS. OF LOCKS AND CANALS. GATE FOR GRIST MILL WHEEL, PUT IN IN 1884.]	SEE TITLE		PAPER
C-119-370	[PLAN OF ADDITION TO GRIST MILL.] [PROPS. OF LOCKS AND CANALS. ADDITION TO GRIST MILL.]	1892/00/00		PAPER
C-119-370-01	[PLAN SHOWING PROPOSED ARRANGEMENT OF A 30" C.R.H. SWING GATE VERTICAL HERCULES TURBINE FOR THE L. & C. GRIST MILL.] [PROPS. OF LOCKS & CANALS. ARRANGEMENT OF VERTICAL WHEEL, ETC., IN GRIST MILL. H. M. CO.-WORCESTER, MASS.]	1915/10/01		DRAFTING CLOTH
C-119-370-02	[PLAN SHOWING PROPOSED ARRANGEMENT OF A 30" C.R.H. SWING GATE VERTICAL HERCULES TURBINE FOR THE L.& C. GRIST MILL.] [PROPS. OF LOCKS AND CANALS. PROPOSED ARRANGEMENT OF THE 30 C.R.H. SWING GATE VERTICAL HERCULES TURBINE, HOLYOKE MACHINE CO.]	1915/10/01	BLUEPRINT	PAPER
C-119-371	[PROPS. OF LOCKS AND CANALS. FIRST FLOOR PLAN OF GRIST MILL.]	1946/08/09		PAPER
C-119-372	[PROPS. OF LOCKS AND CANALS. SECOND FLOOR PLAN OF GRIST MILL.]	1946/08/09		PAPER

C-119-373	[PROPS. OF LOCKS AND CANALS. ATTIC FLOOR PLAN OF GRIST MILL.]	1946/08/09	PAPER
C-119-373-A	[PROPS. OF LOCKS AND CANALS. LOCKS AND CANALS GRIST MILL BUILDING. PLAN. FRENCH ST., LOWELL, MASS.]	1946/07/30	PAPER
C-119-382	[PLAN & SECTIONS OF CISTERN CONNECTED WITH KYANIZING TANKS.] [PROPS. OF LOCKS AND CANALS. CISTERN CONNECTED WITH KYANIZING TANKS.]	1848/06/08	PAPER
C-119-383	[PLAN & SECTION OF KYANIZING TANKS SHOWING DIMENSIONS.] [PROPS. OF LOCKS AND CANALS. PLAN OF KYANIZING TANKS.]	1848/06/06	PAPER
C-119-384	[PUMP FOR KYANIZING TANK.]	1848/09/27	
C-119-385	[PLAN FOR HEADS OF THE BURNETTIZING TANK TO BE BUILT.] [PROPS. OF LOCKS AND CANALS. PLAN FOR THE HEAD OF THE BURNETTIZING TANK TO BE BUILT FOR THE PROPS. OF LOCKS AND CANALS.]	1849/12/31	PAPER
C-119-386	[PLAN FOR HEADS OF THE BURNETTIZING TANK TO BE BUILT.] [PROPS. OF LOCKS AND CANALS. PLAN OF THE HEADS OF THE BURNETTIZING TANKS TO BE BUILT FOR THE PROPS. OF LOCKS AND CANALS.]	1849/12/31	PAPER
C-119-387	[PLAN OF ROSIN OIL WORKS.] [PROPS. OF LOCKS AND CANALS. RESIN OIL WORKS.]	UNDATED	PAPER

C-119-395 OVERSIZE	[CAR FOR BURNETTIZING TANK.] [PROPS. OF LOCKS AND CANALS. CAR FOR BURNETTIZING TANK.] [STILL FOR ROSIN OIL.] [PROPS. OF LOCKS AND CANALS. STILL FOR ROSIN OIL FOR PROPS. OF LOCKS AND	1850/02/28	PAPER
C-119-396	CANALS.]	1852/06/25	PAPER
C-119-400	[DIPLOMA FROM THE MIDDLESEX MECHANIC ASSOCIATION GIVEN TO THE L.& C. FOR WORK IN BURNETTIZING.] [PROPS. OF LOCKS AND CANALS. AWARD READING "THE MIDDLESEX MECHANIC ASSOCIATION AWARD THIS DIPLOMA TO PROPRIETORS OF LOCKS AND CANALS ON THE (SEE NOTES)	1856-1857/00/00	PAPER
C-119-401	[PLAN & SECTION OF BRICK KYANIZING TANK.] [PROPS. OF LOCKS AND CANALS. BRICK KYANIZING TANK AT KYANIZING WORKS OF PROPS. OF LOCKS AND CANALS, LOWELL, MASS., AS CONSTRUCTED IN 1887."	1887/03/28	DRAFTING CLOTH
C-120-2650	[PATENT IMPROVING EFFICIENCY OF WATER ACTUATING THE TURBINE & LIABILITY TO ACCIDENT DIMINISHED.] [U.S. PATENT OFFICE. PATENT NO. 5144 ISSUED TO URIAH ATHERTON BOYDEN FOR IMPROVEMENTS IN TURBINES, WHEREBY THE EFFICIENCY OF WATER IN ACTUATING....ETC.	1947/06/05	PAPER

C-120-2651	[PATENT FOR DIFFUSER FOR WHEEL.] [U.S. PATENT OFFICE. PATENT ISSUED TO URIAH ATHERTON BOYDEN FOR DIFFUSERS FOR WATER WHEELS.]	1847/12/23	PAPER
C-120-2652	[PATENT SELF-ADJUSTING BEARING FOR SUSTAINING AXLES & WHEELS.] [U.S. PATENT OFFICE. PATENT NO. 5068 ISSUED TO URIAH BOYDEN FOR IMPROVEMENT IN HANGING SHAFTS OF WATER WHEELS.]	1847/12/23	PAPER
C-120-2653	[PATENT ON HYDRAULIC MOTORS CALLED PONCELET TURBINES.] [U.A. BOYDEN'S IMPROVEMENTS IN HYDRAULIC MOTORS. NO. 10.027.]	1853/09/20	DRAFTING CLOTH
C-120-2654	[PATENT ON IMPROVEMENTS ON TURBINES.] [U.A. BOYDEN'S IMPROVEMENTS IN TURBINES. NO. 10.026.]	1853/09/20	DRAFTING CLOTH
C-120-2655	[PATENT IMPROVING EFFICIENCY OF WATER ACTUATING THE TURBINE & LIABILITY TO ACCIDENT DIMINISHED.] [IMPROVEMENTS IN TURBINES, WHEREBY THE EFFICIENCY OF WATER IN ACTUATING THEM IS INCREASED, AND THE COST OF CONSTRUCTING THEM, DIMINISHED. NO. 10.025.]	1853/09/20	DRAFTING CLOTH
C-120-2658	[PLAN OF WHEEL PIT FOR ATLANTIC MILLS.] [ATLANTIC COTTON MILLS. PLAN FOR WHEELPIT OF ATLANTIC COTTON MILLS.]	1847/03/00	PAPER

C-120-2659	[PART OF GUIDES OF ATLANTIC TURBINE NO.3.] [ATLANTIC TURBINE NO. 3, PART OF GUIDES.] [VERTICAL SECTION THRU AXIS OF TURBINE NO.3.]	SEE NOTES	PAPER
C-120-2660	[ATLANTIC COTTON MILLS, PART OF THE TURBINE NO. 3 AT THE ATLANTIC COTTON MILLS, NUMBER 1 AND 2, VERTICAL AXIS OF WHEEL. DRAWN FROM WRITTEN DIMENSIONS ON A DESIGN OF U.A. BOYDEN BY DR. HAEFFELY.]	1856/01/30	PAPER
C-120-2661	[FORM OF THE FLOATS FOR TURBINE NO.3.] [ATLANTIC COTTON MILLS. FORM OF THE FLOATS FOR TURBINE NO. 5 AT THE ATLANTIC COTTON MILLS, LAWRENCE, MASS.]	1856/06/23	PAPER
C-120-2664 OVERSIZE	[DIAGRAM TO ASSIST IN COMPREHENDING BOYDEN'S MATHEMATICAL METHOD FOR COMPUTING THE FLOW OF WATER THRU TURB. NO. 5 IN ATLANTIC MILLS.] [DIAGRAM TO ASSIST IN COMPREHENDING BOYDEN'S MATHEMATICAL METHOD FOR COMPUTING THE FLOW OF WATER THROUGH...(SEE NOTES)	1856/01/25	PAPER
C-120-2665	[DESIGN FOR TURBINE NO.3.] [DESIGN FOR TURBINE NO. 3 FOR THE ATLANTIC COTTON MILLS, NUMBERS ONE AND TWO, BY U. A. BOYDEN, COMPILED BY M. L. C. WILDS.	UNDATED	PAPER

C-120-2666 OVERSIZE	[SECTIONAL PLAN OF DESIGN FOR TURBINE FOR NO.3.] [DESIGN FOR TURBINES FOR THE ATLANTIC COTTON MILLS NUMBERS 1 AND 2, SHEET NO. 83, DIFFUSER AND PARTS CONNECTED WITH IT FOR TURBINE NO. 3.]	UNDATED	PAPER
C-120-2667 OVERSIZE	[SECTIONAL PLAN OF DESIGN FOR TURBINE FOR NO.3.] [DESIGN FOR TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 AND 2, BY U.A. BOYDEN. NO. 83, DIFFUSER AND PARTS CONNECTED WITH IT FOR TURBINE NO. 3.]	UNDATED	PAPER
C-120-2668	[VERTICAL SECTION THRU ONE SIDE OF GATE OF TURB. NO.3.] [DESIGN FOR TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 AND 2, SHEET 85, BY U. A. BOYDEN.]	UNDATED	PAPER
C-120-2669	[VERTICAL SECTION OF FLUME & SOME PARTS CONNECTED WITH IT FOR TURBINE NO.3.] [DESIGN FOR TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 AND 2, SHEET 67. BY U. A. BOYDEN.]	UNDATED	PAPER
C-120-2672	[PLAN OF UPPER BEAMS FOR SUSTAINING THE WHEEL & SHAFT TOGETHER WITH OTHER PARTS OF TURBINE NO.3.] [DESIGN FOR PARTS CONNECTED WITH THE TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 AND 2, BY U. A. BOYDEN, SHEET 18.]	UNDATED	PAPER

C-120-2673	[PLAN OF UPPER BEAMS FOR SUSTAINING THE WHEEL & SHAFT TOGETHER WITH OTHER PARTS OF TURBINE NO.3.] [DESIGN FOR PARTS CONNECTED WITH THE TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 & 2, BY U. A. BOYDEN, SHEET 18.]	UNDATED	PAPER
C-120-2674	[PLAN OF UPPER BEAMS FOR SUSTAINING THE WHEEL & SHAFT TOGETHER WITH OTHER PARTS OF TURBINE NO.3.] [DESIGN FOR PARTS CONNECTED WITH THE TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 & 2, SHEET 17.]	UNDATED	PAPER
C-120-2675	[SECTIONAL PLAN OF UPPER BEAMS FOR SUSTAINING THE WHEEL & SHAFT TOGETHER WITH OTHER PARTS OF TURBINE NO.3.] [DESIGN FOR PARTS CONNECTED WITH THE TURBINES FOR THE ATLANTIC COTTON MILLS, NUMBERS 1 AND 2, BY U. A. BOYDEN.]	UNDATED	PAPER
C-121-2689	[PATTERN OF BUCKET OUTLET OF A 72" SWAIN AT HAMILTON MFG. CO.] [HAMILTON MANUFACTURING COMPANY, BUCKET NO. 10, PATTERN NO. 1, SHEET WITH BROWN CARDBOARD CUT-OUTS.]	1894/06/00	PAPER, CARDBOARD

C-121-2690	[PATTERN OF BUCKET OUTLET OF A 45" McCORMICK WHEEL AT MERRIMACK MFG. CO.] [MERRIMACK MANUFACTURING COMPANY. OUTLINE OF BUCKET OUTLET FOR 45 INCH McCORMICK WHEEL AT MERRIMACK M. CO. BROWN CARDBOARD CUT-OUT MOUNTED.]	1896/00/00	PAPER, CARDBOARD
C-121-2690	[PATTERN OF BUCKET OUTLET OF 54" HERCULES WHEEL PUT IN LAWRENCE MFG. CO. MILL NO. 5.]	1896/00/00	
C-121-2691	[THE FOLLOWING PATTERNS OF 42" HERCULES AT MERRIMACK MFG: BUCKET OUTLET. OPENING BETWEEN BUCKET AT PLACE OF FINAL DISCHARGE. INTERSECTION OF UNDER SIDE OF BUCKET WITH HUB. FLANGE ON BUCKET.] [MERRIMACK MANUFACTURING COMPANY. BUCKET.]	1894/02-03/00	PAPER, CARDBOARD
C-121-2692	[PLAN & ELEVATION OF POWER LOOM FOR YARD WIDE SHEETING BY THE LOWELL MACHINE SHOP.] [LOWELL MACHINE SHOP. POWER LOOM FOR YARD WIDE SHEETING BY THE LOWELL MACHINE SHOP.]	UNDATED	PAPER
C-121-2693 OVERSIZE	[PATTERNS OF BUCKET OUTLET & OTHER OPENINGS OF 54" VICTOR AT TREMONT & SUFFOLK MILLS.] [TREMONT & SUFFOLK MILLS. BUCKET OUTLINES FOR TREMONT AND SUFFOLK MILLS.]	1895/00/00	PAPER, CARDBOARD

C-121-2694	[VERTICAL SECTION OF DESIGN FOR TURBINE FOR SALMON FALLS MFG. CO'S MILL NO. 2.] [SALMON FALLS MANUFACTURNG COMPANY. DESIGN FOR TURBINES FOR THE SALMON FALLS MANUFACTURING CO.'S MILL NO. 2.]	UNDATED	PAPER
C-121-2695	[DESIGN FOR THROTTLES IN THE PENSTOCK OF THE ESSEX COMPANY'S MACHINE SHOP & BLACKSMITH SHOP.] [DESIGN FOR THROTTLES IN THE PENSTOCKS OF THE ESSEX CO.'S MACHINE SHOP AND BLACKSMITH SHOP.]	UNDATED	PAPER
C-121-2696	[PATTERN OF BUCKET OUTLET FOR 39" McCORMICK WHEEL PUT IN THE APPLETON MFG. CO. IN 1895.] [APPLETON COMPANY. OUTLINE FOR BUCKET OF 39 INCH McMORMICK WHEEL PUT IN APPLETON CO.'S MILLS.]	1895/00/00	PAPER, CARDBOARD
C-121-2697	[PATTERN OF BUCKET OUTLET OF L.H. 54" SWAIN WHEEL PUT IN HAMILTON MFG. CO.]	1901/08/02	
C-121-2697 OVERSIZE	[PATTERN OF BUCKET OUTLET OF R.H. 54" McCORMICK WHEEL PUT INTO APPLETON CO'S NO. 1 PIT.] [APPLETON COMPANY. PATTERN OF NO. 14 BUCKET OUTLET OF R.H. 54" McCORMICK WHEEL PUT INTO APPLETON CO.'S NO. 1 PIT.]	1900/12/00	PAPER, CARDBOARD

C-121-2698	[DESIGN FOR TURBINES FOR THE AMOSKEAG MANFG. CO. FOR MILL NO.4. SECTION THRU & PARALLEL WITH AXIS OF WATER WHEEL.] [AMOSKEAG MANUFACTURING COMPANY. DESIGN FOR TURBINE FOR THE AMOSKEAG MANG. CO'S NEW MILL NO. 4, SHEET 8.]	UNDATED	PAPER
C-121-2699	[DESIGN FOR TURBINE FOR TILESTON & HOLLINGWORTH'S UPPER MILL (VERT. SECT.).] [TILESTON AND HOLLINGSWORTH COMPANY. DESIGN FOR A TURBINE FOR TILESTON AND HOLLINGSWORTH'S UPPER MILL, SHEET 2.]	UNDATED	PAPER
C-121-2700	[DESIGN FOR TILESTON & HOLLINGSWORTH'S UPPER MILL. [ALSO] SECTION THRU SIDE OF GATE, DISC, & WHEEL.] [TILESTON AND HOLLINGSWORTH COMPANY. DESIGN FOR A TURBINE FOR TILESTON AND HOLLINGSWORTH'S UPPER MILL.]	UNDATED	PAPER
C-121-2701	[DESIGN FOR TURBINE FOR N.E. WORSTED CO. & SUNCOOK MFG. CO. (VERTICAL SECTION).] [NEW ENGLAND WORSTED COMPANY. DESIGN FOR TURBINES FOR THE NEW ENGLAND WORSTED CO. AND FOR THE SUNCOOK MANUFACTURING CO., SHEET 3.]	1849/03/07	PAPER

C-121-2702 OVERSIZE	[PLAN & ELEVATION OF APPARATUS USED TO TEST THE WESTERLY PAIR OF 42" RODNEY-HUNT TURBINES AT APPLETON COMPANY.] [APPLETON COMPANY. APPARATUS USED IN TESTING THE WESTERLY PAIR OF 42 INCH RODNEY HUNT TURBINES AT THE APPLETON CO.]	1892/08-09/00		PAPER
C-121-2703	[FULL SIZE PATTERNS OF BUCKET OUTLETS OF 36" TYPE C, HERCULES, R.H. & L.H., FOR HAMILTON MFG. CO.] [HAMILTON MANUFACTURING COMPANY. FULL SIZE PATTERN, BUCKET OUTLET OF RIGHT AND LEFT HAND, 36 INCH TYPE C HERCULES WHEEL FOR HAMILTON MFG. CO.]	1907/06/00		PAPER, CARDBOARD
C-121-2704	[PLAN & SECTIONS OF COFFER DAM AT TURNERS FALLS, MASS.] [COFFER DAM AT TURNERS FALLS, MASS.]	1867/00/00	1/8"=1'	PAPER
C-121-2705	[PATTERN OF BUCKET OUTLET OF NO.3 UNIT (L.H.) AT BIGELOW HARTFORD CO.(COLUMBIA TEXTILE).] [TEMPLATE OF BUCKET OUTLET, INSTALLED IN NO. 3 UNIT, ABOUT AUGUST, 1913.]	1913/00/00		PAPER
C-121-2705-A	[HAMILTON MANUFACTURING COMPANY. 54 INCH SWAIN WHEEL, MEASURED AUGUST 2, 1901, BY G.W. MANSUR AND A.L. CHENEY, TO REPLACE HAMILTON NO. 4, 88 INCH BOYDEN BUCKET OUTLET.]	1901/08/02		PAPER

C-121-2708	[PLAN, SECTIONS & ELEVATIONS OF APPARATUS FOR INDICATING CHANGES IN DIRECTIONS IN WHICH WATER RUNS PRODUCED BY OBSTRUCTIONS.] [APPARATUS FOR INDICATING THE CHANGES IN THE DIRECTIONS IN WHICH WATER RUNS PRODUCED BY OBSTRUCTIONS, SHEET 1.]	UNDATED	PAPER
C-121-2709	[PLAN, SECTIONS & ELEVATIONS OF APPARATUS FOR INDICATING CHANGES IN DIRECTIONS IN WHICH WATER RUNS PRODUCED BY OBSTRUCTIONS.] [APPARATUS FOR INDICATING THE CHANGES IN THE DIRECTIONS IN WHICH WATER RUNS PRODUCED BY OBSTRUCTIONS, SHEET 2.]	UNDATED	PAPER
C-121-2710	[PLAN, SECTIONS & ELEVATIONS OF APPARATUS FOR INDICATING CHANGES IN DIRECTIONS IN WHICH WATER RUNS PRODUCED BY OBSTRUCTIONS.] [APPARATUS FOR INDICATING THE CHANGES IN WHICH WATER RUNS PRODUCED BY OBSTRUCTIONS, SHEET 4.]	UNDATED	PAPER

C-121-2717	[DESIGN FOR A HYDRAULIC MOTOR FOR DRIVING MACHINERY AT MESSERS GAY, SILVER CO'S SHOPS AT NO. CHELMSFORD.] [GAY, SILVER AND COMPANY. DESIGN FOR A HYDRAULIC MOTOR FOR DRIVING MACHINERY AT MESSRS. GAY, SILVER AND CO'S SHOPS AT CHELMSFORD, SHEET 7.]	UNDATED		PAPER
C-121-2718	[DESIGN FOR HYDRAULIC MOTOR FOR DRIVING MACHINERY AT MESSERS GAY, SILVER CO'S SHOPS AT NO. CHELMSFORD.] [GAY, SILVER AND COMPANY. DESIGN FOR A HYDRAULIC MOTOR FOR DRIVING MACHINERY AT MESSRS. GAY, SILVER AND CO'S SHOPS AT CHELMSFORD, SHEET 8.]	UNDATED		PAPER
C-121-2722	[PLAN & ELEVATION OF CIRCULAR GUARD GATE FOR CANALS OF LARGE SECTION.] [PLAN AND ELEVATION OF A CIRCULAR GUARD GATE FOR CANALS OF LARGE SECTION, BOSTON.]	1839/07/19	1"=4'	PAPER
C-121-2724	[SKETCH OF A FOURNEYRON TURBINE COPIES FROM FRANKLIN JOURNAL.] [SKETCH OF A TURBINE-FOURNEYRON, BY JAMES J. DANA, DESIGNER.]	1845/01/17		PAPER
C-121-2725	[WATER WHEEL INVENTED BY JOHN DUMMER, LOWELL.] [WATER WHEEL, INVENTED BY JOHN DUMMER.]	1844/02/29		PAPER

C-121-2726 OVERSIZE	[SKETCH OF WATER WHEEL AT WALTHAM IMPORTED FROM ENGLAND IN 1821.]	1844/03/30	PAPER
C-121-2727	[VALENTINES LAST PATENT WHEEL AT SUNCOOK FACTORY, N.H.] [SUNCOOK MILLS. VALENTINE'S FACTORY, NEW HAMPSHIRE.]	1845/12/05	PAPER
C-121-2733 OVERSIZE	[PLAN & SECTION OF GEAR BY GEO. O. BUSSEY.] [APPLETON COMPANY. GEAR. 2929 PLAN.]	1846/09/00	PAPER
C-121-2734 OVERSIZE	[PLAN & HALF SECTION & HALF ELEVATION OF BEVEL GEAR BY GEO.O. BUSSEY.] [APPLETON COMPANY. GEAR.]	1846/09/00	PAPER
C-121-2738	[ELEVATION OF SHAFT, BEVEL GEARS & PARTS ATTACHED BY GEO. O. BUSSEY.] [UNIDENTIFIED MACHINERY.]	1846/06/00	PAPER
C-121-2739	[FRONT ELEVATION OF GUARD GATES AT MANCHESTER, N.H.] [GUARD GATES AT MANCHESTER.]	1846/08/27	PAPER
C-121-2742	[ELEVATION SHOWING WHEEL & WHEEL PIT OF GREAT FALLS CO. MILL NO.4.] [GREAT FALLS COMPANY. WHEELPIT OF GREAT FALS CO'S MILL NO. 4.]	1847/07/01	PAPER

C-121-2743 OVERSIZE	[PLAN & SECTION OF HOWD WHEEL BUILT BY SOUTHGATE & UPHAM OF WORCESTER TO GO TO HOPE VALLEY, R.I.] [SOUTHGATE AND UPHORN. HOWD WHEEL, BUILT BY SOUTHGATE AND UPHORN OF WORCESTER TO GO TO HOPE VALLEY NEAR BRAND'S IRON WORKS, RHODE ISLAND.]	1847/07/13		PAPER
C-121-2744	[U.S. WHEEL (VERT. SECT.). ALSO PLAN OF STEP.] [U.S. WHEEL.]	1847/03/30		
C-121-2745	[GAUGE FOR ACCURATE MEASUREMENT OF HEIGHT OF WATER.] [GAUGE FOR ACCURATE MEASUREMENT OF THE HEIGHT OF WATER.]	1849/09/10	FULL SIZE	PAPER
C-121-2746	[A SKETCH OF CORBALS GRAVITATION WATERWORKS SELF-REGULATING VALVE.] [CARBALS GRAVITATION WATERWORKS. SELF-REGULATING VALVE.]	1849/00/00		PAPER
C-121-2747	[SKETCHES SHOWING METHODS OF JOINING SHAFTING IN TRANSMITTING POWER. (IN FRENCH).] [TRANSMISSIONS DE MOUVEMENT.]	1849/09/00		PAPER
C-121-2749	[TUTTLE & HAVILAND WHEEL AT PEARSON MFG. CO. DRACUT.] [PEARSON MANUFACTURING COMPANY, DRACUT, MASS. TUTTLE AND HAVILAND WHEEL COPIED FROM A PLAN IN THE POSSESSION OF MR. BAKER.]	1850/03/02		PAPER

C-121-2750	[TUTTLE & HAVILAND WHEEL AT PEARSON MFG. CO. DRACUT.] [PEARSON MANUFACTURING COMPANY. TUTTLE AND HAVILAND WHEEL, PLAN DRAWN FROM MEASUREMENTS MADE BY J. B. FRANCIS.]	1850/05/01	PAPER
C-121-2751	[TURBINE FOR MEXICO-40 FLOATS, 25 GUIDES.] [TURBINE FOR MEXICO, 40 FLOATS, 25 GUIDES.]	1854/02/11	PAPER
C-121-2754	[VERT. SECTION OF TURBINE AT NASHUA MFG. CO.] [NASHUA MANUFACTURING COMAPNY. SECTION THROUGH AND PARALLEL WITH AXIS OF WHEEL, CHICOPEE.]	1856/05/17	DRAFTING CLOTH
C-121-2758	[PLAN & SECTIONS OF APPARATUS USED IN EXPERIMENTS ON DIFFUSER PIPES.] [PROPRIETORS OF LOCKS AND CANALS ON THE MERRIMACK RIVER. PLAN.]	1854/08/15	PAPER
C-121-2759	[PLAN OF APPARATUS USED FOR EXPERIMENTS ON TORSION.] [PROPRIETORS OF THE LOCKS AND CANALS ON THE MERRIMACK RIVER. PLAN OF APPARATUS USED FOR EXPERIMENTS ON TORSION.]	1867/02/00	PAPER
C-121-2760 OVERSIZE	[SECTION OF WHEEL OF YORK MFG. CO., SACO, ME.] [YORK MANUFACTURING COMAPNY, SACO, MAINE. TURBINE.]	1870/03/18	DRAFTING CLOTH

C-121-2761	[PLAN & SECTIONS OF APPARATUS USED IN EXPERIMENTS ON DIFFUSER PIPES.] [PROPRIATORS OF THE LOCKS AND CANALS ON THE MERRIMACK RIVER. TUBE.]	1854/05/01	FULL SIZE		PAPER
C-121-2762	[VERTICAL SECTION OF 54" SWAIN TURBINE AT CLINTON MILLS, WOONSOCKET R.I.] [CLINTON MILLS, WOONSOCKET, R.I. CLINTON MILLS, 54 INCH, TURBINE.]	1873/05/00			PAPER
C-121-2763	[VERTICAL SECTION OF 54" SWAIN TURBINE AT SAXONVILLE, ME.] [54 INCH RIGHT HAND SWAIN TURBINE, SAXONVILLE, MAINE.]	1879/11/00			PAPER
C-121-2764 OVERSIZE	[PLAN OF CALUMET & HECLA MINING CO'S HOISTING ENGINE #2.] [CALUMET AND HECLA MINING COMPANY. HOISTING ENGINE NO. 2, CALUMET MINE 40" & 70" BY 6'.]	1880/06/25		BLUEPRINT	PAPER
C-121-2765	[PLAN & SECTIONAL ELEVATION OF WATER REGISTER FOR L.& C.] [PROPRIETORS OF THE LOCKS AND CANALS ON THE MERRIMACK RIVER. WATER REGISTER FOR LOCKS AND CANALS.]	1884/08/13		BLUEPRINT	PAPER

C-121-2766	[DESIGN FOR PAIR OF 48" HORIZONTAL WHEELS IN IMPROVED RECTANGULAR CASING BY COLLINS TURBINE MACHINE CO. OF NORWICH, CONN.] [DESIGN FOR PAIR OF 48 INCH HORIZONTAL WHEELS IN IMPROVED RECTANGULAR CASING, COLLINS TURBINE MACHINE CO., NORWICH, CONN.]	1892/00/00	BLUEPRINT	PAPER
C-122-1000	[PLAN & SECTION OF UPPER VAULT, SHOWING FILING CABINETS.]	UNDATED		
C-122-1001	[PLAN & SECTIONS OF LOWER VAULT, SHOWING FILING CABINETS.]	UNDATED		
C-122-1002	[PLAN SHOWING PROPOSED ALTERATIONS.]	1911/12/00		
C-122-1003	[PLAN OF LIBRARY BUREAU'S FILING CABINET.]	UNDATED		
C-122-1004	[PLAN OF PROPOSED FILING CASES FOR LOWER VAULT.]	1912/00/00		
C-122-1005	[LIBRARY BUREAU PLAN FOR LOWER VAULT.]	UNDATED		
C-122-1006	[PLAN OF COMPARTMENT IN UPPER VAULT.]	UNDATED		
C-122-1007	["ARNOLD'S HOUSE" AT 98 BROADWAY BEFORE & AFTER ALTERATIONS.]	UNDATED		
C-122-1008	[SCALE DRAWING OF PORTFOLIO IN COUNTING ROOM SAFE.]	UNDATED		
C-122-1009	[PLAN OF LOCKERS IN L.& C. OFFICE.]	1900/00/00		
C-122-1010	[SKETCH OF PLAN OF OFFICE BUILDING.]	UNDATED		

C-122-1011	[PLAN OF LAND AT 98 BROADWAY.]	UNDATED				
C-122-1013	[PLAN OF OFFICE BUILDING.]	1855/00/00				
C-122-1014	[PLAN OF OFFICE BUILDING.]	1853/00/00				
C-122-1015	[SKETCH SHOWING ALTERATIONS TO HOUSE ON ANDOVER ST.]	1909/00/00				
C-122-1016	[PLAN & ELEVATION OF HOUSE AT HEAD OF BOOTT PENSTOCK.]	1907/00/00				
C-122-1017	[PLAN OF HOUSE ON ANDOVER ST. SHOWING PIPE LAID IN 1892 TO SUPPLY WATER FOR DOMESTIC PURPOSES.]	UNDATED				
C-122-1018	[PLAN OF PROPOSED ALTERATIONS IN L.& E. ENGR'S. VAULT.]	1913/00/00				
C-122-1019	[FRONT ELEVATION OF CONSULTING ENGINEER'S HOUSE ON ANDOVER ST.]	1868-1869/00/00				
C-122-1020	[PLANS OF LOWER & UPPER FLOORS OF OFFICE.]	1916/00/00				
C-122-1021	[SKETCH OF PROPOSED NEW OFFICE BUILDING.]	1924/12/00	1"=8'			
C-122-1022	[PLAN OF FIRST FLOOR OF L. & C. OFFICE AND YARD.]	1931/02/00	1"=20'			
C-122-1023	[PLAN OF SECOND FLOOR OF L. & C. OFFICE YARD.]	1931/02/00	1"=20'			
C-122-1024	[ISOMETRIC DRAWING OF L. & C. OFFICE, YARD AND TENEMENTS.]	1920/06/00	1"=20'			
C-122-1025	[PLAN OF TREASURER'S AND ENGINEERS ROOM OF PROPS. OF LOCKS AND CANALS.]	1941/03/27	3/4" = 1' 0"			
C-123-[2913]	A / PLAN OF LAND / IN THE VICINITY OF / PATUCKET FALLS.	1846/01/00	1"=50'	H 73.4, W 130 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-123-2784	SCHEDULE OF LAND IN LITTLE CANADA / & PLAN OF SAME.	1892/07/00	1"=80'	H 57, W 71.5 CM	INK, COLORED INK, COLORED PENCIL, WATER COLOR, GRAPHITE	PAPER, TRACING PAPER
C-123-2785	PLAN OF LAND / BELONGING TO / OTIS ALLEN & SON / LOWELL, MASS.	1887/07/00	1"=20'	H 69.5, W 79.8 CM	INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-123-2787	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 26.5, W 42.5 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2788	PLANS AND CONDITIONS OF SALE, / 123 LOTS OF LAND IN LOWELL & DRACUT / BELONGING TO / THE PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1857/05/27	NONE	H 50, W 43.5 CM	LITHOGRAPH	PAPER
C-123-2789	NEWFIELD POND, IN CHELMSFORD.	UNDATED	NONE	H 48, W 62 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2790	[UNTITLED PLAN. SEE NOTES.]	1892/03/03	NONE	H 28.6, W 40.2 CM	INK	DRAFTING CLOTH
C-123-2791	NEWFIELD POND.	1894/01/00	1"=8 RODS	H 61.5, W 84.4 CM	COLORED PENCIL, GRAPHITE, INK	TRACING PAPER

C-123-2792	[UNTITLED PLAN. SEE NOTES.]	UNDATED	3"=400'	H 93.5, W 60.3 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-123-2793	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 75, W 58 CM	GRAPHITE, INK, COLORED INK,	PAPER
C-123-2794	PLAN / OF LANDS IN LOWELL.	1857/02/28	1"=20'	H 54.5, W 63.5 CM	GRAPHITE INK, COLORED PENCIL, WATER COLOR	PAPER
C-123-2795	PLAN OF LAND / IN DRACUT / NEAR PATUCKET [SIC] BRIDGE.	1872/10/01	1"=20'	H 71.2, W 92 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2796-[A]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	3/4"=50'	H 46.5, W 68 CM	INK, COLORED INK, GRAPHITE	PAPER
C-123-2796-[B]	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1/8"=1'	H 22, W 16.5 CM	GRAPHITE	PAPER
C-123-2797	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=200'	H 42.5, W 62.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER

C-123-2798	PLAN OF LAND / IN / CENTRALVILLE, LOWELL.	SEE NOTES	1"=30'	H 58.7, W 140.1 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2799	PLAN OF SUNDRY ROADS & STREETS / IN LOWELL.	1828/11/01	3"=400'	H 47.5, W 67.7 CM	LITHOGRAPH, INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
C-123-2800	A PLAN / OF LAND IN DRACUT, / BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON / MERRIMACK RIVER.	1833/02/00	1"=10 CHAINS	H 51, W 350.6 CM	COLORED INK, INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2801	PLAN OF LAND / BELONGING TO THE PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	SEE NOTES	1'=40'	H 61.9, W 156.4 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-123-2802	PLAN OF THE FARM WHICH BELONGED TO THOMAS FLETCHER / WHO DIED IN CHELMSFORD IN 1771.	1833/11/00	1"=3 CHAINS OR RODS	H 54, W 74.9 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2803	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=80'	H 53.9, W 74.9 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

C-123-2804	PLAN SHOWING / LAND IN DRACUT TO BE / TAKEN FOR / SETTLING RESERVOIR.	1870/09/01	1"=80'	H 66.4, W 86.3 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2805-[A]	HEDRICK LOT.	1869/05/20	1/10"=10'	H 66.6, W 21.3 CM	COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-123-2805-[B]	PROFILE OF HEDRICK LOT.	1869/05/19	NONE	H 63.5, W 121.5 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2806	[UNTITLED PLAN. SEE NOTES.]	1826/01/02	3/4"=10'	H 26.5, W 42.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-123-2807	PLAN OF LAND / IN LOWELL / OPPOSITE MERRIMACK & LAWRENCE MILLS / OWNED BY / PROPS LOCKS & CANALS.	1858/00/00	1"=50'	H 67.8, W 250.3 CM	INK, COLORED PENCIL, GRAPHITE, WATER COLOR	PAPER
C-123-2808	PLAN / OF / LAND IN DRACUT / BELONGING TO THE HEIRS OF / J. B. VARNUM.	1873/02/04	1"=10 RODS	H 48.8, W 55.8 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2809	PLAN OF THE THIRDS.	1832/00/00	3"=500'	H 61.3, W 41.8 CM	INK, COLORED PENCIL, COLORED INK	PAPER

C-123-2810	PLAN / SHOWING PART OF / LONG ISLAND & MERRIMACK RIVER / ABOVE / AIKEN ST. BRIDGE.	1886/07/01	1"=40'	H 76, W 106.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-123-2811	PLAN OF LAND BETWEEN PAWTUCKET CANAL & / WESTERN AVE. NEAR UPPER FREE LANDING.	UNDATED	NONE	H 47, W 56 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2812	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 41.5, W 61.5 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2813	PLAN / OF / RIVERSIDE STREET (PART OF).	1885/12/03	1"=40'	H 50.8, W 236.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-123-2814	PLAN OF / PART OF THE SHORE OF MERRIMACK RIVER / NEAR NORTHERLY END OF / PAWTUCKET BRIDGE.	1888/10/00	1"=10'	H 66, W 167 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-123-2815	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1/2"=100'	H 61, W 48.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-123-2816	[UNTITLED PLAN. SEE NOTES.]	UNDATED	3"=80'	H 28.5, W 40.5 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER

C-123-2817	PLAN / OF A / LOT OF LAND / IN LOWELL, MASS., / SOLD TO MR. AARON MANSUR.	1831/03/23	NONE	H 42, W 25.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2818	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	2"=100'	H 47, W 59.2 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2820	A PLAN / OF LAND IN DRACUT, / BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON / MERRIMACK RIVER.	1832/11/00	1"=1 CHAIN	H 54.9, W 49 CM	COLORED INK, INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2822	PLAN OF / LAND FROM THE PROPS OF THE / LOCKS & CANALS ON MERIMACK RIVER / TO THE HAMILTON MANFG. CO.	1826/05/00	SEE NOTES	H 47.5, W 33 CM	INK, COLORED INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-123-2826	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 34.5, W 42.5 CM	GRAPHITE, COLORED PENCIL, INK, WATER COLOR	PAPER
C-123-2827	[UNTITLED PLAN. SEE NOTES.]	1826/01/00	1"=200'	H 38, W 55 CM	GRAPHITE, INK, COLORED PENCIL, WATER COLOR	PAPER

C-123-2828	A PLAN / OF LAND IN DRACUT, / BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON / MERRIMACK RIVER.	1833/02/00	1"=1 CHAIN	H 53.7, W 74.4 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2832	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1 1/2"=100'	H 42.7, W 62 CM	GRAPHITE, WATER COLOR, INK	PAPER
C-123-2835	[UNTITLED PLAN. SEE NOTES.]	1856/11/21	1 1/2"=100'	H 43, W 53.7 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
C-123-2837	[UNTITLED PLAN. SEE NOTES.]	UNDATED	6"=100'	H 61.7, W 42 CM	GRAPHITE, INK, WATER COLOR, COLORED PENCIL	PAPER
C-123-2838	PLAN EXHIBITED BY PLAINTIFF IN SUIT REED VS. L. & C.	1834/03/00	NONE	H 52, W 63.5 CM	GRAPHITE, INK, COLORED INK, COLORED PENCIL, WATER COLOR	PAPER
C-123-2838-[COPY 1]	[UNTITLED PLAN.] [PLAN EXHIBITED BY PLAINTIFF IN SUIT REED VS. L. & C.]	1834/03/00	NONE	H 48.8, W 55.8 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER

C-123-2840	[UNTITLED PLAN. SEE NOTES.]	1831/11/02	1"=200'	H 42.4, W 49.5 CM	LITHOGRAPH, GRAPHITE, COLORED PENCIL, WATER COLOR INK,	PAPER
C-123-2842	ROAD TO BOSTON / LOWELL CHELMSFORD BILLERICA.	UNDATED	NONE	H 56.5, W 47 CM	GRAPHITE, COLORED PENCIL INK,	PAPER
C-123-2845	[UNTITLED PLAN. SEE NOTES.]	1832/03/21	NONE	H 43, W 56 CM	GRAPHITE, COLORED PENCIL	PAPER
C-123-2847	PLAN / OF THE / FACTORIES, HOUSES & C. / BELONGING TO THE MIDDLESEX COMPANY, / IN LOWELL.	1833/11/00	1"=40'	H 74.5, W 155 CM	INK, GRAPHITE, WATER COLOR, COLORED INK	PAPER
C-123-2848	PLAN OF MASSACHUSETTS COTTON MILLS.	UNDATED	3/4"=1'	H 41.7, W 62.6 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-123-2853	[UNTITLED PLAN. SEE NOTES.]	1825/06/00	1"=10 RODS	H 65.5, W 167 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-123-2853-04	PLAN OF LAND ON BOTH SIDES / OF MERRIMACK CANAL NORTH OF / MERRIMACK ST.	UNDATED	NONE	H 30.6, W 51 CM	INK, COLORED PENCIL, WATER COLOR, GRAPHITE	PAPER

C-123-2855	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=80'	H 44.3, W 56 CM	INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
C-123-2857	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 61, W 65.9 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	PAPER
C-123-2858	[UNTITLED PLAN. SEE NOTES.]	1838/11/22	3/4"=100'	H 52.7, W 73.8 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
C-123-2863	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	1"=40'	H 32, W 36.8 CM	INK, COLORED PENCIL, COLORED PENCIL GRAPHITE	PAPER
C-123-2864	[UNTITLED PLAN. SEE NOTES.]	1835/00/00	NONE	H 40.8, W 50.5 CM	, INK, COLORED PENCIL	PAPER
C-123-2869	[UNTITLED PLAN. SEE NOTES.]	1831/04/13	1"=66'	H 34.2, W 42.2 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2870	[UNTITLED PLAN. SEE NOTES.]	1835/00/00	1"=10'	H 49.5, W 68.7 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

C-123-2872	[UNTITLED PLAN. SEE NOTES.]	1835/00/00	1"=40'	H 80.4, W 84.4 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-123-2873	SURVEY OF LAND IN LOWELL, WHICH BELONGED TO THE PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER, TAKEN BY THE NASHUA & LOWELL RAILROAD / CORPORATION, AUG. 23, 1838. / BOUNDARY LINE RUN OVER JULY 19,1866.	1866/07/19	1"=40'	H 38.7, W 55.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2875	[UNTITLED PLAN. SEE NOTES.]	1838/11/22	3/4"=100'	H 51, W 70.5 CM	INK, COLORED PENCIL, GRAPHITE, WATER COLOR	PAPER
C-123-2877	A PLAN / OF THE LAND TAKEN BY THE / NASHUA & LOWELL RAILROAD CO. / FROM THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / WITH A SKETCH OF THE / ADJOINING STREET, CANALS ETC.	1839/05/23	3"=400',1"=8 RODS	H 61, W 99 CM	GRAPHITE, INK, COLORED INK, WATER COLOR	PAPER
C-123-2879	A PLAN OF THE KEYES LOT. / SITUATED IN / LOWELL MASSACHUSETTS.	1839/10/28	1"=3 RODS	H 70.9, W 50.4 CM	INK, COLORED PENCIL, GRAPHITE, WATER COLOR	PAPER
C-123-2882	SKETCH OF SOME LAND NEAR FOOT OF / PATUCKET FALLS.	1840/08/21	1 1/4"=10 RODS	H 38, W 51.2 CM	INK, GRAPHITE, WATER COLOR	PAPER

C-123-2883	PLOT OF SURVEY IN LOWELL.	1872/08/00	1"=40'	H 64.2, W 75.5 CM	INK, COLORED PENCIL, WATER COLOR, GRAPHITE	PAPER
C-123-2884	A PLAN / OF LAND IN LOWELL NEAR THE FOOT OF PAWTUCKET FALLS.	1841/09/21	1"=6 RODS	H 47, W 52.3 CM	INK, COLORED PENCIL, GRAPHITE, WATER COLOR	PAPER
C-123-2885	PLAN / OF / THREE LOTS. CORNER OF / MERRIMACK & KIRK STS.	1842/00/00	1"=20'	H 32.7, W 39.3 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-123-2886	SKETCH BY CAPT. ELISHA FORD / SHOWING FISHING IN UPPER / PART OF PAWTUCKET FALLS / MADE ABOUT 1842 TO 1845.	1845/00/00	1"=100'	H 71.6, W 290.1 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-123-2887	PLAN OF LAND IN DRACUT BELONGING TO PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/05/00	1 1/4"=1 CHAIN	H 68.8, W 690.2 CM	INK, COLORED INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-123-2889	A PLAN OF / LANDS IN DRACUT / BELONGING TO / PROPRIETORS OF LOCKS & CANALS.	SEE NOTES	1"=200'	H 42.5, W 62.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER

C-123-2895	PLAN OF AN ESTATE IN LOWELL / BELONGING TO G. PARKER.	1847/06/25	NONE	H 67, W 40.5 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-123-2896	SALE ON WEDNESDAY [MONDAY CROSSED OUT] AT 10. O.CLOCK A.M. / SEPT 8-AT OFFICE.	1847/08/27	NONE	H 25.5, W 67 CM	INK, COLORED INK, GRAPHITE	PAPER
C-123-2897	A PLAN / OF / LAND IN DRACUT / BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS.	1847/00/00	1"=200'	H 73.1, W 76.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-123-2899	A / PLAN / OF LAND IN / DRACUT & LOWELL / BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS.	1847/00/00	1"=100'	H 71.7, W 290.2 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-123-2900	A PLAN / OF / PART OF MERRIMACK RIVER / BELOW CENTRAL BRIDGE / SHOWING LANDS BELONGING TO THE PROPRIETORS OF LOCKS & CANALS.	1847/00/00	1"=100'	H 71.6, W 290.1 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-123-2903	PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER, / PLAN / OF LANDS IN / LOWELL & DRACUT.	1857/05/00	1"=400'	H 42.5, W 38.7 CM	LITHOGRAPH, GRAPHITE, INK, WATER COLOR, COLORED PENCIL	PAPER

C-123-2904	PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER. / PLAN / OF LAND IN / LOWELL.	1857/05/00	1"=100'	H 47, W 37.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-123-2905	PLAN OF LAND AT CORNER OF PAWTUCKET & BEACON ST'S. / BELONGING TO / PROP'S LOCKS & CANALS.	1856/05/00	1"=20'	H 29.2, W 49.5 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-123-2906	PLAN OF A COARSLEY MADE / SURVEY OF LAND BELONGING TO / THEODORE HAMBLET IN DRACUT.	1861/08/14	1"=80'	H 61, W 50.7 CM	INK, GRAPHITE	PAPER
C-123-2908	PLAN OF LAND IN LOWELL.	1865/07/26	1"=16'	H 60.6, W 87.8 CM	INK, GRAPHITE, COLORED INK	CLOTH BACKED PAPER
C-123-2909	LAND / BELONGING TO P. L.& C. / BURNETTIZING LOT.	1857/04/00	1"=40'	H 33.3, W 87 CM	COLORED INK, GRAPHITE, INK, COLORED PENCIL	PAPER
C-123-2912	PLAN OF / LAND IN LOWELL.	1875/07/00	1"=50'	H 48.6, W 54.8 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-124-[3056]	A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER	1838/00/00	0.5" = 100'		H 84.7, W 127 CM	INK, WATER COLOR

C-124-[3056]	A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER	1838/00/00	0.5" = 100'	H 84.7, W 127 CM	INK, WATER COLOR	CLOTH BACKED PAPER
C-124-[3057]	A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER	1838/00/00			H 80.6, W 121.5 CM	INK, WATER COLOR
C-124-[3057]	A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER	1838/00/00	0.5" = 100'	H 80.6, W 121.5 CM	INK, WATER COLOR	DRAFTING CLOTH
C-124-[3058]	REFERENCES TO TITLES AND LOTS REPRESENTED ON "A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER."	SEE NOTES			H 32, W 20.5 CM	INK
C-124-[3058]	REFERENCES TO TITLES AND LOTS REPRESENTED ON "A PLAN OF THE LAND IN LOWELL & DRACUT / CONVEYED AT SEVERAL TIMES TO / THE PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER."	SEE NOTES	0.5" = 100'	H 32, W 20.5 CM	INK	PAPER
C-124-[3059]	COPY OF PLAN TO ACCOMPANY DEED FOR THE / SALE OF LAND FROM THE P.L.& C. TO THE / LOWELL MACHINE SHOP.	1845/04/01	1"=80'	H 43.5, W 33.5 CM	INK, COLORED INK	DRAFTING CLOTH

C-124-2914	CORPORATION HOSPITAL LOT.	1835/00/00	1"=25',35/2	H 35, W 53.5 CM	INK, GRAPHITE	PAPER
C-124-2914-1	PLAN OF LAND ON GORHAM & / HIGHLAND STS.	UNDATED	NONE	H 74.6, W 64.3 CM	INK, GRAPHITE	PAPER
C-124-2915	LOWELL MACHINE SHOP YARD.	UNDATED	2 1/4"=100'	H 53, W 73.7 CM	GRAPHITE, COLORED PENCIL, INK, COLORED INK	PAPER
C-124-2917	SKETCH OF THE VACANT LOTS AT THE CORNER OF CENTRAL AND MERRIMACK STREETS.	UNDATED	1"=50'	H 27, W 36.7 CM	INK, GRAPHITE	PAPER
C-124-2918	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1/4"=10'	H 46.3, W 67 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-124-2919	[UNTITLED PLAN. SEE NOTES.]	UNDATED	1"=80'	H 47, W 68.5 CM	INK, COLORED INK, GRAHITE, WATER COLOR, COLORED PENCIL	PAPER
C-124-2920	MAP / OF THE / ESTATE / OF THE / HADLEY FALLS CO.	1850/10/03	NONE		H 73.7, W 112.4 CM	INK, WATER COLOR, GRAPHITE
C-124-2920	MAP / OF THE / ESTATE / OF THE / HADLEY FALLS CO.	1850/10/03	NONE	H 73.7, W 112.4 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-124-2921	[UNITITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 45.7, W 57.7 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-2922	PLAN OF LAND / IN / CENTRALVILLE, LOWELL / OPPOSITE THE MILLS OF THE / MERRIMACK & LAWRENCE MFG. COS.	1872/01/00	1"=50'	H 60.8, W 131.7 CM	WATER COLOR, INK, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-124-2923	PLAN OF / VARNUM AVENUE.	1894/09/02	1"=40'	H 50.2, W 168.3 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-124-2927	[UNTITLED PLAN. SEE NOTES.]	18??/11/2?	3/4"=100'	H 52.7, W 75.8 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-124-2928	[UNTITLED PLAN. SEE NOTES.]	184?/11/22	3/4"=100'	H 70.5, W 54.7 CM	WATER COLOR, INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-2929	PLAN OF LAND IN LOWELL.	1856/12/00	1"=20'	H 48.6, W 61 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

C-124-2930	PLAN / OF THE / LOWER / FREE LANDING.	1881/11/16	1"=20'	H 51.1, W 66 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-124-2931	PLAN OF / LOWER FREE LANDING / ON / PAWTUCKET CANAL, / LOWELL.	1882/00/00	1"=40'	H 41.2, W 51 CM	INK, WATER COLOR, COLORED INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-124-2932	SKETCH OF THE PART OF THE FREE LANDING / TO BE DEEDED TO THE CITY OF LOWELL.	1882/05/20	1"=20'	H 38, W 50.8 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER
C-124-2933	PLAN OF / LOWER FREE LANDING / ON PAWTUCKET CANAL, / LOWELL.	1882/00/00	1"=20'	H 68.3, W 93.5 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-124-2934	DATA PERTAINING TO THE / "LOWER FREE LANDING."	1897/02/01	1"=20'	H 56.1, W 71.1 CM	INK, COLORED INK, GRAPHITE, WATER COLOR, COLORED PENCIL	TRACING PAPER
C-124-2935	PLAN OF PART OF LOWER FREE LANDING.	1896/12/02	1"=5'	H 48.2, W 76.2 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER

C-124-2936	PLAN SHOWING DATA FOR DETERMINING THE / LINES OF THE LOWER FREE LANDING.	1896/12/02	1"=5'	H 55.9, W 71.1 CM	INK, WATER COLOR, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-124-2937	PLAN OF / LOWER FREE LANDING / ON / PAWTUCKET CANAL, / LOWELL.	1882/00/00	1"=20'	H 58.5, W 64.2 CM	INK, GRAPHITE, COLORED PENCIL, CRAYON	DRAFTING CLOTH
C-124-2939	SKETCH OF LOTS IN LOWELL.	1858/10/27	1"=40'	H 32.4, W 68 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
C-124-2942	[UNTITLED PLAN. SEE NOTES.]	1835/00/00	NONE	H 43.4, W 55.5 CM	INK, GRAPHITE	PAPER
C-124-2943	[UNTITLED PLAN. SEE NOTES.]	1836/06/11	1"=20'	H 37, W 54.7 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-2944	PLAN OF SOME LANDS IN THE CITY OF LOWELL, / THE LOTS COLORED RED ARE NOT OWNED BY THE PROPRIETORS / OF LOCKS & CANALS ON MERRIMACK RIVER.	1840/11/20	1"=50'	H 71, W 47 CM	INK, GRAPHITE, WATER COLOR, COLORED PENCIL	PAPER

C-124-2945	[UNTITLED PLAN. SEE NOTES.]	1841/08/31	1"=40'	H 44.5, W 52 CM	WATER COLOR, INK, GRAPHITE, COLORED PENCIL INK, COLORED INK, GRAPHITE,	PAPER
C-124-2946	PLAN OF LAND / BELONGING TO MRS. P. WHITING.	1843/08/00	1"=25'	H 74.8, W 54 CM	COLORED PENCIL ENGRAVING, WATER	PAPER
C-124-2947	MAP / OF / THE CITY OF / LOWELL.	SEE NOTES	1"=375'	H 80.4, W 89.2 CM	COLOR, INK	CLOTH BACKED PAPER
C-124-2948	PLAN OF LAND ON MERRIMACK STREET TAKEN BY THE CITY OF LOWELL / FROM THE PROPRIETORS OF LOCKS & CANALS.	1843/07/18	NONE	H 53.2, W 44.7 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
C-124-2951	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/01/05	3"=80'	H 52, W 71.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR GRAPHITE	PAPER
C-124-2952	PLAN OF LAND FOR MALL IN LOWELL.	1841/10/05	3"=400'	H 42.5, W 32 CM	, INK, WATER COLOR, COLORED PENCIL	PAPER

C-124-2955	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER.	1844/00/00	1"=50'	H 65, W 75.5 CM	GRAPHITE, INK, WATER COLOR, COLORED PENCIL	PAPER
C-124-2959	PLAN OF ST. ANNE'S CHURCH LOT.	1845/01/25	1"=40'	H 30.5, W 35.7 CM	LITHOGRAPH, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-124-2961	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 75, W 59.7 CM	INK, GRAPHITE WATER COLOR,	PAPER
C-124-2962	PLAN SHOWING THE DEPTHS OF THE CELLARS OF HOUSES NEAR THE NORTHERN CANAL.	1847/09/23	NONE	H 48.4, W 61.6 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-2966	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	NONE	H 52.3, W 73.7 CM	GRAPHITE, INK, COLORED PENCIL	PAPER
C-124-2967	PLAN OF LAND ON PAWTUCKET CANAL / ADJACENT TO / NASHUA & LOWELL RAILROAD / BELONGING TO / P. L.& C., WM. LIVINGSTON ET AL [ILLEGIBLE].	1847/09/04	1"=10'	H 55.7, W 97.1 CM	INK, COLORED INK, COLORED PENCIL, WATER COLOR, GRAPHITE	PAPER
C-124-2968	PLAN OF LAND / BELONGING TO / WM. & LOUIE MCFARLIN.	1848/00/00	NONE	H 30.7, W 47.5 CM	INK, COLORED PENCIL, GRAPHITE	PAPER

C-124-2972	PLAN OF LAND / ON THE SOUTH SIDE OF PAWTUCKET CANAL EAST OF / FISK & NORCROSS.	1849/11/18	1"=15'	H 48.1, W 68 CM	WATER COLOR, COLORED PENCIL, GRAPHITE, INK	PAPER
C-124-2973	[UNTITLED PLAN. SEE NOTES.]	1849/11/22	3/4"=100'	H 86.8, W 58.4 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-124-2975	[UNTITLED PLAN. SEE NOTES.]	1849/00/00	1"=20'	H 35.1, W 100.5 CM	GRAPHITE,INK, COLORED PENCIL, WATER COLOR	PAPER
C-124-2978	PLAN OF LOTS ON RACE STREET.	1850/10/02	1"=40'	H 37, W 45.5 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-124-2979	PLAN OF LAND BELONGING TO THE / PROPRIETORS OF LOCKS & CANALS ON THE MERRIMACK RIVER.	1850/00/00	1"=50'	H 64.9, W 84.1 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-124-2981	[UNTITLED PLAN. SEE NOTES.]	1854/02/02	1"=66'	H 60, W 68.5 CM	INK, COLORED PENCIL, WATER COLOR	PAPER
C-124-2983	PLAN OF PART OF LOWELL.	1856/04/00	3"=800'	H 28.8, W 51 CM	LITHOGRAPH, GRAPHITE, INK, WATER COLOR, COLORED PENCIL	PAPER

C-124-2984	PLAN OF PART OF LOWELL.	1856/04/00	3"=800'	H 28.8, W 51 CM	LITHOGRAPH, GRAPHITE, INK, WATER COLOR, COLORED PENCIL	PAPER
C-124-2985	PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER / PLAN / OF LANDS IN / LOWELL & DRACUT.	1856/12/00	1"=400'	H 45.4, W 41.3 CM	LITHOGRAPH, GRAPHITE, INK, WATER COLOR	PAPER
C-124-2987	PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER. / PLAN / OF LANDS IN / LOWELL & DRACUT.	1856/12/00	1"=400'	H 42.5, W 38.7 CM	GRAPHITE, INK, WATER COLOR, COLORED PENCIL, LITHOGRAPH	PAPER
C-124-2988	PLAN OF LAND / IN / LOWELL.	1856/07/05	1"=200'	H 74.9, W 100.8 CM	COLORED INK, COLORED PENCIL, GRAPHITE, INK	CLOTH BACKED PAPER
C-124-2990	PLAN / OF LAND ETC. / ON THE SOUTH SIDE OF / PAWTUCKET CANAL / NEAR THE SAW MILLS OF / NORCROSS SAUNDERS & CO. & OTIS ALLEN.	1859/11/25	1"=30'	H 59, W 96.7 CM	COLORED INK, INK, GRAPHITE	PAPER
C-124-2991	PLAN OF LOTS OF LAND FOR SALE BY THE PROPS. OF LOCKS & CANALS / AT AUCTION JULY 9,1860.	1860/06/00	1"=20'	H 60.4, W 86.2 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

					GRAPHITE, COLORED INK, INK, WATER COLOR,	
C-124-2992	PLAN OF THE STONE HOUSE LOT.	1844/06/08	1"=20'	H 53.5, W 73 CM	COLORED PENCIL	PAPER
C-124-2993	PLAN OF LOTS OF LAND IN LOWELL FOR SALE BY PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / ON JULY 9TH 1860.	SEE NOTES	1 1/4"=50'	H 53.9, W 75.6 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-124-2994	PLAN OF LAND FOR SALE BY THE PROPRIETORS OF LOCKS & CANALS / AT AUCTION JULY 9,1860.	1860/07/09	1"=50'	H 70.5, W 58.5 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-2996	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	1"=20'	H 19.2, W 69 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3000	PLAN OF LAND IN TEWKSBURY / BELONGING TO THE / PROPS OF LOCKS & CANALS.	SEE NOTES	1"=40'	H 47.1, W 89.6 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-124-3002	PLAN OF LAND / BELONGING TO THE / PROPS. OF LOCKS & CANALS.	1860/07/00	1"=20'	H 54.7, W 81.8 CM	COLORED PENCIL	PAPER

C-124-3003	PLAN OF LANDS CONVEYED BY THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / TO AARON MANSUR, MARCH 23RD, 1831, MAY 8TH, 1833, & TO ROYAL SOUTHWICK OCTOBER 2ND 1835.	1861/04/11	1"=8'	H 44.7, W 57 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
C-124-3004	PLAN OF LAND IN CENTRALVILLE, LOWELL, SOLD BY ASA & SAMUEL RICHARDSON TO JOHN GREEN, JUNE 19TH 1848.	1862/11/20	1"=15'	H 60.1, W 86.6 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3005	PLAN, COPIED FROM A BOOK OF PLANS, ENTITLED / "PLANS OF LAND OWNED BY THE / CITY OF LOWELL / C. LATHAM, CITY ENGINEER."	1864/10/21	1"=40'	H 61, W 34 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3006-[A]	LAND IN CENTRALVILLE LOWELL / LEASED TO LEVI HANCOCK, CALEB CARLTON-& LEVI SPRAGUE.	1866/12/21	1"=20'	H 38.3, W 65 CM	GRAPHITE, COLORED PENCIL, INK	PAPER
C-124-3006-[B]	LAND IN CENTRALVILLE, LOWELL.	1866/10/27	1"=20'	H 24.1, W 51 CM	INK, GRAPHITE	PAPER
C-124-3007	SKETCH OF LAND / ADJOINING THE PAWTUCKET CANAL / BELONGING TO THE / PROPS OF LOCKS & CANALS.	1867/10/16	1"=10'	H 32.1, W 120.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER

C-124-3008	SKETCH / OF LAND / ADJOINING WESTERN CANAL.	1867/08/00	1"=20'	H 48.4, W 60.6 CM	WATER COLOR, COLORED PENCIL, COLORED INK, INK, GRAPHITE	PAPER
C-124-3010	PLAN MADE TO SHOW THE LOCATION / OF A PORTION OF THE OLD COUNTY ROAD IN LOWELL / IN COMPARISON WITH THE WESTERN CANAL AND THE / EXISTING STREETS IN THE VICINITY.	1868/09/14	1"=40'	H 42.9, W 86.8 CM	WATER COLOR, INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3018	SKETCH OF A PORTION OF THE HAMILTON / & APPLETON MILLYARDS.	1877/10/30	1/8"=1'	H 40.2, W 50.7 CM	GRAPHITE, INK, COLORED INK, WATER COLOR	PAPER
C-124-3019	PLAN OF LAND IN CENTRALVILLE, SOLD BY / PROP'S. L.& C. TO BOOTT COTTON MILLS.	1881/06/00	1"=40'	H 24, W 44 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-124-3020	LAND IN CENTRALVILLE LOWELL / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER.	1881/03/00	1"=20'	H 59.5, W 22.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-124-3021	LOCATION / OF A PART OF THE / LAND WEST OF SCHOOL ST. / TAKEN BY THE / NASHUA & LOWELL RAIL-ROAD CORPORATION / FROM THE / PROPRIETORS OF LOCKS & CANALS.	1880/04/20	1"=40'	H 33.7, W 71 CM	GRAPHITE, INK, COLORED INK, COLORED PENCIL	PAPER

C-124-3022	PLAN OF / LANDS & BUILDINGS / BELONGING TO THE / LOWELL GAS LIGHT COMPANY.	1881/04/00	1"=40'	H 71.6, W 45 CM	INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
C-124-3023	A PLAN / OF LAND IN DRACUT & / LOWELL, CALLED THE MERRIL RICHARDSON FARM / BELONGING TO / JOSIAH WOODS & COMPANY.	1881/00/00	1"=80'	H 57.1, W 1120.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	[SEE NOTES]
C-124-3025	PLAN OF LAND IN CENTRALVILLE, LOWELL, / BELONGING TO P. L.& C. & MERRIMACK M. CO.	1881/12/24	1"=40'	H 68.6, W 94.1 CM	INK, WATER COLOR, GRAPHITE	[SEE NOTES]
C-124-3027	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	1"=100'	H 63.5, W 28.5 CM	WATER COLOR, INK, GRAPHITE	DRAFTING CLOTH
C-124-3028	DATA PERTAINING TO LAND IN LOWELL OWNED BY THE PROPRIETORS OF LOCKS & CANALS.	1894/01/01	NONE	H 66, W 51.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3029	[UNTITLED PLAN. SEE NOTES.]	SEE NOTES	NONE	H 66, W 52.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3030	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40'	H 55.3, W 75.7 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3031	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40'	H 56.5, W 74.5 CM	BLUEPRINT, GRAPHITE, INK	PAPER
C-124-3032	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40'	H 56.4, W 74 CM	BLUEPRINT, GRAPHITE, INK	PAPER
C-124-3033	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40'	H 56.4, W 74 CM	BLUEPRINT, GRAPHITE, INK	PAPER

C-124-3034	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40'	H 56.1, W 74 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3035	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=100', 1"=150'	H 56.6, W 73.4 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3036	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40', 1"=80'	H 55.6, W 73.9 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3037	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=80'	H 53.4, W 74.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3038	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=80'	H 53.4, W 74.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3039	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40', 3/4"=100'	H 55.1, W 76 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3040	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1893/12/00	1"=40',100', 133.3'	H 54.9, W 74.4 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3041	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 56, W 73.7 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3042	SCHEDULE OF TAXABLE PROPERTY IN LOWELL, MASS. BELONGING TO PROP'S OF LOCKS & CANALS.	1896/01/01	NONE	H 80.1, W 54.5 CM	INK, COLORED PENCIL, GRAPHITE, COLORED INK	DRAFTING CLOTH

C-124-3043	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 80.7, W [?] CM	INK, GRAPHITE, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
C-124-3044	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40'	H 56.5, W 74.2 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3045	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40'	H 56.5, W 74.2 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3046	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40'	H 56.5, W 74.2 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-124-3047	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40'	H 56.6, W 75.4 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3048	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=100'	H 56.6, W 74.8 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3049	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=100' & 150'	H 56.3, W 75 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3050	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40', 1"=80'	H 56.1, W 75.6 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER

C-124-3051	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40', 1"=80'	H 56, W 74.8 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3052	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40'	H 56.6, W 75 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3053	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS.	1895/12/00	1"=40', 3/4"=100'	H 57.8, W 75.4 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3054	[UNTITLED PLAN. SEE NOTES.]	1895/12/00	1"=100', 40', 133.3'	H 55.9, W 75.6 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-124-3055	SCHEDULE OF TAXABLE PROPERTIES IN LOWELL, MASS., BELONGING TO PROPS. OF LOCKS & CANALS.	1896/09/00	NONE	H 114.9, W 60.6 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-125-[3102]	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1896/08/01	1"=40'	H 68.3, W 98.9 CM	LITHOGRAPH, COLORED INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-125-[3103]-[A]	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1897/01/00	1"=40'	H 76.2, W 116.1 CM	LITHO, WATER COLOR	PAPER
C-125-[3103]-[B]	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1897/01/00	1"=40'	H 75.8, W 116.5 CM	LITHO, COL. INK, GRAPHITE,WATER COLOR	PAPER

C-125-[3104]	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING PIPES LAID FOR EXTINGUISHING FIRE	1896/11/30	1"=40'	H 78.5, W 106 CM	LITHO, COL. INK, GRAPHITE ,WATER COLOR	TRACING PAPER
C-125-[3105]	LOWELL MASS. / PROP. OF LOCKS AND CANALS / MAP SHOWING / MERRIMACK RIVER, CONCORD RIVER AND CANALS	1912/07/00	1"=250'	H 68, W 76.3 CM	LITHO, INK, COLORED INK, GRAPHITE	PAPER
C-125-[3106]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1888/10/00	1/4"=10'	H 76.2, W 114..8 CM	LITHO, WATER COLOR, COLORED INK	PAPER
C-125-[3107]	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1896/08/01	1"=40'	H 68.6, W 98.9 CM	LITHOGRAPH, COLORED INK, GRAPHITE , WATER COLOR	TRACING PAPER
C-125-[3108]-[COPY 1]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1889/05/00	1/4"=10'	H 73.6, W 106.5 CM	LITHO, COL. INK, GRAPHITE ,WATER COLOR	PAPER
C-125-[3108]-[COPY 2]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1889/05/00	1/4"=10'	H 73.6, W 106.7 CM	LITHO, WATER COLOR	PAPER
C-125-[3109]	PLAN OF THE / MILL YARD / OF THE / APPLETON COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1900/01/10	1/4"=10'	H 68.7, W 99 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER

C-125-[3110]	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION LOWELL MILL TRACKS / VALUATION SECTION NO. 13.1 / CURVE REVISION ACROSS DUTTON ST. / LOWELL-MASS	SEE NOTES	1"=20'	H 45.9, W 78.4 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3111]	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION LOWELL MILL TRACKS / VALUATION SECTION NO. 13.1 / CURVE REVISION AT BOOTT STOREHOUSE / LOWELL-MASS	SEE NOTES	1"=20'	H 45.6, W 78.2 CM	BLUE PRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3112]	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION LOWELL MILL TRACKS / VALUATION SECTION NO. 13.1 / CURVE REVISION NORTH END OF TREMONT ST. / LOWELL-MASS	SEE NOTES	1"=20'	H 46.9 W 76.7 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3113]	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION LOWELL MILL TRACKS / VALUATION SECTION NO. 13.1 / CURVE REVISION AT TREMONT STREET / LOWELL-MASS	SEE NOTES	1"=20'	H 52 W78.4 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3114]	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION LOWELL MILL TRACKS / VALUATION SECTION NO. 13.1 / CURVE REVISION AT FOOT OF DUTTON ST. / LOWELL-MASS	SEE NOTES	1"=20'	H 46.2 W 78 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3115]	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION LOWELL MILL TRACKS / VALUATION SECTION NO. 13.1 / CURVE REVISION AT TILDEN STREET / LOWELL-MASS	SEE NOTES	1"=20'	H 67.7 W 82.2CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER

C-125-[3116]	[UNTITLED PLAN.] [THIS PLAN IS A COPY OF PART OF THE BRANCH TRACK LOCATIONS OF THE BOSTON AND MAINE RAILROAD CORP AS FILED APRIL 11, 1883]	1918/04/11	1"=41.86"	H 46.4 W 35 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-[3117]	[PLAN OF] PROPOSED CHANGES IN / BRANCH TRACKS / AT FOOT OF DUTTON STREET / LOWELL MASS.	1917/09/19	1"=20'	H 56, W 89.1 CM	BLUEPRINT, COLORED PAPER, GRAPHITE	PAPER
C-125-[3118]	PROPOSED CHANGES IN / BRANCH TRACKS / TILDEN AND TREMONT STS. / LOWELL, MASS.	1917/08/00	1"=40'	H 91.1, W 67.7 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3119]	COPY / BOSTON & MAINE RAILROAD / SOUTHERN DIVISION-LOWELL YARD / TRACKS & BUILDINGS / SACO-LOWELL SHOPS / JACKSON STREET / LOWELL MASS.	1917/06/17	1"=20'	H 51.2, W 64.3 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3120]	PROPOSED CHANGES IN / BRANCH TRACKS / DUTTON STREET / LOWELL MASS. [SHOWING TRACK CURVES OF 166'& 120' RADII INSTEAD OF THE PRESENT TRACK OF 100' RADIUS.]	1917/08/00	1"=20'	H 47.7, W 57.8 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3121]	[PLAN OF] PROPOSED CHANGES IN / BRANCH TRACKS / NEAR BOOTT STORE HOUSE / LOWELL MASS. [WITH CURVES OF 166' RADIUS & A TUNNEL THRU THE TUNNEL OF THE BOOTT STOREHOUSE.]	1917/08/00	1"=20'	H 55.6, W 62.3 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER

C-125-[3122]	PROPOSED CHANGES IN / BRANCH TRACKS / AT FOOT OF DUTTON STREET / LOWELL, MASS. / SHOWING CHOICE OF THREE.	1917/09/10	1"=20'	H 45, W 68 CM	BLUEPRINT, GRAPHITE, COLORED PENCIL	PAPER
C-125-[3123]	[SKETCH SHOWING] CONTEMPLATED CHANGES / TO PROPERTY ON / DUTTON STREET ON ACCOUNT OF / CHANGE IN TRACKS.	1917/10/22	1"=20'	H 19.1, W 53 CM	BLUEPRINT, GRAPHITE	PAPER
C-125-[3124]	PROPOSED STEEL FRAMING / BOOTT MILLS STOREHOUSE / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1918/05/21	1/8"=1'	H 42.1, W 84.2 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-125-[3125]	PLAN SHOWING A PORTION OF THE BRANCH TRACK LOCATIONS CLAIMED BY THE B.& L. RAILROAD IN ITS FILING / OF MARCH 23, 1883.	1917/11/03	1/4"=10'	H 48, W 74.2 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-125-[3126]	PLAN SHOWING / RAILROAD TRACKS / IN JACKSON STREET / LOWELL MASS.	1917/04/00	1"=50'	H 56.2, W 142.8 CM	BLUEPRINT	PAPER
C-125-[3127]	PLAN SHOWING / RAILROAD TRACKS / IN JACKSON STREET / LOWELL MASS.	1917/04/00	1"=50'	H 38.2, W 143.3 CM	BLUEPRINT	PAPER
C-125-[3128]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1888/10/00	1/4"=10'	H 76.2, W 115.5 CM	LITHO, WATER COLOR	PAPER

C-125-3056	MAP / OF / THE CITY OF / LOWELL [SURVEYED IN 1841 SHOWING LOCATION OF BRANCH TRACKS OF B.& L.R.R.]	1842/00/00	4"=1500'	H 80.7, W 89.5 CM	ENGRAVING, INK	PAPER
C-125-3058	N. AND L. R. R. LOCATION / SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE / WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION / OF GEO. THOMPSON, CHIEF ENGR. OF B. AND L. R.R.	1885/07/00	NONE	H 35.4, W 50.8 CM	INK, GRAPHITE	PAPER
C-125-3058-[A]	LOCATION OF / NASHUA AND LOWELL RAILROAD. / PLOTTED FROM DRAWINGS OBTAIN- / ED AT B. AND L. R. R. OFFICE IN JULY / 1885 [ENVELOPE TITLE]. PART OF / N. AND L. R. R. LOCATION [PLAN TITLE].	1885/07/00	1"=1/4 MILE	H 42.8, W 55.9 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-125-3058-[B]	LOCATION OF / NASHUA AND LOWELL RAILROAD. / PLOTTED FROM DRAWINGS OBTAIN- / ED AT B. AND L. R .R. OFFICE IN JULY / 1885 [ENVELOPE TITLE]. PART OF / N. AND L. R. R. LOCATION [PLAN TITLE].	1885/07/00	1"=1/4 MILE	H 42.8, W 55.9 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-125-3058-01	[UNTITLED PLAN.] [N. AND L. R. R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.3, W 51 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-125-3058-02	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=30'	H 35, W 50.3 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-03	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=50'	H 34.8, W 50.6 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-04	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 34.8, W 50.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-05	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.9 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-06	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON. CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.3, W 50.9 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-07	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.4, W 50.8 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-08	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.4, W 50.8 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-09	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.4, W 50.6 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-10/11	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.4, W 50.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-12	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.6, W 50.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-13	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.5, W 50.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-14	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.6, W 50.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-15	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 36, W 50.6 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-16	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON. CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.5 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-17	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.6 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-125-3058-18	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.5 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-19	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-20	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-125-3058-21	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.2 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-22	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.1, W 50.6 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-23	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.4, W 50.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-125-3058-24	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.4, W 50.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-25	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-26	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.6 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH

C-125-3058-27	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.2 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-28	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.1 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-29	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.3, W 50.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-30	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.1, W 50.8 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-31	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-32	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.2 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH

C-125-3058-33	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSOSSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.1 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-34	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.8 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-35	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.8 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-36	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.1 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3058-37	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.1, W 50.2 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-38	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.1, W 50 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH

C-125-3058-39	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35, W 50.1 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-40	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-125-3058-41	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-42	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON. CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.1, W 50 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-43	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION PF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.2, W 50.5 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-44	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=100'	H 35.3, W 50.5 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3058-45	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=80'	H 35.3, W 50.5 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3058-46	[UNTITLED PLAN.] [N. AND L. R.R. LOCATION SHEETS NUMBERED FROM 1 TO 46 INCLUSIVE WERE TRACED FROM OTHER TRACINGS IN THE POSSESSION OF GEO. THOMPSON, CHIEF ENG'R OF B. AND L. R.R.] [45 SHEETS OF TRACINGS SHOWING LOCATION OF NASHUA & LOWELL R.R. TRACKS.]	1885/07/00	1"=80'	H 35.3, W 50.7 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3059	[UNTITLED PLAN.] [BRANCHES IN TREMONT YARD BETWEEN SUFFOLK & TREMONT STS.]	UNDATED	1"=40'	H 35.8, W 25.9 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-125-3060	[UNTITLED PLAN.] [TRACKS ALONG EASTERN CANAL AT MASSACHUSETTS MILLS.]	1890/12/06	2"=83'	H 32.1, W 54.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

C-125-3061	[UNTITLED PLAN.] [TRACKS ALONG CANAL & AMORY STS.]	UNDATED	1"=2'	H 43.6, W 68.8 CM	INK, WATER COLOR, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-125-3062	MEMO RELATING TO / LOCATION OF BRANCH TRACKS IN LOWELL [ENVELOPE TITLE]. MEMORANDA RELATING TO THE BRANCH TRACKS IN LOWELL OF THE BOSTON / AND LOWELL RAIL ROAD CORPORATION [DOCUMENT TITLE].	SEE NOTES	NONE	H 20.2, W 15.2 CM	INK, GRAPHITE	PAPER
C-125-3062-01	MEMO OF RIGHTS TO BE CONCEDED / TO P .L.& C. BY B.& L. R. R. / FROM / LOCATION OF BRANCH TRACKS IN LOWELL [ENVELOPE TITLE]. MEMORANDA OF THE RIGHTS OR PRIVELEGES TO BE SURRENDURED TO THE PROPRIETORS...BY THE BOSTON & LOWELL R.R. FROM...[DOCUMENT TITLE].	SEE NOTES	NONE	H 37.5, W 21.5 CM	INK, COLORED INK, GRAPHITE	PAPER
C-125-3062-01-[A]	FLOWAGE ON N. & L. R. R. LOCATION, AS SCALED FROM / TRACINGS IN POSSESSION OF PROPS. LOCKS & CANALS, JULY 1885.	1885/07/31	NONE	H 25, W 20 CM	INK	PAPER
C-125-3062-01-[B]	EXTRACTS FROM "PROPOSALS BY THE PROPRIETORS OF THE LOCKS AND / CANALS ON MERRIMACK RIVER, FOR THE SALE OF THEIR MILL POWERS AND LAND / IN LOWELL".	UNDATED	NONE	H 35.1, W 21.5 CM	INK	PAPER

C-125-3062-01-[C]	LENGTH OF DIAGONALS / ON PLAN AT TREMONT YARD [AND] ON PLAN OF MERRIMACK YARD. [NOTATIONS ON SMALL PIECE OF CARD STOCK.]	UNDATED	NONE	H 11.3, W 6.3 CM	GRAPHITE	PAPER
C-125-3062-01-[D]	LENGTH OF DIAG. ON MAP OF LOWELL = 64 FT. / LENGTH OF DIAG. ON PHOTOGRAPH = 15.29 INCHES.	SEE NOTES	NONE	H 20.5, W 15 CM	GRAPHITE	PAPER
C-125-3062-01-[E]	NOTES. / BY A. W. H.	1885/06/22-24	NONE	H 18, W 43 CM	INK, COLORED INK	TRACING PAPER
C-125-3062-01-[F]	B.& L. R. R. / SCALED FROM MAP OF ORIGINAL FILING OF BOSTON TRACKS (AT E. CAMBRIDGE) / JUNE 29/85.	1885/06/29	VARIOUS	H 27.5, W 19.5 CM	GRAPHITE	PAPER
C-125-3063-[COPY 1]	[(COPY) FROM REG. OF DEEDS OF MIDDLESEX COUNTY SHOWING] / BOSTON AND LOWELL RAILROAD CORPORATION. / LOCATION OF BRANCH TRACKS IN LOWELL.	1883/03/23	1'=500'	H 43.7, W 73.5 CM	INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-125-3063-[COPY 2]	[(COPY) FROM REG. OF DEEDS OF MIDDLESEX COUNTY SHOWING] / BOSTON AND LOWELL RAILROAD CORPORATION. / LOCATION OF BRANCH TRACKS IN LOWELL.	1918/04/00	1'=500'	H 29.1, W 20.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS, WATER COLOR	CLOTH BACKED PAPER
C-125-3063-[COPY 3]	[(COPY) FROM REG. OF DEEDS OF MIDDLESEX COUNTY SHOWING] / BOSTON AND LOWELL RAILROAD CORPORATION. / LOCATION OF BRANCH TRACKS IN LOWELL.	1918/04/00	1'=500'	H 29.1, W 20.5 CM	UNKNOWN PHOTOGRAPHIC PROCESS, WATER COLOR	PAPER
C-125-3064	LOCATION OF BRANCH TRACKS IN LOWELL.	1883/03/23	NONE	H 43.5, W 73.4 CM	INK, GRAPHITE, COLORED INK	CLOTH BACKED PAPER

C-125-3065	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=100'	H 43.5, W 73.4 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-125-3066	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.5, W 73.5 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	CLOTH BACKED PAPER
C-125-3067	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.6, W 73 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
C-125-3068	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.5, W 73.5 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-125-3069	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.4, W 73.4 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-125-3070	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.5, W 73.5 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	CLOTH BACKED PAPER
C-125-3071	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.7, W 72.4 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	CLOTH BACKED PAPER

C-125-3072	[UNTITLED PLAN.] [LOCATION OF BRANCH TRACKS IN LOWELL.]	UNDATED	1"=500'	H 43.3, W 73.3 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-125-3073	B.& L. BRANCH TRACKS / IN THE / MERRIMACK M. COS. YARD.	UNDATED	1"=41.86'	H 21.6, W 35.5 CM	INK, GRAPHITE	PAPER
C-125-3074	PLAN OF THE / B.& L. BRANCH TRACKS / IN AND NEAR THE MILL YARD OF THE / MERRIMACK MFG. CO.	1889/07/18	1"=41.86'	H 43.3, W 55.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-125-3076	PLAN OF THE / B.& L. BRANCH TRACKS / IN AND NEAR THE MILL YARD OF THE MERRIMACK M. CO.	1886/04/14	1"=41.86'	H 45.8, W 56 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-125-3078	SKETCH OF SUGGESTED ARRANGEMENT OF / BRANCH TRACKS IN LOWELL, IF THE LO- / CATION OF THE PRESENT TRACK IN MOODY / STREET IS CHANGED.	1891/08/18	1"=40'	H 55.9, W 168.3 CM	INK, COLORED INK, WATER COLOR, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-125-3079	SKETCH OF SUGGESTED ARRANGEMENT OF / BRANCH TRACKS IN LOWELL, IF THE LO- / CATION OF THE PRESENT TRACK IN MOODY / STREET IS CHANGED.	1891/08/18	1"=40'	H 54.5, W 136.8 CM	BLUEPRINT, INK, COLORED INK, COLORED PENCIL	PAPER
C-125-3080	[UNTITLED PLAN.] [BRANCH TRACKS IN MERRIMACK YARD.]	1892/05/23	1"=20'	H 28.9, W 49.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER

C-125-3082	PLAN OF LAND ETC. [TRACKS] / NEAR THE BOOTT DAM & PENSTOCK.	1847/11/01	1"=10'	H 58.8, W 89 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-125-3083	PROFILE OF THE HOOSAC MOUNTAIN ON TUNNEL LINE / ON THE / TROY & GREENFIELD RAILROAD.	UNDATED	H1"=2000' V1"=600'	H 33.5, W 54.3 CM	LITHOGRAPH, GRAPHITE	PAPER
C-125-3084	TOPOGRAPHICAL PLAN & PROFILE / OF THE / PHILADELPHIA AND READING RAILROAD.	UNDATED	1 1/2"=1 MILE	H 28.8, W 84.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-125-3085	[MAP & PROFILE OF RUTLAND & BURLINGTON R. R.]	UNDATED				
C-125-3086	PLAN OF / NASHUA AND LOWELL RAIL ROAD / NEAR / KYANIZING HOUSE.	1884/07/28	1"=20'	H 48.3, W 76.2 CM	INK, COLORED PENCIL, WATER COLOR, GRAPHITE	TRACING PAPER
C-125-3087	[UNTITLED PLAN.] [TRACKS AT HEAD OF HAMILTON CANAL].	UNDATED	NONE	H 76.4, W 108.9 CM	INK, COLORED INK, GRAPHITE	PAPER
C-125-3090	[PLAN OF] BRANCH TRACKS IN LOWELL / [SUIT OF] T.& S. MILLS VS. B.& R. R.	1885-1886	NONE	H 24.8, W 20 CM	INK, COLORED INK, GRAPHITE	PAPER
C-125-3090-[A]	BRANCH TRACKS IN LOWELL / T. & S. VS. B. & L. R. R. / MEMORANDUM OF THE DRAWINGS FURNISHED FOR THIS HEARING BY THE / PROPS. LOCKS & CANALS / 1885-1886.	1885-1886/00/00	NONE	H 35.7, W 21.7 CM	INK, GRAPHITE, COLORED INK	PAPER

C-125-3090-[B]	B. AND L. R. R. / BRANCH TRACKS IN TREMONT YARD.	1885/11/17	1"=40.76'	H 35.7, W 53.1 CM	GRAPHITE, COLORED INK	PAPER
C-125-3090-[C]	B. AND L. BRANCH TRACKS / IN THE / YARD OF THE TREMONT MILLS.	1885/11/23	NONE	H 55.8, W 45.7 CM	GRAPHITE, COLORED INK	PAPER
C-125-3090-[D]	B. AND L. BRANCH TRACKS / IN THE / YARD OF THE TREMONT MILLS.	1885/12/14	NONE	H 55.8, W 45.7 CM	GRAPHITE	PAPER
C-125-3090-[E]	PLAN OF / B. AND L. BRANCH TRACKS / IN THE YARD OF THE TREMONT MILLS.	1885/11/23	NONE	H 55.8, W 45.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-125-3090-[F]	PLAN OF / B. AND L. BRANCH TRACKS / IN THE / YARD OF THE TREMONT MILLS.	1885/12/14	NONE	H 55.8, W 45.8 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-125-3091	BOSTON & MAINE RAILROAD / OFFICE OF DIVISION ENGINEER-SECOND DIV. / PLAN SHOWING CANAL WALLS / AND / PROPOSED CHANGES OF TRACKS / BRIDGE NO. 340. / [OVER MERRIMACK CANAL NEAR Y.M.C.A.] LOWELL YARD.	1912/05/00	1"=4'	H 60.4, W 90.5 CM	BLUEPRINT, GRAPHITE, COLORED INK, INK	PAPER
C-125-3092	BOSTON & MAINE RAILROAD / SECOND DIVISION-BOSTON & LOWELL RAILROAD / BRIDGE NO. 344-LOWELL YARD / GENERAL PLAN OF PROPOSED STRUCTURE.	UNDATED	1/4" & 1/2"=1'	H 36.3, W 53 CM	BLUEPRINT, GRAPHITE	PAPER
C-125-3093	BOSTON AND MAINE R. R. / 2ND DIV. BOSTON AND LOWELL R. R. / BRIDGE # 343 / LOWELL YARD-LOWELL, MASS.	UNDATED	1/16"& 1/4"& 1/2"=1'	H 50.5, W 66.7 CM	BLUEPRINT, GRAPHITE	PAPER

C-125-3094	LAND IN / LOWELL, MASS. / PROPRIETORS OF LOCKS / AND CANALS / TO BOSTON & LOWELL R. R. CORP. [BLUEPRINT SHOWING PROPOSED CHANGES OF TRACK AT R.R. BRIDGE 340, OVER MERRIMACK CANAL NEAR Y.M.C.A.]	1912/10/00	1"=20'	H 43.2, W 27.8 CM	BLUEPRINT, GRAPHITE	PAPER
C-125-3095	BOSTON AND MAINE RAILROAD. / SECOND DIVISION LOWELL SIDE TRACKS. / BRIDGE NO. 340 / LOWELL, MASS.	1912/12/07	1/4" & 3/4"=1'	H 91.3, W 60.4 CM	BLUEPRINT, GRAPHITE	PAPER
C-125-3096	BOSTON AND MAINE RAILROAD / SOUTHERN DIV. VAL. SEC. NO 15M. [SHOWING LOCATION OF NEW] NORTH BOUND SIDING / [AT] MIDDLESEX, [VILLAGE] MASS. [BLUEPRINT SHOWING]	1928/12/05	1"=100'	H 60.9, W 182.5 CM	BLUEPRINT, COLORED PENCIL, COLORED INK	PAPER
C-125-3097	SIDING EXTENSION / MIDDLESEX TO N. CHELMSFORD [CROSS SECTIONS TAKEN ALONG ABOVE LOCATION].	1928/12/04	1"=10'	H 54.6, W 119.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-125-3098	B.& M. R. R. / SOUTHERN DIVISION CORPORATION TRACKS / TRACKS WEST OF BRIDGE ST. / LOWELL, MASS.	SEE NOTES	NONE	H 20, W 34.5 CM	INK, GRAPHITE	DRAFTING CLOTH
C-125-3099	PORTION OF PLANS OF THE / BOSTON & LOWELL RAILROAD CORPORATION / LOCATION OF BRANCH TRACKS IN LOWELL [FROM MERRIMACK WASTEWAY TO BRIDGE ST.].	1933/08/28	1"=500'	H 21.6, W 73.5 CM	INK, COLORED INK, CRAYON	DRAFTING CLOTH

C-125-3100	PORTION OF PLAN / OF THE / BOSTON & LOWELL RAILROAD CORPORATION / LOCATION OF BRANCH TRACKS IN LOWELL [ALONG CANAL ST. FROM BRIDGE ST. TO EAST MERRIMACK ST. WITH ADDITIONS].	1933/08/28	1"=500'	H 21.8, W 61.9 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
C-125-3101	MAP & DESCRIPTION OF PARTS OF THE LOCATION / OF THE / NASHUA & LOWELL RAILROAD / IN THE COUNTY OF MIDDLESEX [FROM SCHOOL STREET TO MIDDLESEX STREET IN LOWELL, MASS.].	UNDATED	1"=50'	H 36.1, W 135.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-126-3091	[PROPOSED ELEVATION OF BRIDGE &] PLAN OF FLOOR TIMBERS & TRUSSES OF A BRIDGE [INTENDED FOR HEAD OF PAWTUCKET CANAL.]; BEING ABOUT THE SPAN OF WHICH WOULD BE REQUIRED FOR A BRIDGE / OVER THE HEAD OF PATUCKET [SIC] CANAL.	1833/05/00	1"=4'	H 38.6, W 64.5 CM	INK, GRAPHITE, COLORED PAPER	PAPER
C-126-3092	[PROPOSED] ELEVATION OF BRIDGE [& PLAN OF FLOOR TIMBERS & TRUSSES OF A BRIDGE] INTENDED FOR HEAD OF PATUCKET [SIC] CANAL IF IT SHOULD BE WANTED.	1833/05/00	1"=4'	H 37.3, W 64.2 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3093	PLAN & ELEVATION OF A PIER IN THE BOOTT CANAL.	1835/00/00	NONE	H 34.2, W 50.4 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3094	SECTION OF BELVIDERE BRIDGE / EAST MERRIMACK ST.	1835/06/26	1"=8'	H 34.2, W 50.3 CM	INK, COLORED INK, GRAPHITE	PAPER

					INK, COLORED INK, GRAPHITE,	
C-126-3095	PLAN OF THE CENTRAL STREET BRIDGE.	1836/09/24	1"=4'	H 55.4, W 75 CM	COLORED PENCIL	PAPER
C-126-3096	[PLAN & ELEVATION OF] IRON BRIDGE BELOW FLAT ROCK TUNNEL / [ON THE] PHILADELPHIA, READING & POTTSVILLE R. R.	1845/00/00	NONE	H 50.5, W 68 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3097	GENERAL & DETAILED STATEMENTS OF THE COST OF [BUILDING] IRON BRIDGE / BELOW FLAT ROCK TUNNEL- [ON THE] PHILADELPHIA & READING R. R.	1845/06/00	NONE	H 31.7, W 19.8 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-126-3098	SECTIONS & ELEVATIONS OF RACE ST. BRIDGE PIERS NORTHERN CANAL.	1846/07/23	1"=4'	H 32.7, W 58.6 CM	INK, COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-126-3099	PLAN [ELEVATION & SECTION] OF / RACE ST. BRIDGE. / NORTHERN CANAL.	1846/07/22	1"=4'	H 59.4, W 92.1 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3100	[PLAN AND SECTION OF PROPOSED] BRIDGE / OVER EASTERN CANAL / MERRIMACK STREET.	1846/11/30	1/4"=1'	H 76, W 55.2 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-126-3101	[PLAN AND SECTION] BRIDGE OVER EASTERN CANAL / BRIDGE STREET.	1846/11/23	1/4"=1'	H 59, W 45.5 CM	INK, WATER COLOR	PAPER

C-126-3102	PLAN OF WALLS / AT CENTRAL STREET BRIDGE [OVER PAWTUCKET CANAL].	1848/11/00	1"=10'	H 56.8, W 74.8 CM	INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
C-126-3103	CENTRAL STREET BRIDGE / PLAN OF THE PLATFORM ON THE EAST SIDE [OVER THE PAWTUCKET CANAL].	1849/01/02	1/4"=1'	H 51.4, 92.1 CM	INK, COLORED INK, COLORED PENCIL	PAPER
C-126-3104	CENTRAL STREET BRIDGE / PLAN OF PLATFORM ON THE WEST SIDE [OVER THE PAWTUCKET CANAL].	1849/01/21	1/4"=1'	H 55.2, W 93.2 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3104-1	DRAWING SHOWING CURVE OF CENTRAL ST. BRIDGE.	1898/07/14	1/2"=1'	H 31.2, W 70.5 CM	GRAPHITE, COLORED INK	PAPER
C-126-3104-A	PLAN [SHOWING REPAIRS MADE OCTOBER 1911] OF / PLATFORM / ON THE / WEST SIDE OF CENTRAL STREET / OVER / LOWER PAWTUCKET CANAL / BUILT 1849.	1911/00/00	1/4"=1'	H 49, W 80 CM	INK, COLORED INK, CRAYON, GRAPHITE	TRACING PAPER
C-126-3104-B	[PLAN OF PLATFORM SHOWING CONDITION AND REPAIRS OF] SUPPORTING PILES UNDER WESTERLY OR UPSTREAM PLATFORM / AT CENTRAL STREET BRIDGE OVER PAWTUCKET CANAL.	1911/10/00	NONE	H 19.2, W 59.5 CM	INK, COLORED INK, WATER COLOR	PAPER
C-126-3105	CASTINGS FOR TRUSSES / OF PLATFORM NEAR / CENTRAL ST. BRIDGE / LOWELL.	1849/02/14	1/2 SIZE & 1/4 SIZE	H 35, W 39 CM	INK	PAPER

C-126-3106	[TOP VIEW & SECTION OF] TRUSSES FOR PLATFORMS / NEAR CENTRAL STREET BRIDGE / LOWELL.	1849/02/10	1/16"=1'	H 29.5, W 98.4 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3107	[PLAN & SECTIONS OF THE] REMINGTON BRIDGE / AT THE SURREY ZOOLOGICAL GARDENS.	1849/09/04	1/4"=1', 1/8 SIZE	H 48.8, W 68.4 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-126-3108	PLAN [AND SECTION] OF / ABUTMENTS & PIERS / PAWTUCKET ST. [HIGH] BRIDGE.	1849/05/00	1/8"=1'	H 55.7, W 77.3 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-126-3109	[PLAN OF] CENTRAL STREET BRIDGE / OVER PATUCKET [SIC] CANAL.	1849/09/26	1"=4'	H 59, W 92.2 CM	INK, GRAPHITE, COLORED INK, WATER COLOR, COLORED PENCIL	PAPER
C-126-3110	[ARCH STONES FOR NORTHERLY FACE OF ARCH OF] MERRIMACK STREET BRIDGE / OVER / MERRIMACK CANAL.	1890/05/09	1"=1'	H 71.2, W 114 CM	INK, COLORED INK, GRAPHITE	PAPER
C-126-3111	[TOP VIEW & SECTION OF] TRUSSES / FOR / CENTRAL STREET BRIDGE [PLATFORMS].	1850/01/14	1/16"=1"	H 35, W 91 CM	INK, WATER COLOR	PAPER
C-126-3112	[CROSS SECTION OF] CENTRAL STREET BRIDGE / OVER PAWTUCKET CANAL.	1850/02/06	1/2"=1'	H 34.2, W 97 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER

C-126-3113	WT [I.E. WROUGHT] IRON TIE RODS FOR TRUSSES FOR / CENTRAL STREET BRIDGE / LOWELL.	1850/06/15	NONE	H 27.4, W 92.7 CM	INK, COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-126-3114	[TOP VEIW & SECTION OF] TRUSSES / CENTRAL STREET BRIDGE / LOWELL.	1850/06/15	1/16"=1"	H 39.1, W 88.3 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3115	[CROSS SECTION OF] CENTRAL STREET BRIDGE [OVER PAWTUCKET CANAL].	1850/08/10	1"=1'	H 41.9, W 89.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-126-3116	FRAME FOR SUPPORTING THE MIDDLE OF EASTERLY SIDE / OF CENTRAL STREET BRIDGE.	1850/08/15	1"=1'	H 39.1, W 88.3 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3117	FRAME FOR SUPPORTING THE MIDDLE OF / WESTERLY SIDE OF CENTRAL STREET BRIDGE.	1850/08/05	1"=1'	H 30.3, W 92.5 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3118	[PLAN OF] CENTRAL ST. BRIDGE [SHOWING PIERS, ABUTMENTS, AND BUILDINGS].	1850/08/02	1/8"=1'	H 59, W 96.5 CM	INK, COLORED PENCIL	PAPER
C-126-3119	[PLAN & ELEVATION &] TRUSS FOR APPLETON COUNTING ROOM BRIDGE [OVER HAMILTON CANAL IN CONNECTION WITH THE WIDENING OF THE CANAL.]	1853/01/00	NONE	H 64.7, W 93.8 CM	INK, COLORED INK, GRAPHITE	PAPER

C-126-3120	[PLAN AND ELEVATION OF] BROADWAY BRIDGE OVER THE PAWTUCKET CANAL.	1852/02/00	1/4"=1'	H 62.5, W 94.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-126-3121	[UNTITLED PLAN.] [PROPOSED ARCH OVER MERRIMACK CANAL AT MERRIMACK STREET].	1852/00/00	NONE	H 31.5, W 67.1 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3122	[PLAN & ELEVATION OF] BOSTON AND LOWELL RAILROAD-"RED BRIDGE" OVER THE PAWTUCKET CANAL AT LOWELL, MASS.	1883/09/00	1/8"=1'	H 53.2, W 68.2 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
C-126-3123-A	[PLAN FOR EAST MERRIMACK STREET] EASTERN CANAL BRIDGE / LOWELL MASS. / PROPOSED BY BOSTON BRIDGE WORKS.	1894/02/15	3/8"=1', 1/20"=1'	H 44.1, W 85 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-126-3123-B	[PROPOSED PLAN FOR EAST MERRIMACK STREET BRIDGE OVER EASTERN CANAL.]	1894/02/15	3/8"=1'			
C-126-3123-C	[PROPOSED PLAN FOR EAST MERRIMACK STREET BRIDGE OVER EASTERN CANAL.]	1894/02/15	3/8"=1'			
C-126-3124	PLAN OF THE ABUTMENTS AND PIERS AND OUTSIDE STRINGERS / OF THE BREWERY [THORNDIKE ST.] BRIDGE ACROSS PAWTUCKET CANAL, ALSO OF / THE LOCATION OF THE SOUTHERLY END OF FLETCHER ST., IN LOWELL.	1861/11/26	1"=8'	H 45.5, W 58.3 CM	INK, COLORED PENCIL, GRAPHITE	PAPER

C-126-3125	[PLAN OF] FOOT BRIDGE OVER MERRIMACK CANAL / BUILT IN 1857. A NEW ONE LIKE IT OF / [...?] BUILT IN 1862 / ANOTHER BUILT IN 1888 OR 89.	1862/10/03	1"=1'	H 61.4, W 175.8 CM	INK, GRAPHITE	PAPER
C-126-3126	ELEVATION OF BRIDGE PROBABLY THE HIGH BRIDGE, OVER PAWTUCKET CANAL.	UNDATED	1"=8'	H 48, W 61.4 CM	INK, GRAPHITE	PAPER
C-126-3127	PLAN OF THE LOCATION OF THE ABUTMENTS & PIERS & OUTSIDE STRINGERS / OF THE BREWERY [THORNDIKE ST.] BRIDGE ACROSS PAWTUCKET CANAL, ALSO THE LOCATION OF / THE SOUTHERLY END OF FLETCHER STREET, IN LOWELL [WITH SECTIONS AND ELEVATIONS].	1861/11/26	1"=8'	H 61.5, W 174.9 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-126-3128	PLAN OF PAWTUCKET BRIDGE BETWEEN LOWELL & DRACUT / PLOTTED FROM SURVEY OF JAMES B. FRANCIS, MADE / AUGUST 1843, SHOWING ALSO IN RED THE STONE WORK OF / THE GUARD GATES AND LOCK, BUILT A.D. 1847. [ALSO CROSS SECTION OF RIVER AT NORTH EASTERLY SIDE].	1869/10/21	1"=16'	H 61, W 88 CM	INK, GRAPHITE	PAPER
C-126-3129	[ELEVATION OF] BRIDGE ACROSS CANAL IN LEDGE CUT [PROBABLY AT PAWTUCKET ST.].	1847/09/23	1"=10'	H 44.8, W 23 CM	INK, COLORED INK, GRAPHITE	PAPER
C-126-3130	PLAN FOR A BRIDGE OVER THE WESTERN CANAL [(ARCH)].	UNDATED	1"=8'	H 25.4, W, 40.8 CM	INK, COLORED PENCIL, GRAPHITE	TRACING PAPER

C-126-3131	SKETCH SHOWING TIMBERS / IN CENTRAL PART OF / DUTTON ST. BRIDGE OVER WESTERN CANAL.	1902/06/30	1"=5'	H 21.4, W 58.1 CM	INK, GRAPHITE, COLORED INK, WATER COLOR	TRACING PAPER
C-126-3132	MERRIMACK ST. BRIDGE OVER / WESTERN CANAL.	SEE NOTES	1"=1'	H 19.9, W 45.1 CM	INK, COLORED INK, GRAPHITE	PAPER
C-126-3133	BOSTON & LOWELL R. R. / TRAIN HOUSE AT LOWELL MASS. GENERAL PLAN OF GROUNDS & TRACKS.	1879/02/00	1/8"=8'& 1"=30'	H 48.2, W 61.4 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3134	LAWRENCE TRAIN HOUSE. / DETAILS OF PASSENGER HOUSE ROOF.	UNDATED	1"=2'	H 47, W 60.1 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-126-3135	SKETCH SHOWING POSITIONS OF ABUTMENTS OF PAWTUCKET STREET BRIDGE OVER PAWTUCKET CANAL / LOWELL.	1880/05/11	1"=4'	H 55.5, W 110.1 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3136	[PLAN & SECTIONS OF] TRUSSED STRINGER / FOR / PAWTUCKET ST. BRIDGE / OVER / PAWTUCKET CANAL.	1880/06/28	1/8"=1'	H 43, W 190.6 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-126-3137	[PLAN & SECTIONS OF] TRUSSED STRINGER / FOR PAWTUCKET STREET BRIDGE / OVER PAWTUCKET CANAL.	1880/06/02	1/8"=1"	H 43.8, W 193 CM	INK, WATER COLOR	DRAFTING CLOTH

C-126-3138	[PLAN & SECTIONS OF TRUSSED STRINGER OF] BRIDGE OVER PAWTUCKET CANAL, PAWTUCKET STREET, AS REBUILT IN 1880.	1880/06/00	NONE	H 17.7, W 140.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-126-3139	[PLAN & SECTIONS OF] SHOE FOR TRUSSED STRINGER [OF PAWTUCKET ST. BRIDGE OVER PAWTUCKET CANAL]. / 68 PIECES / FOR PROPRIETORS OF LOCKS AND CANALS.	1880/06/28	NONE	H 43.2, W 35.4 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3140	[PLAN] SKETCH OF [R.R.] BRIDGE [# 339] / OVER THE / MERRIMACK CANAL / AT LOWELL M. CO.	1881/00/00	1"=10'	H 57.9, W 87.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3141	BRIDGE OVER PAWTUCKET CANAL ON PAWTUCKET STREET / REBUILT IN 1880 [WITH SECTIONS AND ELEVATION OF SAME].	1881/03/00	1/4"=1'	H 53, W 78.4 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE, WATER COLOR	PAPER
C-126-3142	SKETCH OF PIER / FOR / PROPOSED R. R. BRIDGE OVER THE MERR'K CANAL / AT LOWELL M. CO.	1881/00/00	1"=1'	H 64.4, W 56.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-126-3143	SKETCH OF PROPOSED / R. R. BRIDGE OVER THE MERR'K CANAL / AT LOWELL M. CO.	1881/00/00	NONE	H 51, W 61 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

C-126-3144	SKETCH [PLAN] OF PROPOSED / R. R. BRIDGE OVER THE MERR'K CANAL / AT THE LOWELL M. CO. [SHOWING PIER & TRUSSES].	1881/00/00	NONE	H 35, W 38.2 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-126-3145	PLAN AND SECTION / OF THE / SOUTH ABUTMENT OF THE NEW / CENTRAL [STREET] BRIDGE.	1882/00/00	1"=40'	H 42, W 44.5 CM	INK, GRAPHITE	DRAFTING CLOTH
C-126-3146	AIKEN ST. BRIDGE PIER NO. 1 [PLAN & SECTION OF PILE & TIMBER FOUNDATION.]	1882/03/00	1"=40'	H 56.7, W 67.8 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3147	[PLAN & SIDE ELEVATION OF] AIKEN ST. BRIDGE PIERS [2, 3, & 4.].	1882/03/00	1"=4'	H 55.2, W 67.8 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3148	AIKEN ST. BRIDGE / PLAN & ELEVATION OF NORTH ABUTMENT.	1882/05/00	1"=40'	H 50.7, W 71 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3149	AIKEN ST. BRIDGE / PLAN & ELEVATION OF SOUTH ABUTMENT.	1882/05/00	1"=4'	H 71.1, W 56 CM	BLUEPRINT, INK, GRAPHITE, COLORED INK	PAPER
C-126-3150	PLAN & PROFILE / OF / MERRIMACK RIVER / FOR / LOCATION OF PILE BRIDGE FROM / BELVIDERE TO CENTREVILLE.	1882/08/08	1"=2'	H 28.6, W 69.6 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3151	[PLAN & ELVATION OF] PILE BRIDGE ACROSS RIVER.	1882/07/08	1"=2'	H 69.2, W 46.6 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3152	DESIGN FOR CARPET MILLS BRIDGE, / LOWELL, MASS. / B.& L. R. R.	1882/10/16	1"=4'	H 58, W 73.8 CM	BLUEPRINT	PAPER
C-126-3153	DETAILS OF DESIGN FOR CARPET MILLS BRIDGE. / B. & L. R. R., LOWELL, MASS.	1882/10/17	1/2'=1', 1 1/2"=1'	H 57.8, W 74 CM	BLUEPRINT, INK, GRAPHITE	PAPER

C-126-3154	PLAN FOR REBUILDING OF TRESTLE NO. 3 1/2 JEFFERSON BRANCH [OF NEW YORK, LAKE ERIE, & WESTERN R. R.].	1882/10/09	1"=2'	H 69.1, W 95.8 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-126-3155	[PLAN OF] CENTRAL STREET BRIDGE [WITH SECTION OF PIER].	1879/11/17	1/4"=1'	H 66, W 99 CM	INK, COLORED INK, GRAPHITE	PAPER
C-126-3157	CENTRAL STREET BRIDGE [PLAN OF TRUSS WITH MEASUREMENTS].	1883/08/07	1"=1'	H 25.6, W 141.5 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-126-3158	SKETCH SHOWING THE PROPOSED ARRANGEMENT OF TRUSSES / THE CENTRAL ST. BRIDGE NOW BEING REBUILT.	1883/09/00	1/4"=1'	H 64.1, W 23 CM	INK, GRAPHITE, COLORED PENCIL, COLORED INK	PAPER
C-126-3159	[SKETCH OF] BOSTON BRIDGE WORKS STANDARD FENCE.	1887/01/01	1"=1'	H 54.7, W 64.9 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3160	DESIGN FOR IRON WORK / OF / MERRIMACK ST. BRIDGE OVER EASTERN CANAL, / LOWELL MASS.	1888/08/06	1"=1'& 1/8"=1'	H 61.5, W 81.7 CM	BLUEPRINT, INK, GRAPHITE, WATER COLOR	PAPER
C-126-3161	SKETCH OF MERRIMACK ST. BRIDGE OVER / EASTERN CANAL, WITH SECTIONS OF SURFACE WOOD / WORK TO BE SUPPORTED BY IRON GIRDERS.	1888/07/18	1"=4'	H 55	INK	DRAFTING CLOTH

C-126-3162	SKETCH OF BRIDGE SHOWING SECTION OF SURFACE WOOD WORK TO BE SUPPORTED BY IRON GIRDERS.	1888/07/10	1"=4'	H 61, W 89.8 CM	INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
C-126-3163	[PLAN OF] MERRIMACK STREET BRIDGE / OVER / MERRIMACK CANAL. [SHOWING AREAS OWNED BY CITY, L.& C., & R. R.].	1889/06/00	1"=4'	H 56.6, W 71.4 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-126-3164	MERRIMACK STREET BRIDGE / OVER MERRIMACK CANAL / SECTION ON AXIS OF MERRIMACK CANAL.	1889/08/12	3/8"=1'	H 39, W 92 CM	INK, COLORED INK, WATER COLOR	PAPER
C-126-3165	DESIGN OF BRIDGE OVER BOOTT PENSTOCK-LOWELL MASS. / BY BOSTON BRIDGE WORKS.	1889/08/14	1/2"=1'	H 39.2, W 57.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-126-3166	[DESIGN OF] BOOTT PENSTOCK BRIDGE / DETAILS.	1889/10/02	SEE NOTES	H 60, W 90 CM	BLUEPRINT, INK	PAPER
C-126-3167	[VARIOUS PATTERNS OF] PATENT CAMBERED CORRUGATED FLOORING (STEEL ONLY) & STRAIGHT CORRUGATED FLOORING (WROUGHT IRON OR STEEL) /- FOR BRIDGES, WAREHOUSES, PIERS, PONTOONS, THE COVERING OF SUBWAYS & WAREHOUSES, ROOFS,WATER COURSES, CULVERTS [...SEE NOTES]	UNDATED	NONE	H 54.4, W 79.7 CM	BLUEPRINT, INK, GRAPHITE	PAPER

C-126-3168	[OUTLINE] PLAN OF / MERRIMACK STREET BRIDGE / OVER / MERRIMACK CANAL.	1889/12/00	1"=4'	H 62.4, W 89.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-126-3169	PLAN SHOWING CONSTRUCTION OF CENTERS USED IN BUILDING THE [16"] BRICK ARCH OVER MERRIMACK CANAL ON MERRIMACK / STREET IN MAY, JUNE AND JULY 1890.	1890/00/00	1"=1'	H 45.8, W 58.2 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-126-3171	[PLAN IN CONNECTION WITH] PROPOSED [CHANGES IN] TRACKS, LOWELL FREIGHT YARD / MIDDLESEX ST. [IN VICINITY OF DEPOT, BASIN, JACKSON & FLETCHER STREETS.]	1890/06/00	NONE	H 54.8, W 88.3 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-126-3172	SECTION OF ARCH BRIDGE OVER MERRIMACK / CANAL AT MERRIMACK STREET [SHOWING ARCH, ABUTMENTS, STREET, BOTTOM OF CANAL AND LEDGE] AS BUILT / DURING 1890.	1891/01/13	1"=2'	H 41.4, W 76.4 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	PAPER
C-126-3173	PLAN OF TRUSS AS BUILT DEC. 12, 1891 FOR SUSTAINING THE 12 INCH PIPE BEING LAID AT THIS TIME BY THE P. L.& C. FROM JUNCTION OF BROWN & EAST MERRIMACK STS. ACROSS THE CONCORD RIVER TO THE PRESCOTT MILLS.	1891/12/16	1"=2'	H 44.1, W 78.1 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

C-126-3174	[PLAN & ELEVATION OF PROPOSED] PAWTUCKET ST. BRIDGE [OVER NORTHERN CANAL] / AT / LOWELL MASS. [AS SUBMITTED BY BOSTON BRIDGE WORKS WITH COST OF SAME.]	1893/01/16	3/8"=1'	H 50.8, W 88.5 CM	BLUEPRINT, COLORED INK, INK, COLORED PENCIL, GRAPHITE	PAPER
C-126-3175	SHEET NO. 1. / EAST MERRIMACK STREET BRIDGE / [PLAN OF] PIER AND ABUTMENTS [ALSO ELEVATION]. / OFFICE OF THE CITY ENGINEER.	1893/10/00	1"=4'	H 65, W 96.5 CM	BLUEPRINT	PAPER
C-126-3176	SHEET NO. 1. / EAST MERRIMACK STREET BRIDGE / [PLAN OF] PIER AND ABUTMENTS [ALSO ELEVATION]. / OFFICE OF THE CITY ENGINEER.	1894/05/00	1"=4'	H 69, W 97 CM	BLUEPRINT	PAPER
C-126-3177	DESIGN [PLAN & SECTION] / FOR / EASTERN CANAL BRIDGE / LOWELL MASS. / PROPOSED BY / BOSTON BRIDGE WORKS.	1893/08/09	1/4"=1'	H 66.2, W 91 CM	RED LINE PRINT, COLORED INK, GRAPHITE, INK	PAPER
C-126-3178	DESIGN [PLAN & SECTION] / FOR / EASTERN CANAL BRIDGE / LOWELL MASS. / PROPOSED BY BOSTON BRIDGE WORKS.	1893/08/09	1/4"=1'	H 66, W 91.2 CM	RED LINE PRINT, COLORED INK, GRAPHITE, INK	PAPER
C-126-3179	[PLAN AND SECTION OF BRIDGE OVER EASTERN CANAL AT EAST MERRIMACK STREET BY BOSTON BRIDGE CO.]	1893/08/00				
C-126-3180-[A]	EAST MERRIMACK ST. / BRIDGE OF EASTERN CANAL. [PLAN OF BRIDGE SHOWING SIDEWALK BRACKET FOR PIPE LINE.]	1892/11/00	NONE	H 64, W 89.5 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-126-3180-[B]	[SECTION SHOWING] SIDEWALK BRACKET [FOR PIPE LINE] / EAST MERRIMACK ST. BRIDGE.	1904/02/03	1"=1'	H 47.5, W 60 CM	INK, COLORED INK, GRAPHITE	PAPER
C-126-3181	PLAN [AND ELEVATION] OF / BROADWAY BRIDGE / OVER / PAWTUCKET CANAL / SHOWING IT AFTER CHANGES AND REPAIRS / WERE MADE IN JUNE 1902.	1902/09/00	1"=5'	H 62.2, W 71.8 CM	INK, COLORED INK, WATER COLOR, COLORED PENCIL	TRACING PAPER
C-126-3182	[ELEVATION OF] HIGH BRIDGE-NORTHERN CANAL-PAWTUCKET ST.	1907/06/19	1"=10' & 1/4"=1'	H 39.7, W 68.3 CM	INK, COLORED PENCIL, COLORED INK, CRAYON	DRAFTING CLOTH
C-126-3183	PLAN [ELEVATION, & SECTIONS] OF / THORNDIKE ST. BRIDGE / OVER / PAWTUCKET CANAL [SHOWING LOCATION OF TIMBERS, PIPES, CABLES AND REINFORCEMENT UNDER SOUTHERLY SPAN.]	1908/01/00	1"=10'	H 51.2, W 70.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-126-3184	PLAN OF / OLD SCHOOL ST. BRIDGE / OVER / UPPER PAWTUCKET CANAL. [BEFORE ABOLITION OF GRADE CROSSING & PHOTO OF NEW BRIDGE.]	1908/02/00	1"=10'	H 54.5, W 74.6 CM	INK, COLORED INK, WATER COLOR, UNKNOWN PHOTOGRAPHIC PROCESS	DRAFTING CLOTH, PAPER
C-126-3185	PLAN [AND SECTION] OF / MERRIMACK STREET BRIDGE / OVER / WESTERN CANAL.	1908/03/20	1"=5'	H 69.5, W 97.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

C-126-3186	PLAN [AND SECTIONS] OF / EAST MERR'K ST. BRIDGE / OVER EASTERN CANAL.	1908/04/00	1"=5'	H 73.9, W 101 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-126-3187	PLAN [& SECTIONS] OF / SUFFOLK STREET BRIDGE / OVER / NORTHERN CANAL.	1908/04/05	1"=5'	H 67.1, W 101.2 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-126-3188	SKETCH OF / SUGGESTED, REINFORCED CONCRETE BRIDGE / OVER PAWTUCKET CANAL AT / THORNDIKE STREET.	1917/06/00	1"=8'	H 44.5, W 60.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-126-3189	[PLAN, ELEVATION & SECTION OF PROPOSED] THREE HINGED ARCHED BRIDGE / BROADWAY OVER PAWTUCKET CANAL / PROPRIETORS OF LOCKS AND CANALS / LOWELL, MASS.	1918/04/25	1"=1'	H 68.9, W 91.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-126-3190	PLAN [AND ELEVATION] OF / BROADWAY BRIDGE / OVER / PAWTUCKET CANAL / SHOWING IT AFTER CHANGES AND REPAIRS / WERE MADE IN JUNE 1902.	1902/09/00	1"=5'	H 61.4, W 69.8 CM	BLUEPRINT, INK, COLORED INK	PAPER
C-126-3191	B. AND M. R. R. SOUTHERN DIVISION / [PLAN & ELEVATION SHOWING] SIDE TRACK BRIDGE / OVER WESTERN CANAL / LOWELL MASS.	1895/10/00	1/4"=1'	H 48.6, W 76.2 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
C-126-3192	[PLAN SHOWING GRADES ON PIER AND ABUTMENTS.] PAWTUCKET STREET BRIDGE / OVER PAWTUCKET CANAL.	1927/04/00	1"=10'	H 25.7, W 38 CM	INK	DRAFTING CLOTH

C-126-3193	[UNTITLED PLAN.] [STEEL SCHEDULE, N.E. STRUCTURAL CO.]	1927/09/30	NONE	H 31.1, W 99.9 CM	BLUEPRINT, INK	PAPER
C-126-3194	PLAN OF / PAWTUCKET STREET BRIDGE / OVER / PAWTUCKET CANAL / SHOWING REPAIRS MADE IN 1927. [SHOWING ARRANGEMENT OF TRUSSES & I-BEAMS AFTER RECONSTRUCTION.]	1928/08/07	1"=4'	H 62.5, W 63 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
C-126-3195	[PLAN SHOWING] ABOLITION OF GRADE CROSSING / NASHUA & LOWELL RAILROAD / SCHOOL ST., LOWELL, MASS. [WITH GRADES OF SCHOOL ST. & WESTERN AVE. BOSTON & MAINE R. R.]	1910/01/00	1"=40'	H 75.2, W 52 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-127	[PORTFOLIO CONTAINING RESULTS OF EXPERIMENTS AND OTHER PAPERS PERTAINING TO FLOW OF WATER IN PIPES AND IRON CONDUITS.]	UNDATED				
C-128-1082-01-[A]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/09/20	NONE	H 55.9, W 45.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-01-[B-COPY 1]	DAM AT THE HEAD OF PAWTUCKET FALLS. LOWELL, MASS.	1875/06/08	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-01-[B-COPY 2]	DAM AT THE HEAD OF PAWTUCKET FALLS. LOWELL, MASS.	1875/06/08	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-02-[A]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/07/20	NONE	H 55.8, W 42 CM	PHOTOGRAPH, INK	PAPER

C-128-1082-02-[B]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/07/30	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-03-[A]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/07/30	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-03-[B]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/07/20	NONE	H 55.8, W 42 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-04-[COPY 1]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/08/26	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-04-[COPY 2]	DAM AT HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/08/26	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-05-[COPY 1]	DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/08/31	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-05-[COPY 2]	DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/08/31	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-06-[COPY 1]	DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/09/11	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1082-06-[COPY 2]	DAM AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/09/11	NONE	H 42, W 55.8 CM	PHOTOGRAPH, INK	PAPER
C-128-1751	PLAN OF THE FISHWAY TO BE CONSTRUCTED AT THE DAM AT PAWTUCKET FALLS ON THE MERRIMACK RIVER, / IN LOWELL & DRACUT, MASS.	UNDATED	3/8"=1'	H 60, W 95.2 CM	INK	DRAFTING CLOTH

C-128-1752	PLAN OF NEW DAM TO BE BUILT AT THE HEAD / OF PAWTUCKET FALLS FROM THE GREAT ROCK / TO THE DRACUT SHORE-LENGTH ABOUT 629 FEET. / HEIGHT FROM 4 TO 18 FEET, AVERAGE HEIGHT / ABOUT 10 FEET [ALSO SECTION OF CAPPING STONE].	1869/07/11	1"=3'	H 50.5, W 62.5 CM	INK	PAPER
C-128-1753	[PLAN OF DAM SHOWING] OBSERVATIONS MADE TO DETERMINE THE MEAN HEIGHT OF THE TOP OF THE DAM AT THE HEAD OF PAWTUCKET FALLS ON MERRIMACK RIVER-IN / SEPTEMBER 1867.	1867/09/03	1"=40'	H 57.8, W 87.7 CM	INK, GRAPHITE	PAPER
C-128-1754	SKETCH OF PROPOSED FISHWAY [(NOT ADOPTED)] AT THE DAM AT PAWTUCKET FALLS. LOWELL, MASS.	1866/08/04	SEE NOTES	H 58.8, W 92.8 CM	INK, WATER COLOR	PAPER
C-128-1755	SKETCH OF PAWTUCKET DAM [SHOWING STATE OF DAMS JUNE 18, 1848].	1848/07/27	1"=40'		H 49, W 70 CM	INK, GRAPHITE
C-128-1755	SKETCH OF PAWTUCKET DAM [SHOWING STATE OF DAMS JUNE 18, 1848].	1848/07/27	1"=40'	H 49, W 70 CM	INK, GRAPHITE	PAPER
C-128-1756	[PLAN, ELEVATION & SECTION OF] COFFER DAM / ERECTED ABOVE GUARD GATES NORTHERN CANAL.	1848/01/05	1/2"=1'		H 49, W 69.8 CM	INK, WATER COLOR
C-128-1756	[PLAN, ELEVATION & SECTION OF] COFFER DAM / ERECTED ABOVE GUARD GATES NORTHERN CANAL.	1848/01/05	1/2"=1'	H 49, W 69.8 CM	INK, WATER COLOR	PAPER
C-128-1757	SECTION OF THE PART OF THE DAM AT THE HEAD OF / PAWTUCKET FALLS / BUILT IN THE YEAR 1847.	1876/07/14	NONE	H 82.3, W 61.3 CM	INK, GRAPHITE	PAPER
C-128-1758	SECTIONS OF NEW DAM / NORTHERN CANAL.	1847/05/20	1/2"=1'		H 45.7, W 58.8 CM	INK, WATER COLOR
C-128-1758	SECTIONS OF NEW DAM / NORTHERN CANAL.	1847/05/20	1/2"=1'	H 45.7, W 58.8 CM	INK, WATER COLOR	PAPER

C-128-1759	SECTION OF PART OF THE DAM AT [PIER] PAWTUCKET FALLS / CONSTRUCTED IN 1867.	1847/00/00	1/2"=1'		H 49.2, W 70 CM	INK, WATER COLOR, GRAPHITE
C-128-1759	SECTION OF PART OF THE DAM AT [PIER] PAWTUCKET FALLS / CONSTRUCTED IN 1867.	1847/00/00	1/2"=1'	H 49.2, W 70 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-128-1760	PLAN OF LAND IN DRACUT BELONGING TO BRADLEY VARNUM / FROM WHICH THE PROPS. OF LOCKS & CANALS PROPOSE TO TAKE EARTH FOR FILLING COFFER DAM NEAR PAWTUCKET DAM.	1847/00/00	1"=20'		H 18, W 102 CM	INK, WATER COLOR
C-128-1760	PLAN OF LAND IN DRACUT BELONGING TO BRADLEY VARNUM / FROM WHICH THE PROPS. OF LOCKS & CANALS PROPOSE TO TAKE EARTH FOR FILLING COFFER DAM NEAR PAWTUCKET DAM.	1847/00/00	1"=20'	H 18, W 102 CM	INK, WATER COLOR	PAPER
C-128-1761	PROFILE OF FOUNDATION / OF THE NEW DAM / & THE PIER OF PAWTUCKET BRIDGE / NORTHERN CANAL.	1847/09/07	1/4"=1'		H 67.8, W 99.6 CM	INK, WATER COLOR
C-128-1761	PROFILE OF FOUNDATION / OF THE NEW DAM / & THE PIER OF PAWTUCKET BRIDGE / NORTHERN CANAL.	1847/09/07	1/4"=1'	H 67.8, W 99.6 CM	INK, WATER COLOR	PAPER
C-128-1762	SECTIONS OF PART OF THE / BED OF MERRIMACK RIVER / PARALLEL TO THE EASTERLY / WING OF PAWTUCKET DAM.	1846/11/06	1"=10'		H 27, W 144.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE

C-128-1762	SECTIONS OF PART OF THE / BED OF MERRIMACK RIVER / PARALLEL TO THE EASTERLY / WING OF PAWTUCKET DAM.	1846/11/06	1"=10'	H 27, W 144.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-128-1763	SECTION OF OLD DAM. / TAKEN AWAY DURING THE CONSTRUCTION OF THE NORTHERN CANAL.	UNDATED			H 49.2, W 70 CM	INK, WATER COLOR
C-128-1763	SECTION OF OLD DAM. / TAKEN AWAY DURING THE CONSTRUCTION OF THE NORTHERN CANAL.	UNDATED	1"=1'	H 49.2, W 70 CM	INK, WATER COLOR	PAPER
C-128-1764	SKETCH OF / PAWTUCKET DAM / SHOWING LENGTHS & DISTANCES BETWEEN ANGLES, ETC. [ALSO SECTION OF DAM AT DEEP PLACE].	1903/01/00	1"=40'	H 33.7, W 81.6 CM	INK	DRAFTING CLOTH
C-128-1765	DEPTHS OF WATER ABOVE / BED OF MERRIMACK RIVER / NEAR N.E. PART OF / PAWTUCKET DAM / WATER THREE INCHES ABOVE FLASHBOARDS.	1846/07/28	1"=20'		H 52.5, W 86.4 CM	INK, WATER COLOR
C-128-1765	DEPTHS OF WATER ABOVE / BED OF MERRIMACK RIVER / NEAR N.E. PART OF / PAWTUCKET DAM / WATER THREE INCHES ABOVE FLASHBOARDS.	1846/07/28	1"=20'	H 52.5, W 86.4 CM	INK, WATER COLOR	PAPER
C-128-1766	A PLAN OF PART OF / MERRIMACK RIVER / BETWEEN LOWELL & DRACUT; / BY U.A. BOYDEN.	1833/02/00	1"=1 CHAIN	BOYDEN, URIAH	H 55.4, W 75.4 CM	INK, WATER COLOR
C-128-1766	A PLAN OF PART OF / MERRIMACK RIVER / BETWEEN LOWELL & DRACUT; / BY U.A. BOYDEN.	1833/02/00	1"=1 CHAIN	H 55.4, W 75.4 CM	INK, WATER COLOR	PAPER
C-128-1767	[PLAN OF] HEAD OF PAWTUCKET FALLS, [SHOWING DAM] LOWELL, MASS.	1875/00/00	1"=110' OR 4"=1 MILE	H 37, W 37 CM	INK, WATER COLOR	CLOTH BACKED PAPER

C-128-1768	[UNTITLED DAM.] [PLAN OF DAM GIVING SOUNDINGS BELOW NEW PART.]	1875/00/00	NONE	H 78.2, W 56.5 CM	INK, GRAPHITE	PAPER
C-128-1769	[NEW DAM AT PAWTUCKET FALLS BUILT IN 1875.]	SEE TITLE				
C-128-1770	MAIN DAM AT PAWTUCKET FALLS . / 1875. / BEFORE RECONSTRUCTION, / LEVELS & MEASUREMENTS BY JAMES FRANCIS.	1875/00/00	NONE	H 35.5, W 21.5 CM	INK, COLORED INK	PAPER
C-128-1771	PAWTUCKET DAM. LOWELL. / PLAN & ELEVATION OF PART REBUILT IN 1875.	1875/08/30	1"=20',H1"=5',V1"=1'	H 93, W 96.2 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-128-1772	SECTION OF DAM & BACKING AT 47' WESTERLY OF THE CORNER.	1875/02/13	NONE	H 48.1, W 242.2 CM	GRAPHITE	PAPER
C-128-1773	[PLAN OF] SECTION OF PAWTUCKET DAM [WITH ADDITIONS SUBSEQUENT TO FEBRUARY 1875, SHOWING POSITION OF COFFER DAMS ETC., DURING CONSTRUCTION.]	1875/02/00	1"=40'	H 64.3, W 93.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-128-1774-	[UNTITLED PLAN, SEE NOTES.] [SECTION OF DAM WHERE 14' HIGH ON FACE / ALSO, SECTION OF CAPPING STONE AS USED.] [UNTITLED PLAN, SEE NOTES.]	1875/04/00	NONE	H 21, W 37 CM	INK, COLORED INK	PAPER
C-128-1774-[COPY 1]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS. [SECTION OF DAM WHERE 14' HIGH ON FACE / ALSO, SECTION OF CAPPING STONE AS USED.]	1875/03/12	1/2"=1'	H 45, W 54 CM	HELIOTYPE, GRAPHITE	TRACING PAPER

C-128-1774-[COPY 2]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS. [SECTION OF DAM WHERE 14' HIGH ON FACE. ALSO, SECTION OF CAPPING STONE AS USED.]	1875/03/12	1/2"=1'	H 45, W 54 CM	HELIOTYPE, COLORED INK	TRACING PAPER
C-128-1774-[COPY 3]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS. [SECTION OF DAM WHERE 14' HIGH ON FACE. ALSO, SECTION OF CAPPING STONE AS USED.]	1875/03/12	1/2"=1'	H 45, W 54 CM	HELIOTYPE	TRACING PAPER
C-128-1774-[COPY 4]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS. [SECTION OF DAM WHERE 14' HIGH ON FACE. ALSO, SECTION OF CAPPING STONE AS USED.]	1875/03/12	1/2"=1'	H 45, W 54 CM	HELIOTYPE	TRACING PAPER
C-128-1775	[SECTION OF] CAPPING STONE FOR DAM OF THE / PROPS. OF LOCKS & CANALS ON MERRIMACK RIVER, FOR FIRST & SECOND ROCKS.	1875/04/26	NONE	H 26, W 41.6 CM	INK	PAPER
C-128-1776	[SECTION OF CAPPING STONE FOR NEW DAM FROM WHICH PATTERN WAS MADE.]	1875/03/00				
C-128-1778	SPECIFICATIONS OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER

C-128-1778-[COPY 01]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 02]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 03]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 04]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER ST THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER

C-128-1778-[COPY 05]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 06]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 07]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 08]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER

C-128-1778-[COPY 09]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 10]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 11]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 12]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER

C-128-1778-[COPY 13]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 14]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 15]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 16]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER

C-128-1778-[COPY 17]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 18]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 19]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS., TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1778-[COPY 20]	SPECIFICATION OF CUT STONE REQUIRED FOR NEW DAM ON / MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, / MASS. TO BE BUILT BY THE PROPRIETORS OF THE LOCKS & / CANALS ON MERRIMACK RIVER.	1875/04/05	NONE	H 25, W 19.8 CM	LITHOGRAPH	PAPER
C-128-1779	PROVISIONAL / HEIGHT OF NEW DAM AT HEAD OF PAWTUCKET FALLS, / FROM GREAT ROCK TO THE DRACUT SHORE.	1875/03/15	NONE	H 58.5, W 76.4 CM	INK, COLORED INK, GRAPHITE	PAPER

C-128-1780	SKETCH OF BANK ON NORTHERLY SIDE OF / MERRIMACK RIVER, BELONGING TO SAM / FAY ESQR, FROM WHICH SAND IS TO BE TAKEN / FOR THE COFFER DAM.	1875/05/28	1"=40'	H 46.6, W 66.5 CM	INK	PAPER
C-128-1781	PLAN & PROFILE OF GREAT ROCK ON LINE OF PAWTUCKET / DAM, MERRIMACK RIVER, LOWELL, MASS.	1875/06/15	<1'>=HOR. & VERT.	H 58.6, W 76.5 CM	INK, COLORED INK	PAPER
C-128-1782	LEVELS & SURVEY OF GREAT ROCK BY / JAMES FRANCIS BEFORE THE ROCK WAS CUT DOWN.	1875/06/11	1"=SIDE OF SQUARE	H 58.6, W 76.4 CM	GRAPHITE, COLORED INK	PAPER
C-128-1784	[SECTION OF THE OLD & NEW DAMS, 81 & 23 FEET FROM CORNER OF NEW DAM BY J.B. FRANCIS.]	1875/10/18-19	NONE	H 76, W 58.5 CM	INK, WATER COLOR	PAPER
C-128-1785	SKETCH, SHOWING A FRONT ELEVATION OF A PART OF THE OLD DAM / AT PAWTUCKET FALLS, BEGINNING ABOUT 175 FT. FROM THE END OF THE OLD DAM, ON THE DRACUT SIDE OF THE RIVER.	1875/07/31	1"=10'	H 50.5, W 92.6 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-128-1786	[SPECIFICATIONS & PLAN OF] CAPPING STONE FOR NEW DAM PROPOSED TO BE BUILT AT / THE HEAD OF PAWTUCKET FALLS DAM ON MERRIMACK RIVER.	1869/08/12	2"=1'	H 26.1, W 47.5 CM	INK	PAPER
C-128-1787	[MEASUREMENTS OF] STONE RECEIVED FROM "CAPE ANN GRANITE COMPANY", USED IN THE CONSTRUCTION OF THE NEW DAM AT PAWTUCKET FALLS.	1875/00/00	NONE	H 58.5, W 79 CM	INK	PAPER

C-128-1788	[MEASUREMENTS OF] STONE RECEIVED FROM "CAPE ANN GRANITE COMPANY", USED IN THE CONSTRUCTION OF THE NEW DAM AT PAWTUCKET FALLS.	1875/00/00	NONE	H 58.5, W 79 CM	INK	PAPER
C-128-1789	COMPARISONS OF DEPTHS OF WATER ABOVE TOP OF FLASH-BOARDS ON DAM AT HEAD OF PAWTUCKET FALLS, LOWELL MASS., AS IT NOW IS, AND / REBUILT WITH CREST HORIZONTAL, WITH THE ROCKS CUT DOWN TO LEVEL OF CREST.	1875/02/13	NONE	H 58.5, W 79 CM	INK	PAPER
C-128-1790	DIAGRAM SHOWING HEIGHTS OF WATER ABOVE CREST OF MASONRY AT PAWTUCKET DAM FOR THE MONTHS OF / JULY, AUGUST, SEPTEMBER & OCTOBER, FROM 1883 TO 1889 INCL.	1890/07/18	NONE	H 54.8, W 92.8 CM	INK, COLORED INK	PAPER
C-128-1792	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.7 CM	HELIOTYPE, COLORED INK, GRAPHITE	TRACING PAPER
C-128-1792-[A]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE, INK	TRACING PAPER
C-128-1792-[B]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1895/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE, INK	TRACING PAPER
C-128-1792-[COPY 01]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 02]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER

C-128-1792-[COPY 03]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 04]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 05]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 06]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 07]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 08]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 09]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS. LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 10]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 11]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 12]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1792-[COPY 13]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER

C-128-1792-[COPY 14]	DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.5 CM	HELIOTYPE	TRACING PAPER
C-128-1793	[PLAN OF MERRIMACK RIVER AT] PAWTUCKET DAM / [SHOWING] ELEVATIONS [IN THAT VICINITY & FOUR SECTIONS ABOVE DAM] ON SCHOOL ST. & VARNUM AVE.	1928/01/11	1"=50'	H 76.9, W 88 CM	INK, COLORED INK	DRAFTING CLOTH
C-128-1794	CHANNEL IMPROVEMENTS IN MERRIMACK RIVER NEAR PAWTUCKET DAM.	1937/00/00	1"=250'	H 21.1, W 28.1 CM	INK	DRAFTING CLOTH
C-128-1795	SKETCH OF / PAWTUCKET DAM.	1923/03/00	1"=40',4' & 4"	H 53.1, W 76.6 CM	INK	DRAFTING CLOTH
C-128-3183	PROFILE OF DRAIN IN THE EASTERLY PART OF CROSS ST. / DIGGING DONE BY NORTON ROBINSON.	1837/11/22	NONE		H 22.2, W 45.8 CM	INK
C-128-3183	PROFILE OF DRAIN IN THE EASTERLY PART OF CROSS ST. / DIGGING DONE BY NORTON ROBINSON.	1837/11/22	NONE	H 22.2, W 45.8 CM	INK	PAPER
C-128-3184	[CROSS SECTION OF SEWER] UNDER MASS. FLUME.	1842/09/27	3/4"=1'		H 33.2, W 50.1 CM	INK, WATER COLOR
C-128-3184	[CROSS SECTION OF SEWER] UNDER MASS. FLUME.	1842/09/27	3/4"=1'	H 33.2, W 50.1 CM	INK, WATER COLOR	PAPER
C-128-3187	PROFILE OF RACE ST.	1846/04/13	1"=10'		H 20.7, W 54.8 CM	INK, WATER COLOR, GRAPHITE
C-128-3187	PROFILE OF RACE ST.	1846/04/13	1"=10'	H 20.7, W 54.8 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-128-3188	PROFILE OF MAIN SEWER FROM CROSS ST. TO THE NORTHERN CANAL / WITH BRANCHES IN MOODY & DODGE STS.	1848/06/07	H1"=75', V1"=4'		H 49.3, W 70.1 CM	INK, COLORED INK, WATER COLOR

C-128-3188	PROFILE OF MAIN SEWER FROM CROSS ST. TO THE NORTHERN CANAL / WITH BRANCHES IN MOODY & DODGE STS.	1848/06/07	H1"=75', V1"=4'	H 49.3, W 70.1 CM	INK, COLORED INK, WATER COLOR	PAPER
C-128-3189	[PROFILE OF SEWER IN DUTTON ST. FOR LOWELL MACHINE SHOP HOUSES.]	1852/10/00				
C-128-3190	[PLAN & SECTIONS OF] THORNDIKE ST. OVERFLOW / THORNDIKE ST. CATCH BASIN.	1886/05/08	1"=1', 1/2"=1'	H 59.7, W 83 CM	BLUEPRINT	PAPER
C-128-3191	[PLAN & SECTION OF] BROADWAY OVERFLOW.	1887/10/13	1/4"=1'	H 37, W 45.3 CM	BLUEPRINT	PAPER
C-128-3196	PLAN FOR THE ALTERATION OF SEWER NEAR PRESCOTT MILLS.	1844/03/09		FRANCIS, J.B.	H 54, W 73 CM	GRAPHITE, WATER COLOR
C-128-3196	PLAN FOR THE ALTERATION OF SEWER NEAR PRESCOTT MILLS.	1844/03/09	NONE	H 54, W 73 CM	GRAPHITE, WATER COLOR	PAPER
C-128-3197	[PROFILE OF] PIPES REQUIRED FROM LOWELL MILLS TO MACHINE SHOP.	UNDATED			H 28, W 47.7 CM	INK, GRAPHITE
C-128-3197	[PROFILE OF] PIPES REQUIRED FROM LOWELL MILLS TO MACHINE SHOP.	UNDATED	NONE	H 28, W 47.7 CM	INK, GRAPHITE	PAPER
C-128-3201	PROFILE OF DUTTON ST. FROM MERRIMACK TO MACHINE SHOP.	1836/10/12	H1/8"=10', V1/8"=1'		H 17.6, W 51.2 CM	INK, COLORED INK
C-128-3201	PROFILE OF DUTTON ST. FROM MERRIMACK TO MACHINE SHOP.	1836/10/12	H1/8"=10', V1/8"=1'	H 17.6, W 51.2 CM	INK, COLORED INK	PAPER
C-128-3203	PROFILE / OF / MERRIMACK STREET / BETWEEN KIRK & CENTRAL / STREETS.	1835/10/05	H1"=40', V1"=8'		H 24.7, W 59.8 CM	INK, COLORED INK

C-128-3203	PROFILE / OF / MERRIMACK STREET / BETWEEN KIRK & CENTRAL / STREETS.	1835/10/05	H1"=40', V1"=8'	H 24.7, W 59.8 CM	INK, COLORED INK	PAPER
C-128-3206	PROFILE OF PART OF SUFFOLK ST.	UNDATED			H 13.4, W 51.2 CM	INK, GRAPHITE
C-128-3206	PROFILE OF PART OF SUFFOLK ST.	UNDATED	NONE	H 13.4, W 51.2 CM	INK, GRAPHITE	PAPER
C-128-3208	PROFILES OF MERRIMACK ST. [BETWEEN WESTERN & MERRIMACK CANAL.]	UNDATED			H 51.2, W 71.1 CM	INK, COLORED INK
C-128-3208	PROFILES OF MERRIMACK ST. [BETWEEN WESTERN & MERRIMACK CANAL.]	UNDATED	V1/8"=1'	H 51.2, W 71.1 CM	INK, COLORED INK	PAPER
C-128-3210	PROFILE OF PROPOSED ST. ON NORTH SIDE OF NASHUA & LOWELL R. R.	UNDATED			H 20.2, W 71.9 CM	INK, COLORED INK, GRAPHITE
C-128-3210	PROFILE OF PROPOSED ST. ON NORTH SIDE OF NASHUA & LOWELL R. R.	UNDATED	H1"=80', V1"=20'	H 20.2, W 71.9 CM	INK, COLORED INK, GRAPHITE	PAPER
C-128-3215	[PROFILE OF] WILLIE ST.	UNDATED			H 32.8, W 56.9 CM	INK, GRAPHITE
C-128-3215	[PROFILE OF] WILLIE ST.	UNDATED	SEE NOTES	H 32.8, W 56.9 CM	INK, GRAPHITE	PAPER
C-128-3216	[UNTITLED PLAN. SEE NOTES.]	UNDATED			H 52.9, W 64.8 CM	INK, GRAPHITE

C-128-3216	[UNTITLED PLAN. SEE NOTES.]	UNDATED	NONE	H 52.9, W 64.8 CM	INK, GRAPHITE	PAPER
C-128-3218	[PROFILE FROM HAMILTON CANAL TO LOWELL BLEACHERY.]	1842/04/20	H1"=100', V1"=8'		H 23.3, W 146.9 CM	INK, WATER COLOR
C-128-3218	[PROFILE FROM HAMILTON CANAL TO LOWELL BLEACHERY.]	1842/04/20	H1"=100', V1"=8'	H 23.3, W 146.9 CM	INK, WATER COLOR	PAPER
C-128-3219	PROFILE OF THE SOUTH PART OF WILLIE ST.	1843/04/25	H1"=20',V1"=8'		H 26.9, W 73.2 CM	INK, WATER COLOR, COLORED INK
C-128-3219	PROFILE OF THE SOUTH PART OF WILLIE ST.	1843/04/25	H1"=20',V1"=8'	H 26.9, W 73.2 CM	INK, WATER COLOR, COLORED INK	PAPER
C-128-3220	PROFILE OF PART OF MERRIMACK ST. IN BELVIDERE.	1845/06/10	H1/16"=1', V1/4"=1'		H 26.5, W 137.2 CM	INK, COLORED INK
C-128-3220	PROFILE OF PART OF MERRIMACK ST. IN BELVIDERE.	1845/06/10	H1/16"=1', V1/4"=1'	H 26.5, W 137.2 CM	INK, COLORED INK	PAPER
C-128-3221	PROFILE OF PART OF MOODY ST.	1845/03/21	H1"=50', V1"=8'		H 24, W 85 CM	INK, WATER COLOR, GRAPHITE
C-128-3221	PROFILE OF PART OF MOODY ST.	1845/03/21	H1"=50', V1"=8'	H 24, W 85 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-128-3222	PLAN & PROFILE / OF PART OF / ROCK ST. / SHOWING / CUTTING & FILLING.	1849/11/17	H1"=30', V1"=5'		H 36.3, W 87.5 CM	INK, COLORED INK, GRAPHITE
C-128-3222	PLAN & PROFILE / OF PART OF / ROCK ST. / SHOWING / CUTTING & FILLING.	1849/11/17	H1"=30', V1"=5'	H 36.3, W 87.5 CM	INK, COLORED INK, GRAPHITE	PAPER

C-128-3223	PROFILE OF PART OF ROCK ST.	1849/09/25	H1"=40', V1"=4'		H 31.7, W 84.5 CM	INK, COLORED INK
C-128-3223	PROFILE OF PART OF ROCK ST.	1849/09/25	H1"=40', V1"=4'	H 31.7, W 84.5 CM	INK, COLORED INK	PAPER
C-128-3224	PROPS. OF LOCKS & CANALS / PROFILES OF FARM STS., / BUILT IN 1857. [(FRONT, FIRST, CHRISTIAN, LLEWELLYN, MT. PLEASANT ST.)]	SEE TITLE			H 91, W 213.3 CM	INK, COLORED INK
C-128-3224	PROPS. OF LOCKS & CANALS / PROFILES OF FARM STS., / BUILT IN 1857. [(FRONT, FIRST, CHRISTIAN, LLEWELLYN, MT. PLEASANT ST.)]	SEE TITLE	H1"=100', V1"=10'	H 91, W 213.3 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-128-3225	PLAN SHOWING LOCATION AND ALTERATIONS / IN [LINE OF] BRIDGE STREET AS LAID OUT BY / COURT OF SESSIONS AND COUNTY COMMISSIONERS.	1929/01/00	1"=50'	H 37, W 71.1 CM	INK, COLORED INK	DRAFTING CLOTH
C-128-3226	[PROFILE OF] ANNE ST. SEWER / SKETCH / SHOWING WALL ON EAST BANK OF / MERRIMACK CANAL / MERRIMACK CANAL / MERRIMACK STREET TO FOOT BRIDGE.	1909/06/00	1"=40'& 2'	H 33.4, W 80 CM	INK, COLORED INK	PAPER
C-128-3226-[COPY 1]	[PROFILE OF] ANNE ST. SEWER / SKETCH / SHOWING WALL ON EAST BANK OF / MERRIMACK CANAL / MERRIMACK CANAL / MERRIMACK STREET TO FOOT BRIDGE.	1909/06/00	1"=40'& 2'	H 33.5, W 79.4 CM	BLUEPRINT	PAPER
C-128-3227-A	PLAN & SECTIONS / SHOWING / EXISTING CONDITIONS ON TYNG ST. / & / PROPOSED CUT-OFF WALL.	1937/06/12	H1"=10', V1"=5'	H 38.8, W 84.1 CM	INK	DRAFTING CLOTH
C-128-3227-B	PLAN & ELEVATION / OF PROPOSED CUT-OFF WALL.	1937/06/12	H1"=20', V1"=10'	H 48.3, W 78.7 CM	INK, WATER COLOR	PAPER

C-128-3228	PLAN OF PROPOSED SURFACE DRAINS / IN PORTIONS OF / SCHOOL ST., WESTFORD ST. & ADJOINING STS.	1939/08/00	1"=50'	H 106.4, W 138.5 CM	BLUEPRINT	PAPER
C-128-3229	PLAN SHOWING / LOCATION OF SEWERS / IN CENTRAL PART OF LOWELL.	1925/06/06	1"=500'	H 43.3, W 59.7 CM	INK, WATER COLOR	DRAFTING CLOTH
C-128-3230	MAP SHOWING / PROPRIETORS OF THE LOCKS & CANALS / CANAL SYSTEM / & PORTION OF / MERRIMACK & CONCORD RIVERS / LOWELL MASSACHUSETTS.	SEE NOTES	1"=1000'	H 88.4, W 107.1 CM	RED LINE PRINT	CLOTH BACKED PAPER
C-128-3231	PLAN & PROFILE / PROPOSED SURFACE DRAIN & OUTLET / SCHOOL ST.	1939/08/00	1"=50'& 5'	H 56.5, W 90.1 CM	BLUEPRINT	PAPER
C-128-3232	[W. P. A. WORK PROJECT-CITY OF LOWELL.]	UNDATED				
C-128-3233	SKETCH OF EXISTING LOCATIONS / & PROPOSED CHANGES / PEVEY ST. LOWELL.	1941/04/23	NONE	H 31.8, W 85.3 CM	GRAPHITE	PAPER
C-129-3228	[FOLDER CONTAINING 23 DIAGRAMS SHOWING DISCHARGE OF GRIST MILL WHEEL UNDER DIFFERENT HEADS & OPENINGS OF SPEED GATE.] [PROPS. OF LOCKS AND CANALS. GRIST MILL WHEEL, QUANTITY OF WATER DISCHARGED.]	1857/11/00				PAPER
C-129-3229 OVERSIZE	[PROPS. OF LOCKS & CANALS. MISCELLANEOUS PAPERS, 1871-1881.]	SEE TITLE				PAPER

C-129-3229-(A) OVERSIZE	[TABLE OF FLUME MEASUREMENTS AT APPLETON, MERRIMACK, BOOTT, AND MASSACHUSETTS MILLS.] [[TABLE SHOWING FLUME MEASUREMENTS OF APPLETON & MERRIMACK FLUMES.]	1872/00/00	PAPER
C-129-3229-(B) OVERSIZE	EXPERIMENTS [WITH REFERENCE TO BACKWATER] .	UNDATED	PAPER
C-129-3229-(C) OVERSIZE	[DISCHARGE TABLES OF TWO SOUTHERLY & ONE NORTHERLY BREAST WHEEL AT MIDDLESEX MILL NO. 3.]	1867/07/08	PAPER
C-129-3229-(D) OVERSIZE	[DIAGRAM SHOWING RAINFALL FOR PERIODS OF 10 YEARS, FROM OBSERVATIONS MADE AT PENNSYLVANIA HOSPITAL, PHILA. PA. & AT PROVIDENCE, R.I. 1810 TO 1877.]	SEE TITLE	PAPER
C-129-3229-(E) OVERSIZE	[DIAGRAM REPRESENTING RESULTS OF CERTAIN EXPERIMENTS UPON THE FLOW OF WATER OVER WEIRS, MADE AT METZ, BY PONCELET & LESBROS IN 1821.]	1862/06/06	PAPER
C-129-3229-(F) OVERSIZE	[DATA RELEATING TO THE WATER POWER USED BY THE CORPORATOPNS AT LOWELL OWNING SHARES IN THE PROP. OF L.& C. ON MERR'K RIVER & COMPARISON OF THE QUANTITIES OF WATER CONSTITUTING A MILL POWER ACCORDING TO ANOTHER METHOD RECENTLY SUGGESTED.]	1881/00/00	PAPER

C-129-3229-(G) OVERSIZE	[DIAGRAM REPRESENTING EYTELWEINS FORMULA FOR MOTION OF WATER IN OPEN CHANNELS AS TAKEN FROM TABLE IN "STORROW ON WATERWORKS" PAGES 45, 46 & 47.]	1881/02/15	PAPER
C-129-3229-(H) OVERSIZE	[TABLE TO FACILITATE THE COMPUTATION OF THE DISCHARGE OF WATER AT THE LAWRENCE WEIRS.]	UNDATED	PAPER
C-129-3229-(I) OVERSIZE	[COMPARISON OF DIFFERENT METHODS OF COMPUTING THE DISCHARGE OF WATER AT THE LAWRENCE WEIRS.]	1872/07/01-03	PAPER
C-129-3229-(J) OVERSIZE	[REDUCTION OF EXPERIMENTS ON THE FLOW OF WATER THRU RECTANGULAR ORFICES IN THEIR PLATES BY PONCELET & LESBROS. ALSO EXPERIMENTS MADE AT COHOES N.Y. IN 1849 ON FLOW OF WATER THRU RECTANGULAR ORIFICES WITH SQUARE EDGES IN CAST IRON PLATES 1" THICK.]	1877/06/15	PAPER
C-129-3229-(K) OVERSIZE	[DIAGRAM OF THE VALUES OF "K" AS DEDUCED FROM THE EQUATION K=[1+C(H/D)2]3/2 - [C(H/D)2 K2]3/2.]	1884/03/20	PAPER
C-129-3229-(L) OVERSIZE	[TESTS OF CEMENT MADE BY BURNHAM BRICK, LIME & CEMENT COMPANY OF LONDON.]	1887/01-02/00	PAPER
C-129-3229-(L) OVERSIZE	[HEAD IN FEET DUE TO VELOCITY FROM 0 TO 5.09 PER SECOND.]	UNDATED	PAPER

C-129-3229-(M) OVERSIZE	[DIAGRAM SHOWING COEFFICIENTS OF DISCHARGE OF BOOTT PENSTOCK GATES.]	1891/05/08	PAPER
C-129-3229-(N) OVERSIZE	[TABLES SHOWING RESULTS OF SUBMERGED WEIR EXPERIMENTS.]	1883/00/00	PAPER
C-129-3230-(A)	[TABLE SHOWING RESULTS OF EXPERIMENTS UPON BALDWIN'S IMPROVED FOURNEYRON TURBINE WATERWHEEL IN THE PAPER MILL OF ISAAC AMES ESQ. IN ASHLAND, MASS.] [EXPERIMENTS UPON BALDWIN'S IMPROVED FOURNEYRON TURBINE WATER WHEEL IN THE PAPER MILL OF ISAAC (SEE NOTES)	1856/05/13	PAPER
C-129-3230-(B)	[DIAGRAMS SHOWING RESULTS OF POWER REQUIRED FOR THROSTLE SPINNING FRAMES IN THE DIFFERENT MILLS.] [EXPERIMENTS ON THROSTLE SPINNING FRAMES, ETC. 1853-1855.]	1855/00/00	PAPER
C-129-3230-(C)	[TABLE SHOWING RAINFALL AT LAKE WINNIPISSIOGEE FROM 1857 TO 1886.] [PROPS. OF LOCKS AND CANALS. RAINFALL AT LAKE WINNEPISSIOGEE, JANUARY, 1857 TO DECEMBER, 1886.]	SEE TITLE	PAPER

C-129-3230-(D)	[DIAGRAM FOR COMPUTING QUANTITY OF WATER PASSING THE WEIR AT MERRIMACK DAM.] [PROPS. OF LOCKS AND CANALS. DIAGRAM FOR COMPUTING THE QUANTITY OF WATER PASSING THE WEIR AT MERRIMACK DAM.]	1877/08/14	PAPER
C-129-3230-(E)	[COMPARISON OF HEIGHT OF WATER FLOWING OVER THE FLASHBOARDS AT PAWTUCKET DAM & HEIGHT OF WATER IN MERRIMACK RIVER BACK OF MERRIMACK MILL NO. 6.][COMPARISON OF THE DEPTH OF WATER FLOWING OVER THE FLASHBOARDS AT PAWTUCKET DAM AND THE HEIGHT OF (SEE NOTES)	1886-1887/00/00	PAPER
C-129-3230-[F]	[LOWELL MANUFACTURING COMPANY. DIAGRAM OF EXPERIMENTS WITH A FAN HAVING EIGHT CURVED FLOATS, USED ON TRIAL BY THE LOWELL MANUFACTURING COMPANY FOR DRYING WOOL. EXPERIMENTS MADE AUGUST 9, 1861.]	1861/08/09	PAPER
C-129-3230-[G]	[PRESCOTT MILL. DIAGRAMS EXPRESSING THE RELATIVE POWER REQUIRED BY THROSTLE SPINNING FRAMES IN PRESCOTT MILLS.]	1855/00/00	PAPER

C-129-3231-[A]	[FOLDER CONTAINING DIAGRAMS SHOWING RESULTS OF EXPERIMENTS AT TREMONT GATES.] [PROPS. OF LOCKS AND CANALS. EXPERIMENTS ON THE TREMONT GATES.]	1868/00/00	PAPER
C-129-3231-[B]	[DATA RELATING TO CHANGING BACKWATER MARK FROM 1'6" TO 1'9".] [PROPS. OF LOCKS AND CANALS. DATA RELATING TO CHANGING BACKWATER MARK.]	1887/12/00	PAPER
C-129-3231-[C]	[TABLE SHOWING FALL IN FEET FROM UPPER TO LOWER CANAL AT SUFFOLK MFG. CO'S MILLS FOR THE SIX MONTHS MAY TO OCTOBER, 1892 & 1894.] [PROPS. OF LOCKS AND CANALS. TABLE SHOWING FALL FROM UPPER TO LOWER CANAL AT SUFFOLK M. CO.'S MILLS, 1892 & 1894.]	SEE TITLE	PAPER
C-129-3232	[EXPERIMENTS ON THE POWER OF 72" SWAIN WHEEL AT BOOTT COTTON MILLS.] [BOOTT COTTON MILLS. EXPERIMENTS ON THE POWER OF THE 72 INCH SWAIN WHEEL. BOOTT COTTON MILLS.]	1874/00/00	PAPER
C-129-3233-[A]	[COEFFICIENTS OF DISCHARGE THRU EXTERIOR CIRCUMFERENCE OF THE WHEEL.]	UNDATED	PAPER
C-129-3233-[B]	[COEFFICIENTS OF DISCHARGE THRU THE OPENING AT THE OUTSIDE EDGE OF THE CYLINDRICAL PART OF THE SPEEDGATE.]	UNDATED	PAPER

C-129-3233-[C]	[RELATIVE DISCHARGE AT RELATIVE HEIGHTS OF SPEED GATES FOR SEVERAL TURBINES PLOTTED FROM THE TABLES ON FILE, DEDUCED FROM THE TABLES THE SAME TURBINES COMPUTED FROM THE WHEEL MEASUREMENTS.]	UNDATED	PAPER
C-129-3233-[D]	[DIAGRAM SHOWING QUANTITY DISCHARGED BY THE TYLER WHEEL AT THE LOWELL MACHINE SHOP.]	1871/04/00	PAPER
C-130-3234-(A)-[01] OVERSIZE	[DIAGRAMS REPRESENTING THE COEFFICIENT OF USEFUL EFFECT IN THE EXPERIMENTS MADE IN OCTOBER & NOVEMBER 1883 ON THE HUMPHREY IXL, 100" TURBINE. THE HEIGHT OF THE WATER ABOVE THE WHEEL BEING MEASURED IN THE PENSTOCK DIRECTLY OVER THE WHEEL.]	1884/01/02	PAPER
C-130-3234-(A)-[02] OVERSIZE	[ALSO DIAGRAM SHOWING PERCENT OF EFFICIENCY AT DIFFERENT GATES.]	1884/01/02	PAPER
C-130-3234-(B) OVERSIZE	[DIAGRAMS REPRESENTING THE COEFFICIENT OF USEFUL EFFECT IN THE EXPERIMENTS MADE IN OCTOBER & NOVEMBER 1883 ON THE HUMPHREY IXL, 100" TURBINE. THE HEIGHT OF THE WATER ABOVE THE WHEEL BEING MEASURED IN THE FOREBAY.]	1884/01/02	PAPER

C-130-3234-(C) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(D) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(E) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(F) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(G) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(H) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(I) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF HUMPHREY IXL TURBINE IN EXPERIMENTS MADE DEC. 1883 & JAN. 1884.]	1884/01/00	PAPER
C-130-3234-(J) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. PLAN & ELEVATION OF OLD BREAST WHEEL WITH SPECIFICATIONS BY JAMES LINDSAY & CO., LONDON.]	1820/11/20	PAPER
C-130-3234-(K) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. PLAN & ELEVATION OF OLD BREAST WHEEL WITH SPECIFICATIONS BY JAMES LINDSAY & CO., LONDON.]	1820/11/20	PAPER

C-130-3234-(L) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. PLAN OF PULLEY & BRAKE, NO. 3 TREMONT TURBINE TEST.]	1883/10-11/00	PAPER
C-130-3234-(M) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. BRAKE & BRAKE ARM. NO. 3 TREMONT TURBINE TEST.]	1883/10-11/00	PAPER
C-130-3234-(N) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. DETAILS OF FRICTION PULLEY, NO. 3 TREMONT TURBINE TEST.]	1883/10-11/00	PAPER
C-130-3234-(O) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. BELL CRANK FULCRUM, NO. 3 TREMONT TURBINE TEST.]	1883/10-11/00	PAPER
C-130-3234-(P) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. FRONT ELEVATION OF WEIR, NO. 3 TREMONT TURBINE TEST.]	1883/10-11/00	PAPER
C-130-3234-(Q) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. BELL CRANK FULCRUM, NO. 3 TREMONT TURBINE TEST.] [BELL CRANK AND COUNTER BALANCE.]	1883/10-11/00	PAPER
C-130-3234-(R) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. PLAN OF WHEELPIT, DYNAMOMETER & WEIR.]	1883/10-11/00	PAPER
C-130-3234-(S) OVERSIZE	[HUMPHREY IXL EXPERIMENTS. SERIES A. EXPERIMENTS.]	1883/00/00	PAPER
C-130-3235-(A) OVERSIZE	[RESULTS OF 48" VICTOR EXPERIMENTS AT HOLYOKE TESTING FLUME.]	1890/12/03-05	PAPER
C-130-3235-(B) OVERSIZE	[MEAN BUCKET OPENING OF ONE OF OLD VICTOR TURBINES. OPENING NO. 5 OF VICTOR TURBINE, HOLYOKE, DEC. 3-5, 1890. AREA 70.84 SQ. INCHES. 17 OPENINGS LIKE THIS.]	1890/12/03-05	PAPER

C-130-3235-(C)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING CHANGE IN Q. DUE TO CHANGE IN REL. VEL.]	1892/00/00	
C-130-3235-(D) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL.] DIAGRAM SHOWING % OF CHANGE IN Q. CORRESPONDING TO CHANGE OF 0.10 IN RELATIVE VELOCITY.]	1892/05/14-16	PAPER
C-130-3235-(E) OVERSIZE	VICTOR TURBINE EXPERIMENTS AT HOLYOKE. VICTOR WHEELS. PROPORTIONAL DISCHARGE FOR PROPORTIONAL HEIGHT OF SPEEDGATES. DATA FROM TESTS BY HOLYOKE WATER POWER CO. MADE ON A 48" R.H. WHEEL.	1892/05/14-16	PAPER
C-130-3235-(F) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAMS SHOWING DISCHARGE OF VICTOR WHEELS.]	1890/12/03-05	PAPER
C-130-3235-(G) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	1890/12/03-05	PAPER
C-130-3235-(H) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	1890/12/03-05	PAPER
C-130-3235-(I) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	PAPER

C-130-3235-(J) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	1891/01/23	PAPER
C-130-3235-(K)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(L)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(M)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(N)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(O)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(P)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(Q)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3235-(R)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	

C-130-3235-(S)	[VICTOR TURBINE EXPERIMENTS AT HOLYOKE. DIAGRAM SHOWING DISCHARGE OF VICTOR WHEELS.]	UNDATED	
C-130-3236-(A) OVERSIZE	RESULTS OF VICTOR TURBINE EXPERIMENTS AT LOWELL. TURBINE TEST AT TREMONT AND SUFFOLK.	UNDATED	PAPER
C-130-3236-(B)	[VICTOR TURBINE EXPERIMENTS AT LOWELL. PATTERN FOR SPEEDGATE GAUGES FOR TREMONT VICTOR TURBINES.]	189100/00	
C-130-3236-(C) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. PLAN OF GUIDE OPENINGS & BUCKET OUTLETS FOR VICTOR TURBINES.]	1889/09/00	PAPER
C-130-3236-(E) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. PLAN OF GUIDE OPENINGS & BUCKET OUTLETS FOR VICTOR TURBINES.]	1889/09/00	PAPER
C-130-3236-(F) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. PLAN OF APPARATUS USED IN MAKING TEST OF VICTOR TURBINE NO. 1 AT TREMONT & SUFFOLK.]	1888/10/00	PAPER
C-130-3236-(G) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. PLAN OF APPARATUS USED IN MAKING TEST OF VICTOR TURBINE NO. 1 AT TREMONT & SUFFOLK.]	1888/10/00	PAPER
C-130-3236-(H) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. DIAGRAM OF HEIGHTS ON WEIR.]	UNDATED	PAPER
C-130-3236-(I) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. DIAGRAM OF HEIGHTS ON WEIR.]	UNDATED	PAPER

C-130-3236-(J) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. DIAGRAM SHOWING RATION OF USEFUL EFFECT.]	UNDATED	PAPER
C-130-3236-(K) OVERSIZE	[DIAGRAM SHOWING HORSE POWER OF VICTOR TURBINES IN EXPERIMENTS AT LOWELL.]	UNDATED	PAPER
C-130-3236-(L) OVERSIZE	[VICTOR TURBINE EXPERIMENTS AT LOWELL. DIAGRAM SHOWING HORSE POWER OF VICTOR TURBINES IN EXPERIMENTS AT LOWELL.]	UNDATED	PAPER
C-130-3236-(M) OVERSIZE	[DIAGRAM SHOWING DISCHARGE OF VICTOR TURBINES IN EXPERIMENTS OF LOWELL.]	1889/00/00	PAPER
C-130-3236-(N) OVERSIZE	[DIAGRAM SHOWING DISCHARGE OF VICTOR TURBINES IN EXPERIMENTS AT LOWELL.]	1889/11/00	PAPER
C-130-3236-(O) OVERSIZE	[DIAGRAM SHOWING DISCHARGE OF VICTOR TURBINES IN EXPERIMENTS AT LOWELL.]	1889/00/00	PAPER
C-130-3236-(P) OVERSIZE	[DIAGRAM SHOWING DISCHARGE OF VICTOR TURBINES IN EXPERIMENTS AT LOWELL.]	1889/00/00	PAPER
C-130-3236-(Q) OVERSIZE	[DIAGRAMS SHOWING DISCHARGE OF VICTOR TURBINES IN EXPERIMENTS AT LOWELL.]	1889/00/00	PAPER
C-130-3237-[A]-[01] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1892 APPLETON CO'S PAIR, RODNEY HUNTS. REPORT OF TEST OF 42", NO. 4 PAIR, RODNEY-HUNTS.]	1892/00/00	

C-130-3237-[A]-[02] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. ESPERIMENTS OF 1892 OF APPLETON CO'S NO. 4 PAIR. DIAGRAM OF DISCHARGE.]	1892/00/00
C-130-3237-[A]-[03] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1892 APPLETON CO'S NO. 4 PAIR. DIAGRAMS SHOWING EFFICIENCY.]	1892/00/00
C-130-3237-[A]-[04] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1892 APPLETON CO'S NO. 4 PAIR. DIAGRAMS SHOWING HORSE POWER.]	1892/00/00
C-130-3237-[A]-[05] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1892 OF APPLETON CO'S NO. 4 PAIR. ENVELOPE CONTAINING ORIGINAL MEASUREMENTS, ETC.]	1892/00/00
C-130-3237-[A]-[06] OVERSIZE	[RODNEY HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1892 OF APPLETON CO'S NO. 4 PAIR. WOODEN PATTERN OF SHAPE OF ORFICE OF DISCHARGE OF LEFT HAND WHEEL.]	1892/00/00
C-130-3237-[B]-[01] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1894, APPLETON CO'S NO. 4 PAIR. REPORT OF TEST OF 42" NO. 4 PAIR.]	1894/00/00
C-130-3237-[B]-[02] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1894, APPLETON CO'S NO. 4 PAIR. DIAGRAM OF DISCHARGE FOR DIFFERENT REL. VELOCITIES.]	1894/00/00

C-130-3237-[B]-[03] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1894, APPLETON CO'S NO. 4 PAIR. DIAGRAM SHOWING EFFICIENCY & HORSE POWER.]	1894/00/00
C-130-3237-[B]-[04] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1894, APPLETON CO'S NO. 4 PAIR. DIAGRAM SHOWING HORSE POWER AND RELATIVE VELOCITY.]	1894/00/00
C-130-3237-[B]-[05] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1894, APPLETON CO'S NO. 4 PAIR. DIAGRAM SHOWING DISCHARGE OF NEW AND OLD WHEELS.]	1894/00/00
C-130-3237-[B]-[06] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF 1894, APPLETON CO'S NO. 4 PAIR. DIAGRAM SHOWING DISCHARGE FOR DIFFERENT SPEED GATE AND DIFFERENT RELATIVE VELOCITIES.]	1894/00/00
C-130-3237-[C]-[01] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF NOVEMBER, 1894 OF APPLETON CO'S NO. 4 PAIR. REPORT OF TEST OF 42" WHEELS, NO. 4 PAIR.]	1894/00/00
C-130-3237-[C]-[02] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF NOVEMBER, 1894 OF APPLETON CO'S NO. 4 PAIR. DIAGRAMS OF DISCHARGE AND RELATIVE VELOCITY.]	1894/00/00

C-130-3237-[C]-[03] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF NOVEMBER, 1894 OF APPLETON CO'S NO. 4 PAIR. DIAGRAMS OF HORSE POWER AND EFFICIENCY.]	1894/00/00
C-130-3237-[C]-[04] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF NOVEMBER, 1894 OF APPLETON CO'S NO. 4 PAIR. DIAGRAMS SHOWING POWER OF WATER FT. LBS. PER SEC; DISCHARGE OF TWO WHEELS.]	1894/00/00
C-130-3237-[C]-[05] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. EXPERIMENTS OF NOVEMBER, 1894 OF APPLETON CO'S NO. 4 PAIR. DISGRAMS SHOWING VELOCITY OF WHEEL; SPEED AND WORK DONE BY WHEEL; WEIGHTS NECESSARY TO GIVE CERTAIN RELATIVE VELOCITIES.]	1894/00/00
C-130-3237-[D] OVERSIZE	[RODNEY-HUNT TURBINE EXPERIMENTS. PLAN OF TESTING APPARATUS.]	UNDATED
C-130-3237-[E]	RODNEY-HUNT TURBINES EXPERIMENTS. DIFFERENT VIEWS OF A PAIR OF RODNEY-HUNT WHEELS.]	UNDATED
C-130-3237-[F] OVERSIZE	RODNEY-HUNT TURBINE EXPERIMENTS. PHOTOGRAPHS OF WHEEL AND TESTING APPARATUS.]	UNDATED

C-130-3237-[G] OVERSIZE	RODNEY-HUNT TURBINE EXPERIMENTS. TWO UNMARKED SHEETS RELATIVE DISCHARGE OF MERR'K MFG. CO'S TURBINE NO. 8 AND APPLETON CO'S 11 TURBINE.]	UNDATED
C-130-3238-[A]-[01] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING EXPERIMENTS ON 42" SWAIN TURBINES.]	1870/00/00
C-130-3238-[A]-[02] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING COEFFICIENTS OF DISCHARGE OF A 42" SWAIN.]	1872/00/00
C-130-3238-[A]-[03] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING QUANTITIES DISCHARGED AND RELATIVE VELOCITY.]	1872/00/00
C-130-3238-[A]-[04] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING HEIGHT OF GATE AND QUANTITIES DISCHARGED.]	1872/00/00
C-130-3238-[A]-[05] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING HEIGHT OF SPEED GATE AND QUANTITIES DISCHARGED FOR 72".]	UNDATED
C-130-3238-[A]-[06] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING COEFFICIENT OF DISCHARGE FOR 72" SWAIN.]	1874/00/00
C-130-3238-[A]-[07] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING RELATIVE GATE OPENINGS AND COEFFICIENT OF DISCHARGE FOR DIFFERENT RELATIVE VELOCITIES.]	UNDATED

C-130-3238-[A]-[08] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING COEFFICIENT OF DISCHARGE FOR 42".]	1872/00/00
C-130-3238-[A]-[09] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DIAGRAM SHOWING COEFFICIENT OF DISCHARGE FOR 42".]	1872/00/00
C-130-3238-[B]-[01] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. TABLE SHOWING QUANTITIES DISCHARGED BY MASSACHUSETTS # 7 WHEEL, A 72" SWAIN.]	1873/00/00
C-130-3238-[B]-[02] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. TABLE SHOWING QUANTITIES DISCHARGED BY BOOTT NO. 9 WHEEL, AN 80" SWAIN.]	1873/00/00
C-130-3238-[B]-[03] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. TABLE SHOWING QUANTITIES DISCHARGED BY LAWRENCE MFG. CO. # 7, 8, 9 & 10 WHEELS.]	1873/00/00
C-130-3238-[B]-[04] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. TABLE SHOWING QUANTITIES OF WATER DISCHARGED BY MERRIMACK PRINT WORKS, 80" SWAIN.]	1873/00/00
C-130-3238-[B]-[05] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. TABLE SHOWING QUANTITIES DISCHARGED BY PRESCOTT # 1, 2, 3 & 4.] [80" SWAINS.]	1873/00/00
C-130-3238-[B]-[06] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. TABLE SHOWING QUANTITIES DISCHARGED BY MASSACHUSETTS NO. 6 WHEEL.] [AND 80" SWAIN.]	1873/00/00

C-130-3238-[C] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. DATA FOR SEVERAL SWAIN WHEELS.]	1873/00/00	
C-130-3238-[D] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. REPORT OF EXPERIMENTATION ON 80" SWAIN AT BOOTT MILLS.]	UNDATED	
C-130-3238-[E] OVERSIZE	[SWAIN TURBINE EXPERIMENTS. REPORT OF EXPERIMENTATION OF 42" SWAIN AT LOWELL MACHINE SHOP FOUNDRY.]	1872/00/00	
C-130-3239 OVERSIZE	[PROPS. OF LOCKS AND CANALS. BRYSON WHEEL. THE CAPACITY OF THIS WHEEL WAS TESTED IN A FLUME NEAR WHIPPLE'S MILLS IN LOWELL, NOVEMBER 19, 23 AND 25, 1869.] [PLAN OF A PORTION OF BRYSON WHEEL TESTED IN FLUME NEAR WHIPPLE'S MILL.]	SEE TITLE	PAPER
C-130-3240	[PLAN OF A PORTION OF BRYSON WHEEL TESTED IN FLUME NEAR WHIPPLE'S MILL.]	1869/00/00	PAPER
C-130-3241	[PLAN OF A PORTION OF BRYSON WHEEL TESTED IN FLUME NEAR WHIPPLE'S MILL. SECTION OF GATE AND BUCKET INLETS OF ABOVE WHEEL.]	1869/00/00	PAPER
C-130-3242	[PROPS. OF LOCKS AND CANALS. SECTION OF BODINE WATER WHEEL. EXPERIMENTS WERE MADE WITH THIS WHEEL IN THE FLUME NEAR WHIPPLES MILLS, OCTOBER 27 AND 28, 1869.]	1869/00/00	PAPER

C-131	PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER / DUPLICATE PLANS OF / LAND IN LOWELL.	1844-1876/00/00	VARIOUS SCALES		H 62, W 93 CM	INK, COLORED INK
C-131	PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER / DUPLICATE PLANS OF / LAND IN LOWELL.	1844-1876/00/00	VARIOUS SCALES	H 62, W 93 CM	INK, COLORED INK	CLOTH-BACKED PAPER
C-132	[PORTFOLIO CONTAINING PHOTOGRAPHS AND DIAGRAMS SHOWING RESULTS OF HYDRANT TESTS FOR PREVENTION OF FIRE AT THE VARIOUS CORPORATION YARDS.]	1897/00/00				
C-133-[030]	PLAN OF / LAND AND BUILDINGS / BELONGING TO THE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1888/00/00	1"=40'	H 35.5, W 51.5 CM	PHOTOGRAPH	PAPER
C-133-[031]	STANDARD [COTTON] STOREHOUSE. / AIR VALVE & PIT / FOR / DRY PIPE SYSTEM.	UNDATED	NONE	H 34, W 56 CM	LITHOGRAPH	PAPER
C-133-[032]	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1896/00/00	1/4"=10'	H 66.2, W 98.9 CM	INK, WATER COLOR	CLOTH BACKED PAPER
C-133-[033]	PLAN OF THE / MILL YARD / OF THE [IPSWICH MILLS] MIDDLESEX COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1900/06/15	1/4"=10'	H 67, W 96.2 CM	HELIOTYPE	CLOTH BACKED PAPER
C-133-[034]	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1957/09/00	1/4"=10'	H 69, W 101 CM	RED LINE PRINT, WATER COLOR, COLORED INK	CLOTH BACKED PAPER

C-133-001	PLAN / SHOWING WATER MAIN SYSTEM / BELONGING TO / PROPS OF L. & C. / LOWELL,MASS.	1897/04/00	1"=100'	H 104.2, W 134.6 CM	INK, COLORED INK	DRAFTING CLOTH
C-133-002-[A]	MAP SHOWING PROTECTION AFFORDED / BY THE / LOCKS & CANALS & CITY / WATERWORKS SYSTEMS / LOWELL, MASS.	1897/05/12	1"=400'	H 66.1, W 53.4 CM	LITHOGRAPH	PAPER
C-133-002-[B]	MAP SHOWING PROTECTION AFFORDED / BY THE / LOCKS & CANALS & CITY / WATERWORKS SYSTEMS / LOWELL, MASS.	1897/05/12	NONE	H 66.2, W 53.4 CM	LITHOGRAPH	PAPER
C-133-003	[BLUEPRINT OF] MAP SHOWING PROTECTION AFFORDED / BY THE / L.& C. & CITY / & CITY / WATER WORKS SYSTEM / [IN THE MILL DISTRICT] LOWELL, MASS.	1897/00/00	1"=100'	H 51.8, W 76.8 CM	BLUEPRINT	PAPER
C-133-004	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS [(1889) SHOWING LOCATION OF 12" CONNECTIONS BETWEEN L.& C. & CITY MAINS].	1894/03/06	1"=1000'	H 56.5, W 78 CM	LITHOGRAPH	PAPER
C-133-005-[A]	[ASSOCIATED MUTUAL PLAN OF] LAWRENCE MFG. CO. / (KNITTING FACTORY) / LOWELL, MASS. [WITH VIEW OF SAME, SHOWING DIMENSIONS, PIPE LINES, BUILDING NOS.]	1897/09/28	1"=50'	H 66.2, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-005-[B]	LAWRENCE MFG. CO. / (KNITTING FACTORY) / LOWELL, MASS.	1897/09/28	1"=50'	H 66.2, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-005-[C]	LAWRENCE MFG. CO. / (KNITTING FACTORY) / LOWELL, MASS.	1897/09/28	1"=50'	H 66.2, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER

C-133-006-[A]	TREMONT & SUFFOLK MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 71.2, W 51.2 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-006-[A]-[A]	TREMONT & SUFFOLK / WEAVE SHED.	UNDATED	1"=50'	H 21.9, W 28 CM	GRAPHITE, COLORED PENCIL	PAPER
C-133-006-[A]-[COPY 1]	TREMONT MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 54.5, W 39.5 CM	NEGATIVE PHOTOGRAPHIC PRINT, INK	PAPER
C-133-006-[B]-[COPY 1]	TREMONT & SUFFOLK MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 54.5, W 39.5 CM	NEGATIVE PHOTOGRAPHIC PRINT	PAPER
C-133-006-[C]-[01]	TREMONT & SUFFOLK MILLS, / LOWELL, MASS.	1918/10/09	1"=50'	H 71.2, W 51.2 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-006-[C]-[01]-[COPY 1]	TREMONT & SUFFOLK MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 54.5, W 39.5 CM	NEGATIVE PHOTOGRAPHIC PRINT	PAPER
C-133-006-[C]-[02]	TREMONT & SUFFOLK MILLS, / LOWELL, MASS.	1921/01/10	1"=50'	H 71.2, W 51.2 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-006-[D]-[COPY 1]	TREMONT & SUFFOLK MILLS, / LOWELL, MASS.	1915/08/26	1"=50'	H 39.5, W 54.5 CM	NEGATIVE PHOTOGRAPHIC PRINT	PAPER
C-133-007-[A]	TREMONT & SUFFOLK MILLS / (COTTON MILL) / LOWELL, MASS.	1898/12/30	1"=60'	H 65.4, W 53.6 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-007-[B]	TREMONT & SUFFOLK MILLS / (COTTON MILL) / LOWELL, MASS.	1899/01/02	1"=60'	H 66.4, W 53.5 CM	LITHOGRAPH, WATER COLOR	PAPER

C-133-007-[C]	TREMONT & SUFFOLK MILLS / (COTTON MILLS) / LOWELL, MASS.	1895/04/06	1"=60'	H 53.6, W 66.2 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-008-[A]	[ASSOCIATED MUTUAL PLAN OF] MERRIMACK MFG. CO. / (COTTON MILL) / LOWELL, MASS.	1900/01/11	1"=60'	H 66.4, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-008-[B]	[ASSOCIATED MUTUAL PLAN OF] MERRIMACK MFG. CO. / (PRINT WORKS) / LOWELL, MASS.	1900/01/11	1"=60'	H 66.4, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-008-[C]	[ASSOCIATED MUTUAL PLAN OF] MERRIMACK MFG. CO. (COTTON MILL & PRINT WORKS) / LOWELL, MASS.	1900/01/11	1"=80'	H 50.5, W 66 CM	INK, COLORED INK	PAPER
C-133-008-[D]-[01]	MERRIMACK MANUFACTURING COMPANY / (COTTON CLOTH) / LOWELL, MASS.	1933/08/11	1"=60'	H 67, W 53 CM	CHROMOLITHOGRAPH	PAPER
C-133-008-[D]-[02]	MERRIMACK MFG. CO. / LOWELL, MASS.	1933/08/11	1"=60'	H 67, W 53 CM	CHROMOLITHOGRAPH, GRAPHITE	PAPER
C-133-008-[E]	MERRIMACK MANUFACTURING COMPANY / (COLORED COTTON CLOTH) / LOWELL, MASS.	1940/08/20		H 67, W 53 CM	CHROMOLITHOGRAPH, GRAPHITE	PAPER
C-133-009	BOOTT COTTON MILLS / LOWELL, MASS.	1901/03/12	1"=60'& 80'	H 66.1, W 53.5 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-010	MASSACHUSETTS COTTON MILLS. / MAIN YARD / (COTTON FACTORY) / LOWELL, MASS.ASSOCIATED MUTUAL INSURANCE CO. [WITH BIRD'S EYE VIEW OF SAME, & SHOWING PIPE LINES, BUILDING NUMBERS, ETC.]	1895/00/00	1"=60'	H 66.1, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER

C-133-011	MASSACHUSETTS COTTON MILLS. / MASSACHUSETTS YARD. / LOWELL, MASS. ASSOCIATED MUTUAL INSURANCE CO. [WITH BIRD'S EYE VIEW OF SAME, & SHOWING PIPE LINES, BUILDING NUMBERS, ETC.]	1899/01/02	1"=60'& 80'	H 66.4, W 53.4 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-012-[A]	MASSACHUSETTS COTTON MILLS / PRESCOTT YARD / LOWELL, MASS. [(MAIN YARD) WITH BIRD'S EYE VIEW OF SAME, & SHOWING PIPE LINES, BUILDING NUMBERS, ETC.]	1901/07/23	1"=50'	H 66.3, W 53.5 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-012-[B]	MASSACHUSETTS COTTON MILLS / "PRESCOTT YARD" / LOWELL, MASS.	1911/02/11	1"=60'	H 65, W 53 CM	INK, COLORED INK	PAPER
C-133-012-[B]-[COPY 1]	MASSACHUSETTS COTTON MILLS / "PRESCOTT YARD" / LOWELL, MASS.	1911/02/11	1"=60'	H 65, W 53 CM	BLUE LINE PRINT, WATER COLOR	PAPER
C-133-012-[C]	MASSACHUSETTS COTTON MILLS / "PRESCOTT YARD" / LOWELL, MASS.	1925/11/27	1"=60'	H 65, W 53 CM	BLUEPRINT	PAPER
C-133-012-[D]	MASSACHUSETTS COTTON MILLS / "MASSACHUSETTS YARD" / LOWELL, MASS.	1911/01/19	1"=60'	H 53, W 66 CM	INK, COLORED INK	PAPER
C-133-013	MIDDLESEX COMPANY / (WOOLEN MILL) / LOWELL, MASS.	1897/05/12	1"=60'& 80'	H 66.1, W 53.3 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-014-[A]	[ASSOCIATED MUTUAL PLAN OF] LOWELL MFG. CO.[(COLUMBIA TEXTILE CO.)] /(CARPET MILL) / LOWELL, MASS. [SHOWING PIPE LINES, BUILDING NUMBERS, ETC.]	1899/05/12	1"=50'	H 66, W 53 CM	LITHO, INK, COLORED INK	PAPER
C-133-014-[B]	LOWELL MFG. CO. / (CARPET MILL) / LOWELL, MASS.	1892/06/28	1"=60'	H 66, W 53 CM	LITHO, INK, COLORED INK	PAPER

C-133-015-[A]	[ASSOCIATED MUTUAL PLAN OF] HAMILTON MFG. CO. / [SHOWING PIPE LINES, BUILDING NUMBERS, ETC.] (COTTON MILL, PRINT & DYE WORKS) / LOWELL, MASS.	1896/02/06	1"=50'	H 66, W 53.3 CM	WATER COLOR	PAPER
C-133-015-[B]	HAMILTON MANUFACTURING CO. / (COTTON MILL & DYE WORKS) / LOWELL, MASS.	1913/12/08	1"=40'	H 61, W 103.5 CM	LITHOGRAPH	PAPER
C-133-015-[C]	LOWELL MACHINE SHOP / MAIN & FOUNDRY YARDS / LOWELL, MASS.	1899/02/11	1"=50'	H 66, W 53.3 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-015-[D]	SACO LOWELL SHOPS / "MAIN & FOUNDRY YARDS" / (COTTON & WORSTED MACHINERY) / LOWELL, MASS.	1911/08/28	1"=50'	H 66, W 53.3 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-016	APPLETON COMPANY / (COTTON MILL / LOWELL, MASS. MILL YARD PLANS SHOWING FIRE EXTINGUISHING PIPE LINES].	1902/06/05	1"=60'& 80'	H 66.4, W 53.5 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-017	[OLD MILL YARD PLAN OF MILL YARD SHOWING PIPE LINES LAID FOR EXTINGUISHING FIRES. LOWELL MANUFACTURING COMPANY.]	1878/00/00				
C-133-018	[OLD MILLYARD PLANS OF LAWRENCE MFG. CO., SHOWING PIPE LINES.]	1888/00/00				
C-133-019	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1897/01/00	1/4"=10'	H 76.3, W 116.3 CM		PAPER

C-133-020	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1900/07/05	1/4"=10'	H 67, W 96.2 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
C-133-021	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1896/08/01	1/4"=10'	H 68.6, W 99 CM	HELIOTYPE, INK, WATER COLOR	PAPER
C-133-022	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1900/06/15	1/4"=10'	H 68.7, W 96 CM	HELIOTYPE	PAPER
C-133-023	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1889/05/00	1/4"=10'	H 69.6, W 102.2 CM	HELIOTYPE, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
C-133-024	PLAN OF THE / MILL YARD / OF THE / HAMILTON MFG. CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1900/02/00	1/4"=10'	H 77.5, W 133.3 CM	INK, WATER COLOR	CLOTH BACKED PAPER
C-133-025	PLAN OF THE MILL YARD / OF THE / APPLETON COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1900/02/00	1/4"=10'	H 66.1, W 99.1 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
C-133-026	[OLD MILL YARD PLAN OF APPLETON CO. SHOWING PIPE LINES.]	1896/00/00				
C-133-027	PLAN OF MILL YARD / OF THE / APPLETON COMPANY / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1896/08/01	1/4"=10'	H 68.5, W 98.5 CM	LITHOGRAPH, WATER COLOR	PAPER
C-133-028	PLAN OF THE / MILL YARD / OF THE [IPSWICH MILLS] MIDDLESEX COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1893/06/00	1/4"=10'	H 67, W 96.2 CM	HELIOTYPE	CLOTH BACKED PAPER

C-133-029	PLAN OF THE / MILL-YARD / OF THE / MIDDLESEX COMPANY [IPSWICH CO'S MILLS SHOWING PIPES LAID FOR EXTINGUISHING FIRES].	1878/04/00	1/4"=10'	H 69, W 98.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-133-4655	LOCATION OF THE RESERVOIR PIPE / IN THE YARDS OF THE / MASSACHUSETTS COTTON MILLS & THE PRESCOTT MILLS / & ACROSS CONCORD RIVER, / IN LOWELL.	1861/12/11	1"=40'	H 88.9, W 61.5 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
C-133-4658	LOCATION OF THE RESERVOIR PIPE IN THE YARD OF THE / MIDDLESEX COMPANY. / IN LOWELL.	1862/01/17	1"=40'	H 88.9, W 61.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-134-4621	PROFILE OF LAWRENCE WASTEWAY NEAR LOWER BRIDGE / SHOWING 8" RESERVOIR PIPE & BOX.	1873/11/04	1"=6'	H 33.1, W 50.8 CM	INK	PAPER
C-134-4622	SKETCH SHOWING LOCATION / OF 12" WATER PIPE LAID / BY THE CITY ACROSS PAWTUCKET CANAL / AT BRIDGE ON FLETCHER ST. IN JULY 1878.	1878/07/00	1"=10'	H 35.6, W 61 CM	INK, WATER COLOR	CLOTH BACKED PAPER
C-134-4623	[SKETCH SHOWING PIPE CROSSING AT] SIDE SECTION OF BRIDGE [OVER EASTERN CANAL] ON BRIDGE ST.	1872/07/24	SEE NOTES	H 35.7, W 43.5 CM	INK, WATER COLOR	PAPER

C-134-4624	[SKETCH OF] SECTIONS ACROSS THE WESTERN CANAL NEAR THE SOTHWESTERLY SIDE / OF MARKET ST. BRIDGE, PRELIMINARY TO LAYING CITY WATER PIPE / ACROSS THE CANAL, & CONNECTING WITH THE CITY PIPES ALREADY / LAID AT THE POINTS E & F AS SHOWN IN THIS SKETCH.	1871/10/00	NONE	H 58.6, W 88.7 CM	INK	PAPER
C-134-4625	LOCATION OF L.& C. RESERVOIR PIPE BETWEEN THE / HAMILTON, MFG. CO.'S, MIDDLESEX / CO'S, & LOWELL MANUFACTURING CO'S YARDS. & BIGELOW CARPET CO.	1867/11/29	1"=40'	H 30, W 51 CM	INK, COLORED INK	PAPER
C-134-4626	[SKETCH SHOWING LOCATION SKETCH SHOWING LOCATION OF PIPE LINE AT APPLETON MFG. CO.]	1849/09/27	1/8"=1'		H 70, W 104.1 CM	INK, WATER COLOR
C-134-4626	[SKETCH SHOWING LOCATION SKETCH SHOWING LOCATION OF PIPE LINE AT APPLETON MFG. CO.]	1849/09/27	1/8"=1'	H 70, W 104.1 CM	INK, WATER COLOR	PAPER
C-134-4627	PLAN SHOWING THE LOCATION OF THE WATER PIPES ACROSS CONCORD RIVER [OPPOSITE BROWN ST.], IN LOWELL.	1861/10/19	1"=40'	H 45.8, W 58.6 CM	INK, WATER COLOR	PAPER
C-134-4628	PLAN / SHOWING [CONNECTING] PIPE BETWEEN THE / BOOTT & MASSACHUSETTS MILLS [UNDER BRIDGE ST].	1849/09/25	1/8"=1'		H 48.6, W 62.3 CM	INK, WATER COLOR
C-134-4628	PLAN / SHOWING [CONNECTING] PIPE BETWEEN THE / BOOTT & MASSACHUSETTS MILLS [UNDER BRIDGE ST].	1849/09/25	1/8"=1'	H 48.6, W 62.3 CM	INK, WATER COLOR	PAPER

C-134-4629	SECTION OF WATER PIPE CROSSING EASTERN CANAL AT E. MERRIMACK ST.	1893/00/00	1"=1'	H 20.4, W 40.3 CM	INK, COLORED INK	PAPER
C-134-4630-[A]	BOX FOR PIPES CROSSING LOWER LEVEL / OF PAWTUCKET CANAL IN REAR OF HAMILTON M. CO'S MILLS.	1893/08/21	1/4 FULL SIZE	H 29.2, W 37.2 CM	INK, COLORED INK	PAPER
C-134-4630-[B]	SKETCH SHOWING ELEVATION OF 12" WATER PIPE IN LOWER PAWTUCKET CANAL ABOUT 72' WEST OF CENTRAL ST. BRIDGE.ELEVATION TAKEN ON TOP / OF PIPE.THE BELLS COVER ABOVE THIS ELEVATION. [ALSO BOX COVERING PIPES.]	1893/09/19	1"=5'	H 20.6, W 21.7 CM	INK, COLORED INK	PAPER
C-134-4631	PLAN SHOWING / WATER PIPES, RAILROAD TRACKS, &c. / IN CANAL STREET / LOWELL, MASS.	1903/04/00	1"=40'	H 23, W 41.3 CM	BLUEPRINT	PAPER
C-134-4671	RACE & MATHEWS' [(R. D. WOOD & CO.)] / PATENTED / JAN. 26, 1858 / & NOV. 16, 1869. / FIRE HYDRANT.	SEE TITLE	NONE	H 61.1, W 48.7 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-134-4672	[PLAN OF] BENDS FOR 12" PIPE FOR THE ANDOVER ST. MAIN / TO BE LAID BY THE PROPS. OF LOCKS & CANALS.	1868/09/04	1/4 FULL SIZE	H 50.2, W 61.3 CM	INK	PAPER
C-134-4673	DESIGN FOR CURVED PIPES / FOR / 16" WATER MAIN, / TO BE LAID BY / PROP'S. OF LOCKS & CANALS.	1873/07/11	1/4	H 70, W 92.8 CM	INK, WATER COLOR	PAPER
C-134-4674	SPECIAL CASTINGS / FOR / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / FOR / IMPROVED CONNECTIONS OF SPRINKLERS WITH MAIN PIPES.	1878/04/27	1/4 & 1/2 FULL SIZE	H 88.3, W 72 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

C-134-4675	PLAN & PROFILE / OF THE / SALEM WATER WORKS.	1869/01/00	1"=100'	H 35.9, W 62.6 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-134-4676	WATER PIPES AT THE PIPE YARD / OF THE / CITY OF LOWELL.	1878/07/00	1/4	H 70, W 95.8 CM	INK, WATER COLOR	PAPER
C-134-4677	[UNTITLED.] [LUGS FOR 16" PIPES.]	UNDATED	SEE NOTES	H 104.8, W 74 CM	INK, COLORED INK	DRAFTING CLOTH
C-134-4678	HORN & CORRESPONDING FLANGE OF SOCKET / ON THE 3' & 5' LENGTHS OF / 16" PIPE. / PROPS. OF LOCKS & CANALS.	1873/08/11	FULL SIZE x 1"	H 50.3, W 71.2 CM	INK, WATER COLOR	PAPER
C-134-4679	[SPECIAL CASTINGS FOR SPRINKLER CONNECTIONS.]	1878/04/00	NONE	H 51.4, W 72.5 CM	INK, WATER COLOR	PAPER
C-134-4680	SOCKET OF 8" BRANCH ON 16" MAIN / TO RECEIVE CAP / PROPS. OF LOCKS & CANALS / LOWELL, MASS.	1873/08/11	FULL SIZE x 1"	H 50.5, W 71.2 CM	INK, COLORED INK, WATER COLOR	PAPER
C-134-4681	[PATTERN FOR] 12" WATER PIPE / FOR / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / FOR THE / ANDOVER ST. MAIN FROM THE RESERVOIR ON LYNDE'S HILL TO THE LOWELL MACHINE SHOP.	1868/08/13	1/2 FULL SIZE	H 59.8, W 61 CM	INK, COLORED INK	PAPER
C-134-4682	BENDS / FOR 16" MAIN. / LOWELL.	1873/08/08	1/5	H 56, W 70 CM	INK, WATER COLOR	PAPER

C-134-4683	LONGITUDINAL SECTIONS / OF TWO SIZES OF IRON PIPES TO LAY FROM THE COUNTING ROOM OF THE PROPS. OF THE LOCKS & CANALS / TO THE OLD GUARD LOCKS, A DISTANCE OF / 3700 FEET, BY PLAN, TO SUPPLY RESERVOIR / WATER FOR THE PROPOSED HYDRAULIC LIFT.	1870/02/21	FULL SIZE	H 49.5, W 38.4 CM	INK, COLORED INK	PAPER
C-134-4684	[PATTERNS OF PIPE CONNECTIONS.]	1870/00/00	1/4 FULL SIZE	H 49, W 70.2 CM	INK	PAPER
C-134-4685	[PATTERNS OF PIPE CONNECTIONS.]	1849/05/08	VARIES		H 49.5, W 70 CM	INK, GRAPHITE
C-134-4685	[PATTERNS OF PIPE CONNECTIONS.]	1849/05/08	VARIES	H 49.5, W 70 CM	INK, GRAPHITE	PAPER
C-134-4686	[PATTERNS OF] WATER PIPES AT THE PIPE YARD / OF THE / CITY OF LOWELL.	1873/07/00	1/4 FULL SIZE	H 37.6, W 90.6 CM	INK, WATER COLOR	PAPER
C-134-4687	[SPECIAL CASTINGS FOR SPRINKLER CONNECTIONS.]	UNDATED	NONE	H 52.1, W 73.1 CM	INK, WATER COLOR	PAPER
C-134-4688	RESERVOIR GAUGE.	1852/00/00	FULL SIZE		H 35.6, W 42.4 CM	INK
C-134-4688	RESERVOIR GAUGE.	1852/00/00	FULL SIZE	H 35.6, W 42.4 CM	INK	PAPER
C-134-4689	[HORIZONTAL & TRANSVERSE SECTIONS OF CROSS & TEE BRANCH.] ROCHESTER WATER WORKS.	1874/02/11	SEE NOTES	H 50.2, W 83.2 CM	LITHOGRAPH	PAPER

C-134-4690	ONE OF THE HYDRANTS CONNECTED WITH THE LINE OF / 12" WATER / PIPE LEADING FROM THE RESERVOIR ON LINES HILL.	1849/09/08	1/3 FULL SIZE		H 59.5, W 85.1 CM	INK, WATER COLOR
C-134-4690	ONE OF THE HYDRANTS CONNECTED WITH THE LINE OF / 12" WATER / PIPE LEADING FROM THE RESERVOIR ON LINES HILL.	1849/09/08	1/3 FULL SIZE	H 59.5, W 85.1 CM	INK, WATER COLOR	PAPER
C-134-4691	SKETCH OF BENDS / FOR / 16" MAIN.	1873/08/05	1/16	H 55.9, W 93.4 CM	INK, WATER COLOR	PAPER
C-134-4692	[SECTIONS OF PIPE BENDS, TEES, ETC.]	UNDATED	NONE	H 52.1, W 73.1 CM	INK, WATER COLOR	PAPER
C-134-4693	DESIGN / FOR / MAN HOLE & GATE PIT / FOR / STAND PIPES IN MILLS / AT LOWELL.	1886/04/26	NONE	H 71.2, W 57.2 CM	INK, WATER COLOR	PAPER
C-134-4694	[PLAN & SECTIONS OF] FORCE PUMP / MADE BY HUNNEMAN & COMP'Y / FOR MERRIMACK MILL NO. 1.	1854/11/27	1/4 FULL		H 59.8, W 85.7 CM	INK
C-134-4694	[PLAN & SECTIONS OF] FORCE PUMP / MADE BY HUNNEMAN & COMP'Y / FOR MERRIMACK MILL NO. 1.	1854/11/27	1/4 FULL	H 59.8, W 85.7 CM	INK	PAPER
C-134-4695	12 INCH BENDS FOR THE / PROP'S OF LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1874/09/22	1/8 FULL SCALE	H 54, W 41 CM	INK, WATERCOLOR	PAPER
C-134-4696	PERKIN'S / PATENT / FIRE HYDRANT.	UNDATED	NONE	H 54.6, W 61.1 CM	UNKNOWN PRINTING PROCESS	PAPER
C-134-4697	FULL SIZE DRAWING OF / 12-INCH CHECK VALVE (FOR USE IN COWLEY SUIT) [CHAS. COWLEY VS. PL&C]	1903/07/00	FULL SIZE	H 79.1, W 94.3	INK, WATER COLOR	PAPER

C-135	[PORTFOLIO CONTAINING EXPERIMENTAL PAPERS BY J. B. FRANCIS ON WATER WHEELS AT THE DIFFERENT CORPORATIONS, ON FLOW OF WATER IN CANALS, & OTHER MISCELLANEOUS OLD PLANS.]	SEE NOTES				
C-136-001	OLD PLAN OF MERRIMACK / RIVER FROM PAWTUCKET DAM TO AIKEN ST. BRIDGE [SHOWING STREETS IN PAWTUCKETVILLE].	UNDATED	1"=150'	H 90.2, W 114 CM	INK, WATER COLOR, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-002	FOUNDATION PLAN / TAYLORS FALLS / REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / [BETWEEN] HUDSON & NASHUA, N.H.	1910/05/24	1/4"=1',1/8"=1'	H 35.4, W 170.5 CM	INK, COLORED PENCIL, GRAPHITE, COLORED INK	TRACING PAPER
C-136-002-[COPY 1]	FOUNDATION PLAN / TAYLORS FALLS / REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / HUDSON & NASHUA, N.H.	1910/05/24	1/4"=1',1/8"=1'	H 38.3, W 171.5 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-136-003-[A]	[DIAGRAM SHOWING] HEIGHT OF WATER AT PAWTUCKET DAM / & AT HEAD OF / CANAL.	1894/00/00	NONE	H 45.6, W 58.4 CM	INK, COLORED INK, COLORED PENCIL	PAPER
C-136-003-[B]	HEIGHT OF WATER AT / PAWTUCKET DAM.	1894/00/00	NONE	H 45.7, W 58.3 CM	INK, COLORED INK, GRAPHITE	PAPER

C-136-005	PLAN [& SECTIONS] OF A PART OF MERRIMACK RIVER, / AT / TYNGSBORO [ISLAND] & CHELMSFORD, MASS. [SHOWING SOUNDINGS].	1895/10/00	1"=80'	H 73, W 133.3 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-136-006	SKETCH SHOWING WATERWAY / AT / MINE FALLS DAM, NASHUA RIVER, N.H.	1896/05/00	NONE	H 45.9, W 58.5 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-007	COPY OF PLAN IN POSESSION OF AMOSKEAG COMPANY SHOWING WEIR [AT MANCHESTER, N.H.] FOR / WASTING WATER TO RUN OUT ICE. THIS OCCURS WHEN ANCHOR ICE IS RUNNING.	1896/03/13	1"=25'	H 36.5, W 75.2 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-136-008	SKETCH OF DAM / ACROSS / MERRIMACK RIVER AT GARVIN'S FALL. [N.H. DISTANCES ESTIMATED BY EYE.]	1896/06/02	1"=20'	H 58.5, W 42 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-136-009	DIAGRAM OF [RIVER] SLOPES / [FROM] HUNT'S FALLS TO PAWTUCKET DAM.	1870/01/15	NONE	H 51, W 40.4 CM	INK, COLORED PENCIL	PAPER
C-136-009-[A]	DIAGRAM OF RIVER SLOPES / OF LITTLE VALUE.	1870/00/00	NONE	H 45.1, W 67.2 CM	GRAPHITE ,INK, COLORED PENCIL	PAPER
C-136-010	CROSS SECTIONS OF MAIN CHANNEL OF MERRIMACK RIVER AT HUNTS FALLS. SUNDAY AUG. 12, 1877.	1877/08/12	NONE	H 63.8, W 49.3 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER

C-136-010-[A]	PROFILE OF MAIN CHANNEL OF MERRIMACK RIVER AT HUNT'S FALL. SUNDAY AUG. 12, 1877.	1877/08/00	NONE	H 63.8, W 49.3 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-136-011	[DIAGRAM SHOWING] OBSERVATIONS ON HEIGHTS OF WATER AT FOOT OF HUNTS FALLS & POND GAUGE AT ESSEX COMPANY'S DAM, FEB. 11TH & 12TH 1881.	1881/02/11-12	NONE	H 56.2, W 74.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-136-012	PLAN / OF A PORTION OF / HUNTS FALLS.	1885/07/00	1"=50'	H 87.7, W 126 CM	INK, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-136-013	SECTIONS OF RIVER AT HUNTS FALLS.	1885/07/29	NONE	H 45.3, W 82.8 CM	INK, COLORED INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
C-136-014	[DIAGRAM SHOWING] HEIGHTS / OF / MERRIMACK RIVER / AT / LOWER LOCKS, LAWRENCE / & AT / MERR'K M. CO'S. GAUGE / LOWELL.	1895/04/27	NONE	H 60.8, W 48.2 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-136-015	PLAN OF A PORTION / OF THE / WINNIPISEOGEE / RIVER / SHOWING SOUNDINGS.	1893/00/00	1"=2O'	H 81, W 185 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

C-136-016-[1]	[DIAGRAMS SHOWING] HEIGHTS OF WATER [MERRIMACK RIVER] ABOVE / AMOSKEAG MFG. CO'S DAM, / MANCHESTER N.H. FROM RECORDS / FURNISHED BY THE COMPANY.	1897/05/00	NONE	H 32.3, W 41.1 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL, COLORED INK	PAPER
C-136-016-[2]	HEIGHTS OF WATER ABOVE / AMOSKEAG MFG. COMPANY'S DAM, / MANCHESTER N.H. FROM RECORDS FURNISHED BY THE COMPANY.	1897/05/00	NONE	H 33, W 41.4 CM	BLUEPRINT, COLORED PENCIL, INK, GRAPHITE	PAPER
C-136-016-[3]	HEIGHTS OF WATER ABOVE / AMOSKEAG MFG. COMPANY'S DAM, / MANCHESTER N.H. FROM RECORDS FURNISHED BY THE COMPANY.	1897/05/00	NONE	H 32.4, W 41.4 CM	BLUEPRINT, INK, COLORED PENCIL , CRAYON	PAPER
C-136-016-[4]	HEIGHTS OF WATER ABOVE AMOSKEAG MFG. COMPANY'S DAM, / MANCHESTER N.H. FROM RECORDS FURNISHED BY THE COMPANY.	1897/05/00	NONE	H 32.5, W 42.1 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-017	PROFILE / OF THE MAIN DAM AT PAWTUCKET FALLS AS IT WAS PREVIOUS TO THE CONSTRUCTION OF THE NEW PART IN 1875, FROM LEVELS & MEASUREMENTS MADE BY JAMES FRANCIS [AND] PLAN SHOWING WIDTH OF CAP-STONES OF PAWTUCKET DAM / & LOCATION OF PINS FOR [...SEE NOTES]	1897/08/26	4"=10'OR 1 CM=1'	H 28, W 139.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER

C-136-018	PLAN [& FRONT ELEVATION] SHOWING MEAN CONDITION OF A LENGTH OF FLASHBOARDS ON PAWTUCKET DAM NEAR SECOND ANGLE / FROM DRACUT SHORE, AS FOUND AUG. 4,1897, WATER HAVING BEEN AT GRADE 89.9 ON JULY 16, PREVIOUS.	1897/08/11	NONE	H 44.3, W 70.9 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	PAPER
C-136-019	CROSS SECTION / OF THE / PEMIGEWASSET RIVER / AT THE / HIGHWAY BRIDGE / PLYMOUTH N.H. [SHOWING LOCATION OF THE GAUGE OF THE WINNIPISEOGEE LAKE COTTON & WOOLEN CO.]	1883/11/13	H1"=10', V1"=4'	H 40, W 93.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-136-020-[A]	OBSERVATIONS OF THE HEIGHT OF WATER AT SEVERAL / GAUGES IN BEAVER BROOK & MERRIMACK RIVER, AT VARIOUS STAGES OF THE RIVER, IN 1882, 1883, & 1884 / OFFICE OF LOCKS & CANALS / LOWELL.	1882/10/00	NONE	H 76.2, W 118.1 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-136-020-[B]	OBSERVATIONS ON GAUGES IN BEAVER BROOK & MERR. RIVER / SHEET NO. 1.	SEE NOTES	NONE	H 58.3, W 78.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-021-[1]	SHEET NO.1 / SECTIONS SHOWING BOTTOM OF / MERRIMACK RIVER BACK OF LAWRENCE M. CO'S. MILL. / TAKEN AUG.-OCT.	1898/12/00	1"=10'	H 56.1, W 163.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER

C-136-021-[2]	SHEET NO. 2 / SECTIONS SHOWING BOTTOM OF / MERRIMACK RIVER BACK OF LAWRENCE M. CO'S. RIVER MILL. / TAKEN AUGUST-OCT. 1898.	1898/12/00	1"=10'	H 56, W 158.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-022	SECTIONS SHOWING THE BED OF THE RIVER / ALONG PROPOSED RIVER LINES AS SHOWN ON / A [ROLL PLAN] TRACING OF MERRIMACK RIVER BELOW AIKEN / STREET DATED OCT. 5, 1897.	1897/10/26	NONE	H 55.6, W 151 CM	INK, WATER COLOR	PAPER
C-136-024	DIAGRAM SHOWING AMOUNT OF WATER FLOWING / OVER BEAVER BROOK DAM AT MERRIMACK WOOLEN MILLS.	1898/01/17	NONE	H 58.6, W 45.8 CM	INK, COLORED PENCIL	PAPER
C-136-025	PLAN OF / TYNGS ISLAND [ON THE MERRIMACK RIVER] / IN TYNGSBORO MASS., / BELONGING TO THE VESPER COUNTRY CLUB [SHOWING CONTOURS].	1898/09/00	1"=80'	H 61.8, W 118.3 CM	BLUEPRINT, INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-029	PLAN OF FILTER GALLERY [OF THE CITY OF LOWELL] & PART OF / CONDUIT OF LOWELL WATER WORKS.	1903/01/00	H1"=200', V1"=20'	H 43.9, W 60.3 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-136-030	[CONTINUOUS MAPS OF MERRIMACK RIVER FORM PAWTUCKET DAM TO NASHUA-IN BOOK.]	1883/01/25	1"=3/4 MILE	H 26.5, W 50 CM	INK, COLORED INK, GRAPHITE, WATERCOLOR	PAPER

C-136-031-[A]	[PLAN OF] WICASSEE DAM [NEAR TYNGS ISLAND ON THE MERRIMACK RIVER] SHOWING SOUNDINGS [& CONTOURS].	1908/00/00	1"=40'	H 69.5, W 76 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-136-031-[B]	[PLAN OF] WICASSEE DAM [NEAR TYNGS ISLAND ON THE MERRIMACK RIVER] SHOWING SOUNDINGS [& CONTOURS].	1908/00/00	1"=40'	H 69.5, W 76 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-136-034	DIAGRAM SHOWING DISCHARGE OF MERRIMACK R. BACK OF BOOTT [MILLS] / AND NET FALL FROM TREMONT GATES TO BOOTT RIVER GAUGE.	SEE NOTES	NONE	H 29.2, W 87.3 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-136-036	SECTION / ACROSS MERRIMACK RIVER / IN PROLONGATION OF THE CENTRE LINE OF / MOODY STREET.	1891/07/00	H1"=40', V1"=10'	H 60.7, W 114 CM	INK, WATER COLOR, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-036-[COPY 1]	SECTION / ACROSS MERRIMACK RIVER / IN PROLONGATION OF THE CENTRE LINE OF / MOODY STREET.	1891/07/00	H1"=40', V1"=10'	H 36.2, W 107 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-136-037	A PLAN OF / THE RIVER MERRIMACK / FROM ITS / MOUTH TO THE BOUNDRY LINE BETWEEN THE STATES OF / MASSACHUSETTS & NEW-HAMPSHIRE.	1801/01/00		H 32.4, W 138.8 CM	INK, WATER COLOR, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER

C-136-038	CROSS SECTION / OF THE / PEMIGEWASSET RIVER / AT THE / HIGHWAY BRIDGE. [SHOWING LOCATION OF THE GAUGE OF THE WINNIPISEOGEE LAKE COTTON & WOOLEN CO. PLYMOUTH, N.H.]	1883/11/13	H1"=10', V1"=4'	H 63.8, W 96.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-136-042	MERRIMACK RIVER BETWEEN PAWTUCKET DAM TO N.H. STATE LINE. [MEASUREMENTS GIVING VALUE OF C IN CHEZY FORMULA V=CV/RS DURING] FRESHET OF APRIL 16,1895.	1914/04/27	NONE	H 27.5, W 40.3 CM	INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-136-042-[COPY 1]	MERRIMACK RIVER BETWEEN PAWTUCKET DAM & N.H. STATE LINE. FRESHET OF APRIL 16,1895.	1914/04/27	NONE	H 27.5, W 40.3 CM	BLUEPRINT, GRAPHITE	PAPER
C-136-043	PLAN & PROFILE / OF / MERRIMACK RIVER / BETWEEN / PAWTUCKET DAM & N.H. STATE LINE / SHOWING / LOCATION OF STRETCHES / USED IN / FIGURING "C" IN CHEZY FORMULA / FOR / FRESHET OF APRIL 16, 1895.	1914/03/26	H1"=5000', V1"=5'	H 22.9, W 29.6 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-136-045	[DIAGRAM SHOWING] FLOOD HEIGHTS OF MERRIMACK RIVER [DURING MARCH 1ST & 2ND, 1896].	1896/03/01-02	NONE	H 55.2, W 40.6 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-136-048	DIAGRAM OF / LOCKS & CANALS MILL POND / SHOWING STORAGE CAPACITY CORRESPONDING TO DIFFERENT / WATER-SURFACE ELEVATIONS.	1915/08/00	SEE NOTES	H 33.3, W 76.1 CM	INK, COLORED INK	DRAFTING CLOTH

C-136-048-[COPY 1]	DIAGRAM OF / LOCKS & CANALS MILL PON / SHOWING STORAGE CAPACITY CORRESPONDING TO DIFFERENT / WATER SURFACE ELEVATIONS.	1916/08/00	SEE NOTES	H 33.1, W 73.6 CM	UNKNOWN PHOTOGRAPH, COLORED PENCIL, GRAPHITE	PAPER
C-136-049-[A]	[DIAGRAM SHOWING HEIGHTS & MONTHLY DRAFT LAKE WINNIPISEOGEE 1905-1925.]	SEE TITLE				
C-136-049-[B]	HEIGHTS & MONTHLY DRAFT / LAKE WINNIPISEOGEE / 1926-1946.	SEE TITLE	NONE	H 66.1, W 116.4 CM	INK, WATER COLOR, GRAPHITE, UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-136-049-[C]	HIEGHTS OF / LAKE WINNIPISEOGEE / 1947-1967.	SEE TITLE	NONE	H 70.5, W 117.5 CM	INK	DRAFTING CLOTH
C-136-050	COEFFICIENT OF DISCHARGE / VS. GATE. [MERRYMEETING LAKE GATE.]	1923/11/06	1"=8", 1"=40'	H 21.6, W 30.5 CM	INK	PAPER
C-136-051-[A]	GAGE HEIGHT & LEAKAGE / MERRYMEETING LAKE / MARCH TO JULY-1924.	SEE NOTES	NONE	H 29.1, W 45.7 CM	GRAPHITE, INK	PAPER
C-136-051-[B]	GAGE HEIGHT & LEAKAGE / MERRYMEETING LAKE / AUGUST TO OCTOBER-1924.	SEE NOTES	NONE	H 29.1, W 45.7 CM	GRAPHITE, INK	PAPER
C-136-052	CROSS SECTIONS OF / MERRYMEETING LAKE DAM / SHOWING ELEVATION OF WATER / IN EMBANKMENT ON MARCH / 27 TO 29 INCLUSIVE 1924.	1924/04/12	1"=4'	H 56.2, W 107.3 CM	INK, GRAPHITE	PAPER

C-136-053	ELEVATIONS & SECTIONS / SHOWING FILL IN FRONT OF / MERRYMEETING LAKE DAM.	1924/04/08	1"=5'	H 56.2, W 71.3 CM	INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-136-054	[PLAN SHOWING] PROPOSED REPAIRS / MERRYMEETING LAKE DAM / PROPRIETORS OF LOCKS & CANALS / LOWELL MASS.	1924/10/12	NONE	H 45.9, W 58.5 CM	INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-136-055	SECTIONS THROUGH / MERRYMEETING LAKE DAM / SHOWING REPAIRS IN 1924 / PROPRIETORS OF THE LOCKS & CANALS.	1924/12/05	1"=5'	H 56.1, W 117 CM	GRAPHITE, INK	PAPER
C-136-056	ELEVATION & PLAN / MERRYMEETING LAKE. / SHOWING REPAIRS IN 1924 / PROPRIETORS OF THE LOCKS & CANALS.	1924/11/13	1"=5'& 20'	H 56.1, W 108.8 CM	INK, COLORED INK, GRAPHITE	PAPER
C-136-057-[A]	[BOOK OF PHOTOSTATS OF LARGE] PROPERTY MAPS / FOR LAKE WINNEPESAUKEE [(IN ATTIC) SHOWING PROPERTY OWNERS].	UNDATED	NONE	H 29, W 38.1 CM	PHOTOGRAPHS, INK	PAPER
C-136-057-[B]	COLORED / BIRD'S EYE VIEW / OF / LAKE WINNIPESAUKEE / NEW HAMPSHIRE.	UNDATED	NONE	H 48.5, W 72.3 CM	CHROMO LITHOGRAPHY, INK	PAPER, TRACING PAPER
C-141-001-A	[PLAN OF] FIRST STREET OVAL [FROM BRIDGE ST. TO CITY MAINS SHOWING CONTOURS].	1922/03/00	1"=40'	H 77, W 141.5	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-001-B	PLAN OF [LAND SOUTH OF] FIRST STREET / [NEAR READ ST. SHOWING PROPOSED] CHANGE IN STREET LINE [FOR BOULEVARD].	1922/03/01	1"=20'	H 41.8, W 44.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-141-001-D-[01]	FIRST ST. / BOULEVARD.	1922/09/06	1"=40'	H 41.6, W 98.5 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-141-001-D-[02]	[FIRST ST. / BOULEVARD].	1922/06/19	1"=40'	H 42.5, W 99 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER
C-141-001-E	PLAN OF LAND / BELONGING TO / PROPS OF THE LOCKS & CANALS ON / MERRIMACK RIVER [SHOWING LOTS 96-B, 96-C, 96-D, & HOW THE FIRST ST. BOULEVARD RUNS THRU THEM].	1923/04/01	1"=100'	H 36.5, W 80 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-141-001-F	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / ON FIRST STREET / LOWELL, MASS. / SHOWING AREAS DESIRED BY THE CITY OF LOWELL FOR / PARKS AND PLAYGROUNDS [INCLUDING LOTS 95, 96, 96-A-B-C-D].	1922/04/00	1"=80'	H 38.5, W 134.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-141-002-A	SKETCH SHOWING GRADES / TAKEN TO DETERMINE / HEIGHT OF / LEDGE ALONG RAILROAD TRACK AT BROADWAY.	1902/04/17	1"=40'	H 17.5, W 33.3 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
C-141-002-B	PROFILE OF [PART OF] / BROADWAY / NEAR / BRIDGE OVER THE PAWTUCKET CANAL / LOOKING UPSTREAM.	1902/05/12	H1"=4', V1"=2'	H 21, W 59.6 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-002-C	[PLAN OF] BROADWAY BRIDGE, [OVER] PAWTUCKET CANAL / [TRACED FROM LOCKS & CANALS PLAN #C-126-3120 DATED] FEBRUARY 1852.	1902/05/02	1/4"=1'	H 10 1/2", W 30"	INK, PENCIL	TRACING PAPER

C-141-002-D	PROFILE OF BROADWAY / AT / BRIDGE OVER THE PAWTUCKET CANAL.	1902/03/25	H1"=20', V1"=2'	H 60.6, W 76.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-002-E	[PLAN AND ELEVATION OF] BROADWAY ST. BRIDGE [OVER PAWTUCKET CANAL] / PROPRIETORS OF LOCKS & CANALS-LOWELL, MASS.	1919/00/00	NONE	H 61.9, W 92.1 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
C-141-003-A	PLAN OF PREMISES / NEAR / FLETCHER ST. BRIDGE / [SHOWING GRADES & THE LOCATION OF THE PIERS FOR THE NELSON MORRIS BUILDING] LOWELL, MASS.	1898/03/01	1"=20'	H 56.1, W 49.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-003-B	[SKETCH OF] NELSON MORRIS CO.'S FOUNDATION [SHOWING SECTION OF THE TWO "CROSS WALLS" FROM NEW BARN TO B.& M. R.R. CO.'S WALL FOR SUPPORTING BARN. LONGITUDINAL SECTION SHOWING DISTRIBUTION OF 24" BEAMS BENEATH NELSON MORRIS BUILDING.]	1898-1899/00/00	1/4"=1'	H 22, W 28.2 CM	GRAPHITE, INK	TRACING PAPER
C-141-003-C	[SKETCH OF NELSON MORRIS CO.'S FOUNDATION SHOWING SECTION OF THE TWO "CROSS WALLS" FROM NEW BARN TO B & M R.R. CO.'S WALL FOR SUPPORTING BARN.] LONGITUDINAL SECTION SHOWING DISTRIBUTION OF 24" BEAMS / BENEATH NELSON MORRIS BUILDING.	1898/12/16	1/4"=1'	H 25.1, W 93.4 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER

C-141-003-D	GIRDERS-NELSON MORRIS WALL. [PLAN OF FOUNDATION OF NELSON MORRIS BUILDING SHOWING THE DISTRIBUTION OF THE 24" BEAMS & GIVING THE LENGTH THE SELLER & THE DATE OF PURCHASE OF THE BEAMS.]	1899/03/00	NONE	H 33.6, W 58.5 CM	INK, COLORED INK, GRAPHITE	PAPER
C-141-003-E	ELEVATION OF THE SOUTH SIDE OF THE PIER / FOR NELSON MORRIS & CO. [BUILDING GIVING NUMBER OF FEET REQUIRED FOR EACH COURSE OF STONE & SHOWING THE PROGRESS OF THE WORK].	1898/10/00	1"=5'	H 25, W 75.6 CM	BLUEPRINT, INK, COLORED INK, GRAPHITE	PAPER
C-141-004-A	[PLAN OF] EAST MERRIMACK ST. BRIDGE / OVER EASTERN CANAL, LOWELL, MASS. [SHOWING PARTS OF BRIDGE TO BE DONE RESPECTIVELY BY THE P.L.& C. & BOSTON & NORTHERN ST. R.R.]	1908/08/00	1/2"=1'	H 70.2, W 162.8 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-141-004-B	[PLAN OF] BRIDGE OVER [EASTERN] CANAL / EAST MERRIMACK ST. / LOWELL MASS. [SHOWING PLAN & SECTIONS FOR CONSTRUCTION].	1908/07/16	3/4"=1'	H 60.5, W 89.7 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-004-C	[PLAN OF] EAST MERRIMACK ST. [BRIDGE] / OVER / EASTERN CANAL [GIVING GRADES].	1907/12/31	1"=4'	H 67.5, W 106 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-004-D	[PLAN OF] CITY OF LOWELL / SIDEWALK IN MERRIMACK SQUARE / OVER / EASTERN CANAL / [SHOWING] GENERAL PLAN & DETAIL OF FLOOR & RAILING.	1908/06/00	1/4"& 1 1/2"=1'	H 64.5, W 98 CM	BLUEPRINT, INK	PAPER

C-141-004-E	DETAILS OF RAILING / FOR SOUTH SIDE OF THE / EAST MERRIMACK ST. BRIDGE / OVER EASTERN CANAL / LOWELL, MASS.	1909/09/23	1 1/2"=1'	H 32.5, W 62.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-004-F	[SKETCH SHOWING] ARRANGEMENT OF ROAD BED / [ON] EAST MERRIMACK ST. BRIDGE [OVER EASTERN CANAL].	1908/08/00	1/10"=1'	H 29.3, W 45.7 CM	INK, GRAPHITE, COLORED INK	PAPER
C-141-005-A	[PLAN OF] PROPOSED ARCH [WITH 145" SPAN] OVER NORTHERN CANAL / TO REPLACE / PAWTUCKET ST. BRIDGE.	1914/10/00	1"=10'	H 50.1, W 89.6 CM	INK, GRAPHITE, COLORED PENCIL, COLORED INK, WATER COLOR	TRACING PAPER
C-141-005-B	ELEVATION / SHOWING / HALF OF ONE RIB / OF THE / CENTERING / FOR THE / PROPOSED ARCH / OVER / NORTHERN CANAL.	1914/10/26	1"=1'	H 37.1, W 45.2 CM	INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-005-C	PROPOSED / ARCH BRIDGE / OVER / NORTHERN CANAL [TO REPLACE PAWTUCKET ST. BRIDGE WITH 143' SPAN.]	UNDATED	1"=1', 1/4"=1'	H 45.4, W 46.4 CM	INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-005-D	[PLAN OF] PAWTUCKET ST. BRIDGE / OVER / NORTHERN CANAL / LOWELL, MASS. [GIVING MEASUREMENTS OF THE OLD BRIDGE].	1915/10/00	1"=10'	H 29.6, W 92 CM	INK, GRAPHITE	TRACING PAPER
C-141-005-E	PLAN OF / PAWTUCKET STREET BRIDGE / OVER NORTHERN CANAL / LOWELL, MASS. [SHOWING IN RED THE LINES OF THE PROPOSED NEW BRIDGE].	1915/12/00	1"=10'	H 42.1, W 91.4 CM	INK, GRAPHITE, COLORED INK, COLORED PENCIL	TRACING PAPER

C-141-005-F	[AN] ANALYSIS OF THE LOCATION OF PIER [OF THE PAWTUCKET ST. BRIDGE OVER THE NORTHERN CANAL].	1915/12/14	1/4"=1'	H 50.4, W 106 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER
C-141-005-G	SECOND / DESIGN FOR / PAWTUCKET ST. BRIDGE / OVER NORTHERN CANAL / LOWELL, MASS. [SHOWING ELEVATION & PLANS OF THE ROADWAY & FRAMING].	1915/02/02	1/8"& 1/4"=1'	H 61.8, W 101.9 CM	BLUEPRINT	PAPER
C-141-005-H	[PLAN SHOWING] HIGH BRIDGE / [RELATIVE] REPOSITIONING OF PRESENT GAS PIPE [BENEATH PAWTUCKET ST. BRIDGE OVER NORTHERN CANAL] AND / PROPOSED NEW PLATE GIRDERS / LOOKING NORTHEAST.	1916/01/12	1"=5'	H 43.6, W 48 CM	INK, GRAPHITE	PAPER
C-141-005-I	[PLAN OF] PAWTUCKET ST. BRIDGE / OVER / NORTHERN CANAL / LOWELL, MASS. [SHOWING GENERAL CONSTRUCTION LAY-OUT].	1916/03/20	1/8"=1'	H 63.3, W 98.1 CM	BLUEPRINT, INK	PAPER
C-141-005-J	[PLAN OF] PAWTUCKET ST. BRIDGE / OVER / NORTHERN CANAL / LOWELL, MASS. [SHOWING PLAN & ELEVATION FOR THE LOCATION OF CAST BASES].	1916/03/20	1/4"=1'	H 63.2, W 98 CM	BLUEPRINT	PAPER
C-141-005-K	PAWTUCKET STREET BRIDGE / OVER NORTHERN CANAL / LOWELL, MASS. / DETAIL OF CROSS FRAME XM [WHICH APPEARS AS SECTION BB UPON PLAN 5-I].	1916/03/30	3/4"=1'	H 34.6, W 46.6 CM	GRAPHITE	TRACING PAPER
C-141-006-A	PLAN OF / SUFFOLK STREET BRIDGE / OVER / NORTHERN CANAL.	1909/04/00	1"=5'	H 61.6, W 99.6 CM	BLUEPRINT, INK	PAPER

C-141-006-B	PLAN OF REPAIRS ON / SUFFOLK ST. BRIDGE / [OVER NORTHERN CANAL] MADE JUNE 29 TO JULY 3, 1914.	1914/06/29-07/03	1"=5'	H 45.4, W 70.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-007.5-A	PLAN SHOWING / LOWELL [ELECTRIC] LIGHT CO.'S / CONDUIT PIPES / UNDER CENTRAL ST. BRIDGE [OVER PAWTUCKET CANAL] .	1901/11/01	1"=4',2',1'	H 55, W 86.3 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-141-007.5-B	[PLAN OF] LOWELL ELECTRIC LIGHT CO.'S CONDUIT CROSSING UNDER [NORTH SPAN OF] CENTRAL ST. BRIDGE.	1901/11/00	1"=2'	H 72.1, W 127.5 CM	INK, COLORED INK	TRACING PAPER
C-141-007.5-C	SECTIONS OF LOWER PAWTUCKET CANAL / UNDER THEATER PLATFORM / SOUTH SPAN LOOKING DOWNSTREAM.	1916/06/12	1"=10'	H 58.4, W 45.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-007.5-D	SECTIONS OF LOWER PAWTUCKET CANAL UNDER THEATER PLATFORM & BELOW / ON NORTH SIDE OF CANAL LOOKING DOWNSTREAM.	1916/07/23	1"=10'	H 58.4, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
C-141-007.5-E	COMPOSITE SECTION / SHOWING / STRUCTURES OVER PAWTUCKET CANAL / AT CENTRAL ST. LOWELL, MASS. / -LOOKING DOWNSTREAM.	1916/09/09	1/4"=1'	H 30.6, W 73.4 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-141-007-A	[PLAN SHOWING SECTIONS UPON NORTH AND SOUTH ABUTMENTS OF] BRIDGE ST. BRIDGE OVER NORTHERN CANAL.	1910/04/15	NONE	H 55.8, W 75.7 CM	INK, COLORED INK, GRAPHITE	PAPER

C-141-008-A	[PLAN OF] SUPPORTING PILES UNDER EASTERLY OR DOWNSTREAM PLATFORM / AT CENTRAL ST. BRIDGE OVER PAWTUCKET CANAL-NOW BEING SUPPLEMENTED WITH CEMENT CONCRETE.	1911/07/00	NONE	H 20.1, W 50.1 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	PAPER
C-141-008-B	[PLAN OF] PIER UNDER EASTERLY OF DOWNSTREAM PLATFORM AT / [SIDE OF] CENTRAL STREET BRIDGE OVER PAWTUCKET CANAL (SUPPORTING SPAULDING BLOCK) SHOWING REPAIRS MADE IN 1911.	1911/08/00	1"=3'	H 19.5, W 67.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-141-008-C	CENTRAL ST. BRIDGE / PLAN OF PLATFORM ON EAST SIDE [SHOWING THE RESULTS OF AN EXAMINATION OF THE PLATFORM BY W.E. BADGER & H. LANGE].	1914/10/25	1"=20'	H 45.5, W 96 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-008-D	PLAN SHOWING PLATFORMS OF CENTRAL ST. BRIDGE [FROM MEASUREMENTS TAKEN NOV 1914].	1914/11/00	1"=20'	H 26.7, W 48.9 CM	BP, INK, GRAPHITE, COLORED PENCIL	PAPER
C-141-008-E	[PLAN OF] EASTERLY PLATFORM OVER PAWTUCKET CANAL / [AT] CENTRAL ST. / SHOWING DATA RELATIVE TO NEW I-BEAMS PUT IN TO STRENGTHEN THE WOODWORK.	1914/12/00	1"=4'	H 21.4, W 73.8 CM	INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-008-F	CROSS SECTION SHOWING ORIGINAL TRUSSED BEAMS / & NEW STRENGTHENING STEEL BEAMS / PLACED UNDER PLATFORM ON EAST SIDE / OF CENTRAL ST., NOVEMBER 1914.	1915/01/19	1"=1'	H 22.5, W 41.3 CM	INK, WATER COLOR, GRAPHITE	PAPER

C-141-008-G	THEATER PLATFORM / SIDE ELEVATION OF PIER IN CANAL [ON THE EASTERLY SIDE OF CENTRAL ST. BRIDGE UPON WHICH THE THEATER PLATFORM IS TO REST].	1916/08/01	1"=3'	H 34.3, W 78.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-008-H	[PLAN SHOWING LAYOUT OF STEEL BEAMS FOR] THEATER PLATFORM / IN PAWTUCKET CANAL / ON EAST SIDE OF CENTRAL ST.	1916/06/00	1"=4'	H 50.4, W 86 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-009-A	THEATRE STORE & OFFICE BUILDING / CENTRAL STREET LOWELL MASS / FOR THE STRAND REALTY COMPANY / OF LOWELL / FOUNDATION PLAN [& INDICATING STAGE & FOYER FRAMING].	UNDATED	1/8"=1'	H 53.4, W 104.7 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-141-009-C	THEATER STORE & OFFICE BUILDING / FOR / THE STRAND REALTY CO. OF LOWELL / FIRST FLOOR PLAN.	1916/11/02	1/8"=1'	H 41.3, W 64.8 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-009-D	[SECTION THRU VESTIBULE & LOBBY OF STRAND] THEATER STORE & OFFICE BUILDING / CENTRAL STREET LOWELL, MASS. / THE STRAND REALTY COMPANY [SHOWING FLOOR GRADES].	UNDATED	1/8"=1'	H 35.1, W 51.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-009-E	COMMERCIAL BUILDING / STRAND THEATER [OF THE STRAND REALTY CO.] LOWELL, MASS. / SECOND FLOOR PLAN [SHOWING THE ELECTRIC LIGHTING LAY-OUT OF APRIL 12, 1917].	1917/03/26	1/8"=1'	H 34, W 58.2 CM	BLUEPRINT, INK, GRAPHITE	PAPER

C-141-009-F	[PLAN OF] THEATER STORES & OFFICE BLDG. / THE STRAND REALTY CO. OF LOWELL / NEW STORE FRONTS / REVISED FRONT ELEVATION ON CENTRAL ST.	1916/11/04	1/8"=1'	H 44.7, W 57.9 CM	BLUEPRRINT, INK, GRAPHITE	PAPER
C-141-009-G	THEATER STORE & OFFICE BUILDING / FOR / THE STRAND REALTY COMPY OF LOWELL / REVISED FIRST FLOOR FRAMING OF COMMERCIAL [PART OF THE STRAND THEATER] BLDG. [SHOWING DETAILS OF THE COLUMNS].	1916/11/15	1/8"=1'	H 43.3, W 54 CM	BLUEPRINT, INK	PAPER
C-141-009-H	THE STRAND THEATER & STORES / STRAND REALTY CO. OF LOWELL / FRAMING PLAN OF ENTRANCE / LOWELL THEATER.	1916/11/16	1/8"=1'	H 35.1, W 51.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-009-I	[THE COMMERCIAL PART OF THE STRAND] THEATER STORES & [OFFICE] BUILDING / THE STRAND REALTY COMP. OF LOWELL / REVISED FRAMING PLAN OF SECOND FLOOR [SHOWING DETAILS OF THE COLUMNS].	1916/11/17	1/8"=1', 3/4"=1'	H 46.7, W 67.2 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-141-009-J	ROOF FRAMING PLAN [OF COMMERCIAL PART OF STRAND THEATER BUILDING].	UNDATED	1/8"=1'	H 47, W 68 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-009-K	BEAM & BINDING DETAILS / [FOR STRAND] LOWELL THEATER.	1916/11/16	NONE	H 37, W 100.7 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-009-L	SCHEDULE [FOR] CONCRETE REINFORCEMENT / [OF PANELS A, B, & C OF STRAND THEATER BUILDING] LOWELL THEATRE.	1916/11/15	NONE	H 47.8, W 34.4 CM	BLUEPRINT, INK, GRAPHITE	PAPER

C-141-009-M	SCHEDULE [FOR] CONCRETE REINFORCEMENT / [OF STRAND] LOWELL THEATER [BUILDING GIVING SPECIFICATIONS FOR PASSAGEWAY, BRIDGE IN REAR OF THEATER, BRIDGE BESIDE THEATER, PASSAGEWAY, ORCHESTRA PIT FLOOR, COLUMN PIERS & ORCHESTRA WALL.]	1916/11/14	NONE	H 48, W 34.5 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-009-N	SCHEDULE [FOR] CONCRETE REINFORCEMENT / [OF STRAND] LOWELL THEATER [BUILDING GIVING REINFORCEMENT SPECIFICATIONS FOR FRESH AIR TUNNEL, PIPE TUNNEL, FAN ROOM SLAB A, FAN ROOM BEAMS, & COLUMNS UNDER FOYER].	1916/11/16	NONE	H 47.8, W 34.3 CM	BLUEPRINT,INK, GRAPHITE	PAPER
C-141-009-O	STRAND THEATER STORES / STRAND REALTY CO. OF LOWELL / REVISED DRAWING / REAR ELEVATION OF STORE SHOWING OPENINGS.	1916/11/22	1/4"=1'	H 44.2, W 69.2 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER
C-141-010-A	CENTRAL ST. BRIDGE / [OVER PAWTUCKET CANAL] PLAN OF [DUNBAR-MOTLEY] PLATFORM ON WEST SIDE [SHOWING RESULTS OF THE CONDITION OF TIMBERS].	1914/10/23	1/4"=1'	H 45.5, W 95.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-010-B	[PLAN OF] FIRST FIVE TRUSSES OF CENTRAL ST. [BRIDGE] WEST [MOTLEY] PLATFORM [SHOWING THE VARYING WEIGHTS IN BUILDINGS ABOVE SUPPORTED BY PLATFORM].	1914/11/13	1"=40'	H 30.6, W 96.5 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER

C-141-010-C	[PLAN OF] WESTERLY PLATFORM OVER PAWTUCKET CANAL / [ON] CENTRAL ST.	1914/12/00	1"=4'	H 38.4, W 88.3 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-010-D	[PLAN OF] PIER UNDER WEST [MOTLEY] PLATFORM / [OF] CENTRAL ST. BRIDGE. / SHOWS TEMPORARY BRACING TO BE USED WHILE / PIER IS BEING INSTALLED.	1915/05/26	1"=1'	H 34.5, W 52 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-010-E	[PLAN OF] MOTLEY PLATFORM / OVER / PAWTUCKET CANAL / AT CENTRAL ST. / LOWELL.	1917/05/01	1"=4'	H 56.2, W 89.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-010-F	[PLAN OF] MOTLEY PLATFORM / OVER / PAWTUCKET CANAL / AT CENTRAL ST. / LOWELL [REVISED].	1918/04/24	1"=4'	H 63.2, W 85.1 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
C-141-011-A	[PLAN OF] BOSTON & NORTHERN [STREET RAILWAY] / THORNDIKE ST. BRIDGE / LOWELL, MASS. [SHOWING SWAY FRAMES, THE LONG SECTION & PLAN, AND ALSO DATA FOR PAINTING THE STRUCTURE.]	1909/06/23	1/10"& 3/4"=1'	H 58.6, W 85.1 CM	BLUEPRINT,INK, COLORED PENCIL	PA
C-141-012-A	CITY OF LOWELL-[PLAN OF] MOODY ST. BRIDGE [SHOWING THE THREE SPANS, THE PLAN & ELEVATION OF 121'-6" SPAN, & DETAILS OF THE SWAY BRACING. CITY OF LOWELL, GEORGE BOWERS, CITY ENGINEER].	1895/10/00	NONE	H 68.2, W 100.8 CM	BLUEPRINT, INK, COLORED PENCIL, COLORED INK	PAPER

C-141-012-B	[PLAN OF] CITY OF LOWELL-MOODY ST. BRIDGE. [SHOWING PLAN & ELEVATION OF 180' SPANS, DETAILS OF THE SWAY BRACING, & A CROSS SECTION OF THE FLOOR. CITY OF LOWELL, GEORGE BOWERS, CITY ENGINEER].	1895/10/00	NONE	H 67.8, W 110 CM	BLUEPRINT, INK,	PAPER
C-141-013-A	AIKEN ST. BRIDGE / ABUTMENT ON SOUTHERLY SIDE OF MERRIMACK RIVER [SHOWING PLAN & ELEVATION OF THE PIER & A SECTION OF THE CENTER LINE OF THE SEWER].	1882/03/00	1"=4'	H 59.1, W 75.2 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-141-013-B	[PLAN] AIKEN ST. BRIDGE PIER NO.1 [OVER MERRIMACK RIVER SHOWING PLAN & ELEVATION OF THE PIER].	SEE NOTES	1"=4'	H 59.1, W 75.9 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
C-141-014-A	[PLAN OF] SUGGESTED BRIDGE[S] OVER PAWTUCKET CANAL ABOUT SIX HUNDRED FEET DOWNSTREAM FROM / PAWTUCKET ST. / SUGGESTED R.R. BRIDGE OVER PAWTUCKET CANAL ABOUT 350 FT. UPSTREAM FROM GATE HOUSE AT OLD GUARD HOUSE AT OLD GUARD LOCKS.	1920/08/00	NONE	H 58.3, W 63.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-141-015.5-A	PLAN [AND SECTION] OF / BRIDGE ST. BRIDGE / OVER / EASTERN CANAL.	1908/02/00	1"=5'	H 63.1, W 88.4 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
C-141-015.5-B	[PLAN AND SECTIONS OF] BOSTON & NORTHERN / BRIDGE ST. BRIDGE / OVER [EASTERN] CANAL / LOWELL, MASS.	1909/07/22	1/4"&1/2"=1'	H 60.7, W 90.8 CM	BLUEPRINT, INK	PAPER

C-141-015-A	BOSTON & NORTHERN ST. RY. / PROPOSED CONSTRUCTION OF FLOOR UNDER TRACK LOCATION / BRIDGE OVER WESTERN CANAL / MERRIMACK ST. LOWELL.	1903/04/29	1"=1'	H 31.7, W 49.2 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-016-A	PLAN & PROFILE OF / PAWTUCKET [ST.] BRIDGE [OVER THE MERRIMACK RIVER] / SHOWING / PROPOSED CHANGES IN LINES & GRADES / OF SCHOOL ST. & MAMMOTH RD. / ALSO LOCATION & TENTATIVE GRADES OF NEW CONCRETE BRIDGE.	1916/03/00	1"=40'& 4'	H 72.8, W 108.9 CM	BLUEPRINT, INK, COLORED INK	PAPER
C-141-017-A	PLAN / OF / STACKPOLE ST. / LOWELL, MASS. [GIVING DIMENSIONS OF THE ST. BETWEEN LIVERMORE & BROWN STS.]	1892/07/00	1"=40'	H 29.5, W 71.3 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-017-B	DATA FOR GRADING LOCKS & CANALS [DUMP] LAND / ON [NORTH OF] STACKPOLE ST. [OPPOSITE FAYETTE & LIVERMORE ST. IN LOCKS & CANALS LOT # 84].	1899/10/11	1"=40'	H 51.7, W 29.6 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-017-C	[SKETCH SHOWING GRADES OF LAND NORTH OF STACKPOLE ST. OPPOSITE & EAST OF LIVERMORE ST. IN LOCKS & CANALS LOT # 84.] GRADING STACKPOLE ST. DUMP.	UNDATED	1"=40'	H 73, W 70.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	TRACING PAPER

C-141-017-D	PLAN OF / STACKPOLE ST. DUMP / SHOWING / [CONTOURS &] SECTIONS ON EARTH TO BE REMOVED BY MASSACHUSETTS MILLS. [AT A POINT NORTH OF STACKPOLE ST. MIDWAY BETWEEN LIVERMORE & ALDER ST].	1914/08/00	1"=40'	H 51.8, W 104.2 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-017-E	[SECTIONS OF] STACKPOLE ST. DUMP / [LOOKING EAST] SHOWING / SECTIONS ON EARTH TO BE REMOVED BY MERRIMACK MILLS.	1914/08/28	H1"=10', V1"=2'	H 58.8, W 45.9 CM	INK, COLORED INK	PAPER
C-141-018-A	[PLAN OF] GATE HOUSE ON WALL OF NORTHERN CANAL [AT WASTEWAY SHOWING I-BEAMS WANTED FOR THE WALK ABOUT THE GATE HOUSE & THEIR POSITION ABOUT THE HOUSE].	1897/06/27	1"=4'	H 43.3, W 71.2 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	TRACING PAPER
C-141-018-B	[PLAN OF] IRON PIERS / AT WASTEWAY ON NORTHERN CANAL WALL.	1897/07/17	1"=1'	H 44, W 30.2 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-018-C	[PLAN & ELEVATION OF] FOOT BRIDGE OVER WASTEWAY IN NORTHERN CANAL WALL.	1895/09/04	1"=4'	H 48.2, W 76.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-019-A	PLAN OF WORK / DONE BY BY P.L. & C. IN FRONT OF / SACO-LOWELL SHOPS ON / WALL IN LOWER PAWTUCKET CANAL / DURING 1913 & 1914.	1914/11/00	1"=20'	H 48.7, W 84.1 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER

C-141-020-A	PLAN OF 24" DRAIN PIPE IN / LOWER LEVEL OF PAWTUCKET CANAL / & ITS CONNECTION WITH THE SLUICE GATE [& DETAILS OF THE PROGRESS OF THE WORK].	1910/09/11	1"=1'	H 74.9, W 76.9 CM	INK, COLORED INK, WATER COLOR	PAPER
C-141-020-B	COFFIN VALVE COMPANY / BOSTON MASS. / COFFIN STANDARD 24 IN. CIRCULAR SLUICE GATE / WITH SPIGOT END / PATENTED.	1906/02/23	3"=1', 1:1	H 56.7, W 88.9 CM	BLUEPRINT, INK	PAPER
C-141-020-C	COFFIN VALVE COMPANY / BOSTON, MASS. / [PLAN OF] COFFIN LIGHT BALL BEARING STAND.	1906/02/26	6"=1', 1:1	H 56.8, W 89.9 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
C-141-021-A	PLAN FOR THE ALTERATION OF THE CITY OF LOWELL SEWER NEAR THE PRESCOTT MILL.	1844/03/09	1"=10'	FRANCIS, JAMES B.	H 37.8, W 70 CM	INK, WATER COLOR, GRAPHITE
C-141-021-A	PLAN FOR THE ALTERATION OF THE CITY OF LOWELL SEWER NEAR THE PRESCOTT MILL.	1844/03/09	1"=10'	H 37.8, W 70 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-141-021-B	PROFILE OF SEWER FROM PRESCOTT ST. TO / LOWER LOCKS WASTEWAY SHOWING CHANGE PROPOSED / WHERE IT CROSSES THE EASTERN CANAL.	1910/02/16	SEE NOTES	H 43.9, W 95.9 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-141-022-A	BLUE DYE HOUSE [ICE] BOOM [IN LOWER PAWTUCKET CANAL SHOWING ELEVATION OF THE FRAMEWORK].	UNDATED	NONE	H 54.5, W 152 CM	INK, COLORED INK	DRAFTING CLOTH
C-141-022-B	BLUE DYE HOUSE ICE BOOM [SHOWING SECTION OF FRAMEWORK WITH THE APRON & THE BRACKET FOR WALK ON TOP OF BOOM].	1918/10/00	1"=1'	H 45.9, W 58.7 CM	INK, COLORED INK, WATER COLOR	PAPER

C-141-023-A	PLAN OF LOWER PAWTUCKET CANAL ABOVE CENTRAL ST. SHOWING / WORK DONE IN / 1909, [& INDICATING] TEST HOLES [IN CANAL] & SECTIONS [ON THEM].	1909/00/00	1"=20'& 10'	H 54, W 91.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-023-B	MEMORANDUM PLAN OF LOWER LEVEL OF / PAWTUCKET CANAL [ABOVE CENTRAL ST. CONTAINING NOTES OF WORK DONE DURING THE SESSION OF 1910].	1910/00/00	1"=20'& 10'	H 40, W 54 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-141-023-C	PLAN OF LOWER PAWTUCKET CANAL CENTRAL ST. PIER & BELOW [LOOKING DOWNSTREAM] SHOWING SECTIONS.	1910/04/00	NONE	H 66, W 140.7 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-024-A	DESIGN FOR [SECTION OF THE] "DAVIS & SARGENT WALL" [SHOWING DESIGN & ACTUAL SHAPE IN CONSTRUCTION].	1915/06/16	1"=1'	H 58.6, W 45.8 CM	INK, WATER COLOR, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-141-025-A	PLAN SHOWING / PROPOSED ROUTES / FOR CITY OF LOWELL'S NEW 24-IN [WATER MAIN].	1913/08/00	1"=100'	H 106, W 37.1 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	TRACING PAPER
C-141-025-B	[PLAN & ELEVATION OF] CITY [OF LOWELL'S NEW] 24" WATER MAIN CROSSING MERRIMACK RIVER AT AIKEN ST.	1914/06/03	1"=100'	H 77.4, W 90.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER

C-141-026-A	PLAN OF [LAND] / & DATA RELATING TO A PARCEL OF LAND / [LOT 2-A] LEASED BY PROPS. L.& C. / TO JONATHAN C. ARMOUR [SHOWING SECTIONS OF PAWTUCKET CANAL WALL].	1896/08/26	1"=10'	H 68.9, W 97.4 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-141-026-B	PLAN OF PROPOSED TRACK FOR / ARMOUR & CO. / LOWELL, MASS.	UNDATED	1"=10'	H 47.1, W 60.2 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-027-A	[PLAN OF] REF.[RIGERATING] WAREHOUSE AT LOWELL MASS. / FOR ARMOR & COMPANY CHICAGO ILL. / FOUNDATION PLAN.	1896/00/00	1/4"=1'	H 61.5, W 99.7 CM	BLUEPRINT, INK	PAPER
C-141-027-B	[UNTITLED PLAN.] [SKETCH OF FOUNDATION PLAN OF REFRIGERATING WAREHOUSE FOR ARMOUR & CO. WITH DETAILS OF WALLS AND GRANITE ESTIMATE.]	1896/00/00	1/4"=1'	H 60.3, W 105.7 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-028-A	SKETCH OF MIDDLESEX CO.'S / DRUG STORE HOUSE / SHOWING A PROPOSED LOCATION FOR A / STEAM FIRE PUMP.	1898/03/22	1"=5'	H 42.6, W 60.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-028-B	SKETCH OF MIDDLESEX CO.'S / NO. 3 MILL / SHOWING POSSIBLE LOCATION OF TWO ROTARY / FIRE PUMPS.	1898/05/00	1"=10'	H 38.7, W 59.5 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-029-A-01	SECTIONS IN LOWER PAWTUCKET CANAL / IN REAR OF NO. 3 BUILDING OF / LOWELL MACHINE SHOP.	1900/06/28	NONE	H 58.6, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER
C-141-029-A-02	SECTION IN LOWER PAWTUCKET CANAL / IN REAR OF NUMBER 3 BUILDING OF LOWELL MACHINE SHOP.	1900/06/26	1"=10'	H 58.4, W 45.8 CM	INK, COLORED INK, GRAPHITE	PAPER

C-141-029-B	FOUNDATION PLAN / [OF] # 3 MILL-1902 ADDITION-[OF THE SACO-LOWELL] L. M. SHOP [SHOWING PLAN & SECTIONS].	1902/01/08	1/4"& 1/2"=1'	H 29.8, W 83.8 CM	BLUEPRINT,INK	PAPER
C-141-029-C	PLAN OF LAND / [TO BE] CONVEYED BY / PROPS. LOCKS & CANALS ON MERR'K RIVER / TO / SACO-LOWELL SHOPS / LOWELL MASS [SHOWING SITE FOR # 3 SHOP].	1916/00/00	1"=20'	H 51, W 21.75 CM	INK, WATER COLOR	DRAFTING CLOTH
C-141-030-A	[PROFILE OF] SCHOOL ST. [WITH LINE ADDED SHOWING THE EFFECT OF A 4% GRADE].	1907/05/07	H 1"=50', V 1"=5'	H 29.8, W 83.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-030-B	[PLAN IN REGARD TO THE] ABOLITION OF [THE] GRADE CROSSING / [OF THE] NASHUA & LOWELL RAILROAD / [AT] SCHOOL ST., LOWELL, MASS. [SHOWING PLAN OF SCHOOL ST., & A PROFILE OF WESTERN & PROPOSED RAMP].	1910/01/00	1"=40'& 20'	H 72.2, W 55.5 CM	BLUEPRINT, COLORED PENCIL, INK, GRAPHITE	PAPER
C-141-030-C	BOSTON & MAINE R.R. / SHOWING / [PLAN OF] BRIDGE NO. A60 / SCHOOL ST. [PLAN & PROFILE ALONG CENTER OF STREET].	1911/05/00	H 1/8"=1', V 1/4"=1'	H 81, W 106 CM	BLUEPRINT, INK, GRAPHITE,	PAPER
C-141-030-D	BOSTON & MAINE R. R. / SOUTHERN DIV. MAINE LINE / [PLAN OF] BRIDGE NO. A60 / SCHOOL ST. [GIVING DETAILS OF THE STEEL CONSTRUCTION].	1911/05/00	3/4"=1'	H 81.1, W 106 CM	BLUEPRINT, INK, GRAPHITE, COLORED PENCIL	PAPER
C-141-030-E	PLAN SHOWING / LAND OF / PROPS. LOCKS & CANALS ON MERRIMACK RIVER / AFFECTED BY THE RAISING OF THE / GRADE AT SCHOOL ST. [-LOTS 5, 6, 15, 16, 17].	1911/12/00	1"=40'	H 45.4, W 102.6 CM	BLUEPRINT, INK	PAPER

C-141-030-F	[PLAN OF] RETAINING WALL AT SCHOOL ST. GRADE CROSSING.	1912/12/05	NONE	H 56.9, W 54.9 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-031-A	[UNTITLED PLAN.] [PLAN OF C.M.A.C. BUILDING ON MOODY ST., LOWELL SHOWING WEST ELEVATION].	UNDATED	NONE	H 55.1, W 39.7 CM	BLUEPRINT, INK	PAPER
C-141-031-B	[UNTITLED PLAN.] [PLAN OF C.M.A.C. BUILDING ON MOODY ST., LOWELL SHOWING EAST ELEVATION.]	UNDATED	NONE	H 60.3, W 44.7 CM	BLUEPRINT, INK	PAPER
C-141-032-A	[PLAN &] SCHEME FOR / ELEVATED COAL TRACK / FOR / E.A. WILSON & CO. [NEAR BROADWAY ST. & PAWTUCKET CANAL.]	1912/02/00	1"=20'	H 84.8, W 113.9 CM	BLUEPRINT,INK	PAPER
C-141-033-A	[PLAN OF] IRON GATE & POSTS / BUILDING [ON MERRIMACK ST.] FOR COURIER CITIZEN CO. / LOWELL MASS.	1924/08/15	1"=1'	H 90.9, W 106.3 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
C-141-034-A	PLAN SHOWING / PROPOSED SIDE TRACK / ALONG SOUTHERLY SIDE OF PAWTUCKET / CANAL FROM NASHUA & LOWELL R. R. TO SCHOOL ST.	1923/01/30	1"=40'	H 44, W 90.7 CM	INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-141-035-A	SKETCH / SHOWING LOCATION / OF CERTAIN / BRANCH TRACKS / IN LOWELL & SOME SUGGESTED ARRANGEMENTS / OF TRACKS IN CASE THE PRESENT LOCATION OF THE TRACK IN MOODY ST. IS CHANGED.	1881/07/00	1"=40'	H 109, W 252.7 CM	INK, GRAPHITE, COLORED INK, WATER COLOR	DRAFTING CLOTH

C-141-035-B	[UNTITLED PLAN.] [PLAN OF R.R. BRANCH TRACKS ABOUT THORNDIKE ST. COMMENCING WITH THE SWITCH ON WESTERN AVE. & INCLUDING THOSE WHICH RUN BY THE SACO-LOWELL SHOP & ALONG THE HAMILTON CANAL].	1926/03/22	1"=40'	H 91.8, W 92 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-035-C	PLAN SHOWING / RAILROAD CURVES / AT THE FOOT OF DUTTON ST. NEAR MERRIMACK MILLS.	1902/04/11	1"=10'	H 49.4, W 72.7 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-141-035-D	B. & M. R. R. SOUTHERN DIV. / PLAN SHOWING PROPOSED / CHANGES IN TRACK AT FOOT OF DUTTON ST. / FOR MERRIMACK MANUFACTURING CO. / LOWELL, MASS.	1902/04/00	1"=10'	H 55.7, W 62.9 CM	BLUEPRINT, COLORED INK, INK, GRAPHITE	PAPER
C-141-035-E	PLAN & SECTION / SHOWING / PROPOSED WIDENING OF R. R. BRIDGE / OVER / MERRIMACK CANAL NEAR MERRIMACK MILLS [AS AUTHORIZED BY AN INDENTURE BETWEEN PROPS. LOCKS & CANALS & BOSTON & MAINE R.R. DATED-1902].	UNDATED	1"=10'	H 64.5, W 76.2 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-035-G	[PLAN FOR EASING CURVE AT] WEST END OF TREMONT & SUFFOLK TRACK / [ON] DUTTON ST. / LOWELL, MASS.	1908/01/00	1"=20'	H 44.4, W 73.9 CM	BLUEPRINT, INK, COLORED INK, GRAPHITE	PAPER
C-141-035-H	B. & M. R. R. SOUTHERN DIV. / CHANGES IN TRACKS AT END OF DUTTON ST. / NEAR MERRIMACK MANUFACTURING CO. / LOWELL, MASS.	1908/01/00	1"=20'	H 47.3, W 75.6 CM	BLUEPRINT, INK, COLORED PENCIL, GRAPHITE	PAPER

C-141-035-I	CHANGES IN TRACKS BETWEEN BOOTT MILLS / & MERRIMACK MFG. CO. / LOWELL, MASS. [BOSTON & MAINE R. R., SOUTHERN DIVISION].	SEE NOTES	1"=20'	H 44.1, W 73.9 CM	BLUEPRINT, INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-141-035-J	COPY / BOSTON & MAINE RAILROAD / SOUTHERN DIVISION-LOWELL YARD / [PLAN OF] TRACKS & BUILDINGS / SACO-LOWELL SHOPS / JACKSON STREET / LOWELL.	1917/06/11	1"=20'	H 51.1, W 64.3 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-035-K	STUDY PLAN / OF / RAILROAD CURVES / NEAR / TREMONT & SUFFOLK MILLS.	1917/07/11	1"=40'	H 64.8, W 40 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-035-K-[COPY 1]	STUDY PLAN / OF / RAILROAD CURVES / NEAR / TREMONT & SUFFOLK MILLS.	1917/07/11	1"=40'	H 64.3, W 39.8 CM	BLUEPRINT, INK	PAPER
C-141-035-L	BOSTON & MAINE RAILROAD / SOUTHERN DIVISION, LOWELL MILL TRACKS / EASEMENT OF CURVATURE / DUTTON ST. TO BOOTT MILLS / LOWELL, MASS.	SEE NOTES	1"=20'	H 33.5, W 108 CM	BLUEPRINT, INK, GRAPHITE	PAPER
C-141-035-M	BOSTON & MAINE R.R. / SOUTHERN DIVISION LOWELL SIDE TRACKS / VALUATION SECTION NO. 342 / [AT FOOT OF] MERRIMACK CANAL [NEAR MILL] / PLAN & DETAILS.	1917/07/24	SEE NOTES	H 60.4, W 110.8 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER

C-141-035-N	PROPOSED CHANGES IN / BRANCH TRACKS / NEAR BOOTT STORE HOUSE / LOWELL, MASS.	1917/08/00	1"=20'	H 55.7, W 62.9 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	TRACING PAPER
C-141-035-O	PROPOSED CHANGES IN / BRANCH TRACKS / DUTTON ST. / LOWELL, MASS.	1917/08/00	1"=20'	H 47.9, W 58 CM	INK, COLORED INK, GRAPHITE, WATER COLOR, COLORED PENCIL	TRACING PAPER
C-141-035-P	[PLAN OF] PROPOSED CHANGES IN / BRANCH TRACKS / [ON] TILDEN & TREMONT STS. [SUBSTITUTING 166' RADII CURVES FOR PRESENT ONES.] / LOWELL MASS.	1917/08/00	1"=40'	H 92.1, W 65.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-035-Q	[PLAN OF] PROPOSED CHANGES IN / BRANCH TRACKS / AT FOOT OF DUTTON ST. / LOWELL, MASS. [OVER MERRIMACK CANAL SHOWING THE SUBSTITUTION OF CURVES WITH 120' & 166' RADII FOR PRESENT CURVES. DATA RELATIVE TO 166' CURVES ADDED AUGUST 30, 1917.]	1917/08/00	1"=20'	H 39.6, W 74.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-141-035-R	PLAN SHOWING / RAILROAD TRACKS / IN JACKSON STREET / LOWELL MASS. [INDICATING AGREEMENTS FIXING THE RIGHT OF WAY].	1917/08/00	1"=50'	H 57, W 144 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER

C-141-035-S	[PLAN OF] PROPOSED CHANGES IN / BRANCH TRACKS / AT FOOT OF DUTTON ST. / LOWELL, MASS. / SHOWING CHOICE OF THREE.	1917/09/10	1"=20'	H 62.3, W 104.2 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	DRAFTING CLOTH
C-141-035-T	[PLAN OF] PROPOSED CHANGES IN / BRANCH TRACKS / AT FOOT OF DUTTON ST. / LOWELL, MASS.	1917/09/19	1"=20'	H 56.6, W 90.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-035-U	[PLAN SHOWING A PORTION OF THE BRANCH TRACK LOCATIONS CLAIMED BY THE BOSTON & LOWELL R. R. IN ITS FILING OF MARCH 23, 1883.]	1917/11/03	1"=50'			TP
C-141-035-V	PLAN NO.1 / PROPOSED CHANGES IN R. R. [BRANCH] TRACKS [AT DUTTON ST., BELOW YORICK CLUB, SHOWING LAND GRANTED FOR NEW LOCATION OF TRACK].	1918/01/00	1"=20'	H 39, W 55.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-035-W	PLAN NO. 2 / PROPOSED CHANGES IN R.R. [BRANCH] TRACKS [AT FOOT OF DUTTON ST. SHOWING LAND GRANTED FOR NEW LOCATION OF TRACK].	1918/01/00	1"=20'	H 37, W 53.2 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-141-035-X	PLAN NO. 3 / PROPOSED CHANGE IN R.R. [BRANCH] TRACKS / [NEAR BOOTT STOREHOUSE SHOWING LAND GRANTED FOR NEW LOCATION OF TRACK & ALSO ADDITIONAL TRACKS FOR LOADING REQUESTED BY THE MASTER MECHANIC OF THE BOOTT MILLS] LOWELL, MASS.	1918/01/00	1"=20'	H 34, W 48.3 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER

C-141-035-Y	PLAN NO. 4 / PROPOSED CHANGES IN R.R. [BRANCH] TRACKS / [ON TILDEN & TREMONT STS. SHOWING THE PROPERTY RIGHTS OF WAY] LOWELL, MASS.	1918/01/00	1"=40'	H 47.2, W 63.8 CM	INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-035-Z	PLAN NO. 5 / PROPOSED CHANGES IN R. R. [BRANCH] TRACKS [ON TREMONT ST. SHOWING NEW LOCATION & 1883 R.R. LOCATION].	1918/01/00	1"=40'	H 36, W 25.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-141-036-A-01	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL, MASS. / ADDITION OF SMOKEHOUSE.	1905/02/00	1"& 3/4"=1'	H 44.9, W 93 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-03	[UNTITLED PLAN. SEE NOTES.] [PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.]	UNDATED	1/4"=1'	H 53, W 92 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-04	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MECHANICAL REFRIGERATION / MORRIS & COMPANY / LOWELL, MASS. / FIRST FLOOR PLAN.	1925/02/19	1/4"=1'	H 33.4, W 99 CM	GRAPHITE	TRACING PAPER
C-141-036-A-05	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL, MASS . / ADDITION OF SMOKEHOUSE.	UNDATED	1"=4'	H 58.5, W 96.2 CM	INK, GRAPHITE	DRAFTING CLOTH

C-141-036-A-06	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] SECOND STORY.	UNDATED	1/4"=1'	H 45.5, W 90.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-07	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL, MASS. / ADDITION OF SMOKEHOUSE.	1905/02/00	1/4"=1'	H 36.5, W 76.8 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-08	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] LONGITUDINAL SECTION.	UNDATED	1/4"=1'	H 36.8, W 89 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-09	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] DIAGRAM OF BEAMS / FOR MEAT MARKET / NELSON MORRIS & CO. / AT LOWELL, MASS.	UNDATED	NONE	H 55.2, W 95.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-10	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL, MASS. / ADDITION OF SMOKEHOUSE.	1905/02/00	NONE	H 45.4, W 90.4 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-11	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MECHANICAL REFRIGERATION / MORRIS & COMPANY / LOWELL, MASS. / SECOND FLOOR PLAN.	1925/02/02	1/4"=1'	H 53.8, W 99.6 CM	GRAPHITE	TRACING PAPER

C-141-036-A-12	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MECHANICAL REFRIGERATION / MORRIS & COMPANY / LOWELL, MASS.	1925/02/02	NONE	H 53.9, W 101.8 CM	GRAPHITE	TRACING PAPER
C-141-036-A-13	[UNTITLED PLAN. SEE NOTES.] [PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.]	UNDATED	1/4"=1'	H 43.7, W 51.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-14	[UNTITLED PLAN. SEE NOTES.] [PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.]	UNDATED	1/4"=1'	H 41.8, W 50.8 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-15	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] REFRIGERATOR WAREHOUSE / FOR NELSON MORRIS & CO. / AT LOWELL, MASS.	UNDATED	1/4"=1'	H 50.8, W 39.4 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-16	[UNTITLED PLAN. SEE NOTES.] [PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.]	UNDATED	1/4"=1'	H 42.3, W 40 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-17	[UNTITLED PLAN. SEE NOTES.] [PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.]	UNDATED	1/4"=1'	H 50.8, W 35.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-141-036-A-18	[UNTITLED PLAN. SEE NOTES.] [PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.]	UNDATED	1/4"=1'	H 42.5, W 40 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-19	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL MASS. / ADDITION OF SMOKE HOUSE / CAST IRON WORK / MORRIS & CO.	1905/02/00	1"=1'	H 46.1, W 74.3 CM	INK, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-141-036-A-20	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL, MASS. / ADDITION OF SMOKE HOUSE / MORRIS & CO.	1905/02/00	1/4"=1'	H 48.2, W 89.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-21	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] NORTHWEST ELEVATION.	UNDATED	1/4"=1'	H 40.4, W 91.3 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-22	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] NELSON MORRIS & CO. / DRESSED BEEF, PORK, MUTTON. / LARD & PROVISIONS.	UNDATED	1/4"=1'	H 42.2, W 93.2 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-036-A-23	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] MARKET AT LOWELL, MASS. / ADDITION OF SMOKEHOUSE / WROUGHT IRON WORK / MORRIS & CO.	1905/02/00	1/2" & 1"=1'	H 53.6, W 91.4 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

C-141-036-A-24	[PLANS OF CONSTRUCTION OF NELSON MORRIS BLDG. OVER PAWTUCKET CANAL ON FLETCHER ST.] DETAILS OF INSULATION.	UNDATED	1 1/2"=1'	H 31.5, W 62.2 CM	INK, GRAPHITE	DRAFTING CLOTH
C-141-037	PLAN & REAR ELEVATION / OF / MOTLEY PLATFORM & BUILDING / OVER PAWTUCKET CANAL.	1932/11/02	1"=10'	H 38.7, W 86.5 CM	INK, COLORED INK	DRAFTING CLOTH
C-141-037-A	PLAN & REAR ELEVATION / OF / MOTLEY PLATFORM & BUILDING / OVER / PAWTUCKET CANAL.	1932/11/02	1"=10'	H 38.5, W 85.6 CM	BLUEPRINT, INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-141-038	ALTERATION TO CANAL BLOCK / 115-131 CENTRAL ST. LOWELL / FIRST FLOOR PLAN.	UNDATED	1/4"=1'	H 61.6, W 89.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-141-038-A	ALTERATION TO CANAL BLOCK / 115-131 CENTRAL ST. LOWELL / SECOND FLOOR PLAN.	1918/00/00	1/4"=1'	H 63.6, W 90.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-141-039	MOTLEY PLATFORM OVER / PAWTUCKET CANAL AT CENTRAL ST.	1918/05/29	NONE	H 56.1, W 91.9 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-141-040	PLAN SHOWING / SIDE TRACKS [ON SOUTHERLY SIDE OF PAWTUCKET CANAL FROM NASHUA & LOWELL RAILROAD TO SCHOOL STREET] / SERVING SACO-LOWELL SHOPS / & / PRATT & FORREST CO.	1940/05/03	1"=40'	H 41.1, W 95.9 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-141-041	CROSS SECTION OF / PAWTUCKET STREET BRIDGE / SHOWING / PROPOSED REPAIRS.	1948/05/00	3/8"=1'	H 27.9, W 48.2 CM	INK, COLORED INK	TRACING PAPER

C-141-041	[UNTITLED PLAN, SEE NOTES.]	UNDATED	1"=20'	H 27.9, W 21.6 CM	INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-141-042	PROPERTY PLAN OF THE MOTLEY-DUNBAR PLATFORM / BELONGING TO PROPRIETORS OF THE LOCKS & CANALS ON / MERRIMACK RIVER.	1953/12/15	1"=20'	H 29.5, W 34.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-141-043	PLAN SHOWING / MOTLEY-DUNBAR PLATFORM / & / SURROUNDING PROPERTIES.	1951/01/10	1"=20'	H 45.5, W 52.6 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-141-044	FIRST FLOOR PLAN / MOTLEY & DUNBAR BLDG.	1951/03/15	1/4"=1'	H 55.2, W 77.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-045	SECOND FLOOR PLAN / MOTLEY & DUNBAR BLDG. / LOWELL, MASS.	1951/03/15	1/4"=1'	H 55.1, W 76.9 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-141-046	COPIED FROM LAND COURT PLAN / CERTIFICATE TITLE NO. 6867 / & SHOWING / MOTLEY DUNBAR-MASON PROPERTY / RELATING TO LEASE OF MAY 7, 1947.	1951/09/18	1"=20'	H 28, W 21.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-142-001-A-[A]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 65, W 80.5 CM	LITHOGRAPH, WATER COLOR	PAPER
C-142-001-A-[B]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 68.6, W 83.2 CM	LITHOGRAPH, COLORED PENCIL	CLOTH BACKED PAPER

C-142-001-A-[C]-[COPY 1]-[A]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 64.5, W 80 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-142-001-A-[C]-[COPY 1]-[B]	SUNDRY PIECES OF LAND ACQUIRED BY P.L.& C. IN 1826, SOME OF WHICH ARE / SHOWN ON FARMS PLAN IN TOWN OF CHELMSFORD, 1821.	1950/05/00	NONE	H 28.3, W 21.9 CM	INK	PAPER
C-142-001-A-[C]-[COPY 2]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 62.5, W 77 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-142-001-A-[COPY 01]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 66, W 81 CM	LITHOGRAPH	PAPER
C-142-001-A-[COPY 02]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 66, W 79 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-142-001-A-[COPY 03]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 65, W 78 CM	INK	DRAFTING CLOTH
C-142-001-A-[COPY 04]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/16"=50'	H 66, W 81 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-142-001-A-[COPY 05]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF CHELMSFORD.	1871/11/00	3/16"=50'	H 62.3, W 76.6 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-142-001-A-[COPY 06]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF CHELMSFORD.	1871/11/00	3/16"=50'	H 62.3, W 80 CM	LITHOGRAPH	CLOTH BACKED PAPER

C-142-001-A-[COPY 07]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF CHELMSFORD.	1871/11/00	3/16"=50'	H 62.8, W 77.5 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-142-001-B	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD [WITH OLD LANDMARKS SHOWN IN RED.]	1923/04/00	1/8"=50'	H 68.2, W 80.7 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-142-001-C	[PLAN OF LOWELL SHOWING ASSESSORS'] CORPORATION VALUATIONS FROM 1901 TO 1911, INDICATING CHANGES.	SEE TITLE	NONE	H 83.5, W 106.7 CM	INK, WATER COLOR	PAPER
C-142-001-D	[PLAN OF THE CITY OF LOWELL GIVING A RECORD OF DISCLAIMERS &] PUBLIC NOTICES [SENT, TO 1908].	1904/00/00	1"=250'	H 83.6, W 143 CM	INK, WATER COLOR	PAPER
C-142-001-E	PLAN OF LOWELL / SHOWING MISCELLANEOUS / NOTICES [LAND BELONGING TO L.& C. AS DETERMINED BY VARIOUS PUBLIC STATUTES].	1882/00/00	1"=250'	H 83.6, W 143 CM	INK, WATER COLOR	PAPER
C-142-001-F	[PLAN OF LOWELL GIVING A RECORD] INDEX OF DISCLAIMERS [& SIMILAR AGREEMENTS TO L.& C. THROUGH 1903].	SEE TITLE	1"=250'	H 84.1, W 141.7 CM	BLUEPRINT, INK	PAPER
C-142-001-G	[MAP OF THE CITY OF] LOWELL MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS [& ALSO SHOWING POINTS OF SIGNIFICANCE FOR THE PROPS., LOCKS & CANALS].	1912/07/00	1"=250'	H 77.5, W 102.6 CM	LITHOGRAPH, WATER COLOR	PAPER

C-142-001-H	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS.	1912/07/00	3/16"=50'	H 77.5, W 104.2 CM	LITHOGRAPH, WATER COLOR	PAPER
C-142-001-I	[MAP OF CITY OF] LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS / INDICATING DIRECTION OF WATER FLOW IN CANALS.	1912/07/00	1"=250'	H 77.2, W 103.8 CM	LITHOGRAPH, COLORED INK	PAPER
C-142-001-J-[COPY 1]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD [WITH THE PRESENT CITY OF LOWELL SUPERIMPOSED].	1923/03/29	3/16"=50'	H 56.4, W 72.5 CM	PHOTOGRAPH	PAPER
C-142-001-J-[COPY 2]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD [WITH THE PRESEMT CITY OF LOWELL SUPERIMPOSED].	1871/11/00	3/16"=50'	H 56.4, W 68.6 CM	PHOTOGRAPH	PAPER
C-142-001-K	PLAN / OF THE TOWN OF / LOWELL / AND / BELVIDERE VILLAGE, TAKEN BY MEASUREMENT / BY / BENJ. MATHER.	1832/00/00	NONE	H 61, W 82.5 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-142-001-L	[PLAN OF] CITY LOWELL [SHOWING NOTICES GIVEN TO THE BOSTON & LOWELL RAILROAD.]	UNDATED	1/2"=500'	H 50.8, W 72.8 CM	LITHOGRAPH	PAPER
C-142-002	SKETCH SHOWING / THREE LOTS OF LAND LEASED TO BOSTON / & LOWELL R.R. CORP. BY PROP. OF LOCKS / & CANALS.	1918/03/11	1"=50'	H 35.2, W 37.5 CM	INK, WATER COLOR, COLORED PENCIL	PAPER
C-142-003	[MEMO PLAN OF LAND BELONGING TO PROPS., LOCKS & CANALS ABOUT THORNDIKE ST.]	1920/01/12	1"=50'			

C-142-003-[A]	MEMO PLAN OF / LAND BELONGING TO / PROPS. LOCKS & CANALS [ABOUT THORNDIKE ST.].	1931/03/00	1"=50'	H 38.7, W 28.7 CM	BLUEPRINT	PAPER
C-142-004	PLAN SHOWING LAND / PROPOSED TO BE LEASED TO / DAVID ZISKIND.	1921/02/04	1"=50'	H 31.3, W 39.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-142-005	PLAN OF LAND / BELONGING TO / PROPS. OF LOCKS & CANALS / LOWELL, MASS. [BETWEEN PAWTUCKET CANAL & PAYNE ST. WITH ANGLES & DISTANCES OF OUTSIDE BOUNDARIES ADDED.]	1921/08/00	1"=40'	H 41.3, W 64.8 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-006	[UNTITLED PLAN.] [PLAN OF LOT # 4 WITH BOUNDARY DETAILS ADDED.]	1923/10/10	1"=40'	H 28.6, W 62.9 CM	INK	DRAFTING CLOTH
C-142-007	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN PAWTUCKET CANAL & PEVEY ST. BELONGING TO PROPS., LOCKS & CANALS.]	1920/03/10	1"=50'	H 61.3, W 91.4 CM	BLUEPRINT	PAPER
C-142-008	PLAN SHOWING / LAND DEDICATED FOR A ST. / BY / PROPS. LOCKS & CANALS / & / LOWELL LIGHT CO. [NEAR PAWTUCKET CANAL, WEST OF SCHOOL ST.]	1908/10/30	1"=100'	H 21.6, W 35 CM	INK, COLORED INK, WATER COLOR	PAPER
C-142-009	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / WESTERLY OF / SCHOOL ST., LOWELL, MASS. [SHOWING ONE FOOT CONTOURS.]	1906/03/00	1"=50'	H 52.1, W 92.9 CM	INK, COLORED INK, WATER COLOR	PAPER
C-142-010	PLAN SHOWING / LAND BELONGING TO / PROPS. OF LOCKS & CANALS / SOUTHERLY OF / BROADWAY.	1920/03/03	1"=40'	H 37.9, W 65.2 CM	INK, COLORED INK, WATER COLOR	PAPER

C-142-010-[A]	PLAN SHOWING / LAND BELONGING TO / PROPS. OF LOCKS & CANALS / SOUTHERLY OF / BROADWAY.	1920/03/03	1"=40'	H 37.6, W 64.8 CM	BLUEPRINT	PAPER
C-142-011	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / ALONG SOUTHERLY SIDE OF PAWTUCKET / CANAL FROM PAWTUCKET ST. TO / NASHUA & LOWELL R. R.	1906/02/00	1"=40'	H 60.4, W 186 CM	INK, WATER COLOR	PAPER
C-142-012	PLAN OF LAND / ADJACENT TO PAWTUCKET CANAL / BETWEEN / MERRIMACK RIVER & BROADWAY / OWNED BY / PROPS. LOCKS & CANALS / LOWELL, MASS. [EMBRACING FEATURES PROPOSED TO BE GRANTED TO LOWELL ELECTRIC LIGHT CORP.]	1920/03/03	1"=40'	H 69.2, W 125.1 CM	INK, COLORED INK, WATER COLOR	PAPER
C-142-013	PLAN OF LAND / BELONGING TO / PROPS., LOCKS & CANALS / LOWELL, MASS. / SHOWING CONTOURS OF THE LAND [ADJACENT TO THE PAWTUCKET CANAL NORTH OF BROADWAY. THE PLAN ALSO SHOWS PROPOSED LOCATION OF BRIDGES ACROSS PAWTUCKET CANAL.]	1920/08/00	1"=150'	H 30.5, W 57.5 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-014	PLAN SHOWING / LAND BELONGING TO PROPS. LOCKS & CANALS / AVAILABLE FOR BUILDING DWELLING HOUSES / TOGETHER WITH SUGGESTIONS FOR SEWERS.	1918/08/00	1"=40'	H 72.4, W 141.3 CM	INK, WATER COLOR	PAPER

C-142-015	[PLAN OF] LAND [ADJACENT TO PAWTUCKET CANAL BETWEEN BROADWAY & SCHOOL ST. INCLUDING LOTS #6, 7, 14, 15, 16, 17, & SHOWING PROPOSED NEW R.R. TRACK FOR LOWELL ELECTRIC LIGHT CORPORATION.] OF / PROPS. LOCKS & CANALS / LOWELL, MASS.	1920/03/00	1"=40'	H 48.3, W 70.8 CM	INK, WATER COLOR	DRAFTING CLOTH
C-142-016	PLAN OF LAND LEASED TO / E.A. WILSON & OTHERS BY P.L.& C. [& WITH FIGURES IN RED SHOWING ELEVATIONS EXISTING DEC. 18, 1920.]	1895/08/00	1"=20'	H 69.2, W 105.8 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-017	PLAN OF LAND / CONVEYED TO / E. A. WILSON CO.	1922/12/00	1"=40'	H 22.3, W 44.1 CM	INK	DRAFTING CLOTH
C-142-018	PLAN OF / SUNDRY LOTS OF LAND / BELONGING TO / PROPS. LOCKS & CANALS [SHOWING DATA PERTAINING TO LEASES.]	1920/08/00	1"=40'	H 28.3, W 74.3 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-142-019	PLAN SHOWING / PREMISES LEASED TO / OTIS ALLEN & SON CO.	1924/01/02	1"=40'	H 23.5, W 40.3 CM	INK, WATER COLOR	DRAFTING CLOTH
C-142-020	[PLAN OF LAND BETWEEN PAWTUCKET CANAL & WESTERN AVE. SHOWING SECTION LEASED TO BOSTON & MAINE R.R.]. LOWELL MASS.	1923/02/06	1"=100'	H 21, W 67 CM	INK, GRAPHITE	DRAFTING CLOTH
C-142-021-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / SACO-LOWELL SHOPS / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=100'	H 56.3, W 71.5 CM	INK, WATER COLOR	PAPER
C-142-021-[COPY 2]	PLAN SHOWING / AREAS LEASED TO / SACO-LOWELL SHOPS / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=100'	H 56.3, W 71.5 CM	INK, WATER COLOR	PAPER
C-142-022	[UNTITLED PLAN.] [PLAN OF LOT LEASED TO ERNEST B. GENEST.]	1924/01/02	1"=10'	H 45.5, W 39 CM	INK, WATER COLOR	DRAFTING CLOTH

C-142-023	PLAN OF / CERTAIN PREMISES AT / LOWELL, MASS. / WHERE PROPS. LOCKS & CANALS & B. & M. R. R. HAVE INTERESTS.	1917/03/00	1"=20'	H 21, W 52.5 CM	BLUEPRINT	PAPER
C-142-024	[UNTITLED PLAN.] [PLAN OF LAND ADJACENT TO NORTHERN CANAL NEAR MOODY ST. SHOWING LAND LEASED TO CITY OF LOWELL].	UNDATED	1"=50'	H 20, W 33 CM	BLUEPRINT	PAPER
C-142-025	[PLAN OF LAND ABOUT MELVIN ST. SHOWING LOT # 31-C WITH ONE FOOT CONTOURS] LOWELL, MASS.	1917/10/10	1"=20'	H 60.6, W 82.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-142-026	MEMORANDUM PLAN / OF LAND [NORTH OF PERKINS ST.] BELONGING TO PROPS. LOCKS & CANALS / LOWELL, MASS.	1922/08/00	1"=100'	H 47.6, W 69.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-142-027	PLAN / SHOWING BUILDINGS TO / D. H. LAPORTE WHICH ARE ON LAND OF PROPS. LOCKS & CANALS IN "LITTLE CANADA" LOWELL.	1911/01/02	1"=20'	H 41.7, W 50.5 CM	BLUEPRINT	PAPER
C-142-028	LAND IN VICINITY OF CHEEVER / PERKINS & AIKEN STS. LOWELL.	1922/06/00	1"=50'	H 55, W 60 CM	INK, GRAPHITE	DRAFTING CLOTH
C-142-029	PLAN OF LAND / CONVEYED BY / PROPS. OF THE LOCKS & CANALS / ON MERRIMACK RIVER / TO HELENE GELINAS.	1923/05/25	1"=50'	H 34.9, W 21.6 CM	BLUEPRINT	PAPER
C-142-030	PLAN OF LAND IN / LOWELL MASS. / BELONGING TO / PROPS. LOCKS & CANALS ON MERRIMACK RIVER [BETWEEN PAWTUCKET & AIKEN STS. NEAR THE MERRIMACK RIVER SHOWING LAND LEASED TO THE CITY OF LOWELL FOR PARK & PLAYGROUND.].	1910/08/00	1"=50'	H 62, W 96.5 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER

C-142-031	PLAN SHOWING / AREAS LEASED TO / TREMONT & SUFFOLK MILLS / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=40'	H 41.7, W 75 CM	INK, WATER COLOR	TRACING PAPER
C-142-031-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / TREMONT & SUFFOLK MILLS / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 65, W 71 CM	PHOTOCOPY, WATERCOLOR	PAPER
C-142-031-[COPY 2]	PLAN SHOWING / AREAS LEASED TO / TREMONT & SUFFOLK MILLS / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 65, W 71 CM	PHOTOCOPY, WATERCOLOR	PAPER
C-142-032	DETERMINATION OF LINES OF LOT OF LAND / BELONGING TO PROPS. LOCKS & CANALS AT COR- / NER OF DUMMER STREET & BROADWAY.	1915/05/01	1"=40'	H 57.5, W 42.3 CM	INK, COLORED INK	TRACING PAPER
C-142-033	PLAN SHOWING / CERTAIN PREMISES [ALONG DUTTON ST.] REFERRED TO INDENTURES / BETWEEN / PROPS. LOCKS & CANALS ON MERRIMACK RIVER / BOSTON & LOWELL R. R. CORPORATION.	1906/00/00	1"=50'	H 24.2, W 102.2 CM	BLUEPRINT	PAPER
C-142-034	PLAN SHOWING / PROPERTY LINES / ON THE SOUTH-EASTERLY SIDE OF / MERRIMACK CANAL / FROM / MARKET STREET TO SWAMP LOCKS DAM / & PARTICULARLY THE DIVIDING LINE / BETWEEN TERRITORY OF THE / PROPS. LOCKS & CANALS ON MERR. RIVER / & THE / LOWELL MACHINE SHOP.	1905/11/24	1"=20'	H 21.7, W 163.9 CM	BLUEPRINT	PAPER
C-142-035	PLAN SHOWING / AREAS LEASED TO / LAWRENCE MFG. CO. / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=50'	H 53.5, W 77.8 CM	INK, WATER COLOR	PAPER
C-142-035-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / LAWRENCE MFG. CO. / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=50'	H 55.8, W 71 CM	INK, WATER COLOR	PAPER

C-142-036	PLAN SHOWING / AREAS LEASED TO / MERRIMACK MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 40.3, W 48.2 CM	INK, WATER COLOR	TRACING PAPER
C-142-036-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / MERRIMACK MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 56, W 71.4 CM	PHOTOCOPY, INK, WATER COLOR	PAPER
C-142-036-[COPY 2]	PLAN SHOWING / AREAS LEASED TO / MERRIMACK MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 56, W 71.4 CM	PHOTOCOPY, INK, WATER COLOR	PAPER
C-142-037	PLAN SHOWING / AREAS LEASED TO / BOOTT MILLS / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=50'	H 43.2, W 62.3 CM	INK, WATER COLOR	PAPER
C-142-037-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / BOOTT MILLS / BY / PROPS. LOCKS & CANALS.	1919/01/00	1"=50'	H 56, W 71.4 CM	INK, WATER COLOR	PAPER
C-142-038	PLAN SHOWING / AREAS LEASED TO / APPLETON COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 39.1, W 69.6 CM	INK, WATER COLOR	TRACING PAPER
C-142-038-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / APPLETON COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 65, W 71 CM	PHOTOCOPY, WATER COLOR	PAPER
C-142-038-[COPY 2]	PLAN SHOWING / AREAS LEASED TO / APPLETON COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 56, W 71.2 CM	PHOTOCOPY, INK, WARERCOLOR	PAPER
C-142-038-[COPY 3]	PLAN SHOWING / AREAS LEASED TO / APPLETON COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 56, W 71.3 CM	PHOTOCOPY, INK, WATERCOLOR	PAPER
C-142-038-[COPY 4]	PLAN SHOWING / AREAS LEASED TO / APPLETON COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 56, W 71.3 CM	PHOTOCOPY, INK, WATERCOLOR	PAPER

C-142-039	PLAN SHOWING / AREAS LEASED TO / HAMILTON MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=50'	H 56.1, W 71.5 CM	INK, WATER COLOR	TRACING PAPER
C-142-039-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / HAMILTON MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=50'	H 65, W 71 CM	PHOTOCOPY, WATERCOLOR	PAPER
C-142-039-[COPY 2]	PLAN SHOWING / AREAS LEASED TO / HAMILTON MFG. CO. / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=50'	H 65, W 71 CM	PHOTOCOPY, WATERCOLOR	PAPER
C-142-040	PLAN OF PREMISES ON / CENTRAL STREET / NEAR / PAWTUCKET CANAL / LOWELL, MASS.	1917/03/00	1"=20'	H 50.8, W 89.5 CM	INK, WATER COLOR	TRACING PAPER
C-142-041	PLAN SHOWING / AREAS LEASED TO / MIDDLESEX COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=20'	H 46.5, W 64.6 CM	INK, GRAPHITE	TRACING PAPER
C-142-041-[COPY 1]	PLAN SHOWING / AREAS LEASED TO / MIDDLESEX COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=20'	H 65, W 71 CM	PHOTOCOPY, WATERCOLOR	PAPER
C-142-041-[COPY 2]	PLAN SHOWING / AREAS LEASED TO / MIDDLESEX COMPANY / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=20'	H 65, W 71 CM	PHOTOCOPY, WATERCOLOR	PAPER
C-142-042	PLAN SHOWING / PROPERTY LINES / NEAR / LOWER LOCKS / BETWEEN TERRITORY OF THE / PROPS OF THE LOCKS & CANALS ON MERRIMACK RIVER / AND THE / MIDDLESEX COMPANY.	UNDATED	1"=20'	H 22.2, W 95.2 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-142-043	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN BRIDGE ST. & EASTERN CANAL SHOWING SOME CONVEYANCES TO THE MASSACHUSETTS MILLS & SHOWING THE LOCATION OF THE BOUNDARIES ALONG THE EASTERN CANAL.]	1923/08/16	1"=40'	H 29.6, W 55 CM	INK, WATER COLOR	DRAFTING CLOTH

C-142-043-[COPY 1]	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN BRIDGE ST. & EASTERN CANAL SHOWING SOME CONVEYANCES TO THE MASSACHUSETTS MILLS & SHOWING THE LOCATION OF THE BOUNDARIES ALONG THE EASTERN CANAL.]	1933/02/00	1"=40'	H 30.2, W 54.6 CM	BLUE LINE PRINT, INK, WATER COLOR	PAPER
C-142-044	PLAN SHOWING / AREAS / LEASED TO / MASS. COTTON MILLS / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 38.2, W 79.1 CM	INK	PAPER
C-142-044-[COPY 1]	PLAN SHOWING / AREAS / LEASED TO / MASS. COTTON MILLS / BY / PROPS LOCKS & CANALS.	1919/01/00	1"=40'	H 65, W 71 CM	INK	PAPER
C-142-045	PLAN OF LAND / CONVEYED TO / SACO-LOWELL SHOPS.	1922/12/00	1"=40'	H 37.2, W 24 CM	BLUEPRINT	PAPER
C-142-046	PLAN OF THE "KILLET" LOT (BEING THE LOT OF LAND ADJACENT TO EAST MERRIMACK ST. BRIDGE ON THE CONCORD RIVER). FROM A STEEL TAPE SURVEY BY W. E. BADGER.	SEE NOTES	1"=10'	H 36.3, W 54.8 CM	INK	PAPER
C-142-047	PLAN OF / A LOT OF LAND IN BELVIDERE KNOWN / AS THE KILLET LOT AND / BELONGING TO PROP'S LOCKS & CANALS.	1893/05/22	1"=10'	H 55.9, W 71.2 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-142-048	PLAN OF LAND IN LOWELL / BETWEEN / STACKPOLE & EAST MERRIMACK STREETS / AND / MERRIMACK RIVER / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS.	1908/04/06	1"=250'	H 27.3, W 54.3 CM	INK, COLORED INK, WATER COLOR	PAPER
C-142-049	MEMORANDUM PLAN / OF CERTAIN LOCKS & CANALS' LAND FOR SALE.	1921/07/00	1"=50'	H 29, W 42 CM	INK	DRAFTING CLOTH

C-142-050	PLAN OF / BELONGING TO / PROPS. LOCKS & CANALS ON MERR'K RIVER / LOWELL MASS. / SHOWING PRESENT & FUTURE POSSIBILITIES FOR / LAYING OUT BUILDING LOTS.	1920/09/00	1'=50'	H 50.5, W 92.4 CM	INK INK, COLORED	DRAFTING CLOTH
C-142-051	WORKING PLAN / [OF] LAND OF / PROPS., LOCKS & CANALS / LOWELL, MASS.	1919/05/00	1"=50'	H 43.1, W 125.4 CM	INK, WATER COLOR	DRAFTING CLOTH
C-142-052	PLAN / SHOWING PART OF / LONG ISLAND AND MERRIMACK RIVER / ABOVE / AIKEN ST. BRIDGE / FROM / SURVEY MADE JULY 1881.	1881/07/00	1"=40'	H 74, W 109 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
C-142-053	PLAN SHOWING LAND / CONVEYED TO / PROP. LOCKS & CANALS ON MERRIMACK RIVER / BY / FLORENCE HILDRETH NESMITH.	1915/04/00	1"=40'	H 44.9, W 81.3 CM	INK, WATER COLOR	PAPER
C-142-054	PLAN OF LAND / BELONGING TO / PROP., LOCKS & CANALS ON MERR'K RIVER / LOWELL, MASS. / SHOWING PRESENT & FUTURE POSSIBILITIES FOR LAYING OUT BUILDING LOTS.	1920/08/00	1"=50'	H 69.3, W 110 CM	INK INK, COLORED	DRAFTING CLOTH
C-142-055	PLAN SHOWING SOME ASSESSED VALUES OF LOCKS & CANALS LAND.	1915/02/09	1"=50'	H 70.5, W 106.8 CM	INK, WATER COLOR	PAPER

C-142-056	[PLAN OF THE] NORTHERN SHORE OF MERRIMACK [RIVER] AT LOWELL [BETWEEN AIKEN ST. & MOODY ST. BRIDGES SHOWING THE LOCATION OF A 30" IRON CONDUIT AS RUN ALONG BANK OF EITHER SIDE OF CONFLUENCE OF BEAVER BROOK.]	UNDATED	NONE	H 79, W 238 CM	INK	DRAFTING CLOTH
C-142-057	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / NEAR MOODY ST. EXTENSION, / LOWELL, MASS. / SHOWING SCHEME FOR DIVIDING THE LAND INTO HOUSE LOTS.	1895/08/00	1"=50'	H 77, W 109.5 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-058	PLAN GIVING DATA RELATIVE TO CERTAIN LAND BELONGING / TO PROPS. LOCKS & CANALS NEAR NORTH END OF PAWTUCKET BRIDGE / LOWELL, MASS.	1916/02/03	1"=50'	H 33, W 98.5 CM	INK, COLORED INK	TRACING PAPER
C-142-059	PLAN SHOWING / LAND / BELONGING TO / PROPS. LOCKS & CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1920/04/00	1"=50'	H 72.7, W 81.9 CM	INK	DRAFTING CLOTH
C-142-060	PLAN OF LAND / NEAR THE BUNT FISHERY / BELONGING TO THE PROPS. LOCKS AND CANALS / AND THE HENRY EMERY ESTATE.	1897/12/00	1"=40'	H 44.5, W 82.6 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-061	[PLAN OF PART OF FRYE LOT BETWEEN LAKEVIEW AVE. & LOWELL WATER WORKS CONDUIT, LOT # 106.]	1900/10/22	1"=20'			TP

C-142-062	PLAN / OF ESTATE OF / J. B. V. COBURN HEIRS / SHOWING / CONTOUR LINE 6 FEET ABOVE PAWTUCKET / DAM & AREA OF WATER BACKED UP IN / BROOK MAY 15, 1897 ABOUT 11-A.M.	1897/05/27	1"=80'	H 79, W 62.3 CM	BLUEPRINT	PAPER
C-142-063	PLAN OF LAND ON THE WESTERLY SIDE OF WATER STREET.	1885/12/04	1"=30'	H 55.5, W 91 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-142-064	CONTOUR MAP / SHOWING / SOUTH BANK OF MERRIMACK RIVER / BELOW / STACKPOLE STREET.	1914/06/00	1"=20'	H 57.2, W 103.5 CM	INK, COLORED INK	TRACING PAPER
C-142-065	PLAN OF / LAND IN LOWELL, MASS. / [BETWEEN CENTRAL & GORHAM STS.] BELONGING TO / MARTHA A. GLEASON ET AL.	1917/08/14	1"=10'	H 82.6, W 54 CM	INK	TRACING PAPER
C-142-066	PLAN OF A STRIP OF LAND SITUATED / BETWEEN THE BRICK WALLS OF THE AMERICAN / HOUSE STABLE & THE ENGINE HOUSE OF THE / CITY OF LOWELL ON THE NORTHERLY SIDE / OF WARREN ST.	1887/10/04	1"=4'	H 51.8, W 38.2 CM	BLUEPRINT	PAPER
C-142-067	PLAN OF LAND IN LOWELL, MASS., / BELONGING TO / HEIRS OF MARIA T. STEVENS [ON CENTRAL ST.].	1913/07/00	1"=10'	H 63, W 55.5 CM	BLUEPRINT	PAPER
C-142-068	[PLAN OF LAND IN LOWELL, MASS. BELONGING TO FREDERICK FANNING AYER ET AL NEAR CORNER OF CENTRAL & MARKET STS.]	1917/08/14	1"=20'			TP

C-142-069	PLAN OF LAND IN LOWELL, MASS. / [ON PRESCOTT ST.] BELONGING TO / FREDERICK FANNING AYER ET AL.	1917/07/14	1"=20'	H 55.3, W 82 CM	INK	TRACING PAPER
C-142-070	PLAN OF LAND IN LOWELL, MASS. [IN VICINITY OF CABOT & MOODY STS.] / BELONGING TO / JAMES VENTRE ET AL.	1923/12/31	1"=10'	H 37.2, W 52.1 CM	INK	DRAFTING CLOTH
C-142-071	PLAN OF PREMISES / ADJACENT TO / WESTERN CANAL / BETWEEN / MERRIMACK & MARKET STREETS.	1917/11/20	1"=20'	H 39.5, W 53 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-142-072	PLAN OF / THE LOCALITY AROUND THE / MERRIMACK STREET STATION / OF THE / BOSTON & LOWELL RAILROAD CORPORATION / LOWELL, MASS.	1906/01/00	1"=20'	H 56.2, W 89.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	TRACING PAPER
C-142-073	PLAN OF LAND / BETWEEN PAWTUCKET CANAL & DUTTON ST. COMPILED JANUARY 1899 TO SHOW THE SEVERAL / TRANSFERS & CONDITIONS RELATING TO THE SAME.	1899/01/01	1"=20'	H 55.6, W 106.7 CM	INK, COLORED INK, WATER COLOR	PAPER
C-142-074	SKETCH [OF LAND BETWEEN JACKSON, MIDDLESEX, KING & REVERE STREETS] SHOWING / BUILDINGS AS THEY EXISTED IN / 1888. THIS SKETCH WAS TRACED MARCH 4, 1914, FROM / PLAN IN CITY ENGINEER'S OFFICE.	1914/03/04	1"=50'	H 24.9, W 33.4 CM	INK, COLORED PENCIL	PAPER
C-142-075	[PLAN] SHOWING CONDITIONS EXISTING BETWEEN JACKSON, THORN- / DIKE & DUTTON STREETS.	1920/03/00	1"=50'	H 72.5, W 91.5 CM	INK, WATER COLOR	DRAFTING CLOTH

C-142-076	[UNTITLED PLAN.] [PLAN OF LAND ADJACENT TO PAWTUCKET CANAL NEAR THORNDIKE ST. SHOWING GRADES OF LAND ON SOUTHERLY SIDE OF CANAL.]	1902/01/24	1"=50'	H 54.3, W 105.7 CM	INK, WATER COLOR, COLORED INK	PAPER
C-142-077	PLAN OF LAND / IN THE VICINITY OF THE / UPPER FREE LANDING RECENTLY LEASED & SOLD BY / PROPRIETORS OF THE LOCKS & CANALS.	1900/03/29	1"=8'	H 75.5, W 167.6 CM	INK	TRACING PAPER
C-142-078	[PLAN OF LAND & BUILDINGS BETWEEN PAWTUCKET ST. & THE MERRIMACK RIVER ON THE SOUTHERLY SIDE OF THE PAWTUCKET CANAL.] SURVEYED FOR THE VESPER BOAT CLUB, JUNE 1879 / BY MELVIN B. SMITH, CIVIL ENGINEER / LOWELL, MASS.	1879/06/00	1"=20'	H 50, W 66.3 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-079	SKETCH OF / LOWELL MACHINE SHOP / MILL YARD [USED FOR COMPUTING AREAS FOR COMPARISON WITH THE CITY ENGINEER].	1901/05/00	1"=40'	H 59.7, W 77.2 CM	GRAPHITE, COLORED PENCIL	PAPER
C-142-080	PLAN OF / FORMER MILL YARD / OF THE / BIGELOW-HARTFORD CARPET COMPANY / SHOWING SUBDIVISIONS DUE TO SUNDRY SALES.	1920/02/13	1"=40'	H 65.5, W 103.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-142-080-[A]	PLAN OF / FORMER MILL YARD / OF THE / BIGELOW-HARTFORD CARPET COMPANY / SHOWING SUBDIVISIONS DUE TO SUNDRY SALES.	1920/02/13	1"=40'	H 64, W 100 CM	BLUEPRINT, COLORED PENCIL	PAPER

C-142-080-[B]	PLAN OF / FORMER MILL YARD / OF THE / BIGELOW-HARTFORD CARPET COMPANY / SHOWING SUBDIVISIONS DUE TO SUNDRY SALES.	1920/02/13	1"=40'	H 64, W 100 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-142-080-[C]	PLAN OF / FORMER MILL YARD / OF THE / BIGELOW-HARTFORD CARPET COMPANY / SHOWING SUBDIVISIONS DUE TO SUNDRY SALES.	1920/02/13	1"=40'	H 64, W 100 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-142-081	MISC. DATA / RELATING TO / BIGELOW-HARTFORD CARPET CO. / LOWELL, MASS.	1920/01/00	1"=40'	H 62.8, W 82.5 CM	BLUEPRINT	PAPER
C-142-082	PLAN OF / FORMER MILL YARD / OF THE BIGELOW-HARTFORD CARPET COMPANY / SHOWING SALES MADE BY E. MURRAY HOWE.	1920/00/00	1"=40'	H 62, W 93.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-142-083	SKETCH OF MILL YARD / OF THE / BIGELOW CARPET CO. / USED FOR COMPUTING AREA.	1901/07/22	1"=40'	H 50.8, W 89.5 CM	INK, WATER COLOR	DRAFTING CLOTH
C-142-084	INFORMATION PLAN [OF LAND] / NEAR / HAMILTON M [FG.] CO.	1921/03/00	1"=40'	H 25.5, W 82.5 CM	INK	DRAFTING CLOTH
C-142-085	AREA OF LAND / BELONGING TO / HAMILTON M. CO.	1902/12/01	1"=60'	H 37.8, W 57.8 CM	INK, WATER COLOR	DRAFTING CLOTH
C-142-086	PLAN OF / CERTAIN PREMISES / BELONGING TO THE / HAMILTON MFG. CO. [BETWEEN JACKSON ST. & THE HAMILTON MFG. CO.]	1902/12/17	1"=20'	H 39.7, W 136.5 CM	BLUEPRINT	PAPER
C-142-087	AREA OF LAND / BELONGING TO / HAMILTON MFG. CO.	1898/12/01	1"=60'	H 35.6, W 57.2 CM	BLUEPRINT	PAPER
C-142-088	PLAN OF / CERTAIN PREMISES [BETWEEN MIDDLESEX & JACKSON ST.] / BELONGING TO / HAMILTON M. CO.	1897/06/30	1"=40'	H 33.1, W 62 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

C-142-089	PLAN MADE TO SHOW / THE RELATION OF THE HAMILTON M. CO.'S / BUILDINGS TO THE NORTHERLY LINE OF / MIDDLESEX ST. & TO THE SOUTHERLY LINE OF JACKSON ST.	1896/06/19	1"=20'	H 58.5, W 134.4 CM	INK, WATER COLOR	PAPER
C-142-090	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / LOWELL, MASS.	1920/03/31	1"=40'	H 60.4, W 97.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-142-091	PLAN OF LAND IN LOWELL, MASS. / [BETWEEN WARREN ST. & THE PAWTUCKET CANAL] SURVEYED FOR MIDDLESEX CO.	1916/05/26	1"=40'	H 42.3, W 34.7 CM	BLUEPRINT	PAPER
C-142-091-[COPY 1]	PLAN OF LAND IN LOWELL, MASS., / SURVEYED FOR / MIDDLESEX COMPANY.	1916/05/26	1"=40'	H 42.6, W 35.6 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-092	PLAN SHOWING PROPERTY / BELONGING TO THE / MIDDLESEX CO. / LOWELL, MASS. [BETWEEN PERRY ST. & THE CONCORD RIVER.]	1910/07/01	1"=20'	H 40, W 65.8 CM	INK, WATER COLOR	PAPER
C-142-093	PLAN SHOWING PROPERTY / BELONGING TO THE / MIDDLESEX CO. / LOWELL, MASS. [WITH SUGGESTIVE FOR RETAINING WALL ALONG PROPOSED NEW LINE OF MILL POND & GRADE OF GROUND ALONG THE SAME.]	1901/06/00	1"=20'	H 50.3, W 75.5 CM	BLUEPRINT	PAPER
C-142-094	PLAN OF / LAND & BUILDINGS / LYING BETWEEN / HURD & WARREN STS. / BELONGING TO / MIDDLESEX COMPANY / LOWELL, MASS.	1900/12/15	1"=20'	H 42.3, W 79.1 CM	BLUEPRINT	PAPER

C-142-095	PLAN OF / PART OF THE / MILL POND / BELONGING TO THE MIDDLESEX CO. / SHOWING ADJACENT LAND & PROPOSED CHANGE IN / LINE OF MILL POND.	1900/08/25	1"=20'	H 52.1, W 76.5 CM	INK	PAPER
C-142-096	SKETCH OF / MIDDLESEX MILL YARD / USED FOR COMPUTING AREA FOR COMPARISON WITH THE CITY ENGINEER.	1901/04/00	1"=40'	H 44.5, W 77.8 CM	GRAPHITE, COLORED PENCIL	PAPER
C-142-097	[PLAN OF LAND BETWEEN THE EASTERN & MERRIMACK CANAL INCLUDING THE PROPERTY OF THE MASSACHUSETTS MILLS.]	UNDATED	3/4"=100'			
C-142-098	SKETCH OF THE / PRESCOTT & MASSACHUSETTS MILL YARDS / USED FOR COMPUTING AREAS TO COMPARE WITH THE AREAS OF THE CITY ENGINEER.	1901/04/00	1"=40'	H 46.7, W 92.4 CM	GRAPHITE, COLORED PENCIL	PAPER
C-142-099	SKETCH OF / BOOTT MILL YARD / USED FOR COMPUTING AREAS FOR COMPARISON WITH CITY ENGR.	1901/03/00	1"=40'	H 50.3, W 76.5 CM	COLORED PENCIL	PAPER
C-142-100	SKETCH OF / MERRIMACK MILL YARD / USED FOR COMPUTING AREAS FOR COMPARISONS WITH CITY ENGINEER.	1901/03/00	1"=40'	H 73.7, W 88 CM	COLORED PENCIL	PAPER
C-142-101	PLAN SHOWING / CERTAIN DEED CONDITIONS NEAR THE PREMISES OF / TREMONT & SUFFOLK MILLS / LOWELL, MASS. [AT THE CORNER OF HALL & CABOT STREETS.]	1919/06/00	1"=40'	H 59.5, W 90.7 CM	INK, WATER COLOR	PAPER

C-142-102	PLAN SHOWING / SOME DEED CONDITIONS NEAR / TREMONT & SUFFOLK MILLS [ALONG TREMONT ST.] / LOWELL, MASS.	1919/07/00	1"=40'	H 57.5, W 44 CM	BLUEPRINT	PAPER
C-142-103	PLAN SHOWING / DEED CONDITIONS NEAR THE / LAWRENCE MFG. CO. / & / TREMONT [& SUFFOLK MILLS BETWEEN THE MERRIMACK MFG. CO. & AIKEN ST.].	1919/07/00	1"=80'	H 49.5, W 70 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-142-104	SKETCH OF / LAWRENCE MILL YARD / USED FOR COMPUTING AREAS FOR COMPARISON WITH CITY ENGINEER.	1901/02/00	1"=40'	H 63, W 88.2 CM	COLORED PENCIL	PAPER
C-142-105	HUNTINGTON HALL LOT / [BETWEEN DUTTON & SHATTUCK STS.] LOWELL, MASS.	1910/05/00	1"=10', 1"=20'	H 55.9, W 68.5 CM	BLUEPRINT	PAPER
C-142-106	SURFACE PLAN / PAWTUCKET STREET BRIDGE [OVER PAWTUCKET CANAL] / RESURFACED ALL OVER WITH TAR / CONCRETE.	1914/06/11-12	1"=10'	H 30.2, W 40 CM	INK, COLORED INK, WATER COLOR	PAPER
C-142-107	STUDY PLAN / OF A / PROPOSED DRAIN RUNNING / FROM / WESTERN AVENUE / TO / LAND NEAR OLD GUARD GATES.	1899/09/00	1"=150'	H 45.7, W 91.1 CM	INK, WATER COLOR	PAPER
C-142-108	SKETCH OF THE ROADS, ETC. NEAR THE HEAD OF THE PAWTUCKET CANAL MADE FROM DESCRIPTION & EXPLANATION ON THE GROUND BY CAPTAIN JOEL SPAULDING ABOUT 1854.	1904/07/00	NONE	H 21.6, W 35 CM	GRAPHITE	PAPER

C-142-109	PLAN OF LAND IN LOWELL / BORDERING ON / PAWTUCKET CANAL NORTH OF BROADWAY / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS [SHOWING LAND BETWEEN WANNALANCIT, BROADWAY, WALKER ST. & MERR'K RIVER WITH ITS OWNERS].	1904/04/04	1"=150'	H 28.3, W 44.8 CM	INK	DRAFTING CLOTH
C-142-110	PLAN OF LAND IN LOWELL / AT HEAD OF PAWTUCKET CANAL / BELONGING TO / PROPRIETORS OF THE LOCKS & CANAL.	1904/04/04	1"=50'	H 41.7, W 33.5 CM	INK	DRAFTING CLOTH
C-142-111	[UNTITLED PLAN.] [PLAN OF LAND AT THE HEAD & WEST OF PAWTUCKET CANAL TRACED FROM PLAN "CHELMSFORD, JUNE 1825."]	1904/07/00	1"=5 RODS	H 19, W 28 CM	INK, WATER COLOR	PAPER
C-142-112	[PLAN OF] PAWTUCKET STREET BRIDGE OVER PAWTUCKET CANAL [LAID OUT. 50' WIDE].	UNDATED	1"=10'	H 32.4, W 21.6 CM	INK, WATER COLOR	TRACING PAPER
C-142-113	[UNTITLED PLAN.] [PLAN OF LAND ABOUT THE PAWTUCKET CANAL SOUTH OF BROADWAY SHOWING DIVISION OF THE LAND INTO GARDEN PLOTS & SHOWING LAND THRU WHICH LOWELL ELECTRIC LIGHT CORP. MAY LAY A DISCHARGE PIPE.]	UNDATED	NONE	H 40.3, W 76 CM	BLUEPRINT	PAPER
C-142-114	SKETCH SHOWING AMOUNT OF / LOCKS & CANALS LAND BEING / USED BY DANIEL H. WALKER.	1917/12/21	1"=40'	H 24.2, W 37.8 CM	INK	PAPER
C-142-114-[COPY 1]	[SKETCH SHOWING AMOUNT OF LOCKS & CANALS LAND BEING USED BY DANIEL H. WALKER.]	1917/12/21	1"=40'		BP	

C-142-115	MEMO: RELATIVE TO EDWIN COPE'S FENCE / PART OF WHICH HAS JUST BEEN RE-BUILT BY LOCKS AND CANALS [SOUTH OF PAWTUCKET ST.].	1917/12/18	1"=40'	H 21.5, W 28 CM	INK, WATER COLOR	PAPER
C-142-116	SKETCH SHOWING LOT OF LAND [SOUTH OF PAWTUCKET ST. NEAR PAWTUCKET CANAL] LET TO / BOARD OF PARK COMMISSIONERS FOR / AN ARBORETUM.	1919/09/24	1"=40'	H 26.5, W 50.5 CM	INK, WATER COLOR	TRACING PAPER
C-142-117	[PLAN OF LAND SOUTH OF BROADWAY NEAR PAWTUCKET CANAL SHOWING] DATA RELATIVE TO CERTAIN RENTAL LANDS [ALONG THOMAS ST.].	1917/10/06	1"=10'	H 39.1, W 78.1 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-142-117-[COPY 1]	[PLAN OF LAND SOUTH OF BROADWAY NEAR PAWTUCKET CANAL SHOWING] DATA RELATIVE TO CERTAIN RENTAL LANDS [ALONG THOMAS ST.].	1917/10/06	1"=40'	H 40.6, W 73.7 CM	BLUEPRINT	PAPER
C-142-118	PLAN SHOWING PREMISES / NEAR / TYNG STREET / LOWELL, MASS.	1919/06/14	1"=40'	H 31.8, W 57.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-142-119	PLAN OF / FREE LANDING PLACE / ABOVE THE SWAMP LOCKS.	1900/12/22	1"=40'	H 20.4, W 66.6 CM	BLUEPRINT	PAPER
C-142-120	[SKETCH SHOWING] BROADWAY BRIDGE OVER PAWTUCKET CANAL.	UNDATED	1"=10'	H 32.4, W 21.6 CM	INK, WATER COLOR	PAPER
C-142-121	[PLAN OF] BROADWAY ST. BRIDGE / OVER / UPPER PAWTUCKET CANAL [SHOWING ELEVATIONS OF CERTAIN POINTS SOUGHT FOR BY THE NEW ENGLAND STRUCTURAL CO.]	1919/06/00	1/8"=1'	H 29, W 45.75 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

C-142-122	[SKETCH SHOWING] DESIRED LOCATION / OF WIRES / [CROSSING LOCKS & CANALS] PROPERTY / OFF BROADWAY. [TO SERVE E. A. WILSON OPPOSITE 700 BROADWAY.]	UNDATED	1"=150'	H 27.9, W 21.6 CM	INK	PAPER
C-142-123	[PLAN OF LOT # 7 SOUTH OF BROADWAY SHOWING CONTOURS & INDICATING SMALL PIECE OF LAND LEASED TO THE LAMSON CO. TENANTS AT WILL FROM AUGUST 1, 1917.] REAL ESTATE.	1917/08/22	1"=40'	H 50.1, W 55 CM	INK, COLORED INK	PAPER
C-142-124	PLAN SHOWING / LAND BELONGING TO / PROPS. OF LOCKS & CANALS [DESIRED BY LAMSON CO.] / SOUTHERLY OF BROADWAY.	SEE NOTES	1"=40'	H 38.7, W 68.3 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-125	[UNTITLED PLAN.] [PLAN OF LOT # 13-A SHOWING PROPERTY LEASED TO EDWIN A. WILSON & LA FOREST BEALS & SHOWING THE LOCATION OF WILSON'S NEW STORE HOUSE.]	1920/06/03	1"=40'	H 21.7, W 35.6 CM	INK, WATER COLOR	PAPER
C-142-126	[PLAN OF] LOCKS & CANALS LAND [ALONG THOMAS ST.] LEASED TO DANIEL GAGE & ALSO [PROPERTY] HE DESIRES TO LEASE.	1898/03/00	1"=40'	H 38.5, W 52.7 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-127	DESIGN FOR "WALL ON PAWTUCKET / CANAL ABOVE RED BRIDGE. / SMALL STONE IN CEMENT."	SEE NOTES	NONE	H 30.5, W 21.7 CM	INK, COLORED INK	PAPER
C-142-128	[PLAN OF] P.L.& C. LAND NEAR RED BRIDGE [SHOWING PROPOSED TRACK TO BE PUT UP BY MERRIMACK PAVING CO.].	1901/09/30	1"=20'	H 46.1, W 53 CM	GRAPHITE	PAPER

C-142-129	PLAN OF LAND / [TO BE CONVEYED BY] P.L.& C. / ON MERRIMACK RIVER / TO LOWELL GAS LIGHT CO. [SOUTH OF PERRIN ST.]	1901/04/00	1"=40'	H 20.4, W 39.1 CM	BLUEPRINT	PAPER
C-142-130	LOCATION OF / PROPOSED PNEUMATIC TUBE / ON LAND OF / LOCKS & CANALS CO. / LOWELL, MASS. / [WEST OF PAWTUCKET CANAL BY] LAMSON CONSOLIDATED STORE SERVICE CO.	1900/02/01	1"=20'	H 35.6, W 82.6 CM	BLUEPRINT	PAPER
C-142-131	SURVEY NOTES / FOR / NEW WALL ON SOUTHERLY SIDE / OF PAWTUCKET CANAL / FROM RED BRIDGE TO SCHOOL ST.	1902/06/00	1"=40'	H 45.7, W 66.6 CM	BLUEPRINT	PAPER
C-142-132	[UNTITLED PLAN.] [SURVEY OF LAND SOUTH WEST OF PAWTUCKET CANAL BELOW RED BRIDGE SHOWING THE LOCATION OF THE NEW BRANCH TRACK & PEVEY ST.]	SEE NOTES	1'=40'	H 37.1, W 55.3 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-133	B.& M. R. R. LEASE MAP [WEST OF SCHOOL ST.] / LOWELL, MASS. / PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER-TO- / BOSTON & MAINE R. R.	1912/09/00	1"=40'	H 20.3, W 33 CM	INK	DRAFTING CLOTH
C-142-134	SKETCH SHOWING AMOUNT NECESSARY TO CUT OFF DOHERTY / BROS' BUILDING TO PERMIT TRACK TO BE MOVED TO ACCOMMODATE R. R. CO.	1913/01/15	1/4"=1'	H 43.2, W 82.6 CM	INK, COLORED INK, COLORED PENCIL	PAPER
C-142-135	[UNTITLED PLAN.] [PLAN OF LAND NEAR KYAN ST. SHOWING LAND DESIRED BY SACO-LOWELL FOR STORING LUMBER.]	1918/04/12	1"=40'	H 22.8, W 36.2 CM	INK	DRAFTING CLOTH

C-142-136	PLAN OF LAND IN LOWELL / BORDERING ON / PAWTUCKET CANAL WEST OF SCHOOL ST. / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS.	1904/04/04	1"=100'	H 21.7, W 44.5 CM	INK	DRAFTING CLOTH
C-142-137	PLAN SHOWING / PREMISES LEASED TO / OTIS ALLEN & SON COMPANY / LOWELL, MASS.	SEE NOTES	1"=40'	H 20.7, W 32.5 CM	INK, WATER COLOR	DRAFTING CLOTH
C-142-137-[COPY 1]	PLAN SHOWING / PREMISES LEASED TO / OTIS ALLEN & SON COMPANY / LOWELL, MASS.	1917/09/28	1"=40'	H 20.7, W 32.4 CM	BLUEPRINT	PAPER
C-142-138	PLAN OF LAND / CONVEYED TO / PRATT & FORREST CO.	1922/12/00	1"=40'	H 23, W 78.5 CM	BLUEPRINT	PAPER
C-142-139	PLAN SHOWING / PROPOSED SIDE TRACKS / ALONG SOUTHERLY SIDE OF PAWTUCKET CANAL FROM N.& L. R.R. TO SCHOOL ST.	1923/01/00	1"=40'	H 40.6, W 88 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-142-140	[UNTITLED PLAN.] [SURVEY OF LAND WEST OF SCHOOL ST. NEAR PAWTUCKET CANAL SHOWING LOCATION OF BRANCH TRACKS.]	1922/12/20	1"=40'	H 37.5, W 78.7 CM	INK, COLORED INK	DRAFTING CLOTH
C-142-141	PLAN SHOWING / LAND DEDICATED FOR A ST. / BY / PROPS. LOCKS & CANALS / & / LOWELL GAS LIGHT CO.	1908/10/30	1"=100'	H 22.2, W 35.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-142-142	MARGINAL SEWER PLOTTED FROM DATA IN THE "RESOLUTIONS / ADDITIONAL TO RESOLUTION TO LAY A / MARGINAL SEWER FROM MIDDLESEX STREET / NORTHWESTERLY NEAR PAWTUCKET CANAL, / APPROVED JULY 27, 1878."	1881/06/25	1"=100', 1"=80'	H 25.1, W 95.9 CM	BLUEPRINT	PAPER

C-142-143	LAND [WEST OF SCHOOL ST.] IN LOWELL, MASS. / THE PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER -TO- / BOSTON & MAINE RAILROAD.	1908/06/26	1"=40'	H 21.5, W 34 CM	INK	DRAFTING CLOTH
C-142-144	SECTION OF NEW ABUTMENT AT / SCHOOL ST. BRIDGE NORTH SIDE / OF PAWTUCKET CANAL.	1911/11/15	NONE	H 30.5, W 21.7 CM	INK, COLORED INK	PAPER
C-142-145	SECTION OF NEW ABUTMENT AT / SCHOOL ST. BRIDGE SOUTH / SIDE.	UNDATED	NONE	H 30.5, W 21.6 CM	INK, COLORED INK	PAPER
C-142-146	[PLAN & SECTION OF] SCHOOL STREET BRIDGE / OVER PAWTUCKET CANAL.	UNDATED	1"=10'	H 32.5, W 21.5 CM	INK, WATER COLOR	PAPER
C-142-147	[UNTITLED PLAN.] [PLAN OF LAND BELONGING TO P.L.& C. EAST OF SCHOOL ST. SHOWING LEASES OF LAND.]	1923/05/00	1"=80'	H 20.4, W 33 CM	INK	DRAFTING CLOTH
C-142-148	PLAN OF LAND IN LOWELL / ON / NORTH BANK OF PAWTUCKET CANAL / SOUTHERLY OF WESTERN AVENUE / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS.	1904/04/05	1"=100'	H 25.3, W 48.3 CM	INK	DRAFTING CLOTH
C-142-149	MR. MILLS' DESIGN FOR WALL / ON SOUTH SIDE OF CANAL DOWN / STREAM FROM SCHOOL STREET.	1917/06/06	NONE	H 30.5, W 21.6 CM	INK, COLORED INK	PAPER
C-142-150	[UNTITLED PLAN.] [PLAN OF PREMISES EAST OF SCHOOL ST. BETWEEN WESTERN AVE. & PAWTUCKET CANAL SHOWING LAND LEASED TO THE BOSTON & MAINE R. R.]	UNDATED	1"=40'	H 21, W 68.2 CM	BLUEPRINT	PAPER

C-142-151-[COPY 1]	[UNTITLED PLAN.] [PHOTOSTAT SHEETS SHOWING JUNCTION OF MERRIMACK AND CONCORD RIVERS, PAWTUCKET CANAL AND MIDDLESEX PENSTOCKS.]	UNDATED	NONE	H 33.8, W 33.8 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-142-151-[COPY 2]	[UNTITLED PLAN.] [PHOTOSTAT SHEETS SHOWING JUNCTION OF MERRIMACK AND CONCORD RIVERS, PAWTUCKET CANAL AND MIDDLESEX PENSTOCKS.]	UNDATED	NONE	H 33.8, W 33.8 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-143-001	PLAN / OF PROPOSED LINE OF / EAST MERRIMACK STREET / IN THE VICINITY OF CONCORD RIVER BRIDGE.	1893/08/00	40 & 4	H 56.3, W 108 CM	INK, COLORED INK	DRAFTING CLOTH
C-143-002	PROFILE OF / FIRST ST. / ON OCT. 8, 1880 LEVELED & PLOTTED BY CITY / SHOWING ALSO / ESTABLISHED GRADES OF / OCT. 26, 1858 & NOV. 11, 1880 / & GRADES ON TRACK BY W.E.B.	1914/08/01	H 1"=60', V 1"=6'	H 41.9, W 106 CM	INK, COLORED INK	PAPER
C-143-003	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / ALONG PAWTUCKET CANAL / FROM / NASHUA & LOWELL R. R. BRIDGE TO THORNDIKE STREET / LOWELL, MASS.	1913/03/00	1"=40'	H 76.2, W 297.2 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-143-004	PROFILE OF GROUND WHERE PROPOSED NEW STREET WILL RUN AT / OLD GUARD LOCKS FROM BROADWAY NORTH.	1908/10/06	H 1"=20' V 1"=4'	H 41.7, W 90.8 CM	INK, COLORED INK	TRACING PAPER
C-143-005	PLAN OF LAND / BELONGING TO / PROPS. OF LOCKS & CANALS / ALONG SOUTHERLY SIDE OF PAWTUCKET / CANAL NEAR O.G.L. [OLD GUARD LOCKS].	1908/09/25	1"=40'	H 45.3, W 67.7 CM	INK, COLORED INK	DRAFTING CLOTH

C-143-006	[PLAN OF] VARNUM AVENUE / LOWELL, MASS. / SHOWING THE SEVERAL LINES ESTABLISHED BY THE / CITY AT DIFFERENT TIMES.	1903/11/00	1"=40'	H 30.5, W 21.7 CM	INK, COLORED INK	TRACING PAPER
C-143-007	PROFILE OF / PROPOSED ST. (SINCE NAMED MELVIN ST.) / RUNNING NORTHWESTERLY FROM PAWTUCKET STREET / OPPOSITE END OF CHEEVER STREET.	1907/07/00	H 1"=20', V 1"=4'	H 45, W 91 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-143-008	PLAN SHOWING LINES OF / A PART OF PAWTUCKET / ST. LEADING TO CITY LAND- / ING.	1897/10/27	1"=10'	H 71.1, W 104.8 CM	INK, COLORED INK	PAPER
C-143-009	PLAN SHOWING LEVELS / OF A PROPOSED ST. [MELVIN ST.] LEADING FROM PAWTUCKET / ST. OPPOSITE CHEEVER ST.	1907/07/00	1"=20'	H 51.5, W 84.5 CM	INK, COLORED INK	PAPER
C-143-010	SKETCH SHOWING EAST SIDE OF PAWTUCKET ST. / NEAR CHEEVER ST.	1896/12/00	1"=10'	H 45.4, W 212.5 CM	INK, COLORED INK	PAPER
C-143-011	BOSTON AND MAINE RAILROAD / SOUTHERN DIVISION / VALUATION SECTION # 13.1 / [PLAN OF] DUTTON STREET MILL TRACKS / LOWELL MASS / FROM OFFICE OF CHIEF ENGINEER.	1917/11/07	1"=40'	H 75, W 114 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
C-143-012	PLAN NO.1 / OF THE LOCATON OF THE / LOWELL & ANDOVER RAILROAD / IN THE CITY OF LOWELL / OF MIDDLESEX.	1873/04/00	1"=50'	H 21.3, W 78.8 CM	GRAPHITE	DRAFTING CLOTH
C-143-013	[A PLAN & PROFILE OF THE BOSTON & LOWELL R.R.]	1902/12/00			BP	

C-143-014	MAP & DESCRIPTIONS OF PARTS OF THE LOCATION / OF THE / NASHUA & LOWELL RAILROAD / IN THE COUNTY OF MIDDLESEX.	1879/08/24	1"=50'	H 21.3, W 124.9 CM	GRAPHITE	DRAFTING CLOTH
C-143-015	PLAN OF LAND / BELONGING TO / PROPS LOCKS AND CANALS / ALONG PAWTUCKET CANAL / FROM NASHUA & LOWELL R.R. BRIDGE TO THORNDIKE STREET / SHOWING / PROPOSED LOCATION OF R.R. BRANCH TRACKS.	1904/12/00	1"=40'	H 74, W 271 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-143-016	B & M. R.R. SOUTHERN DIV. / PLAN OF A PROPOSED TRACK BETWEEN / DUTTON & HANOVER STS. / LOWELL, MASS.	1892/03/00	1"=30'	H 74.9, W 130.5 CM	BLUEPRINT	PAPER
C-143-017	PLAN OF THE LOCATION OF A PORTION OF THE [N. & L., B. & L., AND L. & L. RAILROADS] LOWELL AND / LAWRENCE RAIL ROAD [NEAR MIDDLESEX ST.] FROM ARCH / BRIDGE TO THE NORTHERLY SIDE OF PAWTUCKET / CANAL IN LOWELL, RECORDING ACT OF 1857.	1880/00/00	1"=50'	H 61, W 71.5 CM	INK, GRAPHITE	DRAFTING CLOTH
C-143-018	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1920/04/01	1/4"=10'	H 66, W 99 CM	BLUEPRINT	PAPER
C-143-019	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE [& SHOWING PART CONVEYED, APRIL 1, 1920, BY MIDDLESEX CO. TO IPSWICH HOSIERY CO].	1920/04/01	1"=40'	H 65.4, W 97.8 CM	BLUEPRINT	PAPER

C-143-020-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / LOWELL MANUFACTURING COMPANY. / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 60.5, W 75 CM	LITHOGRAPH	PAPER
C-143-020-[COPY 2]	PLAN OF THE / MILL YARD / OF THE / LOWELL MANUFACTURING COMPANY. / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 57, W 73.6 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-143-021	STUDY PLAN / OF THE FEEDERS IN THE MILL YARD OF THE / BIGELOW-HARTFORD CARPET CO. / LOWELL, MASS.	1920/01/00	1/4"=1'& 1"=40'	H 45.3, W 66 CM	INK, COLORED INK	DRAFTING CLOTH
C-143-022	[PLAN OF] BIGELOW YARD / FIRE PROTECTION SYSTEM.	1921/04/08	1"=100'	H 21.7, W 27.9 CM	BLUEPRINT	PAPER
C-143-023	PLAN OF THE / MILL YARD / OF THE BIGELOW CARPET COMPANY [COLUMBIA TEXTILE CO.] / SHOWING PIPE LINES LAID FOR EXTINGUISHING FIRE.	1919/02/13	1"=40'	H 62, W 94 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-143-024	PLAN OF THE / YARD / OF THE / LOWELL MACHINE SHOP / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1891/01/00	NONE	H 67.2, W 102 CM	LITHOGRAPH, WATER COLOR	TRACING PAPER
C-143-025	PLAN OF THE / MILL YARD / OF THE / KITSON PLANT / OF THE / SACO-LOWELL SHOPS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1920/10/00	1"=20'	H 68.6, W 110.6 CM	BLUEPRINT	PAPER
C-143-026	GENERAL PLAN & DATA / HAMILTON NO. 9 WATERWHEEL / PROPRIETORS OF LOCKS & CANALS / LOWELL, MASS.	1919/04/00	1"=10'	H 60.5, W 94 CM	INK, COLORED INK	DRAFTING CLOTH

C-143-027	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1889/05/00	1/4"=10'	H 73, W 107 CM	LITHOGRAPH, COLORED INK, WATER COLOR	PAPER
C-143-028-[COPY 1]	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1886/11/30	1/4"=10'	H 73.9, W 101 CM	LITHOGRAPH, WATER COLOR	PAPER
C-143-028-[COPY 2]	PLAN OF THE / MILLS AND PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1886/11/30	1/4"=10'	H 75, W 106 CM	LITHOGRAPH	PAPER
C-143-029	[PLAN SHOWING FLOOD HEIGHTS ON PAWTUCKET DAM 1852, 1870, 1895, 1896.]	SEE TITLE				
C-143-030	SKETCH / OF THE OLD [PAWTUCKET] DAM & THE NEW PART / CONSTRUCTED IN 1875, THE LATTER DRAWN / IN RED.	SEE NOTES	1"=40'	H 55.8, W 76.2 CM	INK, COLORED INK	PAPER
C-143-031	[PLAN OF] DAM ON MERRIMACK RIVER / AT THE HEAD OF PAWTUCKET FALLS, LOWELL, MASS.	1875/03/12	1/2"=1'	H 40.6, W 53.4 CM	LITHOGRAPH	TRACING PAPER
C-143-032-[COPY 01]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 37, W 90 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

C-143-032-[COPY 02]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 03]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 04]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 05]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 06]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

C-143-032-[COPY 07]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 08]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 09]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 10]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 11]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

C-143-032-[COPY 12]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 13]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 14]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 15]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 16]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

C-143-032-[COPY 17]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 18]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 19]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 20]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 21]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

C-143-032-[COPY 22]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 23]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-143-032-[COPY 24]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 25]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 26]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 27]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 28]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 29]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 30]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 31]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 32]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 33]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 34]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 35]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 36]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 37]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 38]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 39]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 40]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 41]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 42]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 43]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 44]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 45]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 46]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 47]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 48]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 49]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 50]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 51]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 52]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 53]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 54]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 55]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 56]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 57]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 58]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 59]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 60]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 61]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER

C-143-032-[COPY 62]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-032-[COPY 63]	THIS MAP / DELINEATES THE BOUNDARIES OF THE BED AND CHANNEL OF THE MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK AND THE CONCORD RIVER.	1882/11/00	1/2"=100'	H 38, W 91 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	PAPER
C-143-033-[A]	PLAN / SHOWING / LOCATION OF THE "NEW RIVER LINE" / (BACK OF THE MERRIMACK MFG. COMPANY'S MILLS) / REFERRED TO THE REPAIR SHOP.	1894/07/12	1"=40'	H 37.5, W 89.5 CM	INK	DRAFTING CLOTH
C-143-033-[B]	PLAN / SHOWING / SURVEY (MADE ON THE ICE) JAN. 30, 1883 / TO OBTAIN THE / LOCATION OF THE "NEW RIVER LINE." / BACK OF THE M.M. CO'S. MILLS / REFERRED TO THE REPAIR SHOP.	1930/01/06	NONE	H 46, W 84.5 CM	BLUEPRINT	PAPER
C-143-034	PLAN OF A PART / OF / MERRIMACK RIVER / SHOWING AN ADOPTED MODIFICATION OF THE / SOUTHERLY BOUNDARY LINE ADJACENT TO / THE MASSACHUSETTS COTTON MILLS.	1908/12/00	1"=100'	H 52, W 81 CM	BLUEPRINT, COLORED INK	PAPER

C-143-035	DESCRIPTIVE PLAN [OF LAND BETWEEN VARNUM AVE. & MERRIMACK RIVER] / PERTAINING TO FLOWAGE CLAIMS AGAINST / PROPS. LOCKS & CANALS / LOWELL MASS.	1922/11/16	1"=80'	H 40, W 59.8 CM	INK, COLORED INK	DRAFTING CLOTH
C-143-036-[A]	SECTIONS ON SOUTH SIDE OF / PAWTUCKET CANAL / ON LINE OF PROPOSED NEW WALL / BETWEEN N. & L. R. R. BRIDGE & THORNDIKE / STREET BRIDGE LOOKING DOWNSTREAM.	1917/09/16	NONE	H 58.7, W 46 CM	INK, COLORED INK	PAPER
C-143-036-[B]	SECTIONS ON SOUTH SIDE OF / PAWTUCKET CANAL / ON LINE OF PROPOSED NEW WALL / BETWEEN N. & L. R. R. BRIDGE & THORNDIKE / STREET BRIDGE LOOKING DOWNSTREAM.	1917/09/16	NONE	H 58.7, W 46 CM	INK, COLORED INK	PAPER
C-143-037	SECTIONS OF LOWER PAWTUCKET CANAL / AT GAUGES [WITH OLD SECTIONS IN RED & NEW SECTIONS IN BLACK].	1913/05/13	1/10"=1'	H 71.1, W 55.8 CM	BLUEPRINT	PAPER
C-143-038	PLAN OF / PAWTUCKET CANAL / FROM / BROADWAY TO BELOW B. & M. R. R. / PLOTTED FROM SURVEY MADE IN 1891 & / ADDITIONAL NOTES TAKEN IN 1902.	1902/12/00	1"=20'	H 66, W 117 CM	BLUEPRINT	PAPER
C-143-039	[PLAN OF] PAWTUCKET CANAL / FROM SCHOOL ST. TO THORNDIKE ST. [SWAMP LOCKS BASIN & SECTIONS OF NEW WALL'S PROGRESS, ETC.]	SEE NOTES	1"=10' [SEE NOTES]	H 80.9, W 180.3 CM	INK, COLORED INK	CLOTH BACKED PAPER

C-143-040	PLAN OF PART OF / PAWTUCKET CANAL [& OTHER CANALS LEADING FROM THE SAME] / SHOWING DATA RELATING TO THE / MARGINS AND ADJACENT LAND. / CONDITIONS SHOWN AS EXISTING MAY 1, 1899.	1899/05/01	1"=100'	H 68.7, W 132.2 CM	INK, WATER COLOR	PAPER
C-143-041	PLAN OF PART OF / PAWTUCKET CANAL, / & OTHER CANALS LEADING FROM THE SAME, / SHOWING DATA RELATING TO THE / MARGINS AND ADJACENT LAND. / CONDITIONS SHOWN AS EXISTING MAY 1, 1899.	1899/05/01	1"=100'	H 68.7, W 106.8 CM	INK, WATER COLOR	PAPER
C-143-042	SKETCH FOR DETERMINING LINE OF FACE OF WALL ON N. W. SIDE OF PAWTUCKET CANAL / BETWEEN THORNDIKE ST. & N. & L. R. R.	1844/06/19	1"=10', 1"=4'	H 102.9, W 61.3 CM	INK, COLORED INK, WATER COLOR	
C-143-042	SKETCH FOR DETERMINING LINE OF FACE OF WALL ON N. W. SIDE OF PAWTUCKET CANAL / BETWEEN THORNDIKE ST. & N. & L. R. R.	1844/06/19	1"=10', 1"=4'	H 102.9, W 61.3 CM	INK, COLORED INK, WATER COLOR	PAPER
C-143-043	STUDY OF NEED OF / WALLS AT REAR OF BUILDINGS [LEDGES] / ON WEST BANK OF WESTERN CANAL ALONG SUFFOLK ST.	1921/03/00	1"=10'	H 58.8, W 46 CM	GRAPHITE	PAPER
C-143-044	SKETCH SHOWING LINES OF / MERRIMACK CANAL FROM NEAR L. M. S. OFFICE TO BEYOND MARKET ST.	1902/07/03	1"=40'	H 41.1, W 76.2 CM	INK, COLORED INK, WATER COLOR	PAPER

C-143-045	PLAN OF / NORTHERN & WESTERN CANALS / SHOWING DATA RELATING TO THE MARGINS / & ADJACENT LAND. [CONDITIONS SHOWN AS EXISTING MAY 1, 1899.]	1899/05/01	1"=100'	H 68.2, W 127.7 CM	INK, WATER COLOR	PAPER
C-143-046	PLAN OF THE / [LOWELL] TEXTILE SCHOOL LOT / LOWELL, MASS. / SHOWING / LOCATION OF FRONT BUILDING.	1900/12/14	1"=20'	H 66.1, W 97.2 CM	BLUEPRINT	PAPER
C-143-047	[UNTITLED PLAN.] [PLAN OF SOUTHWICK HALL OF LOWELL TEXTILE SCHOOL.]	UNDATED	1"=30'	H 36.8, W 44.5 CM	BLUEPRINT	PAPER
C-143-048	PROPOSED POWER STATION SITE / LOWELL ELECTRIC LIGHT CORPORATION / STONE & WEBSTER / BOSTON.	1920/04/28	1"=150'	H 27.2, W 55.3 CM	BLUEPRINT	PAPER
C-143-049	CHECK VALVE / FOR / PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER / LOWELL, MASS.	1891/02/17	HALF SIZE	H 72.1, W 54 CM	BLUEPRINT	PAPER
C-143-050	DIAGRAM SHOWING RISE NECESSARY / TO BE MADE BY BOATS FROM NEWBURYPORT / TO MERRIMACK RIVER ABOVE PAWTUCKET DAM, / LOWELL, MASS..	1898/02/08	H 1"=5000', V 1"=10'	H 76.2, W 48.3 CM	INK, COLORED INK	PAPER
C-143-051	DIAGRAM / SHOWING / HEIGHT OF SILLS ETC. [FROM BACKWATER POINT TO FLOOD WALL AT GUARD LOCKS] / BY LOCKS AND CANALS GENERAL.	1896/01/31	NONE	H 26.8, W 132 CM	INK, COLORED PENCIL	PAPER
C-143-052	COMPOUND PUMPING ENGINE / 5,000,000 GALLONS CAPACITY / FOR / LOWELL WATER WORKS / CONSTRUCTED BY / HENRY G. MORRIS / SOUTHWARK FOUNDRY / PHILADELPHIA.	1872/05/00	1"=4.5'	H 48.6, W 61 CM	LITHOGRAPH	PAPER

C-143-053	BOILER[S] FOR LOWELL WATER WORKS / CONSTRUCTED BY / HENRY G. MORRIS / SOUTHWARK FOUNDRY / PHILADELPHIA.	1872/05/00	1/4"=1'	H 49, W 61 CM	LITHOGRAPH	PAPER
C-143-054	MEMO: RELATIVE TO FENCE BETWEEN FRENCH ORPHANAGE AND LOCKS & CANALS.	1922/05/08	NONE	H 25.4, W 38.7 CM	INK	DRAFTING CLOTH
C-143-054-[COPY 1]	[UNTITLED PLAN.] [MEMO: RELATIVE TO FENCE BETWEEN FRENCH ORPHANAGE AND LOCKS & CANALS.]	1922/05/08	NONE	H 22.2, W 35 CM	BLUEPRINT	PAPER
C-143-055	SKETCH SHOWING FENCES & TOP OF BANK IN RELATION / TO THE ST. LINE ON FIRST ST.	1911/05/00	1"=40'	H 70.4, W 244.2 CM	INK, COLORED INK	PAPER
C-143-056	CURVE FOR 1" SPRUCE BEAM.	UNDATED	NONE	H 46, W 58.8 CM	GRAPHITE	PAPER
C-143-057	DIAGRAM SHOWING GROWTH OF TENSILE STRENGTH OF / NEAT PORTLAND CEMENT & PORTLAND CEMENT MORTARS.	SEE NOTES	NONE	H 46, W 58.8 CM	GRAPHITE	PAPER
C-143-058	NORMOGRAPHIC CHART / FOR THE FRANCIS FORMULA / FOR / RECTANGULAR WEIRS.	1915/07/22	NONE	H 31, W 38.5 CM	INK	PAPER
C-143-059	NORMOGRAPHIC CHART FOR THE CHEZY FORMULA.	1915/07/00	NONE	H 56.2, W 76.3 CM	INK	PAPER
C-143-060	CURVES OF RAINFALL AT BOSTON OF VARIOUS DEGREES OF PROBABILITY.	UNDATED	NONE	H 42, W 56.5 CM	INK	DRAFTING CLOTH
C-143-061	DATA PERTAINING TO LAND IN LOWELL OWNED BY LOCKS & CANALS.	1892/01/01	NONE	H 57.7, W 79.7 CM	BLUEPRINT	PAPER
C-143-062	SCHEDULE OF LOTS OF LAND & ALL PRIVILEGES FOR WHICH THE CORPORATIONS PAY RENT TO THE PROPS. LOCKS & CANALS.	1893/03/01	NONE	H 25, W 54.7 CM	INK	DRAFTING CLOTH

C-143-063	DATA RELATING TO TAXATION OF LAND IN & NEAR HAMILTON M. CO.'S MILL YARD.	1898/12/00	NONE	H 40.7, W 32.5 CM	INK	DRAFTING CLOTH
C-143-064	SCHEDULE OF LANDS & PRIVILEGES FOR WHICH THE CORPORATIONS PAY RENT TO PROPS., LOCKS & CANALS.	1919/01/01	NONE	H 36.2, W 61.2 CM	INK	DRAFTING CLOTH
C-143-064-[COPY 1]	SCHEDULE OF LANDS & PRIVILEGES FOR WHICH THE CORPORATIONS PAY RENT TO PROPS., LOCKS & CANALS.	1919/01/01	NONE	H 31, W 55 CM	BLUEPRINT	PAPER
C-143-065	PLAN OF LAND / CONVEYED TO / BURNHAM & DAVIS LUMBER CO.	1923/00/00	1"=40'	H 34.3, W 59.4 CM	BLUEPRINT	PAPER
C-143-066	SKETCH SHOWING LAND SOLD TO / FISKE & NORCROSS / BY / PROPS. OF THE LOCKS AND CANALS / BY DEED DATED / DEC. 20, 1848.	1900/09/26	1"=40'	H 31, W 39 CM	BLUEPRINT	PAPER
C-143-067	PLAN OF LAND / [BETWEEN MIDDLESEX ST. & PAWTUCKET CANAL] BELONGING TO / JOHN F. WINIFRED & WM. C. DOHERTY / LOWELL MASS.	1901/06/24	1"=40'	H 30.6, W 42.9 CM	BLUEPRINT	PAPER
C-143-068	SKETCH / SHOWING THE / TWO LOTS OF LAND / EXCHANGED BY / PROPS. LOCKS & CANALS ON MERRIMACK RIVER / AND / JOHN F. AND WILLIAM C. DOHERTY / NY INDENTURE DATED 1903.	1903/00/00	1"=20'	H 34.5, W 21.5	INK, WATER COLOR	TRACING PAPER
C-143-069	[UNTITLED PLAN.] [SECTIONS OF THE DOHERTY WALL UPSTREAM END & THE STAPLES WALL BEING LAID.]	1911/05/23	NONE	H 30.5, W 21.7 CM	INK, COLORED INK	PAPER
C-143-070	[SECTION OF THE] NEW DOHERTY WALL .	1903/03/27	NONE	H 30.6, W 21.9 CM	INK, COLORED INK	PAPER

C-143-071	PLAN OF LAND / IN LOWELL, MASS., / BELONGING TO / JOHN F. & WILLIAM C. DOHERTY.	1909/07/00	1/2"=20'	H 22, W 45.3 CM	BLUEPRINT	PAPER
C-143-072	PLAN OF / LAND [SOUTH OF THE PAWTUCKET CANAL EAST OF SCHOOL ST.] LEASED TO / JOHN F. & WM. C. DOHERTY / BY / P.L.& C . / [FOR] FIVE YEARS FROM DEC. 1, 1903. / LOWELL, MASS.	1903/12/01	1"=40'	H 21.7, W 34.9 CM	INK, WATER COLOR	PAPER
C-143-073	SKETCH SHOWING / SHAPE AND SIZE OF THE BUILDING WHICH / MASS. MOHAIR PLUSH CO. HAVE NOW DECIDED / TO ERECT ON LAND LEASED OF P.L.& C.	1899/05/19	1"=20'	H 35, W 21 CM	INK, COLORED INK	TRACING PAPER
C-143-074	PLAN OF LAND / BELONGING TO / PROPS. OF LOCKS & CANALS / LOWELL, MASS. [SHOWING CONDITIONS BETWEEN WESTERN AVE. & PAWTUCKET CANAL.]	1899/12/05	1"=40'	H 25.5, W 43.8 CM	INK, COLORED INK	TRACING PAPER
C-143-075	PLAN SHOWING LAND BELONGING TO / MASSACHUSETTS MOHAIR PLUSH CO. / ON WESTERN AVENUE / LOWELL, MASS.	1907/05/00	NONE	H 39, W 78.1 CM	INK, WATER COLOR	TRACING PAPER
C-143-076	FOUNDATION PLAN / OF MILL FOR / MASS. MOHAIR PLUSH CO. / LOWELL [DAVIS & RAYNES, ARCHITECTS, LOWELL].	1899/05/17	1/8"=1'& 1/2"=1'	H 46.1, W 56.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-143-077	PLAN OF INDUSTRIAL RAILWAY. / FOR MASS. MOHAIR PLUSH CO., LOWELL, MASS.	1911/09/11	1/8"=1'	H 66.1, W 115.5 CM	BLUEPRINT	PAPER
C-143-077-A	PLAN [& ELEVATION] OF INDUSTRIAL RAILWAY / FOR MASS. MOHAIR PLUSH CO. / LOWELL, MASS.	1911/09/00	1/8"=1'	H 20.3, W 100.3 CM	INK	DRAFTING CLOTH

C-143-078	SECTION FOR WALL ON NORTH SIDE / OF PAWTUCKET CANAL ABOVE MASS. / MOHAIR PLUSH CO., MILL.	1906/04/27	NONE	H 30.5, W 21.5 CM	INK, COLORED INK	PAPER
C-143-079	PLAN SHOWING LAND / SOLD BY / PROPS. LOCKS & CANALS / TO / EDWARD P. & HOWARD W. BLISS.	1905/04/25	1"=40'	H 32.5, W 62.3 CM	BLUEPRINT	PAPER
C-143-080	DATA PERTAINING TO THE "UPPER FREE LANDING" [WHICH LIES BETWEEN WESTERN AVE. & PAWTUCKET CANAL].	1896/01/00	1"=40'	H 22.5, W 41.1 CM	INK, WATER COLOR	DRAFTING CLOTH
C-143-081	SKETCH SHOWING THE / R. R. LOCATIONS BETWEEN / MIDDLESEX STREET & PAWTUCKET CANAL.	1910/12/24	1"=80'	H 20.6, W 25.4 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-143-082	DESIGN (FROM MR. MILL'S / NOTEBOOK) FOR WALL OF PAWTUCKET / CANAL SOUTH SIDE FROM THORNDIKE / ST. TO ABOUT THE LOWER TANGENT / POINT OPPOSITE MASS. MOHAIR PLUSH CO.'S MILL.	1913/04/02	NONE	H 30.5, W 21.7 CM	INK, COLORED INK	PAPER
C-143-083	PLAN OF LAND / IN LOWELL MASS. / BELONGING TO EMMA M. KELLEY [BETWEEN MIDDLESEX ST. & THE PAWTUCKET CANAL].	1912/09/00	1"=5'	H 52.7, W 47.8 CM	GRAPHITE	TRACING PAPER
C-143-084	PLAN OF / PAWTUCKET CANAL / ABOVE THORNDIKE ST. [SHOWING PROGRESS ON CANAL WALL].	1914/07/02	1"=40'	H 27.3, W 101.5 CM	INK, COLORED INK	TRACING PAPER
C-143-085	LAND & BUILDINGS IN LOWELL, MASS. BETWEEN THORNDIKE ST. & MIDDLESEX PLACE BELONGING TO DAVID ZISKIND.	1919/12/09	1"=40'	H 51.5, W 32.4 CM	BLUEPRINT	PAPER

C-143-086	PLAN SHOWING / LOCATION OF LAND SOLD TO / WILLIAM LIVINGSTON IN 1847 & 1849.	1917/01/02	1"=50'	H 21.7, W 35 CM	BLUEPRINT	PAPER
C-143-087	PLAN SHOWING / CITY SEWER / IN / FLETCHER ST. NEAR JUNCTION / WITH WESTERN AVE. & WITH DUT- / TON ST.	1919/06/07	1"=50'	H 24.2, W 26 CM	INK	DRAFTING CLOTH
C-143-088	MEMO PLAN OF / CERTAIN PREMISES [ABOUT THORNDIKE ST.] OF / PROPS. LOCKS & CANALS / LOWELL MASS.	1917/10/10	1"=40'	H 40.6, W 65.2 CM	INK	DRAFTING CLOTH
C-143-089	FLETCHER ST. BRIDGE PLATFORM [PROPOSED BY BOSTON BRIDGE WORKS].	189(?)/12/05	1/8"=1', 1/20"=1'	H 44.4, W 50.8 CM	BLUEPRINT	PAPER
C-143-090	PLAN OF FLETCHER ST. BRIDGE / OVER PAWTUCKET CANAL [COPIED FROM PLAN IN BRIDGE BOOK].	UNDATED	1"=10'	H 32.4, W 21.7 CM	INK, WATER COLOR	PAPER
C-143-091	DESIGN BY H. F. MILLS / FOR / NELSON MORRIS CO'S / WALL.	1898/00/00	NONE	H 30.5, W 21.6 CM	INK, COLORED INK	PAPER
C-143-092	SKETCH SHOWING "THORNDIKE ST. BRIDGE" & VICINITY / LOWELL MASS. BEING THE PLACE WHERE MISS FRANCIS T. / KENNEY CLAIMS TO HAVE BEEN HURT BY BEING HIT BY A BI / CYCLE NOV. 5, 1917 BETWEEN 5:20 & 5:30 P.M.	SEE TITLE	1"=10'	H 24.9, W 62.5 CM	INK	DRAFTING CLOTH
C-143-092-[COPY 1]	[SKETCH SHOWING THORNDIKE ST. BRIDGE & VICINITY BEING THE PLACE WHERE MISS FRANCIS T. KENNEY CLAIMS TO HAVE BEEN HURT BY BEING HIT BY A BICYCLE NOV. 5, 1917 BETWEEN 5:20 & 5:30 P.M.]	SEE TITLE	1"=10'		BLUEPRINT	
C-143-093	[PLAN OF] THORNDIKE ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS.	1919/04/10	1"=10'	H 24.2, W 28	BLUEPRINT	PAPER

C-143-094	INDEX MAP [OF LOT # 28 & VICINITY SHOWING OWNERSHIP OF THE VARIOUS SECTIONS].	1917/09/11	NONE	H 27.9, W 21.6 CM	BLUEPRINT	PAPER
C-143-095	[SECTION OF] GEORGE L. CADY BUILDING AT CORNER / OF WESTERN AVE. & FLETCHER ST. / LOWELL, MASS. [WITH SUGGESTED PLANS FOR HOLDING UP THE 8" WIDTH OVER-HANGING THE PAWTUCKET CANAL.]	1919/06/00	NONE	H 25.5, W 20.2 CM	INK, COLORED INK	PAPER
C-143-096	SKETCH OF CERTAIN LAND OF P. L. & C. / IN THE VICINITY OF / FLETCHER ST. BRIDGE.	1897/02/11	1"=20'	H 38.2, W 39.6 CM	INK, COLORED INK	DRAFTING CLOTH
C-143-097	FLETCHER ST. BRIDGE / OUTLINE OF FOUNDATIONS / PROPRIETORS OF LOCKS & CANALS.	1919/04/23	1"=10'	H 28, W 28 CM	BLUEPRINT	PAPER
C-143-098	NEW NORTH ABUTMENT / [OF] FLETCHER ST. BRIDGE / PROPRIETORS OF LOCKS & CANALS.	1919/05/08	1"=4'	H 27.7, W 27.7 CM	BLUEPRINT	PAPER
C-143-099	[UNTITLED PLAN.] [INDEX MAP FOR SECTIONS IN PAWTUCKET CANAL ABOVE THORNDIKE ST. BRIDGE.]	1917/10/10	1"=40'	H 40.3, W 65.1 CM	BLUEPRINT	PAPER
C-143-100	PLAN 2. [PLAN OF LAND & BUILDINGS BETWEEN FLETCHER ST. & THE HEAD OF THE WESTERN CANAL.]	1914/10/26	1"=20'	H 21.6, W 47.3 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-143-101	PLAN OF / CERTAIN PREMISES AT / LOWELL MASS. [BETWEEN FLETCHER ST. & THE HEAD OT THE WESTERN CANAL] / WHERE PROPS. LOCKS & CANALS & B. & M. R. R. CO. HAVE INTERESTS.	1917/03/00	1"=20'	H 21.3, W 52.1 CM	INK	DRAFTING CLOTH

C-143-102	[UNTITLED PLAN.] [PLAN OF LAND ALONG WESTERN CANAL IN THE VICINITY OF WORTHERN ST. SHOWING LAND LEASED TO THE SACO-LOWELL SHOPS, JULY 1, 1912.]	1917/08/08	1"=40'	H 33.2, W 20.4 CM	INK, WATER COLOR	TRACING PAPER
C-143-103	PLAN OF / SURFACE WATER DRAIN / FOR / WORTHEN STREET / LOWELL, MASS.	1917/06/00	1"=50'	H 20.6, W 33.3 CM	INK	TRACING PAPER
C-143-104	SKETCH FOR THE LOCATION / OF / NEW DRAIN IN WORTHERN ST.	1917/06/19	NONE	H 27.7, W 21.3 CM	GRAPHITE	PAPER
C-143-105	PLAN OF / WESTERN CANAL & LEASED LOTS / ALONG SUFFOLK STREET.	1921/01/12	1"=50'	H 45.8, W 71.4 CM	INK, COLORED INK	DRAFTING CLOTH
C-143-106	TENEMENT BUILDINGS ALONG BROADWAY / BELONGING TO P. L.& C.	1918/11/03	1"=20'	H 34.7, W 34.7 CM	INK, WATER COLOR	PAPER
C-143-107	[PLAN OF LAND BELONGING TO DANIEL MURPHY.]	1914/08/00				
C-143-108	MAP OF LOWELL / IN THE VICINITY OF / FLETCHER, DUTTON, SUFFOLK, / & MERRIMACK STS. [SHOWING PROPOSED LOCATION OF CARDINAL O'CONNELL PARKWAY.]	1917/05/23	1"=100'	H 39.4, W 75.7 CM	BLUEPRINT	PAPER
C-143-109	[PLAN OF LAND SHOWING PREMISES EITHER OWNED OR OCCUPIED BY GREEKS & PREMISES OWNED BY PROPS. LOCKS & CANALS IN THE VICINITY OF WESTERN CANAL & SUFFOLK STS.] LOWELL, MASS.	1918/10/04	1'=100'	H 42.5, W 62.4 CM	INK, WATER COLOR	TRACING PAPER
C-143-110	PLAN & PROFILE / OF / PROPOSED DRAIN FOR SURFACE WATER FROM / COMMON ST. TO WESTERN CANAL / THRU CROSS ST.	1912/08/00	NONE	H 31.4, W 48.2 CM	BLUEPRINT	PAPER

C-143-111	SKETCH SHOWING LOCATION OF FENCE ON / HANOVER ST. BETWEEN MARKET & MERRIMACK [ST].	1877/10/12	1/8"=1'	H 21.4, W 51.5 CM	INK, COLORED INK	PAPER
C-143-112	SECTION ACROSS WESTERN CANAL / ABOUT MIDWAY BETWEEN MERRIMACK / ST. & MARKET STREET / LOWELL, MASS. [SHOWING THE ELEVATION OF THE MARKET & MERRIMACK ST. BRIDGES].	1918/07/22	NONE	H 21, W 26 CM	INK	TRACING PAPER
C-143-113	SKETCH SHOWING / LAND ON MOODY STREET LEASED TO HARRY / L. STANLEY BY PROPS. LOCKS & CANALS / LOWELL, MASS.	1918/01/23	1"=40'	H 34.8, W 21.3 CM	INK	DRAFTING CLOTH
C-143-114	PLAN OF LAND / CONVEYED TO / TREMONT & SUFFOLK MILLS.	1918/02/00	1"=50'	H 34.8, W 21.3 CM	BLUEPRINT	PAPER
C-143-115	LOWELL, MASS. [PLAN OF LAND LEASED TO TREMONT & SUFFOLK MILLS BY P. L.& C.]	1919/00/00	1"=50'	H 21.7, W 35.7 CM	BLUEPRINT	PAPER
C-143-116	MEMO PLAN / SHOWING / SOME LAND CONDITIONS / NEAR / TREMONT & SUFFOLK MILLS / LOWELL, MASS.	1918/12/18	1"=50'	H 31.1, W 35.8 CM	BLUEPRINT	PAPER
C-143-117	PLAN OF PREMISES / ADJACENT TO / WESTERN CANAL / BETWEEN / MERRIMACK & MARKET STS.	1917/11/20	1"=20'	H 35.7, W 52.1	BLUEPRINT	PAPER
C-143-118	[UNTITLED PLAN.] [PLAN OF P.L.& C. OFFICE BUILDING LOT FOR COMPARISON OF AREAS WITH THE CITY ENGINEER.]	1900/04/05	NONE	H 21.6, W 33.1 CM	INK, COLORED INK, COLORED PENCIL	TRACING PAPER

C-143-119	[UNTITLED PLAN.] [PLAN OF HANOVER & SUFFOLK STS. INDICATING THE DATES OF THE RESOLUTIONS OF THEIR LAYING OUT.]	1902/02/17	1"=50'	H 22.2, W 66 CM	INK, WATER COLOR	TRACING PAPER
C-143-120	PLAN OF REPAIRS ON / MERRIMACK ST. BRIDGE / OVER / WESTERN CANAL.	SEE NOTES	1"=5'	H 27.4, W 55.3 CM	BLUEPRINT	PAPER
C-143-121	GRADES ON / MERRIMACK STREET BRIDGE / OVER WESTERN CANAL.	1911/07/00	1"=5'	H 50.4, W 51.7 CM	INK, COLORED INK	TRACING PAPER
C-143-122	[PLAN OF] MERRIMACK STREET BRIDGE OVER WESTERN CANAL.	UNDATED	1"=8'& 1/2"=1'	H 32.6, W 52.4 CM	INK, WATER COLOR	PAPER
C-143-123	SKETCH SHOWING LOCATION OF WESTERN CANAL WALL / PARALLEL TO SUFFOLK STREET WITH OFFSETS / TO BUILDINGS ON OPPOSITE SIDE OF / SUFFOLK ST.	1897/09/00	NONE	H 19.1, W 105.4 CM	INK	TRACING PAPER
C-143-124	PLAN OF STRINGERS OF / MERRIMACK STREET BRIDGE / OVER / WESTERN CANAL [SHOWING CONDITION JULY 15, 1914].	1914/07/15	1"=5'	H 28, W 52.4 CM	INK, WATER COLOR	TRACING PAPER
C-143-126	SKETCH SHOWING / LOCATION OF / NEW BRIDGE & FENCE / NEAR OFFICE BUILDING OF SACO-LOWELL SHOPS / LOWELL.	1920/10/00	1"=50'	H 31.9, W 24.7 CM	INK	DRAFTING CLOTH
C-143-127	PLAN SHOWING / PROPERTY LINES / ALONG / MERRIMACK CANAL / BETWEEN TERRITORY OF THE / PROPS., LOCKS & CANALS ON MERRIMACK RIVER / & THE / BIGELOW CARPET CO. / LOWELL, MASS.	SEE NOTES	1"=20'	H 22, W 85.8 CM	BLUEPRINT	PAPER
C-143-128	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN DUTTON & DUMMER STS. INCLUDING SOME PROPERTY OF THE P. L. & C. LOTS # 68 AND 69.]	UNDATED	NONE	H 35.5, W 21.3 CM	BLUEPRINT	PAPER

C-143-129	PLAN / SHOWING PROPOSED WIDENING / OF MARKET ST. / LOWELL, MASS.	1911/07/00	1"=20'	H 22, W 37.4 CM	BLUEPRINT	PAPER
C-143-130	PLAN OF LAND IN LOWELL / [BETWEEN WORTHEN & DUTTON STS.] BELONGING TO / MARY E. LENNON.	1913/12/16	1"=10'	H 35.9, W 26.7 CM	INK	TRACING PAPER
C-143-131	PLAN SHOWING DIMENSIONS OF THE / "HUNTINGTON HALL LOT".	1910/02/00	1"=20'	H 30.8, W 41.3 CM	BLUEPRINT	PAPER
C-143-132	[UNTITLED PLAN.] [PLAN OF LAND IN THE VICINITY OF MERRIMACK & SHATTUCK STS. SHOWING TRIANGLE OF SIDEWALK WHICH THE PROPS. LOCKS & CANALS ARE REQUIRED TO KEEP SHOVELLED.]	1924/01/29	1"=50'	H 23.5, W 38.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-143-133	PLAN OF LAND NEAR / HUNTINGTON HALL.	1897/12/16	1"=40'	H 18.7, W 27.9 CM	INK, COLORED INK	TRACING PAPER
C-143-133-[COPY 1]	PLAN OF LAND NEAR / HUNTINGTON HALL.	1897/12/16	1"=40'	H 18, W 26.5 CM	BLUEPRINT, COLORED INK	PAPER
C-143-134	SKETCH TO ACCOMPANY LETTER DATED JULY 24 / 1922 TO A. C. STICKNEY, DIV. SUPT. OF B. AND M. R. R. / RELATIVE TO CHANGE IN BRIDGE 340 ASKED FOR / PROPS. LOCKS & CANALS.	1922/07/24	1"=50'	H 21.5, W 40 CM	BLUEPRINT	PAPER
C-143-135	PLAN [OF LAND NEAR MARKET & DUTTON STS.] COPIED FROM BLUEPRINT / [SHOWING LOCATION OF WIRES OF L.E.L. CORP. CROSSING MERRIMACK CANAL] FURNISHED BY L.E.L. [LOWELL ELECTRIC LIGHT] CORP.	1920/12/02	1'=50'	H 21.8, W 47.7 CM	INK	DRAFTING CLOTH

C-143-136	SCHEDULE OF STEEL BEAMS FOR BOOM / IN / MERRIMACK CANAL / NEAR / MOODY ST. FEEDER GATE HOUSE.	1912/06/00	1/2"=1'	H 24.6, W 64.2 CM	INK, WATER COLOR	TRACING PAPER
C-143-137	[CROSS SECTION OF BENT IRONS FOR] ICE BOOM IN MERRIMACK CANAL / AT MOODY ST. FEEDER GATE HOUSE.	1912/07/00	NONE	H 28.8, W 22 CM	INK, COLORED INK	PAPER
C-143-138	[ICE] BOOM IN MERRIMACK CANAL AT MOODY ST. FEEDER GATE HOUSE / SKETCH SHOWING HOW I-BEAMS "A" & "B" ARE TO CUT OFF AT ONE END.	1912/06/00	FULL SIZE	H 28.6, W 58.4 CM	INK, COLORED INK	TRACING PAPER
C-143-139	[UNTITLED PLAN.] [PLAN SHOWING DATA CONCERNING THE ST. ANNE'S CHURCH PREMISES.]	1914/05/22	1"=50'	H 43.2, W 33.3 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
C-143-140	[UNTITLED PLAN.] [PLAN SHOWING PREMISES BETWEEN KIRK & JOHN STS.]	1888/05/16	NONE	H 47.1, W 44.2 CM	INK, WATER COLOR	DRAFTING CLOTH
C-143-141	PLAN SHOWING PREMISES / 27-28 & 29-30 DUTTON STREE / LOWELL, MASS. [& LOCATION OF NEW PROPOSED BRANCH TRACKS].	1917/11/01	1"=20'	H 31.4, W 39 CM	INK	DRAFTING CLOTH
C-143-142	PLAN OF / CERTAIN PREMISES / BETWEEN / ANNE ST. & MERRIMACK CANAL.	1899/11/24	1"=50'	H 17.7, W 55.4 CM	BLUEPRINT	PAPER
C-143-143	[SKETCH OF] MERRIMACK FLUME.	1917/04/00	1"=10'	H 26.6, W 54 CM	INK, COLORED INK	TRACING PAPER
C-143-144	DESIGN FOR TOPPING OUT WALL OF MERRIMACK CANAL PARALELL / WITH ANNE ST.	1909/04/02	NONE	H 30.5, W 21.6 CM	INK, COLORED INK	PAPER
C-143-145	BOOTT MILLS / PLAN OF / PROPOSED TRANSFORMER HOUSE.	1910/02/08	1"=40', 1/8"=1'	H 30.5, W 45.1 CM	INK	DRAFTING CLOTH

C-143-146	[PLAN OF] LAND IN / LOWELL, MASS. [AT FOOT OF DUTTON ST.] / PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER-TO-/ BOSTON & [LOWELL] R.R. CORP. / F. B. ROWELL ENG. OF REAL ESTATE.	1912/09/00	1"=20'	H 27.6, W 42.6 CM	BLUEPRINT	PAPER
C-143-147	[MEMO RELATIVE TO SEWER IN KIRK ST.]	1917/07/06	1"=50'			TP
C-143-147-[COPY 1]	MEMO RELATIVE TO / SEWER IN KIRK STREET / LOWELL.	1917/07/06	1"=50'	H 28.3, W 51.2 CM	BLUEPRINT	PAPER
C-143-148	[PLAN OF R. R. LOCATIONS SOUTHWEST OF] MERRIMACK M. CO. MILL NO. 3.	1891/11/09	1"=20'	H 29.3, W 43.3 CM	INK, WATER COLOR	TRACING PAPER
C-143-149	[PLAN SHOWING] MILLS & PRINT WORKS / OF THE / MERRIMACK MFG. CO. / LOWELL, MASS. [MANVILLE MILL, RHODE ISLAND, & TYPE OF OLD MILL AT LOWELL, MASS.]	UNDATED	1/2"=100'	H 35.9, W 26.7 CM	INK	PAPER
C-143-150	[PLAN OF] MERRIMACK MFG. CO.'S / MILL YARD / SHOWING DATA PERTAINING TO TEST / OF FIRE SYSTEM MADE SEPT 14, 1897.	1897/09/14	1 1/4"=100'	H 28.9, W 40.1 CM	BLUEPRINT	PAPER
C-144-[151]	ASOCIATED FACTORY MUTUAL FIRE INSURNACE COMPANIES / SPRINKLER SHUT-OFF WARNING.	1917/07/01	NONE	H 43.5, W 28 CM	INK	PAPER
C-144-001	PLAN OF / BOOTT PENSTOCK.	1906/07/14	1"=10'	H 41.6, W 71.1 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
C-144-002	BOSTON & MAINE RAILROAD / SOUTHERN DIV. LOWELL SIDE TRACKS / VALUATION SECTION 15 / BRIDGE NO. 332 / DUTTON ST. LOWELL, MASS. / DETAIL OF BENT.	1917/06/14	1"=100'	H 20.3, W 26.7 CM	BLUEPRINT	PAPER

C-144-003	BOSTON & MAINE RAILROAD / SOUTHERN DIV. LOWELL SIDE TRACKS / VALUATION SECTION 15 / BRIDGE # 332 / DUTTON ST. [NEAR THORNDIKE ST.] LOWELL, MASS. / DETAIL OF BENT.	1917/06/14	1/8"=1'	H 20.3, W 26.7 CM	BLUEPRINT	PAPER
C-144-004	[UNTITLED PLAN.] [PLAN OF LAND ABOUT THE PAWTUCKET CANAL EAST OF THORNDIKE ST.]	1921/08/00	1"=50'	H 40, W 46.4 CM	BLUEPRINT	PAPER
C-144-005	[UNTITLED PLAN.] [PLAN OF LAND ABOUT PAWTUCKET CANAL EAST OF THORNDIKE ST. SHOWING PROPERTY LEASED TO WALKER S. WATSON.]	UNDATED	1"=50'	H 21.9, W 35 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-006	NEW B. & M. R. R. BRIDGE # 331 / OVER PAWTUCKET CANAL / SHOWING ELEVATIONS AT BOTTOM OF COVER PLATES.	1921/01/26	1"=20'	H 31.5, W 30.5 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-007	PLAN SHOWING / LOCATION OF THREE WIRE / CABLES TO BE INSTALLED OVER / LOWER PAWTUCKET CANAL BY / SACO-LOWELL SHOPS.	1921/10/10	1"=40'	H 28.5, W 21.5 CM	INK, GRAPHITE	DRAFTING CLOTH
C-144-008	PLAN OF LAND / CONVEYED BY / PROPS. LOCKS & CANALS ON MERR'K RIVER / TO / SACO-LOWELL SHOPS / LOWELL, MASS.	1916/07/28	1"=20'	H 23.6, W 48.4 CM	INK	DRAFTING CLOTH
C-144-009	PLAN / SHOWING / AREA LEASED TO / LOWELL MACHINE SHOP / FOR BUILDING OVER / LOWER LEVEL OF PAWTUCKET CANAL / 99 YEARS FROM MAY 1,1902.	SEE TITLE	1"=40'	H 21.6, W 35 CM	BLUEPRINT	PAPER
C-144-010	[UNTITLED PLAN.] [PLAN OF LAND NEAR SWAMP LOCKS LEASED TO THE SACO-LOWELL SHOPS.]	1918/09/18	1"=20'	H 21.7, W 35.6 CM	BLUEPRINT	PAPER

C-144-011	SECTIONS IN LOWER LEVEL OF PAWTUCKET CANAL NEAR LOWELL MACHINE SHOP PRESENT / # 3 BUILDING, SHOWING SIZE & / LOCATION OF A PROPOSED PIER & / AMOUNT OF LEDGE TO BE EXCAVATED / BY LOWELL MACHINE SHOP UNDER THE / TERMS OF THE INDENTURE DATED APRIL 1902.	SEE TITLE	1/10"=1'	H 34.6, W 21.6 CM	BLUEPRINT	PAPER
C-144-012	DESIGN BY WHICH THE WALL ON / SOUTH SIDE OF ENTRANCE TO HAMILTON / CANAL WAS BUILT IN 1894.	SEE TITLE	NONE	H 30.5, W 21.6 CM	INK	PAPER
C-144-013	PLAN SHOWING / LOCATION OF A SUGGESTED FENCE ON THE WALL / OF THE HAMILTON CANAL NORTHWESTERLY OF / JACKSON STREET LOWELL, MASS.	1916/09/14	1"=50'	H 42.1, W 55 CM	INK	TRACING PAPER
C-144-014	PLAN OF / LAND IN LOWELL [MASS.] / BELONGING TO / P.L.& C. ON MERRIMACK RIVER / [COPIED FROM PLAN OF] 1844.	1922/07/14	1"=40'	H 48, W 71.4 CM	BLUEPRINT	PAPER
C-144-015	PLAN OF LAND / CONVEYED BY / P. L. & C. ON MERR'K RIVER / TO SACO-LOWELL SHOPS [BELOW SWAMP LOCKS ON SOUTHERN SIDE OF PAWTUCKET CANAL].	1916/00/00	1"=20'	H 21.5, W 21.5 CM	BLUEPRINT	PAPER
C-144-016	PLAN SHOWING LOCATION OF OUTER ROW OF PILES / PUT IN BY APPLETON COMPANY FOR SUPPORT OF NEW / DYE HOUSE BUILT BY AUTHORITY OF 10-YEAR LEASE / DATED MARCH 1, 1901.	1901/03/01	1"=10'	H 18.5, W 76.3 CM	INK	TRACING PAPER

C-144-017	J. MURPHY HOWE PROPERTY / LOWELL, MASS / LAYOUT OF NEW TRACKS..	1920/02/08	1"=40', 3/4"=1'	H 58.4, W 91,5 CM	BLUEPRINT	PAPER
C-144-018	SKETCH OF / P.L.& C. 12" WATER MAIN CROSSING / LOWER PAWTUCKET CANAL [THROUGH THE YARDS OF THE BIGELOW CARPET CO.] & CONNECTIONS WITH SAME.	1902/09/12	1"=40'	H 37.2, W 60.4 CM	BLUEPRINT	PAPER
C-144-019	[UNTITLED PLAN.] [SECTIONS OF WALL ON NORTHERN SIDE OF LOWER PAWTUCKET CANAL NEAR BIGELOW CARPET CO.]	1909/07/02	1/4"=1'	H 50, W 35.5 CM	INK, COLORED INK	PAPER
C-144-020	MISC. DATA / RELATING TO / BIGELOW-HARTFORD CARPET CO. / LOWELL, MASS.	1920/01/00	1"=40'	H 63.2, W 104.4 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-021	PROPS. LOCKS & CANALS / [TYPICAL PLAN OF TRUSSES FOR THE] BLUE DYE HOUSE ICE BOOM.	1918/10/00	1"=1'	H 63.2, W 158.1 CM	INK	DRAFTING CLOTH
C-144-022	PROPS. LOCKS & CANALS / [ELEVATION OF THE] BLUE DYE HOUSE ICE BOOM [& PLAN SHOWING LOCATION OF THE BOOM].	1918/10/00	1"=1', 1"=20'	H 46.4, W 90.2 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-023	[PLAN OF] LAND IN LOWELL, MASS., [AT CORNER OF CENTRAL & MARKET STS.] / BELONGING TO / ROBERT L. P. MASON	1915/03/26	1"=10'	H 60.7, W 46.6 CM	BLUEPRINT	PAPER
C-144-024	PLAN OF LAND OF THE WESTERLY SIDE OF / CENTRAL STREET BETWEEN PAW- / TUCKET CANAL & MAR- / KET STREET.	1888/10/13	1"=10'	H 46.4, W 37.9 CM	INK, COLORED PENCIL	TRACING PAPER
C-144-025	[PLAN SHOWING LOCATION OF] PRESCOTT ST. / SEWERS.	1909/08/13	1"=50'	H 54.3, W 69.2 CM	INK, COLORED INK	PAPER

C-144-025-[A]	SEWER LOCATIONS / IN VICINITY OF / PRESCOTT STREET.	1928/05/00	1"=50'[SEE NOTES]	H 25, W 37 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER
C-144-026	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN MARKET ST. & PAWTUCKET CANAL SHOWING DISPOSAL OF P.L.& C. PROPERTY.]	1887/00/00	1"=40'	H 21.3, W 35.3 CM	INK, WATER COLOR	TRACING PAPER
C-144-027	[UNTITLED PLAN.] [PLAN OF LAND ALONG CENTRAL ST. BETWEEN MARKET ST. & PAWTUCKET CANAL INCLUDING LOTS # 76 & 77.]	1904/00/00	1"=10'	H 45.1, W 38 CM	INK, WATER COLOR	TRACING PAPER
C-144-028	PLAN SHOWING / PREMISES LEASED TO / GEORGE S. MOTLEY & FRANK E. DUNBAR / LOWELL, MASS. [ON CENTRAL ST. & SHOWING ALSO LENGTH OF CONCRETE FACING PUT IN.]	1918/08/30	1"=20'	H 33.4, W 22.6 CM	BLUEPRINT	PAPER
C-144-029	[PLAN SHOWING LOCATION OF] CONCRETE LAID BY E. A. & A. T. SMITH CO. ON CENTRAL ST. BRIDGE.	1913/04/00	1"=4'	H 52.4, W 70 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-144-030	SURFACE PLAN OF / CENTRAL STREET BRIDGE / OVER / PAWTUCKET CANAL / SHOWING AREA RESURFACED WITH TAR ON AUG. 11, 13, 14, 1914.	SEE TITLE	1"=4'	H 48.4, W 82.9 CM	INK, WATER COLOR	TRACING PAPER
C-144-031	[PLAN OF] CENTRAL STREET BRIDGE [OVER PAWTUCKET CANAL SHOWING CONDUIT PIPES OF LOWELL ELECTRIC LIGHT CO.]	SEE NOTES	1"=20'	H 32.4, W 21.6 CM	INK, WATER COLOR	PAPER

C-144-032	METHOD OF ATTACHING SUPPORTS FOR N. E. TEL.& TEL. CO. CONDUIT, TO GIRDERS OF THE NEW / CENTRAL ST. BRIDGE OVER PAWTUCKET CANAL, / LOWELL, MASS.	1922/06/22	NONE	H 21, W 39.1 CM	BLUEPRINT	PAPER
C-144-033	PROP. OF LOCKS & CANALS / DETAIL OF / CENTRAL ST. BRIDGE / NEAR / CAR TRACK.	1917/05/08	2"=1'	H 25.5, W 36.8 CM	INK	TRACING PAPER
C-144-034	[PLAN & ELEVATION OF] ADDITION TO [DUNBAR-] MOTLEY PLATFORM.	1918/03/15	NONE	H 20.3, W 49.3 CM	INK, COLORED INK, WATER COLOR	PAPER
C-144-035	DIAGRAM OF PAWTUCKET CANAL / AT / CENTRAL ST. LOWELL, MASS. SHOWING / TRUSSES & PIPES THEREIN & STEEL / GIRDERS BEING INSTALLED UNDER PLAT- / FORM ON EAST SIDE OF CENTRAL STREET.	1916/09/27	1"=40'	H 32.5, W 73.4 CM	BLUEPRINT	PAPER
C-144-036	[SKETCH TO BE USED AS SHIPPING LIST OF STEEL BEAMS FOR] ALTERATIONS TO [MOTLEY] CANAL BLOCK, LOWELL, MASS. [ON THE WESTERN PLATFORM OF CENTRAL ST. BRIDGE OVER PAWTUCKET CANAL].	1918/06/03	NONE	H 43.3, W 28.3 CM	BLUEPRINT	PAPER
C-144-037	[BEAM SKETCH FOR] ALTERATIONS TO [MOTLEY] CANAL BLOCK, LOWELL [ON WESTERLY PLATFORM OF CENTRAL ST. BRIDGE].	1918/06/03	NONE	H 43.5, W 28.3 CM	BLUEPRINT	PAPER
C-144-038	[DETAILS OF THE STEEL WORK FOR] ALTERATIONS TO [MOTLEY] CANAL BLOCK, LOWELL [ON WESTERLY PLATFORM OF CENTRAL ST. BRIDGE].	1918/06/03	NONE	H 30.5, W 88.4 CM	BLUEPRINT	PAPER

C-144-039	CITY SEWERS NEAR NEW [STRAND] THEATRE.	1916/08/30	1"=50'	H 35.7, W 25.4 CM	BLUEPRINT	PAPER
C-144-040	PLAN OF PLATFORM OVER / PAWTUCKET CANAL / EAST SIDE OF CENTRAL ST. [BRIDGE].	1916/04/00	1"=20'	H 36.8, W 39.9 CM	INK, COLORED INK	TRACING PAPER
C-144-041	SKETCH SHOWING AREA OUTSIDE OF LEASED / AREA DESIRED FOR USE BY THE MIDDLESEX CO. / IN REAR OF "THEATER PLATFORM" / ON CENTRAL ST. [NORTH OF AMERICAN HOUSE PROPERTY.]	1916/10/00	1"=4'	H 34.5, W 21.4 CM	BLUEPRINT	PAPER
C-144-042	SKETCH SHOWING AREA OUTSIDE OF LEASED / AREA DESIRED FOR USE BY THE MIDDLESEX / CO. IN REAR OF "THEATRE PLATFORM" / ON CENTRAL ST. [OPPOSITE MIDDLESEX CO.].	1916/11/00	1"=4'	H 34.6, W 21.3 CM	BNLUEPRINT	PAPER
C-144-043	PLAN SHOWING PREMISES / LEASED TO / MIDDLESEX CO. / BY / P.L.& C. / [NEAR CENTRAL ST.] LOWELL, MASS.	1916/00/00	1"=20'	H 37.8, W 21.6 CM	BLUEPRINT	PAPER
C-144-044	PLAN SHOWING / PROPERTY LINES / NEAR / LOWER LOCKS / BETWEEN TERRITORY OF THE / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / AND THE / MIDDLESEX CO.	1920/03/31	1"=20'	H 22, W 88.9 CM	BLUEPRINT	PAPER
C-144-045	PLAN OF THE PREMISES / [EAST OF LOWER LOCKS] LEASED TO / MIDDLESEX CO. / LOWELL, MASS.	UNDATED	1"=40'	H 20.5, W 33 CM	BLUEPRINT	PAPER
C-144-046	SKETCH SHOWING / LAND REQUIRED BY / STRAND REALTY CO. / FOR FIRE ESCAPE PASSAGEWAY / AT STRAND THEATER BUILDING / LOWELL.	1917/00/00	1"=40'	H 21.7, W 35.2 CM	BLUEPRINT	PAPER

C-144-047	SKETCH SHOWING / THREE LOTS OF LAND [SOUTH OF HAMILTON CANAL] LEASED TO BOSTON / AND LOWELL R. R. CORP. BY PROPS. OF LOCKS / AND CANALS.	1918/03/11	1"=50'	H 35.3, W 37.2 CM	BLUEPRINT	PAPER
C-144-048	[UNTITLED PLAN.] [SKETCH OF HAMILTON CANAL & VICINITY SHOWING LOCATION OF MAIN TRACK OF BOSTON & LOWELL R.R.]	1891/10/19	NONE	H 25.4, W 56 CM	INK, WATER COLOR	TRACING PAPER
C-144-049	PLAN SHOWING / RAILROAD TRACKS / IN JACKSON STREET / LOWELL MASS.	1917/04/00	1"=50'	H 55.8, W 144.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-050	SACO-LOWELL SHOPS / ALTERATION TO FOUNDRY / REQUIRED BY / PROPOSED TRACK LOCATION.	1921/03/28	1"=20"	H 37.2, W 44.2 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-051	SKETCH SHOWING OCCUPATION OF / CERTAIN RAILROAD LAND / BY APPLETON / COMPANY [BET. JACKSON ST. AND HEAD OF HAMILTON CANAL].	1918/06/05	1"=50'	H 28.5, W 42 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-144-052	PLAN SHOWING LOT OF / LAND LEASED TO THE / APPLETON CO. / FOR RAILROAD PURPOSES.	1918/05/00	1"=50'	H 28.6, W 21.6 CM	BLUEPRINT	PAPER
C-144-053	[UNTITLED PLAN.] [PLAN OF PREMISES SOUTH OF ENTRANCE TO HAMILTON CANAL SHOWING LOT "D" REFERRED TO IN INDENTURE # 434.]	1918/04/22	1"=20'	H 35.9, W 20.3 CM	INK	DRAFTING CLOTH

C-144-054	[PLAN OF] PROPERTY OF THE APPLETON MANUFACTURING / COMPANY, LOWELL, MASS., TO BE SOLD AT PUBLIC / AUCTION, TUESDAY, MARCH 26, 1889, AT 4 O'CLOCK, / P.M. / BY J. E. CONANT & CO., AUCTIONEERS, OFFICE / 184 CENTRAL STREET.	1889/03/18	NONE	H 26.7, W 40.7 CM	INK	PAPER
C-144-055	PLAN / SHOWING LOCATION OF WALLS NEAR / BOUNDARY LINE BETWEEN / APPLETON & HAMILTON CO' S.	1881/11/22	5/16"=10', 1"=8'	H 36, W 23.6 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-056	SKETCH SHOWING / PROPOSED FOOT BRIDGE / AT APPLETON COMPANY.	1923/07/00	1"=40'	H 21.6, W 28 CM	INK	TRACING PAPER
C-144-057	APPLETON CO. / PROPOSED 2" PIPE / BESIDE HAMILTON CANAL / FOR CONNECTION TO PRIVATE / FIRE BOX.	1921/08/09	1"=4'	H 21.6, W 27.1 CM	BLUEPRINT	PAPER
C-144-058	[UNTITLED PLAN.] [PLAN SHOWING LOCATION OF APPLETON CO. DYE HOUSE OVER LOWER PAWTUCKET CANAL.]	1909/09/01	NONE	H 39.4, W 46.7 CM	INK, COLORED PENCIL	TRACING PAPER
C-144-059	[PLAN OF] PART OF / MILL YARD / OF THE / HAMILTON MFG. CO. [SHOWING THE LOCATION OF THE WHEELS.]	1914/04/00	1"=10'	H 60.9, W 118.8 CM	BLUEPRINT	PAPER
C-144-060	LOWELL, MASS. [PLAN OF THE MILL YARD OF THE HAMILTON MFG. CO.]	1919/05/00	1"=100'	H 21.7, W 35.3 CM	BLUEPRINT	PAPER
C-144-061	MEMO OF AGREEMENT / BETW. LOW. BLEACHERY / & WAMESIT POWER RE / WATER RIGHTS.	1901/10/01	NONE	H 38.5, W 28.5 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

C-144-062	SKETCH SHOWING ASSESSED / VALUATION OF LAND BETWEEN / ANDOVER & POND STREETS / IN 1900. FIGURES IN CIRCLES / SHOW VALUATION PER SQ. FT.	1900/08/10	NONE	H 24.5, W 33.1 CM	BLUEPRINT	PAPER
C-144-063	PLAN OF / LAND & BUILDINGS / # 100 CHURCH ST. / LOWELL, MASS., BELONGING TO / MIDDLESEX CO. [AT CORNER OF CHURCH & GEORGE STS].	1902/02/04	1"=20'	H 26.1, W 35.3 CM	BLUEPRINT	PAPER
C-144-064	SECTIONS IN FRONT OF THE / DILLON DYE HOUSE BUILDING / (LOOKING DOWNSTREAM).	1918/12/08	NONE	H 95.9, W 48.2 CM	INK, COLORED PENCIL	PAPER
C-144-065	[PLAN OF THE] DILLON LOT [ON CONCORD RIVER SHOWING LOCATION OF THE COFFER DAM].	1919/07/00	1"=10'	H 29.5, W 44.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-144-066	PART OF / CONCORD RIVER / NEAR / EAST MERRIMACK ST. LOWELL, MASS.	1919/01/00	1"=50'	H 44.2, W 61 CM	INK, WATER COLOR	TRACING PAPER
C-144-067	ARRANGEMENT OF ROAD BED / EAST MERRIMACK ST. BRIDGE.	1908/08/00	1/10"=1'	H 29.3, W 46 CM	COLORED PENCIL	PAPER
C-144-068	EAST MERRIMACK ST. BRIDGE / EAST ABUTMENT [LOOKING DOWNSTREAM].	1918/12/04	1"=8'	H 28, W 21.6 CM	INK, COLORED INK	TRACING PAPER
C-144-069	[UNTITLED PLAN.] [PLAN OF CONCORD RIVER & VICINITY BELOW EAST MERRIMACK ST. BRIDGE].	1921/07/00	1"=40'	H 44, W 77 CM	INK, GRAPHITE	DRAFTING CLOTH

C-144-070	SKETCH SHOWING LINES OF THE TEMPORARY DRY WALL BUILT / IN 1908 ON WESTERLY SIDE OF CONCORD RIVER:- THE PART HERE / SHOWN IS ABREAST OF THE MASS. PICKER.	1909/06/00	1"=4'	H 41.3, W 139.7 CM	INK	TRACING PAPER
C-144-071	[UNTITLED PLAN.] [PLAN OF NORTHERN SIDE OF EASTERN CANAL BELOW CENTRAL ST.]	1919/10/27	1"=20'	H 35.2, W 59.7 CM	INK	TRACING PAPER
C-144-072	[UNTITLED PLAN.] [PLAN SHOWING PREMISES BETWEEN PRESCOTT ST. & THE HEAD OF THE EASTERN CANAL, SHOWING LAND LEASED TO JAMES GOOKIN.]	UNDATED	1"=20'	H 21.5, W 35.5 CM	INK, WATER COLOR	TRACING PAPER
C-144-073	LOWELL, MASS. [PLAN OF PREMISES BETWEEN PRESCOTT ST. & HEAD OF THE EASTERN CANAL SHOWING LOT LEASED TO WILLIAM L. ROBERTSON.]	UNDATED	1"=20'	H 21.7, W 35.7 CM	INK, WATER COLOR	TRACING PAPER
C-144-074	LOWELL, MASS. [PLAN OF EASTERN CANAL & VICINITY ABOVE EAST MERRIMACK ST. BRIDGE SHOWING AREA LEASED TO MASS. COTTON MILLS BY P. L.& C.]	1909/04/01	1"=40'	H 21.5, W 35.6 CM	BLUEPRINT	PAPER
C-144-075	[PLAN OF] EAST MERRIMACK ST. BRIDGE [OVER] (EASTERN CANAL).	UNDATED	1"=10'	H 32.4, W 21.4 CM	INK, WATERCOLOR	PAPER
C-144-076	SURFACE PLAN OF / EAST MERRIMACK STREET BRIDGE / OVER / EASTERN CANAL SHOWING AREA RESURFACED WITH TAR SEPT. 3, 1914.	SEE TITLE	1"=5'	H 38.4, W 54.6 CM	INK, WATER COLOR	TRACING PAPER
C-144-077	PLAN SHOWING AREA OVER EASTERN CANAL / TO BE LEASED TO / MASSACHUSETTS COTTON MILLS.	1910/03/00	1"=10'	H 36.8, W 61 CM	INK, COLORED INK	TRACING PAPER

C-144-078	PLAN SHOWING A PORTION OF THE BRANCH TRACK LOCATIONS CLAIMED BY THE B.& L. RAILROAD IN ITS FILING / OF MARCH 23, 1883.	1917/11/03	1/4"=10'	H 47.6, W 74 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-144-079	SKETCH OF / CANAL ST. WALL / AS REINFORCED IN 1917.	1917/08/01	1"=25'	H 28.2, W 21.6 CM	BLUEPRINT	PAPER
C-144-080	[UNTITLED PLAN.] [DESCRIPTIVE PLAN OF LAND ABOUT THE EASTERN CNAL BELOW MERRIMACK ST. SHOWING R.R. LOCATION.]	1910/02/26	1"=40'	H 29.2, W 40.5 CM	INK, COLORED INK, COLORED PENCIL	TRACING PAPER
C-144-081	SKETCH / TO SHOW PIPES CAN BE LAID TO / SUPPLY WATER FOR FIRE PURPOSES TO THE / NEW COTTON STORE HOUSES OF THE / MASS. COTTON MILLS / ON CANAL STREET LOWELL, MASS.	1903/02/00	1"=40'	H 29.2, W 79.5 CM	INK, WATER COLOR	PAPER
C-144-082	PLAN OF LAND IN LOWELL, MASS [NEAR BRIDGE ST., BROWN ST., & KIRK ST.] BELONGING TO THE MASSACHUSETTS COTTON MILLS. [TO BE SOLD AT AUCTION OCT.13, 1890.]	1890/00/00	1"=40'	H 34.9, W 31.8 CM	INK, COLORED INK	PAPER
C-144-083	MASSACHUSETTS C. MILLS / MILL YARD / SHOWING DATA PERTAINING TO TEST / OF FIRE SYSTEM MADE MAY 10, 1897.	1898/10/28	1"=60'	H 39.5, W 28.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-084	[PLAN OF] MASSACHUSETTS COTTON MILLS. / "MAIN YARD" / LOWELL, MASS. [TO ACCOMPANY REPORT OF ASSOCIATED MUTUAL INSURANCE COS.].	1898/09/23	1"=60'	H 40.5, W 55.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
C-144-085	[PLAN OF] BRIDGE STREET BRIDGE OVER EASTERN CANAL.	UNDATED	1"=10'	H 32.4, W 21.6 CM	INK, COLORED PENCIL	PAPER

C-144-086	[UNTITLED PLAN.] [PLAN SHOWING REPAIRS MADE ON EASTERN CANAL WALL BELOW MASS. NEW MILL.]	1918/11/23	1"=40'	H 27.3, W 83.9 CM	INK, COLORED PENCIL	TRACING PAPER
C-144-087	SECTIONS IN EASTERN CANAL / BELOW / EAST MERRIMACK STREET / TAKEN DEC. 1, 1918.	1918/12/01	1"=10'	H 40.5, W 62 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-088	[UNTITLED PLAN.] [SECTIONS OF EASTERN CANAL WALL.]	1919/03/17	NONE	H 25.6, W 20.3 CM	INK, WATER COLOR, COLORED INK	PAPER
C-144-089	[UNTITLED PLAN.] [PLAN SHOWING LOCATION OF THE SECTIONS OF C-144-088.]	1919/03/17	1"=40'	H 30.6, W 56 CM	INK, COLORED INK	TRACING PAPER
C-144-090	STREET PLAN / BRIDGE ST. CANAL BRIDGE / RESURFACED BY SMITH JUNE 19, 1914.	1914/06/19	1"=5'	H 32.1, W 39.4 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
C-144-091	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS. / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 68.8, W 72.4 CM	HELIOTYPE, GRAPHITE	TRACING PAPER
C-144-092	[PLAN & ELEVATION OF] HOUSE OVER BOOTT DAM.	1888/10/17	1"=4'	H 48.5, W 76.2 CM	INK	PAPER
C-144-093	PLAN SHOWING / LOCATION OF / THE BOOTT PENSTOCK / AND PROPOSED NEW STEEL PENSTOCK / LOWELL, MASS.	1906/07/27	1"=20'	H 21.5, W 34 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-094	PLAN OF LAND BELONGING TO / PROPS. OF LOCKS & CANALS / NEAR HEAD GATES / OF / NORTHERN CANAL [INCLUDING LOTS # 29 & 29-A].	1916/11/20	1"=50'	H 33.9, W 46.4 CM	INK, WATER COLOR	TRACING PAPER
C-144-095	PLAN A / PLAN OF GATE HOUSE & CHAMBERS / GUARD GATES / NORTHERN CANAL.	1916/08/00	1"=4'	H 48.5, W 58.5 CM	BLUEPRINT	PAPER

C-144-096	PLAN B / CHAMBERS AT / GATE HOUSE OF / NORTHERN CANAL / LOWELL, MASS.	1916/08/00	1/4"=1'	H 43.5, W 71 CM	BLUEPRINT	PAPER
C-144-097	[UNTITLED PLAN.] [PLAN OF PROPERTY SOUTH OF THE NORTHERN CANAL & EAST OF SCHOOL ST. INCLUDING P.L.& C. LOTS # 29-A & 30.]	1922/09/07	1"=100'	H 32.1, W 61.4 CM	INK, WATER COLOR	DRAFTING CLOTH
C-144-098	PLAN OF LAND IN LOWELL [ALONG FALLS ST.] / BELONGING TO / HEIRS OF ANDREW F. JEWETT.	1923/07/26	1"=20'	H 33.2, W 37.1 CM	INK	DRAFTING CLOTH
C-144-099	MEMORANDUM PLAN [OF LAND AT CORNER OF PAWTUCKET & MOODY STS. SHOWING AREA DESIRED BY OMER DEZIEL] / LOWELL, MASS.	1921/07/19	1"=50'	H 21.3, W 38.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-100	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN MOODY, PAWTUCKET, MELVIN STS. & THE MERR'K RIVER.]	UNDATED	1"=50'	H 20.5, W 33 CM	BLUEPRINT	PAPER
C-144-101	[PLAN OF] "HIGH BRIDGE" PAWTUCKET ST. / OVER NORTHERN CANAL.	UNDATED	1"=20'	H 32.3, W 21.6 CM	INK, WATER COLOR	PAPER
C-144-102	PAWTUCKET ST. BRIDGE OVER / NORTHERN CANAL-KNOWN AS / "HIGH BRIDGE" / SHOWING REPAIRS MADE TO THE STRINGERS IN OCTOBER & NOVEMBER 1915.	SEE TITLE	1"=10'	H 22.2, W 64.8 CM	INK, WATER COLOR	TRACING PAPER
C-144-103	[PLAN OF] SUFFOLK ST. BRIDGE / [OVER] NORTHERN CANAL.	UNDATED	1"=10'	H 21.6, W 32.5 CM	INK, WATER COLOR	PAPER
C-144-104	TWO BRACES / TO HOLD SAGGING STRINGERS / [FOR] SUFFOLK ST. BRIDGE / OVER / NORTHERN CANAL / PUT IN JULY 18, 1914.	1914/08/16	1"=1'	H 22.2, W 38.8 CM	BLUEPRINT	PAPER

C-144-105	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN AIKEN & CABOT STS. SHOWING LAND RESERVED FOR SIDEWALKS ALONG MERRIMACK ST.]	1918/12/16	1"=80'	H 28, W 21.6 CM	BLUEPRINT	PAPER
C-144-106	PLAN OF LAND / [ON COOLIDGE ST.] CONVEYED BY / PROPS. LOCKS & CANALS / TO / LILLIAN A. COGNAC.	1923/00/00	1"=50'	H 21.7, W 35 CM	BLUEPRINT	PAPER
C-144-107	[SKETCH SHOWING] THE / [LOCATION OF THE] LOWELL ELECTRIC LIGHT / CORPORATION. [WIRESCROSSING NORTHERN CANAL AT AIKEN ST.]	1910/07/25	1"=100'	H 27.9, W 21.6 CM	INK	PAPER
C-144-108	[UNTITLED PLAN.] [PLAN OF NORTHERN CANAL FROM AIKEN ST. TO TREMONT & SUFFOLK MILLS SHOWING LOT # 65-Y-Z & SHOWING LAND CONVEYED TO THE TREMONT & SUFFOLK MILLS.]	1919/00/00	1"=50'	H 21.6, W 35.6 CM	BLUEPRINT	PAPER
C-144-109	[UNTITLED PLAN.] [PLAN OF LAND NEAR THE JUNCTION OF THE NORTHERN & WESTERN CANALS.]	1919/00/00	1"=50'	H 21.5, W 35.5 CM	BLUEPRINT	PAPER
C-144-110	TREMONT & SUFFOLK MILLS / TREMONT SIDE / MILL YARD / SHOWING DATA PERTAINING TO TEST / OF THE FIRE SYSTEM MADE JUNE 9, 1897.	1897/06/09	1"=60'	H 28.3, W 39.4 CM	BLUEPRINT	PAPER
C-144-111	[PLAN OF LAND BETWEEN NORTHERN CANAL, AIKEN ST. & MERRIMACK RIVER INCLUDING LOTS # 31, 33, 34, 35, 36, & 64.] PLAN A.	1920/05/00	1"=80'	H 32.7, W 20.3 CM	BLUEPRINT	PAPER

C-144-112	SKETCH GIVING SOME DETAILS RELATIVE TO / PROPERTY LINES AT TREMONT & SUFFOLK MILLS.	1917/04/00	1"=40'	H 64.1, W 96.6 CM	BLUEPRINT	PAPER
C-144-113	PLAN SHOWING / DEED CONDITIONS / NEAR THE / LAWRENCE MFG. CO. / & / TREMONT & SUFFOLK MILLS / [BETWEEN AIKEN ST. NORTHERN CANAL, MERRIMACK MFG. CO. & MERRIMACK RIVER] LOWELL, MASS.	1919/07/00	1"=80'	H 62.6, W 59.3 CM	BLUEPRINT	PAPER
C-144-114	PLAN SHOWING / SOME DEED CONDITIONS NEAR / TREMONT & SUFFOLK MILLS / [BETWEEN TREMONT & TILDEN STS.] LOWELL, MASS.	1919/07/00	1"=40"	H 57.5, W 43.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-115	PLAN SHOWING / CERTAIN DEED CONDITIONS NEAR THE PREMISES OF / TREMONT & SUFFOLK MILLS / [BETWEEN HALE ST. & THE NORTHERN CANAL] LOWELL, MASS.	1919/06/00	1"=40'	H 54.1, W 86.7 CM	BLUEPRINT	PAPER
C-144-116	[PLAN OF] TREMONT & SUFFOLK MILLS. / LAWRENCE SECTION. / LOWELL, MASS. [ASSOCIATED MUTUAL FIRE INSURANCE COS.]	1898/09/30	1"=50'	H 28, W 40.6 CM	BLUE LINE PRINT, WATER COLOR	PAPER
C-144-117	[PLAN OF] TREMONT & SUFFOLK MILLS / SUFFOLK SIDE / MILL YARD / SHOWING DATA PERTAINING TO THE TEST OF THE FIRE SYSTEM MADE SEPT. 7, 1897.	SEE NOTES	1"=60'	H 39.4, W 28.4 CM	BLUEPRINT, COLORED INK	PAPER
C-144-118	[PLAN OF] TREMONT & SUFFOLK MILLS / LAWRENCE SECTION / MILL YARD / SHOWING DATA PERTAINING TO TEST / OF THE FIRE SYSTEM MADE SEPT. 7, 1897.	1897/09/07	1"=50'	H 39.1, W 28.3 CM	BLUEPRINT	PAPER

C-144-119	LOWELL, MASS. [PLAN OF LAND BETWEEN RACE ST., DODGE ST., NORTHERN & WESTERN CANAL SHOWING DEED CONDITIONS IN REGARD TO DAMAGE FROM CANAL WATER.]	1920/12/02	1"=40'	H 21.8, W 28.3 CM	INK	DRAFTING CLOTH
C-144-120	[SKETCH OF LAND ABOUT PAWTUCKET DAM & PAWTUCKET CANAL]. COPIED FROM MAP OF CITY / OF LOWELL BY BEARD AND HOAR DATED 1841.	SEE TITLE	1"=200'	H 26, W 19 CM	GRAPHITE	TRACING PAPER
C-144-121	[UNTITLED PLAN.] [SEKTCH OF HEAD OF PAWTUCKET CANAL AND VICINITY.]	1904/07/00	1"=200'	H 24.2, W 24.4 CM	INK	TRACING PAPER
C-144-122	[UNTITLED PLAN.] [SKETCH OF LAND ABOUT PAWTUCKET BRIDGE COPIED JULY 1904 FROM PLAN BY U. A. BOYDEN.]	1904/07/00	1"=20 RODS	H 24.2, W 36 CM	INK, WATER COLOR	PAPER
C-144-123	PLAN OF PART OF / NEW PAWTUCKET BRIDGE / OVER / NORTHERN CANAL.	1916/12/08	1"=10'	H 65.1, W 89.5 CM	INK, WATER COLOR	PAPER
C-144-124	[UNTITLED PLAN.] [PLAN OF NORTHERN CANAL TO AIKEN ST. SHOWING PROGRESS IN TRIMMING TREES ALONG BANK].	1919/00/00	NONE	H 57.1, W 86.3 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER
C-144-125	PLAN OF NEW FLOOR & TRACK / ON MOODY STREET BRIDGE LOWELL, MASS.	SEE NOTES	1"=1'	H 34.1, W 83.2 CM	INK, COLORED INK	TRACING PAPER
C-144-126	PLAN OF / LAND IN LOWELL, MASS. / BELONGING TO / PROPRIETORS OF THE LOCKS & CANALS / ON MERRIMACK RIVER.	1914/02/00	1"=250'	H 34.6, W 21.5 CM	BLUEPRINT	PAPER
C-144-127	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN CABOT ST. NORTHERN CANAL & MERRIMACK RIVER WITH SURVEY NOTES.]	UNDATED	1"=40'	H 55.9, W 71.2 CM	INK, COLORED INK	PAPER

C-144-128	LOWELL, MASS. [PLAN OF LAND NORTH WEST OF AIKEN ST. NEAR MERRIMACK RIVER BELONGING TO THE LAWRENCE MFG. CO.]	1913/02/01	1"=50'	H 51.5, W 61.9 CM	BLUEPRINT	PAPER
C-144-129	PLAN OF LAND [BETWEEN PERKINS, AIKEN, TUCKER, & HILL STS.] CONVEYED BY / PROPS LOCKS & CANALS ON MERR'K RIVER / TO HELENE GELINAS / LOWELL, MASS.	1923/05/00	1"=50'	H 38.4, W 25.2 CM	INK	DRAFTING CLOTH
C-144-130	PLAN OF LAND IN VICINITY OF CHEEVER, / PERKINS & AIKEN STS.	1922/05/24	1"=50'	H 30.1, W 46.6 CM	BLUEPRINT	PAPER
C-144-131	PLAN SHOWING / ENCROACHMENT BY BUILDINGS BELONGING / TO GEORGE VAROUNIS ON LAND OF PROPS. LOCKS & CANALS [NEAR WARD ST].	1922/06/00	1"=10'	H 26.7, W 47 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-144-132	SKETCH / INDICATING WORK DONE / SUNDAY SEPT. 8, 1918 / FOR THE PURPOSE OF DIVERTING WATER / FROM MERRIMACK RIVER TO LAWRENCE M.F.'G. CO'S. / 4, & 6 RACEWAYS, / TO / SUPPLY FIRE PUMPS WHEN / RIVER IS VERY LOW.	SEE TITLE	1"=100'	H 28.2, W 21.7 CM	BLUEPRINT	PAPER
C-144-133	PLAN OF PART OF / BOOTT MILLS [ALONG AMORY ST.] / SHOWING LOCATION OF SURFACE DRAINS RECENTLY LAID.	1920/10/27	1/4"=10'	H 28, W 51.8 CM	INK, COLORED INK	DRAFTING CLOTH
C-144-134	COPY OF PLAN ATTACHED TO THE ORIGINAL / INDENTURE, DATED NOV.16, 1835, BY WHICH / P.L.& C. CONVEYED TO BOOTT / COTTON MILLS LAND FOR THEIR MILL SITE.	1918/08/14	1"=80'	H 24.5, W 44.5 CM	BLUEPRINT	PAPER

C-144-135	PLAN OF A PART / OF / MERRIMACK RIVER [AT LOWELL] SHOWING AN ADOPTED MODIFICATION OF THE SOUTHERLY BOUNDARY LINE ADJACENT TO / THE MASSACHUSETTS COTTON MILLS.	1908/12/00	1"=100'	H 51.8, W 81.9 CM	BLUEPRINT	PAPER
C-144-136	PLAN OF LAND ON STACKPOLE STREET / SOLD TO ST. JOHN'S HOSPITAL / JULY 27, 1917.	1919/09/09	1"=40'	H 25.8, W 42 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-144-137	SKETCH SHOWING / LOCATION & CO-ORDINATES / OF POINTS IN / HUNTS FALLS SURVEY.	1897/03/00	NONE	H 56, W 71.5 CM	INK, COLORED INK	TRACING PAPER
C-144-138	[SKETCH OF THE LOCATION OF] THE LOWELL ELECTRIC LIGHT CORPORATION [WIRES NEAR LOCKS & CANALS RESERVOIR ON FAIRMOUNT ST.].	1911/05/31	1"=150'	H 21, W 27.6 CM	BLUEPRINT	PAPER
C-144-139	PLAN OF LAND / ON / VARNUM AVE. BELONGING TO PETER COUREMBIS.	1921/10/21	1"=80'	H 41.9, W 41.9 CM	BLUEPRINT	PAPER
C-144-140	PLAN OF LAND [ON VARNUM AVE.] / BELONGING TO / ARGIRO COUREMBIS / LOWELL, MASS.	1921/12/00	1"=80'	H 34.9, W 21.9 CM	INK	DRAFTING CLOTH
C-144-141	PLAN OF LAND [ON VARNUM AVE.] / BELONGING TO / ATWOOD L. DEARBORN / LOWELL, MASS.	1921/11/00	1"=80'	H 35, W 21.7 CM	INK	DRAFTING CLOTH
C-144-142	PLAN OF LAND IN LOWELL, MASS. / BELONGING TO / PETER J. & ARGIRO COUREMBIS.	1921/09/00	1"=40'	H 48.9, W 68.9 CM	BLUEPRINT	PAPER
C-144-143	SECTION / ACROSS / VARNUM AVE. / AT / PAWTUCKET DAM.	1894/09/19	NONE	H 14.7, W 58.5 CM	INK, COLORED INK	PAPER

C-144-144	PLAN OF / LAND IN LOWELL, MASS. / BELONGING TO / P.L.& C. / ON MERRIMACK RIVER.	1914/02/00	1"250'	H 34.7, W 21.3 CM	BLUEPRINT	PAPER
C-144-145	BUILDING LOTS / AT / RIVERBANK, / LOWELL, MASS. [BELONGING TO GEORGE J. CARNEY & A. S. COVEL BETWEEN RIVERSIDE ST. & COLONIAL AVE.]	1897/06/10	1"=100'	H 33.7, W 48.2 CM	INK	PAPER
C-144-146	PLAN OF LAND [BETWEEN RIVERSIDE, MOULTON, & WOODSTOCK STS. & COLONIAL AVE.] / CONVEYED TO / COMMONWEALTH MASSACHUSETTS / LOWELL, MASS.	1921/07/29	1"=100'	H 34.9, W 21.3 CM	INK	DRAFTING CLOTH
C-144-147	PLAN OF / LAND IN LOWELL MASS. / BELONGING TO / PROPS. OF THE LOCKS & CANALS / ON MERRIMACK RIVER.	1914/02/00	1"=250'	H 34.9, W 21.5 CM	BLUEPRINT	PAPER
C-144-148	PLAN OF / LAND IN PAWTUCKETVILLE / BELONGING TO / PROPS. OF LOCKS & CANALS. [SHOWING PROPERTY CONVEYED TO THE TRUSTEES OF THE LOWELL TEXTILE SCHOOL IN THE STREET LINE OF COLONIAL AVE.].	1899/01/01	1/8"=10'	H 40.7, W 61.1 CM	HELIOTYPE, WATER COLOR, COLORED INK	PAPER
C-144-149	LOT SKETCH. [SKETCH OF LAND BETWEEN FALMOUTH ST., RIVERSIDE ST., MOULTON AVE., & COLONIAL AVE.]	1898/07/00	1"=50'	H 25.7, W 49 CM	INK	DRAFTING CLOTH
C-144-150	LOT SKETCH. [SKETCH OF LAND BETWEEN RIVERSIDE ST., WOODSTOCK ST., COLONIAL AVE., & MOULTON AVE.]	1898/07/00	1"=50'	H 35.5, W 17.8 CM	INK, COLORED INK	DRAFTING CLOTH

C-145-001	LOT SKETCH. [OF LAND BETWEEN WOODSTOCK ST., CONDUIT ST., EMERY ST., & COLONIAL AVE.].	1898/08/00	1"=50'	H 43, W 55 CM	INK	DRAFTING CLOTH
C-145-002	LOT SKETCH. [OF LAND BETWEEN IVANHOE ST., RIVERSIDE ST., EMERY ST., & CONDUIT ST.].	1898/08/00	1"=50'	H 42.3, W 27.3 CM	INK	DRAFTING CLOTH
C-145-003	SKETCH OF PROPOSED MAIN SEWER / FROM RIVERSIDE STREET TO BEAVER BROOK.	1897/04/29	NONE	H 22.3, W 35.2 CM	INK, COLORED INK, WATER COLOR	PAPER
C-145-004	PLAN OF / LAND IN LOWELL, MASS. / BELONGING TO / PROPS. LOCKS & CANALS / ON MERRIMACK RIVER.	1914/02/00	1"=250'	H 34.6, W 22.2 CM	BLUEPRINT	PAPER
C-145-005	TRACING OF PLAN OF / ROSEMONT TERRACE / LOWELL, MASS. [INCLUDING PROPS. LOCKS & CANALS LOT #105].	1907/06/25	1"=100'	H 35, W 59 CM	INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-145-006	PLAN SHOWING LAND / LEASED TO / CITY OF LOWELL / FOR PLAYGROUND.	1913/09/26	1"=150'	H 35, W 21.6 CM	INK, WATER COLOR	PAPER
C-145-007	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN BEAVER BROOK, LAKEVIEW AVE., & AIKEN ST.]	1913/06/00	1"=150'	H 21.3, W 34.7 CM	BLUEPRINT	PAPER
C-145-008	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / LOWELL, MASS.	1920/07/00	1"=50'	H 49, W 78.8 CM	INK	DRAFTING CLOTH
C-145-009	SKETCH SHOWING A SUGGESTED WATER PIPE RUNNING / TO "AIKEN STREET DUMP" TO BE USED BY THE / CITY OF LOWELL FOR EXTINGUISHING FIRES.	1916/11/28	1"=50'	H 58.8, W 86.7 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

C-145-010	WORKING SKETCH OF SOME PARTS OF LOCKS & CANALS' / LAND TO BE DEVELOPED & LEASED.	1917/06/00	1"=50'	H 60.1, W 61 CM	INK, COLORED INK, WATER COLOR	PAPER
C-145-011	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN WHITE ST. & RIVERSIDE ST., MELVIN B. SMITH, CIVIL ENGINEER].	1890/12/00	1"=40'	H 101.3, W 193 CM	INK, COLORED INK	DRAFTING CLOTH
C-145-012	PLAN OF / LAND IN LOWELL MASS. / BELONGING TO / P.L.& C. / ON MERRIMACK RIVER.	1914/03/00	1"=250'	H 35.2, W 22 CM	BLUEPRINT	PAPER
C-145-013	WORKING PLAN / LAND OF / PROPS LOCKS & CANALS / LOWELL, MASS.	1919/05/00	1"=50'	H 36.4, W 108 CM	INK	DRAFTING CLOTH
C-145-014	COBURN ST. / OUTLET TO [THE MERR'K] RIVER.	1914/02/18	1"=50'	H 19.1, W 26 CM	BLUEPRINT	PAPER
C-145-015	FULTON ST. [PROFILE.]	1914/02/18	H1"=50', V1"=5'	H 26, W 34.4 CM	BLUEPRINT	PAPER
C-145-016	WEST ST. [PROFILE.]	1914/01/22	H1"=50', V1"=5'	H 27, W 45.7 CM	BLUEPRINT	PAPER
C-145-017	PLAN OF / LAND IN LOWELL, MASS. / BELONGING TO / PROPS. OF THE LOCKS & CANALS / ON MERRIMACK RIVER.	1914/03/00	1"=250'	H 22.2, W 35.3 CM	BLUEPRINT	PAPER
C-145-018	[UNTITLED PLAN.] [PLAN OF LAND AT CORNER OF BRIDGE ST. & LAKEVIEW AVE. INCLUDING A PART OF LOT # 87.]	1917/04/02	1"=50'	H 24.2, W 64.6 CM	INK, COLORED INK, WATER COLOR	PAPER
C-145-019	PLAN OF LAND / BELONGING TO / P.L.& C. / ON FIRST ST. / LOWELL, MASS.	1916/01/00	1"=80'	H 36.8, W 90.5 CM	INK, COLORED INK	PAPER
C-145-020	PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS / ON FIRST ST. / LOWELL, MASS.	1920/07/00	1"=80'	H 36, W 87 CM	BLUEPRINT	PAPER

C-145-021	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN & ABOUT BEACON & DURANT STS.]	1910/03/00	1"=50'	H 35.6, W 62.5 CM	INK, COLORED INK	PAPER
C-145-022	PLAN OF LOTS / IN / LOWELL / BELONGING TO / PROPRIETORS OF LOCKS & CANALS / ON / MERRIMACK RIVER [BETWEEN THIRD ST. & BRADLEY ST.].	1857/05/00	1"=100'		H 49.6, W 41.6 CM	LITHOGRAPH
C-145-022	PLAN OF LOTS / IN / LOWELL / BELONGING TO / PROPRIETORS OF LOCKS & CANALS / ON / MERRIMACK RIVER [BETWEEN THIRD ST. & BRADLEY ST.].	1857/05/00	1"=100'	H 49.6, W 41.6 CM	LITHOGRAPH	PAPER
C-145-023	PLAN OF LAND / IN / LOWELL / BELONGING TO / PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER [BETWEEN TENTH ST. & BRADLEY ST.].	1857/05/00	1"=240'		H 49.6, W 41.9 CM	LITHOGRAPH
C-145-023	PLAN OF LAND / IN / LOWELL / BELONGING TO / PROPRIETORS OF LOCKS & CANALS / ON MERRIMACK RIVER [BETWEEN TENTH ST. & BRADLEY ST.].	1857/05/00	1"=240'	H 49.6, W 41.9 CM	LITHOGRAPH	PAPER
C-145-024	PROFILE OF GROUND WHERE CITY OF LOWELL PROPOSES TO LAY A 12" SEWER FROM LLEWELLYN ST. [THRU LAND OF THE LOCKS & CANALS INTO MERR'K RIVER.]	1912/09/18	NONE	H 21.8, W 108.6 CM	INK	PAPER
C-145-025	MAP OF THE / CITY OF / LOWELL PUBLISHED BY / SAMPSON & MURDOCK CO. / 246 SUMMER ST. BOSTON.	1915/00/00	1"=1000'	H 53.4, W 72.1 CM	LITHOGRAPH, COLORED PENCIL	PAPER
C-145-026	OUTLINE MAP / SHOWING THE / MAIN FEEDERS FROM L.& C. / & / CITY RESERVOIRS / TO THE / MILLS.	1898/00/00	NONE	H 23.8, W 36.2 CM	BLUEPRINT	PAPER

C-145-027	MAP SHOWING PROTECTION AFFORDED / BY THE / LOCKS & CANALS & CITY / WATER WORKS SYSTEM / LOWELL, MASS.	1898/06/24	1"=500'	H 22.2, W 32.4 CM	LITHOGRAPH, COLORED INK	PAPER
C-145-028	[UNTITLED PLAN.] [SKETCH OF THE CITY OF LOWELL SHOWING THE DISPOSITION OF BOULEVATD WELL WATER & COOK & HYDRAULIC WELL WATER.]	1899/09/20	NONE	H 43.9, W 68 CM	INK, COLORED INK, COLORED PENCIL	PAPER
C-145-029	[UNTITLED PLAN.] [SKETCH IN VICINITY OF WHICH STONY BROOK EMPTIES INTO THE MERRIMACK RIVER COPIED DEC.10,1917 FROM SKETCH IN LOCKS & CANALS DEED BOOK # 1, P. 36.]	1917/12/10		H 21.6, W 34.7 CM	INK	DRAFTING CLOTH
C-145-030	MEMORANDUM SKETCH / SHOWING LOCATION OF WATER / TANK NOW BEING ERECTED BY / B.& M. R. R. AT MIDDLESEX STATION.	1917/11/06	1"=30'	H 26.7, W 20.5 CM	INK	DRAFTING CLOTH
C-145-031	PLAN OF / A PART OF THE / CITY OF LOWELL, MASS. / SHOWING CONNECTION OF WATER MAINS OF THE / CITY OF LOWELL & P.L.& / C. & CONNECTIONS WITH THE RESERVOIRS.	1907/11/00	1"=500'	H 74.2, W 77.8 CM	BLUEPRINT	PAPER
C-145-032	CITY OF LOWELL / CATCH BASIN / WITH / SQUARE GRATE / & CURB CASTING.	1908/10/24	1/2"=1'	H 31.7, W 48.6 CM	BLUEPRINT	PAPER
C-145-033	PLAN / OF A PART OF AN / ESTATE IN BELVIDERE VILLAGE, BELONGING TO / THOMAS & JOHN NESMITH [BY ALEXANDER WADSWORTH].	1831/00/00	1"=120'		H 56.6, W 41.3 CM	LITHOGRAPH

C-145-033	PLAN / OF A PART OF AN / ESTATE IN BELVIDERE VILLAGE, BELONGING TO / THOMAS & JOHN NESMITH [BY ALEXANDER WADSWORTH].	1831/00/00	1"=120'	H 56.6, W 41.3 CM	LITHOGRAPH	PAPER
C-145-034	EASTMAN'S / NEW / MAP / OF THE / WHITE / MOUNTAINS.	UNDATED	1"=5 MILES	H 46.1, W 43.8 CM	LITHOGRAPH	PAPER
C-145-035	MAP / OF / LAKE WINNIPISEOGEE [PUBLISHED BY EDISON E. EASTMAN., CONCORD, N.H.]	1878/00/00	NONE	H 28.9, W 35.3 CM	LITHOGRAPH, WATER COLOR INK, COLORED INK,	CLOTH BACKED PAPER
C-145-036	PLAN OF DAM & WING WALL AT LANCASTER MILLS, [CLINTON] BOYLSTON, MASS.	1895/02/12	1/8"=1'	H 40.9, W 58.8 CM	WATER COLOR	DRAFTING CLOTH
C-145-037	DETAIL OF OLD FLASHBOARDS / LANCASTER MILLS / CLINTON, MASS.	1894/10/11	FULL SIZE	H 46.7, W 65.1 CM	INK	PAPER
C-145-038	PLAN OF BUCKETS & GUIDES / [FOR] 75" WHEEL FOR THE BATES MFG. CO. [LEWISTON, ME.].	UNDATED	NONE	H 52.8, W 73.9 CM	BLUEPRINT	PAPER
C-145-039	PLAN OF / LAND IN LOWELL, MASS. / BELONGING TO / P.L. & C. / ON MERRIMACK RIVER.	1914/02/00	1"=250'	H 34.6, W 21.3 CM	BLUEPRINT	PAPER
C-145-040	[UNTITLED PLAN.] [PLAN OF LAND BETWEEN PAWTUCKET CANAL & PAYNE ST. LEASED TO A. J. HARRIS 10 YEARS FROM OCT. 1911.]	1917/05/00	1"=40'	H 33.6, W 19.4 CM	INK, WATER COLOR	PAPER
C-145-041	PLAN OF / LAWRENCE WASTEWAY / LOWELL, MASS.	1917/12/06	1"=40'	H 38.8, W 21.7 CM	INK	PAPER
C-145-042	PLAN OF 75" WHEEL FOR THE BATES MFG. CO. LEWISTON, MAINE / TWO L.H. WHEELS.	1891/01/00	1 1/2"=1'	H 50, W 34.6 CM	BLUEPRINT	PAPER

C-145-043	SKETCH TO ACCOMPANY AGREEMENT / BETWEEN / PROPS. LOCKS & CANALS / ON MERRIMACK RIVER, & CITY OF LOWELL [IN REGARD TO THE LOCATION OF CATCH BASINS ON THORNDIKE ST., & MIDDLESEX PLACE.].	1885/12/08		H 30.4, W 20 CM	BLUEPRINT	PAPER
C-145-044	[PLAN OF] BROADWAY OVERFLOW.	UNDATED	1/4"=1"	H 35.5, W 22 CM	BLUEPRINT	PAPER
C-145-045	[UNTITLED PLAN.] [LOCATION OF OVERFLOW FROM MARGINAL SEWER INTO PAWTUCKET CANAL BELOW RED BRIDGE.]	UNDATED	1"=40'	H 32.1, W 19.7 CM	BLUEPRINT	PAPER
C-145-046	[PLAN, SECTION, & LOCATION OF] SCHOOL ST. OVERFLOW / OFFICE OF CITY ENGR. LOWELL, MASS.	1901/06/00	1"=5'& 3'	H 21.7, W 35.3 CM	BLUEPRINT	PAPER
C-145-047	STORM OVERFLOWS AT THORNDIKE [&] AT GRAND STS.	1885/08/04	NONE	H 31.7, W 20.3 CM	BLUEPRINT	PAPER
C-145-048	[PLAN & SECTION OF] OVERFLOW / [OF] MARGINAL SEWER.	UNDATED	1/2"=1'	H 32.1, W 19.8 CM	BLUEPRINT	PAPER
C-145-049	BOSTON & MAINE RAILROAD / CLEARANCE DIAGRAM / FOR MAINE, MASS., NEW HAMPSHIRE / VERMONT & NEW YORK.	1917/01/31	3/16"=1'	H 28, W 37.9 CM	BLUEPRINT	PAPER
C-145-050	MEASUREMENTS FOR LAYING OUT / STANDARD TURNOUTS.	UNDATED	NONE	H 25.3, W 37.8 CM	BLUEPRINT	PAPER
C-145-051	SOME DATA / RELATING TO / THE FINANCES, ETC. OF THE CITY OF LOWELL.	SEE NOTES	NONE	H 58.4, W 45.8 CM	BLUEPRINT	PAPER
C-145-052	[UNTITLED PLAN.] [DIAGRAMS FROM J.R. FREEMAN'S EXPERIMENTS 1888. DISCHARGE OF 2 1/2" HOSE BUTTS, DISCHARGE OF SMOOTH NOZZLES TO 100' OF 2 1/2"" HOSE; DISCHARGE OF SMOOTH NOZZLES ATTACHED TO 50' OF 2 1/2" HOSE.]	SEE NOTES	NONE	H 33.6, W 40 CM	BLUEPRINT	PAPER

C-145-053	DISCHARGE OF / SIAMESE METER NOZZLE / CURVES ARE COMPUTED TO CORRECT FOR / VELOCITY PAST PIEZOMETER 6 IN. DIAM. / COEFFICIENT OF DISCHARGE= 1.000.	1897/06/00	SEE NOTES	H 56.9, W 53.3 CM	BLUEPRINT	PAPER
C-145-054	PIPES TO RESERVOIR [DIAGRAM SHOWING POUND LOSS PER 1000' LENGTHS OF PIPE MADE IN TESTS OF 1897, FROM TESTS AT PRESCOTT 1849 PIPE, T & S 1868 PIPE, & MIDDLESEX 1868 PIPE].	1897/00/00	NONE	H 57, W 48.5 CM	BLUEPRINT	PAPER
C-145-055	STONY BROOK COMMISSION. / PLAN OF THE / WATER SHED OF STONY BROOK.	1886/07/00	SEE NOTES	H 72.8, W 48.3 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-145-056	PLAN / OF / BOSTON AND / ITS VICINITY / SHOWING THE / DRAINAGE AREA OF STONY BROOK / WHICH EMPTIES INTO THE / FULL BASIN OF THE BACK BAY.	UNDATED	2 1/2"=1 MILE	H 77.8, W 64.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-145-057	MECHANICAL DEVICE / FOR EXCAVATING A CHANNEL AT HUNTS FALLS.	1885/07/30	NONE	H 44.7, W 71.4 CM	INK	PAPER
C-145-057	[BLUEPRINT SHOWING PROPOSED] SNOW REMOVAL PLATFORM ON BROWN ST. / CITY OF LOWELL, MASSACHUSETTS [ENGINEER'S OFFICE].	1926/10/00	1/4" & 1"=1'	H 59.1, W 91.7 CM	BLUEPRINT	PAPER
C-145-058	SCHEDULE OF REAL ESTATE OWNED BY LOCKS & CANALS IN LOWELL, MASS. [WITH AREAS & VALUATIONS.]	1913-1926/00/00	NONE	H 106.7, W 88 CM	INK	DRAFTING CLOTH
C-145-059	[PLAN OF] WEST PLATFORM / OVER PAWTUCKET CANAL AT / CENTRAL ST.	1917/03/00	1"=4'	H 49.2, W 91.4 CM		PAPER

C-145-060	[PLAN SHOWING] B. & M. R. R. / SOUTHERN DIVISION / LOWELL YARD. / VALUATION SECTION NO. 131 / BRIDGE NO.331 / 0.1 MILE NORTH OF MIDDLESEX ST. / [OVER] PAWTUCKET CANAL [AT SWAMP LOCKS BASIN].	1920/02/02	1"=10'& 100'	H 61.6, W 99.1 CM	BLUEPRINT	PAPER
C-145-060-[A]	MEMORANDUM.	1920/05/13	NONE	H 15, W 20 CM	INK	PAPER
C-145-061	[BLUEPRINT SHOWING] PLAN OF / THORNDIKE ST. BRIDGE / OVER / PAWTUCKET CANAL [WITH PHOTOGRAPHS].	1914/07/00	1"=10'	H 48.3, W 67 CM	BLUEPRINT, PHOTOGRAPH	PAPER
C-145-061-[A]	COST OF PLANKING THORNDIKE ST. BRIDGE FROM JUNE 8-10-24-1914 INCLUSIVE.	SEE TITLE	NONE	H 13.4, W 24.1 CM	INK	PAPER
C-145-062	[BLUEPRINT SHOWING] BOSTON & MAINE R. R. BRIDGE NO. 338 / OVER MERRIMACK CANAL-LOWELL, MASS. / FOR THE / SACO-LOWELL MACHINE SHOPS.	1920/08/00	1/4"&3/4" =1'	H 70.5, W 100.3 CM	BLUEPRINT	PAPER
C-145-063-[A]	PLAN OF / CENTRAL ST. BRIDGE / OVER / LOWER PAWTUCKET CANAL / SHOWING ROADWAY CONSTRUCTION [IN 1920 AND 1921.]	1920/05/12	1"=5'	H 52.1, W 65.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-145-063-[B]	PLAN OF / CENTRAL ST. BRIDGE / OVER / LOWER PAWTUCKET CANAL / SHOWING ROADWAY CONSTRUCTION [IN 1920 AND 1921.]	1920/05/12	1"=5'	H 52.1, W 65.8 CM	BLUEPRINT, COLORD PENCIL	PAPER
C-145-064	[REPAIRS TO] BRIDGE OVER / EASTERN CANAL / ON / EAST MERRIMACK STREET [ROADWAY IN 1921] / LOWELL, MASS.	SEE NOTES	1"=2'	H 84.2, W 116 CM	BLUEPRINT	PAPER

C-145-065	PLAN OF / [B.& M. GIRDERS AND EXTENSIONS IN PLACE IN] SUFFOLK ST. BRIDGE / OVER / NORTHERN CANAL [PROPOSED ONLY].	1915/00/00	1"=5'	H 61.3, W 96.8 CM	BLUEPRINT, PHOTOGRAPH	PAPER
C-145-066	PLAN OF [B.& M. GIRDERS IN PLACE IN] / BRIDGE ST. BRIDGE / OVER / EASTERN CANAL [PROPOSED ONLY.]	1915/00/00	1"=5'	H 71.2, W 90.9 CM	BLUEPRINT, PHOTOGRAPH	PAPER
C-145-067	PLAN OF LAND / ADJACENT TO PAWTUCKET CANAL / BETWEEN / MERRIMACK RIVER & BROADWAY / OWNED BY / PROPS LOCKS & CANALS / LOWELL, MASS. [SHOWING FEATURES PROPOSED TO BE GRANTED TO L.E.L. (LOWELL ELECTRIC LIGHT) CORP.]	1920/03/03	1"=40'	H 69, W 124.5 CM	BLUEPRINT	PAPER
C-145-068	LOWELL, MASS. / PROP. OF LOCKS & CANALS / [CANAL DISTRICT] MAP SHOWING [CANAL WALLS & WHEN BUILT; ALSO L. & C. LAND & LAND OF L.& C. USED FOR PARK TOURS] / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS.	1921/00/00	3/16"=50'	H 91.7, W 110.5 CM	LITHOGRAPH	PAPER
C-145-069	RIGHT-OF-WAY & TRACK MAP / NASHUA & LOWELL R. R. CORP. OPERATED BY THE / BOSTON & MAINE R. R. / STATION 1350+11 TO STATION 140+80 [SHOWING PROPOSED TRACK ON WESTERLY SIDE OF PAWTUCKET CANAL ABOVE RED BRIDGE].	1920/01/00	1"=100'	H 41, W 53.8 CM	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
C-145-070	SKETCH SHOWING AREAS / OVER WESTERN CANAL BETWEEN / MOODY & MARKET STS. / SUGGESTED AS BUSINESS SITES.	1922/00/00	1"=50'	H 21.6, W 35.3 CM	GRAPHITE, COLORED PENCIL	PAPER

C-145-071	PROPOSED [B.& M.] R. R. BRIDGE [(# 335) OVER HAMILTON CANAL AT] SACO-LOWELL MACHINE SHOP LOWELL, MASS.	1920/09/24	1"=10'& 8'	H 45.7, W 105.5 CM	BLUEPRINT	PAPER
C-145-072	MAP OF LOWELL / IN VICINITY OF / FLETCHER, DUTTON, SUFFOLK, AND MERRIMACK STREETS [BLUEPRINT SHOWING PROPOSED EXTENSION OF CARDINAL O'CONNELL PARKWAY TO BROADWAY].	1923/00/00	1"=100'	H 39.7, W 76 CM	BLUEPRINT	PAPER
C-145-073-[A]	[PROPOSED] CONDUIT ST. BRIDGE / OVER BEAVER BROOK. / GENERAL [& DETAIL] PLAN [CITY ENGR.'S OFFICE].	1925/07/00	1/20" & 3/16"=1'	H 58.7, W 102.5 CM	BLUEPRINT	PAPER
C-145-073-[B]	[PROPOSED] CONDUIT ST. BRIDGE / OVER BEAVER BROOK. / [GENERAL &] DETAILS. [PLANS, CITY ENGR.'S OFFICE.]	1925/07/00	NONE	H 59.1, W 102.9 CM	BLUEPRINT	PAPER
C-145-073-[C]	SPECIFICATIONS / FOR / CONDUIT STREET BRIDGE # 38. / OVER BEAVER BROOK. B.& M. R. R. / STANDARD	UNDATED	NONE	H 27.9, W 21.6 CM	INK	PAPER
C-145-074-[1]	COAL TRESTLE / GENERAL PLAN & DETAILS.	1925/09/22	1/4"=1'	H 28.6, W 38.5 CM	BLUEPRINT	PAPER
C-145-074-[2]	PILE TRESTLE / DETAILS OF LONGITUDINAL BRACING-USING PLANK.	1925/09/22	1/4"=1'	H 28.6, W 38.5 CM	BLUEPRINT	PAPER
C-145-074-[3]	FRAME TRESTLE / DETAILS OF LONGITUDINAL BRACING-USING SQUARED STICKS.	1925/09/22	1/4"=1'	H 28.6, W 38.5 CM	BLUEPRINT	PAPER
C-145-074-[4]	FRAME TRESTLE / DETAILS OF BRACING AT END.	1925/09/22	1/4"=1'	H 28.6, W 38.5 CM	BLUEPRINT	PAPER
C-145-074-[5]	FRAME TRESTLE / DETAILS OF BRACING AT END.	1925/09/22	1/4"=1'	H 28.6, W 38.5 CM	BLUEPRINT	PAPER

C-145-075	[COMPOSITE BLUEPRINT OF] PLAN SHOWING SIDE TRACK, [ON] SOUTHERLY / SIDE PAWTUCKET CANAL / [FROM] RED BRIDGE TO DAVIS & SARGENT.	1924/12/00	1"=40'	H 32.1, W 206.4 CM	BLUEPRINT	PAPER
C-145-076	[BLUEPRINT SHOWING PLAN & PROFILE OF] PART OF WARREN ST. [FROM STRAND THEATRE TO CHURCH ST. WITH LOCATION OF NEW SEWER. CITY ENGR.'S OFFICE].	1928/05/00	1"=40'& 4'	H 56.2, W 95.2 CM	BLUEPRINT	PAPER
C-145-077-A	[BLUEPRINT SHOWING DEED CONDITIONS NEAR SACO-LOWELL SHOPS ON WORTHEN ST. TAKEN] FROM J. C. WARNER'S / REPORT TO THE CITY SOLICITOR.	1928/10/00	1"=40'	H 33, W 42.5 CM	BLUEPRINT	PAPER
C-145-077-B	[BLUEPRINT SHOWING DEED CONDITIONS NEAR SACO-LOWELL SHOPS ON WORTHEN ST. TAKEN] FROM J. C. WARNER'S / REPORT TO THE CITY SOLICITOR.	1928/10/00	1"=8 RODS	H 30.5, W 42.5 CM	BLUEPRINT	PAPER
C-145-077-C	[BLUEPRINT SHOWING DEED CONDITIONS NEAR SACO-LOWELL SHOPS ON WORTHEN ST. TAKEN] FROM J. C. WARNER'S / REPORT TO THE CITY SOLICITOR.	1928/10/00	1"=40'	H 42.5, W 55.5 CM	BLUEPRINT	PAPER
C-145-077-D	[BLUEPRINT SHOWING DEED CONDITIONS NEAR SACO-LOWELL SHOPS ON WORTHEN ST. TAKEN FROM] JAMES C. WARNER'S / REPORT TO THE CITY SOLICITOR.	1928/10/22	1"=40'	H 42.7, W 76.2 CM	BLUEPRINT	PAPER

C-147-001	LAND IN MIDDLESEX VILLAGE / LYING BETWEEN THE / NASHUA & LOWELL R. R. & MIDDLESEX ST. / WEST OF EDWARDS ST. [BELONGING TO: O.M. PRATT, G. L. FOWLER, ALMIRA H. CHENERY, FRED AYER, CHAS. F. TAYLOR, GEO. G. MORGAN, D. W. WILLS, ANDREW J. ATWELL.]	UNDATED	1"=50'	H 61, W 102.8 CM	INK	CLOTH BACKED PAPER
C-147-002	PLAN OF LAND IN MIDDLESEX VILLAGE / LYING BETWEEN THE / NASHUA & LOWELL R. R. & MIDDLESEX ST. / EAST OF EDWARDS ST. [BELONGING TO: HADLEY, FROST, BOWERS, MARY HOWARD, F.H.PEARSON, [...SEE NOTES]	UNDATED	1"=50'	H 61, W 83.8 CM	INK, GRAPHITE	CLOTH BACKED PAPER
C-147-003	PLAN OF LAND IN NORTH CHELMSFORD, MASS. [BETWEEN N.& L. R. R. & RIVER] / SURVEYED FOR THE / T. J. ADAMS ESTATE.	1895/07/00	1"=80'	H 71.2, W 55.8 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	TRACING PAPER
C-147-004	[LAND IN] NASHUA N. H. [NEAR CROWN ST. ON MERRIMACK RIVER. BELONGING TO] BOSTON & MAINE R. R. / FORMERLY BOWERS [MARK FLATHER PLANER CO., N. O. MARSHALL, FLATHER & CO.] / HILLSBOROUGH RECORDS B529-P296.	SEE NOTES	1"=40'	H 48.2, W 51.3 CM	INK	TRACING PAPER

C-147-005	[UNTITLED PLAN.] [TRACING FROM ASSESSORS MAP SHOWING LAND ON RIVER BELONGING TO JAMES F. WATSON, HARRY W. DAVIS, ISAAC W. DODGE, IRA F. HARRIS, C. E. EMERSON.]	SEE NOTES	1"=200"	H 43, W 55.8 CM	INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-147-006	PLAN SHOWING / CONTOURS OF FARMS [ON NORTH BANK] BELONGING TO / GEORGE L. GOODALE AND EDWARD S. HOWE IN / LOWELL MASS. / FROM SURVEYS MADE SEP. 5, 1888 [REFERRED TO MASONRY CREST OF PAWTUCKET DAM].	SEE TITLE	NONE	H 56.2, W 60.4 CM	INK, WATER COLOR	PAPER
C-147-007-[01]	HEIGHTS OF WATER / IN / MERRIMACK & NASHUA RIVERS / TUESDAY, AUG. 6, 1895.	1895/08/06	NONE	H 61.1, W 48.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-147-007-[02]	HEIGHT OF WATER / IN / MERRIMACK RIVER / 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, GRAPHITE	PAPER
C-147-007-[03]	HEIGHT OF WATER / IN / MERRIMACK RIVER / 1895.	1895/00/00	NONE	H 61.2, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-007-[04]	HEIGHT OF WATER / IN / MERRIMACK & NASHUA RIVERS / 1895.	1895/00/00	NONE	H 61.2, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER

C-147-007-[05]	HEIGHT OF WATER / IN / MERRIMACK & NASHUA RIVERS / 1895.	1895/00/00	NONE	H 61.2, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-007-[06]	HEIGHT OF WATER / IN / MERRIMACK & NASHUA RIVERS / 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-147-007-[07]	HEIGHT OF WATER / IN / MERRIMACK & NASHUA RIVERS / 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-147-007-[08]	HEIGHT OF WATER / IN / MERRIMACK RIVER, 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-007-[09]	HEIGHT OF WATER / IN / MERRIMACK & NASHUA RIVERS. / 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-007-[10]	HEIGHT OF WATER / IN / MERRIMACK RIVER, 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAOHITE	PAPER

C-147-007-[11]	HEIGHT OF WATER / IN / MERRIMACK RIVER, 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-007-[12]	HEIGHT OF WATER / IN / MERRIMACK RIVER, 1895.	1895/00/00	NONE	H 61, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-007-[13]	HEIGHT OF WATER / IN / MERRIMACK & NASHUA RIVERS / MONDAY, AUGUST 6, 1894.	SEE TITLE	NONE	H 61, W 48.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-008	PLAN OF LAND [ON SOUTH BANK] / BETWEEN / HEAD OF PAWTUCKET CANAL / AND / PAWTUCKET DAM [BELONGING TO: PAUL BUTLER, A. J. DOWNING, MRS. A. F. SWAPP, AMOS D. WRIGHT, W. B. EARL ET AL, MRS. HENRY A. LAMBERT, MRS. SARAH R. SPAULDING.]	SEE NOTES	1"=50'	H 43.8, W 77.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-147-008-[COPY 1]	PLAN OF LAND [ON SOUTH BANK] / BETWEEN / HEAD OF PAWTUCKET CANAL / AND / PAWTUCKET DAM [BELONGING TO: PAUL BUTLER, A. J. DOWNING, MRS. A. F. SWAPP, AMOS D. WRIGHT, W. B. EARL ET AL, MRS. HENRY A. LAMBERT, MRS. SARAH R. SPAULDING.]	SEE NOTES	1"=50'	H 42.8, W 72.3 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE, INK	PAPER

C-147-008-[COPY 2]	PLAN OF LAND [ON SOUTH BANK] / BETWEEN / HEAD OF PAWTUCKET CANAL / AND / PAWTUCKET DAM [BELONGING TO: PAUL BUTLER, A. J. DOWNING, MRS. A. F. SWAPP, AMOS D. WRIGHT, W. B. EARL ET AL, MRS. HENRY A. LAMBERT, MRS. SARAH R. SPAULDING.]	SEE NOTES	1"=50'	H 42.8, W 73 CM	BLUEPRINT, GRAPHITE	PAPER
C-147-009	PLAN OF LAND IN LOWELL [ON NORTH SIDE ALONG PAWTUCKET BOULEVARD AT VARNUM AVE.] / BELONGING TO / DANIEL GAGE & OTHERS.	1898/04/00	1"=50'	H 45, W 87.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-147-009-[COPY 1]	PLAN OF LAND IN LOWELL [ON NORTH SIDE ALONG PAWTUCKET BOULEVARD AT VARNUM AVE.] / BELONGING TO / DANIEL GAGE & OTHERS.	1898/04/00	1"=50'	H 44.7, W 74.7 CM	BLUEPRINT, COLORED PENCIL, INK, GRAPHITE	PAPER
C-147-010	PLAN OF LANDS [ON NORTH BANK ALONG PAWTUCKET BOULEVARD] TAKEN [BY WATER WORKS] FOR / FILTER BED.	1894/09/11	1"=40'	H 51.8, W 150.1 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-147-011	PLAN OF LANDS / AND THE BUILDINGS THEREON, / IN / [NORTH] CHELMSFORD / [ALONG OLD MIDDLESEX CANAL] BELONGING TO THE GLASS MANUFACTURING COMPANY.	1826/07/29	1"=42'	H 68.8, W 58.5 CM	BLUEPRINT, INK	PAPER
C-147-012	PLAN / SHOWING LOCATION OF / LOWER END OF PAWTUCKETVILLE MAIN SEWER / AND BRANCHES.	1896/00/00	1"=40'	H 55.8, W 70.8 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-147-013	PROFILE / OF / SEWERS IN THIRD AND WHITE STREETS.	1896/00/00	1"=40'	H 55.9, W 71.2 CM	INK, COLORED INK	TRACING PAPER

C-147-013-A	PLAN / SHOWING LOCATION OF / LOWER LAND OF PAWTUCKETVILLE MAIN SEWER / AND / BRANCHES.	1896/00/00	1"=40'	H 55.9, W 67.7 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-147-014	[LAND ON NORTH SIDE ON VARNUM AVENUE BELONGING TO] A.N. HORR / SURVEYED NOV. 4TH 1893.	SEE TITLE	1"=20'	H 36.4, W 28.4 CM	INK	DRAFTING CLOTH
C-147-015	A PLAN / OF MERRIMACK RIVER, / BETWEEN NASHUA & LOWELL.	1833/03/00	SEE NOTES	BOYDEN, URIAH	INK, COLORED INK, WATER COLOR, GRAPHITE H 53.2, W 132.5 CM	
C-147-015	A PLAN / OF MERRIMACK RIVER, / BETWEEN NASHUA & LOWELL.	1833/03/00	SEE NOTES	H 53.2, W 132.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
C-147-016	PLAN OF LAND IN MIDDLESEX VILLAGE / LYING BETWEEN THE NASHUA AND LOWELL R. R. AND MIDDLESEX ST. / WEST OF BALDWIN ST.	1897/11/24	1"=50'	H 59.5, W 201.5 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
C-147-017	PLAN / OF / LAND IN LOWELL [SOUTH SIDE OF MIDDLESEX ST. BETWEEN WOOD ST. & CORNELL ST. & PRINCETON ST.] / BELONGING TO / H. E. SHAW & J. V. MEIGS, JR.	1893/08/09	1"=50'	H 47, W 58.8 CM	INK, GRAPHITE, COLORED INK	DRAFTING CLOTH
C-147-018	A PLAN OF LOTS / IN / MIDDLESEX VILLAGE / BELONGING TO / DR. J. C. AYER.	1874/04/00	1"=150'	H 47.3, W 58.8 CM	INK, GRAPHITE	DRAFTING CLOTH

C-147-019	PLAN OF LAND IN LOWELL [ON SOUTH BANK] / BELONGING TO DANIEL GAGE & OTHERS [PICKERING KNITTING CO., H. K. FERRIN, MRS. H. S. SMITH, N. & L. R. R.].	1898/04/00	1"=50'	H 45.1, W 114.9 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-147-019-[A]	PLAN OF LAND IN LOWELL [ON SOUTH BANK] / BELONGING TO DANIEL GAGE & OTHERS [PICKERING KNITTING CO., H. K. FERRIN, MRS. H. S. SMITH, N. & L. R. R.].	1898/04/00	1"=50'	H 44.5, W 114.2 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-147-019-[B]	PLAN OF LAND IN LOWELL [ON SOUTH BANK] / BELONGING TO DANIEL GAGE & OTHERS [PICKERING KNITTING CO., H. K. FERRIN, MRS. H. S. SMITH, N. & L. R. R.].	1898/04/00	1"=50'	H 44.3, W 110.8 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE, COLORED INK	PAPER
C-147-020	PLAN OF LAND IN LOWELL [ON SOUTH BANK BETWEEN WALKER ST. & BLACK BROOK] / BELONGING TO / DANIEL GAGE & OTHERS. [O. B. RANDLETT, J. FOLLIS, CHAS. H. ALLEN, JAMES MINTER, & OTHERS.]	1898/04/00	1'=50'	H 65.7, W 220.6 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-147-020-[COPY 1]	PLAN OF LAND IN LOWELL [ON SOUTH BANK BETWEEN WALKER ST. & BLACK BROOK] / BELONGING TO / DANIEL GAGE & OTHERS. [O. B. RANDLETT, J. FOLLIS, CHAS. H. ALLEN, JAMES MINTER, & OTHERS.]	1898/04/00	1"=50'	H 63.8, W 124.5 CM	BLUEPRINT	PAPER

C-147-020-[COPY 2]	PLAN OF LAND IN LOWELL [ON SOUTH BANK BETWEEN WALKER ST. & BLACK BROOK] / BELONGING TO / DANIEL GAGE & OTHERS. [O. B. RANDLETT, J. FOLLIS, CHAS. H. ALLEN, JAMES MINTER, & OTHERS.]	1898/04/00	1"=50'	H 65.3, W 126.7 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-147-020-[COPY 3]	PLAN OF LAND IN LOWELL [ON SOUTH BANK BETWEEN WALKER ST. & BLACK BROOK] / BELONGING TO / DANIEL GAGE & OTHERS. [O. B. RANDLETT, J. FOLLIS, CHAS. H. ALLEN, JAMES MINTER, & OTHERS.]	1898/04/00	1"=50'	H 65.4, W 133.3 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-147-021	ESTATE OF / HENRY G. CUSHING / LOWELL MASS. [SHOWING THAT PORTION BETWEEN THE NEW BOULEVARD & MERRIMACK RIVER WITH GRADES REFERRED TO A HEIGHT OF THE RIVER OPPOSITE MARKED 88.0 & DUE TO 5' OF FLASH BOARDS OF WATER OVER STONE DAM.]	1897/07/21	5 CM=100', H & V=5'	H 56.2, W 62.3 CM	INK, COLORED INK, WATER COLOR	PAPER
C-147-022	DEPOSITIONS IN PERPETUAM / OF / CHRISTOPHER BARON, / [&] WILLIAM HARTLEY [IN CONNECTION WITH APPLICATION OF C. A. GUTCHER ET AL.]	1897/11/10	NONE	H 28.6, W 22.8 CM	INK	PAPER
C-147-023	EFFECT OF PROPOSED FLASHBOARDS.	1895/07/10	NONE	H 35.8, W 49.8 CM	INK, COLORED INK, GRAPHITE	PAPER

C-147-023-1	EFFECT OF PROPOSED FLASHBOARDS / NOVEMBER 1894.	1895/07/10	NONE	H 35.9, W 50.8 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-147-023-2	EFFECT OF PROPOSED FLASHBOARDS / AUGUST 1894.	1895/07/10	NONE	H 35.8, W 50.9 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-023-3	EFFECT OF PROPOSED FLASHBOARDS / JUNE 1894.	1895/07/10	NONE	H 35.9, W 50.8 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-147-023-4	EFFECT OF PROPOSED FLASHBOARDS / JUNE 1894.	1895/07/10	NONE	H 35.9, W 50.8 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-147-023-5	EFFECT OF PROPOSED FLASHBOARDS / MAY 1894.	1895/07/10	NONE	H 35.7, W 50.9 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER

C-147-024	COPY OF PLAN MADE AT CITY ENG'S. OFFICE. [LAND ON NORTH SIDE BOUNDED BY PAWTUCKET BOULEVARD, VARNUM AVE, & OLD FERRY RD. BELONGING TO J. M. WILSON & B. C. MORRISON, THOS. J. UNDERWOOD, GEO. L. GOODALE, EDWARD S. HOWE].	1878/05/23	1"=100'	H 61.5, W 79.3 CM	INK, GRAPHITE	DRAFTING CLOTH
C-147-025	[DIAGRAM SHOWING] HEIGHTS OF WATER ABOVE CREST OF / PAWTUCKET DAM JULY TO OCT. 1879.	1879/10/00	1"=4'	H 55.6, W 104.8	INK, COLORED INK, GRAPHITE	PAPER
C-147-026	PLAN SHOWING CONTOURS ON FARM BELONGING TO / HEIRS OF T. J. ADAMS, NORTH CHELMSFORD MASS. / FROM SURVEYS MADE SEPTEMBER, 1887. [AS REFERRED TO MASONRY CREST OF PAWTUCKET DAM.]	1887/00/00	H1CM=20', V1CM=2'	H 45.8, W 58.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-147-027	PLAN SHOWING CONTOURS ON FARM [ON NORTH BANK] / BELONGING TO HEIRS OF J. V. B. COBURN, LOWELL MASS. / FROM SURVEY MADE IN AUGUST 31, 1888.	SEE TITLE	1 CM=20' & 2'	H 56.3, W 75.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
C-147-028	SKETCH SHOWING MERRIMACK RIVER / BETWEEN CROMWELL'S FALLS & / PAWTUCKET FALLS.	1840/09/00	1"=400'	H 27.9, W 163.8 CM	INK	DRAFTING CLOTH
C-147-029	GRADES ON INTERVALE AT TYNGSBOROUGH / BELONGING TO A. S. BAKER & G. F. STILES.	1896/06/00	1"=50'	H 51.5, W 71 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER

C-147-030	LAND OF / HANNAH F. & JOHN H. BUTTERFIELD / [BETWEEN N.& L. R. R. & NASHUA RD.] NORTH CHELMSFORD.	1895/00/00	1"=4'	H 55.8, W 67.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-147-031	LAND OF ELLEN B. WOTTON, NORTH CHELMSFORD / [BETWEEN N. & L. R .R. & NASHUA RD.] SHOWING CONTOURS 89 (IN RED) AND 88 (IN BLACK) / AND BLODGETT BROOK (IN GREEN).	1895/00/00	1"=40'	H 42.6, W 67.3 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	CLOTHBACKED PAPER
C-147-032	PLAN BY SMITH BROOKS / WITH ADDITIONS FROM REGISTRY OF DEEDS UNDERLINED [OF LAND IN NORTH CHELMSFORD BELONGING TO J. T. ADAMS, ET AL.].	UNDATED	NONE	H 65, W 43 CM	GRAPHITE, INK	TRACING PAPER
C-147-033	LOT BELONGING TO / G. AND E. C. SWIFT / AT NORTH CHELMSFORD [BETWEEN MERRIMACK RIVER & N.& L. R. R.].	1895/00/00	1"=40'	H 55.8, W 89 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-147-034	PLAN OF LAND BELONGING TO / DR. J. C. AYER / MIDDLESEX VILLAGE / TO BE SOLD AT AUCTION.	1884/00/00	1"=150'& 50'	H 43.3, W 55.8 CM	INK, GRAPHITE	TRACING PAPER
C-147-035	LAND IN MIDDLESEX VILLAGE BETWEEN / NASHUA & LOWELL R. R. AND MIDDLESEX STREET / WEST OF BALDWIN STREET / SHOWING AREAS LIABLE TO FLOWAGE AND SOAKAGE BY FOURTH FLASHBOARD.	1896/00/00	1"=50'	H 55.8, W 190.5 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER

C-147-036	[LAND ON NORTH BANK SHOWING] PROFILE OF PAWTUCKET BOULEVARD / SHOWING ALSO / INTERSECTIONS OF NORTH LINE WITH PROPERTY LINES. / FROM CITY PLAN DATED JUNE, 1889.	1895/05/04	H1"=80', V1"=8'	H 23.8, W 370.6 CM	INK, COLORED INK, WATERCOLOR, GRAPHITE	TRACING PAPER
C-147-037	PLAN / OF / LAND ON [NORTH BANK BETWEEN PAWTUCKET BOULEVARD &] VARNUM AVE. / BELONGING TO / JULIA COBURN AND OTHERS / SHOWING / CONTOURS ABOVE L. & C. DATUM.	1897/06/26	1"=40'	H 55.5, W 71 CM	INK, COLORED INK, GRAPHITE	PAPER
C-147-038	GRADES OF WATER ON PERCY PARKER'S ESTATE [LAND ON SOUTH SIDE BETWEEN BROADWAY, PAWTUCKET & N.L. R. R.] / COMPARED WITH THE HEIGHTS OF MERRIMACK / RIVER OPPOSITE AND AT PAWTUCKET DAM. [SHOWING HEIGHTS ABOVE L.& C DATUM.]	1897/00/00	NONE	H 45.8, W 58.4 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-039	PLAN / OF PART OF / LAND BELONGING TO PERCY PARKER / BETWEEN / BROADWAY & B.& M. R. R. / SHOWING HEIGHTS ABOVE L.& C. DATUM.	1897/08/26	1"=50'	H 46.3, W 59 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-147-039-[A]	PLAN / OF PART OF / LAND BELONGING TO PERCY PARKER / BETWEEN / BROADWAY & B.& M. R. R. / SHOWING HEIGHTS ABOVE L.& C. DATUM.	1897/08/26	1"=50'	H 46.3, W 59 CM	BLUEPRINT, COLORED INK	PAPER
C-147-039-[COPY 1]	PLAN / OF PART OF / LAND BELONGING TO PERCY PARKER / BETWEEN / BROADWAY & B.& M. R. R. / SHOWING HEIGHTS ABOVE L.& C. DATUM.	1897/08/26	1"=50'	H 46.3, W 59 CM	BLUEPRINT	PAPER

C-147-040-[A]	PLAN OF LAND IN NORTH CHELMSFORD / BELONGING TO / MARINEL ET AL. [ABBIE F. SLEEPER, F. VASSELIN] / ON BLODGETT BROOK.	1900/05/00	1"=40'	H 57.6, W 61.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-147-040-[B]	PLAN OF LAND IN NORTH CHELMSFORD / BELONGING TO / MARINEL ET AL. [ABBIE F. SLEEPER, F. VASSELIN] / ON BLODGETT BROOK.	1900/05/00	1"=40'	H 57.5, W 61.3 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-147-041	PLAN OF LAND IN LOWELL / [ON SOUTH BANK BORDERING ON BLACK BROOK] BETWEEN / MIDDLESEX & PRINCETON [FROM BALDWIN TO MAKER STS.].	1899/12/11	1"=50'	H 80.3, W 123.7 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-147-041-[COPY 1]	PLAN OF LAND IN LOWELL / [ON SOUTH BANK BORDERING ON BLACK BROOK] BETWEEN / MIDDLESEX & PRINCETON [FROM BALDWIN TO MAKER STS.].	1899/12/11	1"=50'	H 101.9, W 89 CM	BLUEPRINT, INK, COLORED INK, GRAPHITE	PAPER
C-147-042-A	[UNTITLED PLAN.] [LAND ON SOUTH BANK BORDERING ON BLACK BROOK BELONGING TO STILLMAN CLOUGH.]	UNDATED	NONE	H 45.8, W 25.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-147-042-B	SKETCH OF LAND OF / T. J. UNDERWOOD. [CHAS. S. HOWE, & OTHERS ON NORTH SIDE BETWEEN BOULEVARD & VARNUM AVE.]	1889/01/00	NONE	H 115.2, W 55.8 CM	INK, WATER COLOR, COLORED INK	TRACING PAPER

C-147-042-C	DIAGRAM SHOWING HEIGHT OF WATER IN PARKER'S FIELD, BROADWAY & PAWTUCKET ST. & HEIGHT OF WATER IN MERRIMACK RIVER OPPOSITE PARKER'S FIELD.	1912/04/25	NONE	H 40.5, W 63.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-147-042-C-[COPY 1]	DIAGRAM SHOWING HEIGHT OF WATER IN PARKER'S FIELD, BROADWAY & PAWTUCKET ST. & HEIGHT OF WATER IN MERRIMACK RIVER OPPOSITE PARKER'S FIELD.	1912/04/25	NONE	H 30.5, W 53.3 CM	BLUEPRINT, GRAPHITE	PAPER
C-147-042-D	SKETCH SHOWING / PROPERTY OF LUCY M. FAY / 1889 & 1897.	1939/08/31	1"=250'	H 21.6, W 27.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-147-043	LOT "A" / PLAN OF LAND BELONGING TO ESTATE OF J. M. WILSON CO. / SURVEYED AUG 1889 & AUG 1900 / O. P. OSGOOD CIVIL ENGINEER.	1900/08/07	1"=60'	H 85.4, W 55.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-148-[033]	SKETCH SHOWIING LOCATION OF LOTS ON THE / J.B.V. COBURN HEIRS PROPERTY, AND THE LOTS / ON WHICH DAMAGES FOR FLOWAGE HAVE BEEN PAID.	1921/03/00	1"=250'	H 31.5, W 30 CM	INK, COLORED PENCIL	DRAFTING CLOTH
C-148-001	[UNTITLED PLAN.] [LAND AT NASHUA BORDERING ON SALMON BROOK FROM MERRIMACK RIVER TO LAND OF C. WILLIAMS AT N.H. BELONGING TO: ROBY & SWART, GEO. A. UNDERHILL, CHAS. WILLIAMS.]	1895/00/00	1"=100'	H 63.6, W 96.3 CM	INK, COLORED PENCIL, GRAPHITE	PAPER

C-148-002	[UNTITLED PLAN.] [LAND AT NORTH CHELMSFORD AT JUNCTION OF STONY BROOK & MERRIMACK RIVER. BELONGING TO L. & C.]	UNDATED		BOOTT, KIRK	H 47.3, W 57.4 CM	INK, WATER COLOR, GRAPHITE
C-148-002	[UNTITLED PLAN.] [LAND AT NORTH CHELMSFORD AT JUNCTION OF STONY BROOK & MERRIMACK RIVER. BELONGING TO L. & C.]	UNDATED	NONE	H 47.3, W 57.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-148-003	LAND OF / JOHN H. KEYES / SUBJECT TO FLOWAGE BY 4TH FLASHBOARD. / TYNGSBORO MASS.	1895/10/00	1"=40'	H 55.8, W 103.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-148-004	PLAN / OF / LAND IN TYNGSBORO / CONVEYED BY / SARAH B. BANCROFT TO B. & L. R. R.	1897/01/31	1"=60'	H 48.2, W 76.1 CM	INK, GRAPHITE	TRACING PAPER
C-148-005	LAND ON SCARLET BROOK, TYNGSBORO, / BELONGING TO / HANNAH J. WILLIAMS.	1895/11/00	1"=40'	H 55.8, W 103.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-148-006	[UNTITLED PLAN.] [LAND ON SOUTH BANK BETWEEN BLACK BROOK, MERRIMACK RIVER & BEYOND MIDDLESEX CANAL.]	1851/03/30	NONE		H 59.8, W 94.8 CM	INK
C-148-006	[UNTITLED PLAN.] [LAND ON SOUTH BANK BETWEEN BLACK BROOK, MERRIMACK RIVER & BEYOND MIDDLESEX CANAL.]	1851/03/30	NONE	H 59.8, W 94.8 CM	INK	CLOTH BACKED PAPER

C-148-007	SKETCH OF THE HOME FARM OF / ANDREW CRAIGIE [LAND ON SOUTH BANK BORDERING ON BLACK BROOK BELONGING ORIGINALLY TO ANDREW CRAIGIE &] / SOLD IN 1821 TO / NATHAN TYLER / SHOWING LOTS SOLD BY NATHAN TYLER & HIS HEIRS.	SEE TITLE	1"=100'	H 66, W 51.1 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-148-008	PLAN OF LAND IN LOWELL [ON SOUTH BANK BORDERING ON BLACK BROOK] / BELONGING TO WILLIAM E. LIVINGSTON & OTHERS.	1898/04/00	1"=60'	H 68,6, W 82 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-148-009	COPY OF A [SIC] COPY OF A / PLAN / OF / LAND / [ON SOUTH BANK BETWEEN BLACK BROOK , MERRIMACK RIVER & MIDDLESEX CANAL.] BELONGING TO / SAMUEL & WIDOW WM. TYLER & HEIRS. / SITUATED IN / MIDDLESEX / GEO. W. BUTTERFIELD.	1854/00/00	1"=400'	H 60.4, W 57.8 CM	INK, GRAPHITE	DRAFTING CLOTH
C-148-010-[A]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 50.8, W 57.2 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-148-010-[A]-[COPY 1]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 51.5, W 57 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER

C-148-010-[A]-[COPY 2]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 51.4, W 57.1 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-148-010-[B]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 57.6, W 77.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-148-010-[B]-[COPY 1]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 57.6, W 73.8 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-148-010-[B]-[COPY 2]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 56.5, W 75.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-148-010-[B]-[COPY 3]	PLAN SHOWING CONTOURS / [LAND ON SOUTH BANK BORDERING] ALONG BLACK BROOK / BETWEEN WESTFORD AND PRINCETON STS.	1908/00/00	1"=50'	H 56.5, W 75.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
C-148-010-[C]	PLAN SHOWING CONTOURS / ALONG BLACK BROOK / BETWEEN HADLEY & WOOD STS.	1908/00/00	1"=50'	H 54.4, W 63.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

C-148-010-[C]-[COPY 1]	PLAN SHOWING CONTOURS / ALONG BLACK BROOK / BETWEEN HADLEY & WOOD STS.	1908/00/00	1"=50'	H 54.4, W 63.8 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
C-148-010-[C]-[COPY 2]	PLAN SHOWING CONTOURS / ALONG BLACK BROOK / BETWEEN HADLEY & WOOD STS.	1908/00/00	1"=50'	H 63.1, W 54 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-148-010-[D]	[UNTITLED PLAN. SEE NOTES.]	1908/00/00	1"=50'	H 52.2, W 64.4 CM	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-148-010-[E]	[UNTITLED PLAN. SEE NOTES.]	1908/00/00	1"=50'	H 52.5, W 70.8 CM	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
C-148-011-[A]	TRACING OF ASSESSORS' MAP SHOWING / [LAND ON SOUTH BANK BORDERING ON] BLACK BROOK & ADJACENT LANDS / EAST OF BALDWIN ST. [PLAN SHOWING CONTOURS & AREAS OF FLOWAGE IN COLORS AT DIFFERENT HEIGHTS FROM BALDWIN STRET TO MIDDLESEX STREET.]	1891-1892/00/00	1"=50'	H 71.1, W 55.8 CM	INK, COLORED INK, WATER COLOR, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-148-011-[B]	TRACED FROM MAP G25 / CITY ENGINEER'S OFFICE / LOWELL, MASS. [PLAN SHOWING BLACK BROOK CONTOURS & AREAS OF FLOWAGE IN COLORS AT DIFFERENT HEIGHTS FROM BALDWIN STRET TO MIDDLESEX STREET.]	1907/12/06	1"=50'	H 48.2, W 57.8 CM	INK, COLORED INK, WATER COLOR, COLORED PENCIL, GRAPHITE	TRACING PAPER

C-148-011-[C]	[UNTITLED PLAN. SEE NOTES.] [PLAN SHOWING BLACK BROOK CONTOURS & AREAS OF FLOWAGE IN COLORS AT DIFFERENT HEIGHTS FROM BALDWIN STRET TO MIDDLESEX STREET.]	SEE NOTES	NONE	H 71.1, W 55.6 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	TRACING PAPER
C-148-011-[D]	[UNTITLED PLAN. SEE NOTES.] [PLAN SHOWING BLACK BROOK CONTOURS & AREAS OF FLOWAGE IN COLORS AT DIFFERENT HEIGHTS FROM BALDWIN STRET TO MIDDLESEX STREET.]	SEE NOTES	1"=50'	H 71.1, W 55.6 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
C-148-012	MIDDLESEX VILLIAGE / LAND ON MERRIMACK RIVER / LOCKS & CANALS. [LAND ON SOUTH BANK FROM BLACK BROOK TO NO. CHELMSFORD SHOWING LEVELS OF LAND AS REFERRED TO TOP OF PAWTUCKET DAM.]	1851/05/22	3/4"=100'		H 48.5, W 93.2 CM	INK, WATER COLOR
C-148-012	MIDDLESEX VILLIAGE / LAND ON MERRIMACK RIVER / LOCKS & CANALS. [LAND ON SOUTH BANK FROM BLACK BROOK TO NO. CHELMSFORD SHOWING LEVELS OF LAND AS REFERRED TO TOP OF PAWTUCKET DAM.]	1851/05/22	3/4"=100'	H 48.5, W 93.2 CM	INK, WATER COLOR	CLOTH BACKED PAPER
C-148-013	COPY OF PLAN IN OFFICE OF LOCKS & CANALS, / SHOWING / FLOWAGE LINES ON LAND [ON SOUTH BANK BORDERING BLACK BROOK] OF W.E. LIVINGSTON.	1900/05/00	1"=50'	H 48.5, W 93.2 CM	INK, WATER COLOR	DRAFTING CLOTH

C-148-014	LAND IN CHELMSFORD [AREA OF GLASS HOUSE LOT NEAR MIDDLESEX VILLAGE BORDERING ON MERRIMACK RIVER] OWNED BY GEN. LEACH.	1833/05/31	1"=2 CHAINS		H 62.5, W 49.3 CM	INK, COLORED INK
C-148-014	LAND IN CHELMSFORD [AREA OF GLASS HOUSE LOT NEAR MIDDLESEX VILLAGE BORDERING ON MERRIMACK RIVER] OWNED BY GEN. LEACH.	1833/05/31	1"=2 CHAINS	H 62.5, W 49.3 CM	INK, COLORED INK	PAPER
C-148-015	[BANK BORDERING] BLACK BROOK / NEAR MIDDLESEX VILLAGE.	1833/00/00	1"=2'		H 62.5, W 49.3 CM	INK, COLORED INK
C-148-015	[BANK BORDERING] BLACK BROOK / NEAR MIDDLESEX VILLAGE.	1833/00/00	1"=2'	H 62.5, W 49.3 CM	INK, COLORED INK	PAPER
C-148-016	[UNTITLED PLAN.] [LAND ON SOUTH BANK BORDERING BLACK BROOK BELONGING TO MARTIN BATES & SON.]	1837/04/28	NONE		H 19.2, W 18 CM	INK
C-148-016	[UNTITLED PLAN.] [LAND ON SOUTH BANK BORDERING BLACK BROOK BELONGING TO MARTIN BATES & SON.]	1837/04/28	NONE	H 19.2, W 18 CM	INK	CLOTH BACKED PAPER
C-148-017	[UNTITLED PLAN.] [LAND ON NORTH BANK BORDERING CLAY PIT BROOK. CLAIMS OF T. VARNUM & OTHERS.]	1887/11/00	NONE	H 26.5, W 41.9 CM	INK	TRACING PAPER
C-148-017-[A]	[UNTITLED. SEE NOTES.]	1887/11/00	NONE	H 11.4, W 8 CM	INK, GRAPHITE	PAPER

C-148-017-[B]	[UNTITLED. SEE NOTES.]	1887/00/00	NONE	H 11.4, W 7.7 CM	GRAPHITE	PAPER
C-148-017-[C]	[UNTITLED. SEE NOTES]	1887/00/00	NONE	H 11.7, W 7.7 CM	GRAPHITE	PAPER
C-148-017-[D]	[UNTITLED. SEE NOTES.]	1887/00/00	NONE	H 11.4, W 8 CM	GRAPHITE	PAPER
C-148-017-[E]	[UNTITLED. SEE NOTES.]	1887/00/00	NONE	H 11.8, W 7.7 CM	GRAPHITE	PAPER
C-148-017-[F]	[UNTITLED. SEE NOTES.]	1887/00/00	NONE	H 11.9, W 7.8 CM	GRAPHITE	PAPER
C-148-017-[G]	[UNTITLED. SEE NOTES.]	1887/10/20	NONE	H 21.3, W 13.3 CM	INK, GRAPHITE	PAPER
C-148-017-[H]	[UNTITLED. SEE NOTES.]	1887/11/05	NONE	H 25.3, W 20.3 CM	INK, GRAPHITE	PAPER
C-148-017-[I]	[UNTITLED. SEE NOTES.]	1887/11/12	NONE	H 25.3, W 20.3 CM	INK, GRAPHITE	PAPER
C-148-017-[J]	ECONOMY / IN / MANAGEMENT OF THE SOIL / AN ADDRESS / BEFORE THE / AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE / AT / THE NEW YORK MEETING. / BY / HENRY E. ALVORD.	1887/00/00	NONE	H 24.3, W 15.5 CM	INK, GRAPHITE	PAPER
C-148-017-[K]	PROCEEDINGS / OF THE / EIGHTH ANNUAL MEETING / OF THE PROMOTION / OF THE / SOCIETY FOR THE PROMOTION / OF / AGRICULTURAL SCIENCE, / EDITED BY THE SECRETARY / WILLIAM R. LAZENBY.	1887/00/00	NONE	H 22.7, W 14.7 CM	INK, GRAPHITE	PAPER

C-148-018-[A]	OBSERVATIONS ON HEIGHT OF THE WATER IN / CLAY PIT BROOK.	1885/09/11	H1"=500', V1"=2 1/2'	H 25, W 42.9 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	PAPER
C-148-018-[B]	CLAY PIT BROOK / OBSERVATIONS MADE ON THE HEIGHT OF WATER IN / THE BROOK AT DIFFERENT SITUATIONS. THERE / WERE FLASHBOARDS ON THE DAM.	1885/09/21	H1"=500', V1"=2 1/2'	H 25, W 42.9 CM	INK, COLORED PENCIL, COLORED INK, GRAPHITE	PAPER
C-148-018-[C]	CLAY PIT BROOK / SKETCH SHOWING, APPROXIMATELY / WHERE CONSTRUCTIONS EXIST.	1885/09/21	1"=1000'	H 24.1, W 43.1 CM	INK, COLORED PENCIL, GRAPHITE, COLORED INK	TRACING PAPER
C-148-018-[D]	DIAGRAM / OF / SLOPES IN CLAY PIT BROOK / 1885 & 1886.	1886/00/00	H1"=250', V1"=1/4'	H 90, W 76 CM	INK, COLORED INK, GRAPHITE	PAPER
C-148-019	PLAN / OF [LAND ON NORTH BANK BORDERING CLAY PIT BROOK BELONGING TO / ESTATE OF / J. B. V. COBURN HEIRS. / SHOWING / CONTOUR LINE 6 FEET ABOVE PAWTUCKET / DAM & AREA OF WATER BACKED UP IN / BROOK MAY 15, 1897 ABOUT 11 A.M.	1897/05/27	1"=80'	H 80.2, W 62.3 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

C-148-019-[A]	PLAN / OF ESTATE OF / J. B. V. COBURN HEIRS / SHOWING / CONTOUR LINE 6 FEET ABOVE PAWTUCKET / DAM & AREA OF WATER BACKED UP IN / BROOK MAY 15, 1897 ABOUT 11-AM.	1897/05/27	1"=80'	H 80, W 62.3 CM	BLUEPRINT, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
C-148-020	PLAN OF / PROPOSED LOTTING UP OF / ESTATE OF LUCY M. FAY / WITH APPROXIMATE LOCATION OF CONTOUR / 9O (8 FEET ABOVE CREST OF L.& C. DAM.) / DOTTED CONTOUR LINES SKETCHED ON.	1897/05/03	1"=80'	H 58.4, W 92 CM	INK, WATER COLOR, COLORED PENCIL	TRACING PAPER
C-148-021	DRAINAGE [AREA] OF FLAGGY MEADOW BROOK / DRACUT.	UNDATED	1"=200'	H 64.6, W 113 CM	INK, COLORED INK, GRAPHITE	PAPER
C-148-022	[PHOTOGRAPHS OF CITY] CLAY PIT BROOK [& VICINITY] / JULY 15, 1897.	1897/07/15	NONE	H 65.5, W 96.5 CM	PHOTOGRAPHIC PRINT, INK, GRAPHITE	CARDBOARD
C-148-023	[UNTITLED.] [PHOTOGRAPHS OF CITY CLAY PIT BROOK & VICINITY.]	1897/07/15	NONE	H 65.5, W 96.5 CM	PHOTOGRAPHIC PRINT, INK	CARDBOARD
C-148-024	[UNTITLED.] [PHOTOGRAPHS OF CITY CLAY PIT BROOK & VICINITY.]	1897/07/15	NONE	H 65.5, W 96.5 CM	PHOTOGRAPHIC PRINT, INK	CARDBOARD

C-148-025	PLAN / OF / [LAND ON NORTH BANK BORDERING] CLAY PIT BROOK & LAND ADJACENT / ABOVE COBURN ESTATE. [BELONGING TO GEORGE L. GOODALE, FRANCIS G. GREEN, THOMAS J. UNDERWOOD, JAMES & MOSES GIBSON, JOSEPH M. WILSON & BENJ. MORRISON, L. A. DEARBORN.]	1897/07/01	1"=80'	H 70.8, W 58.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-148-025-[COPY 1]	PLAN / OF / CLAY PIT BROOK & LAND ADJACENT / ABOVE / J. B. V. COBURN ESTATE.	1897/07/01	1"=80'	H 69.8, W 57.9 CM	BLUEPRINT, COLORED PENCIL, INK, GRAPHITE	PAPER
C-148-025-[COPY 2]	PLAN / OF / CLAY PIT BROOK & LAND ADJACENT ABOVE / J. B. V. COBURN ESTATE.	1897/07/01	1"=80'	H 70.2, W 58.4 CM	BLUEPRINT, GRAPHITE	PAPER
C-148-026	DIAGRAM OF SLOPES / IN CLAY PIT BROOK AT DIFFERENT / TIMES.	1897/07/12	H1"=500', V1"=3 1/2'	H 47.3, W 57.4 CM	INK, WATER COLOR, GRAPHITE	PAPER
C-148-027	PLAN / OF / LAND ON [NORTH BANK BORDERING] CLAY PIT BROOK / BELONGING TO / WILLIAM H. HULL & OTHERS.	1897/07/12	1"=80'	H 67.6, W 55.8 CM	INK, COLORED INK	DRAFTING CLOTH
C-148-027-[COPY 1]	PLAN / OF / LAND ON [NORTH BANK BORDERING] CLAY PIT BROOK / BELONGING TO / WILLIAM H. HULL & OTHERS.	1897/07/12	1"=80'	H 67.2, W 55.8 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER

C-148-028	PLAN / OF / LAND ON [NORTH BANK BORDERING] CLAY PIT BROOK / BELONGING TO / THOS. VARNUM & OTHERS [HEIRS OF JEREMIAH VARNUM].	1897/07/08	1"=80'	H 71.1, W 96.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
C-148-028-[A]	PLAN / OF / LAND ON [NORTH BANK BORDERING] CLAY PIT BROOK / BELONGING TO / THOS. VARNUM & OTHERS.	1897/07/08	1"=80'	H 71.1, W 96.8 CM	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
C-148-029	DIAGRAM / SHOWING / SLOPES IN CLAY PIT BROOK.	1885-1886/00/00	H1"=250', V1"=1/2"	H 56.3, W 102.7 CM	INK, COLORED INK	PAPER
C-148-030	A PLAN / OF LAND [ON NORTH BANK] IN DRACUT, / BELONGING TO PROPS OF L.& C. ON / MERRIMACK RIVER.	1832/12/00	3/4"=50'	BOYDEN, URIAH	H 54.5, W 148.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL
C-148-030	A PLAN / OF LAND [ON NORTH BANK] IN DRACUT, / BELONGING TO PROPS OF L.& C. ON / MERRIMACK RIVER.	1832/12/00	3/4"=50'	H 54.5, W 148.5 CM	INK, WATER COLOR, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-148-031	SECTIONS ACROSS CLAY PIT BROOK / ON LAND [ON NORTH BANK] OF T. VARNUM IN / PAWTUCKETVILLE, LOWELL, MASS.	1889/01/18	NONE	H 76.6, W 58.8 CM	WATER COLOR, INK, GRAPHITE	PAPER

C-148-032	PLAN OF / PROPOSED LOTTING UP OF / ESTATE OF LUCY M. FAY [LAND ON NORTH BANK BORDERING CLAY PIT BROOK] / WITH APPROXIMATE LOCATION OF CONTOUR / 90 (8 FEET ABOVE CREST OF L.& C. DAM.) / DOTTED CONTOUR LINES SKETCHED ON.	1897/05/03	1"=80'	H 51.1, W 88.8 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-148-032-[A]	PLAN OF / PROPOSED LOTTING UP OF / ESTATE OF LUCY M. FAY [LAND ON NORTH BANK BORDERING CLAY PIT BROOK] / WITH APPROXIMATE LOCATION OF CONTOUR / 90 (8 FEET ABOVE CREST OF L.& C. DAM.) / DOTTED CONTOUR LINES SKETCHED ON.	1897/05/03	1"=80'	H 53.1, W 90.5 CM	BLUEPRINT, GRAPHITE, COLORED PENCIL	PAPER
C-P.H. 001	[DIAGRAMS SHOWING HEIGHTS OF RIVER AT LAKE WINNIPISEOGEE, PLYMOUTH, SEWELL'S FALLS, GARVIN'S FALLS, MANCHESTER, NASHUA AND LOWELL FOR THE YEARS, 1895-1904.]	SEE TITLE				
C-P.H. 002	[PLAN OF LAND ALONG NORTH BANK OF MERRIMACK RIVER BETWEEN MOODY & SCHOOL STS. SHOWING CONTOURS, ETC., KNOWN AS FALLS FIELD.]	1890/00/00				
C-P.H. 003	[PLAN & SECTIONS OF BED OF UPPER PORTION OF HUNTS FALLS.]	1871/00/00				

C-P.H. 004	[POSTAL DEPT. MAP OF PENNSYYLVANIA, NEW JERSEY, MARYLAND, DELAWARE, WITH ADJACENT TERRITORY OF NEW YORK, OHIO, VIRGINIA & WEST VIRGINIA.]	1869/00/00	1"=6 MILES			
C-P.H. 005	[PLAN OF LAND IN LOWELL AND DRACUT (NOW CENTERVILLE) SHOWING LOTS FROM BRIDGE ST. EAST TO CITY LINE. CONSECUTIVE INDEX SAYS: "…WEST OF BRIDGE ST."]	1856/00/00				
C-P.H. 006	[LAND PLAN OF CHELMSFORD (NOW LOWELL) AS SURVEYED BY JAS. BALDWIN IN 1825 FOR THE MERRIMACK MFG. CO. & RECORDED IN THE REGISTER OF DEEDS OFFICE OF MIDDLESEX COUNTY.]	1874/00/00				
C-P.H. 007	[OLD FACTORY MUTUAL MILL YARD PLANS.]	UNDATED				
C-P.H. 008	PLAN OF PART / OF / NORTHERN CANAL GATE HOUSE / SHOWING / HOISTING WHEEL WITH WATERWAYS TO AND FROM SAME.	1902/03/00	1/2"=1'	H 128, W 157 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 009	[PLAN OF PAWTUCKET CANAL FROM SCHOOL ST. BRIDGE TO CENTRAL ST. BRIDGE SHOWING ADJACENT LAND & STREETS.]	1898/00/00				
C-P.H. 010-[A]-[01]	PROFILES OF THOSE PARTS OF / MERRIMACK & NASHUA RIVERS, / FROM / NASHUA TO LOWELL	1836/11/00	NONE	BOYDEN, URIAH	H 36", W 54"	INK, COLORED INK

C-P.H. 010-[A]-[01]	PROFILES OF THOSE PARTS OF / MERRIMACK & NASHUA RIVERS, / FROM / NASHUA TO LOWELL	1836/11/00	NONE		INK, COLORED INK	CLOTH BACKED PAPER
C-P.H. 010-[A]-[02]-[COPY 1]	PROFILES / OF A PART OF / NASHUA AND MERRIMACK RIVERS; / BY U.A. BOYDEN.	1836/00/00	NONE	BOYDEN, URIAH	H 75, W 163.7 CM	INK, COLORED INK, GRAPHITE
C-P.H. 010-[A]-[02]-[COPY 1]	PROFILES / OF A PART OF / NASHUA AND MERRIMACK RIVERS; / BY U.A. BOYDEN.	1836/00/00	NONE	H 75, W 163.7 CM	INK, COLORED INK, GRAPHITE	PAPER
C-P.H. 010-[A]-[02]-[COPY 2]	PROFILES / OF A PART OF / NASHUA AND MERRIMACK RIVERS; / BY U. A. BOYDEN.	SEE NOTES		BOYDEN, URIAH	H 44, W 120CM	INK, COLORED INK, GRAPHITE
C-P.H. 010-[A]-[02]-[COPY 2]	PROFILES / OF A PART OF / NASHUA AND MERRIMACK RIVERS; / BY U. A. BOYDEN.	SEE NOTES	NONE	H 44 W 120CM	INK, COLORED INK, GRAPHITE	PAPER
C-P.H. 010-[A]-[03]	PROFILES / OF A PART OF / NASHUA AND MERRIMACK RIVERS; / BY U.A. BOYDEN.	1836/00/00	NONE	BOYDEN, URIAH	H 76, W 161 CM	INK, COLORED INK, GRAPHITE
C-P.H. 010-[A]-[03]	PROFILES / OF A PART OF / NASHUA AND MERRIMACK RIVERS; / BY U.A. BOYDEN.	1836/00/00	NONE	H 76, W 161 CM	INK, COLORED INK, GRAPHITE	PAPER
C-P.H. 010-[A]-[04]-[01]	TABLE 1.	1835/06/00	NONE	BOYDEN, URIAH A.	H 52, W 46CM	INK
C-P.H. 010-[A]-[04]-[01]	TABLE 1.	1835/06/00	NONE	H 52, W 46CM	INK	PAPER

C-P.H. 010-[A]-[04]-[01]-[COPY 1]	TABLE 1.	1835/06/00	NONE	BOYDEN, URIAH A.	H 63, W 45 CM	INK
C-P.H. 010-[A]-[04]-[01]-[COPY 1]	TABLE 1.	1835/06/00	NONE	H 63, W 45 CM	INK	PAPER
C-P.H. 010-[A]-[04]-[02]	TABLE 2.	1835/07/00	NONE	BOYDEN, URIAH A.	H 55.5, W 49.5 CM	INK
C-P.H. 010-[A]-[04]-[02]	TABLE 2.	1835/07/00	NONE	H 55.5, W 49.5 CM	INK	PAPER
C-P.H. 010-[A]-[04]-[02]-[COPY 1]	TABLE 2.	1835/07/00	NONE	BOYDEN, URIAH A.	H 69.5, W 52 CM	INK
C-P.H. 010-[A]-[04]-[02]-[COPY 1]	TABLE 2.	1835/07/00	NONE	H 69.5, W 52 CM	INK	PAPER
C-P.H. 010-[A]-[04]-[02]-[COPY 2]	TABLE 2.	1859/06/00	NONE	BOYDEN, URIAH A.	H 62, W 51.5 CM	INK

C-P.H. 010-[A]-[04]-[02]-[COPY 2]	TABLE 2.	1859/06/00	NONE	H 62, W 51.5 CM	INK	PAPER
C-P.H. 010-[A]-[04]-[03]	TABLE 3.	1859/06/00	NONE	BOYDEN, URIAH A.	H 44, W 47 CM	INK
C-P.H. 010-[A]-[04]-[03]	TABLE 3.	1859/06/00	NONE	H 44, W 47 CM	INK	PAPER
C-P.H. 010-[A]-[04]-[03]-[COPY 1]	TABLE 3.	1859/06/00	NONE	BOYDEN, URIAH A.	H 44, W 51.7 CM	INK
C-P.H. 010-[A]-[04]-[03]-[COPY 1]	TABLE 3.	1859/06/00	NONE	H 44, W 51.7 CM	INK	PAPER
C-P.H. 010-[A]-[05]	TABLE I.	1835/06/00	NONE		H 59.7, W 33.3 CM	INK
C-P.H. 010-[A]-[05]	TABLE I.	1835/06/00	NONE	H 59.7, W 33.3 CM	INK	PAPER

C-P.H. 010-[A]-[06]	[UNTITLED DOCUMENT IN THE FORM OF A TABLE. MAY BE ROUGH WORK FOR TABLE 2.]	1835/07/00	NONE		H 83.3, W 54 CM	INK, GRAPHITE
C-P.H. 010-[A]-[06]	[UNTITLED DOCUMENT IN THE FORM OF A TABLE. MAY BE ROUGH WORK FOR TABLE 2.]	1835/07/00	NONE	H 83.3, W 54 CM	INK, GRAPHITE	PAPER
C-P.H. 010-[B]	PROFILE / OF THE / NASHUA & MERRIMACK RIVERS / FROM THE JACKSON FACTORY ON THE NASHUA TO THE DAM / AT THE HEAD OF PAWTUCKET FALLS / ON THE MERRIMACK / IN LOWELL [FROM JUNE 20 TO JULY 18, 1834, INCLUSIVE].	SEE NOTES	1"=1500', 1/16"=1'	H 11", W 57"	INK, GRAPHITE	PAPER
C-P.H. 010-[B]-[COPY 1]	PROFILE / OF THE / NASHUA & MERRIMACK RIVERS / FROM THE JACKSON FACTORY ON THE NASHUA TO THE DAM / AT THE HEAD OF PAWTUCKET FALLS / ON THE MERRIMACK / IN LOWELL [FROM JUNE 20 TO JULY 18, 1834, INCLUSIVE].	1834/10/00	1"=1500', 1/16"=1'	H 11", W 57"	INK	DRAFTING CLOTH
C-P.H. 010-[B]-[COPY 2]	PROFILE / OF THE / NASHUA & MERRIMACK RIVERS / FROM THE JACKSON FACTORY ON THE NASHUA TO THE DAM / AT THE HEAD OF PAWTUCKET FALLS / ON THE MERRIMACK / IN LOWELL [FROM JUNE 20 TO JULY 18, 1834, INCLUSIVE].	1834/10/00	1"=1500', 1/16"=1'	H 11", W 57"	BLUEPRINT	PAPER

C-P.H. 010-[C]	PROFILE SHOWING THE FALLS, OR SLOPES BETWEEN DIFFERENT STATIONS AND THE WHOLE FALL / FROM THE JACKSON FACTORY ON THE NASHUA RIVER TO THE LOWELL DAM ON THE / MERRIMACK RIVER. / FROM JUNE 20 TO JULY 18, 1834 INCLUSIVE.	SEE TITLE			H 49, W 120 CM	INK, COLORED INK
C-P.H. 010-[C]	PROFILE SHOWING THE FALLS, OR SLOPES BETWEEN DIFFERENT STATIONS AND THE WHOLE FALL / FROM THE JACKSON FACTORY ON THE NASHUA RIVER TO THE LOWELL DAM ON THE / MERRIMACK RIVER. / FROM JUNE 20 TO JULY 18, 1834 INCLUSIVE.	SEE TITLE		H 49, W 120 CM	INK, COLORED INK	PAPER
C-P.H. 010-[D]	[REPORT] TO WILLIAM AMORY, ESQ. / TREASURER OF THE JACKSON MANUFACTURING COMPANY, BOSTON / SIGNED, L. BALDWIN [TO ACCOMPANY THE PROFILES C-P.H. 010 -[B] & [C].	1834/06/19	NONE		H25.4, W 20.4 CM	
C-P.H. 010-[D]	[REPORT] TO WILLIAM AMORY, ESQ. / TREASURER OF THE JACKSON MANUFACTURING COMPANY, BOSTON / SIGNED, L. BALDWIN [TO ACCOMPANY THE PROFILES C-P.H. 010 -[B] & [C].	1834/06/19	NONE	H25.4, W 20.4 CM	INK	PAPER

C-P.H. 010-[D]-[COPY 1]	[REPORT] TO WILLIAM AMORY, ESQ. / TREASURER OF THE JACKSON MANUFACTURING COMPANY, BOSTON / SIGNED, L. BALDWIN [TO ACCOMPANY THE PROFILES C-P.H. 010 -[B] & [C].	SEE NOTES	NONE	H21.5, W 27.5 CM	INK	PAPER
C-P.H. 011-[01]	BOOTT PENSTOCK / LOWELL, MASS. [OLD PLANS (6) PERTAINING TO THE BOOTT PENSTOCK AS BUILT IN 1873, AND TO THE EXTENSION BUILT IN 1889].	1873/05/00	1/2"=1'	H 129.5, W 153 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-P.H. 011-[02]	[OLD PLANS (6) PERTAINING TO THE BOOTT PENSTOCK AS BUILT IN 1873, AND TO THE EXTENSION BUILT IN 1889].	SEE TITLE				
C-P.H. 011-[03]	[OLD PLANS (6) PERTAINING TO THE BOOTT PENSTOCK AS BUILT IN 1873, AND TO THE EXTENSION BUILT IN 1889].	SEE TITLE				
C-P.H. 011-[04]	[OLD PLANS (6) PERTAINING TO THE BOOTT PENSTOCK AS BUILT IN 1873, AND TO THE EXTENSION BUILT IN 1889].	SEE TITLE				
C-P.H. 011-[05]	[OLD PLANS (6) PERTAINING TO THE BOOTT PENSTOCK AS BUILT IN 1873, AND TO THE EXTENSION BUILT IN 1889].	SEE TITLE				
C-P.H. 011-[06]	[OLD PLANS (6) PERTAINING TO THE BOOTT PENSTOCK AS BUILT IN 1873, AND TO THE EXTENSION BUILT IN 1889].	SEE TITLE				
C-P.H. 012	PLAN [& SECTION] / OF THE / HAMILTON WASTEWAY / A TO B RECONSTRUCTED IN 1883.	1884/02/02	1"=4'	H 105.3, W 172.7 CM	INK, WATER COLOR, WATER COLOR	CLOTH BACKED PAPER

C-P.H. 013-[A]	PLAN / OF THE / NORTHERN CANAL / WITH THE / LANDS ADJACENT.	1848/00/00	1"=40'		H 106.6, W 331.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL
C-P.H. 013-[A]	PLAN / OF THE / NORTHERN CANAL / WITH THE / LANDS ADJACENT.	1848/00/00	1"=40'	H 106.6, W 331.5 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-P.H. 013-[B]	[UNTITLED PLAN.] [PLAN OF MERRIMACK RIVER (3 PARTS) FROM BEAVER BROOK TO MOUTH OF CONCORD. LARGE SCALE.]	1881/00/00			INK, WATER COLOR	PAPER
C-P.H. 014-[A]	[SCHEMATIC PROFILE OF MERRIMACK RIVER FROM NEWBURYPORT TO MANCHESTER N.H. BY GENERAL THOM, CORPS OF ENGINEERS, U.S.A. SHOWING BENCH GAUGES, & OBSTRUCTIONS TO NAVIGATION FROM HEAD OF MITCHELL'S FALLS BELOW LAWRENCE TO MANCHESTER.]	1881/00/00	1:1000			
C-P.H. 014-[B]	[PLAN & PROFILE OF MERRIMACK RIVER AT HUNTS FALLS, SURVEYED UNDER THE DIRECTION OF BVT. BRIG. GENERAL GEO. THOM, COL OF CORPS OF ENGINEERS, U.S.A. SHOWING SOUNDINGS & PROPOSED CUTS TO MAKE A 4' CHANNEL FOR NAVIGATION.]	1881/08/00	1:2000			

C-P.H. 015-[A]	[LAND ON NORTH SIDE IN LOWELL & DRACUT BORDERING ON BEAVER BROOK, BELOW THE LEVEL OF THE TOP OF THE TWO FEET FLASHBOARDS ON THE DAM.]	1875/00/00				
C-P.H. 015-[B]	[PLAN & PROFILE OF MERRIMACK RIVER FROM HUNTS FALLS TO MITCHELLS FALLS BASED UPON SURVEYS FOR PROPOSED CANAL.]	1844/01/00				
C-P.H. 016-[A]	SKETCH SHOWING [PLAN & SECTIONS OF] LAKE CO. DAM / AT LAKEPORT N.H. / (TO ACCOMPANY MEMORANDUM OF S. S. KENT DATED MAY 25, 1928).	1928/05/25	1"=5'& 20'	H 52, W 64.7 CM	INK, COLORED INK	DRAFTING CLOTH
C-P.H. 016-[B]-[01]	PLAN / OF / DAM / AT / LAKE VILLAGE N.H.	1854/04/00	1"=4'		INK, COLORED INK, WATER COLOR	
C-P.H. 016-[B]-[01]	PLAN / OF / DAM / AT / LAKE VILLAGE N.H.	1854/04/00	1"=4'	H 51 1/2", W 76"	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
C-P.H. 016-[B]-[02]	[PLANS SHOWING DAMS AT LAKE VILLAGE N.H. & BRISTOL, N. H.]	1859/00/00				
C-P.H. 016-[C]	PLAN / OF THE / MILL PROPERTY / ON THE / NEWFOUND RIVER / AT / BRISTOL VILLAGE, N.H.	1884/01/00	1"=30'	H 85, W 113 CM	INK, WATER COLOR	DRAFTING CLOTH
C-P.H. 016-[D]	[PHOTOGRAPH OF] LAKE ST. DAM / 1929, / LAKEPORT, N.H. [AFTER REPAIRS BY INT. PAPER CO.]	1929/00/00	NONE	H 25, W 70.6 CM	PHOTOGRAPHIC PRINT	PAPER

C-P.H. 017-[A]	TRACING OF PART OF THE LAND / BETWEEN / MOODY ST. & THE MOUTH OF THE CONCORD RIVER / SHOWING / THE MERRIMACK RIVER LINES / & CONTOURS TAKEN OCT. 1899. [IN THREE PARTS WITH BLUE PTS.]	1897/10/05	1"=50'	H 86.3, W 218.4 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-P.H. 017-[A]-[COPY 1]	TRACING OF PART OF THE LAND / BETWEEN / MOODY ST. & THE MOUTH OF THE CONCORD RIVER / SHOWING / THE MERRIMACK RIVER LINES / & CONTOURS TAKEN OCT. 1899. [IN THREE PARTS WITH BLUE PRTS.]	1897/10/05	1"=50'	H 86.3, W 218.4 CM	BLUEPRINT, COLORED INK	PAPER
C-P.H. 017-[B]	[UNTITLED PLAN.] [PLAN (TRACING) OF MERRIMACK RIVER BETWEEN MOODY STREET AND MOUTH OF CONCORD RIVER SHOWING THE PROPERTY ADJACENT AND THE CONTOURS OF RIVER TAKEN OCT. 1899. (IN 3 PARTS WITH BLUE PTS.]	SEE NOTES	NONE	H 23.5, W 106.8 CM	BLUEPRINT	PAPER
C-P.H. 017-[C]	MERRIMACK RIVER FROM AIKEN TO MOODY ST. / SHOWS CONTOURS OF 1897. [IN THREE PARTS WITH BLUE PRTS.]	SEE NOTES	1"=50'	H 110, W 176 CM	INK, COLORED INK	DRAFTING CLOTH
C-P.H. 017-[C]-[COPY 1]	MERRIMACK RIVER FROM AIKEN TO MOODY ST. / SHOWS CONTOURS OF 1897. [IN THREE PARTS WITH BLUE PRTS.]	SEE NOTES	1"=50'	H 110, W 176 CM	BLUEPRINT	PAPER
C-P.H. 017-[D]	COPY OF PLAN OF MERRIMACK RIVER / FROM BEAVER BROOK TO MOUTH OF / CONCORD SHOWING ESTABLISHED / RIVER LINES. TRACED FROM PLAN / IN OFFICE OF REGISTER OF DEEDS IN LOWELL / IN 1897.	1897/00/00	1"=100'	H 106, W 179.5 CM	INK, GRAPHITE	TRACING PAPER

C-P.H. 018	[PLAN OF LANDS BELONGING TO L. & C. TAKEN BY CITY OF LOWELL FOR WATER WORKS.]	UNDATED				
C-P.H. 019	PLAN / OF / BOSTON.	1868/00/00	1"=500'	H 35 1/2",W 53"	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
C-P.H. 020-[A]	GUARD SLUICES OF PAWTUCKET CANAL / LOWELL, / AS RECONSTRUCTED BY THE / PROPRIETORS OF LOCKS & CANALS ON MERRIMACK RIVER / IN 1870. [MISC PLANS PERTAINING TO THE RECONSTRUCTION OF THE OLD GUARD...INCLUDING THE HYDRAULIC APPARATUS FOR LIFTING THE GATES].	1870/00/00	SCALE & FULL SIZE	H 76", W 51"	INK	CLOTH BACKED PAPER
C-P.H. 020-[B]-[01]	PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / CYLINDER FOR HYDRAULIC LIFTS / AT THE GUARD GATES OF PAWTUCKET CANAL AT / LOWELL, MASS. [MISC. PLANS PERTAINING TO THE RECONSTRUCTION...INCLUDING THE HYDRAULIC APPARATUS FOR LIFTING THE GATES].	1870/04/19	3"=1'	H 25 1/4", W 38"	INK, COLORED INK	PAPER
C-P.H. 020-[B]-[01]-[COPY 1]	PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER / CYLINDER FOR HYDRAULIC LIFTS / AT THE GUARD GATES OF PAWTUCKET CANAL AT / LOWELL, MASS. [MISC. PLANS PERTAINING TO THE RECONSTRUCTION...INCLUDING THE HYDRAULIC APPARATUS FOR LIFTING THE GATES].	1880/06/30	3"=1'	H 25 1/4", W 38"	INK, COLORED INK	PAPER

C-P.H. 020-[B]-[02]	SPECIFICATION FOR FIVE CYLINDERS FOR THE HYDRAULIC / LIFTS AT THE GUARD GATES OF THE PAWTUCKET CANAL. [MISC. PLANS PERTAINING TO THE RECONSTRUCTION...INCLUDING THE HYDRAULIC APPARATUS FOR LIFTING THE GATES].	1870/00/00	NONE	H 32, W 20.5 CM	COLORED INK	PAPER
C-P.H. 020-[C]-[02]	RECONSTRUCTION OF THE GUARD GATES / OF THE PAWTUCKET CANAL.	1870/05/09	2"=1'	NOT MEASUREABLE	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 020-[C]-01	RECONSTRUCTION OF THE GUARD GATES / OF PAWTUCKET CANAL.	1870/05/09	2"=1'	H 68, W 101.5 CM	INK, COLORED INK	PAPER
C-P.H. 020-[D]	RECONSTRUCTION OF THE GUARD GATES / OF THE PAWTUCKET CANAL.	1870/05/09	2"=1'	H 66.5, W 98 CM	INK, COLORED INK, WATER COLOR	PAPER
C-P.H. 020-[D]-[COPY 1]	RECONSTRUCTION OF THE GUARD GATES / OF PAWTUCKET CANAL.	1880/06/30	2"=1'	H 66.5, W 98 CM	INK, COLORED INK, WATER COLOR	PAPER
C-P.H. 020-[E]	PISTON HEAD COVER / HYDRAULIC CYLINDERS / OLD GUARD LOCKS / PRPPRIETORS LOCKS AND CANALS.	1921/07/02	3"=1'	H 26, W 33 CM	INK, GRAPHITE	DRAFTING CLOTH
C-P.H. 021-[A]	[DRAWINGS PERTAINING TO] APPLETON CO. TURBINE.	1854/11/21	1:1		H 181, W 118 CM	INK, COLORED INK, WATER COLOR, GRAPHITE, COLORED PENCIL

C-P.H. 021-[A]	[DRAWINGS PERTAINING TO] APPLETON CO. TURBINE.	1854/11/21	1:1	H 181, W 118 CM	INK, COLORED INK, WATER COLOR, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
C-P.H. 021-[B]	[DRAWINGS PERTAINING TO] LONGITUDINAL SECTION / OF / APPLETON CO'S TURBINE.	1855/07/25	1:1		H 104.2, W 128 CM	INK, COLORED INK, GRAPHITE
C-P.H. 021-[B]	[DRAWINGS PERTAINING TO] LONGITUDINAL SECTION / OF / APPLETON CO'S TURBINE.	1855/07/25	1:1	H 104.2, W 128 CM	INK, COLORED INK, GRAPHITE	CLOTHBACKED PAPER
C-P.H. 022	[PLAN OF THE OUTLINES OF A DRESSING MILL PROPOSED TO BE BUILT BY THE MERRIMACK MFG. CO.]	1862/11/06				
C-P.H. 023-[01]	LAWRENCE CO'S TURBINE. / PLAN OF REGULATING APPARATUS.	1854/07/00	1/4"=1"		H 46 1/2", W 69 5/8"	INK, COLORED INK, WATER COLOR, COLORED PENCIL, GRAPHITE
C-P.H. 023-[01]	LAWRENCE CO'S TURBINE. / PLAN OF REGULATING APPARATUS.	1854/07/00	1/4"=1"	H 46 1/2", W69 5/8"	INK, COLORED INK, WATER COLOR, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER

C-P.H. 023-[02]	PLAN AND SECTION / OF / LAWRENCE CO'S TURBINE.	1854/10/00	1/8:1		H 102.7, W 207.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE
C-P.H. 023-[02]	PLAN AND SECTION / OF / LAWRENCE CO'S TURBINE.	1854/10/00	1/8:1	H 102.7, W 207.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 023-[03]	LAWRENCE CO'S TURBINE / PLAN OF REGULATING APPARATUS / WESTERLY WHEEL NO. 7.	1857/11/22	1/4:1		H 118, W 178.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE
C-P.H. 023-[03]	LAWRENCE CO'S TURBINE / PLAN OF REGULATING APPARATUS / WESTERLY WHEEL NO. 7.	1857/11/22	1/4:1	H 118, W 178.4 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 024	[DRAWINGS RELATING TO HUMPHREY IXL TURBINE AT TREMONT MILLS.]	1883/00/00				
C-P.H. 025-[COPY 1]	RIPPEY'S / INDEX MAP / OF / LOWELL / MASS.	1888/00/00	1/4"=100'	H 39 1/2", W 58"	HELIOTYPE/WATER COLOR/COLORED INK	CLOTH BACKED PAPER
C-P.H. 025-[COPY 2]	RIPPEY'S / INDEX MAP / OF / LOWELL, / MASS.	1888/00/00	1/4"=100'	H 39 1/2", W 58"	HELIOTYPE	CLOTH BACKED PAPER
C-P.H. 025-[COPY 3]	RIPPEY'S / INDEX MAP / OF / LOWELL, / MASS.	1888/00/00	1/4"=100'	H 39 1/2", W 58"	HELIOTYPE	CLOTH BACKED PAPER

C-P.H. 026	[PLAN & SECTIONS OF LAWRENCE MFG. CO' S 9' TURBINE WITH FULL SIZE SECTION OF SOME OF THE LOWER PARTS.]	1870/00/00				
C-P.H. 027-01	DYNAMOMETER / FOR TESTING THE WESTERLY SWAIN TURBINE / IN BOOTT COTTON MILL NO. 5.	1874/03/30	1"=1'	H 95.1, W 126.7 CM	INK, WATER COLOR. COLORED INK, COLORED PENCIL, GRAPHITE	CLOTHBACKED PAPER
C-P.H. 027-02	DETAILS OF DYNAMOMETER / FOR TESTING WESTERLY SWAIN TURBINE IN BOOTT COTTON MILL NO. 5.	1874/07/11	1/4 SIZE	H 53.5, W 74.7 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL	PAPER
C-P.H. 028	[LAND IN PAWTUCKETVILLE BELONGING TO HENRY EMERY.]	1875/00/00				
C-P.H. 029-[01]	[DRAWINGS PERTAINING TO PROPOSED BOOTT PENSTOCK.]	1907/01/00				
C-P.H. 029-[02]	[PROPOSED BOOTT NEW BOOM.]	1907/06/06	1/2"=1'			
C-P.H. 030	[PLAN OF FOUNDATION OF NEW TREMONT MILLS.]	1853/03/29				
C-P.H. 031-[A]-[01]	PLAN OF MERRIMACK RIVER / FROM / PAWTUCKET DAM LOWELL, MASSACHUSETTS, TO CROMWELL'S FALLS N.H. / SHOWING / "LOCKS AND CANALS" MILL POND AND ABUTTERS ALONG BANKS OF RIVER. [EACH LOT SHOWING INDEX NUMBER FOR FLOWAGE CLAIMS & REGISTRY OF DEEDS NUMBER.]	1921/02/00	1"=50 RODS	H 67, W 252.4 CM	INK, COLORED INK, WATERCOLOR	DRAFTING CLOTH

C-P.H. 031-[A]-[01]-[COPY 1]	[UNTITLED PLAN.] [PLAN OF THE MERRIMACK RIVER FROM PAWTUCKET DAM TO COMWELLS FALLS, N.H. WITH A TRACING OF SAME, SHOWING L.& C. MILL POND & ABUTTERS ALONG THE RIVER BANKS, EACH LOT SHOWING INDEX NUMBER FOR FLOWAGE CLAIMS & REGISTRY OF DEEDS NUMBER.]	1921/02/00	1"=50 RODS	H 73.5, W 262 CM	BLUEPRINT	PAPER
C-P.H. 031-[A]-[01]-[COPY 2]	PLAN OF MERRIMACK RIVER / FROM / PAWTUCKET DAM LOWELL, MASSACHUSETTS, TO CROMWELL'S FALLS N.H. / SHOWING / "LOCKS AND CANALS" MILL POND AND ABUTTERS ALONG BANKS OF RIVER. [EACH LOT SHOWING INDEX NUMBER FOR FLOWAGE CLAIMS & REGISTRY OF DEEDS NUMBER.]	1921/02/00	1"=50 RODS	H 67, W 252 CM	BLUE LINE PRINT	PAPER
C-P.H. 031-[A]-[01]-[COPY 3]	PLAN OF MERRIMACK RIVER / FROM / PAWTUCKET DAM LOWELL, MASSACHUSETTS, TO CROMWELL'S FALLS N.H. / SHOWING / "LOCKS AND CANALS" MILL POND AND ABUTTERS ALONG BANKS OF RIVER. [EACH LOT SHOWING INDEX NUMBER FOR FLOWAGE CLAIMS & REGISTRY OF DEEDS NUMBER.]	1921/02/00	1"=50 RODS	H 67, W 252 CM	BLUE LINE PRINT, COLORED INK, COLORED PENCIL	PAPER

C-P.H. 031-[A]-[02]	PLAN OF MERRIMACK RIVER / FROM / PAWTUCKET DAM LOWELL, MASSACHUSETTS, TO CROMWELL'S FALLS N.H. / SHOWING / "LOCKS AND CANALS" MILL POND AND ABUTTERS ALONG BANKS OF RIVER [EACH LOT SHOWING INDEX NUMBER FOR FLOWAGE CLAIMS & REGISTRY OF DEEDS NUMBER.]	1921/02/00	1"=50 RODS	H 67, W 252.4 CM	INK, COLORED INK, WATERCOLOR	TRACING PAPER
C-P.H. 031-[B]	[PLAN OF THE MERRIMACK RIVER BETWEEN NASHUA & LOWELL.]	1833/03/00	4"=1 MILE			
C-P.H. 031-[C]-1	SKETCH / OF THE PART OF / MERRIMACK RIVER / BETWEEN CROMWELL'S FALLS / & / PAWTUCKET FALLS /...IN 3 PARTS / PART 1.	1840/09/00	1"=400'	BOYDEN, URIAH	H 53.5, W 231 CM	INK, COLORED PENCIL, GRAPHITE
C-P.H. 031-[C]-1	SKETCH / OF THE PART OF / MERRIMACK RIVER / BETWEEN CROMWELL'S FALLS / & / PAWTUCKET FALLS /...IN 3 PARTS / PART 1.	1840/09/00	1"=400'	H 53.5, W 231 CM	INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 031-[C]-2	SKETCH / OF THE PART OF / MERRIMACK RIVER / BETWEEN CROMWELL'S FALLS / & / PAWTUCKET FALLS; /...IN 3 PARTS / PART 2.	1840/09/00	1"=400'	BOYDEN, URIAH	H 66.2, W 261.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE
C-P.H. 031-[C]-2	SKETCH / OF THE PART OF / MERRIMACK RIVER / BETWEEN CROMWELL'S FALLS / & / PAWTUCKET FALLS; /...IN 3 PARTS / PART 2.	1840/09/00	1"=400'	H 66.2, W 261.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	CLOTH BACKED PAPER

C-P.H. 031-[C]-3	SKETCH / OF THE PART OF / MERRIMACK RIVER / BELOW CROMWELL'S FALLS / & PAWTUCKET FALLS; /...IN 3 PARTS. / PART 3.	1840/09/00	1"=400'	BOYDEN, URIAH	H 35.6, W 65.7 CM	INK, GRAPHITE
C-P.H. 031-[C]-3	SKETCH / OF THE PART OF / MERRIMACK RIVER / BELOW CROMWELL'S FALLS / & PAWTUCKET FALLS; /...IN 3 PARTS. / PART 3.	1840/09/00	1"=400'	H 35.6, W 65.7 CM	INK, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 031-[D]	PLAN / OF A PART OF / MERRIMACK RIVER / BETWEEN / CROMWELL'S FALLS & TAYLOR'S FALLS BRIDGE / SURVEYED & DRAWN BY G. P. WORCESTER.	1840/08/00	1"=10 CHAINS	WORCESTER, G.P.	H 46.5, W 115 CM	INK
C-P.H. 031-[D]	PLAN / OF A PART OF / MERRIMACK RIVER / BETWEEN / CROMWELL'S FALLS & TAYLOR'S FALLS BRIDGE / SURVEYED & DRAWN BY G. P. WORCESTER.	1840/08/00	1"=10 CHAINS	H 46.5, W 115 CM	INK	CLOTH BACKED PAPER
C-P.H. 031-[E]-[01]	PLAN OF / LOCKS AND CANALS MILL POND / SHOWING ABUTTERS.	1914/00/00	1"=200'	H 76.5, W 213 CM	INK	TRACING PAPER
C-P.H. 031-[E]-[02]	PLAN OF / LOCKS AND CANALS MILL POND / SHOWING ABUTTERS.	1914/00/00	1"=200'	H 76.5, W 213 CM	INK	TRACING PAPER
C-P.H. 031-[E]-[03]	PLAN OF / LOCKS AND CANALS MILL POND / SHOWING ABUTTERS.	1914/00/00	1"=200'	H 76, W 244.5 CM	INK	TRACING PAPER
C-P.H. 031-[E]-[04]	PLAN OF / LOCKS AND CANALS MILL POND / SHOWING ABUTTERS.	1914/00/00	1"=200'	H 76, W 256 CM	INK	TRACING PAPER
C-P.H. 031-[E]-[05]	PLAN OF / LOCKS AND CANALS MILL POND / SHOWING ABUTTERS.	1914/00/00	1"=200'	H 76, W 245.5 CM	INK, GRAPHITE	TRACING PAPER

C-P.H. 031-[F]	MAP / OF / LAKE WINNIPISSEOGEE / AND VICINITY / REACHED BY / BOSTON AND MAINE / RAILROAD / AND / STEAMER MOUNT WASHINGTON.	1878/00/00	NONE	H 55.1, W 40 CM	LITHO, COLORED INK	CLOTH-BACKED PAPER
C-P.H. 032-[001]	[PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.] DATA PERTAINING TO LAND IN LOWELL OWNED BY THE PROPRIETORS OF THE LOCKS & CANALS.	1894/01/01	NONE	H 64, W 103 CM	INK	DRAFTING CLOTH
C-P.H. 032-[002]	[PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.] DATA PERTAINING TO LAND IN LOWELL OWNED BY THE PROPRIETORS OF THE LOCKS & CANALS.	1892/01/01	NONE	H 58.5, W 81.5 CM	INK	DRAFTING CLOTH
C-P.H. 032-[003]-[A]	[PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.] DATA PERTAINING TO LAND IN LOWELL OWNED BY THE PROPRIETORS OF THE LOCKS & CANALS.	1895/00/00	NONE	H 73, W 54 CM	INK, GRAPHITE, COLORED PENCIL	PAPER

C-P.H. 032-[003]-[B]	[PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R. R. AND OTHER MISCELLANEOUS PLANS.] DATA PERTAINING TO LAND IN LOWELL OWNED BY THE PROPRIETORS OF THE LOCKS & CANALS.	1895/00/00	NONE	H 73, W 54 CM	INK, GRAPHITE, COLORED PENCIL	PAPER
C-P.H. 032-[004]	[UNTITLED PLAN OF LAND OWNED BY P. L.& C. BETWEEN COOLIDGE & CABOT STS.] [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.]	1894/03/22	1"=40'	H 43, W 17 CM	INK, WATER COLOR	DRAFTING CLOTH
C-P.H. 032-[005]	PLAN OF LAND IN LOWELL. MASS. [ON NORTH BANK OF RIVER NEAR FIRST ST.] BELONGING TO / PROPS. OF LOCKS AND CANALS / SOLD TO THE LOWELL, LAW- / RENCE & HAVERHILL STREET RAIL ROAD [AND OTHER MISCELLANEOUS PLANS].	1895/03/00	1"=50'	H 71.5, W 114 CM	INK, COLORED INK, GRAPHITE	PAPER
C-P.H. 032-[006]	[PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE] LOWELL, LAWRENCE, & HAVERHILL ST. RY. / PROPOSED LOCATION / ACROSS LAND OF LOCKS AND CANALS CO. / LOWELL, MASS. [AND OTHER MISCELLANEOUS PLANS.]	1894/10/09	1"=40'	H 37, W 136 CM	BLUEPRINT, COLORED PENCIL	PAPER

C-P.H. 032-[007]	[UNTITLED PLAN SHOWING VICINITY OF BRADLEY ST., NEW ST., CHRISTIAN ST., AND LLEWELLYN ST.] [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R. R. AND OTHER MISCELLANEOUS PLANS.]	1895/03/25	1"=100'	H 48, W 76 CM	INK	TRACING PAPER
C-P.H. 032-[008]	PLAN [OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST.] SHOWING PROPOSED LOCATION OF THE LOWELL / LAWRENCE, & HAVERHILL STREET R. R. THROUGH LAND / OF THE LOCKS & CANALS, LOWELL, MASS. [AND OTHER MISCELLANEOUS PLANS].	1894/10/21	3/4"=100'	H 43.5, W 87.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-P.H. 032-[009]	PLAN [OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST.] SHOWING PROPOSED LOCATIONS THROUGH LOCKS & CANALS / LAND OF THE LOWELL LAWRENCE, & HAVERHILL STREET RAILWAY [AND OTHER MISCELLANEOUS PLANS].	1894/10/18	3/4"=100'	H 59, W 88 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
C-P.H. 032-[010]	[UNTITLED PLAN SHOWING VICINITY OF BRADLEY ST. AND LLEWELLYN ST.] [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R. R. AND OTHER MISCELLANEOUS PLANS.]	SEE NOTES	1"=4'V, 1"=40'H	H 55, W 170 CM	GRAPHITE	DRAFTING CLOTH

C-P.H. 032-[011]	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS / PLAN NO. 1. [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R. R. AND OTHER MISCELLANEOUS PLANS.]	1893/12/00	1"=40'	H 59, W 79 CM	INK, COLORED INK	DRAFTING CLOTH
C-P.H. 032-[012]	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS / PLAN NO. 5. [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.]	1893/12/00	1"=100'	H 59, W 79 CM	INK, COLORED INK	DRAFTING CLOTH
C-P.H. 032-[013]	PLAN OF LAND / BELONGING TO / PROP'S OF LOCKS & CANALS / PLAN NO. 8. [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.]	1893/12/00	1"=80'	H 59, W 79 CM	INK, COLORED INK	DRAFTING CLOTH
C-P.H. 032-[014]	[UNTITLED PLAN.] [PLAN OF LAND ON NORTH BANK OF RIVER NEAR FIRST ST. SOLD TO THE LOWELL, LAWRENCE, & HAVERHILL R.R. AND OTHER MISCELLANEOUS PLANS.]	1893/12/00	NO SCALE	H 59, W 79 CM	INK	DRAFTING CLOTH
C-P.H. 033	[CROTON AQUEDUCT DRAWINGS FOR CROTON AQUEDUCT COMMISSION OF NEW YORK CITY.]	UNDATED				
C-P.H. 034-[A]	SECTION OF THE "GREAT WALL" OF THE WASTE GATE HOUSE.	1890/04/21	1"=4'	H 22 1/4", W 24 1/4"	INK, WATER COLOR, GRAPHITE	PAPER

C-P.H. 034-[B]	PLAN OF THE NORTHERN CANAL / NEAR THE WASTE GATE HOUSE.	1890/04/21	1"=20'	H 18 5/8", W 23"	INK, COLORED INK, WATER COLOR	PAPER
C-P.H. 034-[C]	PROPOSED DESIGN FOR / PUMPING MACHINERY / FOR / PROPRIETORS OF LOCKS & CANALS ON M. R.	1890/07/03	1-4"=1'	H 25 1/2", W 30 1/4"	INK, WATER COLOR	PAPER
C-P.H. 034-[D]	PLAN SHOWING / SCHEME FOR PUMPING STATION / AT / GUARD GATES OF NORTHERN CANAL	1890/07/24	1"=10'	H 22", W 28"	INK, WATER COLOR	PAPER
C-P.H. 034-[E]	PLAN OF ENGINES PUMPS & BOILERS FOR PROPS. OF LOCKS & CANALS.	1890/07/15	3/8"=1'	H 19", W 17 1/4"	BLUEPRINT	PAPER
C-P.H. 034-[F]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS. / 1886	1886/00/00	1"=1000'	H 18 1/2", W 24 1/2"	LITHOGRAPH, COLORED INK	PAPER
C-P.H. 034-[G]	[UNTITLED PLAN SHOWING MERRIMACK RIVER, LAND OWNED BY PROPS. OF LOCKS & CANALS & AREA IN VICINITY OF SCHOOL ST.]	SEE NOTES	1"=10'	H 32 1/2", W 43 1/2"	INK, WATER COLOR	DRAFTING CLOTH
C-P.H. 034-[H]	PLAN SHOWING / SCHEME FOR PUMPING STATION / NEAR / WASTE GATES OF NORTHERN CANAL	1890/07/24	1"=8'	H 26", W 31 5/8"	INK, WATER COLOR	CLOTH BACKED PAPER
C-P.H. 034-[I]	SECTION OF THE NORTHERN CANAL / 34 FEET WEST OF THE WASTE GATES.	1890/04/21	1"=4'	H 20 1/2", W 44 6/8"	INK, COLORED INK, WATER COLOR	PAPER
C-P.H. 035	PLAN OF / WESTERN CANAL / NEAR JUNCTION WITH NORTHERN CANAL.	1898/04/00	1"=10'	H 63, W 128.5 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-P.H. 036	[DIAGRAM SHOWING SLOPES OF MERRIMACK RIVER FROM LAWRENCE MFG. CO. TO LOWER MONUMENT. ALSO LOWER PART OF CONCORD RIVER.]	1901/04/00				

C-P.H. 037	[DIAGRAM SHOWING SLOPES OF MERRIMACK RIVER FROM PAWTUCKET DAM TO TYNGSBORO.]	1901/03/00		
C-P.H. 038-[A]	[PROFILE OF MERRIMACK RIVER FROM PAWTUCKET DAM TO NASHUA, N.H. SHOWING SLOPES DURING FRESHETS ON FOLLOWING DATES: OCT.24, 1785. APR.23, 1852. APR.21, 1870. APR.16, 1895. MAR.03, 1896. APR.18, 1831. APR.11, 1836. APR.25, 1836. LOW WATER SLOPES IN 1836.]	1901/00/00		
C-P.H. 038-[B]	[BLUEPRINT PLAN OF MERRIMACK RIVER BETWEEN MOODY ST. & MOUTH OF CONCORD RIVER, SHOWING RIVER LINES & CONTOURS TAKEN OCT. 1899.]	1899/00/00	1"=50'	BP
C-P.H. 039	[PROFILE OF RIGHT HAND INWARD RAIL OF THE NASHUA DIVISION OF B.& M. R.R. BETWEEN BLACK BROOK CULVERT & RED BRIDGE OVER PAWTUCKET CANAL.]	1902/04/00		
C-P.H. 040-A	[PROFILE OF THE MERRIMACK RIVER BETWEEN STONY BROOK & LAWRENCE MFG. CO'S GAUGE SHOWING SLOPES DURING GREATEST FRESHETS.]	1896/03/08		
C-P.H. 040-B	[PROFILE OF PAWTUCKET FALLS AT HIGHEST POINT OF THE FRESHET OF APRIL 22, & 23, 1852.]	SEE TITLE		
C-P.H. 041-[A]	[LITHOGRAPH MAPS SHOWING SUGGESTED IMPROVEMENTS FOR THE DIFFERENT CANALS.]	1885/00/00		

C-P.H. 041-[B]	[BLUEPRINTS SHOWING BEAMS FOR MARKET AT NELSON MORRIS PLANT OVER WESTERN CANAL.]	UNDATED				
C-P.H. 042	[COMPLETE SECTIONS OF HUNTS FALLS.]	1897/00/00				
C-P.H. 043-[A]	[PLANS FOR MACHINERY FOR HOISTING GATE AT SWAMP LOCKS, LOWER LOCK GATES, LAWRENCE DAM, AND HAMILTON WASTE GATES.]	1912-1913/00/00				
C-P.H. 043-[B]-001	[TWO BLUEPRINT SKETCHES SHOWING PLAN & ELEVATIONS OF SWAMP LOCKS DAMS.]	1927/10/00				
C-P.H. 043-[B]-002	[SHOP BLUEPRINT FOR NO. 0 GATE.]	1927/06/00				
C-P.H. 043-[B]-003	[BLUEPRINT OF MOTOR HOIST ARRANGEMENT FOR HEAD GATES QUINNEBAUG CO., DANIELSON, CONN.]	1927/01/10				
C-P.H. 043-[B]-004	[BLUEPRINT OF GENERAL PLAN OF WASTE GATE.]	1927/10/00				
C-P.H. 043-[B]-005	[BLUEPRINT SHOWING ARRANGEMENT OF PROPOSED GATES IN SWAMP LOCKS DAM.]	1927/11/11				
C-P.H. 043-[B]-006	[TWO BLUEPRINTS SHOWING ARRANGEMENT OF MOTOR DRIVE FOR HOISTING MECHANISM FOR WASTE GATE.]	1927/12/01				
C-P.H. 044	[DIAGRAMS SHOWING BEHAVIOR OF L.& C. RESERVOIR FOR THE YEARS 1914 & 1915.]	SEE TITLE				
C-P.H. 045	[UNTITLED PLAN.] [EARLY PLAN OF LOWELL, SHOWING FLETCHER FARM, SPEEN'S BROOK, GEORGE'S BROOK, AND MERRIMACK RIVERS.]	UNDATED	1/2"=10 RODS	H 26 1/4",W 32 1/2"	INK, WATER COLOR	CLOTH BACKED PAPER

C-P.H. 045-[COPY 1]	[UNTITLED PLAN.] [PLAN OF SPEEN'S BROOK]	1949/12/00	1/2"=10 RODS	H 34", W 27 1/2"	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
C-P.H. 050	[COPY OF PLAN IN REGISTER OF DEEDS OFFICE] THIS MAP / DELINEATES THE [EXACT] BOUNDARIES OF THE BED AND CHANNEL OF MERRIMACK RIVER WITHIN THE CITY / OF LOWELL BETWEEN THE MOUTH OF BEAVER BROOK [SEE NOTES]	1882/00/00	1"=100'	H 71, W 175 CM	INK, COLORED INK	CLOTH BACKED PAPER
C-P.H. 053	[DIAGRAMS SHOWING HEIGHTS OF RIVER AT LAKE WINNIPISEOGEE, PLYMOUTH, SEWALL'S FALLS, GARVIN'S FALLS, MANCHESTER, NASHUA, AND LOWELL FOR THE YEARS 1904 TO 1914.]	SEE TITLE				
C-P.H. 058-[001]	PLAN OF THE / MILL YARDS / OF THE / APPLETON COMPANY / LOWELL, MASS.	1878/00/00	1/4"=10'	H 57, W 64 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[002]	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS. / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1885/01/00	1/4"=10'	H 67.5, W 73 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[003]	PLAN OF THE / MILL YARD / OF THE / HAMILTON MANUFACTURING COMPANY. / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 68, W 90.5 CM	LITHOGRAPH	PAPER
C-P.H. 058-[004]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY. / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 66, W 108 CM	LITHOGRAPH	CLOTH BACKED PAPER

C-P.H. 058-[005]-[COPY 1]	PLAN OF THE / YARD / OF THE / LOWELL MACHINE SHOP; / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 57.5, W 75 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[005]-[COPY 2]	PLAN OF THE / YARD / OF THE / LOWELL MACHINE SHOP; / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 57.5, W 75 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[006]	PLAN OF THE / MILL YARDS / OF THE / LOWELL MANUFACTURING COMPANY / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 57.5, W 75 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[007]	PLAN OF THE / MILL YARDS / OF THE / LOWELL MANUFACTURING COMPANY / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	188/02/24	1/4"=10'	H 58.5, W 75 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[008]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 64, W 95.5 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[009]	PLAN OF THE / MILL YARDS / OF THE / MIDDLESEX COMPANY / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 66, W 76 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[010]	PLAN OF THE / MILL YARDS / OF THE / TREMONT AND SUFFOLK MILLS, / SHOWING THE WATER PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=10'	H 65.5, W 88.5 CM	LITHOGRAPH	CLOTH BACKED PAPER
C-P.H. 058-[011]	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1888/09/00	1/4"=10'	H 73.5, W 126 CM	LITHO, WATER COLOR	CLOTH BACKED PAPER

C-P.H. 058-[012]	PLAN OF THE / MILLYARDS / OF THE / TREMONT AND SUFFOLK MILLS. / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1878/00/00	1/4"=1'	H 75, W 127 CM	LITHOGRAPH, WATERCOLOR COLORED INK, GRAPHITE	CLOTH BACKED PAPER
C-P.H. 059	[GRADE SECTION & PLAN SHOWING LOCATION OF TIMBERS UNDER ROADWAY OF SUFFOLK ST. BRIDGE BY H. F. MILLS.]	1898/10/00				
C-P.H. 079-001	[COFFIN VALVE CO. DETAIL OF INDICATOR POST; HYDRANT & SECTION OF HYDRANT.]	1901/09-1903/08				
C-P.H. 079-002	[PLAN & DETAILS OF MERCURY PRESSURE GAUGE.]	1891/12/00				
C-P.H. 079-016	[SKETCH OF PROPOSED PIPE CONNECTION WITH MIDDLESEX PUMP.]	1904/04/00				
C-P.H. 079-019	[BLUEPRINT SHOWING L. & C. SYSTEM IN THE MILL DISTRICT.]	UNDATED			BP	
C-P.H. 079-022	[PLANS (BLUEPRINTS) OF RESERVOIR SHOWING TRACING OF 24" PIPE LINE & MEASURING SPIKES.]	1907/06/25	1"=25'		BP	
C-P.H. 079-025	[SKETCH SHOWING PRESENT & PROPOSED NEW PUMP AT MIDDLESEX CO.]	1910/06/11			BP	
C-P.H. 079-026-A	[NEGATIVE PLAN OF L.& C. SYSTEM OF WATER MAINS FROM RESERVOIR TO VARIOUS CORPORATIONS CORRECTED TO 1913.]	1913/00/00	1"=200'		BLP	
C-P.H. 079-027	[BLUE PRINT OF L. & C. PIPE SYSTEM COMPLETE CORRECTED TO JAN. 1906 AND SHOWING APPROXIMATE AGES OF PIPE OBTAINED FROM MR. YOUNG AND BASED ON RECOLLECTION.]	1906/01/00			BP	

C-P.H. 079-028	[PLAN OF PROPOSED COFFER DAM FOR THE RESERVOIR TO BE USED IN CONNECTION WITH THE INSTALLATION OF 26" PIPE LINE.]	1904/02/00				
C-P.H. 079-030	[SECTION AND PLAN OF CHECK VALVE (12") FOR L.& C.]	1891/02/00				
C-P.H. 079-031	[PLAN & ELEVATION OF NEW DUPLEX FIRE PUMP IN BOILER HOUSE OF MERR'K MFG. CO.]	1903/10/07				
C-P.H. 079-033	[PLAN OF ADJACENT PROPERTY BELONGING TO PROPRIETORS OF LOCKS & CANALS SHOWING PIPE LOCATIONS.]	1910/01/01	1"=20'		BP	
C-P.H. 079-035	[PLAN OF TREMONT & SUFFOLK NEW 16" PIPE (CONDENSER) FROM NORTHERN CANAL TO CONNECTION WITH 18" PIPE LAID IN 1903.]	1904/11/29	1"=10'			
C-P.H. 079-051	[LOCATION-PIPE CONNECTIONS-& DRIVE OF RESERVOIR PUMPS AT SACO-LOWELL SHOPS.]	1913/02/08				
C-P.H. 079-070	[GENERAL ARRANGEMENT OF PROPOSED 16-25 x 15 x 12 WORTHINGTON PUMP.]	1910/03/10				
C-P.H. 079-071	[SKETCH OF SINGLE ACTING TRIPLEX PUMP.]	UNDATED				
C-P.H. 079-072	ARRANGEMENT OF FOUR / WORTHINGTON COMPOUND STEAM PUMPS / SIZE 18 1/2 & 29 & 16 & 18 / PROPOSED FOR / LOCKS AND CANALS CO. LOWELL, MASS.	1890/06/11	1/4"=1'	H 59.7, W 91.5 CM	BLUEPRINT	PAPER
C-P.H. 079-073	[SKETCH OF CROSS COMPOUND MEYER GEAR PUMP.]	UNDATED				
C-P.H. 079-074	[PROPOSED ELEVATION OF WORTHINGTON PUMP.]	UNDATED				

C-P.H. 079-077	[BLUEPRINT SHOWING LOCATION OF 16" PIPE UNDER COAL POCKET AT MERR'K MANUFACTURING COMPANY.]	1903/00/00		
C-P.H. 079-088	[BLUEPRINT SHOWING PROPOSED LAYOUT OF NEW 1000 GAL PUMP FOR LOWELL MACHINE SHOP.]	1912/05/00		
C-P.H. 079-090	[PLAN OF CHECK VALVE FOR L.& C.]	1891/02/00		
C-P.H. 079-091	[PUMP FOUNDATION PLAN OF 16"x 18" DUPLEX P.C.P. POWER PUMP BY THE PLATT IRON WORKS.]	UNDATED		
C-P.H. 079-093	[PUMP FOULDATION PLAN OF 16"x 18" DUPLEX P.C.P. POWER PUMP BY THE PLATT IRON WORKS.]	UNDATED		BP
C-P.H. 079-095	[PLANS SHOWING SUGGESTED CONNECTIONS BETWEEN THE L. & C. WATER PIPE SYSTEM AND THE CITY OF LOWELL SYSTEM AT JACKSON STREET AND EAST MERR'K STREET.]	1914/12/00		
C-P.H. 079-096	[SKETCH SHOWING GENERAL LOCATION OF PROPOSED DEAN VERTICAL TRIPLEX SINGLE ACTING PUMPS NO. 891 FOR SACO-LOWELL SHOPS.]	1914/10/31		BP
C-P.H. 079-097	[BLUE PRINT END VIEW OF 12" O.S. & Y GATE VALVE SHOWING 1/2,1/4, & 3/4 FULL GATE & CLOSED GATE & CORRESPONDING AREAS FOR SAME IN SQ. IN.]	1915/11/19	1/2"=1'	BP
C-P.H. 079-098	[CROSS SECTION OF L.& C. RESERVOIR SHOWING DEPTH OF MUD IN THE RESERVOIR.]	1915/07/00		BP
C-P.H. 079-099	[LOCATION OF CROSS SECTIONS OF L.& C. RESERVOIR.]	1915/07/00		BP

C-P.H. 079-110	[BLUEPRINT SKETCH SHOWING LOCATION OF PIPES & GAUGES USED FOR MEASURING LOSS OF PRESSURE IN 8" GATE VALVES & 8" CHECK VALVES LIKE 12" PROPOSED FOR CONNECTIONS WITH CITY OF LOWELL. ALSO PLAN OF PIPE & FITTINGS TO BE USED IN EXPERIMENTS.]	UNDATED			BP	
C-P.H. 079-115	[BLUEPRINT PLAN SCHEDULE OF GATES IN LOCKS & CANALS PIPE SYSTEM.]	1915/02/23			BP	
C-P.H. 079-117	[SKETCH SHOWING PROPOSED CONNECTION BETWEEN CITY OF LOWELL & L.& C. WATER SYSTEMS AT THE CORNER OF HALL & RACE STREETS.]	1917/08/27				
C-P.H. 079-118	[DOUBLE ACTING HEAVY DUTY TRIPLEX PUMP.]	UNDATED				
C-P.H. 079-119	[DEAN SINGLE ACTING VERTICAL TRIPLEX PUMP.]	UNDATED				
C-P.H. 079-120	[DUPLEX UNDERWRITER FIRE PUMP.]	UNDATED				
C-P.H. 079-121	[HORIZONTAL DUPLEX POWER PUMP.]	UNDATED				
LIDC 51838-[COPY 1]	DETAIL OF STRUCTURAL STEEL / FOR SERIES S1-A BOILERS / FOR / S1-A-36 / STANDARD.	1948/11/01	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 51838-[COPY 2]	DETAIL OF STRUCTURAL STEEL / FOR SERIES S1-A BOILERS / FOR / S1-A-36 / STANDARD.	1948/11/01	1"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51840-[COPY 1]	DETAIL OF STRUCTURAL STEEL / FOR SERIES S1-A-28 THRU S1-A-36 / STANDARD.	1949/03/30	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER

LIDC 51840-[COPY 2]	DETAIL OF STRUCTURAL STEEL / FOR SERIES S1-A-28 THRU S1-A-36 / STANDARD.	1949/03/30	1"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51846-[COPY 1]	UPPER FRONT CASING FOR / SERIES S1-A-H-34 THRU S1-A-H-44 / STANDARD.	1949/04/05	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51846-[COPY 2]	UPPER FRONT CASING FOR / SERIES S1-A-H-34 THRU S1-A-H-44 / STANDARD.	1949/04/05	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51850-[COPY 1]	DETAILS OF TOP CASING FOR / SERIES S1-A-36 THRU S1-A / STANDARD.	1949/04/06	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51850-[COPY 2]	DETAILS OF TOP CASING FOR / SERIES S1-A-36 THRU S1-A / STANDARD.	1949/04/06	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51851-[COPY 1]	DETAIL OF REAR CASING FOR / SERIES S1-A-18 THRU S1-A-24 & / S1-A-34 THRU S1-A-38.	1949/12/22	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51851-[COPY 2]	DETAIL OF REAR CASING FOR / SERIES S1-A-18 THRU S1-A-24 & / S1-A-34 THRU S1-A-38.	1949/12/22	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51857-[COPY 1]	DET. CLOSING OFF PL AT DAMPER FOR / SERIES S1-A-36 THRU S1-A-40 / STANDARD.	1949/03/29	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 51857-[COPY 2]	DET. CLOSING OFF PL AT DAMPER FOR / SERIES S1-A-36 THRU S1-A-40 / STANDARD.	1949/03/29	1"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER

LIDC 51860-[COPY 1]	DETAIL OF DAMPER FRAMES FOR / SERIES S1-A-34 THRU S1-A-40 / STANDARD.	1949/03/29	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 51860-[COPY 2]	DETAIL OF DAMPER FRAMES FOR / SERIES S1-A-34 THRU S1-A-40 / STANDARD.	1949/03/29	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 51862-[COPY 1]	MUD DRUM CLOSING OFF PL FOR / TYPE S1-A BOILERS / STANDARD.	1949/05/04	1"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51862-[COPY 2]	MUD DRUM CLOSING OFF PL FOR / TYPE S1-A BOILERS / STANDARD.	1949/05/04	1"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 51961-[COPY 1]	ASSEMBLY FOR / S -1A - BOILER.	1949/11/17	NOT GIVEN	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 51961-[COPY 2]	ASSEMBLY FOR / S -1A - BOILER.	1949/11/17	NOT GIVEN	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 52072-[COPY 1]	BRICKWORK DETAILS FOR / SERIES "S" BOILER / FOR STANDARD.	1949/11/25	NOT GIVEN	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 52072-[COPY 2]	BRICKWORK DETAILS FOR / SERIES "S" BOILER / FOR STANDARD.	1949/11/25	NOT GIVEN	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 52073-[COPY 1]	TILE LAYOUT (SIDE WALL) S1-A-H BOILERS / STANDARD.	1949/12/12	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 52073-[COPY 2]	TILE LAYOUT (SIDE WALL) S1-A-H BOILERS / STANDARD.	1949/12/12	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 52073-[COPY 3]	TILE LAYOUT (SIDE WALL) S1-A-H BOILERS / STANDARD.	1949/12/12	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 52837-[COPY 1]	REAR BAFFLE PL & BENT PL FOR / TYPE S1AH - 36 BOILER.	1949/03/29	1" & 3"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 52837-[COPY 2]	REAR BAFFLE PL & BENT PL FOR / TYPE S1AH - 36 BOILER.	1949/03/29	1" & 3"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER

LIDC 53220-[COPY 1]	DET.OF TOP CASING PANEL C-27-P / WITH EXT. DOOR FOR TYPE S1-A BLR.	1949/06/07	1"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 53220-[COPY 2]	DET.OF TOP CASING PANEL C-27-P / WITH EXT. DOOR FOR TYPE S1-A BLR.	1949/06/07	1"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 53232-[COPY 1]	DETAIL OF SIDE, CASING FOR / SERIES S1-A-H BOILERS R STANDARD.	1949/09/19	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 53232-[COPY 2]	DETAIL OF SIDE, CASING FOR / SERIES S1-A-H BOILERS / STANDARD.	1949/09/19	3/4"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 53235-[COPY 1]	ASSEMBLY OF STRUCTURAL STEEL FOR / SERIES S1-A-4-34 THRU S1-A-H-44 / STANDARD.	UNDATED	3/8"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 53235-[COPY 2]	ASSEMBLY OF STRUCTURAL STEEL FOR / SERIES S1-A-4-34 THRU S1-A-H-44 / STANDARD.	UNDATED	3/8"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 53236-[COPY 1]	DETAIL OF STRUCTURAL STEEL / FOR SERIES S1-A-H BOILERS / STANDAR	1949/09/20	1"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 53236-[COPY 2]	DETAIL OF STRUCTURAL STEEL / FOR SERIES S1-A-H BOILERS / STANDARD.	1949/09/20	1"=1'	H 61, W 92 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 53940-[COPY 1]	DETAIL OF STOOL FOR / NO. 1 DRUM - 37" I.D. / "S" TYPE BOILER.	1949/09/19	3"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 53940-[COPY 2]	DETAIL OF STOOL FOR / NO. 1 DRUM - 37" I.D. / "S" TYPE BOILER.	1949/09/19	3"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 54798-[COPY 1]	SETTING PLAN FOR / 1 - 702 H.P. / TYPE S1AH - 36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/06/02	1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 54798-[COPY 2]	SETTING PLAN FOR / 1 - 702 H.P. / TYPE S1AH - 36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/06/02	1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER

LIDC 54799-[COPY 1]	PLAN VIEW FOR 1 - 702 H.P. / TYPE S1AH - 36 BOILER. / FOR LOWELL INDUSTRIAL DEVELOPMENT CO	1950/02/24	1/2"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
LIDC 54799-[COPY 2]	PLAN VIEW FOR 1 - 702 H.P. / TYPE S1AH - 36 BOILER. / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/02/24	1/2"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 54800-[COPY 1]	FOUNDATION PLAN FOR 1 - 702 / TYPE S1AH - 36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/02/24	1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 54800-[COPY 2]	FOUNDATION PLAN FOR 1 - 702 / TYPE S1AH - 36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/02/24	1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 54880-[COPY 1]	DRILLING AND LOCATION OF 2 1/2" OBS. PORTS & DRILLING IN ANGLE S-3. / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/03/14	1"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 54880-[COPY 2]	DRILLING AND LOCATION OF 2 1/2" OBS. PORTS & DRILLING IN ANGLE S-3. / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/03/14	1"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 54928-[COPY 1]	DETAIL OF # 2 DRUM FOR / - 697 H.P. S-1A-36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1949/04/14	1 1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 54928-[COPY 2]	DETAIL OF # 2 DRUM FOR / - 697 H.P. S-1A-36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1949/04/14	1 1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 54979-[COPY 1]	PIPING PLAN & DETAILS FOR 702 H.P. / S1AH - 36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/04/18	1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER

LIDC 54979-[COPY 2]	PIPING PLAN & DETAILS FOR 702 H.P. / S1AH - 36 BOILER / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/04/18	1/2"=1'	H 61, W 92 CM	BLUE LINE PRINT	PAPER
LIDC 55267-[COPY 1]	DET. OF FRONT & REAR SUPPORT- / ING BEAM FOR 1 - 702 H.P. S1AH - 26 / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/05/22	1"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
LIDC 55267-[COPY 2]	DET. OF FRONT & REAR SUPPORT- / ING BEAM FOR 1 - 702 H.P. S1AH - 26 / FOR LOWELL INDUSTRIAL DEVELOPMENT CO.	1950/05/22	1"=1'	H 45.8, W 61.3 CM	BLUE LINE PRINT	PAPER
MAP [055]	PLAN / OF A PORTION OF / CONCORD RIVER / CONTROLLED BY THE / MIDDLESEX MAN'G. CO. / LOWELL, MASS.	1875/00/00	1"=40'	H 74, W 149 CM	INK	CLOTH-BACKED PAPER
MAP [055]	PLAN / OF A PORTION OF / CONCORD RIVER / CONTROLLED BY THE / MIDDLESEX MAN'G. CO. / LOWELL, MASS.	1875	1"=40'	H 74, W 149 CM	INK	CLOTH BACKED PAPER
MAP [056]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920.	1920/09/01	1"=534'	H 122, W 181 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH-BACKED PAPER
MAP [056]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920.	1920/09/01	1"=534'	H 122, W 181 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER

MAP [056]-[A-G]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920..	1920/09/01	1"=534'	H 57.3, W 45.7 CM EA.	UNKNOWN PHOTO PROCESS	PAPER
MAP [056]-[A-H]-[COPY 1]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920.	1927/00/00	1"=534'	H 57.3, W 45.7 CM EA.	UNKNOWN PHOTO PROCESS	PAPER
MAP [056]-[A-H]-[COPY 2]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920.	1920/09/01	1"=534'	H 57.3, W 45.7 CM EA.	UNKNOWN PHOTO PROCESS	PAPER
MAP [056]-[COPY 1]-[A-H]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920.	1920/09/01	1"=534'	H 57.3, W 45.7 CM EA.	UNKNOWN PHOTO PROCESS	PAPER
MAP [056]-[COPY 2]-[A-G]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920..	1920/09/01	1"=534'	H 57.3, W 45.7 CM EA.	UNKNOWN PHOTO PROCESS	PAPER

MAP [056]-[COPY 3]-[A-H]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / SHOWING CONSTRUCTION AND CONDITION OF STREETS / AS OF SEPTEMBER 1, 1920.	1927/00/00	1"=534'	H 57.3, W 45.7 CM EA.	UNKNOWN PHOTO PROCESS	PAPER
MAP [056]-[COPY 3]-[SUPPL. 1]	[UNTITLED 21-PAGE DOCUMENT WITH INFO ON LOWELL STREETS AND THEIR PAVING MATERIALS.]	1927/11/03		H 25.3, W 20.3 CM	GRAPHITE	PAPER
MAP [056]-[COPY 3]-[SUPPL. 2]	[UNTITLED 23-PAGE DOCUMENT WITH INFO ON LOWELL STREETS AND THEIR PAVING MATERIALS.]	1927/11/11		H 25.3, W 20.3 CM	GRAPHITE	PAPER
MAP [056]-[SUPPL. 1]	[UNTITLED 21-PAGE DOCUMENT WITH INFO ON LOWELL STREETS AND THEIR PAVING MATERIALS.]	1927/11/03		H 25.3, W 20.3 CM	GRAPHITE	PAPER
MAP [056]-[SUPPL. 2]	[UNTITLED 23-PAGE DOCUMENT WITH INFO ON LOWELL STREETS AND THEIR PAVING MATERIALS.]	1927/11/11		H 25.3, W 20.3 CM	GRAPHITE	PAPER
MAP [057]	[UNTITLED MAP MADE UP FROM U. S. G. S. TOPOGRAPHIC SHEET] NEW HAMPSHIRE / MONADNOCK QUADRANGLE.	UNDATED	NONE	H 143.5, W 207 CM	CHROMOLITHOGRAPH	CLOTH-BACKED PAPER
MAP [057]	[UNTITLED MAP MADE UP FROM U. S. G. S. TOPOGRAPHIC SHEET] NEW HAMPSHIRE / MONADNOCK QUADRANGLE.	UNDATED	NONE	H 143.5, W 207 CM	CHROMOLITHOGRAPH	CLOTH BACKED PAPER
MAP [058]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / PUBLISHED FOR / MILLER & LORD.	1929/00/00	NONE	H 108, W 168 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER

MAP [058]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / PUBLISHED FOR / MILLER & LORD.	1929/00/00	NONE	H 108, W 168 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP [059]	PLAN / OF PART OF THE / CITY OF LOWELL, / EXHIBITING THE REAL ESTATE AT PRESENT / AND FORMERLY OWNED BY THE / MIDDLESEX COMPANY.	UNDATED	1 1/4"=50'	H 90.2, W 142.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [059]	PLAN / OF PART OF THE / CITY OF LOWELL, / EXHIBITING THE REAL ESTATE AT PRESENT / AND FORMERLY OWNED BY THE / MIDDLESEX COMPANY.	UNDATED	1 1/4"=50'	H 90.2, W 142.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [060]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / PUBLISHED BY THE NATIONAL SURVEY CO. / PORTLAND, ME.	1914/00/00	NONE	H 134.4, W 181.4 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP [060]-[COPY 1]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / PUBLISHED BY THE NATIONAL SURVEY CO. / PORTLAND, ME.	1914/00/00	NONE	H 134.4, W 181.4 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP [060]-[COPY 2]	A SURVEY / OF THE CITY OF / LOWELL / BASED ON PLANS IN THE CITY ENGINEERS OFFICE / PUBLISHED BY THE NATIONAL SURVEY CO. / PORTLAND, ME.	1914/00/00	NONE	H 121, W 180 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [061]	MAP OF THE / MERRIMACK VALLEY AREA / MASACHUSETTS / PUBLISHED BY F. J. MILLER.	UNDATED	2 3/8"=1 MI	H 149.8, W 106 CM	CHROMOLITHOGRAPH	CLOTH-BACKED PAPER
MAP [061]	MAP OF THE / MERRIMACK VALLEY AREA / MASACHUSETTS / PUBLISHED BY F. J. MILLER.	UNDATED	2 3/8"=1 MI	H 149.8, W 106 CM	CHROMOLITHOGRAPH	CLOTH BACKED PAPER

MAP [062]	POST ROUTE MAP / OF THE STATE OF / MAINE / AND THE ADJACENT PARTS OF / NEW HAMPSHIRE AND THE DOMINION OF CANADA / RED LINES SHOW DISTRIBUTION OF RAINFALL IN NORTHERN / NEW ENGLAND IN STORM OF OCTOBER 3 AND 4, 1868.	1869/00/00	1"=8 1/2 MI	H 94, W 78.7 CM	LITHOGRAPH, COLORED INK	CLOTH-BACKED PAPER
MAP [062]	POST ROUTE MAP / OF THE STATE OF / MAINE / AND THE ADJACENT PARTS OF / NEW HAMPSHIRE AND THE DOMINION OF CANADA / RED LINES SHOW DISTRIBUTION OF RAINFALL IN NORTHERN / NEW ENGLAND IN STORM OF OCTOBER 3 AND 4, 1868.	1869/00/00	1"=8 1/2 MI	H 94, W 78.7 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
MAP [063]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 68.5, W 80.5 CM	LITHOGRAPH, COLORED PENCIL	CLOTH-BACKED PAPER
MAP [063]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 68.5, W 80.5 CM	LITHOGRAPH, COLORED PENCIL	CLOTH BACKED PAPER
MAP [064]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 68.5, W 80.5 CM	LITHOGRAPH, COLORED INK, COLORED PENCIL	CLOTH-BACKED PAPER
MAP [064]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 68.5, W 80.5 CM	LITHOGRAPH, COLORED INK, COLORED PENCIL	CLOTH BACKED PAPER
MAP [065]-[COPY 1]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER

MAP [065]-[COPY 1]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [065]-[COPY 2]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [065]-[COPY 2]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [065]-[COPY 3]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [065]-[COPY 3]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [065]-[COPY 4]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [065]-[COPY 4]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [065]-[COPY 5]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [065]-[COPY 5]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [065]-[COPY 6]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [065]-[COPY 6]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [065]-[COPY 7]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [065]-[COPY 7]	MAP OF THE / CITY OF / LOWELL.	1889/00/00	1"=1000'	H 54.5 W 78.2 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [066]	BIRDS EYE VIEW OF / LOWELL MASS.	1876/00/00	NONE	H 65, W 91.5 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [067]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/8"=100'	H 62.2, W 77.4 CM	LITHOGRAPH	CLOTH-BACKED PAPER

MAP [067]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	3/8"=100'	H 62.2, W 77.4 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [068]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1876/00/00	1"=1000'	H 44.4, W 67.3 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 1]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 56.4, W 71.5 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 2]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 56.4, W 71.5 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 3]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 56.4, W 71.6 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 4]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 56.4, W 71.6 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 5]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 56.4, W 71.6 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 6]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 56.4, W 71.6 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [069]-[COPY 7]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1884/00/00	1"=1000'	H 45.2, W 61.4 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [070]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1886/00/00	1"=1000'	H 56.4, W 71.6 CM	LITHOGRAPH	PAPER
MAP [071]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1886/00/00	1"=1000'	H 54.3, W 71 CM	LITHOGRAPH, COLORED INK	PAPER
MAP [072]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1886/00/00	1"=1000'	H 54.3, W 71 CM	LITHOGRAPH, WATER COLOR	PAPER

MAP [073]-[COPY 1]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1888/00/00	1"=1000'	H 56, W 71.8 CM	LITHOGRAPH	PAPER
MAP [073]-[COPY 2]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1888/00/00	1"=1000'	H 56, W 71.8 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [073]-[COPY 3]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1888/00/00	1"=1000'	H 56, W 71.8 CM	LITHOGRAPH, WATER COLOR	PAPER
MAP [073]-[COPY 4]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1888/00/00	1"=1000'	H 57, W 78.6 CM	LITHOGRAPH	PAPER
MAP [074]-[COPY 1]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1889/00/00	1"=1000'	H 56.5, W 78.2 CM	LITHOGRAPH	PAPER
MAP [074]-[COPY 2]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1889/00/00	1"=1000'	H 56.5, W 78.2 CM	LITHOGRAPH	PAPER
MAP [075]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1889/00/00	1"=1000'	H 55 W 77 CM	LITHOGRAPH, COLORED INK, GRAPHITE, WATER COLOR	PAPER
MAP [076]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1889/00/00	1"=1000'	H 55.9 H 75	LITHOGRAPH,COLORED INK, GRAPHITE	PAPER
MAP [077]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1889/00/00	1"=1000'	H 56.5 W 78.7	LITHOGRAPH, COLORED PENCIL	PAPER
MAP [078]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1889/00/00	1"=1000'	H 56.5 W 78.2	LITHOGRAPH	PAPER
MAP [079]-[COPY 1]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1892/00/00	1"=1000'	H 58.5 W 69	LITHOGRAPH	PAPER
MAP [079]-[COPY 2]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1892/00/00	1"=1000'	H 58.5 W 69	LITHOGRAPH	PAPER

MAP [079]-[COPY 3]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1892/00/00	1"=1000'	H 58.5 W 69	LITHOGRAPH	PAPER
MAP [080]-[COPY 1]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1893/00/00	1"=1000'	H 56.3 W 71.5	LITHOGRAPH	PAPER
MAP [080]-[COPY 2]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1893/00/00	1"=1000'	H 56.3 W 71.5	LITHOGRAPH	PAPER
MAP [081]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1926/00/00	1"=1000'	H 54 W 73.8 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP [081]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1926/00/00	1"=1000'	H 54 W 73.8 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP [082]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1939/00/00	1"=1000'	H 54 W 73.8 CM	LITHOGRAPH, COLORED INK	CLOTH-BACKED PAPER
MAP [082]	MAP OF THE / CITY OF / LOWELL / MASSACHUSETTS.	1939/00/00	1"=1000'	H 54 W 73.8 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
MAP 001	[OLD PLAN OF LOWELL. NO DATE OR AUTHOR GIVEN.]	UNDATED				
MAP 002-[COPY 1]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 103.5, W 156.3 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 002-[COPY 1]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 103.5, W 156.3 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 002-[COPY 2]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 68.5, W 80.5 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 002-[COPY 2]	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD.	1871/11/00	1/4"=100'	H 68.5, W 80.5 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 003	A PLAN / OF SUNDRY FARMS ETC. AT / PATUCKET / IN THE TOWN OF / CHELMSFORD WITH PRESENT CITY OF LOWELL SUPERIMPOSED.	1923/03/29	1/4"=100'	H 44.4, W 54 CM	PHOTOGRAPHIC COPY	PAPER

MAP 004	A PLAN / OF THE LAND AND BUILDINGS BELONGING TO THE MERRIMACK MANUFACTURING COMPANY / WITH NEIGHBORING FARMS, ROADS ETC. / AT PATUCKET / IN THE TOWN OF CHELMSFORD.	1825/00/00	1/2"=1'	H 151, W 131 CM	INK	PAPER
MAP 004	A PLAN / OF THE LAND AND BUILDINGS BELONGING TO THE MERRIMACK MANUFACTURING COMPANY / WITH NEIGHBORING FARMS, ROADS ETC. / AT PATUCKET / IN THE TOWN OF CHELMSFORD.	1825/00/00	1/2"=1'	H 151, W 131 CM	INK	PAPER
MAP 005	PLAN OF BUILDINGS / AND LAND BELONGING TO THE / MERRIMACK AND HAMILTON / MANUFACTURING COMPANIES / AND THE PROPRIETORS OF LOCKS AND CANALS / ON THE MERRIMACK RIVER / SITUATED AT PATUCKET FALLS IN THE TOWN OF LOWELL AND DRACUT.	1827/00/00	3/4"=100'	HALES, J.C.	H 174, W 152.3 CM	LITHOGRAPH
MAP 005	PLAN OF BUILDINGS / AND LAND BELONGING TO THE / MERRIMACK AND HAMILTON / MANUFACTURING COMPANIES / AND THE PROPRIETORS OF LOCKS AND CANALS / ON THE MERRIMACK RIVER / SITUATED AT PATUCKET FALLS IN THE TOWN OF LOWELL AND DRACUT.	1827/00/00	3/4"=100'	H 174, W 152.3 CM	LITHOGRAPH	CLOTH-BACKED PAPER

MAP 005	PLAN OF BUILDINGS / AND LAND BELONGING TO THE / MERRIMACK AND HAMILTON / MANUFACTURING COMPANIES / AND THE PROPRIETORS OF LOCKS AND CANALS / ON THE MERRIMACK RIVER / SITUATED AT PATUCKET FALLS IN THE TOWN OF LOWELL AND DRACUT.	1827/00/00	3/4"=100'	H 174, W 152.3 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 006	PLAN / OF TOWN OF LOWELL / AND / BELVIDERE VILLAGE, TAKEN BY MEASUREMENT / BY / BENJ. MATHER.	1832/00/00	NONE	MATHER, BENJAMIN	H 61, W 82.5 CM	LITHOGRAPH
MAP 006	PLAN / OF THE TOWN OF LOWELL / AND / BELVIDERE VILLAGE, TAKEN BY MEASUREMENT / BY / BENJ. MATHER.	1832/00/00	NONE	H 61, W 82.5 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 006	PLAN / OF TOWN OF LOWELL / AND / BELVIDERE VILLAGE, TAKEN BY MEASUREMENT / BY / BENJ. MATHER.	1832/00/00	NONE	H 61, W 82.5 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 007	PLAN / OF A PART OF THE / CITY OF LOWELL / FROM A SURVEY MADE IN 1833-4 BY U. A. BOYDEN / WITH ADDITIONS / BY / JAMES B. FRANCIS.	1837/05/00	3/4"=100'	H 143, W 159 CM	INK	PAPER
MAP 008-[COPY 01]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 88.8, W 157.2 CM	LITHOGRAPH, WATER COLOR

MAP 008-[COPY 01]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 88.8, W 157.2 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 008-[COPY 01]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 88.8, W 157.2 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 008-[COPY 02]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 02]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 03]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 03]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 04]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 04]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 05]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 05]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 06]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH

MAP 008-[COPY 06]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 07]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 07]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 08]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 08]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 09]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 09]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 008-[COPY 10]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 81.2, W 93.1 CM	LITHOGRAPH
MAP 008-[COPY 10]	MAP / OF / CITY OF / LOWELL [SURVEYED IN 1841, BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 81.2, W 93.1 CM	LITHOGRAPH	PAPER
MAP 009	MAP / OF / THE CITY OF / LOWELL / THE BANKS COLORED THUS BELONG TO THE / PROPS. OF LOCKS AND CANALS [SURVEYED IN 1841 BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 80.5, W 89.3 CM	LITHOGRAPH, COLORED INK, WATER COLOR

MAP 009	MAP / OF / THE CITY OF / LOWELL / THE BANKS COLORED THUS BELONG TO THE / PROPS. OF LOCKS AND CANALS [SURVEYED IN 1841 BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 80.5, W 89.3 CM	LITHOGRAPH, COLORED INK, WATER COLOR	CLOTH-BACKED PAPER
MAP 009	MAP / OF / THE CITY OF / LOWELL / THE BANKS COLORED THUS BELONG TO THE / PROPS. OF LOCKS AND CANALS [SURVEYED IN 1841 BY I. A. BEARD AND J. HOAR].	1841/00/00	1/4"=100'	H 80.5, W 89.3 CM	LITHOGRAPH, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
MAP 010	MAP / OF / THE CITY OF LOWELL / SURVEYED IN 1841 / BY ORDER OF THE MUNICIPAL AUTHORITIES BY / I. A. BEARD AND J. HOAR [SHOWING PIPE LINES].	1841/00/00	1/4"=100'	BEARD, I.A. & J. HOAR	H 102.4, W 89 CM	LITHOGRAPH, COLORED INK
MAP 010	MAP / OF / THE CITY OF LOWELL / SURVEYED IN 1841 / BY ORDER OF THE MUNICIPAL AUTHORITIES BY / I. A. BEARD AND J. HOAR [SHOWING PIPE LINES].	1841/00/00	1/4"=100'	H 102.4, W 89 CM	LITHOGRAPH, COLORED INK	CLOTH-BACKED PAPER
MAP 010	MAP / OF / THE CITY OF LOWELL / SURVEYED IN 1841 / BY ORDER OF THE MUNICIPAL AUTHORITIES BY / I. A. BEARD AND J. HOAR [SHOWING PIPE LINES].	1841/00/00	1/4"=100'	H 102.4, W 89 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
MAP 011	[UNTITLED MAP.] [PLAN OF LAND IN LOWELL BELONGING TO LOCKS AND CANALS, BY J .B. FRANCIS].	1844/00/00	1/16"=10'	FRANCIS, J.B.	UNMEASUREABLE	LITHOGRAPH
MAP 011	[UNTITLED MAP.] [PLAN OF LAND IN LOWELL BELONGING TO LOCKS AND CANALS, BY J .B. FRANCIS].	1844/00/00	1/16"=10'	UNMEASUREABLE	LITHOGRAPH	CLOTH-BACKED PAPER

MAP 011	[UNTITLED MAP.] [PLAN OF LAND IN LOWELL BELONGING TO LOCKS AND CANALS, BY J.B. FRANCIS].	1844/00/00	1/16"=10'	UNMEASUREABLE	LITHOGRAPH	CLOTH BACKED PAPER
MAP 012	[PLAN OF CITY OF LOWELL FROM ACTUAL SURVEYS BY SIDNEY AND NEFF.]	1850/00/00				
MAP 012	[PLAN OF CITY OF LOWELL FROM ACTUAL SURVEYS BY SIDNEY AND NEFF.]	1850/00/00				
MAP 013	MAP OF / THE CITY OF / LOWELL / MASSACHUSETTS [BY R. W. BAKER].	1868/00/00	1"=300'	H 186.5, W 151.7 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 013	MAP OF / THE CITY OF / LOWELL / MASSACHUSETTS [BY R. W. BAKER].	1868/00/00	1"=300'	H 186.5, W 151.7 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 014	MAP OF / THE CITY OF / LOWELL / MASSACHUSETTS [SHOWING PIPE LINES, BY R. W. BAKER].	1868/00/00	1"=300'	H 149.8, W 141 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 014	MAP OF / THE CITY OF / LOWELL / MASSACHUSETTS [SHOWING PIPE LINES, BY R. W. BAKER].	1868/00/00	1"=300'	H 149.8, W 141 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 015	MAP OF / THE CITY OF / LOWELL / MASSACHUSETTS [WITH RED LINES FOR PURPOSES UNKNOWN, BY R. W. BAKER].	1868/00/00	1"=300'	H 150, W 140 CM	LITHOGRAPH, COLORED INK	CLOTH-BACKED PAPER
MAP 015	MAP OF / THE CITY OF / LOWELL / MASSACHUSETTS [WITH RED LINES FOR PURPOSES UNKNOWN, BY R. W. BAKER].	1868/00/00	1"=300'	H 150, W 140 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
MAP 016	MAP OF / THE CITY OF / LOWELL / MASACHUSETTS [SHOWING CITY WATER PIPES, BY R. W. BAKER].	1868/00/00	1"=300'	H 150, W 140 CM	LITHOGRAPH, INK	CLOTH-BACKED PAPER

MAP 016	MAP OF / THE CITY OF / LOWELL / MASACHUSETTS [SHOWING CITY WATER PIPES, BY R. W. BAKER].	1868/00/00	1"=300'	H 150, W 140 CM	LITHOGRAPH, INK	CLOTH BACKED PAPER
MAP 017-[COPY 1]	RIPPEY'S / INDEX MAP / OF / LOWELL / MASS.	1888/00/00	3/16"=100'	H 103, W 160 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 017-[COPY 1]	RIPPEY'S / INDEX MAP / OF / LOWELL / MASS.	1888/00/00	3/16"=100'	H 103, W 160 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 017-[COPY 2]	RIPPEY'S / INDEX MAP / OF / LOWELL / MASS.	1888/00/00	3/16"=100'	H 100, W 147 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 017-[COPY 2]	RIPPEY'S / INDEX MAP / OF / LOWELL / MASS.	1888/00/00	3/16"=100'	H 100, W 147 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 018	[MAP OF] NEW HAMPSHIRE / BY RECENT SURVEY / MADE UNDER THE SUPREME AUTHORITY AND ESTABLISHED ACCORDING TO LAW.	1818/00/00	NONE	CARRIGAIN, PHILIP	H 157.4, W 151 CM	LITHOGRAPH, WATER COLOR
MAP 018	[MAP OF] NEW HAMPSHIRE / BY RECENT SURVEY / MADE UNDER THE SUPREME AUTHORITY AND ESTABLISHED ACCORDING TO LAW.	1818/00/00	NONE	H 157.4, W 151 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 018	[MAP OF] NEW HAMPSHIRE / BY RECENT SURVEY / MADE UNDER THE SUPREME AUTHORITY AND ESTABLISHED ACCORDING TO LAW.	1818/00/00	NONE	H 157.4, W 151 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 019	MAP / OF THE / MOUNTAIN AND LAKE REGIONS / OF NEW HAMPSHIRE / WITH / RAIL-ROAD ROUTES [BY M. CONANT].	1852/00/00	1/2"=1MI	CONANT, M.	H 101.7, W 81.4 CM	LITHOGRAPH

MAP 019	MAP / OF THE / MOUNTAIN AND LAKE REGIONS / OF NEW HAMPSHIRE / WITH / RAIL-ROAD ROUTES [BY M. CONANT].	1852/00/00	1/2"=1MI	H 101.7, W 81.4 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 019	MAP / OF THE / MOUNTAIN AND LAKE REGIONS / OF NEW HAMPSHIRE / WITH / RAIL-ROAD ROUTES [BY M. CONANT].	1852/00/00	1/2"=1MI	H 101.7, W 81.4 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 020	TOWNSHIP AND RAILROAD MAP / OF / NEW HAMPSHIRE. / COMPILED FROM THE BEST AUTHORITIES / WITH CORRECTIONS AND ALTERATION OF TOWN LINES FROM ACTUAL SURVEYS. / PUBLISHED BY J. R. DODGE / NASHUA, N.H.	1854/00/00	1 1/16"=10 MI		H 94, W 66 CM	LITHOGRAPH, COLORED INK
MAP 020	TOWNSHIP AND RAILROAD MAP / OF / NEW HAMPSHIRE. / COMPILED FROM THE BEST AUTHORITIES / WITH CORRECTIONS AND ALTERATION OF TOWN LINES FROM ACTUAL SURVEYS. / PUBLISHED BY J. R. DODGE / NASHUA, N.H.	1854/00/00	1 1/16"=10 MI	H 94, W 66 CM	LITHOGRAPH, COLORED INK	CLOTH-BACKED PAPER
MAP 020	TOWNSHIP AND RAILROAD MAP / OF / NEW HAMPSHIRE. / COMPILED FROM THE BEST AUTHORITIES / WITH CORRECTIONS AND ALTERATION OF TOWN LINES FROM ACTUAL SURVEYS. / PUBLISHED BY J. R. DODGE / NASHUA, N.H.	1854/00/00	1 1/16"=10 MI	H 94, W 66 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER

MAP 021	[TOWNSHIP AND RAILROAD MAP OF N.H. FROM ACTUAL SURVEYS.]	1854/00/00				
MAP 022	STATE MAP / OF / NEW / HAMPSHIRE / FROM THE LATEST / OFFICIAL SURVEYS AND RECORDS / PUBLISHED BY / J. A. CLINE & CO.	1878/00/00	NONE	H 228.6, W 151.1 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH-BACKED PAPER
MAP 022	STATE MAP / OF / NEW / HAMPSHIRE / FROM THE LATEST / OFFICIAL SURVEYS AND RECORDS / PUBLISHED BY / J. A. CLINE & CO.	1878/00/00	NONE	H 228.6, W 151.1 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
MAP 023	[MAP OF N. H. FROM LATEST OFFICIAL SURVEYS AND RECORDS.]	1878/00/00				
MAP 024	MAP OF / STRAFFORD CO. / NEW HAMPSHIRE [BY J. CHACE, JR.]	1856/00/00	NONE	CHACE, J., JR.	H 152, W 147 CM	LITHOGRAPH, WATER COLOR, COLORED INK
MAP 024	MAP OF / STRAFFORD CO. / NEW HAMPSHIRE [BY J. CHACE, JR.]	1856/00/00	NONE	H 152, W 147 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH-BACKED PAPER
MAP 024	MAP OF / STRAFFORD CO. / NEW HAMPSHIRE [BY J. CHACE, JR.]	1856/00/00	NONE	H 152, W 147 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
MAP 025	[MAP OF LAKE WINNIPISSEOGEE, LONG BAY, AND SMITH'S POND, BY W. P. CROCKER, COPIED BY W. C. PICKERSGILL.]	1858/00/00				
MAP 025	[MAP OF LAKE WINNIPISSEOGEE, LONG BAY, AND SMITH'S POND, BY W. P. CROCKER, COPIED BY W. C. PICKERSGILL.]	1858/00/00				

MAP 026	MAP OF / MERRIMACK COUNTY / NEW HAMPSHIRE [FROM SURVEYS UNDER DIRECTION OF H. F. WALLING].	1858/00/00	1"=240 RODS	WALLING, H.F.	H 152, W 168.4 CM	LITHOGRAPH, WATER COLOR
MAP 026	MAP OF / MERRIMACK COUNTY / NEW HAMPSHIRE [FROM SURVEYS UNDER DIRECTION OF H. F. WALLING].	1858/00/00	1"=240 RODS	H 152, W 168.4 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 026	MAP OF / MERRIMACK COUNTY / NEW HAMPSHIRE [FROM SURVEYS UNDER DIRECTION OF H. F. WALLING].	1858/00/00	1"=240 RODS	H 152, W 168.4 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 027	MAP OF / CHESHIRE CO / NEW HAMPSHIRE / FROM ACTUAL SURVEY BY L. FAGAN. / PHILADELPHIA.	1858/00/00	1 1/2"-1 MI	FAGAN, L.	H 148, W 150 CM	LITHOGRAPH, COLORED INK
MAP 027	MAP OF / CHESHIRE CO / NEW HAMPSHIRE / FROM ACTUAL SURVEY BY L. FAGAN. / PHILADELPHIA.	1858/00/00	1 1/2"-1 MI	H 148, W 150 CM	LITHOGRAPH, COLORED INK	CLOTH-BACKED PAPER
MAP 027	MAP OF / CHESHIRE CO / NEW HAMPSHIRE / FROM ACTUAL SURVEY BY L. FAGAN. / PHILADELPHIA.	1858/00/00	1 1/2"-1 MI	H 148, W 150 CM	LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
MAP 028	MAP / OF / HILLSBORO CO. / NEW HAMPSHIRE [FROM SURVEYS BY J. CHACE].	1858/00/00	1"=60 RODS	CHACE, J.	H 151, W 163.7 CM	LITHOGRAPH, WATER COLOR
MAP 028	MAP / OF / HILLSBORO CO. / NEW HAMPSHIRE [FROM SURVEYS BY J. CHACE].	1858/00/00	1"=60 RODS	H 151, W 163.7 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 028	MAP / OF / HILLSBORO CO. / NEW HAMPSHIRE [FROM SURVEYS BY J. CHACE].	1858/00/00	1"=60 RODS	H 151, W 163.7 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER

MAP 029	TOPOGRAPHICAL MAP / OF / CARROLL / COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING].	1860/00/00	1"=1MI	WALLING, H.F.	H 129.5, W 158.6 CM	LITHOGRAPH, WATER COLOR
MAP 029	TOPOGRAPHICAL MAP / OF / CARROLL / COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING].	1860/00/00	1"=1MI	H 129.5, W 158.6 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 029	TOPOGRAPHICAL MAP / OF / CARROLL / COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING].	1860/00/00	1"=1MI	H 129.5, W 158.6 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 030	TOPOGRAPHICAL MAP / OF / THE COUNTY OF / SULLIVAN / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING].	1860/00/00	1/8"=20 RODS	WALLING, H.F.	H 142.5, W 157.5 CM	LITHOGRAPH, WATER COLOR
MAP 030	TOPOGRAPHICAL MAP / OF / THE COUNTY OF / SULLIVAN / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING].	1860/00/00	1/8"=20 RODS	H 142.5, W 157.5 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 030	TOPOGRAPHICAL MAP / OF / THE COUNTY OF / SULLIVAN / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING].	1860/00/00	1/8"=20 RODS	H 142.5, W 157.5 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 031	MAP OF / ROCKINGHAM / CO. / NEW HAMPSHIRE [FROM SURVEYS BY J. CHACE, JR.].	1860/00/00	1 1/4"=1MI	CHACE, J., JR.	H 147.3, W 165 CM	LITHOGRAPH, WATER COLOR
MAP 031	MAP OF / ROCKINGHAM / CO. / NEW HAMPSHIRE [FROM SURVEYS BY J. CHACE, JR.].	1860/00/00	1 1/4"=1MI	H 147.3, W 165 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 031	MAP OF / ROCKINGHAM / CO. / NEW HAMPSHIRE [FROM SURVEYS BY J. CHACE, JR.].	1860/00/00	1 1/4"=1MI	H 147.3, W 165 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER

MAP 032	TOPOGRAPHICAL MAP / OF / GRAFTON / COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING.]	1860/00/00	NONE	WALLING, H.F.	H 160, W 170.3 CM	LITHOGRAPH, WATER COLOR
MAP 032	TOPOGRAPHICAL MAP / OF / GRAFTON / COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING.]	1860/00/00	NONE	H 160, W 170.3 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 032	TOPOGRAPHICAL MAP / OF / GRAFTON / COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY H. F. WALLING.]	1860/00/00	NONE	H 160, W 170.3 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 033	MAP OF / BELKNAP COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY E. M. WOODFORD].	1860/00/00	1"=200 RODS	WOODFORD, E.M.	H 139.6, W 150.7 CM	LITHOGRAPH, WATER COLOR
MAP 033	MAP OF / BELKNAP COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY E. M. WOODFORD].	1860/00/00	1"=200 RODS	H 139.6, W 150.7 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 033	MAP OF / BELKNAP COUNTY / NEW HAMPSHIRE [FROM SURVEYS BY E. M. WOODFORD].	1860/00/00	1"=200 RODS	H 139.6, W 150.7 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 034	MAP / OF / THE CITY OF / MANCHESTER / NEW HAMPSHIRE [BY J. A. WESTON].	1870/00/00	1"=200'	H 169.8, W 160 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 034	MAP / OF / THE CITY OF / MANCHESTER / NEW HAMPSHIRE [BY J. A. WESTON].	1870/00/00	1"=200'	H 169.8, W 160 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 035	[MAP OF U.S., PROVINCES, MEXICO, WEST INDIES, BY J. H. COLTON.]	1851/00/00				
MAP 036	[MAP OF U.S. BY A. PETERMANN.]	1874/00/00				

MAP 037	[MAP OF U.S. AND TERRITORIES WITH DETAILS, COMPLIED UNDER DIRECTION OF HON. S. S. BURDETT.]	1874/00/00				
MAP 038	[MAP OF U.S. AND TERRITORIES WITH ADJACENT PARTS OF CANADA AND MEXICO, AND PARTS OF WEST INDIES, WITH DETAILS FROM OFFICIAL SURVEYS OF THE GENERAL LAND OFFICE AND OTHER AUTHENTIC SOURCES, DRAWN BY G. P. STRUM.]	1885/00/00				
MAP 039	[MAP OF U.S. AND TERRITORIES WITH ADJACENT PARTS OF CANADA AND MEXICO, AND PARTS OF WEST INDIES, WITH DETAILS BY HARRY KING, C. E.]	1894/00/00				
MAP 040	[MAP OF U.S. ISSUED BY THE CHICAGO, BURLINGTON, AND QUINCY R. R.]	UNDATED				
MAP 041	TOPOGRAPHICAL MAP / OF THE STATE OF MASSACHUSETTS [FROM SURVEYS BY SIMEON BORDEN].	UNDATED		H 145, W 190.3 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 041	TOPOGRAPHICAL MAP / OF THE STATE OF MASSACHUSETTS [FROM SURVEYS BY SIMEON BORDEN].	UNDATED		H 145, W 190.3 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 042	TOPOGRAPHICAL MAP / OF / MASSACHUSETTS / COMPILED FROM / ASTRONOMICAL, TRIGONOMETRICAL, / AND / VARIOUS LOCAL SURVEYS.	1842/00/00	1"=2 1/2 MI		H 132, W 185.5 CM	LITHOGRAPH, WATER COLOR

MAP 042	TOPOGRAPHICAL MAP / OF / MASSACHUSETTS / COMPILED FROM / ASTRONOMICAL, TRIGONOMETRICAL, / AND / VARIOUS LOCAL SURVEYS.	1844/00/00	1"=2 1/2 MI	H 132, W 185.5 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER
MAP 042	TOPOGRAPHICAL MAP / OF / MASSACHUSETTS / COMPILED FROM / ASTRONOMICAL, TRIGONOMETRICAL, / AND / VARIOUS LOCAL SURVEYS.	1844/00/00	1"=2 1/2 MI	H 132, W 185.5 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 043	PLAN / OF / BOSTON AND / ITS VICINITY / SHOWING THE / DRAINAGE AREA OF STONEY BROOK / WHICH EMPTIES INTO THE FULL BASIN OF THE BACK BAY [FROM SURVEY OF H. M. WIGHTMAN].	UNDATED	2 1/2"=1 MI	H 77.5, W 138.4 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH-BACKED PAPER
MAP 043	PLAN / OF / BOSTON AND / ITS VICINITY / SHOWING THE / DRAINAGE AREA OF STONEY BROOK / WHICH EMPTIES INTO THE FULL BASIN OF THE BACK BAY [FROM SURVEY OF H. M. WIGHTMAN].	UNDATED	2 1/2"=1 MI	H 77.5, W 138.4 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
MAP 044	PLAN OF LANDS / ON THE BACK BAY / BELONGING TO THE BOSTON WATER POWER CO., THE COMMONWEALTH AND OTHER PARTIES / SHOWING THE SYSTEM OF / STREETS, GRADES / AND SEWERS AS LAID OUT AND RECOMMENDED BY / THE BACK BAY COMMISSIONERS....	1861/12/13	1"=300'	H 72.5, W 48.7 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH-BACKED PAPER

MAP 044	PLAN OF LANDS / ON THE BACK BAY / BELONGING TO THE BOSTON WATER POWER CO., THE COMMONWEALTH AND OTHER PARTIES / SHOWING THE SYSTEM OF / STREETS, GRADES / AND SEWERS AS LAID OUT AND RECOMMENDED BY / THE BACK BAY COMMISSIONERS....	1861/12/13	1"=300'	H 72.5, W 48.7 CM	LITHOGRAPH, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
MAP 045	PLAN OF LANDS / ON THE BACK BAY / BELONGING TO THE BOSTON WATER POWER CO., THE COMMONWEALTH AND OTHER PARTIES / SHOWING THE SYSTEM OF STREETS, GRADES / AND SEWERS AS LAID OUT AND RECOMMENDED BY / THE BACK BAY COMMISSIONERS....	1863/02/02	1"=300'	H 77.5, W 138.4 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 045	PLAN OF LANDS / ON THE BACK BAY / BELONGING TO THE BOSTON WATER POWER CO., THE COMMONWEALTH AND OTHER PARTIES / SHOWING THE SYSTEM OF STREETS, GRADES / AND SEWERS AS LAID OUT AND RECOMMENDED BY / THE BACK BAY COMMISSIONERS....	1863/02/02	1"=300'	H 77.5, W 138.4 CM	LITHOGRAPH	CLOTH BACKED PAPER

MAP 046	PLAN OF LANDS / ON THE BACK BAY / BELONGING TO THE BOSTON WATER POWER CO., THE COMMONWEALTH AND OTHER PARTIES / SHOWING THE SYSTEM OF STREETS, GRADES / AND SEWERS AS LAID OUT AND RECOMMENDED BY / THE BACK BAY COMMISSIONERS....	1864/12/06	1"=300'	H 77.5, W 138.4 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 046	PLAN OF LANDS / ON THE BACK BAY / BELONGING TO THE BOSTON WATER POWER CO., THE COMMONWEALTH AND OTHER PARTIES / SHOWING THE SYSTEM OF STREETS, GRADES / AND SEWERS AS LAID OUT AND RECOMMENDED BY / THE BACK BAY COMMISSIONERS....	1864/12/06	1"=300'	H 77.5, W 138.4 CM	LITHOGRAPH	CLOTH BACKED PAPER
MAP 047	[MAP OF CITY OF LAWRENCE, BY J. H. BARKER.]	1853/00/00				
MAP 048	[ILLUSTRATED MAP OF THE WORLD ON MERCATOR'S PRJOECTION, BY D. G. JOHNSON.]	1852/00/00				
MAP 049	[POST ROUTE MAP OF NEW YORK, AND PARTS OF VT., MASS., CONN., N.J., AND PA, ALSO ADJACENT PORTIONS OF CANADA, BY W. L. NICHOLSON.]	1868/00/00				
MAP 050	MAP / OF / MIDDLESEX COUNTY, / MASSACHUSETTS [BY H. F. WALLING.]	1856/00/00	NONE	WALLING, H.F.	H 53, W 155.5 CM	LITHOGRAPH, WATER COLOR
MAP 050	MAP / OF / MIDDLESEX COUNTY, / MASSACHUSETTS [BY H. F. WALLING.]	1856/00/00	NONE	H 53, W 155.5 CM	LITHOGRAPH, WATER COLOR	CLOTH-BACKED PAPER

MAP 050	MAP / OF / MIDDLESEX COUNTY, / MASSACHUSETTS [BY H. F. WALLING.]	1856/00/00	NONE	H 53, W 155.5 CM	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
MAP 051	[RAILROAD AND TOWNSHIP MAP OF NEW ENGLAND WITH PORTIONS OF NEW YORK AND PROVINCES, BY G. W. COLTON.]	1855/00/00				
MAP 052	[CENTENNIAL POSTAL STATISTICAL MAP OF MASS., R.I., AND CONN. SHOWING RAILROARD, POST-ROUTES, AND POST OFICES, ALSO POPULATION OF CITIES AND TOWNS BY M.G. COOK AND FRANK O. ELLIS.]	1876/00/00				
MAP 053	[MAP OF THE WORLD-RAND McNALLY.]	UNDATED				
MAP 054	MAP OF THE / NEW ENGLAND / STATES, / SHOWING STATE, COUNTY & TOWN BOUNDARIES, POST OFFICES, RAILROAD STATIONS ETC. [GEO. H. WALKER].	1905/00/00	1/8"=1MI	H 184, W 143.7 CM	LITHOGRAPH	CLOTH-BACKED PAPER
MAP 054	MAP OF THE / NEW ENGLAND / STATES, / SHOWING STATE, COUNTY & TOWN BOUNDARIES, POST OFFICES, RAILROAD STATIONS ETC. [GEO. H. WALKER].	1905/00/00	1/8"=1MI	H 184, W 143.7 CM	LITHOGRAPH	CLOTH BACKED PAPER
MASS. MILLS A-043	MASS. COTTON MILLS. / WHEEL-HOUSE MILL / ELEVATION OF WEST SIDE.	1888/06/00	1 1/4"=1'	H 63.5, W 109.8 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
MASS. MILLS A-047	MASS. COTTON MILLS, / LOWELL, MASS. / LOWELL, MASS. / LOT B, / 9 COLUMNS LIKE DRAWING.	1888/07/30	3"=1'	H 66.5, W 55.3 CM	INK, COLORED INK	DRAFTING CLOTH

MASS. MILLS A-048	LOT C. / 11 COLUMNS LIKE DRAWING 10' - 11 1/2" LONG. / 2 COLUMNS SIMILAR TO DRAWING, 12' - 4 1/2" LONG.	1888/07/21	3"=1'	H 62.2, W 55.6 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS A-049	LOT D. / 13 COLUMNS LIKE DRAWING.	1888/07/21	3"=1'	H 76.5, W 55.3 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-050	LOT W. / 13 COLUMNS LIKE DRAWING.	1888/07/23	3"=1'	H 70, SW 55.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-051	MASS. COTTON MILLS, / WHEEL - HOUSE MILL. / PLATES FOR COLUMNS IN WHEEL ROOM, ON STONE CAPPING.	1888/07/27	3"=1'	H 55, W 72 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-052	MASS. COTTON MILLS. / WHEEL-HOUSE MILL / PLATES, WASHERS, ETS. FOR BEAMS.	1888/07/27	3"=1'	H 55, W 88 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-055	MASS. COTTON MILLS. / WHEEL - HOUSE MILL.	1888/08/16	NOT GIVEN	H 55.4, W 75.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-060-[01]	MASSACHUSETTS COTTON MILLS, / WHEEL - PITS. / FOR TURBINES FOR NOS. 1 AND 2 MILLS.	1856/03/29	1/4"=1'	H 44 W 82.6 CM	INK, WATER COLOR, GRAPHITE	PAPER
MASS. MILLS A-060-[02]-[01]	MASSACHUSETTS COTTON MILLS. / WHEELHOUSE FOR THE TEN FOOT TURBINES.	1856/03/03	1/4"=1'	H 80.2 W 128.2 CM	INK, WATER COLOR	CLOTH-BACKED PAPER
MASS. MILLS A-060-[02]-[02]	MASSACHUSETTS COTTON MILLS. / PART OF THE WHEELHOUSE / FOR THE TEN FOOT TURBINES.	UNDATED	NOT GIVEN	H 69, W 82 CM	INK, WATER COLOR	PAPER
MASS. MILLS A-060-[03]	MASSACHUSETTS COTTON MILLS, / PIER BETWEEN NO. 1 MILL & WHEEL-HOUSE.	1873/08/08	1/2"=1'	H 52, W 79 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER

MASS. MILLS A-082	LOCATION OF MOTOR. / SECTION 8 - WHEELHOUSE. / MASS. COTTON MILLS - LOWELL, MASS.	1917/10/20	1/4"=1'	H 51, W 56.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS A-085	FORE-BAY FOR SEC - 8 WHEELS / MASS. COTTON MILLS - LOWELL, MASS.	1918/07/16	1/4"=1'	H 52.6, W 89 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
MASS. MILLS A-086	NEW ARRANGEMENT OF COLUMNS AND I - BEAMS / SECTION EIGHT - WHEEL - HOUSE / MASS. COTTON MILLS - LOWELL, MASS.	1918/09/18	1/4"=1', 1 1/2"=1'	H 78.6, W 114 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS A-110	MASSACHUSETTS MFG. CO. MILL AT END OF NO. 2.	1872/04/00	1/4"=1'	H 69, W 68 CM	INK, COLORED INK, GRAPHITE	PAPER
MASS. MILLS A-127	DETAILS OF COLUMNS / SECTION 7. - BASEMENT OF FIRST FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1920/12/28	HALF SIZE	H 75, W 64.8 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-128	CAST & WROUGHT IRON DETAILS. / SECTION 7 - BASEMENT & FIRST FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1921/01/13	HALF SIZE & 1/2"=1'	H 72.2, W 85 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-129	RECONSTRUCTION OF NO. 1 ENG. ROOM. / SECTION 7 - BASEMENT & FIRST FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1921/01/22	1/8", 1/4" & 1"=1'	H 88.4, W 104.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS A-130	SECTIONS. / SECTION 7 - BASEMENT & FIRST FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1921/01/28	1/4"=1'	H 76.7, W 104.7 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

MASS. MILLS A-134	LOCATION OF SPRINKLERS. / SECTION 7 - BASEMENT. / MASS. COTTON MILLS - LOWELL, MASS.	1921/08/02	1/8"-1'	H 54.6, W 67.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS A-137	STEEL BRIDGE / FROM / SEC. 7 TO SEC. 9 - TOP FLOOR. / MASS. COTTON MILLS; LOWELL, MASS.	1910/01/28	1/4"=1'	H 52, W 78.7 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS A-138	PLAN OF BRIDGE. / SECTION 7 - SECTION 9 / MASS. COTTON MILLS - LOWELL, MASS.	1923/03/23	1/4"=1'	H 54.2, W 89 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS A-312	DETAILS OF WATER CLOSETS. / SECTIONS 2 AND 7. / MASS. COTTON MILLS. LOWELL, MASS.	1905/12/00	1"=1/2'	H 88.7, W 146.1 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS A-319	CONDITION OF TIMBERS IN NO. - 1 MILL, MAY - 1916.	1916/05/00	NOT GIVEN	H 72.4, W 81.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS A-323	DETAIL OF COLUMNS / SECTION ONE & TWO BASEMENTS.	1918/02/12	3"=1'	H 45, W 73 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS A-433	DETAIL OF FLOOR. / TOILET - SECTION 1 - SECOND FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1923/04/03	1/2"=1'	H 57.7, W 80.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS A-436	PLAN & ELEVATIONS & / MACHINERY LAYOUT IN SAMPLE WEAVE / SECTION 1 - SECOND FLOOR / MASS. COTTON MILLS - LOWELL, MASS.	1926/07/08	NOT GIVEN	H 68.5, W 114.3 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-006	FRAMING PLAN OF ROOF / PICKER AND CARDING BUILDING / MASSACHUSETTS COTTON MILLS.	1891/05/00	1/8" & 1"=1'	H 76.2, W 44.8 CM	BLUEPRINT, COLORED PENCIL	PAPER

MASS. MILLS B-017	DETAIL OF NEW SASH. / SECTION 9 - FIFTH FLOOR - / MASS COTTON MILLS - LOWELL, MASS.	1926/05/19	1"=1'	H 58.8, W 85.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-029	AIR SUPPLY FOR NEW PICKER BUILDING / FOR / MASS. COTTON MILLS / LOWELL / MASS.	1891/06/03	1"=1'	H 57.5, W 99.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-034	DETAILS OF ELEVATOR FOR SEC. 9 / MASS. COTTON MILLS. LOWELL, MASS.	1905/01/10	1/4", 1/2" & 6"=1'	H 73, W 110 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-036	FIRE ESCAPE ON SEC. 9 - BACK. / MASS. COTTON MILLS, LOWELL.	1910/06/22	1/4"=1'	H 62.2, W 81.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-051	FOUNDATION PLAN SECTION 10. / MASS. COTTON MILLS. LOWELL, MASS.	1904/04/16	1/4" & 1/2"=1'	H 87, W 145 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-052	FIRST FLOOR PLAN. SECTION 10. / MASS. COTTON MILLS. LOWELL, MASS.	1904/03/12	1/4" & 1/2"=1'	H 85, W 145 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-053	SECOND FLOOR PLAN - SECTION - 10. / MASS COTTON - MILLS LOWELL MASS.	1904/04/26	1/4" & 1/2"=1'	H 83.7, W 144.3 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-054	DETAILS OF DOORS - SECTION 10. / MASS. COTTON MILLS, LOWELL, MASS.	1904/04/30	1"=1' & FULL SIZE	H 84, W 142.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-055	ROOF PLAN SECTION 10 / MASS. COTTON MILLS. LOWELL, MASS.	1904/04/16	1/4" & 1/2"=1'	H 83.8, W 144.9 CM	INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH

MASS. MILLS B-056	CROSS SECTION SECTION - 10 / MASS. COTTON MILLS LOWELL, MASS.	1904/04/25	1/4"=1'	H 78, W 147.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-057	LONGITUDINAL SECTION - SECTION 10. / MASS. COTTON MILLS. LOWELL, MASS.	1904/04/22	1/4"=1'	H 79.2, W 137.2 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-058	SECTION - 10 / DETAILS OF FLAT CAST IRON COLUMNS / MASS. COTTON MILLS. LOWELL, MASS.	1904/04/27	1" & 3"=1'	H 83.8, W 144 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-059	DETAILS OF CAST IRON COLUMNS - SECTION - 10 / MASS. COTTON MILLS. LOWELL, MASS.	1904/04/28	1/2"=1/ & FULL SIZE	H 83.8, W 144.7 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-060	DETAILS OF IRON WORK - SECTION - 10 / MASS. COTTON M ILLS. LOWELL MASS.	1904/04/29	6", 3" & 1/2"=1'	H 78, W 142.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-061	DETAILS OF WINDOWS. SECTION - 10 / MASS. COTTON MILLS. LOWELL, MASS.	1904/05/03	1"=1' & FULL SIZE	H 83.8, W 143.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-062	DETAILS OF TRANSOM WINDOW - SECTION - 10 / MASS. COTTON MILLS LOWELL MASS.	1904/05/14	1"=1' & FULL SIZE	H 84, W 143.8 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-063	AUTOMATIC SLIDING FIRE DOOR. SECTION - 10 / MASS. COTTON MILLS, LOWELL, MASS.	1904/05/06	1"=1'	H 81.2, W 84.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-064	SOUTH ELEVATION SECTION - 10 / MASS. COTTON MILLS. LOWELL MASS.	1904/05/16	1/4"=1'	H 84, W 143.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-070	DETAILS OF WATER CLOSETS - SECTION - 10 - / MASS. COTTON MILLS LOWELL MASS.	1904/07/21	1/2"=1'	H 85.8, W 145 CM	INK	DRAFTING CLOTH
MASS. MILLS B-075	WEST END ELEVATION - SECTION - 10 - / MASS. COTTON MILLS. LOWELL, MASS.	1904/07/29	1/4"=1'	H 85, W 146 CM	INK, COLORED INK	DRAFTING CLOTH

MASS. MILLS B-079	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / LAYOUT OF MOTOR DRIVE FOR ELEVATORS / ON TOP FLOOR SECS. 9-10.	1912/03/13	1/2"=1'	H 76, W 114.2 CM	BLUEPRINT	PAPER
MASS. MILLS B-158	2ND FLOOR PLAN & ELEVATIONS. / RECONSTRUCTION NO. 2 ENG. ROOM. / MASS. COTTON MILLS-LOWELL, MASS.	1925/12/23	1/4"=1' [SEE NOTES]	H 85, W 113 CM	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-158	[UNTITLED PLAN SHOWING MAIN POWER STATION OR UNSPECIFIED STRUCTURE ADJACENT TO THE SLASHER BUILDING AND THE MAIN POWER STATION ALONG THE MERRIMACK RIVER.]	UNDATED	NONE	H 76.3, W 114.3 CM	GRAPHITE	PAPER
MASS. MILLS B-158	[UNTITLED PLAN WHICH SHOWS MAIN POWER STATION OR UNSPECIFIED STRUCTURE]	UNDATED	NONE	H 76.3, W 114.3 CM	GRAPHITE	PAPER
MASS. MILLS B-160	LOCATION OF SPRINKLERS / RECONSTRUCTED NO. 2 ENGINE ROOM. / SECTION 5 - FIRST & SECOND FLOORS. / MASS. COTTON MILLS - LOWELL, MASS.	1926/04/16	1/4"=1'	H 69.7, W 116.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-210	DETAIL OF METAL WORK / SECTION 4 - FOR SIXTH [CROSSED OUT] FLOOR / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1903/04/27	6"=1'	H 79.1, W 139.1 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-226	IRON DETAILS. / TOILET TOWER - SECTION 4.	1921/04/16	HALF SIZE	H 52.5, W 72 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-227	SILL & LINTEL DETAILS / TOILET TOWER - SECTION 4.	1921/04/18	HALF SIZE	H 63, W 103 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-228	SECTIONAL ELEVATIONS. / TOILET TOWER SECTION 4. / MASS. COTTON MILLS - LOWELL, MASS.	1921/04/23	1/2"=1'	H 85, W 156 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

MASS. MILLS B-229	FLOOR PLANS. / TOILET TOWER - SECTION 4.	1921/07/21	1/2"=1'	H 69, W 110 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-230	CONSTRUCTION DETAILS / TOILET TOWER - SECTION 4 / MASS. COTTON MILLS, LOWELL, MASS.	1921/04/26	1/2" & 1"=1'	H 68, W 118 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-231	ELEVATION / TOILET TOWER - SECTION 4. / MASS. COTTON MILLS - LOWELL, MASS.	1921/05/15	1/4"=1'	H 63.2, W 91.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-301	MASSACHUSETTS COTTON MILLS / NO. 3 ELEVATOR TOWER.	1875/04/00	1/2"-1'	H 30.5, W 123 CM	INK, COLORED INK, GRAPHITE	PAPER
MASS. MILLS B-317	DETAIL OF WATER CLOSETS FOR NO. 2 MILL. / MASS COTTON MILLS, LOWELL, MASS.	1904/06/26	1/2" & 3/8"=1'	H 91, W 143.5 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS B-318	DETAIL OF IRON WORK / FOR / WATER CLOSET TOWER NO. 2 MILL / MASS. COTTON MILLS. LOWELL, MASS.	1905/07/12	1", 3", 6"& 12" = 1'	H 88.2, W 147 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-400	FOUNDATION PLAN OF SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/01/29	1/4" & 1/2"=1'	H 79, W 130.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-401	FIRST FLOR PLAN / OF / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/02/10	1/4" & 1/2"=1'	H 73.5, W 115.9 CM	INK, COLORED INK, COLORED PENCIL, PENCIL	DRAFTING CLOTH
MASS. MILLS B-402	SECOND FLOOR PLAN / OF / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/02/14	1/4" & 1/2"=1'	H 73.5, W 110 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

MASS. MILLS B-403	CAST IRON COLUMNS / FOR / SECTION 22 / MASS. COTTON MILLS, LOWELL, MASS.	1910/02/21	FULL SIZE	H 79, W 115 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-405	BASEMENT PLAN / OF / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/02/28	1/4" & 1/2"=1'	H 73.2, W 116.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-406	END ELEVATION / OF / SECTION 4. / MASS. COTTON MILLS, LOWELL, MASS.	1910/02/28	1/4"=1'	H 66.2, W 85 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-407	FLAT CAST-IRON COLUMNS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/02	3"=1'	H 63.5, W 85 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-408	CAST IRON DETAILS / FOR / SECTION 11, MASS. COTTON MILLS, LOWELL, MASS.	1910/03/07	3"=1'	H 91.5, W 109.8 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-409	DETAILS OF I - BEAMS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/08	1"=1'	H 66, W 82.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-410	WROUGHT IRON DETAILS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/10	6" & 3"=1'	H 66, W 87.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-411	CAST IRON DETAILS FOR DOORS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/11	3" & 6"=1'	H 68.5, W 104.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-412	ELEVATIONS OF WINDOWS / FOR / SECTION - 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/14	1"=1'	H 80.2, W 105.4 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-413	DETAILS OF WINDOWS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/15	FULL SIZE	H 79.3, W 135.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH

MASS. MILLS B-414	DETAILS OF DOORS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/17	FULL SIZE & 1"=1'	H 67, W 117.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-415	DETAILS OF STONEWORK / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/19	1 1/2"=1'	H 54, W 89.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-416	FIFTH FLOOR PLAN / OF / SECTIONS 9, 10 & 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/21	VARIOUS	H 61., W 139.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-417	BASEMENT SPRINKLERS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/24	1 1/4"=1'	H 72.3, W 104.1 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-418	FIRST FLOOR SPRINKLERS / FOR / SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/26	1/4"-1'	H 71.2, W 103.4 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-419	SECOND, THIRD ANS FOURTH FLOOR SPRINKLERS / FOR SECTION 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/28	1 1/4"=1'	H 73, W 101.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS B-420	FIFTH FLOOR SPRINKLERS. / FOR / SECTIONS 9, 10 & 11. / MASS. COTTON MILLS, LOWELL, MASS.	1910/03/29	1/8"=1'	H 46.5, W 135.4 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS B-424	STEAM HEATING SYSTEM. / SECTION 11 - FIRST FLOOR. / MASS. COTTON MILLS, LOWELL, MASS.	1910/05/17	1/4"-1'	H 71, W 104.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
MASS. MILLS B-426	THIRD, FOURTH AND FIFTH FLOORS SIMILAR TO SECOND FLOOR / STEAM HEATING SYSTEM. / SECTION 11 - SECOND FLOOR / MASS. COTTON MILLS, LOWELL, MASS.	1910/05/22	1/4"-1'	H 71.2, W 104 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

MASS. MILLS C-017	TRACING OF PART OF THE LAND / BETWEEN / MOODY ST. AND THE MOUTH OF THE CONCORD RIVER / SHOWING / THE MERRIMACK RIVER LINES / AND / CONTOURS TAKEN OCT. 1897.	1897/10/05	1"=50'	H 108, W 175.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
MASS. MILLS C-103	MASS. COTTON MILLS.	1882/04/00	NOT GIVEN	H 48, W 91.9 CM	INK, COLORED INK, GRAPHITE	CLOTH-BACKED PAPER
MASS. MILLS C-104	MASS. COTTON MILLS.	1882/03/00	NOT GIVEN	H 37, W 62.6 CM	INK, COLORED INK	CLOTH-BACKED PAPER
MASS. MILLS C-105	MASS. COTTON MILLS.	SEE NOTES	NOT GIVEN	H 43, W 94 CM	INK, GRAPHITE	CLOTH-BACKED PAPER
MASS. MILLS C-107	MASS. COTTON MILLS [PLAN OF STOREHOUSES A AND B AT LOWELL INDUSTRIAL DEVELOPMENT CO.].	1882/05/24	1/4"=1'	H 62.2, W 89.7 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH-BACKED PAPER
MASS. MILLS C-108	[CROSS SECTION OF STOREHOUSE A AND B AT LOWELL INDUSTRIAL DEVELOPMENT CO.] MASS. COTTON MILLS.	1882/03/29	1/4"=1'	H 45.6, W 94.5 CM	INK, COLORED INK	CLOTH-BACKED PAPER
MASS. MILLS C-109	MASSACHUSETTS COTTON MILLS, PLAN FOR A BRICK PARTITION WALL BETWEEN CLOTH-ROOM AND STORE-HOUSE, OVER FEEDER TO NOS. 1 AND 2 WHEELS.	1889/05/00	1/2"=1'	H 99, W 79.4 CM	INK, COLORED INK	CLOTH-BACKED PAPER
MASS. MILLS C-110	MASS. COTTON MILLS.	1882/04/00	1/2"=1'	H 25.5, W 90.1 CM	INK, COLORED INK, GRAPHITE	CLOTH-BACKED PAPER
MASS. MILLS C-124	CAST-IRON COLUMN FOR STORE-HOUSE B. / MASS. COTTON MILLS, LOWELL, MASS.	1907/11/19	3"=1'	H 57.2, W 30.2 CM	INK, COLORED INK	DRAFTING CLOTH

MASS. MILLS C-150	PLAN AND ELEVATION OF NEW WASTE HOUSE. / MASS. COTTON MILLS. LOWELL, MASS.	1904/03/22	1/4"=1'	H 85, W 146 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
MASS. MILLS C-151	DETAILS FOR NEW WASTE HOUSE. / MASS. COTTON MILLS, LOWELL, MASS.	1904/03/31	3" & 6"=1'	H 67.6, W 108 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-202	MASS. COTTON MILLS. / SOUTH SIDE ELEVATIONS. / CLOTH ROOM EXTENSION.	1895/02/00	1/4", 1/8" & 1"=1'	H 81, W 99 CM	INK, COLORED INK, GRAPHITE	CLOTH-BACKED PAPER
MASS. MILLS C-203	END ELEVATION OF CLOTH ROOM EXTENSION. / MASS. COTTON MILLS.	UNDATED	1/4"=1'	H 15.1, W 59.1 CM	INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS C-205	WALL PLATES / FOR / CLOTH ROOM EXTENSION. / MASS. COTTON MILLS.	1895/06/00	3"=1'	H 33.4, W 38 CM	INK	DRAFTING CLOTH
MASS. MILLS C-206	MASS. COTTON MILLS. / FOUNDATION PLAN. / CLOTH ROOM EXTENSION.	1895/02/00	1/4"=1'	H 64.9, W 100.2CM	INK, COLORED INK, WATER COLOR	CLOTH-BACKED PAPER
MASS. MILLS C-215	WALL PLATES / FOR / CLOTH ROOM EXTENSION. / MASS. COTTON MILLS.	1895/06/00	3"=1'	H 34.74, W 56 CM	INK	DRAFTING CLOTH
MASS. MILLS C-216	PLAN OF UNDERPINNING FOR CLOTH ROOM EXTENSION. / FOR / MASS. COTTON MILLS.	1895/06/00	1/4"=1'	H 57.2, W 107.2 CM	INK	DRAFTING CLOTH
MASS. MILLS C-217	MASS. COTTON MILLS. / SOUTH SIDE ELEVATION. / CLOTH ROOM EXTENSION.	1895/02/00	1/4" & 3/4"=1'	H 89, W 109 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-218	DETAILS OF WINDOW FRAMES / FOR / CLOTH ROOM EXTENSION. / MASS. COTTON MILLS.	1895/06/00	1 1/2"=1'	H 46.8, W 61.6 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-319	CLOTH ROOM BUILDING. / SECTIONAL END ELEVATIONS. / MASS COTTON MILLS. LOWELL, MASS.	1903/12/15	1/4"=1'	H 63.8, W 118 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-320	DETAILS OF STONE WORK, / CLOTH ROOM EXTNESION, / MASS. COTTON MILLS.	1902/09/04	NOT GIVEN	H 21.6, W 66.7 CM	INK	DRAFTING CLOTH

MASS. MILLS C-321	DETAIL OF CORNERSTONE / CLOTH ROOM EXTENSION / MASS. COTTON MILLS, LOWELL.	1903/04/24	1 1/2"=1'	H 44, W 71 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-323	PLAN SHOWING CONSTRUCTION OF DUST FLUE OVER / FEEDER, CLOTH ROOM EXTENSION [CROSSED OUT AND REPLACED BY] OLD MAIN CLOTH ROOM MASS. COTTON MILLS.	1902/08/08	1 1/4"=1'	H 33.7, W 51 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-326	PLAN OF SECOND FLOOR, OLD CLOTH ROOM. / MASS. COTTON MILLS	1902/10/00	1/4"=1'	H 53.2, W 124.5 CM	INK	DRAFTING CLOTH
MASS. MILLS C-328	ELEVATION OF EAST END OF CLOTH ROOM BUILDINGS. / MASS. COTTON MILLS.	1902/09/08	1/4"=1'	H 42, W 102.2 CM	INK	DRAFTING CLOTH
MASS. MILLS C-329	ELEVATION OF NORTH SIDE OF CLOTH ROOM. / MASS/ COTTON MILLS.	1902/09/20	1/4"=1'	H 57, W 128.3 CM	INK	DRAFTING CLOTH
MASS. MILLS C-330	SKETCH OF BRACKETS FOR CLOTH ROOM EXTENSION / MASS. COTTON MILLS.	1902/08/08	3"=1'	H 20.5, W 51 CM	INK	DRAFTING CLOTH
MASS. MILLS C-333	SKETCH SHOWING STYLE OF TOPS OF / CAS IRON COLUMNS FOR CLOTH ROOM BUILD'G. / MASS. COTTON MILLS.	1902/09/06	NOT GIVEN	H 28.2, W 42 CM	INK	DRAFTING CLOTH
MASS. MILLS C-334	SKETCH SHOWING ROOF TIMBERS AND SKY-LIGHTS, MAIN CLOTH ROOM BUILDING, / MASS. COTTON MILLS.	1902/08/06	1/4"=1'	H 58, W 114 CM	INK	DRAFTING CLOTH
MASS. MILLS C-349	ELEVATION OF TRUSS FOR / CLOTH ROOM - TOP FLOOR. / MASS. COTTON MILLS, LOWELL, MASS.	1908/04/21	3/4"=1'	H 25.7, W 80.6 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-352	PLAN OF ADDITION TO / CLOTH ROOM - NORTH END / MASS. COTTON MILLS - LOWELL, MASS.	1909/03/04	1/4"=1'	H 42.2, W 112.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

MASS. MILLS C-353	DETAILS OF WINDOWS / FOR CLOTH-ROOM ADDITION. / MASS. COTTON MILLS - LOWELL, MASS.	1908/03/09	1"=1'	H 53.2, W 68.6 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-354	CAST-IRON DOOR-SILL / FOR / CLOTH ROOM ADDITION. / MASS. COTTON MILLS, LOWELL, MASS.	1909/03/11	FULL SIZE	H 31.4, W 47.1 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-355	LOCATION OF SEWER / UNDER CLOTH ROOM ADDITION. / MASS. COTTON MILLS, LOWELL, MASS.	1909/03/18	1/8"=1'	H 25.7, W 66.7 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS C-356	SECTIONAL ELEVATION OF / CLOTH- ROOM ADDITION. / MASS. COTTON MILLS, LOWELL, MASS.	1909/03/24	1/2"=1'	H 43.3, W 50.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS C-357	LOCTION OF SPRINKLERS / IN CLOTH ROOM ADDITION.	UNDATED	NOT GIVEN	H 25.5, W 62 CM	INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS E-004	SECTIONAL ELEVATION THROUGH COAL BUNKER / FOR / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1893/03/08	1/4"=1'	H 46.6, W 64.7 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS E-006	ELEVATION OF BRIDGE STREET END OF BOILER HOUSE BUILDING / FOR / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1893/03/08	1/4"=1'	H 52, W 69.5 CM	INK, COLORED INK	CLOTH-BACKED PAPER
MASS. MILLS E-007	DETAIL OF GIRDERS IN BOILER HOUSE BUILDING / FOR MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1893/08/09	VARIOUS	H 59, W 50.8 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS E-008	DETAIL OF COLUMNS FOR BOILER HOUSE BUILDING / FOR / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1893/10/09	1 1/2"=1'	H 47, W 24 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

MASS. MILLS E-023	DETAILS OF CAST IRON COLUMNS / BASE PLATES & BEAM PLATES / MASS. COTTON MILLS - LOWELL, MASS.	1915/06/14	3"=1'	H 52, W 71.6 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS E-024	RECONSTRUCTION PLAN OF / OLD BOILER HOUSE AND COAL POCKET / MASS. COTTON MILLS, LOWELL, MASS.	1915/06/20	1/4"=1'	H 61, W 136 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS E-029	LOCATION OF TOILETS AND SINK / OLD BOILER HOUSE - FIRST FLOOR / MASS. COTTON MILLS - LOWELL, MASS.	1915/11/24	1/2"=1'	H 53, W 70 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS E-114	PLAN OF SPRINKLERS IN SLASHER ROOM AND ROOM ABOVE / FOR / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1893/12/07	1/4"=1'	H 72.4, W 101.6 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS E-117	D. B. MACLARY & SON CO. / ELEVATORS / 129 PEARL ST., BOSTON / FOR MASS. COTTON - MILLS / LOWELL, MASS.	1915/06/28	3/4" & 1/2"=1'	H 52.8, W 54.6 CM	BLUEPRINT, COLORTED PENCIL	PAPER
MASS. MILLS E-508	SECTION OF WIDEST POINT / NORTHERLY EXTENSION OF BLUE DYE HOUSE, / MASSACHUSETTS COTTON MILLS.	1901/05/01	1/4"=1'	H 38, W 48.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS E-607	CROSS SECTION ON LINE A-A. / ADDITION TO DYE-HOUSE. / MASS. COTTON MILLS - LOWELL, MASS.	1901/06/03	1/4"=1'	H 52, W 102.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS E-608	FOUNDATION PLAN. / ADDITION TO DYE - HOUSE. / MASS. COTTON MILLS, LOWELL, MASS.	1909/07/14	1/8"=1'	H 61.4, W 147.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS E-611	CROSS SECTIONS / OF / ADDITION TO DYE - HOUSE. / MASS. COTTON MILLS, LOWELL, MASS.	1909/06/21	1 1/2" & 1/2"=1'	H 60.6, W 97.6 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS E-612	CROSS SECTIONS / OF / ADDITION TO DYE - HOUSE. / MASS. COTTON MILLS, LOWELL, MASS.	1909/06/23	SEE NOTES	H 56.2, W 91.3 CM	INK, COLORED INK	DRAFTING CLOTH

MASS. MILLS E-655	LAYOUT OF SINKS AND WATER CLOSETS / IN BEAMING ROOM, / MASS. COTTON MILLS, LOWELL, MASS.	1915/05/23	1/4"=1'	H 52, W 69.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS E-669	DETAILS OF CEMENT FLOOR. / FANCY DYE HOUSE - FIRST FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1922/10/21	1/4" & 1/2"=1'	H 74, W 122 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS F-104	PLAN OF ENGINE IN SECTION 7 / FOR / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1943/03/00	3/8"=1'	H 82.5, W 117 CM	INK, WATER COLOR	CLOTH-BACKED PAPER
MASS. MILLS F-201	FIRST FLOOR PLAN / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1916/07/15	3/16"=1'	H 63.4, W 146.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
MASS. MILLS F-202	SECOND FLOOR PLAN / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1916/07/15	3/16", 3" & 1"=1'	H 55.2, W 147.4 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-203	DETAIL OF WINDOWS / FOR / NEW NAPPING BUILDING / MASS. COTTON MILLS, LOWELL, MASS.	1916/07/19	FULL SIZE	H 80.5, W 136 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS F-204	ELEVATIONS OF WINDOWS / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, / MASS.	1916/07/23	1"=1'	H 71.6, W 89 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-205	ELEVATIONS AND DETAILS OF DOORS / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1916/08/03	3/4"=1' & FULL SIZE	H 81, W 108 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-206	DETAILS OF IRON WORK / NEW NAPPING BUILDING / MASS COTTON MILLS - LOWELL, MASS.	1916/08/29	1", 3", 6"& 12"=1'	H 79.5, W 115 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

MASS. MILLS F-207	CAST IRON COLUMNS / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1916/08/05	FULL SIZE	H 75, W 118.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-208	BASEMENT AND FOUNDATION PLAN, / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1916/08/10	3/16"=1'	H 63.5, W 147.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-209	SECTIONS / NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1916/08/14	1/4"=1'	H 81., W 115.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-210-A	ALTERATIONS TO ELEVATOR. / MASS. COTTON MILLS, / LOWELL, MASS.	UNDATED	NOT GIVEN	H 40.7, W 36.3 CM	BLUEPRINT, INK, COLORED PENCIL	PAPER
MASS. MILLS F-210-B	D. B. MACLARY & SON CO. / ELEVATORS / 129 PEARL ST. BOSTON / FOR MASSACHUSETTS COTTON MILLS LOWELL, MASS.	1916/07/17	3/4" & 1/2"=1"	H 53.2, W 53.5	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS F-210-C	EXTENSION TO ELEVATORS / MASS. COTTON MILLS / LOWELL, MASS.	UNDATED	NOT GIVEN	H 40.7, W 36.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS F-211	LOCATION OF SPRINKLERS / NEW NAPPING BUILDING - BASEMENT / MASS. COTTON MILLS - LOWELL, MASS.	1916/09/09	3/16"=1'	H 62.4, W 145 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS F-212	LOCATION OF SPRINKLERS / NEW NAPPING BUILDING - FIRST FLOOR. / MASS/ COTTON MILLS - LOWELL, MASS.	1916/09/13	3/16"=1'	H 61, W 145.4 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-213	LOCATION OF SPRINKLERS / NEW NAPPING BUILDING - SECOND FLOOR. / MASS. COTTON MILLS - LOWELL, MASS.	1916/09/21	3/16"=1'	H 62.6, W 146 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-214	LOCATION OF TOILETS AND SINKS / NEW NAPPING BUILDING / MASS. [COTTON MILLSLOWELL, MASS.	UNDATED	NOT GIVEN	H 77.5, W 105.4 CM	COLORED PENCIL, GRAPHITE	PAPER

MASS. MILLS F-215	STEAM HEATING SYSTEM - NEW NAPPING BUILDING / MASS. COTTON MILLS - LOWELL, MASS.	1917/01/17	1"=1'	H 81.3, W 109.3 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS F-222	CONCRETE PIERS FOR BRIDGE / NEW NAPPING TO CLOTH ROOM BUILDINGS / MASS. COTTON MILLS - LOWELL, MASS.	1918/04/20	1"=1'	H 57.4, W 82 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS F-225	LOCATION OF NEW DUST CHAMBERS / BASEMENT - NEW NAPPING BUILDING. / MASS. COTTON MILLS LOWELL, MASS.	1918/05/08	1/2"=1'	H 81.2, W 115.5 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS F-226	LOCATION OF SEWER PIPES / NEW NAPPING BUILDING. / MASS. COTTON MILLS, LOWELL, MASS.	1918/07/11	3/16"=1'	H 77.5, W 152.3 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS F-227	ANCHOR BOLT & GENERAL ERECTION PLAN.	SEE NOTES	NOT GIVEN	H 62.6, W 60.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS F-228	MASS. COTTON MILLS BRIDGE LOWELL, MASS. - ROOF TRUSSES.	1918/04/26	NOT GIVEN	H 61, W 26.5 CM	BLUEPRINT	PAPER
MASS. MILLS F-229	MASS. COTTON MILLS - BRIDGE LOWELL MASS. FLOOR BEAMS & TOP OF BOLT LATTERALS.	1918/04/15	NOT GIVEN	H 61, W 26.5 CM	BLUEPRINT	PAPER
MASS. MILLS F-230	MASS. COTTON MILLS - FOOT BRIDGE LOWELL, MASS. BENTS.	UNDATED	NOT GIVEN	H 60.3, W 34 CM	BLUEPRINT	PAPER
MASS. MILLS G-004	LOWELL INDUSTRIAL DEVELOPMENT CO. / LOWELL, MASS.	1932/11/00	1"=60'	H 46, W 74 CM	BLACK LINE PRINT	PAPER
MASS. MILLS G-009	PLAN OF THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY / SHOWING WATCHMEN STATIONS.	1936/01/25	1"=60'	H 56, W 76.1 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH

MASS. MILLS G-012	PLAN OF / "MASSACHUSETTS AND PRESCOTT YARDS" / SHOWING PROPERTY OF LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1930/04/01	1"=40' & 1/4"=100'	H 69.2, W 107.4 CM	INK	DRAFTING CLOTH
MASS. MILLS K-000	[UNTITLED.]	UNDATED	NOT GIVEN	H 47, W 129 CM	BLUEPRINT, INK, GRAPHITE	PAPER
MASS. MILLS K-035-A	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	SEE NOTES	NOT GIVEN	H 73.7, W 106.7 CM	LITHOGRAPH, INK, COLORED INK, GRAPHITE	PAPER
MASS. MILLS K-097	STEAM HEATING / NO. 1 & 2 MILLS.	UNDATED	NOT GIVEN	H 85.8, W 153.6 CM	GRAPHITE, COLORED PENCIL	PAPER
MASS. MILLS K-098	STEAM HEATING / NO. 1 & 2 MILLS.	UNDATED	NOT GIVEN	H 85, W 120CM	GRAPHITE, COLORED PENCIL	PAPER
MASS. MILLS K-107	[PLAN SHOWING] PROPOSED CHANGES / IN CONCORD RIVER / BELOW E. MERRIMACK ST.	1922/03/17	1"=40'	H 51, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS K-116	DISTRIBUTION OF POWER / MASS. COTTON MILLS - LOWELL, MASS.	1919/03/05	NOT GIVEN	H 53.3, W 87.8 CM	BLUEPRINT	PAPER
MASS. MILLS K-127	MASSSACHUSETTS COTTON MILLS / "MASSACHUSETTS YARD" / LOWELL, MASS.	1922/02/27	1"=60'	H 53.5, W 67 CM	LITHOGRAPH, COLORED INK	PAPER
MASS. MILLS L-030-[COPY 1]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / LOCATION - UNDERGROUND FEEDERS.	1921/02/05	1"=APPROX. 200'	H 51, W 73.7 CM	BLUEPRINT	PAPER
MASS. MILLS L-030-[COPY 2]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / LOCATION - UNDERGROUND FEEDERS.	1921/02/05	1"=APPROX. 200'	H 50.7, W 73.7 CM	BLUEPRINT	PAPER

MASS. MILLS L-060	OUTLINE 8 H.S. / WESTINGHOUSE LEBLANC CONDENSER / FOR / MASSACHUSETTS MILLS CO.	1912/09/07	3/4"=1'	H 45, W 66 CM	BLUEPRINT	PAPER
MASS. MILLS M-004	REVISED PILING PLAN FOR WOOD PILES / NEW GENERATOR HOUSE FOR / MASSACHUSETTS MILLS LOWELL, MASS.	1909/07/29	1/8"=1'	H 43, W 90 CM	BLUEPRINT	PAPER
MASS. MILLS M-005	MASSACHUSETTS COTTON MILLS. / LOWELL / MASS. / POWER PLANT. / PLAN OF STEAM & EXHAUST PIPING.	1910/01/22	VARIOUS	H 87.5, W 125.1 CM	BLUEPRINT, GRAPHITE	PAPER
MASS. MILLS M-007	NEW GENERATOR HOUSE / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/07/20	1/8"=1'	H 73.6, W 134.5 CM	BLUEPRINT	PAPER
MASS. MILLS M-008	NEW GENERATOR HOUSE. MASSACHUSETTS MILLS, LOWELL, MASS.	1909/07/12	1/4"=1'	H 73.6, W 164.8 CM	BLUEPRINT	PAPER
MASS. MILLS M-009	STEAM TURBINE ROOM FLOOR FRAMING / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/11/01	1/4"=1'	H 86.9, W 147.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-010	PLAN OF FIRST STORY GR. 62.50 / BASEMENT UNDER GR. 95.50 / SKETCH SHOWING LOCATION OF GENERATORS AND PIPE HOLES / MASSACHUSETTS MILLS.	1909/07/29	1/4"=1'	H 48.5, W 113.2 CM	GRAPHITE, COLORED PENCIL	PAPER
MASS. MILLS M-011	SKETCH OF STEAM TURBINE ROOM FLOOR SHOWING / OPENING LEFT IN FLOOR FOR FUTURE UNITS / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/09/20	1/4"=1'	H 52, W 121.3 CM	GRAPHITE, COLORED PENCIL	PAPER
MASS. MILLS M-012	WINDOW DETAILS / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/07/12	1/2"=1' & FULL SIZE	H 85, W 128.3 CM	BLUEPRINT	PAPER
MASS. MILLS M-013	DETAIL OF DOORS / FOR / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS. LOWELL, MASS.	1909/07/12	1/2"=1'	H 82.5, W 142.2 CM	BLUEPRINT	PAPER

MASS. MILLS M-016	CAST IRON DETAILS / FOR THE / NEW GENERATOR HOUSE, / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/07/12	1/4" & 1/8"=1'	H 76.8, W 88.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-017	CAST IRON DETAILS / FOR THE / NEW GENERATOR HOUSE, / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/07/12	1/4" & 1/8"=1'	H 78, W 89 CM	BLUEPRINT	PAPER
MASS. MILLS M-018	CORNICE & CONDUCTOR HEAD / FOR / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS - LOWELL, MASS.	1909/07/20	3"=1'	H 69.8, W 88.9 CM	BLUEPRINT	PAPER
MASS. MILLS M-019	DETAIL OF ADDITIONAL STAIRS IN / NEW GENERATOR HOUSE / FOR THE / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1909/12/16	1/2" & 1"-1'	H 70.5, W 87 CM	BLUEPRINT	PAPER
MASS. MILLS M-020	DETAIL OF CIRCULAR STAIRWAY / FOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/01/23	3/4", 3" & 12"=1'	H 86, W 71 CM	BLUEPRINT	PAPER
MASS. MILLS M-021	PLAN SHOWING CRANE GIRDERS.	1909/07/23	NOT GIVEN	H 46, W 71 CM	BLUEPRINT	PAPER
MASS. MILLS M-022	REVISION / SWITCHBOARD GALLERY / NEW GENERATOR HOUSE / MASACHUSETTS MILLS / LOWELL, MASS.	1910/03/25	1/2"=1'	H 87, W 68.5 CM	BLUEPRINT	PAPER
MASS. MILLS M-023	SUPPORTS FOR WALL OF SWITCHBOARD GALLERY / OVER CONDENSER WELL . NEW GENERATOR HOUSE / MASSACHUSETTS MILLS, LOWELL MASS.	1909/09/20	1/4"=1'	H 44.4, W 62.4 CM	GRAPHITE, COLORED PENCIL	PAPER
MASS. MILLS M-024	MASS. COTTON MILLS / LOWELL, MASS. / SWITCH FLOOR & SWITCH BOARD, GALLERY	1920/03/05	1/4", 1"=1'	H 73.7, W 100.2 CM	BLUEPRINT	PAPER

MASS. MILLS M-051	PROPOSED ARRANGEMENT OF 3 PAIRS 48" G CYL. GATE HORIZONTAL HERCULES TURBINES. / FOR / MASSACHUSETTS COTTON MILLS.	1909/06/10	1/8"=1'	H 82.4, W 109 CM	BLUEPRINT	PAPER
MASS. MILLS M-053	PO.[WER] HO.[USE] / FEEDERS	UNDATED	NOT GIVEN	H 61.2, W 77.5 CM	INK, GRAPHITE	DRAFTING CLOTH
MASS. MILLS M-056	PLAN & SECTION / SHOWING / NEW FOREBAY & FEEDERS. / MASS. COTTON MILLS / LOWELL MASS.	1909/08/11	1/8", 1/4", 3/8"=1'	H 83, W 124.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-058	DETAIL OF SLIDING HEAD GATE "C" / FOR THE / MASSACHUSETTS COTTON MILLS. / LOWELL, MASS.	1909/02/12	3/4"=1'	H 71, W 118 CM	BLUEPRINT	PAPER
MASS. MILLS M-059	CHANGES IN HEADGATE C. / FOR / MASSACHUSETTS COTTON MILLS / LOWELL MASS.	1910/01/11	1/4"=1'	H 38, W 60.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-060	SURGE TANK AND REINFORCEMENT ON FEEDERS FOR 48" C WHEELS. / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1911/03/07	3/4"=1'	H 88.8, W 93.8 CM	BLUEPRINT	PAPER
MASS. MILLS M-061	DETAIL OF REINFORCEMENT FOR FLAT PORTION OF FEEDER / FOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1911/02/01	1/4"=1'	H 78.7, W 81.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-062	SURGE TANK AND REINFORCEMENT ON FEEDERS FOR 48" C WHEELS. / MASSACHUSETTS COTTON MILLS. LOWELL, MASS.	1911/03/07	3/4"=1'	H 81.7, W 92 CM	COLORED PENCIL	PAPER
MASS. MILLS M-063	DETAIL OF STEEL SHIELDS / AROUND GENERATORS / NEW GENERATOR HOUSE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/03/03	1/2"=1'	H 63.6, W 78.7 CM	BLUEPRINT	PAPER

MASS. MILLS M-064	PLAN FOR ERECTING 1 - TYPE-N-14" GOVERNOR / FOR / MASSACHUSETTS COTTON MILLS. / LOWELL, MASS.	1909/08/12	1/2"=1'	H 65, W 95.3 CM	BLUEPRINT	PAPER
MASS. MILLS M-065	PLAN FOR ERECTING 1-TYPE-N GOVERNOR / FOR / MASSACHUSETTS COTTON MILLS. / LOWELL, MASS.	1909/09/01	1/2"=1'	H 49, W 64.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-066	12 FOOT TUBE THROUGH YARD / TO POWER HOUSE. / MASS. COTTON MILLS, LOWELL, MASS.	1909/10/13	1/16"=1'	H 48.2, W 91.5 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS M-067	FRAMEWORK FOR RACK, / FOR WHEELS ON MERRIMACK RIVER. / MASS. COTTON MILLS, LOWELL MASS.	1909/07/12	1/4" & 1/2"=1'	H 57.7, W 91.2 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS M-068	IRON RACK ON EASTERN CANAL / FOR / 12 FOOT TUBE THROUGH YARD. / MASS. COTTON MILLS - LOWELL, MASS.	1909/12/13	1/2"=1'	H 62.7, W 91.2 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS M-101	OUTLINE. / POWERHOUSE / TURBINE & SWITCHBOARD.	1909/02/10	NOT GIVEN	H 62.4, W 91.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-102	FOUNDATIONS FOR 1500 K.W. TURBINE & CONDENSER / & ELECTRIC LIGHTING SET. / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS, LOWELL, MASS..	1909/10/20	1/4"=1'	H 90, W 79 CM	BLUEPRINT	PAPER
MASS. MILLS M-103-A	1500 K.W. TURBINE / CONDENSER / INSTALLED / AUG. 1924.	1920/11/02	NOT GIVEN	H 60.8, W 91/5 CM	BLUEPRINT, GRAPHITE	PAPER
MASS. MILLS M-103-B	ROTOR SHAFT.	1920/11/02	NOT GIVEN	H 31.5, W 43.5 CM	BLUEPRINT	PAPER
MASS. MILLS M-103-C	CYL. BASE MACH. CHANGE (GOV. & GROUP END).	1920/11/02	NOT GIVEN	H 31.5, W 43.5 CM	BLUEPRINT	PAPER

MASS. MILLS M-103-D	CYL. COVER MACHINING CHANGE. / INSTALLED AUG. 1924 / 1500 K.W. TURBINE / CONDENSER.	1920/11/02	NOT GIVEN	H 31.5, W 43.5 CM	BLUEPRINT, GRAPHITE	PAPER
MASS. MILLS M-104	FOR 1500 K.W. TURBINE.	1913/04/22	NOT GIVEN	H 44.8, W 61.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-107	OUTLINE & FOUNDATION.	1908/10/01	NOT GIVEN	H 60.8, W 91.5 CM	BLUEPRINT	PAPER
MASS. MILLS M-109	OUTLINE 8 H.S. / WESTINGHOUSE LEBLANC CONDENSER / FOR / MASSACHUSETTS COTTON MILLS CO.	1912/09/07	3/4"=1'	H 45.6, W 66 CM	BLUEPRINT	PAPER
MASS. MILLS M-110	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / PLAN OF PIPING FOR 750 KW BLEEDER TURBINE.	1912/10/12	1/4"=1'	H 71, W 96. CM	BLUEPRINT	PAPER
MASS. MILLS M-111	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / POWER HOUSE / 750 KW BLEEDER TURBINE - EXHAUST PIPE SUPPORT.	1912/08/19	HALF SIZE	H 27.7, W 52.7 CM	BLUEPRINT	PAPER
MASS. MILLS M-112	COUPLING FOR VALVE GEAR DRIVE. / FIRST MADE FOR CURTIS TURBINE 2 STG.-100 KW-2400.	1915/02/19	NOT GIVEN	H 45.5, W 61 CM	BLUEPRINT	PAPER
MASS. MILLS M-116	OUTLINE TURBINE GEN. / (CONDENSING) / GEN. C.C. 4-125 K.W. - 2400-T-125V.	1909/08/12	NOT GIVEN	H 61, W 70.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-118	MASSACHUSETTS COTTON MILLS. / LOWELL, MASS. / STEAM, EXHAUST & CONDENSER OVERFLOW / PIPING IN POWER HOUSE.	1910/09/15	1/4"=1'	H 87.5, W 125.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-119	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / POWER PLANT / SECTIONS OF STEAM EXHAUST PIPING.	1914/011/03	1/4"=1'	H 83.9, W 157.4 CM	BLUEPRINT	PAPER
MASS. MILLS M-129	MASS. COTTON MILLS / LOWELL, MASS. / SCREENS FOR AIR INLET 3000 K.W. TURBINE.	1921/02/04	1"=1'	H 50.2, W 73 CM	BLUEPRINT	PAPER

MASS. MILLS M-130-[COPY 1]	MASS. COTT. MILLS / LOWELL MASS. / DOOR LOCKING DEVICE FOR GENERATOR AIR DUCT.	1921/02/05	1"=1'	H 50.2, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS M-130-[COPY 2]	MASS. COTT. MILLS / LOWELL MASS. / DOOR LOCKING DEVICE FOR GENERATOR AIR DUCT.	1921/02/05	1"=1'	H 50.2, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS M-133	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / RELOCATION OF NIGHT SET AND PIPE LINES.	1920/01/22	1/4"=1'	H 50.2, W 72.8 CM	BLUEPRINT	PAPER
MASS. MILLS M-134-[COPY 1]	MASS. COTTON MILLS / LOWELL, MASS. / FOUNDATION FOR 40 K.W. GENERATOR & ENGINE.	1919/12/29	1"=1'	H 50.6, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS M-134-[COPY 2]	MASS. COTTON MILLS / LOWELL, MASS. / FOUNDATION FOR 40 K.W. GENERATOR & ENGINE.	1919/12/29	1"=1'	H 50.6, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS M-150-[COPY 1]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / ELECTRICAL ARRANGEMENT.	1919/12/01	1/4" & 1"=1'	H 73.5, W 100.4 CM	BLUEPRINT	PAPER
MASS. MILLS M-150-[COPY 2]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / ELECTRICAL ARRANGEMENT.	1919/12/01	1/4" & 1"=1'	H 73.5, W 100.4 CM	BLUEPRINT	PAPER
MASS. MILLS M-151-[COPY 1]	SWITCHBOARD / (FRONT VIEW).	1920/03/02	NOT GIVEN	H 61, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-151-[COPY 2]	SWITCHBOARD / (FRONT VIEW).	1920/03/02	NOT GIVEN	H 61, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-151-[COPY 3]	SWITCHBOARD / (FRONT VIEW).	1920/03/02	NOT GIVEN	H 61, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-151-[COPY 4]	SWITCHBOARD / (FRONT VIEW).	1920/03/02	NOT GIVEN	H 61, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER

MASS. MILLS M-152	ARRANGEMENT OF SWITCHING / APPARATUS / MASS. COTTON MILLS / LOWELL, MASS.	1920/03/02	NOT GIVEN	H 61, W 91.5 CM	BLUEPRINT	PAPER
MASS. MILLS M-153	ARRANGEMENT OF SWITCHING / APPARATUS.	1920/03/02	NOT GIVEN	H 61, W 90.2 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-155	ARRANGEMENT OF SWITCHING / APPARATUS.	1919/12/00	NOT GIVEN	H 61, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS M-158	DETAIL OF CUT STONE / FOR / NEW GENERATOR HOUSE / MASSACHUSETTS MILLS. LOWELL, MASS.	1909/07/12	3/4", 1 1/2"=1'	H 63.4, W 83.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-160	OUTLINE/ MASSACHUSETTS COTTON MILLS BOILER HOUSE EXCITER.	1918/05/13	NOT GIVEN	H 30.4, W 45.7 CM	BLUEPRINT	PAPER
MASS. MILLS M-161	OUTLINE [FOR MASS COTTON MILLS].	1909/08/20	NOT GIVEN	H 38, W 60.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-162	OUTLINE [FOR MASS COTTON MILLS].	1909/08/30	NOT GIVEN	H 38, W 60.2 CM	BLUEPRINT	PAPER
MASS. MILLS M-200	AMERICAN BLOWER CO. / DETROIT, MICH. / MANUFACTURERS AND EBGINEERS / DETAIL OF HEATING APPARATUS / FOR MASSACHUSETTS COTTON MILLS. / AT LOWELL, MASS.	1914/12/10	3/4"=1'	H 46.16, W 61 CM	BLUEPRINT	PAPER
MASS. MILLS M-201	LOCATION & SUPPORT FOR POWER HOUSE FAN / MASS. COTTON MILLS - LOWELL, MASS.	1914/11/13	3/4"=1'	H 85.6, W 60.3 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS N-001	SKETCH SHOWING LOCATION OF BOILER HOUSE / IN RELATION TO SEC'S. 8 & 11 / MASS. COTTON MILLS, LOWELL, MASS.	1910/06/20	1/8"=1'	H 41.5, W 64.1 CM	BLUEPRINT	PAPER

MASS. MILLS N-007	DRAWING SHOWING - LOCATIONS - TRENCHERS / PUMP FOUNDATIONS - ETC. / NEW BOILER-HOUSE. / FOR MASSACHUSETTS COTTON MILLS / LOWELL - MASS.	1910/10/03	VARIOUS	H 89, W 29.7 CM	BLUEPRINT	PAPER
MASS. MILLS N-010	DETAIL OF CUT STONE / NEW BOILER HOUSE / FOR THE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/10/13	1" & 3"=1'	H 87.6, W 127.1 CM	BLUEPRINT	PAPER
MASS. MILLS N-011	DETAIL OF / CORNICE AND CONDUCTOR HEADS / NEW BOILER HOUSE / FOR THE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/10/03	VARIOUS	H 87.6, W 127.1 CM	BLUEPRINT	PAPER
MASS. MILLS N-012	DETAIL OF CAST IRON, WRO'T IRON & STEEL / NEW BOILER HOUSE / FOR THE / MASSACHUSETTS MILLS / LOWELL, MASS.	1910/10/03	VARIOUS	H 88.2, W 124. CM	BLUEPRINT	PAPER
MASS. MILLS N-013	DETAIL OF WINDOWS / NEW BOILER HOUSE / MASSACHUSETTS COTTON MILLS / LOWELL - MASS.	1910/10/05	1/2", 6" & 12"=1'	H 86.2, W 128 CM	BLUEPRINT	PAPER
MASS. MILLS N-014	DETAIL OF DOORS / NEW BOILER HOUSE / MASSACHUSETTS COTTON MILLS - LOWELL, MASS.	1910/10/05	VARIOUS	H 88, W 127.2 CM	BLUEPRINT	PAPER
MASS. MILLS N-015	DRAWING SHOWING LOCATION OF STAIRS TO BASEMENT; / ALSO HOLES FOR BOLTING UP ASH CHUTES AND BUCKSTAYS ETC., / NEW BOILER HOUSE, / FOR THE / MASSACHUSETS COTTON MILLS, / LOWELL, MASS.	1910/10/10	VARIOUS	H 60.3, W 85.3 CM	BLUEPRINT	PAPER
MASS. MILLS N-020	BOILER HOUSE PLAN OF ANCHOR BOLTS / FOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/08/01	3/32", 1"=1'	H 61.1, W 90.1 CM	BLUEPRINT	PAPER

MASS. MILLS N-022	BOILER HOUSE / DESIGN OF STEEL WORK MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1919/06/09	3/32"=1'	H 61, W 89.5 CM	BLUEPRINT	PAPER
MASS. MILLS N-023	BOILER HOUSE / DESIGN OF STEEL WORK MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1919/06/09	3/32"=1'	H 61, W 89.5 CM	BLUEPRINT	PAPER
MASS. MILLS N-024	BOILER HOUSE / DESIGN OF STEEL WORK MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	19110/06/09	3/16"=1'	H 61, W 89.5 CM	BLUEPRINT	PAPER
MASS. MILLS N-025	BOILER HOUSE / DESIGN OF STEEL WORK MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	19110/06/09	3/32" & 1/8"=1'	H 61, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-026	2 TOWERS FOR 2 COAL TANKS / DESIGN OF STEEL WORK / BOOTT COTTON MILLS / LOWELL, MASS.	1910/06/24	1/2" & 1/4"=1'	H 60.6, W 90.1 CM	BLUEPRINT	PAPER
MASS. MILLS N-027	DETAIL AT END OF BUNKER / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/12/05	1/4"=1'	H 60, W 91.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-028	DETAIL OF CONCRETE FOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	UNDATED	NOT GIVEN	H 60.4, W 91.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-032	LOCATION PLAN AND DETAILS OF ASHES PIPE / AND ASHES TANK TOWER FOUNDATION / FOR / MASSACHUSETTS COTTON MILLS, / LOWELL, MASS.	1911/03/01	3/32", 3/8"=1'	H 60, W 90.3 CM	BLUEPRINT	PAPER
MASS. MILLS N-033	TOWER FOR ASH TANK / DESIGN OF STEEL WORK / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/07/01	1/4" & 3/4"=1'	H 56, W 90.3 CM	BLUEPRINT	PAPER
MASS. MILLS N-035	PLAN OF ASH TANK TOP AND DETAILS OF BEARING PLATES / FOR / MASSACHUSETTS COTTON MILLS LOWELL, MASS.	1910/10/20	VARIOUS	H 59, W 44.6 CM	BLUEPRINT	PAPER
MASS. MILLS N-036	FOUNDATION PLAN / NEW RADIAL BRICK CHIMNEY / MASSACHUSETTS COTTON MILLS, / LOWELL - MASS.	1919/12/22	1/4"=1'	H 57.2, W 86.3 CM	BLUEPRINT	PAPER

MASS. MILLS N-037-[COPY 1]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/05/16	1/8"=1'	H 94, W 40.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-037-[COPY 2]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1910/05/16	1/8"=1'	H 94, W 40.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-038	DRAWING SHOWING METHOD OF BANDING / NEW CUSTODIS CHIMNEY. / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1913/06/13	VARIOUS	H 91, W 121.6 CM	BLUEPRINT	PAPER
MASS. MILLS N-043	CROSS SECTIONS OF STEAM PIPING - SEC. 1 & SEC. 2 / BOILER HOUSE PIPING, / MASSACHUSETTS COTTON MILLS, / LOWELL, MASS.	1910/12/09	1/4"=1'	H 86.4 W 124.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-044	PLAN OF AUXILIARY PIPING - SEC. 1 / BOILER HOUSE PIPING, / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1910/12/09	1/4"=1'	H 88, W 125.7 CM	BLUEPRINT	PAPER
MASS. MILLS N-045	PLAN OF AUXILIARY PIPING, SEC. 2 / BOILER HOUSE PIPING. / MASSACHUSETTS COTTON MILLS, / LOWELL, MASS.	1910/10/09	1/4"=1'	H 87.6, W 127.1 CM	BLUEPRINT	PAPER
MASS. MILLS N-046	ELEVATIONS OF AUXILIARY PIPING - SEC. 1 & SEC. 2 / BOILER HOUSE PIPING. / MASSACHUSETTS COTTON MILLS, / MILLS, LOWELL, MASS.	1910/12/09	1/4"=1'	H 87.6, W 123.2 CM	BLUEPRINT	PAPER
MASS. MILLS N-055	PLAN & DETAILS / BOILER HOUSE FLUE / MASSACHUSETTS COTTON MILLS, / LOWELL, MASS.	1910/10/05	1/4",1/2" & 1 1/2=1'	H 87.5 W 125.2 CM	BLUEPRINT	PAPER
MASS. MILLS N-056	LAYOUT OF PIVOT, BEARING AND BRACKET FOR DAMPER TO BOILER HOUSE FLUE / MASS. COTTON MILLS, LOWELL, MASS.	1915/09/23	1 1/2" & 3"=1'	H 46.3, W 83.8 CM	GRAPHITE	PAPER

MASS. MILLS N-057	DETAIL OF HOPPER FOR / THE / MASSACHUSETTS COTTON MILLS, LOWELL, MASS.	1910/10/26	3/4"=1'	H 68, W 80 CM	BLUEPRINT	PAPER
MASS. MILLS N-060	BILL OF STEEL FOR STEEL BEAM BOX / FURNISHED BY B.S. CO.	1911/02/11	1/2" & 1 1/2"=1'	H 59.7, W 81.4 CM	BLUEPRINT	PAPER
MASS. MILLS N-061	HOPPER FOR DELIVERING COAL / TO ELECTRIC CRANE IN BOILER HOUSE / MASS. COTTON MILLS, LOWELL, MASS.	1915/03/01	1 1/2"=1'	H 47.5, W 68 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS N-062	STEAM PIPING FROM / NEW BOILER HOUSE TO POWER HOUSE / MASS. COTTON MILLS - LOWELL, MASS.	1915/03/01	1 1/2"=1'	H 47.5, W 67.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
MASS. MILLS N-078	MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1913/06/12	3/4"=1'	H 49.8, W 63.6 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-089	6" CLASS A PUMP AND 5" & 6" / VERTICAL ENGINE.	1903/05/13	1 1/2"=1'	H 34.5, W 43.2 CM	BLUEPRINT	PAPER
MASS. MILLS N-090	PLAN FOR 12 AND 20x10x18 WARREN COMPOUND DUPLEX / PLUNGER PUMP.	1909/05/17	3/4"=1'	H 33.5, W 50.3 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS N-091	WORTHINGTON / 4" - 3 STAGE TURBINE PUMP (SPECIAL) / DIRECT CONNECTED TO TYPE " B" TERRY STEAM TURBINE. / PATENTED.	1909/10/10	1"=1'	H 45, W 61 CM	BLUEPRINT	PAPER
MASS. MILLS N-093	SKIP HOIST INVESTIGATION / FOR OVERHEAD SWITCH.	1917/11/22	NOT GIVEN	H 60.5, W 92 CM	BLUEPRINT	PAPER
MASS. MILLS N-094	GENERAL DETAIL OF [ILLEGIBLE] / FOR 160 [ILLEGIBLE] 20 TO 30 CUBIC [ILLEGIBLE]. / MASSACHUSETTS COTTON MILLS.	1917/04/12	NOT GIVEN	H 60.3, W 81.3 CM	BLUEPRINT	PAPER
MASS. MILLS N-095	GENERAL ARRANGEMENT OF / ASH SKIP / MASSACHUSETTS MILLS / LOWELL, MASS.	1917/04/06	1/2"-1'	H 91, W 120 CM	BLUEPRINT	PAPER

MASS. MILLS N-097	STEAM PIPING FROM / NEW BOILER HOUSE TO POWER HOUSE / MASS. COTTON MILLS - LOWELL, MASS.	1918/08/19	1/4"=1'	H 53.3, W 91 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS N-097	FIRE DOOR JAMB NO. 16.	1918/08/19	1 1/2"=1'	H 45.5, W 61 CM	BLUEPRINT	PAPER
MASS. MILLS N-100	LOCATION OF / NEW CONDENSER PIPE. / MASS. COTTON MILLS, LOWELL, MASS.	1909/11/30	1/16"=1'	H 48.5, W 84 CM	INK, COLORED INK	DRAFTING CLOTH
MASS. MILLS R-002	MASS. COTTON MILLS / LOWELL, MASS. / FUEL OIL TANKS.	1919/12/01	NOT GIVEN	H 50.8, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS R-003	MASS. COTTON MILLS / LOWELL, MASS. / OIL UNLOADING STATION.	1919/12/03	3/4" & 3"=1'	H 73.7. W 101.6 CM	BLUEPRINT	PAPER
MASS. MILLS R-004	MASS. COTTON MILLS / LOWELL, MASS. / OIL UNLOADING STATION.	1919/12/20	1/8", 3/4", 3"=1'	H 51, W 73.7 CM	BLUEPRINT	PAPER
MASS. MILLS R-005	MASS. COTTON MILLS / LOWELL, MASS. / CONCRETE C'L'G OIL UNLOADING STA.	1919/10/06	1/4"=1'	H 50.8, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS R-006	MASS. COTTON MILLS / LOWELL, MASS. / UNLOADING PUMP HO[USE].	1919/12/22	1/4"=1'	H 50.5, W 76.2 CM	BLUEPRINT	PAPER
MASS. MILLS R-007	MASS. COTTON MILLS / LOWELL, MASS. / UNLOADING PUMP HOUSE.	1919/12/15	1/2", 3/4" & 1"=1'	H 50.8, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS R-008	MASS. COTTON MILLS / LOWELL, MASS. / UNLOADING PUMP & PIPING.	1919/12/05	1"=1'	H 50.7, W 76 CM	BLUEPRINT	PAPER
MASS. MILLS R-009	MASS. COTTON MILLS / LOWELL, MASS. / OIL LINE THRU OLD BOILER HO[USE].	1919/12/22	3/16"=1'	H 50.8, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS R-010	MASS. COTTON MILLS / LOWELL, MASS. / LAYOUT - PART OF FUEL OIL FILLING LINE.	1919/11/25	1/4"=1'	H 50.8, W 73 CM	BLUEPRINT	PAPER

MASS. MILLS R-011	MASS. COTTON MILLS / LOWELL, MASS. / PUMP HOUSE DETAILS.	1919/11/22	1/2"=1'	H 50.8, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS R-013	MASS. COTTON MILLS / LOWELL, MASS. / PIPING BETWEEN PUMP HOUSE & TANKS.	1919/12/06	1/8"=1'	H 50.8, W 73 CM	BLUEPRINT	PAPER
MASS. MILLS R-014	MASS. COTTON MILLS / LOWELL, MASS. / LAYOUT - OIL PRESSURE SYSTEM.	1919/12/06	1/4" & 1/8"=1'	H 50.5, W 73.7 CM	BLUEPRINT	PAPER
MASS. MILLS R-015	MASS. COTTON MILLS / LOWELL, MASS. / CONCRETE DUCT FOR OIL PIPES.	1920/11/11	1/4" & 1"=1'	H 50.9, W 73.7 CM	BLUEPRINT	PAPER
MASS. MILLS R-016	MASS. COTTON MILLS / LOWELL, MASS. / BRACKET FOR OIL LINE.	1920/02/10	1 1/2" & 6"=1'	H 54.5, W 76.2 CM	BLUEPRINT	PAPER
MASS. MILLS S-001	MASSACHUSETTS COTTON MILLS / NO.12 UNIT-GENERAL PLAN.	1920/08/00	1/4"=1'	H 54.3, W 75.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-001	MASSACHUSETTS COTTON MILLS / NO.12 UNIT-GENERAL PLAN.	1920/08/00	1/4"=1'	H 54.3, W 75.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-002	MASSACHUSETTS COTTON MILLS / NO.12 UNIT BEAM & GIRDER DETAILS.	UNDATED	NOT GIVEN	H 53, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-002	MASSACHUSETTS COTTON MILLS / NO.12 UNIT BEAM & GIRDER DETAILS.	UNDATED	NONE	H 53, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-003	MASSACHUSETTS COTTON MILLS / NO.12 UNIT, REINFORCEMENT OF PENSTOCK.	1920/09/24	1/2"=1'	H 69.2, W 107.8 CM	BLUEPRINT	PAPER
MASS. MILLS S-003	MASSACHUSETTS COTTON MILLS / NO.12 UNIT, REINFORCEMENT OF PENSTOCK.	1920/09/24	1/2"=1'	H 69.2, W 107.8 CM	BLUEPRINT	PAPER

MASS. MILLS S-004	MASSACHUSETTS COTTON MILLS / NO.12 UNIT / DRAFT TUBE DETAILS.	1920/08/27	1"=1'	H 57, W 78.2 CM	BLUEPRINT	PAPER
MASS. MILLS S-004	MASSACHUSETTS COTTON MILLS / NO.12 UNIT / DRAFT TUBE DETAILS.	1920/08/27	1"=1'	H 57, W 78.2 CM	BLUEPRINT	PAPER
MASS. MILLS S-005	MASSACHUSETTS COTTON MILLS / NO.12 UNIT-DRAFT TUBE / DETAILS OF CAST IRON CURB RING / ARTHUR T. SAFFORD CONSULTING ENG'R.	1920/09/11	1"=1', FULL SIZE	H 57.8, W 79 CM	BLUEPRINT	PAPER
MASS. MILLS S-005	MASSACHUSETTS COTTON MILLS / NO.12 UNIT-DRAFT TUBE / DETAILS OF CAST IRON CURB RING / ARTHUR T. SAFFORD CONSULTING ENG'R.	1920/09/11	1"=1', FULL SIZE	H 57.8, W 79 CM	BLUEPRINT	PAPER
MASS. MILLS S-006	MASSACHUSETTS COTTON MILLS. / NO.12 UNIT-DRAFT TUBE. / DETAILS OF CAST IRON BELL.	1920/08/22	FULL SIZE	H 56, W 77.5 CM	BLUEPRINT	PAPER
MASS. MILLS S-006	MASSACHUSETTS COTTON MILLS. / NO.12 UNIT-DRAFT TUBE. / DETAILS OF CAST IRON BELL.	1920/08/22	FULL SIZE	H 56, W 77.5 CM	BLUEPRINT	PAPER
MASS. MILLS S-007	MASSACHUSETTS COTTON MILLS / RING FOR GENERATOR SUPPORT # 12 UNIT / ARTHUR T, SAFFORD CONS. ENG'R.	1920/06/11	1"=1'	H 50.5, W 74.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-007	MASSACHUSETTS COTTON MILLS / RING FOR GENERATOR SUPPORT # 12 UNIT / ARTHUR T, SAFFORD CONS. ENG'R.	1920/06/11	1"=1'	H 50.5, W 74.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-008	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / NO.12 UNIT-PLAN & SPECIFICATIONS / FOR GIRDER OVER GENERATOR ROOM / ARTHUR T. SAFFORD-CONSULTING ENGINEER / TURNER, MILLSPAUGH & SAFFORD.	1920/09/16	1 1/2"=1'	H 54, W 76.8 CM	BLUEPRINT	PAPER

MASS. MILLS S-008	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / NO.12 UNIT-PLAN & SPECIFICATIONS / FOR GIRDER OVER GENERATOR ROOM / ARTHUR T. SAFFORD-CONSULTING ENGINEER / TURNER, MILLSPAUGH & SAFFORD.	1920/09/16	1 1/2"=1'	H 54, W 76.8 CM	BLUEPRINT	PAPER
MASS. MILLS S-010	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / HEADGATES FOR NO.12 UNIT / ARTHUR T. SAFFORD-CONSULTING ENGINEER.	1921/04/20	1 1/2"& 3/4"=1'	H 52, W 74.2 CM	BLUEPRINT	PAPER
MASS. MILLS S-010	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / HEADGATES FOR NO.12 UNIT / ARTHUR T. SAFFORD-CONSULTING ENGINEER.	1921/04/20	1 1/2"& 3/4"=1'	H 52, W 74.2 CM	BLUEPRINT	PAPER
MASS. MILLS S-011	MASSACHUSETTS COTTON MILLS-LOWELL, MASS.	1921/04/11	SEE NOTES	H 68.4, W 106.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-011	MASSACHUSETTS COTTON MILLS-LOWELL, MASS.	1921/04/11	SEE NOTES	H 68.4, W 106.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-012	MASS. COTTON MILLS HEAD GATE LOWELL, MASS. PLAN & DETAILS.	UNDATED	NOT GIVEN	H 61.5, W 105.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-012	MASS. COTTON MILLS HEAD GATE LOWELL, MASS. PLAN & DETAILS.	UNDATED	NONE	H 61.5, W 105.5 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-013	SECTION ON LINE A-B / SHOWING METHOD OF TAKING CARE OF SURGE OVERFLOW / FROM NO.12 UNIT, MASSACHUSETTS COTTON MILLS.	1921/06/01	1"=10'	H 17.4, W 57 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-013	SECTION ON LINE A-B / SHOWING METHOD OF TAKING CARE OF SURGE OVERFLOW / FROM NO.12 UNIT, MASSACHUSETTS COTTON MILLS.	1921/06/01	1"=10'	H 17.4, W 57 CM	BLUEPRINT, COLORED PENCIL	PAPER

MASS. MILLS S-015	[UNTITLED.]	UNDATED	NOT GIVEN	H 61, W 91.4 CM	BLUEPRINT	PAPER
MASS. MILLS S-017-[A]	MEMO. OF SHIPMENT NO. / FROM / GENERAL ELECTRIC COMPANY / SCHENECTADY, N.Y. / # 12 WHEEL / OFFICE FILES.	UNDATED	NOT GIVEN	H 28, W 16.5 CM	LITHOGRAPH, GRAPHITE	PAPER
MASS. MILLS S-017-[A]	MEMO. OF SHIPMENT NO. / FROM / GENERAL ELECTRIC COMPANY / SCHENECTADY, N.Y. / # 12 WHEEL / OFFICE FILES.	UNDATED	NONE	H 28, W 16.5 CM	LITHOGRAPH, GRAPHITE	PAPER
MASS. MILLS S-017-[B]	SWITCHBOARD INSTRUCTIONS / SAFETY ENCLOSED UNIT PANEL / STATIONERY TYPE.	UNDATED	NOT GIVEN	H 20.5, W 26.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-017-[B]	SWITCHBOARD INSTRUCTIONS / SAFETY ENCLOSED UNIT PANEL / STATIONERY TYPE.	UNDATED	NONE	H 20.5, W 26.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-017-[C]	SWITCHBOARD INSTRUCTIONS / SAFETY ENCLOSED UNIT PANEL / STATIONERY TYPE.	UNDATED	NOT GIVEN	H 20.5, W 26.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-017-[C]	SWITCHBOARD INSTRUCTIONS / SAFETY ENCLOSED UNIT PANEL / STATIONERY TYPE.	UNDATED	NONE	H 20.5, W 26.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-017-[D]	SWITCHBOARD INSTRUCTIONS / SAFETY ENCLOSED UNIT PARCEL / TRUCK TYPE.	UNDATED	NOT GIVEN	H 20.5, W 26.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-017-[D]	SWITCHBOARD INSTRUCTIONS / SAFETY ENCLOSED UNIT PARCEL / TRUCK TYPE.	UNDATED	NONE	H 20.5, W 26.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-018	24" BAND BRAKE [S. MORGAN SMITH CO.].	1921/05/18	SEE NOTES	H 85, W 127.7 CM	BLUEPRINT	PAPER

MASS. MILLS S-018	24" BAND BRAKE [S. MORGAN SMITH CO.].	1921/05/18	SEE NOTES	H 85, W 127.7 CM	BLUEPRINT	PAPER
MASS. MILLS S-022	MASSACHUSETTS COTTON MILLS / NO.12 UNIT BEAM & GIRDER DETAILS.	1920/09/24	1"=1'	H 53.6, W 76.8 CM	BLUEPRINT	PAPER
MASS. MILLS S-022	MASSACHUSETTS COTTON MILLS / NO.12 UNIT BEAM & GIRDER DETAILS.	1920/09/24	1"=1'	H 53.6, W 76.8 CM	BLUEPRINT	PAPER
MASS. MILLS S-052-[COPY 1]	DETAILS OF 3 - 42" D SPECIAL - VERTICAL HERCULESE TURBINES AND GOVERNOR CONNECTION / FOR THE / MASSACHUSETTS COTTON MILLS.	1918/07/22	3/4"=1'	H 141, W 89 CM	BLUEPRINT	PAPER
MASS. MILLS S-052-[COPY 2]	DETAILS OF 3 - 42" D SPECIAL - VERTICAL HERCULESE TURBINES AND GOVERNOR CONNECTION / FOR THE / MASSACHUSETTS COTTON MILLS.	1918/07/22	3/4"=1'	H 141, W 89 CM	BLUEPRINT	PAPER
MASS. MILLS S-054	WHEEL SETTING & FLUME RECONSTRUCTION / FOR 42" TYPE D, HERCULES WHEELS / MASSACHUSETS MILLS / FOR PROPRIETORS OF LOCKS [& CANALS] / LOWELL, MASS.	1918/03/04	1/4"=1'	H 73.6, W 99.8 CM	BLUEPRINT	PAPER
MASS. MILLS S-055	CHUTE CASE FOR [3-] 42" R.H. [TYPE] D SPECIAL / [VERTICAL] HERCULES HY-TURBINE[S] [& GOVERNOR CONNECTION] / HOLYOKE MCH. CO. WORCESTER, MASS.	1918/01/05	1 1/2" & 3"=1'	H 87.5, W 119.4 CM	BLUEPRINT	PAPER

MASS. MILLS S-056	DETAIL OF CAST IRON DRAFT TUBE FOR 42" D R.H. SPECIAL VERTICAL HERCULES TURBINES / FOR THE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1918/03/06	1"=1'	H 59. W 75 CM	BLUEPRINT	PAPER
MASS. MILLS S-057	[DETAILS] HYDRAULIC COUNTER-BALANCE / [FOR] 42" SWING GATE CASE, TYPE D SPECIAL ROTOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS., HOLYOKE MACHINE CO. / WORCESTER MASS.	1918/03/04	3" & 3/4"=1'	H 61, W 87 CM	BLUEPRINT	PAPER
MASS. MILLS S-058	OUTLINE. / SECTION 8 GENERATOR.	1917/10/19	NOT GIVEN	H 91, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-059	OUTLINE. / SEC. 8 WHEELS. MASS. COTTON MILLS.	1915/05/26	NOT GIVEN	H 91, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
MASS. MILLS S-060	ARRANGEMENT OF SWITCHING / APPARATUS. / MASSACHUSETTS COTTO MILLS, LOWELL, MASS.	1917/11/12	NOT GIVEN	H 46, W 61 CM	BLUEPRINT	PAPER
MASS. MILLS S-063	FEEDERS TO WHEEL-ROOM TURBINES / IN / SECTION EIGHT. / MASS. COTTON MILLS, LOWELL, MASS.	1910/02/08	1/4"=1'	H 69.2, W 67.3 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
MASS. MILLS S-064	BOTTOM GRADES OF SHEET PILING / FOR / RACK TO SEC 8 & POWER HO. / SEC 12 EAST SIDE.	1911/04/25	NOT GIVEN	H 28, W 21.5 CM	INK, GRAPHITE	PAPER
MASS. MILLS S-064	BOTTOM GRADES OF SHEET PILING / FOR / RACK TO SEC 8 & POWER HO. / SEC 12 EAST SIDE.	SEE NOTES	NONE	H 11", W 8 1/2"	INK, GRAPHITE	PAPER
MASS. MILLS S-065	RACK IN EASTERN CANAL / FOR / SECTION EIGHT AND POWER HOUSE. / MASS. COTTON MILLS, LOWELL, MASS.	1910/05/27	VARIOUS	H 59.6, W 91.2 CM	INK, COLORED INK	DRAFTING CLOTH

MASS. MILLS S-109	MASSACHUSETTS COTTON MILLS. / LOWELL, MASS. / PRESCOTT HYDRO-ELECTRIC PLANT. / CROSS SECTIONS.	1918/11/03	1/4"=1'	H 67, W 87 CM	BLUEPRINT	PAPER
MASS. MILLS S-112	MASSACHUSETTS COTTON MILLS. / LOWELL, MASS. / PRESCOTT HYDRO-ELECTRIC PLANT. / MAIN FLOOR MANSORY.	1919/02/20	VARIOUS	H 67, W 87 CM	BLUEPRINT	PAPER
MASS. MILLS S-113	PLAN SHOWING / PROPOSED LAYOUT OF 10" CENTRIFUGAL PUMP / IN NEW PRESCOTT WHEELHOUSE.	1919/02/26	1/4"=1'	H 83, W 69 CM	BLUEPRINT	PAPER
MASS. MILLS S-124	OUTLINE. / MASSACHUSETTS COTTON MILLS / PRESCOTT EXCITER.	1917/09/22	NOT GIVEN	H 45, W 30.5 CM	BLUEPRINT, GRAPHITE	PAPER
P.H. 002-A	PLAN / OF SOME OF THE BUILDINGS / OF THE / MIDDLESEX COMPANY / SHOWING / FEEDERS & RACES OF WATER WHEELS.	1886/11/30	NONE	H 73.4, W 159 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 002-B	[PLAN OF PART OF YARD OF] MIDDLESEX [(IPSWICH)] CO. / PLAN & ELEVATION / OF / WATERWAY FOR NO. 1 & 2 WATER-WHEELS / ALSO / VELOCITY DIAGRAMS FOR PRESENT & PROPOSED WATER.	1915/10/00	1"=10'	H 61.4, W 84.5 CM	GRAPHITE	DRAFTING CLOTH
P.H. 003	[SCALE] PLAN OF THE / PENSTOCKS & RACEWAYS / FOR NOS. 1 & 2 WHEELS / OF THE / LOWELL MACHINE SHOP [MFG. CO. (SACO-LOWELL) SHOPS].	1900/01/15	1"=10'	H 91.4, W 186.8 CM	INK, WATER COLOR	PAPER
P.H. 004	[SCALE] PLAN OF THE / PENSTOCKS & RACEWAYS / FOR NOS. 3, 4,& 5 WHEELS / OF THE / LOWELL MACHINE SHOP [MFG. CO. (SACO-LOWELL SHOPS)].	1900/03/00	1"=10'	H 96.4, W 147.6 CM	INK, COLORED INK, WATER COLOR	PAPER

P.H. 005	PLAN OF / PENSTOCK & RACEWAY / [ALSO SHOWING SWAMP LOCKS DAM AND BASIN] FOR NO. 6 WHEEL / & PART OF YARD, OF / LOWELL MACHINE SHOP.	1901/01/21	1"=10'	H 74, W 147.5 CM	INK, WATER COLOR	PAPER
P.H. 005-[COPY 1]	PLAN OF / PENSTOCK & RACEWAY / [ALSO SHOWING SWAMP LOCKS DAM AND BASIN] FOR NO. 6 WHEEL / & PART OF YARD, OF / LOWELL MACHINE SHOP.	1901/01/21	1"=10'	H 99, W 154.4 CM	PHOTOGRAPHIC NEGATIVE	PAPER
P.H. 006-A	DRAINAGE AREA / OF THE / MERRIMACK RIVER / IN NEW HAMPSHIRE & / MASSACHUSETTS / ABOVE / LOWELL, MASS.	UNDATED	1"=2 1/2 MILES	H 73.8, W 106.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 006-B	[UNTITLED PLAN.] [DRAINAGE AREA OF THE MERRIMACK RIVER IN NEW HAMPSHIRE.]	UNDATED	1"=2 1/2 MILES	H 137.8, W 109.2 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 006-C	DURHAM / RAIN GAUGE / DRAINAGE AREA / OF THE / MERRIMACK RIVER / IN NEW HAMPSHIRE / ABOVE / LAWRENCE, MASS.	UNDATED	1"=2 1/2 MILES	H 121.8, W 94 CM	BLUE LINE PRINT	PAPER
P.H. 006-D	DRAINAGE AREA / OF THE / MERRIMACK RIVER / IN / MASSACHUSETTS / ABOVE / LAWRENCE, MASS.	1898/01/00	1/62500	H 94, W 137 CM	BLUE LINE PRINT	PAPER
P.H. 006-E	DRAINAGE AREA / OF THE / MERRIMACK RIVER / IN / NEW HAMPSHIRE / & / MASSACHUSETTS / ABOVE / LOWELL, MASS.	UNDATED	1"=2 1/2 MILES	H 171.4, W 105.8 CM	BLUE LINE PRINT	PAPER
P.H. 006-F	DRAINAGE AREA / OF THE / MERRIMACK RIVER / IN / NEW HAMPSHIRE / & / MASSACHUSETTS / ABOVE / LOWELL, MASS. / SHOWING / LINES OF EQUAL PRECIPITATION / STORM OF JULY 1-9, 1915.	SEE TITLE	1"=2 1/2 MILES	H 183, W 103 CM	RED LINE PRINT, WATER COLOR, COLORED INK, INK	CLOTH BACKED PAPER

P.H. 006-G-[01]	DRAINAGE AREA / OF THE / MERRIMACK RIVER / IN NEW HAMPSHIRE & / MASSACHUSETTS / ABOVE / LOWELL, MASS.	UNDATED	1"=2 1/2 MILES	H 75, W 104 CM	UNKNOWN PHOTOGRAPHIC PROCESS (REVERSE NEGATIVE)	PAPER
P.H. 006-G-[02]	[UNTITLED PLAN.] [DRAINAGE AREA OF THE MERRIMACK RIVER IN NEW HAMPSHIRE.]	UNDATED	1"=2 1/2 MILES	H 147, W 108 CM	UNKNOWN PHOTOGRAPHIC PROCESS (REVERSE NEGATIVE)	PAPER
P.H. 006-H	[MAP SHOWING] PORTION OF / NEW HAMPSHIRE & MASSACHUSETTS / SHOWING / MERRIMACK RIVER WATER-SHED [AND HORSE POWER DEVELOPED AT DIFFERENT CITIES ON RIVER].	1904/01/00	1"=2 1/2 MILES	H 108.4, W 77.6 CM	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
P.H. 006-H	[UNTITLED PLAN SHOWING DRAINAGE AREA OF THE MERRIMACK RIVER IN MASSACHUSETTS AND NEW HAMPSHIRE].	UNDATED	1"=2 1/2 MILES	H 170, W 90 CM	BLUEPRINT	PAPER
P.H. 006-H-[COPY 1]	[MAP SHOWING] PORTION OF / NEW HAMPSHIRE & MASSACHUSETTS / SHOWING / MERRIMACK RIVER WATER-SHED [AND HORSE POWER DEVELOPED AT DIFFERENT CITIES ON RIVER].	1904/01/00	1"=2 1/2 MILES	H 161, W 76 CM	BLUEPRINT	PAPER
P.H. 006-I-01	STORM OF / MARCH 5, 1896 / MERRIMACK RIVER / PLAN SHOWING DRAINAGE BASIN ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS, & / LENGTH OF PRECIPITATION RECORDS.	SEE TITLE	3/8"=5 MILES	H 43.5, W 27 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER

P.H. 006-I-02	STORM OF / JULY 1-9, 1915 / MERRIMACK RIVER / PLAN SHOWING DRAINAGE BASIN ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS, & / LENGTH OF PRECIPITATION RECORDS.	SEE TITLE	3/8"=5 MILES	H 43.5, W 27 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER
P.H. 006-I-03-[01]	STORM OF / OCT 4, 1869 / MERRIMACK RIVER / SHOWING DRAINAGE BASIN ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS, & / LENGTH OF PRECIPITATION RECORDS.	SEE TITLE	3/8"=5 MILES	H 43.5, W 27 CM	BLUEPRINT, COLORED PENCIL, INK	PAPER
P.H. 006-I-03-[02]	MERRIMACK RIVER / PLAN SHOWING DRAINAGE BASIN. / ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS, & / LENGTH OF PRECIPITATION RECORDS.	UNDATED	3/8"=5 MILES	H 43.5, W 27 CM	BLACK LINE PRINT, PENCIL	PAPER
P.H. 006-I-04	RAIN GAUGE STATIONS IN & NEAR MERRIMACK / SHOWING DRAINAGE BASIN ABOVE LAWRENCE, / LOCATION OF PRECIPITATION STATIONS, & / LENGTH OF PRECIPITATION RECORDS.	SEE NOTES	3/8"=5 MILES	H 43.5, W 27 CM	BLACK LINE PRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 007-A/C-[01]	PLAN OF / LOCKS & CANALS MILL POND / ABOVE PAWTUCKET DAM FROM LOWELL, MASS. / TO CROMWELLS FALLS, N.H. A DISTANCE OF 18 MILES. SHOWING CONTOURS OF RIVER / FROM GRADE 82.00 (CREST OF STONE DAM) TO GRADE / 87.00 (TOP OF FIFTH FLASHBOARD).	1914/01/00	1"=200'	H 77.3, W 204 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 007-A/C-[02]	PLAN OF / LOCKS & CANALS MILL POND / ABOVE PAWTUCKET DAM FROM LOWELL, MASS. / TO CROMWELLS FALLS, N.H. A DIATANCE OF / 18 MILES, SHOWING CONTOURS OF RIVER / FROM GRADE 82.00 (CREST OF STONE DAM) TO GRADE / 87.00 (TOP OF FIFTH FLASHBOARD).	1914/01/00	1"=200'	H 77.7, W 203.4 CM	INK	DRAFTING CLOTH
P.H. 007-A/C-[03]	PLAN OF / LOCKS & CANALS MILL POND / ABOVE PAWTUCKET DAM FROM LOWELL, MASS. / TO CROMWELLS FALLS, N.H. A DISTANCE OF 18 MILES, SHOWING CONTOURS OF RIVER / FROM GRADE 82.00 (CREST OF STONE DAM) TO GRADE / 87.00 (TOP OF FIFTH FLASHBOARD).	1914/01/00	1"=200'	H 77, W 244.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 007-A/C-[04]	PLAN OF / LOCKS & CANALS MILL POND / ABOVE PAWTUCKET DAM FROM LOWELL, MASS. / TO CROMWELLS FALLS, N.H. A DISTANCE OF 18 MILES, SHOWING CONTOURS OF RIVER / FROM GRADE 82.00 (CREST OF STONE DAM) TO GRADE / 87.00 (TOP OF FIFTH FLASHBOARD).	1914/01/00	1"=200'	H 77.5, W 22.9 CM	INK, COLORED INK	DRAFTING CLOTH

P.H. 007-A/C-[05]	PLAN OF / LOCKS & CANALS MILL POND / ABOVE PAWTUCKET DAM FROM LOWELL, MASS. / TO CROMWELLS FALLS, N.H. A DISTANCE OF 18 MILES SHOWING CONTOURS OF RIVER / FROM GRADE 82.00 (CREST OF STONE DAM) TO GRADE / 87.00 (TOP OF FIFTH FLASHBOARD).	1914/01/00	1"=200'	H 76.3, W 235 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 007-B-[01]	SKETCH / OF THE PART OF / MERRIMACK RIVER / BETWEEN CROMWELLS' FALLS / AND PATUCKET [SIC] FALLS; / BY U. A. BOYDEN / PART 1.	1840/09/00	1"=400'	H 110, W 513.2 CM	GRAPHITE, COLORED INK	DRAFTING CLOTH
P.H. 007-B-[02]	[PLAN OF MILL POND BY U. A. BOYDEN SHOWING AREA.]	1840/00/00				
P.H. 007-B-[03]	[PLAN OF MILL POND BY U. A. BOYDEN SHOWING AREA.]	1840/00/00				
P.H. 008-[B]	DEVELOPMENT-CORPORATION-HOSPITAL-LOT-LOWELL-MASS-FRANK-CHOUTEAU-BROWN-ARCHITECT / NINE-PARK-ST.-BOSTON MASS.	1910/09/10	1/16" SCALE	H 58.2, W 64.2 CM	BLUE LINE PRINT	PAPER
P.H. 008-[C]	DEVELOPMENT-CORPORATION-HOSPITAL-LOT-LOWELL-MASS-FRANK-CHOUTEAU-BROWN-ARCHITECT / NINE-PARK-ST.-BOSTON MASS.	1910/08/30	1/16" SCALE	H 59.4, W 64.7 CM	BLUE LINE PRINT	PAPER
P.H. 008-[D]	NURSE'S-HOME-CORPORATION-HOSPITAL-LOWELL-FRANK-CHOUTEAU-BROWN-ARCHITECT / NINE-PARK-ST.-BOSTON MASS.	UNDATED	1/8" SCALE	H 36.8, W 50.5 CM	BLUE LINE PRINT	PAPER

P.H. 008-[E]	NURSE'S-HOME-CORPORATION-HOSPITAL-LOWELL-FRANK-CHOUTEAU-BROWN-ARCHITECT / NINE-PARK-ST.-BOSTON MASS.	UNDATED	1/8" SCALE	H 36.8, W 50.5 CM	BLUE LINE PRINT	PAPER
P.H. 008-[F]	NURSE'S-HOME-CORPORATION-HOSPITAL-LOWELL-FRANK-CHOUTEAU-BROWN-ARCHITECT / NINE-PARK-ST.-BOSTON MASS.	1910/09/20	1/8" SCALE	H 36.8, W 50.5 CM	BLUE LINE PRINT	PAPER
P.H. 008-[G]	A DESCRIPTION OF THE PROPOSED & GRADUAL / DEVELOPMENT OF A MODERN & COMPLETE GROUP OF PRELIMINARY HOSPITAL BUILDINGS ON THE / CORPORATION HOSPITAL LOT / LOWELL, MASS.	1910/10/01	NONE	H 28, W 22 CM	COLORED INK	TRACING PAPER
P.H. 008-A	PLAN / OF / CORPORATION HOSPITAL LOT / SHOWING BUILDINGS.	1906/05/03	1/8"=1'	H 119.4, W 153 CM	INK, COLORED INK, WATER COLOR	PAPER
P.H. 009-[C]	SKETCH / OF THE DAM & THE NEW / PART CONSTRUCTED IN 1875, THE / LATTER DRAWN IN RED. / THE DIMENSIONS AND / ANGLES / WERE MEASURED BY JAMES FRANCIS, / AND...[SEE NOTES.]	1875/00/00	1"=40'	H 28.5, W 79 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 009-A	PROFILE / OF THE MAIN DAM AT PAWTUCKET FALLS, AS IT WAS PREVIOUS TO THE CONSTRUCTION OF THE NEW PART IN 1875, FROM LEVELS AND MEASUREMENTS BY JAMES B. FRANCIS.	1903/08/00	1"=40'	H 32, W 1200 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER

P.H. 009-B	PLAN / SHOWING [PROPOSED BAFFLE WALL NEAR] FISHWAY / AT / PAWTUCKET DAM / FOR / LOCKS & CANALS.	1926/06/00	1"=4'	H 44.5, W 46.4 CM	BLACK LINE PRINT, COLORED INK, INK	PAPER
P.H. 011-A-[18]	MERRIMAC RIVER, MASSACHUSETTS / FROM LOWELL TO NEW HAMPSHIRE STATE LINE. [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897/11/00	1/8"=100'	H 49, W 123 CM	LITHOGRAPH, GRAPHITE	CLOTH BACKED PAPER
P.H. 011-A-[18]-[COPY 1]	[UNTITLED PLAN.] [MERRIMAC RIVER, MASSACHUSETTS / FROM LOWELL TO NEW HAMPSHIRE STATE LINE.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897/11/00	1/8"=100'	H 49, W 123 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 011-A-[19]-1	SURVEY OF MERRIMAC RIVER, MASSACHUSETTS, FROM LOWELL TO NEW HAMPSHIRE / STATE LINE.	1898/01/19	NONE	H 28, W 22 CM	INK	PAPER
P.H. 011-A-[19]-2	SURVEY OF MERRIMAC RIVER, MASSACHUSETTS, FROM LOWELL TO NEW HAMPSHIRE / STATE LINE.	1898/01/19	NONE	H 28, W 22 CM	INK	PAPER
P.H. 011-A-[19]-3	SURVEY OF MERRIMAC RIVER, MASSACHUSETTS, FROM LOWELL TO NEW HAMPSHIRE / STATE LINE.	1898/01/19	NONE	H 28, W 22 CM	INK	PAPER
P.H. 011-A-[19]-4	SURVEY OF MERRIMAC RIVER, MASSACHUSETTS, FROM LOWELL TO NEW HAMPSHIRE / STATE LINE.	1898/01/19	NONE	H 28, W 22 CM	INK	PAPER
P.H. 011-A-[20]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N.H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 106.6 CM	INK, WATER COLOR	PAPER

P.H. 011-A-[21]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 115.7 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[22]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 95.3 CM	INK, WATER COLOR, GRAPHITE	PAPER
P.H. 011-A-[23]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG.1897.]	1897-1914/00/00	NONE	H 56.2, W 95.3 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[24]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 95 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[25]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 85.1 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[26]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.5, W 120.8 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[27]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.5, W 120.8 CM	INK, WATER COLOR	PAPER

P.H. 011-A-[28]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 80 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[29]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 80 CM	INK, WATER COLOR	DRAFTING CLOTH
P.H. 011-A-[30]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 95.2 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[31]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 95.2 CM	INK, WATER COLOR	PAPER
P.H. 011-A-[32]	[UNTITLED PLAN.] [PLAN AND SECTIONS FROM PAWTUCKET DAM TO N. H. STATE LINE BY LT. COL. S. M. MANSFIELD, U. S. A. ENG. 1897.]	1897-1914/00/00	NONE	H 56.2, W 106.2 CM	INK, WATER COLOR, GRAPHITE	PAPER
P.H. 011-A-01	NO.1 / MEAN ELEVATION OF BOTTOM / MERRIMACK RIVER / FROM A SECTION 1400 FT. ABOVE / LOWER END PAWTUCKET DAM / TO A SECTION 1400 FT. ABOVE / LOWER END PAWTUCKET DAM / TO A SECTION 4400 FT. ABOVE IT.	1913/09/15	1MM=1'	H 8", W 42 1/2"	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
P.H. 011-A-02	MERRIMACK RIVER SECTIONS / NO. 2.	SEE NOTES	NONE	H 9", W 42 1/2"	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH

					GRAPHITE ,	
P.H. 011-A-03	MERRIMACK RIVER SECTIONS / NO. 3.	SEE NOTES	NONE	H 9", W 42 1/2"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-04	MERRIMACK RIVER SECTIONS / NO. 4.	SEE NOTES	NONE	H 9", W 42 1/2"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-05	MERRIMACK RIVER SECTIONS / NO. 5.	SEE NOTES	NONE	H 9", W 42 1/2"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-06	MERRIMACK RIVER SECTIONS / NO. 6.	SEE NOTES	NONE	H 7 3/4", W 42 1/2"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-07	MERRIMACK RIVER SECTIONS / NO. 7.	SEE NOTES	NONE	H 7 3/4, W 42 1/2"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-08	MERRIMACK RIVER SECTIONS / NO. 8.	SEE NOTES	NONE	H 8", W 42 1/2"	COLORED PENCIL	DRAFTING CLOTH
P.H. 011-A-09	MERRIMACK RIVER SECTIONS / NO. 9.	SEE NOTES	NONE	H 5 1/2", W 43"	GRAPHITE	DRAFTING CLOTH
P.H. 011-A-10	MERRIMACK RIVER SECTIONS / NO. 10.	SEE NOTES	NONE	H 7 1/2", W 43"	GRAPHITE , COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-11	MERRIMACK RIVER SECTIONS / NO. 11.	SEE NOTES	NONE	H 7 1/2, W 43"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-12	MERRIMACK RIVER SECTIONS / NO. 12.	SEE NOTES	NONE	H 7", W 43"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-13	MERRIMACK RIVER SECTIONS / NO. 13.	SEE NOTES	NONE	H 7", W 43"	COLORED PENCIL GRAPHITE ,	DRAFTING CLOTH
P.H. 011-A-14	MERRIMACK RIVER SECTIONS / NO. 14.	SEE NOTES	NONE	H 7", W 43 1/2"	COLORED PENCIL	DRAFTING CLOTH

P.H. 011-A-15	MERRIMACK RIVER SECTIONS / NO. 15.	SEE NOTES	NONE	H 7 1/2, W 43"	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
P.H. 011-A-16	MERRIMACK RIVER SECTIONS / NO. 16.	SEE NOTES	NONE	H 7 1/8", W 43"	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
P.H. 011-A-17	MERRIMACK RIVER SECTIONS / NO. 17.	SEE NOTES	NONE	H 7", W 43"	GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
P.H. 011-B-01	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100' [SEE NOTES]	H 27", W 39 1/2"	BLUEPRINT	PAPER
P.H. 011-B-02	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100' [SEE NOTES]	H 26 1/2", W 40"	BLUEPRINT	PAPER

P.H. 011-B-03	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100', 5/16"=10 K'	H 26 1/4",W 37 1/2"	BLUEPRINT	PAPER
P.H. 011-B-04	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100', 5/16"=10 K	H 26 1/2", W 40"	BLUEPRINT	PAPER
P.H. 011-B-05	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100'	H 26 1/2", W 39 1/4"	BLUEPRINT	PAPER

P.H. 011-B-06	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100'	H 26 1/2",W 39"	BLUEPRINT	PAPER
P.H. 011-B-07	MERRIMACK RIVER / MASSACHUSETTS / WITH A VIEW TO SECURING / INCREASED DEPTH FROM LOWELL TO THE SEA / OR IN ANY PART OF THIS SECTION OF THE RIVER. [PLAN OF SURVEY BY LT. COL. W. E. CRAIGHILL FROM OCEAN TO MITCHELL'S FALLS TO MAKE THE RIVER NAVIGABLE.]	1914/11/10	1/4"=100'	H 26 1/2",W 40"	BLUEPRINT	PAPER
P.H. 012-A-[01]	PLAN OF / GRIST MILL / & / ENVIRONMENTS. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/06/00	1"=4'	H 81, W 113 CM	INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 012-A-[02]	GRIST MILL.[PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/06/00	1/4"=10'	H 74, W 111.8 CM	INK, COLORED INK, GRAPHITE	PAPER

P.H. 012-A-[03]	GRIST MILL-PROPOSED REPAIRS OR CHANGES. / TENTATIVE SCHEME FOR PRELIMINARY ESTIMATE. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/07/00	3/4"=1'	H 53.5, W 68 CM	GRAPHITE	TRACING PAPER
P.H. 012-A-[04]	GRIST MILL FILE NO. 100 / GENERAL PLAN OF WATERWAYS. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/07/25	1/4"=1'	H 53.2, W 68.2 CM	INK, GRAPHITE	TRACING PAPER
P.H. 012-A-[05]	PRELIMINARY- / GRIST MILL-FILE NO.100. / TRANSVERSE SECTIONAL ELEVATION-SCHEME NO. 2. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/07/00	3/4"=10'	H 53.5, W 78.2 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 012-A-[06]	GRIST MILL-PROPOSED REPAIRS OR CHANGES. / TENTATIVE SCHEME FOR PRELIMINARY ESTIMATE. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R TRACKS AT FOOR OF DUTTON ST.]	1915/07/00	3/4"=1'	H 53.5, W 68.5 CM	GRAPHITE	TRACING PAPER
P.H. 012-A-[07]	GRIST MILL-FILE 100 / PLAN-SCHEME NO.2. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/07/00	NONE	H 53.3, W 68.6 CM	GRAPHITE, COLORED PENCIL	TRACING PAPER

P.H. 012-A-[08]	GRIST MILL-FILE NO.100 / CROSS-SECTIONAL ELEVATION-SCHEME NO. 2. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/07/00	3/4"=1'	H 53.4, W 68.6 CM	GRAPHITE	TRACING PAPER
P.H. 012-A-[09]	GRIST MILL-FILE NO. 100 / TRANSVERSE SECTIONAL ELEVATION-SCHEME NO.2. [PRELIMINARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1915/07/00	3/4"=1'	H 53.5, W 78.1 CM	GRAPHITE	TRACING PAPER
P.H. 012-B	PLAN SHOWING / EFFECT OF / PROPOSED CHANGES IN / BRANCH TRACKS / AT FOOT OF DUTTON STREET / LOWELL, MASS. [PRELINIMARY SCHEMES FOR NEW WATER WHEEL, WITH PLAN OF MILL. ALSO PROPOSED CHANGE IN R. R. TRACKS AT FOOT OF DUTTON ST.]	1917/10/29	1"=20'	H 54.5, W 64.2 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 013	[DIAGRAM SHOWING] OPERATION OF / MERRIMACK RIVER / AT LOWELL, MASS. / BY / LOCKS & CANALS CO., / DURING PART OF DEC. 1917 / & JAN. 1918 [WITH RESPECT TO HEIGHTS ON FLASHBOARDS].	SEE TITLE	NONE	H 58.5, W 190 CM	INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 014-A-[01]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	

P.H. 014-A-[02]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	
P.H. 014-A-[03]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	
P.H. 014-A-[04]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	
P.H. 014-A-[05]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	
P.H. 014-A-[06]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	
P.H. 014-A-[07]	[PLANS OF TREMONT & SUFFOLK NO. 3 WHEEL (40.8"S. MORGAN SMITH) BY ROBINSON & ROBINSON OF LOWELL, MASS.]	1918-1919/00/00			BLUEPRINT	
P.H. 014-B-[01]	TREMONT & SUFFOLK MILLS / LOWELL, MASS.	1919/08/02	1/2"=12"	H 87, W 99.7 CM	BLUEPRINT	PAPER
P.H. 014-B-[02]	TREMONT & SUFFOLK MILLS / LOWELL, MASS.	1919/08/02	1/2"=12"	H 90.2, W 120 CM	BLUEPRINT	PAPER

P.H. 015-001	[PLANS FOR PROPOSED HYDROELECTRIC UNIT FOR BOOTT NO.1 WHEEL] OUTLINE / GENERATOR A. C. TYPE A. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	NONE	H 56, W 87 CM	BLUEPRINT	PAPER
P.H. 015-002	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL] PROPOSED INSTALLATION / OF / SINGLE VERTICAL TURBINE / IN / OPEN FLUME [(A. C. MFG. CO.)].	1916/11/21	1/4"=12"	H 56, W 87 CM	BLUEPRINT	PAPER
P.H. 015-003	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] PIPE STRUTS / USED ON / HYDRAULIC TURBINE [(ALLIS-CHALMERS MFG. CO.)].	1919/00/00	1 1/2"=12"	H 55.6, W 43.3 CM	BLUEPRINT	PAPER
P.H. 015-004	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] SOLE PLATE / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	6"=12"	H 55.7, W 43.2 CM	BLUEPRINT	PAPER
P.H. 015-005	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] 5" BRACE-SUPPORT / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	3"=12"	H 43.2, W 28 CM	BLUEPRINT	PAPER
P.H. 015-006	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] BOOTT MILLS [# 1 WHEEL] / CONCRETE DRAFT TUBE.	1917/11/14	1/2"=12"	H 56, W 87 CM	BLUEPRINT	PAPER
P.H. 015-006 1/2	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] STEP BEARING / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	6"=12"	H 43.2, W 56 CM	BLUEPRINT	PAPER

P.H. 015-007	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] 9"-9 1/2"=10" / LIGNUM VITAE BEARING / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	3"& 6"=12"	H 56, W 87 CM	BLUEPRINT	PAPER
P.H. 015-008	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] COVER PLATE / FOR / 42 1/2" RUNNER / USED ON / HYDRAULIC TURBINE. [(A. C. MFG CO.)]	1919/00/00	1 1/2"& 6"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-009	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] FOUNDATION RING / USED FOR / HYDRAULIC TURBINE [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	3"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-010	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] 7 1/2"-8 1/2"-LIGNUM VITAE BEARING / USED FOR / HYDRAULIC TURBINE. [(A.C. MFG CO.)]	1919/00/00	3"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-011	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] COVER PLATE / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	1 1/2"& 6"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-012	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] 9 1/2" DOUBLE LEVER. / USED ON / HYDRAULIC TURBINE. ALLIS-CHALMERS MFG. CO.	1919/00/00	6"=12"	H 87, W 56 CM	BLUEPRINT	PAPER

P.H. 015-013	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] MAIN & REG. SHAFT. / USED ON / HYDRAULIC TURBINE. ALLIS-CHALMERS MFG. CO.	1919/00/00	1 1/2"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-014	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] BOOTT MILLS [#1 WHEEL.] GOVERNOR ARRANGEMENT [ON BOOTT MILLS HYD. TURBINE]. ALLIS-CHALMERS MFG. CO.	1917/11/20	1/2"=1'	H 86.5, W 56 CM	BLUEPRINT	PAPER
P.H. 015-015	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] 5 1/2" & 6" STANDARD CLAMP COUPLING / USED ON / HYDRAULIC TURBINE. [(A-C MFG. CO.)]	1919/00/00	6"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-016	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] REGULATION LINK / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	3"& 6"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-017	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] DISCHARGE [AND BEARING] OF BASE RING / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	12" & 1 1/2"=12"	H 56, W 87 CM	BLUEPRINT	PAPER
P.H. 015-018	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] SHIFTING RING / USED ON / HYDRAULIC TURBINE. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	12"& 1 1/2"=12"	H 56, W 87 CM	BLUEPRINT	PAPER

P.H. 015-019	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] 45"X 24 1/2" R. H. RUNNER / TYPE # 12 / USED ON / HYDRAULIC TURBINE. [(A.C. MFG. CO.)]	1919/00/00	3"& 1"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-020	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT #1 WHEEL.] SECTION / OF / PROPOSED TURBINE / FOR / BOOTT MILLS. [(ALLIS-CHALMERS MFG. CO.)]	1919/00/00	1 1/2"=12"	H 87, W 56 CM	BLUEPRINT	PAPER
P.H. 015-021	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] PROPOSED / GENL. ASSEMBLY / BOOTT MILLS / 600 H. P. HYDRO-ELECTRIC UNIT / FOR PIT NO. 1 [(ALLIS-CHALMERS MFG. CO.)].	1919/00/00	1/2"=12"	H 59.7, W 91.4 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 015-022	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] L. H. GUIDE VANES (SHAPE # 5) FOR / 42 1/2" TYPE 13 RUNNER / USED ON / HYDRAULIC TURBINE [(A.C. MFG. CO.)].	1919/00/00	1/2"=12"	H 77.5, W 106 CM	BLUEPRINT	PAPER
P.H. 015-023	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] BOOTT MILLS [# 1 WHEEL], / PROPOSED POWERHOUSE ARRANGEMENT. ALLIS-CHALMERS MFG. CO.	1919/00/00	1/2"=12"	H 77.5, W 106 CM	BLUEPRINT	PAPER
P.H. 015-024	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] R. H. GUIDE VANES (SHAPE # 5) / FOR / 45" TYPE # 12 RUNNER / USED ON / HYDRAULIC TURBINE ALLIS-CHALMERS MFG. CO.	1919/00/00	12"=12"	H 77.5, W 106 CM	BLUEPRINT	PAPER

P.H. 015-025	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] SHIFTING RING / FOR / 42 1/2"X 24 1/2" TYPE # 13 RUNNER / USED ON / HYDRAULIC TURBINE ALLIS-CHALMERS MFG. CO.	1919/00/00	1 1/2",6"& 12"=12"	H 77.5, W 106 CM	BLUEPRINT	PAPER
P.H. 015-026	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] DISCHARGE RING / USED ON / HYDRAULIC TURBINE. ALLIS-CHALMERS MFG. CO.	1919/00/00	3"& 12"=12"	H 77.5, W 106 CM	BLUEPRINT	PAPER
P.H. 015-027	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] DRAFT TUBE / USED ON / HYDRAULIC TURBINE. ALLIS-CHALMERS MFG. CO.	1919/00/00	1 1/2"& 12"=12"	H 77.5, W 106 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 015-028	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] BOOTT MILLS [# 1 WHEEL] / PROPOSED POWER HOUSE ARRANGEMENT. ALLIS-CHALMERS MFG. CO.	1919/00/00	1/2"=12"	H 77.5, W 106 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 015-029	DIAGRAM SHOWING VELOCITY IN FT. PER SEC. AT / DIFFERENT POINTS IN DRAFT TUBE EXTENSION- [FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] BOOTT # 1 WHEEL.	1919/00/00	NONE	H 21.5, W 28 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 015-030	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT] PLAN OF GENERATOR ROOM / FOR / [BOOTT] # 1 WATERWHEEL.	1918/09/13	1/2"=1'	H 43, W 55.3 CM	BLUEPRINT	PAPER
P.H. 015-031	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT] PLAN AND ELEVATION / # 1 WATERWHEEL / BOOTT MILLS / LOWELL, MASS.	1918/09/12	1/2"=1', 1/4"=1'	H 42, W 83.5 CM	BLUEPRINT	PAPER

P.H. 015-032	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL] FROM / S. MORGAN SMITH CO. [MODEL] / YORK, PA. / FOR BOOTT COTTON MILLS / LOWELL, MASS.	1912/09/13	1 1/2"& 3"=1'	H 53.3, W 70 CM	BLUEPRINT	PAPER
P.H. 015-033	[PLANS FOR PROPOSED HYDRO-ELECTRIC UNIT FOR BOOTT # 1 WHEEL.] PRELIMINARY ARRANGEMENT OF 60" [S. MORGAN] SMITH WICKET GATE TURBINE / FOR / BOOTT COTTON MILLS LOWELL MASS. / ARTHUR T. SAFFORD ENGINEER LOWELL.	1908/12/08	1/2"=1'	H 54, W 70 CM	BLUEPRINT	PAPER
P.H. 016-[018]	PROPOSED I BEAM CONSTRUCTION IN / RACEWAY TO REPLACE WOODEN COLUMNS / MASS. MILLS.	1913/04/21	3/8"=1'	H 74, W 87.8 CM	BLUEPRINT	PAPER
P.H. 016-001-[COPY 1]	[DETAILS] HYDRAULIC COUNTER-BALANCE / [FOR] 42" SWING GATE CASE, TYPE D SPECIAL ROTOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. HOLYOKE MACHINE CO. / WORCESTER MASS.	1918/03/04	3"& 3/4"=1'	H 24", W 34 1/2"	BLUEPRINT	PAPER
P.H. 016-001-[COPY 2]	[DETAILS] HYDRAULIC COUNTER-BALANCE / [FOR] 42" SWING GATE CASE, TYPE D SPECIAL ROTOR / MASSACHUSETTS COTTON MILLS / LOWELL, MASS. HOLYOKE MACHINE CO. / WORCESTER MASS.	1918/03/04	3"& 3/4"=1'	H 24", W 34 1/2"	BLUEPRINT	PAPER
P.H. 016-002	PRELIMINARY ARRANGEMENT [(ELECTRICAL)] / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1917/08/03	1/4"=1'	H 16 5/8", W 32 1/2"	BLUEPRINT	PAPER

P.H. 016-003	SKETCH SHOWING PRESENT CONDITION / AND / PROPOSED NEW VERTICAL 42" TYPE "D" HERCULES WHEELS / IN / SECTION-8 OF MASSACHUSETTS COTTON MILLS.	1917/08/27	1"=10'	H 59.25, W 61.5 CM	BLUEPRINT	PAPER
P.H. 016-004-[COPY 1]	WHEEL SETTING & FLUME RECONSTRUCTION / FOR 42" TYPE D, HERCULES WHEELS / MASSACHUSETTS MILLS / FOR PROPRIETORS OF LOCKS [& CANALS] / LOWELL, MASS.]	1918/03/04	1/4"=1'	H 29", W 39"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 016-004-[COPY 2]	WHEEL SETTING & FLUME RECONSTRUCTION / FOR 42" TYPE D, HERCULES WHEELS / MASSACHUSETTS MILLS / FOR PROPRIETORS OF LOCKS [& CANALS] / LOWELL, MASS.]	1918/03/04	1/4"=1'	H 73.6, W 99.8 CM	BLUEPRINT	PAPER
P.H. 016-005	GENERAL PLAN [& DATA] OF 3-42" D SPECIAL VERTICAL HERCULES TURBINES / FOR THE / MASSACHUSETTS COTTON MILLS [FOR 4, 5, & 6 WHEELS] / LOWELL, MASS..	1918/07/22	1/4"=1'	H 80, W 130 CM	BLUEPRINT	PAPER
P.H. 016-006	[GEAR LIST FOR ABOVE WHEELS] MASSACHUSETTS COTTON MILLS. / LOWELL, MASSS.	1918/05/03	3/4",1 1/2", 3"=1'	H 33 1/8", W 43 3/4"	BLUEPRINT	PAPER
P.H. 016-007	[DETAILS OF CAST IRON DRAFT TUBE FOR ABOVE WHEELS.]	1918/03/06			BP	
P.H. 016-008	[DETAILS OF] HYDRAULIC COUNTER-BALANCE / FOR / 42" SWING GATE CASE, TYPE D SPECIAL ROTOR / MASSACHUSETTS COTTON MILLS / LOWELL / MASS. / HOLYOKE MACHINE CO. / WORCESTER MASS.	1918/03/04	3/4",3" & 6"=1'	H 25 1/2", W 35"	BLUEPRINT	PAPER

P.H. 016-009	DETAILS OF 3-42" [TYPE] D-SPECIAL VERTICAL HERCULES TURBINES AND GOVERNOR CONNECTIONS / FOR THE / MASSACHUSETTS COTTON [MILLS] / LOWELL, MASS.	1918/03/21	3/4"=1'	H 35", W 50 1/2"	BLUEPRINT	PAPER
P.H. 016-010	[GENERAL] PLAN OF 3-42" TYPE D SPECIAL VERTICAL HERCULES TURBINE[S & GOVERNOR CONNECTION] / FOR THE / MASSACHUSETTS COTTON [MILLS] / LOWELL, MASS.	1918/05/22	NONE	H 32", W 52"	BLUEPRINT	PAPER
P.H. 016-011-[COPY 1]	CHUTE CASE FOR [3-] 42" R.H. [TYPE] D SPECIAL / [VERTICAL] HERCULES HY-TURBINE[S] [& GOVERNOR CONNECTION] / HOLYOKE MCH. CO. WORCESTER, MASS.	1918/01/05	3"& 1 1/2"=1'	H 87.5, W 119.4 CM	BLUEPRINT	PAPER
P.H. 016-011-[COPY 2]	CHUTE CASE FOR [3-] 42" R.H. [TYPE] D SPECIAL / [VERTICAL] HERCULES HY-TURBINE[S] [& GOVERNOR CONNECTION] / HOLYOKE MCH. CO. WORCESTER, MASS.	1918/01/05	3"& 1 1/2"=1'	H 87.5, W 119.4 CM	BLUEPRINT	PAPER
P.H. 016-011-[COPY 3]	ELEVATION OF 42" R.H. D / SPECIAL HERCULES HY-TURBINE GATE,	UNDATED	3"=12"	H 40, W 29.5 CM	GRAPHITE, COLORED PENCIL	PAPER
P.H. 016-012	[WHEEL HOUSE FOR 10' TURBINES AT MASS. MILLS.]	1856/07/04			BP	
P.H. 016-013	MASS. COTTON MILLS.-42" D VERT. WHEELS / SKETCH OF CAST IRON RINGS SET IN CONCRETE.	1918/01/30	1"=1'	H 41, W 59.2 CM	BLUEPRINT	PAPER
P.H. 016-014	[OUTSIDE] SKETCH OF 42" D, CYLINDER GATE VERTICAL HERCULES TURBINE / FOR THE / MASSACHUSETTS COTTON MILLS / LOWELL, MASS.	1918/07/17	1"=1'	H 89, W 45.2 CM	BLUEPRINT	PAPER
P.H. 016-015	OUTLINE. [SKETCH OF GENERATOR BY G. E. CO.]	1917/08/27	NONE	H 60.2, W 91.5 CM	BLUEPRINT	PAPER

P.H. 016-016	DISTRIBUTION OF POWER / MASS. COTTON MILLS-LOWELL, MASS.	1919/03/05	NONE	H 53.3, W 87.8 CM	BLUEPRINT	PAPER
P.H. 016-017	DIAGRAM / SHOWING LOSSES OF MASS. 4, 5, & 6 WHEELS / FROM EASTERN CANAL TO CONCORD RIVER.	1918/12/31	NONE	H 40.9, W 59.8 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 017-001	[PLAN & ELEVATION OF PRESCOTT MILL.]	1918/08/10	1"=10'		BP	
P.H. 017-002	[PLAN & ELEVATION OF PRESCOTT MILL.]	1918/08/10			BP	
P.H. 017-003	[ELEVATION OF ARCHES UNDER MILL WALL.]	1918/10/12	1"=10'		BP	
P.H. 017-004	[GENERAL ARRANGEMENT OF 2-33" TYPE D, CYLINDER GATE HERCULES VERTICAL TURBINES.]	1919/06/24			BP	
P.H. 017-005	[GENERAL ARRANGEMENT OF 3-33" TYPE D, CYLINDER GATE HERCULES VERTICAL TURBINES.]	1918/12/10			BP	
P.H. 017-006	[PROPOSED 33" D, HERCULES.]	1918/08/31			BP	
P.H. 017-007	[SKETCH SHOWING GRADE IN VICINITY OF POWER HOUSE.]	1919/02/17			BP	
P.H. 017-008	[CONCORD RIVER IN VICINITY OF PRESCOTT SHOWING CONTOURS.]	1919/06/00			BP	
P.H. 017-009	[SKETCH SHOWING LOSSES FROM PRESCOTT UPPER GAUGE TO CONCORD RIVER GAUGE.]	UNDATED			BP	
P.H. 017-010	[SKETCH ELEVATION LOOKING DOWN STREAM.]	UNDATED			BP	
P.H. 017-011	[REPAIRS TO WOOD FLUME.]	1919/03/17			BP	
P.H. 017-012	[SPECIAL HIGH SETTING FOR HOLYOKE TEST OF 33" D.]	1917/05/15			BP	
P.H. 017-013	[GENERAL LAYOUT PRESCOTT WATERWAYS.]	1918/06/27			BP	
P.H. 017-014	[PROPOSED LAYOUT OF 10" CENT. PUMP IN NEW WHEEL HOUSE.]	1919/02/06			BP	

P.H. 017-015	[PLAN, ELEVATION & SECTION OF WHEEL ROOM.]	1895/00/00	BP
P.H. 017-016	[DETAIL OF VENT PIPE FOR 33" D, VERTICAL WHEELS.]	1919/02/27	BP
P.H. 017-017	[PROPOSED DRAFT TUBES FOR PRESCOTT NOS. 1, 2 & 3.]	1918/09/00	BP
P.H. 017-018	[LOCATION OF VENT PIPE FOR WHEELS 1 & 2.]	1919/02/28	BP
P.H. 017-019	[GENERAL PLAN & DATA FOR MASSACHUSETTS MILLS (PRESCOTT SIDE) NOS. 1, 2 & 3 WHEELS, 33" TYPE D, HERCULES.]	1918/02/28	BP
P.H. 017-020	[ARRANGEMENT OF GOVERNORS & EXCITER DRIVE.]	1918/11/27	BP
P.H. 017-021	[DETAILS OF 3-33" TYPE D, CYLINDER GATE HERCULES VERTICAL TURBINES.]	1918/10/31	BP
P.H. 017-022	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT-CROSS SECTION.]	1918/11/03	BP
P.H. 017-023	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT-CROSS SECTION.]	1918/11/03	BP
P.H. 017-024	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT-LONGITUDINAL & PLANE SECTION.]	1918/11/03	BP
P.H. 017-025	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT-MAIN FLOOR & GOVERNOR CHAMBER.]	UNDATED	BP

P.H. 017-026	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT- ARCHITECTURAL ELEVATIONS.]	1919/02/00			BP	
P.H. 017-027	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT- ARCHITECTURAL ELEVATIONS.]	1919/02/00			BP	
P.H. 017-028	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT] SWICHBOARD WIRING / BACK VIEW / MASS. COTON MILLS / LOWELL, MASS.	1920/01/12	NONE	H 60, W 89 CM	BLIEPRINT. COLORED PENCIL	PAPER
P.H. 017-029	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT] SWITCHBOARD / (FRONT VIEW) / MASS. COTTON MILLS / LOWELL, MASS.	1919/12/06	NONE	H 60, W 89 CM	BLUEPRINT	PAPER
P.H. 017-030	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT OUTLINE OF GENERATOR.]	UNDATED			BP	
P.H. 017-031	[GENERAL ELECTRIC PLANS FOR HYDRO ELECTRIC PLANT FOR PRESCOTT MILLS. HYDRO-ELECTRIC PLANT.] ARRANGEMENT OF SWITCHING APPARATUS MASS. COTTON MILLS / LOWELL, MASS.	1919/12/01	NONE		BLUEPRINT	

P.H. 017-032	[PLAN OF FIVE TON CRANE & RUNWAY FOR MASSACHUSETTS COTTON MILLS POWER HOUSE BY EASTERN BRIDGE & STRUCTURAL CO.] HOLYOKE TEST NO. 2363 REDUCED TO ONE FOOT HEAD. / CURVES FOR 30"	UNDATED			BP	
P.H. 018-[020]	IMPROVED SPECIAL SAMSON / TYPE Z / R.H.	UNDATED	NONE	H 28, W 40.8 CM	BLUEPRINT	PAPER
P.H. 018-001	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL. PLAN OF 30" TYPE Z] RUNNER DETAIL- / DRAWING NO. 23590-SHOP NO. AB11235.	1918/04/18	3"=1'	H 34.3, W 36 CM	BLUEPRINT, INK	PAPER
P.H. 018-002	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] HAMILTON MFG. CO. [WITH] 39" [TYPE] Z [LEFFEL WHEEL]. / [PLAN OF] RUNNER 39" TYPE "Z" L.H.	1918/04/18	3"=1'	H 45.6, W 40 CM	BLUEPRINT	PAPER
P.H. 018-003	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL. PLAN OF 36" TYPE Z, RUNNER.]	1919/00/00				
P.H. 018-004	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] HAMILTON MFG. CO. [WITH 39" TYPE Z, LEFFEL WHEEL. (S. MORGAN SMITH WHEEL PLAN).]	1919/00/00	NONE	H 86.2, W 70.4 CM	BLUEPRINT	PAPER

P.H. 018-005	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL.] UNIT NO.2. / [UNIT NO. 9 CROSSED OUT] ONE 39," TYPE Z, VERTICAL SHAFT TURBINE, / FOR / HAMILTON MFG. CO. / LOWELL, MASS.	1918/04/08	3/18"=1'	H 64.2, W 91.4 CM	BLUEPRINT	PAPER
P.H. 018-006	UNIT NO. 2 / ONE 39" TYPE Z VERTICAL SHAFT TURBINE / FOR / HAMILTON MFG. CO. / LOWELL, MASS.	1918/04/17	1"=1'	H 86.7, W 109.4 CM	BLUEPRINT	PAPER
P.H. 018-007	PLAN # 8. / ONE TYPE "Z" VERTICAL SHAFT TURBINE [36"] / FOR / HAMILTON M'F'G. CO., / LOWELL, MASS.	1918/04/15	1/2"=1'	H 53.3, W 87 CM	BLUEPRINT	PAPER
P.H. 018-008	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL. DRAFT TUBE DETAILS] UNIT NO. 8 / ONE 36" TYPE Z VERTICAL SHAFT TURBINE. / FOR / HAMILTON MFG. CO., / LOWELL, MASS.	1918/04/15	3/4"=1'	H 41.5, W 85 CM	BLUEPRINT	PAPER
P.H. 018-009	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT] ONE 39" TYPE Z VERTICAL SHAFT TURBINE [WITH 39" TYPE Z, LEFFEL WHEEL. DRAFT TUBE DETAILS UNIT NO. 9] / FOR / HAMILTON M'F'G. CO. / LOWELL, MASS.	1918/04/12	3"=1'	H 48.2, W 65 CM	BLUEPRINT	PAPER
P.H. 018-010	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR] HAMILTON MFG. CO., LOWELL, MASS. / [WITH 39" TYPE Z, LEFFEL WHEEL] PRELIMINARY LAYOUT / FOR / PROPOSED HYDRO-ELECTRIC POWER [HOUSE].	1917/11/09	1/8"=1'	H 61.4, W 106.7 CM	BLUEPRINT	PAPER

P.H. 018-011	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL.] SHEET NO. 8 / LONGITUDINAL SECTION. / EXTENSION TO MILL NO. 7. / HAMILTON MFG. CO.	1919/05/28	1/4"=1'	H 76.2, W 159 CM	BLUEPRINT	PAPER
P.H. 018-012	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL.] SHEET NO.12 / SECTIONS THRU RACES / EXTENSION TO MILL NO. 7. / HAMILTON MFG. CO.	1919/05/28	1/4"=1'	H 76.2, W 159.5 CM	BLUEPRINT	PAPER
P.H. 018-013	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL.] SHEET NO.2. / FOUNDATION & FIRST FLOOR PLAN. / EXTENSION TO MILL NO. 7 / HAMILTON MFG. CO.	1919/05/28	1/8"=1'	H 76.2, W 152.5 CM	BLUEPRINT	PAPER
P.H. 018-014	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT] NEW WHEEL SETTINGS TO REPLACE WHEELS 1 TO 7 [WITH 39"] TYPE Z, LEFFEL / [FOR] HAMILTON MFG. CO. / ARTHUR T. SAFFORD, ENG'R. / 66 BROADWAY, LOWELL, MASS.	1919/06/28	1"=40'	H 61, W 79 CM	GRAPHITE	TRACING PAPER
P.H. 018-015	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT] NEW WHEEL SETTINGS TO REPLACE WHEELS NOS. 1 TO 7 INC. / HAMILTON MFG. CO. [WITH 39" TYPE Z, LEFFEL WHEEL. DETAIL PLAN OF # 14] / ARTHUR T. SAFFORD, ENG'R. / 66 BROADWAY, LOWELL, MASS.	1919/06/26	1/8"=1'	H 61, W 79 CM	GRAPHITE	TRACING PAPER

P.H. 018-016	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT] NEW WHEEL SETTINGS TO REPLACE WHEELS NOS. 1 TO 7 INC. / HAMILTON MFG. CO. / [WITH 39" TYPE Z, LEFFEL WHEEL. ELEVATIONS & SECTIONS AS IN # 14] ARTHUR T. SAFFORD ENG'R. / 66 BROADWAY, LOWELL, MASS.	1919/06/25	1/8"& 1/4"=1'	H 61, W 79 CM	GRAPHITE	TRACING PAPER
P.H. 018-017	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT FOR HAMILTON MFG. CO. WITH 39" TYPE Z, LEFFEL WHEEL] 36"-[TYPE] Z- / EACH BUCKET AREA 85 SQ." 15 BUCKETS=121775 SQ." TOTAL AREA / HAMILTON M'F'G. CO. / AB.11235.	UNDATED	NONE	H 10.7, W 85 CM	INK	PAPER
P.H. 018-018	[PLAN FOR PROPOSED HYDRO-ELECTRIC UNIT WITH] 39" TYPE Z AB1123.5 [LEFFEL WHEEL] / HAMILTON MFG. CO. / EACH BUCKET 100 SQ." AREA. / 15 BUCKETS=1500 SQ." / 13 FT. HEAD-133 R.P.M.-93.3% COEFFICIENT OF DISCHARGE=283 C.F.S. / [SEE NOTES]	1918/06/17	NONE	H 11.2, W 95.4 CM	INK	PAPER
P.H. 018-019	30"-Z AB 11235 / ORIGINAL TEST RUNNER. / EACH BUCKET 59 SQ." AREA.	UNDATED	NONE	H 8.6, W 73.5 CM	INK	PAPER
P.H. 019-[09]	PROPOSED LAYOUT FOR FIRE PUMP / AT # 5 & # 6 WHEEL HOUSE HYDRO-ELEC. STATION / MERRIMACK MFG. CO., LOWELL, MASS.	1921/01/10	1/2"=1'	H 76.2, W 148.6 CM	BLUEPRINT	PAPER
P.H. 019-01	DETAILS OF / 10" CENTRIFUGAL PUMP / [FOR THE] LAWRENCE MFG. CO.	1919/12/24	1/4"=1'	H 73.5, W 120.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 019-02	PLAN OF 12 INCH FEED PIPE / FOR THE / NEW CENTRIFUGAL FIRE PUMP / IN / THE PUMP HOUSE / THE LAWRENCE MFG. CO., LOWELL, MASS.	1919/11/00	1/4"=1'	H 66, W 114.4 CM	BLUEPRINT, GRAPHITE	PAPER
P.H. 019-03	DETAILS OF / 10" CENTRIFUGAL PUMP / AT / BOOTT MILLS.	1920/11/01	1/4"=1'	H 48, W 63 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 019-04	PLAN SHOWING / PIPING OF 10" CENTRIFUGAL PUMP / AND 24" CONDENSER LINE AT / BOOTT MILLS.	1920/11/09	1"=10'	H 83.6, W 107 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
P.H. 019-05	BOOTT FIRE PUMP / SUCTION SCREEN ON 24" CONDENSER PIPE / IN NO. 3-4-5 PENSTOCKS.	1920/09/12	1 1/2"=1'	H 28, W 21.5 CM	INK, COLORED INK, WATER COLOR	TRACING PAPER
P.H. 019-06	DRAWING SHOWING / DELAVAL 10" CENTRIFUGAL PUMP / AT THE / LAWRENCE SECTION.	1921/05/00	1/4"=1'	H 56.2, W 104.8 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 019-07	PLAN SHOWING LOCATION OF / 10" CENTRIFUGAL PUMP INSTALLED OCT. 1919 / IN PRESCOTT POWER HOUSE OF / MASSCAHUSETTS COTTON MILLS.	1919/11/14	1/4"=1'& 1"=200'	H 75.5, W 120 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 019-08	LOCATION OF / 8" CENTRIFUGAL PUMP / KITSON PLANT OF SACO LOWELL SHOPS.	1919/12/12	1/2"& 3/4"=1'	H 87.6, W 104.1 CM	INK, WATER COLOR, GRAPHITE, COLORED INK	DRAFTING CLOTH
P.H. 020	[BROADWAY BRIDGE OVER PAWTUCKET CANAL. (WORKING PLANS).]	1919/00/00				

P.H. 021-[021]	DETAIL OF NOSE / OF UPSTREAM PIER / FILE 1010.	UNDATED	1 1/2"=1'	H 32.5, W 21.5 CM	INK, COLORED INK	TRACING PAPER
P.H. 021-[022]	MASS. COTTON MILLS / LOWELL MASS. / SKETCH SHOWING PROGRESS ON NO. 12 GATE / ARTHUR T. SAFFORD CONSULTING ENGINEER / FILE 1010.	1921/06/20	NONE	H 30.5, W 45 CM	INK, COLORED INK	PAPER
P.H. 021-[023]	PUMP FOR TYPE T GOVERNOR / NO. 12 WHEEL.	1939/06/06	HALF SIZE	H 50, W 65 CM	BLUE LINE PRINT	PAPER
P.H. 021-[024]	DETAIL OF GIRDER AT CL OF COL.	UNDATED	1/2"=1', 1/4"=1'	H 57, W 90 CM	GRAPHITE	TRACING PAPER
P.H. 021-[025]	[UNTITLED PLAN].	UNDATED	1/2"=1'	H 54.5, W 77 CM	GRAPHITE	TRACING PAPER
P.H. 021-[026]	GENERAL PLAN / SHOWING LOCATION OF GATES / PRESENT STRUCTURES ONLY SHOWN.	UNDATED	1"=10'	H 69, W 107 CM	GRAPHITE	TRACING PAPER
P.H. 021-001	FILE 1010 / MASSACHUSETTS COTTON MILLS / NO.12 UNIT-GENERAL PLAN	1920/08/00	1/4"=1'	H 54.5, W 76 CM	BLUEPRINT	PAPER
P.H. 021-002	FILE 1010 / MASSACHUSETTS COTTON MILLS / NO.12 UNIT, REINFORCEMENT OF PENSTOCK.	1920/09/24	1/2"=1'	H 69.5, W 109.4 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 021-003	FILE 1010 / MASSACHUSETTS COTTON MILLS / NO.12 UNIT, DETAILS OF SLAB REINFORCEMENT, ANCHOR BOLTS, MANHOLES & DRAINS.	1920/10/14	3/4"& 1/2"=1'	H 53.7, W 77.5 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 021-004	MASSACHUSETTS COTTON MILLS / NO.12 UNIT / DRAFT TUBE DETAILS [(TURNER, MILLSPAUGH & SAFFORD)].	1920/08/27	1"=1'	H 59, W 80 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 021-005	MASSACHUSETTS COTTON MILLS. / NO.12 UNIT-DRAFT TUBE. / DETAILS OF CAST IRON CURB RING.	1920/08/28	FULL SIZE, 1"=1'	H 57.4, W 80 CM	INK, GRAPHITE	DRAFTING CLOTH

P.H. 021-006	MASSACHUSETTS COTTON MILLS. / NO.12 UNIT-DRAFT TUBE. DETAILS OF CAST IRON BELL.	1920/08/22	FULL SIZE	H 57.4, W 80 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 021-007	MASSACHUSETTS COTTON MILLS / NO.12 UNIT-DRAFT TUBE / DETAILS OF CAST IRON CURB RING / ARTHUR T. SAFFORD CONSULTING ENG'R.	1920/09/00	1"=1',FULL SIZE	H 57.3, W 80 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 021-008	FILE 1010 / MASSACHUSETTS COTTON MILLS / NO.12 UNIT BEAM & GIRDER DETAILS.	1920/09/24	1/2"=1'	H 54, W 77.5 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 021-009	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / NO.12 UNIT-PLAN & SPECIFICATIONS / FOR GIRDER OVER GENERATOR ROOM / ARTHUR T. SAFFORD-CONSULTING ENGINEER.	1920/09/16	SEE NOTES	H 56.4, W 78 CM	GRAPHITE	TRACING PAPER
P.H. 021-010	MASSACHUSETTS COTTON MILLS / RING FOR GENERATOR SUPPORT # 12 UNIT / ARTHUR T. SAFFORD CONS. ENG'R.	1920/06/11	1"=1'	H 54, W 84 CM	INK, COLORED INK, GRAPHITE	TRACING PAPER
P.H. 021-012	MASSACHUSETTS COTTON MILLS / PRESCOTT PENSTOCK REPAIRS.	1921/03/16	1"=10'& 1"=4'	H 53.5, W 84 CM	INK, COLORED INK	TRACING PAPER
P.H. 021-013	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / HEAD GATES FOR NO.12 UNIT / ARTHUR T. SAFFORD CONSULTING ENGINEER / TURNER, MILLSPAUGH & SAFFORD.	1921/04/11-20	SEE NOTES	H 70, W 109.2 CM	INK, WATER COLOR	DRAFTING CLOTH
P.H. 021-014	MASSACHUSETTS COTTON MILLS-LOWELL, MASS. / HEADGATES FOR NO. 12 UNIT / ARTHUR T. SAFFORD-CONSULTING ENGINEER.	1921/04/20	3/4"& 1 1/2"=1'	H 54.3, W 76.8 CM	INK, WATER COLOR	DRAFTING CLOTH

P.H. 021-015	GIRDER DETAILS-EASTERN BRIDGE & STRUCTURAL CO.	1920/10/08	NONE	H 61, W 94 CM	BLUEPRINT	PAPER
P.H. 021-016	[24" BAND BRAKE-S. MORGAN SMITH CO.]	1921/05/18				
P.H. 021-017	OUTLINE [OF GENERATOR BY GENERAL ELEC. CO.].	1920/06/03	NONE	H 30.5, W 46 CM	BLUEPRINT	PAPER
P.H. 021-018	FILE 1010 / MASSACHUSETTS COTTON MILLS / [SKETCH PLAN OF] WHEEL ROOM FLOOR SLABS.	1921/01/17	NONE	H 42, W 53.4 CM	INK, GRAPHITE	PAPER
P.H. 021-019-[COPY 1]	OUTLINE [OF HYDRO-ELECTRIC GENERATOR.]	1920/07/30	NONE	H 46, W 61 CM	BLUEPRINT	PAPER
P.H. 021-019-[COPY 2]	OUTLINE [OF HYDRO-ELECTRIC GENERATOR.]	1920/07/30	NONE	H 46, W 61 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 021-019-[COPY 3]	OUTLINE [OF HYDRO-ELECTRIC GENERATOR.]	1920/07/30	NONE	H 46, W 61 CM	BLUEPRINT	PAPER
P.H. 021-020	[PRELIMINARY] SKETCH OF / NO.12 UNIT.	UNDATED	NONE	H 86.2, W 54.7 CM	BLUEPRINT	PAPER
P.H. 022-[A]	[MAP OF NEW ENGLAND SHOWING STREAM GAGING STATIONS. COMMITTEE ON RUN-OFF, BOSTON SOCIETY OF CIVIL ENGINEERS.]	1921/03/18				
P.H. 022-[B]	McKINLEY'S WALL OUTLINE MAPS. NEW ENGLAND. [UNTITLED MAP.]	1908/00/00	NONE	H 112, W 81.5 CM	INK	PAPER
P.H. 022-[B]-[COPY 1]	[MERRIMACK RIVER D. A. MAP ON TRACING CLOTH, FOR USE IN MAKING PHOTOSTATS, WHITE PRINTS, ETC.] [McKINLEY'S WALL OUTLINE MAPS. NEW ENGLAND.]	UNDATED	NONE	H 110, W 79 CM	INK	DRAFTING CLOTH

P.H. 022-[B]-[COPY 2]	[UNTITLED MAP.] [MCKINLEY'S WALL OUTLINE MAPS. NEW ENGLAND.]	UNDATED	NONE	H 108.5, W 76 CM	BLUEPRINT	PAPER
P.H. 022-[C]	WATER STORAGE MAP / OF / MERRIMACK RIVER DRAINAGE BASIN / PROPRIETORS OF THE LOCKS AND CANALS. COMMONWEALTH OF MASSACHUSETTS / METR.[OPOLITAN] DIST.[RICT] WATER SUPPLY COMMISSION / MAP SHOWING /	1922/03/00	1"=2 1/2MI	H 169, W 106 CM	INK, COLORED INK	CLOTH BACKED PAPER
P.H. 022-[D]-[COPY 1]	MERRIMACK RIVER WATERSHED / ABOVE TYNG'S ISLAND. COMMONWEALTH OF MASSACHUSETTS / METR.[OPOLITAN] DIST.[RICT] WATER SUPPLY COMMISSION / MAP SHOWING /	1930/04/07	3/4"=2MI	H 139, W 85 CM	BLUE LINE PRINT	PAPER
P.H. 022-[D]-[COPY 2]	MERRIMACK RIVER WATERSHED / ABOVE TYNG'S ISLAND.	1930/04/07	3/4"=2MI	H 139, W 85 CM	BLUE LINE PRINT	PAPER
P.H. 023-[A]-[01]	[MAPS OF POWER STATIONS & TRANSMISSION LINES FOR PUBLIC SERVICE IN STATES OF NEW YORK & PENNSYLVANIA, ALSO N. H. AND VT.] STATE OF NEW YORK / STATIONS AND TRANSMISSION LINES USED IN PUBLIC SERVICE / 1919.	1921/00/00	1:500,000	H 111, W 162.5 CM	INK, COLORED INK	PAPER
P.H. 023-[A]-[02]	[MAPS OF POWER] STATIONS AND TRANSMISSION LINES USED IN PUBLIC SERVICE / 1920 [IN PENNSYLVANIA, ALSO N. H. AND VT.].	1921/00/00	1:500,000	H 91.5, W 131.5 CM	INK, COLORED INK	PAPER

P.H. 023-[A]-[03]	[MAPS OF POWER STATIONS & TRANSMISSION LINES FOR PUBLIC SERVICE IN STATES OF NEW YORK & PENNSYLVANIA, ALSO N. H. AND VT.] ENERGY SUPPLY / ELECTRIC POWER SYSTEMS ENGAGED IN PUBLIC SERVICE [IN VERMONT AND NEW HAMPSHIRE].	1919/00/00	1:500,000	H 76, W 56 CM	INK, COLORED INK	PAPER
P.H. 023-[B]	[BLUEPRINT] MAP SHOWING / TERRITORY SERVED / BY THE / PUBLIC SERVICE COMPANY / OF NEW HAMPSHIRE.	1927/01/06	NONE	H 93.5, W 57 CM	BLUEPRINT	PAPER
P.H. 023-[C]	STATE OF MAINE.	1922/00/00	1:500,000	H 106, W 74 CM	INK, COLORED INK	PAPER
P.H. 023-[D]	STATE OF MAINE / STATIONS AND TRANSMISSION LINES USED IN PUBLIC SERVICE IN 1919.	1922/00/00	1:500,000	H 106, W 76 CM	INK, COLORED INK	PAPER
P.H. 023-[E]	STATIONS AND TRANSMISSION LINES USED IN PUBLIC SERVICE IN 1919.	1922/00/00	1:500,000	H 123, W 102 CM	INK, COLORED INK	CLOTH BACKED PAPER
P.H. 023-[F]	STATIONS AND TRANSMISSION LINES USED IN PUBLIC SERVICE IN 1919.	1922/00/00	1:500,000	H 123, W 102 CM	INK, COLORED INK	CLOTH BACKED PAPER
P.H. 023-[G]-[COPY 1]	COMMONWEALTH OF MASSACHUSETTS / COMMISSION ON WATERWAYS AND PUBLIC LANDS / MAP OF / MASSACHUSETTS.	1917/00/00	1:250,000	H 80, W 127 CM	LITHO., INK, COLORED INK	PAPER
P.H. 023-[G]-[COPY 2]	COMMONWEALTH OF MASSACHUSETTS / COMMISSION ON WATERWAYS AND PUBLIC LANDS / MAP OF / MASSACHUSETTS.	1917/00/00	1:250,000	H 80, W 127 CM	LITHO., INK, COLORED INK	PAPER

P.H. 023-[G]-[COPY 3]	COMMONWEALTH OF MASSACHUSETTS / COMMISSION ON WATERWAYS AND PUBLIC LANDS / MAP OF / MASSACHUSETTS.	1917/00/00	1:250,000	H 80, W 127 CM	LITHO., INK, COLORED INK	PAPER
P.H. 023-[H]-[01]	STATE OF MAINE / COMPLIED FROM U.S. GEOLOGICAL SURVEY, U.S. COAST AND GEODETIC / SURVEY, U.S. BOUNDARY COMMISSION AND VARIOUS / STATE AND PRIVATE MAPS.	1922/11/00	1"=5MI	H 89.2, W 127.7 CM	LITH., COLORED INK	PAPER
P.H. 023-[H]-[02]	[STATE OF MAINE / COMPILED FROM U.S. GEOLOGICAL SURVEY, U.S. COAST AND GEODETIC / SURVEY, U.S. BOUNDARY COMMISSION AND VARIOUS / STATE AND PRIVATE MAPS.]	UNDATED	NONE	H 89.2, W 127.7 CM	LITH., COLORED INK	PAPER
P.H. 024-001	PLAN OF LAND BELOW / FIRST STREET [& THE RIVER] / SHOWING THE / PROPOSED BOULEVARD / [&] CONTOURS [OF LAND] TAKEN APRIL 1914 BY CITY.	1914/00/00	1"=50'	H 104, W 201 CM	INK, COLORED INK, GRAPHITE, COLORED PENCIL, WATER COLOR	PAPER
P.H. 024-002-[A]	PLAN & SECTIONS SHOWING / "TAKING" FOR / LOWELL-LAWRENCE BOULEVARD / & "WHAT IS LEFT" / PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER, LOWELL, MASS.	1935/05/06	1"=40'& 10'	H 76.2, W 187.4 CM	INK, WATER COLOR, COLORED PENCIL	DRAFTING CLOTH
P.H. 024-002-[B]	PLAN & SECTIONS SHOWING / "TAKING" FOR / LOWELL-LAWRENCE BOULEVARD / & "WHAT IS LEFT."	1935/05/06	1"=10'& 40'	H 79.5, W 187.2 CM	BLACK LINE PRINT	CLOTH BACKED PAPER

P.H. 024-004	[LOWELL-LAWRENCE BOULEVARD, PENCIL TRACING COPIED FROM BLUEPRINT AT CITY ENGINEER'S OFFICE, 1922 LAYOUT, SHEET 3 OF 4 SHEETS FROM STATION 26 TO 41.]	1922/00/00	1"=40'			
P.H. 024-005	[LOWELL-LAWRENCE BOULEVARD, PENCIL TRACING COPIED FROM BLUEPRINT AT CITY ENGINEER'S OFFICE, 1922 LAYOUT, SHEET 4 OF 4 SHEETS FROM STATION 40 TO 52.]	1922/00/00	1"=40'			
P.H. 024-006	[PLAN OF] LOWELL-LAWRENCE BOULEVARD [(PENCIL DRAWING)] / FROM READ ST. TO DRACUT LINE / LOWELL, MASS. / COPIED FROM PLAN IN CITY ENGINEER'S OFFICE.	1936/09/00	1"=50'	H 96.5, W 220 CM	GRAPHITE	DRAFTING CLOTH
P.H. 025-001	[U. S. G. S. MAPS OF VARIOUS STATES] STATE OF NEVADA.	1922/00/00	1:5,000,000	H 162.5, W 112 CM	LITHOGRAPH	PAPER
P.H. 026-[009]	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / IN VICINITY OF / THORNDIKE ST., BRIDGE.	1921/04/00	1"=50'	H 24, W 49 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-[010]	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LOTS / BETWEEN / NORTHERN CANAL, PAWTUCKET / PERKINS AND TUCKER ST'S.	1921/04/00	1"=50'	H 42, W 59 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-[011]	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOT NO. 105. / BETWEEN / COLONIAL AVE., BEAVER BROOK / AND RIVER.	1921/04/00	1"=50'	H 30, W 63 CM	INK, COLORED PENCIL	DRAFTING CLOTH

P.H. 026-[012]	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOTS NO. 3 & 3-A / ON SOUTHERLY SIDE OF / PAWTUCKET CANAL.	1921/04/00	1'=40'	H 37.5, W 62.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-001	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOT NO. 103-H. / BETWEEN / RIVERSIDE ST., AND COLONIAL AVE., / & / COLONIAL AVE., AND RIVER.	1921/04/00	1"=100'	H 40.5, W 58.5 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-002	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOTS NO. 5 & 6 / ON SOUTHERLY SIDE OF / PAWTUCKET CANAL / BETWEEN / RED BRIDGE AND SCHOOL ST.	1921/04/00	1"=40'	H 46, W 87 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-003	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOTS NO. 84 & 85 / ON / SOUTHERLY SIDE OF RIVER / ALONG / STACKPOLE AND EAST MER'K ST'S.	1921/04/00	1"=100'	H 38, W 116 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-004	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOTS NO. 87 & 88 / BETWEEN / LAKEVIEW AVE. AND RIVER.	1921/04/00	1"=50'	H 38, W 116 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-005	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOTS NO.95 ,96 & 96-A / ON NORTHERLY SIDE OF RIVER / BELOW BRIDGE ST.	1921/04/00	1"=100'	H 55.4, W 117 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-006	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / ALONG PAWTUCKET CANAL / BELOW SCHOOL STREET.	1921/04/00	1"=40'	H 46, W 70 CM	INK, COLORED PENCIL	DRAFTING CLOTH

P.H. 026-007	[TRACING OF LAND PLANS.] PLAN OF LOCKS & CANALS LAND / LOTS NO. 7 & 14 / BETWEEN / BROADWAY & N. & L. R. R.	1921/04/00	1"=40'	H 49, W 73.8 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 026-008	[TRACING OF LAND PLANS.] PLAN OF LAND / BELONGING TO / PROPS. LOCKS & CANALS ON MERR'K RIVER / LOWELL, MASS. / SHOWING PRESENT POSSIBILITIES FOR / LAYING OUT BUILDING LOTS.	1922/02/00	1"=50'	H 49.5, W 93 CM	INK	DRAFTING CLOTH
P.H. 027-[027]	PRINT 24969 - / - I. P. MORRIS -.	SEE NOTES	NONE	H 55.4, W 75 CM	GRAPHITE	PAPER
P.H. 027-[028]	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION.	1923/06/05	NONE	H 28, W 48.5 CM	GRAPHITE, INK	PAPER
P.H. 027-[029]	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION.	1923/06/11	NONE	H 28, W 48.5 CM	GRAPHITE, INK	PAPER
P.H. 027-[030]	AMOSKEAG MANUFACTURING COMPANY / HORESPOWER DEVELOPED.	1923/06/05-11	NONE	H 26, W 27 CM	INK, GRAPHITE	PAPER
P.H. 027-[031]	[AMOSKEAG MFG. CO. ORIGINAL DATA AND COMPUTATION TEST ON NEW HYDRO STA. WHEELS # 2 & 3 / JUNE 5 & 11, 1923.]	1923/06/05-11	NONE	H 28, W 49.5 CM	GRAPHITE, INK	PAPER
P.H. 027-[032]	FIVE GATES OPENING, SIX GATES OPENING.	1923/06/22	NONE	H 14, W 21.5 CM	GRAPHITE	PAPER
P.H. 027-[033]	[UNTITLED.] [AMOSKEAG MFG. CO. ORIGINAL DATA AND COMPUTATION TEST ON NEW HYDRO STA. WHEELS # 3 & 3 / JUNE 5 & 11, 1923.]	1923/06/22	NONE	H 14, W 21.5 CM	GRAPHITE	PAPER

P.H. 027-[034]	POWER OUTPUT - AMOSKEAG TEST - USING G. E. STANDARD CURVES.	1923/07/00	NONE	H 28, W 21.5 CM	GRAPHITE	PAPER
P.H. 027-[035]-[A]	PRICE MEASUREMENT. P.M. MEASUREMENT.	1923/06/05	NONE	H 26.7, W 20.2 CM	GRAPHITE	PAPER
P.H. 027-[035]-[B]	[PRICE MEASUREMENT.] A.M. [MEASUREMENT.]	1923/06/05	NONE	H 26.7, W 20.2 CM	GRAPHITE	PAPER
P.H. 027-[036]-[A]	PRICE MEASUREMENT, P.M.	1923/06/11	NONE	H 26.7, W 20.2 CM	GRAPHITE	PAPER
P.H. 027-[036]-[B]	VERTICAL VELOCITY CURVE DATA.	1923/06/11	NONE	H 26.7, W 20.2 CM	GRAPHITE	PAPER
P.H. 027-[037]	[UNTITLED.] [AMOSKEAG MFG. CO. ORIGINAL DATA AND COMPUTATION TEST ON NEW HYDRO STA. WHEELS # 3 & 3 / JUNE 5 & 11, 1923.]	1923/06/05-11	NONE	H 21.5, W 35.5 CM	GRAPHITE	PAPER
P.H. 027-001-A	PLAN SHOWING / AMOSKEAG MFG. COMPANY / CANAL SYSTEM, HYDRO STATION, / SOUTH STATION OIL TANKS, / TRANSMISSION LINES.	1923/02/01	1"=200'	H 41.4, W 109.4 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 027-001-B	PLAN [BLACK & WHITE PRINT] SHOWING / AMOSKEAG MFG. COMPANY / CANAL SYSTEM, HYDRO STATION, / STEAM STATIONS, OIL TANKS, / TRANSMISSION LINES.	1923/02/01	1"=200'	H 41.4, W 109.4 CM	RED LINE PRINT, COLORED PENCIL	PAPER

P.H. 027-001-C	PLAN SHOWING / AMOSKEAG MFG. COMPANY / CANAL SYSTEM, HYDRO STATION, / STEAM STATIONS, OIL TANKS, / TRANSMISSION LINES [& PROPOSED GAUGE].	1923/02/01	1"=200'	H 42.4, W 109.8 CM	BLUE LINE PRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 027-001-D	PLAN SHOWING / AMOSKEAG MFG. COMPANY / CANAL SYSTEM, HYDRO STATION[S], / STEAM STATIONS, OIL TANKS, / TRANSMISSION LINES [& LOCATION OF GAUGES].	1923/02/01	1"=200'	H 41.4, W 110 CM	BLUEPRINT, COLORED INK	PAPER
P.H. 027-002	SCHEDULE OF WATER WHEELS ON AMOSKEAG MFG. CO'S. CANALS. UPPER LEVEL [STEAM TURBINES & MOTORS].	1916/01/01	NONE	H 67.5, W 64.2 CM	BLUEPRINT	PAPER
P.H. 027-003	[TABLE OF MERRIMACK] RIVER HEIGHTS-MERRIMACK RIVER / AMOSKEAG MFG. CO.-MANCHESTER, N.H. [1895-1921]	SEE NOTES	NONE	H 60.5, W 56.6 CM	BLUE LINE PRINT, INK	PAPER
P.H. 027-004	THE / AMOSKEAG MFG. CO. / PROFILE OF CANALS & RIVER.	1923/06/05-11	NONE	H 53.4, W 114.3 CM	INK	PAPER
P.H. 027-005	AMOSKEAG MFG. CO. / LOWER WEIR & # 5 GAGES / RATING CURVE FOR MERRIMACK RIVER / A. T. SAFFORD-CONSULTING ENGR.	1923/06/00	NONE	H 53.8, W 75 CM	INK	DRAFTING CLOTH
P.H. 027-006	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION / GATE VS. HORSE POWER. / [# 2 & # 3 UNITS, PROVISIONAL] FOR EACH UNIT.	1923/06/05-11	NONE	H 25.5, W 51.4 CM	GRAPHITE	PAPER

P.H. 027-007	AMOSKEAG MFG. CO. / [GATE VS. KW, ACTUAL & EXPECTED PERFORMANCE, ONE UNIT] OUTPUT ONE UNIT NEW HYDRO STATION.	1923/06/05-11	NONE	H 25.5, W 51.4 CM	GRAPHITE	PAPER
P.H. 027-008	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION / GATE VS. HORSE POWER [# 2 & # 3 UNITS, FINAL].	1923/06/05-11	NONE	H 29, W 50.8 CM	INK	DRAFTING CLOTH
P.H. 027-009	AMOSKEAG MFG. CO. / VELOCITY DIAGRAM. / NO. 2 & NO. 3-[UNITS] HYDRO STATION.	1923/06/00	NONE	H 26.5, W 48.5 CM	INK	DRAFTING CLOTH
P.H. 027-010	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION / [DIAGRAM OF] EFFICIENCY VS. HORSEPOWER.	SEE NOTES	NONE	H 28.5, W 48.6 CM	INK	DRAFTING CLOTH
P.H. 027-011	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION / GATE VS. DISCHARGE.	1923/06/05-11	NONE	H 28.5, W 54.6 CM	INK	DRAFTING CLOTH
P.H. 027-012	AMOSKEAG MFG. CO. / TEST OF HYDRO STATION / GATE VS. HORSEPOWER / FOR EACH UNIT.	SEE NOTES	NONE	H 29.2, W 56.4 CM	INK	PAPER
P.H. 027-013-A	AMOSKEAG MFG. CO. / SECTION OF TAILRACE [FOR TEST OF JUNE 5, 1923] / BELOW HYDRO-ELECTRIC STATION / A. T. SAFFORD-CONSULTING ENGINEER / LOWELL, MASS.	1923/06/05	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-013-B	AMOSKEAG MFG. CO. / SECTION OF TAILRACE [FOR TEST OF JUNE 11, 1923] / BELOW HYDRO-ELECTRIC STATION / A. T. SAFFORD-CONSULTING ENGR. / LOWELL, MASS.	1923/06/11	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-014-A	CORRECTION CURVE[S]. IND. [FOR] WATTMETER] / NO. 16 GENERATOR-HYDRO STATION / AMOSKEAG MFG. CO.	1923/06/00	NONE	H 21.5, W 30.5 CM	INK	PAPER

P.H. 027-014-B	CORRECTION CURVE[S] IND. [FOR] WATTMETER[S] / CALIBRATED BY GENERAL ELECTRIC CO.	1923/07/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-014-C	CORRECTION CURVES IND. [FOR] WATTMETERS / CALIBRATED BY GENERAL ELECTRIC CO.	1923/07/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-014-D	CORRECTION CURVE[S] IND. [FOR] WATTMETER[S] / NO.17 GENERATOR HYDRO STATION / AMOSKEAG MFG. CO.	1923/06/00	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-014-E	CALIBRATION [CORRECTION] CURVE[S] FOR / AMOSKEAG MFG. CO. / WESTON POLYPHASE WATTMETER[S].	SEE NOTES	NONE	H 21.5, W 30.5 CM	GRAPHITE, INK	PAPER
P.H. 027-015-A	AMOSKEAG MFG. CO. GAGE HEIGHTS [AT # 1, # 2, # 5, LOWER WEIR, # 6 &] ON RIVER & CANALS.	1923/06/00	NONE	H 45.6, W 29.2 CM	GRAPHITE	PAPER
P.H. 027-015-B	AMOSKEAG MFG. CO. / GAGE HEIGHTS-[AT # 1, # 2, # 5] LOWER WEIR & # 5 [# 6] GAGE [& RIVER]. / JUNE 5, & JUNE 11, 1923.	SEE NOTES	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-016-A	AMOSKEAG MFG. CO. / EFFICIENCY & POWER / OF AN 8 FT. BOYDEN WHEEL / ARMORY MILL 19 FT. HEAD.	1923/07/06	NONE	H 30.5, W 21.5 CM	INK	PAPER
P.H. 027-016-B	AMOSKEAG MFG. CO. / EFFICIENCY & POWER / OF A PAIR OF 36" HERCULES "B" / JEFFERSON MILLS # 1-2 OR 3-4 46 FT. HEAD.	1923/07/06	NONE	H 30.5, W 21.5 CM	INK	PAPER
P.H. 027-016-C	AMOSKEAG MFG. CO. / EFFICIENCY & POWER / OF A PAIR OF 30" HERCULES "D" / JEFFERSON MILLS # 5-6 25 FT. HEAD.	1923/07/06	NONE	H 30.5, W 21.5 CM	INK	PAPER
P.H. 027-017-A	AMOSKEAG MFG. CO. / VERTICAL VELOCITY CURVES / CURRENT METER MEASUREMENTS.	1923/06/11	NONE	H 21.5, W 30.5 CM	INK	PAPER

P.H. 027-017-B	AMOSKEAG MFG. CO. / VERTICAL VELOCITY CURVES / CURRENT METER MEASUREMENTS.	1923/06/05	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-017-C	AMOSKEAG MFG. CO. / VERTICAL VELOCITY CURVES / CURRENT METER MEASUREMENTS.	1923/06/05	NONE	H 21.5, W 30.5 CM	INK	PAPER
P.H. 027-018	EFFICIENCY CURVES / EXCLUDING FIELD & FIELD RHEOSTAT LOSSES / FOR A / A. T. B. 64-6250M-112.5-V-2300 V G. E. GENERATOR.	1923/07/05	NONE	H 30.5, W 21.5 CM	INK	PAPER
P.H. 027-019	AMOSKEAG MFG. CO. / VELOCITY CONTOURS / [IN] TAILRACE BELOW HYDRO STATION.	1923/06/00	NONE	H 21.5, W 30.5 CM	INK	TRACING PAPER
P.H. 027-020-A	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/05	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-B	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENT[S] / [AT] NEW HYDRO STATION.	1923/06/05	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-C	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENT[S] / [AT] NEW HYDRO STATION.	1923/06/05	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-D	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENT[S] / [AT] NEW HYDRO STATION.	1923/06/05	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-E	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-F	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-G	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.5, W 45.8 CM	INK	PAPER

P.H. 027-020-H	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-I	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-J	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.5, W 45.8 CM	INK	PAPER
P.H. 027-020-K	AMOSKEAG MFG. CO. / [25] CURRENT METER MEASUREMENTS / [AT] NEW HYDRO STATION.	1923/06/11	NONE	H 29.4, W 45.7 CM	INK	PAPER
P.H. 027-021-A	AMOSKEAG MFG. CO. / CURRENT METER MEASUREMENT / CROSS SECTION OF UPPER CANAL / [AT] PAPER MILL BRIDGE.	1923/06/03	NONE	H 29.4, W 45.7 CM	INK	PAPER
P.H. 027-021-B	AMOSKEAG MFG. CO. / [5] CURRENT METER MEASUREMENTS / UPPER CANAL AT / PAPER MILL BRIDGE.	1923/06/05	NONE	H 29.4, W 45.7 CM	INK	PAPER
P.H. 027-021-C	AMOSKEAG MFG. CO. / [5] CURRENT METER MEASUREMENTS / UPPER CANAL AT / PAPER MILL BRIDGE.	1923/06/11	NONE	H 29.4, W 45.7 CM	INK	PAPER
P.H. 027-022	AMOSKEAG MFG. CO. / LOWER WEIR & NO. 5 GAGES / RATING CURVE FOR MERRIMACK RIVER.	1923/06/00	NONE	H 53.2, W 76.3 CM	INK	DRAFTING CLOTH
P.H. 027-023	AMOSKEAG MFG. CO. / WHEEL & GENERAL EFFICIENCIES / NO. 2 & 3 UNITS NEW HYDRO STATION.	1923/06/00	NONE	H 27.2, W 54 CM	GRAPHITE	PAPER
P.H. 027-026	AMOSKEAG MFG. CO. / [WHEEL & GENERATOR EFFICIENCIES] UNITS # 2 & # 3.	SEE NOTES	NONE	H 26.5, W 20 CM	BLUEPRINT, GRAPHITE	PAPER

P.H. 028-[A]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1911-1916.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	CLOTH BACKED PAPER
P.H. 028-[B]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1917-1922.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	PAPER
P.H. 028-[C]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1923-1928.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	PAPER
P.H. 028-[D]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1929-1934.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	PAPER

P.H. 028-[E]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1935-1940.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	PAPER
P.H. 028-[F]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1941-1946.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	PAPER
P.H. 028-[G]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] LAKE WINNIPISEOGEE N. H. / "SCHEDULE"AND ACTUAL HEIGHTS / 1947-1952.	SEE TITLE	NONE	H 89, W 97 CM	INK, COLORED INK	PAPER
P.H. 028-[H]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] MASS. DIAGRAMS / PRECIPITATION AT PAWTUCKET DAM / LOWELL, MASS. 1826-1924.	SEE TITLE	NONE	H 86, W 85 CM	INK, COLORED INK	PAPER

P.H. 028-[I]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE…] MASS. DIAGRAMS / PRECIPITATION AT PAWTUCKET DAM / LOWELL, MASS. 1935-1939. / PROGRESSIVE AVERAGE RAINFALL IN EASTERN MASSACHUSETTS 1750 TO 1854 AND IN LOWELL 1854-1944.	SEE TITLE	NONE	H 86, W 85 CM	INK, COLORED INK	PAPER
P.H. 028-[J]	[LARGE DIAGRAMS SHOWING HEIGHTS OF LAKE WINNEPESAUKEE AND MASS. PRECIPITATION AT LOWELL (CURRENT DIAGRAMS ON WALL IN OFFICE). 1911 TO DATE.] MASS. DIAGRAMS / PRECIPITATION AT PAWTUCKET DAM / LOWELL, MASS. 1945-1954.	SEE TITLE	NONE	H 45, W 85 CM	INK, COLORED INK	PAPER
P.H. 029-01	GENERAL PLAN SHOWING / PROPERTY OF / MERRIMACK MANUFACTURING COMPANY.	1945/07/00	1"=60'	H 86.2, W 114.2 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 029-01-[COPY 1]	GENERAL PLAN SHOWING / PROPERTY OF / MERRIMACK MANUFACTURING COMPANY.	1938/07/08	1"=60'	H 86.2, W 114.2 CM	BLACK LINE PRINT, COLORED PENCIL, WATER COLOR	PAPER
P.H. 029-01-[COPY 2]	GENERAL PLAN SHOWING / PROPERTY OF / MERRIMACK MANUFACTURING COMPANY.	1938/07/08	1"=60'	H 86.2, W 114.2 CM	BLACK LINE PRINT	PAPER

P.H. 029-02	LAND IN / LOWELL, MASS. [NEAR LOWER END OF TILDEN STREET] / MERRIMACK MANUFACTURING CO. TO / BOSTON & LOWELL R. R. CORP. / F. B. ROWELL, ENG' OF REAL ESTATE.	1912/09/00	1"=20'	H 89, W 97.8 CM	INK, COLORED INK, WATER COLOR	PAPER
P.H. 029-03	LAND ON DUTTON STREET AT R. R. TRACKS / SHOWING FENCE LINE / MERRIMACK MFG. LOWELL, MASS.	1929/10/00	1"=20'	H 43.2, W 47.4 CM	BLUEPRINT	PAPER
P.H. 029-04	PLAN OF MERRIMACK M'F'G. CO'S LAND / CENTRALVILLE.	1933/02/24	1"=50'	H 44, W 82.5 CM	BLUEPRINT	PAPER
P.H. 030-[04]	ELEVATION OF POST FOR BENT "B" / [OF] CONVEYER BRIDGE / NASHUA M'F'G CO., LOWELL, MASS. / PROP. OF LOCKS & CANALS-LOWELL, MASS.	1928/06/00	3/4"& 1 1/2"=1'	H 81.9, W 69.2 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 030-01	GENERAL PLAN / OF / CONVEYER BRIDGE / NASHUA MFG. CO.	1927/05/25	1/8"=1'	H 74.3, W 107 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 030-02	PLAN AND ELEVATION [OF BUILDINGS AT BOTH ENDS OF BRIDGE] / SHOWING PART OF / STORE HOUSE "A" AND MILL NO. 6 / NASHUA MFG. CO.	1928/01/31	1/4"=1'	H 53, W 70 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 030-03-[01]	[CONSTRUCTION BLUEPRINTS FROM E. N. PIKE, ENGR., N. E. STRUCTURAL CO. & LAMSON CO.] GENERAL PLAN / OF / CONVEYOR BRIDGE / NASHUA MFG. CO.	1928/01/18	1/8"=1'	H 74, W 105.4 CM	BLUEPRINT	PAPER
P.H. 030-03-[02]	CONVEYOR BRIDGE / NASHUA MFG. CO. SUFFOLK MILLS. / LOWELL, MASS.	SEE NOTES	1/4"=1'	H 54.5, W 33.8 CM	BLUEPRINT	PAPER

P.H. 030-03-[03]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS) / LOWELL, MASS.	SEE NOTES	NONE	H 54.5, W 33.8 CM	BLUEPRINT	PAPER
P.H. 030-03-[04]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.1, W 50.8 CM	BLUEPRINT	PAPER
P.H. 030-03-[05]	CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.4, W 50.8 CM	BLUEPRINT	PAPER
P.H. 030-03-[06]	CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.4, W 50.8 CM	BLUEPRINT	PAPER
P.H. 030-03-[07]	[UNTITLED .SEE NOTES.]	SEE NOTES	NONE	H 45.8, W 30 CM	BLUEPRINT	PAPER
P.H. 030-03-[08]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[09]	CONVEYOR BRIDGE.	1928/02/03	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[10]	CONVEYOR BRIDGE.	1928/02/02	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[11]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[12]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[13]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[14]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[15]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[16]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS)	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[17]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[18]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER

P.H. 030-03-[19]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[20]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[21]	CONVEYOR BRIDGE / NASHUA MFG. CO.	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[22]	CONVEYOR BRIDGE / NASHUA MFG. CO.	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[23]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[24]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[25]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[26]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[27]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[28]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[29]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[30]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[31]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[32]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[33]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER

P.H. 030-03-[34]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[35]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[36]	CONVEYOR BRIDGE / NASHUA MFG. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 30.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[37]	LOWELL CONVEYOR BRIDGE.	SEE NOTES	NONE	H 30.5, W 91 CM	BLUEPRINT	PAPER
P.H. 030-03-[38]	SUFFOLK MILLS-NASHUA MFG. CO.	SEE NOTES	NONE	H 60.4, W 91 CM	BLUEPRINT	PAPER
P.H. 030-03-[39]	SUFFOLK MILLS-NASHUA M'F'G. CO. (SUFFOLK MILLS).	SEE NOTES	NONE	H 60.7, W 91.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[40]	CONVEYOR BRIDGE FOR / NASHUA M'F'G. CO. (SUFFOLK MILLS).	1928/02/04	NONE	H 60.7, W 91.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[41]	CONVEYOR BRIDGE FOR / NASHUA MFG. CO. (SUFFOLK MILLS).	1926/01/00	NONE	H 60.7, W 91.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[42]	CONVEYOR BRIDGE FOR / NASHUA M'F'G. CO. (SUFFOLK MILLS).	1928/01/31	NONE	H 60.8, W 91.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[43]	LOWELL CONVEYOR BRIDGE.	1928/02/04	NONE	H 60.8, W 91.5 CM	BLUEPRINT	PAPER
P.H. 030-03-[44]	CONVEYOR BRIDGE / FOR / NASHUA MFG. CO. (SUFFOLK MILLS) / LOWELL, MASS.	1928/01/20	1/4"=1'	H 64, W 116.3 CM	BLUEPRINT	PAPER
P.H. 030-03-[45]	CONVEYOR BRIDGE / FOR / NASHUA MFG. CO. (SUFFOLK MILLS) / LOWELL, MASS.	1928/01/20	1/4",3/4" & 3"=1'	H 68.2, W 116.2 CM	BLUEPRINT	PAPER
P.H. 030-03-[46]	CONVEYOR BRIDGE / FOR / NASHUA MFG. CO. (SUFFOLK MILLS.) / LOWELL, MASS.	1928/02/04	3/4"& 1/4"=1'	H 68.6, W 115 CM	BLUEPRINT	PAPER

P.H. 030-03-[47]	CONVEYOR BRIDGE / FOR / NASHUA MFG. CO. (SUFFOLK MILLS) / LOWELL, MASS.	1928/02/04	3/4"& 1/4"=1'	H 68.6, W 115.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 030-03-[48]-[COPY 1]	[BLUEPRINT SHOWING DETAIL OF POST FOR BENT "B" OF] CONVEYER BRIDGE, LOWELL.	1928/07/21	NONE	H 30.3, W 48.2 CM	BLUEPRINT	PAPER
P.H. 030-03-[48]-[COPY 2]	[BLUEPRINT SHOWING DETAIL OF POST FOR BENT "B" OF] CONVEYER BRIDGE, LOWELL.	1928/07/21	NONE	H 30.3, W 48.2 CM	BLUEPRINT	PAPER
P.H. 030-03-[49]	CROSS SECTIONS / CONVEYOR BRIDGE / NASHUA MFG. CO. LOWELL MASS.	SEE NOTES	3"=1' & 3/4"=1'	H 42, W 66 CM	BLUEPRINT	PAPER
P.H. 030-03-[50]	PROPRIETORS OF / LOCKS & CANALS-LOWELL.	1927/10/01	NONE	H 31.5, W 52 CM	BLUEPRINT	PAPER
P.H. 030-03-[51]	PLAN & ELEVATION OF / DRIVE & CWT TAKEUP- / CONVEYER # 2. [ALSO] PLAN & DETAILS-CONVEYERS / NASHUA MFG. CO. (SUFFOLK MILLS) / LOWELL-MASS.	1928/01/18	1 1/2"=1'SEE NOTES	H 62.2, W 92.7 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 030-03-[52]	PLAN & ELEVATION OF DRIVE & CWT TAKE UP- / CONVEYER # 2. [ALSO] PLAN & DETAILS-CONVEYERS / NASHUA-MFG. CO. (SUFFOLK MILLS) / LOWELL, MASS.	1927/12/29	1 1/2"=1'SEE NOTES	H 62.2, W 92.7 CM	BLUEPRINT	PAPER
P.H. 031-001	PLAN OF THE / MILL YARD / OF THE / LAWRENCE MANUFACTURING COMPANY / SHOWING / ELEVATIONS [& FLOOD HEIGHTS] IN MILL YARD.	1928/02/00	1"=40'	H 73, W 105.7 CM	LITHOGRAPH, WATER COLOR, COLORED INK, INK	PAPER
P.H. 031-002-[COPY 1]	PLAN OF THE / MILL YARD / OF THE / SUFFOLK MILLS [NASHUA MFG. CO.] / SHOWING / WATERWAYS FOR WATER POWER.	1928/02/00	1"=40'	H 73, W 105.4 CM	LITHOGRAPH COLORED INK, INK,WATER COLOR	PAPER

P.H. 031-002-[COPY 2]	PLAN OF THE / MILL YARD / OF THE / SUFFOLK MILLS [NASHUA MFG. CO.] / SHOWING / WATERWAYS FOR WATER POWER.	1928/02/00	1"=40'	H 73, W 105.5 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER
P.H. 031-003	PLAN OF THE MILL YARDS / OF THE / TREMONT MILLS / & / LAWRENCE SECTION OF T.& S. MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1928/01/00	1"=40'	H 72.7, W 105.4 CM	LITHOGRAPH, WATERCOLOR, COLORED INK	PAPER
P.H. 031-004	PLAN OF THE / MILLS [YARD] & PRINT WORKS / OF THE / MERRIMACK MANUFACTURING COMPANY / SHOWING / WATER-WAYS [ELEVATIONS & FLOOD HEIGHTS] FOR WATER POWER.	1928/02/00	1"=40'	H 88.2, W 99 CM	LITHOGRAPH, WATER COLOR, INK, COLORED INK	PAPER
P.H. 031-005	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1928/03/00	1"=40'	H 73.6, W 105.4 CM	LITHOGRAPH, COLORED INK, WATER CLOTH, INK	PAPER
P.H. 031-006-[A]	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING / WATERWAYS FOR WATER POWER.	1928/03/00	1"=40'	H 73.6, W 105.4 CM	LITHOGRAPH, WATER COLOR, INK, COLORED INK	PAPER
P.H. 031-006-[B]	PLAN OF THE MILL YARDS / OF THE / "MASSACHUSETTS COTTON MILLS" / SHOWING WATERWAYS FOR WATER POWER.	1928/04/00	1"=40'	H 73, W 105.4 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER
P.H. 031-007-[A]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / SHOWING / WATERWAYS FOR WATER POWER.	1928/04/00	1"=40'	H 73, W 105.5 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER

P.H. 031-007-[B]	PLAN OF THE / MILL YARD / OF THE / MIDDLESEX COMPANY / SHOWING WATERWAYS FOR WATER POWER.	1928/04/00	1"=40'	H 73, W 105.5 CM	LITHOGRAPH, WATER COLOR, COLORED INK	PAPER
P.H. 031-008	FLOOR & YARD ELEVATIONS / BOOTT MILLS-LOWELL, MASS.	1918/07/26	1/8"=12"	H 43.1, W 56 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 031-009	[UNTITLED PLAN].	SEE NOTES	NONE	H 56, W 208 CM	GRAPHITE	TRACING PAPER
P.H. 032-001	SPECIFICATION FOR CONSTRUCTION (EXCEPT ELEVATOR) OF THE UNITED / STATES POST OFFICE AT LOWELL, MASSACHUSETTS.	1930/04/19	NONE	H 32, W 20.4 CM	INK	PAPER
P.H. 032-002	U.S. POST OFFICE / LOWELL, MASS.	1929/12/23	1/8"=1'	H 62, W 94 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 032-003	U.S. POST OFFICE / LOWELL, MASS.	1929/12/23	1/8"=1'	H 62.2, W 94 CM	BLUEPRINT	PAPER
P.H. 032-004	U.S. POST OFFICE / LOWELL, MASS.	1929/12/23	1/8"=1'	H 62.2, W 94 CM	BLUEPRINT	PAPER
P.H. 032-005	U.S. POST OFFICE / LOWELL, MASS.	1929/12/23	1/8"=1'	H 62.2, W 94 CM	BLUEPRINT	PAPER
P.H. 032-006	U.S. POST OFFICE / LOWELL, MASS.	1929/12/23	1/8"=1'	H 62.2, W 94 CM	BLUEPRINT	PAPER
P.H. 032-007	U.S. POST OFFICE / LOWELL, MASS.	1930/01/14	SEE NOTES	H 63, W 92.7 CM	BLUEPRINT	PAPER
P.H. 033-[A]	[WHEEL DISCHARGE DIAGRAMS] BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R.H. ALLIS CHALMERS.	1923/00/00	NONE	H 50.7, W 65 CM	INK, COLORED INK	PAPER

P.H. 033-[A]-[COPY 1]	[WHEEL DISCHARGE DIAGRAMS] BOOTT MILLS / DISCHARGE OF / WHEEL NO. 6 / 72 INCH R.H. ALLIS CHALMERS.	1923/00/00	NONE	H 21",W 26"	BLUEPRINT	PAPER
P.H. 033-[B]	[WHEEL DISCHARGE DIAGRAMS] ASSETS REALIZATION CO. / DISCHARGE OF / WHEELS NOS. 1, 2 OR 3.	1939/01/00	NONE	H 52.5, W 70 CM	INK, COLORED INK	PAPER
P.H. 033-[C]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING DISCHARGE OF SACO-LOWELL] LOWELL MACHINE SHOP / DISCHARGE OF / WHEELS NOS. 1, 2, 3 [82 1/2" BOYDENS ALSO WHEELS NOS.], 4, 5 & 6 [(SWAINS)] / IN CUBIC FEET PER SECOND.	1912/10/00	NONE	H 58, W 54.5 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 033-[D]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6. / R. H. 42 INCH TYPE "D" HERCULES WHEELS / INSTALLED 1918 & 1919.	SEE NOTES	NONE	H 48, W 79 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 033-[D]-[COPY 1]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6. / R. H. 42 INCH TYPE "D" HERCULES WHEELS / INSTALLED 1918 & 1919.	SEE NOTES	NONE	H 63, W 84 CM	BLUE LINE PRINT	PAPER

P.H. 033-[D]-[COPY 2]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6. / R.H. 42 INCH TYPE "D" HERCULES WHEELS / INSTALLED 1918 & 1919.	SEE NOTES	NONE	H 51, W 85 CM	PHOTO NEGATIVE	PAPER
P.H. 033-[E]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING] PRESCOTT MILLS / DISCHARGE OF WHEELS / NOS. 1, 2, & 3 [ERASED AND WRITTEN OVER WITH] 7 TO 11, 33" R.H. TYPE "D", HERCULES.	1919/09/06	NONE	H 56, W 82 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 033-[F]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING] MASSACHUSETTS COTTON MILLS / DISCHARGE OF / WHEEL NO. 12 / 46 1/2" TYPE "S", S. MORGAN SMITH.	1921/04/00	NONE	H 75.5, W 76 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 033-[G]	[WHEEL DISCHARGE DIAGRAMS] TREMONT MILLS / 1, 2 OR 4 WHEELS / 46 1/2 INCH, TYPE "S", S. MORGAN SMITH.	SEE NOTES	NONE	H 51, W 76.2 CM	INK	DRAFTING CLOTH
P.H. 033-[G]-[COPY 1]	[WHEEL DISCHARGE DIAGRAMS] TREMONT MILLS / 1, 2 AND 4 WHEELS / 46 1/2 INCH, TYPE "S", S. MORGAN SMITH.	SEE NOTES	NONE	H 56.5, 79 CM	INK	PAPER
P.H. 033-[H]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAM SHOWING] TREMONT MILLS / DISCHARGE OF / WHEEL NO. 3/40.8 INCH R. H. MORGAN SMITH TYPE "S".	UNDATED	NONE	H 56, W 64.5 CM	INK, COLORED INK	DRAFTING CLOTH

P.H. 033-[I]	[WHEEL DISCHARGE DIAGRAMS] LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6 / UNITS OF TWO / 24 INCH TYPE "D" HERCULES WHEELS / INSTALLED IN 1915 & 1916.	1916/03/06	NONE	H 52, W 63.5 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 033-[I]-[COPY 1]	[WHEEL DISCHARGE DIAGRAMS] LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6 / UNITS OF TWO / 24 INCH TYPE "D" HERCULES WHEELS / INSTALLED IN 1915 & 1916.	1916/03/06	NONE	H 60.3, W 67.4 CM	RED LINE PRINT, COLORED INK	PAPER
P.H. 033-[I]-[COPY 2]	[WHEEL DISCHARGE DIAGRAMS] LAWRENCE MFG. CO. / DISCHARGE OF / WHEELS NOS. 4, 5 OR 6 / UNITS OF TWO / 24 INCH TYPE "D" HERCULES WHEELS / INSTALLED IN 1915 & 1916.	1916/03/06	NONE	H 19 6/8", W 25 2/8"	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
P.H. 033-[J]	[WHEEL DISCHARGE DIAGRAMS] [DIAGRAMS SHOWING] DISCHARGE OF / SACO-LOWELL SHOPS / WATERWHEELS [NOS. 1 & 2, WHEELS (82 1/2" BOYDENS). ALSO NOS. 3, 4, 5, & 6 S. MORGAN SMITH WHEELS].	UNDATED	NONE	H 64.5, W 76.5 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 033-[K]	[WHEEL DISCHARGE DIAGRAMS] SACO-LOWELL SHOPS / DISCHARGE OF / WHEELS NOS. 3-4, 5 OR 6.	1938/06/00	NONE	H 53, W 66 CM	INK, COLORED INK	PAPER
P.H. 033-[K]-[COPY 1]	[WHEEL DISCHARGE DIAGRAMS] SACO-LOWELL SHOPS / DISCHARGE OF / WHEELS NOS. 3-4, 5 OR 6.	1938/06/00	NONE	H 21",W 26"	BLUEPRINT	PAPER

P.H. 034-001	PLAN & SECTIONS / OF / SUGGESTED WALLS & FENCE / ON / CANAL STREET WALL.	1940/09/21	1/4"=1',1"=20'	H 18 2/8", W 35 1/2"	INK, GRAPHITE, WATER COLOR, COLORED PENCIL, COLORED INK	DRAFTING CLOTH
P.H. 034-002	CONCRETE CURB / AND FENCE / ON / CANAL STREET.	1941/11/00	1",3/16"&1/4"=1'	H 22 1/8",W 137 2/8"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
P.H. 035-001	FDN. & ROOF PLANS & DETAILS-BOILER HOUSE, BRIDGE OVER CANAL.	SEE NOTES	NONE	H 30 6/8",W 42"	BLUEPRINT	PAPER
P.H. 035-002	DETAILS.	1939/09/16	1",1/2",1/4"=1'	H 30",W 41 6/8"	BLUEPRINT	PAPER
P.H. 035-003	SITE PLAN / REVISED OVERHEAD & UNDERGROUND DISTRIBUTION.	SEE NOTES	NONE	H 30",W 50 6/8"	BLUEPRINT	PAPER
P.H. 035-004	SITE PLAN.	SEE NOTES	1"=40'	H 30",W 50"	BLUEPRINT	PAPER
P.H. 035-005	UNDERGROUND HEATING PIPING.	SEE NOTES	NONE	H 29 6/8",W 50 6/8"	BLUEPRINT	PAPER
P.H. 035-006	LOWELL HOUSING AUTHORITY / PROPOSED PIPE BRIDGE / CROSSING WESTERN CANAL / SOUTH OF MARKET STREET.	1939/08/11	1/4"&1"=1',1"=300'	H 22 2/8",W 29 2/8"	BLUEPRINT	PAPER

P.H. 036-[010]	PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS. / SCHEME NO. 1.	1948/01/06	1/2"=1'	H 67.3, W 105.2 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 036-[010]-[COPY 1]	PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1948/01/06	1/2"=1'	H 35.5, W 52 CM	PHOTOGRAPHIC NEGATIVE	PAPER
P.H. 036-[010]-[COPY 2]	PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1948/01/06	1/2"=1'	H 33, W 51 CM	PHOTOGRAPHIC POSITIVE	PAPER
P.H. 036-[010]-[COPY 3]	PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1948/01/06	1/2"=1'	H 71, W 104 CM	BLUEPRINT	PAPER
P.H. 036-[010]-[COPY 4]-[DETAIL]	[PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.] LONGITUDINAL SECTION.	1948/01/06	1/2"=1'	H 11, W 15.5 CM	PHOTOGRAPHIC NEGATIVE	PAPER
P.H. 036-[010]-[COPY 5]-[DETAIL]	[PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.] LOWER LOCKS DAM / LONGITUDINAL SECTION.	UNDATED	1/2"=1'	H 41.5, W 69 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 036-[011]	PROPOSED / NO. 3 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM, LOWELL MASS.	1958/04/30	1/2"='1, 1"=1'	H 67.2, W 109.2 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 036-[012]	PROPOSED / NO. 2 SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS. / SCHEME NO. 3.	1958/03/07	1/2"=1'& 1"=1'	H 66.6, W 104.7 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 036-[013]	PRESENT AND PROPOSED SIPHON SPILLWAYS / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1955/03/00	3/8"=1'& 1/2"=1'	H 81.3, 105.5 CM	INK, COLORED INK, WATER COLOR, CRAPHITE	DRAFTING CLOTH
P.H. 036-[013]-[COPY 1]	PRESENT AND PROPOSED SIPHON SPILLWAYS / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1955/03/00	3/8"=1'& 1/2"=1'	H 76, 104 CM	BLUEPRINT	PAPER
P.H. 036-[013]-[COPY 2]	PRESENT AND PROPOSED SIPHON SPILLWAYS / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1955/03/00	3/8"=1'& 1/2"=1'	H 76, 104 CM	BLUEPRINT	PAPER
P.H. 036-[014]	SCHEME NO. 2 / PROPOSED SIPHON SPILLWAY NO. 4 / AT THE LOWER LOCKS DAM / LOWELL, MASS.	1957/06/11	3/8"=1'& 1/2"=1'	H 59, W 73.6 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 036-[014]-[COPY 1]	SCHEME NO. 2 / PROPOSED SIPHON SPILLWAY NO. 4 / AT THE LOWER LOCKS DAM / LOWELL, MASS.	1957/06/11	3/8"=1'& 1/2"=1'	H 48, W 73.5 CM	BLUEPRINT	PAPER
P.H. 036-[015]	MERRIMACK DAM SIPHON.	1953/05/00	3/4"=1'& 1 1/2"=1'	H 75.5, W 104.6 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 036-[016]	LAWRENCE DAM SIPHON NO. 1.	1948/08/00	1 1/2"=1'& 3/4"=1'	H 68.6, W 103 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 036-[016]-[COPY 1]	LAWRENCE DAM SIPHON NO. 1.	1948/08/00	1 1/2"=1'& 3/4"=1'	H 34, W 50.5 CM	PHOTOGRAPHIC NEGATIVE	PAPER
P.H. 036-[016]-[COPY 2]	LAWRENCE DAM SIPHON NO. 1.	1948/08/00	1 1/2"=1'& 3/4"=1'	H 22, W 32.5 CM	PHOTOGRAPHIC POSITIVE	PAPER
P.H. 036-[016]-[COPY 3]	LAWRENCE DAM SIPHON NO. 1.	1948/08/00	1 1/2"=1'& 3/4"=1'	H 11, W 16 CM	PHOTOGRAPHIC NEGATIVE	PAPER

P.H. 036-[017]	PLAN AND SECTION / OF / MERRIMACK DAM / LOWELL, MASS. / EASTERLY END NEAR GRIST MILL.	1953/04/29	1/2"='1	H 56, W 63.5 CM	INK, COLORED INK	PAPER
P.H. 036-[018]	NO. 2 SIPHON SPILLWAY / LOWER LOCKS DAM.	1948/02/00	1"=1'	H 56, W 110.5 CM	INK, COLORED INK, GRAPHITE	PAPER
P.H. 036-[019]	NO. 2 SIPHON SPILLWAY / LOWER LOCKS DAM.	1948/02/00	1"=1'	H 54.5, W 108.7 CM	INK, COLORED INK, GRAPHITE	PAPER
P.H. 036-[020]-[COPY 1]	NO. 2 SIPHON SPILLWAY / LOWER LOCKS DAM.	1948/02/00	1"=1'	H 92, W 119.5 CM	BLUEPRINT	PAPER
P.H. 036-[020]-[COPY 2]	NO. 2 SIPHON SPILLWAY / LOWER LOCKS DAM.	1948/02/00	1"=1'	H 91.8, W 119.5 CM	BLUEPRINT	PAPER
P.H. 036-[021]	PRELIMINARY PLAN / FOR STUDY OF / SIPHON SPILLWAY / AT THE / LOCKS & CANALS LOWER LOCKS DAM / LOWELL, MASS.	1946/02/23	3/8"=1'	H 54, W 77 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 036-001	PLAN & SECTIONS / OF / PROPOSED SIPHON SPILLWAY / AT LOWER LOCKS DAM.	1945/06/22	1/4"=1'	H 21 1/2", W 76.2 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
P.H. 036-001-[COPY 1]	PLAN AND SECTIONS / OF / PROPOSED SIPHON SPILLWAY / AT LOWER LOCKS DAM.	1945/06/22	1/4"=1',1"=10'	H 8 6/8",W 13"	PHOTOGRAPH	PAPER
P.H. 036-001-[COPY 2]	PLAN AND SECTIONS / OF / PROPOSED SIPHON SPILLWAY / AT LOWER LOCKS DAM.	1945/06/22	1/4"=1',1"=10'	H 4 3/8",W 6 2/8"	PHOTOGRAPH	PAPER
P.H. 036-001-[COPY 3]	PLAN AND SECTIONS / OF PROPOSED SIPHON SPILLWAY / AT LOWER LOCKS DAM.	1945/06/22	1/4"=1',1"=10'	H 10 2/8",W 15"	PHOTOGRAPH	PAPER

P.H. 036-002	STUDY FOR SIPHON SPILLWAY / AT LOWER LOCKS DAM / LOWELL, MASS.	1945/08/21	1/4"=1'	H 11 2/8",W 18 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 036-003	PLAN & SECTIONS / OF / SOUTHEASTERLY SIDE OF LOWER LOCKS DAM / FOR STUDY OF / SIPHON SPILLWAY / LOWELL, MASS.	1945/08/29	3/8"=1'	H 18 6/8", W 29 6/8"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 036-003-[COPY 1]	PLAN & SECTIONS / OF / SOUTHEASTERLY SIDE OF LOWER LOCKS DAM / FOR STUDY OF / SIPHON SPILLWAY / LOWELL, MASS.	1945/08/29	3/8"=1'	H 9 1/8",W 14 6/8"	PHOTOGRAPH	PAPER
P.H. 036-004	PLAN AND SECTION / OF / PROPOSED SIPHON SPILLWAY NO. 1 / AT THE LOWER LOCKS DAM / FOR / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER / LOWELL, MASS.	1945/09/10	3/4"=1'& 1/2"=1'	H 74, W 115 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 036-005	LONGITUDINAL SECTION / OF / PROPOSED SIPHON SPILLWAY / AT LOWER LOCKS DAM.	1945/10/00	1"=1'	H 22 2/8", W 46"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 036-006	[LONGITUDINAL SECTION OF] PROPOSED SIPHON SPILLWAY / AT / P. L.& C. LOWER LOCKS DAM. / LOWELL, MASS.	1946/03/00	3/8"=1'	H 9 5/8",W 19 2/8"	GRAPHITE	DRAFTING CLOTH
P.H. 036-007	[LONGITUDINAL SECTION OF] PROPOSED SIPHON SPILLWAY / FOR / BOOTT DAM.	1946/03/00	1"=20'	H 11",W 17"	GRAPHITE	TRACING PAPER
P.H. 036-008	[LONGITUDINAL SECTION OF] PROPOSED / BOOTT DAM SIPHON / PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER.	1946/08/16	1/8 ACTUAL SIZE	H 19 6/8",W 35"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 036-009-[A]	ELEVATION OF / BOOTT DAM SIPHON NO.1.	1947/09/00	1"=1'	H 19 1/8",W 34 1/2"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 036-009-[B]	ELEVATION OF / BOOTT DAM SIPHON NO.2.	1947/10/16	1/2"=12"	H 25 3/8",W 30 1/2"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 036-009-[B]-[COPY 1]	ELEVATION OF / BOOTT DAM SIPHON NO.2.	1947/10/16	1/2"=12"	H 32.1, W 39.3 CM	PHOTOGRAPH	PAPER
P.H. 036-009-[B]-[COPY 2]	ELEVATION OF / BOOTT DAM SIPHON NO.2.	1947/10/16	1/2"=12"	H 11.5, W 14.7 CM	PHOTOGRAPH	PAPER
P.H. 036-009-[B]-[COPY 3]	ELEVATION OF / BOOTT DAM SIPHON NO. 2.	1947/10/16	1/2"=12"	H 25, W 22 CM	PHOTOGRAPH	PAPER
P.H. 040-[007]-[A]	LOWELL / BY-PASS.	1949/01/21	1"=40'	H 56, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-[007]-[B]	LOWELL / BY-PASS.	1948/02/17	1"=40'	H 56, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-[007]-[C]	LOWELL / BY-PASS.	1948/02/02	1"=40'	H 56, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-[007]-[D]	[LOWELL / BY-PASS.] TYPICAL SECTIONS.	UNDATED	1/4"=1'	H 56, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-[008]	LOWELL - 1957 LAYOUT / STATE HIGHWAY.	1958/02/00	1"=20'	H 40.7, W 92 CM	GRAPHITE	PAPER

P.H. 040-001-01-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 1/2",W 38 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-001-01-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 3/8",W 38 6/8"	BLUEPRINT	PAPER
P.H. 040-001-02-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 1/2",W 38 1/2"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 040-001-02-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 3/8",W 38 6/8"	BLUEPRINT	PAPER
P.H. 040-001-03-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 1/2",W 38 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-001-03-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 3/8",W 38 6/8"	BLUEPRINT	PAPER

P.H. 040-001-04-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 1/2",W 38 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-001-04-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1923/06/05	1"=40'	H 16 3/8",W 38 6/8"	BLUEPRINT	PAPER
P.H. 040-002-01-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS. [FIRST ST. BOULEVARD FROM DRACUT LINE TO FIRST STREET.]	1934/12/11	1"=40'	H 16",W 38 6/8"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 040-002-01-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAYED OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS. [LAYOUT OF STATE HIGHWAY FROM DRACUT LINE TO STATION 31.]	1934/12/11	1"=40'	H 16",W 38 6/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-002-02-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAYED OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS. [LAYOUT OF STATE HIGHWAY FROM DRACUT LINE TO STATION 31.]	1934/12/11	1"=40'	H 16",W 37 6/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-002-02-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAYED OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS. [LAYOUT OF STATE HIGHWAY FROM DRACUT LINE TO STATION 31.]	1934/12/11	1"=40'	H 16",W 37 6/8"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 040-002-03-[COPY 1]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAYED OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS. [LAYOUT OF STATE HIGHWAY FROM DRACUT LINE TO STATION 31.]	1934/12/11	1"=40'	H 16",W 37 6/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-002-03-[COPY 2]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAYED OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS. [LAYOUT OF STATE HIGHWAY FROM DRACUT LINE TO STATION 31.]	1934/12/11	1"=40'	H 16",W 37 6/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-003-03	FIRST STREET BOULEVARD [FROM STATION NO. 26 TO FIRST STREET.]	1936/11/24	1"=40'	H 16 1/2",W 38"	GRAPHITE	DRAFTING CLOTH
P.H. 040-003-04	FIRST STREET BOULEVARD [FROM STATION NO. 26 TO FIRST STREET.]	1936/11/24	1"=40'	H 42, W 96.5 CM	GRAPHITE	DRAFTING CLOTH
P.H. 040-004-01-[A]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / LAYED OUT AS A HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS.	1949/07/26	1"=40'	H 15 6/8",W 38"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 040-004-01-[B]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAYED OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS.	1950/03/07	1"=40'	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-02	LOWELL-1949 LAYOUT-SHEET 2 OF 11.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-03	LOWELL-1949-LAYOUT-SHEET 3 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-04	LOWELL-1949-LAYOUT-SHEET 5 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-05	LOWELL-1949-LAYOUT SHEET 5 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-06	LOWELL-1949-LAYOUT-SHEET 6 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-07	LOWELL-1949 LAYOUT-SHEET 7 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-08	LOWELL-1949 LAYOUT-SHEET 8 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-09	LOWELL-1949 LAYOUT-SHEET 9 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-004-10	LOWELL 1949 LAYOUT-SHEET 10 OF 11 SHEETS.	1949/00/00	NONE	H 16, W 38"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 040-004-11	LOWELL-1949 LAYOUT-SHEET 11 OF 11 SHEETS.	1949/00/00	NONE	H 16",W 38"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-005-[11]-001	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / TYPICAL SECTIONS / NESMITH ST. / CUT-OFF / E. MERRIMAC ST. / STACKPOLE ST. / BARTLETT ST. / FIRST & REED STS.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-002	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / TYPICAL SECTIONS / RELOC. LAWRENCE BLVD. / S.E. & S.W. RAMPS / N.E. & N.W. RAMPS / CIRCLE SECTION.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-003	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / PLAN AND PROFILE OF / PROPOSED LIMITED ACCESS STATE HIGHWAY / IN THE / CITY OF LOWELL.	1953/06/29	1''=40'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-004	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / NESMITH ST. PROFILE.	1952/07/10	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-005	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / PROFILES / SIDE STREETS.	1952/06/23	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-006	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / HIGHWAY GUARD (STANDARD STEEL BEAM TYPE) / HIGHWAY GUARD (HEAVY DUTY STEEL BEAM TYPE).	1952/05/14	1''=40'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-007	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / NESMITH ST. & CUT-OFF / PROFILE.	1952/07/11	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER

P.H. 040-005-[11]-008	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / PROFILES / INTERSECTIONS / NESMITH ST. CUT-OFF / & E. MERRIMACK ST.	UNDATED	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-009	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / PROFILES SIDE STRREETS / WILLOW ST. / ALDER ST. / E. MERRIMACK ST.	1952/06/24	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-010	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / PROFILES / INTERSECTION / STACKPOLE ST. & CUT-OFF.	UNDATED	1''=20', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-011	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / PROFILES SIDE STREET / STACKPOLE ST. / BARTLETT ST.	1952/06/25	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-012	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / DRAINAGE DETAILS.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-013	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / UNDERGROUND STRUCTURES.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-014	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / NESMITH ST. & CUT-OFF / WALL DETAILS / STEPS DETAILS.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-015	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / HIGHWAY GUARD (HEAVY DUTY STEEL BEAM TYPE).	1952/05/27	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-016	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / PROFILE.	1952/06/11	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER

P.H. 040-005-[11]-017	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / HIGHWAY GUARD (HEAVY DUTY STEEL BEAM TYPE).	1952/05/27	NONE	H 57, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-005-[11]-018	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / PROFILE.	1952/06/12	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-019	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / HIGHWAY GUARD (HEAVY DUTY STEEL BEAM TYPE).	1952/05/20	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-020	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / PROFILE.	1952/06/12	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-021	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / PROFILE OF FIRST & / REED STS.	1952/05/23	NONE	H 57, W 92 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-005-[11]-022	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / PROFILE.	1952/06/12	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-023	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / PROFILES.	1952/09/02	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-024	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / CIRCLE & BRIDGE / PROFILES.	1952/08/27	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-025	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / N.W. & S.W. RAMP / PROFILES.	1952/09/04	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER

P.H. 040-005-[11]-026	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / DRAINAGE DETAILS / RELOC. LAWRENCE BLVD.	1952/09/30	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-027	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD. / DRAINAGE DETAILS	1952/09/30	1''=40', 1"=8'	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-028	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES. / RELOC. LAWRENCE BLVD.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-029	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-030	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-031	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-032	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-[11]-033	LOWELL / HUNT'S FALLS BRIDGE / AND APPROACHES.	UNDATED	NONE	H 57, W 92 CM	BLUEPRINT	PAPER
P.H. 040-005-01	THE COMMONWEALTH OF MASSACHUSETTS / SUBSTRUCTURE OF PROPOSED BRIDGE / LOWELL / HUNT'S FALLS / OVER MERRIMACK RIVER.	1932/01/00	1"=40'	H 23", W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-02	[PLAN VIEW & EASTERLY ELEVATION OF PROPOSED BRIDGE, LOWELL, HUNT'S FALLS OVER MERRIMACK RIVER.]	1952/01/26	1"=20'	H 23", W 42 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-005-03	BORING DATA [FOR PROPOSED BRIDGE, LOWELL, HUNTS FALLS OVER MERRIMACK RIVER.]	1952/01/00	1"=8'& 40'	H 23",W 42 1/2"	BLUEPRINT	PAPER

P.H. 040-005-04	[PLAN & SECTIONS OF PROPOSED BRIDGE, LOWELL, HUNTS FALLS OVER MERRIMACK RIVER.]	SEE NOTES	1/4",1/8", 1/2"3"=1'	H 23",W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-05	PLAN & SECTIONS OF PROPOSED BRIDGE, LOWELL, HUNTS FALLS OVER MERRIMACK RIVER.]	SEE NOTES	SEE NOTES	H 23,W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-06	[PLAN & SECTIONS OF PROPOSED BRIDGE, LOWELL, HUNTS FALLS OVER MERRIMACK RIVER.]	SEE NOTES	SEE NOTES	H 23",W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-07	[PLAN & SECTIONS OF PROPOSED BRIDGE, LOWELL, HUNT'S FALLS OVER MERRIMACK RIVER.]	SEE NOTES	1/8",1/4" & 1"=1'	H 23",W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-08	[SECTIONS & ELEVATIONS OF PROPOSED BRIDGE, LOWELL, HUNT'S FALLS OVER MERRIMACK RIVER.]	SEE NOTES	1/8"=1'	H 23',W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-09	[SECTIONS OF PROPOSED BRIDGE, LOWELL, HUNTS FALLS OVER MERRIMACK RIVER.]	SEE NOTES	1/2",1/4" =1'	H 23",W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-005-10	CABLEWAY DETAILS [FOR PROPOSED BRIDGE, HUNT'S FALLS OVER MERRIMACK RIVER]	SEE NOTES	1/4",3/8" = 1'	H 23",W 42 1/2"	BLUEPRINT	PAPER
P.H. 040-006-01	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS.	1953/01/20	1"=40'	H 16 2/8",W 38 2/8"	BLUEPRINT	PAPER

P.H. 040-006-01-[A]	THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS.	1953/01/20	1"=40'	H 16 2/8",W 38 2/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 040-006-02	[UNTITLED.] [THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS.]	1953/01/20	1"=40'	H 16 2/8",W 38 2/8"	BLUEPRINT	PAPER
P.H. 040-006-02-[A]	[UNTITLED.] [THE COMMONWEALTH OF MASSACHUSETTS / PLAN OF ROAD / IN THE CITY OF / LOWELL / MIDDLESEX COUNTY / ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE / DEPARTMENT OF PUBLIC WORKS / DIVISION OF HIGHWAYS.]	1953/01/20	1"=40'	H 16 2/8",W 38 2/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 042-A	[SCALE] PLAN OF THE / PENSTOCKS AND RACEWAYS / FOR NOS. 1, 1A, 2, 3, 4 AND 5 WHEELS / OF THE / APPLETON COMPANY.	1902/01/00	1"=10'	H 48", W 56 1/2"	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 043-A-[01]	[SCALE] PLAN OF THE / PENSTOCKS AND RACEWAYS / FOR NOS. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 WHEELS / OF THE / HAMILTON MANUFACTURING COMPANY.	1901/07/00	1"=10'	H 91, W 207 CM	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

P.H. 043-A-[02]	SECTIONS OF / PENSTOCKS AND RACEWAYS / OF THE / HAMILTON MANUFACTURING COMPANY.	1901/00/00	1"=10'	H 88.4, W 90.3 CM	INK, COLORED INK	CLOTH BACKED PAPER
P.H. 044-[B]	PLAN OF / PROPOSED NEW FEEDERS / FOR BIGELOW CARPET CO.	1907/06/21	1/4"=1'	H 79, W 215 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 044-[C]	PLAN OF / PROPOSED NEW FEEDERS / FOR BIGELOW CARPET CO.	1907/06/21	1/4"=1'	H 90, W 210 CM	INK, COLORED INK, GRAPHITE	PAPER
P.H. 044-[D]	PROPOSED NEW FEEDERS / FOR / BIGELOW CARPET CO.	1907/09/05	1/4"=1'	H 35, W 39.5 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 044-[E]	SECTION THROUGH BIGELOW CARPET CO'S YARD / BETWEEN OLD BRUSSELS WEAVING MILL AND STORE HOUSE, / LOOKING EAST.	1907/08/24	1/4"=1'	H 23, W 62 CM	INK, COLORED INK, WATER COLOR	PAPER
P.H. 044-[F]	SECTION THROUGH LOWER END / TO 110 FEET UP. [ALSO] SECTION FROM HEAD TO WITHIN 110 FEET OF LOWER END / OF PROPOSED NEW FEEDERS / FOR BIGELOW CARPET CO.	UNDATED	1/4"=1'	H 28.6, W 62.2 CM	BLUEPRINT	PAPER
P.H. 044-A-[COPY 1]	PLAN OF / PROPOSED NEW [CONCRETE] FEEDERS / FOR BIGELOW CARPET CO.	1907/07/24	1"=10', 1/4"=1'	H 33 1/2", W 76"	BLUEPRINT	CLOTH BACKED PAPER
P.H. 044-A-[COPY 2]	PLAN OF / PROPOSED NEW [CONCRETE] FEEDERS / FOR BIGELOW CARPET CO.	1907/07/24	1"=10', 1/4"=1'	H 24 1/2", W 85"	UNKNOWN PRINTING PROCESS	PAPER
P.H. 046	[NEGATIVES OF MILL YARD PLANS MADE 1917.]	1917/00/00	NONE		PHOTOGRAPHIC NEGATIVE	
P.H. 047-A	[PLAN SHOWING 6" PIPE LINE FOR HYDRANT # 4 AT PRESCOTT MILLS.]	UNDATED	NONE			

P.H. 049-A	[LARGE BROWN PAPER PLAN SHOWING] HUNTS FALLS [LOCATION OF SECTIONS & CONTOURS OF BANKS JUST ABOVE RAPIDS.]	UNDATED	1"=40'	H 47", W 145"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 049-B	PLAN OF HUNTS FALLS / SHOWING SURFACE VELOCITY OF WATER [ON 5 DIFFERENT DAYS IN 1897 & 1898.]	1898/00/00	1"=40'	H 41", W 102 1/2"	INK, COLORED INK	PAPER
P.H. 049-C	MISCELLANEOUS DATA / HUNTS FALLS / SECTIONS [PLAN OF SOUTH BANK OF RIVER AT HUNTS FALLS ABOVE ALDER ST. SHOWING LOCATION OF SECTIONS & PROGRESS ON RIVER WALL. 1896 & 1897.]	1897/00/00	NONE	H 40 1/2,W 63 6/8"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 049-D	[PLAN OF UPPER PART OF] HUNTS FALLS [(ABOVE ALDER ST.) SHOWING CONTOURS COMPILED FROM LEVELS TAKEN IN 1896-97.]	1897/01/00	1"=40'	H 41 1/2", W 70"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 049-E	[PLAN OF] HUNTS FALLS [FROM BELOW THE RAPIDS TO ABOVE CONCORD RIVER SHOWING CONTOURS OF RIVER & PROGRESS OF WORK ON RIVER WALLS; ALSO SECTIONS OF WALL.]	UNDATED	NONE	H 40 1/2", W 116 1/2"	INK, COLORED INK, COLORED PENCIL, GRAPHITE	PAPER
P.H. 049-F	PLAN & PROFILE OF / MERRIMACK RIVER / FROM / AIKEN ST. BRIDGE / TO / [HEAD OF] ESSEX CO'S MILL POND [SHOWING CONTOURS AT 5' INTERVALS, THE FRESHET LINE IN 1896, & THE BED OF THE CHANNEL IN 1912 (ADDED OCT. 1921).]	1893/03/31	1'=40'	H 31", W 65"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 049-G	TRACING OF GOVERNMENT / PLAN OF MERRIMACK RIVER [PLAN AND PROFILE OF MERRIMACK RIVER FROM AIKEN ST. BRIDGE TO HEAD OF ESSEX MILL POND SHOWING DEPTH MEASUREMENTS IN DETAIL].	1893/00/00	1/10"=200'	H 31", W 68 1/2"	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
P.H. 050-A	PLAN OF / MERRIMACK RIVER / NEAR / [UPPER PART OF] HUNT'S FALLS [(ABOVE ALDER ST.) SHOWING CONTOURS FROM LEVELS OBTAINED IN 1896, DESIGNED FOR USE IN STUDYING THE CONDITIONS PREPARATORY TO FURTHER CLEARING THE RIVER BED AT THIS PLACE.]	1896/00/00	1"=40'	H 31 2/8", W 60 1/2"	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 050-B	PLAN OF [RIVER AT UPPER PART OF] HUNT'S FALLS AND VICINITY [(ABOVE ALDER ST.) BEGAN IN 1895, SHOWING OUTLINE OF CHANNELS & DEPTH OF RIVER AT DIFFERENT POINTS.]	1895/00/00	NONE	H 22",W 76"	INK, GRAPHITE, COLORED INK	PAPER
P.H. 050-C	[PLAN OF UPPER PART OF HUNT'S FALLS IN RIVER, SHOWING CONTOURS FROM SECTIONS ACCOMPANYING A PLAN BY A. H. HOWLAND, DATED DECEMBER 1871.]	1897/03/00				
P.H. 050-D	DIAGRAM / SHOWING SLOPES OF RIVER THROUGH / SOUTH CHANNEL / AT HUNT'S FALLS [IN 1896.]	1896/00/00		H 22", W 76"	GRAPHITE, COLORED INK, INK	PAPER
P.H. 050-E	[GENERAL] PLAN OF HUNT'S FALLS / LOWELL, MASS. [SHOWING FIRST ST. FROM BRIDGE TO LLEWELLYN ST.]	1897/04/00	1"=40'	H 41", W 116"	INK, WATER COLOR	PAPER

P.H. 050-F	HUNTS FALLS / CONTOURS [IN 1896].	1897/10/00	1"=40'	H 106.4, W 282.6 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 051-A	MAP / OF / MERRIMACK RIVER / FROM BRIDGE ST. TO BELOW HUNT'S FALLS / [SHOWING AREA & SECTIONS AT FOUR DIFFERENT POINTS & PROPOSED BOULEVARD BELOW FIRST ST.] PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/10/00	H 1"=100', V 1"=20'	H 33 1/2", W 48 1/2"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 051-A-[COPY 1]	MAP / OF / MERRIMACK RIVER / FROM BRIDGE ST. TO BELOW HUNT'S FALLS / [SHOWING AREA & SECTIONS AT FOUR DIFFERENT POINTS & PROPOSED BOULEVARD BELOW FIRST ST.] PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/10/00	H 1"=100', V 1"=20'	H 33 1/8",W 48 1/2"	BLUEPRINT	PAPER
P.H. 051-B	MAP / OF / MERRIMACK RIVER / FROM AIKEN ST. TO THE CONCORD RIVER / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. [SHOWING AREA & SECTIONS AT DIFFERENT POINTS & MILLS & WASTEWAYS INCLUDING BOOTT & LAWRENCE CANALS.]	1921/10/00	H 1"=20' V 1"=100'	H 33 2/8", W 63"	INK, COLORED PENCIL, COLORED INK	DRAFTING CLOTH

P.H. 051-B-[COPY 1]	MAP / OF / MERRIMACK RIVER / FROM AIKEN ST. TO THE CONCORD RIVER / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS. [SHOWING AREA & SECTIONS AT DIFFERENT POINTS & MILLS & WASTEWAYS INCLUDING BOOTT & LAWRENCE CANALS.]	1921/10/00	H 1"=20' V 1"=100'	H 33", 63 1/2"	BLUEPRINT	PAPER
P.H. 051-C	PLAN SHOWING / [LOWER PART OF HUNTS FALLS SHOWING 1'] CONTOURS OF BED / OF / MERRIMACK RIVER / LOWELL MASS. [FROM LEVELS OF AUG. & SEPT. 1912.]	1912/08-09/00	1"=40'	H 43 1/2",W 72 1/2"	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
P.H. 051-D	PLAN SHOWING / [UPPER PART OF HUNTS FALLS SHOWING 1'] CONTOURS OF BED / OF / MERRIMACK RIVER / LOWELL, MASS. [FROM LEVELS OF AUG. & SEPT. 1912.]	1912/08-09/00	1"=40'	H 41 2/8", W 86"	INK, COLORED INK	PAPER
P.H. 051-E	[UNTITLED PLAN SHOWING CONTOURS OF MERRIMACK RIVER LOWELL, MASS.]	UNDATED	NONE	H 27 1/2", W 114 1/2"	INK, COLORED PENCIL, WATER COLOR	PAPER
P.H. 051-F	[DIAGRAM OF SLOPES OF MERRIMACK RIVER AT HUNTS FALLS SHOWING CONDITIONS BEFORE & AFTER ALTERATIONS BEGAN IN 1895.] PLAN OF A PART OF / MERRIMACK RIVER AT HUNTS FALLS.	1900/12/22	1"=100'	H 47, W 96 CM	INK, COLORED INK	TRACING PAPER
P.H. 051-G	[DIAGRAM SHOWING SLOPE OF SURFACE OF THE MERRIMACK RIVER FROM THE AMOSKEAG CO'S DAM AT MANCHESTER, N. H. TO POWOW RIVER AT AMESBURY, MASS.]	1921/04/25			BP	

P.H. 051-H	DIAGRAM SHOWING / SLOPE[S] OF MERRIMACK RIVER / FROM / LAWRENCE MFG. TO BELOW HUNTS FALLS [DURING NOVEMBER, 1921].	1921/11/00	1"=20, 1"=20'	H 31 1/2",W 57 1/2'	INK	DRAFTING CLOTH
P.H. 051-H-[COPY 1]	DIAGRAM SHOWING / SLOPE[S] OF MERRIMACK RIVER / FROM / LAWRENCE MFG. CO. TO BELOW HUNTS FALLS / ON DATES GIVEN. / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1921/11/00	1"=200', 1"=1'	H 32 1/2", W 47 6/8"	BLUE LINE PRINT, INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 051-I	DIAGRAM OF SLOPES / OF / MERRIMACK RIVER / FROM / PAWTUCKET DAM TO THORNTON'S FERRY.	1914/10/00	NONE	H 56, W 293 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 065	[UNTITLED PLAN]. [BIGELOW CARPET CO. MILL YARD PLANS (OF THE COLUMBIA TEXTILE CO.) SHOWING WATERWAYS (UNFINISHED).]	SEE NOTES	NONE	H 47 3/8", W 64 2/8"	GRAPHITE, INK	CLOTH BACKED PAPER
P.H. 066-01	[SCALE] PLAN OF THE / PENSTOCKS & RACES / OF THE / TREMONT MILLS [WITH SECTIONS, SHOWING BUILDINGS, HALL ST. DAM, ETC.].	1899/02/00	1"=10'	H 37 1/2", W 58 1/2"	INK, WATER COLOR, COLORED INK, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER
P.H. 066-02	[SCALE] PLAN OF THE / PENSTOCKS & RACES / OF THE / TREMONT MILLS [WITH SECTIONS, SHOWING BUILDINGS, HALL ST. DAM, ETC.].	1900/03/00	1"=10'	H 37 1/2", W 57 1/2"	INK, WATER COLOR, COLORED INK, GRAPHITE, COLORED PENCIL	CLOTH BACKED PAPER

P.H. 067-[A]	[SCALE] PLAN OF PART / OF / LAWRENCE M. CO.'S MILLYARD / SHOWING PENSTOCKS & RACEWAYS / FOR NOS. 4, 5 & 6 WHEELS [WITH SECTIONS OF SAME, SHOWING BUILDINGS, ETC.]	1901/06/00	1"=10'	H 35 1/2", W 58"	INK, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
P.H. 067-[B]	PLAN OF PART / OF / LAWRENCE M. CO'S MILLYARD / SHOWING / PENSTOCKS AND RACEWAYS / FOR NOS.1, 2 & 3 WHEELS.	1901/06/00	1"=10'	H 36", W 55"	INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 068-[A]	PLAN OF THE / PENSTOCKS & RACEWAYS / FOR NOS 3, 4, 5 & 6 WHEELS / OF THE / MASSACHUSETTS COTTON MILLS.	1952/02/02	1"=10'	H 58",W 37"	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
P.H. 068-[B]	PLAN OF THE / PENSTOCKS & RACEWAYS / FOR NOS 1, 2 & 12 WHEELS.	1952/03/04	1"=10'	H 37 1/4", W 59 1/2"	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
P.H. 068-[C]	PLAN OF THE / PENSTOCKS & RACEWAYS / OF THE / PRESCOTT MILL / OF THE / MASSACHUSETTS COTTON MILLS.	1898/02/05	1"=10'	H 37 1/4", W 59"	INK, GRAPHITE, WATER COLOR, COLORED INK	CLOTH BACKED PAPER
P.H. 068-[D]	PLAN OF THE / PENSTOCKS, RACEWAYS / FOR NOS 3, 4, 5 & 6 WHEELS / OF THE / MASSACHUSETTS COTTON MILLS.	1898/09/30	1"=10'	H 60 1/2",W 43 2/8"	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH

P.H. 068-[E]	PLAN OF THE / PENSTOCKS & RACEWAYS / OF THE / PRESCOTT MILL / OF THE / MASSACHUSETTS COTTON MILLS.	1898/02/05	1"=10'	H 37 1/4", W 59 1/2"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 069-[A]	BOOTT 80" SWAIN TURBINE. / PLAN & SECTION OF [WHEEL] PIT.	1872/03/02	1/4"=1'	H 109.2, W 170.7 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
P.H. 069-[B]	[SCALE] PLAN / OF THE / PENSTOCKS / AND RACEWAYS / FOR WHEELS NOS. 1, 2, 3, 4, 5, 6, 7, 8 & 9 / OF THE BOOTT MILLS [WITH SECTIONS AND SHOWING BUILDINGS. OLD TRACINGS.]	1906/01/00	1=20', 1"=10'	H 86, W 137 CM	INK, COLORED INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
P.H. 069-[C]	[SCALE] PLAN / OF THE / PENSTOCKS / AND RACEWAYS / FOR WHEELS NOS. 1, 2, 3, 4, 5, 6, 7, 8 & 9 / OF BOOTT MILLS [WITH SECTIONS AND SHOWING BUILDINGS. NEW PLAN.]	1911/05/00	1"=20', 1"=10'	H 86, W 137 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 069-[D]-[01]	BOOTT MILLS. [FLOOR ELEVATIONS AND MARCH 20, 1936, FLOOD HEIGHTS.]	1940/03/00	1"=20', 1"=100'	H 76.2, W 131.2 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 069-[D]-[02]	BOOTT MILLS. [FLOOR ELEVATIONS AND MARCH 20, 1936, FLOOD HEIGHTS.]	SEE [D]-[01]	1"=20', 1"=100'	H 25.8, W 76.5 CM	INK, GRAPHITE, COLORED PENCIL	DRAFTING CLOTH
P.H. 069-[E]	[SCALE PLANS OF PENSTOCKS, RACES, ETC., OF BOOTT MILLS WITH SECTIONS AND SHOWING BUILDINGS. OLD ORIGINAL.]	1897/01/13				

P.H. 069-02	PLAN & SECTIONS / OF / BOOTT MILLS & VICINITY.	1945/01/00	1"=20', 1"=100'	H 60.9, W 213.7 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 070-[001]	PROPOSITION FOR EXHAUST STEAM TURBINE / IN / SOUTH WING OF PRESENT COAL POCKET [BY A.T. SAFFORD & JOHN A. STEVENS, ENGNRS.].	1909/08/00	1/4"=1'	H 24",W 35"	BLUEPRINT	PAPER
P.H. 070-[002]	PROPOSED EXHAUST STEAM / TURBINE STATION.	1909/08/00	1/4"=1'	H 24", W 46"	BLUEPRINT	PAPER
P.H. 070-[003]	PROPOSED EXHAUST STEAM / TURBINE STATION.	1909/08/00	1/4"=1'	H 24",W 35"	BLUEPRINT	PAPER
P.H. 070-[004]	PROPOSED EXHAUST STEAM / TURBINE STATION.	1909/08/00	1/4"=1'	H 61, W 88.5 CM	BLUEPRINT	PAPER
P.H. 070-[005]	PROPOSED / HIGH PRESSURE STEAM / TURBINE STATION.	1909/08/00	1/4"=1'	H 28",W 46"	BLUEPRINT	PAPER
P.H. 070-[006]	PLAN OF PRESENT BOILER ROOM / AND / PART OF ENGINE ROOM.	1909/08/00	1/4"=1'	H 24",W 25 1/2"	BLUEPRINT	PAPER
P.H. 070-[007]	PROPOSED / HIGH PRESSURE STEAM / TURBINE STATION.	1909/08/00	1/4"=1'	H 24", W 34 7/8"	BLUEPRINT	PAPER
P.H. 070-[008]	PROPOSED / HIGH PRESSURE STEAM / TURBINE STATION.	1909/08/00	1/4"=1'	H 24", W 34 7/8"	BLUEPRINT	PAPER
P.H. 070-[009]	PROPOSED / HIGH PRESSURE STEAM / TURBINE STATION.	1909/08/00	1/8"=1'	H 23 7/8",W 34 6/8"	BLUEPRINT	PAPER
P.H. 070-[010]	PROPOSED / HIGH PRESSURE STEAM / TURBINE STATION.	1909/08/00	1/8"=1'	H 23 7/8", W 34 6/8"	BLUEPRINT	PAPER
P.H. 070-[011]	PROPOSED HIGH PRESSURE / TURBINE STATION / AND BOILER HOUSE.	1909/08/00	1/10"=1'	H 29 1/2",38 1/2"	BLUEPRINT	PAPER
P.H. 070-[012]	SIDE ELEVATION OF PROPOSED BOILER HOUSE / WITH / COAL POCKET.	1909/08/00	1/10"=1'	H 22 1/2",W 34"	BLUEPRINT	PAPER

P.H. 070-[013]	PROPOSED IMPROVEMENT / IN / PRESENT COAL POCKET.	1909/08/00	1/8"=1'	H 24",W 34 6/8"	BLUEPRINT	PAPER
P.H. 070-[014]	PROPOSED IMPROVEMENT / IN / PRESENT COAL POCKET.	1909/08/00	1/8"=1'	H 24",W 34 6/8"	BLUEPRINT	PAPER
P.H. 070-[015]	PROPERTY MAP / SHOWING THE SEVERAL PROPOSITIONS.	1909/08/00	1"=40'	H 24",W 34 6/8"	BLUEPRINT, GRAPHITE	PAPER
P.H. 070-[016]	SECTION THROUGH / BOOTT MILLS-LOWELL, MASS. / PRESENT RATED HP.	1908/10/31	1"=40'	H 19 2/8",W 26"	BLUEPRINT	PAPER
P.H. 070-[017]	PRELIMINARY ARRANGEMENT OF 51 SMITH WICKET GATE TURBINE / FOR / BOOTT MILLS LOWELL, MASS. / ARTHUR T. SAFFORD ENGR. LOWELL,MASS. / S. MORGAN SMITH CO., YORK, PA. / FROM BOSTON OFFICE 176 FEDERAL ST.	1911/03/23	1/4"=1'	H 27 6/8",W 33"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 070-[018]	[BOOTT MILLS. POWER DEVELOPMENT SCHEME, 1909-1910, JOHN A. STEVENS AND A. T. SAFFORD ENGINEERS. 19 BLUEPRINTS SHOWING DETAILS OF DIFFERENT PROPOSITIONS.]	SEE TITLE				
P.H. 070-[019]	[BOOTT MILLS. POWER DEVELOPMENT SCHEME, 1909-1910, JOHN A. STEVENS AND A. T. SAFFORD ENGINEERS. 19 BLUEPRINTS SHOWING DETAILS OF DIFFERENT PROPOSITIONS.]	SEE TITLE				
P.H. 071-[G]	PROPOSED PLAN / OF L. & C. 20" PIPE / ON CANAL STREET.	UNDATED	1"=10'	H 55.8, W 146.8 CM	INK, COLORED INK, GRAPHITE	PAPER

P.H. 071-[H]	2O" PIPE ON CANAL STREET / LAID OCT. 1929.	1929/10/00	NONE	H 56.3, W 153 CM	GRAPHITE	PAPER
P.H. 071-[I]	PLAN SHOWING CHANGE IN 20" PIPE / IN PAWTUCKET CANAL AT HAMILTON / MFG. CO. SEPT. 1919 FOR MILL NO. 7.	1919/10/16	1"=10'	H 33.3, W 83.3 CM	INK, COLORED INK	PAPER
P.H. 071-[J]-[01]	PROPOSED RELOCATION / OF 20" L.& C. MAIN.	1929/07/15	1"=50'	H 59.5, W 75.5 CM	INK, COLORED INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 071-[J]-[02]	PROPOSED RELOCATION / OF 20" L.& C. MAIN.	1929/07/15	1"=40' & 1"=20'	H 55.3, W 80 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 071-A	[UNTITLED PLAN.] [CROSSING EAST MERRIMACK STREET AT PRESCOTT MILLS.]	UNDATED	NONE	H 23 3/8", W 27 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 071-B-[01]	PLAN & PROFILE / OF / NEW 20" L.& C. PIPE IN THE YARD OF / MASSACHUSETTS COTTON MILLS / AS LAID-JULY 1916.	1916/11/15	1"=10'	H 21 1/2",W 36 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 071-B-[02]	PLAN AND PROFILE / OF / 20" L.& C. PIPE IN THE YARD OF / MASSACHUSETTS COTTON MILLS / AS LAID-JULY 1916 (REVISED MAR. 1934).	1934/03/00	1"=10'	H 66.5, W 146 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 071-C	PLAN OF LOWER PAWTUCKET CANAL / FROM THE / HAMILTON BLACKSMITH SHOP TO LOWER LOCKS / SHOWING / 20 INCH PIPE LINE LAID IN 1903 AND 1904.	1904/12/07	1"=10'	H 28", W 112 5/8"	INK,WATER COLOR	PAPER
P.H. 071-D	20" PIPE LINE [ALONG EASTERN CANAL] FROM MASS. YARD TO MERR'K. YARD.	UNDATED	NONE	H 41 1/2", W 182 1/2"	INK, COLORED INK, GRAPHITE	PAPER

P.H. 071-E	PLAN OF PRESCOTT YARD / FROM COAL SHED TO EAST MERR'K ST. / SHOWING / 20 IN. PIPE LAID IN 1903 & 1904.	1904/12/00	1"=10'	H 40, W 44 2/8"	INK, GRAPHITE, WATER COLOR, COLORED INK	PAPER
P.H. 071-F-[01]	20" PIPE FROM E. MER'K. ST. THROUGH MASS. YARD.	UNDATED	NONE	H 29 6/8", W 94 1/2"	INK, COLORED PENCIL, GRAPHITE	PAPER
P.H. 071-F-[02]	[20" PIPE FROM E. MER'K. ST. THROUGH MASS. YARD.]	UNDATED	NONE	H 71.8, W 211.9 CM	INK, COLORED PENCIL, GRAPHITE	PAPER
P.H. 072-[D]	PORTIONF OF KEARNEY SQUARE, / PEPPERELL MFG. COMPANY, / LAND OF PROPRIETORS OF THE / LOCKS AND CANALS AND OTHER PROPERTIES / SHOWING / PROPOSED RELOCATION / OF 24" AND 20" FIRE PROTECTION MAINS,	1929/07/22	1"=50'	H 26, W 69.3 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 072-[E]	PLAN SHOWING / PROPOSED 24" PIPE AND BRIDGE / ACROSS EASTERN CANAL.	1929/09/03	1/4"=1'	H 33.6, W 75 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 072-[F]	PROPOSED 24" PIPE LINE.	UNDATED	1"=10'	H 55.9, W 110.6 CM	GRAPHITE	PAPER
P.H. 072-[G]	PLAN OF / PROPOSED 24 INCH WATER MAIN / TO / LOCKS AND CANALS RESERVOIR, FAIRMOUNT ST. LOWELL.	1904/05/24	1"=1'	H 104.2, W 320 CM	INK, COLORED INK	PAPER
P.H. 072-[H]	PROFILE OF / PROPOSED 24 INCH WATER MAIN / LOCKS AND CANALS RESERVOIR, FAIRMOUNT ST. LOWELL.	1904/05/24	NONE	H 56.5, W 362 CM	INK, COLORED INK	PAPER

P.H. 072-[I]	[UNTITLED PLAN OF L.& C. PIPE LINES.]	UNDATED	NONE	H 56, W 460.7, CM	INK, COLORED INK, COLORED PENCIL	PAPER
P.H. 072-[J]	PLAN SHOWING LOCATION OF L.& C. 12 INCH RESERVOIR PIPE / WHICH WAS LAID IN 1849.	1903/03/00	1"=120'	H 25", W 41 1/2"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 072-[K]	PLAN SHOWING THE LOCATION OF THE PIPE / LAID FROM THE RESERVOIR ON LINES HILL / TO THE MASSACHUSETTS COTTON MILLS.	1849/09/20	1"=120'		H 41, W 126.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE
P.H. 072-[K]	PLAN SHOWING THE LOCATION OF THE PIPE / LAID FROM THE RESERVOIR ON LINES HILL / TO THE MASSACHUSETTS COTTON MILLS.	1849/09/20	1"=120'	H 41, W 126.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
P.H. 072-A	PLAN OF / LOCKS AND CANALS NEW 24 INCH PIPE LINE / FROM PRESCOTT MILL EAST MERRIMACK STREET TO RESERVOIR IN BELVIDERE / A DISTANCE OF 5381 FEET.	1906/03/16	1/4"=1'	H 126, W 612 CM	INK	PAPER
P.H. 072-B	TRACING SHOWING / APPROXIMATE LOCATION / OF PIPES [(24" & 12")] LAID / FROM THE LOCKS & CANALS RESERVOIR / TO / MASS. MILLS AND MIDDLESEX COMPANY / ALSO / CITY PIPES ON THE SAME STREETS.	1916/12/06	1"=120'	H 63.2, W 108.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 072-C	[PLAN OF PROPOSED] 24" [WATER MAIN] PIPE LINE AT L.& C. RESERVOIR.	1904/05/24	1"=20'	H 49.6, W 46 CM	INK, GRAPHITE	PAPER
P.H. 073-[001]	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS.	SEE NOTES	1"=40'	H 29",W 41 6/8"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 073-[002]	MASSACHUSETTS COTTON MILLS / SKETCH SHOWING ARRANGEMENT OF / FIVE PAIR OF HORIZONTAL WATER WHEELS / ON SECTION EIGHT & EXTENSION WITH / END DISCHARGE DRAUGHT TUBES.	1908/02/10	1"=10'	H 17 1/2",W 32"	INK, COLORED INK	DRAFTING CLOTH
P.H. 073-[002]-[COPY 1]	MASSACHUSETTS COTTON MILLS / SKETCH SHOWING ARRANGEMENT OF / FIVE PAIR OF HORIZONTAL WATER WHEELS / ON SECTION EIGHT & EXTENSION, WITH / END DISCHARGE DRAUGHT TUBES.	1908/02/10	1"=10'	H 17 1/2",W 32"	INK, COLORED INK	DRAFTING CLOTH
P.H. 073-[003]	PROPOSED WATER POWER DEVELOPMENT / FOR / MASSACHUSETTS COTTON MILLS. / LOWELL MASS.	1907/09/23	1"=10'	H 18 3/8",W 36 1/2"	BLUEPRINT	PAPER
P.H. 073-[004]	[UNTITLED PLAN OF MASS. COTTON MILLS WATERWHEELS.]	SEE NOTES	NONE	H 28", W 44"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 073-[005]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-[006]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-[007]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-[008]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				

P.H. 073-[009]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[010]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[011]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[012]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[013]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[014]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[015]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[016]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE
P.H. 073-[017]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE

P.H. 073-[019]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-[020]	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-[021]	MASSACHUSETTS COTTON MILLS / LOWELL, MASS. / MOTIVE POWER PLANTS / BY / ARTHUR T. SAFFORD & JOHN A. STEVENS / PRELIMINARY / 15 SHEETS NO. 22 TO 36 INCLUSIVE.	1907/12/00	NONE	H 55.5, W 45.5 CM	BLUEPRINT	PAPER
P.H. 073-022	THRUST BEARING.	1907/12/00	NONE	H 22", W 41 5/8"	BLUEPRINT	PAPER
P.H. 073-023	THRUST BEARING.	SEE NOTES	NONE	H 20 1/2",W 41 6/8"	BLUEPRINT	PAPER
P.H. 073-024	THRUST BEARING.	SEE NOTES	NONE	H 21 2/8",W 41 1/2"	BLUEPRINT	PAPER
P.H. 073-025	THRUST BEARING.	UNDATED	NONE	H 21",W 41 1/2"	BLUEPRINT	PAPER
P.H. 073-026	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-027	PLAN OF PROPERTY.	1907/11/00	1"=20'	H 23", W 36"	BLUEPRINT	PAPER
P.H. 073-028	PLAN & ELEVATION / OF / PROPOSED COAL CONVEYOR.	1907/10/00	1"=20'	H 15 1/8",W 39 1/8"	BLUEPRINT	PAPER
P.H. 073-029	PLAN & ELEVATIONS / OF / PROPOSED BOILER HOUSE & COAL POCKET.	1907/00/00	1"=10'	H 23 1/8",W 38 1/2"	BLUEPRINT	PAPER
P.H. 073-030	[UNTITLED PLAN]	1907/00/00	1"=10'	H 23 1/2",W 37"	BLUEPRINT	PAPER

P.H. 073-031	PLAN OF ARRANGEMENT "A".	1907/00/00	1"=10'	H 22 5/8",W 37 2/8"	BLUEPRINT	PAPER
P.H. 073-032	PLAN OF ARRANGEMENT "B".	1907/00/00	1"=10'	H 23",W 37"	BLUEPRINT	PAPER
P.H. 073-033	PLAN OF ARRANGEMENT "C".	1907/00/00	1"=10'	H 22",W 40 1/2"	BLUEPRINT	PAPER
P.H. 073-034	PLAN OF ARRANGEMENT "D".	1907/00/00	1"=10'	H 23 1/2", W 41 1/2"	BLUEPRINT	PAPER
P.H. 073-035	ELEVATION OF ARRANGEMENT "C".	1907/00/00	1"=10'	H 22 2/8", W 39 6/8"	BLUEPRINT	PAPER
P.H. 073-036	DETAIL OF PARTS.	1907/00/00		H 22 2/8",W 39"	BLUEPRINT	PAPER
P.H. 073-037	DESIGN FROM DRAWING OF / MANHATTAN RAILWAY CO'S PLANT / NEW YORK.	1907/12/00	1"=10'	H 25",W 23"	BLUEPRINT	PAPER
P.H. 073-038	PLAN OF BOILER HOUSE AND COAL POCKET.	1907/12/07	1"=10'	H 21 6/8",W 32"	BLUEPRINT	PAPER
P.H. 073-039	PLAN OF / BOILER HOUSE BASEMENT & ENGINE ROOM.	1907/12/00	1"=10'	H 20 6/8", W 31 7/8"	BLUEPRINT	PAPER
P.H. 073-040	ELEVATION OF BOILER HOUSE & COAL POCKET.	1907/12/00	1"=10'	H 22",W 32 1/2"	BLUEPRINT	PAPER
P.H. 073-041	DIAGRAM OF PRIME MOVERS WITH SPECIAL REFERENCE TO GROSS & NET EFFECTIVE HORSE POWER / 17 PAIRS OF GEARS ON OPERATION AT PRESENT TIME.	1907/00/00	NONE	H 22", W 32"	BLUEPRINT	PAPER
P.H. 073-042	ELEVATIONS OF / PROPOSED ENGINE HOUSE.	1907/12/00	1"=10'	H 21 1/2",W 32"	BLUEPRINT	PAPER
P.H. 073-043	FRONT ELEVATION OF PROOSED / BOILER HOUSE, ENGINE HOUSE AND COAL POCKET.	1907/12/00	1"=10'	H 22 1/2",W 32"	BLUEPRINT	PAPER
P.H. 073-044	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				
P.H. 073-045	[POWER DEVELOPMENT SCHEME 1907-08. 45 BLUE PRINTS & DRAWINGS BY A. T. SAFFORD AND J. A. STEVENS, ENGRS.]	SEE TITLE				

P.H. 074-[D]	PLAN OF CERTAIN STREETS IN / LOWELL, MASS. LOWELL, MASS. / PROP. OF LOCKS AND CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER,	1903/10/00	1"=50'	H 91.5, W 325.2 CM	INK, GRAPHITE LITHOGRAPH, COLORED	PAPER
P.H. 074-[E]	CONCORD RIVER AND CANALS.	1912/07/00	3/16"=50'	H 77.5, W 104.2 CM	INK, GRAPHITE	PAPER
P.H. 074-A	COPY OF / INDEX MAP / OF LOWELL, MASS. / SUPPLY AND DISTRIBUTION / SYSTEMS / [AND MAP OF DISTRICT INCLUDING CORPORATIONS SHOWING HYDRANT, & WATER MAINS OF] LOWELL WATER WORKS [& LOCKS & CANALS.]	1915/01/01	1"=500'	H 133, W 210.6 CM	BLUE LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 074-A-[COPY 1]	COPY OF / INDEX MAP / OF LOWELL, MASS. / SUPPLY AND DISTRIBUTION / SYSTEMS / [AND MAP OF DISTRICT INCLUDING CORPORATIONS SHOWING HYDRANT, & WATER MAINS OF] LOWELL WATER WORKS [& LOCKS & CANALS.]	1905/00/00	1"=500'	H 134.5, W 212 CM	PHOTOGRAPHIC NEGATIVE	PAPER
P.H. 074-B-[01]	COPY OF / MAP / OF / DISTRICT INCLUDING CORPORATIONS / SHOWING HYDRANTS AND WATER MAINS / OF / LOWELL WATER WORKS / AND THOSE OF THE / PROPRIETORS OF LOCKS AND CANALS (IN AND ADJACENT TO STREETS) / ALSO / FIRE ALARM BOXES WITH NUMBERS AND LOCATION.	1915/04/00	1"=100'	H 135, W 109 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

P.H. 074-B-[01]-[COPY 1]	COPY OF / MAP / OF / DISTRICT INCLUDING CORPORATIONS / SHOWING HYDRANTS AND WATER MAINS / OF / LOWELL WATER WORKS / AND THOSE OF THE / PROPRIETORS OF LOCKS AND CANALS (IN AND ADJACENT TO STREETS) / ALSO / FIRE ALARM BOXES WITH NUMBERS AND LOCATION.	1915/04/00	1"=100'	H 135, W 109 CM	BLACK LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 074-B-[02]	SUPPLEMENTARY PLAN / SHOWING / LOCKS & CANALS PIPES / LAID FOR EXTINGUISHING FIRE.	1915/04/03	1"=500'	H 57.3, W 68.5 CM	INK, WATER COLOR	DRAFTING CLOTH
P.H. 074-B-[02]-[COPY 1]	SUPPLEMENTARY PLAN / SHOWING / LOCKS & CANALS PIPES / LAID FOR EXTINGUISHING FIRE.	1915/04/03	1"=500'	H 57.7, W 69.8 CM	BLACK LINE PRINT	PAPER
P.H. 074-B-[02]-[COPY 2]	SUPPLEMENTARY PLAN / SHOWING / LOCKS & CANALS PIPES / LAID FOR EXTINGUISHING FIRE.	1915/04/03	1"=500'	H 57.7, W 69.8 CM	PHOTONEGATIVE, COLORED PENCIL	PAPER
P.H. 074-C	PLAN OF / A PART OF THE CITY OF LOWELL, MASS. / SHOWING CONNECTION OF WATER MAINS OF THE / CITY OF LOWELL & PROPS. OF LOCKS & / CANALS & CONNECTIONS WITH THE RESER- / VOIRS.	1907/11/00	1"=500'	H 29 1/2",W 31"	INK, WATER COLOR, COLORED INK	DRAFTING CLOTH
P.H. 075-[044]	LUMBER = HARD PINE.	UNDATED	1/2"-1'	H 21.5, W 28 CM	BLUE LINE PRINT, INK	PAPER
P.H. 075-001	INDEX MAP / OF / LOWELL, MASS. / SHOWING [FLOOD AREAS] / SUPPLY & DISTRIBUTION / SYSTEMS / LOWELL WATER WORKS	1936/00/00	1"=500'	H 52 1/2", W 83"	LITHOGRAPH, WATER COLOR, COLORED PENCIL	CLOTH BACKED PAPER

P.H. 075-001-[COPY 1]	INDEX MAP / OF / LOWELL, MASS. / SHOWING / SUPPLY AND DISTRIBUTION / SYSTEMS / LOWELL WATER WORKS.	1905/00/00	1/2"=500'	H 52 1/2", W 83"	PHOTOGRAPH, WATER COLOR, INK	PAPER
P.H. 075-002	LOWELL, MASS. / PROP. OF LOCKS AND CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND AND CANALS [SYSTEM].	1912/07/00	3/16"=50'	H 30 1/2",W 41"	COLORED LITHOGRAPH	PAPER
P.H. 075-003	MAP OF LOWELL ABOVE DAM SHOWING FLOOD AREAS.	UNDATED	NONE	H 31", W 41"	BLUE LINE PRINT	PAPER
P.H. 075-004	PLAN OF LOWELL / ABOVE PAWTUCKET DAM SHOWING AREA / FLOODED BY HIGH WATER OF MARCH 2 AND 3, 1896.	1916/02/01	1"=500'	H 80, W 106.7 CM	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 075-005	MAP OF LOWELL ABOVE DAM SHOWING CONTOURS. [ALSO SHOWS AREA FLOODED NORTH OF VARNUM AVE.]	UNDATED	NONE	H 36 1/2", W 42"	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 075-006-(A)	PLAN & PROFILE / OF / VARNUM AVENUE / FROM / MAMMOTH ROAD TO BROOKSIDE STREET.	1915/07/03	1"=50'	H 25", W 51"	INK	DRAFTING CLOTH
P.H. 075-006-(B)	PLAN AND PROFILE / OF / VARNUM AVENUE / FROM MAMMOTH ROAD TO BROOKSIDE STREET.	1915/07/03	1"=50'	H 24 6/8", W 44"	BLUEPRINT	PAPER
P.H. 075-007-(A)	PLAN & PROFILE / OF / STREETS IN PAWTUCKETVILLE / NEAR / PAWTUCKET DAM.	1915/07/10	1"=150',1"=4'	H 23 6/8", W 29 2/8"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 075-007-(B)	PLAN & PROFILE / OF / STREETS IN PAWTUCKETVILLE / NEAR / PAWTUCKET DAM.	1915/07/10	1"=50',150',4'	H 23 1/2", W 29"	BLUEPRINT	PAPER
P.H. 075-008-(A)	SECTIONS IN MERRIMACK RIVER / AT SCHOOL ST. BRIDGE / AND ABOVE (LOOKING UPSTREAM).	1915/07/00	1"=20'	H 36", W 25 1/2"	INK, COLORED INK	DRAFTING CLOTH

P.H. 075-008-(B)	SECTIONS IN MERRIMACK RIVER / AT SCHOOL ST. BRIDGE / AND ABOVE (LOOKING UPSTREAM).	1915/06/00	1"=20'	H 36", W 20"	BLUEPRINT	PAPER
P.H. 075-009-(A)	[HEIGHTS OF DIFFERENT POINTS IN VICINITY OF BLACK BROOK].	UNDATED				
P.H. 075-009-(B)	[UNTITLED PLAN]. [HEIGHTS OF DIFFERENT POINTS IN VICINITY OF BLACK BROOK].	UNDATED	NONE	H 19.5, W 95 CM	INK, COLORED INK	PAPER
P.H. 075-010-(A)	PROFILES ON RIVER BOTTOM / AT / PAWTUCKET BRIDGE. / LOWELL, MASS.	UNDATED	10'=1'	H 23 6/8", W 43	BLUE LINE PRINT	PAPER
P.H. 075-010-(B)	PROFILES ON RIVER BOTTOM / AT / PAWTUCKET BRIDGE. / LOWELL, MASS.	1915/06/00	10'=1'	H 23 6/8", W 42 6/8"	BLUEPRINT	PAPER
P.H. 075-010.5	PLAN OF GATEKEEPERS HOUSE AND LOT / LOCKS AND CANALS GATE HOUSE / AT HEAD OF NORTHERN CANAL.	1916/08/15	1"=20'	NOT MEASUREABLE	BLUE LINE PRINT	PAPER
P.H. 075-011	[LOCATION OF WORKING SHANTYS AT BRIDGE.]	UNDATED				
P.H. 075-012	[UNTITLED PLAN.] [OUTLINE OF PLAN OF PAWTUCKET END OF BRIDGE SHOWING ABUTMENT.]	UNDATED	1"=40'	H 12 1/8",W 10 2/8"	INK	TRACING PAPER
P.H. 075-013	PROFILE ON B.& M. R.R. [TRACKS] FROM MIDDLESEX VILLAGE TO RED BRIDGE.	1915/07/02	NONE	H 11",W 8 2/8"	BLUEPRINT	PAPER
P.H. 075-014	[UNTITLED PLAN.] [PROPOSED PLAN FOR REINFORCED CONCRETE BRIDGE OVER MERRIMACK RIVER AT SCHOOL STREET WITH PROFILE OF SAME.]	1915/06/28	1"=10'	H 75, W 191.6 CM	INK, GRAPHITE	PAPER
P.H. 075-015	PROPOSED / [PLAN FOR] REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / AT / SCHOOL STREET [WITH PROFILE OF SAME].	1915/08/00	1"=10'	H 34 1/2", W 87"	INK	DRAFTING CLOTH

P.H. 075-015-[COPY 1]	PROPOSED / [PLAN FOR] REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / AT / SCHOOL STREET [WITH PROFILE OF SAME].	1915/08/00	1"=10'	H 107, W 245 CM	BLUE LINE PRINT	PAPER
P.H. 075-016	[BLUEPRINTS SHOWING PLAN & PROFILE OF PROPOSED] REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / CONNECTING SCHOOL STREET AND MAMMOTH ROAD. / CITY OF LOWELL, MASS. [WITH MEASUREMENTS].	1915/06/00	1/8"=1'	H 17", W 59 5/8"	BLUEPRINT	PAPER
P.H. 075-017-[01]	[BLUEPRINTS SHOWING PLAN & PROFILE OF PROPOSED] REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / CONNECTING SCHOOL STREET AND MAMMOTH ROAD. / CITY OF LOWELL, MASS. [WITH MEASUREMENTS].	1915/06/00	1/8"=10'	H 16 6/8", W 48 2/8"	BLUEPRINT	PAPER
P.H. 075-017-[02]	[BLUEPRINTS SHOWING PLAN & PROFILE OF PROPOSED] REINFORCED CONCRETE BRIDGE / OVER / MERRIMACK RIVER / CONNECTING SCHOOL STREET AND MAMMOTH ROAD. / CITY OF LOWELL, MASS. [WITH MEASUREMENTS].	1915/06/00	1/4"=10'	H 43, W 175 CM	BLUEPRINT	PAPER
P.H. 075-018	[ANOTHER STUDY OF] PROPOSED PAWTUCKETVILLE BRIDGE OVER THE / MERRIMACK RIVER / LOWELL, MASS.	1912/03/27	1"=20'	H 14",W 39"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 075-019	PLAN AND SECTION SHOWING PERMISSIBLE / WATER WAYS AND GRADES AT PROPOSED / PAWTUCKET FALLS BRIDGE / TO ILLUSTRATE LETTER OF APRIL 3, 1916 TO CITY ENGINEER.	SEE TITLE	1"=10'	H 29 3/8", W 75 1/2"	BLUEPRINT	PAPER
P.H. 075-019-(A)	PLAN AND SECTION SHOWING PERMISSIBLE / WATER WAYS AND GRADES AT PROPOSED / PAWTUCKET FALLS BRIDGE / TO ILLUSTRATE LETTER OF APRIL 3, 1916 TO CITY ENGINEER.	1916/04/10	1"=10'	H 27 1/2", W 75 1/2"	BLUE LINE PRINT	PAPER
P.H. 075-019-(B)-[COPY 1]	PLAN AND SECTION SHOWING PERMISSABLE / WATER WAYS AND GRADES AT PROPOSED / PAWTUCKET FALLS BRIDGE / TO ILLUSTRATE LETTER OF APRIL 3, 1916 TO CITY ENGINEER.	1916/04/03	1"=10'	H 28", W 69"	BLUE LINE PRINT	PAPER
P.H. 075-019-(B)-[COPY 2]	PLAN AND SECTION SHOWING PERMISSABLE / WATER WAYS AND GRADES AT PROPOSED / PAWTUCKET FALLS BRIDGE / TO ILLUSTRATE LETTER OF APRIL 3, 1916 TO CITY ENGINEER	1916/04/03	1"=10'	H 28", W 69"	BLUE LINE PRINT	PAPER
P.H. 075-019-(C)	PLAN AND SECTION SHOWING PERMISSIBLE / WATER WAYS AND GRADES AT PROPOSED / PAWTUCKET FALLS BRIDGE / TO ILLUSTRATE LETTER OF APRIL 3, 1916 TO CITY ENGINEER.	1916/04/03	1"=10'	H 29 6/8", W 74 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 075-020	[UNTITLED PLAN.] [SKETCH PLAN OF ARCH WITH MEASUREMENTS.]	UNDATED	NONE	H 5 5/8", W 45 1/2"	GRAPHITE	DRAFTING CLOTH

P.H. 075-021-(A)	PROFILE OF SCHOOL STREET / IN VICINITY OF GATE HOUSE [SHOWING PRESENT (OLD LINE), CITY, & H. F. MILLS LINE].	1916/06/30	1"=10'	H 12", W 37"	INK, COLORED INK	DRAFTING CLOTH
P.H. 075-021-(B)	PROFILE OF SCHOOL STREET / IN VICINITY OF GATE HOUSE [SHOWING PRESENT (OLD LINE), CITY, & H. F. MILLS LINE].	1916/06/30	1"=10'	H 11", W 35 2/8"	BLUE LINE PRINT	PAPER
P.H. 075-022	[UNTITLED PLAN.] [PENCIL DRAWING OF PROPOSED ROADWAY.]	1915/06/20	1"=8'	H 20 2/8", W 43"	GRAPHITE	TRACING PAPER
P.H. 075-023	ELEVATION OF PROPOSED / SCHOOL STREET BRIDGE.	1915/07/29	1/8"=1'	H 15", W 49 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 075-024	SECTIONS OF MASONRY AT SOUTH [EASTERLY] ABUTMENT AT "PAWTUCKET BRIDGE".	1915/05/00	1/4"=1'	H 27 6/8", W 36"	INK, GRAPHITE, COLORED INK, GRAPHITE	PAPER
P.H. 075-025	[PLAN OF] PAW. BRIDGE (GATE HO.) [MASONRY AT SOUTHEASTERLY ABUTMENT]	1915/05/12	1/4"=1'	H 25 1/2", W 31 1/2"	INK, WATER COLOR, COLORED INK, GRAPHITE	PAPER
P.H. 075-026	PLAN & PROFILE TO ACCOMPANY PETITION OF / INHABITANTS OF CITY OF LOWELL, MASS., JAMES E. O'DONNELL, MAYOR. / TO BUILD A REINFORCED CONCRETE BRIDGE OVER MERRIMACK RIVER / NEAR PAWTUCKET FALLS, LOWELL, MASS.	1916/06/00	1"=50',10',1000'	H 17 6/8",W 25 5/8"	BLUEPRINT, GRAPHITE	PAPER
P.H. 075-027	[PLAN SHOWING PROPOSED & ACTUAL EXCAVATIONS IN RIVER ACCOMPANYING PETITON OF CITIZENS FOR BRIDGE.]	UNDATED				

P.H. 075-028	PLAN & PROFILE TO ACCOMPANY PETITION OF / INHABITANTS OF CITY OF LOWELL,MASS., JAMES E. O'DONNELL, MAYOR. / TO BUILD A REINFORCED CONCRETE BRIDGE OVER MERRIMACK RIVER / NEAR PAWTUCKET FALLS, LOWELL, MASS.	1916/05/00	1"=50',10',600'	H 18 6/8",W 28"	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 075-029	REINFORCED CONCRETE BRIDGE / OVER MERRIMACK RIVER / AT SCHOOL STREET.	1917/09/07	1"=50'	H 14 1/2",W 21 6/8"	INK	DRAFTING CLOTH
P.H. 075-030-(A)	[ELEVATIONS OF] [UNTITLED PLAN.] [PLANS SHOWING OLD & NEW BRIDGES & PIERS.]	UNDATED	NONE	H 14 7/8", W 22"	BLUE LINE PRINT	PAPER
P.H. 075-030-(B)	[ELEVATIONS OF] [UNTITLED PLAN.] [PLANS SHOWING OLD & NEW BRIDGES & PIERS.]	UNDATED	NONE	H 14 7/8", W 22"	BLUE LINE PRINT	PAPER
P.H. 075-031-(A)	[ELEVATIONS OF] LOCKS & CANALS / GATE HOUSE / AT HEAD OF NORTHERN CANAL. [SHOWING NECESSARY CHANGES TO AGREE WITH CHANGE IN GRADE OF ST.]	1916/00/00	1"=8'	H 26.5, W 86 CM	BLUEPRINT	PAPER
P.H. 075-031-(B)	[ELEVATIONS OF] LOCKS & CANALS / GATE HOUSE / AT HEAD OF NORTHERN CANAL. [SHOWING NECESSARY CHANGES TO AGREE WITH CHANGE IN GRADE OF ST.]	1916/00/00	1"=8'	H 12 1/2", W 34 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 075-031-(C)	[ELEVATIONS OF] LOCKS AND CANALS / GATE HOUSE / AT HEAD OF NORTHERN CANAL. [SHOWING NECESSARY CHANGES TO AGREE WITH CHANGE IN GRADE OF ST.]	1916/00/00	1"=8'	H 12 1/2", W 34 1/2"	BLUEPRINT	PAPER

P.H. 075-031-(D)	[ELEVATIONS OF] LOCKS AND CANALS / GATE HOUSE / AT HEAD OF NORTHERN CANAL. [SHOWING NECESSARY CHANGES TO AGREE WITH CHANGE IN GRADE OF ST.]	1916/00/00	1"=8'	H 14 1/2", W 37 1/2"	BLUEPRINT	PAPER
P.H. 075-031-(E)	[ELEVATIONS OF] LOCKS & CANALS / GATE HOUSE / AT HEAD OF NORTHERN CANAL. [SHOWING NECESSARY CHANGES TO AGREE WITH CHANGE IN GRADE OF ST.]	1916/00/00	1"=8'	H 14 5/8", W 35 1/2"	BLUEPRINT	PAPER
P.H. 075-031-(F)	[ELEVATIONS OF] LOCKS & CANALS / GATE HOUSE / AT HEAD OF NORTHERN CANAL [SHOWING NECESSARY CHANGES TO AGREE WITH CHANGE IN GRADE OF ST.]	1916/10/00	1"=8'	H 14 2/8", W 29"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 075-032-(A)	SECTION[S] OF SCHOOL ST. / AT MIDDLE OF NORTHERN CANAL [1848, 1871, 1917].	1917/03/30	1"=8'	H 12", W 17 2/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 075-032-(B)	SECTION[S] OF SCHOOL ST. / AT MIDDLE OF NORTHERN CANAL [1848, 1871, 1917].	1917/03/30	1"=8'	H 39.5, W 50 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 075-033-[A]	SECTION OF SCHOOL STREET / OPPOSITE GATE HOUSE.	1916/12/27	1"=8'	H 12 6/8", W 16 2/8"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 075-033-[B]	SECTION OF SCHOOL STREET / OPPOSITE GATE HOUSE [UNTITLED PLAN.]	1916/12/27	1"=8'	H 10", W 13 2/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 075-034	[ELEVATION SHOWING FENCE AT GATE HOUSE.]	UNDATED	NONE	H 21, W 32 CM	INK	DRAFTING CLOTH
P.H. 075-035	NEW PAWTUCKET BRIDGE / LOWELL, MASS. / NATIONAL ENGINEERING CORPORATION / 689 LAWRENCE STREET-LOWELL, MASS.	1916/00/00	1/8"=1'	H 19 1/2",W 41 1/2"	BLUEPRINT	PAPER

P.H. 075-036	[DETAILS OF ABUTMENT G OF] NEW PAWTUCKET BRIDGE / LOWELL, MASS / NATIONAL ENGINEERING CORPORATION / 689 LAWRENCE ST. LOWELL, MASS.	SEE NOTES	1"=10',1/4"=1'	H 27 1/2", W 48"	BLUEPRINT	PAPER
P.H. 075-037	[CANAL PORTION DECK OF] NEW PAWTUCKET BRIDGE / LOWELL, MASS. / NATIONAL ENGINEERING CORPORATION / 689 LAWRENCE ST. LOWELL, MASS.	UNDATED	1/4"=1'	H 25 6/8", W 53 1/2"	BLUEPRINT	CLOTH BACKED PAPER
P.H. 075-038-(A)	ELEVATION OF CONCRETE FENCE / SOUTH OF GATE HOUSE-WEST SIDE OF SCHOOL ST.	1917/01/11	3/4"=1'	H 12 2/8",W 23 1/2"	BLUEPRINT	PAPER
P.H. 075-038-(B)	ELEVATION OF CONCRETE FENCE / SOUTH OF GATE.	1917/01/11	3/4"=1'	H 12 3/8",W 23 5/8"	INK	DRAFTING CLOTH
P.H. 075-039	NEW PAWTUCKET BRIDGE / LOWELL-MASS. / SCHEME NO. 1. [(SECTION & ELEVATIONS OF BRIDGE.)]	SEE NOTES	3/8"=1'	H 26", W 31 1/2"	BLUEPRINT	CLOTH BACKED PAPER
P.H. 075-040	NEW PAWTUCKET BRIDGE / LOWELL, MASS. [CROSS SECTION OF 60' ARCH.]	1916/04/18	1/4"=1', 3/8"=1'	H 26", W 33"	BLUEPRINT	DRAFTING CLOTH
P.H. 075-041	NEW PAWTUCKET BRIDGE / LOWELL-MASS. [117.5 ARCH SECTION].	1916/10/00	1/4"=1'	H 12 1/8", W 49 1/2"	BLUEPRINT	DRAFTING CLOTH
P.H. 075-042-[01]	NEW PAWTUCKET BRIDGE / LOWELL-MASS. / NATIONAL ENGINEERING CORPORATION / 689 LAWRENCE ST. LOWELL, MASS. / SCHEME NO. 1. [SECTION THRU CANAL PORTION.]	UNDATED	1/4"=1'	H 67.3, W 141 CM	BLUEPRINT	PAPER
P.H. 075-042-[02]	NEW PAWTUCKET BRIDGE / LOWELL-MASS. / NATIONAL ENGINEERING CORPORATION / 689 LAWRENCE ST. LOWELL, MASS. [SECTION THRU CANAL PORTION.]	SEE NOTES	1/4"=1'	H 65.5, W 136 CM	BLUEPRINT	PAPER

P.H. 075-043	[PLAN & PROFILE OF] NEW PAWTUCKET BRIDGE / LOWELL,MASS.	SEE NOTES	1"=10'	H 25 1/2",W 69 5/8"	BLUEPRINT	PAPER
P.H. 076-[01]	IMPROVEMENT OF WALL AT / OLD GUARD LOCKS.	1867/00/00	1"=5'	H 94.1, W 118.8 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 076-[02]	PROPOSED IMPROVEMENTS / AT THE / GUARD LOCKS OF PAWTUCKET CANAL.	1879/10/30	1/16"=1'	H 40.7, W 96.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
P.H. 076-[03]	IMPROVEMENTS AT GUARD LOCKS / PAWTUCKET CANAL.	1881/00/00	1"=8', 1"=1'	H 83.4, W 152.2 CM	INK, WATER COLOR, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 076-[04]	[PLANS OF OLD GUARD LOCKS SHOWING IMPROVEMENTS IN THE FOLLOWING YEARS: 1867-1879-1881-1898-1900-1901.]	1898/00/00				
P.H. 076-[05]	[PLANS OF OLD GUARD LOCKS SHOWING IMPROVEMENTS IN THE FOLLOWING YEARS: 1867-1879-1881-1898-1900-1901.]	1900/00/00				
P.H. 076-[06]	PLAN OF PAWTUCKET CANAL / AT / OLD GUARD LOCKS.	1901/12/00	1"=4'	H 136, W 197.3 CM	INK, COLORED INK, GRAPHITE	CLOTH BACKED PAPER
P.H. 077-001-(A)	PLAN OF THE / MILL YARD / OF THE / [LAWRENCE SECTION OF THE] T.& S. MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE[S].	1917/02/28	1/4"=10'	H 28 1/2",W 52 1/2"	BLUE LINE PRINT, WATER COLOR, INK	CLOTH BACKED PAPER

P.H. 077-001-(B)	PLAN OF THE / MILL YARD / OF THE / TREMONT & SUFFOLK MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1916/03/17	1/4"=10'	H 28 1/2",W 52 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 077-002-(A)	PLAN OF THE / MILLS & PRINT WORKS / OF THE / MERRIMACK MFG. CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1917/02/27	1/4"=10'	H 32 1/2", W 42"	RED LINE PRINT, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 077-002-(B)	PLAN OF THE / MILLS & PRINT WORKS / OF THE / MERRIMACK MFG. CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1916/03/08	1/4"=10'	H 77, 103 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 077-003	PLAN OF THE / MILL YARD / OF THE / BOOTT COTTON MILLS / SHOWING PIPES LAID FOR EXTINGUISHING FIRES [CORRECT AS FAR AS KNOWN TO FEB. 27, 1917].	1917/02/27	1/4"=10'	H 28", W 40 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 077-004	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	1916/03/03	1"=40'	H 29 1/8", W 42"	INK, COLORED INK	DRAFTING CLOTH
P.H. 077-005	PLAN OF THE / MILL YARD / OF THE MIDDLESEX [IPSWICH] CO'S / SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1917/02/26	1/4"=10'	H 27 1/2", W 39 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 077-006	PLAN OF THE / MILL YARD / OF THE / HAMILTON MFG.CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE[S].	1917/02/26	1/4"=10'	H 30 2/8", W 46 6/8"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 077-007	PLAN OF THE / MILL YARD / OF THE / APPLETON CO. / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE [CORRECT TO MARCH 8, 1917].	1917/03/08	1/4"=10'	H 26 1/2", W 39 1/2"	INK, COLORED INK	DRAFTING CLOTH

P.H. 077-008-(A)	PLAN OF THE / [MILL] YARD / OF THE / [SACO-] LOWELL MACHINE SHOP[S] SHOWING / PIPES LAID FOR EXTINGUISHING FIRES.	1917/02/26	1"=40'	H 27", W 40 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 077-008-(B)	PLAN OF THE / YARD / OF THE / LOWELL MACHINE SHOP / SHOWING / PIPES LAID FOR EXTINGUISHING FIRE.	SEE NOTES	1"=40'	H 24 6/8", W 38 2/8"	CLOTH BACKED PAPER RED LINE PRINT,	PAPER
P.H. 077-009	PLAN OF THE / MILL YARD / OF THE / BIGELOW CARPET CO.[COLUMBIA TEXTILE CO] / SHOWING PIPES LAID FOR EXTINGUISHING FIRE.	1919/02/13	1"=40'	H 24 6/8", W 35"	WATER COLOR,INK, COLORED INK	CLOTH BACKED PAPER
P.H. 077-010	MAP / SHOWING [SYSTEMS OF] WATER MAINS [FROM RESERVOIR TO VARIOUS CORPORATIONS] OF LOCKS & CANALS / LOWELL, MASS.	1917/03/26	1/2"=100', 1"=200'	H 22 1/2", W 45 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 078-[01]	[PLAN OF RACES FOR WHEELS 1, 1A, 2, 3, 3A, 4, 4A, OF T.& S. MILLS. (NO. 6 MILL).] CROSS SECTION OF EASTERLY RACKS / AT SUFFOLK MILLS NEAR LAWRENCE CANAL.	1897/05/20	1/2"=1'	H 57.8, W 47.1 CM	GRAPHITE	PAPER
P.H. 078-[02]	[PLAN OF RACES FOR WHEELS 1, 1A, 2, 3, 3A, 4, 4A, OF T.& S. MILLS. (NO. 6 MILL).] PLAN OF / PENSTOCKS AND FOREBAY / FOR / LAWRENCE SECTION WHEELS.	1901/04/24	1"=10'	H 71.2, W 68.3 CM	INK, COLORED INK	PAPER
P.H. 078-[03]	[PLAN OF RACES FOR WHEELS 1, 1A, 2, 3, 3A, 4, 4A, OF T.& S. MILLS. (NO. 6 MILL).] PLAN OF / PENSTOCKS AND FOREBAY / FOR / LAWRENCE SECTION WHEELS.	1901/04/24	1"=10'	H 72.4, W 105 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

P.H. 078-[04]	[PLAN OF RACES FOR WHEELS 1, 1A, 2, 3, 3A, 4, 4A, OF T.& S. MILLS. (NO. 6 MILL).] SUFFOLK.	UNDATED	NONE	H 85, W 251.2 CM	INK, WATER COLOR	PAPER
P.H. 078-[05]	[PLAN OF RACES FOR WHEELS 1, 1A, 2, 3, 3A, 4, 4A, OF T.& S. MILLS. (NO. 6 MILL).] PLAN / OF / SOME OF THE BUILDINGS OF THE / TREMONT & SUFFOLK MILLS / OVER AND ADJACENT TO THE / RACEWAYS FROM THE SUFFOLK WHEELS.	1896/12/00	1"=10'	H 58.3, W 237.6 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
P.H. 079	[MAP SHOWING] DRAINAGE AREA / OF THE / MERRIMACK [NASHUA] RIVER / IN / MASSACHUSETS / ABOVE / LAWRENCE, MASS.	1898/01/00	1/62500	H 120, W 134 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
P.H. 080-01-[01]	[PLAN OF] SACO-LOWELL SHOPS [YARD SHOWING] / LOCATION OF LOCKS AND CANALS [NEW] 12" AND 16" / WATER MAINS FOR FIRE PROTECTION [PIPE CHANGES IN 1918.]	1918/10/11	1"=10'	H 57.3, W 146 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 080-01-[02]	[PLAN OF] SACO-LOWELL SHOPS [YARD SHOWING] / LOCATION OF LOCKS AND CANALS [NEW] 12" AND 16" / WATER MAINS FOR FIRE PROTECTION [PIPE CHANGES IN 1918.]	1918/10/11	1"=10'	H 50.7, W 122 CM	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 080-01-[03]	[PLAN OF] SACO-LOWELL SHOPS [YARD SHOWING] / LOCATION OF LOCKS AND CANALS [NEW] 12" AND 16" / WATER MAINS FOR FIRE PROTECTION [PIPE CHANGES IN 1918.]	1918/10/11	1"=10'	H 80.8, W 129.7 CM	INK, COLORED INK	DRAFTING CLOTH

P.H. 080-02	[PLAN OF] SACO-LOWELL SHOPS [YARDS SHOWING LOCATION] / REMOVAL OF 8" AND 6" PIPE LINES [IN YARD] FOR COAL POCKET / ALSO / NEW CONNECTIONS FOR MILL # 4.	1918/09/18	1/4"=1'	H 50.8, W 77.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 080-03	PLAN [OF SACO-LOWELL SHOP YARDS] SHOWING / [LOCATION OF] 12" CONNECTION BETWEEN THE APPLETON CO. & SACO-LOWELL SHOPS.	1920/12/10	1"=10'& 1/8"=1'	H 80.7, W 77.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 081-001	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING PAWTUCKET CANAL BETWEEN PAWTUCKET ST. AND BROADWAY.]	1918/06/00	1"=50'	H 25", W 55"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-002	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING PAWTUCKET CANAL BETWEEN BROADWAY AND SCHOPOL ST.]	1918/06/00	1"=40'	H 29", W 51 1/2"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-003	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING PAWTUCKET CANAL BETWEEN SCHOOL ST. AND B.& M. R.R. BRIDGE.]	1918/06/00	1"=40'	H 29", W 51 1/2"	INK, WATER COLOR	DRAFTING CLOTH

P.H. 081-004	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED BORDERING PAWTUCKET CANAL BETEEN B.& M. R.R. BRIDGE AND CENTRAL ST. BRIDGE OVER LOWER PAWTUCKET CANAL AND BODERING ON THE MERR. AND HAMILTON CANALS.]	1918/06/00	1"=50'	H 35 1/2", W 67 6/8"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-005	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING LOWER LOCKS, EASTERN CANAL AND MERRIMACK CANAL FROM MERRIMACK STREET TO RIVER.]	1918/06/00	1"=50'	H 36 1/2", W 51 6/8"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-006	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING ON NORTHERN CANAL BEWTEEN SCHOOL AND MOODY STREETS.]	1918/06/00	1"=40'	H 25", W 59"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-007	CANALS / AND / CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING ON NORTHERN CANAL BETWEEN MOODY AND SUFFOLK STREETS.]	1918/06/00	1"=50'	H 24 7/8", W 55"	INK, WATER COLOR	DRAFTING CLOTH

P.H. 081-008	CANALS / AND CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING ON WESTERN CANAL BETWEEN MERR'K ST. AND THE RIVER.]	1918/06/00	1"=50'	H 29 7/8", W 51 6/8"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-009	CANALS / AND CANAL MARGINS / BELONGING TO / PROPS LOCKS & CANALS. [PLAN SHOWING LEASED AND UNLEASED LAND BORDERING ON WESTERN CANAL BETWEEN MERR'K ST. AND SWAMP LOCKS.]	1918/06/00	1"=40'	H 25", W 59"	INK, WATER COLOR	DRAFTING CLOTH
P.H. 081-010	PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER, AND CANALS. [CANAL MARGINS TAXED TO L. & C. TENANTS.]	1924/00/00	1CM=100'	H 43 1/2", W 33 1/4"	BLUE LINE PRINT, COLORED PENCIL	PAPER
P.H. 082-[01]	[DIAGRAM SHOWING] BOOTT GAGE / QUANTITIES USED BY MILLS (FROM / RIVER BOOK) VS. 11 A.M. READINGS [AT THE BOOTT GAUGE.]	1924/01/25	NONE	H 33, W 33.4 CM	INK, COLORED INK, GRAPHITE	PAPER
P.H. 082-[02]	[DIAGRAM SHOWING] DISCHARGE CURVE / OF / MERRIMACK RIVER / AT / BOOTT LOWER GAUGE.	1914/03/00	NONE	H 34.3, W 38.5 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 082-[03]	[DIAGRAM SHOWING] BOOTT GAGE VS. LAWRENCE LOWER LOCKS GAGE / 1850-1920.	1923/01/18	NONE	H 64.2, W 61 CM	INK, COLORED INK	PAPER
P.H. 082-[04]	DIAGRAM SHOWING DAILY VARIATIONS IN GAUGE HEIGHTS / ON THE MERRIMACK / RIVER, FOR THE PERIOD FROM JULY 24 TO AUGUST 22, 1914.	1918/01/31	NONE	H 53, W 77.7 CM	INK, GRAPHITE	DRAFTING CLOTH

P.H. 082-[05]	DIAGRAM SHOWING DAILY VARIATIONS IN GAUGE HEIGHTS AT VARIOUS POINTS ON THE MERRIMACK RIVER, FOR THE / PERIOD FROM NOV. 1 TO DEC. 1, 1913.	SEE TITLE	NONE	H 53.3, W 78.2 CM	INK, GRAPHITE	PAPER
P.H. 082-[06]	[DIAGRAM SHOWING HEIGHT OF MERRIMACK RIVER AT] BOOTT RIVER GAUGE [FROM AUGUST 1919 TO JULY 1920.]	SEE TITLE	NONE	H 35.5, W 109.1 CM	INK	DRAFTING CLOTH
P.H. 082-[07]	DIAGRAM SHOWING DAILY VARIATIONS IN / GAUGE HEIGHTS ON THE MERRIMACK RIVER, FOR THE PERIOD FROM APRIL 8 TO MAY 7, 1915.	1918/01/22	NONE	H 53.4, W 77.5 CM	INK, GRAPHITE	PAPER
P.H. 082-[08]	DIAGRAM SHOWING DAILY VARIATION OF / 24 HR. FLOW OF / MERRIMACK RIVER / AT / CROMWELL'S FALLS / LOWELL / LAWRENCE / SINCE JAN. 1, 1918 [TO DEC. 1918.]	1918/12/16	NONE	H 54, W 96.6 CM	COLORED INK, GRAPHITE	PAPER
P.H. 082-[09]	[UNTITLED PLAN].	SEE NOTES	NONE	H 13.7, W 41.1 CM	GRAPHITE	PAPER
P.H. 082-[10]	[UNTITLED PLAN].	SEE NOTES	NONE	H 13.7, W 41.1 CM	GRAPHITE	PAPER
P.H. 082-[11]	[UNTITLED PLAN].	SEE NOTES	NONE	H 19, W 43.2 CM	GRAPHITE	PAPER
P.H. 082-[12]	DIAGRAM SHOWING INCREASE IN FALL / AT BOOTT MILLS / BY REMOVAL OF EARTH AND STONES / AT HUNTS FALLS, FOR DIFFERENT YEARS.	SEE NOTES	NONE	H 19, W 73.1 CM	INK, GRAPHITE	PAPER
P.H. 082-[13]	MERRIMACK RIVER.	1913/03/00	NONE	H 27.7, W 21 CM	INK	PAPER

P.H. 082-[14]	HEIGHTS OF MERRIMACK RIVER / BACK OF BOOTT MILLS / FOR DIFFERENT FRESHETS.	1915/11/27	NONE	H 21.6, W 30.5 CM	INK, COLORED INK	PAPER
P.H. 082-[15]	DISCHARGE CURVE / OF / MERRIMACK RIVER.	1913/03/14	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
P.H. 082-[16]	NET FALL / BETWEEN / TREMONT GATES & BOOTT RIVER GAUGE / FOR / DIFFERENT QUANTITIES FLOWING / IN / MERRIMACK RIVER.	1913/03/14	NONE	H 29.2, W 45.7 CM	INK, COLORED INK	PAPER
P.H. 082-[17]	[UNTITLED PLAN].	SEE NOTES	NONE	H 29.2, W 41.3 CM	GRAPHITE	PAPER
P.H. 082-[18]	[UNTITLED PLAN].	SEE NOTES	NONE	H 29.2, W 93.5 CM	INK, COLORED INK, GRAPHITE	PAPER
P.H. 082-[19]	DIAGRAM / SHOWING COEFFICIENTS / TO USE FOR CONVERTING / 10 HOUR FLOW (OR 11 A.M. FLOW) TO 24 HOUR FLOW / OF THE MERRIMACK RIVER AT THE / BOOTT RIVER GAUGE LOWELL, MASS.	1914/02/00	NONE	H 35.6, W 81.5 CM	INK	DRAFTING CLOTH
P.H. 082-[20]	DISCHARGE OF / MERRIMACK RIVER AT BOOTT MILLS / LOWELL, MASS.	SEE TITLE	NONE	H 48.3, W 105.3 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 082-[21]	CONCENTRATION DIAGRAM.	SEE TITLE	NONE	H 50.1, W 77 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 082-[22]	DIAGRAM SHOWING / DISCHARGE OF MERRIMACK RIVER / AT THE BOOTT MILLS / 1910 TO 1929 INCLUSIVE.	SEE TITLE	NONE	H 56.5, W 253.5 CM	INK, COLORED INK	PAPER

P.H. 082-[23]	DIAGRAM SHOWING / DISCHARGE OF MERRIMACK RIVER / AT THE BOOTT MILLS / 1890 TO 1909 INCLUSIVE.	SEE TITLE	NONE	H 56.5, W 253.5 CM	INK, COLORED INK	PAPER
P.H. 082-[24]	DIAGRAM SHOWING / DISCHARGE OF MERRIMACK RIVER / AT THE BOOTT COTTON MILLS / 1910 TO 1919 INCLUSIVE.	SEE TITLE	NONE	H 56.5, W 253.5 CM	INK, COLORED INK	PAPER
P.H. 082-[25]	DIAGRAM SHOWING / DISCHARGE OF MERRIMACK RIVER / AT THE BOOTT MILLS / 1870 TO 1889 INCLUSIVE.	SEE TITLE	NONE	H 56.5, W 253.5 CM	INK, COLORED INK	PAPER
P.H. 083-001	LOCKS & CANALS / 12" PIPE LINE [IN APPLETON CO. PLANT] ON JACKSON STREET / LAID MARCH 1919.	1919/05/06	1"=10'	H 31 6/8", W 47 2/8"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 083-002	SKETCH SHOWING / NEW 6" [L. & C. PIPE] LINE NEAR BOILER HOUSE [LAID JUNE 1, 1919] AT / APPLETON CO.	1919/06/12	1/4"=1'	H 10 1/8",W 17 1/2"	INK	DRAFTING CLOTH
P.H. 083-003	[PLAN SHOWING] APPLETON CO. / 8" [L. & C.] PIPE [LAID 1918] BETWEEN DYE HOUSE AND MILL # 2 / NEW WORK SHOWN SHADED.	1918/09/16	1/8"=1'	H 14",W 49"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 083-004	PLAN SHOWING / [PIPE LINES IN] APPLETON [CO. PLANT AND] PUMP CONNECTIONS / WITH CHANGES OF 1918.	1919/03/07	1/4"=1'	H 22 2/8",W 63"	INK, COLORED INK	DRAFTING CLOTH
P.H. 083-005	APPLETON CO. / PLAN SHOWING [PLANT WITH] CHANGES IN FIRE PROTECTION [LINES] / FOR CONCRETE STOREHOUSE AND MILL # 5 [IN 1918].	1919/01/08	1/8"=1'	H 21",W 31 2/8"	INK	DRAFTING CLOTH
P.H. 083-005-[COPY 1]	APPLETON CO. / PLAN SHOWING CHANGES IN FIRE PROTECTION / FOR CONCRETE STORE HO. AND MILL # 5.	1919/01/08	1/8"=1'	H 21, W 79.5 CM	BLUEPRINT	PAPER

P.H. 084-[04]	SKETCH SHOWING LOCKS & CANAL'S FIRE PROTECTION PIPES / IN THE NEIGHBORHOOD OF NEW THEATRE B'LD'G, WITH PROPOSED / CHANGES IN RED.	1916/07/24	1"=40'	H 50.3, W 63 CM	BLUEPRINT, COLORED INK, COLORED PENCIL	PAPER
P.H. 084-01	[PLAN SHOWING] MIDDLESEX CO. LOWELL MASS. / PLAN SHOWING LOCATION / OF / STRAND THEATER BUILDING / WITH / PIPE [LINE (12")] CHANGES MADE IN 1916 [AFFECTING THE MIDDLESEX CO. AND 12" PIPE LINE ON WARREN STREET, LAID IN 1919.]	1916/11/00	1"=10'	H 107.5, W 120 CM	INK, COLORED INK	DRAFTING CLOTH
P.H. 084-02	[PLAN SHOWING LOCATION OF] MIDDLESEX CO. / 12" PIPE [LINE] ON WARREN ST. [LAID IN 1919. ALSO CHANGES MADE IN 12" PIPE LINE AT MIDDLESEX CO. ON ACCOUNT OF STRAND THEATRE.]	1916/03/11	1"=10'	H 48. W 72.5 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 084-03-[01]	[PLANS OF PROPOSED REDEVELOPMENT OF IPSWICH MILLS POWER.] IPSWICH MILLS / TWO STEEL CASE UNITS IN PRESENT PITS.	1923/01/29	NONE	H 54.7, W 56 CM	GRAPHITE	PAPER
P.H. 084-03-[02]	[PLANS OF PROPOSED REDEVELOPMENT OF IPSWICH MILLS POWER.] IPSWICH MILLS / PROPOSED 3 UNIT LAYOUT.	1923/01/26	NONE	H 61, W 51.2 CM	GRAPHITE	PAPER
P.H. 084-03-[03]	[PLANS OF PROPOSED REDEVELOPMENT OF IPSWICH MILLS POWER.] IPSWICH MILLS / STEEL CASED WHEEL.	1923/01/25	NONE	H 58.5, W 48 CM	GRAPHITE	PAPER

P.H. 084-03-[04]	[UNTITLED PLAN.] [PLANS OF PROPOSED REDEVELOPMENT OF IPSWICH MILLS POWER.]	SEE NOTES	NONE	H 44.8, W 57.8 CM	GRAPHITE	PAPER
P.H. 084-03-[05]	[PLANS OF PROPOSED REDEVELOPMENT OF IPSWICH MILLS POWER.] IPSWICH MILLS.	1923/01/23	1/8"=1'	H 70.5, W 81.4 CM	GRAPHITE	PAPER
P.H. 084-03-[06]	[PLANS OF PROPOSED REDEVELOPMENT OF IPSWICH MILLS POWER.] IPSWICH MILLS.	1923/01/24	NONE	H 74.2, W 104.7 CM	GRAPHITE	PAPER
P.H. 085-[01]	MAP OF / MERRIMACK RIVER / IN MASSACHUSETTS [AND] PROFILE ALONG PROPOSED MERRIMACK RIVER CHANNEL [FOR NAVIGATION FROM LOWELL TO THE SEA.]	1922/12/00	1"=1650'	H 102.9, W 276.8 CM	LITHOGRAPH, INK, COLORED INK, WATER COLOR	CLOTH BACKED PAPER
P.H. 085-[02]	PROPOSED MERRIMACK RIVER VALLEY SEWER.	1922/12/00	1"-500'	H 92.6, W 207 CM	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
P.H. 086-001	PLAN SHOWING / 12" PIPE LINE AT THE / LAWRENCE MFG. CO. [LAID 1919.]	1919/05/24	1"=10'	H 30 6/8", W 48"	INK, GRAPHITE, COLORED INK	DRAFTING CLOTH
P.H. 086-002	PLAN SHOWING / 16"& 12" MAIN OF THE / LOCKS & CANALS / FROM [12" PIPE LINE AT THE LAWRENCE MFG. CO., LAID 1919. ALSO 12" & 16" BETWEEN] TREMONT & DUTTON STS.	1921/11/04	1"=20'	H 33", W 66 3/8"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 086-003	[UNTITLED PLAN.] [PLAN SHOWING COMPLETE SYSTEM REPRESENTING THE BEST INFORMATION AVAILABLE AS TO LOCATION OF PIPE LINES NOT COVERED BY MILL YARD PLANS.]	1901/07/00	1"=100'	H 42 1/2", W 100"	INK, COLORED INK	DRAFTING CLOTH

P.H. 087-A	[PLAN OF] PAWTUCKET CANAL / FROM / SCHOOL STREET TO HAMILTON CANAL / WITH / RETAINING WALL SECTIONS / PROPRIETORS OF LOCKS AND CANALS ON MERRIMACK RIVER.	1919/00/00	1"=40'& 10'	H 36 1/2",W 74"	INK, COLORED INK	DRAFTING CLOTH
P.H. 087-B	PLAN OF / PAWTUCKET CANAL / FROM / BROADWAY TO N. & L. R. R. BRIDGE [MADE ESPECIALLY TO SHOW PROPOSED SPUR TRACK ALONG THE SOUTH BANK & ALSO THE COST & DATE OF CONSTRUCTION OF THE CANAL WALLS].	1921/11/00	1"=40'	H 33 1/2", W 95"	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 088	[THREE LITHOGRAPH MAPS OF LOWELL BY N. E. SURVEY CO.]	UNDATED				
P.H. 088-001	[MAP SHOWING PROPRIETORS OF THE CANAL SYSTEM AND PORTION OF MERRIMACK & CONCORD RIVERS SHOWING LOCATION OF BOOMS.]	1912/04/00				
P.H. 088-001-[A]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1941/07/00	1"=1000', 1/8"=50'	H 23 6/8",W 31 6/8"	BLACK LINE PRINT, COLORED PENCIL	PAPER
P.H. 088-001-[B]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1941/09/29	1"=80',30',1000',30'	H 23 6/8", W 30 5/8"	BLACK LINE PRINT, COLORED INK, INK	PAPER

P.H. 088-001-[C]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1957/07/00	1"=1000', 400'	H 93, W 110 CM	BLUE LINE PRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 088-001-[COPY 1]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1952/10/00	1"=1000', 400'	H 38, W 58.5 CM	PHOTOGRAPHIC NEGATIVE	PAPER
P.H. 088-001-[COPY 2]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1957/07/00	1"=1000', 400'	H 91.5, W 106 CM	BLUE LINE PRINT	MYLAR
P.H. 088-001-[COPY 3]	MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1957/07/00	1"=1000', 400'	H 91.5, W 114 CM	BLUE LINE PRINT	MYLAR
P.H. 088-001-[D]	[MAP SHOWING] PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1959/10/00	1"=1000', 400'	H 81, W 106 CM	BLUEPRINT, COLORED PENCIL	CLOTH BACKED PAPER
P.H. 088-002	[MAP OF LOWELL SHOWING RAILROAD NUMBERS FOR CANAL BRIDGES.]	1912/04/00				

P.H. 088-003	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / BRANCH TRACKS / MERRIMACK RIVER, CONCORD RIVER & CANALS.	1917/05/13	NONE	H 26 1/4",W 29 1/2"	CHROMO LITHOGRAPH, COLORED INK	PAPER
P.H. 088-004	LOWELL, MASS. [CANAL DISTRICT] / PROP. OF LOCKS AND CANALS / MAP SHOWING / PART OF CITY / MERRIMACK, CONCORD RIVER AND CANALS [L.& C. BRIDGES, FENCES, & LAND].	1935/07/00	1"=200'	H 34 1/2", W 42"	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
P.H. 088-005	[LOWELL CANAL DISTRICT ELECTRICAL INTERCONNECTIONS BY L.E.C.]	1918/07/00				
P.H. 088-005	[PHOTOSTAT OF SYSTEM PLAN SHOWING L. & C. NON REVENUE AREAS.]	UNDATED				
P.H. 088-006	MAP SHOWING / PROPRIETORS OF THE / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	1940/01/01	1/8"=50',1"=1000'	H 33 1/8",W 42"	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
P.H. 088-006	[LOWELL CANAL DISTRICT ELECTRICAL INTERCONNECTIONS BY L.E.C.]	1918/07/00				
P.H. 088-007	[LAND BELONGING TO PROPS. LOCKS & CANALS AND LOWELL LAND CO. AS OF 1939.] MAP SHOWING / PROPRIETORS OF THE LOCKS AND CANALS / CANAL SYSTEM / AND PORTION OF / MERRIMACK AND CONCORD RIVERS / LOWELL, MASSACHUSETTS.	SEE TITLE	1"=250'& 1"=1000'	H 86, W 108 CM	LITHOGRAPH, INK, COLORED INK	CLOTH BACKED PAPER
P.H. 088-007	[PIPE LOCATIONS UNDER BRIDGES AND CANALS (OTHER THAN L. & C.)]	1920/08/00				

P.H. 088-008	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS [LOCATION OF L.& C. REGULAR GAUGES].	1916/05/04	1/4"=10'	H 28", W 38"	CHROMOLITHOGRAPH, COLORED INK	PAPER
P.H. 088-009	[NEGATIVE PHOTOSTAT SHOWING PETITIONS TO BOARD OF TAX APPEALS.]	1934/07/27				
P.H. 088-009	[HYDRANTS OUTSIDE CORPORATION YARDS.]	UNDATED				
P.H. 088-010	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / [LAND BEING USED BY THE CITY OF LOWELL FOR PARK PURPOSES BELONGING TO THE L. & C.] PART OF CITY / MERRIMACK RIVER AND CANALS.	1927/09/00	1/4"=50'	H 26 1/8",W 38 6/8"	LITHOGRAPH, WATER COLOR	CLOTH BACKED PAPER
P.H. 088-011	LOWELL, MASS. / PROP. OF LOCKS AND CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS. ALSO PROPOSED HYDRO-ELECTRIC STATION / AT NORTHERN CANALS WASTE GATES / AND / TRANSMISSION CABLE CONNECTING TO MILLS.	1922/02/13	1"=200'	H 77.5, W 101 CM	INK, COLORED INK	CLOTH BACKED PAPER
P.H. 088-011	[PHOTOSTAT: LAND BELONGING TO PROPS. LOCKS & CANALS AS OF 1937.]	SEE TITLE				
P.H. 088-012	[MAP OF LOWELL CANAL DISTRICT SHOWING LOCATION OF POSSIBLE SURPLUS POWER STATIONS.]	UNDATED				
P.H. 088-013	[CANAL DISTRICT MAP SHOWING SIDEWALKS WHICH L.& C. IS OBLIGED TO KEEP CLEAR OF SNOW.]	UNDATED				

P.H. 088-014	[L.& C. MAP SHOWING CONDITION OF CANAL WALLS.]	1919/00/00				
P.H. 088-015	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER, AND CANALS [SHOWING REPAIRS TO CANALS WALLS, 1916-1923].	1919/00/00	1/4"=10'	H 25", W 35 1/4"	CHROMO LITHOGRAPH, COLORED INK	CLOTH BACKED PAPER
P.H. 088-016	[PROPOSED LOCATION OF TWO PRIVATE TELEPHONE LINES OWNED BY THE PROPS. OF LOCKS AND CANALS UNDER TRACKS OF THE BOSTON & MAINE R. R.]	1949/06/20	1"=30'			TRACING
P.H. 089-001	[BLUEPRINT SHOWING CROSS SECTIONS OF SEATT'S MILLS DAM SITE. UPPER BLACKWATER DEVELOPMENT. CENTRAL N.H. POWER CO. STONE & WEBSTER ENGINEERING CORP. CONCORD, N. H.]	1911/08/28	H 1"=100', V 1"=10'		BP	
P.H. 089-002	[BLUEPRINT SHOWING UPPER BLACKWATER DAM. CENTRAL POWER CO.]	1911/10/00			BP	
P.H. 089-003	[BLUEPRINT SHOWING UPPER BLACKWATER DEVELOPMENT. PROPERTY MAP, BLACKWATER BASIN. CENTRAL N.H. POWER CO. STONE & WEBSTER ENGINEERING CO. CONCORD, N. H.]	1911/10/27	1"=1000'		BP	
P.H. 089-004	[BLUEPRINT SHOWING LOCATION & TYPOGRAPHY. FLOWAGE MAP. LOWER BLACKWATER DEVELOPMENT. CENTRAL N.H. POWER CO. STONE & WEBSTER ENGRG. CO. CONCORD N. H.]	1911/10/19	1"=200'		BP	

P.H. 089-005	[BLUEPRINT SHOWING TEST BORINGS. DAM SITE. LOWER BLACKWATER DEVELOPMENT. CENTRAL N.H. POWER CO. STONE & WEBSTER ENGRG. CO. CONCORD, N. H.]	1911/10/17			BP	
P.H. 089-006	[BLUEPRINT SHOWING GENERAL PLAN OF LOWER BLACKWATER DEVELOPMENT. CENTRAL N. H. POWER CO.]	1911/09/00	1"=120'		BP	
P.H. 089-007	[BLUEPRINT SHOWING GENERAL PLAN OF UPPER BLACKWATER DEVELOPMENT. CENTRAL N. H. POWER CO.]	1911/10/24			BP	
P.H. 089-008	[BLUEPRINT SHOWING UPPER BLACKWATER DEVELOPMENT. CENTRAL N. H. POWER CO.]	1911/10/20			BP	
P.H. 089-009	[BLUEPRINT SHOWING ROUTE MAP. LOCATION & TYPOGRAPHY. LOWER BLACKWATER DEVELOPMENT. CENTRAL N. H. POWER CO. STONE & WEBSTER ENGRG. CO. CONCORD N. H.]	1911/08/28			BP	
P.H. 089-010	GENERAL PLAN / OF / BLACKWATER RIVER / HYDRO-ELECTRIC DEVELOPMENTS.	1933/10/00	1"=1 MILE OR 5000'	H 21 1/2",W 27"	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 089-011-[01]	[NEGATIVE PHOTOSTATS OF METCALF & EDDY'S BLACKWATER AND OTHER PROJECTS IN NEW HAMPSHIRE.] STATE OF NEW HAMPSHIRE / BLACKWATER PROJECT.	1933/10/00	1"=5000'	H 12 2/8", W 18 1/8"	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
P.H. 089-011-[02]	[NEGATIVE PHOTOSTATS OF METCALF & EDDY'S BLACKWATER AND OTHER PROJECTS IN NEW HAMPSHIRE.] STATE OF NEW HAMPSHIRE / WEST CANAAN PROJECT.	1933/10/00	1"=5000'	H 10 6/8",W 13 5/8"	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER

P.H. 089-011-[03]	[NEGATIVE PHOTOSTATS OF METCALF & EDDY'S BLACKWATER AND OTHER PROJECTS IN NEW HAMPSHIRE.] STATE OF NEW HAMPSHIRE / PITTSBURG PROJECT.	1933/10/00	1"=1 MILE,1/62,500	H 10 7/8",W 13 2/8"	UNKNOWN PHOTOGRAPHIC PROCESS	PAPER
P.H. 089-011-[04]	[NEGATIVE PHOTOSTATS OF METCALF & EDDY'S BLACKWATER AND OTHER PROJECTS IN NEW HAMPSHIRE.] STATE OF NEW HAMPSHIRE / LIVERMORE FALLS PROJECT	1933/10/00	1"=5000'	H 10 6/8", W 13 5/8"	PHOTOGRAPH	PAPER
P.H. 089-011-[05]	[NEGATIVE PHOTOSTATS OF METCALF & EDDY'S BLACKWATER AND OTHER PROJECTS IN NEW HAMPSHIRE.] STATE OF NEW HAMPSHIRE / SUNCOOK PONDS PROJECT.	1933/10/00	1"=1 MILE	H 10 7/8",W 13 6/8"	PHOTOGRAPH	PAPER
P.H. 089-154-004	[MAP OF PROPOSED SUNCOOK PONDS RESERVOIR.]	1922/06/12	1"=1/3 MILE			
P.H. 089-154-042	[PENCIL DRAWING OF PROPOSED LOWER BLACKWATER DAM.]	1922/12/18				
P.H. 090-001	PLAN & PROFILE / OF SEWER LOCATION FROM / LIVINGSTON'S LOT TO SWAMP LOCKS.	1922/11/20	1"=20'	H 30 2/8",W 71 2/8"	INK, GRAPHITE, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 090-002	PLAN & PROFILE / OF SEWER LOCATION [PROPOSED] FROM / LIVINGSTON LOT TO SWAMP LOCKS.	1922/07/00	1"=50'	H 30 2/8",W 71 2/8"	INK, GRAPHITE, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 091-001	BOOTT MILLS CO. / SWITCHBOARD / FRONT AND REAR VIEW [ALLIS-CHALMERS 1700 HP UNIT.]	1922/04/15	NONE	H 17 3/8",W 21 7/8"	BLUEPRINT	PAPER

P.H. 091-002	BOOTT MILLS [ALLIS-CHALMERS] 1700 HP UNIT / POWER HOUSE [ROOF.]	1922/09/14	1/2"=1'& 1"=1'	H 62.2, W 92.8 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 091-003	OUTLINE OF GENERATOR, A[LLIS-]C[HALMERS] 1700 HP UNIT] / TYPE-AV72 153-12 1/2 & E=147.	1922/04/07	NONE	H 21 7/8",W 34 1/2"	BLUEPRINT	PAPER
P.H. 091-004	[DRAWING OF] BASE RING. / TYPE AV 72 153- [ALLIS-CHALMERS 1700 HP UNIT.]	1922/01/21	1.5"=12"	H 84, W 54 CM	BLUEPRINT, GRAPHITE	PAPER
P.H. 091-004-[A]	[UNTITLED.] [LETTER FROM SALES AGENT, ALLIS-CHALMERS MFG. CO. TO MECH. SUPT. AT BOOTT MILLS.]	1922/11/14	NONE	H 11",W 8 1/2"	INK	PAPER
P.H. 091-005	[DRAWING OF] BASE RING / USED ON / HYDRAULIC TURBINE [ALLIS-CHALMERS 1700 HP UNIT].	1918/04/04	6"& 1"=12"	H 22",W 17"	BLUEPRINT	PAPER
P.H. 091-006	BOOTT MILLS-1700 H.P. UNIT / POWER HOUSE REINFORCING-I [ALLIS-CHALMERS 1700 HP UNIT] / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/07/14	1/4"=1'	H 61, W 91 CM	BLUEPRINT	PAPER
P.H. 091-007	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / CAST IRON-DRAFT TUBE RIM / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/10/11	FULL SIZE, 3/8"=1'	H 21 1/2", W 24"	INK	DRAFTING CLOTH
P.H. 091-008	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / DRAFT TUBE & STEEL / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/10/20	1/4"=1'	H 62.2, W 94 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 091-009	LUPTON PIVOTED SASH / FOR / HYDROELECTRIC POWER HO.-BOOTT MFG. CO. [ALLIS-CHALMERS 1700 HP UNIT] / ARTHUR T. SAFFORD-ENGR.-LOWELL, MASS. / DAVID LUPTON'S SONS CO. / PHILADELPHIA.	1922/10/30	NONE	H 54.5, 42 CM	BLUEPRINT	PAPER

P.H. 091-010-A	[N. E. STRUCTURAL CO. STEEL DRAWINGS AND SCHEDULES, ALLIS-CHALMERS 1700 HP UNIT.] BOOTT MILLS, LOWELL, MASS.	1922/09/05	NONE	H 18 1/2",W 11 6/8"	BLUEPRINT	PAPER
P.H. 091-010-B	[N. E. STRUCTURAL CO. STEEL DRAWINGS AND SCHEDULES, ALLIS-CHALMERS 1700 HP UNIT.] BOOTT MILLS, LOWELL, MASS.	1922/09/00	NONE	H 18 1/2",W 12"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 091-010-C	[N. E. STRUCTURAL CO. STEEL DRAWINGS AND SCHEDULES, ALLIS-CHALMERS 1700 HP UNIT.] BOOTT MILLS, LOWELL, MASS.	1927/11/00	NONE	H 18 1/2",W 12"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 091-010-D	[N. E. STRUCTURAL CO. STEEL DRAWINGS AND SCHEDULES, ALLIS-CHALMERS 1700 HP UNIT.] BOOTT MILLS, LOWELL, MASS.	1922/09/00	NONE	H 18 1/2", W 12"	BLUEPRINT	PAPER
P.H. 091-010-E	[N. E. STRUCTURAL CO. STEEL DRAWINGS AND SCHEDULES, ALLIS-CHALMERS 1700 HP UNIT.] BOOTT MILLS, LOWELL, MASS.	1922/09/00	NONE	H 18 1/2", W 12"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 091-010-F	[N. E. STRUCTURAL CO. STEEL DRAWINGS AND SCHEDULES, ALLIS-CHALMERS 1700 HP UNIT.] BOOTT MILLS-LOWELL.	1922/09/01	NONE	H 12",W 33 7/8"	BLUEPRINT	PAPER
P.H. 091-011	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / MANHOLE, DRAINS AND VENT / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/09/26	1/4",1/2", 2"=1"	H 24 1/2",W 37 1/2"	INK	DRAFTING CLOTH
P.H. 091-012	[UNTITLED PLAN.] [FOUNDATION PLAN, ALLIS-CHALMERS 1700 HP UNIT.]	1922/04/18	NONE	H 71, W 106.7 CM	BLUEPRINT	PAPER

P.H. 091-013	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / ELEVATIONS OF POWER HOUSE / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/05/19	1/4"'1'	H 65.3, W 76.7 CM	INK	DRAFTING CLOTH
P.H. 091-014	[PLAN OF] BOOTT MILLS [ALLIS-CHALMERS] 1700 H.P. UNIT / ELEVATION OF POWER HOUSE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/04/18	1"=10'	H 24 1/2",W 37 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 091-015	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / MASONRY DETAILS / PROPIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/10/20	1/4"=1'	H 65.7, 94.8 CM	INK, GRAPHITE, WATER COLOR	DRAFTING CLOTH
P.H. 091-015-[COPY 1]	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / MASONRY DETAILS / PROPIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/10/20	1/4"=1'	H 62.5, 90.3 CM	BLUEPRINT	PAPER
P.H. 091-016	BOOTT MILLS [ALLIS-CHALMERS 1700 HP UNIT] / DRAFT TUBE / PROPRIETORS OF THE LOCKS AND CANALS / LOWELL, MASS.	1922/08/28	1/2"=1'& 1"=1'	H 62.2, W 94 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 091-017	BOOTT MILLS [ALLIS-CHALMERS] 1700 HP UNIT / STRUCTURAL-STEEL-PLAN / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/06/19	3/4"=1'	H 24 1/2", W 37 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 091-018	BOOTT MILLS CO. / WIRING DIAGRAM [ALLIS-CHALMERS 1700 HP UNIT].	1922/03/23	NONE	H 11",W 8 1/2"	BLUEPRINT	PAPER
P.H. 091-019	TWO DRAIN GATES FOR 12" SQUARE OPENING [ALLIS-CHALMERS 1700 HP UNIT] / BOOTT MILLS. LOWELL, MASS.	1922/10/04	3/4"=1'	H 68.5, W 43 CM	BLUEPRINT, GRAPHITE	PAPER

P.H. 091-020	BOOTT MILLS POWER HOUSE / SILLS AND LINTELS [ALLIS-CHALMERS 1700 HP UNIT].	1922/11/03	1"=1'	H 11", W 8"	GRAPHITE	PAPER
P.H. 091-021	[PLAN & SECTION OF] PROPOSED HYDROELECTRIC PLANT. / BOOTT MILLS, LOWELL MASS. [WITH KEY PLAN, ALLIS-CHALMERS 1700 HP UNIT.]	1921/11/21	1"=8'& 250'	H 27",W 42"	BLUEPRINT	PAPER
P.H. 091-022	BOOTT MILLS-[ALLIS-CHALMERS] 1700 HP UNIT / POWER HOUSE LAYOUT / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/04/12	1/4"=1'	H 26 1/2",W 38"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 091-023	[PLAN OF] BOOTT MILLS [ALLIS-CHALMERS] 1700 H.P. UNIT / PENSTOCKS / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/03/29	1/4"=1'	H 21 1/2", W 24 1/2"	INK	DRAFTING CLOTH
P.H. 091-024	BOOTT MILLS 1700 HP UNIT / PROPOSED LAYOUT-SCHEME "A" [ALLIS-CHALMERS] / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/03/03	1/8"=1'	H 21 1/2",W 24 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 091-025	BOOTT MILLS [ALLIS-CHALMERS] 1700 HP UNIT / DRAFT TUBE / PROPRIETORS OF THE LOCKS & CANALS / LOWELL, MASS.	1922/06/14	1/2"=1'	H 24 1/2', W 37"	INK	DRAFTING CLOTH
P.H. 091-026	BOOTT MILLS-LOWELL, MASS. / EXISTING WORK-WHEELS 6, 7, AND 8 / ARTHUR T. SAFFORD CONSULTING ENGINEER / TURNER, MILLSPAUGH & SAFFORD / ENGINEERS.	1921/05/00	1/4"=1'	H 72, 108 CM	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 091-030	PROPOSED DEVELOPMENT / OF / BOOTT MILLS NOS. 3, 4 & 5 WHEELS / SHOWING / HIGH SPEED RUNNER TO DEVELOP / APPROXIMATELY [400 HP UNDER 17 FT HEAD AT 200 R. P.M. / 530HP UNDER 23 FT HEAD AT 200 R.P.M.] / LOWELL, MASS.	1944/08/15	1/4"=1',1"=10'	H 30 1/2",W 41 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 091-030-[COPY 1]	PROPOSED DEVELOPMENT / OF / BOOTT MILLS NOS 3, 4 & 5 WHEELS / SHOWING / HIGH SPEED RUNNER TO DEVELOP / APPROXIMATELY [400 HP UNDER 17 FT HEAD AT 200 R. P.M. / 530HP UNDER 23 FT HEAD AT 200 R. P. M] / LOWELL, MASS.	1944/08/15	1"=10'& 20',1/8"=1'	H 19 5/8",W 30 6/8"	BLUE LINE PRINT	PAPER
P.H. 091-031	PROPOSED DEVELOPMENT / OF / BOOTT MILLS NOS 3, 4 & 5 WHEELS / SHOWING / TWO WHEELS TO DEVELOP / APPROXIMATELY 1360 HP. UNDER 22 FT. HEAD AT 150 R.P.M.	1944/09/25	1"=10',1/8"=1'	H 22 1/2",W 31"	INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 091-032	PRELIMINARY SUGGESTIONS / FOR SETTINGS IN / 3, 4 & 5 WHEEL PITS / BOOTT MILLS / LOWELL, MASS.	1945/06/11	1/8"=1'	H 23 2/8", W 29 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 091-033	PLAN, ELEVATIONS & SECTIONS / OF / WATERWAYS OF 3, 4 & 5 WHEELS / AT / BOOTT MILLS / LOWELL, MASS.	1946/05/00	1/4"=1',1"=10'	H 30 1/2",W 41 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 091-034	PLAN & SECTION / OF / PROPOSED SURGE VENTS / FOR / NEW 3, 4 & 5 WHEELS / LOWELL, MASS. / SCHEME # 1.	1946/05/00	1/4"=1"	H 23 6/8",W 30 1/2"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 091-035	PLAN & SECTION / OF / PROPOSED SURGE VENTS / FOR / NEW 3, 4 & 5 WHEELS / LOWELL, MASS. / LOWELL, MASS. / SCHEME # 2.	1946/05/00	1/4"=1'	H 23 1/2",W 30 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 091-036	PLAN AND SECTION / OF / PROPOSED SURGE VENTS / FOR / NEW 3, 4 & 5 WHEELS / LOWELL, MASS. / BOOTT MILLS / SCHEME # 3.	1946/09/00	1/4"=1'	H 35 1/2",W 30"	INK, GRAPHITE, COLORED INK	DRAFTING CLOTH
P.H. 091-037	THREE LEFFEL VERTICAL TURBINE UNITS / FOR / BOOTT MILLS / LOWELL, MASS. [BY THE JAMES LEFFEL & CO.]	1946/07/18	3/8"=1'	H 83, W 108 CM	BLUE LINE PRINT, COLORED PENCIL	PAPER
P.H. 091-038	PLAN & SECTION / SHOWING / PROPOSED STEEL RACKS / FOR 3, 4 & 5 WHEELS / BOOTT MILLS.	SEE NOTES	1/8" & 3/4"=1',1"=2"	H 17 1/2",W 34 6/8"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 091-039	BOOTT MILLS / LOWELL, MASS. [SECTION AT TOP OF DRAFT TUBE FOR 33" Z LEFFEL WHEELS SHOWING SIZE OF FLANGE WHICH IS TO REMAINE IN PLACE].	1946/08/29	1"=1'	H 7 1/8", W 14 3/8"	INK	DRAFTING CLOTH
P.H. 092-[005]	N.E. STRUCTURAL CO. / EVERETT MASS. / FOR CENTRAL ST. BRIDGE / OVER PAWTUCKET CANAL, LOWELL, MASS. / OWNERS-PROPRIETORS OF LOCKS & CANALS.	1922/06/01	NONE	H 61, W 91.5 CM	BLUEPRINT	PAPER
P.H. 092-001-FC01	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS.	SEE NOTES	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-FC02	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS.	SEE NOTES	NONE	H 18",W 12"	BLUEPRINT	PAPER

P.H. 092-001-W01	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/14	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W02	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/19	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W03	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/19	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W04	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/19	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W05	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/19	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W06	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/14	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W07	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / BEAM SKETCH / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/19	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W08	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/15	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W09	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/20	NONE	H 18",W 12"	BLUEPRINT	PAPER

P.H. 092-001-W10	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/20	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-001-W11	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS.	1922/06/14	NONE	H 18",W 12"	BLUEPRINT	PAPER
P.H. 092-002-X01	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X02	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X03	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X04	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER

P.H. 092-002-X05	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X06	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X07	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X08	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X09	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER

P.H. 092-002-X10	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X11	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X12	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X13	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X14	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER

P.H. 092-002-X15	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X16	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X17	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X18	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER
P.H. 092-002-X19	NEW ENGLAND STRUCTURAL CO., EVERETT, MASS. / SKETCH SHEET / CENTRAL ST. BRIDGE LOWELL, MASS. SIDEWALK PRE-CAST SLABS / OWNER PROPRIETORS LOCKS & CANALS.	1922/06/04	NONE	H 19", W 12"	BLUEPRINT	PAPER

P.H. 092-003-[COPY 1]	N. E.STRUCTURAL CO. / EVERETT, MASS. / [PLAN VIEW] FOR CENTRAL ST. BRIDGE / OVER PAWTUCKET CANAL LOWELL MASS. / OWNER PROPRIETORS OF LOCKS & CANALS.	1922/03/07	1/2"& 1/4" & 3"=1"	H 24 1/2", W 36 2/8"	BLUEPRINT	PAPER
P.H. 092-003-[COPY 2]	N. E.STRUCTURAL CO. / EVERETT, MASS. / [PLAN VIEW] FOR CENTRAL ST. BRIDGE / OVER PAWTUCKET CANAL LOWELL MASS. / OWNER PROPRIETORS OF LOCKS & CANALS.	1922/03/07	1/2",1/4" &3"=1'	H 24 1/2",W 36 2/8"	BLUEPRINT	PAPER
P.H. 092-003-[COPY 3]	N. E.STRUCTURAL CO. / EVERETT, MASS. / [PLAN VIEW] FOR CENTRAL ST. BRIDGE / OVER PAWTUCKET CANAL LOWELL MASS. / OWNER PROPRIETORS OF LOCKS & CANALS.	1922/03/07	1/2"& 1/4"=1'	H 24", W 36 1/2"	BLUEPRINT	PAPER
P.H. 092-004-[COPY 1]	N. E. STRUCTURAL CO. / EVERETT MASS. [ELEVATIONS OF ABUTMENTS AND PIER] / FOR CENTRAL ST. BRIDGE / OVER PAWTUCKET CANAL LOWELL, MASS. / OWNER OF PROPRIETORS OF LOCKS & CANALS.	1922/03/10	NONE	H 24 2/8",W 36"	BLUEPRINT	PAPER
P.H. 092-004-[COPY 2]	N. E. STRUCTURAL CO. / EVERETT MASS. [ELEVATIONS OF ABUTMENTS AND PIER] / FOR CENTRAL ST. BRIDGE / OVER PAWTUCKET CANAL LOWELL, MASS. / OWNER OF PROPRIETORS OF LOCKS & CANALS	1922/03/10	NONE	H 24 2/8", W 35 6/8"	BLUEPRINT	PAPER

P.H. 093-[A]-[01]-[01]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/20	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[01]-[02]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/20	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[01]-[03]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/21	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[01]-[04]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/21	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[01]-[05]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/21	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[01]-[06]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/21	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER

P.H. 093-[A]-[01]-[07]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] CROSS SECTIONS-LOWELL / PRELIMINARY [ACROSS BRIDGE ST. FROM AMORY STREET TO MERRIMACK RIVER.]	1937/07/21	NONE	H 55.3, W 91.3 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[01]-[08]	PLAN AND SECTIONS / ON SITE OF STORE HOUSE A & B / AT THE / LOWELL INDUSTRIAL DEVELOPMENT COMPANY.	1937/04/26	1"=10'H, 1"=5'V	H 54, W 75 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 093-[A]-[02]-[01]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] COMMONWEALTH OF MASSACHUSETTS / BRIDGE OVER EASTERN CANAL / LOWELL / BRIDGE STREET.	1937/08/00	1/8, 3/4 & 1 1/2"=1'	H 55.2, W 106.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 093-[A]-[02]-[02]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] COMMONWEALTH OF MASSACHUSETTS / BRIDGE OVER EASTERN CANAL / LOWELL / BRIDGE STREET.	1937/08/00	1/8"=1'	H 55.2, W 106.1 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 093-[A]-[02]-[03]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] COMMONWEALTH OF MASSACHUSETTS / PLAN SHOWING / PROPOSED WIDENING OF BRIDGE ST. / LAID OUT IN BEHALF OF THE / CITY OF LOWELL.	1937/01/25	1"=40'	H 40.7, W 75 CM	BLUEPRINT	PAPER
P.H. 093-[A]-[03]	LOWELL / BRIDGE ST. / APPROACHES TO CENTRAL BRIDGE.	1937/07/29	1"=20' & 1"=5'	H 56, W 90.4 CM	BLUEPRINT	PAPER

P.H. 093-[B]-[01]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE; BRIDGE DETAIL DRAWINGS] THE COMMONWEALTH OF MASSACHUSETTS LOCATION OF SURVEY OF CENTRAL BRIDGE / LOWELL / BRIDGE STREET / OVER MERRIMACK RIVER.	1937/04/00	1"=20'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[02]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] PLAN AND PROFILE OF / PROPOSED RECONSTRUCTION OF EASTERLY END OF BRIDGE AND APPROACH / BRIDGE STREET / IN THE CITY OF LOWELL.	1936/12/21	1"=20'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[03]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1"=20'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[04]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1"=20'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[05]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1/8"=1'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[07]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1"=10'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[08]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1/2", 3/4"=1'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[09]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1/2"=1'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[10]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1" & 1 1/2"=1'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-[11]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	3"=1'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[B]-06]	[UNTITLED PLAN.] [BRIDGE STREET & MERRIMACK RIVER BRIDGE.]	UNDATED	1/8", 1/4", 3/4"=1'	H 56, W 106.8 CM	BLUEPRINT	PAPER

P.H. 093-[C]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] PROPOSED CENTRAL BRIDGE [OVER MERRIMACK RIVER] / LOWELL, MASS. / CELLULAR TYPE CONTINUOUS REINFORCED CONCRETE.	UNDATED	1/16=1'	H 24, W 86.6 CM	BLUEPRINT	PAPER
P.H. 093-[D]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] PLAN SHOWING LOCATION AND ALTERATIONS / IN BRIDGE STREET AS LAID OUT BY / COURT OF SESSIONS AND COUNTY COMMISSIONER.	1929/01/00	1"=50'	H 36.5, W 70 CM	BLUEPRINT	PAPER
P.H. 093-[E]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] PLAN OF THE / PROPOSED EXTENSION / OF THE / MASSACHUSETTS WASTEWAY.	1883/04/09	1"=4'	H 71.7, W 84.6 CM	BLUEPRINT	PAPER
P.H. 093-[F]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] SKETCH SHOWING / PROPOSED FENCE & SIDEWALK / ALONG PROPERTY OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1938/03/23	1"=20'	H 34.7, W 50.3 CM	GRAPHITE, COLORED INK	TRACING PAPER
P.H. 093-[G]-[01]-[COPY 1]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] [BLUE PRINT OF OLD] CENTRAL BRIDGE LOWELL MASS. / MORSE BRIDGE CO. / YOUNGSTOWN, OHIO.	1883/04/16	1"=1'	H 57, W 77.5 CM	BLUEPRINT	PAPER
P.H. 093-[G]-[01]-[COPY 2]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] [BLUE PRINT OF OLD] CENTRAL BRIDGE LOWELL MASS. / MORSE BRIDGE CO. / YOUNGSTOWN, OHIO.	1883/04/16	1"=1'	H 57.2, W 76 CM	BLUEPRINT	PAPER

P.H. 093-[G]-[02]-[COPY 1]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] [BLUE PRINT OF OLD] CENTRAL BRIDGE LOWELL MASS. / MORSE BRIDGE CO. / YOUNGSTOWN, OHIO.	1883/04/16	1"=1'	H 67.2, W 92 CM	BLUEPRINT	PAPER
P.H. 093-[G]-[02]-[COPY 2]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] [BLUE PRINT OF OLD] CENTRAL BRIDGE LOWELL MASS. / MORSE BRIDGE CO. / YOUNGSTOWN, OHIO.	1883/04/16	1"=1'	H 67.2, W 92 CM	BLUEPRINT	PAPER
P.H. 093-[G]-[02]-[COPY 3]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] [BLUE PRINT OF OLD] CENTRAL BRIDGE LOWELL MASS. / MORSE BRIDGE CO. / YOUNGSTOWN, OHIO.	1883/04/16	1"=1'	H 67.2, W 92 CM	BLUEPRINT	PAPER
P.H. 093-[H]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] [BLUE PRINT SHOWING] PROPOSED STRENGTHENING / OF / CENTRAL BRIDGE LOWELL MASS.	1920/12/15	1"=1'	H 81.2, W 120.5 CM	BLUEPRINT	PAPER
P.H. 093-[I]	[BRIDGE STREET & MERRIMACK RIVER BRIDGE.] GENERAL PLAN OF OLD / CENTRALVILLE BRIDGE / AND / VICINITY / ALSO / PRESENT BRIDGE.	1925/01/00	1"=40'	H 34.5, W 94 CM	INK, COLORED INK, COLORED PENCIL	DRAFTING CLOTH
P.H. 093-[J]	CENTRAL BRIDGE - BRIDGE STREET. CITY OF LOWELL	UNDATED	NONE	46.5 x 61 CM	BLACK LINE PRINT	PAPER
P.H. 093-[K]	PLAN OF RAMP.	UNDATED	1" & 1/2"=1'	H 65.5, W 48.5 CM	BLUEPRINT	PAPER
P.H. 093-[L]-[01]	LOWELL / CENTRAL BRIDGE LOCATED ON BRIDGE STREET / OVER MERRIMACK RIVER.	1937/12/31	1"=20'	H 55.6, W 105.5 CM	BLUEPRINT, GRAPHITE	PAPER

P.H. 093-[L]-[02]	REVISED DETAIL OF BEAM ANCHORAGE UNDER SOUTH TOWER / TEMPORARY FOOTBRIDGE / LOWELL, MASS.	1937/03/26	0.5"=1'	H 27.6, W 20.4 CM	BLUEPRINT	PAPER
P.H. 093-[M]-[A]	LOWELL / BRIDGE STREET OVER MERRIMACK RIVER. PLAN OF / PROPOSED RECONSTRUCTION OF BRIDGE AND APPROACHES / BRIDGE STREET / IN THE / CITY OF LOWELL.	UNDATED	1" & 1/8"=40'	H 56, W 106.8 CM	BLUE LINE PRINT	PAPER
P.H. 093-[M]-[B]	LOWELL / BRIDGE STREET OVER MERRIMACK RIVER.	UNDATED	1" & 1/8"=40'	H 56, W 106.8 CM	BLUEPRINT	PAPER
P.H. 093-[N]	[UNTITLED.] [LOWELL / BRIDGE STREET OVER MERRIMACK RIVER. PLAN OF / PROPOSED RECONSTRUCTION OF BRIDGE AND APPROACHES / BRIDGE STREET / IN THE / CITY OF LOWELL.]	UNDATED	NONE	H 58.5, W 87.6 CM	BLUEPRINT	PAPER
P.H. 094-[033]-001	DAILY WEATHER MAP / FOR NOV. 4, 1927.	1927/11/04	NONE	H 8 1/2", W 10 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-002	[UNTITLED GRAPH GIVING INFO. RELATIVE TO TOTAL STORM RAINFALL-INCHES AT VARIOUS STATIONS.]	UNDATED	NONE	H 8 1/8", W 7 1/2"	INK	DRAFTING CLOTH
P.H. 094-[033]-003	[UNTITLED GRAPH OF FLOWS AT SUNDERLAND FALLS, TURNERS FALLS, VERNON, BELLOWS FALLS, WHITE RIVER JUNCTION, SOUTH NEWBERRY BETWEEN NOV. 3 AND NOV. 11, 1927.]	1927/00/00	NONE	H 25, W 40.5 CM	INK	DRAFTING CLOTH
P.H. 094-[033]-004	[UNTITLED GRAPH OF FLOWS AT LAWRENCE, LOWELL, MANCHESTER, GARVINS FALLS, SEWALLS FALLS, FRANKLIN JUNCTION, BRISTOL, PLYMOUTH BETWEN NOV. 3 AND NOV. 11, PRESUMABLY IN 1927.]	SEE TITLE	NONE	H 25.5, W 44 CM	INK	DRAFTING CLOTH

P.H. 094-[033]-005	[UNTITLED GRAPH SHOWING PRECIPITATION FOR DEGREE DAYS ABOVE 27 DEGREES AT ELEVEN LOCATIONS.]	UNDATED	NONE	H 18, W 28 CM	INK	DRAFTING CLOTH
P.H. 094-[033]-006-[01]	[UNTITLED GRAPHS OF WATERSHEDS A, B & C.]	UNDATED	NONE	H 8 1/2", W 12"	INK	PAPER
P.H. 094-[033]-006-[02]	[UNTITLED GRAPHS OF WATERSHEDS A, B & C.]	UNDATED	NONE	H 8 1/2", W 12"	INK, COLORED INK	PAPER
P.H. 094-[033]-006-[03]	[UNTITLED GRAPHS OF WATERSHEDS A, B & C.]	UNDATED	NONE	H 10 1/2", W 14 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-007-[01]	DIAGRAMS SHOWING / "SIMPLIFIED" / DRAINAGE AREAS.	UNDATED	NONE	H 11 1/2", W 18"	INK, GRAPHITE	PAPER
P.H. 094-[033]-007-[02]	DIAGRAM SHOWING / "SIMPLIFIED" / DRAINAGE AREAS.	UNDATED	NONE	H 5 1/2", W 8"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-008-[01]	[UNTITLED PLAN.] [DIAGRAM SHOWING EFFECT OF VELOCITY OF FLOW ON FLOOD PEAKS]	UNDATED	NONE	H 8 7/8",W 10 6/8"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-008-[02]	DIAGRAM SHOWING [FLOOD HEIGHT AT PLYMOUTH, N. H.] EFFECT / OF / VELOCITY OF FLOW / ON / FLOOD PEAKS.	UNDATED	NONE	H 8 1/2",W 12"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 094-[033]-009-[01]	DIAGRAM SHOWING / FLOW VS. AVERAGE VELOCITY / CONNECTICUT R. AT SUNDERLAND.	UNDATED	NONE	H 8 1/2", W 12"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-009-[02]	DIAGRAM SHOWING / FLOW VS. AVERAGE VELOCITY / CONNECTICUT RIVER AT SUNDERLAND.	UNDATED	NONE	H 8 1/2", W 12"	INK, GRAPHITE	PAPER
P.H. 094-[033]-010-[01]	DIAGRAMS FOR DISCUSSION / OF / THE EFFECT OF PONDAGE.	1928/09/25	NONE	H 8 1/2", W 12"	INK, COLORED INK	PAPER
P.H. 094-[033]-010-[02]	[UNTITLED PLAN.] [FIG.1 FROM DIAGRAMS FOR DISCUSSION OF THE EFFECT OF PONDAGE]	1928/09/25	NONE	H 5",W 7"	INK, GRAPHITE	DRAFTING CLOTH

P.H. 094-[033]-011	[UNTITLED GRAPH SHOWING FLOOD HEIGHTS AT FRANKLIN JUNCTION AND GARVINS FALLS FOR PERIOD NOV. 4 THROUGH 7, PRESUMABLY 1927.]	SEE TITLE	NONE	H 7 6/8", W 8 5/8"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-012-[01]	DIAGRAM SHOWING METHOD OF OBTAINING / TOTAL FLOOD PERIOD / FROM FLOOD HYDROGRAPH.	UNDATED	NONE	H 12", W 8 1/2"	INK	PAPER
P.H. 094-[033]-012-[02]	[UNTITLED PLAN.] [DIAGRAM SHOWING METHOD OF OBTAINING TOTAL FLOOD PERIOD FROM FLOOD HYDROGRAPH.]	UNDATED	NONE	H 4 2/8", W 6 6/8"	INK	DRAFTING CLOTH
P.H. 094-[033]-013-[01]	[UNTITLED PLAN.] [FLOOD HYDROGRAPHS OF NOVEMBER 1927]	1927/00/00	NONE	H 18 1/2",W 16 6/8"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-013-[02]	FLOOD HYDROGRAPHS / OF / NOVEMBER 1927.	1927/11/00	NONE	H 21",W 16"	INK, GRAPHITE	PAPER
P.H. 094-[033]-014-[01]	FLOOD HYDROGRAPHS / OF / NOVEMBER 1927.	1927/11/00	NONE	H 21",W 16"	INK, GRAPHITE	PAPER
P.H. 094-[033]-014-[02]	[UNTITLED PLAN SHOWING FLOW AT SIX LOCATIONS BETWEEN NOV. 3 AND 9, PRESUMABLY IN 1927.]	SEE TITLE	NONE	H 46, W 41.5 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-015-[01]	HYDROGRAPH OF FLOW AT L FOR STORMS OF / UNIFORM INTENSITY AND CONSTANT VELOCITY OF FLOW. (ASSUMED VELOCITY = 4 MILES PER HOUR).	UNDATED	NONE	H 8 1/2",W 12"	INK	PAPER
P.H. 094-[033]-015-[02]	[UNTITLED PLAN.] [HYDROGRAPH OF FLOW AT L FOR STORMS OF / UNIFORM INTENSITY AND CONSTANT VELOCITY OF FLOW. (ASSUMED VELOCITY = 4 MILES PER HOUR).]	UNDATED	NONE	H 7 1/2",W 9 5/8"	INK, GRAPHITE	DRAFTING CLOTH

P.H. 094-[033]-017-[01]	CHARACTERISTIC FLOOD CURVES / (ONE INCH FLOOD ON DRAINAGE AREA ONE SQ. MILE). [UNTITLED PLAN.]	UNDATED	NONE	H 8 1/2", W 12"	INK	PAPER
P.H. 094-[033]-017-[02]	[CHARACTERISTIC FLOOD CURVES / (ONE INCH FLOOD ON DRAINAGE AREA ONE SQ. MILE).]	UNDATED	NONE	H 8 1/2", W 12"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-018-[01]	CHARACTERISTIC FLOOD CURVES MERRIMACK RIVER AT LOWELL / (ONE INCH FLOOD ON ONE SQ. MILE DRAINAGE AREA). [UNTITLED PLAN.]	UNDATED	NONE	H 8 1/2", W 12"	INK, COLORED INK	PAPER
P.H. 094-[033]-018-[02]	[CHARACTERISTIC FLOOD CURVES MERRIMACK RIVER AT LOWELL / (ONE INCH FLOOD ON ONE SQ MILE DRAINAGE AREA).]	UNDATED	NONE	H 8 1/2", W 12"	INK	DRAFTING CLOTH
P.H. 094-[033]-019	[UNTITLED GRAPH WHICH GIVES INFO RELATIVE TO RUN-OFF IN SECOND FEET VS. DRAINAGE AREA IN SQ. MILES.]	SEE NOTES	NONE	H 19 1/2",W 28"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-019-A	[UNTITLED TOPOGRAPHIC DRAWING OF NEW ENGLAND SHOWING COMPOSITION OF LAND.]	UNDATED	NONE	H 8 1/2", W 7 1/2"	INK, GRAPHITE	PAPER
P.H. 094-[033]-020	LAKE CHAMPLAIN / DRAINAGE AREA IN VERMONT.	UNDATED	5/8"=10 MILES	H 11 2/8", W 6 2/8"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-021	CONNECTICUT RIVER / DRAINAGE AREA (11,345 SQ. MILES).	UNDATED	9/32"=10 MILES	H 20", W 9 1/8"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-022	MERRIMACK RIVER / DRAINAGE AREA / (5015 SQ. MILES).	UNDATED	5/8"=10 MILES	H 10",W 6"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-023	ANDROSCOGGIN RIVER / DRAINAGE AREA / (34.70 SQ. MILES).	UNDATED	5/8"=10 MI	H 19, W 17.2 CM	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-024	KENNEBEC RIVER / DRAINAGE AREA / (5,970 SQ. MILES).	UNDATED	9/32"=10 MILES	H 10 6/8",W 7 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[033]-025	PENOBSCOT RIVER / DRAINAGE AREA.	UNDATED	5/8"=10 MILES	H 9 5/8",W 9 1/2"	INK, GRAPHITE	DRAFTING CLOTH

P.H. 094-[033]-026	[UNTITLED DIAGRAM SHOWING INFO. RELATIVE TO VOLUME OF DRAWDOWN, INFLOW DURING PERIOD OF DRAWDOWN, VOLUME OF REFILL.]	UNDATED	NONE	H 7",W 10 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-[034]	MERRIMACK RIVER / BOOTT GAUGE.	UNDATED	NONE	H 11 1/2", W 8 1/2"	INK	DRAFTING CLOTH
P.H. 094-[035]	[UNTITLED SHEET CONTAINING COPIES OF P.H. 094-002, P.H. 094-004, P.H. 094-005, AND P.H. 094-006.]	UNDATED	VARIOUS	H 59.1, W 46.4 CM	PHOTOCOPY, COLORED INK, WATER COLOR	PAPER
P.H. 094-001	MAP OF THE / N. E. STATES, / SHOWING / STATE COUNTY & TOWN BOUNDARIES, POST OFFICES, RAILROAD STATIONS & C. [SHOWING STORM OF NOV. 3-4, 1927 AT VARIOUS STATIONS IN NEW ENGLAND.]	1909/00/00	1"=12 MI [SEE NOTES]	H 42",W 29 2/8"	LITHOGRAPH, COLORED INK, WATER COLOR	PAPER
P.H. 094-002	[UNTITLED PLAN.] [ASSEMBLED TOPOGRAPHICAL MAP & PHOTOSTATS SHOWING AREAS ABOVE MANCHESTER FLOWED BY 1927 FLOOD.]	1927/00/00	1/62500	H 37", W 28"	CHROMO LITHOGRAPH, COLORED INK, WATER COLOR	PAPER
P.H. 094-002-[COPY 1]	[UNTITLED PLAN.] [ASSEMBLED TOPOGRAPHICAL MAP & PHOTOSTATS SHOWING AREAS ABOVE MANCHESTER FLOWED BY 1927 FLOOD.]	SEE TITLE	NONE	H 22 3/8", W 18 2/8"	PHOTOGRAPH	PAPER
P.H. 094-002-[COPY 2]	[UNTITLED PLAN.] [ASSEMBLED TOPOGRAPHICAL MAP & PHOTOSTATS SHOWING AREAS ABOVE MANCHESTER FLOWED BY 1927 FLOOD.]	SEE TITLE	NONE	H 16", W 7"	PHOTOGRAPH	PAPER

P.H. 094-003	[UNTITLED PLAN.] [ASSEMBLED TOPOGRAPHICAL MAP SHOWING AREAS BELOW MANCHESTER FLOWED BY 1927 FLOOD.]	1898/08/00	1/62500	H 36 1/2",W 28"	CHROMO LITHOGRAPH, COLORED INK, WATER COLOR	PAPER
P.H. 094-004	PRECIPITATION / NOV. 3 & 4, 1927 / MERRIMACK RIVER DRAINAGE AREA.	SEE TITLE	1/500,000	H 38 1/2",W 27"	LITHOGRAPH, COLORED PENCIL, COLORED INK, INK	CLOTH BACKED PAPER
P.H. 094-004-[COPY 1]	PRECIPITATION / NOV. 3 & 4, 1927 / MERRIMACK RIVER DRAINAGE AREA.	SEE TITLE	1/500,000	H 16",W 12 2/8"	PHOTOGRAPH	PAPER
P.H. 094-005	PROFILE OF [PEMIGEWASSET &] / MERRIMACK RIVER [S FROM PLYMOUTH, N. H. TO NEWBURYPORT, MASS.]	1927/11/00	NONE	H 7", W 11"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 094-005-[COPY 1]	PROFILE OF / MERRIMACK RIVER.	SEE NOTES	NONE	H 22", W 27"	POSITIVE PHOTOPRINT, INK, COLORED INK	PAPER
P.H. 094-006	[DIAGRAM SHOWING] MERRIMACK RIVER / FLOOD HEIGHTS [AND DISCHARGE AT PLYMOUTH, FRANKLIN, MANCHESTER, LOWELL & LAWRENCE] NOV. 1927.	1927/11/05	NONE	H 21", W 16"	INK, COLORED INK	PAPER

P.H. 094-006-[A]	[UNTITLED DOCUMENT WHICH GIVES DATA RELATIVE TO HEIGHTS OF MERRIMACK RIVER NOV. 5 & 6, '27 MOORE'S FALLS DATUM. ALSO GIVES DATA RELATIVE TO HEIGHTS OF MERRIMACK RIVER AT GOFF'S FALLS R.R. BRIDGE-DATED NOV. 5, 1927-MOORE'S FALLS DATUM.]	1927/11/00	NONE	H 11", W 8 1/2"	INK	PAPER
P.H. 094-006-[B]	[UNTITLED DOCUMENT WHICH GIVES DATA RELATIVE TO HEIGHTS OF MERRIMACK RIVER NOV. 5 & 6, '27 MOORE'S FALLS DATUM. ALSO GIVES DATA RELATIVE TO HEIGHTS OF MERRIMACK RIVER AT GOFF'S FALLS R.R. BRIDGE-DATED NOV. 5, 1927-MOORE'S FALLS DATUM.]	1927/00/00	NONE	H 11", W 8 1/2"	INK	PAPER
P.H. 094-006-[COPY 1]	[DIAGRAM SHOWING] MERRIMACK RIVER / FLOOD HEIGHTS [AND DISCHARGE AT PLYMOUTH, FRANKLIN, MANCHESTER, LOWELL & LAWRENCE.] NOV. 1927.	1927/11/05	NONE	H 11", W 8 1/2"	PHOTOGRAPH	PAPER
P.H. 094-007	[SMALL TRACING SHOWING] HEAVY PRECIPITATION / IN MASSACHUSETTS EAST OF [THE] CONNECTICUT RIVER / DURING [THE] STORM OF NOV. 3-4, 1927.	SEE TITLE	1/8"=10 MILES	H 10 1/2",W 16 1/2"	INK, COLORED INK, WATER COLOR, GRAPHITE	DRAFTING CLOTH
P.H. 094-008	[DIAGRAM SHOWING] PEMIGEWASSET RIVER AT PLYMOUTH, N. H. / FLOOD HEIGHTS OF NOV. 4 & 5, 1927.	SEE NOTES	NONE	H 12", W 8 1/2"	INK	PAPER

P.H. 094-009	[DIAGRAM SHOWING] MERRIMACK RIVER AT FRANKLIN JCT. N. H. / FLOOD HEIGHTS [AT FRANKLIN JCT., N. H. DURING FLOOD] OF NOV. 4 & 5, 1927.	SEE TITLE	NONE	H 12", W 8 1/2"	INK	PAPER
P.H. 094-010	[DIAGRAM SHOWING] FLOOD HEIGHTS / ON / PAWTUCKET DAM [FOR NINE HIGHEST FRESHETS.]	1927/11/00		H 12",W 8 1/2"	INK, COLORED INK	PAPER
P.H. 094-011	[DIAGRAM SHOWING] FLOOD HEIGHTS / AT / BOOTT COTTON MILLS RIVER GAUGE [FOR EIGHT HIGHEST FRESHETS].	UNDATED	NONE	H 12", W 8 1/2"	INK	PAPER
P.H. 094-012	MAP OF / NEW ENGLAND / SHOWING / STREAM GAGING STATION / PRECIPITATION FOR [DURING] STORM OF / FEB. 29-MARCH 4, 1896.	1928/02/00	2"=25'	H 42 1/2", W 31"	RED LINE PRINT, COLORED PENCIL, COLORED INK, GRAPHITE, INK	PAPER
P.H. 094-013	MAP OF / NEW ENGLAND / SHOWING / STREAM GAGING STATIONS / EXCESSIVE PRECIPITATION FOR 3 CONSECUTIVE DAYS / [TAKEN] FROM RECORDS OF MIAMI CONSERVANCY DISTRICT.	1921/03/18	2"=25'	H 42 1/2",W 31"	RED LINE PRINT, COLORED INK	INK
P.H. 094-014	[DIAGRAM OF] NOVEMBER 1927 FLOOD / [HEIGHTS IN] NASHUA & MERRIMACK RIVERS / AT NASHUA, N. H.	1928/03/00	NONE	H 22",W 27"	INK	PAPER
P.H. 094-014-[COPY 1]	[DIAGRAM OF] NOVEMBER 1927 FLOOD / [HEIGHTS IN] NASHUA AND MERRIMACK RIVERS / AT NASHUA N. H.	SEE NOTES	NONE	H 50.2, W 68.6 CM	BLUEPRINT	PAPER
P.H. 094-015	MAP OF THE / NEW ENGLAND STATES / SHOWING LOCATION AND DATES / OF MAXIMUM FLOODS ON RECORD.	1929/02/00	NONE	H 13 1/2", W 11 3/8"	INK, GRAPHITE	DRAFTING CLOTH

P.H. 094-016	[DIAGRAM SHOWING THE] RELATION OF [THE] RUN-OFF / TO / SIZE OF DRAINAGE AREA [ACCORDING TO VARIOUS FORMULAE].	UNDATED	NONE	H 23 2/8", W 29"	INK, COLORED INK	DRAFTING CLOTH
P.H. 094-017	OFFICIAL / HIGHWAY MAP / OF THE STATE OF / VERMONT [SHOWING THE TEN MILE AREAS OF THE CONNECTICUT RIVER BASIN.]	1923/00/00	1"=4 MILES	H 44", W 28"	CHROMO LITHOGRAPH, COLORED PENCIL, WATER COLOR	PAPER
P.H. 094-018	MAP OF / NEW ENGLAND / SHOWING / [THE RAINFALL OF OCT. & NOV. 1-5, 1927] STREAM GAGING STATIONS.	SEE TITLE	2"=25'	H 41 1/2", W 31"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 094-019	MAP OF NEW ENGLAND / SHOWING STREAM GAGING STATIONS [GREATEST FLOODS ON RECORD IN VARIOUS SECTIONS.]	SEE NOTES	2"=25'	H 41 1/2",W 31"	BLUEPRINT, COLORED PENCIL, WATER COLOR	PAPER
P.H. 094-020	MAP OF / NEW ENGLAND / SHOWING STREAM GAGING STATIONS [RAINFALL OF THE STORM OF JULY 12-14, 1897.]	SEE TITLE	2"=25'	H 41 1/2",W 31"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 094-021	STORM OF / SEPT. 24-29, 1909 / MAP OF / NEW ENGLAND / SHOWING / STREAM GAGING STATIONS.	SEE TITLE	2"=25'	H 42 1/2", W 31"	RED LINE PRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 094-022	[UNTITLED PLAN.] [FLOOD PROFILES OF PENOBSCOT, KENNEBEC, ANDROSCOGGIN, MERRIMACK, & CONNECTICUT RIVERS IN 1927 & THE MIAMI RIVER IN 1913.]	SEE TITLE	NONE	H 22, W 33"	INK, GRAPHITE	PAPER

P.H. 094-023	DATA FROM [FLOOD] PROFILES [OF WHITE & PASSUMPSIC RIVERS IN 1927] H. K. BARROWS / FOR ADVISORY COMM. OF ENGRS. / ON VERMONT FLOOD CONTROL.	1928/12/00	NONE	H 22", W 17 6/8"	INK, GRAPHITE	PAPER
P.H. 094-024	[UNTITLED PLAN.] [FLOOD PROFILES OF OTTER CREEK & POULTNEY RIVER IN 1927.]	1928/10/09	NONE	H 22, W 23 1/2	GRAPHITE	PAPER
P.H. 094-025	DATA TAKEN FROM PROFILES MADE BY U.S. ENGINEER OFFICE, JUNE-JULY,1928 / FIRST DISTRICT, NEW YORK CITY. [FLOOD PROFILES OF LAMOILLE, MISSISQUOI, & WINOOSKI].	1927/00/00	NONE	H 22", W 17 6/8"	INK, GRAPHITE	PAPER
P.H. 094-026	[UNTITLED GRAPH OF PLYMOUTH & BRISTOL STATIONS.] [DIAGRAM SHOWING RAINFALL FER HOUR AND RUN-OFF IN CFPS/SM FOR PEMIGEWASSET RIVER DURING NOVEMBER 1927 FLOOD.]	SEE TITLE	NONE	H 21", W 16"	INK, COLORED INK	PAPER
P.H. 094-027	DIAGRAM SHOWING TIME OF / PEAK FLOWS / MERRIMACK RIVER / AND / TRIBUTARIES / NOV. 3-8, 1927.	1927/11/00	NONE	H 21", W 16"	INK	PAPER
P.H. 094-028	DIAGRAM SHOWING / DEPTH OF RUN-OFF / IN INCHES / FOR / CERTAIN FLOODS [ON MIAMI, FARMINGTON, PENOBSCOT, SUDBURY, NEPAUG, AND CONNECTICUT RIVERS].	1929/02/19	NONE	H 53.5, W 40.5 CM	INK, GRAPHITE	PAPER
P.H. 094-029	[DIAGRAM SHOWING] HOURLY PRECIPITATION / [AT VARIOUS STATIONS WITHIN THE AREA OF] STORM OF NOVEMBER 2-5, 1927.	1927/11/00	NONE	H 21", W 16"	INK, GRAPHITE, COLORED INK	PAPER

P.H. 094-030	APPROX. PERIOD OF RAINFALL / ABOVE PLYMOUTH NOV. 2 & 3, 1927.	1927/11/00	NONE	H 21", W 16"	INK	PAPER
P.H. 094-031-[A]	[U.S.G.S. TOPOGRAPHIC MAP SHOWING MERRIMACK RIVER AS IT RUNS THROUGH NEW HAMPSHIRE SHOWING STORAGE ON RIVER NEAR CONCORD, N. H. DURING NOVEMBER 1927 FLOOD.]	SEE TITLE	NONE	H 21", W 13 2/8"	PHOTOGRAPH,INK	PAPER
P.H. 094-031-[B]	[U.S.G.S. TOPOGRAPHIC MAP SHOWING MERRIMACK RIVER AS IT RUNS THROUGH NEW HAMPSHIRE SHOWING STORAGE ON RIVER NEAR CONCORD, N. H. DURING NOVEMBER 1927 FLOOD.]	SEE TITLE	7/16"=1/2 MILE	H 21", W 13 2/8"	PHOTOGRAPH, INK	PAPER
P.H. 094-032	MAP [USED IN REPORT OF COMMITTEE ON FLOODS, BOSTON SOCIETY OF CIVIL ENGINEERS, JOURNAL OF SEPT. 1930] OF / NEW ENGLAND / SHOWING / TOTAL RAINFALL FOR THE STORM OF / NOVEMBER 2-5, 1927.	SEE NOTES	5/8"=10 MILES	H 11 1/2", W 8 1/2"	INK, GRAPHITE	DRAFTING CLOTH
P.H. 095-[021]	SKETCH SHOWING / WEST END OF PRESCOTT YARD / AND LOWER LOCKS DAM.	1927/01/08	1"=40'	H 32, W 27.5 CM	INK, COLORED PENCIL, GRAPHITE	DRAFTING CLOTH
P.H. 095-001	SURVEY [OF LAND] FROM / KEARNEY SQUARE / TO / WARREN ST. [SHOWING LOCATION OF PROPOSED STREET.]	1928/04/00	1"=10'	H 36 6/8", W 85 2/8"	GRAPHITE, INK, COLORED INK	PAPER
P.H. 095-002	PLAN SHOWING / LOCATION FOR PROPOSED STREET / FROM KEARNEY SQUARE TO WARREN STREET.	1928/05/00	1"=10'	H 34 1/2, W 42 1/2"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH

P.H. 095-003	LONGITUDINAL SECTION OF PROPOSED 60' ST., WITH [VARIOUS] CROSS SECTIONS.	1928/04/00	1"=10'	H 17 1/4", W 87"	INK, COLORED INK, WATER COLOR, GRAPHITE	PAPER
P.H. 095-004-A	[UNTITLED PLAN SHOWING LONGITUDINAL SECTION OF PROPOSED 60' ST., WITH VARIOUS CROSS SECTIONS.]	SEE NOTES	1"=10'	H 15 5/8", W 44 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 095-004-B	[UNTITLED PLAN SHOWING LONGITUDANAL SECTION OF PROPOSED 60' ST., WITH VARIOUS CROSS SECTIONS.]	SEE NOTES	1"=10'	H 15 1/2", W 42"	INK, COLORED INK	DRAFTING CLOTH
P.H. 095-005	[UNTITLED PLAN OF PRESCOTT YARD SHOWING CENTER LINE LOCATION FOR PROPOSED STREET FROM KEARNEY SQUARE TO WARREN STREET & WATERWAYS.]	SEE NOTES	NONE	H 34 1/2",W 44"	INK, COLORED INK, GRAPHITE	DRAFTING CLOTH
P.H. 095-006	PORTION OF 10 SCALE PENSTOCK PLAN [SHOWING PROPOSED STREET, WATERWAYS, & PIPE LINES WITH PROPOSED HOTEL SUPERIMPOSED] / OF / PRESCOTT WHEELS.	1928/03/21	1"=10'	H 15 5/8", W 44 2/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 095-006-[A]	PORTION OF 10 SCALE PENSTOCK PLAN [SHOWING PROPOSED STREET, WATERWAYS, & PIPE LINES WITH PROPOSED HOTEL SUPERIMPOSED] / OF / PRESCOTT WHEELS.	1928/03/21	1"=10'	H 15 5/8", W 44 2/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 095-007	[TRACING FROM ATLAS SHOWING] PORTION OF / CITY OF LOWELL / BETWEEN CONCORD RIVER AND CENTRAL ST. [WITH ELEVATIONS.]	1928/03/00	1"=150'	H 11 1/2", W 17"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH

P.H. 095-008-A	PLAN OF [AND PROFILE OF] PROPOSED STREET FROM KEARNEY SQ. TO WARREN ST. [THROUGH PRESCOTT YARD.]	1928/04/13	1"=10'	H 20 2/8", W 40"	INK	DRAFTING CLOTH
P.H. 095-008-B	PLAN OF [AND PROFILE OF] PROPOSED STREET FROM KEARNEY SQ. TO WARREN ST. [THROUGH PRESCOTT YARD.]	1928/04/13	1"=10'	H 17",W 40"	INK	DRAFTING CLOTH
P.H. 095-009	PRESCOTT YARD / OF THE / MASSACHUSETTS COTTON MILLS. / LOWELL, MASS.	1923/11/26	1"=20'	H 26", W 33 6/8"	BLUEPRINT	PAPER
P.H. 095-010	PLAN OF / PROPERTY OF MIDDLESEX COMPANY.	1928/04/00	NONE	H 24 6/8", W 35 6/8"	BLUEPRINT	PAPER
P.H. 095-011	PLAN / OF THE / LAND, FACTORIES, AND OTHER BUILDINGS, / SHOWING THE PROPOSED IMPROVEMENTS, / IN THE TOWN OF / LOWELL. [BLUEPRINT SHOWING PROPERTY OF MIDDLESEX COMPANY.]	SEE NOTES	1/4"=10'	H 35 6/8", W 47 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 095-012	[UNTITLED PLAN.] [BLUEPRINT SHOWING PROPERTY LINES AND AREAS IN PRESCOTT YARD AND LOCATION OF PROPOSED STREET.]	1928/04/11	1"=50'	H 18", W 28 1/2"	BLUEPRINT, COLORED PENCIL, INK	PAPER
P.H. 095-013-[A]	[UNTITLED PERSPECTIVE DRAWING OF A HOTEL AT LOWELL, MASS.] [SET OF BLUEPRINT PLANS OF PROPOSED HOTEL IN PRESCOTT YARD.]	1928/04/00	NONE	H 21 1/4", W 26"	BLUEPRINT	PAPER
P.H. 095-013-[B]	[SET OF BLUEPRINT PLANS OF PROPOSED HOTEL IN PRESCOTT YARD.] A HOTEL AT / LOWELL, MASS. / BASEMENT PLAN.	SEE NOTES	NONE	H 21 1/4", W 26"	BLUEPRINT	PAPER

P.H. 095-013-[C]	[SET OF BLUEPRINT PLANS OF PROPOSED HOTEL IN PRESCOTT YARD.] A HOTEL AT / LOWELL, MASS. / GROUND FLOOR.	SEE NOTES	1/8"=1'	H 21", W 27 1/2"	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 095-013-[D]	[SET OF BLUEPRINT PLANS OF PROPOSED HOTEL IN PRESCOTT YARD.] A HOTEL AT / LOWELL, MASS. / SAMPLE ROOM FLOOR PLAN.	SEE NOTES	1/8"=1'	H 21", W 27 1/2"	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 095-013-[E]	[SET OF BLUEPRINT PLANS OF PROPOSED HOTEL IN PRESCOTT YARD.] A HOTEL AT / LOWELL, MASS. / TYPICAL BEDROOM FLOOR.	SEE NOTES	1/8"=1'	H 21", W 27 1/2"	BLUEPRINT, COLORED PENCIL, GRAPHITE	PAPER
P.H. 095-014	[UNTITLED PLAN.] [BLUEPRINT SHOWING STEEL LAYOUT FOR PROPOSED BRIDGE OVER LOCK & WASTEWAY AT LOWER LOCKS.]	SEE NOTES	NONE	H 22 6/8", 26 1/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 095-015	CITY OF LOWELL, MASS. / SECTIONS OF BRIDGES / PROPOSED NEW STREET.	1928/04/00	1"=10'	H 11", W 8 1/2"	BLUEPRINT	PAPER
P.H. 095-016	CITY OF LOWELL, MASS. / PROPOSED STREET / 60 FEET WIDE.	1928/04/00	1"=50'	H 10 6/8",W 23 6/8"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 095-017-A	[UNTITLED BLUEPRINT PLAN & PROFILE OF PROPOSED 60' STREET FROM KEARNEY SQUARE TO WASTEWAY]	SEE NOTES	1"=10'	H 22 1/2", W 40 6/8"	BLUEPRINT	PAPER
P.H. 095-017-B	[UNTITLED BLUEPRINT PLAN & PROFILE OF PROPOSED 60' STREET FROM KEARNEY SQUARE TO WASTEWAY]	1928/02/00	1"=10'	H 28",W 32"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 095-018	OFFICE OF CITY ENGINEER / CITY HALL LOWELL, MASS. [BLUEPRINT SHOWING LOCATION OF PROPOSED 45' & 60' STREETS.]	1928/02/00	1"=50'	H 28", W 32"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 095-019	SCHEMES FOR / PROPOSED STREET / THROUGH / PRESCOTT, IPSWICH & MIDDLESEX / MILL YARDS [ALSO, AT DAVIDSON ST. & AT HOWE ST.]	1926/03/16	1"=100'	H 17 6/8", W 23 1/2"	BLUEPRINT	PAPER
P.H. 095-020	PROPOSED NEW STREET [SHOWING EXTENSION OF PALMER ST. FROM MARKET ST. TO MIDDLESEX ST.]	1928/05/01	1"=60'	H 29 1/2", W 34 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 096-001-[A]-[COPY 1]	PLAN SHOWING / LAND OF THE PEPPERELL MFG. CO. / SOLD TO THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / BY DEED OF JAN. 21, 1930. (BOOK 785,-PAGE 590).	SEE NOTES	1/4"=10'& 100'	H 71.5, W 111.2 CM	BLUEPRINT	PAPER
P.H. 096-001-[A]-[COPY 2]	PLAN SHOWING / LAND OF THE PEPPERELL MFG. CO. / SOLD TO THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / BY DEED OF JAN. 21, 1930. (BOOK 785,-PAGE 590).	SEE NOTES	1/4"=10'& 100'	H 71.5, W 111.2 CM	BLUEPRINT	PAPER
P.H. 096-001-[B]	PLAN SHOWING / LAND OF THE PEPPERELL MFG. CO. / SOLD TO THE / LOWELL INDUSTRIAL DEVELOPMENT CO. / BY DEED OF JAN. 21, 1930. (BOOK 785,-PAGE 590).	SEE NOTES	1/4"=10'& 100'	H 70.5, W 104 CM	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 096-002	PLAN SHOWING / MAIN STEAM LINES / AT / "MASSACHUSETTS MILLS" / OF THE LOWELL INDUSTRIAL DEVELOPMENT CO.	1919/01/00	1"=40'	H 28 1/2", W 42 1/8"	BLUE LINE PRINT	PAPER

P.H. 096-002-[D]	PLAN OF THE / MILL YARDS / OF THE "MASSACHUSETTS MILLS" / SHOWING WATERWAYS FOR WATER POWER [AND PRESENT STEAM SYSTEM].	1919/02/00	1"=40'	H 74.2, W 101.2 CM	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 096-002-A	[PLAN SHOWING] PRINCIPLE / STEAM & WATER PIPES [LINES] / IN POWER HOUSE / AT / "MASSACHUSETTS COTTON MILLS" / OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/16	NONE	H 19 1/2", W 23 6/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 096-002-A-[COPY 1]	[PLAN SHOWING] PRINCIPAL / STEAM AND WATER PIPES / IN / POWER HOUSE / AT / "MASSACHUSETTS MILLS" / OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/16	NONE	H 19 1/2", W 23 6/8"	BLUE LINE PRINT	COLORED INK
P.H. 096-002-A-[COPY 2]	[PLAN SHOWING] PRINCIPAL / STEAM & WATER PIPES / IN / POWER HOUSE / AT / "MASSACHUSETTS MILLS" / OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/16	NONE	H 19 1/2", W 23 6/8"	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 096-002-B	PLAN OF / PRINCIPAL WATER, [MAIN] STEAM, AND OIL PIPES [LINES] / IN / BOILER HOUSE / AT "MASSACHUSETTS MILLS" / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/05	NONE	H 29 1/8", W 34"	INK, COLORED INK	DRAFTING CLOTH
P.H. 096-002-B-[COPY 1]	PLAN OF / PRINCIPAL WATER, [MAIN] STEAM, AND OIL PIPES [LINES] / IN / BOILER HOUSE / AT / "MASSACHUSETTS MILLS" / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/05	NONE	H 29 1/8", W 33 6/8"	BLUE LINE PRINT, COLORED INK	PAPER

P.H. 096-002-B-[COPY 2]	PLAN OF / PRINCIPAL WATER, STEAM, AND OIL PIPES / IN / BOILER HOUSE / AT / "MASSACHUSETTS MILLS" / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/05	NONE	H 29 1/8", W 33 6/8"	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 096-002-C	[PLAN SHOWING MAIN] STEAM PIPE [LINES] / IN / DYE HOUSE & SLASHER BLDG. / "MASSACHUSETTS MILLS" / LOWELL INDUST. DEV. CO.	UNDATED	1"=20'& 40'	H 18 5/8", W 27"	INK, COLORED INK	DRAFTING CLOTH
P.H. 096-002-C-[COPY 1]	[PLAN SHOWING MAIN] STEAM PIPE [LINES] / IN / DYE HOUSE AND SLASHER BLDG. / "MASSACHUSETTS MILLS" / LOWELL INDUST. DEV. CO.	UNDATED	1"=40'	H 18 1/2", W 27 1/4"	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 096-002-C-[COPY 2]	[PLAN SHOWING MAIN] STEAM PIPE [LINES] / IN / DYE HOUSE AND SLASHER BLDG. / "MASSACHUSETTS MILLS" / LOWELL INDUST. DEV. CO.	UNDATED	1"=40'	H 18 1/2", W 27 1/4"	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 096-003	PLAN SHOWING / PRINCIPAL SANITARY & CITY WATER LINES / AT THE / "MASSACHUSETTS MILLS" / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/09/09	NONE	H 30", W 43 1/2"	BLUE LINE PRINT, COLORED INK	PAPER
P.H. 096-004	PLAN SHOWING / MAIN STEAM [RETURN] LINES / AT / "MASSACHUSETTS MILLS" / OF / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/08/16	1"=40'[SEE NOTES]	H 30", W 43 2/8"	BLUE LINE PRINT	PAPER
P.H. 096-005	[SKETCH SHOWING LOCATION OF YARD DRAINS, NEW 6" SEWER & LOCKS & CANALS WATER MAINS IN NEIGHBORHOOD OF NAPPING BUILDING & WASTE HOUSE.]	UNDATED				

P.H. 096-006	PLAN OF / PIPE TUNNELS / AT THE / "MASSACHUSETTS MILLS" / OF THE / LOWELL INDUSTRIAL DEVELOPMENT CO.	1930/11/11	1"=40'	H 30", W 43 1/2"	BLUEPRINT, COLORED INK	PAPER
P.H. 096-007	[UNTITLED PLAN.] [PLAN & ELEVATION SHOWING METHOD OF CONNECTING CABLES TO BUS BARS AT BOOTT MILLS END OF LINE]	UNDATED	1/2"=1'	H 21 1/2", W 25"	INK, WATER COLOR	PAPER
P.H. 096-008-[A]	[PROPOSED] PLAN OF / BOOTT BOILER ROOM AND LOWELL INDUSTRIAL DEVELOPMENT CO. / SHOWING PROPOSED STEAM INTERCONNECTION.	1930/05/00	1"=10'	H 14 7/8", 47 1/2"	INK, COLORED PENCIL	PAPER
P.H. 096-008-[B]	[PLAN SHOWING AGES OF L. I. D. BUILDINGS UP TO 1932.]	1932/03/10	1"=60'			
P.H. 096-009	[PLAN AND ELEVATIONS OF L. I. D. BUILDINGS AS OF APRIL 1, 1931, SHOWING AGES.]	1931/04/01	1'=30'			
P.H. 096-010	RECONSTRUCTION PLAN OF / OLD BOILER HOUSE AND COAL POCKET / MASS. COTTON MILLS, LOWELL, MASS.	1915/06/20	1/4"=1'	H 23 6/8", W 53 1/2"	INK, COLORED INK	DRAFTING CLOTH
P.H. 096-011	2ND FLOOR PLAN & ELEVATIONS. / RECONSTRUCTION NO. 2 ENG. ROOM. / MASS. COTTON MILLS-LOWELL, MASS.	1925/12/23	1/4"=1'[SEE NOTES]	H 33 1/2", W 44 1/2"	INK, COLORED INK, WATER COLOR	DRAFTING CLOTH
P.H. 096-012	PLAN OF THE / MILL YARDS / OF THE / MASSACHUSETTS COTTON MILLS / SHOWING [LOCATIONS OF POWER CABLES] / WATERWAYS FOR WATER POWER.	1919/01/00	1"=40'	H 30 2/8", W 43 2/8"	BLUEPRINT, COLORED PENCIL	PAPER

P.H. 097-[01]	LOCKS & CANALS, CO.-LOWELL / FLOOD PROFILES.	1935/01/29	H 1"=200'	H 11", W 23"	BLUEPRINT, COLORED INK, GRAPHITE	PAPER
P.H. 097-[02]	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 87, 88, 89, 90, 90-B, 91-B, 91-E, 91-D, 91-X.	1935/01/16	1"=100'	H 15 1/4", W 44 1/4"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 097-[03]	PROPERTY IN VICINITY OF / PROPRIETORS OF THE LOCKS & CANALS / LOTS 31-A, 31-B, 31-C, 33-C-2, 33-C-1, 103-J, 105, 107, 91, 92, 92-A, 91-D, 91-E, 91-X.	1935/01/16	1"=200'	H 56, W 76 CM	BLUEPRINT, COLORED PENCIL INK, COLORED INK, GRAPHITE,	PAPER
P.H. 097-[04]	FLOOD PROFILES-MERRMACK RIVER / PAWTUCKET DAM TO BELOW MOODY ST. BRIDGE.	1928/00/00	NONE	H 22", W 50 1/4"	COLORED PENCIL	PAPER
P.H. 097-[05]	RED SHOWS / HYDRO-ELECTRIC STATION / AS PROPOSED BY MR. HALL.	UNDATED	1"=50'	H 24 1/2", W 44"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 097-[06]-[A]	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS. [ALSO] PETITIONS TO BOARD OF TAX APPEALS.	1934/07/27	1"=1000', 1"=200'	H 24 1/2", W 44"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 097-[06]-[B]	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING PART OF CITY / MERRIMACK RIVER, CONCORD RIVER AND CANALS. [ALSO] PETITIONS TO BOARD OF TAX APPEALS.	1934/07/26	1"=1000', 1"=200'	H 77.4, W 114.2 CM	LITHOGRAPH, GRAPHITE, COLORED INK, WATER COLOR	CLOTH BACKED PAPER

P.H. 097-[07]	MILLION KILOWATT HOURS / AND / AVERAGE SECOND FEET / FROM / MERRIMACK RIVER AT LOWELL, MASS. / PROPRIETORS OF THE LOCKS & CANALS.	1935/08/01	NONE	H 30 1/2", W 79 1/2"	INK	DRAFTING CLOTH
P.H. 097-[08]	MILLION KILOWATT HOURS / AND / AVERAGE SECOND FEET / FROM / MERRIMACK RIVER AT LOWELL, MASS. / PROPRIETORS OF THE LOCKS & CANALS.	1935/08/01	NONE	H 30 1/2",W 81"	WATER COLOR, INK	PAPER
P.H. 097-[09]	LOWELL, MASS. / PROP. OF LOCKS & CANALS / MAP SHOWING / PART OF CITY / MERRIMACK RIVER, CONCORD RIVER & CANALS.	1935/11/16	1"=200', 1"=1000'	H 34", W 41 1/2"	LITHOGRAPH, INK, WATER COLOR	PAPER
P.H. 098-[036]	FRANKLIN FALLS DAM / FUTURE POWER DEVELOPMENT / UTILIZING FLOOD CONTROL CONDUIT / AND EAST STILLING BASIN.	1941/10/00	3/32"=1'& 1"=10'	H 62.6, 97.8 CM	INK, COLORED PENCIL	PAPER
P.H. 098-001-[01]	MERRIMACK RIVER HEIGHTS / ABOVE CREST OF / PAWTUCKET DAM.	SEE NOTES	NONE	H 11", W 17"	INK	PAPER
P.H. 098-001-[02]	MERRIMACK RIVER HEIGHTS / ABOVE CREST OF / PAWTUCKET DAM.	SEE NOTES	NONE	H 11", W 17"	INK	PAPER
P.H. 098-001-[03]	MERRIMACK RIVER HEIGHTS / ABOVE CREST OF / PAWTUCKET DAM.	SEE NOTES	NONE	H 11", W 17"	INK	PAPER
P.H. 098-001-[04]	MERRIMACK RIVER HEIGHTS / ABOVE CREST OF / PAWTUCKET DAM.	SEE NOTES	NONE	H 11", W 17"	INK	PAPER
P.H. 098-001-[05]	MERRIMACK RIVER HEIGHTS / ABOVE CREST OF / PAWTUCKET DAM.	SEE NOTES	NONE	H 11", W 17"	INK	PAPER
P.H. 098-002-[01]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / 615 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER

P.H. 098-002-[02]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / 615 SQ. MILES D. A. TO 1931. / 622 SQ. MILES D.A. FROM 1932 ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-002-[03]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / 615SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-002-[04]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / 615SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-002-[05]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / 615 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-002-[06]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / 622 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[01]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[02]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[03]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[04]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[05]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER

P.H. 098-003-[06]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[07]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[08]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-003-[09]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES 1880-1897. / D. A. 4452 SQ.MILES 1898-1934. / D. A. 4463 SQ. MILES 1935-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-004-[01]	PEMIGEWASSET RIVER / PLYMOUTH N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES, 1888-1931. / D. A. 622 SQ. MILES FROM 1932.	SEE NOTES	NONE	H 11", 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-004-[02]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES TO 1931.	SEE NOTES	NONE	H 11, W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-004-[03]	PEMIGEWASSET RIVER / PLYMOUTH N. H. / (CONTINUOUS RECORDS AFTER 1906) / D. A. 615 SQ. MILES TO 1931.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-004-[04]	PEMIGEWASSET RIVER / PLYMOUTH ,N. H. / (CONTINOUS RECORDS APR.15, TO NOV.15, INCLUSIVE NO WATER RECORDS AFTER 1906) / D. A. 615 SQ. MILES TO 1931.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER

P.H. 098-005-[01]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[02]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[03]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[04]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[05]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[06]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[07]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-005-[08]	PEMIGEWASSET RIVER / PLYMOUTH, N. H. / D. A. 615 SQ. MILES 1888-1931. / D. A. 622 SQ. MILES 1932-ON.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-006-[01]	EAST BRANCH PEMIGEWASSET RIVER / NEAR LINCOLN, N. H. 103 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER

P.H. 098-006-[02]	EAST BRANCH PEMIGEWASSET RIVER / NEAR LINCOLN, N. H. 103 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-007	PEMIGEWASSET RIVER / WOODSTOCK, N. H. / 193 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-008-[01]	BAKERS RIVER / RUMNEY, N. H. / 140 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-008-[02]	BAKERS RIVER / RUMNEY, N. H. / 140 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-009	CONTOOCOOK RIVER / PENACOOK, N. H. / 763 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-010	MERRIMACK RIVER AT LAWRENCE, MASS. / AVERAGE DISCHARGE OF PEAK DAY.	1944/03/00	NONE	H 11 5/8", W 18"	INK	PAPER
P.H. 098-011-[01]	BLACKWATER RIVER / 1927-1935, NEAR CONTOOCOOK, N.H. 131 SQ. MILES D. A. / OCT.1935 ON, NEAR WEBSTER, N. H. 129 SQ.MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-011-[02]	BLACKWATER RIVER / NEAR WEBSTER N. H. / 129 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, WATER COLOR	PAPER
P.H. 098-012	CONTOOCOOK RIVER / PENACOOK, N. H. / 763 SQ. MILES D. A.	SEE NOTES	NONE	H 11", W 17"	INK	PAPER
P.H. 098-013	DRAINAGE AREA VERSUS RUN-OFF.	UNDATED	NONE	H 11", W 17"	INK	PAPER
P.H. 098-014	PEMIGEWASSET RIVER / AT / FRANKLIN, NEW HAMPSHIRE.	UNDATED	NONE	H 8 1/2", W 12"	INK	PAPER
P.H. 098-015	PEMIGEWASSET RIVER / AT / PLYMOUTH, N.H.	UNDATED	NONE	H 8 1/2", W 12"	INK	PAPER
P.H. 098-016	MERRIMACK RIVER, BOOTT GAUGE / DISCHARGE IN C. F. P. S.	1944/01/00	NONE	H 8 1/2", W 12"	INK	PAPER

P.H. 098-017	MERRIMACK RIVER / MAIN STREAM / CHANNEL STORAGE / BETWEEN MEAN STAGE AND / THE MARCH 1936 FLOOD STAGE.	1938/00/00	NONE	H 12", W 8 1/2"	INK	PAPER
P.H. 098-018	FRANKLIN FALLS RESERVOIR / PEAK QUANTITIES BETWEEN 1 & 2 DAYS / SHOWING / HOW QUICKLY RESERVOIR FILLS WHEN WATER / IS STORED AT ELEV. 345 WITH NONE / FLOWING OUT / ALSO / REGULATED FLOW WITH POWER POOL AT EL.345	UNDATED	NONE	H 16 1/2", W 11"	INK, COLORED PENCIL	PAPER
P.H. 098-019	FRANKLIN FALLS RESERVOIR / PEAK QUANTITIES FOR 2 OR 3 DAYS / SHOWING / HOW QUICKLY RESERVOIR FILLS WHEN EMPTY / WITH NONE FLOWING OUT. / ALSO / REGULATED FLOW WITHOUT POWER POOL.	1944/04/00	NONE	H 16 1/2", W 11"	INK, COLORED PENCIL	PAPER
P.H. 098-020	[UNTITLED CHART WHICH MEASURES BILLION CUBIC FEET TO STORE 3.2 INCHES FROM WATERSHED VS. CUBIC FEET PER SECOND.]	UNDATED	NONE	H 11 1/2", W 18"	INK	PAPER
P.H. 098-021	[UNTITLED PLAN WHICH GIVES INFO. RELATIVE TO DRAINAGE AREA IN RELATION TO PRECIPITATION.]	UNDATED	NONE	H 11 1/2", W 18"	INK	PAPER
P.H. 098-022	COMPARATIVE CLIMATOLOGICAL DATA / FOR / NORTHERN & SOUTHERN NEW ENGLAND.	SEE NOTES	NONE	H 11", W 16 1/2"	INK, COLORED INK, GRAPHITE	PAPER
P.H. 098-023	[UNTITLED.] [PHOTO NEGATIVE OF ARTICLE FROM THE LOWELL SUN & PHOTO NEGATIVE OF THE VIEW OF FRANKLIN FALLS DAM NEAR FRANKLIN, N. H.]	SEE NOTES	NONE	H 11", W 8 1/2"	PHOTOGRAPH	PAPER

P.H. 098-024	FLOOD CONTROL PROJECT COMPLETED.	UNDATED	NONE	H 11", W 8 1/2"	PHOTOGRAPH	PAPER
P.H. 098-025	NEW ENGLAND / MAXIMUM RAINFALL / BETWEEN / 1934 & 1944 / FOR SELECTED STATIONS.	SEE TITLE	3/16"=5 MILES	H 12", W 9 1/2"	BLUE LINE PRINT, COLORED INK. GRAPHITE	PAPER
P.H. 098-026	[UNTITLED MAP SHOWING A PORTION OF MASSACHUSETTS & NEW HAMPSHIRE]	UNDATED	NONE	H 25 1/2", W 16 7/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 098-027	[UNTITLED MAP OF PORTION OF MASSACHUSETTS & NEW HAMPSHIRE SHOWING U. S. G. S. GAGING STATIONS & RAINFALL STATIONS.]	UNDATED	NONE	H 28", W 18 1/2"	BLUEPRINT, COLORED PENCIL	PAPER
P.H. 098-028	[UNTITLED MAP SHOWING A PORTION OF MASSACHUSETTS & NEW HAMPSHIRE]	UNDATED	NONE	H 25 1/2",W 16 7/8"	INK, COLORED INK	DRAFTING CLOTH
P.H. 098-029	MAP OF / NEW ENGLAND / SHOWING / MAXIMUM MONTHLY / PRECIPITATION RECORDS.	SEE NOTES	NONE	H 32", W 25 1/2"	INK, BLUE LINE PRINT	PAPER
P.H. 098-030	MAP OF / NEW ENGLAND / SHOWING / MAXIMUM MONTHLY / PRECIPITATION RECORDS.	SEE NOTES	NONE	H 20 1/4", W 16 1/4"	PHOTOGRAPH	PAPER
P.H. 098-031	MERRIMACK RIVER / GARVINS FALLS, N. H. / D. A. 2340 SQ. MILES, 1906-1915 [ALSO] MERRIMACK RIVER, / MANCHESTER, N. H. / D. A. 2840 SQ. MILES, 1924 TO 1931 / D. A. 2850 SQ. MILES, 1932 TO 1934 / D. A. 2854 SQ. MILES, 1935 ON.	SEE NOTES	NONE	H 21", W 30"	INK, WATER COLOR	PAPER

P.H. 098-032	MERRIMACK RIVER / FRANKLIN JUNCTION, N. H. / D. A. 1460 SQ. MILES, 1903 TO 1930 / D.A. 1510 SQ. MILES, 1931 TO 1933 / D. A. 1507 SQ. MILES, 1934 ON.	SEE NOTES	NONE	H 21", W 30"	INK, WATER COLOR	PAPER
P.H. 098-033-[01]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES, 1880-1897 / D. A. 4452 SQ. MILES, 1898-1934 / D. A. 4463 SQ. MILES, 1935-ON.	SEE NOTES	NONE	H 16 1/2",W 11"	INK, WATER COLOR	PAPER
P.H. 098-033-[02]	MERRIMACK RIVER / LAWRENCE, MASS. / D. A. 4570 SQ. MILES, 1880-1897. / D. A. 4452 SQ. MILES, 1898-1934. / D. A. 4463 SQ. MILES, 1935-ON.	SEE NOTES	NONE	H 21", W 30"	INK, WATER COLOR	PAPER
P.H. 098-034	STATE OF NEW HAMPSHIRE / HIGHWAY DEPARTMENT.	UNDATED	1/62500	H 20", W 16 1/2"	CHROMO LITHOGRAPH, COLORED INK GRAPHITE,	PAPER
P.H. 098-035	FRANKLIN FALLS RESERVOIR / STORAGE STUDIES.	1943/06/00	NONE	H 21, W 32"	COLORED PENCIL	PAPER
P.H. 109	PLAN OF / CONCORD RIVER AT LOWELL, MASS. / [FROM] BELOW MASSIC FALLS TO ABOVE HALES BROOK / COMPILED FOR / WAMESIT POWER COMPANY.	1902/02/00	1"=50'	H 141, W 200.5 CM	INK, COLORED INK, WATER COLOR, GRAPHITE	CLOTH BACKED PAPER
P.H. NOT NUMBERED	[LARGE SCALE PLAN SHOWING PENSTOCKS, RACEWAYS, ETC. FOR TURBINES TOGETHER WITH NEIGHBORING BUILDINGS.]	1902/03/00	1"=10'			

	[PLAN OF THE MERRIMACK RIVER FROM BOOTT WASTEWAY TO FOOT OF HUNT'S FALLS & OF CONCORD		
P.H. NOT NUMBERED	RIVER BELOW THE LOWER LOCKS, SHOWING ADJACENT LAND & STONE BOUNDS.]	1899/00/00	1"=40'

TYPE	CONDITION	NOTES
B	SO/TE	THE PLAN NUMBER FOR THIS DRAWING WAS GIVEN AS 155 ONLY ON BOTH THE DRAWING AND THE L. & C. INDEX CARD. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS SQ. FOOTAGE OF BUILDINGS 3, 4, 5E, & 5W LEASED BY JET CONTAINERS, INC.
B	CLEAN, TORN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
C	CLEAN	
B	CLEAN, FOLDS, PIN HOLES	
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
C	FOLDS, TAPED	THE LOWER THIRD OF LEFT SIDE IS CUT OFF.
A		
B	CLEAN, FOLDS	

B	CLEAN	A FOUR PAGE REQUEST FOR OFFERS AND A THREE PAGE EXHIBIT "A" DESCRIBING THE REAL ESTATE.
B	FOLDS	
A		
B	CLEAN	A FIVE PAGE DOCUMENT GIVING DIMENSIONS OF MILL BUILDINGS BY ROOM AND FLOOR.
A		
A		SEE PLANS 03-84, 03-85, 03-86. THIS PLAN COULD BE ANY OF THESE
B	SOILED	A MAP OF THE MASSACHUSETTS MILLS COMPLEX.
B	FOLDS, TORN	PLAN ORIGINAL DATE WAS NOVENBER, 1909.
A		
B	SOILED, FOLDS	

B	SOILED, FOLDS	
A		
A		
C	FOLDS	REFERS TO VALHALLA MILLS, INC. AND WESTGATE REALTY TRUST.
B	CLEAN	GENERIC FLOOR PLAN OF BUILDING NO. 1.
B	FOLDS	
A		
C	CLEAN	SHOWS MAKEUP WATER, CONDENSATE RETURNS & TANK SYSTEM.
B	CLEAN	
B	CLEAN	THERE IS A PICTURE GLUED TO THE PRINT OF "TWO PAIRS CYLINDER GATE HERCULES TURBINES - SET IN MASONRY FLUME, EACH PAIR DISCHARGING THROUGH A COMMON CENTER CASE AND DRAFT-TUBE."
A		
C	CLEAN	NOTES: 7' 2" HDRM, 6'7" UNDER BMS, & LALLYS 3 1/2" O.D.

B	CLEAN	
A		
C	FOLDS, SOILED	
B	CLEAN	
B	TORN	
C	TORN, FOLDS	
B	CLEAN	
B	TAPED	
C	SOILED	DETAILS TOTAL SQ. FOOTAGE FOR THE 1ST. TO THE 6TH FLOOR, HEADROOM AND FLOOR LOAD. INCLUDES PENCIL CALCULATIONS. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	

B	FOLDS, PASTED TO BACKING	
C	SOILED	SHOWS THE 2ND AND 3RD FLOORS OF NO. 1 MILL WITH SQ. FOOTAGE NUMBERS. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	
B	FOLDS	
C	SOILED	SHOWS THE 1ST. FLOOR OF NO. 2 MILL WITH SQ. FOOTAGE NUMBERS. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN, HOLE	
B	CLEAN	
C	SOILED	SHOWS THE 2ND. FLOOR OF NO. 2 MILL WITH SQ. FOOTAGE NUMBERS. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN, TAPE	
B	FOLDS	

C	CLEAN	SHOWS TOWER FRAME AND STUCCO OF SECTION 5 OF NO. 2 MIL, 7TH FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	PLAN SHOWS ONLY SECTION 5.
C	SOILED	SHOWS AREA OF THE DYE HOUSE BASEMENT. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	GENERIC FLOOR PLAN OF BUILIDNG NO. 3.
B	FOLDS	
C	SOILED	SHOWS AREA OF THE DYE HOUSE FIRST FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	
B	FOLDS	
C	SOILED	SHOWS AREA OF THE DYE HOUSE SECOND FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."

B	CLEAN	
B	FOLDS	KEY DESCRIBES SIZE OF PIPES USED, AND OWNERS OF PIPES.
C	CLEAN	SHOWS AREA OF THE SLASHER BUILDING, FIRST FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	
C	CLEAN	SHOWS AREA OF THE SLASHER BUILDING, 2ND. & 3RD.FLOORS. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
B	CLEAN	
C	TORN, FOLDS	THE DRAWING IS TORN ALMOST IN HALF.
C	CLEAN	SHOWS AREA OF THE OFFICE BUILDING, AND REPAIR SHOP, THREE FLOORS.. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	SOILED	SHOWS AREA OF THE BASEMENT AND 1ST. & 2ND. FLOORS OF THE NAPPING BLDG. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."

C	FOLDS	THE KEY SHOWS SYMBOLS FOR POLES AND WIRES.
C	SOILED	SHOWS AREA OF THE PICKER HOUSE, 2ND. FLOOR, AND GIVES AREAS FOR 6 FLOORS. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	PLAN IS STAMPED "PRELIMINARY". PROJECT P5174 - PLATE 1.
C	SOILED	SHOWS AREA OF THE CLOTH ROOM BUILDING BASEMENT. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	FOLDS	ILLUSTRATES AN EXPANSION JOINT.
C	SOILED	SHOWS AREA OF THE CLOTH ROOM BUILDING 1ST. FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	FOLDS	THIS MAY BE THE THIRD FLOOR OF THE BUILDING IN 06-23.
C	CLEAN	SHOWS AREA OF THE CLOTH ROOM BUILDING 2ND. FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	SHOWS AREA OF THE CLOTH ROOM BUILDING 3RD. FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	SHOWS AREA OF STOREHOUSE "A", 3RD. FLOOR, AND STOREHOUSE "B", 2ND. FLOOR, AND ELEVATION OF BUILDING. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	SHOWS AREA OF STOREHOUSE "A", 1ST. & 2ND. FLOORS,, AND STOREHOUSE "B", 1ST. FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	SHOWS TOTAL AREA OF EACH FLOOR NOTED IN THE TITLE. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."

C	CLEAN	SHOWS TYPICAL PLAN OF ALL FLOORS OF STOREHOUSE "C". BEARS NOTE: "NO 2ND FLOOR AT OPENING ROOM." FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	SHOWS TOTAL AREA OF SECTION 8 OF AN UNIDENTIFIED BUILDING, 1ST. FLOOR. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	SOILED	SHOWS CALCULATIONS FOR SECTION 8 OF MILL NO. 1. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	TEARS, FOLDS	SHOWS TOTAL AREA.
C	CLEAN	SHOWS 27 PARKING PLACES.
C	CLEAN	SHOWS 18 PARKING PLACES.
C	CLEAN	SHOWS 34 PARKING PLACES.
C	CLEAN	SHOWS 35 PARKING PLACES.
C	TEARS, FOLDS, PIN HOLES	SHOWS BUILDING NO. 2, 5TH FLOOR.
C	FOLDS, TEARS	SHOWS TOTAL SQ. FOOTAGE FOR 2ND FLOOR.
C	FOLDS, PIN HOLES	BEARS NOTE: KEY TO PROPOSED ALTERATIONS.

C	FOLDS, TEARS	SHOWS BUILDINGS BOUNDED BY BRIDGE STREET AND THE MERRIMACK RIVER.
C	CLEAN	SHOWS BUILDINGS NO. 5 AND 6.
C	FOLDS, TEARS	SHOWS TOTAL FLOOR AREA AND TOTAL LAND AREA SQUARE FOOTAGE.
C	FOLDS, TEARS, PIN HOLES	SHOWS HARVARD STREET.
C	FOLDS, TEARS	SHOWS HARVARD STREET AND A BROOK.
C	FOLDS, TEARS	SHOWS FIELD WELD.
C	PIN HOLES, FOLDS	SHOWS TOTAL AREA SQUARE FOOTAGE.
C	PIN HOLES TEARS	
C	FOLDS, TEARS	SHOWS TOTAL SQUARE FOOTAGE.
C	TEARS	SHOWS CONSTRUCTION ELEMENTS FOR BOTH FLOORS.
C	TEARS,	SHOWS ELEMENTS OF THE ELEVATOR GATE CONSTRUCTION.
C	SOILED	THIS PLAN COULD POSSIBLY BE PLAN 03-35.
C	SOILED, FOLDS	SHOWS A BUILDING, DOCK, AND PIER PLAN. THIS PLAN COULD POSSIBLY BE PLAN 03-35.
C	SOILED, FOLDS, TEARS	SHOWS A CANOPY PLAN. THIS PLAN COULD POSSIBLY BE PLAN 03-35.

C	CLEAN	SHOWS A BATHROOM PLAN.
C	CLEAN	
C	CLEAN	
C	SOILED	
B	FOLDS, SOILED	THIS PLAN CONTAINS FRONT, REAR, LEFT AND RIGHT SIDE ELEVATIONS.
B	CLEAN, PIN HOLES	A THREE PAGE LIST OF 21 PLANS FOR 5 BUILDINGS FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED	MOVED BY P.L.& C. FROM DRAWER 03, PLAN NUMBER 18, TO DRAWER 09 PLAN NUMBERS 16-01 AND 16-02, AS NOTED ON P.L.& C. DRAWER LISTS FOR BOTH DRAWERS 03 AND 09.
C	FOLDS, SOILED	A TWO PAGE LETTER WITH SUGGESTIONS FOR IMPROVING THE FIRE PROTECTION SYSTEMS AT BOOTT MILLS, MERRIMACK MFG. CO., LAWRENCE YARD, NASHUA MFG. CO., TREMONT YARD, HAMILTON, APPLETON, SACO, BIGELOW, KITSON, MIDDLESEX, AND L. & C. YARDS.
B	FOLDS, SOILED	THIS PLAN CONTAINS SCHEDULES FOR PARTS OF THE JOB.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED	MOVED BY P.L.& C. FROM DRAWER 03, PLAN NUMBER 18, TO DRAWER 09 PLAN NUMBERS 16-01 AND 16-02, AS NOTED ON P.L.& C. DRAWER LISTS FOR BOTH DRAWERS 03 AND 09.
C	FOLDS, SOILED	A ONE PAGE ASSESSMENT OF THE RESERVOIR AND NO. 2 UNITS, OUT OF COMMISSION. THIS IS PAPER CLIPPED TO 09-17-1.
B	FOLDS, SOILED	

B	SOILED	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED	
B	FOLDS, SOILED	THE PLAN SHOWS BOTH FLOOR AND ROOF FRAMING PLAN.
B	SOILED, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	
B	FOLDS, SOILED	
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	THE PLAN CONTAINS AN EQUIPMENT SCHEDULE AND A FIXTURE SCHEDULE.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".

B	SOILED, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	THIS IS A BASEMENT AND FIRST FLOOR PLAN.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	THIS PLAN CONTAINS SCHEMATICS AND SCHEDULES.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	THIS PLAN CONTAINS SEVERAL NOTES RELATIVE TO THE HEATING PLAN.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".

B	FOLDS, SOILED	THIS CONTAINS SECITONS "A-A" THROUGH "E-E".
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	ALL OF THE PLANS IN THE SET ARE STAMPED WITH THE JUNE 25, 1965 DATE ON THE VERSO.
B	SOILED, HOLES	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED	BEARS NOTE: "WORKING AREAS DO NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1756 SQ. FT." FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED, DOG-EARED	CONSISTS OF 18 TYPEWRITTEN SHEETS WHICH ARE LISTS OF THE CONTENTS OF THE INDIVIDUAL DRAWERS OF THE ASSETS REALIZATION CO. PLANS FILE AND 3 SHEETS OF PLANS USED BY ONE MR. BOTTOMS.
B	SOILED, TORN, TAPE	

B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	SOILED	BEARS NOTE: "SURVEY CERTIFY TO HOME TITLE GUARANTY CO. TALBOT MILLS INC.", RECTO.
B	SOILED	BEARS NOTE: "Q-5695", RECTO.
B	CLEAN	BEARS NOTE: "BOOTT MILLS, LOWELL, MASS.", RECTO.
A		
B	CLEAN, FOLDS	
B	CLEAN, PIN HOLES	BEARS NOTE: " BLDG NO. 11 - TURBINE ROOM, NO 13 OLD COAL STORAGE (ROOF REMOVED), NO 14 BOILER HOUSE", RECTO.
B	CLEAN	
B	FOLDS	BEARS NOTE: "BOOTT MILLS, LOWELL, MASS.", RECTO.

B	CLEAN	
B	FOLDS, CLEAN	
B	CLEAN, FOLDS	
C	CLEAN	
C	CLEAN	
C	CLEAN	NOTE: "COPY FURNISHED BY COUNTY ENGINEER / COMPARED AND CORRECTED / ATTEST, E. W. THOMPSON / EXAMINER". THE DATE OF THIS COPY IS UNKNOWN.
C	CLEAN	
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN, PIN HOLES	
B	SOILED	HANDWRITTEN PAGE OF DATA AND CALCULATIONS.
A		

B	CLEAN, TORN, FOLDS	CONTAINS BUILDING NOS., VALVE NOS., LOCATIONS, FLOW ALARM, AND CONTROLS INFORMATION.
B	CLEAN	
B	TORN	
B	SOILED, FOLDS	REVISED 02/12/1962 AND 03/23/1962.
B	FOLDS, TORN, FADED	
B	CLEAN	BEARS NOTE: "SECTION A-A".
B	CLEAN, FOLDS	BEARS NOTE: "DO NOT SCALE".
B	CLEAN	
B	CLEAN, FOLDS, PIN HOLES	SHOWS PRESENT OFFICE AND TOILETS, AND PROPOSED OFFICE AND TOILETS.
B		MOVED BY P.L.& C. FROM DRAWER 03, PLAN NUMBER 18, TO DRAWER 09 PLAN NUMBERS 16-01 AND 16-02, AS NOTED ON P.L.& C. DRAWER LISTS FOR BOTH DRAWERS 03 AND 09.

B CLEAN BEARS NOTE: "NOT TO SCALE"

A .

A .
CLEAN,
TORN,
B FOLDS

CLEAN,
TORN,
B FOLDS

CLEAN,
TORN,
B FOLDS
CLEAN,
TORN,
B FOLDS

B CLEAN .

CLEAN,
B FOLDS

CLEAN,
B PIN HOLES

B CLEAN

B	CLEAN, FOLDS	
A		
B	FOLDS, SOILED	
B	CLEAN	SCALE: HORIZONTAL, 10,000' PER DIVISION, VERTICAL, 10' PER DIVISION, DATUM - MEAN SEA LEVEL.
B	CLEAN	
A		
A		SEE ALSO ASSETS PLAN NO. 04-14.
B	FOLDS, TORN	ORIGINAL DATE WAS NOV. 23, 1916, REVISED DATE OCT. 4, 1917.
B	FOLDS, TORN, SOILED	ORIGINAL DATE: 1929, REVISED: MARCH 1932, OCTOVER 1932, APRIL 1934, AUGUST 1927, AUGUST 1944, AND AUGUST 1947.
B	FOLDS, TORN	CONTAINS A KEY TO THE PLAN.
B	FOLDS, TORN	START DATE IS FEB. 3, 1913.

B	FOLDS	
B	FOLDS, SPOTTED	THERE IS A PARTS LIST ON THE BLUEPRINT.
B	FOLDS, TORN	
B	FOLDS	LOWER RIGHT CORNER HAS BEEN CUT OFF.
B	CLEAN	
B	FOLDS	SCALE FOR SECTION A-A 1/4 ' = 12". THERE ARE COMMENTS WRITTEN IN PENCIL ON THE VERSO.
B	FOLDS, TORN, SPOTTED, SOILED	
B	FOLDS	THISGROUND FLOOR PLAN MAY BE RELATED TO 06-56 WHICH SHOWS A THIRD FLOOR..
B	TORN	
B	FOLDS, TORN	

B	FOLDS, TORN	
B	FOLDS, TORN	DRAWN FROM OLD PLANS JULY 14, 1924.
B	FOLDS, TORN, SOILED	
B	FOLDS, TORN, SOILED, PATCHED	THE "F" NUMBER TAG IS PAPER CLIPPED TO THE BLUEPRINT. IT WAS DETACHED FROM THE FRONT.
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	FOLDS, TORN	
C	CLEAN	PLAN OF BUIDLINGS 1 - 9 OF BOOTT MILLS COMPLEX, INCLUDING STOREHOUSE.
B	FOLDS	
B	TORN, SOILED, TAPED ON VERSO	ORIGINAL DATE, OCTOBER 1939, CORRECTED JULY 1941, CORRECTED OCTOBER 1955.

B	FOLDS, TORN	THE ACTUAL TITLE HAS BEEN CUT OFF.
B	TORN, SOILED, FOLDS	
B	TORN, SOILED, FOLDS	A PUMP SCHEDULE AND KEY TO BLOW OFF VALVES IS ALSO ON THE MAP.
B	FOLDS, SOILED	REVISED 09/29/65/
B	CLEAN	
B	FOLDS, TORN	
C	FOLDS	
C	SOILED	
C	CLEAN	

B	SOILED	
C	FOLDS, CLEAN	
B	FOLDS, SOILED	
B	CLEAN	
B	TORN	DATES: SEPT. 1942 CHANGES COMPLETED BY NOVEMBER 7, 1942.
B	FOLDS, SOILED	
B	SOILED, TORN	
B	SOILED	

B	CLEAN	
C	FOLDS	THERE ARE NOTES ON THE VERSO IN INK.
C	CLEAN	# 36142 TYPE P3 HEAD 231 FT. 1000 GPM 1745 RPM.
C	TORN	
C	TORN, FOLDS	PLAN DONE BY THE INSPECTION DEPARTMENT OF THE ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES.
C	FOLDS, TORN	IDENTIFIES DAMS AND PROTECTION AREAS.
C	FOLDS, SOILED	
A		
A		
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A		
A		
A		

A

A

SOILED,
B FOLDS SCALE IS LISTED AS 1" = 10, 20 & 40' AS NOTED.

A

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FOLDS,
B TORN

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B	TEARS, HOLES, FOLDS	NOTE: MR. SAFFORD STATES THAT A WATER WHEEL USUALLY RUNS 50% ABOVE NORMAL SPEED WHEN ON FULL GATE AND WITH NO LOAD.
A		
A		
A		
A		
B	TORN, FOLDS	THERE IS AN ENGINEERING COMPANY'S STAMP ON THE BLUEPRINT DATED SEP. 21, 1908.
A		
A		
A		
A		
A		
B	SOILED	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".

B	SOILED	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	SOILED	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN, PIN HOLES	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS FOOTPRINTS OF ALL BOOTT MILLS BUILDINGS.

B	SOILED	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, TORN	ORDER NO. A, HEAD 40 FT. THIS DRAWING WAS CREATED BY THE HOLYOKE MACHINE CO., WORCESTER, MASS. ALSO BEARS NO. 386.3-7.
C	FOLDS, TORN	UNIT NO. 3. THIS DRAWING WAS CREATED BY THE HOLYOKE MACHINE CO., WORCESTER, MASS. ALSO BEARS NO. 386.3-7.
B	SOILED, LOSSES	BEARS REVISED DATES OF 1955/09/12 AND 1958/01/15.
B	SOILED	BEARS REVISED DATES OF 1955/09/12 AND 1958/01/15. BEARS NOTE: "BUILDINGS NOS. 3,7,8,19.& 20 ARE TO BE TORN DOWN FOR CITY OF LOWELL PARKING AREA."
B	SOILED, TORN, FOLDS	BEARS REVISED DATE OF 1955/09/12.

B	SOILED, FOLDS	
B	SOILED, FOLDS	
B	SOILED, FOLDS	
B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.

B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	CLEAN	BEARS NOTE: "BY D. F. PERKINS & SONS, INC., C.E.'S. RECORDED IN M.N.D. REGISTRY OF DEEDS, PLAN BK. 90, PLAN 121", RECTO.
B	TORN	
B	TORN	
B	SOILED	BEARS NOTE: "LOWELL GAS COMPANY LOWELL, MASSACHUSETTS", RECTO.
B	CLEAN	
B	CLEAN	THE CARD IS IN A HOLDER THAT ATTACHES TO THE LETTER WITH A TOP FLAP.
B	CLEAN	BEARS NOTE: "TOTAL LAND AREA IN LOWELL PLANT = 16 ACRES MORE OR LESS", RECTO
B	CLEAN	BEARS NOTE: "TOTAL LAND AREA IN LOWELL PLANT = 16 ACRES MORE OR LESS", RECTO.

B	CLEAN, FOLDS
B	CLEAN
B	CLEAN
B	CLEAN
B	CLEAN
B	CLEAN
B	CLEAN, FOLDS

B	CLEAN, FOLDS	
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	FOLDS, CLEAN	
B	FOLDS, CLEAN	
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	STAIN	LABEL PAPER CLIPPED TOGETHER WITH 01-22-B, C, D.

B	CLEAN	PAPER CLIPPED TOGETHER WITH 01-22-A, C, D.
B	SOILED	PHOTOCOPY OF 01-22-C WITH NEW WORK. PAPER CLIPPED TOGETHER WITH 01-22-A, B, D.
B	CLEAN	PAPER CLIPPED TOGETHER WITH 01-22-A, B, C.
B	CLEAN	
B	CLEAN	
B	CLEAN	THIS COPY IS A REVERSE IMAGE OF THE ORIGINAL.
B	CLEAN	BEARS NOTE: "TO BE MADE A PART OF THOMAS THE MASTER CLEANER INC. LEASE DATED OCTOBER 20, 1958". FOUND IN ENVELOPE TITLED "BOOTT ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	BEARS NOTE: "TO BE MADE A PART OF VOGUE SILVER COMPANY LEASED DATED MARCH 1, 1968". FOUND IN ENVELOPE TITLED "BOOTT ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	BEARS NOTE: "MICHAEL BARRY - DBA F.W.M. CO.)".

B	CLEAN, TORN, FOLDS	FOUND IN ENVELOPE TITLED "BOOTT - ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT - ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "BOOTT - ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	BEARS NOTE: "NET AREA = 2160 SQ FT., CLR. HEAD RM - 11' - 1", ALL. LOADING 100.# / SQ. FT." FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".

B	CLEAN, FOLDS, TORN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN, FOLDS, TORN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)".
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)". SHOWS CHEMICAL & MINERALS DEV. CORP. WITH 6425 SQ. FT. IN BUILDING NO. 5 WEST.

B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)". SHOWS A RAMP NEAR NO. 9 ELEV.
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)". BEARS NOTE: "NET AREA = 11,000 SQ. FT., CLEAR HEAD ROOM 9' - 7 1/2"." SHOWS AREA OCCUPIED BY SOUTH INDUSTRIES, INC..
B	CLEAN	FOUND IN ENVELOPE TITLED "BOOTT- ORIGINAL FLOOR PLANS. (BLANK)". SHOWS FOOTPRINTS OF BOOTT MILLS BUILDINGS NO. 3, 4, 5 WEST, 8 & 9.
B	CLEAN, FOLDS, TORN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TENANTS ON 2ND. AND 3RD. FLOORS OFALL BOOTT MILLS BUILDINGS. DRAWING # 1 IN A SERIES OF 6 NUMBERED DRAWINGS.
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TENANTS ON THE 3RD. AND 4TH. FLOORS OF ALL BOOTT MILLS BUILDINGS. DRAWING # 2 IN A SERIES OF 6 NUMBERED DRAWINGS.
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TENANTS ON THE 1ST. AND 2ND. FLOORS OF ALL BOOTT MILLS BUILDINGS. DRAWING # 3 IN A SERIES OF 6 NUMBERED DRAWINGS.
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TENANTS ON THE 1ST. FLOOR OF BUILDINGS 2, 3, & 5 E. DRAWING # 4 IN A SERIES OF 6 NUMBERED DRAWINGS.
B	SOILED	FOUND AMONG MISCELLANEOUS PLANS. SHOWS TENANTS ON THE 1ST. FLOOR OF BUILDINGS 2, 3, 5 E, 8 & 9. COPY OF DRAWING # 4 IN A SERIES OF 6 NUMBERED DRAWINGS.
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TENANTS ON THE 4TH, AND 5TH. FLOORS OF BUILDINGS 1, 2, 3, 4, 7 & 9. DRAWING # 5 IN A SERIES OF 6 NUMBERED DRAWINGS.
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TENANTS ON THE 6TH, FLOOR OF BUILDINGS 2, 3, & 4. DRAWING # 6 IN A SERIES OF 6 NUMBERED DRAWINGS.

B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS THIRD FLOOR, BLDG. 7, SYMPHONIC ELECTRONIC CORP. BEARS NOTE: "TO BE MADE A PART OF SYMPHONIC ELECTRONIC COPRORATION LEASE DATE FEVRUARY 27, 1958".
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS SQ. FOOTAGE OF BUILDINGS 5 E & 5 W, AND FOOTPRINT OF BUILDINGS 1, 2, 3, & 4.
B	CLEAN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS SQ. FOOTAGE OF ALL BOOTT MILLS BUILDINGS, SECOND FLOOR.
B	CLEAN, TORN, FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS FOOTPRINT OF ALL BOOTT MILLS BUILDINGS.
B	CLEAN, FOLDS, PIN HOLES	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS TOTAL SQ. FOOTAGE OF THE FIFTH FLOOR OFMOST OF THE BOOTT MILLS BUILDINGS.
B	CLEAN, PIN HOLES	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS FOOTPRINTS OF ALL BOOTT MILLS BUILDINGS, INCLUDING THE STOREHOUSES AND ALL THE PARKING LOTS UP TO FRENCH ST..
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS AREA, CLEAR HEAD ROOM, ALL. FLOOR LOADING IN BOOTT MILLS BUILDINGS 8 & 9 LEASED BY CASUAL FOOTWEAR INCORPORATED.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS WHAT IS IN THE THIRD FLOORS IN BOOTT MILLS BUILDINGS 1, 4, 5E, 5W, & 7.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS WHAT IS IN THE SECOND FLOOR IN BOOTT MILLS BUILDINGS 1, 2, 3, 5E, & 5W.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS FIRST FLOOR AREA, TENANTS, BUILDING NOS., AND SIZE OF STOREHOUSES 1, 2, & 3.
B	CLEAN. FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - FLOOR PLANS". SHOWS FOURTH FLOOR SQ. FOOTAGE OF BUILDING NOS., 3,4, 5E & 5W.
B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - SHOWS FIRST FLOOR OF BOOTT MILLS COMPLEX.

B	CLEAN	FOUND IN ENVELOPE TITLED "ORIGINALS - SHOWS SQ. FOOTAGE OF BUILDING NOS. 1 - 4. BEARS NOTE: "GRAND TOTAL UNDER LEASE 359,902 SQ. FT., VACANT AREAS 32,960, STOREHOUSE 5TH FLOOR 58,000. TOTAL 450,862".
B	SOILED	SHOWS PUMP ROOM.
B	SOILED, TORN, FOLDS	SHOWS BUILDING MEASUREMENTS..
B	SOILED	
B	CLEAN	
B	CLEAN	THE WORD "PELLON" HAS BEEN ERASED AND OVERWRITTEN AS "JOAN". ORIGINALLY DATED NOV. 28, 1969. THE WORDS "2 ND TANK" HAVE BEEN ERASED.
C	CLEAN	ORIGINALLY DATED NOV. 28, 1969.
B	SOILED, TORN, FOLDS	BEARS NOTE: "43 CARS".
B	SOILED, FOLDS	BEARS NOTE: "127 CARS".
B	SOILED, FOLDS, TORN	BEARS NOTE: "200 CARS".
B	SOILED, FOLDS, TORN	
B	CLEAN	BEARS AN ALPHABETICAL KEY IDENTIFYING TENANTS PARKING PLACES SHOWN BY LETTER.

B	CLEAN	SHOWS NAMES OF TENANTS IN SPACES DESIGNATED IN ALPHABETICAL ORDER.
B	CLEAN	
B	CLEAN	
B	CLEAN, FOLDS	
B	SOILED, FOLDS, STAPLE HOLES	
B	SOILED, FOLDS, STAPLE HOLES	
B	SOILED, FOLDS, PIN HOLES, TORN	
B	CLEAN	SHOWS FOOTPRINT OF BOOTT MILLS COMPLEX WITH PARKING SPACES.
B	CLEAN, FOLDS	SHOWS FOOTPRINT OF BOOTT MILLS COMPLEX WITH PARKING SPACES.
B	CLEAN, FOLDS	SHOWS FOOTPRINT OF BOOTT MILLS COMPLEX WITH PARKING SPACES.

B	SOILED, TORN, PIN HOLES	
B	SOILED, TORN, FOLDS	
B	CLEAN, FOLDS	
B	SOILED, FOLDS, PIN HOLES	
B	SOILED, PIN HOLES	BEARS NOTE: "TO BE MADE PART OF WAKEFIELD INDUSTRIES, INC. LEASE DATED OCTOVER 1, 1964".
A		
B	SOILED, TORN, PIN HOLES	
A		
B	CLEAN	
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	

	CLEAN, TORN, FOLDS,	
B	PIN HOLES	
	CLEAN,	
B	PIN HOLES	
B	CLEAN	
B	CLEAN	
	CLEAN,	
B	FOLDS	STAPLED TO 02-20-C.
B	CLEAN	STAPLED TO 02-20-B.
		BEARS NOTE: "11500 SQ. FT. STOREHOUSE". SHOWS FIRST FLOOR.
C	FOLDS	FOUND IN MANILA ENVELOPE TITLED "ORIGINALS BOOTT TENANTS"
		BEARS NOTE: 11500 SQ. FT. J.C. WHITE STORES INC. STOREHOUSE".
B	CLEAN	SHOWS FIRST FLOOR.
		BEARS NOTE: "5363 SQ. FT. STOREHOUSE". SHOWS THIRD FLOOR.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "ORIGINALS BOOTT TENANTS"
C	FOLDS	BEARS NOTE: "5363 SQ. FT. STOREHOUSE". SHOWS THIRD FLOOR.
		BEARS NOTE: "TO BE MADE A PART OF JET CONTAINERS, INC.
B	CLEAN	AMENDMENT TO LEASE DATED JULY 1, 1968".
B	CLEAN	

	CLEAN, FOLDS,	
B	TORN	
	CLEAN, TORN, PIN	
B	HOLES	
	CLEAN, FOLDS,	
B	PIN HOLES	
	CLEAN, FOLDS,	
B	TORN	
	CLEAN, FOLDS,	
B	TORN	
	TORN,	
B	SOILED	THIS IS A PARTIAL COPY OF 02-26-B.
	CLEAN,	BEARS NOTE: "(2) ADDITIONAL PARTITION SECTIONS REQ. 8' LONG
B	TORN	BY 8' HIGH - PLYWOOD FASTENED - (1) SIDE ONLY".
		PLAN MODIFIED FROM THE ORIGINAL OF PLAN 02-028 TO SHOW THE ALTERATION OF TWO FORMER AREAS INTO A SPACE TO RECEIVE
	CLEAN,	A PRESS AND TWO OVENS. BEARS SAME TITLE. DRAWING NO. D-502-
B	TORN,	43.
	CLEAN, TORN,	INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION,
B	FOLDS	FLOW ALARMS, AND CONTROLS.
	CLEAN,	
B	FOLDS	ARROW IN LOWER RIGHT CORNER INDICATES NORTH.

	CLEAN, TORN, PIN	
B	HOLES	
	CLEAN, TORN, PIN	
B	HOLES	
B	CLEAN	
B	CLEAN	
B	CLEAN	
	CLEAN,	
B	FOLDS	
B	CLEAN	
	CLEAN,	
B	PIN HOLES	
A		
		BEARS NOTE: "_____ L&C WATER MAINS, NEW CONNECTION,
B	CLEAN	_______\ REMOVED FROM SYSTEM".
B	CLEAN	BEARS INSTRUCTION: "MAKE 2 CR STEEL".

B	CLEAN	
B	CLEAN, TORN	
B	CLEAN, PIN HOLES	
B	CLEAN, FOLDS	
B	CLEAN, TORN	
B	CLEAN, FOLDS	SHOWS TOTAL BUILDING AREA. FOR FIRST AND SECOND FLOORS
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	
B	CLEAN, PIN HOLES	

B	CLEAN	
	CLEAN, PIN HOLES,	
B	FOLDS	
	CLEAN, PIN HOLES,	
B	FOLDS	
	CLEAN, PIN HOLES,	
B	TORN	
	CLEAN, TORN,	
B	FOLDS	
	CLEAN, FOLDS,	
B	PIN HOLES	
	FOLDS,	BEARS P L & C PLAN # 135-035 - [B]. TRANSFERRED TO P L & C PLANS COLLECTION. P.L. & C. CONSECUTIVE INDEX OF DRAWINGS GIVES
B	TEARS	DATE OF 3 AUG. 1933.
B		BEARS P. L. & C. PLAN # 135-036. TRANSFERRED TO P. L. & C. PLANS COLLECTION.
	SOILED, PIN HOLES TORN,	
B	FOLDS	
	CLEAN,	
B	PIN HOLES	BEARS NOTE ABOUT COMBUSTIBLE MATERIALS IN INTERIOR.

	CLEAN, PIN HOLES, TORN,	
B	FOLDS	
	CLEAN, PIN HOLES,	
B	TORN	
	CLEAN, PIN HOLES,	
B	FOLDS	
	CLEAN, FOLDS,	
B	TORN	
	CLEAN,	
B	FOLDS	
	CLEAN,	
B	FOLDS	
	CLEAN,	
B	FOLDS	
	SOILED, FOLDS, PIN HOLES,	
B	TORN	
	SOILED,	BEARS NOTE: "TO ACCOMPANY LETTER TO THE TREASURER OF MAY 8, 1905 BY HIRAM F. MILLS, CONSULTING ENGINEER". AND "TRACED FROM ORIGINAL PAPER DRAWING BY JOHN A. STEVENS, INC.,
B	FOLDS	LOWELL, MASS, APR. 14, 1941".
	CLEAN,	BEARS NOTE: "LOTS 12 - 16 ADDED TO MEMORANDUM OF REAL ESTATE IN AND OUTSIDE OF MILL YARD, MAY 1929. MAY 28, 1929.
B	TORN	REVISED NOV. 4, 1936". PLAN IS A REVERSED IMAGE.

B	FOLDS	BEARS NOTE: "LOTS 12 - 16 ADDED TO MEMORANDUM OF REAL ESTATE IN AND OUTSIDE OF MILL YARD, MAY 1929. MAY 28, 1929. REVISED NOV. 4, 1936, APR. 26, 1955, MAY 19, 1955".
C	FOLDS	LETTER FROM PROPRIETORS OF THE LOCKS AND CANALS ON MERRIMACK RIVER LETTERHEAD TO MR. J. ROGERS FLATHER.
B	CLEAN	
B	CLEAN, FOLDS, TORN	
B	CLEAN	THIS PLAN WAS MODIFIED FROM AN EARLIER ORIGINAL RENDERED ON THIS SAME SHEET. ERASURES ARE VISIBLE. PLAN 02-028 REPRESENTS YET ANOTHER MODIFICATION FROM THE ORIGINAL BEFORE 02-070 WAS PRODUCED. DRAWING NO. D-502-43.
A		
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	
A		
C	FOLDS	REFERS TO WORK AT MILL # 3, THIRD FLOOR.
C	FOLDS	REFERS TO WORK AT MILL # 1, THIRD FLOOR.

C	FOLDS, SOILED	REFERS TO WORK AT MILL # 1, THIRD FLOOR, THAT REPRESENTS CHANGES AFTER SYMPHONIC ELECTRONIC NO LONGER OCCUPIED THE FLOOR. THE SYMPHONIC NAME IS TAPED OVER ON THE PLAN.
C	CLEAN	TYPEWRITTEN NOTE READS: " TO BE MADE A PART OF JAMPPA MANUFACTURING COMPANY LEASE DATED" FOUND IN MANILA ENVELOPE TITLED "ORIGINALS BOOTT TENANTS"
C	CLEAN	A BOOTT MILLS BUILDINGS TEMPLATE.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS".
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE NO. 1.
C	CLEAN	
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : TRACED FROM B/P #98 / SHELF #153."
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "1ST FLOOR 31,300 / 2ND FLOOR 66,800 / TOTAL 1 & 2 98,100, SHIPPING AREA 6,500, GROSS 104,600."
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "TO BECOME PART OF MIINERAL INDUSTRIES CORPORATION OF AMERICA LEASES DATED DECEMBER 16, 1963."
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "IDS, INC." SHOWS BLDGS. # 1,2 AND 5 W, SECOND FLOOR.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "IDS, INC." SHOWS BLDGS.# 1, & 2, FIRST AND SECOND FLOORS.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "INDEPENDENT DELIVERY SERVICE INC." SHOWS BLDG. # 2, SECOND FLOOR.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "ASSOCIATED TEXTILE MARKETING CORP. SHOWS BLDGS. # 1, & 2, THIRD AND FOURTH FLOORS".

C	FOLDS	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "DISTANCE "A" 10 PIPE DIAMETERS, DISTANCE "B" 5 PIPE DIAMETERS. SHOWS PIPING AND RESPECTIVE RESPONSIBLE PARTIES FOR SERVICE.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "DISTANCE "A" 10 PIPE DIAMETERS, DISTANCE "B" 5 PIPE DIAMETERS. SHOWS PIPING AND RESPECTIVE RESPONSIBLE PARTIES FOR SERVICE.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "NATHAN SOLOMAN & CO." SHOWS BLDG. # 8 SQ. FOOTAGE 20, 363.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "NATHAN SOLOMAN & CO." SHOWS BLDG. # 9, THIRD FLOOR 2484 SQ. FT.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "3 RD. FLOOR - NATHAN SOLOMAN & CO." SHOWS PROPOSED LOCATION OF ELEVATOR NO. 9.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "TO BE MADE A PART OF IDEAL TAPE INCORPORATIED LEASE DATED AUGUST 1980". SHOWS 1ST & 2ND FLOORS OF BLDGS. NO. 1 & 2.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "ENTREX, INC." SHOWS 5TH & 6TH FLOORS OF BLDGS. NO. 1 & 2.
C	CLEAN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE : "MIDDLESEX PRESS CO.". SHOWS BLDG. # 3.
C	TORN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". SHOWS 1ST. & 2ND FLOORS OF A BUILDING ALONG THE MERRIMACK RIVER.
C	FOLDS, TORN	FOUND IN MANILA ENVELOPE TITLED " ORIGINALS BOOTT TENANTS". BEARS NOTE: TO BE MADE A PART TO THOMAS THE MASTER CLEANER INC. LEASE DATED OCTOBER 1, 1958.
C	TORN, PIN HOLES	PLAN FOR 1 1/8" STEEL PLATE. INSTRUCTIONS FOR PART NO. 1, AND PART NO. 2.
C	TORN, PIN HOLES	MATERIAL FOR 1 1/8' STEEL PLATE. INSTRUCTIONS FOR MAKING HOLES.
C	TORN, FOLDS	PLAN OF 3RD FLOOR, BLDG. 5 WEST.

C	CLEAN	PLAN FOR NEW WASTE GATE AND GRANITE CAPSTONE.
C	CLEAN	PLAN SHOWING (A) GRADE, FRENCH ST., AND (B) GRADE , R.R. TRACKS.
C	FOLDS	PLAN SHOWING STOREHOUSES # 1, 2, & 3, AND SQUARE FOOTAGE ON FIRST FLOOR.
C	PIN HOLES	LABELED SECTION A-A. BEARS NOTE: "VOID SEE REVISED 10-20-64". YEAR NOTATION IS AN ERROR. PLAN IS DATED 1965.
C	FOLDS	LABELED SECTION A-A. REVISED 10-20-65
C	FOLDS	
C	FOLDS, PIN HOLES	
C	FOLDS, PIN HOLES	
C	FOLDS, TORN	HALF OF DRAWING IS A BLANK TEMPLATE.
C	TORN, PIN HOLES	
C	TORN, FOLDS	CONTAINS INSTRUCTIONS FOR FABRICATING SEVEN DISTINCT PARTS OF THE APPARATUS.
C	CLEAN	
C	TORN, TAPED	SHOWS BLDGS. 1, & 2, AND 5 EAST. ONLY 5 EAST HAS FIRST FLOOR IDENTIFIED. ALSO SHOWS HYDROELECTIC TURBINES NO. 3, 4, & 5.
C	FOLDS, PIN HOLES	PLAN SHOWING STOREHOUSES # 1, 2, & 3, AND SQUARE FOOTAGE ON FIRST AND SECOND FLOORS.

C	FOLDS	
C	TORN	BEARS NOTE: 2ND FLOOR. SHOWS BLDGS. 1 & 2 ON RIGHT HALF, AND BLDGS. 8 & 9 ON LEFT HALF OF DRAWING.
C	STAINED	BEARS NOTE: PRESENT HTM BLDG. NO. 1 - 1ST. FLOOR."
C	STAINED FOLDS	PLAN FOR UNIDENTIFIED CONSTRUCITON THAT INCLUDES MESUREMENTS.
C	CLEAN	PLAN FOR REMOVAL OF FLOORS 4, 5, 6, & 7 FROM AN UNIDENTIFIED BUILDING.
C	FOLDS, SOILED	BEARS NOTE: "VOID 9/9/58".
C	FOLDS, TORN	FIRST AND SECOND FLOOR PLANS WITH SQUARE FOOTAGE.
C	CLEAN	DRAWING IS OF JOHN STREET, BOOTT MILLS, BUILDINGS 5 E AND 5 W.
C	CLEAN	DRAWING IS OF JOHN STREET, BOOTT MILLS, BUILDINGS 1 THROUGH 4. BLUE LINE INDICATES WATER PIPES.
C	CLEAN	DRAWING IS OF JOHN STREET, BOOTT MILLS, BUILDINGS 1 THROUGH 4. RED PEN INDICATES WATER PIPES.
C	CLEAN	
C	CLEAN	
B	FOLDS	FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	FOLDS, SOILED	THE PLAN SHOWS SECTIONS "A-A", AND "B-B".
B	FOLDS, SOILED	PLAN SHOWS DETAILS A, B, AND C.

B	FOLDS, SOILED	THE PLAN CONTAINS AN EQUIPMENT SCHEDULE AND A FIXTURE SCHEDULE.
B	FOLDS, TORN, TAPED	FOUND IN ENVELOPE TITLED "HEAD GATE PLAN NO. 1, MAIN POWER I5 BRIDGE ST." THIS IS A HOLYOKE MACHINE CO. PLAN.
B	FOLDS	FOUND IN ENVELOPE TITLED "HEAD GATE PLAN NO. 1, MAIN POWER I5 BRIDGE ST."
B	FOLDS	FOUND IN ENVELOPE TITLED "HEAD GATE PLAN NO. 1, MAIN POWER I5 BRIDGE ST."
B	CLEAN	FOUND IN ENVELOPE TITLED "HEAD GATE PLAN NO. 1, MAIN POWER I5 BRIDGE ST."
B	CLEAN	A TWO PAGE LIST OF PLANS FOR 5 BUILDINGS FOUND IN AN UNTITLED ENVELOPE.
B	CLEAN	A TWO PAGE LIST, IN LANDSCAPE MODE, OF PLANS FOR 5 BUILDINGS FOUND IN AN UNTITLED ENVELOPE.
B	CLEAN	A TWO PAGE LIST, IN LANDSCAPE MODE, OF PLANS FOR 5 BUILDINGS FOUND IN AN UNTITLED ENVELOPE.
B	CLEAN	A THREE PAGE LIST OF PLANS FOR 5 BUILDINGS.
B	CLEAN	A TWO PAGE LIST OF PLANS FOR 5 BUILDINGS. PAGE 2 IS MISSING FROM THIS COPY.

B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.

B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	

B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN, DARK	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	

B	CLEAN, DARK	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN, DARK	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.

B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	

B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
	CLEAN.	
B	DARK	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	

B	CLEAN, DARK	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN, DARK	
B	CLEAN	BEARS NOTE: "WORKING AREAS DO NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1756 SQ. FT." FOUND IN UNTITLED ENVELOPE.
B	CLEAN	BEARS NOTE: "WORKING AREAS DO NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1756 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREAS DO NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1756 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN UNTITLED ENVELOPE.

B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN UNTITLED ENVELOPE.
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN UNTITLED ENVELOPE.
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."

B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN ENVELOPE TITLED "ORIGINALS - 95 BRIDGE STREET, WITH DIMENSIONS".
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT." FOUND IN UNTITLED ENVELOPE.
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	BEARS NOTE: "WORKING AREA DOES NOT INCLUDE STAIR, ELEVATOR, TOILET, AND FLUE TOWERS OR WALLS, TOTALING 1172 SQ. FT."
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	

B	CLEAN	
B	CLEAN	FOUND IN UNTITLED ENVELOPE.
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	CLEAN	A MAP OF THE MASSACHUSETTS MILLS COMPLEX, FOUND IN AN UNTITLED ENVELOPE.

B	CLEAN	A MAP OF THE MASSACHUSETTS MILLS COMPLEX, FOUND IN AN UNTITLED ENVELOPE.
B	SOILED	
B	CLEAN, FOLDS	
B	CLEAN, TORN, PIN HOLES	UNTITLED, BUT MATCHES 03-12-A.
B	CLEAN, STAPLE HOLES	
B	CLEAN, STAPLE HOLES, FOLDS	
B	FOLDS, SOILED	THIS REFERENCES PLAN 65-9/H WHICH IS THE SKETCH FOR THE PLATFORM.
B	SOILED , PIN HOLES, FOLDS	
B	CLEAN , PIN HOLES, FOLDS	
C	CLEAN	SHOWS THE PEPPERELL MFG. CO PLANT FROM EAST MERRIMACK ST. TO THE MERRIMACK RIVER, AND BRIDGE ST. TO THE CONCORD RIVER. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."

C	CLEAN	SHOWS THE PEPPERELL MFG. CO PLANT FROM EAST MERRIMACK ST. TO THE MERRIMACK RIVER, AND BRIDGE ST. TO THE CONCORD RIVER. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	FOLDS	SHOWS THE PEPPERELL MFG. CO PLANT FROM EAST MERRIMACK ST. TO THE MERRIMACK RIVER, AND BRIDGE ST. TO THE CONCORD RIVER. FOUND IN A MANILA ENVELOPE TITLED "PEPPERELL MFG. PLANS 23 TRACINGS."
C	CLEAN	
B	FOLDS, TORN	
B	FOLDS	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS".
B	FOLDS	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS".
B	FOLDS	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS".
B	CLEAN	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS".
B	CLEAN	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS".

B	FOLDS	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS".
B	SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". BEARS NOTES SHOWING SQUARE FOOTAGE OF THESE THREE FLOORS SHOWN ON THE PLAN.
B	SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". BEARS NOTES RELATIVE TO FLOOR LOAD AND CLEARANCES.
B	SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". BEARS NOTES RELATIVE TO FLOOR LOAD AND CLEARANCES.
B	SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". BEARS NOTES RELATIVE TO FLOOR LOAD, AREA, AND CLEARANCES.
B	SOILED, FOLDS	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". BEARS NOTES RELATIVE TO AREA AND CLEARANCES.
B	SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". SHOWS ALL THREE PLANS.
B	TORN, SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". SHOWS ALL THREE PLANS.

B	SOILED	FOUND IN A MANILA ENVELOPE TITLED "SULLIVAN TRUST BLDG PLANS". SHOWS ALL THREE PLANS AND BEARS NOTES RELATIVE TO AREA, CLEARANCES, AND FLOOR LOAD..
B	FOLDS, SOILED	COPY OF PLAN 03-08. INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
B	FOLDS, SOILED, TORN	COPY OF PLAN 03-08. INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
B	FOLDS	COPY OF PLAN 03-08. INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
B	SOILED	COPY OF PLAN 03-08. INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
B	CLEAN	COPY OF PLAN 03-08. INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
B	CLEAN	COPY OF PLAN 03-08. INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
A		
B	CLEAN, FOLDS	LISTED - MEASUREMENTS OF STEEL REQUIRED, AS WELL AS AN "END VIEW".
B	FOLDS, STAPLE HOLES, TORN	CONTAINS CALCULATIONS.

A		
B	CLEAN	BEARS NOTE ABOUT NET AREA, HEAD ROOM, FLOOR LOADS.
B	TORN	
B	CLEAN	NOTES SHOW GENERATING CAPACITY BY STATION. DATE READS "CORRECTED TO 9/1/22".
B	TORN, FOLDS	BEARS NOTE: "SECTION A-A" AND "LOWELL SHOE CO."
B	CLEAN	BEARS NOTE: "CROSS SECTION A-A"
B	SOILED, TORN	
B	FOLDS, TORN	SEE ALSO ASSETS PLAN NO. 06-08.

B	FOLDS	
B	FOLDS, TORN	
B	TORN	WRITING IS ILLEGIBLE.
B	FOLDS	
B	FOLDS	
B	CLEAN	
B	CLEAN	
B	TORN	TOP PLAN IS STAPLED TO THREE OTHER PLANS - 04-21-B,C, & D.
B	CLEAN	TOP PLAN IS STAPLED TO TWO OTHER PLANS - 04-21-B-COPY 1, & D-COPY 1.

B	CLEAN	SECOND PLAN IS STAPLED TO THREE OTHER PLANS - 04-21-A,C, & D.
B	CLEAN	SECOND PLAN IS STAPLED TO TWO OTHER PLANS - 04-21-A,-COPY 1, & D-COPY 1.
B	CLEAN	THIRD PLAN IS STAPLED TO THREE OTHER PLANS - 04-21-A,B, & D.
B	CLEAN	FOURTH PLAN IS STAPLED TO THREE OTHER PLANS - 04-21-A,B, & C.
B	CLEAN	THIRD PLAN IS STAPLED TO TWO OTHER PLANS - 04-21-A- COPY 1, & B -COPY 1.
B	TORN	

B	TORN	
B	SOILED, TORN	THIS IS A PAGE FROM A MANUFACTURER'S CATALOG, AND IS NUMBERED "INDEX E-354.9".
B	SOILED, TORN, FOLDS	
B	FOLDS	THIS IS A MANUFACTURER'S BULLETIN.
B	TORN	
B	HOLES, FOLDS	WIRING DIAGRAM.
B	HOLES	PRIMARY AND SECONDARY WIRING CONNECTION INSTRUCTIONS.

B	FOLDS	
B	FOLDS	
B	CLEAN	
B	TORN, HOLES, FOLDS	THIS COPY IS BOUND WITH BRASS FASTENERS TO THREE OTHER PAPERS, 04-21-14-B, C, & D.
B	TORN, HOLES, SOILED	THIS COPY IS A STAND-ALONE.
B	FOLDS	THIS COPY IS BOUND WITH BRASS FASTENERS TO THREE OTHER PAPERS, 04-21-14-A, C, & D.
B	TORN, FOLDS	THIS COPY IS BOUND WITH BRASS FASTENERS TO THREE OTHER PAPERS, 04-21-14-A, B, & D. IT IS AN ALLIS-CHALMERS INSTRUCTION SHEET G-16.
B	TORN, FOLDS	THIS COPY IS BOUND WITH BRASS FASTENERS TO THREE OTHER PAPERS, 04-21-14-A, B, & C.IT IS AN ALLIS-CHALMERS INSTRUCTION SHEET NO. 1055.

B	FOLDS	THIS IS AN ALLIS-CHALMERS INSTRUCTION SHEET MADE FOR CONNECTION PUPOSES AT THE BOOTT MILLS.
B	HOLES	THIS IS A LATER VERSION OF 04-21-05.
B	FOLDS	
B	FOLDS	
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.

B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
B	CLEAN	THIS GROUP CONSISTS OF 13 PLANS STAPLED TOGETHER IN A BROWN PAPER COVER.
C	FOLDS, TORN	PLAN FROM TOWER ITON WORKS, ICN. SEEKONK, MASS.
C	FOLDS, TORN	PLAN FROM TOWER ITON WORKS, ICN. SEEKONK, MASS.

B	CLEAN	
B	FOLDS	
B	CLEAN	
B	CLEAN	
B	CLEAN	THERE IS A PLAN DRAWN ON THE VERSO OF THIS PLAN.
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	CLEAN	THERE IS A DRAWING ON THE VERSO OF THIS PLAN.

B	CLEAN	
B	CLEAN	THERE IS A DRAWING ON THE VERSO OF THIS PLAN.
C	SOILED, FOLDS	
C	CLEAN	COPY OF P.L. & C. 158 - 104 [L];.
C	FOLDS	COPY OF BLUEPRINT 04-14, BUT WITH DIFFERENT TITLE. FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED, TEARS	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.

C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET. BEARS NOTES A - E IN EXPLANATION OF DRAWING.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	SOILED	FOUND IN MANILA ENVELOPE TITLED "FLOOR PLANS OF THE LOWELL INDUSTRIAL DEVELOPMENT CO. OLD SET.
C	CLEAN, FOLD	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA.
C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA

C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN, PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN. PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN. PIN HOLES	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	SOILED	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	SOILED	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	SOILED	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA. SHOWS LESSEES AND VACANCIES.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA. SHOWS LESSEES AND VACANCIES.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA. SHOWS LESSEE.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA. SHOWS LESSEE.
C	CLEAN, ONE PHOTO CUT OUT	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA. SHOWS LESSEE. A SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.

C	CLEAN, ONE PHOTO CUT OUT	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. FLOOR AREA. ANOTHER PART OF THE SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. CUT FROM SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO. CUT FROM SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO." CUT FROM SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO." PART OF A SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO". A SALES BROCHURE FOR PROPERTY OWNED BY L.I.D.C.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO". RENDERING OF PROPOSED SIGN TO GO ON FRONT OF BUILDING.
C	SOILED	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO". SHOWS THE BUILDING WITH THE SIGN PAINTED IN.
C	CLEAN	FOUND IN MANILA FOLDER TITLED "LOWELL INDUSTRIAL DEVELOPMENT CO". RENDERING OF PROPOSED SIGN TO GO ON FRONT OF BUILDING.

C	FOLDS	SHEET 1 OF 2, SENT TO BOOTT MILLS FROM HOWE SCALE CO., RUTLAND, VT. PER ATTACHED NOTE.
C	FOLDS	SHEET 2 OF 2, SENT TO BOOTT MILLS FROM HOWE SCALE CO., RUTLAND, VT. PER ATTACHED NOTE.
C	FOLDS	SHEET 1 OF 2, SENT TO BOOTT MILLS FROM HOWE SCALE CO., RUTLAND, VT. PER ATTACHED NOTE.
C	FOLDS	SHEET 2 OF 2, SENT TO BOOTT MILLS FROM HOWE SCALE CO., RUTLAND, VT. PER ATTACHED NOTE.
C	FOLDS, TORN	
C	FOLDS	
C	FOLDS	
C	FOLDS	
C	FOLDS, SOILED	MADE BY MERRIMACK-ESSEX ELECTRIC COMPANY.
C	FOLDS, SOILED, TORN	A GUARANTEE CONSTRUCTION COMPANY PLAN. REVISED 08/01/1910.
C	FOLDS	
C	TORN	

C	CLEAN	BEARS NOTE " NICK MARTAKOS" AND GIVES SQUARE FOOTAGE.
C	FOLDS	SANITARY SEWERS - PLAN 1 OF 4. CONTAINS A KEY.
C	FOLDS	SANITARY SEWERS - PLAN 1 OF 4. CONTAINS A KEY.
C	FOLDS, SOILED	DETAIL SHEET - PLAN 2 OF 4. TRENCH DETAIL D - 2, AND INVERT SECTION.
C	FOLDS, SOILED	DETAIL SHEET - PLAN 2 OF 4. TRENCH DETAIL D - 2, AND INVERT SECTION.
C	FOLDS	SITE LAYOUT & DETAILS - PLAN 3 OF 4. DETAIL D - 4. SECTION A - A.
C	FOLDS	SITE LAYOUT & DETAILS - PLAN 3 OF 4. DETAIL D - 4. SECTION A - A.
C	FOLDS, SOILED	PLAN 4 OF 4. PIPE SUPPORT D - 6.
C	FOLDS, SOILED	PLAN 4 OF 4. PIPE SUPPORT D - 6.
C	CLEAN	
C	CLEAN	
C	CLEAN	SHOWS LOADS FOR WHEELS 1 THROUGH 9. NOTED: DRAWER NO. 3.
C	CLEAN	

C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS SLEEP SHOPPE INC.
C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE KAUFMAN CO. INC. AND FENWAY MFG. CO. INC.
C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS LOWELL COUNTER CO.
C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS GAMBIT SHOE CO. INC.
C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE ROBERT LEONARD AND FENWAY MFG. CO. INC.
C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE JAY DRESS COMPANY, INC. AND LOWELL DRESS CO.
C	CLEAN, HOLES	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS SANBRON SHOE COMPANY. THIS IS WRITTEN OVER KUTE KIDDIES SHOE COMPANY WHICH IS EITHER THE PREVIOUS TENANT OR THE OLD NAME FOR SANBRON.
C	CLEAN	SHOWS NET AREA 16,000 SQ. FT.
C	CLEAN	SHOWS NET AREA 4,725 SQ. FT.
C	CLEAN	SHOWS NET AREA 19,503 SQ. FT.

	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE ROBINSON TOP & YARN DYE WORKS INC., LOWELL SHOE CO.,
C	HOLES	LOWELL PAPER BOX CO.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS
C	HOLES	LOWELL SHOE CO., INC.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS
C	HOLES	LOWELL SHOE CO., INC.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS
C	HOLES	GAMBIT SHOE CO.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE FENWAY MFG. CO., LOWELL STITCHING CO., AND ROBERTS
C	HOLES	SPORTSWEAR INC.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE
C	HOLES	BARRY CORPORATION AND PLEASANT DRESS CO.
	CLEAN, FOLDS,	
C	HOLES	IDENTIFIED AS "NOT GOOD RENTAL SPACE".
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE
C	HOLES	LOWELL PAPER BOX CO. AND COATED PRODUCTS CORP.
	CLEAN, FOLDS,	
C	HOLES	ALL TENANT NAMES HAVE BEEN ERASED.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE
C	HOLES	VISCOUNT SHOE CO. AND PARIS SHOE CO., INC.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE
C	HOLES	PARIS SHOE CO., INC. AND IDEAL DRESSES, INC.

	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS
C	HOLES	UNIVERSAL HEEL COMPANY, INC.
	CLEAN, FOLDS,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS LORUM FIBRE CO. NOTE READS "TO BE MADE PART OF COMPOSITION MATERIALS CO., ONC. AND LORUM FIBRE CO., INC.
C	HOLES	LEASE DATED OCTOBER 30, 1959.
	CLEAN,	
C	HOLES	SHOWS SQUARE FOOTAGE AREA OF 6840 SQ. FT.
	CLEAN,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANT IS LOWELL MILL SUPPLY CO. ALSO SHOWN ARE REMOVAL DATES FOR A PLATFROM AND A BULKHEAD WHICH ARE OCT. 1963 AND NOV.
C	HOLES	1963, RESPECTIVELY.
	CLEAN,	SHOWS OPEN AREA IN FRONT OF MILL NO. 2, SECTIONS 4 AND 5
C	HOLES	BORDERED BY BRIDGE STREET AND THE MERRIMACK RIVER.
	CLEAN,	
C	HOLES	
	CLEAN,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE CLAYTON HOSIERY MILLS, INC., MERRIMACK SUNSHINE LAUNDRY, AND RICHARD SHOE WHICH OCCUPIES A SPACE FORMERLY
C	HOLES	OCCUPIED BY A. RHODES CO., INC.
	CLEAN,	SHOWS SQUARE FOOTAGES RENTED BY TENANTS. TENANTS ARE F.S. PAYNE CO., SHERMAN STITCHING, LYONS CALLANDER, ROBERT H. JONES, BLUE-WHITE PRINT CO., JAMES MURPHY, SURGICAL PRODUCTS, INC. ROBERTS SPORTSWEAR, LEWIS SPORTSWEAR, AND
C	HOLES	ROYAL MOP MFG. CO.
C	STAINED	

C	STAINED	
B	FOLDS	
B	FOLDS, TORN	DRAWING BEARS A LEGEND.
B	TAPED	THERE IS A RECTANGLE CUT OUT OF THE LOWER RIGHT SIDE OF THE MAP.
B	TAPED, FOLDS	THIS COPY IS A POSITIVE PHOTOCOPY.
B	TAPED, FOLDS	THIS COPY IS A NEGATIVE PHOTOCOPY.
B	TAPED, TORN	THIS COPY IS A NEGATIVE PHOTOCOPY.
A		
B	CLEAN, FOLDS	

B	CLEAN	PLAN AND ELEVATION OF FORMER BOARDING HOUSES AND BOOTT MILLS COTTON STOREHOUSE OCCUPIED BY H&H PAPER AND BON MARCHE AT THE TIME OF THE DRAWING. THE BOARDING HOUSE PORTION WAS LATER RESTORED TO ITS HISTORICAL APPEARANCE BY LOWELL NATIONAL HISTORICAL PARK.
B	CLEAN	PLAN OF FORMER BOARDING HOUSES AND BOOTT MILLS COTTON STOREHOUSE OCCUPIED BY H&H PAPER AND BON MARCHE AT THE TIME OF THE DRAWING. THE BOARDING HOUSE PORTION WAS LATER RESTORED TO ITS HISTORICAL APPEARANCE BY LOWELL NATIONAL HISTORICAL PARK.
B	CLEAN	
B	FOLDS, CLEAN	A COVER LETTER FROM CONSULTING ENGINEERS, 05-08-B, IS STAPLED TO THE BLUEPRINT.
B	FOLDS	THIS LETTER IS STAPLED TO BLUEPRINT 05-08-A AND IS THE COVER LETTER FOR THE BLUEPRINT.
B	CLEAN	
B	FOLDS, TAPED	
B	CLEAN	
B	CLEAN, FOLDS	INFORMATION IS ORGANIZED BY BLDG. #, VALVE #, LOCATION, FLOW ALARMS, AND CONTROLS.
B	SOILED, FOLDS	THIS COPY IS ONLY A PARTIAL COPY OF 05-12- COPY 1.
A		

B	CLEAN, FOLDS	
B		OUTLINE PLAN OF FIFTH AND SIXTH FLOORS OF BOOTT MILLS 1 AND 2.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.

B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, STAPLED	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
A		
B	FOLDS, TORN	
B	CLEAN	
B	FOLDS, TORN	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.

B	FOLDS, TORN	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	CLEAN	THIS IS SHEET 2 IN A SERIES OF 6, HELD TOGETHER WITH TWO BRASS HOLDERS.
B	CLEAN	THIS IS SHEET 3 IN A SERIES OF 6, HELD TOGETHER WITH TWO BRASS HOLDERS.
B	CLEAN	THIS IS SHEET 4 IN A SERIES OF 6, HELD TOGETHER WITH TWO BRASS HOLDERS.
B	CLEAN	THIS IS SHEET 5 IN A SERIES OF 6, HELD TOGETHER WITH TWO BRASS HOLDERS.
B	CLEAN	THIS IS SHEET 6 IN A SERIES OF 6, HELD TOGETHER WITH TWO BRASS HOLDERS.
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	
B	CLEAN, FOLDS	
B	SOILED, FOLDS	A PIECE OF LINED PAPER EXTENDING THE PLAN OF A ROOM AT THE BOTTOM OF THE PRINT IS TAPED TO THE DRAWING. NOTED ON THE PAPER IS "PRIME STORE".
B	FOLDS	

	CLEAN,	
B	FOLDS	
	FOLDS,	
B	TORN	JOB - C - 37.
		THIS IS SHEET 1 IN A SERIES OF 6, HELD TOGETHER WITH TWO BRASS HOLDERS. CONFORMS TO TITLE AT NUMBER 26 ON PL & C LIST FOR
B	CLEAN	DRAWER NO. 5.
A		
	CLEAN,	
B	FOLDS	
C	CLEAN	
B	CLEAN	
B	CLEAN	
	CLEAN,	
B	FOLDS	
	CLEAN,	THERE ARE 3 HOLES PUNCHED ON THE LEFT SIDE OF THE
B	FOLDS	BLUEPRINT.
	FOLDS,	
B	SOILED	

B	FOLDS, SOILED	
B	CLEAN	
B	CLEAN	
A		
B	FOLDS, TORN	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	CLEAN	
B	FOLDS	BLUEPRINT HAS TWO ATTACHMENTS, 50-37-B, AND 50-37-C.
B	CLEAN	BLUEPRINT HAS TWO ATTACHMENTS, 50-37-A, AND 50-37-C.
B	FOLDS	INSTALLATION DETAILS HAS TWO ATTACHMENTS, 50-37-A, AND 50-37-B.

B	CLEAN	
B	FOLDS, TORN	THIS BLUEPRINT WAS ATTACHED TO 05-39-A-COPY 2, 05-39-B, 05-39-C-COPY 1, AND 05-39-C-COPY 2. CHARLES T. MAIN, ENGINEER, 201 DEVONSHIRE ST., BOSTON, MASS.
B	FOLDS, TORN	THIS BLUEPRINT WAS ATTACHED TO 05-39-A-COPY 1, 05-39-B, 05-39-C-COPY 1, AND 05-39-C-COPY 2. BLUEPRINT FROM CHARLES T. MAIN, ENGINEER, 201 DEVONSHIRE ST., BOSTON, MASS.
B	FOLDS, TORN	THIS BLUEPRINT WAS ATTACHED TO 05-39-A-COPY 1, 05-39-A-COPY2, 05-39-C-COPY 1, AND 05-39-C-COPY 2. BLUEPRINT FROM CHARLES T. MAIN, ENGINEER, 201 DEVONSHIRE ST., BOSTON, MASS.
B	FOLDS, PUNCHED HOLES	THIS BLUEPRINT WAS ATTACHED TO 05-39-A-COPY 1, 05-39-A-COPY2, 05-39-B, AND 05-39-C-COPY 2. THIS BLUEPRINT IS ALSO ATTACHED TO 05-39-C-COPY 2 WITH A BRASS HOLDER. BLUEPRINT FROM CHARLES T. MAIN, ENGINEER, 201 DEVONSHIRE ST., BOSTON, MASS.
B	FOLDS, PUNCHED HOLES	THIS BLUEPRINT WAS ATTACHED TO 05-39-A-COPY 1, 05-39-A-COPY2, 05-39-B, AND 05-39-C-COPY 1. THIS BLUEPRINT IS ALSO ATTACHED TO 05-39-C-COPY 1 WITH A BRASS HOLDER. BLUEPRINT FROM CHARLES T. MAIN, ENGINEER, 201 DEVONSHIRE ST., BOSTON, MASS.
B	TORN, FOLDS	
B	TORN, FOLDS	
B	TORN, FOLDS	

B	TORN, FOLDS	
B	TORN, FOLDS	
B	FOLDS	
C	FOLDS	
B	FOLDS	
B	FOLDS, TORN	ORIGINAL DATE OF BLUEPRINT IS 1944/10/11, REVISED 1946/12/31. THERE ARE COMMENTS WRITTEN IN PENCIL ON THE VERSO.
B	FOLDS, TORN, SOILED	
A		
B	FOLDS	DATE ON BLUEPRINT RECTO IS DEC. 1939, DATE STAMPED ON VERSO IS 1940/01/10.

A		
B	FOLDS	
B	FOLDS	
B	FOLDS	DATE A = APRIL 19, 1924, DATE B = DECEMBER 19, 1927.
B	FOLDS	
B	FOLDS	
B	FOLDS	
B	SOILED	
B	FOLDS	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS, TAPED	THIS PLAN IS TAPED TOGETHER IN THREE SECTIONS.
B	CLEAN	

B	CLEAN	
B	CLEAN	
B	FOLDS	
B	FOLDS, TORN	
B	FOLDS, TORN	
B	FOLDS, TORN, PUNCHED HOLES	
B	FOLDS, TORN, PUNCHED HOLES	
B	PUNCHED HOLES	
B	PUNCHED HOLES	
B	PUNCHED HOLES	
B	PUNCHED HOLES	
B	FOLDS, TORN	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.

B	FOLDS	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
B	FOLDS	BLUEPRINT FROM CHAS. T. MAIN, INC., ARCHITECTS-ENGINEERS, BOSTON, MASS., U.S.A.
A		
B	FOLDS, TORN	
B	FOLDS	
B	FOLDS, TORN	
B	CLEAN	
B	CLEAN	
B	CLEAN	THIS COPY OF 05-66-A IS ONLY PART OF THE WHOLE DRAWING.
B	CLEAN	
B	CLEAN	
B	CLEAN	ORIGINAL DATE 12/08/1916, REVISED DATE 10/24/1919.
B	CLEAN	THE TITLE IS WRITTEN IN GRAPHITE ON AN ATTACHED NOTE.

B	FOLDS, TORN	
B	FOLDS, TORN, SOILED	
B	FOLDS	
B	FOLDS	
B	FOLDS	
B	CLEAN	
B	CLEAN	
B	PUNCHED HOLES TORN, TAPED, FOLDS	
C	FOLDS, SOILED	SHOWS BRIDGE BETWEEN BUILDINGS NO. 4 AND NO. 9 AT EACH FLOOR. THERE ARE TWO HOLES PUNCHED IN THE RIGHT SIDE OF PAPER.
C	CLEAN	BEARS NOTE: " REMOVAL OF TRANSVERSE WALL BETWEEN # 3, & # 4."
C	CLEAN	BEARS NOTE: " REMOVAL OF TRANSVERSE WALL BETWEEN # 3, & # 4."
C	CLEAN	

C	TORN, FOLDS, TAPED	PUBLISHED FOR THE LOWELL DIRECTORY, PUBLISHED BY R.L. POLK & CO., PRINTED BY LUCAS COMPANY.
C	TORN IN HALF	
C	TORN, FOLDS	
C	FOLDS	THIS PLAN WAS ORIGINALLY THE SAME AS 02-18, AND MODIFIED FOR THE 2ND FLOOR.
C	CLEAN	
C	CLEAN	
C	CLEAN	
C	FOLDS, TORN	NOTE: DATE IS STAMPED ON VERSO.
C	FOLDS	
C	CLEAN	TEMPLATE FOR FIRST FLOOR BUILDINGS IN BOOTT MILL COMPLEX.
C	FOLDS, SOILED	REFERS TO LORUM FIBRE CO. INC. SQUARE FOOTAGE.

C	FOLDS, SOILED	FIRST OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	SECOND OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	THIRD OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	FOURTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	FIFTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	SIXTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	SEVENTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE OF STOREHOUSE 1, 2, & 3, BY FLOOR.

C	FOLDS, SOILED	FIRST OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	SECOND OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	THIRD OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	FOURTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	FIFTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	SIXTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE BY FLOOR.
C	FOLDS, SOILED	SEVENTH OF A GROUP OF PLANS STAPLED TOGETHER SHOWING SQUARE FOOTAGE OF STOREHOUSES 1, 2, & 3, BY FLOOR.

C	FOLDS	SHOWS TURBINES AND CHANGES IN RED PENCIL.
C	SOILED	
C	TORN	
C	FOLDS, SOILED	FLOOR PLAN OF BUILDINGS 1 & 2.
C	FOLDS, SOILED	FLOOR PLAN OF BUILDINGS 1 & 2. WITH NOTATIONS.
C	FOLDS	SHEET 1 OF 3, STAPLED TOGETHER.
C	FOLDS	SHEET 1 OF 3, STAPLED TOGETHER.
C	FOLDS	SHEET 2 OF 3, STAPLED TOGETHER, SHOWS LONGITUDINAL SECTION TOWARD MERRIMACK MFG., AND TRANSVERSE SECTION THROUGH MERRIMACK RIVER LOOKING UPSTREAM.
C	FOLDS	SHEET 2 OF 3, STAPLED TOGETHER, SHOWS LONGITUDINAL SECTION TOWARD MERRIMACK MFG., AND TRANSVERSE SECTION THROUGH MERRIMACK RIVER LOOKING UPSTREAM.
C	FOLDS	SHEET 3 OF 3, STAPLED TOGETHER, SHOWS LONGITUDINAL SECTION LOOKING TOWARD BOOTT MILL, AND TRANSVERSE SECTION LOOKING UP THE WASTEWAY.

C	FOLDS	SHEET 3 OF 3, STAPLED TOGETHER, SHOWS LONGITUDINAL SECTION LOOKING TOWARD BOOTT MILL, AND TRANSVERSE SECTION LOOKING UP THE WASTEWAY.
C	TORN	PLAN OF BUILDINGS NO. 1 & 2 SHOWING SQUARE FOOTAGE.
C	TORN	PLAN OF BUILDINGS NO. 1 & 2 SHOWING SQUARE FOOTAGE.
C	FOLDS, SOILED	SHOWS BRIDGE BETWEEN BUILDINGS NO. 4 AND NO. 9. THERE ARE TWO HOLES PUNCHED IN THE RIGHT SIDE OF PAPER.
B	TORN, FOLDS	
B	TORN, FOLDS	
B	TORN, FOLDS	
B	FOLDS	
B	FOLDS, TORN	
B	FOLDS, TORN	THERE IS A BLUE STAMP NOTING "FOR CONSTRUCTION PURPOSES … FOR BOOTT MILLS.
B	FOLDS, TORN	THERE IS A BLUE STAMP NOTING "FOR CONSTRUCTION PURPOSES … FOR BOOTT MILLS.
B	FOLDS, TORN	THERE ARE TWO EARLIER DATES ON THE BLUEPRINT, SEP. 29, 1910, AND SEP. 30, 1910.

B	FOLDS, TORN	THERE ARE TWO EARLIER DATES ON THE BLUEPRINT, SEP. 29, 1910, AND SEP. 30, 1910.
B	FOLDS	THERE ARE TWO EARLIER DATES ON THE BLUEPRINT, SEP. 29, 1910, AND SEP. 30, 1910.
B	FOLDS	THERE ARE SEVERAL REVISION DATES SHOWN. THIS WAS ATTACHED TO 06-17-B.
C	FOLDS, SPOTTED	THIS WAS ATTACHED TO 06-17-A..
B	FOLDS, TORN, SOILED	
B	FOLDS, TORN	
B	FOLDS, TORN, SOILED	
B	FOLDS, TORN, SOILED	
B	FOLDS, TORN, SOILED	
B	FOLDS, TORN	
B	FOLDS, TORN	

B	FOLDS, TORN IN TWO PIECES	THIS BLUPRINT IS TORN IN HALF.
B	FOLDS	
B	FOLDS	BEARS NOTE: OFFICE COPY
B	FOLDS	
B	FOLDS, TORN	
B	FOLDS	
B	FOLDS	CHART SHOWS CUBIC FEET PER SECOND, AND COVERS THE YEARS 1939 THROUGH 1942.
B	FOLDS	CHART SHOWS CUBIC FEET PER SECOND FROM 0 - 22,000, AND COVERS THE YEARS 1939 THROUGH 1942.
B	FOLDS	

B	FOLDS	
B	FOLDS	
B	FOLDS	
B	FOLDS	
B	FOLDS	
B	FOLDS	
C	CLEAN	THE KEY SHOWS WHICH TYPE OF LINE APPLIES TO WHICH YEAR. THE DATE IS ON THE BOTTOM, HEIGHTS ALONG THE SIDES.
C	CLEAN	THE KEY SHOWS WHICH TYPE OF LINE APPLIES TO WHICH YEAR. THE DATE IS ON THE BOTTOM, HEIGHTS ALONG THE SIDES.
B	CLEAN	THIS WAS ATTACHED TO 07-02-B.
B	CLEAN	THIS WAS ATTACHED TO 07-02-A.

C	TORN	A PUMP SCHEDULE AND KEY TO BLOW OFF VALVES IS ALSO ON THE MAP.
B	TORN, SOILED, FOLDS	THIS WAS THE ORIGINAL FROM WHICH 08-06-B WAS COPIED, BEFORE THE COLORED PENCIL PARTS WERE ADDED.
B	CLEAN	THIS WAS COPIED FROM 08-06-A BEFORE THE COLORED PENCIL PARTS WERE ADDED TO A..
B	FOLDS	
B	FOLDS	

B	FOLDS	
B	FOLDS, SOILED, CUT	A QUARTER SECTION OF THE LEFT SIDE OF THE PLAN, SHOWING THE STRAND THEATRE AND THE PAWTUCKET CANAL, HAS BEEN CUT OFF.
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	FOLDS	
B	FOLDS	
B	FOLDS, SOILED	THERE IS AN EXPLANATION KEY ON THE PLAN.

B	FOLDS, SOILED	THERE IS AN EXPLANATION KEY ON THE PLAN.
B	FOLDS, SOILED, TORN	THERE IS AN EXPLANATION KEY ON THE PLAN. ATTACHED TO THIS PLAN ARE TWO HANDWRITTEN LISTS OFVALVE LOCATIONS, HYDRAN LOCATION, AND PUMP INFORMATION. THIS PLAN SHOWS # 23 MUST BE SHUT.
B	FOLDS, SOILED, TORN	THERE IS AN EXPLANATION KEY ON THE PLAN. "CHECK FOR CLOW" IS ON A NOTE DATED 12-19-73
B	SOILED	
B	CLEAN	
B	CLEAN	ORIGINAL DATES, 1907 AND 1912. INFORMATION ADDED, MARCH 29, 1943 AND JULY 29, 1949.
B	CLEAN	ORIGINAL DATES, 1907 AND 1912. INFORMATION ADDED, MARCH 29, 1943 AND JULY 29, 1949.
C	FOLDS, SOILED	TRANSMITTAL SHEET FORWARDING A SKETCH OF 8" D.I. BYPASS FOR FIRE PROTECITON LOOP ON DUTTON STREET STA 26+90 TO STA 31+40, FROM MODERN CONTINENTAL CONSTRUCTION CO., INC.

C	CLEAN	SKETCHES AND SHEET CLIPPED TO 09-19-01 PLAN.
C	CLEAN	SKETCHES AND SHEET CLIPPED TO 09-19-01 PLAN.
C	FOLDS, SOILED	APPROVED 7/2/69.
C	FOLDS, SOILED	APPROVED 7/2/69.
C	CLEAN	TO MR. MELVIN G. LEZBERG PROPRIETORS OF LOCKS AND CANALS ON MERRIMACK RIVER FOOT OF JOHN STREET, LOWELL, MASSACHSETTS 08152. ATTACHED TO 09-21-B AND C AND ALSO REFERENCING 09-22-COPIES 1 & 2.
C	FOLDS, SOILED	UTILITY DETAIL PLAN FOR JOB.
C	FOLDS, SOILED	UTILITY DETAIL PLAN FOR JOB.
C	FOLDS, SOILED	DETAIL SPECIFICATIONS FOR WATER SUPPLY.
C	FOLDS, SOILED	DETAIL SPECIFICATIONS FOR WATER SUPPLY.
C	CLEAN	SPECIFICATIONS FOR COMPLETING JOB 021713 AS REFERENCED IN 19-21-A, AND SHOWN IN 19-21- B, & C.
C	CLEAN	SPECIFICATIONS FOR COMPLETING JOB 021713 AS REFERENCED IN 19-21-A, AND SHOWN IN 19-21- B, & C.

C	CLEAN	
C	CLEAN	
C	CLEAN	DONE BYMAURER AND SFORZA, INC.
C	CLEAN	DONE BY MAURER AND SFORZA, INC.
C	CLEAN	DONE BY MAURER AND SFORZA, INC.
C	CLEAN	DONE BY MAURER AND SFORZA, INC.
C	CLEAN	EDA PROJECT NO. 01-51-20414. DONE BY ROBERT C. GOODOAK & ASSOCIATES.
C	CLEAN	EDA PROJECT NO. 01-51-20414. DONE BY ROBERT C. GOODOAK & ASSOCIATES.
C	CLEAN	EDA PROJECT NO. 01-51-20414. DONE BY ROBERT C. GOODOAK & ASSOCIATES.
C	CLEAN	WRITTEN BY RESIDENT ENGINEER HENRY ST. GERMAIN.

C	CLEAN	WRITTEN BY RESIDENT ENGINEER HENRY ST. GERMAIN.
C	CLEAN	WRITTEN BY RESIDENT ENGINEER HENRY ST. GERMAIN.
C	CLEAN	SHOWS SEWER AND COUPLINGS.
C	CLEAN	SHOWS 16' C.I. - W. JUNCTURE.
C	CLEAN	TIES TO WATERMAIN.
C	CLEAN	TIES TO WATERMAIN.
C	CLEAN	REQUEST FOR PERMISSION TO RELOCATE A 12" WATER MAIN BETWEEN MARKET MILLS AND A AND B BUILDINGS AT 246 MARKET STREET.
C	CLEAN	PERMISSION GIVEN TO RELOCATE A 12" WATER MAIN BETWEEN MARKET MILLS AND A AND B BUILDINGS AT 246 MARKET STREET.
C	CLEAN	
C	TORN, SOILED	BEARS NOTE: 1) AS BUILT DRAWINGS TO FOLOLW, 2) PIPE NEW DUCTILE IRON CLASS 51, 3) AND MINIMJM COVER FROM TOP OF PIPE TO FINISH GRADE SHALL BE 5'0".
C	FOLDS, SOILED	

C	FOLDS	LETTER DEFINES WHERE ON ANDOVER STREET THE 12" WATER LINE IS LOCATED.
C	FOLDS	BEARS NOTE: REVISED 2/26/80.
C	FOLDS	.
C	FOLDS, SOILED	.
C	SOILED	REFERS TO ENCLOSED DRAINAGE PLANS FOR PAVING ON ANDOVER STREET, LOWELL, MASS.
C	FOLDS	ELEVATION SCALE: 1" = 4'.
B	SOILED	
A		

B	FOLDS	THE MAP IS OF UNITED STATES PRIMARY DRAINAGE BASINS. INDICATES AVERAGE PRECIPITATION IN INCES FOR THE YEARS 1870 TO 1901.
A		
A		
A		
B	CLEAN	
B	CLEAN	
B	CLEAN	
B	SOILED	THIS ENVELOPE CONTAINED TWO BLUEPRINTS, ONE A NUMBERED LIST OF PARTS, AND THE OTHER "L.I.D. CO. FEEDER PANELS, MAIN POWER".
B	FOLDS	THIS WAS IN THE ENVELOPE 10-10-A.

B	FOLDS, TORN	THIS WAS IN THE ENVELOPE 10-10-A. THE DATES ARE : MARCH 28, 1942, REVISED FEBRUARY 9, 1943.
A		
B	TORN, CUT	THIS IS A LIST OF SPRINKLERED AREAS TO ASSESS BILLING FROM JAN. 1, 1947.
B	FOLDS, SOILED	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS, SOILED	THE PRINT IS COMPRISED OF SHEET 1 AND SHEET 2.
B	FOLDS, SOILED	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.

B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	FOLDS	THE PRINT IS COMPRISED OF SHEET ONE AND SHEET TWO.
B	SOILED	THE FOLDER, HELD TOGETHER WITH THREE BRASS HOLDERS, CONTAINS COLORED PHOTOSTATS OF REAL ESTATE PLANS WITH GREEN - LOCKS & CANALS LAND, AND RED - LAND SOLD BY LOCKS & CANALS. ALSO INCLUDED ARE 19 NEGATIVE PHOTOSTATIC COPIES
B	SOILED	OF THE PLANS.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	TORN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	TORN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.

B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.

B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	TORN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.

B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	CLEAN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER.

B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	TORN	THE PHOTOSTAT SHOWS NUMBERED LOTS. THESE PHOTOSTATS WERE FOUND IN FRONT OF THE COLORED PHOTOSTAT FOLDER. THE FOLDER, HELD TOGETHER WITH TWO BRASS HOLDERS, CONTAINS COLORED PHOTOSTATS OF REAL ESTATE PLANS WITH GREEN - LOCKS & CANALS LAND, AND RED - LAND SOLD BY LOCKS &
B	SOILED	CANALS.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.

B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING. THERE IS A DISCLAIMER WRITTEN IN GRAPHITE RELATIVE TO # 809.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.
B	SOILED	THE PHOTOSTAT SHOWS NUMBERED LOTS, AND THE ABOVE MENTIONED COLORING.

B	FOLDS	
B	FOLDS	
B	FOLDS, SOILED	PLAN SHOWS BORINGS 1 - 3, AND 5 & 6 AS WELL AS BORINGS A - F. BORING # 4 WAS NOT DONE.
A		
B	FOLDS, SOILED	
B	CLEAN	
B	TAPED	
B	FOLDS	
B	FOLDS	
B	FOLDS, TORN	

B	TORN	
B	CLEAN	A SECTION OF PAPER EXTENDS FROM THE BOTTOM RIGHT OF THE PLAN WITH NUMBERS WRITTEN IN GRAPHITE. IT IS A PART OF THE PRINT PAPER.
B	CLEAN	
B	FADED	THE SCALE IS WRITTEN AS 1" = 5', 10' & 50'.
B	TORN	LETTER CONSISTS OF PAGE 1 AND PAGE 2.
B	FOLDS	
B	FOLDS	
B		THE CHANGE INVOLVES AN ELEVATION CHANGE AND PIER DETAILS AND LOCATIONS.
B	FOLDS, FADED	THERE ARE SCALES FOR EACH PART OF THE DRAWING.

	FOLDS,	
B	FADED	THERE ARE SCALES FOR BOTH PARTS OF THE DRAWING.
A		
A		
	FOLDS,	
	BURN	
B	HOLE	
	FOLDS,	
B	TORN	
	FOLDS,	
B	TORN	SCALES ARE NOTED FOR EACH PART OF THE PLAN.
	FOLDS,	
B	TORN	"NOTE: COMPILED FROM EXISTING PLANS AND RECORDS."
B	SOILED	
B	TORN	
B	SOILED	

B	TORN, FOLDS	
B	SOILED	FOLDER IS HELD TOGETHER WITH 4 BRASS HOLDERS IN PUNCHED HOLES.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS A # 2.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS # 2-C, AND 2-D. A NOTE PINNED TO THE PRINT: LOT # 2-D NOT ON 1928 TAX LIST.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS # 3-A. A NOTE PINNED TO THE PRINT: LOTS 3 & 3-A CONVEYED TO DANS & SARGENT LUMBER CO. DEC. 26, 1924 - 87,727 SQ. FT.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS # 4. A NOTE PINNED TO THE PRINT: LOTS 4, 4-A, 4-B, & 4-E CONVEYED TO BURNHAM & DANS LUMBER NOV. 30, 1923 - 61,287 SQ. FT.
B	FOLDS	A TAB ATTACHED TO THE BOTTOM SHOWS # 5, 5-A, 6. A NOTE PINNED TO THE PRINT: LOT NO. 5 MERGED WITH # 6. 30,425 SQ. FT OF LOT # 6 SOLD TO SACO-LOWELL SHOPS 2/23/23. 98,824 SQ FT OF LOT # 6 SOLD TO PRATT & FORREST CO. 2/23/23. # 5-A ON MAP BUT NOT ON '28…

B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS # 7, 14. A NOTE PINNED TO THE PRINT: LOT 13-A CONVEYED TO E.A. WILSON CO. - 54,700 SQ. FT. 2/23/23.
B	CLEAN	THREE TABS ATTACHED TO THE BOTTOM SHOWS LOTS 34-A THROUGH 35-A-3. A NOTE PINNED TO THE PRINT ALSO LISTS DEEDS FOR THESE LOTS, OWNERS AND SQ. FOOTAGE OF LOTS. THE DATE IS JAN. 18, 1926.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS LOTS 8, 9, 11, 13, 13-O.
B	CLEAN, PIN HOLE	A TAB ATTACHED TO THE BOTTOM SHOWS # 16-A. A NOTE PINNED TO THE PRINT: INCLUDED IN LOT #17 LOT # 16-A, 4400 SQ. FT. TAXED TO P.L.& C. LOT #17 12,804 SQ. FT LEASED TO ALIS ALLEN & SON CO. 1/24/24. LOT 17-A 5167 SQ. FT. LEASED TO MIDDLESEX PAPER TUBE CO.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS # 35-B.. A NOTE PINNED TO THE PRINT: LOT 35-B 15,845 SQ. FT. SOLD TO HELENE GELINAS 5/25/23. LOT 33 AIKEN ST. PLAYGROUND BOUGHT BACK BY P.L. & C.4/15/27 & LEASED TO LOWELL 12/29/27.
B	FOLDS	A TAB ATTACHED TO THE BOTTOM SHOWS # 84, 85.
B	FOLDS	A TAB ATTACHED TO THE BOTTOM SHOWS # 87, 88.

B	FOLDS	A TAB ATTACHED TO THE BOTTOM SHOWS # 89, 90, 90-B..
B	FOLDS	A TAB ATTACHED TO THE BOTTO SHOWS # 91, 91-D, 91-E, 92, 92-A, 106, 107. A NOTE PINNED TO THE PRINT ADDS INFO ABOUT THE SALE OF LOTS 106 AND LOT 91.
B	FOLDS, PIN HOLES	A TAB ATTACHED TO THE BOTTOM SHOWS # 95, 96. A NOTE PINNED TO THE PRINT: 1/2 OFLOT # 95 PART OF LOT # 96 & ALL OF LOT # 96-A SOLD TO LOWELL 5/26/22. SQ. FOOTAGE OF ALL 3 PARCELS NOTED.
B	CLEAN, TORN	A TAB ATTACHED TO THE BOTTOM SHOWS # 103-I,103-J. A NOTE PINNED TO THE PRINT: LOT # 102-I 118,575 SQ. FT. SOLD TO COMMONWEALTH OF MA. 7/29/21.
B	CLEAN	A TAB ATTACHED TO THE BOTTOM SHOWS # 105.

B	FOLDS	
B	TORN	
B	TORN	
B	STAPLE HOLES	
B	FOLDS, STAPLE HOLES	THIS SKETCH IS OF THE PLANS AND ELEVATIONS SHOWN IN 10-43-A.
B	CLEAN	
C	CLEAN	A 3 PAGE DESCRIPTION OF THE BOUNDARIES FOR "FENCES IN AND AROUND DUTTON STREET PARKING AREA." TO BE NOTARIZED.
B	FOLDS	NOTES SHOW PASSAGES WITH AND WITHOUT FENCES.
B	FOLDS	NOTES SHOW PASSAGES WITH AND WITHOUT FENCES.

B	FOLDS, TORN	
C	CLEAN	DESCRIPTION OF THE BOUNDARIES OF THE EASEMENT AREA "ALONG THE SOUTHERLY SIDE OF THE LOWER PAWTUCKET CANAL," ATTACHED TO 10 - 046-D-1-4.
C	CLEAN	DESCRIPTION OF THE ABOVE EASEMENT BOUNDARIES. ATTACHED TO 10 - 046-D-1-4.
C	SOILED	PREPARED BY WHITMAN & HOWARD INC. ENGINEERS AND ARCHITECTS. UPEATED SEPT. 3, 1975. SHEET 2 OF 6. ATTACHED TO 10 - 046-D-1-4.
C	FOLDS	PREPARED BY WHITMAN & HOWARD INC. ENGINEERS AND ARCHITECTS. UPEATED SEPT. 3, 1975. SHEET 1 OF 3. ATTACHED TO 10 - 046-D-1-4.
C	FOLDS	PREPARED BY WHITMAN & HOWARD INC. ENGINEERS AND ARCHITECTS. UPEATED SEPT. 3, 1975. SHEET 2 OF 3. ATTACHED TO 10 - 046-D-1-4.
C	FOLDS	PREPARED BY WHITMAN & HOWARD INC. ENGINEERS AND ARCHITECTS. UPEATED SEPT. 3, 1975. SHEET 3 OF 3. ATTACHED TO 10 - 046-D-1-4.
B	FOLDS	ORIGINAL DATE WAS AUGUST 13, 1942.
B	CLEAN	
B	FOLDS	

B	CLEAN	LITTER IS FROM E. L. HUSE.
B	FOLDS	
B		THE LETTER DEFINES THE LIMITS OF THE LAND IN THE TITLE.
B	CLEAN	
B	CLEAN	
B	CLEAN	
C	CLEAN	

B	FOLDS
B	GLUED, TORN
B	FOLDS
B	FOLDS
B	FOLDS
B	FOLDS
B	CLEAN

B	CLEAN	
B	FOLDS	
B	FOLDS	
B	FOLDS	THERE IS NO SCALE ON THE UPPER PLAN, AND 1/4" = 1' ON SECTION "A-A".
B	CLEAN	
B	CLEAN	
B	CLEAN	

A

A

B CLEAN

B CLEAN

B TORN, FOLDS

B FOLDS

B	FOLDS, TORN	
B	FOLDS, SOILED	
B	FOLDS	ORIGINAL DATE: SEPT. 26, 1950, REVISED SEPT. 12, 1955, REVISED DEC. 15, 1955.
B	CLEAN	ZONE M - 5, LOT 29 - B, AND 29 - A.
B	CLEAN	ZONE B - 35, CANAL BORDER H, CANAL BORDER K., AND BUILDING AIR RIGHTS.
B	CLEAN	ZONE B - 1, LOT 96 B.

B	CLEAN	ZONE 1 - A, PORTION OF LOT 8 - A, LOT 8 - B, LOT 8 - C, LOT 13 - B.
B	CLEAN	ZONE M - 3, LOT 29.
B	FOLDS, TORN	
B	FOLDS, SOILED	
B	CLEAN	NOTE: BLACK LINES SHOW SECTION OF STREET IN 1848, YELLOW - 1871, RED - 1917.
B	CLEAN	NOTE: BLACK LINES SHOW SECTION OF STREET IN 1848, YELLOW - 1871, RED - 1917. 10-76-B SHOWS EARTH FILL IN RED ON PRINT.
C	CLEAN	
C	STAPLED	COVER SHEET FOR PELLON CORP. SET OF PLANS FOR SEWAGE. THE SET IS DATE STAMPED APRIL 10, 1979.

C	STAPLED	
C	STAPLED	
C	STAPLED	
C	STAPLED	SHOWS NORTHERN INTERCEPTOR SEWER, SHOUTHERN INTERCEPTOR SEWER, AND NORTHWEST INTERCEPTOR SEWER.
C	STAPLED	
C	STAPLED	THE BUSINESS CARD IS STAPLED TO THE FIRST SHEET OF THE SEWERAGE PLANS.
C	SOILED, FOLDS	PAGE ONE OF A SET OF PLANS STAPLED TOGETHER COVERING THE PROJECT.
C	FOLDS	PAGE TWO OF A SET OF PLANS STAPLED TOGETHER COVERING THE PROJECT.
C	FOLDS	PAGE THREE OF A SET OF PLANS STAPLED TOGETHER COVERING THE PROJECT.
C	FOLDS	PAGE FOUR OF A SET OF PLANS STAPLED TOGETHER COVERING THE PROJECT.
C	FOLDS	PAGE FIVE OF A SET OF PLANS STAPLED TOGETHER COVERING THE PROJECT.

C	CLEAN	THIS LETTER IS STAPLED TO THE VERSO OF 10-79-01 OF THE SET OF PLANS.
C	FOLDS, SOILED	
C	FOLDS	
C	SOILED, FOLDS	BEARS A NOTE: "P.L. & C. TO CITY OF LOWELL DEC. 29, 1939". THERE IS NO CLEAR REFERENCE TO THOSE PARCELS.
B	TAPED	
B	TAPED	

B	TAPED	
B	TAPED	
C	SOILED, FOLDS	
C	TORN, FOLDS	REVISION DATES: OCT. 1939,JULY 1941,FEB. 1943, JULY 1946, OCT. 1950, OCT. 1952, JAN. 1956, JULY 1957. THIS MAP OUTLINES REAL ESTATE HOLDINGS FOR P.L. & C.
C	FOLDS, APPLIQUES	THIS MAP OUTLINES REAL ESTATE HOLDINGS FOR P.L. & C. AND BOOTT MILLS, EACH SEPARATELY COLOR CODED.
C	FOLDS	SHOWS AN AREA OF 6,596 SQ. FT. LEAST TO AENON W. NARKUN AND ITENE D. NARKUN.
C	FOLDS, TORN	BEARS NOTE: "SURVEY CERTIFY TO HOME TITLE GUARANTY CO. TALBOT MILLS INC."
C	SOILED	THIS WAS DONE FOR SUBMISSION TO THE REGISTERS OF DEEDS.
C	SOILED	THIS WAS DONE FOR SUBMISSION TO THE REGISTERS OF DEEDS.

	SOILED,	THIS PLAN SHOWS SOME CHANGES FROM 10-89-COPIES 1 & 2,
C	FOLDS	DONE IN PENCIL ON THE DRAWING.
C	FOLDS	
C	FOLDS	
	FOLDS,	
C	TORN	
C	FOLDS	DATED APRIL 3, 1958, ADDITIONS ADDED MARCH 9, 1959.
C	FOLDS	

C	FOLDS	
C	FOLDS	
C	FOLDS, GLUED	
C	GLUED	THE PAPER MAP IS GLUED TO A CLOTH BACKING.
C	GLUED	THE PAPER MAP IS GLUED TO A CLOTH BACKING. DATES: OCTOBER 1939, CORRECTED JULY 1941, CORRECTED DEC. 1942, READ AREAS DATE DEC. 1942.
C	FOLDS, TORN	

C	FOLDS, SOILED	THESE PLANS 10-100-1 - 3 ARE STAPLED TOGETHER.
C	FOLDS, SOILED	THESE PLANS 10-100-1 - 3 ARE STAPLED TOGETHER.
C	FOLDS, SOILED	THESE PLANS 10-100-1 - 3 ARE STAPLED TOGETHER.
C	SOILED	THE BRIDGE PLANS ARE STAPLED TOGETHER ALTHOUGH THEY ARE NOT IN PLAN NUMBER ORDER.
C	SOILED	THE BRIDGE PLANS ARE STAPLED TOGETHER ALTHOUGH THEY ARE NOT IN PLAN NUMBER ORDER.
C	SOILED	THIS REVISION IS ATTACHED TO 10-101-02-A.
C	SOILED	THIS LIST IS ALSO ATTACHED TO 10-101-02-A.
C	SOILED	THE FOLLOWING PLANS ARE ALL STAPLED TOGETHER WITH 10-101-1 & 2.

C SOILED STAPLED TOGETHER WITH 10-101-1 & 2.

C SOILED STAPLED TOGETHER WITH 10-101-1 & 2.

C SOILED STAPLED TOGETHER WITH 10-101-1 & 2.

C SOILED STAPLED TOGETHER WITH 10-101-1 & 2.

C SOILED STAPLED TOGETHER WITH 10-101-1 & 2.

C SOILED STAPLED TOGETHER WITH 10-101-1 & 2.

C	SOILED	STAPLED TOGETHER WITH 10-101-1 & 2.
C	SOILED	STAPLED TOGETHER WITH 10-101-1 & 2.
C	SOILED	STAPLED TOGETHER WITH 10-101-1 & 2.
C	CLEAN	DATE STAMPED FEBRUARY 27, 1981.
C	TORN, FOLDS	ALL AS BUILT DRAWINGS OF THE COURIER CITIZEN PROJECT.
C	FOLDS	AN EARLIER DRAWING OF THE COURIER CITIZEN PROJECT UTILITY PLAN, WITH ATTACAHED TRANSMITTAL SHEET.
C	FOLDS	ALL AS BUILT DRAWINGS OF THE COURIER CITIZEN PROJECT.
C	FOLDS	ALL AS BUILT DRAWINGS OF THE COURIER CITIZEN PROJECT.

C	FOLDS	ALL AS BUILT DRAWINGS OF THE COURIER CITIZEN PROJECT.
C	FOLDS	ALL AS BUILT DRAWINGS OF THE COURIER CITIZEN PROJECT.
C	TORN, TAPED	
C	CLEAN	A 48 PAGE BOUND VOLUME OF MAPS ISSUED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE.
C	FOLDS	THE DATE OF THIS BLUE LINE PRINT IS UNKNOWN. IT WAS MADE FROM A 1902 COPY OF THE SEPT. 5,1822, ORIGINAL DONE BY WILLIAM TAYLOR FOR THE PROPRIETORS OF THE MIDDLESEX CANAL.
C	STAPLED	A 5 PAGE LIST OF LEASING INFORMATION INCLUDING LESSEE, YEARS, AMT. PER YEAR, SQUARE FOOTAGE, AND LOCATION.
C	STAPLED	A 5 PAGE LIST OF LEASING INFORMATION INCLUDING LESSEE, YEARS, AMT. PER YEAR, SQUARE FOOTAGE, AND LOCATION.
C	FOLDS	SHEET 1 OF 5.
C	FOLDS	COPY OF MAP 2029 IN THE STATE ARCHIVES. DISTANCES MEASURED IN MILES, FURLONGS, AND RODS.

C	FOLDS	
C	FOLDS	PASTED TO BLUEPRINT TITLED PLAN SHOWING SIDE TRACK ALONG SOUTHERLY SIDE OF PAWTUCKET CANAL FRROM N. & L.R.R. TO SCHOOL STREET, LOWELL, MASS.
C	TORN	
C	FOLDS	TAKEN FROM A LARGER PAGE OF A BOUND VOLUME.
C	SOILED	
C	FOLDS	
C	TORN, FOLDS	THE STRUCTURE IS UNIDENTIFIED.

C	CLEAN	1ST. OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."
C	FOLDS	2ND OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C." BEARS PENCIL NOTE: " NOS. 1 - 7 REFER TO PARAGRAPHS IN REPORT TO TREASURER DATED JUNE 22, 1932."
C	CLEAN	3RD OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C." BEARS NOTE: "CORRECTED MAR. 1929."
C	CLEAN	4TH OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."
C	CLEAN	5TH OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."
C	CLEAN	6TH OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."
C	CLEAN	7TH OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."
C	CLEAN	8TH OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."
C	CLEAN	9TH OF 9 PLANS IN A TAN, MANILLA FOLDER TITLED "AREAS LEASED TO THE VARIOUS MILLS BY L& C."

C	FOLDS	BEARS NOTE: LOT 43 IN 1826, IN GREY PENCIL, AND PRESENT CONDITIONS 1959, IN PINK PENCIL. THE NEW WORK ON THIS BLUEPRINT COPY IS DATED 1959. THE DATE OF THE ORIGINAL FROM WHICH THIS PLAN WAS MADE IS 1838.
C	FOLDS	BEARS NOTE: LOT 43 IN 1826, IN GREY PENCIL, AND PRESENT CONDITIONS 1959, IN PINK PENCIL..
C	CLEAN	TITLE PAGE, SHEET 1 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 2 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 3 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 4 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 5 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 6 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 7 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	SHEET 8 OF 9 BOUND TOGETHER FOR THIS PROJECT.

C	CLEAN	SHEET9 OF 9 BOUND TOGETHER FOR THIS PROJECT.
C	CLEAN	PAGE 1 OF 5 ASSOCIATED WITH DRAWING.
C	CLEAN	PAGE 2 OF 5 ASSOCIATED WITH DRAWING.
C	CLEAN	PAGE 3 OF 5 ASSOCIATED WITH DRAWING.
C	CLEAN	PAGE 4 OF 5 ASSOCIATED WITH DRAWING.
C	CLEAN	PAGE 5 OF 5 ASSOCIATED WITH DRAWING. NOTE REFERENCES INDIVIDUAL WHO HAS DEEDS TO 2 PIECES OF PROPERTY.
C	FOLDS	
C	FOLDS	
B	TORN, FOLDS	
B	FOLDS	REVISED FEB. 1955.
A		

C		PASTED TO 12-29-C. CONTAINS DATA SPECIFIED IN PLAN 12-29-[A] WITH ADDITIONAL DATA TO APRIL 26, 1913.
C		PASTED TO 12-29-B. CARRIES DATA FROM 12-29-[B] FORWARD TO JULY 26, 1913.
B	FOLDS	
B	FOLDS, SOILED	THIS PLAN IS A REVISION OF 13-01-A.

B	CLEAN	MAY 31 1955, REVISED, JUNE 1, 1955, JUNE 7, 1955.
A		
B	FOLDS	
B	FOLDS	
A		
B	TORN, FOLDS	
B	SO	ORIGINAL DATED AUG. 10, 1853. COPIED FROM ORIGINAL JUNE 12, 1908, BY H. P. CONKLIN. BEARS STENCILLED NO. 1001 BENEATH PAPER LABEL, RECTO. ALSO BEARS NO. 150 RECTO.
B	SO/TE	ORIGINAL DATED AUG. 10, 1853. THIS BLUEPRINT IS A COPY OF DRAFTING CLOTH PLAN 131-001, WHICH ITSELF IS A HAND MADE OF COPY OF THE ORIGINAL 1853 PLAN.
CLOTH-BACKED PAPER	B	FOLDS, SOILED, TEARS

B	FO/TE/SO	BEARS STENCILLED NO. 1003 BENEATH PAPER LABEL, RECTO.
B	TE/FO/SO	BEARS STENCILLED NO. 1004 BENEATH PAPER LABEL, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/FX	BEARS NO. 1005 TAPED OVER, VERSO.
B	FO/SO/TE	BEARS NO. 154 IN GRAPHITE RECTO. A HOLYOKE MFG. CO. PLAN.
B	SO/FO	ATTACHED TO 131-006-[B]. BEARS NO. 1012 CROSSED OUT VERSO. HEAD 34'. A HOLYOKE MACHINE CO. PLAN.
B	SO/FO/ST	ATTACHED TO 131-006-[A].
B	SO	BEARS STENCILLED NO. 1014 BENEATH PAPER LABEL, RECTO. ATTACHED WITH 131-007-[A]. ALSO PLAN & ELEVATION OF GUIDES & SPEEDGATES (UNFINISHED).
B	SO/FO	ATTACHED TO 131-007. BEARS STENCILLED NO. 1015 BENEATH PAPER LABEL, RECTO.

B	TE/SO/FO	"THESE TESTS REPRESENT AS FAR AS KNOWN THE BEST RESULTS OBTAINED FROM THESE WHEELS & IN ALMOST EVERY CASE THE RESULTS HAVE BEEN FURNISHED BY THE BUILDERS OF THE WHEELS."
B	SO	
B	SO	
B	SO	ATTACHED WITH 131-011-[B] & [C]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. DATE CAN BE ASSUMED TO BE JULY 1, 1894, BECAUSE OF THE DATES OF THE OTHER PLANS TO WHICH IT IS ATTACHED.
B	SO	BEARS STENCILLED NO. 1019, RECTO. ATTACHED WITH 131-011-[A] & [C]. BEARS NO. 1019 STENCILLED, RECTO.
B	SO/TE/FO	ATTACHED WITH 131-011-[A] & [B].
B	LM/TE/SO /FO	BEARS NO. 1022 COVERED OVER RECTO.
B	SO	BEARS NO. 163 IN GRAPHITE RECTO.

B	SO	BEARS STENCILLED NO. 1024 BENEATH PAPER LABEL, RECTO. PLAN NO. 131-014-[A] ATTACHED, RECTO. FROM SKETCH FURNISHED BY SWAIN TURBINE CO.
B	SO/FO/TE	LETTER WRITTEN TO MR. STAFFORD FROM A. F. NICHOLS, TREAS'R, ON "THE SWAIN TURBINE & MFG. CO." FORM. BEARS SKETCH WHICH "VERY NEARLY" SHOWS DIM. OF INTENDED APERATURES IN THE BUCKETS OF THE HAM. MFG.CO. ATTACHED TO PLAN NO. 131-014.
B	TE/LM	ALSO CHANGE IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FEET. ONE L. &. C. CARD FILE REFERENCE GIVES DATE 0F 17 JUNE, 1896.
B	SO/TE	ALSO CHANGE IN QUANTITIES DUE CHANGE IN RELATIVE VELOCITY. QUANTITIE REDUCED TO A UNIFORM FALL OF 17 FEET.
B	SO/TE	ALSO SHOWING CHANGES IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FEET.

B	SO/TE	ALSO SHOWING CHANGE IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FEET.
B	SO/TE/LM	ALSO SHOWING CHANGE IN QUANTITY DUE CHANGE IN RELATIVE VELOCITY. QUANTITIES REDUCED TO A UNIFORM FALL OF 17 FEET.
B	DO	BEARS NO. 1030 BENEATH PLAN NO. LABEL.
B	FO/SO	

B	TE/SO	A HOLYOKE MACHINE CO. PLAN, WORCESTER, MASS.
B	SO/FO	ORIGINALLY NUMBERED 131-033, CROSSED OUT & RENUMBERED 131-023.
B	SO/TE	BEARS NO. 174 RECTO.
B	TE/SO	ATTACHED TO 131-025-[B].
B	TE/LM/SO	TEST MADE BY THE HOLYOKE WATER POWER CO. OCT.18-19, 1895. BEARS NO. 1038 RECTO. ATTACHED TO 131-025-[A].
B	SO/TE	
B	FO/SO/TE /ST	
B	FO	PLAN SEEMS TO SHOW GENERATORS RELATED TO POSITION OF TURBINES. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897. THE FULL DATE IS PROBABLY 27 DEC. 1897, LIKE ITS COMPANION DRAWINGS.
B	SO/TE/FO /LM	BEARS SHEET A RECTO.

B	FO/TE	BEARS SHEET A RECTO. HOLYOKE MACHINE CO., WORCESTER, MASS.
B	FO/TE	BEARS SHEET B RECTO. HOLYOKE MACHINE CO., WORCESTER MASS.
B	FO/TE	BEARS SHEET B RECTO. HOLYOKE MACHINE CO., WORCESTER, MASS.
B	SO/TE/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	CL	
B	CL	

B	CL	NOTE DIRECTS TO SEE DIAGRAM OF GUARANTEED H.P. AT 21 FT. HEAD DATED MARCH 20,1919. BASE ON DRAFT SHEETS FOR MARCH & APRIL 1919.
B	CL/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	NOTE DIRECTS TO SEE DIAGRAM OF GUARANTEED H.P. AT 21 FT. HEAD DATED MARCH 20, 1919. BASED ON DRAFT SHEETS FOR JAN., FEB. & MAR. 1919.
B	SO	INFORMATION PLOTTED REFERS TO MAXIMUM & MINIMUM GUARANTEED 1, 2, UNDER 21' HEAD. TEST NO. 2611 & 2612 AT HOLYOKE UNDER 21' HEAD. RESULTS IN PLACE (# 5 & # 6 WHEEL) UNDER 21' HEAD.
B	CL/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	CL	
B	FO	RECORD LOCATED IN L. & C. CUMULATIVE INDEX RATHER THAN PLANS INDEX. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO	RECORD LOCATED IN L. & C. CUMULATIVE INDEX RATHER THAN PLANS INDEX. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/FO	PLAN DID NOT BEAR A NUMBER BUT WAS FOUND IN THE PROPER LOCATION AND MATCHED EXACTLY THE REFERENCE IN THE L. & C. CARD INDEX.
B	CL	DIAGRAM WHICH PLOTS PER CENT GATE OPENING VS. PERCENT EFFICIENCY OF 30" WHEEL 13' FALL.
B	FO/SO	VEL.=4.6.
B	CL/FO	
B	SO/TE	BLANK FORM FOR PROPRIETORS OF LOCKS & CANALS DATA. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BLANK FORM FOR PROPRIETORS OF LOCKS & CANALS DATA. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ALSO LISTED AS 131-ENV. 029-X IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/FO	WORDS "FILE 1009" AND "BOOTT MILLS", RECTO, CROSSED OUT. LOCATED AFTER COMPLETION OF FORMAL INVENTORY PROJECT.
B	HO	J. B. FRANCIS TEST IN PLACE.
B	SO	
B	SO	
B	CL	
B	CL/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY PROJECT. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	
B	TE/FO/LM	
B	FO/SO/TE	AN ALLIS-CHALMERS CO. PLAN. BEARS NO. 821, RECTO.
B	FO/LM/TE	
B	FO/SO/TE	
B	SO	NOTE STATES,"THESE TESTS REPRESENT AS FAR AS KNOWN THE BEST RESULTS OBTAINED FROM THESE WHEELS & IN ALMOST EVERY CASE THE RESULTS HAVE BEEN FURNISHED BY THE BUILDERS OF THE WHEELS."
B	FO	
B	FO	

B	FO/LM/TE /SO	
B	FO/TE/LM /SO	HOLYOKE MACHINE CO. NOTE DIRECTS TO SEE TRACING 7-28-`21 FOR GENERAL ARRANGEMENT, NO. 2 WHEEL HOUSE.
B	FO/TE	BEARS ALLIS-CHALMERS PLAN NO. 800, RECTO.
B	FO/TE	BEARS ALLIS-CHALMERS PLAN NO. 815, RECTO.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 21 JAN. 1913.
B	SO	BEARS NO. 8 RECTO.

C	FO/SO/TE	BEARS NO. 18 STAMPED, VERSO. THIS IS A BLUEPRINT COPY OF PLAN C-128-1764, MINUS THE SECTION OF THE DAM, BUT CLEARLY MARKED SHELF 131 BY P. L.& C. TRACED FROM PLAN NO. 1485, WHICH WAS NOT FOUND IN THE COLLECTION.
C	FO/TE	
C	FO/TE	
C	TE	LOCATED IN FOLDER ENTITLED "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".
C	SO	2 PAGE DOCUMENT. MARGIN NOTES "REALTIVE VELOCITY" AND "HORSE POWER WITH 38' FALL", SHEET 1, "RELATIVE VELOCITY" AND "EFFICIENCY IN PERCENT". FROM FOLDER "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".
C	SO	2 PAGE DOCUMENT. MARGIN NOTES "RELATIVE VELOCITY" AND "HORSE POWER WITH 38' FALL", SHEET 2. FAINT MARGIN NOTE, "HERCULES", SHEET 2. FROM FOLDER "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".
C	FO	APPEARS TO BE A VERY PRELIMINARY GRAPH, AXES NOT IDENTIFIED. LOCATED IN FOLDER ENTITLED "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".
C	TE	LOCATED IN FOLDER ENTITLES "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".

C	SO	LOCATED IN FOLDER ENTITLED "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".
C	SO/TE	APPEARS TO HAVE BEEN ATTACHED TO OTHER PLAN OR PLANS AT ONE TIME. LOCATED IN FOLDER NETITLED "MISCELLANEOUS DIAGRAMS PERTAINING TO WATERWHEELS".
B	SO	
B	SO	
B	SO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	MOUNTED ON SAME CARD AS 132-004-[B] & [C]. SEE L.& C. CONSECUTIVE INDEX OF DRAWINGS.
B	SO	MOUNTED ON SAME CARD AS 132-004-[A] & [C]. SEE L.& C. CONSECUTIVE INDEX OF DRAWINGS.
B	SO	MOUNTED ON SAME CARD AS 132-004-[A] & [B]. SEE L.& C. CONSECUTIVE INDEX OF DRAWINGS.
B	FO/SO/TE	"...CURVE AS A BASE LINE / WHICH WAS TRACED DIRECTLY." BEARS NO. 182 VERSO.

B	SO	NOTE STATES: ALL TESTS OF HERCULES, McCORMICK & VICTOR WHEELS WERE MADE AT HOLYOKE & THE RESULTS HAVE BEEN FURNISHED BY THE BUILDERS OF THE WHEELS.NOTICE IS MADE ON 4 TESTS ON 27" L.H. SPECIAL HERC. WHEELS, SEE LETTER FROM S. HOLMAN, RECORD BOOK 12 P.49.
B	FX/TE/SO	ATTACHED TO 132-007-[B] & [C]. TESTED FEB. 21, 1896. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED TO 132-007-[A] & [C]. TESTED FEB.21,1896. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	SO	ATTACHED TO 132-007-[A] & [C]. TESTED FEB.21,1896. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	SO	NOTE STATES FOR MESUREMENTS OF WHEELS SEE BOOK 10 PP.
B	SO	ATTACHED TO 132-009-[B] & [C]. NOTE STATES 72" PUT IN IN 1888. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE BUT DATE IS IS PROBABLY OCT. 1893, LIKE ITS COMPANION DRAWINGS.
B	SO	ATTACHED TO 132-009-[A] & [C].

B	SO	ATTACHED TO 132-009-[A] & [B].
B	SO	FOR MEASUREMENTS OF WHEEL SEE BOOK 10 PP. AREA OF SINGLE OUTLET 99.76 SQ. IN.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FX/SO	ATTACHED TO 132-013-[B]. BEARS NO.1055 RECTO.
B	FX/SO	ATTACHED TO 132-013-[A]. BEARS NO. 1055 1/2 COVERED OVER RECTO.
B	SO/TE/FX	ATTACHED TO 132-014-[B] & [C]. TESTED AT HOLYOKE JUNE 22, 1896. BEARS NO. 1056 BENEATH LABEL, RECTO.

B	SO/FX	TESTED AT HOLYOKE JUNE 22, 1896. ATTACHED TO 132-014-[A] & [C]. BEARS NO. 1057 BENEATH LABEL, RECTO.
B	SO/TE	TESTED AT HOLYOKE JUNE 16,1896. ATTACHED TO 132-014-[A] & [B]. ALSO SHOWS TEST OF MAY 14, 1896. BEARS NO. 1058 BENEATH LABEL, RECTO.
B	SO	BOUND WITH 132-015-[A] AND 132-015-[B]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 1059 BENEATH LABEL, RECTO.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 1060 BENEATH LABEL, RECTO.

B	SO	ATTACHED TO 132-014. BEARS NO. 1061 BENEATH LABEL, RECTO.
B	SO	TESTED AT HOLYOKE, FEB. 25, 1898. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO	QUANTITIES REDUCED TO UNIFORM HEAD OF 170 FT. TESTED AT HOLYOKE WATER POWER CO. JUNE 1, 1896.
B	SO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	FOR MEASUREMENTS OF WHEELS SEE BOOK 10, PP. 133-137.

B	SO	
B	LM/TE/ST/SO	ATTACHED TO 132-022-[B] & [C]. BEARS NO. 1067 COVERED OVER RECTO.
B	TE/SO	ATTACHED TO 132-022-[A] & [C]. BEARS NO. 1068 RECTO.
B	TE/SO	ATTACHED TO 132-022-[A] & [B]. BEARS NO. 1069 COVERED OVER RECTO.
B	SO/TE	ATTACHED TO 132-023-[B] & [C]. NOTE VERSO STATES: HORSE POWER AT LAWRENCE. L.& C. CARD INDEX REFERENCE DATES TEST AS AUG. 26, 1896.
B	SO/TE	ATTACHED TO 132-023-[A] & [C]. L.& C. CARD INDEX REFERENCE GIVES DATE OF TEST AS AUG. 26, 1896.

B	TE/LM/SO	ATTACHED TO 132-023-[A] & [B]. L.& C. CARD INDEX REFERENCE GIVES DATE OF TEST AS AUG. 26, 1896.
B	SO	PUT IN TO REPLACE A 48" VICTOR BROKEN FEB. 1897. BEARS STENCILLED NO. 1077 BENEATH LABEL, RECTO. ALSO BEARS NO. 1197.
B	TE/SO	ATTACHED TO 132-025-[B] & [C]. TESTED AT HOLYOKE, AUGUST 18, 1896. BEARS STENCILLED NO. 1078 BENEATH LABEL, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	TE/LM	ATTACHED TO 132-025-[A] & [C]. TESTED AT HOLYOKE ON AUG. 18, 1896. BEARS NO. 1071 BENEATH LABEL, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	TE/LM/SO	ATTACHED TO 132-025-[A] & [B]. TESTED AT HOLYOKE, AUG. 18,1896. BEARS NO. 1075 BENEATH LABEL, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE

B	SO/FO	TESTED AT HOLYOKE, JULY 15-16, 1919. TEST USED IN COMPUTATIONS FOR NO'S 8 & 9 HAMILTON WHEELS.
B	SO/FO	TESTED AT HOLYOKE JULY 15-16, 1919.
B	SO	162-019-050-[COPY 1] FOUND ATTACHED AND LEFT ATTACHED.
B	FO/TE	BEARS 30" SPARKS SPECIAL. GENERAL ARRANGEMENT. DRAWING NO. 22120-SHOP NO.-AB3745.
B	TE	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. LAST REVISION MADE 9-30-`08. TAINTER GATE TEST MADE 12-20-`13. BEARS NO. 1306A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES THIS DATE
B	FO/SO	REDRAWN 7-5-`07. REVISED 7-11-`07.

B	FO/SO/LM /TE	SEE TR. AUG 30,1924 FOR DETAILS OF WHEEL. GATE & FRAME UNCHANGED. SEE TRC. OCT.19-`01 & NOV.20-`01 FOR DETAILS. GATE & FRAME UNCHANGED,SEE TRC. AUG. 30-1924 FOR DETAILS OF WHEEL. 2 PRS. 39" HERC. TURBS. IN THIS FLUME. GEN. ARR. AS PER TR. MAY 21,1904.
B	SO/FO/TE	ORIG. DATED MAY 2,1924. LAST REV. SEP.30,1924. FOR CORRECT LOCATION SEE PLAN VIEW, DWG.#2482-AD. FOR CORRECT LOCATION OF 12" DRAINAGE PIPE SEE GR-EL-LT-& DR CO'S CONSTRUCTION DWG. FOR CONCRETE DRAFT TUBE SEE DWG.#2482-S. FOR PLAN VIEW SEE DWG.#2482 A-D.
B	FO/TE/SO	ORIGINAL DATED APRIL 10, 1924. LAST REVISION MADE MAY 13, 1924. BEARS DRAWING NO. 2482. FORM STATES, FROM S. MORGAN SMITH CO., YORK, PA. FOR GREENFIELD ELEC. LT. & POWER CO. GARDNERS FALL EXTENSION.
B	CL	ATTACHED TO 132-033-[COPY 1].
C	CL	ATTACHED TO 132-033.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. WHEELS INSTALLED IN 1926. NOTE STATES THIS PATTERN MADE FROM AVERAGE MEASUREMENTS OF BOTH WHEELS.
B	SO	

B	FO/SO	
B	SO	
B	SO	
C	SO	
A		
A		
A		TRACED THRU ORIGINAL FEB.4, 1898. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	SO/FX/FO	

A

A

CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. MEAN BUCKET
A AREA 55.4 SQ. IN.

A

A

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A

A

ORIGINAL DRAWINGS IN POSSESSION OF HOLYOKE MACHINE CO.,
A HOLYOKE , MASS. TRACINGS MADE JULY 5, 1882.

A

A

A		
A		
A		
B	SO	
A		
A		
B	TE/HO/ST	TESTED AT HOLYOKE JULY 19, OCT. 24, 25 AND 26, 1910. TEST NOS. 1939 ABD 1955. TO BE INSTALLED AT BIGELOW CARPET CO., LOWELL, MASS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	TE/HO/ST	TESTED AT HOLYOKE JULY 19, OCT. 24, 25 AND 26, 1910. TEST NOS. 1939 ABD 1955. TO BE INSTALLED AT BIGELOW CARPET CO., LOWELL, MASS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/HO/ST	TESTED AT HOLYOKE JULY 25, 1913. TEST NO. 2250. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/HO/ST	TESTED AT HOLYOKE JULY 19, 1910. TEST NO. 1939. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO/LM	"TO BE INSTALLED AT BIGELOW CARPET CO., LOWELL, MASS." TESTED AT HOLYOKE, JULY 19, OCT. 24, 25, & 26, 1910.
A		TESTED 1874, BY J. B. FRANCIS, SEE LIBR. BOOK NO. 2801 IN L.& C. OFFICE.

A		TESTED AT LOWELL, MASS. AUG.1874. (SEE L.& C. LIBR. BK. NO. 2801). CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO	ATTACHED WITH PLAN NOS. 133-022-[B] TO [D]. TESTED AT HOLYOKE NOV.30, 1909, JAN. 5, 6, 7, 1910. NEW WORK ADDED 3 JAN. 1917.
B	TE/SO	LAST DATE TESTED APRIL 4,1910. ATTACHED WITH PLAN NOS. 133-021-[A] TO [D].
B	TE/SO	ATTACHED WITH PLAN NOS. 133-021-[A] TO [D]. MOST LIKELY DATE IS APRIL 4, 1910, LIKE ITS COMPANIONS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1910 FOR THE SERIES.
B	TE/SO	ATTACHED WITH PLAN NOS. 133-021-[A] TO [C]. TESTED AT HOLYOKE NOV.30, 1909 & JAN. 5, 6, 7, 1910.

A

A

B SO

A TESTED AT HOLYOKE SEPTEMBER 25, 26, & 28, 1905.

A TESTED AT HOLYOKE OCT. 1906- MAY 1907.

A

A

A

B FO/SO

B FO/SO BEARS #8 HAMILTON.

A

A

A

A

B SO THIS PATTERN MADE UP FROM THE AVERAGE OF THREE WHEELS.

B SO

A

B	LM/TE/SO	NOTE STATES: WHEEL IS FOR NO.3, TREMONT.
A		
A		
B	FO	
A		WHEEL IS TYPE # 15 R.H. TO REPLACE OLD # 9 WHEEL 18 GUIDES, EACH 22 INCHES HIGH.
A		
A		IN USE FROM OCT. 31, 1917.
C	CL	NOTE READS: "DATA FROM P.L.& C. DRAFT SHEETS - YEAR 1940".

B	SO	3 PAGE DOCUMENT. NO.1614A, SOLID LINES, TESTED AT HOLYOKE, OCTOBER 22, 1906. NO.1614B, DOTTED LINES, TESTED AT HOLYOKE, JUNE 21 & 22, 1906. ENTERED AS 133-ENV. 50-28 IN L. & C. CARD INDEX.
B	SO	3 PAGE DOCUMENT. NO. 1614A, SOLID LINES, TESTED AT HOLYOKE, OCT.22, 1906. NO. 1614B. DOTTED LINES, TESTED AT HOLYOKE JUNE 21 & 22, 1906. ENTERED AS 133-ENV. 50-28 IN L. & C. CARD INDEX.
B	CL	3 PAGE DOCUMENT. NO. 1614A, SOLID LINES TESTED AT HOLYOKE, OCTOBER 22, 1906. NO. 1614 B., DOTTED LINES TESTED AT HOLYOKE JUNE 2 & 22, 1906. ENTERED AS 133-ENV. 50-28 IN L. & C. CARD INDEX.
B	SO	ATTACHED WITH PLAN NOS. 133-050-029-[B] THRU [L]. BEARS CALCULATION BOOK NO.639, P.44. ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	SO	ATTACHED WITH PLAN NOS. 133-050-029-[A] THRU [L]. BEARS CALCULATION BOOK 639, PG.38. DATES TESTED RANGE FROM APRIL 18,1890 TO FEB.25, 1898. ENTERED AS 133-ENV. 50-29.
B	CL/SO	ATTACHED WITH PLAN NOS.133-050-929-[A] THRU [L]. BEARS CALCULATION BOOK 639, PG.38. DATES TESTED RANGE FROM 1874 TO JAN.20 & 21, 1897. ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	ATTACHED WITH PLAN NOS. 133-050-029-[A] THRU [L]. BEARS CALCULATION BOOK 639 P.38. DATES TESTED RANGE FROM 1874 TO JAN. 20 & 21, 1897. ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX AS 133-ENV. 50-29.

B	CL	BEARS CALCULATION BOOK NO. 639, P.38. DATES TESTED RANGE FROM OCT.1895 TO JAN. 1897. ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	BEARS CALCULATION BOOK NO. 639, P.44. DATES TESTED RANGE FROM JULY 1894 TO MAY 1898. ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	BEARS CALCULATION BOOK 639, P.38. ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	ENTERED AS 133-ENV. 50-29 IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-36 IN L. & C. CARD INDEX.
B	CL	DISCHARGE 537 CFPS TO STATION 90. DISCHARGE 318 CFPS BEYOND STA. 90. PLAN NUMBER ENTERED AS 133-ENV. 50-36 IN L. & C. CARD INDEX.

B	TE/SO	WITH 13 FT. FALL & DIFFERENT SPEEDS & OPENINGS OF SPEED GATES OF A 28", R.H., TYPE "S" SMITH TURBINE WHEEL. REG. GATE & CONICAL DRAFT TUBE. TESTED AT HOLYOKE DEC. 30-31, 1918. TEST NO. 2663. NO. 3, SACO WHEEL. PLAN NO. 133-ENV. 50-41 IN L. & C CARD INDEX
B	CL	WITH 13 FT. FALL & DIFFERENT SPEEDS & OPENINGS OF SPEED GATE OF A 28 1/2" R.H. TYPE "S" SMITH TURBINE WHEEL. REG. GATE & CONICAL DRAFT TUBE. TESTED AT HOLYOKE DEC. 30-31,1918. TEST NO. 2663. NO.3 SACO WHEEL. PLAN NO. 133-ENV. 50-41 IN L. & C. CARD INDEX.
B	SO	NOTE RECTO STATES "SUPERCEDED". PLAN NUMBER ENTERED AS 133-ENV. 50-49 IN L. & C. CARD INDEX.
B	SO/FO	PLAN NUMBER ENTERED AS 133-ENV. 50-50 IN L. & C. CARD INDEX.
B	SO	NOTE STATES "SUPERCEDED." 13 FEET HEAD. SPEED FACTOR @ 200 R.P.M.=.8438. PLAN NUMBER ENTERED AS 133-ENV. 50-50 IN L. & C. CARD INDEX.
B	SO	NOTES STATES "SUPERCEDED." 13 FEET HEAD. SPEED FACTOR @ 200 R.P.M.=.8438. (R.H.). PLAN NUMBER ENTERED AS 133-ENV. 50-51 IN L. & C. CARD INDEX.
B	FO/SO	13 FT. HEAD. 200 R.P.M. PLAN NUMBER ENTERED AS 133-ENV. 50-52 IN L. & C. CARD INDEX.

B	CL	13 FT. HEAD. SPEED FACTOR AT 200 R.P.M.=8438. NOTE STATES "SUPERCEDED". PLAN NUMBER ENTERED AS 133-ENV. 50-53 IN L. & C. CARD INDEX.
B	SO	HEAD 22 FT., DISCHARGE 263 CFPS.
B	SO	
B	CL	
B	CL	159 CFPS. 21A. HEAD. OLD # FLUME CANAL TO FOREBAY 278 CFPS. NEW #3 PENSTOCK & DRAFT TUBE-159 CFPS.
B	CL	MADE FROM DESIGN OF ROBINSON & ROBINSON DATED DEC. 1918.
B	CL	40.8" TYPE "S" S. MORGAN-SMITH RUNNER. MADE FROM DESIGN OF ROBINSON & ROBINSON DATED DEC. 1918.
B	CL	

B	TE/SO	TESTED JUNE 26-27, 1918
B	CL	WITH 16' FALL & DIFFERENT SPEEDS & OPENINGS OF SPEEDGATE OF A 30" R.H. ALLIS CHALMERS TYPE # 15 TURBINE WHEEL. SWING GATE & CONICAL DRAFT TUBE. TESTED AT HOLYOKE, FEB. 3-4, 1915 TEST NO. 2202. TEST USED IN COMPUTATIONS FOR NO. 9 MERRIMACK WHEEL.
B	CL	WITH 16 FEET FALL & DIFFERENT SPEEDS & OPENINGS OF SPEEDGATE OF A 30" R.H. ALLIS CHALMERS TYPE # 15 TURBINE WHEEL. SWING GATE & CONICAL DRAFT-TUBE. TESTED AT HOLYOKE, FEB. 3-4,1915 TEST NO. 2202. TEST USED IN COMPUTATIONS FOR NO. 9 MERRIMACK WHEEL.
B	CL	WITH 13 FT. FALL & DIFFERENT SPEEDS & OPENINGS OF SPEEDGATE AT A 30" R.H. LEFFEL TYPE "Z" TURBINE WHEEL REG. GATE & CONICAL DRAFT-TUBE TESTED AT HOLYOKE, OCT.7-8, 1914. TEST NO.2363. TEST USED IN COMPUTATIONS FOR NOS. 8-9 HAMILTON WHEELS. 133-ENV. 50-63.
B	SO/FO	TEST USED IN COMPUTATIONS FOR BOOTT MILLS NO. 1 45" R.H. ALLIS-CHALMERS WHEEL. PLAN NUMBER ENTERED AS 133-ENV. 50-66 IN L. & C. CARD INDEX.

B	FO/SO	TESTS NOS. 2546 & 2547 MADE AT HOLYOKE, MARCH 28, 1917 & FEBRUARY 26, 1919 RESPECTIVELY. TEST NO. 2546 USED IN COMPUTATIONS FOR PRESCOTT WHEELS. PLAN NUMBER ENTERED AS 133-ENV. 50-67 IN L. & C.CARD INDEX.
B	FO/SO/TE	TESTS NOS. 2546 & 2547 MADE AT HOLYOKE, MARCH 28, 1917 & FEBRUARY 26, 1919 RESPECTIVELY. TEST NO. 2546 USED IN COMPUTATIONS FOR PRESCOTT WHEELS. PLAN NUMBER ENTERED AS 133-ENV. 50-67 IN L. & C. CARD INDEX.
B	TE/SO	NOTE STATES: TEST NO. 2546 MADE MARCH 28, 1917. PLAN NUMBER ENTERED AS 133-ENV. 50-68 IN L. & C. CARD INDEX.
B	SO	TESTED AT HOLYOKE OCT. 7-8, 1914. TEST NO. 2363. TEST USED IN COMPUTATIONS FOR NOS. 8-9 HAMILTON WHEELS. PLAN NUMBER ENTERED AS 133-ENV. 50-69 IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-70 IN L. & C. CARD INDEX.
B	SO	(NO.1) 72" SWAIN L. H. 182 CFPS 20' HEAD. (NO.2) 66" SWAIN R. H. 143.5 CFPS 18' HEAD. PLAN NUMBER ENTERED AS 133-ENV. 50-72 IN L. & C. CARD INDEX.

B	FO/SO	TEST USED IN COMPUTATIONS FOR MERRIMACK NO. 9 WHEEL. TESTED AT HOLYOKE, FEB. 3-4, 1915. TEST # 2202.
B	SO	NOTE STATES: CONCRETE ELBOW DRAFT TUBE USED. A TRACING PAPER COPY OF THIS PLAN MAY HAVE EXISTED. PLAN NUMBER ENTERED AS 133-ENV. 50-76 IN L. & C. CARD INDEX.
A		
B	CL	NOTE STATES H.P. REDUCED TO 13' HEAD BY SLIDE RULE. PLAN NUMBER ENTERED AS 133-ENV. 50-79 IN L. & C. CARD INDEX.
B	TE/CL	ATTACHED WITH 133-050-80-[COPY 1]. PLAN NUMBER ENTERED AS 133-ENV. 50-80 IN L. & C. CARD INDEX.
C	CL	ATTACHED WITH 133-050-80.
B	CL/TE	PLAN NUMBER ENTERED AS 133-ENV. 50-81 IN L. & C. CARD INDEX.

B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-82 IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-83 IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-84 IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 133-ENV. 50-85 IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-86 IN L. & C. CARD INDEX.
B	CL/FO	HOLYOKE TEST NO. 2611. TESTED JUNE 26, 1918. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	CL/FO	HOLYOKE TEST NO. 1865. TESTED NOV. 30, 1909. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-89 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	HOLYOKE TEST # 2202. (SAME TYPE AS MERR'K # 9). LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN NUMBER ENTERED AS 133-ENV. 50-93 IN L.& C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	PLAN NUMBER ENTERED AS 133-ENV. 50-94 IN L.& C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED WITH PLAN NOS. 133-050-095-B THRU I. NOTE STATES "SOURCE BLUEPRINT FROM HOLYOKE MACHINE CO. DATED NOV. 7, 1895." PLAN NUMBER ENTERED AS 133-ENV. 50-95-A IN L. & C. CARD INDEX.

B	SO	ATTACHED WITH PLAN NOS. 133-050-095-A THRU I. PLAN NUMBER ENTERED AS133-ENV. 50-95-B IN L. & C. CARD INDEX.
B	SO	BEARS SOURCES: ORIGINAL DESIGNS OF U.A. BOYDEN; L.& C. RECORD BOOK I,1866-75, P.191; L.& C. DISCHARGE DIAGRAM. WHEEL DESIGNED IN 1853.
B	SO	ATTACHED WITH PLAN NOS. 133-050-95-A THRU J. PLAN NUMBER ENTERED AS 133-ENV. 50-95-D IN L. & C. CARD INDEX.
B	SO	NOTE DIRECTS TO SEE LETTER DATED OCT.14, '21 FROM H.C. DAGGETT. PLAN NUMBER ENTERED AS 133-ENV. 50-95-E IN L. & C. CARD INDEX.
B	SO	NOTE STATES WHEEL INSTALLED IN 1875. NEW DRAFT TUBE PUT ON IN 1912. PLAN NUMBER ENTERED AS 133-ENV. 50-95-F.
B	CL	SOURCES NOTED AS BLUEPRINT FROM RODNEY HUNT CO. SHOWING CHANGE IN DRAFT TUBE FOR #4 PAIR OF WHEELS AT THE APPLETON CO. MILL-YARD PLAN. PLAN NUMBER ENTERED AS 133-ENV. 50-95-G IN L. & C. CARD INDEX.
B	SO	SOURCES NOTED AS L.& C. DRAWINGS A152-28 & A133-64. WHEEL INSTALLED IN 1918. PLAN NUMBER ENTERED AS 133-ENV. 050-095-H IN L. & C. CARD INDEX.
B	SO	SOURCES NOTED AS L.& C. DRWG. A133-64 & BLUEPRINT FROM S. MORGAN SMITH CO. DWG. #2482, DATED JUNE 25, 1913. WHEEL INSTALLED IN 1918. PLAN NUMBER ENTERED AS 133-ENV. 50-95-I.

B	SO	SOURCES NOTED AS BLUEPRINTS OF DRAWINGS NOS. 26712 & 28788 FROM JAS. LEFFEL & CO. WHEEL INSTALLED IN 1918. PLAN NUMBER ENTERED AS 133-ENV. 50-95-J IN L. & C. CARD INDEX.
B		PLAN NUMBER ENTERED AS 133-96-A IN L. & C. CARD INDEX. ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-096-B THROUGH G.
B	CL	ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-96-A THRU G. PLAN NUMBER ENTERED AS 133-96-B IN L. & C. CARD INDEX.
B	FO/SO	ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-96-A THRU G. PLAN NUMBER ENTERED AS 133-96-C IN L. & C. CARD INDEX.
B	FO/SO	ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-96-A THRU G. PLAN NUMBER ENTERED AS 133-96-D IN L. & C. CARD INDEX.
B	SO/FO	ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-96-A THRU G. PLAN NUMBER ENTERED AS 133-96-E IN L. & C. CARD INDEX.
B	SO/FO	ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-96-A THRU G. PLAN NUMBER ENTERED AS 133-96-F IN L. & C. CARD INDEX.
B	SO/FO	ATTACHED WITH PLAN NOS. 133-050-106 & 133-[050]-96-A THRU F. PLAN NUMBER ENTERED AS 133-096-G IN L. & C. CARD INDEX.

A		P.L.& C. SUBJECT CARD INDEX SHOWS THE PLAN NUMBER AS 133-97. CONSECUTIVE INDEX SHOWS THE PLAN NUMBER AS 133-50-97.
A		P.L.& C. SUBJECT CARD INDEX SHOWS THE PLAN NUMBER AS 133-98. CONSECUTIVE INDEX SHOWS THE PLAN NUMBER AS 133-50-98
A		P.L.& C. SUBJECT CARD INDEX SHOWS THE PLAN NUMBER AS 133-99. CONSECUTIVE INDEX SHOWS THE PLAN NUMBER AS 133-50-98.
B	FO/SO	ATTACHED IN 12 PAGE DOCUMENT. TESTED AUG.5, 7 & 8, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-A IN L. & C. CARD INDEX.
B	FO/SO	ATTACHED IN 12 PAGE DOCUMENT. TESTED AUG. 12 & 14, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-B IN L. & C. CARD INDEX.
B	FO/SO	TESTED AUG.15, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-C IN L. & C. CARD INDEX.
B	FO/SO	ATTACHED IN 12 PAGE DOCUMENT. TESTED AUG. 18, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-D IN L. & C. CARD INDEX.
B	SO/FO	TESTED AUG. 21, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-E IN L. & C. CARD INDEX.
B	SO/FO	ATTACHED IN 12 PAGE DOCUMENT. TESTED SEPT.11, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-F IN L. & C. CARD INDEX. INDEX CARD STATED TEST CONDUCTED AT BOOTT SETTING #1 RATHER THAN #2 AS PER ABOVE.
B	FO/SO	ATTACHED IN 12 PAGE DOCUMENT. TESTED SEPT.13-15, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-G IN L. & C. CARD INDEX.

B	FO/SO	TESTED SEPT. 22 & OCT. 9, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-H IN L. & C. CARD INDEX.
B	FO/SO	ATTACHED IN 12 PAGE DOCUMENT. TESTED OCT. 17, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-I IN L. & C. CARD INDEX.
B	SO/FO	ATTACHED IN 12 PAGE DOCUMENT. TESTED OCT. 19 & NOV. 7, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-J IN L. & C. CARD INDEX.
B	SO/FO	ATTACHED IN 12 PAGE DOCUMENT. TESTED NOV.14 & 18, 1922. PLAN NUMBER ENTERED AS 133-ENV. 50-100-K IN L. & C. CARD INDEX.
B	FO/SO	[ALSO] CHARACTERISTIC CURVES SWAMP LOCKS TEST # 17 12" TYPE Z LEFFEL WITH DRAFT TUBE # 4 (HYDRAU-CONE) WITH PLATE 7" BELOW. ATTACHED IN 12 PAGE DOCUMENT. TESTED NOV. 27, 1922. PLAN ENTERED AS 133-ENV. 50-100-L IN L. & C. CARD INDEX.
A		
B	SO	
B	SO	

B	SO	ATTACHED WITH PLAN NOS. 133-050-96-A THRU G. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	
B	SO	PLAN NUMBER ENTERED AS 133-ENV. 50-223 IN L. & C. CARD INDEX.
B	SO	ATTACHED WITH PLAN NOS. 133-050-116-B THRU H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-A IN L. & C. CARD INDEX.
B	SO	ATTACHED WITH PLAN NOS. 133-050-116-A THRU H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-B
B	SO	ATTACHED WITH PLAN NOS. 133-050-116-A THRU H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-C IN L. & C. CARD INDEX. COMPARISON OF TUBES.
B	SO	ATTACHED WITH PLAN NOS. 133-50-116-A THROUGH H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-D IN L. & C. CARD INDEX.
B	SO	ATTACHED WITH PLAN NOS. 133-050-116-A THRU H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-E IN L. & C. CARD INDEX.

B	CL	ATTACHED WITH PLAN NOS. 133-050-116-A THRU H. PLAN NUMBER ENTERED AS 113-ENV. 50-116-F IN L. & C. CARD INDEX.
B	CL	ATTACHED WITH PLAN NOS. 133-050-116-A THRU H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-G IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 15 APR. 1924.
B	CL	ATTACHED WITH PLAN NOS. 133-050-116-A THRU H. PLAN NUMBER ENTERED AS 133-ENV. 50-116-H IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 15 APR. 1924.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	PLAN NUMBER ENTERED AS 133-50-119 IN L. & C. CARD INDEX.
B	SO/TE	PLAN NUMBER ENTERED AS 133-ENV. 50-120 IN L. & C. CARD INDEX.
B	SO	ATTACHED WITH 133-121-[B] & [C]. BEARS "SEPT 1924 ?"
B	SO	ATTACHED WITH 133-121-[A] & [C]. BEARS "SEPT 1924 ?"
B	SO	ATTACHED WITH 133-121-[A] & [C]. BEARS "SEPT 1924 ?"

B	SO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/FO	LOCATED SFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	CL	THIS ILLUSTRATION WAS COPIED FROM A GERMAN TEXT OF 1860 BY E. L. HUSE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		318 CFPS. 22 FT. HEAD.

A		283 & 240 CFPS 13 FT. HEAD.
A		2000 CFPS. 54' HEAD.
A		263 CFPS. 22 FT. HEAD.
A		
A		SEE ALSO PLAN NO. 153-057.
B	TE	TESTED AT HOLYOKE FEB 26, 1919.
B	TE	DISCHARGE 537 CFPS TO STATION 90. DISCHARGE 318 CFPS BEYOND STATION 90.
B	LM/SO	WHEEL IS TYPE #12, R.H. TO REPLACE OLD #1 WHEEL, 18 GUIDES, EACH 24 1/2" HIGH.
A		
A		

A		
A		
A		
A		
A		
A		
A		
A		NOTE READS "NOT USED". LOCATED IN P.L.& C. CONSECUTIVE INDEX RATHER THAN THE SUBJECT CARD INDEX.
B	CL	PHOTO ATTACHED RECTO SHOWING ONE OF THREE UNITS NOW IN USE AT THE ASSETS DIVISION OF LOWELL INDUSTRIAL DEVELOPMENT CO.

B	CL/TE	PHOTO ATTACHED RECTO SHOWING ONE OF THREE UNITS NOW IN USE AT THE ASSETS DIVISION OF LOWELL INDUSTRIAL DEVELOPMENT CO. SOME NEW WORK WAS ADDED TO THE ORIGINAL DRAFTING CLOTH PLAN 133-128, AFTER THIS COPY HAD BEEN MADE OF IT.
B	FO/SO	
B	FO/SO	BEARS "O.K." & INITIALS GEW.
B	SO	
B	CL	NOTE NOS. 3, 3A, 4 & 4A WHEELS.
C	ST	
C	SO	
B	FO/SO	THIS PLAN NO. WAS USED TWICE BY P. L. & C. PLAN OF LAND LEASED ON WESTERN SIDE OF THOMAS ST. IN VICINITY OF BROADWAY. BEARS NO. 4127 BENEATH LABEL, RECTO.
C	FO/SO	THIS PLAN NO. WAS USED TWICE BY P. L. & C.

B	SO	THIS SKETCH COPIED FROM PG. 21; BOOK MARKED "SURVEYS," DRAWN FOR THE PURPOSE OF DETERMINING THE BOUNDARY LINE OF THE EASTERN CANAL BANK ALONG CANAL ST. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO/TE /ST	BEARS NO. 4125 COVERED OVER RECTO. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	PLAN IS DATED MAY 26, 1899, TRANSFER WAS MADE JUNE 20, 1899. BEARS NO. 4123 BENEATH LABEL, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	TE/SO	BEARS NO. 4220 RECTO. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO/ST	THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	CL/FO	COLORED PENCIL HIGHLIGHTS SAME DETAILS AS COLORED INK ON ORIGINAL PLAN. PLAN NUMBERED 134-ENV. 4 ON L.& C. LABEL. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	WATERMARK READS "CRANE CO., DALTON MASS, 1888, BOND NO. 21". LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN IS NOT A COMPONENT OF 134-004-[A]. BEARS NO. 4126 BENEATH PLAN LABEL. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	O. F. OSGOOD, CIVIL ENGINEER. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4128 BENEATH PLAN NO. LABEL. NOT A COMPONENT OF 134-005-[A]. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
A		

C	FO/SO	JUDGING FROM THIS COPY, IT APPEARS THE ORIGINAL PLAN WAS EITHER PAPER OF DRAFTING CLOTH. A REVERSE NUMBER 4355 APPEARS IN THE CORNERS, INDICATING A TRANSLUCENT ORIGINAL. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	NOTE RECTO STATES GENERAL NORTHERN CANAL. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	TE	BEARS UNREADABLE NO. BENEATH PLAN NO.TAG. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO	THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	TE	BEARS NO. 4130 RECTO. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	ST/SO/TE	BEARS NO. 4130 RECTO. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	THIS PLAN NO. WAS USED TWICE BY P. L. & C.

B	CL	THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	BEARS NO. 4131, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. NOT A COMPONENT OF 134-008-[A]. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	BEARS FILE NO. 1124-64-A-3 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	BEARS NO. 4132-A BENEATH PLAN NO. LABEL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. NOT A COMPONENT PART OF 134-009-[A]. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	BEARS NO. 4132 BENEATH PLAN NO. LABEL. NOT A COMPONENT PART OF 134-010-[A]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO	BEARS NOS. 28 & 4145 RECTO. FORMERLY NUMBERED 134-22. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO/TE /ST	BEARS NO. 4153-A RECTO. FORMERLY NUMBERED 134-34. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	BEARS NO. 4132-B BENEATH PLAN NO. LABEL. NOT A COMPONENT OF 134-011-[A]. SEE ALSO PLAN C-142-128. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/TE	BEARS NO. 4133 BENEATH PLAN NO. LABEL. LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY. SEE ALSO 135-4100-[B] FOR DETAIL OF AREA. NOTES RENT. ALSO BEARS NO. 11-A1. THIS PLAN WAS ORIGINALLY NUMBERED 134-41. THIS PLAN NO. WAS USED TWICE BY P. L. & C.

B	SO/ST	ADDITIONAL NOTE DATED OCT. 10, 1918 IN GRAPHITE RECTO. BEARS NO. 79 & 80 RECTO. ALSO BEARS NO. 4425 VERSO, AS WELL AS "MR. BADGER." THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	UNDATED TYPESCRIPT ATTACHED TO 134-013-[B]. BEARS NO. 4159 BENEATH LABEL. THIS PLAN NO. WAS USED TWICE BY P. L. & C. DATE OF ORIGINAL DOCUMENT WAS DECEMBER 15, 1846.
B	SO	SURVEYED JULY 1890. 134-013-[A] ATTACHED RECTO. BEARS NO. 4159 BENEATH LABEL, RECTO. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/TE	BEARS NO. 4135 BENEATH PLAN NO. LABEL. LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO/ST /LM	BEARS NO. 4162 VERSO. THIS PLAN WAS ORIGINALLY NUMBERED 134-43. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	NOTE STATES MR. MILLS GAVE THE ORIGINAL OF THIS TO THE REAL EST. COM. NOT A COPY OF 134-015. BEARS NO. 4136 BENEATH LABEL, RECTO. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
C	ST/SO	BEARS NO. 4137 RECTO. NEW WORK SHOWS ASSESSED VALUATIONS OF LAND. NOT A COPY OF 134-015. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	ATTACHED WITH 134-016. BEARS NO. 4170 BENEATH PLAN NO. LABEL. THIS PLAN WAS ORIGINALLY NUMBERED 134-50. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
A		LISTED IN P. L. & C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX OF DRAWINGS. THIS PLAN MAY ACTUALLY BE BLUEPRINT C-145-016 WHICH MAY HAVE BEEN RENUMBERED WITHOUT THE CARD INDEX BEING CHANGED TO REFLECT IT.

C	TE/ST/SO	ATTACHED TO 134-016-[B]. BEARS NO. 4138 BENEATH PLAN NO. LABEL. LISTED IN P. L. & C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX OF DRAWINGS. THIS PLAN NO. WAS USED TWICE BY P. L. & C. ATTACHED TO PLAN 134-015. ALSO NO. 4171 BENEATH PLAN NO. LABEL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN WAS ORIGINALLY NUMBERED 134-51. LISTED IN P. L. & C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX. PLAN NO. WAS USED
B	SO/TE	TWICE BY P. L. & C.
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4139 BENEATH PLAN NO. LABEL. ATTATCHED TO 134-016-[B]. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO/TE	ADDITIONAL NOTE PERTAINING TO SUFFOLK ST. SIDEWALK ON EASTERN SIDE STATES COPY MADE JULY 23, 1890. SEE [...?] WASTE BOOK PG. 5 FOR ASSESSMANTS TO THE TENANTS. BEARS NO. 4172. THIS PLAN WAS ORIGINALLY NUMBERED 134-52. PLAN NO. WAS USED TWICE BY P. L. & C.
A		THE ORIGINAL PLAN WAS IN THE LOWELL CITY ENGINEER'S OFFICE. THIS RECORD MAY REFER TO THE TRACING MADE OF IT FROM WHICH THE BLUEPRINT 134-018-[COPY 1] WAS MADE. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	RANDOM NOTE READS "MERRIMACK N. SIDE". MASTER FROM WHICH THIS BLUEPRINT WAS MADE SEEMS TO HAVE BEEN A TRACING OF AN ORIGINAL PLAN IN THE LOWELL CITY ENGINEER'S OFFICE. SEE 134-018. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4140 BENEATH PLAN NO. LABEL. PLAN NO. WAS USED TWICE BY P. L. & C.

C	SO/LO	LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY. BEARS NO. 4141 BENEATH PLAN NO. LABEL. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	NOTE STATES, THIS IS THE PROPERTY OF THE LOCKS & CANALS. BEARS NO. 4178 BENEATH LABEL, RECTO. THIS PLAN WAS ORIGINALLY NUMBERED 134-59. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. SHOWS AREA ADJACENT TO UPPER FREE LANDING. BEARS NO. 4142 BENEATH PLAN NO. LABEL. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO/FO/TE	BEARS NO. 4180-A, RECTO. ALSO BEARS #103, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN WAS ORIGINALLY NUMBERED 134-62. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	BEARS NO. 4143, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO/FO	NOTE STATES FOR ORIGINAL NOTES BY F.M. PALMER SEE BOOK NO. PP. 1-79. BEDARS NO. 4185, RECTO, DETACHED. THIS PLAN WAS ORIGINALLY NUMBERED 134-68. PLAN NO. WAS USED TWICE BY P. L. & C.

B	FO/TE/SO/ST	BEARS NO. 4189. IT IS UNCLEAR FROM THE CARD INDEX RECORD IF THIS PLAN IS A COPY OR ORIGINAL ON TRACING PAPER. THIS PLAN WAS ORIGINALLY NUMBERED 134-71. PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO	NOTE STATES: "TRACED FROM CITY ENGR'S PLAN". BEARS NO. 4189-A, RECTO. PLAN NO. WAS USED TWICE BY P. L. & C.
B	LM/SO/FO	NOTE STATES, CONTOURS BETWEEN R. R. & BROADWAY PLOTTED FROM NOTES TAKEN DEC. 7, 8 & 11, 1900. BEARS NO. 687 & NO. 4188 RECTO. THIS PLAN ORIGINALLY NUMBERED 134-70. PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO	PLAN NUMBER GIVEN AS 134-25 IN L.& C. CARD INDEX. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. FORMERLY NUMBERED 134-29.
C	SO/FO/LO	BEARS NO. 4147, RECTO. ALSO BEARS NO. 25, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C. SEE PLAN C-144-026 FOR A LATER VERSION OF THIS PLAN.
B	TE/LO/SO/FO	BEARS NO. 4197 BENEATH PLAN NO. LABEL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN WAS ORIGINALLY NUMBERED 134-79. PLAN NO. WAS USED TWICE BY P. L. & C.

C	LO/TE/SO	LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY. APPENDED NOTE READS "S.W. LOCKE TO LUKE MC FARLIN AUG. 4, 1882" AND REFERS TO THE BOUNDS OF A FIVE YEAR LEASE ON THE PARCEL OF LAND ON THE PLAN. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO/FO/TE	DATE FROM W. E. BADGER DATED JUNE 16, 1904. MEMO RELATING TO RUNNING ON PROPERTY LINE FOUND IN BOOK S PG.20 & IN [...?] NOTE BOOKS. BEARS NO. 4206 RECTO. THIS PLAN WAS ORIGINALLY NUMBERED 134-92. PLAN NO. WAS USED TWICE BY P. L. & C.
C	LO/TE/SO	PLAN DISCRIBES LEASE PROPERTIES. LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO	BEARS NO. 4197-A RECTO. THIS PLAN WAS ORIGINALLY NUMBERED 134-80. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FX	BEARS NO. 4150 BENEATH PLAN LABEL. DESCRIBES AREA ADJACENT TO NORTHERN CANAL BETWEEN CABOT & AIKEN STS. SHOWING LAND OF AMADEE JEAN ON FORD ST. SIDE OF CANAL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO	BEARS NO. 4209 (1), RECTO. SEE PLAN NO. 138-028. THIS PLAN WAS ORIGINALLY NUMBERED 134-94. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	PLAN NO. WAS USED TWICE BY P. L. & C.

C	FO/ST	BEARS NO. 4151 BENEATH PLAN NO. LABEL. NOTE READS "TRACED AT LOWELL, MASS FEB 12, 1894." DESCRIBES PROPERTIES IN AREA SOUTH OF MERRIMACK RIVER AND WEST OF CABOT ST. INVENTORIED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	PHOTOGRAPHS ATTACHED RECTO. PLAN NO. WAS USED TWICE BY P. L. & C.
C	TE/FO/SO	BEARS NO. 4124 BENEATH PLAN NO. LABEL. PLAN NOTES "S. B. SET MAY 8, 1900" AND "S. B. SET MAY 9, 1900". LOCATED AFTER COMPLETION OF FORMAL INVENTORY. ATTACHED TO 134-030-[4124-A] WITH PAPER CLIP. PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO	BEARS NO. 4124-A BENEATH PLAN NO. LABEL. ATTACHED TO 134-030-[4124] WITH A PAPER CLIP. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO/TE	PHOTOS ATTACHED RECTO.
B	SO	PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	PLAN NO. WAS USED TWICE BY P. L. & C.

C	LO/SO	BEARS NO. 4144 BENEATH PLAN NO. LABEL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	ADDITIONAL TITLE READS: PLAN SHOWING SUGGESTED SEWER ON WEST SIDE OF PAWTUCKET CANAL. PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4152 BENEATH LABEL, RECTO. PLAN NO. WAS USED TWICE BY P. L. & C.
B	FO/SO	PLAN NO. WAS USED TWICE BY P. L. & C. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	FO/ST/SO /FX	PLAN OF LAND ON NORTHERN & SOUTHERN SIDE OF NORTHERN CANAL. BEARS NO. 4153 RECTO. PLAN NO. WAS USED TWICE BY P. L. & C.
B	TE	PLAN NO. WAS USED TWICE BY P. L. & C.
C	TE/SO/LO	BEARS NO. 4155 BENEATH PLAN NO. LABEL. PLAN SHOWS SEVERAL LOTS WITH RENTS AND LEASE DATES; LATEST DATES APPEAR TO BE IN LATE 1895. SEE 134-036-[B] FOR 4155-A WHICH APPEARS TO AN EARLIER VERSION OF THIS PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	PLAN NO. WAS USED TWICE BY P. L. & C.
C	CL	PLAN NO. WAS USED TWICE BY P. L. & C.

B	TE	PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO	BEARS NO. 4322, VERSO, CROSSED OUT AND OVERWRITTEN 4155-A. SEE 134-035-[B] FOR 4155 WHICH APPEARS TO BE A LATER VERSION OF THIS PLAN. TITLE TAKEN FROM PLAN 134-035-[B]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/TE	ORIGINAL DATED MARCH 1887. REVISED MARCH 1895. ADDITIONAL WORK DATED APRIL 1, 1896. NOTE STATES THAT STREETS, CANAL & RIVER WERE COPIED FROM PLAN NO. 31. PLAN NO. WAS USED TWICE BY P. L. & C.
C	CL	LOCATED IN ENVELOPE 37 OF SHELF 134.
B	FO/TE/SO	PLAN NUMBER ENTERED AS 134-ENV. 37-1 IN L. & C. CARD INDEX.
B	FO/SO	
B	SO	PLAN NUMBER ENTERED AS 134-ENV. 37-3 IN L. & C. CARD INDEX.
B	SO	PLAN OF SUGGESTED TRACKS CROSSING PAWTUCKET CANAL & LOTS 13 & 8 BORDERING EITHER SIDE OF PAWTUCKET CANAL. PLAN NUMBER ENTERED AS 134-ENV. 37-4 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO/FO	PLAN NUMBER ENTERED AS 134-ENV. 37-5 IN L. & C. CARD INDEX.
B	FO	PLAN NUMBER ENTERED AS 134-ENV. 37-6 IN L. & C. CARD INDEX.
B	FO/SO	PLAN NUMBER ENTERED AS 134-ENV. 37-7 IN L. & C. CARD INDEX. ORIGINALLY DATED FEB.14, 1924. REVISED DEC. 21, 1938. PLAN OF LAND LOCATED BETWEEN MERRIMACK RIVER & PAWTUCKET ST. & BORDERED BY MELVIN ST. ADDITIONAL TITLE INFO. TAKEN FROM L. & C. INDEX CARD. PLAN NUMBER ENTERED AS 134-ENV. 37-8 IN L. &
B	FO/SO	C. CARD INDEX.
B	SO/FO/ST /TE	
B	FO	PLAN NUMBER ENTERED AS 134-ENV. 37-10 IN L. & C. CARD INDEX.
B	FO/SO	PLAN NUMBER ENTERED AS 134-ENV. 37-11 IN L. & C. CARD INDEX.
B	SO/TE	PLAN NUMBER ENTERED AS 134-ENV. 37-12 IN L. & C. CARD INDEX. PLAN SHOWS LOT 34-A-4.
B	FO/SO	PLAN NUMBER ENTERED AS 134-ENV. 37-13 IN L. & C. CARD INDEX. PLAN SHOWS LOCKS & CANALS LAND.

B	SO	PLAN NUMBER ENTERED AS 134-ENV. 37-14 IN L. & C. CARD INDEX.
B	SO	
B	CL	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	
B	SO	
B	FO/SO	

B	CL	
B	SO	
B	CL	NOTE VERSO STATES: THE ORIGINAL OF THIS PRINT IS FILED AT THE COURTHOUSE.
B	SO/FO	
B	CL	BEARS: LOWELL, MASS. SEPT. 25, 1937. RECEIVED & ENTERED WITH MIDDLESEX NORTH DISTRIC REGISTRY OF DEEDS BOOK OF PLANS 60 PLAN 78. DANIEL P. MORIARTY REGISTRAR. U.S. ARMY CORPS OF ENGINEERS.
B	SO	PLAN SHOWING LOTS OF LAND BORDERING EASTERN CANAL LEASED TO VARIOUS COMPANYS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	
B	SO	
B	SO	
B	CL/FO	

B	FO/CL	
B	FO	
B	FO/SO	SEE 134-037-031-[B] FOR A NARRATIVE DESCRIPTION OF THIS PROPERTY.
C	FO/SO	THIS IS A TYPED NARRATIVE DESCRIPTION OF THE PROPERTY DELINEATED IN PLAN 134-037-031-[A].
B	FO/SO	
B	FO/SO	
B	SO	

B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	
B	SO	PLAN OF LAND BORDERING MELVIN ST. BELONGING TO LOWELL LAND CO. LEASED SOLD (?) TO GEORGE J. TRUDEL JUNE 1939.
B	SO	
B	SO	
B	SO	ADDITIONS & CORRECTIONS PUT ON JUNE 26,1940 SHOWING SURVEY OF PORTION OF LOT 84 BETWEEN PROPRIETORS OF ST. JOHN'S HOSPITAL & LOWELL WATER WORKS ON THE NORTHERLY SIDE OF STACKPOLE ST.
B	CL	

B	SO	PLAN OF LAND BORDERING PAWTUCKET CANAL IN VICINTY OF WESTERN AVE. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
C	CL	
B	SO	
B	SO	
B	SO	
B	SO	TRACED FROM BOOK OF P.L.& C. LAND SALE 1845, PLAN NO.7.
B	SO	
B	CL	
C	CL	
B	CL	

B	CL/HO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	CL	PLAN OF LAND BORDERING WESTERN CANAL IN VICINITY OF DUTTON & WORTHEN STS., BELONGING TO P. L.& C. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	PLAN OF R. R. TRACKS & LOT BORDERING EASTERN CANAL & AMORY ST. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	
B	CL	
A		
B	CL	

B	SO	
B	FO	BEARS NO. 3254 RECTO. PLAN OF LAND LIES WEST OF DUTTON ST.
B	CL	
B	CL	
B	SO	
B	SO/TE	
B	CL	
B	TE/HO	PLAN OF LAND SOUTH OF VARNUM AVE. SHOWING LAND BELONGING TO P.L.& C. OF WHICH FENCE & WALL HAVE FALLEN INTO MERRIMACK RIVER.

B	SO	
B	CL	
B	FO	
B	CL	PROPRIETORS OF THE LOCKS & CANALS 20' CANAL BORDER. LOCATED ON SOUTH SIDE OF UPPER PAWTUCKET CANAL.
B	FO	PLAN OF LAND BORDERED BY SHATTUCK, MARKET, DUTTON & MERRIMACK STS.
B	SO	AREA LIES NORTH OF BROADWAY & EAST OF PAWTUCKET CANAL.
B	SO	
B	SO	THE PLAN NO. AS RECORDED ON THE PLAN ITSELF PUTS THIS PLAN IN ENVELOPE 37, HOWEVER, THE P.L.& C. CONSECUTIVE INDEX OF DRAWINGS DOES NOT AND RECORDS IT SIMPLY AS 134-125.

		THE PLAN NO. AS RECORDED ON THE PLAN ITSELF PUTS THIS PLAN IN ENVELOPE 37, HOWEVER, THE P.L.& C. CONSECUTIVE INDEX OF DRAWINGS DOES NOT AND RECORDS IT SIMPLY AS 134-129.
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO/SO	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX.
C	FO/SO	BEARS NO. 4156-A BENEATH LABEL, RECTO.
C	TE/HO/ST /SO	PLAN OF 3 LOTS WHICH BORDER PAWTUCKET ST. BEARS NO. 4158 RECTO.
C	FO/TE/SO	PLAN OF LAND NORTH OF MERRIMACK RIVER & WEST OF AIKEN ST. BEARS NO. 4203 BENEATH LABEL, RECTO.
C	FO/HO/TE	NOTE DATED MAY 1904. BEARS NO. 4165 BENEATH LABEL, RECTO.
C	FO/SO	PLAN OF WESTERLY EXTENSION OF STACKPOLE ST. ORIGINAL DATED DEC. 1848. DOCUMENT 134-045-[A] ATTACHED. NOTE STATES THIS IS A TRACING OF A PLAN AT THE OFFICE OF THE CITY ENGINEER OF LOWELL. THE PLAN IS NUMBERED "153." BEARS NO. 4164 BENEATH LABEL, RECTO.
C	TE	COPY FROM THE "STREET RESOLUTIONS." ORIGINAL DATED JUNE 1849. COPIED JULY 17, 1849. TWO PAGE DOCUMENT CONCERNING STACKPOLE ST. ATTACHED TO 135-045.
C	FO/TE	BEARS NO. 4166 BENEATH LABEL, RECTO.
C	TE/SO	BEARS NO. 4167 RECTO.
C	SO	BEARS NO. 4167-A RECTO.

C	ST/TE/SO/FX	PLAN OF MERRIMACK RIVER & LAND ON NORTHERN BANK, BORDERING FIRST ST. SHOWS LOCATION OF PIPE LINE. ALSO SHOWS LOACTION OF TEMPORARY PILE BRIDGE.
C	FO/SO/ST	PLAN SHOWS LOTS IN LOWELL. BEARS NO. 3077 RECTO & 4173 VERSO.
C	TE	PLAN OF LOTS IN THE VICINITY OF MARKET ST. NOTES DATED MARCH 26, 1842 & NOV.8, 1870, RECTO. BEARS NO. 4174 BENEATH LABEL, RECTO.
C	TE/SO/ST	BEARS PLAN NO. 4174-A, RECTO.
C	ST/SO	NOTE STATES TRACED MARCH 19, 1898 FROM PLAN ON FILE AT CITY ENGINEER'S OFFICE. ORIGINAL DATED NOV. 1895. BEARS NO. 4176 BENEATH LABEL, RECTO.
C	ST/SO/FX/TE	PLAN OF LAND IN UNDESIGNATED AREA. BEARS NO. 4180 BENEATH LABEL, RECTO.
C	TE/ST/FX	PLAN OF STRIP OF LAND ON WEST SIDE OF MOODY ST. EXTENSION. DOCUMENT 134-063-[A] ATTACHED TO PLAN. BEARS NO. 4181 RECTO.
C	FO/HO/SO/FX	LETTER FROM A.J. LYMAN TO GEO. J. CARNEY CONCERNING STRIP OF LAND ON WEST SIDE OF MOODY ST. COPY IS TYPED RECTO. ATTACHED TO 134-063.
C	ST	NOTE STATES, "THE ORIGINAL OF WHICH THIS IS A COPY WAS ATTACHED TO THE DEED WHICH WAS GIVEN TO LOWELL TEXTILE SCHOOL." BEARS NO. 4182 RECTO.
C	TE/SO	NOTE INDICATES TAKEN FROM CONTOURS ON PLAN NO. 4183.
C	FO/SO/TE	BEARS NO. 4184, VERSO.

		NOTE, RECTO, READS "THE PART WESTERLY OF THE CONDUIT COPIED FROM PLAN NO. 26". NOTE, VERSO, READS "FRYE LOT-CONTOURS". LOCATED AFTER COMPLETION OF FORMAL
C	SO/FO	INVENTORY. BEARS NO. 4186 BENEATH PLAN NO. LABEL.
		BEARS NO. 4190, RECTO. LOCATED AFTER COMPLETION OF FORMAL
C	SO/FO	INVENTORY.
		PLAN OF LAND BETWEEN CONCORD ST. & CONCORD RIVER. NOTE INDICATES WAS TRACED FROM A PLAN AT CITY ENGINEERS OFFICE.
C	ST/SO	BEARS NO. 4191 BENEATH LABEL, RECTO.
		PLAN SHOWS INTERSECTION OF PAWTUCKET & MOODY STS. STAMP RECTO READS, "OFFICE OF CITY ENGINEER...NO. 248 DAY BOOK".
C	FO/SO/ST	BEARS NO. 4192 BENEATH LABEL, RECTO.
		ORIGINAL DATED JULY 8, 1880. TRACED AT CITY ENGINEERS OFFICE
C	SO/TE/FO	JULY 19, 1901. BEARS NO. 4193 BENEATH LABEL, RECTO.
		PLAN SHOWS BANK OF NORTHERN CANAL BORDERING FORD ST. PLAN ALSO SHOWS SOUTHERLY LINE OF PAWTUCKET ST. BEARS NO.
C	TE/SO	4194 RECTO. NOTE RECTO DATED SEPT. 5, 1901.
		PLAN SHOWS LAND IN VICINITY OF LAKEVIEW AVE. & AIKEN ST.
C	FO	BEARS NO. 4196 RECTO.
C	ST/SO	BEARS NO. 4198 RECTO.
		NOTE STATES "GIVE COPY OF THIS TO BCC OCT 30, 02". BEARS NO. 4198-A RECTO.THIS IS A BLUEPRINT OF PLAN 134-081-4198 MADE
C	ST	BEFORE NEW WORK WAS ADDED TO IT.
		PLAN OF LAND OWNED BY BIGELOW CARPET CO. LAND LOCATED
C	ST/SO	SOUTH OF WESTERN AVE. BEARS NO. 4199 RECTO.
C	ST/SO/FX	BEARS NO. 4200 RECTO.

C	TE	NOTE INDICATES COPY OF PLAN RECORDED AT MDSX. NO. DIST. REG. OF DEEDS. BEARS NO. 4201 RECTO.
C	TE/HO/ST /SO	BEARS 4201-A RECTO.
C	TE/SO/ST	BEARS NO. 4201-B RECTO.
C	FO/ST/SO	PLAN OF LAND BETWEEN MIDDLESEX ST. & PAWTUCKET CANAL. ALSO SHOWS ORIGINAL LOCATION OF STREET & NEW ESTABLISHED LINE OF CANAL. BEARS NO. 4201-C, RECTO.
C	FO/SO/TE	DETAIL OF PLAN 134-087 SHOWING END OF PAYNE STREET. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4201-D, RECTO.
C	TE/HO/ST /SO	BEARS 4210 RECTO.
C	TE/ST/HO /SO	BEARS NO. 4202 RECTO.

C	FO/SO/TE	BEARS 4204 RECTO. TRACING MADE FROM THIS PLAN.
C	FO/TE	NOTE STATES TRACED FROM 4204.
C	ST/SO	BEARS NO. 4208 RECTO. NOTE STATES, "THIS PLAN NOT MUCH GOOD."
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4222, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4223, RECTO.
B	SO/FO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4224, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4225, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4226 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4227 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4229 RECTO. RANDOM NOTE DATED APRIL 1900. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4228 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4230 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO.4231 RECTO.
B	SO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4232 RECTO.
B	SO/TE/FO /FX	PART OF 21 PAGE DOCUMENT. BEARS NO. 4233 RECTO.
B	CL/FO	ATTACHED IN 21 PAGE DOCUMENT. BEARS NO. 4234 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/FO	PART OF 21 PAGE DOCUMENT. BEARS NO. 4235 RECTO. STAMP FROM OFFICE OF CITY ENGINEER CITY HALL, LOWELL, MASS. DATED OCT.1897. STAMP ALSO NOTES NO. 457 DAY BOOK. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/TE	PART OF 21 PAGE DOCUMENT. BEARS NO. 4236, RECTO.

B	FO/TE/SO /ST	ATTACHED IN 21 PAGE DOCUMENT. BEARS NO. 4237 RECTO.
B	FO/SO	BEARS OFFICE CITY ENGINEER CITY HALL, LOWELL, MASS. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	BEARS NO. 4238 BENEATH PLAN NO. LABEL. ATTACHED TO 134-112-[B]-[SHEET 2] & [SHEET 3]. LOCATED AFTER COMPLETION FOR FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	BEARS NO. 4238, RECTO. ATTACHED TO 134-112-[B]-[SHEET 1] & [SHEET 3]. TITLE TAKEN FROM VERSO AND FROM SHEET 1. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	CALCULATIONS TO SUPPORT SHEETS 1 & 2. ATTACHED TO 134-112-[B]-[SHEET 1] & [SHEET 2]. TITLE TAKEN FROM VERSO AND FROM SHEET 1. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
B	TE	PART OF 21 PAGE DOCUMENT. BEARS NO. 4239 RECTO.
B	FO/SO/TE	PART OF 21 PG. DOCUMENT. NOTE STATES THIS PROFILE TRACED FROM A PROFILE AT CITY ENGINEERS OFFICE. BEARS NO. 4240 BENEATH LABEL, RECTO.
B	FO/SO	PART OF 21 PG. DOCUMENT. COPIED BY W.E.B. FROM PLANS IN CITY ENGINEERS OFFICE OCT. 13, 1903. BEARS NO. 4241 BENEATH LABEL, RECTO.
B	FO/SO	PART OF 21 PG. DOCUMENT. BEARS NO. 4242.
B	FO/TE/SO	PLAN NUMBER USED TWICE BY P. L. & C.

C	SO/FO	BEARS NO. 4270 RECTO. LOCATED AFTER FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
B	SO	
C	CL	
B	SO	
B	SO/FO	
B	FO/SO	
B	SO	TRACED FROM PLAN BELONGING TO PERRY THOMPSON ON MAY 18, 1928 BY F.W. HOLT.
B	SO	

B	SO	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	FO/TE	
B	CL	SEE DRAFTING CLOTH PLAN NO. 134-148 FOR THE RENUMBERED ORIGINAL OF THIS BLUEPRINT. LOT NO. 15, WHICH WAS SOLD IN 1939.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	
B	FO	ORIGINALLY DATED JAN. 6, 1936. TRACED FROM A BLUEPRINT FURNISHED BY WM. D. REGAN JAN. 22, 1936.
B	FO/SO	
B	FO	NOTE STATES THIS LOT FORMERLY COMPRISED LOTS NOS.26 TO 26K INCLUSIVE, PREVIOUS TO CONSTRUCTION OF NEW WALL IN 1924 & 25.
B	FO/SO	
B	SO/FO	
B	FO/SO	
B	FO/SO	PLAN SHOWS LAND & BUILDINGS NORTH OF MERRIMACK RIVER IN VICINITY OF AIKEN ST. & LAKEVIEW AVE. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 16 JAN. 1935.

B	SO	
B	SO	
B	FO/SO	
B	SO/FO	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES TITLE OF THIS PLAN AS "PLAN OF PORTION OF LOT # 84 LEASED TO DR. ADAM E. SHAW". THAT LOT # IS THE LOT COVERED IN THIS PLAN AND MATILDA IS THE WIFE OF DR. ADAM BUT THE THE INDEX GIVES THE DATE AS SEPT. 2, 1932.
B	FO/SO	
B	SO	NOTE STATES: FOR PLAN ACCOMPANYING DEED OF THIS PROPERTY SEE SHELF C-142. NO. 15. PLAN WAS MADE UP TO SHOW LOCATION OF FENCES DATED-AUG. 23, 1939. A BLUEPRINT COPY EXISTS AS PLAN NO. 134-131, WHICH WAS THE ORIGINAL NUMBER OF 134-148.LOT NO. 15.
B	SO	

B	FO/SO	NOTE OF "RIGHTS" COPIED FROM L.& C., BOOK 7, PAGE 48.
B	SO	NOTE STATES THIS PLAN CONTAINS SAME MATERIAL AS REGISTRY PLAN (SAME DATE) WITH SOME ADDITIONS.
B	FO	
B	FO/TE	COPIED FROM CITY ENGRS. PLAN. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MARCH, 1933.
B	TE	COPIED FROM CITY ENGRS. PLAN. NOTE STATES LINES BY RESOLUTION ON JULY 2, 1850.
B	FO/SO	
B	FO/SO	

B	FO/SO	
B	FO/SO	
B	SO/FO	ORIGINALLY DATED JULY 25, 1942. REVISED APRIL 28, MAY 22, & AUG. 3, 1944. ADDITIONAL WORK DONE ON SHEET NO. 134-159-[B] & ATTACHED WITH METAL PINS.
B	SO/FO	REPRESENTS ADDITIONAL WORK APPLIED TO PLAN NO. 134-159-[A] IN 1944. ATTACHED TO PLAN NO. 134-159-[A] BY TWO METAL PINS. TITLE TAKEN FROM PLAN NO. 134-159-[A]. LOACATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/FO/LM	COPY OF BOTH PLAN NO. 134-159-[A] & [B] GLUED TOGETHER. ORIGINALLY DATED JULY 25, 1942. REVISED APRIL 28, MAY 22, & AUG. 3, 1944.
B	FO/TE	NOTE STATES: (COPY) ORIGINAL FILED IN COURT HOUSE MAY 17, 1943. RAMP AREA SOLD TO ST. JOHNS HOSPITAL APRIL 7, 1943.
B	FO	PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO	PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO	PLAN NO. WAS USED TWICE BY P. L. & C.

C	SO	PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO/SO	PLAN NO. WAS USED TWICE BY P. L. & C.
C	FO	AMENDED JULY 15, 1947 FOR FILING WITH THE CLERK OF THE U.S. DISTRICT COURT, CONCORD, N.H. AN ANSWER TO SAID PETITION ON OR BEFORE AUG. 19, 1947. PLAN NUMBER USED TWICE BY L. & C.
B	SO	DATE GIVEN AS JUNE 1948 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. PLAN NUMBER USED TWICE BY L. & C.
B	CL	DATE GIVEN AS JUNE 1948 IN L. & C. CARD INDEX. PLAN NUMBER USED TWICE BY L. & C.
B	CL	DATE GIVEN AS JUNE 1948 IN L. & C. CARD INDEX. PLAN NUMBER USED TWICE BY L. & C.
C	FO	PLAN NUMBER USED TWICE BY L. & C.
B	CL	PLAN NUMBER USED TWICE BY L. & C.
B	CL/FO	PLAN NUMBER USED TWICE BY L. & C.

C	FO/SO	PLAN NUMBER USED TWICE BY L. & C.
B	FO/SO	PLAN NUMBER USED TWICE BY L. & C.
B	FO	PLAN NUMBER USED TWICE BY L.& C. L. & C. INDEX CARD NOTES "PLUS 3 COPIES".
C	FO/SO	PLAN NUMBER USED TWICE BY L.& C.
B	LM/SO	PLAN NUMBER USED TWICE BY L. & C.
B	TE/SO	PLAN NUMBER USED TWICE BY L. & C.
B	TE/SO/FO	PLAN NUMBER USED TWICE BY L. & C.
C	SO	PLAN NUMBER USED TWICE BY L. & C.

B	CL	PLAN NUMBER USED TWICE BY L. & C.
B	FO	BEARS STAMP FROM COMMONWEALTH OF MASS. THOMAS P. SHEEHAN. PLAN NUMBER USED TWICE BY L. & C.
C	LM/SO	PLAN NUMBER USED TWICE BY L. & C.
C	FO/SO	PLAN NUMBER USED TWICE BY L. & C.
B	SO	PLAN NUMBER USED TWICE BY L. & C.
B	FO/SO	AREA LIES BETWEEN DUTTON & SHATTUCK STS. PLAN NO. WAS USED TWICE BY P. L. & C.
C	SO/FO	BEARS "GEO. BOWERS CITY ENGINEER" RECTO. NOTES "COPIED FROM ORIGINAL DRAWING DEC. 8, 1953 BY E. L. HUSE." RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NO. WAS USED TWICE BY P. L. & C.
C	LO/TE/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".

PAPER	C	SOILED, LOSSES
C	SO/LO	FOUR PAGE DOCUMENT CONSISTING OF A TITLE PAGE AND THREE PAGES OF PLOT PLANS SHOWING P.L.& C. LOTS FOR SALE AT AUCTION. DATE OF DOCUMENT IS DATE OF AUCTION. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS STAMPED NO. 3428, VARIOUS LOCATIONS.
PAPER	C	TEARS, SOILED
C	SO/TE	FOUR PAGE DOCUMENT CONSISTING OF A TITLE PAGE AND THREE PAGES OF PLOT PLANS SHOWING P.L.& C. LOTS FOR SALE AT AUCTION. DATE OF DOUCMENT IS DATE OF AUCTION. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS STAMPED NO. 3428, VARIOUS LOCATIONS.

C	FO/LO/TE	NOTE READS "LAND OF ROGER PARK SYNDICATE", VERSO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	FO/SO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	FO/SO/TE /LO	UNDATED. PAPER SUPPORT IS WATERMARKED "1904 BOND NO. 16" THUS THE DATE OF THE DRAWING IS 1904 OR LATER. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	RO/FO	LAND BOUNDARIES MARKED IN RED PENCIL. ROMAN NUMERALS CONVERTED TO ARABIC. NOTED "RED FIGURES REFER TO DEEDS ON FILE AT PL&C OFFICES" P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	LO/TE/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/ST	
B	SO	
B	SO	
B	SO	ORIGINALLY DATED JUNE 1933. PLAN WAS REVISED FEB. 1951. THIS PLAN WAS THE MASTER FROM WHICH 135-004 WAS MADE BEFORE 135-003 WAS ALTERED AND REDATED IN 1951.

C	FO/TE	ORIGINALLY DATED JUNE 1933 WITH REVISIONS OF FEB. 1951 AND SEPT. 1959. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE	ORIGINALLY DATED JUNE 1933 WITH REVISIONS OF FEB. 1951 AND SEPT. 1959. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE	ORIGINALLY DATED JUNE 1933 WITH REVISIONS OF FEB. 1951 AND SEPT. 1959. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	ORIGINALLY DATED JUNE 1933. PLAN WAS REVISED FEB. 1951. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	THIS PLAN IS A COPY OF 135-003 BEFORE 135-003 WAS ALTERED IN 1951. IT CONFORMS WITH THE L.& C. INDEX RECORD FOR PLAN 140-045-B EXCEPT FOR DATE, WHICH IS 1929 IN THE INDEX RECORD.
C	FO	A SCALE REDUCTION OF PLAN 135-004. THE SAME IN ALL OTHER RESPECTS. FOUND IN FOLDER 166.
B	SO	ATTACHED WITH PLAN NOS. 135-012 A & B AND 012-[COPY 1].
B	FO	
B	FO	GIVES INFO. RELATIVE TO WATER POWER, ORDINARY OPERATING CONDITIONS FOR VARIOUS COMPANY'S AS WELL AS HORSE POWER OF WATER WHEELS BY GROUPS.

B	SO/FO	
B	SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
C	FO/SO/TE	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
B	FO/SO/TE	BEARS NOTE: "ELECTRIC TIE LINES FEB. 10, 1933."
B	CL	
B	SO	
B	SO/FO	ATTACHED WITH 135-012-[COPY 1], A, B & [C]. BEARS FILE 1012.2. ORIGINAL PLAN NO. 140-45 WAS ERASED AND REPLACED WITH 135-12 AS CAN BE SEEN BY REFERENCE TO THE ACCOMPANYING PHOTOSTAT WHICH SHOWS THE ORIGINAL PLAN NO.

B	FO/SO	BEARS 1929 IN GRAPHITE RECTO. BEARS FILE 1012.2 RECTO. ATTACHED WITH 135-12,135-12-[COPY 1],B & [C]. ORIGINAL NUMBER PLAN NO.140-45-A HAS BEEN CROSSED OUT AND NEW PLAN NO. 135-12-A HAS BEEN ADDED.
B	SO	BEARS FILE NO. 1012.2. ATTACHED WITH 135-12, 135-12-[COPY 1], A & [C]. ORIGINAL PLAN NO. 140-45-B HAS BEEN CROSSED OUT AND NEW PLAN NO. 135-12-B HAS BEEN ADDED.
B	SO	BEARS FILE 1012.2. ATTACHED WITH PLAN NOS. 135-013-[A-COPY 1], [B], 014-[A], 159-025-[COPY 1]. ORIGINAL PLAN NO. 140-46 HAS BEEN ERASED AND NEW PLAN NO. 135-13 HAS BEEN ADDED.
C	SO/FO	PHOTONEGATIVE. ATTACHED WITH 135-013-[A], [A-COPY 1], 014-[COPY 1].
C	SO	REDUCED PHOTONEGATIVE. BEARS FILE 1012.2. ATTACHED WITH PLAN NOS. 135-013-[A], [B], 014-[A] & 159-025-[COPY 1].
B	SO/ST	BEARS SHEET 1, RECTO. ORIGINALLY DATED JUNE 16,1933. LAST REVISION DATED OCT.16,1933.
C	SO	SCALES ARE NOTED AS FOLLOWS: 1"=60', H1"=60', V1"=10'. BEARS SHEET NO. 1, RECTO. ORIG. DATE JUNE 16,1933. LAST REVISION 7/12/33. ATTACHED WITH PLAN NOS. 135-[A], [A-COPY 1], 013-[B], 159-025-[COPY 1]. REDUCED PHOTONEGATIVE OF 135-014 WITH NEW WORK.

A		LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	SO/ST	BEARS SHEET NO.2, RECTO.
B	SO	BEARS SHEET NO. 3, RECTO. REVISION DATE AUG.1, 1933-CHANGED TO CONFORM TO ACTUAL CONSTRUCTION-SEPT.20, 1934. FOUND AFTER COMPLETION OF INVENTORY PROJECT.
C	FO/TE	EARLIER BLUEPRINT COPY OF DRAFTING CLOTH PLAN 135-016 BEFORE FURTHER WORK WAS ADDED TO IT. HAS CHANGES IN COLORED PENCIL OF ITS OWN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE	EARLIER BLUEPRINT COPY OF DRAFTING CLOTH PLAN 135-016 BEFORE FURTHER WORK WAS ADDED TO IT. HAS CHANGES IN COLORED PENCIL OF ITS OWN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE	BEARS SHEET NO. 3, RECTO. REVISION DATES AUG.1,1933-CHANGED TO CONFORM TO ACTUAL CONSTRUCTION-SEPT.1934.

C	RO/SO/FO /TE	BEARS SHEET NO. 3, RECTO.PLAN DIRECTS TO SEE SHEET 10 FOR PIPE FRAMEWORK & SHEET H FOR DETAILS OF SWITCH GEAR IN OLD ECONOMIZER ROOM. ORIGINALLY DATED JULY 15 1930.
C	FO	BEARS SHEET NO.3 RECTO. THIS BLUEPRINT WAS MADE FROM DRAFTING CLOTH PLAN 136-106 BEFORE ITS REVISIONS OF AUG. 1, 1933, AND SEPT. 20, 1934. BLUEPRINT COPY 1 SHOWS THOSE CHANGES THUS IT POSTDATES COPY 2. THIS COPY FOUND IN SHELF 166.
B	SO	BEARS SHEET NO. 4 RECTO. ALSO STATES "REVISE" IN GRAPHITE, RECTO.
C	FO	BEARS SHEET NO. 4 RECTO. THIS BLUEPRINT WAS MADE BEFORE CHANGES WERE MADE TO ORIGINAL DRAFTING CLOTH PLAN 135-017. THIS COPY FOUND IN SHELF 166.
B	SO	ORIGINALLY DATED JUNE 1933. ADDED SCHEDULES & REVISED LOCATION OF INSTRUMENTS 2/1/34. REVISED TO CONFORM TO ACTUAL CONSTRUCTION 9/22/34. BEARS SHEET 5 RECTO.
C	RO/TE/SO	PLAN READS "DIUGRAMATIC" IN REFERENCE TO SCALE. ORIGINALLY DATED JUNE 22, 1933, REVISED 2/1/34.

C	RO/TE/SO	PLAN READS "DIUGRAMATIC" IN REFERENCE TO SCALE. ORIGINALLY DATED JUNE 22, 1933, REVISED 2/1/34.
B	SO	BEARS SHEET NO. 6 RECTO. DIMENSIONS & SECTION DD ADDED TO CONFORM TO ACTUAL CONSTRUCTION SEPT. 17, 1934. ORIGINALLY DATED FEB. 24, 1934.
C	RO/SO/FO /TE	BEARS SHEET NO. 6 RECTO. THIS COPY WAS MADE BEFORE THE NEW WORK OF SEPT. 17, 1934, WAS ADDED TO THE ORIGINAL PLAN NO. 135-019.
B	SO	ORIGINALLY DATED JUNE 27,1933. GENERAL REVISIONS DATED OCT.3,1933. BEARS SHEET NO.7 RECTO.
B	TE/SO	BEARS SHEET NO. 8 RECTO.
B	SO	BEARS SHEET NO. 9 RECTO. ORIGINALLY DATED JULY 5,1933. REVISED SECTION O-O AS ACTUALLY INSTALLED AUG.1,1933.

		BEARS SHEET NO. 9 RECTO. ORIGINALLY DATED JULY 5,1933.
C	SO	REVISED SECTION O-O AS ACTUALLY INSTALLED AUG.1,1933.
B	SO	BEARS SHEET NO. 10..
C	RO/SO/FO /TE	PLAN READS: BOOTT MILLS SWITCH BOARD VERSO.
B	SO	BEARS SHEET NO. 11.
B	SO/FO	REVISION DATES SEPT. 12, 1933 AND OCT. 17, 1933 AS BUILT. BEARS SHEET NO. 12. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ORIGINALLY DATED JULY 24, 1933. LAST REVISION DATED NOV.1, 1933. BEARS SHEET NO. 16.
B	SO	BEARS SHEET NO. 14. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	BEARS NO.28 SHEET 15.
B	SO	BEARS SHEET NO. 16. REVISED NOV. 14, 1933.
B	SO/ST	BEARS SHEET 17. REVISION DATED 8/20/34. NOTE RECTO DIRECTS TO SEE REVISED DRAWING AS OF FEB. 1949.
C	RO/TE	ORIGINALLY DATED AUG 4, 1934. REVISED AUG 20, 1934. PLAN READS SHELF 135 NUMBER 30 SHEET NO.17. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE	ORIGINALLY DATED AUG 4, 1934. REVISED AUG 20, 1934. PLAN READS SHELF 135 NUMBER 30 SHEET NO.17. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ATTACHED WITH 135-031-[A] THRU [Z].
B	CL	EIGHT PAGE DOCUMENT WITH TWO SMALL BLUEPRINTS INCLUDED. PLAN 135-031-[A] IS A CARBON COPY OF PAGE TWO OF THIS DOCUMENT. FOUND IN FOLDER 166.

B	SO	NOTE STATES CHANGED NOV.1,1927. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].
B	SO	DOCUMENT ADRESSED TO PROP. OF THE LOCKS & CANALS ON THE MERRIMACK RIVER LOWELL, MASS. BEARS NOTE CONCERNING APPROVAL FOR CONSTRUCTION. ATTACHED VERSO TO PLAN 135-031-[C]. ATTACHED TO PLAN NO. 135-031-[A] THRU [Z].
B	FO	FIRST MADE FOR Y-285-FORM F CUR TRANS. INSPECTED MARCH 4,1932. BEARS K-4113414. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z]. GENERAL ELECTRIC FORM.
B	CL	PLAN GIVES THIRD ANGLE PROJECTION. REVISED: OUTLINE OF OIL SWITCH 600V, 4000 AMP. T.P.S.T. TYPE F, FORM K-25. SOLENOID MECHANISM & ACCESS. INSPECTED AUG.27,1918. ORIG. DRAWN APR.24,1915. LAST REVISION MADE SEPT.18,1919. BEARS GENERAL ELECT. CO. STAMP.
B	CL	ORIGINALLY DATED OCT.7,1929. LAST REVISION DATED FEB.2,1932. FIRST MADE FOR TYPE WF-1 CURRENT TRANSFORMER. BEARS K-4110321 RECTO. ATTACHED WITH 135-031-[A] THRU [Z].
B	CL	2-SIDED PLAN. "ALSO FOR RATING AS SHOWN ON THE REVERSE SIDE OF THIS PRINT." ORIGINALLY DATED DEC.22,1927. REVISED FEB.17,1931. BEARS K-1288973. ALSO BEARS NO.39 RECTO. ATTACHED WITH 135-031-[A] THRU [Z].BLUE LINE PRINT VERSO: MEMO OF SHIPMENT G.E. CO.
B	CL	ORIGINALLY DATED DEC.22,1927. REVISED FEB.17,1931. BEARS K-1288975. ALSO BEARS S20 RECTO. 2 SIDED PLAN. BLUE LINE PRINT VERSO: MEMO. OF SHIPMENT GENERAL ELECTRIC COMPANY. ATTACHED WITH 135-031-[A] THRU [Z].
B	CL	ORIGINALLY DATED JULY 16,1931. REVISED OCT.13,1931. BEARS K-4113351. ALSO BEARS S10 RECTO. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT, GENERAL ELECTRIC COMPANY. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].
B	CL	ORIGINALLY DATED MAY 25,1922. RETRACED NOV.13,1928. BEARS K-1248322. ALSO BEARS S11 RECTO. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC COMPANY. ATTACHED WITH 135-031-[A] THRU [Z].
B	CL	ORIGINALLY DATED NOV.27,1924. LAST REVISION MADE MARCH 20,1930. BEARS K-1284080. ALSO BEARS S13 RECTO. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].

		ORIGINALLY DATED AUG.17,1927. REVISION DATED MARCH 23,1931. BEARS K 1288783. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED
B	CL	WITH PLANS 135-031-[A] THRU [Z].
		ORIGINALLY DATED JAN.30,1918. LAST REVISION MADE APRIL 24,1929. BEARS K-1872353. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED
B	SO	TO PLAN NOS 135-031-[A] THRU [Z].
		ORIGINALLY DATED JAN.3,1918. LAST REVISION MADE APRIL 24,1929. BEARS K-1872352. ALSO BEARS NO.1 RECTO. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL
B	CL	ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].
		ORIGINALLY DATED AUG.21,1933. LAST REVISION MADE OCT.9.1933. ALSO BEARS P.H. 58. 2 SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED
B	FO/SO	WITH PLAN NOS. 135-031-[A] THRU [Z].
		ORIGINALLY DATED AUG.21,1933. LAST REVISION MADE OCT.9,1933. BEARS M6018799. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMO OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED WITH PLAN NOS.
B	FO/SO	135-031-[A] THRU [Z].
		ADDITIONAL NOTE DATED 8/25/33. BEARS 6018799. BEARS P.H.58. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-
B	FO/SO	031-[A] THRU [Z].
		ORIGINALLY DATED SEPT. 2,1922. LAST REVISION MADE OCT.23, 1929. BEARS NO. M-2620766 & P.H. 58. 2-SIDED PLAN. BLUE LINE PRINT VERSO:MEMO OF SHIPMENT G.E. CO. ATTACHED WITH PLAN
B	FO/SO	NOS. 135-031-[A] THRU [Z].
		ORIGINALLY DATED SEPT.20,1927. LAST REVISION MADE MAY 17,1929. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT G.E. CO. ATTACHED WITH PLAN NOS. 135-031-[A]
B	FO/SO	THRU [Z].
		LAST REVISION MADE OCT.8,1929. BEARS M-1835785. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL
B	FO/SO	ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].
		ORIGINALLY DATED FEB.4,1919. LAST REVISION MADE APRIL 23,1931. BEARS NO. M-1835787. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMO OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED
B	FO/SO	WITH PLAN NOS. 135-031-[A] THRU [Z].
		ORIGINALLY DATED FEB.4,1919. LAST REVISION MADE APRIL 23,1931. BEARS NO. M-1835787. 2-SIDED PLAN. BLUE LINE PRINT
B	FO/SO	VERSO: MEMO OF SHIPMENT GENERAL ELECTRIC CO.

B	FO/SO	BEARS P-6120118. ALSO BEARS P.H. 58. 2-SIDED PLAN. BLUE LINE PRINTVERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].
B	FO/SO	ORIGINALLY DATED JULY 16,1931. LAST REVISION MADE MAY 9,1933. BEARS P-6027598. BEARS P.H. 81 FOLDER #25. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED TO PLAN NOS. 135-031-[A] THRU [Z].
B	FO/SO	ORIGINALLY DATED APRIL 25,1933. LAST REVISION MADE AUG.16,1933. BEARS P-6128007 & P.H. 72. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Z].
B	FO/SO	BEARS P-6120118 & P.H. 58. 2-SIDE PLAN. BLUE LINE PRINT VERSO:MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO.
B	FO/SO	BEARS T 6038363 & P.H.72 RECTO. 2-SIDED PLAN. BLUE LINE PRINT VERSO: MEMORANDUM OF SHIPMENT GENERAL ELECTRIC CO. ATTACHED WITH PLAN NOS. 135-031-[A] THRU [Y].
B	TE/FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/FO	
B	SO/TE/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	

B	FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY IN ASSETTS DIVISION PLANS. P. L. & C. CONSECUTIVE INDEX GIVES DATE OF 3 AUG. 1933.
B		LISTED IN P. L. & C. CONSECUTIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY IN ASSETTS DIVISION PLANS.
B	SO	ORIGINALLY DATED DEC.29,1933. REVISED AUG.1,1934. BEARS E-16 RECTO.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	ORIGINALLY DATED FEB.1933. REVISED NOV. 21,1933 & TRANSMISSION LINES BROUGHT UP TO DATED AS OF MAY 1,1938.
C	TE/SO	PHOTOSTAT OF ORIGINAL. ORIGINAL PLAN DATED FEB.1933. TRANSMISSION LINES BROUGHT UP TO DATE MAY 1938.

B	CL	
C	FO	
B	SO	ORIGINALLY DATED SEPT.15, 1933. REVISED JULY 1, 1955.
C	SO	ORIGINALLY DATED SEPT.15, 1933. REVISED JULY 1, 1955. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	SO	
B	SO	ORIGINALLY DATED JULY 1912. REVISED JULY 24, 1918. MEMO TO ATRHUR T. SAFFORD FROM J.A. HUNNEWELL COPIED RECTO. DATED JULY 26, 1918.

B	SO	PLAN ORIGINALLY DATED JULY 29, 1937. REVISED 1941.
C	CL	
C	CL	
B	FO/TE	ORIGINALLY DATED FEB.1933. ALSO SHOWS ELECTRIC POWER TIE LINES DATED MAY 20,1933.
B	SO	BEARS DRAWING NO. E-23. BEARS "PRELIMINARY ONLY."
C	TE/SO	BEARS DRAWING NO. E-23. ALSO BEARS "PRELIMINARY ONLY." BLUEPRINT COPY WITH NEW WORK.

B	SO	BEARS SHEET 18.
B	FO/SO	BEARS DRAWING NO. B-1.
B	SO	BEARS SHEET B-2.
B	SO	BEARS DRAWING NO. B-3.
C	SO, TE	BEARS DRAWING NO. B-3. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	ST	ORIGINALLY DATED FEB.1, 1949. CORRECTED FEB.9, 1955. BEARS TABLE OF SUMMARY OF GENERATING CAPACITIES.

C	ST/FO/TE	THIS COPY WAS MADE BEFORE THE REVISIONS OF FEB. 9, 1955 WERE MADE TO THE ORIGINAL. BEARS TABLE OF SUMMARY OF GENERATING CAPACITIES. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	ORIGINALLY DATED FEB.1, 1949. CORRECTED FEB.9, 1955. BEARS TABLE OF SUMMARY OF GENERATING CAPACITIES. LOCATED AFTER COMPLELTION OF FORMAL INVENTORY.
C	CL	ORIGINALLY DATED JUNE 23, 1948; REVISIONS OF DEC. 1, 1948, MAY 21, 1949, AND FEB. 9, 1955. HAS TABLE OF SUMMARY OF GENERATING CAPACITIES. CLEARLY A COMPANION TO DRAWING 135-052. PLAN NO. DOES NOT EXTEND BEYOND 135-.
C	FO	FIRST DATED JUNE 23, 1948; REVS OF DEC.1,1948, MAY 21,1949. HAS TABLE OF SUMMARY OF GENERATING CAPACITIES. CLEARLY A COMPANION TO DRAWING 135-052. PLAN NO. READS 135-NO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. COPY MADE BEFORE 1955 REVS TO ORIGINAL
C	FO	FIRST DATED JUNE 23, 1948; REVISIONS OF DEC.1,1948, MAY 21,1949, AND FEB 9,1955. HAS TABLE OF SUMMARY OF GENERATING CAPACITIES. CLEARLY A COMPANION TO DRAWING 135-052. PLAN NO. DOES NOT EXTEND BEYOND 135-. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	OIGINALLY DATED AUG.1, 1939. REVISED FEB.14, 1951.
B	SO/ST	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	PLAN DETAILS LAND NORTH OF INTERSECTION OF PAWTUCKET, WARD & PERKINS STS. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO/FO	PLAN DETAILS LOTS ALONG HALL ST. FROM PERKINS ST. TO "TUCKER ST.," & ONE LOT AT THE S. E. CORNER OF PERKINS & WARD STS. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/MO	SUPPORT IS NOTED AS DRAFTING CLOTH ON CLOTH BACKED PAPER. BEARS NOS 5-54 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO/TE	BEARS NO. 11-14 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	PLAN DETAILS LOTS & STRUCTURES ALONG MOODY ST. FROM MERRIMACK CANAL TO WESTERN CANAL. NOTE STATES WAS COPIED FROM CITY ENGINEERS PLAN DEC 4/97. SEE ALSO PLAN NO. 135-4057. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	SURVEY SHOWS ONE "BRICK BUILDING," TWO "WOODEN BUILDINGS" & THE "AMERICAN HOUSE" ON EAST SIDE OF CENTRAL ST., SOUTH OF PAWTUCKET CANAL. BEARS 5-18 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE	PLAN DETAILS AREA BOUNDED BY JOHN, LEE, FRENCH & KIRK STS. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
B	SO/ST/LM /TE	REFER TO PLAN NOS. 135-4035, 135-4036, 135-4037,& 135-4038. FROM FOLDER LABELED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY W 3035-3038." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
B	SO	REFER TO PLAN NOS. 135-4034, 135-4036, 135-4037,& 135-4038. FROM FOLDER LABELED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY W 3035-3038." APPEARS TO HAVE HAD A SMALL SCALE LONGITUDINAL SECTION OF THE JOURNAL BOX CUT OUT.

B	SO/ST	REFER TO PLAN NOS. 135-4034, 135-4035, 135-4036,& 135-4038. FROM FOLDER LABELED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY W 3034-3038." APPEARS TO BE THE SAME PLAN AS C-118-341. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
B	SO/LM	REFER TO PLAN NOS. 135-4034, 135-4035, 135-4037,& 135-4038. FROM FOLDER LABELED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY W 3034-3038." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
B	SO	REFER TO 135-4034, 135-4035, 135-4036,& 135-4037. FROM FOLDER LABELED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY W 3034-3038." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	ANOTHER COPY OF THIS PLAN IS FOUND AT C-144-093. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/MO	BEARS NO. 22-B RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	BEARS NO. 22A RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE/ST	BEARS NO. 11-13 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/ST	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	PLAN SHOWS EASTERN CANAL WASTEWAY AT MERRIMACK WASTEWAY, ARMORY & KIRK STS. & LAND OF BOOTT COTTON MILLS. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/ST	BEARS NO. 11-18 RECTO. NOTE DIRECTS TO SEE COPY OF LETTER TO I.M. STORY DATED SEPT.4,1883. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE	PLAN SHOWS R. R. TRACK, MOODY ST. FEEDER GATE HOUSE, MERRIMACK CANAL, MERRIMACK ST., WENTWORTH BLDG., ANNE ST., & SHATTUCK ST. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	NOTE DIRECTS TO SEE ALSO PLAN NO. 3054 & 3040. BEARS PLAN NO. 11. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	SEE ALSO PLAN NOS. 4047, 3054 & 3040. BEARS PLAN NO.11. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/HO	PLAN DETAILS LAND ALONG "TILDEN ST.," NEAR COBURN ST. FROM "COUNTY RD." [MERRIMACK ST.] TO MERRIMACK RIVER. TREMONT, LAWRENCE & MERRIMACK MFG. CO. SHOWN IN PART. BEARS NO. 70 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO/FO	SEE ALSO PLAN NO. 135-4054. PLAN 142-102 IS ORGANICALLY RELATED TO PLAN 135-4051. CLEARLY, PLAN 142-102 WAS RENUMBERED OUT OF THE 135 SERIES AT SOME POINT. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE/ST	SEE ALSO 135-4051. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	PLAN SHOWS MILL NO.1 & NO.5 OF UNSPECIFIED CO. BEARS NOTE: "GENERAL DISCLAIMER MAY 25, 1895." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	PLAN SHOWS LAND BOUNDED BY MOODY, TREMONT & HANOVER STS. & LAND OF THE PROPS. OF TREMONT MILLS. THE LAND DETAILED BELONGS TO THE PROP'S. OF LOCKS & CANALS & THE LOWELL GAS LIGHT CO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO	SEE ALSO PLAN NO. 135-4057. ALSO BEARS NO. 3193. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	SEE ALSO 135-4057. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/ST	BEARS 11-2 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	BEARS 11-D RECTO. "END OF CURB STONE" OF SIDEWALK IS SHOWN, & DATED "JUNE 22,1893." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	BEARS NOTE RETURN TO DRAWER 5. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	PLAN DETAILS THE WESTERN SIDE OF WESTERN CANAL NORTH OF WHERE WORTHEN ST. USED TO CROSS THE CANAL. SEE ALSO PLAN NO. 135-4065. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE/LM	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO	BEARS NO. 11-5 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	BEARS NO. 68 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	PLAN DETAILS THE WESTERN BANK OF THE WESTERN CANAL. NOTE STATES, "USED THIS PLAN IN ESTIMATING AREA OF LOT LEASED TO JOHN & PATRICK H. RYAN." SEE ALSO PLAN NO. 135-4061. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	PLAN SHOWS LOT ON EASTERN SIDE OF MOODY ST. FROM HANOVER ST. S.E. TO TREMONT ST. BELONGING TO PROPS. OF LOCKS & CANALS. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	BEARS NOTE "TRACED IN OFFICE OF P.L. & C. OCT. 24,1896 W.E.B." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
CLOTH-BACKED PAPER	C	SOILED, STAINS, MOLD
C	SO/ST/MO	BEARS NOS. 11-4 & 94 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/ST	PLAN IS ON THE BACK SIDE OF A CHART, NOT FILLED IN, OF "OBSERVATIONS MADE AT THE MILLS OF THE LAWRENCE MANUFACTURING COMPANY, TO DETERMINE THE QUANTITY OF WATER DRAWN." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	PLAN SHOWS LAND BOUNDED BY NORTHERN CANAL, & PAWTUCKET ST. FROM SALEM ST. TO FRENCH ST. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO/FO/TE	PLAN DATED 1893. NOTES GLUED RECTO DATED MARCH 29,1895. SEE ALSO PLAN NOS 135-4072. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	SEE ALSO PLAN NO. 135-4072. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	LOCATED IN FOLDER 154. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO/TE	PLAN DETAILS THE LOT AT THE NORTHWESTERN CORNER OF LAKEVIEW AVE. & AIKEN ST. "SOLD TO ISABEL BENOIT JAN.31, 1896." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	FO/SO/ST	PLAN SHOWS LAND BETWEEN "RIVER" [LAKEVIEW AVE.] ST. & MERRIMACK RIVER TO WHAT APPEARS TO BE WEST ST. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/MO	ALSO BEARS NO. 11-12. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/TE	BEARS NO. 11 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO/TE/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/ST/TE	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FI	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	PLAN OF LAND SURVEYED ALONG NORTH SIDE OF STACKPOLE ST. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO/FO	LAND SHOWN IS BETWEEN EAST MERRIMACK & STACKPOLE STS. CONDITIONS OF SALE NOTED ON OCT.15, & NOV.5,1895. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"
C	SO	SEE ALSO PLAN NO. 135-4087. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED"

C	SO	SEE ALSO PLAN NO. 135-4085. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	SHOWS LAND FROM MERRIMACK RIVER SOUTH ALONG WALKER ST. BUILDINGS & SOME SURVEY NOTES ARE GIVEN. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	TE/SO	LOCATED WITH SHELF 139. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/TE	AREA SURVEYED MARCH 21,1851. SHOWS "LAND LEASED BY J. CLARK OF LOWELL GAS LIGHT COMPANY" AND "BRANCH RAILROAD TRACK OF PROPS LOCKS & CANALS." P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	BEARS NO. 4093. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	PLAN SHOWS LOT "LEASED TO E. A. WILSON TENANT AT WILL FROM MAY 1892." ALSO GIVES RENT. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
B	SO/FO/ST	BEARS NO. 11-14 AND NOTE READING "PART OF 129". P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".

C	SO/ST	"THIS SKETCH REDUCED FROM A PLAN IN THE CITY ENGINEERS OF-FILE." BEARS NO. 7 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/FO	NOTE DIRECTS TO SEE NEW SKETCH. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
CLOTH-BACKED PAPER	C	SOILED, MOLD
C	SO/MO	BEARS NOS 118 & 5-10. PLAN SHOWS ADDITIONS MADE MARCH 1,1882. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
B	SO/FO	BEARS NO. 4363-D, VERSO. FORMERLY NUMBERED 136-32 BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
B	SO	SEE ALSO PLAN 134-012-[B]. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	PLAN SHOWS LAND LEASED ON NORTH SIDE OF KYAN ST. FROM OCT. 1, 1892, MAY 1 & APR 1, 1895. PLAN QUOTES RENTS & VARIOUS NAMES. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".

CLOTH-BACKED PAPER	C	SOILED, STAINS
C	SO/ST	BEARS NO. 5-14 RECTO. BEARS SURVEY NOTES DATED 1877 & 1890. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/FO	PLAN DETAILS AREA BOUNDED BY PAWTUCKET CANAL , PAYNE, SCHOOL & SAUNDERS STS. SHOWS PROPOSED LINE OF CANAL. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/TE	PLAN SHOWS R. R. TRACKS AT SOUTHWEST CORNER OF PAWTUCKET CANAL & THORNDIKE ST. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	ORIGINAL LINE OF CANAL & "NEW WALL 1897" SHOWN. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	PLAN SHOWS LOTS BETWEEN WESTERN AVE. & PAWTUCKET CANAL WEST OF FLETCHER ST. ALSO GIVES RENT & TAXES PER YEAR. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/TE	BEARS NO. 11-17 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	PLAN SHOWS "NEW [APPLETON] MILL ALONG SIDE OF JACKSON ST. BETWEEN REVERE & PEARL STS. BEARS NO. 5-6 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".

CLOTH-BACKED PAPER	C	SOILED
C	SO	PLAN SHOWS AREA IN VICINITY OF SWAMP LOCKS DAM. PLAN ALSO SHOWS R. R., PAWTUCKET, MERRIMACK & HAMILTON CANALS, & LINE OF [HAMILTON] CANAL AFTER ALTERATION. BEARS NO. 97 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/TE	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
B	SO/ST	ONE LOT WAS SURVEYED IN APRIL 1887, THE REST WERE "TAKEN FROM A PLAN...DATED OCT. 30,1879. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	BEARS 11-3A RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO/FO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".

C	SO/FO/TE	PLAN SHOWS LAND ALONG EAST SIDE OF MOODY ST. & DUTTON ST., FROM DUTTON ST. TO "TREMONT ST." SHOWS PROPOSED R. R. BETWEEN DUTTON & TREMONT STS. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	TWO TYPE WRITTEN LETTERS & A BLUEPRINT ARE GLUED, RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	GLUED TO THE PLAN IS A TYPEWRITTEN DOCUMENT RESTRICTING BASEMENT USE OF A PARTICULAR LOT. A BLUEPRINT IS ALSO GLUED TO PLAN, OF A NOTE SIGNED BY THE CONSTABLE. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
B	SO	P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	BEARS NO. 939 RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 135 LAND PLANS ARE "NOT INDEXED".
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES. PROPRIETORS OF THE LOCKS & CANALS, LOWELL, MASS. ELCTRICAL INTERCONNECTION. ADDITIONAL TIE LINES BETWEEN BOOTT MILLS & L. I. D.
C	FO/SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES. BEARS ITEM NO. 103.

C	TE/SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES. BEARS ITEM NO.103.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES. ORIGINALLY DATED JULY 17,1933. REVISED AUG.1,1933. ADDITIONAL TIE LINES BETWEEN BOOTT MILLS & L.I.D.
C	TE/FO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	CL	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	CL	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	CL	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.

C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	CL	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES. DISTRIBUTION OF CURRENT BETWEEN OLD TIE LINE & 2-NEW TIE LINES BETWEEN L.I.D. & BOOTT MILLS.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	CL	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO/HO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
C	SO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO	LOCATED IN FOLDER ENTITLED ELECTRICAL INTERCONNECTION 1933 SKETCHES.
B	SO/TE	P. L. & C. CONSECUTIVE INDEX OF DRAWINGS GIVES A DATE OF 1920. THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/SO/TE	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	TE/SO	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/SO/TE	AREA SOUTH OF FRENCH STREET BORDERED BY BRIDGE & ANNE ST. THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C. NOTE STATES FOR GENERAL LOCATION SEE MILL YARD PLAN OF WATERWAYS OF THE TREMONT MILLS & LAWRENCE SECTION. THESE SECTIONS ARE FOR PLAN 136-037.

CLOTH-BACKED PAPER	C	LOSSES, TEARS, SOILED
C	RO/LM/SO/TE	THIS PLAN NO USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA NORTH OF MARKET ST. & WEST OF DUTTON ST. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO/FO	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	TEARS
C	RO/TE	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. AREA BORDERED BY LEWIS, MECHANIC & DUTTON STS. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
CLOTH-BACKED PAPER	C	SOILED, STAINS
C	RO/SO/ST	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BORDERED BY CABOT, MERRIMACK & TILDEN STREETS. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".

B	SO	THIS PLAN NO. USED TWICE BY P.L.& C. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	THIS PLAN NO. USED TWICE BY P.L.& C. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	SOILED, TEARS
C	RO/SO/TE	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA IN VICINITY OF WESTERN CANAL. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C. ATTACHED IN 4 PAGE DOCUMENT. MAY HAVE BEEN NUMBERED 154-008 ORIGINALLY.

CLOTH-BACKED PAPER	C	SOILED
C	RO/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BETWEEN MERRIMACK, CABOT AND CLARK STS. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO/TE	BEARS SHEET NO. 1. MAY HAVE BEEN NUMBERED 154-005 ORIGINALLY.
B	CL	BEARS SHEET NO. 2. MAY HAVE BEEN NUMBERED 154-006 ORIGINALLY.
B	CL	BEARS SHEET NO. 3. MAY HAVE BEEN NUMBERED 154-007 ORIGNIALLY.
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	TEARS
C	RO/TE	THIS PLAN NO. USED TWICE BY P.L.& C. AREA NORTH OF WILLIE ST. FOUND STORED IN COPPER TUBE WITH PADLOCK. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".

B	SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	SOILED
C	RO/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA WEST OF ADAMS ST. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
A		THIS PLAN NO. WAS USED TWICE BY P.L.& C. LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/TE/LI/SO	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. AREA NORTHWEST OF DUTTON ST. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".

B	SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK.
CLOTH-BACKED PAPER	C	FOLDS, TEARS
C	RO/FO/TE/LI	THIS PLAN NO.USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA NORTH OF MIDDLESEX ST. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/TE/SO	THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN WEST OF DUTTON ST. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
C	CL	ORIGINAL APPEARS TO HAVE BEEN GIVEN SHELF NO. 138. THIS PLAN NO. WAS USED TWICE BY P.L.& C. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF SEPT. 1927.

CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/SO/LI/TE	PLAN SHOWS AREA BETWEEN APPLETON AND HAMILTON CANALS. THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	FO/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
CLOTH-BACKED PAPER	C	SOILED, TEARS
C	RO/SO/LI/TE	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA WEST OF CENTRAL ST. & BORDERED BY JACKSON ST. ON THE NORTHERLY BORDER. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
CLOTH-BACKED PAPER	C	SOILED

C	RO/SO	THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA SOUTH OF MIDDLESEX ST. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	TE/FO/SO /LM	PLAN GIVES DECEMBER 1909 & JANUARY 1919 AND ADDITIONAL INFO. RELATIVE TO WIDENING OF INNER CANAL & NEW WALL. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. THIS PLAN NO. USED TWICE BY P.L.& C.
B	SO/FO	NOTE STATES DUPLICATE COPY. THIS COPY HAS NO DATES BECAUSE THE PORTION OF THE PLAN THAT WOULD HAVE THEM HAS BEEN CUT OFF. DATES FROM COPY 1 APPLY. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. THIS PLAN NO. USED TWICE BY P.L.& C.
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C. PHOTO NEGATIVE OF PLAN IN FOUR PARTS CLIPPED TOGETHER. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1928.
CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/SO/TE	THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA IN VICINITY OF MERRIMACK AND CONCORD RIVER JUNCTION. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".

CLOTH-BACKED PAPER	C	TEARS, SOILED
C	RO/SO/LI/TE	STORED IN COPPER TUBE WITH PADLOCK. SHOWS AREA BETWEEN APPLETON & HAMILTON CANAL WEST OF TILDEN ST. BORDERED BY SUFFOLK MFG. CO. & TREMONT MILLS ON NORTH.THIS IS THE ORIGINAL PLAN, OF WHICH 136-017-[02] IS A COPY.
CLOTH BACKED PAPER	C	SOILED, TEARS
C	RO/SO/TE	FOUND WITH 136-017-[01]. SHOWS AREA BET. APPLETON & HAMILTON CANAL WEST OF TILDEN. BORDERED BY SUFFOLK & TREMONT MILLS ON NORTH. NOTE READS: "THE ORIGINAL PLAN NO. 17 WAS LOST IN 1879 OR 1880." PLAN 136-017-[01] IS THAT ORIGINAL; ITS DATE APPLIES.
CLOTH BACKED PAPER	C	SOILED, TEARS

C	RO/SO/LM/TE	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN IN VICINITY OF NORTHERN CANAL. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	LM/TE/SO	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	SOILED
C	RO/SO	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN SOUTH OF DUTTON ST., BORDERED BY APPLETON ST. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO/FO	DOWNSTREAM VIEW. FORMERLY PLAN NO. 154-111 WHICH CAN BE SEEN BENEATH NEW NUMBER. THIS PLAN NO. WAS USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	SOILED

C	RO/SO	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA SOUTH OF ROCK ST. & PAWTUCKET ST. BEARS "2-3-4-5-20-23" IN GRAPHITE RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	UPSTREAM VIEW. FORMERLY PLAN NO. 154-111. MAY ALSO HAVE BEEN 154-067 WHICH SEEMS TO BE VISIBLE BENEATH NUMBER 136-20. A BLUEPRINT COPY WILL BE FOUND AT 154-112-[COPY 1]. THIS PLAN NO. WAS USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	SOILED, TEARS
C	RO/SO/TE	FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BETWEEN FLETCHER & MECHANIC ST. & BORDERED BY PAWTUCKET CANAL. PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. BEARS DRAWING NO. 2 RECTO.

CLOTH BACKED PAPER	C	SOILED, TEARS
C	RO/SO/TE	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BORDERED BY COOLIDGE HALL & TILDEN STS, & NORTHERN CANAL. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO/FO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. BEARS DRAWING NO. 2 RECTO.
CLOTH BACKED PAPER	C	SOILED
C	RO/SO	FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA SOUTH OF MERRIMACK RIVER & BORDERED BY BRIDGE ST. ON WEST SIDE. BEARS LIGHT "74" IN GRAPHITE RECTO. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".

C	CL	ATTACHED IN 49 PG. DOC. WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. BEARS DRAWING NO. 3.
B	CL	THIS PLAN NO. WAS USED TWICE BY P.L.& C. BEARS DRAWING NO. 4 RECTO.
CLOTH BACKED PAPER	C	SOILED, TEARS, LOSSES
C	RO/LM/TE /SO	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN SHOWS AREA WEST OF WARREN ST. ALSO DEPICTS VARIOUS MILLS & DATES OF INDENTURE. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
C	CL	ATTACHED IN 49 PG. DIC. WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. BEARS DRAWING NO. 4 RECTO.

CLOTH BACKED PAPER	C	LOSSES PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BETWEEN THORNDIKE & CENTRAL ST. SHOWS JUNCTION OF PAWTUCKET, WESTERN, & HAMILTON CANAL. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136
C	RO/LM	LAND PLANS ARE "NOT INDEXED".
		BEARS DRAWING NO.1 RECTO. DATE OF ORIGINAL LITHO. ON WHICH THIS NEW WORK WAS DRAWN IS JULY, 1912. THIS PLAN NO. USED
B	FO/SO/TE	TWICE BY P.L.& C.
A		LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
		BEARS DRAWING NO. 5 RECTO. THIS PLAN NO. WAS USED TWICE BY
B	FO/SO	P.L.& C.

CLOTH BACKED PAPER	C	SOILED, TEARS PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA EAST OF VARNUM AVE. & RIVERSIDE ST. SHOWS BRANCHING OF MERRIMACK RIVER & NORTHERN CANAL. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136
C	RO/TE/SO	LAND PLANS ARE "NOT INDEXED".
B	SO	BEARS DRAWING NO.1 RECTO. THIS PLAN NO. WAS USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	SOILED, TEARS AREA BETWEEN RIVERSIDE ST. AND MERRIMACK RIVER. STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. USED TWICE BY P.L.&
C	RO/SO/TE /FX	C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
C	SO	THIS PLAN NO. USED TWICE BY P.L.& C. ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. BEARS DRAWING NO.1 RECTO.

		THIS PLAN NO. USED TWICE BY P.L.& C. BEARS DRAWING NO. 2
B	SO	RECTO.
CLOTH BACKED PAPER	C	LOSSES, TEARS
		AREA WEST OF RIVER ST. BEARS :"89-88-87". STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT
C	RO/LM/TE	INDEXED".
		ATTACHED IN 49 PG. DOC. WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. BEARS DRAWING
C	SO	NO. 2. THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	FOLDS, TEARS
		AREA NORTH OF MERRIMACK RIVER & EAST OF BRIDGE ST. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136
C	RO/FO/TE	LAND PLANS ARE "NOT INDEXED".

B		THIS PLAN NO. USED TWICE BY P.L.& C. THIS PLAN IS ACTUALLY LOCATED AT 154-046. AS PER THE CONSECUTIVE INDEX OF DRAWINGS, P. L. & C. INTENDED TO MOVE THIS PLAN TO THIS LOCATION BUT DID NOT FOLLOW THROUGH.
B	CL	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	SOILED, TEARS
C	RO/SO/TE	AREA WEST OF WALKER & EAST OF WILLIE ST. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C.

CLOTH BACKED PAPER	C	SOILED, TEARS, LOSSES
C	RO/SO/TE /LM	AREA SOUTH OF FIRST ST. THIS PLAN NO USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	SO	THIS PLAN NO. USED TWICE BY P.L.& C.
CLOTH BACKED PAPER	C	SOILED
C	RO/SO	PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN SOUTH OF DUTTON ST. BORDERED BY APPLETON ST. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".
B	FO/SO	BEARS JOB 64 C, SHEET NO. 2, DRAWER NO.11. PROJECT BY JOHN A. STEVENS.
B	SO/FO	JOHN A. STEVENS, ENGINEER. LOCATED AFTER COMPLETION FOR FORMAL INVENTORY.

B	FO/SO	NOTE STATES PRACTICALLY APPROVED IN DETAIL BY HIRAM F. MILLS DEC.16,1912. BEARS JOB NO. 64 C.
B	FO/SO	NOTE STATES PRACTICALLY APPROVED IN DETAIL BY HIRAM F. MILLS DEC.16,1912. BEARS JOB NO. 64 C.
B	CL	PLAN 140-044 OS A BLUEPRINT COPY OF THIS PLAN BEFORE THE PLAN NUMBER WAS ENTERED INTO THE TITLE BLOCK.
B	CL	BLUEPRINT COPIES OF THIS PLAN WERE USED AT 140-043-[COPY 1] & [COPY 2].
B	CL	NOTE DIRECTS: FOR SECTION AT A-B-C & D SEE PROFILE & SECTION SHEET OF JUNE 10,1927 IN PLAN 136-003.
C	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. NOTE STATES THIS SCHEME PUT ON BLUE PRINT, BACKGROUND TRACING IN SHELF 136-37. NOTE STATES FOR SECTION A,B,C & D SEE SHEET OF JUNE 10,1927.
C	FO	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. ATTACHED TO 136-37-[A]. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
C	SO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. ATTACHED TO 136-037-[A]. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. NOTE STATES THIS SCHEME PUT ON BLUE PRINT BACKGROUND, TRACING IN SHELF 136-37. SEE SHEET OF JUNE 10,1927.
C	SO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO. ATTACHED TO 136-037-[C].

C	TE/SO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO.136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. NOTE STATES THIS SCHEME PUT ON BLUE PRINT BACKGROUND TRACING IN SHELF 136-37.
C	SO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. NOTE STATES THIS SCHEME PUT ON BLUEPRINT, BACKGROUND TRACING IN SHELF 136-37.
C	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. ATTACHED TO 136-037-[F].
C	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. NOTE STATES THIS SCHEME PUT ON BLUE PRINT. BACKGROUND TRACING IN SHELF 136 #37.
B	CL	
B	FO/TE/SO	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO. COPIES OF THREE PLANS GLUED TOGETHER TO FORM ONE. THE ORIGINAL PLAN NOS. ARE AS FOLLOWS: 154-40,49 & 49-[A]. PLOTTED DATES RANGE FROM 1902 TO 1939.
B	TE/FO	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO.
B	SO	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO. NOTE DIRECTS TO SEE SHEETS 1871 TO 1876 IN FIELD BOOKS 20 & 23. PLAN SHOWS CONTOURS OF MERRIMACK RIVER NORTHWEST OF AIKEN ST. & SOUTHEAST OF COLONIAL AVE. ATTACHED IN 49 PG. DOC. WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.

B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-039 FOR ADDITIONAL INFO.
B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	FO/HO/TE	UNTITLED DIAGRAM. ATTACHED IN 49 PG. DOC. WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1914, 1920, 1933, AND 1940 FOR THIS SERIES.
B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. ORIGINAL PLAN DATED FEB.1933. ADDITIONAL INFO. DATED NOV.21,1933 & CORRECTED JULY 1928.
B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. ORIGINAL PLAN DATED FEB.1933. ADDITIONAL INFO. DATED NOV.21,1933.

B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO.
B	FO	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	FO/SO/TE /LM	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO.136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO. NOTE STATES THERE IS NO TRACING OF THIS PLAN. THIS IS THE ORIGINAL.
B	FO/TE	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO 136-39 FOR ADDITIONAL INFO. BEARS SHELF 142 FROM ORIGINAL STICKER.
B	CL	ATTACHED IN 49 PG. DOC. WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1914, 1920, 1933, AND 1940 FOR THIS SERIES.

B	CL	ATTACHED IN 49 PG. DOC. WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1914, 1920, 1933, AND 1940 FOR THIS SERIES.
B	CL	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO 136-39 FOR ADDITIONAL INFO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1914, 1920, 1933, AND 1940 FOR THIS SERIES.
B	CL	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. BEARS FIL NO. 406.
B	CL	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1914, 1920, 1933, AND 1940 FOR THIS SERIES.
B	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	CL	ATTACHED IN 49 PAGE DOCUMENT. BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO.
B	CL	HARVARD UNIVERSITY COURSE 6L. WATER POWER ENGINEERING HYDRO-ELECTRIC DEVELOPMENT AT LOWELL, MASS.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1914, 1920, 1933, AND 1940 FOR THIS SERIES.

B	TE/SO	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO PLAN NO.136-39 FOR ADDITIONAL INFO. COPIES OF THREE PLANS GLUED TOGETHER TO FORM ONE. THE ORIGINAL PLAN NOS. ARE AS FOLLOWS: 154-44, 53 & 53-[A]. DATES PLOTTED RANGE FROM 1902 TO 1939.
B	SO	BEAR NO. 1, RECTO.
B	SO	BEARS NO. 2, RECTO.
B	SO	BEARS NO. 3, RECTO. SUGGESTED JUNE 7,1920.
B	SO	BEARS NO. 4, RECTO.
B	SO	BEARS NO. 5, RECTO.
B	SO	BEARS NO. 6, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	

B	SO	
B	SO	
B	SO/FO	
B	SO	
B	SO	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	LOCATED IN FOLDER ENTITLED DRAWINGS & DIAGRAMS FOR A. T. SAFFORD'S 1941 CENTRAL STATION WATER POWER REPORT 136-40. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	BEARS NO. 62, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	RATIO OF KW. HOURS TO TOTAL MILL POWERS. GIVES MISCELLANEOUS LIMITATIONS FOR AUG.1939 & 200% LIMITATION FOR MAY 1940. BEARS NO. 59, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	RATIO OF K.W. HRS. TO TOTAL MILL POWERS. BEARS NO. 53, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	BEARS NO. 56, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	BEARS NO. 50, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	BEARS NO. 44, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	BEARS NO. 41, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	BEARS NO. 41, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	UNTITLED PLAN LOCATED IN FOLDER ENTITLED, DRAWINGS & DIAGRAMS FOR A.T. SAFFORD'S 1941 CENTRAL STATION WATER POWER REPORT 136-040. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1935, 1936, 1937, 1939, AND 1940 FOR THE DATE ON THIS DRAWING.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	UNTITLED DIAGRAM WHICH GIVES INFO. RELATIVE TO WATER POWER TAX IN DOLLARS PER THOUSAND, CONSTRUCTION COSTS INDEX 1913-100, LOWELL WATER WORKS COAL PRICES. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO	NOTE STATES PLAN CORRECTED OCT. 8, 1955 WITH NEW CHANGES.
B	SO/TE/ST	UNTITLED PLAN OF LAND AND LOTS BETWEEN MERRIMACK CANAL AND PAWTUCKET CANAL CENTERED ON LOWELL MACHINE SHOP. BEARS NO. 9, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/ST	UNTITLED PLAN OF LAND & LOTS BETWEEN MARKET ST. & MERRIMACK RIVER. BEARS NO. 12 RECTO. BEARS NO. 4012, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/SO	LOCATED IN FOLDER ENTITLED LAND PLANS OF LOCKS & CANALS. BEARS NO. 4041,,AND NO. 14, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/FX /TE	UNTITLED PLAN OF LAND IN LOWELL. BEARS NO. 11 RECTO. BEARS NO. 4011, RECTO. BEARS NO. 2 RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/TE	UNTITLED PLAN OF LAND IN LOWELL. BEARS NO. 4013 AND NO. 13, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	UNTITLED PLAN OF LAND BETWEEN EAST MERR. ST. & MERRIMACK RIVER, EAST MERR. ST. & ANDOVER ST., AS WELL AS P.L.& C. RESERVOIR LOT 86, BETWEEN FAIRMONT & BELMONT AVE. BEARS NO. 4019 AND NO. 19, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/ST	UNTITLED PLAN OF LAND WHICH LIES BETWEEN MERRIMACK RIVER & RUNS THE LENGTH OF STACKPOLE ST. & CORRIGAN AVE. BEARS NO. 4018 AND NO. 18, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FX	UNTITLED PLAN OF LAND TAKEN BY STATE FOR HIGHWAY WIDENING & AREA OF LAND BORDERING MERRIMACK RIVER. SCALE IS NOTED AS FOLLOWS: 1"=40', H1"=40', V1"=10'. BEARS NO. 4017 AND NO. 17, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	UNTITLED PLAN OF LAND BET. FIRST ST. & MERR. RIVER. CITY ASSESSED AREA=233,949 SQ. FT. INCLUDES ALL OF 96-D & PORTION OF 96-B TO EASTERLY SIDE OF WATERWORKS RIGHT OF WAY. BEARS NO. 4016 AND NO. 16, RECTO.CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	UNTITLED PLAN OF LAND WHICH LIES BETWEEN FIRST ST. & MERRIMACK RIVER. PLAN SHOWS LAND TAKEN FOR STATE FROM CITY & PARCEL ONE P.L.& C. TO CITY OF LOWELL. BEARS NO. 4015 AND NO. 15 RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	BEARS NO. 4010 AND NO. 10, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	UNTITLED PLAN OF LAND BORDERING PAWTUCKET CANAL. BEARS NO. 8 RECTO. ALSO BEARS NO. 4008 RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/LI	PLAN OF LAND LOCATED ON BOTH SIDES OF PAWTUCKET CANAL & CONVEYED TO VARIOUS COMPANYS. BEARS NO. 4007 AND NO. 7, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/LM /TE	UNTITLED PLAN OF LAND IN LOWELL. BEARS NO. 4006 AND NO. 6, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	UNTITLED PLAN OF LAND BORDERING MERRIMACK RIVER INCLUDING 1949 LAYOUT OF STATE HIGHWAY. BEARS NO. 5 RECTO. ALSO BEARS NO. 4005 RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	UNTITLED PLAN OF LAND NORTH OF THE MERRIMACK RIVER. BEARS NO. 4004 AND NO. 4, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	UNTITLED PLAN OF LAND WEST OF MERRIMACK RIVER. BEARS NO. 4003 AND NO. 3, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BEARS NO. 4002 AND NO, 2, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	UNTITLED PLAN OF LAND ON EITHER SIDE OF MERRIMACK RIVER. SPECIFICALLY, NORTHERN SIDE OF RIVER WHICH SHOWS 1949 LAYOUT OF STATE HIGHWAY. BEARS NO. 4001 AND NO. 1, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/TE/FO /LM	PLAN SHOWS BOULEVARD, LOCATION OF PIPES & PROPOSED RIVER LINE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/TE/FO /LM	PLAN SHOWS BOULEVARD, LOCATION OF PIPES & PROPOSED RIVER LINE. PLAN IN 2 PIECES. LOCATED IN P.H. 024.
B	RO/TE/FO	4 PAGE DOCUMENT. SHEET NO.1. BEARS NOTE VERSO: BOULEVARD FIRST ST. 1917. SEE ALSO PLAN NO. 137-020 & 022.
A		SEE PLAN NOS. 137-020 & 021.
A		

B	FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. P. L.. & C. CARD INDEX GIVES DATE OF 1919.
C	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED IN FOLDER 146.
C	FO	
C	FO	
C	FO	
C	FO	
C	SO/FO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/FO	PLAN MADE FEB. 1954, CORRECTED TO 1958. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	LOCATED IN FOLDER 165. SEE 138-[038].
C	SO/TE	THIS IS THE ORIGINAL PLAN FROM WHICH BLUEPRINT 138-022 WAS MADE BEFORE THE REVISIONS OF 27 SEPTEMBER 1947.
C	SO/ST	ORIGINALLY DATED OCTOBER, 1888. BEARS NOTE "OFFICE COPY", RECTO.
C	SO	ORIGINAL PLAN FROM WHICH THIS COPY WAS MADE WAS DATED JANUARY, 1917.
C	CL	
C	CL	

C	CL	
C	SO	ORIGINALLY DATED FEB. 1912.
C	SO/FO/LO	COPY OF 138-003 WITH NEW WORK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/TE	THIS IS COPY OF 138-005-A WITH NEW WORK.
C	SO/FO/LO	THIS IS COPY OF 138-005-A WITH NEW WORK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/LO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO/TA	
C	FO/SO/TA	ORIGINALLY DATED NOVEMBER, 1890. NEW WORK IS DATED AS SEPT. 1957.
B	SO/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THE ULTIMATE ORIGINAL FROM WHICH THIS COPY WAS MADE IS PLAN 138-036.
C	SO/TE	

C	SO	ORIGINALLY DATED FEB. 1912.
C	SO/TE	ORIIGINALLY DATED NOVEMBER, 1890.
C	SO/ST/TE/ LO/TA	WHILE THE ORIGINAL DATE ON THE COPY IS DEC., 1916, THE INFORMATION SHOWN ON THE PLAN IS CLEARLY MUCH LATER BEING AT LEAST FROM THE 1930s.
C	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/TE/FO	ROLLED IN COPPER TUBE WITH PADLOCK. ORIGINALLY DATED FEB 1917. P.L.& C. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1911.
B	SO/FO/TE	ORIGINALLY DATED FEB. 1900. REVISED TO MARCH 1911.
B	RO	ORIGINALLY DATED FEB. 1912, REVISED TO APR. 1922. ROLLED IN COPPER TUBE WITH PADLOCK.

		THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE THIS PLAN WAS SUBSTANTIALLY ALTERED. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/LO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1911.
		ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE
C	RO	BEFORE THE ORIGINAL WAS ALTERED.
		THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE THIS PLAN WAS SUBSTANTIALLY ALTERED. IT IS A PALIMPSEST. ORIGINALLY DATED DEC. 1916. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1911. LOCATED AFTER COMPLETION OF
B	FO/SO/LO	FORMAL INVENTORY.
		ROLLED IN COPPER TUBE WITH PADLOCK. ORIGINALLY DATED DEC.
C	RO	1916.
C	RO	
		ROLLED IN COPPER TUBE WITH PADLOCK. ORIGINAL DATED JUNE 1917. THIS COPY WAS MADE BEFORE THE ORIGINAL, 138-005-A,
C	RO	WAS ALTERED.
C	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/TE /LO	ORIGINAL DATED JUNE 1927. THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE THIS PLAN WAS SUBSTANTIALLY ALTERED. IT IS A PALIMSEST. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1911. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	THIS IS THE ORIGINAL FROM WHICH BLUEPRINT 138-005 WAS MADE BEFORE THIS ORIGINAL WAS SUBSTANTIALLY ALTERED. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
B	RO	ROLLED IN COPPER TUBE WITH PADLOCK. THIS PLAN IS DIFFERENT THAN THOUGH VERY SIMILAR TO PLAN NO. 138-013. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1911.
B	SO/FO/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/TE	THIS PLAN WAS COPIED FROM PLAN 138-00-6-{A] BEFORE IT WAS MODIFIED BY THE ADDITION OF THE VARIOUS TENANT NAMES INCLUDED ON IT.
B	FO/SO	ORIGINAL DATE OF 1926. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	ORIGINAL DATE OF 1926. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/HO/TE	THIS IS THE ORIGINAL PLAN NO. 138-007 WHICH WAS MODIFIED AFTER 1922 BY P.L.& C. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1910.
B	RO	ROLLED IN COPPER TUBE WITH PADLOCK. [MARCH 10, 1910 CORRECTED TO JAN. 1921]. CORRECTED TO APRIL, 1922. THIS COPY WAS MADE FROM PLAN NO. 138-007 BEFORE THE MODIFICATIONS OF 1952.
C	SO/ST	THIS PLAN NO. WAS USED TWICE BY P.L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. NOTE READING "SEE TRACING OF ABOVE" MUST REFER TO PLAN NO. 138-008-[A]. COPY 1 SEEMS TO HAVE BEEN MADE BEFORE CERTAIN PENCIL WORK WAS ADDED TO THIS ORIGINAL.

C	RO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. L.& C. CARD INDEX GIVES DATE OF FEB. 1921. ROLLED IN COPPER TUBE WITH PADLOCK.
C	SO/TE/FO /HO/LO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. NOTE READS: "NOTES IN RED SHOW USE OF BLDGS. ON DEC. 11, 1917. CHANGES BEING MADE CONSTANTLY." THIS COPY WAS MADE BEFORE COPY 1 AND BEFORE THE ORIGINAL ITSELF WAS ALTERED IN 1920.
B	RO	ORIGINALLY DATED JAN. 1917. CORRECTED TO APR. 1922. ROLLED IN COPPER TUBE WITH PADLOCK. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 1911.
B	SO/LO/TE	THIS IS A COPY OF 138-010-[A]-[B] BEFORE THE MODIFICATIONS OF 1952. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO/LO	THIS PLAN WAS TRACED EITHER FROM THE ORIGINAL OR FROM COPY-1. IT IS NOT THE ORIGINAL ITSELF. ORIGINALLY DATED 1942, REVISED TO 1952. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	ORIGINALLY DATED APRIL 1, 1920. THE 1952 CORRECTED DATE ENTERED IN PENCIL. THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE IT WAS SUBSTANTIALLY ALTERED. P.L.& C. CONS. INDEX GIVES DATE OF APRIL, 1912. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	ROLLED IN COPPER TUBE WIITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED. IT FAINTLY BEARS THE APRIL 1, 1920, DATE AND THE CORRECTED 1922 DATE WAS ENTERED IN PENCIL ON THE ORIGINAL AT THE TIME THIS COPY WAS MADE.

C	FO/SO/TA	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
		DATED DEC. 1909, CORRECTED TO JAN. 1919, JAN. 1922, AND FEB. 1954. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1909.

B	SO/FO/LO	DATED NOV. 1909, CORRECTED TO JAN. 1919 AND AUG. 1947. THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE THE AMENDMENTS OF 1947. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 1909.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS COPY WAS MADE BEFORE ORIGINAL DRAFTING CLOTH PLAN 138-013 WAS AMENDED IN 1919 & 1947.
C	RO	ORIGINAL DATED NOV. 1909 & CORRECTED TO JAN.1919. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE ORIGINAL DRAFTING CLOTH PLAN 138-013 WAS AMENDED IN 1947. BLUEPRINT VERSION OF 138-013-[COPY 3]
C	RO/FO/TE	ORIGINAL DATED NOV. 1909 & CORRECTED TO JAN.1919. THIS COPY WAS MADE BEFORE ORIGINAL DRAFTING CLOTH PLAN 138-013 WAS AMENDED IN 1947. BLACK LINE VERSION OF 138-013-[COPY 2]
B	SO/TE/LO	THIS IS THE ORIGINAL FROM WHICH COPIES 1 & 2 WERE MADE BEFORE THIS PLAN WAS SUBSTANTIALLY ALTERED. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC 1909.
C	RO/TE	ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
C	RO	ORIGINALLY DATED NOV. 1909; CORRECTED TO JAN. 1919. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.

B	SE	THE DATE HAS BEEN ERASED. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE	THIS BLUEPRINT SHOWS SUBSTANTIAL ADDITIONS TO 138-015 BUT NOT THE COLORED INK NOTES FOUND ON 138-015. FOUND ROLLED IN COPPER TUBE WITH PADLOCK.
B	SO	DATED DEC. 1909, CORRECTED TO JAN 1919 & FEB. 1954. THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE AMENDMENTS OF 1954. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1909.
C	CL	THIS COPY WAS MADE BEFORE THE AMENDMENTS OF 1919 & 1947 WERE MADE TO DRAFTING CLOTH PLAN 138-016. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
C	RO	DATED DEC. 1909 & CORRECTED TO JAN 1919. ROLLED IN COPPER TUBE WITH PADLOCK.THIS COPY WAS MADE BEFORE THE AMENDMENTS OF 1947 WERE MADE TO DRAFTING CLOTH PLAN 138-016.
B	FO/SO	DATED DEC. 1909, CORRECTED TO JAN 1919 & NOV. 1952. THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE AMENDMENTS OF 1952. IT IS A PALIMPEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1909.
C	FO	THIS COPY WAS MADE BEFORE THE AMENDMENTS OF 1919 & 1952 WERE MADE TO THE ORIGNIAL DRAFTING CLOTH PLAN 138-017. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE	ROLLED IN COPPER TUBE WITH PADLOCK. DATED DEC 1909 & CORRECTED TO JAN 1919. THIS COPY WAS MADE BEFORE THE AMENDMENTS OF 1952 WERE MADE TO THE ORIGNIAL DRAFTING CLOTH PLAN 138-017.

B	SO/FO	DATED DEC. 1909, CORRECTED TO JAN. 1919 & MAY 1954. THIS IS THE ORIGINAL FROM WHICH COPY 1 AND 2 WERE MADE BEFORE MODIFICATIONS OF 1919 & 1954. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P. L.& C.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1909. SCALE AS PER ORIGINAL, 1"=40'. PLAN NO. USED TWICE BY P. L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P. L.& C. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1909. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
C	RO	DATED DEC. 1909, CORRECTED TO JAN. 1919. ROLLED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P. L.& C. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
B	FO/SO/LO	DATED DEC. 1909, CORRECTED TO JAN. 1919 & MAY 1952 (ERASED). THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE THE AMENDMENTS OF 1952. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	DATED DEC. 1909 & CORRECTED TO JAN. 1919. ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
B	RO/TE	DATED DEC. 1909, JAN. 1919, MAR. 1921, CORRECTED TO MAY 1926. THIS IS THE ORIGINAL FROM WHICH COPY 1 WAS MADE BEFORE AMENDMENTS OF 1926. IT IS A PALMIPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE	PLAN DATED DEC. 1909 & JANUARY 1919, CORRECTED TO MARCH 1921. ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.

C	SO/FO	PLAN DATED DEC. 1909, JAN. 1919, MARCH 1921, AND MAY, 1926..
C	CL	PLAN NO. USED TWICE BY P. L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	PLAN NO. USED TWICE BY P. L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	PLAN NO. USED TWICE BY P. L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	DATED JAN. 1919, MAR. 1932 (ERASED). THIS IS THE ORIGINAL FROM WHICH COPY 1 WEREMADE BEFORE AMENDMENTS OF 1919 & 1932. IT IS A PALIMPSEST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1909.
C	FO/ST	THIS COPY WAS MADE BEFORE THE MODIFICATIONS OF 1919. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. THIS COPY WAS MADE BEFORE THE ORIGINAL WAS ALTERED.
C	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	ROLLED IN COPPER TUBE WITH PADLOCK. P.L.& C. ORIGINAL DATE WAS NOVEMBER 1909. THIS COPY SHOWS REVISIONS OF JANUARY 1919. CONSECUTIVE INDEX GIVES DATE OF DEC. 1909. THE REVISED ORIGINAL FROM WHICH THIS COPY WAS MADE IS AT 138-[043].
A		
B	SO	THE ORIGINAL OF THIS PLAN IS PLAN NO. 138-036 BEFORE ITS MODIFICATIONS OF 1906 AND 1908. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	PLAN NO. USED TWICE BY P.L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	FO/SO	PLAN NO. USED TWICE BY P.L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4209 (3), RECTO. THIS PLAN MAY HAVE BEEN MISNUMBERED BY P.L.& C., SEE 134-028-[A].
B	CL	BEARS FILE NO. 1002. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/LO	ORIGINALLY DATED FEB. 19, 1904; CORRECTED TO JAN. 19, 1906 & JAN. 1, 1908. PLAN NO. 138-025 IS A COPY OF THIS PLAN BEFORE THE MODIFICATIONS OF 1906 & 1908. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO	THIS PLAN, ALTHOUGH UNNUMBERED BY L.& C., IS CLEARLY PART OF THE 139 SERIES OF PLANS. LOCATED IN FOLDER 162.
C	SO	THIS PLAN, ALTHOUGH UNNUMBERED BY L.& C., IS CLEARLY PART OF THE 139 SERIES OF PLANS. LOCATED IN FOLDER 166. COLORED PENCIL OUTLINES THE AREAS RECEIVING WATER COLOR ON THE ORIGINAL PLAN.
C	FO	LOCATED IN FOLDER 139. THIS PARCEL WAS COVERED UNDER LEASE # 5721 ACCORDING TO PLAN NO. 134-119. IT IS ILLUSTRATED IN CONTEXT ON PLAN NO. 139-072.
C	SO/TE	CORRECTED TO FEB. 1942 AND THEN REVISED TO AUG. 1942. SHOWS AREAS LEASED BY P.L. & C. TO SACO-LOWELL SHOPS, LOCKS AND CANALS LAND, AND WATERWAYS AND WATER MAINS MAINTAINED BY P.L. & C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	NO. 3 PLAN OF FIVE PLANS.
C	SO	PLAN NO. 4 OF FIVE PLANS.

B	TE	NOTE STATES CONTOURS ARE FROM NOTES TAKEN IN DEC.1900.
B	SO	LOT # 84.
B	SO	SHOWS NORTHERN CANAL WALL IN VICINITY OF AIKEN & PERKINS STS. RED LINE ESTABLISHED JUNE 6,1900 BY H. F. MILLS. OFFSETS PLOTTED FROM NB 8 P.60 JUNE 1900. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1898.
B	FO/SO	BEARS NO. 5-17 VERSO. LOT # 84.
B	SO/ST/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FX/TE/SO	BEARS NO. 505 COVERED OVER RECTO. LOT # 8.
B	TE/SO	BEARS NO. 990 COVERED OVER RECTO. LOTS # 8, 9, 11, 12, 13.
B	SO/TE	PLOTTED FROM A SURVEY MADE IN 1887. PLAN ALSO SHOWS SECTIONS OF WALL & DIRECTS FOR FURTHER DETAILS SEE PLAN NO. 1888. LOTS # 5, 6, 7, 13, 14, 15, 16, 17.
B	SO/TE	BEARS NO. 992 COVERED OVER RECTO. LOTS # 3 & 4.
B	TE/SO	BEARS NO. 1587 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES SAME DATE INFORMATION AS TITLE.
B	SO/ST	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.

B	SO	PLAN NO. WAS USED TWICE IN THE L.& C. PLANS INDEX. BEARS PLAN NO. 370 RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO/SO/TE /ST	BEARS NO. 34 COVERED OVER VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	BEARS NO. 1580. LOTS # 15, 16, 17.
B	SO	BEARS NO. 1688 COVERED OVER RECTO.
B	FO/SO/TE /LM	
A		TITLE AND PLAN NUMBER CROSSED OUT AND NOT RENUMBERED ON CONSECUTIVE INDEX OF DRAWINGS. P. L. & C. MAY HAVE DISCARDED THIS PLAN. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	BEARS DRAWER NO. 39 RECTO.
B	SO	

B	FO/SO	ORIGINALLY DATED DEC. 26,1924. BUILDINGS CORRECTED & BROUGHT UP TO DATE OF JULY 19,1933.
B	SO/FO	
B	SO/FO	
B	SO/FO	
B	SO/FO	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS NOTES DATE OF ORIGINAL FROM WHICH THIS PLAN WAS TRACED WAS 28 MAY, 1913.
B	SO	

B	SO	
B	SO	
B	CL	ORIGINALLY DATED APRIL 1921. ADDDITIONAL CONTOURS TAKEN OCT. 30,1924. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 30 OCT. 1924.
B	FO/SO	
B	SO/FO	SEE ALSO PLAN NO. 139-039-A.
B	SO/FO	SEE ALSO PLAN NO. 139-039. THIS IS AN INCOMPLETE HAND-DRAWN COPY OF 139-039. DESCRIBED IN CONSECUTIVE INDEX OF DRAWINGS AS "BROWN PAPER DRAWING SAME AS ABOVE [I.E. NO. 39]."
B	SO	NOTE DIRECTS TO: SEE PLAN NO. 120 SHELF 134 FOR LEASED AREA TO CITY OF LOWELL, JULY 1, 1938. (SEE ALSO 139-031 & 134-120).
B	SO	

B	FO	L. & C. CARD INDEX AND COSNECUTIVE INDEX GIVE DATE OF SEPT. 1928. REFERENCES TO THE CROSS ST. SURFACE DRAIN ARE FOUND IN THE HANDWRITTEN NOTES. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	
B	SO	
B	SO	
B	CL	BEARS NO. 175/114 & NO. 3457, RECTO. SURVEYED BY BROOKS JORDAN & GRAVES.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO	NOTE DIRECTS TO "SEE REVISED PLAN DEC.1944."
B	SO	
B	CL	
B	SO	ORIGINALLY DATED OCT.1941. REVISED MAY 1,1945.
B	SO	
B	SO	
B	FO/SO	

B	CL	
B	SO	
B	TE	NOTE STATES "ORIGINAL SUPPOSED TO BE FILED."
B	CL	
B	SO	
B	SO	
B	SO	
B	SO	

B	FO/SO/HO	ORIGINALLY NUMBERED 132-18 AND LATER RENUMBERED BY P. L. & C.
B	SO	ORIGINALLY NUMBERED 132-19 AND LATER RENUMBERED BY P. L. & C.
B	SO	
B	SO	ORIGINALLY NUMBERED 132-21 AND LATER RENUMBERED BY P. L. & C.
B	SO	
B	HO/FO	CONSECUTIVE INDEX OF DRAWINGS IDENTIIFIES THIS AS A "PHOTOSTATIC COPY" OF 139-046-022-A.

B	SO	
B	SO	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ORIGINALLY NUMBERED 132-26 AND LATER RENUMBERED BY P. L. & C.
B	SO	ORIGINALLY NUMBERED 132-27 AND LATER RENUMBERED BY P. L. & C.
B	SO	ORIGINALLY NUMBERED 132-28 AND LATER RENUMBERED BY P. L. & C.
B	SO	

B	TE/SO	ORIGINAL DATED MARCH 1825. COPIED NOV.7,1945. ORIGINAL PLAN MADE BY GEORGE BALDWIN. NOTE STATES FOR COPY OF DEED SEE P.L.& C. BK. 1-P.98, ALSO RECORDED IN MIDDLESEX REGISTRY OF DEEDS, BOOK 269, PAGE 1.
C	CL	ORIGINAL DATED MARCH 1825, COPIED NOV.7,1945. NOTE DIRECTS TO "SEE DEED DATED JAN.2,1826 TO THE PROPRIETORS OF THE LOCKS & CANALS. FOR COPY OF DEED SEE P.L.& C. BK. 1-P.98, ALSO RECORDED IN MIDDLESEX REGISTRY OF DEEDS, BOOK 269, P.1."
C	RO,TE,FO	ORIGINAL DATED MARCH 1825, COPIED NOV.7,1945. NOTE DIRECTS TO "SEE DEED DATED JAN.2,1826 TO THE PROPRIETORS OF THE LOCKS & CANALS. FOR COPY OF DEED SEE P.L.& C. BK. 1-P.98, ALSO RECORDED IN MIDDLESEX REGISTRY OF DEEDS, BOOK 269, P.1." WHITE CHALK NOTES.
C	CL	ORIGINAL DATED MARCH 1825, COPIED NOV.7,1945. NOTE DIRECTS TO "SEE DEED DATED JAN.2,1826 TO THE P.L.& C.. FOR COPY OF DEED SEE P.L.& C. BK. 1-P.98, ALSO RECORDED IN MIDDLESEX REGISTRY OF DEEDS, BOOK 269, PG.1.
C	CL	ORIGINAL DATED MARCH 1825, COPIED NOV.7,1945. NOTE DIRECTS TO "SEE DEED DATED JAN.2,1826 TO THE PROPRIETORS OF THE LOCKS & CANALS. FOR COPY OF DEED SEE P.L. & C. BK. 1-P. 98, ALSO RECORDED IN MIDDLESEX REGISTRY OF DEEDS, BOOK 269, PG. 1."
B	SO	
B	CL	BEARS DESCRIPTION OF LOT # 43 AS WELL AS DRAWING.
B	SO	

B	SO	ORIGINALLY NUMBERED 132-34 AND LATER RENUMBERED BY P. L. & C.
B	SO	
B	SO	
B	SO	CONSECUTIVE INDEX GIVES DATE OF 22 SEPT., 1928.
C	SO	ORIGINALLY DATED AUG. 17, 1942. REVISED OCT. 14, 1942. COPIED FROM BLUEPRINT 139-047-[COPY 1] DEC. 22, 1952. A BLUEPRINT COPY OF THIS PLAN WAS USED AT 150-135.
B	CL	
B	CL	WITH REVISIONS OF OCT. 14, 1942.
B	CL	BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS.
C	CL/FO	BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS. ADDITIONAL NOTE STATES: REVISED AREA MAY 1,1948.
B	TE	BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS.

B	FO	NOTE DIRECTS TO SEE PLAN DATED APR. 20,1945. NOTE STATES CRAYON ADDITIONS PUT ON JAN. 8,1946. NOTE STATES, "WE CERTIFY THAT THIS SURVEY WAS MADE IN ACCORDANCE WITH LAND COURT INSTRUCTIONS, DEC.23,1944. BROOKS, JORDAN & GRAVES, CIVIL ENGRS. LOWELL, MASS.
B	FO/SO/TE	
B	FO	
B	CL	BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS. BEARS NO. 4448, RECTO.
B	SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	NOTE STATES CONVEYED & DEED GIVEN JUNE 7,1946. BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS.

B	SO/FO	ORIGINALLY DATED JUNE 11,1946. REVISED JULY 10,1946. BEARS CERTIFICATE NO. 1514.
A		
B	SO	PLAN DIRECTS TO SEE TRACING [PLAN NO. 139-090] MADE JUNE 8, 1954 FOR COMPLETE INFORMATION.
B	FO/SO/LM	
C	SO	THIS PLAN WAS UNNUMBERED BY L.& C. BUT IS OBVIOUSLY AN EASTWARD EXTENSION OF 139-060.
B	SO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	LM/FO/SO	NOTE STATES COPY GIVEN TO WM. C. DOHERTY AUG. 26,1921.
B	FO/TE/SO	BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS.
B	SO	BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS.
B	SO	
B	CL	
B	TE/SO	
B	CL	
B	SO	PLAN NOS. 139-073 AND 139-094 ARE BLUEPRINT COPIES OF THIS PLAN.

C	EXCELLENT	OTHER COPIES GIVEN PLAN NOS. 139-073 AND 139-094. LOCATED AFTER COMPLETION OF FORMAL INVENTORY PROJECT.
C	EXCELLENT	OTHER COPIES GIVEN PLAN NOS. 139-073 AND 139-094. LOCATED AFTER COMPLETION OF FORMAL INVENTORY PROJECT.
B	CL	
A		
B	SO	

B	SO	BLUEPRINT COPY OF ORIGINAL DRAFTING CLOTH PLAN NO. 139-069. OTHER BLUEPRINT COPIES ARE FOUND AT 139-094, 139-069-[COPY 1], AND 139-069-[COPY 2].
B	SO	
B	SO	
B	CL	
B	CL	

C	CL	NOTE STATES DIMENSIONS ON PARCEL NO. 2 NOT SHOWN.
B	SO	
B	FO	
B	CL	
B	CL	
B	CL	

B	SO/FO	
B	SO	
B	SO	
B	SO	
B	SO	ORIGINALLY DATED MAY 10,1956. NOTE STATES THIS PLAN IS A COPY OF A PORTION OF A PLAN THAT WAS RECORDED FOR SALE OF P.L.& C. LAND TO THE DEL REALTY TRUST. COPIED NOV. 22,1957.

B	FO/SO	
B	SO/FO	
B	CL	TRACED COPY REFERRED TO ON PLAN NO. 139-059.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	FO/TE	

B	CL/FO	
B	CL/FO	BLUEPRINT COPY OF DRAFTING CLOTH PLAN NO. 139-069. OTHER BLUEPRINT COPIES ARE FOUND AT 139-069-[COPY 1], AND 139-069-[COPY 2].
B	CL	NOTE STATES ORIGINAL RECORDED.
B	CL	NOTE STATES ORIGINAL RECORDED.

B	CL	NOTE STATES ORIGINAL RECORDED.
B	SO	
B	SO	
B	SO	
B	CL	
B	CL	

B	CL/FO	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	TE	
B	SO	
B	TE/LM/SO	
B	SO	ORIGINALLY DATED MAY 6,1955. REVISED MAY 27,1955.
C	CL	ORIGINALLY DATED MAY 6,1955. REVISED MAY 27,1955.
C	CL/TE	THIS COPY WAS MADE FROM THE ORIGINAL DRAWING BEFORE THE ORIGINAL WAS REVISED ON MA7 27, 1955. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		ORIGINALLY DATED MAY 6, 1955. REVISED MAY 27, 1955. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO	[...] PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER LOWELL, MASS. ORIGINALLY DATED MAY 6,1955. REVISED JUNE 1 & 7,1955.
C	FO/SO	[...] PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER LOWELL, MASS. BEARS REDUCED COPY. ORIGINALLY DATED JUNE 1 & 7,1955.
B	CL	[...] PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER LOWELL, MASS. PHOTO NEGATIVE. ORIGINALLY DATED MAY 31,1955. REVISED JUNE 1 & 7,1955.
B	CL	COMPILED PLAN. TAKEN FROM VARIOUS SOURCES. ORIGINAL RECORDED.
B	SO	REDUCED COPY OF PLAN BY P.A. TOLMAN DATED JUNE 10, 1954. W.S. CROCKER C.E. 46 CORNHILL, BOSTON OCTOBER 15, 1954. COPIED FROM "REDUCED COPY" JAN.12, 1956. BUILDING & PROPERTY TRANSFERRED TO STEAM ASSOCIATES INC. LOWELL, MASS.
C	CL	REDUCED COPY OF PLAN BY P.A. TOLMAN DATED JUNE 10, 1954. W.S. CROCKER, C.E. 46 CORNHILL BOSTON OCTOBER 15, 1954. BUILDING & PROPERTY TRANSFERRED TO STEAM ASSOCIATES INC. LOWELL, MASS.

B	FO	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	ATTACHED IS A BLUE LINE PRINT OF THE BRIDGE ADDITION AT COURIER CITIZEN CO. GIVEN THE PLAN NUMBER 139-113-[A].
B	FO/SO	ATTACHED TO 139-113. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	TE	
C	SO/ST	ATTACHED TO 140-[074]-[A]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BASICALLY, THIS IS A NOTE ATTACHED TO THE DRAWING.
C	FO/SO	ATTACHED TO 140-[074]-[B]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. REFER TO 140-[074]-[B] FOR A PROBABLE DATE FOR THIS PLAN.
B	SO/FO	BEARS NO. 1103 VERSO.

B	FO/SO	"PLAN IS A COPY OF 140-004." NOTE STATES, SOME ADDITIONS WERE MADE TO THIS TRACING IN 1893, CONSISTING OF SUNDRY NOTES, ETC. COPY OF THIS GIVEN TO MR. MILLS JUNE 17,1893. BEARS NO. 1106 COVERED OVER VERSO. CONSECUTIVE INDEX GIVES DATE OF JUNE 1, 1893.
B	FO/SO/ST /TE	
B	FO/SO	BEARS NO. 1106, COVERED OVER, VERSO. SEE PLAN 140-007 FOR SECTIONS.
B	SO	
B	SO/TE	NOTE STATES "THESE SECTIONS GO WITH PLAN OF LOWER LEVEL OF PAWTUCKET CANAL DATED 1885" (PLAN NO. 140-004). ATTACHED IN 7 PAGE DOCUMENT. BEARS 1106B TO 1106H, COVERED OVER, RECTO.
B	FO/SO	SEE PLAN NO. 140-004 FOR PLAN VIEW. BEARS NO. 1108 COVERED OVER, VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE BUT NOTES RELATIONSHIP TO PLAN 140.004, THUS, THE DATE OF PLAN 140-007 SHOULD BE ABOUT 1895.
B	LM/FO/SO /TE	BEARS NO. 1107 COVERED OVER, RECTO.
B	LM/FO/SO /TE	BEARS NO. 1107 COVERED OVER, RECTO.
B	SO/TE/FO	HALF OF THIS PLAN IS A BLUEPRINT, THE OTHER HALF IS GRAPHITE & INK ON PAPER.

B	FO/SO	BEARS NO. 1110 COVERED OVER, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/FO	NOTE STATES THIS PLAN SHOWS THE WALL OF CANAL AT BOTTOM. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	NOTE STATES THIS PLAN SHOWS THE WALL OF CANAL AT BOTTOM. BEARS NO. 1122 VERSO. THE LEFT HALF OF THIS PLAN IS A TRACING OF 140-012.
B	FO/SO	BEARS NO. 1123 COVERED OVER, VERSO.
B	FO	BEARS NO. 1169, VERSO.
B	FO/SO	BEARS NO. 1112, VERSO.
B	FO/TE/SO /FX	BEARS NO. 1113 COVERED OVER, RECTO. FOR LOCATION OF THESE SECTIONS SEE PLAN NO. 140-016.
B	SO	NOTE STATES COPY GIVEN TO MR. MILLS JUNE 26, 1893. BEARS NO 1609 COVERED OVER, RECTO. FOR LOCATION OF THESE SECTIONS SEE 140-016.

B	SO	NOTE STATES COPY GIVEN TO MR. MILLS JUNE 26, 1893. BEARS NO. 1120 COVERED OVER, VERSO.
B	FO/SO/STE	"THIS PLAN BELONGS IN OFFICE OF LOCKS & CANALS LOWELL, MASS." PLAN GIVES INFORMATION RELATIVE TO PAWTUCKET CANAL DISTANCE BETWEEN GAUGES. ATTACHED TO 140-020-[B]. BEARS NO. 1114 COVERED OVER, RECTO.
B	FO/SO/ST	UNTITLED PLAN WHICH GIVES SAME INFORMATION AS 140-020-[A], TO WHICH IT IS ATTACHED. PLAN APPEARS TO BE UNFINISHED. LISTED IN P. L. & C. CARD INDEX AND IN CONSECUTIVE INDEX OF DRAWINGS BUT WITHOUT DATE. DATE SHOULD BE ABOUT MAY, 1893, LIKE ITS COMPANION.
B	SO	NOTE DIRECTS TO SEE ACCOMPANYING PLAN 1114, THIS BEING PLAN NO. 140-020, FOR LOCATIONS OF THESE SECTIONS. BEARS NO. 1117 COVERED OVER RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE, HOWEVER, DATE SHOULD BE ABOUT MAY, 1893, LIKE ITS COMPANION.
B	FO/SO/TE	BEARS NO. 1132 VERSO.
B	LM/SO/TE	2 SHEETS. SHEET NO. 1, RECTO, NOTE STATES LOOKING DOWN STREAM SEE H. C. DAGGETT'S NOTE BOOK NO. 5 LOCATION ON PLAN 1132. BEARS NO. 1122 COVERED OVER RECTO. FOR LOCATION SEE PLAN 140-022.
B	SO	ATTACHED TO 140-024-[A]. NOTE STATES: TRACING GIVEN TO MR. MILLS SEPT. 24,1893.
B	FO/SO	ATTACHED TO 140-024. ADDITIONAL NOTE DATED OCT.16,1893. BEARS NO. 1131 COVERED OVER RECTO.

B	SO	BEARS NO. 1149 RECTO. PLAN 141-009 IS A COPY OF THIS PLAN WITH NEW WORK ADDED IN 1898.
B	SO	TWO DATES GIVEN FOR PHOTOS, SEPT.13, 1896 & JUNE 20, 1897. CONSECUTIVE INDEX GIVES DATE OF 1896 & 1897. P. L. & C. PHOTO COLLECTION NUMBERS REPRESENTED HAVE BEEN IDENTIFIED ARE 251, 253, 256, 257, 258, AND 259.
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	SO	[...] WHICH IS AT P.C. SHOWN IN TRANSIT BOOK 8, P.15. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE
B	SO	LISTED IN BOTH THE P. L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX GIVES DATE OF 1906.
B	SO	LISTED IN BOTH THE P. L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX GIVES DATE OF 1906.

B	FO/SO	
B	SO	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1910.
B	SO	SURVEYED IN 1918 BY DURFEE & McFAYDEN.
B	SO	ORIGINALLY DATED JUNE 9, 1920. NOTE STATES BROUGHT UP TO DATE SEPT.29, 1920. REVISED JULY 26, 1920. CONSECUTIVE INDEX NOTES "REVISED TO SEPT. 29, 1920".
B	SO	
B	SO	2 PAGE DOCUMENT.
B	SO	

B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	ST/SO	
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	SCALES ARE NOTED AS FOLLOWS: 1/4"=1',1"=10',1"=250'. BEARS FILE 1012.2, RECTO. COPY OF DRAFTING CLOTH PLAN NO. 136-036.
B	CL	SCALES ARE NOTED AS FOLLOWS: 1/4"=1',1"=10',1"=250'. BEARS FILE 1012.2, RECTO. COPY OF DRAFTING CLOTH PLAN NO. 136-036.
B	SO/FO/TE	THIS IS A COPY OF 136-035 BEFORE THE PLAN NUMBER WAS ENTERED INTO ITS TITLE BLOCK.
B	FO	

B	FO/SO	SCALES ARE NOTED AS FOLLOWS: 1"=40',H1"=40',V1"=10'.
B	SO/FO	LOCATED WITH SHELF 153.
B	SO	PART OF 27 PAGE DOCUMENT.
B	SO	PART OF 27 PAGE DOCUMENT. SECTION TAKEN LOOKING DOWNSTREAM.
B	SO	SECTIONS TAKEN LOOKING DOWNSTREAM.
B	CL	ATTACHED IN 27 PAGE DOCUMENT.
B	SO	PART OF A 27 PAGE DOCUMENT. ABOUT 50 FT. ABOVE EASTERLY END OF MILL NO. 4. NOTE STATES SECTION CHANGED.

B	CL	ATTACHED IN 27 PAGE DOCUMENT.
B	SO/TE	PART OF A 27 PAGE DOCUMENT. GIVES DATA FOR OCT. 9, 1933 & AUG. 22, 1943. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF OCTOBER, 1933.
B	CL	PART OF A 27 PAGE DOCUMENT. SEE ALSO PLAN NOS. 140-054, 140-054-B, & 140-054-C.
B	SO	PART OF A 27 PAGE DOCUMENT. U.S.G.S. PRICE METER. SEE ALSO PLAN NOS. 140-054, 140-054-A, & 140-054-C.
B	CL	PART OF A 27 PAGE DOCUMENT. U.S.G.S. PRICE METER. SEE ALSO PLAN NOS. 140-054, 140-054-A, & 140-054-B.
B	SO	
B	SO	PART OF 27 PAGE DOCUMENT.
B	SO	PART OF A 27 PAGE DOCUMENT. "ABOUT 50' ABOVE EASTERLY END OF MILL NO.4."
B	SO	PART OF A 27 PG. DOCUMENT.

B	CL	PART OF 27 PAGE DOCUMENT. U.S.G.S. PRICE METER. SEE ALSO PLAN NOS. 140-054-A, 140-054-B, & 140-054-C.
B	CL	SEE ALSO FILE # 1156.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	NOTE STATES LOCATION OF SECTIONS ARE SHOWN ON ANOTHER PLAN.
B	TE/SO	CLIPPED TOGETHER IN 27 PG. DOCUMENT. PLAN NO. WAS USED TWICE BY L.& C.
B	ST/SO	NOTE DIRECTS TO SEE TRACING DATED FEB.15, 1955. ADDITIONAL NOTES STATE BLACK LINES WERE COPIED FROM P. L.& C. PLAN C-143-127, A COPY OF WHICH ACCOMPANIES AN INDENTURE MEMO. PLAN NO. WAS USED TWICE BY L.& C.
B	FO	NOTE DIRECTS TO SEE BROWN PAPER DRAWING FEB. 8, 1955.

B	FO/SO	BEARS FIG. A-7 RECTO. ALSO BEARS 33041-Z-11804. PLAN NUMBER USED TWICE BY L. & C.
C	TE/SO	CLIPPED TOGETHER IN 27 PG. DOCUMENT. BEARS FIG. A-7 RECTO. ALSO BEARS 33041-Z-11804. PLAN NUMBER USED TWICE BY L. & C.
C	TE	CLIPPED TOGETHER IN 27 PG. DOCUMENT.
C	CL/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. SEE 162-065 FOR RACES 4, 5, & 6.
C	CL	CLIPPED TOGETHER IN 27 PG. DOCUMENT. NOTE STATES: SECTIONS TAKEN LOOKING DOWNSTREAM.
C	CL	CLIPPED TOGETHER IN 27 PG. DOCUMENT.
C	SO	CLIPPED TOGETHER IN 27 PG. DOCUMENT.
C	SO	CLIPPED TOGETHER IN 27 PG. DOCUMENT.
C	SO	CLIPPED TOGETHER IN 27 PG. DOCUMENT.
C	CL	CLIPPED TOGETHER IN 27 PG. DOCUMENT.
C	SO	CLIPPED TOGETHER IN 27 PG. DOCUMENT.

A		
A		
A		
A		
C	SO/TE/MO	ALSO SHOWS "NEW PIPE, 1867."
C	SO/TE/LI/MO/FO	
C	SO/TE	
C	SO/TE/MO	PLAN SHOWS ANDOVER STREET MAIN, CITY PIPE, & NEW PIPE LAID OCT.1867.
C	SO/TE/LM	BEARS MAINTAINENCE NOTE CONCERNING STOP GATE CONNECTING LOCKS & CANALS PIPE WITH CITY PIPE DATED MARCH 2, 1875.

C	SO/TE/MO	
PAPER	C	SOILED, STAINS
C	SO/ST	
PAPER	C	SOILED, TEARS, FOLDS
C	SO/TE/LI/FO	
A		
B	FOLDS, TORN, SOILED	
A		
A		

A		
C	ST	SHOWS SECTIONS 15+28 TO 14+12. DATES AND DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET.
C	CL	SHOWS SECTIONS 13+87 TO 12+62. DATES AND DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET. SEE PLANS 141-[069] OR 141-[070] FOR TITLE INFORMATION.
C	CL	SHOWS SECTIONS 12+37 TO 12+12. DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET. SEE PLANS 141-[069] OR 141-[070] FOR TITLE INFORMATION.
C	CL	SHOWS SECTIONS 11+87 TO 10+87. DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET. SEE PLANS 141-[069] OR 141-[070] FOR TITLE INFORMATION.
C	CL	SHOWS SECTIONS 10+62 TO 9+62. DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET. SEE PLANS 141-[069] OR 141-[070] FOR TITLE INFORMATION.
C	CL	SHOWS SECTIONS 9+37 TO 8+37. DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET. SEE PLANS 141-[069] OR 141-[070] FOR TITLE INFORMATION.
C	CL	SHOWS SECTIONS 8+12 TO 7+12. DATA ARE NEARLY IDENTICAL TO 141-023 BUT THIS BLUEPRINT COPY WAS CLEARLY MADE FROM FROM SOME OTHER MASTER SHEET.
A		
B	TE/SO	BEARS NO. 1115 TAPED OVER, RECTO. FOR LOCATION OF SECTIONS SEE 140-020. CONTAINS SECTIONS 1-8.

B	TE/SO	BEARS NO. 1116 TAPED OVER, RECTO. FOR LOCATION OF SECTIONS SEE 140-020. CONTAINS SECTIONS 9-12.
B	TE/LM	NOTE STATES TO SEE ACCOMPANYING PLAN FOR LOCATION OF SECTIONS. FOR LOCATION OF SAME SEE PLAN NO.140-020. BEARS NO. 1118 TAPED OVER, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE, HOWEVER, DATE SHOULD BE ABOUT 1895, LIKE ITS COMPANION.
B	FO/TE/SO	
B	FO/SO	BEARS NO. 1127 VERSO.
B	FO/SO	
B	FO/SO/TE /ST	BEARS 1124 VERSO. DATE APPEARS TO HAVE BEEN ALTERED FROM 1873 TO 1893.
B	SO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	BEARS NO. 1134 COVERED OVER RECTO.
B	SO	NOTE STATES CONTOURS ON THIS PLAN ARE FROM SURVEY OF JULY 1898, SEE LEVEL BOOK 15 PP.46-59. BEARS NO. 1142 BENEATH PLAN NUMBER LABEL, RECTO. THIS IS A COPY OF 140-025 WITH NEW WORK ADDED.

B	SO/TE	NOTE DIRECTS TO SEE LOCATION ON SHEET 1, NO. 11-141. BEARS NO. 1144 VERSO.
B	FO/TE/SO /FX	SCALES ARE NOTED AS FOLLOWS: H1"=20', 1"=20', 1"=4'& 2"=1'. BEARS SHEET NO.1 RECTO.
B	SO	BEARS NO. 1146 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1135 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1136 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1137 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1138 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1139 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1140 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1141 TAPED OVER, RECTO.
B	SO/TE/LM	THE HEIGHTS OF WATER USED IN FIGURING THE AREAS OF THESE SECTIONS WERE TAKEN FROM THE SLOPE OF THE CANAL OCT. 17, 1895, WITH A QUANTITY OF 1778 CUBIC FEET PER SECOND. BEARS NO. 1142 TAPED OVER, RECTO.

B	SO	NOTE RECTO STATES, SENT TRACING OF THIS PLAN TO H.F. MILLS, DEC. 13,1893. BEARS NO. 1145 COVERED OVER RECTO.
B	FO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/ST/ LM	
B	FO/SO	BEARS NO. 1195 VERSO. FOR SECTIONS 1 TO 6 SEE NO.31 SHELF 141.
B	FO/FX/TE	ALSO FOR THE FLETCHER ST. & THE LOWELL & NASHUA R. R. BRIDGES. BEARS NO. 1192 RECTO. ALSO BEARS NO. 1102 COVERED OVER VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/SO /FI	APRIL, MAY AND SEPTEMBER, 1896.

B	FO/TE	BEARS NO. 1189 COVERED OVER, VERSO.
B	FO/SO	BEARS NO. 1184 COVERED OVER, RECTO.
B	FO/SO	BEARS NO. 1186 VERSO. NOTE DIRECTS TO SEE NEW PLAN C.B.L. 4-27-14.
B	FO/SO/FX	BEARS NO. 1187.
A		
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/LM/TE	BLUEPRINT OF 144-006-[A] DATED MAY 1901, WITH NEW WORK.
B	SO/TE	NOTE DIRECTS TO SEE TRANSIT BOOK NO. 8. PAGES 98-101. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1901.
B	SO	NOTE DIRECTS TO SEE BOOK 108 PAGES 155-163. BEARS NO. 1891-8 BENEATH PLAN NO. LABEL, RECTO.

B	SO	NOTE DIRECTS TO SEE BOOK 108 PAGES 155-163. BEARS NO. 1891-7 CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	NOTE DIRECTS TO SEE BOOK 29, PAGES 54-67. BEARS 1891-6 CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	NOTE DIRECTS TO SEE BOOK 29, PAGES 54-67. BEARS 1891-5 CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	NOTE DIRECTS TO SEE BOOK 108, PAGES 154-163. BEARS 1891-4 CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	NOTE DIRECTS FOR NOV.24, 1901 SEE BOOK 29, PAGES 54-67, & FOR NOV.2, 1901 SEE BOOK SEE BOOK 108 PAGES. 155-163. BEARS NO. 1891-3 CROSSED OUT, RECTO.
B	SO	NOTE DIRECTS TO SEE BOOK 29, PAGES. 54-67. BEARS NO. 1891-2 CROSSED OUT, RECTO.
B	SO	NOTE DIRECTS TO SEE BOOK 29, PAGES 54-67. BEARS 1891-1 CROSSED OUT, RECTO.

B	SO	NOTE DIRECTS TO SEE BOOK 29, PAGES 54-67. BEARS 1891 CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE/SO	
B	FO/TE/SO	
B	FO/SO	
C	FO/SO	
B	FO/TE	NOTE STATES THE AREAS NOTED HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPS. LOCKS & CANALS. BLUEPRINT OF PLAN NO. P.H. 081-009.

B	FO/TE	NOTE STATES THE AREAS NOTED HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPOS LOCKS & CANALS. BLUEPRINT OF PLAN NO. P.H. O81-005.
B	FO/SO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	SO	

B	FO/SO	
B	FO/SO	PLAN SHOWS ACTUAL CONDITION FOR APRIL 1926 & SEPT.1928.
B	FO	BEARS NO. 616-43 RECTO.
B	SO	
B	SO	1 OF 2.
B	SO	2 OF 2.
A		
B	SO/FO	
B	FO/SO	

B	FO/SO	
B	CL/TE/FO	BEARS NO. F-2162 RECTO.
B	SO	NOTE, RECTO, STATES GOOD FOR 20 TON LOADING.
B	CL/TE/FO	BEARS NO. F-2162 RECTO.
B	FO/SO	
B	TE/SO	
B	TE/SO	

B	SO/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	FO/SO	
C	FO/SO	LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE/LM /ST	NOTE STATES CONTOURS ARE COPIED FROM PLAN NO.4186. BEARS NO. 106 IN GRAPHITE RECTO.
C	SO/TE	TRACED ON AUG.14, 1917 FROM BLUEPRINT ON FILE AT REG. OF DEEDS LOWELL-LAND COURT PLAN. BEARS NO. 6503. SURVEYED MAY 27, 1917, SMITH & BROOKS CIVIL ENGINEERS.
A		
A		
A		
A		
A		
A		
A		
A		
A		
A		

B	TE/SO/FX	
B	FO/TE	BEARS 3 1/2"x 5 2/8" CARD ATTACHED RECTO. BEARS NO. 1130 COVERED OVER VERSO.
B	SO	THIS IS A GRAPH MATRIX WITHOUT ANY DATA. SEE ALSO 142-028-A. CONSECUTIVE INDEX OF DRAWINGS GIVES SAME DATES AS TITLE.
B	FO/TE/FX/ SO/ST	BEARS NO. 1169 COVERED OVER VERSO.
B	SO	NOTE DIRECTS TO SEE NEW PROFILE C.R.L. 4-27-14. ATTACHED IN 4 PAGE DOCUMENT.
B	SO/TE	BEARS CASE A RECTO. ATTACHED IN 4 PAGE DOCUMENT.
B	SO	ATTACHED IN 4 PAGE DOCUMENT.
B	SO/TE	ATTACHED IN 4 PAGE DOCUMENT.

B	FO/SO/TE	[...] & THE MERRIMACK CANAL / NEAR THE LOWELL MFG. CO'S. CANAL.
B	FO/SO/TE	[...] & THE MERRIMACK CANAL / NEAR THE LOWELL MFG. CO'S. CANAL.
B	SO	BEARS FILE NO. 1083. NOTE STATES SURVEY MADE BY NOYES & DROPPERS MAY 7, 1922. SEE TRANSIT BOOK # 141, PP.138-43.
B	TE/SO	BEARS NO. 1166 COVERED OVER RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
A		

B	SO	FILE NO. 1083. ALSO BEARS "BILL OF MATERIALS" TABLE.
A		
B	TE/LO	
B	FO/SO/ST /TE	
B	FO/SO/TE	BEARS NO. 1156 COVERED OVER, VERSO.
B	SO/TE/HO	FOR LOCATION SEE PLAN NO. 1629. ADDITIONAL NOTES DATED MAY 1900. NOTE DIRECTS TO SEE NOTES OF MAY 1900, LEVEL BOOK 27, PP. 28-35. BEARS NO. 1633 COVERED OVER, RECTO.
B	ST/SO	FOR SECTION OF PROPOSED BOOM SEE 142-015.
B	FO/SO/TE	PLAN BEARS TABLE OF GAUGE SECTIONS & FLOW. NOTE DIRECTS TO SEE DRAWING NO. 142-034 FOR CROSS SECTIONS OF CANAL. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES SAME DATE AS TITLE.

B	SO	BEARS FILE 1083. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF OCT. 6, 1923.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. PLAN WAS DRAWN ON BACK OF FORM ENTITLED: OBSERVATIONS MADE AT THE BOOTT COTTON MILLS, TO DETERMINE THE QUANTITY OF WATER DRAWN. CONSECUTIVE INDEX OF DRAWINGS
B	FO/SO	ALSO GIVES NO DATE.
B	TE/SO/ST	
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	SO	
C	SO	BEARS FILE 1083.
C	SO	BEARS FILE 1083.
B	FO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES INCOMPLETE DATE.

B	FO/TE	THIS IS A COPY OF 142-003 WITH DATA IN GRAPH FORM. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS NO. 1636 COVERED OVER VERSO.
B	FO	BEARS NO. 1642 COVERED OVER VERSO.
B	FO/TE/SO	
B	TE	BEARS NO. 1625 CROSSED OUT RECTO. MEASUREMENTS TAKEN THURS. A.M. FEB. 6,1891. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES SAME DATE.
B	TE/LM/SO	BEARS NO. 1626 CROSSED OUT RECTO. NOT NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE IS VERY LIKELY THE SAME AS 142-032-[A].
B	FO/TE/SO /ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO	ATTACHED TO 142-035-[B] & [C].
B	SO	ATTACHED TO 142-035-[A] & [C]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JULY, 1912, FOR PLAN NO. 142-035, THUS JULY, 1912 IS LIKELY THE TRUE DATE FOR THIS PLAN AS WELL AS 142-035-[A].
B	SO/ST/FO /HO	ATTACHED TO 142-035-[A] & [B]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JULY, 1912, FOR PLAN NO. 142-035, THUS JULY, 1912 IS LIKELY THE TRUE DATE FOR THIS PLAN AS WELL AS 142-035-[A].
B	FO/SO	
B	SO	
B	SO	
B	SO	ATTACHED TO 142-040.
B	SO/FX	ON SAME SHEET GIVES PLAN NO. 142-39 DESIGN FOR BOOM IN PAWTUCKET CANAL, LOWELL, BELOW CENTRAL ST. BRIDGE. SAME SCALE, MEDIUM & VIEW AS 142-40.
B	SO/TE/LM	METER L.& C. GURLEY.

B	SO/TE/LM	METER L.& C. GURLEY.
B	SO	ATTACHED IN 3 PAGE DOCUMENT.
C	SO/FO/TE	ATTACHED IN 3 PAGE DOCUMENT.
C	SO	ATTACHED IN 3 PAGE DOCUMENT.
B	FO/SO	BEARS TABLE OF GAUGE SECTION & FLOW. APPEARS TO HAVE ONCE BEEN NUMBERED 142-36. NO. 36 CROSSED OUT & REPLACED WITH PRESENT NO. 142-45. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO/SO/TE	PLAN BEARS TABLE OF GAUGE SECTIONS & FLOW. NOTE DIRECTS TO SEE DRAWING NO.34, SHELF 142 FOR CROSS SECTIONS OF CANALS.

B	SO/TE	NOTE DIRECTS TO SEE DRAWING NO. 34, SHELF 142, FOR CROSS SECTIONS OF CANAL IN REFERENCE TO INFO. IN TABLE OF GAUGE SECTIONS & FLOW.
B	LI/SO	NOTE DIRECTS TO SEE DRAWING 34, SHELF 142, FOR CROSS-SECTIONS OF CANAL IN REFERENCE TO INFO TABLE OF GAUGE SECTIONS & FLOW. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B		CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO/SO	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	
B	CL	CALCULATIONS BASED ON SHEET # 7, SLIDE 142.CONSECUTIVE INDEX GIVES DATE OF JULY 11, 1919.
B	CL	BEARS NO.1041 RECTO. NOTE STATES CALCULATIONS BASED ON SECTIONS OF SHEET # 13 SHELF 141, & ON HEADS & QUANTITIES OF PG.0, MISC. DIAGRAMS, 1902. WATER LEVELS FOR OTHER HEAD LOSSES ESTIMATE BY REFERENCE TO THOSE GIVEN ON THE SECTIONS DATED 10/17/85.
B	TE	BEARS METER # 4176 B.& B. KENT & GARMON WATCH # 5.
B	TE	BEARS METER L.& C.& B. # 8163 WATCH-"JOCKEY CLUB" DURFEE, McFADYEN & HAMILTON.
B	SO	METER L.& C. BUFF & BERGER TAKEN BY MANSUR & HOLT.
B	CL	BEARS METER 8163 WATCH # 2.
B	TE	NOTE DIRECTS TO SEE SHEET # 2.

B	SO	
B	SO	GIVES INFO. FOR SECTION DATED JUNE 23, OCT. 20 & NOV. 6,1919. JAN. 8,1915. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	
B	TE	
B	CL	
B	CL	
B	SO	142-047-0-[A] ATTACHED RECTO.

B	SO	4 PAGE DOCUMENT.
B	FO/SO/TE	BEARS 135-1865 COVERED OVER, RECTO. NOTE STATES "THE ORIGINAL OF THIS PLAN WAS COMPILED FROM SURVEYS BY J. P. GREY, W. E. BADGER AND OTHERS."
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	ALSO SHOWS TABLE WITH BILL OF MATERIAL. CONSECUTIVE INDEX GIVES DATE OF OCT. 1919.
B	TE/SO	
B	SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX GIVES DATE OF DEC. 17, 1920.
B	SO	

B	SO	REVISED OCT. 22, 1923.
B	FO/SO	THIS BLUEPRINT WAS MADE BEFORE THE REVISIONS OF OCT. 22, 1923, WERE MADE TO THE ORIGINAL DRAFTING CLOTH PLAN 142-057.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE OTHER THAN THAT IN THE TITLE.
B	FO/SO	
A		IDENTICAL TO PLAN NO. 140-003.
B	SO	
B	FO	
B	SO	

B	FO/SO	
B	SO	
B	FO	
B	CL	
B	SO	
B	SO	
B	SO	
B	SO	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		

C	ST/SO	BEARS NO. 4051-A, RECTO. 135-4051 IS ORGANICALLY RELATED TO PLAN 142-102. CLEARLY, PLAN 142-102 WAS RENUMBERED FROM THE 135 SERIES AT SOME POINT.
B	TE/SO	
B	FX/SO/FO	LOCATED IN FOLDER 143-003.
B	FO/FX/SO	
B	FO	NOTE STATES FOR SECTIONS SEE SHEETS 1643 TO 1646 NOTES IN FIELD BOOKS 104-16-18-20. FIRST SHEET OF A 10 SHEET GROUP.
B	SO/ST/LI	DATES ARE GIVEN AS FOLLOWS: MARCH 5, 7, 9, 10, 1898. MARCH 16, 21,1899. MARCH 26, 31, 1900. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. NOTE DIRECTS TO SEE BOOK 104, PAGES 23 TO 37. LAST 9 SHEETS OF A 10 SHEET GROUP.
B	SO/TE/LM	
B	SO	
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO/TE/LI	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	FIRST SHEET IN A 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT, VERSO.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT, VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN SHOWS SECTIONS OF PAWTUCKET CANAL. ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. NOTE STATES PENCIL LINES=SEC. TAKEN NOV.30,1902. SEE 975 ON SHEET OF GAUGE SECTIONS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 COVERED OVER VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	ATTACHED IN 14 SHEET GROUP. BEARS NO. 1865 CROSSED OUT VERSO.
B	FO/SO/TE /LM	NOTE STATES FOR SECTIONS SEE SHEETS 1871 TO 1876. IN FIELD BOOKS 20 & 23. BEARS "INDEX PLAN" RECTO. BEARS NO. 1877-1 VERSO.
B	SO/LI	ATTACHED IN 6 SHEET GROUP. NOTE DIRECTS TO SEE LEVEL BOOK 20 & 23. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. DATE IS MORE LIKELY THE SAME AS 143-009-[A] RATHER THAN THE DATE GIVEN IN THE TITLE.

B	TE/SO	
B	FO/SO	ATTACHED IN 4 SHEET GROUP.
B	SO	ATTACHED IN 4 SHEET GROUP. PLOTTED FROM NOTES TAKEN 1900. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. NOTE DIRECTS TO SEE LEVEL BOOK NO.31 PAGES 0-25 FOR LOCATION OF SECTIONS. NOTE DIRECTS TO SEE PLAN NO. 1881. BEARS NO. 1878 COVERED OVER RECTO.
B	SO	ATTACHED IN 4 SHEET GROUP. NOTE STATES, PLOTTED FROM NOTES TAKEN 1900. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. SEE LEVEL BOOK NO. 31 PAGES 0-25 FOR LOCATION OF SECTIONS. SEE PLAN NO. 1881. BEARS NO. 1878 COVERED OVER RECTO.
B	SO	ATTACHED IN 4 SHEET GROUP. NOTE STATES PLOTTED FROM NOTES TAKEN 1900. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. SEE LEVEL BOOK NO.31 PAGES 46-61. SEE PLAN NO. 1881. BEARS NO. 1880 COVERED OVER RECTO.
B	SO	NOTE IN TITLE BLOCK DIRECTS TO SEE LOCATION. ATTACHED TO 143-012-[A].

B	FO/TE/SO	ATTACHED TO 143-012.
B	TE/SO	BEARS FILE NO. 1130, RECTO. ATTACHED TO 143-020-[B], [C] & [D].
B	SO	
B	SO/TE/LM /LI	[...] DIAGRAM / OF SLOPES FOR JUNE 2,1897, NO.1168.
B	SO/TE	BEARS TRANSIT BOOK 8 PAGE 89.
B	SO/ST	
B	SO/ST	TRACED FROM PLAN DATED MARCH 3,1898 (# 3-143).

B	SO	
B	TE/SO	BEARS FILE NO. 1130, RECTO. ATTACHED TO 143-020-[B], [C] & [D].
B	SO	ATTACHED TO 143-020-[A], [C] & [D].
B	SO	ATTACHED TO 143-020-[A], [B] & [C]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1917.
B	SO	ATTACHED TO 143-020-[A], [B] & [C].
C	SO	
C	SO	
B	SO	ADDITIONAL NOTE DATED 1920.
C	FO/TE/LO	

B	TE/SO	
B	SO/ST	9 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF 1902.
B		
B	SO/ST	
B	FO	
B	SO/ST	
B	SO/ST/FO	NOTE STATES DOTTED LINES SHOW BRIDGE AS DESIGNED BY J. R. WORCESTER & CO. FROM PLAN DATED AUG.1920 MARKED (0-6283). NOTE DIRECTS TO SEE C.W.F'S NOTE BOOK.

B	SO/TE/LM	ATTACHED TO 143-029-[A]. NOTE STATES, FOR SECTIONS TAKEN MORE RECENTLY, SEE SHEET 1648. BEARS NO.1163.
B	SO	ATTACHED TO 143-029. BEARS NO. 1162 COVERED OVER RECTO.
B	SO/TE	ATTACHED TO 143-030-[A].
B	SO	ATTACHED TO 143-030. BEARS NO. 1164 COVERED OVER RECTO.
B	SO/TE	ATTACHED TO 143-031-[A]. BEARS NO.1160 COVERED OVER RECTO.
B	SO/LM/TE /LI	ATTACHED TO 143-031.
B	SO	

C	TE	
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
A		
B	FO/SO	
B	CL	
B	TE	
B	TE	
B	FO/SO/TE	
B	SO	NOTE STATES, WALL BUILT IN SPRING OF 1926.

B	SO	NOTE STATES, STARTED IN SUMMER OF 1924 & FINISHED IN 1925.
B	FO	NOTE STATES, FOR PLAN OF 24" C.I. DRAIN SEE PLAN NO. 34-SHELF 140.
C	RO	NOTE STATES, FOR PLAN OF 24" C.I. DRAIN SEE PLAN NO. 34-SHELF 140.
B	SO	SCALES ARE NOTED AS FOLLOWS: H1"=80',V1"=30'. ORIG. DATED OCT.1939, CORRECTED TO JULY 1941. NOTE STATES PLAN & SECTIONS USED FOR STUDIES IN CONNECTION WITH AUTOMATIC CONTROL OF WATER IN CANALS. ADDITIONAL NOTE DATED SEPT.29,1941. BEARS P.H. 88-# 1 RECTO.
B	SO/FO/ST /TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	
C	CL	
C	FO/SO	THIS HOIST MAY HAVE BEEN INTENDED FOR USE AT SWAMP LOCKS. THE LETTERING IS IN THE SAME HAND AS PLAN 144-027-[C].
B	CL	BEARS NO. 1855-11 CROSSED OUT.

B	CL	BEARS NO. 1855-10 CROSSED OUT RECTO.
B	FO/TE	TITLE OF PLAN IS LOCATED ON FOLDER COVER. TITLE IS NOT FOUND ON PLAN. BEARS NO. 1855-8 CROSSED OUT RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1894 FOR THIS SERIES.
B	FO/SO/TE	BEARS NO. 1855-1 CROSSED OUT RECTO.
B	FO/SO	ATTACHED IN 5 PAGE DOCUMENT.
B	FO/SO	ATTACHED IN 5 PAGE DOCUMENT. ORIGINALLY DATED AUG.23,1894. REVISED AUG.28,1894.
B	FO/SO	ATTACHED IN 5 PAGE DOCUMENT.
B	FO/SO/TE	ATTACHED IN 5 PAGE DOCUMENT. ADDITIONAL NOTE DATED MAY 27,1894.
B	FO/TE	ATTACHED IN 5 PAGE DOCUMENT.
B	FO/SO/TE	BEARS NO. 1855-9 CROSSED OUT RECTO & VERSO. THIS IS FOR THE BACK OR HIGHER WALL. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1894 FOR THIS SERIES.
B	FO/SO/LM /TE	TITLE OF PLAN LOCATED ON FOLDER COVER. TITLE IS NOT FOUND ON PLAN. BEARS NO. 1855-2 CROSSED OUT.

B	FO/SO	BEARS NO. 1855-5 CROSSED OUT, RECTO.
B	FO/SO/HO	BEARS NO. 1855-3 CROSSED OUT BOTH RECTO & VERSO.
B	TE	
B	FO/TE/SO	NOTE, VERSO, READS "DRAWING & CURVES OF J.B. FRANCIS EXPERIMENTAL FLUME".
C	FO/SO	BEARS NO. 1639 COVERED OVER, VERSO. PLAN NO. 144-003-[COPY 2] IS ACTUALLY A COPY OF THIS PLAN RATHER THAN OF PLAN NO. 144-003 ITSELF.
C	FO	BEARS NO. 1639 IN REVERSE, FROM VERSO OF ORIGINAL. THIS IS ACTUALLY A BLUWPRINT COPY MADE FROM DRAFTING CLOTH PLAN NO. 144-003-[COPY 1].
B	SO	AT SWAMP LOCKS.
B	FO/SO	
B	SO/TE	ATTACHED IN 11 PAGE DOCUMENT. THE TITLE APPLIED BY L. & C. IS A GENERIC TITLE FOR THE 144-005 SERIES OF PLANS WHICH APPEARS ON THE VERSO OF PLAN NO. 144-005-[J]. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO/TE	ATTACHED IN 11 PAGE DOCUMENT. L.& C. CARD INDEX GIVES A DATE OF 23 JULY, 1897. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/TE	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO/TE	ATTACHED IN 11 PAGE DOCUMENT.
B	SO/ST	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO. 1931 CROSSED OUT RECTO.
B	SO	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO. 2 RECTO.
B	SO	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO. 3 RECTO.
B	SO	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO.4 RECTO.
B	FO	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO. 5 RECTO.
B	FO	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO. 6 RECTO.
B	SO/FO	ATTACHED IN 7 PAGE DOCUMENT. BEARS NO. 7 RECTO. ALSO BEARS NO. 1937 CROSSED OUT RECTO.
B	FO/TE/SO /CL	"A TRACING OF THIS PLAN WAS GIVEN TO THE L.M. SHOP APR. 26, 1889."
B	CL	

C FO

C FO

C CL

C CL

C CL

C CL

C CL

C CL

C CL BEARS FILE NO. 1110.

C CL BEARS FILE NO. 1110.

C CL BEARS FILE NO. 1110.

C CL BEARS FILE NO. 1110.

C CL BEARS FILE NO. 1110.

C CL BEARS FILE NO. 1110.

C CL BEARS FILE NO. 1110.

C CL

C CL

C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
C	CL	BEARS L.& C. FILE NO. 1110, RECTO.
B	CL	BEARS RATING OF MAR.20, 1919.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO	UNFINISHED CHART. BLANK FORM. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	UNFINISHED CHART. BLANK FORM. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO	NOTE "KENT & HAMILTON #8163".
B	CL	LOCATED IN FOLDER 144-009.
B	FO	
B	FO	
B	FO	

B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES SAME DATES AS TITLE.
B	FO	ATTACHED TO 144-010-[B]. SEE 158-094. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	ATTACHED TO 144-010-[A].
C	TE/HO	UNTITLED DOCUMENT PERTAINING TO SWAMP LOCKS. NOTE STATES "MADE UP TO USE AT SWAMP LOCKS BUT NOT USED". CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE OTHER THAN THAT IN TITLE.
B	SO	ALSO SHOWS DATE OF 1912.
B	CL	
B	FO/TE	THIS PLAN IS A BLUEPRINT COPY OF 144-011-[A] WITH NEW WORK.
B	SO/ST	ATTACHED IN 4 PAGE DOCUMENT. BEARS NO. 1176, VERSO. SHELF NO. 142 CROSSED OUT & REPLACED WITH SHELF NO. 144. TAKEN APRIL AND MAY, 1896. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APRIL & MAY, 1896.

B	SO	ATTACHED IN 4 PAGE DOCUMENT. BEARS SHEET NO. 1, RECTO. TAKEN APRIL & MAY, 1896, AND OLD PLAN NUMBER 142-1. .
B	SO	ATTACHED IN 4 PAGE DOCUMENT. BEARS SHEET NO. 2, RECTO. TAKEN APRIL & MAY, 1896, AND OLD PLAN NUMBER 142-1.
B	SO/FO/TE	ATTACHED IN 4 PAGE DOCUMENT. BEARS SHEET NO. 3, RECTO. TAKEN APRIL & MAY, 1896, AND OLD PLAN NUMBER 142-1. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APRIL & MAY, 1896.
B	FO/SO	ORIGINALLY NUMBERED 142-012.
B	SO/TE/LM	
B	SO	
B	SO	ATTACHED TO 144-015-[B].
B	SO	ATTACHED TO 144-015-[A]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF FEB. 8, 1922.
B	CL	ATTACHED TO 144-016-[COPY 1].
C	SO	ATTACHED TO 144-016.
B	FO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	SO	
B	CL	
B	SO	
B	SO/ST	
B	SO	
C	SO	THIS IS A COPY OF 144-022 WITH NEW WORK. LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	CL	

B	SO	ADDITIONAL NOTE DATED OCT.10, 1955.
C	FO	ADDITIONAL NOTE DATED OCT.10, 1955.
B	SO	ATTACHED IN 11 PAGE DOCUMENT. R. L. BURNS. THE BLUEPRINT 144-026-[COPY 1] IS ACTUALLY MADE FROM ANOTHER COPY OF 144-026 DONE IN 1952, PROBABLY ON DRAFTING CLOTH. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
C	CL	THIS BLUEPRINT IS NOT A COPY OF PLAN NO. 144-026, ABOVE, BUT OF ANOTHER COPY, PROBABLY ON DRAFTING CLOTH, MADE IN 1952. THIS BLUEPRINT WAS ORIGINALLY NUMBERED 160-65 BUT THAT NUMBER HAS BEEN LINED OUT ON THE CONSECUTIVE INDEX OF DRAWINGS.
B	FO/SO	
C	SO	APPEARS TO SHOW SOME OF THE SAME DETAILS AS PLAN 144-027-[A].
C	FO/SO/ST	SHOWS SOME OF THE SAME DETAILS AS PLAN 144-027-[A]. DRAWN ON SHEET WITH "CROWN MANUFACTURING CO. PAWTUCKET RHODE ISLAND" TITLE BLOCK.
B	FO/SO	
B	SO	
C	SO/FO	LOCATED IN FOLDER 148. LOCATED AFTER COMPLELTION OF FORMAL INVENTORY.
C	SO	BASED ON RECORDS FROM 1785 TO 1927 WITH DATA FAIRLY COMPLETE FROM 1848 TO 1927. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	FO/SO/TE	SHOWS HIGH WATER LINE FOR FLOOD OF 1936. FOUND IN FOLDER 145.
C	CL	PAGE 1 OF A TWO PAGE DOCUMENT ATTACHED TO DRAWINGS 145-[031] AND 145-[032]. FOUND IN FOLDER 145.
C	ST	PAGE 2 OF A TWO PAGE DOCUMENT ATTACHED TO DRAWINGS 145-[031] AND 145-[032]. FOUND IN FOLDER 145.
C	TE	ATTACHED TO 145-[030]-[A] & [B] AND DRAWING 145-[032]. FOUND IN FOLDER 145.
C	TE	ATTACHED TO 145-[030]-[A] & [B] AND DRAWING 145-[031]. FOUND IN FOLDER 145.
B	FO/ST	ORIGINALLY DATED JULY 1, 1935. SEE 145-001-[A] AND [B] FOR EXAMPLES OF 145-001 BEFORE NEW WORK WAS ADDED SHOWING FRESHET OF 1938 AND ITS DATA.
C	RO/SO/FO	ORIGINALLY DATED JULY 1, 1935. THIS IS A COPY OF 145-001 BEFORE NEW WORK WAS ADDED TO 154-001 SHOWING FRESHET OF 1938 AND ITS DATA. LESS THAN A COMPLETE COPY OF ORIGINAL, MISSING LEFT SIZE.
C	FO/TE	ORIGINALLY DATED JULY 1, 1935. THIS IS A COPY OF 145-001 BEFORE NEW WORK WAS ADDED TO 154-001 SHOWING FRESHET OF 1938 AND ITS DATA.
B	FO/SO	
B	TE	

B	FO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAR. 18-24, 1936.
B	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	FO/TE/ST	BEARS S-1 RECTO.
C	ST	HEIGHT FOR OCT 1938 ADDED.
C	FO/TE/SO	
B	CL	REDUCED PHOTOGRAPHIC NEGATIVE ON PAPER. VIEW IS SEEN AS MIRROR IMAGE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO/TE	NOTE STATES COPIES WERE MADE FROM THIS PLAN.
C	CL	
C	CL	

B	TE/HO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	CL/FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL MASS.
C	CL	LOACTED IN FOLDER ENTITLED SHELF 145-23, U.S ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS.
B	TE	
B	SO	SHOWS 1936 FRESHET. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE	SHOWS 1936 FRESHET.
B	CL	SHOWS 1936 FRESHET.

C	FO/TE	SHOWS 1936 FRESHET. BEARS "REDUCE TO 7 1/2" RECTO.
C	SO	SHOWS 1936 FRESHET.
B	TE/ST	MAP SHOWS FRESHET OF 1936.
B	FO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RECORD FOUND IN CONSECUTIVE INDEX.
B	SO/LO	THIS IS A PHOTO SUPPLEMENT TO A BOSTON SUNDAY NEWSPAPER. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/ST/HO	PLAN SHOWS 1936 CURVES FOR MERRIMACK RIVER BELOW CONCORD RIVER. OTHER CURVES FOR MERRIMACK RIVER RIVER AT PAWTUCKET DAM. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
C	HO/ST	LOCATED IN FOLDER ENTITLED: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. CHANGES MADE ON FIGURES.
C	CL	LOCATED IN FOLDER ENTITLED: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS.
C	CL	LOCATED IN FOLDER ENTITLED: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS.
C	CL	LOCATED IN FOLDER ENTITLED: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS.

C	CL	LOCATED IN FOLDER ENTITLED: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS.
B	FO/ST	NOTE STATES ONE INCH FLOOD ON ONE SQUARE MILE DRAINAGE AREA. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES GIVES NO DATE. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO/TE	NOTE STATES ONE INCH FLOOD ON ONE SQ. MILE DRAINAGE AREA. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. REDUCED COPY OF 145-005. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE OTHER THAN IN TITLE.
B	SO	REDUCED COPY OF 145-005. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE OTHER THAN IN TITLE.
C	SO	BEARS NO. 1785 IN GRAPHITE, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	ATTACHED TO 145-019 & 020. BEARS "PLATE 1", RECTO. WAR DEPARTMENT, CORPS OF ENGINEERS, U.S. ARMY FORM. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE, HOWEVER, IT IS LIKELY TO BE QUITE CLOSE TO THE DATE INFORMATION FOR PLAN 145-019.
B	FO	PLAN DATED NOV.1940. NOTE INDICATES NAMES OF MILL YARDS & CONCORD RIVER ADDED BY L.& C. JULY 1942. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. ATTACHED TO 145-018-020. WAR DEPT., CORPS OF ENGINEERS, U.S. ARMY FORM. BEARS "PLATE 2", RECTO.

B	CL	NOTE STATES COPIED FROM U.S. ARMY DRAWING, PLATE 2, DATED NOV.1940. ATTACHED TO 145-018 & 019.
B	ST	PLAN ON WAR DEPARTMENT, CORPS OF ENGINEERS, U.S. ARMY SHEET. GIVEN FILE NO. M-100-27/4.
B	TE/SO/FO	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. ONE OF 22 PLANS ATTACHED TO FOLDER IN BOOK FORM. BEARS FILE NO. M54-12/1.
B	TE/SO/FO	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. ONE OF 22 PLANS ATTACHED TO FOLDER IN BOOK FORM. BEARS FILE NO. M54-12/1.
B	TE/SO/FO	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. ONE OF 22 PLANS ATTACHED TO FOLDER IN BOOK FORM. BEARS FILE NO. M54-12/1.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M 54-12/9 RECTO. BEARS SHEET NO.2 RECTO. LAST REVISION DATED 4/19/37.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE M54-12/9 RECTO. BEARS SHEET NO.3 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED APRIL 9,1937.
B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/5. BEARS SHEET NO.4 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED 1/25/37.

B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/5. BEARS SHEET 4 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED JAN.25,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/9 RECTO. BEARS SHEET NO.4 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION MADE APRIL 9,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO.M54-12/9 RECTO. BEARS SHEET NO.4 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED APRIL 9,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENT AT LOWELL, MASS. BEARS FILE NO. M54-12/14. BEARS SHEET NO.4 RECTO. ORIGINAL DATED FEB.1937. LAST REVISION DATED JAN.25,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/5. BEARS SHEET NO.4 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED MARCH 18,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/4. BEARS SHEET NO.7 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED JULY 2,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/2. BEARS SHEET NO.8 RECTO. ORIGINALLY DATED FEB.1937. LAST REVISION DATED 3/18/37.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/2. BEARS SHEET NO.8 RECTO. ORIGINALLY DATED FEB.1937. LAST REVISION DATED 3/18/37.

B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/2. BEARS SHEET NO.8 RECTO. ORIGINALLY DATED FEB.1937. LAST REVISION DATED 3/18/37.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/3. BEARS SHEET NO.9 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED 7/14/37.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/3. BEARS SHEET NO.9 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED 7/14/37.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/3. BEARS SHEET NO.9 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED 7/14/37.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/31. BEARS SHEET NO.11 RECTO.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/3. BEARS SHEET NO.11 RECTO. ORIGINALLY DATED MARCH 1937. LAST REVISION DATED 7/15/37. SHOWS REINFORCING SCHEDULE.

B	CL	SCALES ARE NOTED AS FOLLOWS: 1"=50'& 20',H1"=50', V1"=5'. LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/10. ORIG. DATED FEB.1937. LAST REVISION MADE 4/15/37.
B	CL/FO	SCALES ARE NOTED AS FOLLOWS: 1"=50'& 20',H1"=50',V1"=5'. LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AR LOWELL, MASS. BEARS FILE NO. M54-12/13. BEARS SHEET NI. 11 RECTO. ORIGINALLY DATED MARCH 1937.
B	CL	SCALES ARE NOTED AS FOLLOWS: 1"=50'& 20',H1"=50', V1"=5'. LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/10. BEARS SHEET NO.13 RECTO. ORIGINALLY DATED FEB.1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS. BEARS FILE NO. M54-12/6 RECTO. BEARS SHEET NO.14 RECTO. ORIGINALLY DATED DEC.1936. LAST REVISION DATED 7/13/37.
B	FO/TE	LOCATED IN FOLDER ENTITLED SHELF 145-24, U.S. ARMY ENGINEERS, MERRIMACK RIVER, CHANNEL IMPROVEMENTS AT LOWELL, MASS.
B	ST	LOCATED IN FOLDER MARKED "COPIES OF DRAWING & DIAGRAMS OF SUGGESTED POWER INSTALLATIONS AT FRANKLIN FALLS RESERVOIR BY U.S. ARMY ENGINEERS...." NOTE STATES COPIED FROM PRINT.
B	ST	LOCATED IN FOLDER MARKED "COPIES OF DRAWING & DIAGRAMS OF SUGGESTED POWER INSTALLATIONS." NOTE STATES COPIED FROM PRINT. BEARS K.J. 8-30-42 RECTO.

B	ST	LOCATED IN FOLDER MARKED "COPIES OF DRAWING & DIAGRAMS OF SUGGESTED POWER INSTALLATION AT FRANKLIN FALLS RESERVOIR BY U.S. ARMY ENGINEERS...." COPIED FROM PRINT 3/8/43. BEARS F.C.M. 10/7/42.
B	CL	ORIGINAL DATED AUG.23,1942. LOCATED IN FOLDER MARKED "COPIES OF DRAWINGS & DIAGRAMS OF SUGGESTED POWER INSTALLATION AT FRANKLIN FALLS RESERVOIR BY U.S. ARMY ENGINEERS...." NOTE STATES COPIED FROM PRINT 3/8/43.
B	CL	LOCATED IN FOLDER MARKED "COPIES OF DRAWING & DIAGRAMS OF SUGGESTED POWER INSTALLATION AT FRANKLIN FALLS RESERVOIR BY U.S. ARMY ENGINEERS...." NOTE STATES WAS ENLARGED FROM REDUCED PRINT 3/8/43. BEARS FILE NO. M100-14/15. BEARS K.J. 8-30-42 RECTO.
B	ST/HO	NOTE STATES COPIED FROM REDUCED PRINT 3/8/43. ORIGINAL DATED OCT.1941. BEARS FIGURE 6 RECTO.
B	FO/TE	LOCATED IN FOLDER ENTITLED 145-24, U,S, ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS AT LOWELL, MASS.
B	FO/TE	LOCATED IN FOLDER ENTITLED SHELF 145-22, U.S. ARMY ENGINEERS, MERRIMACK RIVER CHANNEL IMPROVEMENTS, AT LOWELL, MASS. BEARS FILE NO.M54-/1. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/ST	

B	FO/TE	
B	SO/FO	
B	FO	LOCATED IN FOLDER ENTTILED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-1/1. NOTE STATES: PRELIMINARY, IN TWO SHEETS.
B	FO/TE	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-1/2. NOTE STATES: PRELIMINARY, IN 2 SHEETS.
B	FO	SCALES ARE NOTED AS FOLLOWS: 1"=50'& 10', H1"=50', V1"=10'. LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. ATTACHED IN 19 PG. DOCUMENT. BEARS FILE NO. M54-51/1.
B	FO	SCALES ARE NOTED AS FOLLOWS: 1"=50' & 10', H1"=50', V1"=10'.LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. ATTACHED IN 19 PG. DOCUMENT. BEARS FILE NO. M54-51/1.

B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-51/2. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-51/2. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED IN FOLDER: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-51/3.
B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-51/3.
B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-52/2.

B	FO	SCALES ARE NOTED AS FOLLOWS: 1/4",3",3/4" & 1 1/2"=1'. LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-52/4.
C	LM	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-12/12.1.
C	FO/TE	LOCATED IN FOLDER ENTITLED SHELF 145-23 U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-12/11.2.
B	FO	LOCATED IN FOLDER ENTITLED: SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-52/26.
B	SO/FO	SHEEL NO. 32 OF 52. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	SCALES ARE NOTED AS FOLLOWS: 1"=30',50'& 10',H1"=50', V1"=10'. LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION,AT LOWELL, MASS. BEARS FILE NO. M54-53/1.
B	FO	SCALES ARE NOTED AS FOLLOWS: 1"=10'& 50', H1"=50',V1"=10'. LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-53/1.

B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-54/1.
B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL MASS. BEARS FILE NO. M54-54/2.
B	FO	LOCATED IN FOLDER ENTITLED SHELF 145-23, U.S. ARMY ENGINEERS, MERRIMACK RIVER FLOOD PROTECTION AT LOWELL, MASS. BEARS FILE NO. M54-54/16. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	NOTE STATES ORIGINAL IS IN MERRIMACK SLIDE SHELF 154 NO. 136. BEARS FILE NO. 37.1 RECTO.
C	SO	52 PAGE DOCUMENT CONTAINING VARIOUS PLANS & DOCUMENTS. SCALES ARE NOTED AS FOLLOWS: 1"=300', 50',10' & 1'. 1/2",1/4",1/8", 3/4", 3/8",1 1/2"& 1"=1'.1"=10'.
C	FO/SO/TE /TA	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9305 AND INDEX NO. 316. ATTACHED TO PLAN 146-[072]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	FO/SO/TE /TA	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9306 AND INDEX NO. 316. ATTACHED TO PLAN 146-[071]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	FO/SO/TE /TA	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 15278 REPLACING 9305 AND INDEX NO. 9316. ATTACHED TO PLAN 146-[074]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.

C	FO/SO/TE /TA	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 15279 REPLACING 9306 AND INDEX NO. 9316. ATTACHED TO PLAN 146-[073]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	FO/SO/TE	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 15280 AND INDEX NO. 9316. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	FO/SO/TE	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 25675 REPLACING 15280 AND INDEX NO. 9316. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	FO/SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 18882 AND INDEX NO. 9316. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	FO/SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 29966 AND INDEX NO. 9316. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146.
C	SO/TE	BEARS FACTORY INSURANCE ASSOCIATION PLAN NOS. 324-D & 325-D. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997. THIS PLAN DUPLICATES C-133-006-[D]-[COPY 1] EXCEPT FOR THE TITLE CHANGE.
C	SO/TE	BEARS FACTORY INSURANCE ASSOCIATION PLAN NOS. 324-D & 325-D. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997. DUPLICATES C-133-006-[D]-[COPY 1] EXCEPT FOR TITLE CHANGE AND BEING A POSITIVE PRINT.
C	SO/TE	BEARS FACTORY INSURANCE NOS. 134-A AND 324-B. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 146. SEE ALSO C-133-006-[A].
C	SO/FO/TA	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
		ORIGINALLY DATED AUGUST, 1940, REVISED TO SEPT., 1957.
C	SO/FO/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/LO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	
B	SO	
B	TE/SO	BEARS NO.1222 CROSSED OUT VERSO.
B	CL	
B	FO	ATTACHED TO 146-005-[COPY 2]. BEARS 1223 CROSSED OUT VERSO.
B	FO	ATTACHED TO 146-005-[COPY 1]. BEARS NO. 1223 VERSO.
B	SO	

C	FO	ATTACHED TO 146-006-[COPY 2].
C	FO	ATTACHED TO 146-006-[COPY 1].
B	FO	BEARS NO. 1222 CROSSED OUT VERSO. ORDER NO. A70.
B	FO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO/TE/FX	146-010-[A] ATTACHED, RECTO.
C	FO/SO	ORIGINAL DATED JAN. 27, 1863. ADDITIONAL NOTE DATED SEPT. 28, 1902. ATTACHED TO 146-010.

B	SO	BEARS NO. 1215 CROSSED OUT, RECTO. ATTACHED TO 146-011-[B].
B	FO/TE	ATTACHED TO 146-011-[A]. BEARS NO. 1216 TAPED OVER, RECTO. DOCUMENT ATTACHED RECTO ENTITLED, BILL OF TIMBER FOR ICE BOOM FOR THE MERRIMACK MFG. CO. DATED SEPT.1895. BEARS
B	FO/ST	NO. 1217 CROSSED OUT VERSO.
B	SO	BEARS NO. 1218 CROSSED OUT RECTO.
B	FO/TE/SO	BEARS NO. 1211 CROSSED OUT VERSO.
B	FO	2 PAGE DOCUMENT. NOTE DIRECTS TO SEE ACCOMPANYING PLAN FOR LOCATION OF SECTIONS. BEARS NO. 1212 VERSO.
B	FO/SO	BEARS NO. 1212A CROSSED OUT, VERSO. THE DATE IS PROBABLY 1893, LIKE ITS COMPANION PLAN. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO/TE/HO	
B	SO	ATTACHED IN 4 PAGE DOCUMENT.
B	CL	ATTACHED IN 4 PAGE DOCUMENT.
B	CL	ATTACHED IN 4 PAGE DOCUMENT.
B	TE	ATTACHED IN 4 PAGE DOCUMENT.
B	FO/TE/SO	
B	FO	ATTACHED IN 3 PAGE DOCUMENT. NOTE DIRECTS TO SEE DRAWING NO. 185-J.
B	FO	ATTACHED IN 3 PAGE DOCUMENT. BEARS DRAWING NO. 714-FF.
B	FO	ATTACHED IN 3 PAGE DOCUMENT. BEARS DRAWING NO. 185-J RECTO.

B	CL	ATTACHED IN 3 PAGE DOCUMENT. ADDITIONAL NOTE STATES ,"DIRECTION OF ROTATION REVERSED PER LETTER 3-22-`11.
B	CL	ATTACHED IN 3 PAGE DOCUMENT. BEARS NO. 9 VERSO. CONSECUTIVE INDEX GiVES DATE OF 1911.
B	FO/TE/LM	ATTACHED IN 3 PAGE DOCUMENT. NOTE STATES, FOR GENERAL ARRANGEMENT SEE DRWG. 2-20-1911. DIRECTION OF ROTATION REVERSED PER LETTER 3-22-1911.
B	SO/TE	CONSECUTIVE INDEX NOTES "NOT DATED".
B	SO	ATTACHED IN 5 PAGE DOCUMENT. BEARS, "NOT IN USE" RECTO. NOTE STATES, THIS DIAGRAM MADE IN JAN.1918 FROM OLD DIAGRAM, PLUS 5 PERCENT.
B	SO	ATTACHED IN 5 PAGE DOCUMENT. BEARS, "NOT IN USE" RECTO. ORIGINALLY DATED APRIL 1906. REVISED JAN. 9,1912.
B	SO	ATTACGED IN 5 PAGE DOCUMENT. BEARS "NOT IN USE" RECTO. ORIGINALLY DATED APRIL 1906. REVISED JAN. 9,1912.
B	SO	ATTACHED IN 5 PAGE DOCUMENT. NOTE DIRECTS TO SEE CALCULATION BOOK NO. 663, PAGES 44 TO 48, INCLU. WHEELS IN USE BEGINNING DEC.4,1911.
B	TE	ATTACHED IN 5 PAGE DOCUMENT. NOTE DIRECTS TO SEE CALCULATION BOOK NO. 663, PAGES 44 TO 48, INCLU. WHEELS IN USE BEGINNING DEC.4,1911.
B	SO	BEARS NO. 3468 VERSO. ALSO BEARS #375 ROLL PLAN RECTO.

B	FO/SO	
B	SO	WHEELS MADE BY RODNEY HUNT MFG. CO. TEST MADE FOR MERRIMECK MFG. CO. RESULTS AT 35 FEET HEAD & 164 R.P.M.
C	SO	NOTE STATES, CANCELLED, USE DIAGRAM DATED 9-22-`19. SEE 146-026-[A].
B	SO/ST	DIAGRAM IN USE FROM SEPT. 22, 1919. NOTE STATES BASED ON HOLYOKE TEST #2202. SEE 146-026.
B	FO/TE	NOTE STATES DIAGRAM IN USE FROM SEPT.22, 1919. CURVES BASED ON HOLYOKE TEST #2202.
B	SO	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APRIL 3 & 4, 1941.
B	TE/FO	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO.
B	FO/TE/SO	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO.

B CL

B CL BEARS FILE NO. 1001 RECTO.

B CL

B ST METER # 8163. BEARS FILE NO. 1001, RECTO.

B FO/SO

B SO

B CL

B	SO	MARKED (OBSOLETE). THE GIVEN FALL IS FROM CANAL TO RIVER.
B	SO	(MARKED OBSOLETE). THE GIVEN FALL IS FROM CANAL TO RIVER.
B	SO	NOTE STATES, OBSOLETE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF AUG. 17 & 19, 1920.
B	CL	
B	TE/SO	CURVES BASED ON HOLYOKE TEST #2202.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. DIAGRAM IN USE FROM SEP. 22, 1919. REFERENCE TO COMP. BOOK NO. 699, PP. 27.

B	SO	DETERMINED BY CURRENT METER MEASUREMENT IN 1921.
		PLOT OF TESTS OF SEPT.11, & OCT. 14, 15, & 16,1919 TOGETHER WITH CURVES FROM ALLIS CHALMERS DRAWING # T-16-1 BASED ON HOLYOKE TEST # 2202 OF 30" TYPE 15, ALLIS CHALMERS WHEEL.
B	SO	BEARS SHEET NO. 8, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	TE/SO	BEARS SHEET NO. 8A, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO	BEARS SHEET NO.7. FOR TEST IN PLACE SEE COMP. BOOK NO. 699 P.26. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	BEARS SHEET NO. 6, RECTO. CONSECUTIVE INDEX OF DRAWING ALSO GIVES NO DATE.

B	CL	
B	CL	LOCATED AFTER COMPLETION FORMAL INVENTORY.
B	FO	
B	SO	
B	SO	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO.
B	SO	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MARCH 1, 1934..
B	FO/SO	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO.

C	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 FOR ADDITIONAL INFO. NOTE STATES ORIGINAL TRACING IN SHELF 146-27-Y.
B	SO/ST	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO.
C	TE	LOCATED IN FOLDER ENTITLED MERRIMACK MFG. CO.
B	SO	WHEEL IN USE BEGINNING SEPTEMBER 3,1919. DIAGRAM IN USE FROM JANUARY 1920. FOR MILL POWERS OF OTHER WHEELS OF MERRIMACK MFG. SEE 146-022. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1920.
B	CL	BEARS NO. 146-028 CROSSED OUT RECTO.
B	FO/SO	ATTACHED IN 7 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE JULY 30, 1918.
B	FO/SO	ATTACHED IN 7 PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE JULY 30, 1918.
B	TE	

B	FO	ATTACHED IN 7 PAGE DOCUMENT.
B	SO	IN USE FROM OCT. 1920. NOTE DIRECTS TO SEE CALC. BKS. 688, P.65, & 689, P.85. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE AUG. 1, 1918.
B	FO/SO	ATTACHED IN 7 PAGE DOCUMENT. BEARS JOB 124, SHEET 10, DRAWER 1 RECTO.
B	FO	ATTACHED IN 7 PAGE DOCUMENT. BEARS "JOB 124, SHEET 10, DRAWER 1" RECTO.
B	FO	ATTACHED IN 7 PAGE DOCUMENT.
B	FO	ATTACHED IN 7 PAGE DOCUMENT.
A		
B	CL	PART OF A 3 PAGE DOCUMENT. NOTE DIRECTS TO SEE CALC. BOOKS 688 PAGES 65-68 & 705 PAGES 50-52.

C	CL	PART OF A 3 PAGE DOCUMENT. NOTE DIRECTS TO SEE CALC. BOOKS 688 PAGES 65-68 & 705 PAGES 50-52.
C	CL	PART OF A 3 PAGE DOCUMENT. NOTE DIRECTS TO SEE CALC. BOOKS 688 PAGES 65-68 & 705 PAGES 50-52.
B	CL	
B	CL	
B	FO	NOTE DIRECTS TO SEE CALC. BOOKS 688, PAGES 65-68 & 705, PAGES 50-52.
C	RO/SO	NOTE DIRECTS TO SEE CALC. BOOKS 688, PAGES 65-68 & 705, PAGES 50-52.
B	FO	
C	RO/SO	

B	FO	
B	SO	
B	CL	NOTE DIRECTS TO SEE CALC. BOOK NO. 705 PAGE 44 FOR TREMONT NO.1,2 OR 4, & BOOK NO. 693 PAGE 36 FOR TREMONT NO.3.
B	SO	
B	SO	
B	TE/SO	(SUPERCEDED-SINGLE GATE USED).

B	FO/SO	
B	FO	
B	SO	ADDITIONAL NOTE DATED JULY 17, 1941.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
B	SO	
B	CL	

B	FO/SO	ORIGINAL DATE SEP.20,1921. TRACED SEP.21,1921. BEARS MERRIMACK MFG. CO.,LOWELL MASS. TYE 75M P10 175 HP 2 STAGE 10 MOTOR PUMP. ALSO BEARS DRAWER NO.40, TRACING NO.72 C. BEARS P.O. # 89 RECTO.
B	ST/FO	BEARS MERRIMACK MFG. CO., LOWELL, MASS. TYPE 175 M. 2 P10 175HP 2 STAGE 10 MOTOR PMP. ALSO BEARS DRAWER NO.40 DRAWING NO.74C.
B	SO	REVISED OCT. 5, 1934. THE PLAN NUMBER APPEARS TO HAVE BEEN CHANGED.
C	TE	
B	TE	COPY OF PLAN 146-060 WITH NEW WORK AND AND EXPANDED TITLE.
B	SO	DOCUMENT ATTACHED RECTO ENTITLED, EXTRACTS FROM REGISTRY DEED BOOK 327, PAGES 425 & 428. DATED SAME AS PLAN.
B	SO	
B	CL	RESURVEYED SEPT. 29,1938 BY BROOKS-JORDAN & GRAVES-CIVIL ENG'RS. NOTE STATES SOLD OUT OCT.1,1938.

B	SO	NOTE STATES OLD RACKS & WALL AT SECTION A-A CAVED IN MAR.22,1940.
B	SO	
B	SO	NOTE STATES COPIED FROM BLUEPRINT 1-24-41.
B	FO/SO	THIS BLUEPRINT IS THE ORIGINAL FROM WHICH PLAN 146-068-[COPY 1] WAS TRACED.
B	FO/SO	THIS PLAN IS A COPY MADE FROM THE H.P. CONVERSE & CO. BLUEPRINT, 146-068.
B	FO/SO	
B	SO	SURVEYED NOV. 22,1946, BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 22, 1946.
C	SO/TE/TA	ORIGINALLY DATED OCT. 19, 1920. BEARS FACTORY INSURANCE ASSOCIATION NO. 1630-A, RECTO.. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/FO/TE	ORIGINALLY DATED OCT. 19, 1950. BEARS FACTORY INSURANCE ASSOCIATION NO. 1630-A, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.

C	SO/TE	ORIGINALLY DATED OCT. 19, 1950. BEARS FACTORY INSURANCE ASSOCIATION NO. 1630-B, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/TE/TA	ORIGINALLY DATED OCT. 19, 1920. BEARS FACTORY NO. 1630-C, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/FO/TE /LO	BEARS FACTORY INSURANCE ASSCIATION NO. 1630-A, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, DRAWER 147.
C	SO/FO/TE /LO	BEARS FACTORY INSURANCE ASSCIATION NO. 1630-B, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, DRAWER 147.
C	FO/SO	BEARS NO. 139, NEW ENGLAND. EASTERN UNDERWRITERS INSPECTION BUREAU. LOCATED AFTER COMPLETION OF FORMAL IVNENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, DRAWER 147.
C	SO/ST/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P. L.& C. APRIL, 1977, DRAWER 147.
B	SO	FIGURES ARE ALL TEST RESULTS.
C	HO	
B	SO/FO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	

C	FO	SEE ALSO PLAN NO. 147-002. IN TWO SECTIONS.
B	TE/FO/ST	SEE ALSO PLAN NO. 147-007. ORDER NO. A290.
B	FO	LATEST REVISION MAR. 22, 1907. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JULY, 1907.
B	TE/FO/SO /LM	LATEST REVISION APR. 17. 1907.CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JULY, 1907.
B	FO/TE/SO	
B	FO/SO	SEE ALSO PLAN NO. 147-004.
B	SO	

B	TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	
B	FX/SO	
B	SO/FO/HO	THIS IS A COPY OF A PORTION OF 147-011 WITH NEW WORK ADDED. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS NO. 1276 BENEATH NEWER PLAN NO. LABEL, RECTO.
C	FO/SO/TE	TRACED FROM LOCKS & CANALS PLAN # 1276. ORIGINAL WAS DATED 20 MAY, 1898.
C	FO/TE/SO	TRACED FROM LOCKS & CANALS PLAN # 1276. ORIGINAL WAS DATED 20 MAY, 1898.
B	SO	NOTE STATES THAT THIS ADDITION WAS MADE IN 1892.

B	SO	PART OF 3 PAGE DOCUMENT.
B	SO	PART OF 3 PAGE DOCUMENT.
B	SO/ST	
B	TE/SO	
B	SO/ST	
B	SO	
B	SO	
B	SO/FO	
B	SO	

B	SO	
B	TE/SO	
B	SO/TE	BEARS NO. 1509, RECTO, BENEATH PLAN NO. LABEL.
C	FO	BEARS NO. 1509, RECTO. THIS BLUEPRINT COPY WAS MADE BEFORE THE ORIGINAL DRAFTING CLOTH PLAN WAS ALTERED.
B	TE/SO	UNTITLED DRAWING, NEARLY A COPY OF 147-023.
C	CL	THIS BLUEPRINT COPY WAS MADE BEFORE THE ORIGINAL DRAFTING CLOTH PLAN WAS ALTERED.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PART OF A 4 PAGE DOCUMENT. TESTED AT HOLYOKE, SEPTEMBER 25, 26, & 28, 1905.

B	SO	PART OF 4 PAGE DOCUMENT. TESTED AT HOLYOKE SEPTEMBER 25, 26 & 28,1905.
B	CL	PART OF 4 PAGE DOCUMENT.
B	FO	PART OF 4 PAGE DOCUMENT. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	SO/ST	
A		

C	CL	SEE 153-014.
C	CL	SEE 153-014. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	COPY OF 152-039-W MINUS COLORATION AND WITH DIFFERENT TITLE BLOCK ARRANGEMENT.
C	CL	COPY OF 152-057 WITH DIFFERENT ARRANGEMENT OF TITLE BLOCK.
C	CL	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE OF LAND FROM P.L.& C. TO APPLETON MFG. CO. MAR. 15, 1828.
C	CL	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE OF LOTS NO. 7 & 8 FROM P.L.& C. TO HAMILTON MFG. CO. MAR 15, 1828.
C	CL	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE OF LAND FROM P.L.& C. TO THE LOWELL MFG. CO. MAR. 15, 1828.
C	CL	COPY OF PLAN TO ACCOMPANY DEED FOR THE SALE OF LAND FROM P.L.& C. TO THOMAS HURD OCT. 1, 1828.
C	CL	

C	CL	
C	CL	
C	CL	
C	CL	
C	CL	SHOWS INTERSECTION OF MOODY AND TILDEN STREETS. NOT POSSIBLE TO ASCRIBE INDEX HEADINGS.
B	SO	BEARS METER L.& C. BUFF & BUFF 8163. SHOWS PLAN OF NO.10 WHEELPIT & MEASURING STATION.
B	CL	NOTE DIRECTS TO SEE DWG. 147-029.
B	SO	PART OF 3 PAGE DOCUMENT. BEARS SHEET 1 OF 2, RECTO.

B	CL	PART OF 3 PAGE DOCUMENT. BEARS SHEET 2 OF 2, RECTO.
B	CL	PART OF 3 PAGE DOCUMENT.
B	SO	
B	TE	METER-L.& C. BUFF & BUFF # 8163.
B	TE/SO	
C	RO	NO.8 WHEEL (36" R.H.) IN USE FROM OCT. 15, 1918. NO.9 WHEEL (39" L.H.) IN USE FROM APRIL 25, 1919.
B	SO/TE	NO.8 WHEEL (36" R.H.) IN USE FROM OCT. 15, 1918. NO.9 WHEEL (39" L.H.) IN USE FROM APRIL 25, 1919.
B	CL	BEARS SHEET NO. 1.

B	CL	CONSECUTIVE INDEX OF DRWINGS ALSO GIVES NO DATE..
B	CL	
B	CL	NOTE STATES,"WHEN CATALOGUED , PUT IN SHELF 155.
B	SO	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR THE SALE OF LOT NO. 6 FROM P.L& C. TO HAMILTON MFG. CO. MAY 15, 1826. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE AS 1826 (1929).
B	FO/SO	
B	CL	NOTE STATES PLAN DRAWN AUG.29,1911, FROM SURVEY MADE DEC.1910.
B	CL	BEARS F.146 P.104-107.
B	CL	

B	SO	
C	SO	COPY OF ORIGINAL PLAN TO ACCOMPANY DEED FOR SALE OF LOT NO. 5 FROM P. L.& C. TO HAMILTON MFG. CO. MAY 15, 1826.
B	SO	COPY OF ORIGINAL PLAN IN P. L.& C. INDENTURE BOOK. INDENTURE DATED MAY 15, 1826.
B	CL	
B	CL	3 PAGE DOCUMENT CONSISTING OF ORIGINAL PLAN & TWO PHOTOGRAPHIC COPIES.
C	SO	DOCUMENT ATTACHED RECTO ENTITLED, SUGGESTED CONCRETE WALL ACROSS PENSTOCKS.
C	CL	
C	FO/SO	BEARS NO.643-351 RECTO.

C	FO	NOTE STATES SOLD TO CHRIS LAGANAS SHOE CO.
B	ST	NO. 8 WHEEL IN USE FROM OCT. 15, 1918. DIAGRAM IN USE FROM FEB. 1, 1919. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	REVISED JULY 1922.
B	SO	REVISED JULY 1922.
B	SO/ST	
B	FO/SO/TE	DRAWING NO. 28245 SHOP NO. W-144.
B	FO/SO/ST	ORIGINALLY DATED APRIL 24,1920. DATED CORRECTED TO MAY 10,1920.
A		
B	FO/TE	

B	TE	ORIGINALLY DATED FEB. 1912, REVISED FEB. 12,1920. ADDITIONAL NOTE DATED JAN.'21.
A		
B	FO/TE/SO	
B	CL	
A		SHEET # 1.
C	SO/TE/FX	20 PAGE DOCUMENT.
B	FO	WM. T. REED CO. ORIGINALLY DATED AUG. 29,1922. REVISED TO SEPT. 8,1922.
B	FO	WM. T. REED CO. BEARS DRAWING NO. 2232-4.
B	FO	WM. T. REED CO., ENGRS.
B	FO/SO/TE	WM. T. REED CO.. ENGRS.

B	FO/SO	WM. T. REED CO., ENGRS. ORIGINALLY DATED, AUG. 28,1922. REVISED SEPT. 16,1922.
B	TE/FO/SO	WM. T. REED CO., ENGRS. BEARS DRAWING NO. 2232.2 RECTO.
B	SO/FO	TRACED FROM DRAWING MADE BY S. G. STEPHENS OF HAMILTON MFG. CO. ORIGINAL DATED MAY 24, 1918. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO/ST	
B	SO	
B	SO	

B	FO	BEARS GENERAL ARRANGEMENT 36" Z DRAWING NO. 26078-SHOP NO. A,B, 11235. DATE CORRECTED TO APRIL 29,1918. BEARS # 8 VERSO.
B	FO/TE/SO	BEARS NO.1 RECTO.
B	SO/FO	PLAN SURVEYED FEB. & MARCH 1927 BY BROOKS, JORDAN & GRAVES, CIVIL ENGRS. LOWELL, MASS.
B	FO	PLAN SURVEYED FEB. & MARCH 1927 BY BROOKS, JORDAN & GRAVES, CIVIL ENGRS. LOWELL, MASS.
B	CL	PLAN SURVEYED FEB. & MARCH 1927 BY BROOKS, JORDAN & GRAVES CIVIL ENGRS. LOWELL, MASS.

B	SO
B	SO/ST
C	FO
B	SO
B	SO

B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MARCH & JUNE, 1938.
B	SO	
B	SO/FO	
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF FEB. 4, 1929. BROOKS, JORDAN & GRAVES. NOTE READS "THIS AREA NOW USED BY ICE COMPANY. MARCH, 1943". NOTE STATES ELEVATIONS REFER TO CITY DATUM. BEARS 3363, RECTO.

B	CL	BEARS NO. 3362, RECTO. PLAN SURVEYED JULY 9,1929 BY BROOKS, JORDAN & GRAVES-CIVIL ENGRS. LOWELL, MASS.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1933.
B	SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE	ORIGINAL DATED MARCH 29,1934.
B	FO	PLAN SURVEYED FEB.& MAR.1927 BY BROOKS, JORDAN & GRAVES CIVIL ENGRS., LOWELL, MASS. FOR COURIER CITIZEN. NOTE STATES RED LINES SHOW PASSAGEWAYS & AREAS TO BE KEPT OPEN AS REFERRED TO IN DEED. PLAN RECORDED IN BOOK 50, PG.25. BEARS NO. 3136 RECTO.

B	FO/SO/TE	2 TITLES FOUND RECTO-BOTH INCLUDED IN TITLE BLOCK.
B	FO/SO	ORIGINALLY DATED JAN.17,1942. PLAN REVISED JULY 1945. NOTE STATES "SED FOR MARDEN & MURPHY INC. TAX ABATEMENT CASE IN 1942".
B	ST	NOTE STATES "THIS PLAN ACCOMPANIED SALE TO SYDNEY CORP."
B	CL	
B	SO	
B	SO/ST	

C	FO
B	SO
B	SO
B	SO

B	SO/FO	
C	FO/SO/TE /LO	BEARS FACTORY INSURANCE ASSOCIATION NO. 1780-A. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, DRAWER 147.
C	FO/SO/TE	BEARS FACTORY INSURANCE ASSOCIATION NO. 1780-C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, DRAWER 147.
C	FO/SO/TE	BEARS FACTORY INSURANCE ASSOCIATION NO. 1780. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, DRAWER 147.
C	SO	BEARS ASSOCIATED FACTORY MUTUAL INSURANCE CO. SERIAL NO. 13424, INDEX NO. 9346. MISSING ONE PASTE ON ADDITION. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO	BEARS ASSOCIATED FACTORY MUTUAL INSURANCE CO. SERIAL NO. 13424, INDEX NO. 9346. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	FO/SO/ST	BEARS NO. 9346, RECTO. HAD BEEN GLUE MOUNTED ON SEPARATE SHEET OF WHITE PAPER WHICH IS STORED WITH THE PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	ST	LOCATED IN FOLDER 148.
C	SO/TE	
C	SO/ST/TE	BEARS HANDWRITTEN NOTE, RECTO, WHICH READS: "3.75' FROM BOTTOM OF WHEEL TO TAILWATER. TOP OF WHEEL 5.50' BELOW UPPER WATER LEVEL".

B	FO/TE	BEARS SHEET NO. 1, RECTO. NOTE DIRECTS TO SEE PHOTO BOOK #5, PAGES 79 TO 86 INC., FOR PHOTOGRAPHS OF THESE WHEELS. BEARS DRAWING NO. 1940 J AND STAMPED NO. 1091RECTO. STAMP, VERSO, IDENTIFIES THIS AS A RODNEY HUNT CO. PLAN.
C	FO/TE	BEARS SHEET NO. 1 RECTO. NOTE DIRECTS TO SEE PHOTO BOOK #5, PAGES 79 TO 86 INC., FOR PHOTOGRAPHS OF THESE WHEELS. BEARS DRAWING NO. 1940 J, VERSO.
B	FO/TE	BEARS SHEET NO. 2, RECTO. NOTE DIRECTS TO SEE PHOTO BOOK #5, PAGES 79 TO 86 INC., FOR PHOTOGRAPHS OF THESE WHEELS. BEARS DRAWING NO. 1939 J AND STAMPED NO. 1090, RECTO. STAMP, VERSO, IDENTIFIES THIS AS A RODNEY HUNT CO. PLAN.
C	CL	BEARS SHEET NO. 1, RECTO. NOTE DIRECTS TO SEE PHOTO BOOK #5, PAGES 79 TO 86 INC., FOR PHOTOGRAPHS OF THESE WHEELS. BEARS DRAWING NO. 1939 J, VERSO.
C	SO	FIVE 4.5"x 7.5" PHOTOPRINTS MOUNTED ON HEAVY PAPER STOCK. ALL RELATE TO THE SUBJECT OF THE TITLE. LOCATED IN SHELF 166.
B	SO/FO	
B	SO/FO	
B	FO/SO	THIS LINE ESTABLISHED ON THE ROOFS OF THE APPLETON CO.'S BUILDINGS. CONSECUTIVE INDEX OF PLANS TRANSPOSES PLANS 004 AND 005 BUT THIS INVENTORY CORRECTLY RECORDS THEM AS THEY THEMSELVES ARE NUMBERED.
B	SO/ST	CONSECUTIVE INDEX OF PLANS TRANSPOSES PLANS 004 AND 005 BUT THIS INVENTORY CORRECTLY RECORDS THEM AS THEY THEMSELVES ARE NUMBERED.

B	TE/FO/SO	
B	FO/SO	
B	SO/FO	NOTE DIRECTS TO SEE ACCOMPANYING PLAN FOR LOCATION OF SECTIONS.
B	TE/FO	
B	FO/EN	OVERSIZE PLAN.
B	SO	
B	SO	THE WHEEL INSTALLED IN # 2 CASE TO REPLACE # 2 L. H. WHEEL. SINGLE BUCKET AREA = 17.16 SQ.". TOTAL BUCKET AREA = 8.573 SQ.'.
B	SO	NOTE STATES, WHEELS NOS. 1 & 1A INSTALLED FEB. 1917. BUCKET AREA FOR L. H. WHEEL = 137.26, FOR R.H. WHEEL = 129.41.
B	SO	NOTE STATES TO ACCOMPANY LETTER TO ARTHUR T. SAFFORD.
B	SO	TO ACCOMPANY LETTER OF ARTHUR T. SAFFORD.

B	FO/TE	BEARS #134.
B	FO	ATTACHED TO PLAN NO. 148-016-[COPY 1]. BEARS NO. 1207 IN GRAPHITE RECTO.
C	FO	ATTACHED TO PLAN NO. 148-016.
B	FO	BEARS NO. 4207-A IN GRAPHITE RECTO.
B	SO	
B	FO/SO	
B	SO	

B	SO	
B	FO/ST	NOTE STATES THIS IS A PRELIMINARY LAYOUT ONLY. MORE DETAILS NECESSARY FOR CONSTRUCTION.
c	FO	NOTE STATES THIS IS A PRELIMINARY LAYOUT ONLY. MORE DETAILS NECESSARY FOR CONSTRUCTION. A BLUEPRINT OF 148-022 WITH NEW WORK.
B	SO	BEARS DRAWING NO. 1 GATE LEAF RECTO. ALSO BEARS "SUPERCEDED" RECTO.
B	SO	
B	FO/TE	AN EXETER MACHINE WORKS, INC. PLAN. DRAWING NO. 48-254. TRAN. # X5730.
B	SO	A BLUEPRINT COPY OF THIS PLAN WITH NEW WORK MAY BE FOUND AT PLAN NO. 148-027.
B	SO	

B	CL	THIS PLAN IS A BLUEPRINT OF PLAN NO. 148-025 WITH NEW WORK.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
A		
B	FO	ORDER A3961. NOTE STATES FOR FURTHER DETAILS SEE TRACING "B". BEARS TRACING "A" RECTO.
B	FO	ORDER A3961. NOTE STATES FOR WHEEL DETAILS SEE TRACING "A". BEARS TRACING "B" RECTO.
B	SO	
B	SO	

B	SO	
B	SO	
B	FO/TE	BEARS JOB. 323, FILE 41, SHEET 2. JOHN A. STEVENS, ENGINEER. "REVISED TO OCT. 1929."
B	FO/TE	BEARS JOB. 323, FILE 41, SHEET 2. JOHN A. STEVENS, ENGINEER.
B	FO/SO	BEARS JOB. 323, FILE 41, SHEET 3. JOHN A. STEVENS, ENGINEER.
B	FO/SO	BEARS JOB. 323, FILE 41, SHEET 4. JOHN A. STEVENS, ENGINEER.

C	FO/SO	BEARS JOB. 323, FILE 41, SHEET 5. JOHN A. STEVENS, INC.
C	FO/SO	BEARS JOB. 323, FILE 41, SHEET 6. JOHN A. STEVENS, INC.
C	SO	
C	SO	
C	SO	
C	SO	
C	SO	
C	SO	
B	SO	NOTE STATES PIPE PUT IN AS SHOWN BUT NOT COVERED.

B	SO	
B	FO/SO	ORIGINALLY DATED APRIL 21, 1939. REVISED JUNE 12, 1939. BEARS ORDER NO. 39954-W. ALSO BEARS DRAWING NO.C-5839.
C	FO	ORIGINALLY DATED APRIL 21, 1939. REVISED JUNE 12, 1939. BEARS ORDER NO. 39954-W. ALSO BEARS DRAWING NO. C-5839.
C	FO/SO	
B	FO/SO	
B	SO	
C	SO	UNTITLED PLAN OF APPLETON CO.'S MILL YARD NORTH OF JACKSON ST. PLAN NUMBER USED THREE TIMES BY L.& C.
C	SO	PLAN NUMBER USED THREE TIMES BY L.& C.
B	SO	COMPILED FROM SURVEYS & DEEDS MAY 4, 1943. BROOKS, JORDAN & GRAVES, CIVIL ENGINEERS, LOWELL, MASS. PLAN NUMBER USED THREE TIMES BY L.& C.
C	CL	LOCATED IN FOLDER 149. SEE PLAN NOS. 149-060, 149-061, 149-062.

C	SO/LO/TE /TA	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9500 AND INDEX NO. 9340. ORIGINALLY DATED MAY 5, 1911. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	FO/TE	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9500 AND INDEX NO. 9340. ORIGINALLY DATED MAY 5, 1911. THIS COPY WAS MADE BEFORE THE MODIFICATIONS OF AUG. 1953. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO/LO/TE /TA	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 7616 AND INDEX NO. 9340. ORIGINALLY DATED NOV. 5, 1906. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	FO/TE	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 7616 AND INDEX NO. 9340. ORIGINALLY DATED NOV. 5, 1906. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 25017, REPLACING 9500, AND INDEX NO. 9340.6. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1977, FROM DRAWER 147.
C	SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 25913, REPLACING 9500, AND INDEX NO. 9340. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 25913, REPLACING, 9500 AND INDEX NO. 9340. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/TE	ASSOCIATED MUTUAL FIRE INSURANCE CO. SERIAL NO. 30121 REPLACING 30121 AND INDEX NO. 9340.3. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1977, FROM DRAWER 147.

C	SO/FO/TE /TA	ASSOCIATED MUTUAL FIRE INSURANCE CO. SERIAL NO. 31801 REPLACING 25017 AND INDEX NOS. 9340.6 AND 9349. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 31802, REPLACING 25913, AND INDEX NO. 9340. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 32457, REPLACING 30121, AND INDEX NO. 9340. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 147.
C	SO/TE/TA	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 32465, REPLACING 31801, AND INDEX NO. 9340.6. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	TE/FO/TA	
C	FO/SO/TE	HOWARD M. TURNER, CONSULTING ENGINEER, BOSTON. FILE NO. 904-17. SHEET NO. 4. NOTE, VERSO, READS "ASSETS WIRING".
C	FO/ST	HOWARD M. TURNER, CONSULTING ENGINEER, BOSTON. FILE NO. 904-17. LOCATED ATER COMPLETION OF FORMAL INVENTORY.
C	FO/ST	HOWARD M. TURNER, CONSULTING ENGINEER, BOSTON. FILE NO. 904-17. SHEET NO. 6. PENCIL NOTE, RECTO, READS "REVISED". LOCATED ATER COMPLETION OF FORMAL INVENTORY.
C	FO/ST	HOWARD M. TURNER, CONSULTING ENGINEER, BOSTON. FILE NO. 904-17. SHEET NO. 8. PENCIL NOTE, RECTO, READS "CAN SUBSTITUTE STEEL OF DIFFERENT SIZE OR SHAPE BUT OF SAME STRENGTH?" LOCATED ATER COMPLETION OF FORMAL INVENTORY.

C	FO/TE	HOWARD M. TURNER, CONSULTING ENGINEER, BOSTON. FILE NO. 904-17. SHEET NO. 8. NEW WORK SHOWN IN COLORED PENCIL.
B	SO/FO	ATTACHED TO PLAN NO. 149-001-[A]. SEE ALSO PLAN NO. 149-001-[COPY 1]. BEARS NO. 1309 BENEATH TAPE, RECTO.
B	LI/TE/ST	ATTACHED TO 149-001.
B	SO	ATTACHED IN 5 PAGE DOCUMENT.
B	SO	ATTACHED IN 5 PAGE DOCUMENT.
B	SO	ATTACHED IN 5 PAGE DOCUMENT.
B	SO	PART OF 5 PAGE DOCUMENT.
B	SO	ATTACHED IN 5 PAGE DOCUMENT.

B	SO	
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1910.
B	FO/SO/TE	
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1910.
B	FO/SO/FX	SEE ALSO PLAN NOS. 138-008, 138-025, P.H. 077-009 & C-133-014. LOCATED IN SHELF 150. BEARS NO. 1328 BENEATH LABEL, RECTO.
A		.

B	SO/TE	ORDER NO. A 458
A		
A		
A		
B	SO/FO	NOTE CARD ATTACHED RECTO DATED MAY 19,1898. ALSO ATTACHED TO 149-008-[B].
C	TE	ATTACHED TO 149-008-[A]. NOT LISTED IN CONSECUTIVE INDEX OF DRWINGS.
B	ST/SO/TE	BEARS NO. 1332 BENEATH TAPE, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED WITH SHELF 150. BEARS NO. 1330 TAPED OVER, VERSO.

C	SO	NOTE STATES TRACED FROM DRAWING NO.11 SHELF 149. ATTACHED TO 149-011-[B].
B	SO	SCALES ARE NOTED AS FOLLOWS: 1"=20',H1"=20', V1"=2'. NOTE STATES FROM MEASUREMENT MADE JULY 1,1878.
B	SO	BEARS NO. 1325 BENEATH TAPE, RECTO.
B	TE	ATTACHED IN 3 PAGE DOCUMENT. BLUEPRINT CUT IN HALF. SOME INFO. NOT PRESENT. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 1897.
B	FO/SO/TE	ATTACHED IN 3 PAGE DOCUMENT. NOTE STATES MADE NOV.21 TO 28,1897. ADDITIONAL NOTE DATED JUNE 10,1898.
B	FO/SO/TE	ATTACHED IN 3 PAGE DOCUMENT.
B	FO/TE	PART OF 6 PAGE DOCUMENT.

B	FO/SO	PART OF 6 PAGE DOCUMENT.
B	FO/SO	PART OF 6 PAGE DOCUMENT.
B	CL	PART OF 6 PAGE DOCUMENT.
B	SO	PART OF 6 PAGE DOCUMENT. BEARS MIDDLESEX NEW RACK AUG. TO OCT.1899.
B	SO	PART OF 6 PAGE DOCUMENT.
B	FO/LM/TE	ORIGINALLY DATED NOV. 1890. ADDITIONAL NOTE DATED MARCH 15, 1898. BEARS NO. 1333 TAPED OVER, VERSO.
B	FO/SO	BEARS NO. 1331 CROSSED OUT, RECTO.

B	FO/SO/TE	NO. 1334 COVERED OVER WITH TAPE, RECTO.
B	TE/SO	NOTE DIRECTS TO SEE TRANSIT BOOK NO. 4. SURVEYED MAY 7,1898.
B	TE/SO/FO	
B	TE/SO	ATTACHED IN 3 PAGE DOCUMENT. NOTE DIRECTS TO SEE PLAN DATED SEPT.22,1896.
B	FO/SO/TE /LM	NOTE DIRECTS TO SEE PLAN DATED SEPT. 22,1896.
B	SO/TE	ORIGINALLY DATED DEC. 1896. NOTE STATES ADDITIONAL WORK DONE BY CITY OF LOWELL SEPT. & OCT. 1897. BEARS PLAN NO. 4 RECTO. ADDITIONAL INDEX CARD NOTES REFER TO PLAN NO. 149-041.
B	TE/SO	BEARS PLAN NO. 3 RECTO. THIS IS A DUPLICATE OF 149-021 BUT NUMBERED 149-20 BY P. L. & C.

B	SO/FO/TE	BEARS PLAN NO. 3 RECTO.
B	TE/SO	
B	FO/SO	PLAN NUMBER ENTERED AS 149-023-030 IN L. & C. CARD INDEX.
B	FO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/HO	PLAN NO. 5. BEARS NO. 1320 CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/HO	PLAN NO. 5 WITH ADDITIONAL NEW WORK. NOT NUMBERED BY P. L. & C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	FO/TE/SO	NOTE STATES, MADE FROM SKETCHES, PLANS ETC. FURNISHED THE PROP'S OF THE LOCKS & CANALS BY THE MIDDLESEX COMPANY. PLAN NUMBER ENTERED AS 149-27-28 IN L. & C. CARD INDEX. SCALE ENTERED AS 1/8"=1' IN SAME.
B	FO/SO/TE	

B	SO	NOTE READS "OUT OF DATE. USE NEW DIAGRAM DATED JAN. 19, 1914."
B	SO	
B	SO	ATTACHED TO 149-030-[B]. NOTE STATES INFORMATION AS NEARLY CORRECT AS COULD BE OBTAINED BY MEASUREMENTS MADE ON THE GROUND. BEARS STAMP FROM OFFICE OF PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER OCTOBER 20,1905 LOWELL, MASS.
B	SO	ATTACHED TO 149-030-[A]. NOTE STATES INFORMATION AS NEARLY CORRECT AS COULD BE OBTAINEDBY MEASUREMENTS MADE ON THE GROUND. BEARS STAMP FROM OFFICE OF PRPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER OCTOBER 20,1905 LOWELL, MASS.
B	SO	4 PAGE DOCUMENT.
B	SO	4 PAGE DOCUMENT.
B	SO	4 PAGE DOCUMENT.
B	SO	4 PAGE DOCUMENT.

B	TE/SO	2 PAGE DOCUMENT.
B	TE/SO	2 PAGE DOCUMENT.
B	TE/SO	
B	TE/SO	
B	TE/SO	

B	CL	IN ENVELOPE 35. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	IN ENVELOPE 35. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	BEARS METER #8163 WATCH #5. ALSO BEARS SHEET #1.
B	CL	BEARS METER #4176, WATCH #5, SHEET #2.
B	CL	BEARS METER #4176, WATCH #5.
B	SO	METER A.T.S. B.& B. #4176 WATCH #5.
B	SO	BEARS METER #8163.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.

B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 4 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 4 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.

B	SO	BOUND TOGETHER AS AN 4 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
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B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 8 PAGE DOCUMENT.

B	SO	BOUND TOGETHER AS AN 4 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS AN 11 PAGE DOCUMENT.
B	CL	NOTE DIRECTS TO SEE TRANSIT BOOK 136, P.162.
B	CL	
B	TE	METER # 8163. WATCH # 1. HOLT & HAMILTON.
B	SO	LOCATED IN FOLDER ENTITLED BIGELOW-HARTFORD CARPET CO.

B	SO	LOCATED IN FOLDER ENTITLED BIGELOW-HARTFORD CO.
B	SO/FO/TE	LOCATED IN FOLDER ENTITLED BIGELOW-HARTFORD CARPET CO. SURVEYED BY BROOKS, JORDAN AND GRAVES.
B	SO	LOCATED IN FOLDER ENTITLED BIGELOW-HARTFORD CO.
B	SO	LOCATED IN FOLDER ENTITLED BIGELOW-HARTFORD CARPET CO. 3 PAGE DOCUMENT. CONSECUTIVE INDEX GIVES DATE OF 1946.
B	SO	LOCATED IN FOLDER ENTITLED BIGELOW-HARTFORD CARPET CO., ENV. 35.
B	LI/LM/TE/ SO/ST	
A		CONSECUTIVE INDEX SHOWS PLAN NO. CROSSED OUT WITH NOTE "BLUEPRINT SENT TO IPSWICH MILLS". IT WAS VERY LIKELY THIS COPY WHICH WAS SENT.
B	SO/TE	PLAN NUMBER ENTERED AS 149-39-21 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1896.

B	TE/SO	NOTE DIRECTS TO SEE A.T.S. FILE NO. 110 PP.-45-49.
B	TE/SO	ORDER # A1221. ATTACHED IN 3 PAGE DOCUMENT. SEE ALSO PLAN NO. 149-020. BEARS NO. 1316, VERSO.
B	TE/FO	ATTACHED IN 3 PAGE DOCUMENT. SEE ALSO PLAN NO. 149-020.
B	SO	NOTE DIRECTS TO SEE A.T.S. FILE NO. 110 PP-45-49.
C	TE/SO	NOTE DIRECTS TO SEE A.T.S. FILE NO. 110 PP-45-49.
B	FO/SO/TE	
A		NOTED AS "DESTROYED" IN CONSECUTIVE INDEX.

B	CL	CONSEUCTIVE INDEX OF DRAWINGS GIVED DATE OF 1896-1897.
B	SO	DETAIL USED AS 149-060.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	
B	FO/TE	ADDITIONAL NOTE DATED: MARCH 3, 1916.
B	FO/SO/TE	

B	SO	
B	CL	
A		NOTED AS "REMOVED TO BOOK OF MEASUREMENTS" IN P. L.& C. CONSECUTIVE INDEX.
B	SO	METER L.& C. 8163, WATCH #5.
B	SO	PART OF 7 PAGE DOCUMENT. SEE ALSO PLAN NOS. 149-050-E, F, & G.
B	SO	PART OF A 7 PAGE DOCUMENT. SEE ALSO PLAN NO. 149-050-D, F, & G.
B	SO	SEE ALSO PLAN NOS. 149-050-D, E, & G.
B	SO	PART OF A 7 PAGE DOCUMENT.
B	SO	PART OF 7 PAGE DOCUMENT. SEE ALSO PLAN NOS. 149-050-D, E, & F.
B	SO	PART OF 7 PAGE DOCUMENT. METER #8163, WATCH #5.

B	SO	BEARS METER #4176, WATCH #5. THIS PLAN NO. USED TWICE BY P.L.& C.
B	SO	NOTE DIRECTS TO SEE CALCULATION BOOK 692, PAGES 83 & 84. THIS PLAN NO. USED TWICE BY P.L.& C.
B	CL	
B	CL	
B	FO/SO	
B	CL	PART OF 4 PAGE DOCUMENT.
B	CL	PART OF A 4 PAGE DOCUMENT.
B	CL	PART OF 4 PAGE DOCUMENT.
B	CL	PART OF 4 PAGE DOCUMENT. NOTE STATES PLOTTED FROM HOLYOKE TEST L.H. #1618.
B	CL	NOTE STATES PLOTTED FROM HOLYOKE TEST R.H. #1593.
B	CL	
B	CL	NOTE STATES PLOTTED FROM HOLYOKE TEST #954.
B	CL	PLOTTED FROM HOLYOKE TEST #954.
B	CL	NOTE STATES PLOTTED FROM HOLYOKE TEST L.H. #912.
B	CL	PLOTTED FROM HOLYOKE TESTS: R.H. #954, & L.H. #912.

B	SO	CONSECUTIVE INDEX OF DRAWING NUMBERS GIVES DATES OF DEC., 1896, AND JAN., 1897.
B	SO	
C	TE/SO	SHOWS NEW WORK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	TE/SO	
B	SO/FO	SCHEME A, CONCORD RIVER UNIT.
B	SO	SCHEME B.
B	SO	
B	SO	

A		
B	FO/SO/TE	
B	SO	
A		
A		
C	FO/SO	DETAIL OF 149-046. THIS PLAN NO. WAS USED TWICE BY P. L.& C. DATE IS COVERED OVER BY PLAN NUMBER LABEL BUT WOULD BE THE SAME AS 149-046, THAT IS, MARCH, 1919.
B	SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
B	SO/TE	BEARS NOTES: JOB NO. B-37, DRAWER NO. 1, SHEET NO. 67, AND JOHN B. STEVENS, ENG'R, RECTO. ALSO KNOWN AS ASSETS POWER HOUSE. CONSECUTIVE INDEX OF DRAWINGS DEFINES THIS AS A PHOTOSTAT.
B	SO/FO	BEARS NOTES: JOB NO. B-37, DRAWER NO. 1, SHEET NO. 67, AND JOHN B. STEVENS, ENG'R, RECTO. ALSO KNOWN AS ASSETS POWER HOUSE. CONSECUTIVE INDEX OF DRAWINGS DEFINES THIS AS A PHOTOSTAT.

B	SO	
A		FROM JOHN A. STEVENS.
B	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF AUG., 1928. ORIGINAL DATE HAS BEEN SCRAPED AWAY WITH MORE WORDING ADDED AND THE DRAWING ITSELF WAS THEN REDATED.
B	SO/FO	TO ACCOMPANY LETTER OF ARTHUR T. SAFFORD.
B	FO/SO/LM	ORDER # A2270. NOTE STATES, FOR DETAILS OF WHEEL ROOM & GENERAL ARRANGEMENT, SEE TRACING DATED SEPT.22ND-1896. FOR PLAN SHOWING REARRANGEMENT OF FEEDERS, SEE TRACING DATED, OCT.7, 1896. FOR ARRANGEMENT OF SPECIAL STEPWORK, SEE TRACING DATED JAN.15, 1897.
B	SO	NOTE STATES COMPILED FROM VARIOUS SOURCES OCT. 1931.
B	SO	
B	FO/SO	ADDITIONAL NOTES DATED JULY 23, 1935.

B	LM/FO/ST	ADDITIONAL NOTES DATED JULY 23, 1935.
B	FO/SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS NOTES "COMPILED BY E. L. HUSE".
B	SO	
B	FO/SO/TE	BEARS SHEET NO. 67 JOB NO.B-37 RECTO. THERE MAY HAVE BEEN A SECOND BLUEPRINT CREATED 1 JULY 1948.
B	SO	
B	SO	
B	FO/SO/TE	
C	FO/SO/TE	ORIGINALLY DATED JANUARY, 1891. TRACED JANUARY, 1904. NEW WORK ADDED TO THIS COPY IN 1931 AND 1932. LATEST WORK DATED NOV. 15, 1932.

C	FO/SO/LO	ORIGINALLY DATED JANUARY, 1891, TRACED JANUARY, 1904. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/TE	
C	CL	PLAN IS A PHOTO NEGATIVE THEREFORE THE IMAGE IS REVERSED.
B	ST/FO/SO /TE	
B	FO/TE	
B	FO/SO	
B	TE/SO/FO	
B	FO/SO	NOTE DIRECTS TO SEE ACCOMPANYING PLAN FOR LOCATION OF SECTION.
B	FO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1900.

B	TE	TO ACCOMPANY LETTER OF ARTHUR T. SAFFORD.
B	FO/SO	
B	FO/SO/TE	
B	FO/SO	
B	FO/SO	
B	FO/TE/SO	ORIGINAL DATED JAN. 1893. TRACED MARCH 1896.
B	FO/SO/TE	UNDATED, MOST DATA IS FOR YEAR 1901. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897 AND 1897.
A		SEE TUBE # 78.
B	SO	ORIGINALLY BOUND AS A 4 PAGE DOCUMENT. FOR LOCATION OF SECTIONS SEE PLAN 1383 P.H. 66. BEARS NO. 1384 BENEATH TAPE, RECTO.

C	SO	ORIGINALLY BOUND AS A 4 PAGE DOCUMENT. FOR LOCATION OF SECTIONS SEE PLAN 1383 P.H. 66. BEARS NO. 1384 BENEATH TAPE, RECTO.
B	SO	ORIGINALLY BOUND AS A 4 PAGE DOCUMENT. FOR LOCATION OF SECTIONS SEE PLAN 1383 P.H. 66. BEARS NO. 1384-1 BENEATH TAPE, RECTO.
C	SO	ORIGINALLY BOUND AS A 4 PAGE DOCUMENT. FOR LOCATION OF SECTIONS SEE PLAN 1383 P.H. 66. BEARS NO. 1384-1 BENEATH TAPE, RECTO.
B	SO	ATTACHED IN 9 PAGE DOCUMENT. BEARS NO. 1 RECTO. ORDER NO. A1193.
B	SO	ATTACHED IN 9 PAGE DOCUMENT. BEARS NO. 1 RECTO. ORDER NO. A1193.
B	SO	PART OF A 9 PAGE DOCUMENT. BEARS NO. 3 RECTO. ORDER NO. A1193.
B	CL	ATTACHED IN 9 PAGE DOCUMENT. ORDER NO. A1193.
B	CL	ORDER NO. A1193.

B	FO	PART OF 9 PAGE DOCUMENT. BEARS NO. 6 RECTO. ORDER NO. A1193.
B	CL	PART OF 9 PAGE DOCUMENT. BEARS NO. 7 RECTO. ORDER NO. A1193.
B	FO/SO	ATTACHED IN 9 PAGE DOCUMENT. BEARS NO. 8 RECTO. ORDER NO. A1193.
B	FO/TE/SO	ATTACHED IN 9 PAGE DOCUMENT. BEARS NO. 9 RECTO. ORDER NO. A1193.
B	TE/FO	

B	SO/TE/LO	LOCATED AFTEER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	FO/TE/ST/ SO	2 PAGE DOCUMENT ATTACED RECTO.
C	TE/SO	2 PAGE DOCUMENT. ATTACHED TO 150-021.
B	SO	
B	FO/ST/SO	
B	FO/SO	CONSECUTIVE INDEX OF PLAN NUMBERS GIVES DATE OF "ABOUT 1890".
B	SO	DISCHARGE DIAGRAM OF WHEELS 1 THROUGH 6 AT SACO-LOWELL SHOPS.

B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	PART OF 10 PAGE DOCUMENT. BEARS "O.K." RECTO.
C	CL	NOTE STATES, LOWER WHEEL O.K. PART OF 10 PAGE DOCUMENT.
B	SO	PART OF A 10 PAGE DOCUMENT.
B	SO	PART OF 10 PAGE DOCUMENT.
B	SO	PART OF 10 PAGE DOCUMENT. BEARS #2 RECTO.
C	CL/TE	
B	SO	PART OF 10 PAGE DOCUMENT.
B	SO	PART OF 10 PAGE DOCUMENT.
B	SO	PART OF 10 PAGE DOCUMENT.
C	CL	NOTE STATES UPPER WHEEL O.K. PART OF 10 PAGE DOCUMENT.
B	SO	ATTACHED TO 150-029 & 150-029-[A].

B	SO	NOTE STATES CORRECTED TO JAN 15,1914. ATTACHED TO 150-029-[A] & [B].
B	SO	
B	SO	ATTACHED TO 150-029 [A] & [B]. NOTE STATES THAT THIS PLAN IS OUT OF DATE, USE NEW DIAGRAM DATED JAN. 15, 1914.
B	SO	(TO ACCOMPANY REPORT ON CONDITIONS OF WHEELS MAY 7, 1911).
B	SO	
B	FO	SCALES ARE NOTED AS FOLLOWS: 1/2 FULL SIZE, FULL SIZE, 1/8"=1', 1/4"=1', 3"=1'. LOCKWOOD, GREENE & CO. BLUEPRINT.
B	FO/SO	PART OF 19 PAGE DOCUMENT ENTITLED "NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T." DOCUMENT BEARS FILE 1044. BEARS NO. 3523, VERSO. ALSO READS, LAW SECTION VACUUM GAUGE.
B	SO/TE	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE	PART OF 19 PAGE DOCUMENTARY ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.

B	CL	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	CL	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE/SO	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE/SO	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE	2 PLANS COPIED ON ONE SHEET. PLANS DATED FEB.28,1911 & AUG.5,1913. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	CL	TWO PLANS COPIED ON ONE SHEET. PLANS DATED JAN.13,1913 & OCT.8,1913. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	CL	2 PLANS COPIED ON ONE SHEET. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	TE/SO	4 PLANS COPIED ON 1 SHEET. PLANS ARE DATED AS FOLLOWS: MAY 19 & 20,1904, JAN.20,1910, MAR.20,1911. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	CL	2 PLANS COPIED ON ON SHEET. PLANS ARE DATED DEC.7,1905 & JUNE 3,1910. PART OF 19 PAGE DOCUMENT ENTITLED:NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	SO	4 PLANS COPIED ON ONE SHEET. PLANS DATED AS FOLLOWS: DEC.20,1912, OCT.19 & NOV.2,1914. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.

B	SO	3 PLANS COPIED ON ONE SHEET. DATES OF PLANS ARE NOTED AS FOLLOWS: OCT. 25, 1904, APRIL 19, 1909, & FEB. 13, 1913. NOTE DIRECTS TO SEE DR 35268. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	CL	4 PLANS COPIED ON ONE SHEET. DATES ARE NOTED AS FOLLOWS: SEP.7,1908, JULY 7,1909, APRIL 8,1912 & DEC.2,1914. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	CL	PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	SO	PLAN DATED SEPT.9,1902, BUT ADDITIONAL NOTE DATED SEPT.18,1913. PART OF 19 PAGE DOCUMENT ENTITLED: NEW 1914 TRIPLEX SACO-LOWELL PUMPS DETAILS FOR 13 x 12 S.A.V.T.
B	SO	4 PAGE DOCUMENT.
B	SO	4 PAGE DOCUMENT.
B	SO	4 PAGE DOCUMENT.
B	SO	4 PAGE DOCUMENT.

A		
B	SO	ATTACHED TO 150-037-[B].
B	SO	ATTACHED TO 150-037-[A].
B	CL	
A		
B	SO/FO	DATE GIVEN AS NOV 1915 IN L.& C. CARD INDEX. SCALE WAS NOT GIVEN BUT PLAN IS IN SAME SCALE AS 150-040-A.

B	SO	DATE GIVEN AS NOV 1915 IN L.& C. CARD INDEX.
B	SO	LOCATED IN FOLDER ENTITLED FLOOR PLANS LAWRENCE SECTIONS MILLL NO.1-2ND &5TH FLOORS TREMONT YARD MILL NO.2-1ST & 2ND FLOORS. LOCATED WITH SHELF 150.
B	SO	LOCATED IN FOLDER ENTITLED FLOOR PLANS LAWRENCE SECTIONS MILL NO.1-2ND & 5TH FLOORS TREMONT YARD MILL NO.2-1ST & 2ND FLOORS. LOCATED WITH SHELF 150.
B	SO	LOCATED IN FOLDER ENTITLED FLOOR PLANS LAWRENCE SECTIONS MILL NO.1-2ND & 5TH FLOORS TREMONT YARD MILL NO.2-1ST & 2ND FLOORS. LOCATED WITH SHELF 150.

B	SO	LOCATED IN FOLDER ENTITLED FLOOR PLANS LAWRENCE SECTIONS MILL NO. 1-2ND & 5TH FLOORS TREMONT YARD MILL NO.2-1ST & 2ND FLOORS. LOCATED WITH SHELF 150.
B	SO/FO	LOCATED IN FOLDER ENTITLED FLOOR PLANS LAWRENCE SECTIONS MILL NO. 1-2ND & 5TH FLOORS TREMONT YARD MILL NO. 2-1ST & 2ND FLOORS. LOCATED WITH SHELF 150. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION.
B	TE/SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-41-A IN L. & C. CARD INDEX.
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL/FO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-041-C IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. NOTE DIRECTS TO SEE CALC. BOOK NO.693, PAGES 22-27. (IN USE FROM JUNE 13, 1919.) PLAN NUMBER ENTERED AS 150-41-D IN L. & C. CARD INDEX.
C	RO	NOTE DIRECTS TO SEE CALC. BOOK NO.693, PAGES 22-27. (IN USE FROM JUNE 13, 1919.)
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. HOLYOKE TEST #2663 OF 28 1/2" TYPE S, WHEEL. PLAN NUMBER ENTERED AS 150-41-E IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. NOTE STATES "IN USE FROM JUNE 1920". NOTE DIRECTS TO SEE CALC. BOOK 700-P.57. PLAN NUMBER ENTERED AS 150-041-F IN L. & C. CARD INDEX.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. IN USE FROM JUNE 1920.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-041-G IN L. & C. CARD INDEX.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. BEARS FILE 1006 RECTO. PLAN NUMBER ENTERED AS 150-41-I IN L. & C. CARD INDEX.

B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. BEARS FILE 1007 RECTO. PLAN NUMBER ENTERED AS 150-41-J IN L. & C. CARD INDEX.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. BEARS FILE 1007 RECTO.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION.
B	TE	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-41-M IN L. & C. CARD INDEX. FILE 1006. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-041-N IN L. & C. CARD INDEX.
B	SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-41-O IN L. & C. CARD INDEX.
B	TE/SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. NOTE DIRECTS TO SEE CALC. BOOK 700-PP. 56 & 57. NOTE ALSO STATES "OBSOLETE MARCH 30, 1921 USE # 2 DIAGRAM". IN USE FROM JUNE 1920.
B	SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. NOTE STATES THIS DIAGRAM IS OBSOLETE. PLAN NUMBER ENTERED AS 150-041-Q IN L. & C. CARD INDEX.

B	SO	PLAN FOUND IN SHELF 146. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BASED ON HOLYOKE TEST # 940. PLAN NUMBER USED TWICE IN L. & C. CARD INDEX TO REFER TO RELATED BUT DIFFERENT PLANS. SEE ALSO 150-A-041-S. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED AS 150-41-T IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. PLAN NUMBER ENTERED IN L. & C. CARD INDEX AS 150-ENV. 41-U.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. NOTE STATES THIS IS NOT THE PLAN REFERRED TO IN THE REPORT OF PAUL R. CLAY COMMISSINER. PLAN NUMBER ENTERED AS 150-41-V IN L. & C. CARD INDEX.
B	SO	LOCATED IN FOLDER ENTITLED, T.& S. & LAWRENCE SECTION. ORIGINAL DATE JAN. 1, 1832, COPIED 1929. PLAN NUMBER ENTERED AS 150-41-W IN L. & C. CARD INDEX.

B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. ATTACHED TO 150-041-Y & 150-041-Z.
B	CL	LOCATED IN FOLDER ENTITLED T.& S. & LAWRENCE SECTION. ATTACHED TO 150-041-X & Z. NOTE STATES 70% SPEED FACTOR. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1931.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. ATTACHED IN 5 PAGE DOCUMENT. PLAN NUMBER ENTERED AS 150-42-A IN L. & C. CARD INDEX.
B	CL	LOCATED IN FOLDER 150-A-042 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-B IN L. & C. CARD INDEX.
B	SO	LOCATED IN FOLDER 150-A-042 ENTITLED SACO LOWELL SHOPS. BEARS METER #8163. ALSO BEARS SHEET NO.3. PLAN NUMBER ENTERED AS 150-42-C IN L. & C. CARD INDEX.
B	SO	LOCATED IN FOLDER 150-A-042 ENTITLED SACO-LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-D IN L. & C. CARD INDEX. H.S. FERGUSON'S GURLEY METER NO. 374 USED ON ROD FOR ONE MEASUREMENT & CABLE & WEIGHT USED FOR OTHER.
B	SO	LOCATED IN FOLDER 150-A-042 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-E IN L. & C. CARD INDEX. H.S. FERGUSON'S GURLEY METER NO. 374 USED ON ROD FOR ONE MEASUREMENT & CABLE & WEIGHT USED FOR OTHER.

B	SO	LOCATED IN FOLDER 150-A-042 ENTITLED SACO-LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-D IN L. & C. CARD INDEX. H.S. FERGUSON'S GURLEY METER NO. 374 USED ON ROD FOR ONE MEASUREMENT & CABLE & WEIGHT USED FOR OTHER.
B	SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. ORIGINALY DATE JUNE 15, 1913. DATE CORRECETED TO OCT.2, 1914. PLAN NUMBER ENTERED AS 150-42-F IN L. & C. CARD INDEX.
B	FO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-G IN L. & C. CARD INDEX. FILE 1011. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO-LOWELL SHOPS. ATTACHED TO 150-A-042-H-[COPY 1]. PLAN NUMBER ENTERED AS 150-42-H IN L. & C. CARD INDEX. FILE 1011. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	CL/FO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO-LOWELL SHOPS. ATTACHED TO 150-A-042-H. THIS COPY NOT NOTED IN L. & C. CARD INDEX. FILE 1011. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	LOCATED IN FOLDER 150-A-42 ENTITLED SACO-LOWELL SHOPS. PLOT OF COMPUTED CURVES FROM HOLYOKE TEST # 2663 & TEST OF WHEEL IN PLACE ON SEPT. 14, 16 & OCT. 3, 1919.
B	FO/TE/SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-J IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. NOTE STATES NOS.1 OR 2 WHEELS, SEE CALC BKS 1 & 559 PP9-16, 45-49 NO.3 WHEEL SEE CALC BK 693 PP18-20. NOS 4,5 OR 6 WHEELS, SEE CALC BK 692 PP1-2. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-K IN L. & C. CARD INDEX.
B	CL	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-L IN L. & C. CARD INDEX. FILE 1011. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1918.
B	FO/TE/SO /HO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. BEARS METER # 8163. ALSO BEARS SHEET NO.3. SEE ALSO PLAN NO. 150-A-042-N.
B	SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-N IN L. & C. CARD INDEX. SEE ALSO PLAN NUMBER 150-A-042-M.
C	SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. ATTACHED WITH 150-A-042-S & 150-A-042-R.
B	FO/SO	NOTE STATES TRACED FROM 10 SCALE PLAN. PLAN NUMBER ENTERED AS 150-ENV. 42-Q IN L. & C. CARD INDEX.

B	CL	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-R IN L. & C. CARD INDEX.
B	SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO LOWELL SHOPS. PLAN NUMBER ENTERED AS 150-42-S IN L. & C. CARD INDEX.
C	CL	LOCATED IN FOLDER 150-A-042 ENTITLED SACO LOWELL SHOPS.
C	SO	LOCATED IN FOLDER 150-A-042 ENTITLED SACO LOWELL SHOPS.
B	FO/SO	LOCATED IN FOLDER 150-A-42 ENTITLED SACO-LOWELL SHOPS. ATTACHED TO 150-A-042-V-[COPY 2]. CONSECUTIVE INDEX OF DRAWINGS NOTES "THIS PROPERTY WAS CONVEYED TO SACO-LOWELL SHOPS AND LATER TO APPLETON CO.".
B	CL	LOCATED IN FOLDER 150-A-042 ENTITLED SACO-LOWELL SHOPS. ATTACHED TO 150-A-042-V-[COPY 1]. CONSECUTIVE INDEX OF DRAWINGS NOTES "THIS PROPERTY WAS CONVEYED TO SACO-LOWELL SHOPS AND LATER TO APPLETON CO.".
B	TE/FO/SO	NOTE STATES NEW BUILDING TO BE CONSTRUCTED BY SACO-LOWELL SHOPS BEGINNING JAN. 22,1917.
B	SO/TE	

B	FO/TE/SO	LOCATED WITH SHELF 154. BEARS NO. 4146, RECTO.
B	SO	BEARS NO. 4148, RECTO.
B	SO	BEARS NO. 4149 , RECTO. ALSO BEARS NO. 47, RECTO.
B	FO/TE/SO	LOCATED WITH SHELF 154.
B	SO	
B	SO	
B	CL	
B	SO	BEARS #37 RECTO.
B	CL	

		NOTE DIRECTS TO SEE "BOOK OF USEFUL INFORMATION".
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	TWO DATES GIVEN FOR PLAN: MAY 16,1919 & JUNE 11,1921.
B	FO	
C	FO	
B	SO	
B	FO/SO	

B	FO/SO/TE	NOTE DATED JAN, 1921.
B	TE/SO/ST	A. T. SAFFORD, ENG.
A		
B	TE/SO/FO	
B	FO/SO/TE	NOTE DATED JAN. 1921. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JANUARY, 1921.
A		IN USE FROM MARCH 1, 1920. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	REFER TO PLANS: 150-069, 150-070, 150-071 & 150-072.

B	SO	BEARS SHEET NO. 1 RECTO. REFER TO PLANS: 150-068, 150-070, 150-071, & 150-072.
B	SO	BEARS SHEET NO. 2 RECTO. REFER TO PLANS: 150-068, 150-069, 159-071 & 150-072.
B	SO	BEARS SHEET NO. 3 RECTO. REFER TO PLANS: 150-068, 150-069, 150-070 & 150-072.
B	CL	BEARS SHEET NO. 4 RECTO. REFER TO PLANS: 150-068, 150-069, 150-070, & 150-071.
B	FO/SO/TE	LATEST REVISION WAS 13 MARCH, 1919. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1 OCT., 1919.
B	SO	

B	SO	
B	SO	
B	SO	
B	SO	
B	FO/SO	NOTE STATES: INSPECTION MADE SEPT. 23,1923.
B	FO/SO	ATTACHED TO 150-081.
B	FO/SO	ATTACHED TO 150-080.
B	SO	
B	SO/TE/FO	NOTE STATES SURVEYED MARCH 24,1926. BROOKS, JORDAN, AND GRAVES.

B	SO	SEE 150-087 FOR SCHEME 1.
B	SO	
B	SO/FO	
B	FO/SO	SEE 150-084 FOR SCHEME 2.
B	SO	
B	FO/TE/SO	A WORTHINGTON MACHINE CO. BLUEPRINT.
B	SO/FO	

B	SO/FO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	
B	FO/SO	BEARS DRAWING NO. 1. BEARS NO. 7 RECTO. PLAN BEARS SIGNATURE OF APPROVAL.
B	FO/TE	
B	LO/TE/FO	
B	SO	PLAN NUMBER ENTERED AS 150-96 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX. ATTACHED TO 150-096-B.
B	SO	PLAN NUMBER ENTERED AS 150-96 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX. ATTACHED TO 150-096-A.
B	FO/SO/TE	
B	TE/SO	KNOWLTON & NEWTON CO., INC.

B	TE	KNOWLTON & NEWTON CO., INC. TITLE TAKEN FROM 150-098-A. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 26, 1927 FOR BOTH PLANS AS WELL SAME TITLE FOR BOTH.
B	SO	
A		
B	SO	L. & C. INDEX CARD NOTED THAT PLAN NUMBER 150-100 CONSISTED OF 4 SHEETS.
B	SO	L. & C. INDEX CARD NOTED THAT PLAN NUMBER 150-100 CONSISTED OF 4 SHEETS.
B	SO	L. & C. INDEX CARD NOTED THAT PLAN NUMBER 150-100 CONSISTED OF 4 SHEETS.
B	SO	L. & C. INDEX CARD NOTED THAT PLAN NUMBER 150-100 CONSISTED OF 4 SHEETS.
B	SO	
B	CL	
B	CL	

B	FO/SO	
B	SO	BEARS SHEET NO. 2.
B	SO	
B	FO	
B	FO	
B	FO	
B	CL	LOCATED IN FOLDER 150-A-042 ENTITLED SACO LOWELL SHOPS.
B	CL	

B	SO/FO	NOTE STATES DEED RECORDED APRIL 15,1927, BOOK 748, PAGE 299.
B	FO/SO	
A		
B	CL	THIS PLAN NO. WAS USED TWICE BY P.L.& C. THIS COPY OF 150-115 AS LISTED IN THE CARD INDEX BUT NOT IN THE CONSECUTIVE INDEX OF DRAWINGS.
B	SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. THIS COPY OF 150-115 WAS LISTED IN THE CONSECUTIVE INDEX OF DRAWINGS BUT NOT IN THE SUBJECT CARD INDEX.
A		
B	FO/SO	BEARS DRAWING NO. 39102. CONSECUTIVE INDEX NOTES THIS AS TYPE B-4 AND ALSO "PROP. # 1 & # 1-A".

B	FO/SO/TE	BEARS DRAWING NO. 39105, RECTO. CONSECUTIVE INDEX NOTES THIS AS TYPE B-2 AND ALSO "PROPS. # 2 & # 4".
B	FO/SO	CONSECUTIVE INDEX NOTES THIS AS "PROP. # 3".
B	FO/SO/TE	BEARS NO. P-3212-P-2.
B	FO/SO	NOTE STATES FLUME COVER ADDED 7-5-21.
B	FO/SO/TE /ST	LATEST REVISION IS 1925.
B	SO	
B	SO	NOTES STATES COPIED FROM LOCKS & CANALS LAND PLAN NO.9.
B	SO	
B	SO	
B	SO	

B	FO/SO	
B	SO	
B	FO/SO	
B	FO/SO/TE	BEARS JOB NO. 408 FILE NO. 26 SHEET NO.1.
B	FO/SO	NOTE STATES BUILT BY L.& C. OCT.21-22, 1933.
B	TE	
B	SO	BORRKS, JORDAN, AND GRAVES. PLAN REVISED SEPT. 24, 1942. CONSECUTIVE INDEX NOTES THAT "THIS PROPERTY LATER DEEDED TO PROPS. LOCKS AND CANALS".
A		THIS PLAN IS BLUEPRINT COPY OF PLAN NO. 139-047.

B	SO	
B	SO	
B	SO	
C	SO	THERE IS NO NEW WORK ON THIS COPY, SIMPLY A NOTE ADDED ON MAY 2, 1944.
B	FO/SO/TE	BEARS LAH-240-2 RECTO.
B	FO/SO	CONSECUIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	ORIGINALLY DATED AUGUST 1948. REVISED JANUARY & FEBRUARY 1949.
B	SO	
B	SO	ORIGINALLY DATED JAN. 8, 1951, REVISED FEB., 1958. THE BLUEPRINT COPY 150-143-[B] WAS MADE BEFORE THIS PLAN WAS REVISED IN FEB. 1958.

C	FO/SO	THIS COPY WAS MADE BEFORE THE CHANGES OF FEB. 1958 WERE MADE TO THE ORIGINAL PLAN, 150-143-[A].
A		
A		
A		
A		
A		
A		
A		
C	FO	
C	FO/SO/TE	ORIGINALLY DATED 6 OCT., 1907. ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 8099, INDEX NO. 308. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	SO/TE	ORIGINALLY DATED 28 SEPT., 1897. ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 5084, INDEX NO. 306. LOCATED AFTER COMPLETION OF FORMAL IVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9228, INDEX NO. 306. LOCATED AFTER COMPLETION OF FORMAL IVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.

C	FO/SO	FACTORY INSURANCE ASSOCIATION NO. 2274-A. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE/TA	FACTORY INSURANCE ASSOCIATION NO. 2274-B. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE	FACTORY INSURANCE ASSOCIATION NO. 2274-A. JOINED TO 151-[066]-[B]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE	FACTORY INSURANCE ASSOCIATION NO. 2274-B. JOINED TO 151-[066]-[A]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE/TA	FACTORY INSURANCE ASSOCIATION NO. 2274-C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
A		
B	SO	NOTE STATES FOR GENERAL ARRANGEMENT SEE DRAWING 6-19-'08. HOLYOKE MACHINE CO., WORCESTER, MASS. BEARS ORDER NO. A590. HEAD 21 FT. BEARS NO. 1358, CROSSED OUT, VERSO.
B	FO/SO	NOTE DIRECTS FOR GENERAL ARRANGEMENT-SEE DRAWING DATED 6-19-`08. ORDER NO.A590. HEAD 21 FT. BEARS NO. 1391, RECTO.
B	FO	HOLYOKE MACHINE CO., WORCESTER, MASS. HEAD 21 FT. NOTE DIRECTS FOR DETAILS OF WHEELS-SEE DRAWING DATED JUNE 30,'08.

B	SO	NOTE DIRECTS FOR DETAILS OF WHEELS-SEE DRAWING DATED JUNE 30-`08. HEAD 21 FT.
B	FO/SO	"NOTE PLAN IN THREE PARTS. PART 1 SHOWING NOTES THAT RELATE TO THE SURVEY & MEASUREMENTS OF THE BUILDINGS." BEARS NO. 1379 TAPED OVER, VERSO.
B	FO/SO	"NOTE PLAN IN THREE PARTS. PART 2. PARTS 2 & 3 SHOW NOTES RELATING TO THE SURVEY & MEASUREMENTS OF THE BUILDINGS. ATTACHED TO 151-002-[2] & 151-002-[3]. BEARS NO. 1379 RECTO. BEARS NO. 1380 TAPED OVER, VERSO.
B	FO/SO	"NOTE PLAN IN THREE PARTS. PART 3. PARTS 2 & 3 SHOW NOTES RELATING TO THE LOCATION OF HYDRANTS, SPRINKLERS & L.& C. RESERVOIR PIPES,TOGETHER WITH THE GATES OR VALVES PERTAINING THERETO; ALSO SOME PORTIONS OF THE CITY OF LOWELL WATER MAINS & GATES.
B	FO/SO	LEAKS UNDER THE REPAIR SHOP & NAPPING ROOM, OBSERVED AUG. 11, 1897. CONSECUTIVE INDEX GIVES DATE OF 1888. NOTE DIRECTS TO SEE M.S. AMY'S NOTEBOOK NO. 7. BEARS NO. 1377 COVERED OVER, VERSO.

B	SO	[...] & HAVING A PASSAGEWAY/ WITHOUT LOAD 8 FEET WIDE EXTENDING THE / WHOLE LENGTH OF BUILDING IN THE MIDDLE SPAN: TO ACCOMPANY A LETTER OF HIRAM F. MILLS, C.E.
B	SO/FO	NOTE STATES FOR POINT "A" SEE PLAN NO. 1388, I.E. PLAN NO.P.H.-67-[B]. SECTIONS TAKEN LOOKING EAST. LOCATION OF SECTIONS ON PLAN 1368, I.E. PLAN 151-006.
B	FO/TE/SO	"CONTOURS PLOTTED FROM SHEETS OF SECTIONS NO'S 1491-1492." BEARS NO.1368 COVERED OVER, VERSO. SECTIONS ON PLAN 151-005.
B	FO/SO	NOTE STATES TRACING FROM PLAN IN OFFICE, P.L. & C. NO. 1369 COVERED OVER, VERSO.
B	FO/SO	DATE OF ORIGINAL 1855. TRACED IN P.L.& C. JULY 14, 1894 FROM A PLAN BORROWED FROM LAWRENCE MFG. CO. BEARS NO. 1366 COVERED OVER, VERSO.
B	SO	BEARS NO. 1392, RECTO.
B	FO/SO	

B	SO	
B	SO	
C	CL	
B	SO	
B	SO/TE	ATTACHED TO 151-025-[COPY 1].
B	FO/SO	IN USE FROM MARCH 8,1909.
B	FO	IN USE FROM MARCH 8,1909.
B	TE/FO/SO	
C	CL	ATTACHED IN 6 PG. DOCUMENT.
C	CL	ATTACHED IN 6 PG. DOCUMENT.

C	CL	ATTACHED IN 6 PG. DOCUMENT.
C	CL	ATTACHED IN 6 PG. DOCUMENT.
B	SO	ATTACHED IN 6 PG. DOCUMENT.
B	SO/TE	ATTACHED IN 6 PG. DOCUMENT.
B	CL	BEARS 4-5-6 RACES R.H. RACE. PLAN SHOWING LOCATION OF POINT MEASUREMENTS & DIAGRAM WHICH GIVES INFO RELATIVE TO DISTANCE OF WHEEL FROM BOTTOM VS. "D" CORRECTION IN PER CENT.
C	CL	4-5-6 RACES. R.H. RACE.
B	SO	
B	SO	ATTACHED WITH 151-017-[A] & [A-COPY 1].
B	SO	ATTACHED TO 151-017-[COPY 1] & [A-COPY 1].

C	CL	ATTACHED WITH 151-017-[COPY 1] & [A].
B	CL	
C	CL	
B	SO	ATTACHED WITH PLANS 151-019-B TO 151-019-[I-COPY 4]. TESTED AT HOLYOKE # 2436 & 2437 - DEC. 28 & 29,1915.
B	SO	ATTACHED TO 151-019-A TO 151-019-[J].TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MARCH, 1919.

B	SO	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915.
B	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC. 28 & 29,1915. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MARCH, 1919.
B	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC. 28 & 29,1915.
B	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915.

C	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC. 28 & 29,1915.
B	CL	ATTACHED WITH PLANS 151-019-[A] TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC. 28 & 29,1915.
C	CL	ATTACHED TO PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE DEC.28 & 29,1915. TEST NO. 2437 SHOWS R.H. WHEEL. TEST NO. 2436 SHOWS L.H. WHEEL.
B	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 &2437-DEC.28 & 29,1915.

C	CL	ATTACHED TO 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29.
B	FO	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29, 1915. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915.
C	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915.

C	CL	ATTACHED WITH PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915.
C	CL	ATTACHED TO PLANS 151-019-A TO 151-019-[J]. TESTED AT HOLYOKE DEC. 28 & 29,1915. TEST NO. 2437 SHOWS R.H. WHEEL. TEST NO. 2436 SHOWS L.H. WHEEL.
B	CL	ATTACHED TO PLANS 151-019-A-151-019-[J]. TESTED AT HOLYOKE # 2436 & 2437-DEC.28 & 29,1915.
B	FO/TE/SO	TESTED AT HOLYOKE DEC. 28 & 29,1915.
B	FO/SO	NOTE DIRECTS TO SEE CALC. BOOK # 654 PP. 40 TO 48.
B	SO	

B	SO	BEARS NO. 1008.
B	SO	
B	SO/TE	FILE 1008. ATTACHED WITH 151-023-D-[COPY 1], 151-023-E & 151-023-E [COPY 1].
C	SO	FILE 1008. ATTACHED WITH 151-023-D, 151-023-E & 151-023-E-[COPY 1].
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JULY 19, 1915.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JULY 19, 1915.
B	SO	NOTE DIRECTS TO SEE 151-023-G FOR LATER INFORMATION.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 25, 1933, CORRECTED TO AUG. 12, 1937.
B	FO/SO	

B	CL	
B	SO	LAST DATE TESTED FEB. 25,1938. CONSECUTIVE INDEX OF DRAWINGS GIVES DATES OF 1935 AND FEB. 25,1938.
B	SO	
B	SO/FO	
B	FO	
C	SO	CONSISTS OF THREE STANDARD 8 1/2 X 11 TYPEWRITTEN SHEETS SHOWING THE SQUARE FOOTAGE, BUILDING BY BUILDING AND FLOOR BY FLOOR, OF SPACE OCCUPIED BY THE ATLANTIC RAYON CORPORATION IN THE LAWRENCE MILL COMPLEX. FOUND WITH OTHER 151-023-N DOCUMENTS.

B	SO
B	SO
B	SO
B	SO
C	CL
B	SO
B	SO

B	FO/SO	CONSECUTIIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	CONSECUTIIVE INDEX OF DRAWINGS GIVES DATE OF JUNE 14, 1937.
B	FO/TE	BEARS 1008, RECTO.
B	FO/TE/LM	ORDER NO. A 861. 22 FT. WORKING HEAD. FOR GENERAL ARRANGEMENT SEE PLAN DATED AUG. 9, 1915. BEARS NO. 1008, RECTO.
B	FO/TE/SO	NOTE STATES FOR DETAILS SEE TRACING DATED AUG. 31,1915. BEARS 1008, RECTO.
B	SO/TE	ATTACHED TO 151-025-[COPY 1].

C	SO/FO	
B	SO	A TWO PAGE DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 15, 1912.
B	SO/TE/LM	17' FALL. NOTE DIRECTS TO SEE CALC. BOOKS NOS. 667 & 679 PP. 96-99 & 1-11 FOR COMPUTATIONS. SEE FILE NO. 1051 FOR TEST SHEET. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 15, 1912.
B	FO	BEARS HOLYOKE MACHINE CO. WORCESTER, MASS. PLOTTED FROM TEST # 2054. MADE AT HOLYOKE TESTING FLUME MAY 15TH & 16TH 1912. PLOTTED 7-9-15, BY A. REID. NOTE STATES TESTED AT HOLYOKE DEC. 28 & 29,1915.
B	SO	BEARS REFERENCES & DATA ON LAWRENCE NOS. 4, 5 & 6, (UNITS OF TWO) 24" TYPE D HORIZONTAL HERCULES WHEELS. NOTE DIRECTS TO SEE BOOK OF USEFUL INFORMATION.
C	TE	
A		
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/FO	HEAD 22.5 FT. DISCH. (EACH UNIT) 249 CFPS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	DATES GIVEN ARE AS FOLLOWS: NOV. 1909, JAN. 1919, & SEPT. 1925. ORIGINAL PLAN BORE NO. 138-13. THIS COPY HAS NEW WORK IN COLORED INK. PLAN NUMBER ENTERED AS 150-31 IN L. & C. CARD INDEX.
B	FO/SO	
B	FO/SO	NOTE DIRECTS NOT TO USE SCALE.
B	CL	
B	TE/SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS NOTES "FROM INSURANCE PLAN". PERHAPS FACTORY MUTUAL INSURANCE CO.

B	FO/SO	
B	SO/FO	SURVEYED BY PROPRIETORS OF LOCKS & CANALS.
A		
B	FO/SO	SURVEYED AUGUST 1926 BROOKS, JORDAN & GRAVES, CIVIL ENG'RS. LOWELL, MASS. BEARS "COPY" IN GRAPHITE.
B	FO/SO	SURVEYED AUGUST 1926 BROOKS, JORDAN & GRAVES, CIVIL ENG'RS. LOWELL, MASS. PENCIL NOTES ADDED MARCH 1933.
B	SO	ADDITIONAL NOTES DATED MAY 14 & 17,1937, & JUNE 1937.
C	FO/SO	NOTE STATES TO ACCOMPANY PLAN OF SIDETRACK AUGUST 14,1935. SCALE 1"=20'.
B	FO/SO	NOTE DIRECTS TO SEE CALCULATION BOOKS NOS. 654 & 679, PP. 48 & 41. RESPECTIVELY.
B	SO	

B	SO	
B	FO/SO	ATTACHED TO PLAN NOS. 151-019-A THRU [J]. TESTED AT HOLYOKE DEC. 28 & 29,1915. TEST NO.2437 SHOWS R.H. WHEEL & TEST NO.2436 SHOWS L.H. WHEEL.
B	FO/SO	BEARS 33-19 IN GRAPHITE RECTO. ALSO BEARS 6-11 RECTO.
B	SO/TE	SURVEYED BY BROOKS, JORDAN & GRAVES.
C	SO/TE	SURVEYED BY BROOKS, JORDAN & GRAVES. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/TE/LO	SURVEYED BY BROOKS, JORDAN & GRAVES. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	
B	SO	IT IS UNCLEAR WHETHER 151-039 HAS BEEN RENUMBERED 151-048 OR VICE VERSA. NO.48 IS WRITTEN IN RED COLORED PENCIL.
B	SO	
C	SO	NOTE STATES, LEAKS FOUND & GROUTED 5/25/41.

C	CL	
B	SO/FO	
		ATTACHED TO PLAN NOS 151-019-A TO [J]. TESTED AT HOLYOKE DEC.28 & 29,1915. TEST NO.2437 SHOWS R.H. WHEEL. TEST
B	FO/TE	NO.2436 SHOWS L.H. WHEEL.
B	FO	
B	SO/FO	
B	SO	
B	SO	
B	SO	
B	SO	
B	SO/FO	

B	SO/FO	
B	SO	
B	SO	
B	SO	
B	SO	
B	FO	
B	FO/SO/TE	THE HALL ST. WAREHOUSE ADDITION WAS BY ROBINSON & ROBINSON CONTRACTORS,& SPRINKLER SYSTEM WAS BY MIDDLESEX MACHINE COMPANY 40-48 LEE ST. LOWELL, MASS. BEARS DRAWING #1.
B	SO/TE/FO	PLAN DATED 19 JUNE, 1939 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. PLAN ITSELF WAS ORIGINALLY DATED 19 JUNE, 1939. THE COLORED INK WORK MAY REPRESENT NEW WORK ADDED IN 1942.

B	FO/SO	
A		STORED IN AN ENVELOPE WITH 15-11-B THRU G.
A		STORED IN AN ENVELOPE WITH 15-11-A AND C THRU G.
A		STORED IN AN ENVELOPE WITH 15-11-A, B AND D THRU G.
A		STORED IN AN ENVELOPE WITH 15-11-A, B, C AND E THRU G.
A		STORED IN AN ENVELOPE WITH 15-11-A, B, C, D, F AND G.
A		STORED IN AN ENVELOPE WITH 15-11-A, B, C, D, E AND G.
A		STORED IN AN ENVELOPE WITH 15-11-A THRU F.
A		
A		
A		
A		

A		
A		
B	CLEAN	THIS DOCUMENT BEARS TWO PLANS, "PLAN 1" AND "PLAN 2". METCALF & EDDY ENGINEERS, BOSTON, MASS. BEARS "FIG. A-6" IN UPPER RIGHT, RECTO. THIS IMPLIES THE EXISTENCE OF OTHER PLANS IN WHAT MAY HEVE BEEN A SERIES OF PLANS.
B	CLEAN	THIS DOCUMENT BEARS TWO PLANS, "PLAN 1" AND "PLAN 2". METCALF & EDDY ENGINEERS, BOSTON, MASS. BEARS "FIG. A-6" IN UPPER RIGHT, RECTO. THIS IMPLIES THE EXISTENCE OF OTHER PLANS IN WHAT MAY HEVE BEEN A SERIES OF PLANS.
B	CLEAN	MODEL CITIES PROJECT UBI-MA-01-06-1000.
C	FO/SO	LOCATED IN SHELF 153. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	A GENERAL ELECTRIC CO. BLUEPRINT NO. M-1684194. PUNCHED 5 1 19, UPPER LEFT CORNER. NOTES, VERSO, READ "MAIN POWER HOUSE 100 HP MOTOR GENERATOR SET", "RC 17-923885" AND B-0014".
C	FO/SO/TE	BEARS NO. W20046.
A		
B	CL/LI/LM	SEE ALSO PLAN NO. 152-005. BEARS NO. 1419, RECTO.

B	CL/LI/LM	
B	TE/FO/ST	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS." ATTACHED TO 152-003-[B] THRU [D].
B	TE/FO/SO /ST	LOCATED IN SHELF 153 ENTITLED,"MASSACHUSETTS MILLS." NOTE STATES, 2 SETS WANTED FOR HEAD GATES "A" & "B". BEARS ORDER NO. A619. NOTE DIRECTS TO SEE DRAWING OF SLIDING HEAD GATE "C" FEEDERS & CASES-DATED DEC.18 & 21,1909. ATTACHED TO 152-003-[A] THRU [D].
B	ST/FO/TE	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS." NOTE DIRECTS TO SEE DRAWING DATED 12-21-09 FOR DETAILS OF FEEDERS. ATTACHED TO 152-003-[A],[B] & [D].
B	FO/TE/ST	LOCATED IN SHELF 153 ENTITLED "MASSACHUSETTS MILLS." NOTE DIRECTS TO SEE DRAWINGDATED 12-21-09 FOR DETAILS OF FEEDERS. ATTACHED TO 152-003-[A] THRU [C].
B	SO/FO/TE /LI	LOCATED IN SHELF C-148 BUT LISTED IN CARD INDEX AS SHELF 152.

B	TA/TE/FO/ SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. A HOLYOKE MACHINE CO. PLAN.
B	CL	
B	CL/LI/LM	SEE ALSO PLAN NO. 152-001. BEARS NO. 142, RECTO.
B	CL	
B	CL/EN/LM	
B	SO	SEE ALSO PLAN NOS. 152-009 & 010.
B	SO	SEE ALSO PLAN NOS. 152-008 & 152-010.

B	LM/TE/SO	SEE ALSO PLAN NOS. 152-008 & 009.
B	CL	ATTACHED TO 152-011. ORIGINAL DATED NOV. 1876. TRACED OCT. 12, 1904.
B	CL	BEARS NO. 1436 CROSSED OUT, RECTO.
B	FO/SO/HO	ORIGINALLY DATED JULY 3, 1856. THIS COPY MADE FEB 18, 1898. BLUEPRINT COPY AT 152-034.
B	FO/SO	BEARS NO. 1431, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	TE	PUNCH HOLES INDICATE MAY HAVE BEEN ATTACHED TO ADDITIONAL PLAN(S) AT ONE TIME.
C	TE/LO	
B	TE/SO	

B	TE	BEARS NO. 1434 BENEATH LABEL, RECTO.
C	SO	PLAN VIEW OF SCHEME FOR ENTIRE SITE SHOWN IN RED INK LINE DRAWING ON THIS TRACING OF AN OLDER VIEW OF THE ENTIRE COMPLEX. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1903.
B	SO/TE	SCHEME A.
B	SO	SCHEME B.
B	SO	SCHEME C.
B	CL	ATTACHED IN 4 PAGE DOCUMENT.
B	FO/SO	
B	SO	ATTACHED IN 6 PAGE DOCUMENT. NOTE DIRECTS TO SEE CALCULATION BOOK NO. 667, PAGES 74-79.

C	CL	ATTACHED IN 6 PAGE DOCUMENT.
C	CL	ATTACHED IN 6 PAGE DOCUMENT.
C	CL	ATTACHED IN 6 PAGE DOCUMENT.
C	CL	ATTACHED IN 6 PAGE DOCUMENT.
C	TE	
B	SO	ORIGINAL DATED MARCH 19,1906. REVISED JUNE 1,1911. ATTACHED IN 6 PAGE DOCUMENT.
B	SO	NOTE DIRECTS TO SEE CALCULATION BOOKS NOS. 612 & 658, PAGES 72-79 & 80-84 RESPECTIVELY. THIS ORIGINAL WAS ALTERED SOMETIME AFTER BLUEPRINT COPIES 1 & 2 WERE MADE.
C	CL	NOTE DIRECTS TO SEE CALCULATION BOOKS NOS. 612, 658 & 667. PAGES 72-79: 80-84 & 80-87 RESPECTIVELY.
C	CL	NOTE DIRECTS TO SEE CALCULATION BOOK NOS. 612, 658 & 667, PAGES 72-79: 80-84 & 80-87 RESPECTIVELY.
B	SO	NOTE DIRECTS TO SEE CALCULATION BOOKS NOS. 612, 658 & 667, PAGES 72-79: 80-84 & 80-87 RESPECTIVELY. THIS ORIGINAL WAS ALTERED SOMETIME AFTER BLUEPRINT COPIES 1, 2 & 3 WERE MADE.

C	CL	NOTE DIRECTS TO SEE CALCULATION BOOK NOS. 612, 656 & 667, PAGES 72-79: 80-84 & 80-87 RESPECTIVELY.
C	CL	NOTE DIRECTS TO SEE CALCULATION BOOK NOS. 612, 656 & 667, PAGES 72-79: 80-84 & 80-87 RESPECTIVELY.
C	CL	NOTE DIRECTS TO SEE CALCULATION BOOK NOS. 612, 656 & 667 PAGES 72-79: 80-84 RESPECTIVELY.
B	CL	
C	CL	
B	TE/SO	NOTE DIRECTS TO SEE CALCULATION BOOKS NOS. 612 & 658, PAGES 72-79 & 80-84 RESPECTIVELY.
B	FO/SO	ATTACHED IN 6 PAGE DOCUMENT.
B	SO	ATTACHED IN 6 PAGE DOCUMENT. NO. 2A WHEEL PENSTOCK.
B	SO	ATTACHED IN 6 PAGE DOCUMENT. NO. 2A WHEEL PENSTOCK.

B	SO	ATTACHED IN 6 PAGE DOCUMENT. NO. 2A WHEEL PENSTOCK.
B	SO	ATTACHED IN 6 PAGE DOCUMENT. NO 2A WHEEL PENSTOCK.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF AUG. & SEPT., 1911. ATTACHED IN 6 PAGE DOCUMENT.
B	FO/TE	
B	LM/TE	NOTE, VERSO, READS "LOCKS & CANALS MR. SAFFORD (MASSACHUSETTS COTTON MILLS).
C	TE	
C	TE	
B	TE	

B	TE	
B	TE/FO/SO	TRACED FROM ORIGINAL 23 MARCH, 1917. A BLUEPRINT COPY WILL BE FOUND AT 152-029.
B	FO/SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS." NOTE STATES TO ACCOMPANY LETTER OF ARTHUR T. SAFFORD. BEARS FILE # 1010.
B	SO	LOCATED IN SHELF 153 ENTITLED "MASSACHUSTTS MILLS." NOTE STATES TO ACCOMPANY LETTER OF ARTHUR T. SAFFORD. BEARS FILE # 1010.
B	SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS."
B	FO/ST	BEARS # 24 RECTO. SEE ALSO P.H. 016-017 FOR A BLUEPRINT MADE FROM THIS ORIGINAL.
C	TE	

B	ST/SO/TE/ LM	
B	TE/SO	
C	SO	
B	SO	ORIGINAL PLAN DATED MARCH 28, 1856. TRACED FROM ORIGINAL MARCH 23, 1917. THIS IS A BLUEPRINT COPY OF 152-024.
B	SO	ATTACHED IN 4 PAGE DOCUMENT. BUFF & BUFF METER # 8163.
B	SO	NOTE STATES SUPERCEDED.
B	SO	NOS. 1, 2 & 3.
B	SO	ATTACHED IN 4 PAGE DOCUMENT. BUFF & BUFF METER # 8163.

B	SO	ATTACHED IN 4 PAGE DOCUMMENT. BUFF & BUFF METER # 8163.
C	SO	ATTACHED IN 4 PAGE DOCUMENT. BUFF & BUFF METER # 8163.
B	FO/TE/SO	ORIGINAL IS LOCATED AT 152-012. CONSECUTIVE INDEX GIVES DATES OF 1856 & 1898. THE DATE OF THIS BLUEPRINT MUST THEREFORE BE 1898 SINCE JULY 3, 1856, IS THE DATE OF THE ORIGINAL AS IT APPEARS ON THIS BLUEPRINT.
B	SO	SEE ALSO PLAN NO. 152-036.
B	SO	SEE ALSO PLAN NO. 152-035.
B	CL	
B	CL	

B	SO	
B	SO	
B	CL	SEE ALSO PLAN NOS. 152-039-F, & G.
B	CL	SEE ALSO PLAN NOS. 152-039-E, & G.
B	CL	SEE ALSO PLAN NOS. 152-039-E, & F.

B	CL	
B	SO	CURVES BASED ON HOLYOKE TEST OF ONE FOR EACH SET OF WHEELS., NOS. 1-3 HOLYOKE TEST # 1865. NOS. 4-6 HOLYOKE TEST # 2611. NOS. 7-11 HOLYOKE TEST # 2667.
B	SO/FO	CURVES BASED ON HOLYOKE TEST # 2663 OF 28 1/2" TYPE S. S. MORGAN SMITH. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ROLLED WITH VARIOUS PLANS IN A RANDOM P.H. IN USE FROM APRIL 1921. SEE CALC BK. 706, P.23-25.
C		IN USE FROM APRIL 1921. SEE CALC BK. 706, P.23-25.
B		LOCATED AFTER COMPLETION OF FORMAL INVENTORY. DIAGRAM IN USE FROM DEC. 13, 1918. SEE CALC. BK. NO. 687. PP.38-40, 62-64. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1918.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. DIAGRAM IN USE FROM DEC. 13, 1918. SEE CALC. BK. NO. 687. PP.38-40, 62-64.

B		NOTE READS "IN USE FROM SEPT. 6, 1919". LOCATED AFTER COMPLETION OF FORMAL INVENTORY. SEE CALC BK NO 687 PP 94-96.
C	RO	NOTE READS "IN USE FROM SEPT. 6, 1919". ROLLED IN COPPER TUBE WITH PADLOCK. SEE CALC BK NO 687 PP 94-96.
B	CL	
B	CL	BEARS SHEET NO. 5 RECTO.
B	SO	IN USE FROM JUNE 1920.
B	SO	
B	TE/SO	
B	FO/SO	

B	TE/SO	
B	SO	NOTE STATES COPIES FROM BLUEPRINT NO.34-SHELF 143 DATED DECEMBER 1908.
B	FO/SO	TO ACCOMPANY LETTER OF ARTHUR T. SAFFORD.
B	FO/SO	SEE 147-029-[2].
B	TE	
B	ST	
C	CL	ATTACHED TO 152-043-[COPY 1].
B	FO/SO	LOCATED IN SHELF 153 ENTITLED "MASSACHUSETTS MILLS."

C	FO	ATTACHED TO 152-042-[COPY 1].
B	TE	ORIGINALLY DATED OCT.29,1920. LAST DATE REVISED FEB.5,1921.
B	RO/FO/SO	ORIGINALLY DATED OCT. 29,1920. LAST DATE REVISED FEB. 5,1921.
B	SO	SEE CALC. BOOK NO. 705 PAGES 56-57.
B	SO	PHOTO INCLUDED ON PLAN. GENERAL DRAWING.
B	SO/HO	BEARS NOTE "SCHEME B", RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/HO/FO	BEARS LABEL READING # K-107 AND NOTE "SCHEME C", RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/HO	BEARS NOTE "SCHEME A", RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/LO	ARTHUR T. SAFFORD, CONSULTING ENGINEER. THIS IS A BLUEPRINT COPY OF P.H. 021-012. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	
B	FO/SO	
B	LM/SO	
B	FO/SO	
B	FO/SO	L.& C. CARD INDEX GIVES DATE OF MAR. 1924.
A		
B	SO	SEE 147-029-[3].
B	CL	NOTE STATES SURVEYED NOV. 1925. BROOKS, JORDAN & GRAVES.
B	CL	NOTE STATES SURVEYED NOV. 1925. BROOKS, JORDAN & GRAVES.

B	SO	
B	SO	
B	FO/SO	SEE ALSO PLAN NO. 152-062.
B	SO	SEE ALSO PLAN NO. 152-061.
B	CL/FO	
B	FO/SO	ADDITIONAL WORK DATED JAN.29,1927.
B	FO/SO/ST /TE	NOTE STATES "COMPILED FEB.4,1927".

B	SO	
B	SO	
B	FO/SO	COPY OF MEMO LOCATED VERSO, DATED APR.29,1930. NOTE VERSO STATES APPROVED FOR CONSTRUCTION. SKETCH # 677-1.
A		
B	SO	NOTE STATES "COPY OF BLUEPRINT".
B	SO/FO	SURVEYED NOV.1928. ADDITIONS DATED DEC.1928.

B	SO	PLAN DATED 1890. MIDDLESEX REGISTRY OF DEEDS STAMP DATED JUNE 3, 1891. BOOK 6. PAGE 27. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1929.
B	TE/FO	SMITH & BROOKS.
B	FO/SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS."
B	CL	SEE ALSO MASS. COTTON MILLS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	SEE ALSO MASS. COTTON MILLS.
B	SO	SEE ALSO MASS. COTTON MILLS.
C	FO/SO	SEE ALSO MASS. COTTON MILLS. LOCATED IN FOLDER 153. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/TE/LI	SEE ALSO MASS. COTTON MILLS. PLAN FOUND IN FOLDER OF SHELF 148. DATE IS THE DATE OF THE BASE LITHOGRAPH ON WHICH THIS WORK IS PROJECTED.
B	TE/LI/FO/ SO	SEE ALSO MASS. COTTON MILLS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	SEE ALSO MASS. COTTON MILLS.
B	FO/TE/ST/ SO/HO	
B	FO/SO	
B	ST/SO/TE/ LM	SEE ALSO MASS. COTTON MILLS. DATE IS THE DATE OF THE BASE LITHOGRAPH ON WHICH THIS WORK IS PROJECTED. SHOWS EXTANT 2300 VOLT AND 600 VOLT LINES WITH A PROPOSED 600 VOLT LINE.

B	SO/FO	SEE ALSO MASS. COTTON MILLS. BLUEPRINT COPY OF 138-015 WITH NEW WORK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	SEE ALSO MASS. COTTON MILLS.
B	SO	SEE ALSO MASS. COTTON MILLS.
B	ST/SO	SEE ALSO MASS. COTTON MILLS.
B	SO	LOCATED IN FOLDER 152-088.
B	SO	LOCATED IN FOLDER 152-088.

B	CL	LOCATED IN FOLDER 152-088.
B	CL	LOCATED IN FOLDER 152-088.
B	CL	LOCATED IN FOLDER 152-088. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	LOCATED IN FOLDER 152-088. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	LOCATED IN FOLDER 152-088.
B	CL	SEE ALSO MASS. COTTON MILLS.
B	FO/SO	
B	SO	

B	SO/ST	
B	FO/SO	
B	SO	
B	FO/SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS." BEARS M-6014316 RECTO. COPY OF MEMO LOCATED VERSO DATED APR. 29, 1930. MEMO STATES APPROVED FOR CONSTRUCTION. A GENERAL ELECTRIC CO. PLAN.
B	FO/SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS." BEARS M-6014316 RECTO. COPY OF MEMO LOCATED VERSO DATED APR. 29, 1930. MEMO STATES APPROVED FOR CONSTRUCTION. A GENERAL ELECTRIC CO. PLAN.
C	FO/SO	BEARS M-6014317 RECTO.
A		

B	ST/FO	SEE ALSO MASS. COTTON MILLS.
B	FO/ST/TE	SEE ALSO MASS. COTTON MILLS.
B	FO/SO	PLAN BEARS SCHEME B RECTO. SEE ALSO MASS. COTTON MILLS.
A		
B	FO/SO	PLAN BEARS SHEME C RECTO. SEE ALSO MASS. COTTON MILLS.
B	SO/LO/TE	
B	SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS."

B	SO/FO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS COTTON MILLS."
B	FO/SO	LOCATED IN SHELF 153 ENTITLED "MASSACHUSETTS MILLS."
B	SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS."
B	SO	LOCATED IN SHELF ENTITLED, "MASSACHUSETTS COTTON MILLS." NOTE STATES TRACED FROM L.& C. BLUEPRINT, NO.65-SHELF 152, DATE FEB.4,1927 '.
B	FO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS."
B	FO	
B	FO/SO	LOCATED IN SHELF 153 ENTITLED, "MASSACHUSETTS MILLS."

B FO ...LOWELL INDUSTRIAL DEVELOPMENT COMPANY / LOWELL, MASS.

A

B MODEL CITIES PROJECT OSL-MA-01-06-1035.

A

A

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A

C	CLEAN	
C	FO, TAPE	THIS IS A PHOTOREDUCTION OF PLAN P.H. 069-[B].
C	RO/SO	THIS PLAN IS A COMPOUND BLUEPRINT MADE FROM PLANS 153-25-024 AND 153-148.
C	SO	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 2764 WITH NO INDEX NUMBER. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.
C	SO	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9369, INDEX NO. 320. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.
C	SO/LO/TE	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 24695, INDEX NO. 9320. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.
C	FO/SO/TE /HO	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 30036, INDEX NO. 9320, PARTLY REPLACING SERIAL NO. 24695. LOCATED AFTER COMPLETION OF FORMAL INVENTORYH. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.
C	SO	REDUCED COPY OF 153-[178]. ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 30036, INDEX NO. 9320, PARTLY REPLACING SERIAL NO. 24695. LOCATED AFTER COMPLETION OF FORMAL INVENTORYH. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.
C	SO	FACTORY INSURANCE ASSOCIATION. BEARS NO. 2810. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.
C	FO/SO/TE	FACTORY INSURANCE ASSOCIATION. BEARS NO. 12830. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 153.

C	SO	A BOUND 15 PAGE PROPOSAL FOR NEW TURBINE TO REPLACE AN EXISTING TURBINE AT BOOTT MILLS PLUS 11 PAGES OF LOOSE SUPPLEMENTAL INFORMATION. LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	TE/SO	TESTED AT HOLYOKE JULY 19, 1919. TEST NO. 2683. LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	FO/SO	TESTED AT HOLYOKE JULY 19, 1919. TEST NO. 2683. LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	FO/SO	TESTED AT HOLYOKE JULY 19, 1919. TEST NO. 2683. LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS / 33" LEFFELS / BOOTT MILLS 153".
C	SO	LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	CL	LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	CL	LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".

C	SO	LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	ST	LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	SO	LOCATED IN AN ENVELOPE MARKED "MATERIAL ON 3, 4 + 5 WHEELS 33" LEFFELS BOOTT MILLS 153".
C	FO/SO	FOUND IN FOLDER 153.
C	FO/SO	FOUND IN FOLDER 153. SEE ALSO P.H. 91-038.
C	SO	
B	SO	
B	SO	AREA OF BUCKET OUTLET 9.724 SQ. FT.
B	TE/SO/LM	
A		

B	SO	NOTE STATES THAT PLAN IS IN TWO PARTS. THIS IS PART 1. NOTE DIRECTS TO SEE OFFICE NOTEBOOK, NO. 115 PP.1 TO 83. SEE PLAN NO. 153-005-[B].
C	FO/SO	
B	SO/FO/ST	NOTE STATES THAT THIS PLAN IS IN TWO PARTS. THIS IS PART 2. NOTE DIRECTS TO SEE L.& C. NOTEBOOK NO.8 PP.55-83. SEE ALSO PLAN NO. 153-005-[A]. CONSECUTIVE INDEX ALSO GIVES NO DATE.
C	CL	NOTE STATES THAT THIS PLAN IS IN TWO PARTS. THIS IS PART 2. NOTE DIRECTS TO SEE L.& C. NOTEBOOK NO.8 PP.55-83. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	NOTE STATES THAT THIS PLAN IS IN TWO PARTS. THIS IS PART 2. NOTE DIRECTS TO SEE L.& C. NOTEBOOK NO.8 PP.55-83. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	NOTE STATES THAT THIS PLAN IS IN TWO PARTS. THIS IS PART 2. NOTE DIRECTS TO SEE L.& C. NOTEBOOK NO.8 PP.55-83. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	NOTE STATES THAT THIS PLAN IS IN TWO PARTS. THIS IS PART 2. NOTE DIRECTS TO SEE L.& C. NOTEBOOK NO.8 PP.55-83. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO	3 PAGE DOCUMENT. DOCUMENT ATTACHED RECTO DATED JUNE 20,1889.
B	TE/SO	NOTE STATES TRACED APRIL 1896. BEARS NO. 1405, VERSO, TAPED OVER.
B	FO/SO	
B	SO	ATTACHED WITH 153-009-[A].

C	SO/FO	ATTACHED TO 153-009. THIS BLUEPRINT OF 153-009 HAS NEW WORK IN INK.
B	FO/SO	7 PAGE DOCUMENT COMPOSED OF DISCHARGE DIAGRAMS. TAKEN IN CONJUNCTION WITH POWER TEST MADE BY C.M. ALLEN, NOV. 14, 21 & 23, 1908.
B	FO/SO/TE	TO ACCOMPANY REORT OF A.T. SAFFORD, HYD. ENGR.
C	FO/TE/SO	ATTACHED IN 5 PAGE DOCUMENT. ORIGINAL OF 153-025-009-A.
C	FO/SO	ATTACHED IN 5 PAGE DOCUMENT.
C	SO	ATTACHED IN 5 PAGE DOCUMENT.
C	SO	ATTACHED IN 5 PAGE DOCUMENT. CONSECUTIVE INDEX ALSO GIVES NO DATE.
C	SO	ATTACHED IN 5 PAGE DOCUMENT.
B	SO	CONSECUTIVE INDEX GIVES NO DATE.

B	SO	CONSECUTIVE INDEX ALSO GIVES NO DATE.
C	TE/FO	
A		
B	SO/TE	
B	SO	CONSECUTIVE INDEX ALSO GIVES NO DATE.
B	SO	PART OF A 3 PAGE DOCUMENT.
C	CL	PART OF 3 PAGE DOCUMENT.
B	SO	PART OF A 3 PAGE DOCUMENT.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	

B	FO/SO	APR. 4, 1912 GIVEN IN ADDITION TO MAY 27, 1919. A BLUEPRINT COPY IS FOUND AT 153-025-006-[A].
B	FO/SO	NOTE: SEE CALCULATION BOOK NO. 663, PAGES 54 & 55. QUANTITIES FOR SAME SPEED-GATE OPENING AND 17' FALL WITH SAME SPEED MADE PROPORTIONAL TO PRODUCTS OF COEFFICIENT OF DISCHARGE THRU GUIDES & GUIDE AREA LESS 6% BASED ON TEST OF BOOTT MILLS, AUG. 1874.
B	SO	NOTE: SEE CALCULATION BOOK NO. 663, PAGES 56 & 57. QUANTITIES FOR SAME SPEED-GATE OPENING AND 17' FALL WITH SAME SPEED MADE PROPORTIONAL TO PRODUCTS OF COEFFICIENT OF DISCHARGE THRU GUIDES & GUIDE AREA LESS 6% BASED ON TEST OF BOOTT MILLS, AUG. 1874.
B	TE	WATERMARK READS "PARSONS PAPER CO. HOLYOKE MASS. 1907 BOND". CONSECUTIVE INDEX GIVES NO DATE.
C	TE/SO	WATERMARK, IN REVERSE IMAGE, READS "PARSONS PAPER CO. HOLYOKE MASS. 1907 BOND".
B	CL	ATTACHED TO 153-019-[B-COPY 1]. WATERMARK READS "PARSONS PAPER CO. HOLYOKE MASS. 1907 BOND". CONSECUTIVE INDEX GIVES NO DATE.
C	CL	ATTACHED TO 153-019-[B]. WATERMARK, IN REVRSE IMAGE, READS "PARSONS PAPER CO. HOLYOKE MASS. 1907 BOND".

B	TE/SO/LM	CONSECUTIVE INDEX ALSO GIVES NO DATE.
B	SO	
B	SO	ALSO LISTED AS 152-21-ENV.25 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A		SWAIN 72" WHEELS.
B	TE/FO	SWAIN 72" WHEELS. NOTE DIRECTS TO SEE L.& C. PLAN P.H. 69 & "REPORT ON A TEST-TRIAL OF A SWAIN TURBINE WATERWHEEL," IN JOURNAL OF FRANKLIN INSTITUTE FOR APRIL 1875 OR L.& C. LIBRARY BOOK NO. 2801 PAMPHLET NO. 7. BOOTT MILLS. L.& C. FILE NO. 1009.
B	LM/SO	
B	SO	SWAIN 72" WHEEL.

C	CL	SEE ALSO 153-025-028. LOCATED IN FOLDER 153. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ATTACHED TO 153-019-[B-COPY 1]. WATERMARK READS "PARSONS PAPER CO. HOLYOKE MASS. 1907 BOND".
B	SO	BEARS FILE NO. 1009. PLAN NUMBER ENTERED AS 153-ENV.25-2 IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 153-ENV.25-3 IN L. & C. CARD INDEX.
B	CL	FILE 1009. PLAN NUMBER ENTERED AS 153-ENV.25-4 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	FILE 1009.
B	SO/TE	FILE 1009.
C	SO/TE	THIS IS A COPY OF 153-017-[D].
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
B	SO	

B	FO	LOCATED IN FOLDER ENTITLED BOOTT MILLS. PLAN NUMBER ENTERED AS 153-ENV.25-8 IN L. & C. CARD INDEX.
C	FO/CL	NOT LISTED IN EITHER THE L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	SO/TE	DATE STAMPED VERSO APRIL 9, 1924. PLAN NUMBER ENTERED AS 153-ENV.25-9 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY OF A-153-011-[A].
B	FO/SO	
B	FO/SO	PLAN NUMBER ENTERED AS 153-25 IN L. & C. CARD INDEX.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		
B	SO	NOTE STATES THIS PLAN IS A REDUCED COPY OF ORIGINAL DEED PLAN. BOARDING HOUSES SOUTH OF FRENCH ST. & P. L.& C. PROPERTY LINES ALONG EASTERN CANAL ADDED OCT. 1928. PLAN NUMBER ENTERED AS 153-25 IN L. & C. CARD INDEX.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	

C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	PLAN NUMBER ENTERED AS 153-25 AND AS 153-15 IN L. & C. CARD INDEX.
B	FO	BEARS NO. 590, DRAWER NO. 8 RECTO.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/TE	NOTE STATES FOR SECTIONS SEE DWG. OF MAY 1911.
B	SO	TEST MADE OCT. 9, 1923.
B	CL	CONSECUTIVE INDEX GIVES NO DATE BEYOND THE TITLE.

B	CL/FO	CONSECUTIVE INDEX GIVES NO DATE BEYOND THE TITLE.
B	TE/SO	PLAN GIVES INFO. FOR COPY DATED OCT. 3, 1938. COPY OF PLAN BY H. W. BUTTERWORTH & SONS CO., PHILADELPHIA, PA.
B	SO	
B	SO	
B	SO	NOTE STATES "DATA FROM L.& C. DRAFT SHEETS 1920 TO 1940".
B	SO	CONSECUTIVE INDEX OF DRAWINGS NOTES "DATA FROM L.& C. DRAFT SHEETS 1920 TO 1943".
B	SO	LOCATED IN FOLDER ENTITLED: "DISCHARGE DIAGRAMS OF WATERWHEELS OF ALL CORPORATIONS". THE TITLE WAS MODIFIED FROM "PRELIMINARY" TO "PERMANENT" TRACES OF THE OLD WORDING ARE VISIBLE.
C	CL	LOCATED ROLLED WITH SERIES 162-019 PLANS. THIS COPY WAS MADE BEFORE THE TITLE ON THE ORIGINAL WAS MODIFIED FROM "PRELIMINARY" TO "PERMANENT" AND THE DATE "NOV. 1946" WAS ADDED.
C	SO/TE	
C	SO	
C	CL	NOTE STATES: TO ACCOMPANY ARTHUR T. SAFFORD'S MEMORANDUM OF JULY 31, 1947.
B	SO	BEARS FILE NO. 1009 RECTO.

B	SO/FO	LOCATED IN FOLDER ENTITLED BOOTT DAMS.
B	SO	
B	SO	LOCATED IN FOLDER ENTITLED BOOTT DAMS.
B	SO	NOTE STATES BLUEPRINT IN FILE.
B	SO/FO	
B	CL	
B	SO	
B	CL	

B	CL	
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/CL	REDUCED TO 21' FALL REGARDLESS OF SPEED FACTOR, FULL GATE SET 6 3/4"150RPM.
C	TE/SO	BEARS THE WORD, "SUPERCEDED" RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF AUG. 1919.
B		LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LINE PARALLEL TO CURVE OBTAINED BY RAISING HOLYOKE TEST 2121 @ 30" R.H. TYPE 12 A-C WHEEL. SEE CALC. BK. 699, P.41. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. LINE PARALLEL TO CURVE OBTAINED BY RAISING HOLYOKE TEST 2121 @ 30" R.H. TYPE 12 A-C WHEEL. SEE CALC. BK. 699, P.41.
B	FO	21" FALL, 150 RPM. BASED ON HOLYOKE TEST #2121 OF 30" TYPE 12, R.H. ALLIS-CHALMERS WHEEL. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE	BOOTT #2 WHEEL A 72" SWAIN.

B	SO	
B	TE/SO	ON INSPECTION OF THIS WHEEL ON 30 JULY IT WAS FOUND THAT THE RUNNER WAS DOWN 1" AND THE TRUE GATE OPENING WAS 1" LESS THAN INDICATED BY THE SPEED GATE.
A		
B	CL	
B	CL	
B	TE/SO	
B	SO	
B	CL	PLAN NUMBER ENTERED AS 153-ENV. 25-V IN L. & C. CARD INDEX.
B	CL	BEARS HOLYOKE TEST NO. 2122. NOTE STATES TEST USED IN COMPUTATIONS FOR BOOTT MILLS NO. 6-72" R.H. ALLIS-CHALMERS WHEEL. PLAN NUMBER ENTERED AS 153-ENV. 25-W IN L. & C. CARD INDEX.

B	FO/SO	
B	FO/SO	
C	SO	
B	FO/SO	PLAN NUMBER ENTERED AS 153-ENV. 025-Z1 IN L. & C. CARD INDEX.
B	FO/SO	LOCATED WITH SHELF 162. PLAN NUMBER ENTERED AS 153-25-Z2 IN L. & C. CARD INDEX.
B	SO/FO	PLAN NUMBER ENTERED AS 153-ENV. 25-Z3 IN L. & C. CARD INDEX.
B	SO/ST/TE	

B	FO/SO	
B	FO/SO	
B	SO	
B	TE/ST	
B	SO/FO	
B	TE/SO	BEARS #28 RECTO.
B	FO/SO/TE	

B	TE/SO	PART OF 3 PAGE DOCUMENT.
B	SO	PART OF 3 PAGE DOCUMENT.
B	SO	PART OF 3 PAGE DOCUMENT.
B	SO	PLAN NUMBER ENTERED AS 153-36 ENV. 25 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS NOTES "(IN ENVELOPE # 25)". SEE CALC. BK. 687, P. 97-100. QUANTITIES FOR 16' FALL WITH 150 RPM TAKEN FROM MEASUREMENT OF SIMILAR 30" WHEEL TESTED AT HOLYOKE, MAY 15,16 & 18,1912 AND QUANS. FOR OTHER FALLS COMPUTED IN DIRECT PROP. TO BUCKET OUTLET AREAS. FORMERLY
B	FO/SO	PLAN NO. 153-037.
B	TE/SO	BEARS PLAN NO. 1.
B	TE/SO	NOTE STATES TO ACCOMPANY REPORT OF ARTHUR T. SAFFORD, CONSULT. ENGR. DATED OCT. 26, 1911.
B	LM/TE	NOTE STATES TO ACCOMPANY REPORT OF ARTHUR T. SAFFORD, CONSULT. ENGR.

B	LI/SO	THREE FRAGMENTS TOTAL; TWO LARGE, ONE SMALL. PLAN AND SECTIONS OF UNSPECIFIED WHEEL. BEARS PLAN NO. 4.
B	FO/SO	FILE-48.
C	SO	TO ACCOMPANY REPORT OF MR. SAFFORD. FOR OTHER PLANS ON PROPOSITION SEE 40, 41, 42 & 43, THIS SHELF. FILE-48.
B	FO/SO	FOR OTHER PLANS ON PROPOSITION SEE 40, 41, 42 & 43, THIS SHELF. FILE-48.
C	FO/SO	FILE-48.
B	FO/SO	FILE-48.
C	FO/SO	FILE-48.
B	FO/SO	FOR OTHER PLANS ON PROPOSITION SEE 40, 41, 42 & 43, THIS SHELF. LOCATED AFTER COMPLETION OF FINAL INVENTORY. FILE-48.

C	SO	ATTACHED TO PLANS 153-41 & 153-040. FILE-48.
B	FO/SO	FOR OTHER PLANS ON PROPOSITION SEE 40, 41, 42 & 43, THIS SHELF. FILE-48.
C	FO/SO	FILE-48.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/TE	
B	TE/FO/SO	BEARS NOTE "PLAN NOT ACCEPTED". AN S. MORGAN SMITH CO. PLAN, NO. 2334-A.
B	TE/FO/SO	AN S. MORGAN SMITH CO. PLAN, NO. 32031. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
A		

B	FO/SO/ST	NOT USED. AN ALLIS-CHALMERS MFG. CO. DRAWING.
A		SEE ALSO PLAN NO. 133-065. LOCATED IN CONSECUTIVE INDEX.
B	FO/SO	SWAIN 72" WHEELS.
B	SO	SCANNEL BOILER WORKS, LOWELL, MASS.
B	FO/SO/ST	
B	FO/CL	DATE STAMPED, VERSO.
B	SO/FO/HO	SEE ALSO P.H. 091-006. LOCATED IN P.H. 091. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	

B	SO	
B	FO/SO	
B	SO	ORIGINALLY DATED DEC. 2,1926. PLAN REVISED DEC. 9,1926, BRIDGE CHANGED.
B	FO/SO	
B	FO/SO/ST	
B	SO	
B	SO/TE/ST	
B	SO	

B	SO	L.&. C CARD INDEX REFERRED TO THIS PLAN AS BEING ON TRACING PAPER. NO TRACING PAPER COPY HAS BEEN FOUND.
B	FO/SO	
B	FO/SO	
B	SO	
A		
B	FO/SO	
B	TE/FO/SO	
B	FO/SO	NOTE READS: "TRACED OCT. 1926".
B	SO	
B	SO	

B	TE/FO	CONSECUTIVE INDEX OF DRAWINGS NOTES "SAME AS NO. 79".
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS NOTES "SAME AS NO. 80".
B	SO	
B	FO/SO	
A		
B	SO	A BLUEPRINT COPY OF THIS PLAN WITH APPROVAL STAMP EXISTS AT PLAN NO. 153-089.
B	SO	A BLUEPRINT COPY OF THIS PLAN WITH AND APPROVAL STAMP EXISTS AT PLAN NO. 153-090.
B	TE	SCALES ARE NOTED AS FOLLOWS: 1"=10', H1"=10', V1"=1'.

B	SO/TE	THIS IA A BLUEPRINT COPY OF PLAN NO. 153-086, WITH APPROVAL STAMP.
B	LM/TE/SO	THIS IS A BLUEPRINT COPY OF PLAN NO. 153-087 WITH APPROVAL STAMP.
B	SO	NOTE STATES THAT THIS PLAN IS A PRELIMINARY DRAWING, NOT CHECKED.
B	LI/LM/DU /ST/FO	
B	FO/SO	
B		
C		SEE DATE OF PLAN 153-096 FOR POTENTIAL DATE FOR THIS PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS COPY DOES NOT SHOW EITHER THE PLAN NO., THE TITLE OR THE DATE OF THE ORIGINAL FROM WHICH IT WAS COPIED.
B	SO	JOHN A. STEVEN'S OFFICE.

B	SO/TE	NOTE DIRECTS TO SEE REVISED PLAN DATED NOV.4,1936. A COPY WAS USED BY THE ASSETS DIVISION OF BOOTT MILLS AS PLAN 02-67 AND IS FILED WITH THOSE PLANS.
C	SO/ST	ORIGINALLY DATED MAY 28,1929. PLAN REVISED NOV.4,1936, APRIL 26,& MAY 19,1955.
A		
A		
B	SO	
B	FO/SO/TE	NEITHER THE PLAN ITSELF, NOR THE SUBJECT CARD INDEX, NOR THE CONSECUTIVE INDEX OF DRAWINGS GIVES A YEAR FOR THIS PLAN. HOWEVER, IT IS PROBABLY EITHER 1929 OR 1930. CONSECUTIVE INDEX GIVES NO DATE.
B	FO/SO/TE /LM	NEITHER THE PLAN ITSELF, NOR THE SUBJECT CARD INDEX, NOR THE CONSECUTIVE INDEX OF DRAWINGS GIVES A YEAR FOR THIS PLAN. HOWEVER, IT IS PROBABLY EITHER 1929 OR 1930.
B	SO/ST/TE	
B	SO	

B	SO	
B	FO/SO	
B	FO/SO	
B	SO	
B	SO	
B	FO/SO	
B	SO/TE	BEARS NO. 911-9 RECTO.
B	TE/LM/SO	JOHN A. STEVENS.

B	FO	
B	SO	ORIGINALLY DATED MAR. 16, 1931. DATE CORRECTED TO FEB. 21, 1936.
C	RO/FO/TE /SO	LOCATED WITH P.H. 072. ORIGINALLY DATED MAR. 16, 1931. DATE CORRECTED FEB. 21, 1936.
A		LOCATED IN CONSECUTIVE INDEX.
B	SO/TE	THIS IS A FRAGMENT OF A LARGER DRAWING MOST OF WHICH IS MISSING. IT HAPPENS TO CONTAIN THE PLAN NUMBER. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		LOCATED IN CONSECUTIVE INDEX.
A		LOCATED IN CONSECUTIVE INDEX.
B	FO/SO	
B	FO/SO	

B	SO	NOTE STATES THIS SURVEY & EXTENSION WEST OF JOHN ST. WAS MADE NOV. 1899 BUT MR. DUNBAR ORDERED THE SAME DATE AS OTHER PLANS. NOTE STATES TRACED FROM PLAN OBTAINED FROM O.M. SNELL BY B.W.F. DEC.1899. BEARS A-VOL. 10 2 32 RECTO.
B	FO	
B	CL	
B	TE/FO/SO /LO	PLAN MATCHED TO ENTRY IN L.& C. CONSECUTIVE INDEX OF DRAWINGS. NOT FOUND IN L.& C. PLANS INDEX.
A		LOCATED IN CONSECUTIVE INDEX.
B		
B	CL	
B	CL	

B	SO	SCALES ARE NOTED AS FOLLOWS: H 1"=1', V 1/8"=1', 1"=200'.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		LOCATED IN CONSECUTIVE INDEX.
B	SO	
C	SO	LOCATED IN P.H. 072.
B	SO	
C	SO	LOCATED IN P.H. 072.
B	SO	
B	FO/CL	
B	SO	
B	TE/SO	
B	SO/TE	

B	TE/SO	
A		LOCATED IN CONSECUTIVE INDEX.
A		LOCATED IN CONSECUTIVE INDEX.
B	FO/SO	
B	TE	PLAN ALSO SHOWS PROPOSED ALTERATIONS.
B	FO/SO/ST	NOTE STATES: "SCHEME B (USED)".
C	FO/SO/ST	NOTE STATES: "SCHEME B (USED)". ADDITIONAL NOTE STATES: "30 TON CAPACITY". LOCATED IN SMALL L.& C. MAP CASE RETREIVED NOV. 1997.
B	SO	NOTE STATES: "SCHEME A (NOT USED)".
B	FO/SO	
A		LOCATED IN CONSECUTIVE INDEX.
A		LOCATED IN CONSECUTIVE INDEX.

B	FO/SO/ST	
C	FO/SO/ST	PLAN ALSO SHOWS PROPOSED CONSTRUCTION FOR NEW BUILDING.
C	FO/SO/ST	PLAN ALSO SHOWS PROPOSED CONSTRUCTION FOR NEW BUILDING. MARKED "APPROVED, JOHN E. MOYNAHAN, NOV. 5, 1938.
A		LOCATED IN CONSECUTIVE INDEX.
B	SO/FO	
C	SO/FO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. ORIGINALLY DATED SEPT. 1939, REVISED MARCH 1940.
A		LOCATED IN CONSECUTIVE INDEX.

A		LOCATED IN CONSECUTIVE INDEX.
A		LOCATED IN CONSECUTIVE INDEX.
B	SO	NOTE STATES TRACED FROM PLAN OBTAINED FROM O.M. SNELL BY B.W.F. BEARS A-VOL-10 2 32.
B	SO/FO	
B	SO/FO	
B	FO/SO	
B	FO/TE	
B	SO/FO	
B	FO/SO	
B	SO/FO	

B	SO	
A		LOCATED IN CONSECUTIVE INDEX.
A		LOCATED IN CONSECUTIVE INDEX.
C	FO/SO	PLAN NUMBER USED TWICE BY L. & C.
B	FO/SO	PLAN NUMBER USED TWICE BY L. & C.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/ST	
A		
B	ST/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/TE	FOUND IN FOLDER 132. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/TE	FOUND IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST/FO/TE	TAPE JOINTS FAILING; PLAN IS IN SEVERAL PIECES.
C	ST/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/TE	FOUND IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/TE	FOUND IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/CL	LOCATED ROLLED WITH PLAN SERIES 162-019.
B	SO	WINTERS OF 1911 TO 1919.
B	SO/ST	

B	FO/SO/ST /TE	
B	SO/TE	ATTACHED WITH 154-005-[A]. SHEET 1.
C	SO	ATTACHED WITH 154-005-[COPY 1]. SHEET 1. SHOWS NEW WORK.
B	ST/SO	
B	SO	PROPOSED CONSTRUCTION ALSO PRESENT ON PLAN.
B	SO	PROPOSED CONSTRUCTION ALSO PRESENT ON PLAN.
B	SO	SPILLWAY DETAILS ADDED 5/7/23.

B	SO/ST/TE/ HO	PLAN SHOWS STATUS OF WORK ON FEB.1,1923.
B	SO	
A		
B	SO/ST	
B	FO/ST/TE	NOTE STATES, "FOR DETAIL OF GATE SEE SUNCOOK MILLS DRAWING DATED-5-31-22.
B	FO/ST/TE	ORDER A #1150.

B	FO/TE/SO	NOTE DIRECTS TO SEE LATER DIAGRAM 17-A SHELF 154.
C	FO/SO	ORIGINAL DATED MARCH 4,1922. TRACED FROM ORIGINAL 1937 WITH ADDITIONAL DATA.
C	FO/SO	ORIGINAL DATED MARCH 4,1922. TRACED FROM ORIGINAL IN 1937 WITH ADDITIONAL WORK.
C	FO/SO/TE	ORIGINAL DATED MARCH 4,1922. COPIED FROM ORIGINAL 1937, WITH ADDITIONAL DATA.
C	FO/SO	ORIGINAL DATED MARCH 4,1922. TRACED FROM ORIGINAL WITH ADDITIONAL INFORMATION DATED 1937.
B	SO	
B	FO/FX	
B	FO/SO	
B	SO/ST	

B	FO/SO/TE	FILE 37.1. ARTHUR T. SAFFORD.
A		
B	HO/SO	
B	ST/SO/TE	
B	SO/TE	
B	TE	SECTION JUST ABOVE HIGHWAY BRIDGE, LOOKING UPSTREAM.
B	SO/HO	ADDITIONAL INFO. DATED OCT.4, 1906.
B	LI/TE/SO	ATTACHED WITH 154-028-[A]. NOTE: THIS DIAGRAM IS MADE UP FROM CURRENT METER MEASUREMENTS TAKEN BY THE U.S. GEOLOGICAL SURVEY. (SEE LETTER FROM N.C. GROVER TO A.T. SAFFORD DATED JUNE 30,1904. RECORD BK. 17, PG. 102.
C	HO/SO	ATTACHED WITH 154-028.

A		
B	ST	BEARS FILE NO. 1012.8.
A		PLAN RENUMBERED BY P.L.& C. TO C-136-031.
C	SO/ST	
B	SO/ST	
C	CL/TE	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-039 ON COVER. REFER TO PLAN NO. 136-039 FOR ADDITIONAL INFO. DIVIDER HEADING IN DOCUMENT STATES THIS PLAN IS PART OF A "1914 STUDY."
B	SO	NOTE DIRECTS TO SEE LETTER & RATING TABLE FROM C.C. COVERT, DATED OCT.18,1912. ATTACHED WITH 154-033-[A] THROUGH [C]. SEE ALSO PLAN NO. 154-035.
B	SO	BEARS TABLE WITH DATES WHICH RANGE FROM 1903-1911. ATTACHED WITH 154-033, 154-033 THROUGH 154-033-[C].

B	FO/ST	BEARS TABLE WITH DATES WHICH RANGE FROM 1903-1911. ATTACHED WITH 154-033 THROUGH 154-033-[C].
B	FO/SO	BEARS TABLE WITH DATES WHICH RANGE FROM 1903-1911. ATTACHED WITH 154-033 THROUGH 154-033-[B].
B	TE/SO	NOTE DIRECTS TO SEE L.& C. RECORD BOOK NO.17 PAGES 104. SEE ALSO PLAN NO. 154-033.
B	SO/TE	
B	SO	ADDITIONAL NOTE DATED JUNE 1926.
B	SO	DATE TAKEN FROM L. & C. INDEX CARD AS PORTION OF TITLE BLOCL IS MISSING FROM PLAN.
B	SO	ORIGINAL DATED APRIL 26,1921, BUT REVISED APRIL 28,1921.
B	SO/ST	BEARS FILE NO. 1023 RECTO.
B	TE/SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-43 IN L. & C. CARD INDEX.
C	SO	ATTACHED WITH 154-044-[COPY 2]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

C	LI/TE/SO	ATTACHED WITH 154-044-[COPY 1]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/ST	ALSO BEARS NO. 136-028. AS PER THE CONSECUTIVE INDEX OF DRAWINGS, P. L. & C. INTENDED TO MOVE THIS PLAN TO THIS LOCATION BUT DID NOT FOLLOW THROUGH.
B	FO/SO	
B	FO/TE	FILE 37.1. BEARS NO.1 RECTO.
B	SO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	NOTE DIRECTS TO SEE DIAGRAM DATED MARCH 4, 1919.
B	SO/ST	NOTE DIRECTS TO SEE DIAGRAM DATED JULY 19,1920.
C	SO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/ST	NOTE DIRECTS TO SEE DIAGRAM DATED JULY 19,1920.
C	SO/ST	NOTE DIRECTS TO SEE DIAGRAM DATED MARCH 4,1919.
C	SO/ST	NOTE DIRECTS TO SEE DIAGRAM DATED MARCH 4,1919.
C	SO/TE	NOTE DIRECTS TO SEE DIAGRAM DATED MARCH 4,1919. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/ST/TE	NOTE DIRECTS TO SEE DIAGRAM DATED MARCH 4,1919.
B	SO	
B	TE/FO/SO	
B	ST/SO/FO	
B	FO/TE/ST	FILE 37. ORIGINAL DATED NOV.18,1920. CORRECTED TO JAN. 6,1921.
B	FO/LI/TE/ SO/ST	FILE 37. ORIGINAL DATED NOV.18,1920. REVISED TO JAN. 6,1921.
C	SO/TE/HO	[...] IN CONNECTION WITH / HARVARD UNIV. COURSE IN WATER- / POWER ENGINEERING, IN MARCH 1914. 24 HR. FLOW WAS FIGURED / FROM LAWRENCE DATA BY USING / DRAINAGE AREAS OF 4452 SQ MI. AT / LOWELL.

B	CL	[...] IN CONNECTION WITH / HARVARD UNIV. COURSE IN WATER- / POWER ENGINEERING, IN MARCH 1914. 24 HR. FLOW WAS FIGURED / FROM LAWRENCE DATA BY USING / DRAINAGE AREAS OF 4452 SQ MI. AT / LOWELL.
B	CL	[...] IN CONNECTION WITH / HARVARD UNIV. COURSE IN WATER- / POWER ENGINEERING, IN MARCH 1914. 24 HR. FLOW WAS FIGURED / FROM LAWRENCE DATA BY USING / DRAINAGE AREAS OF 4452 SQ MI. AT / LOWELL.
C	CL	[...] IN CONNECTION WITH HARVARD UNIV. COURSE IN WATERPOWER ENGINEERING IN / MARCH 1914. 24 HR. FLOW WAS FIGURED FROM LAWRENCE DATA BY USING AREAS OF / 44.52 SQ. MI. AT LAWRENCE & 8967 SQ. MI. AT LOWELL. SEE PLAN NO. 136-39 FOR ADDITIONAL INFO.
C	CL	[...] IN CONNECTION WITH HARVARD UNIV. COURSE IN WATERPOWER ENGINEERING IN / MARCH 1914. 24 HR. FLOW WAS FIGURED FROM LAWRENCE DATA BY USING AREAS OF / 44.52 SQ. MI. AT LAWRENCE & 8967 SQ. MI. AT LOWELL.

B	SO/ST	
B	SO/ST	
B	SO/ST	
C	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER. REFER TO 136-39 FOR ADDITIONAL INFO.

C	SO/FO	BEARS NO. 6856-1, RECTO., ALSO, NO. 1001 BSCE FOR D.M. WOOD.
C	FO	LOCATED IN FOLDER 154.
C	FO	LOCATED IN FOLDER 154.
C	FO	LOCATED IN FOLDER 154.
C	CL/HO	LOCATED IN FOLDER 149.
C	CL/HO	LOCATED IN FOLDER 149.
C		
B	ST/FO/SO	
B	SO/ST	

C	FO/SO	ORIGINAL NO. 154-066. NOTE STATES TRACED FROM PLAN IN FILE 1012.10. ATTACHED TO [158]-PLAN 2-25.
C	SO	LOCATED WITH SHELF 158. BEARS "PLAN # 1", RECTO.
C	FO	BEARS PLAN NUMBER 154-066. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. ALSO BEARS "PLAN # 1", RECTO.
B	SO/TE	
B	TE	SEE ALSO PLAN NO. 154-066-006.
B	SO	SEE ALSO PLAN NO. 154-066-005.
B	SO	FOR SECTIONS AT THIS PLACE SEE 154-066-008.
B	SO	
B	SO	
B	FO/SO	(FILE: P.H.11).

B	SO/ST	
B	SO	
B	ST/SO	
B	SO	
B	TE/SO	
B	TE/SO	
A		
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/TE	PLAN NUMBER ENTERED AS 154-ENV. 66-19 IN L. & C. CARD INDEX.
A		TAKEN FROM JOURNAL OF THE NEW ENGLAND WATER WORKS ASSOC.
B	FO/SO	BEARS NO. 6529-1.
B	FO/SO/ST /HO	
B	SO/HO	PLAN NUMBER ALSO ENTERED COLLECTIVELY AS 154-ENV. 66-(23 TO 28) IN L. & C. CARD INDEX. BEARS NO. 6529-2, RECTO. ALSO, NO. 1001 B.S.C.E FOR D.M. WOOD.

B	SO/ST	PLAN NUMBER ALSO ENTERED COLLECTIVELY AS 154-ENV. 66-(23 TO 28) IN L. & C. CARD INDEX. BEARS NO. 6529-3, RECTO. ALSO, NO. 1001 B.S.C.E. FOR D.M. WOOD.
B	SO	PLAN NUMBER ALSO ENTERED COLLECTIVELY AS 154-ENV. 66-(23 TO 28) IN L. & C. CARD INDEX. BEARS NO. 6529-11, RECTO.
B	SO/ST	BEARS 6529-7 RECTO. ALSO BEARS PLATE XII COMMITTEE ON RUN-OFF BOSTON SOCIETY OF CIVIL ENGINEERS. PLAN NUMBER ENTERED COLLECTIVELY AS 154-ENV. 66-(23 TO 28) IN L. & C. CARD INDEX.
B	SO/ST	PLAN NUMBER ALSO ENTERED COLLECTIVELY AS 154-ENV. 66-(23 TO 28) IN L. & C. CARD INDEX.
B	ST/SO	PLAN NUMBER ALSO ENTERED COLLECTIVELY AS 154-ENV. 66-(23-28) IN L. & C. CARD INDEX. BEARS NO. 6529-10, RECTO.

B	SO/ST	PLAN NUMBER ALSO ENTERED COLLECTIVELY AS 154-ENV. 66-(23 TO 28) IN L. & C. CARD INDEX.
B	TE/FO/SO	NOTE STATES: TRACED FROM LOWELL & MANCHESTER VS. GEOLOGICAL SURVEY QUADRANGLES. SEE ALSO PLAN NO. 154-066-002.
B	FO/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-29 IN L. & C. CARD INDEX.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-32 IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-30 IN L. & C. CARD INDEX.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-33 IN L. & C. CARD INDEX. ORIGINALLY DATED APRIL 11, 1922; CHANGED TO APRIL 13, 1922.
B	SO/ST/TE	PLAN NUMBER ENTERED AS 154-ENV. 66-34 IN L. & C. CARD INDEX.

B	TE/SO	DATES ON DIAGRAM RANGE FROM 1909-1921. PLAN NUMBER ENTERED AS 154-ENV. 66-35 IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 154-ENV. 66-36 IN L. & C. CARD INDEX.
A		CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-38 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-39 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-40 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-41 IN L. & C. CARD INDEX.

B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-42 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-42 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
A		SEE PLAN SERIES 154-066. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-44 IN L. & C. CARD INDEX.
B	HO	BEARS FILE NO. 1024. PLAN NUMBER ENTERED AS 154-ENV. 66-45 IN L. & C. CARD INDEX.

B	SO/TE	ATTACHED TO 154-066-046-B. PLAN NUMBER ENTERED AS 154-ENV. 66-46 IN L. & C. CARD INDEX. CURRENT METER MEASUREMENT.
B	SO	ATTACHED TO 154-066-046-A. PLAN NUMBER ENTERED AS 154-ENV. 66-46 IN L. & C. CARD INDEX.
B	SO	ATTACHED TO 154-066-047-B. PLAN NUMBER ENTERED AS 154-ENV. 66-47-A IN L. & C. CARD INDEX.
B	SO	ATTACHED TO 154-066-047-A. PLAN NUMBER ENTERD AS 154-ENV. 66-47-B IN L. & C. CARD INDEX.
B	SO/ST	ATTACHED TO 154-066-048-B AND C. PLAN NUMBER ENTERED AS 154-ENV. 66-48-A IN L. & C. CARD INDEX. CURRENT METER MEASUREMENT. SEE ALSO 154-ENV. 066-048-C.
B	SO/TE	ATTACHED TO 154-066-048-A AND C. PLAN NUMBER ENTERED AS 154-ENV. 66-48-B IN L. & C. CARD INDEX. SEE ALSO 154-ENV.-066-048-C.
B	SO/FO	ATTACHED TO 154-066-048 A AND B. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-49 IN L. & C. CARD INDEX.
B	CL	GRAPH DEPICTS 2 MEASUREMENTS OF WATER VELOCITY AT VARIOUS STATIONS WHEN GATES ARE OPENED 8 7/8" TEST MADE OCT. 23, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-A IN L. & C. CARD INDEX.

B	CL	GRAPH DEPICTS WATER VELOCITY AT VARIOUS STATIONS. 3RD MEASUREMENT WITH GATE OPEN 8 7/8" ON OCT. 23, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-B IN L. & C. CARD INDEX.
B	SO	GRAPH DEPICTS WATER VELOCITY AT VARIOUS STATIONS. 1ST MEASUREMENT WITH GATE OPEN 15" ON OCT. 24, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-C IN L. & C. CARD INDEX.
B	SO	GRAPH DEPICTS WATER VELOCITY AT VARIOUS STATIONS. 2ND MEASUREMENT WITH GATE OPEN 15" ON OCT. 24, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-D IN L. & C. CARD INDEX.
B	SO	GRAPH DEPICTS WATER VELOCITY AT VARIOUS STATIONS. 3RD MEASUREMENT WITH GATE OPEN 15" ON OCT. 24, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-E IN L. & C. CARD INDEX.
B	CL	GRAPH DEPICTS WATER VELOCITY AT VARIOUS STATIONS. 1ST MEASUREMENT OF GATE OPENED 21" ON OCT. 24, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-F IN L. & C. CARD INDEX.
B	ST	GRAPH DEPICTS 2ND MEASUREMENT OF GATE OPENED 21" ON OCT. 24, 1923. LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. PLAN NUMBER ENTERED AS 154-ENV. 66-50-G IN L. & C. INDEX.
B	FO/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-51 IN L. & C. CARD INDEX.
B	SO	FROM OCT.1,1911 TO SEP.30,1920.

C	TE/SO/ST	BEARS NO. 163 RECTO. ATTACHED TO 154-063-053-A THRU J.
B	TE/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-53-A IN L. & C. CARD INDEX. ATTACHED TO PLAN NO. 154-066-053-B THRU J. BEARS NO. 1095 RECTO.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-53-B IN L. & C. CARD INDEX. BEARS NOTE FROM JAMES B. FRANCIS CONCERNING WINTER THAW. ATTACHED TO 154-066-053-A THRU J.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-53-C IN L. & C. CARD INDEX. BEARS NOTE FROM JAMES, B. FRANCIS CONCERNING FRESHET IN THE MERRIMACK. ATTACHED TO PLAN NOS. 154-066-053-A THRU J.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-53-D IN L. & C. CARD INDEX. ATTACHED TO 154-066-053-A THRU J.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-53-E IN L. & C. CARD INDEX. ATTACHED TO PLAN NOS 154-066-053-A THRU J.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-53-F IN L. & C. CARD INDEX. ATTACHED TO 154-066-053-A THRU J.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-53-G IN L. & C. CARD INDEX. ATTACHED TO DRAWING NOS 154-066-053-A THRU J.
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-53-H IN L. & C. CARD INDEX. ATTACHED TO 154-066-053-A THRU J.

C	SO/ST	ATTACHED TO 154-066-053-A THRU J.
A		
A		
A		
A		
A		
A		
A		
A		
A		
A		
C	FO/HO/SO	ENLARGED FROM ORIGINAL NO. 63. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		

A		
A		
B	TE/FO/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-67 IN L. & C. CARD INDEX.
A		
A		
A		
B	SO/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-71 IN L. & C. CARD INDEX. NOTE STATES COPIED FROM USGS CURVE DATED MAY 9,1923.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-72 IN L.& C. CARD INDEX. NOTE STATES: MISSING RECORDS OCT.1,1920-JUNE 14,1921. SUPPLIED FROM RECORDS OF SOUHEGAN RIVER. BEARS NO. 7 RECTO.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-73 IN L. & C. CARD INDEX.
B	FO/TE/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-74 IN L. & C. CARD INDEX. NOTE DIRECTS TO SEE RECORD BOOK ("A") PAGES 141-142 1837-1865 FOR INFORMATION. IDENTIFIED AS A BLUEPRINT IN L. & C. CARD INDEX.
B	ST/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-75 IN L. & C. CARD INDEX. BEARS FILE NO. 1015.
B	SO	PLAN NUMBER ENTERED AS 154-ENV. 66-76 IN L. & C. CARD INDEX. CURRENT METER MEASUREMENT.

B	TE/SO	PLAN NUMBER ENTERED AS 154-ENV. 66-77 IN L. & C. CARD INDEX.
B	TE/ST	PLAN NUMBER ENTERED AS 154-ENV. 66-78 IN L. & C. CARD INDEX.
B	ST/SO	
B	ST	LOCATED IN FOLDER ENTITLED: MERRIMACK CANAL.
B	ST/SO	DATES ON GRAPH RANGE FORM 1923-35.
B	CL	DOCUMENT 154-066-082-[A] ATTACHED.
C	CL	3 PAGE DOCUMENT ATTACHED TO 154-066-082.
B	SO/ST	SCALES ARE NOTED AS FOLLOWS: H13/16"=10 MILES, V1/8"=10'. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	RO	SCALE IS NOTED AS FOLLOWS: H1/16"= 1 MILE & V1/8"=10'. LOCATED IN P.H. 098. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	SCALE IS NOTED AS FOLLOWS: H13/16"=10 MILES, V1/8"=10'. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	RO	SCALE IS NOTED AS FOLLOWS: H1/16"= 1 MILE & V1/8"=10'. LOCATED P.H. 098. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	SCALE IS NOTED AS FOLLOWS: H13/16"=10 MILES, V1/8"=10'. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	RO/FO	SCALE IS NOTED AS FOLLOWS: H 1/16"=1 MILE, V 1/8"=10'. LOCATED IN P.H. 098. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	RO	SCALE IS NOTE AS FOLLOWS: H 1/16",V 1/8"=10'. LOCATED IN P.H. 098. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	
B	TE/SO/ST	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	
B	SO/TE	DATES ON CHARTED ARE AS FOLLOWS: APRIL 1895, FEB.1896, MARCH & APRIL 1901.

B	SO	DATES CHARTED RANGE FROM 1912-21. PLAN NUMBER ENTERED AS 154-ENV. 92 IN L. & C. CARD INDEX BUT CONSECUTIVE INDEX OF DRAWINGS NOTES THAT 154-92 IS LOCATED IN ENVELOPE # 66.
B	SO	DATES CHARTED ARE AS FOLLOWS: NOV.1927, SEPT.1938 & MARCH 1936.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. U.S.G.S.
B	FO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. NOTE STATES RECEIVED FEB.2 OR 3, 1957. U.S.G.S.
B	FO/SO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC. 1933. U.S.G.S.
B	FO/ST	PLAN IS ON U.S. DEPT. OF THE INTERIOR GEOLOGICAL SURVEY WATER RESOURCES BRANCH FORM. BEARS P-213-A RECTO. U.S.G.S.
B	SO/TE	
B	ST	
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE..

B	ST	
B	SO	
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	TE/SO	LOCATED IN FOLDER ENTITLED: MERRIMACK RIVER. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO	UNTITLED DOCUMENT LOCATED IN FOLDER ENTITLED "MERRIMACK RIVER". CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	UNTITLED DOCUMENT LOCATED IN FOLDER ENTITLED "MERRIMACK RIVER". CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
A		P.L.& C. CONSECUTIVE INDEX INDICATES THAT THIS PLAN WAS SENT TO FOLDER 136 BUT IT WAS NOT LOCATED THERE.
A		P.L.& C. CONSECUTIVE INDEX INDICATES THAT THIS PLAN WAS SENT TO FOLDER 136 BUT IT WAS NOT LOCATED THERE.
B	LI/TE/FO	FILE 1143.
A		ROLLED IN COPPER TUBE WITH PADLOCK. BEARS "5" RECTO. NOTE STATES PLAN TRACED FROM DRAWING NO. 2, BUT SHOWS 2 UNITS INSTEAD OF 6 IN POWER HOUSE. ARTHUR T. SAFFORD, CONS. ENGR.
B	RO	NOT LOCATED IN FOLDER 136 AS PER P.L.& C. CONSECUTIVE INDEX NOTE. FILE 1143.
B	SO/ST	
B	SO	MEASUREMENTS OF NOV. 5,1920 CORRECTED FOR VARIATIONS IN WATER LEVEL AT PAWTUCKET DAM.
B	SO/ST	

B	SO	
B	FO/SO/ST	BEARS PLAN NO. 2 RECTO.
C	SO	PLAN GIVES CAPACITY OF MILL POND. LOCATED WITH SHELF 158. BEARS "PLAN # 2", RECTO.
B	SO/ST	
B	SO/ST	DATES CHARTED RANGE FROM 1892-1932.
A		
B	FO/SO	SEE TRANSIT BOOK #141 PP. 130-137. SEE CALC. BOOK 716 PP. 8-15.
A		
B	TE/SO/ST/HO	TAKEN FROM FILE 1095 COMP. BK. 547, P.69. COMP. BK. 5632, P.34 & DRAWINGS C-P.H. 036 & 040.

B	SO/TE/ST	READINGS FROM 16 SEPT 1921, 18 SEPT 1921 AND JAN 19, 1922.
B	TE/SO/ST/LI	BEARS DATES SEPT. 16, 1921; SEPT. 18. 1921; APR. 13, 1922.
B	SO	SHEET 1 OF 3.
B	SO	SHEET 2 OF 3.
B	SO	SHEET 3 OF 3.
B	SO	
B	TE/SO	
B	TE/LM/FO/SO	ORIGINAL DATED NOV.1874. TRACED MARCH 1, 1922, FROM DRG. NO.1-DRG.32 ENGINEERS OFFICE. BEARS CASE NO. 45 & NO.30.
B	FO/SO	ORIGINAL DATED NOV.1874. TRACED MARCH 1,1922. TRACED FROM DRG. #1-DRG. 32 ENGINEERS OFFICE.

B	SO/TE/FO	ALL ELEVATIONS REFER TO ESSEX COMPANY'S DATUM. FROM BLUEPRINT U.S. SURVEY MERRIMACK RIVER DEC. 16, 1881. SEE P.H. 051-G.
B	SO	
B	FO/ST/TE	BEARS DRAWING NO.1, RECTO. FILE 37.3.
B	FO/ST/LI/ TE/SO	BEARS DRAWING NO. 2. RECTO. A.T.S. FILE 37.3-AMOSKEAG MFG. CO.
A		CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	
B	FO/SO	

B	SO	COPY MADE FROM ORIGINAL AUG. 30,1923.
A		
B	SO	ORIGINAL DATED AUG.2,1923. REVISED SEPT.28,1923. (A.T.S.).
B	SO	
C	FO/SO/ST	
B	SO	SEE COMPUTATION BOOKS NO.722, PP.92 TO 95 & NO.724, PP.62 & 63.
B	FO/SO	
B	ST/SO	BEARS FILE NO. 1012.4B.
B	ST/SO	BEARS FILE NO. 1012.4B.

B	SO/ST	CURVES BASED UPON MR. MILLS' CURVE OF 1915.
C	CL	CURVES ARE BASED UPON MR. MILLS' CURVE OF 1915.
B	TE/ST/SO	
B	FO/SO	BLUEPRINT OF PLAN 136-020. CONSECUTIVE INDEX NOTES ORIGINAL "PUT IN SLIDE 136". HOWEVER, THIS COPY STILL BEARS THE NUMBER 154-112. BEARS NO. 6, RECTO.
B	TE	ORIGINAL DATED JUNE 1923. COPY MADE FROM ORIGINAL AUG. 30,1923. WITH ADDITIONS. (REC'D APRIL 18,1924.). REVISED MARCH 18,1924. BEARS SHEET NO. 5.
B	FO/TE/ST	
B	SO	
A		CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	TE	ORIGINAL DATE MARCH 1925. REVISED MARCH 1926.

B	TE	ORIGINAL DATED APRIL 1925. REVISED MARCH 1926. CAUGHEY AND PRATT, ENGINEERS.
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/ST/TE/ SO	FILE 37. THIS PLAN IS INCORRECTLY NUMBERED AS 154-122. IT ACTUALLY MATCHES THE RECORD FOR PLAN 154-121 IN THE CONSECUTIVE INDEX OF DRAWINGS.
B	SO	
B	FO/SO	
B	SO	NOTE STATES THAT DOTTED LINE CONTOURS WERE COPIED FROM L.& C. PLAN 160-028-D. SEE PLAN 154-127 WHICH THIS PLAN ACCOMPANIES.
B	SO	

B	FO/SO	
B	FO/TE/SO /ST	
B	FO/TE/SO /ST	TO ACCOMPANY PLAN 154-124.
B	TE/SO	
B	LI/SO/ST	DATES RANGE FROM 1923-1939.
C	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO.136-39 ON COVER. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. DATES PLOTTED RANGE FROM 1923 TO 1939.
C	FO/SO/ST	DATES RANGE FROM 1940-1951.
C	SO	DATES RANGE FROM 1952-1964.
C	SO	FORM DATES RANGE FROM 1923-1964. COLLECTED DATA RANGE FROM 1923 TO MID-1964. THIS CHART IS COMPOSED OF THREE SEPARATE BLUEPRINTS OF 154-130-[A], [B], & [C] PASTED TOGETHER END-TO-END. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	INCOMPLETE CHART. DATES RANGE FROM 1940-1951.

C	SO	DATES CHARTED RANGE FROM 1952-1966.
B	SO/ST/FO	DATES RANGE FROM 1923-1939. BEARS SHEET 1 RECTO.
B	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO. 136-39 ON COVER.REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. DATES PLOTTED RANGE FROM 1923 TO 1939.
C	SO/ST	DATES RANGE FROM 1940-1951.
B	SO/TE	DATES PLOTTED RANGE FROM 1923 TO 1929. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	CL	ATTACHED IN 49 PAGE DOCUMENT WHICH BEARS NO.136-39 FOR ADDITIONAL INFO. REFER TP PLAN NO. 136-39 FOR ADDITIONAL INFO. DATES PLOTTED RANGE FROM 1923 TO 1939.
C	FO/SO	ATTACHED IN 49 PG. DOCUMENT WHICH BEARS NO.136-39 FOR ADDITIONAL INFO. REFER TO PLAN NO. 136-39 FOR ADDITIONAL INFO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	PLAN SHOWING CONTOUR OF LAND BETWEEN MAMMOTH & BROOKSIDE ST. ALSO SHOWS PROFILES OF BROOKSIDE ST., VARNUM AVE., STARBIRD ST., & ORCHARD ST.
C	FO	PLAN SHOWS CONTOURS BETWEEN MAMMOTH & BROOKSIDE ST. ALSO SHOWS PROFILES OF BROOKSIDE ST., VARNUM AVE., STARBIRD ST. & ORCHARD ST. PLAN ALSO SHOWS WATER LEVEL AFTER FLOOD OF 1936.

B	SO	DATES CHARTED RANGE FROM 1939-1947.
B	SO	DATES CHARTED RANGE FROM 1948-1956.
B	SO	DATES CHARTED RANGE FROM 1957-1960.
B	SO	
B	SO	FILE 37.1. NOTE STATES BLUEPRINT IN SHELF 145. SEE 145-026. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST/HO	DATES CHARTED RANGE FROM MAR.12-26.
B	FO/ST	ORIGINAL PLAN DRAWN ON "UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY WATER RESEARCH BRANCH" FORM. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	NOTE DIRECTS TO SEE STUDIES OF RATING CURVES FOR BOOTT GAUGE ON DIAGRAM MADE UP AUG.1943.
B	SO/ST	NOTE STATES RATINGS BASED ON U.S.G.S. MEASUREMENTS OF MERRIMACK & CONCORD RIVERS FROM APRIL 1,1940 TO JULY 11,1943.
B	FO/TE/SO	

B	CL	BEARS SHEET NO. 4 RECTO.
B	CL	ORIGINAL MADE BY GEORGE MITCHELL. THE DATE OF THIS COPY IS UNKNOWN.
B	TE/SO/ST	PROFILES OF MERRIMACK RIVER, PEMIGEWASSET RIVER, EAST BRANCH OF PEMIGEWASSET RIVER, SUNCOOK RIVER & BAKER RIVER. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	

B SO/ST

B SO/ST

B SO/ST/TE

B	SO/ST/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	TE/SO	PLAN NO. USED TWICE BY P.L.& C.
B	FO/ST/SO	NOTE STATES THIS PLAN WAS USED FOR WORK SHEET. NOTE ALSO DIRECTS TO SEE FINISHED PLAN AUGUST 1950. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF AUG. 1950. PLAN NO. USED TWICE BY P.L.& C.
B	FO/SO/ST	NOTE STATES PROPOSED LINE NEVER OFFICIALLY ESTABLISHED OR AGREED UPON BY THE CITY OF LOWELL & THE PROPRIETORS OF THE LOCKS & CANALS ON MERRIMACK RIVER. PLAN NO. USED TWICE BY P.L.& C.
C	RO	SHOWS AN ALTERNATIVE LINE FOR ONE SEWER. PLAN NO. USED TWICE BY P.L.& C.
C	SO/TE	NOTE STATES: COMPILED FROM A PLAN MADE FOR HIRAM F. MILLS MARCH 31,1893.

C	FO	LOCATED IN FOLDER 155.
C	FO	LOCATED IN FOLDER 155.
B	FO/SO	L.& C. INDEX GIVES DATE OF OCT. 1912. SHEET NO. 203. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	L.& C. INDEX GIVES DATE OF NOV. 1912. NOTE READS "SEE RATING SHEET NO. 203". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	L.& C. INDEX GIVES DATE OF NOV. 1912. NOTE READS "SEE RATING SHEET NO. 201". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	ST/SO	
B	SO/HO	
B	CL	FILE NO. 1010.

B	SO	FILE NO. 1010.
B	FO/TE	
B	CL	BEARS "2 PRINTS" RECTO.
B	CL	
B	CL	SEE ALSO PLAN NOS.155-014 & 155-015.
B	CL	
B	SO	SEE ALSO PLAN NO. 155-012 & 155-015. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 23, 1918.

B	CL	SEE ALSO PLAN NOS. 155-012 & 155-014.
B	CL	BEARS FILE 1010 RECTO.
B	SO/FO	ATTACHED IN 9 PAGE DOCUMENT. FILE NO. 1016.
B	FO/SO/TE	ATTACHED IN 9 PAGE DOCUMENT. FILE NO. 1016.
B	SO/FO	ATTACHED IN 9 PAGE DOCUMENT. FILE NO. 1016.
B	SO/FO	ATTACHED IN 9 PAGE DOCUMENT. FILE NO. 1016.
B	FO/SO	ATTACHED IN 9 PAGE DOCUMENT. FILE NO. 1016.

B	SO	ATTACHED IN 9 PAGE DRAWING. FILE NO. 1016.
B	SO	ATTACHED IN 9 PAGE DRAWING. FILE NO. 1016.
B	SO/FO	ATTACHED IN 9 PAGE DOCUMENT. TWO COPIES MADE.
B	SO/FO/TE	ATTACHED IN 9 PAGE DOCUMENT. TWO COPIES MADE.
B	SO/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/HO	BEARS "PRELIMINARY" RECTO.

B	CL	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/HO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO	
B	HO/SO	SEE ALSO PLAN NO. 155-032-[COPY 1]. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER. ATTACHED IN 4 PAGE DOCUMENT.
C	CL	ATTACHED IN 4 PAGE DOCUMENT.
C	CL	ATTACHED IN 4 PAGE DOCUMENT.
C	CL	ATTACHED IN 4 PAGE DOCUMENT.
B	SO	CONSTRUCTED IN 1917.

B	SO/ST/FO	
B	CL	PLAN NUMBER ENTERED AS 155-34-X IN CONSECUTIVE INDEX OF DRAWINGS.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	PLAN NUMBER ENTERED AS 155-35-X IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/SO	
B	FO/SO	PLAN NUMBER ENTERED AS 155-36-X IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/SO	
B	SO	NOTE STATES METES & BOUNDS AS PER DEED OF MARCH 19,1913. BETWEEN P.L.& C. & MARY F. DILLON. P.L.& C. BOOK 7. PAGE 84. RECORDED AT REGISTRY IN BOOK 502, PG. 579. PLAN NUMBER ENTERED AS 155-37-X IN CONSECUTIVE INDEX OF DRAWINGS.

B	CL	BEARS FILE # 1144, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	PLAN NUMBER ENTERED AS 155-38-X IN CONSECUTIVE INDEX OF DRAWINGS.
A		CONSEUCTIVE INDEX OF DRAWINGS NOTES "DESTROYED 8/2/1923"..
B	SO	
B	SO/ST/FO	
B	FX	
B	SO	

B	SO/ST/FO	
B	SO/FO	THIS IS THE ORIGINAL FROM WHICH BLUEPRINT C-144-099 WAS MADE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BEARS NOTE FILE-1003. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	SO/FO	COLORED INK AND PENCIL WORK DUPLICATES SAME ON ORIGINAL PLAN. CARBON COPY OF MEMORANDUM DATED 19 FEB, 1918, APPENDED AS PER COPY OF MEMO AND PLAN IN FILE 1003, AND AS INDICATED BY GLUE AND STAPLE MARKINGS ON THESE COPIES.
B	FO/SO	
B	FO/SO/TE	
B	FO/TE/SO	
C	SO/TE	

B	SO	
B	LM/TE	
B	SO	NOTE STATES TO: SEE SHEET # 2 FOR REMAINDER OF FISHWAY. BEARS SHEET # 1, RECTO.
B	SO	BEARS SHEET # 2, RECTO.
C	SO/ST	
B	SO	SWAIN 72" WHEEL.
B	SO/ST	

B	SO/ST	
B	TE/SO	BEARS SHEET NO. 2.
B	TE/SO	
B	SO	
C	SO	BEARS NO. 139-16 CROSSED OUT, RECTO. THE TITLE IS ENTERED IN COLORED PENCIL ON THIS COPY.
C	CL	
A		
B	CL	

B	SO	
C	SO/LO/HO	
B	SO	
B	FO/SO	
B	SO/ST	
B	SO	
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/ST	
B	FO/SO/HO	
C	FO/SO/TE	
B	SO/ST	
B	SO	FOUND IN FOLDER 143.
B	SO	
A		IT IS UNCLEAR FROM THE ENTRY IN THE CONSECUTIVE INDEX OF DRAWINGS IN THIS PLAN WAS DIECARDED BY P. L. & C. OR IF IT WAS SIMPLY BEING HIGHLIGHTED IN THE INDEX.
B	SO	
B	SO	

B	FO/ST/SO	NOTE STATES THAT THIS WALL WAS STARTED IN OCTOBER, 1920; FINISHED IN APRIL 1922.
B	SO/FO/ST	
B	FO/ST/SO	
B	SO	
B	SO	COPIED FROM PLAN DATED NOV. 1794. PRESENT CITY OF LOWELL SHOWN IN PENCIL. DATE OF THIS COPY UNKNOWN.
B	SO	
B	SO/FO	
B	SO/FO	
B	SO	

C	SO	
B	FO/SO	
B	SO	
C	FO/SO	
B	SO/ST	L.& C. CARD INDEX GIVES A SCALE OF 1"=8 RODS AND IDENTIFIES IT AS A TRACING PAPER PLAN.
B	SO	L.& C. CARD INDEX IDENTIFIES THIS AS A TRACING PAPER PLAN.
B	SO	
B	TE/SO	L.& C. CARD INDEX IDENTIIFIES THIS AS A TRACING PAPER PLAN.
B	SO	
B	CL	

B	FO/SO	PLAN SHOWS SUGGESTED STREETS FROM EAST MERRIMACK ST. TO WARREN ST. MAY ORIGINALLY HAVE BEEN P.H. 088-016.
B	FO/SO/LM	PLAN EMPHASIZES MERRIMACK CANAL NORTH OF MERRIMACK ST., DUTTON ST., & BUILDINGS ON NORTH SIDE OF FRENCH ST. MAY ORIGINALLY HAVE BEEN P.H. 088-017.
B	SO/TE	MAY ORIGINALLY HAVE BEEN P.H. 088-018.
B	SO	AREA LIES BETWEEN ARMORY & PAIGE STS. PLAN NUMBER ENTERED AS 155-99 IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 155-99 IN L. & C. CARD INDEX.
B	SO/ST	
B	FX	
B	SO	

B	FO/SO	ADDITIONAL NOTES DATED OCT.1,1931.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	
C	SO	
B	FO/SO	
B	ST	
B	ST	
B		

B	SO
B	SO
B	SO
B	SO
B	SO
B	SO
B	SO
B	SO/FO

B	FO/SO	
B	FO/SO/HO	
B	CL	LOCATED WITH SHELF 162. PLAN OF LAND LEASED TO KITSON MACHINE SHOP ON EITHER SIDE OF WESTERN CANAL, IN VICINITY OF DUTTON & WORTHEN STREETS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO	DATES PLOTTED RANGE FROM 1918 TO 1936.
B	SO/TE	DATES PLOTTED RANGE FROM 1918 TO 1936.
B	CL	

B	TE	THE DATE SPAN IN THE TITLE REPRESENTS THE PROJECTED DATA GATHERING CAPACITY OF THIS GRAPH. IN FACT, THE GRAPH ITSELF DOES NOT SHOW DATA BEYOND 1925. THE DATE OF THE GRAPH IS THE DATE OF ITS CREATION.
B	SO	DATA COMPILED FOR THE YEAR 1930.
B	SO/FO	
B	CL	DATA COMPILED FOR THE YEAR 1932. LOCATED AFTER COMPLETION OF INVENTORY.
B	SO	DATA COMPILED FOR THE YEAR 1932.
B	SO	
B	SO/TE	

B	SO	
B	SO	
B	SO	NOTE STATES: USED FOR PITOT GAGE.
B	SO	
B	SO/TE	
B	SO	
B	SO	
B	SO/FO	DATA COMPILED FOR THE YEARS 1922-1933.
B	CL	
B	SO/FO	

B	SO/HO	
B	CL	DATA COLLECTED IS FROM 1921-1932.
B	CL	DATA COLLECTED IS FROM 1921-1932.
B	FO/SO	ORIGINALLY DATED AUG.6,1915. BEARS COPY-JULY 12,1932 RECTO, WITH ADDITIONS. ALSO BEARS I. R. D. 4308 NEW ENGLAND INSURANCE EXCHANGE 141 MILK ST. BOSTON, MASS. SPECIFICATION PLAN.
B	SO	PLAN STATES: FIRE STARTED AT OLD FEDERAL SHOE CO. BUILDING.
C	SO	PLAN STATES: FIRE STARTED AT OLD FEDERAL SHOE CO. BUILDING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO	11 PAGE DOCUMENT.
B	CL	NOTE STATES FROM 1933 RETURN TO PUBLIC SERVICE COMMISSION PP.428-429.
B	CL	NOTE STATES, "FROM 1933 RETURN TO PUBLIC SERVICE COMMISSION PP.428-429"
B	SO	NOTE STATES, "FROM 1932 RETURN TO PUBLIC SERVICE COMMISSION PP.428-429".

C	CL	NOTE STATES, "FROM RETURN TO PUBLIC SERVICE COMMISSION 1931 PP.428-429".
B	FO/SO	ATTACHED TO 155-142-[COPY 2].
B	FO/SO	ATTACHED TO 155-142-[COPY 1].
B	SO	SEE ALSO PLAN NO. 155-143-[COPY 2].
B	FO/SO	
B	FO/SO	PLAN SHOWS: EMPTY BUILDINGS, 1/4, 1/2, 3/4 & ALL OCCUPIED BUILDINGS.
B	FO/SO/TE	
B	SO	PLAN IS NUMBERED 55 (ENV.) 146. HOWEVER, THE PLAN CONFORMS TO THE DESCRIPTION OF PLAN 155-146 IN THE CONSECUTIVE INDEX. RESULTS IN A DUPLICATE NO. IN THE CONSEC. INDEX NUMBERING IF ITS NUMBER IS READ AS 146-55. CONSECUTIVE INDEX ALSO GIVES NO DATE.

B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	PART OF 4 PAGE DOCUMENT.
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
C	SO	PLAN NUMBER USED TWICE BY L. & C.
B	ST	PLAN NUMBER USED TWICE BY L. & C. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. DATA SHOWN IN GRAPH FORM FROM 1900 THROUGH 1945.
B	CL/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	

B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	FO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/SO/FX	NOTE STATES TO ACCOMPANY ARTHUR T. SAFFORD'S MEMORANDUM OF JULY 31,1947.
B	SO	METER NO. 8163. RATING MADE FOR PROP. LOCKS & CANALS.
C	SO	LOCATED IN FOLDER 158. PLAN 156-[167] IS AN EARLIER DESIGN FOR THIS PROJECT.
C	SO	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9831 AND INDEX NOS. 9348 AND 9349. ALSO BEARS NOS. 684 A AND TT C-16 JOB B 410. ORIGINALLY DATED 28 AUG., 1911. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.

C	SO/TE	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX AND CONSECUTIVE INDEX. BEARS ASSOCIATED MUTUAL INSURANCE CO. SERIAL NUMBER 14417. SERIAL NO. NOTE READS "THIS REPLACES NO. 9831. INDEX NUMBER 9349. NOTE READS "FOR PLAN SEE SHEET 14416".
C	SO	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 3945 AND INDEX NOS. 1678 AND 1680. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	SO	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES SERIAL NO. 25711 AND INDEX NO. 9328. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	SO	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES SERIAL NO. 25710 AND INDEX NO. 9328. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	SO	ASOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES SERIAL NO. 25879 AND INDEX NO. 9352. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	SO	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 25879 AND INDEX NO. 9352. DUPLICATE OF 156-[161]-[A] WITH NEW TITLE AND GIANT STORES LEASE HOLD SHOWN. LOCATED AFTER COMPLETION OF INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	SO/FO/TE	READS: NEW ENGLAND 12155, EASTERN UNDERWRITERS INSPECTION BUREAU. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	FO/SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES SERIAL NO. 31684 AND INDEX NOS. 9334 AND 1994.1. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	SO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES SERIAL NO. 11046 AND INDEX NOS. 9333-34. ORIGINALLY DATED 2 JULY, 1913. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.

C	SO	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES SERIAL NO. 24105 AND INDEX NOS. 9334.1. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	FO/SO/TE	ASSOCIATED MUTUAL INSURANCE CO'S SERIAL NO. 14912 AND INDEX NOS. 9328. THIS IS A RETITLED PLAN ORIGINALLY DATED 12 FEB 1922. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	ASSOCIATED MUTUAL INSURANCE CO'S SERIAL NO. 14912 AND INDEX NOS. 9328. THIS IS A RETITLED PLAN ORIGINALLY DATED 12 FEB 1922. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	ST/FO/SO	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE MASS. MILLS COMPLEX. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 156.
C	ST/SO/FO /TE	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE BOOTT AND MASS. MILLS COMPLEXES. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL. LOCATED AFTER FORMAL COMPLETION OF INVENTORY.
C	FO	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE BOOTT AND MASS. MILLS COMPLEXES. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL. LOCATED AFTER FORMAL COMPLETION OF INVENTORY.
C	FO	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE BOOTT AND MASS. MILLS COMPLEXES. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL. LOCATED AFTER FORMAL COMPLETION OF INVENTORY.
C	FO	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE BOOTT AND MASS. MILLS COMPLEXES. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL. LOCATED AFTER FORMAL COMPLETION OF INVENTORY.
C	FO	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE BOOTT AND MASS. MILLS COMPLEXES. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL. LOCATED AFTER FORMAL COMPLETION OF INVENTORY.
C	SO/TE	PLAN SHOWS PROPERTY OF LOCKS AND CANALS IN THE MARKET MILLS COMPLEX. DRAWN BY DANA F. PERKINS, CIVIL ENGINEERS & SURVEYORS, LOWELL

C	CL	GRAPH SHOWING STORAGE CAPACITIES FOR 24 P.L.& C. OIL STORAGE TANKS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE	LOCATED IN P.H. 16.
C	FO/SO	JOHN A. STEVENS, INC. ENGINEERS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. JOB NO. 694.
C	FO/SO	PLAN FROM COCHRANE CORPORATION, PHILADELPHIA, PA. DATE STAMP, VERSO, READS "AUG 21 1951" AND "3088 51" BY COCHRANE CORP. BEARS NO. 694-1, RECTO, IN COLORED PENCIL UNDOUBTEDLY APPLIED BY P.L. & C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	PLAN FROM COCHRANE CORPORATION, PHILADELPHIA, PA. DATE STAMP, VERSO, READS "AUG 21 1951" AND "3088 51" BY COCHRANE CORP. BEARS NO. 694-5, RECTO, IN COLORED PENCIL UNDOUBTEDLY APPLIED BY P.L. & C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	PLAN FROM COCHRANE CORPORATION, PHILADELPHIA, PA. DATE STAMP, VERSO, READS "AUG 21 1951" AND "3088 51" BY COCHRANE CORP. BEARS NO. 694-6, RECTO, IN COLORED PENCIL UNDOUBTEDLY APPLIED BY P.L. & C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	
C	TE/CL	

C	TE	DRAWING # LI-1941-2. HERBERT C. BROWN, MATERIAL HANDLING ENGINEER, MEDFORD ST., CHARLESTOWN. NOTE, VERSO 156-[174], READS "BUCKET CONVEYOR - BRIDGE ST. - BO. HSE".
C	FO/TE	DRAWING # LI-1941-5. HERBERT C. BROWN, MATERIAL HANDLING ENGINEER, MEDFORD ST., CHARLESTOWN. NOTE, VERSO, READS "BUCKET CONVEYOR - BRIDGE ST. - BO. HSE".
C	CL	DRAWING # LI-1941-4. HERBERT C. BROWN, MATERIAL HANDLING ENGINEER, MEDFORD ST., CHARLESTOWN. NOTE, VERSO 156-[174], READS "BUCKET CONVEYOR - BRIDGE ST. - BO. HSE".
C	FO.ST	SHOWS "GREEN AREA" BORDERED BY BRIDGE ST., MERRIMACK RIVER & MILL NO. 2, SECTIONS 4 & 5.
C	SO/FO/ST	WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN # 42-70-77. STAMPED, VERSO, DEC. 11, 1922.
C	FO	WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN # 20-48-43. STAMPED, VERSO, DEC. 11, 1922.
C	FO	WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN # 20-48-44. STAMPED, VERSO, DEC. 11, 1922.
C	FO	WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN # 20-48-47. STAMPED, VERSO, DEC. 11, 1922.
C	FO/SO/TE	TITLE BLOCK ALSO NOTES: R.H. BEAUMONT CO., COAL HANDLING SYSTEMS, DREXEL BLDG., PHILA., PA.
C	CO/TE	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CORP ENGINEERING DIVISION PLAN # 9328.
C	FO/ST/TE	

C	FO/SO/TE	ACUTLER-HAMMER MFG. CO. BLUEPRINT 13264D.
C	FO/SO/TE	GENERAL ELECTRIC CO. BLUEPRINT NO. T-1202943. ORIGINAL DATE JUNE 12, 1912 BEFORE REVISIONS OF 1917.
C	FO	DRAWING # LI-1941-1. HERBERT C. BROWN, MATERIAL HANDLING ENGINEER, MEDFORD ST., CHARLESTOWN. LOCATED AFTER COMPLETION OF FROMAL INVENTORY.
C	SO/TE	DRAWING # LI-1941-3. HERBERT C. BROWN, MATERIAL HANDLING ENGINEER, MEDFORD ST., CHARLESTOWN. LOCATED AFTER COMPLETION OF FROMAL INVENTORY.
B	FO/SO	A BLUEPRINT COPY OF THIS PLAN WAS USED AS PLAN P.H. 096-001. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	THE PHOTOSTATS NOTED IN THE CONSECUTIVE INDEX RECORD WERE NOT ATTACHED. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	

B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	REVISED OCT. 22, 1942. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO/TE /FO	
B	RO/SO/TE /FO	REFERENCES TO LOWELL FURNITURE CO. AND ITS PARTY WALLS HAVE BEEN CROSSED OUT. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. SAME TITLE AS PLAN P.H. 096-008-[B]. CONSECUTIVE INDEX OF DRAWINGS SHOWS THIS TITLE FOR BOTH PLAN NUMBERS. THIS PRINT MAY BE A COPY OF P.H. 096-008-[B].
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/ST/SO	
A		
A		

B	SO/FO/TE /LO	THE SURVEY DATE WAS FEB. 15, 1919 BUT THE DATE OF THE PLAN IS DEC. 15, 1919. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	
C	FO/SO	BLUEPRINT FROM THE ESTERLINE-ANGUS CO., INDIANAPOLIS, IND., NO. 9239.
B	FO	
B	SO	AREA LIES IN VICINITY OF EASTERN CANAL
B	TE/SO	
B	SO	
B	ST	

B	FO	BEARS F-34 P. 16-17 RECTO. ALSO BEARS "COPY" RECTO.
B	ST	BEARS NO. 730 RECTO. ALSO BEARS F.B. 92/20.21. PLAN BEARS "COPY" RECTO.
B	CL	BEARS NO. 757 RECTO. ALSO BEARS F-32 P.2-28. PLAN BEARS "COPY" RECTO.
B	CL	
B	SO	
B	ST	
B	SO	DATES CHARTED RANGE FROM 1930 TO 1939. DATA COLLECTED FROM 1930 THROUGH 1934.
B	SO	DATES CHARTED RANGE FROM 1930 TO 1939. DATA COLLECTED FROM 1930 THROUGH 1934.
B	SO	DATES CHARTED RANGE FROM 1930 TO 1939. DATA COLLECTED FROM 1930 THROUGH 1934.
B	SO/ST	DATES CHARTED RANGE FROM 1930 TO 1939. DATA COLLECTED FROM 1930 THROUGH MID-1932.

B	FO/TE/SO	DATES CHARTED RANGE FROM 1930 TO 1939. DATA COLLECTED FROM 1930 THROUGH MID-1932.
B	SO	
B	CL	DATA COLLECTED FROM 1930 THROUGH 1937.
B	TE	DATA COLLECTED FROM 1930 THROUGH 1937.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE	DATES CHARTED RANGE FROM JAN.1938 - DEC.1939.
A		
B	TE/ST	
B	ST/SO	

B	SO	
B	SO	
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1937.
B	FO	NOTE STATES PLAN REFERS TO CLOTH ROOM BUILDING.
B	SO	
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	DATA SHOWN FROM 1930 THROUGH 1937.
B	SO	DATA SHOWN FROM 1930 THROUGH 1937.
B	SO	DATA SHOWN FROM 1930 THROUGH 1937.

B	CL	DATA SHOWN FROM 1930 THROUGH 1937.
B	CL	DATA SHOWN FROM 1930 THROUGH 1937.
B	CL	DATA SHOWN FROM 1930 THROUGH 1937.
B	CL	DATA SHOWN FROM 1930 THROUGH 1937.
B	CL	DATA SHOWN FROM 1930 THROUGH 1937.
B	CL	ATTACHED TO 156-042-030 THRU 044.
B	CL	ATTACHED TO 156-042-030 THRU 044.
B	CL	ATTACHED TO 156-042-030 THRU 044.
B	CL	ATTACHED TO 156-042-030 THRU 044.
B	SO	ATTACHED TO 156-042-030 THRU 044.
B	HO	ATTACHED TO 156-042-030 THRU 044.

B	TE/SO	ATTACHED TO 156-042-030 THRU 044.
B	FO	DATES ON GRAPH RANGE FROM 1840-1930.
B	CL	
B	SO	
B	FO/SO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	FO/SO	
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	THIS IS A 1952 REVISION OF PLAN NO. 156-042-053-01. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS NOTE READING "SEE AUG.1952 BASEMENT PLAN" WHICH REVISION WILL BE FOUND AT PLAN 156-042-053-[07]. PREVIOUSLY REVISED IN DEC. 1942. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS NOTE READING "SEE FIRST FLOOR PLAN AUG. 1952" WHICH REVISION WILL BE FOUND AT PLAN 156-042-053-[08]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		THIS IS A 1952 REVISION OF PLAN NO. 156-042-054-01. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		THIS IS A 1952 REVISION OF PLAN NO. 156-042-054-02. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		BEARS NOTE READING "SEE BASEMENT PLAN AUG. 1952" WHICH REVISION WILL BE FOUND AT PLAN 156-042-054-[07]. PREVIOUSLY REVISED IN DEC. 1942. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	
B		BEARS NOTE READING "SEE FIRST FLOOR PLAN AUG. 1952" WHICH REVISION WILL BE FOUND AT PLAN 156-042-054-[08]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO	
B		REVISED AUG. 1952. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		REVISED AUG. 1952. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO	

B	SO	NOTE STATES CORRECT AS FAR AS KNOWN AFTER CHANGES WERE COMPLETED AUG. 1943.
B	SO	
B	SO	
B	SO	
C	RO/FO/TE	
B	SO	
B	SO	
B	SO	
B	FO/SO	

B	SO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	PLAN NUMBER GIVEN IN L.& C. CARD INDEX AS 156-042-067. COVERS TIME PERIOD 1930-1945.
C	CL/FO	PLAN NUMBER EXTRAPOLATED FROM 156-042-067-[A]. COVERS TIME PERIOD 1930-1947.
B	SO	
B	CL	
B	SO/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
A		
A		SMALL TRACING.

B	FO/SO	
B	SO	
C	SO	
B	SO	
A		TRACING.
B	SO	
B	SO	
A		
A		
B	SO	

A		TRACING.
A		TRACING.
A		TRACING
A		TRACING.
B	SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	SO/FO	
B	SO	

B	SO	
B	SO	
B	SO	TRACING.
B	SO	
B	SO	
B	SO	
B	SO	PLAN SHOWS FIRST FLOOR PLAN OF CLOTH ROOM BLDG.

B	SO	
B	SO	
B	SO	LOCATED IN SHELF 157.
B	SO	
B	SO/TE	
B	SO	PLAN BEARS SCHEME SUGGESTED BY DEPT. PUBLIC WORKS & AN ALTERNATE SCHEME.
C	SO/TE/FO	THIS BLUEPRINT COPY WAS MADE BEFORE ADITIONAL WORK WAS ADDED TI THE ORIGINAL. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

A		
B	SO/HO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
C	SO	
B	SO/ST	
B	SO	
B	SO	
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS # G-9, RECTO.
B	SO	REVISED AUG.30,1944. SCALES ARE NOTED AS FOLLOWS: 1"=20'& 10', 3/16"=1'.
B	SO/FO	
B	SO	
B	SO	REVISED SEPT.14, 1942.

B	SO/TE	
B	FO/SO	PLAN SHOWS BUSINESS CENTER OF LOWELL, MASS.
B	SO	
C	SO	PLAN SHOWS BUSINESS CENTER OF LOWELL, MASS.
B	FO/SO/LO	PLAN SHOWS BUSINESS CENTER OF LOWELL, MASS. LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	TE/SO	PLAN SHOWS BUSINESS CENTER OF LOWELL, MASS.
B	SO	REFER TO PLAN NO. 156-092.
B	SO	NO TITLE BLOCK.

A		
B	TE	4 PAGE DOCUMENT. GAY & PROCTOR. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	FO	GAY & PROCTOR. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	SO	GAY & PROCTOR. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	SO/TE/FO	GAY & PROCTOR. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	SO/TE	THIS 7 PAGE DOCUMENT IS THE CONTRACT SPECIFICATIONS TO ACCOMPANY THE PLANS. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	SO/FO	THIS 2 PAGE DOCUMENT IS AN ESTIMATE SUBMITTED BY A SUBCONTRACTOR. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	FO	THIS 1 PAGE DOCUMENT IS A LETTER REGARDING THE SUBCONTRACTOR'S ESTIMATE. CONSECUTIVE INDEX GIVES DATE OF 1937.
B	SO/FO/TE	NOTE RAEDS "MS MAGUIRE". IT IS UNCLEAR IF THIS DRAWING WAS ACTUALLY PRODUCED BY GAY & PROCTOR.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/HO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1937.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/HO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1937.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/HO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1937.
		THIS 11 PAGE DOCUMENT IS A PROPOSAL WITH A SCOPE OF WORK STATEMENT. IT WAS INTENDED TO COMPLIMENT THE BLUEPRINTS.
C	SO/FO	JOB NO. 2240.
B	SO	DATA COVERS PERIOD 1880-1930.
B	SO	CONSECUTIVE INDEX ALSO GIVES NO DATE.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 27, 1940.
B	SO	

C	SO/RO/MO	LOCATED IN SHELF 157.
B	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
A		TRACING.
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF FEB. 18, 1941.

B	SO/FO	PLAN SHOWS EXPANSE OF PIPE WHICH RUNS FROM BOOTT BOILER ROOM TO MASS. POWER HOUSE, INDICATING LOCATION OF EXPANSION JOINTS.
B	SO	
A		TRACING.
B	SO	
A		TRACING.
B	SO	PLAN NUMBER ENTERED INTO L.& C. CARD INDEX AS 156-111.
C	SO/FO	FOUND IN SHELF 157. PLAN NUMBER EXTRAPOLATED FROM 156-111-[A].
A		TRACING.

B	SO	
B	SO	
A		TRACING.
B	SO	NOTE DIRECTS TO SEE LATER PLAN OF CHANGES COMPLETED AUG.1943.
C	SO	LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
C	SO/TE	FOUND IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS REVISION DATES FEB. 9, 1943 & OCT. 20, 1950.
C	SO	BEARS REVISION DATES FEB. 9, 1943 & OCT. 20, 1950.

B	SO	
C	SO	
A		TRACING.
B	SO/FO	ORIGINALLY DATED DEC.15,1941. REVISED AUG.26,1942.
B	FO/SO	ORIGINALLY DATED DEC.15, 1941. REVISED AUG.26, 1942. LOCATED IN SHELF 157.
C	FO/SO	NOTE STATES TRACED 9-28-64.
B	SO/ST	

C	SORO/TE	
B	SO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE	LOCATED IN RANDOM P.H. WITH VARIOUS PLANS.
C	RO/TE	NOTE READS "CABLE NUMBERS COLORED ARE ALIVE". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/ST	
B	FO/SO	
B	RO/SO/ST	BEARS # F-104, RECTO. ORIGINALLY DATED JAN. 1894 WITH ADDITIONS PUT ON MARCH 1943.
B		A BLUEPRINT MAY EXIST OF THIS PLAN.
C		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/HO	BEARS ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 25710 & INDEX NO. 9328. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETREIVED FROM P.L.& C. APRIL, 1997.
B	SO/FO/HO	BEARS ASSOCIATED FACTORY MUTUAL FIRE INSURANCE CO. SERIAL NO. 25711 & INDEX NO. 9328. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	SO	NOTE: THE VALUATION FIGURES ON PLANS C-1 TO C-5 RESPECTIVELY ARE GRADUALLY REDUCED DUE TO THE TEARING DOWN OF VARIOUS BUILDINGS.
B	SO	NOTE: THE VALUATION FIGURES ON PLANS C-1 TO C-5 RESPECTIVELY ARE GRADUALLY REDUCED DUE TO THE TEARING DOWN OF VARIOUS BUILDINGS.
B	SO	NOTE: THE VALUATION FIGURES ON PLANS C-1 TO C-5 RESPECTIVELY ARE GRADUALLY REDUCED DUE TO THE TEARING DOWN OF VARIOUS BUILDINGS.
B	SO	NOTE: THE VALUATION FIGURES ON PLANS C-1 TO C-5 RESPECTIVELY ARE GRADUALLY REDUCED DUE TO THE TEARING DOWN OF VARIOUS BUILDINGS.
B	SO	NOTE: THE VALUATION FIGURES ON PLANS C-1 TO C-5 RESPECTIVELY ARE GRADUALLY REDUCED DUE TO THE TEARING DOWN OF VARIOUS BUILDINGS.

B	TE/SO	
B	TE/SO	
B	SO	
B	SO	
B	SO	PLAN OF PROPOSED STREET.
B	SO	
B	SO	
B	FO/SO	

B	SO/FO	
B	FO/SO	
B	TE	HARRY PRESCOTT GRAVES, ARCHITECT. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	
B	SO/FO	
B	SO/FO	BEARS NO. G 6, RECTO. LOCATED IN FOLDER 156. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/LM/TE /SO/ST	BEARS # C-107 RECTO.
B	HO/SO	

B	FO/SO/HO	
B	FO/SO	SECTIONS 3, 4 & 5.
B	SO/FO	SECTION 4.
B	FO/SO	
B	SO	
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
B	SO	BEARS MILL NO. 2 SECTION 5.

B	SO	
B	FO/SO	
B	SO/FO	
B	SO	
B	SO	
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	

C	SO	THIS PLAN IS A COPY OF 156-143 WITH NEW WORK. LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO/FO	
B	SO/TE	
B	SO/FO	
B	TE/SO/ST	
B	FO/SO	PLAN SHOWS SECTION 3 & SECTION 5.
B	FO/TE/SO	

B	SO	
B	SO	BEARS # 156-152, RECTO.
B	FO/SO/TE	ORIGINALLY DATED MARCH 1892, BUT COPIED AUG. 30,1945.
B	FO/SO/TE	ORIGINAL DATE MARCH 1882. COPIED AUG. 30, 1945.
B	CL	
C	FO/TE/SO	
B	FO/HO	NOTE STATES ISSUED 8-16-43. NOTE STATES CHANGES 2 DWG. NO. WAS C-56349 ADDED & OF BREAKER 10-10-44. ALSO STATES 2 WAS 56439 1-26-48. BEARS C 56438 RECTO. ALSO BEARS STAMP VERSO WITH NO. K8629 MAR.11,1849.
B	CL	

C	FO/SO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO	SHOWS NEW PARTITIONS AND DOORS.
C	SO	REVISION OF 157-[003] SHOWING NEW PARTITIONS. LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO	LOWELL INDUSTRIAL DEVELOPMENT CO. LOWELL, MASS, UPPER LEVEL TO LOWER LEVEL ELECTRICAL INTERCONNECTION. LOCATED IN FOLDER 157.

C	ST/TE	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157. INITIAL DESIGN. PLAN 156-[157] IS A LATER DESIGN FOR THIS PROJECT.
C	LO/FO/SO	LOCATED IN FOLDER 157. ORIGNIALLY STAPLED TO 157-[012]-[B] WHICH IS AN EXTENSION OF THIS DRAWING.
C	FO/SO/TE	LOCATED IN FOLDER 157. ORIGINALLY STAPLED TO 157-[012]-[A] AS AN EXTENSION OF THAT DRAWING.
C	FO/SO	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157.

C	SO	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157. SEE ALSO 157-[039].
C	FO/SO	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157.
C	CL	THIS IS A DOCUMENT; A REQUEST FOR BID ON THE PROPOSED ELEVATOR SHAFT CHANGES SENT TO RUNELS CONSTRUCTION CO., INC., LOWELL. FOUND FOLDED TOGETHER WITH 157-[020] AND 157-[021]. LOCATED IN FOLDER 157.
C	CL	FOUND FOLDED TOGETHER WITH 157-[019] AND 157-[021]. LOCATED IN FOLDER 157.
C	FO/SO	FOUND FOLDED TOGETHER WITH 157-[019] AND 157-[020]. LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO/TE	LOCATED IN FOLDER 157. REVISED JULY 24, 1953, AND JULY 29, 1953.

C	SO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	SO/FO	LOCATED IN FOLDER 157.
C	FO/SO/TE	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157.
C	FO	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.

C	CL	LOCATED IN FOLDER 157.
C	SO	LOCATED IN FOLDER 157.
C	ST	LOCATED IN FOLDER 157.
C	CL	LOCATED IN FOLDER 157.
C	FO/SO	LOCATED IN FOLDER 157.
C	SO/TE	LOCATED IN FOLDER 157.
C	FO/SO ST	DIMENSIONS ARE APPROXIMATE. SKETCH FROM OHIO TRANSFORMERS CO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO/TE	SEE ALSO 157-[016].

C	SO	
C	FO/ST	JOB NO. 706-SS-1.
C	FO/ST	JOB NO. 706-SS-1. ORIGINAL DATE IS NOV. 28, 1951, REVISED DEC. 7, 1951.
C	FO/SO/TE	BEARS NO. 645-SS-4, RECTO.
C	FO	BEARS JOB NO. 647, SHEET NO. 2, RECTO. ALSO NOTES: "FOR FOUNDATION SEE SHEET S-4, FOR FLUE WORK SEE SHEET M-3, FOR TRENCHES, PLATFORMS & STAIRS SEE SHEET S-5.
C	FO/SO/TE	BEARS JOB NO. 706, SHEET NO. M-2, RECTO.
C	FO/TE	A WESTINGHOUSE ELEC. & MFG. CO. BLUEPRINT NO. 9-J-890.
C	FO/TE	BLUEPRINT FROM JOHN A. STEVENS, ENGINEER, 8 MREEIMACK STREET, LOWELL, MASS.,

C	CL	
C	CL	LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS BLUEPRINT IS NOT A COPY OF 158-[221]-[A] BUT, RATHER, A COPY OF ANOTHER GENERATION OF THIS SAME PLAN.
C	FO/CL	
C	FO/SO	RETRIEVED FROM P.L.& C., APRIL 1997. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	A LAWRENCE MACHINE CO., LAWRENCE, MASS., BLUEPRINT.
C	SO/TE	LOCATED IN SHELF 158.
C	SO/TE	
C	FO/ST/TE/ SO/TA	

C	RO/TE/LO /ST	
C	ST/TA/FO	
C	FO	A LAWRENCE MACHINE CO., LAWRENCE, MASS., BLUEPRINT.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	
B	SO	
B	SO/ST	THE COLORED PENCIL WORK REPRESENTS NEW DATA.
B	TE	

B	SO/ST/FO /TE	DOCUMENT 158-005-[COPY 2-A] ATTACHED RECTO.
B	SO/ST/FO	2 PAGE DOCUMENT ATTACHED TO 158-005-[COPY 2].
B	SO/ST/TE	DIAGRAM WITH PRESSURES MEASURED AT A 6" PIEZOMETER. COMPUTED BY A.L. KENDALL.
A		
B	SO	PRESSURES MEASURED AT 1", 1 1/8", 1 1/4", 1 3/4" & 3". COMPUTED BY BENJ. RICHARDS.
B	CL	NOTE STATES: FURNISHED BY HERSEY METER CO.
B	SO/ST/FO	
B	FO/SO	
C	SO/ST/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/ST	BOUND IN 7 PAGE DOCUMENT.
C	SO/ST	BOUND IN 7 PAGE DOCUMENT.

B	SO/TE	
C	SO/ST	BOUND IN 7 PAGE DOCUMENT.
B	TE/SO/ST	BOUND IN 7 PAGE DOCUMENT.
B	TE/SO	BOUND IN 7 PAGE DOCUMENT.
B	SO/FO/ST	
B	SO	BOUND TOGETHER AS A 4 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS A 4 PAGE DOCUMENT.
B	SO	BOUND TOGETHER AS A 4 PAGE DOCUMENT.

B	SO	BOUND TOGETHER AS A 4 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO/FO/TE	EXPERIMENT # 20 WITH 3" NOZZLE. BOUND IN 14 PAGE DOCUMENT.
B	FO/SO	EXPERIMENT # 55 WITH 3" NOZZLE.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	BOUND IN 14 PAGE DOCUMENT.

B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO/ST	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.

B	SO	NEW LINE OPENED JULY 28, 1904. BOUND IN 14 PAGE DOCUMENT.
B	FO/SO/TE /HO	NOTE STATES "FURNISHED BY HERSEY METER CO." CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	FO/SO/TE	HERSEY MANUFACTURING CO., BOSTON, MASS.
B	SO	
B	SO	
B	SO	ASSOCIATED MUTUAL INSURANCE CO. PLAN. BEARS SERIAL NO. 4986. BEARS INDEX NO. 1622. ORIGINAL LOCATED AT C-113-002-[A].
B	SO	ASSOCIATED MUTUAL INSURANCE CO, PLAN. BEARS SERIAL NO. 4987. BEARS INDEX NO. 1622. ORIGINAL LOCATED AT C-113-002-[B].
B	FO/SO	2 PAGE DOCUMENT.

B	SO/ST	
B	SO	ADDITIONAL INFO. DATED 1912; MARCH 29, 1943; JULY 29, 1949.
B	SO/ST	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/ST/TE	
C	SO/ST/LI/FO	REVISED TO JAN. 24, 1906, APR. 13, 1913.
C	SO/TE	NOTE STATES LOCATION OF MAIN LINES NOT BE EXACT.
C	SO/ST/TE	REVISED TO MAY 1959.

C	SO/ST/TE	REVISED TO MAY 1959.
C	FO/SO	
C	SO/ST/FO	REVISED TO 1959. NOTE STATES LOCATION OF MAIN LINES NOT EXACT.
C	SO/FO/TE	NOTE STATES LOCATION OF MAIN LINES NOT EXACT.
C	SO/FO/TE /LO	NOTE READS: "RED LINE SHOWS 1850 TO 1860 8" PIPE LINE". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	DATE OF ORIGINAL WAS JAN. 3, 1934 WITH NEW WORK IN COLORED PENCIL ADDED FEB. 6, 1934. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	PREVIOUS REVISIONS JANUARY 24, 1906; AUGUST 13, 1914; JANUARY 15, 1915.

C	SO/TE	PREVIOUS REVISIONS JANUARY 24, 1906; APRIL 15, 1914.
C	FO/TE	
B	FO/SO/ST	REVISED TO APR. 15, 1913 & FEB. 11, 1915.
B	FO/SO	
B	SO/LO	REVISED TO JAN. 24, 1910.
B	SO	
B	SO	ORIGINAL DATED FEB. 17, 1891. TRACED FROM LOCKS & CANALS PLAN #4405 FEB. 25, 1907. BEARS NO. 2374 RECTO. PLAN NO. 143-049 IS A BLUEPRINT MADE FROM THIS DRAFTING CLOTH PLAN.

B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/TE /ST	NOTES "2ND PLAN", RECTO. THE FIRST PLAN IS 158-033-A FROM WHICH THIS WAS COPIED IN PART. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1910.
C	SO/FO/TE /ST	
B	FO/SO	
B	SO	ORIGINALLY DATED DEC.17,1919. REVISED TO AUG.1957. NOTE DIRECTS TO SEE SKETCH DATED NOV.25,1957. ORIGINALLY NUMBERED 158-033.
B	FO/SO/ST	ORIGINALLY DATED OCT.17,1907. REVISED DEC.6,1922.
B	FO/SO/ST	
A		

B	SO	
B	SO	
B	FO/SO	FACTORY MUTUAL INSURANCE CO.
B	FO/SO	
B	SO	BOUND IN 6 PAGE DOCUMENT.
B	SO	BOUND IN 6 PAGE DOCUMENT.
B	SO	
B	SO	BOUND IN 6 PAGE DOCUMENT.
B	FO/SO	BOUND IN 6 PAGE DOCUMENT.

B	SO	UNTITLED PLAN DEPICTING SECTION OF UNSPECIFIED PIPE. BOUND IN 6 PAGE DOCUMENT.
B	TE/FO/SO	
C	SO	
B	SO/FO	
B	TE/SO/FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	ATTACHED WITH 158-047-[A].
B	SO	ATTACHED WITH 158-047.
B	TE/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO/FO	

B	SO	NOTE DIRECTS TO SEE BOOK 130 P.97.
B	SO	
B	SO	
B	CL	CONSECUTIVE INDEX GIVES A DATE OF MARCH, 1912.
B	SO/FO	TRACED FROM CITY PLANS JAN. 28, 1904.
B	SO	ADDITIONAL NOTE DATED SEPT. 20, 1899.
A		TO ACCOMPANY MAP SHOWING WATER MAINS OF L.& C. THE DATE GIVEN ON THE P.L.& C. INDEX CARD IS JANUARY 24, 1917. THE 1906 DATE COMES FROM THE CONSECUTIVE INDEX. THIS WOULD SEEM TO BE THE SAME PLAN AS 158-115-[A] AND 158-115-[C].

B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	NOTE STATES ACCEPTED BY COMMISSION OF STREETS. NOTE DIRECTS TO SEE LETTER OF AUG.12,1912 TO [..?] H. BROWN.
B	SO	TRACING FROM L.& C. PLAN NOS. 1423 & 1428.
B	CL	
B	SO	
B	SO	MADE FOR "RESERVOIR PICTURE." CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	
B	SO/TE	
B	SO/HO/FO	NOTE STATES THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
B	SO	NOTE STATES THIS WAS NOT INSTALLED.
A		
B	SO	
B	SO	3 PAGE DOCUMENT.
A		
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/ST	
B	SO/HO	
B	SO	
B	SO/ST	3 PAGE DOCUMENT.
B	SO/ST	3 PAGE DOCUMENT.

B	SO/ST	3 PAGE DOCUMENT.
B	SO/ST	ATTACHED WITH 158-084-[B].
B	SO	ATTACHED WITH 158-084-[A].
B	CL	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO/ST	
B	SO/FO	BEARS NO. 4451-B, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/HO	BEARS NO. 2374, RECTO, NO. 4461-D, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY
B	CL	NOTE STATES TRACED FROM FACTORY MUT. INS. CO'S PLAN.
B	TE/SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	TE/SO/FO	

A		SEE 144-010-[A].
B	FO/SO/ST	SEE ALSO C-P.H. 079-095.
B	SO	SEE ALSO C-P.H. 079-095.
B	SO/TE	
B	SO	SEE ALSO C-P.H. 079-095.

B	SO/ST	NOTE STATES: TO ACCOMPANY LETTER TO A.T. SAFFORD. SEE ALSO PLAN NO. C-P.H. 079-096.
B	SO	SEE ALSO C-P.H. 079-097.
B	SO/TE	
B	SO	
A		
B	SO	
B	SO/TE	RATING MADE FOR HARVARD UNIVERSITY. SHEET NO. 301.
B	SO	
B	CL	NOTE DIRECTS TO SEE METER NOZZLE RATING SHEETS, NOS. 301-304.
B	SO	

B	CL	
B	CL	
B	CL	
B	CL	
B	CL	
B	HO	
B	SO	
B	TE/SO	
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.

B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	SO/ST	PIPE OPENED JULY 28, 1904.
B	FO/SO	
B	SO/TE	BOUND IN 12 PAGE DOCUMENT.
B	SO	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM FLASK SHOP BASEMENT SACO LOWELL SHOPS.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM STOCK OF LOCKS & CANALS.

B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM DYE HOUSE BASEMENT MASS. COTTON MILLS.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM SACO LOWELL SHOPS.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM STRAND THEATRE BUILDING.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM FELT MILL BASEMENT MIDDLESEX CO.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM UNDER ECONOMIZER MERRIMACK MFG. CO.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM ENGINE ROOM BASEMENT LAWRENCE SECTION T.& S. MILLS.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM TURBINE ROOM APPLETON CO.
B	SO	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036. TAKEN FROM NOS. 3,4,5 & 6 WHEEL ROOM MASS. COTTON MILLS.
B	CL	BOUND IN 12 PAGE DOCUMENT. BEARS FILE NO. 1036
B	SO	
B	TE/FO/SO	
B	CL	PIPE LAID NOV. 1916 & MAY 1925. SEE ALSO PLAN NO. 158-107-[COPY 1]. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.

B	FO/SO/TE	SEE ALSO PLAN NO. 158-107. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER. THE TITLE WAS ALTERED SLIGHTLY ON THIS HANDMADE COPY.
B	SO/ST/FO	PIPES LAID NOV. 1916 & MAY 1925.
B	SO	NOTE STATES 2" PIPE CUT OFF FROM LOCKS & CANALS SYSTEM ON AUG. 19,1919.
B	SO	
B	SO	ATTACHED WITH PLAN 158-110-A. SEE ALSO PLAN NO. 158-111.
B	SO	ATTACHED WITH 158-110.
B	TE/SO	FACTORY MUTUAL INSURANCE CO. SEE ALSO PLAN NO. 158-110 & 158-111.

B	HO/TE	FACTORY MUTUAL INSURANCE CO. ATTACHED WITH 158-113.
B	SO	FACTORY MUTUAL INSURANCE CO. ATTACHED WITH 158-152 & 158-152-[COPY 2].
B	ST	FACTORY MUTUAL INSURANCE CO. SEE ALSO PLAN NO. 158-113. ATTACHED TO 158-112-[COPY 1] & [COPY 2].
B	TE/SO	FACTORY MUTUAL INSURANCE CO. ATTACHED WITH PLAN NOS. 158-112-[COPY 1] & [COPY 2].
B	HO/TE/SO	
C	HO/TE/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	HO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	HO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	HO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	HO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	HO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO	ATTACHED WITH 158-115-[B] & 158-115-[D]. SAME BASE DOCUMENT AS 158-115-[C] BUT WITHOUT ADDITIONAL PENCIL NOTATIONS. SEE ALSO 158-057.
B	SO	ATTACHED WITH 158-115-[A] & 158-115-[D].
B	SO/ST	SAME BASE DOCUMENT AS 158-115-[A] BUT WITH ADDITIONAL PENCIL NOTATIONS. LOCATED IN SHELF 161. SEE ALSO 158-057.
B	SO	ATTACHED WITH 158-115-[A] & [B]. THIS IS A COPY OF 158-115-[B] BEFORE THE REVISIONS OF 1934.
A		

B	FO	
B	FO/ST/SO	
B	ST	
B	HO	BEARS "RESERVOIR", RECTO. ORIGINAL DATED JUNE 21, 1918. NOTE STATES DUPLICATE TRACING MADE AUG. 30, 1918.
B	FO/ST	
B	FO	
B	FO	
B	CL	PLAN REVISED AUG. 8/17.
B	FO/SO	TRACED FROM BLUEPRINT IN FACTORY MUTUAL BOSTON OFFICE.

B	SO/ST	
B	SO/ST/TE	
B	ST/SO	
B	SO	
B	SO	SEE ALSO PLAN NO. 158-129.
B	ST	SEE ALSO PLAN NO. 158-130.
B	ST	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	ST/SO	
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	FO/SO/ST	
B	SO	
B	SO/TE/ST	20 PAGE DOCUMENT WHICH CHARTS AUTOMATIC GAUGES AT VARIOUS DATES, RANGING FROM AUG.1914-JAN.1915.
B	ST/SO	
B	SO	

B	FO/ST/SO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO	DATES GIVEN FOR TESTING: NOV.13-14,1922 & NOV.16-17,1922. NO DATE GIVEN FOR CHART.
B	ST/SO	ATTACHED WITH 158-144-[A].
B	SO	
C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P.L.& C.
A		THIS PLAN NO. WAS USED TWICE BY P.L.& C.
A		THIS PLAN NO. WAS USED TWICE BY P.L.& C.

C	FO/SO	A 28 LEAF BOOKLET WITH TWO COVERS. EACH LEAF BEARS ONE B/W PHOTOGRAPH OF A MUTUAL INSURANCE CO. PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS PLAN NO. WAS USED TWICE BY P.L.& C.
C	FO/SO	A 28 LEAF BOOKLET WITH TWO COVERS. CONTAINS 1 TINTED B/W PHOTOGRAPH PER LEAF OF MUTUAL FIRE INSURANCE CO. PLANS OF MILL COMPLEXES. BOUND WITH STRING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO	
B	SO	
C	TE/FO	DATA COVER THE TIME SPAN 1868 THROUGH 1898 AND SHOW WHAT SEEMS TO BE THE PRICE OF IRON PIPE FOR THE WHOLE OF THA T PERIOD WITH WHAT APPEARS TO BE PIG IRON PRICES FROM MID-1892 THROUGH 1898. ATTACHED TO 158-149-[B]
B	TE/FO	DATA COVER TIME SPAN 1899 THROUGH MID-1922 AND SHOW THE PRICE PER TON FOR BOTH IRON PIPE AND PIG IRON. ATTACHED TO 158-149-[A].
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE/SO	
B	SO/ST	ATTACHED WITH PLAN NOS. 158-152-[A] & [COPY 1].

B	FO/TE	ATTACHED WITH 158-152 & 158-152-[A].
B	FO/ST/TE	ATTACHED WITH PLAN NOS. 158-152 & 158-152-[COPY 1].
B	FO/ST/TE	ATTACHED WITH PLAN NOS. 158-152 & 158-152-[COPY 1].
B	CL	
B	ST	
B	ST	
B	SO	
B	SO	
B	SO/ST	
B	ST	SCALES ARE NOTED AS FOLLOWS: 1"=20', H 1"=20', V 1"=10'.

B	SO	
B	TE/SO	
B	FO	ASSOCIATED FACTORY MUTUAL INS. COS. PLAN. NO. 4.
B	SO	
B	SO	
B	FO/ST/TE/ HO	
B	ST	
B	FO/SO	

B	LM/TE/SO	NOTE STATES, "OLD NUMBER E-68."
B	SO/TE	NOTE STATES, "OLD NUMBER E-65."
B	TE	NOTE STATES, "OLD NUMBER E-64."
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE SEPT. 7 & 8, 1922.
B	FO/SO	DATES GIVEN FOR EXPERIMENTS: OCT. & NOV.1912, NOV.1913 & JUNE 8 & 9,1914. CURVE FOR 6 x 3 METER GIVEN IN ENG. NEWS-RECORD SEPT. 25,1919, P.608. APPENDED TO 158-173-[A] & [B].
B	FO/ST	EXPERIMENTS DATED MAY 19-21,1913. CURVE FOR 10 x 5 METER GIVEN IN ENG. NEWS-RECORD SEP. 25,1919 P. 608. APPENDED TO 158-173-[B].
B	FO/ST	DATE GIVEN FOR SETTING 1912, 1913, 1914. APPENDED TO 158-173 & 173-[A].
B	SO/FO/TE /ST	18 PAGE DOCUMENT.
B	FO/SO	BEARS "SACO YARD", RECTO. CONSECUTIVE INDEX OF DRAWINGS NOTES "OLD NO. 149".
B	SO	CONSECUTIVE INDEX OF DRAWINGS NOTES "OLD NO. 141". CONSECUTIVE INDEX ALSO GIVES NO DATE.

B	SO	CONSECUTIVE INDEX OF DRAWINGS NOTES "OLD NO. 148".
B	TE	CONSECUTIVE INDEX OF DRAWINGS NOTES "OLD NO. 144".
B	SO	PLAN FOR SUCTION PIPES AT SACO-LOWELL YARD. CONSECUTIVE INDEX OF DRAWINGS NOTES "OLD NO. 150". CONSECUTIVE INDEX ALSO GIVES NO DATE.
B	SO	
B	SO	
C	SO	
B	TE	ORIGINALLY DATED JULY 1912. NOTE STATES, "INDEX PLAN FOR LOCATION OF PIPES, UNDER BRIDGES & IN BOTTOM OF CANALS, NOT PROPERTY OF L.& C. AUG.10,1920." 158-182-[A] ATTACHED.
C	FO/TE	6 PAGE DOCUMENT WHICH GIVES LOCATION OF PIPES. ATTACHED TO 158-182.

B	TE	COULD THIS PLAN POSSIBLY BE PLAN NO. P.H. 088-009M RENUMBERED?
A		
B	SO	
B	CL	
B	CL	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/ST	
B	ST	

B	CL	PLAN SHOWING LOCATION OF HYDRANTS, 6" & 8" PIPES IN LOWELL.
B	SO	ADDITIONAL NOTES DATED NOV. 7, 1942.
C	SO	DOES NOT BEAR ADDITIONAL NOTES DATED NOV. 7, 1942, BUT DOES INDICATE COMPLETED WORK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
B	CL	NOTE STATES ELEVATIONS L.& C. DATUM.
B	ST/SO	
B	SO/ST	
B	FO/SO/ST/TE	NOTE DIRECTS TO SEE FINISHED PLAN AS PUT IN JUNE 25,1949.
C	SO/ST	

B	FO	
B	SO	ORIGINALLY DATED MARCH 1943. REVISED JUNE 1949. NOTE DIRECTS TO SEE PLAN NO. 158-197 JUNE 27,1949 FOR REMAINDER OF CONCRETE SPILLWAY, CONCRETE MANHOLE & 12" CONCRETE PIPE LAID ACROSS BELMONT AVE. & PART WAY DOWN HOVEY ST.
B	SO	PLAN BEARS HISTORICAL NOTES ON FIRE PROTECTION FOR MILLS, RECTO. NOTE DIRECTS TO SEE P.L.& C. PAMPHLET ENTITLED, TEST OF FIRE SYSTEM BELONGING TO PROP. OF THE LOCKS & CANALS, 1897.
B	SO	
B	SO	PLAN BEARS HISTORICAL NOTES ON FIRE PROTECTION.
B	SO	
B	SO	
B	CL	
B	FO/SO	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO	
B	CL	
B	FO/HO	
C	TE	NOTES READS: "RED SHOWS NEW PIPE WORK" BUT THIS MERELY HIGHLIGHTS A DETAIL ON THE ORIGINAL PLAN. LOCATED SFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO	
B	SO	
B	SO	
B	SO/ST	
B	FO/SO	PLAN OF DOUBLE-SUCTION-HORIZONTAL-SPLIT-SHELL-PUMP. BEARS DRAWING NO. O-4474 RECTO.
B	FO	BEARS NO. C-58850 RECTO, 2391 & ORDER NO. K8629 VERSO. ALSO BEARS CERTIFIED STAMP DATED MARCH 11,1949 VERSO.

B	FO	BEARS NO. C 56523 RECTO.
B	SO	
B	SO	
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	TE/SO	
B	SO/HO	
B	HO	PLAN NUMBER ENTERED IN L. & C. CARD INDEX AS 158-2-E.
B	ST	PLAN NUMBER ENTERED AS 158-3-E IN L. & C. CARD INDEX. PLAN BY EZRA E. CLARK OF A.F.M.I. CO. FOR LAWRENCE MFG. CO.

B	CL	PLAN NUMBER ENTERED AS 158-4-E IN L. & C. CARD INDEX. CONSECUTIVE INDEX GIVES DATE OF 1919.
B	CL	PLAN NUMBER ENTERED AS 158-5-E IN L. & C. CARD INDEX. CONSECUTIVE INDEX GIVES DATE OF 1919.
B	SO	
B	CL	BEARS NO. 1077 RECTO. PLAN NUMBER ENTERED AS 158-7-E IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 158-8-E IN L. & C. CARD INDEX. NOTE STATES TO SEE NOTEBOOK #139 PG. 78-88.
B	CL	
B	CL	PLAN NUMBER ENTERED AS 158-E10 IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-E11 IN L. & C. CARD INDEX
B	SO	

B	CL	PLAN NUMBER ENTERED AS 158-13-E IN L. & C. CARD INDEX. NOTE BOOK REFERS TO NOTEBOOK 139 PAGES 78-88 FOR DETAILS.
B	SO/TE	PLAN NUMBER ENTERED AS 158-14-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-15-E IN L. & C. CARD INDEX. DATE GIVEN AS 15 JUNE, 1921, IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	PLAN NUMBER ENTERED AS 158-17-E IN L. & C. CARD INDEX. DELAVAL SINGLE STAGE CENTRIFUGAL. ATTACHED TO PLAN NOS.158-E, 158-E-17 THRU 020,& 033-[B].
B	CL	PLAN NUMBER ENTERED AS 158-18-E IN L. & C. CARD INDEX. DELAVAL SINGLE STAGE CENTRIFUGAL. ATTACHED TO PLANS 158-E, 158-E-017 THRU 20 & 33-[B].
B	CL	PLAN NUMBER ENTERED AS 158-19-E IN L. & C. CARD INDEX. DELAVAL SINGLE STAGE CENTRIFUGAL. ATTACHED TO PLAN NOS. 158-E, 158-E-017 THRU 020 & 033-[B].
B	CL	PLAN NUMBER ENTERED AS 158-20-E IN L. & C. CARD INDEX. DELAVAL SINGLE STAGE CENTRIFUGAL. ATTACHED TO PLAN NOS. 158-E, 158-E-017 THRU 020, & 033-[B].
B	SO	PLAN NUMBER ENTERED AS 158-21-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-22-E-(1) IN L. & C. CARD INDEX. BOUND IN 10 PAGE DOCUMENT.
B	CL	PLAN NUMBER ENTERED AS 158-22-E-(2) IN L. & C. CARD INDEX. BOUND IN 10 PAGE DOCUMENT.
B	CL	PLAN NUMBER ENTERED AS 158-22-E-(3) IN L. & C. CARD INDEX. BOUND IN 10 PAGE DOCUMENT.
B	CL	PLAN NUMBER ENTERED AS 158-22-E-(4) IN L. & C. CARD INDEX. BOUND IN 10 PAGE DOCUMENT.
B	CL	PLAN NUMBER ENTERED AS 158-22-E-(5) IN L. & C. CARD INDEX. BOUND IN 10 PAGE DOCUMENT.
B	CL	PLAN NUMBER ENTERED AS 158-22-E-(6) IN L. & C. CARD INDEX. BOUND IN 10 PAGE DOCUMENT.

		PLAN NUMBER ENTERED AS 158-22-E-(7) IN L. & C. CARD INDEX.
B	CL	BOUND IN 10 PAGE DOCUMENT.
		PLAN NUMBER ENTERED AS 158-22-E-(8) IN L. & C. CARD INDEX.
B	CL	BOUND IN 10 PAGE DOCUMENT.
		PLAN NUMBER ENTERED AS 158-22-E-(9) IN L. & C. CARD INDEX.
B	CL/TE	BOUND IN 10 PAGE DOCUMENT.
		PLAN NUMBER ENTERED AS 158-22-E-(10) IN L. & C. CARD INDEX.
B	CL	BOUND IN 10 PAGE DOCUMENT.
C	CL	
		DELAVAL SINGLE STAGE CENTRIFUGAL. ATTACHED WITH PLAN NOS.
C	CL	158-E, 158-E-017 THRU 020 & 033-[B].
B	SO	PLAN NUMBER ENTERED AS 158-24-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-25-E IN L. & C. CARD INDEX.
B	FO	PLAN NUMBER ENTERED AS 158-26-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-27-E IN L. & C. CARD INDEX.
		BOUND IN FOLDER 158-174. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO
B	FO	GIVES NO DATE.
		BOUND IN FOLDER 158-174. LOCATED AFTER COMPLETION OF
B	SO/FO	FORMAL INVENTORY.
B	SO	PLAN NUMBER ENTERED AS 158-30-E IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 158-31-E IN L. & C. CARD INDEX.

B	SO	
C	SO	
C	CL	DELAVAL SINGLE STAGE CENTRIFUGAL. ATTACHED TO PLANS 158-E, 158-E-017 THRU 20 & 033-[B].
B	SO	BOUND IN 7 PAGE DOCUMENT.
B	SO	BOUND IN 7 PAGE DOCUMENT.
B	CL	
B	CL	
B	SO	PLAN NUMBER ENTERED AS 158-E38 IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-E39-A IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 158-39-B IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 158-39-C IN L. & C. CARD INDEX.
B	CL	PLAN NUMBER ENTERED AS 158-39-D IN L. & C. CARD INDEX.

B	CL	PLAN NUMBER ENTERED AS 158-39-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-39-F IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-39-G IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-40-E IN L. & C. CARD INDEX. DATA PROVIDED BY G. E. COMPANY.
B	TE	
B	CL	PLAN NUMBER ENTERED AS 158-E42 IN L. & C. CARD INDEX.
B	CL	BOUND IN 7 PAGE DOCUMENT.
B	FO	PLAN NUMBER ENTERED AS 158-E44 IN L. & C. CARD INDEX.
B	FO/CL	PLAN NUMBER ENTERED AS 158-E45 IN L. & C. CARD INDEX.

B	CL	BOUND IN 7 PAGE DOCUMENT.
B	SO	PLAN NUMBER ENTERED AS 158-47-E IN L. & C. CARD INDEX.
B	CL	
B	CL	PLAN NUMBER ENTERED AS 158-49-E IN L. & C. CARD INDEX.
B	FO/ST	SEE ALO PLAN NO. 158-E-050. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.
B	CL	
B	SO/TE	PLAN NUMBER ENTERED AS 158-52-E IN L. & C. CARD INDEX.
B	SO	
B	SO	
B	TE	PLAN NUMBER ENTERED AS 158-55-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-56-E IN L. & C. CARD INDEX.
B	SO	

B	SO	BOUND IN 7 PAGE DOCUMENT.
B	CL	
B	SO	BOUND IN 7 PAGE DOCUMENT.
B	SO	
C	FO/SO	
B	SO	PLAN NUMBER ENTERED AS 158-62-E IN L. & C. CARD INDEX.
B	CL	
B	FO/SO	PLAN NUMBER ENTERED AS 158-66-E IN L. & C. CARD INDEX.
B	SO	PLAN NUMBER ENTERED AS 158-67-E IN L. & C. CARD INDEX.

C	FO	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	
C	SO/FO	
C	SO	ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
B	SO	ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY IN L. & C. CARD INDEX AS 159-(0 TO 13). CORRECTED TO MAY 1922.
B	SO	ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER." PLAN NUMBER ENTERDD COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX. CORRECTED TO MAY 1922.
B	SO	ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX. CORRECTED TO MAY 1922.
C	FO/TE	ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX. CORRECTED TO MAY 1922.

		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRCETED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER." PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORED IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.
		ORIG. DATED MAY 1902, CORRECTED TO MAY 1921. FOLDER NOTES "PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER". PLAN NUMBER ENTERED COLLECTIVELY AS 159-(0 TO 13) IN L. & C. CARD INDEX.
B	SO	CORRECTED TO MAY 1922.

B	SO	ORIGINALLY DATED MAY 1902, CORRECTED TO MAY 1921. NOTE ON FOLDER STATES [...PLOTTED FROM SURVEYS BY P.L.& C. BALANCE OF PLAN COMPILED FROM RECORDS IN OFFICE OF CITY ENGINEER.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 12 RECTO.
C	SO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 12", RECTO.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 17 RECTO.
C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 17", RECTO. ORIGINALLY NUMBERED 142-050.

B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 8 RECTO.
C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 8", RECTO.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 10 RECTO.
C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 10", RECTO.
B	SO/ST	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 14 RECTO.

C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 14", RECTO. ORIGINALLY NUMBERED 142-053.
B	SO/ST	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 13 RECTO.
C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 13", RECTO.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 11 RECTO.
C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 11", RECTO.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN NO.18 RECTO.
C	HO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 18", RECTO. ORIGINALLY NUMBERED 142-056.

B	SO/ST	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN NO. 21 RECTO.
C	HO/SO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 21", RECTO. ORIGINALLY NUMBERED 142-057.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN NO. 20 RECTO.
C	HO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 20", RECTO.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN NO. 6 RECTO.
C	CL	LOCATED WITH SHELF 158. VALUATION LIST ATTACHED. BEARS "PLAN # 6', RECTO. ORIGINALLY NUMBERED 143-029.

B	SO/ST	
C	RO	
C	SO	REDUCED PHOTOPOSITIVE. BEARS FILE 1012.2. ATTACHED WITH: 135-013, 135-013-[A], 135-013-[COPY 1], & 135-014-[A].
C	SO	LOCATED WITH SHELF 158. VALUATION LIST ATTACHED. BEARS "PLAN # 5" RECTO. ORIGINALLY NUMBERED 160-033.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 15 RECTO.
C	RO	LOCATED WITH SHELF 158. VALUATION LIST ATTACHED. BEARS "PLAN # 16" RECTO.

B	SO	BEARS PLAN NO. 9, RECTO.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN NO. 9, RECTO.
C	CL	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 9", RECTO.
B	SO/ST	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS "PLAN 3" RECTO.
C	RO	VALUATION LIST ATTACHED. BEARS "PLAN # 3", RECTO. ORIGINALLY NUMBERED 160-032. LOCATED WITH SHELF 158.
C	FO	
B	SO	
C		
C	HO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 15", RECTO. ORIGINALLY NUMBERED 160-035.

B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS 19 RECTO.
C	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 19", RECTO.
B	SO/ST	NOTE STATES OBSOLETE, REBUILT IN 1927.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 22 RECTO. PLANS FOR BROADWAY BRIDGE, PAWTUCKET ST. BRIDGE, BREWERY BRIDGE, NELSON-MORRIS PLATFORM AND WATSON PLATFORM.
C	HO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 22", RECTO. ORIGINALLY NUMBERED 164-050.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN NO 23 RECTO.
C	TE/SO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 24", RECTO.

B	SO	
C	FO/SO	CARRIES ONLY PLAN NO. 159. THIS PLAN UPDATES PLAN NOS. 150-031, 032 AND 033 BY SHOWING NEW SECTIONS OF BRIDGES IDENTIFIED AS OBSOLETE ON THOSE THREE PLANS.
C	SO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 23", RECTO.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. ALSO OTHER L.& C. BRIDGES.
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. BEARS PLAN 25 RECTO.
C	HO	LOCATED WITH FOLDER 158. VALUATION LIST ATTACHED. BEARS "PLAN # 25", RECTO.
B	SO	BEARS PLAN NO. 7 RECTO.
C	CL	LOCATED WITH SHELF 158.VALUATION APPENDED. BEARS "PLAN # 7", RECTO.

C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. 25 PG. DOCUMENT. BEARS PLAN NO. 7 RECTO.
B	SO	ORIGINALLY DATED MAY 13,1926. REVISED JUNE 11,1926.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	IDENTIFIED AS A TRACING PAPER PLAN IN L.& C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	A.T. SAFFORD, CONS. ENG. THIS PLAN IS A COPY OF THE ORIGINAL PLAN MADE FEB.1922, SHOWING LOCATION OF THE PLANT GIVING FIVE FOOT CONTOURS & CONSTRUCTION ELEVATIONS.
B	SO/TE	
B	SO	IDENTIFIED AS A TRACING IN THE L.& C. CARD INDEX.

B	SO	ORIGINALLY NUMBERED 159-42, THE NUMBER ON THE PLAN HAS BEEN ALTERED TO 149-43 BUT IT IS STILL SHOWN IN THE L.& C. CARD INDEX AND CONSECUTIVE INDEX AS 149-42. IDENTIFIED IN THE L.& C. CARD INDEX AS A TRACING.
B	FO/SO/TE	PLATE 11.
B	CL/TE	PHOTOPOSITIVE OF PLAN 159-43 WITH PART OF THE TITLE PAINTED OUT.
B	ST	IDENTIFIED AS A TRACING PAPER PLAN IN THE L. & C. CARD INDEX.
B	SO	CONSISTS OF 5 SHEETS WITH MONTHLY RAINFALL STATISTICS FOR THE PERIOD JAN. 1880 THROUGH DEC. 1937 AND 2 NARROW STRIPS NOTING KILOWATTS AT MANCHESTER, N.H. THE WHOLE ATTACHED TO 159-047. ORIGINALLY DATED AUG. 1927.

B	SO	ATTACHED WITH PLANS 159-046-[A] THROUGH [E]. DATES RANGE FROM 1880-1919. MONTHLY AVERAGES FOR TEN YEAR PERIODS.
B	FO/TE	CONSISTS OF THE FIRST 4 OF THE 5 SHEETS OF 159-046 JOINED TOGETHER WITH THE EACH OF THE 2 NARROW STRIPS NOTING KILOWATTS AT MANCHESTER, N.H. FOR THE PERIOD JAN. 1880 THROUGH DECEMBER 1931. ORIGINAL DATED AUG. 1927.
B	FO/TE/SO	JULY 1927 IS THE LITHO. DATE. THERE IS A HANDWRITTEN DATE OF AUG. 18, 1927. THE PLAN ALSO SHOWS THE LOCATIONS OF TURBINES. AS PER THE CONSECUTIVE INDEX OF DRAWINGS, P.L.& C. INTENDED TO RENUMBER THIS PLAN AS 136-17 BUT NEVER ACTUALLY DID.
A		PHOTOSTAT NEGATIVE OF PLAN NO. 159-049 WITH THE GENERAL PLAN CUT DOWN TO THE AREA BOUNDED BY DUTTON & PAWTUCKET ST.
B	FO/TE/ST	IDENTIFIED AS NEGATIVE PHOTOSTAT IN L.&. C. CARD INDEX.

B	FO	IDENTIFIED AS A TRACING PAPER PLAN IN THE L.& C. CARD INDEX.
C	FO/SO/TE	COPY OF A DIAGRAM PREPARED BY WHITE ELECTRIC MOTORS, LOWELL, MASS.
C	FO/SO/TE	COPY OF A DIAGRAM PREPARED BY WHITE ELECTRIC MOTORS, LOWELL, MASS.
C	SO	
B	SO/FO	
B	FO/SO	BEARS NO. 1174-A BENEATH TAPE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS NO. 1174 BENEATH PLAN NUMBER LABEL.
B	SO/ST/TE	BEARS NO. 1614 BENEATH NUMBER LABEL. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/HO	PLAN NO. WAS ASSIGNED THREE TIMES BY P. L.& C.

B	FO/SO	PLAN NO. WAS ASSIGNED THREE TIMES BY P.L.& C.
B	SO	BEARS NO. 1620 BENEATH TAPE, RECTO. PLAN NO. WAS ASSIGNED THREE TIMES BY P. L.& C.
B	SO/ST/TE	BEARS NO. 1861 BENEATH LABEL. APPARENTLY ONCE ATACHED TO 160-005-[B].
C	LO/TE/SO	APPARENTLY ONCE ATTACHED TO 160-005-[A]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. A TWO SHEET PLAN, JOINED.
B	SO/TE	SEE ALSO PLAN NO. 160-007.
B	TE/SO/FO	A HOLYOKE MACHINE CO. BLUEPRINT. WORDS "SLATER WOOLEN CO. WEBSTER" HAVE BEEN OVERWRITTEN WITH "ESSEX CO. LAWRENCE". DATE OF "FEB. 12, 1902" HAS BEEN OVERWRITTEN WITH DATE OF "9-27-05". NOTE TO "SEE BLUEPRINT ATTACHED" IMPLIES A SECOND BLUEPRINT.
B	SO	
B	TE/SO	PLAN NUMBER ENTERED AS 160-9 IN L. & C. CARD INDEX. ATTACHED TO 160-009-A-[COPY 1].
C	CL	ATTACHED TO 160-009-A. PLAN NUMBER ENTERED AS 160-9 IN L. & C. CARD INDEX.
C	CL	LOCATED IN SHELF 160. APPEARS TO BE A TABLE OF DIMENSIONS FOR FLASHBOARDS WITH NO SPECIFIED LOCATION.
B	SO	16 PAGE DOCUMENT. BEARS FILE NO. 1082.
C	CL	16 PAGE DOCUMENT. BEARS FILE NO. 1082.

B	CL	SEE ALSO PLAN NOS. C-160-010-C & D.
B	SO	SEE ALSO PLAN NOS. C-160-010-B & D.
B	SO	SEE ALSO PLAN NOS. C-160-010-B & C.
B	FO/SO/ST	ATTACHED WITH 160-010-E-[A-K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[B-K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A], 160-010-E-[C-K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A],[B],[D] THROUGH [K].
C	CL	ATTACHED TO 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [K].
C	CL	ATTACHED WITH 160-010-E, 160-010-E-[A] THROUGH [J].
B	SO	

C	TE	BLUEPPRINT COPY OF A LITHOGRAPH A COPY OF WHICH IS FOUND AT 160-010-F. ATTACHED TO 160-010-[A].
C	CL	ATTACHED TO 160-010.
B	FO/SO	SEE ALSO PLAN NO.160-010-H. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	SEE ALSO PLAN NO.160-010-G. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	NOTE STATES, TO ACCOMPANY REPORT OF ARTHUR T. SAFFORD CONSULT. ENG.
B	CL	TESTS MADE MARCH & APRIL 1919. (SEE DRGS. 160-023 & 024.)
B	FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF SEPT. 1915.
C	FO	

B	CL	
C	SO	
B	SO	
B	CL	
B	SO/ST	
B	CL	
B	SO	
B	CL	39 PAGE DOCUMENT.

B	FO	
B	CL	COMPOSITE OF P.L. & C. PHOTOGRAPHS 1521-1 (LOWE-7053) AND 1521-2 (LOWE 7054) BOTH DATED JUNE 27, 1915.
B	CL	
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	A BLUEPRINT OF P.30 OF 160-011-[1]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	A BLUEPRINT OF P.29 OF 160-011-[1]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	CL	
B	CL	
B	CL	UNTITLED PLAN LOCATED IN FOLDER ENTITLED COEFFICIENTS FOR WASTE BAYS BOOTT DAM. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	A BLUEPRINT OF P.18 OF 160-011-[1].

B	FO/SO/ST	JULY-AUG-SEPT-1915.
B	FO/SO/ST	SEPT-OCT-1915. LOCATED AFTER COMPLETION FOR FORMAL INVENTORY.
B	SO/HO	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	SO	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	SO	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	SO/ST	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	SO/HO	ATTACHED WITH 160-013-[A] THROUGH [H].
B	HO	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	HO	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	HO	ATTACHED WITH 160-013, 160-013-[A] THROUGH [H].
B	TE	UNTITLED DOCUMENT ATTACHED WITH 160-013, 160-013-[A] THROUGH [H]. CONSECUTIVE INDEX OF DRAWINGS GIVES DAE OF AUGUST, 1915.

B	FO/SO/TE	A HOLYOKE MACHINE CO. BLUEPRINT.
B	SO/ST	ORIGINAL PLAN OF CHANGES TO MERRIMACK DAM. REFER TO PLANS: 164-037 & 164-038.
B	SO	SEE ALSO PLAN NO. 160-016, STUDY FOR RECONSTRUCTION OF MERRIMACK DAM.
B	FO	SEE ALSO PLAN NO. 160-017, STUDY FOR RECONSTRUCTION OF MERRIMACK DAM.
B	SO	
B	SO/ST	
A		

B	LI/SO/TE	SEE 160-020 FOR PLAN OF PROPOSED CHANGES IN R.R. TRACK.
B	FO/SO/ST /TE	
B	CL	ATTACHED TO 160-023-[B].
B	CL	ATTACHED TO 160-023-[A].
B	FO/TE/SO	
B	FO/SO	
B	CL	ATTACHED TO 160-025-[A-COPY 1].
C	SO	ATTACHED TO 160-025-[A].
B	SO/ST	
B	SO	
B	SO/TE	

B	SO/TE	
B	FO/SO	THIS BLUEPRINT IS A COPY OF 160-028-B WITH THE PLAN NO. 160-28-C APPLIED BY P.L.& C.
B	SO/TE	BEARS FILE NO. 1116, RECTO. BEARS "CASE A P.H. NO. 75" CROSSED OUT, RECTO.
B	FO/ST/SO	
B	FO/TE/SO	
B	ST	
B	CL	AS MEASURED OCT.1920.

B	FO	SEVERAL ELEMENTS OF THIS PLAN WERE TRACED FROM PLAN C-P.H. 020-[B]-[01]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE/SO	SEVERAL ELEMENTS OF THIS PLAN WERE TRACED FROM PLAN C-P.H. 020-[B]-[01].
C	FO	SEVERAL ELEMENTS OF THIS PLAN WERE TRACED FROM PLAN C-P.H. 020-[B]-[01]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	DATE GIVEN AS 22 AUGUST 1922 IN L. & C. CARD INDEX.
B	SO/FO	A HOLYOKE MACHINE CO. PLAN. ORDER A1232. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.RETRIEVED FROM P.L.& C. APRIL, 1997.
B	SO/ST/TE	
B	FO	BEARS FILE NO. 1122. LOCATD AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO/TE	BEARS FILE NO. 1122.

B	SO/ST/TE	
B	SO	BEARS PLAN 4 RECTO.
C	FO	BEARS "PLAN # 4", RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	VALUATION LIST ATTACHED. BEARS "PLAN # 4", RECTO.
B	SO	ALSO BEARS NO. 140-42 RECTO. REFER TO PLAN NO. 160-040.
B	SO	REFER TO PLAN NO. 160-039.
B	SO/TE	NOTE STATES FOR GATE SECTION SEE DRAWING OF APRIL 18,1923.
B	SO/ST	
B	SO/HO	

B	SO	ORIGINALLY DATED MARCH 25,1921. REVISED APRIL 14,1921. SCALES ARE NOTED AS FOLLOWS: 1/4"=1',1/2"=1", FULL SIZE.
B	SO/ST	ORIGINALLY DATED MARCH 28,1921. REVISED APRIL 5 & 20,1921.
C	CL	ORIGINALLY DATED MARCH 28,1921. REVISED APRIL 5,& 20,1921.
B	SO	ORIGINALLY DATED MARCH 30, 1921. REVISED APRIL 2, 1921 & MAY 3, 1921.
B	SO	ORIGINALLY DATED MARCH 30, 1921. REVISED APRIL 2, 1921. THIS COPY WAS MADE BEFORE THE REVISIONS OF MAY 3, 1921, TO THE ORIGINAL. LOCATED IN FOLDER 158.
B	SO	
C	CL	LOCATED IN SHELF 158.
B	FO/SO	
C	CL	

B	SO	
B	SO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	CHANGE MADE IN 1895.
B	FO/ST/SO/TE/HO	ADDITIONAL NOTE ADDED JAN 1, 1895. BEARS NO. 1157 BENEATH TAPE, RECTO.
B	SO	
B	SO	
B	FO/SO/TE/LI	NOTE DIRECTS TO SEE TRACING DATED JAN. 8,1923 FOR DETAILS OF ICE GATE. ORDER A1643. HOLYOKE MACHINE CO., WORCESTER, MASS.
B	SO	
B	FO	
B	FO/TE	ATTACHED TO 160-058-[B], WHICH IS THE ESTIMATE.
B	SO	ATTACHED TO 160-058-[A], WHICH IS THE PLAN.

B	SO/RO/FO	LOCATED IN P.H. 36. NOTE STATES: APPROXIMATE COST $11,500.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. NOTE STATES: APPROXIMATE COST $11,500.
B	RO/FO/SO	LOCATED IN P.H. 36.
C	RO/FO/SO	READS: "APPROXIMATE COST $11,500" RECTO.
B	LM/TE/FO /HO	
B	TE	DATE GIVEN AS 19 SEPT. 1948 IN L. & C. CARD INDEX.
B	TE	DATE GIVEN AS 19 SEPT. 1948 IN L. & C. CARD INDEX.
C	FO	THIS PLAN NUMBER WAS USED TWICE BY P.L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO	CONSECUTIVE INDEX OF DARWINGS ALSO GIVES NO DATE. THIS PLAN NUMBER WAS USED TWICE BY P.L.& C.
C	SO	PLAN NUMBER USED TWICE BY P.L.& C. THE CONSECUTIVE INDEX OF DRAWINGS REFERS TO THE BLUEPRINT BELOW RATHER THAN TO THIS ORIGINAL DRAWING.

C	SO	PLAN NUMBER USED TWICE BY P.L.& C.
B	FO	PLAN NUMBER USED TWICE BY P.L.& C. THE CONSECUTIVE INDEX OF DRAWINGS REFERS TO THIS BLUEPRINT RATHER THAN TO THIS ORIGINAL DRAWING, ABOVE.
B	SO	PLAN NO. USED TWICE BY P.L.& C.
C	RO/FO	LOCATED IN P.H. 36. PLAN NO. USED TWICE BY P.L.& C.
C	CL	PLAN NO. USED TWICE BY P.L.& C. LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/FO	LOCATED IN P.H. 36. NOTE STATES: A SINGLE LARGE SLUICE GATE & NO ICE GATE COULD BE USED FOR SCHEME NO. 3. PLAN NO. USED TWICE BY P.L.& C.
B	FO/TE/SO	BEARS NO. BV 15-7, RECTO. ASSEMBLY TYPE SE VALVE WITH INTEGRAL METAL DISC.
C	SO	PLAN NUMBER USED TWICE BY P.L.& C.
B	SO	PLAN NUMBER USED TWICE BY P.L.& C.
B	CL	
B	LM/TE/FO /HO	2 SHEETS.
B	CL	

B	TE/SO	
B	SO/TE/LI	SEE C-118-290 FOR ANOTHER VERSION OF THIS SCHEME WITH THE SAME DATE.
C	SO/FO	LOCATED IN FOLDER 136. LOCATED IN FOLDER 158 BUT WITHOUT A SHELF OR PLAN NUMBER.
C	SO	COMPENDIUM OF 23 BLUEPRINTS OF NUMBERED PLANS FROM THE P.L.& C., PLUS ONE PLAN WITHOUT A CURRENT PLAN NO., WITH ATTACHED SHEETS TOTALING THE VALUE OF THE ASSET SHOWN ON EACH PLAN.
C	SO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LITHOGRAPH DATE IS JULY 1912. SCHEMATIC OF SYSTEM ADDED TO PLAN JAN. 16, 1922.
C	FO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	SHEET 1 OF 2.
B	FO/SO	SHEET 2 OF 2.
B	FO/SO/TE	[...] ROUGHNESS OF WETTED PERIMETER (N) / SLOPE OF WATER SURFACE (S) OR GRADES PER HUNDRED (G). [FORMULA ARRANGED WITH SPECIAL REFERENCE TO SEWER CALCULATIONS BY RUDOLPH HERING]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE	
B	FO/SO	ATTACHED TO 162-004-[C].
C	FO/SO	BEARS NOTE "COPY OF THIS PRINT GIVEN TO MR. NOURSE OCT. 8, 1905".
C	SO	
C	SO/FO	BEARS NOTE, RECTO, "SHEET A, NO.3". ANOTHER COPY OF THIS BLUEPRINT CAN BE FOUND AT C-141-013-A.

C	FO/TE	LETTER TO MR. MILLS FROM ARTHUR T. SAFFORD WITH INFORMATION REGARDING CURRENT METER MEASUREMENTS. ATTACHED TO 162-004-[A].
B	SO/ST	ATTACHED TO 162-005-[B]. BEARS NO. 1852, CROSSED OUT, RECTO.
B	SO/ST	ATTACHED TO 162-005-[A]. BEARS NO. 1851, CROSSED OUT, RECTO.
B	FO/TE	
B	HO/FO/SO	
B	TE/SO	CHART SHOWING VARIOUS DATA RELATING TO GRAPHS ON PLAN NO. 162-007-[A].
C	SO/FO	A TWO PAGE LETTER GIVING TEST RESULTS FOR VARIOUS SITES NOTED IN PLANS NO. 162-007-[A] & [B] AND ATTACHED TO [B]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	A ONE PAGE LETTER CONVEYING CEMENT TEST RESULTS AND NOTING THAT THEY ARE NOT FOR CIRCULATION. RELOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO/TE /LM	

A		
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.100-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.100-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" O.100-0.300. CONSECUTIVE
B	SO	INDEX OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	SO	OF DRAWINGS ALSO GIVES NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH/1.86-1.980. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES
B	CL	NO DATE.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	CL	OF DRAWINGS ALSO GIVES NO DATE.
		LOCTAED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOTOF 2GH
B	SO/ST	0.001-2.500 COEFFICIENT "D" 0.100-0.300.
		LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX
B	ST	OF DRAWINGS ALSO GIVES NO DATE.

B	CL	LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-O.300. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" 0.100-0.300. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST/TE	LOCATED IN FOLDER ENTITLED: TABLE OF THE SQUARE ROOT OF 2GH 0.001-2.500 COEFFICIENT "D" O.100-0.300. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	
B	SO/ST	
B	CL	
C	CL	LOCATED IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO	DATA TAKEN FROM 1906. ATTACHED WITH 162-014-[B].
B	CL	DATA TAKEN FROM 1900, EXCEPT FOR APPLETON WHICH IS FROM 1901. ATTACHED WITH 162-014-[A].
B	ST/SO/TE	
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	BLANK FORM MASTER. CONTAINS HEADER, LOG DATA FIELDS, TWO GRIDS FOR RATING DATA, AND A GRAPH FORM FOR L.& C. BUFF & BUFF NOS. 4176 & 8163, AND OTHERS, AT LOWELL, MASS., IN STILL WATER AT 32 DEGREES FAHR. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	SO/ST	BLANK FORM. CONTAINS HEADER, LOG DATA FIELDS, TWO DATA GRIDS FOR RATING DATA, AND A GRAPH FORM. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

C	SO/ST	BLANK FORM. CONTAINS HEADER, LOG DATA FIELDS, TWO DATA GRIDS FOR RATING DATA, AND A GRAPH FORM. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	BLANK FORM. CONTAINS HEADER, LOG DATA FIELDS, TWO DATA GRIDS FOR RATING DATA, AND A GRAPH FORM. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST	METER NO. 4176.
B	ST/SO	METER NO. 4176.
B	ST/SO	METER NO. 4176.
B	CL	METER NO. 4176.
B	SO	METER NO. 4176.
B	ST	RATING MADE FOR A.T. SAFFORD. METER NO. 4176. COMPILED JUNE 3,1913. ADDITIONAL NOTES STATE RATING MADE IN 1909. LATEST RATING OCT.10, 1919.
B	SO	METER NO. 8163.
B	CL	METER NO. 8163.
B	SO/ST	METER NO. 8163.
B	CL	METER NO. 8163.
B	CL	METER NO. 8163. VERIFIED SEP.20,1921, & AUG.16,1923.
B	CL	RATING MADE FOR PROP. OF LOCKS & CANALS. NO METER NO. GIVEN.
B	CL	NO METER NO. GIVEN.
B	CL	RATING MADE FOR CENTRAL ENGINEERING & CONSTRUCTION CO. SHEET NO. 1. NO METER NO. GIVEN.

B	CL	RATING MADE FOR PROP. LOCKS & CANALS. NO METER NO. GIVEN.
B	CL	RATING MADE FOR CENTRAL ENGINEERING & CONSTRUCTION CO. SHEET NO. 2. NO METER NO. GIVEN.
B	SO	RATING MADE FOR STATE BOARD OF HEALTH. NO ,ETER NO. GIVEN.
B	CL	METER NO. 2341. RATING MADE FOR BUFF & BUFF.
B	SO	METER NO. 1692. RATING MADE FOR PROPS. LOCKS & CANALS.
B	SO	METER NO. 5333. RATING MADE FOR W.P. GYATT. LOCKPORT N.Y.
B	SO	METER NO. 3858. RATING MADE NOV. 27,1923.
B	SO	METER NO. 3831. RATING MADE FOR DEPT. OF PUBLIC HEALTH.
B	SO	METER NO. 3858.
B	SO	METER NO. 24997. RATING MADE FOR C.L. BERGER & SONS.
B	SO	METER NO. 3858. RATING MADE FOR C.L. BERGER & SONS.
B	SO	RATING MADE FOR PROPS. LOCKS & CANALS. NO METER NO. GIVEN.
B	SO	METER NO. 8163. RATING MADE FOR LOCKS & CANALS CO. ORIGINAL DATA IN RATING BOOK.
B	CL	RATED FOR W.O. WEBBER. METER NO.1811.

B	SO	RATED FOR LEDDER & PROBST. CURRENT METER NO. 5495.
B	CL	METER NO. 2404.
B	SO/ST	FOUR REVISIONS. LAST REVISION MADE JUNE 18,1914.
B	SO	METER NO. 8162.
B	SO	ORIGINALLY DATED OCT. 20,1910. METER NO. 3858.
B	SO/ST	ORIGINAL DATED DEC.6,1911. CORRECTED TO JUNE 1913.
B	SO	METER NO. 8163.
B	SO	NO METER NO. GIVEN.
B	SO	BEARS FILE NO. 386.15. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. METER NO. 4176.
B	SO/ST	METER NO. 3842.
B	SO/ST	RATED FOR LEDDER & PROBST. METER NO. 5494.

B	SO/ST	ALSO RATED APRIL 4,1912. METER NO. 5325.
B	SO	RATED AT L.& C. RATING STATION, LOWELL, MASS. NO METER NO. GIVEN.
B	SO	METER NO. 3851. AT L.& C. RATING STATION, LOWELL, MASS.
B	SO	METER NO. 4176.
B	SO	METER NO. 5068.
B	SO	METER NO. 8163.
B	SO/ST	METER NO. 4176.
B	CL	METER NO. 4176.
B	SO	METER NO. 8163.
B	SO/ST	METER NO. 8163.
B	SO/ST	METER NO. 4176.
B	SO	METER NO. 5068. RATING MADE FOR TURNERS FALLS POWER CO.
B	SO/FO/ST	DATES FOR RATINGS GIVEN ARE JUNE 6,1923 & MAY 15,1944.
B	CL	METER NO. 286.

B	SO	NO METER NO. GIVEN.
B	SO	METER NO. 121.
B	SO	NO METER NO. GIVEN.
B	SO	NO METER NO. GIVEN.
B	SO	METER NO. 2.
B	FO/TE	NO METER NO. GIVEN.
B	SO	METER NO. 69.
B	FO/SO/ST	METER NO. 3.
B	SO	RATED SEPT.26,1912. ATTACHED WITH 162-018-[CL-A]. METER NO. 374.
B	SO	NOTE STATES THIS RATING IS PRACTICALLY THE SAME AS MAY 9,1913. ATTACHED TO 162-018-[CL]. METER NO. 374.
B	SO/ST	METER NO. 5068. RATING MADE FOR TURNERS FALLS POWER CO.
B	CL	METER NO. 8162. RATING MADE FOR HYDRAULIC RACE CO. LOCKPORT N.Y.

B	SO	METER NO 8163.
B	SO	METER NO. 8163.
B	SO	METER NO. 4176. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	METER NO. 8163. ORIGINAL DATA.
B	SO	METER NO. 8163. RATING MADE FOR LOCKS & CANALS. ORIGINAL DATA.
B	SO	METER NO. 4176.
B	SO	METER NO. 4176. ORIGINAL NUMBERING LABEL BEARS NO. 162-43-E, CROSSED OUT AND SUPERCEDED BY NO. 162-18.
B	SO	METER NO. 8163.
B	SO	METER NO. 8162. RATING MADE FOR HYDRAULIC RACE CO. LOCKPORT N.Y.
B	SO	METER NO. 6691. RATING MADE FOR STATE BOARD OF HEALTH, NEWTON. SHEET NO. 1.
B	SO	METER NO. 6691. RATING MADE FOR STATE BOARD OF HEALTH, NEWTON. SHEET NO. 2.
B	SO/ST	METER NO. 6035.
B	SO/ST	METER NO. 4176.
B	SO	METER NO. 8163.
B	SO	REVISED SEP. 29,1924. METER NO. 13,646.
B	SO/ST	METER NO. 8163. NOTE STATES, VERIFIED IN 1931.
B	CL	METER NO. 13646.
B	CL	METER NO. 25197. RATING MADE FOR BUFF & BUFF MFG. CO.

B	CL	METER NO. 8163. RATING MADE FOR LOCKS & CANALS.
B	CL	METER NO. 4176.
B	CL	METER NO. 4176.
B	FO/SO	
B	CL	
B	CL	
B	CL	ORIGINAL DATED DEC. 6, 1911. DATE CORRECTED TO JUNE 1913.
B	CL	ORIGINAL DATED DEC. 6, 1911. DATE CORRECTED TO JUNE 1913.
B	CL	ORIGINAL DATED DEC. 6, 1911. DATE CORRECTED TO JUNE 1913.
B	CL	METER NO. 1550. RATING MADE FOR METCALF & EDDY. ORIGINAL DATA.
B	CL	ATTACHED TO 162-018-A-[P]. METER NO. 4176. ORIGINAL DATA.
B	CL	METER NO. 8163. ORIGINAL DATA.
B	CL	ATTACHED TO 162-018-A-[Q]. RATING MADE FOR PROP. LOCKS & CANALS. ORIGINAL DATA.
B	CL	METER NO. 8163. ORIGINAL DATA.
B	FO/SO	ORIGINAL DATA DATED DEC.2,1922. METER NO. 1550.
B	CL	METER NO. 4176.

B	SO	ORIGINAL DATA DATED: DEC.12, 1922. METER NO. 1551.
B	SO	
B	FO/SO	
B	CL	RATINGS INFORMATION DATED JUNE 10 & 16, 1916.
B	CL	RATINGS INFORMATION DATED JUNE 10 & 16,1916.
B	CL	
B	CL	
B	CL	
B	SO/TE	
B	CL	
B	FO/SO/ST	ORIGINALLY DATED JUL7 6,1910. LAST DATE CORRECTED TO JUNE 18,1914.
B	CL	ORIGINAL DATED JULY 1910. LAST DATED CORRECTED TO JUNE 18,1914.
B	TE	ORIGINAL DATED JULY 6,1910. LAST DATE CORRECTED TO JUNE 18,1914.
B	CL	ORIGINAL DATED JULY 1910. LAST DATED CORRECTED TO JUNE 18,1914.
B	SO	BEARS "COPY" RECTO. ATTACHED TO 162-018-[CM] & 162-018-[CM-B].

B	SO	UNTITLED LETTER TO JOHN G. W. THOMAS, ENGINEER OF L.& C. CO., SHOWING RATING TABLE OF CURRENT METER FROM JAMES R.BALDWIN, CHIEF ENGINEER. ATTACHED TO PLAN NOS. 162-018-[CM] & 162-018-[CM-A].
B	FO	ORIGINALLY DATED AUG.9,1910. LAST DATE CORRECTED TO JUNE 16,1913.
B	FO	ORIGINALLY DATED AUG.9,1910. LAST DATE CORRECTED TO JUNE 16,1913.
B	SO	METER NO. 4176. ORIGINAL DATA.
B	CL	METER NO. 8163. RATING MADE FOR LOCKS & CANALS. ORIGINAL DATA.
B	CL	METER NO. 4176. METER MADE FOR A.T. SAFFORD. LATEST RATING MADE OCT.10,1919.
B	FO	METER NO. 8163. RATING MADE FOR LOCKS & CANALS. ORIGINAL DATA.
B	SO/ST	METER NO. 3858. LOCATED IN SHELF 158.
B	SO	METER NO. 1692. LOCATED IN SHELF 158.
B	TE/SO	
C	TE/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	NOTE DIRECTS TO USE NEW DIAGRAM DATED DEC. 1913, AFTER JAN. 1914.
B	SO/FO/TE /LO/TA	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.$ C. APRIL, 1997.

C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.$ C. APRIL, 1997.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.$ C. APRIL, 1997. ROLLED IN COPPER TUBE WITH PADLOCK.
B	CL	ROLLED IN COPPER TUBE WITH PADLOCK.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	ROLLED IN COPPER TUBE WITH PADLOCK.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST/SO/TE	CALC. BOOK NO. 506, PP. 10-17.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK.

C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST/SO	
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/TE /LO/TA	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK.

C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO	TEST R.H. NO.1639. L.H. NO. 1644. (SEE LETTER BOOK 20 PAGE 4).
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. INSTALLED 1911. NOTE DIRECTS TO SEE CALCULATION BOOK NO 663 PAGE 31.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. INSTALLED 1911. NOTE DIRECTS TO SEE CALCULATION BOOK NO 663 PAGE 31. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE	IN USE FROM OCT.1, 1894.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. IN USE FROM OCT 1,1894. SEE CALC. BOOK NO. 2 PP 41 AND 60.
C	CL	

B	CL	
C	CL	
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	

C	CL	ROLLED IN COPPER TUBE WITH PADLOCK.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	IN USE FROM MARCH 1901. DIAGRAM SHOWS AN AVERAGE QUANTITY FOR BOTH WHEELS, FULL GATE AND 13' FALL WITH 90 RPM TAKEN FROM WEIR MEASUREMENTS OF DISCHARGE OF THESE WHEELS, MADE AT HOLYOKE, OCTOBER 1900.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK ABOVE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK ABOVE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL/TE	QUANTITIES FOR FULL GATE AND 13' FALL WITH 100 REV./56 SEC. MADE UP FROM WEIR MEASUREMENTS OF DISCHARGE OF A SIMILAR WHEEL AT HOLYOKE.
C	CL/TE	QUANTITIES FOR FULL GATE AND 13' FALL WITH 100 REV./56 SEC. MADE UP FROM WEIR MEASUREMENTS OF DISCHARGE OF A SIMILAR WHEEL AT HOLYOKE. IN USE FROM JULY 1, 1895. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	QUANTITIES FOR FULL GATE & 13' FALL WITH 100 REV./60 SEC. MADE UP FROM WEIR MEASUREMENTS OF DISCHARGE WHEELS AT HOLYOKE APRIL 8 & 10, 1905. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997. "JACKSON" LATER ADDED TO TITLE.

C	CL	QUANTITIES FOR FULL GATE & 13' FALL WITH 100 REV./60 SEC. MADE UP FROM WEIR MEASUREMENTS OF DISCHARGE WHEELS AT HOLYOKE APRIL 8 & 10, 1905. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	CL	QUANTITIES FOR FULL GATE & 13' FALL WITH 100 REV./60 SEC. MADE UP FROM WEIR MEASUREMENTS OF DISCHARGE WHEELS AT HOLYOKE APRIL 8 & 10, 1905. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	CL	NO. 3 R.H. TEST # 913 (SEE LETTER BOOK 12 PAGE 162). NO. 4, L.H. TEST #926 (SEE LETTER BOOK 12 PAGE 161).
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. NOTE DIRECTS TO: SEE CALC. BOOK 12 PAGE 162/4 L.H. TEST # 926 SEE LETTER BOOK 12 PAGE 161. SEE CALCULATION BOOK NO 2 PAGES 70 & 71. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. NOTE DIRECTS TO: SEE CALC. BOOK 12 PAGE 162/4 L.H. TEST # 926 SEE LETTER BOOK 12 PAGE 161. SEE CALCULATION BOOK NO 2 PAGES 70 & 71. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST	QUANTITIES FOR 13 FEET FALL WITH 100 REV. IN 133 SECONDS, ARE TAKEN FROM TABLES IN USE IN THE OFFICE.
B	CL	NOTE STATES "OBSOLETE".
B	CL	NOTE STATES: "OBSOLETE". CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 1913.
B	CL	NOTE STATES DRAWING IS OBSOLETE.

B	SO	
B	CL	
B	CL	
B	SO	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. MADE IN AUG 1874. SEE L. & C. LIBRARY BK. NO. 2801.
C	CL	ROLLED IN COPPER TUBE WITH PADLOCK. MADE IN AUG 1874. SEE L. & C. LIBRARY BK. NO. 2801.
B	SO	QUANTITIES FOR SAME SPEED GATE OPENING & 17' FALL WITH SAME SPEED MADE PROPORTIONAL TO COEFFICIENT OF DISCHARGE THROUGH GUIDES AND GUIDE AREAS LESS 6%, BASED ON TEST MADE AUG.1874.

C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. MADE IN AUG 1874 SEE L & C BK NO 2801
C	CL	
B	SO	QUANTITIES FOR SAME SPEED GATE OPENING & 17' FALL WITH SAME SPEED MADE PROPORTIONAL TO COEFFICIENT OF DISCHARGE THRU GUIDES AND GUIDE AREAS LESS 6%, BASED ON TEST MADE AUG.1874.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. MADE IN AUG 1874 THIS COPY WAS MADE BEFORE 162-019-028 WAS MODIFIED AS SHOWN IN ITS TITLE.
C	CL	THIS IS A TRUE COPY OF 162-019-028.
B		QUANTITIES FOR SAME SPEED-GATE OPENING & 17' FALL WITH SAME SPEED MADE PROPORTIONAL TO PRODUCTS OF COEFFICIENT OF DISCHARGE THRU GUIDES AND GUIDE AREA LESS 6%, BASED ON TEST MADE AUG. 1874.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. MADE IN AUG. 1874. SEE L & C LIBRARY BK NO 2801
C	CL	QUANTITIES FOR SAME SPEED-GATE OPENING & 17' FALL WITH SAME SPEED MADE PROPORTIONAL TO PRODUCTS OF COEFFICIENT OF DISCHARGE THRU GUIDES AND GUIDE AREA LESS 6%, BASED ON TEST MADE AUG. 1874.
B	CL	
C	RO	ROLLED IN COPPER TUBE TUBE WITH PADLOCK. NOTE DIRECTS TO SEE CALC BOOK 642 PAGES 25 & 82.
B	CL	
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO	
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	SEE CALC. BOOK NO. 2 PAGES 38-45.
B	CL	
B	RO	ROLLED IN COPPER TUBE WITH PADLOCK. NOTE DIRECTS TO SEE CALCULALTION BOOK NO 2 PP 39-45.
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. NOTE DIRECTS TO SEE CALCULALTION BOOK NO 2 PP 39-45.
B	ST	
B	CL	
C	RO	ROLLED IN COPPER TUBE WITH PADLOCK. NOTE DIRECTS TO SEE CALCULATION BOOK NO 2 PP 30-45.
B	ST	IN USE FROM APRIL 1,1894.
B	ST	IN USE FROM JAN.1,1900.

B	CL	IN USE FROM APRIL 1,1894.
B	CL	IN USE FROM APRIL 1,1894.
B	CL	IN USE FROM APRIL 1,1894.
B	CL	IN USE FROM APRIL 1,1894. SEE CALC. BOOK NO. 2 PAGES 39-45.
B	CL	SEE CALC. BOOK NO. 657 PAGES 23-25. IN USE FROM DEC. 1905.
B	CL	IN USE FROM MAY 1, 1898.
B	TE/CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST/TE/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	CL	
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/ST	LOCATED AFTER COMPLATION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO/ST	LOCATED AFTER COMPLATION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	CL	
C	CL	LOCATED AFTER COMPLATION OF FORMAL INVENTORY.
B	TE/SO	FOUND ATTACHED TO 132-026-[C] AND LEFT ATTACHED.
C	CL	LOCATED AFTER COMPLATION OF FORMAL INVENTORY.
B	CL	
C	SO	
B	SO/ST/TE/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.

C	CL	
B	RO	
C	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	ST	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L. & C. APRIL, 1997.
C	ST	RETRIEVED FROM P.L. & C. APRIL, 1997.
B	CL	
C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/TE	COMPUTED FROM TEST MADE BY P.L.& C. ON JUNE 27, 1939, ADJ. FOR RODNEY HUNT MACHINE CO'S EXPECTED PERFORMANCE OF A PAIR OF 38" TYPE HORIZ. WHEELS FOR 13' OF FALL & 125 R.LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	CL	COMPUTED FROM TEST MADE BY P.L.& C. ON JUNE 27, 1939, ADJ. FOR RODNEY HUNT MACHINE CO'S EXPECTED PERFORMANCE OF A PAIR OF 38" TYPE HORIZ. WHEELS FOR 13' OF FALL & 125 R.LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO	
C	SO/FO	
C	SO/ST	33 PAGE DOCUMENT LOCATED IN FOLDER ENTITLED, DISCHARGE DIAGRAMS FOR DIFFERENT CORPORATIONS.
C	SO	LOCATED WITH SHELF 162-019-A IN FOLDER ENTITLED:DISCHARGE DIAGRAMS FOR DIFFERENT CORPORATIONS.
C	CL	LOCATED WITH 162-019-A IN FOLDER ENTITLED: DISCHARGE DIAGRAMS FOR DIFFERENT CORPORATIONS.
C	SO/ST	LOCATED WITH 162-019-A IN FOLDER ENTITLED: DISCHARGE DIAGRAMS FOR DIFFERENT CORPORATIONS.
C	TE	LOCATED WITH 162-019-A IN FOLDER ENTITLED: DISCHARGE DIAGRAMS FOR DIFFERENT CORPORATIONS.
B	CL	INDEX, PAGE 1. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

B	CL	INDEX, PAGE 2. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.

		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1913.
B	SO	

B	CL	DRAWN FROM ENG. NEWS, APRIL 2, 1908-PAGE 360 VOLUME 59, NUMBER 14, FIGURE 3-"PLAN & PROFILE OF BORINGS AT STORM KING CROSSING, CATSKILL AQUEDUCT DECEMBER 17,1907."
B	SO	
B	SO	
B	SO	
C	SO/ST	THREE CIRCULAR CHARTS ATTACHED. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
A		
B	SO	BLANK FORM MASTER FOR USE IN CREATING BLANK PAPER COPIES OF SAME. CONTAINS HEADER, LOG DATA FIELDS, TWO GRIDS FOR RATING DATA, AND A GRAPH FORM. SEE ALSO PLAN NO. 162-018. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/ST	ATTACHED WITH 162-030-[B] & 162-030-[C].
B	TE	ATTACHED WITH 162-030-[A] & 162-030-[C].
B	TE	ATTACHED WITH 162-030-[A] & 162-030-[B].
B	TE	
B	SO/ST	
B	TE/FO/LM	
B	TE/FO/SO	BEARS DRAWING NO. 3. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	SO	
B	SO	
A		NOTE IN CONSECUTIVE INDEX OF DRAWINGS READS "NOT IN SHELF AT TIME OF INDEXING'.

B	SO/TE	
B	SO/ST/TE	NOTE STATES TRACING MADE FROM PLAN ON FILE IN OFFICE OF COMMISSION ON WATERWAYS & PUBLIC LANDS.
B	CL	
B	SO/ST	BEARS 152 MISCELLANEOUS. ALSO BEARS FILE 1127 RECTO. L.& C. CARD INDEX GAVE PLAN NO. AS 168-041.
B	SO/ST	THIS BOLT FIRST USED BY L.& C. JULY 1918.
B	CL	
B	SO	DATES PLOTTED RANGE FROM 1910-1938.
B	CL	

B	CL	
B	CL	
		ALTHOUGH NUMBERED 162-ENV. 46 NO. 99, THIS PLAN IS IDENTIFIED IN THE P.L.& C. CONSECUTIVE INDEX AS 162-ENV. 43 NO.
B	CL	99.
B	FO/SO/ST	ORIGINAL DRAWING NUMBERED 32850. BEARS 60-B RECTO. REPRODUCED FROM THE BOSTON EVENING TRANSCRIPT OF SEPT. 15,1931. NOTE STATES: SHOWS THE SWING OF AMERICAN BUSINESS ACTIVITY FROM PROSPERITY TO DEPRESSION & BACK AGAIN DURING THE PAST 142 YEARS. CHARLES T. MAIN, INC. ENGINEERS, BOSTON,
B	FO/TE/ST	MASS.
B	SO	
		PAYROLL TABLE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO
B	CL	DATE.
B	ST/SO	
B	CL	
B	CL	
B	CL	

B	FO/SO	ORIGINAL DRAWING NUMBERED 167-245.
B	SO	SCALES ARE NOTED AS FOLLOWS: FULL SIZE & 1/2 FULL SIZE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	ORIGINAL DATED SEP.21, 1920. CORRECTED TO AUG.26,1926.
C	TE	ORIGINAL DATED SEP.21,1920. CORRECTED TO OCT.4,1920.
B	CL	
B	TE	
B	CL	
B	CL	

B	CL	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	INCORRECTLY IDENTIFIED AS 162-43-G IN CONSECUTIVE INDEX OF DRAWINGS.
C	CL	
B	TE	NOTE STATES DRAWING WAS COPIED FROM BLUEPRINT OF ABERTHAW CONST. CO. INCORRECTLY IDENTIFIED AS 162-43-F IN CONSECUTIVE INDEX OF DRAWINGS. 162-43-H IN THE CONSECUTIVE INDEX IS SHOWN AS A BLANK.
B	TE	DATES PLOTTED RANGE FROM 1917-1921.
B	SO/ST	BEARS FILE NO. 1013. 8 PAGE DOCUMENT INCLUDING TOTAL WATER INCOME & EXPENSE FROM 1900 TO 1919.
B	FO/TE/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. ANOTHER BLUEPRINT COPY IS FOUND AT 142-023-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

C	TE	NOTE DIRECTS TO SEE COMP. BK. # 707 P. 53. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	TE	NOTE DIRECTS TO SEE COMP. BK. #707 P. 53. SHOWS SOME NEW WORK. LOCATED IN A GROUP OF SHELF 154 GRAPHS WHOSE FIRST SHEET IS NO. 154-063.
B	CL	
B	SO	
B	SO/FO/ST /TE	
B	SO/FX	
B	TE/SO	

B	FO	
B	FO	
B	SO	
B	SO	
C	TE/FX	PLAN NUMBER USED TWICE BY P. L. & C.
B	CL	PLAN NO. ENTERED AS ENV. 162-50 IN L.& C. CARD INDEX. ATTACHED TO PLAN NOS. 162-051 & 162-052. PLAN NUMBER USED TWICE BY P. L. & C
B	CL	ATTACHED TO PLAN NOS. 162-050 & 162-052.
B	CL	ATTACHED WITH PLAN NOS. 162-050 & 051.
B	SO	

C	SO/ST	CONSECUTIVE INDEX GIVES DATE OF 1923.
B	FO	RELATIVE TO CLOSING OF STACKPOLE ST.
A		
B	SO/TE	
B	SO/ST	JOINED TO 162-074 TO FORM A SINGLE DOCUMENT.
B	CL	
B	CL	RESULTS OF TEST CONDUCTED MAY 31,1923.
A		
B	FO/SO/TE	

A		KEPT IN EARL HUSE'S ROOM.
B	CL	
C	SO	LOCATED IN SHELF 140. P.L. & C. MAY ACTUALLY HAVE INTENDED THIS PLAN TO BE NUMBERED 140-065 SINCE 140-066 SHOWS RACES 1, 2 & 3 AT ATLANTIC RAYON. P.L.& C. USED THIS PLAN NUMBER TWICE.
B	FO/TE	PLAN DATED NOV.1894. REVISED 1918. P.L.& C. USED THIS PLAN NUMBER TWICE.
B	CL	
B	FO	
B	SO/FO/ST	YEARS RANGE FROM 1850-1935.
C	FO/TE/SO	YEARS RANGE FROM 1850-1935.
B	FO	
B	SO	
B	CL	

B	SO	ORIGINAL ON BROWN PAPER.
B	ST/SO/TE	
B	SO	SEE ALSO PLAN NO. 162-066.
B	FO/TE/SO	BEARS SHEET NO. 1.
B	SO/ST	JOINED TO 162-058 TO FORM A SINGLE DOCUMENT.
B	SO	
B	SO	
B	FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	ADDITIONAL INFO. DATED MAY, 1928.
C	ST/SO/TE	ADDITIONAL INFO. DATED MAY, 1928. THIS IS A PHOTONEGATIVE PRINT.

B	TE	THE COPY OF THE ZONING ORDINANCE NOTED ON THE L.& C. INDEX CARD WAS NOT LOCATED.
B	SO	
C	FO/SO	
B	CL	
B	FO/SO/TE	
B	CL	
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	CONSISTS OF 7 BOUND SHEETS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO/TE	SCALE IS NOTED AS FOLLOWS: 1"& 1/2"=10',1/4"=1'& 1/2"=1'. REVISIONS DONE MARCH 12,1935. METCALF & EDDY, ENGINEERS.
B	FO/SO/TE	SCALE IS NOTED AS FOLLOWS: 3/8"& 1/2"=1', 1"=50'& 20'. BEARS 13909 H 4414 RECTO.
B	TE/SO/ST	
B	FO/SO	
B	FO/SO/TE	THIS IS A BLUEPRINT COPY OF PLAN NO. 162-090 WITH ADDITIONAL WORK.
B	FO/TE/SO	
B	TE	

B	SO	PLAN PRODUCED BY LOWELL ELECTRIC LIGHT CORPORATION. BEARS VF-2503 RECTO.
B	SO	PLAN PRODUCED BY LOWELL ELECTRIC LIGHT CORPORATION. BEARS VF-2503 RECTO.
B	SO/TE	DOCUMENT 162-089-[B] ATTACHED.
B	SO/TE	ATTACHED TO PLAN NO. 162-098-[A].
B	FO	
B	FO/SO	ORIGINAL DATED SEP.1904. LAST REVISION MADE OCT.3, 1917. BEARS NO. 5974 RECTO.
A		DATE OF ORIGINAL AS GIVEN IN THE CONSECUTIVE INDEX OF DRAWINGS. THE DATE OF THIS COPY IS UNKNOWN.
B	CL	
B	SO	

B	SO/ST	
B	FO/TE/SO	ORIGINAL DATED FEB.6,1924. RETRACED FROM ORIGINAL PLAN NO. 97203 MAY 20,1932.
B	SO/ST	PLAN DEPICTING LAYOUT OF VARIOUS STORAGE EQUIPMENT IN ROOM. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	FIRST MADE UP FOR THE CHARTER COMMISSION OF 1921 & FINANCE COMMISSION OF 1926 TO 1931.
B	ST/SO	COVERS PERIOD 1860-1960.
B	FO/SO	BEARS 162-18-A RECTO.
B	FO	
B	FO/SO	BEARS NO. 33036-Z-11799 RECTO. ALSO BEARS FIG. A-3 RECTO.
B	SO	
PAPER	B	TEARS, FOXING, STAINS, SOILED
B	SO/ST/FX/TE	SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].

PAPER	B	TEARS, FOXING, STAINS, SOILED
B	SO/ST/FX/ TE/LI	SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].
PAPER	B	TEARS, FOXING, STAINS, SOILED
B	SO/ST/TE/ FX	SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].
PAPER	B	TEARS, FOXING, STAINS, SOILED
B	SO/ST/TE/ FX	LOCATED IN FOLDER WITH 9 OTHER PLANS PERTAINING TO LOWELL MACHINE SHOP. SEE ALSO PLAN NOS. 162-123 THRU 162-123-[H].
PAPER	B	TEARS, SOILED, STAINS, MOLD
B	TE/SO/ST/ MO	BEARS NO. 1 RECTO. SEE ALSO PLAN NOS. 162-123-[A] THRU [I].
PAPER	B	FOXING, STAINS, SOILED
B	SO/ST/FX	BEARS NO. 2 RECTO. SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].
PAPER	B	TEARS, SOILED, STAINS, LOSSES

B	TE/ST/SO/ LM	BEARS NO. 3 RECTO. SEE ALSO PLAN NO. 162-123 THRU 162-123-[I].
PAPER	B	FOXING, STAINS, SOILED
B	ST/SO/FX	SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].
PAPER	B	TEARS, FOXING, STAINS, SOILED
B	TE/FX/ST/ SO	BEARS NO. 1 RECTO. SEE ALSO PLAN NOS 162-123 THRU 162-123-[I].
PAPER	B	TEARS, FOXING, STAINS, SOILED
B	SO/ST/TE/ FX	BEARS NO. 7 RECTO. SEE PLAN NOS 162-123 THRU 162-123-[I].
B	CL	BEARS PLAN NO. L-5575.
B	FO	

C	SO/FO/TE	NOTED ON VERSO IS DATE SEPT. 14, 1948 AND THE NOTE "FROM A.T.S. [I.E. ARTHUR T. SAFFORD]".
C	SO	
B	FO/SO/ST	LAST REVISION MADE JAN.1900. THREE PAGE DOCUMENT ON BOTH CLOTH BACKED PAPER & PAPER.
B	FO/SO	
B	TE/SO/ST	
B	SO	OCT. 4 (P.M.) 1910.
C	FO	ATTACHED TO 163-004-[COPY 2].
C	FO	ATTACHED WITH 163-004-[COPY 1].
B	SO	ATTACHED TO 163-005-[B].
B	FO	ATTACHED TO 163-005-[A].
B	SO/ST	

B	SO/ST	
B	SO/FO	
B	SO/ST	CONSECUTIVE INDEX GIVES DATE OF JULY, 1910.
B	SO	ATTACHED WITH 163-010-[COPY 1].
C	SO	ATTACHED WITH 163-010.
B	SO	ASSOCIATED FACTORY MUTUAL INSURANCE CO. (TO ACCOMPANY LETTER OF MR. A.T. SAFFORD, JAN. 8/13. SEE LETTER FROM INSPECTION DEPARTMENT TO MR. SAFFORD DATED JAN. 1, 1913.)
B	SO	
B	FO/SO	
B	CL	

B	SO	
B	CL	ALSO: QUANTITY PASSING PLYMOUTH, LAKEPORT FRANKLIN, & FRANKLING JCT.
B	SO/ST	8 PAGE DOCUMENT.
B	FO/SO	
B	SO/ST	4 PAGE CHART. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1913.
B	SO/ST	
B	FO/SO	
B	SO/FO/ST	DATED APRIL 8,1914, BUT ADDITIONAL NOTE STATES TENTATIVE TO JUNE 1914.
B	SO	A 26 PAGE LEDGER CONTAINING DATA FROM VARIOUS DATES BETWEEN AUGUST 25, 1913 AND AUGUST 18, 1916.
B	CL	FILE 453. LOCATED WITH ENVELOPE 163-018 ENTITLED, MEASUREMENTS AT CROMWELL'S FALLS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1913.

B	SO	
B	SO	2 PAGE DOCUMENT.
B	SO/ST	9 PAGE DOCUMENT. LOCATED IN ENVELOPE ENTITLED MISCELLANEOUS DIAGRAMS PERTAINING TO WATER MEASUREMENTS.
B	FO/SO/ST	NOTE: SHOWS DISCHARGE OF ONE GATE ONLY.CONSECUTIVE INDEX NOTES "ROUGH DIAGRAM. UNFINISHED".
B	SO/ST	CONSECUTIVE INDEX NOTES "ROUGH DIAGRAM. UNFINISHED".
B	SO/ST	
B	CL/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
B	SO/ST/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. ENTERED COLLECTIVELY ON L.& C. INDEX CARD WITH 163-025-[B], [C] & [D].
B	SO/ST	ENTERED COLLECTIVELY ON L.& C. INDEX CARD WITH 163-025-[A], [C] & [D].

B	FO/SO/ST/TE	ENTERED COLLECTIVELY ON L.& C. INDEX CARD WITH 163-025-[A], [B] & [D].
B	SO/ST/FO	ENTERED CLOOECTIVELY ON L.& C. INDEX CARD WITH 163-025-[A], [B] & [C].
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	3 PAGE DOCUMENT.
B	SO	
B	CL	
B	SO	10 PAGE DOCUMENT.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE..
B	CL	

B	SO	ENTERED COLLECTIVELY ON L.7 C. INDEX CARD WITH 163-025-[A], [B] & [C].
B	SO	
C	SO	
B	SO/FO	ENTERED COLLECTIVELY ON L.& C. INDEX CARD.
B	CL	ENTERED COLLECTIVELY ON L.& C. INDEX CARD.
B	SO	ENTERED COLLECTIVELY ON L.& C. INDEX CARD WITH DATE OF 13 & 14 JULY, 1925.
C	CL	ENTERED COLLECTIVELY ON L.& C. INDEX CARD.
C	SO	ENTERED COLLECTIVELY ON L.& C. INDEX CARD.

C	SO	ENTERED COLLECTIVELY ON L.& C. INDEX CARD.
C	FO/SO	
C	FO	LOCATED IN FOLDER 156.
C	SO	LOCATED IN FOLDER 164.
C	SO/FO	LOCATED IN FOLDER 164.
B	LM/SO	ATTACHED TO 164-001-[A]. BEARS NO. 1634 COVERED OVER VERSO.
B	LM	ATTACHED TO 164-001. BEARS NO. 1635 COVERED OVER RECTO.
B	FO/SO	BEARS NO. 1496.
B	FO/SO	(NOTES IN TRANSIT BOOK NO.3, PAGES 115 TO 144).

B	FO/SO	SURFACE VELOCITIES TAKEN JAN.11,1901. SEE LEVEL BOOK 32 PAGE 62-5. BEARS NO. 1430.
B	FO/SO	
B	SO	3 PAGE DOCUMENT.
B	SO	BEARS NO. 1471 RECTO. ATTACHED WITH 164-007-[A] TO [C].
B	FO/SO	BEARS NO. 1472-1 RECTO. ATTACHED WITH 164-007 TO 164-007-[C].
B	SO/TE	BEARS NO. 1472 COVERED OVER RECTO. ATTACHED WITH 164-007-[A] TO [C].
B	ST/SO	BEARS NO. 1172-2 COVERED OVER RECTO. ATTACHED WITH 164-007-[A] TO [B].

B	FO/SO/TE	SHOWS PLAN AND ELEVATION OF NEW GIRDERS UNDER R.R. TRACKS.
B	SO	
B	FO/SO	
B	FO/SO	PLAN NOT USED.
B	FO/SO	NOTE DIRECTS TO SEE BLUEPRINT FOR CORRECTIONS TO PIPE, 1914.
C	SO	
B	SO	ORIGINALLY DATED SEPT. 1907. NOTE STATES GIRDERS PLOTTED BY G. E. ZABRISKIE, MAY 15,1908. ADDITIONAL NOTE STATES ''CORRECT AS FAR AS KNOWN TO MAR.1914". NOTE DIRECTS TO SEE BRIDGE BOOK # 82 & PORTFOLIO A.149, PP.1143 & 1144 (SECTION H.1.).

C	CL	ORIGINALLY DATED SEPT. 1907. NOTE STATES GIRDERS PLOTTED BY G.E. ZABRISKIE, MAY 15,1908. NOTE STATES CORRECT AS FAR AS KNOWN TO MAR.1914. ADDITIONAL NOTE IN REFERENCE TO REPAIRS MADE DATED DEC.18,1919.
C	TE	ORIGINALLY DATED SEPT. 1907. NOTE STATES GIRDERS PLOTTED BY G.E. ZABRISKIE, MAY 15,1908. ADDITIONAL NOTE STATES CORRECT AS FAR AS KNOWN TO MARCH 1917. NOTE DIRECTS TO SEE BRIDGE BOOK #82 & PORTFOLIO A.149,PP.1143 & 1144 (SECTION H.1).
B	SO	
B	SO	
C	TE/FO/SO	ORIGINALLY DATED FEB. 1908. ADDITIONAL NOTE GIVES INFO. RELATIVE TO WORK DONE AUG. 25, 1921.
B	SO	ORIGINALLY DATED JAN.1908. NOTE STATES CORRECT AS FAR AS KNOWN TO MARCH 1914.
C	SO/FO	ORIGINALLY DATED JAN.1908. ADDITIONAL NOTE STATES CORRECT AS FAR AS KNOWN TO JULY 1914.
C	TE	ORIGINALLY DATED JAN.1908. NOTE STATES CORRECT AS FAR AS KNOWN TO MARCH 1914.
B	SO/FO	
C	CL	ORIGINALLY DATED JAN. 21, 1980. REVISED JAN. 26, 1980. THIS PLAN NUMBER MAY ACTUALLY HAVE BEEN APPLIED BY THE CONTRACTOR RATHER THAN P.L. & C.

B	SO	ORIGINALLY DATED FEB 1908. CORRECT AS FAR AS KNOWN TO MAR. 1914. NOTE DIRECTS TO SEE BLUEPRINT FOR REPAIRS SEP.1913.
B	FO/TE/SO	
C	FO/TE/SO	NOTE STATES THIS PLAN WAS USED IN CONSTRUCTION. SEE LATER PLAN OF BRIDGE AS BUILT.
B	SO	COPIED FROM PLAN OF CITY ENGINEER. SEE ALSO PLAN NOS. 164-021-B TO D.
B	SO	ORIGINALLY DATED APRIL 1922. COPIED BY J.E.M. OCT. 22,1917. SEE ALSO PLAN NOS. 164-021-A TO D.
B	SO	COPIED BY J.E.M., OCT. 29,1917, FROM PLAN OF CITY ENGINEER. SEE ALSO PLAN NO. 164-021-A TO D.
B	FO/SO	SCALES ARE NOTED AS FOLLOWS: 1 1/2" & 3"=1', 1"=4', 1"=1". ORIGINAL DATED OCT.31,1911. SEE ALSO PLAN NO. 164-021-A TO C.
C	CL	ORIGINALLY DATED OCT.31,1911. COPIED OCT.24,1917 BY J.E.M. SCALES ARE NOTED AS FOLLOWS: 1 1/2"& 3"=1',1"=4',1"=1". ALSO GIVES SPECIFICATIONS RECT.
C	CL	ORIGINALLY DATED OCT.31,1911. COPIED OCT.24,1917 BY J.E.M. SCALES ARE NOTED AS FOLLOWS: 1 1/2"& 3"=1', 1"=4', 1"=1".
B	SO	ORIGINALLY DATED AUG. 18,1911. COPIED BY J.E.M. FROM CITY ENGINEER'S PLANS, OCT. 19,1917.

C	CL	LOCATED IN SHELF 164, FOLDER 23.
B	SO	LOCATED IN SHELF 165, ENVELOPE 23. GIVEN PLAN NO. 164-ENV. 23-30 IN L.& C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS SHOWS IT AS 164-30 IN ENVELOPE 23.
B	SO	LOCATED IN SHELF 165, ENVELOPE 23. GIVEN PLAN NO. 164-ENV. 23-41 IN L.& C. CARD INDEX.
B	SO	LOCATED IN SHELF 165, ENVELOPE 23. GIVEN PLAN NO. 164-ENV. 23-43 IN L.& C. CARD INDEX.
C	SO	LOCATED IN SHELF 165, ENVELOPE 23.
B	SO	LOCATED IN 165, ENVELOPE 23.
B	FO/SO/ST	LOCATED IN SHELF 165, ENVELOPE 23.
B	SO	ORIGINAL DATED JULY 9,1920. REVISED AUG.12,1920. LOCATED IN SHELF 165, ENVELOPE 23.

B	CL	LOCATED IN SHELF 165, ENVELOPE 23.
B	SO	ORIGINAL DATED JUNE 23,1920. REVISED JULY 15,1920 & AUG.12,1920. NOTE DIRECTS TO SEE GENERAL PLAN DATED AUG.10,1920 FOR MORE DETAILS. LOCATED IN SHELF 165, ENVELOPE 23.
B	SO	LOCATED IN SHELF 165, ENVELOPE 23. PLAN AS ENTERED IN L. & C. CARD INDEX DID NOT IDENTIFY RENDERING MEDIUM, THEREFORE, IT IS ASSUMED THAT THIS PLAN IS A COPY OF AN ORIGINAL NO LONGER EXTANT.
B	SO	ORIGINAL DATED MAY 8,1917. TRACED FROM COPY OF DEC. 2,1919. LOCATED IN SHELF 165, ENVELOPE 23.
B	FO/SO/ST	LOCATED IN SHELF 165, ENVELOPE 23. SEE ALSO PLAN NO. 164-023-I.
B	SO	LOCATED IN SHELF 165, ENVELOPE 23. SEE ALSO PLAN NO. 164-023-H.
B	CL	LOCATED IN SHELF 165, ENVELOPE 23. DIRECTS TO SEE PLAN NO. 164-030.
B	SO/TE	LOCATED IN SHELF 165, ENVELOPE 23.

B	SO	LOCATED IN SHELF 165, ENVELOPE 23.
B	SO/ST	
C	FO/TE	
B	SO	LOCATED IN SHELF 165, ENVELOPE 23.
B	SO	LOCATED IN SHELF 165, ENVELOPE 23.
C	CL	LOCATED IN SHELF 165, ENVELOPE 23.
B	SO	SEE ALSO PLAN NO. 164-026. ALTERNATE PLAN FOR FENCE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE/HO/ST	ATTACHED WITH 164-025-[A].

C	FO/SO	PLAN OF LOTS WEST OF SCHOOL ST. TO BE TAXED TO VARIOUS OWNERS. ATTACHED TO 164-025.
B	FO/SO	SEE ALSO PLAN NO. 164-024. THIS PLAN IS AN ALTERNATE PLAN FOR FENCE.
B	SO	
B	FO/SO	BEARS "NOT USED" RECTO.
B	TE	
B	FO/SO	BEARS NO. 28 RECTO. WORK BEGUN OCT.1918 & FINISHED NOV.1918.
B	SO/FO	
B	SO/FO	ORIGINALLY DATED MARCH 26,1920. REVISED APRIL 10 & 28,1920.
B	FO/SO	

B	TE	BEARS ENVELOPE NO. C7792. ATTACHED TO 164-034-C.
B	TE	BEARS ENVELOPE NO. C7792. ATTACHED TO 164-034-B.
B	TE/FO/SO	STAMP FROM NEW ENGLAND STRUCTURAL CO. ENGINEERING DEPARTMENT INDICATES REC'D JAN.7. SENT TO MR. SAFFORD 1/12. BEARS SHEET FC1 OF W. ALSO BEARS CONTRACT C 7792.
A		
A		
A		
A		
B	FO/SO	
B	SO	BOUND WITH PLANS 164-037-[A], 038 & 038-[A].

B	FO/TE	ORIGINAL PLAN NO. 160-015. SHEET 1 OF 2, SHEET 2 BEING PLAN 164-038-[A]. BOUND WITH PLANS 164-037, 038 & 038-[A].
B	FO	BOUND WITH PLANS 164-037, 037-[A] & 038-[A].
B	FO/TE	ORIGINAL PLAN NO. 160-015. SHEET 2 OF 2, SHEET 1 BEING PLAN 164-037-[A]. BOUND WITH PLANS 164-037, 037-[A] & 038.
B	TE/FO/LM /SO	
B	CL	LOCATED IN SHELF 165, ENVELOPE 23. GIVEN PLAN NO. 164-ENV. 40 IN L.& C. CARD INDEX.

B	FO/SO	ORIGINALLY DATED APRIL 10,1920. LAST REVISION DATED AUG.10,1920.
B	SO/FO	SHOWS REPAIRS AS MADE IN JULY 1917. SEE ALSO 141-039 & 040.
B	FO/SO	ORIGINALLY DATED 1908 & 1909. NEW WORK DATED OCT. 1924, OCT. 1943 AND SEPT. 1955.
C	FO	FOUND IN FOLDER 126.
B	FO	THIS IS THE ORIGINAL FROM WHICH C-145-063-[A] & [B] WERE MADE.
C	TE/FO	ORIGINAL BRIDGE BUILT IN 1826. BEARS "SHEET NO. 1". RECTO.
C	TE/FO	BEARS "SHEET 1", RECTO.
B	SO/FO	

B	SO/ST	
B	CL	BEARS NO. 4195.
B	FO/SO	
B	SO/FO	NOTE STATES "NOT BUILT (VOID)". LOCATED IN SHELF 151.
C	CL	
B	SO	NOTE STATES THIS BRIDGE WAS BUILT IN 1910 USING SECOND-HAND TRUSSES-SOME OF WHICH WERE TOO SHORT.
A		THIS MUST BE THE ORIGINAL REFERRED TO IN THE NOTE ON 164-054-[COPY 1] WHICH READS "ORIGINAL OF THIS TAKEN TO B & M RR BY MR. MILLS MARCH 31, 1905". FROM SURVEY OF 1895-98.

B	LM/TE	NOTE STATES "ORIGINAL OF THIS TAKEN TO B.& M. R. R. BY MR. MILLS MARCH 31,1905."
B	FO/SO	THIS BLUEPRINT WAS MADE FROM 164-055-[A] BEFORE MODIFICATIONS OF 1921 WERE MADE TO IT.
C	SO/FO	NOTE STATES "NOT BUILT (VOID)". THIS WAS THE BASE PLAN FROM WHICH THE BLUEPRINT 164-055 WAS MADE BEFORE MODIFICATIONS OF 1921 WERE MADE TO THIS PLAN.
B	FO/SO	
B	SO	
B	SO	
B	SO/FO	
B	FO/SO	

B	SO/ST	PLAN NUMBER ENTERED AS 164-62 IN L. & C. CARD INDEX.
B	TE	FUNK & WILCOX, ARCHITECTS, BOSTON. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/TE	FUNK & WILCOX, ARCHITECTS, BOSTON. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE
C	FO/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C.
B	TE	FUNK & WILCOX, ARCHITECTS, BOSTON. THIS PLAN NO. WAS USED TWICE BY P.L.& C.
B	FO/SO	
B	SO	2 PG. DOCUMENT. HARRY GRAVES, ARCHITECT.

B	SO/TE	DATED OCT.1915 WITH ADDITIONAL NOTE DATED DEC.1915.
B	TE	
C	TE	PLAN NUMBER USED TWICE BY P.L. & C. BEARS "NO.164-69 PAWTUCKET CANAL ST." IN GRAPHITE, VERSO, BUT, THOUGH SIMILAR, THIS IS NOT A BLUEPRINT COPY OF 164-069. ANOTHER COPY OF THIS PLAN MAY BE FOUND AT C-144-035.
B	FO	PLAN NUMBER USED TWICE BY P.L. & C.
B	FO	
B	SO	SCALES ARE NOTED AS FOLLOWS: H1"=10' & 100', V1"=1' & 5'.
B	TE	THIS IS A COPY OF 164-073 WITH NEW WORK.
B	FO/SO	BEARS "REVISED" RECTO.

B	SO	
A		
B	TE	
B	TE	NOTE STATES PROPOSED REPAIRS B.P. GIVEN TO SSK BY CITY ENGR ABOUT JUNE 18-1925.
C	SO/FO	CITY OF LOWELL SPECIFICATIONS GIVEN TO SSK BY CITY ENGINEER ABOUT JUNE 22, 1925.
B	SO	
B	CL	BEARS DRG. #1 OF 2. ALSO BEARS B13-38. ATTACHED WITH 164-081-[2].
B	CL/TE	BEARS DRG. #2 OF 2. ALSO BEARS B13-38 RECTO. ATTACHED TO 164-081-[1].
A		

A		LOWELL ELECTRIC LIGHT CO.
B	SO	
C	FO	ATTACHED WITH 164-095-[COPY 1], 164-094-[COPY 1], 164-093-[COPY 1] & 164-014-[COPY 2]. VERY POOR BLUEPRINT, SEE PLAN 164-084 FOR BETTER VIEWS.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		
B	SO	BEARS CONDUIT LOCATION L-2813. ALSO BEARS F-2444. NOTE STATES , THIS DRAWING IS SUBJECT TO SLIGHT CHANGES DUE TO UNEXPECTED OBSTACLES MET IN CONSTRUCTION. BEARS SHEET B RECTO. SEE PLAN NO. 164-088.
B	TE	BEARS SHEET A RECTO. ALSO BEARS F2445 RECTO. "THIS DIAGRAM COVERS PETITION FOR 16 ADDITIONAL DUCTS AT PRESENT LOCATION". SEE PLAN NO, 164-087.

B	FO/TE	PLAN, SECTION, & ELEVATION OF GIRDERS.
B	TE	
C	SO	LOCCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	
B	SO	ORIGINALLY DATED APRIL 12, 1938. REVISED APRIL 15, 1938.
B	CL	
C	CL	ATTACHED WITH 164-095-[COPY 1],164-093-[COPY 1], 164-094-[COPY 1], 164-084-[COPY 1] & 164-014-[COPY 2].
B	SO	

C	CL	ATTACHED WITH 164-095-[COPY 1], 164-093-[COPY 1], 164-084-[COPY 1] & 164-014-[COPY 2]. PLAN NO. 164-094-[COPY 1] IS COPIED ON SAME SHEET. THIS PLAN TAKES UP HALF OF SHEET & HAS BEEN INVENTORIED SEPARATELY. SHEET BEARS 4/6 IN GRAPHITE RECTO.
B	SO	
C	CL	ATTACHED WITH 164-095-[COPY 1], 164-093-[COPY 1], 164-094-[COPY 1], 164-084-[COPY 1], & 164-014-[COPY 2].
B	SO/FO	NOTE STATES FOR FURTHER DETAILS OF CONSTRUCTION SEE PLAN MADE AUG.25,1938.
C	FO	NOTE DIRECTS FOR FURTHER DETAILS OF CONSTRUCTION SEE PLAN MADE AUG.25,1938.
B	FO	
B	FO	

B	FO	
B	FO/SO	[ALSO] SURFACE PLAN / OF / CENTRAL ST. BRIDGE / OVER EASTERN CANAL [SHOWING ROADWAY AND SIDEWALK CONDITIONS AND APPROACHES].
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1940 OR 1941.
B	FO/SO	NOTE DIRECTS TO SEE PLAN DATED NOV.21,1942 SHOWING SIDEWALK EXTENSION & NEW WOOD PICKET FENCE.
B	SO/FO	

B	SO	
B	SO/FO	NOTE STATES "ROADWAY REVISED SEPT. 1955."
B	FO/TE	
B	FO	
C	FO	THIS PLAN NO. WAS USED TWICE BY L.& C..
B	FO	L.& C. INDEX CARD NOTES 2 SHEETS. THIS PLAN NO. WAS USED TWICE BY L.& C..
B	FO/TE	L.& C. INDEX CARD NOTES 2 SHEETS. THIS PLAN NO. WAS USED TWICE BY L.& C..
C	FO	THIS PLAN NO. WAS USED TWICE BY L. & C.

B	SO	THIS PLAN NO. WAS USED TWICE BY L. & C.
C	SO	
C	SO/ST	LOCATED IN FOLDER 165. BEARS NOTE: "FINANCE COMMISSION OF LOWELL, MASS. SEPT 30, 1926.
B	SO	NOTE READS "COPY OF PLAN OWNED BY EDWARD B. PIERCE. TRACING MADE BY ARTHUR L. CHENEY, LOWELL MASS. MARCH 1, 1901". SEE PLAN NO. 165-005 FOR 1881 LITHO. VERSION OF THIS SAME PLAN. BEARS NO. 1499 COVERED OVER WITH TAPE, RECTO.
B	SO/ST/HO /FO	CONSECUTIVE INDEX OF DRAWINGS HAS NOTE: "ALSO UPDATED MAP TO 1956".
B	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS HAS NOTE: "ALSO UPDATED MAP TO 1956"
B	FO/SO/ST	CONSECUTIVE INDEX OF DRAWINGS HAS NOTE: "ALSO UPDATED MAP TO 1956" BEARS NOTE "SHELF 140", VERSO.

B	SO/ST/FO	SCALES ARE NOTED AS FOLLOWS: 1"=3300', 1"=200 RODS, H1"=2/3 MILES, V1"=3960'. THIS PLAN IS NUMBERED 165-3 BY P. L. & C. BUT IT IS ACTUALLY C-143-013 AS PER THE INDEX OF CONSECUTIVE DRAWINGS WHICH SHOWS PLAN 165-003 WITH THE DATE OF 1836.
C	FO/SO	SCALES ARE NOTED AS FOLLOWS: 1"=3300', 1"=200 RODS, H1"=2/3 MILES, V1"=3960'. THIS PLAN IS NUMBERED 165-3 BY P. L. & C. BUT IT IS ACTUALLY C-143-013 AS PER THE INDEX OF CONSECUTIVE DRAWINGS WHICH SHOWS PLAN 165-003 WITH THE DATE OF 1836.
PAPER	B	FOLDS, STAINS, SOILED
B	FO/ST/SO	
B	SO/ST	SEE PLAN NO. 165-001 FOR A 1901 DRAFTING CLOTH COPY OF THIS PLAN. ALSO BEARS NO. 3026, RECTO. THIS PLAN NO. WAS USED TWICE IN THE L.& C. INDEX.
CLOTH-BACKED PAPER	B	FOXING, STAINS, SOILED
B	FX/ST/SO	
B	TE/SO	BEARS REFERENCE TABLE. L.& C. INDEX CARD GIVES DATE OF 1821 WHICH WAS DATE OF ORIGINAL FROM WHICH THIS LITHOGRAPH WAS MADE IN 1871.

B	TE/SO/ST	COPY FROM AN ORIGINAL DATED-DEC. 24, 1786-J. P. HUTCHINSON JULY 1880. PRESENTED TO JAMES B. FRANCIS BY J. P. HUTCHINSON FEB. 27, 1883. L.& C. CARD INDEX GIVES DATE OF 1786. BEARS NO. 3453, VERSO. DATE OF THIS COPY UNKNOWN BUT PROBABLY 1883.
B	SO	L.& C. CARD INDEX GIVES DATE OF 1852. TWO SEPARATE SHEETS OF PAPER WITH OVERLAPPING GLUE JOINT. BEARS NO. 3458, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	BEARS NO. 2059 RECTO. ALSO BEARS NO. 3459 RECTO. PLAN NUMBER ENTERED AS 165-10 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1871.
B	SO/ST	
B	ST	TRACED FROM U.S. GEOLOGICAL SURVEY. AREA BY PLANIMETER=95.5 SQ. MI.
B	SO/ST/TE	
B	FO/TE/SO	DATED JULY 23,24 & 25,1921.
B	FO/ST/SO	FROM ACTUAL SURVEYS, SOUNDINGS & LEVELS BY CUSHING & DEWITT. P.L.& C. CONSECUTIVE INDEX OF DRAWINGS MAKES REFERENCE ONLY TO THIS BLUEPRINT AND GIVES A DATE OF 1861..
C	FO/ST/SO	ORIGINAL DATED 1866, BUT NOTE READS "TRACED BY J.E.M., 1922". TRACING HAD TO HAVE BEEN MADE FROM BLUEPRINT 165-015. CONSECUTIVE INDEX OF DRAWINGS MAKES REFERENCE ONLY TO THE BLUEPRINT AND GIVES A DATE OF 1861.

B	SO/ST	PLAN NUMBER ENTERED AS 165-16 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A		PLAN NUMBER ENTERED AS 165-16 IN L. & C. CARD INDEX.
B	FO/SO/TE	FILE 374. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF AUG. 18, 1922.
A		COPY MADE FROM THIS ORIGINAL BLUEPRINT BY S.R.D. MARCH 23, 1922, P.L.& C., SEE 165-018-[COPY 1]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF SEPT. 1910.
B	SO/ST	COPIED FROM ORIGINAL BLUEPRINT BY S.R.D. MARCH 23, 1922, P.L.& C. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF SEPT. 1910.
B	FO	
B	SO/ST	NOTE STATES COMPILED IN 1914. EDITION OF 1922.
B	SO/ST	
B	SO	FOR A.T.S. REPORT.

B	SO/ST	U.S.G.S. MAY 1916. REPRINTED 1916.
B	SO/FO	U.S.G.S. EDITION OF MAY 1906, REPRINTED 1916.
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES GIVES DATE OF FEB. 15, 1919.
B	SO/ST/TE	BEARS FILE NO. 37.2 RECTO.
B	SO/ST/TE	SCALES ARE NOTED AS FOLLOWS: 1/8"=1 MILE, 1/16"=1 KIL0.
A		
B	TE/ST	ORIGINAL DATED 1923. NEW WORK DATED 1925. LOWELL WATER WORKS.
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/ST/HO /FO	
B	FO/SO/ST	
C	ST/SO/HO	BEARS INFO. PERTAINING TO ELECTRICAL INTERCONNECTION OF MILLS & GENERATOR CAPACITY IN THE MILLS. ORIGINAL DATE OF FEB. 1933 CHANGED TO APR. 1933.
B	SO	ADDITIONAL WORK DATED APRIL 1928.
C	SO	ADDITIONAL WORK DATED APRIL 1928.
C	CL	THIS IS A COPY OF THE ORIGINAL BEFORE ADDITIONAL WORK WAS ADDED AND BEFORE THE WORD "INDUSTRIAL" WAS ADDED TO THE TITLE.
C	FO/TE/SO	BEARS NOTE: "INFORMATION ADDED BY ARTHUR T. SAFFORD, ENGINEER OF THE LOCKS & CANALS, MAY 1928."
B	TE/ST	GIVES AUTOMOBILE ROUTES IN MASSACHUSETTS VERSO. CONSECUTIVE INDEX OF DRAWINGS NOTES "TWO COPIES".
B	SO	CONSECUTIVE INDEX NOTES THAT THIS IS A TRACING.

B	FO/SO	DATE OF ORIGINAL, 1832.
B	SO/ST/TE	
B	SO/FO/TE	
B	SO	
C	SO	
C	SO	BEARS STAMP FROM MASS. ARCHIVES MAPS & PLANS NO. 994. NOTE STATES "DRAWN FROM ORIGINAL PLAN", ALSO "FROM PAPERS OF ACT JUNE 25, 1792 PROPS. OF THE LOCKS & CANALS ON MERRIMACK RIVER INCORP." ATTACHED TO 165-040-[COPY 1]. DATE OF THIS COPY IS UNKNOWN.
B	SO/ST	BEARS STAMP FROM MASS. ARCHIVES MAPS & PLANS NO. 994. NOTE STATES "COPY OF ORIGINAL PLAN", ALSO "FROM PAPERS OF ACT JUNE 25, 1792 PROPS. OF THE LOCKS & CANALS ON MERRIMACK RIVER INCORP." ATTACHED TO 165-040. DATE OF THIS COPY IS UNKNOWN.
B	SO	ORIGINAL DATED ABOUT 1792. NOTE STATES COMPILED FROM VARIOUS SOURCES. E. L. HUSE.
B	SO	MAP OF NEW HAMPSHIRE & MASSACHUSETTS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	NOTE STATES THIS PLAN WAS COPIED FROM THE HISTORY OF CHELMSFORD WRITTEN BY REV. WILSON WATERS. ORIGINAL SURVEY BY FREDERIC FRENCH NOV. 1794. DATE OF THIS COPY UNKNOWN.

B	SO	
C	FO/TE	LOCATED WITH SHELF 159 IN FOLDER ENTITLED "ORIGINAL DRAWINGS OF MERRIMACK RIVER POWER SURVEY". NOTE STATES ORIGINAL DRAWING FRAMED IN MR. SAFFORD'S ROOM.
C	TE	LOCATED WITH SHELF 159 IN FOLDER ENTITLED "ORIGINAL DRAWINGS OF MERRIMACK RIVER POWER SURVEY". NOTE STATES ORIGINAL DRAWING FRAMED IN MR. SAFFORD'S ROOM.
C	SO	LOCATED WITH SHELF 159 IN FOLDER ENTITLED "ORIGINAL DRAWINGS OF MERRIMACK RIVER POWER SURVEY".
B	SO/FX	

B SO/FX [...] CONN. (1893-1904) PAGE 123. NEW HAVEN, CONN. (1894-1903) (1905). PAGE 126.]

B SO

B FX/SO

B FX/SO

B	FX/SO
B	FX/SO
B	SO/FX
B	TE/FX/SO/ FO
B	FX/SO

B	FX/SO/TE	
B	TE/FO	
C	TE/FO	
D		SHELF NUMBER 166 CROSSED OUT ON L. & C. CARD INDEX CARD & REPLACED WITH SHELF NUMBER C-121. 13 SHEETS. FOUND FOLDER IN 166-ENV. 021.
D		SHELF NUMBER 166 CROSSED OUT ON L. & C. CARD INDEX CARD & REPLACED WITH SHELF NUMBER C-121. FOUND IN FOLDER 166-ENV. 021.
A		CONSECUTIVE INDEX OF DRAWINGS NOTES "SEE C-121". NOT LISTED IN UMASS LOWELL/ CENTER FOR LOWELL HISTORY CARD CATALOGUE.
D		NOT FOUND IN P.L.& C. CARD INDEX. RECORD PRODUCED FROM UMLCLh CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L.& C. MODEL CONSECUTIVE INDEX OF DRAWINGS NOTES "SEE C-121".

D		SHELF NUMBER 166 CROSSED OUT ON L. & C. CARD INDEX CARD & REPLACED WITH SHELF NUMBER C-121. FOUND IN FOLDER 166-ENV. 021. PLAN NUMBER USED TWICE IN L.& C. CARD INDEX.
C	TE/FO/HO	BEARS JULY 20-AUG.14, 1908 IN COLORED PENCIL RECTO. SEE ALSO 166-017-A. PLAN NUMBER USED TWICE IN L.& C. CARD INDEX.
C	TE/FO	SEE ALSO 166-[017].
D		SHELF NUMBER 166 CROSSED OUT ON L. & C. CARD INDEX CARD & REPLACED WITH SHELF NUMBER C-121. FOUND IN FOLDER 166-ENV. 021.
D		SHELF NUMBER 166 CROSSED OUT ON L. & C. CARD INDEX CARD & REPLACED WITH SHELF NUMBER C-121. FOUND IN FOLDER 166-ENV. 021. CONSECUTIVE INDEX NOTES "IN C-121".
B	TE/LM/LI/ HO	
D		FOUND IN FOLDER 166-ENV. 021. CONSECUTIVE INDEX NOTES "SEE C-121".
D		ENVELOPE CONTAINING GRAPHS. RAINFALL FOR VARIOUS CITIES IN NEW ENGLAND. CONTAINS 166-013, -014, -017, -018, -019 AND -021. PLAN NUMBER NOT FOUND IN L. & C, CARD INDEX. RECORD PRODUCED FROM UMLCLH CARD CAT ENTRY. INDEX HEADING BY LNHP STAFF FROM L. & C.
A		

B	FO/SO	GRAPH SHOWS ANNUAL PRECIPITATION AS MEASURED AT PAWTUCKET DAM, & AVERAGE PRECIPITATION FOR EACH MONTH OF THE YEAR FOR PERIOD 1855 TO 1922 INCLUSIVE.
C	SO/TE	FOUND AMONG SHELF 162 PLANS AT TIME OF INVENTORY, SUBSEQUENTLY REHOUSED WITH SHELF 166 PLANS . A BLUEPRINT OF 166-023 BUT WITH ADDITIONAL DATA COVERING THE PERIOD 1923-1929.
A		
A		
B	SO	LOCATED IN FOLDER 166-024. DATA RELATIVE ONLY FROM YEARS 1888 TO 1932.
B	FO/SO/TE	LOCATED IN FOLDER 166-024. DATA RELATIVE ONLY FROM YEARS 1888 TO 1932.
B	TE/LI/SO	PLAN NUMBER USED TWICE BY L. & C.
B	CL	BEARS NO. 45, RECTO.

B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26, ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE.
B	SO	
B	SO	NOTES: REPORT OF THE COMMITTEE ON RUN-OFF JANUARY 1,1937.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. PRECIP., 50 YEARS 1886-1935. REPORT OF THE COMM. ON RUN-OFF JAN.1,1937.

B	SO	LOCATED IN FOLDER ENTITLED SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R.& RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIV. ENGRS. SEE SLIDE 154 ENV. BEARS PRECIPITATION, 25 YEARS 1911-1935. BEARS REPORT OF THE COMM. ON RUN-OFF JAN.1,1937.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUNOFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS 1925 PRECIPITATION. BEARS REPORT OF THE COMMITTEE ON RUN-OFF JAN 1,1937.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS PRECIP. FOR YEARS 1902-1935. ADDITIONAL SHEET ATTACHED RECTO.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO. 18 IN GRAPHITE RECTO.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE. BEARS NO.51 IN GRAPHITE RECTO.
C	FO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE. BEARS NO.52 IN GRAPHITE RECTO.

B	FO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.79 IN GRAPHITE RECTO.
B	FO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.53 IN GRAPHITE RECTO. DATA RELATIVE TO DATES 1900 TO 1935.
B	FO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.54 IN GRAPHITE RECTO. DATA RELATIVE TO DATES 1900 TO 1935.
C	FO	LOCATED IN FOLDER ENTITLED: SHELF 166-NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. DATA RELATIVE TO DATES 1900 TO 1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.5 IN GRAPHITE RECTO. DATA RELATIVE TO DATES 1900 TO 1935.
B	FO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.57 IN GRAPHITE RECTO. DATES RELATIVE TO 1902 TO 1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE. BEARS NO.33 IN GRAPHITE RECTO. DATA REALATIVE TO 1835 TO 1935. 2 PG. DOCUMENT.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO. 50 IN GRAPHITE RECTO.

B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.13 IN GRAPHITE RECTO. 2 PG. DOCUMENT. DATA REALTIVE TO DATES 1835 TO 1935.
B	CL/FX	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.14 & 33 IN GRAPHITE RECTO. 2 PG. DOC. DATA RELATIVE TO DATES 1835 TO 1935.
B	CL/FO	LOCATED IN FOLDER ENTITLED: SHELF 166 NBO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUNOFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.15 & 33 IN GRAPHITE RECTO. 2 PG. DOC. DATA RELATIVE TO DATES 1835 TO 1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.29 IN GRAPHITE RECTO.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.30 IN GRAPHITE RECTO.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.31 IN GRAPHITE RECTO.

B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.28 IN GRAPHITE RECTO.
B	CL	BEARS NO. 24 IN GRAPHITE, RECTO.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUNOFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.23 IN GRAPHITE RECTO.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.25 IN GRAPHITE RECTO.

B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUNOFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.26 IN GRAPHITE RECTO.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO. 26 IN GRAPHITE RECTO.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO. 26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.22 IN GRAPHITE RECTO.
B	CL	BEARS NO. 21, RECTO. LOCATED IN FOLDER ENTITLED SHELF 166 NO. 26 ORIGINAL PLANS AND DIAGRAMS FOR REPORT ON RAILROAD AND RUN-OFF IN NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE. MATCHES RECORD IN CONSECUTIVE INDEX.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS NO.2 IN GRAPHITE RECTO. DATA REALATIVE TO YEARS 1897-1935.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.46 IN GRAPHITE RECTO. DATA RELATIVE TO YEARS 1920-35.

B	CL	LOCATED IN FOLDER ENTILED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUNOFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE. BEARS NO. 33 IN GRAPHITE RECTO.
B	CL/FO	BEARS NO. 60, RECTO. MATCHES RECORD IN CONSECUTIVE INDEX.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.19 IN GRAPHITE RECTO.
B	TE/SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS NO.49 IN GRAPHITE RECTO.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV.BEARS NO.3 IN GRAPHITE RECTO.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON RAILROAD & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL EGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS IN COSEC. ORDER TO 164-026-51. DATA RELATIVE TO 1876 TO 1940.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUNOFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-26-51. DATA RELATIVE TO YEARS 1876-1940.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA REL.TO YEARS 1871 TO 1935.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.

B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN COSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 164 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO 1876 TO 1935.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.

B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOCIETY OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS 165-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166-026 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	CL	LOCATED IN FOLDER ENTITLED: 164 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.

B	TE/SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. CLIPPED TOGETHER WITH PLAN NOS. IN CONSEC. ORDER TO 164-026-51. DATA RELATIVE TO YEARS 1876-1935.
B	SO/TE	BEARS WATERMARK: MOUNT TOM SUPERFINE U.S.A.
B	SO/TE	BEARS NO. 37.1.
B	CL	NOTE READS: BASED MAINLY OF RECORDS COVERING A PERIOD OF 40 YEARS. LOCATED IN FOLDER ENTITLED SHELF 166 NO. 26 ORIGINAL PLANS AND DIAGRAMS FOR REOPT RAILROAD AND RUN-OFF OF NEW ENGLAND 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENVELOPE.
B	CL	UNDATED BUT DATA RELATES TO PERIOD MAR. 9-12, 1936. BEARS WORDS: PRECIPITATION RECORDS" AND NO. 43 AT TOP OF SHEET.
B	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOCIETY OF CIVIL ENGINEERS. SEE SLIDE 154 ENV. BEARS "PRECIPITATION RECORDS" & NO.41 AT TOP OF PLAN. DATA RELATIVE TO MARCH 16-19,1936.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOCIETY OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS "SNOW" & NO.53 AT TOP OF PLAN. DATA RELATIVE TO MARCH 9,1936.

B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIGINAL PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. BEARS "PRECIPITATION RECORDS" & NO.41 AT TOP OF PLAN. DATA RELATIVE TO MARCH 9-22,1936.
B	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. REPORT OF THE COMMITTEE ON RUN-OFF JAN.1937. GIVES DATA RELATIVE TO YEARS 1890 TO 1934.
C	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R. R. & RUN-OFF OF N. E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. DATA RELATIVE TO YEARS 1920 TO 1935. BEARS NO.39 IN GRAPHITE RECTO.
C	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. DATA RELATIVE TO YEARS 1920 TO 1935. BEARS NO.40 IN GRAPHITE RECTO.
C	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. DATA RELATIVE TO YEARS 1920 TO 1935. BEARS NO.41 IN GRAPHITE RECTO.
C	CL	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. DATA RELATIVE TO YEARS 1920 TO 1935. BEARS NO.42 IN GRAPHITE RECTO.
C	SO	LOCATED IN FOLDER ENTITLED: SHELF 166 NO.26 ORIG. PLANS & DIAGRAMS FOR REPORT ON R.R. & RUN-OFF OF N.E. 1939. BOSTON SOC. OF CIVIL ENGRS. SEE SLIDE 154 ENV. DATA RELATIVE TO YEARS 1920 TO 1935. BEARS NO.42 IN GRAPHITE RECTO.
D		PLAN NUMBER ENTERED AS C-105-402 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-403 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-405 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-406 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-410 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. PLAN COPIED 24 FEBRUARY, 1857.

D PLAN NUMBER ENTERED AS C-105-413 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS JANUARY, 1857 IN L. & C. CARD INDEX. COPY TO MARCH 23, 1857.

D PLAN NUMBER ENTERED AS C-105-415 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 10 APRIL, 1857.

D PLAN NUMBER ENTERED AS C-105-416 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 24 MARCH, 1857.

D PLAN NUMBER ENTERED AS C-105-420 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 20 APRIL, 1857.

D PLAN NUMBER ENTERED AS C-105-422 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 14 AMY, 1857.

D PLAN NUMBER ENTERED AS C-105-426 IN L. & C. CARD INDEX. DATED ENTERED AS JULY, 1857 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 19 JUNE, 1857.

D PLAN NUMBER ENTERED AS C-105-429 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 28 JULY, 1857.

D PLAN NUMBER ENTERED AS C-105-432 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED 11 OCTOBER, 1856.

D PLAN NUMBER ENTERED AS C-105-434 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-437 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-438 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.

D	PLAN NUMBER ENTERED AS C-105-442 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C.105-447 IN L. & C. CARD INDEX. COPY AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-448 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-450 IN L. & C. CARD INDEX. COPY AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-452 IN L. & C. CARD INDEX. DATE ENTERED AS AUGUST, 1853 IN L. & C. CARD INDEX.
D	PLAN NUMBER ENTERED AS C-105-454 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS AUGUST, 1853 IN L. & C. CARD INDEX. SIGNED BY JAMES B. FRANCIS.
D	PLAN NUMBER ENTERED AS C-105-461 IN l. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS JANUARY, 1856 IN L. & C. CARD INDEX.

D	PLAN NUMBER ENTERED AS C-105-462 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-465 IN L. & C. CARD INDEX. AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-466 IN l. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN P.L.& C. CARD INDEX. LOCATED IN P.L.& C. CONSECUTIVE INDEX RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER ENTERED AS C-105-471 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-472 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

A	PLAN NUMBER ENTERED AS C-105-473 IN CONSECUTIVE INDEX OF DRAWINGS. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
D	PLAN NUMBER ENTERED AS C-105-474 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-477 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	SEE ALSO PLAN NOS. C-105-084 TO 088. PLAN NUMBER ENTERED AS C-105-483 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1857 IN L. & C. CARD INDEX. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L.& C. MODEL. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L.& C. MODEL. GRAPH ON GRAPH PAPER.

D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL. GRAPH ON PAPER. INITIALLED "J.B.F." SEE ALSO 105-487 & 488.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L.& C. MODEL. GRAPH ON PAPER. INITIALLED "J.B.F." SEE ALSO 105-486 & 488
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L.& C. MODEL. GRAPH ON PAPER. INITIALLED "J.B.F." SEE ALSO 105-486 & 487
D	PLAN NUMBER ENTERED AS C-105-489 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-490 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-105-492 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-494 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-495 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-496 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-499 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-504 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1853 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS AND AS1858 IN UMLCLH CARD CATALOGUE. .

D PLAN NUMBER ENTERED AS C-105-505 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-506 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-508 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-515 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-519 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-522 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-105-529 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-105-531 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER ENTERED AS C-105-534 IN L. & C. CARD INDEX. TABLE AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-105-525 IN L. & C. CARD INDEX. TABLE AND CONSECUTIVE INDEX OF DRAWINGS.
D	SEE ALSO PLAN NO. 106-582. PLAN NUMBER ENTERED AS C-106-581 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	SEE ALSO PLAN NO. 106-581. PLAN NUMBER ENTERED AS C-106-582 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-583 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-584 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-106-585 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-586 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-587 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-588 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-106-589 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY DATED 5 MARCH, 1857.

D PLAN NUMBER ENTERED AS C-106-590 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY DATED 26 FEBRUARY, 1857.

D PLAN NUMBER ENTERED AS C-106-591 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-592 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-593 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-594 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. THIRTEENTH COPY.

D PLAN NUMBER ENTERED AS C-106-595 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-596 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CORRECTED 8 OCTOBER, 1845.

D PLAN NUMBER ENTERED AS C-106-597 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-598 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 106-600. PLAN NUMBER ENTERED AS C-106-599 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 106-599. PLAN NUMBER ENTERED AS C-106-600 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-601 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-602 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-612 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 106-619. PLAN NUMBER ENTERED AS C-106-618 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 106-618. PLAN NUMBER ENTERED AS C-106-619 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-622 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-623 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-628 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-629 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-632 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-106-633 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-635 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SKETCH ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-106-636 IN L. & C. CARD INDEX. NOT IN CONSECUTIVE INDEX OF DRAWINGS. INITIALLED J. B. F.
D	PLAN NUMBER ENTERED AS C-106-637 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-638 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-639 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-649 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-106-651 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-651 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN P.L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-658 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-661 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY. SIGNED BY W. H. DENNES.
D	PLAN NUMBER ENTERED AS C-106-663 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-106-685 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-686 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 106-688. PLAN NUMBER ENTERED AS C-106-687 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 106-687. PLAN NUMBER ENTERED AS C-106-688 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-689 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-106-697 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. ORIGINAL DATE OF 14 JUNE WAS CORRECTED TO 11 AUGUST 1857. DATE ENTERED AS JANUARY 1857 IN L. & C. CARD INDEX.

D	PLAN NUMBER ENTERED AS C-106-698 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	PLAN NUMBER ENTERED AS C-106-700 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
D	PLAN NUMBER ENTERED AS C-106-701 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-106-702 IN L. & C. CONSECUTIVE INDEX OF DRAWINGS.
D	COPIED FROM ONE DRAWN BY J. S. BEARD. PLAN NUMBER ENTERED AS C-107-703 IN L. & C. CARD INDEX. NOT FOUND IN THE CONSECUTIVE INDEX OF DRAWINGS.

PLAN NUMBER ENTERED AS C-107-704 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF
D DRAWINGS GIVES NO DATE.

PART OF TURBINE FOR HAMILTON MFG. CO. PLAN NUMBER ENTERED AS C-107-705 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO
D DATE.

PLAN NUMBER ENTERED AS C-107-707 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF
D DRAWINGS GIVES NO DATE.

PLAN NUMBER ENTERED AS C-107-709 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF
D DRAWINGS GIVES NO DATE.

PLAN NUMBER ENTERED AS C-107-710 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF
D DRAWINGS GIVES NO DATE.

PLAN NUMBER ENTERED AS C-107-711 IN L. & C. CARD INDEX AND
D CONSECUTIVE INDEX OF DRAWINGS.

PLAN NUMBER ENTERED AS C-107-714 IN L. & C. CARD INDEX. DATE ENTERED AS MAY 1870 IN L. & C. CARD INDEX AND CONSECUTIVE
D INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-107-715 IN L. & C. CARD INDEX. DATE ENTERED AS JUNE 1870 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-719 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-721 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-722 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-723 IN L. & C. CARD INDEX. NOT FOUND IN THE CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-724 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-725 IN L. & C. CARD INDEX. DATE ENTERED AS JULY 1875 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-726 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-727 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-107-728 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATED LOWELL 23 MARCH, 1888, IN CONSECUTIVE INDEX.
D	PLAN NUMBER ENTERED AS C-107-729 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-730 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-731-(2 TO 4) IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WITH TITLE "PLAN OF PARTS OF WHEEL". SIGNED BY JAMES B. FRANCIS.
D	PLAN NUMBER C-107-731-(2 TO 4) IN L. & C. CARD INDEX, WITH TITLE "PLANS OF PARTS OF WHEEL", MAY REFER TO THIS PLAN . SIGNED BY JAMES B. FRANCIS. ALSO LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-734 IN L. & C. CARD INDEX. PLAN NUMBER C-107-731-(2 TO 4) IN L. & C. CARD INDEX, WITH TITLE "PLANS OF PARTS OF WHEEL", MAY REFER TO THIS PLAN. ALSO LISED IN CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-735 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-737 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-740 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-741 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-744 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-743 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-745 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-748 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-757 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-762 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-764 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-765 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-767 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS JAN 1851 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-770 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS JAN 1851 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-107-773 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-778 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-782 IN L. & C. CARD INDEX.
D	PLAN NUMBER ENTERED AS C-107-787 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-789 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-107-792 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-793 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.

D PLAN NUMBER ENTERED AS C-107-796 IN L. & C. CARD INDEX. NOT IN CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-798 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-799 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-800 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-802 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-803 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPIED FROM A PLAN BELONGING TO THE HAMILTON MANUFACTURING COMPANY.

D PLAN NUMBER ENTERED AS C-107-804 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. "BY J. FRANCIS" PENCILLED IN.

D PLAN NUMBER ENTERED AS C-107-805 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-107-806 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L..& C. MODEL.
D	PLAN NUMBER ENTERED AS C-108-810 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-811 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-810 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 28 SEPTEMBER, 1846 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-186 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	PLAN NUMBER ENTERED AS C-108-820 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE. SEE C-108-821. L. & C. RECORDS MAY HAVE CONFLATED PLANS C-108-821 AND C-108-821.
D	PLAN NUMBER ENTERED AS C-108-821 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS BUT WITH NO TITLE ENTRY. SEE C-108-820. L. & C. RECORDS MAY HAVE CONFLATED PLANS C-108-821 AND C-108-821.

	PLAN NUMBER ENTERED AS C-108-827 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.
D	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	PLAN NUMBER ENTERED AS C-108-828 IN L. & C. CARD INDE AND CONSECUTIVE INDEX OF DRAWINGS.. GRAPH ON GRAPH PAPER.
D	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	PLAN NUMBER ENTERED AS C-108-829 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.
D	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	PLAN NUMBER ENTERED AS C-108-830 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.
D	DATE ENTERED IN L. & C. CARD INDEX BUT NOT ON DOCUMENT.
	PLAN NUMBER ENTERED AS C-108-831 IN L. & C. CARD INDEX AND
D	CONSECUTIVE INDEX OF DRAWINGS.
	PLAN NUMBER ENTERED AS C-108-833 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1846 IN L. &
D	C. CARD INDEX. AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-836 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-837 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-838 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-839 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1854 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-840 IN L. & C. CARD INDEX. GRAPH AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-845 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-848 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-108-852 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 16 JAUNARY, 1855 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-861 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-862 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE GIVEN AS 29 JULY, 1855 IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-866 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-868 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-872 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-873 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH.

D	PLAN NUMBER ENTERED AS C-108-875 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH.
D	PLAN NUMBER ENTERED AS C-108-876 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH.
D	PLAN NUMBER ENTERED AS C-108-878 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX .AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.
A	PLAN NUMBER ENTERED AS C-108-878 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
D	PLAN NUMBER ENTERED AS C-108-880 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-108-881 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-108-882 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH ON GRAPH PAPER.

D	PLAN NUMBER ENTERED AS C-108-883 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.
A	PLAN NUMBER ENTERED AS C-108-884 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
D	PLAN NUMBER ENTERED AS C-108-885 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-108-886 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH.
A	PLAN NUMBER ENTERED AS C-108-887 IN L. & C. CARD INDEX. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-108-888 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. NO DATE GIVEN ON DOCUMENT. GRAPH ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-889 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-890 IN L. & C. CARD INDEX. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-891 IN L. & C. CARD INDEX. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. GRAPH.

D PLAN NUMBER ENTERED AS C-108-892 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-893 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. GRAPH ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-894 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-895 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-896 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER.

D PLAN NUMBER ENTERED AS C-108-897 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER. SEE ALSO 108-898 AND 108-899.

D PLAN NUMBER ENTERED AS C-108-898 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER. SEE ALSO 108-897 AND 108-899.

D PLAN NUMBER ENTERED AS C-108-899 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1856/57 IN L. & C. CARD INDEX. ON GRAPH PAPER. SEE ALSO 108-897 AND 108-898.

D PLAN NUMBER ENTERED AS C-108-902 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-108-908 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-108-909 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-108-910 IN L. &. C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-911 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-912 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-914 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-916 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-917 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-927 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-929 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-109-930 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-109-931 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-109-932 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-109-933 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-109-934 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS APRIL 1851 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-109-935 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1842-1845. DATE MUST BE 1845 OR LATER.

D PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE 1842-1845. PROBABLE DATE 1844.

D PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED

D PLAN NUMBER ENTERED AS C-109-937 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-938 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.

D SEE ALSO PLAN NO. 109-940. PLAN NUMBER ENTERED AS C-109-939 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 109-939. PLAN NUMBER ENTERED AS C-109-940 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.

D PLAN NUMBER ENTERED AS C-109-942 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-947 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-949 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-950 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.

D PLAN NUMBER ENTERED AS C-109-951 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED JMAES B. FRANCIS. "THIS WORK TO BE CHARGED TO THE LOCKS AND CANALS."]

D PLAN NUMBER ENTERED AS C-109-952 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.. SIGNED BY JAMES B. FRANCIS.

D	PLAN NUMBER ENTERED AS C-109-956 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.
D	PLAN NUMBER ENTERED AS C-109-957 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-109-960 IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-109-964 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-109-965 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-109-971 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. BY U. A. BOYDEN. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-109-978 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-980 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-981 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-982 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-983 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-984 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. PLAN NUMBER C-109-934 DOES NOT APPEAR IN UMLCL CARD CATALOGUE. THE DRAWING ITSELF BEARS THE NUMBER 109-983. CHART.

D PLAN NUMBER ENTERED AS C-109-985 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-986 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-987 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-988 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART.

D PLAN NUMBER ENTERED AS C-109-988 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART.

D PLAN NUMBER ENTERED AS C-109-989 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.TABLE. GIVEN IN JAMES B. FRANCIS WASTE BOOK NO. 12, OCT. 29, 1870.

D PLAN NUMBER ENTERED AS C-109-990 IN L. & C. CARD INDEX. DATE ENTERED AS APRIL, 1870, IN L. & C. CARD INDEX AND 1870 IN CONSECUTIVE INDEX OF DRAWINGS.TABLE.

D PLAN NUMBER ENTERED AS C-109-991 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-109-992 IN L. & C. CARD INDEX. CHART AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-109-993 IN L. & C. CARD INDEX. DATE ENTERED AS MAY 1871 IN L. & C. CARD INDEX. GRAPH ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-109-994 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART.
D	PLAN NUMBER ENTERED AS C-109-995 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART.
D	PLAN NUMBER ENTERED AS C-109-996 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART.
D	PLAN NUMBER ENTERED AS C-110-2001 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2002 IN L. & C. CARD INDEX. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. MAP ON "ONIONSKIN". ALSO BEARS NO. 3472 CROSSED OUT.

D	PLAN NUMBER ENTERED AS C-110-2005 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2015 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2021 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2024 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2025 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2026 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2028 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS MAY 1850 IN L. &. C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2029 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2032 IN L. & C. CARD INDEX NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. WRITING BY U. A. BOYDEN.

D PLAN NUMBER ENTERED AS C-110-2033 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-110-2034 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-110-2035 IN L. & C. CARD INDEX. SEE ALSO PLAN NUMBER 110-2034. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-110-2036 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-110-2037 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-110-2038 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2039 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CHART. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-110-2040 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D	PLAN NUMBER ENTERED AS C-110-2041 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-110-2045 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2046 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2047 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2947 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON L. & C. MODEL.
D	PLAN NUMBER ENTERED AS C-110-2048 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2049 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2050 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2052 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2057 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE AS "ABOUT 1848".

D PLAN NUMBER ENTERED AS C-110-2059 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2063 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2068 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2073 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2093-(1 & 2) IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. UMLCLH TITLE CONT...MILL IN DORCHESTER, 1850. EXPERIMENTS UPON THE TREMONT TURBINE, 1851.]

PLAN NUMBER ENTERED AS C-110-2983-(1 & 2) IN L. & C. CARD INDEX. UMLCLH TITLE CONT...EXPERIMENTS UPON A TURBINE AT TILESTON AND HOLLINGSWORTH UPPER MILL AT DORCHESTER, MASS. IN MAY 1850, WITH THOSE FROM EXPERIMENTS UPON
D TREMONT TURBINE, IN FEB. 1851.]

PLAN NUMBER ENTERED AS C-110-2096 IN L. & C. CARD INDEX AND CONSECIVE INDEX OF DRAWINGS. DATE ENTERED AS NOVEMBER 1857 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF
D DRAWINGS.

PLAN NUMBER ENTERED AS C-110-2097 IN L. & C. CARD INDEX AND
D CONSECUTIVE INDEX OF DRAWINGS.

PLAN NUMBER ENTERED AS C-110-2098 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS AND CONSECUTIVE INDEX OF
D DRAWINGS. DATE ENTERED AS 1856 IN L. & C. CARD INDEX. GRAPH.

PLAN NUMBER ENTERED AS C-110-2099 IN L. & C. CARD INDEX AND
D CONSECUTIVE INDEX OF DRAWINGS. GRAPH.

D PLAN NUMBER ENTERED AS C-110-2100 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. THIS IS PROBABLY THE COPY REFERRED TO IN THE TITLE. THE TESTING DATE NOTED IN THE TITLE IS MORE LIKELY AN APPENDED NOTE THAN THE CREATION DATE FOR THE PLAN. GRAPH.

D PLAN NUMBER ENTERED AS C-110-2100 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2101 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 9 OCTOBER 1866 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-110-2102 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. TABLE.

D	PLAN NUMBER ENTERED AS C-110-2103 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-110-2104 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. TABLE.
D	PLAN NUMBER ENTERED AS C-110-2105 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. 16 PAGES WITH ILLUSTRATIONS AND TABLES.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.. RECORD PRODUCED FROM UMLCLH CARD CCATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL. GRAPH.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.

D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.
D	PLAN NUMBER ENTERED AS C-111-2108 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SEE ALSO PLAN NO. 111-2109. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-111-2109 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SEE ALSO PLAN NO. 111-2108.
D	PLAN NUMBER ENTERED AS C-111-2111 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-111-2112 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. "NOT TITLED BUT PROBABLY A PLAN OF PENSTOCKS, WHEEL PITS AND RACES OF LAWRENCE MFG. CO." AS PER CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-111-2113 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-111-2114 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2116 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-111-2117-1 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2117-4 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1845.
D	PLAN NUMBER ENTERED AS C-111-2117-5 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2124 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2125 IN L. & C. CARD INDEX. TITLE PENCILLED IN. NOT IN CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-111-2126 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. ATTRIBUTION TO JAMES B. FRANCIS COMES FROM L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2127 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS. UMLCLH CATALOGUE CARD NOTES "6 PIECES" BUT MEANING OF NOTE IS UNCLEAR.
D	PLAN NUMBER ENTERED AS C-111-2129 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2136 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.
D	PLAN NUMBER ENTERED AS C-111-2151 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2152 IN L. & C. CARD INDEX. COPY AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2153 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2158 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2161 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2162 IN L. & C. CARD INDEX. COPY AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2166 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2168 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2170 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED T. P. PEMBERTON, DEL.

D PLAN NUMBER ENTERED AS C-111 2182 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2192 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE OF ORIGINAL PLAN WAS 12 SEPTEMBER, 1854. THIS PLAN WAS COPIED BY T. P. PEMBERTON ON 12 OCTOBER, 1854.

D PLAN NUMBER ENTERED AS C-111-2194 IN L. & C. CARD INDEX. COPY AND CONSECUTIVE INDEX OF DRAWINGS. INITIALLED T.P.P.

D PLAN NUMBER ENTERED AS C-111-2202 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2203 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT SHOWN IN CONSECUTIVE INDEX OF DRAWINGS. DATED 1854 IN CONSECUTIVE INDEX OF DRAWINGS. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPS. OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER ENTERED AS C-111-2210 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERDD AS C-111-2211 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-111-2112 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS BOTH 1854 AND AS FEBRUARY 1855 ON SEPARATE CARD ENTRIES IN L. & C. CARD INDEX. .
D	PLAN NUMBER ENTERED AS C-111-2214 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPS. OF LOCKS AND CANALS MODEL. MAY ACTUALLY BE C-111-2206.

D PLAN NUMBER ENTERED AS C-111-2220 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY. DATE ENTERED AS FEBRUARY 1855 IN L. & C. CARD INDEX. MAY REFER TO THE DATE OF THE ORIGINAL PLAN RATHER THAN THIS COPY.

D PLAN NUMBER ENTERED AS C-111-2230 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2231 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2237 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1865 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.

D PLAN NUMBER ENTERED AS C-111-2238 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1870/1871 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2239 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1870-1871 IN CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-111-2240 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY. BUILT BY SACO-LOWELL. SEE ALSO PLAN NO. C-P.H. 026.

D PLAN NUMBER ENTERED AS C-111-2241 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-111-2242 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-112-2242 IN CONSECUTIVE INDEX OF DRAWINGS. FLOOR PLANS AND ELEVATIONS OF AN EIGHT UNIT BLOCK OF BOARDING HOUSES ON A SLOPING SITE. 4 SHEETS.
A	PLAN NUMBER ENTERED AS C-112-2243 IN L. & C. CARD INDEX. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-112-2245 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-112-2246 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-112-2248 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-112-2259 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-112-2256 IN L. & C. CARD INDEX
D	PLAN NUMBER ENTERED AS C-112-2257 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-112-2259 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2260 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SHOWS FRONT AND END ELEVATIONS OF ONE OF THE BOOTT BLOCKS OF BOARDING HOUSES ON A LEVEL SITE.

D PLAN NUMBER ENTERED AS C-112-2266 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2270 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SECTION SHOWS WEST END WALL OF THE #5 MILL AS ORIGINALLY BUILT AND ONE OF ITS TWO RIVETTED SHEET METAL RACEWAYS.

D PLAN NUMBER ENTERED AS C-112-2275 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2281 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2283 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2284 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SHEET 1 OF 2. SEE C-112-2285.

D PLAN NUMBER ENTERED AS C-112-2285 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SHEET 2 OF 2. SEE C-112-2284.

D PLAN NUMBER ENTERED AS C-112-2286 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2318 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2346 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-112-2350 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 8 AUGUST, 1848 IN L. & C. CARD INDEX.
D	PLAN NUMBER ENTERED AS C-112-2355 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. ATTRIBUTION TO JAMES B. FRANCIS MADE IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-112-2356 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES B. FRANCIS.
D	PLAN NUMBER ENTERED AS C-112-2361 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-112-2372 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 23NOV/14DEC 1848 AND ATTRIBUTION TO JAMES B. FRANCIS MADE IN L. & C. CARD INDEX AND CONSEC. INDEX OF DRAWINGS. SEE ALSO C-112-2373 THRU C-112-2380.
A	SEE ALSO 112-2372, 112-2380 AND C-112-2374 THROUGH C-112-2379. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELLL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
A	SEE ALSO 112-2372, 112-2380, C-112-2373 AND C-112-2375 THROUGH C-112-2379. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
A	SEE ALSO 112-2373, 112-2380, C-112-2373, C-112-2374 AND C-112-2376 THROUGH C-112-2379. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
A	SEE ALSO 112-2372, 112-2380, C-112-2373 THROUGH C-112-2375 AND C-112-2377 THROUGH C-112-2379. NOT LISTED IN UMASS LOWELL/ CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
A	SEE ALSO 112-2372, 112-2380, C-112-2373 THROUGH C-112-2376, C-112-2378 AND C-112-2379. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.

A	SEE ALSO 112-2372, 112-2380, C-112-2373 THROUGH C-112-2377 AND C-112-2379. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
A	SEE ALSO 112-2372, 112-2380 AND C-112-2373 THROUGH C-112-2378. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-112-2380 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. ATTRIBUTION TO JAMES B. FRANCIS MADE IN CONSECUTIVE INDEX OF DRAWINGS. SEE ALSO C-112-2373 THROUGH C-112-2379 AND 112-2372.
D	PLAN NUMBER ENTERED AS C-112-2387 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-112-2391 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. EXPERIMNETS MASE IN MARCH 1849. DIAGRAM ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-112-2392 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-112-2393 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2394 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2395 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-112-2396 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS DECEMBER 1849 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-112-2398 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 20 NOVEMBER, 1856 IN L. & C. CARD INDEX. SIGNED BY JAMES B. FRANCIS.

D PLAN NUMBER ENTERED AS C-112-2401 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. ALSO CONTAINS "ESTIMATE OF THE WEIGHT AND COST OF A FIREPROOF FLOOR....".

D		PLAN NUMBER ENTERED AS C-112-2402 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
PAPER	C	SOILED, TEARS
C	TE/SO	FOUND ROLLED IN UNMARKED PIGEON HOLE.
PAPER	C	SOILED
C	SO	FOUND ROLLED IN UNMARKED PIGEON HOLE. BEARS UNDATED. WATERMARK "J. ROBESON, PHILA.." WITHOUT A DATE.
PAPER	C	TEARS, SOILED
C	TE/SO	FOUND ROLLED IN UNMARKED PIGEON HOLE. BEARS UNDATED WATERMARK "J. ROBESON, PHILA.." WITHOUT A DATE. ALTHOUGH THIS PLAN IS UNDATED, AS A MATE TO C-113-[02] AND BEARING THE SAME WATERMARK AS IT DOES, THE DATE IS VERY LIKELY JUNE, 1842.

PAPER	C	SOILED, TEARS
C	SO/TE	
A		SEE ALSO PLAN NOS. 113-2531 & 2532. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE. LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
PAPER	C	SOILED, STAINS, TEARS
C	RO/SO/ST /TE/LI	LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
D		PLAN NUMBER ENTERED AS C-113-2416 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D		PLAN NUMBER ENTERED AS C-113-2417 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-113-2418 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2419 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2420 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2421 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX. OR IN CONSECUTIVE INDEX OF DRAWINGS. MAY ACTUALLY BE C-113-2430. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.
D	PLAN NUMBER ENTERED AS C-113-2429 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE. LISTED IN CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-113-2438 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2443 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2448 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2450 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEXOR CONSECUTIVE INDEX OF DRAWINGS. MAY BE C-113-2459. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.
D	PLAN NUMBER ENTERED AS C-113-2456 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE. ENTERED AS C-113-2459 IN CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2465 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2466 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2472 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. NOTE PENCILLED IN AND INITIALLED "J. B. F.".

D PLAN NUMBER ENTERED AS C-113-2483 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2485 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2491 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY. DATE IS DATE OF COPY.

D PLAN NUMBER ENTERED AS C-113-2492 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2494 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2527 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE GIVEN AS 1856 IN CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2528 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. NOTE PENCILLED IN "PROBABLY MASSACHUSETTS C. MILLS.".

D SEE ALSO PLAN NOS. C-113-2414 & 2532. PLAN NUMBER ENTERED AS C-113-2531 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. TITLE PENCILLED IN.

D	SEE ALSO PLAN NO. C-113-2531 & 2414. PLAN NUMBER ENTERED AS C-113-2532 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. TITLE PENCILLED IN.
D	PLAN NUMBER ENTERED AS C-112-2539 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2453 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. COPY. DATE IS DATE OF COPY.
D	PLAN NUMBER ENTERED AS C-113-2545 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. TITLE PENCILLED IN.
D	PLAN NUMBER ENTERED AS C-113-2546 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2547 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-113-2553 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2573 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DIAGRAM ON GRAPH PAPER.
D	PLAN NUMBER ENTERED AS C-113-2575 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2576 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-113-2577 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	5 SHEETS. SEE C-113-3417-4, -5, -6, -8 AND -10. PLAN NUMBER LISTED AS C-113-2578 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS, WHICH NOTES IS COMPOSED OF 5 SHEETS. NOT LISTED IN UMLCLH CARD CATALOGUE.
D	PLAN NUMBER ENTERED IN L. & C. CARD INDEX, CONSECUTIVE INDEX OF DRAWINGS, AND UML CENTER FOR LOWELL HISTORY CARD CATALOGUE AS C-113-2594.

D PLAN NUMBER ENTERED AS C-113-2596 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED IN L. & C. CARD INDEX, CONSECUTIVE INDEX OF DRAWINGS, AND UML CENTER FOR LOWELL HISTORY CARD CATALOGUE AS C-113-2596.

D PLAN NUMBER ENTERED AS C-113-2603 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2609 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2611 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-113-2639 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D	PLAN NUMBER ENTERED AS C-113-2640 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED IN L. & C. CARD INDEX, CONSECUTIVE INDEX OF DRAWINGS, AND UML CENTER FOR LOWELL HISTORY CARD CATALOGUE AS C-113-2641.
D	PLAN NUMBER ENTERED IN L. & C. CARD INDEX, CONSECUTIVE INDEX OF DRAWINGS, AND UML CENTER FOR LOWELL HISTORY CARD CATALOGUE AS C-113-2642.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPS. OF LOCKS AND CANALS MODEL.MAY BE C-113-2578.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPS. OF LOCKS AND CANALS MODEL. MAY BE C-113-2578.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED UPON PROPS. OF LOCKS AND CANALS MODEL. MAY BE C-113-2578.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPS. OF LOCKS AND CANALS MODEL. MAY BE C-113-2578.
D	PLAN NUMBER NOR FOUND IN L. & C. CARD INDEX. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPS. OF LOCKS AND CANALS MODEL. MAY BE C-113-2578.

		SURVEYED AND DRAWN BY WM. E. WORTHEN. NUMBERED SECTIONS (1-15, 16-28) ARE NOT IDENTIFIED ON THE DRAWING BUT ARE IN ELLEN FLETCHER ROSEBROCK, "LOWELL HERITAGE STATE PARK: TRANSPORTATION SYSTEM" B-1 FINAL REPORT, P. ICA 168:37,
B	ST	AS EXCAVATION "STATIONS".
B	EN/FO/TE /ST	OVERSIZED PLAN.
B	FO/FX/ST	OVERSIZE PLAN.
B	FO/TE/FX/ ST	OVERSIZE PLAN.
B	FO/FX/ST/ TE	OVERSIZE PLAN.
B	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/ST/ FX/SO	OVERSIZE PLAN.
B	TE/FX/ST	ONE 8x10 B/W STUDY PRINT AND ONE 4x5 B/W NEGATIVE EXIST FOR THIS PLAN. THEY WERE CREATED IN 1996 AND ARE FILED WITH THE BOXED LNHP MODERN NEGS. AND PRINTS.
B	TE/FO/FX/ ST	OVERSIZE PLAN. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/ST/ FX	SEE ALSO PLAN NO. C-114-009.
B	FO/TE/ST/ FX	SEE ALSO PLAN NO. C-114-008. OVERSIZE PLAN.
B	CL/EN	

B	TE/ST	SEE ALSO PLAN NO. C-114-012.
B	FO/FX/ST/ TE	SEE ALSO PLAN NO C-114-011. OVERSIZE PLAN.
B	CL/EN	
B	CL	SEE ALSO PLAN NOS. C-114-015 & C-1140-016. SEVEN BOUND DRAWINGS WITH FRONT COVER. CONTAINS A "MEMORANDUM OF STONE TO BE USED ABOUT THE PIERS & ABUTMENTS OF THE NEW GUARD LOCKS" DATED DEC 15,1846, ON ONE 8" X 12" SHEET OF PAPER.
B	CL	SEE ALSO PLAN NOS. C-114-014 & C-114-016. EIGHT BOUND DRAWINGS WITH FRONT COVER.
B	CL	SEE ALSO PLAN NOS. C-114-014 & C-114-015. EIGHT BOUND DRAWINGS WITH FRONT COVER. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST/FX/TE	SEE ALSO PLAN NO. C-114-020.
B	FO/TE/ST/ FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/EN	

B	TE/ST/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/ST/FX	
B	FX/TE/ST	
B	ST	SEE ALSO PLAN NO. 114-025.
B	CL	PLAN NUMBER ENTERED AS C-114-25 IN L. & C. CARD INDEX. DATE ENTERED AS 13 JUNE 1871 IN L. & C. CARD INDEX. SEE ALSO PLAN NO. C-114-024.
B	CL/EN	SEE ALSO PLAN NO. C-114-027. BEARS WATERMARK READING "J. WHITMAN TURKEY MILL 1863". CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	ONE OF COURSES OF ABUTMENTS TO PAWTUCKET BRIDGE NEAR GATE HOUSE. SEE ALSO PLAN NO. C-114-026. TWO SIDED DRAWING.
B	TE/ST	
B	ST	
B	CL	BEARS NOTE "THIS PLAN WAS ABANDONED F. F.". CONSISTS OF SIX BOUND DRAWINGS WITH FRONT COVER.
B	CL/EN	INITIALLED P.W.P.
B	SO/FX	

B	CL/EN	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/EN	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/EN	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/EN	
B	CL	FOUR BOUND DRAWINGS WITH FRONT COVER READING "FOR OFFICE".
B	CL	SEE ALSO PLAN NOS. C-114-039, & C-114-040. TEN BOUND DRAWINGS BOUND WITH PAPER COVER, LACKING BACK. BEARS NOTE "UPPER END OFFICE COPY".
B	CL/EN	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	SEE ALSO PLAN NOS. C-114-038, & C-114-039. FOUR BOUND DRAWINGS, MAY BE OFFICE COPIES.
B	CL/EN	
B	FO/FX/ST/SO	2 SIDED DRAWING: 42-[A] & 42-[B]. SEE ALSO PLAN NO. C-114-043. PLAN NUMBER ENTERED AS C-114-42 IN L. & C. CARD INDEX AND IN CONSECUTIVE INDEX OF DRAWINGS.
C	FO/FX/ST	2 SIDED DRAWING: 114-042-[A] & [B]. NOT LISTED L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.

B	ST/FX	SEE ALSO PLAN NO. 114-042.
B	TE/FX/ST	2 SIDED DRAWING 45-[A] & 45-[B]. BOTH SHOWING PLAN OF STONE FOR GUARD GATES. NOT LISTED IN P. L. & C. CARD INDEX OR
C	TE/ST	CONSECUTIVE INDEX OF DRAWINGS.
C	TE/ST	2 SIDED DRAWING: 114-045-[A] & [B]. BOTH SHOW PLAN OF STONE FOR GUARD GATES. TITLE IS CROSSED OUT ON PLAN. NOT LISTED IN P. L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	CL/EN	APPEARS TO BE A MITRE SILL FOR A BOAT LOCK. PENCIL SKETCH, VERSO.
B	CL/EN	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/FX/SO/ ST	OVERSIZED PLAN. PLAN NUMBER ENTERED AS C-114-048 IN L. & C. CARD INDEX. PLAN DATE GIVEN AS 1 MAY 1847 IN L. & C. CARD INDEX.
B	FO/FX/ST	SEE ALSO PLAN NO. C-114-048. OVERSIZE PLAN.
B	TE/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/FX/ST/ SO	SEE ALSO PLAN NO. C-114-053.
B	TE/FX/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/ST	SEE ALSO PLAN NO. C-114-051. DATE ESTIMATED AT 1846-47. AS PER A. CHAMBERLAIN, CURATOR. OVERSIZE PLAN.

B	SO	BOUND WITH C-114-054.
C	SO	COPY NOT LISTED IN INDEX OF CONSECUTIVE DRAWINGS.
C	SO	COPY NOT LISTED IN INDEX OF CONSECUTIVE DRAWINGS.
C	SO	COPY NOT LISTED IN INDEX OF CONSECUTIVE DRAWINGS.
B	SO	BOUND WITH PLAN NO. C-114-054-[A].
B	CL	
B	SO/FO/TE	BEARS NOTE DATED OCT. 11, 1915.

B	FO/ST/TE	OVERSIZE PLAN. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST/SO/EN	OVERSIZE PLAN.
B	CL/EN	
B	CL/EN	SEE ALSO PLAN NO. C-114-059. BEARS NOTE "HOUSE AT PAW[TUCKET] DAM".
B	CL/EN	SEE ALSO PLAN NO. C-114-058.
B	CL/EN	SCALE GIVEN AS "50 & 5", MAY BE HORIZ. 1"=50', VERT. 1"=5'.
B	CL	OVERSIZE PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	LISTED IN P. L. & C. CARD INDEX BUT NOT IN INDEX OF CONSECUTIVE DRAWINGS. BEARS NUMBER 3367 STAMPED VERSO.

B	CL/TE/ST	OVERSIZE PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. SEE ALSO PLAN NOS. C-115-063 & C-115-064.
B	CL/FO/ST	OVERSIZE PLAN. SEE ALSO PLAN NOS. C-115-062 & C-115-064
B	CL/EN/FO /SO	OVERSIZE PLAN. 2 SIDED PLAN. ONE SIDE GIVES VARIOUS PLAN VIEWS & SECTIONS OF UNSPECIFIED RIVER WALL. THE OTHER SIDE SHOWS PLAN VIEW & ELEVATIONS OF WALL. SEE ALSO PLAN NOS. C-115-062 & C-115-063. CONSECUTIVE INDEX OF DRAWINGS NOTES "NO DATE".
B	SO	OVERSIZE PLAN. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FX/SO/TE	NOTE STATES COPY OF MARCH 1847. BEARS "1ST COURSE & PAVING."

B	SO	BEARS "2ND COURSE 17 INCHES RISE." TITLE TAKEN FROM TITLE OF FIRST COURSE PLAN.
B	SO	BEARS "3RD COURSE 19 INCHES RISE." TITLE TAKEN FROM TITLE OF FIRST COURSE PLAN.
B	FX/SO	BEARS "4TH COURSE PART 18 INCHES RISE & PART 24 INCHES RISE." TITLE TAKEN FROM TITLE OF FIRST COURSE PLAN.
B	SO	BEARS: 5TH COURSE, ASHLAR WORK 18 INCH RISE, WITH LINTELS. FROM 18 TO 24 IN RISE. TITLE TAKEN FROM TITLE OF FIRST COURSE PLAN.
B	ST	OVERSIZE PLAN.
B	FX/SO	SHOWS ELEVATION OF ABUTMENT WITH LINE OF TOP OF WEIRS, ELEVATION OF QUOINS ON RIVER SIDE WITH PART OF WEIR & PLAN OF CAPPING OF ABUTMENTS.
B	SO	TITLE TAKEN FROM CONSECUTIVE INDEX OF DRAWINGS.
B	CL	
B	EN/FO	2 SIDED DRAWING. ONE SIDE SHOWS VIEWS OF 1-6 COURSES. THE OTHER SIDE SHOWS PLAN & CROSS SECTION OF RIVER WALL. OVERSIZE PLAN. TITLE TAKEN FROM TILE OF FIRST COURSE PLAN.
B	EN/FO/SO	OVERSIZE PLAN. LOCKS AND CANALS PLANS INDEX GIVES DATE 0F 1890.

B	TE/CL/EN	OVERSIZE PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FX/SO	BEARS NOTE: "4 PIECES WANTED."
B	FX/SO	NOTE READS: THE DIMENSIONS HERE WRITTEN WERE TAKEN BY JAMES B. FRANCIS WHEN THE WHEEL WAS PUT IN. L.& C. CARD INDEX AND MASTER LIST REFER TO PLANS A AND B. BEARS NO. 3395, VERSO.
B	CL	L.& C. CARD INDEX AND MASTER LIST REFER TO PLANS 115-75 A AND B.
B	FO/SO/FX	BEARS NO. 3395 CROSSED OUT, VERSO. OVERSIZE PLAN.
B	SO/MO	
C	SO	COPY NOT P. L. & C, CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. TITLE TAKEN FROM PLAN NO. C-115-077.
B	SO/FO/ST	
B	SO	
B	FX/SO	OVERSIZE PLAN. TITLE TAKEN FROM CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
B	FX/SO/FO	OVERSIZE PLAN.

B	FO	OVERSIZE PLAN. TITLE TAKEN FROM CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
B	SO/FO/TE	
B	SO/FO/TE	BEARS NO. 52, VERSO.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	NOTE STATES THE SECTIONS SOUTH OF THE BRIDGE ARE MEASURED FROM THE STRINGER OF THE SAME. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	EN	SIGNED "GEO. O. BUSSEY" LOWER RIGHT.

B	FX	
B	SO	
B	SO/FX	
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 20, 1846, FOR THE ENTIRE SERIES.
B	SO/FX	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 20, 1846, FOR THE ENTIRE SERIES.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 20, 1846, FOR THE ENTIRE SERIES.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 20, 1846, FOR THE ENTIRE SERIES.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY 20, 1846, FOR THE ENTIRE SERIES.

B	SO/FX	
B	SO/FX	
B	CL	UNTITLED PLAN SHOWING SECTION OF GREAT RIVER WALL OF NORTHERN CANAL WITH RANDOM NOTES.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FX	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	EN	OVERSIZE PLAN. PLAN IS IN 4 SECTIONS. EACH SECTION IS ENCAPSULATED & MEASURES 26.7 CM x 100.3 CM. MULTIPLIED BY 4 WOULD BE DIMENSIONS OF PLAN IN ITS ENTIRETY.
B	FO/SO	OVERSIZE PLAN.
B	FX/SO	OVERSIZE PLAN. CONSECUTIVE INDEX OF DRAWINGS NOTES "NOT DATED".
B	FX/ST/EN	

B	FO/SO	OVERSIZE PLAN.
B	FO/SO/FX	OVERSIZE PLAN.
B	SO/FO/MO	
B	SO	
B	SO/MO/FO	
B	SO/MO/FO	BEARS REPAIR NOTES DATED FROM JUNE 28, 1936 TO SEPT.11, 1936. FOUND IN FOLDER 140. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE 28, 1936.

B	SO/FO/MO	
B	SO	
B	SO/FO	BLUEPRINT FROM H. E. FLETCHER CO.
B	SO	BLUEPRINT FROM H. E. FLETCHER CO.
B	SO/FO/TE	
B	SO/MO	
B	SO/MO	

B	SO/MO	
B	CL	OVERSIZE PLAN. SCALES ARE NOTED AS FOLLOWS: 1"=40',8',20',1"=16'HORIZ. & 1"=4'VERT.
B	FX	
B	ST/LM	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/LI	
B	CL	
B	CL	

B	CL	OVERSIZE PLAN.
C	CL/LM/ST	PLAN SHOWS VARIOUS VIEWS OF NORTHERN CANAL. BEARS NOTES DATED NOV. 23, 1898, JAN 23, 1906, AND NOV. 26 & 27. NOT LISTED IN P. L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	ST	
B	ST/LM	
B	LM	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	LM/FX/LI	OVERSIZE PLAN.
B	LM	
B	CL	
B	CL/LM	
B	FX/LI	

B	ST	
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST	
B	CL	L.& C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS GIVE DATE OF NOV. 1847. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	NOT LISTED IN P.L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
C	CL	NOT LISTED IN P.L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	CL	
B	TE/FO/ST	OVERSIZE PLAN.
B	TE/FX/ST	INITIALLED "J.B.F.", I.E. JAMES B. FRANCIS. SEE ALSO PLAN NO. C-116-122.
C	CL	NOTE READS "NOT ADOPTED J.B.F. OCT.5 1883". LOCATED AFTER COMPLETION OF FORMAL INVENTORY. NOT LISTED IN P.L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.

B	CL	
B	FX	
B	CL/LM	OVERSIZE PLAN.
B	CL/FX/LM	
B	CL	OVERSIZE PLAN.
B	CL/FX	
B	CL	SEE ALSO PLAN NO. C-116-132. (NOT USED). CONSECUTIVE INDEX OF DRAWINGS NOTE READS: (QUASHED).
B	CL	SEE ALSO PLAN NO. C-116-131. CONSECUTIVE INDEX OF DRAWINGS NOTE READS: (QUASHED).
B	CL	

B	CL	
B	FX	
B	TE	
B	LM	
B	ST	
B	ST	OVERSIZE PLAN.
B	CL/ST	L.& C. INDEX CARD GIVES DATE OF 1847. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL/ST	NOT LISTED IN P.L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	CL	
B	TE/ST/FX	

B	CL	ALSO BEARS "TEST [RESULTS] OF A SAMPLE OF THE BRONZE OF WHICH THE NEW RACK WAS MADE, FURNISHED BY THE SCOVILLE M'F'G CO. WATERBURY CONN."
B	TE/FO/ST/ FX	OVERSIZE PLAN.
B	TE/ST	SIGNED "H. G. BURGESS", DEL. LOWER RIGHT.
B	ST	
B	CL/ST/LM	
B	ST/SO	
B	CL	
B	ST	
B	CL	

B	CL	
B	CL	
B	CL	NOT LISTED IN P.L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	FX/ST	4 PAGE PAMPHLET WITH DRAWINGS. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. BEARS STAMPED 2963, BENEATH NEW PLAN NUMBER LABEL.
C	SO/ST/FO	BEARS "C-117", RECTO. LOCATED IN FOLDER 117. "1902" APPEARS ON THE APRON OF THE GUARD LOCKS DAM. THUS, PLAN DATE MUST BE DATED 1902 OR LATER.
C	SO/ST/FO	"1902" APPEARS ON THE APRON OF THE GUARD LOCKS DAM. THUS, PLAN DATE MUST BE 1902 OR LATER.
B	CL	SHOWS "PROFILE ON BACK STREET BETWEEN DUTTON AND NORTHERN STS." LOCATES "SIDEWALK ON MOODY ST."
B	CL	ALSO BEARS NOTE "JULY 11/05 PROPOSED [ILLEG.] OF N.E. TEL. & TEL."
B	CL	VERSO READS "A.T. SAFFORD 66 BROADWAY LOWELL, MASS".
B	CL	ALSO BEARS AN UNTITLED GRAPHITE, INK AND WATER COLOR DRAWING, VERSO.

B	CL	ADDED DESIGN SPECIFICATIONS ARE GIVEN.
B	CL	
B	CL/EN	OVERSIZE PLAN.
B	CL	
C	CL	NOT LISTED IN P. L. & C. CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS. THIS IS A LARGER SCALE COMPANION DRAWING TO C-117-174.
B	CL	
B	CL	
B	CL	
B	CL/EN/LM	ALSO BEARS SURVEY NOTES DATED MAY 19, 1893 AND APRIL 25, 1899. OVERSIZE PLAN.
B	CL	APPEARS TO SHOW RACKS AT MOODY ST. FEEDER CA. 1848. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	BEARS NOTE "PROBABLY ELEVATION OF FORM USED IN TURNING THE ARCH ON MOODY STREET FEEDER". CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	L.& C. INDEX CARD GIVES DATE OF MAR. 1848. LOCATED AFTER COMPLETION FOR FORMAL INVENTORY. VERY SIMILAR TO PLAN C-117-170.
B	CL	WRONGLY DESCRIBED IN P. L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS AS "RACK FOR HOISTING GATE AT FEEDER". VERY SIMILAR TO PLAN C-117-169.
B	CL	
B	CL	SIGNED "J. GRAVES, DELR.", TITLE BLOCK. TITLE IS A MISNOMER FOR THIS PLAN REALLY IS A SIDE ELEVATION OF THE RACK FOR THE HOISTING GATE AT THE MOODY ST. FEEDER.
C		NOTE STATES TRACED FROM ORIGINAL PAPER DRAWINGS IN P.L.& C. FILES. TITLE IS A MISNOMER FOR THIS PLAN REALLY IS A SIDE ELEVATION OF THE RACK FOR THE HOISTING GATE AT THE MOODY ST. FEEDER.
B	CL	SIGNED "J. GRAVES, DELR.", TITLE BLOCK. TITLE IS A MISNOMER FOR THIS PLAN REALLY IS A FRONTAL ELEVATION OF THE RACK FOR THE HOISTING GATE AT THE MOODY ST. FEEDER.
C	FO/SO	NOTE STATES COPY, TRACED FROM ORIGINAL DRAWING IN P.L.& C. FILES. TITLE IS A MISNOMER FOR THIS PLAN REALLY IS A FRONTAL ELEVATION OF THE RACK FOR THE HOISTING GATE AT THE MOODY ST. FEEDER.
C	FO/SO	THIS BLUEPRINT WAS MADE FROM PLAN NO. C-117-[COPY 1]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. TITLE IS A MISNOMER FOR THIS PLAN REALLY IS A FRONTAL ELEVATION OF THE RACK FOR THE HOISTING GATE AT THE MOODY ST. FEEDER.
B	CL	SHOWS NUTS, SUMMATION OF NUMBERS, RECTO. THIS IS A SMALLER SCALE COMPANION DRAWING TO C-117-162.
B	CL	
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	CL	EVIDENTLY DRAWN ON REUSED PLAN STOCK SINCE IT SHOWS PART OF "BOOTT WEAVING MILL WHEEL UPPER AND LOWER BEARINGS OF UPRIGHT SHAFT" DATED.MARCH 8, 1848", VERSO, CROSSED OUT. MAY ONCE HAVE BEEN PART OF SHELF C-112.
B	CL	THREE 8x10 B/W STUDY PRINTS AND ONE 4x5 B/W NEGATIVE EXIST FOR THIS PLAN. THEY WERE CREATED IN 1996 AND ARE FILED WITH THE BOXED LNHP MODERN NEGS. AND PRINTS.
B	CL	ONE 8x10 B/W STUDY PRINT AND ONE 4x5 B/W NEGATIVE EXIST FOR THIS PLAN. THEY WERE CREATED IN 1996 AND ARE FILED WITH THE BOXED LNHP MODERN NEGS. AND PRINTS.
B	CL	ONE 8x10 B/W STUDY PRINT AND ONE 4x5 B/W NEGATIVE EXIST FOR THIS PLAN. THEY WERE CREATED IN 1996 AND ARE FILED WITH THE BOXED LNHP MODERN NEGS. AND PRINTS.
B	CL	SHOWS FIRE PLUGS AT TREMONT, TILDEN, COLBURN, PRINCE AND WORTHEN STREET CROSSINGS. THEY WERE COVERED WITH PAVING AND HAD REMOVABLE COVERS PUT ON IN APRIL 1919.
B	CL/EN/LM	ALSO SHOWS "PIPE DRAIN LAID BY LOCKS AND CANALS FOR CITY OF LOWELL 1890" AND MAINTENANCE NOTE OF MARCH 2, 1898. PART A OF 27 JUNE, 1897. ADDITIONAL NOTE: TOTAL LENGTH OF EACH FEEDER BY J.B. FRANCIS 1390 FT., 6/27/97.TRACED AS PLAN NO. C-117-296.
B	CL/EN	"MEASUREMENTS TAKEN SEPT. 14, 1856".
B	CL	TO ACCOMPANY SECTIONS MADE IN 1847. SHOWS DETAIL OF HOISTING APPARATUS. BEARS NOTE "DATA FOR THIS PLAN WAS TAKEN PRINCIPALLY FROM SECTIONS OF THE GATES DRAWN IN 1847, THIS BEING DESIGNED TO ACCOMPANY SAID SECTIONS".

C	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST	NOTE DIRECTS TO SEE PLAN OF MAY 1848.
B	ST/SO	
B	FO/ST/SO	LISTED IN P. L. & C. CARD INDEX AS C-117-188. IN CONSECUTIVE INDEX OF DRAWINGS IT IS LISTED AS C-117-339 WHILE C-117-188 IS NOT LISTED AT ALL. THE PLAN ITSELF IS NUMBERED C-117-188. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	SEE ALSO PLAN NO. C-117-283. SIGNED "GEO. O. BUSSEY, DELR.", LOWER RIGHT.
B	CL/EN	SEE ALSO PLAN NO. C-117-282. SIGNED GEO. R. BUSSEY, DELR.", LOWER RIGHT.
B	CL/EN	BEARS NOTE "SHOWING NEW SPILING PUT IN ABOUT 1848". OVERSIZE PLAN.
B	SO	NOTE INDICATES THIS GATE REBUILT IN 1924. SEE NEW PLAN.
C	FO/TE/HO	NOTE STATES REBUILT IN 1924, SEE NEW PLAN.
B	ST	

B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	SEE C-117-287-[B]. APPEARS TO BE ONE HALF OF WHAT WAS ORIGINALLY ONE PLAN.
B	CL	SEE C-117-287-[A]. APPEARS TO BE ONE HALF OF WHAT WAS ORIGINALLY ONE PLAN.
B	CL	SHOWS WASHERS, CAP AND STIRRUP, NUT, BOLTS.
B	CL	
B	CL	
B	CL	L.& C. INDEX CARD GIVES DATE OF FEB. 1856. LOCATED AFTER COMLPETION OF FORMAL INVENTORY.
B	CL	
B	CL	SIGNED "GEO. O. BUSSEY", LOWER RIGHT.
B	CL/EN	UNIDENTIFIED DRAWINGS VERSO.

B	TE/SO/ST	NOTE INDICATES SECOND SKETCH.
B	CL	THIS PLAN NO. WAS USED TWICE BY P. L.& C. OVERSIZE PLAN. LISTED IN P.L. & C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX OF DRAWINGS
B	FO/ST	THIS PLAN NO. WAS USED TWICE BY P. L.& C. SHOWS LOCATION OF FIREPLUGS INSTALLED APRIL 14, 1919. AND 15" PIPE DRAIN LAID BY L.& C. FOR THE CITY OF LOWELL, 1890. TRACED FROM ORIGINAL PLAN C-117-182 A & B DATED 11 MAY, 1848.
B	HO/TE/SO	
B	ST/TE/SO	
B	TE/ST/SO	
B	CL	PLAN VIEW OF GATES WITH MITRE SILL.
B	CL	ALSO SHOWS PLAN OF "STRETCHERS" AND "HEADERS".
B	CL	

C	FO	PLAN SHOWS "ELEVATION OF ONE GATE". THIS TRACING IS FROM A DETAIL ON "PLAN & SECTIONS OF GUARD GATES AT THE WESTERN CANAL", C-117-303. BEARS "SHELF 117", RECTO. LOCATED IN FOLDER 117.
B	CL	
B	CL	SEE ALSO PLAN NOS. C-117-306 & 307.
B	CL	SEE ALSO PLAN NO. C-117-305 & 307. ALSO SHOWS NUTS.
B	CL	SEE ALSO PLAN NOS. C-117-306 & 305.
B	CL	CONSECUTIVE INDEX OF DRAWINGS NOTES "NO DATE".
B	CL	BEARS NOTE READING "LOCKS & CANALS SUFFOLK GATES".
B	CL	
B	CL	
B	CL	REFER TO PLAN NO. C-117-313. ALSO SHOWS "PLAN FOR PINTAL FOR GUARD GATES.
B	CL	REFER TO C-117-312. ALSO SHOWS "PLAN FOR THE PINTAL FOR GUARD GATES. THIS IRON PATTERN COULD NOT BE USED SO WELL AS THE REVISE OF IT & ONE WAS THEREFORE MADE LIKE THAT SHOWN BY THE PENCIL LINES."
B	CL	L.& C. INDEX CARD GIVES DATE OF MAY 27, 1846. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	CL	
B	CL	ALSO SHOWS "TIN SHOP".
B	CL	
B	ST/SO	
B	CL	ALSO SHOWS "MACHINE SHOP PATTERN HOUSE".
B	CL	
B	CL	SHOWS "LOWELL MACHINE SHOP PATTERN HOUSE".
B	CL	SIGNED "GEO. R. BUSSEY, DELR.", LOWER RIGHT.
B	CL/EN	
B	CL	
B	CL	

B	CL	
B	CL	
B	CL	
B	CL	
B	TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	TITLE ADAPTED FROM PLANS 111-2109 AND 121-2733. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. NOT LISTED IN P. L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS.
B	TE/SO	
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	BEARS NOTE READING "PROBABLY HICKEY HALL DAM AND LOCKS". CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/LI/LM	
B	FO/TE/ST	NOTE STATES COPIED FROM THE ORIGINAL DIAGRAM MADE BY HIRAM F. MILLS.
B	FO/TE/HO /ST/SO	

B	FO/TE/ST/ SO	
B	TE/ST/SO	
B	SO/FO/TE /ST/HO	
C	ST/RO/TE/ SO	ROLLED LOOSELY WITH VARIOUS PLANS IN RANDOM P.H.
B	ST	
C	SO	NOTE READS SHELF 151 RECTO. NOT LISTED IN P. L. & C. CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
C	SO	LOCATED IN PLANS REAMINING WITH P.L. & C. AND NOT RETRIEVED UNTIL 1997. AFTER COMPLETION OF FORMAL INVENTORY. NOT LISTED IN P. L. & C. CARD CATALOGUE OR CONSECUTIVE INDEX OF DRAWINGS.
PAPER	C	SOILED, TEARS
C	SO/TE	

PAPER	C	SOILED, TEARS
C	SO/TE	
PAPER	C	SOILED, TEARS
C	SO/TE	NO SCALE GIVEN BUT IT IS IN THE SAME SCALE AS C-118-[346].
PAPER	C	SOILED
C	SO	
PAPER	C	FOXING, SOILED, LOSSES
C	FX/SO/LO	BEARS UNDATED WATERMARK "J. ROBESON, PHILA." APPEARS RELATED TO C-118-[350] AND C-118-[351] BY THE DIMENSIONS OF WHEEL.

PAPER	C	FOXING, SOILED, TEARS
C	FX/SO/TE	BEARS UNDATED WATERMARK "J. ROBESON, PHILA." APPEARS RELATED TO C-118-[349] AND C-118-[351] BY THE DIMENSIONS OF WHEEL.
PAPER	C	FOXING, SOILED
C	FX/SO	BEARS UNDATED WATERMARK "J. ROBESON, PHILA." APPEARS RELATED TO C-118-[349] AND C-118-[350] BY THE DIMENSIONS OF WHEEL.
PAPER	C	FOXING, SOILED, TEARS
C	FX/SO/TE	BEARS PARTIALLY DATED WATERMARK "JAMES WHATMAN…" WHO WAS AN ENGLISH PAPERMAKER AT TURKEY MILL, KENT. OTHER SUCH SHEETS LOCATED WITH THIS ONE HAD THE FULL WATERMARK DATED 1840 AND THOSE PLANS WERE DATED 1842.
PAPER	C	FOXING, SOILED, TEARS

C	FX/SO/TE	
PAPER	C	FOXING, SOILED
C	FX/SO	
PAPER	C	FOXING, SOILED
C	FX/SO	BEARS PARTIALLY DATED WATERMARK "JAMES WHATMAN…" WHO WAS AN ENGLISH PAPERMAKER AT TURKEY MILL, KENT. OTHER SUCH SHEETS LOCATED WITH THIS ONE HAD THE FULL WATERMARK DATED 1840 AND THOSE PLANS WERE DATED 1842.
PAPER	C	SOILED, TEARS

C	TE/SO	BEARS PARTIAL WATERMARK "TURKEY MILL KENT, 1840".
PAPER	C	SOILED, TEARS
C	SO/TE	BEARS PARTIAL WATERMARK "TURKEY MILL KENT, 1840".
CLOTH-BACKED PAPER	B	SOILED, STAINS
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. C-118-343 AND C-118-144 MAY BE LATER COPIES OF THIS DRAWING. SEE ALSO C-118-207.
CLOTH-BACKED PAPER	B	SOILED, MOLD
B	SO/MO	BUILT IN 1835. THE DAM "...HAS SINCE BEEN REBUILT-FAILURE IN PAVING".
PAPER	B	FOLDS, SOILED, TEARS

B	SO,FO,TE	(OLD PLAN).
B	CL	
B	SO/FO	ALSO SHOWS WASTEWAY. CLOTH BACKING IS COMING LOOSE.
B	SO	ALSO SHOWS THE DAM. BEARS NOTES DATED "6/4/61" AND NO. "D-19", VERSO.
B	CL	BEARS ADDITIONAL WORK DATED DEC.24,1853. ALSO BEARS NUMBER 96, RECTO. SHOWS TREMONT MILLS, TREMONT ST., TILDEN ST., MERRIMACK PRINT YARD. SEE ALSO PLAN NOS. C-118-196 & C-118-198 TO 201.
B	SO	
B	CL	

B	SO	BEARS NO. 16 VERSO, CROSSED OUT.
B	CL/EN	SEE ALSO PLAN NOS. C-118-192 & C-118-198 TO 201. L.& C. INDEX CARD GIVES DATE OF FEB. 4, 1847. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/MO	DRAWING IS BOUND WITH PLAN NOS. C-118-197[A], C-118-197[B],& C-118-197[C].
B	SO/ST/MO	DRAWING IS BOUND WITH PLAN NOS. C-118-197, C-118-197[B] & C-118-197[C].
B	SO/ST/MO	DRAWING BOUND WITH PLAN NOS. C-118-197, C-118-197[A] & C-118-197[C].
C	LO/TE/HO/FO/SO	ONCE BOUND WITH C-118-197, 197-[A] & 197-[B]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST/MO	DRAWING BOUND WITH PLAN NOS. C-118-197, C-118-197[A] & C-118-197[B].

B	CL	SEE ALSO PLAN NOS. C-118-192, C-118-196 & C-118-199 TO 201. L.& C. INDEX CARD GIVES DATE OF FEB. 4, 1847. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
PAPER	B	TEARS, FOLDS, LOSSES, SOILED
B	TE/LO/FO /SO	L.& C. INDEX CARD GIVES DATE OF FEB. 4, 1847. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	REFER TO PLANS C-118-192 TO 196, 199 TO 201. PLAN BEARS THE MORE RECENT NOTE: "PROPOSED MERRIMACK FEEDER 1855".
PAPER	B	FOLDS, SOILED
B	FO/SO	L.& C. INDEX CARD GIVES DATE OF FEB.4, 1847. LOCATED AFTER COMPLETION OF FROMAL INVENTORY.

B	PLAN	THE DRAWING IS IN TWO PIECES WITH THE NUMBER APPEARING ON THE VERSO OF THE SMALLER.
B	SO/FO/TE	REFER TO PLAN NO. C-118-202. DRAWING IS ON METRIC GRAPH PAPER USING ENGLISH MEASURE.
B	SO	
B	SO/MO/ST/TE/LM	
B	SO/ST	
B	SO/LM/TE	SEE ALSO C-118-186, C-118-343, C-118-344.
PAPER	B	TEARS, FOLDS, STAINS, FOXING, SOILED

		BEARS PLAN NO. 143-208 BUT NUMBER 143 IS AN ALTERED NUMBER. IN ALL RESPECTS, THIS PLAN CONFORMS TO INDEX CARD PLAN C-118-208 & NO. 208 FALLS IN THE C-118 SEQUENCE. L.& C.
B	TE/FO/ST/ FX/SO	INDEX CARD AND CONSECUTIVE INDEX NOTE THAT PLAN SHOWS FOUR SECTIONS, WHICH IT DOES.
		ORIGINALLY DATED 1873, "WITH ADDITIONS MADE IN 1883". SHOWS LOCATION OF KYANIZING HOUSE. ALSO BEARS NUMBERS
B	SO/FO/LM	3306 AND 6, VERSO, BOTH CROSSED OUT.
PAPER	C	SOILED, FOLDS, STAINS
		CONSECUTIVE INDEX OF DRAWINGS NOTES "NO DATE".
B	SO/FO/ST	WATERMARK "J. ROBESON, PHILA.." WITHOUT A DATE.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
		ATTACHED TO PLAN NOS. C-118-219 TO 221. ORIGINALLY DATED NOV. 1892. ALSO BEARS DATE MAY 10, 1892. LOCATED IN RANDOM
B	RO/SO	P.H.

B	RO/TE/FO /SO	SEE ALSO PLAN NOS. C-118-218 TO 221. BEARS NOTE IN RED COLORED PENCIL ORDERED JULY 8, 1892 SEE LETTER BOOK. LOCATED IN RANDOM P.H.
B	RO/TE/SO	SEE ALSO PLAN NOS. C-118-218 TO 221.
B	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BOUND TOGETHER WITH C-118-222-[COPY 2].
C	SO	APPEARS TO HAVE ONCE BEEN BOUND TOGETHER WITH PLANS C-118-222 AND C-118-222 [COPY 2]. APPEARS TO BE A TRACING OF C-118-222 WITH ALTERATIONS.
C	SO	BOUND TOGETHER WITH C-118-222. APPEARS TO BE A COPY OF C-118-222-[COPY 1] BEFORE ALTERATIONS WERE MADE TO IT. REPRODUCTION PROCESS MAY BE "NIGROSINE PROCESS".
B	SO	APPEARS TO HAVE ONCE BEEN JOINED TO C-118-223-[COPY 1].
C	SO	APPEARS TO HAVE BEEN BOUND TOGETHER WITH C-118-223 AND TO BE A TRACING OF PORTIONS OF SAME.
B	SO	THIS PLAN WAS LOCATED WITH SHELF 148.

B	SO/LI/LM/ FO/TE	THE INK APPEARS TO BE CAUSING THE CLOTH TO DISINTIGRATE ALONG THE LINES WHERE IT WAS USED. THERE ARE PREVIOUS TAPE REPAIRS ALONG THESE LINES.
B	SO	"ADOPTED ONLY IN PART" VERSO.
B	SO/TE/ST	ALSO SHOWS RAILROAD BRIDGES CROSSING EASTERN CANAL AT BRIDGE STREET.
B	SO/ST/TE/ FO/LM	ORIGINAL PLAN NO. E-22.
B	SO/LM	
B	SO/ST/TE	SHOWS "SECTION OF DAM BUILT SEPT, 1865" IN RED INK.
B	FO/SO/ST	THIS PLAN NO. WAS USED TWICE BY P. L.& C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/TE /ST	THIS PLAN NO. WAS USED TWICE BY P. L.& C. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.

B	SO/FO/TE	THE DRAWING IS ON BLUE GRAPH PAPER AND IS IRREGULAR IN SHAPE. SHOWS UNIDENTIFIED AND UNKNOWN STRUCTURE; MAY BE A COAL HOUSE.
B	SO	
B	SO/FO	TITLE APPEARS ON VERSO.
B	SO/FO/TE	
B	SO,TE,LI,LM	
B	CL	
B	CL	
B	SO/LM/TE	ALSO BEARS NO. "D-19".
B	SO/MO/LM/TE	

B	CL	APPEARS TO BE THE SECOND PLAN IN A SERIES. SIGNED "FR. BUDDEN" (PROBABLY FRED BUDDEN), LOWER RIGHT.
B	CL/EN	
B	CL	
B	CL	
PAPER	B	SOILED,TEARS, FOLDS
B	SO,TE,FO	
B	CL	APPEARS TO BE NUMBER 3 IN A SERIES. SHOWS BURNETTIZING HOUSE, GUARD LOCKS AND MERRIMACK LUMBER CO.
PAPER	B	SOILED, FOLDS

B	SO/FO	
B	CL	ALSO BEARS NO. 3026 RECTO. APPEARS TO BE NUMBER 4 IN A SERIES. SIGNED "FRED BUDDEN", LOWER RIGHT. ALSO "BILL DENNIS, SCRT."
B	CL	
B	FO/TE/SO	
B	CL,EN,CI	THIS PLAN APPEARS TO BE ONE HALF OF A PLAN WHOSE OTHER HALF IS C-118-02-[B]. SEE ALSO C-118-269, NOTES, WHICH MAY APPLY TO THIS PLAN. "WESTERN CANAL" ON THIS PLAN SEEMS TO REFER TO TREMONT MILLS. PLAN SHOWS DETAIL OF HOISTING APPARATUS.
B	CL, EN, CI	THIS PLAN APPEARS TO BE ONE HALF OF A PLAN WHOSE OTHER HALF IS C-118-02-[A]. SEE ALSO C-118-269, NOTED, WHICH MAY REFER TO THIS PLAN. PLAN SHOWS DETAIL OF GATE. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY, 1855.
B	CL, EN	LISTED AS C-118-269-(1,2,3) IN L.& C. CARD INDEX, TITLED "PLAN, SECTIONS & ELEVATIONS OF TREMONT GATES & HOISTING APPARATUS. SEE ALSO C-118-269.

B	CL	BEARS NOTE "TREMONT GATES 1855".
B	CL/EN	NOTE READS "TREMONT GATES 1855".
B	CL	NOTES REFER TO THIS BEING A "COPY" DETAILING THE "TREMONT GATES".
A		LISTED IN BOTH P. L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX NOTES "NO DATE".
B	CL	SEE CONSECUTIVE INDEX. ALSO BEARS NO. 2846 (NO DOUBT 123-2846) BENEATH CURRENT NUMBER LABEL AND POSS. NO. 27.
PAPER	B	SOILED,TEARS
B	SO,TE	
B	SO/TE/LM/ST	ALSO SHOWS LAWRENCE DAM. PLAN MAY BE EARLY SINCE HALL ST. IS NOT SHOWN IN ITS ENTIRETY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	SOILED, LOSSES, TEARS, FOLDS
B	SO/LM/TE/FO	

B	SO/FO/ST	CONSECUTIVE INDEX OF DRAWINGS NOTES "OLD PLAN NOT DATED".
B	CL	FIVE PAGES OF NOTES BOUND BY TWO SHEETS OF HEAVY PAPER. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/LM/FO /TE	
B	SO/FO	"SEE ALSO DWG. OF PATTERN."
B	SO/FO/ST	BEARS E-22. A BLUEPRINT COPY OF THIS PLAN, WITH HIGHLIGHTING, IS FOUND AT 118-287.
C	SO	A COPY OF A 3 PAGE TYPED REPORT FOUND PAPER CLIPPED TO PLAN C-118-287-[COPY 1].
C	SO	BEARS NO. E-22. A BLUEPRINT, WITH HIGHLIGHTING, OF C-118-287.
B	SO	DETAILS TREMONT GATE HOUSE JUNE 19, 1868.

C	SO/LM	NOT LISTED IN INDEX OF CONSECUTIVE DRAWINGS.
C	SO/ST/FO	NOT LISTED IN INDEX OF CONSECUTIVE DRAWINGS. SEE 160-072 FOR ANOTHER VERSION OF THIS SCHEME WITH THE SAME DATE.
C	TE/SO/FO	NOT LISTED IN INDEX OF CONSECUTIVE DRAWINGS. SEE 160-072 FOR ANOTHER VERSION OF THIS SCHEME WITH THE SAME DATE.
B	CL	LISTED AS C-118-281 IN CONSECUTIVE INDEX OF DRAWINGS.
B	CL	LISTED AS C-118-282 IN CONSECUTIVE INDEX OF DRAWINGS.
PAPER	B	SOILED
B	SO	LISTED AS C-118-283 IN CONSECUTIVE INDEX OF DRAWINGS. APPEARS TO BE THE SAME PLAN AS 135-4036 IN FOLDER TITLED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY".
B	CL	LISTED AS C-118-284 IN CONSECUTIVE INDEX OF DRAWINGS.

B	SO	BUILT IN 1835. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED AS C-118-285 IN CONSECUTIVE INDEX OF DRAWINGS. MAY BE A COPY OF C-118-186. SEE ALSO C-118-207.
B	SO/FO/TE /LM	LISTED AS C-118-286 IN CONSECUTIVE INDEX OF DRAWINGS. MAY BE A COPY OF C-118-186. SEE ALSO C-118-207.
D		PLAN NUMBER NOT FOUND IN P.L.& C. CARD OR CONSECUTIVE INDEX. RECORD PRODUCED FROM UMLCLH CAT. ENTRY. INDEX HEADINGS APPLIED BY LNHP BASED ON P.L.& C. MODEL. PLAN NUMBER ENTERED AS C-119-12 IN UMLCLH CARD CAT. BLUEPRINT COPY OF P.H. 012-A-[04].
D		PLAN NUMBER NOT FOUND IN P.L.& C. CARD OR CONSECUTIVE INDEX. RECORD PRODUCED FROM UMLCLH CAT. ENTRY. INDEX HEADINGS APPLIED BY LNHP BASED ON P.L.& C. MODEL. PLAN NUMBER ENTERED AS 119-13 IN UMLCLH CARD CAT. BLUEPPRINT COPY OF P.H. 012-A-[05] OR [09].
A		LISTED IN P.L. & C. CARD INDEX AND CONSECUTIVE INDEX OF PLANS AS C-119-336. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
A		LISTED IN P.L. & C. CARD INDEX AND CONSECUTIVE INDEX OF PLANS AS C-119-337. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
A		LISTED IN P.L. & C. CARD INDEX AND CONSECUTIVE INDEX OF PLANS AS C-119-338. NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE.
D		SEE ALSO PLAN NO. 119-340. PLAN NUMBER ENTERED AD C-119-339 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D		SEE ALSO PLAN NO. 119-339. PLAN NUMBER ENTERED AS C-119-340 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 28 APRIL 1857 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-341 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-342 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-343 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-344 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHIICH ALSO NOTES "NO DATE".

D PLAN NUMBER ENTERED AS C-119-345 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-346 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-347 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO NOTES "NO DATE".

D PLAN NUMBER ENTERED AS C-119-348 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-349 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-350 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-351 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO NOTES "NO DATE".

D PLAN NUMBER ENTERED AS C-119-352 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-353 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-354 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-355 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-356 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO NOTES "NO DATE".

D PLAN NUMBER ENTERED AS C-119-357 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-358 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-359 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH NOTES "NO DATE". TITLE PENCILLED IN ON VERSO.

D PLAN NUMBER C-119-360 APPEARING IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.REFERS TO PLAN 119-360-A, NOT THIS PLAN. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.

D	PLAN NUMBER ENTERED AS C-119-360 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. APPEARS TO BE A COPY OF 119-361. LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-119-361 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	CONSECUTIVE INDEX OF DRAWINGS NOTES "NO DATE".
D	PLAN NUMBER ENTERED AS C-119-363 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH SHOWS NO DATE.
D	PLAN NUMBER ENTERED AS C-119-364 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH SOHOW NO DATE.
D	PLAN NUMBER ENTERED AS C-119-365 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS BUT NEITHER ONE GIVES A DATE.
D	PLAN NUMBER ENTERED AS C-119-366 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO NOTES "NO DATE". TITLE PENCILLED IN.
D	PLAN NUMBER ENTERED AS C-119-368 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-119-369 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-119-370 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. 119-002. PLAN NUMBER ENTERED AS C-119-001 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 2 SEPT 1915 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN NO. C-119-001. PLAN NUMBER ENTERED AS C-119-002 IN L. & C. CARD INDE AND CONSECUTIVE INDEX OF DRAWINGS.. DATE ENTERED AS 2 SEPT 1915 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.

D PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.

D PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX BUT IN CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.

D THREE SHEETS. PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UML CENTER FOR LOWELL HISTORY CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.

D PLAN NUMBER ENTERED AS C-119-382 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-383 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

A NOT LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE. LISTED IN P.L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D SEE ALSO PLAN N0. 119-386. PLAN NUMBER ENTERED AS C-119-385 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 31 DECEMBER 1847 IN L. & C. CARD INDEX.

D SEE ALSO PLAN NO. 119-385. PLAN NUMBER ENTERED AS C-119-386 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 31 DECEMBER 1847.

D PLAN NUMBER ENTERED AS C-119-387 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-119-395 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-396 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-119-400 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX. TITLE CONT. "...MERRIMACK RIVER, WITH A SILVER MEDAL, FOR SPECIMENS OF WOOD, SHOWING THE EFFECT OF BURNETTIZING IN PREVENTING RAPID DECAY." EXHIBITED AT THE FAIR OF 1857.

D PLAN NUMBER ENTERED AS C-119-401 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NO. ENTERED AS C-120-2650 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 5 DEC.1846 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES BUCHANAN AND EDMUND BURKE.

D PLAN NUMBER ENTERED AS C-120-2651 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 1 MAY 1847 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES BUCHANAN AND EDMUND BURKE.

D PLAN NUMBER ENTERED AS C-120-2652 IN L.& C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 23 OCT. 1846 IN L.& C. CARD INDEX AND 17 OCT. 1846 IN CONSECUTIVE INDEX OF DRAWINGS. SIGNED BY JAMES BUCHANAN AND EDMUND BURKE.

D PLAN NUMBER ENTERED AS C-120-2653 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 20 SEPTEMBER 1846 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. FIVE SHEETS.

D PLAN NUMBER ENTERED AS C-120-2654 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. FIVE SHEETS.

D PLAN NUMBER ENTERED AS C-120-2655 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-120-2658 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-120-2659 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DIMENSIONS TAKEN FROM THE MODEL EXHIBITED AT THE TRIAL IN COURT HOUSE JANUARY 23,1856. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-120-2660 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS JAN 1856 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-120-2661 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D (TITLE CONT.) TURBINE NO. 5 IN ATLANTIC COTTON MILLS NOS. 1 AND 2. PLAN NUMBER ENRTERED AS C-120-2664 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 23 JAN.1856 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-120-2665 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D	SEE ALSO PLAN NO. 120-2667. PLAN NUMBER ENTERED AS C-120-2666 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	SEE ALSO PLAN NO. 120-2666. PLAN NUMBER ENTERED AS C-120-2667 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-120-2668 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-120-2669 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-120-2672 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-120-2673 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-120-2674 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-120-2675 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2689 IN L. & C., CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. WHEEL NO. 3 PUT IN JUNE 1894. "THIS PATTERN WAS FITTED TO BUCKET NO. 10 OF 72 INCH SWAIN WHEEL AT HAMILTON M. CO. (NO. 3) PUT IN JUNE, 1894."

D	PLAN NUMBER ENTERED AS C-121-2690 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. PLAN NUMBER WAS ISSUED TWICE BY P. L. & C.
A	PLAN NUMBER ENTERED AS C-121-2690 IN CONSECUTIVE INDEX OF DRAWINGS. PLAN NUMBER WAS ISSUED TWICE BY P. L. & C.
D	PLAN NUMBER ENTERED AS C-121-2691 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SHEET WITH 4 BROWN CARDBOARD CUT-OUTS. CONTENTS. PATTERN OF OPENING BETWEEN BUCKETS, INTERSECTION UNDER SIDE OF BUCKET WITH HUB, PATTERN OF FLANGE BUCKETS.
D	PLAN NUMBER ENTERED AS C-121-2692 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. PRINTED IN MARGIN "W.B. BEMENT, DESIGN., W.C. SHARP, LITH. BOSTON.] CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-121-2693 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SHEET WITH 4 CARDBOARD CUTOUTS.

D	PLAN NUMBER ENTERED AS C-121-2694 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-121-2695 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.
D	PLAN NUMBER ENTERED AS C-121-2696 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
A	PLAN NUMBER ENTERED AS C-121-2697 IN CONSECUTIVE INDEX OF DRAWINGS. THIS PLAN NUMBER WAS ISSUED TWICE BY P. L. & C.
D	PLAN NUMBER ENTERED AS C-121-2697 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. THIS PLAN NUMBER WAS ISSUED TWICE BY P. L. & C.

D PLAN NUMBER ENTERED AS C-121-2698 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2699 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2700 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2701 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE PENCILLED IN.

D	PLAN NUMBER ENTERED AS C-121-2702 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-121-2704 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER ENTERED AS C-121-2705 IN L. & C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX OF DRAWINGS.
D	PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL.

D PLAN NUMBER ENTERED AS C-121-2708 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2709 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2710 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2717 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2718 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES NO DATE.

D PLAN NUMBER ENTERED AS C-121-2722 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2724 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. DATE ENTERED AS 17 JANUARY 1845 IN L. & C. CARD INDEX.

D PLAN NUMBER ENTERED AS C-121-2725 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2726 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2727 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2733 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2734 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2738 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2739 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2742 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2743 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2744 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2745 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2746 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2747 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2749 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2750 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2751 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2754 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2758 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2759 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2760 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2761 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2762 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2763 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.

D PLAN NUMBER ENTERED AS C-121-2764 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS. SIGNED, E.O. LEAVITT, JR..

D PLAN NUMBER ENTERED AS C-121-2765 IN L. & C. CARD INDEX. AND CONSECUTIVE INDEX OF DRAWINGS.

	PLAN NUMBER ENTERED AS C-121-2766 IN L. & C. CARD INDEX AND
D	CONSECUTIVE INDEX OF DRAWINGS.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
	NOT RECEIVED BY LNHP. NOTED AS "NOT ACCEPTED" ON
	CONSECUTIVE INDEX OF DRAWINGS. NOT RECEIVED BY LNHP.
	NOTED AS "GONE" ON P.L.& C. CONSECUTIVE INDEX OF DRAWINGS
A	SUMMARY SHEET. CONSECUTIVE INDEX GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
	NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
	CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P. L.& C. CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A		CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A		CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A		CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A		CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
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		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A		CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
		NOT RECEIVED BY LNHP. NOTED AS "GONE" ON P.L.& C.
A		CONSECUTIVE INDEX OF DRAWINGS SUMMARY SHEET.
A		LOCATED IN P. L. & C. CONSECUTIVE INDEX OF DRAWINGS.
A		LOCATED IN P. L. & C. CONSECUTIVE INDEX OF DRAWINGS.
A		LOCATED IN P. L. & C. CONSECUTIVE INDEX OF DRAWINGS. PHOTOGRAPH OF THIS DRAWING EXISTS IN P. L. & C. PHOTOS (SEE ANCS+ CATALOGUE RECORD LOWE-9971 FOR IMAGE) AND IN 158-146-[A] & [B].
A		LOCATED IN P. L. & C. CONSECUTIVE INDEX OF DRAWINGS
C	CL/EN	JAMES B. FRANCIS SURVEYOR, AUG. 1843.

C	SO/FO	PLAN & DOCUMENT BOUND TOGETHER. PLAN BEARS NO. C-45, VERSO. PLAN BEARS STAMPED NO. 4464, RECTO.
C	SO/MO	BEARS STAMPED NO. 3358, VERSO.
C	CL/EN	PLAN SHOWS NEWFIELD POND, STONY BROOK, PROPOSED CANAL, ADAM' TAVERN, TURNPIKE, FARWELL'S, RIVER ROAD TO WESTFORD.
C	CL/LO	FOUR PAGE DOCUMENT CONSISTING OF A TITLE PAGE AND THREE PAGES OF PLOT PLANS SHOWING P.L.& C. LOTS FOR SALE AT AUCTION. DATE OF DOCUMENT IS DATE OF AUCTION. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS STAMPED NO. 3428, VARIOUS LOCATIONS.
C	CL/EN	
C	SO	PLAN SHOWS NEWFIELD POND, STONY BROOK, PROPOSED CANAL, BLDGS. OF CAPT. ADAMS, FARWELL'S IRONWORKS, SAWMILL, & TURNPIKE. COPIED FROM ORIG. PLAN WHICH IS ON FILE IN THE OFFICE OF THE PROPS OF THE LOCKS & CANALS, LOWELL, MASS., MARCH 3,1892, BY W.E. BADGER.
C	SO/FO/ST	BEARS NOTE: 1821 PLAN ENLARGED FROM A SCALE 5 TIMES AS LARGE OR 8 RODS TO AN INCH.

C	CL	PLAN SHOWS LAND, MILLS & MILL HOUSING OF APPLETON & HAMILTON CO'S. SOUTH OF THE LOWER PAWTUCKET & HAMILTON CANALS, BOUNDED BY THORNDIKE & CENTRAL STS.
C	CL/EN	PLAN SHOWS AREA ADJACENT TO INTERSECTION OF MARKET ST. & MERR. CANAL.
C	CL	
C	CL	COPY OF PLAN DATED MARCH 5,1861 WITH ADDITIONAL NOTES DATED 1872.
C	CL/EN	PLAN SHOWS AREA BETWEEN PAWTUCKET CANAL AND MERRIMACK CANAL FROM LOWELL MFG. CO. TO MERRIMACK STREET. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL/EN	PENCIL SKETCH OF CONCENTRIC ELIPSES, POSSIBLY FROM AREA IN FRONT OF THE CHIEF ENGINEER'S HOUSE. FOUND ADHERED TO BACK OF 123-2796-[A]. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	PLAN SHOWING LAYOUT OF AREA NORTH OF SWAMP LOCKS TO INCLUDE PAWTUCKET MERRIMACK & WESTERN CANALS, SUFFOLK MILLS, BOARDING HOUSES, MERRIMACK RIVER, ST. ANNE'S CHURCH & RECTORY.

		DATED SEP 1869. SURVEY NOTES DATED JULY 8,1861 & OCT.4, 1876.
C	CL	OVERSIZE PLAN.
C	CL	
C	CL	OVERSIZE PLAN. ALSO BEARS NO. 55.
		ORIGINALLY DATED JULY 1860. SURVEY NOTES DATED OCT. 27 & 28, 1875, SEP. 22, 1876, & APR 17, 1884. BEARS STAMPED NO. 3439,
C	SO/FO	VERSO.
		"COMPILED FROM SUNDRY DEEDS & OTHER DOCUMENTS." BEARS
C	CL	NO. 52 RECTO.
		PLAN APPEARS TO BE A LAYOUT FOR THE EASTERN CANAL, ELEVATION CONTOURS FOR THAT AREA ARE GIVEN, BOOTT & MASSACHUSETTS MILLS, & BOARDING HOUSES SHOWN. CONFLUENCE OF MERRIMACK RIVER, CANAL & CONCORD RIVER
C	CL	SHOWN.

C	SO/TE	BEARS STAMPED NO. 3433, VERSO.
C	SO/FO	SURVEYED MAY 15, 1869. BEARS STAMPED NO. 3440, VERSO.
C	SO/FO	BEARS STAMPED NO. 3440, VERSO.
C	CL/EN	PLAN SHOWS LAND OF MERRIMACK MFG. CO. WITH MILLS & BOARDING HOUSES & ST. ANNE'S CHURCH & RECTORY. NOTES REFER TO MERRIMACK ST. AS COUNTY ROAD.
C	CL	OVERSIZE PLAN.
C	SO/ST/TE	
C	CL	PLAN SHOWS SWAMP LOCKS, NORTH TO MOODY ST., EAST TO INTERSECTION OF WESTERN & SCHOOL STS. SHOWS ST. LAYOUTS. BEARS NO. 44 RECTO.

C	SO/FO	PLAN IS FROM A SURVEY MADE JUNE 30, 1896. BEARS STAMPED NO. 3464, VERSO, & C-56 VERSO.
C	CL/EN	STAMPED NO. 2853-2 CROSSED OUT, RECTO.
C	CL/EN	PLAN OF LAND WEST OF DUTTON ST. & SOUTH OF MERRIMACK ST., WHICH SHOWS M.M. CO., MEETING HOUSE LOT & PRINCE. BEARS NO. 38 RECTO.
C	SO/FO	TRACED DEC. 3,1885 FROM A PLAN IN THE CITY ENGINEER'S OFFICE. ORIGINAL DATED SEP.1885.
C	SO/FO	BEARS STAMPED NO. 3467, VERSO.
C	CL	PLAN DETAILS AREA SOUTH OF MERRIMACK CANAL, BOUNDED BY THORNDIKE & CENTRAL STS.
C	CL/EN	PLAN SHOWS PLOTS AT SOUTHWEST CORNER OF DUTTON & MERRIMACK STS. MERRIMACK ST. IS CALLED COUNTY RD.

C	CL/EN	
C	CL/EN	PLAN SHOWING AREA BETWEEN PAWTUCKET CANAL & WESTERN CANAL, LOCATION OF TANNERY IN 1827, & SAWMILL.
C	CL	OVERSIZE PLAN.
C	CL/EN	MARQUOIS SCALE 35.10' TO THE FOOT. BEARS NO. 30 RECTO.
C	CL/EN	PLAN SHOWS INTERSECTION OF DUTTON & MERRIMACK STS., MIDDLESEX CANAL, ST. ANNE'S CHURCH & RECTORY, OLD CITY HALL.
C	CL	PLAN SHOWING AREA OF MERRIMACK MFG. CO. WEST TO FALLS OF MERRIMACK RIVER.

C	CL	PLAN SHOWS DETAIL OF WESTERN & PAWTUCKET CANALS WITH POTENTIAL DEVELOPMENT OF STRUCTURES ON WEST SIDE OF DUTTON ST. "SECTION OF CANAL OPPOSITE RICHARDSON'S CORNER." PROFILE OF ELEVATIONS RUNNING ALONG WESTERN BANK OF WESTERN CANAL.
C	CL/EN	PLAN SHOWING HEAD OF MERRIMACK CANAL & LOCATION OF MERRIMACK MFG.CO. BUILDINGS, ENDING AT MERRIMACK RIVER.
C	CL/EN	PLAN SHOWS AREA OF SUFFOLK & TREMONT MILLS, MOODY ST. TO MERRIMACK RIVER.
C	CL/EN	BEARS NO. 35 RECTO. SIGNED "E. M. HOLMAN, DEL." JOHN BENNETT, SURVEYOR.
C	SO/ST/TE	SHOWS AREA WEST OF CONFLUENCE OF MERRIMACK & CONCORD RIVERS. PROPERTY HOLDERS: ANDREW, JOSEPH, JOSIAH & HENRY FLETCHER, NATHAN TYLER, & MELVIN. SIGNED "E. M. HOLMAN, DEL." "JOHN BENNETT, SURVEYOR".

C	CL/EN	PLAN SHOWS NUMBERED HOUSE LOTS IN CENTRALVILLE.
C	CL	
C	CL/EN	PLAN SHOWS SCHOOL ST. & AREA WEST TO PAWTUCKET CANAL. BEARS NO. 29 RECTO.
C	CL	
C	CL	
C	CL	OVERSIZE PLAN. SHOWS LAND ALONG MIDDLESEX CANAL BETWEEN CONCORD RIVER & MERRIMACK RIVER. MAY BE RELATED TO PLAN C-P.H. 006. A DETAIL FROM THIS PLAN WAS TRACED AS PLAN C-142-111.
C	CL/EN	BEARS NO. 40 RECTO.

C	ST	SHOWS EARLY LAYOUT OF BOOTT MILLS & BOARDING HOUSES, & "BOOTT CANAL." BEARS NO. 108 RECTO.
C	CL	PLAN SHOWS WESTERN CANAL AT INTERSECTIONS OF DUTTON & FLETCHER STS., EAST TO WORTHEN ST. BEARS NO. 99 RECTO.
C	CL	PLAN SHOWS AREA BOUNDED BY THE PAWTUCKET & WESTERN CANALS, SCHOOL ST. & MOODY ST.
C	CL	PLAN SHOWS LOT NEXT TO LANDING OFF WESTERN AVE. WATER MARK DATED 1840, THEREFORE PLAN POST 1840.
C	CL/EN	PLAN SHOWS AREA BETWEEN LOWELL ST. & PAWTUCKET CANAL AT CENTRAL ST. INTERSECTION, WITH AN EMPHASIS ON THE MARKET HOUSE.
C	CL/EN	VERSO READS: CANCELLED DRAWING, PROFILE SHOWING HEIGHTS OF STREETS OVER LOCK WALL; WASHINGTON ST. & MERRIMACK ST. NAMED. NOTE READS, THIS REPRESENTS THE WATER AS IT WAS, APRIL 13,1831, WHEN IT WAS NEAR 4 FEET HIGHER THAN USUAL. BEARS NO. 39, RECTO.
C	CL/EN	PLAN SHOWING INTERSECTION OF THORNDIKE ST. & PAWTUCKET CANAL.

C	CL	PLAN SHOWS AREA AT INTERSECTION OF MERRIMACK & KIRK STS. BOUNDED BY ARMORY & BRIDGE STS. BEARS NO. 106 RECTO. DRAWN BY GEORGE W. WHISTLER.
C	CL/EN	DATE GIVEN AS "AFTER JULY 19,1866." U.A. BOYDEN, ENGINEER. N.R. HARLOW, SURVEYOR. ALSO BEARS NO. 117 RECTO.
C	CL	PLAN SHOWS DOWNTOWN AREA, BOUNDED BY, & INCLUDING THE WESTERN CANAL, PAWTUCKET CANAL & MERRIMACK RIVER. ALSO SHOWS MERRIMACK, LOWELL & EASTERN CANALS.
C	CL	
C	CL	SURVEYED BY JAMES B. FRANCIS.
C	CL/EN	BEARS NO. 91 RECTO.

C	CL	BEARS NO. 68 RECTO.
C	CL	JAMES B. FRANCIS, SURVEYOR.
C	CL/EN	
C	CL	BEARS NO. 59 RECTO. SURVEY IN PART BY J.B.F. OVERSIZE PLAN.
C	CL	OVERSIZE PLAN.
C	CL	SURVEYED JAN & FEB 1846. BEARS NO. 76 RECTO. F. MEAD & G. W. BUTTERFIELD, ENGINEERS.

C	CL/EN	BEARS NO. 183. "THIS PLAN RECEIVED FROM JAMES BOWERS MAY 23,1855 WHEN THE LOT CONTAINING 31895 FEET WAS PURCHACED OF HIM BY THE PROPS. OF LOCKS & CANALS FOR 12 1/2 CENTS PER SQ. FOOT." SURVEYED BY NOAH R. HARLOW.
C	CL/EN	PLAN SHOWS A PLOT OF MEADOW LAND IN CHELMSFORD AND A PLOT OF WOOD LAND IN GREAT SPRUCE SWAMP IN DRACUT.
C	CL	SURVEYED JAN. & FEB. 1846. F. W. MEAD & G. W. BUTTERFIELD.
C	CL	BEARS NO.77 RECTO. OVERSIZE PLAN.
C	CL	ALSO BEARS NO. 57 RECTO. SURVEY IN PART BY J.B. FRANCIS. OVERSIZE PLAN.
C	CL,EN	BEARS NO. 22 RECTO. ALSO BEARS PLAN NO. 3 RECTO. A. SAVARY, CIVIL ENGINEER.

C	CL/EN	BEARS PLAN NO. 2 RECTO. ALSO BEARS NO. 21 RECTO. A. SAVARY, CIVIL ENGINEER.
C	CL/EN	
C	CL/EN	"AREA ABOUT 39 & 37/100 ACRES."
C	SO	BEARS NO. 64 RECTO.
C	CL	BEARS NO. 121 RECTO.
C	SO/FO/MO	
CLOTH-BACKED PAPER	C	SOILED, TEARS

C	RO/TE/SO/LM	COMPILED FROM PLANS AND DEEDS IN THE POSSESSION OF THE CORPORATION BY JAMES B. FRANCIS, SURVEYOR
DRAFTING CLOTH	C	SOILED
C	RO/SO	COMPILED FROM PLANS AND DEEDS IN THE POSSESSION OF THE CORPORATION BY JAMES B. FRANCIS, SURVEYOR. COPY OF ORIGINAL DRAWING.
PAPER	C	SOILED, TEARS
C	RO/SO/TE	10 SHEET TWO-SIDED DOCUMENT. COMPILED FROM PLANS AND DEEDS IN THE POSSESSION OF THE CORPORATION BY JAMES B. FRANCIS, SURVEYOR. LOWELL, MASSACHUSETTS, 1838.
C	CL	"THE PROPERTIES CONVEYED ARE ENCLOSED BY THE RED LINES." LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	CL	LOT SHOWS STRUCTURED FLOOR PLAN FOR DWELLING UNIT WITH STABLE.
C	CL	
C	CL	
C	CL/EN	
C	CL	PLAN DETAILS THE STREETS FROM PAIGE TO MIDDLE STS., BOUNDED BY BRIDGE & KIRK STS.
C	CL	PLAN DETAILS AREA BETWEEN MERRIMACK CANAL & CONCORD RIVER TO CONFLUENCE WITH MERRIMACK RIVER INCLUDING EASTERN CANAL. ALSO GIVES DIMENSIONS & FRONTAGES OF LOTS ALONG MERRIMACK ST.
PAPER	C	SOILED, LOSSES, FOLDS
C	SO/LM/FO	

C	CL/EN	PLAN SHOWS AREA BETWEEN SUFFOLK ST. & ADAMS ST. ALONG LAGRANGE ST.
C	SO/FO	BEARS NOS. 3326 & C-8 VERSO.
C	SO/FO	ORIGINAL DATED JULY 1894. COPIED SEP 2,1894. BEARS NO. 3499.
C	CL	APPEARS TO BE PROPOSAL FOR THE NORTHERN CANAL. SHOWS WESTERN & LAWRENCE CANALS, NORTHWEST ALONG NORTHERN CANAL TO MERRIMACK RIVER. THE DATE IS PROBABLY 22 NOVEMBER [SEE C-124-298] BEFORE 1848. C-124 PLANS WERE NOT INDEXED BY P. L. & C.
C	CL	PLAN SHOWS AREA BOUNDED BY THE BOSTON & LOWELL R. R., GORHAM ST., HAMILTON CANAL & TO THE SOUTH BY HALE & SOUTH HIGHLAND STS. THE DATE IS PROBABLY BEFORE 1848 [SEE C-124-2827]. C-124 PLANS WERE NOT INDEXED BY P. L. & C.
C	CL	

C	SO/FO/TE	
C	SO/MO	BEARS NO. 5-210 RECTO.
C	CL	BEARS NO. 5-21A RECTO.
C	SO	BEARS NO. 5-21A RECTO.
C	SO/FO/TE	BOUND WITH NOS. 2935 & 2936. BEARS COPY OF "SECT. 1" OF THE "ACT OF 1889" ABSOLVING THE PROPS. OF LOCKS & CANALS OF MAINTAINING OF "ANY LANDING PLACE BELOW THE SWAMP LOCKS...EXCEPT...THE LOWER FREE LANDING.
C	SO/FO	BOUND WITH PLAN NOS. 124-2934 & 2936.

C	SO/FO	BOUND WITH PLAN NOS. 124-2934 & 2935.
C	CL/EN	
C	CL	
C	CL/EN	SHOWS CORNER OF DUTTON AND MERRIMACK STREETS WITH RAILROAD TRACKS, MERRIMACK HOUSE INDICATED. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL/EN	PLAN SHOWING TOWN LANDING, MARTIN'S OR ADAM'S LOT BETWEEN WESTERN AVE. & PAWTUCKET CANAL. BEARS NO. 122 RECTO.
C	CL/EN	BEARS PLAN NO.18.

C	CL/EN	PLAN SHOWS PLOTS AT CORNER OF MERRIMACK & CENTRAL STREETS TO EASTERN CANAL.
C	CL/EN	SURVEYED BY JAMES B. FRANCIS. BEARS NO. 105 RECTO.
C	SO/FO/MO	SURVEYED IN 1841. NOTE STATES: THE LOTS ON WHICH THE PROPS OF LOCKS & CANALS CLAIM ABATEMENT OR THE TAXES ASSESSED IN 1859 ARE COLORED RED & NUMBERED FEBRUARY 20, 1860.
C	CL	BEARS NO. 12 RECTO. NOTE REVEALS THAT THIS MAY HAVE ONLY BEEN A PROPOSED TRANSACTION.
C	CL	
C	CL/EN	

C	CL	BEARS NOTE FROM JAMES B. FRANCIS. INITIALLED "J.B.F." BELOW TITLE BLOCK.
C	CL/EN	BEARS NO. 60 RECTO.
C	CL	PLAN SHOWS LINE OF THE GREAT RIVER WALL OUTSIDE.
C	CL	
C	CL	PLAN SHOWS MONUMENT, ROCKY, EAST ABBOT, & WEST ABBOT ISLANDS IN MERRIMACK RIVER AT HUNTS FALLS BETWEEN DRACUT & TEWKSBURY. ALSO BEARS NO. 73 RECTO. NOTE READS "SKETCH BY JAMES B. FRANCIS MADE ABOUT 1847."
C	CL	BEARS NO. 124 RECTO.
C	CL/EN	BEARS NO. 80 RECTO. SURVEYED BY BUTTERFIELD & CLARK.

C	CL	BEARS NO. 110 RECTO.
C	CL	PLAN SHOWS AREA AT THE CONFLUENCE OF WESTERN & PAWTUCKET CANALS PARTIALLY BOUNDED BY MOODY, WHITTING & SCHOOL STS.
C	CL	SURVEY OF AREA BETWEEN PAWTUCKET CANAL & MIDDLESEX ST. BEARS ADDITIONAL NOTES DATED 1860 & 1876.
C	CL/EN	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	CL	BEARS NO. 66 RECTO.
C	CL	"PLOTTED BY WM. P. DAVIE FROM NOTES OF A SURVEY MADE BY JAMES B. FRANCIS IN 1843." BEARS NO. 62 RECTO.
C	CL/EN	SAME AS PLAN NO. 124-2984. SURVEYED BY SWAN & STRAW.

C	CL/EN	SAME AS PLAN NO. 124-2983. SWAN & STRAW, SURVEYORS.
C	CL/EN	BEARS NO. 23 RECTO. A. SAVARY, CIVIL ENGINEER.
C	CL/EN	BEARS NO. 20 RECTO. A. SAVARY, CIVIL ENGINEER.
C	CL	BY A. OSGOOD, ENGINEER, DRACUT.
C	CL	SURVEYED BY A. SAVARY.
C	CL	BEARS NO. 79 RECTO.

C	CL	BEARS NO. 31 RECTO. ADDITIONAL NOTES DATED 1860.
C	CL	SURVEYED IN JUNE 1860 BY N. R. HARLOW.
C	CL	BEARS NO. 75 RECTO.
C	CL/EN	PLAN SHOWS WEDGE OF LAND OWNED BY PROPRIETORS OF L.& C. ALONG PAWTUCKET CANAL BOUNDED BY LAND OF OTIS ALLEN. DATED "ABOUT 1860 TO 1862."
C	CL	SURVEYED JULY 1860.
C	CL	

C	CL	BEARS NO. 61 RECTO.
C	CL	BEARS NO. 127 RECTO.
C	CL/EN	BEARS NO. 82. COPIED BY N. HARLOW.
C	CL/EN	
C	CL/EN	
C	CL	DATED OCT 16, 1867. SURVEYING NOTES DATED APRIL 18, 1870. SURVEYED BY J.B. FRANCIS.

C CL

C CL GEORGE BALDWIN DIRECTOR OF SURVEY.

C CL/EN

C CL/EN

C SO/FO/ST

C CL/EN

C	SO/MO	ORIGINAL DATED 1880-1. COPIED APR.1881.
C	SO/FO	ORIGINAL DATED SEP.1832. COPIED NOV 19 & DEC 19,1881. SUPPORT NOTED AS DRAFTING CLOTH ON CLOTH BACKED PAPER.
C	SO	SUPPORT IS NOTED AS DRAFTING CLOTH ON CLOTH BACKED PAPER.
C	SO/FO	PLAN SHOWS LAND ALONG PAWTUCKET CANAL FROM MERRIMACK RIVER TO BROADWAY ST. NOTE DIRECTS TO SEE SURVEY OF 1891.
C	SO/TE/FO /ST	BOUND WITH PLAN NO. 124-3029 THROUGH 3041.
C	SO/TE/FO /ST	DATA PERTAINING TO LAND IN LOWELL OWNED BY THE PROPRIETORS OF LOCKS & CANALS. THIS DOCUMENT IS APPARENTLY PAGE 2 OF DOCUMENT NO. 3028, BOUND WITH NO. 2028, & 3030 THROUGH 3041.
C	SO/FO/TE	BEARS PLAN NO. 1 RECTO. BOUND WITH PLAN NOS. 3028 THROUGH 3041.
C	SO/ST/FO	BEARS PLAN NO. 2 RECTO. BOUND WITH PLAN NOS. 124-3028 THROUGH 3041.
C	SO/FO	BEARS PLAN NO. 3. BOUND WITH PLAN NOS. 124-3028 THROUGH 3041.
C	SO/FO	BEARS PLAN NO. 4. BOUND WITH PLAN NOS 124-3028 THROUGH 3041.

C	SO/FO	BEARS PLAN NO. 5. BOUND WITH PLAN NOS. 124-3028 THROUGH 3041.
C	SO	BEARS PLAN NO. 6. BOUND WITH PLAN NOS. 124-3028 THROUGH 3041.
C	SO	BEARS PLAN NO. 7. BOUND WITH PLAN NOS 124-3028 THROUGH 3041.
C	SO	BEARS PLAN NO. 8. BOUND WITH PLAN NOS. 124-3028 THROUGH 3041.
C	SO	BEARS PLAN NO. 9 RECTO. BOUND WITH PLAN NOS. 124-3028 THROUGH 3041.
C	SO/TE	BEARS PLAN NO. 10. BOUND WITH NOS 3028 THROUGH 3041.
C	SO	BEARS PLAN NO. 11 RECTO. BOUND WITH PLAN NOS 124-3028 THROUGH 3041.
C	SO	MAP OF LOWELL HIGHLIGHTING PROPERTY BELONGING TO P.L.& C. BOUND WITH PLAN NOS. 124-3028 THROUGH 3040.
C	SO/FO/ST	BEARS SHEET NO. 1. BOUND WITH PLAN NOS. 124-3043 THROUGH 3054.

C	SO/TE	RECORD OF ACCOUNTS. BEARS SHEET NO. 2 OF DOCUMENT NO. 3042. BOUND WITH NOS. 3042 THROUGH 3054.
C	SO/TE	BEARS PLAN NO. 1. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO/TE	BEARS PLAN NO. 2. BOUND WITH PLAN NOS, 124-3042 THROUGH 3054.
C	SO/TE	BEARS PLAN NO. 3. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO/ST	BEARS PLAN NO. 4. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO	BEARS PLAN NO. 5. BOUND WITH NOS. 124-3042 THROUGH 3054.
C	SO	BEARS PLAN NO. 6. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO/ST	BEARS PLAN NO. 7. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.

C	SO	BEARS PLAN NO. 8. BEARS TRANSACTION NOTES DATED JAN.1896. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO	BEARS PLAN NO. 9. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO	BEARS PLAN NO. 10. BOUND WITH PLAN NOS. 124-3042 THROUGH 3054.
C	SO	DETAILS LAND ALONG MERR. CANAL, LAND BETWEEN E. MERR. & ANDOVER STS. NEAR PARK ST., LAND BETWEEN BELMONT & FAIRMOUNT STS., SO. OF MANSUR ST. & LAND ALONG PAWTUCKET SHOWING A RESERVOIR CANAL AT CENTRAL ST. BEARS PLAN NO.11. BOUND WITH PLANS 124-3042-3054.
C	SO/FO/TE	
C	TE/SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	FO/TE/RO /ST	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	FO/TE	SHOWS ADDITIONAL RAIL LINES. ALL RAIL LINES HIGHLIGHTED, SOME MARKED WITH INKED NOTATIONS. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."

C	SO/FO	FOUND IN ENVELOPE FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO/TE	FOUND IN ENVELOPE FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	FO/SO	TRACKS ANNOTATED IN GREEN INK, SHOWS JOINT MAINT. PROJECTED TO 01OCT1896. OTHERWISE SAME AS C-125-[3128]. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS." BEARS NO. 1412 CROSSED OUT, VERSO.
C	SO/RO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	FO/SO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS." ORIGINALLY DATED AUG. 1, 1896. CORRECTED TO JAN. 10, 1900.

C	SO/FO/FI	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO/TE	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWA/ LOWELL, MASS."
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO/TE	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."

C	SO/MO	SHOWS R. R AT CANAL & ARMORY STS. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	REVISED PLAN NO 4. SHOWS TRACKS NEAR GRIST MILL AND MERRIMACK COTTON STOREHOUSE. "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	PLAN NO. 3. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	PLAN NO.1. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	PLAN NO. 2. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."

C	FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."BEARS NOTE: "RED AND YELLOW TRACKS PROPOSED BY MERRIMACK MFG. CO." BEARS PENCIL NOTE: "MR. WADLEIGH'S PLAN".
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS." BEARS NOTATION "FILE 1128".
C	SO/FO	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO/FI	FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS." BLUEPRINT OF C-141-035-U.
C	SO/FO	PLAN NO. 5. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS."
C	SO/FO	PLAN NO. 5. FOUND IN ENVELOPE "BRANCH TRACKS LOWELL MASS JUNE 1917", STAMPED "ARTHUR T. SAFFORD 66 BROADWAY LOWELL, MASS." BEARS DATE AUGUST 1917 AND "PLAN NO. 5" ADDED TO ORIGINAL BEFORE THIS COPY WAS MADE.
C	FO/RO/TE	BASE PLAN FOR C-125-[3106]. ROLLED LOOSELY WITH OTHER PLANS IN RANDOM P.H.

B	CL/EN	PUBLISHED IN 1842. A LETTER APPEARING ON VERSO INDICATES THAT JAMES B. FRANCIS ALTERED THIS COPY IN 1858.
B	SO/MO	TITLE PAGE FOR BOUND PLANS 3058-1 THROUGH 3058-46.
C	FO	FOUND IN ENVELOPE IN FOLIO CONTAINING C-125-3058. "THIS WAS PLOTTED FOR THE PURPOSE OF TRANSFERRING THE SAME TO A BOOK PLAN [C-125-3058?] OF THE RIVER PREPARED FOR MR. A.P. BONNEY, TO BE USED IN THE SETTLEMENT OF THE "THIRD-FLASH-BOARD CLAIMS"."
C	FO	FOUND IN ENVELOPE IN FOLIO CONTAINING C-125-3058. "THIS WAS PLOTTED FOR THE PURPOSE OF TRANSFERRING THE SAME TO A BOOK PLAN [C-125-3058?] OF THE RIVER PREPARED FOR MR. A.P. BONNEY, TO BE USED IN THE SETTLEMENT OF THE "THIRD-FLASH-BOARD CLAIMS"."
B	SO	SHOWS AREA EAST OF CANAL AND MAIN STREETS, DEPOT AND CAR HOUSE.

B	SO/FO	SHOWS AREA ALONG SOUTH SIDE OF CANAL ST. NEAR JACKSON COMPANY'S LAND IN NASHUA, N.H.
B	SO	SHOWS AREA BETWEEN CANAL ST. AND NASHUA RIVER, REPAIR SHOP, ENGINE HOUSE, WOOD SHEDS, LUMBER HOUSE AND CANAL IN NASHUA, N.H.
B	SO	SHOWS AREA ALONG PEARL ST. NEAR JACKSON COMPANY LAND AND NASHUA RIVER IN NASHUA, N.H.

B	SO	SHOWS AREA ALONG PEARL ST. CROSSING HOLLIS AND FERRY ROADS IN NASHUA, N.H.
B	SO/MO	SHOWS AREA NEAR LAND OF WILLIAM MORSE AND THOMAS CHASE IN NASHUA, N.H.
B	SO/MO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF JESSE BOWERS AND WILLIAM MORSE IN NASHUA, N.H.

B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF EBENEZER FORD AND JESSE BOWERS IN NASHUA, N.H.
B	SO/MO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER BETWEEN LAND OF JOHN DICKERMAN AND EBENEZER FORD IN NASHUA N.H.
B	SO/MO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF BAILARD SMITH, NASHUA N.H. PLAN BEARS BOTH NOS. 11 AND 10.

B	SO/MO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF CLIFTON LUND AND SETH WOODBURY IN NASHSUA, N.H.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF JEREMIAH HUNT AND HENRY D. ADAMS IN NASHUA, N.H.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER BETWEEN LAND OF LUCIAN AND WILLIAM ROBY AND SILAS BUTTERFIELD.

B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER BETWEEN LAND OF NATHAN AND ISAAC CUTLER AND JAMES, LUCIAN B. AND WILLIAM ROBY IN NASHUA, N.H.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER BETWEEN LAND OF M.H. DAVIS, JESSE BOWERS AND PETER CLARK IN NASHUA, N.H.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER BETWEEN LAND OF J. BANCROFT AND CUMMINGS POLLARD IN NASHUA, N.H.

B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER, SOUTH OF MASS./N.H. STATE LINE.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF JONATHAN HOWARD.
B	SO	SHOWS AREA ALONG SOUTH BANK OF MERRIMACK RIVER NEAR LAND OF ASA BUTTERFIELD, J. FARWELL AND S. HOLDEN.

B	SO	SHOWS AREA NEAR WEST BANK OF MERRIMACK RIVER AND LAND OF JONATHAN FARWELL JR. AND SILAS HOLDEN.
B	SO	SHOWS AREA NEAR LAND OF J. FARWELL JR. AND TIMOTHY BUTTERFIELD, TYNGSBORO.
B	SO	SHOWS AREA NEAR MERRIMACK RIVER AND LAND OF JOSEPH BANCROFT.

B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER, NORTH FROM FERRY ROAD, TYNGSBORO.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF ROBERT BRINKLEY, JOSEPH UPTON AND CHARLES BUTTERFIELD, TYNGSBORO.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER SOUTH OF PRESENT WESTFORD AND MIDDLESEX ROADS, TYNGSBORO.

B	SO/MO	SHOWS AREA ALONG MERRIMACK RIVER NEAR MIDDLESEX TURNPIKE AND LAND OF ROBERT BRINKLEY, IN TYNGSBORO.
B	SO	SHOWS AREA ON WEST BANK OF MERRIMACK RIVER NEAR LAND OF ZEPHENIAH BENNETT AND ROBERT BRINKLEY, TYNGSBORO.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER NEAR LAND OF JACOB DRAKE AND Z. BENNETT, TYNGSBORO.

B	SO	SHOWS AREA ALONG WESTERN BANK OF MERRIMACK RIVER NEAR LAND OF CHARLES HOLLIS, TYNGSBORO.
B	SO	SHOWS AREA ALONG WEST BANK OF MERRIMACK RIVER, NORTH OF TYNGSBORO AND CHELMSFORD TOWN LINE.
B	SO/MO	SHOWS AREA BETWEEN MERRIMACK RIVER AND MIDDLESEX TURNPKIE EAST OF TYNGSBORO AND CHELMSFORD TOWN LINE.

B	SO/MO	SHOWS AREA ALONG SOUTH BANK OF MERRIMACK RIVER WEST OF WHAT IS NOW CROSS ST. IN CHELMSFORD. SHOWS TOLL HOUSE ALONG MIDDLESEX TURNPIKE.
B	SO/MO	SHOWS AREA SOUTH OF MERRIMACK RIVER BETWEEN LAND OF WILLIAM ADAMS AND SIMON BLODGETT, CHELMSFORD.
B	SO/MO	SHOWS AREA SOUTH OF MERRIMACK RIVER, WEST OF STONEY BROOK R.R., NEAR LAND OF WILLIAM ADAMS, CHELMSFORD.

B	SO/MO	SHOWS AREA OF STONEY BROOK R.R. AND N.& L. JUNCTION, CHELMSFORD.
B	SO/MO	SHOWS AREA ALONG SOUTH BANK OF MERRIMACK RIVER WEST OF THE CHELMSFORD & LOWELL TOWN LINE, NEAR THE CEMETERY AND TOBIN AVE.
B	SO/MO	SHOWS AREA ALONG SOUTH BANK OF MERRIMACK RIVER NEAR LAND OF HANNAH HOWARD. ALSO SHOWS "NEW LINE DOWN LOWELL & CHELMSFORD".

B	SO/MO	SHOWS AREA ALONG SOUTH BANK OF MERRIMACK RIVER.
B	SO/MO	SHOWS SOUTH BANK OF MERRIMACK RIVER NEAR MIDDLESEX STATION.
B	SO/MO	SHOWS AREA OF MERRIMACK RIVER NEAR BLACK BROOK.

B	SO/MO	SHOWS AREA EAST OF LOWELL ROAD (PAWTUCKET ST.) NEAR MERRIMACK RIVER AND MIDDLESEX STREET.
B	SO/MO	SHOWS AREA WEST OF WALKER STREET.
B	SO/MO	SHOWS AREA ALONG PAWTUCKET CANAL NEAR WESTERN AVE. AND SCHOOL ST.

B	SO/MO	SHOWS AREA SOUTH OF WILLIE AND DUTTON STREETS.
B	SO/MO	SHOWS AREA OF FLETCHER ST. BRIDGE OVER PAWTUCKET CANAL.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	SEE ALSO C-125-3061. SHOWS "LINE OF CENTRE OF PRESENT MAIN TRACK OF B.& L. R.R.".

B	SO	PLAN SHOWS R.R. & BLDGS. ALONG CANAL & ARMORY STS. ALTERATIONS ALONG CANAL ST. APPEAR TO BE CONSIDERED. SEE ALSO PLAN NO. 135-3060. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	FOUND IN SEPARATE ENVELOPE IN FOLIO CONTAINING C-125-3058 PLANS SERIES. CONSISTS OF ENVELOPE AND DOCUMENT.THE VARIOUS MEMORANDA ON THE DOCUMENT ARE DATED 1835, 14 JULY 1843, 3 MARCH 1849, 11 APRIL 1883. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	CL	FOUND IN SEPARATE ENVELOPE IN FOLIO CONTAINING C-125-3058 PLANS SERIES. CONSISTS OF MEMORANDA DATED JAN. 28, 1887, AND ENVELOPE DATED SAME, LATER CHANGED TO FEB. 4, 1887, WITH NOTE "AND OTHER PAPERS". SEE BELOW. CONSECUTIVE INDEX GIVES NO DATE.
C	FO	FOUND IN ENVELOPE IN FOLIO CONTAINING PLANS C-125-3058 THROUGH C-125-3058-46. SEE "AND OTHER PAPERS" NOTE, C-125-3062-01, ABOVE.
C	FO	FOUND IN ENVELOPE IN FOLIO CONTAINING PLANS C-125-3058 THROUGH C-125-3058-46. SEE "AND OTHER PAPERS" NOTE, C-125-3062-01, ABOVE.

C	SO	FOUND IN ENVELOPE IN FOLIO CONTAINING PLANS C-135-3058 THROUGH C-135-3058-46. SEE "AND OTHER PAPERS" NOTE, C-126-3062-01, ABOVE.
C	FO/ST	FOUND IN ENVELOPE IN FOLIO CONTAINING PLANS C-135-3058 THROUGH C-135-3058-46. SEE "AND OTHER PAPERS" NOTE, C-125-3062-01, ABOVE.
C	FO	FOUND IN ENVELOPE IN FOLIO CONTAINING PLANS C-135-3058 THROUGH C-135-3058-46. SEE "AND OTHER PAPERS" NOTE, C-125-3062-01, ABOVE. TRACINGS MADE BY A.W.H. WERE GIVEN TO J.B.F. JUNE 30, 1885.
C	FO/ST	FOUND IN ENVELOPE IN FOLIO CONTAINING PLANS C-135-3058 THROUGH C-135-3058-46. SEE "AND OTHER PAPERS' NOTE, C-125-3062-01, ABOVE.
B	SO/LM	BOUND COLLECTION OF PLANS, NOS. 3064 THROUGH 3071. THESE PLANS WERE FILED IN THE OFFICE OF THE CLECK OF THE COUNTY COMMISSIONERS FOR THE COUNTY OF MIDDLESEX ON APRIL 11,1883. ALSO BEARS NO. 1, RECTO.
B	SO	CONSISTS OF EIGHT PLANS DETAILING R.R., ONE DESCRIPTIVE PAGE AND ONE TITLE PAGE ALL BOUND TOGETHER. PLANS ARE REDUCED EXACT COPIES MADE IN APRIL 1918, OF ORIGINALS DATED MARCH 23,1883. ORIGINALS MADE FOR BRANCH TRACK REFILING OF APRIL 11,1883.
B	SO	EIGHT PLANS DETAILING R.R., ONE DESCRIPTIVE PAGE BOUND WITH COVERS. REDUCED EXACT COPIES, MADE APRIL 1918, OF ORIGINAL PLANS DATED MARCH 23, 1883. ORIGINALS MADE FOR BRANCH TRACK REFILING OF APRIL 11, 1883. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS NO. 2 RECTO. BOUND WITH PLAN NOS C-125-3064 THROUGH 3071.

C	SO/LM	BEARS NO. 3 RECTO. ATTACHED WITH PLAN NOS C-125-3063 THROUGH 3071.
C	SO/LM	BOUND WITH PLAN NOS. C-125-3063 THROUGH 3071.
C	SO/LM	PLAN SHOWS R.R. AT INTERSECTION OF DUTTON, MERRIMACK, & MOODY STS. B. & L. R.R. STATION SHOWN. BEARS NO. 5 RECTO. BOUND WITH PLAN NOS. C-125-3063 THROUGH 3071.
C	SO/LM	PLAN SHOWS TRACKS ALONG MOODY ST. FROM PRINCE ST. TO TREMONT ST., & ALONG TILDEN ST. BEARS NO. 6 RECTO. BOUND WITH PLAN NOS C-125-3063 THROUGH 3071.
C	SO/LM	PLAN SHOWS R. R. ALONG PERKINS & TREMONT STS. BEARS NO. 8 RECTO. BOUND WITH PLAN NOS. C-124-3063 THROUGH 3071.
C	SO/LM	PLAN SHOWS R.R. ALONG TREMONT ST. & BETWEEN TREMONT & SUFFOLK STS. BEARS NO. 7 RECTO. BOUND WITH PLAN NOS. C-125-3063 THROUGH 3071.
C	SO/LM	PLAN SHOWS R. R. ALONG DUTTON ST. & MERRIMACK WASTEWAY TO ARMORY ST. BEARS NO. 9 RECTO. BOUND WITH PLAN NOS. C-125-3063 THROUGH 3071.

C	SO/LM	PLAN SHOWS R.R. ALONG ARMORY & CANAL STS. APPEARS TO HAVE ONCE BEEN BOUND WITH PLANS C-125-3063 THROUGH 3071. BEARS NO. 10 RECTO.
C	SO/TE	
B	SO/FO	SAME AS PLAN NO. C-125-3076. TRACING OF ORIGINAL DATED 14APR1886, WITH ADDITIONAL WORK.
B	SO	SAME AS PLAN NO. C-125-3074.
B	SO/FO	SAME AS PLAN NO. C-125-3079. SHOWS EXISTING AND PROPOSED TRACKS ALONG NORTH BANK OF NORTHERN CANAL SOUTH TO DUTTON STREET.
B	SO/FO	SAME AS PLAN NO. C-125-3078. THIS PLAN IS A BLUEPRINT COPY OF C-125-3078 WITH NEW WORK.
B	SO	SHOWS TRACKS ALONG MERRIMACK CANAL WASTEWAY TO BOOTT COTTON MILLS.

B	CLEAN	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/LM/MO	LAND SHOWN IS FROM THE DELAWARE RIVER AT PHILIDELPHIA WEST ALONG THE SCHUYKILL RIVER. SHOWS RIVERS, CANALS, TOWNS AND TURNPIKES. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A		
B	SO/FO	
B	CL/EN	DETAIL OF RAILROAD SOUTH OF PAWTUCKET AND HAMILTON CANAL JUNCTION TO MIDDLESEX STREET. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	TABLE OF CONTENTS GLUED TO AN ENVELOPE CONTAINING SIX "PLANS ETC. PREPARED & FURNISHED FOR THE HEARING IN THIS SUIT".
B	SO	GIVES DESCRIPTION, SCALE, DRAFTSMAN, DISPOSITION OF THE DRAWINGS IN THE ENVELOPE.

B	SO	"...SCALED FROM A TRACING MADE OF THE LOCATION OF THE B. AND L. R. R. ON FILE AT CAMBRIDGE".
B	SO	
B	CL	
B	SO	
B	SO	
B	SO/TE/FO	SAME AS PLAN NO. C-125-3094. ALSO BEARS NUMBERS 8880 AND S 144, VERSO.
B	SO/FO/TE	SHOWS EXISTING AND PROPOSED TRACK OVER LOWELL CANAL. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/FI	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/FO	SAME AS PLAN NO. C-125-3091. ALSO BEARS NO. D 59-557.
B	SO/TE/FO	PLAN FOUND TORN INTO THREE PIECES.
B	SO/FO	ALSO BEARS "A. F. E. NO. 10209". COVERS SOUTH BANK OF MERRIMACK RIVER FROM CHURCH STREET IN NORTH CHELMSFORD TO BALDWIN STREET IN LOWELL.
B	SO/FO	
B	SO	COPIED FROM B.& M. R.R. BLUEPRINT. ALSO BEARS NO. "V.13.1/2.5". CONSECUTIVE INDEX OF DRAWINGS GIVES TWO DAES FOR THIS PLAN: JUNE 16, 1913, AND FEB. 3, 1921.
B	SO	ORIGINAL DATED MARCH 23, 1883. COPIED AUG. 28, 1933, WITH ADDITIONS.

B	SO	ORIGINAL DATED MARCH 23, 1883. COPIED AUG. 28, 1933. SHOWS "NEW TRACK 1910," OTHER TRACKS & BLDGS ALONG CANAL ST.
B	SO/FO/TE /FI	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	CL	
B	CL	
B	CL	

B	CL	IDENTIFIED STRUCTURES INCLUDE AMERICAN HOUSE AND MANSUR'S BUILDING.
B	CL/EN	TWO LETTERS ARE ENCASED WITH PLAN DATED JULY 17, 1845.
B	CL	
B	CL	
B	CL	
B	CL	
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	CL	STRUCTURES IDENTIFIED INCLUDE AMERICAN HOUSE, COBURN'S BLOCK, HAMILTON CO. STORES AND MANSUR'S BUILDING.
B	CL	
B	CL	
B	SO	APPEARS TO HAVE ONCE BEEN BOUND.
B	SO/FO	ALSO SHOWS "METHOD OF REPAIRING ROTTED TIMBERS" AND "REPAIRS TO UPSTREAM PLATFORM MADE OCT.1911 NEW WORK AS SHOWN".
B	SO	BEARS NOTE "REPAIRS MADE IN SEP.1911 INDICATED".
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	CL/EN	SAME AS PLAN NO.C-126-3111.
B	CL	
B	CL	
B	CL	ALSO SHOWS AMERICAN HOUSE, HAMILTON STORES AND MANSUR'S BUILDING.
B	SO/FO	BEARS NOS. "C-47" AND "3362",CROSSED OUT, VERSO.
B	CL	SEE ALSO PLAN NO.C-126-3106. L.& C. INDEX CARD GIVES DATE OF FEB. 1849.
B	CL/EN	SEE ALSO PLAN NO. C-126-3115.

B	CL	
B	CL	
B	CL/EN	SEE ALSO PLAN NO. C-126-3112.
B	CL	
B	CL	
B	CL/EN	ALSO SHOWS AMERICAN HOUSE, MANSUR'S BUILDING AND HAMILTON STORES.
B	CL/EN/LM/LI	

B	CL/ENCAP.	
B	CL	NOTE DATES DRAWING AS "1852 WHEN NEW DEPOT WAS BUILT".
B	SO/FO/TE	BEARS NOTE "SHEET NO. 1-GENERAL ELEVATION AND PLAN". ALSO BEARS NO. 3256, CROSSED OUT, RECTO.
B	SO	SEE ALSO PLANS C-126-3123-B & C-126-3123-C. BEARS NO. 3476, VERSO. PLAN DRAWN BY BOSTON BRIDGE WORKS.
A		SEE ALSO PLANS C-126-3123-A, & C-126-3123-C. LISTED IN P.L.& C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX OF DRAWINGS.
A		SEE ALSO PLANS C-126-3123-A, & C-126-3123-B. LISTED IN P.L.& C. CARD INDEX BUT NOT IN CONSECUTIVE INDEX OF DRAWINGS.
B	SO	

B	CL	ANOTHER LIKE IT BUT OF LARGER SPAN BUILT IN 1862. ANOTHER IN 1888 OR 1889. OVERSIZE PLAN.
B	CL	BEARS NOTE "PROBABLY BRIDGE AT PAWTUCKET STREET?". CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL/LM	OVERSIZE PLAN.
B	CL/ST	L.& C. INDEX CARD GIVES DATE OF OCT. 21, 1869. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	BEARS NOTE DETAILING EXPENSES.
B	SO/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	ALSO SHOWS LOCATION OF RAILS.
B	SO	BEARS NOTE DATED AUG. 21, 1901.CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OFAUG. 21, 1901..
B	SO/TE	
C	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF 1879.
B	SO/FO/TE /ST	
B	CL	OVERSIZE PLAN.
B	SO/ST/FO	SAME AS C-126-3136 & C-126-3138.

B	SO/FO	SAME AS C-126-3136 & C-126-3137.
B	SO	
B	CL/EN	SHOWS DUTTON STREET AND THE CARPET STOREHOUSE.
C	CL	
B	SO	
B	SO	

B	SO	
B	SO	
B	SO/TE/FO	
B	SO/TE	
B	SO/TE/FO	
B	SO/TE	
B	SO/FO/TE /MO	
B	SO/TE	NEWSPAPER CLIPPING ATTACHED RECTO.
B	SO/TE	SAME AS C-126-3153. FOUND IN FOLDER 150.
B	SO/TE/FO	SAME AS C-126-3152.

B	SO/FO	
		"STRINGERS OF THE BRIDGE WERE MEASURED BY MESSRS. JAMES FRANCIS, HUNKING AND BROOKS NOV.17,1879 WITH STEEL TAPE." ALSO SHOWS "SECTION OF BRIDGE AS BUILT IN 1883" WITH "SECTION OF PIER AS BUILT IN 1883". ALSO BEARS NOTES FROM
B	CL/EN	1907.
B	CL	OVERSIZE PLAN.
B	CL	
B	SO/FO	
		BEARS STAMP READING "HOUDLETT & DUNNELS 272 FRANKLIN ST.
B	SO	BOSTON MASS." FOUR BUSINESS CARDS ARE ATTACHED.
B	SO/TE/FO	SEE ALSO PLAN NO. C-126-3162.

B	CL/EN	SEE ALSO PLAN NO. C-126-3161.
B	SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	
B	SO/FO	L.& C. INDEX CARD GIVES DATE OF AUG. 14, 1889. SCALE OF 1/2"=5/8" IS FOR RIVET DETAIL ONLY. BEARS NO. J410, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	[...] EC. EC. EC. / FOR SALE BY MILLIKEN BROS. NO. 61 LIBERTY ST. NEW YORK. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	ALSO SHOWS "OLD LINE OF MERRIMACK ST. AS LAID OUT BY P.L.& C." AND THE LINES AS OF 1889.
B	SO	THE SPAN OF THE ARCH WAS 32 FEET. BEARS NOTE READING "THIS PLAN SHOWS THE LONGEST CENTER"
B	SO/FO	ALSO BEARS NO. S 94-28-2, VERSO. ATTACHED TO PLAN ARE TWO LETTERS FROM THE B.& M. R.R. TO JAMES B. FRANCIS, DATED SEPT.26, 1890 AND OCT.13, 1890 RESPECTIVELY, RE: THIS BRIDGE.
B	SO	L.& C. INDEX CARD GIVES DATE OF 1890.
B	SO	

B	SO/FO/TE	BEARS NOTE "ESTIMATE NO. 713" VERSO. ALSO BEARS NO. "E.713" RECTO. ATTACHED TO PLAN IS LETTER DATED JAN 19,1893 TO JAMES B. FRANCIS FROM BOSTON BRIDGE WORKS ALSO BEARING NO."E. 713".
B	SO/FO/TE	SEE ALSO PLAN NO. C-126-3176. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO/TE	P. L. &. C. CARD INDEX INDEX AND CONMSECUTIVE INDEX OF DRAWONGS GIVE DATE OF 1893. THIS PLAN IS THE SAME BASE PLAN AS C-126-3175 WITH REVISIONS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE/FO	SEE ALSO PLANS C-126-3178 & C-126-3179.
B	SO/TE/FO	SEE ALSO PLANS C-126-3177 & C-126-3179.
A		LISTED IN P.L.& C. CARD INDEX AND IN CONSECUTIVE INDEX OF DRAWINGS.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	SEE ALSO PLAN NO.C-126-3190. BEARS NOTE "REBUILT 1919 SEE ALSO 164-19".
B	SO	BEARS NOTES READING "SEE PLAN 164-12" AND "COPIED FROM SKETCH ON PAGE 46 BRIDGE BOOK".
B		BEARS NOTES "REBUILT 1919 SEE PLAN 164-" AND SEE BLUEPRINT FOR REPAIRS ETC."
B	SO	"OLD BRIDGE ABOLISHED BY ELIMINATION OF GRADE CROSSING." TWO PHOTOGRAPHS ATTACHED RECTO.
B	SO/FO	BEARS NOTE "REBUILT IN 1919, SEE PLAN 164-28".

B	SO/FO	APPEARS TO HAVE ONCE BEEN BOUND. BEARS NOTE "SEE LATER PLAN 1908-9".
B	SO/TE/FO	
B	SO	BEARS NOTE "NOT USED". APPEARS TO HAVE ONCE BEEN BOUND.
B	SO	BEARS NOTE "NOT USED".
B	SO	SEE ALSO PLAN NO. C-126-3181. ALSO SHOWS "REPAIRS MADE IN SEPT 1913". GLUED TO THE PLAN IS A TYPEWRITTEN DOCUMENT CONCERNING THESE REPAIRS.
B	SO/FO	
B	SO	

B	SO	NEW ENGLAND STRUCTURAL CO. WAS LOCATED IN EVERETT, MASS.
B	SO/FO	L.& C. INDEX CARD GIVES DATE OF JAN. 1928. FORMERLY 141-046 AS PER CONSECUTIVE INDEX. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	
A		CONSECUTIVE INDEX OF DRAWINGS DOES NOT LIST ANY INDIVIDUAL PLAN NUMBERS FOR THIS SHELF NUMBER.
B	FX	"THIS PHOTOGRAPH REPRESENTS THE PROGRESS OF THE WORK AT THE "DEEP HOLE." WRAPPED IN BROWN PAPER ENTITLED FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	TE/SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	TE/CO	WRAPPED IN BROWN PAPER ENTITLED FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX. SAME PRINT AS C-128-1082-03-[A].

B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX. SAME PRINT AS C-128-1082-03-[B].
B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX. SAME PRINT AS C-128-1082-02-[A].
B	TE/SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX. SAME PRINT AS C-128-1082-02-[B].
B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAWTUCKET DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAW. DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1802 IN L. & C. CARD INDEX.
B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAWTUCKET DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	SO	WRAPPED IN BROWN PAPER ENTITLED: FILE 1082 PICTURES 12"x 16" PAWTUCKET DAM DURING CONSTRUCTION 1876. N.C. SANBORN, PHOTOGRAPHER. BEARS SHELF C-128 VERSO. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	TE	WRAPPED IN BROWN PAPER ENTITLED FILE 1082 PICTURES 12"x 16" PAWTUCKET DAM DURING CONSTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	FX/TE	WRAPPED IN BROWN PAPER ENTITLED FILE 1082 PICTURES 12"x 16" PAWTUCKET DAM DURING CONTRUCTION 1875. N.C. SANBORN, PHOTOGRAPHER. PLAN NUMBER ENTERED AS C-128-1082 IN L. & C. CARD INDEX.
B	ST	PLAN NUMBER ENTERED AS C-128-1751 IN L. & C. CARD INDEX. CONSECUTIVE INDEX OF DRAWINGSNOTES "NOT DATED".

B	SO	
B	SO/TE	
B	FO/TE/SO	SCALE IS NOTED AS FOLLOWS: </A - >/B= 1 FOOT. BEARS NO. 1 RECTO.
PAPER	B	SOILED, TEARS
B	SO/TE	
PAPER	B	SOILED, FOXING
B	SO/FX	
B	ST/SO	"A/<SCALE AB=1 FOOT>\B."
PAPER	B	FOXING, SOILED, TEARS
B	FX/SO/TE	NOTE STATES THIS PLAN ALTERED JUNE 23,1847.

PAPER	B	SOILED
B	SO	NOTE STATES CONSTRUCTED IN 1867.
PAPER	B	FOLDS, FOXING
B	FO/FX	
PAPER	B	FOLDS, FOXING, TEARS
B	FO/FX/TE	2 PG. DOCUMENT. 1 OF 20 COPIES.
PAPER	B	FOLDS, SOILED, FOXING

B	FO/SO/FX	BEARS NOTE IN GRAPHITE VERSO "RIVER ABOVE DAM". PLAN NUMBER ENTERED AS C-128-1762 IN L. & C. CARD INDEX.
PAPER	B	SOILED
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	BEARS NO. 18 STAMPED, VERSO. TRACED FROM PLAN NO. 1485, WHICH WAS NOT FOUND IN THE COLLECTION.
PAPER	B	FOLDS
B	FO	NOTE STATES PART OF SECTIONS OF THE BED OF MERRIMACK RIVER PARRALLEL TO THE EASTERLY [...ILLEG.] OF PAWTUCKET DAM.
PAPER	B	LOSSES, FOXING, SOILED, TEARS
B	LM/FX/SO /TE	
B	SO	

B		
A		
B	SO/HO	11 PAGE DOCUMENT.
B	FO/TE/SO	BEARS "JAMES B. FRANCIS AT PROP. OF LOCKS & CANALS" RECTO.
B	SO/FO/TE /FX	
B	FX/TE/SO	
B	FO/ST	5 PG. DOCUMENT. NO FORMAL TITLE. SHOWS CAPPING FOR NEW PART OF DAM IN BLACK INK. CAPPING FOR GREAT ROCK IN RED INK. NOTE STATES PATTERN FOR CAPPING FOR GREAT ROCK MADE APR. 27,1875. BEARS NOTE BY JAMES B. FRANICIS IN REFERENCE TO PATTERN MADE FROM PLAN.
C	SO	PART OF 5 PG. DOCUMENT.

C	SO	PART OF 5 PAGE DOCUMENT. FIGURES IN RED REPRESENT CAPPING OF ROCKS TO BE CUT DOWN.
C	SO	NOTE DIRECTS TO SEE SPECIFICATIONS.
C	SO	PART OF 5 PG. DOCUMENT. FIGURES IN RED REPRESENT CAPPING OF ROCKS TO BE CUT DOWN.
B	SO	PATTERN MADE FROM THIS DRAWING.
A		
B	SO	(SEE CAPPING STONE FOR CAPPING STONES.) 2 PG. DOCUMENT. 1 OF 20 COPIES.

C	SO	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	FX	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C CL 2 PG. DOCUMENT. 1 OF 20 COPIES.

C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
C	CL	2 PG. DOCUMENT. 1 OF 20 COPIES.
B	TE/SO	

B	SO	
B	TE/SO	
B	SO/TE	PROFILE SHOWING HIGHEST PART OF THE GREAT ROCK. PLAN SHOWING WATER LINE & LINE OF HIGHEST PART OF GREAT ROCK.
B	SO/TE/FO /LM	SECTIONS OF OLD & NEW DAM.
B	TE/LM	
B	FO/ST	PUNCHED WITH TWO HOLES FOR JOINING TO OTHER PLANS.
B	FX/SO	JOINED TO C-128-1788 AND C-128-1789.

B	SO	JOINED TO C-128-1787 AND C-128-1789. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	HAD ONCE BEEN JOINED TO C-128-1787 AND C-128-1788.
B	TE/HO/ST	
B	FX	NOTE STATES, "FIGURES IN RED REPRESENT CAPPING OF ROCKS TO BE CUT DOWN." BASE PLAN WITH ADDITIONAL WORK.
B	FO/SO	BEARS "FIG.8" RECTO. BASE PLAN WITH SOME OF THE ADDITIONAL WORK FOUND ON C-128-1792.
B	SO	BEARS "FIG.8" RECTO. BASE PLAN WITH SOME OF THE ADDITIONAL WORK FOUND ON C-128-1792.
C	SO	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.

C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C0128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.

C	CL	PRISTINE COPY OF C-128-1792 BEFORE C-128-1792 HAD ANY NEW WORK ADDED.
B	ST	NOTE STATES "SOUNDINGS TAKEN AUG. 21, 1928.
C	ST	DATE GIVEN AS "SUMMER OF 1937."
C	ST	
PAPER	B	SOILED
B	SO	
PAPER	B	SOILED
B	SO	
PAPER	B	SOILED
B	SO	
PAPER	B	FOXING, SOILED

B	FX/SO	
A		
B	TE	THIS PLAN APPEARS TO COMBINE TWO SEPARATE ORIGINAL PLANS ON ONE SHEET. PLAN FOR THE THORNDIKE ST. OVERFLOW CAME FORM THE "OFFICE OF THE CITY ENGR. LOWELL MASS."
B	CL	
PAPER	B	SOILED
B	SO	NOTE DIRECTS TO "SEE PLAN # 2590 FOR SAME SUBJECT AS THIS." BUT THIS PLAN WAS NOT FOUND. PLAN C-141-021-A IS A LATER COPY WHICH GIVES DATE OF MAR. 9, 1844 AND NOTES J.B. FRANCIS C.E.
PAPER	B	SOILED
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	SOILED
B	SO	
PAPER	B	SOILED

B	SO	
PAPER	B	SOILED
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	FOLDS, TEARS, SOILED
B	FO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	SOILED
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	SOILED, TEARS, FOXING
B	SO/TE/FX	SCALE IS NOTED AS FOLLOWS: DISTANCE 1 1/4"=100', HEIGHTS 1"=10'. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	TEARS, SOILED, STAINED, FOXING

B	TE/SO/ST/FX	UNTITLED PLAN SHOWING PROFILE OF ROADS. TILDEN ST. BEING THE ONLY SPECIFIED ROAD ON PLAN. BEARS "ROADS" IN GRAPHITE, VERSO. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
PAPER	B	FOLDS, SOILED, TEARS
B	FO/SO/TE	
PAPER	B	FOXING, SOILED
B	FX/SO	
PAPER	B	FOLDS, SOILED
B	FO/SO	BEARS NO.7 VERSO.
PAPER	B	FOLDS, SOILED
B	SO/FO	
PAPER	B	FOLDS, SOILED
B	SO/FO	

PAPER	B	FOLDS, SOILED, TEARS
B	FO/SO/TE	
CLOTH BACKED PAPER	B	FOLDS, TEARS
B	FO/TE	
B	ST	
B	ST/FO	
C	ST/FO	BLUE PRINT PLAN NO. C-143-133-[COPY 1] IS ATTACHED, RECTO. THIS PLAN HAD FORMERLY BEEN NUMBERED C-143-134.
B	ST	SECTIONS ACROSS TYNG. ST. (LOOKING FROM BROADWAY TOWARDS PILLING SHOE CO.). ATTACHED TO C-128-3227-B.
B	ST	ATTACHED TO C-128-3227-A. NOTE INDICATES BUILT AS DRAWN.

B	FO/ST	
B	ST/SO	ORIGINALLY NUMBERED 162-076.
B	FO	DATES GIVEN AS FOLLOWS: OCT.1939, CORRECTED JULY 1941. NEW WORK DATED MARCH 1947. NEW WORK SHOWS SEWERS & DRAIN LOCATIONS.
B	FO/ST	BEARS SHEET NO.1 RECTO.
A		
B	ST/SO/FO	BEARS 4-23-41, RECTO, WHICH MUST BE DATE OF 23 APR. 1941. ALSO BEARS R-6226, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D		PLAN NUMBER ENTERED AS C-129-3228 IN L. & C. CARD INDEX. DATE ENTERED AS 1857 & 1874 IN L. & C. CARD INDEX. FOLDER WITH GRAPHS. CONSECUTIVE INDEX OF DRAWINGS DOES NOT LIST THE INDIVIDUAL DRAWING NUMBERS THAT MAKE UP THIS SHELF NUMBER.
D		FOLDER WITH GRAPHS AND TABLES. CONTAINS C-129-3229-(A) THROUGH (N). NOT LISTED AS SUCH IN CONSECUTIVE INDEX OF DRAWINGS.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.

D CONTAINED IN FOLDER 129-3229. 2 SHEETS.

RECORD PRODUCED FROM PLAN. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L. & C. MODEL. NOT SEPARATELY LISTED IN UMLCLH CARD CAT., SUBSUMED IN ENTRY 129-3229. FOUND IN FOLDER 129-3229. CONSECUTIVE INDEX OF PLAN NUMBERS GIVES

D NO DATE.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.

D CONTAINED IN FOLDER 129-3229. 2 SHEETS.

NOT SEPARATELY LISTED IN UMASSLOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229. CONTAINED IN FOLDER 129-3229. CONSECUTIVE INDEX OF PLAN

D NUMBERS GIVES DATE OF 1810-1877..

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.

D CONTAINED IN FOLDER 129-3229.

DEDUCED FROM THE RECORDS KEPT BY SAID L.& C. FOR YEAR 1881. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL

D HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.
D CONTAINED IN FOLDER 129-3229.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.
CONTAINED IN FOLDER 129-3229. CONSECUTIVE INDEX OF PLAN
D NUMBERS GIVES NO DATE.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.
D CONTAINED IN FOLDER 129-3229.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.
D CONTAINED IN FOLDER 129-3229.

NOT SEPARATELY LISTED IN UMASSLOWELL/CENTER FOR LOWELL HSITORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.
D CONTAINED IN FOLDER 129-3229.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUE SUBSUMED IN ENTRY 129-3229.
CONTAINED IN FOLDER 129-3229. THIS IS PLAN NO. C-129-3229-L IN
D THE P.L.& C. CONSECUTIVE INDEX.

PLAN TITLE NOT FOUND IN L.& C. CARD INDEX OR CONSECUTIVE INDEX. RECORD PRODUCED FROM PLAN. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P.L.& C. NOT SEPARATELY LISTED IN
D UMLCLH CARD CAT., SUBSUMED IN ENTRY 129-3229.

NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-3229.

D CONTAINED IN FOLDER 129-3229.

4 SHEETS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 129-

D 3229. CONTAINED IN FOLDER 129-3229.

(TITLE CONT.) AMES, ESQ. IN ASHLAND, MASS.] PLAN NUMBER ENTERED AS C-129-3230 IN L. & C. CARD INDEX AND 129-3230 IN

D UMLCLH CARD CATALOGUE. WHEEL PATENTED NOV.25, 1856.

PLAN NUMBER ENTERED AS C-129-3230 IN L. & C. CARD INDEX AND

D AS 129-3230 IN UMLCLH CARD CATALOGUE.

PLAN NUMBER ENTERED AS C-129-3230 IN L. & C. CARD INDEX AND 129-3230 IN UMLCLH CARD CATALOGUE. CONSECUTIVE INDEX OF

D PLAN NUMBERS GIVES SAME DATE SPAN.

PLAN NUMBER ENTERED A C-129-3230 IN L. & C. CARD INDEX AND
D 129-3230 IN UMLCLH CARD CATALOGUE. 2 SHEETS.

(TITLE CONT.) WATER IN MERRIMACK M. CO.'S MILL NO. 6, DEDUCED FROM SIMULTANEOUS OBSERVATIONS AT THE IRON GAUGE, WHEN THE FLASHBOARDS WERE ALL ON.] PLAN NUMBER ENTERED AS C-129-3230 IN L. & C. CARD INDEX AND 129-3230 IN UMLCLH CARD
D CATALOGUE. 2 SHEETS.

PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSERUTIVE INDEX.. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P.L. &
D C. MODEL.

PLAN NUMBER NOT FOUND IN L. & C. CARD INDEX OR CONSERUTIVE INDEX. RECORD PRODUCED FROM UMLCLH CARD CATALOGUE ENTRY. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON
D PROPRIETORS OF LOCKS AND CANALS MODEL.

D	PLAN NUMBER ENTERED AS C-129-3231 IN L. & C. CARD INDEX. CONTAINED WITHIN PLAN NUMBER 129-3231 IN UMLCLH CARD CATALOGUE. FOLDER ALSO CONTAINS PLAN NOS. 129-3231-[2] AND 129-3231-[3].
D	PLAN NUMBER ENTERED AS C-129-3231 IN L. & C. CARD INDEX. CONTAINED WITHIN PLAN NUMBER 129-3231 IN UMLCLH CARD CATALOGUE. FOLDERED TOGETHER WITH 129-3231-[1] AND 129-3231-[3].
D	PLAN NUMBER ENTERED AS C-129-3231 IN L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS WHICH GIVES DATE AS 1892 & 1894. PLAN NUMBER CONTAINED WITHIN 129-3231 IN UMLCLH CARD CATALOGUE. FOLDERED TOGETHER WITH 129-3231-[1] AND 129-3231-[2].
D	PLAN NUMBER ENTERED AS C-129-3232 IN L. & C. CARD INDEX.
D	CONTAINED IN FOLDER C-129-3233. CONSECUTIVE INDEX OF PLAN NUMBERS ALSO GIVES NO DATE.
D	CONTAINED IN FOLDER C-129-3233. CONSECUTIVE INDEX OF PLAN NUMBERS ALSO GIVES NO DATE.

D	CONTAINED IN FOLDER C-129-3233. CONSECUTIVE INDEX OF PLAN NUMBERS ALSO GIVES NO DATE.
D	CONTAINED IN FOLDER C-129-3233.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234 OVERSIZE.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234 OVERSIZE..
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234 OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECCUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUMSUMED IN ENTRY 130-3234

D OVERSIZE.

PLAN NO. NOT FOUND IN L. & C. CARD INDEX. OR CONSECUTIVE INDEX OF DRAWINGS. RECORD PRODUCED FROM PLAN. INDEX

D HEADINGS BY LNHP STAFF BASED ON PROPS. OF L. & C. MODEL.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235

D OVERSIZE. CONTAINED IN FOLDER 130-3235.

LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235

D OVERSIZE.

A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235 OVERSIZE.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235 OVERSIZE.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235 OVERSIZE.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235 OVERSIZE.
D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235 OVERSIZE. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

D	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3235 OVERSIZE. 3 SHEETS.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS.CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

A	LISTED AS C-130 PLUS PLAN NO. IN P.L. & C. CARD CATALOGUE AND CONSECUTIVE INDEX OF DRAWINGS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	NOT SEPARATELY LISTED IN UMLCLH CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. RECORD PRODUCED FROM PLAN. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON P. L.. & C. MODEL.
A	LISTED AS C-130 PLUS PLAN NO. CONSECUTIVE INDEX OF DRAWINGS.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3236. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236. CONSECUTIVE INDEX OF PLAN NUMBERS GIVES NO DATE.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3236. 3 SHEETS.

LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY
D 130-3237.

D	4 SHEETS. LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.

D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.

D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS WITHOUT A DATE. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS WITHOUT A DATE. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS WITHOUT A DATE. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.

D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS WITHOUT A DATE. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3237.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS WITH NO DATE GIVEN. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS WITH NO DATE GIVEN. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.

D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY WITH NO DATE GIVEN. LISTED IN UMASSLOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY130-3238.
D	LISTED AS C-130 PLUS PLAN NO. IN CONSECUTIVE INDEX OF DRAWINGS. NOT SEPARATELY LISTED IN UMASS LOWELL/CENTER FOR LOWELL HISTORY CARD CATALOGUE BUT SUBSUMED IN ENTRY 130-3238.
D	PLAN NUMBER GIVEN AS C-130-3239 IN CONSECUTIVE INDEX OF DRAWINGS WITH DATE OF NOV. 1869. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER GIVEN AS C-130-3239 IN CONSECUTIVE INDEX OF DRAWINGS. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER GIVEN AS C-130-3239 IN CONSECUTIVE INDEX OF DRAWINGS. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.
D	PLAN NUMBER GIVEN AS C-130-3239 IN CONSECUTIVE INDEX OF DRAWINGS. INDEX HEADINGS APPLIED BY LNHP STAFF BASED ON PROPRIETORS OF LOCKS AND CANALS MODEL.

CLOTH-BACKED PAPER	B	SOILED
		LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PL&C INDEX CARD READS "BOUND BOOK CONTAINING SECTIONAL MAPS OF CITY SHOWING LOTS. MAPS DATED 1844" BUT CONTAINS PLANS WITH
B	SO	LATER DATES THIS. CARD ALSO NOTES "NOT INDEXED".
		P.L.& C. PHOTOGRAPHS LOWE-10087-11003 MAY BE COPIES OF THE PHOTOGRAPHS FROM THIS PORTFOLIO. THEY WERE FOUND IN AN
A		ENVELOPE ENTITLED "FIRE PROTECTION".
C	SO	MOUNTED. BEARS "SLIDE C-133", VERSO.
		LOCTED AFTER COMPLETION OF FORMAL INVENTORY. THIS IS A FOLDED SHEET WITH THE STOREHOUSE ISOMETRICALLY ON THE FIRST PAGE AND THE PUMP HOUSE PIT FOR THE SPRINKLER SYSTEM
C	TE/SO	ON THE SECOND PAGE.
		DATE READS "PLAN MADE ABOUT 1888 [LINED OUT AND
B	SO	SUPERCEDED BY] 1896".
		ORIGINAL DATED NOV. 1890. CORRECTED TO 15 JUNE 1900 THIS PLAN NO. WAS USED TWICE IN THE L.& C. CARD INDEX. PLAN WAS NUMBERED 133-21 BY PL&C, BUT THIS NUMBER DOES NOT
B	TE/SO	CORRESPOND TO THE NUMBERING ON THE PL&C MASTER LIST.
C	SO/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/TE/ST/SO	ORIGINALLY NUMBERED 158-18. BEARS NO. 4451-A, VERSO.
B	CL	BEARS SERIAL NUMBER 4986 AND INDEX NUMBER 1622. ASSOCIATED MUTUAL INSURANCE COS. PLAN.
B	SO	BEARS SERIAL NUMBER 4987 AND INDEX NUMBER 1622. ASSOCIATED MUTUAL INSURANCE COS. PLAN.
B	TE	
B	TE/ST/SO	DATE OF LITHOGRAPH IS 1889, DATE OF MOST RECENT DATE RECORDED IS MAR. 6, 1894.
B	SO	BEARS SERIAL NUMBER 5082 AND INDEX NUMBER 1622. ASSOCIATED MUTUAL INSURANCE COS. PLAN. ATTACHED WITH C-133-055-[B] & [C].
B	SO	BEARS SERIAL NUMBER 5083 AND INDEX NUMBER 1622. ASSOCIATED MUTUAL INSURANCE COS. PLAN. ATTACHED WITH C-133-005-[A] & [C].
B	SO	BEARS SERIAL NUMBER 5084 AND INDEX NUMBER 1622. ASSOCIATED MUTUAL INSURANCE COS. PLAN. ATTACHED WITH C-133-005-[A] & [B]. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-18.

B		NOTE DIRECTS TO SEE FACTORY INSURANCE ASSOCIATION PLAN NO. 324 & 325-B FOR REMAINDER OF PLAN. ADDITIONAL NOTES DIRECT TO SEE NO. 324-B, 325-B & 324-C, 325-C FOR PLANS & ELEVATIONS & 324-D, 325-D FOR VIEW. BEARS NOS 324-A & 325-A. C-133-006-A ATTACHED.
B	HO/FO	ATTACHED TO C-133-006-[A].
C	SO	NOTE DIRECTS TO SEE FACTORY INSURANCE ASSOCIATION PLAN NO. 324B & 325-B FOR REMAINDER OF PLAN. BEARS NOS 324-A & 325-A. TITLE AND ALTERED PLAN WITH INK MASKS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO	BEARS FACTORY INSURANCE ASSOCIATION NOS. 324-B & 325-B. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B		ORIGINALLY DATED 26 AUG., 1915. BEARS FACTORY INSURANCE ASSOCIATION PLAN NOS. 324-C & 325-C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO	BEARS FACTORY INSURANCE ASSOCIATION PLAN NOS. 324-C & 325-C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B		ORIGINALLY DATED 26 AUG., 1915. BEARS FACTORY INSURANCE ASSOCIATION PLAN NOS. 324-C & 325-C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
C	SO	BEARS FACTORY INSURANCE ASSOCIATION PLAN NOS. 324-D & 325-D. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	HO/SO	NOTE DIRECTS TO SEE N.B. 344, P.12. NOTE DIRECTS TO SEE PLAN SERIAL NO. 4327. ASSOCIATED MUTUAL INSURANCE CO. PLAN. BEARS SERIAL NO. 5448 & INDEX NO. 1628, RECTO. ATTACHED TO C-133-007-[B] & [C].
B	SO	NOTE DIRECTS TO SEE PLAN SERIAL NO. 5448 FOR MAIN YARD, & N.B. 344, P.13. ASSOCIATED MUTUAL INSURANCE CO. PLAN. BEARS SERIAL NO. 5449 AND INDEX NO. 1624, RECTO. ATTACHED TO C-133-007-[A] & [C].

B	SO	BEARS SERIAL NO. 4327 & INDEX NO. 1628, RECTO. ASSOCIATED MUTUAL INSURANCE CO. PLAN. ATTACHED TO C-133-007-[A] & [B]. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-19.
B	SO	TITLED "OLD FACTORY MUTUAL PLANS" IN L.& C. CARD INDEX. BEARS SERIAL NO. 5725 AND INDEX NO. 1634, RECTO. ASSOCIATED MUTUAL INSURANCE CO. PLAN.
B	SO/HO	BEARS SERIAL NO. 5726 AND INDEX NO. 1634, RECTO. ASSOCIATED MUTUAL INSURANCE CO. PLAN.
B	ST	BEARS SERIAL NO. 5727 & INDEX NO. 1634. ASSOCIATED MUTUAL FIRE INSURANCE CO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-17.
C	SO/FO/TA	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES. INDEX NUMBER 9316. SERIAL NUMBER 25673, REPLACING 15278 & 15279. FOR VIEW SEE SHEET SERIAL NO. 25675. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TA	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES. INDEX NUMBER 9316. SERIAL NUMBER 25674. FOR VIEW SEE SHEET SERIAL NO. 25675. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO	ASSOCIATED FACTORY MUTUAL FIRE INSURANCE COMPANIES. INDEX NUMBER 9316. SERIAL NUMBER 29966R, REPLACING 25673 & 25674. AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	BEARS SERIAL NO. 5997 & INDEX NO. 1640. ASSOCIATED MUTUAL FIRE INSURANCE CO. LARGE FORMAT COLOR TRANSPARENCY OF THIS PLAN USED IN THE BOOTT EXHIBIT, MILL AGENT PLATFORM. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-10.
B	SO	SURVEYED JULY 11, 1895. AMENDED AUG.20, 1895. BEARS SERIAL NO. 4458 & INDEX NO. 1648. ASSOCIATED MUTUAL INSURANCE CO. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-12.

B	SO	BEARS SERIAL NO. 5471. INDEX NO. 1648. ASSOCIATED MUTUAL INSURANCE CO.
B	SO	BEARS ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 6098 & INDEX NO. 1650.
C	FO/SO/TE /LO	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9473, REPLACING 6098, AND INDEX NO. 330. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE	BEARS ASSOICIATED MUTUAL INUSRANCE CO. SERIAL NO. 9473, REPLACING 6098, AND INDEX NO. 9330. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	FO/SO/TE	BEARS ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 17844, REPLACING 9473, AND INDEX NO. 9330. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997, FROM DRAWER 151.
C	SO/FO/ST	ASSOCIATED MUTUAL INSURANCE CO. SERIAL NO. 9420 AND INDEX NO. 328. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997.
B	FO/SO	BEARS SERIAL NO. 5002 & INDEX NO. 1654. ASSOCIATED MUTUAL INSURANCE CO. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-14.
B	SO	BEARS SERIAL NO. 5550 & INDEX NO. 1660. ASSOCIATED MUTUAL INSURANCE CO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. RETRIEVED FROM P.L.& C. APRIL, 1997. JOINED TO C-133-014-[B] AT ONE TIME.
C	SO/TE	DATE AMENDED TO FEB. 7, 1896. BEARS SERIAL NO. 3179 & INDEX NO. 1660. ASSOCIATED MUTUAL INSURANCE CO. JOINED TO C-133-014-[A] AT ONE TIME.

B	TE/ST/SO	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX AND CONSECUTIVE INDEX. AMMENDED FEB. 6, 1896. SURVEYED NOV. 13, 1893. BEARS SERIAL NUMBER 3724. ASSOCIATED MUTUAL INSURANCE CO.
C	SO/FO/ST	TWO SEPARATE SHEETS JOINED WITH TAPE. EACH IS A CONTINUATION OF THE OTHER. TOGETHER THEY SHOW THE ENTIRE MILL COMPLEX IN PLAN VIEW. BOTH ARE ASSOCIATED MUTUAL INSURANCE CO. PLANS. ONE BEARS SERIAL NO. 11285, THE OTHER 11286. BOTH BEAR INDEX NO. 9344.
B	FO	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX AND CONSECUTIVE INDEX. BEARS SERIAL NUMBER 5490 AND INDEX NUMBERS 1678 AND 1680. SERIAL NO. NOTE READS "THIS REPLACES NO. 3945. ASSOCIATED MUTUAL INSURANCE CO.
B	TE	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX AND CONSECUTIVE INDEX. BEARS ASSOCIATED MUTUAL INSURANCE CO. SERIAL NUMBER 9830. SERIAL NO. NOTE READS "THIS REPLACES NO. 5490. INDEX NUMBERS 9348 AND 9349.
B	SO	BIRD'S EYE VIEW. BEARS SERIAL NO. 6343 AND INDEX NUMBERS 1670 AND 1672. 4x5 COLOR TRANSPS. STORED WITH BOOTT EXHIBIT PRODUCTION GRAPHICS AT 1.2.5 P-13.
A		LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
A		LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/TE	

B	FO/SO/TE	ORIGINALLY DATED JAN. 1897. DATE CORRECTED TO JULY 5, 1900.
B	TE	L.& C. ISSUED PLAN NUMBER TWICE.
B	TE/ST/SO	ORIGINAL DATED AUG. 1, 1896, BUT CORRECTED TO JUNE 15, 1900.
B	TE/ST/SO	CORRECTED TO OCTOBER, 1901.
B	FO/TE/HO /FX	
B	TE/SO	
A		LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/TE	L.& C. CARD INDEX STATED THAT THE PLAN WAS NOT DATED. LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY.
B	TE/SO	ORIGINAL DATED NOV. 1890. CORRECTED TO JUNE 1893. THIS PLAN NO. WAS USED TWICE IN THE L.& C. CARD INDEX. NOTE , VERSO, READS "OFFICE COPY".

B	SO/TE	L.& C. CARD INDEX NOTES CORRECT TO JUNE, 1900. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NUMBER APPLIED BY P. L.& C. MATCHES CARD INDEX RECORD BUT IT IS POSSIBLE ANOTHER CORRECTED PLAN EXISTS.
C	CL	MARKED SHELF 133 BY P. L. & C., HOWEVER, THE PLAN NUMBER PER SE FALLS MORE LOGICALLY WITHIN SHELF C-134. THE CONSECUTIVE INDEX OF DRAWINGS SHOWS A GAP BETWEEN NOS. C-134-4631 AND 4671. THIS PLAN NO. FALLS WITHIN THAT GAP.
C	CL/LM	MARKED SHELF 133 BY P. L. & C., HOWEVER, THE PLAN NUMBER PER SE FALLS MORE LOGICALLY WITHIN SHELF C-134. THE CONSECUTIVE INDEX OF DRAWINGS SHOWS A GAP BETWEEN NOS. C-134-4631 AND 4671. THIS PLAN NO. FALLS WITHIN THAT GAP.
B	SO/TE	
B	ST/SO	
B	FX/SO/HO	SCALE IS NOTED AS FOLLOWS: ONE SPACE=1'. ONE SPACE=2'.

		AN ATTACHED SUPPLEMENTAL DRAWING HAS BECOME DETACHED. IT IS A SMALL DRAFTING CLOTH ELEVATION ENTITLED "SECTION OF
B	FO/TE/ST/SO	CROWNING OF WESTERN CANAL / AT LOWELL STREET. OCT. 19, 1871".
B	FO/SO	
PAPER	B	FOLDS, TEARS, HOLES, STAINS, FOXING
B	FO/TE/HO/ST/FX	
B	TE/FX	
PAPER	B	STAINS, TEARS
B	ST/TE	

B	SO	NOTE STATES COPY SENT TO BOSTON BRIDGEWORKS AUG.12,1893.
B	CL	ATTACHED WITH C-134-4630-[B].
B	SO	ATTACHED WITH C-134-4630-[A].
B	FX/SO/HO	
B	FX/ST/TE/ SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/TE	NOTE STATES COPY. LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	TE/FX/ST/ SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	TE/ST/SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.

B	ST/SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	TE/ST/SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	FO/ST	SCALES ARE NOTED AS FOLLOWS: FULL SIZE, 1/8 SIZE, 1/4 SIZE, 3/4"=1'. LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	ST/SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	ST/SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	TE/SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	FX	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.

B	FO/SO/ST	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	TE/ST	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES. SEE ALSO PLAN NO. C-134-4685.
PAPER	B	SOILED
		LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES. SEE ALSO PLAN NO. C-134-4684. L. & C. CARD INDEX GIVES DATE OF 1870 WHICH IS PROBABLY THE DATE OF THE PENCIL ADDITIONS.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES.
B	ST/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
PAPER	B	STAINS, SOILED, TEARS
B	ST/SO/TE	
B	ST/FX	

PAPER	B	FOXING, SOILED
B	FX/SO	
B	FX/SO/TE	
B	FO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE	
PAPER	B	STAINS, TEARS
B	TE/ST	
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/ST/ SO	TITLE FOUND VERSO. SECTION OF CHECK VALVES USED IN 12-INCH CONNECTIONS BETWEEN THE WATER MAINS OF THE CITY OF LOWELL AND LOCKS AND CANALS. LOCATED IN FOLDER "DETAIL PLANS OF PIPE SPECIALS".

A		CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "ABOUT 1859". IT ALSO DOES NOT SPECIFY THE CONTENTS BY PLAN NUMBER OR EVEN THE TOTAL NUMBER OF PLANS. CONTENTS OF THIS PORTFOLIO NOT LOCATED.
B	SO/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	BEARS SHELF CROSSED OUT, RECTO, AND NO. 1455 CROSSED OUT, VERSO. BOUND WITH 136-002-[COPY 1].
C	SO/FO/ST	BEARS SHELF 154 RECTO AND NO. 1455 CROSSED OUT, VERSO. BOUND WITH 136-002.
B	SO	BOUND WITH C-136-003-[B].
B	SO	BOUND WITH C-136-003-[A]

B	SO/FO	ALSO PROFILE OF CHANNEL.
B	SO/TE	
B	SO/FO	
B	SO	
B	SO/TE	BOUND WITH C-136-009-[A].
B	SO/LI/MO	BOUND WITH C-136-009.
B	SO	BOUND WITH PLAN NO. C-136-010-[A]. BEARS NO. 1465 TAPED OVER, RECTO.

B	SO	BOUND WITH C-136-010. BEARS NO. 1466 TAPED OVER, VERSO.
B	SO/FO	
B	SO/FO	
B	SO	
B	SO/MO	SEE ALSO HIRAM F. MILLS' "DAY BOOK PAGE 119."
B	FO/SO/TE	DRAWN BY WILLIAM NELSON, C.E., LACONIA, N.H. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS SHELF 154 CROSSED OUT, RECTO, AND NO. 1479 TAPED OVER, VERSO.

B	SO	SHEET #1. BOUND WITH PLAN NOS. C-136-016-[2],[3], & [4].
B	SO	SHEET NO.2. BOUND WITH PLAN NOS. C-136-016-[1],[3], & [4].
B	SO	SHEET NO. 3. BOUND WITH PLAN NOS. C-136-016-[1],[2], & [4].
B	SO/FO	SHEET NO. 4. BOUND WITH PLAN NOS. C-136-016-[1],[2], & [3].
B	SO/ST/TE/ FO/LI	[...] FOR SUPPORTING FLASHBOARDS; ALSO SHOWS EMPTY HOLES FILLED WITH BRIMSTONE AS FOUND/AUG. 1897. FOUND IN ENVELOPE LABELED "PAWTUCKET DAM" NO.17.

B	SO	"FOR LOCATION OF SECTION [SEE] PLAN DATED AUG. 26,1897."
B	SO/TE	ATTACHED TO THIS PLAN IS A TWO PAGE LETTER ADRESSED TO J. B. F. FROM AN AGENT OF THE "WINNEPISSEOGEE LAKE COTTON & WOOLEN MANUFACTURING COMPANY." PLAN IS DATED NOV.13,1883; DOCUMENT IS DATED NOV.20,1883.
B	SO/FO/TE /LM	
C	SO/TE	NOTES ARE TABULATED FOR 1882, 1883, 1884, THOUGH "NO OBSERVATIONS WERE MADE DURING [1885]".
B	SO/FO	BOUND WITH C-136-021-[2]. "CONTOURS PLOTTED FROM THESE ON PLAN NO.1368."

B	SO/FO	BOUND WITH C-136-021-[1]. "CONTOURS PLOTTED FROM THESE ON PLAN NO. 1368."
B	SO/FO	LOCATED AFTER COMPLETION OF FINAL INVENTORY.
B	SO/TE	
B	SO/FO	ALSO SHOWS APPROXIMATE LOCATION OF REMAINS OF OLD DAM & APPROXIMATE SECTION ON REMAINS OF OLD DAM LOOKING DOWN STREAM. PLOTTED FROM NOTES TAKEN OCT. 5,1900. ORIGINAL SURVEY MADE IN 1898.
B	SO	
B	SO/FO	A BOUND FIVE PAGE BOOK OF MAPS WITH CARDBOARD COVERS. NOTE DIRECTS TO SEE 179-B.

B	SO/TE/FO /LM	PLAN RENUMBERED BY P.L.& C. FROM 154-031 TO C-136-031.
B	SO/TE/FO /LM	PLAN RENUMBERED BY P.L.& C. FROM 154-031 TO C-136-031.
B	SO/FO/TE	DATES PLOTTED RANGE FROM 1887 TO 1914. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	
C	FO/SO	APPEARS TO BE A TRACING OF 136-036 WITH NEW WORK. BEARS SHELF 154 CROSSED OUT, RECTO.
B	SO/FO/TE	COPIED FROM CAPT. S. HOLLAND'S SURVEY, BY JOSEPH PIKE JUNR. JANUARY 1801, WITH NOTE BY J.B. FRANCIS DATED NOV. 30, 1874 GIVING HISTORY OF MAP.

B	SO/FO	
B	SO	BOUND WITH C-136-042-[COPY 1] & C-136-043.
C	SO	BOUND WITH C-136-042 & C-136-043. TABLE SHOWING MEASURED RESULTS GIVING VALUE OF "C" IN CHEZY FORMULA.
B	SO	BOUND WITH C-136-042 & C-136-042-[COPY 1].
B	SO	
B	SO	BOUND WITH C-136-048-[COPY 1].

C	SO	BOUND WITH C-136-048-[COPY 1].
A		LISTED AS SUCH IN BOTH THE P. L. & C. SUBJECT INDEX AND THE CONSECUTIVE INDEX OF DRAWINGS WITH SAME DATE RANGE.
C	SO/TE/LI	TWO GRAPHS SHOWN. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE RANGE 1905-25..
C	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE RANGE 1905-25..
B	SO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE RANGE OF MAR. TO OCT., 1924.
B	SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE RANGE OF MAR. TO OCT., 1924.
B	TE/FO	

B	SO/FO	
B	SO/FO	
B	SO/FO	
B	SO/FO	
B	SO/TE	W. E. BUCK, DEL. BOUND WITH 136-057-[B]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	BOUND WITH C-136-057-[A]. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	

C	SO/FO	LAYOUT OF FIRST ST. & BOULEVARD. SHOWS "PROPOSED RIVER LINE." SHEET 3 OF 4.
C	SO/FO	LAYOUT OF FIRST ST. & BOULEVARD. SHOWS "PROPOSED RIVER LINE." PROPERTY OF GEORGE L. HUBBARD IS HIGHLIGHTED. SHEET 4 OF 4.
B	FO/SO	NOTE READS; "COPY GIVEN ASSESORS". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	THIS PLAN ALSO INCLUDES THE LAND FOR THE BOULEVARD GIVEN BY THE LOCKS & CANALS. NOTE READS; "THIS PLAN ACCOMPANIES DEED". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	
B	SO/FO	
B	SO	BEARS NOTE: "THIS PLAN EVIDENTLY WAS THE ORIGINAL DESIGN FOR THE BRIDGE..."

B	SO	SHOWS PROPOSED HEIGHT FOR BRIDGE, HEIGHT FOR CITY ENGINEER'S PLAN OF APRIL 24,1902, & LINES OF BRIDGE COPIED FROM L.& C. PLANS OF FEB.1852.
B	SO/FO/TE	NEW ENGLAND STRUCTURAL CO., EVERETT MASS.
B	SO/FO	
B	SO	SEE ALSO PLAN NO. C-141-003-C.
B	SO/FO	SEE ALSO PLAN NO. C-141-003-B.

B	SO/LM/FO/TE
B	SO/FI
B	SO/FO/TE
B	SO/FO
B	SO/FO/TE
B	SO/FO/TE

B	SO	
B	SO	
B	SO/FO	
B	SO/FO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	
B	SO/FO	

B	SO/FO
B	SO/FO/TE
B	SO
B	SO/FO/TE
B	SO/FO/FI
B	SO/FO/TE
C	SO/FO/TE

B	SO	ALL NEW PARTS SHOWN IN RED.
B	SO/FO	SHOWING LOCATION OF PIPES & SIDE ELEVATION & SHOWING ALSO PROPOSED PLAN FOR SUPPORTING THE CONDUIT PIPES.
B	SO/FO/TE	SHOWING NORTH SPAN LOOKING DOWNSTREAM AND SHOWING CHAINS HOLDING THE ENDS OF THE BRIDGE RODS.
B	SO	
B	SO	
B	SO	
B	SO/TE/LM	

B	SO	
B	SO	
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FI	
B	SO	
B	SO	

B	SO	
B	SO	
B	SO/TE/FO	DRAWING # 1A. FRANK & WILCOX, BOSTON, ARCHITECTS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	FRANK & WILCOX, BOSTON, ARCHITECTS. REVISED DRAWING # 16. "DRAWING # C2". ALSO BEARS NOTES DATED DEC.7,1916.
B	SO	FRANK & WILCOX, BOSTON, ARCHITECTS. JOB 150. DRAWING # 18. "SEE DRAWING NO.2 & 24.
B	SO/FI	FRANK & WILCOX ARCHITECTS...BOSTON...JOB # 150. "DRAWING NO.(19)."

B	SO	FRANK & WILCOX, BOSTON, ARCHITECTS. DRAWING # 20 REVISED NOV.4,1916. "SEE DRAWING NUMBER 7."
B	SO/ST	FRANK & WILCOX ARCHITECTS ...BOSTON...JOB NO.150. "SEE REVISED DRAWING NO. C. FOR COLUMN SCHEDULE ETC." "DRAWING NO. C.6". REVISION OF DRAWING DATED NOV. 13, 1916.
B	SO	FRAMING DRAWING # 24. PREPARED BY S.M.I. ENGINEERING CO., BOSTON. FUNK & WILCOX ARCHITECTS...BOSTON.
B	SO	FRANK & WILCOX ARCHITECTS...JOB 150. "DRAWING # 25".
B	SO	"JOB 150 DRAWING # 28." CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE/FO	PREPARED BY S.M.I. ENGINEERING CO., BOSTON. DRAWING # 31. REVISED NOV.16,1916.
B	SO	FINK & WILCOX, ARCHITECTS. S.M.I. ENGINEERING CO., BOSTON. SHEET # 33.

B	SO	FINK & WILCOX, ARCHITECTS. S.M.I. ENGINEERING CO. SHEET #34.
B	SO/TE	FINK & WILCOX, ARCHITECTS. S.M.I. ENGINEERING CO., BOSTON. SHEET #35.
B	SO	FINK & WILCOX, ARCHITECTS. DRAWING #35. PLAN BEARS, "DRAWING NO. 36."
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	

B	SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	
B	SO/FO/TE	THIS PLAN ACCOMPANIES MEMO DATED APR. 24, 1918.
B	SO/FO	
B	SO/FO/TE	SHEET # 1. 2 SHEETS. SEE ALSO PLAN NO. C-141-012-B.

B	SO/FO/TE	SHEET #2. 2 SHEETS. SEE ALSO PLAN NO. C-141-012-A
B	SO	SHEET A, #3. ANOTHER COPY OF THIS BLUEPRINT CAN BE FOUND AT 162-004-[B].
B	SO/FO/TE	ORIGINAL DATED, MARCH 1882. ADDITIONAL DATE GIVEN AS, SEPT. 2, 1913.
B	SO	
B	SO	
B	SO/TE/FO	

B	SO	BY THE BOSTON AND NORTHERN ST. R.R., EPHRAIM HARRINGTON & CO., CIVILO ENGINEERS, BOSTON. COPIED 19 DEC. 1918. BEARS NO. C-1246 RECTO.
B	SO/FO/TE	"SHEET NO. 1."
B	SO	
B	SO	
B	TE/FO/LM	L.& C. INDEX CARD NOTES "SEE STACKPOLE ST. DUMP." APPEARS TO HAVE BEEN PART OF A LARGER PLAN. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/FO
B	SO
B	SO
B	SO
B	SO/FO/ST
C	FO/SO

B	TE/FO/LM /SO	
B	SO/FO/FI/ TE	
B	SO/FO/TE	
PAPER	B	FOXING, SOILED
B	SO/FO	NOTE READS "COPY OF PLAN ON FILE". THAT PLAN MUST BE C-128-3196. DATE OF THIS COPY IS NOT KNOWN.
B	SO/TE	SCALES ARE NOTED AS FOLLOWS: H 1"=20',V 1"=5', 1"=4', 1"=50'.
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE/FO /ST	

B	SO/FO	BEARS NO. 4425, VERSO.
B	SO/FO	
B	SO/TE/FO	
B	SO	
B	SO/FO	
B	SO/FO	

B	SO	
B	SO/FO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/TE /LI	
B	SO/FO	
B	SO	
B	SO	
B	SO/TE	BEARS NO. 4386-A VERSO.
B	SO/TE	BEARS NO. 4386-B VERSO.

B SO/FO/TE

B SO/FO

B SO/FO/TE

B SO/FO/TE

B SO/FO/TE SHEET #5 OF 5 SHEETS.

B SO/FO/LM /TE SHEET #4 OF 5 SHEETS.

B SO/FO

B	SO/FO	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	
B	SO/FO/TE /FI	
B	SO	THIS IS THE ORIGINAL FROM WHICH THE BLUEPRINT AT C-142-139 WAS MADE BEFORE THE DATE WAS MODIFIED FROM SIMPLY JAN. 1923 TO JAN. 30. 1923.
B	SO/FO	

B	SO/FO	NOTE, VERSO, READS "W.E. BADGER, LOWELL, MASS. MAR 22 1926."
B	SO/TE/FO	
B	SO/FO/TE	
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	SHEET 6.
B	SO/FO	SHOWS DAM & GRIST MILL ON MERRIMACK CANAL. BEARS NOTATION "SHEET 8".

B	SO/FI	ORIGINAL DATED JAN.1908. REVISED BY W. E. BADGER, AUG.15, 1917.
B	TE/SO/FO	L.& C. CARD INDEX GIVES DATE OF 28 JUNE, 1917. SEE NOTES FOR C-141-035-J-[COPY 1]. LOCATED AFTER COMPLETION OF OF FORMAL INVENTORY.
B	SO/FO	
C		
B	SO/FO	INDEX OF CONSECUTIVE DRAWINGS GIVES DATE OF 20 JULY, 1917.
B	SO/TE/LM /FO	"EARLIER ISSUES ARE OBSOLETE." SCALES ARE NOTED AS FOLLOWS: 1/4", 3/4" &, 3/8"=1', 1"=20'.

B	SO/FO	PLAN NO. 2.
B	SO	PLAN NO. 1.
B	SO/TE/LM	PLAN NO. 3. REVISED SEPT.27, 1917.
B	SO/TE/FO	PLAN NO. 4.
B	FO/SO/TE	REVISION, PLAN NO. 5. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO/FO	BEARS NOTE: "SECOND REVISED PLAN #4" IN COLORED PENCIL, RECTO.
B	SO	REVISED PLAN #4.
A		PLAN NOS. C-144-078-[COPY 1] AND C-144-078-[COPY 2] ARE BLUEPRINTS OF THIS PLAN.
B	SO	PLAN #1.
B	SO	PLAN #2.
B	SO	PLAN #3.

B	SO/FO	
B	SO	
B	SO	BEARS NOTE "FILE 8-3-A & SHEET NO. 2". BOUND WITH NOS. B-618-10, 03 THROUGH 08, 10 &13 THROUGH 24.
B	SO/ST	DRAWING SHOWS FIRST STORY PLAN OF NELSON MORRIS & CO. BLDG. BOUND WITH PLAN NOS. 141-B-618-01, CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/TE	BOUND WITH PLAN NOS. 141-B-619-O1, 03 THROUGH 08, 10 & 13 THROUGH 24. BEARS NO. 8-3-41 RECTO.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01, 03 THROUGH 08, 10 & 013 THROUGH 024. BEARS FILE 8-3-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO	BOUND WITH PLAN NOS. 141-B-618-01, 03, THROUGH 08, 10 & 13 THROUGH 24. BEARS NO. 8-3-A1 RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01, 03 THROUGH 08,10 & 13 THROUGH 24. BEARS FILE 8-3-A & SHEET NO. 4.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01, 03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. APPEARS TO BE OF NELSON MORRIS & CO. BLDG. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	BEARS FILE 8-3-A, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01, 03, THROUGH 08 & 13 THROUGH 24. BEARS SHEET NO. 1 & FILE 8-3-A.
B	SO/FO/TE	BEARS NO. 8-3-A2 CROSSED OUT RECTO.

B	SO/FO/TE	BEARS NO. 8-3-A2.
B	SO	PLAN SHOWS CROSS SECTION ELEVATION OF NELSON MORRIS & CO. BLDG. THROUGH THE SALESROOM & 2ND. FLOOR. BOUND WITH PLAN NOS. 141-B-618-01, 03 THROUGH 08, 10 & 13 THROUGH 24. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN SHOWS NORTHEAST ELEVATION OF THE NELSON MORRIS & CO. BLDG. NEAR PAWTUCKET CANAL. BOUND WITH PLAN NOS. 141-618-01,03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	BUILDING LABELLED AS "227 NELSON MORRIS & CO. 227." BOUND WITH NOS. 141-B-618-01, 03 THROUGH 08,10 & 13 THROUGH 24. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	PLAN SHOWS SECTION TRANSVERSE THROUGH COOLER OF NELSON MORRIS & CO. BUILDING. BOUND WITH PLAN NOS. 141-B-618-01,03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01,03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. PLAN SHOWS SALESROOM OF NELSON MORRIS & CO. BLDG. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/FO	PLAN SHOWS CROSS SECTION ELEVATION THROUGH SALESROOM OF NELSON MORRIS & CO. BLDG. BOUND WITH PLAN NOS. 141-B-618-01,03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01,03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. PLAN SHOWS SILLS & JAMB FOR SMOKEHOUSE DOOR.
B	SO	BOUND WITH PLAN NOS. 141-B-618-01, 03 THROUGH 08, 10 & 13 THROUGH 24. BEARS SHEET NO. 5 & FILE 8-3-A.
B	SO/FO	NELSOM MORRIS & CO. BUILDING. BOUND WITH PLAN NOS. 141-B-618-01, 03 THROUGH 08, 10 & 13 THROUGH 24. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BOUND WITH PLAN NOS 141-B-618-01,03 THROUGH 08, 10 & 13 THROUGH 24. BEARS FILE 8-3-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BOUND WITH PLAN MOS. 141-B-618-01, 03 THROUGH 10 & 13 THROUGH 24. BEARS FILE 8-3-A.

		BOUND WITH PLAN NOS 141-B-618-01, 03 THROUGH 08, 10 & 13 THROUGH 24. BEARS NO. 8-3-A1 CROSSED OUT RECTO.
B	SO/FO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/TE	
C	SO/FO	
B	SO/FI	SHOWS FOUR STORES & BATHROOMS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FI	BRADLEY BLDG., RESTAURANT, BATHROOMS & KITCHEN SHOWN.
B	SO	RED SHOWS REINFORCEMENT INSTALLED IN 1915-1918. BLACK SHOWS STEEL REINFORCEMENT INSTALLED IN 1918.
B	SO	
C	SO	

C	SO	PLAN SHOWS LOTS LEASED BY MOTLEY & DUNBAR, & MOTLEY & KIMBALL FROM PROPS. OF L.& C. ALONG CENTRAL ST. OVER PAWTUCKET CANAL. THIS PLAN NO. WAS USED TWICE BY P.L. & C.
C	SO	
C	SO	
C	SO/HO/ST	
C	SO	
C	SO	
B	ST/TE	REDUCED FROM ORIGINAL, NOV. 1871. HIGHLIGHTS ARE IN WATERCOLOR.
B	ST/TE	SHOWS VARIOUS AREAS OUTLINED IN COLORS AND MARKED "A" (RED), "B" & "F" (BLUE), "D" & "C", "J", "H", "K" (GREEN), "E", "F" (YELLOW), "G" (ORANGE).

B	FO/SO	SHOWS SOME OF THE LAND ACQUIRED BY P.L.& C. FROM MERRIMACK MFG. CO. IN 1826 AND FROM VARIOUS OTHER PARTIES AT DIFFERENT TIMES UP TO 1828. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ATTACHED TO C-142-001-A.
B	FO/SO	SHOWS SOME OF THE LAND ACQUIRED BY P.L.& C. FROM MERRIMACK MFG. CO. IN 1826 AND FROM VARIOUS OTHER PARTIES AT DIFFERENT TIMES UP TO 1828. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	HO/TE	REDUCED FROM ORIGINAL, NOV. 1871.
B	TE	REDUCED FROM ORIGINAL, NOV.1871.
B	TE/LO/SO	REDUCED FROM ORIGINAL, NOV.1871.
B	TE/SO	REDUCED FROM ORIGINAL C-142-001-A-[COPY 4].
C	SO/ST/LO	FOUND IN SHELF 151.
C	SO/ST/LO	

C	ST/LO	
B	TE/SO/ST	ORIGINAL DATED NOV. 1871. ADDITIONAL WORK DATED APRIL 1923.
B	TE/FO/FX	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	LM/TE/SO /LI	BEARS NO. 4416 A, VERSO.
B	LM/TE/SO /LI	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 4416 B, VERSO.
B	TE/FO/ST/ SO/LI	BEARS NO. 4416-B, VERSO. NOTE READS "THIS PLAN IS INTENDED TO BE AN INDEX RECORD OF DISCLAIMERS AND SIMILAR AGREEMENTS GIVEN TO THE LOCKS & CANALS. SOME DOCUMENTS THAT ARE CONSIDERED OBSELETE ARE OMITTED. NUMBERS REFER TO LOCKS & CANALS INDEX.".
B	FO/TE/SO	

B	FO/SO/TE/ST	READS "MAP OF VARIOUS FENCING CANALS", RECTO. MAP INDICATED LOCATIONS OF VARIOUS BRIDGES.
B	TE/SO	
B	TE/SO	PHOTONEGATIVE ON PAPER REDUCED FROM THE LITHOGRAPH PLAN.
B	TE/FO/ST	PHOTONEGATIVE ON PAPER REDUCED FROM THE LITHOGRAPH PLAN.
B	RO/SO/LM	ANOTHER COPY OF THIS PLAN WAS USED AS MAP #6 BY P.L.& C.
B	TE/FO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/ST	LOT # 2.
A		SEE C-142-003-[A]. LOTS # 2-A-B-C-D. THIS WAS PROBABLY A DRAFTING CLOTH ORIGINAL.

C	SO	ORIGINAL DATED JAN. 12, 1920. NEW WORK SHOWS 6" TILE SEWER PUT IN FOR PERRY THOMPSON MARCH, 1931.
B	FO/ST/TE	CONSECUTIVE INDEX OF DRAWINGS NOTES THAT THE LAND WAS TO BE "RELEASED" TO DAVID ZISKIND.
B	ST	LOT # 4.
B	ST/SO	PLAN SHOWS SURVEY OF LINE ADJACENT TO PAWTUCKET CANAL. SHOWS AREA LOCATED BETWEEN PAWTUCKET CANAL & PAYNE ST.
B	TE/ST	LOT # 6.
B	FO/ST	
B	ST/SO/TE	LOT # 6.
B	ST	LOT # 7.

B	CL	ORIGINAL DATED JAN. 1906. LAST REVISION DATED MARCH 3, 1920.
B	FO/TE/ST	LOT # 8.
B	FO/TE/ST/ SO	LOTS # 8 AND 13.
B	SO	LOTS # 8 AND 13.
B	TE/FO/ST/ SO	LOT # 13.

B	ST/SO	
B	ST/SO/TE	ADDITIONAL WORK DATED DEC.18, 1920. LOTS # 13 AND 14.
B	ST	
B	ST/FO/SO	LOTS # 15, 16, AND 17.
B	SO/ST	LOTS # 16-A, AND 17.
B	FO/SO	LOT # 20-A.
B	TE/ST/SO	
C		
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LOT # 26.

B	TE/FO	DATE ACTUALLY READS OCT. 1914 AND MAR. 1917. P.L.& C. INDEX CARD AND CONSECUTIVE INDEX OF DRAWINGS GIVE ONLY DATE OF MAR. 1917. LOT # 28. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LOTS # 30-A & 31. RECTO. LAND BORDERED BY MOODY, PAWTUCKET & MELVIN STS. & MERRIMACK RIVER. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BLUEPRINT GIVEN TO A.T.S. OCT. 16, 1917. LOT # 31-C.
B	FO/ST	LOT # 33.
B	ST	LOT # 35-A.
B	FO/SO	LOTS # 34 & 35. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	LOT # 35-B.
B	FO/SO/TE	NOTES READ; "SENT TWO BLUEPRINTS OF THIS TO MR. FLATHER SEPT. 3, 1940 (BY EXP)", RECTO AND "AIKEN ST. DUMP", VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	ST/SO	
C	SO	FOUND IN FOLDER 147.
C		
B	SO/TE	SEE ALSO PLAN NO. C-142-032. IT IS UNCLEAR FROM CARD INDEX WHETHER THIS IS A COPY OR AN ORIGINAL ON TRACING PAPER. LOT # 68.
B	TE	NOTES "HUNTINGTON HALL", VERSO.
B	FO/ST/TE	
B	ST/HO/SO /TE	
C	TE	REDUCED COPY OF ORIGINAL

B	TE/ST	
C	TE/SO	
C		
B	ST/SO	SEE ALSO PLAN NO. C-142-037-[COPY 1]. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.
C		SEE ALSO PLAN NO. C-142-037. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.
B	ST/SO	
C	SO	FOUND IN SHELF 147. I
C	SO/ST/TE	FOUND IN SHELF 162.
C	SO/ST/TE	FOUND IN SHELF 162.
C		

B	SO	
C	SO	FOUND IN FOLDER 147.
C		
B	ST/SO	NOTE DIRECTS TO SEE 4466-F. BEARS 4356 RECTO & VERSO.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	FOUND IN FOLDER 147.
C		
B	FO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	

B	SO	NEW WORK SHOWN AS OF FEB. 1933. ALSO NOTED AS SUCH IN CONSECUTIVE INDEX OF DRAWINGS.
B	ST/SO	SEE ALSO PLAN NO. C-142-044-[COPY 1]. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.
C		SEE ALSO PLAN NO. C-142-044. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.
B	TE/ST	
B	FO/ST/SO	FROM A STEEL TAPE SURVEY MADE BY W. E. BADGER MADE NOV.17, 1894. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE AS NOV. 17, 1894.
B	FO/ST/SO /TE/HO	ADDITIONAL NOTES DATED MARCH 10, 1913.
B	TE/ST/SO	
B	FO/ST	LOT # 89.

B	SO	
B	FO/ST/SO	LOTS # 89, 90, AND 91.
B	FO/SO/TE	CONDITION IS VERY FRAGILE, PLAN HAS CRACKED INTO SECTIONS ALONG FOLD LINES.
B	TE/HO/ST /SO/LM	LOT # 92-A.
B	FO/ST/SO	LOTS # 91, 92, 107.
B	TE/ST	LOTS # 91, 92, 107.

B	FO/ST	BEARS NO. 4401, VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	LOT # 103-H.
B	FO/ST/SO /TE/HO	LOTS # 101, 102, 103.
B	TE/ST/SO	LOTS # 103-H AND 104. BLUEPRINT WAS MADE & GIVEN TO ROBERT MARDEN.
B	ST	LOT # 105. BEARS NO. 4323-A, VERSO.
A		LOT # 106.

B	FO/ST	THE ORIGINAL FROM WHICH THIS COPY WAS MADE BORE BOTH PLAN NO. 157-19 AND NO. 1709, RECTO, BENEATH LABELS APPLIED OVER THEM ON THE ORIGINAL.
B	FO/SO TE/LO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE	
B	FO	TRACED FROM BLUEPRINT ON FILE AT REGISTRY OF DEEDS, LOWELL-LAND COURT PLAN. COPIED FROM SURVEY MADE BY SMITH & BROOK MAY 16, 1916.
B	SO	
B	TE/ST	SURVEYED JULY, 1913.
A		

B	TE/SO	TRACED FROM BLUEPRINT ON FILE AT REG. OF DEEDS LOWELL LAND COURT PLAN.
B	ST/SO	PLAN WAS SURVEYED JUNE 26, 1923.
B	FO/ST	
B	SO/FO/LM	
B	FO/ST/TE/SO	BEARS NO. 4325 VERSO.
B	TE/SO/ST	
B	ST/HO	

B	ST/SO/TE	ADDITIONAL WORK DATED FEB. 3, 1905.
B	TE/LM	
B	ST/SO	
B	TE/SO	
B	HO/ST/FO	"BLUEPRINT RECORDED BOOK 37-PLAN NO.22."
C	FO/ST	NEW WORK SHOWN IN COLORED PENCIL.

C	TE/LM	NEW WORK SHOWN IN COLORED PENCIL. .
C	TE/LM	NEW WORK SHOWN IN COLORED PENCIL INDICATING BEFORE AND AFTER FEB. 13, 1920. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/FO/ST	
B	FO/ST/SO	
B	ST/SO	
B	ST	
B	SO/ST	
B	FO/TE	
B	TE/ST	
B	ST	

B	FO/ST/TE	
B	ST/SO	
B	FO/TE/ST/ HO	
c	ST	NOTES INDICATE THIS PLAN WAS COPIED FROM BLUEPRINT.
B	ST/SO	
B	TE/ST	
B	FO/ST	

B	TE	
B	SO	
A		
B	TE/ST	
B	TE/SO	NOTE DIRECTS TO SEE CAL. B. 555, PP. 55-65.
B	TE/SO	
B	LM/TE/ST	

B	TE	
B	SO/ST	NOTE, RECTO, DIRECTS TO SEE SHELF C-144-113 FOR BLUEPRINT.
B	ST	
B	FO/TE/ST	
B	FO/SO/ST	
B	FO/ST/SO	
B	FO/TE	

B	ST	
B		
B	FO/HO	COPIED FROM A DETAIL OF PLAN NO. 123-2853.
B	ST/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST/SO	DATED DEC.1917, BUT ADDITONAL NOTES DATED MARCH 20, & APRIL 25, 1918.
A		

B		BEARS NO. 9, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	BEARS NO. 10, RECTO. THE PLAN ACTUALLY BEARS THE NUMBER 117 BUT IT CONFORMS TO THE DESCRIPTION OF 116 IN BOTH THE SUBJECT CARD FILE AND THE CONSECUTIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	
C	FO/ST/HO /TE	
B	FO/ST	SEE ALSO PLAN NO. C-142-146.
B	FO/ST	PLAN OF FREE LANDING PLACE ABOVE OLD GUARD LOCKS LAID OUT ACCORDING TO PROVISIONS OF CHAPTER 38 OF THE ACTS OF 1900, ATTESTED TO BY THE CITY COUNCIL & APPROVED BY THE MAYOR DECEMBER 19, 1900, DESCRIBED IN AN AGREEMENT BETWEEN CITY OF LOWELL & P.L.& C.
B	SO	L. & C. INDEX REFERRED TO THIS PLAN AS A TRACING PAPER PLAN. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE. IT ALSO INCORRECTLY CALLS THIS PLAN NUMBER C-142.123.
B	FO/ST/TE/ SO/HO	LOT # 7. COPIED FROM PLAN NO. 4188. CONSECUTIVE INDEX OF DRAWINGS INCORRECTLY CALLS THIS PLAN NUMBER C-142-122.
B	FO/ST/HO	ORIGINALLY DATED JAN. 1906. LAST REVISION DATED DEC. 4, 1917. BEARS NOTE DATED APR. 20, 1918. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APRIL, 1918..
B	ST/SO	LOT # 13-A.
B	FO/ST/SO	
B	SO	COPIED MAY 10,1912 FROM PG. 6 OF MR. MILL'S NOTE BOOK "MAR 1912." CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MAY, 1912.
B	FO/ST/TE	SEE ALSO PLAN 134-011-[B].

B	FO/ST	
B	FO/ST	
B	FO/ST	
B	FO/ST/SO	ORIGINAL DATED DEC. 6, 1922. ADDITIONAL WORK DATED DEC.15 & 16, 1922. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF DEC, 1922.
B	SO	
B	FO/ST/SO /HO	
B	ST/SO	

B	ST/SO	
B	ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF SEPT. 1917.
B	FI	
B	FO/ST/FI/ SO	ADDITIONAL NOTE DATED JUNE 29, 1923.
B	FO/ST	ADDITIONAL NOTES DATED MARCH 16 & 17, 1923. NOTE STATES ORIGINAL TRACING IN SHELF C-141 NO. 34-A. THAT DRAWING HAS A DATE OF JAN. 30, 1923. CLEARLY THE ORIGINAL DATE WAS MODIFIED AFTER THIS COPY WAS MADE.
B	FO/ST/SO	
B	ST	
B	FO/ST	ORIGINALLY DATED JUNE 7, 1881. PLOTTED JUNE 25, 1881.THE PART OF PLAN WESTERLY DIRECTION, REFER TO PLAN NO. 29. THE PART OF PLAN EASTERLY DIRECTION, REFER TO PLAN NO. 19.

B	SO	
B	ST/SO	
B	FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	
B	ST/SO	
B	TE/ST	NOTE DIRECTS TO SEE PLAN # 4455, WHICH IS PLAN 143-039.
B	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	CL	ROUGH MAP OF AREA SOUTH OF MERRIMACK RIVER. A POSITIVE IMAGE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	ROUGH MAP OF AREA SOUTH OF MERRIMACK RIVER. A NEGATIVE IMAGE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	
B	FO/ST/SO	
B	FO/TE/ST/ HO/SO	
B	ST/FO	
B	SO	NOTE STATES "FROM PLAN 4413".

B	FO/SO/TE	
B	FO/FO/TE	L.& C. CARD INDEX GIVES DATE OF OCT. 6, 1908. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE/ST/SO	
B	FO/TE/ST/SO	NOT, VERSO, READS: "WORKING PLAN MELVIN STREET GRADING".
B	FO/ST/SO	BEARS NO. 4362.
B	FO/SO	TRACED JAN 16, 1918, FROM A BLUE PRINT BY W.E.B. LOCATED APFTER COMPLETION OF FORMAL INVENTORY PROJECT.
B	FO/ST/SO	
A		SEE 165-003-[COPY 1] WHICH IS NUMBERED 165-3 BY P. L. & C. BUT IT IS ACTUALLY C-143-013 AS PER ITS INDEX OF CONSECUTIVE DRAWINGS DATE. THE INDEX SHOWS PLAN 165-003 WITH THE DATE OF 1836 BUT THAT DOES NOT MATCH THE PLAN ITSELF WHICH GIVES DEC.1902.

B	FO/ST/SO	BEARS NO. 4349-A. PLAN DATE IS DATE OF THE ORIGINAL PLAN FROM WHICH THIS COPY WAS MADE ON SEPT. 2, 1899.
B	SO/FO/TE	BEARS NO. 4419, VERSO. NOTE, VERSO, READS: "SCHEME FOR R. R. TRACK FROM PEVEY'S FOUNDRY TO THORNDIKE ST. S. SIDE OF CANAL". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/FO/ST/ HO	
B	SO/FO/TE	BEARS NO. 4349, VERSO. NOTE READS: "FILED MAY 4, 1852". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE	CORRECTED AS FAR AS IS KNOWN TO FEB. 9, 1920. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE/ST	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.

B	SO/FO/TE	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	ST/SO	
B	FO/TE/ST	BEARS NO. 1303-R.
B	FO/TE	PLAN NO. 138-8 COVERED WITH TRANSLUCENT PATCH, LOWER LEFT CORNER, RECTO. PLAN NO. USED TWICE BY P.L. & C. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/SO/HO	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/SO/ST	PLAN CORRECT AS FAR AS KNOWN TO OCTOBER, 1920.
B	SO	

B	SO/FO/TE	HELIOTYPE PRINTING CO. BOSTON. NOT LISTED IN CONSECUIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO/LM/TE	PHOTOLITH FORBES CO. BOSTON. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/SO/TE	PHOTOLITH FORBES CO. BOSTON. NOT LISTED IN CONSECUIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		
B	TE/ST/SO	DIMENSIONS & ANGLES WERE MEASURED BY JAMES FRANCIS & THE ORIGINAL NOTES MAY BE FOUND IN FOUR NOTEBOOKS LABELLED A B. C. D. REBUILDING OF MAIN DAM 1875. JAMES FRANCIS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/SO	
B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON. BEARS NO. 4391, RECTO AND VERSO.

B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON.
B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON.
B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON..
B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON.
B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON.

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B	SO/FO/TE	AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCKS & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON.
B	FO/SO	BEARS NO. 4391-A, VERSO. COPIED FROM ORIGINAL DRAWING IN POSSESSION OF MERRIMACK M. CO., JULY 12, 1894. BLUEPRINT C-143-033-[B] WAS NOT MADE FROM THIS PLAN BUT FROM ANOTHER ORIGINAL WHICH WAS BASED UPON THIS PLAN.
B	ST/SO	THIS BLUEPRINT WAS NOT MADE FROM PLAN NO. C-143-033-[A] BUT FROM ANOTHER ORIGINAL WHICH WAS BASED UPON IT.
B	SO/TE	L.& C. INDEX CARD GIVES DATE OF NOV. 16, 1922. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	ST/SO	LISTED A C-143 IN L.& C. PLANS INDEX.
B	SO	CONTAINS VIEWS 1-8 OF SECTIONS OF PAWTUCKET CANAL. SEE ALSO PLAN NO. C-143-036-[B].
B	SO	CONTAINS VIEWS 15-22 OF SECTIONS OF PAWTUCKET CANAL. SEE ALSO PLAN NO. C-143-036-[A].
B	TE/FO/ST/ SO	
B	FO/TE/ST/ SO	
B	FO/ST/SO /LI	BEARS NO. 4455, VERSO. SCALE IS FOR ONLY ONE OF A NUMBER OF CONSTITUENT DRAWINGS ON PLAN. THE VARIOUS DRAWINGS ON THIS PLAN BEAR A NUMBER OF DIFFERENT DATES. SEE PLAN C-142-149. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1899.

B	FO/TE/SO	LOT NUMBERS ARE THE SAME AS APPEAR IN L.& C. SCHEDULE OF TAXABLE PROPERTY RETURNED TO ASSESSORS. BEARS NO. 4403, VERSO. CONTINUED BY C-143-041.
B	FO/TE/SO	LOT NUMBERS ARE THE SAME AS APPEAR IN L. & C. SCHEDULE OF TAXABLE PROPERTY RETURNED TO ASSESSORS. BEARS NO. 4403-B, VERSO. CONTINUATION OF C-143-040.
PAPER	B	FOLDS
B	FO	
B	ST/SO	
B	TE/ST/SO	BEARS NO. 4367, VERSO.

B	TE/SO/ST/ FO	BEARS NO. 4403-A.
B	FO	
B	TE/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	
B	FO/ST	NOTE READS: "TRACED FROM LOCKS & CANALS PLAN # 4405 FEB. 25, 1907." THIS BLUEPRINT WAS MADE FROM DRAFTING CLOTH PLAN NO. 158-030.
B	ST/SO	
B	TE/SO	PLAN HAS FALLEN APART AND IS IN 3 PARTS.
B	SO/FO	

B	TE/SO	
B	ST	SKETCH RELATIVE TO FENCE BETWEEN FRENCH ORPHANAGE & LOCKS & CANALS ON FALLS STREET LOCATED BETWEEN SCHOOL ST. & FANNING ST.
B	FO/SO	SKETCH RELATIVE TO FENCE BETWEEN FRENCH ORPHANAGE & LOCKS & CANALS ON FALLS STREET LOCATED BETWEEN SCHOOL ST. & FANNING ST.
B	FO/TE/SO	
B	TE/SO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF AUGUST, 1915.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	HO/TE/ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 22 JULY, 1915. NOT FOUND IN L.& C. CARD INDEX BUT NOTED IN THE CONSECUTIVE INDEX OF DRAWINGS. LOCATED AFTER COMPLETION OF ORIGINAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO
B	SO	DATE.
B	TE/SO/ST	
B	HO/ST/SO	

B	SO	BEARS NO. 4364-H, VERSO.
B	ST/SO	
C		
B	FO	
B		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	
B	FO/SO	L.& C. INDEX CARD GIVES DATE OF JUNE 24, 1901. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST/TE/SO	
B		COPIED FROM MR. MILL'S BOOK PG. 97 DATED JULY 22, 1900.

B	FO/ST	BEARS NO. 58 RECTO. NOTE STATES THAT THIS TRACING WAS SUBSTITUTED FOR THE ORIGINAL FILED AT LAND COURT.
B	FO/ST	
B	FO	NOTE READS: "WORK BEGUN ON FOUNDATION MAY 16-99". LOCATED AFTER COMPLATION OF FORMAL INVENTORY.
B	FO	SEE ALSO C-143-074-[COPY 1].
B	FO/ST	SEE ALSO PLAN NO. C-143-075-[COPY 1].
B	FO	
C	FO/TE/ST	BEARS NO. 64, RECTO. NOTE IN RED PENCIL READS: "THIS AREA {DELINEATED} LEASED TO MASS. MOHAIR PLUSH CO. FROM DEC. 1, 1911-SEE REDUCED SKETCH ON LEASE." THAT REDUCED SKETCH MAY BE PLAN C-143-077-A.
B	FO	NOTE, VERSO, READS: "LEASE 5725". CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APRIL, 1928. CLEARLY THIS PLAN HAS BEEN TRACED FROM EITHER PLAN C-143-077 OR, MORE LIKELY, C-1430-007-[COPY 1].

B		LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/SO	LAND LIES BETWEEN WESTERN AVE. & PAWTUCKET CANAL. ALSO BEARS NO. 66 RECTO.
B	FO/ST	
B	FO/FX	THIS PLAN WAS MADE TO TRACE ON TWO OTHER TRACINGS OF LIVINGSTON'S LAND-FORMS L.& C. PLANS 191, FOR MR. MILLS.
B	ST	
B	FO/ST	COPIED FROM BLUEPRINT LOCATED MDSX. N.D. REG. DEEDS.
B	FO/ST/SO /HO	ADDITIONAL WORK DATED SEPT. 1,3,8,14,1914.
B	FO/ST	

B	TE/SO	
B	SO	
B	FO/SO/ST	
B	FO/SO	THE LAST DIGIT IN THE DATE IS ALSO NOT SHOWN IN THE CONSECUTIVE INDEX OF DRAWINGS.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	BEGAN TO BUILD WALL, SUNDAY SEPT.10,1898.
B	FO/ST/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF 5 NOV. 1917.
A		
B	FO/SO	BEARS NO. 8945. CONSECUTIVE INDEX OF DRAWINGS REFERS TO W. H. DURFEE IN REFERENCE TO THIS PLAN.

B	FO	
B	SO	
B	FO/ST	
B	TE/HO/ST	CONSECUTIVE INDEX OF DRAWINGS REFERS TO W. H. DURFEE IN REFERENCE TO THIS PLAN.
B	TE/FO/ST	CONSECUTIVE INDEX OF DRAWINGS REFERS TO W. H. DURFEE IN REFERENCE TO THIS PLAN.
B	FO/ST/TE	
B	FO/ST/SO	BEARS NO. 88. COPIED FROM PLAN NO. 4325.
B	FO/ST/SO	PLAN DATED OCT. 1914 & MARCH 1917.

B	FO/ST	
B	ST	BEARS NO. 91 RECTO.
B	FO	
B	FO/ST/SO	
B	SO/FO	BEARS NO. 91.
A		
B	FO/ST	
B	FO/TE/ST	
B	FO/ST	

B FO/SO BEARS NO. 98.

B TE/ST

B ST/SO

B ST

B CL

B FO/FI/ST

B FO

B ST/SO

B	FO/SO	
B	FO/ST/SO	WORK DONE AUG.11-13,1914. BEARS NO. 106. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1914.
B	FO/ST	
B	SO	BEARS NO. 108. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/TE/ST/ SO	
B	FO/SO/ST	
B	FO/SO	
B	CL/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF SEPT. 9, 1902. THIS PLAN MADE TO ACCOMPANY INDENTURE MEMORANDUM DATED SEPT. 19, 1902.
B	FO	LOTS 68 AND 69. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO/SO	BEARS NO. 116.
B	FO	TRACED JAN.7, 1914 FROM PLAN ON FILE AT LOWELL REG. OF DEEDS.
B	FO/ST	BEARS NO. 119.
B	ST	PLAN IDENTIFIED AS ON TRACING PAPER IN L. & C. CARD INDEX.
B	FO/ST/SO	
C	CL	ATTACHED TO PLAN C-128-3226. THIS PLAN HAD FORMERLY BEEN NUMBERED C-143-134 BUT THE ORIGINAL FROM WHICH THIS COPY WAS MADE WAS SUBSEQUENTLY RENUMBERED TO C-143-133. THUS THIS COPY WAS RENUMBERED ACCORDINGLY. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO	LABELLED C-143-135, THIS IS CLEARLY PLAN C-143-134 AS IT MATCHES EXACTLY THE DESCRIPTION FOR PLAN C-143-134 IN BOTH THE P. L. & C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
B	FO/ST/SO	

B	FO/ST/SO	
B	FO/ST/SO	
B	FO/ST	
B	FO/SO	
B	FO/ST	BEARS NO. 128 BENEATH PLAN NUMBER LABEL.
B	FO/ST	
B	FO/TE/ST	BEARS NO. 130.
B	FO/ST/SO	
B	CL	
B	FO/ST	NOTES READ "TRACED FROM ORIGINAL AT LOCKS & CANALS OFFICE FEB.14, 1910" AND "2 PRINTS FEB. 14 10".

B	FO/TE/FI	
A		
B	FO/ST	
B	FO/ST	
B	FO/SO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	HO/FO/ST	
C	FO	LOCATED IN SHELF C-144.
B	SO/TE/FO	
B	HO/ST	SHEET # 1. REFER TO C-144-003, C-144-004, FOR SHEETS # 2 & # 3.

B	HO/ST	SHEET # 2. REFER TO C-144-002, & C-144-006, FOR SHEETS # 1 & # 3.
B	FO/ST	
B	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST/SO	
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/ST/SO	
B	ST/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF 1 MAY, 1902..
B	ST	ORIGINAL GIVEN TO SACO-LOWELL & 1 BLUEPRINT ON FILE WITH LEASE.

B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF APRIL, 1902.
B	ST/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	
B	FO/ST	LOT # 2.
B	FO/ST	
B	FO	

B	FO/ST/TE	
B	FO/TE/ST	
B	FO/ST/SO /TE	COPIED FROM DRAWING AT BIGELOW CO.
C	FO/ST/SO	
B	FO/ST/SO	
B	FO/ST/SO	
B	FO/ST	BEARS NO. 5368 A, RECTO..
B	FO/TE/ST/ FX	
B	FO/ST	TRACED FROM CITY ENGINEER'S OFFICE FROM PLAN # 33.

C	CL	THIS PLAN IS A DETAIL FROM C-144-025 THAT HAS CLEARLY BEEN TRACED FROM IT. IT HAS NO SCALE GIVEN BUT IS THE SAME AS C-144-025.
B	FO/ST/SO	BEARS NO. 170 BENEATH PLAN NUMBER LABEL. SEE PLAN NO. 134-025-4147 FOR A LATER VERSION OF THIS PLAN.
B	FO/ST/SO	
B	TE	
B	FO/TE/ST/FX	CONCRETE LAID APRIL 22, 23, 24 & 25, 1913.
B	FO/TE/ST/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF AUG. 1914.
B	ST/SO	SHOWING CONDUIT PIPES OF LOWELL ELECTRIC LIGHT CO. BY DISCLAIMER OF NOV.12, 1901, & CABLES OF NEW ENGLAND TELEPHONE & TELEGRAPH CO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	FO/ST	NOTE DATED JUNE 1922.
B	ST/TE	ORIGINAL DATED MAY 8,1917. COPIED DEC 2,1919. NOTE INDICATES BRIDGE WAS REBUILT OF STEEL & CONCRETE IN JULY 1922.
B	FO/ST/SO	
B	FO/ST/TE	ANOTHER COPY OF THIS PLAN MAY BE FOUND AT 164-070.
B	FO	
B	FO/ST	
B	FO/TE/ST	

B	FO/ST	TRACED FROM CITY ENGR'S. PLANS. BEARS NO. 183 RECTO.
B	FO	
B	CL	SEE ALSO PLANNO. C-144-042.
B	CL/FI	SEE ALSO PLAN NO. C-144-041.
B	SO/TE	
B	FO/ST	
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE	

B	FO/ST	
B	FO/ST/SO	
B	FO/TE/ST	BEARS "PLAN NO. 5", IN COLORED PENCIL, RECTO
B	FO/SO	TRACED MARCH 28, 1921, FROM BLUEPRINT BORROWED FROM SACO-LOWELL SHOPS DATED JAN. 18, 1921.
B	FO/SO	
B	CL	
B	SO/TE	

B	FO/TE	
B	SO	ON NOV. 22, 1881, TWO DUPLICATE COPIES OF THIS PLAN WERE MADE & DELIVERED TO THE APPLETON & HAMILTON CO'S.
B	ST/SO	
B	CL	
B	FO/ST/SO	
B	FO/ST/TE	"MR. MILLS TOOK ORIGINAL COPY."
B	CL	
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO	
B	FO/ST	
B	FO/SO/TE	LOCATED WITH SHELF 144.
B	FO/ST/SO	L.& C. INDEX CALLS THIS A TRACING PAPER PLAN.
B	FO/ST/SO	
B	FO/ST/SO	
B	SO	
B	FO/SO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	
B	FO/TE/ST/ SO	
B	TE/FO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	TE/ST/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES DATE OF 3 SEPT. 1914..
B	FO/ST	

B	FO/ST/TE	BLUEPRINT OF C-141-035-U. BEARS NO. 227, RECTO.
B	CL	NOTE INDICATES ORIGINAL WAS GIVEN TO A.J.S. AUG. 3, 1917.
B	FO/ST/SO	
B	FO/ST SO	
B	FO/TE/ST	
B	SO/FO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	FO/TE	ASSOCIATED MUTUAL INSURANCE CO.
B	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO/TE/ST/ SO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST/SO	SEVEN SKETCHES. PLAN C-144-089 GIVES LOCATION OF THESE SECTIONS.
B	FO/SO/TE /HO	
B	FO/ST/SO	
B	FO/TE/ST	
B	ST/FO	
B	FO/ST	ANOTHER COPY OF THIS PLAN IS FOUND AT 135-4038-A.
B	FO/ST	LOTS NO 29 AND 29-A.
B	FO	

B	SO/FO	LOCATED AFTER COMPLATION OF FORMAL INVENTORY.
B	FO/ST/SO	LOTS NO. 29-A AND 30.
B	FO/SO	PLAN ORIGINALLY DATED JULY 16, 1923 BUT REVISED TO OCT. 1, 1923.
B	FO/ST	THIS IS A COPY OF PLAN 155-045 WHICH WAS THE ORIGINAL.
B	ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	

B	CL	
B	SO	
B	FO/ST/SO	
B	CL	LOTS NO. 65-Y AND Z.
B	CL	
B	FO/HO/ST	
B	CL	ADDITIONAL NOTES ON PLAN DATED OCT. 4 & 8, 1921. LOTS NO. 31, 33, 34, 35, 36. AND 64.

B	FO/ST/TE/ SO	
B	FO/SO/TE	LOCATED WITH SHELF 150. NOTE DIRECTS TO SEE SHELF C-142-103 FOR ORIGINAL TRACING.
B	FO/ST	
B	FO/ST	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	FO/TE/ST/ SO	ASSOCIATED MUTUAL FIRE INSURANCE CO.
B	FO/SO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES A DATE OF JULY 21, 1897. LOCATED WITH SHELF 150.
B	FO/HO/ST	

B	SO	
B	FO	BEARS NO. 276, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1841.
B	FO	PLAN OF LAND WHICH LIES IN VICINITY OF HIGHWAY LEADING BY PAWTUCKET FALLS. BEARS SHELF NO. 277 RECTO. NOTE INDICATES COPIED FROM ROLL PLAN IN TIN BOX DATED 1838. COMPILED BY J. B. FRANCIS.
B	FO/ST/SO	
B	FO/TE/ST	BEARS NO. 279 RECTO.
B	FO	
B	FO/ST/SO /TE	PLAN ORIGINALLY DATED MARCH, 1912, BUT REVISED TO JAN.13, 1916. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF MARCH, 1912..
B	FO/ST	LOT NO. 33.
B	FO/TE/ST/ SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO	
B	ST	
B	FO/ST	
B	FO/ST/HO /SO	
B	CL	BEARS NO. 291, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	FO/ST/SO	
B	FO/TE	

B	FO/TE/ST	
B	FO/ST	
B	FO	
B	FO/ST	
B	TE/ST	
B	SO	
B	SO/ST	
B	FO/ST/TE	NOTE STATES WAS SURVEYED JUNE 1921 SMITH & BROOKS ENG'S. LOWELL, MASSACHUSETTS.
B	FO/ST/SO	

B	FO/ST	LOTS NO. 101, 102, AND 103.
B	TE/ST	
B	ST/SO	
B	FO	LOTS NO. 103-H AND 104.
B	FO/TE	ADDITIONAL NOTES ADDED JUNE, 1921.
B	FO/SO/ST	
B	FO/ST/SO	

B	FO/ST/SO	
B	FO/ST	LOT NO. 104.
B	ST	
B	FO/ST	LOTS. NO. 91, 92, AND 107.
B	FO/SO/ST	BEARS NO. 314 IN COLORED PENCIL RECTO. NOTE STATES TRACING MADE BY W.E.B. FROM BLUEPRINT LOANED BY CARL M. WHITE LOCAL MGR. FOR WARREN REALTY CO. LOT NO. 105.
B	FO	
B	FO/ST	LOTS NO. 91-106.
B	FO/ST/SO	LOTS NO. 106 AND 107.
B	FO/TE/ST/HO	ADDITIONAL NOTE DATED DEC.9,1916. SEE ALSO PLAN NO. C-145-009-[COPY 1]. IT IS UNCLEAR FROM CARD INDEX WHETHER THERE IS A COPY, OR ORIGINAL ON TRACING PAPER.

B	FO/ST/TE	LOTS NO. 91 AND 93.
B	FO/ST/SO /TE	
B	FO/ST	LOT NO. 89.
B	FO/SO/ST /TE	LOTS NO. 89 AND 90.
B	FO	
B	FO/ST	ORIGINAL TRACING FILED WITH L.& C. PLANS. BEARS NO. 327 RECTO. NOTE INDICATES TRACING FROM WHICH THIS BLUEPRINT WAS MADE WAS FILED WITH L.& C. PLANS JUNE 1915. THIS PLAN MAY ACTUALLY BE BLUEPRINT 136-016 RENUMBERED AS 136-016 DOES NOT APPEAR IN THE CONSECUTIVE
B	FO/ST	INDEX BUT DOES IN THE CARD INDEX.
B	FO	
B	FO/ST	LOT NO. 87.
B	FO/ST/SO /TE	CONTOUR LINES APPROXIMATELY CORRECT. THIS PLAN MADE FOR USE IN DISCUSSION OF PROJECT TO MAKE A PUBLIC ATHLETIC FIELD AT THIS PLACE.
B	FO/ST	

B	FO/ST/SO /TE	.
PAPER	B	FOLDS, TEARS, SOILED
B	FO/TE/SO	
PAPER	B	SOILED, FOLDS, TEARS, HOLES
B	FO/SO/TE /HO	
B	FO/ST/SO /ST/TE	THIS PROFILE SHOWS THE BANK OF THE RIVER ONLY.
B	FO/ST/TE	ADDITIONAL WORK DATED APRIL 20, 1917, SHOWS WHERE L.& C. HAVE LAND AVAILABLE FOR GARDENS.
B	FO	

B	FO	SHOWS IMPROVEMENTS PROPOSED JUNE 24,1898.
B	FO/ST/SO	
B	SO	ACCOMPANIED DEED OF WILLIAM ADAMS TO MERRIMACK MFG. CO. DATED MAY 21, 1922.
B	ST/SO	
B	FO/ST	ORIGINAL MADE BY W.E. BADGER. IT WAS PUT IN AS EXHIBIT NO. 29 IN THE CASE OF COWLEY VS. P.L. & C. ON NOV.18, 1907.
B	FO/ST	
PAPER	B	FOLDS, STAINS, TEARS

B	FO/ST/TE	
B	FO/TE/ST	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/ST/FX/ FO/SO	
B	FO	
B	FO/ST/HO	
B	FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST	LOT NO. 33.
B	FO/ST/SO	LOT NO. 4.
B	FO/ST/SO /HO	
B	FO	

B	CL	
B	CL	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	
B	CL	
B	SO	JAMES B. FRANCIS, AGENT. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	FO/ST/SO	
B	FO/ST/FI	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	ST/TE/FO	NOTE STATES THIS TABLE IS SUBJECT TO SOME CHANGES. BEARS NO. 365 RECTO. DATE OF MARCH, 1902, GIVEN IN P.L.& C. CARD INDEX AND CONSECUTIVE INDEX.
B	ST	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1888.

B	FO/TE/ST/ SO	LOGARITHMIC SCALE. 10 INCH BASE.
B	FO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	SCALES ARE AS FOLLOWS: 5/8"=1000', HORIZ. 1/16"=100', VERT. 1/2"=10'.
B	ST/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	FO/TE/ST/ SO	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX.
B	FO/ST	THIS PLAN NO. WAS USED TWICE IN THE L.& C. PLAN INDEX.
B	FO/ST	
B	FO/ST/SO	

B	FO/ST/HO	MEMORANDUM C-145-060-[A] ATTACHED.
C	FO/TE	ATTACHED TO C-145-060. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST	ATTACHED WITH C-145-061-[A].
C	FO/ST	ATTACHED WITH C-145-061.
B	FO/ST/SO	
B	SO	REPAIRS DATED JUNE 4 & SEPT. 21, 1920. PLAN 164-046 IS THE ORIGINAL FROM WHICH THIS BLUEPRINT WAS MADE. INDEX OF CONSECUTIVE DRAWINGS NOTES "TWO BLUEPRINTS…"
B	SO	PLAN 164-046 IS THE ORIGINAL FROM WHICH THIS BLUEPRINT WAS MADE. INDEX OF CONSECUTIVE DRAWINGS NOTES "TWO BLUEPRINTS…"
B	FO/ST/TE	REBUILT IN 1908 & 1909. ADDITIONAL NOTES DATED AUG.29, 1921.

B	TE/SO	ALSO BEARS PHOTOS ATTACHED TO PLAN.
B	FO/ST/TE	TWO PHOTOS ATTACHED TO PLAN.
B	FO/ST/TE	
B	FO/ST/FX/ TE	
B	FO/TE/SO	ADDITIONAL NOTES STATE FROM SURVEY STATION 1350+11 TO SURVEY STATION 1818+41. IDENTIFIED AS PHOTOSTAT IN INDEX OF CONSECUTIVE PLANS.
B	ST	

B	FO/TE/ST	
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	ATTACHED WITH PLANS C-145-073-[1-A] & C-145-073-[2]. INDEX OF CONSECUTIVE DRAWINGS NOTES "TWO BLUEPRINTS…."
B	ST	ATTACHED WITH PLANS C-145-[1] & C-145-[1-A]. INDEX OF CONSECUTIVE DRAWINGS NOTES "TWO BLUEPRINTS….
C	CL	ATTACHED WITH PLANS C-145-073-[1] & C-145-073-[2].
B	CL	ATTACHED WITH C-145-074-[2] THROUGH [5].
B	CL	ATTACHED WITH C-145-074-[1] THROUGH [5].
B	CL	ATTACHED WITH C-145-[1] THROUGH [5].
B	SO	ATTACHED WITH C-145-074-[1] THROUGH [5].
B	SO	ATTACHED WITH C-145-074-[1] THROUGH [4].

B	FO/SO/ST	ORIGINAL TRACING IS IN SHELF C-141 NO. 34A.
B	FI/ST	
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	ST	

B	SO	TAKEN FROM PLANS & DESCRIPTIONS IN DEEDS RECORDED IN MIDDLESEX NORTH REGISTRY OF DEEDS. FOLDER LISTED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	[...] CHAS.STICKNEY, OSGOOD MORRILL, E.G.BASS, W.A. PERLEY, E.J.AUSTIN, E.P. PARKER, B.F.HEALD, B.W.JOHNSON, A.HOWARD.]. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO	BEARS SHELF NO. 156, RECTO, NO. 1682 RECTO AND NO 1684, COVERED OVER, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	BEARS WATERMARK "CRANE & CO. DALTON MASS 1893 BOND NO. 21". BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1675, COVERED OVER, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	SO/FO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. INDEX OF CONSECUTIVE DRAWINGS GIVES DATE OF 1889.
B	SO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1661, COVERED OVER, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1888.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH NOT A PLAN. GRAPHS FOR MONDAY, JUNE 24,1895 & TUESDAY, JUNE 25,1895.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A DRAWING.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.

B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH NOT A PLAN.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 157-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-[1] THROUGH 156-007-12]. THIS IS A GRAPH, NOT A PLAN.

B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO/TE	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-007 THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN.
B	SO/LM	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LOSTED IN PLAN INDEX AS 156. BOUND WITH 156-007-[1] THROUGH 156-007-[12]. THIS IS A GRAPH, NOT A PLAN. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE RANGE OF 1 AUG. 1894 TO AUG. 1895.
B	SO/FO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1732, COVERED OVER, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-008-[A] AND [B]. INDEX OF CONSECUTIVE DRAWINGS GIVES DATE OF APRIL, 1898.
B	SO	BEARS NO. 1735, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-008 AND 156-008-[B]. INDEX OF CONSECUTIVE DRAWINGS GIVES DATE OF APRIL, 1898.

B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-008 AND 156-008-[A]. INDEX OF CONSECUTIVE DRAWINGS GIVES DATE OF APRIL, 1898.
B	SO	BEARS NO. 1736, COVERED OVER, RECTO. TRACED FROM A PLAN IN THE CITY ENGINEER'S OFFICE. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-009-[A].
C	SO	BEARS NO. 1736, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-009.
B	SO/FO/MO	COPIED FROM PLAN IN OFFICE OF WATER WORKS SEPT. 11,1894. BEARS SHELF NO. 156, CROSSED OUT, RECTO. ALSO BEARS NO. 1704, CROSSED OUT, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT PLAN LISTED IN CARD INDEX AS SHELF 156. "SURVEYED JULY 29TH, 1826, BY JNO.G.HALES".
B	SO/FO/LM	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1701, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	BEARS SHELF NO. 156 CROSSED OUT, RECTO. ALSO BEARS NO. 1703 CROSSED OUT, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.

C	SO	BEARS NO. 1702 RECTO.
B	SO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1705, COVERED OVER, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 1893.
CLOTH-BACKED PAPER	B	FOLDS, SOILED
B	SO/FO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. ALSO BEARS NO. 1716 VERSO, COVERED OVER.
B	SO/FO	BEARS SHELF NO. 156, CROSSED OUT, VERSO AND NO. 1720, COVERED OVER, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/ST	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.

B	SO/FO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1725, COVERED OVER, VERSO. BOUND WITH 156-019-[A] AND [B]. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
C	SO/FO	BEARS NO. 1725, REVERSE IMAGE, RECTO. BOUND WITH 156-019 AND 156-019-[B]. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
C	SO/FO	BEARS NO. 1725, REVERSE IMAGE, RECTO, AND NOS. 1737 AND 51 VERSO. BOUND WITH 156-023 AND 156-023-[A].FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/FO	SEE ALSO PLAN NO.156-020-[COPY 1]. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156.
C	SO/FO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-020-[COPY 1] THROUGH 156-020-[COPY 3].

C	SO/FO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-020-[COPY 1] THROUGH 156-020-[COPY 3].
C	SO/FO	FOLDER NUMBERED AS SHELF 156 BUT DRAWING LISTED IN CARD INDEX AS 156. BOUND WITH 156-020-[COPY 1] THROUGH 156-020-[COPY 3].
B	SO/TE	BEARS SHELF NO. 156, CROSSED OUT, RECTO, NO. 1728, COVERED OVER, RECTO AND NO. 42, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	FOLDER NUMBERED AS 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND VOLUME CONTAINING 37 PAGES.
B	SO/TE	BEARS SHELF NO. 156, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-023-1 THROUGH 5. GRAPH DATA FROM NOV.19-24,1894.

B	SO/TE	BEARS NO. 1743-1, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-023 THROUGH 156-023-5. GRAPH DATA FROM NOV.5-10,1894.
B	SO/TE	BEARS NO. 1743-2, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-023 THROUGH 156-023-5. GRAPH DATA FROM AUG.6-11,1894.
B	SO/TE	BEARS NO. 1743-3, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-023 THROUGH 156-023-5. GRAPH DATA FROM JUNE 6-11,1894.
B	SO/TE	BEARS NO. 1743-4, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-023 THROUGH 156-023-5. GRAPH DATA FROM JUNE 4-9,1894.
B	SO/TE/LM	BEARS NO. 1743-5, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. BOUND WITH 156-023 THROUGH 156-023-4. GRAPH DATA FROM MAY 7-12,1894.

B	SO/MO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO 1746, COVERED OVER, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/FO/TE	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO 1656, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/FO/TE	
B	SO/TE	BEARS SHELF NO. 156 AND NOS. 1662 AND 34, ALL CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 31 AUG. 1888..
B	SO/FO	BEARS SHELF 156 VERSO, CROSSED OUT & PLAN NO. 1678 VERSO, COVERED OVER.
B	SO/TE	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO 1676, CROSSED OUT, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.

B	SO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NOS. 96 & 1629, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1680 RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	BEARS SHELF NO. 156, RECTO, AND NO. 1685, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	ALSO SHOWS RESULTS OF SURVEY, OCT.28,1910. BEARS SHELF NO. 156, CROSSED OUT, RECTO, AND NO. 1686, COVERED OVER, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/FO	"PROBABLY MADE IN 1874 FROM COPY IN OFFICE OF SMITH BROOKS." ALSO, "SURVEYED BY SMITH BROOKS SEPT. 1893". BEARS SHELF NO. 156, CROSSED OUT, RECTO, AND NO. 1689, COVERED OVER, RECTO. FOLDER NUMBERED SHELF 147, DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/FO	BEARS SHELF NO. 156, CROSSED OUT, RECTO, NO. 1687, RECTO, AND NO. 1690, VERSO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.

B	SO/FO/ST	FOLDER NUMBERED AS SHELF 147 ENV. 29.
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/ST	BOUND WITH PLAN NOS. 156-039, 156-039-[COPY 1], 156-042-B-[COPY 1].FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
C	SO/MO	ALSO BEARS SHELF 156 RECTO. CROSSED OUT, NO. I/22 RECTO & NO. 1719 COVERED OVER RECTO. BEARS NOTE DATED APRIL 28, 1909. BOUND WITH PLAN NOS 147-038, 039-[COPY 1] & 042-B-[COPY 2].
C	SO/MO	BEARS NOTE DATED APRIL 28,1909. ALSO BEARS NO. 1719 CROSSED OUT & NO. I/22 RECTO. BOUND WITH NOS. 38,39 & 42-B-[COPY 1]. NEW WORK IS IN COLORED PENCIL.
C	SO/MO	ALSO BEARS SHELF 156 RECTO. CROSSED OUT, NO. I/22 RECTO & NO. 1719 COVERED OVER RECTO. BEARS NOTE DATED APRIL 28, 1909. BOUND WITH PLAN NOS 147-038, 039-[COPY 1] & 042-B-[COPY 2].

B	SO	BEARS NO. 1746-A, CROSSED OUT, RECTO. BOUND WITH PLAN NO. 156-040-[COPY 1]. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/MO	BEARS SHELF NO. 156, CROSSED OUT, RECTO AND NO. 1746-B, CROSSED OUT, VERSO. BOUND WITH PLAN NO. 156-040. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO/FO/HO	TRACED FROM A PLAN IN THE CITY ENGINEER'S OFFICE. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. ALSO BEARS NUMBERS C-38 AND 3528 VERSO.
C	SO/FO	BEARS NO. 3528, RECTO. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156.
B	SO	TRACED FROM 1689-B. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/LM	FOLDER NUMBERED AS 142 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. LISTED AS PLAN NO. C-147-42-B IN CONSECUTIVE INDEX.

B	SO/FO/MO	FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. LISTED AS PLAN NO. C-147-42-C IN CONSECUTIVE INDEX.
C	SO	BOUND WITH PLAN NOS. 156-038, 156-039, & 156-039-[COPY 1]. FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. LISTED AS PLAN NO. C-147-42-C IN CONSECUTIVE INDEX.
B	SO/FO/MO	
B	SO/FO	ORIGINAL DATED AUG.7, 1900. SURVEYED AUG.1889 & 1900. BEARS NOTE, "OCT.26,1938 FLOWAGE."
C	SO/FO	
B	SO/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING GIVEN SHELF NO. 157 IN CARD INDEX.

PAPER	B	SOILED, TEARS
B	SO/TE	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING GIVEN SHELF NO. 157 IN CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO	FOLDER NUMBERED AS SHELF 148 BUT DRAWING GIVEN SHELF NO. 157.
B	SO/FO	FOLDER NUMBERED AS SHELF 148 BUT DRAWING NUMBERED AS SHELF 157. BEARS NO. 1680 BENEATH LABEL, RECTO.
CLOTH-BACKED PAPER	B	SOILED
B	SO	FOLDER NUMBERED AS SHELF 148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.

B	SO/ST	FOLDER NUMBERED AS SHELF 148-007 BUT DRAWING LISTED IN CARD INDEX AS SHELF 156. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	SO/FO/TE	COPIED FROM A TRACING IN CITY ENGINEERS OFFICE APRIL, 1898. FOLDER NUMBERED AS SHELF 148 BUT DRAWING GIVEN SHELF 157.
B	SO/ST	FOLDER NUMBERED AS SHELF 148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. THE DATE OF THIS COPY IN UNKNOWN.
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A-COPY 1] THROUGH 157-010-[E].
C	SO	FOLDER NUMBERED AS SHELF 148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A] THROUGH 157-010-[E].

C	SO	FOLDER NUMBERED AS SHELF 148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[B-COPY 2], [B-COPY 3], & [C-COPY 2].
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A] THROUGH 157-010-[E].
C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A] THROUGH 157-010-[E].
C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A]-[COPY 3], [B]-[COPY 3], [C]-[COPY 3].
C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A]-[COPY 2], [B]-[COPY 2], [C]-[COPY 2].
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A] THROUGH 157-010-[E].

C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH 157-010-[A] THROUGH 157-010-[E].
C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-010-[B-COPY 2], [B-COPY 3], & [C-COPY 2].
B	SO	SHOWS CONTOURS ALONG BLACK BROOK BETWEEN HADLEY & WOOD STS. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-010-[A] THROUGH 157-010-[E].
B	SO	SHOWS CONTOURS ALONG BLACK BROOK BETWEEN WESTFORD & PRINCETON STS. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-010-[A] THROUGH C-148-010-[E].
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-011-[A] THROUGH C-148-011-[C].
B	SO/TE/FO/ST	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-01-[A]1 THROUGH C-148-011-[C].

B	SO/TE	SHOWS LAND ALONG BLACK BROOK WEST OF WHERE MIDDLESEX ST. CROSSES IT. PLAN FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-011 THROUGH C-148-011-[C]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1892.
B	SO	SHOWS LAND WEST OF "MARKER" ST. ALONG BLACK BROOK NEAR MIDDLESEX & PAWTUCKET STS. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-011 THROUGH C-148-011-[C]. CONSECUTIVE INDEX GIVES DATE OF 1892.
CLOTH-BACKED PAPER	B	SOILED, STAINED, FOLDS
B	SO/ST/FO	TAKEN MAY 20 TO 25,1851. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/ST	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.

PAPER	B	SOILED, TEARS.HOLES
B	SO/TE/HO	KNOWN AS THE GLASS HOUSE AREA & HOWARD LOT ONCE OWNED BY GENERAL LEACH. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
PAPER	B	SOILED, FOLDS, TEARS
B	SO/FO/TE	PLAN & PROFILE TAKEN IN 1851. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. BEARS NO. 1652, VERSO.
CLOTH-BACKED PAPER	B	SOILED
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/FO/HO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. BOUND TO ENVELOPE TITLED "CLAY PIT BROOK-CLAIMS-T. VARNUM & OTHERS, LETTERS FROM MR. H.E. ALVORD ETC. ETC." NUMBERED C-148-17-157 (CROSSED OUT). ALSO BEARS NO. 1667.
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED MEMORANDUM.

		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO/FO	MEMORANDUM.
		PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. A PERSONAL WORK RELATED
B	SO/FO	MEMORANDUM.
B	SO/TE	
B	SO	

B	SO/TE/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-018-[B] THROUGH C-148-018-[D].
B	SO/TE/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-018-[A] THROUGH C-148-018-[D].
B	SO/TE	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-018-[A] THROUGH C-148-018-[D].
B	SO/TE	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. BOUND WITH C-148-018-[A] THROUGH C-148-018-[D].
B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.

B	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/FO	SEE ALSO PLAN NO. C-148-032. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. A CARDBOARD PANEL CONSISTING OF 17 4 3/4" X 7 3/4" SEPIA TONED PHOTOPRINTS WITH CAPTIONS. SEE ALSO PLAN NOS. C-148-023 & 024.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. A CARDBOARD PANEL CONSISTING OF 16 4 3/4" X 7 3/4" SEPIA TONED PHOTOPRINTS WITH CAPTIONS. SEE ALSO PLAN NOS. C-148-022 & 024.
B	CL	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. A CARDBOARD PANEL CONSISTING OF 11 4 3/4" X 7 3/4" SEPIA TONED PHOTOPRINTS WITH CAPTIONS. SEE ALSO PLAN NOS. C-148-022 & 024.

B	SO/MO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157.
C	SO/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. ADDITIONAL NOTE DATED OCTOBER 3, 1919.
C	SO/TE/LM /FO/FI	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. ADDITIONAL NOTE DATED JAN.12, 1920.
B	SO	SEE ALSO PLAN NOS. 157-018 & 029. "FOR PICTURES OF CONDITIONS ALONG BROOK ON JUNE 11,1897, SEE NOS. 1710-1711." PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/ST	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS 157. PLAN IS BOUND WITH 157-027-[COPY 1].
C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED AS 157 IN CARD INDEX. PLAN BOUND WITH PLAN NO. 157-027-[A].

B	SO/FO/MO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
C	SO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/FO	SEE ALSO PLAN NOS. C-148-018 & 026. FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
CLOTH-BACKED PAPER	B	SOILED, FOLDS
B	SO/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/TE	PLAN ADN FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.

B	SO/FO	SEE ALSO PLAN NO. 157-020. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
B	SO/FO	PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.
A		
A		
A		

A		
A		
A		MAY BE RELATED TO PLAN 123-2853. 1825 IS TOO EARLY FOR JAMES BALDWIN.
A		REFERENCE TO THIS P. H. FOUND IN THE CONSECUTIVE INDEX RATHER THAN THE CARD INDEX. THIS INDEX DOES NOT GIVE THE INDEX HEADINGS USED IN THE CARD INDEX AND NONE CAN BE APPLIED AS THIS P.H. CUTS ACROSS THE CARD INDEX HEADING SCHEME. SEE 138-ENV. 030.
B	SO	BEARS NO. 3539 STAMPED, VERSO. ALSO BEARS NO. C-30 IN PENCIL, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		CONSECUTIVE INDEX NOTES "LARGE SIZE".
CLOTH-BACKED PAPER	B	FOXING, TEARS, STAINS

B	FX/RO/TE/ ST	BEARS NO. 3376, VERSO.
PAPER	B	FOLDS, STAINS, SOILED
B	RO/FO/ST /ST	DUPLICATES PARTS OF C-P.H. 010-[A]-[01]
PAPER	B	FOLDS, STAINS
B	RO/FO/ST /ST	DUPLICATES PARTS OF C-P.H. 010-[A]-[01]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1836 FOR THE SERIES.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE /LO	PLAN NUMBER CROSSED OVER IN GRAPHITE.
PAPER	C	FOLDS, SOILED
C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01-[03] WERE DRAWN. COVERS DATES 16 JUNE THROUGH 19 JUNE 1835.

PAPER	C	FOLDS, SOILED
C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01-[03] WERE DRAWN. COVERS DATES 16 JUNE THROUGH 19 JUNE 1835.
PAPER	C	FOLDS, SOILED
C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 27 JULY THROUGH 31 JULY 1835. NOTE: P.H. C-10, VERSO.
PAPER	C	FOLDS, SOILED
C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 27 JULY THROUGH 31 JULY 1835. NOTE: P.H. C-10, VERSO.
PAPER	C	FOLDS, SOILED

C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 27 JULY THROUGH 31 JULY 1835. PAPER WATERMARKED: J. WHATMAN, TURKEY MILL, 1857.
PAPER	C	FOLDS, SOILED
C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 25 APRIL THROUGH 28 APRIL 1835. PAPER WATERMARKED: J. WHATMAN, TURKEY MILL, 1857.
PAPER	C	FOLDS, SOILED
C	FO/SO	TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 25 APRIL THROUGH 28 APRIL 1835. PAPER WATERMARKED: J. WHATMAN, TURKEY MILL, 1857.
PAPER	C	FOLDS, SOILED, TEARS
C	FO/SO/TE	MAY BE BY URIAH A. BOYDEN. APPEARS TO BE ROUGH WORK FOR TABLE 1. COVERS DATES 16 JUNE THROUGH 19 JUNE 1835.

PAPER	C	FOLDS, SOILED, TEARS
C	FO/SO/TE	MAY BE BY URIAH BOYDEN. APPEARS TO BE ROUGH WORK FOR TABLE 2. COVERS DATES 27 JULY THROUGH 31 JULY 1835.
B	RO/TE/FX	ATTACHED TO P.H. 010-C, & C-[COPY 1]. ORIGINALLY DATED JAN. 1834. COPIED JAN. 1839. SCALES PERTAIN TO DISTANCE & HEIGHT. BEARS U.A. BOYDEN'S COPY, VERSO. L. BALDWIN, ENGINEER. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE 20 TO JULY 18, 1834.
B	RO/TE/FX	ATTACHED TO P.H. 010-C, & C-[COPY 1]. ORIGINALLY DATED JAN. 1834. COPIED JAN. 1839. SCALES PERTAIN TO DISTANCE & HEIGHT. L. BALDWIN, ENGINEER.
B	RO/TE/FX	ATTACHED TO P.H. 010-LOWE L.& C. 601, P.H. 10-C & C-[COPY 2]. ORIGINALLY DATED JAN. 1834 & COPIED JAN. 1839. SCALES PERTAIN TO DISTANCE & HEIGHT. L. BALDWIN, ENGINEER.

PAPER	B	SOILED, LOSSES
B	RO/SO/LO	THIS TITLE MATCHES THE TITLE GIVEN IN THE CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES L. BALDWIN AS SOURCE BUT THE DRAWING ITSELF DOES NOT MENTION HIM. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE 20 TO JULY 18, 1834.
PAPER	C	SOILED
C	SO	26 PAGE REPORT. THIS WAS "U. A. BOYDEN'S COPY" AS PER NOTE ON BACK. ORIGINAL HANDWRITTEN COPY.

C	FO/SO	26 PAGE REPORT. TYPED COPY. ORIGINAL "FOUND AMONG THE PAPERS OF THE LATE U. A. BOYDEN, OCT. 21, 1881. (ORIGINAL & PLAN IN PAYMASTER'S SAFE)". DATE OF ORIGINAL IS 19 JUNE, 1834.
B	RO/SO/LO /FX	NOTE BY JAMES B. FRANCIS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. 3308 STAMPED VERSO.
A		
A		
A		
A		
A		
B	RO/SO	"A TO B RECONSTRUCTED IN 1883." BEARS NO. 3307, VERSO. BEARS C-P.H. 12 IN GRAPHITE VERSO.

CLOTH-BACKED PAPER	B	SOILED, MOLD, FOLDS
B	SO/MO/FO/RO	BEARS NO. 3110, VERSO. ALSO BEARS NOTES DATED SEPT. 27, 1861. BY CHARLES F. REED.
B	RO/TE/SO	THIS PLAN IS SO BADLY FRAGMENTED THAT IT CANNOT BE SURVEYED. IDENTIFIED AFTER COMPLETION OF FORMAL INVENTORY.
A		
A		

A		
A		
B	RO	
CLOTH-BACKED PAPER	B	TEARS, SOILED
B	RO/TE/SO	BEARS 3316 CROSSED OUT AND REPLACED WITH C 14.
A		
B	RO	BEARS NO. 3357 STAMPED, VERSO.
B	RO/SO/TE	EMBOSSED: THE MORIN STUDIO, LAKEPORT N.H.

B	RO/FO	BEARS C-38 CROSSED OUT AND REPLACED WITH 17. NOTE STATES CONTOURS PLOTTED FOR LEVELS TAKEN OCT. 1899 SEE LEVEL BOOK NO. 24. BEARS NO. 3524 CROSSED OUT, VERSO.
B	RO/FO	NOTE STATES CONTOURS PLOTTED FOR LEVELS TAKEN OCT. 1899 SEE LEVEL BOOK NO. 24. BEARS NO. 3524, VERSO.
B	RO	UNTITLED PLAN WHICH SHOWS PORTION OF MERRIMACK RIVER WHERE AIKEN ST. CROSSES OVER. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF OCT. 5, 1897.
B	RO/TE/FX/SO	PLAN SHOWS CONTOURS OF 1897 IN VICINITY OF COLONIAL AVE. AND AIKEN STREET. BEARS NO. 3525, VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF OCT. 5, 1897.
B	RO/TE/SO	PLAN SHOWS CONTOURS OF 1897 IN VICINITY OF COLONIAL AVE. AND AIKEN STREET. BEARS NO. 3525, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF OCT. 5, 1897.
B	TO/SO/TE	BEARS NO. 3526 BENEATH PLAN NO. LABEL.

A		
B	RO/SO	BEARS NO. 3332, VERSO.
B	RO	BEARS NO. 6 IN GRAPHITE, RECTO. BEARS STAMPED NO. 3301, VERSO.
B	RO/TE	APPEARS TO HAVE BEEN ATTACHED TO ADDITIONAL PLANS AT ONE TIME. BEARS NO. 2 IN GRAPHITE, RECTO. BEARS STAMPED NO. 3396, VERSO.
B	FO/SO	ORIGINAL DATED APRIL 19, 1870.

C	SO/TE	THIS IS A FIVE PAGE DOCUMENT WHICH APPEARS TO HAVE BEEN ATTACHED TO ADDITIONAL PLANS AT ONE TIME. BEARS STAMPED NO. 298, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO/TE	PLAN IS TOO FRAGILE TO UNROLL FOR MEASUREMENT. BEARS NOS. 4 AND 5, RECTO. BEARS STAMPED NUMBER 3305, VERSO.
C	FO/SO	BEARS "NO.1" ABOVE TITLE BLOCK.
B	RO/SO/TE	BEARS NO. 3, RECTO. BEARS STAMPED NUMBER 3305, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/SO	ORIGINAL DATED MAY 9, 1870. THIS TRACING MADE JUNE 30, 1890. THIS IS NOT A COMPLETE TRACING AS SOME ELEMENTS ON THE ORIGINAL WERE NOT TRACED ONTO THIS COPY.
C	SO	NOTE READS: UPPER VAULT C-20.
CLOTH-BACKED PAPER	B	SOILED, STAINED, LOSSES

B	SO/RO/MO/ST/LM	BEARS NO. 3339, VERSO.
CLOTH-BACKED PAPER	B	SOILED, FOLDS, MOLD
B	SO/FO/MO	BEARS NO. 3339, VERSO.
A		
CLOTH-BACKED PAPER	B	SOILED, MOLD
B	SO/RO/MO	PLAN NUMBER ENTERED AS C-P.H.23 IN L.& C. CARD INDEX. DATE GIVEN AS 1870 IN L.& C. CARD INDEX. "3 ROLLS C-19" APPEARS VERSO. BEARS NO. 3344, VERSO.

CLOTH-BACKED PAPER	B	SOILED, LOSSES
B	SO/RO/LM	PLAN NUMBER ENTERED AS C-P.H. 23 IN L. & C. CARD INDEX. DATE GIVEN AS 1870 IN L. & C. CARD INDEX. BEARS NO. 3344, VERSO.
CLOTH-BACKED PAPER	B	SOILED, MOLD
B	SO/RO/MO	PLAN NUMBER ENTERED AS C-P.H. 23 IN L. & C. CARD INDEX. DATE GIVEN AS 1870 IN L. & C. CARD INDEX. BEARS NO. 3344, VERSO.
A		MAY RELATE TO PLANS C-130-3234-(L) THRU (Q).
B	RO/SO	PLAN BEARS STREET INDEX & LISTING OF HALLS & BLOCKS. BEARS PALLET SHAPED LABEL VERSO FROM MARSTON & PRINCE, 86 MERRIMACK ST. LOWELL, MASS. PICTURES, FRAMES, ARTISTS MATERIALS. BOSTON PAPERS. BEARS NO. 3372, VERSO.
B	RO/SO/TE	PLAN BEARS STREET INDEX & LISTING OF HALLS & BLOCKS. BEARS PALLET SHAPED LABEL VERSO FROM MARSTON & PRINCE, 86 MERRIMACK ST. LOWELL, MASS. PICTURES, FRAMES, ARTISTS MATERIALS. BOSTON PAPERS. BEARS NO. 3372, VERSO.
B	RO/TE	PLAN BEARS STREET INDEX & LISTING OF HALLS & BLOCKS. BEARS PALLET SHAPED LABEL VERSO FROM MARSTON & PRINCE, 86 MERRIMACK ST. LOWELL, MASS. PICTURES, FRAMES, ARTISTS MATERIALS. BOSTON PAPERS. BEARS NO. 3372, VERSO.

A		SEE ALSO PLAN NO. 111-2240 OVERSIZE.
B	SO/RO/MO	ROLLED WITH C-P.H. 027-02. BEARS NOS. C-21 AND 3352, VERSO.
B	SO/RO/TE/MO	ROLLED WITH C-P.H. 027-01. BEARS NO. 3352, VERSO.
A		
A		
A		
A		
B	FO/SO	FOUND IN SHELF 134.

B	RO/TE	BEARS NUMBER C-31 & 3374, RECTO AND C-P.H. 31. BEARS "FLOWAGE SETTLEMENTS", VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN HAS NO TITLE BLOCK, TITLE TAKEN FROM L.& C. CARD INDEX ENTRY
B	RO	BEARS NUMBER C-31 & 3374 RECTO AND VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	BEARS NUMBER C-31 & 3374, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	FO/SO	
A		
CLOTH-BACKED PAPER	B	SOILED, MOLD
B	SO/RO/MO	BEARS NO. 3373-1, RECTO.
CLOTH-BACKED PAPER	B	SOILED, MOLD
B	SO/RO/MO	BEARS NO. 3373-2 STAMPED, VERSO.

CLOTH-BACKED PAPER	B	SOILED
B	SO/RO	BEARS NO. 3373-3, RECTO.
CLOTH-BACKED PAPER	B	SOILED
B	RO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/FO	LOCATED IN P.H. 051.
C	RO/FO	LOCATED IN P.H. 051.
C	RO/FO	LOCATED IN P.H. 051. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/FO	LOCATED IN P.H. 051.
C	RO/FO	LOCATED IN P.H. 051. LOCATED AFTER COMPLATION OF FORMAL INVENTORY.

C	SO	ROLLED WITH 3373-1, 3373-2, AND 3373-3.
B	RO/FO	LOCATED WITHOUT TUBE IN RANDOM P.H. SPACE. BEARS NO. 3477 STAMPED, VERSO.
B	RO/FO/SO/TE	BEARS NO. 3477 STAMPED, VERSO.
B	RO/TE/LO	BEARS NO. 3477 STAMPED, VERSO. LISTS LEASES 1 THROUGH 67. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	RO/TE/LO	BEARS NO. 3477 STAMPED, VERSO. LISTS LEASES 68 THROUGH 108. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO	LOCATED WITHOUT TUBE IN RANDOM P.H. SPACE. BEARS NO. 3477 STAMPED, VERSO. MAY BELONG TO [C] P.H. 32. OTHER PLANS STAMPED 3477 HAVE LABELS WHICH BEAR [C] P.H. 32. "C" IS LOCATED ABOVE P.H. #.
B	RO/SO	NOTE, RECTO, READS "SEE #3530 FOR OTHER PLANS RELATING TO THIS LOCATION". BEARS NO. 3498 STAMPED, VERSO. BEARS C-P.H. 032, VERSO. LOATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO/TE	BEARS NOTE "SEE FOR FINAL LOCATION PLAN NO. 3498, RECTO". BEARS NO. 3498-A, VERSO. BEARS NO. 3530 STAMPED, VERSO. A HODGES AND HARRINGTON PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	RO/FO	BEARS NO. 3530 STAMPED, VERSO. ALSO BEARS NO. 3498-B, VERSO. BEARS STAMP READING "FROM OFFICE OF HODGES AND HARRINGTON, CIVIL & CONSULTING ENGINEERS, 19 EXCHANGE PLACE, ROOM 14, BOSTON, MASS.". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	BEARS NO. 3530 STAMPED, VERSO. ALSO BEARS NO. 3498-C, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/FO	BEARS NO. 3530 STAMPED, VERSO. ALSO BEARS NO. 3498-D, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/SO	BEARS NO. 3530 STAMPED, VERSO. ALSO BEARS NO. 3498-E, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1895.

B	SO/TE/ST	BEARS NO. 3477 STAMPED, VERSO.
B	SO/TE/ST	BEARS NO. 3477 STAMPED, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE/ST	BEARS NO. 3477 STAMPED, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE/ST	BEARS NO. 3477 STAMPED, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		
B	RO/SO	LOCATED LOOSELY IN P.H. 099 SPACE. STAMPED 3474, VERSO.

B	RO/SO	LOCATED LOOSELY IN P..H. 099 SPACE. NO SHELF OR P.H. # GIVEN. STAMPED 3473, VERSO.
B	RO/TE/SO	LOCATED LOOSELY IN P.H. 099 SPACE. NO SHELF OR P.H. # GIVEN. STAMPED 3474, VERSO.
B	RO/SO/FO	LOCATED LOOSELY ON P.H. 099 SPACE. NO SHELF OR PLAN # GIVEN. STAMPED 3474, VERSO.
B	RO	LOCATED LOOSELY IN P.H. SPACE. BEARS: HERESHOFF, MFG. CO. BRISTOL, R.I. STAMPED 3474, VERSO.
B	RO/FO/TE	LOCATED LOOSELY IN P.H. 099 SPACE BEARS NO SHELF #. SAMPSON, MURDOCK, & CO. STAMPED 3474, VERSO.
B	RO/FO/TE /SO	LOCATED LOOSELY IN P.H. 099 SPACE. BEARS NO SHELF #. STAMPED 3474, VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890.
B	RO/TE	LOCATED LOOSELY IN P.H. 099 SPACE. BEARS NO SHELF #. STAMPED 3474, VERSO.
B	RO/FO/SO	LOCATED IN P.H. 099 SPACE. STAMPED 3474, CROSSED OUT, VERSO & REPLACED W/381. NOTE VERSO READS: PLANS PERTAINING TO PUMPING SCHEMES AT GUARD GATES OF NORTHERN CANAL & AT THE WASTE GATES IN CANAL WALLS.
B	SO/RO	BEARS NO. 1870 STAMPED AND CROSSED OUT, VERSO.

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A CONSECUTIVE INDEX GIVES DATE OF 1855.

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B	RO/SO/TE	BEARS 5-16 RECTO. BEARS NOTE VERSO WHERE CLOTH HAS PEELED AWAY FROM PAPER: NO. 34 REED VS. PROPS OF LOCKS [&] CANALS / PUT IN THE TENANTS [....]. CONSECUTIVE INDEX OF DRAWINGS NOTES "NO DATE".

C	RO/ST/FO	STATES: COPIED FROM ORIGINAL PLAN, DEC. 1949. HISTORY ADDED IN 1951 BY E.L. HUSE. TEXT GIVES EARLY HISTORY OF PAWTUCKET CANAL. NOTE READS: NO DATE GIVEN ON ORIGINAL PLAN. PROBABLY MADE FOR PERIOD OF 1790-1792. PENCIL NOTES PUT ON DEC. 1949.
B	RO/SO	[AND THE CONCORD RIVER AS AGREED UPON BY THE CITY OF LOWELL, THE PROPS. OF LOCK & CANALS, & VARIOUS CORPORATIONS LOCATED THEREON.] BEARS NO. 3405 CROSSED OUT, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ORIGINALLY DATED 1878, CORRECTED TO JAN. 1885. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	ORIGINALLY DATED 1878, CORRECTED TO FEB. 24, 1885. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	SO/TE	PENCIL NOTES, CORRECTED TO MAY 1894.

C SO

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A SEE ALSO PLAN NOS. P.H. 077-010 & P.H. 079-027.

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TRACED IN 1907 AS PLAN NO. 158-030. A BLUEPRINT OF TRACING 158-030 IS AT PLAN NO. C-143-049. SEE ALSO PLAN NO. C-P.H. 079-

A 090.

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B RO/FO/TE READS: HENRY R. WORTHINGTON 145 BROADWAY, N.Y.

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A TRACED IN 1907. SEE ALSO PLAN NO. C-P.H. 079-030.

A

A SEE ALSO PLAN NO. 158-093.

A

A SEE ALSO PLAN NO. 158-096.

A

A SEE ALSO PLAN NO. 158-098.

A SEE ALSO PLAN NO. 158-099.

A BLUEPRINT OF 158-110 & 111.

A SEE ALSO PLAN NO.158-115.

A SEE ALSO PLAN NO. 158-117.

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TE A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

TE A WICKES BOILER CO., SAGINAW, MICH., PLAN.

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FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

TE A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

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CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
FO/TE	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
TE	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
TE	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
TE	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
FO	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO/TE A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

TE/ST A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

SO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO/TE A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO A WICKES BOILER CO., SAGINAW, MICH., PLAN.

ST/TE A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

FO/ST A WICKES BOILER CO., SAGINAW, MICH., PLAN.

CL A WICKES BOILER CO., SAGINAW, MICH., PLAN.

	FO	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
	FO	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
	CL	A WICKES BOILER CO., SAGINAW, MICH., PLAN.
C	RO/TE/LO	NOT FOUND ON P.L.& C. MAP LIST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE/LO	NOT FOUND ON P.L.& C. MAP LIST. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/SO/TE /ST	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO/TE /ST	NOT FOUND ON P.L.& C. MAP LIST.

C	RO/SO/TE	OVERSIZED MAP COPIED IN 8 PIECES, ONE PIECE MISSING. PHOTO POSITIVES
C	RO/SO/TE	OVERSIZED MAP COPIED IN 8 PIECES. PHOTO POSITIVES. PENCIL NOTE: RED MARKINGS SHOW STREET CONDITIONS 13-14JUN1925. BLUE MARKINGS LIKELY REFER TO "STREET SURVEY 1927" NOTED VERSO TOP SHEET. SEE MAP [056]-[COPY 3]-[SUPPL. 1-2] FOR CODE EXPLANATION.
C	RO/SO/TE	OVERSIZED MAP COPIED IN 8 PIECES. PHOTO NEGATIVES.
C	RO/SO/TE	OVERSIZED MAP COPIED IN 8 PIECES. PHOTO NEGATIVES.
C	RO/SO/TE	OVERSIZED MAP COPIED IN 8 PIECES, ONE PIECE MISSING. PHOTO POSITIVES

C	RO/SO/TE	OVERSIZED MAP COPIED IN 8 PIECES. PHOTO POSITIVES. PENCIL NOTE: RED MARKINGS SHOW STREET CONDITIONS 13-14JUN1925. BLUE MARKINGS LIKELY REFER TO "STREET SURVEY 1927" NOTED VERSO TOP SHEET. SEE MAP [056]-[COPY 3]-[SUPPL. 1-2] FOR CODE EXPLANATION.
C		LIST OF STREETS AND LENGTHS ORGANIZED BY PAVING TYPE. DATES 10/24/27 TO 11/3/27. EXPLAINS LETTER CODES ON MAP [056]-[COPY 3].
C		LIST OF STREETS AND LENGTHS ORGANIZED BY PAVING TYPE. DATES 11/7/27 TO 11/11/27. EXPLAINS LETTER CODES ON MAP [056]-[COPY 3].
C		LIST OF STREETS AND LENGTHS ORGANIZED BY PAVING TYPE. DATES 10/24/27 TO 11/3/27. EXPLAINS LETTER CODES ON MAP [056]-[COPY 3].
C		LIST OF STREETS AND LENGTHS ORGANIZED BY PAVING TYPE. DATES 11/7/27 TO 11/11/27. EXPLAINS LETTER CODES ON MAP [056]-[COPY 3].
C	LO/TE	NOT FOUND ON P.L.& C. MAP LIST.
C	LO/TE	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/ST	NOT FOUND ON P.L.& C. MAP LIST.

C	RO/ST	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/LO/TE /ST/SO	NOT FOUND OM P.L.& C. MAP LIST.
C	RO/LO/TE /ST/SO	NOT FOUND OM P.L.& C. MAP LIST.
C	RO/SO/ST	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO/ST	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO/ST /TE/LO	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO	NOT FOUND ON P.L.& C. MAP LIST.

C	RO/SO/FO /TE/LO	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO/FO /TE/LO	NOT FOUND ON P.L.& C. MAP LIST.
C	RO/SO/TE	NOT FOUND ON P.L.& C. MAP LIST. COLORED PENCIL HIGHLIGHTS PARCELS HELD BY OWNERS PRIOR TO P.L.& C. OWNERSHIP. NEW ENGLAND LITH. CO, REDUCTION OF 1821 ORIGINAL. MOUNTED ON RODS. SEE ALSO MAP 002.
C	RO/SO/TE	NOT FOUND ON P.L.& C. MAP LIST. COLORED PENCIL HIGHLIGHTS PARCELS HELD BY OWNERS PRIOR TO P.L.& C. OWNERSHIP. NEW ENGLAND LITH. CO, REDUCTION OF 1821 ORIGINAL. MOUNTED ON RODS. SEE ALSO MAP 002.
C	RO/SO/TE	NOT FOUND ON P.L.& C. MAP LIST. COLORED PENCIL HIGHLIGHTS PARCELS HELD BY OWNERS PRIOR TO P.L.& C. OWNERSHIP. RED FIGURES REFER TO DEEDS IN L.& C. OFFICE BOOK 1. NEW ENGLAND LITH. CO. REDUCTION OF 1821 ORIGINAL. MOUNTED ON RODS. SEE ALSO MAP 002.
C	RO/SO/TE	NOT FOUND ON P.L.& C. MAP LIST. COLORED PENCIL HIGHLIGHTS PARCELS HELD BY OWNERS PRIOR TO P.L.& C. OWNERSHIP. RED FIGURES REFER TO DEEDS IN L.& C. OFFICE BOOK 1. NEW ENGLAND LITH. CO. REDUCTION OF 1821 ORIGINAL. MOUNTED ON RODS. SEE ALSO MAP 002.
C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON

C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
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C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
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C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
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C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
C	SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON
C	ST/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO/TE/SO	HELIOTYPE PRINTING CO., 1871. REDUCED LITHOGRAPH OF 1821 MAP. REFERENCE BLOCK SHOWS DATA FOR CHEEVER, FLETCHER AND TYLER FARMS. ROMAN NUMERALS ADDED TO MANY OF THE NUMBERED LOTS.

C	RO/TE/SO	HELIOTYPE PRINTING CO., 1871. REDUCED LITHOGRAPH OF 1821 MAP. REFERENCE BLOCK SHOWS DATA FOR CHEEVER, FLETCHER AND TYLER FARMS. ROMAN NUMERALS ADDED TO MANY OF THE NUMBERED LOTS.
C	TE/FO/HO	PUBLISHED BY SAMPSON, DAVENPORT, & CO. INKED NOTATION LISTS AREAS OF LOWELL AND ADJACENT TOWNS ANNEXED IN 1874.
C	TE/SO	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE/CM	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE	PUBLISHED BY SAMPSON, DAVENPORT, & CO. 155 FRANKLIN ST. BOSTON
C	TE	PUBLISHED BY SAMPSON, MURDOCK, & CO. 155 FRANKLIN ST. BOSTON.
C	SO/ST	PUBLISHED BY SAMPSON, MURDOCK, & CO. NOTE STATES: "RED LINES SHOW PROPOSED LOCATIONS OF OF LOWELL HORSE R.R. CO. YELLOW LINES …"
C	SO	PUBLISHED BY SAMPSON, MURDOCK, & CO. 155 FRANKLIN ST. BOSTON.

C	TE/LI/SO	PUBLISHED BY SAMPSON, MURDOCK, & CO. 155 FRANKLIN ST. BOSTON.
C	TE	PUBLISHED BY SAMPSON, MURDOCK, & CO. 155 FRANKLIN ST. BOSTON.
C	TE	PUBLISHED BY SAMPSON, MURDOCK, & CO. 155 FRANKLIN ST. BOSTON.
C	TE/SO	PUBLISHED BY SAMPSON, MURDOCK, & CO. 155 FRANKLIN ST. BOSTON.
C		RANDOM NOTES IN GRAPHITE
C		
C	TE/SO	SHOWS NUMBERED LOTS IN VICINITY OF MERRIMACK RIVER
C	RO/SO/TE	NOTES IN GRAPHITE STATE: (RECTO) "MAP OF CITY OF LOWELL SHOWING PROPOSED PUBLIC IMPROVEMENTS 1925". (VERSO) "A.T. SAFFORD 66 BROADWAY"
C	TE/ST/SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON.
C	TE/SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON. BEARS NOTE: AREA SHADED RED IS THE "FIRE DISTRICT" JULY 23, 1891.
C	TE/SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON.
C	TE/SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON.

C	TE	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON.
C	TE	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON.
C	TE/SO	PUBLISHED BY SAMPSON, MURDOCK & CO. 155 FRANKLIN ST. BOSTON.
C	FR/ST	PUBLISHED BY SAMPSON & MURDOCK CO. 377 BROADWAY, BOSTON. NOTE STATES: FOR FULL DESCRIPTION OF WARD & PRECINCT BOUNDRIES SEE INDEX IN CITY DIRECTORY.
C	FR/ST	PUBLISHED BY SAMPSON & MURDOCK CO. 377 BROADWAY, BOSTON. NOTE STATES: FOR FULL DESCRIPTION OF WARD & PRECINCT BOUNDRIES SEE INDEX IN CITY DIRECTORY.
C	SO	PUBLISHED BY R.L. POLK & CO. 179 LINCOLN ST., BOSTON. NOTE STATES: FOR FULL DESCRIPTION OF WARD & PRECINCT BOUNDRIES SEE INDEX IN CITY DIRECTORY.
C	SO	PUBLISHED BY R.L. POLK & CO. 179 LINCOLN ST., BOSTON. NOTE STATES: FOR FULL DESCRIPTION OF WARD & PRECINCT BOUNDRIES SEE INDEX IN CITY DIRECTORY.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	NEW ENGLAND LITHO. CO., 109 SUMMER ST., BOSTON, REDUCTION OF 1821 ORIGINAL. ROLLED WITH MAP 003. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	NEW ENGLAND LITHO. CO., 109 SUMMER ST., BOSTON, REDUCTION OF 1821 ORIGINAL. ROLLED WITH MAP 003. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/LO	NEW ENGLAND LITHO. CO., 109 SUMMER ST., BOSTON, REDUCTION OF 1821 ORIGINAL. ROLLED WITH MAP 003. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/LO	NEW ENGLAND LITHO. CO., 109 SUMMER ST., BOSTON, REDUCTION OF 1821 ORIGINAL. ROLLED WITH MAP 003. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE /FO	THIS IS A PHOTOREDUCTION OF THE 1871 HELIOTYPE LITHO. (SEE MAP [067]) WITH NEW WORK ADDED. ROLLED WITH MAP 002. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

B	LO/TE/EN	ENCAPSULATED, BACKED AND MOUNTED ON ROLLERS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036. COPY #1, A TRANSPARENCY, IS IN ACC. FOLDER 132. COPIES 2 - 5 IN L&C PLANS-8 x 10 BW PRINTS, BOX 2.
B	LO/TE/EN	ENCAPSULATED, BACKED AND MOUNTED ON ROLLERS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	TEARS, LOSSES, SOILED
B	RO/TE/LO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

B	RO/TE/LO /SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	LOSSES, SOILED
B	RO/SO/LO	C-142-001-K IS ANOTHER COPY OF THIS MAP. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
B	RO/SO/LO	C-142-001-K IS ANOTHER COPY OF THIS MAP. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
B	LO/TE/EN	ENCAPSULATED, BACKED AND MOUNTED ON ROLLERS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED, TEARS

B	RO/SO/TE	BEARS STAMP, VERSO, WHICH READS "DOCKET NO. 10 BOARD OF TAX APPEALS-APPELLANT'S EXH. 2/SEP. 21, 1951".LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE	BEARS STAMP, VERSO, WHICH READS "DOCKET NO. 10 BOARD OF TAX APPEALS-APPELLANT'S EXH. 2/SEP. 21, 1951".LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE /LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE /LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE /LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE /LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES

B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
PAPER	B	SOILED, TEARS, LOSSES
B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	FOLDS

B	RO/FO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
B	RO/FO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
CLOTH-BACKED PAPER	B	SOILED, TEARS, STAINS
B	RO/SO/TE/ST	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE/ST	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	LOSSES, TEARS
B	LO/TE	NOTE READS "FROM SURVEY BY JAMES B. FRANCIS ENGINEER." LISTED ON P. L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

		NOTE READS "FROM SURVEY BY JAMES B. FRANCIS ENGINEER."
B	LO/TE	LISTED ON P. L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036 WHERE A NOTE READS "TO BE FRAMED". THE FRAMED COPY OF THIS PLAN FOUND AMONG THE CATALOGUED ARTIFACTS AT LOWE-1039 MAY VERY WELL BE THIS MISSING PLAN.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036. A COPY OF THIS PLAN MAY BE FOUND AT LOWE-6479 AMONG THE CATALOGUED ARTIFACTS AND IT IS POSSIBLE THAT ARTIFACT IS ACTUALLY THIS MISSING PLAN.
B	RO/SO/ST /TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/ST /TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/ST/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/ST/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO	NOTE READS: "CITY WATER PIPES", VERSO. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

B	RO	NOTE READS: "CITY WATER PIPES", VERSO. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
B	RO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
B	RO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED, TEARS
B	RO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	TEARS, LOSSES

B	RO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED
B	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036. IT STATES THAT THIS IS THE SAME MAP AS MAP 020.
B	RO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036. IT STATES THAT THIS IS THE SAME MAP AS MAP 022 AND THAT IT WAS INTENDED TO BE FRAMED.
CLOTH-BACKED PAPER	B	SOILED, TEARS, STAINS, FOXING
B	RO/SO/TE /ST/FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE /ST/FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036. ONE COPY IS LOCATED IN THE NUMBERED DRAWINGS SERIES AT 165-011 AND MAY BE THIS COPY OR IT MAY BE ANOTHER COPY.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

CLOTH-BACKED PAPER	B	FOLDS, SOILED, FOXING
B	RO/FO/SO/FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/FO/SO/FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED
B	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..

CLOTH-BACKED PAPER	B	SOILED
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

CLOTH-BACKED PAPER	B	SOILED,TEARS, LOSSES
B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE/LO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	FOLDS, SOILED,TEARS
B	RO/FO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/FO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/FO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/FO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
CLOTH-BACKED PAPER	B	SOILED

B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

B	RO/SO/TE	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		SEE PLAN NO. 162-036 FOR P.L.& C. MAP NUMERICAL INDEX.
CLOTH-BACKED PAPER	B	SOILED, FOXING
B	RO/SO/FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.

B	RO/SO/FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..
A		LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE /FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
B	RO/SO/TE /FX	LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.
	SO/ST/TE	
	SO/FO	

ST/FO

SO

SO

SO

SO

ST

SO/TE

TE/LO/SO ALSO BEARS NO. K-64, RECTO.

TE/SO/LO BEARS NO. 2, RECTO.

SO

SO/ST

ST/FO

ST/SO/FO
/TE

SO/TE

SO

SO

SO

NOTE READS: "RECONSTRUCTION OF NO. 1 ENGINE ROOM."
SO ADDITIONAL NOTE READS: "SEE DRAWING A-129".

SO

SO

SO/TE

SO/TE

SO/TE

SO/FO

SO/LO/ST/
TE

SO/ST/FO

SO/FO/TE
/LM

SO

SO/FO

SO/ST

SO/FO

SO/TE/ST/
LO

SO/FE

FO/SO/ST

FO/SO

SO/TE

SO/TE ALSO BEARS NO. A-6, LOWER LEFT CORNER, RECTO.

SO

SO/FO

S0

SO/HO

SO

SO/TE/M
O/LO ALSO BEARS NO. A-12, CROSSED OUT, RECTO.

SO/TE

SO/FX ALSO BEARS NO. A-14, CROSSED OUT, RECTO.

SO/FX/TE

SO BEARS "NO. A-25", CROSSED OUT, RECTO.

	SO/FO/TE	
	SO	NUMBER B-158 HAS BEEN LINED OUT ON THIS PLAN. PLAN RENUMBERED TO P.H. 096-011 BY P.L. & C. NOTE DIRECTS: "DO NOT USE SCALE; USE FIGURES ONLY."
	RO/TE/FO /LM	FILE 1010. ADDITIONAL DRAWINGS ATTACHED OVER BASE PLAN AS A MONTAGE CONSISTING OF 3 SEPARATE PIECES OF PAPER. BEARS NOTES "DRAWING OF WINDOWS B-159" AND "SEE DRAWING B-156 FOR DETAIL OF PARTITIONS", RECTO.
C	RO, TE, FO, LM	FILE 1010. ADDITIONAL DRAWINGS ATTACHED OVER PLAN. APPEARS TO BE ASSEMBLAGE OF 3 PIECES OF PAPER.
	SO	
	SO/FO	
	SO	
	SO	
	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

SO/FO

SO/FO

SO

SO/FO/TE
/FX LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

FO/SO/TE

SO/FO/TE

FO/SO/TE
/LO

SO/ST/FO

SO/FO/TE

SO/TE

SO

SO

ST

ST

ST

ST

SO

SO NOTE READS: "FOR DETAILS SEE 413".

FO/SO/ST

SO

SO

SO/FO

SO NOTE READS: "140 AUTOMATIC SPRINKLER HEADS".

SO/TE

SO

SO/TE/LO

SO/TE

SO/FO/TE

SO/ST/TE	ORIGINALLY NUMBERED C-38, RECTO AND VERSO, OVERWRITTEN C-17, VERSO. ALSO BEARS NO. 3524, VERSO.
ST/TE	BEARS NOTE: "OLD COTTON HOUSE".
SO/ST	BEARS NOTE: "WEST END OF COTTON HOUSE" IN REFERENCE TO A STRUCTURE ABUTING THE SUECT OF THIS DRAWING.
SO/ST	BEARS NOTE: "NORTH SIDE OF COTTON HOUSE". THE DATE IS ILLEGIBLE BUT IT IS PROBABLY 1882.
FO/LO/TE /SO/ST	PLAN RENUMBERED TO 156-128 BY P.L. & C.
SO	PLAN RENUMBERED TO 156-152 BY P.L. & C.
SO/ST/TE	NOTE, VERSO, READS: "PUT UP MAY 1890".
SO/ST	
SO/ST	

SO/ST/TE

SO

SO/ST

SO/FO/ST

SO/FO

SO/ST

SO

FO/ST

SO/FO/ST

SO/ST

FO/ST/TE

SO/FO

SO

SO

SO/ST/TE

SO/FO

ST/FO

SO/FO

SO

SO/FO/ST LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

SO

SO/ST

SO/FO/ST

SO/ST

SO/FO/TE

SO/ST

SO

FO/SO

SO/ST

SO

SO/ST

SO

NO. E-24 LINED OUT, RECTO. PLAN RENUMBERED TO P.H. 096-010
SO/FO BY P.L. & C.

ST

SO/FO/TE

FO/TE/SO
/LO NOTE, VERSO, READS: "SLASHER ELEVATOR".

SO/TE

SO

SO/FO/TE
/HO ORIGINALLY DATED JUNE 10, 1909, CORRECTED TO JULY 14, 1909.

SO/ST/LO

FO

SO

SO/ST/TE

ORIGINALLY DATED JAN. 1894 WITH ADDITIONS FROM MARCH 1943.
SO/ST PLAN RENUMBERED TO 156-126 BY P.L. & C.

FO/SO

SO/TE

SO/ST/TE

SO/ST

SO/FO

SO/ST

SO/ST

SO/TE

SO/FO/ST

FO/TE BEARS: "D. B. MACLARY & SON CO." AND NUMBER "741", BOTH RECTO.

SO/FO/TE

FO/TE NOTE READS: "NAPPER ELEVATOR", VERSO.

FO/SO

FO/SO/TE

SO

SO/FO/LO

FO/ST

CL

SO/ST

SO/TE

SO/FO/TE AN EASTERN BRIDGE AND STRUCTURAL COMPANY, WORCESTER, MASS. PLAN. JOB NO. 3863, DRAWING NO. 1. JOB NAME: "MASS. COTTON MILLS FOOT BRIDGE'. BEARS NOTE: "NAPPER BRIDGE", VERSO. APPROVAL STAMP, RECTO, DATED APRIL 16, 1918.

SO/FO/TE AN EASTERN BRIDGE AND STRUCTURAL CO. PLAN. JOB NO. 3863, DRAWING NO. 10.

TE AN EASTERN BRIDGE AND STRUCTURAL CO. PLAN. JOB NO. 3863, DRAWING NO. 9.

FO AN EASTERN BRIDGE AND STRUCTURAL CO. PLAN. JOB NO. 3863, DRAWING NO. 8.

FO/SO SHOWS MASS. MILLS COMPLEX. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

SO BEARS NO. G-9, RECTO, IN RED COLORED PENCIL AS ARE THE OTHER G-PREFIX MASS. MILLS SERIES PLANS. PLAN RENUMBERED TO 156-082 BY P.L. & C.

FO/SO	READS: "6" ROOF DRAIN, SECTION 9 & 10", EVIDENTLY OF MASS. MILLS PICKER HOUSE (SEE PLAN N. K-127). THIS PLAN IS TORN IN THREE PIECES. THE K- PREFIX SHOWS ON THE PLAN BUT THE ACTUAL NUMBER IS MISSING.
FO/SO/TE/LO	
FO/SO/TE	PLAN ORIGINALLY DATED MAY 1889. ATTACHED LETTER AND AREA NOTES DATED 21 NOV. 1890 AND 1 MAY 1892 WITH A PENCIL NOTATION OF APRIL 1928, RESPECTIVELY.
SO/ST/TE/LO	
SO/ST/TE/LO	
SO/HO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
FO/TE	BEARS NOTE" "THISS ARRANGEMENT SHOWS NO. 7 WHEEL AND NO. 2 ENGINE REMOVED."
SO/TE/LO	ASSOCIATED MUTUAL INSURANCE CO. PLAN, INDEX NUMBER 9328, SERIAL NUMBER 14912 REPLACING 9420. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
SO/ST/TE	ORIGINALLY DATED 29 OCT. 1920.
FO/ST/TE	ORIGINALLY DATED 29 OCT. 1920.

ST/TE/LO/ TA	A WESTINGHOUSE MACHINE CO. PLAN, NO. 300262.
FO	
FO/LO/ST/ TE/MO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406. THERE WAS MORE TO THE NUMBER OF THIS PLAN THAN SIMPLY M-5 BUT THE PORTION OF THE NUMBER AFTER THE 5 HAS BEEN TORN AWAY AND IS MISSING.
SO/TE/ST	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406. ORIGINALLY DATED JULY 12, 1909. BEARS NO. M-153, CROSSED OUT, RECTO.
SO/TE/LO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406. ORIGINALLY DATED JULY 12, 1909. BEARS NO. M-168, CROSSED OUT, RECTO.
FO/SO/TE	
SO/FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406 E, SHEET 9. BEARS NO. M-52, CROSSED OUT, RECTO.
SO/FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406 E. BEARS NO. M-54, CROSSED OUT, RECTO.
SO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406 E, SHEET 203. BEARS NO. M-156, CROSSED OUT, RECTO.
SO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406 E, SHEET 204. BEARS NO. M-156, CROSSED OUT, RECTO.

FO/TE/MO	BEARS NO. M-159, CROSSED OUT, RECTO. A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 201. THIS BLUEPRINT IS A DUPLICATE OF MASS. MILLS M-017.
FO/SO/TE/MO	BEARS NO. M-65, CROSSED OUT, RECTO. A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 201. THIS BLUEPRINT IS A DUPLICATE OF MASS. MILLS M-016.
SO/FO/ST/TE	BEARS NO. M-155, CROSSED OUT, RECTO. A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 205. BEARS NO. M-155, CROSSED OUT, RECTO.
SO/FO/ST/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 208. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. M-160, CROSSED OUT, RECTO.
SO/FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 209. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. M-161, RECTO.
SO/FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. M-63, CROSSED OUT, RECTO. THIS ONLY A PORTION OF WHAT WAS A LARGER PLAN.
SO/FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 207. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. M-101, CROSSED OUT, RECTO. ORIGINALLY DATED OCTOBER 8, 1909.
FO/TE/MO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 12.
FO/TE	ORIGINALLY DATED JAN. 17, 1920. JOHN A. STEVENS, ENGINEER, JOB. NO. 165, SHEET NO. 14.

TE	
SO/FO/TE	BEARS NO. M-18, IN GRAPHITE, RECTO AND IN INK, BENEATH CURRENT PLAN NUMBER LABEL.
FO/SO/MO/LO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406.
SO/FO/TE/TA	A HOLYOKE MACHINE CO., WORCESTER, MASS. PLAN. BEARS NO. M-13, CROSSED OUT, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
SO	ORIGINALLY DATED 11 JAN. 1909. A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET 19.
FO/SO/ST/TE/LO	A HOLYOKE MACHINE CO., WORCESTER, MASS. PLAN.
FO/TE	ORIGINALLY DATED 23 JAN. 1911. A HOLYOKE MACHINE CO., WORCESTER, MASS. PLAN.
SO/FO/TE/LO	A HOLYOKE MACHINE CO., WORCESTER, MASS. PLAN.
FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB. 406, SHEET NO. 211.

SO/FO/TE A LOMBARD GOVERNOR CO., ASHLAND, MASS. PLAN.

SO/TE A LOMBARD GOVERNOR CO., ASHLAND, MASS. PLAN.

SO

SO

ST

SO/TE PART OF THE TITLE OF THIS PLAN IS FOUND IN COLORED PENCIL ON THE VERSO. A GENERAL ELECTRIC CO. PLAN. BEARS NO. T841073, RECTO.

SO/FO/TE A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 13. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS NO. M-53, CROSSED OUT, RECTO. ORIGINALLY DATED OCTOBER 8, 1909. THIS PLAN IS TORN INTO TWO PIECES.

SO/FO/TE/LO A WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN, NO. 42-70-77. DATE STAMPED "JUN 25 1924", VERSO.

CL A WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN, NO. 20-48-43. DATE STAMPED "JUN 25 1924", VERSO.

CL A WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN, NO. 20-48-44. DATE STAMPED "JUN 25 1924", VERSO.

CL	A WESTINGHOUSE ELECTRIC & MFG. CO. TURBINE DIVISION PLAN, NO. 20-48-47. DATE STAMPED "JUN 25 1924", VERSO.
FO/LO	A WESTINGHOUSE MACHINE CO. PLAN. NO. 83961.
SO/FO/TE	A GENERAL ELECTRIC CO. PLAN. NO. T-289357.
SO/FO/TE	BEARS NO. L-60, CROSSED OUT, RECTO. A WESTINGHOUSE MACHINE CO. PLAN, NO.300262.
FO/TE/MO	JOHN A. STEVENS, ENGINEER.
FO/MO	JOHN A. STEVENS, ENGINEER.
SO/FO/TE	A GENERAL ELECTRIC CO. PLAN. NO. P-214869. BEARS AN L-PREFIX NUMBER PARTIALLY COVERED OVER BY THE NEW NUMBER LABEL, RECTO.
TE/MO	BEARS NO. M-60, CROSSED OUT, RECTO.
TE/ST/LO/MO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406. BEARS NO. 51, CROSSED OUT, RECTO. ALSO BEARS D 301, RECTO.
ST/TE/LO	A LOCKWOOD, GREENE & CO. DRAWING. ORIGINALLY DATED JAN. 22, 1914.
SO/MO	JOHN A. STEVENS, ENGINEER.

SO JOHN A. STEVENS, ENGINEER.

SO JOHN A. STEVENS, ENGINEER. MARKED "EXTRA COPY" IN COLORED PENCIL.

SO JOHN A. STEVENS, ENGINEER.

SO/TE READS: "EXTRA M-134".

ST/MO

FO/TE/ST

FO/TE/ST

FO ORIGINALLY DATED OCT. 6, 1919.

FO ORIGINALLY DATED OCT. 6, 1919.

FO ORIGINALLY DATED OCT. 6, 1919.

FO ORIGINALLY DATED OCT. 6, 1919.

FO/TE	A GENERAL ELECTRIC CO. PLAN. NO. T-1980173.
SO/FO/TE	A GENERAL ELECTRIC CO. PLAN. NO. T-1980175.
SO/TE	A GENERAL ELECTRIC CO. PLAN. NO. T-1980176.
ST	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 200. THIS PLAN NUMBER IS FROM THE OLD MASS. MILLS NUMBERING SYSTEM RATHER THAN THE NEW NUMBERING SYSTEM.
SO/FO/TE	A GENERAL ELECTRIC CO. PLAN NO. M-1868581. DATE PUNCHED 11-4-18.
ST/TE	A GENERAL ELECTRIC CO. PLAN.
TE	A GENERAL ELECTRIC CO. PLAN.
ST/TE	ORIGINALLY DATED 10-15-1914. REVISED 10/27/1914. HEADERS & CONNECTORS ADDED 12-10-1914.
ST/MO	
FO	

FO/TE/LO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 38. ORIGINALLY DATED SEPTEMBER 30, 1910.
FO/TE/HO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406. ORIGINALLY DATED OCTOBER 5, 1910.
FO/TE/LO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 216. ORIGINALLY DATED OCTOBER 23, 1910.
FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 213. ORIGINALLY DATED OCTOBER 5, 1910.
SO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 214.
FO/TE	
TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. 39. ORIGINALLY DATED SEPT. 22, 1910.
SO/TE	THIS PLAN HAS BEEN TORN IN HALF. BOTH HALVES ARE OTHERWISE INTACT.

FO/TE

ST/TE/LO

SO/TE

SO

FO/ST/TE

SO/FO/TE

SO/FO/TE

SO/FO/TE ORIGINALLY DATED JULY 1, 1910.

SO/FO/TE

FO/TE/LO ORIGINALLY DATED 8-3-1910.

SO/FO/ST/TE A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. A-28.

SO/FO/TE	
SO/FO/TE	
FO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406 E, SHEET NO. 218.
FO/TE	ORIGINALLY DATED OCTOBER 5, 1910.
FO/ST/LO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. D-305.
FO/TE/LO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. D-306. ORIGINALLY DATED OCTOBER 5, 1910.
SO/TE	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET NO. D-310. ORIGINALLY DATED OCTOBER 10, 1910.
SO/FO/TE/HO	A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406 E, SHEET NO. D-313.
TE	

TE A LOCKWOOD, GREENE & CO. DRAWING. JOB NO. 406, SHEET D-314.

ST/FO/TE

SO

SO

SO/FO/TE A MURPHY FURNACE CO. DRAWING FOR A SUPERHEATER FOR A MASS. COTTON MILLS BOILER. MASS. MILLS SERIES PLAN NO. ON VERSO.

SO/FO/TE PLAN FROM THE LAWRENCE MACHINE CO., LAWRENCE, MASS. DRAWING NO. 1479.

FO/TE

SO/LO/MO/TE

FO/TE ORIGINALLY DATED 10-11-917. BEARS PENCIL NOTE: "ELECTRIC STOP ON ASH BUCKET".

FO/ST/TE BEARS NO. L-27, CROSSED OUT, RECTO.

FO/TE/LO

SO	PLAN NO. USED TWICE BY P.L.& C.
SO/TE	PLAN NO. USED TWICE BY P.L.& C.
SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
SO/FO/TE	BEARS " JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 29, DRAWER 39", RECTO.
FO/TE/LO	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 23, DRAWER 39", RECTO.
SO/TE/LO	ORIGINALLY DATED DEC. 12, 1919, REVISED DEC. 20, 1919. BEARS " JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 33, DRAWER 39", RECTO.
FO	BEARS " JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 21, DRAWER 39", RECTO.
SO/TE	BEARS " JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 27A, DRAWER 39", RECTO.
SO/TE	BEARS " JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 35, DRAWER 39", RECTO.
ST/TE	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 31, DRAWER 39", RECTO.
TE	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 34, DRAWER 39", RECTO.
FO/SO/TE /LO	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 28, DRAWER 39", RECTO.

	SO/TE/LO	BEARS " JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 26A, DRAWER 39", RECTO.
	SO/TE	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 34, DRAWER 39", RECTO.
	FO/SO/TE	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 39, DRAWER 39", RECTO.
	FO/TE	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 41, DRAWER 39", RECTO.
	FO/SO/TE	BEARS "JOHN A. STEVENS, ENGINEER. JOB NO. 165, SHEET NO. 37, DRAWER 39", RECTO.
	RO/TE	FILE 1010. DUPLICATE OF P.H. 21-1 BLUEPRINT IN L. & C. CARD INDEX. ANOTHER RECORD EXISTS IN THE INDEX FOR A NON-BLUEPRINT. BEARS REVISION TABLE WITH DATE & NOTE: 20-10-16 MANHOLE OMITTED, NOTE FOR SLAB 4 ADDED.
C	RO/TE	FILE 1010. DUPLICATE OF P.H. 21-1 BLUEPRINT IN L. & C. CARD INDEX. ANOTHER RECORD EXISTS IN THE INDEX FOR A NON-BLUEPRINT. BEARS REVISION TABLE WITH DATE & NOTE: 20-10-16 MANHOLE OMITTED, NOTE FOR SLAB 4 ADDED.
	RO/FO/TE /ST/HO	FILE 1010. PLAN NUMBER ENTERED AS P.H. 21-2 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-002 WITH SOME NEW WORK. NOTE STATES: THIS DWG. SHOWS ALL STEEL REQUIRED IN BEAMS & GIRDERS & DOES NOT SHOW STEEL IN SLABS FOR WHICH SEE DWG. 2 & 3.
B	RO/FO/TE /ST/HO	FILE 1010. PLAN NUMBER ENTERED AS P.H. 21-2 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-002 WITH SOME NEW WORK. NOTE STATES: THIS DWG. SHOWS ALL STEEL REQUIRED IN BEAMS & GIRDERS & DOES NOT SHOW STEEL IN SLABS FOR WHICH SEE DWG. 2 & 3.
	RO/ST/TE	FILE 1010. PLAN NUMBER ENTERED AS P.H. 21-3 IN L. & C. CARD INDEX. APPEARS TO BE A BLUEPRINT OF PLAN NO. P.H. 021-002 RENUMBERED AS P.H. 021-003. BEARS DRAWING NO. 2 RECTO. DATE GIVEN FOR PLAN NO. P.H. 021-003 IS 14 DECEMBER 1920.
B	RO/ST/TE	FILE 1010. PLAN NUMBER ENTERED AS P.H. 21-3 IN L. & C. CARD INDEX. APPEARS TO BE A BLUEPRINT OF PLAN NO. P.H. 021-002 RENUMBERED AS P.H. 021-003. BEARS DRAWING NO. 2 RECTO. DATE GIVEN FOR PLAN NO. P.H. 021-003 IS 14 DECEMBER 1920.

	RO/FO	PLAN NUMBER ENTERED AS P.H. 21-4 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-004. BEARS FILE 1010. ALSO BEARS NO. 4, RECTO.
B	RO/FO	PLAN NUMBER ENTERED AS P.H. 21-4 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-004. BEARS FILE 1010. ALSO BEARS NO. 4, RECTO.
	RO/FO/ST	PLAN NUMBER ENTERED AS P.H. 21-5 IN L. & C. CARD INDEX. BLUEPRINT OF PLAN NO. P.H. 021-005. BEARS FILE 1010 AS DOES PLAN NO. P.H. 021-005. DRAWING NO.7, REVISED 9/11/2[ILLEG.]. INDEX CARD NOTES "SUPERCEDED BY # 7", AS DOES PLAN NO. P.H. 021-005.
B	RO/FO/ST	PLAN NUMBER ENTERED AS P.H. 21-5 IN L. & C. CARD INDEX. BLUEPRINT OF PLAN NO. P.H. 021-005. BEARS FILE 1010 AS DOES PLAN NO. P.H. 021-005. DRAWING NO.7, REVISED 9/11/2[ILLEG.]. INDEX CARD NOTES "SUPERCEDED BY # 7", AS DOES PLAN NO. P.H. 021-005.
	RO/FO/TE	PLAN NUMBER ENTERED AS P.H. 21-6 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-006. BEARS FILE 1010 RECTO. BEARS NOTE VERSO: # 12 WHEEL SEE-4.
B	RO/FO/TE	PLAN NUMBER ENTERED AS P.H. 21-6 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-006. BEARS FILE 1010 RECTO. BEARS NOTE VERSO: # 12 WHEEL SEE-4.
	FO/RO/TE /ST	PLAN NUMBER ENTERED AS P.H. 21-7 IN L. & C. CARD INDEX. BEARS FILE 1010, DRAWING NO.10. APPEARS TO BE A BLUEPRINT OF P.H. 021-010 RENUMERED AS # 7 BECUASE OF NOTE ABOVE AND THAT THE DATES COINCIDE WHEREAS THE DATE OF P.H. 021-007 IS SEPTEMBER 1920.
B	FO/RO/TE /ST	PLAN NUMBER ENTERED AS P.H. 21-7 IN L. & C. CARD INDEX. BEARS FILE 1010, DRAWING NO.10. APPEARS TO BE A BLUEPRINT OF P.H. 021-010 RENUMERED AS # 7 BECUASE OF NOTE ABOVE AND THAT THE DATES COINCIDE WHEREAS THE DATE OF P.H. 021-007 IS SEPTEMBER 1920.
	RO/TE	PLAN NUMBER ENTERED AS P.H. 21-9 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-009 HERE RENUMBERED AS 8. BEARS FILE NO. 1010, DRAWING NO. 9.

B	RO/TE	PLAN NUMBER ENTERED AS P.H. 21-9 IN L. & C. CARD INDEX. BLUEPRINT OF P.H. 021-009 HERE RENUMBERED AS 8. BEARS FILE NO. 1010, DRAWING NO. 9.
	RO/FO/TE	PLAN NUMBER ENTERED AS P.H. 21-14 IN L. & C. CARD INDEX. APPEARS TO BE A BLUEPRINT OF P.H. 21-14 OR POSSIBLY 13. BEARS FILE NO. 1010. DRAWING NO.14. PLAN BEARS LIST OF MATERIAL FOR TWO GATES.
B	RO/FO/TE	PLAN NUMBER ENTERED AS P.H. 21-14 IN L. & C. CARD INDEX. APPEARS TO BE A BLUEPRINT OF P.H. 21-14 OR POSSIBLY 13. BEARS FILE NO. 1010. DRAWING NO.14. PLAN BEARS LIST OF MATERIAL FOR TWO GATES.
	RO/TE/FO/ST	SCALE IS NOTED AS FOLLOWS: 1/2"& 1 1/2"=1'. 1"=10'. BEARS FILE NO.10, DRG. NO.13. ALSO BEARS # 12 WHEEL & GATE IN GRAPHITE VERSO.
B	RO/TE/FO/ST	SCALE IS NOTED AS FOLLOWS: 1/2"& 1 1/2"=1'. 1"=10'. BEARS FILE NO.10, DRG. NO.13. ALSO BEARS # 12 WHEEL & GATE IN GRAPHITE VERSO.
	RO/FO/TE/SO	BEARS JOB NO.4581. DRAWING NO.7. PLAN SHOWS BILL OF MATERIALS & WEIGHTS. BEARS JOB UNO. 4581. DRAWING NO.7. BEARS: JOB COMPLETE RECTO.
C	RO/FO/TE/SO	BEARS JOB NO.4581. DRAWING NO.7. PLAN SHOWS BILL OF MATERIALS & WEIGHTS. BEARS JOB UNO. 4581. DRAWING NO.7. BEARS: JOB COMPLETE RECTO.
	RO/FO/ST	BEARS FILE NO. 1010, DRAWING NO.7.
C	RO/FO/ST	BEARS FILE NO. 1010, DRAWING NO.7.

	SO/LO	THIS A LARGE FRAGMENT OF A PLAN MISSING ITS TITLE BLOCK.
	RO/TE	ATTACHED WITH PLAN NOS. P.H. 021-017-[B] THRU [D].
C	RO/TE	ATTACHED WITH PLAN NOS. P.H. 021-017-[B] THRU [D].
	RO	BEARS K-2104609. PERTAINS TO GENERAL ELECTRIC CO. BEARS NOTE TO PURCHASER. ALSO BEARS NOS. 1, 17, 21 PUNCHED INTO PAPER. ATTACHED TO PLAN NOS. P.H. 021-017-[A] THRU [D].
C	RO	BEARS K-2104609. PERTAINS TO GENERAL ELECTRIC CO. BEARS NOTE TO PURCHASER. ALSO BEARS NOS. 1, 17, 21 PUNCHED INTO PAPER. ATTACHED TO PLAN NOS. P.H. 021-017-[A] THRU [D].
	RO/FO	BEARS K-2104609 RECTO. BEARS NOTE TO PURCHASER. BEARS NOS 3, 9, 21 PUNCHED INTO PAPER. ATTACHED TO PLAN NOS. P.H. 021-017-[1], [2] THRU [4]. BEARS TYPED NOTE & STAMPS VERSO FROM MASS. COTTON MILLS. THIS PRINT SHOULD SUPERCEDE ALL OTHERS OF THIS NO.
C	RO/FO	BEARS K-2104609 RECTO. BEARS NOTE TO PURCHASER. BEARS NOS 3, 9, 21 PUNCHED INTO PAPER. ATTACHED TO PLAN NOS. P.H. 021-017-[1], [2] THRU [4]. BEARS TYPED NOTE & STAMPS VERSO FROM MASS. COTTON MILLS. THIS PRINT SHOULD SUPERCEDE ALL OTHERS OF THIS NO.
	RO	BEARS K-2104610 RECTO. BEARS NOS. 10 9 20 PUNCHED INTO PAPER. ATTACHED TO PLAN NOS P.H. 021-017-[A] THRU [D]. BEARS GENERAL ELECTRIC STAMP VERSO. CORRECT ONLY FOR CUSTOMERS ORDER NO. OF 6/11 REQ. NO. B-71463.
C	RO	BEARS K-2104610 RECTO. BEARS NOS. 10 9 20 PUNCHED INTO PAPER. ATTACHED TO PLAN NOS P.H. 021-017-[A] THRU [D]. BEARS GENERAL ELECTRIC STAMP VERSO. CORRECT ONLY FOR CUSTOMERS ORDER NO. OF 6/11 REQ. NO. B-71463.
	RO/FO/TE	SCALE: FULL SIZE, 4"& 3/4"=1'. BEARS DRAWING NO. 1725-Y RECTO. NOTES "MADE FOR MASS. COTTON MILLS LOWELL, MASS. HEAD-17'-0" H.P. 600 R.P.M. 128. DRAWING NO. 1707-B DATE MAY 18, 1921." BLUEPRINT OF PLAN NO. P.H. 021-016 AS PER L.& C. CARD INDEX.

		SCALE: FULL SIZE, 4"& 3/4"=1'. BEARS DRAWING NO. 1725-Y RECTO. NOTES "MADE FOR MASS. COTTON MILLS LOWELL, MASS./HEAD-17'-0" H.P. 600 R.P.M. 128./DRAWING NO.. 1707-B DATE MAY 18, 1921."
B	RO/FO/TE	BLUEPRINT OF PLAN NO. P.H. 021-016 AS PER L. & C. CRAD INDEX.
	SO/FO/TE /ST	FILE 1010. BEARS DRAWING NO. 8 RECTO. NOTE STATES THIS DWG. SHOWS ALL STEEL REQUIRED IN BEAMS & GIRDERS & DOES NOT SHOW STEEL IN SLAB FOR WHICH SEE DWG. 2 & 3. ALSO BEARS DETAIL FOR REINFORCEMENT FOR BEAMS & GIRDERS.
C	RO/FO/TE /ST	FILE 1010. BEARS DRAWING NO. 8 RECTO. NOTE STATES THIS DWG. SHOWS ALL STEEL REQUIRED IN BEAMS & GIRDERS & DOES NOT SHOW STEEL IN SLAB FOR WHICH SEE DWG. 2 & 3. ALSO BEARS DETAIL FOR REINFORCEMENT FOR BEAMS & GIRDERS.
	FO/ST/TE	A HOLYOKE MACHINE CO., WORCESTER, MASS., PLAN.
	FO/ST/TE	A HOLYOKE MACHINE CO., WORCESTER, MASS., PLAN.
	FO/ST/TE	
	SO	

FO A HOLYOKE MACHINE CO., WORCESTER, MASS., PLAN.

FO/SO BEARS STAMP WHICH STATES: BLUEPRINT ISSUED JUL 9, 1918. HOLYOKE MACHINE CO.

FO/ST/TE A GENERAL ELECTRIC CO., SCHENECTADY N.Y., PLAN, NO. T-1850827. BEARS PUNCHED DATE "10 19 17".

FO/ST/TE A GENERAL ELECTRIC CO., SCHENECTADY N.Y., PLAN, NO. M-1678387. BEARS PUNCHED DATE "10 16 17".

FO/ST/TA/TE A GENERAL ELECTRIC CO., SCHENECTADY N.Y., PLAN, NO. P-1829861. BEARS PUNCHED DATE "11 20 17". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

SO/ST NOTE, RECTO, STATES: "COPIED FEB. 8, 1910, FROM ORIGINAL DRAWING OF JULY 3, 1856." THIS IS POSSIBLY A TRACING OF PLAN NO. P.H. 16-012 FROM THE P.L.& C. NUMBERED PLANS SERIES.

SO/TE/FX

RO/SO/TE/FX
C

SO/ST

	SO/FO/TE	BEARS NUMBER 1, CIRCLED, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
	SO/FO/TE	BEARS NUMBER 6, CIRCLED, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
	SO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
	FO/SO	A GENERAL ELECTRIC CO., SCHENECTADY N.Y., PLAN, NO. M-1678387. BEARS PUNCHED DATE "10 26 18".
B	FO/TE/SO	NOTE STATES MADE FROM AN ORIGINAL SURVEY. NOTES IN TRANSIT BOOK NO. 2 PAGES 1-43. SURVEYED & PLOTTED BY M.S. AMY. NOTE STATES IMPROVEMENTS MADE IN 1897.
B	RO/SO	NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/TE/SO	DRAWINGS MADE FROM ORIGINAL SURVEY MADE BY H. C. DAGGETT & PLOTTED BY G. W. MANSUR. NOTES IN TRANSIT BOOK NO.5, PAGES 12 TO 24, 34 TO 39, 112 TO 113.
B	FO/TE/SO	DRAWING MADE FROM ORIGINAL SURVEY BY H. C. DAGGETT & PLOTTED BY W. W. PEABODY & G. W. MANSUR. NOTES IN TRANSIT BOOK NO.1 P. 136-149 B. NO.4 P. 158-159, 168-179, 187-193. B. NO. 5, P.10-11, 32-35, 112-115.

B	RO/TE/SO	NOTE STATES THIS DRAWING MADE FROM AN ORIGINAL SURVEY BY MESSRS. H. C. DAGETT & G. W. MANSUR. NOTES IN TRANSIT BOOK NO.5, PP.113, 116 TO 130.
C	CL/RO	PHOTO NEGATIVE ON PAPER OF P. H. 005.
B	SO/RO	SCALE IS 1"=2 1/2 MILES OR 1/158400. NOTE STATES: "SKELETAL PLAN TRACED IN PART FROM ONE LOANED BY ESSEX CO. OF LAWRENCE, MASS. & COMPLETED IN MASS. FROM WALLING & GRAY'S ATLAS OF MASSACHUSETTS." CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/TE/SO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/LM/LI/ SO/RO	SCALE IS 1"=2 1/2 MILES OR 1/158400.CERTAIN LINES TRACED FROM STATE MAP OF N.H. PUBLISHED 1878. FOR SUMMARY OF AREAS SEE "FLOW OF WATER IN MERRIMACK RIVER," PG.62. FOR DETAILS SEE W.E. SPEARS CAL. BOOK NO. 1 PAGES 38-47. CONSEC. INDEX ALSO GIVES NO DATE.
B	RO/LM/TE /SO	NOTE STATES THIS MAP WAS TRACED FROM THE SHEETS PUBLISHED BY THE MASS. TOPOGRAPHICAL COMMISSION, PRELIMINARY EDITION OF 1890. FOR DETAILS OF COMPUTATION OF AREAS, SEE W.E. SPEARS CAL. BOOK NO.1 PAGES 32-36.
B	RO/TE/SO /LM	NOTE STATES: SKELETAL PLAN TRACED IN PART FROM ONE LOANED BY ESSEX CO. OF LAWRENCE, MASS. & COMPLETED IN MASSACHUSETTS FROM WALLING & GRAYS ATLAS OF MASSACHUSETTS. COPY OF PLANS P.H. 006-A AND B AS PER CONSECUTIVE INDEX OF DRAWINGS WITH NO DATE.
B	TE/RO	SCALE IS 1"=2 1/2 MILES, 1/158400. NOTE STATES: SKELETON PLAN TRACED IN PART FROM ONE LOANED BY ESSEX CO. OF LAWRENCE, MASS. & COMPLETED IN MASSACHUSETTS FROM WALLING & GRAY'S ATLAS OF MASSACHUSETTS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

C	SO/RO/TE	UNTITLED REVERSE PHOTO NEGATIVE ON PAPER. COPY OF P.H. 006-A. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	TE/LM/SO/RO	UNTITLED REVERSE PHOTO NEGATIVE ON PAPER. COPY OF P.H. 006-B. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/SO	DATE GIVEN AS 1901/1904 IN L. & C. CARD INDEX. BEARS A-6 VERSO. THIS PLAN NO. WAS USED TWICE BY P. L.& C.
C	RO	ACTUALLY COPIES OF P.H. 006-A AND P.H. 006-B PASTED TOGETHER TO FORM A SINGLE PLAN. NOT LISTED IN P. L. & C. CARD INDEX OR CONSECUTIVE INDEX OF DRAWINGS. THIS PLAN NO. WAS USED TWICE BY P. L. & C.
B	RO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/RO	BEARS SHEET 1, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	TE/SO/RO	BEARS SHEET 1, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/CL	BEARS SHEET 1, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	LM/TE/RO /SO	THIS PLAN IS EITHER A PRELIMINARY SKETCH FOR P.H. 006-03-[02] OR A REVISION OF IT. ON BALANCE, IT LOOKS PRELIMINARY DATA. THE ISOHYETS AND NOTATIONS ARE ARE IN LEAD PENCIL AND SEEM TO BE INCOMPLETE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/LM/RO	BEARS SHEET 1 RECTO. NOTE PERTAINS TO RECORD OF JULY 1915 STORM. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/SO	NOTE STATES: "SURVEY MADE IN SUMMER OF 1911 [....] DIRECTION OF RIVER TAKEN FROM PLAN BY U.A. BOYDEN SEP. 1840." CONSECUTIVE INDEX APPEARS TO HAVE NUMBERED THIS PLAN BOTH AS P.H. 007-A AND AGAIN AS P.H. 007-C. ABUTTERS NAMED.

B	RO/SO	NOTE STATES: "SURVEY MADE IN SUMMER OF 1911 [....] DIRECTION OF RIVER TAKEN FROM PLAN BY U.A. BOYDEN SEP. 1840." CONSECUTIVE INDEX APPEARS TO HAVE NUMBERED THIS PLAN BOTH AS P.H. 007-A AND AGAIN AS P.H. 007-C. ABUTTERS NAMED.
B	SO/RO	NOTE STATES: "SURVEY MADE IN SUMMER OF 1911 [....] DIRECTION OF RIVER TAKEN FROM PLAN BY U.A. BOYDEN SEP. 1840." CONSECUTIVE INDEX APPEARS TO HAVE NUMBERED THIS PLAN BOTH AS P.H. 007-A AND AGAIN AS P.H. 007-C. ABUTTERS NAMED.
B	FO/RO	NOTE STATES: "SURVEY MADE IN SUMMER OF 1911 [....] DIRECTION OF RIVER TAKEN FROM PLAN BY U.A. BOYDEN SEP. 1840." CONSECUTIVE INDEX APPEARS TO HAVE NUMBERED THIS PLAN BOTH AS P.H. 007-A AND AGAIN AS P.H. 007-C. ABUTTERS NAMED.

B	RO/SO	NOTE STATES: "SURVEY MADE IN SUMMER OF 1911 [....] DIRECTION OF RIVER TAKEN FROM PLAN BY U.A. BOYDEN SEPT. 1840." CONSECUTIVE INDEX APPEARS TO HAVE NUMBERED THIS PLAN BOTH AS P.H. 007-A AND AGAIN AS P.H. 007-C. ABUTTERS NAMED.
B	RO/SO/HO	BEARS NOTE: "IN 3 PARTS." BEARS NO. 53, STAMPED VERSO.
A		
A		
C	RO	HEADER READS "WORK 119. DRAWING 1459". PLOT PLAN. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	HEADER READS "WORK 119. DRAWING 1460". BEARS NO. NOTE, VERSO, READS "23 PLANS OF CORPORATION HOSPITAL-LOWELL. 1910".
C	RO	HEADER READS "WORK 119. DRAWING 1461". FIRST & SECOND FLOOR PLANS.

C	RO	HEADER READS "WORK 119. DRAWING 1462". BASEMENT & THIRD FLOOR PLAN.
C	RO	HEADER READS "WORK 119. DRAWING 1463". FRONT & SIDE ELEVATIONS.
C	RO/ST/FO	A 13 PAGE DOCUMENT. NOTE STATES: TO ACCOMPANY & EXPLAIN THE PLANS, STUDIES & SKETCHES MADE FOR THIS PURPOSE BY FRANK CHOUTEAU BROWN, ARCHITECT, 9 PARK ST., BOSTON, MASS. BEARS NOTE "PLANS NO. 23?" TITLE PAGE, RECTO.
B	RO/TE/SO	BEARS NO. 20 VERSO.
C	RO/SO/ST	"...THE ORIGINAL NOTES MAY / BE FOUND IN FOUR NOTE BOOKS / LABELLED A, B, C, D. REBUILDING / OF FOOT OF MAIN DAM, 1875." THIS PLAN SHOWS ONLY THE LAST 79 CM OF PLAN P.H. 009-A. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO/ST	THIS DRAWING IS A COPY OF THE ORIGINAL DRAWING FROM THE DATA OBTAINED BY JAMES B. FRANCIS AND M. S. AMY. CONTAINS THE SAME SKETCH THAT CONSTITUTES P.H. 009-[C].

B	TE/DA/RO	ORIGINAL DATED AUG. 1921. PROPOSED BAFFLE WALL SHOWN IN RED JUNE 1926. PLAN IS TORN IN PIECES. DATE ENTERED AS JUNE 1926 IN L. & C. CARD INDEX.
B	RO/FO/SO	USED IN PRESENTATION TO CONGRESS. BEARS NO. H. DOC. 242, 55, 2 (I.E. 55TH CONGRESS, 2ND SESSION).
C	RO/FO/SO /HO	UNCOMPLETED HAND-DRAWN COPY. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/H O	LETTER OF TRANSMITTAL TO ACCOMPANY REPORT AS SUBMITTED TO CONGRESS, PAGE 1. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/H O	LETTER OF TRANSMITTAL TO ACCOMPANY REPORT AS SUBMITTED TO CONGRESS, PAGE 2 AND PAGE 1 OF REPORT. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/H O	LETTER OF TRANSMITTAL TO ACCOMPANY REPORT AS SUBMITTED TO CONGRESS, PAGE 2 OF REPORT. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/H O	LETTER OF TRANSMITTAL TO ACCOMPANY REPORT AS SUBMITTED TO CONGRESS, PAGE 3 OF REPORT. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	TE/RO	SHOWS UNSPECIFIED SECTIONS 1 THRU 9.

B	TE/RO/SO	SHOWS UNSPECIFIED SECTIONS 10 THRU 18.
B	RO/SO	SHOWS UNSPECIFIED SECTIONS 19 THRU 27.
B	TE/RO	SHOWS UNSPECIFIED SECTIONS 28 THRU 36.
B	TE/RO/SO	SHOWS UNSPECIFIED SECTIONS 37 THRU 45. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/TE/SO	SHOWS UNSPECIFIED SECTIONS 46 THRU 54.
B	TE/LM/RO	SHOWS UNSPECIFIED SECTIONS 55 THRU 63.
B	TE/LM/RO	SHOWS UNSPECIFIED SECTIONS 64 THRU 72.

B	RO	SHOWS UNSPECIFIED SECTIONS 73 THRU 81.
B	RO	SHOWS UNSPECIFIED SECTIONS 73 THRU 81.
B	RO	SHOWS UNSPECIFIED SECTIONS 91 THRU 99.
B	RO	SHOWS UNSPECIFIED SECTION 100 THRU 108.
B	RO/SO	SHOWS UNSPECIFIED SECTION 109.
B	RO/FO	
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.

B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.

B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1897.
B	RO/TE/LM	SCALE ALSO NOTED AS 5/16"=10,000'. BEARS NOTE : "CASE A , P.H. 11."
B	RO/TE/SO	SCALE ALSO NOTED AS 5/16"=10,000'. BEARS NOTE : "CASE A , P.H. 11."

B	RO/LM/LI	
B	RO/TE	BEARS NOTE "SHEET 4 OF 7 SHEETS". ALSO NOTES: "REQUIRED BY SEC. 2, RIVER AND HARBOR ACT, JULY 25, 1912."
B	RO/TE	BEARS NOTE : "CASE A , P.H. 11."

B	RO/SO	BEARS NOTE : "CASE A , P.H. 11."
B	RO/TE/LM	SCALE IS ALSO NOTED AS: 5/16"=10,000'. BEARS NOTE : "CASE A , P.H. 11."
B	RO/FX/SO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. DATE ENTERED AS JULY 1915 IN L. & C. CARD INDEX. NOTE STATES DATA USED IN PLOTTING, SEE ELEVATION BOOK #112 PP.155,157 & 171,& BOOK #131 PP.72-88. SEE DRG. NO. 4175.
B	RO/SO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. DATE ENTERED AS JULY IN L. & C. CARD INDEX. NOTE DIRECTS TO SEE FIELD BOOK 131 PP. 71-90. BEARS: SECTION ON LINE A-B (SEE PLAN).

B	FO/RO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. BEARS FILE NO.100 SCHEME NO.1. NOTE DIRECTS TO SEE DRAWING NOS. 352 & 354 SHELF #119.
B	RO/FO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. BLUEPRINT COPY EXISTS AT UMLCLH, PLAN NO. C-119-012.
B	RO/ST	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. PLAN GIVES RELATIVE DISTANCE OF SECTIONS SHOWING VELOCITY. DRAFTING CLOTH COPY OF P.H. 012-A-[09]. BLUEPRINT COPY EXISTS AT UMLCLH, PLAN NO. C-119-013.
B	RO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. BEARS FILE NO. 100 SCHEME NO.1. NOTE DIRECTS TO SCHEME NO. 1. NOTE DIRECTS TO SE DRGS. NO. 352 & 354. SHELF #119.
B	RO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. TENTATIVE SCHEME FOR PRELIMINARY ESTIMATE. NOTE DIRECTS TO SEE DRGS. NO.352 & 354 SHELF 119.

B	TE/RO	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. TENTATIVE SCHEME FOR PRELIMINARY ESTIMATE. NOTE DIRECTS TO SEE DRGS. NO. 352 & 354 SHELF 119.
B	RO/SO/TE	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX. PLAN GIVES RELATIVE DISTANCE OF SECTIONS SHOWING VELOCITY. BEARS NOTE "COPIED ON TRACING CLOTH JULY 23, 1915", I.E. PLAN NO. P.H. 012-A-[05] . NOTE DIRECTS TO SEE DRGS. NO. 352 & 354 SHELF # 119.
B	SO/RO/ST	PLAN NUMBER ENTERED AS P.H. 12 IN L. & C. CARD INDEX.
B	ST/RO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
A		7 BLUEPRINTS.

A		7 BLUEPRINTS.
A		7 BLUEPRINTS.
A		7 BLUEPRINTS.
A		7 BLUEPRINTS.
A		7 BLUEPRINTS.
A		7 BLUEPRINTS.
B	RO/FO/SO	BEARS LIST OF MATERIAL FOR ONE UNIT 46 1/2 TYPE S. TURBINE. BEARS SHEET NO. 2. NOTE STATES "NOW PROPERTY OF MERRIMACK MFG. CO.". BEARS STAMP FROM S. MORGAN SMITH CO. NOTE DIRECTS FOR CORRECT LOCATION OF GOV. & PUMP SEE PLAN.
B	RO/FO/TE /ST	BEARS LIST OF MATERIAL FOR ONE UNIT 40 1/2" TYPE "S" TURBINE FOR TREMONT & SUFFOLK MILLS. BEARS SHEET NO. 2. NOTE STATES "NOW PROPERTY OF MERRIMACK MFG. CO.". BEARS STAMP FROM S. MORGAN SMITH CO.

B	RO/FO/TE	BEARS NO. 7690. BEARS STAMP WHICH STATES FOR PRELIMINARY USE ONLY. DO NOT USE FOR CONSTRUCTION PURPOSES. FINAL DRAWINGS FINISHED AFTER SIGNING CONTRACT.
B	RO/TE/FO	BEARS NO. 880/363. NOTE STATES FOR PELIMINARY USE ONLY. DO NOT USE FOR CONSTRUCTION PURPOSES. FINAL DRAWINGS FURNISHED AFTER SIGNING CONTRACT. ATTACHED IN 24 PG. DOCUMENT.
B	RO/FO/TE /LM	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 823/59.
B	FO/RO	BEARS NO. 857-176.
B	FO/RO	BEARS NO. 862/245. NOTE STATES THIS DRAWING SUPERCEDED 861-162.
B	RO/TE/FO	BEARS NO. 844/82. ATTACHED IN 24 PG. DOCUMENT.
B	RO/FO	BEARS NO. 857/175. ATTACHED IN 24 PG. DOCUMENT.

B	RO/TE/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 836/6 RECTO.
B	RO/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 837/218.
B	RO/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 837/251.
B	FO/RO/ST	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 838/152.
B	RO/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 844/76.
B	RO/FO/TE	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 844/77.

B	RO/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 844/78.
B	FO	LOCATED AFTER COMPLETION OF INVENTORY PROJECT.
B	RO/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 839-228.
B	RO/TE/FO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 840-16. NOTE STATES: SUPERCEDES DWG. #836-95.
B	FO/RO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 844/74.
B	FO/RO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 844/75.

B	FO/RO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 844/72.
B	FO/RO/TE /SO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 824/32.
B	FO/RO/TE /SO	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 824/32.
B	SO/RO/FO /TE/FI	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 809/49. RECTO.
B	RO/SO/FO /TE	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 823/59.
B	RO/SO/TE	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 823/62.

B	RO/FO/TE	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 811/73.
B	SO/RO/FO/TE	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 811/76.
B	RO/FO/TE	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 824/100. NOTE STATES FINAL REC'D JAN. 7,1919.
B	RO/FO/TE/LM	ATTACHED IN 24 PG. DOCUMENT. BEARS NO. 823/59.
B	RO	
B	RO/TE/SO	
B	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	RO/FO	BEARS "DUPLICATE" RECTO. ALSO BEARS LIST OF MATERIALS RECTO.
B	FO/TE	AN S. MORGAN SMITH CO. BLUEPRINT. BEARS NO. 5248, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	FO/TE	MARKED P.H. 168, VERSO, HOWEVER, THERE IS NO P.H. 168 SHOWN IN THE P.L.& C. CONSECUTIVE INDEX OF DRAWINGS. SINCE THE SUBJECT OF P.H. 16 IS MASS. MILLS IT WAS PLACED THERE.
B	RO/FO/SO	LOCATED LOOSELY IN P.H. 101 SPACE. ATTACHED IN 7 PG. DOCUMENT. BEARS STAMP WHICH STATES: BLUEPRINT ISSUED JUL 9, 1918. HOLYOKE MACHINE CO. BEARS "FINAL" IN RED COLORED PENCIL. (H.M.CO.). SEE ALSO PLAN NO. P.H. 016-008.
B	RO/FO/SO	BEARS STAMP WHICH STATES: BLUEPRINT ISSUED JUL 9, 1918. HOLYOKE MACHINE CO. SEE ALSO PLAN NO. 016-008. BEARS LABEL READING "S-57". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO	ATTACHED IN 7 PG. DOCUMENT. BEARS STAMP FROM ENGINEERING DEPT. GENERAL ELECTRIC CO. BOSTON MASS. BEARS P-544-B.

B	RO/SO/TE	ARTHUR T. SAFFORD, CONSULTING ENGINEER. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/SO/TE/LM	ATTACHED IN 7 PG. DOCUMENT. READS "FINAL-REC'D JULY 23-1918 / JULY 27-WHB" IN COLORED PENCIL RECTO.
B	RO/FO/ST/TE	BEARS LABEL WHICH READS "S-54". LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/TE/LO/MO	BEARS THE WORD "FINAL" IN RED COLORED PENCIL, RECTO. BEARS NO. A # 2665, RECTO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 1919.
B	RO/FO/TE/SO	ATTACHED IN 7 PG. DOCUMENT. READS "FINAL" IN RED COLORED PENCIL RECTO. BEARS STAMP WHICH READS: THIS PRINT ISSUED JULY 22, 1918 HOLYOKE MACHINE CO. WORCESTER MASS.
A		(H. M.CO.).
B	RO/FO/SO/TE	ATACHED IN 7 PG. DOCUMENT. READS: "FINAL" IN RED COLORED PENCIL RECTO. (H. M.CO.). SEE ALSO PLAN NO. P.H. 016-001.

B	RO/FO/SO /LI/LM	ATTACHED IN 7 PG. DOCUMENT. READS:"FINAL" IN RED COLORED PENCIL RECTO. BEARS NO. A # 2665, RECTO.
B	RO/FO/TE /LM	ATTACHED IN 7 PG. DOCUMENT. READS "FINAL" IN RED COLORED PENCIL RECTO. PLAN REFERS TO VARIOUS PLANS FOR DETAILS OF VARIOUS PARTS. BEARS NO. A # 2665, RECTO.
B	RO/FO/TE /LM	BEARS "FINAL" IN COLORED PENCIL RECTO. BEARS NOTE VERSO: FINAL 42" CHUTE CASE D. SPECIAL.
B	RO/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS LABEL WITH PLAN # S-55.
C	FO/SO	THIS IS A TRACING OF A DETAIL ON PLAN P.H. 016-011 RATHER THAN THE ENTIRE PLAN.
A		
B	RO/FO	
B	FO/SO	LOCATED WITH SHELF 152.
B	RO/FO/TE /ST	BEARS NO. T-18500827 RECTO.

B	RO/FO/TE	BEARS NOTE: THIS ARRANGEMENT SHOWS NO. 7 WHEEL & NO. 2 ENGINE REMOVED.
B	RO/TE	SEE 152-026 FOR DRAFTING CLOTH ORIGINAL OF THIS PLAN.
A		
A		
A		
A		(H.M.CO.)
A		(H.M.CO.)
A		(H.M.CO.).
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A SEE ALSO PLAN NO. P.H. 017-023.

A SEE ALSO PLAN NO. P.H. 017-022.

A

A

A		SEE ALSO P.H. 017-027.
A		SEE ALSO P.H. 017-026.
B	FO/SO/TE	A GENERAL ELECTRIC CO. BLUEPRINT NO. T-1980181. PUNCHED 6 7 20.
B	FO/SO/TE	A GENERAL ELECTRIC CO. BLUEPRINT NO. T-1980172. DUPLICATE OF MASS. MILLS PLAN NO. M-151. PUNCHED 3 3 20. REVISED 20 MAR 1920.
A		
B	FO/SO/TE	A GENERAL ELECTRIC CO. BLUEPRINT NO. T-1980173. DUPLICATE OF MASS. MILLS PLAN NO. M-152. PUNCHED 3 3 20. SEE ALSO MASS. MILLS PLANS M-153 AND M-155 FOR OTHER SWITCHING APPARATUS PLANS.

A		
C	RO/FO/TE	LOCATED IN P.H. 18.
B	FO/RO/TE	ORIGINAL DATE JAN. 31,1916 CROSSED OUT. BEARS: STANDARD SHEET-FILE IN ST'D. ROLL 30 "Z."
B	RO/FO	BEARS DRAWING NO. A.B. 11235. NOTE DIRECTS FOR FURTHER SECTION OF THIS RUNNER SEE DRAWING NO. 24936.
A		
B	RO/FO/TE	BEARS STAMP FROM S. MORGAN SMITH CO. & NN. 58198.

B	RO/FO/TE/ST	TURBINE AS REVISED BY A.T. SAFFORD, CONS. ENG. NOTE STATES APR. 9, 1918 FROM BLUEPRINT OF DRAWING NO. 26031-SHOP NO. A.B. 11235. DATED MARCH 26, 1918, BY S.G.S. HAM. CO.
B	RO/FO/TE/ST	BEARS SCROLL DETAIL UNIT NO.9-39"Z. DRAWING NO. 26083 SHOP NO. A.B. 11235.
B	RO/FO/LM/TE/ST	DATE CORRECTED APRIL 29 & MAY 14,1918. BEARS GENERAL ARRANGEMENT 36" Z DRAWING NO.26078-SHOP NO. A.B. 11235.
B	FO/RO/TE/ST	BEARS HAMILTON MFG. CO., DRAFT TUBE DETAILS-36"Z-DRAWING NO. 26077-SHOP NO. AB-11235.
B	RO/FO/TE	BEARS DRAWING NO. 26075, SHOP NO. AB11235.
B	RO/FO/LM/TE/ST	

B	FO/LM/LI/ RO/TE	
B	FO/LM/LI/ RO/TE	
B	FO/RO/TE	
B	RO/FO/TE	SEE ALSO PLAN NO. P.H. 018-015. BEARS: GENERAL LOCATION PLAN DRWG. NO.1: DETAILED PLAN. DRWG. NO. 2: ELEVATIONS, SECTIONS, VELOCITY DIA. BEARS FILE 1002 DWG. NO. 3.
B	RO/FO/TE	NOTE DIRECTS: FOR ELEVATIONS & SECTIONS SEE DWG. NO. 2 FOR GENERAL LOCATION SEE DWG. NO. 3. BEARS FILE 1002, DWG. # 1. ATTACHED TO PLAN NOS. P.H. 018-014 & 16.

B	RO/TE	NOTE DIRECTS FOR ELEVATIONS & SECTIONS FOR PLAN SEE DRAWING NO. 1. FOR GENERAL LOCATION PLAN, SEE DRAWING #. BEARS FILE 1002, DWG. # 2. ATTACHED TO PLAN NOS. P.H. 018-014 & 015.
B	FO/RO/TE	PLAN HAS BEEN CUT INTO CURVE SHAPE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO/TE	[...] 14 FT. HEAD-133 R.P.M.-93.0% COEFFICIENT OF DISCHARGE=291 C.F.P.S. PLAN HAS BEEN CUT IN CURVE SHAPE.
B	FO/RO/TE	PLAN CUT INTO CURVE SHAPE. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
C	RO/ST/TE/ FO	PLAN IS NOW IN 3 PIECES.
B	RO/SO	PLAN SHOWS CHANGE IN PUMP LINE DATED SEPT.1,1932.

B	RO/SO	BEARS NO. 34-27 RECTO. BEARS LAWRENCE PUMP IN COLORED PENCIL VERSO.
B	SO/FO/ST	NOTE READS "PLAN NO. 2". TECHNICALLY, THIS IS SHEET 2 OF PLAN P.H. 019-04 ON WHICH PLAN IT IS REFERENCED. NUMBERING TAKEN FRON P.L.& C. CONSECUTIVE INDEX. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO	BEARS PLAN NO. 1, RECTO. BEARS NOTE: "FOR DETAILS OF PUMP SEE PLAN NO. 2. SEE NOTEBOOK NO. 139 P. 48 TO 64". PLAN NO. 2 IS ACTUALLY PLAN NO. P.H. 019-03. TECHNICALLY, IT IS SHEET 2 OF P.H. 019-04. PLAN NUMBERING TAKEN FROM P.L. & C. CONSECUTIVE INDEX.
B	RO	NOTE STATES PUT IN AS SHOWN SEPT. 19, 1920.
B	RO	NOTE STATES CAPACITY, 2000 G.P.M. AT 290 FT. HEAD.
B	RO/SO	
B	RO/SO	
A		

C	SO/ST/FO	
C	SO/FO	
C	SO/FO	BEARS NO. V-B-386, RECTO.
C	SO/FO/LO/TE	BEARS NO. 1010, RECTO.
C	SO/TE/HO	SHOWS RIVETING PLAN FOR GIRDER.
C	SO/TE	
B	EXCELLENT	PLAN SUBMITTED BY ARTHUR T. SAFFORD, CONSULTING ENGINEER. PLAN ENTERED INTO DATABASE POST COMPLETION OF INVENTORY PROCESS.
B	RO	NOTE STATES THIS DRAWING SHOWS COMPLETE SLAB REINFORCEMENT-FOR DETAIL SEE D'R'G. NO.3 BEAMS & GIRDERS ARE SHOWN & DETAILED COMPLETELY ON DRG. NO.8 FOR DIMENSIONS OF PENSTOCK-SEE D'R'G. NO. 1.
B	RO/TE	NOTE STATES GIRDERS DETAILED ON DRG. NO. 8. ORIGINALLY DATED SEP. 24, 1920. REVISION DATED OCT. 14, 1920.
B	RO	BEARS FILE 1010. BEARS : TURNER, MILLSPAUGH & SAFFORD, ENGINEERS 120 TREMONT ST., BOSTON. ALSO BEARS: ARTHUR T. SAFFORD, CONSULTING ENGINEER.
B	RO	(SUPERCEDED BY # 7). BEARS FILE NO. 1010 RECTO.

B	RO	
B	RO	BEARS FILE 1010.
B	RO	NOTE STATES THIS DWG. SHOWS ALL STEEL REQUIRED IN BEAMS & GIRDERS & DOES NOT SHOW STEEL IN SLABS FOR WHICH SEE DWG. 2 & 3. GIVES DETAIL FOR REINFORCEMENT BEAMS & GIRDERS.
B	RO	SCALE IS NOTED AS FOLLOWS: 1/2",1 1/2", 1/4"= 1', H=1000",V=1,000,000". BEARS FILE NO. 1010.
B	RO	
B	SO/HO/FO	BEARS FILE NO. 1010. BEARS "TURNER, MILLSPAUGH & SAFFORD, ENGINEERS 120 TREMONT ST., BOSTON". ALSO BEARS "ARTHUR T. SAFFORD CON. ENG'R". A BLUEPRINT COPY EXISTS AT 152-050. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/SO	INDEX CARD GIVES DATE AS APRIL 20, 1921. SCALE IS NOTED AS FOLLOWS: 1/2" & 1 1/2"=1',& 1"=10'. BEARS FILE NO. 1010.
B	RO/FO	BEARS FILE NO. 1010.

B	RO/FO/TE	NOTE STATES: REC'D SEPT. 8, 1920. BEARS NO. 4459 DRAWING NO.7. BEARS: JOB NAME: MASS. COTTON MILLS GIRDER. LOCATION: LOWELL, MASS. TITLE: GIRDER DETAIL.
A		
B	RO/FO	PLAN MADE BY GENERAL ELECTRIC CO., FORT WAYNE, IND. PLAN # M-1753272. BEARS STAMP W/NOTES VERSO: "NOT TO SCALE. FIRST APPROVED FOR MASS. COTTON MILLS LOWELL, MASS. SUPERCEDES M-1753272. SENT YOU 6/21/20. ATTACHED TO PLAN NOS. P.H. 021-018 THRU 020
B	RO/FO/TE	BEARS FILE 1010. ATTACHED TO PLAN NOS. P.H. 021-017 THRU 020.
B	RO/FO/TE	ATTACHED TO PLAN NOS. P.H. 021-017 THRU 020. ADDITIONAL WORK DATED SEP. 20 & NOV. 18, 1920. BEARS NO. P-746949 RECTO. BEARS STAMP VERSO: NOT TO SCALE THIS PRINT CORRECT FOR MASSACHUSETTS COTTON MILLS. CUSTOMER ORDER OF 6/9/20.
C	RO/FO	BEARS "# 12 WHEEL" IN COLORED PENCIL RECTO. GENERAL ELECTRIC CO. PLAN # P-746949.
C	RO/FO/TE /SO	BEARS GENERAL ELECTRIC CO. PLAN # P-746949.
B	RO/FO/TE	PLAN BEARS: PRELIMINARY RECTO. BEARS STAMP: THIS PRINT IS THE PROPERTY OF THE S. MORGAN SMITH CO. & IS LOANED TO DAGGETT. BEARS NO. 66776 IN GRAPHITE RECTO.
A		LISTED IN BOTH THE P.L.& C. CARD INDEX AND CONSECUTIVE INDEX OF DRAWINGS.
C	RO/SO	McKINLEY PUBLISHING CO., PHILADELPHIA, PA. .
C	RO	CLEARLY TRACED FROM P.H. 022-[B] WITHOUT THE TITLE OR PUBLICATION DATA. LISTED IN THE P.L. & C. CARD INDEX BUT NOT IN THE CONSECUTIVE INDEX OF DRAWINGS.

C	RO	COPIED FROM P.H. 022-[B]-[COPY 1].
C	RO/SO	LISTED IN THE P.L. & C. CARD INDEX BUT NOT IN THE CONSECUTIVE INDEX OF DRAWINGS
C	RO	BEARS DATE JUNE 6, 1930, STAMPED VERSO.
C	RO	BEARS DATE JUNE 6, 1930, STAMPED VERSO.
B	RO/FO	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY. BASE COMPILED 1913, CORRECTED TO 1920.
B	RO	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY.

B	SO/FO	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY. COMPLIED IN 1911-1914.
B	FO/TE	REVISED JAN 16, 1928.
C	FO	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY. COMPLIED IN 1921 AND 1922.
C	FO	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY.
C	RO/SO/ST	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY. COVERS CONN., R.I., MASS., VT., & N.H.
C	RO/SO/ST	PUBLISHED BY THE U.S. GEOLOGICAL SURVEY. COVERS CONN., R.I., MASS., VT., & N.H. HIGHLIGHTING TWIN STATE GAS & ELEC. CO., KEENE GAS & ELEC. CO., NEW ENGLAND POWER CO., MANCHESTER TRACTION CO., ROCKINGHAM POWER & LIGHT CO., AND LOWELL ELECTRIC LIGHT CO.
C	RO	COMPILED FROM CORRECTED U.S. GEOLOGICAL SURVEY ATLAS SHEETS.
C	RO	COMPILED FROM CORRECTED U.S. GEOLOGICAL SURVEY ATLAS SHEETS.

C	RO	COMPILED FROM CORRECTED U.S. GEOLOGICAL SURVEY ATLAS SHEETS.
C	RO/FO/TE	MAP OF SOUTHERN MAINE. WILLIAMS-WEBB, INC., WASH. D.C. IN LOWER RIGHT CORNER. PUBLISHED BY MAINE WATER POWER COMMISSION, STATE HIGHWAY COMMISSION, LAND AGENT AND FOREST COMMISSIONER. SHOWS HIGHWAYS.
C	RO/FO/TE	MAP OF NORTHERN MAINE AND ADJACENT AREAS OF QUEBEC AND NEW BRUNSWICK. SHOWS HIGHWAYS. WILLIAMS-WEBB, INC., WASH. D.C. IN LOWER RIGHT CORNER.
B	SO/TE	CONTOURS TAKEN 1914 BY CITY.
B	FO/SO	
B	RO/FO/TE /FX	NOTE STATES ALL ELEVATIONS ARE ON LOCKS & CANALS DATUM.

A		
A		
B		
C	RO	NOTE STATES COMPILATION BASED ON STATE MAP BY THE GENERAL LAND OFFICE. NOTES RELATION OF THE STATE OF NEVADA TO SHEETS OF THE INTERNATIONAL MAP OF THE WORLD BASED ON THE SCALE OF 1:1,000,000.
B	FO/SO	
B	FO/SO	
B	FO/SO	

B	FO/SO
B	SO
B	SO
B	SO
B	SO
B	SO
B	SO
B	SO

B	SO	
B	FO/SO/ST	
C	FO/SO/TE	LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".
C	FO/SO/TE	NOTE READS "TABLE 1", UPPER RIGHT CORNER, RECTO. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".
C	FO/SO/TE	NOTE READS "TABLE 2", UPPER RIGHT CORNER, RECTO. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".
C	FO/TE	18 PAGES OF STATISTICS. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923". 3 SHEETS FASTENED TOGETHER.
C	FO/SO	LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923". 14 SHEETS FASTENED TOGETHER
C	SO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".
C	SO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".

C	FO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".
C	FO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923". THIS DOCUMENT WAS FOUND JOINED TO P.H. 027-035-B AND 036 A & B.
C	FO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923". THIS DOCUMENT WAS FOUND JOINED TO P.H. 027-035-A AND P.H. 027-036 A & B.
C	FO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923". THIS DOCUMENT WAS FOUND JOINED TO P.H. 027-035-A & B AND P.H. 027-036 B.
C	FO	THIS IS A STATISTICAL TABLE. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923". THIS DOCUMENT WAS FOUND JOINED TO P.H. 027-035-A & B AND P.H. 027-036 A.
C	FO/SO	23 PAGES OF STATISTICS. LOCATED IN ENVELOPE ENTITLED "AMOSKEAG MFG. CO. / ORIGINAL DATA AND COMPUTATION / TEST ON NEW HYDRO STA. / WHEELS # 3 & 3 / JUNE 5 & 11, 1923".
B	RO/FO/SO	
B	RO/FO/SO	

B	RO/FO	
B	RO	BEARS DRAWING NO. 5.
B	RO/FO	
B	FO/RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1923.
B	RO/TE/ST	BEARS DRAWING NO.4, SHEET NO.4.
B	RO	BEARS SHEET NO. 5.
B	RO/FO	NOTE STATES CURVES BASED ON CALIBRATION OF WATT METER BY GENERAL ELECTRIC CO. BEARS "PROVISIONAL" RECTO.

B	RO/FO	NOTE DIRECTS TO SEE I. P. MORRIS CURVE SHEET NO. 144.
B	RO/FO/SO	BEARS DRAWING NO. 1.
B	RO	BEARS SHEET NO. 8.
B	RO	BEARS DRAWING NO. 3. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1923.
B	RO	BEARS DRAWING NO. 2.
B	RO/FO	BEARS SHEET NO. 35. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1923.
B	RO/FO	BEARS SHEET NO. 9. ALSO BEARS SECTION USED FOR TEST OF JUNE 5, 1923. DETERMINED BY FOUR INDEPENDENT SETS OF SOUNDINGS.
B	RO	BEARS SECTIONS USED FOR TEST OF JUNE 11, 1923. DETERMINED BY TWO INDEPENDENT SETS OF SOUNDINGS.
B	FO/RO	BEARS NO. 16 GENERATOR, HYDRO STATION. ALSO BEARS SHEET NO. 14A.

B	FO/RO	BEARS NO. 14-B RECTO.
B	FO/RO	BEARS SHEET NO. 15A.
B	RO/FO	BEARS SHEET NO. 15.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1923.
B	RO/FO	
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1923.
B	RO	BEARS SHEET NO. 18. BEARS: FROM TREMONT.
B	RO	BEARS SHEET NO. 16. BEARS: FROM HOLYOKE 973.
B	RO	BEARS SHEET NO. 17. FROM HOLYOKE # 2436. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO	BEARS SHEET NO. 31 TEST NO. 21 "NORMAL GATE" O.825.

B	FO/RO	BEARS SHEET NO. 24, TEST NO. 8, 0.6 GATE.
B	RO/FO	BEARS SHEET NO. 20, TEST NO. 1, 0.8 GATE.
B	RO/FO	BEARS AMOSKEAG MFG. CO. EFFICIENCY CURVES NOS. 16-17 GENERATORS SHEET NO.13.
B	RO/TE	BEARS TEST NO. 2, SHEET NO. 11.
B	RO	BEARS SHEET NO. 19, TEST NO. 1, 0.8 GATE.
B	RO/FO	BEARS SHEET NO. 21, TEST NOS. 2, 3 & 4, 0.8 GATE.
B	RO/FO	BEARS A.T. SAFFORD, CONSULTING ENGINEER. SHEET NO. 22, TEST NOS. 5, 6 & 7, 0.7 GATE.
B	RO/FO	BEARS A.T. SAFFORD, CONSULTING ENGINEER. SHEET NO. 23 TEST NOS. 8, 9, 10, 0.6 GATE.
B	RO/FO	BEARS A.T. SAFFORD, CONSULTING ENGINEER SHEET NO. 25 TEST NOS. 11, 12, 13, 0.5 GATE.
B	RO/FO	BEARS A.T. SAFFORD, CONSULTING ENGINEER SHEET NO. 26 TEST NOS. 14, 15, 0.8 GATE.
B	RO/FO/SO	BEARS A.T. SAFFORD, CONSULTING ENGINEER/SHEET NO. 28 TEST NOS. 18, 19, 0.9 GATE.

B	RO/FO/SO	BEARS A.T. SAFFORD, CONSULTING ENGINEER SHEET NO. 26 TEST NOS.14, 0.8 GATE.
B	RO/FO/SO	BEARS A.T. SAFFORD, CONSULTING ENGINEER SHEET NO. 29 TEST NO. 20, 0.69 GATE.
B	RO/FO	
B	RO/FO	BEARS SHEET NO. 32.
B	RO/FO	BEARS SHEET NO. 12
B	RO/FO	BEARS SHEET NO. 33.
B	RO/FO	BEARS SHEET 34.
B	RO	BEARS SHEET #5 REVISED.
B	RO/FO	
B	RO/FO/HO	A GENERAL ELECTRIC CO. BLUEPRINT. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1923.

B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE".
B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE". IT ALSO SHOWS THAT THE ORIGINAL NUMBER FOR THIS DRAWING WAS 154-93 BUT THAT IT WAS RENUMBERED TO P.H. 28.
B	FO/SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. FOUND IN FOLDER 136. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"
B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"

B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"
B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"
B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"
B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"

B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"
B	SO	SUN DARKENED WITH OBVIOUS THUMB TACK MARKS WHICH INDICATE WALL MOUNTING. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF "1911 TO DATE"
B	RO/SO	NOTE STATES: COMPILED FROM VARIOUS SOURCES BY P.L.& C. ORIG. DATED JULY 8, 1938. SMALL TRIANGULAR AREA OWNED BY B.& L.R.R. BETWEEN TILDEN & COLBURN STS. ADDED SEPT. 1938. REVISION OF PROPERTY LINE AROUND NASHUA MFG. CO.'S STORE HOUSE DATED JULY 1945.
B	RO	NOTE STATES: COMPILED FROM VARIOUS SOURCES BY PROPS. LOCKS & CANALS, LOWELL, MASS. THIS COPY WAS MADE BEFORE THE REVISIONS OF SEPT. 1938 AND JULY 1945 WERE MADE TO THE ORIGINAL.
B	RO/TE	NOTE STATES: COMPILED FROM VARIOUS SOURCES BY PROPS. LOCKS & CANALS, LOWELL, MASS. THIS COPY WAS MADE BEFORE THE REVISIONS OF SEPT. 1938 AND JULY 1945 WERE MADE TO THE ORIGINAL.

B	RO/SO	DATES CHARTED RANGE FROM 1947 TO 1952.
B	RO	BEARS NOTE "DRAWER 39 NO.47."
B	RO	ORIG. SURVEY MADE NOV. 5, 1828. A PLAN OF LAND SITUATED IN LOWELL OWNED BY LUKE S. RAND ESQ. SURVEYED & PLOTTED BY ITHAMOR A BEARD. SEE PLAN AT THE END OF BOOK 294 OF MIDDLESEX RECORDS. CALEB HAYDEN REG. PER CHAS.B.STEVENS. BEARS DRAWER #39, DWG. #46-B.
B	RO/FO	READS "CORRECTED TO JAN. 18, 1928 & CORRECTED TO JUNE 26, 1928." P.H. 030-003-[048] IS A BLUEPRINT COPY OF THIS PLAN
B	RO/FO	BEFORE IT WAS CORRECTED ON JUNE 26, 1928.
B	FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/TE	PART OF 47 PG. DOCUMENT. ORIGINALLY DATED NOV. 25, 1927.
B	RO/FO/TE	PART OF 47 PG. DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".

		PART OF 47 PG. DOCUMENT. BEARS DETAIL OF EXPANSION JOINT. BOTTOM CHORD. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT
B	RO/FO/TE	FEB.-MAR. 1928".
		PART OF 47 PG. DOCUMENT. CONSECUTIVE INDEX OF DRAWINGS
B	RO/FO	NOTES "BUILT FEB.-MAR. 1928".
		PART OF 47 PG. DOCUMENT. BEARS NOTE "SHEET WM1 CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-
B	RO	MAR. 1928".
		PART OF 47 PG. DOCUMENT. BEARS NOTE "SHEET WM1 CONTRACT
B	RO	C28-4-D."
		PART OF A 47 PG. DOCUMENT. BLANK FORM. BEARS NOTE "SHEET VI OF V CONTRACT C28-4D". CONSECUTIVE INDEX OF DRAWINGS
B	RO	NOTES "BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F1, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO/FO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F2,
B	RO/FO	CONTRACT C28-4-D."
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F3,
B	RO	CONTRACT C28-4-D."
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F4, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F4, CONTRACT C28-4-D."CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F6, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F7, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F8, CONTRACT C28-4-D." CCONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F9, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F10, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F11, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".

		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F12, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F10, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F14, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928"..
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F14, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F15, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F17, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS SHEET F18, CONTRACT C28-4-D. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR.
B	RO	1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE SHEET F19, CONTRACT C28-4-D. CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F20, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F21, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F22, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F23, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES
B	RO/FO	"BUILT FEB.-MAR. 1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F24, C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR.
B	RO/FO	1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F24, C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR.
B	RO/FO	1928".
		ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F26, CONTRACT C28-4-D." NOTE DIRECTS TO SEE SHEET F19 FOR TYP. ELEVATION. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-
B	RO	MAR. 1928".

B	RO	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F27, CONTRACT C28-4-D." NOTE DIRECTS TO SEE SHEET F19 FOR TYP. ELEVATION. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".
B	RO	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F28, CONTRACT C28-4-D." NOTE DIRECTS TO SEE SHEET F19 FOR TYP. ELEVATION. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".
B	RO	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET 29, CONTRACT C28-4-D". NOTE DIRECTS TO SEE SHEET F19 FOR TYP. ELEVATION. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".
B	RO/FO/TE	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET F30, CONTRACT C28-4-D." CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928"..
B	RO/FO/TE	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTES "SHEET D1, CONTRACT C28-4D." AND "NEW ENGLAND STRUCTURAL CO., EVERETT, MASS." CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".
B	RO/FO	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET D2, CONTRACT C28-4D." CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".
B	RO/FO	ATTACHED IN 47 PG. DOCUMENT. BEARS SHEET D3, CONTRACT C28-4D. BEARS "CAMBER TRUSS 1". ALSO BEARS DATE 1/26.
B	RO/TE	ATTACHED IN 47 PAGE DOCUMENT. BEARS SHEET D4, CONTRACT C28-4-D. BEARS "NEW ENGLAND STRUCTURAL CO., EVERETT, MASS."
B	RO/FO	ATTACHED IN 47 PAGE DOCUMENT. BEARS SHEET D5 CONTRACT C28-4-D. BEARS "NEW ENGLAND STRUCTURAL CO., EVERETT, MASS."
B	RO/FO	ATTACHED IN 47 PG. DOCUMENT. BEARS SHEET D6, CONTRACT C28-4-D. BEARS "NEW ENGLAND STRUCTURAL CO., EVERETT, MASS."
B	RO/FO	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET E-1, CONTRACT C28-4-D."
B	RO/SO/TE /FO	ATTACHED IN 47 PG. DOCUMENT. BEARS NOTE "SHEET E-2, CONTRACT C28-4-D."
B	RO/FO/TE /SO	BEARS "SHEET E-3, CONTRACT C28-4-D."

B	RO/FO/TE /SO	ATTACHED IN 47 PG. DOCUMENT. BEARS SHEET E-3, CONTRACT C-28-4-D. BEARS "INCOMPLETE" IN COLORED PENCIL RECTO.
B	RO/FO	BEARS SHEET WS1, CONTRACT C28-170. ORIGINAL FORM BEARS NOTE "WILSTAND TRADEMARK COPYRIGHT 1928. BY FRANCIS W. WILSON CAMBRIDGE, MASS."
B	RO/FO	BEARS SHEET WS1, CONTRACT C28-170. ORIGINAL FORM BEARS NOTE "WILSTAND TRADEMARK COPYRIGHT 1928. BY FRANCIS W. WILSON CAMBRIDGE, MASS."
B	TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS NOTES "BUILT FEB.-MAR. 1928".
B	FO	BEARS SHEET WS1, CONTRACT C9357. NEW ENGLAND STRUCTURAL CO. EVERETT, MASS.
B	RO/FO/TE	BEARS S12669-1 RECTO. NOTE STATES DO NOT SCALE DRAWING. BEARS NOTE: "THIS DRAWING & ALL INFO. THEREON, IS THE PROPERTY OF THE LAMSON COMPANY, INC. 1886, SYRACUSE, N.Y."
B	RO/FO/TE	BEARS NO. S12669 RECTO. BEARS "BOSTON" IN COLORED PENCIL RECO.
B	RO	BEARS HIGH WATER MARKS OF MERRIMACK RIVER FOR MARCH 3, 1893 & MARCH 20, 1936.
B	RO/TE	PLAN ALSO SHOWS ELEVATIONS IN MILL YARD AND FLOOD HEIGHTS. BEARS ORIGINAL DATES NOVEMBER 1909 & JANUARY 1919.

B	RO/TE	PLAN ALSO SHOWS ELEVATIONS IN MILL YARD AND FLOOD HEIGHTS. BEARS ORIGINAL DATES NOVEMBER 1909 & JANUARY 1919.
B	RO/TE	PLAN ALSO SHOWS ELEVATIONS IN MILL YARD AND FLOOD HEIGHTS.
B	RO/TE/SO	NOTE GIVES HIGH WATER MARK OF MERRIMACK RIVER FOR MARCH 3, 1896. PLAN ALSO SHOWS ELEVATIONS IN MILL YARD.
B	RO/SO	PLAN SHOWS ELEVATIONS IN MILL YARD AND FLOOD HEIGHTS. BEARS DATES FROM ORIGINAL DEC. 1909 & JAN. 1919. HIGH WATER MEASUREMENT OF MERRIMACK RIVER MADE MAY 3, 1896.
B	RO/SO	PLAN SHOWS ELEVATIONS IN MILL YARD. BEARS DATES FROM ORIGINAL DEC. 1909 & JAN. 1919. HIGH RIVER MARKS MADE MAY 3, 1896.
B	RO/TE/SO /FO/ST	PLAN ALSO SHOWS ELEVATIONS IN MILL YARD. HIGH WATER MEASUREMENT OF MERRIMACK RIVER MADE MARCH 3, 1896.
B	RO/SO	PLAN SHOWS ELEVATIONS IN MILL YARD AND FLOOD HEIGHTS. BEARS ORIGINAL DATES: DEC. 1909 & JAN. 1919. ALSO BEARS HIGH WATER MEASUREMENTS OF MERRIMACK RIVER DATED MARCH 3, 1896.

B	RO/TE	PLAN SHOWS ELEVATIONS IN MILL YARD AND FLOOD HEIGHTS. BEARS ORIGINAL DATES: DEC. 1909 & JAN. 1919. ALSO BEARS HIGH WATER MEASUREMENTS OF MERRIMACK RIVER DATED: MARCH 3, 1896 & MARCH 20, 1936.
B	RO/TE/FO	NOTE STATES: ALL ELEVATIONS TAKEN FROM RIVER GAUGE. BEARS NO. 891-1, RECTO.
B	TE/SO/RO	SHOWS SECTIONS OF VARIOUS BUILDINGS IN THE BOOTT MILL YARD. NOTE READS APPROXIMATE BOTTOM OF RIVER SEPT. 1909.
B	RO/SO/FO	136 P. DOCUMENT WITH THREE ANCILLARY DOCS: 1) 2 P. FORM 20, STANDARD GOVERNMENT FORM OF INVITATION FOR BIDS; 2) 3 P. FORM 22, STANDARD GOVERNMENT INSTRUCTIONS TO BIDDERS; 3) 5 P. FORM 24 (MISSING P. 1 & 2 AND, THUS, ITS TITLE) WITH 1 P. SUPPLEMENT.
B	RO/FO	ALSO SHOWS 6" STEAM PIPE LINE FROM LOWELL INDUSTRIAL DEVELOPMENT CO. BASEMENT PLAN. HEATING & LIGHTING. BEARS STAMP FROM THE TREASURY DEPT. APPROVAL DATE 2/21/30. ALSO BEARS DATES 2/10/30 & 1/23/30. BEARS HL-455 RECTO. ALSO SHOWS FLOOR HEIGHTS.
B	RO/FO	FIRST FLOOR PLAN. HEATING & LIGHTING. BEARS HL 456. BEARS STAMP FROM TREASURY DEPT. APPROVAL DATE 2/21/30. ALSO BEARS DATES 2/10/30 & 1/23/30.
B	RO/FO	MEZZANINE FLOOR PLAN. HEATING & LIGHTING. BEARS HL-457.
B	RO/FO/TE	THIRD FLOOR PLAN. HEATING & LIGHTING. BEARS HL-459. BEARS STAMP FROM TREASURY DEPT. APPROVAL DATE 2/17/30. DRAWN 12-23-29. CHECKED 1-21-30.
B	RO/FO/TE	THIRD FLOOR PLAN. HEATING & LIGHTING. BEARS: HL-459. BEARS STAMP FROM TREASURY DEPT. APPROVAL DATE 2/17/30. DRAWN 12-23-29. CHECKED 1-21-30.
B	RO/FO/TE	SCALE IS NOTED AS FOLLOWS: 3/32",1/64",1/4",3/4"=1'. BEARS APPROACH PLAN. BEARS NO.1 RECTO. BEARS 2/15/30. BEARS STAMP FROM TREASURY DEPT. APPROVAL DATE 2/17/30. ALSO [ILLEG.] S. THOMPSON'S SIGNATURE DATED 1/23/30.
B	RO/TE	BEARS IN USE FROM MAY 1923 & NOV.26, 1923. NOTE DIRECTS TO SEE CALCULATION BOOK NO. 705 PP.80-84 & DIAGRAM IN ENV. 25Y SHELF 153. SEE ALSO 153-172.

B	RO	NOTE STATES: IN USE FROM MAY 1923 & NOV. 26, 1923. NOTE DIRECTS TO SEE CALCULATION BOOK NO 705 PP.80 TO 84 & DIAGRAM IN ENV. 25Y SHELF 153. SEE ALSO 153-172.
B	RO	BEARS: UNITS OF FOUR 33 INCH R.H. STYLE "C" HERCULES WHEELS, INSTALLED 1911. TEST NO.1939, MADE JULY 19, 1910. 31 INCH L.H. STYLE "D" HERCULES WHEELS INSTALLED 1913, TEST NO. 2250 MADE JUNE 25, 1913. NOTE DIRECTS TO SEE BOOK NO.667 PP.41-44 & 50.
B	SO	FORMERLY PLAN NO. 150-025.
B	SO	INSTALLED IN 1918-1919. DIAGRAM IN USE FROM DEC. 13, 1918. FORMERLY PLAN NO. 152-038.
B	SO/FO	INSTALLED IN 1918-1919. DIAGRAM IN USE FROM DEC. 13, 1918. FORMERLY PLAN NO. 152-038-[COPY 1].

B	SO/FO	IN REVERSE IMAGE ON TWO SHEETS. INSTALLED IN 1918-1919. DIAGRAM IN USE FROM DEC. 13, 1918. FORMERLY PLAN NO. 152-038-[COPY 2].
B		TESTED AT HOLYOKE, MARCH 28, 1917. TEST NO. 2546. LOCATED IN P.H. 033. CONSEC. INDEX GIVES DATE OF 28 MARCH, 1917; CARD INDEX GAVE NO DATE BUT GAVE TEST NO. WHICH MATCHES NUMBER GIVEN ON PLAN. FORMERLY PLAN NO. 152-037.
B	SO/ST	IN USE FROM APRIL 1921. SEE CALC. BK. 706 P. 23-25. FORMERLY PLAN NO. 152-041.
B	RO	NOTE STATES IN USE FROM MARCH 1, 1921. BEARS NOTE "SEE ALSO CALC. BOOK 704 P.4."
B	RO	NOTE STATES IN USE FROM MARCH 1, 1921. BEARS NOTES "SEE ALSO CALC. BOOK 704 P.4." AND "(DIAGRAM COPIES AUGUST, 1957)".
B	SO/ST	FORMERLY PLAN NO. 150-057. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO/SO	TEST DATES FROM DEC. 1915. DIAGRAM IN USE FROM MARCH 6, 1916. FORMERLY PLAN NO. 151-022.
B	TE/SO	TEST DATES FROM DEC. 1915. DIAGRAM IN USE FROM MARCH 6, 1916. FORMERLY PLAN NO. 151-022-[COPY 1].
B	RO	PHOTO NEGATIVE. INSTALLED 1915 & 1916. DIAGRAM IN USE FROM MARCH 1916. FORMERLY PLAN NO. 151-022-[COPY 2].
B	SO	QUANTITIES FOR FULL GATE & 13' FALL WITH REVOLUTIONS IN 60 SECONDS ARE MADE UP FROM TESTS OF ONE OF THESE WHEELS AT HOLYOKE TEST NO. 2663. FORMERLY PLAN NO. 150-058. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO	BEARS WHEEL NO.3, 28 1/2" S. MORGAN SMITH, 200 R.P.M., IN USE FROM SEPT.1921. WHEELS NOS. 4,5 OR 6, 26" S. MORGAN SMITH, 225 R.P.M., IN USE FROM APRIL 1919.
B	RO/FO	WHEEL NO. 3, 28 1/2" S. MORGAN SMITH 200 R.P.M. IN USE FROM SEPT. 1921. WHEEL NOS. 4,5, OR 6 26 INCH S. MORGAN SMITH 225 R.P.M. IN USE FROM APRIL 1919.

B	RO	LOCATED IN P.H. 033. THIS IS NOTED IN THE MASTER LIST CREATED BY P.L.& C.
B	RO/FX/TE/ SO	DATE GIVEN AS SEPT., OCT. & NOV. 1941.
B	RO/TE	ORIGINAL NOTES: NORTH COMMON VILLAGE. PROJECT MASS.1-1 LOWELL MASSACHUSETTS, LOWELL HOUSING AUTHORITY IN COOPERATION WITH UNITED STATES HOUSING AUTHORITY. BEARS 5424. ALSO BEARS KEY PLAN. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1941-1942.
B	RO	ORIGINAL NOTES: NORTH COMMON VILLAGE. PROJECT MASS.1-1 LOWELL MASSACHUSETTS, LOWELL, HOUSING AUTHORITY IN COOPERATION WITH UNITED STATES HOUSING AUTHORITY. BEARS 5424 RECTO. REVISED SEP.1 & 16, 1939.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1941-1942.
B	RO/TE	ORIGINAL NOTES: NORTH COMMON VILLAGE. PROJECT MASS.1-1 LOWELL, MASSACHUSETTS, LOWELL HOUSING AUTHORITY IN COOPERATION WITH UNITED STATES HOUSING AUTHORITY. BEARS P-700. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1941-1942.
B	RO/TE	ORIGINAL NOTES: NORTH COMMON VILLAGE. PROJECT MASS.1-1 LOWELL MASSACHUSETTS, LOWELL HOUSING AUTHORITY IN COOPERATION WITH UNITED STATES HOUSING AUTHORITY. BEARS H600. NOTE DIRECTS TO SEE H601 & H602. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1941-1942.
B	FO/RO/TE	

C	FO
C	FO
C	FO
C	FO
C	FO
C	FO
C	SO
C	SO

C	SO
C	SO
C	SO/LO
C	SO
C	SO
C	SO
C	SO
C	SO
C	SO
C	SO

C	SO	
C	TE/SO/LO	
C	TE/ST/LO	
C	TE/SO	THIS COMPOUND BLUEPRINT CONSISTS OF A COPY OF PLAN NO. P.H. 036-[018] AND PLAN NO. P.H. 036-[019] JOINED TOGETHER LENGTHWISE.
C	TE/SO/LO	THIS COMPOUND BLUEPRINT CONSISTS OF A COPY OF PLAN NO. P.H. 036-[018] AND PLAN NO. P.H. 036-[019] JOINED TOGETHER LENGTHWISE.
C	SO/FO/TE	FOUND IN FOLDER 148. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	
C	RO	READS "50%" IN GRAPHITE VERSO. PHOTO POSITIVE PRINT.
C	RO	PHOTO NEGATIVE PRINT.
C	RO	PHOTO NEGATIVE PRINT.

B	RO	
B	RO/SO/FO	
C	RO/FO	PHOTO NEGATIVE PRINT.
B	FO/SO	
B	RO/SO/TE /LM	ORIGINALLY DATED OCT. 1945. NOTE READS: PENCIL SHOWS SUGGESTED CHANGE FOR SIPHON SPILLWAY JUNE 1956.
B	RO	
B	RO/FO/ST	NOTE IN GRAPHITE, RECTO, STATES: "NOT USED".
B	RO/SO	NOTE STATES: USED FOR MODEL. ACTUAL SIPHON WAS CHANGED FROM THIS MODEL.

B	RO	REVISED FROM ORIGINAL SCHEME OF SEPT.1946. NOTE STATES: PUT IN AS SHOWN. TITLE DIFFERS FROM TITLE IN CONSECUTIVE INDEX OF DRAWINGS. SHELF AND PLAN NUMBER APPLIED BY P. L. & C.
C	RO	NOTE STATES: PUT IN AS SHOWN.
C	RO	PHOTO NEGATIVE PRINT
C	RO	PHOTO NEGATIVE PRINT.
C	RO	PHOTO POSITIVE PRINT.
C	SO/TE	FED. AID PROJ. NO. U-214 (2). SHEET NO. 13 OF 22 SHEETS. TOTAL SHEETS 122.
C	SO/TE	FED. AID PROJ. NO. U-214 (2). SHEET NO. 15 OF 22 SHEETS. TOTAL SHEETS 122.
C	SO/TE	FED. AID PROJ. NO. U-214 (2). SHEET NO. 17 OF 22 SHEETS. TOTAL SHEETS 122.
C	SO/TE	FED. AID PROJ. NO. U-214 (2). TOTAL SHEETS 122.
C	SO/ST	COPY. SHEET 5 OF 9 SHEETS.

B	FO/RO	4 PG.DOCUMENT. PLAN SHOWS "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)". ALSO SHOWS "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)".
B	RO/FO	4 PG. DOCUMENT. PLAN SHOWS: "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)" ALSO SHOWS: "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)"
B	FO/RO	4 PG.DOCUMENT. PLAN SHOWS "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)". ALSO SHOWS "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)".

B	RO/FO	4 PG. DOCUMENT. PLAN SHOWS: "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)" ALSO SHOWS: "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)"
B	FO/RO	4 PG.DOCUMENT. PLAN SHOWS "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)". ALSO SHOWS "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)".
B	RO/FO	4 PG. DOCUMENT. PLAN SHOWS: "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)" ALSO SHOWS: "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)"

B	FO/RO	4 PG.DOCUMENT. PLAN SHOWS "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)". ALSO SHOWS "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)".
B	RO/FO	4 PG. DOCUMENT. PLAN SHOWS: "BEGINNING OF 1922-LAYOUT (COUNTY, DATED OCT.31,1922)" ALSO SHOWS: "BEGINNING OF 1923 LAYOUT (STATE HIGHWAY)"
B	RO	NOTES READS: THREE SHEETS. NOTE READS: THIS CERTIFIES THAT THE LOCATION OF THE HIGHWAY HAS BEEN ALTERED AS SHOWN ON THIS PLAN AND THAT SAID HIGHWAY AS ALTERED WAS LAYED OUT AND TAKEN CHARGE OF AS A STATE HIGHWAY [...] DEC. 11, 1934 [...

B	RO	NOTES READS: THREE SHEETS. NOTE READS: THIS CERTIFIES THAT THE LOCATION OF THE HIGHWAY HAS BEEN ALTERED AS SHOWN ON THIS PLAN AND THAT SAID HIGHWAY AS ALTERED WAS LAYED OUT AND TAKEN CHARGE OF AS A STATE HIGHWAY [...] DEC. 11, 1934 [...
B	RO/FO/TE	NOTE READS: LOWELL-1934 ALTERATION-SHEET 2 OF 3 SHEETS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/TE	NOTE READS: LOWELL-1934 ALTERATION-SHEET 2 OF 3 SHEETS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

		BEARS P.H. 24-3 IN COLORED PENCIL, VERSO. THIS CORROBERATES THE NOTE IN CONSECUTIVE INDEX FOR PLAN NO. P.H. 24-3 WHICH REFERS USER TO P.H. 40. NOTE READS: LOWELL-1934 ALTERATION-
B	RO/FO/TE	SHEET 3 OF 3 SHEETS.
B	RO/FO/TE	NOTE READS: LOWELL-1934 ALTERATION-SHEET 3 OF 3 SHEETS.
		BEARS: LOWELL-1922-SHEET 3 OF 4 SHEETS. NOTE STATES: COPIED FROM BLUE PRINTS AT THE CITY ENGINEERS OFFICE NOV. 24, 1936 (FULL LINE AS ACTUAL LAYOUT). SHEETS COPIED NOS. 3 & 4. FROM
B	RO	STATION 26 TO FIRST STREET.
		BEARS: LOWELL-1922-SHEET 4 OF 4 SHEETS. NOTE STATES: COPIED FROM BLUE PRINTS AT THE CITY ENGINEERS OFFICE NOV. 24, 1936 (FULL LINE IS ACTUAL LAYOUT). SHEETS COPIED NOS. 3 & 4. FROM
B	RO	STATION 26 TO FIRST STREET.
		11 PG. DOCUMENT. NOTE READS: THIS IS TO CERTIFY THAT THE ROAD SHOWN ON THIS PLAN WAS LAYED OUT AS A LIMITED ACCESS STATE HIGHWAY BY THE DEPARTMENT OF PUBLIC WORKS ON JULY
B	RO	26, 1949.

B	RO/SO	PART OF 11 PG. DOCUMENT. READE "ONE SHEET REVISED (SEE SHEETS 2 & 3 FOR ORIGINAL LAYOUT.)"
B	RO	PART OF 11 PG. DOCUMENT. NOTE READS: NEW LAYOUT SEE REVISED DSHEET PARCEL 31-A.
B	RO/FO	PART OF 11 PG. DOCUMENT. NOTE DIRECTS TO SEE REVISED SHEET.
B	RO	PART OF 11 PG. DOCUMENT.
B	RO/FO	PART OF 11 PG. DOCUMENT. NOTE READS: PARCEL 4C CONTINUED ON SHEET 6.
B	RO	PART OF 11 PG. DOCUMENT.
B	RO	PART OF 11 PG. DOCUMENT.
B	RO	PART OF 11 PG. DOCUMENT. NOTE STATES PARCEL 57 CONTINUED ON SHEET 9.
B	RO	PART OF 11 PG. DOCUMENT. NOTE STATES PARCEL 67 CONT. ON SHEET 10.
B	RO	PART OF 11 PG. DOCUMENT.

B	RO/FO/TE	PART OF 11 PG. DOCUMENT. BEARS NO.145-58 IN COLORED PENCIL VERSO.
C	CL, HO	SHEET I OF 100. FILE NO. 3983.
C	CL, HO	SHEET 2 OF 100. FILE NO. 3983.
C	CL, HO, TE	SHEET 3 OF 100. FILE NO. 3983. ALSO SHEET 1 OF 15 SHEETS.
C	CL, HO	SHEET 4 OF 100. FILE NO. 3983. ALSO SHEET 2 OF 15 SHEETS.
C	CL, HO	SHEET 5 OF 100. FILE NO. 3983. ALSO SHEET 13 OF 15 SHEETS.
C	CL, HO	SHEET 6 OF 100. FILE NO. 3983. ALSO SHEET 3 OF 15 SHEETS.
C	CL, HO	SHEET 7 OF 100. FILE NO. 3983. ALSO SHEET 4 OF 15 SHEETS.

C	CL, HO	SHEET 8 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 9 OF 100. FILE NO. 3983. ALSO SHEET 14 OF 15 SHEETS.
C	CL, HO	SHEET 10 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 11 OF 100. FILE NO. 3983. ALSO SHEET 15 OF 15 SHEETS.
C	CL. HO	SHEET 12 OF 100. FILE NO. 3983
C	CL, HO	SHEET 13 OF 100. FILE NO. 3983
C	CL, HO	SHEET 14 OF 100. FILE NO. 3983
C	CL, HO	SHEET 15 OF 100. FILE NO. 3983
C	CL, HO	SHEET 16 OF 100. FILE NO. 3983. ALSO SHEET 6 OF 15 SHEETS.

C	CL, HO	SHEET 17 OF 100. FILE NO. 3983. ALSO SHEET 7 OF 15 SHEETS.
C	CL, HO	SHEET 18 OF 100. FILE NO. 3983. ALSO SHEET 8 OF 15 SHEETS.
C	CL, HO, TE	SHEET 19 OF 100. FILE NO. 3983. ALSO SHEET 9 OF 15 SHEETS.
C	CL, HO	SHEET 20 OF 100. FILE NO. 3983. ALSO SHEET 10 OF 15 SHEETS.
C	CL, HO	SHEET 21 OF 100. FILE NO. 3983. ALSO SHEET 11 OF 15 SHEETS.
C	CL, HO	SHEET 22 OF 100. FILE NO. 3983. ALSO SHEET 12 OF 15 SHEETS.
C	CL, HO	SHEET 23 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 24 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 25 OF 100. FILE NO. 3983.

C	CL, HO	SHEET 26 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 27 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 28 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 29 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 30 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 31 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 32 OF 100. FILE NO. 3983.
C	CL, HO	SHEET 33 OF 100. FILE NO. 3983.
B	RO/FO/TE	ATTACHED IN 10 PG. DOCUMENT. SHEET 1 OF 10. BEARS NOTE: "KEY PLAN".
B	RO/TE	ATTACHED IN 10 P.DOCUMENT. SHEET 2 0F 10.
B	RO	ATTACHED IN 10 PG. DOCUMENT. SHEET 3 OF 10 SHEETS. BRIDGE NO. L-15-59.

B	RO/TE	ATTACHED IN 10 PG. DOCUMENT. SHEET 4 OF 10 SHEETS. BRIDGE NO.L-15-59. READS: ISSUED FOR CONSTRUCTION ISSUED FOR PURPOSE OF BIDDING/DESCRIPTION USE ONLY PRINTS OF LATEST DATE. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO	SCALE IS NOTED AS FOLLOWS: 1/8",1/4", 1 1/2",& 1"=1'. ATTACHED IN 10 PG. DOCUMENT.SHEET 5 OF 10 SHEETS. BRIDGE NO.L-15-59. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO	SCALE IS NOTED AS FOLLOWS: 1/8",1/4", 3/4"& 1"=1'. ATTACHED IN 10 PG. DOCUMENT. SHEET 6 OF 10 SHEETS BRIDGE NO. L-15-59. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO	ATTACHED IN 10 PG. DOCUMENT. SHEET 7 OF 10. BRIDGE NO. L-15-59. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO	ATTACHED IN 10 PAGE DOCUMENT. SHEET 8 OF 10. BRIDGE NO.L-15-59. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO	ATTACHED IN 10 PG. DOCUMENT. SHEET 9 OF 10 SHEETS. NO. L-15-59. REFERS TO SHEET NO.9. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO	ATTACHED IN 10 PG. DOCUMENT. BEARS: SHEET 10 OF 10. BRIDGE NO.L-15-59. CONSECUTIVE INDEX GIVES DATE OF JAN. 1952 FOR THE SET.
B	RO/FO	BEARS LAYOUT NO.4030.

C	RO/FO	BEARS LAYOUT NO. 4030.
B	RO/FO	BEARS LAYOUT NO.4030. 2ND SHEET BEARS: LOWELL 1953 ALTERATION-SHEET 2 OF 2 SHEETS. LIMITED ACCESS. 2ND SHEET ALSO BEARS LOCATION LINES OF MARCH 1952.
C	RO/FO	BEARS LAYOUT NO. 4030. 2ND SHEET BEARS: LOWELL-1953 ALTERATION-SHEET 2 OF 2 SHEETS. LIMITED ACCESS. 2ND SHEET ALSO BEARS LOCATION LINES OF MARCH 1952.
B	RO/FO/TE /SO	
B	FO/SO/TE	

B	TE	
C	SO	DATE IS CROSSED OUT WITH NOTE TO "SEE TRACING MADE JULY 24, 1907".
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO/FO/TE	
C	FO	
C	FO	
B	RO/FO/FX /TE	MAY HAVE BEEN ATTACHED TO ADDITIONAL PLANS AT ONE TIME.
B	RO	
A		LOCATED IN P. L. & C. CONSECUTIVE INDEX BUT NOT IN THE CARD INDEX. NO INDEX HEADINGS CAN BE APPLIED TO A TITLE AS VAGUE AS THIS.
A		

B	RO,SO,TE,	BEARS NO. 3578 & "CASE A", VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO,TE	BEARS NO. 63 CROSSED OUT VERSO. ALSO BEARS NO. 3511.
B	RO/TE	BEARS NOS. A-63 7. 3508 CROSSED OUT VERSO.
B	RO,TE,SO	NOTE STATES: "CONTOURS COMPILED FROM LEVELS TAKEN AT VARIOUS TIMES IN 1896 (LEVELS LAST TAKEN ON THE DIFFERENT PARTS BEING USED) AND FROM DATA OBTAINED FROM PLAN MADE BY U.S. ENGR'S." ALSO BEARS CASE A VERSO.
B	RO,TE,SO	BEARS NO. 3508 & A-63, VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO	DATED MARCH 31, 1893. ADDITIONAL INFO. DATED MARCH 3, 1921. NOTE STATES: THIS PLAN IS MEANT TO BE DESCRIPTIVE RATHER THAN ACCURATE. ADDITIONAL INFO. DATED MARCH 3, 1896 & OCT. 1921.

B	RO/TE/SO	PLAN READS "CASE 4".
B	RO, SO	BEARS NO. 3513, VERSO.
B	RO/TE/SO	PLAN APPEARS TO BE PIECED TOGETHER. NOTE STATES PLAN STARTED IN 1895.
A		
B	RO/TE/FO /ST	
B	RO,TE,SO	BEARS A-62 VERSO.

B RO/SO/TE TRACING. BEARS NO. 3150, VERSO.

B RO,FO,SO

B RO,TE

B RO,SO,TE, ST

B	RO,TE	
B	RO,FO,SO, TE	
B	RO,SO,TE, ST	
B	RO/SO/TE	BEARS NO. 4385 VERSO. CONSECUTIVE INDEX OF DRAWINGS NOTES "NOT DATED".
B	RO/SO/FO	BEARS NO. 4385-A CROSSED OUT, VERSO.
A		ALL ELEVATIONS REFERRED TO ESSEX CO'S DATUM. (RECEIVED FROM THE ESSEX COMPANY). SEE PLAN NO. 154-090.

B	RO/SO	BLANK FORM. BEARS STAMP VERSO: GREAT BRITAIN LOGO & IMPERIAL TRACING CLOTH.
C	RO/TE/SO	
B	RO/SO	
B	RO/SO	TITLE FOUND ON L.& C. STORAGE TUBE COVER. PROB. DATE, ESTIMATED FROM LOWELL MFG. CO. DATA IN C.R.I . AS BETWEEN 1900 AND 1902 BASED ON ALTERATION TO WEST END OF COUNTING HOUSE, ADJACENT RAILROAD SPURS, AND ABSENCE OF BLDGS.# 13 & 14.
B	SO/FO/RO /TE/ST	BEARS "PART NO.1" RECTO. READS: DRAWING MADE FROM ORIG. SURVEYS BY H.C. DAGGETT & M.S. AMY. NOTES IN TRANS.BK.101 PP150-165 AND 102 PP93-119. SURVEYED SUMMER 1898. NOTE: SEE COORDINATES & SKETCH IN CALC.BK.536 P9-11. BEARS #1383-1, VERSO, 1383 INKED OUT.
B	RO/SO/TE	BEARS "PART NO.2" RECTO. READS: FROM ORIG. SURVEY MADE IN 1898, BROUGHT UP TO DATE MAR.1900. NOTES IN TRANSIT BK.102 PP93 TO 201&226 TO 250. SURVEYED & DRAWN BY M.S. AMY. NOTE:SEE COORDINATES & SKETCHES IN CALC.BK.536.BEARS #1383-2,VERSO,1383 INKED OUT.

B	RO,FO,SO	NOTE STATES: FROM ORIGINAL SURVEY BY M. S. AMY IN 1900 & 1901. PLAN NO. 1388 SHOWS PENSTOCKS & RACES OF WHEEL NOS 1-3. BEARS NO.1389 CROSSED OUT, VERSO.
C	RO/FO	SEE PLAN NO. P.H. 067-[A]. BEARS NO. 1388 CROSSED OUT, VERSO.
B	RO/FO/TE /SO	LOCATED IN P.H. 096. TUBE HAS NOTE TAPED TO IT WHICH READS: PENSTOCKS RACEWAY 3/4/52 REV. 2/20/52 REV. BEARS 142 CROSSED OUT, VERSO. OROGINALLY DATED 30 SEPT. 1898.
B	RO/FO/TE	ORIGINALLY DATED DEC.27,1897. REVISED MAR.4,1952. NOTE STATES PLAN MADE FROM AN ORIG. SURVEY BY M.S. AMY, & PLOTTED BY G.W. MANSUR. NOTES IN TRANSIT BOOK NO.3 PP.79 TO 113 & 149 TO 158, AND LEVEL BOOK NO.12, PP.72 TO 77. BEARS NO. 1422 CROSSED OUT, VERSO
B	RO/FO/SO /TE	LOCATED IN P.H. 96. TUBE HAS BEEN TAPED TO IT WHICH READS: PENSTOCKS, RACEWAY 3/4/52REV.2/20/52 REV. NOTES IN TRANSIT BOOK NO.3 PP 114 TO 144. BEARS NO. 1423 CROSSED OUT, VERSO.
B	RO,TE,SO, FO,ST	NOTE STATES DRAWING MADE FROM AN ORIGINAL SURVEY BY M.S. AMY & PLOTTED BY W.W. PEABODY. NOTES IN TRANSIT BOOK NO. 3 PP. 160-185.

B	RO/TE/SO	LOCATED IN P.H. 96. TUBE HAS NOTE TAPED TO IT WHICH READS: PENSTOCKS, RACEWAY 3/4/52 REV. 2/20/52 REV. (2) DWGS.
B	SO/FO	
B	SO/RO/TE /FO/HO	A PHOTOREDUCTION OF THIS PLAN MAY BE FOUND AT 153-[173].
B	SO/RO/FO /TE/HO	
B	SO/RO/FO	SHOWS HIGH WATER LEVEL OF 20 MAR, 1936. LISTS AND SHOWS PUMP, TURBINE, AND TRANSFORMER ROOM EQUIPMENT.
B	SO/RO	CLEARLY A DETACHED PORTION OF P.H. 069-[D]-[01].
A		

B	SO/FO/RO	SHOWS HIGHWATER LEVELS OF MARCH 20, 1936 & SEPT.23, 1938.
B		BEARS JOB C 37 / SHEET NO. 1.
B	RO/FO/TE /LM	LOCATED IN P.H. 68. BEARS JOB C 37 / SHEET NO. 2.
B	RO	LOCATED IN P.H. 68. BEARS JOB C 37 / SHEET NO. 3.
B	HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS JOB C 37 / SHEET NO. 4.
B	RO/TE/FO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 5.
B	RO/LM/TE /FO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37. SHEET NO. IS MISSING.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 7.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 8.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 9.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 10.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 11.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 12.

B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS J.A. STEVENS. JOB C 37 / SHEET 13.
B	RO	LOCATED IN BOUND FOLDER ENTITLED: BOOTT MILLS A. T. SAFFORD & J. A. STEVENS. BEARS JOB C 37 / SHEET NO. 14.
B	RO	MAY HAVE BEEN ATTACHED TO ADDITIONAL PLANS AT ONE TIME. BEARS: JOB C 37 / SHEET 0.
B	RO/FO	
B	RO/FO/TE	BEARS NO. 52481 RECTO.
A		
A		
C	RO/TE	

C	RO	
C	RO/FO	NOTE DIRECTS TO SEE NOTEBOOK # 134 PP. 138-145.
C	RO	
C	RO/TE	
B	RO/FO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO,FO	
C	RO/SO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/TE	NOTES STATES: THIS PLAN COMPILED FROM DIFFERENT SOURCES & IS NOT ABSOLUTELY CORRECT.
B	RO/FO/SO/ST/TE	TITLE FOUND ON VERSO. BEARS "E. G. SOLTMANN NEW YORK" EMBOSSED IN PAPER. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	RO/TE	
B	RO/TE/SO	TITLE FOUND VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	LM/LI/TE/ RO/SO	TITLE TAKEN FROM P.H. 071-F-[01]. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
C	RO/FO	
C	RO/TE/FO /SO	
C	RO	KEARNEY SQUARE AND POST OFFICE SITE NOTED ON PLAN.
C	RO/SO/TE	
C	RO/SO/TE	

C	RO/TE	
		NOTE STATES: IN MARCH 1903 THIS PLAN WAS COMPILED FROM L.& C. PLANS NOS. 4457 & 4458 FOR THE PURPOSE OF STUDYING THE CURVES IN THIS OLD PIPE AND THE EFFECT OF THE CURVES IN THE
C	RO/LM/TE /SO	FLOW OF WATER THEREIN. DATE OF ORIGINAL WAS 4 FEB 1849. BEARS NO. 4458-A, VER
PAPER	C	TEARS, LOSSES
		IN TWO PIECES. BEARS NO. 4459 STAMPED, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BEARS WATERMARK "JAMES WHATMAN, TURKEY MILL, KENT, 1847" ACROSS THE TWO PIECES OF
C	RO/TE/LO	THE DRAWING.
		NOTE STATES: PIPES LAID JUNE AND JULY 1904 AND OPENED JULY
C	RO/TE	28, 1904.
		NOTE STATES: TAKEN FROM PLAN DATED 1849. L.& C. 12" LINE LAID
B	RO	IN 1869. L.& C. 24" LINE LAID IN 1904.
B	TE/FO/RO /SO	
		BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD
B	RO/TE/SO /LM	& J. A. STEVENS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1907-1908 FOR THIS ENTIRE PLAN SERIES..

B	RO/TE/SO/LM	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS. MAY ACTUALLY BE THE MISSING P.H. 073-026 AS THE FASTENER HOLES ALONG THE MARGIN MATCH THE OTHERS IN THAT GROUP.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO/SO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD 7 J. A. STEVENS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1907-1908 FOR THIS ENTIRE PLAN SERIES..
A		
A		
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A		

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A

A

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A

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A

A		
A		
B	TE/HO/LM	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS IS THE COVER SHEET FOR THE GROUP OF PLANS THAT FOLLOWS.
B	RO/TE	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS A. T. SAFFORD & J. A. STEVENS.
B	RO/SO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS A. T. SAFFORD & J. A. STEVENS.MILLS, A. T. SAFFORD & J. A. STEVENS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1907-1908 FOR THIS ENTIRE PLAN SERIES.
B	RO/TE/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS A. T. SAFFORD, J. A. STEVENS.MILLS, A. T. SAFFORD & J. A. STEVENS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1907-1908 FOR THIS ENTIRE PLAN SERIES.
B	RO/TE	BOUND IN FOLDER ENTITLED MASS. COTTON MILLS, A. T. SAFFORD, J. A. STEVENS. MILLS, A. T. SAFFORD & J. A. STEVENS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1907-1908 FOR THIS ENTIRE PLAN SERIES.
A		MAY ACTUALLY BE P.H. 073-[02] AS THE FASTENER HOLES ALONG THE MARGIN MATCH THE OTHERS IN THIS GROUP. MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD, J. A. STEVENS.
B	RO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD, J. A. STEVENS.
B	RO/TE	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD, J. A STEVENS.
B	RO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD, J. A STEVENS.

B	RO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD, J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO/FO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO/TE	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD, J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
B	RO	BOUND IN FOLDER ENTITLED: MASS. COTTON MILLS, A. T. SAFFORD & J. A. STEVENS.
A		
A		

C	RO/SO	NOTE STATES: TRACED FROM PLANS IN THE OFFICE OF THE CITY ENGINEER.
C	RO/FO/L M/TE	
B	RO/SO	ORIGINALLY 1905 & REVISED TO JAN. 1915.
C	RO/SO/TE	
B	RO	

C	RO/SO	
B	RO	
C	RO/FO	
C	RO/FO	
B	RO/FO/TE	BEARS EX. 29 WL.H.
C	RO/FO/TE	
B	RO/TE/SO /FO	ROLLED LOOSELY WITH OTHER PLANS IN RANDOM P.H. ORIGINALLY DATED 1905. ADDITIONAL INFO. DATED 1936. PLAN SHOWS 1936 FRESHET. ALSO SHOWS CONDITION IN 1896. BEARS CASE A FILE 1116. BEARS "LAND INUNDATION" IN BLACK INK VERSO.

C	RO/TE/SO	ROLLED LOOSELY WITH OTHER PLANS IN RANDOM P.H. REDUCED PHOTO COPY OF P.H. 75-001. PLAN SHOWS CONDITIONS IN 1896. BEARS CASE A FILE 1116. BEARS STICKER LABEL FROM SPAULDING-MOSS COMPANY REPRODUCTION SPECIALISTS.
B	TE/RO	BEARS FILE 1116 & CASE A RECTO.
B	TE/LO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/SO/TE	PLAN SHOWS HIGH WATER MARK OF 1896.
B	RO/SO	BEARS FILE NO. 1116. BEARS CASE A RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO	BEARS FILE 1116 RECTO. NOTE DIRECTS TO SEE LEVEL BK.48 PP 16-21. BEARS CASE A RECTO.
B	RO	BEARS CASE A.
B	RO	BEARS FILE NO.1116. NOTE STATES: FOR FIELD NOTES SEE LEVEL BK.48 PP.36-41. BEARS CASE A RECTO.
B	RO/TE	NOTE STATES FOR FIELD NOTES SEE LEVEL BK.48, PP 36-41.
B	RO/TE/FO /ST	

B	RO/TE/SO	(IN CONNECTION WITH CONSTRUCTION OF NEW PAWTUCKET BRIDGE). BEARS FILE 1116.
A		EXISTENCE STRONGLY IMPLIED BY EXISTENCE OF PLAN P.H. 075-009-(B).
B	FO/TE/LM	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. PLAN NUMBER ON PLAN AS APPLIED BY P. L. & C. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/TE/LM	(USED IN CONNECTION WITH CONSTRUCTION OF NEW BRIDGE).
B	RO/TE/LO	PLAN IS IN FRAGMENTS.
A		
B	RO/FO/TE	PLAN REFERS TO FILE 1116. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO/TE	BEARS FILE 1116 RECTO. NOTE DIRECTS TO: SEE LEVEL BK.48 PP 16-21. BEARS: CASE A, RECTO.
B	RO/FO/TE /LM/LI	ORGINAL DATED JUNE 1903. TRACED FROM CITY ENGINEER'S PLAN JUNE 28, 1915, W.E.B.
B	RO/TE/SO	2 SPAN.

C	ST/RO/FO /TE	2 SPAN.
B	RO	BEARS CASE A FILE 1116. ALSO BEARS SHEET 2, RECTO.
B	RO/FO/TE	NOTE VERSO IN GRAPHITE READS: POSSIBLE EXTREME HIGH WATER.
B	RO/FO/TE	BEARS SHEET 3, RECTO. ALSO BEARS NO. B-8-40.
B	RO/TE/FO	

B	RO/TE/FO	BY H. F. MILLS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 3, 1916.
B	RO/TE/FO	NOTE STATES CLEAR WATERWAY ESTIMATED AS 8898 FT DATED APRIL 10, 1916. PLAN IS IN TWO PIECES. BY H.F. MILLS
C	RO/TE/SO	BY H.F. MILLS
C	RO/TE/SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. BY H.F. MILLS
B	RO/FO/TE	MAY HAVE BEEN ATTACHED TO ADDITIONAL PLAN[S] AT ONE TIME. BY H.F. MILLS
B	RO/FO/SO	SKETCH PLAN OF ARCH WITH MEASUREMENTS. BEARS PLAN A, SHEET 3, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	FO/RO	
B	RO/FO/TE	BEARS FILE 1116. BEARS CASE A RECTO.
B	RO/FO/TE	BEARS FILE 1116. BEARS CASE A RECTO.
B	RO/FO	BEARS FILE 1116. BEARS CASE A RECTO.
B	RO/FO/TE	BEARS FILE 116. BEARS CASE A RECTO. NOTE DIRECTS TO SEE L.& C. SHELF 114 NOS.18,19, 20, 21 & 22. BEARS "NEW PAW. BRIDGE 1915" IN GRAPHITE, VERSO.
B	RO/FO/TE	NOTE STATES: TRACED MAY 12, 1915 FROM L.& C. PLAN NO. 22 SHELF 114 SOME ADDITIONS MADE FROM MEASUREMENTS. BEARS FILE NO. 1116. BEARS CASE A. TITLE FOUND VERSO.
B	RO/TE	
A		

B	RO/FO/TE	BEARS NO.4072 APPROVED BY HARBOR & SAND COMMIT., JUNE 7, 1916.
B	RO/FO	NOTE STATES: DOTTED LINE SHOWS AREA WHERE IT WAS EXPECTED THE LEDGE WOULD BE EXCAVATED TO GRADE 70. SHADED PORTION SHOWS AREA THAT LEDGE HAS NOT BEEN EXCAVATED.
B	RO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO/SO	NOTE STATES: RED LINES SHOW PRESENT CONDITIONS THAT IT WILL BE NECESSARY TO CHANGE ON ACCOUNT OF RAISING THE GRADE OF SCHOOL ST. COPY OF SMALL SECTION OF PLAN NO. P.H. 075-034 APPENDED.
B	RO/FO/SO	NOTE STATES: RED LINES SHOW PRESENT CONDITIONS THAT IT WILL BE NECESSARY TO CHANGE ON ACCOUNT OF RAISING THE GRADE OF SCHOOL ST.
B	RO/FO	NOTE STATES: RED LINES SHOW PRESENT CONDITIONS THAT IT WILL BE NECESSARY TO CHANGE ON ACCOUNT OF RAISING THE GRADE OF SCHOOL ST.

B	RO/FO/TE	NOTE STATES: RED LINES SHOW PRESENT CONDITIONS THAT IT WILL BE NECESSARY TO CHANGE ON ACCOUNT OF RAISING THE GRADE OF SCHOOL ST.
B	RO/FO/TE	NOTE STATES: RED LINES SHOW PRESENT CONDITIONS THAT IT WILL BE NECESSARY TO CHANGE ON ACCOUNT OF RAISING THE GRADE OF SCHOOL ST.
B	RO/FO	NOTE STATES:"RED LINES SHOW PRESENT CONDITIONS THAT WILL BE NECESSARY TO CHANGE ON ACCOUNT OF RAISING THE GRADE OF SCHOOL STREET."
B	RO/FO	PLAN SHOWS SECTION OF STREET IN 1848, 1871 & 1917.
B	RO/FO	PLAN SHOWS SECTION OF STREET IN 1848, 1871 & 1917. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/SO	
B	RO/FO	
B	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO/TE	NOTE STATES: ADDED WORK OVER CANAL PORTION & SCHOOL ST. AWARDED TO THE NATIONAL ENG. CORP. DEC. 15, 1916.

B	RO/FO/SO /TE	NOTE DIRECTS TO SEE LETTER FROM J. R. M[ILLEG.] 1916/06/24. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO	BEARS NO. 2, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	TE/RO	MAY HAVE BEEN ATTACHED TO ADDITIONAL PLANS AT ONE TIME.
B	RO	TRACED FROM PLAN BELONGING TO CITY OF LOWELL.
B	RO	NOTE STATES: 2 TRACKS TO BE LAID BY TROLLEY COMPANY. 6 1/2" FINISHED ROADWAY LAID BY CITY. BEARS STAMP, VERSO: REC'D MAY 29, 1916. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/SO	BEARS: NATIONAL ENGINEERING CORPORATION 689 LAWRENCE ST. LOWELL MASS. BEARS 4 RECTO.
B	RO/FO	BEARS SCHEME NO. 1. BEARS NO. 3, RECTO.
B	RO/ST/LM /TE	BEARS NO. 2, RECTO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/SO	BEARS NO. 2 REVISED, RECTO. BEARS STAMP, VERSO, "REC'D MAY 29, 1916". CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	RO	BEARS NO. 1 RECTO. BEARS STAMP "REC'D 29 MAY 1916", VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	SO/FO/RO /MO	
B	SO/RO/M O	PLAN SUBMITTED WITH REPORT OF A COMMITTEE TO THE DIRECTORS OF LOCKS & CANALS, DATED OCT. 30, 1879.
B	SO/RO/FO /MO	BEARS SURVEY NOTES DATED APR 18, 1898. BEARS NO. 1868 STAMPED, VERSO.
A		
A		
B	SO/RO/M O	BEARS NO. 3535 STAMPED, VERSO.
B	RO/TE/FO /LI	2 PLANS. FORMERLY PLAN NO. 138-001. ORIGINALLY DATED JAN. 1897. TRACED MARCH 1904. CORRECT AS FAR AS KNOWN TO MARCH 17, 1916.

B	RO/TE/FO/SO	ORIGINALLY DATED JAN. 1897. TRACED MARCH 1904. CORRECT AS FAR AS KNOWN TO MARCH 17, 1916.
B	RO/TE	ORIGINALLY DATED NOV. 30, 1886.
B	RO/SO	FORMERLY 138-009. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	FORMERLY 138-004. ORIGINALLY DATED AUG. 1, 1896. TRACED FEB. 4, 1904.
B	RO/SO	FORMERLY 138-003.
B	RO/FO/SO	PLAN MADE ORIGINALLY NOV. 1890.
B	RO/FO/SO	FORMERLY 138-002. ORIGINALLY DATED FEB. 1900.
B	RO/FO	FORMERLY 138-007.

		FORMERLY 138-005. CORRECT AS FAR AS KNOWN TO FEB. 1917.
B	RO/SO	ORIGINALLY DATED JANUARY 1891. TRACED JAN. 1904.
B	RO/FO/SO /ST/LI	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 1917.
B	RO/FO/SO	SEE ALSO PLAN NOS. 138-008, 138-025, 149-006 & C-133-014.
B	RO/SO/FO /TE	ORIGINALLY DATED JAN. 24, 1906. CORRECT TO MARCH 1917. SEE ALSO PLAN NOS. C-P.H. 079-026-A & P.H. 079-027. PLAN DIRECTS TO SEE MILL YARD PLANS FOR GREATER DETAIL. BEARS NO. 26-158 CROSSED OUR, RECTO.
B	RO/SO	BEARS NOTE: SEE PLAN NO. 1362 (P.H. 078-[05]).
B	RO/FO	BEARS WATERMARK: CRANE & CO., DALTON MASS., 1868, BOND NO. 21.
B	RO/FO	

B	RO/FO/TE	PLAN AND SECTIONS OF PENSTOCKS AND FOREBAY FOR LAWRENCE SECTION WHEELS. TITLE FROM VERSO. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO/SO /TE	BEARS NOS. 1362 AND S9-10, VERSO.
B	RO/ST	DEALS MAINLY WITH DRAINAGE OF THE NASHUA RIVER.
B	RO	BEARS SHEET NO. 1, RECTO. ALSO ADDITIONAL WORK DATED AUG., 1923.
B	RO/SO	BEARS SHEET NO. 2, RECTO.
B	RO	BEARS SHEET NO. 3, RECTO.

B	RO/FO	
B	RO/SO	
B	RO/FO	NOTE STATES: SEE ALSO PLAN NOS. P.H. 081-002 & 003.
B	RO/FO	NOTE STATES: THE REAS HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPS. LOCKS & CANALS. SEE ALSO PLAN NOS. P.H. 081-001 & 003.
B	TE/RO/FO	NOTE STATES: THE AREAS NOTED HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPS. LOCKS & CANALS. SEE ALSO PLAN NOS. P.H. 081-001 & 002.

B	RO/FO/SO	NOTE STATES THE AREAS NOTED HEREON WERE OBTAINED FROM PLANS IN OFFICE OF PROPS. LOCKS & CANALS.
B	RO/FO/SO	CARD INDEX GIVES "[A]" SUFFIX TO NUMBER. NOTE STATES: THE AREAS NOTED HEREON WERE OBTAINED FROM PLANS IN OFFICE OF PROPS. LOCKS & CANALS. BLUEPRINT OF THIS PLAN USED AS 141-030-[B].
B	RO	NOTE STATES: THE AREAS NOTED HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPS LOCKS & CANALS. SEE ALSO PLAN NO. P.H. 081-007.
B	RO	NOTE STATES: THE AREAS NOTED HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPS. LOCKS & CANALS. SEE ALSO PLAN NO. P.H. 081-006.

B	RO/FO	NOTE STATES:THE AREAS NOTED HEREON WERE OBTAINED FROM PLANS IN OFFICE OF PROPS.LOCKS & CANALS.
B	RO	NOTE STATES: THE AREAS NOTED HEREON WERE DETERMINED FROM PLANS IN OFFICE OF PROPS LOCKS & CANALS. PLAN BEARS:"SUMMARY WESTERN CANAL". BLUEPRINT OF THIS PLAN USED AS 141-030-[A].
B	RO/TE	ORIGINALLY DRAWN JULY 1912, CORRECTED TO 1924. READS RECTO: CANAL MARGINS IN COLOR REPRESENTING TAXES FOR LOCKS & CANALS AND OR TENANTS.
B	RO	BEARS SHELF 154, NO. 107 CROSSED OUT, RECTO.
B	RO/FO	BEARS SHELF 154, NO. 39 CROSSED OUT, RECTO.
B	RO/FO	BEARS SHELF 154, NO. 108 CROSSED OUT, RECTO.
B	RO/FO	BEARS SHELF 154, NO. 58 CROSSED OUT, RECTO.

B	RO/FO	BEARS SHELF 154, NO. 60 CROSSED OUT, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO	BEARS SHELF 154, NO. 62 CROSSED OUT, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO	BEARS SHELF 154, NO. 59 CROSSED OUT, RECTO.
B	RO/FO/TE	BEARS SHELF 154, NO. 57 CROSSED OUT, RECTO. MAY BE DISCHARGE CURVE OF MERRIMACK RIVER. BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. BEARS NOTE: 1893 TO 1896 INCLUSIVE, RECTO AND VERSO. CONSECUTIVE INDEX OF DRAWINGS
B	RO/FO	GIVES DATE OF 1890 TO 1919. MAY BE DISCHARGE CURVE OF MERRIMACK RIVER. BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. BEARS NOTE: 1888 TO 1892 INCLUSIVE, RECTO AND VERSO. CONSECUTIVE INDEX OF DRAWINGS
B	RO/FO	GIVES DATE OF 1890 TO 1919.
B	RO/FO/SO	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/ST	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO/TE	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO.

B	RO	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO.
B	RO/FO/SO/TE	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO.
B	RO/FO/SO/TE	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO.
B	RO/SO/TE	MAY BE DISCHARGE CURVE OF MERRIMACK RIVER. BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO/SO/TE	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. DATA RELATES TO PERIOD 1887 TO 1908. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO	BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO.
B	RO/FO/ST/TE	FILE NO. 1012.10A. BEARS SHELF 154, NO. 34 CROSSED OUT, RECTO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO	TITLE FOUND, VERSO. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.

B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1890 TO 1919.
B	RO	NOTE DIRECTS TO: SEE NOTE BOOK #134 P.53-67.
B	RO/FO/SO	NOTE DIRECTS TO SEE NOTE BOOK 134.
B	RO	BEARS NOTE SHADED PORTION LAID NOV 18,1918. BEARS NOTE BOOK #134 P.36.
B	RO	NOTE DIRECTS TO SEE NOTE BOOKS NO'S 122 & 134.
B	RO	BEARS NOTE: SHADED PORTION LAID NOV.18, 1918. BEARS NOTE BOOK #134 P.36.
B	RO/TE	NOTE STATES SHADED PORTION LAID NOV.18, 1918. BEARS NOTE BOOK #134 P.36. MARKED P.H. 83-A, RECTO AND VERSO.

B	RO/FO	BEARS SHELF 158, NO. 38 CROSSED OUT, RECTO. LETTER DATED 24 JULY, 1916, ATTACHED FROM HIRAM F. MILLS TO ARTHUR T. SAFFORD IN RE: NEW THEATRE PLATFORM ON CENTRAL STREET.
B	RO	
B	RO/FO	
B	RO/FO	
B	RO/FO	
B	RO	

B	RO/FO/TE /LM	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE JAN. 1923.
B	RO	
B	RO/FO/TE /LM	
B	RO/FO/SO /TE	
B	RO/SO/TE	TITLE FOUND VERSO.
B	RO	BEARS NOTEBOOK 134 P.84-100.
B	RO	NOTE STATES: FOR FURTHER INFORMATION SEE NOTE BOOKS 139 & 142.
B	RO/SO/TE /FO	BEARS "NOTE: THIS SKETCH REPRESENTS THE BEST INFORMATION AVAILABLE FOR LOCATION OF PIPES IN AREAS NOT COVERED BY MILL YARD PLANS." ORIG. DATED JULY 1901, CORR. AUG 18, 1903 TO SHOW ALL INSIDE & OUTSIDE HYDRANTS CONNECTED WITH L.& C. SYSTEM. SCALE, VERSO.

B	RO/FO/TE /SO	
B	RO/SO	NOTE STATES: THIS PLAN WAS MADE ESPECIALLY TO SHOW THE PROPOSED SPUR TRACK ALONG THE SOUTH BANK OF THE PAWTUCKET CANAL AND ALSO THE COST AND DATE OF CONSTRUCTION OF THE CANAL WALLS.
A		NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS
A		THIS PLAN NO. WAS USED TWICE BY P.L.& C. AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS
B	RO/FO/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. ORIGINALLY DATED OCT 1939, CORRECTED TO JUL. 1941.
B	RO/TE/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. ORIGINALLY DATED OCT 1939, CORRECTED JULY 1941 AND SEP. 29, 1941. NOTE STATES: PLAN AND SECTIONS USED FOR STUDIES IN CONNECTION WITH AUTOMATIC CONTROL OF WATER IN CANALS.

B	RO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. COPY MADE EITHER FROM PLAN P.H. 008-001-[COPY 2], OR [COPY 3]. ORIGINALLY DATED OCT. 1939, SUCCESSIVELY CORRECTED TO JUL. 1957. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PHOTO NEGATIVE ON FILM. ORIGINALLY DATED OCT. 1939, SUCCESSIVELY CORRECTED TO OCT. 1952. A NEGATIVE PRINT EXISTS AS PLAN NO. 143-042.
B	RO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PHOTO NEGATIVE ON FILM. ORIGINALLY DATED OCT. 1939, SUCCESSIVELY CORRECTED TO JUL. 1957. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. PHOTO NEGATIVE ON FILM. ORIGINALLY DATED OCT. 1939, SUCCESSIVELY CORRECTED TO JUL. 1957. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	PLAN NO. USED TWICE BY P.L.& C. ORIGNIALLY DATED OCT. 1939, CORRECTED TO JUL. 1941, FEB. 1943, JUL. 1946. OCT. 1950. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
A		

B	RO/FO/TE /SO	ORIGINALLY DATED JULY 1912. MAY 12, 1917. INFORMATION ADDED RELATIVE TO BRANCH RAILROAD TRACKS. LOCATED LOOSELY IN P.H. 099 SPACE.
B	RO/FO/TE /SO	
A		
A		
B	RO/FO/SO	THIS PLAN NO. WAS USED TWICE BY P.L.& C. ORIGINALLY DATED OCT. 1939. ADDITIONAL WORK DATED JAN. 1, 1940.
A		PLAN NO. USED TWICE BY P.L.& C. AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/SO	PLAN NO. USED TWICE BY P.L. & C. LOCATED AFTER COMPLETION OF FORMAL INVENTORY. AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS WHICH GIVES DATE OF 1939.
A		PLAN NO. USED TWICE BY P. L. & C. LISTED AMBIGUOUSLY IN CONSECUTIVE INDEX OF DRAWINGS

B	RO/FO/TE	ROLLED WITH VARIOUS PLANS IN RANDOM P.H. NOTE READS: "RED SHOWS LOCKS & CANALS REGULAR GAUGES."
A		PLAN NO. USED TWICE BY P.L.& C. AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
A		PLAN NO. USED TWICE BY P.L.& C. AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS. COULD THIS PLAN HAVE BEEN RENUMBERED AS PLAN 188-183?
B	RO/FO/TE /SO	
B	SO/FO	BASE PLAN OF 1912 MAY BE LITHOGRAPH WITH WORK OF 1922 ADDED. LOWER RIGHT CORNER HAS SCHEMATIC OF PROPOSED POWER DEVELOPMENTS AT SWAMP LOCKS & LOWER LOCKS DATED MAR. 16, 1922. PLAN NO. USED TWICE BY P.L.& C. AMBIGUOUSLY LISTED IN CONS. INDEX.
A		PLAN NO. USED TWICE BY P.L.& C. AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS
A		AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
A		AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS.

A		AMBIGUOUSLY LISTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/TE	ROLLED WITH VARIOUS PLANS IN RANDOM P.H. NOTE READS "VERMILLION SHOWS CANAL WALLS WHICH REQUIRE REBUILDING AS SOON AS POSSIBLE". PLAN ALSO SHOWS REPAIRED WALLS SINCE 1916.
A		
A		STONE & WEBSTER DRAWINGS.
A		STONE & WEBSTER DRAWINGS.
A		STONE & WEBSTER DRAWINGS
A		STONE & WEBSTER DRAWINGS

A		STONE & WEBSTER DRAWINGS
A		STONE & WEBSTER DRAWINGS
A		STONE & WEBSTER DRAWINGS
A		STONE & WEBSTER DRAWINGS
A		STONE & WEBSTER DRAWINGS
B	RO	NOTE READS: COMPILED FROM SEVERAL SOURCES. UPPER DEVELOPMENT. STONE & WEBSTER DRAWINGS
B	RO	BEARS: METCALF & EDDY ENGINEERS BOSTON. STONE & WEBSTER DRAWINGS
B	RO	BEARS: METCALF & EDDY ENGINEERS BOSTON, MASS. STONE & WEBSTER DRAWINGS

B	RO	PHOTO OF PLAN. BEARS: METCALF & EDDY. STONE & WEBSTER DRAWINGS
B	RO	METCALF & EDDY ENGINEERS BOSTON, MASS. STONE & WEBSTER DRAWINGS
B	RO	PLAN BY METCALF & EDDY BOSTON EDDY. STONE & WEBSTER DRAWINGS
A		ORIGINALLY NUMBERED 154-4 AND MOVED TO P.H. 089 AS NOTED IN P.L.& C. CONSECUTIVE INDEX.
A		ORIGINALLY NUMBERED 153-42 AND MOVED TO P.H. 089 AS NOTED IN P.L.& C. CONSECUTIVE INDEX.
B	RO/SO	NOTE STATES: ALL THE 8" PIPE IS LAID ON THE BOTTOM OF THE CANAL. SEE NOTE BOOK 142, PAGE 72-89.
B	RO/SO	
B	RO/FO/TE	BEARS "FERGUSON" IN COLORED PENCIL VERSO. AN ALLIS-CHALMERS CO. DRAWING.

B	RO/SO	BEARS FILE NO. 1009, RECTO. ORIGINALLY DATED JULY 21, 1922. NOTE STATES I BEAMS CHANGED SEPT. 14. ORIGINALLY NUMBERED 153-063.
B	TE/ST/RO/FO	AN ALLIS-CHALMERS MFG. CO. DRAWING. BEARS NO 190708 RECTO. BEARS STAMP WHICH READS: FOR CONSTRUCTION PURPOSES THIS DRAWING TO BE USED FOR SHOP ORDER NO. 2E-6956 ONLY FOR BOOTT MILLS.
B	FO/SO/TE	AN ALLIS-CHALMERS MFG. CO. DRAWING.
C	RO/FO/TE/ST	ATTACHED TO P.H. 091-004. LETTER CONCERNS THE BASE RING THAT GOES UNDER THE GENERATOR. BEARS FERGUSON IN COLORED PENCIL VERSO.
B	FO/TE/SO/RO	BEARS NO.18 RECTO. BEARS 859-18 VERSO. AN ALLIS-CHALMERS MFG. CO. DRAWING.
B	HO/TE	BLUEPRINT COPY OF PLAN NO. 153-061.
B	RO/FO	BEARS FILE NO. 1009.
B	RO	BEARS FILE NO. 1009. ORIGINALLY DATED SEPT. 13, 1922. LAST REVISION MADE OCT. 20, 1922.
B	FO/TE	A.D. LUPTON & SONS DRAWING. ORIGINALLY DATED 20 SEPT. 1922, REVISED 16 OCT. 1922 AND 30 OCT. 1922.

B	RO	N.E. STRUCTURAL CO.
B	RO/TE	ORIGINALLY DATED SEP 5, 1922. REVISED SEP 14, 1922. BEARS IMAGE OF WATER MARK FROM ORIGINAL: SYRIAN PARCHMENT BOND. N.E. STRUCTURAL CO.
B	RO/TE	ORIGINALLY DATED SEP 5, 1922. REVISED SEP 9, 1922. BEARS IMAGE OF WATER MARK FROM ORIGINAL: SYRIAN PARCHMENT BOND. N.E. STRUCTURAL CO.
B	RO/FO	ORIGINALLY DATED SEP 5, 1922. REVISED SEP 12, 1922. N.E. STRUCTURAL CO.
B	RO	ORIGINALLY DATED SEP 5, 1922. REVISED SEP 14, 1922. BEARS WATER MARK FROM ORIGINAL: SYRIAN PARCHMANET BOND. PLAN IS ON NEW ENGLAND STRUCTURAL CO. FORM.
B	RO/FO/TE	BEARS IMAGE OF WATER MARK FROM ORIGINAL: CRANE & CO DALTON MASS 1921 BOND NO 18. BEARS NOTE VERSO: STRUCTURAL STEEL DRWING NEW ENG. ST. CO.
B	RO	BEARS FILE 1009 RECTO. BEARS SHELF 133-64 CROSSED OUT RECTO. ORIGINALLY NUMBERED 153-064.
B	RO/TE	AN ALLIS-CHALMERS MFG. CO. DRAWING. DATE LOCATED IN LOWER LEFT CORNER.

B	RO/FO/TE	BEARS FILE NO. 1009, RECTO. ORIGINALLY DATED APRIL 27, 1922.
B	RO/SO/FO	BEARS FILE 1009. FORMERLY PLAN NO. 153-055.
B	RO/SO	BEARS FILE NO. 1009. ORIGINALLY DATED JUNE 1, 1922. LAST REVISED 20 OCT., 1922. ORIGINALLY NUMBERED 153-058.
C	RO/FO	BEARS FILE NO. 1009. ORIGINALLY DATED JUNE 1, 1922. LAST REVISED 20 OCT., 1922.
B	RO/FO	BEARS FILE NO. 1009, RECTO. ORIGINALLY NUMBERED 153-059.
B	RO/FO/SO	BEARS FILE NO. 1009, RECTO. ORIGINALLY NUMBERED 153-060.
B	RO/TE	AN ALLIS-CHALMERS CO. DRAWING. BEARS NO.92996.
B	SO/FO/TE	A HOLYOKE MACHINE CO. DRAWING. ORDER-A-1428. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	RO/FO	BEARS 1009-153.
B	RO/TE/ST	ARTHUT T. SAFFORD-CONSULTING ENGINEER. FORMERLY PLAN NO. 153-021.
B	RO/SO/FO	LAST REVISION MADE OCT.24,1922. BEARS FILE 1009.
B	RO	BEARS FILE 1009. FORMERLY PLAN NO. 153-054.
B	RO/FO	BEARS FILE 1009. FORMERLY 153-049.
B	RO/FO/SO	BEARS "OBSOLETE" IN INK RECTO. BEARS: FILE 1009.
B	FO/SO/HO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

B	RO/SO	
C	RO	
B	RO	NOTE STATES: IN THESE PROPOSED SETTINGS IT HAS BEEN INTENDED TO INCORPORATE IN THE DESIGN MOST OF THE CHARACTERISTICS THAT HAVE BEEN USED FOR BOOTT NO.1 UNIT. SAME WHEEL, HEAD, C.F.P.S. HP, R.P.M., DRAFT TUBE, GENERATOR ETC.
B	RO/FO	PLAN SHOWS VERTICAL & HORIZONTAL SETTINGS.
B	RO/SO	
B	RO/SO	

B	RO	NOTE STATES: SURGE VENTS & CONCRETE CURB OVER FOREBAY TO BE CONSTRUCTED AS SHOEWN IN SCHEME #1 ON OTHER SHEET.
B	RO/SO	
B	FO/SO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/SO	ORIGINALLY DATED 11 OCT 1944. REVISED 31 DEC 1946. SEE ALSO 153-[191].
B	RO/FO	NOTE STATES: IT WAS NOT POSSIBLE TO GET MEASUREMENTS ON THE INSIDE OF DRAFT TUBES. BY DEDUCTION USING THE THICKNESS OF METAL AS 3/8" THE INSIDE DIAM OF THE DRAFT TUBES FIGURE OUT 7'-1/2" +/-.
C	RO/FO/TE	BEARS SH. E 3 & C 64, RECTO.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. FORMERLY NUMBERED 164-64. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1922.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. FORMERLY NUMBERED 164-63. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE, 1922.

B	RO/TE	13 BLUEPRINTS NOTED CONSECUTIVE INDEX OF DRAWINGS.
B	RO/TE	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/FO/TE	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/FO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/FO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.

B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO	13 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.

B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.

B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.S.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS.. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.

B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS..DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. STAMPED, VERSO.
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO..
B	RO/FO/TE	19 BLUEPRINTS NOTED IN CONSECUTIVE INDEX OF DRAWINGS. DATE STAMPED, VERSO.

B	RO/FO/TE	BEARS SH.E1 & C8162, RECTO.
C	RO/FO/TE /SO	BEARS SH.E1 & C8162, RECTO.
C	RO/FO/TE /SO/LM	BEARS SH E1 & C816, RECTO. BEARS "LOCKS & CANALS-LOWELL" IN GRAPHITE VERSO.
B	RO/TE/FO	BEARS SH.E2, RECTO.
C	RO/FO	BEARS SH.E1 & C8162, RECTO.

B	RO	ONE OF A SERIES OF SEVEN PLANS.
B	RO	ONE OF A SERIES OF SEVEN PLANS.
B	RO	ONE OF A SERIES OF SEVEN PLANS.
B	RO	ONE OF A SERIES OF SEVEN PLANS.
B	RO	ONE OF A SERIES OF SEVEN PLANS.
B	RO	ONE OF A SERIES OF SEVEN PLANS.

B	RO	ONE OF A SERIES OF SEVEN PLANS.
B	RO	
B	RO/FO	
B	RO/FO	
B	RO/FO	
B	RO/FO/TE	

B	RO	ONE OF A SERIES OF ELEVEN PLANS.
B		ONE OF A SERIES OF ELEVEN PLANS.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/TE	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO	ONE OF A SERIES OF ELEVEN PLANS. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.

B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.
B	RO/FO	
B	RO/FO	
B	RO/FO/TE	
B	RO/TE	THE ASSIGNED DATE IS THE DATE RECEIVED, AS NOTED ON THE PLAN. NUMBERED AS P.H. 29 IN L.& C. CARD INDEX.
B	RO/TE	THE ASSIGNED DATE IS THE DATE RECEIVED, AS NOTED ON THE PLAN. NUMBERED AS P.H. 29 IN L.& C. CARD INDEX.

B	RO/TE	THE ASSIGNED DATE IS INFERRED FROM SHEET 1. NUMBERED AS P.H. 29 IN L.& C. CARD INDEX.
B	RO/TE	THE ASSIGNED DATE IS INFERRED FROM SHEET 1. NUMBERED AS P.H. 29 IN L.& C. CARD INDEX.
B	RO/TE	THE ASSIGNED DATE IS INFERRED FROM SHEET 1. NUMBERED AS P.H. 029 IN L.& C. CARDINDEX.
B	RO/FO	NUMBERED AS P.H. 029 IN L.& C. CARD INDEX.
B	RO/FO	NOTE READS: PRESENT RED BRIDGE AND WALL SHOWN IN RED. NUMBERED AS P.H. 029 IN L.& C. CARD INDEX.
C	RO/FO/TE	BEARS: J.R. WORCESTER & CO. ENGRS. 79 MILK ST. BOSTON. COMMONWEALTH OF MASSACHUSETTS PUBLIC WORKS DEPT. BOSTON. COPY OF ARTISTS RENDERING.
C	RO	
C	RO/FO	ORIGINALLY DATED DEC. 5, 1936; REVISED TO DEC. 31, 1937.

C	RO/FO	ATTACHED RECTO TO P.H. 093-[L]-[01]. BEARS: L.R. WORCESTER & CO. CONSULDTING ENG'RS. ALSO BEARS 0-10251 RECTO.
C	RO/FO/TE	
C	RO/FO/TE	
C	SO/FO/TE	
C	RO	DATE IN TITLE BLOCK REFERS TO WEATHER CONDITIONS FOR NOV. 4, 1927.
C	RO	24 STATIONS PLOTTED.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.

C	SO/FO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	
C	RO/FO/SO	
C	RO	
C	RO/FO/SO TE	# 3 CROSSED OUT AND REPLACED WITH # 7, RECTO.
C	RO	REDUCED TRACING ATTACHED TO P.H. 094-007-[B].
C	RO/FO	ALSO SHOWS SKETCH OF ASSUMED DRAINAGE AREA.
C	RO	ALSO SHOWS SKETCH OF ASSUMED DRAINAGE AREA. BEARS # 4 CROSSED OUT AND REPLACED WITH # 8.
C	RO	
C	RO/SO/TE	
C	RO/TE	# 6 CROSSED OUT RECTO & REPLACED WITH # 10. TRACING OF FIGURE 1 ATTACHED RECTO.
C	RO	

C	RO	
C		TRACING ATTACHED RECTO.
C	RO/SO/TE	
C	RO	
C	RO/TE	
C	RO/FO/TE	
C	SO	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
C	RO	
C	RO	

C	RO/SO	THIS PLAN NO USED TWICE IN THE L.& C. CARD INDEX. BEARS # 13 CROSSED OUT & REPLACED WITH # 17. TRACING ATTACHED & NUMBERED P.H. 094-017-[A].
C	RO/SO	
C	RO/TE	
C	RO/SO	
C	RO	BEARS PLOTTED POINTS FOR 1927 FLOOD IN NEW ENGLAND. REFERENCE IS MADE TO TABLE 4.
C	RO/FO	
C	RO	
C	RO/SO	
C	RO	
C	SO	
C	RO/SO	
C	RO/FO	

C	RO	
C	RO	
C	RO/SO	
B	RO/TE	
B	RO/FO	DEPARTMENT OF THE INTERIOR FRANKLIN K. LANE, SECRETARY U.S. GEOLOGICAL SURVEY GEORGE OTIS SMITH DIRECTOR. TOPOGRAPHY WAR DEPARTMENT CORPS OF ENGINEERS U.S. ARMY.
B	RO/FO	PHOTONEGATIVE. IMAGE IS NOT REVERSED. CONSECUTIVE INDEX OF DRAWINGS SIMPLY REFERS TO THE 1927 FLOOD.
B	RO	PHOTONEGATIVE. IMAGE IS NOT REVERSED. CONSECUTIVE INDEX OF DRAWINGS SIMPLY REFERS TO THE 1927 FLOOD.

B	RO/FO	DEPARTMENT OF THE INTERIOR FRANKLIN K. LANE, SECRETARY U.S. GEOLOGICAL SURVEY GEORGE OTIS SMITH DIRECTOR. TOPOGRAPHY WAR DEPARTMENT CORPS OF ENGINEERS U. S. ARMY.
B	RO/SO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 3-4, 1927.
B	RO	PHOTONEGATIVE. IMAGE IS NOT REVERSED.
B	RO/SO	
B	RO/FO/TE	LOCATED ON P.H. 094-[035]. CONSECUTIVE INDEX OF DRAWINGS SIMPLY GIVES DATE OF NOV. 1927.
B	FO/TE	2 PG. DOCUMENT ATTACHED RECTO, NUMBERED P.H. 94-6-[A] & [B].

B	FO/RO	DATA RELATIVE TO NOV. 5 & 6, 1927.
B	FO/RO	DATA RELATIVE TO NOV. 5 & 6, 1927.
B	RO/SO/FO	PHOTONEGATIVE. IMAGE IS NOT REVERSED.
B	RO	SHOWS APPROXIMATE PRECIPITATION LINES. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 3-4, 1927.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 4-5, 1927.

B	RO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 4-5, 1927.
B	RO	
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/TE	BEARS: COMMITTEE ON RUN-OFF. BOSTON SOCIETY OF CIVIL ENGINEERS.
B	RO/TE/FO	PLAN SHOWS "EXCESSIVE PRECIPITATION FOR 3 CONSECUTIVE DAYS FROM RECORDS OF MIAMI CONSERVANCY DISTRICT.
B	RO/FO/TE	
C	RO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO	NOTE READS: "LOCAL EXCEPTIONS TO GEERAL AREAS."

B	RO/SO	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/FO/TE	NOTE READS: COMPILED BY CHIEF ENGINEER DEPARTMENT OF HIGHWAYS AND DIRECTORY OF PUBLICITY DEPARTMENT DISTRIBUTED BY THE SECRETARY OF STATE MONTPELLIER V.T. BEARS COPYRIGHT 1924, BY AARON H. GRANT [....]
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 1-5, 1927.
B	RO/FO	DATA PLOTTED RANGES FROM 1869 TO 1927. BEARS FAINT "FIG 1" RECTO. ALSO BEARS: COMMISSION ON RUN-OFF BOSTON SOCIETY OF CIVIL ENGINEERS. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO	PLAN GIVES INFO RELATIVE TO STORM OF JULY 12-14, 1897. BEARS FAINT "FIG.1" RECTO. BEARS: COMMITTEE ON RUNOFF BOSTON SOCIETY OF CIVIL ENGINEERS. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 12-14, 1927.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF NOV. 24-29, 1927.
B	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.

B	RO	NOTE STATES: MADE FROM TOPOGRAPHIC MAPS.
B	RO/TE/LM	
B	RO	
B	RO/FO/TE	PLAN GIVES MEASUREMENTS IN CUBIC FEET PER SECOND PER SQ. ML. & INCHES PER HOUR. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/FO/TE	DATA DATED NOV. 3-8, 1927.
B	RO/FO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO/FO/TE	

B	RO/FO	SHOWS DATA FROM FLOOD HYDROGRAPHS ON MERRIMACK AND PEMIGEWASSET RIVERS FOR VARIOUS FLOODS.
B	RO/SO/TE	BEARS: 884-S-1 E / 2 / STATE OF NEW HAMPSHIRE HIGHWAY DEPARTMENT FREDERICK E. EVERETTT, COMMISSIONER AND STATE ENGINEER. PENACOOK QUADRANGLE. SHOWS NORMAL RIVER LEVEL. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/FO/TE	BEARS 884-S-1 E / 2 / STATE OF NEW HAMPSHIRE HIGHWAY DEPARTMENT FREDERICK E EVERETT,COMMISSIONER AND STATE ENGINEER. PENACOOK QUADRANGLE. SHOWS RIVER LEVEL IN FLOOD. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/SO	PLAN SHOWS BOUNDARY OF DRAINAGE BASIN. POINT OF DETERMINATION OF MAXIMUM DISCHARGE DURING FLOOD OF NOV. 1927. NOTE STATES: LINES OF EQUAL RAINFALL ARE TAKEN FROM PLATE 1 OF "RAINFALL IN NEW ENGLAND DURING THE STORM OF NOV 3 & 4, 1927 [...] ON JUNE 1928.
C	FO	LOCATED IN FOLDER C-117.
B	RO/FO	
B	RO/FO	NOTE STATES THIS LINE COINCIDES WITH SHEET NO. 2 OF PLAN SHOWING LOCATION FOR PROPOSED ST. FROM KEARNEY SQUARE TO WARREN ST. TRACING FROM P.H. 095-001 AS PER CONSECUTIVE INDEX OF DRAWINGS.

B	RO/FO	
B	RO/FO	UNDATED. TRACING FROM P.H. 095-003 AS PER CONSECUTIVE INDEX OF DRAWINGS THUS, ITS DATE APPLIES.
B	RO	UNDATED. TRACING FROM P.H. 095-003 AS PER CONSECUTIVE INDEX OF DRAWINGS THUS, ITS DATE APPLIES.
B	RO/FO	NOTE STATES THAT THIS PLAN COINCIDES WITH SHEET NO. 1 OF PLAN SHOWING LOCATION FOR POROPOSED STREET FROM KEARNEY SQ. TO WARREN ST. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APRIL, 1928.
B	RO/SO/FO	
C	RO/SO/FO	THIS MAY BE SIMPLY A COPY WITH COLORED PENCIL HIGHLIGHTING OR THE COLORED PENCIL MAY REPRESENT NEW WORK BUT THE ORIGINAL PLAN IS TOO FAINT FOR COMPARISON.
B	RO/FO	"FIGURES SHOW ELEVATIONS MAY 2, 1928."

B	RO	BEARS SHEET # 1 RECTO. TRACED FROM DRAWING MADE BY J.R. WORCESTER APRIL 13, 1928.
B	RO	BEARS SHEET # 2. TRACED FROM DRAWING MADE BY J. R. WORCESTER APRIL 13, 1928.
B	RO/FO	
B	RO/FO	BEARS "FROM THE OFFICE OF JAMES C. WARNER TO ACCOMPANY REPORT OF APRIL 1920."
B	RO/FO	DRAWN BY J. R. BALDWIN, 1830. NOTE STATES: COPIED FROM AN OLD PLAN IN POSESSION OF THE MIDDLESEX COMPANY, APRIL 14 & 15, 1920, BY JAMES C. WARNER. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1830.
B	RO/FO/TE	
B	RO/FO	ATTACHED IN 4 PG. DOCUMENT. BEARS P545.
B	RO/FO/TE	ATTACHED IN 4 PG. DOCUMENT. BEARS P545. DEVELOPMENT SERVICE CORP. THOMAS, MARTIN & KIRKPATRICK. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 1928 FOR THE SET.

B	RO/FO/TE	ATTACHED IN 4 PG. DOCUMENT. BEARS P545. DEVELOPMENT SERVICE CORP. THOMAS, MARTIN & KIRKPATRICK. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 1928 FOR THE SET.
B	RO/FO/TE	ATTACHED IN 4 PG. DOCUMENT. SAMPLE ROOM FLOOR PLAN. BEARS P545. DEVELOPMENT SERVICE CORP. THOMAS, MARTIN & KIRKPATRICK. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 1928 FOR THE SET.
B	RO/FO/TE	ATTACHED IN 4 PG. DOCUMENT. SAMPLE ROOM FLOOR PLAN. BEARS P545. DEVELOPMENT SERVICE CORP. THOMAS, MARTIN & KIRKPATRICK. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 1928 FOR THE SET.
B	RO/FO	CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 1928.
B	RO/FO	DATE STAMPED VERSO. FAY, SPOFFORD & THORNDIKE.
B	RO/FO	BEARS "FILE QL-1 PLAN NO. C-2." ALSO, SHEET B. FAY, SPOFFORD & THORNDIKE.
B	RO/FO	J. B. WORCESTER. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF APR. 1928 FOR BOTH PLANS.
B	RO/FO	J. B. WORCESTER.

B	RO/FO	
B	RO/FO/SO	
B	RO/FO	BEARS "BY JAMES C. DONOVAN, JOHN A. STEVENS, ENGINEER 16 SHATTUCK ST. LOWELL, MASS.
B	RO	ALSO SHOWS SMALL PLAN OF "BUSINESS CENTRE OF LOWELL, MASS." TITLE STATES "...BY DEED OF JAN. 21, 1930." THIS IS A COPY OF PLAN 156-001. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 21, 1930.
B	RO	ALSO SHOWS SMALL PLAN OF "BUSINESS CENTRE OF LOWELL, MASS." TITLE STATES "...BY DEED OF JAN. 21, 1930." THIS IS A COPY OF PLAN 156-001. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JAN. 21, 1930. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.
B	RO	BEARS SHELF 156, RECTO, AND PARTIALLY CROSSED OUT P.H. NUMBER. ALSO SHOWS SMALL PLAN OF "BUSINESS CENTRE OF LOWELL, MASS." TITLE STATES "...BY DEED OF JAN. 21, 1930." LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS IS A COPY OF PLAN 156-001.
B	RO/FO/TE	LOCATED IN P.H. 068.

C	RO/TE	
B	RO	LOCATED IN P.H. 068.
C	RO/FO/SO	LOCATED IN P.H. 068.
C	RO/SO	LOCATED IN P.H. 068.
B	RO	LOCATED IN P.H. 068.
C	RO,TE,SO	LOCATED IN P.H. 068.

C	RO/FO/SO	LOCATED IN P.H. 068.
B	RO,FO	LOCATED IN P.H. 068. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
C	RO/TE	CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
C	RO/TE	LOCATED AFTER COMPLETION OF FORMAL INVENTORY. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/TE/LM /SO	LOCATED IN P.H. 068.
B	RO/SO/TE	LOCATED IN P.H. 068. NOTE STATES PIPE LINES NOT TO SCALE.
A		

B	RO/SO	LOCATED IN P.H. 068.
B	RO/FO/TE	LOCATED IN P.H. 068. CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE.
B	RO/FO/TE	LOCATED IN P.H. 068.
A		SAME TITLE AS PLAN 156-034. THAT PRINT MAY BE A COPY OF THIS DRAWING IF THIS IS THE ORIGINAL. CONSECUTIVE INDEX OF DRAWINGS SHOWS THIS TITLE FOR BOTH PLAN NUMBERS.
A		
B	RO/SO/FO	LOCATED IN P.H. 068. ALSO BEARS # E-24, LINED OUT, RECTO.
B	RO/SO	NOTE DIRECTS: "DO NOT SCALE: USE FIGURES ONLY." FIGURES ARE NOTED AS FOLLOWS: "A-A, B-B". BEARS # B-158, RECTO.
B	RO/TE	LOCATED IN P.H. 68. PLAN SHOWS LOCATION OF POWER CABLES. BEARS NO. 158-B CROSSED OUT RECTO.

		MAY HAVE BEEN ATTACHED TO ADDITIONAL PLANS AT ONE TIME. BEARS STAMP VERSO WHICH READS: BOARD OF TAX APPEALS
B	RO/FO	DOCKET X2453 ET AL. EXHIBIT 29 CLERK J. C.
		BEARS NOTE & STAMP VERSO WHICH READS: "1933 CASE / BOARD OF TAX APPEALS DOCKET X-2453 ET AL EXHIBIT 8F DATE 1/21/35 /
B	RO	CLERK M. G. M."
		BEARS NOTE & STAMP VERSO WHICH READS: "1933 CASE BOARD OF TAX APPEALS / DOCKET X-2453 ET AL EXHIBIT 8C DATE 1/21/35 CLERK M. G .M. LOCATED AFTER COMPLETION OF FORMAL
B	RO/FO/TE	INVENTORY."
		PLAN SHOWS 1896 FLOOD ELEVATIONS FOR NORTH & SOUTH SIDES OF RIVER. BEARS STAMP RECTO WHICH READS: "BOARD OF TAX APPEALS DOCKET 2453 ET AL EXHIBIT 26 CLERK J. C. BEARS NOTE VERSO IN GRAPHITE: 1934 TAX CASE PROP OF LOCKS & CANALS
B	RO/TE/SO	X245, #26."
		BEARS STAMP RECTO WHICH READS: "BOARD OF TAX APPEALS DOCKET 2453 ET AL EXHIBIT 25 CLERK J. C. BEARS THE SAME AS ABOVE" IN GRAPHITE VERSO. CONSECUTIVE INDEX OF DRAWINGS
B	RO/TE	GIVES NO DATE.
		BEARS STAMP RECTO WHICH READS: "BOARD OF TAX APPEALS DOCKET 2453 ET AL EXHIBIT 7 DATE 1/21/35 / CLERK M. M." BEARS
B	RO/TE	SAME INFO. AS ABOVE ,VERSO, AND "APPLETON EXHIBIT".
C	RO/TE	

B	RO/FO	DATES PLOTTED RANGE FROM 1923 TO 1937.
B	RO/FO/SO	DATES PLOTTED RANGE FROM 1923 TO 1937. BEARS STAMP RECTO & VERSO WHICH READS:"BOARD OF TAX APPEALS DOCKET 7054 EXHIBIT 9A DATE 11-19-35 CLERK J. C."
B	RO/TE/SO	BEARS STAMP WHICH READS: "BOARD OF TAX APPEALS DOCKET 7054 EXHIBIT 98 DATE 12-19-35 CLERK J. C." ALSO IN GRAPHITE VERSO,
C	RO/FO/SO /TE	
C	RO/SO	CHART SHOWS GREATEST HEIGHTS IN MARCH, APRIL OR MAY & GREATEST HEIGHTS IN OTHER NINE MONTHS. FOR PERIOD FROM 1785 THROUGH 1850.
C	RO/SO	CHART SHOWS GREATEST HEIGHTS IN MARCH, APRIL OR MAY & GREATEST HEIGHTS IN OTHER NINE MONTHS. FOR PERIOD 1848 THROUGH 1877.
C	RO/SO	CHART SHOWS GREATEST HEIGHTS IN MARCH, APRIL OR MAY & GREATEST HEIGHTS IN OTHER NINE MONTHS. FOR PERIOD 1878 THROUGH 1907.
C	RO/SO	CHART SHOWS GREATEST HEIGHTS IN MARCH, APRIL OR MAY & GREATEST HEIGHTS IN OTHER NINE MONTHS. FOR PERIOD 1908 THROUGH 1937.
C	RO/SO	CHART SHOWS GREATEST HEIGHTS IN MARCH, APRIL OR MAY & GREATEST HEIGHTS IN OTHER NINE MONTHS. FOR PERIOD 1938 THROUGH 1945.
C	RO	DATES PLOTTED RANGE FROM 1886 TO 1895.

C	RO	DATES PLOTTED RANGE FROM 1896 TO 1905.
C	RO	DATES PLOTTED RANGE FROM 1906 TO 1915.
C	RO	DATES PLOTTED RANGE FROM 1916 TO 1925.
C	RO	DATES PLOTTED RANGE FROM 1926 TO 1935.
C	RO/SO	DATES PLOTTED RANGE FROM 1936 TO 1944.
C	RO	DATES RANGE FROM 1937 TO 1943.
C	RO	DATES RANGE FROM 1930 TO 1936.
C	RO	DATES RANGE FROM 1923 TO 1929.
C	RO	DATES RANGE FROM 1916 TO 1922.
C	RO	DATES RANGE FROM 1909 TO 1915.

C	RO	DATES RANGE FROM 1902 TO 1908.
C	RO	DATES RANGE FROM 1895 TO 1901.
C	RO	DATES RANGE FROM 1888 TO 1894.
C	RO	DATES RANGE FROM 1881 TO 1887.
C	RO	DATES PLOTTED RANGE FROM 1928 TO 1941.
C	RO/SO	DATES PLOTTED RANGE FROM 1914 TO 1927.
C	RO	DATES PLOTTED RANGE FROM 1900 TO 1913.
C	RO	DATES PLOTTED RANGE FROM 1886 TO 1899.

C	RO	DATES RANGE FROM 1937 TO 1942.
C	RO	DATES RANGE FROM 1930 TO 1936.
C	RO	DATES RANGE FROM 1923 TO 1929.
C	RO	DATES RANGE FROM 1916 TO 1922.
C	RO	DATES RANGE FROM 1909 TO 1915.
C	RO	DATES RANGE FROM 1902 TO 1908.
C	RO	DATES RANGE FROM 1895 TO 1901.
C	RO	DATES RANGE FROM 1888 TO 1894.
C	RO/ST	DATES RANGE FROM 1929 TO 1938.

C	RO/ST	DATES RANGE FROM 1939 TO 1944.
C	RO/SO	DATES RANGE FROM 1940 TO 1943.
C	RO	DATES RANGE FROM 1916 TO 1922.
C	SO/RO	DATES RANGE FROM 1909 TO 1915.
C	RO	DATES RANGE FROM 1902 TO 1908.
C	ROFO/SO	BEARS: DRAINAGE AREA = 4463 SQ. MILES MARCH 1944. DATES PLOTTED RANGE FROM 1785 TO 1893.
C	RO	DATES RANGE FROM 1927 TO 1936.
C	RO	DATES RANGE FROM 1937 TO 1944.
C	RO/SO	DATES RANGE FROM 1929 TO 1938.
C	RO	
C	RO	
C	RO/SO	
C	RO/TE	DISCHARGE IN THOUSAND C.F.P.S.

C	RO	BEARS NOTE: DATA TAKEN FROM DOC. NO. 689 75TH CONGRESS-3D. SESSION HOUSE OF REPRESENTATIVES MAY 18, 1938.TABLE 15-PAGE 25.
C	RO/TE/SO	
C	RO/TE/SO	
C	RO/FO	
C	RO/FO/TE	
C	RO/TE/SO	DATES PLOTTED RANGE FROM 1888 TO 1944.
C	RO/SO	ARTICLE ENTITLED: "N. H. DAM FIRST LINK IN FLOOD CONTROL RESERVOIR FOR MERRIMACK RIVER BASIN FRANKLIN FALLS UNIT DEDICATED TODAY;ESTIMATED COST $7,783,000. ARTICLE FROM LOWELL FRI., OCT. 22, 1943.

C	RO/SO	IMAGE IS REVERSED. PHOTO & SHORT WRITE UP. COULD BE NEWSPAPER ARTICLE OR REPORT. "ARMY PHOTOS". ARTICLE READS: WATERS OF THE PEMIGEWASSET RIVER AT FRANKLIN, N.H., FLOWED TODAY FOR THE FIRST TIME THROUGH GATES AT A FLOOD CONTROL SYSTEM [....]
C	RO/FO/SO	BEARS CLIMATOLOGICAL REPORT NEW ENGLAND STATION DATED YEAR 1943 VERSO.
C	RO/FO	
C	RO	
C	RO/FO	
C	RO	BEARS NOTE: DATA FROM U.S. DEPT. OF COMMERCE WEATHER BUREAU BULLETINS NEW ENGLAND SECTION. GOODNOUGHS REPORT ON RAINFALL IN NEW ENGLAND. N.E. WATER WORKS VOL.XLIV NO.2. RECORDS UP TO SEPTEMBER 1945.
C	RO	BEARS NOTE: DATA FROM U.S. DEPT. OF COMMERCE WEATHER BUREAU BULLETINS NEW ENGLAND SECTION GOODNOUGH'S REPORT ON RAINFALL IN NEW ENGLAND. N.E. WATERWORKS VOL. XLIV NO.2. RECORDS UP TO SEPTEMBER 1945. PHOTO NEGATIVE IMAGE IS NOT REVERSED.
C	RO/SO	DATES PLOTTED RANGE FROM 1906 TO 1942.

C	RO/TE	DATES PLOTTED RANGE FROM 1903 TO 1942.
C	RO	DATES PLOTTED RANGE FROM 1880-1923. SEE ALSO P.H. 098-033-[B].
C	RO/TE	DATES PLOTTED RANGE FROM 1924 TO 1943. SEE ALSO P.H. 098-033-[A].
C	RO/TE	
C	RO/TE	
B		PLAN ALSO SHOWS PROPERTY ABOUT GATE HOUSE OF WAMESIT CANAL BELONGING TO WAMESIT POWER CO. & ICEWAY FROM WAMESIT CANAL TO HALES BROOK.
A		INDEX CARD STATES FOR LOCATION: "OVER THE DOOR IN LOWER VAULT."

A	INDEX CARD STATES FOR LOCATION: "OVER THE DOOR IN LOWER VAULT."

LCTOPIC	OTHER NOS	LOCATION
SMALL ORIGINALS		UNCONSERVED FOLDER 2 OF 6
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
HYDRO WHEELS - MISCELLANEOUS		
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY HYDRO WHEELS - MISCELLANEOUS	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET HYDRO WHEELS - MISCELLANEOUS TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY HYDRO WHEELS - MISCELLANEOUS	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY HYDRO WHEELS - MISCELLANEOUS		
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY HYDRO WHEELS - MISCELLANEOUS	9349	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY HYDRO WHEELS - MISCELLANEOUS		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET HYDRO WHEELS - MISCELLANEOUS		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	1228-8	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
HYDRO WHEELS - MISCELLANEOUS		ASSETS REALIZATION PLANS FILE, DRAWER 12, FOLDER 1 OF 1
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	I-J-14	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

ELECTRICITY	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY	H-1278-0	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2

ELECTRICITY	R-4427	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 1	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 2	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 3	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 4	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 5	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 6	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 7	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 9	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H -10	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H -11	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H -12	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H -13	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	65-9 H -14	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H -15	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - L - 1	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS & PRINTS-ASSETS-200 MARKET ST.		ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS-ASSETS-200 MARKET ST.		ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST. S.D.CO 2-7.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	SK-482-2-2 & 3-52-432	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	F-267	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	PRINT NO. 2D	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	
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TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
ELECTRICITY		
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		
ELECTRICITY		
ELECTRICITY	F-157	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb-147	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb-123, G.E.# P-1153090	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2

ELECTRICITY	Fb-122, G.E. # P-893977	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb-117, G.E. # P-893022	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-169	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	979-5	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F.B. 12, S-95	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2

ELECTRICITY	328-5	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	2595	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-176	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-154, 368-3	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
BUILDINGS		ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1
BUILDINGS		ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1
BUILDINGS		ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1
BUILDINGS	462-9	ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1
BUILDINGS		ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS	P.L.& C. # P.H.-88-1	ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1

POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS	FP-1	ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS	SHELF 158, NO. 26	ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS	9328	ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1

RESERVOIR	65-158	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	207	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	156-42-29	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2

RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	9320	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
HYDRO WHEELS		
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HYDRO WHEELS		ASSETS REALIZATION PLANS FILE, DRAWER 11, FOLDER 1 OF 1
HYDRO WHEELS		
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HYDRO WHEELS	135-14-SHEET 1	ASSETS REALIZATION PLANS FILE, DRAWER 11, FOLDER 1 OF 1
HYDRO WHEELS		
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HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS	442	ASSETS REALIZATION PLANS FILE, DRAWER 12, FOLDER 1 OF 1
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS	F.B. 6	ASSETS REALIZATION PLANS FILE, DRAWER 12, FOLDER 1 OF 1
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
HYDRO WHEELS - MISCELLANEOUS		
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS & PRINTS-ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS-ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS-ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS-ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS-ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST. D-502-34	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1

TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS & PRINTS- ASSETS-200 MARKET ST.	ASSETS REALIZATION PLANS FILE, DRAWER 1, FOLDER 1 OF 1
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	S-2	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	S-7	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	S-8	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	S-4	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	S-5	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	S-3	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	B-1	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	B-2	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	P L & C # 135-035 - [B]	P. L. & C. UNCONSERVED FOLDER 9 OF 10
TRACINGS - FOOT OF JOHN STREET		P. L. & C. UNCONSERVED FOLDER 9 OF 10
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	552, DRAWER NO. 1	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	B-3	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	P.L.& C. # 153-098.	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2

TRACINGS - FOOT OF JOHN STREET	P.L.& C. # 153-098.	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET	S-1	ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 2 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 2, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET	1140-2	ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET	1140-2	ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET	A 20	ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.

TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET	PS-1	ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET	S - 8	ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET	S - 7	ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2.
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE DRAWER 2, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 3A	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	65-9 H - 5A	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	65-9 H - 8A	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	M-57, M-12	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 1 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2

TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
TRACINGS - 95 BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 3, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	
PRINTS - BRIDGE STREET S-62	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET		
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	COPY OF PL&C 158-222	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	M-70	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	A 4419 - 4	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	B-785, P-590	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	M-568	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-10-1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-10-1-COPY 1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	FC-10-2	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-10-2- COPY 1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-10-3	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-10-4	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-10-4- COPY 1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-21	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	FC-22	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-114	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-146	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-243	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-244	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-256	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-257	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	FC-258	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-264	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-266	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-281-1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-281-1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-281-2	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-281-3	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-281-4	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	FC-310	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-282	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-1	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-2	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-3	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-4	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-5	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-6	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	SHEET - F-7	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-8	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-9	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-10	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-11	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-12	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - F-13	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - P-1/ ORDER # 27-3215	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	SHEET - P-2 / ORDER # 27-3215	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2

PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET	FC-136	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 1 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	N-32599	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	N-32599	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	N-32599	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	N-32599	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	LAH-777-0	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	1522-B	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	544	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET		ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2

PRINTS - BRIDGE STREET	ASSETS REALIZATION PLANS FILE, DRAWER 4, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	432-5	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-20	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-21	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-22	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-23	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-24	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET	368-25	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREE	368-27	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREE	368-28	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-29	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	F-169	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-18	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET	368-18	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
TRACINGS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	153-158	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	153-158	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	153-158	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	153-158	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		
PRINTS - FOOT OF JOHN STREET	368-30	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	T-6357307	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	K-6470155	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	T-6339488	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	F-158, 368-5	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-5	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-6	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	368-4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	COPY OF PL&C 153-107	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	COPY OF PL&C 153-122	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	135-17A	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	COPY OF PL&C PH 91, 038	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET	COPY OF PL&C PH 91, 013, F-300	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2
PRINTS - FOOT OF JOHN STREET		
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 1 OF 2

PRINTS - FOOT OF JOHN STREET		
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	454-28-9	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	368-11	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	368-14	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET	368-15	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	368-16	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	S-5	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	S-4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	S-3	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	B-27	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	FC-296	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET	K-9519-A	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	K-9519-A	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	515-28-1	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	515-28-1	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	3642	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	1291-4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	1292-4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	1289-2	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	S - 7	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET	4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	3	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	1	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	2	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	5	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	6	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET	4	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	3	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	1	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	2	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	5	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	6	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET	S - 6	ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2

PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
PRINTS - FOOT OF JOHN STREET		ASSETS REALIZATION PLANS FILE, DRAWER 5, FOLDER 2 OF 2
ELECTRICITY	F-178	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-165	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-159	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-167	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-159	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb- 138	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb- 144	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb-120, G.E.# P-894538	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2

ELECTRICITY	Fb-125, G.E.# P-894538	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	Fb-121, G.E. # P-893985	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	G-131004	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	H-153672	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-158, 368-6	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-158, 368-6	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-168	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-175	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-160	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	F-164	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY	F-161	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2

ELECTRICITY	F-164	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 1 OF 2
ELECTRICITY	158-181	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY	158-181	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2

ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY		ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY	1219-5	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
ELECTRICITY	1219-5	ASSETS REALIZATION PLANS FILE, DRAWER 6, FOLDER 2 OF 2
BUILDINGS		ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1
BUILDINGS		ASSETS REALIZATION PLANS FILE, DRAWER 7, FOLDER 1 OF 1

POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
POWER & SHOPS		ASSETS REALIZATION PLANS FILE, DRAWER 8, FOLDER 1 OF 1
RESERVOIR	138-11	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	138-11	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2

RESERVOIR	138-11	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	138-11	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2

RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	158-196	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	158-196	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	158-22	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR	158-22	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 1 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2

RESERVOIR	8602	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	8602	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	C-5	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	C-5	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	C-8	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	C-8	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	4359	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	4359	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2

RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	P - 1	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	P - 1	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	P - 1	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2

RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	L - 3	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR		ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2

RESERVOIR	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
RESERVOIR	ASSETS REALIZATION PLANS FILE, DRAWER 9, FOLDER 2 OF 2
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	

REAL ESTATE	7549-B	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		
REAL ESTATE		
REAL ESTATE		
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	1036-J	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	19-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	19-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	18-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	18-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	17-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	17-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	16-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	16-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	15-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	15-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	14-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	14-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	13-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	13-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	12-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	12-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	11-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	4010	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	4-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	4-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	2-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	2-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	5-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	5-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	3-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	3-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	10-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	10-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	9-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	9-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	8-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	8-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	7-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	7-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	6-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	6-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	19-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	18-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	17-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	16-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	15-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	14-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	13-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	12-37	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	1-137	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	4010, 10	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	4-137, 11	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	2-137, 12	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	5-137, 13	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	3-37, 14	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	10-37, 15	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	9-37, 16	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	8-137, 17	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	7-137, 18	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	6-137, 19	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	C-118	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	14-73-1	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	14-73-1	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		
REAL ESTATE		
REAL ESTATE	66227	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	164-90	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	1066-924-172	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	M-68	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 1 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	B 0-303	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	G 0-303	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	H 0-303	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	I 0-303	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	1676-127	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	134-159	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE	
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REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	7494	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	7494	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	7494	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE	7494	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	7494	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE	E-336-1	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	E-336-2	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	E-336-3	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	E-336-4	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	E-336-5	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	A-1 3095	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	L-1, 2424	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	S-1, 3095	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	S-2, 3095	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	F-1, 3095	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	P.L.& C. # P.H.-88-1	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	C-142 NO. 15	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	PH. 88	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE	PH. 88 #1	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 2 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3

REAL ESTATE	1 OF 3.	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	2 OF 3.	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	3 OF 3.	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	1 OF 2, L - 15-23	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	1 OF 2, L - 15-23	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	SHEET 1	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3

REAL ESTATE	SHEET 2	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	SHEET 3	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	SHEET 4	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3

REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	L-1 - 2370	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	L-2 - 2370	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	L-2 - 2370	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	L-3 - 2370	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3

REAL ESTATE	L-4 - 2370	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	L-5 - 2370	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
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REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	32685/H/17589	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3

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REAL ESTATE	PLAN 2	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	PLAN 3	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	PLAN 4	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	PLAN 5	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	PLAN 6	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	PLAN 7	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE	PLAN 8	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3

REAL ESTATE	PLAN 9	ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
REAL ESTATE		ASSETS REALIZATION PLANS FILE, DRAWER 10, FOLDER 3 OF 3
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HYDRO WHEELS - MISCELLANEOUS		

HYDRO WHEELS - MISCELLANEOUS	298	ASSETS REALIZATION PLANS FILE, DRAWER 12, FOLDER 1 OF 1
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LAND PLANS	UNCONSERVED FOLDER 3 OF 10
LAND PLANS	UNCONSERVED FOLDER 4 OF 10

LAND PLANS		UNCONSERVED FOLDER 3 OF 10
LAND PLANS		UNCONSERVED FOLDER 4 OF 10
LAND PLANS		UNCONSERVED FOLDER 5 OF 10
LAND PLANS		UNCONSERVED FOLDER 1 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10
BEARS NOS. 11-4 & 94 RECTO.	LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10

LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 6 OF 10
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 10
LAND PLANS	UNCONSERVED FOLDER 4 OF 10
LAND PLANS	UNCONSERVED FOLDER 4 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 3 OF 10

LAND PLANS	UNCONSERVED FOLDER 4 OF 10
LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 4 OF 10
LAND PLANS	UNCONSERVED FOLDER 4 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10

LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 4 OF 10

		UNCONSERVED FOLDER 3
LAND PLANS		OF 10
		UNCONSERVED FOLDER 4
LAND PLANS		OF 10
BEARS NOS 118 & 5-10. PLAN SHOWS ADDITIONS MADE MARCH 1,1882.	LAND PLANS	UNCONSERVED FOLDER 6 OF 10
		UNCONSERVED FOLDER 6
LAND PLANS		OF 10
		UNCONSERVED FOLDER 1
LAND PLANS		OF 10
		UNCONSERVED FOLDER 1
LAND PLANS		OF 10
		UNCONSERVED FOLDER 1
LAND PLANS		OF 10

BEARS NO. 5-14 RECTO. BEARS SURVEY NOTES DATED 1877 & 1890.	LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10
LAND PLANS		UNCONSERVED FOLDER 1 OF 10
LAND PLANS		UNCONSERVED FOLDER 1 OF 10
LAND PLANS		UNCONSERVED FOLDER 1 OF 10
LAND PLANS		UNCONSERVED FOLDER 1 OF 10
LAND PLANS		UNCONSERVED FOLDER 1 OF 10
LAND PLANS		UNCONSERVED FOLDER 6 OF 10

PLAN SHOWS AREA IN VICINITY OF SWAMP LOCKS DAM. PLAN ALSO SHOWS R. R., PAWTUCKET, MERRIMACK & HAMILTON CANALS, & LINE OF [HAMILTON] CANAL AFTER ALTERATION. BEARS NO. 97 RECTO.	LAND PLANS	UNCONSERVED FOLDER 6 OF 10
	LAND PLANS	UNCONSERVED FOLDER 6 OF 10
	LAND PLANS	UNCONSERVED FOLDER 1 OF 10
	LAND PLANS	UNCONSERVED FOLDER 1 OF 10
	LAND PLANS	UNCONSERVED FOLDER 6 OF 10
	LAND PLANS	UNCONSERVED FOLDER 6 OF 10

LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
LAND PLANS	UNCONSERVED FOLDER 6 OF 10
LAND PLANS	UNCONSERVED FOLDER 1 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10

ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10

ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10
ELECTRIC INTERCONNECTION	UNCONSERVED FOLDER 5 OF 10

ELECTRIC INTERCONNECTION		UNCONSERVED FOLDER 5 OF 10
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
AREA SOUTH OF FRENCH STREET BORDERED BY BRIDGE & ANNE ST. THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6

THIS PLAN NO USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA NORTH OF MARKET ST. & WEST OF DUTTON ST. THIS	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
SURPLUS POWER STATION PLANS PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. AREA BORDERED BY LEWIS, MECHANIC & DUTTON STS.	LAND PLANS	UNCONSERVED FOLDER 4 OF 6 UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BORDERED BY CABOT, MERRIMACK & TILDEN STREETS. THIS PLAN NO. USED TWICE BY P.L.& C.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3

SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA IN VICINITY OF WESTERN CANAL.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6

THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BETWEEN MERRIMACK, CABOT AND CLARK STS.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
THIS PLAN NO. USED TWICE BY P.L.& C. AREA NORTH OF WILLIE ST. FOUND STORED IN COPPER TUBE WITH PADLOCK.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3

SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA WEST OF ADAMS ST.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3
SURPLUS POWER STATION PLANS		
SURPLUS POWER STATION PLANS PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. AREA NORTHWEST OF DUTTON ST.	LAND PLANS	UNCONSERVED FOLDER 4 OF 6 UNCONSERVED FOLDER LAND PLANS 1 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 1 OF 3

SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
THIS PLAN NO.USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA NORTH OF MIDDLESEX ST.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN WEST OF DUTTON ST.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6

PLAN SHOWS AREA BETWEEN APPLETON AND HAMILTON CANALS. THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 3 OF 6
THIS PLAN NO. WAS USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA WEST OF CENTRAL ST. & BORDERED BY JACKSON ST. ON THE NORTHERLY BORDER.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3
THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA SOUTH OF MIDDLESEX ST.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3

		UNCONSERVED FOLDER
LAND PLANS		LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 1 OF 6
THIS PLAN NO. USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA IN VICINITY OF MERRIMACK AND CONCORD RIVER JUNCTION.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3

STORED IN COPPER TUBE WITH PADLOCK. SHOWS AREA BETWEEN APPLETON & HAMILTON CANAL WEST OF TILDEN ST. BORDERED BY SUFFOLK MFG. CO. & TREMONT MILLS ON NORTH.THIS IS THE ORIGINAL PLAN, OF WHICH 136-017-[02] IS A COPY.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3
FOUND WITH 136-017-[01]. SHOWS AREA BET. APPLETON & HAMILTON CANAL WEST OF TILDEN. BORDERED BY SUFFOLK & TREMONT MILLS ON NORTH. NOTE READS: "THE ORIGINAL PLAN NO. 17 WAS LOST IN 1879 OR 1880." PLAN 136-017-[01] IS THAT ORIGINAL; ITS DATE APPLIES.	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 2 OF 3
PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN IN VICINITY OF NORTHERN CANAL. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3

		UNCONSERVED FOLDER
LAND PLANS		LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN SOUTH OF DUTTON ST., BORDERED BY APPLETON ST. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".		UNCONSERVED FOLDER 5 OF 6
	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
		UNCONSERVED FOLDER
LAND PLANS		LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA SOUTH OF ROCK ST. & PAWTUCKET ST. BEARS "2-3-4-5-20-23" IN GRAPHITE RECTO. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".		UNCONSERVED FOLDER 3 OF 6
	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3

		UNCONSERVED FOLDER
LAND PLANS		LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BETWEEN FLETCHER & MECHANIC ST. & BORDERED BY PAWTUCKET CANAL. PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".		UNCONSERVED FOLDER 3 OF 6
	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 2 OF 3
		UNCONSERVED FOLDER
LAND PLANS		LAND PLANS 2 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6

PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BORDERED BY COOLIDGE HALL & TILDEN STS, & NORTHERN CANAL. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA SOUTH OF MERRIMACK RIVER & BORDERED BY BRIDGE ST. ON WEST SIDE. BEARS LIGHT "74" IN GRAPHITE RECTO. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3

SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN SHOWS AREA WEST OF WARREN ST. ALSO DEPICTS VARIOUS MILLS & DATES OF INDENTURE. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 6 OF 6

PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA BETWEEN THORNDIKE & CENTRAL ST. SHOWS JUNCTION OF PAWTUCKET, WESTERN, & HAMILTON CANAL. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
SURPLUS POWER STATION PLANS		
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6

PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. AREA EAST OF VARNUM AVE. & RIVERSIDE ST. SHOWS BRANCHING OF MERRIMACK RIVER & NORTHERN CANAL. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS AREA BETWEEN RIVERSIDE ST. AND MERRIMACK RIVER. STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED"	LAND PLANS	UNCONSERVED FOLDER 4 OF 6 UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 6 OF 6

SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
AREA WEST OF RIVER ST. BEARS :"89-88-87". STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED"	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 6 OF 6
AREA NORTH OF MERRIMACK RIVER & EAST OF BRIDGE ST. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3

SURPLUS POWER
STATION PLANS

SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 1 OF 6
AREA WEST OF WALKER & EAST OF WILLIE ST. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. WAS USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 1 OF 6

AREA SOUTH OF FIRST ST. THIS PLAN NO USED TWICE BY P.L.& C. PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED".	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 4 OF 6
PLAN FOUND STORED IN COPPER TUBE WITH PADLOCK. PLAN SOUTH OF DUTTON ST. BORDERED BY APPLETON ST. THIS PLAN NO. USED TWICE BY P.L.& C. P.L.& C. INDEX CARD NOTES THAT SHELF 136 LAND PLANS ARE "NOT INDEXED"	LAND PLANS	UNCONSERVED FOLDER LAND PLANS 3 OF 3
LAND PLANS		UNCONSERVED FOLDER LAND PLANS 3 OF 3
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS		UNCONSERVED FOLDER 5 OF 6

SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 5 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 3 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 3 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 4 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6

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SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
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SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 3 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 6 OF 6
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SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 2 OF 6
SURPLUS POWER STATION PLANS	UNCONSERVED FOLDER 1 OF 6
LAND PLANS	OVERSIZE UNCONSERVED FOLDER 1 OF 1
LAND PLANS	OVERSIZE UNCONSERVED FOLDER 1 OF 1
LAND PLANS	OVERSIZE UNCONSERVED FOLDER 1 OF 1
LAND PLANS	OVERSIZE UNCONSERVED FOLDER 1 OF 1
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NORTHERN CANAL
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CANALS	UNCONSERVED FOLDER 1 OF 4
CANALS	UNCONSERVED FOLDER 3 OF 4
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CANALS	UNCONSERVED FOLDER 1 OF 4
CANALS	UNCONSERVED FOLDER 2 OF 4
CANALS	UNCONSERVED FOLDER 1 OF 4

CANALS	UNCONSERVED FOLDER 3 OF 4
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CANALS	UNCONSERVED FOLDER 3 OF 4
NORTHERN CANAL RENEWAL AREA	
NORTHERN CANAL RENEWAL AREA	
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 1 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4

CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 4 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	

CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4
CANALS, SLOPES & BOOMS	
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 1 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 4 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 3 OF 4
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 1 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 4 OF 4
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 1 OF 4

CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 2 OF 4
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 4 OF 4
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CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 4 OF 4
CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 4 OF 4
CANALS, SLOPES & BOOMS NORTHERN CANAL RENEWAL AREA	UNCONSERVED FOLDER 2 OF 4

CANALS, SLOPES & BOOMS	UNCONSERVED FOLDER 1 OF 4
CANAL SECTIONS	UNCONSERVED FOLDER 1 OF 2
CANAL SECTIONS	UNCONSERVED FOLDER 1 OF 2
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CANAL SECTIONS	UNCONSERVED FOLDER 2 OF 2
CANAL SECTIONS	UNCONSERVED FOLDER 2 OF 2
CANALS & SWAMP LOCKS	UNCONSERVED FOLDER 1 OF 5
CANALS & SWAMP LOCKS	UNCONSERVED FOLDER 1 OF 5
CANALS & SWAMP LOCKS	UNCONSERVED FOLDER 5 OF 5
CANALS & SWAMP LOCKS	UNCONSERVED FOLDER 1 OF 5

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1936 FLOOD	UNCONSERVED FOLDER 1 OF 6

1936 FLOOD	UNCONSERVED FOLDER 3 OF 6
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1936 FLOOD	UNCONSERVED FOLDER 2 OF 6
1936 FLOOD	UNCONSERVED FOLDER 4 OF 6
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 2 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 2 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 2 OF 5

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MERRIMACK MFG. CO.	UNCONSERVED FOLDER 4 OF 5

MERRIMACK MFG. CO.	UNCONSERVED FOLDER 5 OF 5
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MERRIMACK MFG. CO.	UNCONSERVED FOLDER 1 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 5 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 5 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 4 OF 5

MERRIMACK MFG. CO.	UNCONSERVED FOLDER 5 OF 5
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MERRIMACK MFG. CO.	UNCONSERVED FOLDER 1 OF 5

MERRIMACK MFG. CO.	FOLDERED WITH AND ATTACHED TO PLAN 136-039
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 1 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 1 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 2 OF 5
MERRIMACK MFG. CO.	UNCONSERVED FOLDER 2 OF 5
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HAMILTON MFG. CO.	UNCONSERVED FOLDER 2 OF 7
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HAMILTON MFG. CO.	UNCONSERVED FOLDER 2 OF 7
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
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APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
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APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	OVERSIZE CONSERVED
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 4 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
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APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
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APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5

APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5

APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5

APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 5 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5

APPLETON MFG. CO.	UNCONSERVED FOLDER 3 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 5
APPLETON MFG. CO.	UNCONSERVED FOLDER 2 OF 5
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4

COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4

COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
	UNCONSERVED FOLDER 4 OF 4
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	UNCONSERVED FOLDER 4 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4

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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	

COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 4 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	
COLUMBIA TEXTILE & IPSWICH CO.	
COLUMBIA TEXTILE & IPSWICH CO.	
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4

COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 4 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 2 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 3 OF 4
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COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 4 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 1 OF 4
COLUMBIA TEXTILE & IPSWICH CO.	UNCONSERVED FOLDER 4 OF 4
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 9 OF 9

SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 9 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 9 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9

SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 5 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 5 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 6 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 6 OF 9
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SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 5 OF 9
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SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 3 OF 9

SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 6 OF 9
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SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 9 OF 9
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UNCONSERVED FOLDER 4
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UNCONSERVED FOLDER 4
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SACO-LOWELL &
TREMONT & SUFFOLK

SACO-LOWELL &
TREMONT & SUFFOLK

UNCONSERVED FOLDER 5
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SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 5 OF 9
SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 1 OF 9
SACO-LOWELL & TREMONT & SUFFLOK	UNCONSERVED FOLDER 1 OF 9
SAC0-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 1 OF 9

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TREMONT & SUFFOLK

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SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
WESTERN CANAL BEAUTIFICATION	
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SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9

SACO-LOWELL & TREMONT & SUFFOLK	UNCONSERVED FOLDER 8 OF 9
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LAWRENCE MFG. CO.

WESTERN CANAL
BEAUTIFICATION

WESTERN CANAL
BEAUTIFICATION

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WESTERN CANAL BEAUTIFICATION	33040-Z-11803	ASSETS REALIZATION PLANS FILE, DRAWER 15
WESTERN CANAL BEAUTIFICATION	33040-Z-11803	ASSETS REALIZATION PLANS FILE, DRAWER 15

WESTERN CANAL BEAUTIFICATION	ASSETS REALIZATION PLANS FILE, DRAWER 15
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 4 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6

WESTERN CANAL BEAUTIFICATION

MASSACHUSETTS COTTON MILLS	CONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS	CONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6
MASSACHUSETTS COTTON MILLS	CONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	CONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	CONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	OVERSIZE CONSERVED
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 4 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
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MASSACHUSETTS COTTON MILLS — UNCONSERVED FOLDER 1 OF 6

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MASSACHUSETTS COTTON MILLS — UNCONSERVED FOLDER 2 OF 6

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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 6 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
WESTERN CANAL BEAUTIFICATION	
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 4 0F 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 4 OF 6

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 4 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 3 OF 6
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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 4 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 5 OF 6
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	ASSETS REALIZATION PLANS FILE, DRAWER 15
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	
WESTERN CANAL BEAUTIFICATION	

WESTERN CANAL BEAUTIFICATION	ASSETS REALIZATION PLANS FILE, DRAWER 15
BOOTT COTTON MILLS	UNCONSERVED FOLDER 6 OF 7
BOOTT COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	UNCONSERVED FOLDER 5 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 5 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 5 OF 7
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BOOTT COTTON MILLS	UNCONSERVED FOLDER 4 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 4 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 4 OF 7
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BOOTT COTTON MILLS	UNCONSERVED FOLDER 4 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 7 OF 7

BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 7
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BOOTT COTTON MILLS	UNCONSERVED FOLDER 6 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 3 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 5 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 6 OF 7

BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 7
WATER WHEEL DISCHARGE DIAGRAMS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 6 OF 7
BOOTT COTTON MILLS	UNCONSERVED FOLDER 6 OF 7
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BOOTT COTTON MILLS	UNCONSERVED FOLDER 6 OF 7
MERRIMACK RIVER	UNCONSERVED FOLDER 5 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12

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MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
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MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039
MERRIMACK RIVER	UNCONSERVED FOLDER 6 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 5 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039

MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 6 OF 12
MISCELLANEOUS	UNCONSERVED 162-[127] FOLDER 11 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 11 OF 12 SHELF 162
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 8 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
MERRIMACK RIVER	
MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
MERRIMACK RIVER	
MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 8 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 4 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 11 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 12 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 11 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 11 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039
MERRIMACK RIVER	BOUND WITH PLAN NO. 136-039
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
1936 FLOOD	UNCONSERVED FOLDER 12 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 7 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 8 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 11 OF 12

MERRIMACK RIVER	UNCONSERVED FOLDER 9 OF 12
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MERRIMACK RIVER	UNCONSERVED FOLDER 8 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 8 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	UNCONSERVED FOLDER 10 OF 12
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	UNCONSERVED FOLDER 8 OF 12

SMALL ORIGINALS	UNCONSERVED FOLDER 1 OF 6
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SMALL ORIGINALS	UNCONSERVED FOLDER 2 OF 6
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 3 OF 8
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 4 OF 8

OLD MILL YARD PLANS	UNCONSERVED FOLDER 4 OF 8
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 4 OF 8
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 4 OF 8
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LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 5 OF 8
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 8 OF 8
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	ROLLED STORAGE
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	ROLLED STORAGE
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	ROLLED STORAGE
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	ROLLED STORAGE
LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 8 OF 8

LOWELL INDUSTRIAL DEVELOPMENT COMPANY	UNCONSERVED FOLDER 1 OF 8
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LOWELL INDUSTRIAL DEVELOPMENT COMPANY	ROLLED STORAGE
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 1 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 1 OF 9
RERSERVOIR & PIPE LINES	UNCONSERVED FOLDER 8 OF 9
RERSERVOIR & PIPE LINES	UNCONSERVED FOLDER 8 OF 9
RERSERVOIR & PIPE LINES	UNCONSERVED FOLDER 1 OF 9
RERSERVOIR & PIPE LINES	UNCONSERVED FOLDER 7 OF 9
RERSERVOIR & PIPE LINES	UNCONSERVED FOLDER 7 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 8 OF 9

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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 8 OF 9
RERSERVOIR & PIPE LINES	UNCONSERVED FOLDER 1 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9

RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 7 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 7 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	NOT LOCATED
RESERVOIR & PIPE LINES	NOT LOCATED
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 9 OF 9

RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 9 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 8 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 7 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9

RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 5 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 3 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 3 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 8 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 9 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 2 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 6 OF 9
RESERVOIR PLANS	
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 2 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 2 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 3 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 2 OF 9
RESERVOIR & PIPE LINES	
RESERVOIR & PIPE LINES	

RESERVOIR & PIPE LINES	UNCONSERVED BOX IN MAP CASE DRAWER
RESERVOIR & PIPE LINES	UNCONSERVED BOX IN MAP CASE DRAWER
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 9 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 3 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 5 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 5 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 2 OF 9

RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 1 OF 9
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RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9

RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9

RESERVOIR & PIPE LINES	UNCONSERVED FOLDER 4 OF 9
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 1 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 1 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 1 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 3 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED 162-[127] FOLDER 11 OF 12

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 1 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 1 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 4 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 1 OF 4

CANAL SYSTEM & PARTS,
ALSO FENCES

UNCONSERVED FOLDER 1
OF 4

CANAL SYSTEM & PARTS,
ALSO FENCES

UNCONSERVED FOLDER 4
OF 4

CANAL SYSTEM & PARTS,
ALSO FENCES

UNCONSERVED FOLDER 3
OF 4

CANAL SYSTEM & PARTS,
ALSO FENCES

CANAL SYSTEM & PARTS,
ALSO FENCES

UNCONSERVED FOLDER 4
OF 4

CANAL SYSTEM & PARTS, ALSO FENCES	UNCONSERVED FOLDER 2 OF 4
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GAETS & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 2 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 3 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 3 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 3 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 3 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 3 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 4 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 4 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 4 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 4 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	

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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
MISCELLANEOUS	UNCONSERVED 162-[127] FOLDER 11 OF 12
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 1 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 5 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 1 OF 6
HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 6
MISCELLANEOUS	UNCONSERVED FOLDER 1 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 11 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12

MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12
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MISCELLANEOUS	UNCONSERVED FOLDER 1 OF 12
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HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 12

HEAD GATES, GUARD GATES & DAMS	UNCONSERVED FOLDER 6 OF 12
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MISCELLANEOUS	10 OF 12

MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 11 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 10 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 10 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 10 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 12 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 1 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 1 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 1 OF 12
SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I]. MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12

SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
LOCATED IN FOLDER WITH 9 OTHER PLANS PERTAINING TO LOWELL MACHINE SHOP. SEE ALSO PLAN NOS. 162-123 THRU 162-123-[H].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
BEARS NO. 1 RECTO. SEE ALSO PLAN NOS. 162-123-[A] THRU [I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
BEARS NO. 2 RECTO. SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
BEARS NO. 3 RECTO. SEE ALSO PLAN NO. 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12

MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
SEE ALSO PLAN NOS. 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
BEARS NO. 1 RECTO. SEE ALSO PLAN NOS 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
BEARS NO. 7 RECTO. SEE PLAN NOS 162-123 THRU 162-123-[I].	MISCELLANEOUS	UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 9 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 1 OF 12
MISCELLANEOUS		UNCONSERVED FOLDER 2 OF 12

MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2

MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2

MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
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MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
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MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2

MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 2 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
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MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
MISCELLANEOUS WATER MEASUREMENTS	UNCONSERVED FOLDER 1 OF 2
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 5 OF 6

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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 3 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 3 OF 6

BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 3 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 3 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 5 OF 6

BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 2 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6

BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 6 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 6 OF 6

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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6

BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 5 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 5 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 5 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 3 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6

BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 3 OF 6
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BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 1 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 6 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 6 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6

BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
BRIDGES & CONCORD RIVER	UNCONSERVED FOLDER 4 OF 6
MAPS	UNCONSERVED FOLDER
MAPS	UNCONSERVED FOLDER 1 OF 3
MAPS	UNCONSERVED FOLDER 2 OF 3
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MAPS	UNCONSERVED FOLDER 1 OF 3
RAINFALL	UNCONSERVED FOLDER 3 OF 3

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RAINFALL	UNCONSERVED FOLDER 3 OF 3
RAINFALL	UNCONSERVED FOLDER 3 OF 3
RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY
RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY
RAINFALL	
RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY

RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY
RAINFALL	UNCONSERVED FOLDER 3 OF 3
RAINFALL	UNCONSERVED FOLDER 3 OF 3
RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY
RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY
RAINFALL	UNCONSERVED FOLDER 2 OF 3
RAINFALL	UMASS LOWELL CENTER FOR LOWELL HISTORY
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RAINFALL	UNCONSERVED FOLDER 2 OF 3
RAINFALL	UNCONSERVED FOLDER 2 OF 3
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RAINFALL	UNCONSERVED FOLDER 1 OF 3
RAINFALL	UNCONSERVED FOLDER 1 OF 3
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BOOTT COTTON MILLS FOUND ROLLED IN UNMARKED PIGEON HOLE.	MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS		UNCONSERVED FOLDER 1 OF 1
FOUND ROLLED IN UNMARKED PIGEON HOLE. BEARS UNDATED WATERMARK "J. ROBESON, PHILA.." WITHOUT A DATE.	MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS		UNCONSERVED FOLDER 1 OF 1
FOUND ROLLED IN UNMARKED PIGEON HOLE. BEARS UNDATED WATERMARK "J. ROBESON, PHILA.." WITHOUT A DATE. ALTHOUGH THIS PLAN IS UNDATED, AS A MATE TO C-113-[02] AND BEARING THE SAME WATERMARK AS IT DOES, THE DATE IS VERY LIKELY JUNE, 1842.	MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS		UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS

UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS

UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS

LISTED IN CONSECUTIVE INDEX OF DRAWINGS.

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UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS

UNCONSERVED FOLDER 1 OF 1

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NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
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NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5

NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 4 OF 5
NORTHERN CANAL	CONSERVED FOLDER 4 OF 5
NORTHERN CANAL	CONSERVED FOLDER 4 OF 5
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NORTHERN CANAL	UNCONSERVED FOLDER 2 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 2 OF 3
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5
NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 3
NORTHERN CANAL	CONSERVED FOLDER 5 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5

NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 5 OF 5
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NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 5 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5

NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5
NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
NORTHERN CANAL	CONSERVED FOLDER 1 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5
NORTHERN CANAL	CONSERVED FOLDER 2 OF 5
NORTHERN CANAL	CONSERVED FOLDER 1 OF 5

NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 3
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 3

NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	CONSERVED FOLDER 3 OF 5
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 3

NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 6 OF 8
NORTHERN CANAL	CONSERVED FOLDER 1 OF 8
NORTHERN CANAL	CONSERVED FOLDER 1 OF 8
NORTHERN CANAL	CONSERVED FOLDER 3 OF 8

NORTHERN CANAL	CONSERVED FOLDER 3 OF 8
NORTHERN CANAL	CONSERVED FOLDER 3 OF 8
NORTHERN CANAL	CONSERVED FOLDER 3 OF 8
NORTHERN CANAL	CONSERVED FOLDER 3 OF 8
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 2 OF 8
NORTHERN CANAL	CONSERVED FOLDER 2 OF 8
NORTHERN CANAL	CONSERVED FOLDER 1 OF 8
NORTHERN CANAL	CONSERVED FOLDER 8 OF 8
NORTHERN CANAL	CONSERVED FOLDER 8 OF 8

NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 2 OF 8
NORTHERN CANAL	CONSERVED FOLDER 2 OF 8
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 2 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	CONSERVED FOLDER 2 OF 8
NORTHERN CANAL	CONSERVED FOLDER 6 OF 8
NORTHERN CANAL	CONSERVED FOLDER 6 OF 8

NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	CONSERVED FOLDER 4 OF 8
NORTHERN CANAL	CONSERVED FOLDER 4 OF 8
NORTHERN CANAL	CONSERVED FOLDER 4 OF 8
NORTHERN CANAL	CONSERVED FOLDER 4 OF 8
NORTHERN CANAL	CONSERVED FOLDER 4 OF 8
NORTHERN CANAL	CONSERVED FOLDER 7 OF 8

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NORTHERN CANAL	CONSERVED FOLDER 7 OF 8
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NORTHERN CANAL	CONSERVED FOLDER 5 OF 8
NORTHERN CANAL	CONSERVED FOLDER 5 OF 8
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 8 OF 8

NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4

NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 3 OF 4
NORTHERN CANAL	UNCONSERVED FOLDER 4 OF 4

NORTHERN CANAL	UNCONSERVED FOLDER 2 OF 4
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 3 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6

NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 5 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 3 OF 6
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 3 OF 6
NORTHERN CANAL	CONSERVED FOLDER 3 OF 6
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NORTHERN CANAL	CONSERVED FOLDER 3 OF 6
NORTHERN CANAL	CONSERVED FOLDER 4 OF 6
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 6 OF 6
NORTHERN CANAL	CONSERVED FOLDER 4 OF 6

NORTHERN CANAL	CONSERVED FOLDER 4 OF 6
NORTHERN CANAL	CONSERVED FOLDER 4 OF 6
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 5 OF 6
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 5 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6

NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 4 OF 6
NORTHERN CANAL	CONSERVED FOLDER 6 OF 6
NORTHERN CANAL	CONSERVED FOLDER 4 OF 6
NORTHERN CANAL	CONSERVED FOLDER 4 OF 6
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 2 OF 6
NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
NORTHERN CANAL	CONSERVED FOLDER 6 OF 6
NORTHERN CANAL	CONSERVED FOLDER 6 OF 6

NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
NORTHERN CANAL	OVERSIZE CONSERVED
NORTHERN CANAL	CONSERVED FOLDER 6 OF 6
NORTHERN CANAL	CONSERVED FOLDER 5 OF 6
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NORTHERN CANAL	CONSERVED FOLDER 5 OF 6
NORTHERN CANAL	CONSERVED FOLDER 5 OF 6
NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
NORTHERN CANAL	CONSERVED FOLDER 1 OF 6

NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
NORTHERN CANAL	CONSERVED FOLDER 1 OF 6
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 3 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 3 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	OVERSIZE CONSERVED
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	OVERSIZE CONSERVED
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 3 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	OVERSIZE CONSERVED
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 3 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 3 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	OVERSIZE CONSERVED
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 4 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 3 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	OVERSIZE CONSERVED
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 1 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 1 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 3 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 3 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5

MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 1 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 5 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 2 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	CONSERVED FOLDER 2 OF 5
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4
MOODY ST. FEEDER & OLD GUARD LOCKS	UNCONSERVED FOLDER 4 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 2 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 3 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 4 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 4 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 4 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 2 OF 4

MOODY ST. FEEDER & OLD GUARD LOCKS — UNCONSERVED FOLDER 2 OF 4

CANALS, WASTEWAYS, & WASTE DAMS — UNCONSERVED FOLDER 3 OF 7

CANALS, WASTEWAYS, & WASTE DAMS — UNCONSERVED FOLDER 3 OF 7

	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
NO SCALE GIVEN BUT IT IS IN THE SAME SCALE AS C-118-[346].	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
BEARS UNDATED WATERMARK "J. ROBESON, PHILA." APPEARS RELATED TO C-118-[350] AND C-118-[351] BY THE DIMENSIONS OF WHEEL.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7

BEARS UNDATED WATERMARK "J. ROBESON, PHILA." APPEARS RELATED TO C-118-[349] AND C-118-[351] BY THE DIMENSIONS OF WHEEL.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
BEARS UNDATED WATERMARK "J. ROBESON, PHILA." APPEARS RELATED TO C-118-[349] AND C-118-[350] BY THE DIMENSIONS OF WHEEL.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
BEARS PARTIALLY DATED WATERMARK "JAMES WHATMAN…" WHO WAS AN ENGLISH PAPERMAKER AT TURKEY MILL, KENT. OTHER SUCH SHEETS LOCATED WITH THIS ONE HAD THE FULL WATERMARK DATED 1840 AND THOSE PLANS WERE DATED 1842.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
BEARS PARTIALLY DATED WATERMARK "JAMES WHATMAN…" WHO WAS AN ENGLISH PAPERMAKER AT TURKEY MILL, KENT. OTHER SUCH SHEETS LOCATED WITH THIS ONE HAD THE FULL WATERMARK DATED 1840 AND THOSE PLANS WERE DATED 1842.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
BEARS PARTIAL WATERMARK "TURKEY MILL KENT, 1840".	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
BEARS PARTIAL WATERMARK "TURKEY MILL KENT, 1840".	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
CONSECUTIVE INDEX OF DRAWINGS GIVES NO DATE. C-118-343 AND C-118-144 MAY BE LATER COPIES OF THIS DRAWING. SEE ALSO C-118-207..	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
BUILT IN 1835. THE DAM "...HAS SINCE BEEN REBUILT-FAILURE IN PAVING".	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
(OLD PLAN).	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 1 OF 3

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 3 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 2 OF 3
L.& C. INDEX CARD GIVES DATE OF FEB. 4, 1847. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
L.& C. INDEX CARD GIVES DATE OF FEB.4, 1847. LOCATED AFTER COMPLETION OF FROMAL INVENTORY.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 1 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
BEARS PLAN NO. 143-208 BUT NUMBER 143 IS AN ALTERED NUMBER. IN ALL RESPECTS, THIS PLAN CONFORMS TO INDEX CARD PLAN C-118-208 & NO. 208 FALLS IN THE C-118 SEQUENCE. L.& C. INDEX CARD AND CONSECUTIVE INDEX NOTE THAT PLAN SHOWS FOUR SECTIONS, WHICH IT DOES.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 6 OF 7
CONSECUTIVE INDEX OF DRAWINGS NOTES "NO DATE". BEARS WATERMARK "J. ROBESON, PHILA.." WITHOUT A DATE.	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 3 OF 7

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 3 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 4 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 7 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 6 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 3 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 2 OF 3
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 3 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 3 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 3 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 3 OF 3

CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 3 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 5 OF 7
	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 5 OF 7

CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	CONSERVED FOLDER 2 OF 3
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 2 OF 7

CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 6 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3
LISTED AS C-118-283 IN CONSECUTIVE INDEX OF DRAWINGS. APPEARS TO BE THE SAME PLAN AS 135-4036 IN FOLDER TITLED "PLANS OF BOOTT WASTEWAY AND DAM AND VICINITY".	CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		UNCONSERVED FOLDER 5 OF 7
CANALS, WASTEWAYS, & WASTE DAMS		CONSERVED FOLDER 1 OF 3

CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 1 OF 7
CANALS, WASTEWAYS, & WASTE DAMS	UNCONSERVED FOLDER 5 OF 7
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	UMASS LOWELL CENTER FOR LOWELL HISTORY
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	UMASS LOWELL CENTER FOR LOWELL HISTORY
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	UMASS LOWELL CENTER FOR LOWELL HISTORY
GRIST MILL-KYANIZING & ROSIN OIL APPARATUS	UMASS LOWELL CENTER FOR LOWELL HISTORY

GRIST MILL-KYANIZING &
ROSIN OIL APPARATUS

UMASS LOWELL CENTER
FOR LOWELL HISTORY

GRIST MILL-KYANIZING &
ROSIN OIL APPARATUS

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ROSIN OIL APPARATUS

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ROSIN OIL APPARATUS

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FOR LOWELL HISTORY

BOYDEN PATENTS &
ATLANTIC MILLS

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UMASS LOWELL CENTER
FOR LOWELL HISTORY

MISCELLANEOUS

LOCKS & CANALS OFFICE
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LOCKS & CANALS OFFICE
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LAND PLANS

OVERSIZE FLAT STORAGE

LAND PLANS	UNCONSERVED FOLDER 1 OF 2
LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	CONSERVED FOLDER 4 OF 7
LAND PLANS	CONSERVED FOLDER 1 OF 7
LAND PLANS	CONSERVED FOLDER 4 OF 7
LAND PLANS	UNCONSERVED FOLDER 1 OF 2
LAND PLANS	UNCONSERVED FOLDER 2 OF 2

LAND PLANS	CONSERVED FOLDER 7 OF 7
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LAND PLANS	CONSERVED FOLDER 4 OF 7
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LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	CONSERVED FOLDER 6 OF 7
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	CONSERVED FOLDER 6 OF 7
LAND PLANS	CONSERVED FOLDER 6 OF 7

LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	CONSERVED FOLDER 4 OF 7
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	UNCONSERVED FOLDER 1 OF 2
LAND PLANS	CONSERVED FOLDER 6 OF 7

LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	CONSERVED FOLDER 4 OF 7
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LAND PLANS	UNCONSERVED FOLDER 1 OF 2
LAND PLANS	UNCONSERVED FOLDER 2 OF 2
LAND PLANS	CONSERVED FOLDER 6 OF 7
LAND PLANS	CONSERVED FOLDER 4 OF 7

LAND PLANS	CONSERVED FOLDER 3 OF 7
LAND PLANS	CONSERVED FOLDER 3 OF 7
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LAND PLANS	CONSERVED FOLDER 3 OF 7
LAND PLANS	UNCONSERVED FOLDER 1 OF 2

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LAND PLANS	CONSERVED FOLDER 6 OF 7
LAND PLANS	CONSERVED FOLDER 2 OF 7
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LAND PLANS	CONSERVED FOLDER 1 OF 7
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	CONSERVED FOLDER 2 OF 7

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LAND PLANS	CONSERVED FOLDER 6 OF 7
LAND PLANS	CONSERVED FOLDER 5 OF 7
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	CONSERVED FOLDER 7 OF 7

LAND PLANS	CONSERVED FOLDER 5 OF 7
LAND PLANS	CONSERVED FOLDER 5 OF 7
LAND PLANS	CONSERVED FOLDER 7 OF 7
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	OVERSIZE CONSERVED
LAND PLANS	CONSERVED FOLDER 5 OF 7

LAND PLANS		CONSERVED FOLDER 5 OF 7
LAND PLANS		CONSERVED FOLDER 5 OF 7
LAND PLANS		CONSERVED FOLDER 5 OF 7
LAND PLANS		UNCONSERVED FOLDER 1 OF 2
LAND PLANS		CONSERVED FOLDER 6 OF 7
LAND PLANS		UNCONSERVED FOLDER 1 OF 2
COMPILED FROM PLANS AND DEEDS IN THE POSSESSION OF THE CORPORATION BY JAMES B. FRANCIS, SURVEYOR	LAND PLANS	ROLLED STORAGE

LAND PLANS

ROLLED STORAGE

COMPILED FROM PLANS AND DEEDS IN THE POSSESSION OF THE CORPORATION BY JAMES B. FRANCIS, SURVEYOR. COPY OF ORIGINAL DRAWING.

LAND PLANS

ROLLED STORAGE

LAND PLANS

ROLLED STORAGE

10 SHEET TWO-SIDED DOCUMENT. COMPILED FROM PLANS AND DEEDS IN THE POSSESSION OF THE CORPORATION BY JAMES B. FRANCIS, SURVEYOR. LOWELL, MASSACHUSETTS, 1838.

LAND PLANS

ROLLED STORAGE

LAND PLANS

ROLLED STORAGE

LAND PLANS

UNCONSERVED FOLDER 1 OF 4

LAND PLANS		CONSERVED FOLDER 3 OF 4
LAND PLANS		CONSERVED FOLDER 3 OF 4
LAND PLANS		CONSERVED FOLDER 3 OF 4
LAND PLANS		CONSERVED FOLDER 1 OF 4
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RAILROAD PLANS	UNCONSERVED FOLDER 7 OF 10
RAILROAD PLANS	UNCONSERVED FOLDER 5 OF 10

RAILROAD PLANS	CONSERVED FOLDER 1 OF 1
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RAILROAD PLANS	UNCONSERVED FOLDER 9 OF 10
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RAILROAD PLANS	UNCONSERVED FOLDER 8 OF 10
RAILROAD PLANS	UNCONSERVED FOLDER 10 OF 10
BRIDGES	CONSERVED FOLDER 3 OF 5
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BRIDGES	UNCONSERVED FOLDER 7 OF 8
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BRIDGES	UNCONSERVED FOLDER 4 OF 8
BRIDGES	UNCONSERVED FOLDER 5 OF 8
BRIDGES	
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BRIDGES	UNCONSERVED FOLDER 2 OF 8

BRIDGES	OVERSIZE CONSERVED
BRIDGES	CONSERVED FOLDER 1 OF 5
BRIDGES	OVERSIZE CONSERVED
BRIDGES	CONSERVED FOLDER 4 OF 5
BRIDGES	CONSERVED FOLDER 1 OF 5
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BRIDGES	UNCONSERVED FOLDER 4 OF 8
BRIDGES	UNCONSERVED FOLDER 7 OF 8
BRIDGES	OVERSIZE CONSERVED
BRIDGES	UNCONSERVED FOLDER 6 OF 8

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BRIDGES	UNCONSERVED FOLDER 8 OF 8
FLOW OF WATER IN PIPES & CONDUITS	
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 4 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 4 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 4 OF 6
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PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 5 OF 6
NOTE STATES THIS PLAN ALTERED JUNE 23,1847.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6

NOTE STATES CONSTRUCTED IN 1867.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6
	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 5 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 5 OF 6
2 PG. DOCUMENT. 1 OF 20 COPIES.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 5 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 5 OF 6
BEARS NOTE IN GRAPHITE VERSO "RIVER ABOVE DAM". PLAN NUMBER ENTERED AS C-128-1762 IN L. & C. CARD INDEX.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6

PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6
CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS NOTE STATES PART OF SECTIONS OF THE BED OF MERRIMACK RIVER PARRALLEL TO THE EASTERLY [...ILLEG.] OF PAWTUCKET DAM.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6
	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 1 OF 6

PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS	
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 1 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 5 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 2 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 5 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 1 OF 6
PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 1 OF 6

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PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 1 OF 6

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PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 6 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 3 OF 6
NOTE DIRECTS TO "SEE PLAN # 2590 FOR SAME SUBJECT AS THIS." BUT THIS PLAN WAS NOT FOUND. PLAN C-141-021-A IS A LATER COPY WHICH GIVES DATE OF MAR. 9, 1844 AND NOTES J.B. FRANCIS C.E.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 3 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 3 OF 6
CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 1 OF 6
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CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 3 OF 6
PAWTUCKET DAM & STREETS & SEWERS SCALE IS NOTED AS FOLLOWS: DISTANCE 1 1/4"=100', HEIGHTS 1"=10'. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 3 OF 6 UNCONSERVED FOLDER 1 OF 6
PAWTUCKET DAM & STREETS & SEWERS		UNCONSERVED FOLDER 1 OF 6
UNTITLED PLAN SHOWING PROFILE OF ROADS. TILDEN ST. BEING THE ONLY SPECIFIED ROAD ON PLAN. BEARS "ROADS" IN GRAPHITE, VERSO. NOT LISTED IN CONSECUTIVE INDEX OF DRAWINGS.	PAWTUCKET DAM & STREETS & SEWERS	UNCONSERVED FOLDER 3 OF 6

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LOCATED AFTER COMPLETION OF FORMAL INVENTORY. THIS IS A LARGE BOUND VOLUME CONTAINING PLANS WITH MORE DATES THAN ARE NOTED.	OLD MILLYARD PLANS	BOUND VOL. DRAWER
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HYDRANT TESTS		
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OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2

OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2

OLD MILL YARD PLANS	UNCONSERVED FOLDER 2 OF 2
OLD MILL YARD PLANS	CONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	CONSERVED FOLDER 1 OF 1
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2

PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
	PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 1 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 1 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
	PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2

PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 1 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 1 OF 2

PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 1 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 1 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
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PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2

PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
LOCATED IN FOLDER CONTAINING DETAILS OF SPECIAL PIPES. SEE ALSO PLAN NO. C-134-4684. L. & C. CARD INDEX GIVES DATE OF 1870 WHICH IS PROBABLY THE DATE OF THE PENCIL ADDITIONS. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.	PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
	PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2

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PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 1 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
	PIPE CROSSINGS & PIPE SPECIALS	UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 2 OF 2
PIPE CROSSINGS & PIPE SPECIALS		UNCONSERVED FOLDER 1 OF 2

J.B. FRANCIS FILE

MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3

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MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3
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MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
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MERRIMACK RIVER	UNVONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3
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MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3

MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	OVERSIZE CONSERVED

MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
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MERRIMACK RIVER	UNCONSERVED FOLDER 3 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 3
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6

W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6

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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6

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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6

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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
CANALS	UNCONSERVED FOLDER 6 OF 6
CANALS	UNCONSERVED FOLDER 6 OF 6
CANALS	UNCONSERVED FOLDER 5 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
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CANALS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6

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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 7 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 7 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 7 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	CONSERVED FOLDER 1 OF 1
W.E. BADGER PLANS	UNCONSERVED FOLDER 7 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9

W.E. BADGER PLANS

UNCONSERVED FOLDER 6
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W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS

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W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9

W.E. BADGER PLANS

UNCONSERVED FOLDER 9
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W.E. BADGER PLANS

UNCONSERVED FOLDER 9
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W.E. BADGER PLANS

UNCONSERVED FOLDER 8
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W.E. BADGER PLANS

UNCONSERVED FOLDER 9
OF 9

W.E. BADGER PLANS

UNCONSERVED FOLDER 5
OF 9

W.E. BADGER PLANS

W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	

W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 9 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 8 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 9

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 9
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5

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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5

W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 4 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 4 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 4 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 4 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 1 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 1 OF 5

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5

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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER C-128 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5

W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6

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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 6 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 6

W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 3 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 5 OF 6

W.E. BADGER PLANS UNCONSERVED FOLDER 5 OF 6

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W.E. BADGER PLANS UNCONSERVED FOLDER 3 OF 5

W.E. BADGER PLANS UNCONSERVED FOLDER 2 OF 5

W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 3 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5

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W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5

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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 5 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 1 OF 5

W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 2 OF 5
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W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5
W.E. BADGER PLANS	UNCONSERVED FOLDER 4 OF 5

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD

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FLOWAGE-FIFTH FLASHBOARD

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FLOWAGE-FIFTH FLASHBOARD

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FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4

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FLOWAGE-FIFTH FLASHBOARD

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FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 1 OF 4
FOLDER NUMBERED AS SHELF 147 BUT DRAWING LISTED IN CARD INDEX AS 156. ALSO BEARS NO. 1716 VERSO, COVERED OVER.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD

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FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 4 OF 4

FLOWAGE-FIFTH FLASHBOARD

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FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4

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FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 4 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
HAMILTON MFG. CO.	UNCONSERVED FOLDER 2 OF 4
HAMILTON MFG. CO.	UNCONSERVED FOLDER 3 OF 4
HAMILTON MFG. CO.	UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBAORD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4

PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING GIVEN SHELF NO. 157 IN CARD INDEX. CONSECUTIVE INDEX OF DRAWINGS ALSO GIVES NO DATE.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
FOLDER NUMBERED AS SHELF 148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
TAKEN MAY 20 TO 25,1851. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4

KNOWN AS THE GLASS HOUSE AREA & HOWARD LOT ONCE OWNED BY GENERAL LEACH. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD PLAN & PROFILE TAKEN IN 1851. PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
		UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
		UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 1 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4

FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 1 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 2 OF 4
FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 4 OF 4

FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 4 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
PLAN AND FOLDER NUMBERED AS SHELF C-148 BUT DRAWING LISTED IN CARD INDEX AS SHELF 157.	FLOWAGE-FIFTH FLASHBOARD	UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 3 OF 4
FLOWAGE-FIFTH FLASHBOARD		UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 2 OF 4

FLOWAGE-FIFTH FLASHBOARD

UNCONSERVED FOLDER 4 OF 4

MERRIMACK RIVER HEIGHTS

MERRIMACK RIVER

HUNTS FALLS

POSTAL MAP

LAND PLAN OF
CENTREVILLE

LAND PLAN OF LOWELL

FACTORY MUTUAL MILL
YARD PLANS

NORTHERN CANAL
GATEHOUSE ROLLED STORAGE

PAWTUCKET CANAL

BEARS NO. 3376, VERSO. MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER		ROLLED STORAGE
DUPLICATES PARTS OF C-P.H. 010-[A]-[01]	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER DUPLICATES PARTS OF C-P.H. 010-[A]-[01]. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF 1836 FOR THE SERIES.	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
PLAN NUMBER CROSSED OVER IN GRAPHITE.	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01-[03] WERE DRAWN. COVERS DATES 16 JUNE THROUGH 19 JUNE 1835.	MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER 1 OF 1

TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01-[03] WERE DRAWN. COVERS DATES 16 JUNE THROUGH 19 JUNE 1835.	MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER 1 OF 1
TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 27 JULY THROUGH 31 JULY 1835. NOTE: P.H. C-10, VERSO.	MERRIMACK RIVER	UNCONSERVED FOLDER I OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER I OF 1
TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 27 JULY THROUGH 31 JULY 1835. NOTE: P.H. C-10, VERSO.	MERRIMACK RIVER	UNCONSERVED FOLDER I OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER I OF 1
TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 27 JULY THROUGH 31 JULY 1835. PAPER WATERMARKED: J. WHATMAN, TURKEY MILL, 1857.	MERRIMACK RIVER	UNCONSERVED FOLDER I OF 1

		UNCONSERVED FOLDER I
MERRIMACK RIVER		OF 1
TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 25 APRIL THROUGH 28 APRIL 1835. PAPER WATERMARKED: J. WHATMAN, TURKEY MILL, 1857.	MERRIMACK RIVER	UNCONSERVED FOLDER I OF 1
		UNCONSERVED FOLDER I
MERRIMACK RIVER		OF 1
TABULAR DATA FROM WHICH PLANS C-P.H. 010-[A]-[01[-[03] WERE DRAWN. COVERS DATES 25 APRIL THROUGH 28 APRIL 1835. PAPER WATERMARKED: J. WHATMAN, TURKEY MILL, 1857.	MERRIMACK RIVER	UNCONSERVED FOLDER I OF 1
		UNCONSERVED FOLDER I
MERRIMACK RIVER		OF 1
MAY BE BY URIAH A. BOYDEN. APPEARS TO BE ROUGH WORK FOR TABLE 1. COVERS DATES 16 JUNE THROUGH 19 JUNE 1835.	MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
		UNCONSERVED FOLDER 1
MERRIMACK RIVER		OF 1

MAY BE BY URIAH BOYDEN. APPEARS TO BE ROUGH WORK FOR TABLE 2. COVERS DATES 27 JULY THROUGH 31 JULY 1835.	MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE

THIS TITLE MATCHES THE TITLE GIVEN IN THE CONSECUTIVE INDEX OF DRAWINGS WHICH ALSO GIVES L. BALDWIN AS SOURCE BUT THE DRAWING ITSELF DOES NOT MENTION HIM. CONSECUTIVE INDEX OF DRAWINGS GIVES DATE OF JUNE 20 TO JULY 18, 1834.	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
26 PAGE REPORT. THIS WAS "U. A. BOYDEN'S COPY" AS PER NOTE ON BACK. ORIGINAL HANDWRITTEN COPY.	MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER 1 OF 1

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
BOOTT PENSTOCK	ROLLED STORAGE-FRAGILE
BOOTT PENSTOCK	
BOOTT PENSTOCK	
BOOTT PENSTOCK	
BOOTT PENSTOCK	
BOOTT PENSTOCK	
HAMILTON WASTEWAY	ROLLED STORAGE

BEARS NO. 3110, VERSO.
ALSO BEARS NOTES
DATED SEPT. 27, 1861.
BY CHARLES F. REED. MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE-FRAGILE

MERRIMACK RIVER

MERRIMACK RIVER

MERRIMACK RIVER

MERRIMACK RIVER

LAKE VILLAGE & BRISTOL N.H.

UNCONSERVED FOLDER 1 OF 1

BEARS 3316 CROSSED OUT AND REPLACED WITH C 14.

LAKE VILLAGE & BRISTOL N.H.

ROLLED STORAGE

LAKE VILLAGE & BRISTOL N.H.

ROLLED STORAGE

LAKE VILLAGE & BRISTOL N.H.

LAKE VILLAGE & BRISTOL N.H.

UNCONSERVED FOLDER 1 OF 1

LAKE VILLAGE & BRISTOL N.H.

UNCONSERVED FOLDER 1 OF 1

MERRIMACK RIVER	NOT LOCATED
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE

LAND PLAN OF LOWELL	
MAP OF BOSTON	ROLLED STORAGE
PAWTUCKET CANAL	ROLLED STORAGE
PAWTUCKET CANAL	UNCONSERVED FOLDER 1 OF 1
PAWTUCKET CANAL	UNCONSERVED FOLDER 1 OF 1

PAWTUCKET CANAL	UNCONSERVED FOLDER 1 OF 1
PAWTUCKET CANAL	ROLLED STORAGE-FRAGILE
PAWTUCKET CANAL	ROLLED STORAGE
PAWTUCKET CANAL	ROLLED STORAGE-FRAGILE
PAWTUCKET CANAL	UNCONSERVED FOLDER 1 OF 1
PAWTUCKET CANAL	UNCONSERVED FOLDER 1 OF 1
BEARS NO. 3339, VERSO. APPLETON MFG. CO.	ROLLED STORAGE

APPLETON MFG. CO. ROLLED STORAGE

BEARS NO. 3339, VERSO. APPLETON MFG. CO. ROLLED STORAGE

APPLETON MFG. CO. ROLLED STORAGE

MERRIMACK MFG. CO.

PLAN NUMBER ENTERED
AS C-P.H.23 IN L.& C.
CARD INDEX. DATE
GIVEN AS 1870 IN L.& C.
CARD INDEX. "3 ROLLS C-
19" APPEARS VERSO.
BEARS NO. 3344, VERSO. LAWRENCE MFG. CO. ROLLED STORAGE

LAWRENCE MFG. CO. ROLLED STORAGE

PLAN NUMBER ENTERED AS C-P.H. 23 IN L. & C. CARD INDEX. DATE GIVEN AS 1870 IN L. & C. CARD INDEX. BEARS NO. 3344, VERSO.	LAWRENCE MFG. CO.	ROLLED STORAGE
LAWRENCE MFG. CO.		ROLLED STORAGE
PLAN NUMBER ENTERED AS C-P.H. 23 IN L. & C. CARD INDEX. DATE GIVEN AS 1870 IN L. & C. CARD INDEX. BEARS NO. 3344, VERSO.	LAWRENCE MFG. CO.	ROLLED STORAGE
LAWRENCE MFG. CO.		ROLLED STORAGE
TREMONT MILLS		
MAPS OF LOWELL		ROLLED STORAGE
MAPS OF LOWELL		ROLLED STORAGE
MAPS OF LOWELL		ROLLED STORAGE

LAWRENCE MFG. CO.

DYNAMOMETER	ROLLED STORAGE
DYNAMOMETER	UNCONSERVED FOLDER 1 OF 1
LAND PLAN OF PAWTUCKETVILLE	
BOOTT PENSTOCK	
BOOTT PENSTOCK TREMONT & SUFFOLK MILLS	
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER		ROLLED STORAGE-FRAGILE
MERRIMACK RIVER		
BEARS NO. 3373-1, RECTO.	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
BEARS NO. 3373-2 STAMPED, VERSO.	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE

BEARS NO. 3373-3, RECTO.	MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER		UNCONSERVED FOLDER 1 OF 1
LOCATED AFTER COMPLETION OF FORMAL INVENTORY.	MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE
MERRIMACK RIVER		ROLLED STORAGE

UNCONSERVED FOLDER 1
OF 1

LAND PLAN ON FIRST
STREET

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LAND PLAN ON FIRST
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LAND PLAN ON FIRST STREET	UNCONSERVED FOLDER 1 OF 1
LAND PLAN ON FIRST STREET	UNCONSERVED FOLDER 1 OF 1
LAND PLAN ON FIRST STREET	UNCONSERVED FOLDER 1 OF 1
CROTON ACQUEDUCT COMMISSION	
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1

NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
NORTHERN CANAL	UNCONSERVED FOLDER 1 OF 1
WESTERN CANAL	ROLLED STORAGE
MERRIMACK RIVER	

MERRIMACK RIVER

MERRIMACK RIVER

MERRIMACK RIVER

B.& M. R.R. TRACKS

MERRIMACK RIVER

MERRIMACK RIVER

PAWTUCKET CANAL

PAWTUCKET CANAL

HUNTS FALLS

SWAMP LOCKS GATES

SWAMP LOCKS GATES

SWAMP LOCKS GATES

SWAMP LOCKS GATES

SWAMP LOCKS GATES

SWAMP LOCKS GATES

SWAMP LOCKS GATES

L.& C. RESERVOIR

NOT ASSIGNED BY P. L.& C.

UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER HEIGHTS	
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1

OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
OLD MILL YARD PLANS	ROLLED STORAGE

UNCONSERVED FOLDER 1

OLD MILL YARD PLANS OF 1

SUFFOLK STREET BRIDGE

RESERVOIR PLANS

RESERVOIR PLANS

RESERVOIR PLANS

RESERVOIR PLANS

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NOT ASSIGNED BY P.L.&
C. ROLLED STORAGE

NOT ASSIGNED BY P.L.&
C. ROLLED STORAGE

NOT ASSIGNED BY P.L.&
C. ROLLED STORAGE

NOT ASSIGNED BY P.L.&
C. ROLLED STORAGE

NOT ASSIGNED BY P.L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P.L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P.L.& C.	UNCONSERVED FOLDER 1 OF 1
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NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P.L.& C.	ROLLED STORAGE
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NOT ASSIGNED BY P.L.& C,	UNCONSERVED FOLDER 1 OF 2

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NOT ASSIGNED BY P.L.&C	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P.L.&C	UNCONSERVED FOLDER 2 OF 2
LOWELL MAPS	
LOWELL MAPS	ROLLED STORAGE
LOWELL MAPS	ROLLED STORAGE
LOWELL MAPS	ROLLED STORAGE
LOWELL MAPS	ROLLED STORAGE
LOWELL MAPS	ROLLED STORAGE

		HANGING STORAGE ART
LOWELL MAPS		RACK 5B
		HANGING STORAGE ART
LOWELL MAPS		RACK 5B
LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.	LOWELL MAPS	ROLLED STORAGE
LOWELL MAPS		ROLLED STORAGE

LOWELL MAPS		ROLLED STORAGE
C-142-001-K IS ANOTHER COPY OF THIS MAP. LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036..	LOWELL MAPS	ROLLED STORAGE
LOWELL MAPS		ROLLED STORAGE
LOWELL MAPS		ROLLED STORAGE
LOWELL MAPS		HANGING STORAGE ART RACK 5B
BEARS STAMP, VERSO, WHICH READS "DOCKET NO. 10 BOARD OF TAX APPEALS-APPELLANT'S EXH. 2/SEP. 21, 1951".LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.	LOWELL MAPS	ROLLED STORAGE

LOWELL MAPS		ROLLED STORAGE
LOWELL MAPS		ROLLED STORAGE
LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.	LOWELL MAPS	UNCONSERVED FOLDER 1 OF 2
LOWELL MAPS		UNCONSERVED FOLDER 1 OF 2
LISTED ON P.L.& C. NUMERICAL MAP INDEX, PLAN 162-036.	LOWELL MAPS	UNCONSERVED FOLDER 1 OF 2
LOWELL MAPS		UNCONSERVED FOLDER 1 OF 2
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MASSACHUSETTS STATE MAPS — ROLLED STORAGE

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MASSACHUSETTS COTTON MILLS	ROLLED STORAGE-FRAGILE
	ROLLED STORAGE
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE-FRAGILE
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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 2 OF 2

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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
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MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
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MIDDLESEX MILLS	UNCONSERVED FOLDER 1 OF 1
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SACO-LOWELL SHOPS	ROLLED STORAGE

SACO-LOWELL SHOPS	ROLLED STORAGE
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MERRIMACK RIVER	ROLLED STORAGE-FRAGILE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE-FRAGILE
MERRIMACK RIVER	ROLLED STORAGE

MERRIMACK RIVER	ROLLED STORAGE-FRAGILE
MERRIMACK RIVER	ROLLED STORAGE-FRAGILE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE-FRAGILE
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER ROLLED STORAGE

MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	
MERRIMACK RIVER	
CORPORATION HOSPITAL	UNCONSERVED FOLDER 1 OF 1
CORPORATION HOSPITAL	UNCONSERVED FOLDER 1 OF 1
CORPORATION HOSPITAL	UNCONSERVED FOLDER 1 OF 1

CORPORATION HOSPITAL	UNCONSERVED FOLDER 1 OF 1
CORPORATION HOSPITAL	UNCONSERVED FOLDER 1 OF 1
CORPORATION HOSPITAL	UNCONSERVED FOLDER 1 OF 1
CORPORATION HOSPITAL	ROLLED STORAGE
PAWTUCKET DAM	UNCONSERVED FOLDER 1 OF 1
PAWTUCKET DAM	ROLLED STORAGE

PAWTUCKET DAM	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2

MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	ROLLED STORAGE-FRAGILE
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2

MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCOSNERVED FOLDER 2 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVERC.	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2

MERRIMACK RIVER

UNCONSERVED FOLDER 1
OF 2

MERRIMACK RIVER

UNCONSERVED FOLDER 1
OF 2

MERRIMACK RIVER

UNCONSERVED FOLDER 1
OF 2

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 2
GRIST MILL	ROLLED STORAGE
GRIST MILL	ROLLED STORAGE

GRIST MILL	UNCONSERVED FOLDER 1 OF 1
GRIST MILL	UNCONSERVED FOLDER 1 OF 1
GRIST MILL	UNCONSERVED FOLDER 1 OF 1
GRIST MILL	UNCONSERVED FOLDER 1 OF 1
GRIST MILL	UNCONSERVED FOLDER 1 OF 1

GRIST MILL	UNCONSERVED FOLDER 1 OF 1
GRIST MILL	UNCONSERVED FOLDER 1 OF 1
GRIST MILL	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	ROLLED STORAGE
TREMONT & SUFFOLK MILLS	

TREMONT & SUFFOLK MILLS	
TREMONT & SUFFOLK MILLS	
TREMONT & SUFFOLK MILLS	
TREMONT & SUFFOLK MILLS	
TREMONT & SUFFOLK MILLS	
TREMONT & SUFFOLK MILLS	
TREMONT & SUFFOLK MILLS	UNCONSERVED FOLDER 1 OF 1
TREMONT & SUFFOLK MILLS	UNCONSERVED FOLDER 1 OF 1

BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2

BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2

BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2

BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2

BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2

BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
BOOTT COTTON MILLS	UNCONSERVED FOLDER 2 OF 2
MASSACHUSETTS COTTON MILLS	
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE- FRAGILE
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS COTTON MILLS	ROLLED STORAGE-FRAGILE
MASSACHUSETTS COTTON MILLS	NOT LOCATED
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE-FRAGILE
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
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MASSACHUSETTS
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UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

HAMILTON MFG. CO.

UNCONSERVED FOLDER 1
OF 1

HAMILTON MFG. CO.

UNCONSERVED FOLDER 1
OF 1

HAMILTON MFG. CO.

UNCONSERVED FOLDER 1
OF 1

HAMILTON MFG. CO.

UNCONSERVED FOLDER 1
OF 1

HAMILTON MFG. CO.	ROLLED STORAGE-FRAGILE
HAMILTON MFG. CO.	ROLLED STORAGE-FRAGILE
HAMILTON MFG. CO.	ROLLED STORAGE-FRAGILE
HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
HAMILTON MFG. CO.	UNCOSNERVED FOLDER 1 OF 1
HAMILTON MFG. CO.	ROLLED STORAGE-FRAGILE

HAMILTON MFG. CO.	ROLLED STORAGE- FRAGILE
HAMILTON MFG. CO.	ROLLED STORAGE- FRAGILE
HAMILTON MFG. CO.	ROLLED STORAGE
HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1

HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
HAMILTON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1

CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCOSNERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
CENTRIFUGAL PUMPS	UNCONSERVED FOLDER 1 OF 1
BROADWAY BRIDGE AT PAWTUCKET CANAL	

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2

MASSACHUSETTS COTTON MILLS MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 2
MAP OF NEW ENGLAND	
MAP OF NEW ENGLAND	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW ENGLAND	UNCONSERVED FOLDER 1 OF 1

MAP OF NEW ENGLAND	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW ENGLAND	ROLLED STORAGE
MAP OF NEW ENGLAND	ROLLED STORAGE
MAP OF NEW ENGLAND	ROLLED STORAGE
MAP OF NEW YORK AND PENN.	ROLLED STORAGE
MAP OF NEW YORK AND PENN.	ROLLED STORAGE

MAP OF NEW YORK AND PENN.	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW YORK AND PENN.	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW YORK AND PENN.	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW YORK AND PENN.	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW YORK AND PENN.	ROLLED STORAGE
MAP OF NEW YORK AND PENN.	ROLLED STORAGE
MAP OF NEW YORK AND PENN.	ROLLED STORAGE
MAP OF NEW YORK AND PENN.	ROLLED STORAGE

MAP OF NEW YORK AND PENN.	ROLLED STORAGE
MAP OF NEW YORK AND PENN.	UNCONSERVED FOLDER 1 OF 1
MAP OF NEW YORK AND PENN.	UNCONSERVED FOLDER 1 OF 1
FIRST ST. BOULEVARD	ROLLED STORAGE
FIRST ST. BOULEVARD	ROLLED STORAGE
FIRST ST. BOULEVARD	ROLLED STORAGE

FIRST ST. BOULEVARD

FIRST ST. BOULEVARD

FIRST ST. BOULEVARD	ROLLED STORAGE
U.S. GOV. MAP OF NEVADA	ROLLED STORAGE
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1

TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS.	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS.	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1

TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
TRACING OF LAND PLANS	UNCONSERVED FOLDER 1 OF 1
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3

AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3

AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3

AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3

AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3

AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.C.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 2 OF 3

AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 2 OF 3
AMOSKEAG MFG. CO..	UNCONSERVED FOLDER 3 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3
AMOSKEAG MFG. CO.	UNCONSERVED FOLDER 1 OF 3

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1

NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1

NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1

NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1

NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO..	UNCONSERVED FOLDER 1 OF 1
NASHUA MFG. CO.	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1

MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1

MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	UNCONSERVED FOLDER 1 OF 1
MILL YARD ELEVATIONS AND FLOOD HEIGHTS	ROLLED STORAGE
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
WATER WHEEL DISCHARGE DIAGRAMS	UNCONSERVED FOLDER 1 OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

WATER WHEEL
DISCHARGE DIAGRAMS

UNCONSERVED FOLDER 1
OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	ROLLED STORAGE
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	ROLLED STORAGE
NOT ASSIGNED BY P. L.& C.	ROLLED STORAGE
NOT ASSIGNED BY P. L.& C.	ROLLED STORAGE
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS.	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3

SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS.	UNCONSERVED FOLDER 3 OF 3

SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	ROLLED STORAGE-FRAGILE
SIPHON SPILLWAYS	ROLLED STORAGE-FRAGILE
SIPHON SPILLWAYS	ROLLED STORAGE-FRAGILE
SIPHON SPILLWAYS	ROLLED STORAGE-FRAGILE
SIPHON SPILLWAYS	UNCONSERVED FOLDER 3 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 2 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3

SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 2 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS.	UNCONSERVED FOLDER 2 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 2 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 2 OF 3

SIPHON SPILLWAYS	UNCONSERVED FOLDER 2 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 2 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
SIPHON SPILLWAYS	UNCONSERVED FOLDER 1 OF 3
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 2 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 2
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1

NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
NOT ASSIGNED BY P. L.& C.	UNCONSERVED FOLDER 1 OF 1
APPLETON MFG. CO.	ROLLED STORAGE
HAMILTON MFG. CO.	ROLLED STORAGE

HAMILTON MFG. CO.	ROLLED STORAGE
BIGELOW CARPET COMPANY	ROLLED STORAGE
BIGELOW CARPET COMPANY	ROLLED STORAGE
BIGELOW CARPET COMPANY	UNCONSERVED FOLDER 1 OF 1
BIGELOW CARPET COMPANY	UNCONSERVED FOLDER 1 OF 1
BIGELOW CARPET COMPANY	UNCONSERVED FOLDER 1 OF 1
BIGELOW CARPET COMPANY	ROLLED STORAGE
BIGELOW CARPET COMPANY	ROLLED STORAGE
MILL YARD PLANS	
PRESCOTT MILLS	

HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE

HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	
HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS	ROLLED STORAGE

HUNTS FALLS	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE

HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
HUNTS FALLS & MERRIMACK RIVER	

HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
HUNTS FALLS & MERRIMACK RIVER	ROLLED STORAGE
BIGELOW CARPET COMPANY	ROLLED STORAGE
TREMONT MILLS	UNCONSERVED OVERSIZE FOLDER
TREMONT MILLS	UNCONSERVED OVERSIZE FOLDER

LAWRENCE MFG. CO.	UNCONSERVED OVERSIZE FOLDER
LAWRENCE MFG. CO.	UNCONSERVED OVERSIZE FOLDER
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE
MASSACHUSETTS COTTON MILLS	ROLLED STORAGE

MASSACHUSETTS COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	

BOOTT COTTON MILLS	ROLLED STORAGE
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1

BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
BOOTT COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 20 INCH	ROLLED STORAGE

PIPE LINES. 20 INCH	ROLLED STORAGE
PIPE LINES. 20 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 20 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 20 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 20 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 20 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 20 INCH	ROLLED STORAGE
PIPE LINES. 20 INCH	ROLLED STORAGE
PIPE LINES. 20 INCH	ROLLED STORAGE

PIPE LINES. 20 INCH	ROLLED STORAGE
PIPE LINES. 20 INCH	ROLLED STORAGE
PIPE LINES. 20 INCH	ROLLED STORAGE- FRAGILE
PIPE LINES. 24 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 24 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 24 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 24 INCH	ROLLED STORAGE
PIPE LINES. 24 INCH	ROLLED STORAGE

PIPE LINES. 24 INCH		ROLLED STORAGE
PIPE LINES. 24 INCH		UNCONSERVED FOLDER 1 OF 1
IN TWO PIECES. BEARS NO. 4459 STAMPED, VERSO. LOCATED AFTER COMPLETION OF FORMAL INVENTORY.	PIPE LINES. 24 INCH	UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 24 INCH		UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 24 INCH		ROLLED STORAGE
PIPE LINES. 24 INCH		UNCONSERVED FOLDER 1 OF 1
PIPE LINES. 24 INCH		UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS		UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS
COTTON MILLS

UNCONSERVED FOLDER 1
OF 1

MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1
MASSACHUSETTS COTTON MILLS	UNCONSERVED FOLDER 1 OF 1

MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1

MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1

MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1
MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1

MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1

MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1

MASSACHUSETTS	UNCONSERVED FOLDER 1
COTTON MILLS	OF 1

PIPE LINES ROLLED STORAGE

PIPE LINES UNCONSERVED FOLDER 1 OF 1

PIPE LINES ROLLED STORAGE

PIPE LINES ROLLED STORAGE

PIPE LINES ROLLED STORAGE

PIPE LINES	ROLLED STORAGE
PIPE LINES	UNCONSERVED FOLDER 1 OF 1
PIPE LINES	UNCONSERVED FOLDER 1 OF 1
PIPE LINES	UNCONSERVED FOLDER 1 OF 1
PIPE LINES	UNCONSERVED FOLDER 1 OF 1
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	ROLLED STORAGE

PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	ROLLED STORAGE-FRAGILE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2

PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	ROLLED STORAGE-FRAGILE
PAWTUCKET BRIDGE	
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	ROLLED STORAGE-FRAGILE
PAWTUCKET BRIDGE	ROLLED STORAGE

PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2

PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE-FRAGILE
PAWTUCKET BRIDGE	ROLLED STORAGE-FRAGILE
PAWTUCKET BRIDGE	ROLLED STORAGE-FRAGILE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2

PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	

PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2

PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2

PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 1 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	UNCONSERVED FOLDER 2 OF 2
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE
PAWTUCKET BRIDGE	ROLLED STORAGE

PAWTUCKET BRIDGE	ROLLED STORAGE
OLD GUARD LOCKS	ROLLED STORAGE
OLD GUARD LOCKS	ROLLED STORAGE
OLD GUARD LOCKS	ROLLED STORAGE
OLD GUARD LOCKS	
OLD GUARD LOCKS	
OLD GUARD LOCKS	ROLLED STORAGE
MILL YARD PLANS	ROLLED STORAGE

MILL YARD PLANS	ROLLED STORAGE-FRAGILE
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1

MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	ROLLED STORAGE-FRAGILE
MILL YARD PLANS	UNCONSERVED FOLDER 1 OF 1
MILL YARD PLANS	ROLLED STORAGE-FRAGILE
SUFFOLK MILLS	UNCONSERVED FOLDER 1 OF 1
SUFFOLK MILLS	UNCONSERVED FOLDER 1 OF 1
SUFFOLK MILLS	UNCONSERVED FOLDER 1 OF 1

SUFFOLK MILLS	ROLLED STORAGE
SUFFOLK MILLS	ROLLED STORAGE
NASHUA RIVER	ROLLED STORAGE
SACO-LOWELL SHOPS	ROLLED STORAGE
SACO-LOWELL SHOPS	ROLLED STORAGE
SACO-LOWELL SHOPS	ROLLED STORAGE

SACO-LOWELL SHOPS	UNCONSERVED FOLDER 1 OF 1
SACO-LOWELL SHOPS	UNCONSERVED FOLDER 1 OF 1
CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	ROLLED STORAGE

CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	ROLLED STORAGE

CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	ROLLED STORAGE
CANAL MARGINS & CANALS	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1

MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	UNCONSERVED FOLDER 1 OF 1
MERRIMACK RIVER	ROLLED STORAGE

MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
MERRIMACK RIVER	ROLLED STORAGE
APPLETON MFG. CO.	ROLLED STORAGE
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
APPLETON MFG. CO.	ROLLED STORAGE
APPLETON MFG. CO.	ROLLED STORAGE
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 1
APPLETON MFG. CO.	UNCONSERVED FOLDER 1 OF 1

MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
MIDDLESEX CO.	ROLLED STORAGE
MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1

MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
MIDDLESEX CO.	UNCONSERVED FOLDER 1 OF 1
PROPOSED MERRIMACK RIVER CHANNEL	ROLLED STORAGE
PROPOSED MERRIMACK RIVER CHANNEL	ROLLED STORAGE
PIPE LINES	ROLLED STORAGE
PIPE LINES	ROLLED STORAGE
PIPE LINES	ROLLED STORAGE

PAWTUCKET CANAL	ROLLED STORAGE
PAWTUCKET CANAL	ROLLED STORAGE
MAPS OF LOWELL	
MAPS OF LOWELL	
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1

MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	

MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	
MAPS OF LOWELL	
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	

MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	
MAPS OF LOWELL	
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	UNCONSERVED FOLDER 1 OF 1
MAPS OF LOWELL	
MAPS OF LOWELL	
MAPS OF LOWELL	

MAPS OF LOWELL

UNCONSERVED FOLDER 1
MAPS OF LOWELL OF 1

MAPS OF LOWELL

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

BLACKWATER PROJECT

UNCONSERVED FOLDER 1
OF 1

UNCONSERVED FOLDER 1
OF 1

UNCONSERVED FOLDER 1
OF 1

BLACKWATER PROJECT	UNCONSERVED FOLDER 1 OF 1
BLACKWATER PROJECT	UNCONSERVED FOLDER 1 OF 1
BLACKWATER PROJECT	UNCONSERVED FOLDER 1 OF 1
BLACKWATER PROJECT	
BLACKWATER PROJECT	
LIVINGSTON SEWER	ROLLED STORAGE
LIVINGSTON SEWER	UNCONSERVED FOLDER 1 OF 1
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3

DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 2 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3

DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	ROLLED STORAGE-FRAGILE

DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 1 OF 3

DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 2 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 2 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 2 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3
DRAWINGS OF BOOTT MILLS 1700 HP UNIT	UNCONSERVED FOLDER 3 OF 3

PROPOSED
DEVELOPMENT OF NOS.
3, 4 & 5 WHEELS AT
BOOTT

UNCONSERVED FOLDER 2
OF 3

PROPOSED
DEVELOPMENT OF NOS.
3, 4 & 5 WHEELS AT
BOOTT

UNCONSERVED FOLDER 1
OF 3

PROPOSED
DEVELOPMENT OF NOS.
3, 4 & 5 WHEELS AT
BOOTT

UNCONSERVED FOLDER 2
OF 3

PROPOSED
DEVELOPMENT OF NOS.
3, 4 & 5 WHEELS AT
BOOTT

UNCONSERVED FOLDER 2
OF 3

PROPOSED
DEVELOPMENT OF NOS.
3, 4 & 5 WHEELS AT
BOOTT

UNCONSERVED FOLDER 3
OF 3

PROPOSED
DEVELOPMENT OF NOS.
3, 4 & 5 WHEELS AT
BOOTT

UNCONSERVED FOLDER 2
OF 3

PROPOSED DEVELOPMENT OF NOS. 3, 4 & 5 WHEELS AT BOOTT	UNCONSERVED FOLDER 2 OF 3
PROPOSED DEVELOPMENT OF NOS. 3, 4 & 5 WHEELS AT BOOTT	UNCONSERVED FOLDER 3 OF 3
PROPOSED DEVELOPMENT OF NOS. 3, 4 & 5 WHEELS AT BOOTT	UNCONSERVED FOLDER 3 OF 3
PROPOSED DEVELOPMENT OF NOS. 3, 4 & 5 WHEELS AT BOOTT	UNCONSERVED FOLDER 2 OF 3
PROPOSED DEVELOPMENT OF NOS. 3, 4 & 5 WHEELS AT BOOTT	UNCONSERVED FOLDER 2 OF 3
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1

CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1
CENTRAL STREET BRIDGE DRAWINGS	UNCONSERVED FOLDER 1 OF 1

CENTRAL STREET BRIDGE
DRAWINGS

UNCONSERVED FOLDER 1
OF 1

CENTRAL STREET BRIDGE
DRAWINGS

UNCONSERVED FOLDER 1
OF 1

CENTRAL STREET BRIDGE
DRAWINGS

UNCONSERVED FOLDER 1
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CENTRAL STREET BRIDGE
DRAWINGS

UNCONSERVED FOLDER 1
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CENTRAL STREET BRIDGE
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CENTRAL STREET BRIDGE
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CENTRAL STREET BRIDGE
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UNCONSERVED FOLDER 1
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CENTRAL STREET BRIDGE
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DRAWINGS

UNCONSERVED FOLDER 1
OF 1

CENTRAL STREET BRIDGE
DRAWINGS

UNCONSERVED FOLDER 1
OF 1

BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2

BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2

BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
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BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2

BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2

BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 1 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	ROLLED STORAGE
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2

BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
BRIDGE STREET & MERRIMACK RIVER BRIDGE	UNCONSERVED FOLDER 2 OF 2
FLOOD DATA	UNCONSERVED FOLDER 1 OF 3
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FLOOD DATA	UNCONSERVED FOLDER 3 OF 3
FLOOD DATA	UNCONSERVED FOLDER 3 OF 3
FLOOD DATA	UNCONSERVED FOLDER 2 OF 3
FLOOD DATA	ROLLED STORAGE-FRAGILE
FLOOD DATA	UNCONSERVED FOLDER 2 OF 3
FLOOD DATA	UNCONSERVED FOLDER 2 OF 3

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FLOOD DATA	UNCONSERVED FOLDER 3 OF 3
FLOOD DATA	ROLLED STORAGE-FRAGILE
FLOOD DATA	UNCONSERVED FOLDER 2 OF 3

FLOOD DATA	UNCONSERVED FOLDER 2 OF 3
FLOOD DATA	ROLLED STORAGE-FRAGILE
FLOOD DATA	UNCONSERVED FOLDER 2 OF 3
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FLOOD DATA	UNCONSERVED FOLDER 2 OF 3
FLOOD DATA	UNCONSERVED FOLDER 2 OF 3
FLOOD DATA	UNCONSERVED FOLDER 3 OF 3
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	ROLLED STORAGE
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2

PROPOSED STREET	ROLLED STORAGE
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	ROLLED STORAGE
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2

PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 1 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
PROPOSED STREET	ROLLED STORAGE
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2

PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
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PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
PROPOSED STREET	UNCONSERVED FOLDER 2 OF 2
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1

LOWELL INDUSTRIAL DEVELOPMENT CO.	ROLLED STORAGE-FRAGILE
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
LOWELL INDUSTRIAL DEVELOPMENT CO.	UNCONSERVED FOLDER 1 OF 1
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TAX ABATEMENT CASE
1933-1934

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TAX ABATEMENT CASE
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TAX ABATEMENT CASE
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National Park Service
U.S. Department of the Interior

FINDING AID

Lowell Historic Preservation Commission Records
1971-2011 (bulk dates: 1978-1995)

Prepared by
Margaret Welch, Ami Krawczyk, and Melissa Arnett
2012

National Park Service

Catalog Number: LOWE 16552

Cover Images:
Map of Park and Preservation Districts and the Fairburn Building, 10 Kearney Square. Illustrations from Preservation Plan, 1980, Photo Box 7, Fldrs 8 and 9.

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ACKNOWLEDGEMENTS

The Northeast Museum Services Center staff would like to express their gratitude towards the staff at Lowell National Historical Park for their assistance in carrying out this work. In particular, thanks must go to Museum Specialist Jack Herlihy and Chief of Cultural Resources and Programming David Blackburn for all their help. The Park generously provided a processing area, and Administrative Officer Diana Shiba aided greatly in managing the project funding. The assistance of the Park's Museum Aide Ami Krawczyk in cataloging the records has been invaluable; special thanks goes to her.

HISTORY

Establishment and Objectives

The Lowell Historic Preservation Commission was established in the 1978 legislation creating the Lowell National Historical Park. The Commission was to create a Preservation Plan and to set standards for the historic preservation efforts in the Park zone (part of the downtown, the Wannalancit Textile Company area, and the canal system) and the Preservation District around the Park of over 800 properties. The Commission was to focus rehabilitation efforts on ten historically important buildings mentioned in the Legislation. Another important goal was to aid the Park in telling the human history of Lowell‘s industrial past.

The national park concept had been growing since 1968 when Lowell educator J. Patrick Mogan of the Human Services Corporation, a City of Lowell educator, conceptualized an ~~–ur~~ban park” in which Lowell‘s citizens celebrated their immigrant pasts and industrial city. Other civic leaders were intrigued with a park‘s promise of tourism and development. The State of Massachusetts developed the Lowell Heritage State Park to promote the canal system‘s recreational and historical potential. In a similar effort, the City of Lowell created a Historic Canal District. The federal Lowell Historical Canal District issued detailed recommendations for a national park; these recommendations were recognized in the Park‘s enabling legislation and became the focus for the Commission‘s activities.

Development Projects

The Commission was unlike other park partners in that it received yearly appropriations to develop major projects. It had been given the power to lease and acquire properties; in contrast, the Park could only acquire property by gift. The Commission, therefore, acted on behalf of the Park to rehabilitate properties for the Park‘s use, to create a trolley transportation system, and to develop pathways along the canals.

The first major project completed was Market Mills, the rehabilitation of two mill buildings abandoned by the owners, for affordable housing and the Park visitor center. The Commission worked with the private developer, Market Mills Associates, to create public green space and a courtyard. The Commission also fitted up the remaining ground level spaces for tenants A Brush with History art gallery and studios, the Lowell Telecommunications Corporation, and a food court.

The Commission funded and oversaw the exterior and interior renovations of the Boott Mills Boarding House which became the Mogan Cultural Center, a major Park exhibit space also housing the University of Massachusetts at Lowell Special Collections. The Commission created the Boarding House Park area in front of the Cultural Center. Boott Mills No. 6, now the center for the Park‘s museum operations, originally had been restored for another owner, the

Wang Laboratories, with funding from the Commission (the Wang eventually sold the building to the Commission which donated it to the Park). The Commission also funded the stair tower renovations for the Boott Mills buildings.

The Lowell Historical Canal District Report and the enabling legislation mandated a trolley system to run between the Park's venues. The Commission developed the electrified trolley system consisting of Boston and Maine Railroad rehabilitated tracks and new trolley cars. The first two cars were open-sided and built upon undercarriages from Australia. The electrified system began in 1984 with the Park maintaining and operating the cars. One enclosed closed car for yearlong use was built by 1987. The tracks were extended in two major projects with one extension from French Street to the Wannalancit area and the other extension to Eastern Canal Park and the Jack Kerouac Commemorative.

The Commission, along with the Park and state and city entities, participated in what would become known as the Canalway project, the building of walkways and the general enhancement of the canal system. In projects for the revitalization of the Central Street/Pawtucket Canal area, the Boott Mills area, and the Boott Mills Canalway, the Commission developed the types of signage, fencing, and railing typical of the Canalway projects. The Lucy Larcom Park and Prescott Park lining the canals were also rehabilitated.

The Commission noted in its literature that major projects were developed with a cultural component. The Commission oversaw a Mills Girls, an Immigrant, and a labor history exhibit for the Mogan Cultural Center. It was a major sponsor of Lowell‘s public sculpture program developed in the 1980s. One of the first examples of public art was installed in the Market Mills park area, and others were located to complement the canalways. The purpose of Boarding House Park was to serve as a stage for plays and concerts.

Grants and Loans

The Cultural Programs staff of the Commission supervised the granting of awards in two annual cycles until around 1986 when one round of grants was given yearly. The grants were to relate to the Park‘s themes or to historical themes of Lowell. Popular topics were immigrants and immigration, the fine and decorative arts and architecture in Lowell, ethnic festivals, and archaeology of local sites. The Cultural Programs staff was also responsible for major funding and general support to public sculpture, to the Folklife Program research project with the Library of Congress, to the New England Folklife Center housed in the Mogan Cultural Center, and to the Center‘s exhibits.

The Preservation Plan team described in the Plan and Details of the Plan the Commission‘s building grants and loans programs and created an Index of Properties ranking the buildings‘ historical significance. The Architectural and Planning staffs developed the standards for design review for the historic rehabilitation with the City of Lowell to guide renovations in the Park and Preservation District. Grants and loans following these standards for buildings listed as nationally important in the Index were given in amounts ranging from the thousands to hundreds of thousands. Commission literature cites the high ratio of private investment as compared to the LHPC public investment in these historic rehab projects.

Aftermath

The Commission successfully lobbied for and obtained an extension of its tenure in the mid-1980s. However, the second effort to extend its services was not acted upon and so the Commission disbanded in mid-1995. The Park continued the Canalway efforts and participated in design review for the Preservation District. The Park, the Lowell Office of Cultural Affairs, and educational institutions fostered Lowell‘s cultural and arts promotion.

The Commission‘s staff, led by its Executive Directors Fred Faust, Armand Mercier, and Peter Aucella at various times, had been put together specifically to run development projects and administer grants. The Commission received national awards for the trolley system and waterfront development. It hosted visitors from the United States and the United Kingdom who wanted to learn about its role in Lowell's preservation and rebuilding.

The legacy of the Commission is perhaps most evident in the major development projects for the Park such as the trolley system, the Park‘s Boott Mills Museum and Mogan Center, and segments of the Canalway. However, the cultural grants program fostered artwork and publications and reinforced the Park‘s programming in folklife and Lowell history. Much of what is now appreciated as historic downtown Lowell resulted from the Commission‘s grants and loans enabling its rehabilitation and revitalization.

SCOPE AND CONTENT

Lowell Historic Preservation Commission Records
1971-2011 (bulk dates: 1978-1995)

CATALOG NUMBER	LOWE 16552
VOLUME	100 LF
DESCRIPTION	Minutes, correspondence, administration files, and publications including news articles document the activities of the Commission, in particular their funding of historic preservation and cultural grants. A substantial portion of the records relate to the major building and restoration projects the Commission developed for the Lowell National Historical Park.
ORGANIZATION	[Organization]Organized into nine series: I. Pre-Commission Records, II. Central Files, III. Administrative Files, IV. Cultural Programs, V. Planning, VI. Architectural, VII. Development Projects, VIII. Publications, and IX. Photographic Materials. [Arrangement]According to the nature of the materials, the arrangement is chronological or alphabetical.
PROVENANCE	When the Lowell Historic Preservation Commission (LHPC) ceased operations in 1995, its central files and cultural programs records were taken by the Lowell National Historical Park (LOWE) and housed in the Library. Several LHPC employees involved in the development projects continued their careers at LOWE and brought their files with them. After a 2007 archives survey noted these records, they were gathered at a central location in the Park.
RESTRICTIONS	NO
ASSOCIATED MATERIALS	Resource Management Records Lowell National Historical Park.

HIERARCHY

I. Pre-Commission Records, 1976-1978

II. Central Files, 1987-1995

III. Administrative Files, 1980-1995

IV. Cultural Programs, 1980-1995

- A. Special Projects, 1985-1995
- B. Grant Administration, 1981-1993
- C. Grant Project Files, 1981-1993
- D. Subject Files, 1977-1994
- E. Photographic Materials, 1984

V. Planning, 1979-1995

- A. General Files, 1979-1995
- B. Planning Director, 1979-1995
- C. Preservation Plan, 1979-1995
- D. Index of Properties, 1979-1995
  1. Index , 1979-1995
  2. Cultural Resources Inventory, 1979-1995

VI. Architectural, 1979-1995

VII. Development Projects, 1979-1995

- A. Specifications
- B. Contracts

C. Design and Construction

1. Boarding House
2. Boarding House Park
3. Canals and Canalways
4. Central Street/ Pawtucket Canal Improvements
5. Eastern Canal Trolley Bridge & Prescott Way
6. Gaslight Building
7. Market Mills
8. Mogan Cultural Center
9. Prescott Park/Way
10. Public Art
11. St. Peter's
12. Trolleys
    a. General
    b. Tracks (Initial)
    c. Car Construction
    d. Track Extensions -- French St.

VIII. Publications, 1977-1995

A. Published by LHPC

B. Sponsored by LHPC

C. Re: Lowell (Including LHPC)

IX. Photographic Materials, 1977-1995

(List of Separated Materials including photographic materials and oversize materials follows)

SERIES DESCRIPTIONS

I. *Pre-Commission Records, 1976-1978*

The legislative history and the report of the Lowell Team outlining preferences for the proposed park are located in this series.

Another source of ideas regarding an urban park in Lowell was the Human Services Corporation. Its records are available at Special Collections, Univ. of Mass. Lowell.

II. *Central Files, 1987-1995*

The Commission adopted the central filing system of the National Park Service so the Commission's official records are marked and filed according to the NPS records schedule.

The minutes of the Commission, the first portion of the Central Files, give the summary of the monthly meetings. In these meetings, the LHPC staff briefed the commissioners drawn from federal, state, and local governments and the community at large about the Commission‘s development projects and cultural affairs programming. The minutes beginning in 1985 contain the briefing papers from the staff which give extensive information about status of the Commission‘s many projects and are extremely helpful in determining the chronology of various events. The briefing papers also include photocopies of news articles mentioning the Commission, thus indicating the Commission‘s relationship to the public.

Another major segment relates to memorandums of agreement, in particular to the Lowell Development and Financial Corporation, a consortium of local banks that administered the preservation loans for the Commission.

Only a small portion of "top-level" records related to planning (D), interpretation (K), and history (H) are located in the Central Files. The research will find those materials in the Planning and Architectural series.

Only a small portion of records related to planning (D), interpretation (K), and history (H) are located here.

III. *Administrative Files, 1980-1995*

In addition to its Central Files, the Commission's administration including its executive director filed documents into folders labeled only with subject headings. A major topic is the ongoing battle to regulate commercial billboards in the Park and Preservation District. The Standard Operating Procedures (SOP) for preservation and cultural program grants and the planning process are also present.

IV. *Cultural Programs, 1980-1995*

Apart from its regular cyclical grants program, the Commission provided major funding for projects related to the themes of the city's immigrant history and the arts. While the Park was to administer the exhibit space in the newly rehabilitated Mogan Cultural Center; the Commission helped to fund and oversee the exhibits featuring immigrant and labor history. Boarding House Park was conceived as a space to display the performing arts. The Commission sponsored several major public sculptures placed at highly visible places at Market Mills and the canalways.

A. *Special Projects, 1985-1995*

Materials re: public art projects‘ genesis and funding are located here; documentation on the physical locations is also in the Development Projects series.

B. *Grant Administration, 1981-1993*

This sub-series holds the documentation about the formulation of grant criteria as well as the lists of funded projects.

C. *Grant Project Files, 1981-1993*

These files demonstrate the range and variety of the funded grants. They are arranged by grant account numbers.

D. *Subject Files, 1977-1994*

The minutes of the cultural staff are included. A major topic is the lengthy development of a video related to the labor movement for the Mogan Cultural Center.

E. *Photographic Materials, 1984*

V. *Planning, 1979-1995*

The planning staff, including its two Planning Directors, Sarah Peskin, and Christine (Goetting) Briggs, maintained the documentation regarding the Commission's major projects arranged in subject files. These files contain a wealth of background information about the Preservation Plan, the Canalway, transportation in Lowell including the trolley system, and the relationship between historic preservation and economic development. The Development Projects series (see below) documents the projects in the subsequent phases.

The Preservation Plan (see copy in the Publication Series) noted the requirement for an Index of Properties to rate the structures in the Preservation District. The team who prepared the Preservation Plan determined the historic significance of properties within the National Park and Preservation District and created a ranking system indicating those of major national

significance, local significance, and little significance. Those of national significance were eligible for Commission assistance.

The Index's ratings were based on the information collected for the Cultural Resources Inventory. The architectural firm of Shepley, Bulfinch, Richardson and Abbott conducted for the NPS this survey of the individual properties in the Preservation District which was completed by January 1980. The published report and the original surveys with attached photographs are included in this sub-group. (An electronic copy courtesy of LOWE and Special Collections, Univ. of Mass. Lowell is available at http://uml.edu/cri.)

A. *General Files, 1979-1995*

B. *Planning Director, 1979-1995*

C. *Preservation Plan, 1979-1995*

D. *Index of Properties, 1979-1995*

1. *Index, 1979-1995*

2. *Cultural Resources Inventory, 1979-1995*

VI. *Architectural, 1979-1995*

The highly interrelated subgroups in this subseries document the activity of Chief Historical Architect Charles Parrott who served throughout the tenure of the Commission. Historical Architects David Bitterman and Lance Kasperian also served on the staff. The staff often provided the preliminary designs and always participated fully in the major development projects, hence the extensive information concerning canals and canalways including field notes and measurements, photoprints, and slides. (The Development Projects series also contains the architects' files, see below).

The staff also administered the historic preservation grants (sometimes called the physical grants as opposed to the cultural grants) and loans program. To obtain the grants or larger loans (run through the LDFC), the projects needed to adhere to the Standards guiding the Preservation District. In addition, buildings applying for certain exterior modifications needed to follow the Standards. Thus, the Commission's architect participated in the design review process for many buildings in historic downtown Lowell and developed the Preservation Grants/Loans, Design Review, and Indexed Buildings files with rehabilitation project documents including drawings. Major buildings such the Bon Marche Building, Early Residence, St. Anne's Church, and Old City Hall are represented.

A. Field Notes, 1979-1994

B. Preservation Grants/Loans

1. *Administration*

2. *Grant Project Files*

C. *Design Review*

D. *Indexed Buildings Files*

VII. *Development Projects, 1979-1995*

The major construction and rehabilitation projects generated considerable documentation including contracts and modifications, correspondence between contractor and the Commission's project supervisors and between Commission administrative, architectural, and planning staffers, copies of land deeds and easements, and design and construction drawings. The projects developed for the Park including the trolley and the canals are in this series (the Planning Files – see above – document the projects‘ inception). The documentation re: the Gas Light Building, once the offices of the Commission, is included because it is one of the ten buildings singled out for special consideration in the enabling legislation. The files on St. Peter's Church are extensive and demonstrate the considerable involvement of the Commission staff and resources attempting to rehabilitate a historic structure and halt demolition.

A. *Specifications*

Specifications, often packaged as project manuals, give the special instructions set out to potential bidders in the contract package and thus serve as one of the starting points for approaching the projects. The Commission's architectural staff gathered specifications including those the Commission developed for private properties.

B. *Contracts*

The Commission had its own contracting officer who followed NPS procedures. These copies were housed separately from other Commission files and thus may be extra Contracting Officer copies. (In addition, copies of the contracts and their modifications were kept in the Design and Construction files by project managers and other Commission staff.)

C. *Design and Construction*

This sub-series consists of the documents for the projects' actual design and construction. The Commission fostered communication between staff and contractors by placing their files in an area marked for that project during and after the project. Administrative, architectural, and planning files, therefore, are added to the Contracting Officer Representative's documentation, making for extremely detailed histories. Correspondence, contracts and modifications, drawings, project notebooks, manuals, and photodocumentation comprise these files.

1. *Boarding House*
2. *Boarding House Park*
3. *Canals and Canalways*
4. *Central Street/ Pawtucket Canal Improvements*
5. *Eastern Canal Trolley Bridge & Prescott Way*
6. *Gaslight Building*
7. *Market Mills*
8. *Mogan Cultural Center*
9. *Prescott Park/Way*
10. *Public Art*
11. *St. Peter's*
12. *Trolleys*
    a. *General*
    b. *Tracks (Initial)*
    c. *Car Construction*
    d. *Track Extensions -- French St.*

VIII. *Publications, 1977-1995*

Articles, newsletters, and booklets by and about the Commission make up this series. The Commission's foundation documents including the Preservation Plans and Details suggesting the preservation standards are here. The articles collected by Commission staff reveal the local and national significance of the Park and Lowell's revitalization.

A. *Published by LHPC*

B. *Sponsored by LHPC*

C. *Re: Lowell (Including LHPC)*

IX. *Photographic Materials, 1977-1995*

These items, mostly professional photography of events and places for publicity, were located in a box marked "LHPC Photo Library." The researcher should be aware that most of the Commission photodocumentation for projects is contained in the Planning, Architectural, and Development Projects series.

Audio-visual and oversize paper items were physically removed from the above series with separation sheets indicating the original location in the collection.

CONTAINER LIST

Box 1

I. Pre-Commission

1. The Lowell Team, Phase III Report: Development of the Preferred Alternative, 1 Dec 1976.

See also: Lowell Historic Canal District Commission, Report to Congress, 1977 in Publications.

2. Hearings Before the Subcommittee on Housing and Community Development, Lowell, Mass., 25 Feb 1987.
3. Report on H.R. 11662 (Establishment of Lowell National Historical Park and Commission), 20 March 1978.
4. ~~"~~President Carter Signs Lowell Park Bill," Lowell *Sun*, 5 Jan 1978. Oversize material removed to OS BX 1, Fldr 1.

II. Central Files
Minutes (A40)

5. 26 Dec 1978 - 22 Dec 1980. Interim Planning Committee meeting minutes and Public hearing for draft Preservation Plan notes.
6. 26 Jan 1981 - 19 Dec 1983.
7. 30 Jan 1984 - 23 Sept 1985.
8. 28 Oct 1985.
9. 16 Nov 1985.
10. 04 Dec 1985.
11. 20 Dec 1985.
12. 27 Jan 1986.
13. 24 Feb 1986.
14. 24 Mar 1986.
15. 28 Apr 1986.
16. 02 Jun 1986.
17. 30 Jun 1986.
18. 28 Jul 1986.

Box 2

1. 25 Aug 1986.
2. 29 Sept 1986.

3. 27 Oct 1986.
4. 24 Nov 1986.
5. 15 Dec 1986
6. 26 Jan 1987.
7. 28 Feb 1987.
8. 23 Mar 1987.
9. 28 Apr 1987.
10. 18 May 1987.
11. 22 Jun 1987.
12. 24 Jul 1987.
13. 24 Aug 1987.
14. 28 Sept 1987.
15. 26 Oct 1987.
16. 23 Nov 1987.

Box 3

1. 21 Dec 1987.
2. 25 Jan 1988.
3. 22 Feb 1988.
4. 28 Mar 1988.
5. 25 Apr 1988.
6. 23 May 1988.
7. 27 Jun 1988.
8. 25 Jul 1988.
9. 18 Sept 1988.
10. 24 Oct 1988.
11. 28 Nov 1988.
12. 19 Dec 1988.
13. 23 Jan 1989.
14. 27 Feb 1989.

Box 4

1. 27 Mar 1989.
2. 24 Apr 1989.
3. 22 May 1989.
4. 26 Jun 1989.
5. 24 Jul 1989.
6. 28 Aug 1989.
7. 25 Sept 1989.
8. 23 Oct 1989.
9. 18 Nov 1989.

10. 02 Dec 1989.
11. 18 Dec 1989.

Box 5

1. 22 Jan 1990.
2. 26 Feb 1990.
3. 26 Mar 1990.
4. 23 Apr 1990.
5. 21 May 1990.
6. 25 Jun 1990.
7. 23 Jul 1990.
8. 27 Aug 1990.
9. 24 Sept 1990.
10. 29 Oct 1990.
11. 26 Nov 1990.
12. 17 Dec 1990.

Box 6

1. 28 Jan 1991.
2. 25 Feb 1991.
3. 25 Mar 1991.
4. 29 Apr 1991.
5. 29 May 1991.
6. 24 Jun 1991.
7. 22 Jul 1991.
8. 26 Aug 1991.
9. 23 Sept 1991.
10. 28 Oct 1991.
11. 25 Nov 1991.
12. 23 Dec 1991.

Box 7

1. 27 Jan 1992.
2. 24 Feb 1992.
3. 23 Mar 1992.
4. 27 Apr 1992.
5. 18 May 1992.
6. 22 Jun 1992.
7. 27 Jul 1992.
8. 24 Aug 1992.
9. 28 Sept 1992.
10. 26 Oct 1992.

Box 8

1. 30 Nov 1992.
2. 21 Dec 1992.
3. 25 Jan 1993.
4. 22 Feb 1993.
5. 08 Mar 1993.
6. 29 Mar 1993.
7. 26 Apr 1993.
8. 24 May 1993.
9. 21 Jun 1993.
10. 26 Jul 1993.

Box 9

1. 23 Aug 1993.
2. 27 Sept 1993.
3. 25 Oct 1993.
4. 22 Nov 1993.
5. 20 Dec 1993.
6. 24 Jan 1994.
7. 28 Feb 1994.
8. 28 Mar 1994.
9. 25 Apr 1994.
10. 23 May 1994.
11. 27 Jun 1994.

Box 10

1. 25 Jul 1994.
2. 22 Aug 1994.
3. 26 Sept 1994.
4. 24 Oct 1994.
5. 28 Nov 1994.
6. 19 Dec 1994.
7. 05 Jan 1995.
8. 23 Jan 1995.
9. 27 Feb 1995.
10. 24 Apr 1995.
11. 22 May 1995 [Last meeting].
12. 02 Jun 1995 [Jun and Jul activities].
13. 03 Oct 1995 [LOWE Office of Canalway Development Briefing Paper].

Box 11

Records of Boards (A16)
1. Commission Appts. 1985-1990, Fldr 1 of 2.
2. Commission Appts. 1990, Fldr 2 of 2.

(A1619)
3. Commission Appts. 1988-1992.

Records of Advisory Boards (A18)
4. Mogan Center Advisory Board 1989-1990.

Records of Associations (A22)
5. MCC Community Advisory Board 1987-1989.
6. Commissions, 1993.

Committees (A24)
7. Bells Committee, 1992.

Records of Cooperating Associations (A42)
8. 1992.

Memorandums of Agreements with Other Agencies (A44)
9. LDFC [Lowell Development and Financial Corporation] FY 1979.
10. LDFC FY 1980.
11. LDFC FY 1981.
12. LDFC FY 1982.
13. LDFC FY 1983.
14. LDFC FY 1984.

Box 12
1. LDFC, FY 1985.
2. LDFC, FY 1986.
3. LDFC, FY 1987.
4. LDFC, FY July 1987.
5. LDFC, FY 1988.
6. Lowell Plan – Public Arts Project 1988.
7. Briefing Papers Folklife Center 1989 – 1995.
8. Interagency Agreement - NHP for Mogan 1989 – 1994.
9. Lowell Development and Financial Corporation, FY 1989.
10. The Lowell Plan 1989.
11. Greater Lowell Regatta Festival 1990, Fldr 1 of 3.
12. Greater Lowell Regatta Festival 1990, Fldr 2 of 3.

Box 13
1. Greater Lowell Regatta Festival 1990, Fldr 3 of 3.

2. Emerson College, FY 1990.
3. Lowell Development and Financial Corporation, FY 1990.
4. Merrimack Repertory Theatre-BHP, 1990.
5. Lowell Development and Financial Corporation, FY 1991.
6. Merrimack Repertory Theatre 1991, Fldr 1 of 2.
7. Merrimack Repertory Theatre 1992, Fldr 2 of 2.
8. Lowell Development and Financial Corporation, FY 1992.

Box 14

1. The Lowell Plan, Inc., 1992.
2. City of Lowell Auditorium Draft, 1993.
3. LHPC Folklife Center and LNHP, 1993.
4. Lowell Development and Financial Corporation, FY 1993.
5. Lowell Folklife Project, 1993.
6. Lowell Historical Society, 1993.
7. Merrimack Repertory Theatre, 1993.
8. Middlesex Community College-Cambodian Programs, 1993-94.
9. UMass/Lowell Tsongas Industrial Center, 1993 – 1994.
10. Whistler House Museum 1993-1994 Folder 1 of 3.
11. Whistler House Museum 1993-1994, Folder 2 of 3.
12. Whistler House Museum 1993-1994, Folder 3 of 3.
13. Brush with History 1994.

Box 15

1. Lowell Development and Financial Corporation, FY 1994, Folder 1 of 3.
2. Lowell Development and Financial Corporation, FY 1994, Folder 2 of 3.
3. Lowell Development and Financial Corporation, FY 1994, Folder 3 of 3.
4. Lowell Development and Financial Corporation –Brush with History", FY 1994 Folder 1 of 2.
5. Lowell Development and Financial Corporation –Brush with History", FY 1994 Folder 2 of 2.

Box 16

1. New England Quilt Museum, 1994.
2. UMass/Lowell – Center for Lowell History, 1994.
3. UMass/Lowell and LHPC, 1994.
4. Lowell Development and Financial Corporation, FY 1995.
5. Lowell Historical Society 1995, Fldr 1 of 2.
6. Lowell Historical Society 1995, Fldr 2 of 2.
7. Lowell Development and Financial Corporation, FY 1996.

Records of Visits (A60)

8. Visits Including International Guests, 1991-1993.

Freedom of Information Act (A7221)

9. FOIA – Walter Howard, 1991.

Box 17

1. Freedom of Information Act – William McInerney, 1991.

Reports of Dedications (A8215)

2. Mogan Center Dedication, 1987-1989.

Planning Program Records (D18)

3. Preservation Plan, 1989-1990.
4. Boarding House Park Sculpture, 1990.
5. New England Folklife Center, 1990.
6. Planning Process, 1990.
7. Preservation Plan Amendment, 1990.

Development and Maintenance Reports (D26)

8. Canalway Report, 1985
9. Corps of Engineers Merrimack Navigability, 1987.

Other Structures Files

10. Public Art, 1990.

Certificates of Expenditures (F38)

11. Jan 1974-May 1978.
12. Jun 1978 - Aug 1979.

Box 18

1. Aug 1979 – November 1983.
2. Feb 1984 – Jun 1986.

Historic Sites and Structures (H30)

1. Holy Trinity, 1990.
2. 21-27 Kirk Street [Missionary Oblates], 1992-1993.

Historic Preservation Grants in Aid (H36)

1. Exchange Coffee House, 1980.
2. Spaulding (Male Shop) Building (98-100 Central St.), 1982.
3. Nesmith House, 1988-1992.

4. Lawrence Agent‘s House (119 Hall St.), 1989.
5. Massachusetts Mills Power House, 1989.
6. Executive Building (100 Merrimack Street), 1990.
7. Lowell VMA Building (150 Middlesex St.), 1990.
8. Museum of American Textile History, 1991-1992.

Records of Interpretive Activities (K18)

1. Records of Interpretive Activities, Cultural Grants, 1988.
2. Cultural Grants, 11th Cycle 1989.
3. Cultural Grants and Events 1989.
4. Temporary Exhibits 1989 – 1995.
5. Cultural Grants, 12th Cycle 1990.
6. Cultural Grants, 13th Cycle 1990.
7. Cultural Grants, 14th Cycle 1990.

Box 19

1. Labor Video, 1990.
2. ~~–~~Martha‘s Correspondence,” 1990 – 1992 [Cultural Programs].
3. Public Art, 1990-1993.
4. ~~–~~Julie‘s Correspondence,” 1991 [Cultural Programs].
5. Cultural Grants, 15th Cycle 1992.
6. Education/Technical Assistance, 1993.
7. Folklife Center 1993.
8. Folklife Center 1993 – 1995.
9. Julie‘s Correspondence, 1993 – 1995.
10. ~~–~~Kerouac,” 1993.
11. ~~–~~Martha‘s Correspondence,” 1993 – 1995.
12. Museum of American Textile History 1993.

Land Use Files (L30)

1. Land Use Files, Mogan Center 1987.

Records of Proposed Areas (L58)

2. Background, Aug 1978 – Nov 1979.

Records of Designated Areas (L60)

3. City Hall Local District, 1973.
4. City Hall N. R. District, 1975.
5. Locks and Canals N.R. District, 1976.

Box 20

1. Merrimack Street, N.R. District, 1979.
2. Historic District Materials, 1981.
3. Historic Districts, General, 1981.
4. Locks and Canals Local District, 1982.

III. Administrative Files

1. Billboard Background, 1987-1991 (Part 1 of 2).
2. Billboard Background, 1987-1991 (Part 2 of 2).
3. Billboard Removal, 1989-1990 (Part 1 of 4).
4. Billboard Removal, 1989-1990 (Part 2 of 4).
5. Billboard Removal, 1989-1990 (Part 3 of 4).

Box 21

1. Billboard Removal, 1989-1990 (Part 4 of 4).
2. Billboards, 1995.
3. Budget FY83, 84 Development Program.
4. Budget Development, 1992.
5. City Agencies and Offices [Historical Commission of the City of Lowell], 1992
6. City Agencies [Coalition for a Better Acre], 1983-1984.
7. City of Lowell Agencies and Offices [American City Corporation], 1981.
8. City of Lowell Agencies and Offices [City Manager] 1979-1981.
9. Commission Activity [Committee Affairs] 1979.
10. Commission Activity [News Articles] 1980.
11. Commission Activity [Public Hearing] March 24, 1980.
12. Commission Activity [Press Releases] 1978-1982.
13. Commission Trip [New Orleans] 1989.
14. Cultural Accounts, 1994.

Box 22

1. Cultural Affairs [Lowell Cultural Alliance], Folder 1 of 2.
2. Cultural Affairs [Lowell Cultural Alliance], Folder 2 of 2.
3. Cultural Budget Summary, 1990-1992, Folder 1 of 2.
4. Cultural Budget Summary, 1993-1994, Folder 2 of 2.
5. Cultural and Educational Site [Specific Projects-Strand Theatre], 1980-1983.
6. Cultural and Educational Staff/Community Projects [Center for Human Development] 1978.

7. Cultural and Educational Staff/Community Projects [Lowell Museum Project] 1981.
8. Cultural and Educational Staff/Community Projects [History Conferences] 1981-1982. Oversize material removed. See ½ size map folder list.
9. Downtown Façade Program, n.d. [City of Lowell].
10. Federal Agencies—Secretary of Int. [Dept. of Interior] 1980-1981.
11. Federal Legislation and Regulations—LHPC [Public Law] 1980.

Box 23

1. Folklife Center Transition, 1994-1995.
2. Re: Land Issues/ Authority of LHPC Executive Director, 1992-1993.
3. Local Agencies and Offices [The Lowell Plan] 1980-1987.
4. Lowell Festival, 1981.
5. Re: Mogan Cultural Center, 1993-1994.
6. New England Folk Festival, 1993.
7. Notice of Standards for Rehab. and Construction [Federal Register] 1981.
8. Phasedown & Termination – Briefing on H.R. 4448, [Fall 1994?].
9. Re: Preservation Plan Amendment], [1987]-1990.
10. Regional Agencies and Offices [Inter Agency Coordinating Committee], 1982.
11. Regional Agencies and Organizations [Merrimack River Watershed Council], 1983.
12. Standard Operating Procedures: Part I (Staff) – Part III (Administration), ca. 1990.

Box 24

1. Standard Operating Procedures: Part IV (Cultural Grants), ca. 1990.
2. Standard Operating Procedures: Part V and VI (Loans and Preservation Grants), ca. 1990.
3. Standard Operating Procedures: Part VII (Planning Process) and Appendix (Legislation), ca. 1990.
4. Steering Committee, Lowell State Heritage Park, 1987.

IV. Cultural Programs
A. Special Projects
1. Mogan Cultural Center Permanent Exhibits

5. Mill Girls/ Immigrants Exhibit Contract – Photo Exhibit Specifications, [1986].
6. Mill Girls/ Immigrants Exhibit Contract – Artifact Specifications, Vol. I, [1986].

Box 25

1. Mill Girls/ Immigrants Exhibit Contract – Artifact Specifications, Vol. II, [1986].
2. Mill Girls/ Immigrants Exhibit Contract – Text Label Specifications, [1986].
3. Mill Girls/ Immigrants Exhibit Contract – Art Specifications, [1986].
4. Mill Girls/ Immigrants Exhibit Contract – Room Furnishing Specifications, [1986].

Box 26

1. Mill Girls/ Immigrants Exhibit Contract – Audio-Visual Specifications, [1986].
2. Mill Girls/ Immigrants Exhibit Contract – General Fabrication Specifications, 1986].
3. Mill Girls/ Immigrants Exhibit Contract – Immigrant Object Lists, June 1986.
4. Mill Girls/ Immigrants Exhibit Contract – Artifacts Lists, June-Nov, 1986. Part 1 of 3.
5. Mill Girls/ Immigrants Exhibit Contract – Artifacts Lists, June-Nov, 1986. Part 2 of 3.
6. Mill Girls/ Immigrants Exhibit Contract – Artifacts Lists, June-Nov, 1986. Part 3 of 3.

Box 27

1. Exhibit Space Fabrication Proposal, [1987].
2. Mills Girls/ Immigrants Exhibit – Project Documents for Immigrant Exhibit Videos, 1988.
3. Mills Girls/ Immigrants Exhibit – Exhibit Video Technical Evaluation, 1998.

2. Boarding House Park [BHP]

4. Photograph – During Construction, March 1990.
5. Slides – ~~"B~~HP & Scenery Near It," ca. July 1990.
6. Slides – [BHP] ~~"W~~ith and Without Performers," ca. July 1990.
7. Photographs – Concerts and Fireworks, ca. 1990.

3. Public Art [see also: Development Projects – Design and Construction – Public Art]

8. LHPC Involvement, 1987-1995. Includes photographs.
9. Robert Cumming, Boarding House Park Sculptures, 1988-1991 (Part 1 of 3). Oversize material removed. See ½ size map folder list.
10. Robert Cumming, Boarding House Park Sculptures, 1988-1991 (Part 2 of 3).
11. Robert Cumming, Boarding House Park Sculptures, 1988-1991 (Part 3 of 3) -- Photographs.
12. Carlos Dorrien, Human Construction, 1988-1989. Includes photographs and slides.
13. Peter Gourfain, Stele for the Merrimack, 1993-1996. Slides included.

Box 28

1. Dimitri Hadzi, Agapetime, 1990-1991. Photographs included.
2. Michio Ihara, Power of Water/ Pawtucket Prism, 1985-1988 (Part 1 of 2). Includes photographs. Oversize material removed. See ½ size map folder list.

2a. Michio Ihara, Power of Water/ Pawtucket Prism, 1985-1988 (Part 2 of 2).

3. Mico Kaufman, Homage to Women, 1983-1984. Includes photographs.
4. Ellen Rothenberg, Industry, Not Servitude!, 1989-1996, 2011. Includes photographs and slides.
5. Ivan and Elliott Schwartz, The Worker, [1985]. Includes photographs and slides.

B. Grants Administration

6. Summaries of Grants Cycles 1-10, 1981-1987.
7. Grant Cycle Log, 1981-1986.
8. First Cycle, Spring 1981.
9. Rating System, [Spring 1981].
10. Sixth Cycle, Fall 1984.
11. Seventh Cycle, [Fall-Spring 1985].
12. Eighth Cycle, Fall 1985.
13. Grant Authorizations, 1985-1988.
14. Ninth Cycle, Fall 1986.
15. Tenth Cycle, Fall 1987.
16. Eleventh Cycle, Fall 1988.
17. Twelfth Cycle, Fall 1989 [-Spring 1990].

Box 29

1. Review of Evaluation System, 1981-1989.
2. Secretary of Interior Approval Letters, 1989-1993
3. Revision of Grant Guidelines and Forms, [Aug 1989].
4. Application Procedures, [1989].
5. Grants-In-Progress, 1990, 1992.
6. Thirteenth Cycle, Fall 1990.
7. 14th Cycle, Fall 1991.
8. 15th Cycle, Fall 1992.
9. Correspondence re: Termination of Program, June 1993.

C. Grant Project Files

10. C1015, Franco-American Dance, 1981-1982. (PX1978-1-0107) Includes photographs. Oversize material removed. See ½ size map folder list.
11. C1030, Sacred Spaces: The Spiritual in Folk Art, A Brush With History Gallery and Artists‘ Studios, 1987-1988.
12. C1051, Working the Water: Life and Labor on Lowell's Canals, 1981-1982. (PX1978-1-0109) Includes booklet.
13. C1057, Songs of Our Own French Heritage, 1981. (PX1978-1-0094) Includes playbill. Oversize material removed (see 1/2-size map folder list).
14. C1077, Religious Architecture of Lowell, 1981-1982. (PX1978-1-0098) Includes books (Vol 1 & 2).

Box 30

1. C1100, Kerouac's Lowell Places - A Guide, 1981. (PX1978-1-0093) Includes brochure.

2. C2044, If the Falls Could Speak, 1981. (PX1978-2-0029) Includes playbook. Oversize material removed.
3. C2057, Ask Me, I Know Lowell, 1981-1984. (PX1978-2-0028) Includes information folder.
4. C3018, The First Greek Immigrants in Lowell, 1982-1983. (PX1978-2-0122) Includes book.
5. C4017, Lowellia, 1982-1984. (PX1978-3-0119) Includes playbill.
6. C5001, A Proud New England Daughter, 1983-1984. (PX1978-3-0172) Includes draft.
7. C5015, Fire Service of Lowell, 1983-1984. (PX1978-3-0170) Includes booklet.
8. C6021, Eon, the Time-Traveling Computer: A Puppet Show About Lowell‘s Heritage, The Karesande Players, 1984-1985.
9. C6027, Les Habitants: The French Canadians of Lowell, 1984-1985. (PX1978-5-010[?]) Includes brochure.
10. C6030, Whistler House Museum Brochure, 1984-1985. Includes brochure.
11. C6036, A Day In Lowell's Life, 1985. (PX1978-5-0103) Includes flyer.
12. C6055, Face The Music, 1985. (PX1978-5-0105) Includes booklet.
13. C7044, Samuel P. Howes: Portrait Painter, 1985-1986. Includes book.

Box 31

1. C8014, The Light in the Mill, 1985-1986. (PX1978-6-0048) Includes photographs, script
2. C8022, Irish Cultural Week, 1986. (PX1978-6-0045) Includes photographs, booklet
3. C8033, Samuel P. Howes Catalogue, 1985-1986. (PX1978-6-0044) Includes photographs
4. C8043, Lost Eden/ Lowell Fever, 1982-1995. (GA1978-3-C019).
5. C8043, Lost Eden/ Lowell Fever, 1982-1995. (GA1978-3-C019). Screenplay.
6. C8046, The Young Artists: Dedicated to the Arts Datebook, 1985-1986. (PX1978-6-0046) Includes booklet.

Box 32

1. C9013, The History of Hospital Care in Lowell, 1986-1987. (CRBIB# 405808) Includes book.
2. C9024, Bamboo: A Newsletter, 1986-1988. Includes newsletter.
3. C9028, Folk Clothing of Twelve Countries, Flora Smith, 1987-1989.
4. C10-11, Boott and Massachusetts Mills photodocumentation, 1988. (Part 1 of 6).
5. C10-11, Boott and Massachusetts Mills photodocumentation, 1988. (Part 2 of 6). Includes photographs.
6. C10-11, Boott and Massachusetts Mills photodocumentation, 1988. (Part 3 of 6). Includes photographs.
7. C10-11, Boott and Massachusetts Mills photodocumentation, 1988. (Part 4 of 6). Includes photographs.

8. C10-11, Boott and Massachusetts Mills photodocumentation, 1988. (Part 5 of 6). Includes photographs.

Box 33

1. C10-11, Boott and Massachusetts Mills Photodocumentation, 1988. (Part 6 of 6). Includes photographs.
2. C10-90, Technology Around the Block, 1987-1989. Includes Photographs, Booklet, Slides.
3. C11-6, Labor of Love, 1988. Includes Photographs.
4. C11-12, Bertha: The Sewing Machine Girl, Merrimack Repertory Theatre, 1987-1988. (MT1978-8-0012) Includes Photographs.
5. C-14-7, Greek Immigrant Chronicles: The Alpha and Omega, 1990-1994. (MT1978-1-0019) Includes Photographs.
6. C-14-22, Latin American Exhibit, 1989-1990. (MT1978-0-0051) Includes Brochure.
7. C-14-67, Tile Design Project for Cross Street Park, 1989-1991. (MT1978-0-0055) Includes Photographs.
8. C-14-83, Acre of Hope . (MT1978-0-0053) Includes Videocassette moved to A-V Storage BX 1, Fldr 4.

Box 34

1. GA1978-1-0016, An Ear for History: The Sound of Lowell, 1990-1991. Includes audio-cassettes moved to A-V Storage BX 2, Env. 1-5.
2. GA(MT)1978-3-0006, Textile Traditions: The Fabric of Women's Lives, 1993-1994. Includes booklet.
3. GA(MT)1978-3-0007, Hands Across the City, 1992-1993. Includes videocassette moved to A-V BX 1, Env 5.
4. GA1978-3-0012, The Venice of the North: An Artist's View, 1992-1993. Includes slides.
5. GA1978-3-C013, Music and Dance of Cambodia, 1993. Includes videocassette moved to A-V BX 1, Env 6.
6. MT1978-0-0043, Irish Culture Week, Irish Cultural Week Committee, 1990.
7. MT1978-0-0050, The Musicmakers: Seamus Connolly and Friends, 1989-1990. Includes videocassette moved to A-V BX 1, Env 7.
8. MT1978-0-0057, A Piece of the Pie, Greater Lowell YWCA, 1989-1990.

Box 35

1. MT1978-0-0058, The Dream Weaver, Eleanor Glaessel-Brown, 1985-1991.
2. MT1978-0-0068, French Canadian Studies Program, Middlesex Community College, 1989-1992. Includes booklet.
3. MT1978-0-0069, The Musical Time Machine, Lowell Musicians Association, 1990.
4. MT1978-0-0075, Art as the Voice of Greek Experience, Charles Nikitopoulos, Univ. of Lowell, 1989-1990. Includes booklet. Videocassette moved to A-V BX 1, Env 8.

5. MT1978-0-0088, Living on the Boott, Stephen Mrozowski and Mary Beaudry, 1989-1995, Folder 1 of 2.

Box 36

1. MT1978-0-0088, Living on the Boott, Stephen Mrozowski and Mary Beaudry, 1989-1995, Folder 1 of 2.
2. MT1078-1-0017, Lincoln in Lowell: A Dramatic Portrayal, 1990-1991. Includes booklet, brochure.
3. MT1978-1-0018, The Lowell Neighborhood Fair, 1991. Includes slides.
4. MT1978-1-0022, Lowell Multicultural Book Project, 1991. Includes brochure, poster.

Box 37

1. MT1978-1-0023, City of Lowell Youth Film Festival, 1991. Includes Photographs.
2. MT1978-1-0025, Bibliographic Treasures of Lowell, 1991-1993. Includes Booklet.
3. MT1978-1-0030, Project KID, 1990-1992. Includes Videocassette moved to A-V Storage BX 1, Env 3, Curriculum Booklet.
4. MT1978-2-0006, A Cambodian Legacy: The Endless Struggle, 1992-1993. Includes Playscript.
5. MT1978-2-0008, Chronicling Memories of Lowell, William Roberts, Univ. of Mass, Lowell, 1992. Includes Booklet.
6. MT1978-2-0009, Publication of St. Jean Baptiste Parish History, 1991-1993. Includes Book.

Box 38

1. MT1978-2-0013, Storyteller in Residence, 1992-1993. Includes Videocassette moved to A-V Storage BX 1, Env 9, Booklet.
2. MT1978-2-0015, 4th Annual Thoreau's Portage White Water Slalom Competition, 1992-1993. Includes Booklet.
3. MT1978-2-0018, Kerouac's Lowell: World and Image, 1991-1993. Includes Brochure.
4. MT1978-3-0010, International Institute of Lowell: A Brief History, 1991-1995. Includes draft.
5. MT1978-8-0009, An Exhibit on the Historic Jewish Community of Lowell, 1987-1989. Includes Flyer.

Box 39

1. MT1978-8-0015, Trolley Art, Arts Magnet School, 1987-1989.
2. MT1978-9-0069, Folk Culture in America: On Stage at the National Folk Festival in Lowell, Mass., Page One Productions, 1988-1989. Includes videocassette moved to A-V BX 1, Env 1.
3. MT1978-9-0070, Greek Festival, Liana Cheney, University of Lowell, 1989. Includes brochure, poster, postcard.

4. MT1978-9-0071, Farm to City: The History of Lowell and Its People, curriculum project, Karen Lougee, St. Jeanne D'Arc School, 1988-1990. Includes photographs.
5. MT1978-9-0072, Through Attic Windows, New England Quilt Museum, 1988-1989. Includes booklet.

Box 40

1. MT1978-9-0073, Sweet Treats and Hidden Treasures, 1989-1990. Includes slides. Audiocassette moved to A-V Storage BX 2, Env. 6.
2. MT1978-9-0073, Book -- Sweet Treats and Hidden Treasures, 1989-1990.
3. MT1978-9-0077, Exterior Signage at the Whistler House, Whistler House Museum of Art, 1988-1989. Oversize material removed (see full-size map folder list).
4. MT1978-9-0078, Youth Film Festival, City of Lowell, 1989-1990. Videocassette moved to A-V BX 1, Env 2.
5. [No File Number], Nesmith House Restoration, 1990-1991 [Exhibit Research]. Folder 1 of 2.
6. [No File Number], Nesmith House Restoration, 1990-1991 [Exhibit Research]. Folder 2 of 2. Includes photographs.

Box 41

1. [No File Number], Public Sculpture Project, 1990-1991. Includes brochure
2. [No File Number], A Sign of the Times: A Short Tour of Some of Lowell's Oldest Businesses and Products, 1990. Includes photographs.
3. [No File Number], Preservation of Cambodian Culture, 1990-1991. Includes photographs.
4. [No File Number], At the Edge, 1993. Includes draft.
5. [No File Number], Comprensive Evidence for Viking and Gaelic Sites in the Americas and Elsewhere, 1985. Includes draft.
6. [No File Number], Druid Hill Archaeological Excavation Project, 1989. Includes test pit records.
7. [No File Number], The Middlesex Canal, Republican Ideology, and the Process of Emulation, 1984. (CRBIB# 405809) Includes thesis.
8. [No File Number], Cambodian Neighborhood Walking Tour, 1994. Includes walking tour.
9. [No File Number], Historic Lowell Maps, 1986. Includes maps. Oversize material removed (see full size map folder list).
10. [No File Number], Role Play: Why Education is Important. Includes script.
11. PX1978-5-0038 – 0041 and 0043, Immigrant Exhibit Symposium, 1984-1986. Includes transcribed tapes.

Box 42

1. PX1978-1-0095, Community Food and Nutrition Program, Community Teamwork Inc., 1981-1982.

2. PX1978-1-0105, Charms of the Muse: Women in 19th Century American Music, Suzanne Robertson, 1984-1985.

D. Subject Files

1. Contemporary Labor Exhibit, 1989.
2. Folklife Institute Project Budget, Feb-Aug 1994.
3. Re: Labor Exhibit and Video – State Labor Grant, 1987
4. Re: Labor Exhibit – Committee for the American Workers Story, 1977-1993.
5. Re: Labor Exhibit – Scripts and Review, 1987-1989 (Part 1 of 3).
6. Re: Labor Exhibit – Scripts and Review, 1987-1989 (Part 2 of 3).
7. Re: Labor Exhibit – Scripts and Review, 1987-1989 (Part 3 of 3).

Box 43

1. Re: Labor Video – Contractual Obligations, 1988-1989 (Part 1 of 2).
2. Re: Labor Video – Contractual Obligations, 1988-1989 (Part 2 of 2).
3. Re: Labor Video – Completion, 1988-1990.
4. Re: Labor Exhibit Funding from LHPC, June 1985.
5. Re: Labor Video – Timetables and Progress Reports, 1987-1989.
6. Re: Labor Video – Termination of Production Contract, 1988.
7. Re: LHPC Reauthorization, 1987.
8. Lowell Cultural Plan Review Project: Final Report, 1994.
9. Meeting – The Lowell Public Art Collection, May 1988.
10. Mill Workers of Lowell Oral History Project, 1986.
11. Re: Mill Workers of Lowell Oral History Project, 1986.
12. Minutes, Cultural Staff Meetings, Oct 1988-Feb 1992 (Part 1 of 2).
13. Minutes, Cultural Staff Meetings, Oct 1988-Feb 1992 (Part 2 of 2).

Box 44

1. Mogan Cultural Center – Background Material, 1984-1989.
2. Mogan Cultural Center – Drawings and Floor Plans, [1984-1989?]
3. Mogan Cultural Center – Community Advisory Board Minutes and Additional Materials, 1989-1993 (Part 1 of 2).
4. Mogan Cultural Center – Community Advisory Board Minutes and Additional Materials, 1989-1993 (Part 2 of 2).
5. Mogan Cultural Center – Community Advisory Board, 1993-1994.
6. Mogan Cultural Center – Guidelines for Developing and Fabricating a Temporary Exhibit at the Patrick J. Mogan Cultural Center, 1993-1994 (copy 1).
7. Mogan Cultural Center – Guidelines for Developing and Fabricating a Temporary Exhibit at the Patrick J. Mogan Cultural Center, 1993-1994 (copy 2).

8. Mogan Cultural Center – A Visual Guide to the Development & Installation of Your Temporary Exhibit at the Patrick J. Mogan Cultural Center, ca. 1993 (Part 1 of 2). Includes slides.
9. Mogan Cultural Center – A Visual Guide to the Development & Installation of Your Temporary Exhibit at the Patrick J. Mogan Cultural Center, ca. 1993 (Part 2 of 2). Includes slides.

Box 45

1. Mogan Cultural Center – Themes for Immigrants Exhibit, ca. 1986.
2. Public Art, 1987-1994 (Part 1 of 2).
3. Public Art, 1987-1994 (Part 2 of 2).
4. [No Author], Race, the Canon, and Kerouac, ca. 1997.
5. Research by Daley Junior High Students re: the Acre, 1986.
6. Research Paper, "The Jews in Lowell, 1905-1914," by David Baskin, 1968 [photocopy ca. 1986].
7. Research Paper, "Little Canada," by Mary Ann P. Roux, ca. 1986.
8. Research Paper, "The Polish Community of Lowell, Massachusetts," by Jane Leczynski, ca. 1986.
9. Students Interview Their Mill Worker Grandparents, ca. 1986.
10. Summary Report – Franco-American Center, Lowell, Harvard Graduate School of Design, 1979.
11. "And That's How We Did it in the Mill" – Script for Videotape, ca. 1986.
12. Women's History Conference, 1993.

E. Photographic Materials

13. Scenes at Market Mills [Publicity Shots?], ca. 1984. Includes photographs.

V. Planning
A. General Files

14. Advisory Council on Historic Preservation [106 Review], 1980-1981.
15. [American Consulting Engineers Council], 1983.
16. Belt Drive Wheel (Lawrence Mfg. Co.) Scope of Preservation Work, Aug 1982.
17. Boarding House – Planning Concept Analysis, 1979.
18. Boott Mill [#6 and Wang Laboratories], 1978-1983 (Part 1 of 2).

Box 46

1. Boott Mill [#6 and Wang Laboratories], 1978-1983 (Part 2 of 2).
2. Boott Mill [#6 and Wang Laboratories] – Rehabilitation, 1980-1981 (Part 1 of 2).
3. Boott Mill [#6 and Wang Laboratories] – Rehabilitation, 1980-1981 (Part 2 of 2).
4. Boott Mill [#6 and Wang Laboratories] – 1981-1982 [Change in Plans].
5. Boott Mill [#6 and Wang Laboratories] – Options for Rehabilitation], 1980-1984.

6. Boundary Changes [Proposed], 1980-1981. Oversize material removed. See ½ size map folder list.
7. Briefing Papers, Feb 1980-Sept 1983. *Highly informative.*
8. Budget/Development, 1989.
9. Budget/Development, 1990-1991.

Box 47

1. Budget [Preparation/Projections], 1980-1987 (Part 1 of 2).
2. Budget [Preparation/Projections], 1980-1987 (Part 1 of 2).
3. Canalway – Budgets, 1987-1988
4. Canalway [Master Plan], 1979-1986
5. Commercial Space and Marketing, 1981-1982
6. Cultural Affairs Plan, ca. 1989
7. [Cultural Agencies] – Paul Marion, Toward the Next Stage: A Study of Cultural Organizations and Agencies in Lowell, Massachusetts, Edson Parker Foundation, Sept 1995.
8. Design Review Committee, 19879-1981.
9. Development Projects – St. Anne‘s Church, post 1980.
10. Development Projects – Skills Training Center, 1979-1984.
11. Development Projects – Acre Projects, 1980-1983.
12. Development Projects – AHEPA Building, ca. 1980.
13. Development Projects – Appleton Street House (Colburn Block), 1979-1980.
14. Development Projects – Market Mills – Statue, 1981-1983 [Public Art].
15. Development Status Reports, 1979-1980.
16. Downtown Lowell – Retail Business Characteristics, 1980.

Box 48

1. Easements and Restrictions (General Info.), 1979.
2. Economic Development, 1979-1983.
3. Economic Impacts [of Preservation Grants & Loans], 1979-1985.
4. Energy – General, 1979-1980.
5. Environmental Compliance, 1980-1982 [NEPA].
6. Notebook – Environmental Procedures [and Preservation Grant Process], 1979-1980 (Agency Procedures, Internal Guidelines, Applicant Guidelines) (Part 1 of 3).
7. Notebook – Environmental Procedures [and Preservation Grant Process], 1979-1980 (Agency Procedures, Internal Guidelines, Applicant Guidelines) (Part 2 of 3).
8. Notebook – Environmental Procedures [and Preservation Grant Process], 1979-1980 (Agency Procedures, Internal Guidelines, Applicant Guidelines) (Part 3 of 3).
9. Excellence on the Waterfront Award, 1992.
10. ~~–G~~eneral” [Various Topics], 1979-1983.
11. Historic Buildings – Cleaning, 1980.

12. Historic Buildings – Misc. Information, 1979, 1985.
13. Historic Board – Legislation, 1982-1983.
14. Historic Board – Standards, [1983].
15. History Now [Exhibition Plan: Immigrants, Mogan Cultural Center], 15 Aug 1986.

Box 49

1. Job Signs, ca. 1980.
2. Lowell – The Building Book, 1978.
3. Lowell – The Sign Book, 1983.
4. Lowell Development & Finance Corporation, 1983-1984.
5. The Lowell Plan, 1980-1993.
6. Lowell Promotional Literature, ca. 1985-ca. 1990.
7. Made in U.S.A., 1986-1987 [Film Development Co. Promoting ―Lowell Fever‘].
8. Maintenance [Canal System], 1987-1988.
9. Market Mills – Downtown Development Awards Competition, 1983.
10. Maps – LHPC Projects, ca. 1980-1989. Oversize materials removed. See ½ size map folder list.
11. ―Miscellaneous,‖ 1986-1989.
12. Materials re: Potential Re-Authorization, 1994. Includes spreadsheet with summary of Preservation Grants and Loans.
13. NPS Environmental [and Economic] Impact Statement, ca. July 1980 [LHPC comments].
14. NPS General Management Plan, 1979-1980.
15. NPS General Management Plan – LHPC Response, 1979-1980.
16. NPS Park Plans, 1979-1980.

Box 50

1. ―Photo File‖ [Photocopies of Lowell Historical Society Images], ca. 1980.
2. Photos (Aerial) – Purchase, 1988-1989.
3. Preservation Plan – Feasibility Overview, Oct 1979.
4. [Preservation] Plan – Final, 1980.
5. Preservation Plan – [Inquiries], 1981-1982.
6. Preservation Plan – Printing, 1980.
7. Preservation Plan – Proposal, May 1979. Includes photographs.
8. Preservation Plan – Materials, 1979-1980. Oversize material removed. See ½ size map folder list.
9. Preservation Plan – Responses to, 1980-1981.
10. Preservation Plan – Schedule – Moore-Heder Team, 1979. Oversize material removed (see full size map folder list).
11. Preservation Plan Amendment (Newsletter), June 1989.
12. [Preservation] Standards, 1980-1982.

13. [Preservation] Standards and Criteria, 1980. Oversize material removed. See ½ size map folder list.

Box 51

1. Public Hearings re: Development of LOWE and Preservation District, [May?]-June 1979.
2. Project Report Memos, 1980, 1984.
3. Residential Façade Reserve Fund, 1980.
4. Revitalization Through Partnership, August 1984 [Annotations].
5. Riverwalk – Conceptual Design [TAMS Engineers], March 1991.
6. Sculpture Information – Power of Water, ca. 1988 [Public Art].
7. Sign Book, 1981, 1984 [Correspondence].
8. Sign Code (General), 1979-1985.
9. Sign Design Review (General), 1980-1982.
10. Special Studies Relative to Visitors Access, Lowell Heritage State Park, Dec 1979.
11. Status Reports [re: Development Projects], 1980-1987.
12. [Structural Engineering Services] – TAMS Engineers, 1986-1995 (Part 1 of 2) [Canals & Canalways, Riverwalk].
13. [Structural Engineering Services] – TAMS Engineers, 1986-1995 (Part 2 of 2) [Canals & Canalways, Riverwalk].
14. Technical [Preservation] Workshops, Jan 1980 (Part 1 of 3).
15. Technical [Preservation] Workshops, Jan 1980 (Part 2 of 3).

Box 52

1. Technical [Preservation] Workshops, Jan 1980 (Part 3 of 3).
2. Technical Workshop, 1980 [Energy Conservation].
3. Technical Workshop, 1981 [Grant Program and Applications].
4. Transportation, 1973-1980 [General].
5. Transportation – Auto Restricted Zones, 1979-1980.
6. Transportation – Bike Paths, 1977-1981 [Sewer Inceptor Line].
7. Transportation – Parking, General, 1979.
8. Transportation – Parking – Dutton St. Lot, 1980-1981.
9. Transportation – Highways, 1979-1981 [Sampson Connector and Dutton St.]
10. Transportation – Street & Pedestrian Improvements, 1980-1983.
11. Trolleys [Proposed Trolley Museum], 1979-1980.
12. Workshop (Staff and Commissioners), Jan 1988.
13. Workshop (Staff and Commissioners), Nov 1988.
14. Workshop (Staff and Commissioners), 1989.
15. Workshop – Canalway Development Program and Commission Termination Workshop, 1993.

Box 53

B. Planning Director
1. Subject Files (Peskin)

1. Billboard Removal, 1984-1987 (Part 1 of 2).
2. Billboard Removal, 1984-1987 (Part 2 of 2).
3. [Building] Grant and Loan Program, 1983-1985 (Part 1 of 2).
4. [Building] Grant and Loan Program, 1983-1985 (Part 2 of 2).
5. Canals and Canalways – Articles, 1985-1986.
6. Canals and Canalways – Boott Canalway, 1980-1988 (Part 1 of 2).
7. Canals and Canalways – Boott Canalway, 1980-1988 (Part 2 of 2).
8. Canals and Canalways – Canalway Facility Ownership Inventories, ca. 1986 (Part 1 of 2).

Box 54
1. Canals and Canalways – Canalway Facility Ownership Inventories, ca. 1986 (Part 2 of 2).
2. Canals and Canalways – Canalway Task Force, 1985-1986 (Part 1 of 2).
3. Canals and Canalways – Canalway Task Force, 1985-1986 (Part 2 of 2).
4. [Canals and Canalways] – Lower Locks Area, [1982].
5. Charts Comparing Lowell Economic Growth [–Fred [Faust] Boards"], ca. 1984.
6. Central Street/ Pawtucket Canal Area Improvements, 1982-1983.
7. Historic District Ordinance, 1984. Oversize material removed (see full size map folder list).
8. Index of Properties, Draft, May 1980.
9. Index of Properties, July 1980 and –A" Buildings, Dec 1983.
10. Index of Properties, 1985 [Changes].
11. Legislation and Lobbying, 1971-1987 (Part 1 of 2) [Re-Authorization].
12. Legislation and Lobbying, 1971-1987 (Part 2 of 2) [Re-Authorization].

Box 55
1. Massachusetts Mills, 1980-1988.
2. Mogan Cultural Center – General, Apr 1988.
3. [Museums Located in Boott Mills], ca. 1988.
4. Potential Museum of Science Satellite at Boott Mills, 1987-1988.
5. Project Management, 1988.
6. Reports – Circulation Planning in Downtown Lowell, NMAC, June 1981.
7. Reports – Downtown Lowell Auto Restricted Zone Feasibility Study, NMAC, Aug 1980 (Vol. I).
8. Reports – Downtown Lowell Auto Restricted Zone Feasibility Study, NMAC, Aug 1980 (Vol. II).
9. Reports – Downtown Lowell Parking Utilization Study, Dec 1979.
10. Reports – Final Environmental Impact Report, John Street Parking Garage, Feb 1990.

Box 56

1. Reports – Land Use Plan, Lowell, Massachusetts, City Development Authority, Dept 1972.
2. Reports – Lowell Transportation Study: Summary Report, Mass. Dept. of Public Works, [1976].
3. Reports – Park Transit and Downtown Circulation, Northern Middlesex Area Commission [NMAC], Jan 1980.
4. Reports – Paths to Revitalization: The Experiences of Four Industrial Communities, Conference Proceedings, Dec 1987.
5. Reports – A Regional Analysis of the Lowell S[tandard] M[etropolitan] S[tatistical] A[rea]: High-Tech Sparks a ~~–S~~econd Industrial Revolution," [1984].
6. Reports – Sampson Connector Project, U.S. Dept. of Transportation, July 1985.
7. [Status of Projects for National Trust for Historic Preservation ~~–M~~ill Works" Conference, May 1983].
8. Study re: Public/Private Investment in Lowell, 1984.

Box 57

1. Tenth Anniversary, May-June 1988.
2. Transportation, 1979-1981.
3. Trolley – B[oston] & M[aine] R.R., 1983-1989.
4. Trolley – Burdman, [Kenneth] (Permission), 1983-1988.
5. Trolley – Car (Closed), 1985-1987.
6. Trolley – Car (Open), 1982.
7. Trolley – Rail Car, 1971-1985.
8. Trolley – City of Lowell, 1985-1988.
9. Trolley – Courier [Corporation] (Permission), 1986-1988.
10. Trolley – [Mass. Dept. of Environmental Management], 1984-1987.
11. Trolley – Dept. of Transportation Award for Historic Preservation, 1985-1986.
12. Trolley – Eastern Canal Bridge Study (TAMS Consultants), 1987-1988.
13. Trolley – Eastern Canal Trolley Bridge, 1985-1989 (Part 1 of 2).

Box 58

1. Trolley – Eastern Canal Trolley Bridge, 1985-1989 (Part 2 of 2).
2. Trolley – Eastern Canal Trolley Bridge Test Pits, 1988. Oversize material removed. See ½ size map folder list.
3. Trolley – Fact Sheets, 1986-1988.
4. Trolley – General, 1983-1987.
5. Trolley – Land [and Easements], 1985-1986.
6. Trolley – [Louis T.] Klauder (A/E Services), 1982-1988.
7. Trolley – Lower Locks Extension, 1987.
8. Trolley – Merrimack Properties (Permission), 1984-1987 [French St. Extension].
9. Trolley – ~~–M~~iscellaneous," [General], 1984-1986.

10. Trolley – Operations (Statistics), 1984-1987.
11. Trolley – Other Cities, 1985-1988.
12. Trolley – Postal Service Permission, 1987.
13. Trolley – Track Extensions Bid Process, 1987-1988 (Part 1 of 2).
14. Trolley – Track Extensions Bid Process, 1987-1988 (Part 2 of 2).

Box 59

3. Subject Files (Briggs)

1. _A' Rated Buildings in Pres. District, 1990.
2. Abandoned Buildings, 1992.
3. Annual Goads & Evaluation, 1989-1991.
4. B & M Rail Car, 1989-1991.
5. Boardinghouse Park, [1989-1990].
6. Boott Mills, [1989].
7. Briefing Papers, 1995.
8. Budgets, 1990-1995 (Part 1 of 2).
9. Budgets, 1990-1995 (Part 2 of 2).
10. Canals and Canalways – Site Summaries, ca. 1993.
11. Canalway Planning Process, [1989-1993].
12. Canalway Project Timetables, [1989-1993].

Box 60

1. Canalway Street Crossing Study, 1991. Folder 1 of 2.
2. Canalway Street Crossing Study, 1991. Folder 2 of 2. Includes photographs.
3. City Open Scope Plan, 1993-1994.
4. Downtown Lowell Business Association, 1991.
5. Dutton/Thorndike Feasibility Study, 1993. Folder 1 of 2.
6. Dutton/Thorndike Feasibility Study, 1993. Folder 2 of 2.
7. Fact Sheets [Lowell Development, Planning, Projects, and Budgets], 1979-1987.

Box 61

1. Federal Support Subcommittee – Cultural Meetings, 1993.
2. Gatehouse Restoration, 11 May 1990- 26 July 1990.
3. Goals and Evaluation, 1992.
4. Hazardous Waste, 1994.
5. Historic District Building Inventory, 1974-1985.
6. Historic Preservation Act Amendments, 1980.
7. Inventory Report [Physical Inventory and Property Disposal Request Forms], 1995.
8. Land Acquisition Monthly Tasks, [1993-1995].

9. Land Acquisition Parcel Updates, 1995.
10. Land Trading Database, 1993.

Box 62

1. L'Energia Steam Pipe, 1994.
2. Lowell History Trail, 1991.
3. Lowell Mill Smoke Stacks, 1993.
4. LHPC Review of MEPA Filings, 1989-1991. Oversize material removed.
5. Lowell National Historical Park Electrified Trolley System Extension for Public Transit Use – Planning, Operational, and Engineering Feasibility Study, Dec 1996.
6. Lowell Zoning Code, 1986. Oversize material removed.
7. Lower Locks/ Prescott Park, [1985-1988]. Oversize material removed.

Box 63

1. Lower Locks Area Projects, [1980-1981]. Folder 1 of 2.
2. Lower Locks Area Projects, [1980-1981]. Folder 2 of 2. Oversize material removed. See ½ size map folder list. Includes photographic materials.
3. Lower Locks Trolley Extension, [1984-1991]. Folder 1 of 3. Oversize material removed. See full size map folder list.
4. Lower Locks Trolley Extension, [1984-1991]. Folder 2 of 3.
5. Lower Locks Trolley Extension, [1984-1991]. Folder 3 of 3. Oversize material removed. See full size map folder list.
6. Lucy Larcom Park, 1989-1993. Contains Rialto Building feasibility study. Oversize material removed. See full size map folder list.

Box 63A

1. McGinley Hart and Associates, 1990.
2. Meeting Notes and Minutes, 1993.
3. Merrimack Canal Fence, 1990-1992.
4. Mogan Center – Heat Pump, Wheelchair Lift and Reroof, 1991-1992.
5. Monthly Planning Goals and Evaluations, 1989-1990.
6. Monthly Goals and Evaluations, 1991.
7. Monthly Goals and Evaluations, 1994.
8. Monthly Goals and Evaluations, 1995.
9. Multi Objective River Corridor, 1988-1992.
10. NPS-Canal Safety and Operations Plan and Procedures, 1991.
11. National Register Nomination Info, 1992, Folder 1 of 2.
12. National Register Nomination Info, 1992, Folder 2 of 2.
13. Northern Canal Construction Little Canal Research, 1995.

Box 63B

1. Northern Canal Phase I, 1988-1992, Folder 1 of 2.
2. Northern Canal Phase I, 1988-1992, Folder 2 of 2.
3. NMAC-MEPA Review [Northern Middlesex Council of Government], 1993.
4. Other Publications, 1989-1995.
5. Planning and Design Staff – Project Schedules and Assignments, 1993-1994.
6. Planning Goals and Evaluations, 1993.
7. Planning Meeting Agendas, 1994. Folder 1 of 2.
8. Planning Meeting Agendas, 1994. Folder 2 of 2.
9. Planning Meeting Notes (Monthly), 1995.

Box 63C

1. Planning Meeting Notices and Agendas, 1995.
2. Prescott Way Park: Steam Pipe Relocation, 1987-1988.
3. Prescott Way Park, 1989-1993.
4. Publications [*Designer*, *The Locktender*, *Economic Indicator*], 1989.
5. Preservation Article Reprints, 1990.
6. Public Art, 1981-1992. Folder 1 of 2.
7. Public Art, 1981-1992. Folder 2 of 2.
8. Regional Transportation Improvement Plan, 1995-1998, Folder 1 of 2.
9. Regional Transportation Improvement Plan, 1995-1998, Folder 2 of 2.
10. Requests for Information, 1989-1995.
11. Retail Committee [Marketing Program for Downtown Lowell Retail District], 1987.

Box 63D

1. St. Peter‘s Church Rehabilitation, 1991.
2. Sample Scopes of Work, 1988.
3. Scope of Services [Swamp Locks Improvement Plan], 1981.
4. Shattuck Street, 1991.
5. Staff Meeting Notices and Minutes, 1992.
6. Standard Operating Procedures for Planning, [1989?]
7. Status – Solicitors Office, 1994.
8. Swamp Locks, 1990-1994. Oversize materials removed. See full size map folder list.
9. Then and Now Draft Texts, 1993.
10. Then and Now Project [Book about Lowell, Mass.], 1991, Folder 1 of 2.
11. Then and Now Project [Book about Lowell, Mass.], 1991, Folder 2 of 2.
12. Title Attorney Status, 1994.

Box 63E

1. Tyngsborough Open Space Plan, 1989.
2. University of Utrecht Graduate Student Research, 1991.
3. Waysides and Directional Signage, 1991, Folder 1 of 3.

4. Waysides and Directional Signage, 1991, Folder 2 of 3. Oversize material removed. See ½ size map folder list.
5. Waysides and Directional Signage, 1991, Folder 3 of 3.
6. Webster Engineering – Lucy Larcom Park, 1991-1992.
7. Western Canal CPTED Study [Originals and Xerox Copies], 1995, Folder 1 of 2.
8. Western Canal CPTED Study [Originals and Xerox Copies], 1995, Folder 2 of 2.

Box 64

B. *Preservation Plan*

1. Contract Documents, 1979-1980.
2. Selection of Contractor, May 1929.

C. Index of Properties
1. Index

3. Research Copy, 1 July 1980.
4. Presentation Copy, 1 July 1980.

2. Cultural Resources Inventory

5. Report, Shepley Bulfinch Richardson and Abbott, Cultural Resources Inventory, 1980.
6. Report, Shepley Bulfinch Richardson and Abbott, Cultural Resources Inventory, 1980. Copy 2.

Box 65

1. Appleton Manufacturing Company and Research Report
2. Appleton: No. 1 Cotton House, 217 Jackson St.
3. Appleton: ~~"~~New Mill" – Mill No. 5, Jackson St.
4. Appleton: site of Coal Pocket, off Jackson St.
5. Appleton: Stable, 6 King St.
6. Appleton: Mill No. 1, 217 Jackson St.
7. Appleton: Mill No. 2, 217 Jackson St.
8. Appleton: Mill No. 3, 217 Jackson St.
9. Appleton: Mill No. 4, 217 Jackson St..
10. Appleton: No. 5 Extension, Corner of Jackson & Revere Sts.
11. Appleton: Mill No. 6, Corner of Jackson & Marston Sts.
12. Appleton: Building No. 7, Corner of Jackson & Revere Sts.
13. Appleton: Dye House, 217 Jackson St.
14. Appleton: Office Building, 217 Jackson St.
15. Belvidere: Woolen Manufacturing Company and Research Report

16. Belvidere: site of Mill No. 1, Foot of Howe Street
17. Belvidere: site of Mill No. 1 Storehouse, Foot of Chestnut St.
18. Appleton: Turbine Building and Boiler House, 259 Middlesex St.
19. Belvidere: Mill No. 2, 645 Lawrence St.
20. Belvidere: Mill No. 2 Storehouse, 645 Lawrence St.
21. Belvidere: Mill No. 2 Second Storehouse, 645 Lawrence St.
22. Belvidere: Mill No. 2 Boiler House, 645 Lawrence St.
23. A History of The Boott Mills Complex
24. Boott Cotton Mills: Mill #1, Foot of John St.
25. Boott Cotton Mills Connector Mill, BTW #1 & #2, Foot of John St.
26. Boott Cotton Mills Counting House, Foot of John St.
27. Boott Cotton Mills Mill #2, Foot of John St.
28. Boott Cotton Mills Mill #3, Foot of John St
29. Boott Cotton Mills Connector Mill, BTW #3 & #4, Foot of John St. Between Mills #3 and #4.
30. Boott Coton Mills Mill #4, Foot of John St.
31. Boott Cotton Mills Addition to Mill #4, Foot of John St.
32. Boott Cotton Mills Mill #5 (east & west), Foot of John St.
33. Boott Cotton Mills Mill #6, Foot of John St. and 130 Bridge St.
34. Boott Cotton Mills Mill #7, Foot of John St.
35. Boott Cotton Mills Mill #8, Foot of John St.
36. Boott Cotton Mills Mill #9 (former Cotton House), Foot of John St.
37. Boott Cotton Mills Mill #9 (former Picker House), Foot of John St.
38. Boott Cotton Mills Cotton Warehouse #1, French St.
39. Boott Cotton Mills Cotton Warehouse #2, 42 French St.
40. Boott Cotton Mills Cotton Warehouse #3, French St.
41. Boott Cotton Mills, 92 – 98 John St.
42. Boott Cotton Mills, 190 – 212 French St., 70 – 96 Bridge St.
43. Boott Cotton Mills, 53 Brookings St.
44. Boott Cotton Mills Bridges & Mechanical Fixtures, Foot of John St.
45. Boott Cotton Mills, 93 – 99 John St.

Box 66

1. Bridges = List of 11 locations
2. Bridges: Ouellette Bridge, Aiken St. t the Merrimack River
3. Bridges: Central Bridge, Bridge St. at the Merrimack River
4. Bridges: New Broadway Bridge, Broadway St. at the Pawtucket Canal
5. Bridges: Old Stone Bridge, Broadway St. at Western Canal
6. Bridges: Church Street Bridge, Church St. at the Concord River
7. Bridges: Faulkner Mills Bridge, rear of 576 Lawrence St. over the Concord River

8. Bridges: Merrimack Street Bridge, Merrimack St. at the Pawtucket Canal
9. Bridges: Red Bridge near Pevey & Kyan Sts., over the Pawtucket Canal
10. Bridges: Prescott Yard Railroad Bridge, off Prescott St. over the Eastern Canal
11. Bridges: Rogers Street Bridge, Rogers St. at the Concord River
12. Bridges: School Street Bridge, School St. at the Pawtucket Canal
13. Site of the Chase and the Faulkner Mills – Inventory Form, rear 576 Lawrence St.
14. Site of the Chase and the Faulkner Mills Research Report
15. Kitson Machine Ship (Hamilton Manufacturing Co., off Jackson St.) Research Report
16. Hamilton Manufacturing Co., 48 – 66 Jackson Street
17. Hamilton Manufacturing Company, 68 Jackson Street
18. Hamilton Manufacturing Company, between 68 & 96 Jackson Street
19. Hamilton Manufacturing Company, 96 – 112 Jackson Street
20. Hamilton Manufacturing Company, 142 Jackson Street
21. Hamilton Manufacturing Company Packing Room building, 191 Central St..
22. Hamilton Manufacturing Company Blue Dye House, 30 Market St.
23. Hamilton Manufacturing Company Counting House, 165 Jackson Street
24. Hamilton Manufacturing Company Storehouse, east of 165 Jackson Street
25. Hamilton Manufacturing Company Wheel Room building, off Jackson Street
26. Hamilton Manufacturing Company Mill No. 7, off Jackson Street
27. Hamilton Manufacturing Company Mill No. 6, off Jackson Street
28. Hamilton Manufacturing Company Mill No. 4, 26 Jackson Street
29. Complete Lawrence Manufacturing File for Xeroxing
30. Lawrence Manufacturing Company Research Report, Foot of John Street
31. Lawrence Manufacturing Company Office, Foot of Suffolk St.reet
32. Kitson Machine Shop – see 491 Dutton Street
33. Lawrence Manufacturing Company Mill No. 3, Foot of Suffolk Street
34. Lawrence Manufacturing Company Mill #7, Foot of Suffolk Street

Box 67

1. Lawrence Manufacturing Company Mill #4, Foot of Suffolk Street
2. Lawrence Manufacturing Company Mill #8, Foot of Suffolk Street
3. Lawrence Manufacturing Company Mill #9, Foot of Suffolk Street
4. Lawrence Manufacturing Company Mill #1, off Suffolk Street
5. Lawrence Manufacturing Company Mill #10, Foot of Suffolk Street
6. Lawrence Manufacturing Company Mill #12, Perkins Street
7. Lawrence Manufacturing Company Storehouse #10, off Perkins Street
8. Lawrence Manufacturing Company Storehouse #12, Foot of Suffolk Street
9. Lawrence Manufacturing Company Storehouse #14, Perkins Street
10. Lawrence Manufacturing Company Mill #2 Annex, Foot of Suffolk Street
11. Lawrence Manufacturing Company No. 1 Engine House, Foot of Suffolk Street

12. Lawrence Manufacturing Company No. 2 Engine House, Foot of Suffolk Street
13. Lawrence Manufacturing Company Boiler House, Foot of Suffolk Street
14. Lawrence Manufacturing Company Bleachery, Foot of Suffolk Street
15. Lawrence Manufacturing Company Mill #6 and Wheel House, Foot of Suffolk St.
16. Lawrence Manufacturing Company Loading Platform, Foot of Suffolk Street
17. Lawrence Manufacturing Company Shops and Stable, off Perkins Street
18. Lawrence Manufacturing Company Locomotive House & Parking Lot, off Perkins Street
19. Lawrence Manufacturing Company Comber building (#16), off Aiken Steet
20. Lawrence Manufacturing Company Warper building (#17), off Aiken Street
21. Lawrence Manufacturing Company Yarn Dyeing building (#18), Foot of Suffolk
22. Street
23. Lawrence Manufacturing Company Bridges, Foot of Suffolk Street
24. Lawrence Manufacturing Company Storage Yard site, 141 Hall Street
25. Lawrence Manufacturing Company Agent‘s House, 119 – 21 Hall Street
26. Lawrence Manufacturing Company site of Boarding Houses, 270 Suffolk Street
27. Lowell Machine Shop, Dutton Street Parking Lot
28. Lowell Machine Shop Research Report
29. Site of Lowell Machine Shop, off Dutton Street
30. Lowell Machine Shop – Pellon Corp. bldg., along Pawtucket Canal
31. Lowell Machine Shop – Pellon Corp. bldg., junct. Pawtucket/Merrimack
32. Canals
33. Lowell Machine Shop – Pellon Corp. bldg.., 221 Jackson Street, junction
34. Pawtucket/Merrimack Canals
35. Pellon Corp. bldg., South of 221 Jackson St. (site of Machine Shop Foundry Yard)
36. Saco-Lowell bldg.. #16, 305 Dutton Street (rear)
37. Saco-Lowell bldg.. #14, 221 Jackson Street (rear)
38. Saco-Lowell Shops – Building #15, 305 Dutton Street and 4 Broadway Street
39. Bigelow-Lowell bldg.. #1, off Market Street (Lowell Manufacturing Co. Millyard)
40. Lowell Manufacturing Company Research Report
41. Bigelow-Lowell bldg. #2, 246 Market Street (Lowell Manufacturing Company Millyard)
42. Bigelow-Lowell bldg.. #9, off Market Street (Lowell Manufacturing Co. Millyard)
43. Bigelow-Lowell bldg. #10, off Market Street (Lowell Manufacturing Company Millyard)
44. Lowell Mfg. Co., Lot east of bldg.. #10, off Market Street (partial site of Bigelow-Lowell Building #8)
45. Bigelow-Lowell bldg. #11, off Market Street (Lowell Manufacturing Company
46. Bigelow-Lowell bldg. #13, off Market Street (Lowell Manufacturing Co.Millyard)
47. Bigelow-Lowell bldg. #14, off Market Street (Lowell Manufacturing Co. Millyard)\
48. Bigelow-Lowell bldg. #16, off Market Street (Lowell Manufacturing Co. Millyard)
49. Bigelow-Lowell bldg. #16A, off Market Street (Lowell Manufacturing Co. Millyard)
50. Bigelow-Lowell bldg. #17, off Market Street (Lowell Manufacturing Co. Millyard)

51. Bigelow-Lowell bldg. #18, off Market Street (Lowell Manufacturing Co. Millyard)

Box 68

1. Lowell Manufacturing Com. Parking Garage site, off Marker Street (site of Bigelow-Lowell Bldgs.)
2. Lowell Manufacturing Co., 1,2,4,5,7,8 Wamesit Court
3. Massachusetts Cotton Mills Research Report
4. Massachusetts Cotton Mills Section #1 of Mill #1, off Bridge Street
5. Massachusetts Cotton Mills Mill #1 - Sec. #6, off Bridge Street
6. Massachusetts Cotton Mills Mill #1 – Sec. #2, off Bridge Street
7. Massachusetts Cotton Mills Mill #1 – Sec. #7, off Bridge Street
8. Massachusetts Cotton Mills Mill #2 – Sec. #3, off Bridge Street
9. Massachusetts Cotton Mills Mill #2 – Sec. #5, off Bridge Street
10. Massachusetts Cotton Mills Mill #2 – Sec. #4, off Bridge Street
11. Massachusetts Cotton Mills Powerhouse – Sec. #8, off Bridge Street
12. Massachusetts Cotton Mills Picker House – Sec. #9, off Bridge Street
13. Massachusetts Cotton Mills Picker House – Sec. #10, off Bridge Street
14. Massachusetts Cotton Mills Picker House – Sec. #11, off Bridge Street
15. Massachusetts Cotton Mills Napping Bldg. – Sec. #12, off Bridge Street
16. Massachusetts Cotton Mills Cloth Room Bldg. – Sec. #15, off Bridge Street
17. Massachusetts Cotton Mills Waste House – Sec. #16, off Bridge Street
18. Massachusetts Cotton Mills Main Power House – Sec. #18, off Bridge Street
19. Massachusetts Cotton Mills boiler Room B – Sec. #19, off Bridge Street
20. Massachusetts Cotton Mills site of Boiler Rm. A – Sec. #17, off Bridge Street
21. Massachusetts Cotton Mills – Storehouse C, 93 Bridge Street
22. Massachusetts Cotton Mills – Bridges and Head Gates, off Bridge Street
23. Massachusetts Cotton Mills – Boarding House Row, 28 – 56 Bridge Street
24. Lowell City Laundry, 256 Lawrence Street
25. Richmond Mills Storehouse, 280 Lawrence Street
26. Site of Richmond Mills, 300 Lawrence Street
27. Massic Falls Research Report, site of Richmond‘s Mills, 256 – 300 Lawrence St.
28. Merrimack Manufacturing Company – site of #3 Mill, One Merrimack Plaza
29. Site of the Middlesex Company, off Warren Street Research Report
30. Site of Merrimack Manufacturing Company Research Report, foot of Dutton St.
31. Merrimack Manufacturing Co. – site of part of Millyard, 115-145 Post Office Sq.
32. 128 Warren Street, W.H. Bagshaw Company
33. Site of Prescott Mfg. Co., off E. Merrimack St., bet. Eastern Canal and Concord River and Research Report.
34. Off East Merrimack Street,- Rex Lot, site of Prescott Mfg. Co.

35. Site of Proprietors of Locks & Canals Workshops & Office, 66 Broadway Street and Research Report
36. Stirling Mills, 576 Lawrence Street and Research Report
37. Stirling Mills - Mill & Office, 576 Lawrence Street
38. Stirling Mills - Carbonizing Bldg., 576 Lawrence Street

Box 69

1. Suffolk Manufacturing Co., Suffolk Street and Research Report
2. Stirling Mills Storehouse, 576 Lawrence Street
3. Suffolk Manufacturing Company Mill No. 6, 562 Suffolk Street
4. Suffolk Manufacturing Company Mill No. 8, 562 Suffolk Street
5. Suffolk Manufacturing Company Bldg. No. 12 - Boarding House, 199 Cabot Street
6. Suffolk Manufacturing Company Counting House, 562 Suffolk Street
7. Suffolk Manufacturing Company Machine Shop, 572 Suffolk Street
8. Suffolk Manufacturing Company Mill #5, 562 Suffolk Street
9. Suffolk Manufacturing Company Mill No. 10 & Mill No. 10 Annex, 201 Cabot Street
10. Suffolk Manufacturing Company Boiler House No. 2, 201 Cabot Street
11. Suffolk Manufacturing Company Rowhouse, 111 - 113 Cabot Street
12. Merrimack Weave Shed, on Tilden Street off French Street Extension
13. Tremont Mills Mill No. 2, Intersection of Tremont St. & French St. Extension
14. Site of Tremont Millyard, off Suffolk Street
15. 98 Hall Street, No Historic Name
16. Research Report: Whipples Mill & Wamesit Canal, off Lawrence Street
17. Whipple‘s Canal, off the Concord River near Lawrence Street
18. Whipple‘s Powder Mill, off Lawrence Street
19. Massachusetts Wasteway Gatehouse, Eastern Canal east of Bridge Street
20. Lowell Canal System Research Report
21. Merrimack Canal, Parallel to Sutton Street
22. Merrimack Canal: Guard Gates, near Swamp Locks Basin
23. Merrimack Canal: YMCA /Gates /between Market and Dutton Streets
24. Merrimack Canal: Sluice Gates, off French Street opposite Lucy Larcom Park
25. Pawtucket Canal, from the Merrimack River above the Pawtucket Dam to the Concord River near East Merrimack Street.
26. Pawtucket Canal: Francis Gate, north of Broadway Street
27. Pawtucket Canal: Guard Dam and Gate House
28. Pawtucket Canal: Guard Locks and Gate House, north of Broadway
29. Pawtucket Canal: Swamp Locks, east of Thorndike Street
30. Hamilton Canal, parallel to Jackson Street

Box 70

1. Hamilton Canal: Guard Gates, off Jackson Street
2. Pawtucket Canal: Lower Locks and Dam, east of Central Street
3. Lowell Canal, west of Market Street
4. Lawrence Canal, parallel to Perkins Street
5. Western Canal, from Swamp Locks Basin, paralleling Suffolk Street to Merrimack River
6. Western Canal: Hickey Hall Locks and Dam, opposite Hall Street
7. Western Canal: Tremont Gate House, near French Street Extension
8. Hamilton Canal: Wasteway Gate House, in Hamilton Yard off Jackson St.
9. Western Canal: Lawrence Dam, off Perkins Street
10. Western Canal: Guard Gates, south of Moody Street
11. Eastern Canal, parallel to Bridge Street, then parallel to French Street
12. Eastern Canal: Boott Dam, opposite Kirk Street
13. Eastern Canal: Boott Penstock, between the Eastern and Merrimack Canals
14. Merrimack Gate House, at Dutton Street
15. Merrimack Canal: Rolling Dam, off French Street opposite Kirk Street
16. Northern Canal, along Merrimack River
17. Northern Canal: Gate House, at School Street
18. Moody Street Feeder, beneath Moody Street from Western to Merrimack Canal
19. Northern Canal, from Merrimack River at School Street to French and Suffolk Streets
20. Northern Canal: Waste Gates and Gate House, near Moody Street Bridge
21. Pawtucket Dam above School Street
22. The Acre - Research Report
23. Site of a Daniel Redding Building, 63-65 Adams Street
24. 77 (& 71) Adams Street, William Gregory House
25. 83 - 85 Adams Street, site of the Manahan/Ritchie House
26. 93 Adams Street, G.C. Cook House
27. 93 Adams Street (rear), a G.C.Cook House (1896)
28. 97, 105, 107 Adams Street, Henry Castles Building
29. 123 - 129 Adams Street, T. Mahoney Building
30. 153 Adams Street, John C. Treadwell House
31. 163 - 165 Adams Street, Miss Mary M. Sullivan building
32. 173 Adams Street, Edward Costello House
33. 177 Adams Street, Michael McCue building
34. 209 - 229 Adams Street, see 213 - 225 Broadway
35. 237 Adams Street, C. and N. Gardenas building
36. 36 - 40 Adams Street, site of the Protective Union Store
37. 42 Adams Street, site of the Hugh Cummiskey House
38. 56 - 64 Adams Street, site of the Mary Marvin House
39. 70 - 78 Adams Street, The Abodeely building
40. 84 Adams Street, S. P. Pike building

41. 102 - 108 Adams Street, Mansur House
42. 118 Adams Street, The Thomas Mahoney building
43. 144 Adams Street, 47 Lagrange Street, H.A. Wright building
44. 154 Adams Street, W. and M. Cassis building
45. 168 Adams Street, Thomas Downing House
46. 172 - 178 Adams Street, Amelia Downing building
47. 218 Adams Street, F.O. Morris building
48. 232 - 246 Adams Street, Pavis Shiffoin building
49. 47 - 49 Andover Street, The Richards House
50. 4 - 6 Andover Street, site of Clifford‘s Dye House

Box 71

1. 26 Andover Street, site of the Ladd House
2. 49 Andrews Street, G. Sheridan House
3. 89 Appleton Street, Lowell Post Office
4. 18, 20, 22 Appleton Street, D. Murphy building
5. 90 Appleton Street, Bancroft Block and Research Report
6. 100 - 126 Appleton Street, Coburn Block and Research Report
7. Arcand Drive: Liberty Tree Park - site of Merrimack Manufacturing Boarding House
8. 75 Arcand Drive, site of Merrimack Manufacturing Company housing
9. 50 Arcand Drive, JFK Civic Center, urban renewal site
10. 51 and 65 Austin Street, Moreau building
11. 73 - 77 Austin Street, Helen M. Lawton building
12. 78 Austin Street, Constant Henotte building
13. 82 Austin Street, site of the Colby and Runals House
14. 100 Bourne Street, Patrick Craig House
15. 29 Bridge Street, see 31 - 45 Bridge Street Report
16. 31 - 45 Bridge Street, Keith building
17. 31 - 45 Bridge Street (rear), site of Keith‘s Theater
18. 100 Bridge Street, Arthur‘s Restaurant
19. 41 Broadway (and 259 Worthen St.), site of Dr. F.C. Plunket House
20. 153, 159, 163 Broadway, Daniel Murphy building
21. 175 - 185 Broadway, Cornelius Shanahan building
22. 199 - 207 Broadway Street, A. James Morris building
23. 213 Broadway, John McNabb House
24. 225 Broadway, 209 - 229 Adams Street Andrew McFadden building
25. 235 - 237 Broadway, A. Thomas Downing building
26. 297 Broadway, Gulf Station
27. 673 Broadway, J. W. Madel House
28. 681 Broadway, L. McFarlin House

29. 685 Broadway, A. L. Corliss House
30. 735 Broadway, former property of Proprietors of Locks & Canals
31. 741 Broadway, a Mrs. M. Hamilton House
32. 743 - 749 Broadway, a Mrs. M. Hamilton building
33. 174 - 180 Broadway, a Michael Rourke building
34. 198 - 204 Broadway, Parker Crawford building
35. 214 - 216 Broadway, Mabel Massoud House (1936)
36. 236 - 246 Broadway, a Thomas Downing building
37. 276 Broadway (City Stables), and Research Report
38. 670 Broadway, W. F. Downing House
39. 676 Broadway, E. A. Howe House
40. 682 Broadway, S. J. Wright House
41. 688 Broadway, site of the E. A. Wilson building
42. 700 Broadway, E. A. Wilson Company Building
43. 736 Broadway, former Locks and Canals property - building built in 1940
44. 104 Cabot Street, Margaret Smith House
45. 114 Cabot Street, Stearns House
46. Folder $46 - 120 Cabot Street, J. Kensitt House
47. 9 Central Street, Wyman‘s Exchange and Research Report
48. 21 Central Street, Harrison Hotel
49. 23 Central Street, Bowditch Hotel
50. 29 Central Street, site of Case‘s Building (partial)
51. 91 Central Steet, New Mansur building and Research Report
52. 101 Central Street, Mansur Building and Research Report
53. 111 Central Street, Rialto Building
54. 241 Central Street, site of part of Union Building
55. 135 - 187 Central Street, Bradley Block
56. 201 Central Street, Unknown historic name
57. 219 Central Street, Fiske Building and Research Report
58. 231 Central Street, Cook and Taylor‘s building and Research Report
59. 1 - 5 Middlesex Street/249 Central Street, Union Building and Research Report
60. 289 and 291 Central Street, Isaac Moody Grocery Store (1878-83) and Research Report
61. 295 Central Street, Shedd Block and Research Report
62. 317 Central Street, Master Builders Exchange and Research Report
63. 321 Central Street, a Reed & Mansur Building and Research Report
64. 373 Central Street, Matthew‘s Market
65. 381 Central Street, Unknown Historic Name

Box 72

1. 30 - 32 - 34 Central Street, Morning Times Building
2. 40 Central Street, Prescott National Bank
3. 50, 56, 60 Central Street, Harrington Building
4. 104 Central Street, Unknown Historic Name and Research Report
5. 128 - 36 Central Street, Strand Theatre and Research Report
6. 136 Central Street, American House Hotel and Research Report
7. 166 Central Street, Appleton Block and Research Report
8. 200 Central Street, 11 Hurd Street, Middlesex /Valley Finance
9. 210 Central Street, site of T. Costello‘s Stoves and Tinware Store
10. 212 Central Street, Bartlett and Dowd Hardware
11. 220 Central Street, site of Caesar Misch Clothing Store
12. 226 - 228 Central Street, Merrimack River Savings Bank
13. 238 - 254 Central Street, Boston & Maine Railroad Depot and Research Report
14. 341 Central Street, site of Day, Convers, and Fay Brothers & Hasford, Carriage Manufacturers
15. 345 Central Street, site of entrance to Lowell Opera House
16. 353 Central Street, Unknown Historic Name
17. 361 Central Street, Unknown Historic Name
18. 369 Central Street, Unknown Historic Name
19. 290 Central Street, The First Bank and Trust Company
20. 278 Central Street, Mrs. Hildreth‘s Boarding House/Union House and Research Report
21. 239 Church Street, No Historic Name
22. 251 Church Street, site of the Edward Cawley House
23. 242 Church Street, D. C. Brown Reed Factory and Research Report
24. 15 Clare Street, a Thomas McLaughlin House
25. 17 - 19 Clare Street, a Thomas McLaughlin House
26. 21,23,25,27, Clare Street, The John Considine Building
27. 29 - 31 Clare Street, a John and Nora Flynn House
28. 33 - 35 Clare Street, a John and Nora Flynn House
29. 39 - 41 Clare Street, the Timothy Reardon House
30. 43 - 45 Clare Street, a Timothy Reardon House
31. 47 - 49 Clare Street, a Timothy Reardon House
32. 51 Clare Street, a Timothy Reardon House
33. 57 Clare Street, the Phineas Whiting and David Bradt House
34. 61 Clare Street, James F. O‘Brien House
35. 63 - 65 Clare Street, the John Brady House and Research Report
36. 71 Clare Street, a Timothy Reardon House
37. 22 Clare Street, P. & L. McCarron House
38. 26 Clare Street, Oscar Braley House and Research Report
39. 30 Clare Street, Ellen Sullivan House

40. 34 Clare Street, James Baxter House
41. 36 Clare Street, M. J. Horan House
42. 40 Clare Street, the Mary Dawson House
43. 42 Clare Street, Alphonse Bibeault/W. Sullivan House
44. 46 Clare Street, S. and M. McCutcheon House
45. 50 - 52 Clare Street, a Farrell/Conaton House
46. 54 - 56 Clare Street, A Farrell/Conaton House
47. 58 Clare Street, Michael Cullen House
48. 60 Chare Street, the Timothy Curran House
49. 68 Clare Street, Dennis O'Donoghue House
50. 7 Clarks Court, No Historic Name
51. 8 Clarks Court, William Stickney House and Research Report
52. 22 Colonial Avenue, Lamontagne House
53. 32 Colonial Avenue, site of the Charles Weston House
54. 52 Colonial Avenue, Mary E. Hart House
55. 62 Colonial Avenue, M. O'Plahavan House
56. 82 Colonial Avenue, Delaney House
57. 92 Colonial Avenue, C. B. Desrosiers House
58. 25 Cross Street, Mrs. Daniel F. Lyons House
59. 12 Cross Street, A. Samaras Building
60. 14 Cross Street, Kafalias Building
61. 18 Cross Street, Sullivan House
62. 26 Cross Street, site of the Warren and Smith House
63. 53 - 61 Dummer Street, site of Joel Smith Building (1850)
64. 50 - 64 Dummer Street, see 360-376 Market Street
65. 70 Dummer Street, Dummer Street Garage
66. 79 Dutton Street, Masonic Temple
67. 91 Dutton Street, Yorick Club and Research Report
68. 141 Dutton Street, site of the Merrimack House and Research Report
69. 145 Dutton Street, site of Music Hall
70. 183 Dutton Street & 303 Market Street, site of Jacob Nichols Furniture Store
71. 167 Dutton Street, Middlesex Mechanics Association Building

Box 73

1. 2215 Dutton Street, Haffners Service Station
2. 243 Dutton Street, Farrell and Conaton Plumbing Company and Research Report
3. 261 Dutton Street, L'Union St. Joseph and Research Report
4. 269 Dutton Street, Bennett Building
5. 273 - 277 Dutton Street, Jeremiah Clark Cotton and Woolen Machinery
6. 279 Dutton Street, D. H. Wilson & Company - Plumbing

7. 287 Dutton Street, Rose E. Rourke Variety
8. 291 Dutton Street, Fred Christos Fruitmarket
9. 295 Dutton Street, Richardson Block and Research Report
10. 491 Dutton Street, Saco-Lowell Shops - Kitson Shop Office, Building #1, 491 Dutton Street #3/491 Dutton Street #4 & 491 Dutton Street #7 - 10, and Research Report
11. 507 Dutton Street, Unknown Historic Name
12. 531 - 535 Dutton Street/37 Fletcher Street, a John O'Connor Building
13. 516 Dutton Street, No Historic Name
14. 572 Dutton Street, a Jewett and Swift Building
15. 600 Dutton Street, a Hall and Parham Building
16. 700 Dutton Street, Unknown Historic Name
17. 740 Dutton Street, Unknown Historic Name
18. 750 Dutton Street, Unknown Historic Name
19. 772 Dutton Street, Unknown Historic Name
20. 774 Dutton Street, Endmoor Development
21. 50 E. Merrimack Street, Lowell Memorial Auditorium and Research Report
22. 37 Elliott Street, site of J. Fesler residences
23. Fanning Street, the Frederick Ayer Cottage
24. 229 Fayette Street, a Belvedere Woolen Mill Building
25. 233 Fayette Street, site of the Eliza J. Mellen House
26. 241 Fayette Street, Hildreth House
27. Rear 241, 251 Fayette Street, site of the Mrs. Fisher Hildreth House
28. 251 Fayette Street, the Damon House
29. 255 Fayette Street, site of the C. Sullivan House
30. 261 Fayette Street. site of the Goodhue House
31. 273 Fayette Street, the M.C. Sullivan Building
32. 43 Fletcher Street, S. Ashworth's File Factory
33. 63 - 73 Fletcher Street, & 503 Worthen Street, Ryan Block/The Eatery
34. 121 - 141 Fletcher Street, George L. Cady Building
35. 145 - 147 Fletcher Street, Ansara Building
36. 159 - 161 Fletcher Street, A. Kelil Building
37. 171 - 173 Fletcher Street, A. Narray Building
38. 185 - 187 Fletcher Street, P. H. Savage House
39. 193 - 195 Fletcher Street, Catherine Taylor House
40. 201 - 205 Fletcher Street, S. Tome Building
41. 211 - 215 Fletcher Street, T. J. Flynn House
42. 110 - 112 Ford Street, site of a Lowell Manufacturing Company Building
43. French Street Extension at Arcand Drive, site of Merrimack Manufacturing Co. Housing.
44. 8 Garnet Street, Thomas Jameson House and Research Report
45. 12 Garnet Street, J. E. McGovern House

46. 69 Gorham Street (corner of Appleton), site of a Runels Building
47. 6 Streets that refer to other locations**: 1)** 7 Kearney Square - see 1-5 Merrimack St..; **2)** 15 LaGrange Street - see 54 Marion St.; **3)** 17-21 Kirk Street - see 143 Merrimack St. & 17 - 21 Kirk St.; **4)** 6 King Street - see Appleton Company Research Report; **5**) 576 Lawrence Street - see Industrial-Stering Mills; **6)** 2 -116 Lewis Street - see 312-350 Suffolk St.
48. 91 - 101 Gorham Street, Tower News
49. 107 Gorham Street, a William Corbett Building
50. 24 Gorham Street, Tower‘s Corner
51. 32 Gorham Street, Patrick Shanley Building
52. 62 Gorham Street, James Carr house, & Peter Sheehan‘s Passage and Exchange Office and Research Report
53. 72-76 Gorham Street, Darius Young House and Research Report
54. 80 Gorham Street, The Lowell Hotel and Research Report
55. 92-98 Gorham Street, O.M. Donohoe Building
56. 102 Gorham Street, Carlson‘s Bowling Lanes
57. 110 Gorham Street, Unknown Historic Name
58. 118 Gorham Street, Unknown Historic Name
59. 124 Gorham Street, Unknown Historic Name
60. 15 Hampton Avenue, a Donovan Building
61. 10 and 10 Rear Hampton Avenue, a Donovan Building
62. 39-41 Hanover Street, Nichols/Smith House and Research Report
63. 28 Jackson Street, First James C. Ayer Building and Research Report
64. 32 Jackson Street, David Dana Brass Factory and Research Report
65. 360 Jackson Street, Bay State Storage Warehouse
66. 65-67 John Street, Site at Massachusetts & Boott Mills Boarding Houses
67. 25-35 John Street (See 65 Merrimack Street), New Nesmith Building
68. 36 John Street, Lowell Five Cent Savings Bank
69. 64 John Street, Lowell High School, Commercial and Manual Training Dept.
70. 76 John Street (and 43 French Street), Lowell High School Annex and Research Report
71. In Front of Joiner‘s Court, Unknown Historic Name
72. 5 Joiner‘s Court, Unknown Historic Name

Box 74

1. Near 5 Joiner‘s Court, Site of the Mary Murphy House
2. 4 Joiner‘s Court, Mr. James Blake House
3. 6 Joiner‘s Court, George Green House
4. Kearney Square at Canal Street, Unknown Historic Name
5. 11 Kearney Square, Howe Building/First Federal Savings and Research Report
6. 15 Kearney Square, Courier Citizen Building

7. 2 - 14 Kearney Square, Runels Building and Research Report
8. 50 Kearney Square, Lowell Post Office
9. 8 Kirk Street, Rectory St. Anne‘s Church and Research Report
10. 10 Kirk Street, Benjamin F. French House
11. 17 - 21 Kirk Street, Mitchell Block
12. 21 - 27 Kirk Street, Rose, Maynard & Ward Houses
13. 29 Kirk Street, Kelley & Wetherbee House
14. 30 Kirk Street, Lowell High School
15. 31 Kirk Street, Kirk Street Primary School and Research Report
16. 45, 47 Kirk Street & 49 Kirk Street, Brown-Day Watson Houses and Research Report
17. 63 - 67 Kirk Street, Linus Child House
18. 1 Kyan Street, Unknown Historic Name
19. Kyan Street (West of #1 Kyan) a Noyes and Sons Building
20. West End of Kyan Street, site of Kyanizing Works
21. LaGrange Court (1 & 2), 1, 2 LaGrange Court
22. 1 LaGrange Street, John Burke House
23. 5 LaGrange Street, Richardson House
24. 9 LaGrange Street, a Coffee Brothers Building
25. 13 LaGrange Street Pat Kane Building
26. 31 - 37 LaGrange Street, site of Ezekiel B. Worthen House
27. 49 LaGrange Street, W. H. Wiggin House
28. 8 LaGrange Street, site of A. Sgonis House
29. 10 - 20 LaGrange Street, site of the Andrews House
30. 14 - 16 LaGrange Street, an Ellen O‘Donnell Building
31. 22 LaGrange Street, Ellen O‘Donnell House
32. 24 - 28 LaGrange Street, Massand Building
33. 28 (rear) LaGrange Street, Massand Building
34. 30 - 32 LaGrange Street, site of the Sanborn/George House
35. 60 LaGrange Street, site of the Patrick Cummiskey House
36. 64 Lakeview Avenue, site of a Charles Callahan House
37. 110 Lakeview Avenue, a Charles Callahan Building
38. 120 Lakeview Avenue, a Spaulding House
39. 134 Lakeview Avenue, site of Hamblett House
40. 134 Lakeview Avenue (rear), Mary McKee House
41. 142 Lakeview Avenue, Unknown Historic Name
42. 152 Lakeview Avenue, J. W. Pead House
43. 162 - 164 Lakeview Avenue, Lewis House
44. 172 Lakeview Avenue, C Callahan House
45. 172 Lakeview Avenue (rear), Grady House
46. 186 Lakeview Avenue, Unknown Historic Name

47. 190 Lakeview Avenue, Merrimack Manufacturing Building
48. 204 Lakeview Avenue, site of Mary Lyman House
49. 214 Lakeview Avenue, Bridget Fox House
50. 214 Lakeview Avenue (rear), Hugh Golden House
51. 228 Lakeview Avenue, a Merrimack Manufacturing Company House
52. 218 Lakeview Avenue, Mary Riley House
53. 236 Lakeview Avenue, a Merrimack Manufacturing Company House
54. 242 Lakeview Avenue, a Merrimack Manufacturing Company House
55. 268 Lakeview Avenue, St. Casimir‘s Polish National Church
56. 270 Lakeview Avenue, Unknown Historic Name
57. 276 Lakeview Avenue, Catholic Church of Lowell
58. 430 Lakeview Avenue, City of Lowell Power Plant
59. 498 Lakeview Avenue, G. H. Tryder House
60. 508 Lakeview Avenue, James McMahon House
61. 516 Lakeview Avenue, McMahon House
62. 524 Lakeview Avenue, M. McMahon House
63. 530 Lakeview Avenue, C. H. Whiteley House
64. 570 - 610 Lakeview Avenue, Lowell Housing Authority
65. 664 Lakeview Avenue, Unknown Historic Name
66. 664 Lakeview Avenue (rear), Unknown Historic Name
67. 678 - 699 Lakeview Avenue, site of the Desmarais House
68. 696 Lakeview Avenue, C. Lavallee House
69. 573 Lawrence Street, Greenwood Brothers Store and Research Report
70. 685 Lawrence Street, U. S. Cartridge Company
71. North of 685 Lawrence Street, U. S. Cartridge Company Building
72. 48 Lawrence Street, Lawrence-Wentworth House and Research Report
73. 60 Lawrence Street, St. Vartanantz Armenian Church
74. 70 Lawrence Street, H. A. Miles House
75. 80 Lawrence Street, site of the Robinson-Wilson House
76. 78 - 90 Lakeview Avenue, site of C. Callahan Building
77. 90 - 92 Lawrence Street, The Torigan Building

Box 75

1. 104 Lawrence Street, site of a Richmond Mill House
2. 118 Lawrence Street, site of the Coburn House
3. 122 Lawrence Street, Colburn School and Research Report
4. 158 Lawrence Street, site of Daniel Benson House
5. 164 - 170 Lawrence Street, The Morrill-Benson House
6. 180 - 182 Lawrence Street, site of W. Coburn House
7. 186 Lawrence Street, site of Mary McNully House

8. 190 - 192 Lawrence Street, Harriet J. O'Brien House
9. 202 Lawrence Street, Peter McDermot House and Research Report
10. 220 Lakeview Avenue, a Merrimack Manufacturing Company House
11. 224 & 228 Lawrence Street, a Nancy Richmond House and Research Report
12. 310 - 326 Lawrence Street, Richmond Mills Housing
13. 332 Lawrence Street, E. A. Smith House
14. 342 Lawrence Street, site of A. C. Wheeler House
15. 352 Lawrence Street, W. T. Benson Building
16. 682 - 684 Lawrence Street, Alice Madden House
17. 688 Lawrence Street, J. Flynn Building
18. 768 - 772 Lawrence Street & 5 - 26 Faulkner Street, site of Faulkner Mills Housing
19. 788 Lawrence Street, Guilhermina Ribero House
20. 796 Lawrence Street, T. Hardisty House
21. 900 Lawrence Street, Water Head Mills
22. 900 Lawrence Street (rear), Waterhead Mills
23. South of 900 Lawrence Street (rear), Waterhead Mills
24. 908 Lawrence Street, Building in Wamesit Power Company complex
25. 37 Lee Street, Lee Street Church and Research Report
26. 22-28-30 Lee Street, site of Mary Rourke House (and other houses)
27. 44 Lee Street, Middlesex Machine Company
28. Lewis Street at Jefferson Street, Holy Trinity Hellenic Orthodox Church of Lowell
29. 11 Litchfield Terrace, Thomas S. Kerrigan House
30. 12 Litchfield Terrace, Michael Mullalney House
31. 16 Litchfield Terrace, John Murphy House
32. 22 Litchfield Terrace, William Giblin House
33. 28 Litchfield Terrace, Mrs. Mary A. O'Rourke House
34. 36 Litchfield Terrace, Herman H. Hills House
35. 42 Litchfield Terrace, Peter E. McCallum House
36. 7 Madonna Circle, George B. Bergholm
37. Between 7 and 29 Madonna Circle, Unknown Historic Name
38. 29 Madonna Circle, Francis H. Davey House
39. Between 29 and 39 Madonna Circle, Unknown Historic Name
40. 39 Madonna Circle, Richard J. Farrell House
41. 43 Madonna Circle, Thomas E. Riley House
42. 15 Mammoth Road, grounds of Pawtucket Congregational Church
43. 1 Marion Street, the Donohoe/Bennett House
44. 23 School Street, Northern Canal Gatekeeper's House
45. 23 School Street (rear), a Locks and Canals Company Boathouse
46. 29 - 31 School Street, D. W. Lane House
47. 41 School Street, C. Kelil House

48. 49 - 51 School Street, an Allard Building
49. 391 School Street (and 15 Pevey Street), Unknown Historic Name
50. School Street at Western Avenue, Building No. 3, Purifying House, Coal Shed, a Gasworks Building and Research Report
51. 228 - 236 Suffolk Street, site of Donohoe‘s Court and Research Report
52. 11 - 12 Marion Street, a James Morris Building
53. 13 - 14 Marion Street, a James Morris House
54. 31 Marion Street, F. McNabb House
55. 33 Marion Street, site of the T. Coburn Bowers House
56. 39 Marion Street, Brooks House
57. 41 Marion Street, Dustin B. Melvin House
58. 45 Marion Street, Florence Mahoney House
59. 51 - 53 Marion Street, the Ezekiel B. Worthen House
60. 28 - 30 Marion Street, a Michael Rourke House
61. 34 Marion Street, Unknown Historic Name
62. 38 - 44 Marion Street, a John B. Swift Building
63. 46 Marion Street, Sarandopoulos Building
64. 50 - 52 Marion Street, 15 LaGrange Street, Pearson and Goodwin House
65. 40 Market Street, Old Market House (later Police Station) and Research Report
66. 29 Market Street, H. H. Wilder and Company
67. 43 Market Street, Jonathan Tyler Building
68. 51 Market Street, a C. B. Coburn Building
69. 61 Market Street, a C. B. Coburn Building
70. 73, 79, 91 Market Street, Father John‘s Building and Research Report
71. 95, 99, 103 Market Street, Independent Beef and Provision Company
72. 105 Market Street, Donovan Harness and Auto Supply Company
73. 133 Market Street, Cahill Bros., Blacksmiths
74. 155 Market Street, Unknown Historic Name

Box 76

1. 165 Market Street, J. C. Ayer & Company Laboratory and Research Report
2. 197 Market Street, Foye Brothers Building
3. 199 Market Street, John Vlahos Building
4. 207 Market Street, Putnam Building
5. 307 Market Street, Gates Block
6. 351 Market Street, John Hadley Building
7. 387 - 391 Market Street, Luke H. Clark Grocery & Patrick Dempsey & Co. Liquor and Grocery Store
8. 509 Market Street, Joel Davis House and Research Report
9. 523 Market Street, G. E. Voscolas Building

10. 20 Market Street, Waverly House
11. 302 Market Street, site of Exchange Coffee House
12. 338 - 340 Market Street, a Michael Roark Building
13. 350 Market Street, Parkway
14. 360 - 76 Market Street & 50 - 64 Dummer Street, site of John Dummer House
15. 7 Merrill Street, site of John Handley House
16. 10 Merrill Street, John Donohue House
17. 16 Merrill Street, M. Basset House
18. 16 Merrill Street (rear), No Historic Name
19. 22 Merrill Street, James Haggerty House
20. 36 Merrill Street, Hugh Healey House
21. 38 Merrill Street, William Garrett House
22. 42 Merrill Street, D. Dilworth House
23. 44 Merrill Street, A.D. Dilworth House
24. 46 Merrill Street, a Hugh Fife House
25. 54 Merrill Street, a Hugh Fife House
26. 56, 58 Merrill Street, Unknown Historic Name
27. 19, 25 Merrimack Street & 129 Paige Street, No Historic Name
28. 1 - 5 Merrimack Street & 7 Kearney Square, Simpson‘s Block and Research Report
29. 8 Merrimack Street, Sun Building and Research Report
30. 15 & 17 Merrimack Street & 139 Paige Street, site of Courier Building
31. 16, 18 Merrimack Street, D. L. Paige Company
32. 24 Merrimack Street & 28 Central Street, Colonial Building/Chalifoux Building and Research Report
33. 45 Merrimack Street, Hildreth Building and Research Report
34. 61 Merrimack Street, 39 John Street, Union National Bank and Research Report
35. 65 Merrimack Street (see 25 - 35 John Street), New Nesmith Building and Research Report
36. 72 Merrimack Street, Church of the First Unitarian Society and Research Report
37. 83 Merrimack Street, Nesmith Block and Research Report
38. 100 Merrimack Street, Unknown Historic Name and Research Report
39. 102 - 110 Merrimack Street, Robbins Block and Research Report
40. 105 Merrimack Street, Marble Bank Building/Marble Block site
41. 115 - 121 Merrimack Street, site of the Rugg Building
42. 124 Merrimack Street, Davis Block and Research Report
43. 127 Merrimack Street, Unknown Historic Name
44. 133 Merrimack Street, B.T. Thompson Building
45. 134 Merrimack Street, Masonic Temple and Research Report
46. 143 Merrimack Street, Bon Marche Building/Railroad National Bank Building
47. 144 Merrimack Street, A.G. Pollard and Company Building

48. 154 Merrimack Street, Fellows Building
49. 160 Merrimack Street, Middlesex Safe Deposit and Trust Company Building and Research Report
50. 170 - 184 Merrimack Street, Albion Block and Research Report
51. 175 Merrimack Street, Welles Block and Research Report
52. 190 Merrimack Street, Bascom Building
53. 200 Merrimack Street, Solomon‘s Building
54. 210 Merrimack Street, part of Carlton (Weir) Block
55. 226 Merrimack Street, Old City Hall
56. 237 Merrimack Street, St. Anne‘s Church
57. 256 Merrimack Street, Wentworth Building and Research Report
58. 262 - 266 Merrimack Street, site of Huntington Hall/Boston and Lowell Railroad Depot
59. Merrimack Street, Arcand Drive, and Dutton Street, Monument Square

Box 77

1. 322 Merrimack Street, site of Associate Building
2. 350 - 364/368 - 376 Merrimack Street, Bank Block
3. 400 Merrimack Street, First Congregational Church and Research Report
4. 407 Merrimack Street (City Hall), City Hall and Research Report
5. 408 Merrimack Street, Green School and Research Report
6. 415 Merrimack Street, Memorial Hall (City Library) and Research Report
7. 508 - 540 Merrimack Street (11 Harvey Street) Unknown Historic Name
8. 555 Merrimack Street, No Historic Name
9. 585 Merrimack Street, No Historic Name
10. 586 Merrimack Street, Barnes‘ Folly and Research Report
11. Referral info on: 503 Worthen St.; 248 - 54 Middlesex St.; 200, 204 Middle St.; 1 - 5 Middlesex St.; 256 - 300 Lawrence St.
12. 31 Middle Street, Moller‘s Department Store
13. 43 Middle Street, a Hocum Hosford Building and Research Report
14. 55 Middle Street, Parker Block and Research Report
15. 129 Middle Street, Fellows Building and Research Report
16. 147, 163, 189 Middle Street, site of City Common and Urban Block
17. 16 Middle Street, No Historic Name
18. 45 Middle Street, Talbot Building
19. 56 Middle Street, —K Building
20. 70 Middle Street & Passageway, site of William Kittredge‘s Lumber Yard & O. A. Richardson‘s Gun Manufactory
21. 83 Middle Street, Pollard Building
22. 82-88 Middle Street, Simpson and Rowland, Wholesale Grocers and Research Report
23. 92 Middle Street, W.H.I Hayes Building and Research Report

24. 100-104 Middle Street, Institute Building (Originally Burke Block) and Research Report
25. 108 Middle Street, McCarthy Building
26. 150 Middle Street, J.B. Cover Flour and Grain Company
27. 158 Middle Street, Barker Building
28. 176, 184, 188, 190 Middle Street, JC.C Ayer Company and Research Report
29. 194 Middle Street, a Charles Hovey House and Research Report
30. 9 Middlesex Street, Hoyt‘s German Cologne Building
31. 68, 69, 73, 79, 83 Middlesex Street, a C.E. Bradley Building
32. 155, 157, 159 Middlesex Street, Marston Building and Research Report
33. 163, 165, 167 Middlesex Street, Site of Appleton Company Mill Housing & A.C. Wheelock Building
34. 169 Middlesex Street, Partial Site of the A.C. Wheelock Building
35. 173-181 Middlesex Street, Site of Appleton Company Boardinghouses
36. 189 Middlesex Street, W.B. Spaulding Building
37. 193 Middlesex Street, Elliot Building
38. 207 Middlesex Street, Appleton Chambers
39. 261 Middlesex Street, Appleton Co. Store
40. 295 Middlesex Street, Unknown Historic Name
41. 317 Middlesex Street, S. Farson House
42. 323 Middlesex Street, Burgess-Lang Building
43. 739 Middlesex Street, site of a Samuel Farson Building
44. 389 Middlesex Street, site of Saint Cloud Hotel
45. 489-501 Middlesex Street, part of Lowell Brewery Site
46. 501 Middlesex Street, site of Lowell Brewery and Livingston‘s Grist Mill
47. 511 Middlesex Street, No Historic Name
48. 533 Middlesex Street, Howard House
49. 543 Middlesex Street, St. James Hotel
50. 561-567 & 575-579 Middlesex Street (at Middlesex Place), site of R. Call Building
51. 585 Middlesex Street, Davis and Sargent Building
52. 637 Middlesex Street, James Boyle Building
53. 647-665 Middlesex Street, No Historic Name
54. 8, 20, 24 Middlesex Street, site of Hamilton Mills Boardinghouses & Puffer & Watts West India Goods Store
55. 30 Middlesex Street, Trader‘s National Bank of Lowell
56. 50, 54, 56 Middlesex Street, Hill Brothers, Carriage Manufacturers and Research Report
57. 60, 62, 64 Middlesex Street, Andrew J. Calef Building and Research Report
58. 74 Middlesex Street, Crown Theater
59. 78 Middlesex Street, site of Odd Fellows Building
60. 94-98 Middlesex Street, site of A.D. Puffer Building
61. 114 and 116 Middlesex Street, Harry Boss Building

62. 118 Middlesex Street, D.C. Clark Building
63. 138, 140 Middlesex Street, Elliot Street School and Research Report
64. 150 Middlesex Street, Hamilton and Appleton Corporation School and Lowell Missionary Society and Research Report
65. 160-170 Middlesex Street, Workingman‘s Protective Union Building and Research Report
66. 182-186 Middlesex Street, site of Zenus Doane W.I. Goods Store (1836)
67. 190,194,196 Middlesex Street, Warren Fox Building

Box 78

1. 208 Middlesex Street, The Howe Building
2. 18-220 Middlesex Street, M. Hunt Building
3. 224-6 Middlesex Street, Unknown Historic Name
4. 230-240 Middlesex Street, Raymond‘s Tavern and Used Furniture
5. 248-254 Middlesex Street, Carp Building
6. 262-266 Middlesex Street, Palefsky Building
7. 278, 286, 292 Middlesex Street, Thomas Goward Building
8. 281 Moody Street and 463 Moody Street, North Canal Apartments
9. 407-409 Moody Street, Bartlette/Cook House
10. 411 Moody Street, R.H. Staples House
11. 9 Mt. Hope Street, E.H. Barker House
12. 10-12 Oxford Street, J.D. Horne House
13. 19 Paige Street, W.H. Parker Building (1896)
14. 29-31 Paige Street, C. Adams and G.L. Allen Houses and Research Report
15. 35 Paige Street, Bromley-Shepherd Incorporated
16. 105-127 Paige Street, Unknown Historic Name
17. 19-21-23 Palmer Street, Arthur Staples Building
18. 45 Palmer Street, Central Fire Station and Research Report
19. Pawtucket Boulevard opposite Stockbridge Street, Unknown Historic Name
20. Pawtucket Street west of Broadway Street, Unknown Historic Name
21. 193 Pawtucket Street, an O. Deziel Building
22. 199 Pawtucket Street, an O. Deziel Building
23. 203 Pawtucket Street, a Catholic Association Building
24. 211 Pawtucket Street, Corporation of Members of the Catholic Association Building
25. 241 Pawtucket Street, Unknown Historic Name
26. 267 Pawtucket Street, The Stone House; The Ayer House and Research Report
27. 279 Pawtucket Street, Dow-Beard House and Research Report
28. 295 Pawtucket Street, Jacob and Mary Rogers House and Research Report
29. 305 Pawtucket Street, Wightman House
30. 309 Pawtucket Street, Dr. Packer House
31. 321 Pawtucket Street, Raymond J. Lord Manor

32. 335 Pawtucket Street, G.W. Shattuck House
33. 357 Pawtucket Street, Frederick Ayer Mansion and Research Report
34. 375 Pawtucket Street, an Allard Building
35. 383 Pawtucket Street, Spaulding House
36. 391 Pawtucket Street, H.A. Lambert House
37. 403 Pawtucket Street, Earle House
38. 409 Pawtucket Street, an S. Locke House
39. 415 Pawtucket Street, Samuel W. Locke House and Research Report
40. 423 Pawtucket Street, A/J. Downing House
41. 429 Pawtucket Street, an S. Locke Building
42. 453-455 Pawtucket Street, The Vesper Boat Club
43. 489 Pawtucket Street, Lowell Felting Mills Building
44. 438 Pawtucket Street, Dr. Gage House
45. 440 Pawtucket Street, Miss G. Walker House
46. 450 Pawtucket Street, E. Cope House
47. 500 Pawtucket Street, Unknown Historic Name
48. Payne Street at School Street (Next to 44 Payne), Site of Brooks Mill
49. 40-44 Payne Street, No Historic Name
50. 50 Payne Street, Doherty Brothers Iron Foundry
51. 15 Pearl Street, Unknown Historic Name
52. 21 Pearl Street, Bridget Berne House
53. 107 Perry Street, Lowell Electric Light Generating Station and Research Report
54. 107 Perry Street (rear), site of Boston & Maine Railroad Engine House
55. 117 and 125 Perry Street, American Mason Safety Tread Company
56. 145 Perry Street, an F.J. Fleming Building
57. 151 Perry Street, No Historic Name
58. 223-239, Edward Cawley Houses
59. North of 291 Perry Street, site of White Bros. & Co. Leather Factory
60. 291 Perry Street, White Bros. & Co. Leather Factory
61. 329 Perry Street, Part of White Bros. & Co. Leather Factory
62. 12-16 Perry Street, No Historic Name
63. 40 Perry Street, No Historic Name
64. 50-52 Perry Street, a J.W. Bennett House
65. 54-56 Perry Street, a J.W. Bennett House
66. 58-60 Perry Street, a J.W. Bennett House
67. 62-64 Perry Street, a J.W. Bennett House
68. 66-68 Perry Street, a J.W. Bennett House
69. 85 Perry Street, Unknown Historic Name
70. West of 85 Pevey Street, Unknown Historic Name
71. 25-35 Prescott Street, Phoenix Building/ Chalifoux Annex

72. 6 Prescott Street, The Lowell Sun
73. 6 Prescott Street (rear), Massachusetts Cotton Mills Storehouse
74. 58 Prescott Street, Claflin Block and Research Report
75. 6-82 Prescott Street, Southwick Block and Research Report
76. 88 Prescott Street, The Old Lowell National Bank
77. 44 Race Street, John C. Woodward House and Research Report
78. 91 Riverside Street, A.T. Safford House
79. 10 Riverside Street, No Historic Name
80. 22 Riverside Street, Coburn Blood House and Research Report
81. 28 Riverside Street, Marshall House
82. 36 Riverside Street, E. Park House
83. 40-42 Riverside Street, an A.A. Marshall House

Box 79

1. 48 Riverside Street, Cora A. Bassett House
2. 52 Riverside Street, J. Philbridge House
3. 66 Riverside Street, E. Barrette House
4. 70-72 Riverside Street, Clayton J. Wilson House
5. 82 Riverside Street, Susan Coburn House
6. 23 Rogers Street, J.M.G. Parker Building
7. 75 Rogers Street, American Hyde and Leather Co. Building
8. 81 Rogers Street, No Historic Name
9. 85 Rogers Street, Edward Cawley House
10. 80 Rogers Street, U.S. Bobbin and Shuttle Co.
11. 5 Shaffer Street, Mrs. M. Hamilton House
12. 9 Shaffer Street, J. Kelley House
13. 17 Shaffer Street, F.G. Beharrell House
14. 23 Shaffer Street, John Pilling Shoe Factory Building
15. 33 Shaffer Street, John Pilling Shoe Company Factory and Research Report
16. 39 Shaffer Street, a J.B. Pilling House
17. 43 Shaffer Street, J. Holden House
18. 9 Shaffer Street, Boutwell Building
19. 18 Shattuck Street, Lowell Institution for Savings and Research Report
20. 22 Shattuck Street, Lowell Gas Light Co. and Research Report
21. 25 Shattuck Street, Mack Building
22. 27 Shattuck Street and 247 Market Street, Lowell Card Company Building
23. 17-19 South Street, site of Hasting House
24. 24-26 South Street, site of Union Market
25. 17 and 19 Spring Street, Hunt Building
26. 50 Stackpole Street, Whittier Cotton Mills

27. 82 Stackpole Street, No Historic Name
28. Stackpole Street, Nurses Residence and other Structures Associated with St. John‘s Hospital i.e Saints Memorial
29. 13 Suffolk Street, Three Copper Men
30. 25-197 Suffolk Street, No Historic Name – Western Canal Locations
31. 38 Suffolk Street and 41 Adams Street, a Daniel Redding Building
32. 44 Suffolk Street, site of the Foss House
33. 46 Suffolk Street, site of the Foss House
34. 52 Suffolk Street, McArthur House
35. 62 Suffolk Street, Mrs. M. Keefe House
36. 66 Suffolk Street, a Keefe Building
37. 74-76 Suffolk Street, Taylor/Pettingill House
38. 84 Suffolk Street, Elihu Gates House
39. 92 Suffolk Street, Coffey House
40. 98, 120,134 Suffolk Street, A. Sgonis House
41. 166 Suffolk Street, a Coffee Brothers Building
42. 168-172 Suffolk Street, Richardson House
43. 186 Suffolk Street, S.S. Fisher House
44. 192-194 Suffolk Street (also 160-168 Broadway), Mrs. Catherine Murphy Building
45. 244-252 Suffolk Street, Mathers House
46. 282 Suffolk Street, St. Patrick‘s Rectory
47. 284 Suffolk Street, St. Patrick‘s Church
48. 312-350 Suffolk Street and 2-116 Lewis Street, site of Part of the Acre Neighborhood
49. 408 Suffolk Street, Daniel J. Murphy Building
50. 432 Suffolk Street, No Historic Name
51. Thomas Street, E. A. Wilson Coat Company Yard
52. 5-27 Thorndike Street, No Historic Name
53. 9-27 Varnum Avenue, Unknown Historic Name
54. 35 Varnum Avenue, Peter S. Coburn House
55. 49 Varnum Avenue, John Jay Colton House and Research Report
56. 63 Varnum Avenue, George Coburn House
57. 71 Varnum Avenue, F.A. Lamoureaux House
58. 81-83 Varnum Avenue, Colonel Varnum House and Research Report
59. 89 Varnum Avenue, Atkinson Varnum House
60. 101 Varnum Avenue, Unknown Historic Name
61. 113 Varnum Avenue, Pawtucketville Church Parsonage
62. 123 Varnum Avenue, Unknown Historic Name
63. 131 Varnum Avenue, Joshua Morse House
64. 139 Varnum Avenue, No Historic Name
65. 145 Varnum Avenue, No Historic Name

66. 12 Walker Street, Unknown Historic Name
67. 18 Walker Street, Unknown Historic Name
68. 22 Walker Street, James Gaffney House
69. 28 Walker Street, Unknown Historic Name
70. 32 Walker Street, Unknown Historic Name
71. 38 Walker Street, Unknown Historic Name
72. 9 Wannalancit Street, Bartlett School
73. 64 Warren Street, an Edward Cawley house
74. 168 Warren Street, The Ziembo House
75. 172 Warren Street, a Middlesex Mills Cottage
76. 275-286 Western Avenue, Nashua and Lowell Railroad Freight Depot
77. 6-80 Western Avenue, Unknown Historic Name
78. 122-194 Western Avenue, Mass. Mohair Plush Co. Mills – Comprised of Office, Coram Block, 2 Unknown Historic Name Buildings and The Weaving Building

Box 80

1. Western Avenue (west of 122-194), No Historic Name
2. 12 White Street, Unknown Historic Name
3. 143 Worthen Street, Nicholas and Johnson‘s West India Goods and Research Report
4. 169 Worthen Street, Hadley‘s Stable
5. 205 Worthen Street, James Kelty House
6. 213-217 Worthen Street, site of Worthen Baptist Church
7. 245 Worthen Street, Moody-Whistler House and Research Report
8. 152 Worthen Street, site of J.H. Sparks Stables
9. 200 Worthen Street, Worthen Street Methodist-Episcopal Church and Research Report
10. 222,224 Worthen Street, Stephen Ashton House and Research Report
11. 228 Worthen Street, Miss L.A. Hill‘s Educational Club (1875-1908)
12. 250 Worthen Street, site of the Worthen Street School (Primary # 8)
13. 266 Worthen Street, a Locks and Canals House
14. 284 Worthen Street, Erastus Douglass House and Research Report
15. Amendment Andover Steret, 229 Andover Street, John Nesmith House
16. Amendment Broadway, 719 Broadway (moved from 1708 Middlesex) Hadley House
17. Amendment – Church Street, 205, 219, 227 - Properties
18. Amendment – Fletcher Street, 60, 78, 116, 128 – Properties
19. Amendment – French Street, 50, 62 Properties
20. Amendment – Gorham Street, 273, 323, 327, 339, 347 St. Peter‘s Church and Rectory
21. Amendment – Hurd Street, 13-15, 16, 19-21, 22, 25, 35 Properties
22. Amendment – Lawrence Street, 14, 26-28, 32 Properties
23. Amendment – Market Street, 437, 455, 463, 477, 485, 491 to 503 Properties

24. Amendment – Merrimack Street, 441-445, 442-446, 450-454, 462-466, 463,474,475,484-488,489, 492-496, 504, 520, 521, 555 Properties
25. Amendment – Moody Street, 154, 168 Properties
26. Amendment – Rock Street (mailing address 1 Cushing), 6, 18 Properties
27. Amendment – Wamesit Court, 1,2,4,5,7,8 Properties
28. Amendment – Warren Street, 15
29. Amendment – Miscellaneous Photo Prints – Identified on Verso
30. History of Park Inception
31. CRI Preliminary Documentation – 1973-1980
32. Preliminary Documentation for CRI -1978-1980
33. Original Specifications for CRI
34. CRI Inventory Specifications
35. Appropriations Bill – U.S. House of Representatives 1982

VI . Architectural
A. Field Notes (see Full Size Map Folder List for Removed Oversize Drawings)

Box 81
1. Boott Mills Boardinghouse, 1994. Oversize material removed.
2. Bridge Street Boarding House Original Design. Oversize material removed. Wallpaper fragments moved to Oversize BX 1.
3. Bridge Street Boarding House Storefront.
4. Eastern Canal and Prescott Way.
5. Gas Light Building, 1979. Oversize material removed.
6. Lowell Canalway Signage.
7. Market Mills (General). Oversize material removed.
8. Market Mills Signage. Oversize material removed.
9. Northern Canal Phase 1.
10. Northern Canal Phase 2 (West End).
11. Northern Canal Waste Weirs & Gatehouse. Oversize material removed.
12. Railroad Car # 1. Oversize material removed.
13. Railroad Car # 2. Oversize material removed.
14. Saint Anne's Episcopal Church.
15. Upper Pawtucket Canal, 1993. Oversize material removed.

Box 82
1. Watson House. Oversize material removed.
2. Watson House (Early Residence) Plans & History. Oversize material removed.
3. Watson House Fence. Oversize material removed.
4. Western Canal Area 1, 1994. Oversize material removed.
5. Western Canal Area 2 (Western Canal Park),1994. Oversize material removed.

6. Western Canal Area 3 (Northern Canal Apartments). Oversize material removed. Oversize material removed. Oversize material removed. Oversize material removed.
7. Western Canal Area 4 (Tremont Trolley Terminal) & Lower Canal.

B. Preservation Grants/Loans
1. Administration

8. 1st Cycle, 1981.
9. 2nd Cycle, 1981.
10. 3rd Cycle,Winter 1982.
11. "A" [Top Priority] in Priority Areas, Dec 1983 [annotated ca. 1986].
12. Agreement Forms, 1989-1993.
13. Budgeting [and Grant Allocations], 1985-1987.
14. Chief Historic Architect's Correspondence and Notes, 1985-1989.
15. Commission Development and Resulting Private Investment, Sept 1981.
16. Correspondence, 1991-1994.
17. Davis-Bacon Grant Requirements, 1979-1993.
18. Enquiries, 1985-1993.
19. Façade Program- Central Business District, ca. 1980.
20. Fact Sheets, [1981]-1988 [Application Procedures].

Box 83
1. Grant Agreement- Equal Oportunity Employment Act, [ca. 1985 photocopy].
2. Grant Agreement- Payroll Form, WH-347, [ca. 1985].
3. Grant Agreement - Procurement Standards, [ca. 1985 photocopy].
4. Attachment B to Grant Agreements - Labor Standards Provisions, [ca. 1985 photocopy].
5. Attachment C to Grant Agreements - Utilization of Small Business,[ca. 1985 photocopy].
6. Grants and Loans List, 1985-1989.
7. Grants Committee Re: Davis- Bacon Act, 1986.
8. Grants Committee/ Oversight, 1984-1987.
9. Grants to Active Churches, 1992-1993 (Part 1 of 2).
10. Grants to Active Churches, 1992-1993 (Part 2 of 2).
11. Minor Boundary Changes, 1985-1989 [Changes to Index].
12. Miscellaneous Architect/Engineer Services - Commercial Building Façades, 1986-1989 [McGinley, Hart Associates].
13. Miscellaneous Architect/Engineering Services, 1984- Jan 1985 Including Building Façades, 1984 [TiseWilhelm & Assoc. Inc.].
14. Preservation Restriction Forms, 1988-1994.
15. Re: Policies and Procedures, 1984-1987.

Box 84
1. Renovation Projects [Including Outside Funding Sources], [1981].

2. Special Incentive Grants Program, 1985-1988.
3. Updates and Status Reports, 1985-1987.

2. Project Files (see Full Size Map Folder List for Removed Oversize Drawings)

4. Abijah Watson House, 49 Kirk Street, 1988.
5. Acre Triangle, 236 Broadway, 50-52, 46, 38-44 Marion Street, 1986-1988.
6. Acre Triangle, 236 Broadway, 50-52, 46, 38-44 Marion Street, 1982-1993. (CX1978-1-0013). Oversize material removed.
7. Aiken Street Bridge, Aiken Street, 1992.
8. Allen House, 59 Rolfe Street.
9. Andre Garin House, 1993.
10. Appleton Mill Building, 1991.
11. Bancroft Block, 90 Appleton Street, 1993.
12. Bank of New England, 20-26 Market Street, 1988-1990.
13. Bascom Building, 196 Merrimack Street, 1981-1985. (CX1978-1-0011). Oversize material removed.
14. Blue Dye House (Lowell Sun Garage Building), 30 Market Street, 1983-1984 (Part 1 of 3).
15. Blue Dye House (Lowell Sun Garage Building), 30 Market Street, 1983-1986 (Part 2 of 3).
16. Blue Dye House (Lowell Sun Garage Building), 30 Market Street, 1984-1991 (Part 3 of 3). (CX1978-4-0007).
17. Bon Marche Building (Jordan Marsh), 141-145 Merrimack Street, 1979-1984.
18. Bon Marche Building (Jordan Marsh), 141-145 Merrimack Street, 1994.
19. Boott Dam Gatehouse, 1990.
20. Boott Mill Building # 6, John Street, 1979-1982 (Part 1 of 3). (CX1978-9-0004). Oversize material removed.

Box 85

1. Boott Mill Building # 6, John Street, 1981-1982 (Part 2 of 3). (CX1978-9-0004).
2. Boott Mill Building # 6, John Street, 1980-1982 (Part 3 of 3).
3. Boott Mills Boarding House, 40 French Street, 1983-1985. (Contains Multiple Contract Numbers).
4. Boott Mills Boarding House, 40 French Street, 1984. (CX1600-4-0029).
5. Boston & Maine Railroad Depot (The Rialto Building), 240 Central Street,1990-1993.
6. Boston & Maine Railroad Depot (The Rialto Building), 240 Central Street,1994.
7. Butler Cooperative Bank, 10 Hurd Street, 1981.
8. Central Street/ Pawtucket Canal Area Improvements, 1982-1984.
9. Chalifoux Building, 24 Merrimack Street, 1991.
10. Claflin Block, 1984-1985. (Contains Multiple Contract Numbers).
11. Coburn Building, 126 Appleton Street, 1994.

12. Colburn School, 136 Lawrence Street, 1994.
13. Darius Young House, 70-76 Gorham Street, 1979-1981.
14. Darius Young House, 70-76 Gorham Street,1980-1981.
15. Derby Electric, 82-88 Middle Street, 1980-1983 (Part 1 of 2).
16. Derby Electric, 82-88 Middle Street, 1981. (CX1978-1-0001) (Part 2 of 2).
17. Dye House, 1989-1990.
18. Early Residence, Kirk Street, 1981-1985. (Contains Multiple Contract Numbers) (Part 1 of 2).
19. Early Residence, Kirk Street, 1983-1990. (Contains Multiple Contract Numbers) (Part 2 of 2).
20. Elias Bros. Tobacco, Merrimack Street, 1989.
21. Elliot Building, 193 Middlesex Street, 1989.
22. Fellows Building, Middle Street, 1986.
23. First United Baptist Church, 99 Church Street, 1995.
24. Fox Building,190, 194, 196 Middlesex Street, 1991.
25. Gas Light Building, 22 Shattuck Street, 1980-1988.
26. Girls, Inc., 200 Worthen Street, n.d.
27. Hadley Block, 63 Worthen Street, 1981-1984. Includes photographs.
28. Hamilton Canal, Parallelling Jackson Street, 1993.
29. Hildreth Building, 45 Merrimack Street,1983. (CX1978-3-0004).
30. Historical Trolley Rehab, 1984-1990. (PX1978-0-0027).
31. Holy Trinity Hellenic Orthodox Church, Lewis Street, 1981-1988.
32. Howe Building, 11 Kearney Square, 1979-1981.

Box 86

1. Kirk Street Agent's House, 63-67 Kirk Street, 1990-1994 (Part 1 of 2)..
2. Kirk Street Agent's House, 63-67 Kirk Street, 1990-1994 (Part 2 of 2)..
3. Kirk Street Primary School, 1988.
4. Kitson Machine Shop (American Textile History Museum),491 Dutton Street, 1994.
5. Kitson Machine Shop (American Textile History Museum),491 Dutton Street.
6. Lawrence Manufacturing Company Agent's House (Lowell Day Nursery Association Inc.), 119 Hall Street, 1981-1989. (CX1978-2-0007).
7. Lawrence Wentworth House (Unitas Inc.), 84 Lawrence Street, 1982-1983. (CX1978-2-0003) (Part 1 of 2).
8. Lawrence Wentworth House (Unitas Inc.), 84 Lawrence Street, 1993 (Part 2 of 2).
9. Lowell High School Addition, 64 John Street, 1995.
10. Lowell County Jail (Keith Academy), 201 Thorndike Street, 1982.
11. Lowell Regional Transit Authority, No Address. Oversize material (Gallagher Transportation Terminal Addition) removed.
12. Major's Café, 34 Jackson Street, 1985-1987. (CX1978-5-0007).
13. Mansur Block, 101-107 Central Street, 1983-1985. (CX1978-4-0004).

14. Market Mills, 264 Market Street, 1984-1989. (Contains Multiple Contract Numbers).
15. Market Mills, 264 Market Street, 1982-1986. (Contains Multiple Contract Numbers).
16. Market Mills, 264 Market Street, 1981-1983. (Contains Multiple Contract Numbers).
17. Market Mills, 264 Market Street, 1993.
18. Martin World Furniture Building, 1982-1984. (Contains Multiple Contract Numbers).
19. Martin World Furniture Building, 1983-1987. (Contains Multiple Contract Numbers).
20. Martin World Furniture Building, No Address.
21. Martin's Clothing Building, 104 Central Street, 1982-1984. (Contains Multiple Contract Numbers).
22. Massachusetts Mill # 2, 1988. Oversize material removed.
23. McCarthy Building (Luna Realty), 112 Middle Street, 1993-1994. (GA1978-4-P003). Oversize material removed.

Box 87

1. Memorial Hall at Lowell City Library, 401 Merrimack Street, 1979-1981.
2. Merrimack Street Housing & Commercial Development, 422, 250, 462 Merrimack Street, 1989.
3. Middlesex Building, 1983.
4. Middlesex Safe Deposit And Trust Company Building (Weiner's Furs), 160 Merrimack Street, 1982. Oversize material removed.
5. Mitchell Block, 15 Kirk Street, 1994.
6. Mogan Cultural Center, 40 French Street, 1989-1991.
7. Mogan Cultural Center, 40 French Street, 1982-1985. (Contains Multiple Contract Numbers).
8. Napping Building, 81 Bridge Street, 1987-1989.
9. Napping Building, 81 Bridge Street, 1987-1989. Oversize material removed.
10. Nesmith Block, 65-68 Merrimack Street, 1980-1981 (Part 1 of 2).
11. Nesmith Block, 65-68 Merrimack Street, 1981-1982 (Part 2 of 2). (CX19878-1-0006).
12. Nesmith House, 229 Andover Street, 1984-1994. (CX1978-0-0005).

Box 88

1. Old City Hall, 222 Merrimack Street, 1987-1988. (CX1978-8-0002). Oversize material removed.
2. Old City Hall, 222 Merrimack Street, 1987. (CX1978-8-0007).
3. Old Firehouse, 45 Palmer Street, 1981-1983.
4. Old Firehouse, 45 Palmer Street, 1982. (CX1978-1-0009).
5. Old Market House, 40 Market Street, 1980-1983.
6. Old Market House, 40 Market Street, 1981. (Contains Multiple Contract Numbers).
7. Page's Clock, 16 Merrimack Street, 1992-1995. (GA1978-3-P018).
8. Pollard Memorial Library, 401 Merrimack Street, 1993.
9. Rail Car, No Address. (Contains Multiple Contract Numbers).

10. Railroad National Bank Building, 143 Merrimack Street, 1994.
11. Reed & Mansur Building, 321 Central Street, 1989.
12. Richardson Block, 295 Dutton Street, 1989. Oversize material removed.
13. Robbins Block, 102-110 Merrimack Street, 1984. (CX1978-3-0002).
14. Ryan Block, 63-73 Fletcher Street & 503 Worthen Street, 1994.
15. Saint Anne's, 8 Kirk Street, 1993.
16. Saint Joseph's Church (Saint Joseph the Worker Shrine), 37 Lee Street, 1985-1988. (CX1978-7-0002). Oversize material removed.

Box 89

1. Saint Onge Building, 442 Merrimack Street, 1988-1990. (CX1978-9-0004).
2. Section # 8 Powerhouse, 1991.
3. Sheply Building, 1994.
4. Simpson Block, 1-5 Merrimack Street & 7 Kearney Square, 1982. (CX1978-1-0010).
5. Staples Building, 19, 21, 23 Palmer Street, 1995.
6. Suffolk Manufacturing Company Dye House, 1991.
7. Swamplocks Gatehouse, 1992-1994.
8. Transportation, 1981-1986. (Contains Multiple Contract Numbers).
9. Vesper Boat Club, 453-455 Pawtucket Street. Oversize material removed.
10. Wasteway Gatehouse (Massachusetts Mills), 1988-1991. Oversize material removed.
11. Western Canal, Parallelling Suffolk Street, 1994-1995.
12. Whistler House, 243 Worthen Street, 1991-1992.
13. Whistler House, 243 Worthen Street, 1991.
14. Whistler House, 243 Worthen Street, 1985. (CX1978-2-0006).
15. No Name, 72 Merrimack Street, 1995. Oversize material removed.
16. No Name, 200 Middle Street. Oversize material removed.
17. No Name, 104 Central Street, 1993.
18. No Name, 722 Merrimack Street, 1992.
19. No Name, 1984-1986. (Contains Multiple Contract Numbers).
20. No Name, 1981-1986. (Contains Multiple Contract Numbers).

C. Design Review

21. Acre, Selected Buildings, 1980-1985 (Part 1 of 2).
22. Acre, Selected Buildings, 1985 (Part 2 of 2).
23. Albion Block, 170-184 Merrimack Street, 1979-1983.
24. Appleton Block, Central Street, 1980.
25. Athenian Corner, Market Street.
26. Bagshaw Building (Diamond Taxi), 128 Warren Street, 1980-1982.
27. Bank Block, No Address, 1980.
28. Bascom Building, 190 Merrimack Street, 1983-1984.
29. Big "L" Discount, 125 Merrimack Street, 1980.

30. Boott Mills Stair Tower, John Street, 1987-1989.
31. Bridge Street Boardinghouse, 28-56 Bridge Street, 1983-1986.
32. Byrne Liquor, 100-122 Middlesex Street, 1979. Oversize material removed.
33. Central Savings Bank, 25 Prescott Street, 1981.
34. Chalifoux Building (Merrimack Building), 24 Merrimack Street, 1980.
35. Claflin Block, 58 Prescott Street, 1981-1982.
36. Cook & Taylor Building, No Address, 1985.
37. Cooney's Corner, 317 Central Street, 1980-1984.
38. Copper Kettle/ WCAP Signs, 241-245 Central Street, 1979.
39. Courier Corporation, Hall Street, 1979.
40. Crowe Electric Warehouse Building, Middlesex Street, 1981.
41. Dubliner, 197 Market Street, 1979.
42. East Merrimack Street Bridge, East Merrimack Street, 1980-1982. Oversize material removed.
43. Elks Building, Warren Street, 1979. Oversize material removed.
44. Exchange Coffee House, 302 Market Street, 1980.
45. Fairburn Building, 10 Kearney Square, 1983-1984.

Box 90

1. Fairgrieve Co., 148 Warren Street, 1979-1982.
2. Father John's Medicine Building, Market Street, 1979-1980. Oversize material removed.
3. First Bank & Trust, 170 Merrimack Street, 1979-1984.
4. Fox Building, 190 Middlesex Street, 1987.
5. Garnicks, 60,62,64 Middlesex Street,.
6. Gas Light Building, 22 Shattuck Street, 1983.
7. Giavis & Hadley Block, 165 Worthen Street, 1983-1985.
8. Haffners Gasoline Station, 215 Dutton Street, 1980-1981.
9. Harkins Building, 25 Hurd Street, 1980.
10. Hellenic American School, 266 Worthen Street, 1980.
11. Hildreth Building, 45 Merrimack Street, 1982.
12. Hosford Building, 124 Merrimack Street, 1979-1984.
13. Hotel on Smith Lot, No Address, 1980-1981.
14. House Move, 59 Chestnut Street, 1981.
15. Hurley Building, 15 Hurd Street, 1979.
16. Jewett Building, 494 Merrimack Street, 1980. Oversize material removed.
17. Knights Of Columbus, 167 Dutton Street, 1979. Oversize material removed.
18. Lawrence Manufacturing Company Agent's House (Lowell Day Nursery), 119 Hall Street,
19. Lawrence Wentworth House, 48 Lawrence Street, 1982.
20. Locks & Canals Headquarters, 66 Broadway Street, 1979.
21. Lowell Five Cent Savings Bank, 34 John Street, 1982.

22. Lowell Gas Company, 95 East Merrimack Street, 1980.
23. Lowell Sun Building, 8 Merrimack Street, 1979.
24. Lowell Sun Garage, 30 Market Street, 1982.
25. Lowell Turnkey, 171-173 Fletcher Street, 1982. Oversize material removed.
26. Mansur Building, 101-107 Central Street, 1986.
27. Massachusetts Hydro. Association, No Address, 1982.
28. McQuade's Building, 91 Central Street, 1983.
29. Milne Building, 19 Page Street,.
30. Moller Building, 23 Middle Street, 1979.
31. Nesmith House, 229 Andover Street,.
32. Nu-Martins Inc., No Address, 1984.
33. Old City Hall, 226 Merrimack Street, 1980-1986.
34. Old Fire Station, Palmer Street, 1979-1981.
35. Old Lowell National Bank (Commercial Bank & Trust Company, 88 Prescott Street, 1981.
36. Old Market House Building (Colonial Gas), 40 Market Street, 1982.
37. Pellon Yard, No Address, 1979.
38. Piccolo Mondo Building, 40 Central Street, 1979. Oversize material removed.
39. Prince's Building, Merrimack Street, 1983.
40. Robbins Block, 102-110 Merrimack Street, 1982.
41. Saab Building, 175 Central Street, 1980.
42. Saint Patrick's Church, Suffolk Street, 1981.
43. Shedd Block (United Restaurant), 297 Central Street, 1979-1984. Oversize material removed.
44. Simpson Block, 1-5 Merrimack Street & 7 Kearney Square, 1982.
45. Smith-Baker Building, 1981.
46. Smyrna Lowell Confectionary, 503 Market Street, 1981.
47. Southwick Block, 70-82 Prescott Street, 1979-1981.
48. Spaulding House, 383 Pawtucket Street, 1979.
49. Surf Hotel/Victorian Manor, No Address, 1979.
50. Talbot & "K" Building, 40-56 Middle Street, 1985.
51. Wannalancit Mills, No Address, 1981-1984.
52. Watson House, No Address, 1983.
53. Welles Block, 165-177 Merrimack Street, 1979.
54. Whipple and Stirling Complex, 576 Lawrence Street, 1982.
55. Whistler House, 243 Worthen Street Mill (Part 1 of 2).
56. Whistler House, 243 Worthen Street (Part 2 of 2).
57. Wood-Abbott Jewlers, 175 Merrimack Street, 1987.
58. Yorick Club, 91 Dutton Street, 1981.

D. Indexed Buildings Files (see Full Size Map Folder List for Removed Oversize Drawings)

59. Acre Properties Inc., 176 Adams Street, 1981. Folder 1 of 2.
60. Acre Properties Inc., 176 Adams Street, 1981. Folder 2 of 2.

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1. 44- Arthur's Diner, 100 Bridge Street, 1990.
2. 48- J. Morris Building, 199-207 Broadway, 1995.
3. 61- T. Downing Building, 236-246 Broadway, 1986-1988.
4. 79- New Mansur Building (Enterprise Building), 91-97 Central Street/ 20-26 Market Street, 1985-1986. Folder 1 of 4.
5. 79- New Mansur Building, 91-97 Central Street/ 20-26 Market Street, 1985-1986. Folder 2 of 4.
6. 79- New Mansur Building, 91-97 Central Street/ 20-26 Market Street, 1986-1991. Folder 3 of 4.
7. 79- New Mansur Building, 91-97 Central Street/ 20-26 Market Street, No Date. Folder 4 of 4. Oversize material removed.
8. 80- Mansur Building, 101-107 Central Street, 1983-1986. Folder 1 of 2. Oversize material removed.

Box 92

1. 80- Mansur Building, 101-107 Central Street, 1985. Folder 2 of 2.
2. 82- Bradley Block, 147-175 Central Street, 1985-1987.
3. 84- Fiske Building, 219 Central Street, 1987-1989.
4. 85- Cook and Taylor Building, 231 Central Street, 1985-2003. Folder 1 of 2. Oversize material removed.
5. 85- Cook and Taylor Building, 231 Central Street, 1983-1990. Folder 2 of 2.
6. 87- Union Building, 249-251 Central Street, 1986-1987.
7. 91- Reed & Mansur Building, 321 Central Street, 1985-1989. Folder 1 of 2. Oversize material removed.
8. 91- Reed & Mansur Building, 321 Central Street, 1985-1988. Folder 2 of 2. Oversize material removed.

Box 93

1. 102.0- Spaulding Building [Ryan Block], 98-100 Central Street, 1990-1995. Oversize material removed.
2. 105- Appleton Block, 166-182 Central Street, 1980.
3. 178- Richardson Block, 295 Dutton Street, 1989-1995.
4. 202- Ryan Block, 63-P3 Fletcher Street, 1994.
5. 221- Darius Young House, 72-76 Gorham Street, Ca. 1981. Oversize material removed.
6. 237- Lowell Five Cent Savings Bank, 35 John Street, 1988-1994. Oversize material removed.
7. 222- The Lowell Hotel, 80 Gorham Street, 1997.

8. 246- Howe Building, 11 Kearney Square, 1980-1981. Folder 1 of 3.
9. 246- Howe Building, 11 Kearney Square, 1981. Folder 2 of 3.
10. 246- Howe Building, 11 Kearney Square, 1979-1980. Folder 3 of 3. Oversize material removed.
11. 248- Fairburn Building, 2-14 Kearney Square, 1980-1983. Folder 1 of 2.
12. 248- Fairburn Building, 2-14 Kearney Square, 1979-1984. Folder 2 of 2.
13. 249- Old Federal Building, 1999.

Box 94

1. 251- Rose, Mary, Ward House, 21-27 Kirk Street, 1992-1994. Folder 1 of 2. Oversize material removed.
2. 251- Rose, Mary, Ward House, 21-27 Kirk Street, 1993-1994. Folder 2 of 2.
3. 254- Early Residence, 45-49 Kirk Street, 1987. Folder 1 of 5.
4. 254- Early Residence, 45-49 Kirk Street, 1987-1989. Folder 2 of 5. Oversize material removed.
5. 254- Early Residence, 45-49 Kirk Street, 1988. Folder 3 of 5. Oversize material removed.
6. 254- Early Residence, 45-49 Kirk Street, 1980. Folder 4 of 5.
7. 254- Early Residence, 45-49 Kirk Street, 1987. Folder 5 of 5.
8. 255- Linus Child House, 63-37 Kirk Street, No Date.
9. 256- Saint Anne's Rectory, 8 Kirk Street, 1989-1991.

Box 95

1. 324- Colburn School, 122 Lawrence Street, 1994-1995.
2. 352- Hellenic Orthodox Church, 62 Lewis Street, 1996. Folder 1 of 3.
3. 352- Hellenic Orthodox Church, 62 Lewis Street, 1990. Folder 2 of 3.
4. 352- Hellenic Orthodox Church, 62 Lewis Street, 1985-1987. Folder 3 of 3.
5. 383- J. Tyler Building, 43 Market Street, 1996.
6. 391- J.C. Ayer & Co., 165 Market Street, 2005.
7. 397- Welch Building, 387-397 Market Street, 1995.
8. 401- Old Market House, 40 Market Street, 1980-1983. Folder 1 of 2. Oversize material removed.
9. 401- Old Market House, 40 Market Street, 1982-1983. Folder 2 of 2.

Box 96

1. 418- Simpson Block, 1-5 Merrimack Street, 1981-1984. Folder 1 of 4. Oversize material removed.
2. 418- Simpson Block, 1-5 Merrimack Street, 1982. Folder 2 of 4.
3. 418- Simpson Block, 1-5 Merrimack Street, 1981-1982. Folder 3 of 4.
4. 418- Simpson Block, 1-5 Merrimack Street, 1980-1982. Folder 4 of 4.
5. 421- Hildreth Building, 45 Merrimack Street, 1981-1982. Folder 1 of 3.

6. 421- Hildreth Building, 45 Merrimack Street, 1981-1983. Folder 2 of 3. Oversize material removed.
7. 421- Hildreth Building, 45 Merrimack Street, 1983. Folder 3 of 3.
8. 423- New Nesmith Building, 67 Merrimack Street, 1981-1982.
9. 424- Nesmith Block, 75-83 Merrimack Street, 1980-1981.
10. 425- Cherry & Webb Building, 105-107 Merrimack Street, 1995-1999. Folder 1 of 2.
11. 425- Cherry & Webb Building, 105-107 Merrimack Street, 1998. Folder 2 of 2.

Box 97

1. 429.5- Bon Marche Building, 143 Merrimack Street, 1994-1996. Folder 1 of 6.
2. 429.5- Bon Marche Building, 143 Merrimack Street, 1984-1992. Folder 2 of 6. Oversize material removed.
3. 429.5- Bon Marche Building, 143 Merrimack Street, 1996. Folder 3 of 6.
4. 429.5- Bon Marche Building, 143 Merrimack Street, 1995. Folder 4 of 6.
5. 429.5- Bon Marche Building, 143 Merrimack Street, 1993-1994. Folder 5 of 6.
6. 429.5- Bon Marche Building, 143 Merrimack Street, No Date. Folder 6 of 6.
7. 430- Welles Block, 175 Merrimack Street, 1987-1988. Folder 1 of 2.
8. 430- Welles Block, 175 Merrimack Street, 1979. Folder 2 of 2.

Box 98

1. 431- Saint Anne's Church, 237 Merrimack Street, 1992-1993. Folder 1 of 7.
2. 431- Saint Anne's Church, 237 Merrimack Street, 1987. Folder 2 of 7.
3. 431- Saint Anne's Church, 237 Merrimack Street, 1992-1993. Folder 3 of 7.
4. 431- Saint Anne's Church, 237 Merrimack Street, 1992-1993. Folder 4 of 7.

Box 99

1. 431- Saint Anne's Church, 237 Merrimack Street, 1981-1988. Folder 5 of 7.
2. 431- Saint Anne's Church, 237 Merrimack Street, 1985-1988. Folder 6 of 7.
3. 431- Saint Anne's Church, 237 Merrimack Street, 1987-1988. Folder 7 of 7.
4. 434- Pollard Library, 415 Merrimack Street, 1994. Folder 1 of 3.
5. 434- Pollard Library, 415 Merrimack Street, 1994. Folder 2 of 3.
6. 434- Pollard Library, 415 Merrimack Street, 1994. Folder 3 of 3. Oversize material removed.
7. 437- Sun Building, 8 Merrimack Street, 1983.
8. 438- Paige's Restaurant, No Address, No Date.
9. 439- Chalifoux Building, 24 Merrimack Street, No Date. Folder 1 of 2.
10. 439- Chalifoux Building, 24 Merrimack Street, No Date. Folder 2 of 2. Oversize material removed.
11. 440- 1st Unitarian Church, 72 Merrimack Street, 1992-1994. Folder 1 of 3.

Box 100

1. 440- 1st Unitarian Church, 72 Merrimack Street, 1991-1992. Folder 2 of 3.

2. 440- 1st Unitarian Church, 72 Merrimack Street, 1992-1994. Folder 3 of 3.
3. 441- Executive Building, 100 Merrimack Street, 1985-1987. Folder 1 of 3.
4. 441- Executive Building, 100 Merrimack Street, 1985-1988. Folder 2 of 3.
5. 441- Executive Building, 100 Merrimack Street, 1985-1991. Folder 3 of 3.
6. 443- Robbins Block, 104 Merrimack Street, 1981-1983. Folder 1 of 3. Oversize material removed.
7. 443- Robbins Block, 104 Merrimack Street, 1982-1984. Folder 2 of 3.
8. 443- Robbins Block, 104 Merrimack Street, 1981-1983. Folder 3 of 3.
9. 443- Davis Block, 114 Merrimack Street, 1984-1985. Folder 1 of 3.
10. 443- Davis Block, 114 Merrimack Street, 1984-1986. Folder 2 of 3. Oversize material removed.
11. 443- Davis Block, 114 Merrimack Street, 1984-1985. Folder 3 of 3. Oversize material removed. Oversize material removed.
12. 448- Albion Block, 170-184 Merrimack Street, 1980-1985. Folder 1 of 3.
13. 448- Albion Block, 170-184 Merrimack Street, 1981-1983. Folder 2 of 3. Oversize material removed.
14. 448- Albion Block, 170-184 Merrimack Street, 1985. Folder 3 of 3.
15. 449- Bascom Building, 190 Merrimack Street, No Date.

Box 101

1. 451- Carleton/Odd Fellows/Weir Block, 210 Merrimack Street, No Date.
2. 452- Town House (Old City Hall), 222 Merrimack Street, 1986-1988. Folder 1 of 3.
3. 452- Town House (Old City Hall), 222 Merrimack Street, 1996-2001. Folder 2 of 3. Oversize material removed.
4. 452- Town House (Old City Hall), 222 Merrimack Street, 1984-1985. Folder 3 of 3. Oversize material removed.
5. 453- Wentworth Building, 256 Merrimack Street, 1980.
6. 456- Bank Block, 350-376 Merrimack Street, 1980.
7. 0- Commercial/ Multi-Family, 442-226 Merrimack Street, 1990.
8. 462- Hosford Building, 43-39 Middle Street, 1994.
9. 463- Parker Block (Pollard Building), 55 Middle Street, 1981-1995. Oversize material removed.
10. 465- Fellows Block, 129-143 Middle Street, 1985-1987. Foldler 1 of 2.

Box 102

1. 465- Fellows Block, 129-143 Middle Street, 1985-1998. Folder 2 of 2.
2. 469- K Building, 56 Middle Street, No Date.
3. 471- Simpsons Grocers, 82-88 Middle Street, 1980. Folder 1 of 2. Oversize material removed.
4. 471- Simpsons Grocers, 82-88 Middle Street, 1980-1983. Folder 2 of 2.
5. 476- Barker Building, 158-170 Middle Street, 1990-1999. Oversize material removed.

6. 477- J.C. Ayer Building, 172-192 Middle Street, 1998-2000.
7. 516- W. Fox Building, 190-196 Middle Street, 1986-1991.
8. 517- Howe Building, 208 Middlesex Street, 1986-1991. Oversize material removed.

Box 103

1. 533- Bromley-Shep Building, 35 Paige Street, 1986-1998. Oversize material removed.
2. 536- Central Fire Station, 45 Palmer Street, 1980-1981. Folder 1 of 2.
3. 536- Central Fire Station, 45 Palmer Street, 1981-1982. Folder 2 of 2.
4. 582- Spaulding House, 383 Pawtucket Street, 1987-1994.
5. 592- Claflin Block, 58 Prescott Street, 1981-1982. Folder 1 of 3.
6. 592- Claflin Block, 58 Prescott Street, 1982. Folder 2 of 3.
7. 592- Claflin Block, 58 Prescott Street, 1981. Folder 3 of 3.
8. 630- Mack Building, 25 Shattuck Street, No Date.
9. 632- Savings Bank Building, 18 Shattuck Street, 1995-2011.
10. 657- C. Murphy Building, 192-194 Suffolk Street, No Date.
11. 660- Saint Patrick's Church, 284 Suffolk Street, 1981-1994. Folder 1 of 3.
12. 660- Saint Patrick's Church, 284 Suffolk Street, 1981. Folder 2 of 3.
13. 660- Saint Patrick's Church, 284 Suffolk Street, 1986-1988. Folder 3 of 3.

Box 104

1. 699- Old Worthen Tavern, 143 Worthen Street, 1994.
2. 703- Whistler House, 243 Worthen Street, 1991-1992. Folder 1 of 4.
3. 703- Whistler House, 243 Worthen Street, 1981-1985. Folder 2 of 4.
4. 703- Whistler House, 243 Worthen Street, 1982-1984. Folder 3 of 4.
5. 703- Whistler House, 243 Worthen Street, 1981-1982. Folder 4 of 4.
6. 705- Methodist Church, 200 Worthen Street, 1985-1987. Folder 1 of 6.
7. 705- Methodist Church, 200 Worthen Street, 1981. Folder 2 of 6.

Box 105

1. 705- Methodist Church, 200 Worthen Street, 1984-1985. Folder 3 of 6.
2. 705- Methodist Church, 200 Worthen Street, 1985-1987. Folder 4 of 6.
3. 705- Methodist Church, 200 Worthen Street, 1984-1987. Folder 5 of 6.
4. 705- Methodist Church, 200 Worthen Street, 1985-1987. Folder 6 of 6.
5. 1036- Boott Mills Boardinghouse, No Address, 1992-1994.
6. 1124- Mass. Cotton Mills Powerhouse Section 8, No Address, 1989-1994. Folder 1 of 2. Oversize material removed.

Box 106

1. 1124- Mass. Cotton Mills Powderhouse Section 8, 1989-1994. Folder 2 of 2.
2. 1128- Mass. Mills Napping Building, 81 Bridge Street, 1989-1994.
3. 1136- Mass. Cotton Mills Boardinghouse Row, Bridge Street, 1989-1999. Folder 1 of 3. Oversize material removed.

4. 1136- Mass. Cotton Mills Boardinghouse Row, Bridge Street, 1986-1988. Folder 2 of 3. Oversize material removed.
5. 1136- Mass. Cotton Mills Boardinghouse Row, Bridge Street, 1988. Folder 3 of 3.
6. 1150- Suffolk Manufacturing Company Machine Shop, 675 Suffolk Street, 1995.
7. 1155- Suffolk Manufacturing Company Boarding House, 199 Cabot Street, 1988-1990. Folder 1 of 3.
8. 1155- Suffolk Manufacturing Company Boarding House, 199 Cabot Street, 1989. Folder 2 of 3.
9. 1155- Suffolk Manufacturing Company Boarding House, 199 Cabot Street, 1988. Folder 3 of 3. Oversize material removed.

Box 107

1. 1155- Suffolk Manufacturing Company Dye House, 199 Cabot Street, 1988-1989. Folder 1 of 3.
2. 1155- Suffolk Manufacturing Company Dye House, 199 Cabot Street, 1988-1989. Folder 2 of 3.
3. 1155- Suffolk Manufacturing Company Dye House, 199 Cabot Street, 1988-1989. Folder 3 of 3.

E. Subject Files

4. Architectural Artifacts, 1986.

F. Photographic Materials

Photographic Storage Box 1
Photoprints

1. Agent's House Floor Slab, Northern Canal Wall Breach, 1994.
2. Appleton Mills, 1992.
3. Blackstone Canal (Uxbridge, Mass), N.D.
4. Boardinghouse Park, N.D.
5. Boardinghouse Park, N.D.
6. Boardinghouse Sidewalk, N.D.
7. Boott Construction, N.D.
8. Boott Cotton mills Clock Tower, N.D.
9. Boston Common Details, 1994.
10. Canal Draindown, 1991.
11. Canal Draindown Broken Set, 1991.
12. Canal Draindown Full Set, 1991.
13. Canal Draindown Full Set, 1991.
14. Canal Wall Breach, 1994.
15. Canalway Map, N.D.
16. Development of Swamp Locks & Machine Shop Reach, 1991.

17. Downtown Lowell, N.D.
18. Eastern Canal, N.D.
19. Eastern Canal at Boott, Boott Courtyard, Swamp Locks with Canal Drained, N.D.
20. Francis Gate, 1992.
21. Guard Locks Complex, N.D.
22. Hadley House Exterior Conditions, 1991.
23. Hadley House Interior Conditions, 1991.
24. Hamilton Canal S. Wall 1 of 2, N.D.
25. Hamilton Canal S. Wall 2 of 2, N.D.
26. Hamilton Canal S. Wall with Canal Drained & YMCA Gates With Canal Drained (Negs Only), N.D.
27. Historic Hardware: Lowell Superior Courthouse, Nesmith House, Lowell Day Nursery, 1995.
28. Kazanjian Square, N.D.
29. Kirk Street, 1993.
30. Kirk Street, 1994.
31. Kirk Street Agents House, 1994.
32. Kirk Street Agents House, 1994.
33. Kirk Street Agents House, 1995.
34. Kirk Street Agents House, N.D.
35. Kirk Street Agents House Misc., N.D.
36. Kirk Street Agents House Subfloor, N.D.
37. Kirk Street Agents House Vault Demo, 1995.
38. LCR Northwall, N.D.
39. Link Space, N.D.
40. Lowell Canals Wildflowers, N.D.
41. Lowell High School, N.D.
42. Lower Locks (Draindown), 1984.
43. Lower Western Canal, N.D.
44. Lower Western Canal, N.D.
45. Lower Western Canal, N.D.
46. Lower Western Canal, N.D.
47. Lower Western Canal, 1993.
48. Lower Western Canal, Western Canal Areas 2 & 3, N.D.
49. Lucy Larcom Park, N.D.
50. MacDonald's Site, N.D.
51. Machine Shop Office Building, 1991.
52. Mack & L.L.P. (Merr) [Boston & Maine Railroad Station], 1994.
53. Market Mills, N.D.
54. Market Mills Site Development, N.D.

55. Market Mills Visitor Center, N.D.
56. [Market Mills] Visitors Center Signage, Mass Gate House & Lower Locks egatives, 1990.
57. Mass Waste Gate, 1990.
58. Mass Wasteway Gatehouse Dismantling, 1990.
59. Mass Wasteway House Eastern Canal at Bridge Street, 1990.
60. Mass Wasteway House Eastern Canal at Bridge Street,1 990.
61. Merrimack [Canal], N.D.
62. Merrimack Canal, Swamp Locks, Machine Shop Reach, N.D.
63. Merrimack Wasteway Gatehouse, 1988.
64. Merrimack/Middle Street Misc., 1995.
65. Mill Power Panel, N.D.
66. Misc. Trees, N.D.
67. Moody Street Feeder Gatehouse, 1985.
68. NMCC Courthouse Environments, 1993.

Photographic Storage Box 2
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1. Northern Canal, 1992.
2. Northern Canal, 1991.
3. Northern Canal, N.D.
4. Northern Canal (Except 4 at End- Unidentified), N.D.
5. Northern Canal Gatehouse, 1987.
6. Northern Canal Little Canada Pck., N.D.
7. Northern Canal Upper Level Draw Door, 1994.
8. Northern Canal Walkway, 1990.
9. Northern Canal Waste Gates, N.D.
10. Northern Canal Waste Gates, N.D.
11. Northern Canal Waste Gates, N.D.
12. Northern Canal Waste Gates & Little Canada Reach, N.D.
13. Northern Canal Waste Weirs After Collapse, N.D.
14. Northern Canal/ Island Canal Wall Conditions, 1993-1994.
15. Notini Conduit, 1991.
16. Notini Driveway, N.D.
17. Old City Hall, N.D.
18. Parker House 1 of 2, N.D.
19. Parker House 2 of 2, N.D.
20. Pawtucket Boathouse 1 of 2, N.D.
21. Pawtucket Boathouse 2 of 2, N.D.
22. Plaza in Front of Greek Orthodox Church, N.D.
23. Pollard Memorial Hall, 1987.

24. Public Housing (Arcand Drive), N.D.
25. Suffolk Sidewalk Construction, Swamp Locks Gate & Wicket, N.D.
26. Swamp Locks, 1991.
27. Swamp Locks, 1991.
28. Swamp Locks, N.D.
29. Swamp Locks/Merrimack Canal, 1991.
30. Swamp Locks & Western Canal Area 1, N.D.
31. Tremont Gatehouse, N.D.
32. Tremont Yard Trolley Terminals, N.D.
33. Trolley Cars, N.D.
34. Unidentified Event at Boott, N.D.
35. Upper Pawtucket, N.D.
36. Upper Pawtucket, N.D.
37. Upper Pawtucket (Above Boardwalk) Northern Canal- Little Canada, TTT, N.D.
38. Wall/Fall Hickey Hall Dam & Below, N.D.
39. Wannalancit Mill, N.D.
40. Western Canal, 1995.
41. Western Canal, N.D.
42. Western Canal, N.D.
43. Western Canal, N.D.
44. Western Canal, N.D.
45. Western Canal, N.D.
46. Western Canal Acre, 1993.
47. Western Canal Area 1, N.D.
48. Western Canal Area 1 Boardwalk, N.D.
49. Western Canal Area 1 & Kazanjian, N.D.
50. Western Canal Area 1 from Macheras, N.D.
51. Western Areas 2 & 3, N.D.
52. Western Area 3 & TTT, N.D.
53. Western Area 3, TTT, Lower Western, N.D.
54. Western Canal B'Way to Suffolk (Area 2 Western Canal Park), 1994.
55. Western Canal B'Way to Suffolk (Area 2 Western Canal Park), 1994.
56. Western & Hamilton Canal, N.D.
57. Western Canal/ Kazanjian Square,1 995.
58. Western Canal Street Corners, N.D.
59. Western Canal Tremont Yard, 1995.
60. Western Canal Walls at Railroad Trestle, N.D.
61. Western Canal at Wannalancit, N.D.
62. Western Canal Wasteway, N.D.
63. Western Canal Wheelhouse Parking, N.D.

64. Western Entrance Trolley Stop, N.D.
65. Western TTT, N.D.
66. Wheel House Mill # 2, 1995.
67. No Name, N.D.

Slide Albums

Album 1

1. Acre
    a. Marion Street
    b. Murphy Building
    c. Saint Patrick‘s
    d. Ryan Block
    e. Ansara Building
    f. Kelil Building
    g. Namay House
    h. Savage House
    i. Catherine Taylor House
    j. Stone Building
    k. Flynn House
    l. Holy Trinity Greek Orthodox Church
    m. Burke House
    n. Richardson House
    o. Wiggins House
    p. Kane Building
    q. O‘Donnell Building
2. Appleton Street
    a. Shedd Block
3. Boott Mills

Album 2

4. Bridge Street
    a. Mass Mills Boardinghouse
    b. Arthur‘s Diner
5. Broadway Street
6. Central Street
    a. Shedd Block
    b. B & M RR Depot
    c. Strand Theatre
    d. Wyman‘s Exchange
    e. New Mansur Building
    f. Mansur Building
    g. Fiske Building
    h. Cook-Taylor Building
    i. Moody Grocery
    j. Union Building

k. American House Hotel
l. Appleton Block
m. Lowell Sun Garage Building
n. Martin‘s Clothing
o. Love‘s Furniture
p. Saab Building
q. Master Building
r. George‘s Building

Album 3

s. Blue Dye House

7. Dutton Street
    a. Jewetta Swift Co.
    b. Masonic Temple
    c. L‘Union St. Joseph‘s
    d. Yoric Club
    e. Richardson Block
    f. Kitson Shop
    g. Roarke‘s Shop
    h. Bennett Building
    i. Clark Cotton
    j. Farrell Plumbing
8. Gorham Street
    a. Donohoe Building
9. Jackson Street
    a. Major‘s Café

Album 4

10. John Street
11. Kearney Square
12. Kirk Street
    a. Mitchell Block
    b. St. Anne‘s Rectory
    c. B.F. French House
    d. Linus Child House
    e. Lowell High School
    f. Kirk Street Primary School
    g. Watson House
    h. Kelley & Weatherbee House
13. Market Street
    a. Household Furniture
    b. Burke‘s
    c. Eliade Building
    d. J. Tyler Building
    e. Father John‘s Medicine Building
    f. Ayer Building
    g. Gates Block

h. Hadley Building
i. Roarke Building
j. Coburn Building
k. Davis House

Album 5

14. Market Mills

Album 6

14. Market Mills (cont.)
15. Merrimack Street
    a. Waldorf & Plaza Restaurants
    b. Wentworth Building
    c. Bon Marche Building
    d. Albion Block
    e. Executive Building
    f. Memorial Hall
    g. Sun Building
    h. Robbins Block
    i. Hosford Building
    j. Fellows Block
    k. Sitto‘s Fashion
    l. Ansara Building
    m. Cherry & Webb Building
    n. Welles Block
    o. Saint Anne‘s Church
    p. City Hall
    q. Middlesesx Safe Deposit & Trust Company Building
    r. Davis Block
    s. Pollard Building
    t. Old City Hall
    u. Kent Jewlers
    v. Howe Building

Album 7

    w. Fairburn Building
    x. Bascom Building
    y. Simpson Block
    z. Nesmith Building
    aa. Elias Tobacco
    bb. 1st Congregational Church
    cc. Bank Block
    dd. Sun Building
16. Middle Street
    a. Hosford Building
    b. ~~K~~” Building
    c. J.C. Ayer Building

d. Fellows Building
e. Talbot Building

17. Middlesex Street
    a. Hotel Lowell

Album 8

18. Mills
    a. Boott Mills
    b. Appleton Mills
    c. Hamilton Mills
    d. Joan Fabrics Mill # 1
    e. Joan Fabrics Mill # 2
    f. Joan Fabrics Mill # 3
    g. Joan Fabrics Mill # 6
    h. Wannalancit Mill
    i. Pilling Shoe
    j. Boott Mill # 6
    k. Lowell Manufacturing Company
    l. Appleton Mill # 5
19. Paige Street
    a. Parker Building
    b. Fire House Building
20. Prescott Street
21. Residential
    a. Gas Light Building
    b. Shattuck Street

Album 9

21. Residential (Continued)
22. Worthen Street
    a. Douglass House
    b. Worthen House
    c. Hadley Block

Album 10

23. Misc. Graphics

Album 11

24. Misc. Graphics (Cont.)
25. Signage
26. Sculpture

Album 12

27. Misc. Aerials

Album 13

26. Misc. Aerial (Cont.)
28. Rivers & Canals
    a. Hamilton Canal
    b. Swamp Locks
    c. Guard Locks
    d. Eastern Canal

Album 14

    e. Middlesex Canal
    f. Merrimack River
29. Boston
    a. Reference Photographs
30. Salem, MA
    a. Reference Photographs
31. S[outh]. E[ast]. MA
    a. Reference Photographs

Album 15

32. New Bedford
    a. Reference Photographs
33. Rhode Island
    a. Reference Photographs
34. New York
    a. Reference Photographs
35. Savannah
    a. Reference Photographs
36. San Antonio
    a. Reference Photographs
37. West Coast
    a. Reference Photographs

VII. Development Projects

A. Specifications

Box 107 (cont.)

Boardinghouse

5. Boott Mills Boardinghouse Technical Specifications, 28 June 1983.

Box 108

Boarding House Park

1. Construction, RFP-NARO-8-0020, 23 February 1988.
2. Preliminary Design, CX1600-6-003, 12 September 1986.
3. Project Manual, CX1600-6-003, 1986.

Box 109

Canals and Canalways

Boott Mills Canalway

1. Bid Document for Canalway Trolley Bridge Renovations, 23 June 1989.
2. Trolley Track Work and Overhead Wiring System, 4 April 1989.
3. Site Lighting, 15 October 1989.
4. Canalway Canal Wall Resoration and Rough Grading, 4 August 1989.
5. Canalway Earthwork and Site Drainage, 11 May 1989.

Canalways

6. Canal Title Services, IFB-NARO-0-0020, 25 June 1990.

Box 110

1. Canalway Signage, 1443-IB1600-94-018, 20 January 1995. Oversize material removed.

Merrimack Canalway/ Lucy Larcom Park

2. Fencing, 1443-IB1600-92-007, 26 March 1992.
3. Technical Specifications Merrimack Canal Fencinig, 1 November 1991.

Northern Canalway/ Lucy Larcom Park

4. Rehabilitation of the Northern Canal Walk Phase I Technical Specifications.
5. Safety/ Access Improvement to the Northern Canal Walk and Lucy Larcom Park Volume 1 of 3, RFP-NARO-0-0048, 19 February 1991.

Box 111

1. Safety/ Access Improvement to the Northern Canal Walk and Lucy Larcom Park Volume 2 of 3, RFP-NARO-0-0048, 19 February 1991.
2. Safety/ Access Improvement to the Northern Canal Walk and Lucy Larcom Park Volume 3 of 3, RFP-NARO-0-0048, 19 February 1991.

Northern Canal Phase I

3. Northern Canal Phase I, 1143-IB1-600-92-009, 18 May 1992.

Northern Canal Phase II

4. Rehabilitation of the Northern Canal Walk Phase II Technical Specifications.

Box 112

Pawtucket Canal

1. Central Street/ Pawtucket Canal Area Improvements, IFB-NARO-4-0015, 14 February 1984.
2. Central Street/ Pawtucket Canal Project Specifications.

3. Central Sreet/ Pawtucket Canal Area Improvements Addendum 1, IFB-NARO-4-0015, 8 February 1984.

Swamp Locks

4. Development of Swamp Locks and Machine Shop Reach Technical Specifications, 1 April 1995.
5. Project Manual, 1 June 1993.

Box 113

Central Street Bridge

1. Construct Bridge Railings, IFB-NARO-8-0062, 29 September 1988. Oversize material removed.
2. Demolish Central Street Bridge Pier, IFB-NARO-8-0028, 22 April 1988. Oversize material removed.

Eastern Canal Trolley Bridge/ Prescott Yard Pedestrian Bridge

3. Eastern Canal Trolley Bridge Contract Specifications, December 1989.

Box 114

1. Eastern Canal Trolley Bridge, Prescott Yard Pedestrian Bridge, and Prescott Way, IFB-NARO-0-0019, 26 June 1990.
2. Technical Specifications Section I, March 1990.
3. Technical Specifications Section II, CX-1600-0-0028.

Box 115

French Street

1. Purchase and Install Wood Guard Rail Fence, IFB-NARO-9-0005, 23 January 1989.

HAZMAT

2. Removal and Disposal of Hazardous Materials, 1443-RQ-1600-94-008, 31 May 1994.

LHPC/ Private Properties (see also Technical Assistance Specifications below)

3. Belt Wheel Restoration Project, IFB-NARO-6-0061, June 1986.
4. Spaldinig House Architectural and Engineering Study, 14 June 1995.
5. The Executive Building, 13 May 1985.
6. Alterations to Windows, Doorways, Storefront of Old Central Firehouse, 26 May 1981.

Box 116

1. Transfiguration of Greek Orthodox Church Project Manual.
2. Demolition of Martin's Clothing and Strand Entrance Buildings and Supporting Deck, IFB-1978-3-0003, 31 May 1983.
3. Project Manual Exterior Entryway Restoration Lawrence Agents House, 10 March 1986.

4. Project Manual for Merrimack Valley Regional Skills Training Center, 18 September 1984. Oversize material removed (see full size map folder list).

Box 117
1. Lowell Sun Garage.
2. Project Manual Howe Building Restoration Project, 6 October 1986.

Lucy Larcom Park
3. Rehabilitation of Lucy Larcom Park, 15 October 1990.

Market Mills
4. Construct Public Access Television Studio, 1443-IB1600-94-006, 30 March 1994.
5. Lowell Telecommunications Corporation.

Box 118
1. General Documents and Technical Specifications for Market Mills, 4 January 1980.

Mogan Cultural Center
2. Technical Specifications, 29 March 1985.
3. Mogan Cultural Center Boardinghouse Exhibits, CX1780-4-0008.
4. Install Inclined Wheelchair Lift, IFB-NARO-1-0032, 22 July 1991.

Box 119
Old City Hall
1. Old City Hall, n.d.

Other Government Entities
City of Lowell
2. Sidewalk Replacement Project, January 1990.
3. Public Improvement-Concept 1976 (Downtown Public Improvement Project).
4. Streetscape Improvements, February 1981.

D.E.M.
5. Repairs to Upper and Lower Chambers of the Lower Locks Copmlex on the Pawtucket Canal, July 1991.
6. Specifications and Drawings for Eastern Canal Park, 27 July 1987.

Box 120
1. Contract Documents and Specifications for Eastern Canal Park, July 1987.

Prescott Way
2. Technical Specifications, May 1989.

Shattuck Street
3. Rehabilitation of Shattuck Street, 1443-IB-1600-92-005, 25 February 1992.

Trolleys

French Street Trolley Extension

4. Construction of Electrified Trolley Track and Lines, IFB-NARO-7-0023, 8 September 1987.

Box 121

1. Overhead Line System, IFB-NARO-3-0047, 29 June 1983.
2. Electrification Specifications For Track Extensions, 11 July 1984. Contains oversized drawings
3. French Street Trolley Track Extension, IFB-NARO-8-0035, 25 May 1988. Contains oversized drawings.

Trolleys (at Eastern Canal Park)

Box 122

1. Contract Documents and Specifications for Trolley Corridor at Eastern Canal Park, December 1987.

Technical Assistance Specifications

2. 80, Mansur Building Specifications and Project Manual, 1984.
3. 254, Lowell Five Cents Savings Bank Early Residence Contract Specifications, January 1989.
4. 421, Hildreth Building Renovation Project Mnaual, 11 March 1982.

Box 123

1. 427, Nesmith Block Specifications, 1981.
2. 442, Robbins Block Façade Rehabilitation Project Manual, 1982.
3. 446, First Bank Lowell Building Renovations Outline Specification, September 1985.
4. 633, Exterior Renovation of Gas Light Building Project Manual, 22 April 1985.
5. 703, Whistler House Exterior Restoration and Rehabilitation, 1982.
6. 705, Lowell Girl's Club Inc. Project Manual, 1984.
7. 1029, Wang Laboratories Inc Technical Specifications, 1980.

Box 124

1. 1059, Lowell Sun Garage Exterior Restoration and Rehabilitation, 1983.
2. 1092, Lawrence Agents House Exterior Restoration and Rehabilitation, 1986. Oversize material removed.
3. 1104, Lowell Manufacturing Company Visitor Center Project Manual, 3 August 1981.
4. 1507, Moody Street Feeder Gatehouse Alarm System, 1985.

Box 125

B. Contracts

5. Surface Rail Transportation Feasability Study, CX1600-9-0035, 1979.

6. Market Mills Phase 1, CX1978-1-0005, 1981-1983.
7. Food Court Construction, CX1978-2-0001, 1982-1983.

Box 126
1. Market Mills, CX1978-1-0007, 1981-1983.
2. Trolley Tracks Dutton Street to Boott Mills, CX1978-1-0015, 1981.
3. Lower Locks, CX1978-2-0009, 1983-1985.
4. Trolley Construction, CX1978-2-0011, 1982-1984.
5. Boott Mill Boarding House Design, CX1978-2-0010,1982-1985

C. Design and Construction
1. Boarding House
a. Exterior Restoration (Design)

1. General Background, 1982-1984. (Part 1 of 2).
2. General Background, 1982-1984 (Part 2 of 2).
3. Land Acquisition (H&H Paper), 1983.
4. Contract Materials, 1982-1983 (Part 1 of 2). Oversize materials removed.
5. Contract Materials, 1982-1983 (Part 2 of 2).
6. Project Documents, Aug. 1983.
7. Site Surveys and Drawings, 1983 (Part 1 of 2).
8. Site Surveys and Drawings, 1983 (Part 2 of 2).
9. Correspondence with Architects, 1982-1983.

Box 127
1. Images Taken Before Restoration, ca. 1982. Photographic materials removed.

b. Exterior Restoration (Construction)
2. Consulting Engineers‘ Brick and Mortar Tests, Nov 1982.
3. Project Documents, 1983-1985 (updated) (Part 1 of 2).
4. Project Documents, 1983-1985 (updated) (Part 2 of 2).
5. Pre-Construction Conference, Oct. 1983.
6. Re: Contract and Contracting Officer‘s Authorized Representative.
7. Plans/ Specification Changes, 1983-1984.
8. Field Inspections and Tests, 1984.
9. Correspondence with Architects, 1983-1985.
10. Contract Correspondence, 1983-1985.
11. Change Order #1, Feb. 1984.
12. Change Order #2, Jan.-March 1984
13. Change Order #3, March 1984.
14. Change Order #4, Apr.-Aug. 1984.

Box 128

1. Change Order #5, Aug.-Oct. 1984.
2. Change Order #6, 1985.
3. Correspondence with Contractors, 1984-1985.
4. Job Meeting Minutes, Nov. 1983-Jan. 1985.
5. Weekly Reports, Nov. 1983-May 1985.
6. Inter-Office Memos, Dec.-Aug. 1984.
7. Completion Report, March-Aug. 1985 (Part 1 of 2).
8. Completion Report, March-Aug. 1985 (Part 2 of 2). Includes photographs.
9. Images Taken During Restoration, 1984-1985. Photographs and slides removed to Photographic Storage Boxes 3-5.
10. Index of Transmittals
11. Transmittals 001-010, 1983-1984
    - Mix Design & Material Analysis for Concrete,11/83.
    - Slate Sample,2/84.
    - Letter of Certification & Concrete Masonry Samples,12/83.
    - Manhole Covers, Catchbasin Frames, Curb Inlet Drains, Boots, C.I. Outlet,12/83.
    - Sure Klean Restoration Products Brochure, Catchbasin Field Precast, Manhole Field Precast, Manhole Steps Field Precast, Reinforced Concrete Pipe Field Precast,1/84.
    - 005A- Manhole Steps,2/84.
    - 005B- Restoration Cleaners Product Date Test Concentrations,10/84.
    - 005C- Manhole Steps,11/84.
    - 006-Bar Rienforcing & Shop Drawings,1/84.
    - Gasket for Concrete Pipe, Manhole, Catchbasins,1/84.
    - Duro-Wall Reinforcing Brochures, Brick Vents,1/84.
    - 008A- Brick Vents, Submittal # 2,3/84.
    - 008B- Brick Vent Color Chart,5/84.
    - 009- Pecora MR-201, Pecora AC-20, Tremco Dymeric,1/84.
    - 010- Shop Drawing Structural Steel,1/84.

Box 129

1. Transmittal 010A 012A- 022, 1984.
    - 010A 012A- Shop Drawing E2,3/84.
    - 011- Additional Masonry Reinforcing, Re-Bar Schedule,12/84.
    - 012- Roof Framing Plans & Details,1/84.
    - 013- Tremco-Mono,2/84.
    - 014- Pecora Sealant Color Strips,1/84.
    - 015- Gravel Submittal,2/84.
    - 016- Fitrite Snow Guards, Granite Brochures,4/84.
    - 017-Areaway Drains,4/84.
    - 018- Granite Brochures,4/84.

- 019- Concrete Placement Schedule,4/84.
- 020- Floor Hardner, Vapor Barrier, Non Shrink Grout, Bar Reinforcements, As Plans & Specifications,4/84.
- 020A- Non Shrink Grout,5/84.
- 020B- Revised Floor Hardner Submittal "Floor Coat",7/84.
- 021- Bracing Scheme,4/84.
- 022- First, Second, Roof, Deck Layout ,Deck Notes & Section,4/84.

2. Transmittal 023-032, 1984.
   - 023- Areaway Grates,4/84.
   - 024- Requested Subcontractor List,4/84.
   - 025- Subcontractor Submittal for Steel Erection and Welding,7/84.
   - 026- 3 Brick Sample Panel, "Cypress" Brick Brochure,7/84.
   - 027- Gutter with Straps Sample,7/84.
   - 028- Dormer Windows &Wall Windows,7/84.
   - 028A- Dormer Windows & Wall Windows,7/84.
   - 029- Shutters,7/84.
   - 029A- Shutters,7/84.
   - 030- Sandell Coated Copper Flashing,8/84.
   - 030A- Copper Fabric Flashing,8/84.
   - 031- Lighting Cuts,8/84.
   - 031A- Lighting Cuts, Boxes, Wire,9/84.
   - 032- Finish Hardware Schedule, Hardware Cuts,9/84.

3. Transmittals, 033-059, 1984.
   - 033- Stone Samples,9/84.
   - 034- Site Granite Plans & Elevations Sheet # 1, Site Granite Sections & Details Sheet # 2,9/84.
   - 035- Subcontractor for Windows, Shutters, and Doors,9/84.
   - 036- Load Centers, Circuit Breakers,9/84.
   - 037- Sealant, Color Chart, Backer Rod,10/84.
   - 038- Guarantee,10/84.
   - 039- Subcontractors for Electric & Masonry Wall Cleaning,10/84.
   - 040- Supplier of Shutter Hardware Samples Pintle, Keeper, [?], & Nails,10/84.
   - 041- Joint Sealant,11/84.
   - 042- Subcontractor For Roofing Slate,12/84.
   - 043- Sealant for Slate,12/84.
   - 044- Subcontractor-Slate Roofing,1/85.
   - 045- Subcontractor for Link Demo, Subcontractor for Millwork Painting,1/85.

- 046- Paint, Shutter, Doors,1/85.
- 046A- Shutters,3/85.
- 047- Contractors Review for Roof,1/85.
- 048A- Guarantee Letter, Electric Installation Certification,,4/85.
- 049- Sash Locks,1/85.
- 050- Subcontractor Approval,1/85.
- 051- Shop Drawings- Doors,2/85.
- 052- Cement Waterproofing for Masonry,2/85.
- 053- Shipping Tickets & Mail Certs for Steel,2/85.
- 054- Large Scale Details- Doors,3/85.
- 055- Sample Mortar Joint for Stone,1/85.
- 056- Brass Rail Submittal,3/85.
- 057- Recipts on Door Hardware,4/85.
- 057A- 1 Additional Key Per Cylinder, 3 Master Keys,4/85.
- 058- PE Certification of Test - Electric,4/85.
- 059- Doors Cert of Manufacturer, Doors Warrenty, Windows Product Data,4/85.

4. Unknowns Found in Transmittals 1-50

2. Boarding House Park

a. Design

5. Contract [CX1600-6-0003] Documents, 1986-1993 (Part 1 of 2).
6. Contract [CX1600-6-0003] Documents, 1986-1993 (Part 2 of 2).
7. Cost Estimates, 1986-1988 (Part 1 of 2).

Box 130

1. Cost Estimates, 1986-1988 (Part 2 of 2).
2. Chief Architect Files, 1985-1995 (Part 1 of 3).
3. Chief Architect Files, 1985-1995 (Part 2 of 3).
4. Chief Architect Files, 1985-1995 (Part 3 of 3).

b. Construction (see ½ Size and Full Size Map Folder List for Removed Oversize Drawings)

5. Specifications, [1988] (Part 1 of 2).
6. Specifications, [1988] (Part 2 of 2).

Box 131

1. Contract Documents [CX1600-9-0010] – Correspondence, 1989-1991.
2. Contract Documents [CX1600-9-0010] – Correspondence with Architects/Designers, 1986-June 1989.
3. Contract Documents [CX1600-9-0010] – Correspondence with Architects/Designers, Jul 1989-1990.
4. Contract Documents – Change Orders, 1988-1991.

5. Contract Documents – Site Meeting Notes, Apr 1989-March 1990.
6. Contract Documents – Invoices, 1989-1990.
7. Contract Documents – Additional, 1986-1991.

Box 132
1. Daily Diaries, 1989.
2. Daily Diaries, 1990.
3. [Re: Change Orders], 1989-1990 (Part 1 of 2).
4. [Re: Change Orders], 1989-1990 (Part 2 of 2).
5. Photographs, 1989 (Part 1 of 3).
6. Photographs, 1989 (Part 2 of 3).
7. Photographs, 1989 (Part 3 of 3).
8. Irrigation System, [1988].
9. Green Paint Samples, [1988].
10. Lighting Shop Drawings and Submittals, July 1989 [CX1600-9-0100].
11. Landscape Maintenance, [1989].

Box 133
1. Submittals – Oversize Plans, 1989-1990. Oversize Materials removed.
2. Submittals, 1-5, Apr-May 1989.
3. Submittals, 6-10A, June-Sept 1989.
4. Submittals, 11-14C, 1989-1990.
5. Submittals, 16-20, 1989.
6. Submittals, 21-32, 1989-1990.
7. Testing, 1989-1990.
8. Maintenance Instructions for Well & Pump, Sprinkler Plans, 1990. Oversize Materials removed.
9. Electrical Drawings, As Builts, [Oct 1990]. Oversize Materials removed.

3. Boott Mills
a. General

10. Development Analysis, 1980-1983.
11. Re: Acquisition, 1981-1982.

b. Stair Towers Grant

12. Grant Agreement [CX1978-0-0001] and Preservation, 1989-1990.

Box 134
1. Legal Documents, 1990-1991.
2. Construction Documents, Oct 1989-Spring 1991 (Part 1 of 3).
3. Construction Documents, Oct 1989-Spring 1991 (Part 2 of 3).

4. Construction Documents, Oct 1989-Spring 1991 (Part 3 of 3).

c. Boott Mills #6

5. Wang Laboratories, 1979-1983 (Part 1 of 2).
6. Wang Laboratories, 1979-1983 (Part 2 of 2).

4. Canals and Canalways

a. Boott Canalway (see Full Size Map Folder List for Removed Oversize Drawings)

7. Contract Documents [CX1978-8-0008], 1988-1989 [Preservation Grant].
8. Associated Plans, 1988-1989. Oversize materials removed.
9. Bid Documents – Railing and Fencing, Sept 1989.
10. Bid Documents – Canal Wall Restoration and Rough Grading, Sept 1991.
11. Bid Documents – Paving and Curbing, Sept 1989.

Box 135

1. Bid Documents – Bridge and Wall Construction, Sept 1989.
2. Bid Documents – Site Lighting, Oct 1989.
3. Chief Architect Files, 1989-1994 (Part 1 of 3).
4. Chief Architect Files, 1989-1994 (Part 2 of 3).
5. Chief Architect Files, 1989-1994 (Part 3 of 3).
6. Planting and Irrigation System, Apr [1990?] Oversize materials removed.
7. Railing Gate at Boott Dam Gatehouse, 1993.

b. Canalway Demonstration Project *[Sponsored by the Lowell Plan]*

8. Demonstration Project – Prescott Way [Market St. Garage Canal Bank Improvements], 1986-1987

Box 136

5. Central Street/Pawtucket Canal Improvements (see ½ Size and Full Size Map Folder List for Removed Oversize Drawings)

1. Coordination Meeting Minutes, 1982-1984 (Part 1 of 2).
2. Coordination Meeting Minutes, 1982-1984 (Part 2 of 2).
3. Projects Director Correspondence, 1982-1983 (Part 1 of 2).
4. Projects Director Correspondence, 1982-1983 (Part 2 of 2).
5. Projects Director Phone Conversations, 1982-1984.
6. Architect/Engineer Contract Documents, 1982-1985 [CX1978-2-0009] (Part 1 of 2).
7. Architect/Engineer Contract Documents, 1982-1985 [CX1978-2-0009] (Part 2 of 2).
8. Central Street Bridge Utilities, 1982-1984.
9. Survey Material, 1983. Oversize materials removed.

10. Joan Fabrics #4 [Hamilton Mills #7] Restoration, 1983. Includes photographs.
11. Gemarde Jewelers [Mansur Block, 101 Central St.] Restoration, 1983-1985.

Box 137

1. Lowell Sun Garage [Blue Dye House] Restoration, 1983-1985.
2. C[ontracting] O[fficer's] R[epresentative] Daily Diary, March-Oct 1984.
3. COR Daily Diary, Nov 1984-Feb 1985.
4. COR Daily Diary, March-May 1985.
5. COR Daily Diary, June-Aug 1985.
6. Projects Director Notebook, 1984-1985 (Part 1 of 5).
7. Projects Director Notebook, 1984-1985 (Part 2 of 5).

Box 138

1. Projects Director Notebook, 1984-1985 (Part 3 of 5).
2. Projects Director Notebook, 1984-1985 (Part 4 of 5).
3. Projects Director Notebook, 1984-1985 (Part 5 of 5).
4. Granite Details (H.E. Fletcher Co.), June 1984. Oversize materials removed.
5. ~~–C~~ontracting" [Overview/Update], 1984
6. Easements, 1984-1985
7. Shop Drawings, 1984-1985. Oversize materials removed.
8. Mansur Building Restoration – Construction, 1984 [CX LOWE-4-0004]
9. Contractor Claims and Close-Out, 1984-1985.

Box 139

1. Contractor Rebuttal Claims, 1985-1986
2. Railings, 1984. Oversize materials removed.
3. Submittals, 1984 [CX1600-4-0029] (Part 1 of 2).
4. Submittals, 1984 [CX1600-4-0029] (Part 2 of 2).
5. Progress/ Punch List, Nov 1984-June 1985.
6. Central St. Bridge Railing Project, 1988-1989. Oversize materials removed.
7. Central St. Bridge Pier Demolition, 1988.

Box 140

6. Eastern Canal Trolley Bridge & Prescott Way (see ½ Size and Full Size Map Folder List for Removed Oversize Drawings)

1. Bridge Type Study Report, March 1987.
2. Contract for Eastern Canal Bridge Study [CX1600-7-005], 1987-Aug 1992 (Part 1 of 2).
3. Contract for Eastern Canal Bridge Study [CX1600-7-005], 1987-Aug 1992 (Part 2 of 2).
4. Prescott Yard Footbridge, 1988-1992.
5. Preliminary Design Supplement for the Eastern Canal Bridge, March 1989.

6. Easements, 1990 [Including General Plans], 1990. Oversize materials removed.
7. Eastern Canalway Surveys, 1987-1990. Oversize materials removed.
8. Permits, 1990.
9. Project Schedules [Trolley Bridge, Pedestrian Bridge, Prescott Park], 1990-1991.
10. Sketches, Dec 1990-April 1992. Oversize materials removed.
11. Daily Diary, Oct 1990-Oct 1992 (Part 1 of 3).
12. Daily Diary, Oct 1990-Oct 1992 (Part 2 of 3).

Box 141

1. Daily Diary, Oct 1990-Oct 1992 (Part 3 of 3).
2. [Re: Abutments and Concrete Pricing], 1990.
3. Schedule of Values, Oct 1990.
4. Correspondence, March 1990-Nov 1993 (Part 1 of 3). Includes photographs.
5. Correspondence, March 1990-Nov 1993 (Part 2 of 3).
6. Correspondence, March 1990-Nov 1993 (Part 3 of 3).

Box 142

1. Site Meeting Notes, Dec 1990-Jan 1992.
2. Construction Photographs, 1990-1991 (Part 1 of 3).
3. Construction Photographs, 1990-1991 (Part 2 of 3).
4. Construction Photographs, 1990-1991 (Part 2 of 3).
5. Construction Photographs by LHPC COR, [1991-1992] (Part 1 of 2).
6. Construction Photographs by LHPC COR, [1991-1992] (Part 2 of 2).
7. Trolley Slab, July-Nov 1991.
8. Landscaping, 1991. Oversize material removed.
9. Testing, March 1991-Jan 1992.
10. Correspondence with TAMS [A/E] re: Design [Contract CX-1600-7-0005], Sept 1990-Aug 1992.
11. Change Orders/Modifications, 1991 (Part 1 of 2). Oversize materials removed.

Box 143

1. Change Orders/Modifications, 1991 (Part 2 of 2).
2. Subgrade Preparation, 1991-1993.
3. Summary of Requisitions, Feb 1992.
4. Claims – General Correspondence, 1991-Jan 1994.
5. Claims – Contractor Correspondence, Apr 1991.
6. Claims – Concrete Obstruction Issue, 1991.
7. Claims – Solicitor‘s Correspondence, 1992.
8. Submittals – Shop Drawing and Sample Record [Index to Submittals], 1990-1991. Oversize materials removed.
9. Submittals 1-5, 1990-1991.

Box 144

1. Submittals, 6-10, 1990.
2. Submittals 11-15, 1990.
3. Submittals 16-20, 1990.
4. Submittals 21A-30B, 1990-1991.
5. Submittals 31-35, 1990.
6. Submittals 36-40, 1991.
7. Submittals 41-49, 1991.
8. Submittals 50-61, 1991.

Box 145

1. Claims – LHPC Position, 1993 (Part 1 of 2).
2. Claims – LHPC Position, 1993 (Part 2 of 2).
3. Track Crossing [and Drainage Issues], 1989-1996. Oversize materials removed.
4. Prescott Way Fence [Including Drainage], 1991.
5. Prescott Way Railing, Oct 1990.
6. Prescott Way Construction, March 1991.
7. Chain Link Fence at Prescott – Roy Fence Co., March 1991.

7. Gaslight Building (see ½ Size Folder List for Removed Oversize Drawings)

8. Background, 1979-1983
9. Initial Restoration, 1985-1987 (Part 1 of 2). Oversized Material Removed.
10. Initial Restoration, 1985-1987 (Part 2 of 2).
11. Custom Millwork, 1986.

Box 146

1. Window Project, 1987. Oversized Material Removed.

8. Market Mills (see ½ Size Folder List for Removed Oversize Drawings)

a. General

2. Appraisal Report, Dec 1979.
3. Lease –Acquisition Agreement, 1979-1982.
4. [Management], 1979-1981 (Part 1 of 2) [Contains Building B Construction].
5. [Management], 1979-1981 (Part 2 of 2) [Contains Building B Construction].
6. Lease Development, 1980-1981.
7. Portal Piers/ Canal Walk, 1981-1982.

b. Construction

8. Re: Contract CX1978-2-0001 [AEI designer, Raymond Mansour, contractor], 1981-1983 (Part 1 of 2)

9. Re: Contract CX1978-2-0001 [AEI designer, Raymond Mansour, contractor], 1981-1983 (Part 2 of 2)

Box 147
1. [Minutes of Meetings/ Field Reports, Dec 1981-1982] (Part 1 of 2).
2. [Minutes of Meetings/ Field Reports, Dec 1981-1982] (Part 2 of 2).
3. Project Manual and Amendments, Nov-Dec 1981 [CX1978-2-0001].
4. Background for Buildings B & A, 1979-1981 (Part 1 of 2).
5. Background for Buildings B & A, 1979-1981 (Part 2 of 2).
6. A-1 [Food Court] Ventilation/Fume Exhaust, 1982 (Part 1 of 3).

Box 148
1. A-1 [Food Court] Ventilation/Fume Exhaust, 1982 (Part 2 of 3)
2. A-1 [Food Court] Ventilation/Fume Exhaust, 1982 (Part 3 of 3)
3. Chief Architect Files, 1981-1995 [Building A] (Part 1 of 3).
4. Chief Architect Files, 1981-1995 [Building A] (Part 2 of 3).
5. Chief Architect Files, 1981-1995 [Building A] (Part 3 of 3).
6. Chief Architect Files, 1982 [Tenant Space Construction] (Part 1 of 5). Oversize materials removed.
7. Chief Architect Files, 1982 [Tenant Space Construction] (Part 2 of 5).
8. Chief Architect Files, 1982 [Tenant Space Construction] (Part 3 of 5).
9. Chief Architect Files, 1982 [Tenant Space Construction] (Part 4 of 5).

Box 149
1. Chief Architect Files, 1982 [Tenant Space Construction] (Part 5 of 5).
2. A2 Space – Specifications for WLLH Studios & Offices, [Feb 1985] [Tise Wilhelm & Assoc. Architects].
3. Operating Instructions – Louvers, Windows, Entrances, Glazing, [1980?]
4. Submittals – Electricals, March 1983.
5. Silk Mill Entrance, 1980.

c. Lease Space Development

6. Paint, 1981-1982.
7. Re: Tenant ―A Brush with History,‖ 1982-1983.
8. Art Center Research, 1981.
9. Food Cluster Research, 1980-1981.
10. Hardware [Doors], 1981-1988. Oversize materials removed.
11. Instruction Manuals, 1981.
12. Tenant Guidelines, [1981-1983?]
13. Lighting Fixtures, 1982.
14. Floor Plans, ca. 1982.
15. A2 Space Development, 1988-1990.

Box 150

1. Hardware, 1989.
2. Hardware Replacement, 1995. Oversize materials removed.

d. LTC Fit-Up

3. Field Notes, [1983-1985]. Oversize materials removed.
4. Background, 1991-1994 (Part 1 of 2).
5. Background, 1991-1994 (Part 2 of 2) [Chief Architect's Files].
6. Correspondence, 1994-1996 (Part 1 of 2).
7. Correspondence, 1994-1996 (Part 2 of 2).
8. Door/Windows, 1994.
9. Scope of Project, 1994.
10. Studio Floor, 1994-1995.
11. Drywall, Spring 1994.

Box 151

1. Electric/ Lighting, Spring 1994.
2. Lumber/ Framing, Spring-Summer 1994.
3. Daily Reports, Apr-Oct 1994. Includes photographs.
4. Project Photos, ca. May 1994.
5. Change Orders, May 1994-Feb 1996.
6. Job Meeting Minutes, May-Oct 1994.
7. Plumbing, Spring 1994.
8. [Budget], March 1994.
9. Sketches, Fall 1994.
10. Punch List, Nov-Dec 1994.
11. HVAC, 1994.
12. Specifications and Permits, 1994.
13. Testing [AC], Nov 1994.
14. Chief Architect Files, 1994-1999 (Part 1 of 3). Oversize materials removed.

Box 152

1. Chief Architect Files, 1994-1999 (Part 2 of 3).
2. Chief Architect Files, 1994-1999 [Space Plans] (Part 3 of 3).
3. Submittals – Oversize Plans. Oversize materials removed.
4. Submittals – Construction Schedule, Apr 1994 (#1).
5. Submittals – Bathroom Accessories, May 1994 (#3).
6. Submittals – Bathroom Accessories, Lockers, Color Charts, May-June 1994 (#3A).
7. Submittals – Lighting Fixtures, Power Panels, Cable, May 1994 (#6).
8. Submittals – Ceiling & Wall Panels, May 1994 (#7).

9. Submittals – Doors/Frames/Hardware, May 1994 (#8, 8a, 12, 14).
10. Submittals – Electrical, June 1994 (#8a?).
11. Submittals – Studio Rigging, May 1994 (#9).
12. Submittals – Lighting and Isolators, June (#9a) (Resubmittal).
13. Submittals – Handicapped Lift, June 1994 (#10). Oversize materials removed.
14. Submittals – Ceiling Steel, June 1994 (#11).
15. Submittals – Cementitious Underlayment, May 1994 (#13).
16. Submittals – Carpeting, June 1994 (#16).
17. Submittals – Fire Alarm Devices, June 1994 (#17).
18. Submittals – Fireproofing, June 1994 (#18).
19. Submittals – Counter, Light Fixture, June 1994 (#19-20).
20. Submittals – Studio Flooring, June 1994 (#21).
21. Submittals – Heating Valves & Elements, July 1994 (#22).
22. Submittals – Paint, June 1994 (#23).

Box 153

1. Submittals – Platform Fireproofing, July 1994 (#24).
2. Submittals – Light Fixture, Cable, Transformer, New Panel, July 1994 (#25).
3. Submittals – Tile, July 1994 (#26).
4. Submittals – Appliances, Blinds, Lighting Detail, July 1994 (#27-29).
5. Submittals – Steel Railings at Windows, Sept 1994 (#31).
6. Submittals – Grease Duct Sound-Proofing, June-July 1994 (unnumbered).
7. Submittals – Plumbing & Heating, May 1994.
8. [Submittals] – Air Handling, June 1994.
9. Submittals – Products Information, Spring 1994.

9. Mogan Cultural Center (see ½ Size Map Folder List for Removed Oversize Drawings)

a. Design

10. General Background, 1983.
11. A/E Services, 1983-1985.
12. Program for Development, 1983-1984.
13. Design Documents, 1983-1986 [LHPC Chief Architect] (Part 1 of 2).
14. Design Documents, 1983-1986 [LHPC Chief Architect] (Part 2 of 2).

Box 154

1. Contract Documents, 1983-1986 (Part 1 of 3).
2. Contract Documents, 1983-1986 [Contracting Officer] (Part 2 of 3).
3. Contract Documents, 1983-1986 [Contracting Officer] (Part 3 of 3).
4. Funding, 1983-1985.

5. [Correspondence, Meeting Notes, and Summaries], 1984-1985 [Planning Director] (Part 1 of 2).
6. [Correspondence, Meeting Notes, and Summaries], 1984-1985 [Planning Director] (Part 2 of 2).
7. Soil Testing, 1984.

Box 155

1. Central Labor Council, 1984 [Potential Leasee].
2. Design Review, 1985 [Including Mill Girls Exhibit Area].
3. Univ. of Mass. Lowell, Special Collections, 1984-1985 [Leasee]

b. Construction

4. Immigrant Exhibit, 1984-1985.
5. Technical Specification, P.J. Mogan Cultural Center, 29 March 1985.
6. Cost Estimates, 1985.
7. Electrical Services, Load Information for MCC and Boarding House Park, 1986. Oversize material removed.
8. List of Subcontractors, 1986.
9. Manuals – Sketches [Exhibits, Toilets, Storage], 1986-1987.

Box 156

1. Correspondence, July 1986-March 1987 (Part 1 of 2).
2. Correspondence, July 1986-March 1987 (Part 2 of 2).
3. Project Supervisor Correspondence, July 1986-Feb 1988 (Part 1 of 2).
4. Project Supervisor Correspondence, July 1986-Feb 1988 (Part 2 of 2).
5. Correspondence from Contractors [~~P~~ending Files‘], Sept 1986.
6. Correspondence, LHPC Administration, 1986-1987 (Part 1 of 2).
7. Correspondence, LHPC Administration, 1986-1987 (Part 2 of 2).
8. Project Meeting Minutes (by Contractor), Sept 1986-Aug 1988 (Part 1 of 2).
9. Project Meeting Minutes (by Contractor), Sept 1986-Aug 1988 (Part 2 of 2).
10. Daily Log of Construction, 2-5 Sept 1986.

Box 157

1. Field Reports and Memos (by Architect), Sept 1986-Jun 1987 (Part 1 of 2).
2. Field Reports and Memos (by Architect), Sept 1986-Jun 1987 (Part 2 of 2).
3. SK Drawings File, Sept 1986-March 1987.
4. Manuals – Submittals from Elextrical Contractors, Nov 1986.
5. Progress Schedule, Dec 1986.
6. Color and Materials Selections, 1986-1987.
7. Contract Modifications, Feb-March 1987.
8. Change Orders, March 1987-Apr 1989.
9. DCS Project Supervisor Correspondence, Sept 1987-Jan 1988.

Box 158

1. DSC Project Supervision, 1987-1988.
2. Contract Modifications – Additional Documentation, 1987 (Part 1 of 2).
3. Contract Modifications – Additional Documentation, 1987 (Part 2 of 2).
4. Miller Act Response, Sept 1987.
5. Memos from Contractor, Oct-Dec 1987.
6. Furnishings, 1987.
7. Finish Materials and Colors, 1987.
8. [Structural Engineering & Testing], 1987.
9. Correspondence, Oct 1986-Dec 1987.
10. Correspondence, April 1987-1990 (Part 1 of 2) [Includes Design Phase].
11. Correspondence, April 1987-1990 (Part 2 of 2).

Box 159

1. Video Display Room, 1987-1990 (Part 1 of 2).
2. Video Display Room, 1987-1990 (Part 2 of 2).
3. Manuals – Dimming System, March 1987.
4. Manuals – Lighting, [1987?] (Submittal #68).
5. Manuals – Control Systems Book, March 1987 (Submittal #69).

Box 160

1. Manuals – Hydraulic Systems, [1987] (Submittal #96).
2. Manuals – Security, [1987].
3. DSC Project Supervisor re: Completion, 1988.
4. Punch List, Jan 1988.
5. Weekly Field Reports from DSC and Construction Contract Payments, 1988.
6. Project Documentation – Negatives, Jan 1986, 1987, Jan 1988.
7. Project Documentation – Photoprints, [1987] (Part 1 of 3).
8. Project Documentation – Photoprints, [1987] (Part 2 of 3).
9. Project Documentation – Photoprints, [1987] (Part 3 of 3).
10. Project Documentation – Slides, 1987-1988.

Box 161

c. Transmittals

1. Index of Transmittals.
2. Transmittals 002-012, 1986-1987.
   - 002-Concrete Mix Design, 9/86.
   - 003-Hollow Metal Schedues, Manufacturers Question Sheets, 9/86.
   - 004-Rusco Steel - Foundation Rebar, 9/86.
   - 005- Bolt & First Floor Plan, 9/86.

- 006-Carpet Samples for Mats, Entrance Mat Drawings, Balco Color Catalog Carpet, 11/86 - /87.
- 006A-Balco Mats Sample, Drawings for Sample W/ Letter And Warranty, 12/86.
- 006B-Entrance Mats Color Selection & Flow-Direction Request, 12/86.
- 007-Toilet Partitions & Accessories, 9/86.
- 007A-Toilet Partition Cuts & Colors (Resubmittal), Sanitary Napkins Tampon Vendor, 11/86.
- 007B-Toilet Partition Resubmission & Cover Letter From Contractor, 1/86.
- 007C-Toilet Partition Catalogs & Colors, 8/87.
- 008-Disappearing Stair, 9/86.
- 009-AC Horn PVC Waterstop, Self Expanding Cork-Joint Filler, Concrete Hardner, Anti-Hydro-Acuricon-Curing Compound, "MoisTop" Vapor Barrier, 9/96.
- 009A-Kure-N-Seal Curing & Sealing Compound, 10/86.
- 010-Loading Dock Square, 9/86.
- 011-Mezzanine Framing, 2nd Floor Framing Plan, Roof Framing Plans, Sections & Details, 10/86.
- 012-Electric & Telephone Manhole Frames & Covers, 10/86.

3. Transmittals 013-020, 1986
   - 013- Payne Elevator Power Confirmation, 10/86.
   - 014- Certainteed Bait Consultation, Styrofoam "SM" Insulation, 10/86.
   - 015- Sealants, 10/86.
   - 016- Telephone & Electric Manholes, 10/86.
   - 017- Column Details of Structural Steel, Beams B1-B9 & St. Details, Section Plans E1-E6, 10/86.
   - 018- Copper Seal Flashing, Block Samples, 10/86.
   - 019- Certification of Compliance, Durawall Anchors & Ties, Stainless Steel Granite Anchors, 10/86.
   - 020- Plumbing and Heating, 11/86.
4. 020A- HVAC Submittals, Urinal, Hot Water Heater, Back Flow Preventer, Roof Drain, Wall Hydrant, 12/86.
5. Transmittals 021-023, 1986.
   - 021- Fire Extinguisher & Fire Extinguisher Cabinets, 11/86.
   - 022- Finish Hardware Schedule, Catalog Cuts, 11/86.
   - 022A- Finish Hardware Schedule Resubmittal, 12/86.
   - 023- Sprinkler System, 11/86.

Box 162

1. Transmittals 024- 033, 1986-1987
   - 024- Floor Boxes, 11/86.

- 025- Elevator Drawing & Related Letters, 11/86.
- 025A- Drawing Resubmittal, Poer Confirmation, Cover Letter, 12/86.
- 026- Tile Samples & Brochure, 11/86.
- 027- Drawings: Car Operating Station, Telephone Cabinet, Emergency Light, Position Indicator, In-Car Lantern, Hall Station, Lock Cylinder Detail, 11/86.
- 027A- Elevator Details Resubmittal, Emergency Light Brochure, 1/87.
- 028- Carlon Schedule 40 PVC Conduit, Certainteed Schedule 40 PVC, 11/86.
- 029- Wood Door Schedules # 1 & # 2, Graham Brochure, 11/86.
- 030- Steel Erection Drawings & Existing Building Stl. Details, 12/86.
- 031- Mixed Grain Random Board- Letter, 11/86.
- 032- Tile Samples, 11/86.
- 032A- Vinyl Cove Base Resubmittal, 12/86.
- 033- Panels, Switch Board, & Switches, 12/86.

2. Transmittals 034-038, 1986-1987.
   - 034- Fire Alarm System, Wheatland Rigid Steel & Steelduct Rigid Steel Conduit & EMT, 12/86.
   - 035- Painting Proposal, Colors & Manufacturing Data Sheets, 12/86.
   - 035A- Painting Cuts Resubmittal, 3/87.
   - 036- Security System, 12/86.
   - 036A- Security System Resubmittal, 3/87.
   - 037- Granite, 12/86.
   - 038- Slate Roofing, Flashing & Sheet Metal, 12/86.
3. Transmittals 038A-047, 1986-1987
   - 038A- Slate Roofing, Flashing & Sheet Metal, 1/87.
   - 038B- Flexible Sheet Roofing 2nd Resubmittal, 3/87.
   - 039- Stair Drawings, 12/86.
   - 040- Layout & Detail Drawing For Granite, 12/86.
   - 040A- Granite Layout & Detail -Record Drawing, 1/87.
   - 041- Elevator Cab Detail Drawings & Color Chart, 1/87.
   - 041A- Elevator Cab Elevations, 1/87.
   - 042- Ductwork Drawings, Revised Suppliment Index, 12/86.
   - 043- Entrance Details, Covor Sheet & Color Charts, 12/86.
   - 043A- Final Elevator Drawings, 1/87.
   - 044- Miscellaneous Item Drawing, 12/86.
   - 045- Drawings E4 & B4-B9, 1/87.
   - 046- Paint Color Chart, 12/86.
   - 047- Brick Mortar Mix Design, 1/87.
4. Transmittals 048-069, 1987.
   - 048-Electrical Fixtures, 1/87.
   - 049-Stairs, 1/87.

- 050-Fire Proofing, 1/87.
- 051-Concrete Curing & Hardening, 1/87.
- 052B- Window Drawings # 3 & # 5, 5/87.
- 052C- Drawings 18, 18A, & 19, 6/87.
- 053A-Glass Drawing Resubmittal, 3/87.
- 054-Granite Sample, 1/87.
- 054A- Granite Sample, 1/87.
- 055-Marked Up Drawings for Carpet, 2/87.
- 056-Louver Drawings & Colors, 2/87.
- 057-Tapered Insulation Drawings, 1/87.
- 058-Revision Drawing to Section 302, 1/87.
- 060A- Louvers 1-3, 9/87.
- 063- PCU Partition Bracing Drawing M8, 2/87.
- 064-Simplex Door Holder, 3/87.
- 065-Fire Rated Access Door, 3/87.
- 066-Beam Extension, 4/87.
- 066A- Beam Extension Resubmittal, 5/87.
- 067-Louver Color Chart, 4/87.
- 068-Electrical Fixtures, 3/87.
- 069-Control Systems Books, 3/87.

5. Transmittals 070-087, 1987
   - 070-Drywall, Steel Frames, Insulation, Stucco, 4/87.
   - 071-Dimming System (Mill Girl), 3/87.
   - 072-Partition Bracing, 4/87.
   - 073-Security System Magnetic Door, 4/87.
   - 075- Color Charts for Heat Pumps, 4/87.
   - 076-Slate Samples, 5/87.
   - 076A- Replacement Slate Samples, 9/87.
   - 077- 4 Sided Gallery For Dry Wall, Frame & Cover Medium Duty, 6/87.
   - 078-Alkco Fixture, 5/87.
   - 079-Sketch "P" Grills, Backer Angles, 6/87.
   - 080-Access Door From Under Stairway, Jun-87.
   - 081-Steel Stair Drawings, 6/87.
   - 082-KV Vable, 6/87.
   - 083-Cypress Blend Roof Paver (Sample), 6/87.
   - 084- Storm Window Details, 6/87.
   - 085- Sash Lock, 6/87.
   - 086-Details for Light Hangers, 7/87.
   - 087-Standard Custom Chart, 6/87.
6. Transmittals 088-097, 1987-1988

- 088- Installation of Pre Action Fire Detectors, 7/87.
- 089-Louvers L1 & L2, 7/87.
- 090-Window Frame Color Chips, 7/87.
- 091-Pecoustic Brochures, 8/87.
- 092-Electrical Controls (HVAC), 10/87.
- 093-Wood Door Warranty, 1/88.
- 094-Hydrotech Roof & Warrantys, 1/88.
- 095-Fixture Brochures, Dimming System, Fire Alarm Manual, Security Alarm Manual, Switch Board Panels & Service Cabinet, 2/88.
- 096-Elevator Maintenance Manuals, Test Report, Letter of Guarantee, 2/88.
- 097- Maintenance & Parts Manual (HVAC), 2/88.

Box 163

d. Facility Management

1. Accessability, 1989-1991.
2. AC System, 1988.
3. Automatic Temperature Control System, 1987-1992. Folder 1 of 3.
4. Automatic Temperature Control System, 1987-1992. Folder 2 of 3.
5. Automatic Temperature Control System, 1987-1992. Folder 3 of 3.
6. Bicycle Racks, 1991.
7. Blackboards, 1988.
8. Carpet, 1987-1988.
9. Ceiling Height.
10. Ceiling Repairs- Correspondence, Aug-Oct 1993.
11. Ceiling Repairs- Daily Reports, Sept-Oct 1993.
12. Ceiling Repairs- Specifications, Estimates, Photographs, 1989-1994.

Box 164

1. Drainage Improvement, 1994.
2. Elevator, 1988-1992.
3. Failed Inspection, 1990-1991.
4. General Maintinance and Operations, 1987-1991.
5. Hardware, 1988. Folder 1 of 2.
6. Hardware, 1987-1988. Folder 2 of 2.
7. HVAC Working Drawing Equipment Schedules.
8. Labor Hall Chairs and Room Layout, 1987.
9. Leases/Tenants, 1987-1990.
10. Office Space, 1987-1989.
11. Security and Fire System, 1988.

12. Shutters, 1990.
13. Slate Roof, 1989-1993.
14. Special Collections, 1989.
15. Storm Windows, 1988.
16. Window Shades.

e. Reroofing Project

17. Documents, 1989-1992.
18. Documents, 1989-1992.

Box 165

1. Specifications, June 1992.
2. Correspondence, 1992-1993.
3. Daily Reports, 1992-1993.
4. Submittal # 1 - Performance Guarantee, 1992.
5. Submittals (Including Warranty), 1992.
6. Change Orders, 1993.
7. Icicle Protection -- Building Conservation Branch, Nov-Dec 1993.
8. Center for Lowell History/ B & M Railroad Historical Society Claims, Jan-March 1993.

10. Prescott Park/Way

9. [Planning], 1986-1989 (Part 1 of 2).

Box 166

1. [Planning], 1986-1989 (Part 2 of 2).

11. Public Art [see also: Cultural Programs – Special Projects]
(see ½ Size and Full Size Map Folder List for Removed Oversize Drawings)

2. Canalway Sculpture, 1989-1993.
3. Robert Cumming, Boarding House Public Sculpture, 1989-1990. Oversize material removed (1/2 Map Folder Size).
4. Carlos Dorrian, Human Construction, 1988-1989 (Part 1 of 2).
5. Carlos Dorrian, Human Construction, 1988-1989 (Part 2 of 2). Oversize material removed (Full Map Folder Size).
6. Peter Gourfain, Stele for the Merrimack, 1993-1998 (Part 1 of 2). Photographs included.
7. Peter Gourfain, Stele for the Merrimack, 1993-1998 (Part 2 of 2.) Photographs included.
8. Michio Ihara, Pawtucket Prism/ The Power of Water, 1984-1985 (Part 1 of 2).
9. Michio Ihara, Pawtucket Prism/ The Power of Water, 1984-1985 (Part 2 of 2). Oversize material removed (1/2 Map Folder Size).

Box 167

1. Ellen Rothenberg, Industry, Not Servitude, 1994-1996 (Part 1 of 2).
2. Ellen Rothenberg, Industry, Not Servitude, 1994-1996 (Part 2 of 2). Oversize material removed (Full Map Folder Size).
3. Michael Singer, Sculpture Garden, Northern Canal Island, 1990-1995 (Part 1 of 3)
4. Michael Singer, Sculpture Garden, Northern Canal Island, 1990-1995 (Part 2 of 3)
5. Michael Singer, Sculpture Garden, Northern Canal Island, 1990-1995 (Part 3 of 3) (Contract Documents)
6. Market Mills Sculpture Base, Fall 1984.

12. St. Peters

7. Correspondence, 1985-1996 (Part 1 of 3).
8. Correspondence, 1985-1996 (Part 2 of 3).

Box 168

1. Correspondence, 1985-1996 (Part 3 of 3).
2. Re: Proposals for Usage, 1988-1995 (Part 1 of 2).
3. Re: Proposals for Usage, 1988-1995 (Part 2 of 2).
4. Conditions Report for Exterior Envelope, Building Conservation Branch, NPS, July 1991 (rev.)
5. Drawings of Exterior, 1991.
6. Photographs. Includes Photographic Materials.
7. Feasibility Study, 1993-1994.
8. Public Hearings/ Proposed Demolition, 1995.

Box 169

13. Trolleys
a. Trolleys General

1. –Trolley System", 1980-1984 (Part 1 of 2).
2. –Trolley System", 1980-1984 (Part 2 of 2).
3. Trolley History (Brill Company Included), [1980]-1985.
4. –Trolley Project", 1981-1982 (Part 1 of 2). Contains Photographs.
5. –Trolley Project", 1981-1982 (Part 2 of 2). Contains Photographs.
6. Design Services for Cars and Overhead Line (Contracts CX1978-1-0017 and CX1600-5-0009), 1981-1985 [Contract Change Orders], (Part 1 of 2).
7. Design Services for Cars and Overhead Line (Contracts CX1978-1-0017 and CX1600-5-0009), 1981-1985 [Contract Change Orders], Part 2 of 2.

Box 170

1. Photographs, ca. 1981- ca. 1988.
2. –Trolley Current" Notebook (Planning Director)- Mass. Electric [Including Substation] and

3. –Trolley Current" Notebook (Planning Director)- Coal Pocket & Maintenance, 1983-1984.
4. –Trolley Current" Notebook (Planning Director)- –Overhead-General-[Publicity]", 1982-1984.
5. Trolley System Status, 1982-1983, 1986.
6. Notebook –Agreements & Permissions"- State and City, 1983 (Part 1 of 2).
7. Notebook –Agreements & Permissions" – [Private Owners], 1983 (Part 2 of 2).
8. Work Directive: Trolley Maintenance Facility, [Feb 1984] [LOWE]
9. –Trolley 1984" [Notebook] – Systems Costs, Ridership, B & M Agreements.
10. –Trolley 1984" [Notebook] – Maintenance, Rail Bonds.
11. –Trolley 1984" [Notebook] – Track Work Platforms, Miscellaneous.
12. Feasibility and Operations Analysis, Lowell Electrified Trolley System Extended Trackage, Year Round Service, Northern Middlesex Area Commission, July 1985.

Box 171

1. –The Renaissance of the Traditional Streetcar in the Urban Revitalization Movement", Shannon Dyke Evans, Master's Thesis, LSU, May 1988

b. Trolleys – Tracks (Initial) (see ½ Size and Full Size Map Folder List for Removed Oversize Drawings)

2. General Correspondence, 1982-1984.
3. Overhead Line System, Technical Specifications, Dec 1982 [CX1600-5-0009]
4. [Overhead Line System], Preliminary Pole Layout Plans With LHPC Comments, Fall 1983. Oversized Material Removed.
5. Overhead Line System – Contract CX1978-2-0006 Documents, 1983 – Jan 1985 (Construction).
6. Overhead Line System – Contract CX1600-3-0053 Documents, 1983 – Jan 1985 (Construction).
7. Associated Plan, Feb 1984. Oversized Material Removed.
8. Overhead Line System – Site Visit Reports (CX1600-3-0053) Nov 1983 – March 1984.
9. Overhead Line System (CX1600-3-0053) Submittal Log, 1983-1985.
10. Overhead Line System – Construction Notebook (CX1600-3-0053), Part 1 – Testing, Substation, 1984.

Box 172

1. Overhead Line System – Construction Notebook (CX1600-3-0053), Part 2 – Engineering, Quality Control, 1984.
2. Overhead Line System – Construction Notebook (CX1600-3-0053), Part 3 – Schedules, Coordination, 1983-1984.
3. Overhead Line System – Construction Notebook (CX1600-3-0053), Part 4 – Utilities, 1984.

4. Overhead Line System – Review of Construction (CX1600-3-0053), Sept 1983.
5. Overhead Line System – Construction Notebook (CX1600-3-0053), Inserts – Final Inspection, Dec 1984.
6. Overhead Line System – Ohio Brass Material Listing and Assembly Drawings (Rectifiers), 1984 (Part 1 of 2)
7. Overhead Line System – Ohio Brass Material Listing and Assembly Drawings (Rectifiers), 1984 (Part 2 of 2)
8. Copies of B[oston] & M[aine] 1930, 1943, 1963 Signage and Terminal Box, ca 1984.

Box 173

1. B[oston] & M[aine] Track Improvements CS.A. [MT1780-4-0002], 1983-1984. Includes Photographic Materials.
2. Line Pole Relocation Near Mack Building, Apr 1988.

c. Car Construction (see ½ Size and Full Size Map Folder List for Removed Oversize Drawings)

3. Feasibility Study for Surface Rail Passenger Circulation System, Storch Associates, Oct 1979 (CX1600-9-0035).
4. Inspection Trip Report: European Tram Cars for Lowell Historic Preservation Commission, June 1980.
5. L.A. Times Issue Re: Introduction of San Diego Trolley System, July 1981. Oversized Material Removed.
6. Correspondence Re: Car Prototype Design Project, 1981- Feb 1982.
7. General Correspondence, 1981- 1983.
8. Open Trolley Cars – Purchase and Inspection of Equipment from Australia, 1981-1982.
9. Open Trolley Cars – Technical Specifications, May 1982.
10. Notebook for Contract CX1978-2-0011 (Open Car Construction), July 1983-1984.

Box 174

1. Open Trolley Cars – Construction Correspondence, Jan 1982-1983 [Re: paint, equipment] (Part 1 of 2).
2. Open Trolley Cars – Construction Correspondence, Jan 1982-1983 [Re: paint, equipment] (Part 2 of 2).
3. Photocopies of 1920‘s Engine Machine Parts, [1984].
4. Open Trolley Cars – Development of Operators Manual, 1984.
5. Open Trolley Cars – Development of Maintenance Procedures, 1984 (Part 1 of 2).
6. Open Trolley Cars – Development of Maintenance Procedures, 1984 (Part 2 of 2) [Copy of Self-Propelled 1981 –Whistler” Car Manual].
7. Open Trolley Cars – Paint Colors, [1984?].
8. Open Trolley Cars – Fact Sheet, [May 1984?].

9. Open Trolley Cars – Inspection Reports During Construction, 1983 [Includes Modifications].
10. Open Trolley Cars – Assembly Drawings, Dec 1983. Oversized Materials Removed.

Box 175

1. Closed Trolley Cars – Design (CX1600-5-0009) – Contract Documents – Correspondence, 1984-1985.
2. Closed Trolley Cars – Design (CX1600-5-0009) – Contract Documents – Payments, 1985-1987.
3. Closed Trolley Cars – Historic Background, ca. 1985. Includes Photographic Materials.
4. Closed Trolley Cars – Specifications, Sept 1985 (Part 1 of 3).
5. Closed Trolley Cars – Specifications, Sept 1985 (Part 2 of 3).
6. Closed Trolley Cars – Specifications, Sept 1985 (Part 3 of 3).
7. Closed Trolley Cars – Construction (CX1600-5-0045) – Contract Documents – Specifications and Modifications, 1985-1987 (Part 1 of 2).
8. Closed Trolley Cars – Construction (CX1600-5-0045) – Contract Documents – Specifications and Modifications, 1985-1987 (Part 2 of 2).
9. Closed Trolley Cars – Design (CX1600-5-0009) – Contract Documents – Conversations, 1985-1987.
10. Closed Trolley Cars – Design (CX1600-5-0009) – Contract Documents – Modifications, 1987.

Box 176

1. Closed Trolley Cars – Construction (CX1600-5-0045) – Contract Documents – Correspondence, 1985-1988 (Part 1 of 2).
2. Closed Trolley Cars – Construction (CX1600-5-0045) – Contract Documents – Correspondence, 1985-1988 (Part 2 of 2).
3. LHPC Trolley Construction Supervisor Files, 1986-1987 (Part 1 of 2) (Closed Car).
4. LHPC Trolley Construction Supervisor Files, 1986-1987 (Part 2 of 2) (Closed Car). Oversized Material Removed.
5. Closed Trolley Cars – Manufacturer‘s Presentation Copy to LHPC, [November 1987]. Oversized Material Removed to Oversize Box 1.
6. Closed Trolley Cars – Factsheet, ca. 1987.
7. Closed Trolley Cars – Photographs, ca. 1988. Includes Photographic Materials.

d. Track Extensions – French St.

8. B[oston] & M[aine] [Corporation], 1981, 1986-1989.
9. Prelim. Draft, Technical Specifications for Construction of Railroad Tracks, Oct 1983.
10. Development of Technical Specifications, 1984-1987 (Part 1 of 2).
11. Development of Technical Specifications, 1984-1987 (Part 2 of 2).

Box 177

1. Technical Specifications for Construction of Railroad Track Extension, rev. Feb 1987.

Track Extensions – Eastern Canal Park Trolley (see Full Size Map Folder List for Removed Oversize Drawings)

2. Cooperative Agreement with City Of Lowell, 1987-1988.
3. Testing of Rail Joint Bonding, 1988.
4. Overhead Trolley Wire System Description [Specifications], [1987].
5. Correspondence, 1987-1988. Oversized Material Removed.
6. Rail Purchase, 1987-1988.
7. Change Order, Spring 1988.

VIII. Publications
A. Published By LHPC

8. Summary of Materials for Historic and Cultural Preservation Plan Progress Report, 1979.
9. Preservation Plan, 1980. (CRBIB # 101392)
10. Details of the Preservation Plan, [1980]. (CRBIB # 101371)
11. The Commission Bulletin, Spring 1979 and Winter 1981.
12. LHPC Annual Report, 1982.
13. Market Mills in Lowell, ca. 1982.

Box 178

1. Revitalization Through Partnership: Public and Private Sector Investments in Lowell, 1984.
2. Draft Report of the Canalway Task Force, 1985.
3. 1987 Newsletter.
4. Preservation Plan Amendment Article, 1989.
5. Preservation Plan Amendment [Book], 1990.
6. Canalway News, Fall 1990.

B. Sponsored by LHPC (Ordered Alphabetically)

7. 49th National Folk Festival, 1987.
8. Bibliographic Treasures of Lowell.
9. Dedicated to the Arts Weekly Planner, 1986.
10. Dimitri Hazdi Sculpture Exhibit Brochures, 1990. Oversize removed.
11. Essays from the Lowell Conference on Industrial History 1980 and 1981, 1981.
12. Essays from the Lowell Conference on Industrial History, 1984.

13. Faces & Places: Paintings, Prints, and Photographs from the Collections of the Lowell Historical Society, 1995.
14. Face the music: Lowell's Band Era, 1985.
15. Fire Service of Lowell, 1983. (CRBIB# 405812).
16. Greek Immigrant Chronicles: The Alpha and Omega, 1989.
17. Industrial Heritage: New England, 1984.
18. Large Print Guide to the Whistler House Museum of Art, 1993.

Box 179

1. Lowell Self-Guided Canal Tour.
2. Religious Architecture of Lowell Volumes I and II, 1984. (CRBIB # 405811- Volume II)
3. Report on the Completion of the Lowell Folklife Center, 1988.
4. That Was the Way it Was…, 1986.
5. The Irish Came to Lowell: Journalist's Observations of 19th Century Irish in Lowell, 1985.
6. Whistler: Harbors and Waterways the Venetian Etchings, 1984.

C. About Lowell (and LHPC Role)

7. Report of the Lowell Historic Canal District Commission to the 95th Congress, 1977.
8. Articles, 1980. Oversize material removed.
9. Articles, 1981.
10. Articles, 1982.
11. Articles, 1983.
12. Articles, 1984.
13. Articles, 1985.

Box 180

1. Articles, 1986.
2. Articles, 1987.
3. Articles, 1988.
4. Articles, 1989.
5. Articles, 1990.
6. Articles, 1991. Folder 1 of 2.
7. Articles, 1991. Folder 2 of 2.

Box 181

1. Articles, 1992. Folder 1 of 2.
2. Articles, 1992. Folder 2 of 2.
3. Articles, 1993. Folder 1 of 2.
4. Articles, 1993. Folder 2 of 2.
5. Articles, 1994.
6. Articles, 1995.
7. Brochures.

IX. Photographic Materials[1]

Photo Storage Box 6

1. Architectural Details, ca. 1980.
2. Boott Mills – Historic Shots.
3. Boott Mills – Pre-Rehabilitation.
4. [Bridge St. Boarding House Rehabilitation.
5. Central Street and Lower Locks (Part 1 of 2).
6. Central Street and Lower Locks (Part 2 of 2).
7. Construction.
8. ~~–C~~urrent Signage," ca. 1981.
9. [Downtown Lowell Streetscapes].
10. General Views Including Market Mills and Trolleys, ca. 1985-1990 [Slides].
11. ~~–H~~istoric Names and Faces" [copies of portraits].
12. Historic Storefronts and Signage [from Lowell Historical Society Collection].
13. LHPC Commissioners, City Officials, and LHPC Activities (Part 1 of 2).
14. LHPC Commissioners, City Officials, and LHPC Activities (Part 2 of 2).
15. LHPC Final Meeting, May 1995.
16. Machinery Associated with Boott Mills Including Clock (Part 1 of 2).
17. Machinery Associated with Boott Mills Including Clock (Part 2 of 2).
18. Market Mills Before and After Rehabilitation, ca. 1980-1982 (Part 1 of 2).
19. Market Mills Before and After Rehabilitation, ca. 1980-1982 (Part 2 of 2).

Photo Storage Box 7

1. Market Street.
2. Merrimack Street (Part 1 of 2).
3. Merrimack Street (Part 2 of 2).
4. Mills – Workers, Drawings, Notices (Part 1 of 2).
5. Mills – Workers, Drawings, Notices (Part 2 of 2).
6. ~~–M~~iscellaneous People" [Historic Photos of Workers].
7. ~~–M~~iscellaneous People" [LHPC Tenants – Artists, Chefs – and LHPC Commissioners].

8. Images for Preservation Plan, [1980] (Part 1 of 2).
9. Images for Preservation Plan, [1980] (Part 2 of 2).
10. Postcards, ca. 1980-ca. 1985.
11. [Public Art] – Ellen Rothenberg Ceremony, 1996.
12. [Public Art] – Homage to Women, ca. 1984.
13. Residential.
14. Swamp Locks Canalway Ground Breaking.
15. Tours and Activities.
16. Walking Tour with Lowell Officials and Michael Dukakis, 17 Sept 1977.

Audio-Visual Materials Separated from Collection

Audio-Visual Storage BX 1

1-9. Videocassettes removed from Cultural Programs – Grants Project Files.

Audio-Visual Storage BX 2

1-6. Audiotapes and cassettes removed from Cultural Programs – Grants Project Files.

Photographic Materials Separated from Collection

Photographic Storage Box 3

1.-6. 4X5" Black-and-White Photos, Exterior Boarding House Restoration, 1984.
7.-24. 3X5" Color Photos, Exterior Boarding House Restoration, 1984-1985.

Photographic Storage Box 4-5

35 mm. Color Slides, Exterior Boarding House Restoration taken by DSC Contracting Officer Representative, Nov 1983-Apr 1985.

Oversize Materials Separated from Collection

Oversize BX 1 (14X18")

1. Lowell Sun Special Edition – "President Carter Signs Lowell Park Bill," 5 June 1978. Removed from BX 1, Fldr 4.
2. Wallpaper fragments from two rooms in Bridge St. Boarding House. Removed from BX 81, Fldr 2.

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[1] The researcher should note that photographic materials are also present throughout the LHPC records; a large portion of photoprints and slides are in the Architectural series.

3. Book cover –Trolley Car 4131" – Manufacturer's Presentation Copy to LHPC. Removed from BX 176, Fldr 5.

Oversize BX 2 (16X20")

1. Playbill Removed from BX 30, Fldr 2.
2. Exhibit Brochure Removed from BX 178, Fldr 10.
3. Newspaper Articles Removed from BX 179, Fldr 8.

List of Materials in Map Cases – *The researcher should note that smaller plans and maps are located with the textual records in the LHPC Records.*

Full Size Map Folders

Removed from Development Projects -- Design & Construction

Boarding House -- Exterior Restoration (Design) -- Final Submission Plans, June 1983; Site Plans, Side Wall Drawing

Boarding House Park – Construction -- Submittals (part 1 of 3)

Boarding House Park – Construction -- Submittals (part 2 of 3)

Boarding House Park – Construction -- Submittals (part 3 of 3)

Canals and Canalways -- The Canalway -- Site Layout & Grading Plans

Canals and Canalways -- Merrimack Canal -- Fencing

Canals and Canalways -- Boott Mills Canalway -- Fences and Wall Repairs

Canals and Canalways -- Paving & Curbing & Wall Construction

Canals and Canalways -- Lighting, Irrigation, & Land Plan

Central St./ Pawtucket Canal Improvements -- Shop Drawings (part 1 of 2)

Central St./ Pawtucket Canal Improvements -- Shop Drawings (part 2 of 2)

Central St./ Pawtucket Canal Improvements -- [Central Street Bridge]

Central St./ Pawtucket Canal Improvements -- Survey Material

Eastern Canal Trolley Bridge -- Landscaping

Eastern Canal Trolley Bridge -- Prescott Park/Way

Eastern Canal Trolley Bridge -- Prescott Way Construction

Eastern Canal Trolley Bridge -- Submittals (part 1 of 2)

Eastern Canal Trolley Bridge -- Submittals (part 2 of 2)

MCC [Mogan Cultural Center] -- Construction -- Transmittals 004-005

MCC -- Construction -- Transmittals 039, 040, 040A, 041

MCC -- Construction -- Transmittals 042 & 044

MCC -- Construction -- Transmittals 053, 055, 056

Public Art -- Carlos Dorrian, Human Construction

Public Art -- Ellen Rothenberg, Industry, Not Servitude

Trolleys -- Tracks (Initial) -- [Overhead Line System] -- Preliminary Pole

Trolleys -- Closed Car Construction -- LHPC Trolley Supervisor Files [Brake Arrangement]

Trolleys -- Track Extension -- Eastern Canal Park Trolley (Correspondence)

Facility Management -- Carpet & Drainage Improvements

Boarding House -- Construction -- Transmittals 034, 051

Removed from Architectural Field Notes

Western Canal Area 1

Watson House (Early Residence) Plans & Nursery; Watson House Fence

Watson House

Railroad Car #2

Railroad Car #1

Northern Canal Waste Weirs & Gatehouse

Market Mills (General); Market Mills Signage

Gas Light Building

Bridge Street Boarding House Storefront

Boott Mills Boarding House Original Design

Upper Pawtucket Canal (part 1 of 2)

Upper Pawtucket Canal (part 2 of 2)

Northern Canal Phase 1

Western Canal Area 3 (Northern Canal Apartments) & Western Canal Area 4 (Tremont Trolley Terminus)

Western Canal Area 2 (Western Canal Park)

Removed from Architectural Preservation Grants/ Loans Project Files

Acre Triangle; Bascom Building; Lowell Sun Garage Building; Boott Mills Building #6

Massachusetts Mills #2; Middlesex Safe Deposit and Trust Co.; Old Firehouse

Napping Building

Shrine of St. Joseph; Vesper Boat Club

Lowell Regional Transit Authority (Gallagher Transportation Terminal Addition); 200 Middle Street; 722 Merrimack Street; Wasteway Gatehouse

Byrne Liquor; East Merrimack Street Bridge; Elks Building

Father John's Medicine Building; Jewett Building; Knights of Columbus

Lowell Turnkey; Piccolo Mondo Building; Shedd Block

Removed from Architectural Indexed Building File

#79- New Mansur Building (Enterprise Building);
#80- Mansur Building;
#85- Cook & Taylor Building;
#91- Reed & Mansur Building

#102.0- Spaulding Building;
#221- Darius House;
#237- Lowell 5 Cent Savings Bank;
#246- Howe Building

#254- Early Residence;
#257- Rose, Maynard, and Ward House;
#401- Old Market House

#418- Simpson Building;
#421- Hildreth Building;
#429.5- Bon Marche Building;
#434- Pollard Memorial Library

#439- Chalifoux Building;
#441- Executive Building;
#443- Robbins Block;
#443- Davis Block

#448- Albion Block;
#452- Town House (Old City Hall)

#463- Parker Block;
#471- Simpson Groceries;
#476- Barker Building;
#517- Howe Building

#533- Bromley-Sheperd Building;
#1124- Mass. Cotton Mills Powerhouse Section 8;
#1136- Mass. Cotton Mills Boarding House Row

#1155 Suffolk Manufacturing Company Dye House

Removed from Development Projects -- Specifications

Project Merrimack Valley Regional Skills Training Center

Oversized Removed from Other Series in LHPC Records

1. Removed from Cultural Programs, Grants Project Files, BX 40 Fldr 3 and BX41 Fldr 9
2. Removed from Planning Files, BX 50, Fldr 10 and BX 54, Fldr 7
3. Removed from Planning Files, BX 63, Fldr 3, 5, 6 and BX63D, Fldr 8

½ Size Map Folders

Removed from Development Projects -- Design and Construction

Boarding House – Construction -- Transmittals 006, 010, 010A 012A

Boarding House – Construction -- Transmittals 011, 022

Boarding House – Construction -- Transmittals 054, 056 & Unknown from Transmittals 1-50

Boarding House Park -- Construction -- Sprinkler Plan

Boarding House Park -- Construction -- Electrical As-Builts

Central St. / Pawtucket Canal Improvements -- Bridge Planning

Central St./ Pawtucket Canal Improvements -- Granite Details

Eastern Canal Trolley Bridge -- Change Orders (Steam Line Brace)

Eastern Canal Trolley Bridge -- Layout Plan & Surveys

Eastern Canal Trolley Bridge -- Track Crossing [and Drainage Issues], and Easement (includes full set of plans)

Gas Light Building -- includes window projects

Market Mills -- Construction -- Chief Architect Files re: Tenant Space Construction (Part 1 of 2)

Market Mills -- Construction -- Chief Architect Files re: Tenant Space Construction (Part 2 of 2)

Market Mills -- Lease Space Development -- Hardware (Doors), 1981, 1995

Market Mills -- Lease Space Development -- Building A -- 1981-1983 -- Mechanicals, HVAC

Market Mills -- Lease Space Development -- Building A -- 1981-1983 -- Floor Plans, Plumbing

Market Mills -- LTC Fit-Up (Field Notes and from Chief Architect Files)

Public Art – Robert Cumming, Boarding House Public Sculpture

Public Art -- Michio Ihara, Pawtucket Prism/ The Power of Water

Trolleys -- Car Construction -- L.A. Times Issue re: San Diego Trolley, June 1981

Trolleys -- Car Construction -- Open Trolley Cars -- Assembly Drawings, Dec 1983 (Part 1 of 3)

Trolleys -- Car Construction -- Open Trolley Cars -- Assembly Drawings, Dec 1983 (Part 2 of 3)

Trolleys -- Car Construction -- Open Trolley Cars -- Assembly Drawings, Dec 1983 (Part 3 of 3)

Trolleys -- Tracks, Initial -- Insulating Trough at High School Walkway, Feb 1984

MCC -- Facility Management -- Accessibility

MCC -- Facility Management -- Automatic Temperature Control System

MCC -- Facility Management -- Hardware (Folder 1 of 2 & Hardware Folder 2 of 2)

MCC -- Construction -- Electrical Services

MCC -- Transmittals 011 & 017

MCC -- Transmittals 022, 024

MCC -- Transmittals 029, 030, 036

MCC -- Transmittals 045, 049, 052A, 052B

MCC -- Transmittals 057, 060A , 072, 081, 092

MCC -- Re-roofing project

Public Art – Robert Cumming, Boarding House Public Sculpture

Public Art – Michio Ihara, Pawtucket Prism/ Power of Water

Removed from Development Projects -- Specifications

Wayside, Directional, and Sculpture trail signage

Central Street Bridge -- Construct Bridge Railings

Central Street Bridge -- Demolish Central St. Pier Bridge

(1092) Lawrence Street Agents House

Oversized Removed from Other Series in LHPC Records

1. Posters from Lowell Conferences on Industrial History, Removed from Administrative Files, BX 22, Fldr 8

2. Boarding House Park Sculptures and –Power of Water" Drawings, Removed from Cultural Programs, BX 27, Fldr 9 and BX 28, Fldr 2

2a. Playbills removed from Cultural Programs, BX 29, Fldr 10 and 13

3. Maps & Plans Removed from Planning Files, BX 46, Fldr 6, BX 49, Fldr 10, Box 50, Fldrs 8 and 13

4. Eastern Canal Trolley Bridge Test Pits Plan, Removed from Planning Files, BX 58, Fldr 2

5. Maps Removed from Planning Files, BX 62, Fldr 4 and 6

6. Maps Removed from Planning Files, BX 63, Fldr 2 and BX 63E, Fldr 4

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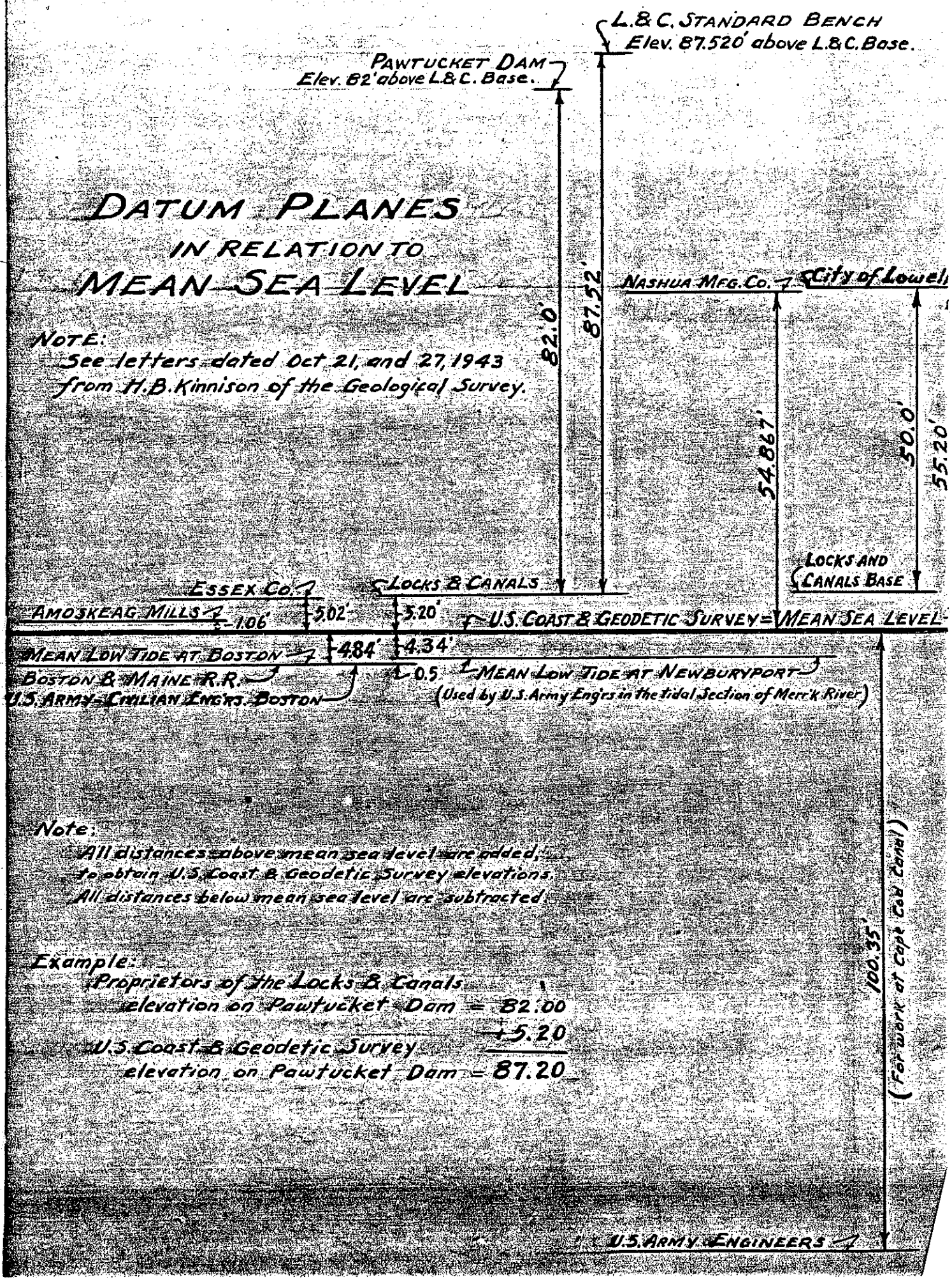

Note:
All distances above mean sea level are added,
to obtain U.S. Coast & Geodetic Survey elevations.
All distances below mean sea level are subtracted.

Example:
Proprietors of the Locks & Canals
elevation on Pawtucket Dam = 82.00
+5.20
U.S. Coast & Geodetic Survey
elevation on Pawtucket Dam = 87.20

RELATION OF DATUM PLANES

MASSACHUSETTS

Town of Orange	+435.52
Town of North Attleboro	+171.25
New England Power Assn.	+105.86
Turners Falls Power Co.	+69.26
City of Lowell	+55.20
Locks and Canals Corp., Lowell	+5.20
City of Lawrence	+5.08
Town of Framingham	+4.06
City of New Bedford	+2.55
City of Attleboro	+2.26
City of Worcester	+0.77
Comm. of Mass. Dept. of Public Works	
Town of Natick	-0.04
City of Chicopee	-0.36
City of Springfield	-0.46
Town of Greenfield	-0.83
City of Haverhill	-1.43
City of Brockton	-1.57
Holyoke Water Power Co.	-2.53
City of Holyoke	-2.60
City of Salem	-4.36
Town of Manchester	-4.47
City of Peabody	-4.82
Boston Low Water Datum	-4.87
Logan Airport Datum (Waterways)	-5.28
City of Lynn	-5.29
Logan Airport Datum (Highways)	-5.35
City of Somerville	-5.39
Town of Wellesley	-5.50
City of Beverly	-5.53
Town of Dedham	-5.64
malden & Boston City Base	-5.65
City of Newton	-5.72
Town of Brookline	-5.78
City of Quincy	-5.82
City of Revere	-5.84
medford & City of Everett	-5.90
City of Chelsea	-6.00
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Boston Navy Yard (Basic Bench)	-105.08
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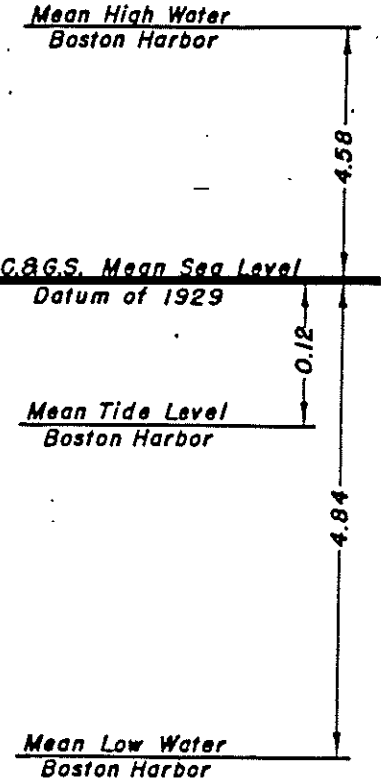
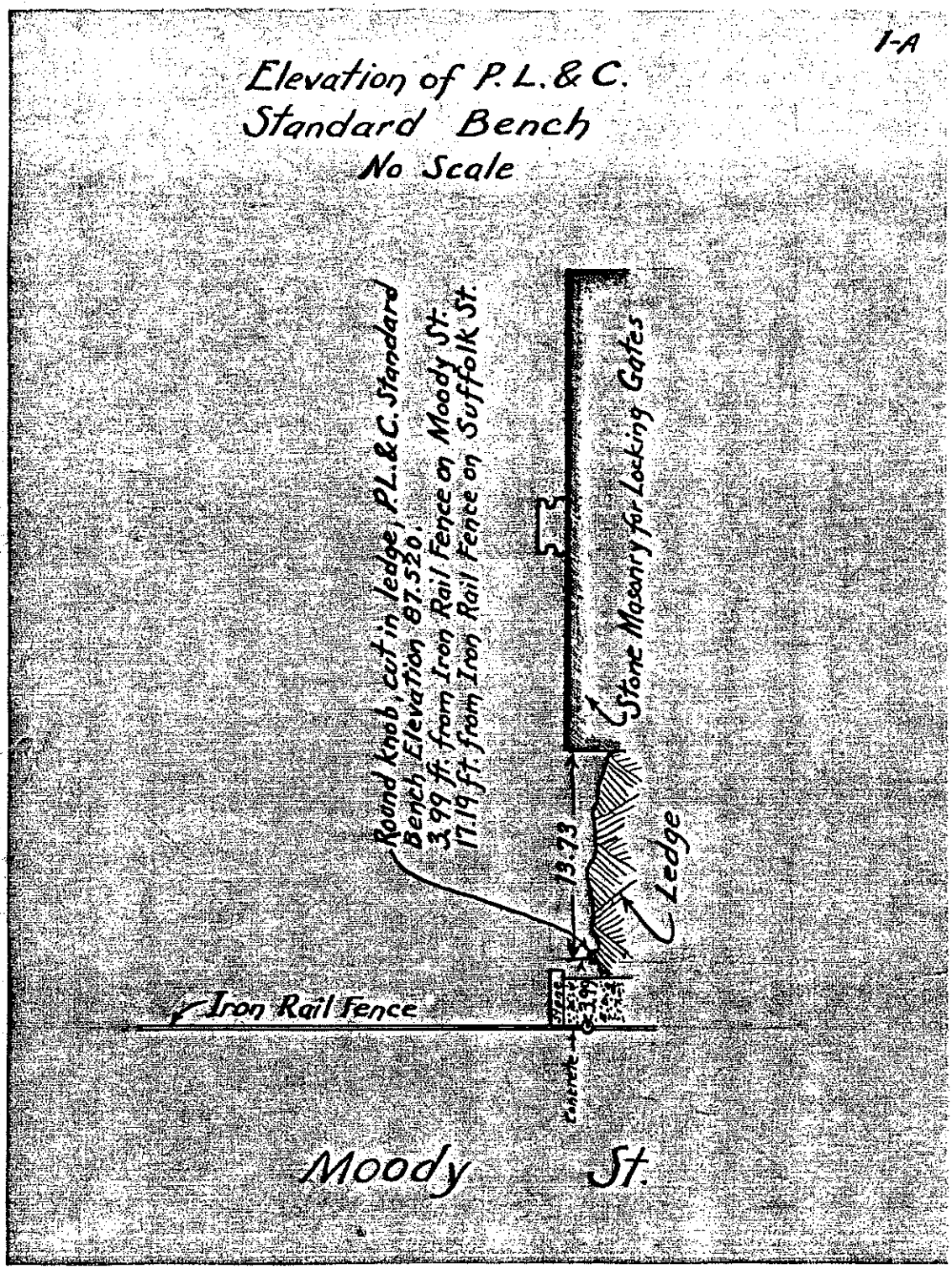


1-A

Elevation of P.L.&C. Standard Bench

No Scale



Prominent Bench Marks.

Description	Height on General Scale.
Swamp Locks	
Brass-head bolt at head Merrimack Canal at L.M.S Upper Canal Gauge.	84.664
~~Brass-head bolt at #2 Pit Gauge~~	~~69.859~~
Brass-head bolt at Upper Canal Gauge R.H. end of Swamp Locks Dam	84.150
Brass-head bolt at Swamp Locks Lower Canal Gauge.	68.649
Cut B.M. on stone at L.H. side of lock below middle gate of Swamp Locks.	78.728
Lower Locks	
Cut B.M. on capstone of Upper Lock of Concord River Locks.	68.800
Brasshead bolt at Concord River Lower Lock Gauge used as River Gauge for Middlesex Co.	48.641
B.M. cut in masonry at west end of Md's'x. Co's Dam. Concord River.	62.936

Prominent Bench Marks

Description	Height on General Scale.
Hamilton Canal.	
Cut B.M. on corner of underpinning at N.E. corner of Hamilton #4 Mill near Hamilton Wasteway Gate House.	85.670
Lower Pawtucket Canal.	
Cut B.M. ⊡ at R.H. side Lock just above Upper Gate of Lower Locks	68.800
Hunt's Falls. South Side.	
On Copper Tack at end Whittier Fence	
B.M. marked VI on boulder below Lower Dump	51.777
B.M. " VII " " " near Lower Rapids.	52.605
Cut B.M. on Well Cover opp Alder St.	49.191
Hunt's Falls North Side	
Upper Monument.	48.280
B.M. stone bound cor Christian First Sts	71.541
Lower Monument.	37.463
B.M. #10 on boulder at bend above Abbott Isl.	6.245

Prominent Bench Marks.

Description	Height on General Scale
Boott Mills - Amory St.	
Brass-head bolt at Counting Room Gauge.	
B.M. on square iron bolt in top of wall at River Gauge.	59.671
Boott Mills - Mass. Div.	
Brass-head bolt at Counting Room Gauge.	69.838
Brass-head bolt at Merrimack River Gauge.	
"Prescott"	
Brass-head bolt at Eastern Canal Gauge L.H. side of canal near Bridge.	68.524

Prominent Bench Marks.

Description	Height on General Scale.
Northern Canal.	
B.M. ▣ on capstone of pier at head of Lock, Pawtucket Dam.	96.113
Copper B.M. L.H. side about 35 feet above Moody Street Bridge.	86.445
Western Canal.	
Standard Bench ⊙ on ledge R.H. side canal at down-stream side of Moody Street.	87.520
B.M. cut in coping (down-stream side) of bridge over Western Canal at Broadway nearest to L.H. side.	94.312
Merrimack Canal.	
B.M. in Moody St. Feeder Gate House	84.513

Prominent Bench Marks.

Description	Height on General Scale.
"Suffolk Yard."	
Cut B.M on canal wall near up-stream corner Tremont Gate House.	87.488
Brass-head bolt near Suffolk Race Gauge in underpinning of stable.	78.234
"Tremont Yard."	
Cut B.M on canal wall near up-stream corner Tremont Gate House	87.488
"Lawrence Yard."	
Cut B.M on stone base on line of Columns in 4-5-6 Wheel-room	62.114
Brass-head bolt at River Gauge at up-stream side of Lawrence Wasteway.	60.048

Prominent Bench Marks.

Description	Height on General Scale
Merrimack River L.H. side looking down-stream. On top 1852 Monument above Pawtucket Dam	95.757
On covering stone above brook south side Varnum Ave. at Totman Street	92.351
On top of Lowell and Dracut line bound on bank of River	89.553
On East side of North abutment to Country Club Bridge	97.136

Prominent Bench Marks.

Description	Height on General Scale.
Merrimack Mfg. Co.	
Brass-head bolt at Tower Gauge	85.105
Brass-head bolt at River Gauge	52.875
"Hamilton Yard."	
Cut B.M. on underpinning N.E.	
corner #4 Mill.	85.670
Brass-head bolt at Lower Canal Gauge	
"Appleton Yard."	
Brass-head bolt at Upper Canal Gauge	83.310

Prominent Bench Marks

Description	Height on General Scale.
Merrimack River RH side looking down-stream. On West end of N. abutment of Pawtucket St. crossing over B&M tracks	95.752
On top of 28th mile post from Boston	100.782
On capstone arches over Stony Brook north side of track.	96.462
On big boulder just above old piling opp upper end of Tyng's Island	92.463

Prominent Bench Marks

Description	Height on General Scale
Lawrence Section.	
Brass-head bolt in underpinning of	
Law. Sec. Cloth-Room Building.	71.746
Brass-head bolt at Law. Sec. River Gauge.	53.858 44.706 ↳ Low down
Upper Pawtucket Canal.	
B.M. ◎ on abutment of Great Gate L.H.	
side of Lock & lower side of Gate House	100.953
B.M. ▣ on R.H. abutment of Red	
Bridge upper end of abutment.	Abutment changed
B.M. ▣ on top of Doherty wall 25 ft.	
below upper end of wall.	90.066

Canal Bridges

Name	Built and Rebuilt	Length of Span in feet	Width in feet	Maintained by	
Pawtucket Canal					
Pawtucket St.	1823-1927	93 to 84	32' widened to 44'	L & C	
Broadway (O.G.L.)	1852-1919	64 to 74	41' widened to 50'	L & C	
School St.	1876-1912			L & C 1876	City 1912
Fletcher St	1826-1919	92	50 to 52'	L & C	
Central St.	1883-1922 and 1938	85 to 87	65	L & C	
Merrimack Canal					
Merrimack St.	1890	38	50' widened to 72'	50' L & C	2 Sidewalks City
• Market St.	1828-1910	41	63		City 1841
Western Canal					
• Dutton St.	1831-1949	35	60		City 1841
• Worthen St.	1874-1926	35	43	City 1874	Saco 1926 & Successors
• Broadway	1833	40	50		City 1883
• Jefferson St.	1891-1930	50	40		City 1891
• Market St.	1831-1916	35	63		City 1841
Merrimack St.	1831-1919 and 1938	26	50' widened to 70'	50' L & C	2 Sidewalks City
• Moody St.	1831-1913	32	50		City 1841
Eastern Canal					N. Sidewalk
E. Merrimack St.	1835-1909	61	60	50' L & C.	City
* Bridge St.	1835-1901 and 1938	45	50' widened to 65	L & C. 1835	State 1938
Northern Canal		Including Locks			
• School St.	1848-1916	125	58	L & C. 1848	City 1916
Pawtucket St. High Bridge	1849-1920	154 to 163	30	L & C.	
• Aiken St.	1898	102	50		City 1898
• Cabot St.	1847-1949	102	50		City 1885
Suffolk St.	1847-1926	102 to 106	45	L & C.	

• Figures from City Engineers.
* Rebuilt by State.

Areas of Different Canals Including Penstocks and Races.

Description	Areas Sq. Ft.	Totals Sq. Ft.	Remarks.
Tremont Wasteway	22000	22000	
Lower Level of Western Canal.			
Tremont Races	60727		
Suffolk Races	42836	plugged at Penstock	
"Lawrence Yard" Penstocks	11640		
Lawrence Section Penstocks	11747		
Lawrence Canal	24870		
Total - Lower Level of Western Canal.		151,819	

Areas of Different Canals Including Penstocks and Races

Description	Areas Used Sq. Ft.	Areas Not used Sq. Ft.	Remarks
Lower Level of Pawtucket Canal from Swamp Locks Dam to Boott Dam	275,900	*	* Lower Level includes Eastern Canal whose Area equals 96,800 sq. ft.
S-L-S Races		14,400	Penstocks plugged
Appleton Races	12,000		
Hamilton Races	14,000	19,100	
Bigelow Races	4500		
Middlesex Penstocks		4,400	Wheels taken out Penstock plugged
Prescott Penstocks	15,700		
Moss Penstocks	35,000		
Boott Penstocks	22600.		
Totals	379,700	37,900	

Areas of Different Canals Including Penstocks and Races.

Description	Areas Used Sq. Ft.	Areas Not Used Sq. Ft.	Remarks
Northern Canal and Upper end of Western Canal	447950		From head of Northern Canal to Locking Gates in Western Canal
Suffolk Penstocks		3022 Penstocks plugged	
Tremont Penstock	7514		
Moody St Feeder	41700		
Total	500246		
Merrimack Canal	133462		Including down to Merrk. Mfg. Co's Forebays
Bigelow Penstocks	16000		
S.L.S. Penstocks		11808	Wheels Out. Penstocks plugged. No 6 Penstock area not included.
Total	148462		
Total carried forward	645686	14830	

Areas of Different Canals Including Penstocks and Races

Description	Areas Used Sq. Ft.	Areas Not Used Sq. Ft.	Remarks.
Total brought forward	645686	14830	
Pawtucket Canal from Old Guard Locks to Merrimack River	162476		
Pawtucket Canal from Old Guard Locks to up-stream side of Fletcher Street	384651		
Swamp Locks Basin from up-stream side of Fletcher St. to Locking Gates	110086		To Merrimack Canal and to Ham Canal Locking Gates.
S.L.S. #6 Penstock		1184	Wheel Out. s.d
Total (Pawtucket Canal + Swamp Locks Basin)	657212	16014	
Western Canal	111650		Locking Gates
Total carried forward	1414548	16014	to Pawtucket Canal

Areas of Different Canals Including Penstocks and Races.

Description	Areas Used Sq. Ft.	Areas Not Used Sq. Ft.	Remarks.
Total brought forward	1,414,548	16014	
Hamilton Canal	66475		
Appleton Penstocks	11887		
Hamilton Penstocks	9150	5480	
Total (Upper Level)	1,502,060	15,450	

Length and Width of Canals.

Description	Length Feet	Width Feet
Merrimack Canal.		
from Locking Gates to		
Merrimack Bell Tower.	2579	
from Moody Street		
Feeder to Bell Tower.		50
from Locking Gates to		
Moody Street Feeder.		40
Boott Penstock	310	8
Northern Canal.		
from Head Gates to		
Suffolk Street.	4400	80 to 100
from Pawtucket Street		
Bridge to Suffolk St.		100
Western Canal.		
from end of Northern		
Canal to Pawtucket	3196	35 to 55
Canal.		

Length and Width of Canals.

Description	Length Feet	Width Feet
Upper Powtucket Canal.		
from Merrimock River		
to Old Guard Locks.	1691	80 to 106
from Old Guard Locks		
to Swamp Locks Dam.	5030	84 to 100
Lower Powtucket Canal		
from Swamp Locks Dam		
to Lower Locks Dam.	2152	100
Eastern Canal.		
from Lower Locks Dam		
to Boott Dam.	2037	40 to 65
Hamilton Canal.	1936	35 to 100

Length and Width of Canals.

Description	Length Feet	Width Feet
Moody Street Feeder.	1418	30
Tremont Wasteway from Tremont Gates to Hall Street Dam.	606	28
Lower Level of Western Canal from Hall Street Dam to Lawrence Dam.	330	78
Lawrence Canal	829	30
Total length of all Canals	26,714	

Pawtucket Dam.

Length of Pawtucket Dam	1092.5 feet
Top of Dam by general scale	82.00
Flashboards July to Feb	5 ft. high
Flashboards March to June	4 ft. high
Quantity passing with one foot depth.	3600 c.f.p.s.
Quantity passing with two feet depth.	10300 c.f.p.s.
Average height of Dam	12.00 feet

Headgates.

Names	Number	Area each Sq. Ft.	Heights of Sills.	
Northern Canal Gates	10	120	67.00	
Old Guard Locks Gates	5	90	72.90	*
Northern Canal Waste Gates	4	23.3	59.00	* C.F.P.S. 2250

Note

* Discharge figured with Canal at 85.00

Waste Dams

Name	Discharge figured at Grade	Height of Sill of Dam	No of Bays	Total Discharge of Bays C.F.P.S.	Size of Gate Sq. Ft.	Discharge of Gate C.F.P.S.	Height of Sill of Gate
					Deep Gate		
Swamp Locks	82.50	78.4	16	2096	34.4	669	66.1
Swamp Locks					Wide Gate 48	600	72.5
					2-Gates		
Lower Locks	68.00	64.5	6	590	24	479	55.5
Siphon Spillways-3						1400	
Merrimack	83.00	78.65	4	440	No	Gate	
Siphon Spillways-2						600	
Boott	67.00	64.32	2	123	48.2	477	61.58
Siphon Spillways-3						450	
Lawrence	69.00	65.00	8	1129	35.1	471	58.82
Siphon Spillways-3						900	
Mass. Wasteway	67.30	63.9	4	433	No	Gate	
	84.00		2		Each	Each	
Tremont Gates	78.00		Gates		49.5	975	72.8
			2		Each	Each	
Hamilton Gates	82.50		Gates		30.4	275	76.59
Merr'k Iceway	83.00	77.00	2	548			
	75.6		78 Ft.	260			
Hall St. Dam	76.6	74.6	long	735			
	77.6			1350			

Flumes.

Name	Length Feet	Width Feet	Area of Cross-Section of Grade	
			Area Sq. Ft.	Grade
Hamilton and	100	49.34	705.9	82.00
Appleton	Measuring Flume gone			
Merrimack	70	48.74	840.6	83.00
Boott	70	41.02	349.9	67.00
Massachusetts	100	65.46	772.7	68.00
Saco-Lowell Shop	50	Flume gone		69.00

Percent of Efficiency of wheel at full gate.

No of wheel	Merrimack Mfg. Co.	Boot Mills	Massachusetts Cotton Mill	Prescott	Middlesex Co.	Bigelow Carpet Co.	Saco-Lowell Shops	Hamilton Mfg. Co.	Appleton Co.	Tremont	Suffolk	Lawrence Station	Lawrence Mfg. Co.
1		85	80			80		83	84	80		82	80
1A									84				
2		75	80			80		83	82	80		82	80
2A													
2B													
2C													
3	83	81	80			80		82	82	80		82	80
3A													
4	83	81	80					83	80	80		82	FAIR 85
4A													
5		81	80					83	82				FAIR 85
5A	80								82				
6		80	80										FAIR 86
7				86									
8				86									
9	78	75		86									
10	82			86									
11	82			86									
12			80±										

Water Wheels - Cont.

Merrimack Mfg. Co. Main Yard

No of Wheel	Kind and Size	R.H. or L.H	Date when Wheel was put in	Avg. Fall Feet	Discharge in C.F.P.S.	Full Opening of Speed gate Inches	Estimated Horse Power	Revs. per Min.
3	45" Special McCormick	R.H.	1896	37	207.0	19.57	719.9	169
4	45" Special McCormick	L.H.	1896	37	207.0	19.57	719.9	169
5&6	Pair of 39" Hercules	R.H. & L.H.	1911	37	429.0	18.7	14380	200
9	50" Allis Chalmers #15	RH	1919	37	423.5	Swing Gate 5.772	13900	180
10	42" Hercules	L.H.	1894	37	184.0	18.44	6322	165
11	42" Hercules	L.H.	1894	37	184.0	18.44	6322	165
	Totals				1634.5		55322	

Water Wheels

Lawrence Section. Gone

Merrimack Mfg. Co. Mills

No of wheel	Kind & Size	R.H. or L.H	Date when wheel was put in	Avg. fall feet	Full opening of speed gate.	Discharge C.F.P.S.	*Estimated horse power
1	54" Hercules	L.H.	1896	23	23.60	242.8	518.9
2	54" Hercules	L.H	1896	23	23.60	242.8	518.9
3	54" Hercules	R.H.	1896	23	23.83	255.2	545.5
4	54" Hercules	R.H.	1896	23	23.83	255.2	545.5
	Totals					996.0	2128.8

*On Wheel Shaft

Net H.P. on Switchboard (full operation)	1690
Kilo-watts on Switchboard	1260

Water Wheels

Tremont Side Cont.
Merrimack Mfg. Co.

No of Wheel	Kind and Size	R.H. or L.H.	Date when Wheel was put in	Avg. Fall Feet	Discharge in C.F.P.S.	Full Opening of Speed gate Inches	Estimated Horse Power	Revs. per Min.
1	46.5 "Type S" Morgan Smith	R.H.	1924	15	3345	Swing Gate 7.044	467	120
2	46.5 "Type S" Morgan Smith	R.H.	1921	15	3345	Swing Gate 6.42"	467	120
3	40.8 "Type S" Morgan Smith	R.H.	1919	15	2875	Swing Gate 7.404"	400	128
4	46.5 "Type S" Morgan Smith	R.H.	1920	15	3345	Swing Gate 6.54"	467	120
	Totals				12910		1801	
Net H.P. on Switchboard (full operation)								1650
Kilo-watts on Switchboard								1230

Waterwheel Generators

Merrimack Mfg. Co.

Main Yard – Lawrence Section – Tremont Yard.

	№ of Wheel	R.P.M.	Volts	Amperes	KVA.	KW. at .8 P.F.
Main Yard	3+4	164	2300	314	1250	1000
	5+6	200	2300	276	1100	900
	9	180	2300	235	940	750
	10	164	2300	94	375	300
	11	164	2300	94	375	300
					4040	3250
Lawrence Section	1,2,3,4*	360	600	433	450	360**
		360	600	530	550	440
					1000	800
Tremont Yard	1	120	600	361	375	300
	2	120	600	361	375	300
	3	128	600	280	290	235
	4	120	600	361	375	300
					1414	1135

* Law. Sect. № 4 disconnected.

** " " Unable to run generators in parallel.

HAMILTON

Water Wheels A11

*Textron American, Inc.

	No. of Wheel	Kind and Size	R.H. or L.H.	Date when Wheel was put in	Avg. Fall Feet	Discharge in C.F.P.S.	Full Opening of Speed-gate Inches	Estimated Horse Power	Revs. per Min.
OK	1	45" Type "Z" Leffel	R.H.	1922	13	374	Swing Gate 8.00"	459	120
OK	2	39" Type "Z" Leffel	L.H.	1919	13	278	Swing Gate 7.13"	341	133
OK	3	36" Type "Z" Leffel	R.H.	1918	13	237	Swing Gate 6.60"	287	150
No	4	45" Type "Z" Leffel	R.H.	1920	13	374	Swing Gate 7.99	459	120
Soon	5	45" Type "Z" Leffel	R.H.	1920	13	374	Swing Gate 7.81	459	120
		Totals				1637		2005	

*Formerly Hamilton Mfg. Co.

Waterwheel Generators

Textron American, Inc. - "Hamilton Yard"

No of Wheel	R.P.M.	Volts	Amperes	KVA.	KW. at .8 P.F.
OK 1	120	600	336.5	350	280
OK 2	133	600	217	225	180
OK 3	150	600	193	200	160
No 4	120	600	336.5	350	280
Soon 5	120	600	336.5	350	280
				1475	1180

"John St."
"Boott mills"

31

Water Wheels

Boott Mills - Amory St.

300

	No. of Wheel	Kind and Size	R.H. or L.H.	Date when Wheel was put in	Avg. Fall. Feet	Discharge in C.F.P.S.	Full Opening of Speed gate. inches	Estimated Horse Power	Revs per Min.
No	1	45" Allis Chalmers-12	R.H.	1919	21	3355	Swing Gate 6.625	680	150
No	2	72" Swain	L.H.	1874	21	201	13.08	358.8	79
OK	3	33" Leffel	R.H.	1949	21	250	Swing Gate 5.83	4823	200
OK	4	33" Leffel	R.H.	1949	21	250	Swing Gate 5.83	4823	200
Soon	5	33" Leffel	R.H.	1949	21	250	Swing Gate 5.83	4823	200
OK	6	72" Allis Chalmers	R.H.	1923	21	1025	Swing Gate 9.72	1925	100
No	9	80" Swain	R.H.	1875	21	242.5	12.15	432.9	80
				Totals		C.F.P.S. 2553		HP 4843.6	

Waterwheel Generators

Boott Mills - Amory St.

No of Wheel	R.P.M.	Volts	Amperes	KVA.	KW. at .8 P.F.
No 1	150	600	481	500	400
No 2	600	600	300	310	250
OK 3	200	600	361	375	300
OK 4	200	600	361	375	300
Soon 5	200	600	361	375	300
OK 6	100	600	1445	1500	1200
No 9	450	600	361	375	300
				3810	3050

Water Wheels

Section 8

*Boott Mills - "Massachusetts Yard"
Main Power, Section 8 and No 12

	No of Wheel	Kind and Size	R.H. or L.H.	Date when Wheel was put in	Avg. Fall Feet	Discharge in C.F.P.S.	Full Opening of Speed gate inches	Estimated Horse Power	Revs. per Min.
Main Power	OK No 1	48" Type "C" Hercules	R.H. & L.H.	1910	22	5050	24.00"	1010	133
	No 2	48" Type "C" Hercules	R.H. & L.H.	1910	22	5050	24.00"	1010	133
	No 3	48" Type "C" Hercules	R.H. & L.H.	1910	22	5050	24.00"	1010	133
Section 8	OK 4	42" Type "D" Hercules	R.H.	1918	22	332.8	Swing Gate 5.25"	655	138.5
	OK 5	42" Type "D" Hercules	R.H.	1918	22	332.8	Swing Gate 5.25"	655	138.5
	No 6	42" Type "D" Hercules	R.H.	1918	22	332.8	Swing Gate 5.25"	655	138.5
	No 12	46.5" Type "S" Morgan Smith	R.H.	1920 & 1921	17	357.0	Swing Gate 64.6"	588	128
		Totals				28704		5583	

Major Repairs

* Formerly Massachusetts Cotton Mills

Water Wheels Code

*Boott Mills–"Prescott Wheels"

No of Wheel	Kind and Size	R.H. or L.H	Date when Wheel was put in	Avg. Fall Feet	Discharge in C.F.P.S.	Full Opening of Speed gate inches	Estimated Horse Power	Revs. per Min.
7	33" Type "D" Hercules	R.H.	1919	21	161.0	18.00"	330	180
8	33" Type "D" Hercules	R.H.	1919	21	161.0	18.00"	330	180
9	33" Type "D" Hercules	R.H.	1919	21	161.0	18.00"	330	180
10	33" Type "D" Hercules	R.H.	1919	21	161.0	18.00"	330	180
11	33" Type "D" Hercules	R.H.	1919	21	161.0	18.00"	330	180
	Totals				805.0		1650	

* Formerly Massachusetts Cotton Mills

625
360
350
360
2,195

625
720

35

Waterwheel Generators

Boott Mills – "Massachusetts Yard"
Main Power, Section 8, Prescott Wheels and No 12

	No. of Wheel	R.P.M.	Volts	Amperes	KVA	KW. at .8 P.F.
Main Power	1 ~~& 2~~	133	600	1504	1565	1250
	3 No	133	600	904	940	750
					2505	2000
Section 8	4 OK	138.5	600	433	450	360
	5 OK	138.5	600	433	450	360
	6 No	138.5	600	433	450	360
					1350	1080
Prescott	7	180	600	264	275	220
	8	180	600	264	275	220
	9	180	600	264	275	220
	10	180	600	264	275	220
	11	180	600	264	275	220
					1375	1100
	12	128.5	600	433	450	360

cut in half

Gone

Water Wheels ~~[illegible]~~ Assets

*Boott Mills-"Bigelow Yard"

No. of Wheel	Kind and Size	Revs. per. Min.	R.H. or L.H.	Date when Wheel was put in	Full Opening of Speed gate inches	Discharge C.F.P.S.	Avg. Fall Feet	Estimated Horse Power
Unit 1	2-33" Style C 2-31" Style D Hercules	150	R.H. L.H.	1911 1913	16.5"	376	13	444.4
Unit 2	2-33" Style C 2-31" Style D Hercules	150	R.H. L.H.	1911 1913	16.5"	376	13	444.4
Unit 3	2-33" Style C 2-31" Style D Hercules	150	R.H. L.H.	1911 1913	16.5"	376	13	444.4
	Totals					1128		1333.2

WO OK 1/2

* Formerly Bigelow Carpet Co.

Assets

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Waterwheel Generators

Boott Mills – "Bigelow Yard"

No of Wheel	R.P.M.	Volts	Amperes	KVA	KW. at .8 P.F.	
1	150	600	320	330	265	No
2	150	600	320	330	265	OK
3	150	600	320	330	~~265~~ 130	
				990	795	

1 wheel Running ?
Apple wheel

Water Wheels

* Jackson Properties Inc.

No of wheel	Kind & Size	R.H or L.H.	Date when wheel was put in.	Avg. fall Feet	Full opening of speed-gate in.	Discharge C.F.P.S.	Estimated Horse Power.
1	54" McCormick	L.H.	1901	13	24.25	210.6	260.6
1A	54" McCormick	R.H.	1901	13	24.40	211.0	261.1
2	(Pair) Special 39" Hercules	L.H & R.H	1926	13	17.40	2185	2650
3	(Pair) Special 39 Hercules	L.H & R.H	1926	13	17.40	2195	2650
4	(Pair) 38" Rodney Hunt	L.H. & R.H.	1939	13	4.10" 4.02"	1820	[illegible]
5	48" McCormick	R.H.	1906	13	21.58	1574	189.8
5A	48" McCormick	R.H.	1906	18	21.58	1574	189.8
	Totals					13574	

* Formerly Appleton Company

Waterwheel Generators

* Jackson Properties, Inc.

No of Wheel	R.P.M.	Volts	Amperes	KVA.	KW. at .8 P.F.
1+1-A	450	600	482	500	400
2+3	450	600	482	500	400
4	600	600	145	150	120
5+5-A	600	600	144	150	120
				1300	1040

* Formerly Appleton Co.

Water Wheels Scagell' wheel 40

* Doherty Realty Co., Inc.

No. of Wheel	Kind and Size	R.H. or L.H	Date when wheel was put in	Avg. fall feet	Full opening of Speed gate inches	Discharge C.F.P.S.	Estimated Horse Power	Revs. per Min.
1	51" Type B Hercules	L.H.	1909	22	22.5	249	496	360
2	51" Type B Hercules	L.H.	1909	22	22.5	249	496	360
3	51" Type B Hercules	R.H.	1909	22	22.5	249	496	360
4	24" Type D Hercules	Pair R.H. L.H.	1916	21	13.3	Pair 159	Pair 325	300
5	24" Type D Hercules	Pair R.H. L.H.	1916	21	13.3	Pair 159	Pair 325	300
6	24" Type D Hercules	Pair R.H. L.H.	1916	21	13.3	Pair 159	Pair 325	300
	Totals					1224	2463	

* Formerly Lawrence Mfg. Co.

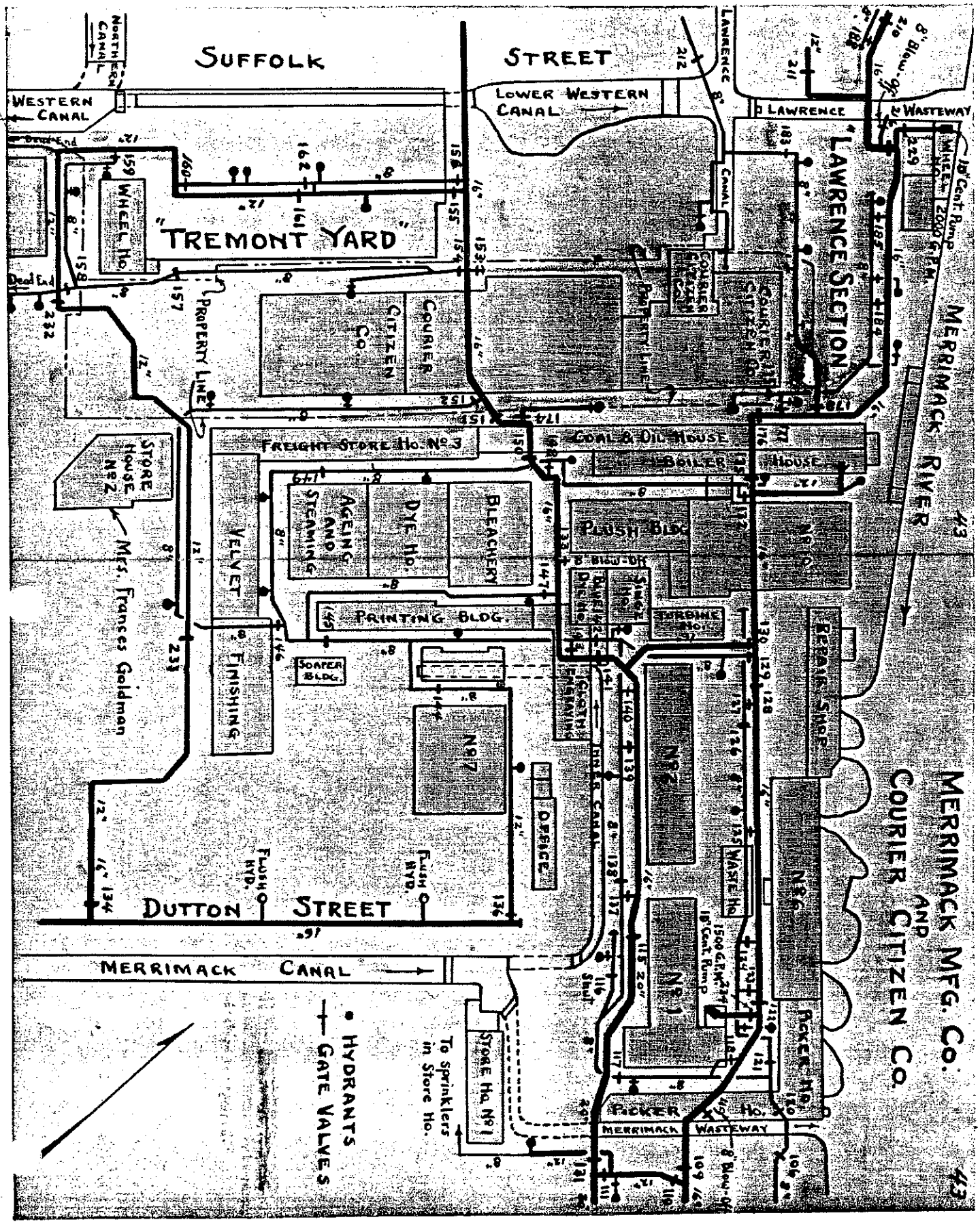
Waterwheel Generators

* Doherty Realty Co, Inc.

No. of Wheel	R.P.M.	Volts	Amperes	KVA.	KW. at .8 P.F.
1,2,3	360	600	963	1000	800
4,5,6	300	600	433	562	450
				1562	1250
* "Lawrence Yard					

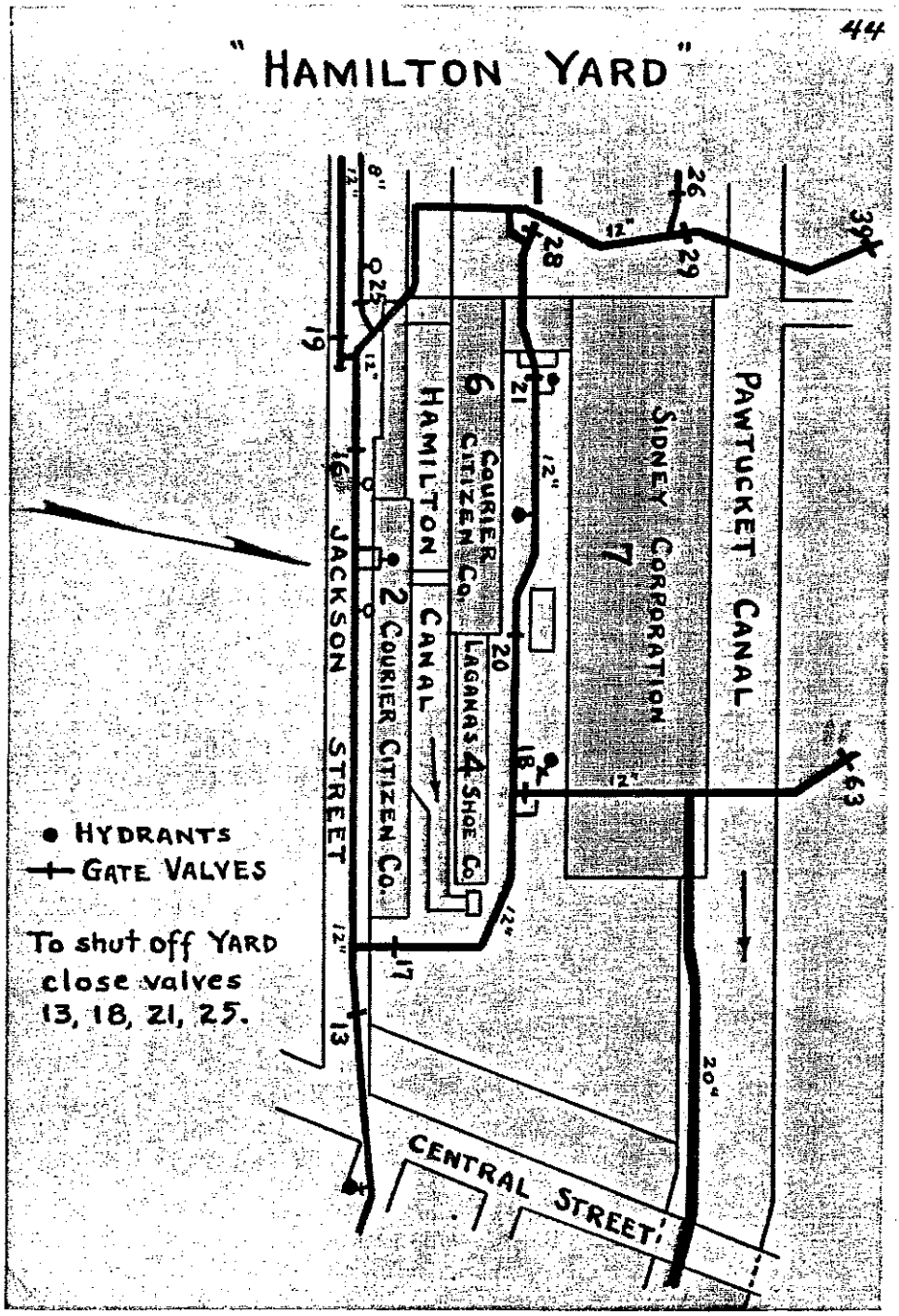
Type of Wheel Horizontal or Vertical

Number of Wheel	Merrimack Mfg. Co.	Merrimack Mfg. Co. Tremont Yard.	Merrimack Mfg. Co. Lawrence Section.	Hamilton Company Newmarket Mfg. Co.	Jackson Properties Inc.	Boott - Mass. Div.	Boott - Prescott	Boott - Assets Div.	Doherty Realty Co, Inc.	Boott Mills.		
1		Vert.	Hor.	Vert.	Hor.	Hor.		Hor.	Hor.	Vert.		
1A					Hor.							
2		Vert.	Hor.	Vert.	Hor.	Hor.		Hor.	Hor.	Vert.		
3	Hor.	Vert.	Hor.	Vert.	Hor.	Hor.		Hor.	Hor.	Vert.		
3A												
4	Hor.	Vert.	Hor.	Vert.	Hor.	Vert.			Hor.	Vert.		
4A												
5	Hor.			Vert.	Hor.	Vert.			Hor.	Vert.		
5A					Hor.							
6	Hor.					Vert.			Hor.	Vert.		
7							Vert.					
8							Vert.					
9	Vert.						Vert.			Vert.		
10	Hor.						Vert.					
11	Hor.						Vert.					
12						Vert.						

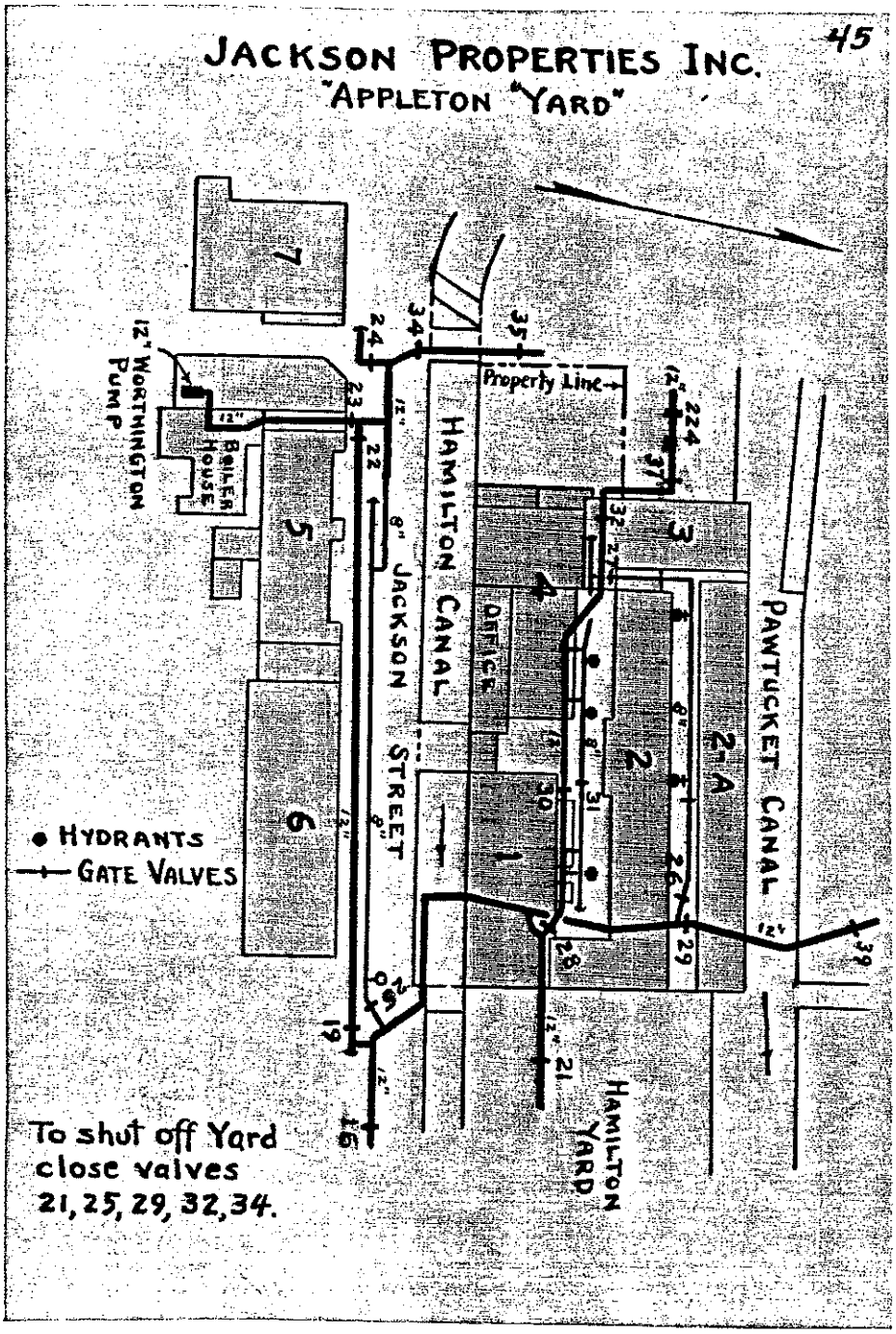


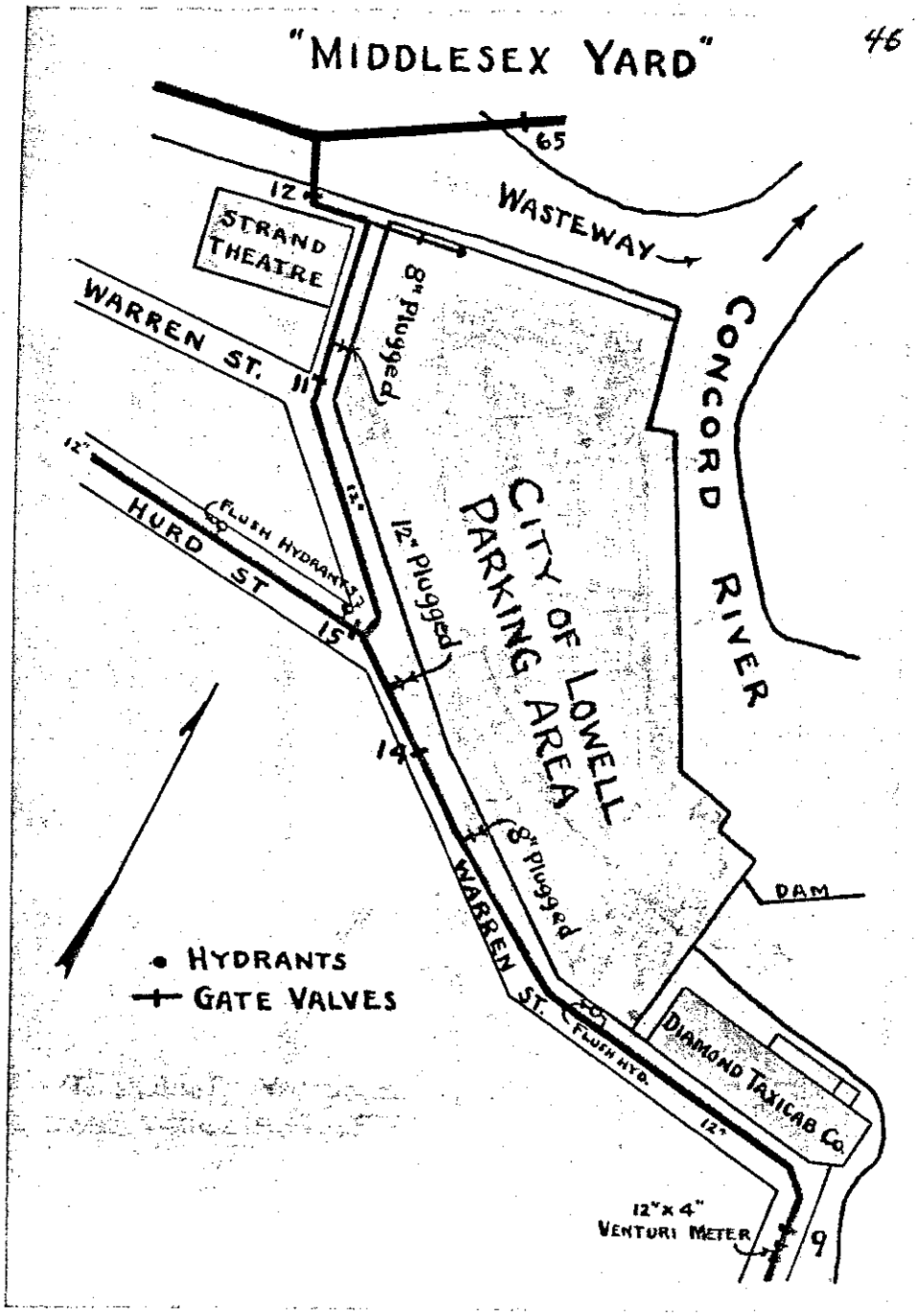
SUFFOLK STREET
NORTHERN CANAL
WESTERN CANAL
LOWER WESTERN CANAL
LAWRENCE
LAWRENCE CANAL
WASTEWAY
"LAWRENCE SECTION"
"TREMONT YARD"
WHEEL HO.
COURIER CITIZEN CO.
PROPERTY LINE
MERRIMACK RIVER
FREIGHT STORE HO. No 3
COAL & OIL HOUSE
BOILER HOUSE
STORE HOUSE No 2
Mrs. Frances Goldman
VELVET
AGEING AND STEAMING
DYE HO.
BLEACHERY
PLUSH BLDG.
No 10
PRINTING BLDG.
TURBINE HO.
SOAPER BLDG.
FINISHING
No 7
OFFICE
CLOTH ENGRAVING
INNER CANAL
No 2
No 1
REPAIR SHOP
WASTE HO.
No 6
PICKER HO.
DUTTON STREET
FLUSH HYD.
MERRIMACK CANAL
STORE HO. No 1
To sprinklers in Store Ho.
HYDRANTS
GATE VALVES
MERRIMACK MFG. CO. AND COURIER CITIZEN CO.
43

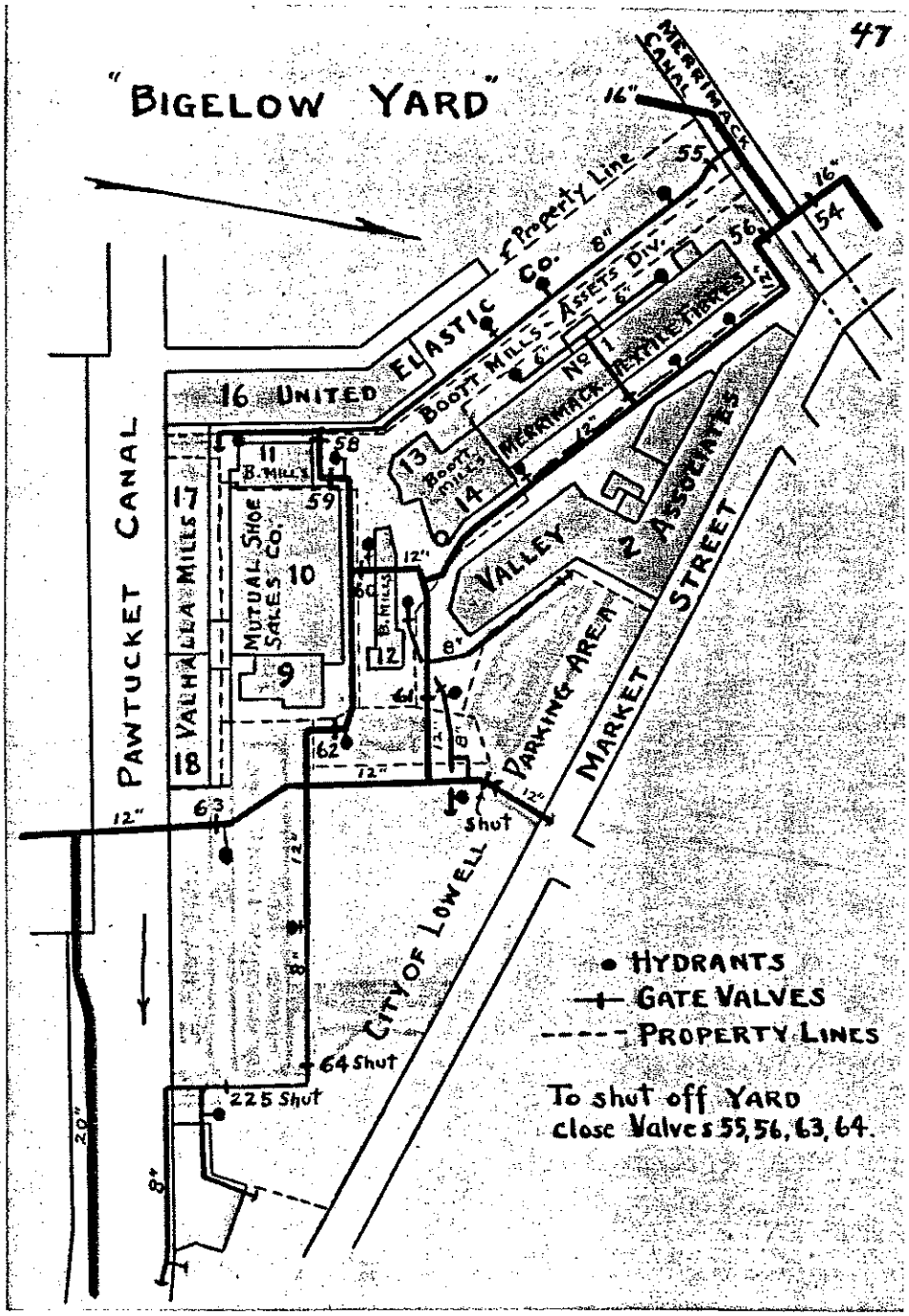
"HAMILTON YARD"

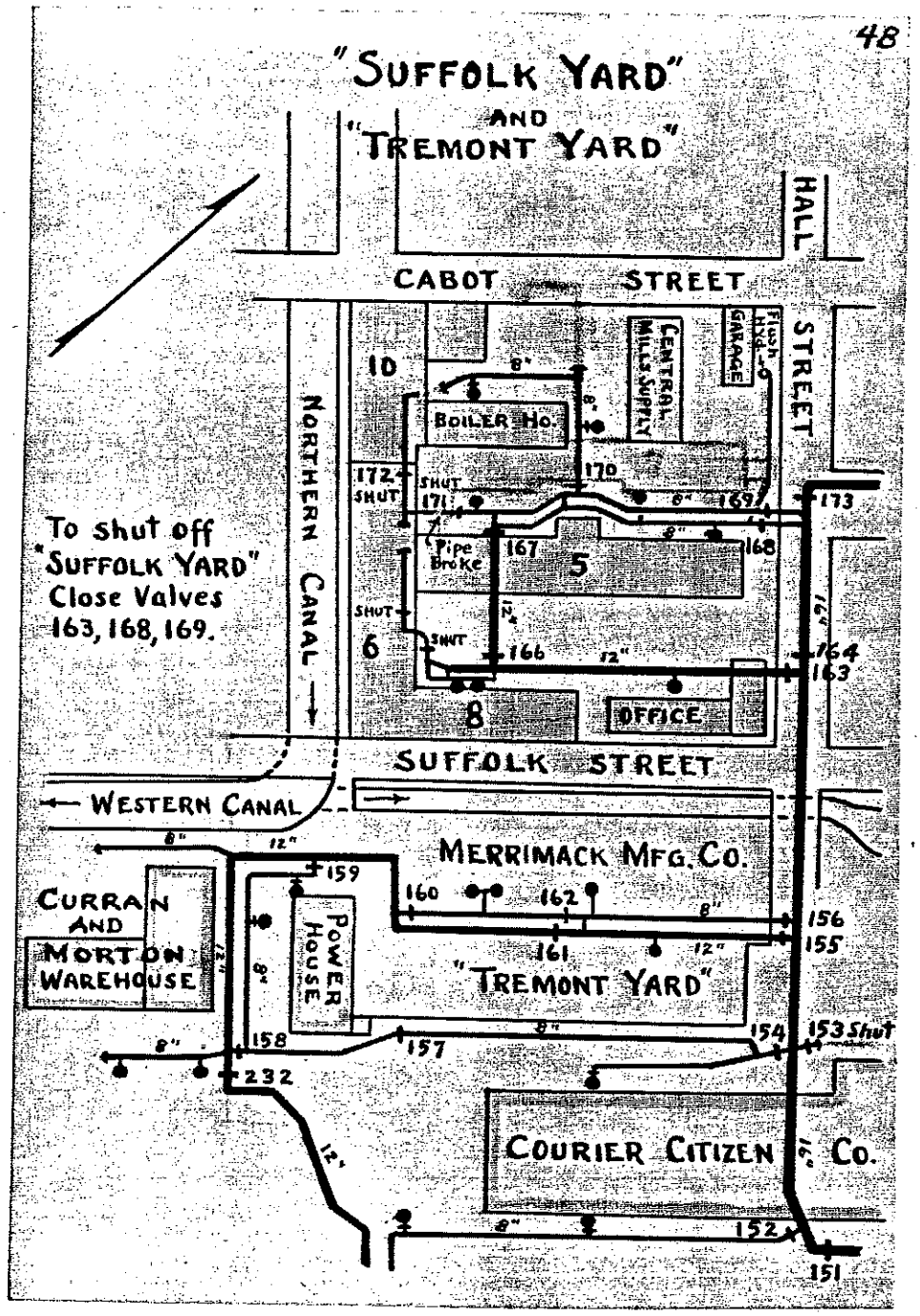


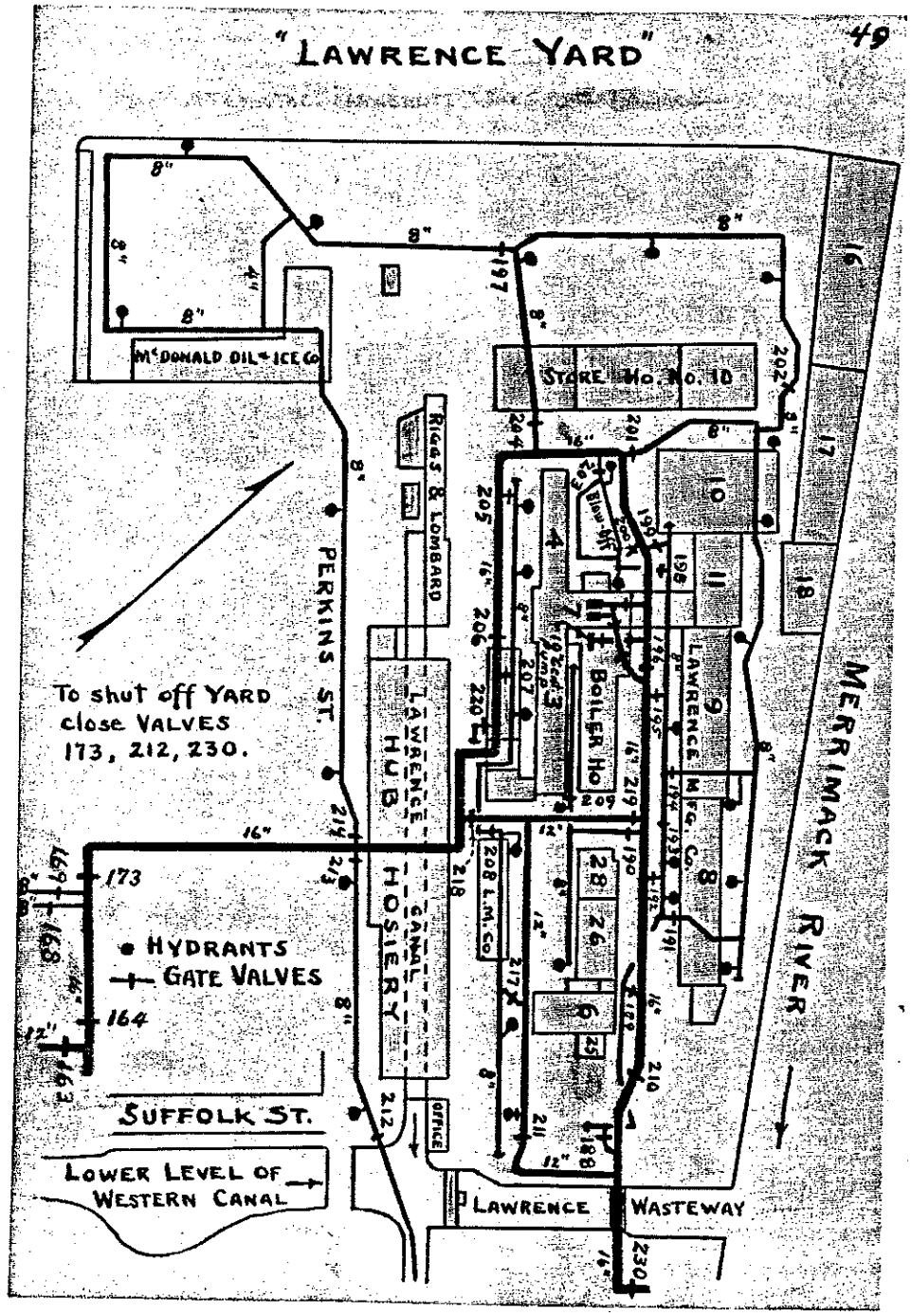
JACKSON PROPERTIES INC.
"APPLETON "YARD"

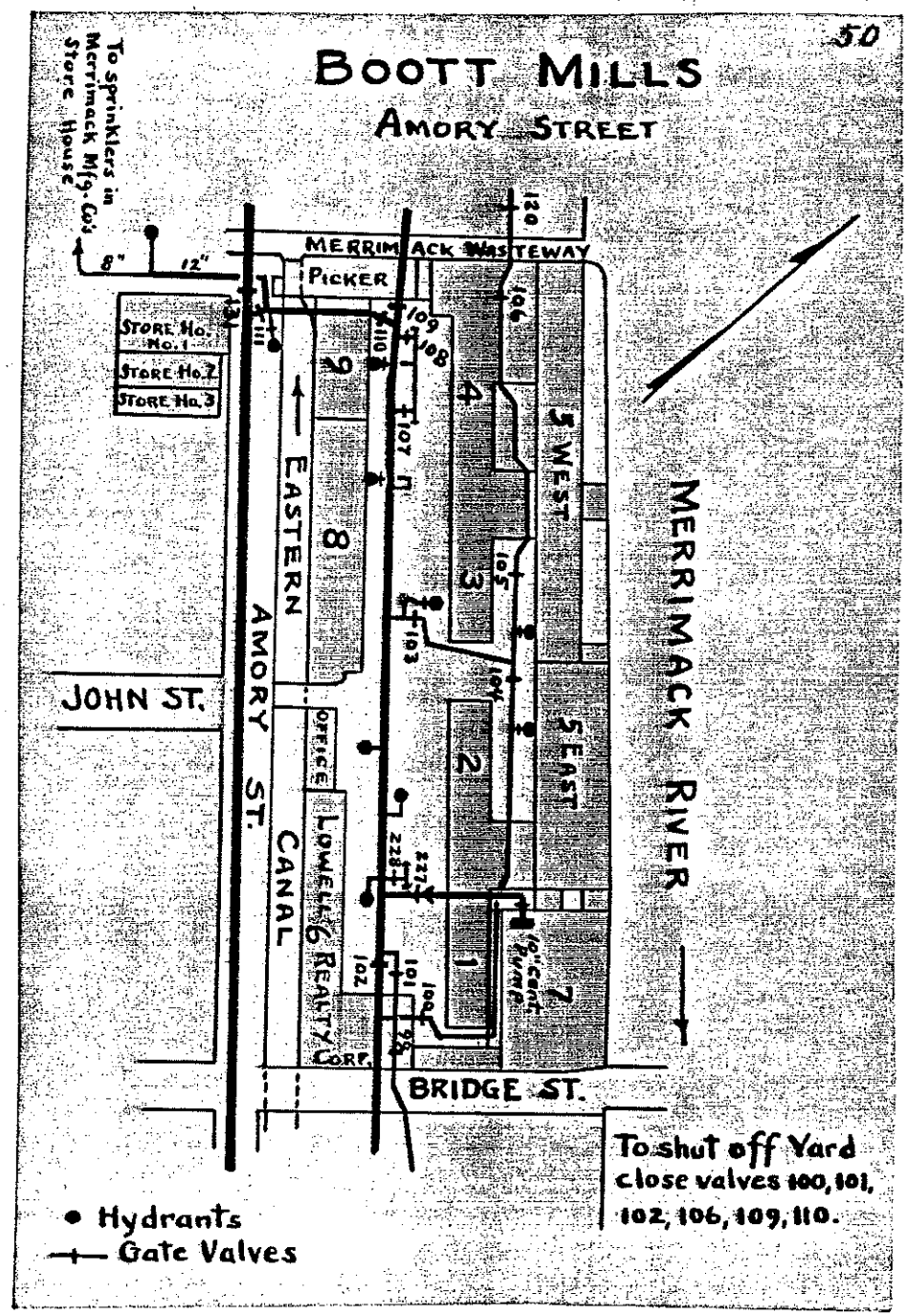


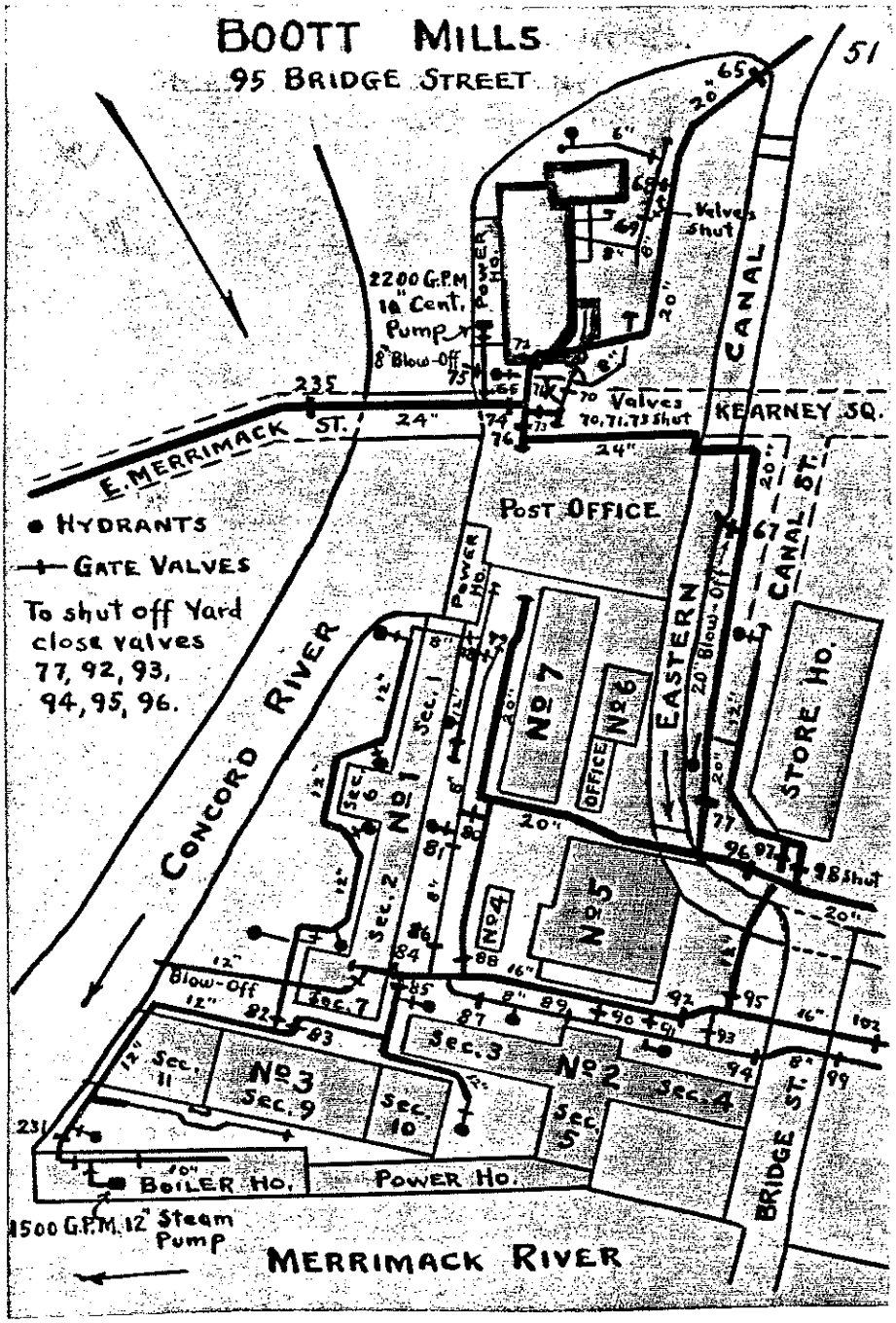

"MIDDLESEX YARD"
65
12"
WASTEWAY
STRAND THEATRE
8" Plugged
WARREN ST.
11"
12"
FLUSH HYDRANT
HURD ST
15"
12" Plugged
CITY OF LOWELL PARKING AREA
CONCORD RIVER
14"
8" Plugged
DAM
WARREN ST.
FLUSH HYD.
12"
DIAMOND TAXICAB Co.
12"x 4"
VENTURI METER
9
• HYDRANTS
+ GATE VALVES

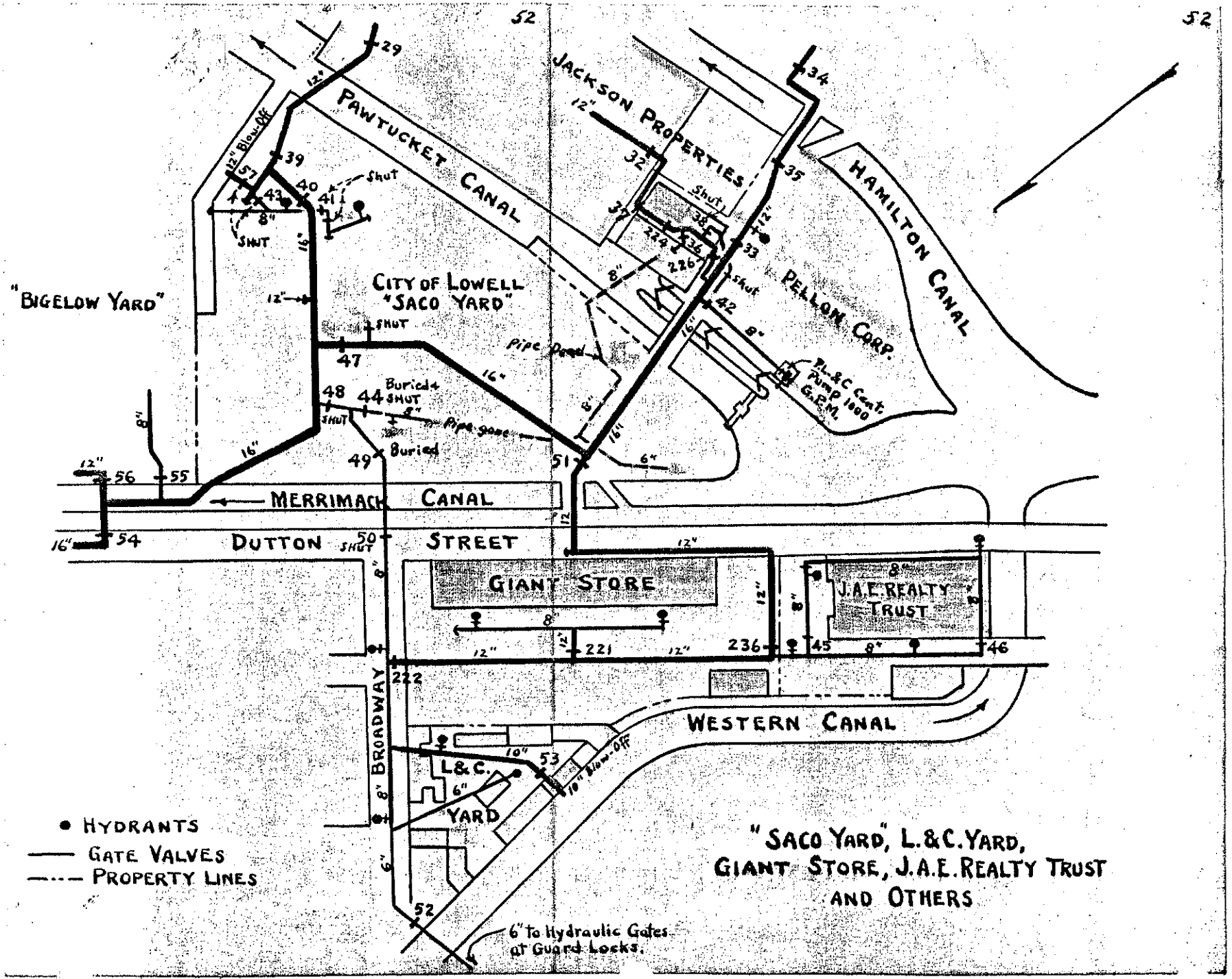

"BIGELOW YARD"
MERRIMACK CANAL
16"
55
54
56
Property Line
ELASTIC CO.
BOOTT MILLS - ASSETS DIV.
No 1 MERRIMACK
EXTILE FIBRES
16 UNITED
PAWTUCKET CANAL
VALHALLA MILLS
17
18
11
B. MILLS
58
59
MUTUAL SHOE SALES CO.
10
9
13
BOOTT MILLS
14
VALLEY
2 ASSOCIATES
12
B. MILLS
60
61
62
63
12"
8"
72"
PARKING AREA
MARKET STREET
Shut
CITY OF LOWELL
64 Shut
225 Shut
20"
HYDRANTS
GATE VALVES
PROPERTY LINES
To shut off YARD close Valves 55, 56, 63, 64.

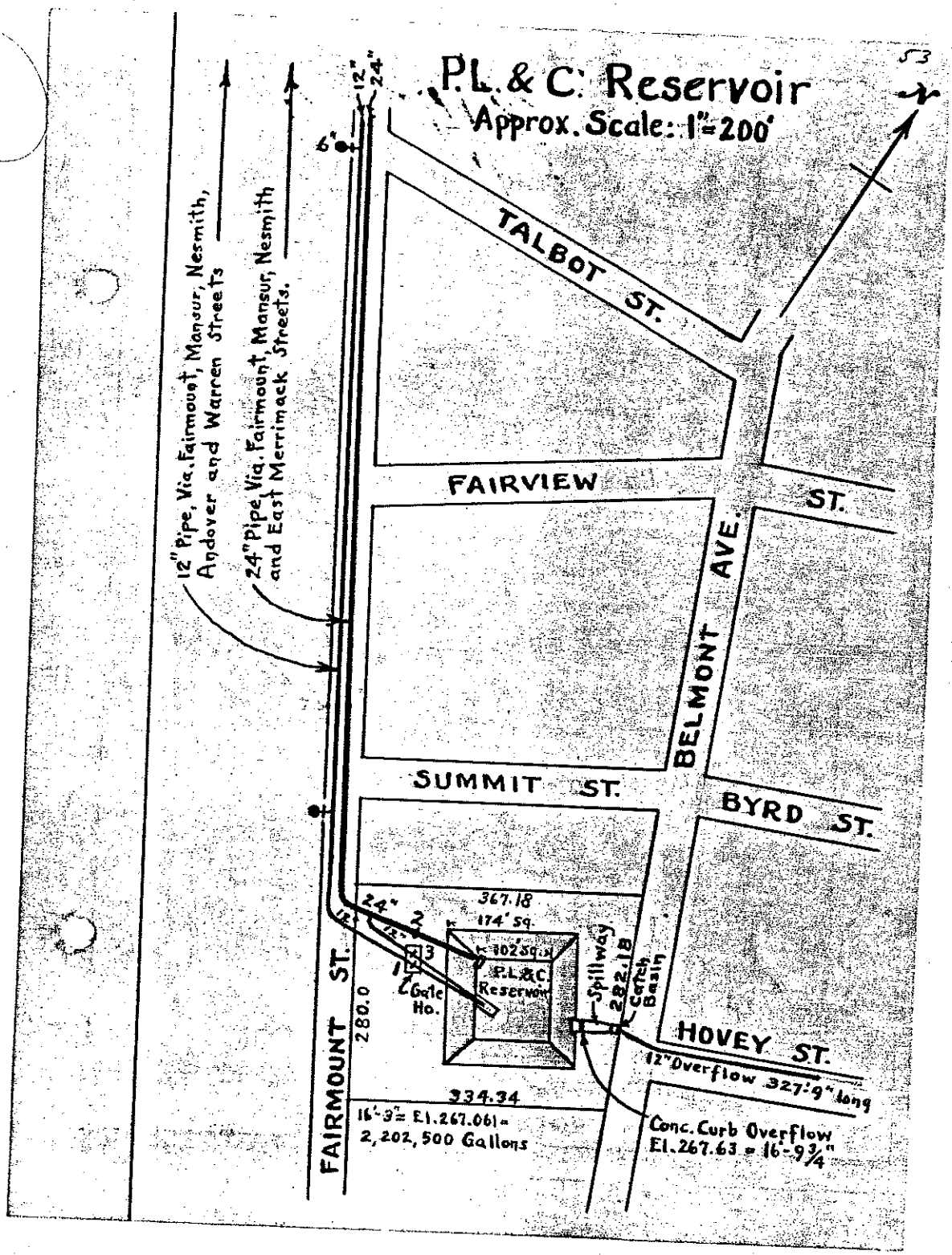

"SUFFOLK YARD"
AND
"TREMONT YARD"
HALL STREET
CABOT STREET
CENTRAL MILLS SUPPLY
Flush Hyd-o GARAGE
10
8"
BOILER HO.
NORTHERN CANAL
172
SHUT
SHUT
171
170
169
173
Pipe Broke
167
5
168
To shut off "SUFFOLK YARD" Close Valves 163, 168, 169.
SHUT
6
SHUT
166
12"
164
163
8
OFFICE
SUFFOLK STREET
WESTERN CANAL
MERRIMACK MFG. CO.
159
160
162
156
155
161
CURRAN AND MORTON WAREHOUSE
POWER HOUSE
"TREMONT YARD"
158
157
154
153 Shut
232
COURIER CITIZEN CO.
152
151


"LAWRENCE YARD"
McDONALD OIL & ICE Co
STORE No. 10
RIGGS & LOMBARD
PERKINS ST.
To shut off YARD close VALVES 173, 212, 230.
LAWRENCE HUB HOSIERY
CANAL
OFFICE
BOILER HO
LAWRENCE M'F'G. Co.
208 L.M. Co
HYDRANTS
GATE VALVES
SUFFOLK ST.
LOWER LEVEL OF WESTERN CANAL
LAWRENCE WASTEWAY
MERRIMACK RIVER


50
BOOTT MILLS
AMORY STREET
To sprinklers in Merrimack Mfg. Co's Store House
8"
12"
MERRIMACK WASTEWAY
PICKER
STORE No. No. 1
STORE No. 2
STORE No. 3
EASTERN
AMORY ST.
JOHN ST.
OFFICE
LOWELL 6 REALTY CORP.
CANAL
5 WEST
5 EAST
10" cent. pump
MERRIMACK RIVER
BRIDGE ST.
To shut off Yard close valves 100, 101, 102, 106, 109, 110.
Hydrants
Gate Valves


BOOTT MILLS
95 BRIDGE STREET
51
2200 G.P.M. 10" Cent. Pump
8" Blow-Off
POWER HO.
Valves Shut
CANAL
Valves 70, 71, 73 Shut
KEARNEY SQ.
E. MERRIMACK ST.
POST OFFICE
CANAL ST.
HYDRANTS
GATE VALVES
To shut off Yard close valves 77, 92, 93, 94, 95, 96.
CONCORD RIVER
EASTERN
20" Blow-Off
STORE HO.
No 1
No 2
No 3
No 4
No 5
No 6
No 7
OFFICE
Sec. 1
Sec. 2
Sec. 3
Sec. 4
Sec. 5
Sec. 6
Sec. 7
Sec. 9
Sec. 10
Sec. 11
Blow-Off
98 Shut
BRIDGE ST.
BOILER HO.
POWER HO.
1500 G.P.M. 12" Steam Pump
MERRIMACK RIVER


52
52
"BIGELOW YARD"
PAWTUCKET CANAL
JACKSON PROPERTIES
HAMILTON CANAL
PELLON CORP.
CITY OF LOWELL "SACO YARD"
MERRIMACK CANAL
DUTTON STREET
GIANT STORE
J.A.E. REALTY TRUST
WESTERN CANAL
BROADWAY
L&C. YARD
12" Blow-Off
10" Blow-Off
Shut
Buried
Pipe Dead
Pipe gone
P.L.&C Cent. Pump 1000 G.P.M.
6" to Hydraulic Gates at Guard Locks.
• HYDRANTS
—— GATE VALVES
—·—·— PROPERTY LINES
"SACO YARD", L.&C. YARD, GIANT STORE, J.A.E. REALTY TRUST AND OTHERS


P.L. & C. Reservoir
Approx. Scale: 1"=200'
53
12" Pipe, Via. Fairmount, Mansur, Nesmith, Andover and Warren Streets
24" Pipe, Via. Fairmount, Mansur, Nesmith and East Merrimack Streets.
12"
24"
6"
TALBOT ST.
FAIRVIEW ST.
BELMONT AVE.
SUMMIT ST.
BYRD ST.
HOVEY ST.
FAIRMOUNT ST.
367.18
174' Sq.
102' Sq.
P.L.&C. Reservoir
Gate Ho.
Spillway
282.18
Catch Basin
280.0
334.34
16'-3" = El. 267.061 = 2,202,500 Gallons
12" Overflow 327'-9" long
Conc. Curb Overflow El. 267.63 = 16'-9 3/4"

PAST AND ONGOING PARK PLANNING AND DATA COLLECTION EFFORTS

Document Name	Year
National Register of Historic Places—City Hall Historic District.	1975
National Register of Historic Places—Lowell Locks and Canals Historic District.	1976
[Brown Book] Report of the Lowell Historic Canal District Commission to the Ninety Fifth Congress of the United States.	1977
National Register of Historic Places—Lowell National Historical Park.	1978
Wyma, C., and P. Cloyd. *Historic Structure Report—Suffolk Mills.*	1979
Roberts, S.K. *Historic Structure Report—The Moody Street Feeder (Merrimack Gatehouse).*	1979
Robbins, J. *Historic Structure Report—Boott Cotton Mills and Massachusetts Cotton Mills Agents House—Architectural Data.*	1979
Cultural Resources Inventory.	1980
Gross, M., et al. *Economic Impact Analysis.*	1980
Draft Resource Management Plan.	1980
Interpretive Prospectus.	1980
Energy Conservation Study—A Cost-Effective Plan for Energy Independence.	1980
Mahlstedt, T.F. *Historic Structure Report—Northern Canal Guard Gatehouse Complex, Francis Gate Complex, Swamp Locks, Lower Locks—Archeological Data Section.*	1980
Preservation Plan.	1980
Details of the Preservation Plan.	1980
Final Environmental Impact Statement.	1981
General Management Plan.	1981
Fiero, K.W. *Archeological Testing—Dutton Street Parking Lot.*	1981
Unrau, H.D. *Historic Structure Report—Old City Hall Historic Data Section.*	1982
Booth, A., and H.D. Unrau. *Historic Structure Report—Pawtucket Canal and Northern Canal Lock Structures Historic Data Section.*	1982
Economic Feasibility Study—Trolley and Barge Transportation System.	1983
Mahlstedt, T.F. *Historic Structure Report—Archeological Data Section.*	1983
Interpretive Prospectus.	1984
Land Protection Plan with Addendums.	1984
Feasibility and Operations Analysis Lowell Electrified Trolley System—Extended Trackage, Year Round Service.	1985
Visitor Use Patterns and Interpretive Effectiveness in Two Urban Historical Parks: Boston and Lowell.	1986
Bellows Woods, N. *The Lowell Park Trolley, Development and Implementation: A Thesis.*	1986
Interdisciplinary Investigations of the Boott Mills—vol. 1: Life at the Boarding Houses Cultural Resources Management Study.	1987
Interdisciplinary Investigations of the Boott Mills—vol. 2: The Kirk Street Agents' House Cultural Resources Management Study.	1987
Interdisciplinary Investigations of the Boott Mills—vol. 3: The Boarding House System as a Way of Life Cultural Resource Management Study, with Appendices.	1987
Preservation Plan Amendment.	1990
National Register of Historic Places Registration Form—Lowell National Historical Park and Preservation District.	1993
Strategic and Annual Performance/Work Plans.	1997
Phillips, M.K. *Historic Structure Report—Kirk Street Agents' House.*	1997
Long-Range Interpretive Plan.	1997
Wall, C. *Visitor Study: Summer 1997.*	1998
Engineering Study for Roads.	1998

Alternative Transportation Systems Study.	2001
Volpe, J.A. *Alternative Transportation System—Historic Trolley Planning Study.*	2002
Griswold, W.A. et al. *Supplementary Excavations at the Kirk Street Agents' House.*	2003
General Management Plan Addendum.	2003
The Road Inventory of Lowell National Historical Park—LOWE—1780, Cycle 3 Report.	2005
Long-Range Interpretive Plan [Second Draft].	2005
Collection Management Plan.	2007
30 Years of Preservation and Innovation for Future Generations—1978-2008.	2008
General Management Plan/Environmental Assessment with FONSI.	2010
Forrant, R., and C. Strobel. *Ethnicity in Lowell—Ethnographic Overview and Assessment.*	2011
Scope of Collections Statement.	2011
Park Asset Management Plan.	2013
Road Inventory and Condition Assessment of Lowell National Historical Park—Cycle 5 Report.	2013
Lowell National Historical Park List of Classified Structures.	2016

*Items highlighted in red contain sensitive cultural resource information and are classified as "Restricted Plan Documents." These are not public documents, but may be shared upon request with approval from Lowell NHP's Cultural Resources Chief and Superintendent.

*Items highlighted in blue are available on Lowell NHP's website (scroll to bottom of page): https://www.nps.gov/lowe/learn/management/park-reports.htm

Contact Park Planner, Christine Bruins at christine_bruins@nps.gov or 978-275-1726 to request a digitized copy of any plan documents on this list.

Scott, Kelsey

Subject: FW: FERC 2790-72 Initial Study Report

From: gene porter <gporter77@gmail.com>
Sent: Monday, September 28, 2020 9:04 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Cc: Thomas Quarles* <tquarles@devinemillimet.com>; James Gallagher <james.gallagher@des.nh.gov>; Collins, William G (US) <william.g.collins@baesystems.com>; Jay Minkarah <jaym@nashuarpc.org>
Subject: FERC 2790-72 Initial Study Report

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Kevin

As you will recall, I chair the NH Lower Merrimack River Local Advisory Committee (LMRLAC). We have a direct interest in the relicensing of the Boott Hydro project whose headpond constitutes our field of regard. For unknown reasons. as an early stakeholder I appear to have been dropped from your distribution list.

I now learn that an Initial Study Report on Recreation matters appears to have been issued earlier this year . Had I been made aware of this report while in draft form I would have submitted the following comment.

The navigable and scenic head-pond of this hydro project extends twelve miles into Southern New Hampshire and

constitutes the major natural resource public body of water in this populous section of the State. Furthermore the recent crest gate project on the Pawtucket Dam has stabilized the upstream water levels, thereby further increasing the recreational value of this scenic, swimmable, skiable stretch of the River.

In 2017 the State-Chartered NH Public Waters Access Advisory Board (PWAAB) assigned the highest state-wide priority to improving public access to this section of the Merrimack. Although a small boat launch has now been upgraded in Nashua's Greeley Park, this is inadequate to serve the large boating population of Southern New Hampshire. The Recreation Study of this Project should explicitly acknowledge the need for additional boat launch capacity in this public head-pond and <u>make provisions for Boott Hydro to contribute thereto.</u>

What can be done to ensure the LMRLAC remains a party to this relicensing as it moves forward?

Regards
Gene Porter
Chair NH LMRLAC
Member, NH PWAAB

Scott, Kelsey

Subject: FW: FERC 2790 Recreation study

From: Kevin Webb
Sent: Tuesday, September 29, 2020 3:16 PM
To: 'gene porter' <gporter77@gmail.com>
Subject: RE: FERC 2790 Recreation study

Gene:

Are you referring to the bike trail that crosses the river alongside the Circumferential Highway between Hudson and Nashua? If so, yes, our headpond extends all the way up to Moore's Falls just south of the airport so that would be within the footprint of our Recreation Study. I do not see that mentioned in the report, but we were more focused on public sites that provide direct access to the river.

Understand that this is a lengthy process and that there will be many more opportunities for you to submit formal comments.

Kevin

From: gene porter <gporter77@gmail.com>
Sent: Tuesday, September 29, 2020 12:55 PM
To: Kevin Webb <kwebb@centralriverspower.com>
Subject: FERC 2790 Recreation study

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Please confirm that the section of the headpond below the Sagamore Bridge in NH is in fact within the footprint of the Recreation Study.

If so, what needs to be done to permit revision of the study that you intend to release tomorrow to reflect the inadvertent delay of our comments re public water access in NH.

Thanks

Gene Porter

Scott, Kelsey

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Thursday, November 5, 2020 3:08 PM
To: Pronovost, Emily S; Bruins, Christine A; Lieb, David M
Cc: Scott, Kelsey; Racine, Laurel A
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Great! Let's say Tuesday November 17. I assume I'm going to need a full day (at least) to go through the material, so what time could I get started in the morning?

Will I be coming to 67 Kirk Street, or somewhere else?

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Sent: Thursday, November 5, 2020 9:53 AM
To: Patrick O'Bannon <pobannon@graypape.com>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Hi Patrick

I'm out of the office the second half of next week, but I can do the 17th or the 19th. Let me know which day you prefer and what time works for you.

Thanks
Emily

Emily S. Pronovost
Museum Specialist
Lowell National Historical Park
67 Kirk St, Lowell, MA 01852
(978) 970 5241

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Thursday, November 5, 2020 8:47 AM
To: Pronovost, Emily S <Emily_Pronovost@nps.gov>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

Hi Emily,

I've been crunching my schedule to see what will work. Is there any chance for Thursday of next week? November 12? Otherwise I could do Tuesday or Thursday of the following week. November 17 or 19.

Thanks for the help!

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Sent: Tuesday, November 3, 2020 8:20 AM
To: Patrick O'Bannon <pobannon@graypape.com>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Hi Patrick

I can assist you with viewing the materials.

Appointments are available this week Thursday November 5 or Friday November 6. 9:00-3:30.
Next week Monday November 9 or Tuesday November 10 9:00-3:30.

Let me know if a day/time within those options works for you. If not we can push the appointment out to another week.

Thanks
Emily

Emily S. Pronovost
Museum Specialist
Lowell National Historical Park
67 Kirk St, Lowell, MA 01852
(978) 970 5241

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Monday, November 2, 2020 4:50 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Pronovost, Emily S <Emily_Pronovost@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

Hi Emily & Laurel,

I wanted to check and see whether I can set up an appointment for some research I'm doing in support of the relicensing for the Boott hydroelectric project. I've reattached the list of materials mentioned below.

Many thanks,

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, October 16, 2020 9:52 AM
To: Patrick O'Bannon <pobannon@graypape.com>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Pronovost, Emily S <Emily_Pronovost@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Patrick,

Linking you in email to Emily Pronovost, Museum Specialist and Laurel Racine, Cultural Resources Chief. They are the keepers of our park's collections and should be able to assist you in your research needs. Thank you for providing a mark up of what you need.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Friday, October 16, 2020 9:45 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: [EXTERNAL] Boott Hydro - research at NPS

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Christine,

If I never thanked you for forwarding all the Finding Aids I apologize. They're wonderfully useful.

I'm ready to jump into the archival research process. Do I need to reach out to someone other than you to gain access to the records? I've attached a list of materials, based upon my review of the Finding Aids, that I think are the most likely to be useful. Please let me know the process and I'll set up an appointment to review these files.

Many thanks,

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager

GRAY & PAPE
HERITAGE MANAGEMENT

60 Valley Street, Suite 103
Providence, RI 02909
Ph. 401-273-9900
Mobile 513-300-1511
pobannon@graypape.com

Scott, Kelsey

From: Kubit, Robert (DEP) <robert.kubit@state.ma.us>
Sent: Monday, November 16, 2020 9:03 AM
To: Scott, Kelsey
Subject: Re: Lowell Revised ISR Meeting Summary Submission

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Kelsey.

Please remove my name from your contact list as I retire this Friday, November 20. Mr. Derek Standish will assume my duties of developing a draft Water Quality Certificate.

Thanks.

Bob Kubit

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Friday, October 30, 2020 4:20 PM
To: Andrew MacLean - Town of Pepperell; Andrew Maylor - Town of North Andover, MA; Andrew Sheehan - Town of Middleton; Andrew Titler - USDOI; Johnson, Arthur (DEP); Gahagan, Ben (FWE); Benjamin Wilson - NHDHR; Bill McDavitt - NOAA; Bjorn Lake - NMFS; bob@americanwhitewater.org; Bryan Sojkowski - USFWS (bryan_sojkowski@fws.gov); internet, env (EEA); Bruins, Christine A; Celeste Bernardo - Lowell NHP; Safety, Dam (DCR); Daniel Rivera - City of Lawrence, MA; David Meeker - Hull Street Energy LLC; David Turin - USEPA; Dinell Clark - Lowell Flood Owners Group and Williamsburg Condominium I; Duncan Hay - NPS; Ed Reiner - USEPA; Fred Jennings - TU; Gene Porter - LMRLAC; Harold Peterson; zzzBuckley, Jack (FWE); Standish, Derek (DEP); Jim Donchess - City of Nashua, NH; John Eddins - ACHP; John Leahy - Mayor City of Lowell; John Nappi - Lowell Flood Owners Group; Jon Kurland - Town of Chelmsford, MA; Julianne Rosset - USFWS; Keith Nislow - USFS; Hollenbeck, Kevin (DCR); Kevin Mendik - NPS; Kim Galipeau - Town of Hollis, NH; Mark Prout - USFS; Matt Carpenter - NHFGD; Michael Bailey - USFWS; zzzJudge, Michael (ENE); Misty Anne Marold; Norman Sims - AMC 2; Owen David - NHDES; Peter Severance - River Merrimack; Freed, Rachel (DEP); Richard Reault - Town of Tyngsborough; Robert Bersak - Eversource Energy; Kubit, Robert (DEP); Rusty Russell; Scott Galvin - City of Woburn, MA; Sean McDermott - NOAA; Carlin, Steve (DCR); Timothy Higgins - Town of Lincoln, MA; Tom Chapman - USFWS; Tom Dolan - NMFS; Troy Brown - USFWS; Mattocks, Steven (FWE)
Cc: Quiggle, Robert; Kevin Webb; Richard Malloy
Subject: Lowell Revised ISR Meeting Summary Submission

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Stakeholders:

Boott Hydropower, LLC (Boott) is pursuing a new license from the Federal Energy Regulatory Commission for the Lowell Hydroelectric Project. In accordance with the Integrated Licensing Process (ILP), Boott held the Revised Initial Study Report (ISR) Meeting on October 15, 2020 by conference call. The Commission's regulations require Boott file the attached summary of the Revised ISR Meeting within 15 days of the Revised ISR Meeting.

Should you have any questions regarding the attached Revised ISR Meeting Summary, please contact Kevin Webb, Licensing Manager with Boott, at (978) 935-6039 or kwebb@centralriverspower.com.

Kelsey Scott, MS
HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Thursday, January 21, 2021 11:46 AM
To: Scott, Kelsey; Bernardo, Celeste
Cc: Quiggle, Robert; Kevin Webb; Richard Malloy
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Kelsey,

NPS can assist with providing this additional information to your team by Feb 2.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Wednesday, January 20, 2021 1:27 PM
To: Bernardo, Celeste <Celeste_Bernardo@nps.gov>; Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hello Celeste and Christine –

As detailed in the attached letter, Boott is requesting further consultation with NPS regarding the Water Level and Flow Effects on Historic Resources Study. Specifically, Boott is seeking NPS's assistance in identifying historic canal structures along the Upper Pawtucket and Northern Canals that have previously been affected by Project-related water levels or flows. Initially, our approved study plan for this report included a site visit with NPS but Boott is looking at alternatives now due to the ongoing COVID-19 pandemic.

Boott is seeking any records of previous damage, maintenance, or repairs to structures along the Upper Pawtucket or Northern canals that have resulted from Project-related flows or water levels. Documentation may include photographs, maps, maintenance records, or other similar files that would facilitate Boott's analysis.

We respectfully ask that the NPS provide the requested information on or before February 2, 2021. Boott is also available to coordinate a conference call with the NPS if it would assist your office in responding to this request or in identifying the types of specific information relevant to this study.

Thank You,

Kelsey Scott, MS
Regulatory Specialist

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, February 9, 2021 10:01 AM
To: Kevin Webb; Scott, Kelsey; Bernardo, Celeste
Cc: Quiggle, Robert; Richard Malloy; Lonsway, Peter; Lieb, David M; Mendik, Kevin R; Hay, Duncan E
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Yes-- I'm sorry for the technical difficulties. Will send a note as soon as they're re-uploaded. Thanks for your patience.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Tuesday, February 9, 2021 9:46 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine

Hate to says it but all of the PDFs in Part 2 are 0 KB as well. Could you please re-upload those as well?

Thanks!
Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Monday, February 8, 2021 2:51 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

Great, glad to hear it.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, February 8, 2021 2:50 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

That worked Christine. Thanks again!

Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Monday, February 8, 2021 2:24 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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I am in process of re-uploading the 47 photos. It looks like another 20 minutes for the files to load. Will send as soon as they're up. Thank you for your patience.

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, February 8, 2021 1:18 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine:

None of the photographs included in Part 1 came through. All are showing 0 KB file size. The PDFs in both Parts 1 and 2 came through OK.

Can you please re-upload those photos?

Thanks again

Kevin

From: Kevin Webb
Sent: Monday, February 8, 2021 11:15 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine:

I did receive the secure file transfer emails – unfortunately discovered them in my junk folder. All set!

Thanks
Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, February 5, 2021 3:44 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Kevin,

The Department of the Interior uses a secure file transfer site for large format files which I will use to deliver to Boott/HDR. Some records include photographs and detail drawings with information that should be filed as "privileged." Most records can be filed as public documents.

Watch for an email to follow shortly through our secure file transfer site.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Friday, February 5, 2021 10:46 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine:

When you eFile the attachments are you planning to submit them as “Privileged” material? If that’s the case we will not be able to access them.

Thanks
Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, February 5, 2021 9:03 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Kelsey,

NPS staff have researched and compiled a series of records in response to your RFI. The file sizes are too large to transmit via email. We plan to file records to the docket today along with the attached cover letter which summarizes the relationship between flow conditions, historical resources and related maintenance, repairs, or rehabilitation.

If you have additional questions, please contact David Lieb, Historical Architect and Section 106 Coordination for Lowell National Historical Park (cc'd).

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Thursday, January 21, 2021 11:46 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Kelsey,

NPS can assist with providing this additional information to your team by Feb 2.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Wednesday, January 20, 2021 1:27 PM
To: Bernardo, Celeste <Celeste_Bernardo@nps.gov>; Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Hello Celeste and Christine –

As detailed in the attached letter, Boott is requesting further consultation with NPS regarding the Water Level and Flow Effects on Historic Resources Study. Specifically, Boott is seeking NPS's assistance in identifying historic canal structures along the Upper Pawtucket and Northern Canals that have previously been affected by Project-related water levels or flows. Initially, our approved study plan for this report included a site visit with NPS but Boott is looking at alternatives now due to the ongoing COVID-19 pandemic.

Boott is seeking any records of previous damage, maintenance, or repairs to structures along the Upper Pawtucket or Northern canals that have resulted from Project-related flows or water levels. Documentation may include photographs, maps, maintenance records, or other similar files that would facilitate Boott's analysis.

We respectfully ask that the NPS provide the requested information on or before February 2, 2021. Boott is also available to coordinate a conference call with the NPS if it would assist your office in responding to this request or in identifying the types of specific information relevant to this study.

Thank You,

Kelsey Scott, MS
Regulatory Specialist

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Scott, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Thursday, February 11, 2021 4:12 PM
To: Bruins, Christine A; Scott, Kelsey; Bernardo, Celeste
Cc: Quiggle, Robert; Richard Malloy; Lonsway, Peter; Lieb, David M; Mendik, Kevin R; Hay, Duncan E
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Thanks for asking Christine. I will defer to your judgement on whether to file public vs. privileged. My understanding is that the need to guard cultural information from the public is largely a concern over keeping information away from "artifact hunters." I agree that there should be little concern for that in this case.

Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Thursday, February 11, 2021 2:43 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Kevin and Kelsey,

NPS is planning on filing the RFI response letter along with the PDF records on the FERC docket. The only file we felt should be filed as "privileged" rather than "public" is the Class A cost estimate for repairs on the Northern Canal Waste Gatehouse. Government estimates should not be made public if the work will be advertised and constructed.

Do you concur? Were there any other records you have concerns with filing public?

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, February 9, 2021 1:34 PM

To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Great! Thank you.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Tuesday, February 9, 2021 1:31 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Thanks for uploading Part 2 again Christine! I downloaded them and confirmed that I was able to open the files.

Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Tuesday, February 9, 2021 10:01 AM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

Yes-- I'm sorry for the technical difficulties. Will send a note as soon as they're re-uploaded. Thanks for your patience.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Tuesday, February 9, 2021 9:46 AM

To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine

Hate to says it but all of the PDFs in Part 2 are 0 KB as well. Could you please re-upload those as well?

Thanks!
Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Monday, February 8, 2021 2:51 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Great, glad to hear it.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, February 8, 2021 2:50 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

That worked Christine. Thanks again!

Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Monday, February 8, 2021 2:24 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>

Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

I am in process of re-uploading the 47 photos. It looks like another 20 minutes for the files to load. Will send as soon as they're up. Thank you for your patience.

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, February 8, 2021 1:18 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine:

None of the photographs included in Part 1 came through. All are showing 0 KB file size. The PDFs in both Parts 1 and 2 came through OK.

Can you please re-upload those photos?

Thanks again
Kevin

From: Kevin Webb
Sent: Monday, February 8, 2021 11:15 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine:

I did receive the secure file transfer emails – unfortunately discovered them in my junk folder. All set!

Thanks
Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, February 5, 2021 3:44 PM
To: Kevin Webb <kwebb@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste

<Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Kevin,

The Department of the Interior uses a secure file transfer site for large format files which I will use to deliver to Boott/HDR. Some records include photographs and detail drawings with information that should be filed as "privileged." Most records can be filed as public documents.

Watch for an email to follow shortly through our secure file transfer site.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Friday, February 5, 2021 10:46 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: RE: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Christine:

When you eFile the attachments are you planning to submit them as “Privileged” material? If that’s the case we will not be able to access them.

Thanks
Kevin

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, February 5, 2021 9:03 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>; Lonsway, Peter <Peter_Lonsway@nps.gov>; Lieb, David M <David_Lieb@nps.gov>; Mendik, Kevin R <Kevin_Mendik@nps.gov>; Hay, Duncan E <Duncan_Hay@nps.gov>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

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Kelsey,

NPS staff have researched and compiled a series of records in response to your RFI. The file sizes are too large to transmit via email. We plan to file records to the docket today along with the attached cover letter which summarizes the relationship between flow conditions, historical resources and related maintenance, repairs, or rehabilitation.

If you have additional questions, please contact David Lieb, Historical Architect and Section 106 Coordination for Lowell National Historical Park (cc'd).

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Thursday, January 21, 2021 11:46 AM
To: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Bernardo, Celeste <Celeste_Bernardo@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

Kelsey,

NPS can assist with providing this additional information to your team by Feb 2.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Sent: Wednesday, January 20, 2021 1:27 PM
To: Bernardo, Celeste <Celeste_Bernardo@nps.gov>; Bruins, Christine A <Christine_Bruins@nps.gov>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: [EXTERNAL] Lowell Hydroelectric Project - Water Level and Flow Effects on Historic Resources Study

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hello Celeste and Christine –

As detailed in the attached letter, Boott is requesting further consultation with NPS regarding the Water Level and Flow Effects on Historic Resources Study. Specifically, Boott is seeking NPS's assistance in identifying historic canal structures along the Upper Pawtucket and Northern Canals that have previously been affected by Project-related water levels or flows. Initially, our approved study plan for this report included a site visit with NPS but Boott is looking at alternatives now due to the ongoing COVID-19 pandemic.

Boott is seeking any records of previous damage, maintenance, or repairs to structures along the Upper Pawtucket or Northern canals that have resulted from Project-related flows or water levels. Documentation may include photographs, maps, maintenance records, or other similar files that would facilitate Boott's analysis.

We respectfully ask that the NPS provide the requested information on or before February 2, 2021. Boott is also available to coordinate a conference call with the NPS if it would assist your office in responding to this request or in identifying the types of specific information relevant to this study.

Thank You,

Kelsey Scott, MS
Regulatory Specialist

HDR
1304 Buckley Road, Suite 202
Syracuse, NY 13212

D 315.414.2206 **M** 315.706.5176
kelsey.scott@hdrinc.com

hdrinc.com/follow-us

Finding Aid for PL&C Records Vol. I

Directors' Records
Box 38 Folder 1 – 1018 Western Canal, 1916-1948
Box 41 Folder 4 – 1036[03] Lowell Experiments, Head & Sluice Gates, 1868-1937
Box 42 & 43 Flashboards, Canals & Waterways
~~Box 48 Northern Canal & Waste Gates~~
~~Box 49 Old Guard Locks/Lower Locks~~
~~Box 50 Swamp Locks, Tremont Gates etc.~~
~~Box 61 Pawtucket Dam~~
Box 63 Upper Pawtucket Canal/Hamilton Canal
Box 90 Eastern & Lower Pawtucket Canals/L&C Inventory

Oversize Material removed from Series III
Map Folders 6-9 Hydroelectric Machinery

Finding Aid for PL&C Records Vol. II (Photographs)
2936-41 Moody Street Gate House 1936
2925-27 Francis Gate 1936
2411 Swamp Locks sluice 1928
2425A Merrimack sluice 1928
2496 Gate House @ Old Guard Locks 1929
2557 Gate House, Tremont 1920
2899 Gate House Pawtucket Dam 1936
2926 Gate House 1936
Lowell IDC – steam turbines

Finding Aid for PL&C Records Vol. II (Drawings)
8 Northern Canal Gate House
43 Swamp Locks Gates
117 Moody Street Feeder
160 Head Gates, Guard Gates & Dams (Pigeon Hole Index)

May 1919 Guide to Photographic Plates
p. 11, 13, 14, 21, 23, 38, 45, 47, 48, 50, 53, 54, 71, 72, 86, 101, 102, 103, 106, 128, 132,

Roberts, S.K. *Historic Structure Report – Moody Street Feeder* (1979).
~~Mahlstedt, T.F. *Historic Structure Report – Northern Canal Guard Gatehouse Complex, Francis Gate Complex, Swamp Locks, Lower Locks – Archaeological Data Section* (1980).~~
~~Booth, A. & H.D. Unrau. *Historic Structure Report – Pawtucket Canal and Northern Canal Lock Structures – Historic Data Section* (1982).~~

p. 149 Series XI Box 105 Folder 4-6 Lower Locks Reconstruction by DEM

Scott, Kelsey

From: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Sent: Friday, February 12, 2021 12:05 PM
To: Patrick O'Bannon
Cc: Scott, Kelsey; Quiggle, Robert
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

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Hi Patrick

I have some availability most days next week.
Tuesday (16th) 8:30-2:30
Wednesday (17th) 8:30-3:00
Thursday (18th) 11:00-4:00
Friday (19th) 9:00-4:00

Let me know if something in those options works for you. If not we can figure out something for the following week.

Emily

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Thursday, February 11, 2021 8:38 AM
To: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Robert Quiggle (robert.quiggle@hdrinc.com) <robert.quiggle@hdrinc.com>
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

Hi Emily,

I'd like to set up another research trip. I'm particularly interested in the Drawings and Photos listed in Vol. 2 of the Finding Aid (please see the attached). Can you please let me know your availability in the next week or so?

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Sent: Friday, November 6, 2020 8:47 AM
To: Patrick O'Bannon <pobannon@graypape.com>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Hi Patrick

We can start at 9:00.

Our collection is stored on the 3rd floor of the Boott Cotton Mills Museum at 115 John St. The closest parking is the Joseph Downes garage on the corner of John and French St.

The building isn't open to the public that early and there are a couple construction projects going on. To make it easier I will meet you outside by the museum entrance and walk you into the building. If you're arriving early or late you can reach me at 978 970-5241.

Let me know if there are any questions anytime before your appointment.

Thanks
Emily

Emily S. Pronovost
Museum Specialist
Lowell National Historical Park
67 Kirk St, Lowell, MA 01852
(978) 970 5241

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Thursday, November 5, 2020 3:07 PM
To: Pronovost, Emily S <Emily_Pronovost@nps.gov>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

Great! Let's say Tuesday November 17. I assume I'm going to need a full day (at least) to go through the material, so what time could I get started in the morning?

Will I be coming to 67 Kirk Street, or somewhere else?

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Sent: Thursday, November 5, 2020 9:53 AM
To: Patrick O'Bannon <pobannon@graypape.com>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Hi Patrick

I'm out of the office the second half of next week, but I can do the 17th or the 19th. Let me know which day you prefer and what time works for you.

Thanks
Emily

Emily S. Pronovost
Museum Specialist
Lowell National Historical Park
67 Kirk St, Lowell, MA 01852
(978) 970 5241

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Thursday, November 5, 2020 8:47 AM
To: Pronovost, Emily S <Emily_Pronovost@nps.gov>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

Hi Emily,

I've been crunching my schedule to see what will work. Is there any chance for Thursday of next week? November 12? Otherwise I could do Tuesday or Thursday of the following week. November 17 or 19.

Thanks for the help!

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Pronovost, Emily S <Emily_Pronovost@nps.gov>
Sent: Tuesday, November 3, 2020 8:20 AM
To: Patrick O'Bannon <pobannon@graypape.com>; Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Hi Patrick

I can assist you with viewing the materials.

Appointments are available this week Thursday November 5 or Friday November 6. 9:00-3:30.
Next week Monday November 9 or Tuesday November 10 9:00-3:30.

Let me know if a day/time within those options works for you. If not we can push the appointment out to another week.

Thanks
Emily

Emily S. Pronovost
Museum Specialist
Lowell National Historical Park
67 Kirk St, Lowell, MA 01852
(978) 970 5241

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Monday, November 2, 2020 4:50 PM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Pronovost, Emily S <Emily_Pronovost@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: RE: [EXTERNAL] Boott Hydro - research at NPS

Hi Emily & Laurel,

I wanted to check and see whether I can set up an appointment for some research I'm doing in support of the relicensing for the Boott hydroelectric project. I've reattached the list of materials mentioned below.

Many thanks,

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager
Mobile: 513-300-1511
pobannon@graypape.com

From: Bruins, Christine A <Christine_Bruins@nps.gov>
Sent: Friday, October 16, 2020 9:52 AM
To: Patrick O'Bannon <pobannon@graypape.com>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>; Pronovost, Emily S <Emily_Pronovost@nps.gov>; Racine, Laurel A <Laurel_Racine@nps.gov>
Subject: Re: [EXTERNAL] Boott Hydro - research at NPS

Patrick,

Linking you in email to Emily Pronovost, Museum Specialist and Laurel Racine, Cultural Resources Chief. They are the keepers of our park's collections and should be able to assist you in your research needs. Thank you for providing a mark up of what you need.

Christine Bruins | Community Planner
Lowell National Historical Park
978.275.1726 (office) | 978.954.1011 (cell)

From: Patrick O'Bannon <pobannon@graypape.com>
Sent: Friday, October 16, 2020 9:45 AM
To: Bruins, Christine A <Christine_Bruins@nps.gov>; Lieb, David M <David_Lieb@nps.gov>
Cc: Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: [EXTERNAL] Boott Hydro - research at NPS

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Christine,

If I never thanked you for forwarding all the Finding Aids I apologize. They're wonderfully useful.

I'm ready to jump into the archival research process. Do I need to reach out to someone other than you to gain access to the records? I've attached a list of materials, based upon my review of the Finding Aids, that I think are the most likely to be useful. Please let me know the process and I'll set up an appointment to review these files.

Many thanks,

Patrick W. O'Bannon, Ph.D.
Northeast Regional Manager

GRAY & PAPE
HERITAGE MANAGEMENT

60 Valley Street, Suite 103
Providence, RI 02909
Ph. 401-273-9900
Mobile 513-300-1511
pobannon@graypape.com

Scott, Kelsey

From: Amy Chang <Amy.Chang@ferc.gov>
Sent: Thursday, March 4, 2021 12:48 PM
To: Scott, Kelsey
Subject: RSVP for Lowell ISR March 11 Meeting

Follow Up Flag: Follow up
Flag Status: Completed

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Kelsey,

I wanted to let you know that the following FERC staff plan to participate in the Lowell ISR March 11 meeting:

Amy Chang
Bill Connelly
Taconya Goar
Erin Kimsey
Nick Palso
Mandy Gill

Please let me know if you need any additional information.

Thank you,
Amy Chang, Project Manager
202-502-8250

Scott, Kelsey

From: Bob Nasdor <bob@americanwhitewater.org>
Sent: Tuesday, April 20, 2021 8:42 AM
To: Quiggle, Robert
Cc: Kevin Webb; Joe t; Richard Malloy; Scott, Kelsey
Subject: Re: Lowell Whitewater Boating Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Flows are still looking strong for this weekend. I would like to make a tentative call on proceeding. Are folks free to chat this morning?

Bob Nasdor
Northeast Stewardship & Legal Director
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 12:24:18 PM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: Lowell Whitewater Boating Study

Thanks Rob. I got my second shot yesterday. No reactions so far. For what it's worth, I was originally scheduled for my shot Saturday but was able to easily move it to Sunday when I thought we were going to do the Missisquoi study this weekend. Maybe you can try to move your a day or so. I don't think we can wait until Thursday though to start putting things in place, so we should figure this out asap.

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Apr 19, 2021 at 12:03 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

Bob:

I wanted to recirculate the survey forms and the safety plan that we developed for this study and that we distributed last year. I would recommend that we setup a go/no-go call for Thursday afternoon so that we can evaluate the flows.

We may also have some logistical issues with this weekend. Both Kelsey and I are needed to support this study, and we are both receiving our second dose of the COVID vaccine at the end of this week. Depending on the potential side effects, we may not be able to travel on Friday for a Saturday flow release. In any case, we should know more by Thursday afternoon.

If Thursday works for you, I'll send around an Outlook invite.

Thanks,

Robert Quiggle, RPA

Syracuse Office Principal

HDR

1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 8:31 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: Lowell Whitewater Boating Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

That sounds perfect. The variable is the Wednesday rain that looks a little heavier up north. Hopefully we can pull this off just using the Field powerhouse. Should we proceed with the tentative assumption that this is a go and notify volunteers, agencies, and public safety? You should also be prepared for the beach put-in and take-out cleanup. Do you have an invitation ready for our volunteers that includes the logistics, Covid protocols, and pre-run survey? I have a list of names that I can forward it to and can also provide you with the contact list.

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Apr 19, 2021 at 8:20 AM Kevin Webb <kwebb@centralriverspower.com> wrote:

> Thanks Bob. The NOAA forecast is showing 9,300 cfs Wednesday AM, backing out the Concord that would put us between 8,000 and 8,500 inflow at Pawtucket Dam. Let's check back in on Wednesday and see what the forecast shows into the weekend.
>
> Kevin

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 8:00 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>
Subject: Lowell Whitewater Boating Study

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Good morning. I'm looking at the flow and weather forecast for this week, and from what I can see, all signs point toward ideal conditions for the whitewater boating study on Saturday. Flows are currently in our target range but dropping slightly and we have some rain forecast for mid-week. We should schedule a call for tomorrow to finalize the plan for moving forward and then confirm that we are a go for lift off on Thursday if everyone agrees.What are you all seeing?

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

Scott, Kelsey

To: Quiggle, Robert
Subject: RE: Lowell Whitewater Boating Study

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Monday, April 19, 2021 8:50 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: RE: Lowell Whitewater Boating Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Oh man we need this like a hole in the head right now! Pray for no rain! We just cancelled a study event up at Sheldon Springs (VT) on Saturday.

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 8:31 AM
To: Kevin Webb <kwebb@centralriverspower.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: Lowell Whitewater Boating Study

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========

That sounds perfect. The variable is the Wednesday rain that looks a little heavier up north. Hopefully we can pull this off just using the Field powerhouse. Should we proceed with the tentative assumption that this is a go and notify volunteers, agencies, and public safety? You should also be prepared for the beach put-in and take-out cleanup. Do you have an invitation ready for our volunteers that includes the logistics, Covid protocols, and pre-run survey? I have a list of names that I can forward it to and can also provide you with the contact list.

Bob Nasdor
Northeast Stewardship & Legal Director

AMERICAN WHITEWATER
American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Apr 19, 2021 at 8:20 AM Kevin Webb <kwebb@centralriverspower.com> wrote:

> Thanks Bob. The NOAA forecast is showing 9,300 cfs Wednesday AM, backing out the Concord that would put us between 8,000 and 8,500 inflow at Pawtucket Dam. Let's check back in on Wednesday and see what the forecast shows into the weekend.
>
> Kevin
>
> ---
>
> **From:** Bob Nasdor | AW <bob@americanwhitewater.org>
> **Sent:** Monday, April 19, 2021 8:00 AM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>
> **Subject:** Lowell Whitewater Boating Study
>
> CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. ==========
>
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>
> Bob Nasdor
> Northeast Stewardship & Legal Director
>
> AMERICAN WHITEWATER
>
> American Whitewater
>
> 65 Blueberry Hill Lane
> Sudbury, MA 01776

bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

Scott, Kelsey

From: Kevin Webb <kwebb@centralriverspower.com>
Sent: Wednesday, April 21, 2021 10:38 AM
To: Bob Nasdor | AW; Quiggle, Robert
Cc: Joe t; Richard Malloy; Scott, Kelsey; Curtis Mooney
Subject: RE: Lowell Whitewater Boating Study

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Thanks Bob. I can confirm that what you state below is consistent with our discussion yesterday.

Thanks
Kevin

Kevin Webb
Licensing Manager
Central Rivers Power
670 N Commercial Street, Suite 204| Manchester, NH 03101
C: 978.935.6039
kwebb@centralriverspower.com

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Wednesday, April 21, 2021 10:27 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Cc: Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
Subject: Re: Lowell Whitewater Boating Study

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Dear Kevin,
I'm confirming our conversation yesterday regarding scheduling the on-water portion of the whitewater boating study in the Lowell bypassed reach. As we discussed, while flows for the upcoming weekend are suitable for the controlled-flow study, CRP is unable to schedule the study for this coming weekend 4/24-4/25 or the following weekend 5/2-5/3 due to its priority in completing and filing its Final License Application for the project. The timing is unfortunate due to the current availability of flows for the on-water portion of the study. We will continue to monitor the flow forecast for another opportunity, but I remain concerned about when another opportunity will occur. We agreed CRP is required to complete the study as part of its FERC relicensing of the project and will need to amend its Final License Application when the study is complete to address project impacts on recreation use in the project boundary. I look forward to working with you to complete this study at the earliest possible time.

Yours truly,
Bob

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater
65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Tue, Apr 20, 2021 at 8:42 AM Bob Nasdor <bob@americanwhitewater.org> wrote:

> Flows are still looking strong for this weekend. I would like to make a tentative call on proceeding. Are folks free to chat this morning?
>
> Bob Nasdor
> Northeast Stewardship & Legal Director
> American Whitewater
> 65 Blueberry Hill Lane
> Sudbury, MA 01776
> bob@americanwhitewater.org
> 617-584-4566
>
> ---
>
> **From:** Bob Nasdor | AW <bob@americanwhitewater.org>
> **Sent:** Monday, April 19, 2021 12:24:18 PM
> **To:** Quiggle, Robert <Robert.Quiggle@hdrinc.com>
> **Cc:** Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>; Scott, Kelsey <Kelsey.Scott@hdrinc.com>
> **Subject:** Re: Lowell Whitewater Boating Study
>
> Thanks Rob. I got my second shot yesterday. No reactions so far. For what it's worth, I was originally scheduled for my shot Saturday but was able to easily move it to Sunday when I thought we were going to do the Missisquoi study this weekend. Maybe you can try to move your a day or so. I don't think we can wait until Thursday though to start putting things in place, so we should figure this out asap.
>
> Bob Nasdor
> Northeast Stewardship & Legal Director

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65 Blueberry Hill Lane
Sudbury, MA 01776
bob@americanwhitewater.org
617-584-4566

Join American Whitewater!

On Mon, Apr 19, 2021 at 12:03 PM Quiggle, Robert <Robert.Quiggle@hdrinc.com> wrote:

> Bob:
>
> I wanted to recirculate the survey forms and the safety plan that we developed for this study and that we distributed last year. I would recommend that we setup a go/no-go call for Thursday afternoon so that we can evaluate the flows.
>
> We may also have some logistical issues with this weekend. Both Kelsey and I are needed to support this study, and we are both receiving our second dose of the COVID vaccine at the end of this week. Depending on the potential side effects, we may not be able to travel on Friday for a Saturday flow release. In any case, we should know more by Thursday afternoon.
>
> If Thursday works for you, I'll send around an Outlook invite.
>
> Thanks,
>
> **Robert Quiggle,** RPA
>
> *Syracuse Office Principal*
>
> **HDR**
>
> 1304 Buckley Road, Suite 202
> Syracuse, New York 13212-4311
> **D** 315.414.2216 **M** 724.989.1579
> Robert.Quiggle@hdrinc.com
>
> hdrinc.com/follow-us
>
> **From:** Bob Nasdor | AW <bob@americanwhitewater.org>
> **Sent:** Monday, April 19, 2021 8:31 AM

To: Kevin Webb <kwebb@centralriverspower.com>
Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Joe t <wemustriseabove@gmail.com>; Richard Malloy <RMalloy@centralriverspower.com>
Subject: Re: Lowell Whitewater Boating Study

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That sounds perfect. The variable is the Wednesday rain that looks a little heavier up north. Hopefully we can pull this off just using the Field powerhouse. Should we proceed with the tentative assumption that this is a go and notify volunteers, agencies, and public safety? You should also be prepared for the beach put-in and take-out cleanup. Do you have an invitation ready for our volunteers that includes the logistics, Covid protocols, and pre-run survey? I have a list of names that I can forward it to and can also provide you with the contact list.

Bob Nasdor
Northeast Stewardship & Legal Director

American Whitewater

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Sudbury, MA 01776
bob@americanwhitewater.org
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On Mon, Apr 19, 2021 at 8:20 AM Kevin Webb <kwebb@centralriverspower.com> wrote:

> Thanks Bob. The NOAA forecast is showing 9,300 cfs Wednesday AM, backing out the Concord that would put us between 8,000 and 8,500 inflow at Pawtucket Dam. Let's check back in on Wednesday and see what the forecast shows into the weekend.

Kevin

From: Bob Nasdor | AW <bob@americanwhitewater.org>
Sent: Monday, April 19, 2021 8:00 AM
To: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Kevin Webb <kwebb@centralriverspower.com>; Joe t <wemustriseabove@gmail.com>
Subject: Lowell Whitewater Boating Study

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Scott, Kelsey

From: Quiggle, Robert
Sent: Monday, April 19, 2021 12:04 PM
To: Bob Nasdor | AW; Kevin Webb
Cc: Joe t; Richard Malloy; Scott, Kelsey
Subject: RE: Lowell Whitewater Boating Study
Attachments: 20201009 Lowell Whitewater Safety Plan.pdf; Whitewater Study Survey Forms.pdf

Bob:

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If Thursday works for you, I'll send around an Outlook invite.

Thanks,

Robert Quiggle, RPA
Syracuse Office Principal

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 **M** 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us

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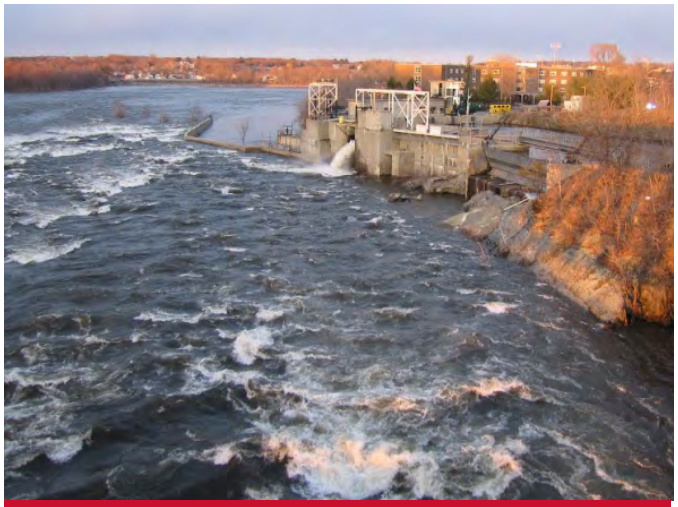

Whitewater Boating and Access Study Safety Plan

Lowell Hydroelectric Project

(FERC No. 2790)

October 2020

Prepared by:

HDR

Prepared for:

Boott Hydropower, LLC
Andover, Massachusetts

Central Rivers Power

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Appendix A: Safety Plan Addendum

Appendix B: COVID-19 Screening Form

List of Acronyms

AW	American Whitewater
Boott	Boott Hydropower, LLC
CFR	Code of Federal Regulations
cfs	cubic feet-per-second
City	City of Lowell
COVID-19	Coronavirus Disease 2019
FERC	Federal Energy Regulatory Commission (or Commission)
ILP	Integrated Licensing Process
MW	megawatt
NPS	National Park Service
POC	Point of Contact
PPE	Personal Protective Equipment
Project	Lowell Hydroelectric Project (or Lowell Project)
RSP	Revised Study Plan
Safety Code	Safety Code of American Whitewater
Safety Plan	Whitewater Boating and Access Study Safety Plan
SPD	Study Plan Determination
Study	Whitewater Boating and Access Study
Working Group	Whitewater Boating and Access Study Working Group

1 Introduction and Background

Boott Hydropower, LLC (Boott), is the Licensee and operator of the 20.2-megawatt (MW) Lowell Hydroelectric Project FERC No. 2790) (Project or Lowell Project). The Project is located along the Merrimack River in Middlesex County, Massachusetts and in Hillsborough County, New Hampshire.

The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of May 1, 1973. The existing license expires on April 30, 2023. Accordingly, Boott is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. As proposed in Boott's January 28, 2019 Revised Study Plan (RSP) and approved in the Commission's March 13, 2019 Study Plan Determination (SPD), Boott will conduct a Whitewater Boating and Access Study (Whitewater Study) in support of Project relicensing.

This Whitewater Boating and Access Study Safety Plan (Safety Plan) is intended to provide guidelines and protocols for protecting the safety of volunteer study participants boating the Project's bypass reach during controlled flow releases. This Safety Plan also provides procedures for emergency situations and guidance for communicating with study participants, Project staff, and emergency responders. The Safety Plan was developed in consultation with American Whitewater (AW), the City of Lowell (City), National Park Service (NPS), Zoar Outdoor, and the Massachusetts Department of Conservation and Recreation (collectively, the Whitewater Boating and Access Study Working Group or Working Group).

As a condition to participation in the controlled flow releases, Boott requires volunteers to review this Safety Plan and understand the safety measures, guidance, and requirements herein. Boott notes that this Safety Plan includes details about Personal Protective Equipment (PPE) that participants are responsible for providing, as well as mandatory pre-fieldwork Coronavirus Disease 2019 (COVID-19) screening requirements. Persons who do not have the required PPE or who do not complete the pre-fieldwork COVID-19 screening measures will not be allowed to participate in the Whitewater Study.

1.1 Whitewater Boating and Access Study Overview

The Lowell Project is a run-of-river hydropower plant. When river flows exceed the hydraulic capacity of the two generating units located at the E.L. Field Powerhouse (combined capacity of approximately 8,000 cubic feet-per-second [cfs]), excess flows (up to approximately 2,000 cfs) are routed through the downtown Lowell canal system and through the canal units. When inflows exceed the 10,000 cfs capacity of the generating units and canals, all excess flows are passed over the Pawtucket Dam spillway into the bypass reach. The Project has the potential to affect whitewater boating opportunities in the bypass reach when flows are less than 10,000 cfs.

As described in the approved RSP, the goal of the study is to assess the Project's bypass reach for whitewater boating and access opportunities. The objectives of the study are as follows:

- Assess a range of flows suitable for whitewater boating opportunities in the Project's bypass reach;
- Assess the frequency, timing, duration, and predictability of paddling flows under current and proposed Project operations;
- Define potential locations for put-in and take-out points for boaters; and,
- Assess the flow information needs for whitewater boating and the current and potential flow information distribution system.

The approved study plan includes three primary tasks:

- **Task 1: Study Planning and Preparation** – The Study Planning and Preparation task includes (1) formation of the Working Group and identification of volunteers to participate in controlled flow release evaluations; (2) identification of appropriate put-in and take-out locations for on-water evaluations; (3) development of a Safety Plan; (4) determination of a method for verifying flows in the Project's bypass reach; and (5) development of survey forms to be used in the execution of the flow evaluations.

- **Task 2: Controlled Whitewater Releases** – In consultation with the Working Group, Boott will schedule controlled flow releases from the Project's Pawtucket Dam. Each flow release is expected to last approximately three hours, and volunteer boaters will have the opportunity to boat the Project's bypass reach and to make multiple passes at each flow to evaluate lines through sections of the study reach. Pre, post, and comparative surveys will be provided to controlled flow release participants for their completion during this portion of the study.

  Following completion of the controlled flow releases, Boott will conduct an on-site meeting to discuss the results of the study and summarize opinions about the feasibility or quality of different types of boating opportunities at different flows.

- **Task 3: Whitewater Recreational Access** – Based on the results of the Recreation and Aesthetics Study, and in consultation with the Working Group, Boott will conduct an evaluation of prospective whitewater recreational access to the bypass reach.

This Safety Plan has been developed pursuant to Task 1 of the approved Whitewater Boating and Access Study Plan to provide appropriate safety measures and emergency protocols for the controlled flow releases (Task 2). Boott will require that all volunteer boaters participating in the controlled flow releases review and adhere to the Safety Plan requirements and applicable Boott safety policies.

2 Safety Code of American Whitewater

Boott's Safety Plan adopts the Safety Code of American Whitewater (AW 2005) (Safety Code). The Safety Code includes guidelines for Personal Preparedness and Responsibility, Boat and Equipment Preparedness, Group Preparedness and Responsibility, and Guidelines for River Rescue. Guidance from the Safety Code is presented in the following sections***. As a precursor to participating in the controlled flow releases, volunteer boaters will review the Safety Code in its entirety on the AW Website at www.americanwhitewater.org.***

As noted in the Safety Code, the code *"is only a collection of guidelines; attempts to minimize risks should be flexible, not constrained by a rigid set of rules. Varying conditions and group goals may combine with unpredictable circumstances to require alternate procedures"* (AW 2005). If conditions require modifications to this Safety Plan, Boott, the Working Group, and study participants, will document and review those modifications prior to boating the controlled flow releases.

While it is appropriate to develop and review safety guidance for whitewater boating, all parties recognize that whitewater boating has inherent risks that cannot be completely avoided or mitigated. As such, volunteer boaters participating in the controlled flow releases do so at their own risk and in recognition of the inherent dangers that such activities pose.

2.1 Personal Preparedness and Responsibility

1. **Be a competent swimmer,** with the ability to handle yourself underwater.
2. **Wear a life jacket.** A snugly fitting vest-type life preserver offers back and shoulder protection as well as the flotation needed to swim safely in whitewater.
3. **Wear a solid, correctly fitted helmet** when upsets are likely. This is essential in kayaks or covered canoes and is recommended for open canoeists using thigh straps and rafters running steep drops.
4. **Do not boat out of control.** Your skills should be sufficient to stop or reach shore before reaching danger. Do not enter a rapid unless you are reasonably sure that you can run it safely or swim it without injury.
5. **Whitewater rivers contain many hazards which are not always easily recognized. The following are the most frequent killers.**
    I. **High Water.** A river's speed and power increase tremendously as the flow increases, raising the difficulty of most rapids. Rescue becomes progressively harder as the water rises, adding to the danger. Floating debris and strainers can make even an easy rapid quite hazardous. It is often misleading to judge the river level at the put-in, since a small rise in a wide, shallow place will be multiplied many times where the river narrows. Use reliable gage information whenever

possible, and be aware that sun on snowpack, hard rain, and upstream dam releases may greatly increase the flow.

II. **Cold.** Cold drains your strength and robs you of the ability to make sound decisions on matters affecting your survival. Cold-water immersion, because of the initial shock and the rapid heat loss which follows, is especially dangerous. Dress appropriately for bad weather or sudden immersion in the water. When the water temperature is less than 50° Fahrenheit, a wetsuit or drysuit is essential for protection if you swim. Next best is wool or pile clothing under a waterproof shell. In this case, you should also carry waterproof matches and a change of clothing in a waterproof bag. If, after prolonged exposure, a person experiences uncontrollable shaking, loss of coordination, or difficulty speaking, he or she is hypothermic, and needs your assistance.

III. **Strainers.** Brush, fallen trees, bridge pilings, undercut rocks or anything else which allows river current to sweep through can pin boats and boaters against the obstacle. Water pressure on anything trapped this way can be overwhelming. Rescue is often extremely difficult. Pinning may occur in fast current, with little or no whitewater to warn of the danger.

IV. **Dams, weirs, ledges, reversals, holes, and hydraulics.** When water drops over an obstacle, it curls back on itself, forming a strong upstream current which may be capable of holding a boat or swimmer. Some holes make for excellent sport. Others are proven killers. Paddlers who cannot recognize the difference should avoid all but the smallest holes. Hydraulics around man-made dams must be treated with utmost respect regardless of their height or the level of the river. Despite their seemingly benign appearance, they can create an almost escape-proof trap. The swimmer's only exit from the “drowning machine” is to dive below the surface when the downstream current is flowing beneath the reversal.

6. **Broaching.** When a boat is pushed sideways against a rock by strong current, it may collapse and wrap. This is especially dangerous to kayak and decked canoe paddlers; these boats will collapse, and the combination of indestructible hulls and tight outfitting may create a deadly trap. Even without entrapment, releasing pinned boats can be extremely time-consuming and dangerous. To avoid pinning, throw your weight downstream towards the rock. This allows the current to slide harmlessly underneath the hull.

7. **Boating alone is discouraged.** The minimum party is three people or two craft.

8. **Have a frank knowledge of your boating ability,** and don't attempt rivers or rapids which lie beyond that ability.

9. **Be in good physical and mental condition,** consistent with the difficulties which may be expected. Make adjustments for loss of skills due to age, health, and fitness. Any health limitations must be explained to your fellow paddlers prior to starting the trip.

10. **Be practiced in self-rescue,** including escape from an overturned craft. The Eskimo roll is strongly recommended for decked boaters who run rapids Class IV or greater, or who paddle in cold environmental conditions.

11. **Be trained in rescue skills, CPR, and first aid** with special emphasis on recognizing and treating hypothermia. It may save your friend's life.

12. **Carry equipment needed for unexpected emergencies,** including footwear which will protect your feet when walking out, a throw rope, knife, whistle, and waterproof matches. If you wear eyeglasses, tie them on and carry a spare pair on long trips. Bring cloth repair tape on short runs, and a full repair kit on isolated rivers. Do not wear bulky jackets, ponchos, heavy boots, or anything else which could reduce your ability to survive a swim.

13. Despite the mutually supportive group structure described in this code, **individual paddlers are ultimately responsible for their own safety, and must assume sole responsibility for the following decisions:**

    I. The decision to participate on any trip. This includes an evaluation of the expected difficulty of the rapids under the conditions existing at the time of the put in.

    II. The selection of appropriate equipment, including a boat design suited to their skills and the appropriate rescue and survival gear.

    III. The decision to scout any rapid, and to run or portage according to their best judgment. Other members of the group may offer advice, but paddlers should resist pressure from anyone to paddle beyond their skills. It is also their responsibility to decide whether to pass up any walk-out or take-out opportunity.

    IV. All trip participants should consistently evaluate their own and their group's safety, voicing their concerns when appropriate and following what they believe to be the best course of action. Paddlers are encouraged to speak with anyone whose actions on the water are dangerous, whether they are a part of your group or not.

2.2 Boat and Equipment Preparedness

1. **Test new and different equipment** under familiar conditions before relying on it for difficult runs. This is especially true when adopting a new boat design or outfitting system. craft may present additional hazards to inexperienced or poorly conditioned paddlers.

2. **Be sure your boat and gear are in good repair** before starting a trip. The more isolated and difficult the run, the more rigorous this inspection should be.

3. **Install flotation bags** in non-inflatable craft, securely fixed in each end, designed to displace as much water as possible. Inflatable boats should have multiple air chambers and be test-inflated before launching.

4. **Have strong, properly sized paddles or oars** for controlling your craft. Carry sufficient spares for the length and difficulty of the trip.

5. **Outfit your boat safely.** The ability to exit your boat quickly is an essential component of safety in rapids. It is your responsibility to see that there is absolutely nothing to cause entrapment when coming free of an upset craft. This includes:

    I. Spray covers which won't release reliably or which release prematurely.

    II. Boat outfitting too tight to allow a fast exit, especially in low volume kayaks or decked canoes. This includes low-hung thwarts in canoes lacking adequate clearance for your feet and kayak footbraces which fail or allow your feet to become wedged under them.

    III. Inadequately supported decks which collapse on a paddler's legs when a decked boat is pinned by water pressure or inadequate clearance with the deck because of your size or build.

    IV. Loose ropes which cause entanglement. Beware of any length of loose line attached to a whitewater boat. All items must be tied tightly, and excess line eliminated; painters, throw lines, and safety rope systems must be completely and effectively stored. Do not knot the end of a rope, as it can get caught in cracks between rocks.

6. **Provide ropes** which permit you to hold on to your craft so that it may be rescued. The following methods are recommended:

    I. Kayaks and covered canoes should have grab loops of ¼-inch + rope or equivalent webbing sized to admit a normal-sized hand. Stern painters are permissible if properly secured.

    II. Open canoes should have securely anchored bow and stern painters consisting of 8 – 10 feet of ¼-inch + line. These must be secured in such a way that they are readily accessible, but cannot come loose accidentally. Grab loops are acceptable but are more difficult to reach after an upset.

    III. Rafts and dories may have taut perimeter lines threaded through the loops provided. Footholds should be designed so that a paddler's feet cannot be forced through them, causing entrapment. Flip lines should be carefully and reliably stowed.

7. **Know your craft's carrying capacity,** and how added loads affect boat handling in whitewater. Most rafts have a minimum crew size which can be added to on day trips or in easy rapids. Carrying more than two paddlers in an open canoe when running rapids is not recommended.

8. **Car-top racks** must be strong and attach positively to the vehicle. Lash your boat to each crossbar, then tie the ends of the boats directly to the bumpers for added security. This arrangement should survive all but the most violent vehicle accident.

2.3 Group Preparedness and Responsibility

1. **Organization.** A river trip should be regarded as a common adventure by all participants, except on instructional or commercially guided trips as defined below. Participants share the responsibility for the conduct of the trip, and each participant is individually responsible for judging his or her own capabilities and for his or her own safety as the trip progresses. Participants are encouraged (but are not obligated) to offer advice and guidance for the independent consideration and judgment of others.

2. **River Conditions.** The group should have a reasonable knowledge of the difficulty of the run. Participants should evaluate this information and adjust their plans accordingly. If the run is exploratory or no one is familiar with the river, maps and guidebooks, if available, should be examined. The group should secure accurate flow information; the more difficult the run, the more important this will be. Be aware of possible changes in river level and how this will affect the difficulty of the run. If the trip involves tidal stretches, secure appropriate information on tides.

3. **Group equipment should be suited to the difficulty of the river.** The group should always have a throw-line available, and one line per boat is recommended on difficult runs. The list may include carabiners, prussic loops, first aid kit, flashlight, folding saw, fire starter, guidebooks, maps, food, extra clothing, and any other rescue or survival items suggested by conditions. Each item is not required on every run, and this list is not meant to be a substitute for good judgment.

4. **Keep the group compact** but maintain sufficient spacing to avoid collisions. If the group is large, consider dividing into smaller groups or using the “buddy system” as an additional safeguard. Space yourselves closely enough to permit good communication, but not so close as to interfere with one another in rapids.

    I. **A point paddler** sets the pace. When in front, do not get in over your head. Never run drops when you cannot see a clear route to the bottom or, for advanced paddlers, a sure route to the next eddy. When in doubt, stop and scout.

    II. **Keep track of all group members.** Each boat keeps the one behind it in sight, stopping if necessary. Know how many people are in your group and take headcounts regularly. No one should paddle ahead or walk out without first informing the group. Paddlers requiring additional support should stay at the center of a group, and not allow themselves to lag behind in the more difficult rapids. If the group is large and contains a wide range of abilities, a “sweep boat” may be designated to bring up the rear.

    III. **Courtesy.** On heavily used rivers, do not cut in front of a boater running a drop. Always look upstream before leaving eddies to run or play. Never enter a crowded drop or eddy when no room for you exists. Passing other groups in a rapid may be hazardous; it's often safer to wait upstream until the group ahead has passed.

5. **Float Plan.** If the trip is into a wilderness area or for an extended period, plans should be filed with a responsible person who will contact the authorities if you are overdue. It may be wise to establish checkpoints along the way where civilization could be contacted if necessary. Knowing the location of possible help and planning escape routes can speed rescue.

6. **Drugs.** The use of alcohol or mind-altering drugs before or during river trips is not recommended. It dulls reflexes, reduces decision-making ability, and may interfere with important survival reflexes.

7. **Instructional or commercially guided trips.** In contrast to the common adventure trip format, in these trip formats, a boating instructor or commercial guide assumes some of the responsibilities normally exercised by the group as a whole, as appropriate under the circumstances. These formats recognize that instructional or commercially guided trips may involve participants who lack significant experience in whitewater. However, as a participant acquires experience in whitewater, he or she takes on increasing responsibility for his or her own safety, in accordance with what he or she knows or should know as a result of that increased experience. Also, as in all trip formats, every participant must realize and assume the risks associated with the serious hazards of whitewater rivers.

8. It is advisable for instructors and commercial guides or their employers to acquire trip or personal liability insurance:

    I. An “instructional trip” is characterized by a clear teacher/pupil relationship, where the primary purpose of the trip is to teach boating skills, and which is conducted for a fee.

    II. A “commercially guided trip” is characterized by a licensed, professional guide conducting trips for a fee.

2.4 Guidelines for River Rescue

1. **Recover from an upset with an Eskimo roll** whenever possible. Evacuate your boat immediately if there is imminent danger of being trapped against rocks, brush, or any other kind of strainer.

2. **If you swim, hold on to your boat.** It has flotation and is easy for rescuers to spot. Get to the upstream end so that you cannot be crushed between a rock and your boat by the force of the current. Persons with good balance may be able to climb on top of a swamped kayak or flipped raft and paddle to shore.

3. **Release your craft if this will improve your chances,** especially if the water is cold or dangerous rapids lie ahead. Actively attempt self-rescue whenever possible by swimming for safety. Be prepared to assist others who may come to your aid.

    I. When swimming in shallow or obstructed rapids, lie on your back with feet held high and pointed downstream. Do not attempt to stand in fast moving water; if your foot wedges on the bottom, fast water will push you under and keep you

there. Get to slow or very shallow water before attempting to stand or walk. Look ahead! Avoid possible pinning situations including undercut rocks, strainers, downed trees, holes, and other dangers by swimming away from them.

II. If the rapids are deep and powerful, roll over onto your stomach and swim aggressively for shore. Watch for eddies and slackwater and use them to get out of the current. Strong swimmers can affect a powerful upstream ferry and get to shore fast. If the shores are obstructed with strainers or undercut rocks, however, it is safer to "ride the rapid out" until a safer escape can be found.

4. **If others spill and swim, go after the boaters first.** Rescue boats and equipment only if this can be done safely. While participants are encouraged (but not obligated) to assist one another to the best of their ability, they should do so only if they can, in their judgment, do so safely. The first duty of a rescuer is not to compound the problem by becoming another victim.

5. **The use of rescue lines requires training;** uninformed use may cause injury. Never tie yourself into either end of a line without a reliable quick-release system. Have a knife handy to deal with unexpected entanglement. Learn to place set lines effectively, to throw accurately, to belay effectively, and to properly handle a rope thrown to you.

6. **When reviving a drowning victim,** be aware that cold water may greatly extend survival time underwater. Victims of hypothermia may have depressed vital signs, so they look and feel dead. Don't give up; continue CPR for as long as possible without compromising safety.

3 Safety, First Aid, and Rescue Equipment

For this study, volunteer boaters participating in the controlled flow releases are required to have the following PPE, regardless of skill level or experience:

- **Personal Floatation Device:** All study participants are required to wear a Type III or V personal floatation device when boating or within 10 feet of the water.

- **Helmet:** All study participants must wear a properly fitted whitewater helmet when boating.

- **Whistle:** All study participants must carry a whistle to alert other participants or spotters of an emergency situation or to signal distress.

- **Sturdy Footwear and Leg Coverings:** All study participants must wear sturdy, closed-toe footwear at put-in and take-out locations or when portaging or scouting rapids. Pants or other leg coverings are required at the put-in and take-out locations.

As noted in the Safety Code, ***it is the responsibility of the study participants to have the PPE, first aid, rescue, and other safety equipment that they determine to be***

appropriate. Participants should consider (both individually and as a group) the equipment that may be appropriate for weather conditions, flows, watercraft, and skill levels. Other appropriate PPE, first aid, rescue, and safety equipment may include (but is not limited to), wetsuits, drysuits, spraycovers, extra oars/paddles, gloves, throw ropes, rescue knives, floatation, first aid kits, and an extra set of dry clothes. It is the responsibility of study participants to have the PPE, safety, first aid, and rescue equipment available for the controlled flow releases and to be familiar with proper use of any such equipment.

4 Alcohol and Drug Policy

For the safety of all participants, and consistent with the Safety Code, the use of alcohol or drugs is prohibited during the controlled flow releases. Whitewater rafting requires exceptional physical exertion and risk of injury or death from whitewater rafting can be mitigated by excluding those under the influence of alcohol or drugs. As noted in the Safety Code, the use of alcohol or drug, dulls reflexes, reduces decision-making ability, and may interfere with important survival reflexes. ***Persons who appear visibly intoxicated will not be allowed to participate in the study.***

5 Safety Issues

Each volunteer boater is responsible for understanding the safety issues associated with participation in the study. In addition to the safety guidance discussed in the Safety Code, volunteer boaters should be aware of the following safety issues that may be encountered during the study:

- **Strainers and obstructions** along the Project's bypass reach that present potential pinning scenarios for boats and boaters, including downed trees, rocks/boulders, and bridge pilings.
- **Potential foot entrapments** that could result from dangling feet over or near the bottom of the river or attempting to stand in the current.
- **Weather related illness**, such as hypothermia or dehydration.
- **Severe or sudden weather events** (i.e., thunderstorms, heavy rainfall, etc.).
- **Sudden rapid flow releases** that may occur if the powerhouse is tripped offline (due to a lightning strike or equipment failure) or if water is released through the surge gate located upstream from the Projects E.L. Field Powerhouse.
- **Advice/encouragement from the general public** to attempt rivers or rapids which lie beyond the volunteer boater's ability.

- **Sudden changes in physical health or mental condition** of volunteer boater on the day of the study.

- **Hazardous materials** commonly found along the shoreline of many urban rivers, including broken glass, rusted metal, and used hypodermic needles.

- **Unexpected emergency situations** (i.e., medical/health emergency, boating collisions, etc.).

6 Safety Measures

Boott, the Working Group, and study participants will all have responsibilities to support safe boating during the controlled flow releases. The following safety measures will be implemented for this study:

- Volunteer boaters will be experienced and will have the skills necessary to boat the Project's bypass reach. AW will be responsible for selecting volunteers to participate in the controlled flow releases.

- The minimum age for participating in the controlled flow releases is 18. All participants will sign a waiver prior to boating the controlled flow releases. Individuals who do not sign the waiver will not be allowed to participate in the Whitewater Study.

- All study participants must adhere to the COVID-19 Protocols described in Section 7 of this Safety Plan. Boott reserves the right to remove any participant who does not adhere to the COVID-19 Protocols from the Whitewater Study.

- All study participants will be required to provide contact information for themselves and an emergency contact. Study participants will have the option to disclose medical conditions/disabilities that could be relevant to potential medical treatment/care (i.e., allergies to certain medications, asthma, etc.).

- Boott will maintain contact information for the City's fire department. The point of contact (POC) for the fire department shall be Joe Roth, Interim Fire Chief, 978-674-1217.

- At least 48 hours prior to boating the controlled flow releases, Boott will contact the City's fire department and any other contact designated by the City to make them aware of the timing and expected schedule for the controlled flow releases. If the fire department's POC has concerns regarding the timing or schedule for controlled flow releases, Boott will consult the working group to address any concerns. If the concerns cannot be addressed to the satisfaction of the fire department's POC, Boott reserves the right to postpone the study.

- Prior to boating the controlled flow releases, all study participants will participate in a daily "tailgate" safety discussion. During the tailgate discussion, Boott will summarize

the safety plan, including the procedures for emergencies. The tailgate discussion will be an opportunity for the Working Group to provide any additional or updated safety information to study participants, and for the volunteer boaters participating in the controlled flow releases to discuss conditions and any additional safety measures, recommendations, or guidance. Boott will document any new or modified safety measures, recommendations or guidance in the Safety Plan Addendum provided in Appendix A to this Safety Plan.

- Prior to boating the controlled flow releases, all study participants will participate in an equipment check to be sure that their gear is in proper functioning condition, all loads are secured so as not to break free and cause harm to fellow study participants, and that required PPE (i.e., vest, helmet, and whistle) are not damaged in a way that would inhibit them from working properly.

- Study participants will sign-in and sign-out on a daily basis and Boott will record the names of individual volunteer boaters as they put-in and take-out their craft.

- During the controlled flow releases, Boott will place “spotters” at two locations identified in the field in consultation with the Working Group. The spotters will observe boaters during the controlled flow releases and will be prepared to call emergency services (911) if there is an observed accident, injury, pinning, or other emergency.

- Boott, the Working Group, and study participants will continually evaluate boating safety and will speak with anyone whose actions on the water are dangerous.

- Study participants will make the decision to scout any rapid, and to run or portage according to their best judgment. Do not enter a rapid unless you are reasonably sure that you can run it safely or swim it without injury. Consistent with the Safety Code, it is the responsibility of individual study participants to decide whether to pass up any walk-out or take-out opportunity.

- A “sweep boat” will be designated for each controlled flow release to ensure all study participants have safely exited the water.

- Study participants should avoid touching or handling any hazardous materials observed along the shoreline, including broken glass, rusted metal, or used hypodermic needles. Sturdy, closed-toe footwear should be worn at put-in and take-out locations or when portaging or scouting rapids.

- Any study participant should call 911 to report life-threatening or medical emergencies (i.e., chest pains) during the controlled flow releases. When calling 911, briefly describe the incident you are reporting to the dispatcher, remain calm, speak clearly, and stay on the line.

- If a safety incident occurs during the controlled flow releases, and a rescue is required, Boott will notify Project operations staff. If the flow in the bypass reach can

safely be reduced to facilitate rescue, Project staff will reduce the flow as quickly as possible.

- Boott reserves the right to remove any participant from the Whitewater Study who does not follow the safety measures or is acting in an unsafe manner.

7 COVID-19 Protocols

COVID-19 is a new disease that presents hazards that must be considered and addressed as part of this Whitewater Study. Massachusetts Governor Charlie Baker declared a State of Emergency to Respond to COVID-19 on March 10, 2020, and the World Health Organization designated COVID-19 as a pandemic on March 11, 2020. On March 13, 2020, the President of the United States declared the COVID-19 pandemic a national emergency.

The Commonwealth of Massachusetts remains under an emergency declaration and has promulgated regulations and guidance to reduce the spread of COVID-19. The Commonwealth's regulations and guidance related to COVID-19 are available at https://www.mass.gov/info-details/covid-19-updates-and-information**.**

Boott notes that the Commonwealth's regulations and guidance are subject to change, and study participants must review the guidance and recommendations prior to arriving at the Project. It is the responsibility of each study participant to review and comply with the Commonwealth's regulations and guidance regarding COVID-19.

The spread of COVID-19 between humans most likely occurs when a person is within six feet of an infected person. Sources of exposure to COVID-19 include droplets of respiratory secretions produced when an infected person coughs or sneezes; these droplets are believed to enter the mouths and noses of people nearby and can be inhaled into the nose and lungs. Exposure can also occur by touching surfaces/objects contaminated with the virus (SARS-COV-2) that causes the disease and then touching the mouth, nose, or possibly the eyes. Activities that involve close (within six feet) contact with infected people or other sources of the virus, social conditions (i.e., high population density, frequent person-to-person contact, large group gatherings), or travel to areas highly affected by COVID-19 are risk factors for exposure to the virus. (OSHA 2020)

Hazards associated with exposure to the virus include developing COVID-19 illness, which has a wide range of symptoms ranging from mild to severe illness, and, in some cases, death. Symptoms may appear 2-14 days after exposure to the virus. People at higher risk for severe illness include older adults, people with severe underlying medical conditions (i.e., heart or lung disease, liver disease), people with asthma, and/or people that are immunocompromised.

The following COVID-19 protocols to prevent or reduce the likelihood of exposure to the virus will be implemented during the Whitewater Study:

- The Commonwealth of Massachusetts has issued a COVID-19 Travel Order, effective August 1, 2020. The Travel Order requires visitors and Massachusetts residents returning from certain states to complete the Massachusetts Travel Form and self-quarantine (or produce a negative COVID-19 test result that has been administered up to 72 hours prior to arrival in Massachusetts). ***It is the responsibility of each study participant to review and comply with the Commonwealth's COVID-19 Travel Order.*** Failure to comply may result in fines or legal action by the Commonwealth.

- For the safety of staff, contractors, study volunteers, and the public, Boott is implementing a COVID-19 screening for study participants. ***Participants must complete the COVID-19 Screening Form in Appendix B of this Safety Plan and email an electronic copy of the completed form to Kevin Webb with Boott at kwebb@centralriverspower.com. The completed COVID-19 Screening Form must be emailed the day before the controlled flow releases are scheduled to begin***. Persons who do not complete the form or who answer any of the screening questions in the affirmative will not be allowed to participate in the Whitewater Study.

- When arriving at the Project, all study participants will have their temperature screened. Temperature screening will be conducted by Boott using a non-contact thermometer. Study participants exhibiting a temperature of 100.4 degrees Fahrenheit or higher will not be allowed to participate in the study.

- Study participants will maintain a minimum of six feet of social distance during the Whitewater Study, including tailgate safety meetings. If appropriate social distancing cannot be maintained, use of a face covering is required.

- It is the responsibility of each study participant to have the appropriate PPE to prevent or reduce the likelihood of exposure to COVID-19. This PPE includes a face covering and hand sanitizer and/or sanitizing wipes.

- To prevent or reduce the likelihood of exposure to COVID-19, the following hygienic practices will be followed by all study participants:

  - Wash hands regularly and thoroughly with soap and water, for a minimum of 20 seconds. Hand sanitizer (containing at least 60 percent alcohol) may be used if soap and water is not available;
  - Avoid touching your nose, mouth, and eyes and sanitize hands before and after eating;
  - Cover coughs and sneezes with a tissue, or cough and sneeze into upper sleeve if tissues are not available;
  - Properly dispose of tissues immediately after use (do not place used tissues in clothing pockets);

  - Wash hands or use hand sanitizer after coughing, sneezing or blowing your nose;
  - Wipe-down frequently touched surfaces and equipment with sanitizing wipes;
  - Use disposable gloves if handling equipment that may be contaminated;
  - Avoid using or sharing other's equipment;
  - Avoid handshakes and direct physical contact with others; and
  - Always wash/sanitize hands after physical contact with others.

- ***To reduce overall exposure, one-person crafts (i.e., kayaks) are recommended for use during the controlled flow releases.*** If a multi-person craft is used, the total number of volunteer boaters on the craft should not exceed the minimum crew size necessary to safely operate the craft, and all volunteer boaters should be separated as far as possible.

- Boott will operate a shuttle system between put-in and take-out locations. Study participants will load/unload their own equipment. A maximum of two occupants will be permitted in each of the shuttle vehicles, including a driver and passenger. Passengers must ride in the back seat, and both the driver and passenger are required to wear a mask or face covering while in the vehicle. Frequently touched surfaces (i.e., door handle, seat belt, etc.) should be disinfected after every shuttle trip.

- Any study participant with signs or symptoms of COVID-19 must report symptoms to Boott and must leave the Project as soon as safely possible.

- Specific guidance from the State of Massachusetts regarding COVID-19, including requirements of any local, state, and federal government directives and/or ordinances applicable to the study area will be reviewed prior to the study and implemented as necessary.

- Boott reserves the right to remove any participant from the Whitewater Study who does not follow the COVID-19 Protocols or who is acting in an unsafe manner.

8 Contact Information

Contact information for emergency services, law enforcement, and Boott personnel are provided below. ***In the event of a life-threatening or medical emergency, call 911.***

City of Lowell Fire Department
99 Moody Street
Lowell, MA 01852
(978) 458-4588

City of Lowell Police Department
50 Arcand Drive
Lowell, MA 01852
(978) 937-3200

National Park Service
Park Ranger (Law Enforcement)
Waiting for Contact Info
From Christine Bruins

Lowell General Hospital
295 Varnum Avenue
Lowell, MA 01854
(978) 937-6000

Kevin Webb
Boott Hydropower, LLC
670 N. Commercial Street, Suite 204
Manchester, NH 03101
(978) 935-6039
kwebb@centralriverspower.com

9 References Cited

American Whitewater. 2005. Safety Code of American Whitewater. Available at: https://www.americanwhitewater.org/content/Wiki/safety:start. Accessed September 8, 2020.

Occupational Health and Safety (OHSA). 2020. COVID-19. Available at: https://www.osha.gov/SLTC/covid-19/. Accessed May 28, 2020.

Appendix A
Safety Plan Addendum

Lowell Hydroelectric Project
Whitewater Boating and Access Study Safety Plan

Safety Plan Addendum

Record any revisions to the Whitewater Boating and Access Study Safety Plan in the table below. Revisions must be communicated to all study participants.

Revision	Reason	Revised By	Date

Appendix B
COVID-19 Screening Form

Lowell Hydroelectric Project
Whitewater Boating and Access Study Safety Plan

COVID-19 Screening Form

Please read each question in the table below carefully and circle the answer that applies to you.

1. Within the past 14 days, have you, or anyone in your household, been in close physical contact (6 feet or closer for at least 15 minutes) with a person who is known to have laboratory-confirmed COVID-19 or with anyone who has any symptoms consistent with COVID-19?	YES	NO
2. To the best of your knowledge, have you, or anyone in your household, been in close contact with a person that is in the process of being tested for COVID-19?	YES	NO
3. Are you, or anyone in your household, currently waiting on the results of a COVID-19 test?	YES	NO
4. Have you, or anyone in your household, experienced any of the following symptoms in the past 72 hours: • fever (over 100.4 degrees Fahrenheit) or chills • cough • shortness of breath or difficulty breathing • fatigue • muscle or body aches • headache • new loss of taste or smell • sore throat • congestion or runny nose • nausea or vomiting • diarrhea	YES	NO
5. Have you, or anyone in your household, traveled internationally, been on a cruise ship, or been to a state other than a lower-risk state designated by the Massachusetts Department of Public Health (*see* https://www.mass.gov/info-details/covid-19-travel-order) in the last 14 days?	YES	NO

Name Signature Date

A completed copy of this COVID-19 Screening Form must be emailed to Kevin Webb with Boott Hydropower, LLC at kwebb@centralriverspower.com the day before the controlled flow releases.

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Pre-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: _____ **Affiliation:** _____

Home Zip Code: _____

E-Mail Address: _____

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak / C1
   b. Inflatable kayak
   c. Open canoe with flotation
   d. Cataraft (include length)
   e. Self-bailing raft (include length)
   f. Stand-up paddleboard
   g. Other (please list)

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   c. Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater

3) How many years have you been whitewater boating?

4) Over the past 3 years, approximately how many days per month did you whitewater boat?

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. _Yes No
   b. If yes, when, and for which project(s)?

6) How many times have you boated this reach before today?

   a. If you have boated this reach before, what were the flows?

      i. Approximately: cfs to: cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak / C1
         2. Inflatable kayak
         3. Open canoe with flotation
         4. Cataraft (include length)
         5. Self-bailing raft (include length)
         6. Stand-up paddleboard
         7. Other (please list)

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Post-Run Survey

Lowell Hydroelectric Project Bypass Reach

Name: _____ **Date of Run:** _____

Flow: _____**cfs**

1) What type of craft did you use for this run?
    a. Hard shell kayak / C1
    b. Inflatable kayak
    c. Open canoe with flotation
    d. Cataraft (include length)
    e. Self-bailing raft (include length)
    f. Stand-up paddleboard
    g. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: _____ Time: _____

Take-out location: _____ Time: _____

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
    a. I accidently hit rocks or other obstacles (but did not stop) about_times.

    b. I was stopped after hitting rocks or other obstacles about_times (but did not have to get out of my boat to continue downstream).

    c. I had to get out to drag or pull my boat off rocks or other obstacles about _____ times.

    d. I had to portage around rapids or sections about_times.

4) How many rapids and play spots did you experience at this flow?

   a. _Rapids Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	4	5
Challenge	1	2	3	4	5
Safety	1	2	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?
   a. Beginner
   b. Novice
   c. Intermediate
   d. Advanced
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?
   a. Definitely no
   b. Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks / C1	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Open canoes with floatation	1	2	3	4	5
Catarafts	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Stand-up paddleboards	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

11) Please use the space below to provide any other comments about your boating experience at this flow.

_____
_____
_____
_____
_____
_____
_____

Thank You for Your Participation

Lowell Hydroelectric Project (FERC No. 2790)
FERC Relicensing
Whitewater Boating Flow Comparison Survey

Lowell Hydroelectric Project Bypass Reach

Name: _____ **Date:** _____

1) Craft used?
    a. Hard shell kayak / C1
    b. Inflatable kayak
    c. Open canoe with flotation
    d. Cataraft (include length)
    e. Self-bailing raft (include length)
    f. Stand-up paddleboard
    g. Other (please list)

2) What is your skill level?
    a. Novice (comfortable running Class II whitewater)
    b. Intermediate (comfortable running Class III whitewater)
    c. Advanced (comfortable running Class IV whitewater)
    d. Expert (comfortable running Class V whitewater

3) Which study dates/flows did you participate in? Please select from the list below.

Study Flows	Study Date	Participated	Did Not Participate
cfs			
cfs			
cfs			

4) Approximately how many times have you boated this reach before this study?

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	2	3	4	5
Whitewater "Play Areas"	1	2	3	4	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater Challenge	1	2	3	4	5
Safety	1	2	3	4	5
Crowding	1	2	3	4	5
Long Run(s)	1	2	3	4	5
Short Run(s)	1	2	3	4	5
Low Number of Portages	1	2	3	4	5
High Number of Rapids	1	2	3	4	5
Low Number of Rapids	1	2	3	4	5
Easy Access	1	2	3	4	5
Easy Shuttles	1	2	3	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	cfs	cfs	cfs
Totally Acceptable	5	5	5
Acceptable	4	4	4
Marginal	3	3	3
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	Yes	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	Yes	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s]).* Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

iii. Craft: Experience: Flow:_____cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

iv. Craft: Experience:__Flow:_____cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

v. Craft: Experience: Flow: cfs to:___cfs

d. What is the highest safe flow for your craft and skill level?

vi. Craft: Experience: Flow:_____cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	5
Acceptable	4	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: _____ Facilities: _____

b. Take Out Location: _____ Facilities: _____

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: _____
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Iffert, Kelsey

From: Williams, Chris <CHRISTIAN.P.WILLIAMS@des.nh.gov>
Sent: Monday, May 1, 2023 11:29 AM
To: Iffert, Kelsey
Cc: kwebb@patriothydro.com; Couture, Steve
Subject: RE: Lowell Hydroelectric Project - Coastal Zone Determination

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Ms. Iffert,

Thanks for your email. You are correct that the Lowell Hydroelectric Project ("Project") referenced in your email below is located outside New Hampshire's coastal zone. As a result, the proposed relicensing of the Project is not subject to Coastal Zone Management Act federal consistency review by the New Hampshire Coastal Program.

Please feel free to contact me should you have any further questions.

Regards,

Christian Williams|Program Coordinator
Coastal Program
Watershed Management Bureau
Water Division, NH Department of Environmental Services
222 International Drive, Suite 175
Portsmouth, NH 03801
Phone: 603-559-0025
Christian.P.Williams@des.nh.gov
Follow us on Twitter
Like us on Facebook

From: Iffert, Kelsey <Kelsey.Iffert@hdrinc.com>
Sent: Monday, May 1, 2023 10:33 AM
To: Couture, Steve <steven.couture@des.nh.gov>
Cc: Kevin Webb <kwebb@patriothydro.com>
Subject: Lowell Hydroelectric Project - Coastal Zone Determination

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.

Good morning,

Boott Hydropower, LLC (Boott), owns and operates the Lowell Hydroelectric Project ("Project" or "Lowell Project"), located at river mile 41 on the Merrimack River within the City of Lowell, Massachusetts, and with a project boundary extending upstream into New Hampshire. Boott operates the Project under a license from the Federal Energy Regulatory

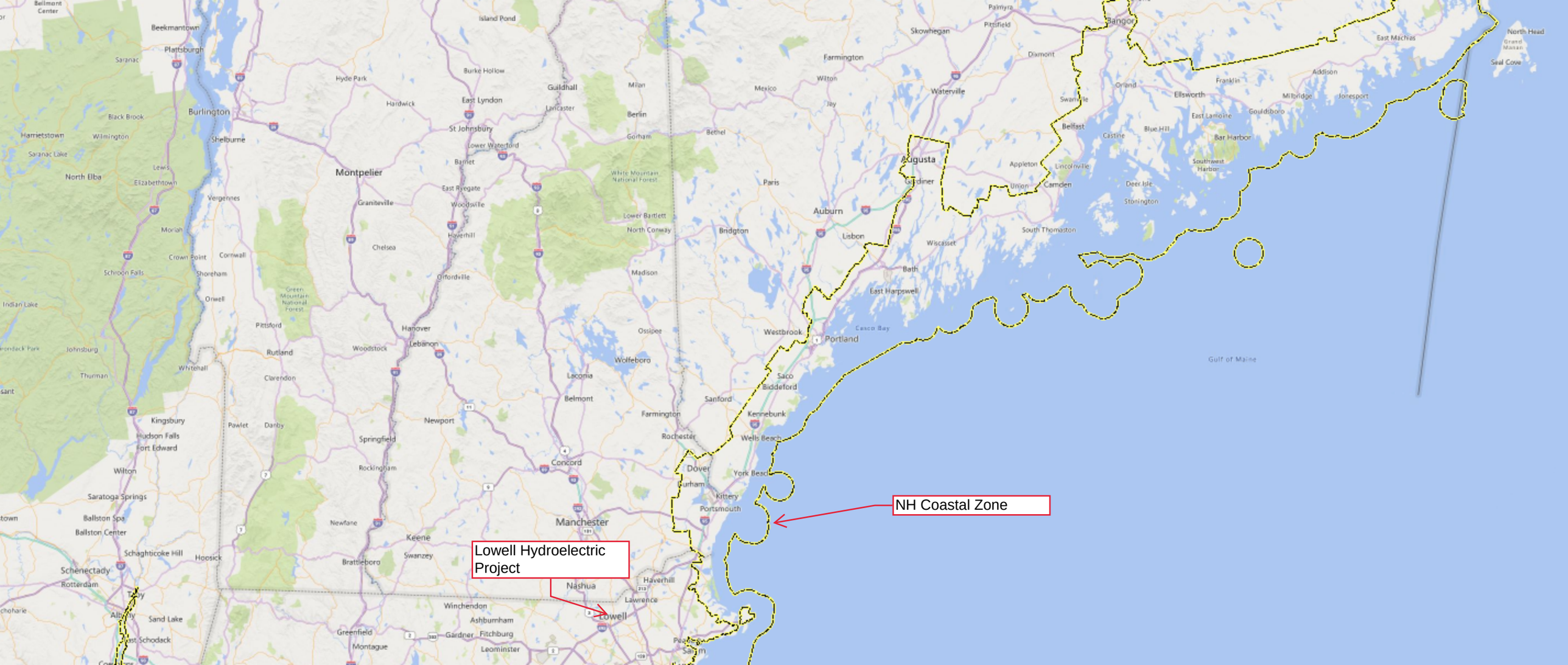
Commission (FERC or Commission). The Project's existing license expired on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. In accordance with the applicable regulations at 18 C.F.R. § 5.17(a), Boott filed with the Commission a Pre-Application Document (PAD) in 2018, and a Final License Application (FLA) on April 30, 2021. The FLA can be downloaded here: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=020D18AB-66E2-5005-8110-C31FAFC91712

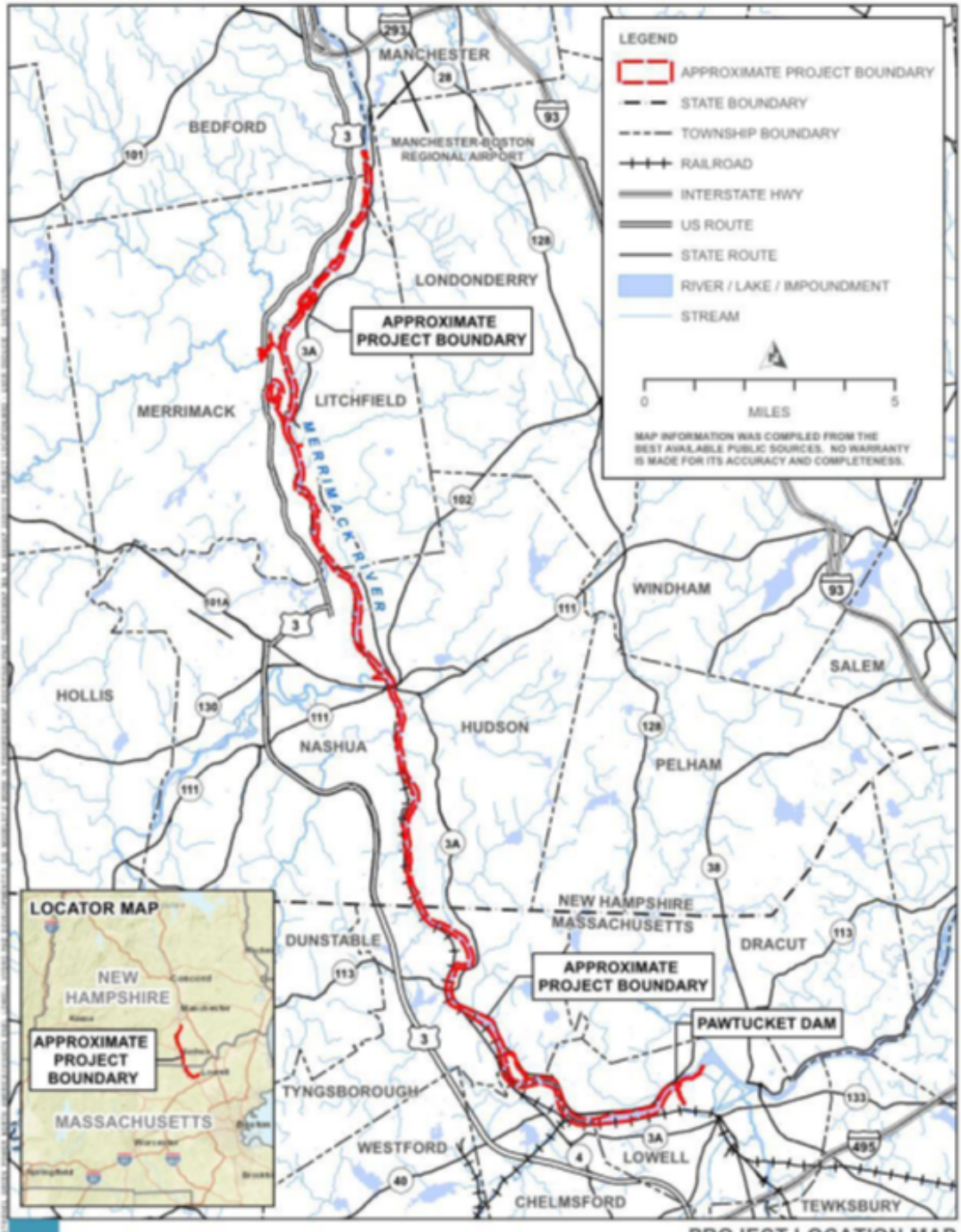
In preparing the PAD, Boott reached out to your offices in 2018 for a determination as to whether the Project was located in the state's coastal zone and requires a federal consistency review, but did not receive a response. Given that the Project is not located within the state's coastal zone, and as a run-of-river facility has no reasonably foreseeable adverse effects on the state's coastal zone, Boott does not believe the Project requires a federal consistency review. Location maps of the Project and your state's coastal zone are attached for reference.

Boott is seeking your determination by May 15, 2023 as to whether the relicensing of the Project requires a federal consistency review. In the meantime, let us know if require more information.

Kelsey Scott Iffert, MS
Environmental/Regulatory Section Lead

HDR
231 Salina Meadows Parkway, Suite 210
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.iffert@hdrinc.com
hdrinc.com/follow-us


NH Coastal Zone
Lowell Hydroelectric Project
Burlington
Montpelier
Augusta
Auburn
Portland
Manchester
Concord
Nashua
Lowell
Keene
Dover
Portsmouth
Gulf of Maine



BOOTT HYDRO, LLC.

PROJECT LOCATION MAP
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

NOVEMBER 2020

Iffert, Kelsey

From: Iffert, Kelsey
Sent: Monday, May 1, 2023 10:02 AM
To: Boeri, Robert (EEA); Bordonaro, Patrice (EEA)
Cc: Kevin Webb
Subject: Lowell Hydroelectric Project - Coastal Zone Determination
Attachments: MA Coastal Zone Project Map.pdf

Good morning,

Boott Hydropower, LLC (Boott), owns and operates the Lowell Hydroelectric Project ("Project" or "Lowell Project"), located at river mile 41 on the Merrimack River within the City of Lowell, Massachusetts. Boott operates the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expired on April 30, 2023. Boott is pursuing a new license for the Project using the Commission's Integrated Licensing Process as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. In accordance with the applicable regulations at 18 C.F.R. § 5.17(a), Boott filed with the Commission a Pre-Application Document (PAD) in 2018, and a Final License Application (FLA) on April 30, 2021. The FLA can be downloaded here: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=020D18AB-66E2-5005-8110-C31FAFC91712

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Boott is seeking your determination by May 15, 2023 as to whether the relicensing of the Project requires a federal consistency review. In the meantime, let us know if require more information.

Kelsey Scott Iffert, MS
Environmental/Regulatory Section Lead

HDR
231 Salina Meadows Parkway, Suite 210
Syracuse, NY 13212
D 315.414.2206 **M** 315.706.5176
kelsey.iffert@hdrinc.com
hdrinc.com/follow-us

Map coordinate system: North American Datum of 1983 (NAD83),
Massachusetts State Plane Coordinate System, Mainland Zone, meters.

NEW HAMPSHIRE

Lowell Hydroelectric Project

AMESBURY
SALISBURY
NEWBURYPORT
NEWBURY
ROWLEY
IPSWICH
ROCKPORT
ESSEX
GLOUCESTER
MANCHESTER
DANVERS
BEVERLY
PEABODY
SALEM
MARBLEHEAD
LYNN
SWAMPSCOTT
SAUGUS
NAHANT
REVERE
EVERETT
CHELSEA
WINTHROP
BOSTON
HULL
QUINCY
MILTON
COHASSET
HINGHAM
BRAINTREE
WEYMOUTH
SCITUATE
NORWELL
HANOVER
MARSHFIELD
PEMBROKE
DUXBURY
KINGSTON
PLYMOUTH
PROVINCETOWN
TRURO
WELLFLEET
EASTHAM
ORLEANS
BREWSTER
DENNIS
HARWICH
CHATHAM
BOURNE
SANDWICH
BARNSTABLE
YARMOUTH
MASHPEE
FALMOUTH
WAREHAM
SEEKONK
REHOBOTH
DIGHTON
BERKLEY
SWANSEA
SOMERSET
FALL RIVER
FREETOWN
ACUSHNET
MARION
NEW BEDFORD
MATTAPOISETT
FAIRHAVEN
DARTMOUTH
WESTPORT
GOSNOLD
TISBURY
OAK BLUFFS
WEST TISBURY
EDGARTOWN
CHILMARK
AQUINNAH
NANTUCKET

RHODE ISLAND

BIGELOW BIGHT
GULF OF MAINE
STELLWAGEN BANK NATIONAL MARINE SANCTUARY
MASSACHUSETTS BAY
CAPE COD BAY
NANTUCKET SOUND
VINEYARD SOUND
BUZZARDS BAY
RHODE ISLAND SOUND

MASSACHUSETTS OFFICE OF COASTAL ZONE MANAGEMENT

Coastal Zone Boundary

CZM Regions:
- North Shore
- Boston Harbor
- South Shore
- Cape Cod and Islands
- South Coastal

- Above -15m
- -15m to -25m
- -25m to -40m
- -40m to -90m
- -90m to -200m
- Below -200m

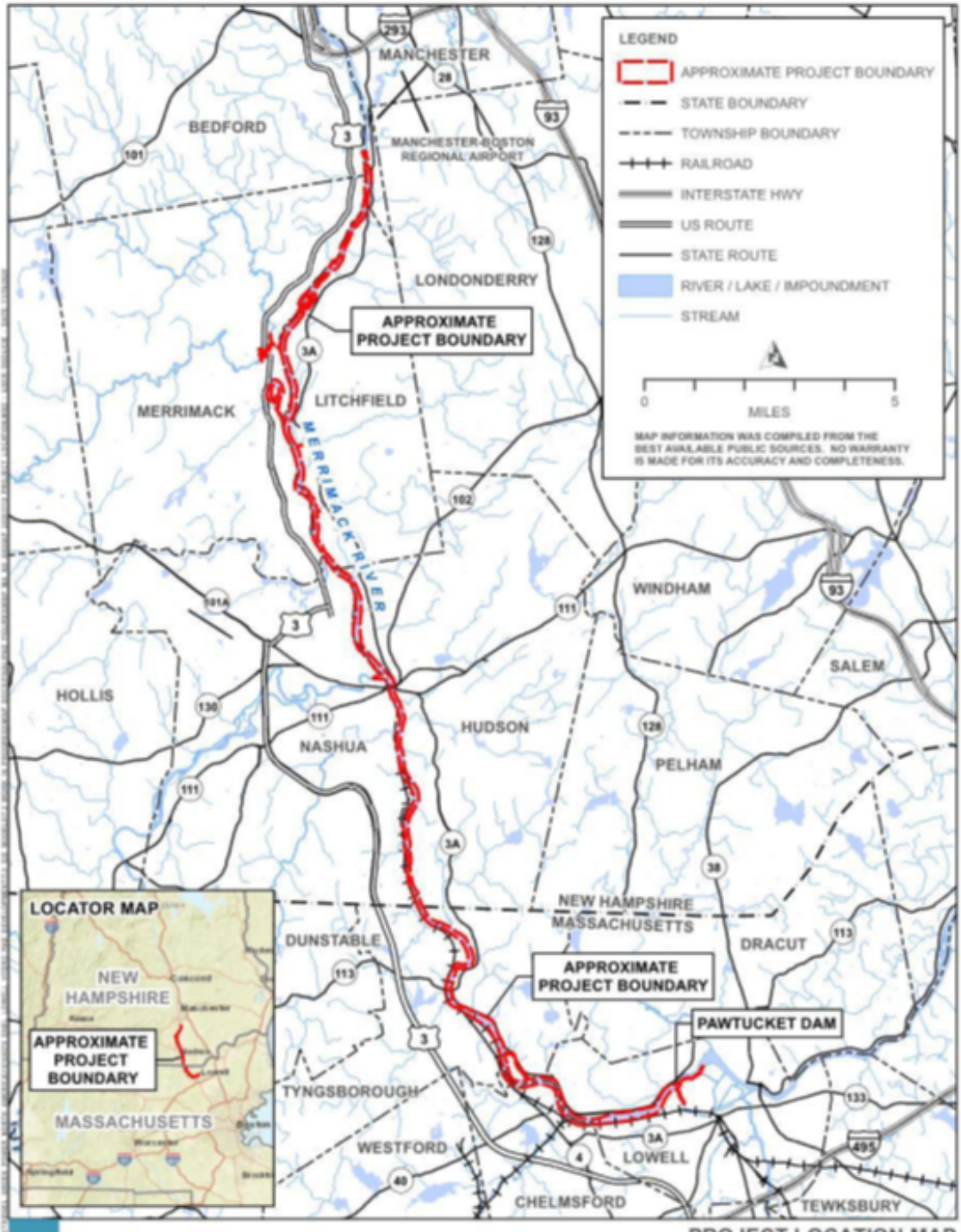
The Massachusetts Coastal Zone

www.mass.gov/czm/mapping/czboundary.htm

0 5 10 20 Miles

0 5 10 20 Kilometers

Revised January 2014



BOOTT HYDRO, LLC.

PROJECT LOCATION MAP
LOWELL HYDROELECTRIC PROJECT
FERC NO. 2790

NOVEMBER 2020

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
100 Cambridge Street, Suite 900, Boston, MA 02114 ◦ (617) 626-1200

January 23, 2025

Jim Gibson
Vice President, National Business Class Lead
HDR
231 Salina Meadows Parkway
Suite 210
Syracuse, NY 13212

Re: CZM Federal Consistency Review of the Lowell Hydroelectric Project; Lowell.

Dear Mr. Gibson:

The Massachusetts Office of Coastal Zone Management received your request for a determination on location within the MA coastal zone on January 23, 2025, concerning the project referenced above.

The activities associated with this project fall outside the geographical boundaries of the Massachusetts Coastal Zone as delineated in Chapter 5: Massachusetts Coastal Regions and An Atlas of Resources, 1 June 1977 and further described in the Massachusetts Office of Coastal Zone Management Policy Guide and therefore are not subject to federal consistency review by this office at this time.

Thank you for submitting the information to CZM. If you have any questions regarding the CZM review process, please feel free to reach me at Sean.Duffey@mass.gov

Sincerely,

Sean Duffey
Project Review Coordinator