NASHUA-MANCHESTER 40818 (CAPITOL CORRIDOR)

APPENDIX A Natural Resources Technical Report

Prepared for:

New Hampshire Department of Transportation



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Prepared by: AECOM



Appendix A Natural Resources Technical Report

Appendix A-1 Natural Resources Technical Report

Appendix A-2 Rare Plant Report (Internal Use Only – Not for Public Distribution)

Appendix A-3 Wetland Report

Appendix A-3.1 Wetland Delineation Report

Part A - Massachusetts Section

Appendix A-3.2 Wetland Delineation Report

Part B – New Hampshire Section

Appendix A-3.3 Wetland Delineation Report Addendum

APPENDIX A-1 Natural Resources Technical Report

NASHUA-MANCHESTER 40818 CAPITOL CORRIDOR RAIL

NATURAL RESOURCES TECHNICAL REPORT



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1.0 Introduction

This report provides a summary of the natural resources that were identified for the Nashua-Manchester 40818 (Capitol Corridor Rail) Project, which extends from Lowell, Massachusetts to Manchester, New Hampshire along an existing operational freight rail line. The project would extend the existing Massachusetts Bay Transportation Authority (MBTA) Lowell Line into southern New Hampshire along this existing rail line (refer to Figure 1.1 in Appendix A). Proposed work includes renewing and repairing the existing rail line and related infrastructure to handle additional trains at higher speeds. This includes the reinstallation of the second track in certain segments of the corridor, upgrading the existing bridges, improving existing at-grade crossings, providing a modern signal system, repairing or replacing culverts, switches, and sidings as needed, and clearing overgrown vegetation. In addition, four stations and one layover facility would be constructed in New Hampshire (Figures 1.2 to 1.6 in Appendix A).

Natural resources identified along the project corridor include wetlands and surface waters, Protected Shoreland and Riverfront Areas, groundwater resources, threatened and endangered species, ecological systems and wildlife, fisheries, floodplains, NH Designated Rivers, and invasive species. These resources were identified through a combination of desktop research (GIS maps, reports, and other existing documents), coordination with resource agencies, and field reviews completed by GM2 Associates, Inc. (GM2) in 2021 and 2022. The following sections summarize the resources present and provide an overview of the applicable regulations. This resource review was completed to support the preliminary design and NEPA documentation phase of the project. As noted in this report, additional field reviews, agency coordination, and permits/approvals will be needed during the final design and permitting phase. These anticipated efforts are summarized in Section 12.0

2.0 Wetlands and Surface Waters

2.1 Regulatory Overview

Wetlands and surface waters are protected to varying degrees at federal, state, and local levels. At the federal level, wetlands are protected under the Clean Water Act (CWA) and activities resulting in impacts to them require a permit from the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA.

New Hampshire

In New Hampshire, wetland resources are protected at the state level under the Fill and Dredge in Wetlands Act (RSA 482-A) and the NH Department of Environmental Services (NHDES) Administrative Wetlands Rules (Env-Wt 100-900). Projects that involve fill, excavation, or construction in wetlands or surface waters require a permit from the NHDES Wetlands Bureau. Compensatory mitigation is required for projects that involve 10,000 square feet or more of wetland impact or any amount of permanent impact to a Priority Resource Area. Priority Resource Areas include wetlands of greater significance, such as floodplain wetlands adjacent to streams, bogs, prime wetlands, or wetlands that contain protected species or habitat.

Municipalities in New Hampshire can choose to designate wetlands as "prime wetlands" (RSA 482-A:15 and administrative rules Env-Wt 700). Prime wetlands are generally considered to be exceptionally valuable because of their large size, undisturbed condition, and ability to support wildlife and provide other functions and values. Municipalities in New Hampshire may also enact local wetlands ordinances that provide additional protections, such as buffer zones.

The following types of regulated wetland resources were identified within the NH portion of the project corridor:

- Wetland As defined in RSA 482-A:2, a wetland "means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions."
- Prime Wetland As defined in RSA 482-A:15, prime wetlands "shall mean any contiguous areas falling within the jurisdictional definitions of RSA 482-A:2, X and RSA 482-A:4 that, because of their size, unspoiled character, fragile condition, or other relevant factors, make them of substantial significance. A prime wetland shall be at least 2 acres in size, shall not consist of a water body only, shall have at least 4 primary wetland functions, one of which shall be wildlife habitat, and shall have a width of at least 50 feet at its narrowest point. The boundary of a prime wetland shall coincide, where present, with the upland edge of any wetland, as defined in RSA 482-A:2, X, that is part of the prime wetland." Prime wetlands are designated by municipalities in accordance with NHDES Wetlands Rules.
- <u>Perennial Stream</u> As defined in Env-Wt 103.53 a perennial stream is "a watercourse that is in the groundwater table for most of the year and so has groundwater as its primary source of water for stream flow, with runoff from rainfall and snowmelt as a supplemental source of water, so that it contains flowing water year-round during a typical year."
- <u>Intermittent Stream</u> As defined in Env-Wt 103.21 an intermittent stream is "a watercourse that is fed by groundwater but is not in the groundwater table throughout the year, where runoff from rainfall and snowmelt is a supplemental source of water for flow, such that the stream typically does not have flowing water during dry portions of the year."
- <u>Bank</u> As defined in Env-Wt 102.15 bank is "the transitional slope immediately adjacent to the edge of a surface water body, the upper limit of which is usually defined by a break in slope, or, for a wetland, where a line delineated in accordance with Env-Wt 400 indicates a change from wetland to upland."
- <u>Priority Resource Area</u> As defined in Env-Wt 103.66, priority resource area (PRA) means "a jurisdictional area that: (a) Has documented occurrences of protected species or habitat; (b) Is a bog; (c) Is a floodplain wetland contiguous to a tier 3 or higher watercourse; (d) Is a designated prime wetlands; (e) Is a duly-established 100-foot buffer of a designated prime wetlands; (f) Is a sand dune, tidal wetland, tidal water, or undeveloped tidal buffer zone; or (g) Is any combination of (a) through (f), above."

New stream crossings and repairs to existing stream crossings are regulated under Section Env-Wt 900 of the NHDES Wetlands Rules. Proposed work needs to meet the applicable design criteria or request approval of an alternative design. The design criteria varies depending on the watershed size of the area draining to the crossing. Tier 1 stream crossings have a watershed size of less than 200 acres and have

the least-stringent criteria. Tier 2 crossings have a watershed size of 200 acres to 640 acres. Tier 3 crossings have a watershed size of 640 acres or greater and also include stream crossings within designated river corridors (unless the crossing is Tier 1 based on watershed size or doesn't have a direct surface water connection to the designated river), 100-year floodplains, jurisdictional wetlands that have protected species or habitat, and prime wetlands. Tier 3 crossings must be a span structure or an open-bottomed culvert with streambed simulation. Tier 4 crossings include crossings on tidal watercourses, which are not found within the project corridor. The tiers for the various stream crossings in the NH portion of the project are shown in Table 2.2.

Massachusetts

In Massachusetts, wetlands are protected at the state level by the Wetlands Protection Act (WPA), which is administered by the municipal conservation commissions, with overview by the Massachusetts Department of Environmental Protection (MassDEP). The regulations (310 CMR 10.00) implementing the Wetlands Protection Act (M.G.L. c. 131 s.40) govern both inland and coastal wetlands, as well as floodplain and Riverfront Areas. The regulations identify "Areas Subject to Protection Under the Act" for which locally issued permits are required including any activity that involves filling, dredging, removing, or altering these areas. Areas subject to protection under the WPA within the project corridor include the following resource areas:

- Bank As defined in 310 CMR 10.54(2), Bank is "the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a vegetated bordering wetland and adjacent floodplain, or, in the absence of these, it occurs between a waterbody and an upland." 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 is the "mean annual low flow level."
- Bordering Vegetated Wetland As defined in 310 CMR 10.55(2), Bordering Vegetated Wetlands (BVWs) are "freshwater wetlands which border on creeks, rivers, streams, ponds and lakes." BVWs are "areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants." The boundary of BVWs is "the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist."
- <u>Land Under Water Bodies and Waterways</u> As defined in 310 CMR 10.56(2), Land Under Water Bodies and Waterways (LUWW) is "the land beneath any creek, river, stream, pond or lake." The boundary of LUWW is the mean annual low water level.
- Bordering Land Subject to Flooding As defined in 310 CMR 10.57(2)(a)(3), Bordering Land Subject to Flooding (BLSF) is "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." The boundary of BLSF is "the estimated maximum lateral extent of flood water which would theoretically result from the statistical 100-year frequency storm."
- Riverfront Area Riverfront Area (RFA) is defined in 310 CMR 10.58(2) as "the area of land between a river's mean annual high water line and a parallel line measured horizontally." Rivers are defined as "any natural flowing body of water that empties to any ocean, lake, pond, or other river and which flows throughout the year." Riverfront Area is discussed further in Section 3.0 of this report.

The buffer zones adjacent to some resource areas are also protected under the WPA. Within the project corridor, buffer zones include areas within 100 feet from the boundary of any bordering vegetated wetland or bank.

In MA, new crossings on fish-bearing streams must comply with the MA stream crossing standards, which specify design criteria such as the type of crossing, the span length, and the openness ratio. Replacement crossings must meet the stream crossing criteria where feasible.

2.2 Existing Conditions

Wetlands and Surface Waters

Wetlands and surface waters within and adjacent to the project corridor were identified through a combination of site visits and GIS map review. Within Massachusetts, the entire rail corridor was field delineated to determine wetland resource boundaries and identify buffer zone impacts. Within New Hampshire, approximately 9 miles of the rail corridor was field delineated in 2021. The field delineation efforts focused on areas of potential impact, such as bridge and culvert crossings, grade crossings, and sections of the proposed double-track segments. The proposed station and layover facilities were also field delineated. Wetland resources along the remaining 12 miles of the NH section were identified using GIS maps, such as National Wetland Inventory (NWI) maps, US Geological Survey (USGS) maps, and orthoimages. Additional information on the wetland delineation for the project is provided in the Wetland Delineation Report prepared by GM2 Associates, Inc. in August 2021 and the Wetland Delineation Report Addendum, dated January 2022 and revised in April 2022.

The dominant surface water feature within the project corridor is the Merrimack River, which flows from north to south along the entire rail line. The rail line crosses the Merrimack River once, at the Manchester-Bedford municipal boundary. Sections of the rail line are situated close to the river, with the top of bank located within the rail right-of-way (ROW).

The wetland resources within the project corridor include palustrine and riverine systems that feed into the Merrimack River. Since the proposed rail corridor follows an existing railroad embankment, wetland and stream crossings are currently bridged or culverted. As a result, the wetland systems that are crossed by the rail line have already been impacted and fragmented by the placement of fill and culverts.

Wetlands are scattered along the entire project corridor, although the larger wetland systems are generally located outside of densely developed areas. Table 2.1 provides a summary of the large wetland systems that are located along the project corridor. Wetland and surface water resources for the rail line are shown on Figures 2.1 to 2.13 (Appendix A). Figures 1.2 to 1.6 (Appendix A) depict wetland and surface water resources at the proposed station and layover facility sites. A summary table of the field delineated wetlands is provided in Appendix B.

The only prime wetlands within the project corridor are located within Nashua. These include the Merrimack River (within the City of Nashua), Salmon Brook, the Nashua River, and Pennichuck Brook (in Nashua). None of the prime wetlands within the project corridor have a 100-foot buffer zone.

Based on site visits and available online mapping, the rail line crosses an estimated 31 streams and rivers between the southern end of the project in Lowell and the northern end in Manchester. Table 2.2 provides a summary of these stream crossings, and the crossings are shown in Figures 2.1 to 2.13 (Appendix A).

Vernal Pools

As part of the wetland delineation site visits conducted in 2021, the wetland resources were reviewed to determine if they provide vernal pool habitat. Much of the delineation was completed in the spring, during the required timeframe for vernal pool surveys. Vernal pools include areas that are flooded long enough during the spring and/or summer months to provide breeding habitat for various amphibian species such as wood frog (*Lithobates sylvatica*) and spotted salamander (*Ambystoma maculatum*).

In addition to the site visits, the Massachusetts Natural Heritage and Endangered Species Program (NHESP) Certified Vernal Pools and Potential Vernal Pools GIS layers were reviewed. No Certified Vernal Pools are mapped within or adjacent to the ROW in Massachusetts. Four Potential Vernal Pools are mapped near the ROW in Massachusetts: two near Wetland CH3 in Chelmsford, one near Deep Brook and Wotton Street in Chelmsford, and one in Bridge Meadow Brook (TY5) in Tyngsborough (refer to Figures 2.2, 2.3, and 2.4 in Appendix A). These areas were field reviewed in April 2021 and vernal pool indicator species were not observed. Although there are various wetlands within the Massachusetts portion of the project that are seasonally flooded and have the potential to provide vernal pool habitat, no vernal pool indicator species were observed during the wetland delineation field work in 2021.

Within New Hampshire, one wetland (ME16) was identified as having potential vernal pool habitat (refer to Figure 2.8 in Appendix A). This wetland was field reviewed in November 2021 and a follow up site visit occurred in April 2022. Twelve wood frog egg masses were observed, confirming that ME16 functions as a vernal pool. A USACE Vernal Pool Characterization Form was completed for vernal pool ME16 and is included in the Wetland Report Addendum prepared by GM2.

No other potential vernal pools were observed within the New Hampshire portion of the project, however it is important to note that approximately 12 miles of the rail line in New Hampshire were not field reviewed and there is potential for vernal pools to be present adjacent to these segments. Additional field reviews may be needed during the final design phase of the project once impacts are further refined.

Table 2.1
Large Wetland Systems

Large Wetland Systems				
Municipality, State	Federal Classification	State-Regulated Resource	Flag Series	Description
Chelmsford, MA	R2UBH, PUBHh, PSS1E, PEM1E, PFO1E	Bank, BVW, LUWW	CH1 to CH15	Stony Brook, Deep Brook, and nearby wetlands
Tyngsborough, MA	PUBHh, R2UBH, PFO1E, R4SB	Bank, BVW, LUWW	TY3, TY4, TY5	Bridge Meadow Brook and nearby intermittent stream and wetlands
Nashua, NH	PUBHh, R2UBH	Perennial Stream, Bank, Prime Wetland, Priority Resource Area	NA8, NA9, NA10, NA11	Salmon Brook and associated wetlands
Nashua, NH	R2UBH, PFO1E	Perennial Stream, Bank, Prime Wetland, Priority Resource Area	NA12, NA13, NA14, NA15	Nashua River and associated wetlands
Nashua and Merrimack, NH	R2UBH, PSS1F	Perennial Stream, Bank, Prime Wetland (Nashua only), Priority Resource Area	NA16, NA17, ME2, ME3	Pennichuck Brook and associated wetlands
Merrimack, NH	R4SB, R2UBH, PFO1E	Intermittent Stream, Perennial Stream, Bank, Wetland, Priority Resource Area (ME6 and ME7)	ME1, ME5, ME6, ME7, ME16	Two stream crossings and associated wetlands that are part of a large wetland system located west of project corridor near the Merrimack Wastewater Treatment Plant. ME16 includes a vernal pool.
Merrimack, NH	R2UBH, PFO1E, PSS1E, L1UBH, PUBH	Perennial Stream, Bank, Pond, Wetland, Priority Resource Area	ME8, ME9, ME10, ME11 and additional unflagged wetlands shown on NWI maps	Naticook Brook, Horseshoe Pond, and associated wetlands

Table 2.1
Large Wetland Systems (continued)

Municipality, State Federal Classification		State-Regulated Resource	Flag Series	Description
Merrimack, NH	R2UBH	Perennial Stream, Bank	ME12, ME13, ME14, ME15	Souhegan River
Merrimack, NH	R2UBH, R4SB, PFO1E, PSS1E	Perennial Stream, Intermittent Stream, Bank, Wetland	Unflagged wetlands and streams shown on NWI map	Merrimack River, unnamed tributaries, scattered wetlands
Bedford, NH	R2UBH, R4SB, PEM1E, PSS1E, PFO1E	Perennial Stream, Intermittent Stream, Bank, Wetland, Priority Resource Area (BE13 and BE14)	BE1 to BE5, BE7 to BE14	Sebbins Brook and associated wetlands; unnamed intermittent tributary to Merrimack River and associated wetlands located near Raymond Wieczorek Drive
Bedford and Manchester, NH	R2UBH	Perennial Stream, Bank	BE6, MA1	Merrimack River crossing at the Bedford/Manchester line

Table 2.2 Stream Crossings

Waterbody Name	Mile Post	Municipality, State	Crossing Type	Watershed Drainage Area (acres)	Tier (for NH)
Pawtucket Canal	25.69	Lowell, MA	Bridge	358	N/A
Pawtucket Canal	26.20	Lowell, MA	Bridge	96	N/A
Black Brook	27.00	Lowell, MA	Stone Box Culvert	2,099	N/A
Stony Brook	28.65	Chelmsford, MA	Bridge	28,992	N/A
Deep Brook	29.10	Chelmsford, MA	Bridge	1,606	N/A
Unnamed intermittent stream	30.61	Tyngsborough, MA	Stone Box Culvert	198	N/A
Biscuit Brook (piped underground in RR ROW)	32.10	Tyngsborough, MA	Stone Box Culvert	288	N/A
Bridge Meadow Brook	32.56	Tyngsborough, MA	Bridge	5,146	N/A
Mill Brook	33.89	Tyngsborough, MA	Stone Culvert	1,786	N/A
Spit Brook (piped underground in RR ROW)	35.66	Nashua, NH	Stone Box Culvert	870	3
Unnamed intermittent/perennial stream (NA20 and NA21)	35.83	Nashua, NH	Stone Box Culvert	83	1
Unnamed perennial stream (NA19 and NA23)	36.19	Nashua, NH	Stone Box Culvert	70	1
Unnamed intermittent stream	37.20	Nashua, NH	Stone Box Culvert	154	1
Salmon Brook	37.87	Nashua, NH	Bridge	19,891	3
Nashua River	39.22	Nashua, NH	Bridge	340,973	3

Table 2.2
Stream Crossings (continued)

Waterbody Name	Mile Post	Municipality, State	Crossing Type	Watershed Drainage Area (acres)	Tier (for NH)
Pennichuck Brook	41.77	Nashua-Merrimack Border, NH	Bridge	17,235	3
Unnamed Perennial Stream - outlet (ME4)	42.21	Merrimack, NH	Stone Box Culvert	26*	1
Unnamed Intermittent/Perennial Stream (ME1 and ME5)	42.34	Merrimack, NH	Stone Box Culvert	333*	3**
Unnamed perennial stream (ME6 and ME7)	43.34	Merrimack, NH	Stone Box Culvert	858	3
Naticook Brook	44.92	Merrimack, NH	Bridge	2,438	3
Souhegan River	46.22	Merrimack, NH	Bridge	141,082	3
Unnamed stream – outlet (area not field- delineated)	47.80	Merrimack, NH	Cast Iron Pipe	179	1
Dumpling Brook (area not field-delineated)	48.34	Merrimack, NH	Stone Box Culvert	467	3**
Sebbins Brook	50.21	Bedford, NH	Stone Arch Bridge	2,330	3
Unnamed Intermittent Stream (BE3, BE4, and BE5)	50.45	Bedford, NH	Stone Box Culvert	19	1
Unnamed Intermittent Stream (BE15 and BE16)	51.02	Bedford, NH	Cast Iron Pipe	Unknown (not mapped)	1

^{*}Estimated watershed drainage area. Location of stream shown on USGS StreamStats is slightly different than field-located stream.

^{**}Watershed size is Tier 2 but stream crossing is classified as Tier 3 due to its location within a NH Designated River corridor, per Env-Wt 904.05(a)(2).

Table 2.2
Stream Crossings (continued)

6. (************************************					
Waterbody Name	Mile Post	Municipality, State	Crossing Type	Watershed Drainage Area (acres)	Tier (for NH)
Merrimack River	51.84	Bedford-Manchester Border, NH	Bridge	1,976,806	3
Unnamed Stream (area not field-delineated)	53.29	Manchester, NH	Stone Box Culvert	115	1
Unnamed Stream (area not field-delineated)	53.80	Manchester, NH	Stone Box Culvert	26	1
Unnamed Stream (area not field-delineated)	53.9	Manchester, NH	Stone Box Culvert	51	1
Unnamed Stream (area not field-delineated)	54.42	Manchester, NH	Stone Box Culvert	38	1

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Pawtucket Canal Crossing at MP 26.20 in Lowell



Black Brook Crossing (Wetland LO9) in Lowell



Stony Brook Crossing and Wetland CH9 in Chelmsford



Deep Brook Crossing in Chelmsford



Mill Brook in Tyngsborough



Merrimack River bank in Tyngsborough (Flag Series TY1)



Wetland NA3 in Nashua



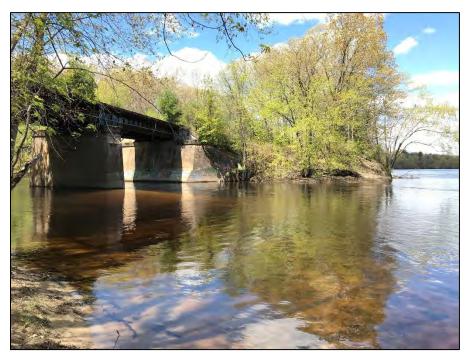
Nashua River Bridge in Nashua



Pennichuck Brook Bridge in Nashua/Merrimack



Perennial Stream ME6 in Merrimack (culvert outlet under rail line)



Souhegan River Bridge and Merrimack River in Merrimack



Vernal Pool ME16 in Merrimack



Wetland BE14 near Bedford-MHT Station Site



Merrimack River Bridge in Bedford/Manchester



Wetland MA5 in Manchester

3.0 Protected Shoreland and Riverfront Areas

3.1 Regulatory Overview

In New Hampshire, areas adjacent to larger streams and ponds, rivers, and lakes are protected under the Shoreland Water Quality Protection Act (SWQPA). The SWQPA (RSA 483-B) applies to all land within 250 feet of the reference line of all lakes, ponds, and impoundments greater than 10 acres in size, all fourth order and larger perennial streams and rivers, tidal waters, and rivers designated under the New Hampshire Rivers Management and Protection Act. Development and vegetation clearing within the protected shoreland is regulated by NHDES. For rivers and streams, the reference line corresponds to the ordinary high water mark. For lakes, ponds, and artificial impoundments, the reference line is the surface elevation as listed in the "Consolidated List of Waterbodies subject to the Shoreland Water Quality Protection Act", which is published by NHDES.

In Massachusetts, The Rivers Protection Act of 1996 provides protection to rivers by establishing a Riverfront Area (RFA) that is regulated under the Wetlands Protection Act, as discussed in Section 2.1. In most municipalities, the RFA is 200 feet wide, however in larger cities and densely developed areas, the RFA is 25 feet wide. The RFA is measured from the mean annual high water line. Proposed projects within the RFA need to avoid significant adverse impacts to the resource and need to determine that there is no practicable and substantially equivalent economic alternative with less adverse impacts.

As defined in 310 CMR 10.58, the following criteria were used to identify streams within the study area that have an RFA:

- A river or stream that is shown as perennial on the current USGS map;
- A river or stream that is shown as intermittent or not shown on the current USGS map, with a watershed size greater than or equal to one square mile; and
- A stream shown as intermittent or not shown on the current USGS map, with a watershed size
 of at least 0.50 square miles and a predicted flow rate greater than or equal to 0.01 cubic feet
 per second at 99% flow duration using the USGS Stream Stats method.

3.2 Existing Conditions

Several waterbodies within the project corridor have protected Shoreland or Riverfront Areas. In New Hampshire, these waterbodies were identified by reviewing the NHDES "Consolidated List of Waterbodies Subject to the Shoreland Water Quality Protection Act" and the NHDES Wetlands Permit Planning Tool online mapper. Table 3.1 lists waterbodies within 250 feet of the ROW that are subject to the New Hampshire SWQPA. The 250-foot protected shoreland zones within and adjacent to the project corridor are shown on Figures 2.4 to 2.13 in Appendix A.

Approximately 22 miles of the existing rail line are located within 250 feet of the Merrimack River. The other waterbodies listed in Table 3.1 are either crossed once by the rail line or border the ROW in one location. Large sections of the Protected Shoreland zone within the project corridor are currently developed or have been previously disturbed, particularly in Nashua and Manchester, although there are undisturbed, forested segments in all four NH municipalities.

Table 3.1
Waterbodies Subject to NH Shoreland Water Quality Protection Act

Waterboules Subject to Ni	1 3 nor claria Water Quanty 1 Total Con Act
Waterbody Name	Town(s)
Salmon Brook	Nashua
Nashua River	Nashua
Pennichuck Brook	Merrimack, Nashua
Horseshoe Pond	Merrimack
Souhegan River	Merrimack
Merrimack River	Nashua, Merrimack, Bedford, Manchester

RFAs in Massachusetts were identified by reviewing USGS topographic maps and other online GIS maps. In Tyngsborough and Chelmsford, the RFA is 200 feet wide, while in Lowell the RFA is 25 feet wide. In accordance with 310 CMR 10.58(2)(a)(1)(g), the human-made canals in Lowell do not have RFAs.

Table 3.2 lists the rivers and streams within and adjacent to the rail ROW that have RFAs. All of these watercourses are shown as perennial on the current USGS map. The approximate RFA boundaries are shown on Figures 2.1 to 2.4 (Appendix A). The Merrimack River parallels the existing rail line and much of the ROW is located within its RFA. Within Tyngsborough, the majority of the rail line (approximately 3.2 miles) is located within the 200-foot RFA of the Merrimack River. In Chelmsford, just over a mile of

the ROW is located within the Merrimack River 200-foot RFA. The rail line in Lowell is located beyond the 25-foot RFA of the Merrimack River, however portions of the rail ROW extend into the RFA. The other streams listed in Table 3.2 are crossed once by the rail line.

Table 3.2
Riverfront Areas in Massachusetts

Waterbody Name	Town(s)
Merrimack River	Lowell, Chelmsford, Tyngsborough
Black Brook	Lowell
Stony Brook	Chelmsford
Deep Brook	Chelmsford
Bridge Meadow Brook	Tyngsborough
Mill Brook	Tyngsborough

4.0 Water Quality – Surface Water

4.1 Regulatory Overview

NPDES

Surface water quality is regulated at the federal level by the US Environmental Protection Agency (EPA) under the Clean Water Act. Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES), which regulates the discharge of pollutants from point sources (pipes, ditches, or other conveyances) into waters of the US (streams, regulated wetlands, and other waterbodies).

Some states have obtained approval to issue NPDES permits, however New Hampshire and Massachusetts both currently do not have NPDES authority, so permits are issued by the EPA. Construction projects that involve at least one acre of ground disturbance require coverage under the NPDES Construction General Permit. This involves preparing a Stormwater Pollution Prevention Plan (SWPPP), using Best Management Practices (BMPs), and performing site inspections during construction.

The NPDES program also includes Municipal Separate Storm Sewer Systems (MS4), which are defined as a system of stormwater conveyances (e.g., storm drains, pipes, ditches) that are owned by state, city, or other public entities and are not part of a combined sewer or sewage treatment plant. The NPDES MS4 permit regulates stormwater discharges into MS4s and requires certain municipalities and other public entities to develop Stormwater Management Programs.

In addition, stormwater discharges from contaminated sites in New Hampshire and Massachusetts require coverage under the NPDES Remediation General Permit. Construction projects that involve dewatering at contaminated or formerly contaminated sites would require coverage under this permit.

Impaired Waters and TMDLs

The Clean Water Act requires each state to submit two surface water quality documents to the EPA every two years. Section 305(b) of the Clean Water Act requires the submittal of a report that describes the quality of surface waters and an analysis of the extent to which all such waters provide for the protection and propagation of a "balanced population of shellfish, fish, and wildlife and allow recreational activities in and on the water."

The second document is commonly referred to as the 303(d) List because it is required by Section 303(d) of the Clean Water Act. The 303(d) list identifies segments of rivers, lakes, impoundments, estuaries, and the ocean that do not meet water quality standards for their assigned uses. The impaired segments are identified as "assessment units" that are based upon the type of waterbody and the watershed in which they are found. The 303(d) List includes all surface waters that are:

- Impaired or threatened by a pollutant or pollutants;
- Not expected to meet water quality standards within a reasonable time even after application of best available technology standards for point sources or best management practices for nonpoint sources; and
- Require development and implementation of a comprehensive water quality study, referred to as a Total Maximum Daily Load (TMDL) study that is designed to facilitate achievement of applicable water quality standards.

Water Quality Certification

Under Section 401 of the Clean Water Act, projects that require federal permits or licenses require a Water Quality Certification by the state. If the project is covered under a federal general permit, such as a Section 404 General Permit from the USACE or the NPDES Construction General Permit, then an application for water quality certification typically does not need to be submitted. Projects that require individual federal permits, such as a Section 404 Individual Permit from the USACE, generally require an Individual Water Quality Certification from the state.

New Hampshire Regulations

In New Hampshire, surface water quality is regulated at the state level by RSA 485-A, Water Pollution and Waste Disposal, and by the NHDES Surface Water Quality Standards Administrative Rules (Env-Wq 1700). The state Surface Water Quality Regulations govern the discharge of potential pollutants to surface waters of the state and specify water quality standards intended to protect aquatic life and human health. State statute RSA 485-A:8 establishes two classes of surface water: Class A and Class B. Class A is the higher classification and designates water quality that is potentially acceptable for water supply uses after adequate treatment. Discharge of sewage or waste into Class A waters is prohibited. Class B waters are the second highest classification and are considered acceptable for swimming, fishing, and other recreational purposes and, after adequate treatment, for use as water supplies. In general, discharges to Class B waters are allowed provided that such discharges do not violate established water quality standards.

Pursuant to NHDES Regulation Env-Wq 1708.04 surface waters of national forests and NH Designated River segments that are classified as natural are considered Outstanding Resource Waters (ORWs). As such, water quality in these water bodies must be maintained and protected, except "that some limited point source and nonpoint source discharges may be allowed providing that they are of limited activity which results in no more than temporary and short-term changes in water quality."

Surface water quality in New Hampshire is also regulated under the NHDES Alteration of Terrain Administrative Rules (Env-Wq 1500). Projects that involve more than 100,000 square feet of disturbance (or more than 50,000 square feet of disturbance within a protected shoreland) require an Alteration of Terrain (AoT) Permit. NHDOT signed an agreement with NHDES in 2011 which exempts NHDOT projects from obtaining an AoT Permit. NHDOT projects must still comply with the AoT rules and project review is conducted through the NHDOT Bureau of Environment Water Quality Program.

Massachusetts Regulations

Surface water quality in Massachusetts is regulated at the state level by MGL Chapter 21, Sections 26 through 53 and the Surface Water Quality Standards (314 CMR 4.00). These regulations designate several categories of surface waters, based on use and water quality. Class A waters consist of inland waters that include public water supplies and their tributaries; wetlands that border Class A Outstanding Resource Waters, and designated reservoirs and surface waters. Class A waters are designated as excellent habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. They are protected as Outstanding Resource Waters and have high aesthetic value.

Class B waters consist of inland waters that include wetlands that border Class B waters, vernal pools, and certain designated waters. Class B waters are designated as habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. They can be used as public water supply sources with appropriate treatment and are suitable for irrigation and agricultural uses.

Class C waters are inland waters with lower water quality. They are designed as habitat for fish, aquatic life, and other wildlife and for secondary contact recreation.

Stormwater treatment for development projects in Massachusetts is reviewed by the Conservation Commission as part of a Notice of Intent application for a Wetland Permit. Applicants are required to submit a Stormwater Report that documents compliance with the Massachusetts Stormwater Management Standards.

4.2 Existing Conditions

The main surface water feature along the project corridor is the Merrimack River, which parallels the rail line from Lowell to Manchester and is crossed once by the project at the Bedford-Manchester line. The rail line also crosses various tributaries to the Merrimack River, as shown in Table 2.2.

Impaired surface waters that are crossed by the rail line are summarized in Table 4.1. All impaired surface waters located within 1 mile of each proposed station/layover site are listed in Table 4.2.

All surface waters within and adjacent to the project corridor are designated as Class B. There are no Class A waters or Outstanding Resource Waters within one mile of the project. A segment of Pennichuck Brook located approximately 3.5 miles upstream of the project is designated as Class A however the portion of Pennichuck Brook that is crossed by the rail line is Class B.

The entire project corridor is located within MS4-regulated communities.

Table 4.1
Water Quality Impairments and TMDLs for Surface Waters Crossed by the Rail Line

Waterbody Name	Assessment Unit ID	Municipality, State	Impairment(s)*
Lowell Canals	MA84A-29	Lowell, MA	DDT in Fish Tissue Lead Mercury in Fish Tissue (TMDL No. 33880) PCBs in Fish Tissue
Black Brook	MA84A-17	Lowell, MA	Turbidity Benthic Macroinvertebrates Fish Bioassessments Debris Trash Physical Substrate Habitat Alterations Sedimentation/Siltation E.Coli
Stony Brook	MA84B-04	Chelmsford, MA	E.Coli Benthic Macroinvertebrates Dewatering
Deep Brook	MA84A-21	Chelmsford, MA	Habitat Assessment Benthic Macroinvertebrates Sedimentation/Siltation E.Coli Lack of coldwater assemblage Temperature
Merrimack River (segment is located adjacent to rail line but not crossed)	MA84A-01	Lowell, Chelmsford, and Tyngsborough, MA	Fish Passage Barrier E. Coli Fecal coliform Mercury in Fish Tissue (TMDL No. 33880)
Merrimack River (segment is located adjacent to rail line but not crossed)	NHRIV700061206-24	Nashua, NH	Aluminum pH Chlorophyll-a E. Coli (TMDL No. 39274)
Salmon Brook	NHRIV700061201-07	Nashua, NH	E.Coli (TDML No. 39272)

Table 4.1
Water Quality Impairments and TMDLs for Surface Waters Crossed by the Rail Line (continued)

Waterbody Name	Assessment Unit ID	Municipality, State	Impairment(s)*
Nashua River	NHRIV700040402-09	Nashua, NH	Non-Native Aquatic Plants E.Coli (TMDL No. 39274)
Merrimack River (segment is located adjacent to rail line but not crossed)	NHRIV700061002-14	Nashua and Merrimack, NH	pH Creosote E. Coli (TMDL No. 39272)
Pennichuck Brook	NHRIV700061001-10	Nashua-Merrimack Border, NH	Benthic-Macroinvertebrate Bioassessments (Streams)
Merrimack River (segment is located adjacent to rail line but not crossed)	NHRIV700061002-13	Merrimack, NH	E. Coli (TMDL No. 39274)
Horseshoe Pond (located adjacent to rail line but not crossed)	NHLAK700061002-03	Merrimack, NH	Non-Native Aquatic Plants pH (TMDL No. 33878) Chlorophyll-a (TMDL No. 40289) Cyanobacteria hepatotoxic microcystins (TMDL No. 40289)
Souhegan River	NHRIV700060906-18	Merrimack, NH	Aluminium Oxygen, dissolved pH E.Coli (TDML No. 39272)
Merrimack River (segment is located adjacent to rail line but not crossed)	NHRIV700060804-11	Merrimack, NH	E. Coli (TMDL No. 39274)
Merrimack River	NHRIV700060803-14-02	Manchester, NH	Aluminium Total Phosphorus pH E.Coli (TDML No. 39274)
Baker Brook (culverted under rail line)	NHRIV700060803-08	Manchester, NH	Chloride

^{*}Sources: Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle and New Hampshire 2020/2022 Section 303(d) Surface Water Quality List. All surface waters in NH are impaired for mercury and are covered under the Northeast Regional Mercury TMDL (No. 33880). All surface waters within the project area are Class B Waters.

Table 4.2
Water Quality Impairments and TMDLs for Surface Waters within 1 Mile of Proposed Stations & Layover Facility

Pheasant Lane Mall - South Nashua					
Waterbody Name	Assessment Unit / Segment ID	Municipality, State	Impairment(s)*		
Merrimack River	NHRIV700061206-24	Nashua/Hudson, NH	Aluminum pH E. Coli (TMDL No. 39274) Chlorophyll-a		
Locust Pond	MA84031	Tyngsborough, MA	Mercury in Fish Tissue (TMDL No. 33880)		
Merrimack River	MA84A-01	Tyngsborough, MA	Fish Passage Barrier E. Coli Fecal Coliform		
Crown Street - Nashua					
Waterbody Name	Assessment Unit / Segment ID	Municipality, State	Impairment(s)*		
Merrimack River	NHRIV700061206-24	Nashua/Hudson, NH	Aluminum pH E. Coli (TMDL No. 39274) Chlorophyll-a		
Salmon Brook	NHRIV700061201-07	Nashua, NH	E. Coli (TMDL No. 39272)		
Second Brook	NHRIV700061206-10	Nashua, NH	рН		
Nashua River – Jackson Plant Dam Pond	NHIMP700040402-05	Nashua, NH	Non-Native Aquatic Plants E. Coli (TMDL No. 39274)		
Nashua River	NHRIV700040402-09	Nashua, NH	Non-Native Aquatic Plants E. Coli (TMDL No. 39274)		

Table 4.2
Water Quality Impairments and TMDLs for Surface Waters within 1 Mile of Proposed Stations & Layover Facility (continued)

Bedford-MHT			
Waterbody Name	Assessment Unit / Segment ID	Municipality, State	Impairment(s)*
Merrimack River	NHRIV700060804-11	Bedford, NH	E. Coli (TMDL No. 39274)
Little Cohas Brook - Unnamed Brook	NHRIV700060804-05	Londonderry/Manchester, NH	Benthic-Macroinvertebrate Bioassessments (Streams) Chloride Dissolved Oxygen Saturation Iron pH Oxygen, Dissolved
South Perimeter Brook	NHRIV700060804-12	Bedford/Londonderry/ Manchester, NH	Chloride Iron
Manchester Station			
Waterbody Name	Assessment Unit / Segment ID	Municipality, State	Impairment(s)*
Merrimack River	NHRIV700060803-14-02	Manchester, NH	Aluminum pH Phosphorus (Total) E. Coli (TMDL No. 39274)
Piscataquog River	NHRIV700060607-22	Manchester, NH	pH E. Coli
Baker Brook	NHRIV700060803-08	Manchester, NH	Chloride

Table 4.2
Water Quality Impairments and TMDLs for Surface Waters within 1 Mile of Proposed Stations & Layover Facility (continued)

Manchester Layover			
Waterbody Name	Assessment Unit / Segment ID	Municipality, State	Impairment(s)*
Merrimack River	NHRIV700060803-14-02	Manchester, NH	Aluminum pH Phosphorus (Total) E. Coli (TMDL No. 39274)
McQuesten Brook	NHRIV700060803-16	Bedford/Manchester, NH	Chloride Dissolved Oxygen Saturation pH E. Coli
Baker Brook	NHRIV700060803-08	Manchester, NH	Chloride
Piscataquog River	NHRIV700060607-22	Manchester, NH	pH E. Coli

^{*}Sources: Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle, Draft for Public Comment and New Hampshire Draft 2020/2022 Section 303(d) Surface Water Quality List.

All surface waters in NH are impaired for mercury and are covered under the Northeast Regional Mercury TMDL (No. 33880).

All surface waters within the project area are Class B Waters.

5.0 Water Quality - Groundwater

5.1 Regulatory Overview

Groundwater resources are protected at the federal level by the Safe Drinking Water Act (42 U.S.C. Section 300f). Under the Safe Drinking Water Act, the EPA has the authority to set national health-based standards for drinking water to protect against contaminants. It has protections for drinking water sources such as rivers, lakes, reservoirs, springs, and groundwater wells that serve more than 25 individuals.

In New Hampshire, groundwater resources are protected under the Groundwater Protection Act (RSA 485-C) as well as other state and local regulations. The Groundwater Protection Act established four categories of groundwater: GAA, GA1, GA2, and GB. GAA and GA1 groundwater areas receive a higher level of protection and include valuable groundwater resources such as wellhead protection areas. GA2 areas include high-yield stratified drift aquifers that are potentially valuable sources of drinking water and GB areas include all groundwater not in a higher classification. NHDES also establishes Drinking Water Source Protection Areas around active public water supply systems.

The NHDES Alteration of Terrain rules (Env-Wt 1500) include several requirements related to drinking water and groundwater resources. These include setbacks for stormwater discharges relative to water supply sources.

In Massachusetts, groundwater resources are protected under MGL Chapter 21, Sections 26 to 53 and 314 CMR 5.00 (Groundwater Discharge Permit Program). These regulations protect the potential use of groundwater as a drinking water source, as well as surface waters under the Massachusetts Surface Water Quality Standards (314 CMR 4.00).

5.2 Existing Conditions

Information on groundwater resources was obtained from the NHDES OneStop Data Mapper and MassGIS. Groundwater resources within the project corridor are generally associated with extensive stratified drift aquifers located along the Merrimack River. Within NH, almost the entire rail corridor in Nashua, Merrimack, and Bedford is located within mapped aquifers. Within MA, portions of the rail corridor in all three communities cross through aquifers. The entire rail corridor in NH is located within GA2 Groundwater Classification Areas, except for a segment from the Merrimack-Bedford town line to just north of the Merrimack River bridge. It should be noted that a large segment of the rail line in NH crosses through the Saint-Gobain Consent Decree boundary and there are sites with known groundwater pollution from perfluoroalkyl and polyfluoroalkyl substances (PFAS) and other contaminants near the project corridor.

The rail corridor from the Merrimack Wastewater Treatment Plant to the northern terminus at Granite Street is located within a Source Water Protection Area associated with Pennichuck Water Works. The rail corridor also crosses through a water supply intake protection area near the Merrimack Wastewater Treatment Plant and a wellhead protection area near Reeds Ferry in Merrimack. In addition, there are various groundwater wells mapped within 1,000 feet of the rail line in all four NH communities.

There are no mapped source water protection areas or wellhead protection areas within or adjacent to the rail line in MA.

The following provides a summary of the groundwater resources within 1,000 feet of the proposed station and layover facility sites.

<u>Pheasant Lane Mall South Nashua Station</u> – The entire site is mapped as a GA2 Groundwater Classification Area. There are no wellhead protection areas or public water supply wells within 1,000 feet of the station limits.

<u>Crown Street Nashua Station</u> – The entire site is mapped as a GA2 Groundwater Classification Area. There are no wellhead protection areas within 1,000 feet of the station limits but there are several private water supply wells located north of the station.

<u>Bedford-MHT Station</u> – The entire site is mapped within a source water protection area (Pennichuck Water Works). There are no wellhead protection areas within 1,000 feet of the station limits, but there are two private water supply wells located approximately 600 to 1,100 feet south/southwest of the proposed station parking lot. These wells are located in Merrimack, on the opposite side of Sebbins Brook.

<u>Manchester Station</u> – The entire site is mapped within a source water protection area (Pennichuck Water Works) and a GA2 Groundwater Classification Area. One water supply well is mapped to the southwest, but there are no wellhead protection areas within 1,000 feet of the station limits.

<u>Manchester Layover Facility (Pan Am South Site)</u> – The entire site is mapped within a source water protection area (Pennichuck Water Works) and a GA2 Groundwater Classification Area. There are no wellhead protection areas within 1,000 feet of the site. One water supply well is mapped approximately 1,000 feet southeast of the site limits and a second well is mapped approximately 650 feet north of the site limits.

A meeting was held with the NHDES Groundwater and Drinking Water Bureau on March 28, 2022 to obtain their input on groundwater resources within the project corridor and potential impacts and design considerations (meeting minutes and correspondence are included in Appendix C). NHDES provided the following comments and recommendations:

- A surface water intake is located near Anheuser-Busch in Merrimack. Accidental spills from train derailments could be a potential contamination issue. The project should include a spill response plan for accidents.
- Any major stormwater discharges should be looked at in relation to surface water intakes. MS4
 and state requirements for sanitary buffers need to be adhered to. The location of the proposed
 stormwater discharge for the new parking lot at the Bedford-MHT station should be reviewed in
 relation to drinking water resources.
- Pesticide or herbicide application, if proposed, requires a state permit.
- The NHDES Alteration of Terrain Rules have several sections that apply to water supply/drinking water sources. The project needs to comply with these rules.

 At the proposed layover facility, there is potential for contamination to enter groundwater from spills during refueling. The design should incorporate measures to protect against and contain spills.

6.0 Threatened and Endangered Species

6.1 Regulatory Overview

Threatened and endangered species are provided protection on both federal and state levels. At the federal level, listed species are protected under the Endangered Species Act of 1973 (16 USC 1531-1544). Under Section 7 of the Endangered Species Act, federal agencies are required to consult with the US Fish and Wildlife Service for any projects that the agency funds or authorizes.

In New Hampshire, rare plant species are protected under the Native Plant Protection Act of 1987 (RSA 217-A) and listed animal species are protected under the New Hampshire Endangered Species Conservation Act of 1979 (RSA 212-A). Coordination with the NH Natural Heritage Bureau is required for projects that could impact rare plants and exemplary natural communities. Exemplary natural communities include rare natural communities as well as more common natural communities that are undisturbed or are of high quality. Coordination with the NH Fish and Game Department (NHF&G) is required for projects that could have an adverse effect on listed wildlife species. NHF&G adopted new rules (Fis 1000) in February 2022 that set requirements for threatened and endangered wildlife species consultation in NH. Upon adoption of these rules, NHDOT and NHF&G signed a Memorandum of Agreement in February 2022 to establish consultation procedures for NHDOT projects.

In Massachusetts, both rare plant and animal species are protected under the Massachusetts Endangered Species Act of 1990 (MESA) (MGL c.131A). The Massachusetts Natural Heritage and Endangered Species Program (NHESP) designates areas of Priority Habitats and Estimated Habitats based on the known locations of listed species. Priority Habitats include areas that are identified as important for the protection of state-listed species. They are defined as "the geographic extent of habitat for state-listed species". Projects or activities that occur within a Priority Habitat require review under MESA and consultation with the NHESP. Estimated Habitat is a sub-set of Priority Habitat and includes the geographical extent of habitat of state-listed rare wetlands wildlife. These areas are protected by both MESA and the Massachusetts Wetlands Protection Act.

6.2 Existing Conditions

The US Fish and Wildlife Service's Information for Planning and Conservation (IPaC) website was used to determine if any federally listed species may be present within the vicinity of the project corridor. According to the information received, northern long-eared bat (*Myotis septentrionalis*), a federally-listed threatened species, and monarch butterfly (*Danaus plexippus*), a candidate for listing status, may occur within the project area (refer to Appendix D).

The New Hampshire Natural Heritage Bureau (NHB) was contacted to obtain information on state listed rare, threatened, and endangered species and exemplary natural communities within the vicinity of the project corridor. The response received from NHB is included in Appendix D and the listed species are shown in Table 6.1.

The Massachusetts NHESP was also contacted to obtain information about state-listed species near the project since portions of the rail line in Chelmsford and Tyngsborough cross through an area mapped as both Priority and Estimated Habitat. The response from NHESP is included in Appendix D and the species are listed in Table 6.1.

Table 6.1
Threatened and Endangered Species

I nreatened and Endangered Species				
Protected Species	Legal Status		Last Reported	Town(s)
·	State	Federal	•	.,
Invertebrate Species	5	A1 . 1	2004	
Brook Floater (Alasmidonta varicosa)	Endangered (NH)	Not Listed	2004	Manchester
Riverine clubtail (Stylurus amnicola)	Endangered (MA)	Not Listed	Unknown	Tyngsborough
Monarch Butterfly (Danaus plexippus)	Not Listed	Candidate	N/A	Entire Project
Plant Species				
Arrow-head rattlebox (<i>Crotalaria sagittalis</i>)	Endangered (NH)	Not Listed	1958	Nashua
Bird-foot violet (Viola pedata var. pedata)	Threatened (NH)	Not Listed	2016	Merrimack
Clasping milkweed (Asclepias amplexicaulis)	Threatened (NH)	Not Listed	1984	Merrimack
Long-spined sandbur (Cenchrus longispinus)	Endangered (NH)	Not Listed	1986	Merrimack
River birch (<i>Betula nigra</i>)	Threatened (NH)	Not Listed	2015	Manchester Bedford
Tall cottonsedge (Eriophorum angustifolium ssp. angustifolium)	Endangered (NH)	Not Listed	2010	Merrimack
Wild lupine (Lupinus perennisssp. perennis)	Threatened (NH)	Not Listed	2011	Merrimack
Wright's spikesedge (Eleocharis diandra)	Endangered (NH)	Not Listed	2016	Manchester Merrimack
Vertebrate Species				
American eel (Anguilla rostrata)	Special Concern (NH)	Not Listed	2011	Merrimack
Bald eagle (Haliaeetus leucocephalus)	Special Concern (NH and MA)	Not Listed	2019	Bedford Merrimack Tyngsborough Chelmsford
Blanding's turtle (<i>Emydoidea blandingii</i>)	Endangered (NH)	Not Listed	2012	Litchfield Merrimack
Eastern box turtle (Terrapene carolina)	Endangered (NH)	Not Listed	2019	Hudson

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Table 6.1
Threatened and Endangered Species (continued)

	Legal Status			
Protected Species	State	Federal	Last Reported	Town(s)
Vertebrate Species (continued)				
Eastern hognose snake (Heterodon platirhinos)	Endangered (NH)	Not Listed	2012	Londonderry Merrimack Bedford Litchfield
Eastern meadowlark (Sturnella magna)	Threatened (NH)	Not Listed	2011	Merrimack
Grasshopper sparrow (Ammodramus savannarum)	Threatened (NH)	Not Listed	2005	Merrimack
New England cottontail (Sylvilagus transitionalis)	Endangered (NH)	Not Listed	2018	Litchfield
Northern black racer (Coluber constrictor constrictor)	Threatened (NH)	Not Listed	2010	Merrimack Londonderry
Northern leopard frog (Lithobates pipiens)	Special Concern (NH)	Not Listed	2006	Litchfield
Peregrine falcon (Falco peregrinus anatum)	Threatened (NH)	Not Listed	2018	Manchester Nashua Bedford
Sea Lamprey (<i>Petromyzon marinus</i>)	Special Concern (NH)	Not Listed	2008	Merrimack
Sora (Porzana carolina)	Special Concern (NH)	Not Listed	2010	Nashua
Spotted turtle (Clemmys guttata)	Threatened (NH)	Not Listed	2004	Bedford
Wood turtle (Glyptemys insculpta)	Special Concern (NH)	Not Listed	2015	Merrimack Litchfield
Northern long-eared bat (Myotis septentrionalis)	Endangered (NH and MA)	Threatened	N/A	Entire project
Natural Community				
Semi-rich oak-sugar maple forest	Not Listed	Not Listed	1992	Manchester

Rare Plants and Exemplary Natural Communities

Field surveys for the rare plant species and exemplary natural community listed in Table 6.1 were conducted by GM2 Associates, Inc. in April, May, June, and August 2021. A portion of the rare plant survey was conducted concurrently with the wetland delineation field work in April and May 2021. Additional rare plant species-specific surveys were conducted in June and August 2021 so that the field work would occur during the species' preferred survey timeframes. Some of the plant surveys that were conducted in June and August 2021 included additional areas that had not been covered by the wetland

Note:

This section contains sensitive plant and wildlife information which is on file at the NH Department of Transportation's Bureau of Environment. For additional information please contact the Bureau of Environment at (603)271-3226.

7.0 Ecological Systems and Wildlife

7.1 Regulatory Overview

At the federal level, the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668 et seq.) prohibits the "take" of bald eagles and golden eagles. "Take" can include taking or possessing bald or golden eagles, nests, or eggs, or causing harm to either species. This could include activities that disturb eagles to the extent that it interferes with their normal breeding, feeding, or nesting habits, such as construction near a nest during breeding season.

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712) prohibits the take of protected migratory bird species without prior authorization by the US Fish and Wildlife Service.

In New Hampshire, RSA 228:46-c ("Wildlife Corridors and Habitat Strongholds"), which became effective in 2019, requires NHDOT to consider wildlife corridors and habitat strongholds, including the improvement of stream crossings and minimizing impacts to wildlife connectivity where feasible.

Although not a regulatory requirement, the NH Wildlife Action Plan identifies Species of Greatest Conservation Need (SGCN) and their habitats. These species include those that are at the greatest risk due to declining populations, reduced habitat, and other threats. The 2015 Wildlife Action Plan lists 169 SGCN, some of which are currently state-listed as endangered, threatened, or special concern. The NH Wildlife Action Plan also includes ecological condition maps that show which areas are ranked as highest in New Hampshire and in the biological regions as well as landscapes that support highest ranked habitat areas.

Similar to the NH Wildlife Action Plan, Massachusetts' BioMap2 provides information on rare species and other Species of Conservation Concern and identifies habitat areas that are important for the protection of these species. In addition, the Massachusetts NHESP produces maps showing the locations of Certified Vernal Pools and Potential Vernal Pools. Certified Vernal Pools include pools that have been reviewed and certified by NHESP according to MassWildlife's *Guidelines for Certification of Vernal Pool Habitat*. Potential Vernal Pools include pools that have been identified using aerial photography but have not been field reviewed and certified by NHESP.

Areas with significant natural and cultural resources in Massachusetts can be designated as Areas of Critical Environmental Concern (ACECs). These include areas "where unique clusters of natural and human resource values exist and which are worthy of a high level of concern and protection" (301 CMR 12.00). ACEC are nominated at the community level and designated at the state level.

7.2 Existing Conditions

Information on wildlife habitat within the project corridor was obtained from the New Hampshire Wildlife Action Plan, BioMap2, and from field reviews conducted in 2021. Since the project spans 30 miles and crosses through various communities in New Hampshire and Massachusetts, there is a range of habitat types in the vicinity of the rail corridor. Within Lowell, the rail line crosses through an urban area that provides limited wildlife habitat. Portions of rail line in Chelmsford and Tyngsborough are also

densely developed, although there are other sections that cross through wetlands, forested land, and agricultural fields. In New Hampshire, the rail line crosses through urban areas in Nashua and Manchester. The project corridor in Merrimack and Bedford is less developed and includes forested, wetland, and some grassland habitat. The primary habitat feature along the entire project corridor is the Merrimack River, which runs parallel to the rail line. The Merrimack River provides an important corridor for migrating birds and provides habitat for bald eagles.

Habitat Types

The following sections provide a general discussion of the habitat types found within and adjacent to the project corridor. This information was obtained from the New Hampshire Wildlife Action Plan (NH Fish and Game, 2015).

<u>Developed Habitats</u> – Developed habitats can range from maintained gardens and lawns to multi-story buildings. Although these areas typically have limited wildlife habitat value, some species have adapted to urban conditions. Peregrine falcons, which typically nest on vertical cliffs, have started nesting in tall buildings and other man-made structures in the southeastern portion of New Hampshire. Chimney swifts (*Chaetura pelagica*) are also known to nest in buildings. Insect species, including bumblebees (*Bombus sp.*) and monarch butterflies, occur in crop fields, orchards, gardens, and other developed locations with flowering plants.



Rail line in Lowell

Developed habitats occur throughout the project corridor. The entire rail line in Lowell crosses through developed areas. The Chelmsford and Tyngsborough sections are also mostly developed, although these areas are interspersed with forests, wetlands, and fields. Within Nashua, the majority of the project corridor is located in developed habitats, particularly near the state border and in downtown Nashua. In Merrimack and Bedford there is scattered development, particularly along the western side of the rail line. Within Manchester, most of the project corridor crosses through developed areas, except for the

segment near Pine Grove Cemetery, north of the I-293 bridges.

Grasslands – Grasslands consist of areas that are vegetated predominantly with grasses, sedges, and wildflowers and have very little tree or shrub cover. They can include hayfields and pastures, meadows, fallow fields, cropland, airports, and landfills. Grasslands provide habitat for several NH state-listed bird species and other bird species of conservation concern, such as grasshopper sparrow, horned lark, vesper sparrow, and Eastern meadowlark. Other rare species that utilize grassland habitat include northern



Grassland habitat near Anheuser-Busch in Merrimack

black racer, northern leopard frog, wood turtle, bumblebees, and monarch butterflies.

Small areas of grassland habitat are scattered throughout the project corridor. Most of these areas are small, individual blocks that do not provide extensive habitat. Although there are no large areas of grassland habitat within the project corridor, there are several areas adjacent to the rail ROW that have larger blocks of grassland habitat. These include:

- The agricultural fields near River Road (MP 33.5) in Tyngsborough;
- The open fields near Anheuser-Busch in Merrimack (near MP 43.7); and
- The open fields near Wright Avenue in Merrimack, east of Horseshoe Pond (near MP 45.5).

<u>Large Warmwater Rivers</u> – Large warmwater rivers are defined in the NH Wildlife Action Plan as having watersheds greater than 1,000 square miles and an average bankfull width of over 250 feet. The Merrimack River, which runs parallel to the project corridor, falls into this category. Large warmwater rivers support for a variety of aquatic and terrestrial species. They provide important habitat for diadromous fish species, which migrate between the ocean and freshwater rivers. Listed species and other species of conservation concern that utilize the habitat within and along the Merrimack River include bald eagle, fish species such as American eel and sea lamprey, mussels such as the brook floater, and the riverine clubtail dragonfly.

<u>Warmwater Rivers and Streams</u> – Warmwater rivers and streams can vary in size, gradient, and substrate but have an average water temperature above 20°C during July and August. They can support various bird, reptile, and fish species and rare species such as the banded sunfish (*Enneacanthus obesus*), and brook floater mussel.

Most of the rivers and streams crossed by the project are classified as warmwater. These include Spit Brook, Salmon Brook, the Nashua River, Pennichuck Brook, Naticook Brook, the Souhegan River, as well as various unnamed perennial streams. In Massachusetts, warmwater streams include the Pawtucket Canal, Black Brook, Stony Brook, Bridge Meadow Brook, and Mill Brook.

<u>Warmwater Lakes and Ponds</u> – Warmwater lakes and ponds include waterbodies that are unable to support coldwater fish species due to water temperature and a lack of oxygen. Fish species that typically occur in warmwater lakes and ponds include large and smallmouth bass (*Micropterus salmoides* and

Micropterus dolomieu), bluegill (Lepomis macrochirus), and chain pickerel (Esox niger). Horseshoe Pond, which is located west of the rail ROW in Merrimack, is categorized as a warmwater pond.

<u>Coldwater Rivers and Streams</u> — Coldwater streams maintain cold temperatures (typically below 20°C) during the summer months and are able to support brook trout (*Salvelinus fontinalis*) and other coldwater fish species. These streams are more common in northern New Hampshire. In southern New Hampshire, groundwater input is needed to maintain cold temperatures during the summer.



Sebbins Brook Crossing in Bedford

Species that are associated with coldwater rivers and streams include American eel, brook trout, and slimy sculpin (*Cottus cognatus*). There are few coldwater streams within the vicinity of the project. Based on a review of the NH Hydrography dataset, Dumpling Brook in Merrimack and Sebbins Brook in Bedford are both classified as coldwater streams and are known to contain brook trout. Dumpling Brook crosses under the rail line through a culvert. Sebbins Brook crosses under the rail line through a stone arch bridge and is also located just south of the proposed Bedford-MHT Station.

<u>Marsh and Shrub Wetlands</u> – This habitat type includes emergent marshes, scrub-shrub wetlands, and wet meadows. Many wildlife species use this habitat type, including common species such as redwinged blackbirds (*Agelaius phoeniceus*), beaver (*Castor canadensis*), and Eastern painted turtle (*Chrysemys picta*). Marsh and shrub wetlands also support rare species such as Blanding's turtle, New England cottontail, and spotted turtle.

Marsh and shrub wetlands are scattered throughout the undeveloped portions of the project corridor, although they are typically located beyond the rail ROW. The following segments of the project have the largest marsh and shrub wetland communities:

- Emergent marsh and scrub-shrub wetlands near Stony Brook and Deep Brook in Chelmsford;
- Constructed wetlands (emergent marsh and scrub-shrub) south of Pheasant Lane Mall in Tyngsborough; and
- Emergent marsh and scrub-shrub wetlands near Naticook Brook in Merrimack.

Appalachian Oak Pine Forest — This habitat type is found at lower elevations in southern New Hampshire. Soils are typically nutrient-poor and sandy. Vegetation includes oak species, such as white oak (Quercus alba), black oak (Quercus velutina), and scarlet oak (Quercus coccinea), as well as hickories (Carya spp.), sassafras (Sassafras albidum), pitch pine (Pinus rigida), and mountain laurel (Kalmia latifolia). A variety of wildlife species use this habitat, such as eastern hognose snake, whip-poor will (Antrostomus vociferus), veery (Catharus fuscescens), northern long-eared bat, white-tailed deer (Odocoileus virginianus), and black bear (Ursus americanus).



Oak pine forest along rail line in Merrimack

Appalachian oak pine forest habitat is scattered throughout the undeveloped portions of the project corridor. It is generally located beyond the rail ROW, which is periodically cleared. Most of the habitat blocks near the ROW are relatively small and are generally either bordered by roads, developed areas, or the Merrimack River.

<u>Floodplain Forests</u> – Floodplain forests are located in low areas adjacent to river channels and are characterized by frequent flooding. Floodplain forests provide breeding habitat for a variety of bird species, such as red-shouldered hawk (*Buteo lineatus*), veery, and Cerulean warbler (*Dendroica cerulea*). They also support migratory birds. Mammal species that are typically associated with this habitat include beaver and mink (*Mustela vison*). Floodplain forests also provide important habitat for reptiles

and amphibians, including rare species such as wood turtle, Blanding's turtle, spotted turtle, Jefferson salamander, and Northern leopard frog.

Floodplain forests are located in small, scattered areas along the project corridor, including along Pennichuck Brook at the Nashua-Merrimack border, along Naticook Brook in Merrimack, and near Pine Grove Cemetery in Manchester. This habitat type is generally located beyond the rail ROW.

<u>Hemlock Hardwood Pine Forest</u> – This is the most common forest type in New Hampshire and provides habitat for a variety of wildlife species, including the cerulean warbler, northern long-eared bat, white-tailed deer, moose, and black bear. White pine (*Pinus strobus*) and Eastern hemlock (*Tsuga canadensis*) are typically the dominant tree species, but other species such as red oak (*Quercus rubra*) and American beech (*Fagus grandifolia*) are also present.

Small blocks of hemlock hardwood pine forest are located along the rail corridor but overall this habitat is limited within the vicinity of the project. Where it is present, it is generally located beyond the rail ROW.

<u>Temperate swamp</u> – Temperate swamps include forested wetlands that are typically vegetated with red maple (*Acer rubrum*), highbush blueberry (*Vaccinium corymbosum*), and winterberry (*Ilex verticillata*). They can include peatlands as well as seasonally-flooded swamps with mineral soils. Temperate swamps provide habitat for species such as northern long-eared bat, veery, Canada warbler (*Cardellina canadensis*), Jefferson salamander, Blanding's turtle, and spotted turtle.

This habitat type is scattered throughout the project corridor, although it is generally located beyond the rail ROW and is not very extensive. The following small, forested swamps were noted near the rail line during site visits:

- Wetland TY3, located north of MA Route 113 in Tyngsborough;
- Wetland ME1, located south of the Merrimack Wastewater Treatment Plant; and
- Portions of Wetlands BE7 and BE14, located near the MHT-Bedford Station Site.

Habitat Value and Wildlife Corridors

The New Hampshire Wildlife Action Plan provides information on habitat value by assessing and ranking habitat condition for the entire state. The ranking is based on biological, landscape, and human impact factors. Biological factors include rare plant and animal species and overall biodiversity. Landscape factors include the size of the habitat and its proximity to other habitats. Human impact factors include considerations such as road density, pollution, and recreational use. The higher value habitat areas are ranked as follows:

- "Highest Ranked Habitat in New Hampshire" includes the top ranked 15% of all terrestrial and wetland habitats, except for rare habitats (includes alpine, dune, coastal islands and rocky shores, and salt marsh) where 100% of the area is included.
- "Highest Ranked Habitat in Biological Region" includes the top 30% of all terrestrial and wetland habitats, except for high elevation spruce-fir and floodplain habitats, where 100% of the area is included.

 "Supporting Areas" consist of habitats that are necessary to keep the highest ranked habitats in good condition and includes the top 50% of all habitats in the biological region and top-ranked forest blocks.

Within Massachusetts, information on habitat value was obtained by reviewing the BioMap2 data and mapping, developed by MassWildlife and The Nature Conservancy. BioMap2 identifies areas of Core Habitat (important for rare species, Priority Natural Communities, high-quality aquatic habitats, and intact forest ecosystems) and Critical Natural Landscape (includes large landscape blocks and uplands that buffer wetland, aquatic, and coastal habitats). Core Habitat and Critical Natural Landscape areas may overlap.

Information on wildlife corridors near the project was obtained from the NH Wildlife Corridors Map, which was developed by NHF&G, NH Audubon, and The Nature Conservancy. This map shows corridors that connect large blocks of important wildlife habitat ("prioritized habitat blocks"). Two levels of corridors are identified. These include top-scoring linkages as well as secondary corridors. The wildlife corridor study extends across the NH-MA border and includes the MA segment of the project.

The existing rail line crosses through "Highest Ranked Habitat" in various locations (refer to Figures 7.1 to 7.4 in Appendix A). The Merrimack River is mapped as a wildlife corridor throughout the entire NH portion of the project. In addition, the rail line crosses several smaller mapped wildlife corridors and secondary wildlife corridors with many of these being located at river and stream crossings. The following provides a summary of the habitat value and potential wildlife corridors by municipality, as well as information on wildlife habitat value and corridors for the proposed station and layover facilities.

<u>Lowell</u> - The rail line in Lowell in surrounded by densely developed areas, with the exception of the Merrimack River which borders the northern side of the rail ROW for approximately 1.7 miles. The river and its banks, as well as Black Brook, are mapped as both Core Habitat and Critical Natural Landscape. These areas are also mapped as a Prioritized Habitat Block on the NH Wildlife Corridors map. In Lowell, the Merrimack River is the only area of substantial wildlife habitat. The rail ROW and adjacent riverbank provide a narrow corridor for wildlife movement.

<u>Chelmsford</u> - Similar to Lowell, the Merrimack River and its banks are mapped as Core Habitat, Critical Natural Landscape, and Prioritized Habitat. These mapped areas extend upstream to include Stony Brook and Deep Brook rail line crossings. A few narrow wildlife corridors are mapped in the northern portion of Chelmsford where the Merrimack River is close to the rail line. This area is well developed, so wildlife use may be limited. The Merrimack River and its bank appears to provide the greatest potential for a wildlife corridor in the area, although the Stony Brook and Deep Brook crossings have adjacent undeveloped wetland habitat that may support wildlife use. Overall, the Chelmsford portion of the rail line is well developed and habitat is fragmented.

<u>Tyngsborough</u> – The Merrimack River is mapped as Core Habitat, Critical Natural Landscape, and Prioritized Habitat. In some areas, these mapped habitats extend beyond the river and overlap with the rail ROW. Several mapped wildlife corridors cross the rail line although, similar to Chelmsford, some of these areas are developed and their value may be limited. The undeveloped forests and fields located along the Merrimack River likely provide the best opportunity for wildlife movement. The Mill Brook crossing at MP 33.89 is mapped as a Priority Habitat Block that extends west to a mapped wildlife corridor.

Nashua — One isolated area mapped as Supporting Landscape is located east of the rail line near the outlet of the Nashua River. There is also another small Supporting Landscape mapped east of the rail line near Pennichuck Brook and the Pennichuck Brook crossing is mapped as Highest Ranked Habitat in the Region. The Merrimack River, Nashua River, Salmon Brook, and Pennichuck Brook are all mapped as wildlife corridors. Secondary wildlife corridors are shown crossing the rail line in several other locations, with the largest potential corridor located near the Nashua Country Club (MP 37.5). Overall, the greatest potential for wildlife habitat and movement within the Nashua portion of the project appears to be along the Merrimack River and at the larger stream crossings. The majority of the area adjacent to the rail ROW in Nashua is developed, so there are very few large blocks of undisturbed habitat.

Merrimack - The Merrimack portion of the project has various undeveloped areas adjacent to the rail line that are mapped as either Highest Ranked Habitat or Supporting Landscape. The Nashua-Merrimack town line, located at Pennichuck Brook, and the area near the Merrimack Wastewater Treatment Plant are mapped as Highest Ranked Habitat in the Region. Highest Ranked Habitat in the Region is also mapped at Horseshoe Pond with a pocket of Highest Ranked Habitat in NH to the east. There are two large areas of Supporting Landscape adjacent to the existing railroad in the northern portion of the Town of Merrimack. In addition, portions of the Merrimack River in Merrimack are mapped as either Highest Ranked Habitat in NH or Supporting Landscape.

The fields located east of Anheuser-Busch are mapped as Highest Ranked Habitat in NH and this area is part of a Prioritized Habitat Block that extends north to include the area near Horseshoe Pond. A second Prioritized Habitat Block is mapped along the Merrimack River, north of Reeds Ferry. The Merrimack portion of the project includes various areas that are mapped as potential wildlife corridors. The most significant ones include the Pennichuck Brook crossing, the undeveloped forested area south of Anheuser-Busch (near MP 43.15), the Souhegan River crossing, and the Dumpling Brook crossing. There are also many smaller undeveloped areas that provide habitat and potential corridors for wildlife movement to and from the Merrimack River.

<u>Bedford</u> – Within Bedford, portions of the rail ROW and the adjacent undeveloped areas are mapped as Supporting Landscape. There is also a small area of Highest Ranked Habitat in the Region near Raymond Wieczorek Drive. These habitat areas are associated with the Merrimack River, which is mapped as a wildlife corridor. A wildlife corridor is also mapped along Sebbins Brook near the Bedford-Merrimack town line. Several smaller, secondary wildlife corridors are shown throughout the Bedford section of the rail line, however most of these cross through developed areas so their value may be limited. There are no Prioritized Habitat Blocks mapped within or adjacent to the rail line in Bedford.

<u>Manchester</u> – Within Manchester, the Merrimack River is mapped as either Highest Ranked Habitat or Supporting Landscape. These habitat areas extend out from the river to include a large portion of the rail ROW near Pine Grove Cemetery and a small area just south of Sundial Avenue. Other than the area near Pine Grove Cemetery, the rail ROW in Manchester provides limited habitat value since it is densely developed. The Merrimack River is mapped as a wildlife corridor, although in many areas development extends up to the river edge. There are also a few mapped secondary corridors near the wastewater treatment plant, but this area is developed and does not appear to provide much opportunity for wildlife passage. A Prioritized Habitat Block is shown near Pine Grove Cemetery and Carthagina Island.

Station and Layover Sites

<u>Pheasant Lane Mall South Nashua Station</u> – The site is not mapped as Highest Ranked Habitat or as a Supporting Area, although the Merrimack River is NH is mapped as a wildlife corridor. South of the station (in MA), the Merrimack River is mapped as Core Habitat, Critical Natural Landscape, and a Prioritized Habitat Block. The only potential habitat (other than urban developed habitat) at the site is the Merrimack River and its bank, which provides a very narrow upland corridor for wildlife movement along the river.

<u>Crown Street Nashua Station</u> - The site is not mapped as Highest Ranked Habitat or as a Supporting Area and there are no mapped wildlife corridors nearby. The site is currently developed and consists of pavement, buildings, and the existing rail line. There is a small, mowed field at the southeastern end of the station site. The site provides some habitat for urban wildlife, but there is little potential for wildlife corridors due to the surrounding development.

<u>Bedford-MHT Station</u> - The majority of the site and the adjacent area along the Merrimack River are mapped as either Highest Ranked Habitat in the Region or Supporting Landscape. In addition, Sebbins Brook and the Merrimack River are both mapped as wildlife corridors. The undeveloped portions of the site generally consist of forested wetland and upland areas that provide quality habitat, particularly along Sebbins Brook. There is also an upland field located south of Raymond Wieczorek Drive and a powerline ROW runs along the west side of the railroad tracks.

<u>Manchester Station</u> - The site is not mapped as Highest Ranked Habitat or as a Supporting Area, although Highest Ranked Habitat in NH is located west of the site along the Merrimack River. The Merrimack River is also mapped as a wildlife corridor, but there is dense development between the river and the station, so there is little potential for wildlife passage through the area. The station site is either currently developed or previously disturbed so there is no valuable habitat present.

<u>Manchester Layover Facility (Pan Am South Site)</u> – Similar to the Manchester Station, the Layover Facility site provides no valuable habitat or potential wildlife corridors since it is surrounded by development. The site is not mapped as Highest Ranked Habitat or as a Supporting Area and there are no wildlife corridors mapped nearby other than the Merrimack River to the west.



Merrimack River bank adjacent to Pheasant Lane Mall South Nashua Station



Crown Street Nashua Station Site



Bedford-MHT Station Site – View toward proposed platform



Bedford-MHT Station Site – View toward proposed parking lot area



View south toward Manchester Station Site



Manchester Layover Facility Site

8.0 Fisheries

8.1 Regulatory Overview

At the federal level, the Magnuson-Stevens Act regulates marine fisheries resources and protects "Essential Fish Habitat" (EFH) for federally managed fish species. It requires that federal agencies consult with the National Marine Fisheries Service (NMFS) on any actions that may adversely affect EFH.

In New Hampshire, the Fish and Game Department Fisheries Division monitors and manages inland and marine fisheries. Projects that have the potential to directly or indirectly impact surface waters, such as stream crossings or development near waterbodies, should be reviewed by NH Fish and Game to obtain their input on design and mitigation measures that can help to avoid and minimize impacts.

In Massachusetts, the Division of Fisheries and Wildlife (MassWildlife) is responsible for the management of marine and freshwater fisheries throughout the state. Similar to NH, coordination with MassWildlife is required to identify fisheries that could be impacted by the project and determine avoidance and mitigation measures to minimize these impacts.

8.2 Existing Conditions

The Merrimack River and other perennial streams in the project corridor provide habitat for fish and other aquatic organisms. Fish species that are found in the Merrimack River and its perennial tributaries include yellow perch (*Perca flavescens*), chain pickerel (*Esox niger*), small mouth bass (*Pomoxis nigromaculatus*), largemouth bass (*Micropterus salmoides*), and American eel (*Anguilla rostrata*), among others (Nashua Regional Planning Commission, 2008).

The Merrimack River, as well as several of its tributaries, is designated as EFH for Atlantic salmon (Salmo salar). Atlantic salmon were extirpated in the Merrimack River in the early 1800's by the construction of dams in Lawrence and Lowell, Massachusetts which blocked their upstream migration from the Atlantic Ocean. Salmon were stocked by NHF&G and USFWS at several locations in the Merrimack River watershed as part of the Merrimack River Anadromous Fish Restoration Program until the program ended in 2013 (NH Fish and Game Department, 2022). Other anadromous fish species that are beginning to return to the Merrimack River include blueback herring (Alosa aestivalis), alewife (Alosa pseudoharengus), and American shad (Alosa sapidissima) (Nashua Regional Planning Commission, 2008).

Table 8.1 provides a summary of fish resources within the project corridor. In addition to the Merrimack River, Stony Brook, the Nashua River, Pennichuck Brook, Horseshoe Pond, and the Souhegan River are identified as EFH for Atlantic salmon.

NMFS, MassWildlife, and NHF&G were contacted to obtain information on fisheries within the vicinity of the project and discuss potential impacts (correspondence is provided in Appendix E). The current preliminary design for the project involves in-water work at the Deep Brook bridge near Wotton Street in Chelmsford. No other in-water work is currently anticipated. NMFS responded that Deep Brook is not mapped as EFH and the currently proposed action does not require EFH consultation. NMFS noted that consultation may be required for in-water work where diadromous fish resources are present so it is

recommended that impacts be reviewed again during final design once the proposed bridge and culvert work is further refined.

MassWildlife indicated that Deep Brook is designated as a Coldwater Fish Resource but the lower reach of the stream that is crossed by the project doesn't provide habitat and water temperatures suitable for coldwater fish. MassWildlife recommended that the proposed repairs to the railroad bridge ensure fish and wildlife passage upstream and downstream of the crossing during and after construction. They also mentioned that erosion and sediment controls are crucial for all phases of construction, as well as after construction is completed.

The NHF&G Fish Habitat Program provided feedback on the project at the February 16, 2022 NHDOT Natural Resource Agency Coordination Meeting (minutes are provided in Appendix F). NHF&G mentioned that Sebbins Brook has sea lamprey and Eastern brook trout, which are both identified in the NH Wildlife Action Plan as Species of Greatest Conservation Need. NHF&G stated that the project should be mindful of impacts near Sebbins Brook, particularly regarding vegetation clearing and stormwater management, as increasing the water temperature of Sebbins Brook could adversely impact brook trout populations. NHF&G also mentioned the need for stormwater management at the Pheasant Lane Mall Station in South Nashua since this site is located adjacent to the Merrimack River.

During field reviews of the project corridor, it was noted that many of the culverts which carry the small perennial streams are either undersized or partially filled in and do not provide aquatic organism passage. If any culverts are to be replaced, potential improvements to aquatic organism passage should be evaluated.

Table 8.1 Fisheries

Waterbody Name	Location	Fisheries Resources ¹	
Deep Brook	Chelmsford, MA	Coldwater Fish Resource ²	
Stony Brook	Chelmsford, MA	EFH for Atlantic salmon	
Merrimack River	Tyngsborough, MA / Nashua, NH	EFH for Atlantic salmon Anadromous fish	
Merrimack River	Nashua to Manchester, NH	EFH for Atlantic salmon Herring stock location or migratory path American shad spawning habitat	
Nashua River	Nashua, NH	EFH for Atlantic salmon Herring stock location or migratory path American shad spawning habitat Species of Concern: American shad, American eel	
Pennichuck Brook	Merrimack/Nashua, NH	EFH for Atlantic salmon Species of Concern: American eel	
Naticook Brook	Merrimack, NH	Herring stock location or migratory path	
Horseshoe Pond	Merrimack, NH	EFH for Atlantic salmon Herring stock location or migratory path Species of Concern: American eel	
Souhegan River	Merrimack, NH	EFH for Atlantic salmon Herring stock location or migratory path American shad spawning habitat Species of Concern: American shad, American eel, sea lamprey	
Dumpling Brook	Merrimack, NH	Species of Concern: Eastern brook trout, sea lamprey	
Sebbins Brook	Bedford, NH	Species of Concern: Eastern brook trout, sea lamprey	

- 1. Data obtained from NH Aquatic Restoration Mapper, MassGIS Oliver, and NMFS EFH Mapper
- 2. MassWildlife indicated that although Deep Brook is designated as a Coldwater Fish Resource, the lower reach of the stream that is crossed by the project doesn't provide habitat and water temperatures suitable for coldwater fish.

9.0 Floodplains

9.1 Regulatory Overview

Floodplains are defined by the Federal Emergency Management Agency (FEMA) as "any land area susceptible to being inundated by floodwaters from any source" (FEMA, 2021). Floodplains are shown on Flood Insurance Rate Maps (FIRMs) as Special Flood Hazard Areas (SFHAs) and are categorized into different zones, which correspond to the severity or type of flooding in the area. 100-year floodplains include areas that have a 1% chance of being inundated in any given year and 500-year floodplains have 0.2% chance of being inundated. Within the project corridor, the 100-year floodplains are mapped as either Zone A or AE. Base Flood Elevations (BFEs) have been determined for Zone AE floodplains but not Zone A.

A Regulatory Floodway includes "the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height" (FEMA, 2021). Development within floodways is regulated to avoid impacts to upstream and downstream flood elevations.

Executive Order 11988, Floodplain Management, directs federal agencies to evaluate potential floodplain impacts, avoid impacts where practicable, and mitigate flood storage loss where impacts are unavoidable.

In New Hampshire, Executive Order 96-4 requires all state agencies to comply with floodplain management requirements for communities that participate in the National Flood Insurance Program (NFIP). The NH Office of Strategic Initiatives (OSI) Floodplain Management Program administers the National Flood Insurance Program (NFIP) program in New Hampshire.

In Massachusetts, Executive Order No. 149 requires all state agencies to avoid construction, provision of loans or grants, conveying, or permitting projects in floodplains to the extent possible. The Massachusetts Department of Conservation and Recreation (DCR) Flood Hazard Management Program (FHMP) is the state coordinating agency for the NFIP. Projects in Massachusetts that have potential to impact floodplains are reviewed in conjunction with the Massachusetts Environmental Policy Act (MEPA), the Massachusetts Wetlands Protection Act (WPA), and the Massachusetts Office of Coastal Zone Management.

9.2 Existing Conditions

Digital Flood Insurance Rate Maps for the project corridor were downloaded from the NH GRANIT GIS and MassGIS websites. The NH Floodplain Management Program was also contacted to obtain information on floodplain and floodway resources in the project corridor (correspondence is provided in Appendix G). Since the rail corridor is located along the Merrimack River, large portions of the rail line are located adjacent to areas that are mapped as 100-year floodplains and sections of the rail line cross 100-year floodplains (refer to Figures 9.1 to 9.8 in Appendix A). The rail ROW also crosses through areas that are mapped as 500-year floodplain.

Most of the rail ROW is elevated above the Merrimack River and its associated 100-year floodplain. The portions of the ROW that are mapped as 100-year floodplain are either low areas or are located at large stream or river crossings. These locations are summarized in Table 9.1.

Table 9.1
Special Flood Hazard Areas

Associated Waterbody /	Municipality	Mile Post	Special Flood Hazard Area
Location Description	- Widinespancy	Wille F OSC	Special Flood Hazara Area
Merrimack River	Lowell, Chelmsford, Tyngsborough, Nashua, Merrimack, Bedford, Manchester	Throughout project corridor Bridge crossing at 51.84	100-year Floodplain (Zone AE) Floodway 500-year Floodplain
Pawtucket Canal	Lowell	25.69 and 26.20	100-year Floodplain (Zone A)
Black Brook	Lowell	27.0	100-year Floodplain (Zone AE) Floodway 500-year Floodplain
Stony Brook, Deep Brook, and surrounding area	Chelmsford	28.65, 29.1, and surrounding area	100-year Floodplain (Zone AE) 500-year Floodplain
Unnamed stream	Tyngsborough	30.61	100-year Floodplain (Zone AE) 500-year Floodplain
Unnamed stream/wetlands	Tyngsborough	33.1	100-year Floodplain (Zone AE) 500-year Floodplain
Mill Brook	Tyngsborough	33.89	100-year Floodplain (Zone AE) 500-year Floodplain
Salmon Brook	Nashua	37.87	100-year Floodplain (Zone AE) Floodway 500-year Floodplain Zone X, Protected by Levee
Nashua River	Nashua	39.22	100-year Floodplain (Zone AE) Floodway 500-year Floodplain Zone X, Protected by Levee
Pennichuck Brook	Nashua, Merrimack	41.77	100-year Floodplain (Zone AE) Floodway 500-year Floodplain
Unnamed stream	Merrimack	43.34	100-year Floodplain (Zone AE) 500-year Floodplain
Naticook Brook and Horseshoe Pond	Merrimack	44.92	100-year Floodplain (Zone AE) Floodway 500-year Floodplain
Souhegan River	Merrimack	46.22	100-year Floodplain (Zone AE) Floodway 500-year Floodplain
Sebbins Brook	Bedford	50.21	100-year Floodplain (Zone AE) Floodway
I-293 Bridges	Manchester	52.80	100-year Floodplain (Zone A)

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Most of the proposed station and layover facility sites are located within or adjacent to floodplains. These areas are generally mapped as either 100-year floodplain (Zone AE) or 500-year floodplain. Portions of the Downtown Nashua site are mapped as "Zone X, Protected by Levee". The following provides a summary of the floodplains and regulatory floodways at each of the proposed station and layover facility sites. These resources are also shown on Figures 1.2 to 1.6 in Appendix A.

<u>Pheasant Lane Mall South Nashua Station</u> – A 100-year floodplain (Zone AE) is mapped east of the station along the edge of the Merrimack River. The floodplain is on the east side of the tracks and doesn't extend into the NH portion of the station. The existing mall parking lot located south of the station in MA is partially mapped as Zone AE floodplain. The Merrimack River has a Regulatory Floodway but this appears to be located beyond the rail ROW. It is also worth noting that the entire station is mapped as 500-year floodplain.

<u>Crown Street Nashua Station</u> – A large portion of the site is mapped as Zone X, Protected by Levee. This is a lower risk flood area that is protected from the 100-year flood by a levee. There are no other Special Flood Hazard Areas mapped near the station.

<u>Bedford-MHT Station</u> – The area to the south of the station and the proposed parking lot, along Sebbins Brook, is mapped as 100-year floodplain (Zone AE). Sebbins Brook also has a Regulatory Floodway. In addition, portions of the platform and access driveway are mapped as 500-year floodplain that is associated with the Merrimack River. The 100-year floodplain (Zone AE) and Regulatory Floodway of the Merrimack River is located to the east, beyond the limits of the proposed station.

Manchester Station – There are no mapped floodplains or floodways at the site.

<u>Manchester Layover Facility (Pan Am South Site)</u> – There are no mapped floodplains or floodways at the site.

10.0 Wild and Scenic Rivers / NH Designated Rivers

10.1 Regulatory Overview

In 1968, the US Congress passed the Federal Wild and Scenic Rivers Act (P.L. 90-542) in order to preserve "certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values".

In 1988, the New Hampshire Legislature passed the Rivers Management and Protection Act (RSA 483) which established a statewide rivers program based on a two-tier approach to river management and protection: 1.) state designation of significant rivers and protection of instream values and 2.) local development and adoption of river corridor management plans to protect shorelines and adjacent lands. Projects located within a ¼ mile of a Designated River require coordination with the River's Local Advisory Committee (LAC).

10.2 Existing Conditions

Currently, there are no river segments within the vicinity of the project corridor that are included in the federal Wild and Scenic Rivers Program.

Several rivers that are designated under the NH Rivers Management and Protection Act are located within a ¼ mile of the project corridor (refer to Table 10.1 and Figure 10.1 in Appendix A).

Table 10.1
NH Designated Rivers*

River	Town(s)	
Lower Merrimack	Nashua, Merrimack	
Souhegan	Merrimack	
Piscataquog	Manchester	

^{*}Within ¼ mile of project corridor.

The Lower Merrimack River was designated under the NH Rivers Management and Protection Act in 1990. The designated segment begins at the Merrimack-Bedford municipal boundary and continues for approximately 15 miles through Merrimack, Litchfield, Hudson, and Nashua to the Massachusetts border. Except for a 1,000-foot section near East Hollis Street in Nashua, the entire rail line in Merrimack and Nashua is within the Lower Merrimack designated river corridor. The one crossing of the Merrimack River, located at the Bedford/Manchester line, is not within the designated river segment.

The Piscataquog River consists of three branches (South, Middle and North), which were all designated under the NH Rivers Management and Protection Act in 1993. The three branches flow through the communities of Deering, Francestown, Lyndeborough, New Boston, Weare, Goffstown, and Manchester. In Manchester, the Piscataquog River flows into the Merrimack River at Bass Island. An approximate 2,500-foot section of the rail line near Queen City Avenue and the proposed Manchester layover facility is located within a ¼ mile of the Piscataquog River, but it is on the opposite side of the Merrimack River.

The Souhegan River was designated in 2000 and includes the communities of New Ipswich, Greenville, Wilton, Milford, Amherst, and Merrimack. The rail line crosses the Souhegan River north of Railroad Avenue in Merrimack, where the Souhegan enters the Merrimack River.

Initial contact letters were sent to the three LACs for the project corridor in September 2021. Responses were not received. It is recommended that continued coordination occur during final design. NHDES requires that a copy of the Wetlands Permit application be provided to the applicable LAC(s) for projects that are located within a Designated River corridor.

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11.0 Invasive Plants

11.1 Regulatory Overview

Invasive plants include non-native species that are able to rapidly colonize an area and can out-compete native species. Executive Order 13112 was enacted in 1999 to prevent the introduction of invasive species and minimize the economic, ecological, and human health impacts that they can cause.

In New Hampshire, aquatic invasive plant species are regulated by NHDES and terrestrial species are regulated by the NH Department of Agriculture. Each agency has a list of prohibited invasive plants. NHDOT developed a manual (*Best Management Practices for the Control of Invasive and Noxious Plant Species*) that provides information on invasive plant species and control methods. The manual defines two types of invasive plants. Type I species are plants that are easily spread by seeds but do not reproduce vegetatively (from root or stem fragments). These include species such as glossy buckthorn (*Frangula alnus*) and Asian bittersweet (*Celastrus orbiculatus*). Type II species can spread through seeds or root/stem fragments and include species such as Japanese knotweed (*Reynoutria japonica*) and purple loosestrife (*Lythrum salicaria*). These species are more easily spread and have different control requirements during construction.

Invasive plants are regulated in Massachusetts by the MA Department of Agricultural Resources, which maintains a list of prohibited plants, similar to New Hampshire. This list includes both terrestrial and aquatic species.

11.2 Existing Conditions

Invasive plants are present throughout most of the project corridor. The disturbed edges of the rail ROW provide the right conditions for invasive species to thrive. Table 11.1 provides a summary of the invasive plant species that were noted within the rail ROW and at the proposed station and layover facility sites during field reviews in 2021.

Invasive species control measures should be incorporated into the construction phase of the project, as well as long-term vegetation maintenance guidance. During the February 2022 NHDOT Natural Resource Agency Coordination Meeting, NHDES recommended that the project include an invasive species management plan. In addition, a letter received from the Bedford Conservation Commission in October 2021 (Appendix H) recommended that any mitigation efforts should include the removal of invasive plant species within the boundaries of the proposed Bedford-MHT station and the replanting of native species according to the anticipated as-built habitat.

Table 11.1 Invasive Plant Species

Common name	Scientific Name	Location	NHDOT Control Type
Asian Bittersweet	Celastrus orbiculatus	All municipalities in project corridor (scattered throughout ROW)	Type I
Autumn Olive	Elaeagnus umbellata	Lowell, Chelmsford, Nashua, Merrimack, Bedford, Manchester	Туре І
Black Locust	Robinia pseudoacacia	Lowell	Not listed*
Burning Bush	Euonymus alatus	Lowell, Tyngsborough, Bedford, Manchester	Туре І
Common Reed	Phragmites australis	Lowell, Chelmsford, Nashua, Bedford, Manchester	Type II
Garlic Mustard	Alliaria petiolata	Lowell, Tyngsborough, Nashua, Merrimack, Bedford, Manchester	Туре І
Glossy Buckthorn	Frangula alnus	All municipalities in project corridor (scattered throughout ROW)	Type I
Japanese Barberry	Berberis thunbergii	All municipalities in project corridor (scattered throughout ROW)	Type I
Japanese Knotweed	Reynoutria japonica	All municipalities in project corridor (scattered throughout ROW)	Type II
Moneywort	Lysimachia nummularia	Tyngsborough	Type I
Multiflora Rose	Rosa multiflora	Lowell, Tyngsborough, Nashua, Merrimack	Туре І
Norway Maple	Acer platanoides	Manchester	Type I
Purple Loosestrife	Lythrum salicaria	Lowell, Chelmsford, Tyngsborough, Bedford, Manchester	Type II
Spotted Knapweed	Centaurea stroebe	Nashua, Merrimack	Type I
Tatarian Honeysuckle	Lonicera tatarica	All municipalities in project corridor (scattered throughout ROW)	Туре І

^{*}Black locust is on the MA Prohibited Plant List and on the NH Invasive Plant Species Watch List (not currently prohibited in NH)

12.0 US Coast Guard Bridge Permit

12.1 Regulatory Overview

Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946 protect navigation and international and interstate commerce along waterways. Proposed repair or replacement of bridges over navigable waters require review by the US Coast Guard. Depending on the proposed changes to the structure, a permit from the Coast Guard may be required. Navigable waters include territorial seas of the US, tidal waters, and non-tidal waters that are or have been used for interstate or foreign commerce.

12.2 Existing Conditions

The Coast Guard was contacted in April 2022 to determine which waterways within the project corridor have been determined to be navigable. The response received (Appendix I) indicated that the Pawtucket Canal and the Merrimack River are the only navigable waterways subject to Coast Guard bridge jurisdiction within the project corridor. It was also determined that the bridge work as currently proposed meets the definition of repair set forth in 33 CFR 115.40 and therefore no Coast Guard permit is required. The proposed bridge work should be reviewed again during final design to confirm that no further coordination with the Coast Guard is required.

13.0 Summary of Anticipated Environmental Permits, Approvals, and Additional Reviews

This report summarizes the natural resources identified along the Nashua-Manchester 40818 (Capitol Corridor Rail) project as part of the preliminary design and NEPA documentation phase completed in 2021 and 2022. As noted in the report, additional field reviews and agency coordination will be needed during the final design and permitting phase. This additional work is anticipated to include:

- Wetlands Wetland impacts will need to be further refined during the final design phase.
 Approximately 12 miles of the NH portion of the rail ROW was not field delineated. If impacts are proposed in the sections that were not field-delineated, then additional site reviews will be needed. The project will require wetland permits from the USACE, NHDES, and the local MA Conservation Commissions.
- <u>Surface Waters</u> During the preliminary design phase, the only in-water work identified included work at the Deep Brook crossing in Chelmsford. If other in-water work is determined to be necessary, then further review would be required to identify potential impacts. Stream crossing assessments were not completed during the preliminary design phase since no replacements of Tier 2 or Tier 3 crossings in NH were identified. If this changes during final design, stream crossing assessment field work may be needed.

- <u>Protected Shoreland and Riverfront Areas</u> A Shoreland Permit from NHDES will be required for the project. Impacts to Riverfront Areas in MA will be permitted under the Wetlands Notices of Intent submitted to the Conservation Commissions in MA.
- Water Quality Surface Water Stormwater treatment will need to be designed to meet NHDES Alteration of Terrain (AoT), MS4, and MA Stormwater Standards. Erosion and sedimentation control measures will need to be incorporated into the final design. Preparation of a Stormwater Pollution Prevention Plan (SWPPP) will be required and coverage under the NPDES Construction General Permit will need to be obtained prior to construction. A NPDES Remediation General Permit may be necessary for construction if dewatering is required in contaminated areas.
- <u>Water Quality Groundwater</u> The project will need to meet NHDES AoT rules regarding setbacks for stormwater discharges relative to water supply sources. The project should include a spill response plan for accidents and also incorporate measures to protect against and contain spills during locomotive refueling at the layover facility in Manchester.
- Threatened and Endangered Species Continued coordination with USFWS, NHF&G, NHNHB, and MassWildlife NHESP will be required during final design. Consultation with NHF&G as outlined in NHF&G Rules Fis 1004 and the February 2022 Memorandum of Agreement between NHF&G and NHDOT will need to occur. The project will also require review under the MA Endangered Species Act (MESA). The following specific reviews and measures may be required during final design and construction:
 - Wild lupine was found in one location west of the rail ROW in Merrimack and semi-rich oak-sugar maple forest was found in one location in Manchester. Both locations are beyond the rail ROW and impacts are not anticipated, but this should be confirmed during final design.
 - An additional survey for Wright's spike sedge is recommended during final design if there will be impacts to the Merrimack River channel. Surveys for this species should also be completed if any drainage work will involve impacts to the Merrimack River channel beyond the rail ROW.
 - If potential impacts to the Merrimack River are identified during final design, coordination with NHF&G should occur to determine if a mussel survey is needed.
 - Vegetation clearing should be minimized where possible, especially near rivers and streams, within the Tyngsborough portion of the project for the state-listed riverine clubtail dragonfly.
 - The following measures are recommended during final design and construction to minimize impacts to turtle and snake species:
 - The use of welded plastic or biodegradable plastic netting or thread in erosion control matting should be avoided during construction since these types of materials can be harmful to snakes and other reptile species. A "wildlife friendly" option, such as jute matting, should be used instead.
 - Construction personnel should receive training in the identification of rare, threatened, and endangered species that may occur within the project area and be aware of their protected status. NHF&G turtle and snake flyers should be distributed to all contractors.

- Photographs of the species listed in the NHB report should be included on the project plans. The following notes should be added to the plans:
 - If spotted, wood, or Blanding's turtle are found laying eggs in the work area, please contact Melissa Doperalski at 271-1738 or Josh Megyesy at 271-1125 for further instructions.
 - All observations of Eastern hognose snake or Northern black racer encountered from the end of September through the month of April must be IMMEDIATELY reported to the NHF&G Department (Brendan Clifford 603-271-0463 or Melissa Doperalski 603-271-1738).
- Tree clearing activities along the Merrimack River should be conducted between July and December to avoid impacts to bald eagles.
- Impacts to the fields near Anheuser-Busch are not currently proposed since they are located beyond the rail ROW. If any impacts to these fields are identified during final design, coordination with NHF&G and NH Audubon should occur to determine the need for grassland bird surveys.
- Bat acoustic surveys are anticipated to be required during final design to document the
 presence or probable absence of northern long-eared bat (NLEB) within the project
 area. In addition, surveys of bridges or other applicable structures that may be impacted
 during construction need to be completed to determine if they provide bat roosting
 habitat.
- The following general avoidance and minimization measures are typically implemented for NHDOT projects to reduce impacts to NLEB:
 - Tree cutting and clearing is restricted from April 15th to August 31st
 - During construction, any sightings of dead or sick bats are reported to the NHDOT Bureau of Environment
 - A "Northern Long-Eared Bat" flyer is shared with all operators, employees, and contractors working on the project and operators, employees, and contractors are made aware of all applicable environmental commitments.
 - Temporary lighting used during construction is directed away from suitable habitat during the NLEB's active season (April 1st to October 31st).
- <u>Ecological Systems and Wildlife</u> Wildlife and aquatic organism passage should be considered during final design, particularly at proposed bridge and culvert replacements or rehabilitations.
- <u>Fisheries</u> The project as currently proposed does not require Essential Fish Habitat (EFH) consultation. If impacts change during final design, work within and adjacent to diadromous fish resources should be reviewed to determine if EFH consultation is necessary. In addition, proposed repairs to bridges and culverts should ensure fish and wildlife passage during and after construction. Potential impacts to Sebbins Brook from vegetation clearing and stormwater management, should be considered during the final design of the Bedford-MHT station.
- <u>Floodplains</u> Impacts to floodplains and regulatory floodways will need to be identified and evaluated to determine if a Letter of Map Revision (LOMR) is needed from FEMA.

- NH Designated Rivers Correspondence with the Lower Merrimack, Souhegan, and Piscataquog Rivers Local Advisory Committees should continue during final design. A copy of the NHDES Wetlands Permit application will need to be provided to each LAC.
- <u>Invasive Plants</u> Invasive species control measures should be incorporated into the construction phase of the project, as well as long-term vegetation maintenance. NHDES recommended that the project include an invasive species management plan. In addition, the Bedford Conservation Commission recommended that any mitigation efforts should include the removal of invasive plant species within the boundaries of the proposed Bedford-MHT station and the replanting of native species according to the anticipated as-built habitat. During construction, the project will need to follow the recommendations outlined in NHDOT's *Best Management Practices for the Control of Invasive and Noxious Plant Species*.
- <u>US Coast Guard Bridge Permit</u> The Merrimack River and the Pawtucket Canal are the only navigable waterways within the project corridor. The currently proposed work on the rail bridges over these waterways meets the definition of repair set forth in 33 CFR 115.40 and no Coast Guard permit is required. The proposed bridge work should be reviewed again during final design to confirm that no further coordination with the Coast Guard is required.

14.0 List of Acronyms

ACEC Area of Critical Environmental Concern

BFE Base Flood Elevation

BLSF Bordering Land Subject to Flooding

BMP Best Management Practice

BVW Bordering Vegetated Wetland

CWA Clean Water Act

EFH Essential Fish Habitat

EPA US Environmental Protection Agency

FEMA Federal Emergency Management Agency

FHWA Federal Highway Administration

FIRM Flood Insurance Rate Maps

FRA Federal Railroad Administration

FTA Federal Transit Administration

GIS Geographic Information System

GM2 GM2 Associates, Inc.

IPaC US Fish and Wildlife Service's Information for Planning and Conservation website

LUWW Land Under Water Bodies and Waterways

Massachusetts Department of Environmental Protection

MBTA Massachusetts Bay Transportation Authority

MEPA Massachusetts Environmental Policy Act

MESA Massachusetts Endangered Species Act

MS4 Municipal Separate Storm Sewer System

NFIP National Flood Insurance Program

NHB NH Natural Heritage Bureau

NHDES NH Department of Environmental Services

NHDOT NH Department of Transportation

NHESP Massachusetts Natural Heritage and Endangered Species Program

NHF&G NH Fish and Game Department

NLEB Northern Long-Eared Bat

NMFS National Marine Fisheries Service

NPDES National Pollutant Discharge Elimination System

NWI National Wetland Inventory

ORW Outstanding Resource Water

PRA Priority Resource Area

RFA Riverfront Area

ROW Right-of-Way

SFHA Special Flood Hazard Area

SWPPP Stormwater Pollution Prevention Plan

SWQPA NH Shoreland Water Quality Protection Act

TMDL Total Maximum Daily Load

USACE US Army Corps of Engineers

USFWS US Fish and Wildlife Service

USGS US Geological Survey

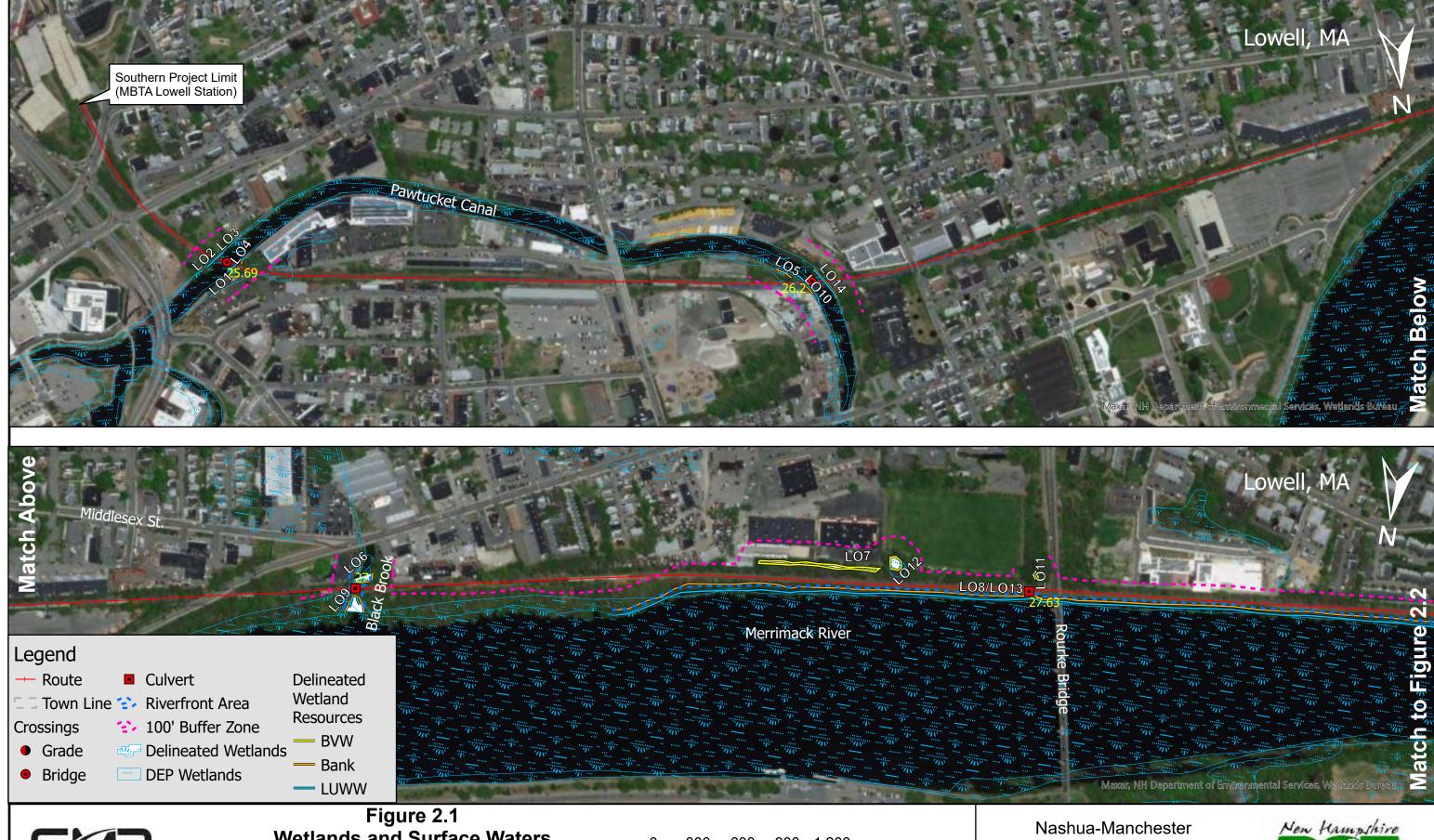
WPA MA Wetlands Protection Act

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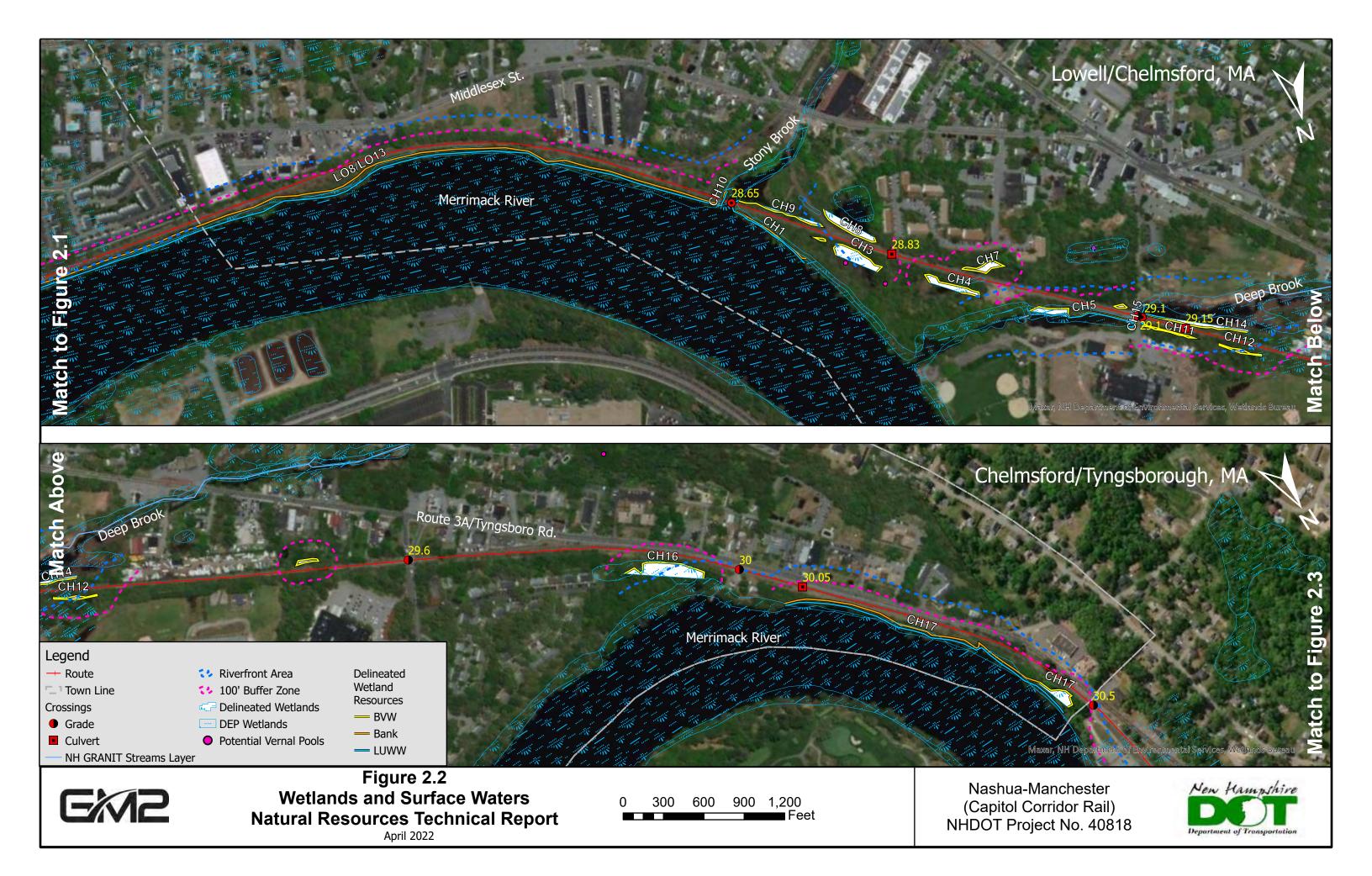
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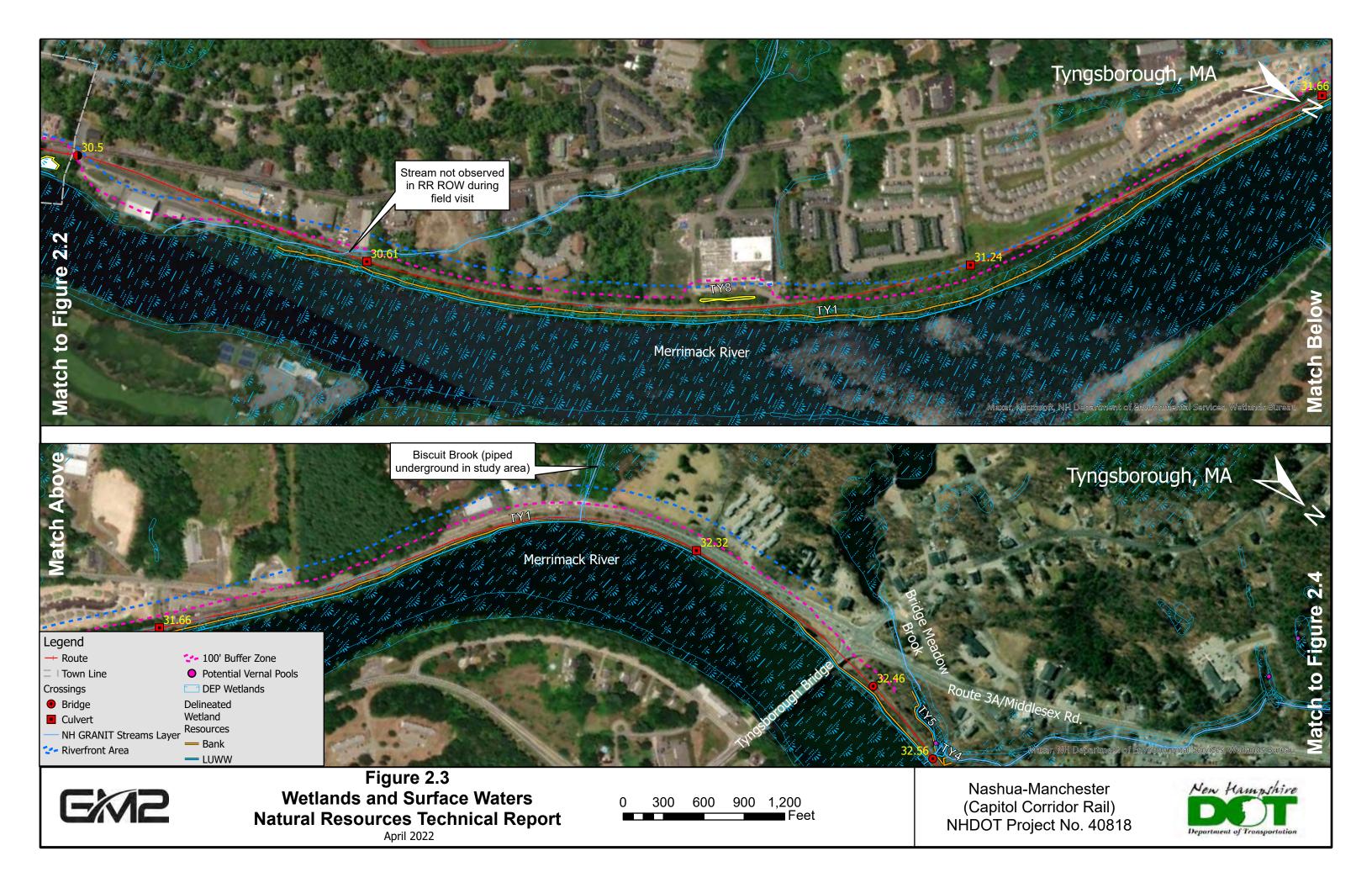
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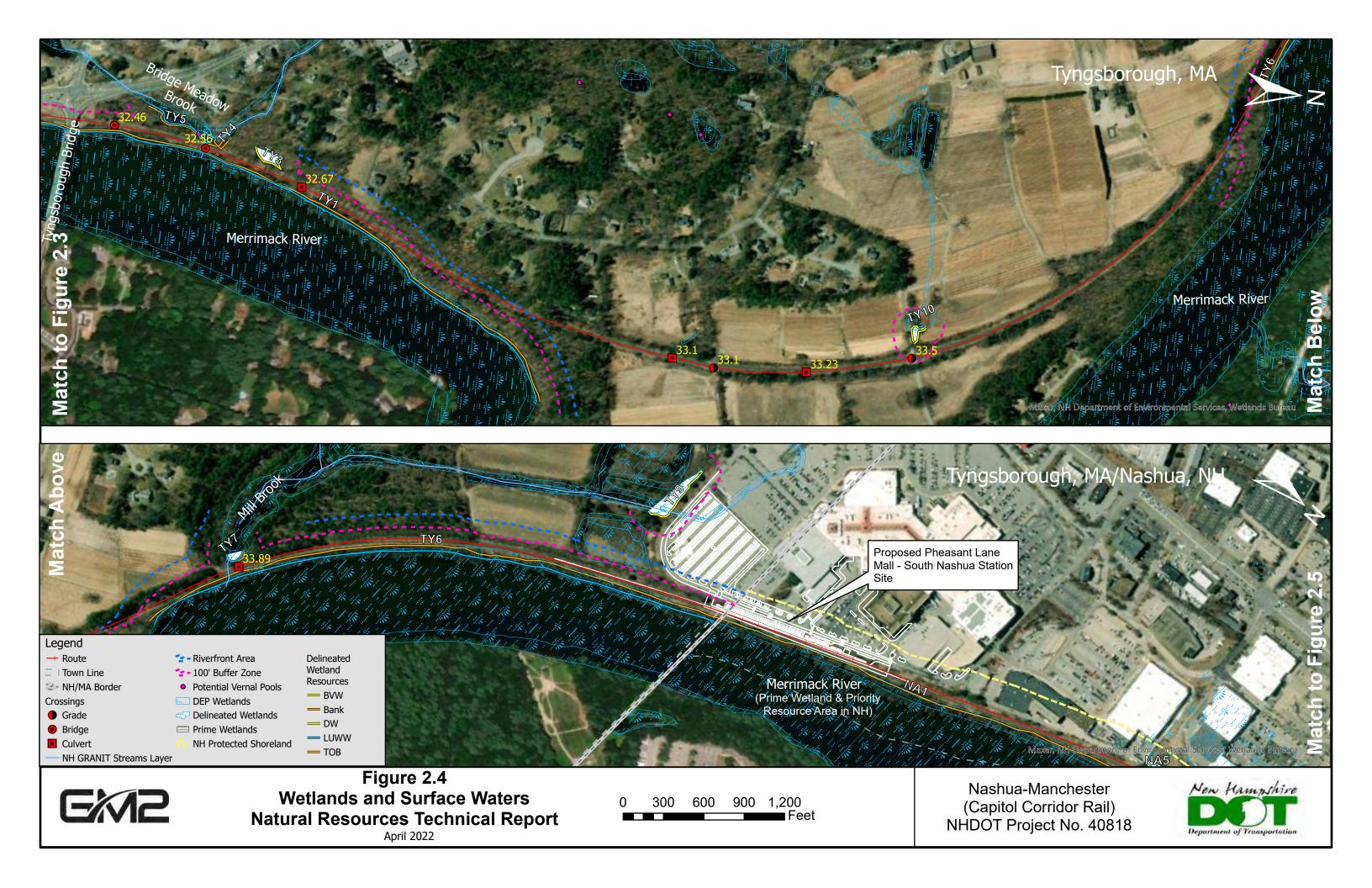


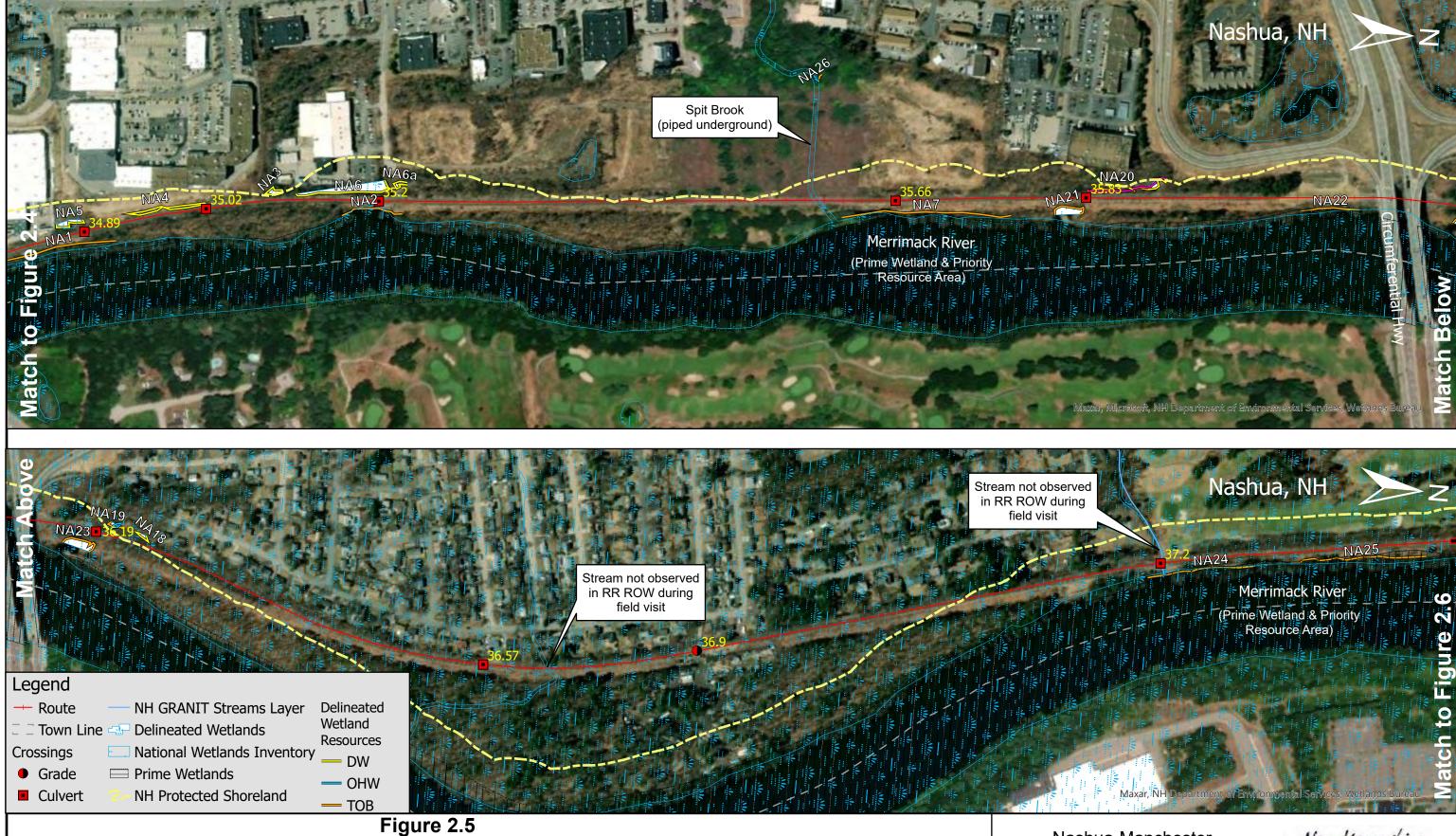
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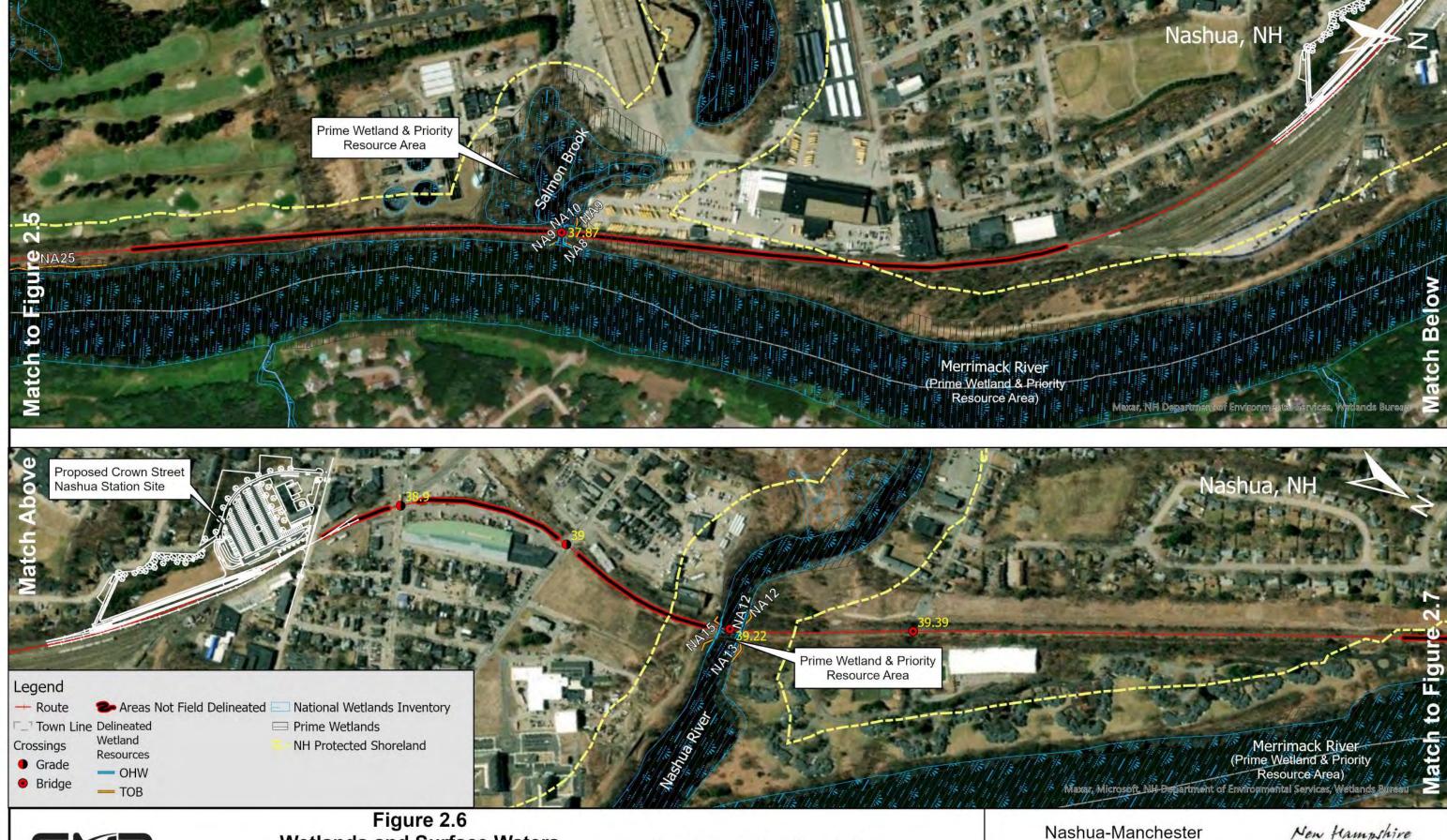
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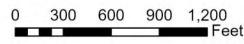






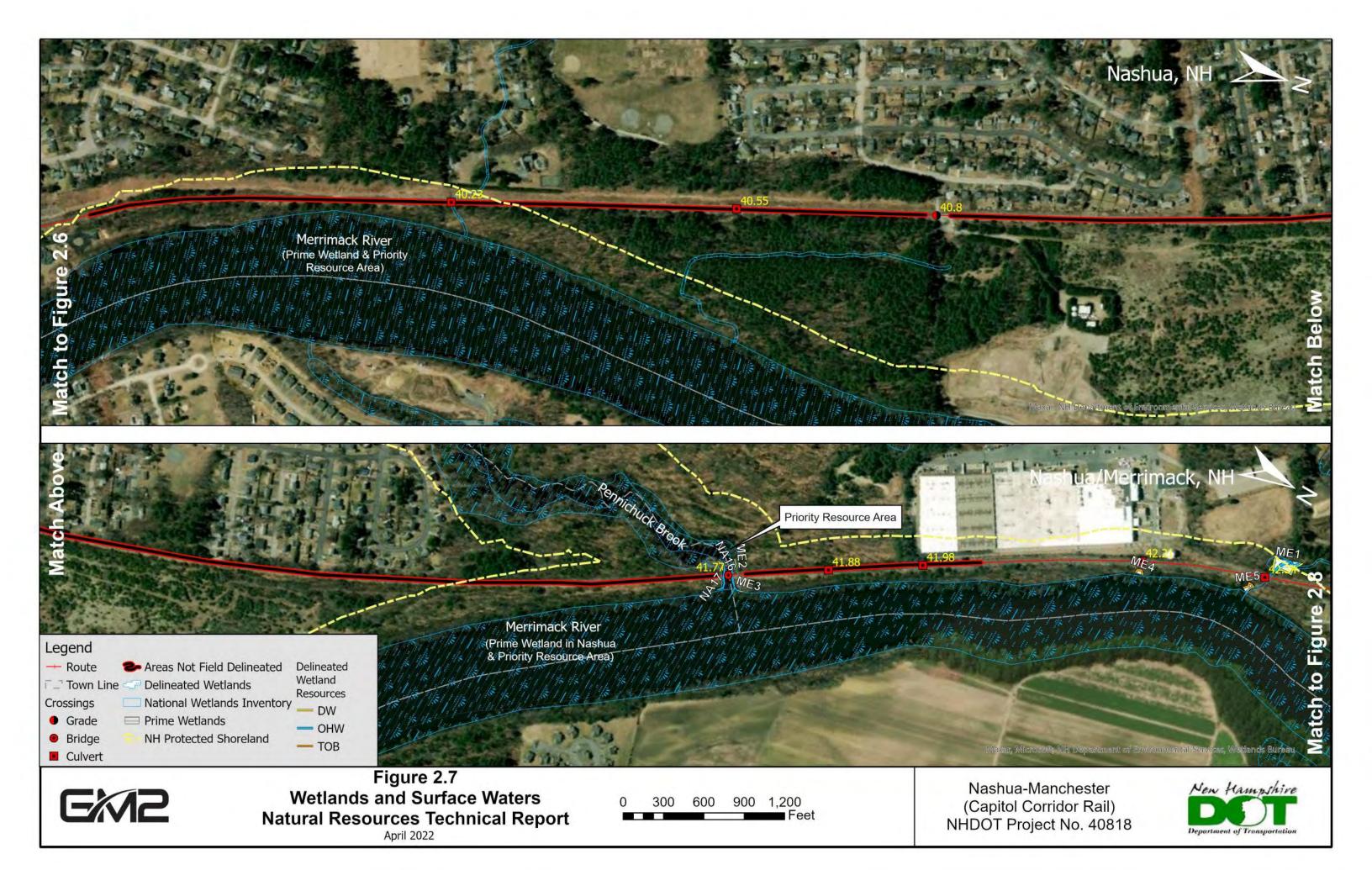
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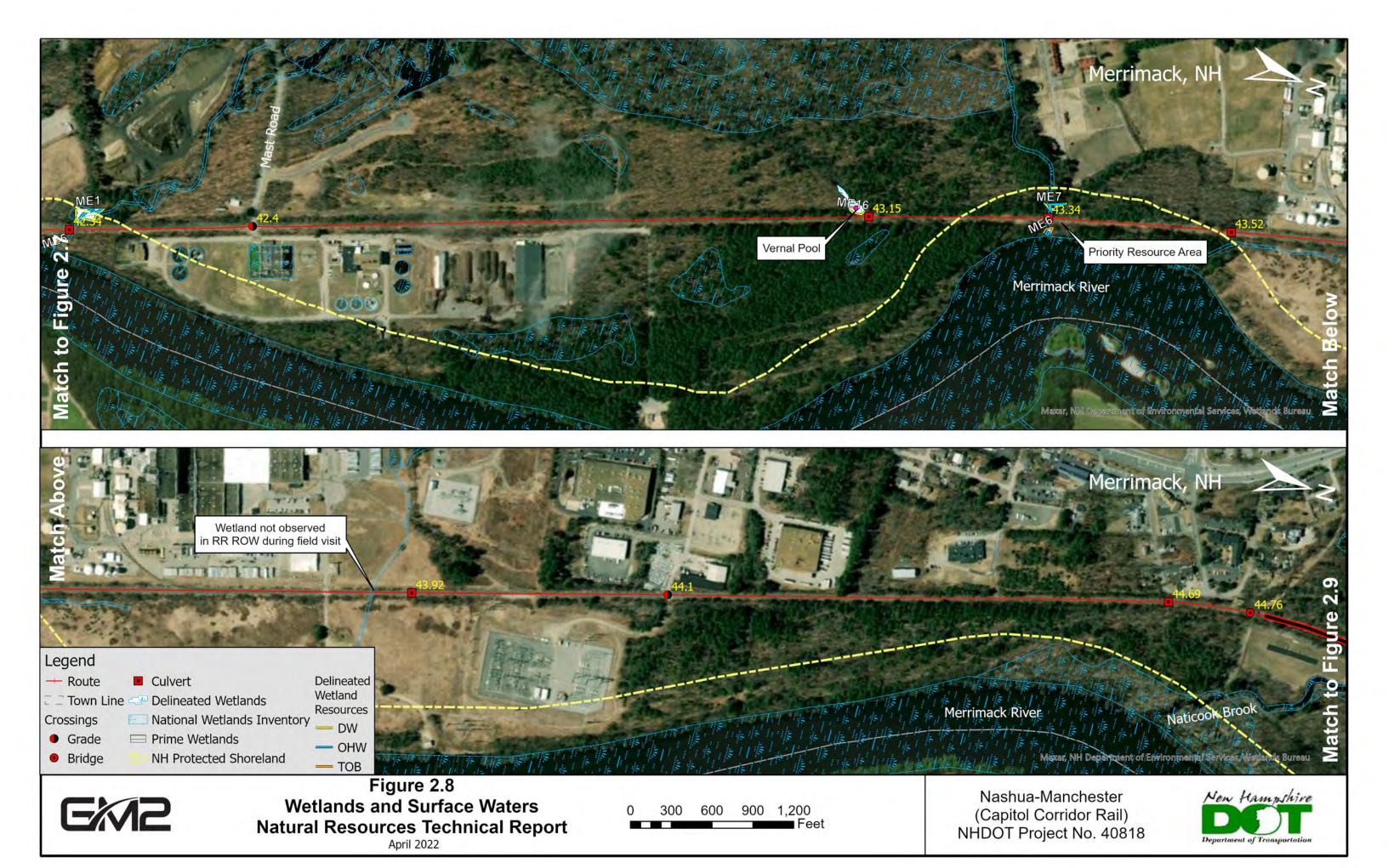
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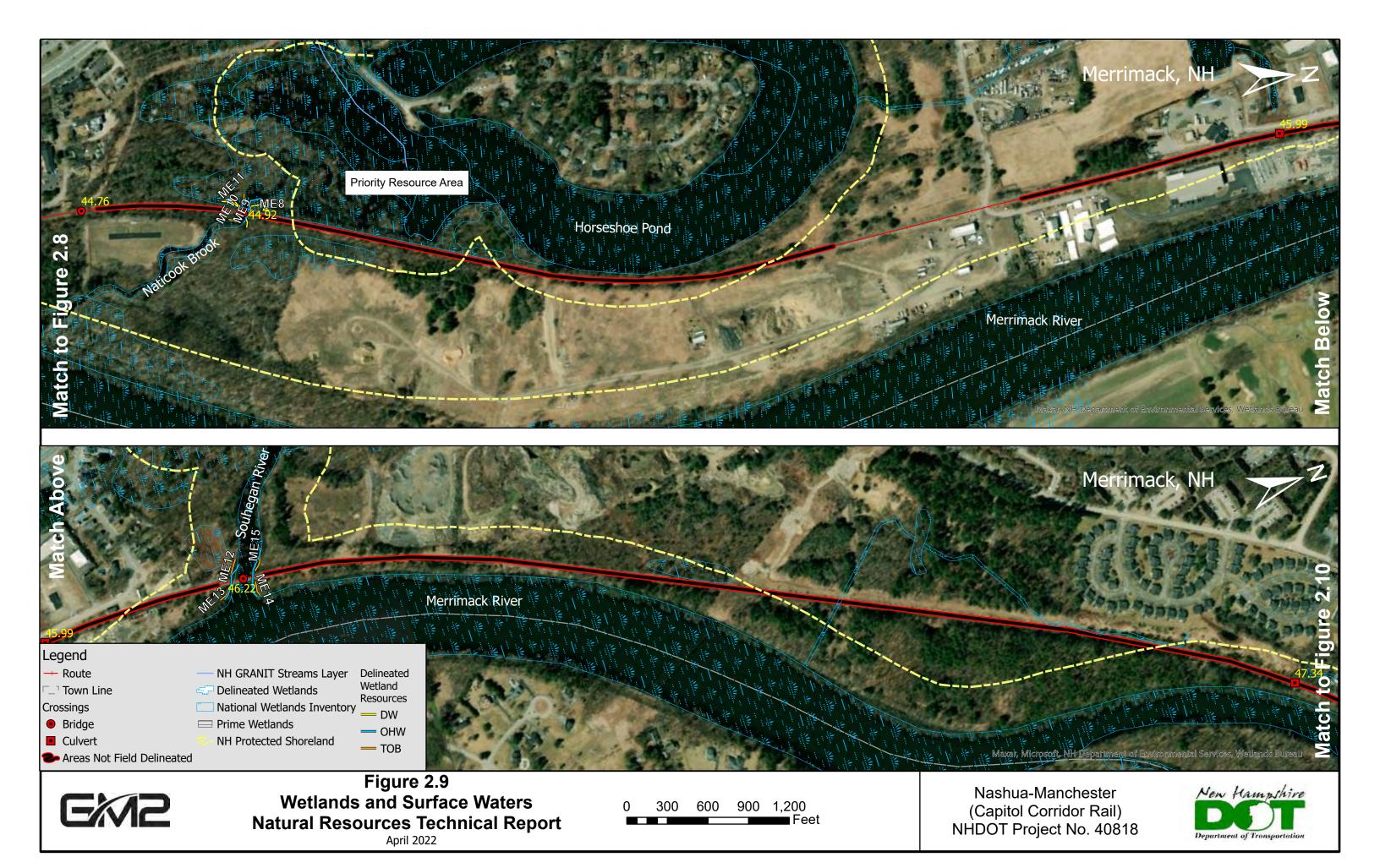


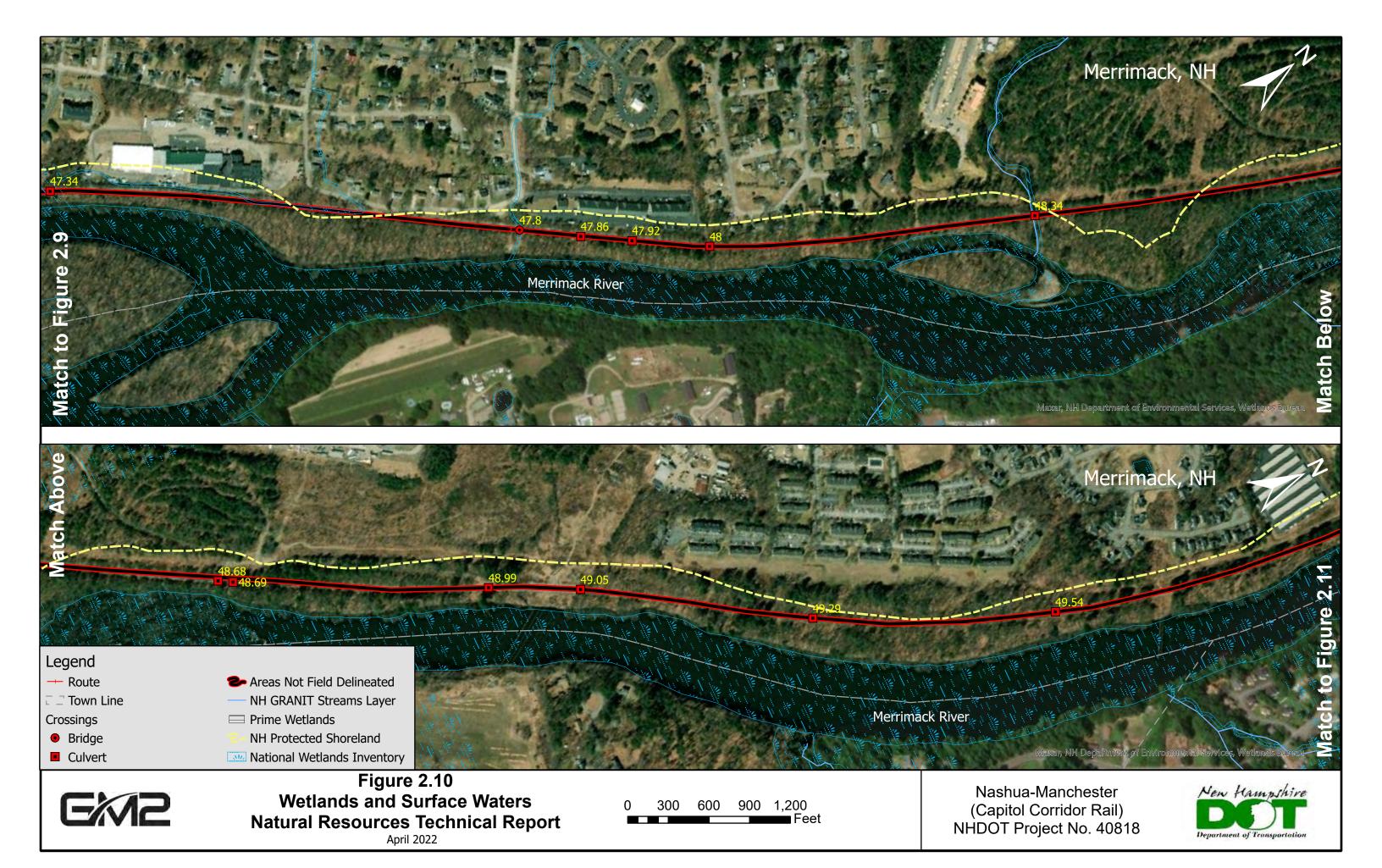
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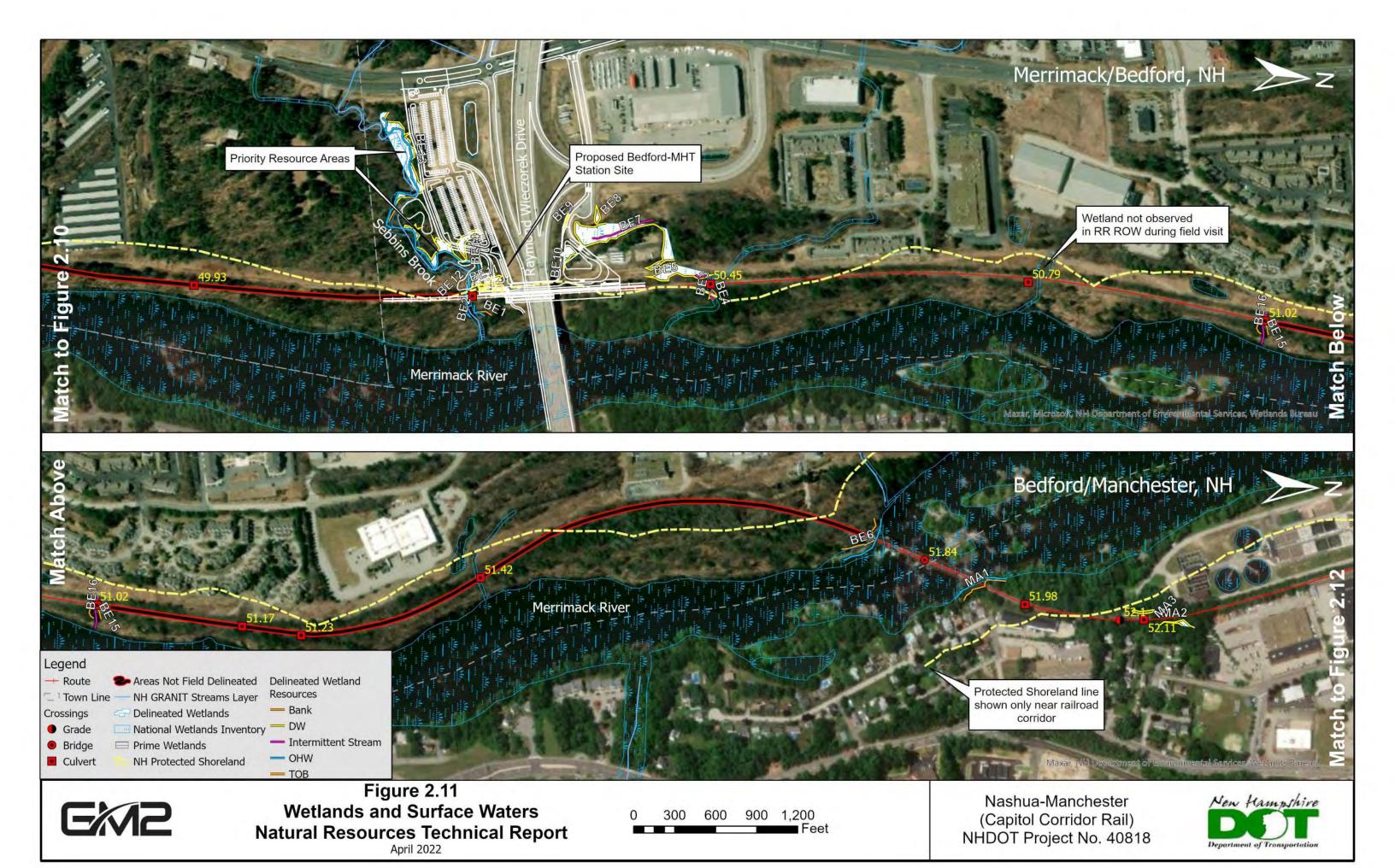


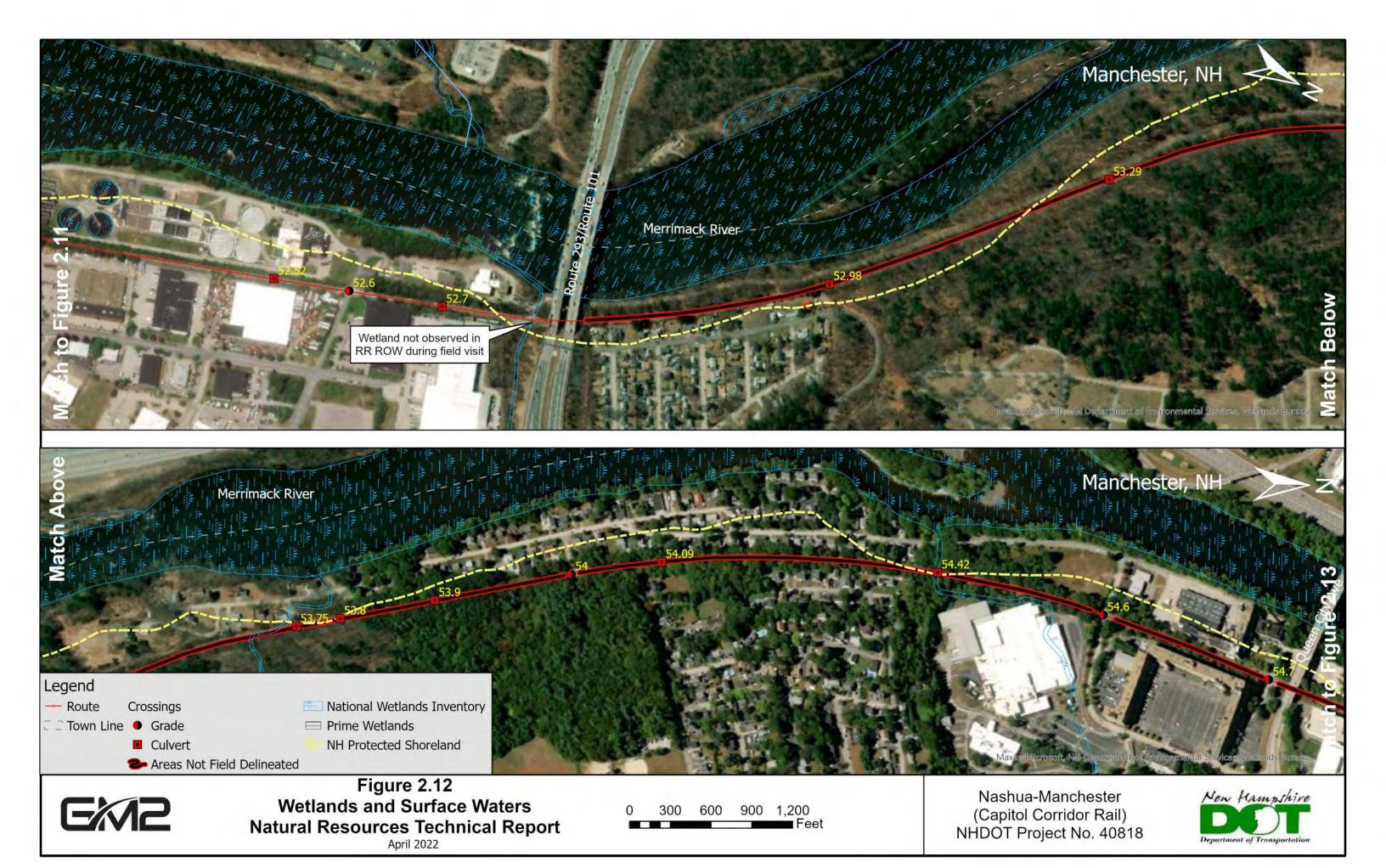








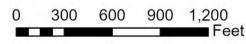






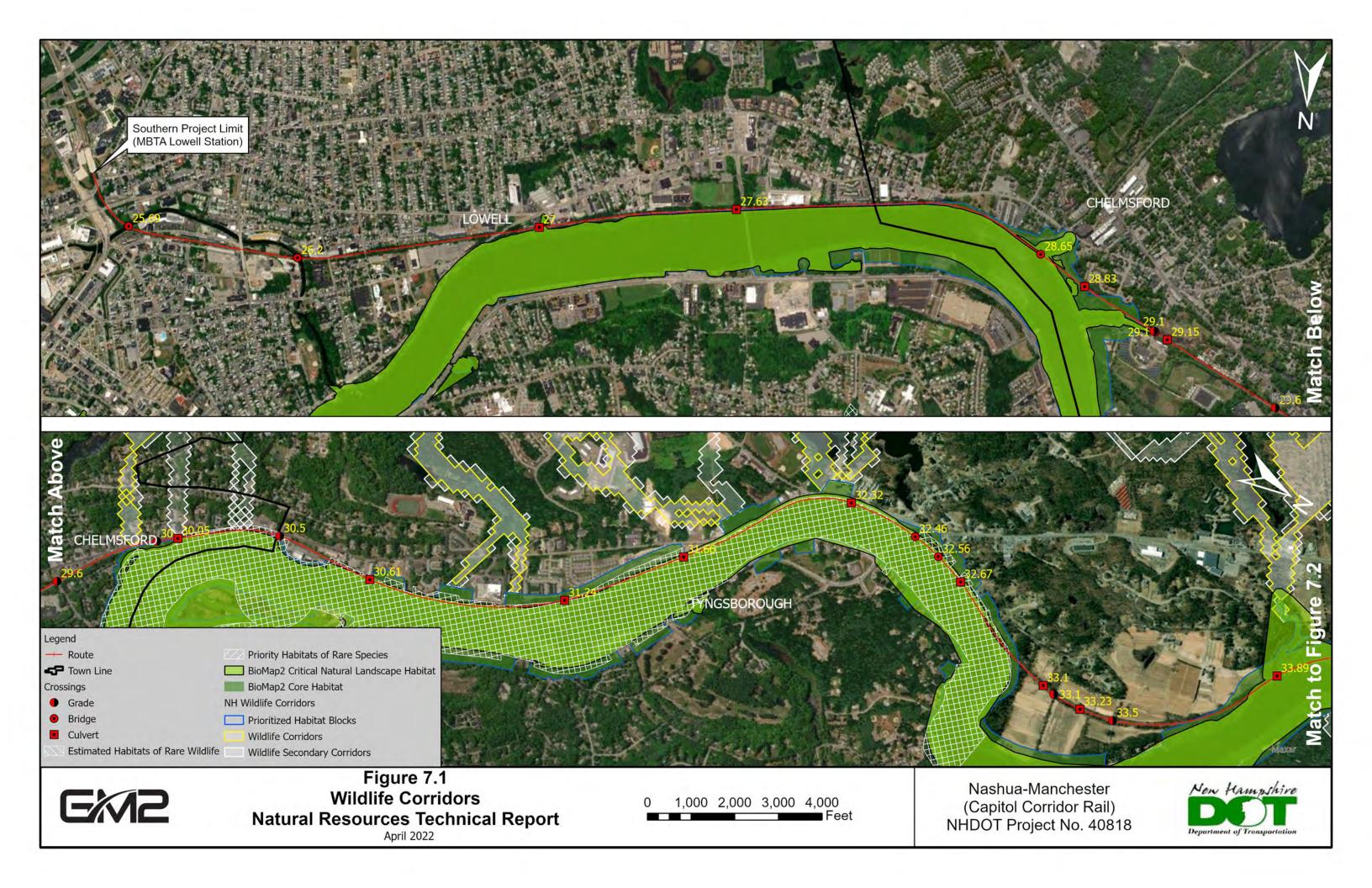


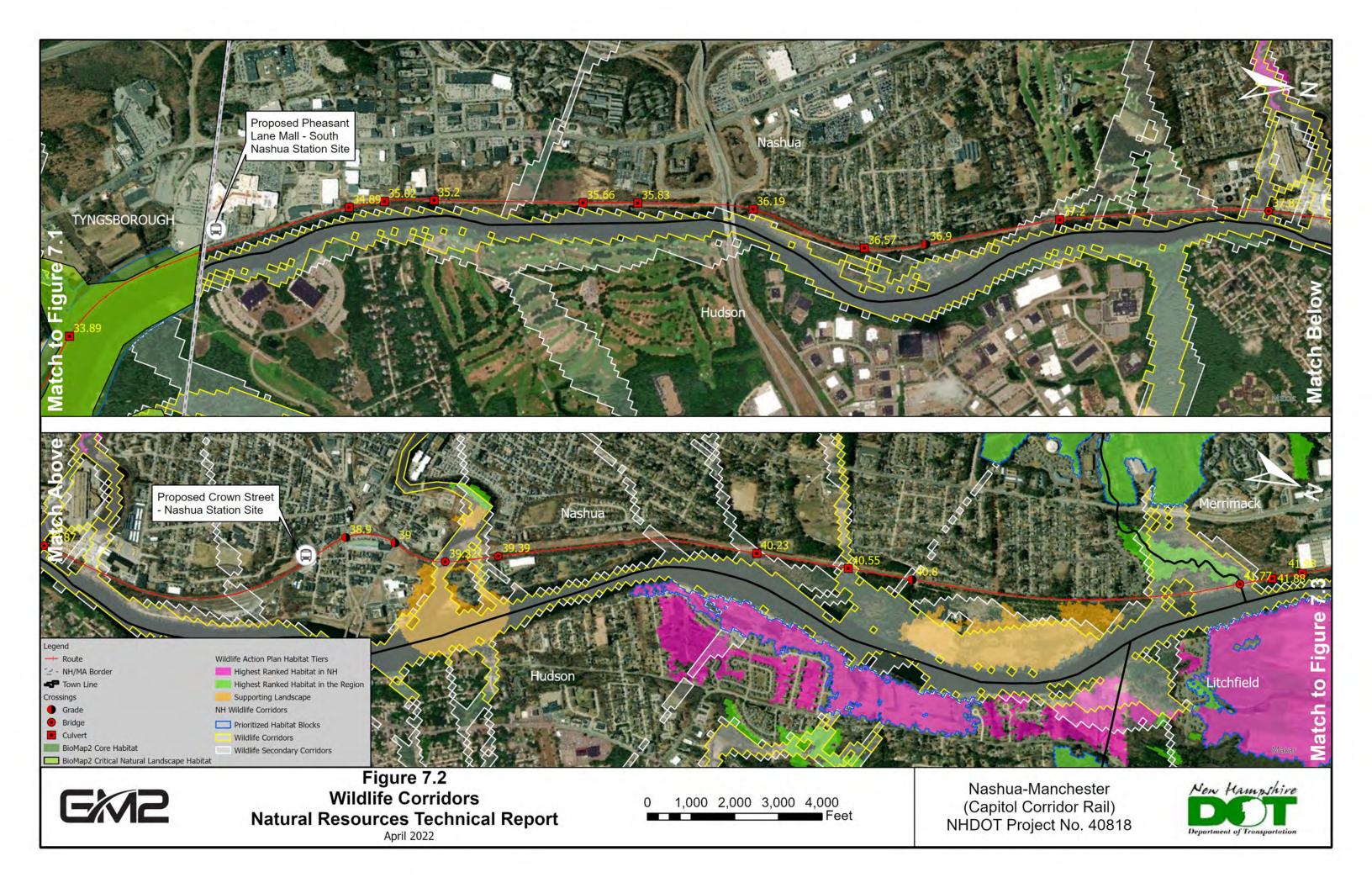
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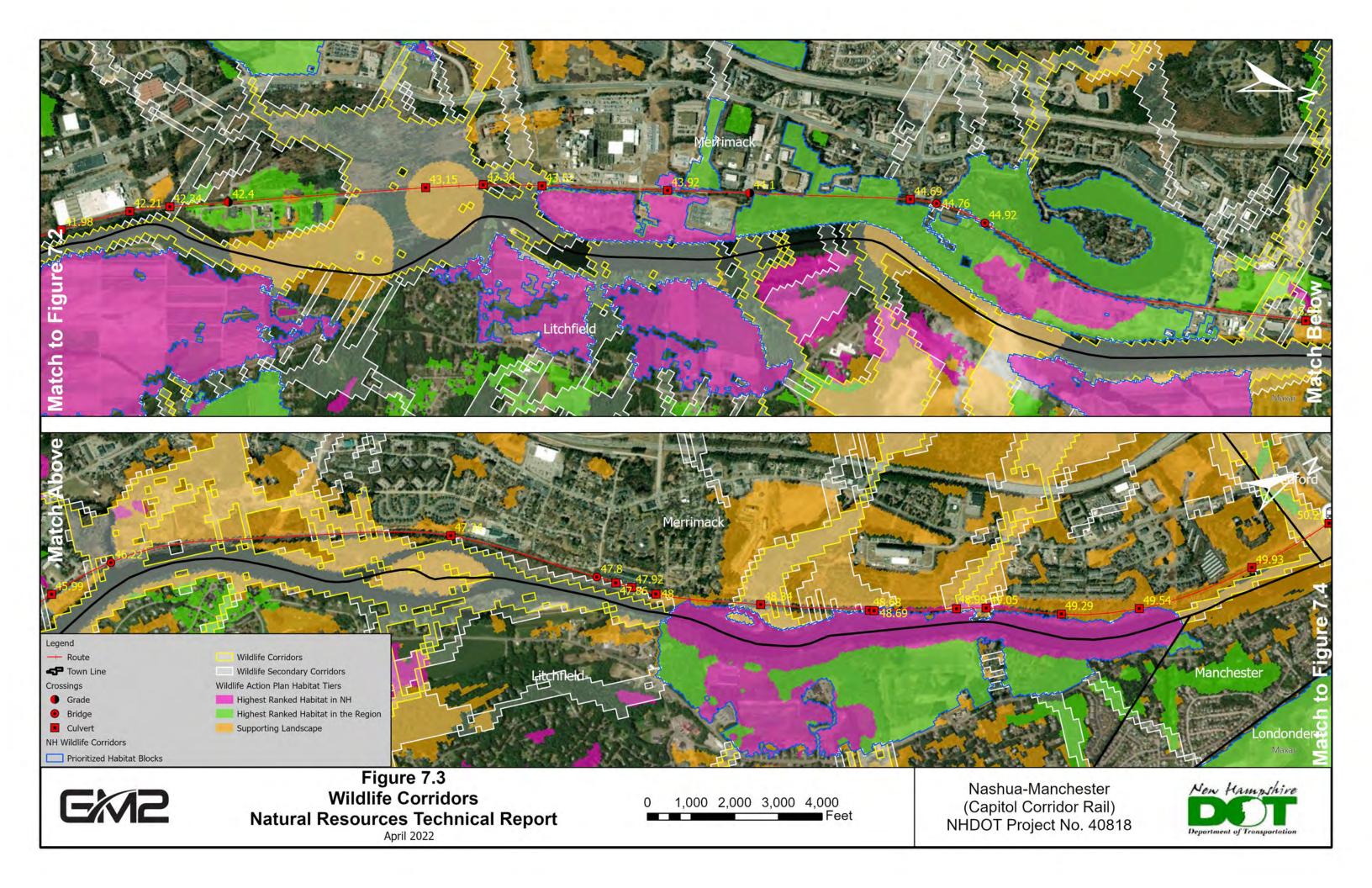


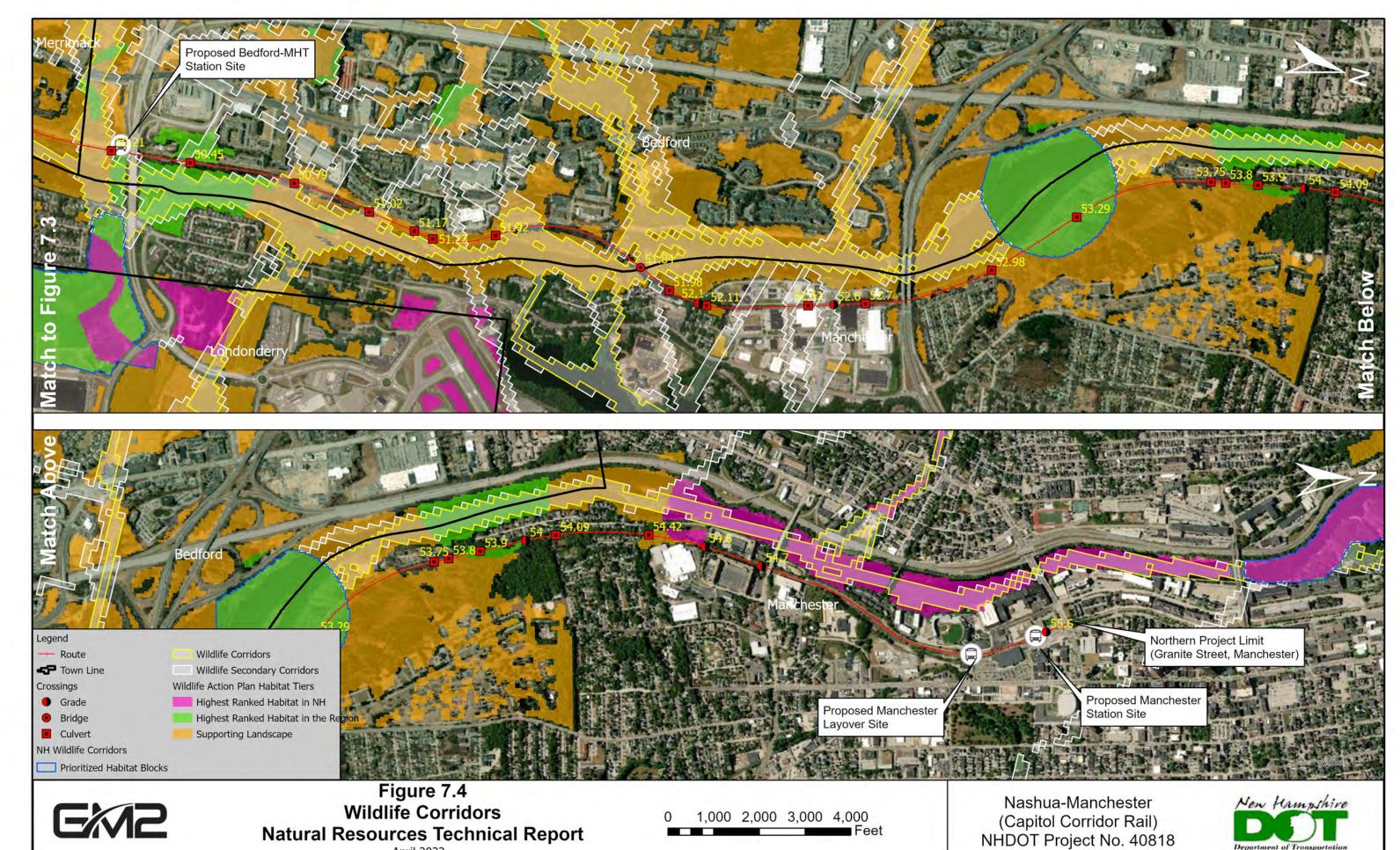
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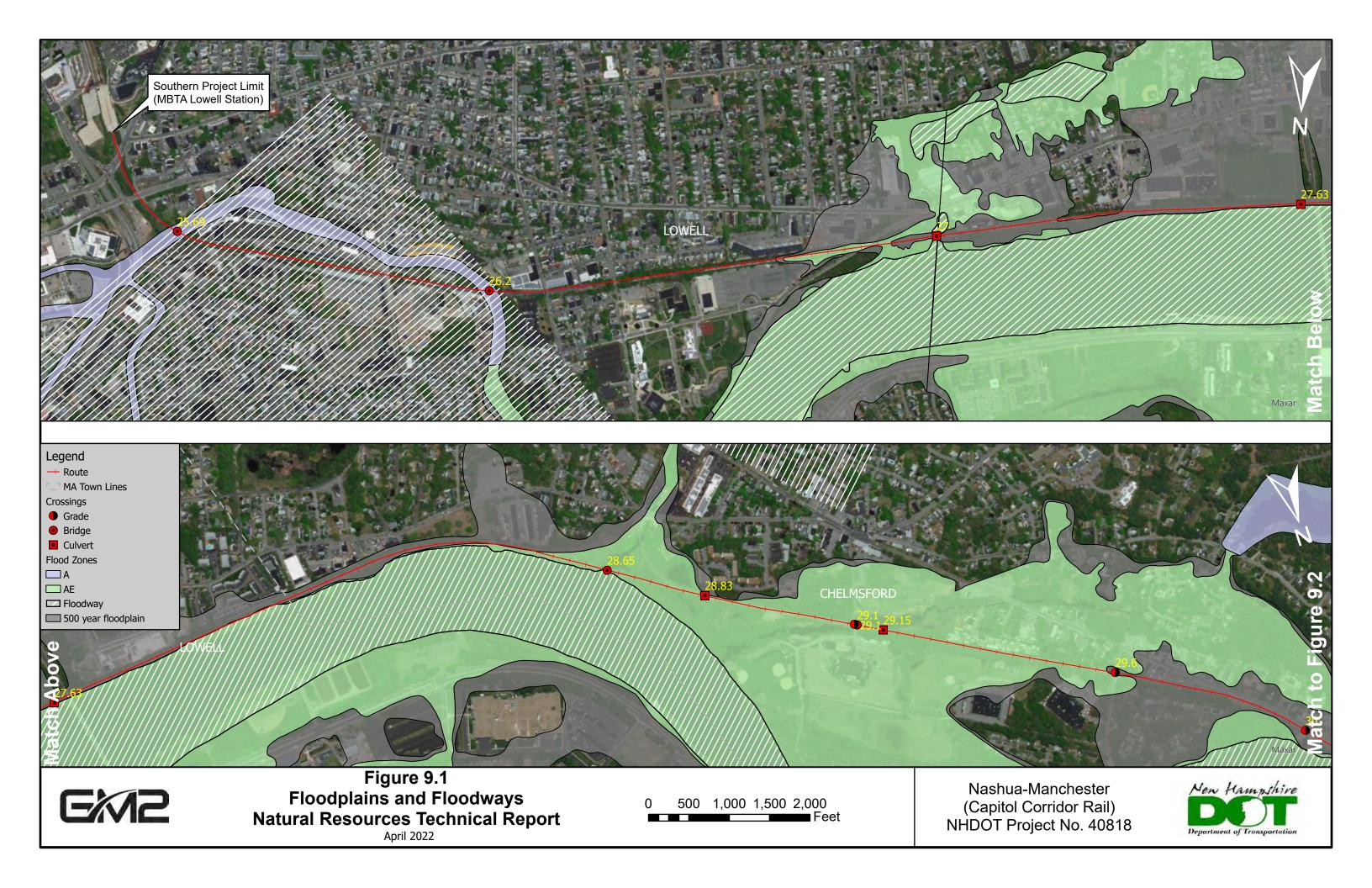


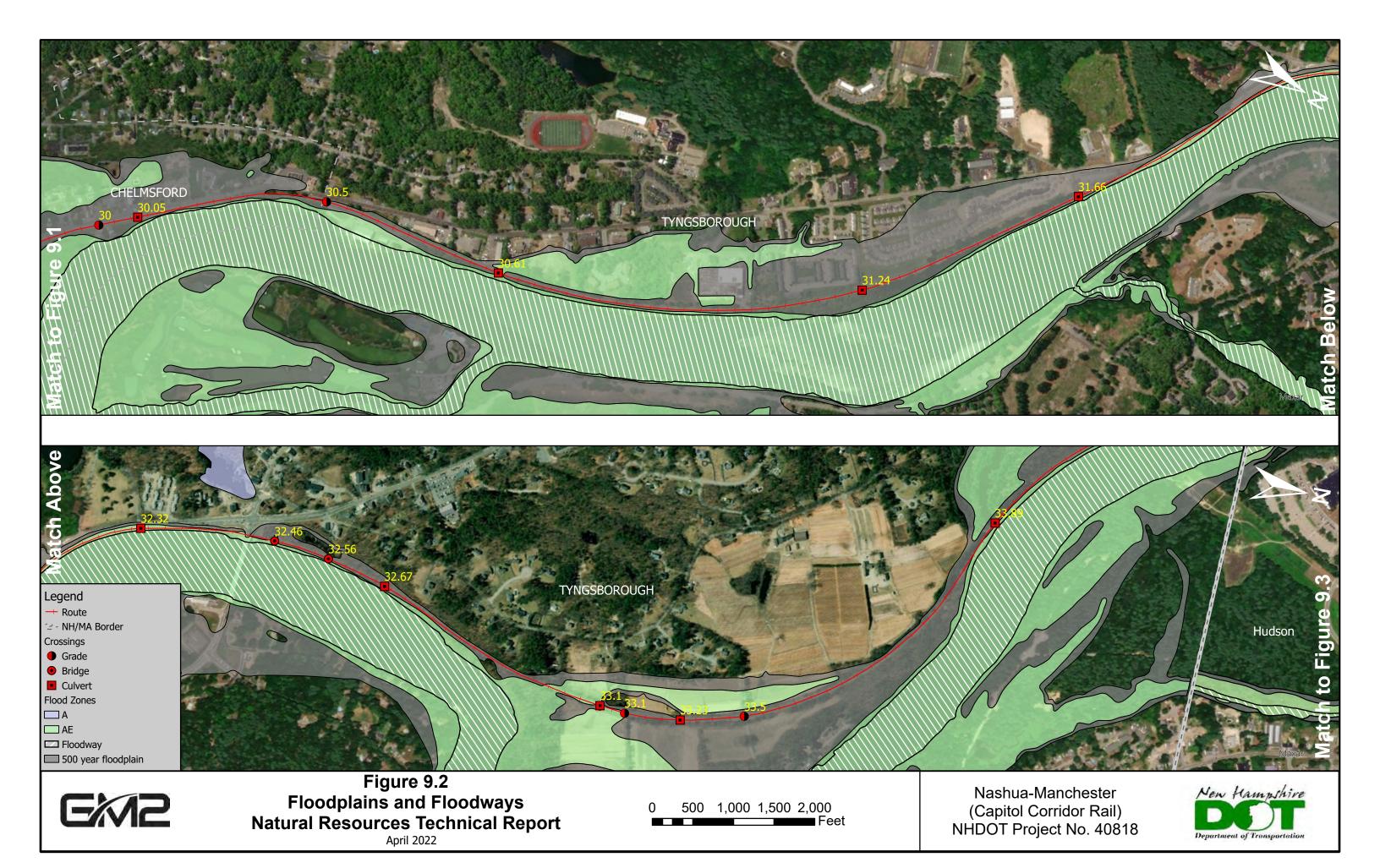


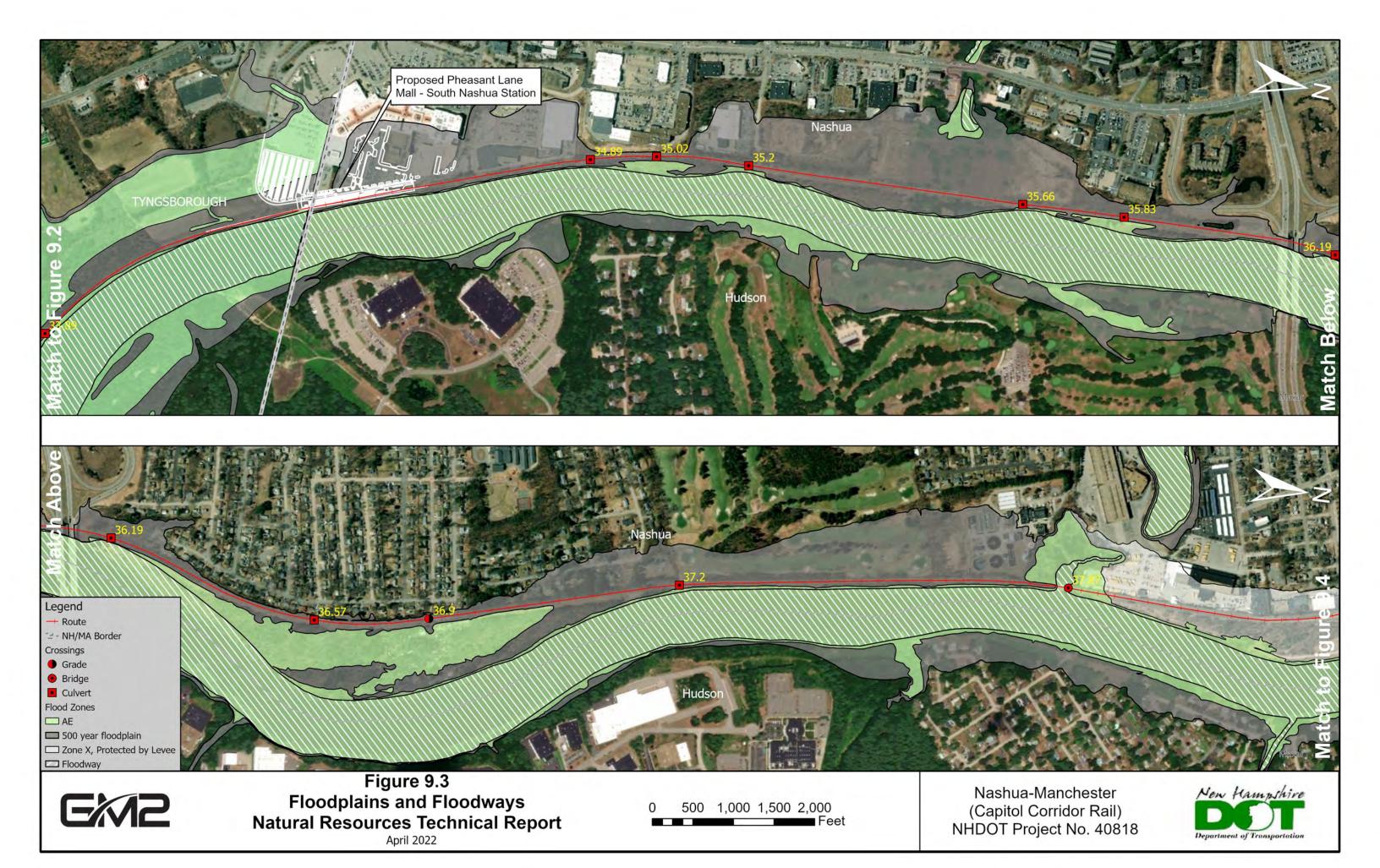


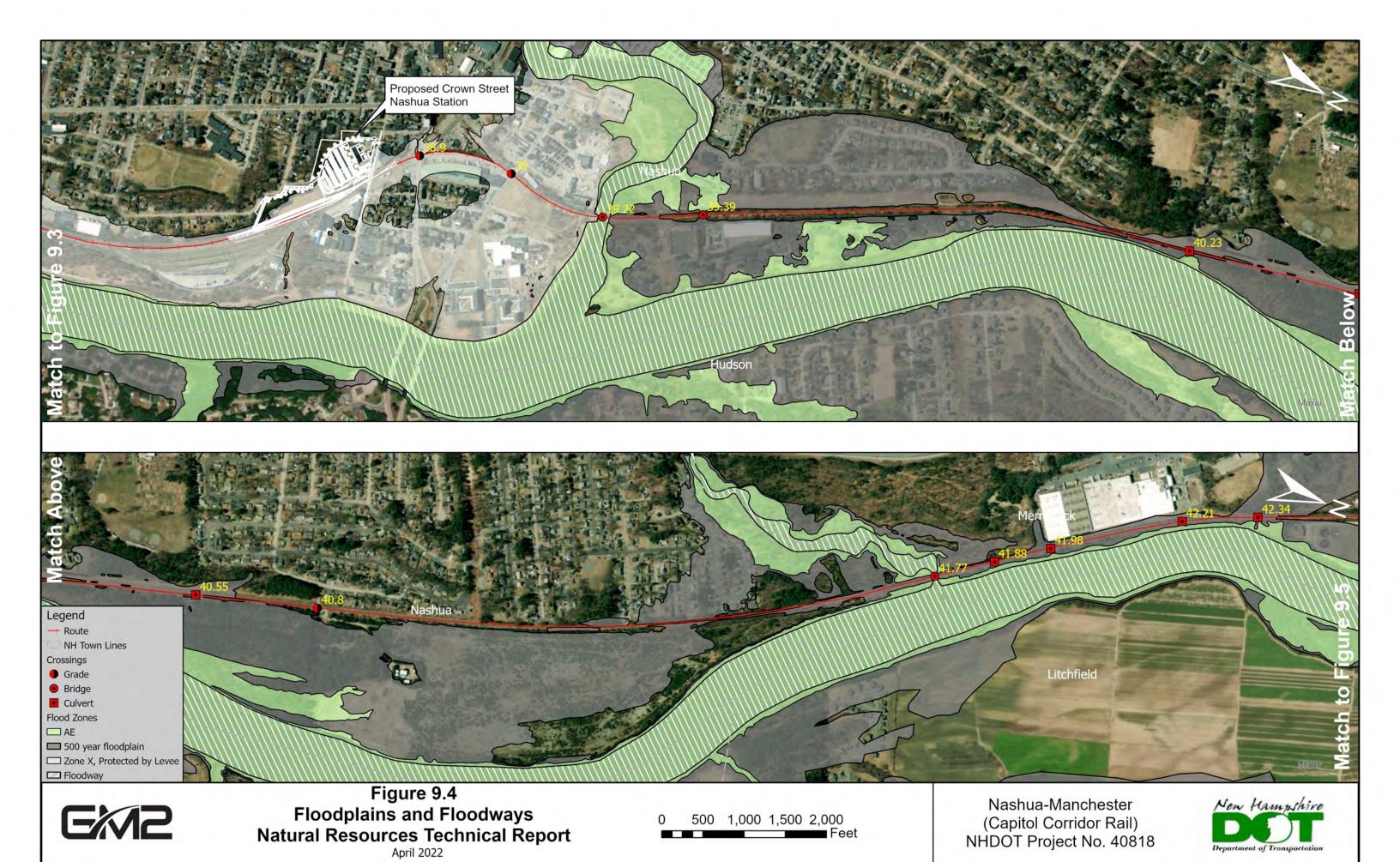


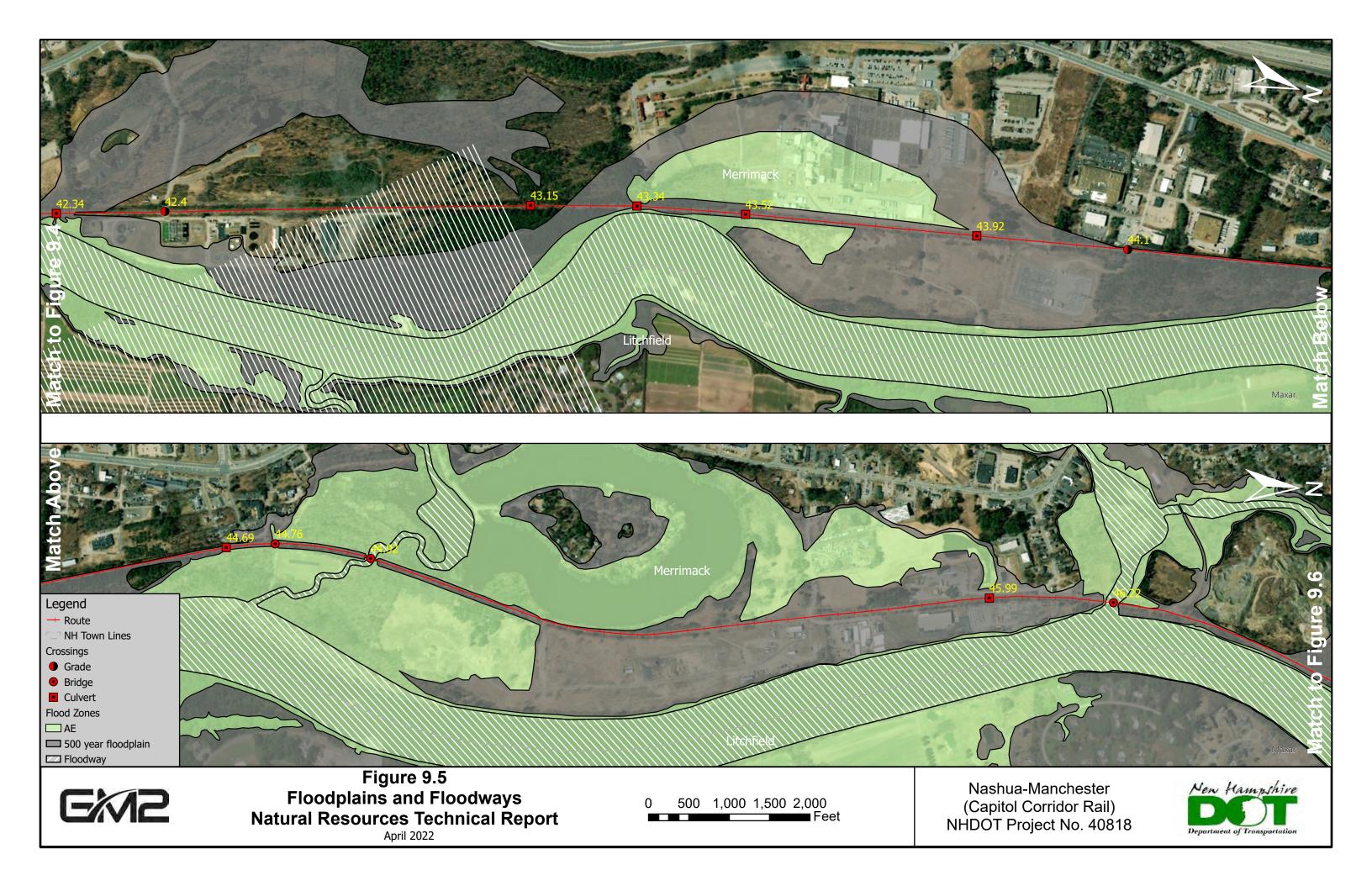
April 2022

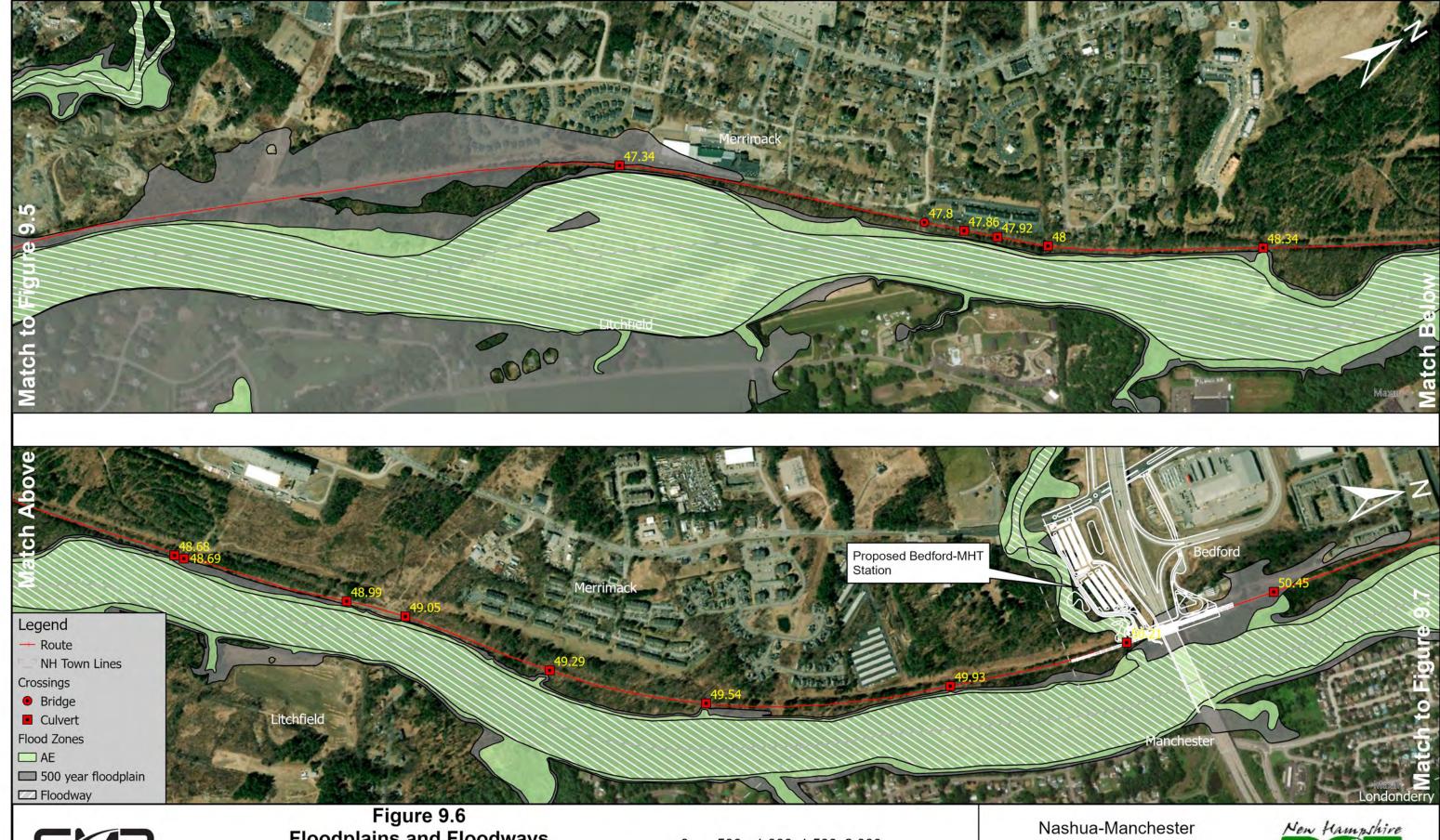






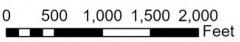








Floodplains and Floodways
Natural Resources Technical Report
April 2022



Nashua-Manchester (Capitol Corridor Rail) NHDOT Project No. 40818





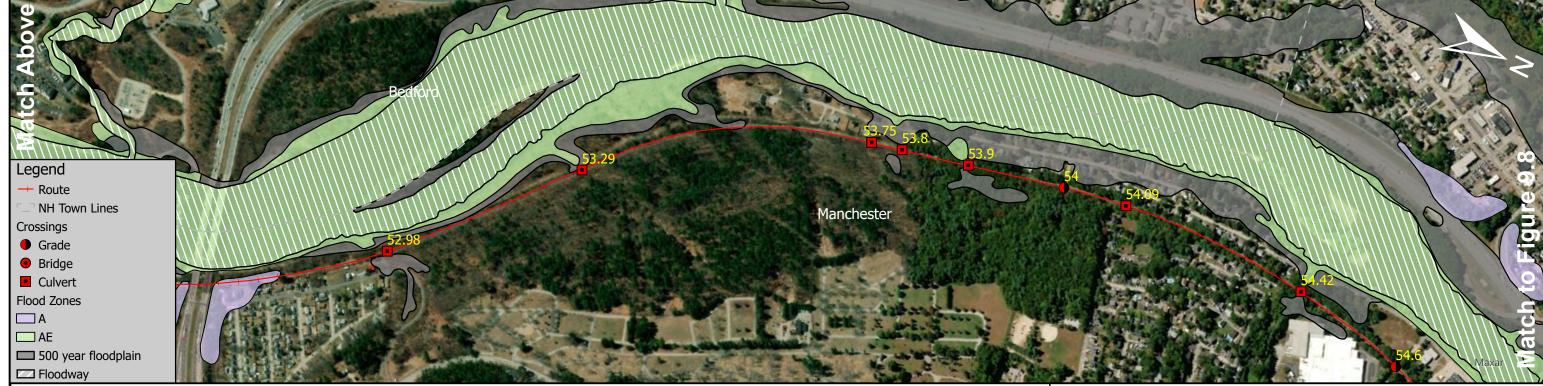




Figure 9.7
Floodplains and Floodways
Natural Resources Technical Report
April 2022

0 500 1,000 1,500 2,000 Feet

Nashua-Manchester (Capitol Corridor Rail) NHDOT Project No. 40818





Natural Resources Technical Report April 2022

500 1,000 1,500 2,000 Feet

(Capitol Corridor Rail) NHDOT Project No. 40818



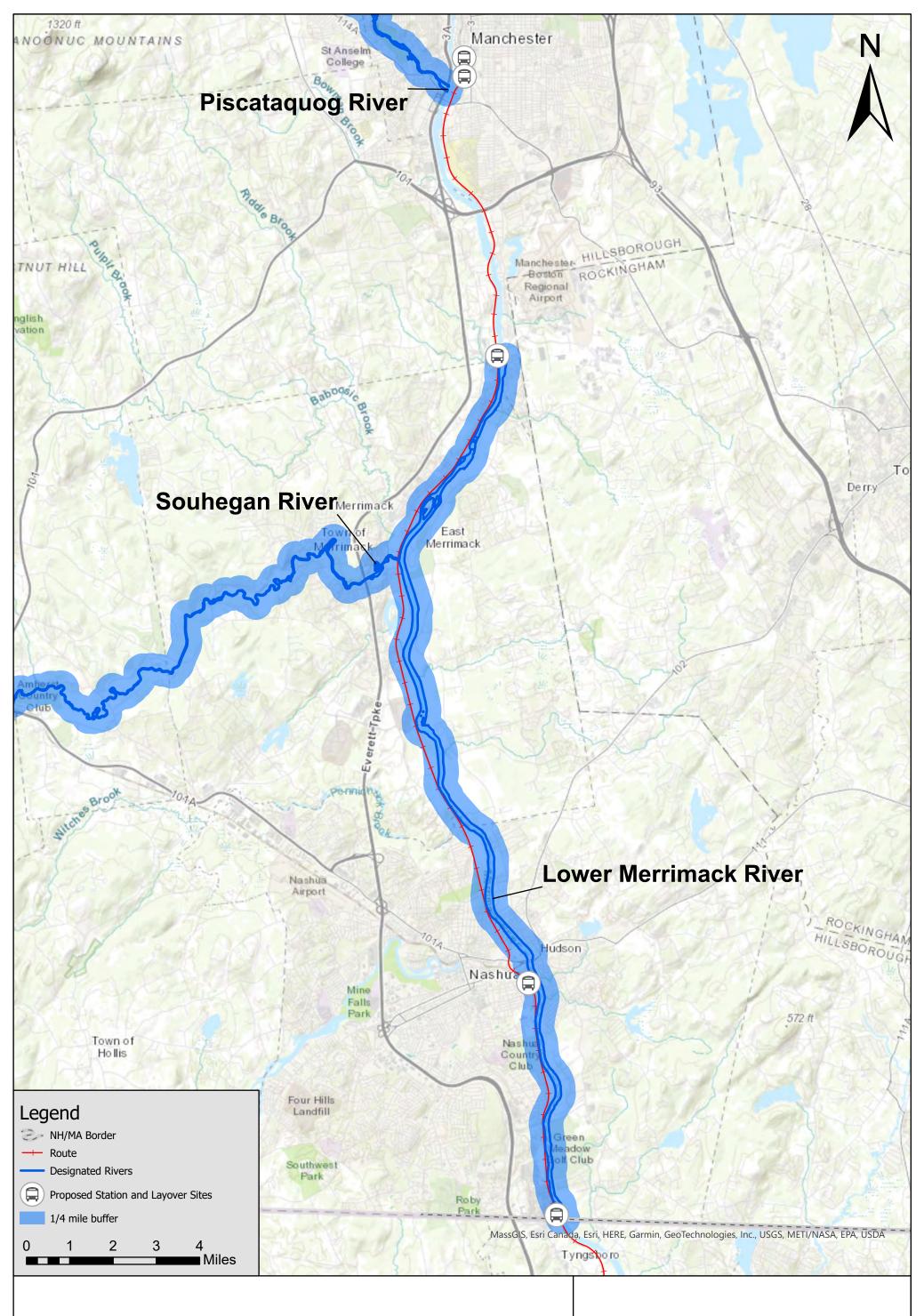




Figure 10.1 New Hampshire Designated Rivers Natural Resources Technical Report

Nashua-Manchester (Capitol Corridor Rail Project) NHDOT No. 40818

APPENDIX B

Field Delineated Wetlands Summary Table

FIELD DELINEATED WETLANDS - MASSACHUSETTS

Flag	Description	Location	Municipality	Classification	100' Buffer						Fun	ctions/\	/alues¹					
Series		(Approximate Mile Post and distance to nearest landmark)			Zone / Riverfront Area	GW Recharge	Floodflow Alteration	Fish Habitat	Sediment Retention	Nutrient Removal	Production Export	Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality	Endangered Species Habitat
LO1	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO2	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO3	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO4	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100'Buffer Zone											Х		
LO5	Pawtucket Canal (Bank, LUWW)	MP 26.20 (500 ft. east of Walker Street)	Lowell	R2UBHx	100'Buffer Zone											Х		
LO6	Black Brook (Bank, LUWW)	MP 27.0 (650 ft. west of Pawtucket Street)	Lowell	R2UBH	100' Buffer Zone 25' RFA		Р	Х	Р	Р		Р	Р					
LO7	Wetland Swale (BVW)	MP 27.4 (1,000 ft. east of Rourke Bridge)	Lowell	PFO/SS1Ex	100' Buffer Zone		Х			Х			Х					
LO8	Merrimack River (Bank, LUWW)	Approx. MP 27.3 to MP 28.65 (starts 2,000 ft. east of Rourke Bridge and ends at Stony Brook)	Lowell	R2UBH	100' Buffer Zone 25' RFA	Р	Х	Р			Р	Р	Р	Х		Р	Х	Р
LO9	Black Brook (Bank, LUWW)	MP 27.00 (700 ft. west of Pawtucket Street)	Lowell	R2UBH	100' Buffer Zone 25' RFA		Р	Х	Р	Р		Р	Р					
LO10	Pawtucket Canal (Bank, LUWW)	MP 26.20 (600ft east of Walker Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO11	BVW	MP 27.63 (East side of Rourke Bridge)	Lowell	PSS1Ex	100' Buffer Zone		Х											
LO12	BVW	MP 27.5 (800 ft. east of Rourke Bridge)	Lowell	PUBHx	100' Buffer Zone		Х			Х			Х					
LO13	Merrimack River (Bank, LUWW)	MP 27.3 to MP 28.65 (Starts east of Rourke Bridge and ends at Stony Brook)	Lowell and Chelmsford	R2UBH	100' Buffer Zone 25' RFA (in Lowell) 200' RFA (in Chelmsford)	P	Х	P			Р	Р	Р	Х		Р	Х	Р
LO14	Pawtucket Canal (Bank, LUWW)	MP 26.20 (500ft. east of Walker Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
CH1	Merrimack River (Bank, LUWW)	MP 28.65 (2,000 ft. southeast of Wotton Street)	Chelmsford	R2UBH	100' Buffer Zone 200' RFA	P	Х	Р			Р	Р	Р	Х		Р	Х	Р

FIELD DELINEATED WETLANDS - MASSACHUSETTS

Flag	Description	Location (Approximate Mile Boot	Municipality	Classification	100' Buffer						Fun	ctions/\	/alues¹					
Series		(Approximate Mile Post and distance to nearest landmark)			Zone / Riverfront Area	GW Recharge	Floodflow Alteration	Fish Habitat	Sediment Retention	Nutrient Removal	Production Export	Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality	Endangered Species Habitat
CH2	BVW	MP 28.70 (Northwest of Stony Brook crossing)	Chelmsford	PSS1E	100' Buffer Zone	Х	Х		Х				Х					
СНЗ	BVW	Approx. MP 28 (Northwest of Stony Brook crossing)	Chelmsford	PSS1E	100' Buffer Zone	Х	P		P	Р			Х					
CH4	BVW	MP 28.9 (1,000 ft. southeast of Wotton Street)	Chelmsford	PSS1E	100' Buffer Zone		Х		Р	Р			Р			Х		
CH5	Deep Brook (Bank and LUWW) and BVW	MP 29.1 (East side of Wotton Street)	Chelmsford	R2UBH, PSS1E, PUBHh	100' Buffer Zone 200' RFA		X		Р	Р		Х	Р			Х		
CH6	BVW	MP 29.1 (100 ft. east of Wotton Street)	Chelmsford	PSS1E	100' Buffer Zone					Х			Х					
CH7	BVW	MP 28.9 (900 ft. southeast of Wotton Street)	Chelmsford	PEM1E/PFO1E	100' Buffer Zone				Х	Х			Х					
CH8	BVW	MP 28.7 (North of Stony Brook crossing)	Chelmsford	PUBHh	100' Buffer Zone	Х	Р		Р	Р			Х			Х		
СН9	BVW and Stony Brook (Bank, LUWW)	MP 28.65 (2,300 ft. southeast of Wotton Street)	Chelmsford	PSS1E, R2UBH	100' Buffer Zone 200' RFA	Х	P	Р	P	Р		Х	Х			Х		
CH10	Stony Brook (Bank, LUWW)	MP 28.65 (2,300 ft. southeast of Wotton Street)	Chelmsford	R2UBH	100' Buffer Zone 200' RFA	Х	P	Р	Х			Х	Х			X		
CH11	Wetland Swale (BVW)	MP 29.10 (Bordering the north side of Wotton Street)	Chelmsford	PSS1Ex	100' Buffer Zone		X		Р	Х			Х					
CH12	Wetland Swale (BVW)	MP 29.2 (500 ft. northwest of Wotton Street)	Chelmsford	PFO1Ex	100' Buffer Zone		Х		Р	Х			Х					
CH13	BVW	MP 29.5 (500 ft. east of Wellman Ave.)	Chelmsford	PFO1E	100' Buffer Zone		Х						Х					
CH14	BVW and Deep Brook (Bank, LUWW)	MP 29.10 (Just north of Wotton Street)	Chelmsford	PEM1E, PSS1E, R2UBH, PUBHh	100' Buffer Zone 200' RFA		Х		Р	Р		Х	Р			Х		
CH15	Deep Brook (Bank, LUWW)	MP 29.10 (Adjacent to Wotton Street)	Chelmsford	R2UBH	100' Buffer Zone 200' RFA							Х						

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

FIELD DELINEATED WETLANDS - MASSACHUSETTS

Flag	Description	Location (Approximate Mile Book	Municipality	Classification	100' Buffer			_			Fun	ctions/V	/alues ¹					
Series		(Approximate Mile Post and distance to nearest landmark)			Zone / Riverfront Area	GW Recharge	Floodflow Alteration	Fish Habitat	Sediment Retention	Nutrient Removal	Production Export	Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality	Endangered Species Habitat
CH16	BVW	MP 29.87 (1,400 ft. northwest of Wellman Ave.)	Chelmsford	PEM1C, PFO1C	100' Buffer Zone		Х		Р	Х			Х					Р
CH17	Merrimack River (Bank, LUWW, and BVW)	MP 30.05 to MP 30.4 (Across the Merrimack River from Vesper Country Club	Chelmsford	R2UBH, PFO1C, PSS1C	100' Buffer Zone 200' RFA	Р	X	Р			Р	Р	Р	Х		Р	Х	Р
TY1	Merrimack River (Bank, LUWW)	MP 30.5 to MP 33 (Starts north of Chelmsford/ Tyngsborough Line; ends 3,000 ft. north NH Route 113)	Tyngsborough	R2UBH	100' Buffer Zone 200' RFA	Р	Х	Р			Р	Р	Р	Х		Р	Х	Р
TY3	BVW	MP 32.6 (1,000 ft. north of NH Route 113)	Tyngsborough	PFO1E	100' Buffer Zone	Р	Х						Х					Р
TY4	Intermittent Stream (Bank) and BVW	MP 32.56 (800 ft. north of NH Route 113)	Tyngsborough	PFO1E, R4SB	100' Buffer Zone		Х					Р	Х					Р
TY5	Bridge Meadow Brook (Bank, LUWW)	MP 32.5 (600 ft. north of NH Route 113)	Tyngsborough	R2UBH or PUBHh	100' Buffer Zone 200' RFA		Х	Х	Р	Х		Р	Х					Р
TY6	Merrimack River (Bank, LUWW)	MP 33.86 to NH/MA state line	Tyngsborough	R2UBH	100' Buffer Zone 200' RFA	Р	Х	Р			Р	Р	Р	Х		Р	Х	Р
TY7	Mill Brook (Impounded) (Bank, LUWW)	MP 33.89 (2,700 ft. south of NH/MA state line)	Tyngsborough	R2UBH, PUBHh	100' Buffer Zone 200' RFA		Р	Х	Р	Р		Р	Р					
TY8	Wetland Swale (BVW)	MP 31.00 (3,700 ft. north of Chelmsford/ Tyngsborough town line)	Tyngsborough	PFO1Ex	100' Buffer Zone		Х		Х	Х								Х
TY9	BVW	South of Pheasant Lane Mall Station	Tyngsborough	PEM1Ex, PFO1Ex, PSS1Ex	100' Buffer Zone		Р		Р	Р	Х		Х					
TY10	BVW	MP 33.5 (at the intersection of Helena Drive/River Road and the railroad)	Tyngsborough	PEM1Ad	100' Buffer Zone	X			Х	Х			Х					

Nashua-Manchester 40818 Capitol Corridor Rail - DRAFT

FIELD DELINEATED WETLANDS - MASSACHUSETTS

Description Key:

LUWW = Land Under Water-Bodies and Waterways BVW = Bordering Vegetated Wetland

Wetland Classification Key:

PEM1E = palustrine, emergent, persistent, seasonally flooded/saturated

PEM1C = palustrine, emergent, persistent, seasonally flooded

PSS1E = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated

PSS1Ex = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated

PSS1C = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded

PFO1Ex = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated

PFO1E = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated

PFO1C = palustrine, forested, broad-leaved deciduous, seasonally flooded

PUBHh = palustrine, unconsolidated bottom, permanently flooded, diked/impounded

PUBHx = palustrine, unconsolidated bottom, permanently flooded

R2UBHx = riverine, lower perennial, unconsolidated bottom, permanently flooded, excavated

R2UBH = riverine, lower perennial, unconsolidated bottom, permanently flooded

R4SB = riverine, intermittent, streambed

Flag	Description	Location	Municipality	Classification	Priority							Func	tions ¹						
Series		(Approximate Mile Post and distance to nearest landmark)			Resource Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
NA1	Merrimack River (Top of Bank)	From NH-MA border to MP 34.9 (1,300 ft. south of Spit Brook Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA2	Merrimack River (Top of Bank)	MP 35.2 (Near Spit Brook Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA3	Wetland	MP 35.08 (500 ft. south of Spit Brook Road)	Nashua	PFO1E	No				Х										
NA4	Wetland Swale	MP 35.02 (1,000 ft. south of Spit Brook Road)	Nashua	PEM1E	No				Х										
NA5	Wetland	MP 34.89 (1,500 ft. south of Spit Brook Road)	Nashua	PEM1E	No				X										
NA6 and NA6A	Wetland	MP 35.2 (Immediately south of Spit Brook Road)	Nashua	PFO1E	No				Х										
NA7	Merrimack River (Top of Bank)	MP 35.55 to MP 35.75 (2,500 ft. north of Spit Brook Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	X	X		Χ	Р	X	Х	Р	Р	Х	Р
NA8 and NA9	Salmon Brook and Merrimack River (Top of Bank)	MP 37.87 (5,000 ft. south of Crown Street)	Nashua	R2UBH	Yes (Prime Wetland)	Р		X	P			Р			Р	Р	Р		Х
NA10 and NA11	Salmon Brook (Top of Bank)	MP 37.87 (5,000 ft. south of Crown Street)	Nashua	R2UBH, PUBHh	Yes (Prime Wetland and Floodplain Wetland)	Р		Х	Р			Р			Р	Р	Р		Х
NA12, NA13, NA14, NA15	Nashua River (Top of Bank, Wetland)	MP 39.22 (850 ft. north of Bridge Street)	Nashua	R2UBH, PFO1E	Yes (Prime Wetland and Floodplain Wetland)	Р		Р	Р	Х			Х			Х	Р		Х
NA16	Pennichuck Brook (Top of Bank, Wetland)	MP 41.77 (3,900 ft. south of Mast Road)	Nashua	R2UBH, PSS1F	Yes (Prime Wetland and Floodplain Wetland)	Р		Р	Х	Х			Х		Х	Х	Х		Р

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Resource							Funct	tions ¹						
Series		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
NA17	Pennichuck Brook and Merrimack River (Top of Bank)	MP 41.77 (3,900 ft. south of Mast Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х			Х		Х	Х	Х		Р
NA18	Wetland	MP 36.19 (500 ft. north of Circumferential Highway)	Nashua	PFO1E	No				Р			Р			Р				Х
NA19	Wetland and Perennial Stream	MP 36.19 (400 ft. north of Circumferential Highway)	Nashua	PFO1E, R3UB	No				Р			Р			Р				Х
NA20	Wetland and Intermittent Stream	MP 35.83 (1,300 ft. south of Circumferential Highway)	Nashua	PFO1E, R4SB	No				Х			Х			Х				Х
NA21	Perennial Stream (Top of Bank)	MP 35.83 (1,500 ft. south of Circumferential Highway)	Nashua	R2UBH	No			Х	Р			Р			Р	Х			Х
NA22	Merrimack River (Top of Bank)	MP 36.06 (100 ft. south of Circumferential Highway)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA23	Perennial Stream	MP 36.19 (300 ft. north of Circumferential Highway	Nashua	R2UBH	No			Х	Р			Р			Р	Х			Х
NA24	Merrimack River (Top of Bank)	MP 37.2 (6,000 ft. north of Circumferential Highway)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA25	Merrimack River (Top of Bank)	MP 37.38 (6,600 ft. north of Circumferential Highway)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA26	Spit Brook (Top of Bank) and Wetland	South Nashua Station alternate site (Spit Brook Road)	Nashua	R2UBH, PFO1E	Yes (Floodplain Wetland)				Х	Х		Х	Х		Х	Р			Р

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Resource							Funct	tions ¹						
Jenes		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
ME1	Wetland and Intermittent Stream	MP 42.34 (900 ft. south of Mast Road)	Merrimack	PFO1E, R4SB	No				Х	X		Х			Х	X			X
ME2 and ME3	Pennichuck Brook and Merrimack River (Top of Bank)	MP 41.77 (3,900 ft. south of Mast Road)	Merrimack	R2UBH	No	P		P	X	Х			Х		X	X	Х		P
ME4	Perennial Stream (Top of Bank)	MP 42.21 (1,600 ft. south of Mast Road)	Merrimack	R2UBH	No			Х	Х							Х			Х
ME5	Perennial Stream (Top of Bank)	MP 42.34 (1,000 ft. south of Mast Road)	Merrimack	R2UBH	No			Х	Х							Х			Х
ME6	Perennial Stream (Top of Bank)	MP 43.34 (South of Anheuser Busch)	Merrimack	R2UBH	No			Х	Р			Р			Р	Р			Р
ME7	Small Perennial Stream and Wetland	MP 43.34 (South of Anheuser Busch)	Merrimack	R2UBH, PFO1E	No				Р	Х		Р	Х		Р	Р			Р
ME8	Wetland	MP 44.92 (South of Horseshoe Pond)	Merrimack	PUBH	Yes (Floodplain Wetland)	P		Р	Р	Х		Р	Х		Р	Р			Р
ME9	Naticook Brook Bank and Wetland	MP 44.92 (South of Horseshoe Pond)	Merrimack	R2UBH, PFO1/SS1E	Yes (Floodplain Wetland)	P		Р	Р	Х		Р	Х		Р	Р			Р
ME10	Naticook Brook Bank	MP 44.92 (South of Horseshoe Pond)	Merrimack	R2UBH	No	P		Р	Р	Х		Р	Х		Р	Р			Р
ME11	Wetland	MP 44.92 (South of Horseshoe Pond)	Merrimack	PFO1E	Yes (Floodplain Wetland)	P		Р	Р	Х		Р	Х		Р	Р			Р
ME12, ME13, ME14, ME15	Souhegan River Bank (Top of Bank)	MP 46.22 (550 ft. north of Railroad Ave.)	Merrimack	R2UBH	No	Р		Р	Р	Х	Р		Х			Х			Р
ME16	Wetland and Vernal Pool	MP 43.15 (3,300 ft. north of Mast Road)	Merrimack	PFO1E	No	Р			Х	Х			Х						Р

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Resource							Func	tions ¹						
Jenes		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
BE1 and BE2	Sebbins Brook (Top of Bank)	MP 50.21 (300 ft. south of Raymond Wieczorek Drive)	Bedford	R2UBH	No			Х	Х	Х			Х			Х			Р
BE3 and BE4	Intermittent Stream	MP 50.45 (850 ft. north of Raymond Wieczorek Drive)	Bedford	R4SB	No														Р
BE5	Wetland and Intermittent Stream	MP 50.45 (700 ft. north of Raymond Wieczorek Drive)	Bedford	PEM1/SS1E, R4SB	No				Х	Х		Р			Р				Р
BE6 and MA1	Merrimack River (Top of Bank)	MP 51.84 (Merrimack River Bridge)	Bedford	R2UBH	No	P		Р	X	Х	Р		Р	Х		Р	Р		Р
BE7	Intermittent Stream and Wetland	MP 50.35 (300-700 ft. north of Raymond Wieczorek Drive)	Bedford	R4SB, PFO1E	No				Х	Х		Р	Х		Р	Х			Х
BE8	Wetland	MP 50.34 (500 ft. northwest of Raymond Wieczorek Drive)	Bedford	PEM1E	No							Х							
BE9	Wetland Swale	MP 50.31 (450 ft. west of Raymond Wieczorek Drive)	Bedford	PEM/SS1E	No							Х							
BE10	Wetland	MP 50.31 (250 ft. northwest of Raymond Wieczorek Drive)	Bedford	PEM/FO1E	No							X							
BE11	Sebbins Brook (Top of Bank)	MP 50.25 (300 ft. south of Raymond Wieczorek Drive)	Bedford	R2UBH	No			Х	Х	Х			Х			X			Р
BE11	Wetland	MP 50.25 (300 ft. south of Raymond Wieczorek Drive)	Bedford	PEM1E	No							Х			Х				

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Resource							Funct	ions ¹						
Series		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
BE11	Ephemeral Stream/Erosion Channel	MP 50.25 (300 ft. south of Raymond Wieczorek Drive)	Bedford	N/A	No														
BE12	Sebbins Brook (Top of Bank)	MP 50.21 (400 ft. south of Raymond Wieczorek Drive)	Bedford	R2UBH	No			Х	Х	Х			Х			Х			Р
BE13 and BE14	Bank, Perennial Stream, Wetland	MP 50.21 (South of Bedford- MHT Station)	Bedford	PFO1E, PSS1E, R2UBH	Yes (Floodplain Wetland)			Х	Р	Х			Х			Х			Р
BE15	Bank, Intermittent Stream	MP 51.02 (3,900 ft. north of Raymond Wieczorek Drive)	Bedford	R4SB4	No				Х										
BE16	Bank, Intermittent Stream	MP 51.02 (3,900 ft. north of Raymond Wieczorek Drive)	Bedford	R4SB4	No				Х	Х									
MA2	Wetland	MP 52.11 (300 ft. north of Pine Island Road)	Manchester	PFO1E, PFO1Ex	No				Х			Х			Х				Х
MA3	Wetland Swale	MP 52.11 (100 ft. north of Pine Island Road)	Manchester	PSS/PFO1Ex	No				Х			Х			Х				
MA4	Wetland	MP 54.9 (850 ft. north of Queen City Ave.)	Manchester	PEM1Ex	No				Х										
MA5	Wetland	MP 55.0 (2,000 ft. north of Queen City Ave.)	Manchester	PEM1E, PFO1E	No				Х										

Wetland Classification Key:

PEM1E = palustrine, emergent, persistent, seasonally flooded/saturated

PEM1Ex = palustrine, emergent, persistent, seasonally flooded/saturated, excavated

PFO1E = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated

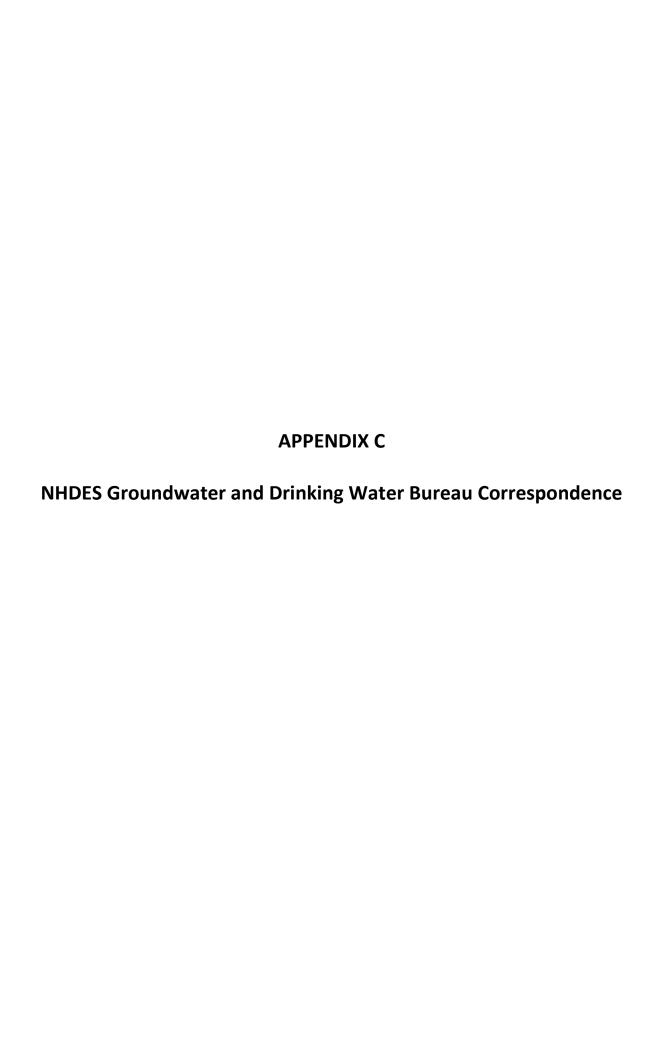
PFO1Ex = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated

R2UBH = riverine, lower perennial, unconsolidated bottom, permanently flooded

R4SB = riverine, intermittent, streambed

PSS1E = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated

PSS1F = palustrine, scrub-shrub, broad-leaved deciduous, semi permanently flooded
PSS1Ex = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated
PUBH = palustrine, unconsolidated bottom, permanently flooded
PUBHh = palustrine, unconsolidated bottom, permanently flooded, diked/impounded
R3UB = riverine, upper perennial, unconsolidated bottom





Nashua-Manchester 40818 (Capitol Corridor Rail Project)

Meeting with NHDES Drinking Water and Groundwater Bureau March 28, 2022, 11:30 AM to 12:20 PM Held via Microsoft Teams

Attendees:

Pierce Rigrod, Ann (Liz) Pelonzi (NHDES Drinking Water and Groundwater Bureau)
Jay Doyle (AECOM)
Jenn Riordan (GM2 Associates)

Minutes:

- NHDES (Pierce) provided several general comments on the project based on their review of the project information provided by GM2.
 - o There are two surface water intakes on the Merrimack River one for Nashua and one for Hooksett. The Hooksett intake was included in the original Capitol Corridor project limits (2014 Environmental Assessment) but is not within the current project limits. The Nashua intake is located south of Anheuser-Busch in Merrimack.
 - One concern is the potential for spills from train accidents or derailments. There
 was some discussion of train frequency and whether they are diesel powered.
 The commuter trains that would run along the corridor would each be powered
 by one diesel locomotive.
 - The project should include a spill response plan for accidents/spills.
 - Any major stormwater discharges should be looked at in relation to surface water intakes. Need to follow MS4 and state requirements for sanitary buffers.
 - o Will pesticides or herbicides be applied? Application requires a state permit.
 - The project is also within a Hydrologic Area of Concern (HAC) associated with the Merrimack River.
 - The NHDES Alteration of Terrain Rules have several sections that apply to water supply/drinking water sources. Need to make sure project complies with these.
 - At the layover facility, there is potential for contamination to enter groundwater from spills during refueling. On-site fuel storage is not proposed – the trains would be refueled from trucks.
- NHDES asked for a map showing the rail line and the water supply systems and wellhead protection areas. GM2 will provide this.
- NHDES also mentioned that large projects can benefit from a higher level of coordination between the various divisions of NHDES. This is coordinated through the Commissioner's office. Pierce offered to find out who coordinates these reviews if NHDOT would like to pursue it.

Jennifer Riordan

From: Jennifer Riordan

Sent:Monday, April 4, 2022 11:30 AMTo:'Rigrod, Pierce'; Pelonzi, AnnCc:Doyle, Jay; Derrig, David

Subject: RE: [WARNING-EXT] RE: Nashua-Manchester 40818 - OneStop Maps **Attachments:** NM40818 NHDES Drinking Water Bureau Meeting Minutes 3-28-22.pdf

Hi Pierce,

Attached are minutes from our meeting on 3/28. Please let me know if you have any comments or additions. Also, below is a summary of the comments that you provided and our responses.

1. A surface water intake is located near Anheuser-Busch in Merrimack. Accidental spills from train derailments could be a potential contamination issue. The project should include a spill response plan for accidents. Also, any major stormwater discharges should be looked at in relation to surface water intakes. MS4 and state requirements for sanitary buffers need to be adhered to. The location of the proposed stormwater discharge for the new parking lot at the Bedford-MHT station should be reviewed in relation to drinking water resources.

As currently proposed, the commuter rail service would be operated by MBTA and any spills along the corridor would be addressed in accordance with their protocols. This will be mentioned in the NEPA document as something that would need to be addressed as part of the operation of the rail line.

The project will need to meet MS4, NHDES AoT, and Massachusetts stormwater standards. This will include a review stormwater discharge points in relation to surface water intakes and other drinking water resources. This will be reviewed under the current phase of the project (preliminary design), with a commitment in the NEPA document to continue this review during final design. We are looking into where the stormwater discharge would be located for the proposed parking lot at the Bedford-MHT station since this is the area with the largest amount of new impervious for the project.

2. Pesticide or herbicide application, if proposed, requires a state permit.

Herbicide application may be proposed along the rail corridor as part of ongoing vegetation maintenance. Herbicide use can be restricted in areas with sensitive groundwater or surface water resources – this will be noted in the NEPA document as something to consider during final design and operation of the rail line. We'll also note that the applicator needs to be licensed.

3. The NHDES Alteration of Terrain Rules have several sections that apply to water supply/drinking water sources. The project needs to comply with these rules.

Thank you for bringing this up. The project will need to meet AoT rule requirements so these will be reviewed as part of the ongoing preliminary design phase.

4. At the proposed layover facility, there is potential for contamination to enter groundwater from spills during refueling. The design should incorporate measures to protect against and contain spills.

This will be considered during the ongoing preliminary design. We'll also mention it in the NEPA document, with a commitment to include measures in the final design and operation that will minimize the potential for contamination.

5. Large projects can benefit from a higher level of coordination between the various divisions of NHDES. This is coordinated through the Commissioner's office. It was recommended that this level of review be considered for the Nashua-Manchester project.

We have reached out to various agencies in NH and MA and presented at two NHDOT Natural Resource Agency Coordination Meetings to gather input for the preliminary design and NEPA document. I believe this is the level of effort that was anticipated for this project but I will discuss further with NHDOT and let you know if it's determined that a broader level of coordination is needed.

Thanks again for your input. Please let me know if you have any further questions or comments.

Jenn

JENNIFER RIORDAN, CWS, CPESC

P 603.856.7854 | **C** 603.724.4950



From: Rigrod, Pierce <PIERCE.A.LASKEY-RIGROD@des.nh.gov>

Sent: Tuesday, March 29, 2022 8:35 AM

To: Jennifer Riordan < JRiordan@GM2INC.COM>; Pelonzi, Ann < Ann.E.Pelonzi@des.nh.gov>

Cc: Doyle, Jay <Jay.Doyle@aecom.com>

Subject: [WARNING-EXT] RE: Nashua-Manchester 40818 - OneStop Maps

One more question, regarding the comments we did provide, will you be responding in email and in that response, can you confirm any additions/changes to the EA or other documents that will be made? Thx

Pierce

From: Jennifer Riordan < <u>JRiordan@GM2INC.COM</u>>

Sent: Tuesday, March 29, 2022 8:04 AM

To: Rigrod, Pierce < PIERCE.A.LASKEY-RIGROD@des.nh.gov >; Pelonzi, Ann < Ann.E.Pelonzi@des.nh.gov >

Cc: Doyle, Jay <Jay.Doyle@aecom.com>

Subject: Nashua-Manchester 40818 - OneStop Maps

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.

Hi Pierce / Liz -

Thank you for meeting yesterday to discuss the Nashua-Manchester rail project. Your input was very helpful. As discussed, attached are OneStop maps showing the rail line, station & layover sites, and water supply layers.

The entire rail corridor in NH is located within GA2 Groundwater Classification Areas, except for a segment from the Merrimack-Bedford town line to just north of the Merrimack River bridge. Also, the rail corridor from the Merrimack Wastewater Treatment Plant to the northern terminus at Granite Street is located within a Source Water Protection Area associated with Pennichuck Water Works.

Please let me know if you have any further comments on the project or need additional information.

Thanks.

Jenn



JENNIFER RIORDAN, CWS, CPESC

Senior Environmental Scientist P 603.856.7854 C 603.724.4950

APPENDIX D Rare, Threatened, and Endangered Species Correspondence



United States Department of the Interior



FISH AND WILDLIFE SERVICE

New England Ecological Services Field Office 70 Commercial Street, Suite 300 Concord, NH 03301-5094 Phone: (603) 223-2541 Fax: (603) 223-0104

http://www.fws.gov/newengland

In Reply Refer To: April 06, 2022

Project Code: 2022-0028903

Project Name: Nashua-Manchester 40818 (Capitol Corridor Rail Project)

Subject: List of threatened and endangered species that may occur in your proposed project

location or may be affected by your proposed project

To Whom It May Concern:

Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "New England Field Office Endangered Species Project Review and Consultation" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/newengland/endangeredspecies/project-review/index.html

NOTE Please <u>do not</u> use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Additional Info About Section 7 of the Act

Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/birds/policies-and-regulations.php

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

• Official Species List

04/06/2022

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office 70 Commercial Street, Suite 300 Concord, NH 03301-5094 (603) 223-2541

Project Summary

Project Code: 2022-0028903

Event Code: None

Project Name: Nashua-Manchester 40818 (Capitol Corridor Rail Project)

Project Type: Railroad - Maintenance/Modification

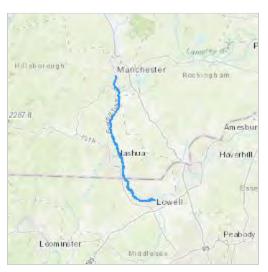
Project Description: NHDOT Project Nashua-Manchester 40818 (Capitol Corridor Rail

Project). The project involves the extension of MBTA commuter rail services from Lowell, MA to Manchester, NH. The majority of the work will be within the existing rail line/embankment. Impacts may result from vegetation clearing, bridge/culvert rehabilitation, grade crossings, and track upgrades. The project also proposes the addition of four stations (two in Nashua, one in Bedford, and one in Manchester) as well as a

layover facility in Manchester.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.81153892504359,-71.47708060862712,14z



Counties: Massachusetts and New Hampshire

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. <u>NOAA Fisheries</u>, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME STATUS

Northern Long-eared Bat Myotis septentrionalis

Threatened

No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045

Insects

NAME STATUS

Monarch Butterfly *Danaus plexippus*

Candidate

No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: GM2 Associates, Inc

Name: Meg Gordon Address: 197 Loudon Road

Address Line 2: Suite 310
City: Concord
State: NH
Zip: 03301

Email mgordon@gm2inc.com

Phone: 6038567854

Lead Agency Contact Information

Lead Agency: Federal Transit Administration

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

To: Ethan Maskiell, GM2 Associates, Inc.

197 Loudon Rd, Suite 310 Concord, NH 03281

From: NHB Review, NH Natural Heritage Bureau **Date**: 2022-05-05 (valid until 05-05-2023) **Re**: Review by NH Natural Heritage Bureau

Permits: NHDES - Alteration of Terrain Permit, NHDES - Shoreland Standard Permit, NHDES - Wetland Standard Dredge & Fill - Major, USACE - General

Permit, USCEQ - Federal: NEPA Review, USEPA - Stormwater Pollution Prevention

NHB ID: NHB22-1578 Town: various Location: Pan Am Railroad ROW

Description: NHDOT Project Na shua-Manchester 40818 (Capitol Corridor Rail Project). The project involves the extension of MBTA commuter

rail services from Lowell, MA to Manchester, NH. The majority of the work will be within the existing rail line/embankment. Impacts may result from vegetation clearing, bridge/culvert rehabilitation, grade crossings, and track upgrades. The project also proposes the addition of four stations (two in Nashua, one in Bedford, and one in Manchester) as well as a layover facility in Manchester. (Previous NHB reviews: NHB14-0614, NHB20-0345, NHB21-1286). This is a long linear project and subject to the

hourly review fee.

cc: NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments NHB: Please continue coordination with NHB. Plant surveys were completed in 2021 and a report was provided to NHB via email on October 26, 2021. Please refer to the recommendations that NHB provided via email on December 12, 2022 in response to this report. Please note: a new record of river birch (Betula nigra) has been added at the southern end of the project area on the east side of the Merrimack River; plants could also occur on the west side of the river in the vicinity of the project. If there will be any impacts to the banks of the Merrimack River in this area, please contact NHB.

F&G: Please continue coordination with NH Fish & Game. Please note: Eastern Box Turtle occurs in the vicinity of the project.

Invertebrate Species State¹ Federal Notes

Brook Floater (Alasmidonta varicosa) E Contact the NH Fish & Game Dept (see below). Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

Natural Community Semi-rich oak - sugar maple forest*	State ¹	Federal 	Notes Threats include physical disturbance of the forest floor that would lead to nutrient loss (e.g., due to erosion), or the introduction of invasive species.
Plantspecies	State ¹	Federal	Notes
arrow-headrattlebox (Crotalaria sagittalis)*	E		
bird-foot violet (Viola pedata var. pedata)	T		
clasping milkweed (Asclepias amplexicaulis)*	T		This species grows in sandplains and disturbed openings, and is sensitive to disturbances that eliminate its habitat.
long-spined sandbur (Cenchrus longispinus)*	Е		This species grows in sandplains and disturbed openings, and is sensitive to disturbances that eliminate its habitat.
river birch (Betula nigra)	T		The population could be deleteriously affected by any project activities that alter the hydrology of its habitat, by increased sedimentation, and by increased nutrients/pollutants in stormwater runoff.
tall cottonsedge (Eriophorum angustifolium ssp. angustifolium)	Е		
wild lupine (Lupinus perennis ssp. perennis)	T		
Wright's spikesedge (Eleocharis diandra)	Е		Primarily vulnerable to changes to the hydrology of its wetland habitat, especially a lterations that change water levels. It may also be susceptible to increased pollutants and nutrients carried in stormwater runoff.
Vertebrate species	State ¹	Federal	Notes
American Eel (Anguilla rostrata)	SC		Contact the NH Fish & Game Dept (see below).
Bald Eagle (Haliaeetus leucocephalus)	SC		Contact the NH Fish & Game Dept (see below).
Blanding's Turtle (Emydoidea blandingii)	E		Contact the NH Fish & Game Dept (see below).
Eastern Box Turtle (Terrapene carolina)	E		Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (Heterodon platirhinos)	E		Contact the NH Fish & Game Dept (see below).
Eastern Meadowlark (Sturnella magna)	T		Contact the NH Fish & Game Dept (see below).
Grasshopper Sparrow (Ammodramus savannarum)	T		Contact the NH Fish & Game Dept (see below).

Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

New England Cottontail (Sylvilagus transitionalis)	E	 Contact the NH Fish & Game Dept (see below).
Northern Black Racer (Coluber constrictor constrictor)	T	 Contact the NH Fish & Game Dept (see below).
Northern Leopard Frog (Lithobates pipiens)	SC	 Contact the NH Fish & Game Dept (see below).
Peregrine Falcon (Falco peregrinus anatum)	T	 Contact the NH Fish & Game Dept (see below).
Sea Lamprey (Petromyzon marinus)	SC	 Contact the NH Fish & Game Dept (see below).
Sora (Porzana carolina)	SC	 Contact the NH Fish & Game Dept (see below).
Spotted Turtle (Clemmys guttata)	T	 Contact the NH Fish & Game Dept (see below).
Wood Turtle (Glyptemys insculpta)	SC	 Contact the NH Fish & Game Dept (see below).

¹Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include <u>ANY</u> wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://wildlife.state.nh.us/wildlife/environmental-review.html. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and must include the NHB Datacheck results letter number and "Fis 1004 consultation request" in the subject line.

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., statutory permit by notification, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

recommended you contact the applicable permitting a gency. For projects <u>not</u> requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle <u>kim.tuttle@wildlife.nh.gov</u> with a copy to <u>NHFGreview@wildlife.nh.gov</u>, and include the NHB Datacheck results letter number and "review request" in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

Note:

This section contains sensitive plant and wildlife information which is on file at the NH Department of Transportation's Bureau of Environment. For additional information please contact the Bureau of Environment at (603)271-3226.

APPENDIX E

Fisheries Correspondence

Jennifer Riordan

From: Kaitlyn Shaw - NOAA Federal <kaitlyn.shaw@noaa.gov>

Sent: Friday, February 4, 2022 10:39 AM

To: Jennifer Riordan; christopher.boelke@noaa.gov; eric.papetti@dot.gov; Winters, Shelley;

Doyle, Jay; Derrig, David; Margaret Gordon; Dexter, Timothy D. (DOT)

Subject: [WARNING-EXT] Re: NHDOT Project - Nashua-Manchester 40818

Hi Jennifer,

While the Merrimack river is designated Essential Fish Habitat (EFH) for Atlantic salmon, Deep Brook is not mapped for EFH. If there are diadromous resources present, we may require consultation under the FWCA for in-water work, but the current proposed action in Deep Brook does not necessitate EFH consultation. I've CC'ed Tim Dexter with MassDOT Environmental as he may be aware of aquatic resources in this vicinity.

Best,

Kaitlyn Shaw

Marine Resources Management Specialist Habitat and Ecosystem Services Division NOAA/ National Marine Fisheries Service Gloucester, MA

Telework: (339) 545-9311
Office: 978-282-8457
Pronouns: she/her/hers
kaitlyn.shaw@noaa.gov
www.nmfs.noaa.gov

On Wed, Feb 2, 2022 at 9:29 AM Jennifer Riordan < JRiordan@gm2inc.com > wrote:

Hi Kaitlyn,

The NH Department of Transportation (NHDOT) is planning the subject project to extend MBTA commuter rail services from Lowell, Massachusetts to Manchester, New Hampshire (refer to attached project location maps). The majority of the work will be within the existing rail line/embankment. The project is approximately 30 miles in length, including approximately 9 miles in Massachusetts. Within Massachusetts, the corridor is located within Lowell, Chelmsford, and Tyngsborough. Within New Hampshire, the corridor is located within Nashua, Merrimack, Bedford, and Manchester. Current site conditions within the project corridor consist of an existing operational rail line, which currently handles only freight.

Preliminary design of the project is ongoing and environmental impacts are being assessed. It is anticipated that impacts may result from vegetation clearing, bridge/culvert rehabilitation and/or replacement, grade crossings, and track upgrades. The project also proposes the addition of four stations and one layover facility, all of which are located in New Hampshire.

GM2 Associates, Inc. is responsible for the ongoing natural resource identification and documentation as a subconsultant to AECOM Technical Services, Inc. Any input you may have related to the project would be appreciated. We are aware that the project crosses several streams and rivers that are designed as Essential Fish Habitat for Atlantic salmon. Currently, the only in-water work proposed for the project is at the Deep Brook crossing near Wotton Street in Chelmsford (shown on attached maps). Work is anticipated to include the repair of scour holes near the abutments and wingwalls for the railroad bridge.

Please let me know if you have any questions or if the project requires further consultation.

Thanks,

Jenn



JENNIFER RIORDAN, CWS, CPESC

Senior Environmental Scientist

www.gm2inc.com

in

P 603.856.7854 C 603.724.4950

Jennifer Riordan

From: Kautza, Adam (FWE) <adam.kautza@state.ma.us>

Sent: Wednesday, February 2, 2022 10:12 AM

To: Jennifer Riordan

Subject: [WARNING-EXT] Re: NHDOT Project - Nashua-Manchester 40818 (Capitol Corridor

Rail)

Thanks for reaching out Jenn. Deep Brook is a designated Coldwater Fish Resource. However, our surveys have all been done pretty far upstream from where this work is being done. Even though a coldwater designation covers the entire stream I doubt that these lower reaches provide habitat and water temperatures suitable for coldwater fish. At this point in the process my general recommendation is that whatever repairs/updates that are planned for the RR crossing should ensure fish (and wildlife) passage up and downstream during and after construction. Erosion and sediment controls will also be critical for all phases of construction as well as after construction is completed.

Let me know if this is what you're looking for and if you need anything else feel free to get a hold of me

Adam Kautza PhD | Coldwater Fisheries Project Leader Massachusetts Division of Fisheries and Wildlife 1 Rabbit Hill Road Westborough, MA 01581 (508) 389-6302 adam.kautza@state.ma.us

From: Jennifer Riordan

Sent: Wednesday, February 2, 2022 9:41 AM

To: Kautza, Adam (FWE)

Subject: NHDOT Project - Nashua-Manchester 40818 (Capitol Corridor Rail)

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hi Adam,

The NH Department of Transportation (NHDOT) is planning the subject project to extend MBTA commuter rail services from Lowell, Massachusetts to Manchester, New Hampshire (refer to attached project location maps). The majority of the work will be within the existing rail line/embankment. The project is approximately 30 miles in length, including approximately 9 miles in Massachusetts. Within Massachusetts, the corridor is located within Lowell, Chelmsford, and Tyngsborough. Within New Hampshire, the corridor is located within Nashua, Merrimack, Bedford, and Manchester. Current site conditions within the project corridor consist of an existing operational rail line, which currently handles only freight.

Preliminary design of the project is ongoing and environmental impacts are being assessed. It is anticipated that impacts may result from vegetation clearing, bridge/culvert rehabilitation and/or replacement, grade crossings, and track upgrades. The project also proposes the addition of four stations and one layover facility, all of which are located in New Hampshire.

GM2 Associates, Inc. is responsible for the ongoing natural resource identification and documentation as a subconsultant to AECOM Technical Services, Inc. Any input you may have related to the project would be appreciated, particularly if there are any concerns related to impacts or seasonal construction restrictions. Currently, the only in-

water work proposed for the project is at the Deep Brook (SARIS ID 8451550) crossing near Wotton Street in Chelmsford (shown on attached maps). Work is anticipated to include the repair of scour holes near the abutments and wingwalls for the railroad bridge. The coordinates of this bridge are 42.641 N, -71.382 W.

Please let me know if you have any questions or if the project requires further coordination.

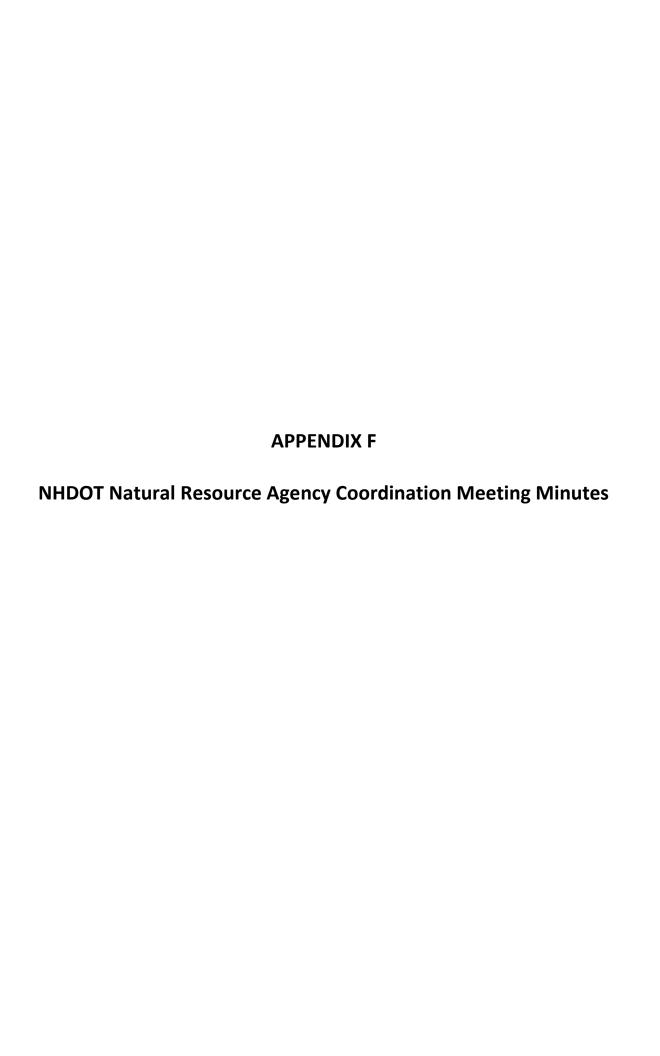
Thanks,

Jenn



JENNIFER RIORDAN, CWS, CPESC Senior Environmental Scientist

P 603.856.7854 C 603.724.4950



BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: September 15, 2021

LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT ACOE Andrew O'Sullivan Absent **The Nature Conservancy** Pete Steckler Matt Urban Rebecca Martin **EPA** Arin Mills Jeanie Brochi Consultants/ Public Ron Crickard **Participants** Christine Perron Mike Dugas **NHDES** Wendy Johnson Lori Sommer Julia Sterns Shelly Winters Karl Benedict Kien Ho **Emily Polychronopolous** Tyler DeRuiter Sam Newsom NHB Jay Doyle John Bruneau Chris Carucci Jessica Bouchard Kerry Ryan Jen Riordan Tim Boodey NH Fish & Game Meg Gordon Joseph Jorgens Carol Henderson

Federal Highway Jaimie Sikora

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: (minutes on subsequent pages)

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Hampton-Portsmouth, 26485 (X-A003(355))	
Claremont, Washington Street Traffic Signal Project, #CMAQ 41748 (X-A004(736))	
Dover Drainage Repair 40042 (Non-federal)	
Bedford #43138 (X-A005(049))	
Nashua-Manchester, #40818 (Capital Corridor Rail)	
Madbury, #43276, (X-0005(068))	
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(PRA) floodplain wetlands adjacent to a Tier 3 stream would require mitigation. Lori Summer also agreed that the concept would be beneficial, but it was unclear as to whether mitigation would be required. C. Henderson noted that stone along the wings as discussed could be a problem for future maintenance related to removing debris at the inlet.

Nashua-Manchester, #40818 (Capital Corridor Rail)

Jenn Riordan (GM2) introduced the project and the team members. The project involves the extension of MBTA commuter rail services from Lowell, MA to Manchester, NH. The project corridor is approximately 30 miles long and crosses through Lowell, Chelmsford, and Tyngsborough, MA, and Nashua, Merrimack, Bedford, and Manchester, NH. It includes 9 miles in Massachusetts and 21 miles in New Hampshire. The route follows an existing rail line that currently handles only freight. The project was formerly referred to as the Capitol Corridor Rail Project. A Federal Railroad Administration (FRA) service-level NEPA Environmental Assessment was completed in 2014, which evaluated various transit alternatives between Boston, MA and Concord, NH. The current project involves extending MBTA commuter rail service from Lowell to Manchester. Tasks include preliminary design engineering, completion of a Federal Transit Administration (FTA) NEPA Environmental Assessment, and development of a financial plan. NHDOT is the project proponent. The existing rail line and right-of-way (ROW) in MA is owned by MassDOT/MBTA and in NH is owned by Pan Am Railways. The purpose of the project is to provide mobility options and reduce congestion and emissions.

Project preliminary design is ongoing and impacts have not been determined yet. Potential improvements include track and signal upgrades, bridge and culvert work, grade crossing improvements, and ROW vegetation clearing. The rail line within the project limits was historically double-tracked. Improvements would include adding the second track back in for certain segments of the corridor. These areas are still being identified. At this point no bridges will be replaced but some may need repair. No culvert replacements have been identified but this is still being evaluated. Vegetation clearing will likely be necessary within the rail ROW. Based on field reviews, it appears that most of the clearing would be shrubs and lower-growing vegetation. Larger trees are generally located beyond the existing ROW.

Four stations and one layover facility are proposed in NH. It was noted that the specific layout at each location is still being defined and some are subject to change. The sites include:

- South Nashua Station Two options are being considered, one adjacent to Pheasant Lane Mall and another at a redevelopment site near Spit Brook Road (former Hampshire Chemical site). The Pheasant Lane Mall site has no wetlands within the proposed limits of disturbance and is located outside of the 100-year floodplain. It is partially within the Protected Shoreland zone of the Merrimack River. The Spit Brook Road site does not have any wetlands and is located outside of the 100-year floodplain. It is located partially within the Protected Shoreland of the Merrimack River.
- <u>Nashua Station</u> Located south of Crown Street. There are no significant natural resource issues. The area is currently developed and the Merrimack River is located over 800 feet away.

- <u>Bedford/Manchester Airport Station</u> Located on the west side of the Merrimack River at Raymond Wieczorek Drive. Sebbins Brook and associated wetlands are located to the south and are within a 100-year floodplain. Additional wetlands have been identified north of the station near Somerville Drive. The Merrimack River is located to the east but the station is not within the Protected Shoreland zone.
- <u>Manchester Station</u> Located between Granite Street and Valley Street. The area is currently developed, located outside the 100-year floodplain, and the Merrimack River is over 400 feet away.
- Manchester Layover Two options are being considered, one located north of Hancock Street/Queen City Avenue in a portion of the abandoned Pan Am rail yard and a second option in the wooded back area of the City of Manchester's Pine Grove Cemetery. The site located north of Hancock Street is mostly developed but there are two low quality wetlands east of the tracks. This site is not located within a 100-year floodplain and the Merrimack River is approximately 250 feet west of the site at the closest point. The Pine Grove Cemetery site would be located on the east side of the tracks beyond the 100-year floodplain and outside of the Protected Shoreland zone. There are two known bald eagle nests located on Carthagina Island and there is a semi-rich oak-sugar maple exemplary natural community forest located on the west side of the tracks but not within the layover limits of disturbance. The layover would be located within the Pine Grove Cemetery Backland Conservation Land. Wetlands are located nearby but impacts have not been evaluated yet.

Natural resources within the project corridor were summarized. Wetlands were field delineated in April, May, and June of 2021. All of the corridor in Massachusetts was field delineated and about 8 miles of the NH portion was field delineated (corresponds to where improvements such as double track, proposed stations, or bridge/culvert work may occur). There are four Prime Wetlands located in Nashua. There are several Priority Resource Areas as well as many small, low functioning wetlands adjacent to the rail bed. No vernal pools were observed. There are eight named surface waters that are crossed by or located adjacent to the project, as well as at least six unnamed small perennial and intermittent stream crossings. Stream crossing assessments have not yet been completed since potential culvert replacements are still being identified. Assessments will be completed if any culvert replacements are proposed.

The project is subject to AoT requirements. New impervious surface would be located at the stations, primarily associated with any new proposed station access roads and parking. and water quality treatment would be included. The project is entirely within the MS4 permit area. Most of the surface waters near the project have impairments or TMDLs. There are no Outstanding Resource Water watersheds or Class A waters near the project.

For groundwater resources, the majority of the rail corridor is mapped as a GA2 groundwater classification area. The rail corridor in Merrimack, Bedford, and Manchester is located within a Source Water Protection Area. In Merrimack there is a water supply intake protection area and wellhead protection area. There are also various wells mapped along the corridor and near the station and layover sites.

Various plant and animal species were listed in the NHB report. Field surveys for the plant species were conducted concurrently with the wetland delineation and follow-up rare plant searches were conducted in June and August. Wild lupine was found in one location adjacent to the rail ROW in Bedford. Semi-rich oak-sugar maple forest exemplary natural community is located adjacent to the rail line near Pine Grove Cemetery (near one of the site options for the Manchester layover facility). Both appear to be located beyond the anticipated impact limits of the project, but their locations have been noted and potential impacts will be reviewed as the design progresses.

Wright's spikesedge has been recorded near the Merrimack River It was not found during the wetland delineation site visit. A follow-up up visit later in the growing season was attempted in August but the water levels in the river were so high that the survey could not be completed. If any work within the river is proposed, an additional survey could be completed during final design (will be included as a condition in the NEPA document).

Small whorled pogonia was listed in the first USFWS IPaC report received for the project but was not listed in a later report. GM2 searched for it during the field reviews and did not find the plant within the rail ROW.

Some coordination has already been completed with NH Fish and Game regarding the listed animal species. For brook floater, a mussel survey near the Merrimack River bridge was not included in the current phase of the project. If impacts to the river are proposed, a survey would be completed during a later phase of the project. For bald eagle, a nest was observed in Manchester. This is located approximately from the rail ROW. For the grassland bird species, GM2 coordinated with NH Fish and Game and NH Audubon. The NHB records are in Merrimack. No impacts to these fields are anticipated but if work would occur in this area, then a grassland bird survey would be completed under a later phase of the project.

For northern long-eared bat, acoustic surveys are not included in the current phase of the project but would be completed under a later phase if necessary. No known maternity roost trees or hibernacula are nearby.

Other natural resources include Essential Fish Habitat for Atlantic salmon (Merrimack River, Nashua River, Pennichuck Brook, and Souhegan River). The Lower Merrimack, Souhegan, and Piscataquog Rivers are NH Designated Rivers. Large sections of the project are located adjacent to 100-year floodplains. The rail line is generally elevated above the Merrimack River and outside of floodplain. The rail line crosses floodplains at the larger perennial streams and a few other locations. Several of the waterbodies within the project limits have Protected Shoreland. Invasive plant species are present throughout the rail ROW.

Resources within the Massachusetts portion of the project were summarized. Wetlands were delineated along the entire 9-mile corridor in MA. Sections of the corridor cross through the 100-foot buffer zones of the wetlands and banks. The rail line runs parallel to the Merrimack River and crosses several perennial streams. MassWildlife Natural Heritage and Endangered Species Program (NHESP) identified two listed species: bald eagle and riverine clubtail dragonfly. A meeting was

held with MassWildlife to discuss potential impacts. Recommendations included minimizing vegetation clearing, especially along river banks, and having time-of-year restrictions.

The next steps for the project include attending a second Natural Resource Agency Coordination meeting once impacts have been identified. The NEPA document is scheduled for completion in late December 2021. Permit applications would be submitted at a later point under a separate phase of the project.

Comments were then provided by the following resource agencies.

Karl Benedict (NHDES)

- The project needs to meet the stream crossing rules (Env 900) and AoT requirements.
- There may need to be some hazardous waste management at the Spit Brook Road station site.
- Recommended focusing on the functional assessments in evaluating wetland impacts.
- Need to consider the Priority Resource Area (PRA) impacts as well as the 100-year floodplain and prime wetlands
- Recommended coordinating with the Local Advisory Committees (LACs) and Conservation Commissions. Jenn responded that the LACs and Conservation Commissions in NH were recently contacted.

Lori Sommer (NHDES)

- Agreed with Karl's comments
- Asked about the protocol for the stations regarding size. Shelly Winters clarified that the station sites would not involve a large amount of construction. No large buildings are proposed, just platforms and parking areas. Regarding the layover sites, Lori stated that the Pine Grove Cemetery location is not appealing due to heritage, landscape, and proximity to the Merrimack River.
- Asked if there was any current use on the second track. Jonathan Bruneau from Jacobs responded that the second track is currently used by Pan Am as a maintenance access road.
- PRA and prime wetland impacts will need to be looked at closely.
- Asked if the clearing of vegetation would be a one-time occurrence or if it would be maintained. Secondary impacts associated with the clearing/conversion of wetlands would be considered by the ACOE.

Carol Henderson (NH Fish and Game)

- Recommended staying in contact with the NH Fish and Game Nongame Program as the
 project moves forward. Suggested coordination and communication when there is more
 information on the disturbances.
- Nesting birds can be disturbed during construction even when their habitat is not being directly impacted (mentioned bald eagle and peregrine falcon in the city station sites)
- Asked if there is a tentative construction date. Shelley Winters responded that the financial plan is next and then it is up to the legislators to decide if the project moves forward.

Jaime Sikora (Federal Highway Administration)

• No comments due to FHWA not funding the project

Jessica Bouchard (NH Natural Heritage Bureau)

- Asked GM2 to send a record of previous communication between GM2 and NHB.
- Asked if GM2 was aware of the two new species listed in the 2021 NHB report and whether GM2 surveyed for them. Jenn Riordan confirmed that these species were included in the field surveys.
- Suggested doing an additional survey for Wright's spikesedge once Merrimack River shoreline impacts have been determined.
- Seconded Lori's comment about not preferring the Pine Grove Cemetery location for a layover site due to potential indirect impacts to the exemplary natural community.

Pete Steckler (The Nature Conservancy)

Agreed with Carol about consulting with the NH Fish and Game Nongame Program. Noted
that wildlife corridor and connectivity maps are being produced that could be useful to the
project.

This project has not been previously discussed at the Monthly Natural Resource Agency Coordination Meetings.

Madbury, #43276, (X-0005(068))

Chris Carucci, NHDOT Highway Design, gave an overview of the proposed federally funded culvert rehabilitation project. The culvert carries Beards Creek under Madbury Road, approximately 0.5 miles north of US Route 4, and is a Tier 2 crossing. The existing culvert is a 58" wide x 36" high x 131' long corrugated metal arch pipe constructed in 1980. The pipe is in poor condition with heavy rust, some perforations, and damage to the inlet end. There was no perch at the culvert inlet or outlet.

A Town owned crossing, located approximately 175' upstream on Sarah Paul Road, was also described.

NHDOT District 6 Maintenance reports no history of flooding related to the State culvert. Discussion with the Town Road Agent indicated no recent history of flooding of the Town Road, except for one time when the State culvert was blocked by beavers. A stream assessment was completed by NHDOT on 5/27/2021, finding the stream to be a Rosgen Type E immediately upstream of the crossing. Immediately downstream, the channel is not natural, as it was constructed as part of the roadway embankment. The reference reach was farther upstream of the inlet and was classified as Type F. Bankfull widths averaged 4.6' at the crossing and 5.6' for the reference reach. The reference reach data and entrenchment ratio range of 1.0 to 1.4 was used to determine the compliant span range of 5.6' to 7.8'. An 8' span was used to evaluate the compliant design option. The environmental review identified the potential presence of rare species, invasive species, and limited re-use soils (LRS), and potential coordination for Section 106, water quality requirements, Alteration of Terrain (AOT) requirements, and essential fish habitat (EFH). Floodplains, protected shoreland buffer, prime wetlands, designated rivers, and conservation lands were not identified. Existing hydrology and hydraulics were outlined in conjunction with the culvert, stream, and road profiles. Streamstats reports drainage area at 0.42 sq mi (268.5 acres). Review of LIDAR contours found additional contributing area in the upper watershed, making the total area used for analysis 376.3 acres, or about 0.588 Sq miles. Streamstats predicts Q100 at 106 cfs using the revised 376 ac

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: February 16, 2022

LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT	EPA	The Nature Conservancy
Andrew O'Sullivan	Jean Brochi	Pete Steckler
Matt Urban		
Jon Evans	NHDES	Consultants/ Public
Mark Hemmerlein	Karl Benedict	Participants
Kerry Ryan	Lori Sommer	Jay Doyle
Rebecca Martin		David Derrig
Shelley Winters	NHB	Jonathan Bruneau
Tim Boodey	Jessica Bouchard	Kathleen Ports
Joseph Jorgens		Julie Donovan
Emily Nichols	NH Fish & Game	Meg Gordon
	John Magee	Deb Evans
ACOE		Jennifer Riordan
Mike Hicks	Federal Highway	
	Jamie Sikora	

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: (minutes on subsequent pages)

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Nashua-Manchester, #40818:	
Errol, #42751:	

Lastly, Matt shared several photos of the 70 yr old structure that is to be demolished and rebuilt. He was able to point out the salt pile on one of the photos.

All the resource agency members supported the project and need with no issues or concerns raised. The only comment notably received was from Karl Benedict, encouraging the Department to review possible design requirements necessary for the construction of a salt barn that meets the guidelines set forth in the Water Quality rules.

Nashua-Manchester, #40818:

Jenn Riordan (GM2) introduced the project and the team members. The project involves the extension of MBTA commuter rail services from Lowell, MA to Manchester, NH. The project corridor is approximately 30 miles long and crosses through Lowell, Chelmsford, and Tyngsborough, MA, and Nashua, Merrimack, Bedford, and Manchester, NH. It includes 9 miles in Massachusetts and 21 miles in New Hampshire. The route follows an existing rail line that currently handles only freight. The project was formerly referred to as the Capitol Corridor Rail Project. A Federal Railroad Administration (FRA) service-level NEPA Environmental Assessment was completed in 2014. The current project involves extending MBTA commuter rail service from Lowell to Manchester. Tasks include preliminary design (30%) engineering, completion of a Federal Transit Administration (FTA) NEPA Environmental Assessment (EA), and development of a financial plan. Final design and permitting would be part of a future contract.

The proposed improvements and potential impacts were discussed by improvement type and location along the corridor:

<u>Track Upgrades</u> - The route follows an existing operational rail line. The rail line within the project limits was historically double-tracked. Improvements would include adding the second track back in for certain segments of the corridor. These proposed double track sections were described. Natural resource impacts are generally limited. There are buffer zone and Riverfront Area impacts for the segment in MA. A potential vernal pool was identified adjacent to the tracks in Merrimack. Portions of the track are within Protected Shoreland and there are mapped Zone A and AE floodplains within and adjacent to portions of the rail right-of-way. Within floodplain areas, the rail embankment is generally raised above the surrounding landscape, so floodplain impacts from adding a second track are anticipated to be minor.

Bridge Work

• Deep Brook, Chelmsford, MA – There are scour holes near the abutments and the wingwalls need repair. The bridge deck would also be replaced to add a second track. This work may result in impacts to bank, BVW (wetland), and LUWW (stream). The National Marine Fisheries Service (NMFS) was contacted and Deep Brook is not mapped as Essential Fish Habitat (EFH) so no further EFH consultation is required. MassWildlife Fisheries was also contacted and they indicated that although Deep Brook is designated as a Coldwater Fish Resource, the lower reaches likely don't provide habitat for coldwater fish. They recommended that proposed repairs ensure fish and wildlife passage during and after construction. Erosion and sediment controls are also important.

• Lock Street, Nashua, NH – This bridge carries Lock Street under the rail line. It would be replaced. No wetlands or surface waters are located nearby. Some minor vegetation clearing and ground disturbance would result from the replacement.

<u>Culvert Work - Many of the culverts along the rail line need general maintenance.</u> This would involve clearing vegetation and removing debris from the inlets and outlets, reshaping/stabilizing channels, and stabilizing banks where necessary. This could involve potential wetland, stream, and/or bank impacts as well as some minor vegetation grubbing. These impacts will be quantified during the final design phase of the project.

There are some specific culverts where replacements, extensions, or headwall repair are anticipated. These include:

- Cattlepass (MP 43.52) in Merrimack Track realignment would require extension on the west side. No wetlands are located nearby. A Zone AE floodplain is mapped on both sides of the rail ROW.
- Stone Box Culvert (MP 50.45) in Bedford This culvert is proposed to be replaced. There is scour at the inlet and severe erosion at the outlet. The culvert carries an intermittent stream (Tier 1 crossing) and a wetland. A Zone AE floodplain (associated with the Merrimack River) is mapped downstream of the culvert.
- Cast Iron Pipe (MP 51.02) in Bedford New headwalls and extension of the pipe is proposed. There is severe erosion at the outlet side. The culvert carries a wetland and a small intermittent stream (assumed to be a Tier 1 crossing but not mapped on USGS StreamStats). The stream appears to be mostly fed by stormwater runoff. A Zone AE floodplain (associated with the Merrimack River) is mapped downstream of the culvert. The culvert is within the Protected Shoreland zone.
- Concrete Pipe (MP 52.11) in Manchester Double tracking would require extension of the outlet headwall. There is a small wetland on the outlet side.

Proposed corridor-wide improvements were summarized, including:

- <u>Ditch/Drainage Work</u> This may include restoration of existing drainage ditches although this would generally be in localized areas and not corridor-wide. Underdrain may also be added in areas. Specific locations will be identified during final design. At that point, the ditches would need to be evaluated to determine if they are jurisdictional wetland resources or connect to jurisdictional areas.
- <u>Vegetation Clearing</u> This would generally be corridor-wide within the rail ROW. Clearing width would be approximately 25 feet on either side of the track centerline.
- <u>Signal System Installation</u> This would include new masts, shelters, and access driveways
- <u>Grade Crossings</u> Improvements could include underdrains to local ditches. Most of the crossings do not have wetlands nearby. Some of the crossings in MA would involve buffer zone and Riverfront Area impacts.

The proposed stations and layover facility were then discussed. Four stations and one layover facility are proposed in NH. The sites include:

- South Nashua Station (Pheasant Lane Mall) This would be located west of the tracks, between the rail line and the mall. An existing mall parking lot would be utilized. The proposed high level platform requires a freight bypass to the east of the mainline (two tracks near the station are proposed). No direct wetland impacts are proposed. There would be some buffer zone and Riverfront Area impact in MA (estimated 5,000 SF). The Merrimack River is a Prime Wetland in Nashua and also a NH Designated River (Lower Merrimack). The station is within the Protected Shoreland. Some minor clearing would be required to construct the station. The proposed platform is located beyond the 100-year floodplain. New impervious surface is estimated at around 50,000 SF.
- An alternative site for the South Nashua Station near Spit Brook Road had been reviewed but this alternative is no longer being considered.
- <u>Nashua (Crown Street)</u> Located near the Pan Am Rail Yard, south of Crown Street. There are no substantial natural resource issues since the site is currently developed. A minimal amount of clearing would be required. New impervious surface is estimated at around 20,000 SF.
- <u>Bedford-MHT Station</u> Located on the west side of the Merrimack River at Raymond Wieczorek Drive. The parking lot layout is still being refined. The station platform would be located under the R. Wieczorek Drive bridge, with a proposed parking lot to the south, near Sebbins Brook. Permanent wetland impacts are estimated at around 5,000-6,000 SF. Tree and vegetation clearing would be required. There is potential for floodplain/floodway impacts, although these impacts will be avoided/minimized where possible. The station is also within the Protected Shoreland. New impervious surface is estimated at around 200,000 SF.
- <u>Manchester Station</u> Located south of Granite Street, at the northern limit of the project. No new parking is proposed. The project would create new curb areas, sidewalks/plaza areas, and a platform. There are limited natural resource issues since the area is currently developed. A small amount of new impervious surface is proposed.
- Manchester Layover Located south of the proposed station, at the Pan Am Yard. Some excavation and grading would be needed to level the area. Five storage tracks are proposed and there would be paved access aisles for service vehicles. The site would also have a support building and parking lot. Stormwater would be managed on site. Locomotives would have drip pans where they park and these would be connected to oil/water separators. Two small, low-quality wetlands are located near the proposed layover facility. A small amount of tree/shrub clearing would be required. An alternative layover site near Pine Grove Cemetery in Manchester had been reviewed but this site is no longer being considered.

An administrative draft of the NEPA EA is anticipated to be submitted to FTA in June 2022. A public hearing is scheduled for September 2022, with a Finding of No Significant Impact (FONSI) anticipated in December 2022.

Rare, threatened, and endangered species were generally discussed. Various plant and animal species were listed in the NHB report. Field surveys for the plant species were conducted in 2021. Wild lupine was found in one location adjacent to the rail ROW in Bedford. A semi-rich oak-sugar maple forest exemplary natural community is located adjacent to the rail line near Pine Grove Cemetery (near one of the site options for the Manchester layover facility). Both appear

to be located beyond the anticipated impact limits of the project. River birch was found near the rail line in Lowell (not a listed species in MA) but not in NH.

Wright's spikesedge has been recorded near the Merrimack River railroad bridge. It was not found during a site visit in May. A follow-up up visit later in the growing season was attempted in August but the water levels in the river were so high that the survey could not be completed. If any work within the river is proposed, an additional survey could be completed during final design (will be included as a condition in the NEPA document).

Some coordination has already been completed with NH Fish and Game regarding the listed animal species. For brook floater, a mussel survey near the Merrimack River bridge was not included in the current phase of the project. If impacts to the river are proposed, a survey would be completed during a later phase of the project. For bald eagle, a nest was observed on Carthagina Island in Manchester. This is located approximately 500 feet from the rail ROW. For the grassland bird species, GM2 coordinated with NH Fish and Game and NH Audubon. The NHB records are in the fields near Anheuser-Busch in Merrimack. No impacts to these fields are anticipated but if work would occur in this area, then a grassland bird survey would be completed under a later phase of the project.

For northern long-eared bat, acoustic surveys are not included in the current phase of the project but would be completed under a later phase if necessary, or the 4(d) rule would be utilized.

Other natural resources include Essential Fish Habitat for Atlantic salmon. The National Marine Fisheries Service (NMFS) was contacted and no further EFH consultation is required for the project as currently proposed.

The Lower Merrimack, Souhegan, and Piscataquog Rivers are NH Designated Rivers.

Comments were then provided by the following resource agencies.

Karl Benedict (NHDES)

- The project will need to meet AoT requirements and address water quality at the stations and layover.
- The culvert at MP 51.02 was discussed, including whether stormwater runoff is contributing to the erosion. Jenn mentioned that the soils in the area are very sandy. Jon Bruneau added that the Merrimack River is nearby and could be causing erosion during flood events.
- Vernal pool surveys should be completed.
- Recommend proposing an invasive species management plan
- Asked how the permitting process will be implemented. There are multiple towns and two states. Will it be combined into one application? Jenn responded that there will be three separate applications in MA to each municipality's Conservation Commission, plus the NHDES wetland permit application.

Lori Sommer (NHDES)

- Pleased that previous agency comments have been incorporated and certain stations are no longer being considered.
- For the vernal pool near the track in Merrimack, recommend looking at ACOE guidance and characterizing the existing pools and possible impacts. If the project lowers the value of the pool, then ACOE would require mitigation.
- Impacts to Priority Resource Areas (PRAs) would also require mitigation.
- Asked if the NHB report covered the Bedford-MHT station. Jenn responded that it did.
- If there is vegetation clearing in wetlands, the ACOE may look at it as a conversion impact and require mitigation.

John Magee (NH Fish and Game, Fisheries)

- There are many rare and listed species in the Sebbins Brook area (New England cottontail, spotted turtle). Sebbins Brook also has sea lamprey and wild brook trout.
- Need to be mindful of impacts near Sebbins Brook, particularly stormwater runoff from the parking lot.
- Asked how stormwater runoff at the Pheasant Lane Mall site will be treated since the tracks and station are very close to the Merrimack River. Jay Doyle responded that stormwater management will be part of the design, being mindful of the proximity to the river.
- Asked about the distance of proposed clearing to the Merrimack River. Jay mentioned that the proposed freight bypass is within the existing rail embankment (this line was historically double tracked). Jon Bruneau indicated that clearing would likely be above the top of bank. The clearing would be to 25 feet from the proposed track, not to the edge of the ROW, which can be very wide in some areas. These limits will be further refined during final design. Jenn mentioned that most of the vegetation clearing is maintenance of areas that were previously cleared.

Jessica Bouchard (NH Natural Heritage Bureau)

- Thanked the team for implementing NHB's recommendation regarding the Manchester layover site and removing the Pine Grove Cemetery option.
- The summary provided in the presentation is in line with previous NHB coordination.
- If any impacts to the Merrimack River bed, sand bars, or along the toe of the bank are proposed, another survey for Wright's spike sedge is recommended.

Mike Hicks (ACOE)

- Recommended contacting the Coast Guard for the bridge work.
- Vernal pool mitigation will need to be addressed later.
- Wanted to confirm that no further EFH review is required.
- Asked about the status of cultural resource review. Dave Derrig stated that AECOM has
 initiated this work. The project was reviewed at a NHDOT Cultural Resource Agency
 Coordination Meeting last week.
- Is the project federally funded? Jay mentioned that one part of the current project is development of a Financial Plan, which will identify funding sources. FTA is the lead agency for the NEPA EA and a potential source of capital investment grant funding.

• Asked if there has been any coordination with the ACOE contact for MA. Jenn responded not yet. Mike will check on this and get back to NHDOT.

Jeanie Brochi (EPA)

- The vernal pool evaluation will be important.
- Asked if temporary impacts have been evaluated. Jenn responded that temporary impacts are anticipated but they haven't been quantified yet.
- Asked if the 2014 EA was made available to agencies. Jenn responded that it is available on the DOT website.

Jaime Sikora (Federal Highway Administration)

• No comments due to FHWA not funding the project, however if funding sources change then FHWA may need to be involved.

Pete Steckler (The Nature Conservancy)

 Asked if team has considered NH Wildlife corridors mapping. Suggested overlaying corridors identified by NHF&G to consider impacts on connectivity and look for opportunities to mitigate potential impacts.

Mark Hemmerlein (NHDOT)

- Asked who will own and operate these facilities long-term? Who will manage construction?
 - O Jay responded that the rail line is currently owned and operated by Pan Am in NH. In MA, MBTA owns the rail line and Pan Am operates on it. MBTA has trackage rights over the rail line from Lowell to Manchester. It is anticipated that construction of the rail improvements would likely be done under force account work. The proposed stations and layover would not be owned by Pan Am. MBTA could potentially own the layover facility. There are ongoing discussions regarding ownership of the stations.
- Who will obtain the permits?
 - o Jay responded that the current phase of the project involves preparing an outline of necessary permits, but not obtaining these permits. At the end of the current project phase (30% design), decisions will need to be made about how the project will be delivered.
 - o Shelley Winters stated that it hasn't been determined yet and will depend on the funding sources.
 - O Mark mentioned that during the permitting process it is important to know who will own the project in the end. The project is subject to MS4 requirements and it will need to be determined if municipal systems will be managing stormwater. Need to have a clear understanding of this after leaving NEPA phase. Jay responded that the team is working to identify these answers.

This project was previously discussed at a Natural Resource Agency Coordination Meeting on September 15, 2021

APPENDIX G

Floodplain Correspondence





MEMORANDUM

TO: Jennifer Riordan, Senior Environmental Scientist, GM2 Inc.

FROM: Samara Ebinger, Principal Planner

State National Flood Insurance Program, Assistant Coordinator

DATE: September 29, 2021

SUBJECT: Nashua-Manchester 40818

I am writing in reference to your September 27, 2021 email regarding the above-referenced project. I have reviewed the contents of your email including linked pdf maps, the GIS shapefile attachment provided which included the project location, and the FEMA Flood Insurance Rate Maps (FIRMs) where the project area is located.

In the City of Manchester, portions of the project area appear to be in Special Flood Hazard Areas (SFHAs) designated as Zone A and Zone AE, with the latter area also being within the regulatory floodway. For the City of Nashua and the Towns of Merrimack and Bedford, portions of the project area also appear to be within an SFHA designated as Zone AE and within the regulatory floodway.

Since all four communities are participating in the National Flood Insurance Program (NFIP), any development that is proposed within an SFHA should meet the NFIP requirements contained in the communities' floodplain management ordinances. Development is defined under the NFIP as "any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials."

At a minimum, the requirement for a local permit and assurance that all other applicable Federal and State permits have been obtained (as stated in the communities' floodplain ordinances) would apply, for any development occurring in the SFHA.

For development occurring in Zone AE within a regulatory floodway, the following NFIP requirement contained in the community's floodplain regulations would apply:

Along watercourses with a designated Regulatory Floodway no encroachments, including fill, new construction, substantial improvements, and other development are allowed within the floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the proposed encroachment would not result in any increase in flood levels within the community during the base flood discharge.

Therefore, any encroachment, fill placement, or other development activity proposed within the floodway may require hydrologic and hydraulic analyses to determine if the work will cause an increase in the base flood elevation. If any increase in the base flood elevation is anticipated, coordination with FEMA through the Conditional Letter of Map Revision process is required prior to the start of the project.

- **6** 603.271.2341

For any development proposed in Zone A, best judgment should be used in determining if further study is necessary. If the work will not present an increased obstruction to flood flows or alter drainage, then additional coordination is likely not necessary.

If you need further assistance, please contact me at 603-271-1755 or Samara.M.Ebinger@livefree.nh.gov.

APPENDIX H

Conservation Commission Correspondence

TOWN OF BEDFORD New Hampshire



October 28, 2021

Jennifer Riordan Senior Environmental Scientist GM2 Associates 197 Loudon Road, Ste 310 Concord, NH 03301

RE: Nashua-Manchester 40818 Project Area in Bedford

Dear Ms. Riordan,

The Bedford Conservation Commission is in receipt of your letter dated September 2, 2021 requesting information on a list of eleven questions regarding the environmental, social, economic, or cultural resources at the proposed Nashua-Manchester 40818 project area in Bedford. Thank you for providing this opportunity to share our knowledge of the proposed project area. Our responses correspond to your specific questions as outlined below.

Question 1. Mitigation Priorities

The Town does not have a list of priority mitigation efforts. However, there is an unnamed tributary flowing east to west through the northern end of the Rail Station project area. The site is highly altered, ponded in areas (with evidence of past beaver activity), and overgrown with invasive plants. The tributary and associated wetlands would benefit from channel reconstruction, improved hydrologic connectivity, and riparian enhancement. Additionally, the culvert underneath the railroad corridor that conveys this tributary is in disrepair, particularly at the outlet where there is a highly unstable slope with evidence of a recent slump that does not appear to be properly stabilized. This slope is also precariously close to the railroad tracks and would benefit from additional restoration and stabilization actions. The channel downstream from the outlet is deeply incised.

Question 2. Community Plan and Question 5. Public Parks

In 2016, the Town completed major improvements to establish the 2-mile Bedford Heritage Trail located on interconnected easements along west side of the Merrimack River (Exhibit A). As described in our Draft Master Plan, the vision for the trail is to continue expanding and improving its surface to enhance it as a recreational asset for the Town (Step 3.2 in the Plan). The proposed Bedford Rail Station is located within the corridor of an expanded trail. Therefore, the design for the future station should support the Town's vision for the expansion and improvement of this trail.

Question 7. Water Quality and 8. Hazardous Material

Regarding water quality, site preparation should include Best Management Practices to reduce nonpoint source impacts to the stream(s) via erosion, especially the judicious placement of hay bales, as well as the proper disposal of old railroad ties, which were apparently discarded adjacent to the railroad tracks following previous repairs.

Question 11. Non-native, Invasive Plants

Based on a site visit on October 14, 2021, there are several invasive plant species within the proposed project area including: common reed (*Phragmites australis*) and oriental bittersweet (*Celastrus orbiculatus*). While onsite we were not specifically identifying invasive plants, but other species commonly observed in the vicinity include glossy buckthorn (*Rhamnus frangula*), autumn olive (*Elaeagnus umbellata*), and purple loosestrife (*Lythrum salicaria*). Any mitigation efforts should include the removal of these species within the boundaries of the station project area and the replanting of native species according to the anticipated as-built habitat (e.g. lotic, lentic, and riparian zones).

We presume the remainder of your questions will be answered as you complete your NEPA Environmental Assessment and supporting technical reports. Please let us know if we can be of further assistance. You can reach me through our Planning Department liaison, Kathleen Ports at 603.792.1320 or kports@bedfordnh.org.

Best Regards,

Patricia a gragar

Pat Grogan

Chair, Bedford Conservation Commission

CC: Kathleen Ports, Associate Planner Bedford Conservation Commission

Jennifer Riordan

From: Kathleen Ports <kports@bedfordnh.org>
Sent: Tuesday, December 21, 2021 11:23 AM

To: Jennifer Riordan

Cc: Doyle, Jay; Derrig, David; sclough153@comcast.net; groganpo@gmail.com; Rebecca W.

Hebert

Subject: RE: [WARNING-EXT] RE: Nashua-Manchester 40818

Jennifer. Thank you so much for your timely response. Please include the Commission on the invitation to the Agency Coordination Meeting.

K

Kathleen
Kathleen Ports
Town of Bedford, NH
Associate Planner
603.792.1320 office
603.289.4414 cell
kports@bedfordnh.org

From: Jennifer Riordan

Sent: Tuesday, December 21, 2021 9:55 AM

To: Kathleen Ports

Cc: Doyle, Jay; Derrig, David

Subject: RE: [WARNING-EXT] RE: Nashua-Manchester 40818

[External]

Hi Kathleen,

I forwarded the Commission's letter to AECOM's project manager and the NEPA lead. The comments will be considered in the project design. I can address a few of their questions based on the natural resource reviews we've completed so far.

- 1. Mitigation Priorities The Commission mentioned the small tributary that flows east under the RR. We have looked at this area and are aware of the erosion issues near the tracks. This is on the list of culverts that would need to be repaired. There is a second culvert further north with similar erosion/slumping issues that is also on the list.
- Community Plan/Public Parks The Heritage Trail has been considered in the design of the Bedford station. Slide 26 in the presentation deck from the Nov 17th public information meeting shows most current layout of the Bedford station. https://www.nh.gov/dot/projects/nashuamanchester40818/documents/40818-pre-11172021.pdf

The design team is looking at a pedestrian tunnel under the tracks for the Heritage Trail to reach riverfront area (i.e., a precast or galvanized unit). They are also currently working to modify the operating plan to eliminate the

need for the short platform adjacent to easternmost track and improve the perimeter road access for K&R passengers to reach curb without conflicting with parking lot aisle. This should reduce potential impacts to Sebbins Brook. In general, the details of the station layout are still being worked out.

- 3. Water Quality and Hazardous Materials The use of BMPs will be required during construction. The project is currently in preliminary design at this stage we usually just indicate what may be done during construction development and implantation of a Stormwater Pollution Prevention Plan (SWPPP) is the contractor's responsibility during construction. Stormwater treatment will also be included for new impervious areas at the stations, in accordance with NHDES Alteration of Terrain and MS4 requirements.
- 4. Non-native, Invasive Plants We have taken note of the many invasive plant species in the project area. NHDOT has requirements for handling invasive plant material during construction (https://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/documents/FINAL-ENV1Manual1-InvasiveSpecies.pdf). I've noted the Commission's comment about the removal of invasive species within the station and the use of native species for planting.

General information on the project can be found here:

https://www.nh.gov/dot/projects/nashuamanchester40818/index.htm. We'll be presenting the project at a NHDOT Natural Resource Agency Coordination Meeting sometime in the next few months. This presentation will focus on the anticipated natural resource impacts. I can include the Commission on the invite list if they are interested in attending. It's held via Zoom.

Please let me know if the Commission has any other questions or comments.

Thanks,

Jenn

JENNIFER RIORDAN, CWS, CPESC P 603.856.7854 | C 603.724.4950



From: Kathleen Ports < kports@bedfordnh.org>
Sent: Monday, December 20, 2021 9:08 AM
To: Jennifer Riordan < JRiordan@GM2INC.COM>

Subject: [WARNING-EXT] RE: Nashua-Manchester 40818

Hi Jennifer. The Conservation Commission was wondering what would happen with their comments and how they would be updated on the progress of the project and what was done with their comments.

When you have a chance, can you either direct me to the DOT contact or let me know your thoughts on their questions? Thanks so much. Kathleen

Kathleen Kathleen Ports Town of Bedford, NH Associate Planner 603.792.1320 office 603.289.4414 cell kports@bedfordnh.org From: Jennifer Riordan < <u>JRiordan@GM2INC.COM</u>>

Sent: Tuesday, October 5, 2021 3:51 PM

To: Kathleen Ports < kports@bedfordnh.org >
Subject: RE: Nashua-Manchester 40818

[External]

Here's the link to NHDOT's website for the Capitol Corridor Rail project:

https://www.nh.gov/dot/projects/nashuamanchester40818/index.htm

Please let me know if you have any further questions. As I mentioned, the Bedford station layout is still being developed and reviewed by NHDOT.

Thanks,

Jenn

JENNIFER RIORDAN, CWS, CPESC P 603.856.7854 | C 603.724.4950



From: Kathleen Ports < kports@bedfordnh.org > Sent: Thursday, September 30, 2021 2:56 PM
To: Jennifer Riordan < JRiordan@GM2INC.COM >

Cc: sclough153@comcast.net

Subject: Nashua-Manchester 40818

Hi Jennifer. The Conservation Commission is in receipt of your letter regarding the proposed Rail Corridor Project. We are wondering if you could provide more information on the parcels being considered for the proposed station in Bedford. There are several properties in that area owned by the State. Is the project only looking at state-owned lands or are other parcels also being considered? About how much acreage would be needed and is there a preference for the north or south side of Raymond Wieczorek Dr.? Any insight on the area they are considering would be appreciated. Thank you. Kathleen

Kathleen Kathleen Ports Town of Bedford, NH Associate Planner 603.792.1320 office 603.289.4414 cell

The Right to Know Law (RSA 91-A) provides that Town email communications regarding the business of the Town of Bedford are governmental records which may be available to the public upon request. Therefore, this email communication may be subject to public disclosure.

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APPENDIX I

US Coast Guard Correspondence



THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



Victoria F. Sheehan Commissioner

April 25, 2022

Donna A. Fisher Bridge Program Manager First Coast Guard District 408 Atlantic Avenue Boston MA 02110

Submitted via email: Donna.A.Fisher@uscg.mil

Re: NHDOT Project Nashua-Manchester 40818 (Capitol Corridor Rail)

Lowell, MA to Manchester, NH

Dear Ms. Fisher:

The NH Department of Transportation (NHDOT) is submitting this request for formal concurrence from the US Coast Guard that the proposed work on the bridges within the subject project meet the definition of "repair" set forth in 33 CFR 115.40 and that a permit from the Coast Guard is not required.

The project involves the extension of MBTA commuter rail service from Lowell, Massachusetts to Manchester, New Hampshire along an existing railroad line. NHDOT is the project proponent. The railroad line and bridges within the Massachusetts portion of the project are owned by the Massachusetts Bay Transportation Authority (MBTA) and in New Hampshire, Pan Am Railways is the current owner of the railroad line and bridges. As the project proponent, NHDOT is representing the bridge owners on this request.

Current site conditions within the project corridor consist of an existing operational railroad line, which currently handles only freight railroad. The attached project location maps show the location of the railroad line and waterway crossings. The waterway crossings consist of existing railroad bridges that will need various repairs to allow for safe usage by commuter (passenger) trains. The attached table provides a summary of these crossings, the current owner, and the anticipated work. Please note that no bridge replacements are currently proposed, and the anticipated repair work will not alter the horizontal or vertical clearances on any of the bridges within the project corridor.

NHDOT believes that the work on each bridge, as currently proposed, meets the definition of "repair" set forth in 33 CFR 115.40 and no further regulatory review by the Coast Guard is required. Accordingly, please accept this letter as NHDOT's request for formal concurrence from the Coast Guard on this determination. NHDOT understands that if the proposed bridge work changes under future phases of the project, then further coordination with the Coast Guard will need to occur.

Please contact me directly should you need any further information relative to this request. I can be reached via phone (603-271-3497) or email (<u>michelle.l.winters@dot.nh.gov</u>).

Sincerely,

Shelley Winters

Shelly Winds

Administrator, Bureau of Rail & Transit

Enclosures (2)

Cc: Jeffrey Stieb (USCG) - Jeffrey.D.Stieb@uscg.mil

Jody Ray (MBTA) - jray@mbta.com

Ted Krug, Rob Culliford (Pan Am) - tkrug@panam.com, rculliford@panam.com

Jay Doyle (AECOM) – jay.doyle@aecom.com

Jon Bruneau (Jacobs) - jonathan.bruneau@jacobs.com

Jenn Riordan (GM2) – jriordan@gm2inc.com

Waterbody Name	Mile Post	Municipality, State	Owner	Crossing Type	Proposed Work	
Pawtucket Canal	25.69	Lowell, MA	MassDOT	Bridge	Maintenance/Immediate work — clean debris, replace ties Future work may include abutment and/or wingwall repair/rehab, vegetation removal, install/repair security fence. No reduction in waterway opening. Maintenance/Immediate work — remove ties and debris, add ballast, remove vegetation near abutments and wingwalls. Future work may include abutment repair and repairs to bridge superstructure. No reduction in waterway opening. Maintenance/Immediate work — replace ties and ballast, remove vegetation. Future work may include repair of wingwalls, repoint masonry joints, replace track ties. No reduction in waterway opening. Maintenance/Immediate work — replace ties and ballast, construct a curb at Wotton St., remove vegetation, remove debris in channel. Future work may include shifting bridge 1 foot on existing seats to accommodate double track, installing new timber deck on siding bridge, repairing scour, repointing masonry joints, and painting. No reduction in waterway opening. Maintenance/Immediate work — remove tree & other vegetation adjacent to structure. Future work may include replacing ties, repairing slab girder and repointing masonry joints. No reduction in waterway opening.	
Pawtucket Canal	26.20	Lowell, MA	MassDOT	Bridge		
Stony Brook	28.65	Chelmsford, MA	MassDOT	Bridge		
Deep Brook	29.10	Chelmsford, MA	MassDOT	Bridge		
Bridge Meadow Brook (outlet of Flint Pond)	32.56	Tyngsborough, MA	MassDOT	Bridge		
Salmon Brook	37.87	Nashua, NH	Pan Am Railways*	Bridge	Maintenance/Immediate work – remove tree & other vegetation, replace ties and ballast. Future work may include replacing timber tie wall and railing, repairing wingwall ends and repointing masonry joints. No reduction in waterway opening.	

^{*}CSX acquisition of Pan Am Railways was approved by US Surface Transportation Board on April 14, 2022, and the closing is planned for June 1, 2022.

Waterway Crossing Summary

Waterbody Name	Mile Post	Municipality, State	Owner	Crossing Type	Proposed Work	
Nashua River	39.22	Nashua, NH	Pan Am Railways*	Bridge	Maintenance/Immediate work – remove vegetation, clean debris from bridge seats. Future work may include replacing timber bridge and track ties, replacing portions of bridge superstructure, removing vegetation from abutments, repointing stone masonry, repairing backwalls and pedestals. No reduction in waterway opening. Maintenance/Immediate work – remove vegetation and debris. Future work may include replacing concrete backwalls in kind, repairing wingwalls, replacing timber deck ties, replace ballast, and replace railroad cross ties. No reduction in waterway opening. Maintenance/Immediate work – remove vegetation and debris from bridge seats. Future work may include replacing concrete pedestals and backwalls in kind, replacing timber deck ties, replacing ballast, and replacing railroad cross ties. No reduction in waterway opening. Maintenance/Immediate work – trim tree limbs, remove vegetation and debris. Future work may include replacing concrete backwall in kind, repairing abutments and pier, replacing timber deck ties, replacing ballast, and replacing railroad cross ties. No reduction in waterway opening.	
Pennichuck Brook	41.77	Nashua-Merrimack Border, NH	Pan Am Railways*	Bridge		
Naticook Brook	44.92	Merrimack, NH	Pan Am Railways*	Bridge		
Souhegan River	46.22	Merrimack, NH	Pan Am Railways*	Bridge		
Merrimack River	51.84	Bedford- Manchester Border, NH	Pan Am Railways*	Um das assessmentarias mana avian a via actati an timana alautina		

^{*}CSX acquisition of Pan Am Railways was approved by US Surface Transportation Board on April 14, 2022, and the closing is planned for June 1, 2022.

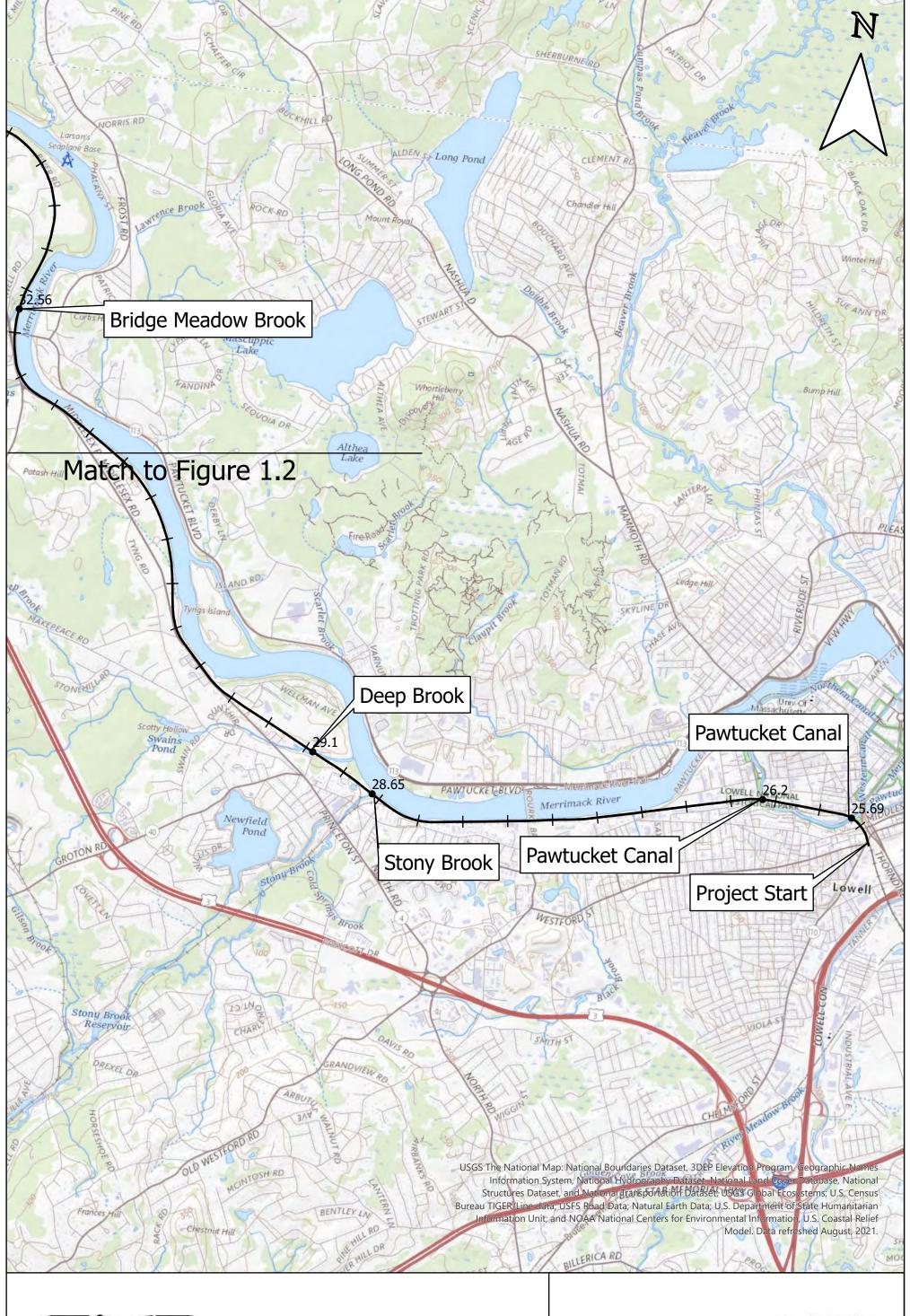
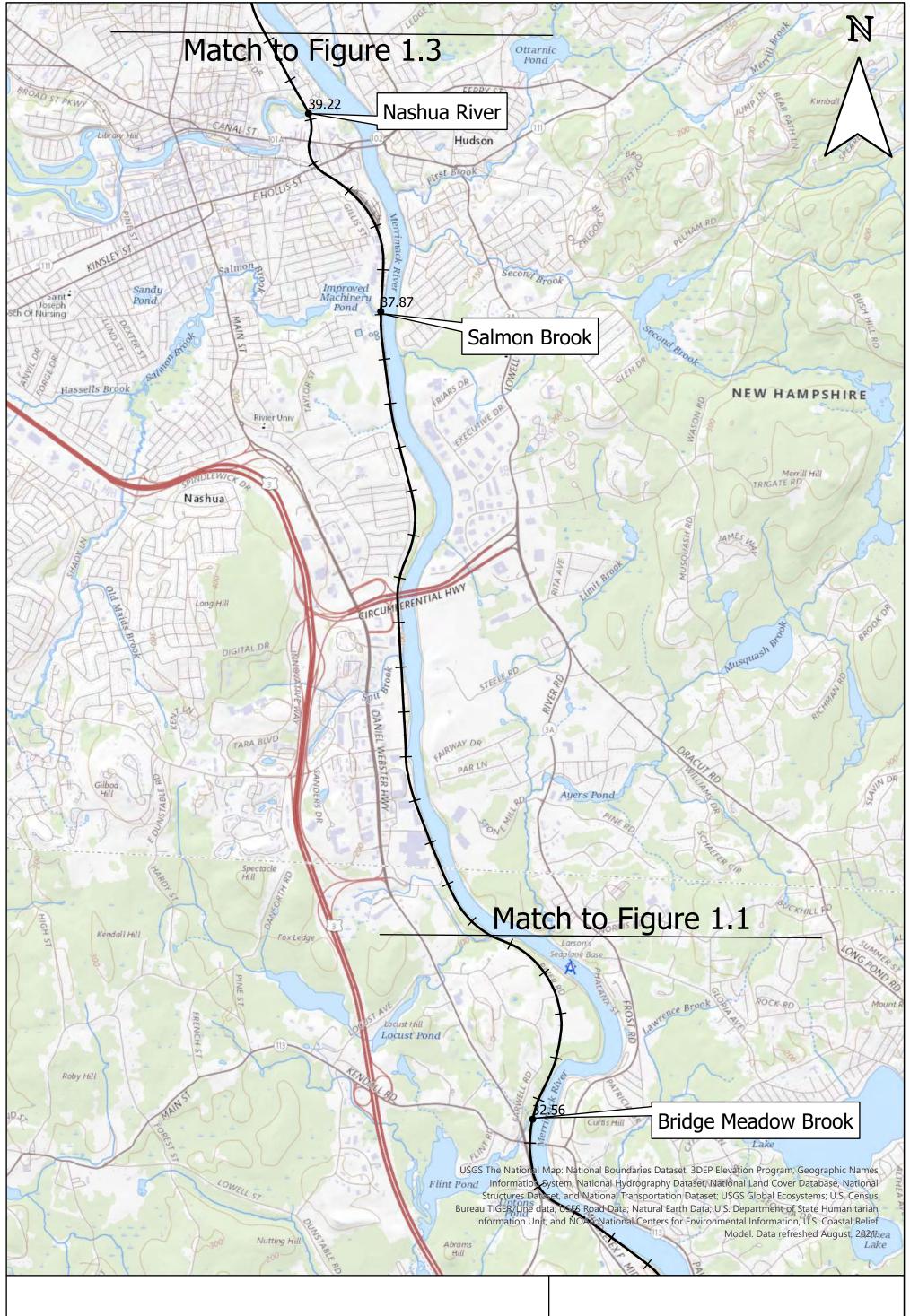




Figure 1.1 Waterway Crossings







Figures 1.2 Waterway Crossings



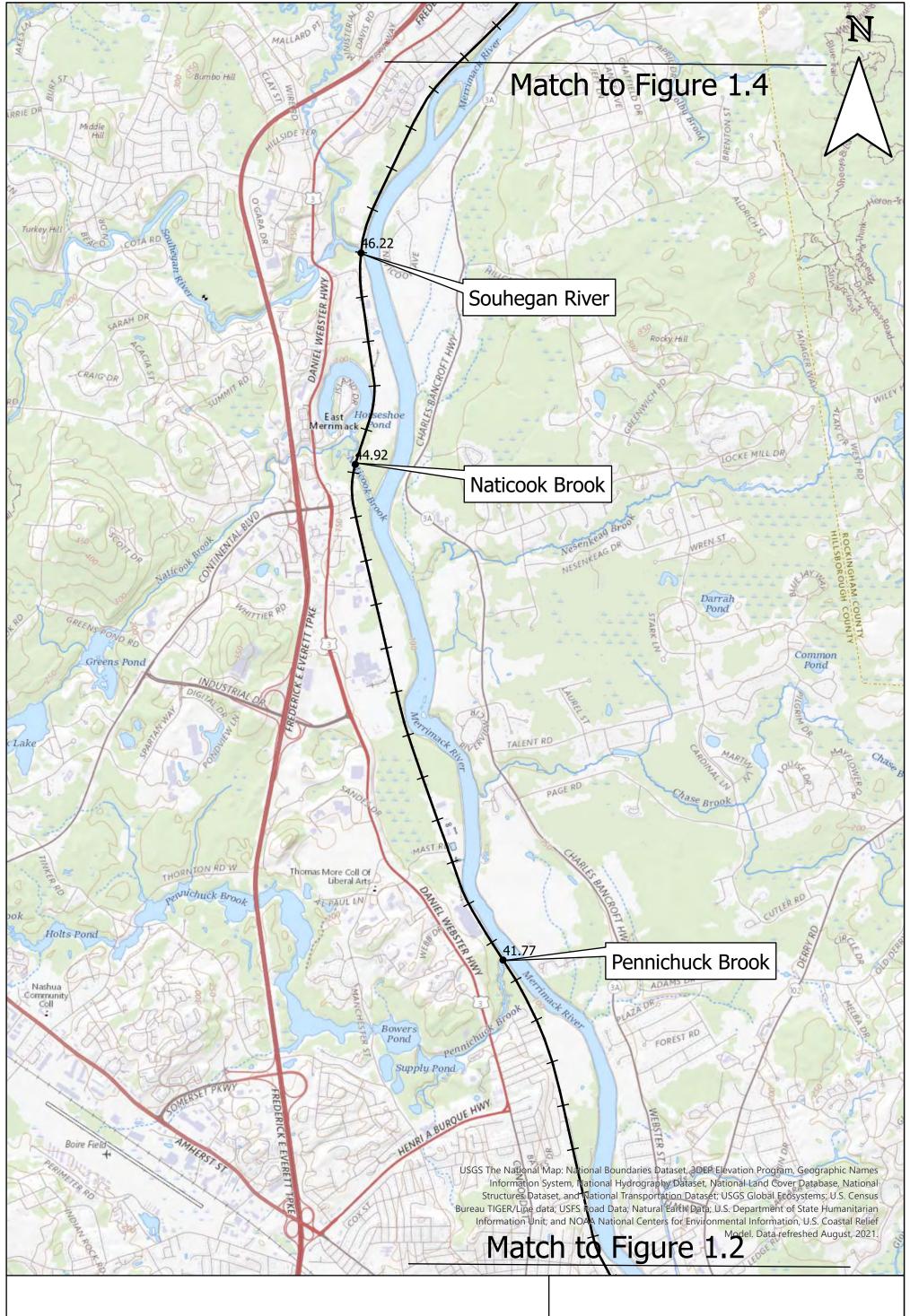




Figure 1.3 Waterway Crossings



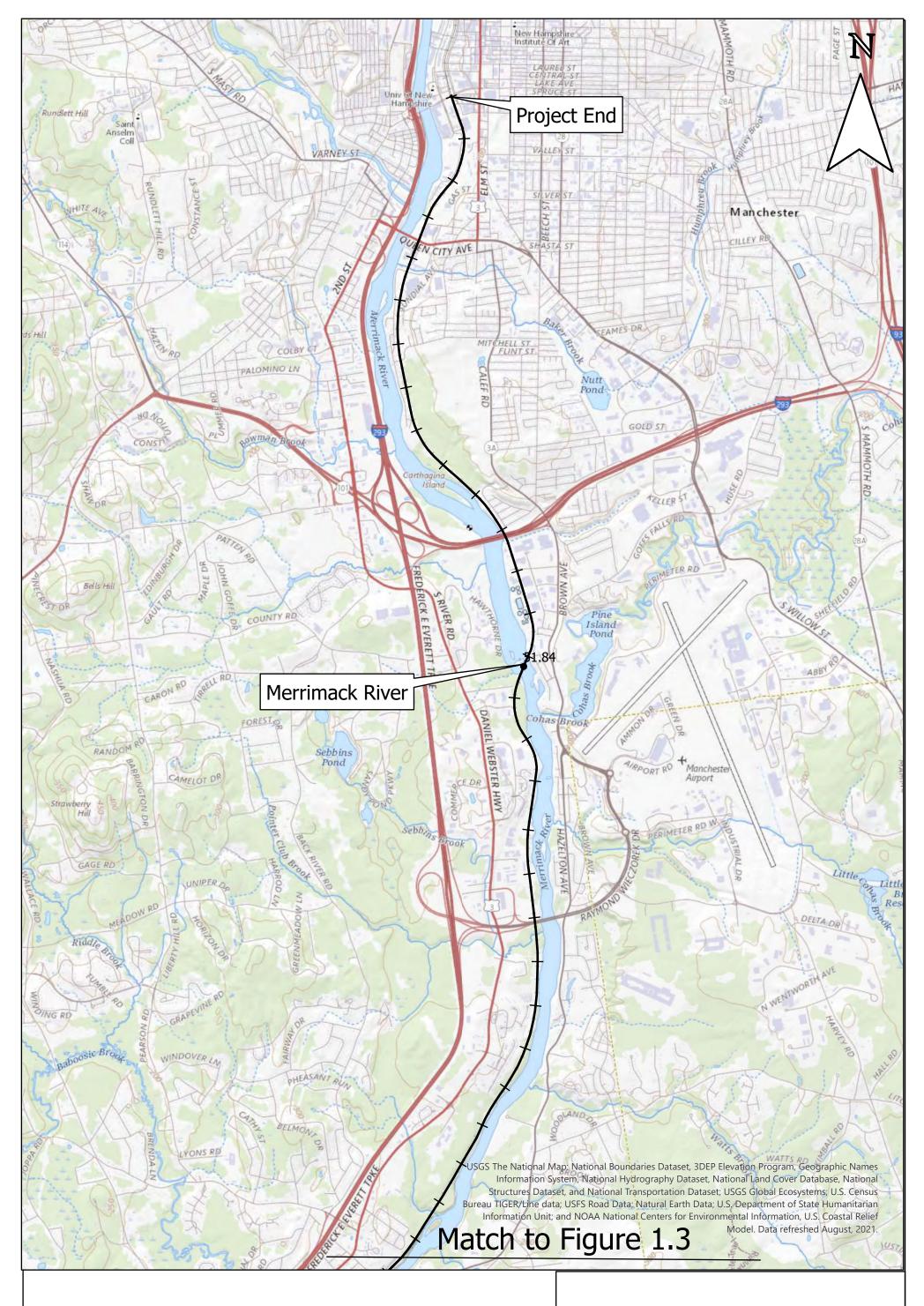




Figure 1.4 Waterway Crossings



Commander First Coast Guard District One South Street Battery Park Building New York, NY 10004-1466 Staff Symbol: dpb Phone: 516-241-5152

16211 May 2, 2022

Shelley Winters Administrator, Bureau of Rail & Transit New Hampshire Department of Transportation 7 Hazen Drive P.O. Box 483 Concord, NH 03302-0483

Re: NHDOT Project Nashua-Manchester 40818 (Capitol Corridor Rail)

Dear Ms. Winters:

This is in response to your letter dated April 25, 2022, requesting whether the Coast Guard will require an approval or permit for the referenced bridge projects. We have examined the waterways with regard to their status as navigable waters of the United States for purposes of Coast Guard bridge jurisdiction. We have also reviewed the projects to determine whether or not the proposed work constitutes repairs as defined in 33 CFR 115.40.

Our examination indicates that there is no sufficient factual support for concluding the following waterways, at the project locations are current or historic navigable waters of the United States:

- Stony Brook
- Deep Brook
- Bridge Meadow Brook
- Salmon Brook
- Nashua River
- Pennichuck Brook
- Naticook Brook
- Souhegan River

Therefore, a Coast Guard bridge permit or exemption will not be required for the bridge projects over those waterways.

We have determined that the Pawtucket Canal and the Merrimack River are navigable waterways for purposes of Coast Guard bridge jurisdiction, however, we concur with New Hampshire DOT that the work described in your letter meets the definition of bridge repairs in 33 CFR 115.40 and, therefore, no Coast Guard permit is required.

If you have any questions feel free to contact Gary Croot, Bridge Management Specialist, at gary.t.croot@uscg.mil or 603-397-9361.

Sincerely,

D.A. Fisher
Bridge Program Manager
U.S. Coast Guard
By direction

Copy: USACE, NE District

USCG Sector Northern New England, WWM

USCG Sector Boston< WWM

APPENDIX A-2 Rare Plant Report

(Internal Use Only – Not for Public Distribution)

CONFIDENTIAL – NOT FOR PUBLIC DISTRIBUTION

NASHUA-MANCHESTER 40818 CAPITOL CORRIDOR RAIL

RARE PLANT FIELD SURVEY REPORT



Prepared for:



NH Department of Transportation 7 Hazen Drive Concord, NH 03302

Prepared by:



GM2 Associates, Inc. 197 Loudon Road, Suite 310 Concord, NH 03301

August 2021

APPENDIX A-3 Wetland Report

APPENDIX A-3.1

Wetland Delineation Report Part A – Massachusetts Section

NASHUA-MANCHESTER 40818 CAPITOL CORRIDOR RAIL

WETLAND DELINEATION REPORT

PART A - MASSACHUSETTS SECTION



Prepared for:



NH Department of Transportation 7 Hazen Drive Concord, NH 03302

Prepared by:



GM2 Associates, Inc. 197 Loudon Road, Suite 310 Concord, NH 03301

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Report Prepared by: Jennifer Riordan, NH CWS #269

1.0 INTRODUCTION

This report provides a summary of the wetland resources that were delineated within the Massachusetts portion of the Nashua-Manchester 40818 (Capitol Corridor Rail) Project, which extends from Lowell, Massachusetts to Manchester, New Hampshire along an existing operational freight rail line. The wetlands that were delineated within the New Hampshire portion of the project are described in a separate report ("Part B"). Wetlands were delineated by GM2 Associates, Inc. (GM2) in April, May, and June 2021.

2.0 METHODOLOGY

The study limits for the Massachusetts portion of the wetland delineation included the area within approximately 100 feet on either side of the existing rail line from the MBTA Station in Lowell to the Massachusetts/New Hampshire state border (refer to Appendix A). The delineation was completed on April 20, 22, 23, 26, 27, and 28, 2021. The delineations were completed at the beginning of the growing season using early plant vegetation, soils, and hydrology. It was conducted during unusually dry conditions (moderate drought, according to US Drought Monitor). The wetland delineation was conducted by Jennifer Riordan (CWS #269) and Meg Gordon of GM2 Associates, Inc. (GM2). Wetlands were delineated in accordance with Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act (MassDEP, 1995), the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), and the applicable local wetland regulations. Individually-labeled flags were placed in the field to designate the wetland boundaries and the flags were located with a Trimble Geo7x GPS unit. In some locations, the bank of the Merrimack River was located with GPS, but individual flags were not placed in the field.

The table included in Appendix B provides a summary of the delineated wetland resources. Bordering vegetated wetland delineation field data forms were completed for each wetland community and are included in Appendix C.

Federal wetland classifications were assigned in accordance with *Classification of Wetlands and Deepwater Habitats of the United States* (Federal Geographic Data Committee, 2013). Wetland functional assessment was completed in accordance with the ACOE New England District Highway Methodology Workbook Supplement (1999). Wetland Functional Assessment forms were completed and are included in Appendix D.

3.0 EXISTING CONDITIONS

Current site conditions within the project corridor consist of an existing operational rail line, which currently handles only freight. The portion of the rail corridor from the Lowell station to near Stony Brook in Chelmsford is double-tracked. North of Stony Brook to the NH-MA border, the existing rail corridor is single-track. The portion of the rail line in Massachusetts is owned by MassDOT.

The corridor runs parallel to the Merrimack River and in many areas is located within 200 feet of the river bank. Within Lowell, the majority of the corridor is densely developed. In Chelmsford and Tyngsborough, the corridor is still well-developed, but there are pockets of undeveloped forested land, wetlands, and fields. The rail corridor crosses several rivers and streams in Massachusetts, including Black Brook, Stony Brook, Deep Brook, Bridge Meadow Brook, and Mill Brook. It also crosses the Pawtucket Canal twice in Lowell.

4.0 SUMMARY OF WETLAND RESOURCES

Wetland resources identified within the project study area include Bordering Vegetated Wetland (BVW), Bank, Land Under Water Bodies and Waterways (LUWW), Bordering Land Subject to Flooding (BLSF), and Riverfront Area. Of these resources, BVW and Bank have a 100-foot buffer zone.

4.1 Bordering Vegetated Wetland

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

BVWs within 100 feet of the existing rail line were delineated and GPS-located in the field. Individually labeled flags were placed in the field for each BVW.

4.2 Bank

As defined in 310 CMR 10.54(2), Bank is "the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a vegetated bordering wetland and adjacent floodplain, or, in the absence of these, it occurs between a waterbody and an upland." 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 is the "mean annual low flow level."

Banks within 100 feet of the existing rail line were delineated and GPS-located in the field. In some locations, the bank of the Merrimack River was located with GPS, but individual flags were not placed in the field.

4.3 Land Under Water Bodies and Waterways

As defined in 310 CMR 10.56(2), Land Under Water Bodies and Waterways (LUWW) is "the land beneath any creek, river, stream, pond or lake." The boundary of LUWW is the mean annual low water level.

LUWW was identified using available aerial photography and field observations/sketches and was not GPS-located in the field. If impacts to LUWW are proposed, these specific areas should be field verified and located with GPS.

4.4 Bordering Land Subject to Flooding

As defined in 310 CMR 10.57(2)(a)(3), Bordering Land Subject to Flooding (BLSF) is "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." The boundary of BLSF is "the estimated maximum lateral extent of flood water which would theoretically result from the statistical 100-year frequency storm."

BLSF within the project study area was identified using FEMA floodplain mapping. The extents of the 100-year floodplains located within the study area are shown on the maps in Appendix A. In general, BLSF or 100-year floodplains are associated with the Merrimack River and the larger perennial stream crossings. For the majority of the rail corridor in Massachusetts, the flood zone associated with the Merrimack River is located to the north or west of the rail line, however in some locations the floodplain crosses over the rail line. Several of the perennial stream crossings have associated 100-year floodplains that are mapped within the rail right-of-way, including the Pawtucket Canal, Black Brook, Stony Brook, Deep Brook, and Mill Brook.

4.5 Riverfront Area

Riverfront Area (RFA) is defined in 310 CMR 10.58(2) as "the area of land between a river's mean annual high water line and a parallel line measured horizontally." Rivers are defined as "any natural flowing body of water that empties to any ocean, lake, pond, or other river and which flows throughout the year." As defined in 310 CMR 10.58, the following criteria were used to identify streams within the study area that have an RFA:

- A river or stream that is shown as perennial on the current USGS map;
- A river or stream that is shown as intermittent or not shown on the current USGS map, with a watershed size greater than or equal to one square mile; and
- A stream shown as intermittent or not shown on the current USGS map, with a watershed size of at least 0.50 square miles and a predicted flow rate greater than or equal to 0.01 cubic feet per second at 99% flow duration using the USGS Stream Stats method;

In accordance with 310 CMR 10.58(2)(a)(1)(g), the human-made canals in Lowell do not have RFAs. Within Chelmsford and Tyngsborough, the RFA is 200 feet from the river's mean annual high water line. Within Lowell, the RFA is 25 feet from the mean annual high water line. RFA does not have a buffer zone.

Streams and rivers within the study area that have an RFA include:

- Black Brook
- Merrimack River
- Deep Brook

- Stony Brook
- Bridge Meadow Brook
- Mill Brook

4.6 Vernal Pool Habitat

Vernal pool habitat is defined in 310 CMR 10.04 as "confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, § 40 as specified in 310 CMR 10.02(1). These areas are essential breeding habitat, and provide other extremely important wildlife habitat functions during non breeding season as well, for a variety of amphibian species such as wood frog (*Rana sylvatica*) and the spotted salamander (*Ambystoma macultum*), and are important habitat for other wildlife species."

The Natural Heritage and Endangered Species Program (NHESP) Certified Vernal Pools and Potential Vernal Pools GIS layers were reviewed as part of the wetland delineation and are shown on the Wetland Delineation Maps in Appendix A. No Certified Vernal Pools are mapped within the study area. Three Potential Vernal Pools

are mapped near the rail line: two near Wetland CH3 and one in Bridge Meadow Brook (TY5). These areas were field reviewed in April 2021 and vernal pool indicator species were not observed. Although various wetlands within the study area are seasonally flooded and have the potential to provide vernal pool habitat, no vernal pool indicator species were observed during the wetland delineation field work in April 2021.

5.0 WETLAND RESOURCE DESCRIPTIONS

5.1 Lowell

5.1.1 Pawtucket Canal: Flag Series LO1, LO2, LO3, LO4, LO5, LO10, LO14

<u>Massachusetts Regulated Wetland Areas:</u> Bank, LUWW, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded, excavated (R2UBHx)

Flag series LO1, LO2, LO3, LO4, LO5, LO10, and LO14 correspond to the banks where the rail corridor crosses the Pawtucket Canal in the study area. The banks are human-made and consist of stone retaining walls. Flag series LO1, LO2, LO3, and LO4 are located at the Pawtucket Canal crossing at mile post 25.69, approximately 1,000 feet north of the Lowell MBTA Station. Flag series LO5, LO10, and LO14 are located at the Pawtucket Canal crossing at mile post 26.2 ("Red Bridge"), approximately 500 feet east of Walker Street. Each individual flag series number corresponds to a segment of the bank at each bridge quadrant with the exception of LO14, which crosses under the bridge on a lower retaining wall.



Wetland LO1 taken from LO2 (Pawtucket Canal Crossing at MP 25.69)

The banks of the Pawtucket Canal have a 100-foot buffer zone, but no Riverfront Area (in accordance with 310 CMR 10.58(2)(a)(1)(g)).

The banks consist of stone retaining walls and do not have much vegetation. Plant species observed at the tops of the retaining walls include sumac (*Rhus sp.*), garlic mustard (*Alliaria petiolata*), and box elder (*Acer negundo*).



Within the study area, the Pawtucket Canal does not provide any functions at a principal level since it is a constructed feature, has a high level of human disturbance, and is located in an urban area. It provides uniqueness/heritage functions at a lower level due to its historic significance in the region.

Wetland LO14 facing LO5 and LO10 (Pawtucket Canal Crossing at MP 26.2)

5.1.2 Black Brook: LO6 and LO9

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)

Flag series LO6 and LO9 correspond to the banks of Black Brook. They are located in Lowell at mile post 27.0, where Black Brook outlets into the Merrimack River. LO6 is located upstream of the rail line and LO9 is located downstream. Black Brook is a perennial stream that flows through a stone box culvert under the rail corridor. The banks have a 100-foot buffer zone and the stream has a 25-foot Riverfront Area.

Dominant vegetation along the banks includes multiflora rose (*Rosa multiflora*), river birch (*Betula nigra*), Japanese knotweed (*Reynoutria japonica*), speckled alder (*Alnus incana*), Asian bittersweet (*Celastrus orbiculatus*), and maple (*Acer sp.*). Beaver sign and a snapping turtle were observed during the field review.

Black Brook provides various functions and values including floodflow alteration, fish habitat, sediment retention, nutrient removal, shoreline stabilization, and wildlife habitat. All of these functions and values are provided at the principal level, except for fish habitat.



Wetland LO6 (Black Brook)



Wetland LO9 (Black Brook)

5.1.3 Wetlands LO7, LO11, LO12

Massachusetts Regulated Wetland Areas: BVW, 100-foot buffer zone

<u>Federal classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated (PFO1Ex); palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated (PSS1Ex); palustrine, unconsolidated bottom, permanently flooded, excavated (PUBHx)



Wetland LO7

Wetlands LO7, LO11, and LO12 are BVWs located east of Rourke Bridge between a developed area, a park, and the rail corridor. They are small, flat, and appear to be seasonally inundated.

Wetland LO7 is a swale extending approximately 600 feet between a commercial development and the rail line. It drains to a culvert at the eastern end and contained standing water at the time of the field review (April 2021). It is classified as PFO/SS1Ex. Dominant vegetation includes sensitive fern (*Onoclea sensibilis*), multiflora rose, and Asian bittersweet.

LO11 is a small man-made wetland located on the east side of the Rourke Bridge next to a recreational field. Portions of the wetland have a concrete bottom. The water drains to a culvert that appears to cross under the rail corridor and empties into the Merrimack River. It is classified as PSS1Ex. At the time of the field review (April 2021), there was little vegetation within the wetland. Asian bittersweet and a few unidentified shrubs were noted.

LO12 resides between LO7 and LO11 at the opposite end of the recreational field from LO11. It is classified as PUBHx. Dominant vegetation includes red maple (*Acer rubrum*), willow (*Salix*), unknown grasses, box elder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), and garlic mustard. Most of the vegetation is located around the edge of the wetland and the central portion had standing water at the time of the field review (April 2021).

Functions provided by LO7 and LO12 include floodflow alteration, nutrient removal, and wildlife habitat. None of these are considered principal functions. Wetland LO11 may provide some floodflow alteration, but this is at a lower level due to the narrow width of the wetland.



Wetland LO11



Wetland LO12

5.1.4 Merrimack River: LO8, LO13

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)



Flag series LO8 and LO13 correspond to the bank of the Merrimack River in Lowell and Chelmsford, where it is located within 100 feet of the rail line. LO8 begins approximately 2,000 feet east of Rourke Bridge and connects to LO13. LO13 continues into Chelmsford and ends at the bridge crossing of Stony Brook.

LO8 and LO13 both have a 100 foot Buffer Zone. Within Lowell, the Merrimack River has a 25 foot Riverfront Area. Within Chelmsford, the Riverfront Area is 200 feet.

LO8 (Merrimack River bank)

Dominant vegetation includes Asian bittersweet, locust (*Robinia sp.*), gray birch (*Betula populifolia*), speckled alder, poison ivy (*Toxicodendron radicans*), red maple, glossy buckthorn (*Frangula alnus*), and red oak (*Quercus rubra*). The banks are generally 10 to 15 feet tall. Seagulls, gray squirrel, and signs of beaver activity were observed along the river.

The Merrimack River and its bank provide many functions including groundwater recharge, floodflow alteration, fish habitat, production export, shoreline stabilization, wildlife habitat, recreation, uniqueness/heritage, visual quality, and endangered species habitat. Of these, groundwater recharge, fish habitat, production export, shoreline stabilization, wildlife habitat, uniqueness/heritage, and endangered species habitat are considered principal functions.



LO13 (Merrimack River bank)

5.2 Chelmsford

5.2.1 Merrimack River: CH1 and CH17

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, BVW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C); palustrine, scrub-shrub, broadleaved deciduous, seasonally flooded (PSS1C)

Flag series CH1 and CH17 correspond to the bank of the Merrimack River in Chelmsford, where it is located within 100 feet of the rail line. Flag series CH1 begins on the north side of Stony Brook and continues for approximately 500 feet. CH17 begins near mile post 30 and ends at the Chelmsford/Tyngsborough town line. CH17 also includes a small BVW located along the edge of the river, just south of the Chelmsford/Tyngsborough town line.

CH1 and CH17 have a 100-foot buffer zone. Within Chelmsford, the Merrimack River has a 200-foot Riverfront Area.

Dominant vegetation includes red maple, red oak, Asian bittersweet, glossy buckthorn, locust, gray birch, speckled alder, poison ivy, white pine (*Pinus strobus*), and Canadian mayflower (*Maianthemum canadense*). The BVW within CH17 has silky dogwood (*Cornus amomum*), sensitive fern, speckled alder, skunk cabbage (*Symplocarpus foetidus*), and areas with saturated soils.



The Merrimack River and its bank provide many functions including groundwater recharge, floodflow alteration, fish habitat, production export, shoreline stabilization, wildlife habitat, recreation, uniqueness/heritage, visual quality, and endangered species habitat. Of these, ground water recharge, fish habitat, production export, shoreline stabilization, wildlife habitat, uniqueness/heritage, and endangered species habitat are considered principal functions.

CH1 (Merrimack River bank)



CH17 (Merrimack River bank)

5.2.2 Wetlands CH2 and CH3

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E)

Wetlands CH2 and CH3 are located northwest of the railroad/Stony Brook crossing, between the rail line and the Merrimack River. Both are densely vegetated and contained standing water at the time of the field review (April 2021). Dominant vegetation includes silky dogwood, sensitive fern, arrowwood (*Viburnum recognitum*), slippery elm (*Ulmus rubra*), and duckweed in the water.

CH2 provides groundwater recharge, floodflow alteration, sediment retention, and wildlife habitat. None of these functions are provided at a principal level due to the small size of the wetland.

CH3 provides groundwater recharge, floodflow alteration, sediment retention, nutrient removal, and wildlife habitat. Floodflow alteration, sediment retention, and nutrient removal are performed at the principal level.



Wetland CH2

11



Wetland CH3

5.2.3 Wetlands CH4, CH6, CH7

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E); palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

Wetlands CH4, CH6, and CH7 are BVWs that are located east of Wotton Street in Chelmsford. CH4 is on the northern side of the rail line and CH6 and CH7 are on the southern side. CH6 had approximately 1 to 3 inches of standing water at the time of the delineation (April 2021). The track chart for the rail line shows a culvert near CH6 that appears to drain to Deep Brook and CH5, however this culvert was not located during the wetland delineation and may be buried. CH7 contains a culvert inlet that drains to the wetland from surrounding development. There does not appear to be a culvert under the rail line that connects CH7 to CH4. Both CH6 and CH7 are small wetlands. CH4 is part of a larger wetland system that is located adjacent to the Merrimack River.

Dominant vegetation within CH4 includes slippery elm, silky dogwood, quaking aspen, speckled alder, glossy buckthorn, purple loosestrife, and grape (*Vitis* sp.). CH4 provides various functions including floodflow alteration, sediment retention, nutrient removal, wildlife habitat, and uniqueness/heritage. Of these, sediment retention, nutrient removal, and wildlife habitat are performed at the principal level.

CH6 is primarily vegetated by silky dogwood, purple loosestrife, and various shrubs. It provides some nutrient removal and wildlife habitat, however these functions are limited by the small size of the wetland and lack of connection to other wetland systems. Wetland CH7 is predominately vegetated with common

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reed (*Phragmites australis*), silky dogwood, Asian bittersweet, and arrowwood. CH7 provides some sediment retention, nutrient removal, and wildlife habitat but none of these functions are provided at a principal level.

Wetland CH4



Wetland CH6



Wetland CH7

5.2.4 Wetland CH8

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh)



Wetland CH8

nutrient removal are considered principal functions.

Flag series CH8 is a BVW and small pond located southwest of the rail corridor, just west of Stony Brook. The edge is vegetated with silky dogwood, sensitive fern, catalpa (Catalpa speciosa), purple loosestrife, and poison ivy. Duckweed (Lemna minor) and pond-lily (Nuphar sp.) were noted in the ponded area.

Wetland CH8 provides groundwater recharge, floodflow alteration, sediment retention, nutrient removal, wildlife habitat, and uniqueness/heritage. Floodflow alteration, sediment retention, and

5.2.5 Stony Brook: CH9 and CH10

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E)



Wetland CH9

Flag series CH9 and CH10 correspond to the banks of Stony Brook. CH9 also includes a BVW located adjacent to Stony Brook on the southwest side of the rail corridor. Both areas are located approximately 2,300 feet southeast of Wotton Street. The banks are vegetated with red oak and maple. The BVW within CH9 is vegetated with red maple, silky dogwood, and sedges (Carex sp.). Stony Brook has a 200-foot Riverfront Area. Its adjacent banks and BVW have a 100foot buffer zone.

CH9 and CH10 provide various functions including

groundwater recharge, floodflow alteration, fish habitat, sediment retention, shoreline stabilization, wildlife habitat, and uniqueness/heritage. Of these, floodflow alteration and fish habitat are performed at the principal level. CH9 also performs nutrient removal and sediment retention at the principal level whereas CH10 does not provide nutrient removal and doesn't provide sediment retention at the principal level. This is because CH10 is a small bank with no wetland edge to retain water.



Stony Brook and CH9



Stony Brook bank (CH10)

5.2.6 Wetlands CH11 and CH12

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated (PSS1Ex); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated (PFO1Ex)



Wetland CH11



Wetland CH12

Wetlands CH11 and CH12 are located on the northern side of the rail line just west of Wotton Street, near Deep Brook. They are both narrow, excavated swales. CH11 drains east into Deep Brook. CH12 does not appear to have a direct hydrologic connection to Deep Brook or other wetland resources.

CH11 and CH12 both have a 100-foot Buffer Zone.
Dominant vegetation includes silky dogwood, grape, and honeysuckle (*Lonicera japonica*).

Functions provided by CH11 and CH12 include floodflow alteration, sediment retention, nutrient removal, and wildlife habitat. Of these, only sediment retention is considered a principal function.

5.2.7 Wetland CH13

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)



Wetland CH13

CH13 is located approximately 500 feet southeast of Wellman Avenue and south of the rail corridor in Chelmsford. It has a 100 foot Buffer Zone. Dominant vegetation includes red maple, silky dogwood, glossy buckthorn, sensitive fern, and jewelweed. At the time of the field review (April 2021) the wetland had little herbaceous cover. CH13 appears to be isolated and doesn't have hydrologic connections to other wetland resources.

Wetland CH13 provides floodflow alteration and wildlife habitat functions. Neither are considered

principal functions due to the small size of the wetland and adjacent development.

5.2.8 Deep Brook: CH5, CH14, CH15

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, BVW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E); palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh); palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E)

Flag series CH5, CH14, and CH15 correspond to banks and BVWs associated with Deep Brook. CH5 is located on the northeast side of Wotton Street while CH14 and CH15 are on the southwest side. CH5 and CH14 include scrub-shrub/emergent BVWs and the banks of Deep Brook. CH15 includes only bank. Deep Brook has a 200-foot Riverfront Area. Its adjacent banks and BVW have a 100-foot buffer zone.

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The western end of CH5 contains a concrete retaining wall and 2 culvert pipe inlets. Dominant vegetation for CH5 includes silky dogwood, jewelweed, autumn olive (Elaeagnus umbellata), oak, Asian bittersweet, and honeysuckle. CH5 provides various functions including floodflow alteration, sediment retention, nutrient removal, shoreline stabilization, wildlife habitat, and uniqueness/heritage. The functions performed at the principal level are sediment retention, nutrient removal, and wildlife habitat.

Wetland CH5



Wetland CH14

CH14 is primarily vegetated with common reed. It contains areas with shallow open water, as well as shrub areas along the edge. CH14 provides the same functions at the same levels as CH5, including floodflow alteration, sediment retention, nutrient removal, shoreline stabilization, wildlife habitat, and uniqueness/heritage. Sediment retention, nutrient removal, and wildlife habitat are provided at a principal level.

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CH15 corresponds to the bank of Deep Brook located near Wotton Street. It is vegetated with silky dogwood and honeysuckle. The only function provided by CH15 is shoreline stabilization. This is provided at a lower level due to the steep bank, location next to the road, and lack of dense vegetation.

Wetland CH15

5.2.9 Wetland CH16

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, emergent, persistent, seasonally flooded (PEM1C); palustrine, forested, broad-leaved deciduous, seasonally flooded (PFO1C)

CH16 is located at mile post 29.87, approximately 1,400 feet northwest of Wellman Avenue. It has a 100-foot buffer zone. CH16 is associated with the Merrimack River and appears to be periodically flooded. At the time of the field review (April 2021) there was several inches of standing water in the wetland. Dominant vegetation includes red maple, gray birch, silky dogwood, speckled alder, and sensitive fern.

The functions CH16 provides include floodflow alteration, sediment retention, nutrient removal, wildlife habitat, and endangered species habitat. Of these, sediment retention and endangered species habitat are considered principal functions. Portions of CH16 are located within mapped Priority Habitat and Estimated Habitat.



Wetland CH16

5.3 Tyngsborough

5.3.1 Merrimack River: TY1 and TY6

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)

Flag series TY1 and TY6 correspond to the bank of the Merrimack River in Tyngsborough, where it is located within 100 feet of the rail line. TY1 begins approximately 1,200 feet north of the Chelmsford/Tyngsborough town line and ends near mile post 33. TY6 starts approximately 550 feet east of Mill Brook and ends at the NH/MA state border. TY1 and TY6 have a 100-foot buffer zone. Within Tyngsborough, the Merrimack River has a 200-foot Riverfront Area

Dominant vegetation within TY1 and TY6 includes American beech, red oak, white pine, speckled alder, Canada mayflower, Asian bittersweet, honeysuckle, and barberry. A section of TY1 located south of the Tyngsborough Bridge (MA Route 113) consists of a stone retaining wall.

The Merrimack River and its bank at TY1 and TY6 provide many functions including groundwater recharge, floodflow alteration, fish habitat, production export, shoreline stabilization, wildlife habitat, recreation, uniqueness/heritage, visual quality, and endangered species habitat. Of these, ground water recharge, fish habitat, production export, shoreline stabilization, wildlife habitat, uniqueness/heritage, and endangered species habitat are considered principal functions.



TY1 (Merrimack River bank)



TY6 (Merrimack River bank)

5.3.2 Wetland TY2

<u>Massachusetts Regulated Wetland Areas</u>: Unregulated drainage channel <u>Federal classification</u>: palustrine, emergent, persistent, seasonally flooded/saturated, excavated (PEM1Ex)

Flag series TY2 is an excavated drainage channel located approximately 2,000 feet southeast of Westford Road at mile post 31.76. There is stone riprap on the banks. At the time of the field review (April 2021), vegetation was relatively sparse and consisted of Asian bittersweet at the edge and purple loosestrife (*Lythrum salicaria*) in the channel. Due to a lack of vegetation and limited natural substrate, TY2 has been classified as an unregulated drainage channel rather than a stream or BVW.

TY2 does not provide any functions due to its small size and limited vegetation. It is located within mapped Priority and Estimated Habitats, however it doesn't appear that this wetland resource contains habitat that would be utilized by the listed species (bald eagle and riverine clubtail).



Flag Series TY2

5.3.3 Wetland TY3

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

Wetland TY3 is a BVW located approximately 1,000 feet north of MA Route 113 in Tyngsborough on the western side of the rail corridor. The wetland is predominantly vegetated with red maple and skunk cabbage. The wetland had saturated soils at the time of the field review and appears to form from a hillside seep. The wetland does not have an outlet and is not directly connected to other wetland resources.

The functions Wetland TY3 provides include groundwater recharge, floodflow alteration, wildlife habitat, and endangered species habitat. Of these, groundwater recharge and endangered species habitat are considered principal functions. TY3 is primarily fed by groundwater discharge. It is located within mapped Priority Habitat and Estimated Habitat.



Wetland TY3

5.3.4 Intermittent Stream and BVW (TY4) and Bridge Meadow Brook (TY5)

<u>Massachusetts Regulated Wetland Areas</u>: Bank, BVW, LUWW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E); riverine, intermittent, streambed (R4SB); riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh)

Flag series TY4 and TY5 correspond to the banks of an intermittent stream and a perennial stream (Bridge Meadow Brook), respectively. They are both located approximately 700 feet north of MA Route 113 on the western side of the rail corridor. TY4 flows from the north whereas TY5 flows from the south. The intermittent stream in TY4 flows into Bridge Meadow Brook (TY5) just upstream of the rail corridor. Bridge Meadow Brook then flows through a culvert under the rail corridor into the Merrimack River. Bridge Meadow Brook has a 200-foot Riverfront Area. Its adjacent banks and BVW, and the banks of TY4, have a 100-foot buffer zone.

The intermittent stream in TY4 contained approximately 1 to 3 inches of flowing water at the time of the field review (April 2021). The substrate consists of sand and muck, with bedrock located upstream of the study area. A small BVW borders the stream. The stream banks and BVW are vegetated with red maple, creeping-jenny (*Lysimachia nummularia*), jewelweed (*Impatiens capensis*), and skunk cabbage. The functions



Wetland TY4

provided by TY4 include floodflow alteration, shoreline stabilization, wildlife habitat, and endangered species habitat. Of these, shoreline stabilization and endangered species habitat are considered principal functions. TY4 is located within mapped Priority Habitat and Estimated Habitat.

TY5 (Bridge Meadow Brook) includes both a perennial stream channel and an impounded area with standing water. Flag series TY5 corresponds to the delineated bank, which ranges from 3 to 15 feet in height. The substrate includes a mix of

cobbles and sand. The bank is predominantly vegetated with honeysuckle, multiflora rose, Asian bittersweet, maple, barberry (*Berberis thunbergii*), and burning bush (*Euonymus alatus*). Similar to TY4, TY5 performs sediment retention, shoreline stabilization, and endangered species habitat at the principal level. TY5 also provides floodflow alteration, fish habitat, nutrient removal, and wildlife habitat.



Wetland TY5

5.3.5 Mill Brook: TY7

<u>Massachusetts Regulated Wetland Areas</u>: Bank, LUWW, Riverfront Area, 100-foot buffer zone <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh)



Mill Brook (TY7)

BVW has a 100-foot buffer zone.

Flag series TY7 represents the outlet of Mill Brook just before it crosses under the rail corridor and empties into the Merrimack River. Mill Brook is located approximately 2,700 feet south of the NH/MA state border, west of the railroad. It is vegetated with fringed loosestrife (Lysimachia ciliata), red maple, silky dogwood, honeysuckle, and Asian bittersweet. The stream contains standing water and not much flow was observed. The stone culvert under the railroad is undersized and appears to restrict flow into the Merrimack River. Mill Brook has a 200-foot Riverfront Area. Its adjacent

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Functions provided by Mill Brook include floodflow alteration, fish habitat, sediment retention, nutrient removal, shoreline stabilization, and wildlife habitat. All but fish habitat are provided at the principal level.

Mill Brook (TY7) culvert under railroad

5.3.6 Wetland TY8

<u>Massachusetts Regulated Wetland Areas</u>: BVW, 100-foot buffer zone <u>Federal classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated (PFO1Ex)

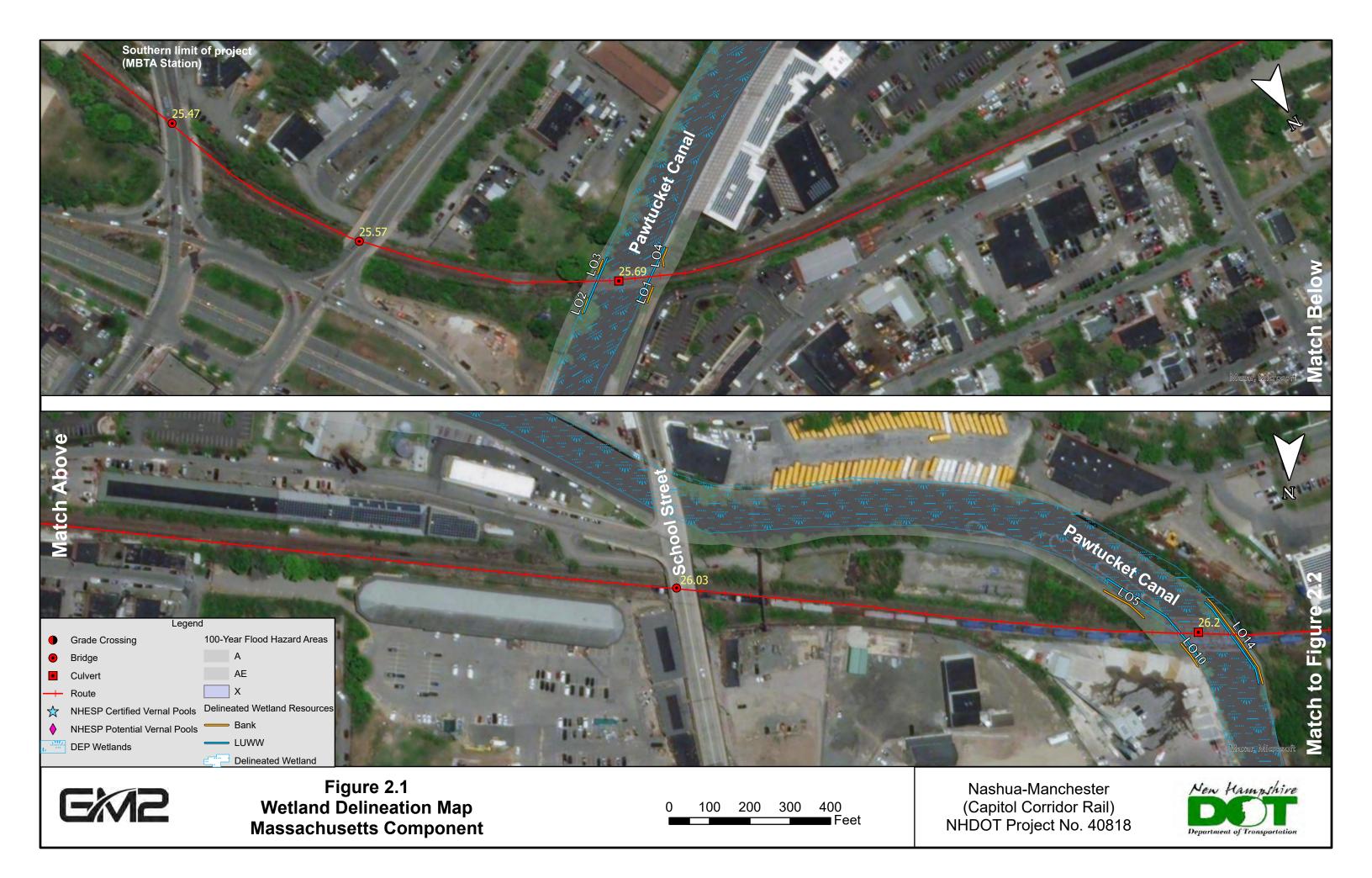


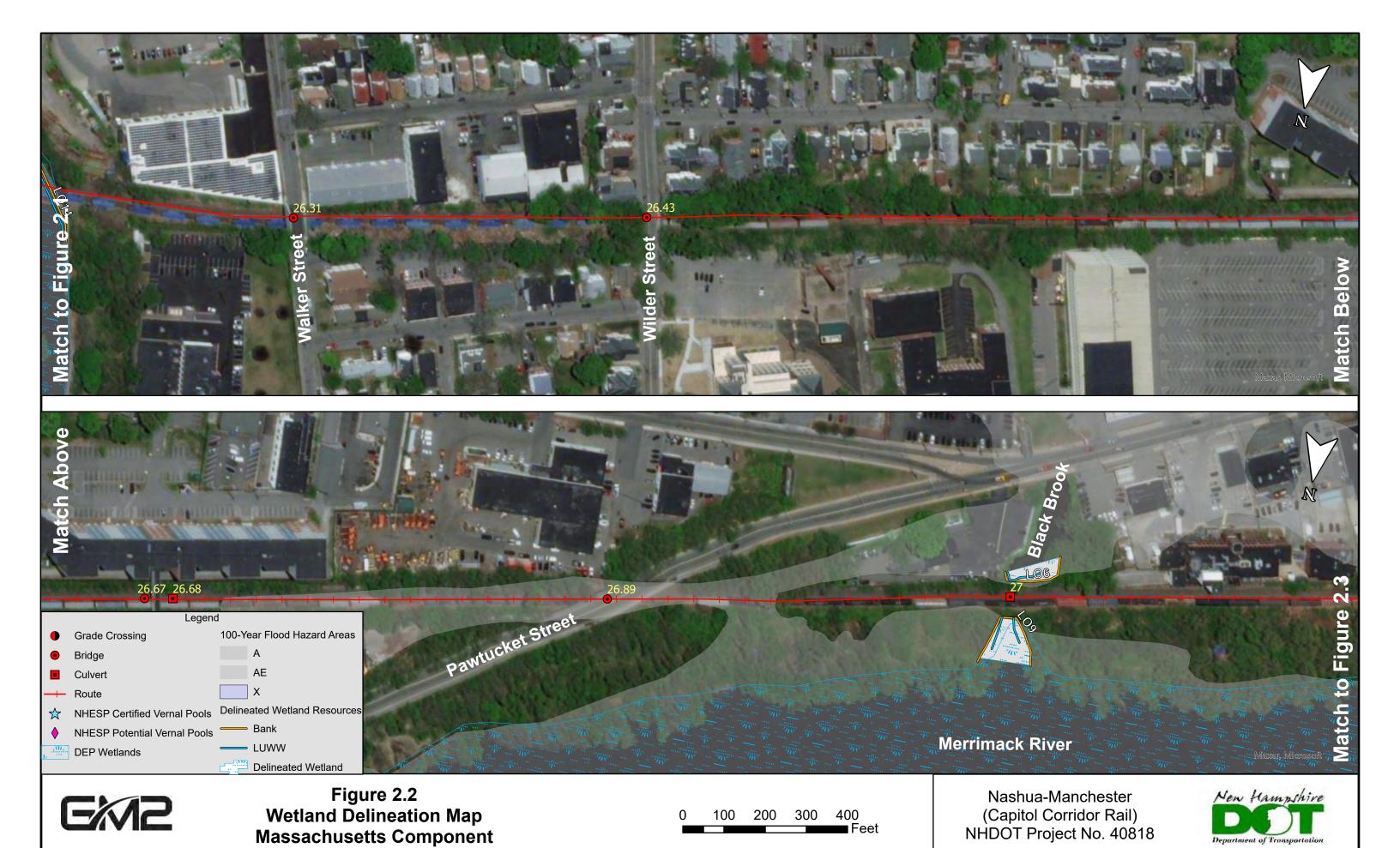
Wetland TY8

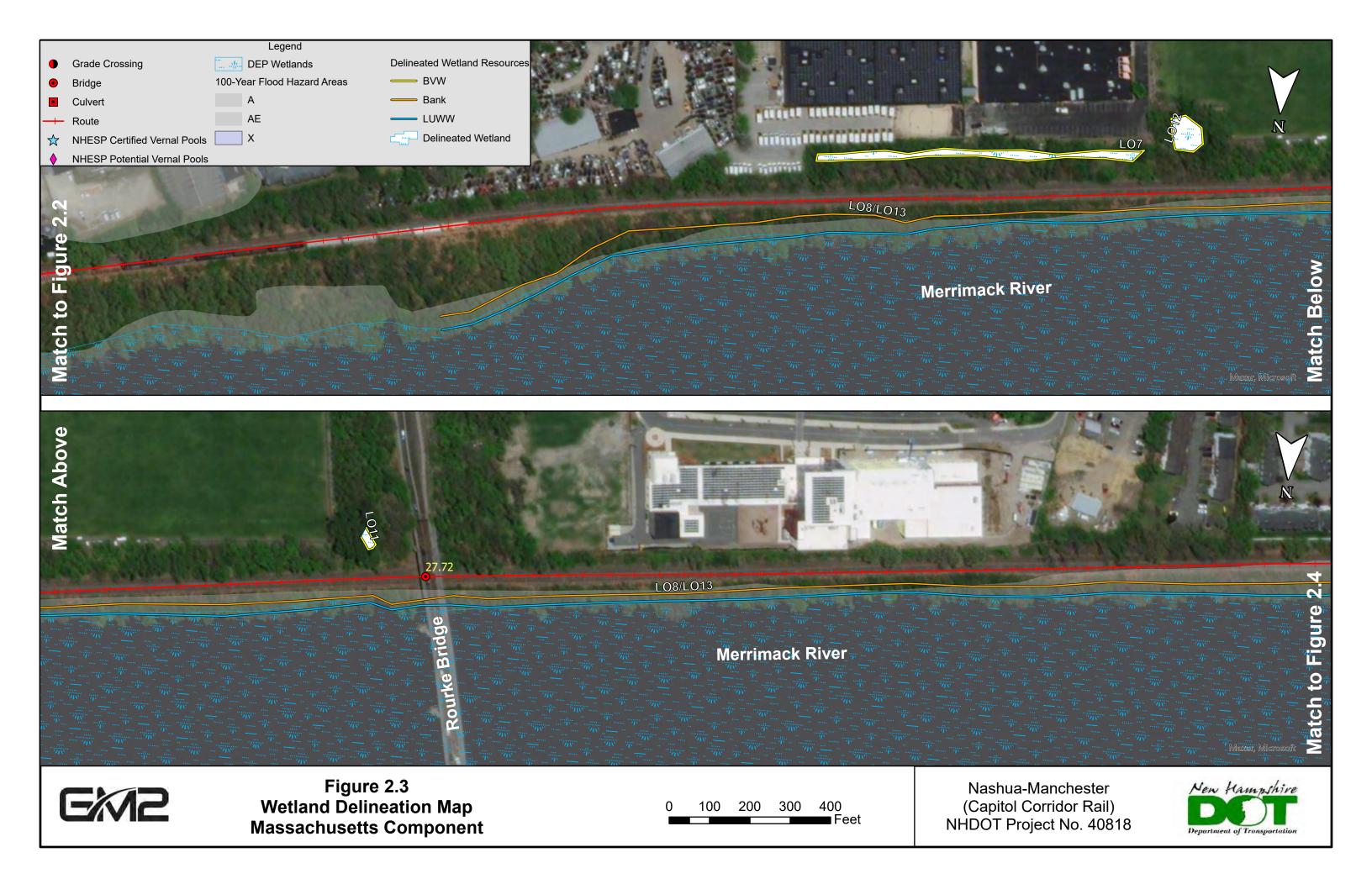
Wetland TY8 is a narrow BVW located approximately 3,700 feet north of the Chelmsford/Tyngsborough town line between a commercial development and the rail line. There are culverts at either end of the wetland, which is located in an excavated swale. It is vegetated with red maple, green ash, sedges (Carex sp.), and goldenrod (Solidago sp.). The functions performed by TY8 include floodflow alteration, sediment retention, nutrient removal, and endangered species habitat. None of these are provided at a principal level.

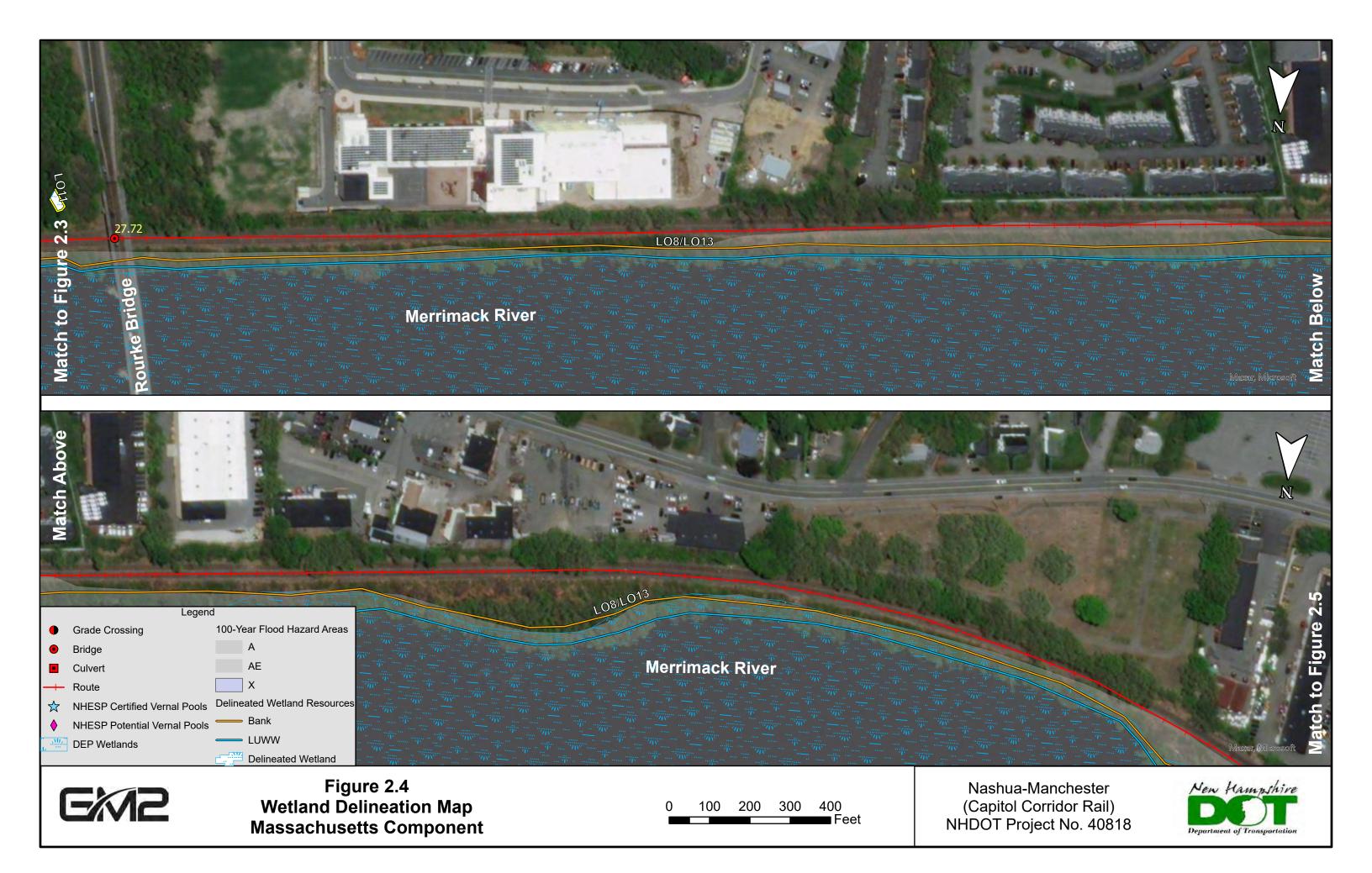
APPENDIX A

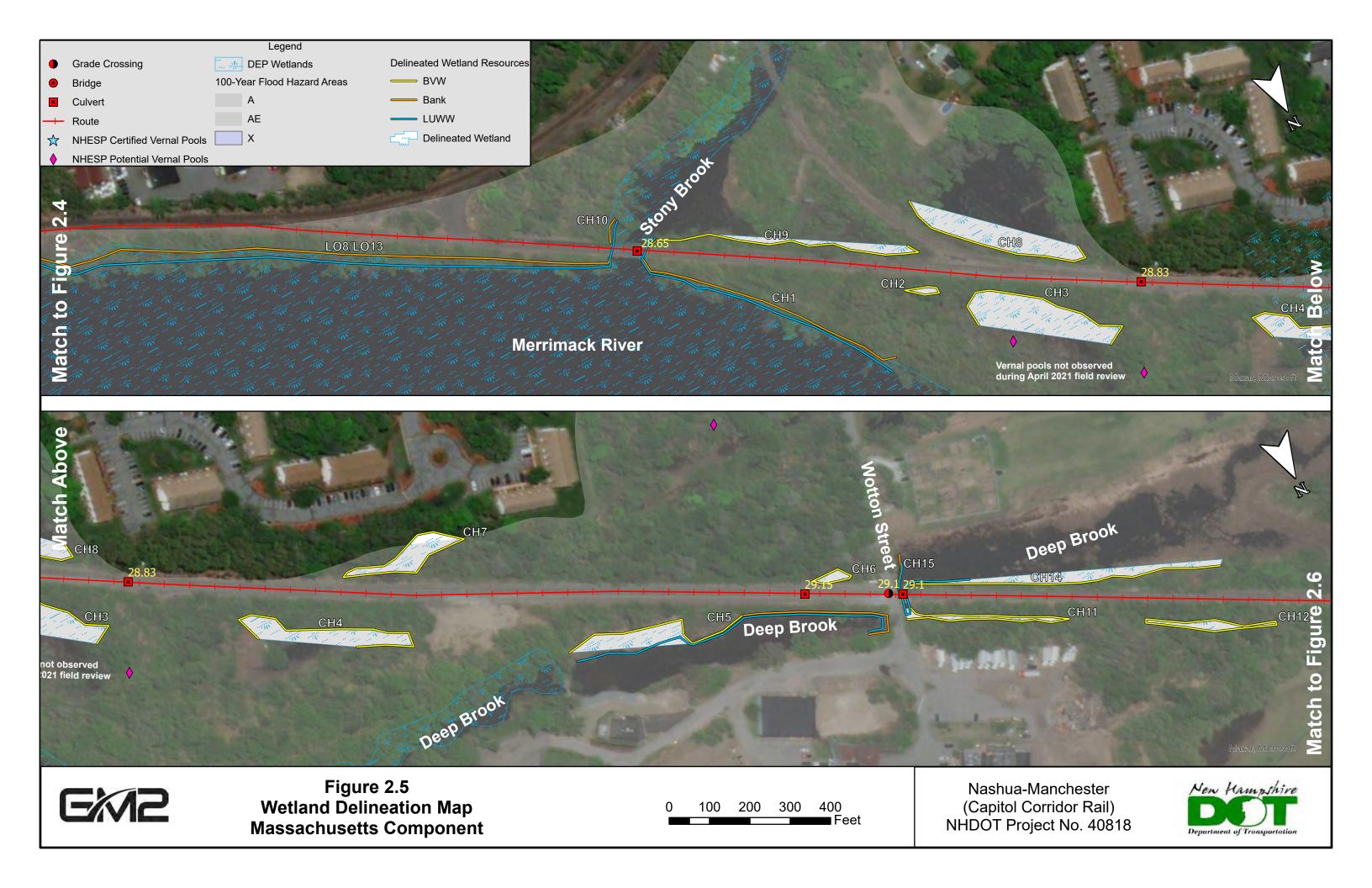
Figures

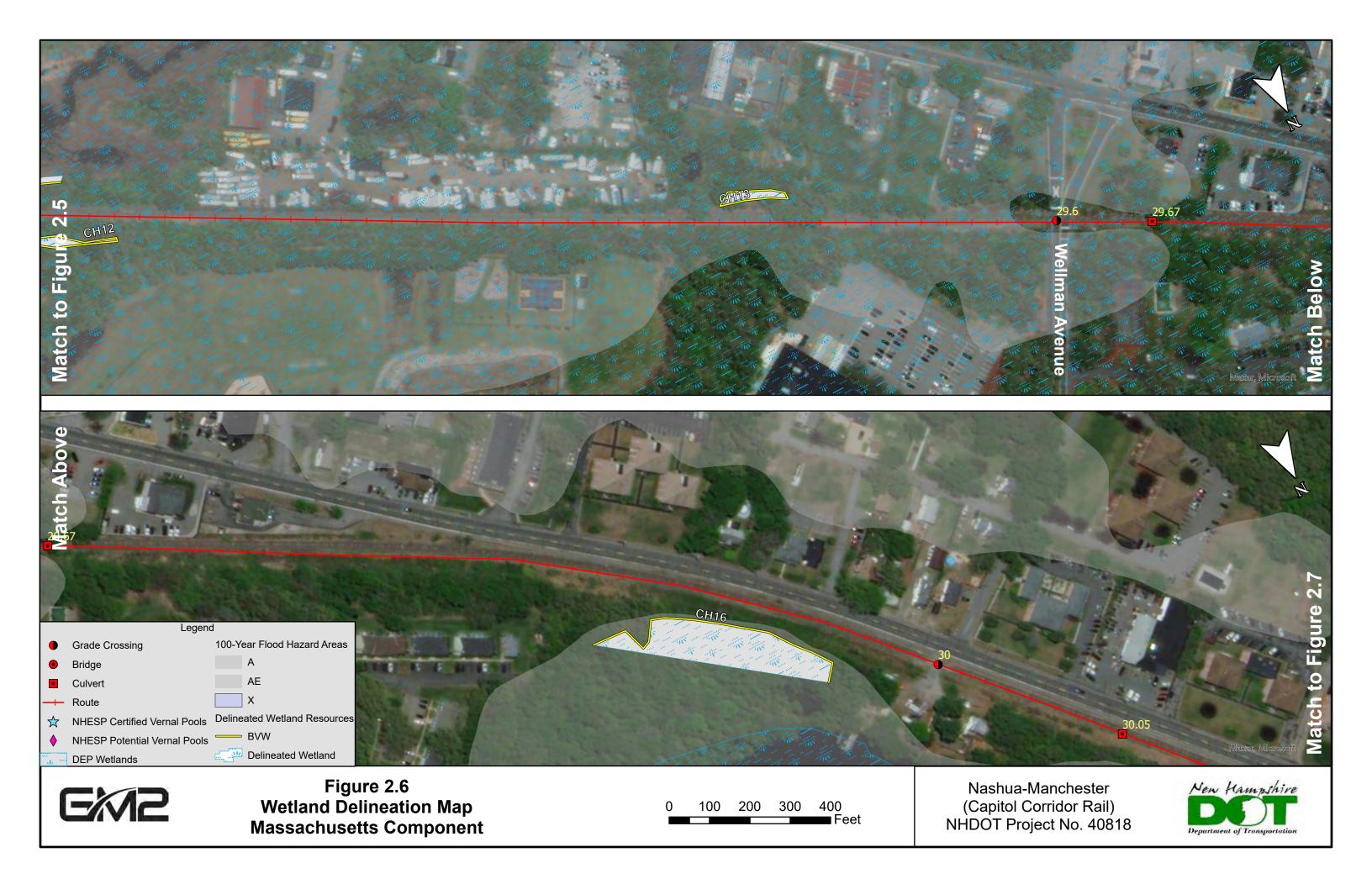


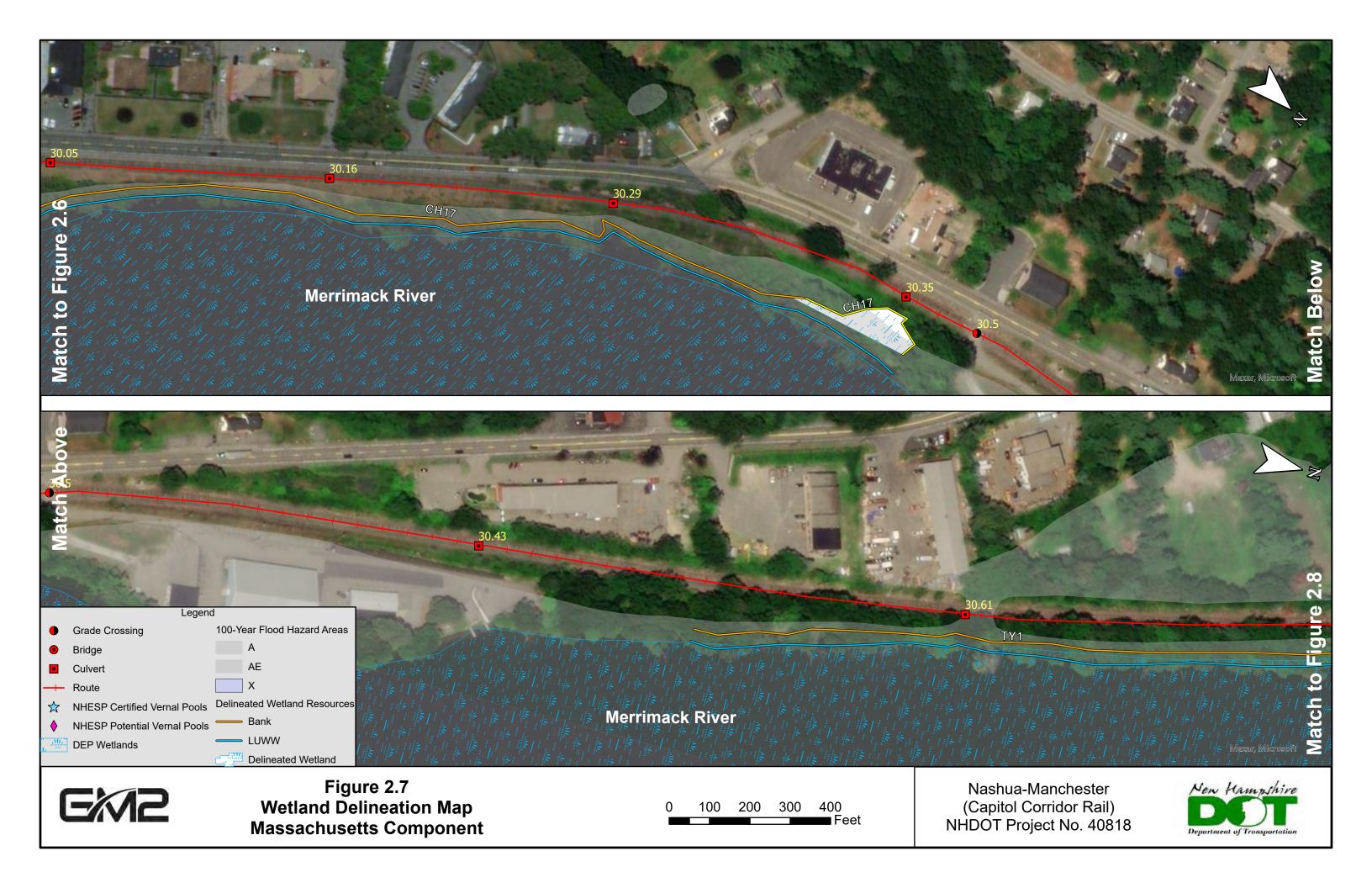


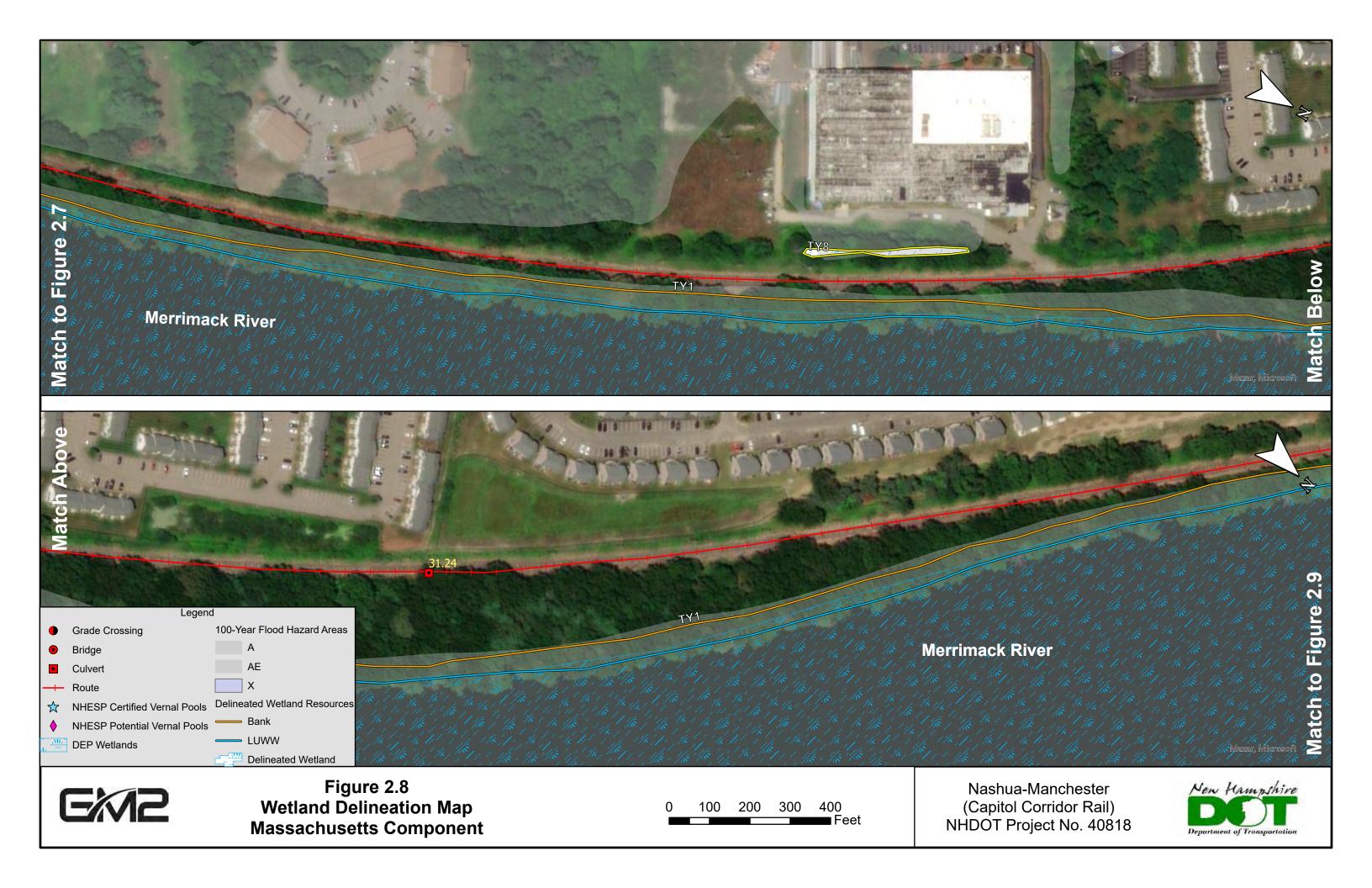


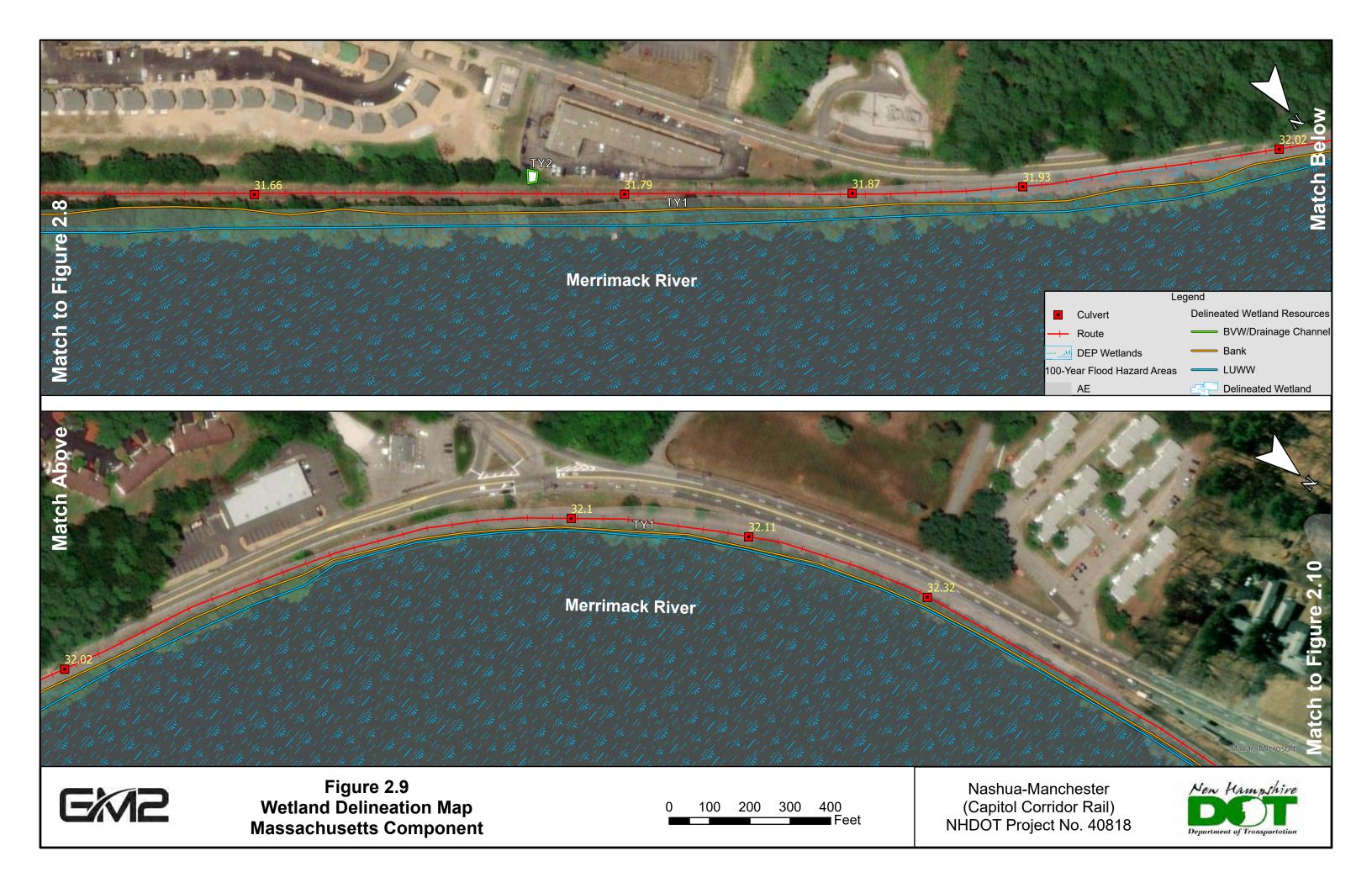


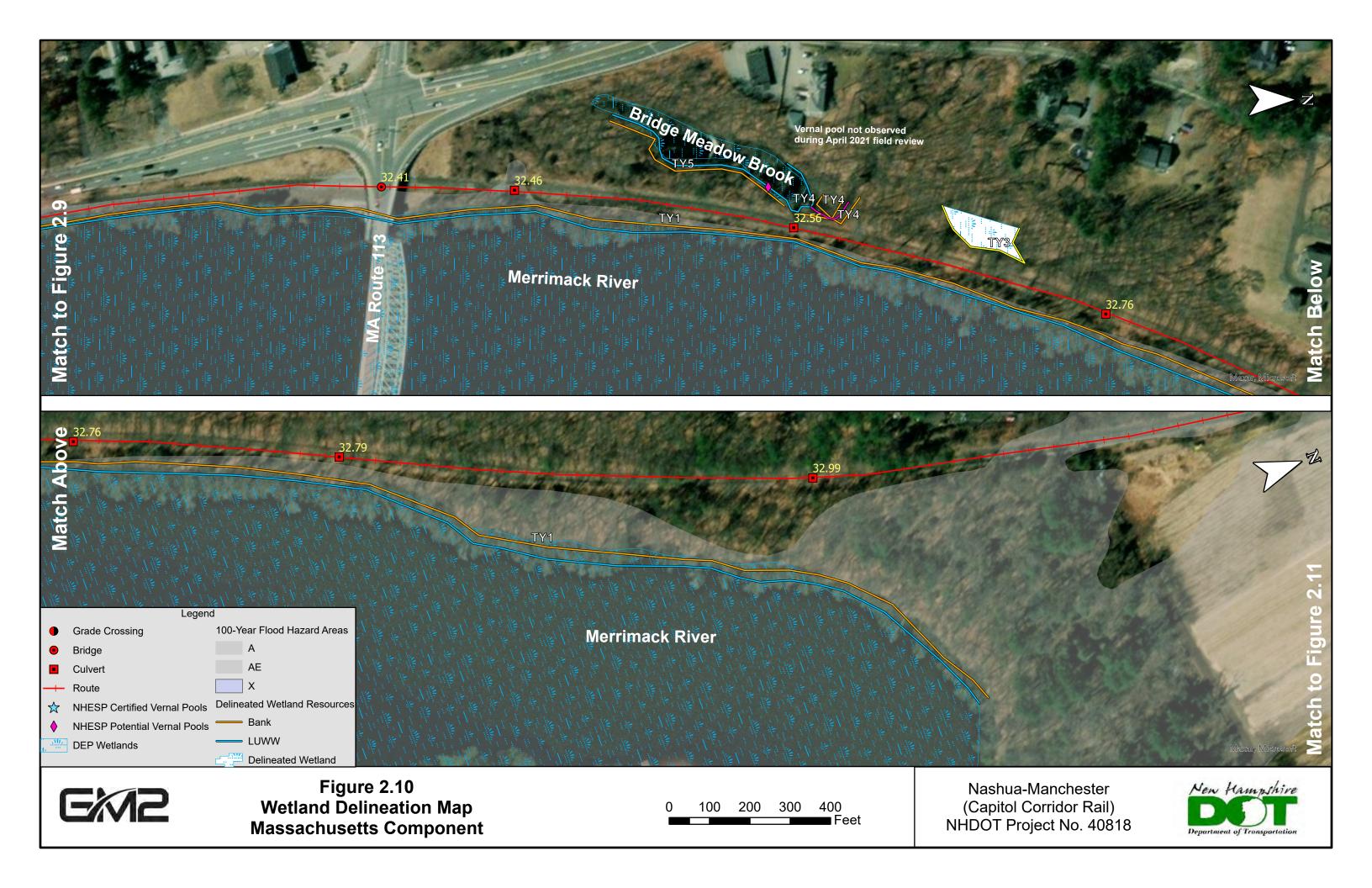


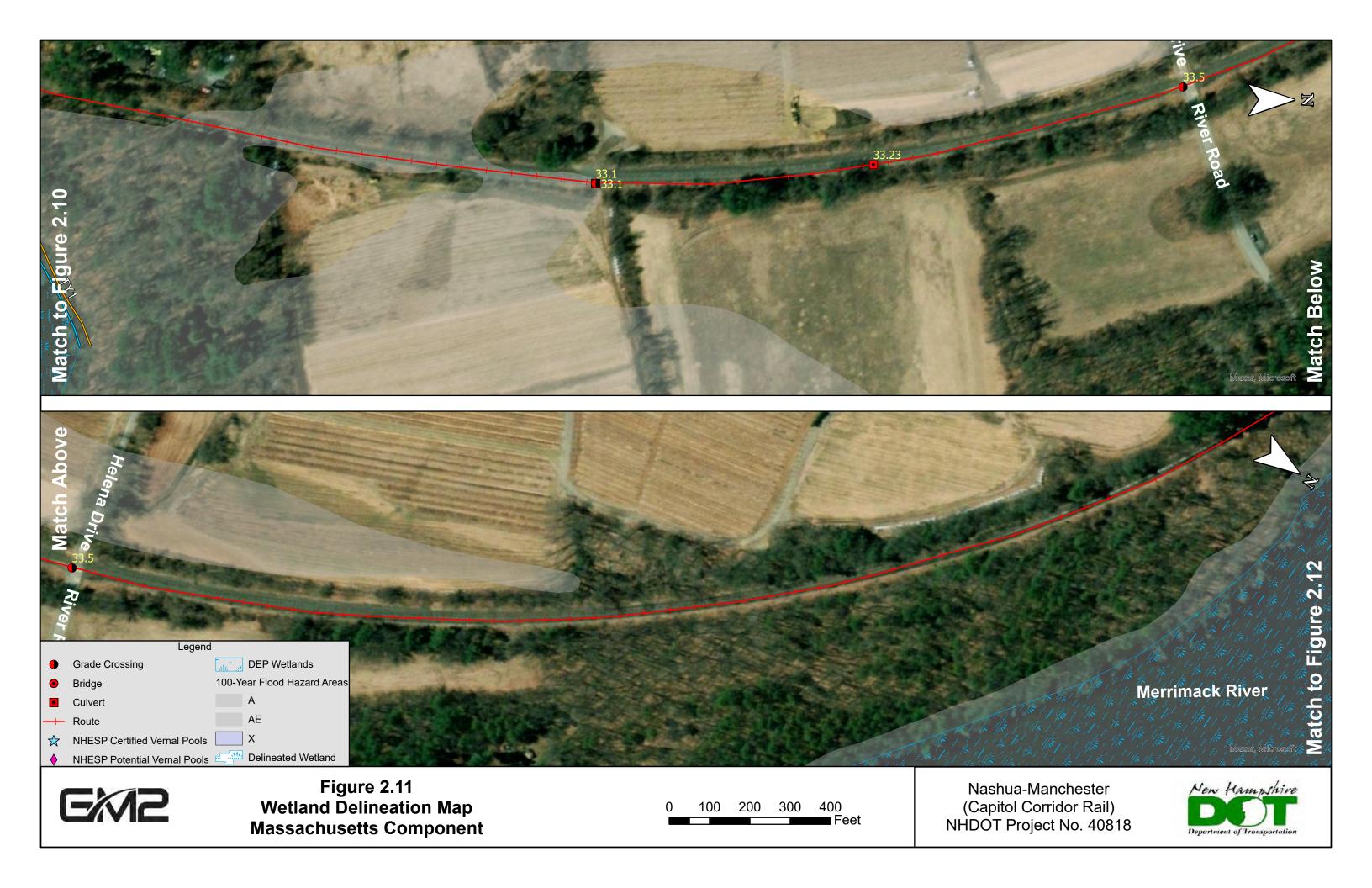


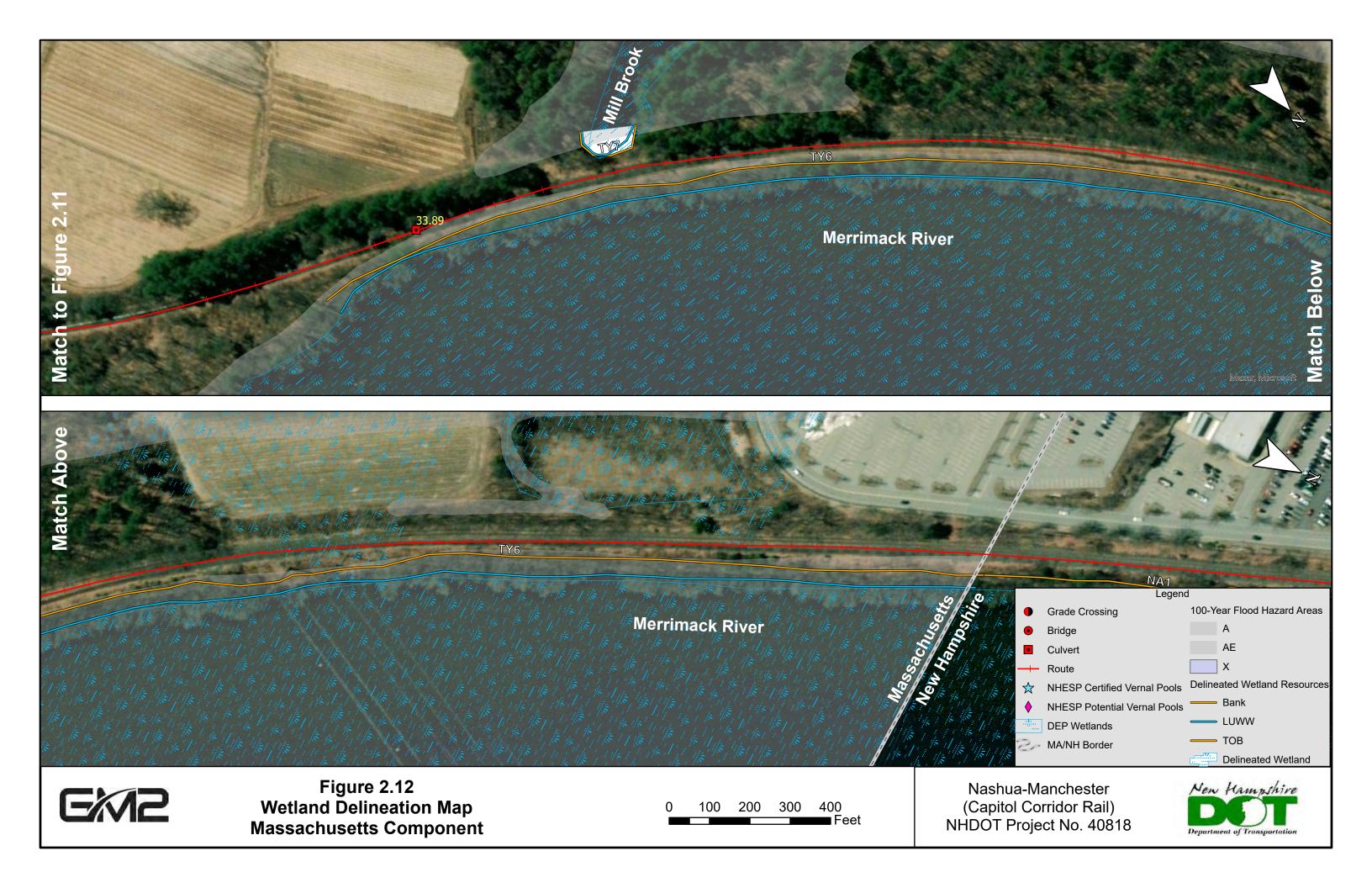












APPENDIX B

Wetland Summary Table

WETLAND SUMMARY TABLE - MASSACHUSETTS

Flag Series	Description	Location	Municipality	Classification	100' Buffer		Functions/Values ¹											
		(Approximate Mile Post and distance to nearest landmark)			Zone / Riverfront Area	GW Recharge	Floodflow Alteration	Fish Habitat	Sediment Retention	Nutrient Removal	Production Export	Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality	Endangered Species Habitat
LO1	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO2	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO3	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO4	Pawtucket Canal (Bank, LUWW)	MP 25.69 (400 ft. west of Thorndike Street)	Lowell	R2UBHx	100'Buffer Zone											Х		
LO5	Pawtucket Canal (Bank, LUWW)	MP 26.20 (500 ft. east of Walker Street)	Lowell	R2UBHx	100'Buffer Zone											Х		
LO6	Black Brook (Bank, LUWW)	MP 27.0 (650 ft. west of Pawtucket Street)	Lowell	R2UBH	100' Buffer Zone 25' RFA		Р	Х	Р	Р		Р	Р					
LO7	Wetland Swale (BVW)	MP 27.4 (1,000 ft. east of Rourke Bridge)	Lowell	PFO/SS1Ex	100' Buffer Zone		Х			Х			Х					
LO8	Merrimack River (Bank, LUWW)	Approx. MP 27.3 to MP 28.65 (starts 2,000 ft. east of Rourke Bridge and ends at Stony Brook)	Lowell	R2UBH	100' Buffer Zone 25' RFA	Р	Х	Р			Р	Р	Р	Х		Р	Х	Р
LO9	Black Brook (Bank, LUWW)	MP 27.00 (700 ft. west of Pawtucket Street)	Lowell	R2UBH	100' Buffer Zone 25' RFA		Р	Х	Р	Р		Р	Р					
LO10	Pawtucket Canal (Bank, LUWW)	MP 26.20 (600ft east of Walker Street)	Lowell	R2UBHx	100' Buffer Zone											Х		
LO11	BVW	MP 27.7 (East side of Rourke Bridge)	Lowell	PSS1Ex	100' Buffer Zone		Х											
LO12	BVW	MP 27.5 (800 ft. east of Rourke Bridge)	Lowell	PUBHx	100' Buffer Zone		Х			Х			Х					
LO13	Merrimack River (Bank, LUWW)	MP 27.3 to MP 28.65 (Starts east of Rourke Bridge and ends at Stony Brook)	Lowell and Chelmsford	R2UBH	100' Buffer Zone 25' RFA (in Lowell) 200' RFA (in Chelmsford)	Р	Х	P			Р	Р	P	Х		Р	Х	P
LO14	Pawtucket Canal (Bank, LUWW)	MP 26.20 (500ft. east of Walker Street)	Lowell	R2UBHx	100' Buffer Zone											Х		

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Flag	Description	Location (Approximate Mile Post and distance to nearest landmark)	Municipality	Classification	100' Buffer	Functions/Values ¹												
Series					Zone / Riverfront Area	GW Recharge	Floodflow Alteration	Fish Habitat	Sediment Retention	Nutrient Removal	Production Export	Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality	Endangered Species Habitat
CH1	Merrimack River (Bank, LUWW)	MP 28.65 (2,000 ft. southeast of Wotton Street)	Chelmsford	R2UBH	100' Buffer Zone 200' RFA	Р	Х	Р			Р	Р	Р	Х		Р	Х	Р
CH2	BVW	MP 28.70 (Northwest of Stony Brook crossing)	Chelmsford	PSS1E	100' Buffer Zone	Х	Х		Х				Х					
CH3	BVW	Approx. MP 28 (Northwest of Stony Brook crossing)	Chelmsford	PSS1E	100' Buffer Zone	Х	Р		Р	Р			Х					
CH4	BVW	MP 28.9 (1,000 ft. southeast of Wotton Street)	Chelmsford	PSS1E	100' Buffer Zone		Х		Р	Р			Р			Х		
CH5	Deep Brook (Bank and LUWW) and BVW	MP 29.1 (East side of Wotton Street)	Chelmsford	R2UBH, PSS1E, PUBHh	100' Buffer Zone 200' RFA		Х		Р	Р		Х	Р			Х		
CH6	BVW	MP 29.1 (100 ft. east of Wotton Street)	Chelmsford	PSS1E	100' Buffer Zone					Х			Х					
CH7	BVW	MP 28.9 (900 ft. southeast of Wotton Street)	Chelmsford	PEM1E/PFO1E	100' Buffer Zone				Х	Х			Х					
CH8	BVW	MP 28.7 (North of Stony Brook crossing)	Chelmsford	PUBHh	100' Buffer Zone	Х	Р		Р	Р			Х			Х		
CH9	BVW and Stony Brook (Bank, LUWW)	MP 28.65 (2,300 ft. southeast of Wotton Street)	Chelmsford	PSS1E, R2UBH	100' Buffer Zone 200' RFA	Х	Р	Р	Р	Р		Х	Х			Х		
CH10	Stony Brook (Bank, LUWW)	MP 28.65 (2,300 ft. southeast of Wotton Street)	Chelmsford	R2UBH	100' Buffer Zone 200' RFA	Х	Р	Р	Х			Х	Х			Х		
CH11	Wetland Swale (BVW)	MP 29.10 (Bordering the north side of Wotton Street)	Chelmsford	PSS1Ex	100' Buffer Zone		Х		Р	Х			Х					
CH12	Wetland Swale (BVW)	MP 29.2 (500 ft. northwest of Wotton Street)	Chelmsford	PFO1Ex	100' Buffer Zone		Х		Р	Х			Х					
CH13	BVW	MP 29.5 (500 ft. east of Wellman Ave.)	Chelmsford	PFO1E	100' Buffer Zone		Х						Х					
CH14	BVW and Deep Brook (Bank, LUWW)	MP 29.10 (Just north of Wotton Street)	Chelmsford	PEM1E, PSS1E, R2UBH, PUBHh	100' Buffer Zone 200' RFA		Х		Р	Р		Х	Р			Х		
CH15	Deep Brook (Bank, LUWW)	MP 29.10 (Adjacent to Wotton Street)	Chelmsford	R2UBH	100' Buffer Zone 200' RFA							Х						

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Nashua-Manchester 40818 Capitol Corridor Rail - DRAFT

Flag	Description	Location	Municipality	Classification	100' Buffer	Functions/Values ¹												
Series		(Approximate Mile Post and distance to nearest landmark)			Zone / Riverfront Area	GW Recharge	Floodflow Alteration	Fish Habitat	Sediment Retention	Nutrient Removal	Production Export	Shoreline Stabilization	Wildlife Habitat	Recreation	Educational Value	Uniqueness/ Heritage	Visual Quality	Endangered Species Habitat
CH16	BVW	MP 29.87 (1,400 ft. northwest of Wellman Ave.)	Chelmsford	PEM1C, PFO1C	100' Buffer Zone		Х		Р	Х			Х					Р
CH17	Merrimack River (Bank, LUWW, and BVW)	MP 30.05 to MP 30.4 (Across the Merrimack River from Vesper Country Club	Chelmsford	R2UBH, PFO1C, PSS1C	100' Buffer Zone 200' RFA	P	Х	Р			Р	Р	Р	Х		Р	Х	Р
TY1	Merrimack River (Bank, LUWW)	MP 30.5 to MP 33 (Starts north of Chelmsford/Tynsborough Line; ends 3,000 ft. north NH Route 113)	Tyngsborough	R2UBH	100' Buffer Zone 200' RFA	Р	Х	P			Р	Р	Р	Х		Р	Х	Р
TY2	Excavated Drainage Channel	MP 31.76 (2,000 ft. southeast of Westford Road)	Tyngsborough	PEM1Ex	100' Buffer Zone													
TY3	BVW	MP 32.6 (1,000 ft. north of NH Route 113)	Tyngsborough	PFO1E	100' Buffer Zone	Р	Х						Х					Р
TY4	Intermittent Stream (Bank) and BVW	MP 32.56 (800 ft. north of NH Route 113)	Tyngsborough	PFO1E, R4SB	100' Buffer Zone		Х					Р	Х					Р
TY5	Bridge Meadow Brook (Bank, LUWW)	MP 32.5 (600 ft. north of NH Route 113)	Tyngsborough	R2UBH or PUBHh	100' Buffer Zone 200' RFA		Х	Х	Р	Х		Р	Х					Р
TY6	Merrimack River (Bank, LUWW)	MP 33.86 to NH/MA state line	Tyngsborough	R2UBH	100' Buffer Zone 200' RFA	Р	Х	Р			Р	Р	P	Х		Р	Х	Р
TY7	Mill Brook (Impounded) (Bank, LUWW)	MP 33.91 (2,700 ft. south of NH/MA state line)	Tyngsborough	R2UBH, PUBHh	100' Buffer Zone 200' RFA		P	Х	P	Р		P	Р					
TY8	Wetland Swale (BVW)	MP 31.00 (3,700 ft. north of Chelmsford/Tynsborough town line)	Tyngsborough	PFO1Ex	100' Buffer Zone		Х		Х	Х								Х

Description Key:

LUWW = Land Under Water-Bodies and Waterways BVW = Bordering Vegetated Wetland

Wetland Classification Key:

PEM1E = palustrine, emergent, persistent, seasonally flooded/saturated
PEM1C = palustrine, emergent, persistent, seasonally flooded
PSS1E = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated

PSS1Ex = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated PSS1C = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded PFO1Ex = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated

Nashua-Manchester 40818 Capitol Corridor Rail - DRAFT

PFO1E = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated

PFO1C = palustrine, forested, broad-leaved deciduous, seasonally flooded

PUBHh = palustrine, unconsolidated bottom, permanently flooded, diked/impounded

PUBHx = palustrine, unconsolidated bottom, permanently flooded

R2UBHx = riverine, lower perennial, unconsolidated bottom, permanently flooded, excavated

R2UBH = riverine, lower perennial, unconsolidated bottom, permanently flooded

R4SB = riverine, intermittent, streambed

APPENDIX C

DEP BVW Delineation Field Data Forms

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DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Jenn Riordan

Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #:

Check all that apply:

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.	Vegetation	Observation Plot N	mber: <u>Ch2</u>	Transect Number: Wet	land Date of De	lineation: 04/22/21
	er and Plant Species		B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Tree	tericitic rang)					caccact
	ood (Populus de	ltoides)?	10.5	78	Yes	FAC*
Slipper	y elm (Ulmus ru	ora)?	3	22	Yes	FAC*
Shrubs/	saplings					
Glossy	buckthorn (Fran	gula alnus)	10.5	31	Yes	FAC*
Arrowwo	od (Viburnum re	cognitum)	20.5	60	Yes	FAC*
Slipper	y elm (Ulmus ru	ora)	3	9	No	
<u>Herb</u> Arrowwo	od (Viburnum re	cognitum)	3	100	No	
<u>Vine</u> Grape (Vitis sp.)		10.5	100	Yes	

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 4 Number of dominant non-wetland indicator plants: 1 unknown

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (ves) no



Section II. Indicators of Hydrology		Other Indicators of Hydrology: (check al	I that apply and d	lescribe)	
Hydric Soil Interpretation		lacktriangle Site inundated: 1-2" in areas			
7		☑ Depth to free water in observation hole: 8"			
1. Soil Survey		Depth to soil saturation in observation h	ole: Surface	<u> </u>	
Is there a published soil survey for this site? yes no)	☐ Water marks:			
title/date: Web Soil Survey		☐ Drift lines:			
map number: soil type mapped: 98A- Winooski very fir	ne sandy loa				
hydric soil inclusions: No		☐ Drainage patterns in BVW:			
Are field observations consistent with soil survey?	s) no	Oxidized rhizospheres:			
Remarks:		☐ Water-stained leaves:			
		Recorded data (stream, lake, or tidal gauge	; aerial photo; o	other):	
2. Soil Description					
Horizon Depth Matrix Color Mo	ttles Color	☐ Other:			
A 0-6" 10yr 2/1	10 4/2 20				
B 6-20" 10yr 4/1	10yr 4/3 3%	Vegetation and Hydrology Conc		no	
		Number of wetland indicator plants > number of non-wetland indicator plants	<u>X</u>	no	
Remarks: A - loam with organic B - Clayey loam		Wetland hydrology present: hydric soil present	X		
3. Other: Depleted Matrix (F3)		other indicators of hydrology present	X		
Conclusion: Is soil hydric? (yes) no		Sample location is in a BVW	X		

Section I.

Vegetation

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Prepared by: <u>and Meg Gordon</u> Project location: <u>Chelmsford</u>, <u>MA</u> DEP File #:__ Applicant: NHDOT Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II П Method other than dominance test used (attach additional information)

Observation Plot Number: Ch2

A. Sample Layer and Plant Species B.	Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
Shrubs/saplings				
Glossy buckthorn (Frangula alnus)	10.5	39	Yes	FAC*
Cottonwood (Populus deltoides)?	10.5	39	Yes	FAC*
Arrowwood (Viburnum recognitum)	3	11	No	
Red maple (Acer rubrum)	3	11	No	
Herb				
Canada mayflower (Maianthemum canadense) 10.5	100	Yes	FACU
Vine				
Grape (Vitis sp.)	20.5	100	Yes	

Vegetation conclusion:

Number of dominant wetland indicator plants: 2

Number of dominant non-wetland indicator plants: 1 (and 1 unknown)

Transect Number: Upland

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

Date of Delineation: 04/22/21

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II.	Indicators	of Hydrology		Other Indicators of Hydrology: (check al	l that apply and d	lescribe)	
Hydric Soil Ir	nterpretation			☐ Site inundated:			
1				\square Depth to free water in observation hole	•		
1. Soil Survey				\square Depth to soil saturation in observation h	nole:		
Is there a published soil survey for this site?			☐ Water marks:				
	Web Soil	Survey		☐ Drift lines:			
map numk soil type		- Winooski very	fine sandy loam	_			
hydric soil inclusions: No			☐ Drainage patterns in BVW:				
Are field observations consistent with soil survey? (yes) no			Oxidized rhizospheres:				
Remarks:			☐ Water-stained leaves:				
				☐ Recorded data (stream, lake, or tidal gauge	e; aerial photo; o	other):	
2. Soil Descrip	tian						
Horizon	Depth	Matrix Color	Mottles Color	☐ Other:			
A	0-4"	- 2					
В	4-12+"	2.5y 4/3 50% 10yr 4/2 50%		Vegetation and Hydrology Conc	lusion		
		10y1 4/2 30%		Number of wetland indicator plants > number of non-wetland indicator plants	X	no	
Remarks: A a	and B - Cl	ayey loam		Wetland hydrology present: hydric soil present		X	
3. Other:				other indicators of hydrology present		X	
Conclusion:	Ta aoil hudrid	77 7799	(no)	Sample location is in a BVW		X	

Section I.

Vegetation

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #: Applicant: NHDOT Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II Method other than dominance test used (attach additional information)

Transect Number: Wetland

A. Sample Layer and Plant Species	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
by common/scientific name)				Category*
Tree				
Slippery elm (Ulmus rubra)	10.5	100	Yes	FAC*
Shrub/sapling				
Silky dogwood (Cornus amomum)	20.5	46	Yes	FACW*
Quaking aspen (Populus tremuloides)	3	7	No	
Speckled alder (Alnus incana)	10.5	24	Yes	FACW*
Glossy buckthorn (Frangula alnus)	10.5	24	Yes	FAC*
Herb				
Purple loosestrife (Lythrum salicaria	20.5	100	Yes	OBL*
<u>Vine</u>				
Grape (Vitis sp.)	3	100	No	

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 5 Number of dominant non-wetland indicator plants: 0

Observation Plot Number: Ch4

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes

Date of Delineation: 04/22/21

Section II.	Indicators	of Hydrology		Other Indicators of Hydrology: (check all that apply and describe)			
Hydric Soil	Interpretation	L		☑ Site inundated: 1-2" nearby			
-	-			☑ Depth to free water in observation hole	:_6"		
1. Soil Surve	Ÿ			Depth to soil saturation in observation h	_{lole:} Surface	<u>}</u>	
Is there a published soil survey for this site? (yes) no				☐ Water marks:			
title/date: Web Soil Survey							
_	mber: ——			☐ Drift lines:			
	laam	- Winooski very f	ine sandy	☐ Sediment deposits:			
hydric soil inclusions: No			☐ Drainage patterns in BVW:				
Are field obse	ervations consiste	ent with soil survey?	yes (no)	☐ Oxidized rhizospheres:			
Remarks:			☐ Water-stained leaves:				
				☐ Recorded data (stream, lake, or tidal gauge	;; aerial photo; (other):	
2. Soil Descri	iptian						
Horizon	Depth	Matrix Color	Mottles Color	☐ Other:			
A	0-3" 0-16"	10yr 4/2	7 5 2/4 59				
В	0-16"	10yr 4/2	7.5yr 3/4 5% 2.5y 6/6 5%	Vegetation and Hydrology Conc			
			,	Number of wetland indicator plants > number of non-wetland indicator plants	<u>X</u>	no	
Remarks: C	layey loam			Wetland hydrology present: hydric soil present	X		
3. Other: De	pleted Mat	rix (F3)		other indicators of hydrology present	X		
Conclusion:	Ta soil hydri	c? (Vec	no	Sample location is in a BVW	X		

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #:____ Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II Method other than dominance test used (attach additional information)

Section I. Vegetation	Observation Plot Number: Ch	4	Transect Number: <u>Upla</u>	and Date of Del	ineation: <u>04/22/21</u>
A. Sample Layer and Plant Species (by common/scientific name)		cent Cover basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Tree					5.555
White pine (Pinus stro	obus)	10.5	50	Yes	FACU
Slippery elm (Ulmus ru		10.5	50	Yes	FAC*
Shrub/sapling					
Unknown shrub		10.5	50	Yes	
Slippery elm (Ulmus ru	ıbra)	10.5	50	Yes	FAC*
Herb					
Unknown fern		3	100	No	
Vine					
Asian Bittersweet (Cel	astrus orbiculatus)	10.5	50	Yes	UPL
Grape species	·	10.5	50	Yes	

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 2

Number of dominant non-wetland indicator plants: 2 (and 2 unknown)

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (ves) no

Indicators of Hydrology Other Indicators of Hydrology: (check all that apply and describe) Section II. ☐ Site inundated: Hydric Soil Interpretation Depth to free water in observation hole: 1. Soil Survey Depth to soil saturation in observation hole: Is there a published soil survey for this site? ☐ Water marks:_____ title/date: Web Soil Survey ☐ Drift lines: map number: soil type mapped 98A - Winooski very fine sandy ☐ Sediment deposits:_____ hydric soil inclusions: No ☐ Drainage patterns in BVW: Oxidized rhizospheres: Are field observations consistent with soil survey? Remarks: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): 2. Soil Description Matrix Color Mottles Color Horizon Depth Other: 0-12" 10yr 3/2Vegetation and Hydrology Conclusion Gravel/rock below 12" no Number of wetland indicator plants X > number of non-wetland indicator plants Wetland hydrology present: Remarks: Loam hydric soil present X other indicators of hydrology 3. Other: present Sample location is in a BVW Conclusion: Is soil hydric? ves

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #:

Check all that apply:

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I. Vegetation Observation	n Plot Number: <u>Ch9</u> Tra	ansect Number: Wetl	and Date of Del	ineation: 04/22/21
A. Sample Layer and Plant Species	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
Tree				
Red maple (Acer rubrum)	20.5	50	Yes	FAC*
Elm (Ulmus sp.)?	20.5	50	Yes	
Shrub/sapling				
Silky dogwood (Cornus amomum)	10.5	50	Yes	FACW*
Unknown shrub - elderberry (Sa	mbucus)? 10.5	50	Yes	
Herb				
Unknown sedge (Carex sp.)	3	50	Yes	
Duckweed (Lemna sp.)	3	50	Yes	OBL*

Vegetation conclusion:

Number of dominant wetland indicator plants: 3

Number of dominant non-wetland indicator plants: 3 unknown

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

MA DEP: 3/95

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology	Other Indicators of Hydrology: (check all that apply and describe)
Hydric Soil Interpretation	∑ Site inundated: 1-3 " in areas
	🛮 Depth to free water in observation hole: Surface
1. Soil Survey	☐ Depth to soil saturation in observation hole:
Is there a published soil survey for this site? ves no	X Water marks:
title/date: Web Soil Survey map number: ——	☐ Drift lines:
soil type mapped:656 - Udorthents-Urban land	☐ Sediment deposits:
complex hydric soil inclusions: No	☐ Drainage patterns in BVW:
Are field observations consistent with soil survey? yes (no)	Oxidized rhizospheres:
Remarks:	☐ Water-stained leaves:
	\square Recorded data (stream, lake, or tidal gauge; aerial photo; other):
2. Soil Description	
Horizon Depth Matrix Color Mottles Color	☐ Other:
A 0-3" 10yr 2/2 B 3-12" 10yr 4/1 60% ——	Wassatatian and Washallana Garalanian
10yr 3/1 40%	Vegetation and Hydrology Conclusion yes no
	Number of wetland indicator plants > number of non-wetland indicator plants
Remarks: Clayey loam with organic	Wetland hydrology present: hydric soil present X
3. Other: Sulfur odor	other indicators of hydrology
Hydrogen Sulfide (A4)	present X
Conclusion: Is soil hydric? (yes) no	Sample location is in a BVW

8

DEP Bordering Vegetated Wetland	(310 CMR 10.55) Delineation Field Data Form
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Jenn Riordan

Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #:______

Check all that apply:

a - - - - - - - - -

Vegetation alone presumed adequate to delineate BW boundary: fill out Section I only

Wegetation and other indicators of hydrology used to delineate BWW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I. Vegetation	Observation Plot Numb	per: Chll Tr	ransect Number: Wet	Land Date of Del	ineation: <u>04/26/21</u>
A. Sample Layer and Plant Species		B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)					Category*
Shrub					
Multiflora rose (Rosa	multiflora)	10.5	50	Yes	FACU
Unknown shrub - Viburn	um? Elderberry?	10.5	50	Yes	
Herb					
Sensitive fern (Onocle	a sensibilis)	3	33	Yes	FACW*
Jewelweed (Impatiens c	apensis)	3	33	Yes	FACW*
Unknown grass		3	33	Yes	

Wetland delineation conducted early in the growing season - grass and shrub species could not be identified

Vegetation conclusion:

Number of dominant wetland indicator plants: 2

Number of dominant non-wetland indicator plants: 1 (and 2 unknown)

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes



^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology	Other Indicators of Hydrology: (check all that apply and describe)			
Hydric Soil Interpretation	☐ Site inundated:			
7 · · · · · · · · · · · · · · · · · · ·	☐ Depth to free water in observation hole:			
1. Soil Survey	Depth to soil saturation in observation hole:			
Is there a published soil survey for this site? yes no	☐ Water marks:			
title/date: Web Soil Survey				
map number: ${}$ 656 - Udorthents-Urban land complex	☐ Drift lines:			
soil type mapped: 8A - Limerick silt loam	☐ Sediment deposits:			
97A - Suncook loamy sand hydric soil inclusions: No	☑ Drainage patterns in BVW: Wetland located in swale			
Are field observations consistent with soil survey? yes (no)	Oxidized rhizospheres:			
Remarks:	☐ Water-stained leaves:			
	☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other):			
2. Soil Description				
Horizon Depth Matrix Color Mottles Color	□ Other:			
A 0-10" 10yr 2/1 78% 10yr 3/4 2%				
10yr 4/2 20% Rock below 10"	Vegetation and Hydrology Conclusion			
	Number of wetland indicator plants > number of non-wetland indicator plants X			
Remarks: Clay loam	Wetland hydrology present: hydric soil present X			
3. Other: Redox Dark Surface (F6)	other indicators of hydrology present			
Conclusion: Is soil hydric? (yes) no	Sample location is in a BVW			
Conclusion: Is soil hydric? (yes) no				

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8

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

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MILLOOM	Jeili Riordan	C11C1 242	
Applicant: NHDOT	Prepared by: and Meg Gordon	Project location: Chelmsford, MA	DEP File #:
	and meg outdon		

Check all that apply:

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

Wegetation and other indicators of hydrology used to delineate BWW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I. Vegetation Observation Plot Number	r: <u>Chll</u>	Transect Number: <u>Upla</u>	nd Date of Del	ineation: <u>04/26/21</u>
A. Sample Layer and Plant Species	3. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
<u>Tree</u>				
Gray birch (Betula populifolia)	10.5	100	Yes	FAC*
<u>Shrub</u>				
Autumn olive (Elaeagnus umbellata)	10.5	64	Yes	NI
Silky dogwood (Cornus amomum)	3	18	No	
Honeysuckle (Lonicera tatarica)	3	18	No	
Herb				
Unknown grass	63	86	Yes	
Goldenrod species	10.5	14	No	
<u>Vine</u>				
Asian Bittersweet (Celastrus orbiculatus	3) 3	100	Yes	UPL

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 1 Number of dominant non-wetland indicator plants: 1 (and 2 unknown)

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes (no



Section II. Indicators of Hydrology	Other Indicators of Hydrology: (check all that apply and describe)
Hydric Soil Interpretation	☐ Site inundated:
marie por incapreciate.	☐ Depth to free water in observation hole:
1. Soil Survey	☐ Depth to soil saturation in observation hole:
Is there a published soil survey for this site? Yes no	☐ Water marks:
title/date: Web Soil Survey	☐ Drift lines:
map number: 656 - Udorthents-Urban land comp	plex
soil type mapped:8A - Limerick silt loam 97A - Suncook loamy sand hydric soil inclusions:	Sediment deposits:
No	Drainage patterns in BVW:
Are field observations consistent with soil survey? (ves) r.	Oxidized rhizospheres:
Remarks:	☐ Water-stained leaves:
	\square Recorded data (stream, lake, or tidal gauge; aerial photo; other):
2. Soil Description	
Horizon Depth Matrix Color Mottles C	olor
A 0-6" 10yr 3/2 ———————————————————————————————————	
D 0 12 10 yr 1, 3	Vegetation and Hydrology Conclusion yes no
	Number of wetland indicator plants
	≥ number of non-wetland indicator plants
	Wetland hydrology present:
Remarks: A - sandy loam B - loamy sand	hydric soil present
3. Other:	other indicators of hydrology
	present X
Conclusion: Is soil hydric? yes (no)	Sample location is in a BVW

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DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

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Applicant: NHDOT	Prepared by: and Meg Gordon	Project location: Chelmsford, MA	DEP File #:
-			·

Check all that apply:

- Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only
- X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.	Vegetation	Observation Plot Nu	mber: Ch13	Transect Number: <u>Wet</u>	land Date of Del	ineation: 04/26/21
A. Sample La	yer and Plant Species		B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/s	cientific name)					Category*
Tree						
Red mapl	le (Acer rubrum)		38	100	Yes	FAC*
Shrub						
Silky do	ogwood (Cornus a	momum)	10.5	78	Yes	FACW*
Glossy k	ouckthorn (Frang	ula alnus)	3	22	Yes	FAC*
<u>Herb</u>						
Sensitiv	ve fern (Onoclea	sensibilis)	10.5	78	Yes	FACW*
Jewelwe	ed (Impatiens ca	pensis)	3	22	Yes	FACW*

Red oak at edge - not in wetland

Vegetation conclusion:

Number of dominant wetland indicator plants: 5

Number of dominant non-wetland indicator plants: ()

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes no

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

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Submit this form with the Request for Determination of Applicability or Notice of Intent.

Redox Dark Surface (F6) not met (Redox is

faint, not distinct or prominent)

Section I.

Vegetation

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #: Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only Vegetation and other indicators of hydrology used to delineate BWW boundary: fill out Sections I and II Method other than dominance test used (attach additional information)

Observation Plot Number: Ch13

A. Sample Layer and Plant Species B	Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
by common/scientific name)				Category*
Tree				
Red oak (Quercus rubra)	38	100	Yes	FACU
Shrub				
Silky dogwood (Cornus amomum)	10.5	24	Yes	FACW*
Glossy buckthorn (Frangula alnus)	20.5	46	Yes	FAC*
Honeysuckle (Lonicera tatarica)	3	7	No	
Arrow-wood (Viburnum recognitum)	10.5	24	Yes	FAC*
Vine				
Asian Bittersweet (Celastrus orbiculatus	3) 20.5	100	Yes	UPL

Vegetation conclusion:

Number of dominant wetland indicator plants: 3

Number of dominant non-wetland indicator plants: 2

Transect Number: Upland

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

Date of Delineation: 04/26/21

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section I	. Indicator	s of Hydrolo) SY			
Hydric Soi	l Interpretation	ı				
1. Soil Sur	vey					
	ublished soil surve date: Web Soil		yes)	no		
soil	number: —— type mapped: 97A csoil inclusions: N		k loamy	sand		
Are field of Remarks:	oservations consist	tent with soil s	urvey?	yes	no	
2. Soil Des	cription					
Horizon	Depth	Matrix Colo		Mottle		
A	0-18"	10yr 3/	1	10yr	3/3	2%
Fi	ne sandy cl	ay loam				
Remarks:						
3. Other:						
Canclusio	n: Is soil hydri	ic? ye	S	no		
Redox 1	Dark Surface	e (F6) no	t met (Redox	is	

faint, not distinct or prominent)

Subject of the subjec

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DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #: Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II П Method other than dominance test used (attach additional information) Transect Number: Wetland Observation Plot Number: Ch14 Section I. Date of Delineation: 04/26/21 Vegetation A. Sample Layer and Plant Species B. Percent Cover C. Percent D. Dominant Plant E. Wetland (or basal area) Dominance Indicator (yes or no) Category* (by common/scientific name) Shrub Silky dogwood (Cornus amomum) - at edge 100 No Herb Common reed (Phragmites australis) 85.5 100 FACW* Yes Vine Grape (Vitis sp.) 10.5 100 Yes

Vegetation conclusion:

Number of dominant wetland indicator plants: 1

Number of dominant non-wetland indicator plants: 1 unknown

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? Yes no

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FACH, FACW-, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology		Other Indicators of Hydrology: (check all	l that apply and d	escribe)	
Hydric Soil Interpretation		☐ Site inundated:			
		🗵 Depth to free water in observation hole	: 12"		
1. Soil Survey		Depth to soil saturation in observation h	nole: 8 "		
Is there a published soil survey for this site? ves no	0	☐ Water marks:			
title/date: Web Soil Survey		☐ Drift lines:			
map number: —— soil type mapped: 8A - Limerick silt loam Suncook loamy sand	and 97A -	☐ Sediment deposits:			
hydric soil inclusions: Yes		☐ Drainage patterns in BVW:			
Are field observations consistent with soil survey?	res no	🖾 Oxidized rhizospheres:			
Remarks:		☐ Water-stained leaves:			
		☐ Recorded data (stream, lake, or tidal gauge	; aerial photo; c	other):	
2. Soil Description					
Horizon Depth Matrix Color M	bttles Color	☐ Other:			
A $0-6$ " 10 yr $2/1$					
B $6-20$ " 10 yr $2/1$	10yr 4/6 5%	Vegetation and Hydrology Conc	lusion		
		Number of wetland indicator plants > number of non-wetland indicator plants	yes X	no	
Remarks: A and B - Sandy loam		Wetland hydrology present: hydric soil present	X		
3. Other: Redox Dark Surface (F6)		other indicators of hydrology present	X		
Conclusion: Is soil hydric? (yes) n	10	Sample location is in a BVW	X		

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Transect Number: Upland

MID OF	Jenn Riordan	G1 1 C 1 - 3.63	
Applicant: NHDOT	Prepared by: and Meg Gordon	Project location: Chelmsford, MA	DEP File #:
	1 1		

Check all that apply:

Vegetation

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Section I.

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BWW boundary: fill out Sections I and II

Observation Plot Number: Ch14

Method other than dominance test used (attach additional information)

A. Sample Layer and Plant Species B	. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
by common/scientific name)				Category*
Tree				
Box elder (Acer negundo)?	10.5	100	Yes	FAC*
Shrub				
Honeysuckle (Lonicera tatarica)	20.5	50	Yes	FACU
Silky dogwood (Cornus amomum)	20.5	50	Yes	FACW
Herb				
Unknown grass	20.5	66	Yes	
Goldenrod species? (seedling)	10.5	34	Yes	
Vine				
Asian Bittersweet (Celastrus orbiculatus	s) 10.5	50	Yes	UPL
Grape (Vitis sp.)	10.5	50	Yes	

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH-, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 2 Number of dominant non-wetland indicator plants: 2 (and 3 unknown)

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes

Date of Delineation: 04/26/21

If vegetation alone is presumed adequate to delineate the BW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent. MA DEP; 3/95 Species could not be identified for all dominant plants since delineation was conducted early in the growing season.

Section II.	Indicators	of Hydrology		Other Indicators of Hydrology: (check all	l that apply and de	escribe)
Hydric Soil Ir	nterpretation			☐ Site inundated:		
				☐ Depth to free water in observation hole:		
1. Soil Survey	1. Soil Survey			☐ Depth to soil saturation in observation h	nole:	
Is there a published soil survey for this site?			☐ Water marks:			
title/date: Web Soil Survey						
_	oer: ——	imoriak ail+ lo:	am and 971 -	Drift lines:		
soil type	e mapped: Suncoo	Limerick silt loa ok loamy sand	alli alla 9/A -	☐ Sediment deposits:		
hydric soil inclusions: No				☐ Drainage patterns in BVW:		
Are field observ	vations consister	nt with soil survey?	(yes) no	Oxidized rhizospheres:		
Remarks:				☐ Water-stained leaves:		
				Recorded data (stream, lake, or tidal gauge	; aerial photo; c	other):
2. Soil Descrip	tian					
Horizon	Depth	Matrix Color	Mottles Color	☐ Other:		
A	0-8"	10yr 3/2				
В	8-14"	10 yr 5/3 50% 10 yr 5/4 50%		Vegetation and Hydrology Conc	lusion	
		10 yr 3/4 30%			yes	no
				Number of wetland indicator plants > number of non-wetland indicator plants		X
				E latter of har western markets praise		
Domondra: Ein	ne sandy l	m		Wetland hydrology present:		_
Remains. Fil	he sandy ro	Oalli		hydric soil present		X
3. Other:				other indicators of hydrology		
				present		X
Conclusion:	Is soil hydric'	? yes	no	Sample location is in a BVW		X

8

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Jenn Riordan

Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #:____

Check all that apply:

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I. Vegetation	bservation Plot Number: Ch16	Transect Number: Wet	land Date of De	lineation: 04/26/23
A. Sample Layer and Plant Species	B. Percent Cove (or basal area	_	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
Tree				
Red maple (Acer rubrum)	10.5	78	Yes	FAC*
Gray birch (Betula populi	folia) 3	22	Yes	FAC*
Shrub				
Silky dogwood (Cornus amo	mum) 10.5	78	Yes	FACW*
Speckled alder (Alnus inc	ana) 3	22	Yes	FACW*
<u>Herb</u>				
Iris (Iris sp.)	3	18	No	
Sensitive fern (Onoclea s	ensibilis) 10.5	64	Yes	FACW*
Common reed (Phragmites a	ustralis) 3	18	No	

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 5 Number of dominant non-wetland indicator plants: 0

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants?

Conclusion: Is soil hydric?

Indicators of Hydrology Other Indicators of Hydrology: (check all that apply and describe) Section II. ☑ Site inundated: 1-2" nearby Hydric Soil Interpretation Depth to free water in observation hole: 3" 1. Soil Survey Depth to soil saturation in observation hole: Surface Is there a published soil survey for this site? no □ Water marks: title/date: Web Soil Survey ☐ Drift lines: map number: soil type mapped:656 - Udorthents-Urban land ☐ Sediment deposits: complex hydric soil inclusions: No ☐ Drainage patterns in BVW: Oxidized rhizospheres: Are field observations consistent with soil survey? no Remarks: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): 2. Soil Description Horizon Matrix Color Mottles Color Depth Other: 0 – 4 " 10vr 3/2 Α 4-12+" 10yr 3/1В Vegetation and Hydrology Conclusion yes no Number of wetland indicator plants \mathbf{x} > number of non-wetland indicator plants Wetland hydrology present: Remarks: A and B - sandy clay loam hydric soil present other indicators of hydrology 3. Other: No redox observed - soil very wet. present

Submit this form with the Request for Determination of Applicability or Notice of Intent.

Sample location is in a BVW

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Chelmsford, MA DEP File #: Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I. Veget	ation	Observation Plot Number	r: <u>Ch16</u>	Transect Number: <u>Upl</u>	and Date of De	lineation: 04/26/21
A. Sample Layer and	Plant Species	I	3. Percent Cover (or basal area)		D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientifi	c name)					Category*
Tree						
Paper birch	Betula pa	apyrifera)	10.5	15	No	
Red oak (Quer	cus rubra	ı)	20.5	30	Yes	FACU
Red maple (Ad	cer rubrum	n)	38	55	Yes	FAC*
<u>Shrub</u> None						
<u>Herb</u> Canada mayflo	ower (Maia	anthemum canadense	2) 3	100	Yes	FACU

Vegetation conclusion:

Number of dominant wetland indicator plants: 1

Number of dominant non-wetland indicator plants: 2

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes



^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology			Other Indicators of Hydrology: (check all that apply and describe)					
Hydric Soil Interpretation			☐ Site inundated:					
-4				☐ Depth to free water in observation hole	<u>. </u>			
1. Soil Survey				☐ Depth to soil saturation in observation h	nole:			
Is there a publis	shed soil survey	for this site? yes	no	□ Water marks:				
title/date: \	Web Soil S	Survey						
map numb	er: —	IIdaathanta IIda] d	☐ Drift lines:				
	COMPI	Udorthents-Urba	an rand	☐ Sediment deposits:				
hydric soil	l inclusions: No)		☐ Drainage patterns in BVW:				
Are field observ	ations consiste	nt with soil survey?	yes (no)	Oxidized rhizospheres:				
Remarks:				☐ Water-stained leaves:				
				☐ Recorded data (stream, lake, or tidal gauge				
2. Soil Descript	ian							
Horizon	Depth	Matrix Color	Mottles Color	☐ Other:				
A	0-6"	10yr 2/1						
В	6-12"	10yr 3/2 (60%) 10yr 3/1 (38%)		Vegetation and Hydrology Conc		200		
		1091 3/1 (30%)	1071 3/4 (2%	Number of wetland indicator plants > number of non-wetland indicator plants	yes	no X		
Remarks: A a	.nd B - sa:	ndy clay loam		Wetland hydrology present: hydric soil present	X			
3. Other: Redo	ox Dark Su	rface (F6)		other indicators of hydrology present		X		
Conclusion: 1	Ta eoil hurbrio	12 (VAC)	no	Sample location is in a BVW		X		

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Lowell, MA DEP File #: Check all that apply: Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II П Method other than dominance test used (attach additional information) Section I. Transect Number: Wetland Date of Delineation: 04/23/21 Vegetation Observation Plot Number: LO7 A. Sample Layer and Plant Species B. Percent Cover C. Percent D. Dominant Plant E. Wetland (or basal area) Dominance Indicator (yes or no) Category* (by common/scientific name) Sapling Ash (Fraxinus sp.) 10.5 100 Yes Shrub Raspberry? (Rubus sp.) 3 100 No Herb Soft rush (Juncus effusus) 2.2 Yes OBL*

10.5

Vegetation conclusion:

Number of dominant wetland indicator plants: 2

Wool grass (Scirpus cyperinus)?

Number of dominant non-wetland indicator plants: 1

78

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (Yes) no

Yes

OBL*

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Depth to free water in observation hole: 4" Depth to soil saturation in observation hole: □ Water marks: _____ ☐ Drift lines: ☐ Sediment deposits: ☐ Drainage patterns in BVW: Oxidized rhizospheres: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): Mottles Color Other: Vegetation and Hydrology Conclusion no Number of wetland indicator plants $|\mathbf{x}|$ > number of non-wetland indicator plants Wetland hydrology present: hydric soil present X other indicators of hydrology present Sample location is in a BVW Submit this form with the Request for Determination of Applicability or Notice of Intent.

Other Indicators of Hydrology: (check all that apply and describe)

☐ Site inundated:

Remarks: A and B - silty loam

A horizon has organic material

Matrix Color

10vr 2/1

10yr 4/2 50%

10yr 5/2 50%

3. Other: No redox observed - soil very wet

Indicators of Hydrology

Section II.

1. Soil Survey

Remarks:

Horizon

В

2. Soil Description

Hydric Soil Interpretation

map number: —

hydric soil inclusions: No

Depth

0 - 3 "

3-12"

Is there a published soil survey for this site?

title/date: Web Soil Survey

soil type mapped: 602 - Urban land

Are field observations consistent with soil survey?

Conclusion: Is soil hydric?

yes

Wetland is in excavated swale. Standing water

near culvert. Lots of debris/trash.

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DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

MIDOE	Jenn Riordan	T 7 7 N/7	
Applicant: NHDOT	Prepared by: and Meg Gordon	Project location: Lowell, MA	DEP File #:

Check all that apply:

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I. Vegetation Observation Plot Number: _I	LO7 т	ransect Number: <u>Uplan</u>	d Date of Del	ineation: 04/23/21
	Percent Cover or basal area)	C. Percent Dominance). Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
<u>Tree</u>				
Box Elder (Acer negundo)?	20.5	100	Yes	FAC*
<u>Shrub</u> Meadowsweet (Spiraea latifolia)	20.5	50	Yes	FACW*
Raspberry? (Rubus sp.)	20.5	50	Yes	FACW.
Herb	20.5		165	
Unknown grass	38	93	Yes	
Unknown grass	3	7	No	
<u>Vine</u> Asian Bittersweet (Celastrus orbiculatus)	10.5	100	Yes	UPL

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 2 Number of dominant non-wetland indicator plants: 1 (2 unknown)

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes

If vegetation alone is presumed adequate to delineate the BWW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent. MA DEP; 3/95 Species could not be identified for all dominant plants since delineation was conducted early in the growing season.

Indicators of Hydrology Other Indicators of Hydrology: (check all that apply and describe) Section II. ☐ Site inundated: Hydric Soil Interpretation Depth to free water in observation hole: 1. Soil Survey Depth to soil saturation in observation hole: Is there a published soil survey for this site? no ☐ Water marks:_____ title/date: Web Soil Survey ☐ Drift lines: map number: — ☐ Sediment deposits:_____ soil type mapped: 602 - Urban land hydric soil inclusions: No ☐ Drainage patterns in BVW: Oxidized rhizospheres: Are field observations consistent with soil survey? Remarks: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): 2. Soil Description Matrix Color Horizon Depth Mottles Color Other: 0-10" 10yr 4/2В 10-16" 2.5y 5/3Vegetation and Hydrology Conclusion no Rocks below 16" Number of wetland indicator plants Х > number of non-wetland indicator plants Wetland hydrology present: Remarks: A and B - fine sandy loam X hydric soil present other indicators of hydrology 3. Other: present Sample location is in a BVW Conclusion: Is soil hydric? ves

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Tynsboro, MA DEP File #:_ Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II Method other than dominance test used (attach additional information) Date of Delineation: 04/27/21 Section I. Vegetation Observation Plot Number: TY3 Transect Number: Wetland

A. Sample Layer and Plant Species	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
<u>Tree</u>				
Red maple (Acer rubrum)	38	100	Yes	FAC*
Shrub				
Multiflora rose (Rosa multiflora)	3	12	No	
Japanese Barberry (Berberis thunbergii) 10.5	44	Yes	FACU
Red maple saplings (Acer rubrum)	10.5	44	Yes	FAC*
Herb				
Skunk cabbage (Symplocarpus foetidus)	63	86	Yes	OBL*
Jewelweed (Impatiens capensis)	10.5	14	No	

Vegetation conclusion:

Number of dominant wetland indicator plants: 3

Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (ve)

MA DEP; 3/95

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Indicators of Hydrology Other Indicators of Hydrology: (check all that apply and describe) Section II. ☐ Site inundated: Hydric Soil Interpretation ☑ Depth to free water in observation hole: 10 " 1. Soil Survey Depth to soil saturation in observation hole: Surface Is there a published soil survey for this site? no □ Water marks: title/date: Web Soil Survey ☐ Drift lines: map number: — ☐ Sediment deposits:_____ soil type mapped: 253D - Hinckley loamy sand hydric soil inclusions: No ☐ Drainage patterns in BVW: Oxidized rhizospheres: Are field observations consistent with soil survey? Remarks: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): 2. Soil Description Mottles Color Horizon Matrix Color Depth Other: 0-12" Α 10yr 2/110yr 4/1 2% 12-14" Vegetation and Hydrology Conclusion 10yr 5/3В 14-24" 10yr 4/2 60% yes no 10yr 3/1 40% Number of wetland indicator plants X > number of non-wetland indicator plants Wetland hydrology present: Remarks: A - sandy loam with organic hydric soil present \mathbf{x} E - sand 3. Other: B - loamy sand other indicators of hydrology present Sample location is in a BVW Conclusion: Is soil hydric? ves

Section I.

Vegetation

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form Jenn Riordan Applicant: NHDOT Prepared by: and Meg Gordon Project location: Tynsboro, MA DEP File #: Check all that apply: Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only X Vegetation and other indicators of hydrology used to delineate BW boundary: fill out Sections I and II

Transect Number: Upland

A. Sample Layer and Plant Species B.	Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
Tree				
Red Maple (Acer rubrum)	63	86	Yes	FAC*
Red Oak (Quercus rubra)	10.5	14	No	
Sapling/shrub				
Red Maple (Acer rubrum)	10.5	100	Yes	FAC*
Herb				
Japanese barberry (Berberis thunbergii)	10.5	44	Yes	FACU
Red Maple (Acer rubrum)	10.5	44	Yes	FAC*
Multiflora Rose seedlings (Rosa multiflor	a) 3	12	No	

Vegetation conclusion:

Number of dominant wetland indicator plants: 3

Method other than dominance test used (attach additional information)

Observation Plot Number: TY3

Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (ves. no

Date of Delineation: 04/27/21

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Indicators of Hydrology Other Indicators of Hydrology: (check all that apply and describe) Section II. ☐ Site inundated: Hydric Soil Interpretation Depth to free water in observation hole: 1. Soil Survey Depth to soil saturation in observation hole: Is there a published soil survey for this site? ☐ Water marks:_____ title/date: Web Soil Survey ☐ Drift lines: map number: — ☐ Sediment deposits:_____ soil type mapped: 253D - Hinckley loamy sand hydric soil inclusions: No ☐ Drainage patterns in BVW: Oxidized rhizospheres: Are field observations consistent with soil survey? no Remarks: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): 2. Soil Description Horizon Matrix Color Mottles Color Depth Other: 0-6" 10 vr 4/3Α 6-12" 10yr 4/6 В Vegetation and Hydrology Conclusion no Number of wetland indicator plants X > number of non-wetland indicator plants Wetland hydrology present: Remarks: A - fine sandy loam hydric soil present B - fine sandy loam other indicators of hydrology 3. Other: present Sample location is in a BVW Conclusion: Is soil hydric? ves

8

Applica	nt: <u>N</u> I		ng Vegetated Wetland (310 C Jenn Riordan and Prepared by: Meg Gordon	CMR 10.55) Delineation Fie	ld Data Form A DEP File #:
Check al		11 2			
	Vegeta	tion alone presumed a	adequate to delineate BVW boundary: fill	out Section I only	
X	Vegeta	tion and other indica	tors of hydrology used to delineate BVW bou	ndary: fill out Sections I and II	
	Method	other than dominance	test used (attach additional information)	
Sectio	nI.	Vegetation	Observation Plot Number: TY8	Transect Number: Wetland	Date of Delineation: 04/28/21

A. Sample Layer and Plant Species	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
(by common/scientific name)				Category
<u>Tree</u> Red Maple (Acer rubrum) Green Ash (Fraxinus pennsylvanica)	38 20.5	65 35	Yes Yes	FAC* FACW*
<u>Shrub</u> Unknown	3	100	No	
<u>Herb</u> Unknown sedge (Carex sp.)	3	50	Yes	
Goldenrod species	3	50	Yes	

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 2

Number of dominant non-wetland indicator plants: 2

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes



no

Other Indicators of Hydrology: (check all that apply and describe) X Site inundated: 2-6" Depth to free water in observation hole: Depth to soil saturation in observation hole: □ Water marks:____ ☐ Drift lines: ☐ Sediment deposits:_____ ☐ Drainage patterns in BVW: Oxidized rhizospheres: ☐ Water-stained leaves: Recorded data (stream, lake, or tidal gauge; aerial photo; other): Other: Vegetation and Hydrology Conclusion yes no Number of wetland indicator plants X > number of non-wetland indicator plants Wetland hydrology present: hydric soil present other indicators of hydrology present Sample location is in a BVW Submit this form with the Request for Determination of Applicability or Notice of Intent.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site?
title/date: Web Soil Survey



no

map number: ——

soil type mapped: 656 - Udorthents-Urban land

complex hydric soil inclusions: No

Are field observations consistent with soil survey?



no

2. Soil Description

Remarks:

Horizon	Depth	Matrix Color	Mottles Color
A	0-4"	10yr 3/1	
В	4-8"	10yr 3/2	10yr 4/3 5%

Remarks: A - fine sandy loam with organic B - fine sandy loam

3. Other:

Conclusion: Is soil hydric? yes no Doesn't meet Redox. Dark Surface (F6) Mottles are faint, not distinct or prominent ^

Section I.

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Transect Number: Upland

MILLOOF	Jeilli Kiordan			
Applicant: NHDOT	Prepared by: and Meg Gordon	Project location: Tynsboro, I	MA	DEP File #:
	1 1 4114 1105 002 4011			

Check all that apply:

Vegetation

Vegetation alone presumed adequate to delineate BWW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BWW boundary: fill out Sections I and II

Observation Plot Number: TY8

Method other than dominance test used (attach additional information)

	rcent Cover rbasal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
(by common/scientific name)				Category*
Tree				
Red Maple (Acer rubrum)	20.5	100	Yes	FAC*
Shrub/sapling				
Red oak (Quercus rubra)	20.5	60	Yes	FACU
White pine (Pinus strobus)	10.5	31	Yes	FACU
Glossy buckthorn (Frangula alnus)	3	9	No	
Herb				
Spotted wintergreen (Chimaphila maculata)	3	6	No	
Unknown grass	38	74	Yes	
Poison Ivy (Toxicodendron radicans)	10.5	20	Yes	FAC*

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MCL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH-, FACW-, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 2 Number of dominant non-wetland indicator plants: 2 (and 1 unknown)

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes (n



Date of Delineation: 04/28/21

	Other Indicators of Hydrology: (check all	l that apply and d	escribe)
	☐ Site inundated:		
	\square Depth to free water in observation hole		
	☐ Depth to soil saturation in observation h	nole:	
no	☐ Water marks:		
	☐ Drift lines:		
an land	☐ Sediment deposits:		
	☐ Drainage patterns in BVW:		
yes no	Oxidized rhizospheres:		
	☐ Water-stained leaves:		
	☐ Recorded data (stream, lake, or tidal gauge	; aerial photo; o	other):
Mottles Color	□ Other:		
10yr 5/6 (2%)	Vegetation and Hydrology Conc	lusion	
	Number of wetland indicator plants > number of non-wetland indicator plants	yes	no X
ganic/roots	Wetland hydrology present: hydric soil present		X
	other indicators of hydrology present		X
no	Sample location is in a BVW		X

Remarks:	Α	_	fine	sandy	loam	with	organic/roots

Matrix Color

10yr 3/2

10yr 4/3

Indicators of Hydrology

 $soil\ type\ mapped$:656 - Udorthents-Urban land

B - fine sandy loam 3. Other:

Section II.

1. Soil Survey

Remarks:

Horizon

Α

В

2. Soil Description

Hydric Soil Interpretation

map number: —

Is there a published soil survey for this site?

complex hydric soil inclusions: No

Depth 0-3"

3-14"

title/date: Web Soil Survey

Are field observations consistent with soil survey?

Conclusion: Is soil hydric?

yes



APPENDIX D

Wetland Functional Assessment Forms

Total area of wetlandUnknownHuman made? Yes	s Is wetla	and part of a wildlife corridor? No	or a "habitat island"? No	Wetland I.D. <u>LO1 - LO5, LO10, LO14</u>
Total area of wetland of the first of the fi	5 IS Wella	ma part of a whathe confidor.	or a matrix island :	Latitude 42.6 N Longitude 71.4 W
Adjacent land use Urban, railroad		Distance to nearest roady	way or other development < 10 ' to RR	Prepared by: JR & MEGDate 05/12/2021
Dominant wetland systems present R2UBHx		Contiguous undeveloped	d buffer zone present_No	Wetland Impact: TypeArea
Is the wetland a separate hydraulic system? No	If no	ot, where does the wetland lie in t	the drainage basin? Low	Evaluation based on:
How many tributaries contribute to the wetland? ^{U1}	nknown	Wildlife & vegetation diversity/a	hundance (see attached list)	Office X Field X
Trow many distractes contribute to the wettand:			rincipal	Corps manual wetland delineation completed? Y_X_ N
Function/Value	Suitability Y / N			omments
Groundwater Recharge/Discharge	N	7	Pawtucket Canal is man r	made with stone wall siding.
Floodflow Alteration	N	4, 9, 13	Canal is man made with st floodplain.	one wall siding and no natural
Fish and Shellfish Habitat	N	3, 4, 5, 6, 14, 16		the canal due to the connections to or shellfish data on MassGIS Oliver
Sediment/Toxicant Retention	N	1, 2, 6, 8, 10, 13	No wetland edge - canal	is bordered by stone walls.
Nutrient Removal	N	14	Not an effective trap for vegetation.	or nutrients, due to lack of
→ Production Export	N	10	No evidence of animal us shellfish data on MassG	se or food sources. No fish or IS Oliver.
Sediment/Shoreline Stabilization	N	11	Canal has stone siding a or shorelines.	and therefore no stream banks
℃ Wildlife Habitat	N	6	Surrounding area is urb	an, highly developed.
Recreation	N	None	No recreational opportu	nities exist.
Educational/Scientific Value	N	None	No educational or scien	tific values.
★ Uniqueness/Heritage	Y	1, 22, 23	Pawtucket Canal was built	in 1796 and has historic value
Visual Quality/Aesthetics	N	None	Not visually or aestheti	ically significant.
ES Endangered Species Habitat	N	None	No known occurrences of species.	threatened or endangered

Notes:

Other

wetland Function-Value Evaluation Form	Merrimack River Bank (LO8,
T.4.1 f 4	Wetland I.D. LO13, CH1, CH17, TY1, TY6)
Total area of wetland <u>Unknown</u> Human made? <u>No</u> Is wetland part of a wildlife corridor? <u>Yes</u> or a "habitat island"? <u>No</u>	Latitude 42.6 N Longitude 71.4 W
Commercial, residential, recreation, Adjacent land use <u>farmland, railroad</u> Distance to nearest roadway or other development <10' to RR	Prepared by: JR & MG Date 05/18/2021
Dominant wetland systems present R2UBH, PFO1C, PSS1C Contiguous undeveloped buffer zone present No	Wetland Impact: TypeArea
Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Low	Evaluation based on:
10+ within How many tributaries contribute to the wetland? Study area Wildlife & vegetation diversity/abundance (see attached list)	Office X Field X Corps manual wetland delineation
	completed? Y X N

Function/Value	Suitability	,	rinci	pal ion(s)/Value(s) Comments
runction/value	Y/N	(Reference #)* 1	unci	
Groundwater Recharge/Discharge	Y	1, 2, 3, 4, 7, 15	X	Merrimack River is a natural perennial stream with a large watershed.
Floodflow Alteration	Y	4, 9, 11, 13, 17		Portions of the bank have a small floodplain bench, however overall flood storage is limited.
Fish and Shellfish Habitat	Y	1, 3, 4, 5, 6, 7, 8, 9 10, 12, 13, 14, 16, 17	X	Fish and shellfish are present.
Sediment/Toxicant Retention	N	1, 2, 6, 8, 10		Banks are steep in most places with little sediment retention.
Nutrient Removal	N	1, 2, 4, 11		Banks are steep with little wetland edge for nutrient retention.
Production Export	Y	1, 2, 4, 5, 6, 10	Х	Provides wildlife food sources and exports nutrients.
Sediment/Shoreline Stabilization	Y	1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 14	Х	Defined stream banks and vegetation(trees and shrubs) border watercourse.
₩ Wildlife Habitat	Y	2, 6, 7, 8, 9, 14, 15, 17, 18, 19, 21	Х	Sufficient wildlife habitat available. Seagulls, gray squirrel, Great Blue Heron, muskrat observed.
Recreation	Y	2, 5, 8, 9, 12		Opportunities for recreation but access points are limited within study area.
Educational/Scientific Value	N	1, 5, 11		Low educational value. Access along RR is restricted.
★ Uniqueness/Heritage	Y	1, 2, 7, 14, 15, 17, 19, 24, 27, 30	Х	Merrimack River provides many functions and is regionally significant.
Visual Quality/Aesthetics	Y	4, 6, 8, 12		Merrimack River provides aesthetic value but access along RR is restricted.
ES Endangered Species Habitat	Y	1, 2	Х	Known occurrences of threatened or endangered species along the Merrimack River - Bald Eagle and Riverine Clubtail
Other				

Yes	Wetland I.D. an
Total area of wetland <u>Unknown</u> Human made? <u>No</u> Is wetland part of a wildlife corridor? <u>Yes (TY7</u>)or a "habitat island"?(<u>LO6, LO9</u>)	Latitude 42.6
TY7-Agriculture, residential, RR Adjacent land use <u>LO6&LO9-Residential, commercial, RR</u> Distance to nearest roadway or other development<20' to RR	Prepared by: <u>JR</u>
Dominant wetland systems present R2UBH, PUBHh Contiguous undeveloped buffer zone present No	Wetland Impact Type
Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Low	Evaluation base
How many tributaries contribute to the wetland? <u>Unknown</u> Wildlife & vegetation diversity/abundance (see attached list)	Office X Corps manual
Suitability Rationale Principal	completed?

LO6, LO9 (Black Brook)

Wetland I.D. and TY7 (Mill Brook)

Latitude 42.6 N Longitude 71.4 W

Prepared by: JR & MG Date 05/17/2021

Wetland Impact:
Type_____Area_

Evaluation based on:
Office_X_Field_X

Corps manual wetland delineation completed? Y_X_N_

Function/Value	Y/N		unct	ion(s)/Value(s) Comments
Groundwater Recharge/Discharge	N	4, 5, 7		Not effective groundwater recharge or discharge.
Floodflow Alteration	Y	4, 5 (TY7), 6 (TY7), 7, 8 (TY 7), 9, 13, 15	Х	TY7 (Mill Brook) and LO6 (Black Brook) have flood storage potential - ponded water present, outlets are constricted.
Fish and Shellfish Habitat	Y	4, 5, 6, 7, 14, 16, 17		Constricted outlets likely restrict fish movement to/from the Merrimack River.
Sediment/Toxicant Retention	Y	1, 2, 3, 4, 6, 10, 12, 13	Х	Impounded water areas provide sediment/toxicant retention.
Nutrient Removal	Y	2, 3, 4, 5, 7, 12, 13, 14	Х	Slow moving water and constricted outlet contribute to nutrient removal.
→ Production Export	N	2, 4, 10		Area near RR corridor does not have substantial production export function.
Sediment/Shoreline Stabilization	Y	3, 4, 6, 9, 12, 13 (LO6), 14	X	Defined stream banks and vegetation border watercourse.
₩ Wildlife Habitat	Y	5(TY7), 6, 7(TY7), 9, 13 LO6&LO9), 15(TY7), 17, 19		Ducks, snapping turtle, and signs of beaver observed in LO6.
Recreation	N	9		No recreational opportunities exist.
Educational/Scientific Value	N	None		No educational or scientific values.
★ Uniqueness/Heritage	N	1, 2, 3, 22		Access is restricted. Streams/wetlands are not considered unique to the area.
Visual Quality/Aesthetics	N	None		Access is restricted. Streams/wetland are not easily viewed.
ES Endangered Species Habitat	N	None		No known occurrences of threatened or endangered species.
Other				

	Wet	land Function-Val	ue Evaluation Form	
	Wetland I.D. LO7, LO11, LO12			
Total area of wetland <u>Unknown</u> Human made? <u>Yes</u>	Latitude 42.6 N Longitude 71.3 W			
Adjacent land use Commercial, recreational	way or other development 20' to RR	Prepared by: JR & MG Date 05/17/2021		
Dominant wetland systems present <u>PFO/SS1Ex,</u>	PSS1Ex,	PUBHxContiguous undeveloped	l buffer zone present No	Wetland Impact: TypeArea
Is the wetland a separate hydraulic system? No How many tributaries contribute to the wetland? Ur	Evaluation based on: Office X Field X Corps manual wetland delineation completed? Y X N			
Function/Value	Suitability Y/N		rincipal unction(s)/Value(s) Co	omments
▼ Groundwater Recharge/Discharge	N	15 (LO12)	Not effective groundwate	er recharge or discharge.
Floodflow Alteration	Y	4, 7(LO12), 9, 15, 18	Wetlands may provide som limits the potential amo	ne flood storage but their size ount.
Fish and Shellfish Habitat	N	None	None	
Sediment/Toxicant Retention	N	1, 2, 6	Low retention potential. been excavated.	. LO7 and LO11 appear to have
Nutrient Removal	Y	4, 5, 9, 10		reas and may retain some nutrients oval does not appear significant.
Production Export	N	7	Wetlands are highly dist	turbed.
Sediment/Shoreline Stabilization	N	None	Wetlands are not associa	ated with a stream or waterbody
❤ Wildlife Habitat	Y	7, 13(LO7), 19	Wetlands are disturbed a LO7 and LO12 provide lim	and surrounded by development.

None

None

1, 2

None

None

Ν

Ν

Ν

Ν

Ν

No recreational opportunities.

No educational or scientific value.

LO7 and LO11 appear to have been excavated. All three

Trash/debris is present and located in urban area.

No known occurrences of threatened or endangered species.

wetlands are disturbed by adjacent development.

Other

Recreation

Educational/Scientific Value

★ Uniqueness/Heritage

Visual Quality/Aesthetics

ES Endangered Species Habitat

^{*} Refer to backup list of numbered considerations.

Total area of wetland <u>Unknown</u> Human made? <u>No</u> Is wetland part of a wildlife corridor? <u>No</u> or a "habitat island"? <u>Yes</u>
Adjacent land use Commercial, residential, railroad Distance to nearest roadway or other development 20 ' to RR
Dominant wetland systems presentR2UBH, PSS1E, PUBHh Contiguous undeveloped buffer zone presentNo
Is the wetland a separate hydraulic system? <u>No</u> If not, where does the wetland lie in the drainage basin? <u>Low</u>
How many tributaries contribute to the wetland? <u>Unknown</u> Wildlife & vegetation diversity/abundance (see attached list)

Stony Brook (CH9 and CH10)
Wetland I.Dand CH2, CH3, CH8
Latitude 42.6 N Longitude 71.3 W
Prepared by: JR & MG Date 05/18/2021
Wetland Impact:
TypeArea
TypeArea Evaluation based on:
·
Evaluation based on:

	C'4-1-'1'4-	v Rationale	Princ	completed? Y X N
Function/Value	Suitability Y / N			tion(s)/Value(s) Comments
Groundwater Recharge/Discharge	Y	2, 7(CH9&CH10), 9, 13(CH2)		CH2 and CH3 are primarily comprised of groundwater. CH9 and CH10 are associated with Stony Brook.
Floodflow Alteration	Y	4, 5, 6, 7, 8, 9, 10, 13, 18	Х	All have floodwater retention potential due to location near Stony Brook. CH2 is very small and has limited flood storage
Fish and Shellfish Habitat	Y	3, 4, 5, 6, 7, 8, 1 14, 16, 17	0 X	Only applicable for Stony Brook(CH9 and CH10).
Sediment/Toxicant Retention	Y	1, 2, 3, 4, 5, 6, 10, 12, 13, 16	Х	CH3, CH8, and CH9 have ponded areas that provide sediment retention.
Nutrient Removal	Y	2, 3, 4, 5, 7, 8, 1	.4 X	Slow moving water and heavily vegetated. Applicable for CH3, CH8 and CH9.
Production Export	N	2, 7, 10(CH10)		Few indicators of production export.
Sediment/Shoreline Stabilization	Y	6, 7(CH9), 12, 13, 14		CH9 and CH10 provide bank stabilization for Stony Brook.
❤ Wildlife Habitat	Y	6(Stony Brook), 7, 8 9, 13, 19, 20, 21		Stony Brook and associated wetlands provide a small habitat "island." Surrounding area is developed.
Recreation	N	None		No recreational opportunities exist. Access along railroad is restricted.
Educational/Scientific Value	N	None		No educational or scientific value. Access along railroad is restricted.
★ Uniqueness/Heritage	Y	1, 2, 4, 6, 7 (Stony Brook), 22		Access along railroad is restricted. Habitat island surrounded by development.
Visual Quality/Aesthetics	N	1, 2, 6		Stony Brook and CH8 contain open water but otherwise not visually or aesthetically significant. Access along railroad is restricted.
ES Endangered Species Habitat	N	None		No known occurrences of threatened or endangered species.
Other				

	id I.D.
Total area of wetland <u>Unknown</u> Human made? <u>No</u> Is wetland part of a wildlife corridor? <u>No</u> or a "habitat island"? <u>No</u> Latitude	le <u>42</u>
Adjacent land use Industrial, residential, railroad Distance to nearest roadway or other development < 20 ' Prepared	ed by:
PSS1E, R2UBH, PUBHh, Wetland	ıd Imp
Dominant wetland systems present_PEM1E, PFO1E Contiguous undeveloped buffer zone present_No Type	
Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Low Evaluati	tion b
Office_	X
How many tributaries contribute to the wetland? <u>Unknown</u> Wildlife & vegetation diversity/abundance (see attached list) Corps in	manu

CH4, CH6, CH7,
Deep Brook (CH5, CH14,
Wetland I.D.CH15)

Latitude 42.6 N Longitude 71.3 W
Prepared by: JR & MG Date 05/19/2021

Wetland Impact:
Type ______ Area

Evaluation based on:
Office X Field X
Corps manual wetland delineation completed? Y X N

	C:4-1-:1:4-	v Rationale	Princi	completed? Y X N
Function/Value	Suitability Y / N			on(s)/Value(s) Comments
Groundwater Recharge/Discharge	N	7, 9(CH14)		The wetlands are associated with Deep Brook.
Floodflow Alteration	Y	4, 5, 6, 7, 8, 9, 13, 18		CH4, CH5, and CH14 provide flood storage along Deep Brook.
Fish and Shellfish Habitat	N	4, 7, 8, 14, 16, 17		Only applicable for Deep Brook however fish habitat unlikely due to road crossings and shallow water.
Sediment/Toxicant Retention	Y	1, 2, 3, 5, 6, 10, 12, 13, 14, 16	Х	Ponded areas of CH14, CH15, CH4 and CH5 provide sediment retention.
Nutrient Removal	Y	2, 3, 4, 5, 7, 8, 9, 10, 14	X	Effective nutrient removal due to slow moving water and dense vegetation.
→ Production Export	N	2, 7, 10		Few indicators of production export.
Sediment/Shoreline Stabilization	Y	4, 7(CH14), 12, 13, 14		CH5, CH14, and CH15 provide bank stabilization for Deep Brook.
₩ Wildlife Habitat	Y	6, 7, 8, 13, 19, 20, 21	Х	Red-winged black birds and other songbirds observed.
Recreation	N	None		No recreational opportunities. Access along railroad is restricted.
Educational/Scientific Value	N	None		Unsafe due to location next to RR Corridor and no parking. Access along railroad is restricted.
★ Uniqueness/Heritage	Y	1, 2, 3, 4, 7		Open water and multiple wetland classes but unsafe for public and access along railroad is restricted.
Visual Quality/Aesthetics	N	6		Access along railroad is restricted.
ES Endangered Species Habitat	N	None		No known occurrences of threatened or endangered species.
Other				

		Wetland I.D.CHII, CHIZ, CHI3, CHI
	part of a wildlife corridor? NO or a "habitat island"? NO	Latitude 42.6 N Longitude 71.3 W
Residential, commercial, Adjacent land use roads, railroad	Distance to nearest roadway or other development 20-50 ' to RR	Prepared by: JR & MGDate 05/18/2021
CH11-PSS1Ex,CH13-PF01E, Dominant wetland systems presentCH12-PF01Ex,CH16-PF01C/PE	EM1 CContiguous undeveloped buffer zone present NO	Wetland Impact: TypeArea
Is the wetland a separate hydraulic system? <u>No</u> If not, w	here does the wetland lie in the drainage basin? Low	Evaluation based on:
How many tributaries contribute to the wetland? <u>Unknown</u> Wild	Office X Field X Corps manual wetland delineation	
Suitability	Rationale Principal	completed? Y_X_ N

Function/Value	Y/N		uncti	ion(s)/Value(s) Comments
Groundwater Recharge/Discharge	N	2, 7(CH11), 9(CH16), 10(CH11)		CH11 has an outlet but no inlet.
Floodflow Alteration	Y	4, 7, 8, 9, 10(CH11&CH16), 13, 18		CH11 and CH16 are connected to watercourses. Flood storage is limited by small size of wetlands.
Fish and Shellfish Habitat	N	None		CH11 and CH16 are associated with watercourses but do not appear to contribute to fish habitat.
Sediment/Toxicant Retention	Y	1, 2, 3, 5(CH16), 6, 10, 12(CH16), 13, 16	Х	Sediment/toxicant retention potential for CH11 and CH12 due to swale design. Vegetation and slow moving water provide retention in CH16.
Nutrient Removal	Y	3, 4, 5(CH16), 8, 9, 10, 14		Dense vegetation provides nutrient retention. CH16 has ponded water.
→ Production Export	N	7		Few production indicators noted.
Sediment/Shoreline Stabilization	N	None		Wetlands are not located adjacent to a stream or water body.
₩ Wildlife Habitat	Y	7, 13, 15(CH16), 19, 20, 21		CH11, CH12, CH13 have limited habitat value due to nearby development. CH16 provides habitat.
Recreation	N	None		No recreation opportunities exist. Access along railroad is restricted.
Educational/Scientific Value	N	None		No educational or scientific opportunities. Access along railroad is restricted.
★ Uniqueness/Heritage	N	1, 2, 22(CH16)		The wetlands are not considered unique to the area. CH11 and CH12 are excavated swales.
Visual Quality/Aesthetics	N	None		None are visually or aesthetically significant.
ES Endangered Species Habitat	Y		Х	Portions of CH16 are within Priority and Estimated Habitat.
Other				

	VV Ct	ianu runcuon-va	iiuc	Evaluation Form	
					Wetland I.D. TY2 and TY8
Total area of wetland <u>Unknown</u> Human made? <u>ye</u> ,	Latitude 42.6 N Longitude 71.4 W				
Adjacent land use Commercial, resident:	Prepared by: JR & MG Date 05/17/2021				
TY2 - PEM	Wetland Impact:				
Dominant wetland systems present TY8 - PFO	TypeArea				
Is the wetland a separate hydraulic system? No	If no	ot, where does the wetland lie in	the dra	ainage basin? Low	Evaluation based on:
	1	TT71 11:0 0	/ 1 1	(1 11)	Office X Field X
How many tributaries contribute to the wetland? <u>U</u>	nknown	Wildlife & vegetation diversity/	abunda	ance (see attached list)	Corps manual wetland delineation
	Suitability	v Rationale F	Princi	nal	completed? Y_X_ N
Function/Value	Y/N			•	omments
Groundwater Recharge/Discharge	N	4		Water comes from storm v the Merrimack River.	water runoff and drains into
Floodflow Alteration	Y(TY8)	4, 9, 15, 18(TY8)		TY8 provides minor floo	d storage.
Fish and Shellfish Habitat	N	None		The wetlands are not ass	sociated with streams.
Sediment/Toxicant Retention	Y(TY8)	1, 2, 4, 6		TY8 has sediment/toxica:	nt retention potential.
Nutrient Removal	Y(TY8)	3(TY8), 4, 7, 9(TY2)		TY8 likely provides limi	ited nutrient removal.
Production Export	N	None		The wetlands do not have communities.	e diverse plant and wildlife
Sediment/Shoreline Stabilization	N	None		The wetlands are not as water body.	sociated with a stream or
W ildlife Habitat	N	7, 8		Not high quality habita	t. Surrounding area is urban.
Recreation	N	None		No recreational oppourtuand very low quality.	unities exist due to small size
Educational/Scientific Value	N	None		No public access and hig	ghly disturbed.
★ Uniqueness/Heritage	N	1, 2		Very low quality, unsafe	e, and no public access.

Notes: * Refer to backup list of numbered considerations.

None

Visual Quality/Aesthetics

Other

ES Endangered Species Habitat

Ν

Y(TY8)

Not visually or aesthetically significant.

All of TY8 and part of TY2 are located in Priority and Estimated Critical Habitat.

Total area of wetland <u>Unknown</u> Human made? <u>No</u> Is wetland part of a wildlife corridor? <u>No</u> or a "habitat island"? <u>No</u>
Adjacent land use Residential, railroad, roadway Distance to nearest roadway or other development <20' to RR
Dominant wetland systems present PFO1E, R4SB, R2UBH, PUBHh Contiguous undeveloped buffer zone present NO
Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Low
How many tributaries contribute to the wetland? <u>Unknown</u> Wildlife & vegetation diversity/abundance (see attached list)

*** 1 1				(Bridg
Wetland	I.D. Meado	ow Bro	ook)	
Latitude	42.6 N	Longi	tude_7 <u>2</u>	1.4 W
Prepared	by:JR &	MG Date	05/1	8/2021
Wetland	Impact:			
Type	<u> </u>	A	rea	
Evaluati	on based on:			
Office_	X Fi	eldX		_
Corps m	anual wetl	and deli	neation	า
	ed? V X			•

				completed? Y_X_ N
	Suitabilit		Princi	
Function/Value	Y/N	(Reference #)* I	uncti	ion(s)/Value(s) Comments
Groundwater Recharge/Discharge	Y(TY3)	3, 4, 7, 9(TY3), 13(TY3)	Х	Hydrology source for TY3 appears to be primarily groundwater TY4 and TY5 are an intermittent and perennial stream, respectively.
Floodflow Alteration	Y	4, 7, 8, 9, 10, 13, 15		All have potential to retain floodwaters from the Merrimack River, Bridge Meadow Brook, and surrounding uplands.
Fish and Shellfish Habitat	Y(TY5)	4, 5(TY5), 6(TY5), 7 14(TY5), 16, 17(TY4,TY		TY5 has potential for fish and shellfish habitat due to connections to Merrimack River and Flint Pond. TY4 stream is too small to provide fish habitat.
Sediment/Toxicant Retention	Y(TY5)	1, 2, 3, 6, 10, 12, 13	X	TY5 has ponded/impounded water.
Nutrient Removal	Y(TY5)	2, 3, 4, 5, 14		TY5 has ponded water, likely retains nutrients.
→ Production Export	N	2, 10		Few indicators of production export.
Sediment/Shoreline Stabilization	Y	2, 3, 4, 6, 9, 14	Х	Not applicable for TY3.
₩ Wildlife Habitat	Y	6, 7, 19, 21		Wetlands are near Merrimack River. Open water and forested areas provide habitat.
Recreation	N	None		No recreation opportunities. Access along railroad is restricted.
Educational/Scientific Value	N	None		Disturbed and not easily accessed.
★ Uniqueness/Heritage	N	1, 2, 4		Wetlands are fragmented. Not considered unique to the area.
Visual Quality/Aesthetics	N	None		Wetlands are disturbed by adjacent development. Access along railroad is restricted.
ES Endangered Species Habitat	Y		Х	TY5, TY4 and part of TY3 are located within Priority and Estimated Critical Habitat.
Other				

APPENDIX A-3.2

Wetland Delineation Report Part B – New Hampshire Section

NASHUA-MANCHESTER 40818 CAPITOL CORRIDOR RAIL

WETLAND DELINEATION REPORT

PART B - NEW HAMPSHIRE SECTION



Prepared for:



NH Department of Transportation 7 Hazen Drive Concord, NH 03302

Prepared by:



GM2 Associates, Inc. 197 Loudon Road, Suite 310 Concord, NH 03301

July 2021

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Report Prepared by: Jennifer Riordan, NH CWS #269

1.0 INTRODUCTION

This report provides a summary of the wetland resources that were delineated within the New Hampshire portion of the Nashua-Manchester 40818 (Capitol Corridor Rail) Project, which extends from Lowell, Massachusetts to Manchester, New Hampshire along an existing operational freight rail line. The wetlands that were delineated within the Massachusetts portion of the project are described in a separate report ("Part A"). Wetlands were delineated by GM2 Associates, Inc. (GM2) in April, May, and June 2021.

2.0 METHODOLOGY

The study limits for the New Hampshire portion of the wetland delineation included the area within approximately 50 feet on either side of various segments of the existing rail line from the Massachusetts/New Hampshire state border to the Granite Street crossing in Manchester, NH (refer to Appendix A). Approximately 8 miles of the NH portion of the rail corridor were delineated in the field. Wetland resources along the remaining 13 miles of the NH section were identified using GIS maps (NWI maps and orthoimages). The segments that were field-delineated correspond to portions of the rail line where new/realigned track or optional second track are proposed. In addition, bridge crossings, grade crossings, and potential station and layover facilities were also field-delineated. These areas are shown on the wetland delineation maps in Appendix A and are also described below. As noted in Part A of the Wetland Delineation Report, the entire Massachusetts segment of the rail corridor (approximately 9 miles) was field-delineated.

Table 2-1: Segments of the NH Portion of the Rail Corridor that were Field-Delineated

Segment	Start		End		Municipality
	Mile Post	Landmark	Mile Post	Landmark	7
Rail Corridor Segment 1	34.4	NH-MA line	37.5	0.4 miles south of Salmon Brook Crossing	Nashua
Rail Corridor Segment 2	38.4	Nashua Yard	38.8	Crown Street	Nashua
Rail Corridor Segment 3	39.22	Nashua River	39.8	Walden Pond Drive	Nashua
Rail Corridor Segment 4	41.96	Just north of Nashua- Merrimack town line	42.4	Mast Road	Merrimack
Rail Corridor Segment 5	43.3	South of Anheuser Busch	44.76	Griffin Street boat launch	Merrimack
Rail Corridor Segment 6	45.5	South of Wright Avenue	45.72	North of Wright Avenue	Merrimack
Rail Corridor Segment 7	54.9	Hancock Street	55.7	Granite Street	Manchester

Table 2-2: Bridge Crossings in NH that were Field-Delineated

Bridge No. / Mile Post	Crossing	Municipality
37.87	Salmon Brook	Nashua
39.22	Nashua River	Nashua
39.39	Lock Street	Nashua
41.77	Pennichuck Brook	Nashua/Merrimack
44.76	Griffin Street boat launch trail	Merrimack
44.92	Naticook Brook	Merrimack
46.22	Souhegan River	Merrimack
51.84	Merrimack River	Bedford/Manchester

Table 2-3: Grade Crossings in NH that were Field-Delineated

Mile Post	Crossing	Municipality
36.9	East Glenwood Street	Nashua
38.8	Crown Street	Nashua
38.9	East Hollis Street (NH Route 111)	Nashua
39.0	Bridge Street (NH Route 101A)	Nashua
40.75	Hills Ferry Road	Nashua
42.4	Mast Road	Merrimack
43.7	Private road	Merrimack
44.1	Star Drive	Merrimack
45.7	Wright Avenue	Merrimack
52.1	Pine Island Road	Manchester
52.6	Winston Street	Manchester
54.0	West Mitchell Street	Manchester
54.6	Sundial Avenue	Manchester
54.74	Byron Street	Manchester
55.6	Depot Street	Manchester
55.7	Granite Street	Manchester

Table 2-4: Potential Station and Layover Sites that were Field-Delineated

Name	Municipality
Spit Brook Road / South Nashua	Nashua
Crown Street / Downtown Nashua	Nashua
Raymond Wieczorek Drive / MHT	Bedford
Downtown Manchester (2014 study)	Manchester
Downtown Manchester (2020 TOD)	Manchester
Pan Am North Layover	Manchester
Pan Am South Layover	Manchester
Wastewater Treatment Plant Layover	Manchester

The delineation was completed on April 28, 2021, May 4, 5, 11, 13, and 28, 2021 and June 2, 2021. It was conducted during unusually dry conditions (moderate drought, according to the US Drought Monitor) in April and early May 2021. Mid May through June 2021 were considered abnormally dry according to the US Drought Monitor. The wetland delineation was conducted by Jennifer Riordan (CWS #269) and Meg Gordon of GM2 Associates, Inc. (GM2). Wetlands were delineated in accordance with the US Army Corps of Engineers (ACOE) 1987 Methodology and the ACOE Northcentral and Northeast Regional Supplement (2012). Individually-labeled flags were placed in the field to designate delineated wetland (DW) boundaries and top of bank (TOB) and the flags were located with a Trimble Geo7x GPS unit. In some locations, the bank of the Merrimack River was located with GPS, but individual flags were not placed in the field. Ordinary high water (OHW) was GPS-located for stream crossings but flags were not placed in the field. OHW was not delineated for the Merrimack River, except for where it crosses under the rail corridor at the bridge in Bedford/Manchester.

While conducting the wetland delineation, GM2 reviewed the study area for vernal pools. No vernal pools were noted within the study area and vernal pool indicator species were not observed during the site visits.

The table included in Appendix B provides a summary of the delineated wetland resources. Wetland delineation field data forms were completed for each wetland community and are included in Appendix C.

Federal wetland classifications were assigned in accordance with "Classification of Wetlands and Deepwater Habitats of the United States" (Federal Geographic Data Committee, 2013). A wetland functional assessment was completed for each wetland system in accordance with the ACOE New England District Highway Methodology Workbook Supplement (1999). New Hampshire Department of Environmental Services (NHDES) Wetlands Functional Assessment worksheets were completed and are included in Appendix D.

3.0 EXISTING CONDITIONS

Current site conditions within the project corridor consist of an existing operational rail line, which currently handles only freight. Within New Hampshire, most of the rail line is single track. A few sections currently have additional track or sidings, including the Pan Am Railways Yard in Nashua, Anheuser-Busch in Merrimack, near Railroad Avenue in Merrimack, and from Byron Street to near Depot Street in Manchester. The portion of the rail line in New Hampshire is owned by Pan Am Railways.

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The corridor runs parallel to the Merrimack River, crossing it once at the Bedford-Manchester boundary line. Within Nashua, the majority of the corridor is densely developed although there are pockets of undeveloped forest and shrub land. The corridor within Merrimack and Bedford is less developed and contains some forested areas with some fields. In Manchester, the area around the corridor is heavily developed except for the forested area near Pine Grove Cemetery.

4.0 SUMMARY OF WETLAND RESOURCES

4.1 Wetland

As defined in RSA 482-A:2, a wetland "means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetlands within 50 feet of the existing rail line were delineated and GPS-located in the field for the portions of the project corridor listed in Section 2.0. Individually labeled flags were placed in the field for each wetland.

4.2 Prime Wetland

As defined in RSA 482-A:15, prime wetlands "shall mean any contiguous areas falling within the jurisdictional definitions of RSA 482-A:2, X and RSA 482-A:4 that, because of their size, unspoiled character, fragile condition, or other relevant factors, make them of substantial significance. A prime wetland shall be at least 2 acres in size, shall not consist of a water body only, shall have at least 4 primary wetland functions, one of which shall be wildlife habitat, and shall have a width of at least 50 feet at its narrowest point. The boundary of a prime wetland shall coincide, where present, with the upland edge of any wetland, as defined in RSA 482-A:2, X, that is part of the prime wetland." Prime wetlands are designated by municipalities in accordance with NHDES Wetlands Rules.

Table 4-1 lists the prime wetlands that are located within 100 feet of the project corridor. These prime wetlands include the large streams and rivers in Nashua. The other municipalities along the project corridor do not have designated prime wetlands.

Table 4-1: Designated Prime Wetlands along Project Corridor

Name	Location	Municipality
Merrimack River	From NH/MA state border to Nashua/Merrimack town border	Nashua
Salmon Brook	North of Nashua Wastewater Treatment Plant	Nashua
Nashua River	North of Bridge Street	Nashua
Pennichuck Brook (Nashua side)	Nashua/Merrimack town border	Nashua

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4.3 Perennial Stream

As defined in Env-Wt 103.53 a perennial stream is "a watercourse that is in the groundwater table for most of the year and so has groundwater as its primary source of water for stream flow, with runoff from rainfall and snowmelt as a supplemental source of water, so that it contains flowing water year-round during a typical year."

Ordinary high water (OHW) and top of bank (TOB), or wetland edge if present, for perennial streams within 50 feet of the existing rail line were field-delineated and GPS-located for the for the portions of the project corridor listed in Section 2.0.

4.4 Intermittent Stream

As defined in Env-Wt 103.21 intermittent stream is "a watercourse that is fed by groundwater but is not in the groundwater table throughout the year, with runoff from rainfall and snowmelt is a supplemental source of water for flow, such that it typically does not have flowing water during dry portions of the year."

4.5 Bank

As defined in Env-Wt 102.15 bank is "the transitional slope immediately adjacent to the edge of a surface water body, the upper limit of which is usually defined by a break in slope, or, for a wetland, where a line delineated in accordance with Env-Wt 400 indicates a change from wetland to upland."

4.6 Priority Resource Area

As defined in Env-Wt 103.66, priority resource area (PRA) means "a jurisdictional area that: (a) Has documented occurrences of protected species or habitat; (b) Is a bog; (c) Is a floodplain wetland contiguous to a tier 3 or higher watercourse; (d) Is a designated prime wetlands; (e) Is a duly-established 100-foot buffer of a designated prime wetlands; (f) Is a sand dune, tidal wetland, tidal water, or undeveloped tidal buffer zone; or (g) Is any combination of (a) through (f), above."

PRAs were identified in both Nashua and Merrimack and include wetland resources that are either identified as prime wetland or are floodplain wetlands contiguous to a tier 3 or higher watercourse. PRAs are identified in the Wetland Summary Table provided in Appendix B as well as the wetland resource descriptions in Section 6.0.

5.0 PROJECT AREAS NOT FIELD DELINEATED

Areas that were field delineated correspond to portions of the rail line where new/realigned track or optional second track are proposed. Areas where no new track is proposed were not field delineated (refer to Table 5-1). National Wetlands Inventory (NWI) maps, the NH National Hydrography dataset, the NHDES Wetlands Permit Planning Tool, and aerial photographs were used to generally identify the large wetland systems located in these segments of the project. If any work is proposed beyond the existing rail line within these segments, then wetland resources should be field-delineated.

Table 5-1: Segments of the NH Portion of the Rail Corridor that were Not Field-Delineated

Segment		Start		End	
	Mile Post	Landmark	Mile Post	Landmark	
Segment 1A	37.5	0.4 miles south of Salmon Brook Crossing	38.4	Nashua Yard	Nashua
Segment 2A	38.8	Crown Street	39.22	Nashua River	Nashua
Segment 3A	39.8	Walden Pond Drive	41.96	Just north of Nashua-Merrimack town line	Merrimack
Segment 4A	42.4	Mast Road	43.3	South of Anheuser Busch	Merrimack
Segment 5A	44.76	Griffin Street boat launch	45.5	South of Wright Ave.	Merrimack
Segment 6A	45.72	North of Wright Ave.	50.2	Bedford-MHT Station	Merrimack, Bedford
Segment 7A	50.45	Bedford-MHT Station	51.84	Merrimack River Bridge	Bedford
Segment 8A	52.7	US Route 293/NH Route 101 Bridge	54.9	Hancock Street	Manchester

5.1 Segment 1A

The western side of the rail line within Segment 1A is developed, except for the Salmon Brook Crossing, which was field-delineated. The Merrimack River is located east of the rail line and is adjacent to the rail right-of-way from the southern edge of this segment to the Salmon Brook crossing. No other wetland resources are mapped within this segment.

5.2 Segment 2A

This segment is developed and no wetland resources are shown on the NWI map or visible in aerial photographs.

5.3 Segment 3A

The Merrimack River is located close to the rail line at the northern and southern ends of this segment. Pennichuck Brook crosses the rail corridor at the Nashua-Merrimack line. This stream crossing was field-delineated. There are no other NWI-mapped wetlands near the rail corridor in this segment. Large sections of the western side of the rail corridor are developed so wetlands are unlikely to be present. A culvert crossing is located near mile post 40.3. The aerial photograph does not show any obvious wetlands resources near this culvert, but it may convey a small stream or wetland.

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5.4 Segment 4A

A large palustrine wetland system is mapped to the west of the rail corridor within this segment. This wetland system is mapped approximately 400 feet from the rail line but it's possible that areas of the wetland could extend closer to the rail corridor. Some parts are emergent while others are forested/scrub-shrub. Two smaller forested/scrub-shrub wetlands are mapped on the east side of the rail corridor.

5.5 Segment 5A

Naticook Brook crosses the rail corridor within this segment and the area near the bridge was field-delineated. Large wetlands associated with Horseshoe Pond are mapped along the western side of the rail corridor. There is also an NWI-mapped wetland on the east side of the rail corridor north of Naticook Brook. Horseshoe Pond is located within 50 feet of the rail corridor for a portion of this segment.

5.6 Segment 6A

The Souhegan River crosses the rail corridor at the southern end of this segment and the area near the bridge was field-delineated. The rest of this segment was not field-delineated, although portions were walked as part of a rare plant survey and wetland resources, if observed, were noted. A NWI-mapped wetland (forested/scrubshrub) is located west of the rail corridor near a powerline crossing. The Merrimack River is located east of the rail line and is close to the rail corridor in several locations.

Several culverts are mapped within Segment 6A. Many of these appear to convey wetlands or small streams. A small stream/wetland was noted at a culvert near the Depot Street boat launch and a few other culverts appear to convey streams/drainages into the Merrimack River. At mile post 48.34, an unnamed perennial stream crosses under the rail line and flows into the Merrimack River.

5.7 Segment 7A

Two small ponds and an emergent wetland are mapped on the west side of the rail corridor and the Merrimack River is located to the east. Several culverts are mapped within this segment, and they may convey small unmapped streams or wetlands.

5.8 Segment 8A

No wetland resources are mapped adjacent to the rail corridor within this segment. The section of this segment near Pine Grove Cemetery (north of the US Route 293/NH Route 101 bridge) was walked as part of a rare plant survey. Various unmapped wetlands and streams were noted along the edge of the rail line in this area. The northern portion of this segment is developed, and fewer wetland resources appear to be present.

6.0 WETLAND RESOURCE DESCRIPTIONS

6.1 Nashua

6.1.1 Merrimack River: NA1, NA2, NA7, NA22, NA24, NA25

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream, Prime Wetland, Priority Resource Area <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)



Merrimack River Bank (NA1)

Flag series NA1, NA2, NA7, NA22, NA24, and NA25 correspond to segments of the Merrimack River bank located adjacent to the rail right-ofway in Nashua. Top of bank (TOB) was delineated in the field and located with GPS. Ordinary high water (OHW) was not located with GPS.

NA1 extends from the NH/MA border approximately 2,700 feet north adjacent to the rail corridor and ends south of East Spit Brook Road. NA2 starts approximately 1,000 feet north of NA1 and extends for 300 feet along the Merrimack River, near East Spit Brook Road. NA7 is an 800-foot-long segment that is located

approximately 2,000 feet south of Circumferential Highway. NA22 is a small, 200-foot-long section located south of Circumferential Highway. NA24 and NA25 are approximately 500 and 600 feet long, respectively, and are located near the Nashua Country Club.

Within Nashua, the Merrimack River is designated as a Prime Wetland and a NH Designated River. Due to its designation as a Prime Wetland, the Merrimack River is considered a Priority Resource Area. The Merrimack River also has a regulatory floodway and portions of the bank are located within mapped floodplains (100-year and 500-year floodplains).



Merrimack River Bank (NA7)



Merrimack River Bank (NA24)

Dominant vegetation along the bank includes red maple (Acer rubrum), Asian bittersweet (Celastrus orbiculatus), Tatarian honeysuckle (Lonicera tatarica), white pine (Pinus strobus), red oak (Quercus rubra), birch (Betula sp.), poison ivy (Toxicodendron radicans), glossy buckthorn (Frangula alnus), box elder (Acer negundo), and multiflora rose (Rosa multiflora). Within the study area, the bank is relatively steep and tall, with some eroded segments. Signs of beaver activity were noted.

Wetlands NA1, NA2, NA7, NA22, NA24, and NA25 provide various functions including ecological integrity, fish and shellfish habitat, flood storage, groundwater recharge, nutrient trapping/retention, production export, scenic quality, sediment trapping, shoreline anchoring, uniqueness/heritage, recreation, and wildlife habitat. Of these, ecological integrity, fish habitat, production export, shoreline anchoring, uniqueness/heritage, and wildlife habitat are considered principal functions.

6.1.2 Wetland NA3, NA4, NA5, NA6 and NA6A

New Hampshire Regulated Wetland Areas: Wetland

<u>Federal classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E), palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E)



Wetland NA3

Wetlands NA3, NA4, NA5, NA6, and NA6A are relatively small, urban wetlands. All are located on the western side of the rail corridor between commercial development and the rail line. They all have areas that are periodically inundated with shallow water.

Wetland NA3 is a small wetland located approximately 500 feet south of East Spit Brook Road in Nashua. It appears to be fed by stormwater runoff that enters from an 18-inch culvert on the west side of the wetland. The wetland does not have an outlet and is not contiguous to other wetland

resources. At the time of the wetland delineation (April 2021), the wetland has approximately 2 to 4 inches of standing water. Dominant vegetation consists of green ash (*Fraxinus pennsylvanica*), Tatarian honeysuckle, and silky dogwood (*Cornus amomum*).

Wetland NA4 is approximately 375 feet long and is located behind the Webster Square commercial development south of East Spit Brook Road. It is an emergent wetland located in a swale. Vegetation includes grasses, poison ivy, purple loosestrife (*Lythrum salicaria*) and areas with dense common reed (*Phragmites australis*).

Wetland NA5 is located at the northern tip of Willow Springs Plaza, south of East Spit Brook Road. It extends less than 200 feet along the railroad corridor and continues west beyond the study area. There is a fenced area with concrete sides containing a large culvert outlet at the southern end of the wetland. Wetland NA4 is densely vegetated with common reed, with some jewelweed (*Impatiens capensis*) also present.



Wetland NA4



Wetland NA5

Wetland NA6 begins between East Spit Brook Road and the railroad corridor and extends for approximately 540 feet to the south. It is a wetland swale that contained areas with at least 12 inches of ponded water at the time of the wetland delineation (April 2021). Dominant vegetation is comprised of Tatarian honeysuckle, poison ivy, Asian bittersweet, and red oak. Water from NA6 flows north across a dirt path at the end of East Spit Brook Road. Flag series NA6A was delineated north of East Spit Brook Road and connects to NA6 via flow over the road. NA6A contains similar vegetation and provides the same functions as NA6.

Wetlands NA3, NA4, NA5, and NA6 provide only flood storage and not at the principal level due to their size/width. The wetlands show evidence of human disturbance and are small and narrow, which limits their ability to provide other functions.



Wetland NA6

6.1.3 Salmon Brook (Wetlands NA8, NA9, NA10, NA11)

<u>New Hampshire Regulated Wetland Areas</u>: Wetland, Bank, Perennial Stream, Prime Wetland, Priority Resource Area

Federal classification: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH),

Salmon Brook and Merrimack River, downstream of railroad (NA8)

palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh)

Flag series NA8 and NA9 correspond to the banks of Salmon Brook and the Merrimack River on the eastern side of the rail corridor while NA10 and NA11 correspond to the banks of Salmon Brook on the western side of the rail corridor. The Salmon Brook crossing is located at mile post 37.87,

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Salmon Brook upstream of railroad (NA10)

approximately 5,000 feet south of NH Route 111, near the Nashua Wastewater Treatment Plant.

All four banks are relatively steep and are located within a mapped Zone AE (100-year) floodplain. Salmon Brook also has a regulatory floodway and is a Prime Wetland. As such, the wetland resources associated with Salmon Brook are considered Priority Resource Areas. The wetland on the west side of the rail corridor is a floodplain wetland contiguous to a Tier 3 watercourse, which also categorizes it as a Priority Resource Area.

Vegetation along the banks includes silky dogwood, Tatarian honeysuckle, Asian bittersweet, box elder, red maple, grasses, poison ivy, Japanese barberry (*Berberis thunbergii*), and multiflora rose. NA10 has a narrow floodplain wetland along the edge and NA11 had signs of beaver activity.

Salmon Brook and its associated wetlands and banks (NA8, NA9, NA10, and NA11) provide various functions including ecological integrity, fish habitat, flood storage, nutrient trapping/retention, sediment trapping, shoreline anchoring, uniqueness/heritage, and wildlife habitat. All except fish habitat and wildlife habitat are considered principal functions.

6.1.4 Nashua River (Wetlands NA12, NA13, NA14, NA15)

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream, Prime Wetland, Priority Resource Area <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH), palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

Flag series NA12, NA13, NA14, and NA15 correspond to the bank of the Nashua River near the railroad crossing. NA12 and NA14 are located on the western side of the railroad and NA13 and NA15 are located on the eastern side. The Nashua River railroad crossing is located approximately 900 feet north of Bridge Street in Nashua. The Nashua River has a regulatory floodway and an associated Zone AE (100-year) floodplain. It is also considered Prime Wetland and, as such, is categorized as Priority Resource Area.



Nashua River (NA13)



Nashua River (NA14)

NA12 is comprised of steep stone slab banks with vegetation growing throughout. The vegetation consists of Asian bittersweet, box elder, red maple, unknown grasses, and glossy buckthorn.

NA13 contains a small wetland bench that is vegetated with glossy buckthorn, grasses, poison ivy, fringed loosestrife (Lysimachia ciliata), silver maple (Acer saccharinum), and deer tongue grass (Dichanthelium clandestinum). There were also signs of beaver activity noted.

NA14 is comprised entirely of stone slabs. Growing on the stone slope is moss, a few grasses, Tatarian honeysuckle, maple saplings, and glossy buckthorn. There is a large concrete structure on the bank near NA14. The structure appears to be current or former outfall.

NA15 is a steep and tall bank with no wetland edge. Asian bittersweet, autumn olive (*Elaeagnus umbellata*), poison ivy, red oak, and silver maple vegetate the embankment.

The Nashua River and its associated banks and wetland (NA12, NA13, NA14, and

NA15) provide many functions including ecological integrity, fish habitat, flood storage, groundwater recharge, production export, shoreline anchoring, uniqueness/heritage, and wildlife habitat. Of these, ecological integrity, fish habitat, flood storage, and uniqueness/heritage are considered to be principal functions.

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Salmon Brook (NA15), looking toward railroad bridge

6.1.5 Pennichuck Brook: NA16, NA17, ME2, ME3

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream, Wetland, Prime Wetland, Priority Resource Area

<u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH), palustrine, scrub/shrub, broad-leaved deciduous, semi-permanently flooded (PSS1F)

Flag series NA16, NA17, ME2, and ME3 correspond to the banks of Pennichuck Brook and the Merrimack River at the outlet of Pennichuck Brook. The Pennichuck Brook crossing is located at mile post 41.77 and the brook delineates the Merrimack/Nashua town line.

ME3 is located on the northeastern side of the bridge. NA17 is located southeast of the bridge, across from ME3. ME2 is located on the northwest side of the bridge with NA16 on the southwest side. The Nashua portion of Pennichuck Brook (NA16 and NA17) are considered Prime Wetlands and are categorized as Priority Resource Areas. In addition, NA16 contains a small floodplain wetland that is adjacent to a Tier 3 watercourse, which also makes it a Priority Resource area. Pennichuck Brook has a regulatory floodway and an associated Zone AE (100-year) floodplain.

NA16 contains a small floodplain wetland which is classified as PSS1F. Under the railroad bridge, the banks are made of concrete abutments and wingwalls. NA16 is vegetated with silky dogwood, elderberry (*Sambucus canadensis*), poison ivy, grasses, and Asian bittersweet.

The dominant vegetation for ME2 includes Asian bittersweet, silver maple, and birch. ME3 is vegetated with poison ivy, glossy buckthorn, maple, speckled alder (*Alnus incana*), and silky dogwood. The dominant vegetation in NA16 includes silky dogwood, elderberry, grasses, and Asian bittersweet. NA17 is vegetated with Asian bittersweet, Tatarian honeysuckle, maple, and glossy buckthorn.

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Pennichuck Brook and its associated banks and wetland (NA16, NA17, ME2, and ME3) provide various functions including ecological integrity, fish habitat, flood storage, groundwater recharge, production export, sediment trapping, shoreline anchoring, uniqueness/heritage, and wildlife habitat. Of these ecological integrity, fish habitat, and wildlife habitat are provided at the principal level.

Pennichuck Brook (NA16, looking toward ME3)



Pennichuck Brook (ME3)

6.1.6 Wetland/Stream NA18, NA19, and NA23

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream, Wetland <u>Federal classification</u>: riverine, upper perennial, unconsolidated bottom (R3UB); riverine, lower perennial, unconsolidated bottom, permanently flooded, saturated (R2UBH); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)



Wetland/perennial stream NA19

Flag series NA18, NA19 and NA23 correspond to a small perennial stream and associated wetland. NA18 is a forested wetland located approximately 600 feet north of Circumferential Highway in Nashua. It connects to NA19 beyond the study area. NA19 includes a small perennial stream and adjacent wetland. Both wetland resource areas are located to the west of the railroad. The stream flows from NA19 under the railroad through a culvert into NA23, which drains into the Merrimack River.

The stream that flows through NA19 is approximately 5 to 6

feet wide with 2 to 4 inches of flowing water at the time of the site visit (May 2021). The substrate consists of cobbles, silt, and sand. Based on the observations made during the field visit and the watershed size (approximately 350 acres), the stream has been classified as a small perennial stream. The stream has not been observed during summer months and could potentially not flow year-round. The stream is not shown on the USGS topographic map. Downstream of the railroad crossing (NA23), the stream becomes larger and is classified as lower perennial (R2UBH). Water appears to flow into NA23 from the Merrimack River resulting in permanent flooding. The portion of the perennial stream located downstream of the rail corridor (NA23) had a water depth of approximately 1 foot at the time of the wetland delineation. The channel is 10 to 15 feet wide and the banks are steep and relatively tall (6 to 15 feet). The substrate consists of rock, cobbles, and sand.

NA18 and NA19 are vegetated with fringed loosestrife, speckled alder, silky dogwood, multiflora rose, garlic mustard (*Alliaria petiolata*), and green ash. NA23 is vegetated with poison ivy, speckled alder, Asian bittersweet, Tatarian honeysuckle, and some silky dogwood. Functions provided by NA18 and NA19 include flood storage, nutrient trapping, sediment trapping, and wildlife habitat. All except for wildlife habitat are provided at the principal level. NA23 provides fish habitat, flood storage, nutrient trapping, sediment trapping, shoreline anchoring, and wildlife habitat. Similar to NA18 and NA19, NA23 performs flood storage, nutrient trapping, and sediment trapping at the principal level.



Wetland NA23

6.1.7 Wetlands NA20 and NA21

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Wetland, Intermittent Stream, Perennial Stream <u>Federal classification</u>: riverine, intermittent, streambed (R4SB); riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, forested, broad-leaved deciduous, seasonally

flooded/saturated (PFO1E)



Wetland/Intermittent Stream NA20

NA20 includes an intermittent stream and forested wetland located approximately 1,300 feet south of Circumferential Highway on the western side of the railroad. The stream is approximately 5 to 6 feet wide and had 2 to 6 inches of flowing water at the time of the site visit (May 2021). Its substrate consists of sand and the banks are approximately 2 to 3 feet tall. The stream flows under the railroad corridor via a culvert into NA21, where it has been classified as a perennial stream. NA21 has banks that are approximately



Perennial Stream NA21

6 to 15 feet tall and the stream had at least one foot of water during the site visit (May 2021). The stream channel is approximately 10 to 15 feet wide and has a sandy substrate. There was not much flow near the Merrimack River but standing water was present. Water from the river appears to flow into the NA21 stream channel.

The dominant vegetation in NA20 includes Japanese knotweed, box elder, multiflora rose, and Asian bittersweet. A catbird was heard during the site visit and cottontail rabbits (*Sylvilagus sp.*) were observed along the

railroad adjacent to the wetland. The banks of NA21 are vegetated with Tatarian honeysuckle, glossy buckthorn, hazelnut (*Corylus americana*), multiflora rose, and grasses.

NA20 performs flood storage, nutrient trapping, sediment trapping, and wildlife habitat functions. None of these are provided at a principal level. NA21 provides fish habitat, flood storage, nutrient trapping, sediment trapping, shoreline anchoring, and wildlife habitat. Of these, flood storage, nutrient trapping, and sediment trapping are provided at a principal level.

6.1.8 Spit Brook: NA26

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Wetland, Priority Resource Area <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH), palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

NA26 is the portion of Spit Brook located just upstream of a culvert that carries it underground to the Merrimack River. It is located on the former Hampshire Chemical property between Daniel Webster Highway and the rail corridor in Nashua, adjacent to a potential rail station site (South Nashua Station). Spit Brook is a perennial stream with a water depth of approximately 8 to 12 inches at the time of the site visit (June 2021). The stream channel is approximately 8 to 10 feet wide with a 3-foot bank on the southern edge. The northern edge of the stream is a wetland. The stream substrate is a mixture of sand and silt with some rocks. A Zone AE floodplain and regulatory floodway is mapped just south of Spit Brook. It appears that this floodplain and floodway should correspond to Spit Brook and that the mapped floodplain and floodway may not be in the correct location. Since Spit Brook is a Tier 3 watercourse, the adjacent floodplain wetland is categorized as a Priority Resource Area.



Spit Brook (NA26) view upstream

NA26 is vegetated with jewelweed, skunk cabbage (Symplocarpus foetidus), Virginia creeper (Parthenocissus quinquefolia), box elder, poison ivy, honeysuckle, garlic mustard, and jack-in-the-pulpit (Arisaema triphyllum).

NA26 provides various functions including flood storage, groundwater recharge, nutrient trapping, production export, sediment trapping, shoreline anchoring, and wildlife habitat. Due to its fragmentation and various underground crossings, only shoreline anchoring and wildlife habitat are considered principal functions.

6.2 Merrimack

6.2.1 Wetlands ME1 and ME5

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Wetland, Intermittent Stream, Perennial Stream <u>Federal classification</u>: riverine, intermittent, streambed (R4SB); riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

ME1 is an intermittent stream and wetland located approximately 900 feet south of Mast Road in Merrimack. The stream channel is approximately 3 to 4 feet wide and has a sandy/silty substrate. At the time of the field visit in May 2021, there was 3 to 4 inches of flowing water. The stream in ME1 flows through a small stone culvert under the railroad into ME5, which drains into the Merrimack River. ME5 is classified as a perennial stream with a silt substrate and steep, eroded banks. At the time of the field visit, there was approximately 1 to 2 feet of water but not much flow was observed.

ME1 is vegetated with red maple and skunk cabbage. The banks of ME5 are vegetated with red oak, birch, grasses, and poison ivy.

The functions provided by ME1 include flood storage, groundwater recharge, nutrient trapping, sediment trapping, shoreline anchoring, and wildlife habitat. Due to its location in a developed area, none of the functions are performed at the principal level. ME5 provides fish habitat, flood storage, shoreline anchoring, and wildlife habitat. Similarly, due to its location, limited vegetated, and eroded banks, none are principal.



Wetland/Intermittent Stream ME1



Perennial Stream ME5

6.2.2 Perennial Stream ME4

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)



Perennial Stream ME4

Flag series ME4 corresponds to the bank of a small perennial stream located at a railroad culvert outlet at mile post 42.21. The stream flows into the Merrimack River approximately 30 feet downstream of the culvert outlet. It is located approximately 1,600 feet south of Mast Road on the eastern side of the rail corridor in Merrimack. The banks are approximately 10 to 15 feet tall and steep. There is standing water and little flow.

ME4 is vegetated with Asian bittersweet, speckled alder, Tatarian honeysuckle, maple, and grasses. The few functions performed by ME4 are fish habitat, flood storage, shoreline anchoring, and wildlife habitat. None of these are provided at the principal level due to the short length of the stream channel, the undersized railroad culvert, and its location in a developed area.

6.2.3 Wetlands ME6 and ME7

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Wetland, Perennial Stream

<u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

ME7 is a small perennial stream and wetland located just south of Anheuser Busch in Merrimack. It is located west of the railroad. The stream had 3 to 10 inches of flowing water during the time of the site visit (May 2021) and was approximately 3 feet wide with 3- to 4-foot-tall banks. The stream substrate is sand with organic debris (leaves, sticks). It flows through a small culvert under the railroad to ME6 (a perennial stream), which drains into the Merrimack River. There was very slow flow into the Merrimack River and the water was at least 1 foot deep at the time of the field review. The banks of the perennial stream ME6 are very steep and approximately 10 to 15 feet tall.

Vegetation along the banks of ME6 includes red maple, red oak, some glossy buckthorn and Japanese barberry, Asian bittersweet, grasses, Canada mayflower (*Maianthemum canadense*), and poison ivy. The wetland portion of ME7 is vegetated with mosses, some skunk cabbage, elderberry, yellow birch (*Betula alleghaniensis*), jewelweed, ostrich fern (*Matteuccia struthiopteris*), and poison ivy.



Wetland/Perennial Stream ME7

ME6 provides fish habitat, flood storage, nutrient trapping, sediment trapping, shoreline anchoring, and wildlife habitat. Of these, all except fish habitat are performed at the principal level. ME7 provides flood storage, groundwater recharge, nutrient trapping, production export, sediment trapping, shoreline anchoring, and wildlife habitat. Of these, all except groundwater recharge and production export are considered principal functions.



Perennial Stream ME6

6.2.4 Naticook Brook: ME8, ME9, ME10, and ME11

<u>New Hampshire Regulated Wetland Areas</u>: Wetland, Bank, Perennial Stream, Priority Resource Area <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, unconsolidated bottom, permanently flooded (PUBH); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E); palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E)



Naticook Brook (ME9) upstream of railroad bridge

Flag series ME8, ME9, ME10, and ME11 correspond to the wetland system and banks of Naticook Brook at the railroad crossing in Merrimack. Naticook Brook is located just south of Horseshoe Pond. The railroad bridge crosses the river at mile post 44.92. ME9 is the northern bank of Naticook Brook and includes a small forested/scrub-shrub floodplain wetland. ME10 is the southern bank. ME8 is an inundated wetland (PUBH) that connects to Naticook Brook beyond the study area. It is located north of the crossing and continues north beyond the study area. ME11 is a forested wetland located southwest of the railroad bridge and connects to ME10.

Naticook Brook has a mucky substrate and banks that are approximately 3 to 5 feet tall. There was approximately 1 to 2 feet of water in the stream at the time of the field review (May 2021). A beaver dam was observed on the upstream side of the crossing. The southern bank (ME10) contains some stone slabs near the railroad bridge but the bank is otherwise well vegetated. A sewer pipe bridges the stream on the east side of the railroad bridge.

The edge of Wetland ME8 is vegetated with sensitive fern (*Onoclea sensibilis*), silky dogwood, birch, and Japanese barberry. The central portion of the wetland is inundated and does not contain vegetation. The northern bank of Naticook Brook and its associated wetland (ME9) is vegetated with Asian bittersweet, multiflora rose, poison ivy, arrowwood (*Viburnum recognitum*), fringed loosestrife, glossy buckthorn, and meadow rue (*Thalictrum pubescens*). The southern bank of Naticook Brook (ME10) is heavily vegetated with Asian bittersweet, multiflora rose, poison ivy, sensitive fern, silky dogwood, ash, box elder, and ferns. Wetland ME11 is vegetated with box elder, speckled alder, multiflora rose, sensitive fern, arrowwood, and Asian bittersweet.



Functions provided by
Naticook Brook and its
associated wetlands include,
ecological integrity, fish
habitat, flood storage,
groundwater recharge,
nutrient trapping, production
export, sediment trapping,
shoreline anchoring, and
wildlife habitat. Of these, all
but groundwater recharge
and production export are
considered principal
functions.

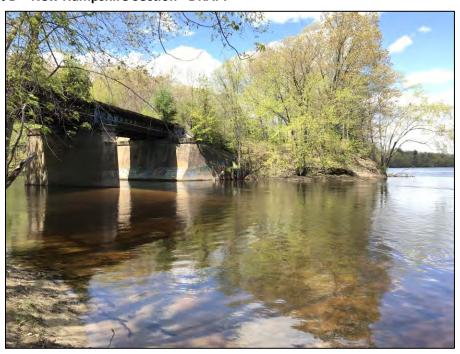
Naticook Brook (ME9 and ME10) view downstream showing sewer pipe bridge

6.2.5 Souhegan River: ME12, ME13, ME14, ME15

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream <u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)

Flag series ME12, ME13, ME14, and ME15 consist of the banks of the Souhegan River at the railroad crossing (mile post 46.22). The crossing is located approximately 550 feet north of Railroad Avenue in Merrimack. ME12, ME13, and ME14 have a bank height of approximately 6 to 10 feet while ME15 is approximately 2 to 5 feet tall. The Souhegan River water depth was at least 3 feet deep at the time of the site visit (May 2021). Vegetation along the banks includes silver maple, Japanese knotweed, Asian bittersweet, poison ivy, Japanese barberry, red oak, and grasses.

The Souhegan River and its banks provides various functions including ecological integrity, fish habitat, flood storage, groundwater recharge, noteworthiness, production export, shoreline anchoring, and wildlife habitat. Of these, ecological integrity, fish habitat, flood storage, noteworthiness, and wildlife habitat are considered principal functions. The Souhegan River is a NH Designated River.



Souhegan River bridge and Merrimack River (view toward ME14)



Souhegan River (ME15 and ME12)

6.3 Bedford

6.3.1 Sebbins Brook: BE1, BE2, BE11, and BE12

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Wetland, Perennial Stream, Ephemeral Stream/Erosion Channel

<u>Federal classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH); palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E)

Flag series BE1, BE2, BE11, and BE12 correspond to the banks of Sebbins Brook at the railroad crossing in Bedford. Sebbins Brook is located approximately 350 feet south of Raymond Wieczorek Drive, at mile post 50.21. Flag series BE11 also include an emergent wetland that is connected to Sebbins Brook via an ephemeral stream/erosion channel. BE1 and BE2 are located on the east side of the railroad, where Sebbins Brook enters the Merrimack River. BE1 is the northern bank and, BE2 is the southern bank. BE1 and BE2 are vegetated with red maple, red oak, Asian bittersweet, poison ivy, ash samplings, and some burning bush (*Euonymus alatus*).



Sebbins Brook (BE1 and BE2)

BE11 and BE12 are located on the western (upstream) side of the rail crossing. BE11 is the northern bank and also includes an emergent wetland and ephemeral stream/erosion channel. At the time of the site visit in May 2021, the channel had no water, was filled with leaves, and had steep, eroded banks. Vegetation within the emergent wetland includes royal fern, sensitive fern, and cinnamon fern. A small culvert inlet is located at the northern edge of the wetland, near a paved bike path. Vegetation within and adjacent to the ephemeral stream was limited to a few ferns and red maple saplings.



Sebbins Brook (BE11 and BE12)



Ephemeral stream/erosion channel (BE11)

The vegetation along the bank section of BE11 includes ferns, red oak saplings, and red maple. BE12 corresponds to the southern bank of Sebbins Brook and is vegetated with Virginia creeper, American hazelnut seedlings, ferns, goldenrod (Euthamia sp.), and ostrich fern. Some skunk cabbage and jewelweed are located along the stream at the bottom of the bank. Overall, the substrate for Sebbins Brook consists of a mix of rocks, cobbles, and sand. The banks are generally around 8 feet tall, and the stream had 6 to 12 inches of flowing water at the time of the field review (May 2021).

Functions provided by Sebbins Brook and its banks includes fish habitat, flood storage, groundwater recharge, production export, shoreline anchoring, and wildlife habitat. Of these, only wildlife habitat is considered a principal function. The emergent wetland located north of Sebbins Brook (BE11) provides some nutrient trapping and sediment trapping, although overall the functions provided by this wetland are limited by its small size, location, and lack of dense/diverse vegetation. The ephemeral stream/erosion channel portion of BE11 does not provide any functions at a notable level.



Emergent wetland (BE11)

6.3.2 Intermittent Stream: BE3 and BE4

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Intermittent Stream Federal Classification: riverine, intermittent, streambed (R4SB)



Headwall erosion of intermittent stream BE3 and BE4

BE3 and BE4 correspond to the banks of an intermittent stream located downstream of the railroad culvert crossing at mile post 50.45. The stream is located approximately 850 feet north of Raymond Wieczorek Drive in Bedford. BE3 is the southern bank and BE4 is the northern bank. The culvert headwall is heavily eroded and several concrete blocks have collapsed into the stream. The railroad embankment is also eroded. The stream is approximately 1 to 2 feet wide with 1 to 2 inches of flowing water at the time of the field review (May 2021). The stream substrate is a mix of sand and cobbles.



BE3 and BE4, view downstream

The banks are approximately 4 to 6 feet tall on the southern side (BE3) and as tall as 8 feet on the northern side (BE4).

Both banks are vegetated with speckled alder, cinnamon fern (Osmunda cinnamomea), jewelweed, yellow birch, red oak, white pine, Canada mayflower, and grasses. The only function provided by the intermittent stream and its banks is wildlife habitat, which is provided at a principal level due to its location near the Merrimack River and wildlife sign observed during the field review.

6.3.3 Wetland and Intermittent Stream: BE5

<u>New Hampshire Regulated Wetland Areas</u>: Wetland, Bank, Intermittent Stream

<u>Federal Classification</u>: palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E); palustrine, scrub/shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E); riverine, intermittent,

Wetland BE5

BE5 consists of a small intermittent stream and an emergent/scrub-shrub wetland. It is located approximately 750 feet north of Raymond Wieczorek Drive and extends for approximately 350 feet along the western side of the rail corridor. The wetland is mostly emergent with some scrub-shrub along the edges. There is some standing water in the center.

streambed (R4SB)

Dominant vegetation within BE5 includes common reed, purple loosestrife, sensitive



fern, duckweed (*Lemna sp.*), gray birch (*Betula populifolia*), and glossy buckthorn.

BE5 provides flood storage, groundwater recharge, nutrient trapping, sediment trapping, and wildlife habitat. Nutrient trapping, sediment trapping, and wildlife habitat are considered principal functions.

Intermittent Stream culvert of BE5

6.3.4 Merrimack River Bridge: BE6 and MA1

<u>New Hampshire Regulated Wetlands Areas</u>: Bank, Perennial Stream
<u>Federal Classification</u>: riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)



Merrimack River Bridge, southern bank (BE6)

BE6 and MA1 correspond to the banks of the Merrimack River at the railroad bridge crossing at mile post 51.84. BE6 is the southern side and is in Bedford. MA1 is the northern side and is in Manchester.

The southern bank (BE6) is sandy and rocky with some bedrock. It slopes gradually, with the top of the bank approximately 3 to 4 feet vertically above Ordinary High Water. The bank is vegetated with autumn olive, glossy buckthorn, Canada mayflower, mosses, and red maple.



Merrimack River Bridge, northern bank (MA1)

The northern bank (MA1) is approximately 4 to 8 feet tall with stone rip rap. It is vegetated with Japanese knotweed, autumn olive, Asian bittersweet, Tatarian honeysuckle, poison ivy, maple species and aspen species. In some places the stone rip rap extends to the river.

The Merrimack River and its banks provide various functions within the study area. These include ecological integrity, fish habitat, flood storage, groundwater recharge, noteworthiness, production export, scenic quality, shoreline anchoring, uniqueness/heritage, and

wildlife habitat. Of these, all except flood storage, groundwater recharge, and scenic quality are considered principal functions.

6.3.5 Wetlands BE7, BE8, BE9, and BE10

New Hampshire Regulated Wetland Areas: Wetland, Intermittent Stream Federal Classification: riverine, intermittent, streambed (R4SB); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E); palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E); palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E)

Wetlands BE7, BE8, BE9 and BE10 are a group of wetlands located just north of Raymond Wieczorek Drive in Bedford. They are located near mile post 50.33 and west of the railroad. BE7 and BE8 are on the northern side of Somerville Drive. Wetland BE7 borders a storage tank facility. Wetland BE8 is a small emergent wetland located adjacent to Sommerville Drive. The two wetlands have a narrow connection where it appears that water flows from BE8 into BE7.

Wetland BE7 is forested and contains a small intermittent stream channel that begins within the wetland. The stream is approximately 2 to 3 feet wide with no banks and a mucky substrate. At the time of the field review, (May 2021), there was approximately 2 to 3 inches of slowly flowing water. A small culvert that is mostly buried is located at the southern end of BE7. It appears that this culvert connects to BE9 under Somerville Drive. Red-winged black birds were observed within BE7. Dominate vegetation includes glossy buckthorn, common reed, royal fern, and sensitive fern. BE8 is an emergent wetland with saturated soils in some areas. It is vegetated by skunk cabbage, common reed, purple loosestrife, and some sedges.



Wetland BE7



Wetland BE8



Wetland BE9



Wetland BE10

Wetland BE9 is a 3- to 4-foot-wide wetland swale located between Somerville Drive and Raymond Wieczorek Drive. BE9 is classified as PEM/SS1E. It contains cattail, purple loosestrife, and some speckled alder.

Wetland BE10 is located just east of BE9 and is classified as PEM/FO1E. There is an 18-inch culvert located near Somerville Drive and a fence borders most of the wetland. The emergent portion contains mostly common reed. The forested portion is vegetated with speckled alder, Asian bittersweet, red maple, royal fern, sensitive fern, common reed, and poison ivy.

Wetland BE7 provides flood storage, groundwater recharge, nutrient trapping, production export, sediment trapping, shoreline anchoring, and wildlife habitat. Of these, nutrient trapping and sediment trapping are performed at a principal level. The only function provided by BE8, BE9, and BE10 is nutrient trapping, and this is provided at a lower level due to the small size of the wetlands and fragmentation from the surrounding development.

6.4 Manchester

6.4.1 Wetlands MA2 and MA3

New Hampshire Regulated Wetland Areas: Wetland

<u>Federal Classification</u>: palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E); palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated (PFO1Ex); palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated (PSS1Ex)



Wetland MA2

Wetlands MA2 and MA3 are located north of the Merrimack River Bridge in Manchester at mile post 52.11. MA2 is to the east of the railroad and MA3 is across the railroad to the southwest. MA2 includes a narrow ditch that runs parallel to the railroad and drains into a small, flooded wetland area. The wetland is vegetated with skunk cabbage, maple, poison ivy, Tatarian honeysuckle, slippery elm, burning bush, and Asian bittersweet. MA3 is a scrub-shrub/forested wetland swale with saturated soils. Two culverts were noted, one under the railroad and one under Pine Island Road.

Wetland MA3 is vegetated with skunk cabbage, silky dogwood, burning bush, and jewelweed. Red oak, white pine, and Norway maple (*Acer platanoides*) are located along the edge of the wetland.

The functions provided by MA2 and MA3 include flood storage, nutrient trapping, and sediment trapping. MA2 also provides wildlife habitat. None of these functions are provided at a principal level due to the small size of the wetlands and fragmentation.



Wetland MA3

6.4.2 Wetlands MA4 and MA5

New Hampshire Regulated Wetland Areas: Wetland

<u>Federal Classification</u>: palustrine, emergent, persistent, seasonally flooded/saturated, excavated (PEM1Ex); palustrine, emergent, persistent, seasonally flooded/saturated, (PEM1E); palustrine, forested, broad-leaved



Wetland MA4

deciduous, seasonally flooded/saturated (PFO1E)

Wetlands MA4 and MA5 are located near mile post 55, north of Queen City Avenue, in Manchester. Both are located east of the rail corridor. They are small, disturbed, low functioning wetlands. MA4 is classified as PEM1Ex and is vegetated with purple loosestrife, cattail, ash seedlings, and horsetail (Equisetum sp.). The wetland has saturated soil in areas and some rocks/fill. MA5 is an emergent/forested wetland with common reed, cattail, purple loosestrife, and quaking aspen (at the edge). Water-



Wetland MA5

stained leaves provided evidence of recent inundation but no water was observed at the time of field review. Wetland MA5 continues east beyond the study area.

MA4 and MA5 provide a small amount of flood storage but no other wetland functions.

APPENDIX A

Figures

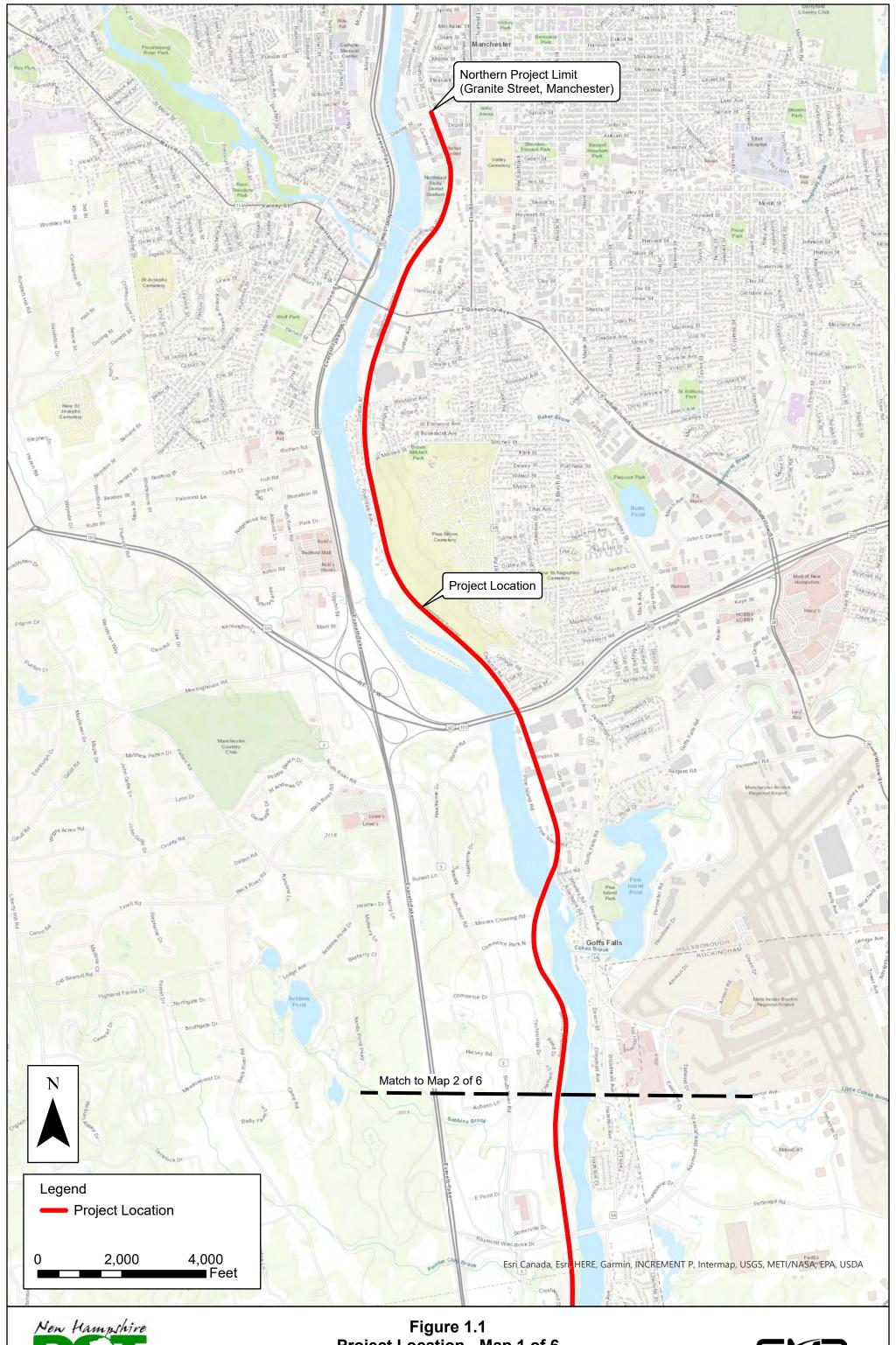
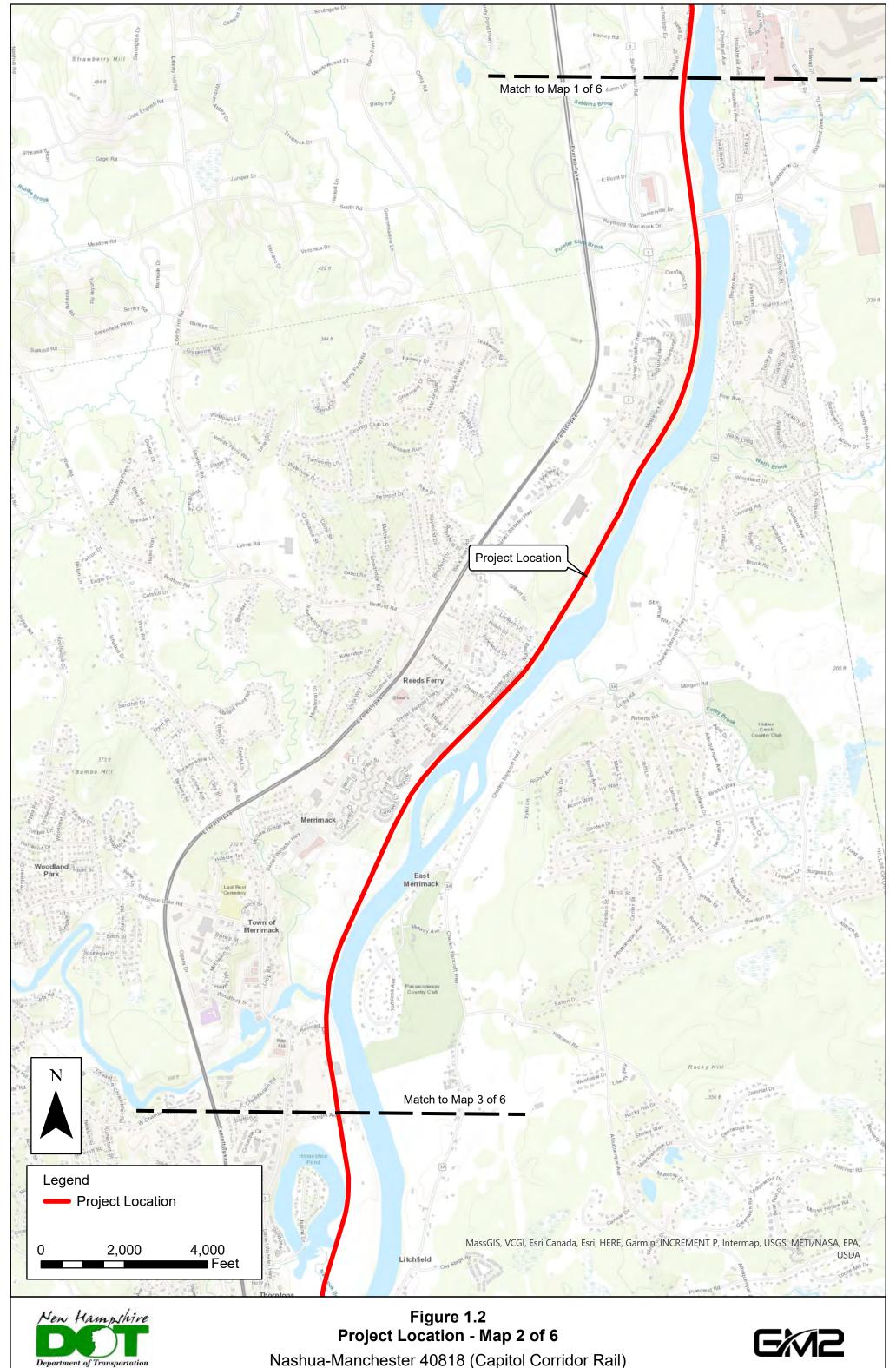




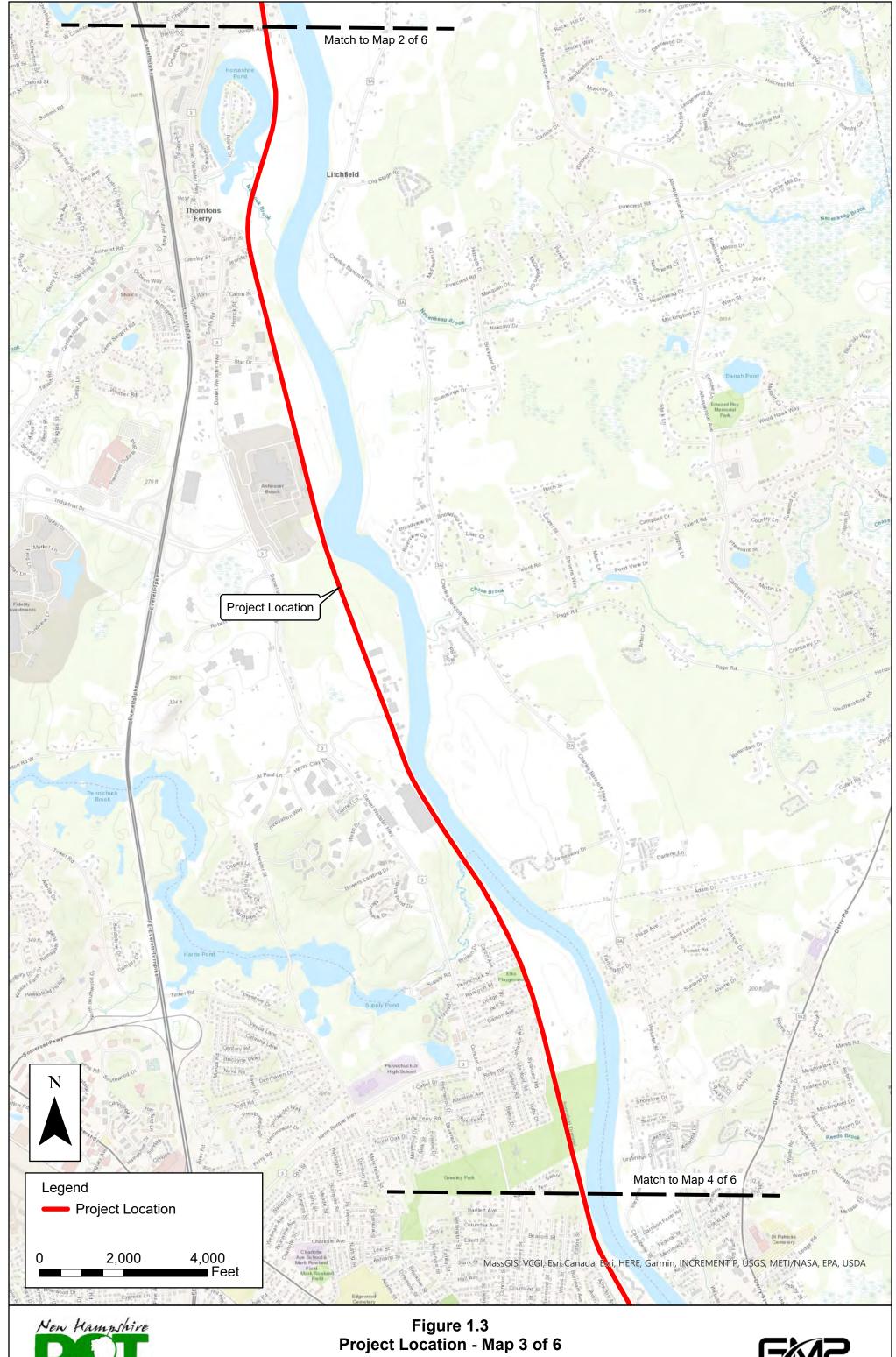
Figure 1.1
Project Location - Map 1 of 6
Nashua-Manchester 40818 (Capitol Corridor Rail)







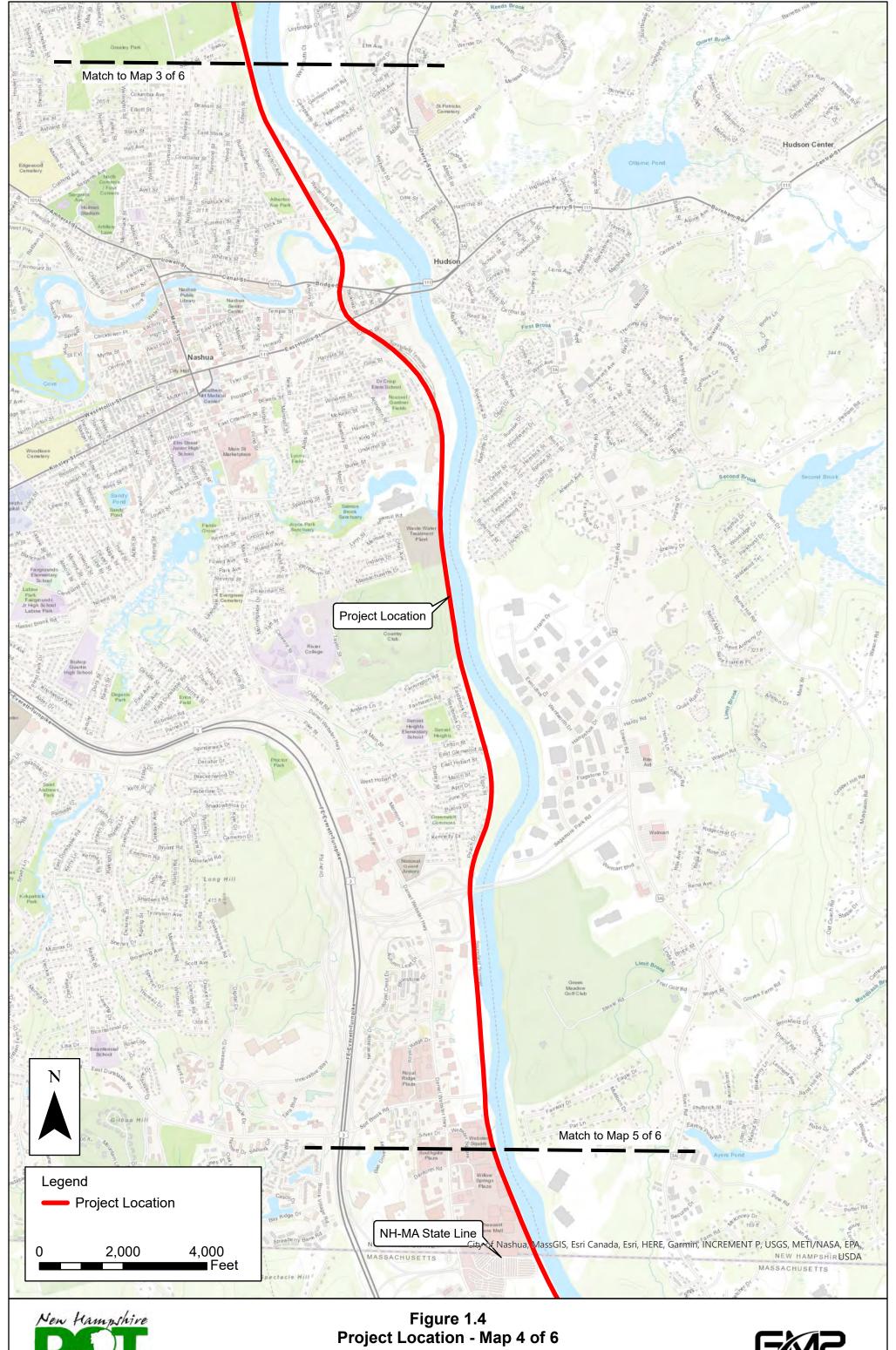
Nashua-Manchester 40818 (Capitol Corridor Rail)





Nashua-Manchester 40818 (Capitol Corridor Rail)

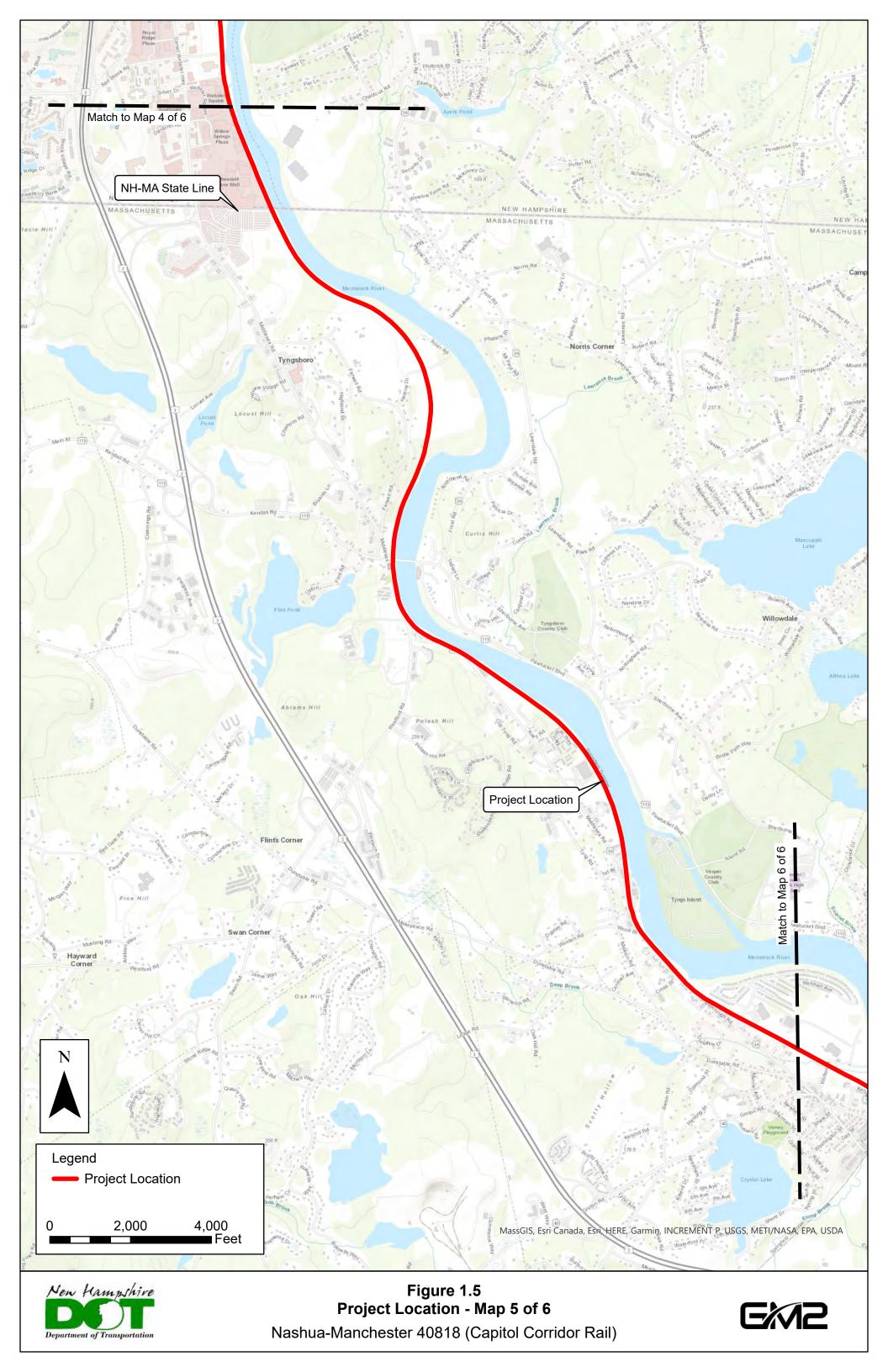


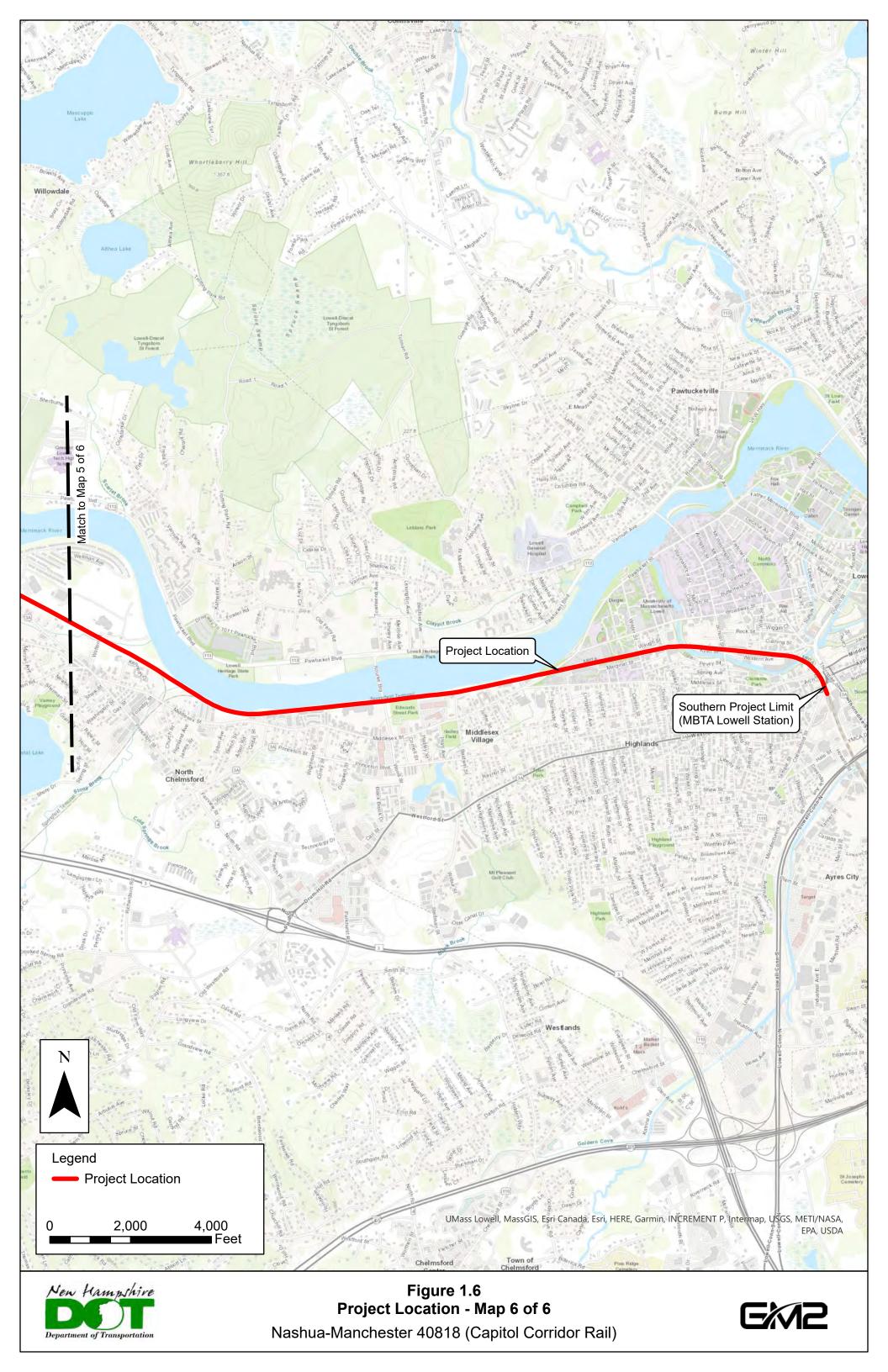


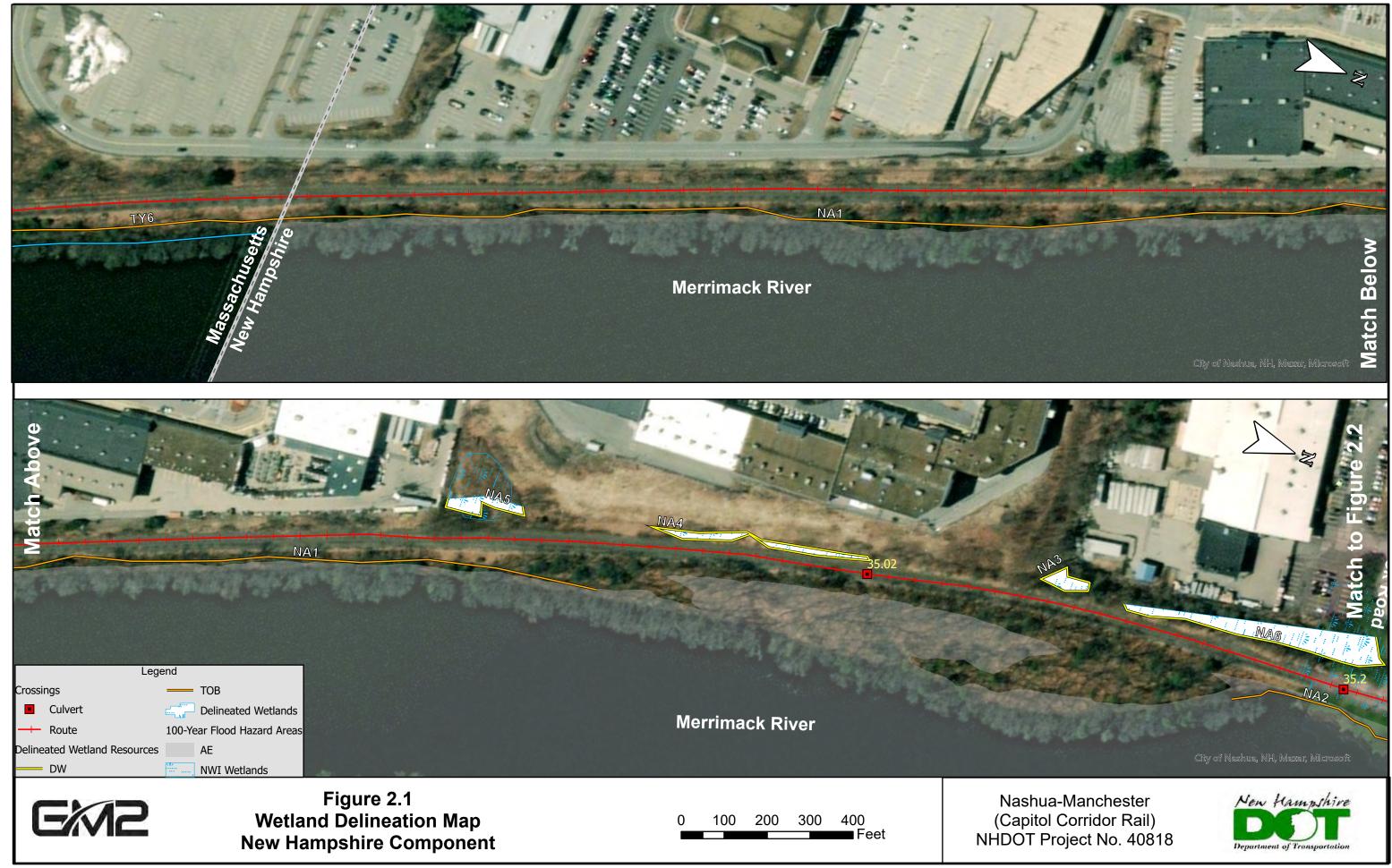


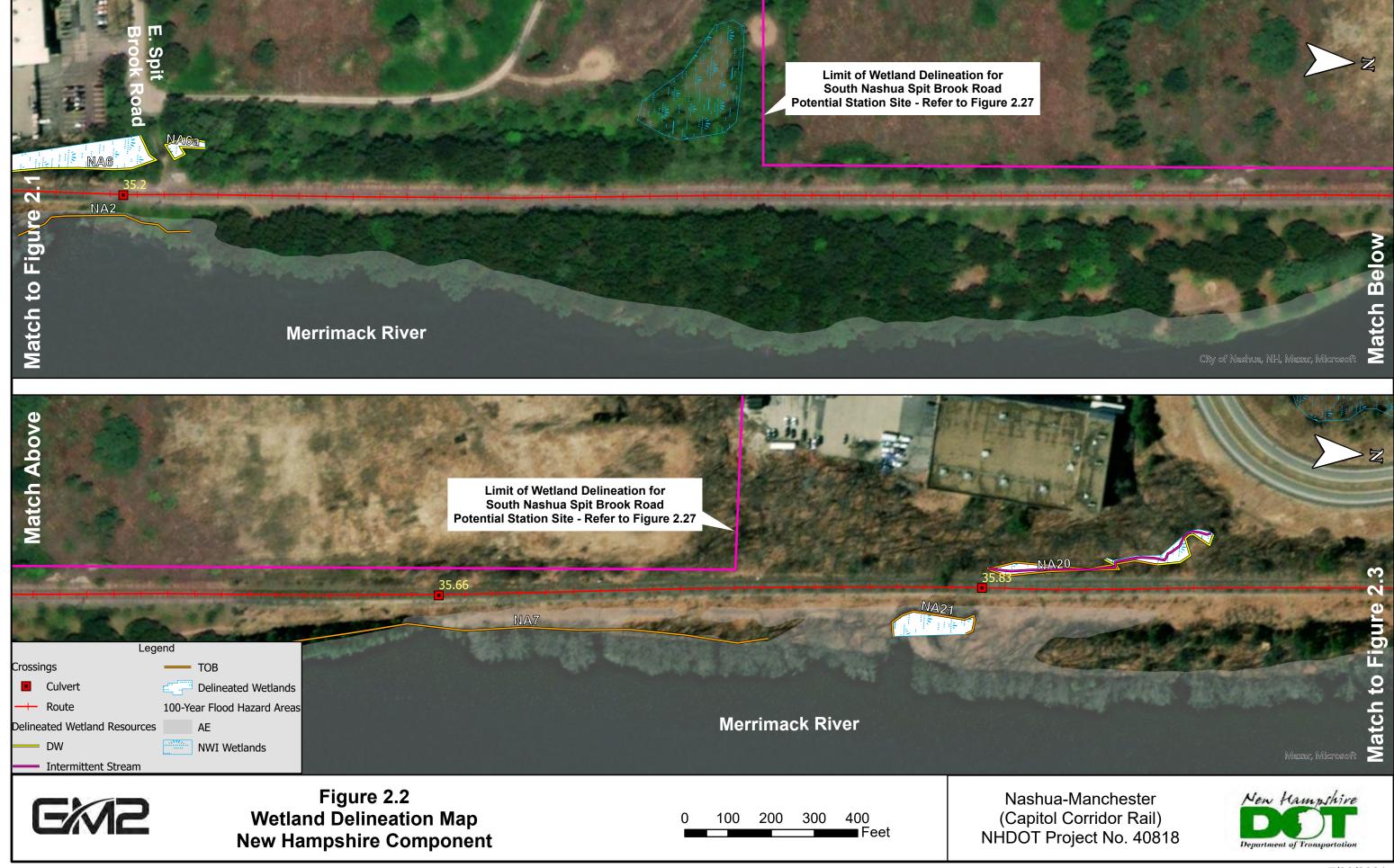
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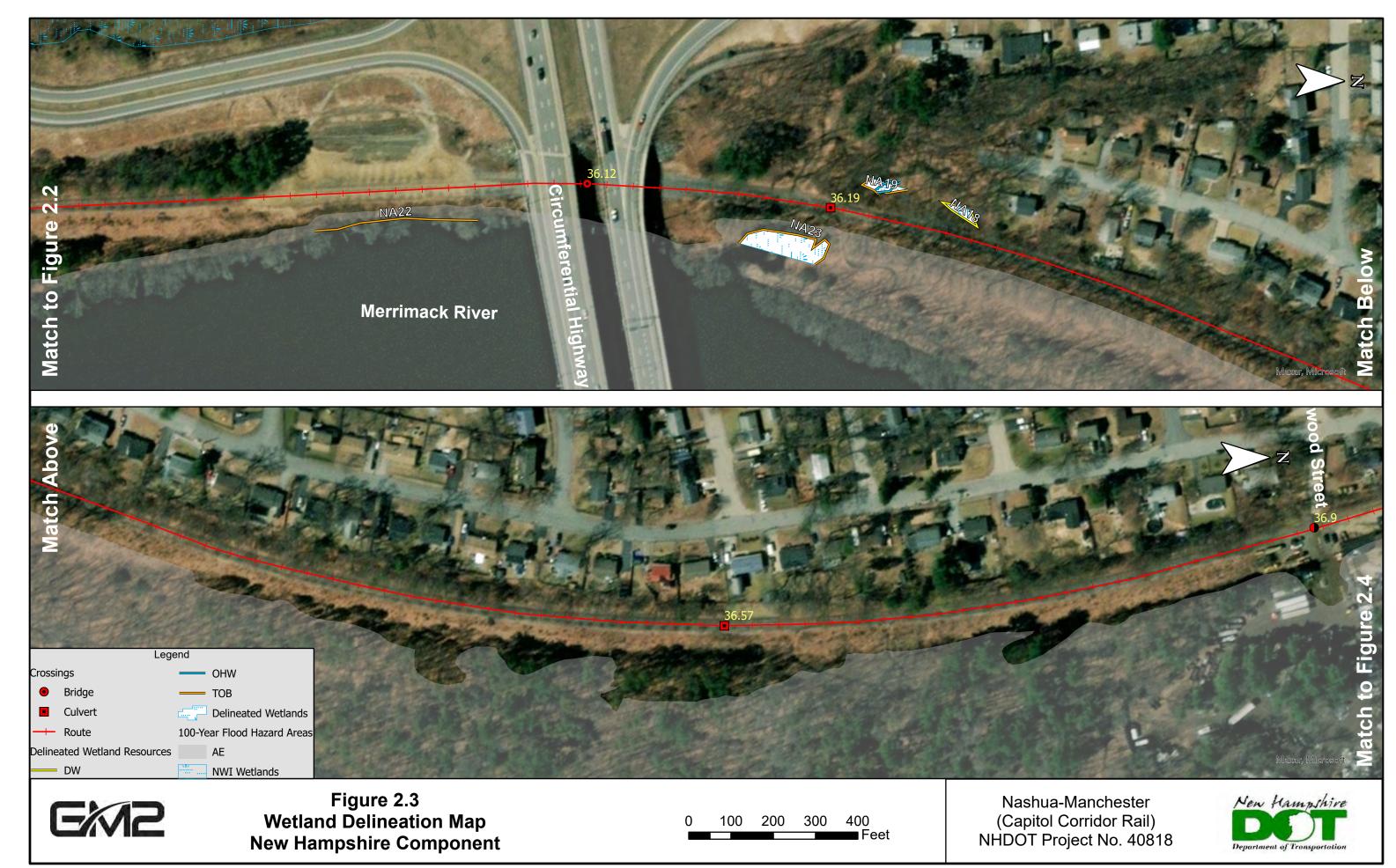


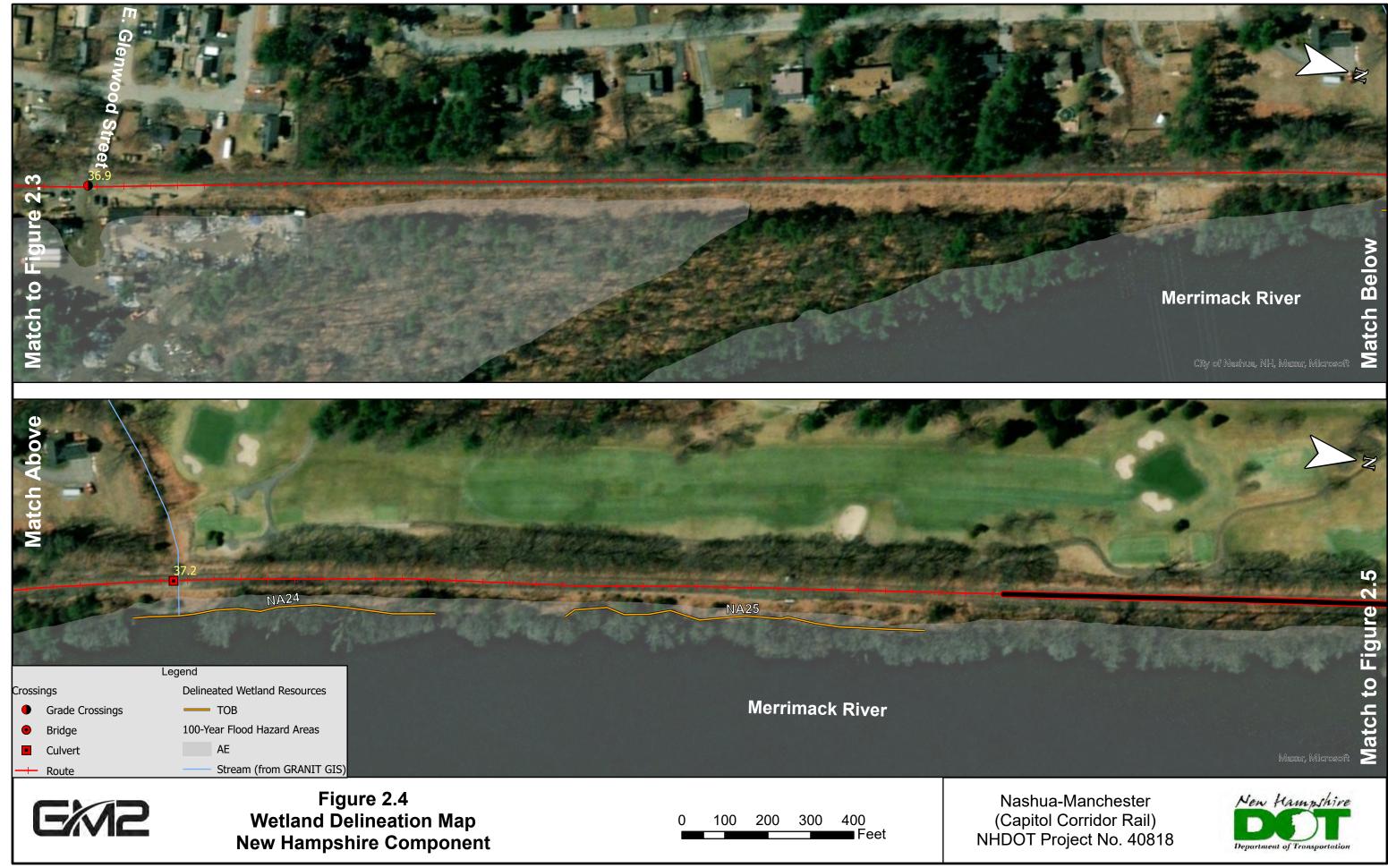












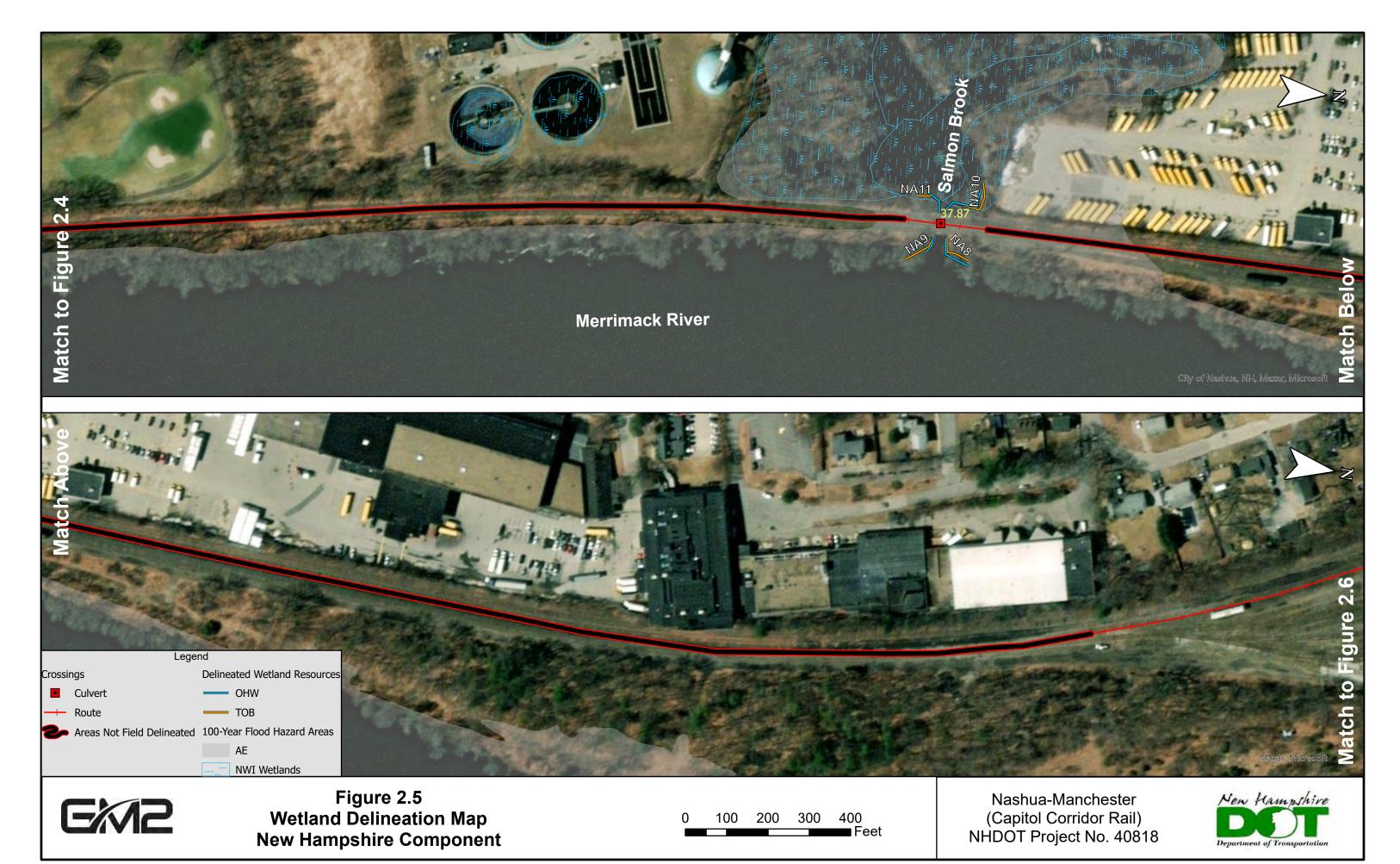




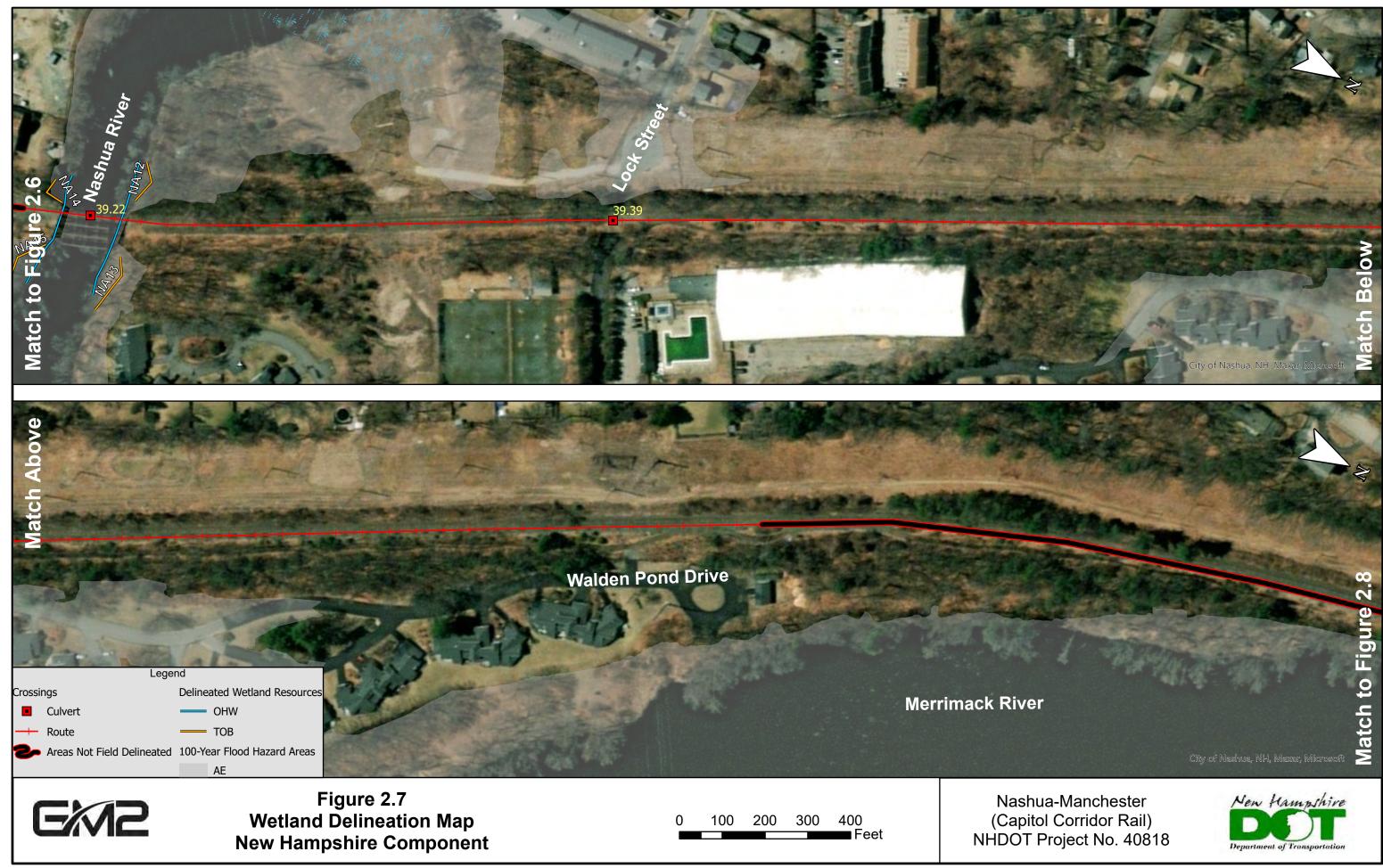


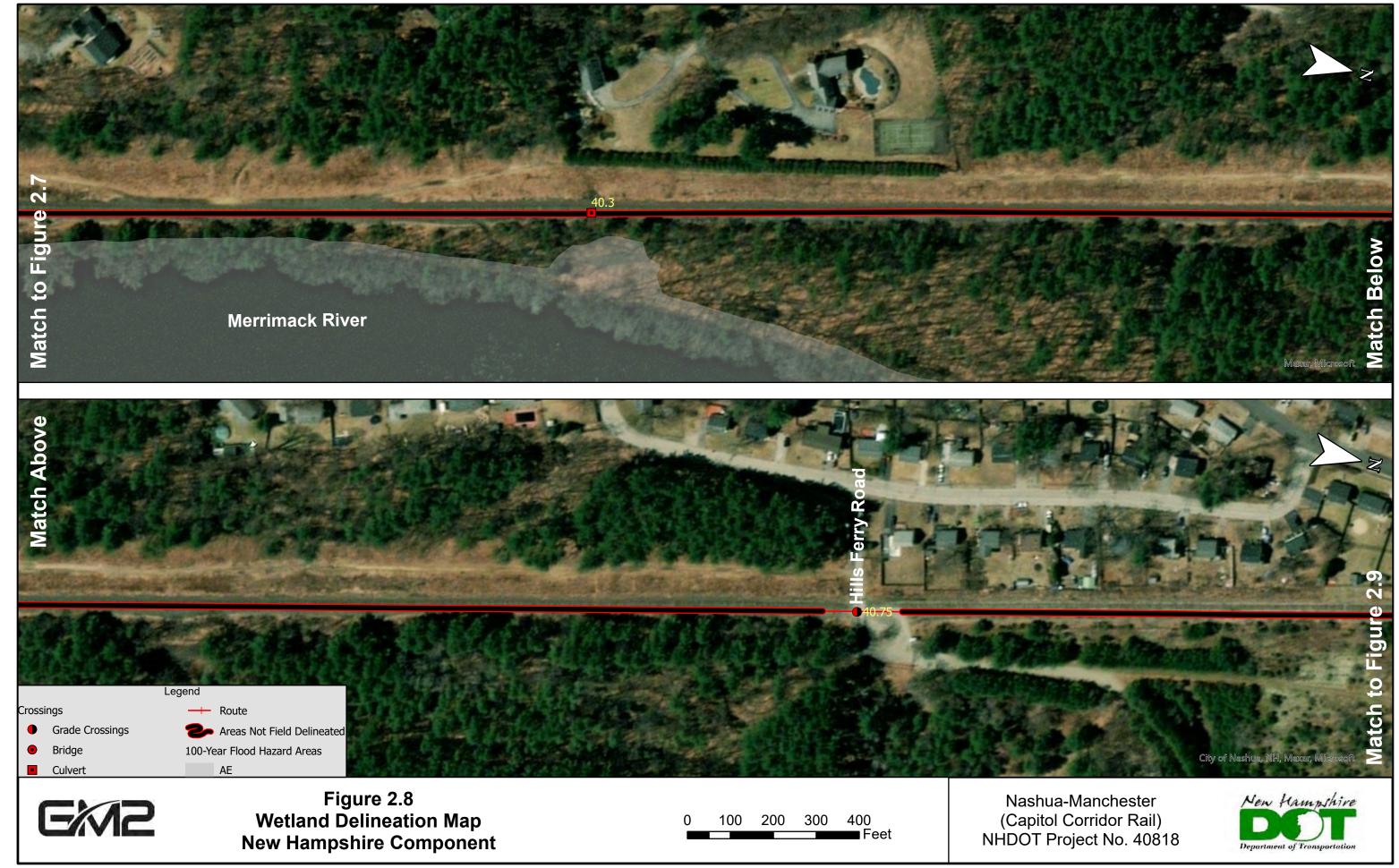


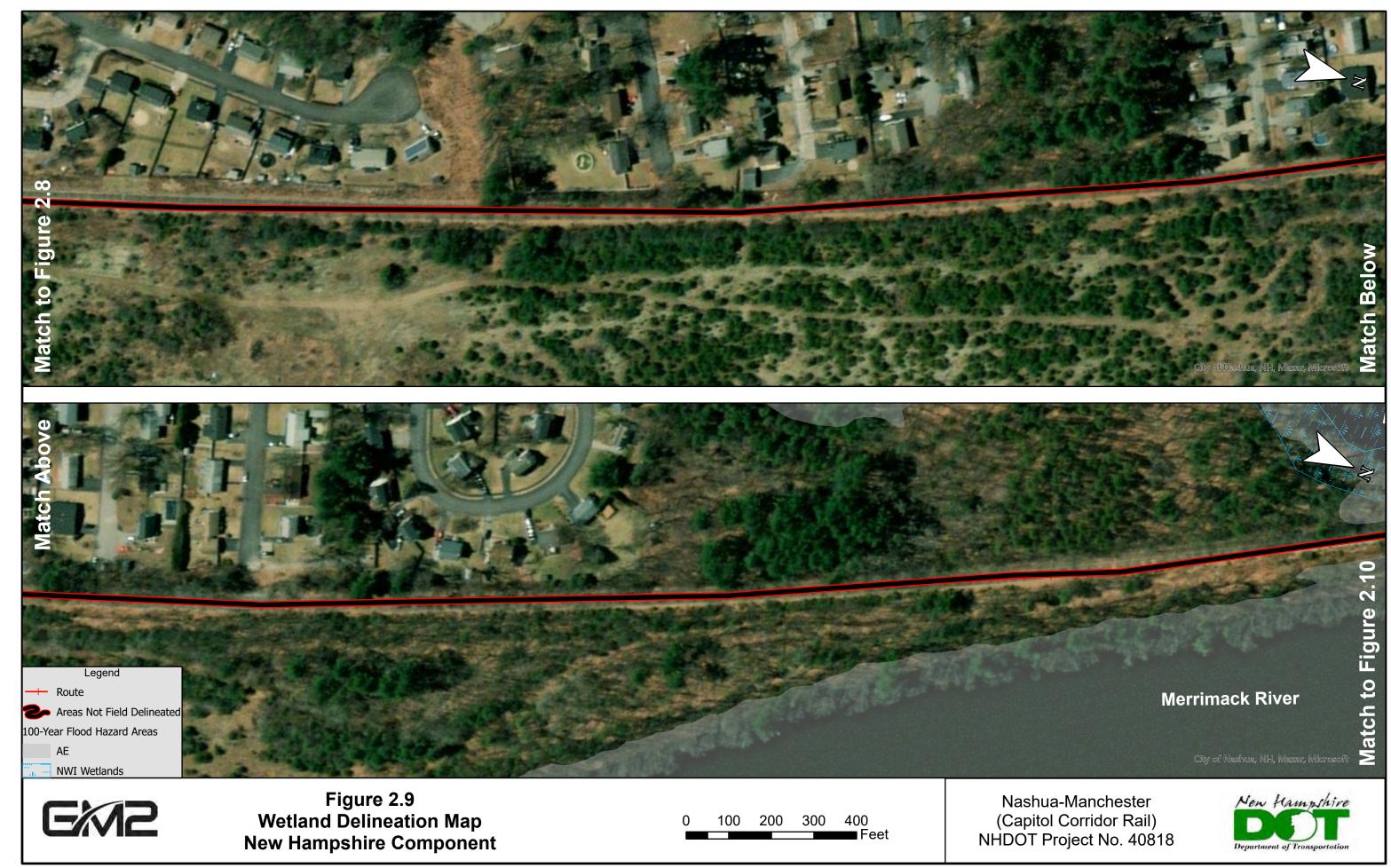
Figure 2.6
Wetland Delineation Map
New Hampshire Component

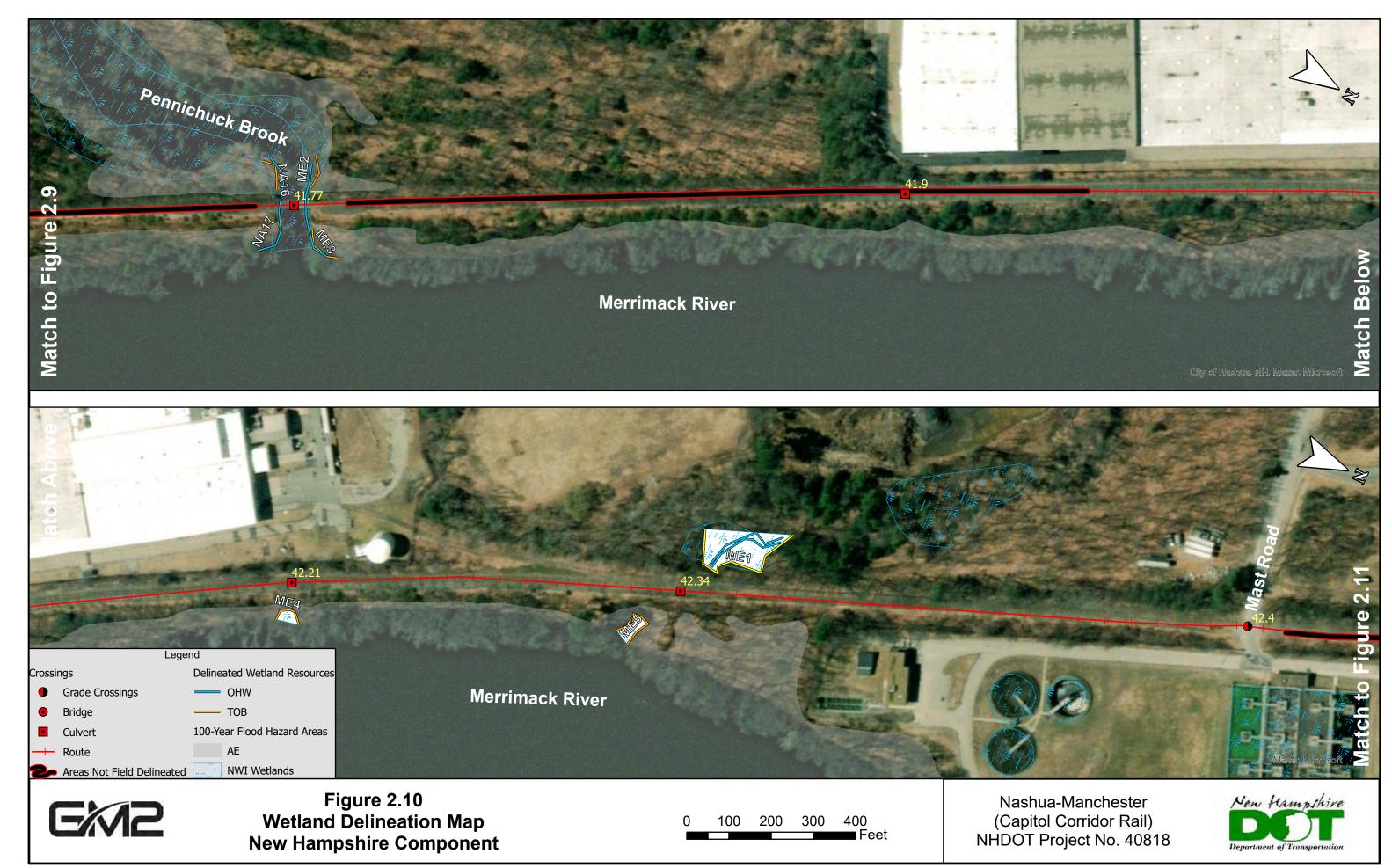
0 100 200 300 400 Feet Nashua-Manchester (Capitol Corridor Rail) NHDOT Project No. 40818

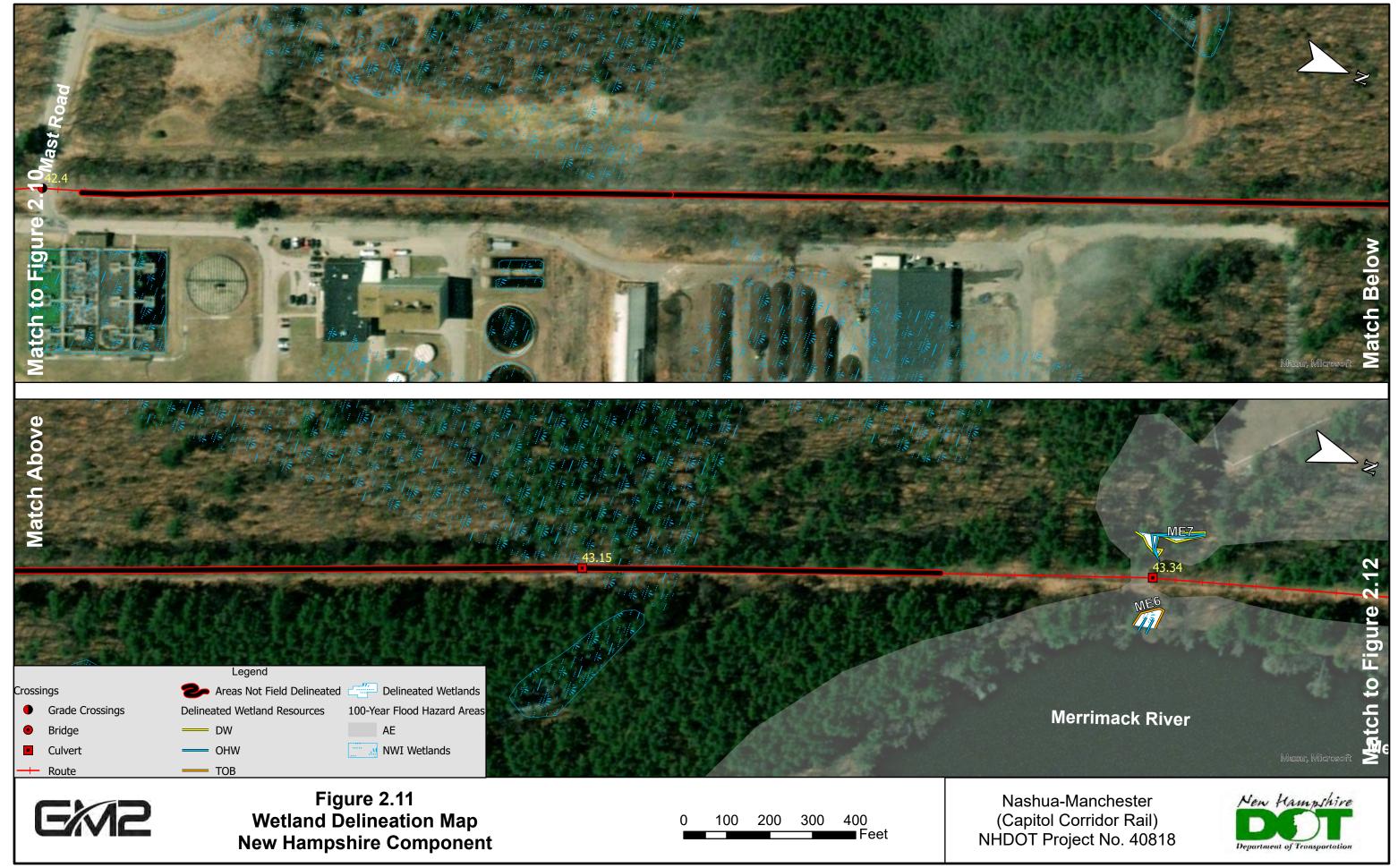


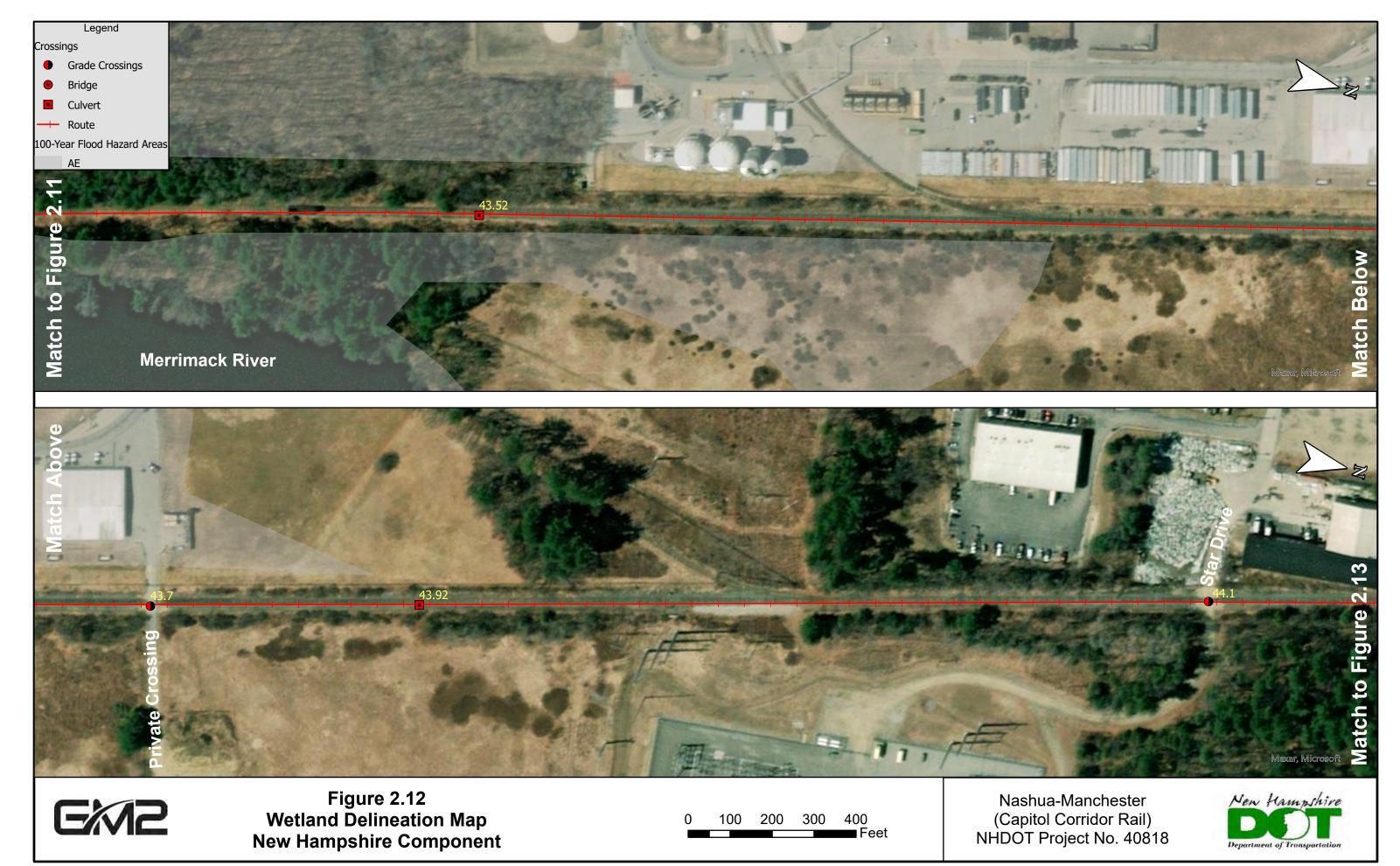


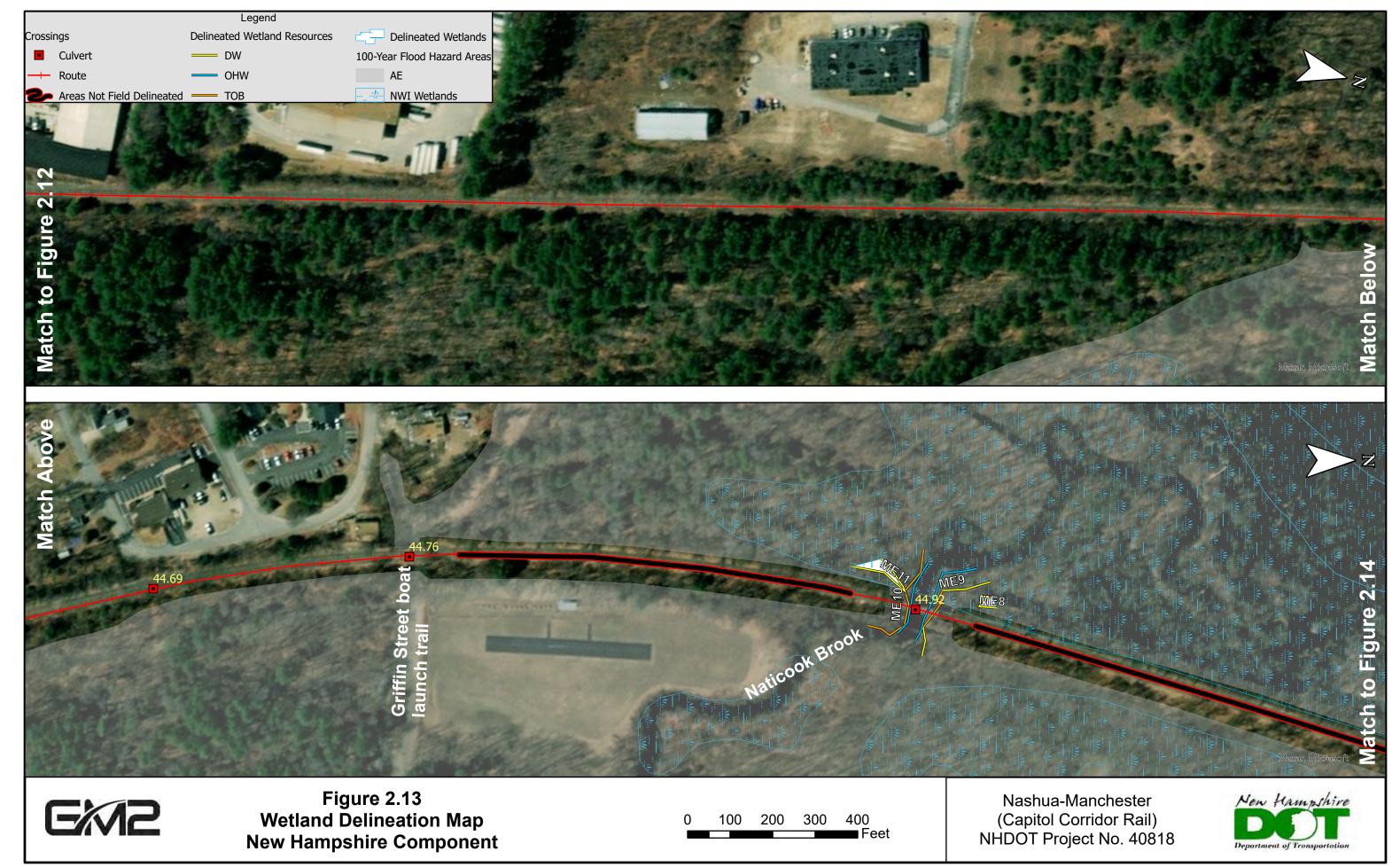


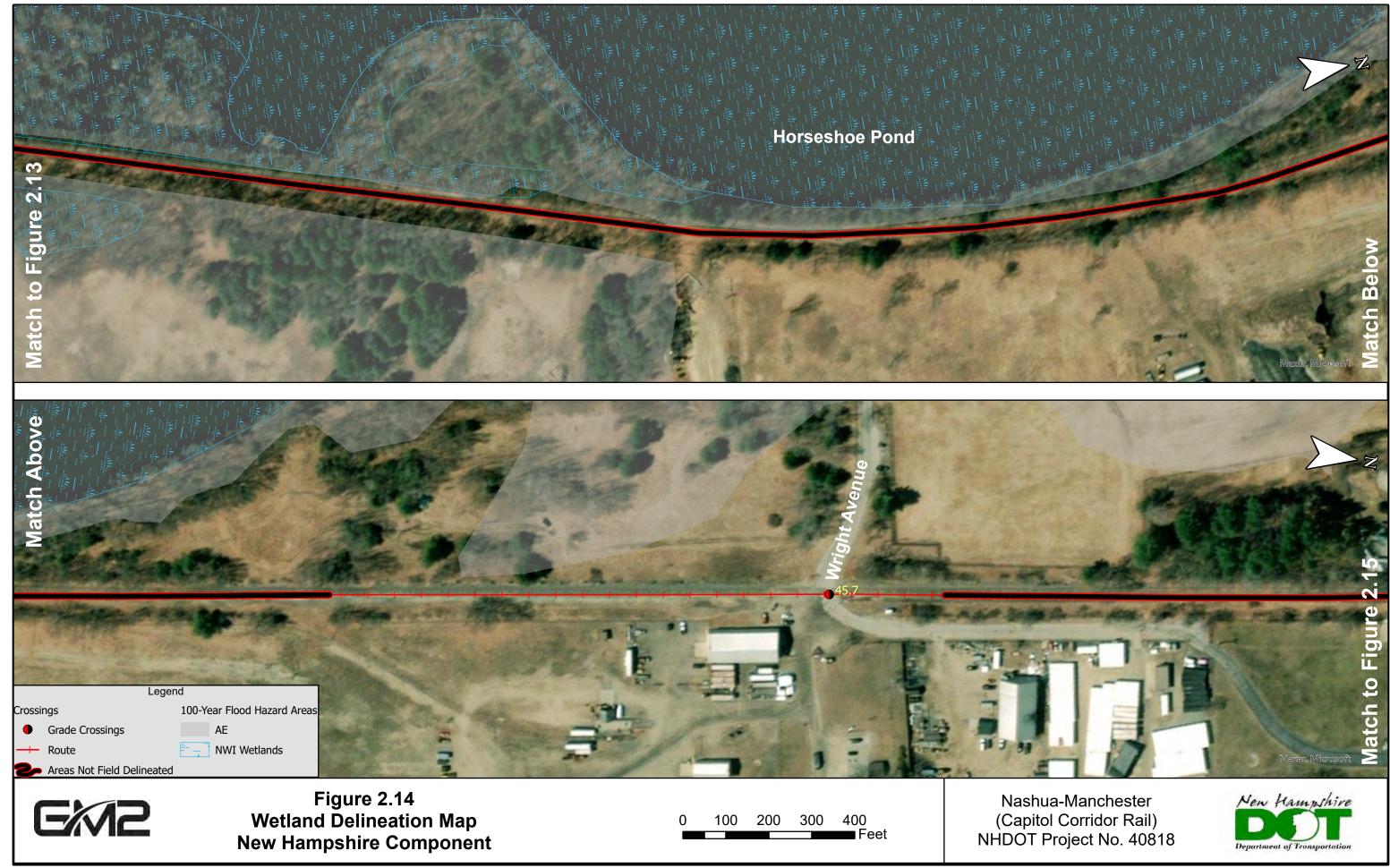


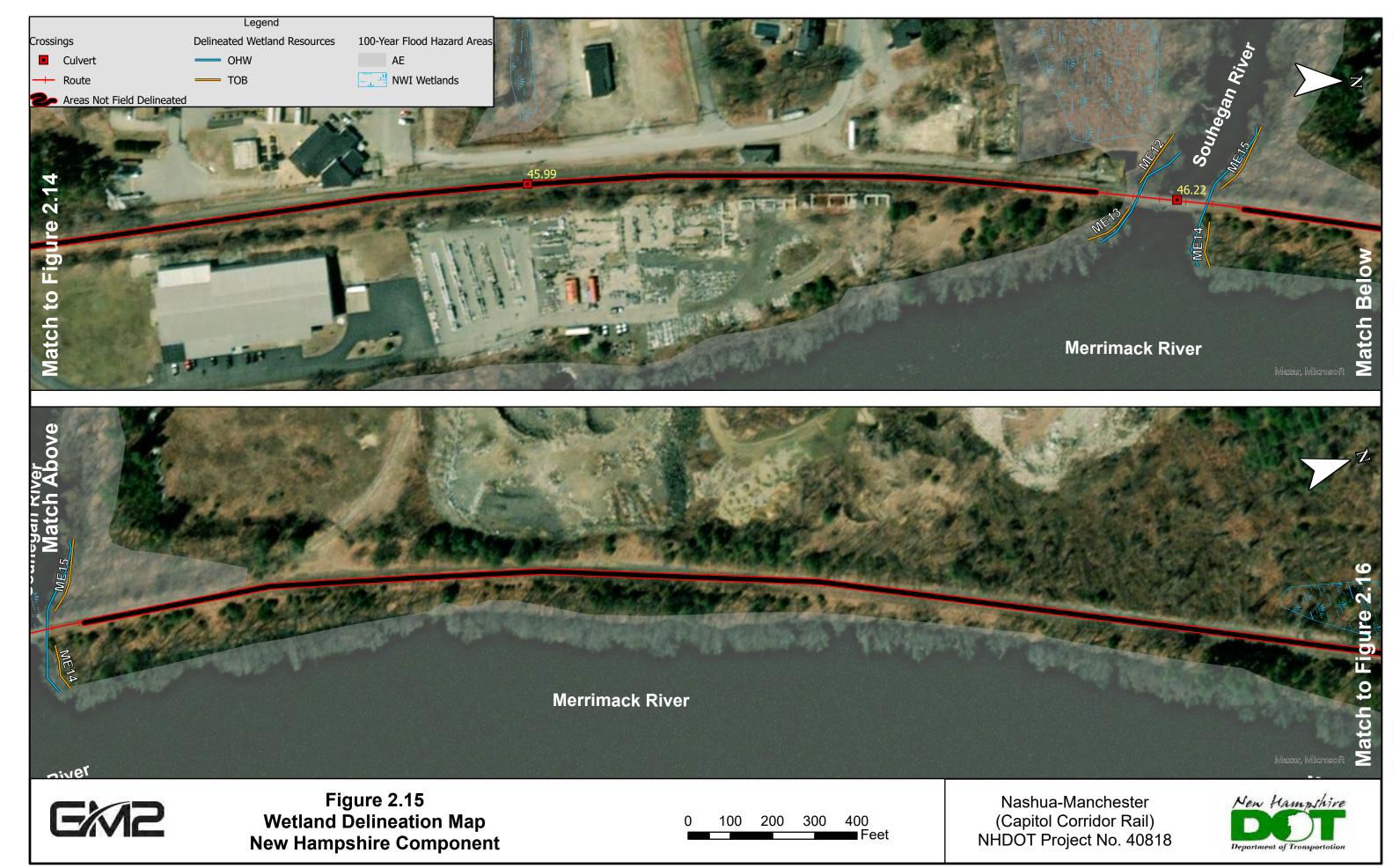


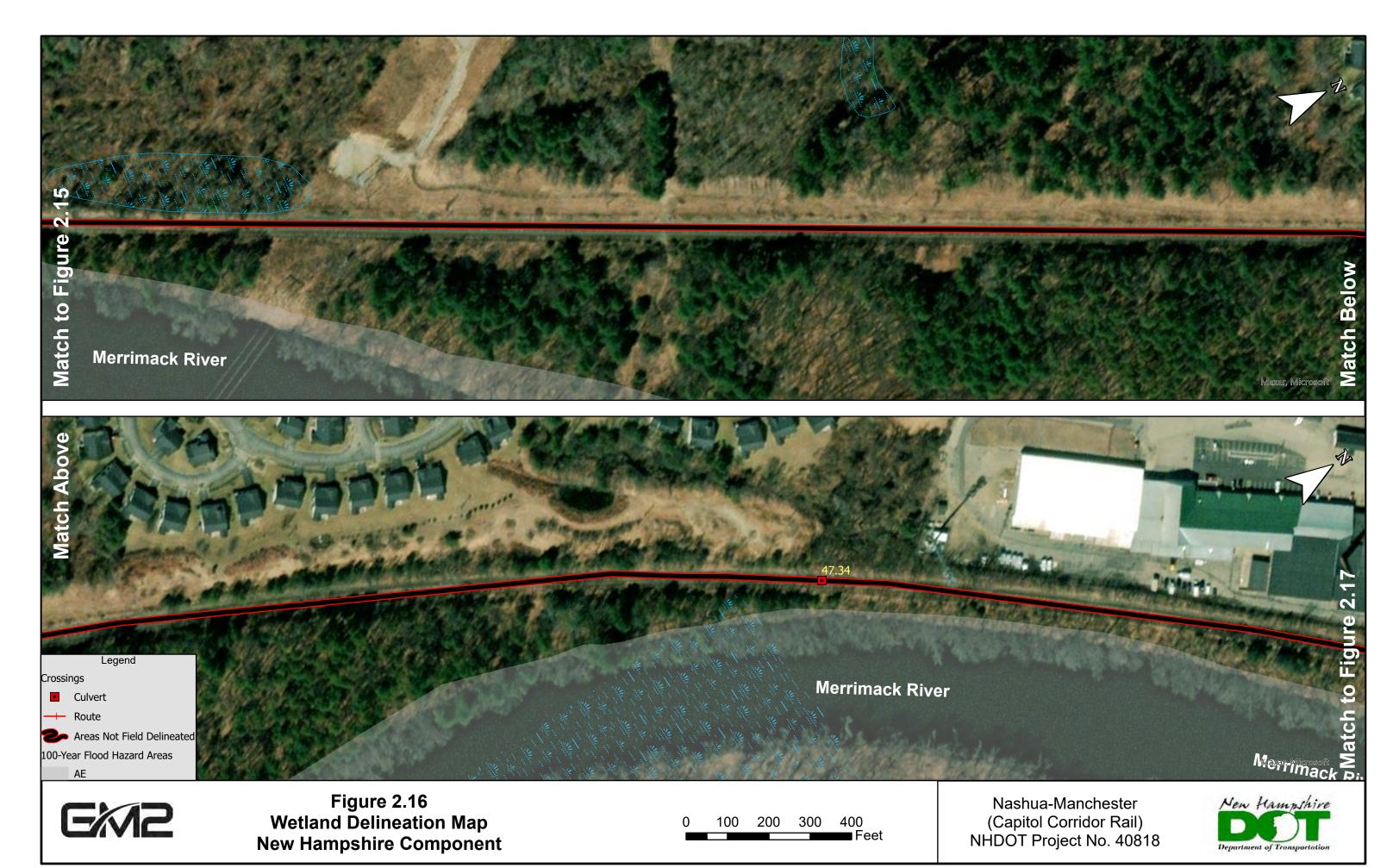


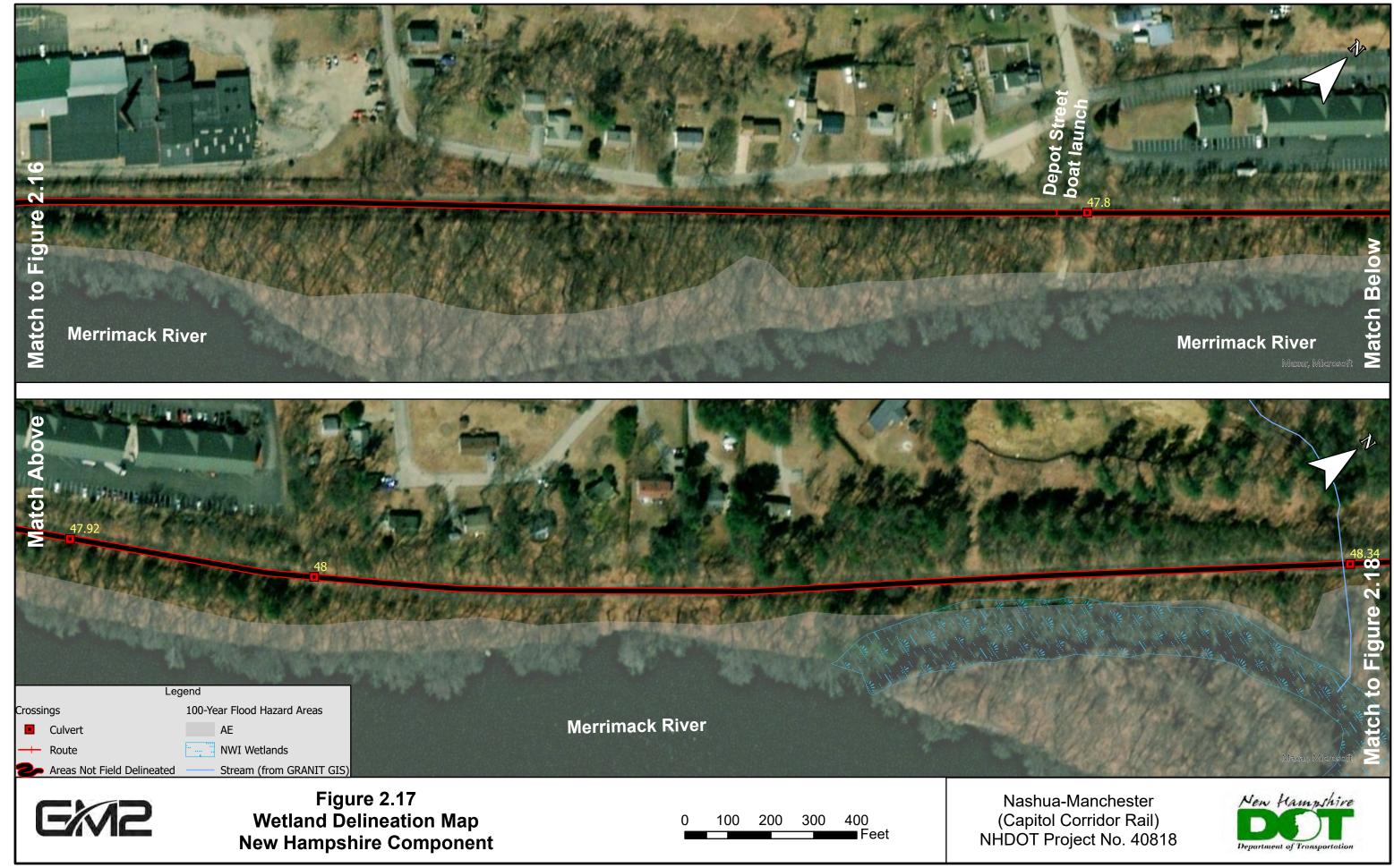


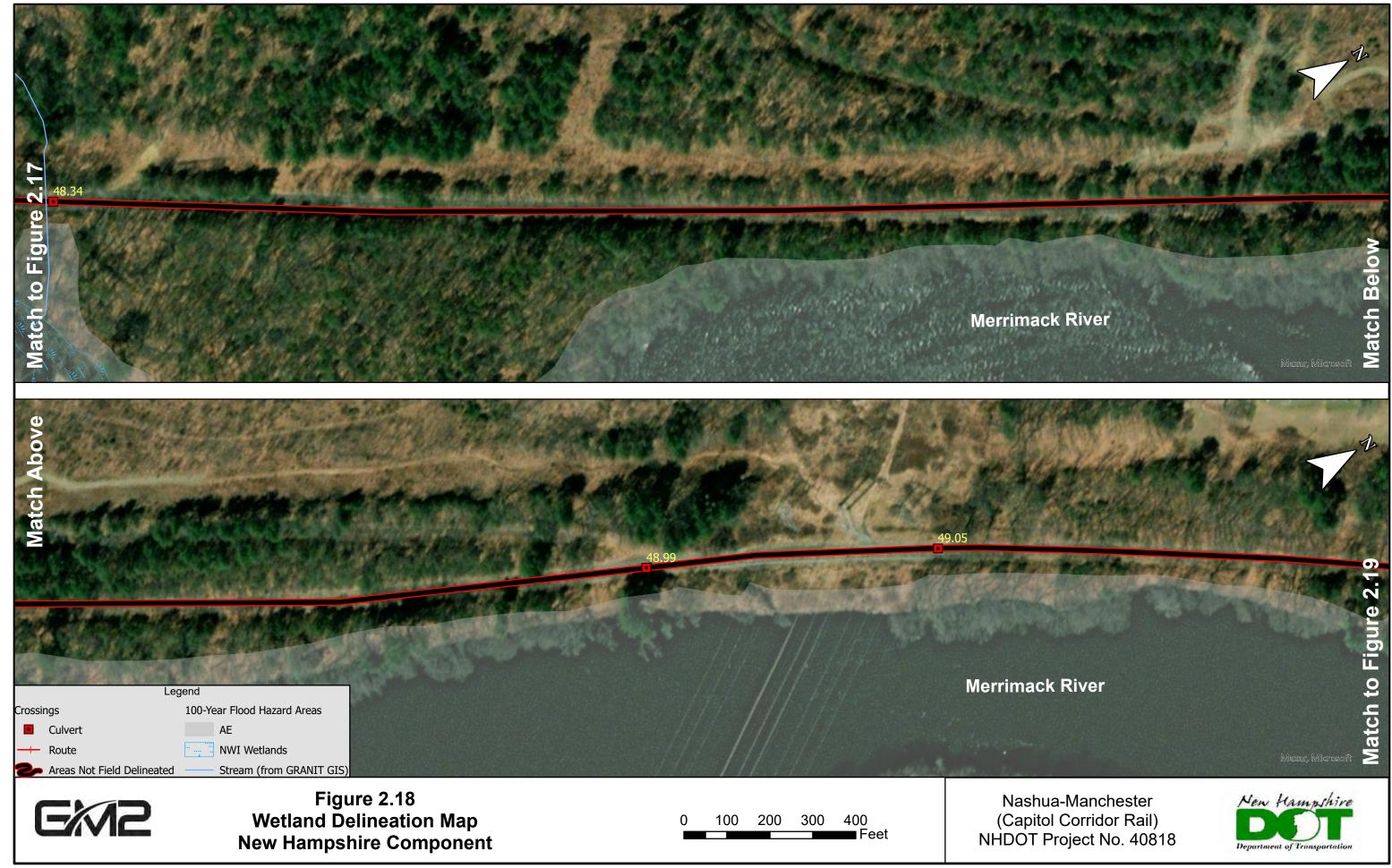


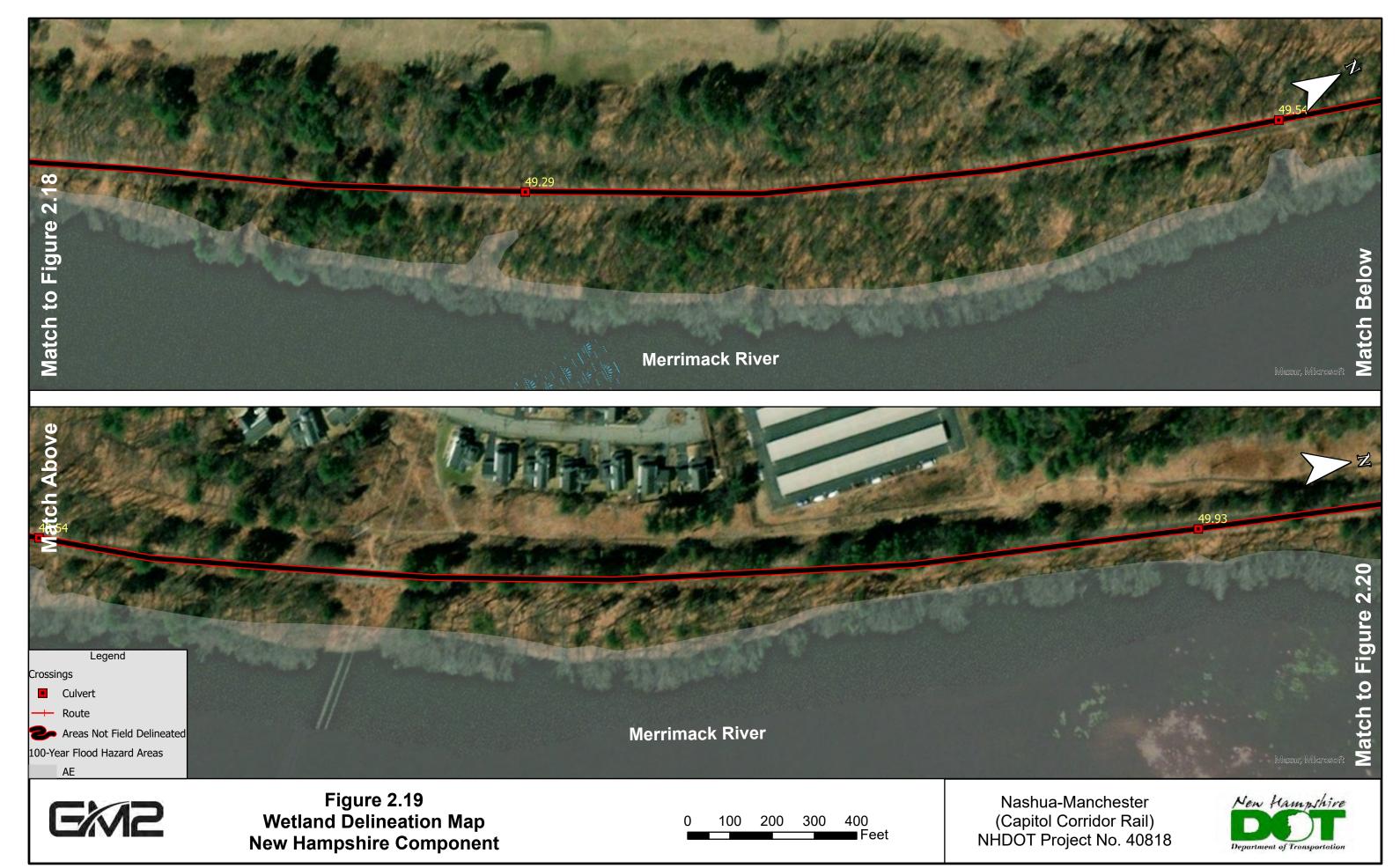


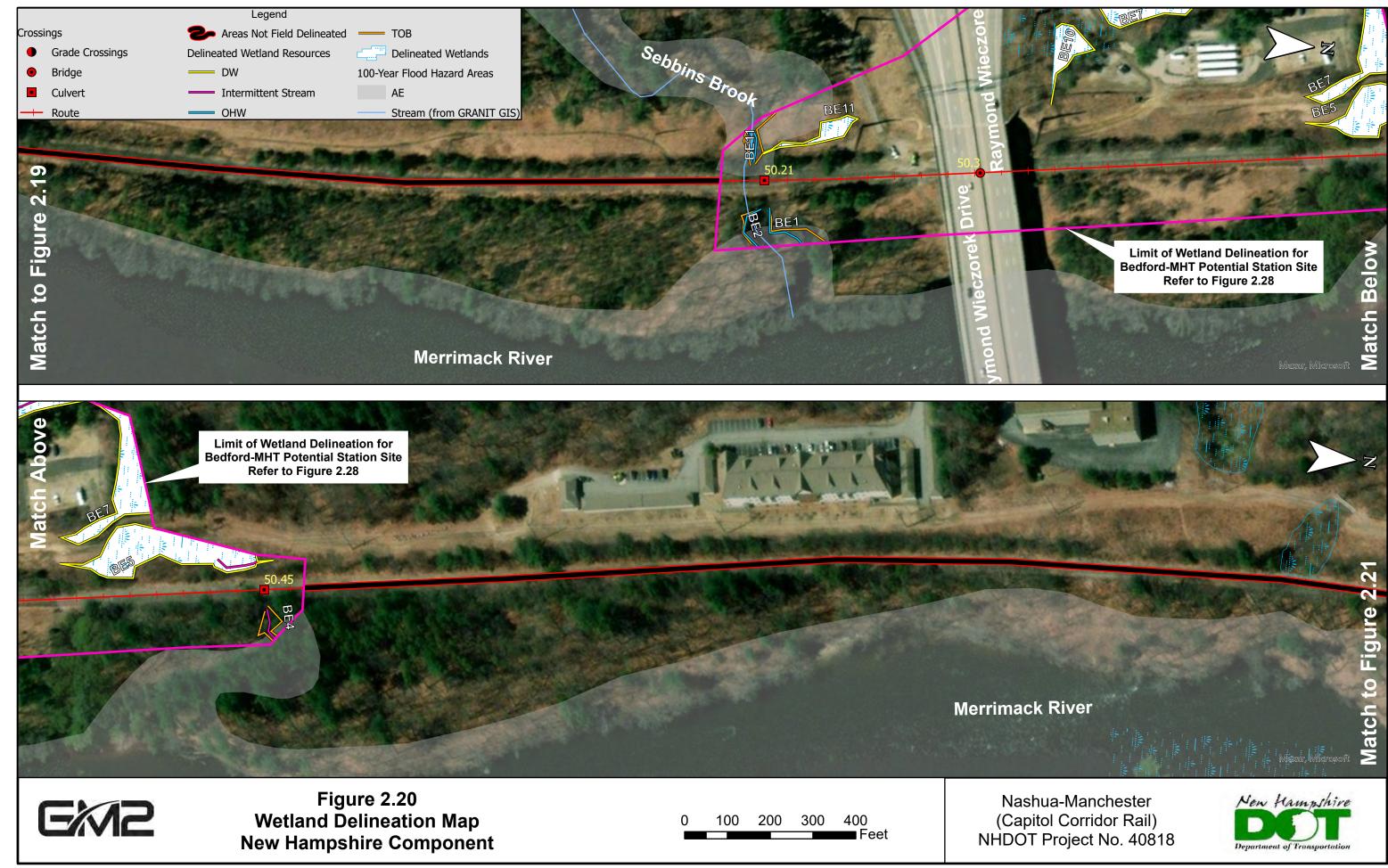


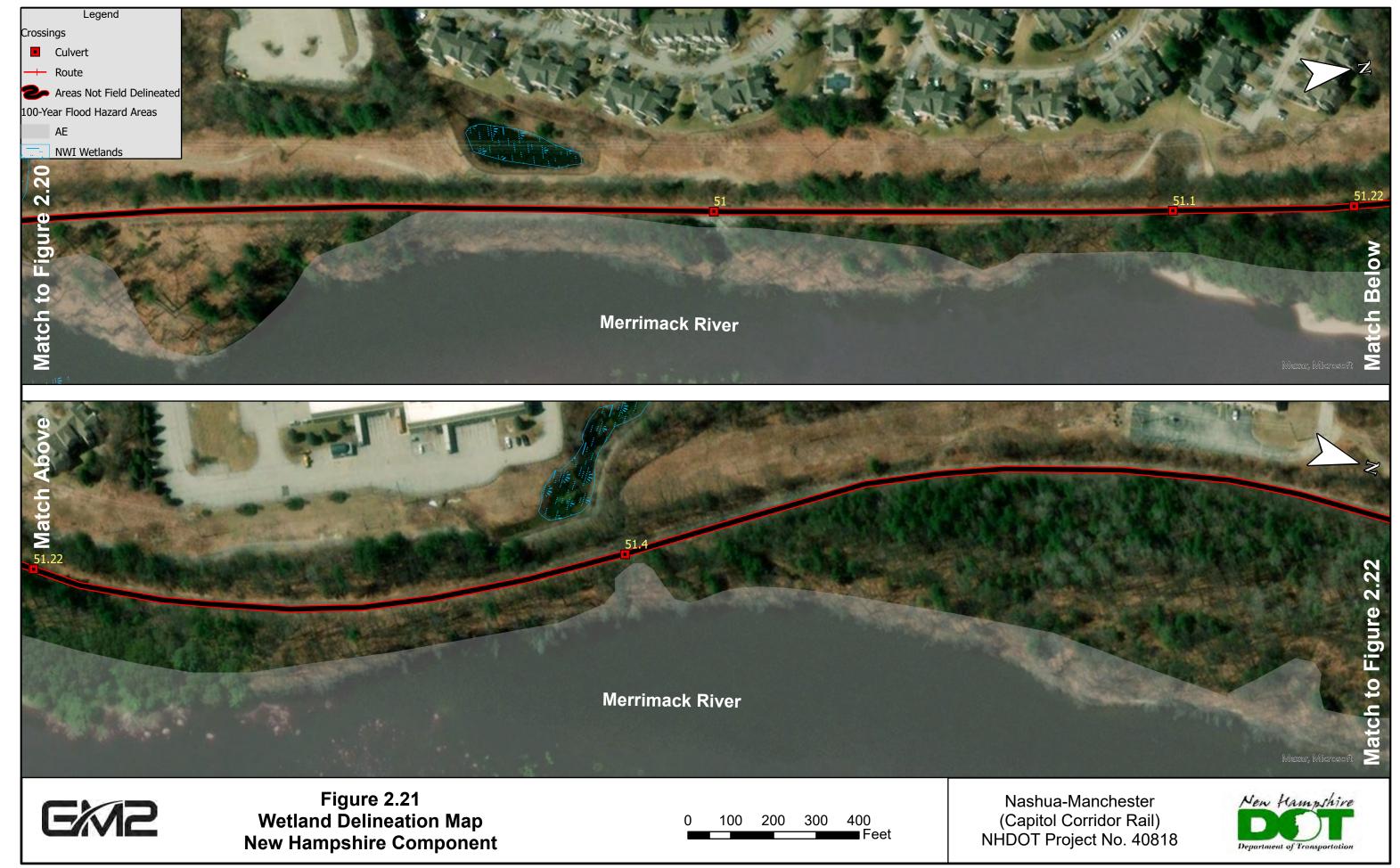


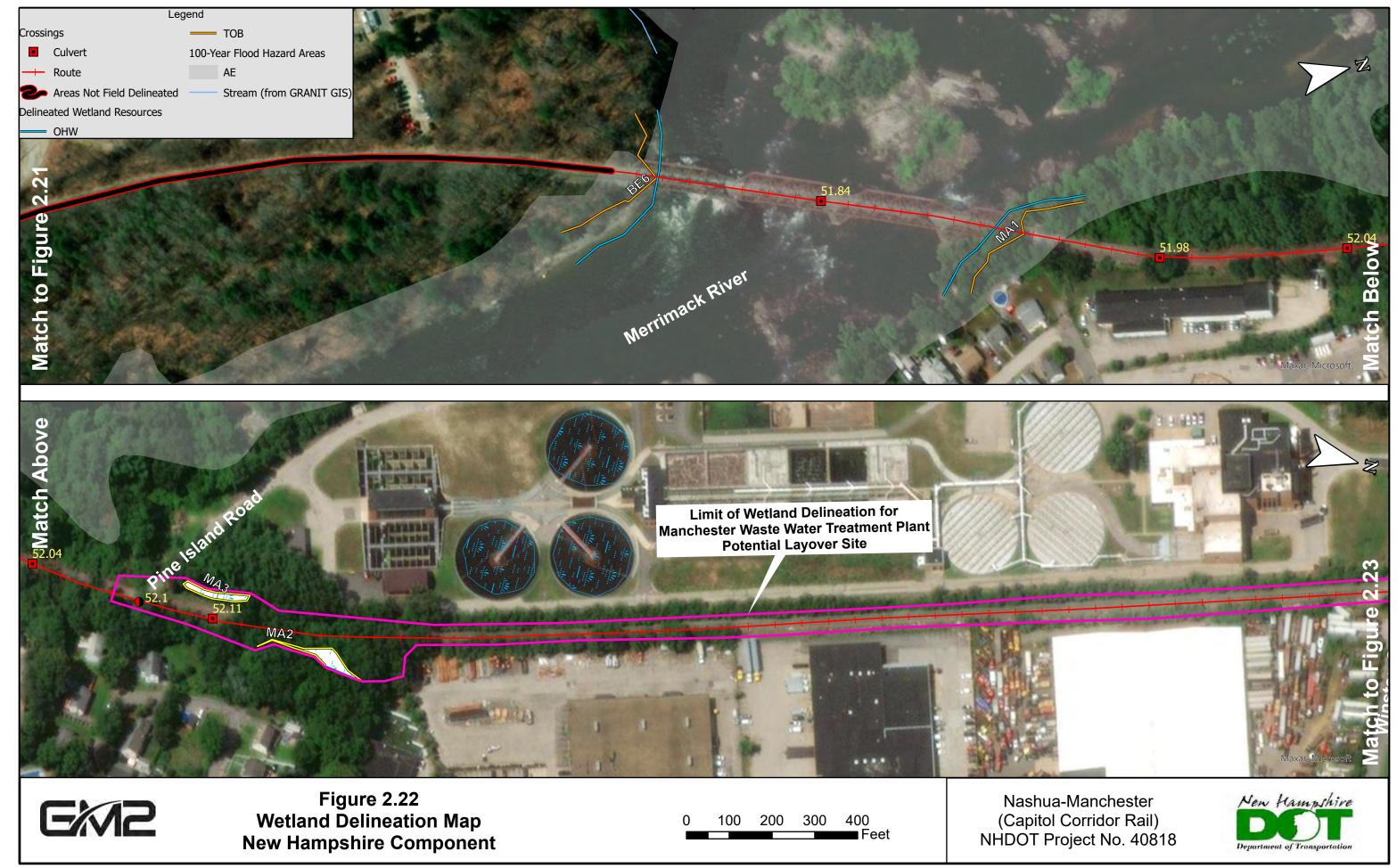


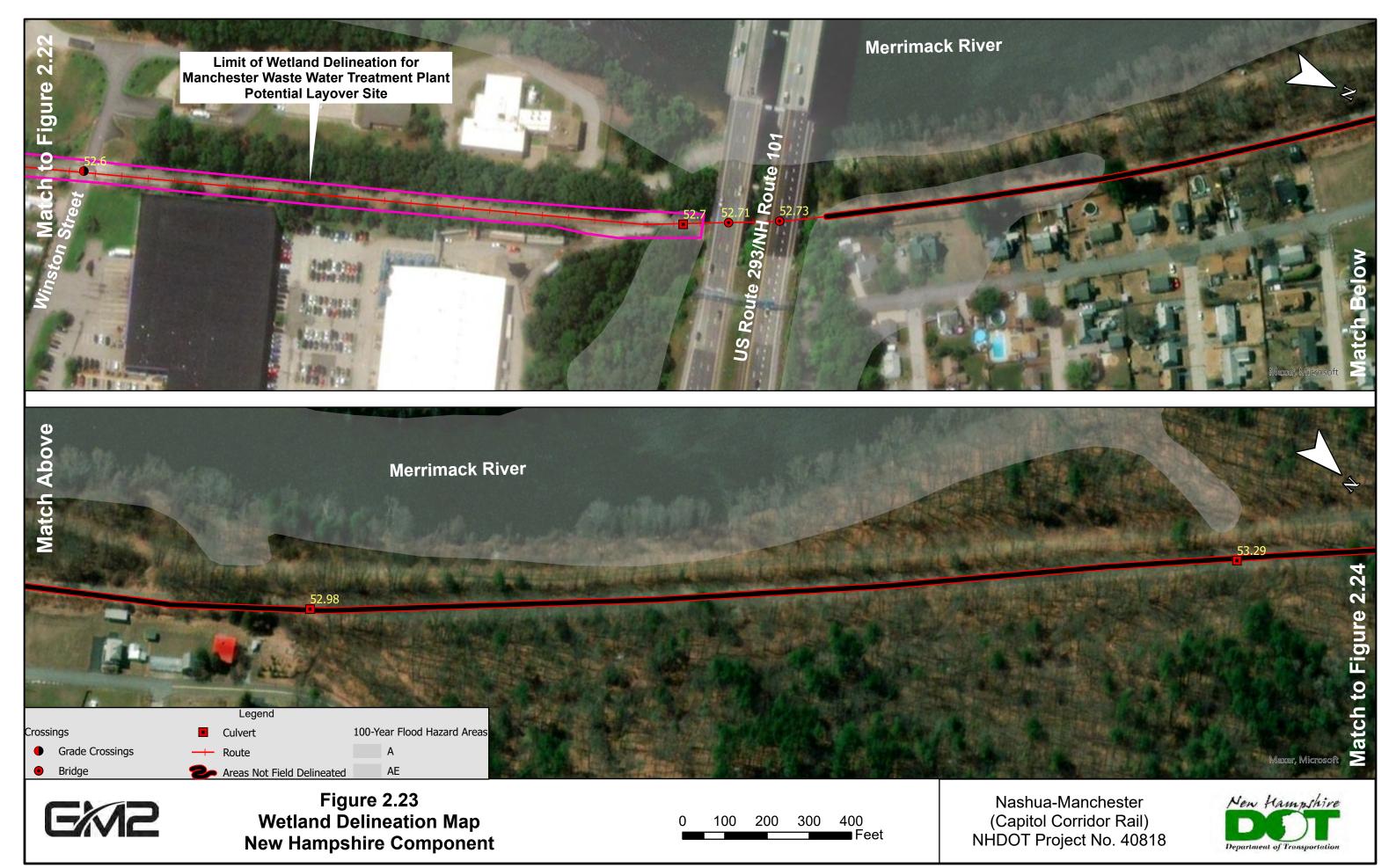




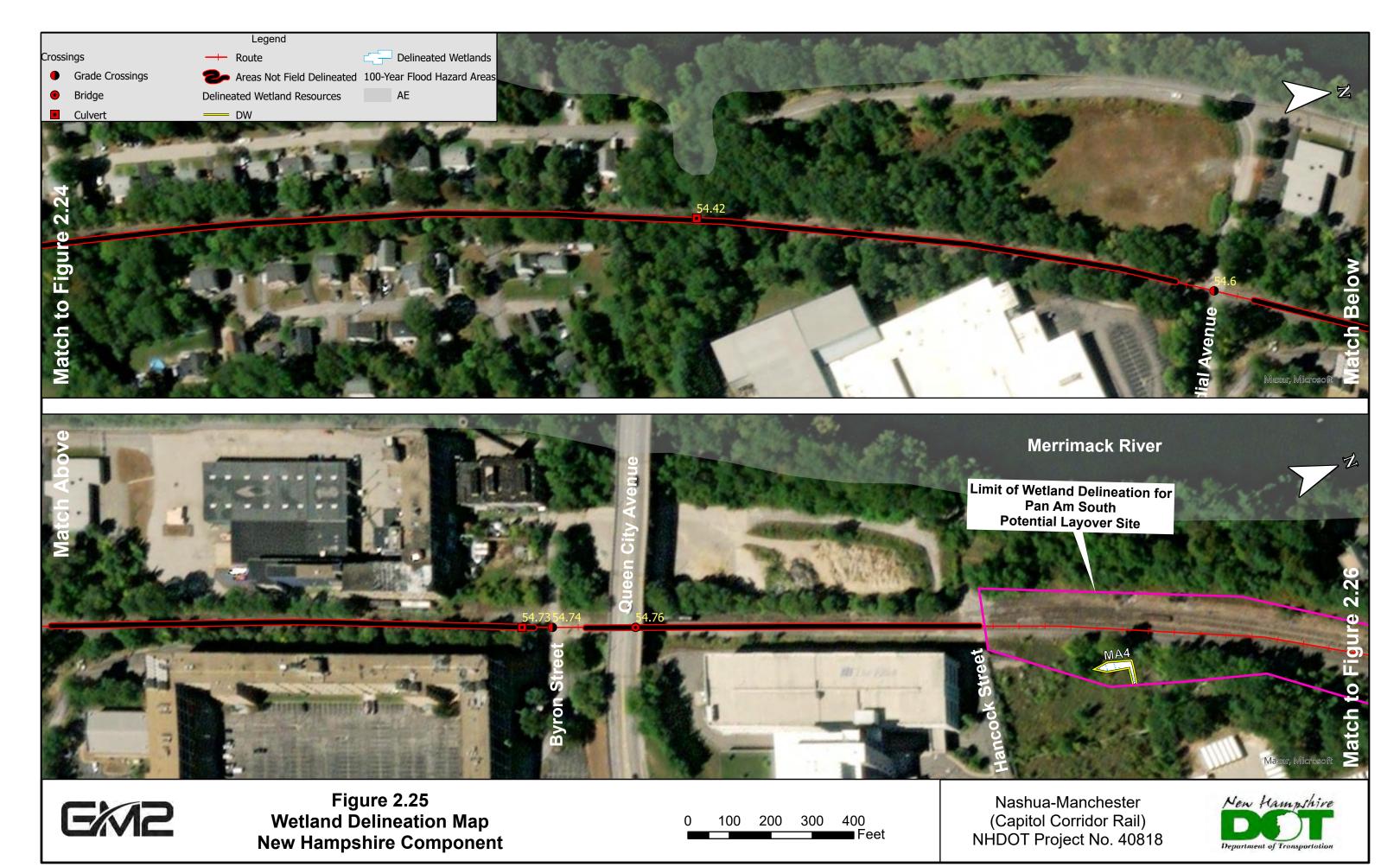


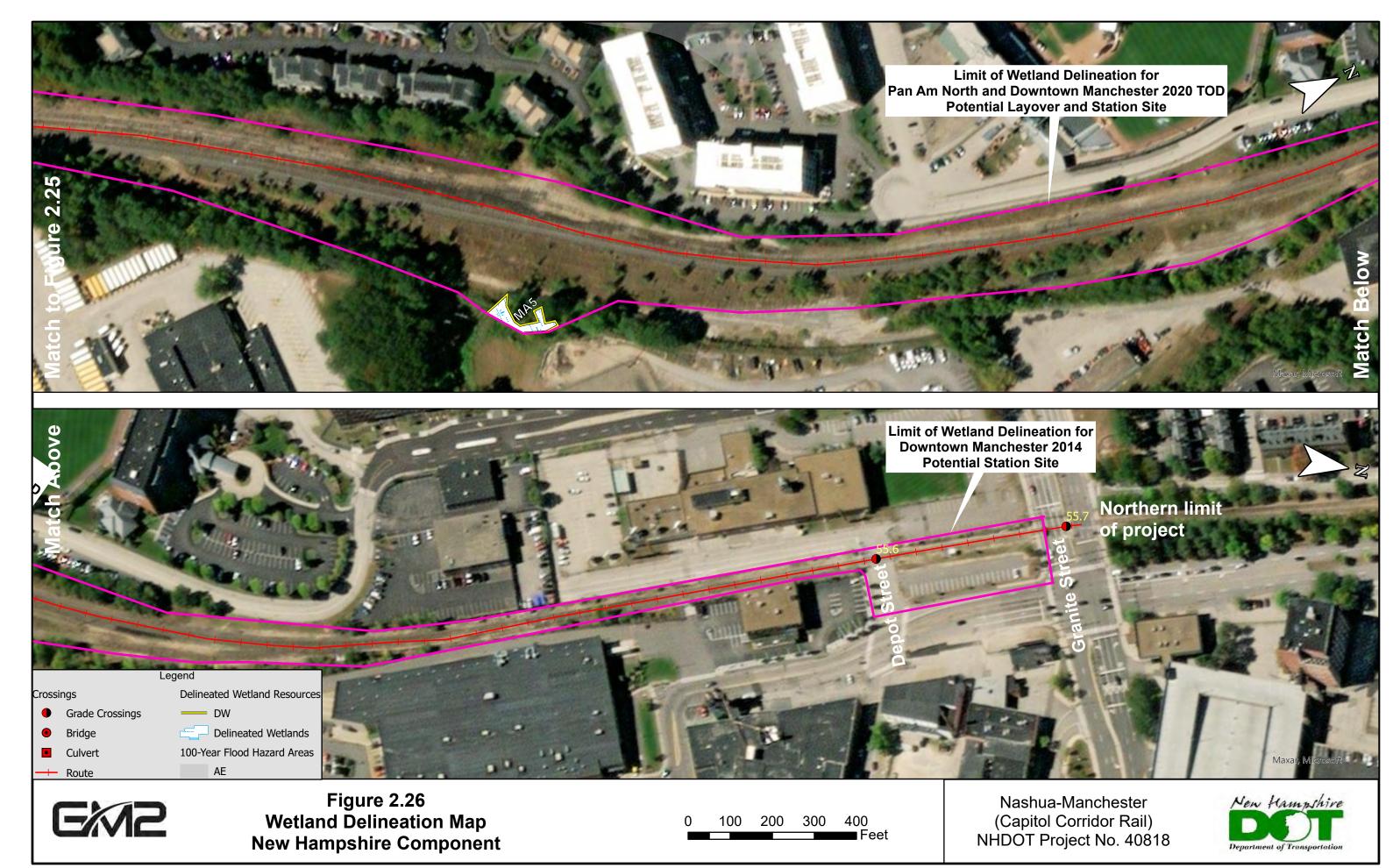


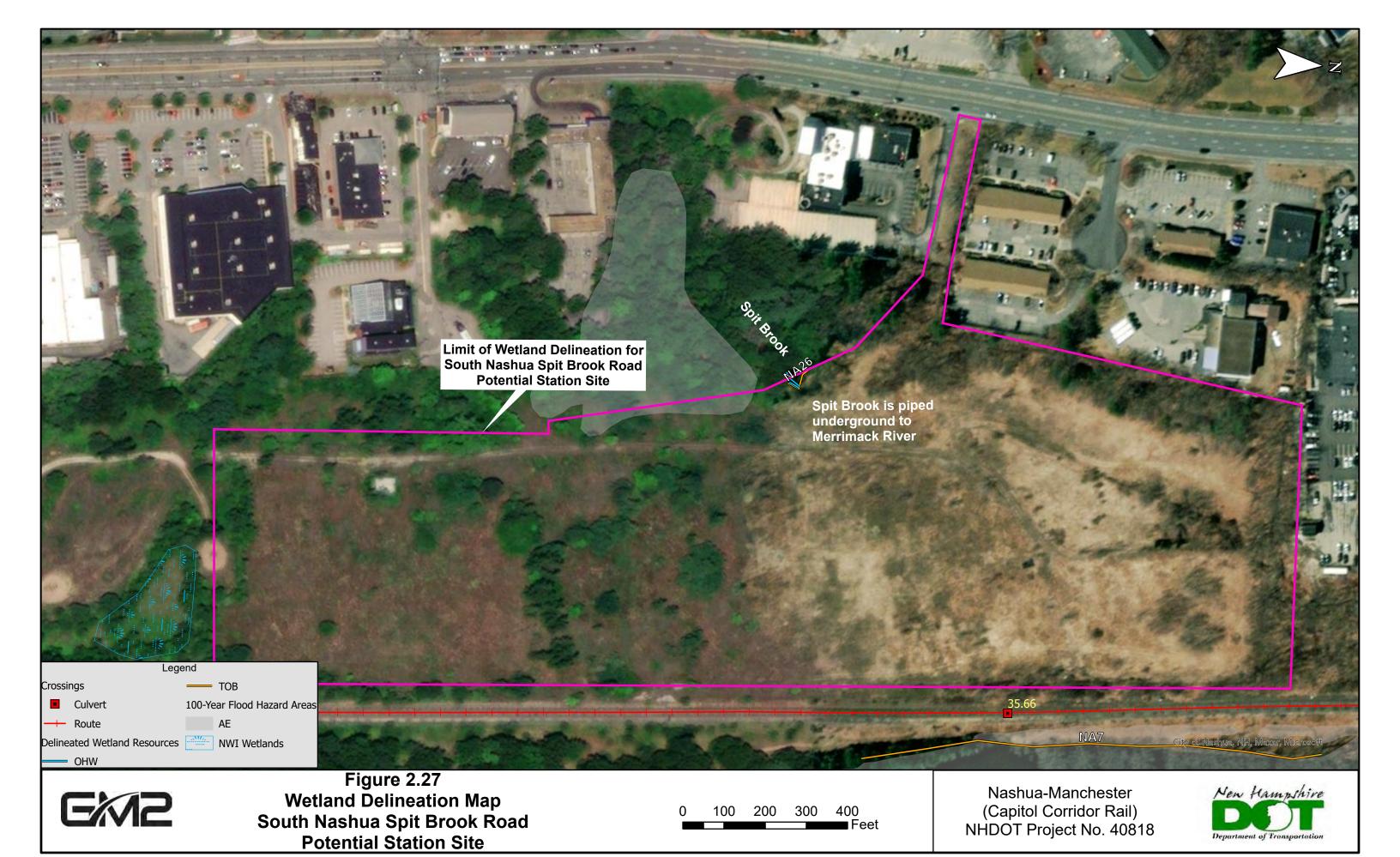












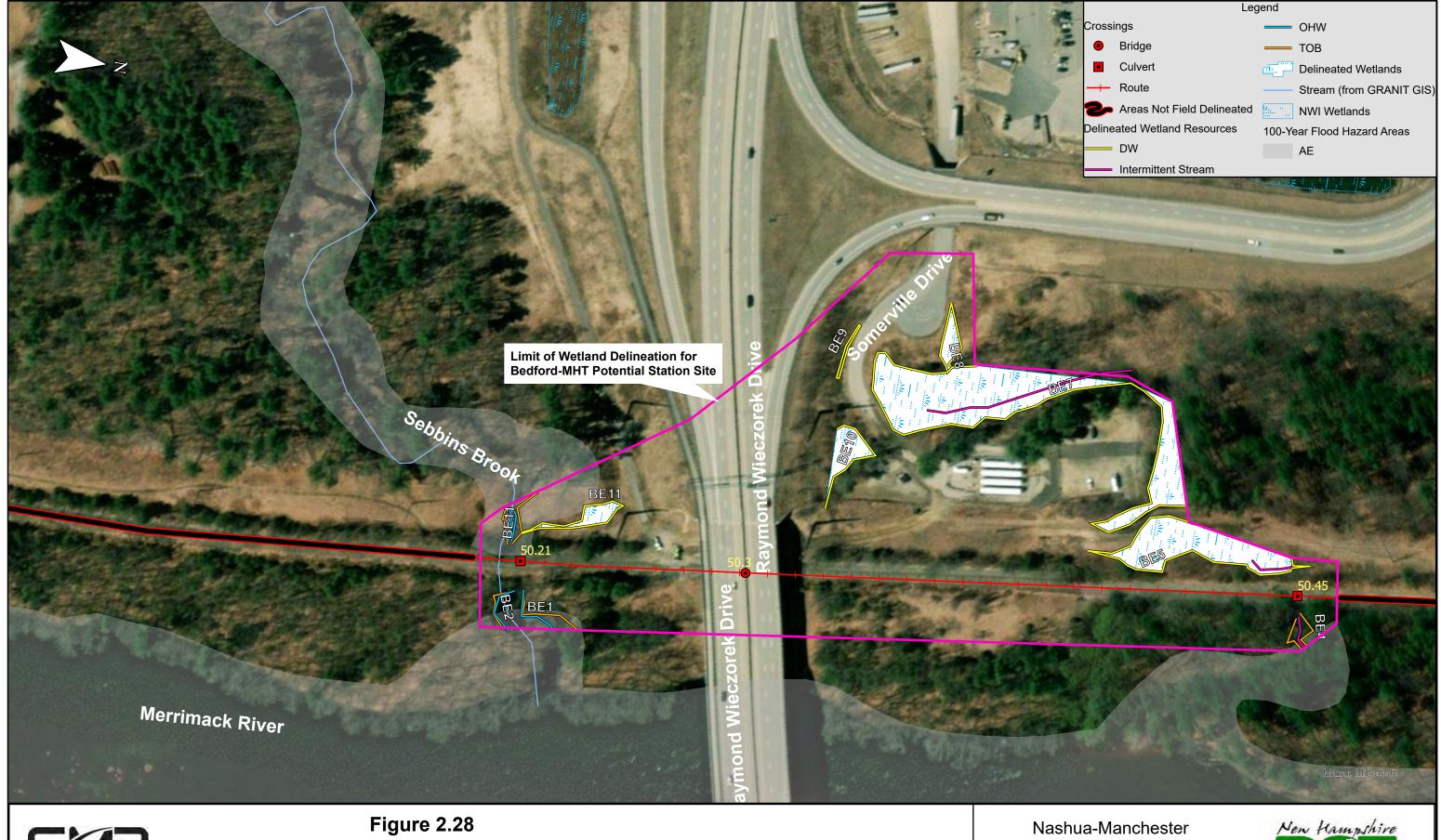




Figure 2.28
Wetland Delineation Map
Bedford-MHT Potential Station Site



Nashua-Manchester (Capitol Corridor Rail) NHDOT Project No. 40818



APPENDIX B

Wetland Summary Table

WETLAND SUMMARY TABLE

Flag	Description	Location (Approximate Mile	Municipality	Classification	Priority		, <u></u>				F	unction	s/Values	3 ¹					
Series		(Approximate Mile Post and distance to nearest landmark)			Resource Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
NA1	Merrimack River (Top of Bank)	From NH-MA border to MP 34.9 (1,300 ft. south of Spit Brook Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	P	Х	P
NA2	Merrimack River (Top of Bank)	MP 35.2 (near Spit Brook Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Χ	Р	Х	Х	Р	Р	Х	Р
NA3	Wetland	MP 35.08 (500 ft. south of Spit Brook Road)	Nashua	PFO1E	No				Х										
NA4	Wetland Swale	MP 35.02 (1,000 ft. south of Spit Brook Road)	Nashua	PEM1E	No				Х										
NA5	Wetland	MP 34.9 (1,500 ft. south of Spit Brook Road)	Nashua	PEM1E	No				Х										
NA6 and NA6A	Wetland	MP 35.2 (Immediately south of Spit Brook Road)	Nashua	PFO1E	No				Х										
NA7	Merrimack River (Top of Bank)	MP 35.55 to MP 35.75 (2,500 ft. north of Spit Brook Road)	Nashua	R2UBH	Yes (Prime Wetland)	P		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA8 and NA9	Salmon Brook and Merrimack River (Top of Bank)	MP 37.87 (5,000 ft. south of Crown Street)	Nashua	R2UBH	Yes (Prime Wetland)	Р		X	Р			Р			Р	Р	Р		X
NA10 and NA11	Salmon Brook (Top of Bank)	MP 37.87 (5,000 ft. south of Crown Street)	Nashua	R2UBH, PUBHh	Yes (Prime Wetland and Floodplain Wetland)	Р		Х	Р			Р			Р	Р	Р		Х
NA12, NA13, NA14, NA15	Nashua River (Top of Bank, Wetland)	MP 39.22 (850 ft. north of Bridge Street)	Nashua	R2UBH, PFO1E	Yes (Prime Wetland and Floodplain Wetland)	Р		Р	Р	Х			Х			Х	Р		Х
NA16	Pennichuck Brook (Top of Bank, Wetland)	MP 41.77 (3,900 ft. south of Mast Road)	Nashua	R2UBH, PSS1F	Yes (Prime Wetland and Floodplain Wetland)	Р		Р	X	Х			Х		Х	Х	Х		Р

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Resource						F	unctions	s/Value	s ¹					
Jenes		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
NA17	Pennichuck Brook and Merrimack River (Top of Bank)	MP 41.77 (3,900 ft. south of Mast Road)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	X	Х			Х		Х	Х	X		Р
NA18	Wetland	MP 36.2 (500 ft. north of Circumferential Highway)	Nashua	PFO1E	No				Р			Р			Р				Х
NA19	Wetland and Perennial Stream	MP 36.2 (400 ft. north of Circumferential Highway)	Nashua	PFO1E, R3UB	No				P			Р			Р				Х
NA20	Wetland and Intermittent Stream	MP 35.83 (1,300 ft. south of Circumferential Highway)	Nashua	PFO1E, R4SB	No				Х			Х			Х				Х
NA21	Perennial Stream (Top of Bank)	MP 35.83 (1,500 ft. south of Circumferential Highway)	Nashua	R2UBH	No			Х	Р			Р			Р	Х			Х
NA22	Merrimack River (Top of Bank)	MP 36.06 (100 ft. south of Circumferential Highway)	Nashua	R2UBH	Yes (Prime Wetland)	P		P	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA23	Perennial Stream	MP 36.19 (300 ft. north of Circumferential Highway	Nashua	R2UBH	No			Х	Р			Р			Р	Х			Х
NA24	Merrimack River (Top of Bank)	MP 37.2 (6,000 ft. north of Circumferential Highway)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	Х	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA25	Merrimack River (Top of Bank)	MP 37.38 (6,600 ft. north of Circumferential Highway)	Nashua	R2UBH	Yes (Prime Wetland)	Р		Р	X	Х		Х	Р	Х	Х	Р	Р	Х	Р
NA26	Spit Brook (Top of Bank) and Wetland	Proposed South Nashua Station. Approx. MP 35.6 (2,000 ft. north of Spit Brook Road)	Nashua	R2UBH, PFO1E	Yes (Floodplain Wetland)				Х	Х		Х	Х		Х	Р			Р

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Resource						F	unction	s/Value	s ¹					
Series		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
ME1	Wetland and Intermittent Stream	MP 42.34 (900 ft. south of Mast Road)	Merrimack	PFO1E, R4SB	No				Х	Х		Х			Х	Х			Х
ME2 and ME3	Pennichuck Brook and Merrimack River (Top of Bank)	MP 41.77 (3,900 ft. south of Mast Road)	Merrimack	R2UBH	No	Р		Р	Х	Х			Х		Х	Х	Х		Р
ME4	Perennial Stream (Top of Bank)	MP 42.21 (1,600 ft. south of Mast Road)	Merrimack	R2UBH	No			Х	Х							Х			Х
ME5	Perennial Stream (Top of Bank)	MP 42.34 (1,000 ft. south of Mast Road)	Merrimack	R2UBH	No			Х	Х							Х			Х
ME6	Perennial Stream (Top of Bank)	MP 43.34 (Just south of Anheuser Busch)	Merrimack	R2UBH	No			Х	Р			Р			Р	Р			Р
ME7	Small Perennial Stream and Wetland	MP 43.34 (Just south of Anheuser Busch)	Merrimack	R2UBH, PFO1E	No				Р	Х		Р	Х		Р	Р			Р
ME8	Wetland	MP 44.92 (Just south of Horseshoe Pond)	Merrimack	PUBH	Yes (Floodplain Wetland)	P		P	P	Х		Р	Х		Р	Р			P
ME9	Naticook Brook Bank and Wetland	MP 44.92 (Just south of Horseshoe Pond)	Merrimack	R2UBH, PFO1/SS1E	Yes (Floodplain Wetland)	Р		Р	Р	Х		Р	Х		Р	Р			Р
ME10	Naticook Brook Bank	MP 44.92 (Just south of Horseshoe Pond)	Merrimack	R2UBH	No	Р		Р	Р	Х		Р	Х		Р	Р			Р
ME11	Wetland	MP 44.92 (Just south of Horseshoe Pond)	Merrimack	PFO1E	Yes (Floodplain Wetland)	P		P	P	Х		Р	Х		Р	Р			P
ME12, ME13, ME14, ME15	Souhegan River Bank (Top of Bank)	MP 46.22 (550 ft. north of Railroad Ave.)	Merrimack	R2UBH	No	P		P	P	Х	Р		Х			Х			P
BE1 and BE2	Sebbins Brook (Top of Bank)	MP 50.21 (300 ft. south of Raymond Wieczorek Drive)	Bedford	R2UBH	No			Х	Х	Х			Х			Х			Р
BE3 and BE4	Intermittent Stream	MP 50.45 (850 ft. north of Raymond Wieczorek Drive)	Bedford	R4SB	No														P
BE5	Wetland and Intermittent Stream	MP 50.4 (700 ft. north of Raymond Wieczorek Drive)	Bedford	PEM1/SS1E, R4SB	No				X	Х		Р			Р				P
BE6 and MA1	Merrimack River (Top of Bank)	MP 51.84 (Merrimack River Bridge)	Bedford	R2UBH	No	Р		Р	Х	Х	Р		Р	Х		Р	Р		Р

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Flag Series	Description	Location (Approximate Mile	Municipality	Classification	Priority Functions/Values¹ Resource														
Jenes		Post and distance to nearest landmark)			Area?	Ecological Integrity	Education Potential	Fish Habitat	Flood Storage	GW Recharge	Noteworthi- ness	Nutrient Trapping	Production Export	Scenic Quality	Sediment Trapping	Shoreline Anchoring	Uniqueness/ Heritage	Recreation	Wildlife Habitat
BE7	Intermittent Stream and Wetland	MP 50.35 (300-700 ft. north of Raymond Wieczorek Drive)	Bedford	R4SB, PFO1E	No				Х	Х		Р	Х		Р	Х			Х
BE8	Wetland	MP 50.34 (500 ft. northwest of Raymond Wieczorek Drive)	Bedford	PEM1E	No							X							
BE9	Wetland Swale	MP 50.31 (450 ft. west of Raymond Wieczorek Drive)	Bedford	PEM/SS1E	No							Х							
BE10	Wetland	MP 50.31 (250 ft. northwest of Raymond Wieczorek Drive)	Bedford	PEM/FO1E	No							Х							
BE11	Sebbins Brook (Top of Bank)	MP 50.25 (300 ft. south of Raymond Wieczorek Drive)	Bedford	R2UBH	No			Х	Х	Х			Х			Х			Р
BE11	Wetland	MP 50.25 (300 ft. south of Raymond Wieczorek Drive)	Bedford	PEM1E	No							Х			Х				
BE11	Ephemeral Stream/Erosion Channel	MP 50.25 (300 ft. south of Raymond Wieczorek Drive)	Bedford	N/A	No														
BE12	Sebbins Brook (Top of Bank)	MP 50.21 (400 ft. south of Raymond Wieczorek Drive)	Bedford	R2UBH	No			Х	Х	Х			Х			Х			Р
MA2	Wetland	MP 52.11 (300 ft. north of Pine Island Road)	Manchester	PFO1E, PFO1Ex	No				Х			Х			Х				Х
MA3	Wetland Swale	MP 52.11 (100 ft. north of Pine Island Road)	Manchester	PSS/PFO1Ex	No				Х			Х			Х				
MA4	Wetland	MP 54.9 (850 ft. north of Queen City Ave.)	Manchester	PEM1Ex	No				Х										
MA5	Wetland	MP 55.0 (2,000 ft. north of Queen City Ave.)	Manchester	PEM1E, PFO1E	No				Х										

^{1. &}quot;X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

Nashua-Manchester 40818 Capitol Corridor Rail - DRAFT

Wetland Classification Key:

PEM1E = palustrine, emergent, persistent, seasonally flooded/saturated

PEM1Ex = palustrine, emergent, persistent, seasonally flooded/saturated, excavated

PFO1E = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated

PFO1Ex = palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated

R2UBH = riverine, lower perennial, unconsolidated bottom, permanently flooded

R4SB = riverine, intermittent, streambed

PSS1E = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated

PSS1F = palustrine, scrub-shrub, broad-leaved deciduous, semi permanently flooded

PSS1Ex = palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated

PUBH = palustrine, unconsolidated bottom, permanently flooded

PUBHh = palustrine, unconsolidated bottom, permanently flooded, diked/impounded

R3UB = riverine, upper perennial, unconsolidated bottom

1. "X" indicates that the function/value is present. "P" indicates that the function/value is present at a principal level.

APPENDIX C

Wetland Delineation Field Data Forms

Project/Site: Nashua-Manchester 40818	City/County: Bedford/Hillsborough	Sampling Date: 05/28/2021
Applicant/Owner: NHDOT		State: NH Sampling Point: BE7-wet
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Township, Range:	
Landform (hillside, terrace, etc.): Terrace	Local relief (concave, convex, none):	Conseque Slone (%): < 2
	42.9 degrees north Long: 71.4 degr	
Soil Map Unit Name: NnA - Ninigret fine sandy loam		NWI classification: Not Mapped
Are climatic / hydrologic conditions on the site typical for	this time of year? Yes No _ X (If	no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology	significantly disturbed? Are "Normal Circums	stances" present? Yes X No
Are Vegetation, Soil, or Hydrology	naturally problematic? (If needed, explain a	any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site ma	— p showing sampling point locations, tr	ransects, important features, etc.
Hydrophytic Vegetation Present? Yes X	No Is the Sampled Area	
Hydric Soil Present? Yes X	No within a Wetland?	Yes _ X _ No
Wetland Hydrology Present? Yes X	No If yes, optional Wetland Site ID:	: Wetland BE7
Wetland delineation conducted during abnormally dry o		
HYDROLOGY		
Wetland Hydrology Indicators:		ondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check		Surface Soil Cracks (B6)
		Drainage Patterns (B10)
		Moss Trim Lines (B16)
- 		Dry-Season Water Table (C2) Crayfish Burrows (C8)
I — · · · · · — ·		Saturation Visible on Aerial Imagery (C9)
		Stunted or Stressed Plants (D1)
	• • • • • • • • • • • • • • • • • • • •	Geomorphic Position (D2)
		Shallow Aquitard (D3)
	` '	Microtopographic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	• • • • • • • • • • • • • • • • • • • •	FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes No _ X	Depth (inches):	
Water Table Present? Yes No X	Depth (inches):	
Saturation Present? Yes X No	Depth (inches): 14 Wetland Hydrolog	gy Present? Yes X No
(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring we	II, aerial photos, previous inspections), if available:	
Remarks:		
Intermittent stream - 10 feet away		

VEGETATION – Use scientific names of plants. Sampling Point: BE7-wet Absolute Dominant Indicator Tree Stratum (Plot size: 30') **Dominance Test worksheet:** % Cover Species? Status 1. Acer rubrum 63 Yes FAC Number of Dominant Species 2. That Are OBL, FACW, or FAC: 5 (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 6 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 83.3% (A/B) Prevalence Index worksheet: 7. 63 =Total Cover Total % Cover of: Multiply by: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Alnus incana **FACW** FACW species x 2 = 1. 2. 10 Yes FAC species Ulmus rubra FAC x 3 = 3. FACU species x 4 = 4. UPL species x 5 = 5. Column Totals: (A) 6. Prevalence Index = B/A = 7. **Hydrophytic Vegetation Indicators:** 30 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') X 2 - Dominance Test is >50% Onoclea sensibilis 63 Yes **FACW** 3 - Prevalence Index is ≤3.01 1. Symplocarpus foetidus 63 Yes OBL 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 20 No 3. Equisetum pratense **FACW** 4. Aster species 10 Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 156 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus Yes UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes X No 10 =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: BE7-wet

	escription: (Describe t	to the de				or or con	firm the absence	of indicators.)
Depth	Matrix			Feature		1 2	Tarabana	Damaarka
(inches)	Color (moist)	<u>%</u> .	Color (moist)		Type ¹	Loc ²	Texture	Remarks
0-12	10YR 2/1	95	10YR 3/3		<u> </u>	M	Loamy/Clayey	Distinct redox concentrations
12-20	10YR 2/1	45	10YR 4/6	10	<u> </u>	<u>M</u>	Loamy/Clayey	Prominent redox concentrations
	10YR 3/1	45						
			_					
			-					
	Concentration, D=Depl	etion, RN	/I=Reduced Matrix, CS	S=Cover	ed or Coa	ted Sand		cation: PL=Pore Lining, M=Matrix.
•	oil Indicators:		Dobaselue Beleur	Curfoss	(CO) (LD	D D		or Problematic Hydric Soils ³ :
	sol (A1) Epipedon (A2)		Polyvalue Below MLRA 149B)	Surrace	(S8) (LR	KK,		rairie Redox (A16) (LRR K, L, MLRA 149B)
	Histic (A3)		Thin Dark Surface	e (SQ) (I	IRRR M	I RA 149		icky Peat or Peat (S3) (LRR K, L, R)
	ogen Sulfide (A4)		High Chroma Sar					e Below Surface (S8) (LRR K, L)
	fied Layers (A5)		Loamy Mucky Mi					k Surface (S9) (LRR K, L)
	eted Below Dark Surface	e (A11)	Loamy Gleyed M	-		-, -,		nganese Masses (F12) (LRR K, L, R)
	Dark Surface (A12)	`	Depleted Matrix (,			nt Floodplain Soils (F19) (MLRA 149B)
	y Mucky Mineral (S1)		X Redox Dark Surfa)			podic (TA6) (MLRA 144A, 145, 149B)
	y Gleyed Matrix (S4)		Depleted Dark Su					ent Material (F21)
Sand	y Redox (S5)		Redox Depressio	ns (F8)			Very Sha	allow Dark Surface (TF12)
Stripp	oed Matrix (S6)		Marl (F10) (LRR	K , L)			Other (E	xplain in Remarks)
Dark	Surface (S7)							
3Indicators	of hydrophytic vogototi	ion and w	votland bydralagy mus	t ho pro	oont unk	oo diatur	had ar problematic	
	s of hydrophytic vegetative Layer (if observed):	ion and v	vetiand hydrology mus	t be pre	sent, unit	ess distur	bed of problematic	
Type:	c Layer (ii ebeci vea).							
Depth (i	inches):						Hydric Soil Pre	esent? Yes X No
Remarks:								
								CS Field Indicators of Hydric Soils
version 7.0	0 March 2013 Errata. (h	ttp://www	/.nrcs.usda.gov/Intern	et/FSE_	DOCUM	ENTS/nrc	s142p2_051293.dd	ocx)

Project/Site: Nashua-Manches	ster 40818	City	/County: Bedford/Hillsbord	ough	Sampling Date: 05	/28/2021
Applicant/Owner: NHDOT				State:	NH Sampling Poi	nt: BE7-up
Investigator(s): Jennifer Riorda	an and Meg Gordon	Sect	tion, Township, Range:			
Landform (hillside, terrace, etc.)): Terrace	Local	relief (concave, convex, no	one): Concave	Slope ((%): ~2
Subregion (LRR or MLRA): LRF	R R Lat: 4	42.9 degrees north		4 degrees west	 Datum:	
Soil Map Unit Name: NnA - Nini					ication: Not mapped	
Are climatic / hydrologic condition	•	r this time of year?	Yes No X			
Are Vegetation , Soil	· ·	•		ircumstances" pre		No
						_ 110
Are Vegetation, Soil _ SUMMARY OF FINDING				olain any answers ns, transects,	•	es, etc.
Hydrophytic Vegetation Preser	nt? Yes	No X	Is the Sampled Area			
Hydric Soil Present?	Yes		within a Wetland?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland S			
Remarks: (Explain alternative Wetland delineation conducted	•	,	ng to US Drought Monitor)			
HYDROLOGY						
Wetland Hydrology Indicator				-	cators (minimum of two	required)
Primary Indicators (minimum o	•		(DO (PO)		il Cracks (B6)	
Surface Water (A1) High Water Table (A2)		Water-Stained Leav Aquatic Fauna (B13		Moss Trim	atterns (B10)	
Saturation (A3)		Marl Deposits (B15)			n Water Table (C2)	
Water Marks (B1)		Hydrogen Sulfide O		Crayfish Bu		
Sediment Deposits (B2)		-	eres on Living Roots (C3)		visible on Aerial Imag∈	erv (C9)
Drift Deposits (B3)		Presence of Reduce			Stressed Plants (D1)	, (,
Algal Mat or Crust (B4)			ion in Tilled Soils (C6)		c Position (D2)	
Iron Deposits (B5)	- -	Thin Muck Surface ((C7)	Shallow Aq	uitard (D3)	
Inundation Visible on Aeria	al Imagery (B7)	Other (Explain in Re	emarks)	Microtopogr	raphic Relief (D4)	
Sparsely Vegetated Conca	ave Surface (B8)			FAC-Neutra	al Test (D5)	
Field Observations:						
Surface Water Present?	Yes NoX	Depth (inches):				
Water Table Present?	Yes No X	Depth (inches):	<u> </u>			
Saturation Present?	Yes No _X	Depth (inches):	Wetland Hy	drology Present	? Yes	No X
(includes capillary fringe) Describe Recorded Data (streat		all parial photos pr	avious inspections) if avai	ilabla		
Describe Recorded Data (strea	im gauge, monitoring we	яі, aeriai priotos, pre	evious irispections), ii avai	llable.		
Remarks:						

VEGETATION – Use scientific names of plants. Sampling Point: BE7-up Absolute Dominant Indicator **Dominance Test worksheet:** Tree Stratum (Plot size: % Cover Species? Status 1. Acer rubrum 38 Yes FAC Number of Dominant Species Yes 2. Pinus strobus 20 FACU That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 6 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 50.0% (A/B) Prevalence Index worksheet: 7. 58 =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species 0 x 1 = Quercus alba **FACW** species x 2 = 1. 58 x 3 = 2. Ulmus sp. 3 No FAC species 174 3. Lonicera tatarica 3 No **FACU FACU** species 56 x 4 = 224 38 4. Quercus rubra 20 Yes **FACU** UPL species x5 =190 5. Frangula alnus 20 Yes FAC Column Totals: 162 (A) 608 (B) No 6. Populus tremuloides **FACU** Prevalence Index = B/A = 3.75 7. **Hydrophytic Vegetation Indicators:** =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') 2 - Dominance Test is >50% Onoclea sensibilis 10 Yes **FACW** 3 - Prevalence Index is ≤3.01 1. 2. Equisetum pratense 3 4 - Morphological Adaptations (Provide supporting No data in Remarks or on a separate sheet) 3. 3 Maianthemum canadense **FACU** No 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must

9. at breast height (DBH), regardless of height. 10. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 16 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus Yes UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes No X 38 =Total Cover

Remarks: (Include photo numbers here or on a separate sheet.)

6.

7.

8.

be present, unless disturbed or problematic.

Tree - Woody plants 3 in. (7.6 cm) or more in diameter

Definitions of Vegetation Strata:

SOIL Sampling Point: BE7-up Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) Depth Redox Features Color (moist) Color (moist) % Type Loc² (inches) Texture Remarks 0-14 10YR 4/4 100 Sandv Loamy sand ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix. **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Polyvalue Below Surface (S8) (LRR R, Histosol (A1) 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) High Chroma Sands (S11) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A11) Loamy Gleyed Matrix (F2) Iron-Manganese Masses (F12) (LRR K, L, R) Piedmont Floodplain Soils (F19) (MLRA 149B) Thick Dark Surface (A12) Depleted Matrix (F3) Sandy Mucky Mineral (S1) Redox Dark Surface (F6) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Red Parent Material (F21) Sandy Redox (S5) Redox Depressions (F8) Very Shallow Dark Surface (TF12) Stripped Matrix (S6) Marl (F10) (**LRR K, L**) Other (Explain in Remarks) Dark Surface (S7) 3 Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: Depth (inches): **Hydric Soil Present?** Yes No Remarks: This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Project/Site: Nashua-Manchester 40	0818 Ci	ty/County: Bedford/Hillsborough	Sampling Date: 05/28/2021
Applicant/Owner: NHDOT		State	e: NH Sampling Point: BE11-wet
Investigator(s): Jennifer Riordan and	d Meg Gordon Se	ection, Township, Range:	
Landform (hillside, terrace, etc.): Te	errace Loca	al relief (concave, convex, none): Concav	/e Slope (%): < 2
Subregion (LRR or MLRA): LRR R	Lat: 42.9 degrees nort		
Soil Map Unit Name: NnA - Ninigret fi			assification: No mapped
		•	
Are climatic / hydrologic conditions or	•		
Are Vegetation, Soil			
Are Vegetation, Soil	, or Hydrologynaturally prob	lematic? (If needed, explain any ans	wers in Remarks.)
SUMMARY OF FINDINGS –	Attach site map showing sa	mpling point locations, transe	cts, important features, etc.
Hydrophytic Vegetation Present?	Yes X No	Is the Sampled Area	
Hydric Soil Present?	Yes No X	within a Wetland? Yes	X No
Wetland Hydrology Present?	Yes X No	If yes, optional Wetland Site ID: Wetland	
Remarks: (Explain alternative proce	dures here or in a separate report.)		
Wetland delineation conducted durin	g abnormally dry conditions (accord	ing to US Drought Monitor)	
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary	Indicators (minimum of two required)
Primary Indicators (minimum of one	is required: check all that apply)		e Soil Cracks (B6)
Surface Water (A1)	Water-Stained Le		ge Patterns (B10)
High Water Table (A2)	Aquatic Fauna (B		rim Lines (B16)
Saturation (A3)	Marl Deposits (B1	· · · · · · · · · · · · · · · · · · ·	ason Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide		h Burrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospi	neres on Living Roots (C3) Saturat	tion Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Redu	ced Iron (C4) Stunted	d or Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Redu	ction in Tilled Soils (C6) X Geomo	orphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface	e (C7) Shallov	v Aquitard (D3)
Inundation Visible on Aerial Ima		Remarks) X Microto	ppographic Relief (D4)
Sparsely Vegetated Concave St	urface (B8)	X FAC-N	eutral Test (D5)
Field Observations:			
Surface Water Present? Yes _	No X Depth (inches):		
Water Table Present? Yes	No X Depth (inches):		
Saturation Present? Yes_	No X Depth (inches):	Wetland Hydrology Pre	sent? Yes <u>X</u> No
(includes capillary fringe)			
Describe Recorded Data (stream ga	uge, monitoring well, aerial priotos, p	revious inspections), il available.	
Remarks:			

VEGETATION – Use scientific names of plants. Sampling Point: BE11-wet Absolute Dominant Indicator Tree Stratum (Plot size: 30') % Cover **Dominance Test worksheet:** Species? Status 1. None Number of Dominant Species 2. That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 4 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B) Prevalence Index worksheet: =Total Cover Total % Cover of: Multiply by: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = 1. FACW species x 2 = 2. FAC species x 3 = 3. FACU species x 4 = 4. UPL species x 5 = 5. Column Totals: (A) 6. Prevalence Index = B/A = 7. **Hydrophytic Vegetation Indicators:** =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') X 2 - Dominance Test is >50% Onoclea sensibilis 3 - Prevalence Index is ≤3.01 1. 10 Yes **FACW** Osmunda spectabilis 20 Yes OBL 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 10 3. Spiraea latifolia Yes **FACW** 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 40 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus Yes UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes X No 10 =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: BE11-wet

	escription: (Describe	to the de				or or con	firm the absence o	f indicators.)
Depth	Matrix Color (moist)	%	Color (moist)	x Featur %		Loc ²	Texture	Remarks
(inches) 0-2	10YR 3/1	40	Color (Illoist)		Type ¹		Loamy/Clayey	Sandy loam with roots
	10YR 4/3	60					Loamy/Clayey	Gandy Idam With 100ts
2-12	10YR 3/1	100					Loamy/Clayey	Sandy loam
12-16	10YR 4/3	100					Sandy	Sand
12-10	1011(4/3	100					Sandy	Janu
¹ Type: C=	-Concentration, D=Dep	letion, RI	M=Reduced Matrix, C	S=Cove	red or Coa	ated Sand	d Grains. ² Loca	ation: PL=Pore Lining, M=Matrix.
Hydric So	oil Indicators:						Indicators for	Problematic Hydric Soils ³ :
	sol (A1)		Polyvalue Below	Surface	e (S8) (LR	RR,		k (A10) (LRR K, L, MLRA 149B)
	Epipedon (A2)		MLRA 149B)	(00)				irie Redox (A16) (LRR K, L, R)
	Histic (A3)		Thin Dark Surface					ky Peat or Peat (S3) (LRR K, L, R)
	ogen Sulfide (A4)		High Chroma Sa					Below Surface (S8) (LRR K, L)
	fied Layers (A5)	o (A11)	Loamy Mucky M			(, L)		Surface (S9) (LRR K, L)
	eted Below Dark Surfac	e (A11)	Loamy Gleyed N	-	2)			anese Masses (F12) (LRR K, L, R)
	Dark Surface (A12)		Depleted Matrix		`			Floodplain Soils (F19) (MLRA 149B)
	y Mucky Mineral (S1)		Redox Dark Surf					odic (TA6) (MLRA 144A, 145, 149B)
	y Gleyed Matrix (S4)		Depleted Dark S	,	,			nt Material (F21)
	y Redox (S5)		Redox Depression	` '				ow Dark Surface (TF12)
	ped Matrix (S6)		Marl (F10) (LRR	(K, L)			Other (Exp	olain in Remarks)
Dark	Surface (S7)							
³ Indicators	s of hydrophytic vegeta	tion and v	wetland hydrology mu	st be pre	esent, unle	ess distur	bed or problematic.	
	e Layer (if observed):							
Type: _								
Depth (i	inches):						Hydric Soil Pres	sent? Yes No _X
Remarks:			al and Nandhaad Davi			/! 0	0 to	O Field by diseasons of the daily Online
	form is revised from No 0 March 2013 Errata. (ł							S Field Indicators of Hydric Soils
VC101011 7.	o Maron 2010 Errata. (1	1ttp:// WW	w.moo.aoaa.gov/mton	IOUT OL		_1110/1110	30142P2_001200.d00	<i>(A)</i>

Project/Site: Nashua-Manch	nester 40818	Ci	ity/County: Bedf	ford/Hillsboroug	jh	Sampling Date:	05/28/2021
Applicant/Owner: NHDOT		_			State:	– NH Sampling	Point: BE11-up
Investigator(s): Jennifer Rior	rdan and Meg Gordon	Se	ection, Township	o, Range:			
Landform (hillside, terrace, etc	c.): Terrace	_	al relief (concave		e): Convex	Slo	pe (%): ~2
Subregion (LRR or MLRA): LI	,	t: 42.9 degrees nort	`	Long: 71.4 d	<i>'</i>	 Datur	· · · ·
Soil Map Unit Name: NnA - N		<u>: u-g: ::</u>	<u></u>		_	cation: No mappe	
•	·	f 41. !		N- V			<u>,u</u>
Are climatic / hydrologic cond	,,	•		No <u>X</u>	-		
Are Vegetation, Soil				e "Normal Circ		_	No
Are Vegetation, Soil	, or Hydrology _	naturally prob	olematic? (If	needed, explai	n any answers	in Remarks.)	
SUMMARY OF FINDING	GS – Attach site m	nap showing sa	ampling poin	nt locations	, transects,	important fea	tures, etc.
Hydrophytic Vegetation Pres	ent? Yes	No X	Is the Sampl	ed Area			
Hydric Soil Present?	Yes	No X	within a Wet		Yes	No X	
Wetland Hydrology Present?	Yes Yes	No X	If yes, optiona	al Wetland Site			
Remarks: (Explain alternativ Wetland delineation conduct	•	,		ght Monitor)			
HYDROLOGY						-A (ii	
Wetland Hydrology Indicate Primary Indicators (minimum		ok all that apply)		<u>S</u>		ators (minimum of	two required)
Surface Water (A1)	or one is required, chec	Water-Stained Le	aves (R9)		_	l Cracks (B6) atterns (B10)	
High Water Table (A2)		_ Aquatic Fauna (B		_	Moss Trim L		
Saturation (A3)	_	Marl Deposits (B1	•	_	_	Water Table (C2)	,
Water Marks (B1)		Hydrogen Sulfide	•	_	Crayfish Bu		
Sediment Deposits (B2)		Oxidized Rhizospl		Roots (C3)		/isible on Aerial Im	nagery (C9)
Drift Deposits (B3)	<u> </u>	Presence of Redu	uced Iron (C4)	<u> </u>	Stunted or S	Stressed Plants (D	1)
Algal Mat or Crust (B4)		Recent Iron Redu	iction in Tilled So	oils (C6)	Geomorphic	Position (D2)	
Iron Deposits (B5)	_	_Thin Muck Surfac	e (C7)	_	Shallow Aqu		
Inundation Visible on Ae		Other (Explain in I	Remarks)	_	Microtopogr	aphic Relief (D4)	
Sparsely Vegetated Con	icave Surface (B8)			_	FAC-Neutra	l Test (D5)	
Field Observations:							
Surface Water Present?	Yes No	_ Depth (inches):					
Water Table Present?	Yes No No	_ Depth (inches):		VAV = 41 = al 1 la -al	- I D 41	0 V	N. V
Saturation Present?	Yes No	_ Depth (inches):		Wetland Hydro	ology Present	? Yes	NoX
(includes capillary fringe) Describe Recorded Data (str	eam gauge monitoring	well serial photos	previous inspect	tions) if availab	ale:		
Describe Necorded Data (Str	eam gauge, monitoring	well, aeriai priotos, į	previous inspect	iioris), ii avallai	ле.		
Remarks:							

 VEGETATION – Use scientific names of plants.
 Sampling Point:
 BE11-up

 Absolute
 Dominant
 Indicator
 BE11-up

Tree Stratum (Plot size: 30')	Absolute	Dominant Species?	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30') 1. Pinus strobus	% Cover 10	Species? Yes	Status FACU	Dominance rest worksheet:
Quercus rubra	10	Yes	FACU	Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
3.		103	1700	
4.				Total Number of Dominant Species Across All Strata: 8 (B)
				
6				Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)
7				Prevalence Index worksheet:
	20	=Total Cover		Total % Cover of: Multiply by:
Sapling/Shrub Stratum (Plot size: 15')		-		OBL species 0 x 1 = 0
1. Lonicera tatarica	3	No	FACU	FACW species 10 x 2 = 20
2.				FAC species 20 x 3 = 60
3.				FACU species 23 x 4 = 92
4.				UPL species 20 x 5 = 100
5.				Column Totals: 73 (A) 272 (B)
6.				Prevalence Index = B/A = 3.73
7.				Hydrophytic Vegetation Indicators:
	3	=Total Cover		1 - Rapid Test for Hydrophytic Vegetation
Herb Stratum (Plot size: 5')		-		2 - Dominance Test is >50%
1. Celastrus orbiculatus	10	Yes	UPL	3 - Prevalence Index is ≤3.0 ¹
2. Unknown grass	10	Yes		4 - Morphological Adaptations ¹ (Provide supporting
3. Solidago rugosa	20	Yes	FAC	data in Remarks or on a separate sheet)
4. Onoclea sensibilis	10	Yes	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
5.				¹ Indicators of hydric soil and wetland hydrology must
6.				be present, unless disturbed or problematic.
7				Definitions of Vegetation Strata:
8.				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
9.				at breast height (DBH), regardless of height.
10				Sapling/shrub – Woody plants less than 3 in. DBH
11				and greater than or equal to 3.28 ft (1 m) tall.
12				Herb – All herbaceous (non-woody) plants, regardless
	50	_=Total Cover		of size, and woody plants less than 3.28 ft tall.
Woody Vine Stratum (Plot size:)				Woody vines – All woody vines greater than 3.28 ft in
1. Celastrus orbiculatus	10	Yes	UPL	height.
2. Clematis species	3	Yes		Hydrophytic
3.				Vegetation
4				Present? Yes NoX
	13	_=Total Cover		
Remarks: (Include photo numbers here or on a separ	ate sheet.))		

SOIL Sampling Point: BE11-up

Profile De	escription: (Describe	to the d	enth needed to docu	ment th	o indicate	or or con	firm the absence (of indicators)	<u> </u>
Depth	Matrix	to the u	•	r Featur		or or con	illilli tile abselice t	of indicators.)	
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks	
0-6	10YR 3/2	100	Color (moist)		Туре		Loamy/Clayey	Sandy loam	
6-12	10YR 4/1	95					Loamy/Clayey	Sandy loam	
0-12							Loamy/Clayey	Gandy loan	
	10YR 5/1	5							
¹ Type: C=	-Concentration, D=De	letion R	——————————————————————————————————————	S=Cove	red or Cos		d Grains 21 oc	 cation: PL=Pore Lining, M=	:Matrix
	oil Indicators:	JIOUOII, IX	ivi i toduoca iviatiix, Ot	J - OUVE	154 01 006	atou Gailt		r Problematic Hydric Soil	
_	sol (A1)		Polyvalue Below	Surface	(S8) (I D	D D		ck (A10) (LRR K, L, MLRA	
				Suriace	5 (30) (LN	ικ κ,			·
	Epipedon (A2)		MLRA 149B)	- (00) (airie Redox (A16) (LRR K,	
	Histic (A3)		Thin Dark Surface					cky Peat or Peat (S3) (LRR	
	ogen Sulfide (A4)		High Chroma Sa					e Below Surface (S8) (LRR	K, L)
Stratit	fied Layers (A5)		Loamy Mucky M	-		(, L)		Surface (S9) (LRR K, L)	
Deple	eted Below Dark Surface	ce (A11)	Loamy Gleyed M	latrix (F2	2)		Iron-Man	ganese Masses (F12) (LRF	R K, L, R)
Thick	Dark Surface (A12)		Depleted Matrix	(F3)			Piedmon	t Floodplain Soils (F19) (MI	LRA 149B)
	y Mucky Mineral (S1)		Redox Dark Surf	` ')			odic (TA6) (MLRA 144A, 1	-
	y Gleyed Matrix (S4)		Depleted Dark S		-			ent Material (F21)	10, 1102)
	y Redox (S5)		Redox Depression	•	•			llow Dark Surface (TF12)	
				. ,					
	ped Matrix (S6)		Marl (F10) (LRR	K, L)			Other (E)	plain in Remarks)	
—— Dark	Surface (S7)								
³ Indicators	s of hydrophytic vegeta	ition and	wetland hydrology mus	st be pre	esent, unle	ess distur	bed or problematic.		
Restrictiv	e Layer (if observed)	:							
Type:									
Depth (i	inches):						Hydric Soil Pre	sent? Yes	No X
Remarks:									
This data	form is revised from N	orthcentra	al and Northeast Regio	nal Sup	plement \	/ersion 2	.0 to reflect the NR0	CS Field Indicators of Hydri	c Soils
version 7.	0 March 2013 Errata. (http://ww	w.nrcs.usda.gov/Intern	et/FSE	DOCUMI	ENTS/nrc	s142p2 051293.do	cx)	
							. –	•	

Project/Site: Nashua-Manchester 40818	City/County: Manchester/Hi	llsborough	Sampling Date: 05/13/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: MA2-wet
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Township, Range:		
Landform (hillside, terrace, etc.): Terrace	Local relief (concave, convex,	none): Concave	Slope (%): < 2
Subregion (LRR or MLRA): LRR R L		1.4 dregrees west	· · · / Datum:
Soil Map Unit Name: WnC - Windor-Urban land com			ication: Not mapped
Are climatic / hydrologic conditions on the site typica		X (If no, explain	• • • • • • • • • • • • • • • • • • • •
Are Vegetation, Soil, or Hydrology	· — –	Circumstances" pre	
	·	•	
Are Vegetation, Soil, or Hydrology SUMMARY OF FINDINGS – Attach site is		explain any answers ons, transects,	
Hydrophytic Vegetation Present? Yes X	No Is the Sampled Area		
Hydric Soil Present? Yes X	- ·	Yes X	No
Wetland Hydrology Present? Yes X			
Remarks: (Explain alternative procedures here or i Wetland delineation conducted during abnormally of		r)	
HYDROLOGY			
Wetland Hydrology Indicators:		•	ators (minimum of two required)
Primary Indicators (minimum of one is required; che			Cracks (B6)
X Surface Water (A1)	Water-Stained Leaves (B9)		atterns (B10)
High Water Table (A2) Saturation (A3)	Aquatic Fauna (B13) Marl Deposits (B15)	Moss Trim I	u Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Bu	
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3		/isible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)		Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aqu	
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)		raphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	_	FAC-Neutra	
Field Observations:			
Surface Water Present? Yes X No	Depth (inches): 6-8 in		
Water Table Present? Yes X No	Depth (inches): 10 in		
Saturation Present? Yes X No	Depth (inches):surface	Hydrology Present	? Yes X No
(includes capillary fringe)		2.11	
Describe Recorded Data (stream gauge, monitoring	j well, aerial photos, previous inspections), if av	/allable:	
Remarks: Standing water in center of wetland.			

VEGETATION – Use scientific names of plants. Sampling Point: MA2-wet Absolute Dominant Indicator 30') **Dominance Test worksheet:** Tree Stratum (Plot size: % Cover Species? Status Acer saccharinum 38 Yes **FACW** Number of Dominant Species Yes 2. Acer rubrum 20 FAC That Are OBL, FACW, or FAC: 6 (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 9 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 66.7% (A/B) Prevalence Index worksheet: 7. 58 =Total Cover Total % Cover of: Multiply by: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Frangula alnus **FAC** FACW species x 2 = 1. **UPL** 2. Euonymus alatus 10 Yes FAC species x 3 = 3. Ulmus rubra 10 Yes **FAC** FACU species x 4 = 10 Yes UPL 4. Acer platanoides UPL species x 5 = 3 5. Fraxinus species No Column Totals: (A) 6. Prevalence Index = B/A = 7. **Hydrophytic Vegetation Indicators:** =Total Cover 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% Herb Stratum (Plot size: 10 Osmunda claytoniana Yes **FAC** 3 - Prevalence Index is ≤3.01 1. 2. Symplocarpus foetidus 3 No OBL 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 10 3. Toxicodendron radicans Yes **FAC** 4. Lonicera tatarica 10 Yes **FACU** Problematic Hydrophytic Vegetation¹ (Explain) 5. Athyrium angustum 10 Yes FAC ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 43 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes X No 3 =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MA2-wet

	escription: (Describe	to the de				or or con	firm the absence	of indicators.)
Depth	Matrix			Feature		1.22	Taratrona	Damanika
(inches)	Color (moist)	<u>%</u> -	Color (moist)		Type ¹	Loc ²	Texture	Remarks
0-14	10YR 2/1	75	10YR 3/4	5	<u> </u>	M	Mucky Sand	Distinct redox concentrations
	10YR 4/3	10						
	10YR 3/2	10						
17	Our control in D. D. D.		Deduced Metric Of			4101	21	
	=Concentration, D=Depl oil Indicators:	etion, Riv	=Reduced Matrix, CS	s=Cover	red or Coa	ited Sand		cation: PL=Pore Lining, M=Matrix. or Problematic Hydric Soils ³ :
•	sol (A1)		Polyvalue Below	Surface	(S8) (I R	RR		ck (A10) (LRR K, L, MLRA 149B)
	Epipedon (A2)	-	MLRA 149B)	Gunado	/ (00) (= 10	,		rairie Redox (A16) (LRR K, L, R)
	Histic (A3)		Thin Dark Surfac	e (S9) (LRR R. M	LRA 149		cky Peat or Peat (S3) (LRR K, L, R)
	ogen Sulfide (A4)	-	High Chroma Sa					e Below Surface (S8) (LRR K, L)
	fied Layers (A5)	-	Loamy Mucky Mi					k Surface (S9) (LRR K, L)
	eted Below Dark Surface	- (A11) −	Loamy Gleyed M	-		, ,		iganese Masses (F12) (LRR K, L, R)
	Dark Surface (A12)	` ′ -	Depleted Matrix (,			t Floodplain Soils (F19) (MLRA 149B)
	y Mucky Mineral (S1)	-	Redox Dark Surfa)			podic (TA6) (MLRA 144A, 145, 149B)
	y Gleyed Matrix (S4)	-	Depleted Dark Su					ent Material (F21)
	y Redox (S5)	-	Redox Depression		-			allow Dark Surface (TF12)
	ped Matrix (S6)	-	Marl (F10) (LRR					xplain in Remarks)
	Surface (S7)	-	Wall (1 10) (LIKK	IX, ∟)			Other (E	Apiairi ir Remarks)
Dark	Surface (S7)							
³ Indicators	s of hydrophytic vegetat	ion and w	etland hydrology mus	st be pre	esent, unle	ess disturb	oed or problematic.	
Restrictiv Type:	e Layer (if observed):							
Depth (i	inches):						Hydric Soil Pre	esent? Yes X No
Remarks:							i i i junio don i i o	<u> </u>
	form is revised from No	rthcentral	and Northeast Regio	nal Sup	plement \	ersion 2.	0 to reflect the NR	CS Field Indicators of Hydric Soils
version 7.0	0 March 2013 Errata. (h	ttp://www	.nrcs.usda.gov/Intern	et/FSE_	DOCUME	ENTS/nrcs	s142p2_051293.dc	ocx)

Project/Site: Nashua-Manchester 40818	City/County: M	anchester/Hillsborough	Sampling Date: 05/13/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: MA2-Up
Investigator(s): Jennifer Riordan and Meg Gordon	n Section, Towns	hip, Range:	
Landform (hillside, terrace, etc.): Terrace		ave, convex, none): None	Slope (%): 5
	Lat: 42.9 degrees north	Long: 71.4 dregrees west	· · · /
	•		fication: Not mapped
Soil Map Unit Name: WnC - Windor-Urban land co	-		•
Are climatic / hydrologic conditions on the site typic	•	No X (If no, explain	
Are Vegetation, Soil, or Hydrolog		Are "Normal Circumstances" pr	
Are Vegetation, Soil, or Hydrology	ynaturally problematic?	(If needed, explain any answers	s in Remarks.)
SUMMARY OF FINDINGS – Attach site	map showing sampling po	oint locations, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes	No X Is the Sam	npled Area	
Hydric Soil Present? Yes	No X within a W	•	No X
Wetland Hydrology Present? Yes	No X If yes, option	onal Wetland Site ID:	
Remarks: (Explain alternative procedures here o Wetland delineation conducted during abnormally	,	ought Monitor)	
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary India	cators (minimum of two required)
Primary Indicators (minimum of one is required; of	heck all that apply)	Surface So	oil Cracks (B6)
Surface Water (A1)	Water-Stained Leaves (B9)		Patterns (B10)
—— High Water Table (A2)	Aquatic Fauna (B13)		Lines (B16)
Saturation (A3)	Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)		urrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospheres on Livir	- · · · · · · · · · · · · · · · · · · ·	Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled	• • • • • • • • • • • • • • • • • • • •	ic Position (D2)
Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7)	Thin Muck Surface (C7)	Shallow Aq	guitard (D3) graphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	Other (Explain in Remarks)		ral Test (D5)
Field Observations:			
Surface Water Present? Yes No	X Depth (inches):		
	X Depth (inches):		
Saturation Present? Yes No	X Depth (inches):	Wetland Hydrology Present	t? Yes No X
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitori	ng well, aerial photos, previous insp	ections), if available:	
Remarks:			
Tremains.			

VEGETATION – Use scientific names of plants. Sampling Point: MA2-Up Absolute Dominant Indicator **Dominance Test worksheet:** Tree Stratum (Plot size: % Cover Species? Status 1. Acer saccharinum 20 **FACW** Yes Number of Dominant Species FAC 2. Acer rubrum 20 Yes That Are OBL, FACW, or FAC: (A) 3. 20 Yes Quercus rubra **FACU Total Number of Dominant** 4. Species Across All Strata: 9 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 44.4% (A/B) Prevalence Index worksheet: 7. 60 =Total Cover Total % Cover of: Multiply by: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Acer rubrum FAC **FACW** species x 2 = 1. **UPL** 68 x 3 = 2. Euonymus alatus 10 Yes FAC species 204 3. Lonicera tatarica 20 Yes **FACU** FACU species 60 x 4 = 240 13 4. UPL species x 5 = 65 5. Column Totals: 161 (A) 549 (B) 6. Prevalence Index = B/A = 3.41 7. **Hydrophytic Vegetation Indicators:** 40 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 2 - Dominance Test is >50% 38 Osmunda claytoniana Yes FAC 3 - Prevalence Index is ≤3.01 1. Polystichum acrostichoides 20 Yes FACU 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 3. Hazel/Birch? 20 Yes 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. 10. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 78 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus **UPL** height. 2. Hydrophytic 3. Vegetation 4. Present? Yes No X 3 =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MA2-Up

Profile De	escription: (Describe	to the de				or or con	firm the absence	of indicators.)	
Depth	Matrix			x Featur					
(inches)	Color (moist)	%	Color (moist)		Type ¹	Loc ²	Texture		Remarks
0-5	10YR 4/3	100					Loamy/Clayey	Sa	andy loam
5-12	10YR 5/4	10					Sandy	Lo	pamy sand
	10YR 3/2	90							
									_
			_						
¹ Type: C=	-Concentration, D=Dep	letion, RN	/=Reduced Matrix, C	S=Cove	red or Coa	ated Sand	d Grains. ² Lo	cation: PL=Pore	Lining, M=Matrix.
	oil Indicators:	,	, -					or Problematic F	
_	sol (A1)		Polyvalue Below	Surface	e (S8) (LR	RR,			(, L, MLRA 149B)
	Epipedon (A2)		MLRA 149B)		, , ,			rairie Redox (A16	·
	Histic (A3)		Thin Dark Surfa	ce (S9) (LRR R, M	ILRA 149		· ·	(S3) (LRR K, L, R)
	ogen Sulfide (A4)	•	—— High Chroma Sa				· —	ie Below Surface	
	fied Layers (A5)	•	Loamy Mucky M					rk Surface (S9) (I	
	eted Below Dark Surfac	e (Δ11)	Loamy Gleyed N			-, -,			(F12) (LRR K, L, R)
	Dark Surface (A12)	· (A11)	Depleted Matrix		<i>-)</i>			-	s (F19) (MLRA 149B)
		-			`				
	y Mucky Mineral (S1)		Redox Dark Sur	-	-				RA 144A, 145, 149B)
	y Gleyed Matrix (S4)		Depleted Dark S		-			rent Material (F21	
	y Redox (S5)		Redox Depressi	` '				allow Dark Surfac	
	ed Matrix (S6)		Marl (F10) (LRR	K , L)			Other (E	Explain in Remark	s)
Dark	Surface (S7)								
³ Indicators	s of hydrophytic vegeta	tion and w	etland hydrology mu	st be pre	esent, unle	ess distur	bed or problemation	.	
	e Layer (if observed):								
Type:									
Depth (i	nches):						Hydric Soil Pr	esent? Ye	s No_X_
Remarks:									
	form is revised from No								ors of Hydric Soils
version 7.	0 March 2013 Errata. (l	nttp://www	/.nrcs.usda.gov/Interr	net/FSE_	_DOCUME	ENTS/nrc	s142p2_051293.d	ocx)	

Project/Site: Nashua-Manchester 40818	City/County: Merrimack/Hil	llsborough	Sampling Date: 05/04/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: Me1-Wet
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Township, Range:		
Landform (hillside, terrace, etc.): Terrace	Local relief (concave, convex		Slope (%): < 2
	<u> </u>	71.4 degrees west	Datum:
	Long.		
Soil Map Unit Name: Om - Occum fine sandy loam			fication: Not mapped
Are climatic / hydrologic conditions on the site typical for this		X (If no, explair	·
		al Circumstances" pr	
Are Vegetation, Soil, or Hydrology	naturally problematic? (If needed,	explain any answers	s in Remarks.)
SUMMARY OF FINDINGS – Attach site map s	howing sampling point locat	ions, transects	, important features, etc.
Lludranhutia Vagatatian Pragant? Vag. V. N	lo the Compled Avec		
	lo Is the Sampled Area within a Wetland?	Yes X	No
	lo If yes, optional Wetlan		
Remarks: (Explain alternative procedures here or in a sep		Totalia	
Wetland delineation conducted during abnormally dry/mod		US Drought Monito	r)
LIVEROLOGY			
HYDROLOGY			
Wetland Hydrology Indicators:			cators (minimum of two required)
Primary Indicators (minimum of one is required; check all t			oil Cracks (B6)
	ter-Stained Leaves (B9)		Patterns (B10)
	atic Fauna (B13)		Lines (B16) n Water Table (C2)
	l Deposits (B15) rogen Sulfide Odor (C1)		urrows (C8)
	dized Rhizospheres on Living Roots (C		Visible on Aerial Imagery (C9)
	sence of Reduced Iron (C4)		Stressed Plants (D1)
l 	ent Iron Reduction in Tilled Soils (C6)		ic Position (D2)
I 	Muck Surface (C7)		quitard (D3)
	er (Explain in Remarks)		graphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	,		al Test (D5)
Field Observations:			
Surface Water Present? Yes No _X De	epth (inches):		
Water Table Present? Yes No X De	epth (inches):		
Saturation Present? Yes X No De	epth (inches): surface Wetland	Hydrology Presen	t? Yes X No
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well, a	erial photos, previous inspections), if a	available:	
Remarks:			
wetland saturated to surface in areas			

VEGETATION – Use scientific names of plants. Sampling Point: Me1-Wet Absolute Dominant Indicator Tree Stratum (Plot size: **Dominance Test worksheet:** % Cover Species? Status 1. Acer rubrum 63 Yes FAC Number of Dominant Species 2. That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 2 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 100.0% (A/B) Prevalence Index worksheet: 7. 63 =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Unknown shrub (Viburnum?) **FACW** species x 2 = 2. 83 x 3 = FAC species 249 0 3. FACU species x 4 = 0 4. UPL species x 5 = 5. Column Totals: 89 (A) 261 (B) 6. Prevalence Index = B/A = 2.93 7. **Hydrophytic Vegetation Indicators:** 3 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') X 2 - Dominance Test is >50% 20 Matteuccia struthiopteris Yes FAC X 3 - Prevalence Index is ≤3.0¹ 1. Impatiens capensis 3 No **FACW** 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 3 3. Laportea canadensis **FACW** No 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 26 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. None height. 2. Hydrophytic 3. Vegetation 4. Present? Yes X No =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: Me1-Wet

	escription: (Describe	to the d				or or con	firm the absence	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	K Feature %	Type ¹	Loc ²	Texture	Remarks
0-6	10YR 2/1	88	10YR 3/3	2	C	M	Loamy/Clayey	Distinct redox concentrations
	10YR 4/2	10					<u> </u>	<u> </u>
6-14	10YR 5/2	60	10YR 3/6	10			Loamy/Clayey	Prominent redox concentrations
	10YR 4/1	30						
	Concentration, D=Dep	letion, R	M=Reduced Matrix, C	S=Cover	ed or Coa	ated Sand		cation: PL=Pore Lining, M=Matrix.
-	oil Indicators:							r Problematic Hydric Soils ³ :
	sol (A1)		Polyvalue Below	Surface	(S8) (LR	RR,		ck (A10) (LRR K, L, MLRA 149B)
	Epipedon (A2)		MLRA 149B)	(00) (airie Redox (A16) (LRR K, L, R)
	Histic (A3)		Thin Dark Surface				· —	cky Peat or Peat (S3) (LRR K, L, R)
	ogen Sulfide (A4)		High Chroma Sa					e Below Surface (S8) (LRR K, L)
	fied Layers (A5)		Loamy Mucky M			(, L)		k Surface (S9) (LRR K, L)
	eted Below Dark Surfac	e (A11)	Loamy Gleyed M	-	2)			ganese Masses (F12) (LRR K, L, R)
Thick	Dark Surface (A12)		X Depleted Matrix	(F3)			Piedmon	t Floodplain Soils (F19) (MLRA 149B)
Sand	y Mucky Mineral (S1)		X Redox Dark Surf	ace (F6)			Mesic Sp	oodic (TA6) (MLRA 144A, 145, 149B)
Sand	y Gleyed Matrix (S4)		Depleted Dark S	urface (F	7)		Red Pare	ent Material (F21)
Sand	y Redox (S5)		Redox Depression	ons (F8)			Very Sha	illow Dark Surface (TF12)
Stripp	oed Matrix (S6)		Marl (F10) (LRR	K , L)			Other (Ex	xplain in Remarks)
Dark	Surface (S7)						<u> </u>	
³ Indicators	s of hydrophytic vegetat	ion and	wetland hydrology mu	st be pre	sent, unle	ess distur	bed or problematic.	
Restrictiv Type:	ve Layer (if observed):							
Depth (i	inches):						Hydric Soil Pre	esent? Yes X No
Remarks:							, , , , ,	<u> </u>
		rthcentr	al and Northeast Regio	onal Sup	plement \	/ersion 2.	.0 to reflect the NR0	CS Field Indicators of Hydric Soils
	0 March 2013 Errata. (h							

Project/Site: Nashua-Manchester 40818	City/County: Merrimack/Hills	borough	Sampling Date: 05/04/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: Me1-Up
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Township, Range:		
Landform (hillside, terrace, etc.): Slope/bottom of F		none). None	Slope (%): 5-10
	<u> </u>	1.4 degrees west	
	.at. 42.0 degrees north	<u> </u>	
Soil Map Unit Name: Om - Occum fine sandy loam			fication: Not mapped
Are climatic / hydrologic conditions on the site typical	· — —	X (If no, explain	•
Are Vegetation, Soil, or Hydrology		Circumstances" pr	esent? Yes X No
Are Vegetation, Soil, or Hydrology	naturally problematic? (If needed, ex	xplain any answers	s in Remarks.)
SUMMARY OF FINDINGS – Attach site	map showing sampling point location	ns, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes >	(No Is the Sampled Area		
Hydric Soil Present? Yes	No X within a Wetland?	Yes	No X
Wetland Hydrology Present? Yes	No X If yes, optional Wetland		<u> </u>
Remarks: (Explain alternative procedures here or			
Wetland delineation conducted during abnormally		S Drought Monitor	-)
HYDROLOGY			
		Casandani Indi	
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; ch	ook all that apply)		cators (minimum of two required) il Cracks (B6)
Surface Water (A1)	Water-Stained Leaves (B9)		atterns (B10)
High Water Table (A2)	Aquatic Fauna (B13)		Lines (B16)
Saturation (A3)	Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Bu	
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)		Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphi	c Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aq	uitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	Microtopog	raphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)		FAC-Neutra	al Test (D5)
Field Observations:			
Surface Water Present? Yes No	Depth (inches):		
Water Table Present? Yes No	Depth (inches):		
Saturation Present? Yes No	Depth (inches): Wetland H	lydrology Present	t? Yes No _X
(includes capillary fringe) Describe Recorded Data (stream gauge, monitorin	g well period photos, provious inspections), if av	ailablo:	
Describe Necorded Data (stream gauge, monitorin	g well, aeriai priotos, previous irispections), ii av	aliable.	
Remarks:			

VEGETATION – Use scientific names of plants. Sampling Point: Me1-Up Absolute Dominant Indicator **Dominance Test worksheet:** Tree Stratum (Plot size: % Cover Species? Status Acer rubrum 38 Yes FAC Number of Dominant Species **FACU** 2. Quercus rubra 38 Yes That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 3 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 66.7% (A/B) Prevalence Index worksheet: 76 =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Carpinus caroliniana FACW species x 2 = 2. FAC species x 3 = 3. FACU species x 4 = 4. UPL species x 5 = 5. Column Totals: (A) 6. Prevalence Index = B/A = 7. **Hydrophytic Vegetation Indicators:** 20 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') X 2 - Dominance Test is >50% Toxicodendron radicans 3 3 - Prevalence Index is ≤3.01 1. 2. 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 3. 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 3 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes X No 3 =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: Me1-Up Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) Depth Redox Features Color (moist) Color (moist) % Type Loc² (inches) Texture Remarks 0-16 10YR 3/2 100 Sandv Loamy Sandy ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix. **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) High Chroma Sands (S11) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A11) Loamy Gleyed Matrix (F2) Iron-Manganese Masses (F12) (LRR K, L, R) Piedmont Floodplain Soils (F19) (MLRA 149B) Thick Dark Surface (A12) Depleted Matrix (F3) Sandy Mucky Mineral (S1) Redox Dark Surface (F6) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Red Parent Material (F21) Sandy Redox (S5) Redox Depressions (F8) Very Shallow Dark Surface (TF12) Stripped Matrix (S6) Marl (F10) (**LRR K, L**) Other (Explain in Remarks) Dark Surface (S7) 3 Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: **Hydric Soil Present?** Yes No

Depth (inches):

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Project/Site: Nashua-Manchester 40818	Ci	ty/County: Merrimack/Hillsbo	orough	Sampling Date: 05/11/21	
Applicant/Owner: NHDOT			State:	 NH Sampling Point: ме	11-wet
Investigator(s): Jennifer Riordan and Meg G	ordon Se	ection, Township, Range:		<u> </u>	
Landform (hillside, terrace, etc.): Floodplain	Loca	al relief (concave, convex, nor	ne): Concave	Slope (%):	< 2
Subregion (LRR or MLRA): LRR R	Lat: 42.8 degrees nort	•	degrees west	Datum:	
Soil Map Unit Name: Pu - Pootatuck fine sand				ication: PFO1/SS1E	
Are climatic / hydrologic conditions on the site	•	? Yes No X			
Are Vegetation , Soil , or Hydr	,,		— (II 110, explain rcumstances" pre		
Are Vegetation, Soil, or Hydr SUMMARY OF FINDINGS – Attach	<u> </u>		lain any answers	•	t 0
SUMMART OF FINDINGS - Attach	The map showing sa		s, transects,	important leatures, e	
	es <u>X</u> No	Is the Sampled Area			
l ·	es No X	within a Wetland?	Yes X	No	
, 0,	es No_X_	If yes, optional Wetland Sit	te ID: Wetland I	Me11	
Remarks: (Explain alternative procedures he Wetland delineation conducted during abnormalisms)	,	ing to US Drought Monitor)			
Wedana delinication conducted during abrief	many ary contamono (accord	ing to oo brought Monitor)			
HYDROLOGY					
Wetland Hydrology Indicators:			Secondary Indic	ators (minimum of two requir	red)
Primary Indicators (minimum of one is requir	ed; check all that apply)	 .	Surface Soi	l Cracks (B6)	
Surface Water (A1)	Water-Stained Le	aves (B9)	Drainage Pa	atterns (B10)	
—— High Water Table (A2)	Aquatic Fauna (B	•	Moss Trim I		
Saturation (A3)	Marl Deposits (B1			Water Table (C2)	
—— Water Marks (B1)	Hydrogen Sulfide		Crayfish Bu		
Sediment Deposits (B2)		neres on Living Roots (C3)		√isible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Redu	` '		Stressed Plants (D1)	
Algal Mat or Crust (B4)		ction in Tilled Soils (C6)	X Geomorphic		
Iron Deposits (B5)	Thin Muck Surface		Shallow Aqı		
Inundation Visible on Aerial Imagery (B7		Remarks) .		raphic Relief (D4)	
Sparsely Vegetated Concave Surface (E	38)	<u>.</u>	FAC-Neutra	al Test (D5)	
Field Observations:					
	No X Depth (inches):				
	No X Depth (inches):				
	No X Depth (inches):	Wetland Hyd	drology Present	? Yes No	<u>X</u>
(includes capillary fringe)					
Describe Recorded Data (stream gauge, mo	nitoring well, aerial photos, p	revious inspections), if availa	able:		
Remarks:					
Adjacent to Naticook Brook. Wetland delinea	ation was conducted during:	abnormally dry conditions and	d few hydrology i	indicators were observed	
Adjustin to National Brook. Wettand domine	mon was conducted daming t	abriormany ary conditions and	a low riyarology i	indicators were observed.	

VEGETATION – Use scientific names of plants.

		<u> </u>	1 1 7	
<u>Tree Stratum</u> (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. Acer negundo	20	Yes	FAC	Newshare of Danstrant Organia
2.				Number of Dominant Species That Are OBL, FACW, or FAC:4 (A)
3.				Total Number of Dominant
4				Species Across All Strata: 5 (B)
5				Percent of Dominant Species
6.				That Are OBL, FACW, or FAC: 80.0% (A/B)
7				Prevalence Index worksheet:
	20	=Total Cover		Total % Cover of: Multiply by:
Sapling/Shrub Stratum (Plot size: 15')				OBL species x 1 =
1. Alnus incana	20	Yes	FACW	FACW species x 2 =
2. Rosa multiflora	20	Yes	FACU	FAC species x 3 =
3.				FACU species x 4 =
4.				UPL species x 5 =
<u> </u>				<u> </u>
· -				
6.				Prevalence Index = B/A =
7				Hydrophytic Vegetation Indicators:
	40	=Total Cover		1 - Rapid Test for Hydrophytic Vegetation
Herb Stratum (Plot size:)				X 2 - Dominance Test is >50%
1. Onoclea sensibilis	20	Yes	FACW	3 - Prevalence Index is ≤3.0 ¹
2. Athyrium angustum	20	Yes	FAC	4 - Morphological Adaptations (Provide supporting
3. Rosa multiflora	10	No	FACU	data in Remarks or on a separate sheet)
4. Carex sp.	3	No		Problematic Hydrophytic Vegetation ¹ (Explain)
5. Viburnum recognitum	10	No	FAC	<u> </u>
6				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7.				Definitions of Vegetation Strata:
8.				Definitions of Vegetation Strata.
· -				Tree – Woody plants 3 in. (7.6 cm) or more in diamete
9.				at breast height (DBH), regardless of height.
10				Sapling/shrub – Woody plants less than 3 in. DBH
11				and greater than or equal to 3.28 ft (1 m) tall.
12				Herb – All herbaceous (non-woody) plants, regardless
	63	=Total Cover		of size, and woody plants less than 3.28 ft tall.
Woody Vine Stratum (Plot size:30')				Woody vines – All woody vines greater than 3.28 ft in
1. Celastrus orbiculatus	3	No	UPL	height.
2.				
3.				Hydrophytic
				Vegetation Present? Yes X No
4.		=Total Cover		
4.	3			

SOIL Sampling Point: Me11-wet

Depth Madrix Redox Features Redox Four Remarks	Profile De	scription: (Describe	to the de				or or con	firm the absence of i	ndicators.)	
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Thought Sund Sund Grains. Thought Sund Sund Grains. Thought Sund Sund Grains. Thought Sund Sund (A10) LRR K, L) Thin Dark Sund (A10) LRR K, L) Thin Dark Sund Sund (A10) LRR K, L) Thin Dark Sund Sund Sund Sund Sund (RR K, L) Thin Dark Sund Sund Sund Sund Sund Sund Matrix, CS=Covered or Coated Sand Grains. Thought Sund Reduced Sund Sund Sund Sund Sund Sund Sund Sun	Depth							_		
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Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Indicators for Problematic Hydric Soils³: 2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) High Chroma Sands (S11) (LRR K, L) Thin Dark Surface (A5) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Sandy Mucky Mineral (S1) Redox Depressions (F8) Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Sandy Redox (S5) Redox Depressions (F8) Dark Surface (S7) Matrix (F3) Dark Surface (S7) Matrix (F4) Dark Surface (TF1) Dark Surface (TF1) Type: Depth (Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Type: Depth (Inches): Hydric Soil Present? Yes No X Type: Depth (Inches): Hydric Soil Present? Yes No X	0-8	10YR 3/2	100					Loamy/Clayey	Silty Loam	
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	8-16	10YR 4/3	50					Loamy/Clayey	Silty Loam	
Hydric Soil Indicators: Histosol (A1)		10YR 3/2	50							
Hydric Soil Indicators: Histosol (A1)										
Hydric Soil Indicators: Histosol (A1)										
Hydric Soil Indicators: Histosol (A1)										
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Hydric Soil Indicators: Histosol (A1)	1									
Histosol (A1)			pletion, RM	/I=Reduced Matrix, C	S=Cove	red or Coa	ited Sand			•
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Stratified Layers (A5)										
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Restrictive Layer (if observed): Type: Depth (inches): Remarks: This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils	Dark S	Surface (S7)								
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Depth (inches): Hydric Soil Present? Yes No X Remarks: This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils	_	e Layer (if observed)):							
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This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils	• `	iches)						nyuric Soil Preser	it! Tes	NO
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									riela ilialcators or riyan	ic Solis

Project/Site: Nashua-Manchester 40818	City/County: Me	rrimack/Hillsborough	Sampling Date: 05/11/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: Me11-Up
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Townsh	in Range [.]	
Landform (hillside, terrace, etc.): Floodplain		ve, convex, none): Concave	Slope (%): < 2
· · · · · · · · · · · · · · · · · · ·	: 42.8 degrees north	Long: 71.4 degrees west	
	. 42.6 degrees north	_	Datum:
Soil Map Unit Name: Pu - Pootatuck fine sandy loam			fication: PFO1/SS1E
Are climatic / hydrologic conditions on the site typical f	· -	No X (If no, explair	n in Remarks.)
Are Vegetation, Soil, or Hydrology _	significantly disturbed? A	Are "Normal Circumstances" pr	resent? Yes X No
Are Vegetation, Soil, or Hydrology _	naturally problematic? (If needed, explain any answers	s in Remarks.)
SUMMARY OF FINDINGS – Attach site m	ap showing sampling poi	nt locations, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes	No X Is the Samp	oled Area	
Hydric Soil Present? Yes	No X within a We	etland? Yes	No X
Wetland Hydrology Present? Yes	No X If yes, option	nal Wetland Site ID:	
Wetland delineation conducted during abnormally dry	conditions (according to 03 Droit	ight Monitor)	
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indi	cators (minimum of two required)
Primary Indicators (minimum of one is required; chec	k all that apply)	Surface Sc	oil Cracks (B6)
Surface Water (A1)	_Water-Stained Leaves (B9)		Patterns (B10)
High Water Table (A2)	_Aquatic Fauna (B13)		Lines (B16)
Saturation (A3)	_Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1) Sediment Deposits (B2)	_Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living		urrows (C8) Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	· · · · · · · · · · · · · · · · · · ·	Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled S		ic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	· · · —	quitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)		graphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	-		al Test (D5)
Field Observations:			
Surface Water Present? Yes No _ X	Depth (inches):		
Water Table Present? Yes No X	Depth (inches):		
Saturation Present? Yes No _X	Depth (inches):	Wetland Hydrology Presen	t? Yes No_X
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring v	vell, aerial photos, previous inspe	ctions), if available:	
Remarks:			
Adjacent to Naticook Brook			

	ants.			Sampling Point: Me11-Up
<u>Tree Stratum</u> (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. Acer negundo	20	Yes	FAC	Number of Dominant Species
2. Acer rubrum	10	Yes	FAC	That Are OBL, FACW, or FAC: 2 (A)
3. Prunus sp.	10	Yes		
4.				Total Number of Dominant Species Across All Strata: 9 (B)
6.				Percent of Dominant Species That Are OBL, FACW, or FAC: 22.2% (A/B)
7.				Prevalence Index worksheet:
	40	=Total Cover		Total % Cover of: Multiply by:
Sapling/Shrub Stratum (Plot size: 15')		•		OBL species 0 x 1 = 0
Lonicera tatarica	10	Yes	FACU	FACW species 0 x 2 = 0
	10	Yes	UPL	
2. Euonymus alatus				'
3. Rosa multiflora	10	Yes	FACU	FACU species 60 x 4 = 240
4				UPL species 20 x 5 = 100
5				Column Totals: 110 (A) 430 (B)
6.				Prevalence Index = B/A = 3.91
7				Hydrophytic Vegetation Indicators:
	30	=Total Cover		1 - Rapid Test for Hydrophytic Vegetation
Herb Stratum (Plot size: 5')		•		2 - Dominance Test is >50%
1. Rosa multiflora	20	Yes	FACU	3 - Prevalence Index is ≤3.0 ¹
2. Circaea canadensis	20	Yes	FACU	4 - Morphological Adaptations ¹ (Provide supporting
3. Unknown grass	3	No No		data in Remarks or on a separate sheet)
4.			-	Problematic Hydrophytic Vegetation ¹ (Explain)
5.				1
6				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7.				Definitions of Vegetation Strata:
8		·		
9.				Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
10.				
11				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
12.				Herb – All herbaceous (non-woody) plants, regardless
	43	=Total Cover		of size, and woody plants less than 3.28 ft tall.
Woody Vine Stratum (Plot size: 30')		-		
1. Celastrus orbiculatus	10	Yes	UPL	Woody vines – All woody vines greater than 3.28 ft in height.
2.				
				Hydrophytic
3				Vegetation
3.				Drocont? Vos No Y
3. 4.	10	=Total Cover		Present?

SOIL Sampling Point: Me11-Up

Depth Matrix Redox Features (inches) Color (moist) % Type' Loc' Texture Remarks 0-5 10YR 3/2 100 Loamy/Clayey Silty Loam 5-12 10YR 4/3 70 Silty Loam 10YR 5/3 30 Silty Loam 10YR 5/3 Silty Loam 10YR 5/3 30 Silty Loam 10YR 5/3 Silty Loam 10YR 5/3 30 Silty Loam 10YR 5/3 Soll Loam, Malaria Soll Crif Ali (MR RK, L) 10Polyalue Below Surface (S8) (LRR K, L) 10Polyalue Below Surface (F6) Soll Reference Surface (F6) Soll Reference Surface (F7) Soll Reference Surface (F7) 10Polyalue Below Surface (S8) Soll Reference Soll Refer	(inches) Color (moist) % Color (moist) % Type¹ Loc² Texture Remarks 0-5 10YR 3/2 100 Loamy/Clayey Silty Loam 5-12 10YR 4/3 70 Silty Loam 10YR 5/3 30 Loamy/Clayey Silty Loamy 10YR 5/3 30 Loamy/Clayey Silty Loamy/Clayey Clayer Solty Silty Loamy/Clayey Clayer Loamy/Clayey Clayer Loamy/Clayey Clayer Loamy/Clayey Clayer Loamy/Clayer L	(inches) Color (moist) % Color (moist) % Type¹ Loc² Texture Remark 0-5 10YR 3/2 100 Loamy/Clayey Silty Loa 5-12 10YR 4/3 70 Silty Loa	m
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1 10YR 5/3 30 10XR 5/3 10XR 6/3 10XR 7. 10XR 6/3 10XR 7. 10XR 6/3 10XR 7. 10XR	1 10YR 5/3 30 10XR 6/3 10XR	5-12 10YR 4/3 70 Silty Loa	
10YR 5/3 30 10XR 5/4 1498 10XR 6/4 10YR	10YR 5/3 30 10XR 6/3 5/4 5/4 5/4 5/4 5/4 5/4 5/4 5/4 5/4 5/4		m
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **Location: PL=Pore Lining, M=Matrix Hydric Soil Indicators: Histosol (A1)	Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Thype: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Thidicators for Problematic Hydric Soils?: This cap (A10) This cap (A10) This cap (A10) Thin Dark Surface (S9) (LRR R, MLRA 149B) Thin Dark Surface (A10) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Depleted Below Dark Surface (A11) Loamy Gleyed Matrix (F2) Thick Dark Surface (A12) Depleted Matrix (F3) Sandy Mucky Mineral (S1) Redox Dark Surface (F6) Mesic Spodic (TA6) (MLRA 144A, 145, 14 Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Red Parent Material (F21) Sandy Redox (S5) Redox Depressions (F8) Dark Surface (S7) Thindicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Type: Ty	10YR 5/3 30	
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Restrictive Layer (if observed): Type:	Restrictive Layer (if observed): Type:	Dark Surface (S7)	
Type:	Type:	Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
Depth (inches): Hydric Soil Present? Yes No	Depth (inches): I Hydric Soil Present? Yes No	··	
			NoX
Remarks:			
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)			ydric Soils

Project/Site: Nashua-Manchester 40818	City/County: Na	ashua/Hillsborough	Sampling Date: 04/28/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: Na4-wet
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Townsl	nip. Range:	
Landform (hillside, terrace, etc.): Terrace		ive, convex, none): Concave	Slope (%): < 2
	42.7 degrees north	Long: 71.4 degrees west	
Soil Map Unit Name: Su - Suncook loamy fine sand	42.7 degrees north		fication: Not mapped
Are climatic / hydrologic conditions on the site typical fo	-	`` ' '	·
Are Vegetation, Soil, or Hydrology		Are "Normal Circumstances" pr	
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answers	s in Remarks.)
SUMMARY OF FINDINGS – Attach site ma	p showing sampling po	int locations, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes X	No Is the Sam	nled Area	
Hydric Soil Present? Yes X	No within a W	•	No
Wetland Hydrology Present? Yes X		nal Wetland Site ID: Wetland	
Remarks: (Explain alternative procedures here or in a	separate report.)	-	
Wetland delineation conducted during moderate droug	ht conditions (according to US	Orought Monitor)	
HYDROLOGY			
<u></u>		Casandaniladi	
Wetland Hydrology Indicators:	all that apply		cators (minimum of two required)
Primary Indicators (minimum of one is required; check Surface Water (A1)	Water-Stained Leaves (B9)		il Cracks (B6) atterns (B10)
l —	Aquatic Fauna (B13)		Lines (B16)
l 	Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Bu	
Sediment Deposits (B2)	Oxidized Rhizospheres on Livin		Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled		c Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aq	
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)		raphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	,	X FAC-Neutra	. , ,
Field Observations:			
Surface Water Present? Yes No _X	Depth (inches):		
Water Table Present? Yes No _X	Depth (inches):		
Saturation Present? Yes X No	Depth (inches): Surface	Wetland Hydrology Present	t? Yes X No
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring w	ell, aerial photos, previous inspe	ections), if available:	
Remarks:			

VEGETATION – Use scientific names of plants. Sampling Point: Na4-wet Absolute Dominant Indicator Tree Stratum (Plot size: 30') % Cover **Dominance Test worksheet:** Species? Status 1. None Number of Dominant Species 2. That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 2 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B) Prevalence Index worksheet: =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = 1. FACW species x 2 = 2. FAC species x 3 = 3. FACU species x 4 = 4. UPL species x 5 = 5. Column Totals: (A) 6. Prevalence Index = B/A = 7. **Hydrophytic Vegetation Indicators:** =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') X 2 - Dominance Test is >50% Phragmites australis 3 - Prevalence Index is ≤3.01 20 Yes **FACW** 1. 2. Lythrum salicaria 10 No OBL 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 20 3. Yes FAC Toxicodendron radicans 4. Impatiens capensis **FACW** Problematic Hydrophytic Vegetation¹ (Explain) 5. Unknown grass 10 No ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 63 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. None height. 2. Hydrophytic 3. Vegetation 4. Present? Yes X No =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: Na4-wet

	scription: (Describe to	the dept				or or con	firm the absence	of indicators.)
Depth	Matrix			Feature		1 2	- .	5
(inches)	Color (moist)	<u>%</u>	Color (moist)		Type ¹	Loc ²	Texture	Remarks
0-12"	10YR 4/2	95	10YR 3/4	5	<u> </u>	M	Mucky Loam/Clay	Mucky sandy loam
1T C-C	Consentation D-Doulet		Dadwaad Matrix C					antique DI - Dana Limina M-Matrix
	Concentration, D=Deplet	ion, Rivi–	Reduced Matrix, Co	S-Cover	ed of Coa	ileu Sano		cation: PL=Pore Lining, M=Matrix. or Problematic Hydric Soils ³ :
-	I Indicators:		Dobavoluo Bolow	Curfoss	(CO) /I D	D D		-
Histoso		_	_ Polyvalue Below	Surrace	(58) (LR	KK,		ick (A10) (LRR K, L, MLRA 149B)
	Epipedon (A2)		MLRA 149B)	- (00) (DD D M	I DA 440		rairie Redox (A16) (LRR K, L, R)
	Histic (A3)	_	Thin Dark Surfac					icky Peat or Peat (S3) (LRR K, L, R)
	gen Sulfide (A4)	_	High Chroma Sa					e Below Surface (S8) (LRR K, L)
	ed Layers (A5)	—	Loamy Mucky Mi	-		(, L)		k Surface (S9) (LRR K, L)
	ed Below Dark Surface (_	Loamy Gleyed M	-	2)			nganese Masses (F12) (LRR K, L, R)
	Dark Surface (A12)	_>	C Depleted Matrix					nt Floodplain Soils (F19) (MLRA 149B)
	Mucky Mineral (S1)	_	Redox Dark Surf					podic (TA6) (MLRA 144A, 145, 149B)
	Gleyed Matrix (S4)		_ Depleted Dark S	urface (F	7)			ent Material (F21)
	Redox (S5)	_	Redox Depression					allow Dark Surface (TF12)
Strippe	ed Matrix (S6)		Marl (F10) (LRR	K , L)			Other (E	xplain in Remarks)
Dark S	urface (S7)							
2								
	of hydrophytic vegetation	n and we	lland hydrology mus	st be pre	sent, unle	ess distur	bed or problematic T	·.
	Layer (if observed):							
Type:								
Depth (in	ches):						Hydric Soil Pre	esent? Yes <u>X</u> No
Remarks:							•	
								CS Field Indicators of Hydric Soils
version 7.0	March 2013 Errata. (http	p://www.n	rcs.usda.gov/Intern	et/FSE_	DOCUME	ENTS/nrc	s142p2_051293.dd	ocx)

Project/Site: Nashua-Manchester 40818	City/County: N	lashua/Hillsborough	Sampling Date: 04/28/21
Applicant/Owner: NHDOT		State:	— NH Sampling Point: Na4-Up
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Town	ship, Range:	
Landform (hillside, terrace, etc.): Terrace		cave, convex, none): None	Slope (%): 10
Subregion (LRR or MLRA): LRR R L	at: 42.7 degrees north	Long: 71.4 degrees west	
Soil Map Unit Name: Su - Suncook loamy fine sand			fication: Not mapped
Are climatic / hydrologic conditions on the site typica	•	No X (If no, explair	
Are Vegetation, Soil, or Hydrology		Are "Normal Circumstances" pr	
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answer	s in Remarks.)
SUMMARY OF FINDINGS – Attach site i	map showing sampling p	oint locations, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes	No X Is the Sar	mpled Area	
Hydric Soil Present? Yes	No X within a V	•	No X
Wetland Hydrology Present? Yes		ional Wetland Site ID:	-
Remarks: (Explain alternative procedures here or i	n a separate report.)		
Wetland delineation conducted during moderate dro	ought conditions (according to US	Drought Monitor)	
L HYDROLOGY			
		0	
Wetland Hydrology Indicators:			cators (minimum of two required)
Primary Indicators (minimum of one is required; che			oil Cracks (B6)
Surface Water (A1)	Water-Stained Leaves (B9)		Patterns (B10)
High Water Table (A2)	Aquatic Fauna (B13)		Lines (B16)
Saturation (A3)	Marl Deposits (B15)		n Water Table (C2) urrows (C8)
Water Marks (B1)	Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livi		Visible on Aerial Imagery (C9)
Sediment Deposits (B2) Drift Deposits (B3)	Presence of Reduced Iron (C4		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled	· —	ic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	· · · —	quitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)		graphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)	Other (Explain in Nemarks)		ral Test (D5)
Field Observations:			1 1001 (20)
Surface Water Present? Yes No	Depth (inches):		
Water Table Present? Yes No	Depth (inches):		
Saturation Present? Yes No	Depth (inches):	Wetland Hydrology Presen	t? Yes No X
(includes capillary fringe)	_ ' \ /	, , , , , , , , , , , , , , , , , , , ,	
Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous ins	pections), if available:	
, , , ,		•	
Remarks:			

VEGETATION – Use scientific names of plants. Sampling Point: Na4-Up Absolute Dominant Indicator Tree Stratum (Plot size: 30') **Dominance Test worksheet:** % Cover Species? Status 1. None Number of Dominant Species 2. That Are OBL, FACW, or FAC: 0 (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 2 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% 6. (A/B) Prevalence Index worksheet: 7. =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = 1. Rhus typhina **FACW** species x 2 = 2. 10 x 3 = FAC species 3. FACU species 0 x 4 = 66 4. UPL species x 5 = 330 5. Column Totals: 76 (A) 360 (B) 6. Prevalence Index = B/A = 4.74 7. **Hydrophytic Vegetation Indicators:** 63 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') 2 - Dominance Test is >50% 63 3 - Prevalence Index is ≤3.0¹ Unknown grass Yes 1. 10 No 4 - Morphological Adaptations (Provide supporting Solidago species data in Remarks or on a separate sheet) 3. Toxicodendron radicans 10 FAC No 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. 10. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 83 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes No X =Total Cover Remarks: (Include photo numbers here or on a separate sheet.) Grass species could not be identified since delineation was conducted early in the growing season.

SOIL Sampling Point: Na4-Up Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) Depth Redox Features Color (moist) Color (moist) % Type Loc² (inches) Texture Remarks 0-6" 10YR 3/2 100 Loamy/Clayey Sandy loam ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix. **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Polyvalue Below Surface (S8) (LRR R, Histosol (A1) 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) High Chroma Sands (S11) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A11) Loamy Gleyed Matrix (F2) Iron-Manganese Masses (F12) (LRR K, L, R) Piedmont Floodplain Soils (F19) (MLRA 149B) Thick Dark Surface (A12) Depleted Matrix (F3) Sandy Mucky Mineral (S1) Redox Dark Surface (F6) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Red Parent Material (F21) Sandy Redox (S5) Redox Depressions (F8) Very Shallow Dark Surface (TF12) Stripped Matrix (S6) Marl (F10) (**LRR K, L**) Other (Explain in Remarks) Dark Surface (S7) 3 Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: Depth (inches): **Hydric Soil Present?** Yes No Remarks: This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Project/Site: Nashua-Manchester 40818	City/County: N	ashua/Hillsborough	Sampling Date: 04/28/21
Applicant/Owner: NHDOT	_	State:	NH Sampling Point: Na6-Wet
Investigator(s): Jennifer Riordan and Meg Gor	don Section, Towns	ship, Range:	
Landform (hillside, terrace, etc.): Floodplain	Local relief (cond	ave, convex, none): Concave	Slope (%): < 2
Subregion (LRR or MLRA): LRR R	Lat: 42.7 degrees north	Long: 71.4 degrees west	Datum:
Soil Map Unit Name: Su - Suncook loamy fine s		·	fication: Not mapped
Are climatic / hydrologic conditions on the site to		No X (If no, explair	•
Are Vegetation, Soil, or Hydrol		Are "Normal Circumstances" pi	
Are Vegetation, Soil, or Hydrol		(If needed, explain any answer	
SUMMARY OF FINDINGS – Attach s			·
Hydrophytic Vegetation Present? Yes	X No Is the Sar	npled Area	
Hydric Soil Present? Yes		•	No
Wetland Hydrology Present? Yes	X No If yes, opti	onal Wetland Site ID: Wetland	
Remarks: (Explain alternative procedures here Data point located ar southern end of wetland. Wetland delineation conducted during moderation		Drought Monitor)	
HYDROLOGY			
Wetland Hydrology Indicators:			cators (minimum of two required)
Primary Indicators (minimum of one is required			oil Cracks (B6)
X Surface Water (A1)	Water-Stained Leaves (B9)		Patterns (B10)
High Water Table (A2)	Aquatic Fauna (B13)		Lines (B16)
Saturation (A3)	Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)		urrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospheres on Livi		Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4	<i></i>	Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled		ic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)		quitard (D3)
Inundation Visible on Aerial Imagery (B7) Sparsely Vegetated Concave Surface (B8)	Other (Explain in Remarks)		graphic Relief (D4)
)	X FAC-Neutr	ai Test (D5)
Field Observations: Surface Water Present? Yes X No	Donth (inches): 24.26		
Surface Water Present? Yes X No Water Table Present? Yes No			
Saturation Present? Yes No		Wetland Hydrology Presen	t? Yes X No
(includes capillary fringe)		Wedana Hydrology Fresch	103 <u>X</u> 110
Describe Recorded Data (stream gauge, monit	oring well, aerial photos, previous insp	ections), if available:	
, , ,		,	
Remarks: 24-36" of standing water nearby.			

VEGETATION – Use scientific names of plants. Sampling Point: Na6-Wet Absolute Dominant Indicator Tree Stratum (Plot size: 30' **Dominance Test worksheet:** % Cover Species? Status 1. Fraxinus pennsylvanica 3 No **FACW** Number of Dominant Species 2. That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 100.0% (A/B) Prevalence Index worksheet: 3 =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Fraxinus pennsylvanica **FACW** species x 2 = 2. 0 x 3 = FAC species 3. FACU species 0 x 4 = 0 4. UPL species x 5 = 5. Column Totals: 26 (A) 52 (B) 6. Prevalence Index = B/A = 2.00 7. **Hydrophytic Vegetation Indicators:** 3 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') X 2 - Dominance Test is >50% 20 X 3 - Prevalence Index is ≤3.0¹ 1. Impatiens capensis **FACW** Unknown grass 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 3. 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 23 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. height. 2. Hydrophytic 3. Vegetation Present? Yes X No =Total Cover Remarks: (Include photo numbers here or on a separate sheet.) Trees next to wetland but few in wetland

SOIL Sampling Point: Na6-Wet

	scription: (Describe to	the de				or or con	firm the absence	of indicators.)
Depth	Matrix			Feature		. 2	- .	
(inches)	Color (moist)	<u>%</u>	Color (moist)		Type ¹	Loc ²	Texture	Remarks
0-18"	10YR 2/1	98	10YR 3/4	2	C	M	Mucky Loam/Clay	Mucky sandy loam
1		tion DM	Deduced Metric Of				21	ation Di Donatinina M Matria
	Concentration, D=Deple	tion, Rivi	=Reduced Matrix, CS	s=Cover	ed or Coa	ited Sand		cation: PL=Pore Lining, M=Matrix.
-	il Indicators:		Dalamaka Dalam	0	(00) (I D			or Problematic Hydric Soils ³ :
	sol (A1)	-	Polyvalue Below	Surface	(S8) (LR	кк,		ick (A10) (LRR K, L, MLRA 149B)
	Epipedon (A2)		MLRA 149B)	(00) (rairie Redox (A16) (LRR K, L, R)
	Histic (A3)	_	Thin Dark Surfac					icky Peat or Peat (S3) (LRR K, L, R)
	gen Sulfide (A4)	_	High Chroma Sa	-				e Below Surface (S8) (LRR K, L)
	ied Layers (A5)	_	Loamy Mucky Mi	-		(, L)	Thin Dar	k Surface (S9) (LRR K, L)
Deple	ted Below Dark Surface	(A11) _	Loamy Gleyed M	atrix (F2	2)		Iron-Mar	nganese Masses (F12) (LRR K, L, R)
Thick	Dark Surface (A12)	_	Depleted Matrix ((F3)			Piedmon	nt Floodplain Soils (F19) (MLRA 149B)
Sandy	Mucky Mineral (S1)	_	X Redox Dark Surfa	ace (F6))		Mesic S	podic (TA6) (MLRA 144A, 145, 149B)
Sandy	Gleyed Matrix (S4)		Depleted Dark St	urface (I	- 7)		Red Pare	ent Material (F21)
Sandy	Redox (S5)		Redox Depression	ns (F8)			Very Sha	allow Dark Surface (TF12)
Stripp	ed Matrix (S6)	_	 Marl (F10) (LRR	K , L)			Other (E	xplain in Remarks)
Dark S	Surface (S7)	_						
	, ,							
³ Indicators	of hydrophytic vegetation	on and w	etland hydrology mus	st be pre	sent, unle	ss distur	bed or problematic	i.
	e Layer (if observed):						·	
Type:	,							
Depth (ii	nches).						Hydric Soil Pro	esent? Yes X No
							Tiyano con Ti	
Remarks:	tama da marda ad foram Nicol	tl 4 1	and North cost Doods				0 to	OO Field by die steem of the daily Oodle
	orm is revised from Nor March 2013 Errata. (ht							CS Field Indicators of Hydric Soils
VEISIOII 7.0) Maich 2013 Eirala. (III	tp.//www	.nics.usua.gov/intern	en se_	_DOCOIVIL	_111 1 3/1110	5 142p2_05 1295.dc	JCX)

Project/Site: Nashua-Manch	hester 40818	C	city/County: Nashu	ua/Hillsboroug	h	Sampling Date:	04/28/21
Applicant/Owner: NHDOT		_			State:	– NH Sampling	Point: Na6-Up
Investigator(s): Jennifer Rio	rdan and Meg Gordon	Se	ection, Township,	Range:			
Landform (hillside, terrace, et			al relief (concave,): None	Sic	ope (%): 5
Subregion (LRR or MLRA): L	, <u> </u>	t: 42.7 degrees nort		Long: 71.4 d		Datu	/
, _		t. 42.7 degrees here					
Soil Map Unit Name: Su - Sui	· ·				_	ication: Not mapp	<u>jea</u>
Are climatic / hydrologic cond		-			(If no, explain		
Are Vegetation, Soil				"Normal Circu	ımstances" pre	esent? Yes _	X No
Are Vegetation, Soil	, or Hydrology _	naturally prob	olematic? (If n	needed, explai	n any answers	in Remarks.)	
SUMMARY OF FINDIN	GS – Attach site m	nap showing sa	ampling point	locations,	transects,	important fea	atures, etc.
Hydrophytic Vegetation Pres	sent? Yes	No X	Is the Sample	d Area			
Hydric Soil Present?	Yes	$-\frac{No}{No}\frac{X}{X}$	within a Wetla		Yes	No X	
Wetland Hydrology Present?		- No X	If yes, optional				
Remarks: (Explain alternativ		a separate report)					
Wetland delineation conduct	•	,		ught Monitor)			
	-	,	-	,			
HYDROLOGY							
Wetland Hydrology Indicat	tors:			Se	econdary Indic	ators (minimum o	f two required)
Primary Indicators (minimum	n of one is required; chec	ck all that apply)			Surface Soi	l Cracks (B6)	
Surface Water (A1)		_Water-Stained Le	eaves (B9)		Drainage Pa	atterns (B10)	
High Water Table (A2)	_	Aquatic Fauna (B	13)		Moss Trim I	Lines (B16)	
Saturation (A3)		_Marl Deposits (B1	15)	_	Dry-Season	Water Table (C2)
Water Marks (B1)	_	_ Hydrogen Sulfide			Crayfish Bu		
Sediment Deposits (B2)			heres on Living R	Roots (C3)		/isible on Aerial In	
Drift Deposits (B3)		Presence of Redu	` ,	-	_	Stressed Plants (D)1)
Algal Mat or Crust (B4)	_	_	uction in Tilled Soi	ils (C6)	_	Position (D2)	
Iron Deposits (B5)	(5-)	_ Thin Muck Surfac			Shallow Aqu		
Inundation Visible on Ae	- · · · -	Other (Explain in	Remarks)			raphic Relief (D4)	
Sparsely Vegetated Cor	ncave Surface (B8)				FAC-Neutra	I Test (D5)	
Field Observations:							
Surface Water Present?	Yes No	_ Depth (inches):					
Water Table Present? Saturation Present?	Yes No	_ Depth (inches):		Va4land		2 V	Na V
	Yes No	_ Depth (inches):	"	vetiana Hyard	ology Present	? Yes	No_X
(includes capillary fringe) Describe Recorded Data (str	room dougo monitoring	wall parial photos	nraviava inanasti	ana) if availab	la.		
Describe Necorded Data (sti	leani gauge, monitoring	well, aeriai priotos,	previous irispection	oris), ii avallab	iie.		
Remarks:							
- tomanie							

VEGETATION – Use scientific names of plants. Sampling Point: Na6-Up Absolute Dominant Indicator Tree Stratum (Plot size: **Dominance Test worksheet:** % Cover Species? Status 1. Betula papyrifera 20 Yes **FACU** Number of Dominant Species 2. Platanus occidentalis 10 Yes **FACW** That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 6 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 16.7% (A/B) Prevalence Index worksheet: 7. 30 =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species 0 x 1 = Lonicera tatarica **FACU FACW** species x 2 = 1. 2. UPL 0 x 3 = Rhus typhina FAC species 0 3. FACU species 50 x 4 = 200 23 4. UPL species x 5 = 115 5. Column Totals: 83 (A) 335 (B) 6. Prevalence Index = B/A = 4.04 7. **Hydrophytic Vegetation Indicators:** 23 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') 2 - Dominance Test is >50% 10 Andropogon gerardii Yes **FACU** 3 - Prevalence Index is ≤3.01 2. Unknown Yes 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 3. 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. 10. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 13 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. Celastrus orbiculatus Yes UPL height. 2. Hydrophytic 3. Vegetation 4. Present? Yes No X 20 =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: Na6-Up Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) Depth Redox Features Color (moist) Color (moist) % Type Loc² (inches) Texture Remarks 0-10" 10YR 3/2 100 Sandv Loamy sand ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix. **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) High Chroma Sands (S11) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A11) Loamy Gleyed Matrix (F2) Iron-Manganese Masses (F12) (LRR K, L, R) Piedmont Floodplain Soils (F19) (MLRA 149B) Thick Dark Surface (A12) Depleted Matrix (F3) Sandy Mucky Mineral (S1) Redox Dark Surface (F6) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Gleyed Matrix (S4) Depleted Dark Surface (F7) Red Parent Material (F21) Sandy Redox (S5) Redox Depressions (F8) Very Shallow Dark Surface (TF12) Stripped Matrix (S6) Marl (F10) (**LRR K, L**) Other (Explain in Remarks) Dark Surface (S7) 3 Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if observed): Type: Depth (inches): **Hydric Soil Present?** Yes No Remarks: This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Project/Site: Nashua-Manch	nester 40818	Ci	ity/County: Nashu	ıa/Hillsborough	Sampling Date:	05/05/21
Applicant/Owner: NHDOT		_		State	 e: NH Sampling	Point: Na18-Up
Investigator(s): Jennifer Rior	rdan and Meg Gordon	Se	ection, Township,	Range:		
Landform (hillside, terrace, etc	c.): Terrace	_		convex, none): None	Slo	ope (%): < 2
Subregion (LRR or MLRA): LI	RR R Lat	t: 42.7 degrees nort	,	Long: 71.4 degrees we	_	/
Soil Map Unit Name: WnC - V					assification: Not mapp	
•		•				<u>leu</u>
Are climatic / hydrologic cond	,,	•		No X (If no, exp		V N
Are Vegetation, Soil				"Normal Circumstances	_ ·	X No
Are Vegetation, Soil	, or Hydrology	naturally prob	olematic? (If n	eeded, explain any ans	wers in Remarks.)	
SUMMARY OF FINDING	GS - Attach site m	nap showing sa	ampling point	locations, transe	cts, important fea	itures, etc.
Hydrophytic Vegetation Pres	sent? Yes	No X	Is the Sample	d Area		
Hydric Soil Present?	Yes	No X	within a Wetla		No X	
Wetland Hydrology Present?	Yes	No X	If yes, optional	Wetland Site ID:		
Remarks: (Explain alternativ						
Wetland delineation conduct	ed during abnormally dry	y/moderate drought	conditions (accor	rding to US Drought Mor	nitor)	
HYDROLOGY						
Wetland Hydrology Indicate	ors:			Secondary	Indicators (minimum o	f two required)
Primary Indicators (minimum		ck all that apply)		Surface	e Soil Cracks (B6)	
Surface Water (A1)	<u> </u>	_Water-Stained Le	aves (B9)	Drainag	ge Patterns (B10)	
High Water Table (A2)	<u> </u>	Aquatic Fauna (B	13)	Moss T	rim Lines (B16)	
Saturation (A3)	_	Marl Deposits (B1	15)	Dry-Sea	ason Water Table (C2))
Water Marks (B1)	_	_ Hydrogen Sulfide			h Burrows (C8)	
Sediment Deposits (B2)		_Oxidized Rhizospl	-		tion Visible on Aerial In	
Drift Deposits (B3)		Presence of Redu	` ,		d or Stressed Plants (D	01)
Algal Mat or Crust (B4)	_	_Recent Iron Redu		· · · —	orphic Position (D2)	
Iron Deposits (B5)	(57)	_ Thin Muck Surfac			v Aquitard (D3)	
Inundation Visible on Ae		Other (Explain in l	Remarks)		ppographic Relief (D4)	
Sparsely Vegetated Con	icave Surface (Bo)			FAC-N	eutral Test (D5)	
Field Observations: Surface Water Present?	Yes No	Depth (inches):				
Water Table Present?	Yes No	Depth (inches):				
Saturation Present?	Yes No	Depth (inches):		/etland Hydrology Pre	sent? Yes	No X
(includes capillary fringe)						
Describe Recorded Data (str	eam gauge, monitoring	well, aerial photos,	previous inspection	ons), if available:		
·						
Remarks:						

VEGETATION – Use scientific names of plants. Sampling Point: Na18-Up Absolute Dominant Indicator Tree Stratum (Plot size: **Dominance Test worksheet:** % Cover Species? Status 1. Fraxinus pennsylvanica 38 Yes **FACW** Number of Dominant Species 2. That Are OBL, FACW, or FAC: (A) 3. **Total Number of Dominant** 4. Species Across All Strata: 4 (B) 5. Percent of Dominant Species That Are OBL, FACW, or FAC: 6. 50.0% (A/B) Prevalence Index worksheet: 7. 38 =Total Cover Total % Cover of: Sapling/Shrub Stratum (Plot size: 15' OBL species x 1 = Euonymus alatus **UPL FACW** species x 2 = 1. 2. FACU 10 x 3 = Rosa multiflora Yes FAC species 3. FACU species 23 x 4 = 63 4. UPL species x 5 = 315 5. Column Totals: 137 (A) 519 (B) 6. Prevalence Index = B/A = 3.79 7. **Hydrophytic Vegetation Indicators:** 83 =Total Cover 1 - Rapid Test for Hydrophytic Vegetation Herb Stratum (Plot size: 5') 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ Impatiens capensis **FACW** 1. Rosa multiflora 3 No **FACU** 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 3. Athyrium angustum 10 Yes FAC 4. Problematic Hydrophytic Vegetation¹ (Explain) 5. ¹Indicators of hydric soil and wetland hydrology must 6. be present, unless disturbed or problematic. 7. **Definitions of Vegetation Strata:** 8. Tree - Woody plants 3 in. (7.6 cm) or more in diameter 9. at breast height (DBH), regardless of height. Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 11. Herb - All herbaceous (non-woody) plants, regardless 16 =Total Cover of size, and woody plants less than 3.28 ft tall. Woody Vine Stratum (Plot size: 30') Woody vines - All woody vines greater than 3.28 ft in 1. None height. 2. Hydrophytic 3. Vegetation 4. Present? Yes No X =Total Cover Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: Na18-Up

Profile Des	scription: (Describe Matrix	to the de		ment the		or or con	firm the absence o	of indicators.)	_
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks	
0-3	10YR 2/2	100	Color (molecy		.,,,,		Sandy	Loamy sand	-
3-14	10YR 4/3	100					Sandy	Loamy sand	-
									-
									-
									-
									-
									-
									-
									-
									-
									-
									-
	Concentration, D=Dep il Indicators:	oletion, RN	/I=Reduced Matrix, CS	S=Cover	ed or Coa	ited Sand		ation: PL=Pore Lining, M=Matrix. r Problematic Hydric Soils ³ :	\dashv
-	ol (A1)		Polyvalue Below	Surface	(S8) (LR	R R.		k (A10) (LRR K, L, MLRA 149B)	
	Epipedon (A2)		MLRA 149B)		(55) (=11	,		airie Redox (A16) (LRR K, L, R)	
	Histic (A3)		Thin Dark Surfac	e (S9) (I	LRR R, M	LRA 149		ky Peat or Peat (S3) (LRR K, L, R)	
	gen Sulfide (A4)	•	—— High Chroma Sa					Below Surface (S8) (LRR K, L)	
	ed Layers (A5)	•	Loamy Mucky M					Surface (S9) (LRR K, L)	
	ted Below Dark Surfac	e (A11)	Loamy Gleyed M			, ,		ganese Masses (F12) (LRR K, L, R)	
	Dark Surface (A12)	- (,	Depleted Matrix		,			Floodplain Soils (F19) (MLRA 149B	۱ (
	Mucky Mineral (S1)	•	Redox Dark Surf)			odic (TA6) (MLRA 144A, 145, 149B)	
	Gleyed Matrix (S4)		Depleted Dark S					nt Material (F21)	
	Redox (S5)		Redox Depression	•	.,			llow Dark Surface (TF12)	
	ed Matrix (S6)		Marl (F10) (LRR					plain in Remarks)	
	Surface (S7)		Wall (I 10) (LIKK	Κ, Δ)			Other (EX	piani in Kemarks)	
Dark S	buriace (S7)								
	of hydrophytic vegeta		etland hydrology mus	st be pre	sent, unle	ess disturb	ped or problematic.		_
Type:	e Layer (if observed):								
Depth (ir	nches):						Hydric Soil Pres	sent? Yes No _X	
Remarks:									\exists
								S Field Indicators of Hydric Soils	
version 7.0	March 2013 Errata. (http://www	/.nrcs.usda.gov/Intern	iet/FSE_	DOCUME	ENTS/nrcs	s142p2_051293.doc	cx)	

Project/Site: Nashua-Manchester 40818	City/County: N	ashua/Hillsborough	Sampling Date: 05/05/21
Applicant/Owner: NHDOT		State:	NH Sampling Point: Na18-Wet
Investigator(s): Jennifer Riordan and Meg Gordon	Section, Towns		
Landform (hillside, terrace, etc.): Terrace		ave, convex, none): Concave	Slope (%): < 2
	at: 42.7 degrees north	Long: 71.4 degrees west	
Soil Map Unit Name: WnC - Windsor-Urban land cor			fication: Not mapped
Are climatic / hydrologic conditions on the site typica			
, , , , , , , , , , , , , , , , , , , ,	•	No X (If no, explair Are "Normal Circumstances" pr	•
		·	
Are Vegetation, Soil, or Hydrology SUMMARY OF FINDINGS – Attach site r		(If needed, explain any answers	•
SOMMANT OF FINDINGS - Attach site i			- Important leatures, etc.
Hydrophytic Vegetation Present? Yes X		npled Area	
Hydric Soil Present? Yes	No X within a W		
Wetland Hydrology Present? Yes X		onal Wetland Site ID: Wetland	Na18
Remarks: (Explain alternative procedures here or in Wetland delineation conducted during abnormally d		according to US Drought Monitor	r)
Wedana delineation conducted during apriormally a	Tyrrioderate drought conditions (d	boording to Go Brought Monto	,
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary India	cators (minimum of two required)
Primary Indicators (minimum of one is required; che			oil Cracks (B6)
X Surface Water (A1)	Water-Stained Leaves (B9)		Patterns (B10)
X High Water Table (A2)	Aquatic Fauna (B13)		Lines (B16)
X Saturation (A3)	Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)		urrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospheres on Livin		Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled	· · — ·	ic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)		quitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)		graphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)		X FAC-Neutr	ai řest (D5)
Field Observations:	Danish (in alcae) 4 Oll		
Surface Water Present? Yes X No	Depth (inches): 1-2"		
Water Table Present? Yes X No	Depth (inches): Surface	Western Herdundens Buseau	42 Vaa V Na
Saturation Present? Yes X No (includes capillary fringe)	Depth (inches): Surface	Wetland Hydrology Presen	t? Yes X No
Describe Recorded Data (stream gauge, monitoring	well aerial photos previous insp	ections) if available	
Boothise Neceration Batta (ethodin gauge, membering	, won, donar priotos, proviodo mop	outility, if available.	
Remarks:			

	nts.			Sampling Point: Na18-Wet
Tree Stratum (Plot size:30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. Fraxinus pennsylvanica	38	Yes	FACW	Number of Dominant Species
2.				That Are OBL, FACW, or FAC: 3 (A)
3.				
				Total Number of Dominant Species Across All Strata: 4 (B)
·		<u> </u>		Opecies Across Air Strata.
5				Percent of Dominant Species
S				That Are OBL, FACW, or FAC:75.0% (A/B
·				Prevalence Index worksheet:
	38	=Total Cover		Total % Cover of: Multiply by:
Sapling/Shrub Stratum (Plot size:15')				OBL species x 1 =
. Cornus amomum	3	No	FACW	FACW species x 2 =
2.				FAC species x 3 =
				FACU species x 4 =
				UPL species x 5 =
		<u> </u>		· — —
5				Column Totals: (A) (B
j				Prevalence Index = B/A =
·				Hydrophytic Vegetation Indicators:
	3	=Total Cover		1 - Rapid Test for Hydrophytic Vegetation
Herb Stratum (Plot size: 5')				X 2 - Dominance Test is >50%
. Lysimachia ciliata	38	Yes	FACW	3 - Prevalence Index is ≤3.0 ¹
2. Impatiens capensis	20	Yes	FACW	4 - Morphological Adaptations ¹ (Provide supportin
3. Rosa multiflora	20	Yes	FACU	data in Remarks or on a separate sheet)
4.		100	17100	Problematic Hydrophytic Vegetation ¹ (Explain)
	-			1
-		·		¹ Indicators of hydric soil and wetland hydrology must
S		·		be present, unless disturbed or problematic.
7				Definitions of Vegetation Strata:
3				Tree – Woody plants 3 in. (7.6 cm) or more in diamete
).				at breast height (DBH), regardless of height.
0				Sapling/shrub – Woody plants less than 3 in. DBH
1.				and greater than or equal to 3.28 ft (1 m) tall.
12.				
	78	=Total Cover		Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Noody Vine Stratum (Plot size: 30')		- Total Cover		or size, and woody plants less than 5.20 it tall.
				Woody vines – All woody vines greater than 3.28 ft in
. None				height.
<u> </u>				Hydrophytic
				Vegetation
3.				Present? Yes X No
3. 				

SOIL Sampling Point: Na18-Wet

Profile De	escription: (Describe	to the de	enth needed to docu	ment the	ndicate	or or con	firm the absence	of indicators)
Depth	Matrix	to the u	•	k Feature		JI 01 COII	iiiiii ale absence	of malcators.)
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-6	10YR 2/2						Sandy	Loamy sand
6-14	10YR 4/2	50	10YR 3/3	10	С	M	Sandy	Faint redox concentrations
	10YR 3/1	40						
								
	=Concentration, D=Dep	oletion, R	M=Reduced Matrix, C	S=Cover	ed or Coa	ated Sand		ocation: PL=Pore Lining, M=Matrix.
_	oil Indicators:		Debession Debes	0	(OO) (LB	D D		or Problematic Hydric Soils ³ :
	sol (A1) : Epipedon (A2)		Polyvalue Below MLRA 149B)	Surrace	(58) (LR	KK,		uck (A10) (LRR K, L, MLRA 149B) Prairie Redox (A16) (LRR K, L, R)
	: Histic (A3)		Thin Dark Surface	ce (S9) (I	IRRR M	II RA 149		ucky Peat or Peat (S3) (LRR K, L, R)
	ogen Sulfide (A4)		High Chroma Sa					ue Below Surface (S8) (LRR K, L)
	fied Layers (A5)		Loamy Mucky M					rk Surface (S9) (LRR K, L)
	eted Below Dark Surfac	e (A11)	Loamy Gleyed N	-		. ,		nganese Masses (F12) (LRR K, L, R)
Thick	Dark Surface (A12)		Depleted Matrix	(F3)			Piedmo	nt Floodplain Soils (F19) (MLRA 149B)
Sand	y Mucky Mineral (S1)		Redox Dark Surf	face (F6))		Mesic S	podic (TA6) (MLRA 144A, 145, 149B)
Sand	y Gleyed Matrix (S4)		Depleted Dark S	urface (F	- 7)		Red Par	rent Material (F21)
	y Redox (S5)		Redox Depression	٠,				allow Dark Surface (TF12)
	ped Matrix (S6)		Marl (F10) (LRR	K , L)			Other (E	Explain in Remarks)
— Dark	Surface (S7)							
³ Indicators	s of hydrophytic vegeta	tion and s	wetland hydrology mu	et he nre	sent unl	see dieturl	hed or problematic	_
	ve Layer (if observed)		wettand flydrology fild	st be pre	Serit, urile	os disturi	l problematic	J.
Type:	e Luyer (ii observed)							
_	inches):						Hydric Soil Pr	resent? Yes No X
Remarks:							,	
		orthcentra	al and Northeast Region	onal Sup	plement \	/ersion 2.	0 to reflect the NF	RCS Field Indicators of Hydric Soils
	0 March 2013 Errata. (

APPENDIX D

NHDES Wetlands Functional Assessment Worksheets



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWA	Y METHODOLOGY)			
ADJACENT LAND USE: Commercial, reside	ntial, railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 20' to RR in areas			
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS#269)				
DATE(S) OF SITE VISIT(S): 04/28/2021, 05/05/2021 DELINEATION PER ENV-WT 406 COMPLETED? Yes No				
CONFIRM THAT THE EVALUATION IS BASI	ED ON:			
☑ Office and				
Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
USACE Highway Methodology.				
Other scientifically supported method	d (enter name/ title):			

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
WETLAND ID: NA1, NA2, NA7, NA22, NA24, NA25 (Merrimack River)	LOCATION: (LAT/ LONG) 42.7 N/71.4 W				
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine				
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Many (exact number not known)	COWARDIN CLASS: R2UBH				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?				
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☐ Yes No				
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?				
⊠ Yes □ No	Yes No (If yes, complete the Vernal Pool Table)				
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☑ Yes ☐ No				
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:				
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE H	IIGHWAY METHODOLOGY; Env-Wt 311.10)				
The following table can be used to compile data on wetlands in the "Functions/ Values" column refer to the following functions Integrity (from RSA 482-A:2, XI)					
2. Educational Potential (from USACE Highway Methodo	ology: Educational/Scientific Value)				
3. Fish & Aquatic Life Habitat (from USACE Highway Me	thodology: Fish & Shellfish Habitat)				
4. Flood Storage (from USACE Highway Methodology: F	oodflow Alteration)				
5. Groundwater Recharge (from USACE Highway Metho	dology: Groundwater Recharge/Discharge)				
6. Noteworthiness (from USACE Highway Methodology:	Threatened or Endangered Species Habitat)				
7. Nutrient Trapping/Retention & Transformation (from	USACE Highway Methodology: Nutrient Removal)				
8. Production Export (Nutrient) (from USACE Highway N	1ethodology)				
9. Scenic Quality (from USACE Highway Methodology: V	isual Quality/Aesthetics)				
10. Sediment Trapping (from USACE Highway Methodolo	.0. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)				
11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)					
12. Uniqueness/Heritage (from USACE Highway Methodology)					
13. Wetland-based Recreation (from USACE Highway Me	thodology: Recreation)				
14. Wetland-dependent Wildlife Habitat (from USACE High	ghway Methodology: Wildlife Habitat)				
First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE <i>The Highway Methodology Workbook Supplement</i> . Second, indicate which functions and values					

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

2020-05

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

number are defined in Section 4.

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

	•							
VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IN	MPORTANT NOTES	
1								
2								
3								
4								
5								
SECTION (6 - STREAM RE	SOURCES SUMMARY	Y					
DESCRIPTION OF STREAM: Merrimack River STREAM TYPE (ROSGEN):								
HAVE FISHERIES BEEN DOCUMENTED? Yes No DOES THE STREAM SYSTEM APPEAR STABLE? Yes No					EAR STABLE?			
OTHER KEY ON-SITE FUNCTIONS OF NOTE:								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference								

2020-05

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES	
1	∑ Yes ☐ No		∑ Yes ☐ No	Valuable wildlife habitat.	
2	Yes No	2, 5, 11	Yes No	Very steep banks and located next to a railroad.	
3	Yes No	1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17	∑ Yes ☐ No	The Merrimack River is a known fish habitat.	
4	Yes No	1, 4, 13, 18	☐ Yes ☑ No	Steep banks, very little wetland edge. Located in a 100-year floodplain.	
5	∑ Yes ☐ No	2, 3, 4, 6, 7, 15	Yes No	Receives water from dozens of streams and wetlands.	
6	☐ Yes ⊠ No	None	Yes No	No known occurrences of T&E species within the Nashua portion of river	
7	Yes No	1, 2, 4, 12	☐ Yes ☑ No	Steep banks limit nutrient retention, no wetland edge.	
8	Yes No	1, 2, 4, 5, 6, 10, 13	⊠ Yes □ No	Provides a variety of food sources for fish and wildlife.	
9	Yes No	2, 3, 6, 8, 12	☐ Yes ☑ No	Does contain some aesthetic quailties but not easily accessed.	
10	Yes No	1, 2, 6, 8, 10	Steep banks		
11	Yes No	1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 14	Large trees and shrubs provide stabilization.		
12	Yes No	1, 2, 3, 7, 14, 16, 22, 23, 27, 30	∑ Yes ☐ No	Merrimack River is a Prime Wetland in Nashua and a NH Designated River.	
13	Yes No	2, 5, 9	Yes No	Recreation opportunites exist but no safe public access due to railroad and steep banks.	
14	∑ Yes ☐ No	1, 2, 3, 6, 7, 8, 9, 17, 18, 21	∑ Yes ☐ No	Signs of beaver presence observed.	
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
Wildlife and vegetation diversity/abundance list. Included in Wetland Delineation Report					
Photograph of wetland.					
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.					
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the					
Coastal Area Worksheet (NHDES-W-06-079) for more information.					



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Commercial, railroa	d				
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No				
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 20' to railroad				
SECTION 2 - DELINEATION (USACE HIGH)	NAY METHODOLOGY; Env-Wt 311.10)				
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)					
DATE(S) OF SITE VISIT(S): 04/28/2021	DELINEATION PER ENV-WT 406 COMPLETED? ☑ Yes ☐ No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and	✓ Office and ✓ Office and				
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
USACE Highway Methodology.					
Other scientifically supported method	(enter name/ title):				

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: NA3, NA4, NA5, NA6, NA6A	LOCATION: (LAT/ LONG) 42.7 N/71.4 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: palustrine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? None	COWARDIN CLASS: PFO1E, PEM1E			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☑ Yes ☐ No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY: Env-Wt 311.10)				

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE The Highway Methodology Workbook Supplement. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in The Highway Methodology Workbook Supplement, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☑ No		Yes No	Not ecologically significant.
2	☐ Yes ☑ No	None	☐ Yes ☑ No	No educational or scientific value.
3	☐ Yes ☑ No	None	Yes No	Not associated with a stream or watercourse; no flowing water.
4	∑ Yes ☐ No	3, 4, 5, 7, 9, 15, 18	Yes No	Ponded water present, outlets are restricted. Wetlands are very narrow.
5	☐ Yes ⊠ No	2, 13 (NA4)	Yes No	NA4 has some groundwater discharge. Overall, this function does not appear to be provided by these wetlands.
6	☐ Yes ☑ No	None	☐ Yes ☑ No	No known occurrences of threatened or endangered species.
7	☐ Yes ⊠ No	4, 5, 8, 9	Yes No	Ponded water may retain some nutrients. Potential for nutrient removal does not appear significant.
8	☐ Yes ☑ No	None	☐ Yes ☑ No	No evidence of animal use or food sources.
9	☐ Yes ☑ No	None	Yes No	Not visually or aesthetically significant; no public access.
10	☐ Yes ☑ No	None	Yes No	Wetlands are not associated with a watercourse.
11	☐ Yes ☑ No	None	Yes No	Not associated with a stream; no flow.
12	Yes No	1	Yes No	Disturbed by adjacent development and no public access.
13	Yes No	None	Yes No	No recreation opportunities

14	Yes No	19	Yes No	Surrounding area is urban, highly developed.
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SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*

Caraarree.					
VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR' INDICATOR: PRESENT (LIS	S LENGTH OF	IMPORTANT NOTES
1					
2					
3					
4					
5					
SECTION 6 - STREAM RESOURCES SUMMARY					
DESCRIPTION OF STREAM: STREAM TYPE (ROSGEN):					J):
HAVE FISHERIES BEEN DOCUMENTED? DOES THE Yes No				DOES THE STREAM SYS	TEM APPEAR STABLE?
OTHER KEY ON-SITE FUNCTIONS OF NOTE:					

The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics
the evaluator used to determine principal function and value of each stream. The functions and values reference
number are defined in Section 4.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No		Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				

	IX	Wildlife	and v	egetation/	diversity	/abundance	list.
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Photograph of wetland.

Included in Wetland Delineation Report

Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.

For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the
Coastal Area Worksheet (NHDES-W-06-079) for more information.

Salmon Brook (NA8, NA9, NA10, NA11)



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)				
ADJACENT LAND USE: Commercial, forest	ed wetland, railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 10' to railroad			
SECTION 2 - DELINEATION (USACE HIGH)	NAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS#269)				
DATE(S) OF SITE VISIT(S): 05/04/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No			
CONFIRM THAT THE EVALUATION IS BASE	ED ON:			
Office and				
Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
USACE Highway Methodology.				
Other scientifically supported method	l (enter name/ title):			

"Important Notes" are to include characteristics the evaluator used to determine the principal function and value of

the wetland.

Salmon Brook (NA8, NA9, NA10, NA11)

Page 3 of 6

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	☐ Yes ☐ No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES	
1							
2							
3	3						
4							
5							
SECTION 6 - STREAM RESOURCES SUMMARY							
DESCRIPTION OF STREAM: Salmon Brook STREAM TYPE (ROSGEN):							
HAVE FISHERIES BEEN DOCUMENTED? DOES THE STREAM SYSTEM APPEAR STABLE? Yes No							
OTHER KEY ON-SITE FUNCTIONS OF NOTE: Prime Wetland							
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.							

Salmon Brook (NA8, NA9, NA10, NA11)

			PRINCIPAL	
FUNCTIONS/ VALUES	T DATIONALE I		FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	∑ Yes ☐ No		⊠ Yes □ No	Salmon Brook is valuable wildlife habitat and Prime Wetland.
2	Yes No		☐ Yes ☑ No	Access along railroad is restricted.
3	⊠ Yes □ No	3, 4, 5, 6, 7, 8, 10, 14, 16, 17	☐ Yes ☑ No	Potential for fish to come into Salmon Brook from Merrimack River. Road crossings further upstream.
4	⊠ Yes □ No	1, 4, 5, 6, 7, 8, 10, 13, 14, 18	⊠ Yes □ No	Salmon Brook is diffuse and can retain excess water from the Merrimack River. Ponded area present upstream from of railroad bridge.
5	☐ Yes ☑ No	2, 3, 7, 9	☐ Yes ☑ No	Railroad bridge appears to cause constriction in outlet.
6	Yes No	None	☐ Yes ☑ No	No known occurrences of threatened or endangered species.
7	⊠ Yes □ No	1, 2, 3, 4, 5, 13, 14	⊠ Yes □ No	Nutrients can be detained in ponded area upstream of railroad bridge.
8	Yes No	1, 4, 6, 7, 10	☐ Yes ☑ No	Low production levels within study area.
9	☐ Yes ☑ No	6	☐ Yes ☑ No	Surrounded by development. Not easily viewed.
10	⊠ Yes □ No	1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13	⊠ Yes □ No	Open water area on upstream side of railroad collects and retains water from surrounding developed areas upland.
11	XYes No	3, 4, 6, 13, 14	⊠ Yes □ No	Wide wetland area slows flow before Salmon Brook crosses under rail road and enters Merrimack River.
12	∑ Yes ☐ No	1, 2, 3, 7, 15, 22, 27, 30	∑ Yes ☐ No	Salmon Brook is a Prime Wetland.
13	Yes No	None	☐ Yes ☑ No	No recreational opportunities exist.
14	∑ Yes ☐ No	2, 6, 8, 12, 18, 19, 20, 21	☐ Yes ☑ No	Area is surrounded by development and fragmented.

SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
₩ Wildlife and vegetation diversity/abundance list.				
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.				
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.				

Nashua River (NA12, NA13, NA14, NA15)



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWAY	Y METHODOLOGY)			
ADJACENT LAND USE: Commercial, reside	ntial, forested, railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 10' to railroad			
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/04/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No			
CONFIRM THAT THE EVALUATION IS BASED ON: Office and Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
USACE Highway Methodology.				
Other scientifically supported method	d (enter name/ title):			

NHDES-W-06-049	Nashua River (NA12, NA13, NA14, NA15)			
SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGH	WAY METHODOLOGY; Env-Wt 311.10)			
WETLAND ID: NA12, NA13, NA14, NA15 (Nashua River)	LOCATION: (LAT/ LONG) 42.7 N/71.4 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine, palustrine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS:			
OTKITOWIT	R2UBH, PFO1E			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:			
Yes No	A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?			
Low	☐ Yes ⊠ No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?			
⊠ Yes □ No	Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE H	IGHWAY METHODOLOGY; Env-Wt 311.10)			
The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:				
1. Ecological Integrity (from RSA 482-A:2, XI)	Ecological Integrity (from RSA 482-A:2, XI)			
2. Educational Potential (from USACE Highway Methodo	ology: Educational/Scientific Value)			
3. Fish & Aquatic Life Habitat (from USACE Highway Met	:hodology: Fish & Shellfish Habitat)			
4. Flood Storage (from USACE Highway Methodology: Fl	oodflow Alteration)			

- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE The Highway Methodology Workbook Supplement. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in The Highway Methodology Workbook Supplement, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

Nashua River (NA12, NA13, NA14, NA15)

Page 3 of 6

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES	
1							
2	2						
3	3						
4							
5							
SECTION 6 - STREAM RESOURCES SUMMARY							
DESCRIPTION OF STREAM: Nashua River STREAM TYPE (ROSGEN):							
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☐ No DOES THE STREAM SYSTEM APPEAR STABLE? ☐ Yes ☐ No							
OTHER KEY ON-SITE FUNCTIONS OF NOTE: Prime Wetland							
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.							

Nashua River (NA12, NA13, NA14, NA15)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES		
1	∑ Yes ☐ No		Yes No	Nashua River is a habitat for fish and is a Prime Wetland.		
2	Yes No	5	Yes No	Access along railroad is restricted.		
3	∑ Yes ☐ No	3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 16, 17	⊠ Yes □ No	Nashua is stocked with fish upstream, dam located upstream could limit fish movement.		
4	⊠ Yes □ No	1, 4, 6, 8, 9, 10 (NA13), 13	⊠ Yes □ No	NA13 has a small floodplain wetland bench that provides storage. Located in a 100-year floodplain.		
5	∑ Yes ☐ No	2, 3, 4, 7, 15	☐ Yes ☑ No	Potential for groundwater recharge.		
6	Yes No	None	☐ Yes ☑ No	No known occurrences of threatened or endangered species.		
7	Yes No	1, 2, 4	☐ Yes ☑ No	Adjacent floodplain wetland is small - nutrient retention not provided.		
8	∑ Yes ☐ No	1, 4, 6, 10,	☐ Yes ☑ No	Nashua River provides food for the fish that inhabit it.		
9	Yes No	2	☐ Yes ☑ No	Open water but otherwise not visually significant and no access.		
10	☐ Yes ⊠ No	1, 2, 6, 8, 10	☐ Yes ☑ No	Banks are generally steep and not vegetated enough to slow water and provide sediment retention.		
11	∑ Yes ☐ No	1, 2, 3, 4, 9, 14	☐ Yes ☑ No	Large trees on banks provide stabilization.		
12	∑ Yes ☐ No	1, 2, 3, 7, 17, 22, 27, 30	∑ Yes ☐ No	Nashua River is a Prime Wetland and connected to a NH Designated River.		
13	☐ Yes ☑ No	2	☐ Yes ⊠ No	Access along railroad is restricted.		
14	∑ Yes ☐ No	2, 6, 8, 12, 21	☐ Yes ☑ No	River provides habitat but surrounding area is mostly developed.		
SECTION 7 - A	SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					

Wildlife and vegetation diversity/abundance list.

Included in Wetland Delineation Report

Photograph of wetland.

Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and
surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the
Coastal Area Worksheet (NHDES-W-06-079) for more information.

Pennichuck Brook (NA16, NA17, ME2, ME3)



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Undeveloped forest	t, railroad				
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Xes No				
DISTANCE TO NEAREST ROADWAY OR OT	DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): <10 to RR or 1,400				
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)					
DATE(S) OF SITE VISIT(S): 05/04/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and	☑ Office and				
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
USACE Highway Methodology.					
Other scientifically supported method	l (enter name/ title):				

Page 2 of 5

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGH	SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
WETLAND ID: NA16, NA17, ME2, ME3 (Pennichuck Brook)	LOCATION: (LAT/ LONG) 42.8 N/71.4 W					
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: Riverine, palustrine					
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: R2UBH, PSS1F					
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?					
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☐ Yes ☑ No					
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☑ Yes ☐ No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)					
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No					
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:					
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)						
The following table can be used to compile data on wetlands functions and values. The reference numbers indicated						

in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat) 3.
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE The Highway Methodology Workbook Supplement. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in The Highway Methodology Workbook Supplement, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	I	MPORTANT NOTES	
1								
2								
3								
4								
5								
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	Y					
DESCRIPTI	ON OF STREAL	M: Pennicuck Brook		STRE	AM TYPE (ROSGEN):		
HAVE FISHERIES BEEN DOCUMENTED? Yes No				DOES THE STREAM SYSTEM APPEAR STABLE? Yes No				
OTHER KEY ON-SITE FUNCTIONS OF NOTE: Prime Wetland (Nashua portion)								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4								

2020-05

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES			
1	Yes No		∑ Yes ☐ No	Valuable habitat for fish and Prime Wetland			
2	Yes No	5, 11	☐ Yes ☑ No	Access along railroad is restricted.			
3	∑ Yes ☐ No	1, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 16, 17	∑ Yes ☐ No	Pennichuck Brook provides fish habitat.			
4	∑ Yes ☐ No	1, 4, 6, 9, 13	☐ Yes ☑ No	Study area has steep banks and limited floodplain wetland area.			
5	Yes No	2, 3, 4, 7	☐ Yes ☑ No	Sandy soils adjacent to stream.			
6	☐ Yes ☑ No	None	☐ Yes ☑ No	No known occurrences of T&E species			
7	☐ Yes ⊠ No	3, 4	☐ Yes ☑ No	Stream has slow moving water but the banks are relatively steep and don't appear to provide nutrient retention.			
8	Yes No	1, 4, 6, 10	☐ Yes ☑ No	Aquatic and avian wildlife use.			
9	☐ Yes ☑ No	6	☐ Yes ☑ No	Access along railroad is restricted.			
10	∑ Yes ☐ No	1, 2, 6, 8, 10, 13	☐ Yes ☑ No	Stream has slow moving water and vegetation along banks.			
11	∑ Yes ☐ No	2, 3, 4, 6, 9, 14	☐ Yes ☑ No	Trees and shrubs along banks provide stabilization.			
12	Yes No	7, 22, 27, 30	☐ Yes ☑ No	Pennichuck Brook is a Prime Wetland in Nashua.			
13	☐ Yes ☑ No	2, 9	☐ Yes ☑ No	Access along railroad is restricted.			
14	Yes No	1, 2, 4, 5, 6, 7, 8, 19, 21	∑ Yes ☐ No	Located in a habitat island. Adjacent area is undeveloped forest.			
SECTION 7 - A	ATTACHMEN [®]	TS (USACE HIGHWAY METHODOLOG	Y; Env-Wt 311.10)				
I =	Wildlife and vegetation diversity/abundance list.						
	Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.						
_		·					
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.							



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Residential, industr	ial, forested, railroad				
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No				
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): <50 to RR					
SECTION 2 - DELINEATION (USACE HIGH)	SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
_	CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/05/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and					
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
USACE Highway Methodology.					
Other scientifically supported method	d (enter name/ title):				

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
WETLAND ID: NA18, NA19, NA20, NA21, NA23	LOCATION: (LAT/ LONG) 42.7 N/71.4 W				
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: palustrine, riverine				
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND?	COWARDIN CLASS:				
Unknown	PFO1E, R4SB, R2UBH				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:				
Yes No	A wildlife corridor or A habitat island?				
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?				
Low	Yes No				
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?				
∑ Yes ☐ No	Yes No (If yes, complete the Vernal Pool Table)				
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? Yes No				
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:				
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE H	IGHWAY METHODOLOGY; Env-Wt 311.10)				
The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:					

values" column refer to the following

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- Flood Storage (from USACE Highway Methodology: Floodflow Alteration) 4.
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE The Highway Methodology Workbook Supplement. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in The Highway Methodology Workbook Supplement, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	Y			
DESCRIPTI	ON OF STREA	M: Perennial and Inte	ermittent	STRE	AM TYPE (ROSGEN):
HAVE FISHERIES BEEN DOCUMENTED? Yes No				DOES THE STREAM SYSTEM APPEAR STABLE? Yes No		
OTHER KEY ON-SITE FUNCTIONS OF NOTE:						
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.						

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES			
1	Yes No		Yes No	Streams are fragmented/disturbed by adjacent development.			
2	Yes No	None	☐ Yes ☑ No	Access along railroad is restricted.			
3	∑ Yes ☐ No	4, 14 (NA19, NA21, NA23), 17	☐ Yes ☑ No	NA21 and NA23 may provide fish habitat connected to the Merrimack River. Railroad culverts have reduced AOP.			
4	∑ Yes ☐ No	4, 7, 8, 9, 10 (NA21, NA23), 13, 15, 18	∑ Yes ☐ No	Potential for water retention in streams and in floodplain wetlands.			
5	Yes No	2, 4, 7, 9	Yes No	Streams are fed by inlets.			
6	Yes No	None	Yes No	Arrow-head Rattlebox and Sora reside in the area but wetlands are not suitable habitat.			
7	∑ Yes ☐ No	3, 4, 5 (NA23), 8 (NA18, NA19, NA20), 9 (NA20), 10, 11	∑ Yes ☐ No	Effective nutrient removal/retention due to vegetation.			
8	☐ Yes ☑ No	1, 7 (NA18, NA19, NA20), 10	☐ Yes ⊠ No	Few production export indicators noted.			
9	Yes No	None	☐ Yes ☑ No	No visual qualities and no public access.			
10	Yes No	1, 2, 3, 10, 16 (NA20)	Yes No	Slow moving water and vegetation assist sediment retention.			
11	∑ Yes ☐ No	1, 2, 3, 4, 6, 9	☐ Yes ☑ No	Only applicable for NA21 and NA23.			
12	Yes No	1, 7, 22, 30	Yes No	Not unique to the area. Disturbed by adjacent development.			
13	Yes No	None	☐ Yes ☑ No	No opportunities for recreation.			
14	Yes No	7, 8, 13, 19, 20, 21	Yes No	Surrounded by development, wetlands are fragmented.			
SECTION 7 -	SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)						

\boxtimes	Wildlife	and	vegetation	diversity/	'abundance	list.
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Photograph of wetland.

Included in Wetland Delineation Report

Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.

For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the	
Coastal Area Worksheet (NHDES-W-06-079) for more information.	

NHDES-W-06-049 Spit Brook (NA26)



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Undeveloped field and forest (contaminated property), commercial					
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? Yes No					
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): 240'					
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)					
DATE(S) OF SITE VISIT(S): 06/02/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No				
CONFIRM THAT THE EVALUATION IS BASED ON:					
□ Office and □ Office and					
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
☑ USACE Highway Methodology.					
Other scientifically supported method (enter name/ title):					

NHDES-W-06-049 Spit Brook (NA26)

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: NA26 (Spit Brook)	LOCATION: (LAT/ LONG) 42.716 N/71.440 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine, palustrine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: R2UBH, PFO1E			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☐ Yes ☑ No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☑ Yes ☐ No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

1. Ecological Integrity (from RSA 482-A:2, XI)

the wetland.

- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of

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FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Wetlands assessed in Section 6	Yes No	
2	☐ Yes ☐ No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6	6 - STREAM RE	SOURCES SUMMARY	′			
DESCRIPTION OF STREAM: Spit Brook STREAM TYPE (ROSGEN):						
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☐ No DOES THE STREAM SYSTEM APPEAR STABLE? ☐ Yes ☐ No						
OTHER KEY ON-SITE FUNCTIONS OF NOTE:						
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.						

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☑ No		☐ Yes ☑ No	Stream is fragmented by development and has portions that flow in underground pipes.
2	☐ Yes ☑ No	5	☐ Yes ☑ No	Restricted access due to location in contaminated area.
3	☐ Yes ⊠ No	1, 14, 17	Yes No	Spit Brook flows underground through pipes before and after the study area.
4	⊠ Yes □ No	5, 9, 13, 15, 18	☐ Yes ☑ No	Spit Brook has a constricted outlet and may provide some storage. Contains a small wetland bench on one side.
5	∑ Yes ☐ No	2, 4, 7, 9	☐ Yes ☑ No	Sandy soils present adjacent to stream.
6	☐ Yes ⊠ No	None	☐ Yes ⊠ No	Arrow-head Rattlebox recorded in the area but wetlands are not suitable habitat.
7	⊠ Yes □ No	4, 5, 8, 10, 11	☐ Yes ☑ No	Vegetation along edge and floodplain bench provide nutrient retention.
8	∑ Yes ☐ No	1, 4, 7, 10	☐ Yes ☑ No	Evidence of wildlife use (racoon tracks).
9	Yes No	None	☐ Yes ☑ No	Public access is restricted due to contaminated property.
10	⊠ Yes □ No	1, 2, 6, 10, 13, 16	☐ Yes ☑ No	Slow moving water and vegetation assist sediment retention.
11	∑ Yes ☐ No	4, 5, 9, 12, 15	∑ Yes ☐ No	Bank/adjacent wetland provides stabilization.
12	Yes No	2, 30	Yes No	No public access and not considered unique to the area.
13	☐ Yes ⊠ No	None	☐ Yes ⊠ No	No recreational opportunities.
14	⊠ Yes □ No	4, 5, 6, 8, 13, 17	∑ Yes ☐ No	Racoon tracks observed. Fence around contaminated property limits large mammal use.

SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

N			/	
IXI Wildlife	and vegetati	ion diversity	//abundai	nce list.

Photograph of wetland.

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Included in Wetland Delineation Report

Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.

For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.

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WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau





RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Industrial, railroad,	ADJACENT LAND USE: Industrial, railroad, undeveloped forested land				
CONTIGUOUS UNDEVELOPED BUFFER ZO	CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? Yes No				
DISTANCE TO NEAREST ROADWAY OR OT	DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): < 50' to railroad				
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)					
DATE(S) OF SITE VISIT(S): 05/04/2021, 05/05/2021 DELINEATION PER ENV-WT 406 COMPLETED? Yes No					
CONFIRM THAT THE EVALUATION IS BASED ON:					
○ Office and ○ Office and					
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
USACE Highway Methodology.					
Other scientifically supported method	d (enter name/ title):				

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: ME1, ME4, ME5	LOCATION: (LAT/ LONG) 42.8 N/71.4 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: Riverine, palustrine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS:			
Olikilowii	R2UBH, PFO1E			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:			
Yes No	A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?			
Low	Yes No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?			
	Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/			
SYSTEM? Yes No	DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			
CECTION A MICE AND CHINICEION AND MALLIES (LICACE LI	1011144V METUODOLOGY E W. 244 40\			

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

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FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES	
1							
2							
3							
4							
5							
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	Y				
DESCRIPTI	DESCRIPTION OF STREAM: Perennial & Int. Streams STREAM TYPE (ROSGEN):						
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☐ No DOES THE STREAM SYSTEM APPEAR STABLE? ☐ Yes ☐ No							
OTHER KEY ON-SITE FUNCTIONS OF NOTE:							
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.							

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No		☐ Yes ☑ No	Streams are fragmented by development and the railroad.
2	Yes No	None	☐ Yes ☑ No	No safe public access, located on either sides of a railroad.
3	Yes No	4, 14, 16, 17	☐ Yes ☑ No	ME1 is too shallow for fish useage and has culvert crossings. Applicable for ME4 and ME5.
4	∑ Yes ☐ No	4, 6, 7, 8, 9, 10, 13, 15 (ME1)	☐ Yes ☑ No	ME1 is located in a 0.2% Annual Chance flood zone. ME4 and ME5 are in Zone AE (100 yr. floodplain).
5	∑ Yes ☐ No	2, 4, 7, 9 (ME1), 15	☐ Yes ☑ No	Applicable for ME1. Streams fed from wetlands upstream.
6	Yes No	None	☐ Yes ☑ No	No known occurrences of threatened or endangered species.
7	∑ Yes ☐ No	2, 4, 5, 10, 13 (ME1)	Yes No	Applicable for ME1 due to vegetation and constricted outlet. ME4 and ME5 are unconstricted.
8	Yes No	10	☐ Yes ☑ No	Few production export indicators noted.
9	Yes No	None	☐ Yes ☑ No	Surrounded by development and a railroad, no public access.
10	∑ Yes ☐ No	1, 2, 3, 4, 6, 10, 12	☐ Yes ☑ No	ME4 is a stormwater culvert that empties into the Merrimack River. ME1 has potentail due to slow moving shallow stream.
11	Yes No	1, 2 (ME4 and ME5), 3, 4, 6 (ME4 and ME5), 7 (ME1), 9	Yes No	ME4 and ME5 have some eroded areas on banks.
12	☐ Yes ☑ No	1, 2, 22, 30	☐ Yes ☑ No	Access along railroad is restricted.
13	☐ Yes ☑ No	None	☐ Yes ☑ No	No recreation opportunities exist.
14				Small area of wildlife habitat available. Surrounding area is developed.
SECTION 7 -	ATTACHMEN'	TS (USACE HIGHWAY METHODOLOGY	Y; Env-Wt 311.10)	
 ✓ Wildlife and vegetation diversity/abundance list. ✓ Photograph of wetland. Included in Wetland Delineation Report				

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Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and
surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the
Coastal Area Worksheet (NHDES-W-06-079) for more information.

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NHDES-W-06-049

ME6 and ME7



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau

Check the Status of your Application



RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)				
ADJACENT LAND USE: Industrial, undeveloped forest, railroad				
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? X Yes No				
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): < 50' to railroad				
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/11/2021	DATE(S) OF SITE VISIT(S): 05/11/2021 DELINEATION PER ENV-WT 406 COMPLETED? X Yes No			
CONFIRM THAT THE EVALUATION IS BASED ON:				
☑ Office and				
Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
☐ USACE Highway Methodology.				
Other scientifically supported method	d (enter name/ title):			

NHDES-W-06-049 ME6 and ME7

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: ME6 and ME7	LOCATION: (LAT/ LONG) 42.82 N/71.48 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine, palustrine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND?	COWARDIN CLASS:			
Unknown	R2UBH, PFO1E			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:			
☐ Yes ☒ No	🔀 A wildlife corridor or 🔲 A habitat island?			
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?			
Low	Yes No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?			
⊠ Yes □ No	Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

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NHDES-W-06-049 ME6 and ME7

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LI:	RS	LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6 - STREAM RESOURCES SUMMARY						
DESCRIPT	ION OF STREAI	M: Small perennial st	ream	STRE	EAM TYPE (ROSGEN	1):
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☑ No				DOES THE STREAM SYSTEM APPEAR STABLE? Yes No		
OTHER KEY ON-SITE FUNCTIONS OF NOTE: 100-year floodplain						
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.						

NHDES-W-06-049 ME6 and ME7

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES	
1	☐ Yes ☑ No		☐ Yes ☒ No	Fragmented by development.	
2	Yes No	2	Yes No	Access along railroad is restricted.	
3	Yes No	1, 4, 14, 16, 17	☐ Yes ☑ No	ME7 is too shallow for fish useage and small culvert barrier. Applicable for ME6.	
4	∑ Yes ☐ No	4, 6, 7, 8, 9, 13, 15 (ME7)	∑ Yes ☐ No	Located in a 100-year floodplain.	
5	⊠ Yes □ No	2, 4, 7, 9 (ME7), 15	☐ Yes ☑ No	Streams fed from stormwater runoff. ME7 fed by groundwater as well.	
6	☐ Yes ⊠ No	None	☐ Yes ⊠ No	No known occurrences of threatened or endangered species.	
7	∑ Yes ☐ No	2, 3, 4, 5 (ME6), 10, 13 (ME7)	∑ Yes ☐ No	ME6 has ponded water. ME7 has constricted outlet present.	
8	☐ Yes ☑ No	2, 6 (ME6), 10	☐ Yes ☑ No	Few production export indicators noted.	
9	Yes No	7, 8	Yes No	Access along railroad is restricted.	
10	∑ Yes ☐ No	1, 2, 3, 4, 6, 10, 13	⊠ Yes □ No	ME6 has slow-moving, ponded water. ME7 has accummulated sediment in stream channel.	
11	Yes No	2, 3, 4, 5, 7 (ME7), 9, 15 (ME7)	∑ Yes ☐ No	Bank/adjacent wetland provides stabilization.	
12	☐ Yes ⊠ No	1, 2, 7 (ME7), 22, 30	☐ Yes ☑ No	Access along railroad is restricted.	
13	☐ Yes ☑ No	5	☐ Yes ☑ No	No recreation opportunities exist.	
14	Yes No	1, 5, 6, 7, 8, 19, 20, 21	∑ Yes ☐ No	Connected to a wildlife corridor and other wetlands.	
SECTION 7 -	SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
 ⊠ Wildlife and vegetation diversity/abundance list.					
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and					
surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans. For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.					



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY	SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)			
ADJACENT LAND USE: Residential, undeve	eloped forest, railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 20' to RR			
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/11/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No			
CONFIRM THAT THE EVALUATION IS BASE	ED ON:			
Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
☐ USACE Highway Methodology.				
Other scientifically supported method	d (enter name/ title):			

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: ME8, ME9, ME10, ME11 (Naticook Brook)	LOCATION: (LAT/ LONG) 42.8 N/71.4 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: Palustrine, riverine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND?	COWARDIN CLASS:			
Unknown	PFO1E, PSS1E, R2UBH, PUBH			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:			
☐ Yes No	A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?			
Low	☐ Yes			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?			
⊠ Yes □ No	Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/			
SYSTEM? Xes No	DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			
,				

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetland assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	1			
DESCRIPTI	ON OF STREA	M: Naticook Brook		STRE	AM TYPE (ROSGEN	1):
HAVE FISHERIES BEEN DOCUMENTED? Yes No				DOES THE STREAM SYSTEM APPEAR STABLE? Yes No		
OTHER KEY ON-SITE FUNCTIONS OF NOTE: 100-year floodplain						
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.						

2020-05

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES	
1	∑ Yes ☐ No		∑ Yes ☐ No	Important flood storage and wildlife habitat.	
2	Yes No	5	☐ Yes ⊠ No	No safe public access due to location under railroad.	
3	∑ Yes ☐ No	1, 2, 3, 4, 5, 6, 7, 8, 10, 14, 16, 17	⊠ Yes □ No	Beaver dam is only nearby barrier to fish passage.	
4	∑ Yes ☐ No	1, 4, 6, 7, 8, 9, 10, 13, 18	⊠ Yes □ No	Located in a 100-year floodplain.	
5	Yes No	2, 3, 4, 7, 15	Yes No	Adjacent wetlands provide groundwater recharge/discharge.	
6	☐ Yes ☑ No		☐ Yes ☑ No	No known occurrences of T&E species	
7	Yes No	1, 2, 3, 4, 5, 7, 8, 10, 11	∑ Yes ☐ No	Adjacent floodplain wetlands provide nutrient retention.	
8	Yes No	2, 4, 7, 10	☐ Yes ⊠ No	Evidence of wildlife (beaver dam)	
9	Yes No	8	☐ Yes ☑ No	Access along RR is restricted. Sewer pipe crosses stream	
10	Yes No	1, 2, 3, 4, 5 (ME8) 6, 7, 8, 10, 12, 13, 16	⊠ Yes □ No	Sediment can be trapped by dense streamside vegetation or drop out in open water.	
11	Yes No	1, 3, 4, 6, 9, 12, 14	⊠ Yes □ No	Dense vegetation borders Naticook Brook but evidence of erosion.	
12	Yes No	1, 2, 4, 7, 22, 30	☐ Yes ☑ No	Sewer pipe runs through wetland and no safe public access.	
13	Yes No	5	☐ Yes ⊠ No	No opportunities for recreation	
14	Yes 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, □ No Yes □ No		Undeveloped forested land nearby		
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
Wildlife and vegetation diversity/abundance list. Included in Wetland Delineation Report					
Photograph of wetland.					
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.					
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the					
Coastal Area Worksheet (NHDES-W-06-079) for more information.					

Souhegan River (ME12, ME13, ME14, and ME15)



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

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APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

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SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)				
ADJACENT LAND USE: Residential, industr	ial, forested, railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 10' to railroad			
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/11/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No			
CONFIRM THAT THE EVALUATION IS BASE	ED ON:			
Office and	Office and			
Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
☐ USACE Highway Methodology.				
Other scientifically supported method	d (enter name/ title):			

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGH	SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: ME12, ME13, ME14, ME15 (Souhegan River)	LOCATION: (LAT/ LONG) 42.8 N/71.4 W				
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine				
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: R2UBH				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?				
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☐ Yes ☑ No				
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☑ Yes ☐ No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)				
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes □ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No				
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:				
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
The following table can be used to compile data on wetlands	functions and values. The reference numbers indicated				

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

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- Flood Storage (from USACE Highway Methodology: Floodflow Alteration) 4.
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
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- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE The Highway Methodology Workbook Supplement. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in The Highway Methodology Workbook Supplement, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
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All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	II	MPORTANT NOTES	
1								
2								
3								
4								
5								
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	1					
DESCRIPTI	ON OF STREA	M: Souhegan River		STRE	AM TYPE (ROSGEN):		
HAVE FISHERIES BEEN DOCUMENTED? DOES THE STREAM SYSTEM APPEAR STABLE? Yes No								
OTHER KEY ON-SITE FUNCTIONS OF NOTE:								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference								

Irm@des.nh.gov or (603) 271-2147
NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

number are defined in Section 4.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES		
1	Yes No		∑ Yes ☐ No	Valuable fish habitat and large river.		
2	Yes No	2, 5	☐ Yes ☑ No	No opportunities for education due to lack of safe access.		
3	∑ Yes ☐ No	1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17	∑ Yes ☐ No	Valuable fish habitat and stocked with fish upstream.		
4	⊠ Yes □ No	4, 6, 7, 8, 9, 10, 13	⊠ Yes □ No	No adjacent wetland but the banks have a floodplain "bench." Located in a 100-year floodplain.		
5	∑ Yes ☐ No	2, 3, 4, 7, 11	☐ Yes ☑ No	Souhegan River is fed by multiple tributaries.		
6	Yes No	1, 2	∑ Yes ☐ No	Known to contain American Eel which is of Special Concern in NH.		
7	☐ Yes ⊠ No	2, 4, 5	☐ Yes ☑ No	No adjacent wetland, limited vegetation along banks.		
8	Yes No	1, 2, 4, 6, 10	☐ Yes ☑ No	Food sources for fish habitat.		
9	☐ Yes ⊠ No	6, 7, 8	☐ Yes ☑ No	No safe access, located below railroad.		
10	Yes No	1, 2, 3, 6, 8	☐ Yes ☑ No	No adjacent wetlands, limited vegetation along banks, some eroded areas.		
11	∑ Yes ☐ No	1, 2, 3, 4, 6, 9, 14	☐ Yes ☑ No	Eroded areas noted on banks. Trees provide stabilization.		
12	Yes No	1, 2, 7, 16, 22, 24, 30	☐ Yes ☑ No	Scenic river but no access for public and unsafe next to railroad.		
13	☐ Yes ☑ No	2, 5	☐ Yes ☑ No	No public access.		
14	∑ Yes ☐ No	1, 2, 3, 5, 6, 8, 21	⊠ Yes □ No	Primarily fish habitat. Habitat island on each side of Souhegan.		
SECTION 7 - A	ATTACHMEN [*]	TS (USACE HIGHWAY METHODOLOG	Y; Env-Wt 311.10)			
Wildlife a	nd vegetation	n diversity/abundance list.	Included in Wetler	nd Dolinoation Papert		
Photograph of wetland. Included in Wetland Delineation Report						
	Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.					
_		•		·		
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.						



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



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RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

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SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Industrial, forest, roadway, railroad					
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No				
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): 30' to railroad				
SECTION 2 - DELINEATION (USACE HIGH)	NAY METHODOLOGY; Env-Wt 311.10)				
CERTIFIED WETLAND SCIENTIST (if in a nor prepared this assessment: Jennifer Riorda	n-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who n (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/13/2021 and 05/28/2021	DELINEATION PER ENV-WT 406 COMPLETED? ✓ Yes No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and	☑ Office and				
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESS	MENT (check one and fill in blank if "other"):				
USACE Highway Methodology.					
Other scientifically supported method	I (enter name/ title):				

Sebbins Brook (BE1, BE2, BE11, BE12)					
WAY METHODOLOGY; Env-Wt 311.10)					
LOCATION: (LAT/ LONG) 42.9 N/71.4 W					
DOMINANT WETLAND SYSTEMS PRESENT: riverine, palustrine					
COWARDIN CLASS:					
R2UBH, PEM1E					
IS THE WETLAND PART OF:					
A wildlife corridor or A habitat island?					
IS THE WETLAND HUMAN-MADE?					
Yes No					
ARE VERNAL POOLS PRESENT?					
Yes No (If yes, complete the Vernal Pool Table)					
ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/					
DOWNGRADIENT? Yes No					
PROPOSED WETLAND IMPACT AREA:					
IGHWAY METHODOLOGY; Env-Wt 311.10)					
The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:					
ology: Educational/Scientific Value)					

- Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat) 3.
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
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FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
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3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IIV	IPORTANT NOTES	
1								
2								
3								
4								
5					-			
SECTION 6	6 - STREAM RE	SOURCES SUMMARY	1					
DESCRIPTI	ION OF STREAI	M: Sebbins Brook		STREAM	И TYPE (ROSGEN):		
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☐ No ☐ No DOES THE STREAM SYSTEM APPEAR STABLE? ☐ Yes ☐ No						AR STABLE?		
OTHER KEY ON-SITE FUNCTIONS OF NOTE:								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference								

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number are defined in Section 4.

2020-05

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES			
1	Yes No		Yes No	Within study area, stream is fragmented by railroad and crosses a powerline corridor.			
2	Yes No	5	☐ Yes ☑ No	No public access and unsafe due to location under rail road and steep banks.			
3	∑ Yes ☐ No	1, 4, 7, 9, 10, 14, 16, 17	☐ Yes ☑ No	Fish have been documented upstream of study area.			
4	Yes No	7, 8, 9, 10, 13	☐ Yes ☑ No	100-year floodplain (Zone AE).			
5	Yes No	2, 4, 7, 15	☐ Yes ⊠ No	Limited flood storage due to lack of wetland edge. Sandy soils present next to stream.			
6	☐ Yes ☑ No		☐ Yes ☑ No	No known occurrences of T&E species			
7	☐ Yes ☑ No	3, 4, 10	☐ Yes ☑ No	Little wetland edge, banks are steep.			
8	Yes No	1, 6, 10	☐ Yes ☑ No	Stream provides fish habitat and wildlife food sources.			
9	☐ Yes ☑ No	6	☐ Yes ☑ No	No public access and unsafe.			
10	☐ Yes ☑ No	1, 2, 6, 10	☐ Yes ☑ No	Not effective sediment trapping due to lack of vegetation.			
11	Yes No	1, 2, 3, 4, 6, 9	☐ Yes ☑ No	Indications of erosion are present. Vegetation on banks provides stabilization.			
12	☐ Yes ☑ No	2, 22, 23, 30	☐ Yes ☑ No	Very tall, steep banks and no public access.			
13	Yes No		☐ Yes ☑ No	No recreation opportunities			
14	Yes No	2, 4, 6, 8, 19, 21	∑ Yes ☐ No	Wildlife habitat potential due to forested areas and open water.			
SECTION 7 -	ATTACHMEN [*]	TS (USACE HIGHWAY METHODOLOG	Y; Env-Wt 311.10)				
$\cdot =$	Wildlife and vegetation diversity/abundance list. Included in Wetland Delineation Report						
Photograph of wetland.							
_	Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.						
_		eas only: additional information requi		·			
Coastal Area Worksheet (NHDES-W-06-079) for more information.							

NHDES-W-06-049 BE3, BE4, BE5



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau





RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY	SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)				
ADJACENT LAND USE: Industrial, residenti	al, undeveloped forest, railroad				
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No				
DISTANCE TO NEAREST ROADWAY OR OT	DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): < 20' to railroad				
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)				
CERTIFIED WETLAND SCIENTIST (if in a nor prepared this assessment: Jennifer Riorda	n-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who n (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/13/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and					
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
☐ USACE Highway Methodology.					
Other scientifically supported method	d (enter name/ title):				

NHDES-W-06-049 **BE3, BE4, BE5**

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
WETLAND ID: BE3, BE4, BE5	LOCATION: (LAT/ LONG) 42.9N/71.4W				
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine, palustrine				
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND?	COWARDIN CLASS:				
Unknown	R4SB, PSS1/EM1E				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:				
Yes No	A wildlife corridor or A habitat island?				
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?				
Low	Yes No				
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?				
Yes No	Yes No (If yes, complete the Vernal Pool Table)				
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/				
SYSTEM? Yes No	DOWNGRADIENT? Yes No				
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:				
05051001 4 14/551 40100 51/10/0510010 4010 1/4/11/50 /1/04 05 1/	ICHWAY METHODOLOGY E. MILOMA 40)				

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

1. Ecological Integrity (from RSA 482-A:2, XI)

the wetland.

- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of

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NHDES-W-06-049 BE3, BE4, BE5

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE?	IMPORTANT NOTES
1	Yes No		(Y/N) ☐ Yes ☐ No	Wetland/stream is fragmented by development, partially located in powerline corridor.
2	Yes No	None	☐ Yes ☑ No	Unsafe due to position next to railroad corridor and no public access.
3	☐ Yes ☑ No	None	☐ Yes ☑ No	Intermittent stream not large enough to support fish.
4	⊠ Yes □ No	4, 7, 9, 13, 15 (BE5)	☐ Yes ☑ No	Potential to receive flood waters from the Merrimack River however not effective flood storage. BE5 has a constricted outlet and may provide some storage.
5	⊠ Yes □ No	2, 4, 7, 10 (BE5)	☐ Yes ☑ No	BE5 likely provides some groundwater recharge/discharge.
6	Yes No		Yes No	No known occurrences of threatened or endangered species.
7	⊠ Yes □ No	3, 4, 8 (BE5), 9 (BE5), 13 (BE5)	⊠ Yes □ No	Applicable for BE5 only. Potential for sediment and nutrient removal exists.
8	☐ Yes ☑ No	2, 7, 10	☐ Yes ☑ No	BE5 provides some food for wildlife, overall production export is limited.
9	☐ Yes ☑ No	2	Yes No	Powerlines intersect through Wetland BE5. BE3 and BE4 are not easily acessed.
10	∑ Yes ☐ No	1, 2, 3 (BE5), 4 (BE5), 5 (BE5), 6, 10, 12 (BE5), 13 (BE5), 15 (BE5), 16 (BE5)	⊠ Yes □ No	BE5 retains water and has dense vegetation to trap sediment
11	Yes No	1, 2, 3, 4, 6 (BE3 and BE4), 9	☐ Yes ☑ No	BE3 and BE4 are experiencing erosion damages - banks are not stable.
12	Yes No	4, 22, 30	☐ Yes ☑ No	Unsafe due to railroad and no public access.
13	☐ Yes ☑ No	None	☐ Yes ☑ No	No opportunities for recreation exist.

14	∑ Yes ☐ No	5, 6, 8, 13(BE5), 17, 19, 20, 21	∑ Yes ☐ No	Small mammals observed and 500ft. of forest adjacent to wetland.
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Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

- Caraanee.						
VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LIS	s ا ا	LENGTH OF YDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6	6 - STREAM RE	SOURCES SUMMARY	Υ			
DESCRIPTION OF STREAM: Intermittent stream STREAM TYPE (ROSGEN):					I):	
HAVE FISHERIES BEEN DOCUMENTED? Yes No			DOES THE STREAM SYSTEM APPEAR STABLE? Yes No			
OTHER KEY ON-SITE FUNCTIONS OF NOTE:						

BE3, BE4, BE5 NHDES-W-06-049

The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Functions assessed under Section 4	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
Wildlife and vegetation diversity/abundance list. Included in Wetland Delineation Report				

Photograph of wetland.

Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.

NHDES-W-06-049 BE3, BE4, BE5

For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.

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WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the Avoidance and Minimization Written Narrative (NHDES-W-06-089) and the Avoidance and Minimization (Checklist (NHDES-W-06-050) to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY	Y METHODOLOGY)			
ADJACENT LAND USE: Forested, residentia	al, railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 10' to railroad			
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS#269)				
DATE(S) OF SITE VISIT(S): 05/13/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No			
CONFIRM THAT THE EVALUATION IS BASED ON: Office and Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
USACE Highway Methodology.				
Other scientifically supported method	d (enter name/ title):			

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
WETLAND ID: BE6 and MA1 (Merrimack River)	LOCATION: (LAT/ LONG) 42.9N/71.4W				
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine				
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? various	COWARDIN CLASS: R2UBH				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?				
if not, where does the wetland lie in the drainage basin? middle	IS THE WETLAND HUMAN-MADE? ☐ Yes ☑ No				
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☑ Yes ☐ No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)				
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? Yes □ No				
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:				
CECTION A WEST ANDS FUNCTIONS AND VALUES (USACE U	IICHWAY METHODOLOGY, Env. W/+ 211 10				

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

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FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Assessed in Setion 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

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www.des.nh.gov

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	II	MPORTANT NOTES	
1								
2								
3								
4								
5								
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	1					
DESCRIPTION OF STREAM: Merrimack River STREAM TYPE (ROSGEN):								
HAVE FISHERIES BEEN DOCUMENTED? DOES THE STREAM SYSTEM APPEAR STABLE? Yes No								
OTHER KEY ON-SITE FUNCTIONS OF NOTE:								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference								

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number are defined in Section 4.

1 No wildlife habitat. 2 Yes No 1, 2, 5 Yes No 1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 16, 17 No Fish habitat. 3 Yes No 1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 16, 17 No Fish habitat. 4 Yes No 1, 4, 6, 8, 13, 17, 18 Yes No Wetland edge - banks provide imited flood storage. Located a 100-year floodplain. 5 Yes No 2, 3, 4, 6, 7, 11, 15 Yes No Merrimack receives water for many streams and wetlands. 6 Yes No 1, 2 Yes No No Provide nutrient retention. 7 Yes No 1, 2, 4, 5, 6, 10, 13 Yes No Merrimack River provides a variety of food sources for not aquatic and wildlife. 9 Yes No 2, 3, 6, 8, 11, 12 Yes No Merrimack River provides a variety of food sources for aquatic and wildlife. 10 Yes No 1, 2, 6, 8, 10 Yes No Wetland edge - banks dor provide sediment retention. 11 Yes No 1, 2, 6, 8, 10 Yes No Wetland edge - banks dor provide sediment retention. 12 Yes No 1, 2, 3, 4, 6, 8, 9, 10, 11, 14 Yes No High flow velocities and stee banks - vegetation provides stabilization. 12 Yes No 1, 2, 3, 7, 14, 16, 17, 22, 24, 27, 30 No Merrimack River has threater and endangered species habit but no safe public access ne railroad. Suitable wildlife habitat. Suitable wildlife habitat.	FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES	
Yes No 1, 2, 5 No From the railroad corridor	1	_			Merrimack River is a valuable wildlife habitat.	
3	2		1, 2, 5		Only access is a steep walk down from the railroad corridor	
4	3		1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 16, 17		The Merrimack River is a known fish habitat.	
No	4		1, 4, 6, 8, 13, 17, 18		No wetland edge - banks provide limited flood storage. Located in a 100-year floodplain.	
threatened or endangered species. 7	5		2, 3, 4, 6, 7, 11, 15	_	Merrimack receives water from many streams and wetlands.	
No	6	_	1, 2		Known occurrences of multiple threatened or endangered species.	
8	7	_	2, 3, 4		No wetland edge - banks don't provide nutrient retention.	
9	8		1, 2, 4, 5, 6, 10, 13		Merrimack River provides a variety of food sources for aquatic and wildlife.	
10	9		2, 3, 6, 8, 11, 12		Does contain some visual and aesthetic quailties but not easily accessed near railroad.	
11	Yes					
No 1, 2, 3, 7, 14, 16, 17, 22, 24, 27, 30 and endangered species habit 13 Yes No 2, 5, 9 Yes No Prailroad. 14 Yes No 1, 2, 3, 5, 6, 8, 13, 17, 18, 21 Yes No Recreation opportunites exist but no safe public access near railroad. Suitable wildlife habitat. Evidence of ducks and Canadageese.	11		2, 3, 4, 6, 8, 9, 10, 11, 14		High flow velocities and steep banks - vegetation provides stabilization.	
13 Yes No 2, 5, 9 Suitable wildlife habitat. Yes No Suitable wildlife habitat. Yes No No Suitable wildlife habitat. Evidence of ducks and Canad geese.	12		1, 2, 3, 7, 14, 16, 17, 22, 24, 27, 30		Merrimack River has threatened and endangered species habitat.	
14 Yes No 1, 2, 3, 5, 6, 8, 13, 17, 18, 21 Yes No Evidence of ducks and Canac geese.	13		2, 5, 9		Recreation opportunites exist but no safe public access near railroad.	
CECTION A ATTACHMENTS (HICAGE HICHMAN MATTHODOLOGY E. MATTACHMENTS)	14 Yes Yes No 1, 2, 3, 5, 6, 8, 13, 17, 18, 21 Yes Evidence of ducks and Canada					
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10) Wildlife and vegetation diversity/abundance list.			•	Y; Env-Wt 311.10)		

\times	l Wildlife an	d vegetation	diversity/	abundance lis	t

Included in Wetland Delineation Report

Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.

Photograph of wetland.

For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the	
Coastal Area Worksheet (NHDES-W-06-079) for more information.	



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY	Y METHODOLOGY)			
ADJACENT LAND USE: Highway, industrial,	, forested (small), railroad			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Tyes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): < 50			
SECTION 2 - DELINEATION (USACE HIGH)	NAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 05/28/2021	DELINEATION PER ENV-WT 406 COMPLETED? ☐ Yes ☐ No			
CONFIRM THAT THE EVALUATION IS BASED ON: Office and Field examination.				
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):				
USACE Highway Methodology.				
Other scientifically supported method	l (enter name/ title):			

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)						
WETLAND ID: BE7, BE8, BE9, BE10	LOCATION: (LAT/ LONG) 42.91 N/71.45 W					
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: palustrine, riverine					
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: PEM/FO/SS1E, R4SB					
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?					
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☑ Yes ☐ No					
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☐ Yes No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)					
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ✓ Yes ✓ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No					
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:					
CECTION A MICE AND CHINGE ON CAND MALLES (MICAGE M	UCUMAY METHODOLOGY E. MI 244 40					

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

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FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☑ No		☐ Yes ☑ No	Not ecologically significant due to fragmentation/disturbance.
2	☐ Yes ☑ No	3, 8	☐ Yes ☑ No	Wetland is accessible but not undisturbed or natural.
3	☐ Yes ☑ No		Yes No	BE7 interrmittent stream is too small to support fish populations.
4	⊠ Yes □ No	4, 6, 7, 8, 9, 15, 18	☐ Yes ☑ No	BE7 provides some flood storage
5	⊠ Yes □ No	2, 4, 7 (BE7), 9	☐ Yes ☑ No	BE7 is associated with an intermittent stream.
6	☐ Yes ☑ No		☐ Yes ☑ No	No known occurrences of threatened or endangered species.
7	⊠ Yes □ No	3, 4, 5, 8, 9 (BE8), 11, 14	⊠ Yes □ No	Slow moving water and heavily vegetated (BE8, BE9, BE10 not principal)
8	⊠ Yes □ No	1, 4, 7, 10, 12	☐ Yes ☑ No	BE7 provides wildlife food sources and exports nutrients.
9	☐ Yes ☑ No	1, 6, 9	Yes No	Easy access and multiple classes but not a pristine area for viewing.
10	⊠ Yes □ No	1, 2, 3, 5, 7, 10, 12, 13, 16	⊠ Yes □ No	Applicable for BE7. Potential for sediment retention due to slow moving stream and heavy vegetation.
11	Yes No	3, 4, 5, 7, 9, 12	☐ Yes ☑ No	Applicable for BE7. Wide wetland bordering intermittent stream.
12	☐ Yes ☑ No	1, 4, 7, 12, 17	Yes No	Wetlands are not considered unique to the area.
13	☐ Yes ☑ No	None	Yes No	No recreational opportunities available
14	∑ Yes ☐ No	7, 8, 9, 13, 19, 20, 21	Yes No	BE7 only. Red-winged black bird and chipmunks observed.

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)		LENGTH OF HYDROPERIOD	IMPORTANT NOTES		
1					-			
2								
3								
4								
5								
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	1					
DESCRIPTI	ON OF STREAL	M: Intermittent Strea	m	STRE	AM TYPE (ROSGEN	1):		
HAVE FISHERIES BEEN DOCUMENTED? Yes No				DOES THE STREAM SYSTEM APPEAR STABLE? Yes No				
OTHER KEY ON-SITE FUNCTIONS OF NOTE:								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.								

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Page 5 of 5

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES	
1	Yes No	Intermittent Stream assessed in Section 4	Yes No		
2	Yes No		Yes No		
3	Yes No		Yes No		
4	Yes No		Yes No		
5	Yes No		Yes No		
6	Yes No		Yes No		
7	Yes No		Yes No		
8	Yes No		Yes No		
9	Yes No		Yes No		
10	Yes No		Yes No		
11	Yes No		Yes No		
12	Yes No		Yes No		
13	Yes No		Yes No		
14	Yes No		Yes No		
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
 ⊠ Wildlife and vegetation diversity/abundance list.					
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.					
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.					



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau





RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY	SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)				
ADJACENT LAND USE: Industrial, residenti	ADJACENT LAND USE: Industrial, residential, railroad				
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? Yes No					
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): < 20' to railroad					
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)					
DATE(S) OF SITE VISIT(S): 05/13/2021	DELINEATION PER ENV-WT 406 COMPLETED? X Yes No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and					
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
USACE Highway Methodology.					
Other scientifically supported method	d (enter name/ title):				

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGH	SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: MA2 and MA3	LOCATION: (LAT/ LONG) 42.93 N/71.45 W				
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: palustrine				
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? None	COWARDIN CLASS: PFO1Ex, PSS1Ex, PFO1E				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?				
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☑ Yes ☑ No				
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)				
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? Yes No				
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:				
CECTION A VALUE AND CHINICTIONS AND VALUE (LICACE II	ICHWAY METHODOLOGY, Franchik 244, 40)				

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

			PRINCIPAL	
FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	FUNCTION/VALUE?	IMPORTANT NOTES
	(.,,	(1.6.6.6.1.6.1.7)	(Y/N)	
1	Yes No		Yes No	Not ecologically significant.
	Z 110			
2	☐ Yes ☑ No		☐ Yes ☑ No	No educational or scientific value.
	Yes		Yes	Wetland is fed by shallow
3	No		⊠ No	stormwater runoff culverts.
	⊠ Yes		Yes	Small size of wetland limits amount
4	No	4, 5, 6, 7, 9, 15	⊠ No	of flood storage. Located in a 500- year floodplain.
	Пусс		Пусс	
5	Yes No	2, 4, 15	☐ Yes ☑ No	Ponded water from floodplain and stormwater outflows.
6	Yes No		Yes No	No known occurrences of threatened or endangered species.
7	Yes No	4, 5, 7, 8, 9 (MA3)	Yes No	No outlet, nutrients caught in ponded area.
			_	
8	Yes No	2, 4	Yes No	Duck nest and eggs observed.
				D
9	Yes No	Noe	Yes No	Dense woody vegetation makes it hard to access and unsafe in
	M NO		NO NO	relation to railroad.
10	Yes	1, 2, 3, 4, 5 (MA2)	Yes	Slow moving/ponded water and
	∐ No	, , , , , ,	⊠ No	long retention time.
11	Yes		Yes	Not associated with a watercourse.
	⊠ No		⊠ No	Not associated with a watercoarse.
12	Yes		Yes	Wetlands are disturbed by adjacent development - not unique to the
12	⊠ No		⊠ No	area.
12	Yes		Yes	No recreation apportunities suich
13	⊠ No		⊠ No	No recreation opportunities exist.
4.4	⊠ Yes	47 40 20 24	Yes	Duck and duck nest with eggs
14	No	17, 19, 20, 21	⊠ No	observed in MA2
L	1		1	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LIS	S LENGTH OF	IMPORIANT NOTES	
1						
2						
3						
4						
5						
SECTION 6	6 - STREAM RE	SOURCES SUMMARY	′			
DESCRIPTI	ION OF STREAI	M:		STREAM TYPE (ROS	SGEN):	
HAVE FISHERIES BEEN DOCUMENTED? Yes No				DOES THE STREAM Yes No	I SYSTEM APPEAR STABLE?	
OTHER KE	Y ON-SITE FUN	NCTIONS OF NOTE:				
the evalua	The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.					

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES		
1	Yes No		Yes No			
2	Yes No		Yes No			
3	Yes No		Yes No			
4	Yes No		Yes No			
5	Yes No		Yes No			
6	Yes No		Yes No			
7	Yes No		Yes No			
8	Yes No		Yes No			
9	Yes No		Yes No			
10	Yes No		Yes No			
11	Yes No		Yes No			
12	Yes No		Yes No			
13	Yes No		Yes No			
14	Yes No		Yes No			
SECTION 7 -	ATTACHMEN	TS (USACE HIGHWAY METHODOLOG	Y; Env-Wt 311.10)			
_		n diversity/ahundance list				
	Included in Wetland Delineation Report					
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and						
surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.						
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the						
Coastal Area Worksheet (NHDES-W-06-079) for more information.						



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau





RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the <u>Avoidance and Minimization Written Narrative (NHDES-W-06-089)</u> and the <u>Avoidance and Minimization Checklist (NHDES-W-06-050)</u> to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)					
ADJACENT LAND USE: Industrial, railroad	ADJACENT LAND USE: Industrial, railroad				
CONTIGUOUS UNDEVELOPED BUFFER ZO	CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? Tyes No				
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): 50'-100' to railroad					
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)					
DATE(S) OF SITE VISIT(S): 05/13/2021	DELINEATION PER ENV-WT 406 COMPLETED? Yes No				
CONFIRM THAT THE EVALUATION IS BASE	ED ON:				
Office and					
Field examination.					
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):					
USACE Highway Methodology.					
Other scientifically supported method	l (enter name/ title):				

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: MA4 and MA5	LOCATION: (LAT/ LONG) 42.97 N/71.46 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: palustrine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: PEM1Ex, PEM1E, PFO1E			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin? Middle	IS THE WETLAND HUMAN-MADE? ☑ Yes ☐ No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			
SECTION A WETLANDS FUNCTIONS AND VALUES (USACE H	IIGHWAY METHODOLOGY: Env. Wt 211 10)			

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

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FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No		Yes No	Not ecologically significant.
2	☐ Yes ☑ No		Yes No	Human disturbance present and unsafe location.
3	Yes No		Yes No	No flowing water to support fish habitat.
4	∑ Yes ☐ No	3, 4, 9, 18	Yes No	Wetlands retain runoff from surrounding area - amount of flood storage is limited.
5	☐ Yes ☑ No	2, 4	Yes No	Wetlands appear to be fed by surface water runoff.
6	☐ Yes ☑ No		Yes No	No known occurrences of threatened or endangered species.
7	☐ Yes ☑ No	4, 8, 9	Yes No	Wetlands do not appear to retain much water and have limited vegetation
8	☐ Yes ☑ No	7	Yes No	Not a high functioning or producing wetland.
9	☐ Yes ☑ No		Yes No	Signs of human disturbance and no access along railroad.
10	Yes No	1, 2	Yes No	Wetlands do not appear to retain much water and have limited vegetation
11	☐ Yes ☑ No		Yes No	Not located next to a watercourse; no channelized flow.
12	☐ Yes ☑ No	1, 2	Yes No	No unique or historic value.
13	☐ Yes ☑ No		Yes No	No recreational opportunities.
14	☐ Yes ☑ No		Yes No	Surrounding urban development inhibits wildlife habitat.

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

Guidance.						
VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LIS	s	LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	Y			
DESCRIPTI	ON OF STREA	M:		STRE	AM TYPE (ROSGEN):
HAVE FISHERIES BEEN DOCUMENTED? Yes No				S THE STREAM SYST	TEM APPEAR STABLE?	
OTHER KE	OTHER KEY ON-SITE FUNCTIONS OF NOTE:					
the evalua	The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.					

FUNCTIONS/	SUITABILITY	RATIONALE	PRINCIPAL FUNCTION/VALUE?	IMPORTANT NOTES		
VALUES	(Y/N)	RATIONALE	(Y/N)	IIVII OKTANT NOTES		
1	Yes No		Yes No			
2	Yes No		Yes No			
3	Yes No		Yes No			
4	Yes No		Yes No			
5	Yes No		Yes No			
6	Yes No		Yes No			
7	Yes No		Yes No			
8	Yes No		Yes No			
9	Yes No		Yes No			
10	Yes No		Yes No			
11	Yes No		Yes No			
12	Yes No		Yes No			
13	Yes No		☐ Yes ☐ No			
14	Yes No		Yes No			
SECTION 7 -	SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)					
Wildlife and vegetation diversity/abundance list. Included in Wetland Delineation Report						
Photograph of wetland.						
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.						
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the						
Coastal Area Worksheet (NHDES-W-06-079) for more information.						

APPENDIX A-3.3 Wetland Delineation Report Addendum

NASHUA-MANCHESTER 40818 CAPITOL CORRIDOR RAIL

WETLAND DELINEATION REPORT ADDENDUM



Prepared for:



NH Department of Transportation 7 Hazen Drive Concord, NH 03302

Prepared by:



GM2 Associates, Inc. 197 Loudon Road, Suite 310 Concord, NH 03301

> January 2022 Updated April 2022

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APPENDICES

- A. Figures
- B. Wetlands Functional Assessment Worksheets
- C. Vernal Pool Characterization Form



Report Prepared By: Jennifer Riordan, NH CWS #269

1.0 INTRODUCTION

This report provides a summary of the additional wetland resources that were delineated in August, October, and November 2021 and April 2022 for the Nashua-Manchester 40818 (Capitol Corridor Rail) Project. The initial wetland delineation for the project was completed in April, May, and June 2021 and the Wetland Delineation Report was finalized in early August 2021. After completion of the report, several additional potential impact areas were identified and additional field visits were conducted.

The Nashua-Manchester 40818 project extends from Lowell, Massachusetts to Manchester, New Hampshire along an existing operational freight rail line. The wetlands that were delineated for the Massachusetts portion of the project are described in "Wetland Delineation Report - Part A" while the wetlands that were delineated for the New Hampshire portion are discussed in "Part B." This Addendum covers the remaining wetlands that were delineated subsequently for the entire project corridor.

2.0 METHODOLOGY

Delineation of additional wetlands was necessary due to potential impacts from culvert repair work, addition of a second track, and station construction that had not been identified prior to the initial delineation efforts. These additional areas are scattered throughout the project corridor in the municipalities of Tyngsborough, Merrimack, and Bedford (refer to Figure 1 in Appendix A).

The additional delineations were completed on August 17, October 12, and November 30, 2021. They were conducted during normal (non-drought) conditions. The wetland delineation was conducted by Jennifer Riordan (CWS #269) and Meg Gordon of GM2 Associates, Inc. (GM2). Wetlands were delineated in accordance with the US Army Corps of Engineers (ACOE) 1987 Methodology and the ACOE Northcentral and Northeast Regional Supplement (2012). Wetland resources were identified and located with a Trimble Geo7x GPS unit.

Federal wetland classifications were assigned in accordance with "Classification of Wetlands and Deepwater Habitats of the United States" (Federal Geographic Data Committee, 2013). A wetland functional assessment was completed for each wetland system in accordance with the ACOE New England District Highway Methodology Workbook Supplement (1999). New Hampshire Department of Environmental Services (NHDES) Wetlands Functional Assessment worksheets were completed for the NH wetlands and ACOE functional assessment worksheets were completed for the MA wetlands (refer to Appendix B).

A potential vernal pool was identified in Merrimack during the November 2021 delineation. A follow-up field visit was conducted in April 2022 to look for vernal pool indicator species and confirm if this wetland functions as a vernal pool. The results of this review are discussed in Section 3.2.

3.0 WETLAND RESOURCE DESCRIPTIONS

The following sections provide a summary of each additional wetland that was delineated within the project corridor.

3.1 Bedford, NH

3.1.1 Wetlands BE13 and BE14

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Perennial Stream, Wetland (Priority Resource Area) <u>Federal Classification</u>:

Palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)
Palustrine, scrub/shrub, broad-leaved deciduous, seasonally flooded/saturated (PSS1E)
Riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH)

Flag series BE13 (BE13-1 to BE13-72) and BE14 (BE14-1 to BE14-17) correspond to floodplain wetlands along the northern bank of Sebbins Brook, which is located south of the proposed MHT-Bedford Station site (refer to Figure 2 in Appendix A). In some areas, the wetland flags correspond to top of bank (TOB)



Wetland BE13 near flag BE13-27

instead of wetland. Flag BE13-72 connects to BE14-1. Site visits were conducted on August 17, 2021 and October 12, 2021.

Wetland BE13 provides the same functions that were assessed under Sebbins Brook (BE1, BE2, BE11, and BE12). These functions are fish and shellfish habitat, floodflow alteration, groundwater recharge/discharge, production export, sediment stabilization, and wildlife habitat. Of these, wildlife habitat and floodflow alteration are considered principal functions. Wetland BE13 is comprised of cinnamon fern (Osmundastrum cinnamomeum), red maple (Acer rubrum), sedges, some joe-pye-weed (Eutrochium purpureum), royal fern (Osmunda spectabilis), and sensitive fern (Onoclea sensibilis). Beaver activity was also noted along much of the wetland including one large dam, one small dam, and numerous cut trees.

Flag series BE14 (BE14-1 to BE14-17) corresponds to a forested wetland and sections of the Sebbins Brook bank located south of the proposed Bedford Station site. The forested wetland corresponds to flags BE14-1 to BE14-12. Top of bank of Sebbins Brook corresponds to BE14-12 to BE14-17. The bank is 4 to 10 feet tall and steep with thick vegetation. Flag series BE14 connects series BE11 to BE13.

Similar to BE13, BE14 also provides the same functions that were assessed for Sebbins Brook. These include fish and shellfish habitat, floodflow alteration, groundwater recharge/discharge, production export, sediment stabilization, and wildlife habitat. Of these, wildlife habitat and floodflow alteration are considered principal functions. BE14 wetland vegetation is comprised of cinnamon fern, skunk cabbage (*Symplocarpus foetidus*), red maple, Asian bittersweet (*Celastrus orbiculatus*), stout wood reed (*Cinna arundinacea*), jewelweed (*Impatiens capensis*), and green ash (*Fraxinus pennsylvanica*). The banks contain ferns, red oak (*Quercus rubra*), and red maple. Burning bush (*Euonymus atropurpureus*) is located in the adjacent upland.



Wetland BE13 near flag BE13-59



Wetland BE14 near flag BE14-9



Wetland BE14 near flag BE14-14

3.1.2 Flag Series BE15 (Bank)

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Intermittent Stream <u>Federal Classification</u>:

Riverine, intermittent, streambed, sand (R4SB4)

Flag series BE15 (BE15-1 to BE15-9) corresponds to an intermittent stream crossing located at mile post 51.02 (refer to Figure 3 in Appendix A). At the time of the site visit (November 30, 2021) there was no flow. The banks are 20+ feet tall, very steep, and heavily eroded. The surrounding land and stream substrate is sandy. The intermittent stream flows into the Merrimack River approximately 105 feet downstream of the railroad tracks. A Zone AE floodplain is mapped just downstream of the culvert, on the east side of the railroad.

Vegetation along the bank of Intermittent Stream BE15 includes white pine (*Pinus strobus*), red oak, grasses, and an unidentifiable fern. The intermittent stream and bank do not provide many functions due to their location and eroded nature. The stream is fragmented by the rail line and nearby residential development and may be fed by stormwater runoff more than groundwater. It provides only some floodflow alteration but not at the principal level.



BE15 near flag BE15-3



BE15 near flag BE15-7

3.1.3 Wetland BE16

<u>New Hampshire Regulated Wetland Areas</u>: Bank, Intermittent Stream <u>Federal Classification</u>:

Riverine, intermittent, streambed, sand (R4SB4)

Flag series BE16 (BE16-1 to BE16-4) corresponds to a small intermittent stream channel across the railroad from BE15 (refer to Figure 3, Appendix A). A culvert at the edge of the powerline corridor feeds BE16 and at the time of the site visit (November 30, 2021) there was some frozen ponded water in the stream channel. The water then flows through a culvert under the railroad and outlets into Intermittent Stream BE15. There is stone rip rap in the channel of BE16.

The banks of Intermittent Stream BE16 are vegetated with gray birch (*Betula populifolia*), white pine, red oak, goldenrod (*Solidago spp.*), and an unidentifiable fern. The functions that BE16 provides are groundwater recharge/discharge and floodflow alteration. Neither of these are provided at the principal level.



BE16, view toward railroad

3.2 Merrimack, NH

3.2.1 Wetland ME16

<u>New Hampshire Regulated Wetland Areas</u>: Wetland, Vernal Pool Federal Classification:

Palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E)

Flag series ME16 corresponds to a forested wetland located on the west side of the rail line, south of Anheuser-Busch (refer to Figure 4 in Appendix A). The area in which ME16 is located was not originally field delineated due to no proposed work in this segment of the rail corridor. Currently, a potential second track is proposed. The side of ME16 closest to the railroad was delineated. The wetland continues west beyond the study area.

Wetland ME16 includes a small vernal pool that is located at the edge of the rail embankment. A field visit was conducted on April 12, 2022 and 12 wood frog (*Lithobates sylvatica*) egg masses were observed in the pool. The edge of the pool is vegetated with red maple and some sparse highbush blueberry (*Vaccinium corymbosum*) and skunk cabbage. An ACOE Vernal Pool Characterization form was completed and is included in Appendix C. During the April site visit, the pool has a maximum water depth of approximately 3 feet. The pool also contained at least 2 feet of standing water during the site visit in November 2021.

The functions provided by Wetland ME16 are ecological integrity, flood storage, groundwater recharge/discharge, production export, and wildlife habitat. Of these, ecological integrity and wildlife habitat are considered principal functions due to the vernal pool.

During the April 2022 site visit, a second pool was observed on the east side of the rail line, approximately 50 feet from the tracks. A search of the pool was conducted but no vernal pool indicator species were observed. This wetland was not field delineated since it is beyond the study area, however it is shown on Figure 4 as a National Wetlands Inventory (NWI) mapped wetland.



ME16 (November 2021)



Wood frog egg masses within Vernal Pool ME16 (April 2022)



Vernal Pool ME16 in relation to railroad corridor (April 2022)

3.3 Tyngsborough, MA

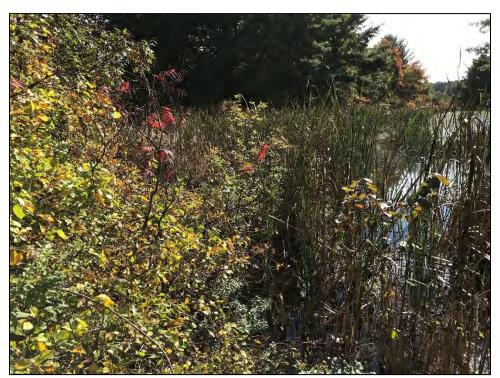
3.3.1 Wetland TY9

<u>Massachusetts Regulated Wetland Areas</u>: BVW Federal Classification:

Palustrine, emergent, persistent, seasonally flooded/saturated, excavated (PEM1Ex)
Palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated, excavated (PFO1Ex)
Palustrine, scrub/shrub, broad-leaved deciduous, seasonally flooded/saturated, excavated
(PSS1Ex)

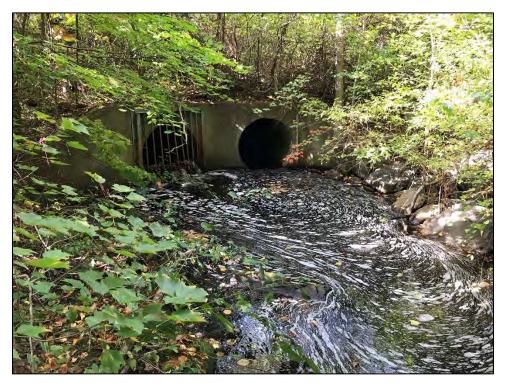
Flag series TY9 (TY9-1 to TY9-20) corresponds to a created wetland area located near the proposed Pheasant Lane Mall-South Nashua station (refer to Figure 5 in Appendix A). Two culverts on the western side of the wetland feed stormwater runoff into the large emergent wetland located just south of the Pheasant Lane Mall and the New Hampshire-Massachusetts state border. The northern side of the emergent wetland was field delineated due to potential improvements along the Mall access road and parking lot north of the wetland. A second wetland area is located east of TY9, however it is located more than 100 feet from the parking lot and rail corridor, so it was not field-delineated.

At the time of the site visit (October 12, 2021), there was approximately 6 inches of standing water within the wetland and flowing water at the culverts. Rock and riprap are located at the edge of the wetland. Wetland TY9 provides various functions including floodflow alteration, sediment/toxicant retention, nutrient removal, production export, and wildlife habitat. Of these, floodflow alteration, sediment/toxicant retention, and nutrient removal are considered principal functions.



Wetland TY9 near flag TY9-8

Vegetation within the emergent portion of the wetland includes cattail (Typha latifolia), common reed (Phragmites australis), and purple loosestrife (*Lythrum* salicaria). Vegetation within the forested/scrub-shrub portion includes speckled alder (Alnus incana) and Asian bittersweet with Tatarian honeysuckle (Lonicera tatarica), white pine, and autumn olive (Elaeagnus umbellata) at the edge.



Wetland TY9 near flag TY9-20

3.3.2 Wetland TY10

<u>Massachusetts Regulated Wetland Areas</u>: BVW Federal Classification:

Palustrine, emergent, persistent, temporarily flooded, partially drained/ditched (PEM1Ad)

Flag series TY10 corresponds to a small pond/emergent wetland located west of the River Road railroad crossing at MP 33.50 (refer to Figure 6 in Appendix A). At the time of the site visit (November 30, 2021) there was approximately one to two feet of standing, partially frozen, water. Evidence of a varying water level was observed. The pond is fed by a small stream that flows through a nearby farm.

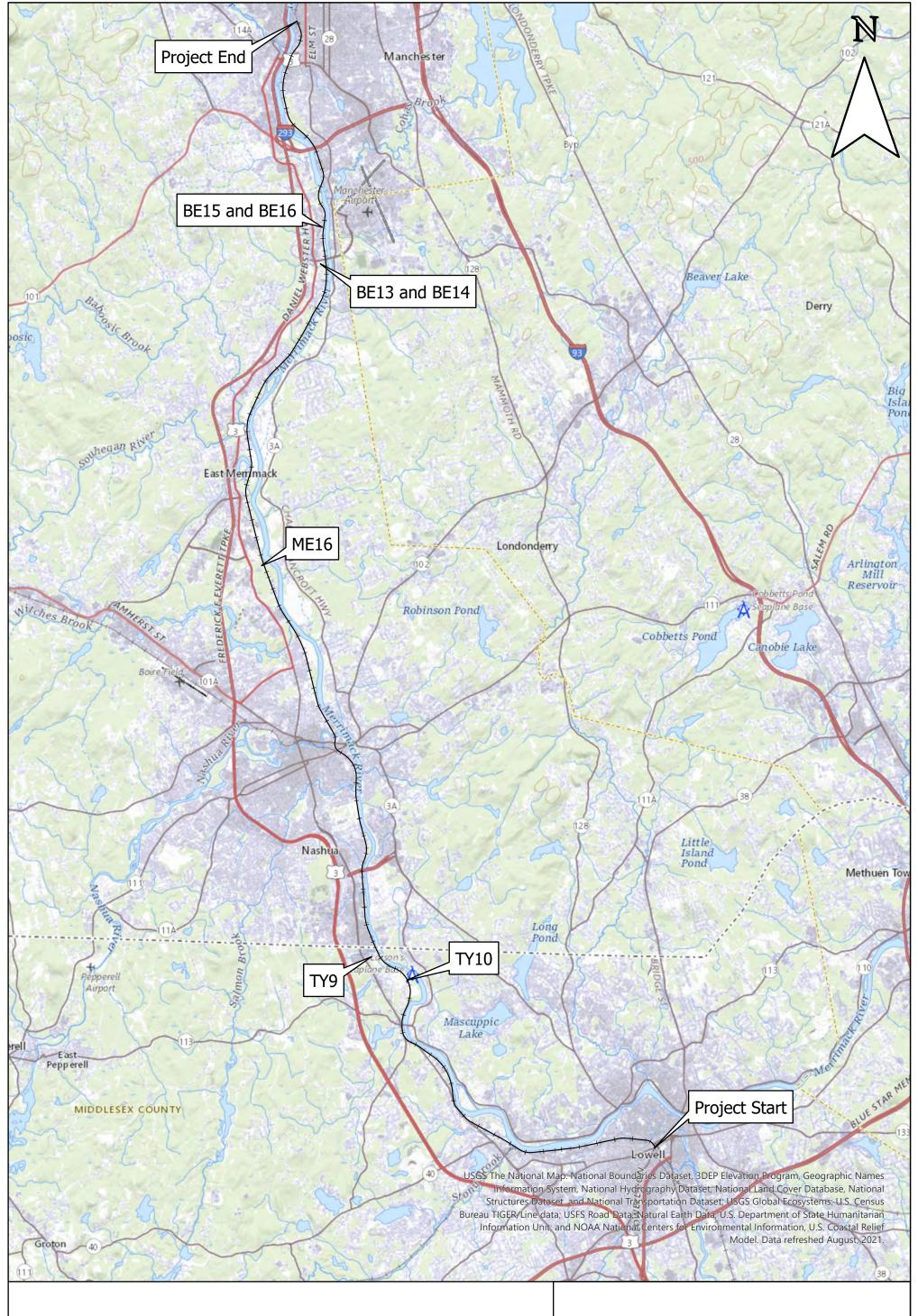
The edge of the ponded area is vegetated with evening primrose (*Oenothera biennis*) and yellow foxtail (*Setaria pumila*). The functions provided by TY10 are groundwater recharge/discharge, sediment/toxicant retention, nutrient removal, and wildlife habitat. None are considered principal functions.



TY10

APPENDIX A

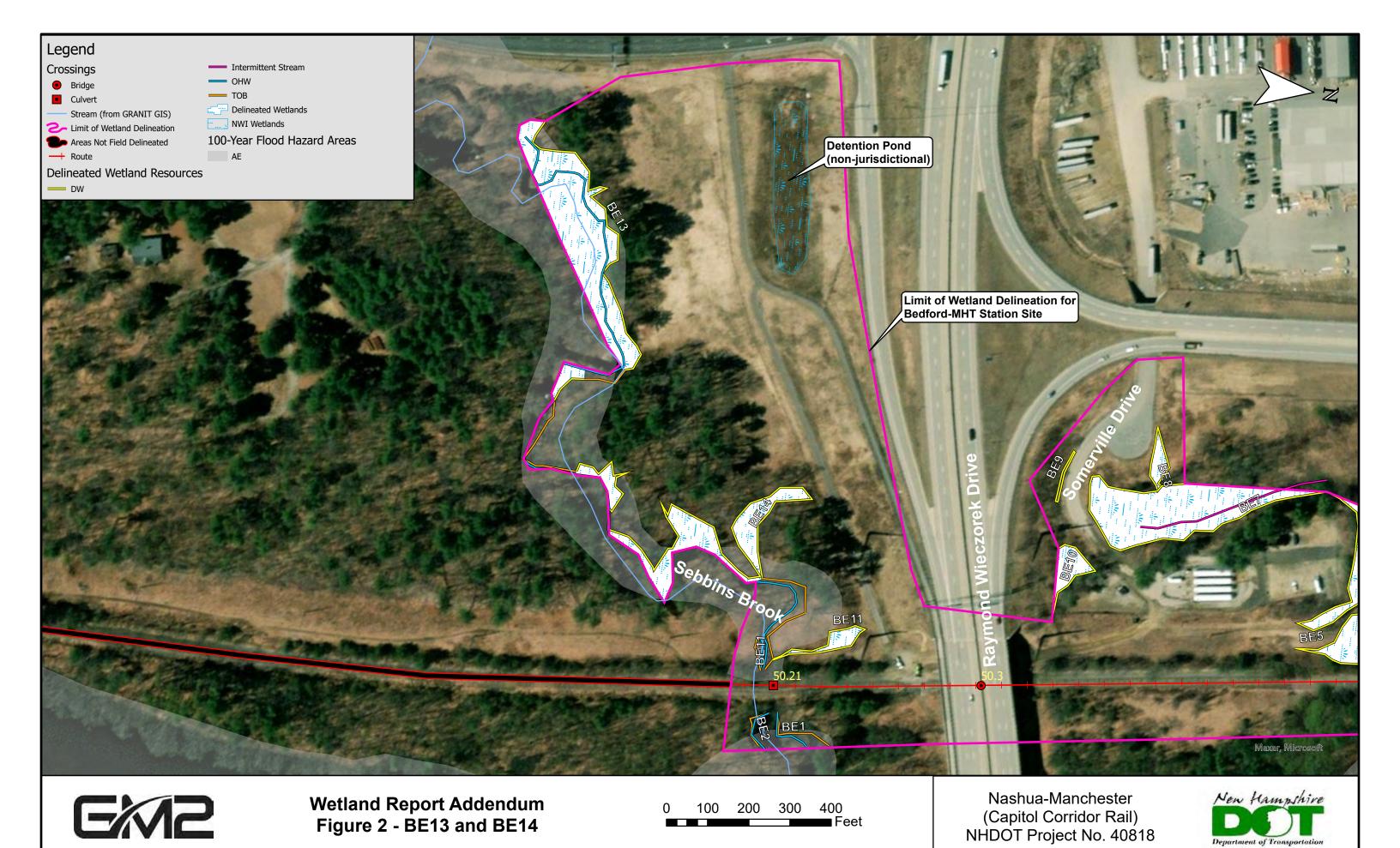
Figures





Wetland Report Addendum
Figure 1 - Overview of Additional
Wetlands Delineated





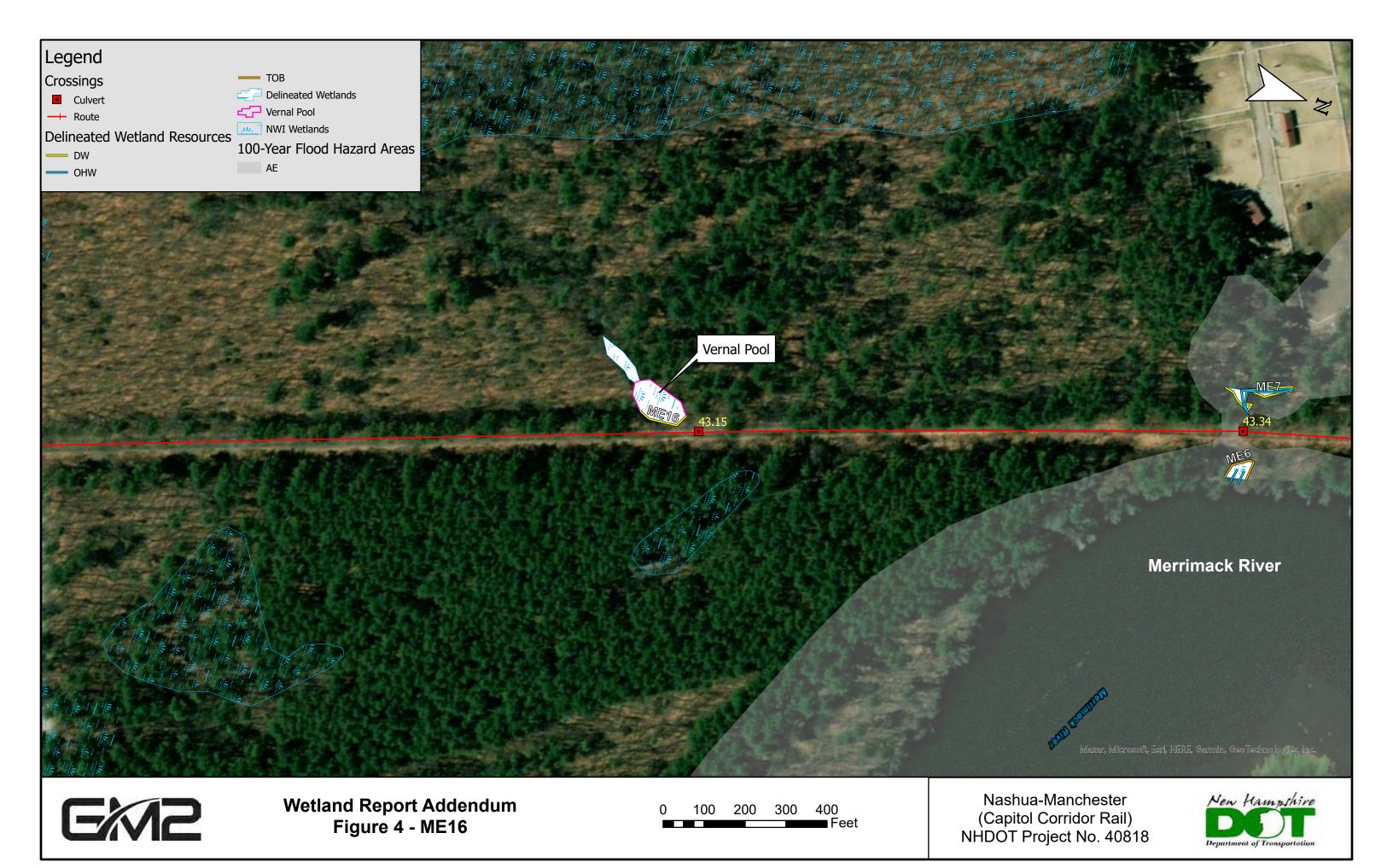


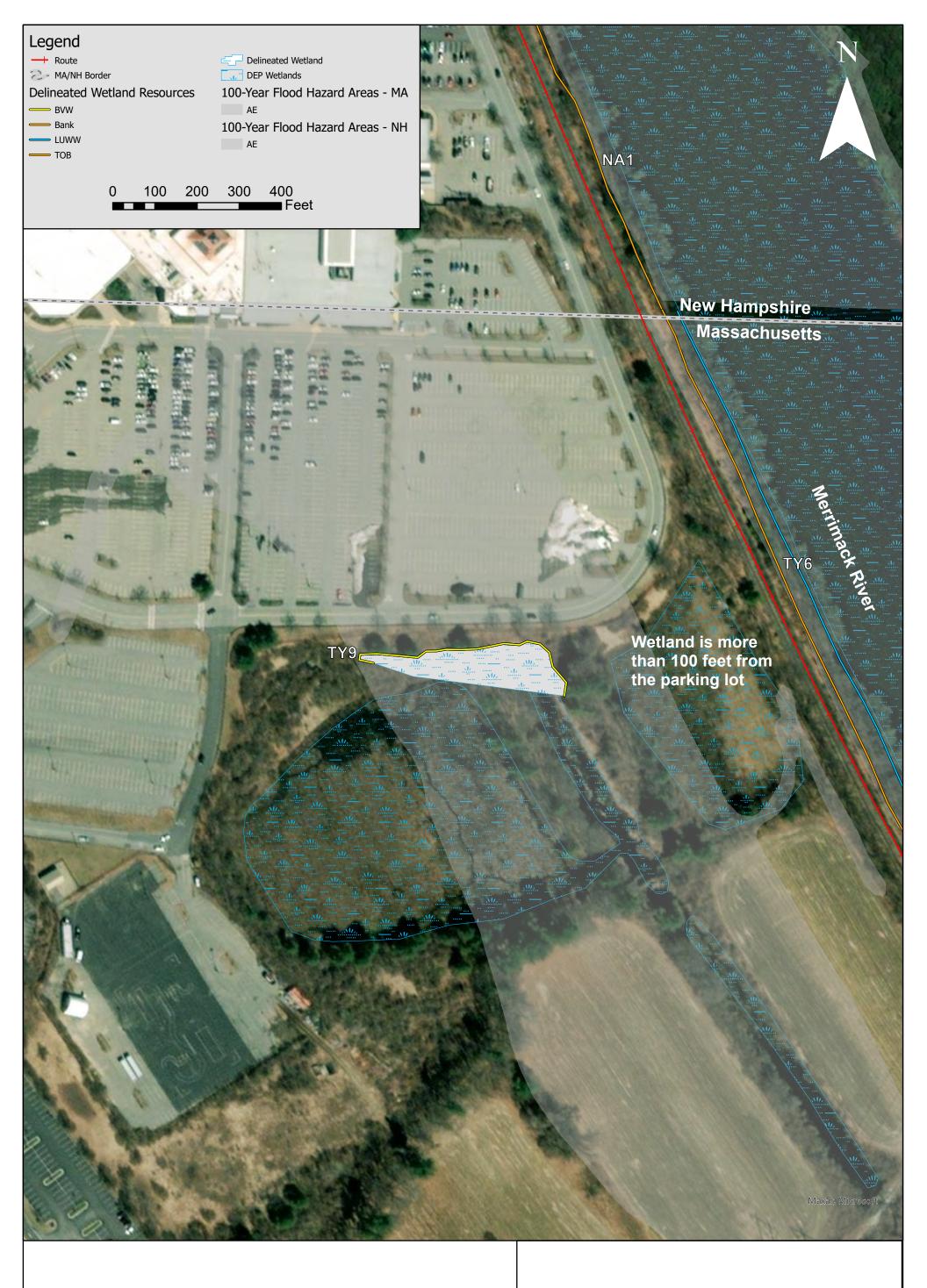


Wetland Report Addendum Figure 3 - BE15 and BE16











Wetland Report Addendum Figure 5 - TY9







Wetland Report Addendum Figure 6 - TY10



APPENDIX B

Wetlands Functional Assessment Worksheets

Sebbins Brook (BE1, BE2, BE11, BE12, BE13, and BE14)



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau



Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the Avoidance and Minimization Written Narrative (NHDES-W-06-089) and the Avoidance and Minimization (Checklist (NHDES-W-06-050) to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)			
ADJACENT LAND USE: Industrial, forest, ro	oadway, railroad		
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Yes No		
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): 30' to railroad		
SECTION 2 - DELINEATION (USACE HIGH)	NAY METHODOLOGY; Env-Wt 311.10)		
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)			
DATE(S) OF SITE VISIT(S): 05/13/2021 and 05/28/2021	DELINEATION PER ENV-WT 406 COMPLETED? ☐ Yes ☐ No		
CONFIRM THAT THE EVALUATION IS BASE	ED ON:		
○ Office and ○ Office and			
Field examination.			
METHOD USED FOR FUNCTIONAL ASSESS	MENT (check one and fill in blank if "other"):		
USACE Highway Methodology.			
Other scientifically supported method	l (enter name/ title):		

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGH	WAY METHODOLOGY; Env-Wt 311.10)		
WETLAND ID: BE1, BE2, BE11, and BE12 (Sebbins Brook)	LOCATION: (LAT/ LONG) 42.9 N/71.4 W		
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: riverine, palustrine		
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND?	COWARDIN CLASS:		
Unknown	R2UBH, PEM1E		
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM?	IS THE WETLAND PART OF:		
☐ Yes No	A wildlife corridor or 🔀 A habitat island?		
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE?		
Low	Yes No		
IS THE WETLAND IN A 100-YEAR FLOODPLAIN?	ARE VERNAL POOLS PRESENT?		
⊠ Yes □ No	Yes No (If yes, complete the Vernal Pool Table)		
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/		
SYSTEM? Xes No	DOWNGRADIENT? Yes No		
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:		

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of

"Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

Sebbins Brook (BE1, BE2, BE11, BE12, BE13, and BE14)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Floodplain wetlands assessed in Section 6	☐ Yes ☐ No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

Irm@des.nh.gov or (603) 271-2147
NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

Sebbins Brook (BE1, BE2, BE11, BE12, BE13 and BE14)

Page 4 of 5

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LIS	S	LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1						
2						
3						
4						
5						
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	′			
DESCRIPTI	ON OF STREA	M: Sebbins Brook		STRE	AM TYPE (ROSGEN):
	IERIES BEEN D No	OCUMENTED?			S THE STREAM SYSTOR	TEM APPEAR STABLE?
OTHER KEY ON-SITE FUNCTIONS OF NOTE:						
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.						

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NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
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2020-05

PRINCIPAL FUNCTIONS/ SUITABILITY FUNCTION/VALUE? IMPORTANT NOTES **RATIONALE VALUES** (Y/N) (Y/N) Within study area, stream is Yes Yes 1 fragmented by railroad and ⊠ No No. crosses a powerline corridor. No public access and unsafe due Yes l Yes 5 2 to location under rail road and No. \bowtie No steep banks. X Yes Yes Fish have been documented 3 1, 4, 7, 9, 10, 14, 16, 17 No. upstream of study area. No X Yes l Yes 100-year floodplain (Zone AE). 4 7, 8, 9, 10, 13 No No. Limited flood storage due to lack X Yes Yes 5 2, 4, 7, 15 of wetland edge. Sandy soils ⊠ No No present next to stream. No known occurrences of T&E Yes Yes 6 No No No No species Yes Yes Little wetland edge, banks are 7 3, 4, 10 No. No steep. X Yes Yes Stream provides fish habitat and 8 1, 6, 10 ⊠ No wildlife food sources. No Yes Yes 9 6 No public access and unsafe. No. No No Yes Yes Not effective sediment trapping 10 1, 2, 6, 10 No. No. due to lack of vegetation. Indications of erosion are × Yes Yes 11 1, 2, 3, 4, 6, 9 present. Vegetation on banks No. No provides stabilization. Yes Yes Very tall, steep banks and no 2, 22, 23, 30 12 No. No. public access. Yes Yes No recreation opportunities 13 No. No. X Yes X Yes Wildlife habitat potential due to 14 2, 4, 6, 8, 19, 21 forested areas and open water. No No SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10) Wildlife and vegetation diversity/abundance list. Included in Wetland Delineation Report Photograph of wetland. Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans. For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the

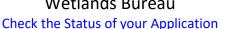
Coastal Area Worksheet (NHDES-W-06-079) for more information.

NHDES-W-06-049 BE15 and BE16



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau





RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the Avoidance and Minimization Written Narrative (NHDES-W-06-089) and the Avoidance and Minimization (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)			
ADJACENT LAND USE: Railroad, undevelop	ped forest, residential		
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Tyes No		
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): <20 feet to railroad		
SECTION 2 - DELINEATION (USACE HIGH)	NAY METHODOLOGY; Env-Wt 311.10)		
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)			
DATE(S) OF SITE VISIT(S): 11/30/21	DELINEATION PER ENV-WT 406 COMPLETED? ☐ Yes ☐ No		
CONFIRM THAT THE EVALUATION IS BASE	ED ON:		
Office and			
Field examination.			
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"):			
USACE Highway Methodology.			
Other scientifically supported method	(enter name/ title):		

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NHDES-W-06-049 BE15 and BE16

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				
WETLAND ID: BE15 and BE16	LOCATION: (LAT/ LONG) 42.92 N/71.45 W			
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: Riverine			
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: R4SB4			
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☑ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?			
if not, where does the wetland lie in the drainage basin? Low	IS THE WETLAND HUMAN-MADE? ☐ Yes ☑ No			
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☑ Yes ☐ No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)			
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? Yes No			
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:			
SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE H	IIGHWAY METHODOLOGY: Env-Wt 311 10)			

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- Flood Storage (from USACE Highway Methodology: Floodflow Alteration) 4.
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE The Highway Methodology Workbook Supplement. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in The Highway Methodology Workbook Supplement, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	Yes No	Refer to Section 6	Yes No	
2	Yes No		Yes No	
3	Yes No		Yes No	
4	Yes No		Yes No	
5	Yes No		Yes No	
6	Yes No		Yes No	
7	Yes No		Yes No	
8	Yes No		Yes No	
9	Yes No		Yes No	
10	Yes No		Yes No	
11	Yes No		Yes No	
12	Yes No		Yes No	
13	Yes No		Yes No	
14	Yes No		Yes No	

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

number are defined in Section 4.

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LIS	RS	LENGTH OF HYDROPERIOD	IMPORTANT NOTES	
1							
2							
3							
4							
5							
SECTION 6	6 - STREAM RE	SOURCES SUMMAR	Υ				
DESCRIPT	ION OF STREAI	M: Intermittent		STRE	EAM TYPE (ROSGEN):	
HAVE FISH		OCUMENTED?			S THE STREAM SYS [*] 'es	TEM APPEAR STABLE?	
OTHER KEY ON-SITE FUNCTIONS OF NOTE: Heavily eroded							
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference							

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www.des.nh.gov

NHDES-W-06-049 **BE15 and BE16**

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES		
1	☐ Yes ☑ No		Yes No	Stream is fragmented by railroad and development and partially located in powerline corridor		
2	Yes No	None	☐ Yes ☑ No	Unsafe due to position next to railroad corridor, no public access		
3	☐ Yes ☑ No	None	Yes No	Intermittent stream not large enough to support fish		
4	Yes No	3, 4, 9, 10, 13	☐ Yes ☑ No	Potential to receive flood waters from the Merrimack River		
5	Yes No	2, 4, 7, 15	Yes No	BE16 may provide some groundwater recharge/discharge but amount is limited		
6	☐ Yes ☑ No	None	☐ Yes ☑ No	No known occurences of T&E species		
7	Yes No	4, 5 (BE16)	☐ Yes ☑ No	No vegetation or slow moving water to retain nutrients		
8	☐ Yes ☑ No	None	☐ Yes ☑ No	Limited production due to extreme erosion and small size		
9	☐ Yes ⊠ No	None	Yes No	Railroad intersects wetlands and there is no public access		
10	Yes No	1, 10 Yes No BE16 is very small and BE banks are not stable or v vegetated				
11	☐ Yes ☑ No	1, 2, 3	☐ Yes ☑ No	BE15 banks are not stable or well vegetated		
12	☐ Yes ☑ No	1	☐ Yes ☑ No	Unsafe due to railroad and no public access		
13	☐ Yes ☑ No	None	☐ Yes ⊠ No	No opportunities for recreation		
14	Yes No	E railroad hut wetlands provide				
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)						
=						
Photograph of wetland.						
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.						
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the						
Coastal Area Worksheet (NHDES-W-06-079) for more information.						

NHDES-W-06-049 ME16



WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management Wetlands Bureau





RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the <u>Coastal Area</u> Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the Avoidance and Minimization Written Narrative (NHDES-W-06-089) and the Avoidance and Minimization (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY	SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)			
ADJACENT LAND USE: Railroad, undevelop	ped forest			
CONTIGUOUS UNDEVELOPED BUFFER ZO	NE PRESENT? Xes No			
DISTANCE TO NEAREST ROADWAY OR OT	HER DEVELOPMENT (in feet): <15 feet to railroad			
SECTION 2 - DELINEATION (USACE HIGH)	WAY METHODOLOGY; Env-Wt 311.10)			
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Jennifer Riordan (CWS #269)				
DATE(S) OF SITE VISIT(S): 11/30/21, 4/12/22	DELINEATION PER ENV-WT 406 COMPLETED? ☐ Yes ☐ No			
CONFIRM THAT THE EVALUATION IS BASE	ED ON:			
☑ Office and				
Field examination.				
METHOD USED FOR FUNCTIONAL ASSESS	MENT (check one and fill in blank if "other"):			
USACE Highway Methodology.				
Other scientifically supported method	(enter name/ title):			

NHDES-W-06-049 ME16

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)			
WETLAND ID: ME16	LOCATION: (LAT/ LONG) 42.81 N/71.48 W		
WETLAND AREA: Unknown	DOMINANT WETLAND SYSTEMS PRESENT: palustrine		
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? Unknown	COWARDIN CLASS: PFO1E		
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☑ Yes ☐ No	IS THE WETLAND PART OF: A wildlife corridor or A habitat island?		
if not, where does the wetland lie in the drainage basin?	IS THE WETLAND HUMAN-MADE? ☐ Yes No		
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☐ Yes No	ARE VERNAL POOLS PRESENT? Yes No (If yes, complete the Vernal Pool Table)		
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? Yes No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/DOWNGRADIENT? Yes No		
PROPOSED WETLAND IMPACT TYPE:	PROPOSED WETLAND IMPACT AREA:		

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

- 1. Ecological Integrity (from RSA 482-A:2, XI)
- 2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
- 3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
- 4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
- 5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
- 6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
- 7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
- 8. Production Export (Nutrient) (from USACE Highway Methodology)
- 9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
- 10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
- 11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
- 12. Uniqueness/Heritage (from USACE Highway Methodology)
- 13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
- 14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

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ME16

				IVIEIO
FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	⊠ Yes □ No		⊠ Yes □ No	Wetland functions as a vernal pool
2	☐ Yes ☑ No	2, 5	☐ Yes ☑ No	Wetland is undisturbed but unsafe location next to railroad
3	☐ Yes ☑ No	1	☐ Yes ☑ No	Not associated with a watercourse
4	∑ Yes ☐ No	6, 7, 9,15	☐ Yes ☑ No	Ponded water present
5	∑ Yes ☐ No	2, 10, 15	☐ Yes ☑ No	Ponded water, signs of variable water levels
6	☐ Yes ☑ No	None	☐ Yes ⊠ No	Wetland is not known to contain T&E species
7	☐ Yes ☑ No	2, 5	☐ Yes ☑ No	Slow moving water but vegetation is sparse
8	∑ Yes ☐ No	4	☐ Yes ☑ No	Wood frog egg masses observed
9	☐ Yes ☑ No	8, 12	☐ Yes ☑ No	Undisturbed but no public access
10	☐ Yes ☑ No	3, 5	☐ Yes ☑ No	Slow moving open water but limited retention
11	☐ Yes ☑ No	None	☐ Yes ☑ No	Not associated with a watercourse
12	☐ Yes ☑ No	17	☐ Yes ☑ No	Not unique to the area and no public access
13	Yes No	5	☐ Yes ☑ No	No recreation opportunities; wetland is small and access is restricted
14	⊠ Yes □ No	4, 5, 7, 8, 9, 18, 20	⊠ Yes □ No	Undistrubed and located in a large undeveloped forest. Includes a vernal pool

ME16

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDAR INDICATOR PRESENT (LI:	RS	LENGTH OF HYDROPERIOD	IMPORTANT NOTES		
1	4/12/2022	Wood Frog					Early July - early September (approximate)	12 wood frog egg masses observed during April site visit
2								
3								
4								
5								
SECTION 6	5 - STREAM RE	SOURCES SUMMARY	Y					
DESCRIPTI	ON OF STREA	M:		STRE	AM TYPE (ROSGEN):		
HAVE FISHERIES BEEN DOCUMENTED? Yes No				DOES THE STREAM SYSTEM APPEAR STABLE? Yes No				
OTHER KEY ON-SITE FUNCTIONS OF NOTE:								
The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.								

ME16

			ı				
FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES			
1	Yes No		Yes No				
2	Yes No		Yes No				
3	Yes No		Yes No				
4	Yes No		Yes No				
5	Yes No		Yes No				
6	Yes No		Yes No				
7	Yes No		Yes No				
8	Yes No		Yes No				
9	Yes No		Yes No				
10	Yes No		Yes No				
11	Yes No		Yes No				
12	Yes No		Yes No				
13	Yes No		Yes No				
14	Yes No		Yes No				
SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)							
Wildlife and vegetation diversity/abundance list.							
Photograph of wetland.							
Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and							
surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.							
For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the							
Coastal Area Worksheet (NHDES-W-06-079) for more information.							

Wetland Function-Value Evaluation Form

Total area of wetland <u>Unknown</u> Human made? <u>Yes</u> Developed (Pheasant Lane I Adjacent land use <u>undeveloped fields</u>	Wetland I.D. TY9 Latitude 42.69 N Longitude 71.43 W Prepared by: MG & JR Date 11/22/21 Wetland Impact:						
Dominant wetland systems present_PEM1/SS/FC Is the wetland a separate hydraulic system?_No How many tributaries contribute to the wetland?_U	TypeArea						
Function/Value	Y / N	(Reference #)* F	uncti		omments		
Groundwater Recharge/Discharge	N	1, 2, 7		Water comes from storm water the Merrimack River.	runoff and drains into		
Floodflow Alteration	Υ	1, 3, 4, 5, 6, 7, 8, 9, 16, 18	X	TY9 has space to hold excess floodwater			
Fish and Shellfish Habitat	N	None		Culverts block fish passage on	inlet and outlet of wetland		
Sediment/Toxicant Retention	Υ	1, 2, 3, 5, 10, 11, 12, 13, 15, 16	X	Water is fed into a large, emergent wetland with thick vegetation and deep water			
Nutrient Removal	Y 1, 2, 3, 4, 5, 8, 9, 10, 11, X Dense vegetation and ponded water present 13, 14				water present		
Production Export	Υ	1, 7, 8, 10		High vegetation density and water flows to Merrimack River			
Sediment/Shoreline Stabilization	N	3		Wetland is not associated with	a stream or waterbody		
W ildlife Habitat	Y	7, 8, 9, 13, 15, 21		Wetland has open water and ur	ndeveloped fields on one side		
Recreation	N	None		No recreation opportunities. Ac	cess is rescricted		
Educational/Scientific Value	N	None		Disturbed and no safe access			
★ Uniqueness/Heritage	N	1, 3, 4, 6		Large, open water wetland but not unique to the area and no access			
Visual Quality/Aesthetics	N	6		Development nearby, trash present, and no public access			
ES Endangered Species Habitat	N	None		No records of threatened or endangered species			
Other							

Notes:

Wetland Function-Value Evaluation Form

					Wetland I.D. TY10
Total area of wetland Unknown Human made? Yes	Is wetlan	nd part of a wildlife corridor	?_No	or a "habitat island"? Yes	Latitude 42.68 N Longitude 71.41 W
Adjacent land use Roadway, farm, railroad		Distance to nearest ro	oadway or	other development<15 feet to road	Prepared by: MG Date 12/3/21
Dominant wetland systems present_palustrine		Contiguous undevel	oped buffe	er zone present_No	Wetland Impact: TypeArea
How many tributaries contribute to the wetland? 1	Suitability Rationale Principal			Evaluation based on: Office X Field X Corps manual wetland delineation completed? Y X N	
Function/Value	Y / N	(Reference #)*	Funcii	on(s)/Value(s) Co	omments
✓ Groundwater Recharge/Discharge	Yes	2, 7, 9, 15		Wetland shows signs of varying	water levels but is fed by a stream
Floodflow Alteration	No	7, 13		Small ponded area with limited f	lood storage potential
Fish and Shellfish Habitat	No	None		Pond is not large enough to sup	port fish
Sediment/Toxicant Retention	Yes	2, 5, 10, 12		Sediment and toxins may settle	out in the pond
Nutrient Removal	Yes	2, 3, 4, 5		Nutrients may settle out in the p	ond
→ Production Export	No	None		No evidence of production expo	rt
Sediment/Shoreline Stabilization	No	None		Wetland does not border a water	rcourse
W ildlife Habitat	Yes	5, 7, 9		Wildlife potential in farm	
Recreation	No	None		No recreational opportunites	
Educational/Scientific Value	No	None		Unsafe location next to railroad	and River Road
★ Uniqueness/Heritage	No	None		Small and not unique to the area	ı
Visual Quality/Aesthetics	No	None		Restricted access	
ES Endangered Species Habitat	No	None		No known records of threatened	or endangered speceis
Other					

Notes:

APPENDIX C

ACOE Vernal Pool Characterization form

US Army Corps of Engineers - New England District DRAFT Vernal Pool Characterization Form

Project File #	Project Name Nashua-Manc	hastar 10212			Do al	UD \/P-ME16	
Project File #	1163(6) 40010	ster 40818 Pool ID VP-ME16 Phone or E-mail jriordan@gm2inc.com					
Landowner/Applicant_NHDOT		Phone or E-mail 603-271-3734					
Address 7 Hazen Drive		City <u>Conco</u>	<u>rd</u>		_State_NH_	Zip <u>03301</u>	
Location of vernal pool: City/Sta	te Merrimack, NH						
Survey date(s) 4/12/2022	egrees) 71.480 W, 42.817	N					
Longitude/ Lutitude (maccimare	<u> </u>	.,					
A. VERNAL POOL CHARACTER 1. Landscape setting (check a	RISTICS (fill in all information k Il that apply):	nown):					
Upland depression (4 pts; if	this is also in a floodplain, use 2 p	ots)		X Pool part o	f wildlife corrido	or (4 pts)	
Pool part of a pool complex (within 1000 feet of one or more	other vernal poo	ls) (N	IA)			
☐ Pool within larger wetland sy	stem (4) ts; if this is also in a flo	odplain, use 2 pts	;)	Other:		(variable pts)	
2. Vernal pool condition:		, ,	,			,	
-	ns to the pool and associated lar	decano: No re	ecer	nt modification	s: pool is loca	ated next to	
Describe any recent mounication	nis to the poor and associated iar	. шэсарс.	Annual Rape: No recent modifications; pool is located next to a railroad and is part of a larger wetland system				
3. Parent material:				•			
Glacial fluvial ("outwash")	☐ Loose till			☐ Peat			
	☐ £6656 tiii				rine sediments		
Dense till	best applies to this pool (choo	sa daminant).		Coastai illa	illie seuillielits		
	best applies to this pool (choo	se dominant).					
Forested wetland (4 pts)	Herbaceous wetlan	d (4 pts)		Floodplain	(overflow/oxbo	w) (3 pts)	
Shrub wetland (4 pts)	Open water (2 pts)			Other:		_(variable points)	
Peatland (acidic fen or bog)	(4 pts)	n reach (2 pts)					
5. Pool canopy cover (%) : <u>8</u>	0%						
6. Predominant substrate:							
X Mineral soil							
Organic matter (peat/muck)	Depth Sampling	location (e.g. de	enes	st zone edge etg	-)		
7. Poolsize:		Tocation (e.g., ac	СРСЗ	it zone, eage, etc	··)	_	
	oool (at maximum capacity; inclu	deunits): Le	ngth	40 feet	Wid	th 30 feet	
a. Approximate annensions of p	oor (at maxima meapacity) meia	· ·	_	1,200 SF			
	point at time of survey (include u	nits): <u>3 feet - 4</u>	/12/	22			
8. Hydrology:							
a. Estimated hydroperiod (unless species to best predict the expe	s actual, observed hydroperiod vected hydroperiod of the pool):	value(s) is(are) kn	own,	, use the presen	ce of these exan	nple indicator	
Dries between early March a	ind early July (e.g., <i>Thelypteris pal</i>	ustris, Carex strict	a, Im	npatiens capensis	, Ilex verticillata)	(6 pts)	
X Dries between early July and	early September (e.g., Sagittaria	latifolia, Scirpus	cyper	rinus, Dulichium (arund., Cephalar	nthus occ.) (8 pts)	
☐ Dries between early Septem	per and early November (e.g., <i>Ele</i>	ocharis palustris,	Glyce	eria cana., Utricu	laria spp., Decoa	lon vert.) (8 pts)	
	per and late December, or interm	•	-				
b. Inlet/outlet (pick one):	ser and face becomber, or mem	intentity exposed	(C.B.,	, reapriar spp., re	tumogeton spp.	, (2 pts)	
▼ No inlet/outlet (8 pts)	Permanent inlet	or outlet (channe	l wit	h well-defined b	anks and perma	nent flow) (2 pts)	
☐ Temporary inlet/outlet (6 pt	s)						
9. Water quality:							
	☐ High turbidity	☐ High algae o	onte	ent N	▼ Tannic		
		man digue (5.110		Y Tarring		

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TOTAL for Pool Characteristics (out of 28 max.)

B. VERNAL POOL ENVELOPE (100 ft) AND CRITICAL HABITAT	AREA (100-750 ft) CHARACTERISTICS (fill)	in all information known):		
1. Landuse type and approximate percentage within the 100)-ft vernal pool en	velope:			
X Forested 85 % (16 pts) Deen (e.g., meadow, agriculture, golf course) 9					
☐ Shrub% (10 pts)	Developed		<u>15</u> % (0 pts)		
$2. \ Landuse type and approximate percentage within the {\bf 100} \\$	0 - 750-ft vernal po	ool critical terrestrial hab	oitat:		
∑ Forested 95 % (16 pts) ☐	Open (e.g., agricul	lture, golf course)			
Shrub% (10 pts) X					
Are there one or more barriers to vernal pool fauna moveme and see directions for explanation of how to incorporate this		ope and/or critical terrest	rial habitat? If so, check here		
Based on: Field estimate	GIS	X Aerial photo estima	te		
28.8 TOTAL for Pool Envelope and Critical Terres	trial Habitat Area	(out of 32 max.)			
C. SPECIES PRESENT IN VERNAL POOL					
INDICATOR SPECIES	DATE	EGG MASSES (#)	TADPOLES/LARVAE		
Wood Frog (Lithobates sylvaticus)	4/12/22	12			
Spotted Salamander (Ambystoma maculatum)					
Blue-spotted Salamander (<i>Ambystoma laterale</i>)					
Jefferson's Salamander (<i>Ambystoma jeffersonianum</i>)					
Marbled Salamander (<i>Ambystoma opacum</i>)					
Fairy Shrimp (<i>Eubranchipus</i> spp.)		PRESENT/ABSENT	ABUNDANCE:		
OTHER SPECIES	DATE	PRESENCE/ABSENCE	FEW/COMMON/MANY		
Facultative Species (e.g., Spring Peeper (<i>Pseudacris crucifer</i>), Gray Tree Frog (<i>Hyla versicolor</i>), Caddisflies (Limnephilidae, Phryganeidae), American Toad (<i>Anaxyrus americanus</i>), Eastern Spadefoot Toad (<i>Scaphiopus holbrookii</i>), Fowler's Toad (<i>Anaxyrus fowleri</i>), Fingernail Clams (Sphaeriidae, Pisidiidae))(list):					
Rare Species (list):					
Predator Species (e.g., Bullfrog/Green frog tadpoles, Fish) (list)):				
Other species (e.g., Ducks, Turtles, etc.)(list): <u>Water strider</u>	4/12/22	Present	Few		
Presence of Indicator Species	X Yes	□ No			
SUMMARY: 28TOTAL for Pool Characteristics28.8	_ TOTAL for Po	ool Envelope and Critica	l Terrestrial Habitat Area		

Other comments (append photographs, additional notes, sketch of pool and surrounding landscape):