

APPENDIX F

Wetland Resource Analysis Report

Armstrong Dam Removal Feasibility Study



August 2, 2016

Email [arubin@gomezandsullivan.com]

Aaron Rubin, EIT
Gomez and Sullivan Engineers, DPC
41 Liberty Hill Road
Henniker, NH 03242

**Re: Wetland Resource Area Analysis Report
Armstrong Dam Removal Project
Monatiquot River
Braintree, Massachusetts**

[LEC File #: G&SE\16-204.01]

Dear Mr. Rubin:

As requested, LEC Environmental Consultants, Inc., (LEC) conducted a site evaluation and Wetland Resource Area analysis at the above-referenced site in Braintree, Massachusetts. The purpose of the evaluation was to determine Wetland Resource Area boundaries associated with portions of the Monatiquot River upstream and downstream of the Armstrong Dam Removal Project. The evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* (WPA; M.G.L. c. 131, s. 40), its implementing *Regulations* (310 CMR 10.00), the federal *Clean Water Act* (CWA; 33 U.S.C. 1344, s.404) and its *Regulations* (33 CFR and 40 CFR), and the *Town of Braintree's Wetland Protection Bylaw* (Chapter 12.20) and its implementing *Regulations*. The following report provides a general site description, wetland delineation methodology, a description of the Wetland Resource Areas, and potential regulatory implications.

General Site Description

The site evaluation and wetland boundary determination was focused on the "Field Survey Area" as depicted on the attached graphic prepared by Gomez and Sullivan entitled, *Massachusetts Division of Marine Fisheries, Armstrong Dam Removal, Field Survey Area* (Attachment A). The Field Survey Area includes approximately .50 miles of the Monatiquot River and Hollingsworth Pond located in the vicinity of the Armstrong Dam within the central portion of Braintree, Massachusetts (Attachment B). The downstream extent of the Field Survey Area is immediately west of the stone arch MBTA Railroad Bridge. The upstream extent of the Field Survey Area is approximately 500-feet west of Hancock Street (Route 37). The Field Survey Area includes areas surrounding the aforementioned river and pond and includes portions of 14 parcels. Representative photographs of the Field Survey Area are included as Attachment C.

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The Monatiquot River meanders in a southeasterly direction from a culvert beneath Jefferson Street toward an expansive forested wetland system in the vicinity of the upstream extent of the Field Survey Area, continuing toward the dam through a culvert beneath Hancock Street. The stream turns north immediately east of Hancock Street then flows beneath the Plain Street Bridge and discharges into Hollingsworth Pond. Hollingsworth Pond is a 3.5 acre impoundment created by Armstrong Dam. Downstream of the dam, the river flows north towards the stone arch MBTA Railroad Bridge ultimately discharging into the Fore River near Weymouth Landing.

Commercial and residential development on Hancock Street, Plain Street, and Washington Street surrounds the Field Survey Area. An industrial building complex is situated immediately to the east and west of the Armstrong Dam. The complex includes two large buildings that are connected by an elevated causeway which extends above the Armstrong Dam. Extensive paved and gravel parking areas are located in the vicinity of the building complex. The landscape in the vicinity of the river and pond is defined by historic disturbance and manmade features including fill slopes along the river.

Forested uplands have become established in the disturbed landscape within the Field Survey Area with large boulders, solid waste, and fill material evident throughout the landscape. The forested upland areas are generally narrow bands of vegetation adjacent to forested wetlands and/or the Bank of the river and pond. These upland areas occupy moderate to steep slopes adjacent to the downstream portion of the Field Survey Area, but are generally flat, transitioning gently into the slopes of the Bank and associated Bordering Vegetated Wetland (BVW) in the upstream area.

Vegetation throughout the forested upland portions of the Field Survey Area consists of a canopy layer of northern catalpa (*Catalpa speciosa*), Norway maple (*Acer platanoides*), northern red oak (*Quercus rubra*), white oak (*Quercus alba*), and honey locust (*Gleditsia triacanthos*). The understory includes saplings from the canopy layer and a shrub layer of staghorn sumac (*Rhus typhina*), smooth sumac (*Rhus glabra*), multiflora rose (*Rosa multiflora*), and common buckthorn (*Rhamnus cathartica*). The groundcover layer contains expansive patches of poison ivy (*Toxicodendron radicans*).

According to the Soil Survey of Norfolk and Suffolk Counties, the portion of the Field Survey Area in the vicinity of the industrial buildings contains Urban Land, Udorthents (wet substratum), Udorthents (Loamy), and Water. The wetland system west of Hancock Street is mapped with Whitman fine sandy loam. Field evaluations of the soil conditions were generally consistent with the soil survey mapping.

Natural Heritage and Endangered Species Program Designation

According to the 13th edition (October 1, 2008) of the *Massachusetts Natural Heritage Atlas* published by the Natural Heritage & Endangered Species Program (NHESP), the site is not located within a *Priority Habitat of Rare Species* or *Estimated Habitat of Rare Wildlife*. No Certified Vernal Pools (CVP) or Potential Vernal Pools (PVP) are mapped on or within the immediate vicinity of the site.



Floodplain Designation

According to the July 17, 2012 FEMA Flood Insurance Rate Map for Plymouth County (*Community Panel 25021 C 0209E*), the Field Survey Area is mapped as a Zone AE (e.l. 83 – 102) – *Special Flood Hazard Areas subject to inundation by the 1% annual chance flood - Base Flood Elevations determined*. Small portions of the Field Survey Area near the Plain Street Bridge and east of Hancock Street are mapped as Zone X (shaded) - *Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood*.

Wetland Boundary Determination Methodology

On July 12, 14, and 15, 2016, LEC conducted site evaluations to identify and characterize existing protectable Wetland Resource Areas within the site. The Bordering Vegetated Wetland (BVW) boundaries were determined through observations of the existing plant communities, using the "fifty percent criteria" to determine dominance of wetland/upland vegetation, the interpretation of soil characteristics, and other indicators of wetland hydrology in accordance with the Massachusetts Department of Environmental Protection (MADEP) handbook, *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act* (March 1995), the *Field Indicators for Identifying Hydric Soils in New England* (April, 2004), the criteria set forth in 310 CMR 10.55, and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeastern Region*.

LEC utilized a Trimble Handheld GEO XH-6000 Global Positioning System (GPS) unit to locate the established wetland flags, as shown on Attachments 1-4 and provided the shapefile data to Gomez and Sullivan Engineers on July 21, 2016. The post-processed data accuracy is between 1 and 2 feet, on average according to GPS Pathfinder Office program.

The boundaries of the BVW were demarcated in the field with blaze orange, surveyor's flagging tape embossed with the words "LEC Resource Area Boundary" in bold, black print. BVW flags are numbered A1 – A17 and B1 – B23.

The boundary of Bank associated with the Monatiquot River and Hollingsworth Pond was also delineated. Bank to the Monatiquot River is essentially coincident with the Mean Annual High Water (MAHW) Line and the Ordinary High Water (OHW) mark, and was delineated with blue flagging numbered MAHW A1 – MAHW A48 and MAHW B1 – MAHW B55. The boundary of Bank/OHW associated with Hollingsworth Pond was demarcated in the field with blue flagging numbered Bank A1 – Bank A43 and Bank B1 – Bank B38. Bank was delineated in accordance with the definition of Bank at 310 CMR 10.54 and MAHW was delineated in accordance with the definition of MAHW at 310 CMR 10.58 as further described below in the *Bank and Riverfront Area* sections, respectively.



The OHW mark was determined in accordance with the Corps Regulations definition. According to a December 7, 2005 Regulatory Guidance Letter issued by the US ACOE, Corps Regulations define the term “Ordinary High Water Mark” as: *...That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed in the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

Wetland Resource Areas

Wetland Resource Areas associated with the site include Bordering Vegetated Wetland (BVW), Land under Waterbodies and Waterways (LUW), Bank, Riverfront Area, and Bordering Land Subject to Flooding (BLSF). A brief description of each Resource Area is provided below.

Bordering Vegetated Wetland (BVW)

BVW is defined in 310 CMR 10.55(2) as *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes. In these areas soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The boundary of BVW is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.*

Additionally, Section X of the *Bylaw* defines Freshwater Wetlands as *wet meadows, marshes, swamps, bogs, areas where groundwater, flowing or standing surface water or ice provide a significant part of the supporting substrate for a plant community for at least five months of the year; emergent and submergent plant communities in inland waters; that portion of any bank which touches any inland waters.*

There are three forested BVWs (wetland flags A1-A7, B16-B19, and B20-B23) associated with the Monatiquot River, and six small sections of forested BVW (Wetland Flags A8-A11, A12-A13, A14-A17, B1-B4, B5-B9, and B10-B14) associated with Hollingsworth Pond, as further described below. The non-contiguous BVWs border on the Bank/MAHW boundary of the Monatiquot River and Bank to Hollingsworth Pond. Topography throughout the BVWs is generally flat, with gentle slopes toward the waterbody.

Vegetation within the forested BVWs is generally similar throughout and comprised of a moderately dense canopy of red maple (*Acer rubrum*), tupelo (*Nyssa sylvatica*), ash (*Fraxinus* spp.), Norway maple, and gray birch (*Betula populifolia*). The understory consists of saplings from the canopy and a shrub layer of fetterbush (*Lyonia lucida*), highbush blueberry (*Vaccinium corymbosum*), common buckthorn (*Rhamnus cathartica*), winterberry (*Ilex glabra*), speckled alder (*Alnus incana*), multiflora rose, buttonbush (*Cephalanthus occidentalis*), and northern spicebush (*Lindera benzoin*). Groundcover consists of large patches of poison ivy, royal fern (*Osmunda regalis*), and jewelweed (*Impatiens capensis*). Entanglements of grape vine (*Vitis* spp.) and common greenbrier (*Smilax rotundifolia*) are common throughout.

Land Under Waterbodies and Waterways (LUW)

LUW is defined at 310 CMR 10.56(2) as *the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock. The boundary of Land under Water Bodies and Waterways is the mean annual low water level.*

LUW is associated with the Monaquot River, as further described below in *Bank*. The boundary of LUW extends between the lower boundary of the Banks to the Monaquot River and Hollingsworth Pond. Based on LEC's limited visual observations from the Bank, the substrate of the river appears to be comprised of organic muck with large scattered boulders. The pond's substrate appears to be comprised of organic muck. It is LEC's understanding that Gomez and Sullivan performed a more detailed analysis of the substrate of the pond and river. As a result, we defer to their observations of the pond and stream channel.

Bank

Bank is defined at 310 CMR 10.54(2)(a) as *the portion of land surface which normally abuts and confines a water body. The upper boundary of a bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a bank is the mean annual low flow level.*

Furthermore, Section X of the *Bylaw* states that *Bank shall mean the land area which normally abuts and confines a water body, the lower boundary being the mean annual low flow level and the upper boundary being the first observable break in the slope or the mean annual flood level, whichever is higher.*

Bank associated with the Monaquot River and Hollingsworth Pond is variable in composition and size but generally consists of manmade embankments with large boulders and fill material evident throughout the Field Survey Area.

Bank associated with the Monaquot River north and south/southwest of the pond consists of sparsely vegetated boulders and steep embankments between 6-7 feet high, with dense patches of poison ivy and common greenbrier. Where BVW is present, the Bank exhibits a gentle slope from the BVW into the main channel. Here, vegetation along the bank consists of a canopy of red maple, Norway maple, and ash, and a shrub layer of honeysuckle (*Lonicera* spp.), grapevine, highbush blueberry, and northern spicebush.

Bank is also associated with Hollingsworth Pond. Vegetation along the pond's Bank consists of various willow (*Salix* spp.), ash, eastern cottonwood (*Populus deltoides*), red maple, and American elm (*Ulmus americana*). The understory consists of a shrub layer of arrowwood (*Viburnum dentatum*), speckled alder, northern spicebush, elderberry (*Sambucus canadensis*), common buckthorn, and silky dogwood (*Cornus amomum*). The groundcover consists of royal fern (*Osmunda regalis*), jewelweed, poison ivy, common greenbrier (*Smilax rotundifolia*), various sedges (*Carex* spp.), and goldenrod (*Solidago* spp.). Entanglements of grapevine are common throughout.



Riverfront Area

Riverfront Area is defined at 310 CMR 10.58(2)(a)(3) as *the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away.*

Additionally, Riverfront Area is defined at Section X of the *Bylaw* as *the area of land situated between a river's mean annual high-water line and a parallel line located a maximum of 200 feet away, measured outward horizontally from the river's mean high-water line. This definition shall not create a buffer zone, so called, beyond such riverfront area. The riverfront area shall not include land now or formally associated with historic mill complexes in existence prior to nineteen hundred and forty-six and situated landward of the waterside façade of a retaining wall, building, sluiceway, or other structure existing on the effective date of this Bylaw (May 1999).*

Furthermore, Mean Annual High Water is defined at 310 CMR 10.58(2)(a)(2) as *the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land. Field indicators of bankfull conditions shall be used to determine the mean annual high-water line. Bankfull field indicators include but are not limited to: changes in slope, changes in vegetation, stain lines, top of pointbars, changes in bank materials, or bank undercuts...*

The 200-foot Riverfront Area is associated with the Monatiquot River and based on the *Bylaw* definition of Riverfront Area above and the WPA. The Riverfront Area extends horizontally outward from the Bank/MAHW line and consists of forested wetlands, forested uplands, and commercial and residential development to the east, west, and south of the river.

Bordering Land Subject to Flooding (BLSF)

BLSF is defined at 310 CMR 10.57(2)(a)(1) as *an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.*

BLSF is associated with the FEMA mapped Zone AE (el. 83-102) associated with Monatiquot River. BLSF is present only where the Zone AE extends beyond any BVW or Bank/MAHW boundary in areas where there is no BVW adjacent to the waterbody.

Summary

In July of 2016, LEC performed a wetland delineation in the vicinity of the Armstrong Dam Removal Project in Braintree, Massachusetts. LEC delineated and GPS-located the boundaries of local, state, and federally protected wetlands and jurisdictional boundaries associated with the Monatiquot River and Hollingsworth Pond upstream and downstream of the Armstrong Dam within the Field Survey Area established by Gomez and Sullivan Engineers.



The Wetland Resource Areas protected under the state WPA and the local *Bylaw* include BVW, Bank, LUW, Riverfront Area, and BLSF. The boundaries of BVW and the OHW mark establish the extent of jurisdiction under the federal *Clean Water Act* (33 U.S.C. 1344, s.404) and its *Regulations* (33 CFR and 40 CFR).

As noted above, the Field Survey Area, including Armstrong Dam, is not located within a *Priority Habitat of Rare Species* or *Estimated Habitat of Rare Wildlife*, according to NHESP; therefore, the project is not subject to review under the *Massachusetts Endangered Species Act* (MESA, M.G.L. c. 131A) and its implementing *Regulations* (321 CMR 10.00).

We appreciate the opportunity to work with you on this project. Should you have any questions or require additional information, please do not hesitate to contact us at (508) 746-9491 or mmanganello@lecenvironmental.com.

Sincerely,

LEC Environmental Consultants, Inc.

Mark L. Manganello

Assistant Director of Ecological Services

Claire Staines

Wetland Specialist



Literature Cited

Town of *Braintree Wetland Protection Bylaw* (Chapter 12.20) and its implementing Regulations

Massachusetts Wetlands Protection Act (M.G.L. c. 131, §. 40), www.state.ma.us/dep

Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), www.state.ma.us/dep

Massachusetts Natural Heritage and Endangered Species Program *Atlas of Estimated Habitat of State-listed Rare Wetlands Wildlife*. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, Route 135, Westborough, MA 01581, www.state.ma.us/dfwele/dfw

National Flood Insurance Program, Federal Emergency Management Agency Flood Insurance Rate Map, Town of Braintree, Massachusetts

Massachusetts Department of Environmental Protection (MADEP) handbook, *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act* (March 1995)

Field Indicators for Identifying Hydric Soils in New England (April, 2004)

Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeastern Region, U.S. Army Corps of Engineers, January, 2012

Massachusetts Endangered Species Act (MESA, M.G.L. c. 131A) and its implementing Regulations (321 CMR 10.00)



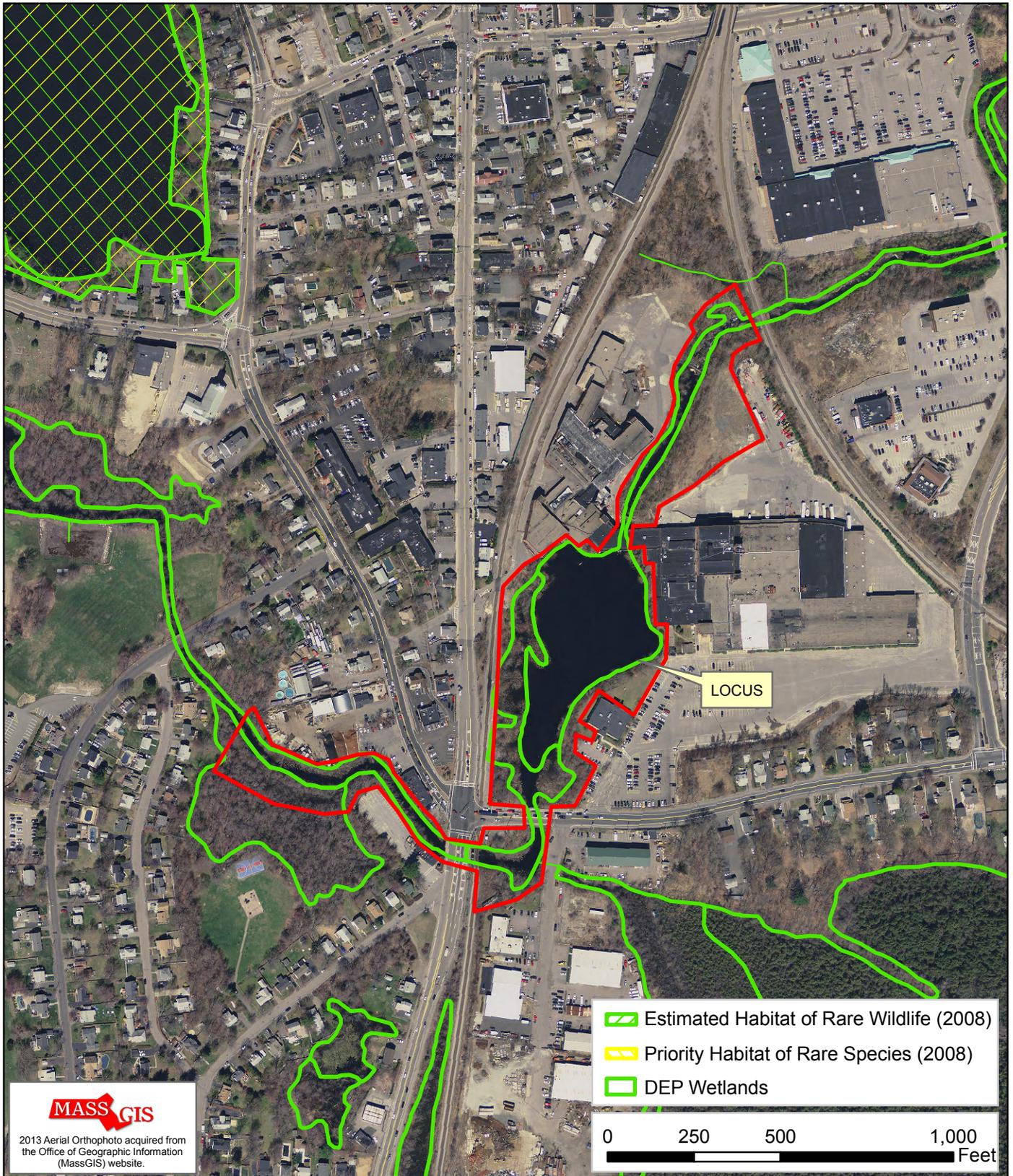
Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs



Massachusetts Division of Marine Fisheries
 Armstrong Dam Removal

Field Survey Area





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Attachment B: Aerial Orthophoto with DEP Wetlands and NHESP Overlay

Armstrong Dam Removal
Braintree, Massachusetts



July 29, 2016

Wetland Resource Area Analysis: Photographs
Armstrong Dam Removal Project
Monatiquot River
Braintree, Massachusetts



Photograph 1: Southern view of Armstrong Dam



Photograph 2: Northern view of Monatiquot River from Armstrong Dam



Photograph 3: Northern (downstream) portion of Monatiquot River



Photograph 4: northern view of Hollingsworth Pond. Armstrong Dam with industrial building in the background



Photograph 5: southern view of Hollingsworth pond. Plain Street Bridge in the background



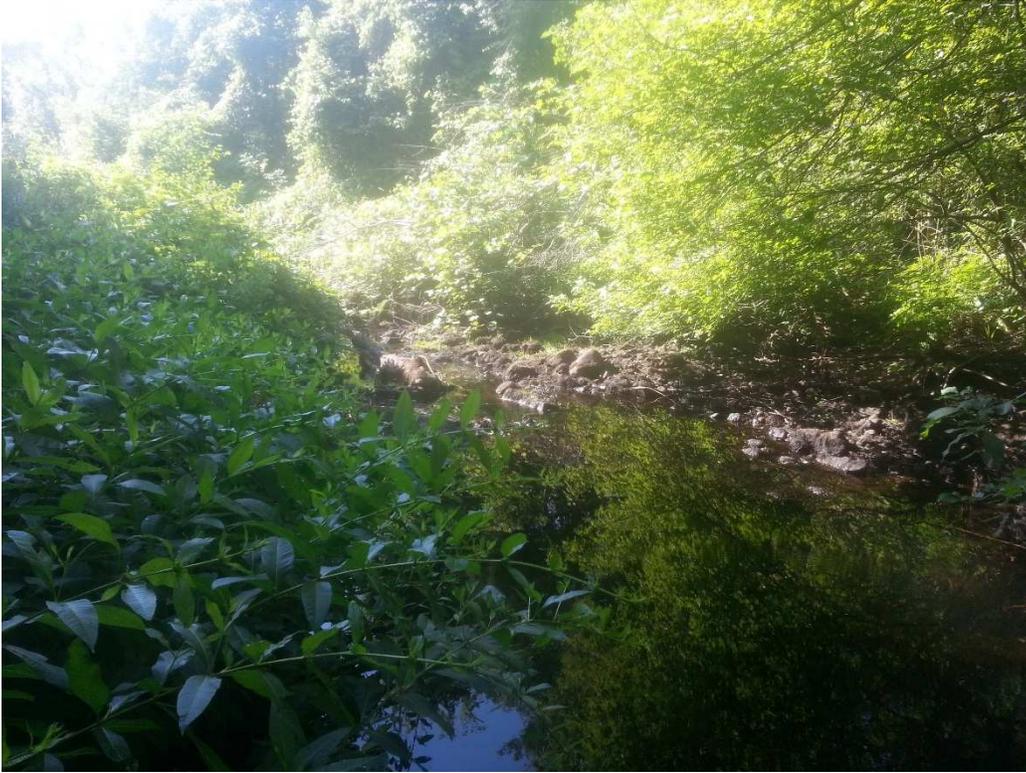
Photograph 6: northern view of Monatiquot River flowing beneath Plain Street



Photograph 7: Southern view of the Monatiquot River immediately south of Plain Street



Photograph 8: Western view of Monatiquot River flowing beneath the Hancock Street Bridge



Photograph 9: Eastern view of Monatiquot River at the southwestern terminus of the Field Survey Area